Foreword

Congratulations for choosing this KAWASAKI Motorcycle, which has been developed through Kawasaki engineering to produce a light weight, high performance machine with superb handling and stability for racing and sporting use.

Your new KX250 is a highly tuned production racer, and thus does not require tuning modification for participation in racing events. However, as with any mechanical device, proper care and maintenance are important for trouble-free operation and top performance. This guide is written to enable you to keep your KX250 properly tuned and adjusted.

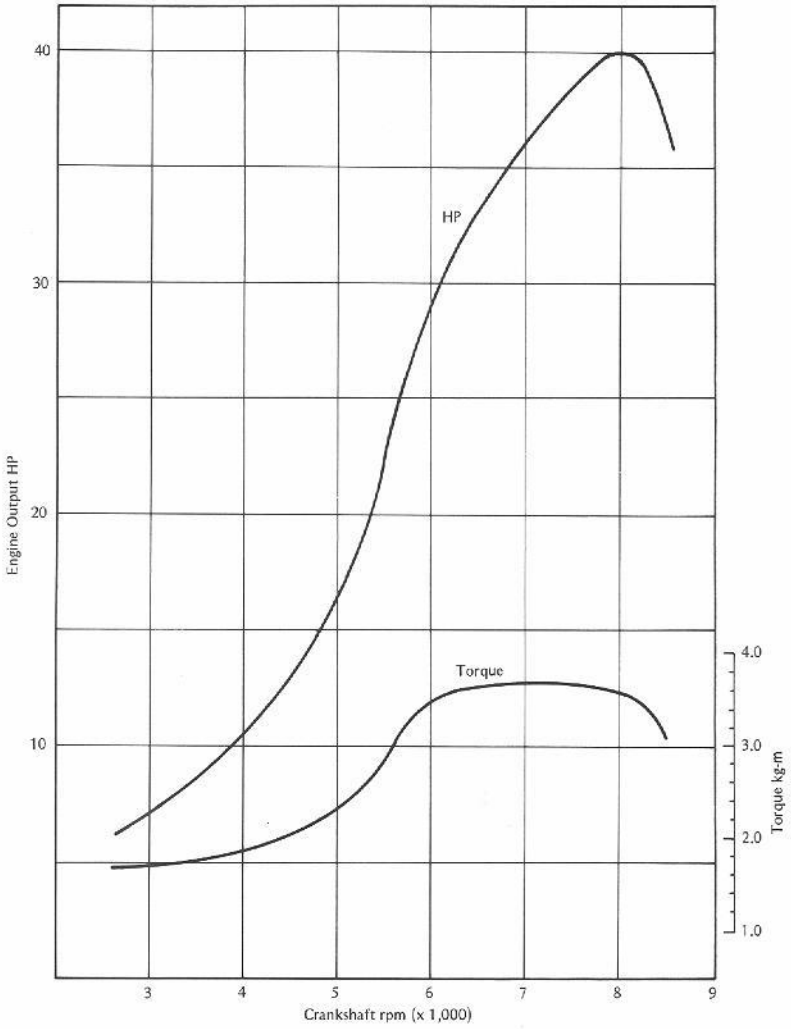
Table of Contents

Specifications

Dimensions		
Overall length		2,120 mm (83.5 in)
Overall width		940 mm (37.0 in)
Overall height		1,185 mm (46.7 in)
Wheelbase		1,415 mm (55.7 in)
Road clearance		300 mm (11.8 in)
Dry weight		94 kg (207 lbs)
Fuel tank capacity		8 ℓ (2.1US gal)
Engine		
Type		2 stroke, single cylinder, piston read valve
Bore and stroke		70 x 64.9 mm (2.76 x 2.56 in)
Displacement		249 cc (15.19 cu in)
Compression ratio		7.6:1
Maximum horsepower		40 HP @6,500 rpm
Maximum torque		3.7 kg-m @7,000 rpm (26.8 ft-lbs @7,000 rpm)
Port timing		
Intake	Open	
	Close	
Scavenging	Open	63° BBDC
	Close	63° ABDC
Exhaust	Open	93° BBDC
	Close	93° ABDC
Carburetor		Mikuni VM38SS
Lubrication system		Petrol mix (20:1)
Starting system		Primary kick
Ignition system		Electronic CDI
Ignition timing		BTDC 20.5°/6,000 rpm
Spark plug		NGK B9EV
Reed valve		Eyvind Boyesen's valve (Patent No. 3905340, 3905341, 4000723)
Transmission		
Type		5 speed, constant mesh, return shift
Clutch		Wet multi disc
Gear ratio:	1st	2.33 (28/12)
	2nd	1.73 (26/15)
	3rd	1.41 (24/17)
	4th	1.16 (22/19)
	5th	1.00 (20/20)
Primary reduction ratio		2.68 (59/22)
Final reduction ratio		3.57 (50/14)
Overall drive ratio		9.58 (5th)
Transmission oil:	capacity	1.0 ℓ (1.1 US qt)
	type	SE class SAE10W30 or 10W40
Frame		
Type		Tubular, semi double cradle
Steering angle		45° to either side
Castor		60°
Trail		130 mm (5.1 in)
Tire size:	Front	3.00-21 4PR
	Rear	5.00-18 4PR
Suspension:	Front	Telescopic fork
	Rear	Swing arm
Suspension stroke:	Front	235 mm (9.3 in)
	Rear	137 mm (5.3 in)
Front fork oil (per shock absorber)		KYB G-10 or SAE 10W 270 cc (9.1 US fl oz)
Brakes		
Inside diameter:	Front	140 x 28 mm (5.5 x 1.1 in)
	Rear	150 x 28 mm (5.9 x 1.1 in)

Specifications subject to change without notice.

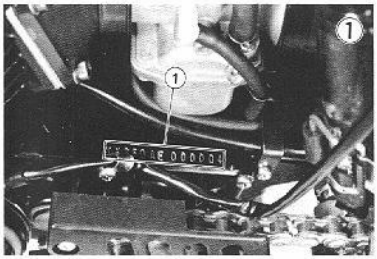
Engine Performance Curves



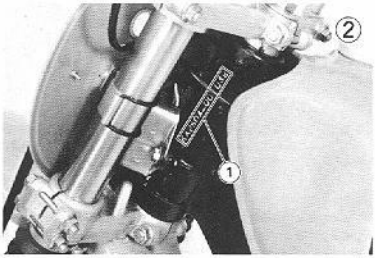
General Information

SERIAL NUMBER LOCATIONS

The frame and engine serial numbers are the only means of identifying 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 will require both numbers as well as the model type and any peculiar features of your machine that can help them identify it.



1. Engine Number



1. Frame Number

FUEL

The fuel is a mixture of gasoline and oil.

Gasoline	High Octane Gasoline
Recommended Oil	Two Stroke Racing Oil
Mixture Ratio	20 : 1

Thoroughly mix the gasoline and oil.

NOTES: ○The lubricative quality of this mixture deteriorates rapidly; use a fresh mixture for each day of operation.

○Do not mix a vegetable oil with a mineral oil.

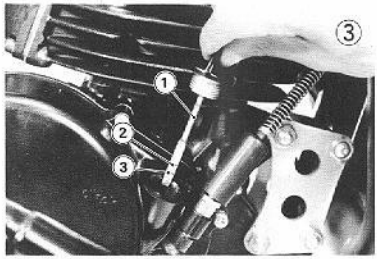
TRANSMISSION OIL

In order 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.

Oil Level

Check the oil level with the dipstick on the oil filler plug. When checking the oil, position the vehicle so that it is fully perpendicular to the ground.

- Remove the dipstick, and wipe off any oil.
- Insert the dipstick without screwing it in, and then remove it. The oil should be between the dipstick marks.



1. Dipstick
2. Upper Level Mark
3. Lower Level Mark

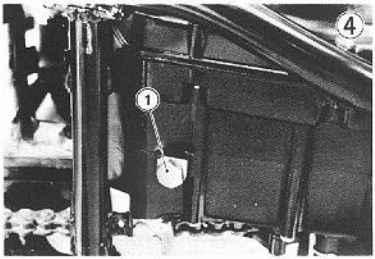
- If there is too much oil, remove the excess oil with a syringe or some other suitable device.
- If there is too little oil, add the correct amount of oil through the oil filler plug. Fill with the same type and make of oil that is already in the transmission.
- Install the dipstick making sure that the O ring is in place and that the dipstick is fully screwed in.

Oil Change

The transmission oil should be changed after break-in and after every 5th race.

- Warm up the engine thoroughly so that the oil will pick up any sediment and drain easily.
- Stop the engine, and place an oil pan beneath the engine.

•Remove the drain plug and position the vehicle so that it is fully perpendicular to the ground to allow all the oil to drain out.

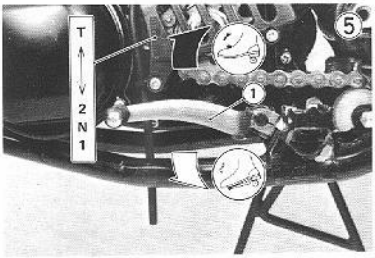


1. Drain Plug

•Install the drain plug with its gasket, tightening it to 1.3 kg-m (9.5 ft-lbs) of torque.
•Remove the oil filler plug, and pour in 1 liter (1.1 US qt) of fresh transmission oil.
•Check the oil level, after kicking the kick pedal 3~4 times.
•Install the oil filler plug with its O ring.

TRANSMISSION

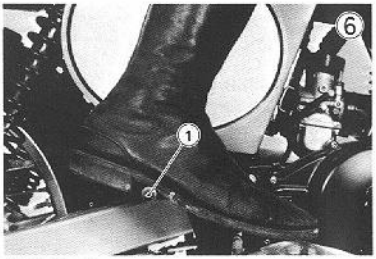
The transmission is a 5 speed, return shift type. Neutral is located between 1st and 2nd gears; 1st gear is reached by shifting down from neutral, and 2nd through 5th gears are reached by shifting up from neutral. The shift pattern is shown on the engine sprocket cover.



1. Shift Pedal

KICK PEDAL

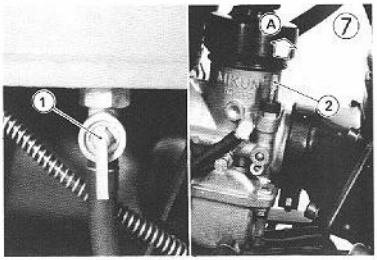
Since the starter is a primary kick type, the engine can be started even if the transmission is in gear, by pulling in the clutch lever and kicking the engine over.



1. Kick Pedal

STARTING THE ENGINE

•Turn the fuel tap to **ON**.
•If the engine is cold, pull up the choke plunger, leaving the throttle closed.



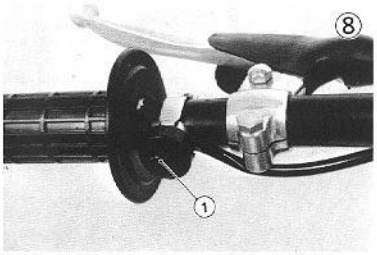
1. Fuel Tap
2. Choke Plunger **A. Pull up**

•Kick the engine over.
•Even after the engine starts, keep the choke plunger pulled up. When the engine is warm enough, push down the choke plunger.

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 still 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.



1. Engine Stop Button

- Turn the fuel tap to the **OFF** (Stop) position.

BREAK-IN

To obtain the proper operating clearance in the engine and transmission that are necessary for smooth engine performance, 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 and if necessary, adjust chain slack and spoke tightness.
- The slow riding necessary during the break-in period may cause carbon to build up on the spark plug and foul it. If inspection of the spark plug shows this to be the case, replace the standard **NGK B9EV** with an **NGK B8EV** for the duration of the break-in period.
- 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 in the power band and rpm range for which it was designed.

NOTE: After break-in install a new **NGK B9EV** spark plug, and change the transmission oil.

Inspection and Adjustment

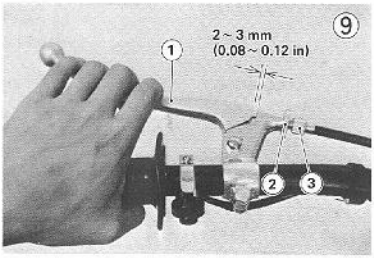
CLUTCH

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 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.

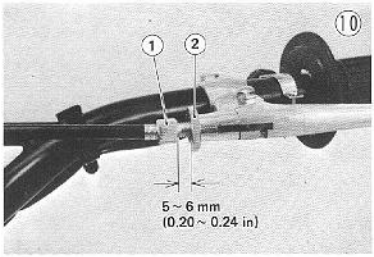


1. Clutch Lever **3. Adjuster**
2. Knurled Locknut

- Slide back the clutch lever dust cover.

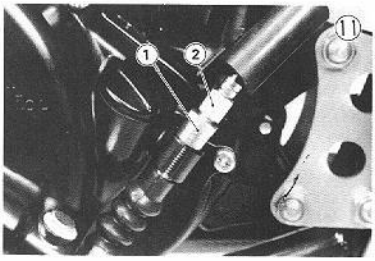
If the adjuster at the clutch lever has reached its limit, adjust the cable with the adjuster on the right engine cover.

- 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 a 5~6 mm (0.20~0.24 in) gap between the adjuster and locknut.



1. Adjuster **2. Knurled 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 adjuster at the bottom of the cable, and then tighten the locknut.



