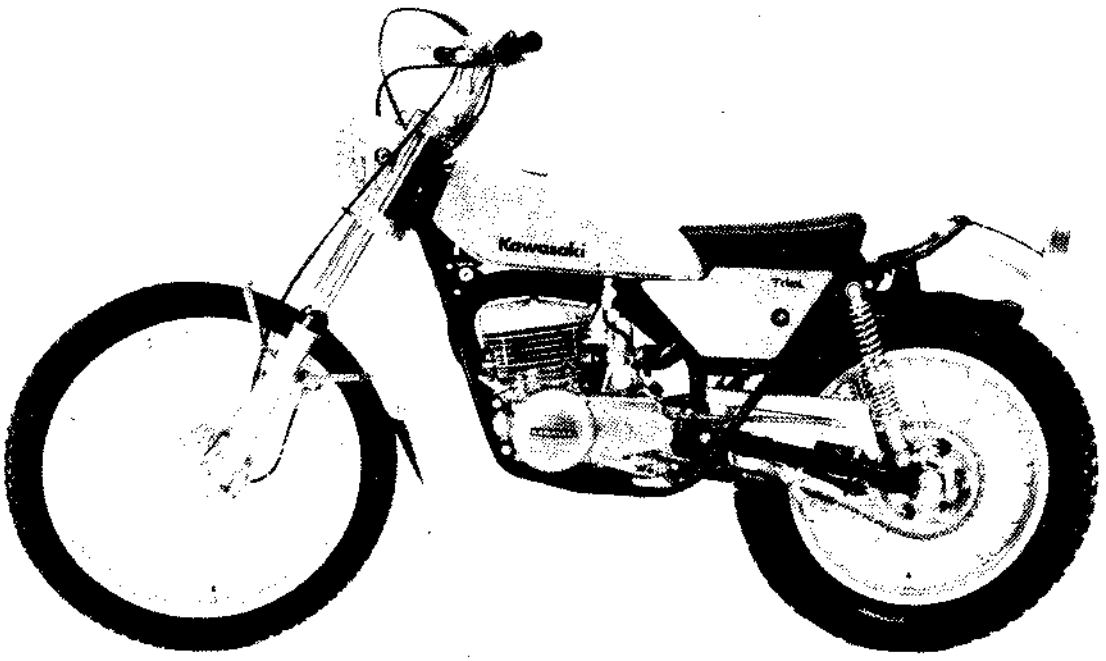
KT250



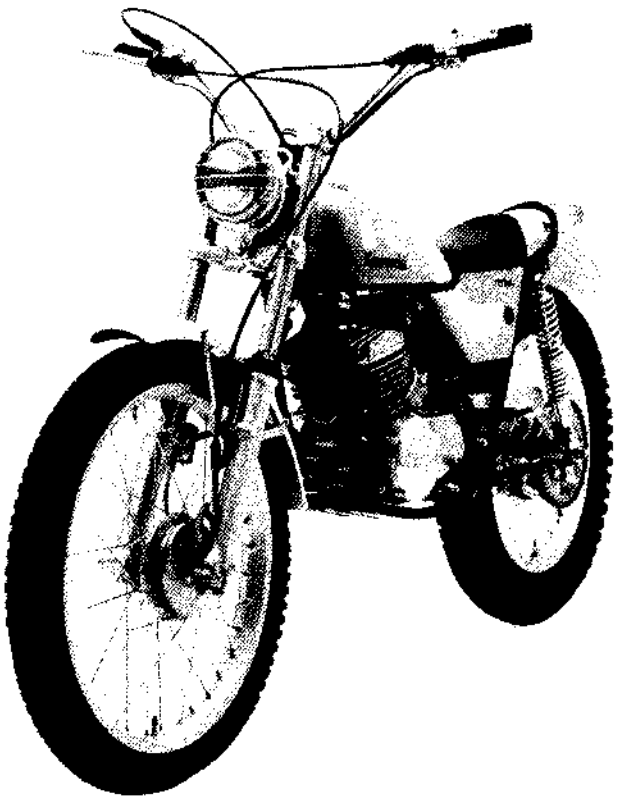
SHOP MANUAL

WARNNING
THIS VEHICLE IS AN OFF-ROAD VEHICLE ONLY AND WAS NOT MANUFACTURED FOR, NOR SHOULD IT BE USED ON, PUBLIC STREETS, ROADS, OR HIGHWAYS.

Foreword

This KAWASAKI Motorcycle has been developed by Kawasaki engineering as a light weight, high performance machine with superb handling and stability for trial and sporting use.

Since the KT250 is already a specially tuned production trials machine, it does not require tuning modification for participation in trials. However, as with any mechanical device, proper care and maintenance are important for trouble-free operation and top performance. This manual is written to enable to keep your KT250 properly tuned and adjusted.



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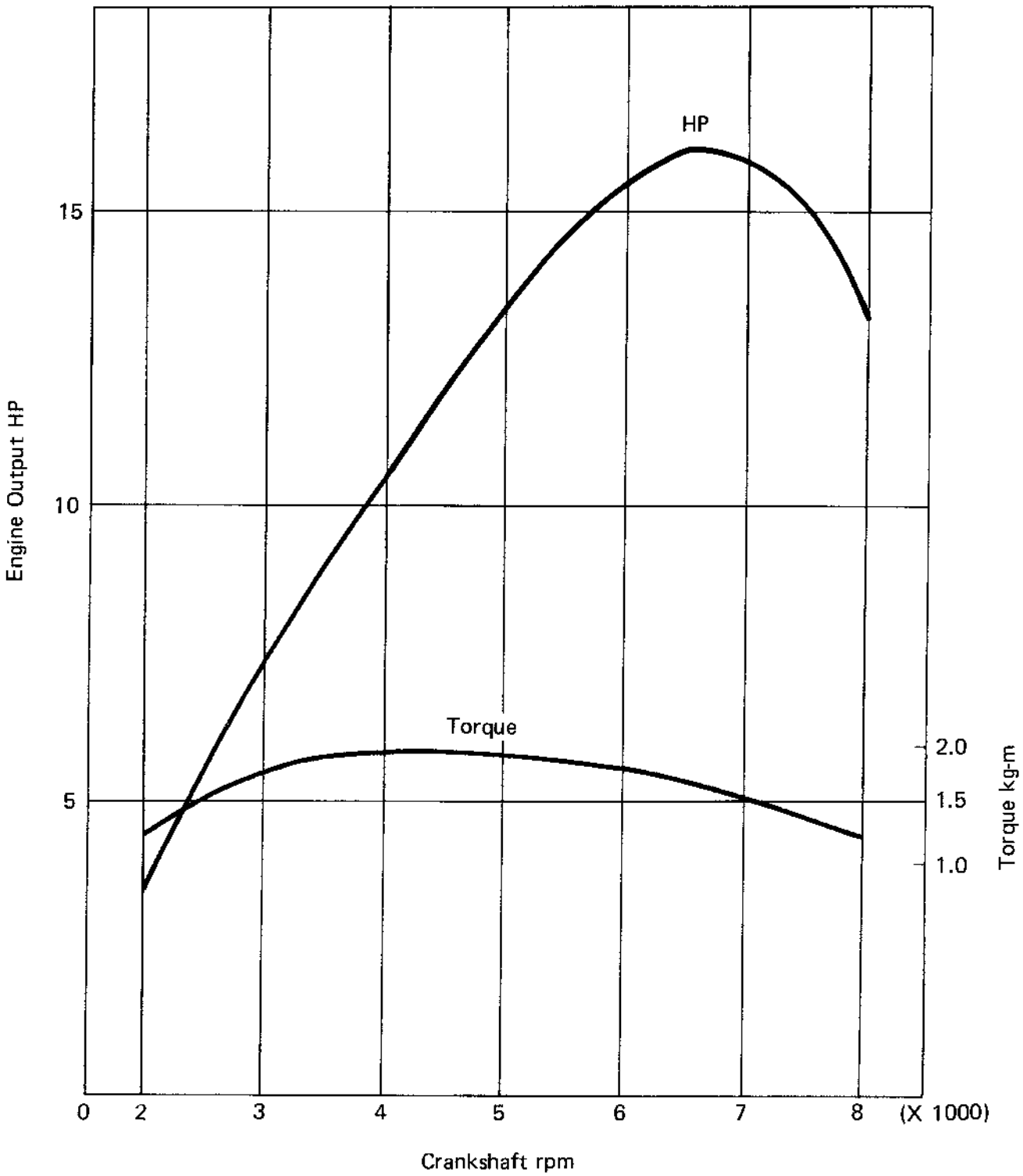
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Specifications

Dimensions		
Overall length		2,015 mm
Overall width		835 mm
Overall height		1,155 mm
Wheelbase		1,305 mm
Ground clearance		310 mm
Dry weight		96 kg
Fuel tank capacity		5.5 ℓ (1.5 US gal)
Oil tank capacity		0.25 ℓ (0.26 US qt)
Engine		
Type		2-stroke, single cylinder, piston valve
Bore and stroke		69.5 x 64.9 mm
Displacement		246 cc
Compression ratio		6.5:1
Maximum horsepower		16 HP @6,500 rpm
Maximum torque		1.9 kg-m @4,000 rpm
Port timing		
Intake	Open	68° BTDC
	Close	68° ATDC
Scavenging	Open	53° BBDC
	Close	53° ABDC
Exhaust	Open	76° BBDC
	Close	76° ABDC
Carburetor		Mikuni VM26SC
Lubrication system		Superlube (Oil injection)
Engine oil		2-stroke oil
Starting system		Primary kick
Ignition system		Electronic CDI
Ignition timing		23° BTDC/3.7 mm BTDC @4,000 rpm
Spark Plug		NGK B7HS
Transmission		
Type		5-speed, constant-mesh, return-shift
Clutch		Wet, multi-disc
Gear ratio:	1st	3.25 (39/12)
	2nd	2.47 (37/15)
	3rd	1.83 (33/18)
	4th	1.22 (28/23)
	5th	0.79 (22/28)
Primary reduction ratio		3.26 (62/19)
Final reduction ratio		3.47 (52/15)
Overall drive ratio		8.89 (5th)
Transmission oil:	capacity	1.2 ℓ
	type	SAE 10W30 or 10W40
Frame		
Type		Tubular, double-cradle
Steering angle		68° to either side
Castor		63.5°
Fork angle		62°
Trail		79 mm
Tire size:	Front	2.75-21 4PR
	Rear	4.00-18 4PR
Suspension:	Front	Telescopic fork
	Rear	Swing arm
Suspension stroke:	Front	175 mm
	Rear	100 mm
Front fork oil (per shock absorber)		SAE 10W 160～168 cc
Brakes		
Type		Internal expansion, leading-trailing
Inside diameter:	Front	120 x 28 mm
	Rear	130 x 28 mm

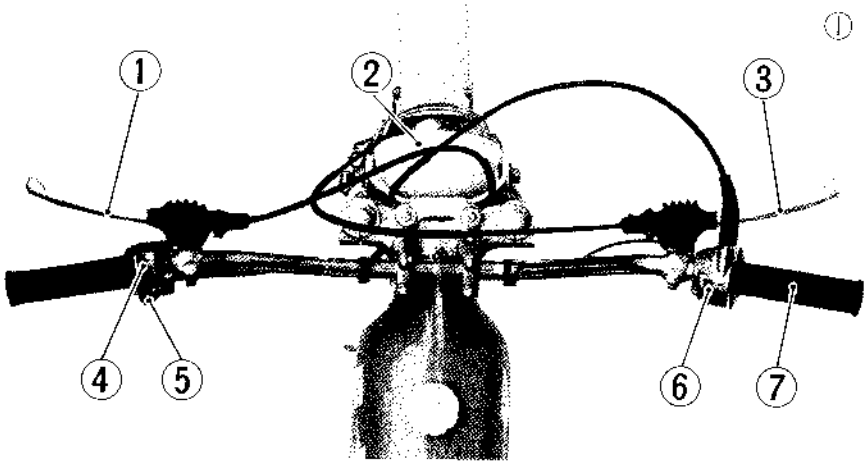
Specifications subject to change without notice.

Engine Performance Curves

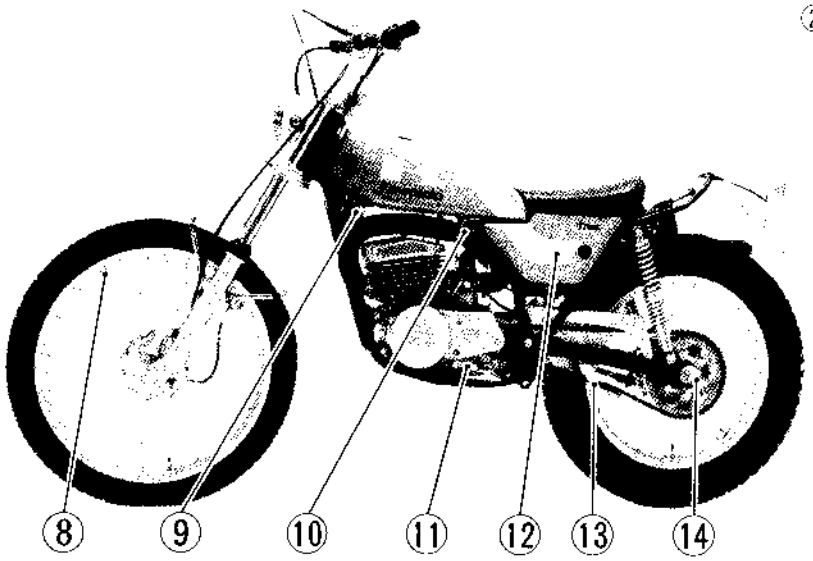


General Information

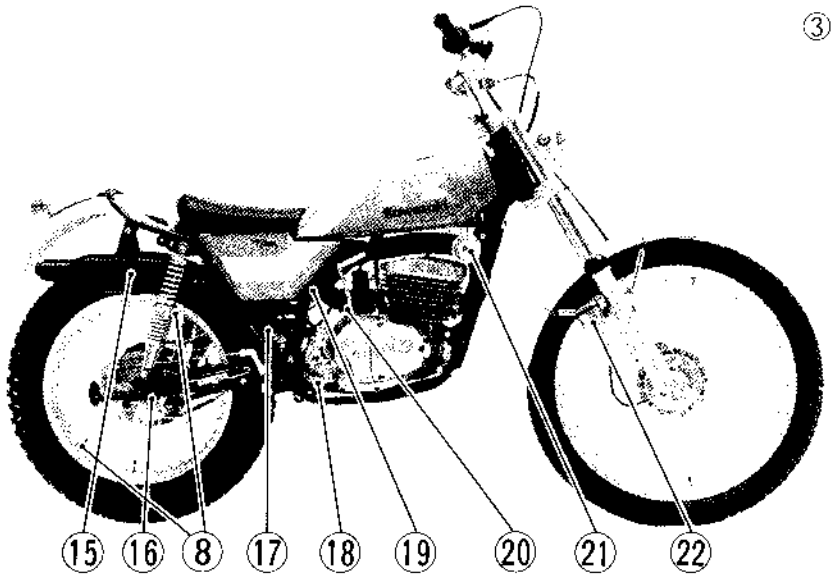
LOCATION OF PARTS



1. Clutch Lever
2. Headlight
3. Front Brake Lever
4. Dimmer Switch
5. Horn Button
6. Engine Stop Switch
7. Throttle Grip



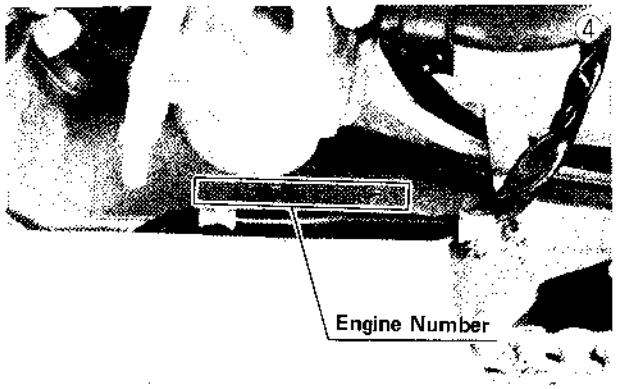
8. Bead Protector
9. Ignition Switch
10. Fuel Tap
11. Shift Pedal
12. Engine Oil Tank and Air Cleaner
13. Chain Tensioner
14. Chain Adjuster