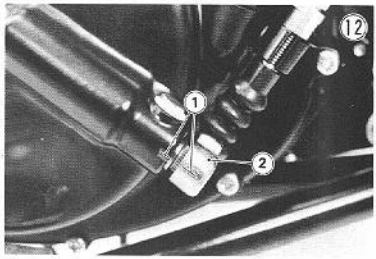
1. Locknut **2. Adjuster**

- 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

If the clutch slips or the action at the lever feels heavy despite proper clutch cable adjustment, inspect and adjust the clutch release mechanism in the following manner.

- Loosen the locknut at the bottom of the clutch cable, and screw in the adjuster to give the cable plenty of play.
- Turn the clutch release lever until it becomes hard to turn, this is the point where the clutch is just starting to release. Check that the mark on the clutch release lever is align with the mark on the right engine cover.



1. Marks **2. Clutch Release Lever**

Inspection and Adjustment

CLUTCH

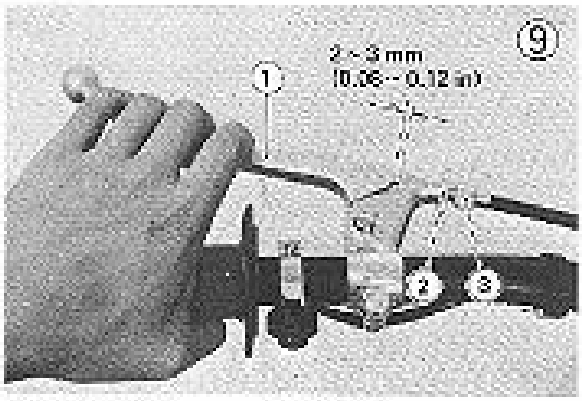
Clutch Lever

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 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.

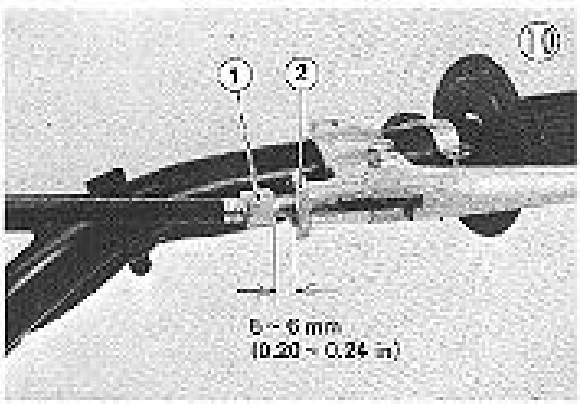


1. Clutch Lever
2. Knurled Locknut
3. Adjuster

*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 right engine cover.

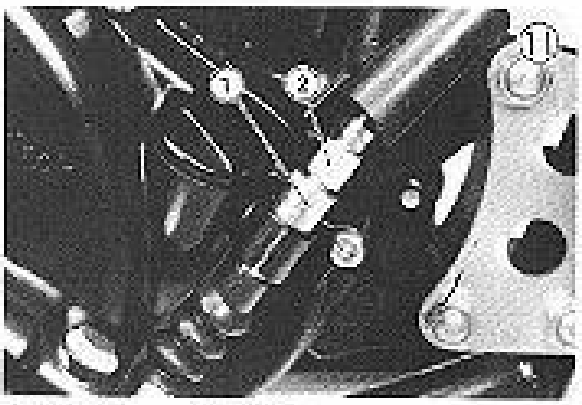
*Loosen the knurled locknut at the clutch lever just enough so that the adjuster will turn freely, and then turn the adjuster so that there is a 5~6 mm (0.20~0.24 in) gap between the adjuster and locknut.



1. Adjuster
2. Knurled 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 adjuster at the bottom of the cable, and then tighten the locknut.



1. Locknut
2. Adjuster

*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.

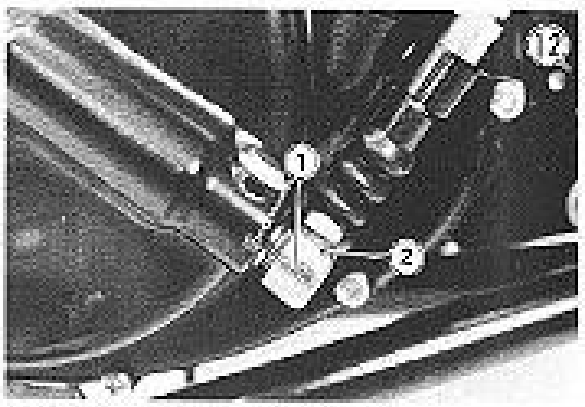
*Slide back the clutch lever dust cover.

Clutch Release Lever

If the clutch slips or the action of the lever feels heavy despite proper clutch cable adjustment, inspect and adjust the clutch release mechanism in the following manner.

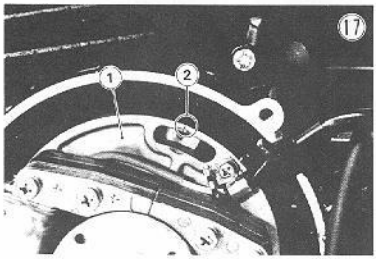
*Loosen the locknut at the bottom of the clutch cable, and screw in the adjuster to give the cable plenty of play.

*Turn the clutch release lever until it becomes hard to turn, this is the point where the clutch is just starting to release. Check that the mark on the clutch release lever is align with the mark on the right engine cover.



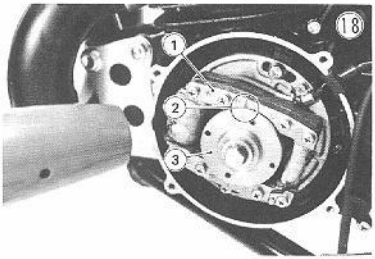
1. Marks
2. Clutch Release Lever

if there is any doubt as to the timing, inspect and adjust, if necessary, as follows:
- Remove the magneto cover.
- Check to see if the mark on the crankcase is aligned with the mark on the magneto stator.
- If the marks are not aligned, loosen the magneto stator screws, move the magneto stator to where the marks will be aligned, and tighten the screws.



1. Magneto Stator 2. Marks

If a strobe light and an electric or hand tachometer are available, a dynamic inspection of ignition timing can be made.
- Remove the magneto cover, and connect the strobe light and tachometer in the manner prescribed by the manufacturer.
- Start the engine and set the engine speed at 6,000 rpm.
- Direct the light at the timing marks on the rotor and coil. The marks should align at 6,000 rpm.



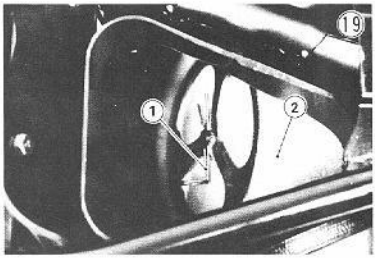
1. Coil 3. Magneto Rotor
2. Timing Marks

- If they do not, stop the engine.
- Loosen the magneto stator screws, and then turn the magneto stator to adjust the timing.
- Tighten the magneto stator screws securely.

AIR CLEANER

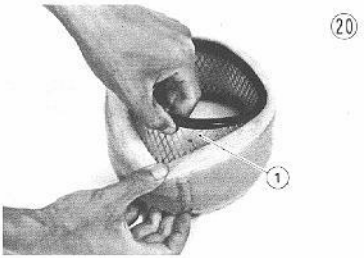
A clogged air cleaner restricts the engine's air intake, increasing fuel consumption reducing engine power, and causing spark plug fouling.

Inspect the element without fail before and after each racing or practice session, and clean it if necessary.
- Remove the right side cover, and pull out the clip.



1. Clip 2. Air Cleaner Element

- Take out the element, and then remove the element from the wire frame.



1. Wire Frame

- Tape up the air cleaner intake, or stuff rags into it, so that no dirt is allowed to enter the carburetor.
- Clean the element in a bath of a high flash-point solvent, and squeeze it dry.
- After cleaning, saturate the element with SE class SAE 30 oil, squeeze out the excess, then wrap it in a clean rag and squeeze it as dry as possible. Be careful not to tear the element.

NOTE: Replace the element after cleaning it 5 times or if it is damaged.

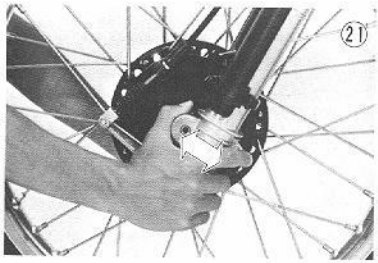
CAUTION
- **Clean the element in a well-ventilated area, and take ample care that there are no sparks or flame anywhere near the working area.**
- **Because of the danger of highly flammable liquids, do not use gasoline or a low flash-point solvent to clean the element.**
- **A break in the element material or damage to the air cleaner tube will allow dirt and dust to pass through**

into the carburetor and eventually damage the engine. If any part of the element is damaged, the element must be replaced.

STEERING

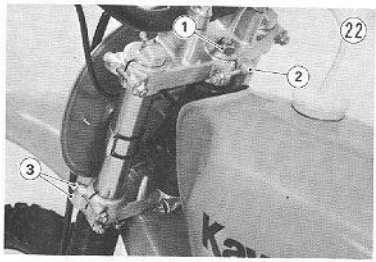
For safety, the steering should always be kept adjusted so that the handlebar will turn freely but not have excessive play.

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. Squatting 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.



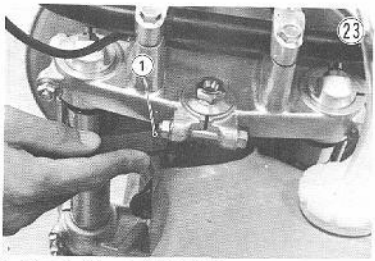
If the steering needs adjusting:

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



1. Stem Head Bolt
2. Clamp Bolt
3. Front Fork Lower Clamp Bolts

- Loosen the four front fork lower clamp bolts.
- Turn the steering stem locknut with the stem nut wrench to obtain the proper adjustment.



1. Stem Nut Wrench (57001-321)

- 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.

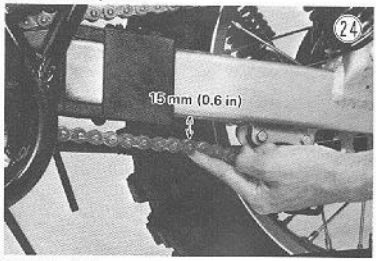
DRIVE CHAIN

The drive chain must be kept properly adjusted for safety and to prevent excessive wear. If the chain becomes badly worn or maladjusted – either too loose or too tight – the chain could jump off the sprockets or break.

WARNING **A jumped or broken chain could snag on the engine sprocket or lock the rear wheel, severely damaging the motorcycle and causing it to go out of control.**

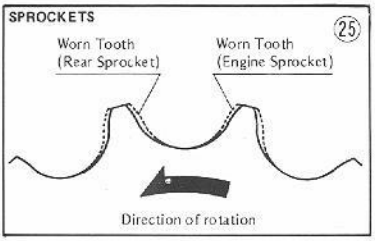
Inspection

With the motorcycle on the side stand, push up the drive chain in the middle of the lower run to measure the chain play. The space between the chain and swing arm should be 15 mm (0.6 in). Rotate the rear wheel around to find the place where the chain is tightest (because it wears unevenly). If the space is less than 10 mm (0.4 in) or more than 15 mm (0.6 in), the chain should be readjusted.



1. Swing Arm

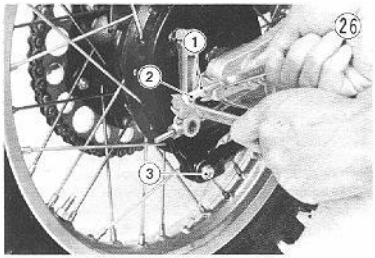
In addition to checking the slack, rotate the rear wheel to inspect the drive chain and sprockets for damaged rollers, loose pins and links, unevenly or excessively worn teeth, and damaged teeth.



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

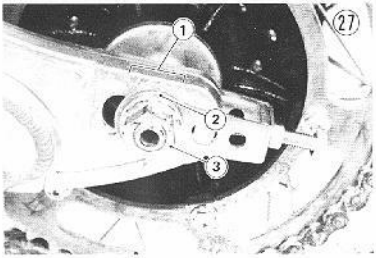
Adjustment

- Loosen the torque link rear bolt.
- Loosen both the chain adjuster locknuts, holding the chain adjusting bolt with on open end wrench.



1. Locknut
2. Chain Adjusting Bolt
3. Torque Link Bolt

- 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 notch on the left chain adjuster should align with the same swing arm mark that the right chain adjuster notch aligns with.



1. Marks
2. Notch
3. Axle Nut

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 tightening the axle lightly, spinning the wheel, and depressing the brake pedal forcefully. 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.
- Tighten the torque link rear nut to 3.0 kg-m (22 ft-lbs) of torque.

WARNING **If the axle and torque link nuts are not correctly tightened, an unsafe riding condition may result.**

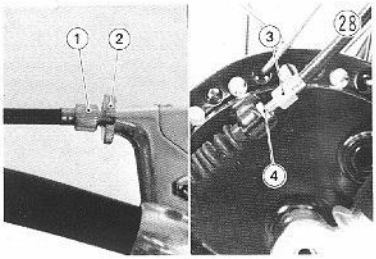
- Check the rear brake adjustment (Pg. 13).

NOTE: IN wet and muddy conditions, mud sticks to the chain and sprockets resulting in an overly tight chain, and the chain may break. To prevent this, adjust the chain to 5 mm (0.2 in) of space between the chain and swing arm whenever necessary.

BRAKES

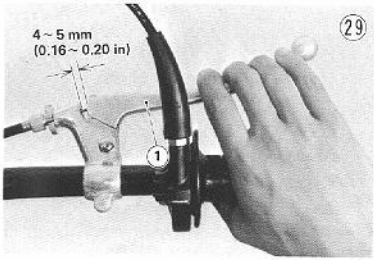
Front Brake Lever

- Slide the front brake lever dust cover out of place.
- Loosen the knurled locknut at the front brake lever, screw the adjuster fully in, and tighten the locknut.
- Slide up the dust cover, and loosen the locknut at the lower end of the brake cable.



1. Adjuster
2. Knurled Locknut
3. Adjuster
4. Locknut

- 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.



1. Front Brake Lever

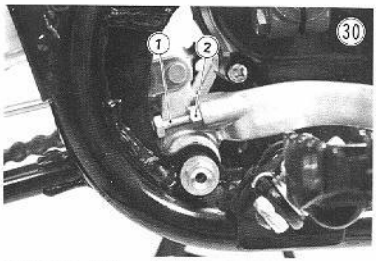
- If sufficient adjustment cannot be made with the adjuster, complete the adjustment with the adjuster at the brake lever, and then tighten the locknut.
- Check for brake drag.
- Check braking effectiveness.
- Slide the dust covers back into place.

NOTES: ○For minor corrections while riding, 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.

Rear Brake Pedal

Brake Pedal Position

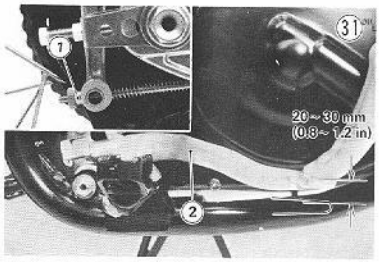
Adjust the rear brake pedal position to suit you. To adjust the pedal position, loosen the locknut, turn the adjusting bolt, and then tighten the locknut.



1. Adjusting Bolt 2. Locknut

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.

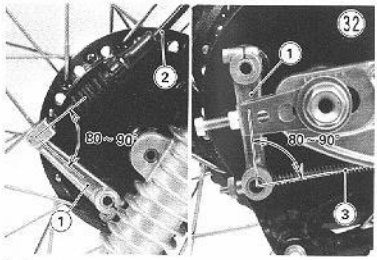


1. Adjusting Nut 2. Rear Brake Pedal

- 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.



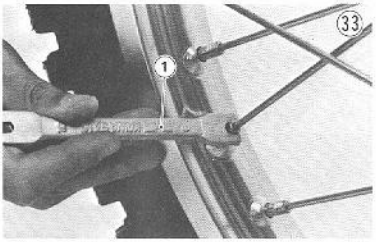
1. Cam Lever 2. Brake Cable 3. Brake Rod

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.**

WHEELS

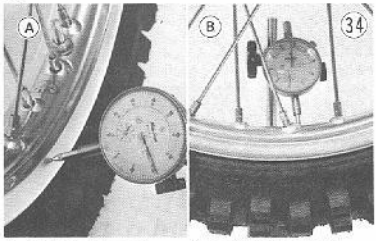
Spokes and Rims

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.



1. Spoke Wrench

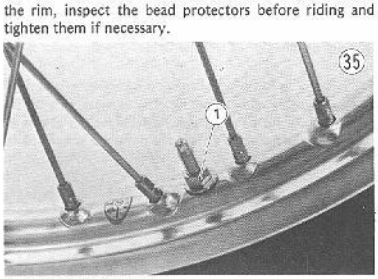
The axial rim runout should be under 3 mm (0.12 in), and the radial rim runout should be under 2 mm (0.08 in).



A. Axial Rim Runout B. Radial Rim Runout

Bead Protectors

There is a bead protector on the front wheel and two 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, necessitating tube replacement. In order that the tire and tube will remain fixed in their position on the rim, inspect the bead protectors before riding and tighten them if necessary.



1. Bead Protector Nut

REAR SHOCK ABSORBERS

The rear shock absorbers can be adjusted to one of 3 positions to suit riding conditions.

To adjust the shock absorbers; first push down the cushion spring, and then move the circlip to suit riding condition.

1. Circlip

WARNING

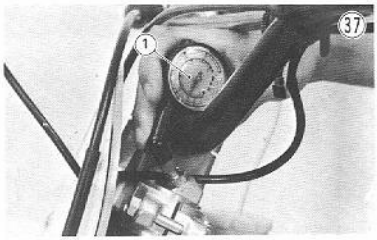
○If the rear shock absorbers are not adjusted equally, handling may be impaired.
○Since the shock absorber contains nitrogen gas, do not incinerate or disassemble the shock absorber.
○Before rear shock absorber is scrapped, open the hole on the point about 5 mm (0.2 in) up from the bottom of the nitrogen reservoir, and release the nitrogen gas completely. At this time, be sure to wear the eye protection.
○Do not unbolt the rear shock absorber hose locknuts.

FRONT FORK

The condition of the front fork is very important for steering stability, and front fork performance is dependent on front fork oil viscosity, quantity, quality, and front fork air pressure.

Alteration of the stiffness or softness of the shock absorption can be achieved by using fork oil of a different viscosity or changing the fork air pressure. If 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.
- The standard air pressure is 1.2 kg/cm^2 (17 psi). Adjust the shock absorption to suit your preference under special conditions.



1. Air Pressure Gauge

NOTE: ○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.

WARNING

○Use only air or nitrogen gas.
○Do not incinerate the front fork.

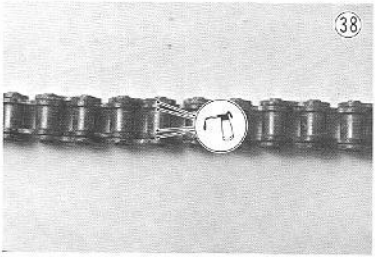
General Lubrication

Lubricate exposed parts subject to rust with SAE 30 motor oil or regular grease after each race or practice session.

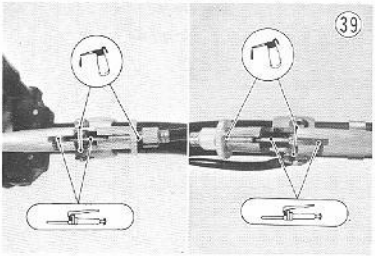
Before lubricating each part, clean off any rust with rust remover. Badly rusted nuts, bolts, etc. should be replaced.

LUBRICATION BEFORE AND AFTER EACH EVENT

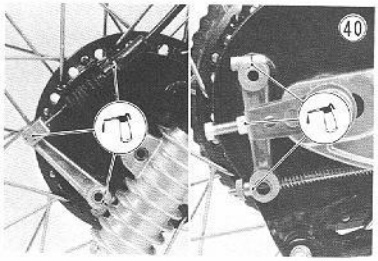
Drive Chain (Use SAE 90 oil)



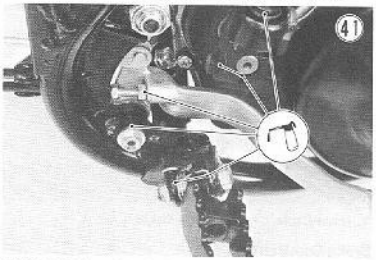
Clutch Lever and Brake Lever



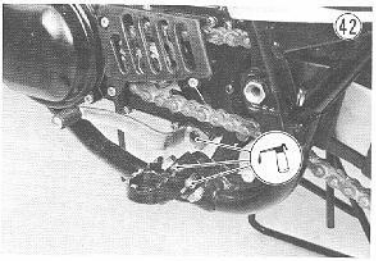
Brake Cam Levers



Kick Pedal, Brake Pedal, and Right Footpeg



Shift Pedal and Left Footpeg

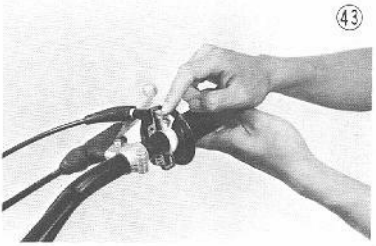


LUBRICATION BEFORE AND AFTER COMPETITION

In addition to the points above, apply oil or grease to the following.

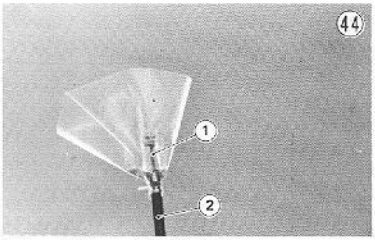
Throttle Grip

Remove the throttle grip housing screws. Apply a light coat of grease to the exposed portion of the throttle grip inner cable.



Clutch, Brake, Throttle Cables

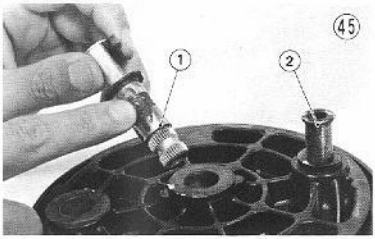
Lubricate the clutch cable, throttle cable, and the front brake cable as shown.



1. Inner Cable 2. Outer Cable

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.



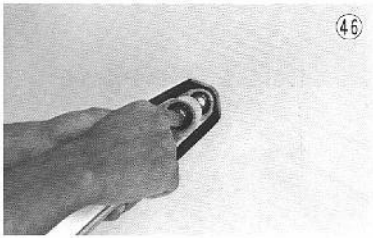
1. Brake Camshaft 2. Anchor Pin

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

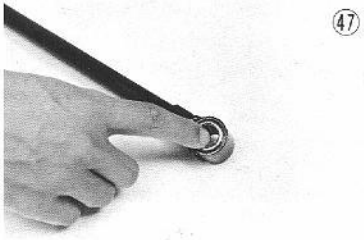
LUBRICATION AFTER 5 COMPETITIONS

In addition to the points above, apply grease to the wheel bearings (Pg. 36), stem bearings (Pg. 39), and following.

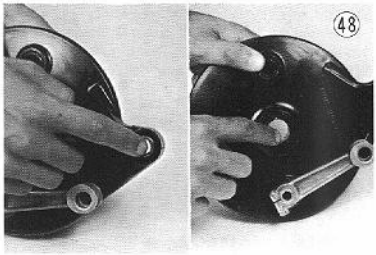
Swing Arm



Torque Link

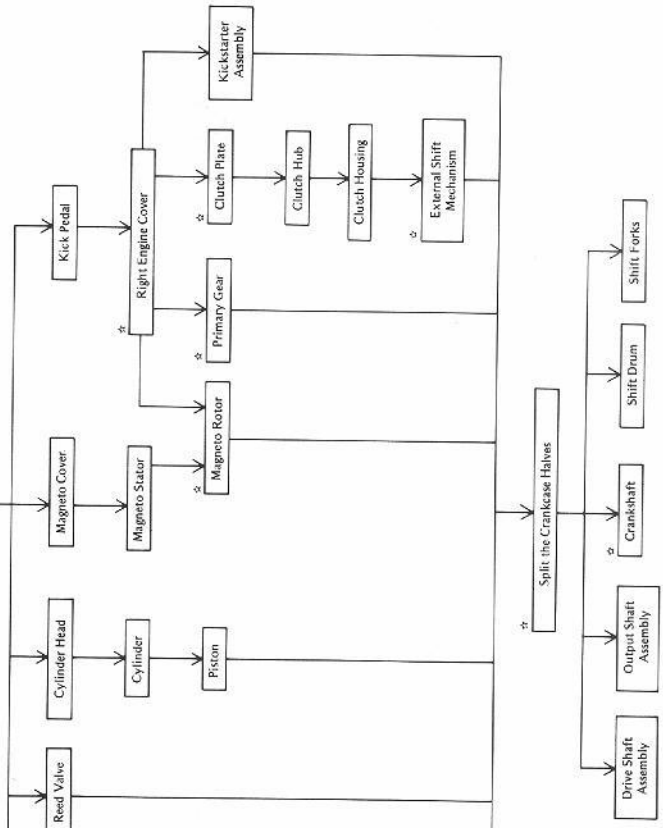


Rear Panel



Disassembly

FLOW CHART (Disassembly)



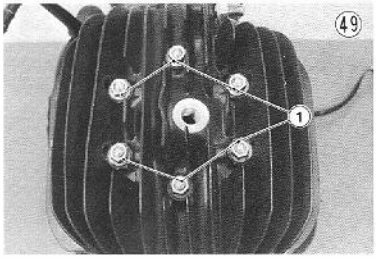
NOTES: 1. Action that has been already done in the engine removal procedure is omitted. Action that is not necessarily required for engine disassembly off the motorcycle is also omitted.
2. Action with a mark (☆) requires special tool(s) for removal, installation, disassembly, or assembly.

ENGINE REMOVAL

- Drain the transmission oil.
- Remove the seat mounting bolts, lockwashers, and flat washer. Then take out the seat.
- Close the fuel tap, and pull off the fuel hose from the fuel tap.
- Remove the fuel tank.
- Remove the silencer mounting bolt, and loosen the clamp screw. Then pull off the silencer on the end of the expansion chamber.
- Remove the spring and muffler mounting bolt.
- Remove the clutch cable clamp mounting bolt.
- Take off the muffler.
- Remove the shift pedal bolt and shift pedal.
- Remove the engine sprocket cover screws, and take out the cover.
- Remove the clip from the drive chain master link using pliers, and remove the master link.
- Remove the drive chain from the engine sprocket, being careful that the chain does not touch the ground and get dirty.
- Disconnect the magneto output lead connectors, and remove the lead from the frame.
- Remove the engine mounting plate nuts, and pull out the plate.
- Pull out the spark plug cap.
- Loosen the carburetor mounting clamp screws, and take out the carburetor.
- Loosen the rear brake adjusting nut, and take the spring off the brake rod.
- 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.