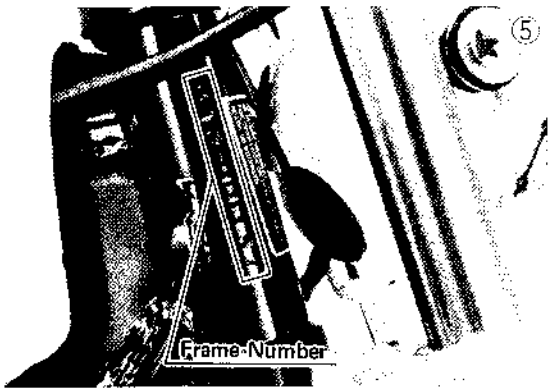


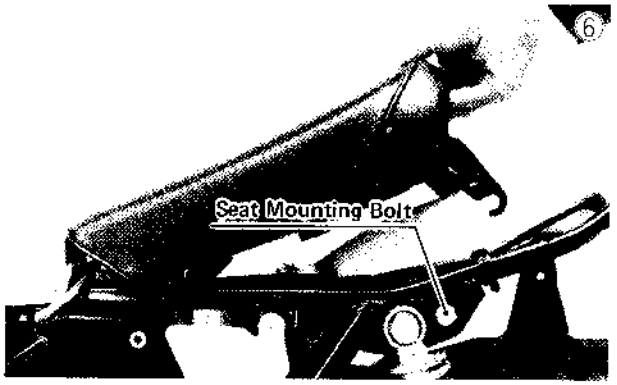
15. Spark Arrester
16. Side Stand
17. Rear Brake Light Switch
18. Rear Brake Pedal
19. Muffler
20. Kick Pedal
21. Horn
22. Speedometer

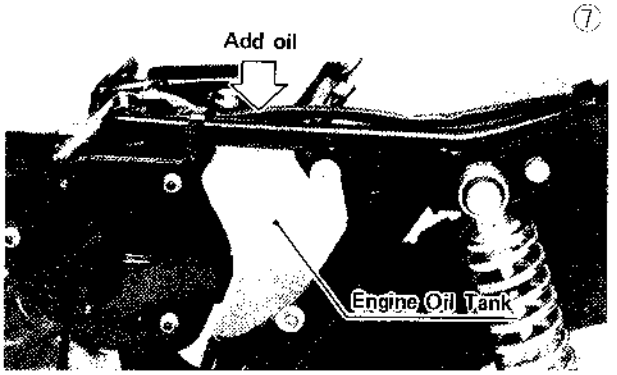
SERIAL NUMBER LOCATIONS

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 locate it.









CAUTION: Never let the oil tank run completely dry, or severe engine damage will occur. If the oil does run dry and air enters the oil pump hoses or oil pump, bleed the oil pump (Pg. 42).
Note: Check the oil tank level at every fuel tank fill-up.

FUEL

The Kawasaki Superlube system is used in this motorcycle. This system eliminates the necessity for the owner himself to mix oil with the gasoline. Use only non-leaded gasoline in the fuel tank.

ENGINE OIL

Do not use ordinary motor oil, transmission oil, or an inferior grade oil as a replacement for the proper oil. The use of improper oil will lead to engine trouble.

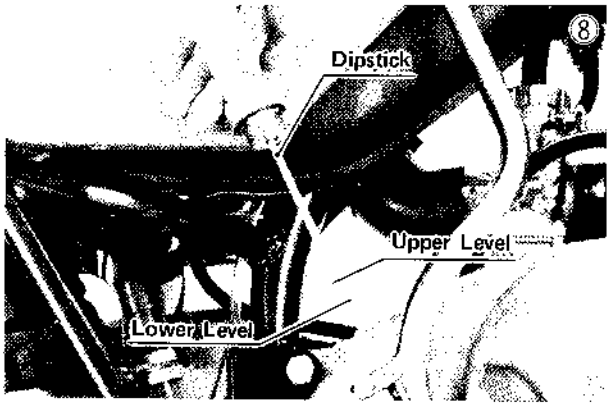
Remove the left side cover to check the oil level. If the tank is less than half full, **2-stroke** oil should be added. To add the engine oil, first loosen the seat mounting bolts (13 mm) and pull the seat off towards the rear, then remove the tank cap and pour in the oil. Since mixing different brands of oil reduces the lubricative ability of the oil, add only the same brand as that already in the tank.

TRANSMISSION OIL

In order for the transmission and clutch to function properly, maintain the transmission oil at the proper level, and change the oil in accordance with the periodic maintenance chart (Pg. 52). Motorcycle operation with insufficient, deteriorated, or contaminated transmission oil will cause accelerated wear and may result in transmission seizure.

Oil Level

- If the motorcycle has just been used, wait 2 to 3 minutes for all the oil to drain down.
- If the oil has been poured in since the motorcycle was last used, kick the motorcycle over 3 or 4 times with the ignition switch left in the off position. This ensures that the oil will "settle".
- Situate the motorcycle so that it is fully perpendicular to the ground (off its side stand).
- Remove the oil filler opening plug dipstick, and wipe off any oil on the end.
- Insert the dipstick back through the oil filler opening without screwing it in, and then remove it. The oil should be between the dipstick marks.

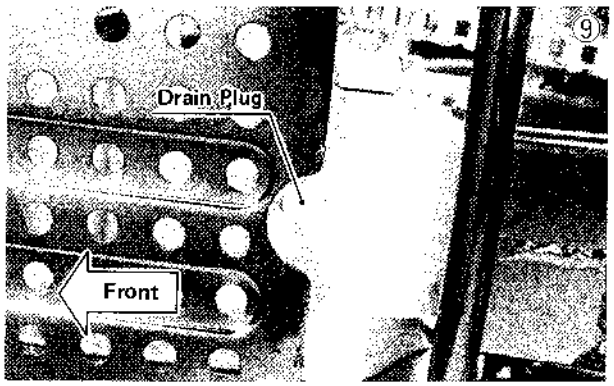


- If there is too much oil, remove the excess oil with a syringe or some other suitable device.
- If there is too little oil, add the correct amount of oil through the oil filler opening. Fill with the same type and make of oil that is already in the transmission.
- Replace the dipstick making sure that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

Oil Change

The transmission oil should be changed periodically (Pg. 52).

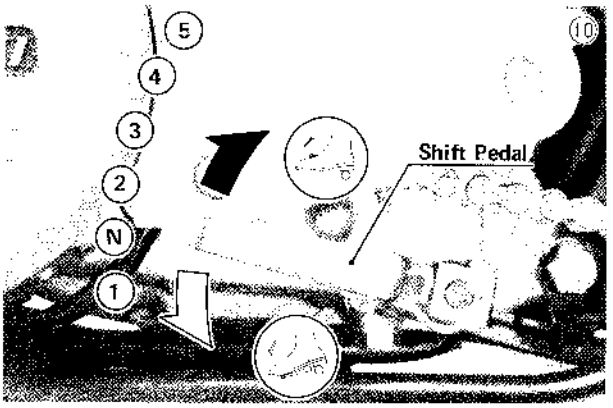
- Warm up the engine thoroughly so that the oil will pick up any sediment and drain easily.
- Stop the engine, and place an oil pan beneath the engine.
- Remove the drain plug (17 mm) and position the vehicle off its side stand so that it is fully perpendicular to the ground to allow all the oil to drain out.



- Replace the drain plug with its gasket, tightening it with 1.0 ~ 1.5 kg-m (7.0 ~ 11.0 ft-lbs) of torque.
- Remove the oil filler hole plug, and pour in 1.2 ℓ (1.27 US qt) of fresh SAE 10W30 or 10W40 oil.
- Check the oil level (Pg. 6), after kicking the kick-starter 3 ~ 4 times.
- Replace the oil filler hole plug with its O ring.

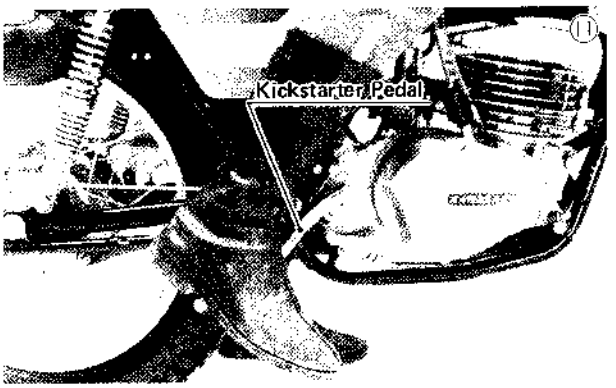
TRANSMISSION

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.



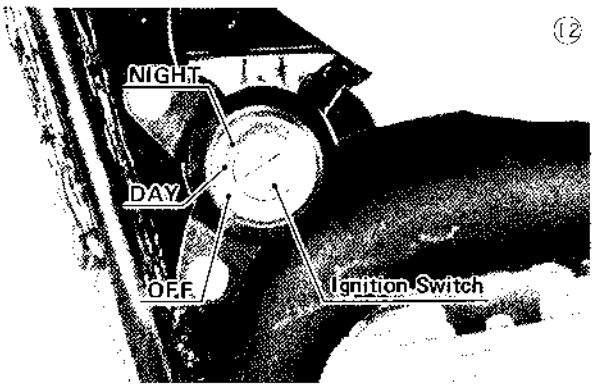
KICKSTARTER

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.



IGNITION SWITCH

This is a key operated switch with 3 positions. The key can be removed from the switch when it is in the **OFF** position.



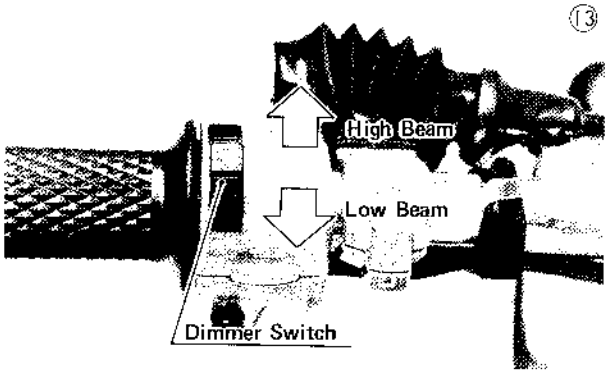
OFF	Engine off. All electrical circuits off.
DAY	For starting and daytime use. All electrical equipment except head and tail lights can be used.
NIGHT	For night riding. Head and tail lights are on, and all electrical equipment can be used.

DIMMER SWITCH

The head and tail lights come on when the ignition switch is turned to the NIGHT position while the engine is running.

High or low beam can be selected with the dimmer switch.

HI..... High Beam , LO..... Low Beam

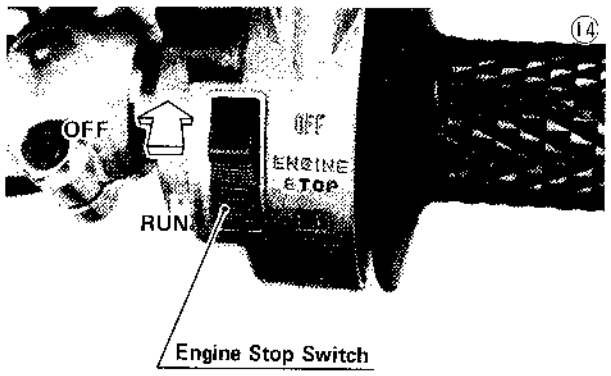


ENGINE STOP SWITCH

In addition to the ignition switch, the engine stop switch must be in the **RUN** position for the motorcycle to operate.

The head and tail lights come on when the ignition switch is turned to the NIGHT position while the engine is running.

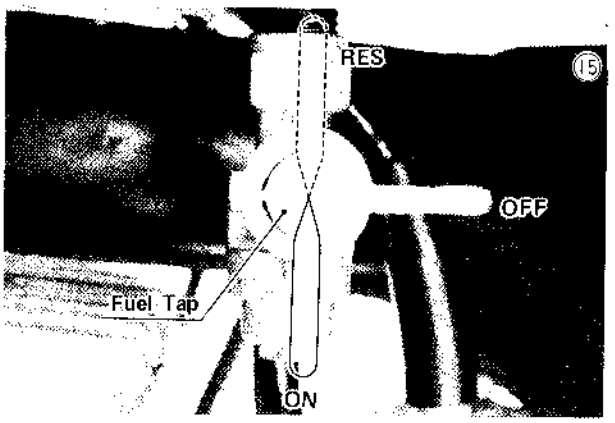
NOTE: Although the engine stop switch stops the engine, it does not turn off all the electrical circuits. Ordinarily, the ignition switch should be used to stop the engine.



FUEL TAP

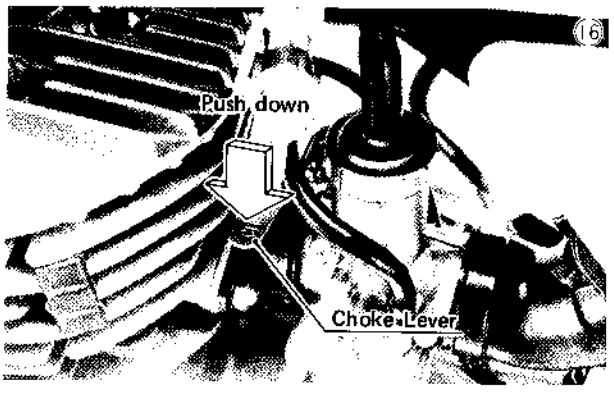
The fuel tap has three positions: **OFF** (Stop), **ON** (On) and **RES** (Reserve). If the fuel runs out with the tap in the **ON** (On) position, the last 0.9 ℓ (0.24 US gal) of fuel can be used by turning the tap to **RES** (Reserve).

NOTE: Since riding distance is limited when on **RES** (Reserve), refuel at the earliest opportunity.



STARTING THE ENGINE

- Turn the fuel tap to **ON** (On).
- Make certain the engine stop switch is in the **RUN** position.
- Check that the side stand is up.
- Make certain the gears are in neutral.
- If the engine is cold, push down the choke lever, leaving the throttle closed.



- Turn the ignition switch to the DAY position.
- Kick the engine over.
- Even after the engine starts, keep the choke lever pushed down. When the engine is warm enough, pull up the choke lever.

NOTES: 1. When the engine is already warm or on hot days, open the throttle part way instead of using the choke lever. Then kick over the engine.

2. If the engine is flooded, kick with the throttle fully open until the engine starts.

3. If the clutch lever is pulled, the motorcycle can be started while still in any gear.

STOPPING THE ENGINE

- Shift the transmission into neutral.
- Turn the ignition switch off.
- Turn the fuel tap to the **OFF** (Stop) position.

Stopping the Motorcycle in an Emergency

Your Kawasaki Motorcycle has been designed and manufactured to provide you optimum safety and convenience. However, in order to fully benefit from Kawasaki's safety engineering and craftsmanship, it is essential that you, the owner and operator, properly maintain your motorcycle and become thoroughly familar

with its operation. Improper maintenance and insufficient riding skills can create a dangerous situation known as throttle failure. Two of the most common causes of throttle failure are:

1. During removal of air cleaner by owner, dirt is allowed to enter and jam carburetor.
2. A novice may forget which direction throttle rotates; then jerk throttle wide open thinking he has shut it off; panic when machine accelerates violently instead of slowing down; and "freeze," holding throttle wide open.

Kawasaki has provided an "engine stop" switch or button on all its motorcycles which may be used to safely stop your motorcycle in an emergency. Alternatively, your motorcycle may be stopped by applying the brakes and disengaging the clutch.

BREAK-IN

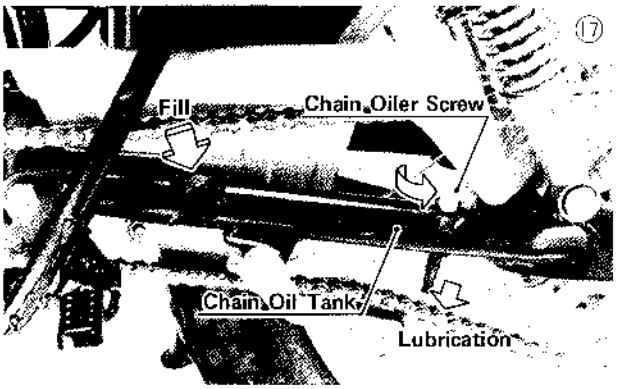
The first 1,600 km (1,000 mi) that the motorcycle is ridden is designated as the break-in period. If the motorcycle is not used carefully during this period, you may very well end up with a "broken down" instead of a "broken in" motorcycle after a few thousand kilometers.

In addition to limiting engine rpm, 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 B7HS** plug with the hotter **B6HS** for the duration of the break-in period. After break-in, be sure to re-install the standard plug.

See the Inspection and Adjustment Section for additional spark plug information.

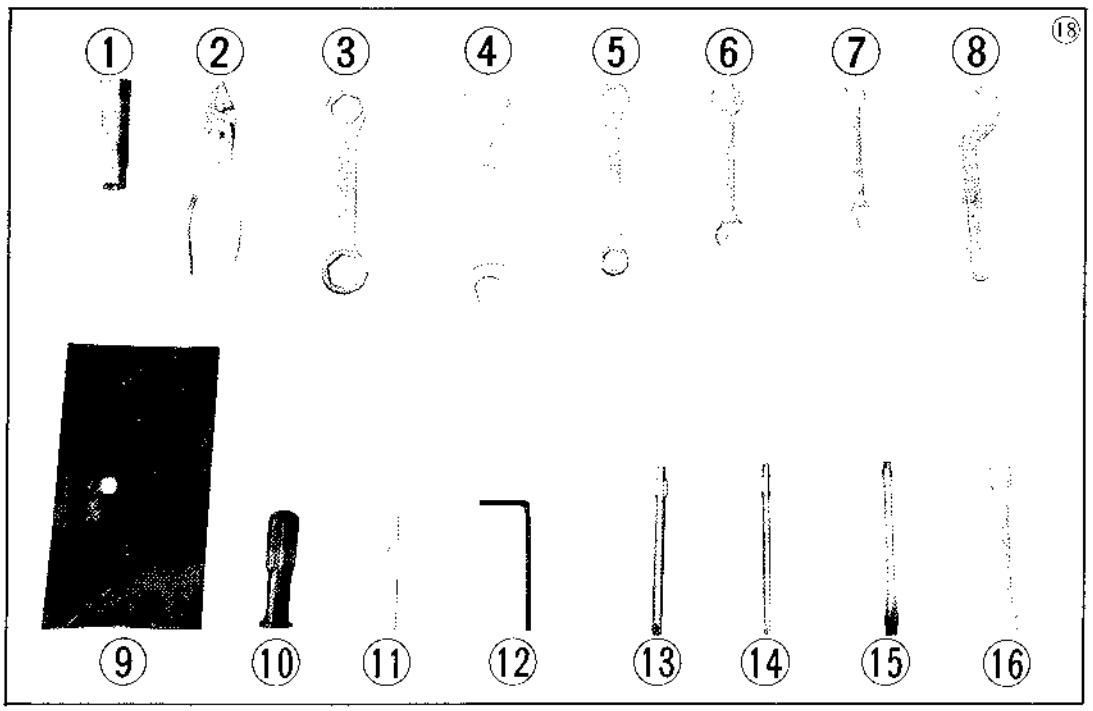
CHAIN OIL TANK

A chain oil tank is provided in the left side of the swing arm, to lubricate the chain whenever necessary.



TOOL KIT

The major adjustments explained in the Inspection and Adjustment section, and the minor replacement of parts explained in the Disassembly section can be performed with the tools in the tool kit.



1. Spark Plug Wrench 17 x 21 mm
2. Pliers
3. Axle Wrench 22 x 24 mm
4. Open End Wrench 19 x 21 mm
5. Axle Wrench 14 x 17 mm
6. Open End Wrench 12 x 13 mm
7. Open End Wrench 8 x 10 mm
8. Hook Spanner
9. Tool Bag
10. Screwdriver Grip
11. Screwdriver Handle
12. Allen Wrench 6 mm
13. #3 Phillips Bit
14. #2 Phillips Bit
15. Regular Screwdriver Bit
16. Spoke Wrench #10 x 9

Inspection and Adjustment

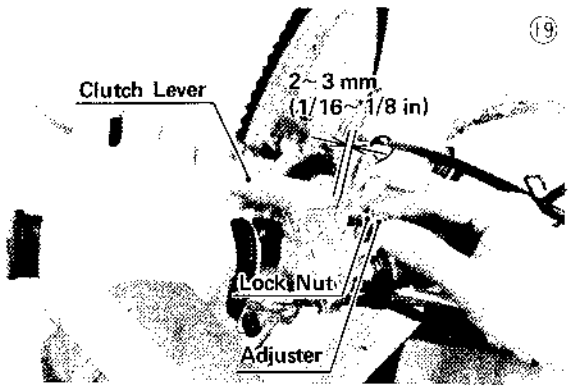
CLUTCH

Clutch Lever

Proper clutch lever play between the clutch lever and the clutch lever holder is 2 ~ 3 mm ($^1/_{16}$ ~ $^1/_8$ in). The play increases with cable stretch, necessitating periodic adjustment.

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

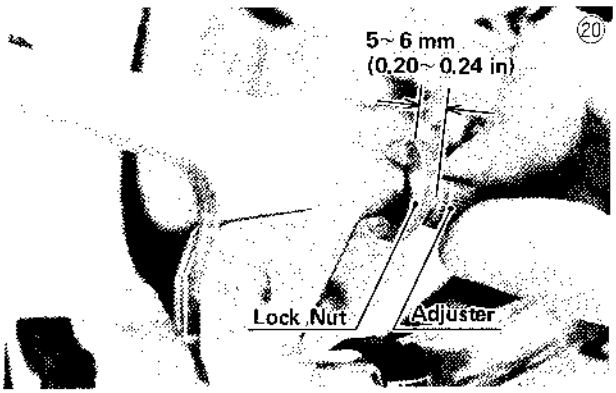
- Slide the clutch lever dust cover out of place.
- Loosen the lock nut, turn the adjuster to obtain the proper amount of lever play, and tighten the lock nut.



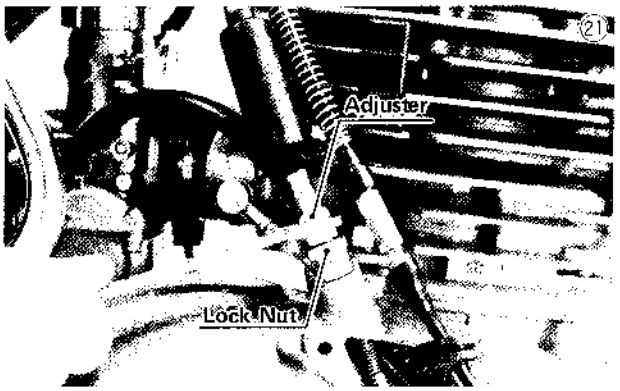
- Slide back the clutch lever dust cover.

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

- Slide the clutch lever dust cover out of place.
- Loosen the lock nut 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 lock nut.



- Slide the dust cover up out of its position at the bottom of the clutch cable.
- Loosen the lock nut (13 mm) 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 lock nut.

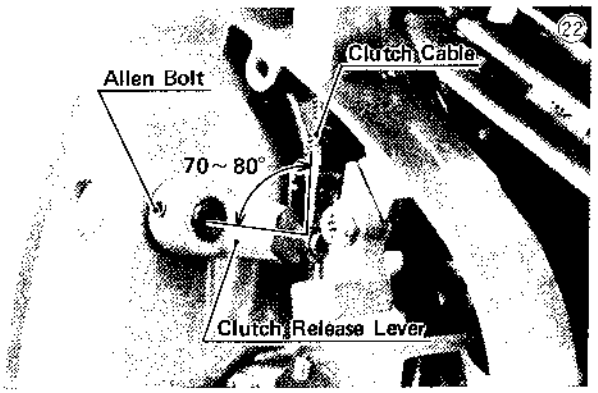


- Slide back the bottom dust cover.
- Turn the adjuster at the clutch lever so that the clutch lever will have 2 ~ 3 mm ($^1/_{16}$ ~ $^1/_8$ in) of play, and tighten the lock nut.
- Slide back the clutch lever dust cover.

Clutch Release Lever Angle

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.

- Remove the oil pump cover.
- Check that the clutch release lever is at a 70 ~ 80° angle with the clutch cable, when the clutch is just starting to release.



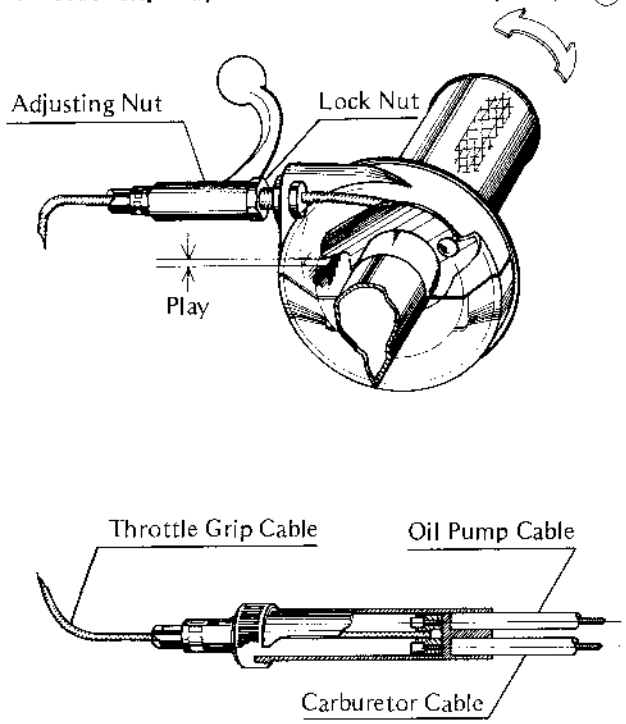
- If it is not, screw in the cable adjuster at the right engine cover, remount the clutch release lever at a new position on the shaft to obtain the proper angle, and then adjust cable play.

THROTTLE GRIP

The throttle grip cable, connecting to both the carburetor cable and the oil pump cable, controls both the carburetor throttle valve and the oil pump lever. If there is too much play in the cable, neither the carburetor nor the oil pump will respond immediately when the grip is turned. Most of this excess play must be adjusted out.

If the throttle grip has too much play, loosen the lock nut (10 mm), turn the adjusting nut (8 mm) to take up the excess play at the throttle grip, and tighten the lock nut.

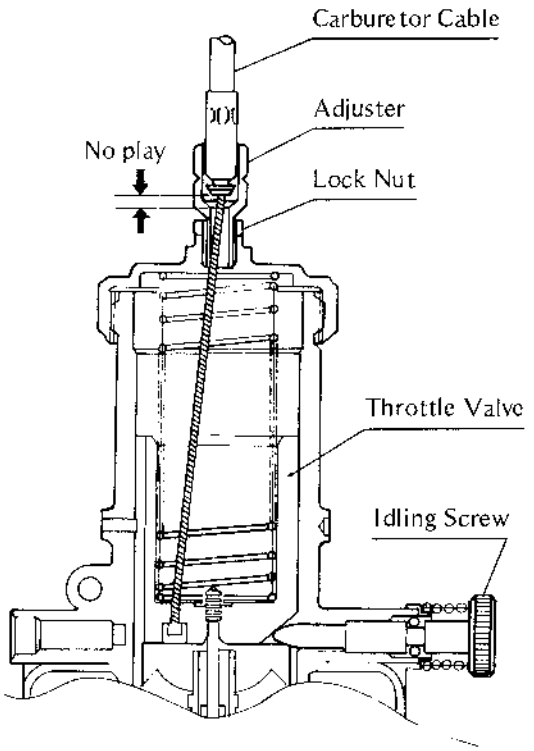
Throttle Grip Play ㉓



NOTE: A small amount has to be left so that steering movement will not affect the throttle valve or oil pump lever.

- Loosen the lock nut (10 mm), and turn in the adjuster so that the throttle valve is at its lowest possible position.
- Adjust the engine idle speed.
- Being careful not to turn the adjuster so far that the throttle valve rises out of its lowest position, turn the adjuster back out to eliminate the play so that the slightest tug on the outer cable will affect the throttle valve. Tighten the lock nut.

Carburetor Cable Play ㉕

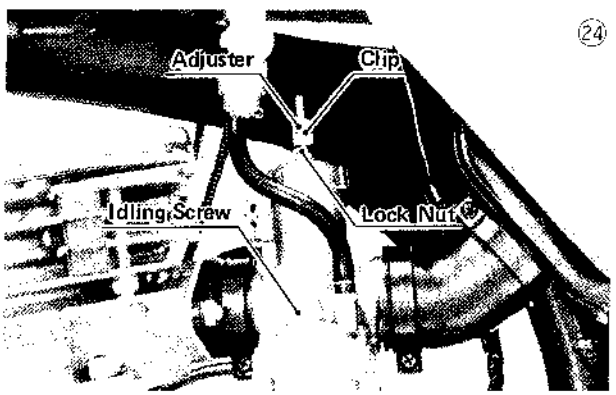


CARBURETOR

Carburetor Cable Adjustment

Due to stretching of the carburetor cable, the throttle valve may not respond immediately to the opening of the throttle, and as a result the oil pump flow may become too large at a given throttle opening. Check and adjust the carburetor cable periodically.

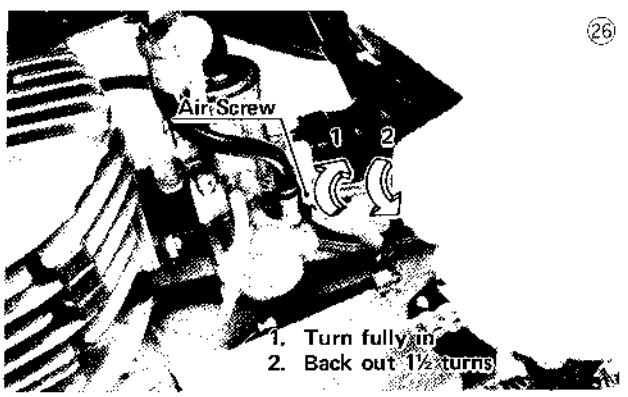
- Back out the idling screw 3 or 4 turns.
- Slide up the adjuster dust cover, and remove the safety clip from the adjuster.