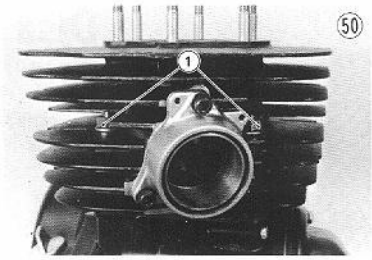
ENGINE DISASSEMBLY

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



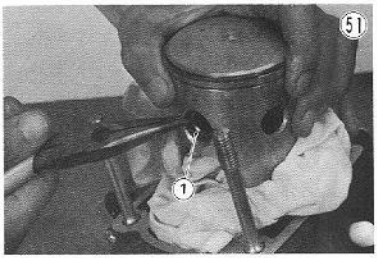
1. Cylinder Head Nuts

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



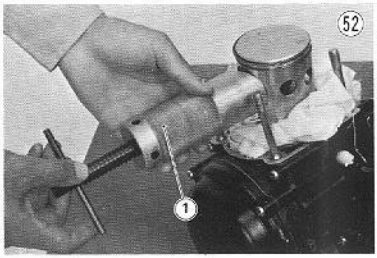
1. Cylinder Base Nuts

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



1. Snap Ring

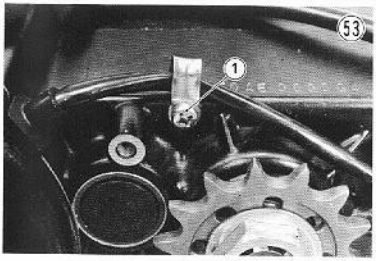
- Using the piston pin puller and adapter "C" (special tools), remove the piston pin from the side the snap ring was removed.



1. Piston Pin Puller (57001-910)
   Adapter "C" (57001-914)

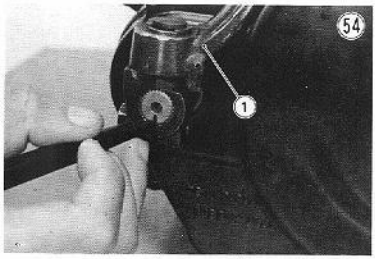
- Take out the piston and connecting rod small end needle bearing.
- Remove the magneto cover screws.

•Remove the magneto cover and gasket.
•Remove the magneto output wiring clamp screw.



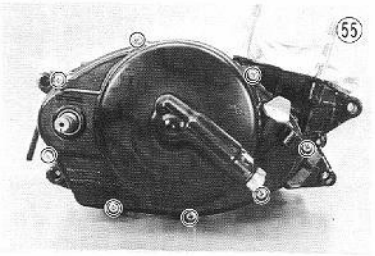
1. Magneto Output Wiring Screw

•Remove the magneto stator screws, lockwashers, and flat washers. Then pull off the magneto staror.
•Remove the kick pedal bolt.
•Mark the position of the kick pedal on the shaft so that it can be reinstalled later in the same position, and remove the kick pedal.



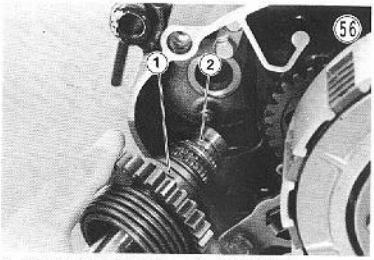
1. Kick Pedal

•Remove the screws and pull off the right engine cover and gasket. The spring plate pusher may fall down.



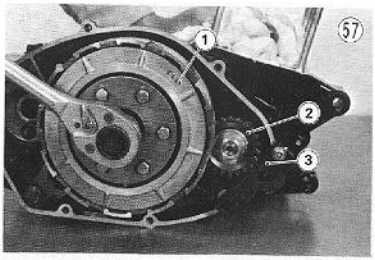
•Remove the end of the kick spring from the crankcase hole.

•Pull out the kickstarter assembly. There is a thrust washer where the kick shaft goes through the crankcase.



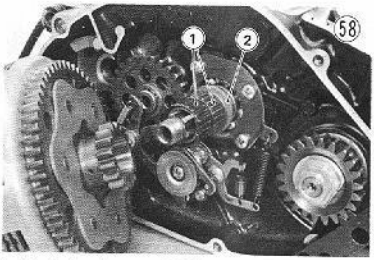
1. Kickstarter Assembly 2. Thrust Washer

•Using the gear holder (special tool) to prevent the clutch from rotating, undo the clutch hub nut, and remove the lockwasher and toothed washer.



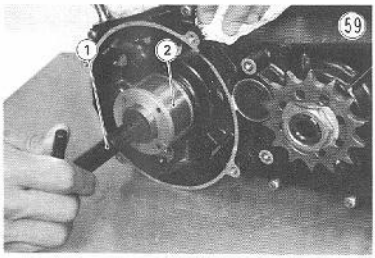
1. Clutch Assembly
2. Primary Gear
3. Gear Holder (57001-302)

•Pull the clutch assembly off the drive shaft. The sleeve and needle bearings may be pulled off with the clutch assembly.



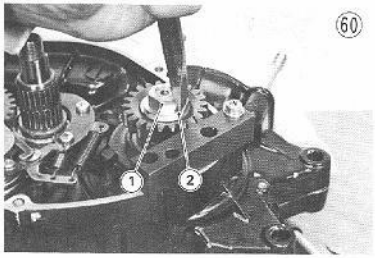
1. Needle Bearings 2. Sleeve

●Remove the magneto rotor bolt and lockwasher, and remove the rotor with the rotor puller (special tool) and then the woodruff key.



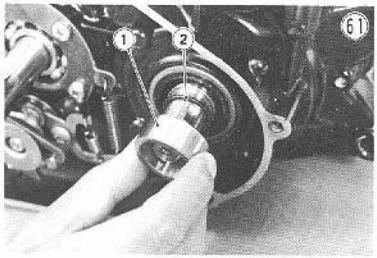
1. Rotor Puller (57001-116) 2. Rotor

●Flatten the portion of the toothed washer which is bent over the primary gear nut, and take off the primary gear nut, toothed washer, primary gear and woodruff key. Remove the gear holder.



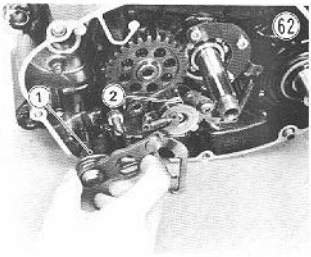
1. Primary Gear Nut 2. Lockwasher

●Pull off the sleeve and O ring.



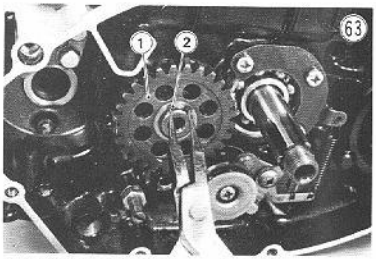
1. Sleeve 2. O ring

●Move the external shift mechanism pawls out of position on the end of the shift drum, and pull the external shift mechanism shaft out of the crankcase.



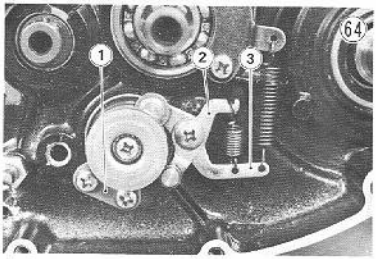
1. External Shift Mechanism Shaft 2. Shift Drum

●Remove the output shaft idle gear circlip and thrust washer.



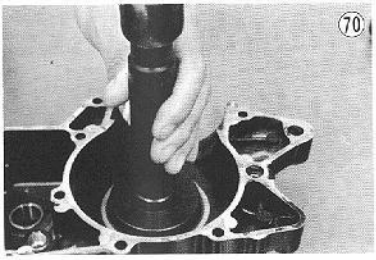
1. Output Shaft Idle Gear 2. Circlip

●Remove the screw, and then remove the neutral set lever and the gear set lever with two springs.



1. Shift Drum Stopper 3. Gear Set Lever
2. Neutral Set Lever

●Remove the shift drum stopper.
●Pull off the output shaft idle gear and another thrust washer.
●Flatten the bent portion of the engine sprocket splined washer.
●Using the engine sprocket holder (special tool) to hold the engine sprocket stationary, remove the engine sprocket nut and splined washer.



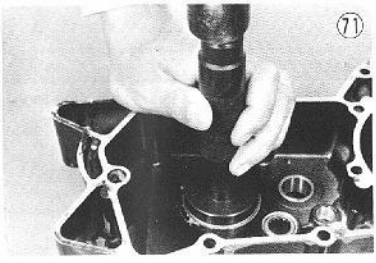
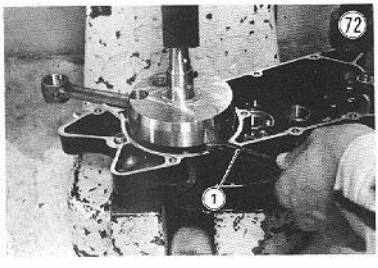


Table 1 Bearing Drivers Necessary for Crankcase Assembly

			Part Number
Left Crankcase Half	Ball Bearing	Crankshaft	57001-296
		Output Shaft	57001-289
Right Crankcase Half	Ball Bearing	Crankshaft	57001-296
		Drive Shaft	57001-290
	Shift Drum Needle Bearing		57001-287

●Clean out the crankcase, and clean off any grime on the transmission and crankshaft parts with a high flash-point solvent.

●Insert a chisel or wedge between the crankshaft flywheels opposite the connecting rod big end to protect flywheel alignment as shown, and fit the crankshaft into the right crankcase half using a press.



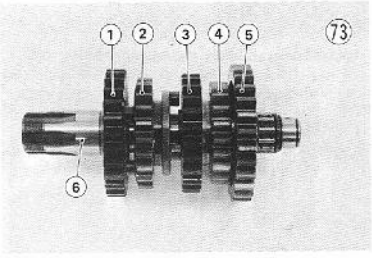
1. Chisel

●Replace the crankcase knock pins if they were removed.

●Install the transmission on the right crankcase half.

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

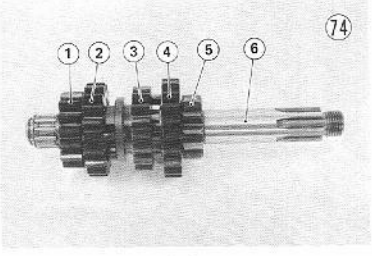
2nd gear – side with larger recess faces to the right
4th gear – fork groove on right side of gear teeth
3rd gear – dog recesses face left
5th gear – fork groove goes to left side of gear teeth
1st gear – plain side faces right



1. 2nd Gear
2. 4th Gear
3. 3rd Gear
4. 5th Gear
5. 1st Gear
6. Output Shaft

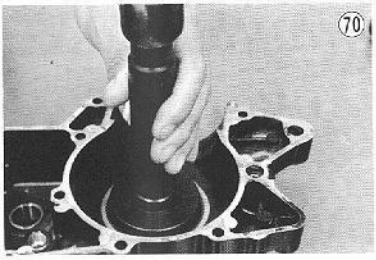
○Drive shaft gears are opposite from those of the output shaft, the smallest being for 1st gear and the largest for 5th.

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



1. 2nd Gear
2. 4th Gear
3. 3rd Gear
4. 5th Gear
5. 1st Gear
6. Drive Shaft

●Mesh the output shaft gears with those on the drive shaft, and simultaneously fit the shift drum, shift forks, and both assemblies into the right crankcase half.



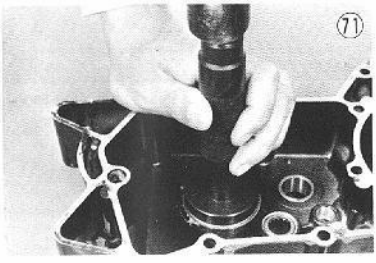
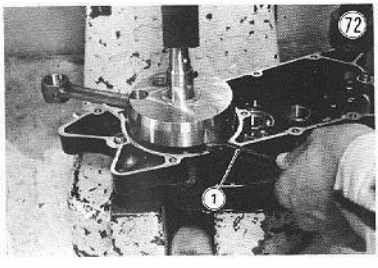


Table 1 Bearing Drivers Necessary for Crankcase Assembly

			Part Number
Left Crankcase Half	Ball Bearing	Crankshaft	57001-296
		Output Shaft	57001-289
Right Crankcase Half	Ball Bearing	Crankshaft	57001-296
		Drive Shaft	57001-290
	Shift Drum Needle Bearing		57001-287

●Clean out the crankcase, and clean off any grime on the transmission and crankshaft parts with a high flash-point solvent.

●Insert a chisel or wedge between the crankshaft flywheels opposite the connecting rod big end to protect flywheel alignment as shown, and fit the crankshaft into the right crankcase half using a press.