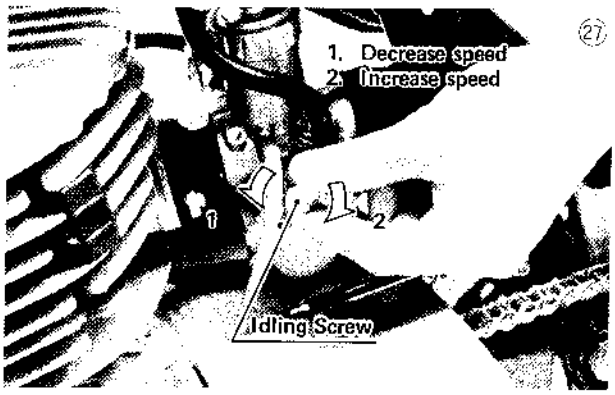
- Install the safety clip in the adjuster, and slide back the dust cover.
- Check the throttle grip play (Pg. 10).
- Check the oil pump adjustment (Pg. 12).

Idle Speed Adjustment

- Screw in the air screw fully but not tightly, and then back it out 1½ turns.



- Warm up the engine for about 5 minutes.
- Adjust the idling speed with the idling screw to the point where the engine stops at zero throttle. Turning the idling screw clockwise raises engine speed, while turning it counterclockwise lowers it.



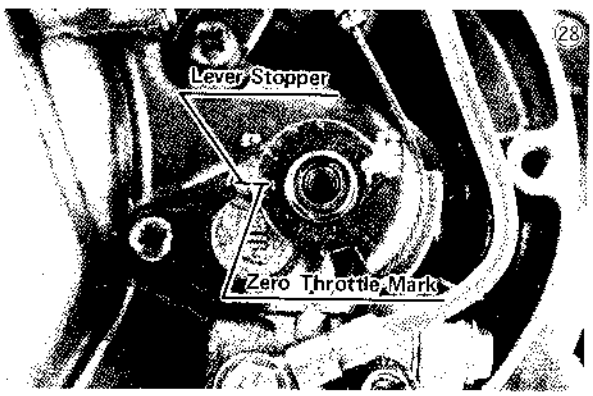
- Turn the throttle grip a few times to make sure that the idling speed is not changed (i.e. the engine will not idle) after the grip is returned. Readjust if necessary.
- Turn the handlebar fully to the right side, and check that the engine is stopped when the throttle grip is fully closed. If the engine is still running, throttle grip cable play is insufficient otherwise the throttle control cable assembly is poorly routed.
- Adjust the carburetor cable (Pg. 11).
- Adjust the oil pump cable (Pg. 12).

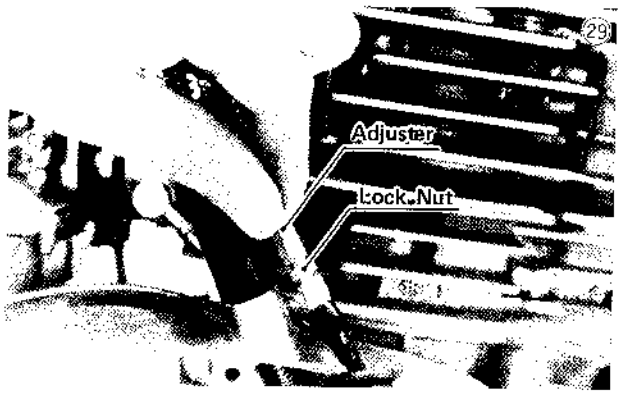
NOTE: The ignition timing must be correct for proper idling adjustment.

OIL PUMP CABLE

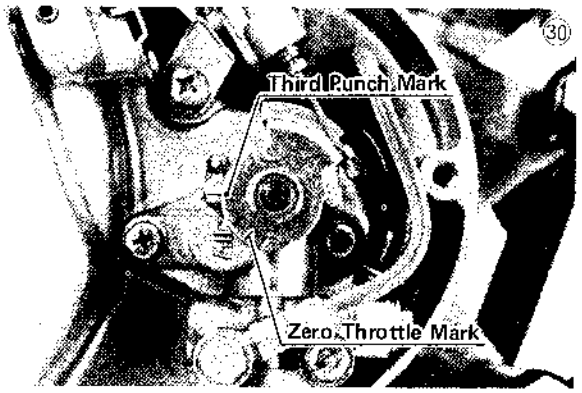
Due to stretching of the oil pump cable, the oil pump flow may become too low at a given throttle opening. Check and adjust the oil pump cable periodically.

Check to see that the lower mark on the oil pump lever is aligned with the corresponding mark on the oil pump lever stopper at zero throttle. If it is not, turn the adjuster to line up the two marks.





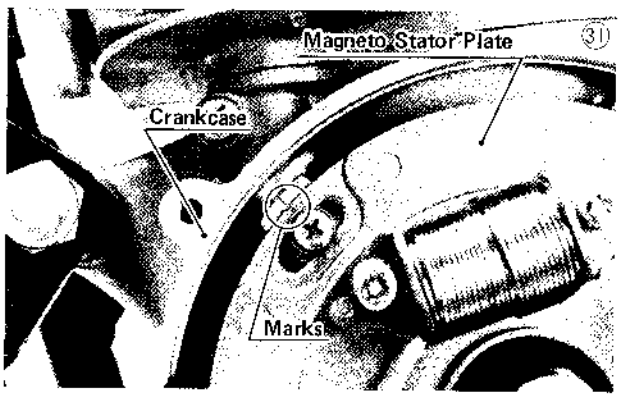
NOTE: The third punched mark on the oil pump lever is designed to line up with or pass the mark on the lever stopper when the throttle grip is fully open. It may be used to check whether or not the throttle grip is opening the pump fully.



IGNITION TIMING

This motorcycle has a CDI (Capacitor Discharge Ignition) system which has no moving parts. Consequently, it is usually unnecessary to adjust the ignition timing, unless tha magneto base is incorrectly installed during engine assembly. However, if there is any doubt as to correct timing, inspect and adjust as follows:

- Remove the magneto cover, and remove the magneto flywheel using the magneto flywheel holder and magneto flywheel puller (special tools).
- Check to see whether or not the magneto stator plate mark is aligned with the crankcase mark.



•If the marks are not aligned, loosen the magneto stator plate screws (3), shift the position of the plate so that the marks are aligned, and then tighten screws securely.

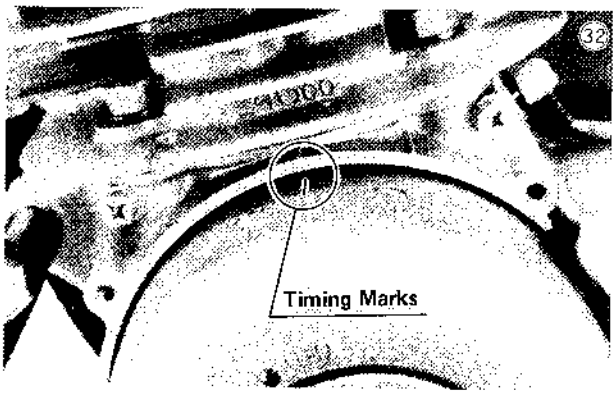
If a hand tachometer and a strobe light are available, a dynamic inspection of ignition timing can be made.

NOTE: Two people are required for carrying out the dynamic inspection.

•Remove the magneto cover, connect the strobe light in the manner prescribed by the manufacturer.

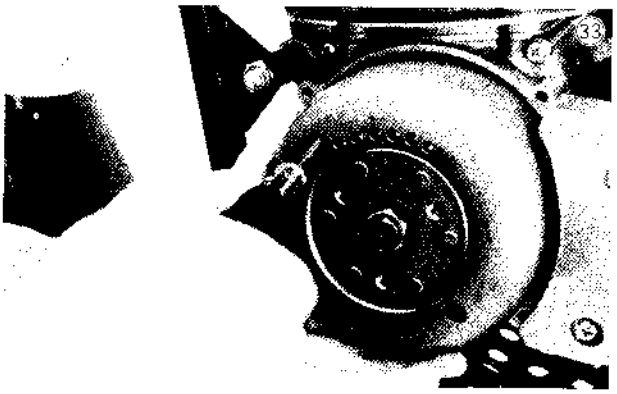
•Start the engine and attach a hand tachometer to the center of the flywheel. Set the engine speed at 4,000 rpm.

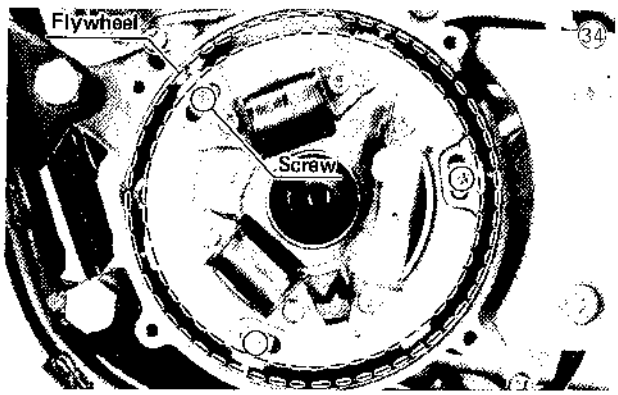
•Direct the light at the timing marks on the flywheel and crankcase. The marks should align at 4,000 rpm. (The crankcase mark to the right is not used to check the timing).



•If they do not, stop the engine.

•Loosen the magneto stator plate mounting screws (3) using a #2 Phillips screwdriver through the flywheel holes. The screw heads are located along the inner circumference of the flywheel.



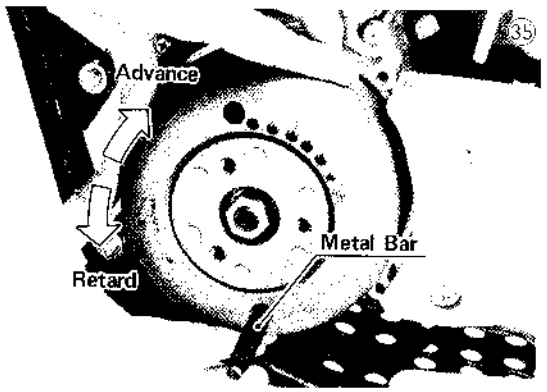


NOTE: Push the screwdriver securely against the screw, otherwise the screw head may be damaged. If the screw can not be turned, the flywheel must be removed with special tools to make the adjustment.

•Insert a metal bar 10 mm (0.394 in.) in diameter and at least about 100 mm (4 in.) long into one of the flywheel holes to a depth of about 32 ~ 38 mm (1¼ ~ 1½ in.).

CAUTION: When inserting the special flywheel holder bar into the flywheel hole, or when moving the stator plate, be careful not to damage the coil windings.

•Then turn the flywheel by hand to adjust the timing; clockwise rotation advances the timing and counter-clockwise retards it. (The flywheel will turn freely up to 1/3 turn before the rod hits the stator coil core and begins moving the stator to change the timing.)



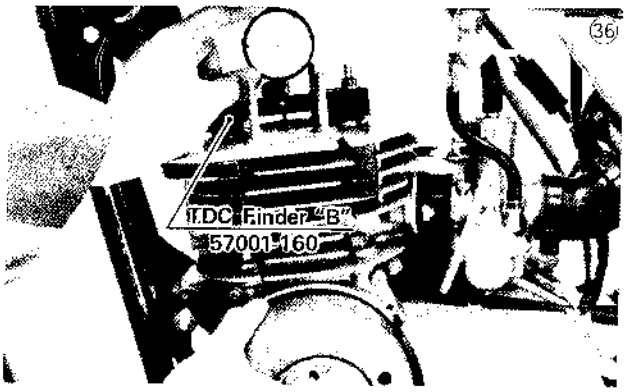
•After adjustment, tighten the stator screws securely.

The accuracy of the timing marks may be checked with a dial gauge and TDC finder "B" (special tool).

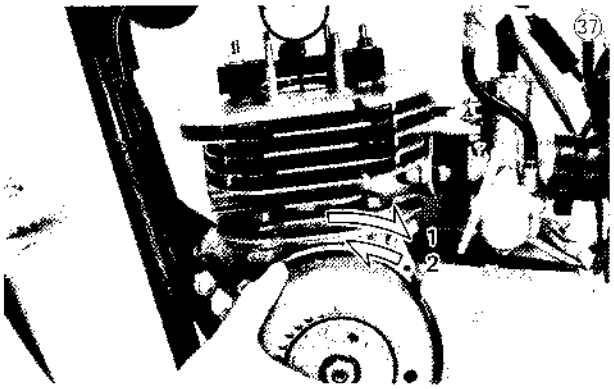
•Remove the magneto cover and the cylinder head.

•Rotate the magneto flywheel until the position of the piston is close to the top.

•Using TDC finder "B" (special tool), mount a dial gauge on the cylinder, rotate the flywheel to set the piston at exact TDC (top dead center), and set the dial to zero.



•Rotate the flywheel clockwise until the dial gauge reads about 4 mm (0.16 in) and then counterclockwise until the dial gauge reads 3.7 mm (0.146 in).

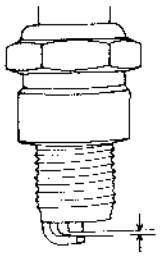


•The timing mark on the flywheel should align with the crankcase mark at this point. If it does not, once the piston has been set at 3.7 mm (0.146 in) BTDC (before top dead center) make a new timing mark on the flywheel just under the projection.

SPARK PLUG

The standard spark plug is an NGK B7HS. It should have a 0.6 ~ 0.7 mm (0.024 ~ 0.028 in) gap, and be tightened with 2.5 ~ 3.0 kg-m (18 ~ 22 ft-lbs) of torque.

Spark Plug Gap (38)



0.6~0.7 mm (0.024~0.028 in)

The spark plug should be taken out periodically for cleaning and to reset the gap. If the plug is oily or has carbon built up on it, clean it (preferably with a sand-blaster) and then clean off any abrasive particles. The plug may also be cleaned using solvent and a wire brush or other suitable tool. Measure the gap with a thickness gauge, and adjust the gap if incorrect by bending the outer electrode.

To find out whether the right temperature plug is being used, pull it out and examine the ceramic insulator around the center electrode. If the ceramic is a light brown color, the spark plug is correctly matched to engine temperature. If the ceramic is burned white, the plug should be replaced with the next colder type, NGK B8HS. If the ceramic is balck, the plug should be replaced with the next hotter type, NGK B6HS.

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 after each trial or practice session without fail, and clean it if necessary.

•Remove the air cleaner element, and close up the air cleaner duct opening with tape, or stuff in rags so that no dirt is allowed to enter the carburetor.



•Clean a dirty element by emersing it in a bath of solvent having a high flash point, and squeezing it gently.

•After the element is clean, squeeze it dry.

•Soak the element in a 20:1 gasoline/oil (SAE 30) mixture (20 parts of gasoline to 1 part of oil), and then, after it is dry, fit the element back in the air cleaner housing properly so that no unfiltered air will enter the engine.

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

CAUTIONS:

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

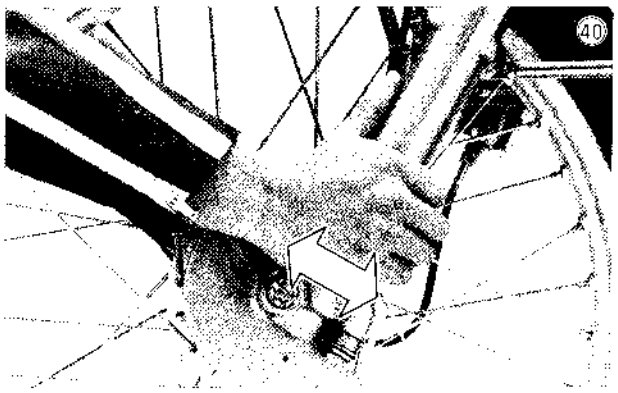
2. Because of the danger of highly flammable liquids, do not use gasoline or some kind of solvent having a low flash point to clean the element.