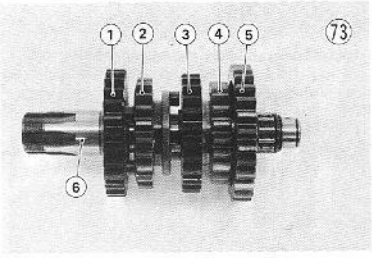
1. Chisel

●Replace the crankcase knock pins if they were removed.

●Install the transmission on the right crankcase half.

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

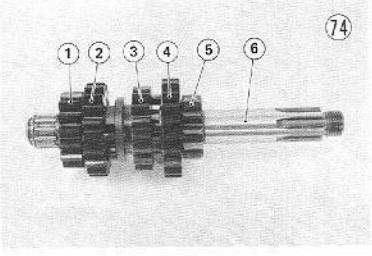
2nd gear – side with larger recess faces to the right
4th gear – fork groove on right side of gear teeth
3rd gear – dog recesses face left
5th gear – fork groove goes to left side of gear teeth
1st gear – plain side faces right



1. 2nd Gear
2. 4th Gear
3. 3rd Gear
4. 5th Gear
5. 1st Gear
6. Output Shaft

○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 – large dog recesses face left
3rd gear – fork groove goes to left side of gear teeth
4th gear – plain side faces to the left
2nd gear – either side may face in



1. 2nd Gear
2. 4th Gear
3. 3rd Gear
4. 5th Gear
5. 1st Gear
6. Drive Shaft

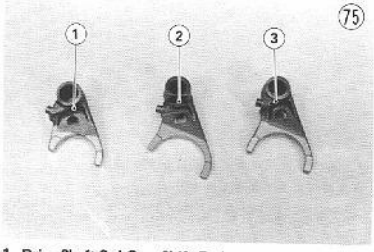
●Mesh the output shaft gears with those on the drive shaft, and simultaneously fit the shift drum, shift forks, and both assemblies into the right crankcase half.

NOTE: Identification of the shift forks

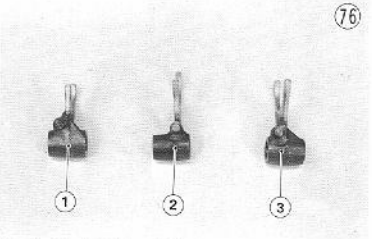
Drive shaft 3rd gear shift fork: fingers are snorter than those of other two shift forks

Output shaft 4th gear shift fork: fingers and guide pin are not in line

Output shaft 5th gear shift fork: fingers and guide pin are aligned

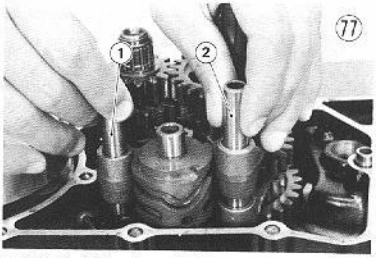


1. Drive Shaft 3rd Gear Shift Fork
2. Output Shaft 5th Gear Shift Fork
3. Output Shaft 4th Gear Shift Fork



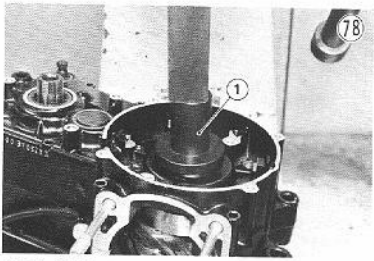
1. Drive Shaft 3rd Gear Shift Fork
2. Output Shaft 5th Gear Shift Fork
3. Output Shaft 4th Gear Shift Fork

- Fit each shift fork guide pin into a shift drum groove.
- Insert the shift rods. The long shift rod is for the output shaft side.



1. Shift Rod (Short) 2. Shift Rod (Long)

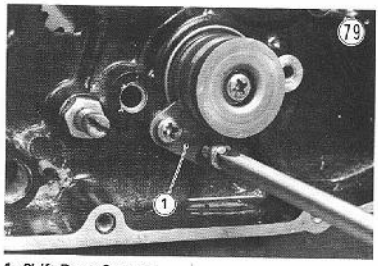
- Shift the transmission to neutral before reassembling the cases.
- Clean off and wipe dry the mating surfaces of the crankcase halves, and apply liquid gasket to the mating surface of the left crankcase half.
- Fit the breather tube to the right crankcase half.
- Using a suitable tool on the left side of the crankshaft, fit the crankcase halves together using a press on the left side end of the crankshaft.



1. Suitable Tool

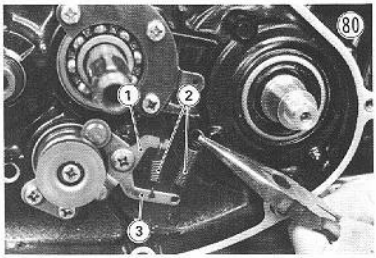
NOTE: Constantly check the alignment of the two halves, and the position of the transmission shafts.

- After the crankcase halves are fitted together, screw in the crankcase screws and tighten them with an impact driver.
- Check to see that the crankshaft, drive shaft, and output shaft all turn freely (in the neutral position). If the crankshaft will not turn, probably the crankshaft is not centered, so tap the appropriate end of the crankshaft with a mallet to reposition it. If it does not free up, the crankcase will have to be disassembled to locate and correct the problem.
- Spinning the output shaft, shift the transmission through all gears to make certain there is no binding and that all gears shift properly.
- Stuff a clean cloth into the crankcase opening around the connecting rod so that no parts will fall into the crankcase.
- Fit the breather tube into its guide, and screw the guide back on the crankcase.
- Fit the shift drum stopper.



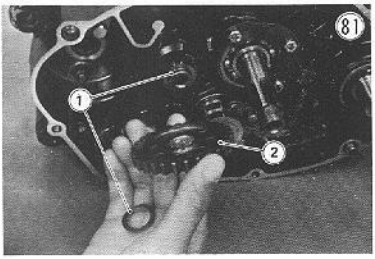
1. Shift Drum Stopper

•Install the neutral set lever and gear set lever, and put the two springs back into position.



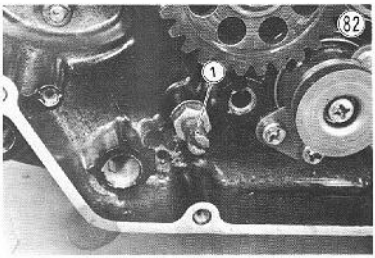
1. Neutral Set Lever
2. Springs
3. Gear Set Lever

•Install the thrust washer, output shaft idle gear, thrust washer, and circlip. The side of the hub that protrudes the most, faces in.



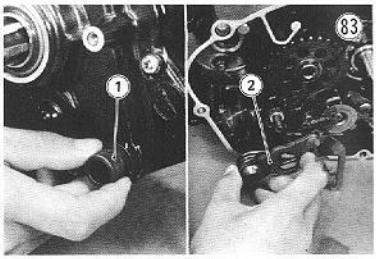
1. Washers
2. Idle Gear

•Check to see if the return spring pin is loose. If it is loose, remove it and apply a locking agent to the threads. Then screw it back in, tightening its locknut.



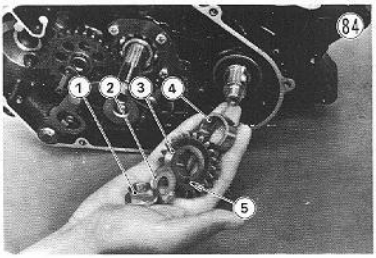
1. Return Spring Pin

•Using the shift shaft oil seal guide (special tool) on the crankcase shift shaft oil seal, insert the external shift mechanism shaft through the crankcase, and fit the pawls back onto the end of the shift drum.



1. Shift Shaft Oil Seal Guide (57001-264)
2. External Shift Mechanism

•Install the sleeve, O ring, and the woodruff key on the right side of the crankshaft.
•Install the primary gear by hand with the hole facing outward to accommodate the toothed washer.

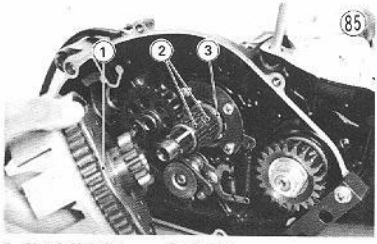


1. Primary Gear Nut
2. Toothed Washer
3. Primary Gear
4. Sleeve
5. Hole

•Once the primary gear is fully in place, fit a new toothed washer with the tooth going into the hole in the primary gear, and fit the primary gear nut.
•Hold the primary gear with the gear holder (special tool), and tighten the primary gear nut to 4.8 kg-m (35 ft-lbs) of torque.
•Bend back part of the toothed washer against the side of the primary gear nut.

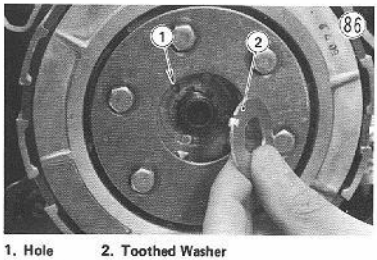
NOTE: When replacing any clutch plate, apply transmission oil to the new clutch plate surfaces.

•If the clutch assembly was disassembled, pre-assemble the clutch hub, friction plates (5), and steel plates (4) to facilitate clutch assembly. The sequence is friction plate, steel palte, friction palte, etc. finishing with a friction plate. Screw in the clutch spring bolts slightly.
•To simplify installing the clutch to the drive shaft, separate the clutch assembly into the clutch housing and the clutch hub assembly. There is a thrust washer between the clutch housing and the clutch hub assembly.
•Install the sleeve, needle bearings, clutch housing, and thrust washer in that order.



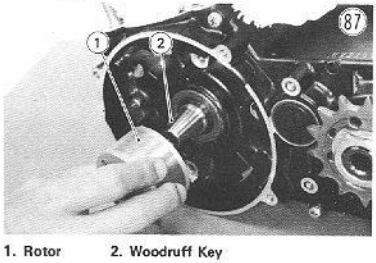
1. Clutch Housing
2. Needle Bearings
3. Sleeve

- Install the clutch hub assembly while meshing the friction plate tabs with the clutch housing fingers, and clutch hub hole with the splined portions of the drive shaft. If necessary, loosen the 10 mm clutch spring bolts so that the friction plates can be moved by hand to align the tabs.
- If the clutch spring bolts were loosened, cross tighten them evenly by hand rather than using a compressed air tool, which might make spring pressure uneven. The torque for the bolts is 1.0 kg-m (0.7 ft-lbs).
- Install the toothed washer, fitting its tooth into the hub hole, and install the lockwasher and the hub nut.



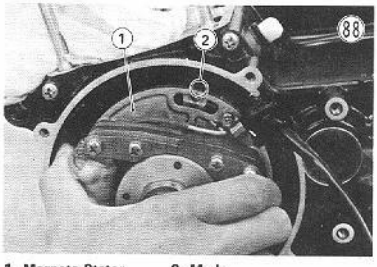
1. Hole
2. Toothed Washer

- Hold the clutch hub with the gear holder and tighten the hub nut to 4.5 kg-m (33 ft-lbs) of torque.
- Fit the woodruff key and rotor on the left side of the crankshaft, and tighten the bolt to 2.2 kg-m (16 ft-lbs) of torque.



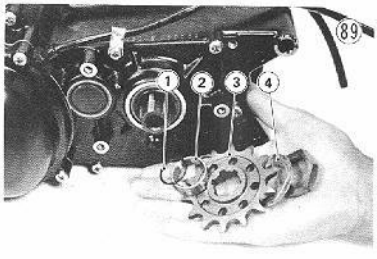
1. Rotor
2. Woodruff Key

- Remove the primary gear holder.
- Mount the magneto stator so that the mark on the magneto stator aligns with the mark on the crankcase, and tighten the screws.



1. Magneto Stator
2. Marks

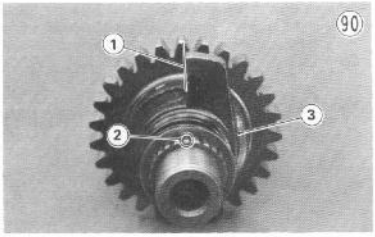
- Install the magneto cover and gasket. Check that the grommet is in its proper position, and tighten its screws.
- Fit the magneto output wiring into the guides, and screw the guides back onto the crankcase, tightening them with an impact driver.
- Fit a new O ring onto the output shaft, and then install the sleeve.
- Fit the engine sprocket onto the output shaft, and fit a new splined washer so that its teeth mesh with those of the splined output shaft.



1. O Ring
2. Sleeve
3. Engine Sprocket
4. Splined Washer

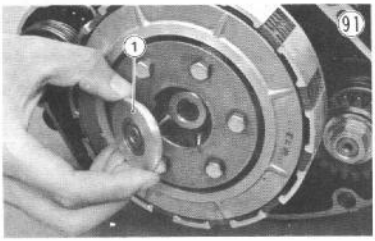
- Using the engine sprocket holder (special tool) to hold the engine sprocket stationary, tighten the engine sprocket nut to 8 kg-m (58 ft-lbs) of torque.
- Bend back one side of the splined washer over the nut.
- Install the kickstarter assembly with the thrust washer and turn the kick shaft all the way clockwise.

NOTE: When installing the ratchet on the kick shaft, the machined side of the ratchet lever should be lined up with the notch on the kick shaft.



1. Machined Side 2. Notch 3. Kick Shaft

- Fit the kick spring back into the crankcase hole.
- Stick the spring plate pusher to the clutch with a thin layer of grease.

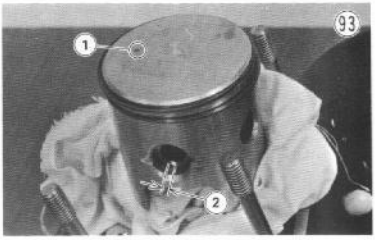


1. Spring Plate Pusher

- Stick the gasket in position with a thin layer of grease, and mount the right engine cover using the kick shaft oil seal guide (special tool) to protect the cover oil seal. Tighten the screws.

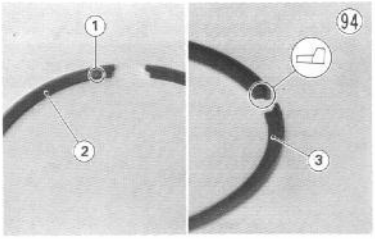
1. Kick Shaft Oil Seal Guide (57001-265)

- Apply 2-stroke oil to the connecting rod needle bearing before insertion, fit it into the connecting rod.
- Install the piston and piston pin. The arrow on the top of the piston must point towards the front.
- Install a new piston pin snap ring in place of every one that is removed since removal weakens and deforms the ring. After installation, turn the snap ring so that its opening does not coincide with the groove in the side of the piston.



1. Arrow 2. Snap Ring Opening

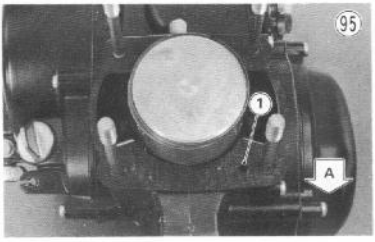
NOTES: ○If the piston is replaced with a new one, piston to cylinder clearance changes (Pg. 30). Also, when a new piston or piston pin is used, check the piston to pin clearance (Pg. 31).
○If a piston ring is replaced with a new one, install the second ring so that the "N" marked side faces up and the top ring so that the plain side faces down.



1. "N" Mark 3. Top Ring
2. Second Ring

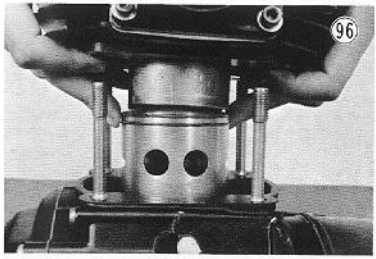
To the Dealer: When possible, match parts from stock so that a marked pin is assembled with an "A" piston, and an unmarked pin with a "B" piston.

- Remove the cloth that covers the cylinder base hole, and set the piston at BDC (bottom dead center) to facilitate cylinder installation.
- If the cylinder base gasket is damaged, replace it. The hole in the gasket should be on the left side of the front.



1. Hole A. Front

- Apply a little 2-stroke oil to the piston rings and the inside wall of the cylinder.
- Fit the base of the cylinder over the rings, pressing in on opposite sides of the rings as necessary. Be certain that the rings do not slip out of position. The pin in each piston groove must be between the ends of the piston ring.

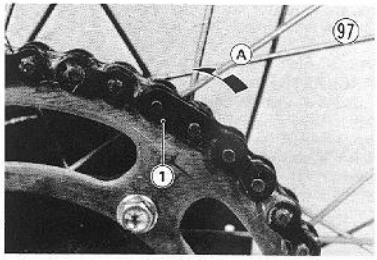


- Cross tighten the cylinder base nuts to 3.5 kg-m (25 ft-lbs) of torque.
- Place the cylinder head gasket and the cylinder head on the cylinder.
- Cross tighten the cylinder head nuts evenly to 2.2 kg-m (16 ft-lbs) of torque.

NOTE: After assembling and installing the engine, fill the engine with oil and check the level (Pg. 5).

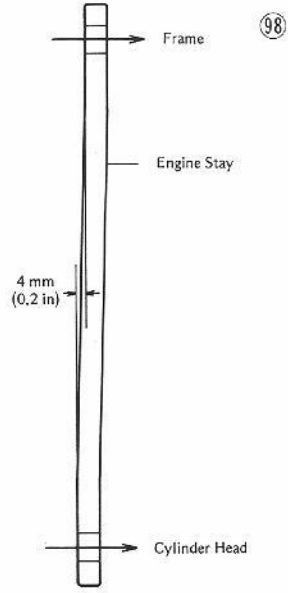
DISASSEMBLY AND ASSEMBLY NOTES OF THE FRAME PARTS

- Before removing the brake cam lever, mark the position of the cam lever so that it can be installed later in the same position.
- When the wheel is disassembled, apply grease liberally to the needle bearing.
- Front wheel:
  - Center the brake panel assembly in the brake drum. This is done by tightening the axle lightly, spinning the wheel, and pulling the brake lever forcefully. The partially tightened axle allows the brake panel assembly to center itself within the brake drum. This procedure can prevent a soft, or "spongy feeling" brake.
  - After tightening the front axle, tighten the axle clamp bolts and panel stopper bolt securely.
  - After installing the front wheel, adjust the front brake.
- Rear Wheel:
  - The direction of the chain master link clip should be as shown.



1. Clip **A. Direction of chain rotation**

  - After installing the rear wheel, adjust the drive chain and rear brake.
- If the footpeg mounting bolt is overtightened, the footpeg does not fold up. Tighten the footpeg mounting bolt to correct torque.
- If the air cleaner element base is improperly installed, the element can not be installed to the base. One of the possible three positions is correct.
- Install the engine stay as shown below.



Maintenance

CARBURETOR

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

Table 2 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

Table 3 Carburetor Specification

Main Jet	165R
Air Jet	0.5
Jet Needle	6FL26-3
Needle Jet	Q-8
Cutaway	3.0
Pilot Jet	50
Air Screw (turns out)	1¼
Service Fuel Level	2 ± 1 mm

NOTE: The last number of the jet needle number ("3" of 6FL26-3) 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.

Jet Needle

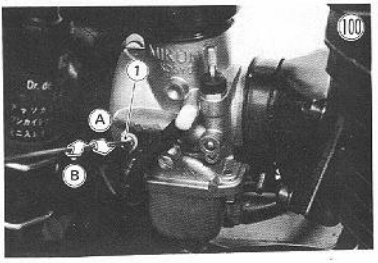
(99)

(1) 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. Alteration of this mixture is effected by the position of the air screw. 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 1¼ turns.

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



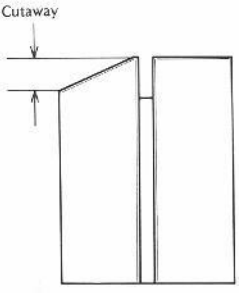
(100)

1. Air Screw
A. Turn in lightly B. Back out 1¼ turns

(2) 1/8 ~ 1/4 throttle

Alteration of the fuel mixture within this range is effected largely by the amount of throttle valve cutaway. The greater the amount of the cutaway, the leaner the mixture in this throttle range.

Throttle Valve

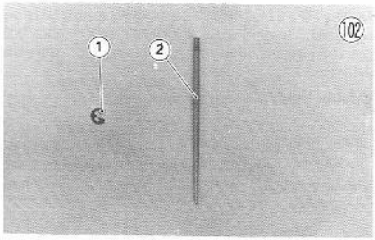


(101)

(3) 1/4 ~ 3/4 throttle

Alteration of the mixture in this range is effected by repositioning the jet needle in the needle jet. 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.

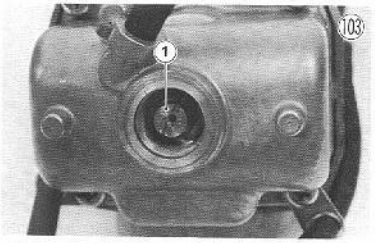
To change the position of the jet needle in the needle jet at a given throttle opening, move the clip, which is in one of 5 grooves at the upper part of the needle, to a higher or lower groove. Moving the clip to a higher groove makes the fuel/air mixture leaner; conversely, moving it lower makes the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



1. Clip 2. Jet Needle

(4) 3/4 ~ 1 throttle

Alteration of the mixture in this range is effected by the main jet size. The larger the main jet, the greater the flow of fuel at a given throttle position.



1. Main Jet

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

(6) Selecting the correct main jet

Choose a main jet that fulfills the following conditions:

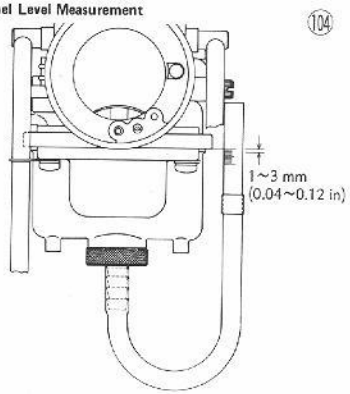
- Highest rpm.
- Smooth transition when accelerating from low rpm.
- Spark plug burning properly.
- Engine lugs without knocking (detonating).

(7) Adjusting the fuel level

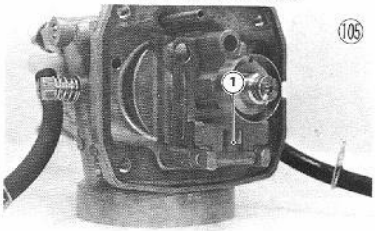
- Close the fuel tap, and remove the carburetor. The fuel hose and carburetor cable do not have to be removed to inspect the fuel level.
- Remove the drain plug from the bottom of the float bowl, and screw the fuel level gauge (special tool) into the plug hole.
- Open the fuel tap so that fuel will flow into the carburetor.
- Line up the uppermost part of the ruled portion of the gauge hose where the bottom edge of the carburetor body connects to the float bowl. The proper fuel level is 1 ~ 3 mm (0.04 ~ 0.12 in) from the top of the ruled portion.

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

Fuel Level Measurement



- 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; readjusting it if necessary.



1. Tab

DECARBONIZATION

The exhaust system, piston head, exhaust port, and cylinder head 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. Clean the silencer with a wire brush, or by burning the carbon out.
- Remove the cylinder head, scrape out any carbon, and clean the head with a high flash-point solvent.

- Remove the cylinder, scrape the carbon out of the exhaust port carefully.
- 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.

CYLINDER AND PISTON

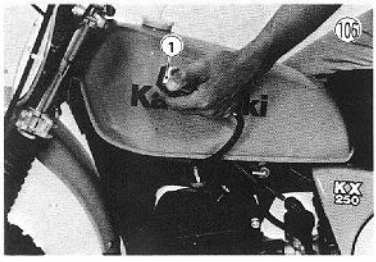
Compression measurement

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 is tightened down to 2.2 kg-m (16 ft-lbs) torque and cylinder base nuts to 3.5 kg-m (25 ft-lbs) of torque, 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 press the compression gauge hose securely against 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 kick pedal several times until the compression gauge stops rising.

The compression is the highest reading obtainable.



1. Compression Gauge

Table 4 Cylinder Compression

Standard	Service Limit
~~15~~ kg/cm² (~~213~~ lbs)	~~10.5~~ kg/cm² (~~149~~ psi)
12 171	8.5 121

Cylinder wear

Since there is a difference in cylinder wear in different directions, take a side-to-side and a front-to-back measurement at each of three locations (total of six measurements) 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) between any two measurements, the cylinder must be replaced with a new one.

NOTE: The ELECTRO FUSE 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 Measurement (107)

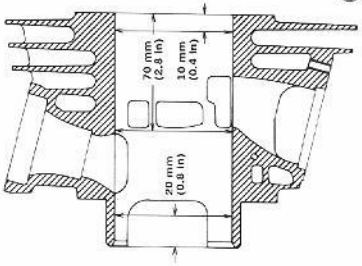


Table 5 Cylinder Inside Diameter

Standard	Service Limit
70.000 ~ 70.020 mm (2.7559 ~ 2.7567 in)	70.1 mm (2.760 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.

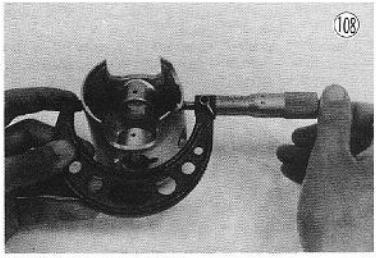


Table 6 Piston Diameter

Standard	Service Limit
69.956 ~ 69.976 mm (2.7452 ~ 2.7550 in)	69.81 mm (2.748 in)

Piston/cylinder clearance

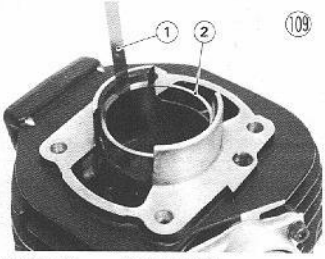
In order to maintain proper piston/cylinder clearance, the piston/cylinder clearance is determined whenever a new piston or cylinder is installed. The most accurate way to find the clearance is to make separate piston and cylinder measurements and then compute the difference between the two values. Measure the piston diameter as just described, and measure the cylinder diameter at the very bottom of the cylinder.

Table 7 Piston/Cylinder Clearance

Standard
0.049 ~ 0.059 mm (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 rings with a thickness gauge. If the gap is wider than the service limit, the rings is overworn and must be replaced.



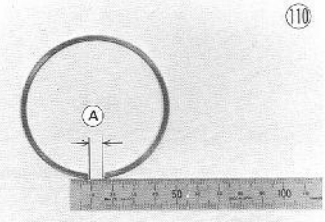
1. Thickness Gauge 2. Piston Ring

Table 8 Piston Ring End Gap

Standard	Service Limit
0.20 ~ 0.40 mm (0.08 ~ 0.016 in)	0.7 mm (0.027 in)

Piston ring tension

Piston ring tension can be evaluated by measuring the gap between the ends of the ring with the ring free of any restraint. If the gap is less than the service limit, the ring is weak and must be replaced.