3. 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 egnine. If any part of the element is damaged, the element must be replaced.

STEERING

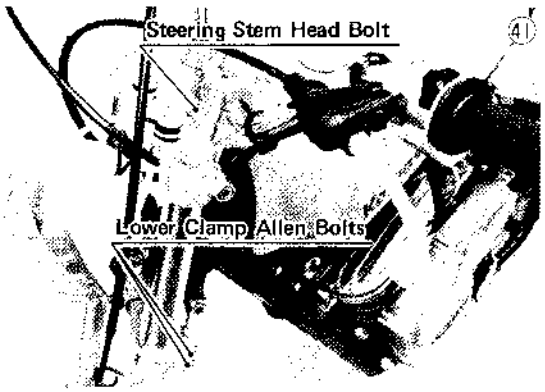
For safety, the steering should always be kept adjusted so that the handlebar will turn freely but not have excessive play.

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 front end back and forth, if play is felt, the steering is too loose.

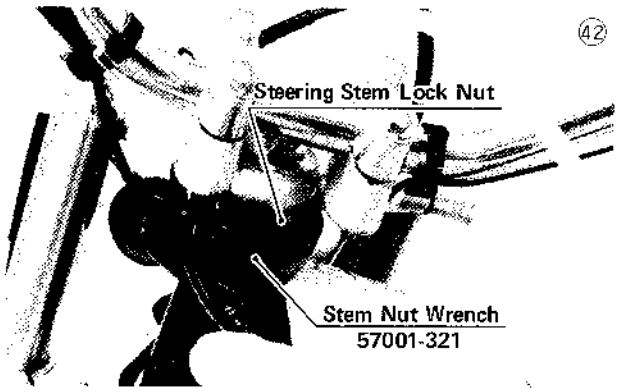


If steering needs adjusting:

- Place a stand under the frame to raise the front wheel off the ground.
- Loosen the steering stem head bolt (19 mm) and the four front fork lower clamp Allen bolts (7 mm).



- Turn the steering stem lock nut with the stem nut wrench (special tool) to obtain the proper adjustment.

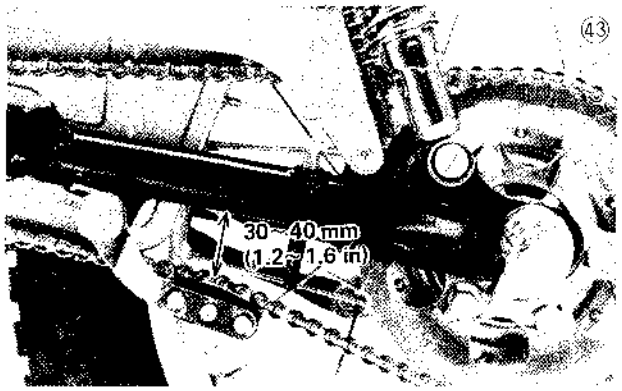


- Tighten the steering stem head bolt with 4.7 ~ 6.8 kg-m (34 ~ 49 ft-lbs) of torque and the four front fork lower clamp Allen bolts with 2.2 ~ 2.3 kg-m (16.0 ~ 16.5 ft-lbs) of torque.
- Check the steering again, and readjust it if necessary.

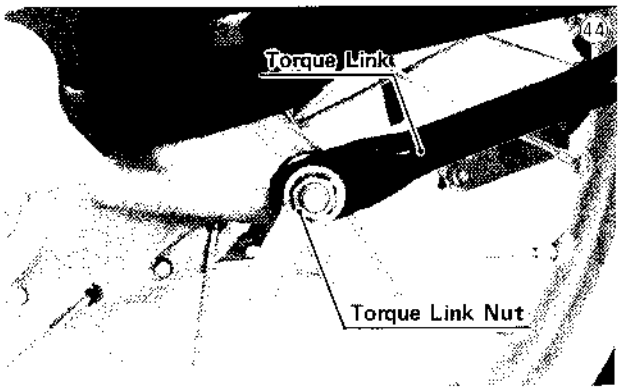
DRIVE CHAIN

First turn the rear wheel to find the part of the chain that is tightest, and make the adjustment using this part.

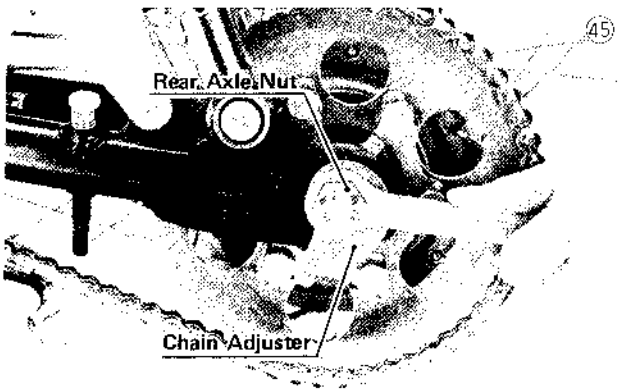
With the motorcycle on its side stand, measure the space left between the chain and the swing arm at the center portion of the drive chain tensioner. The space should be 30 ~ 40 mm (1.2 ~ 1.6 in). If the space is incorrect, the chain must be adjusted.



- Remove the cotter pin from the torque link bolt at the rear brake panel, and loosen the torque link nut (14 mm).

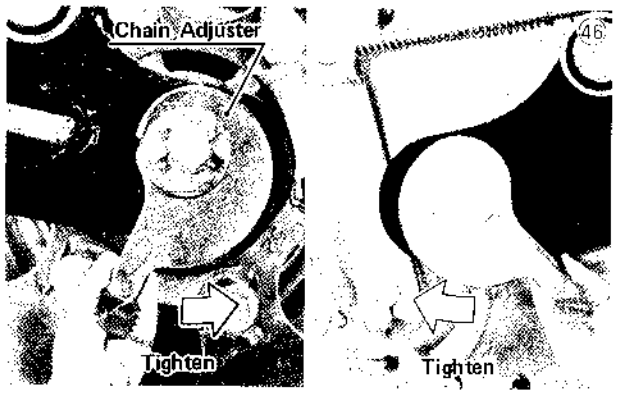


- Remove the cotter pin and loosen the rear axle nut (24 mm).



- If the chain is too tight, rotate the right side chain adjuster counterclockwise and the left side chain adjuster clockwise, and then kick the wheel forward until the chain is too loose.
- Turn the right side chain adjuster clockwise and the left side chain adjuster counterclockwise evenly until the chain has the correct amount of slack. To keep

the chain and the wheel aligned, the left chain adjuster must come to the same turned position that the right side chain adjuster comes to.

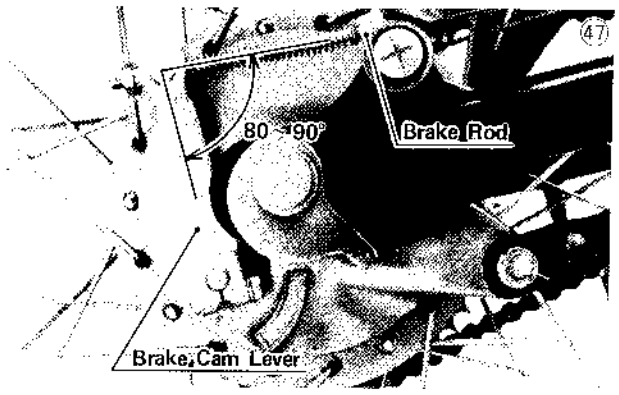


- Tighten the axle nut with 8.0 ~ 10.0 kg-m (58 ~ 72 ft-lbs) of torque.
- Rotate the wheel, measure the amount of slack, and readjust if necessary.
- Insert a new cotter pin through the axle nut and axle.
- Tighten the torque link nut with 2.2 ~ 3.4 kg-m (16.0 ~ 25 ft-lbs) of torque, and insert a new cotter pin.
- Check the rear brake adjustment (Pg. 16) and the rear brake light switch adjustment (Pg. 17).

BRAKES

Rear Brake Cam Lever Angle

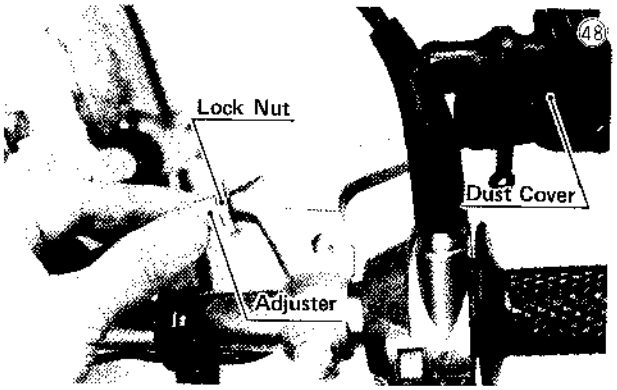
- When the brake is fully applied, the rear brake cam lever should come to 80 ~ 90° angle with the brake rod. If it does not, loosen the adjusting nut on the rear brake rod, remount the cam lever at a new position on the shaft to obtain the proper angle, and then adjust the rear brake pedal.



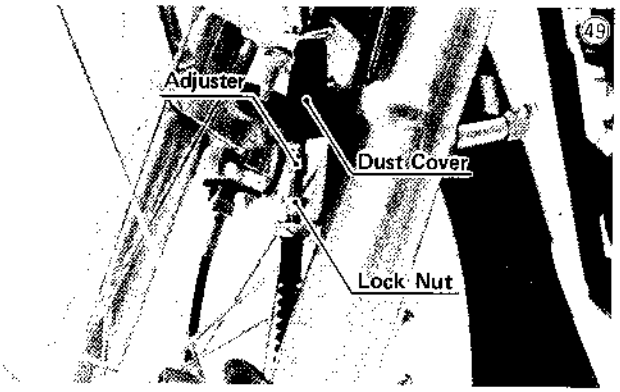
CAUTION: Since a cam lever angle greater than 90° reduces braking effectiveness, this adjustment should not be neglected. Whenever the cam lever angle is adjusted, also check for drag and proper pedal operation. In case of doubt as to braking effectiveness, disassemble and inspect all internal brake parts. Worn parts could cause the brake to lock or fail.

Front Brake Lever

- Slide the front brake lever dust cover out of place.
- Loosen the lock nut at the front brake lever, screw the adjuster fully in, and tighten the lock nut.



- Slide up the dust cover, and loosen the lock nut (10 mm) at the lower end of the brake cable.



- Turn the adjuster on the lower end of the front brake cable so that when the brake is fully applied, there is 55 ~ 65 mm (2 ~ 2½ in) of space left between the throttle grip and the end of the brake lever.



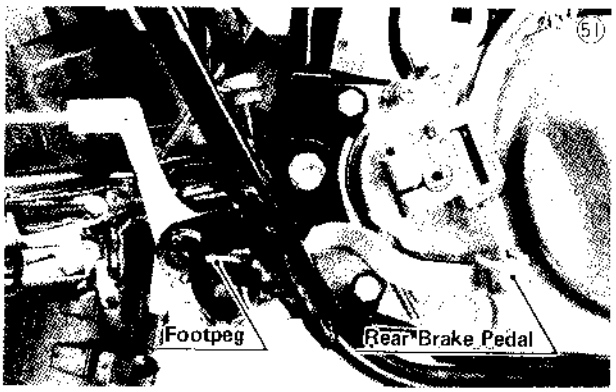
- If sufficient adjustment cannot be made with the adjuster, complete the adjustment with the adjuster at the brake lever, and then tighten all lock nuts.
- Check for brake drag.

•Operate the lever a few times to see that it returns to its rest position immediately upon its release.
•Slide the dust covers back into place.
•For minor corrections while riding, use the adjuster at the front brake lever.

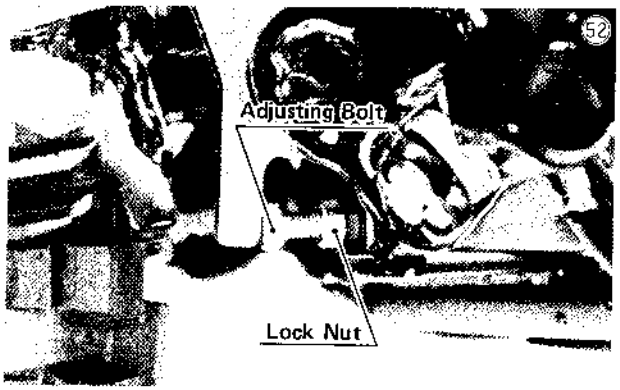
NOTE: If the brake lever adjustment can not be made with the adjuster at the brake lever or at the brake panel, remove the front wheel if necessary and remount the front brake cam lever at a new position on the brake camshaft.

Rear Brake Pedal

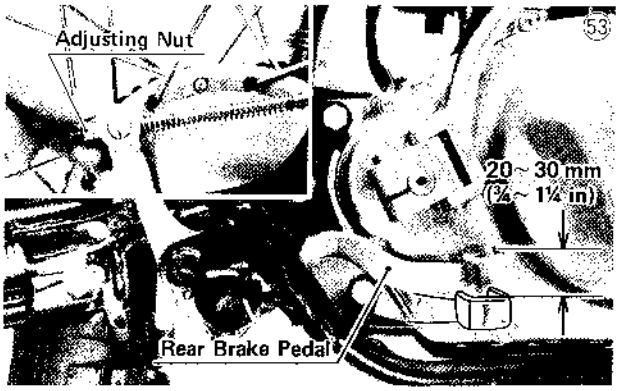
•When the brake pedal is in its rest position, its end should match the level of the upper surface of the right foot peg. If it does not, first loosen the adjusting nut on the end of the brake rod to give the brake pedal plenty of play.



•Loosen the brake pedal adjusting bolt lock nut, turn the adjusting bolt to obtain the correct pedal position, and tighten the lock nut.



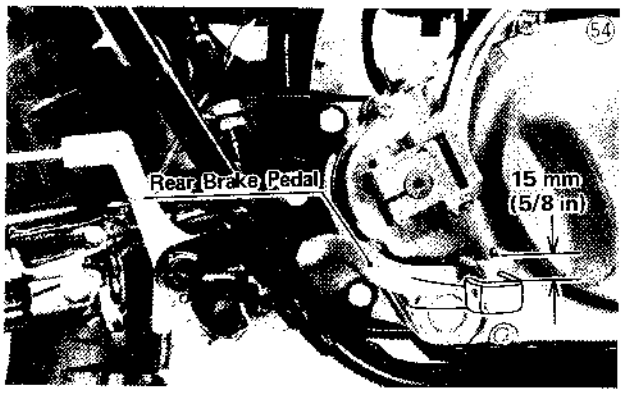
•Turn the adjusting nut on the end of the brake rod so that the brake pedal has 20 ~ 30 mm (¾ ~ 1¼ in) travel from the rest position to the fully applied position when the brake pedal is pushed down lightly by hand.



•Check for brake drag.
•Operate the pedal a few times to see that it returns to its rest position from the fully applied position immediately upon release.
•Check the rear brake light switch adjustment.

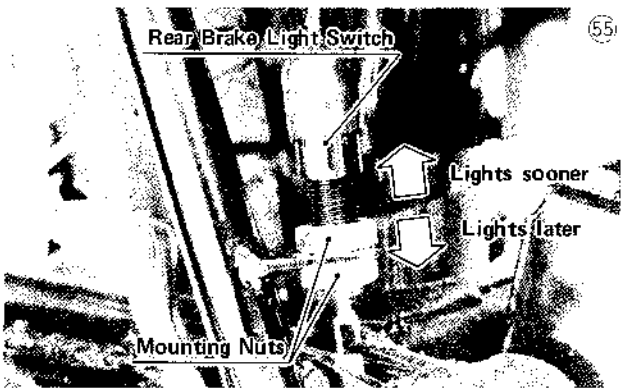
REAR BRAKE LIGHT SWITCH

Check the operation of the switch with the engine running by depressing the brake pedal. The brake light should go on after 15 mm (⅝ in) of pedal travel or shortly before the brake pedal reaches the fully applied position.



•Adjust it by loosening the two mounting nuts, moving the switch up or down, and re-tightening the mounting nuts when the switch is properly positioned.

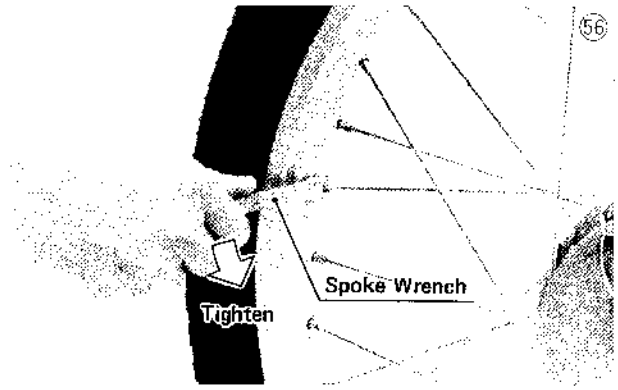
CAUTION: To avoid damaging the electrical connections inside the switch, be sure that the switch body does not turn during adjustment.



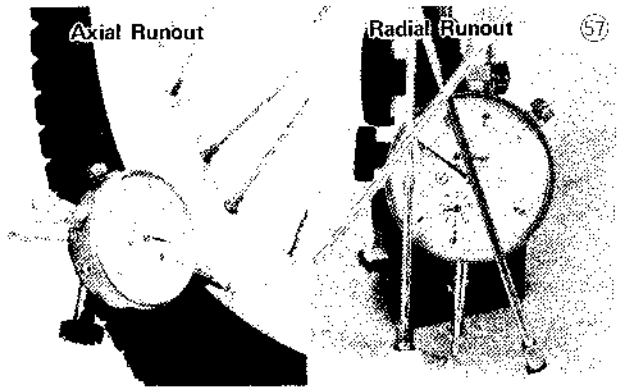
WHEELS

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. Standard spoke tightening torque is 0.25 ~ 0.30 kg-m (22 ~ 26 in-lbs).

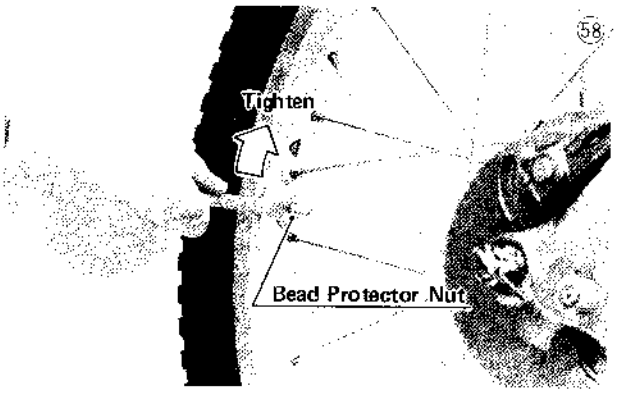


The axial rim runout should be under 3 mm (0.12 in), and the radial rim runout should be under 2 mm (0.08 in).



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 position on the rim, inspect the bead protectors before riding and tighten them if necessary.



Tires

The tires are designed so that when they are inflated to the correct pressure and not overloaded, they will provide good traction and power transmission during acceleration and braking even under bad road surface conditions.

To ensure good handling and stability, use only the recommended tires for replacement and inflate them to the standard pressure.

A certain variation from the standard pressure is acceptable depending on road surface conditions (rain, ice, rough surface, etc.).

Table 1 Tires, Air Pressure (measured when cold)

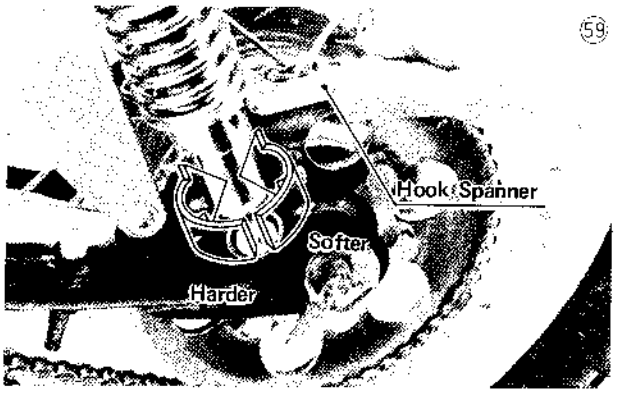
	Front	Rear
Tire Make	DUNLOP	DUNLOP
Tire Type	TRIALS UNIVERSAL	TRIALS UNIVERSAL
Tire Size	2.75-21 4PR	4.00-18 4PR
Air Pressure	0.35 kg/cm^2 (5 psi)	

Inspect the tires for wear or damage. If they are damaged, replace them.

REAR SHOCK ABSORBERS

The rear shock absorbers can be adjusted to one of 5 positions to suit riding conditions.

Adjustment is made by turning the adjusting sleeve with a hook spanner. The higher the adjusting sleeve is positioned, the harder the shock absorber.



NOTE: Always adjust both shock absorbers to the same position.

Check that the shock absorbers function properly, that there is no oil leakage, and that the mounting bushings are in good shape.

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, and quality.

Contaminated or deteriorated oil will affect shock damping and accelerate internal wear. The fork oil should be changed periodically (Pg. 52), or sooner if the oil appears dirty.

Alteration of the stiffness or softness of the shock absorption can be achieved by using fork oil of a different viscosity. It may be desirable to change from the standard viscosity somewhat in order to suit special conditions.

Fork Oil Level

To check the fork oil level, first place a jack or stand under the engine so that the front wheel is raised off the ground. Remove the top bolt from the inner tube, and pull out the upper spring seat. 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, add enough oil to bring it up to the proper level, taking care not to overfill the fork.

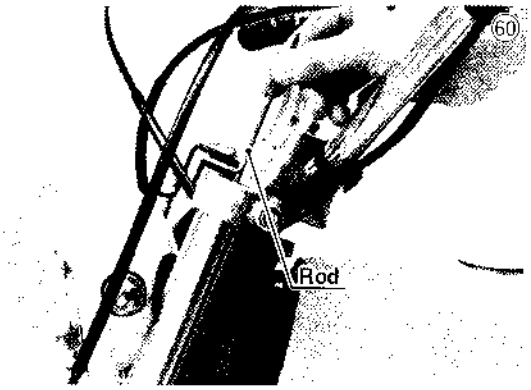
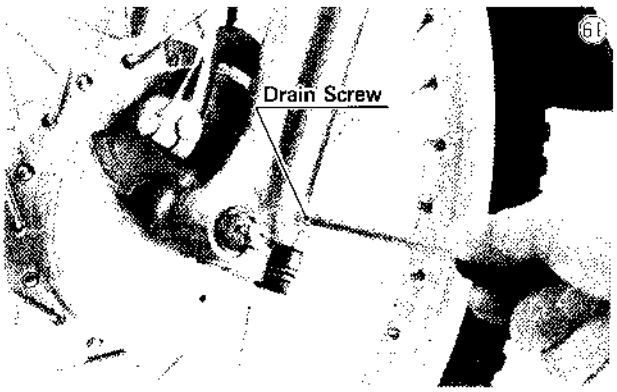


Table 2 Fork Oil

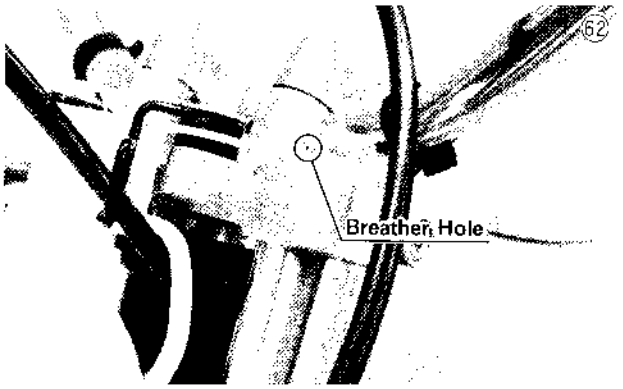
Type	Amount per side	Oil level from top of inner tube
SAE 10W	160~168 cc	492 mm

Oil Change

To drain out the old oil, 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. Replace the drain screws, remove the top bolt from each side, and pour in the specified type and amount of oil. Then repalce the top bolts, tightening them securely.



After tightening the top bolt, check that the air breather hole of the top bolt comes to the front. If it does not, loosen the upper and lower clamp bolts and turn the inner tube to correct the breather hole position. Tighten the clamp bolts to the specific torque (Pg. 54).



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

General Lubrication

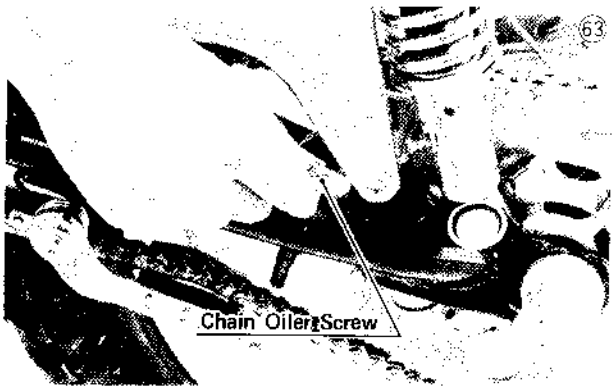
Lubricate exposed parts subject to rust with SAE 30 motor oil or regular grease periodically (Pg. 52), whenever the vehicle has been operated under wet or rainy conditions, and after each race or practice session. Before lubricating each part, clean off any rust with rust remover. Badly rusted nuts, bolts, etc. should be replaced.

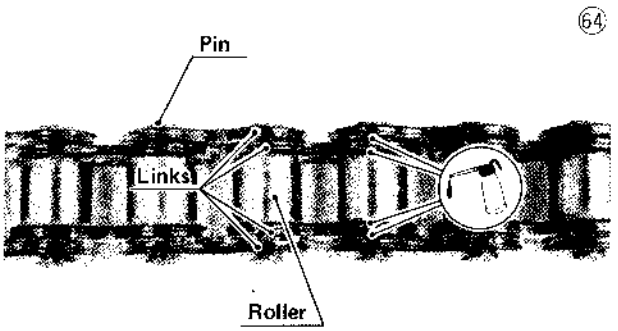
LUBRICATION BEFORE AND AFTER EACH EVENT

Drive Chain

An effective, good quality lubricant specially formulated for chains is best for regular chain lubrication. If a special lubricant is not available, a heavy oil such as SAE 90 is preferred to a lighter oil because it will stay on the chain longer and provide better lubrication.

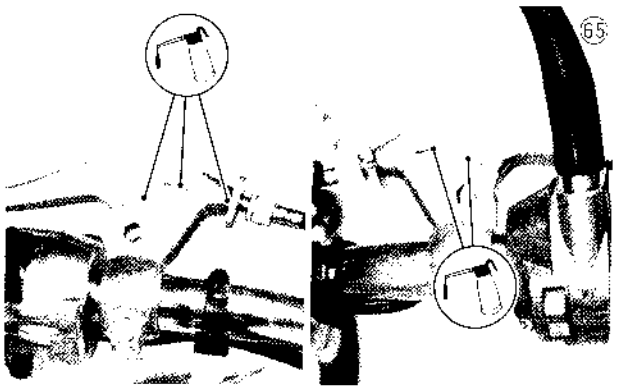
Loosening the chain oiler screw on the left side of the swing arm or using an oiler, apply oil to the sides of the rollers and between the side plates of the links so that oil will penetrate to the pins and bushings where most wear takes place. Wipe off any excess oil.



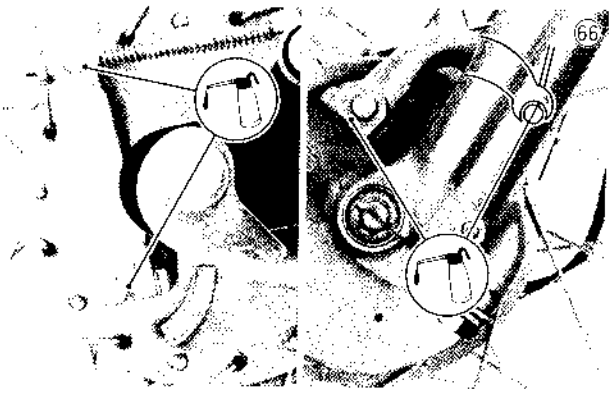


Clutch Lever and Brake Lever

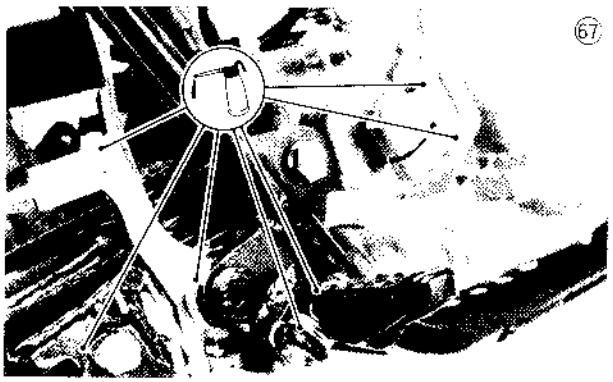
Lubricate the clutch lever and brake lever pivots and exposed portion of the clutch and brake inner cable with SAE 30 motor oil.



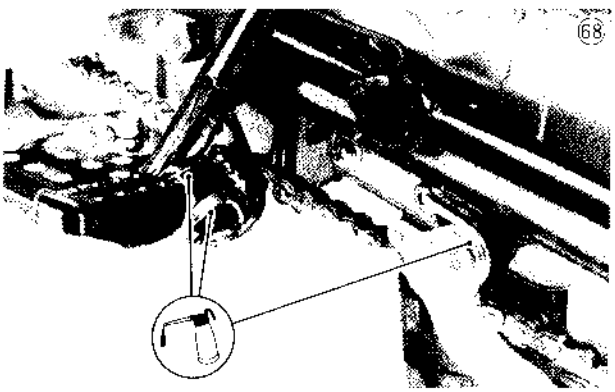
Brake Cam Levers



Kickstarter Pedal, Side Stand Pivot, Brake Pedal Pivot, and Right Foot Peg Pivot



Chain Tensioner Pivot, Left Foot Peg Pivot

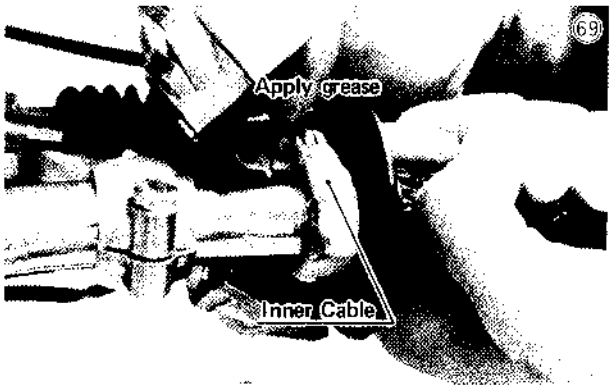


LUBRICATION BEFORE AND AFTER TRIAL

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

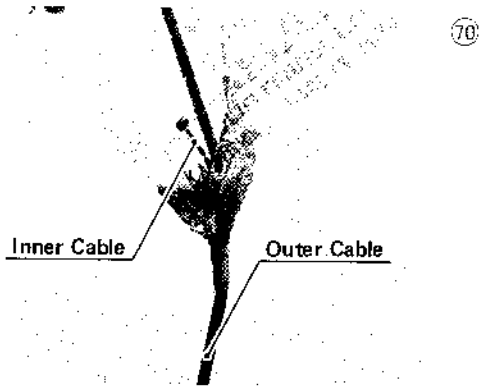
Throttle Grip

Remove the engine stop switch housing screws (2). Wipe clean the throttle grip inner surface and the handlebar where the throttle grip fits. Apply a light coat of grease to the exposed portion of the throttle grip inner cable and to where it is attached to the throttle grip.