A. Gap

Table 9 Piston Ring Free Gap

	Standard	Service Limit
Top	about 4.5 mm (about 0.177 in)	4 mm (0.158 in)
Second	about 8.0 mm (about 0.315 in)	7 mm (0.276 in)

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.

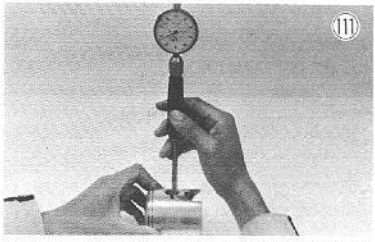


Table 10 Piston Pin, Piston Pin Hole, Small End Dia.

	Standard	Service Limit
Piston Pin	17.994 ~ 18.000 mm (0.7084 ~ 0.7086 in)	17.96 mm (0.707 in)
Piston Pin Hole	17.9985 ~ 18.0065 mm (0.7086 ~ 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 0.0015 ~ 0.0095 mm (0.00006 ~ 0.00037 in).

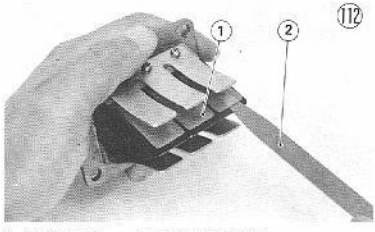
Needle bearing

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

REED VALVE

An Eyvind Boyesen's reed valve is used on this model.

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



1. Reed Valve 2. Thickness Gauge

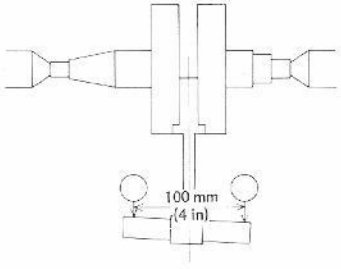
CRANKSHAFT

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 (113)



Using the arrangement shown in the figure, 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 the above measurements exceeds the service limit, the crankshaft assembly must be replaced.

Connecting Rod Twist (114)

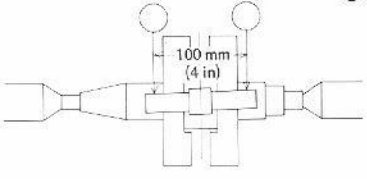


Table 11 Connecting Rod Bend, Twist

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 (115)

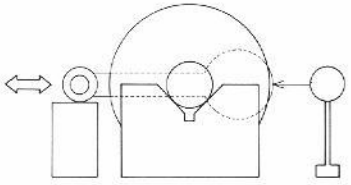


Table 12 Connecting Rod Big End Radial Clearance

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

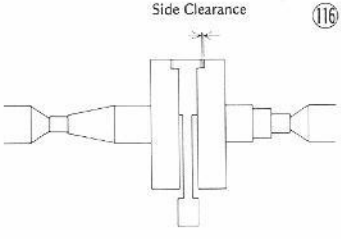


Table 13 Connecting Rod Big End Side Clearance

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

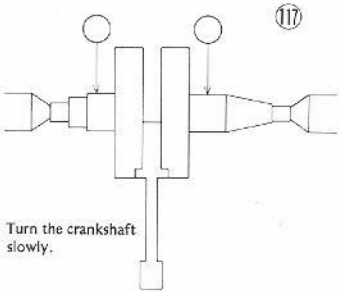


Table 14 Crankshaft Runout

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

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.

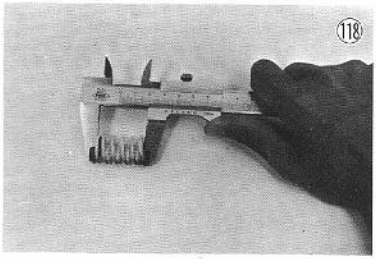


Table 15 Clutch Spring Free Length

Standard	Service Limit
33.6 mm (1.32 in)	30.3 mm (1.20 in)

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

Table 16 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.

Friction Plate/Clutch Housing Clearance

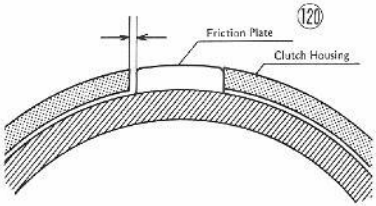
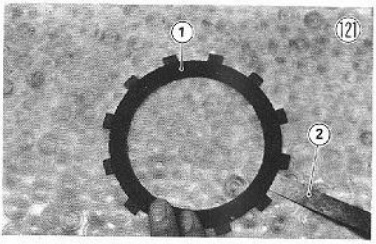


Table 17 Friction Plate/Clutch Housing Clearance

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 over the service limit.



1. Friction Plate **2. Thickness Gauge**

Table 18 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.

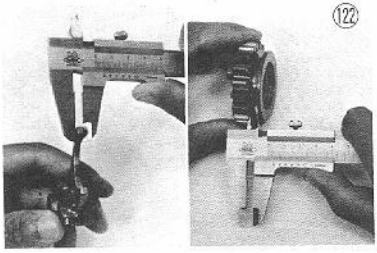


Table 19 Shift Fork Thickness

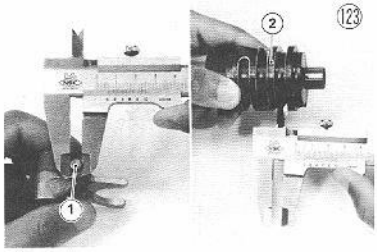
Standard	Service Limit
4.4~4.5 mm (0.174~0.177 in)	4.2 mm (0.166 in)

Table 20 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.



1. Guide Pin 2. Shift Drum

Table 21 Shift Fork Guide Pin Diameter

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

Table 22 Shift Drum Groove Width

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

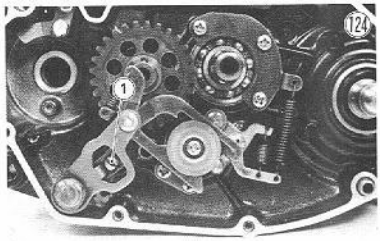
Transmission gear damage

Inspect the teeth on the transmission gear. 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 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.

External shift mechanism inspection

Inspect the shift pawl spring, gear set lever spring, neutral set lever spring, and shift pawls. Replace any broken or otherwise damaged parts.

Check to see if the return spring pin is loose or not. If it is loose, remove it and apply a locking agent to the threads. Then screw it back in tightening its locknut.



1. Return Spring Pin

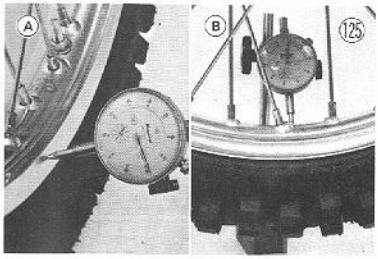
WHEELS

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.



A. Axial Runout B. Radial Runout

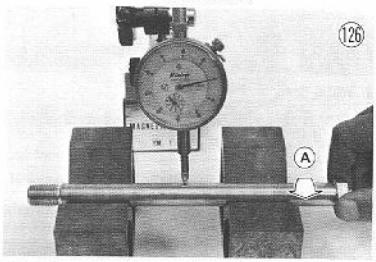
Table 23 Rim Runout

	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.



A. Turn

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 (0.028 in) replace the axle.

Table 24 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 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.

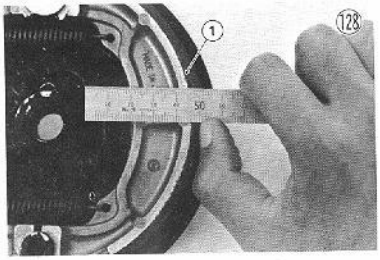
Table 25 Brake Drum Inside Diameter

	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

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.



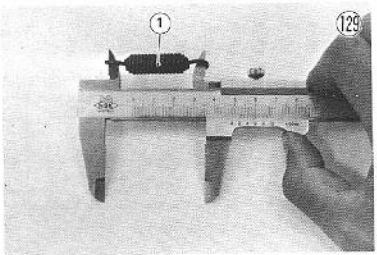
1. Brake Lining

Table 26 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.



1. Brake Shoe Spring

Table 27 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

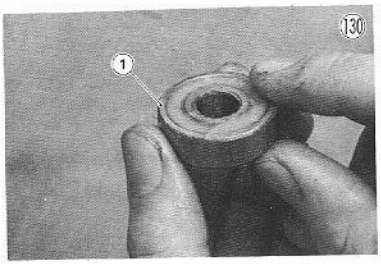
The rollers in the needle bearings wear so little that the wear is difficult to measure. Instead, inspect the bearings for abrasions, color change, or other damage. If there is any doubt as to the condition of a bearing, replace it.

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 grease seals are nearly always damaged during removal, replace all oil seals or grease seals which were 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.



1. Wheel Bearing

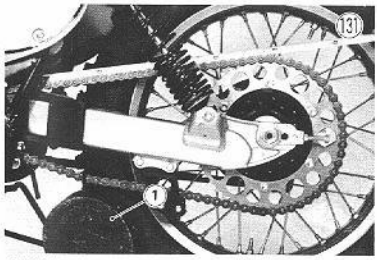
DRIVE CHAIN

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. Overworn 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. Remove the drive chain guide, and stretch the chain taut either by using the chain adjuster, or by hanging a 10 kg (20 lb) weight on the chain. 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.

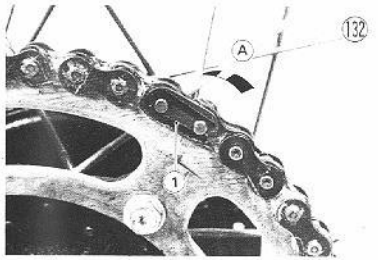


1. Weight

Table 28 Drive Chain Length

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

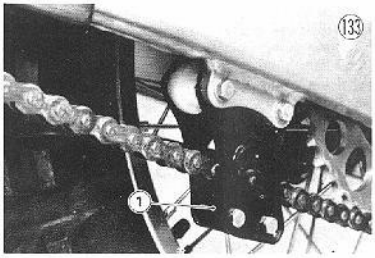
NOTES: ○The drive system was designed for use with the Daido D.I.D. 520-TR 110 link chain. For maximum stretch resistance and safety, the Daido D.I.D. 520-TR 110 link chain must be used for replacement.
○To minimize any chance of the master link dislodging, the master link must be installed with the closed end of the "U" pointed in the direction of chain rotation.



1. Clip A. Direction of chain rotation

Chain guide wear

Visually inspect the drive chain guide rubber. If the rubber protrusion is worn down by about half or damaged, replace it.



1. Rubber

SPROCKETS

Sprocket wear

Visually inspect the sprocket teeth. If they are worn as illustrated, 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 the sprocket.

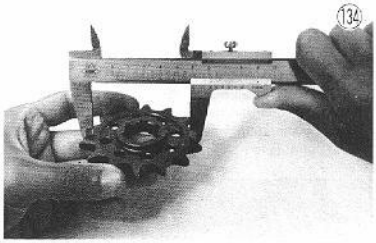


Table 29 Sprocket Diameter

	Standard	Service Limit
Engine	60.98 ~ 61.18 mm (2.401 ~ 2.409 in)	60.3 mm (2.38 in)
Rear	242.67 mm (9.554 in)	242.1 mm (9.53 in)

NOTE: After installing the engine sprocket, bend up one side of the lockwasher against the mounting nut.

FRONT FORK

WARNING **When disassembling, checking the oil level, and changing the oil of the front fork, first release the air from the fork.**

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 shock absorbers balanced for motorcycle stability.

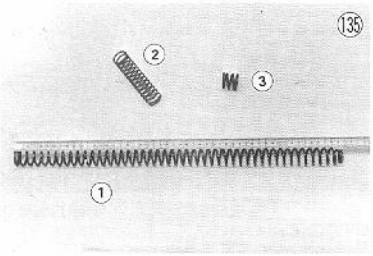
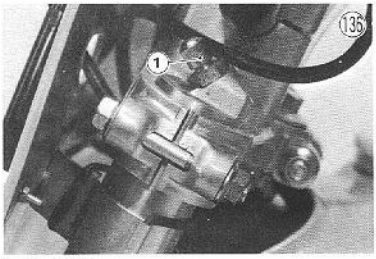


Table 30 Front Fork Spring Free Length

	Standard	Service Limit
① Long	479.5 mm (18.9 in)	477 mm (18.8 in)
② Middle	141 mm (5.55 in)	139 mm (5.47 in)
③ Short	25.5 mm (1.00 in)	25 mm (0.98 in)

NOTE: When installing the front fork, check that the upper surface of the inner tube is even with the upper surface of the stem head, and the air pressure check valve is pointing towards the front.

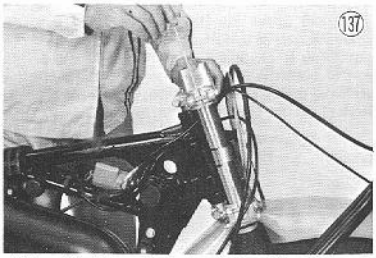


1. Check Valve

Front Fork Oil

To check the fork oil level:

- Remove the handlebar.
- Place a jack or stand under the engine so that the front wheel is raised off the ground.
- Remove the top bolts from the inner tubes, and pull out the spring seats and springs.
- Take out the jack or stand under the engine, and slowly put the front wheel down on the ground until the front fork inner tube is at the lowest position.
- At this position, insert a rod down into the tube, and measure the distance from the top of the inner tube to the oil level.