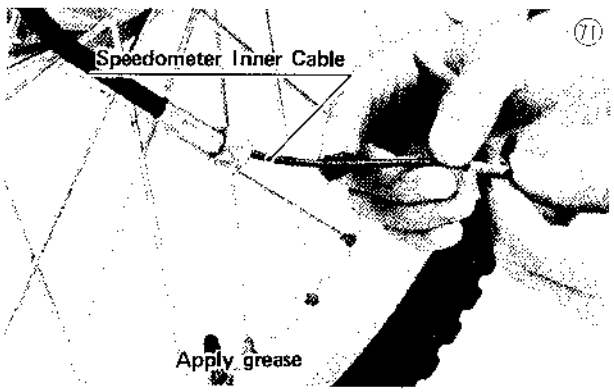
Clutch, Brake, Throttle Cable

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



Speedometer Cable

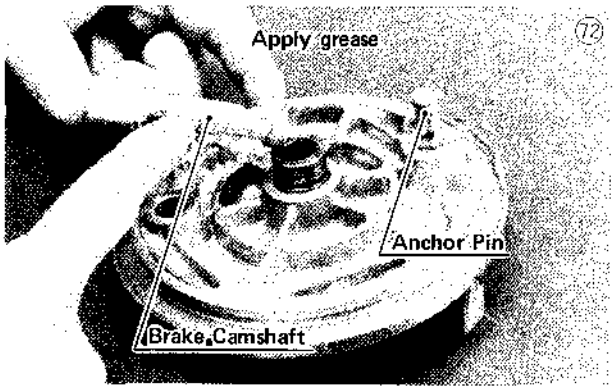
Pull out the speedometer inner cable, and apply a thin coat of grease to it.



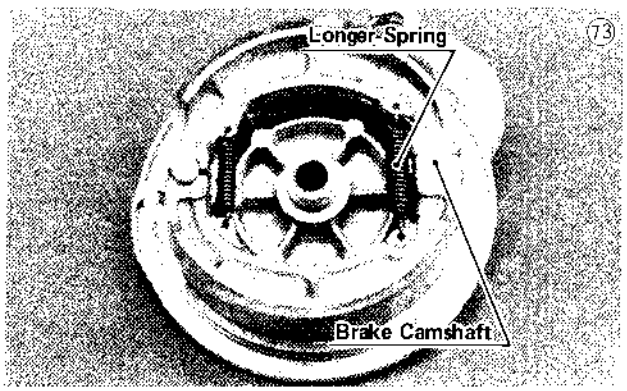
NOTE: Insert the speedometer inner cable into the speedometer gear housing while turning the wheel, so that the slot in the end of the cable is aligned with the tongue of the speedometer pinion.

Brake Camshafts

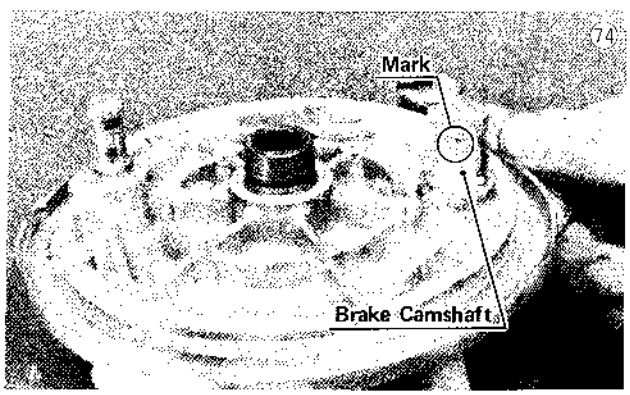
Wipe out the old grease, and re-grease the brake pivot points. Apply grease to the brake shoe anchor pins, spring ends, and cam surface of the camshaft, and fill the camshaft groove with grease.



NOTES: 1. 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. 2. When hooking the brake shoe springs onto the brake shoes, the longer spring should be on the camshaft side.



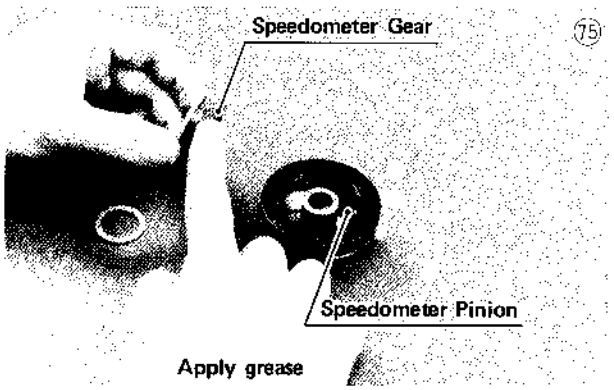
3. The camshaft must be installed so that the triangular mark on the cam surface points to the center of the panel.



22 GENERAL LUBRICATION

Speedometer Gear Housing

Pull out the speedometer gear and gear receiver unit from the speedometer gear housing. Wipe out the old grease, and apply grease liberally to the speedometer gear and the speedometer pinion.

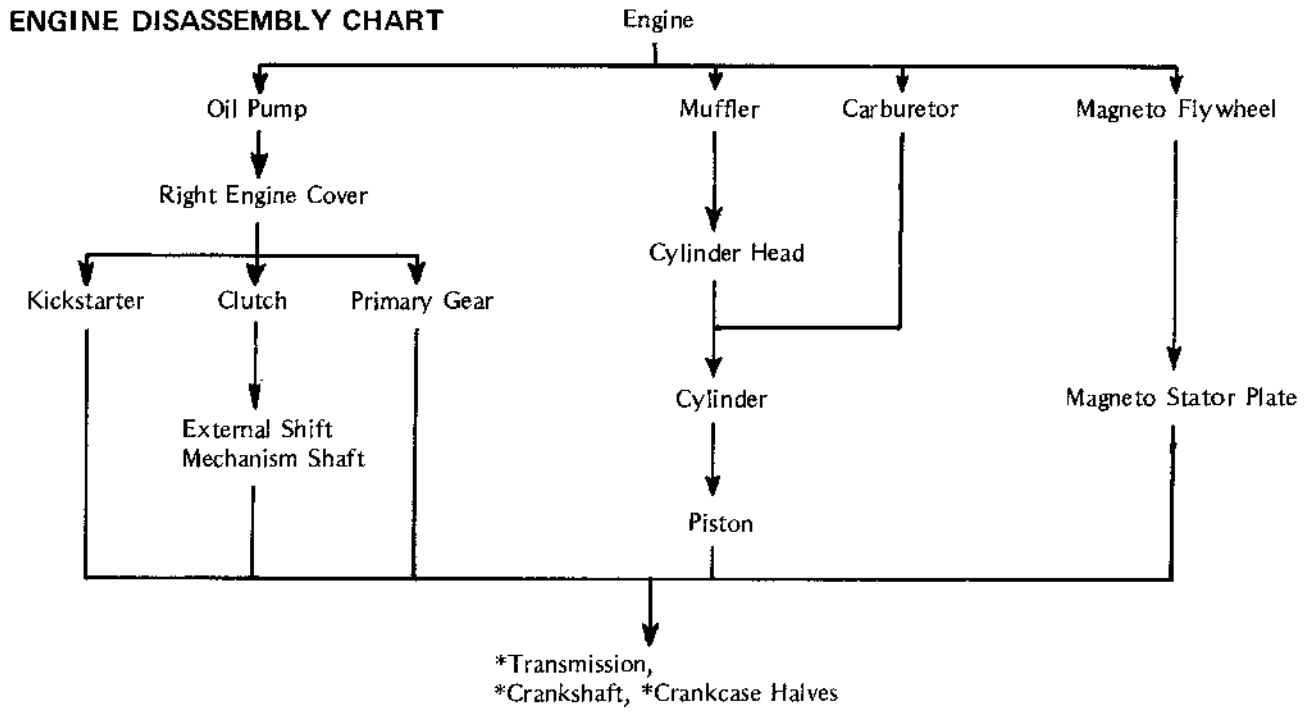


LUBRICATION AFTER 6 TRIALS

In addition to the above points lubricate the wheel bearings (Pg. 44) and the stem bearings (Pg. 46).

Disassembly

ENGINE DISASSEMBLY CHART



NOTES: 1. An asterisk (*) indicates parts which are removed and disassembled only after engine removal.
2. Main parts only are shown in this chart.

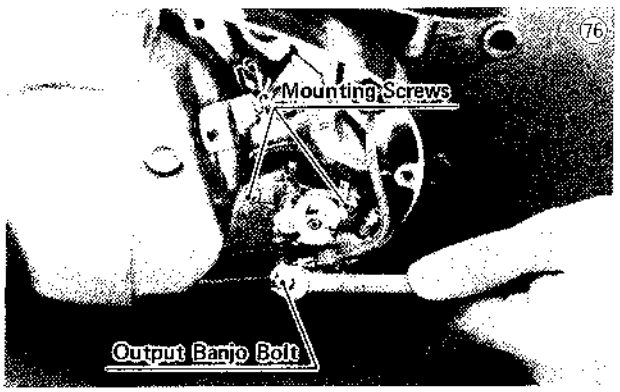
ENGINE

Disassembly

NOTE: Engine parts not requiring engine removal for service are listed below.

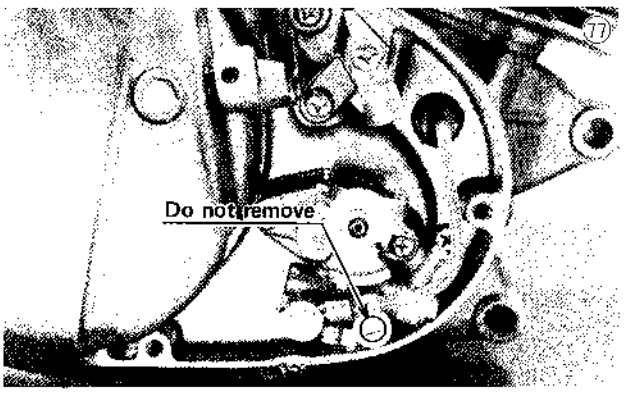
a. Magneto flywheel
b. Magneto stator plate
c. Cylinder head, cylinder and piston
d. Right engine cover
e. Kickstarter
f. Clutch and primary gear
g. External shift mechanism shaft

•Remove the Oil Pump.
○Remove the oil pump output banjo bolt (8 mm). There is a washer on each side of the connector.



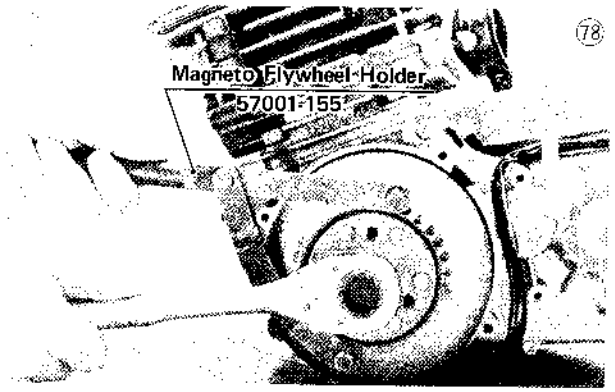
○Remove the oil pump mounting screws (2), and remove the oil pump and gasket. There is a copper washer on the left hand oil pump mounting screw.

CAUTION: Do not remove the bolt between the input banjo bolt and output banjo bolt.

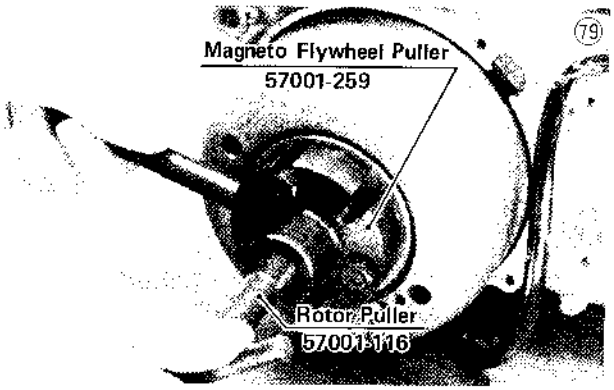


•Remove the Magneto Flywheel.
○Remove the magneto cover and its gasket.
○Using the magneto flywheel holder (special tool) to keep the flywheel stationary, remove the magneto nut

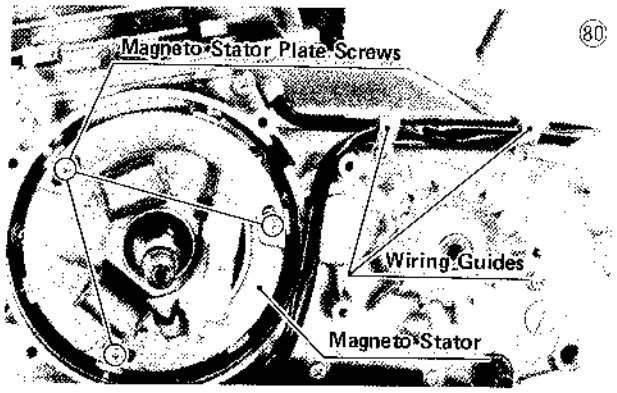
(19 mm) with a socket wrench, and take off the lock washer and flat washer.



○Remove the magneto flywheel with the magneto flywheel puller and rotor puller (special tools).

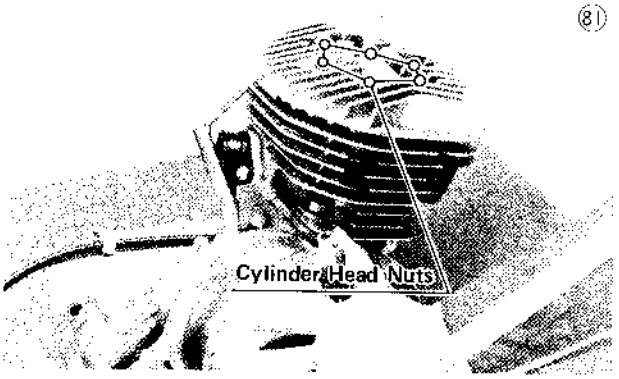


●Remove the Magneto Stator.
○Remove the magneto output wiring guides (2). Their screws are two of twelve crankcase screws.

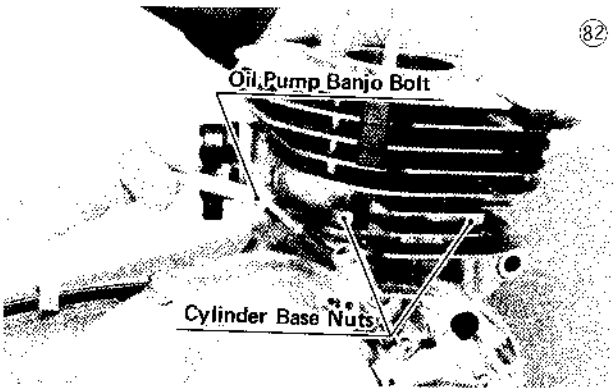


○Remove the magneto stator plate screws (3) and pull the stator free from the side of the crankcase, pulling the magneto output wiring with the rubber grommet through the crankcase hole.