- If the oil is below the correct level, taking care not to overfill the fork.
- Put in springs, fit the spring seats and top bolts, and then tighten the top bolts securely.
- Install the handlebar.
- Pressurized the fork to the desired shock absorption level.

NOTE: If the front fork is disassembled, pour correct amount of oil into the front fork. Run the motorcycle for five to ten minutes so that oil will penetrate into the tube, then recheck the oil level.

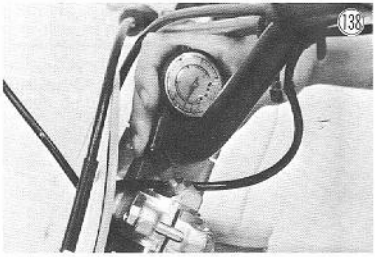
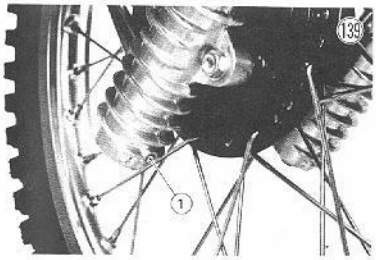


Table 31 Front Fork Oil Level

Type	Amount per side	Oil level from top of inner tube
KYBG10-or SAE 10W	270 cc (9.1 US fl oz)	160 mm (6.3 in)

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 handlebar and top bolt from each side, and pour in the specified type and amount of oil. Then install the top bolts, tightening them securely.



1. Drain Screw

After tightening the top bolt, check that the air pressure check valve of the top bolt is pointing toward the front. If it does not, loosen the upper and lower clamp bolts and turn the inner tube to correct the check valve position. Tighten the clamp bolts to the specific torque (Pg. 46). Pressurize the forks to the desired shock absorption level.

NOTE: Since oil quantity greatly influences damping performance, use only the specified quantity.

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 washing 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 times 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 it 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.

Appendix

PRE-RACE CHECK POINTS

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
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
Spokes	Tighten any loose spokes
Drive chain	Check overall condition and chain slack, oil as necessary
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
Rear shock absorbers	Function properly, no oil leakage
Nuts, bolts fasteners	Tighten any loose bolts and nuts
Fuel tank	Mounted securely
Rear sprocket	Not worn or damaged
Engine stop switch	Functions

AFTER-RACE CHECK POINTS

After racing, first clean the motorcycle (Pg. 40), and then inspect the entire motorcycle, with special care to parts such as the air cleaner, carburetor, brakes, etc.

Carry out general lubrication (Pg. 15~16), and make adjustments as necessary (Pg. 8~14).

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 float bowl. (If left in for a long time, the gasoline will sour.)
- Remove the empty fuel tank, pour about ½ pint of motor oil into the tank, roll the tank around to coat inner surfaces thoroughly, and pour out the excess oil. Install the tank.
- 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.
- 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 (Pg. 5).
- Check all the points listed under the Inspection and Adjustment Section (Pg. 15~16).
- Lubricate the chain and the other points listed in the General Lubrication Section (Pg. 8~14).

CLEANING

1) 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 switch	Cover with plastic bags.
Air cleaner intake	Close up the opening with tape, or stuff in rags.

2) 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.

3) After washing

- Remove the plastic bags, and clean the air cleaner intake.
- Lubricate the chain and other points listed in the Lubrication Section (Pg. 15~16).
- Start the engine and run it for 5 minutes.
- Test the brakes before motorcycle operation.

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
- Transmission gear or bearing 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 defective

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

No fuel flow
- No gasoline in fuel tank
- Fuel hose clogged
- Fuel tap 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 defective
- Ignition coil defective
- Spark plug cap, high tension cord short
- Spark plug gap excessive

Mixture too rich or too lean
- Air screw maladjusted
- Pilot jet or air passage clogged
- Idling 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 head warped
- Cylinder head gasket damaged
- Crankshaft oil seal defective

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 head warped
- Cylinder head gasket damaged
- Crankshaft oil seal defective

Misfiring
- Spark plug defective
- Spark plug cap poorly connected or shorted
- Ignition coil defective
- High tension cord defective

Knocking
- Ignition timing advanced
- Fuel poor quality
- Carbon built up in combusion 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 combusion 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
- Gear shaft, output shaft, or gear splines worn
- Gear groove worn
- Shift drum groove worn
- Shift fork pin worn

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

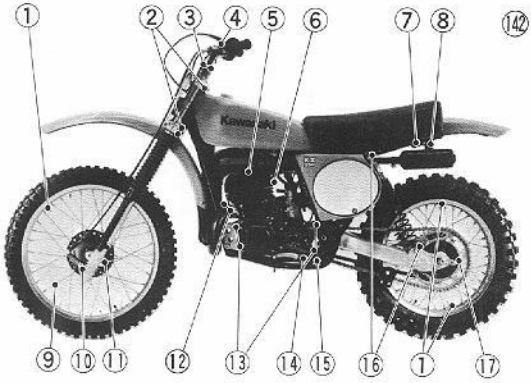
Shock absorption too soft
- Oil quantity insufficient
- Oil viscosity too low
- Front fork air pressure too low
- Fork spring wear
- Suspension oil leak

Brakes Don't Hold

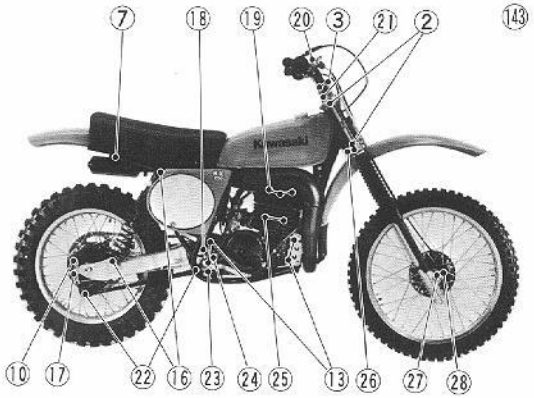
- Brake maladjustment (cable play excessive)
- Linings or drum worn
- Brakes overheated
- Water in brakes
- Brake cam worn
- Oil in drum

BOLT AND NUT TIGHTENING

Every day before riding, check without fail the tightness of the bolts and nuts described here. Also, check to see whether or not each cotter pin is in place and in good condition.

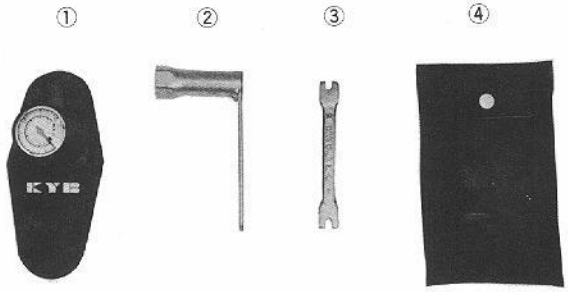


1. Bead Protector Nuts
2. Front Fork Clamp Bolts
3. Handlebar Mounting Bolts
4. Clutch Lever Mounting Bolt
5. Spark Plug
6. Engine Stay Nut
7. Seat Mounting Bolts
8. Silencer Mounting Bolt
9. Spokes
10. Brake Cam Lever Bolts
11. Brake Panel Stopper Bolt
12. Muffler Mounting Springs
13. Engine Mounting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



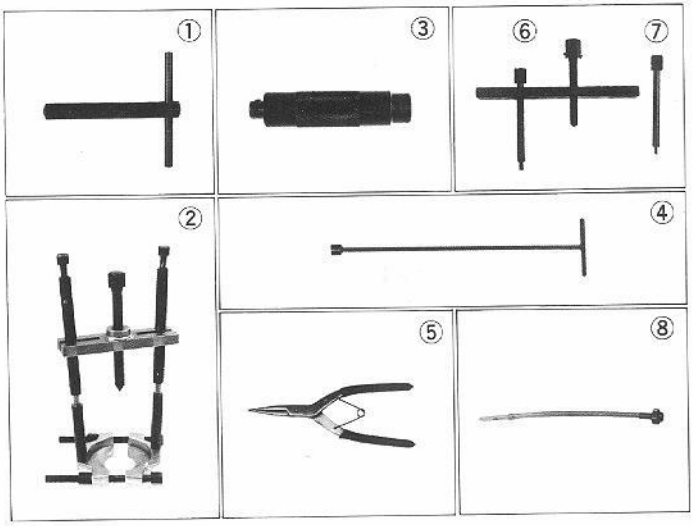
18. Pivot Shaft Nut
19. Cylinder Head Nuts
20. Brake Lever Mounting Bolt
21. Steering Stem Head Bolt
22. Torque Link Nut and Bolt
23. Rear Brake Pedal Bolt
24. Kick Pedal Bolt
25. Cylinder Base Nut
26. Steering Stem Base Clamp Bolt
27. Axle
28. Axle Clamp Bolts

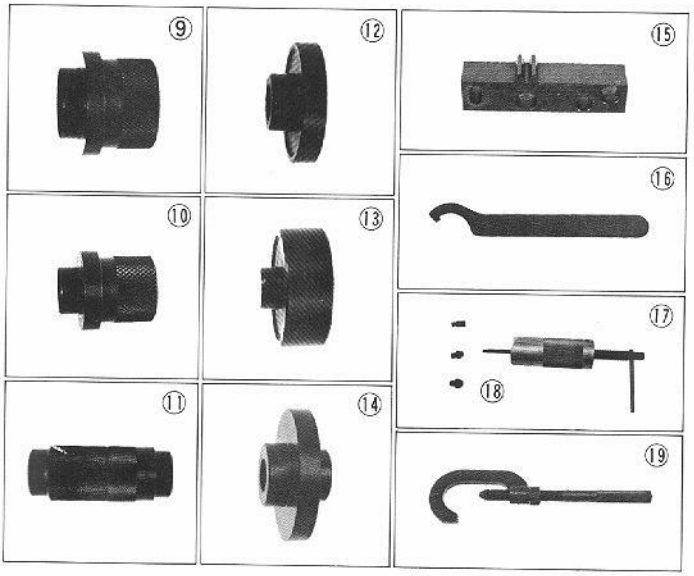
TOOLS



1. Fork Pressure Gauge
2. Spark Plug Wrench
3. Spoke Wrench
4. Tool Case

SPECIAL TOOLS





REF NO.	TOOL NO.	DESCRIPTION
1	57001-116	ROTOR PULLER
2	57001-135	BEARING PULLER
3	57001-139	BEARING DRIVER HOLDER
4	57001-142	FRONT FORK CYLINDER HOLDER
5	57001-144	CIRCLIP PLIERS
6	57001-153	CRANKCASE SPLITTING TOOL
7	57001-157	CRANKCASE SPLITTING TOOL ADAPTER
8	57001-203	FUEL LEVEL GAUGE
9	57001-264	SHIFT SHAFT OIL SEAL GUIDE
10	57001-265	KICK SHAFT OIL SEAL GUIDE
11	57001-287	SHIFT DRUM BEARING DRIVER
12	57001-289	BEARING DRIVER
13	57001-290	BEARING DRIVER
14	57001-296	BEARING DRIVER
15	57001-302	GEAR HOLDER
16	57001-321	STEM NUT WRENCH
17	57001-910	PISTON PIN PULLER ASSEMBLY
18	57001-914	ADAPTER "C"
19	56019-040	ENGINE SPROCKET HOLDER

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, strip an internal screw, or break and then fall out.

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

Part Name	Metric (kg-m)	English (ft-lbs)	See Pg.
Brake Pedal Bolt	5.5	39	–
Clutch Hub Nut	4.5	33	25
Clutch Spring Bolts (6)	1.0	7.0	25
Cylinder Base Nuts (4)	3.5	25	27
Cylinder Head Nuts (6)	2.2	16.0	27
Engine Drain Plug	1.3	9.5	6
Engine Mounting Bolts (4)	4.0	29	–
Engine Sprocket Nut	8.0	58	25
Front Axle Clamp Bolts (2)	1.6	11.5	–
Front Axle Nut	8.0	58	–
Front Fork Clamp Bolts (6)	1.6	11.5	11
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	25
Pivot Shaft Nut	9.0	65	–
Primary Gear Nut	4.8	35	24
Rear Axle Nut	9.0	65	12
Rear Sprocket Bolts (6)	1.9	13.5	–
Spark Plug	2.8	20	9
Spokes	0.3	26 (in-lbs)	–
Steering Stem Base Clamp Bolt 10^{ϕ}	3.5	25	–
Steering Stem Clamp Bolt	1.6	11.5	11
Steering Stem Head Bolt	6.0	43	11
Torque Link Bolt (Front)	0.7	5.0	–
Torque Link Nut (Rear)	3.0	22	12

The table below, relating tightening torque to thread diameter and pitch, lists the basic torque for the bolts and nuts used on Kawasaki Motorcycles. However, the actual torque that it necessary may vary among bolts and nuts with the same thread diameter and pitch. The bolts and nuts listed on Pg. 46 vary to a greater or lesser extent from what is given in this table. Refer to this table for only the bolts and nuts not included in the table on Pg. 46. All of these values are for use with dry solvent cleaned threads.

Coarse threads

dia (mm)	pitch (mm)	kg-m	ft-lbs
5	0.90	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

WIRING DIAGRAM