●Remove the Cylinder Head and Cylinder.
○Remove the 13 mm cylinder head nuts, lock washers, and washers (6 ea), and lift off the cylinder head and gasket.



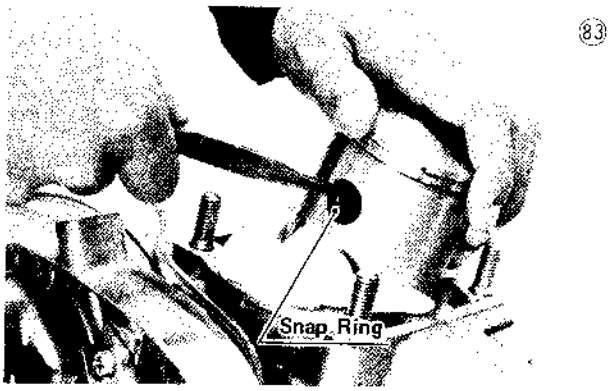
○Remove the banjo bolt (8 mm) from the cylinder. There is a washer on each side of the check valve.



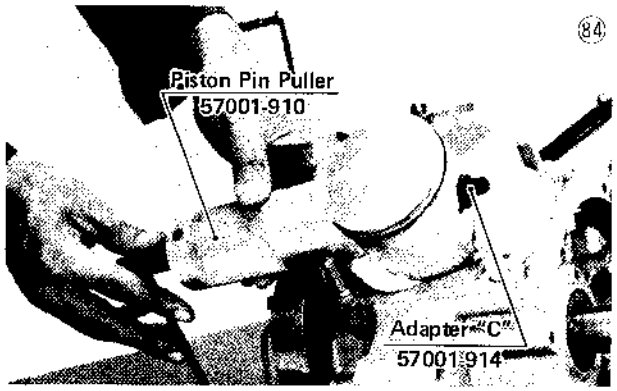
○Remove the 14 mm cylinder base nuts and lock washers (4 ea).
○Lift off the cylinder and cylinder base gasket. If necessary, lightly tap around the cylinder with a mallet, taking care not to damage the cooling fins.

●Wrap a clean cloth around the base of the piston to hold it in the proper position for removal and so that no parts fall into the crankcase.

●Remove the Piston.
○Remove one of the piston pin snap rings.

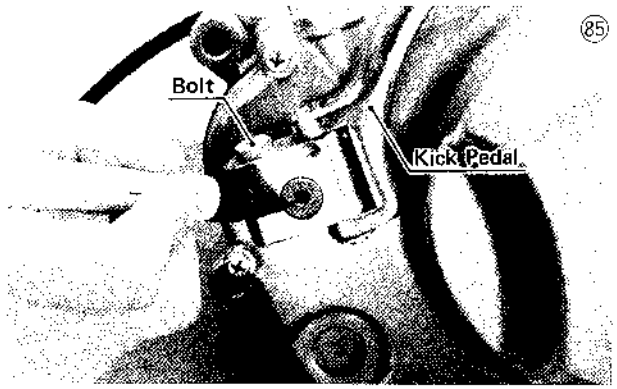


○Using the piston pin puller and adapter "C" (special tools), remove the piston pin from the side the snap ring was removed.

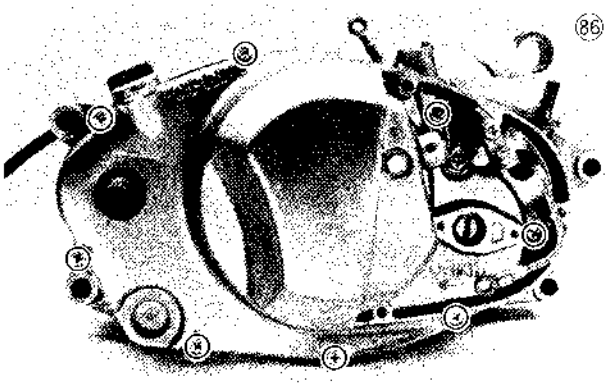


○Remove the piston and the connecting rod needle bearing.

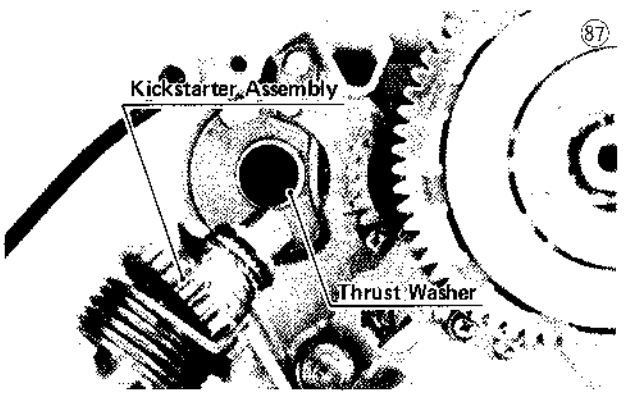
●Remove the Right Engine Cover.
○Mark the position of the kick pedal on the shaft so that it can be replaced later in the same position, and remove the kick pedal.



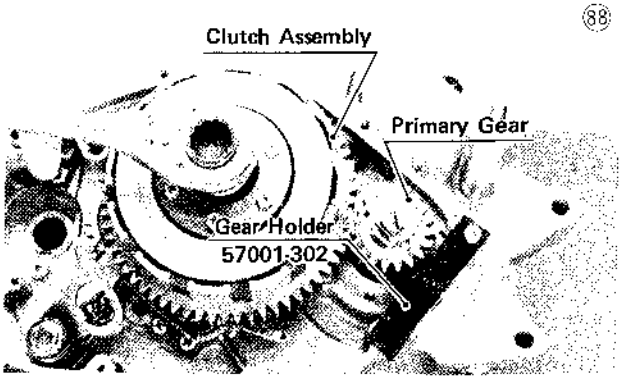
○Remove the screws (8) and pull off the right engine cover and gasket. The spring plate pusher may fall down.



●Remove the Kickstarter.
○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 to the crankcase.

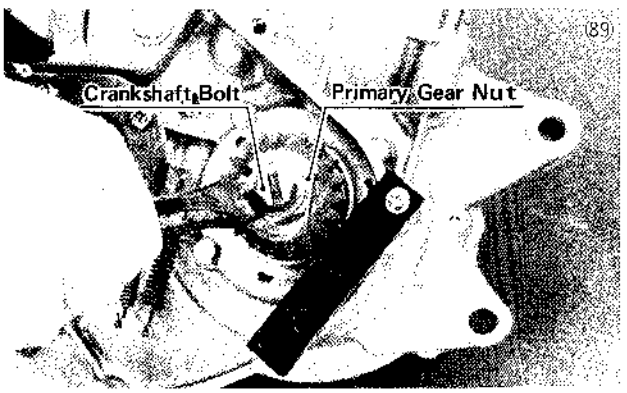


●Remove the Clutch.
○Using the gear holder (special tool) to prevent the clutch from rotating, undo the clutch hub nut (22 mm), and remove the lock washer and toothed washer.



○Pull the clutch assembly off the drive shaft. There is a thrust washer at the rear of the clutch assembly. A sleeve and drive shaft idle gear may be pulled off with the clutch assembly.

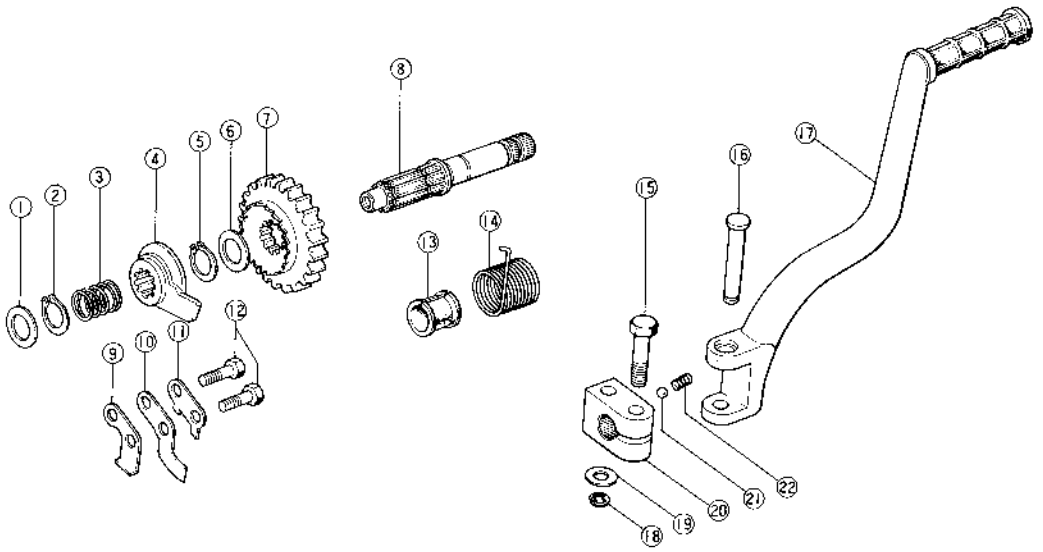
●Remove the Primary Gear.
○Flatten the portion of the lock washer which is bent over against the side of the crankshaft bolt (13 mm), and take the crankshaft bolt and lock washer off the crankshaft.



○Flatten the portion of the toothed washer which is bent over the primary gear nut (22 mm), and take off the primary gear nut, toothed washer, primary gear and woodruff key. Remove the gear holder.

(90)

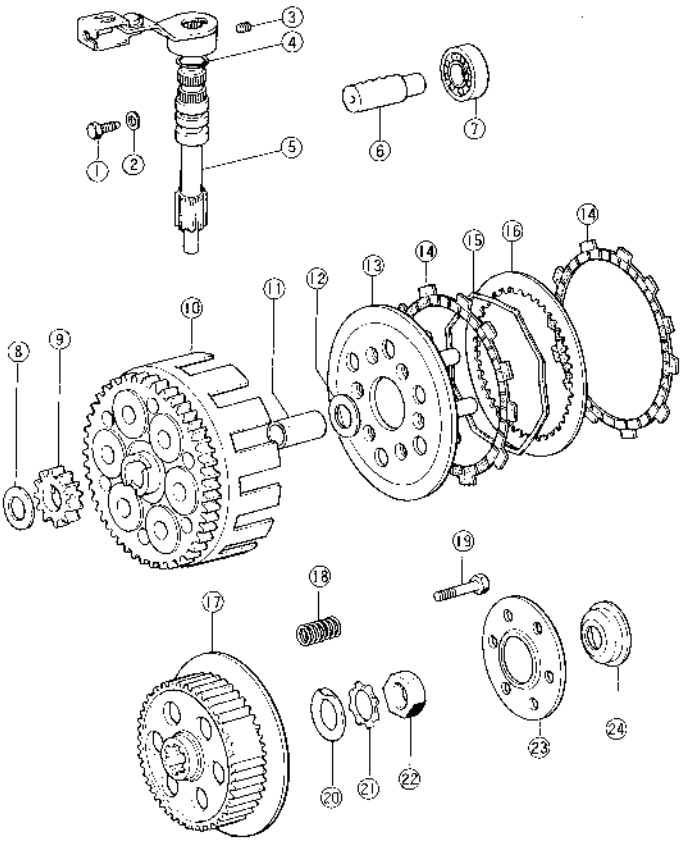
Kickstarter



1. Thrust Washer
2. Circlip
3. Spring
4. Ratchet
5. Circlip
6. Washer
7. Kick Gear
8. Kick Shaft
9. Stopper
10. Guide
11. Lock Washer
12. Bolts
13. Spring Guide
14. KickSpring
15. Bolt
16. Pin
17. Kick Pedal
18. Circlip
19. Washer
20. Kick Pedal Boss
21. Ball
22. Spring

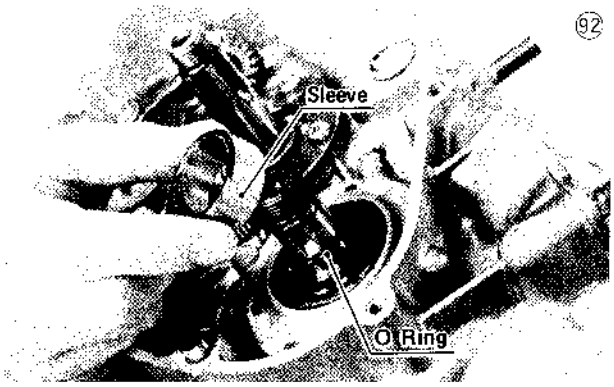
(91)

Clutch

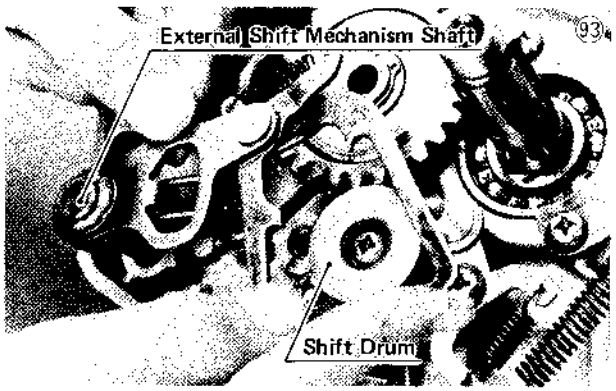


1. Bolt
2. Gasket
3. Allen Screw
4. O Ring
5. Release Shaft
6. Push Rod
7. Ball Bearing
8. Thrust Washer
9. Drive Shaft Idle Gear
10. Clutch Housing
11. Sleeve
12. Thrust Washer
13. Spring Holder
14. Friction Plate
15. Steel Ring
16. Steel Plate
17. Clutch Hub
18. Spring
19. Bolt
20. Toothed Washer
21. Lock Washer
22. Hub Nut
23. Spring Plate
24. Spring Plate Pusher

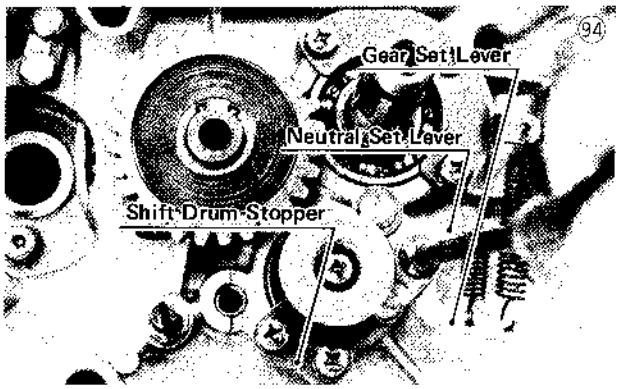
○Pull off the sleeve and O ring.



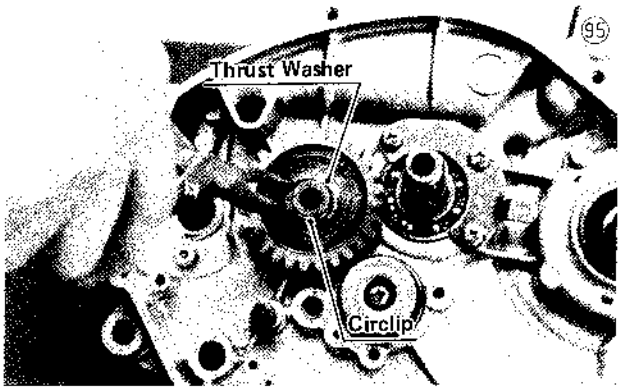
●Remove the External Shift Mechanism.
○Move the external shift mechanism pawls out of position on the end of the shift drum, and pull the external shift mechanism shaft out of the crankcase.



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



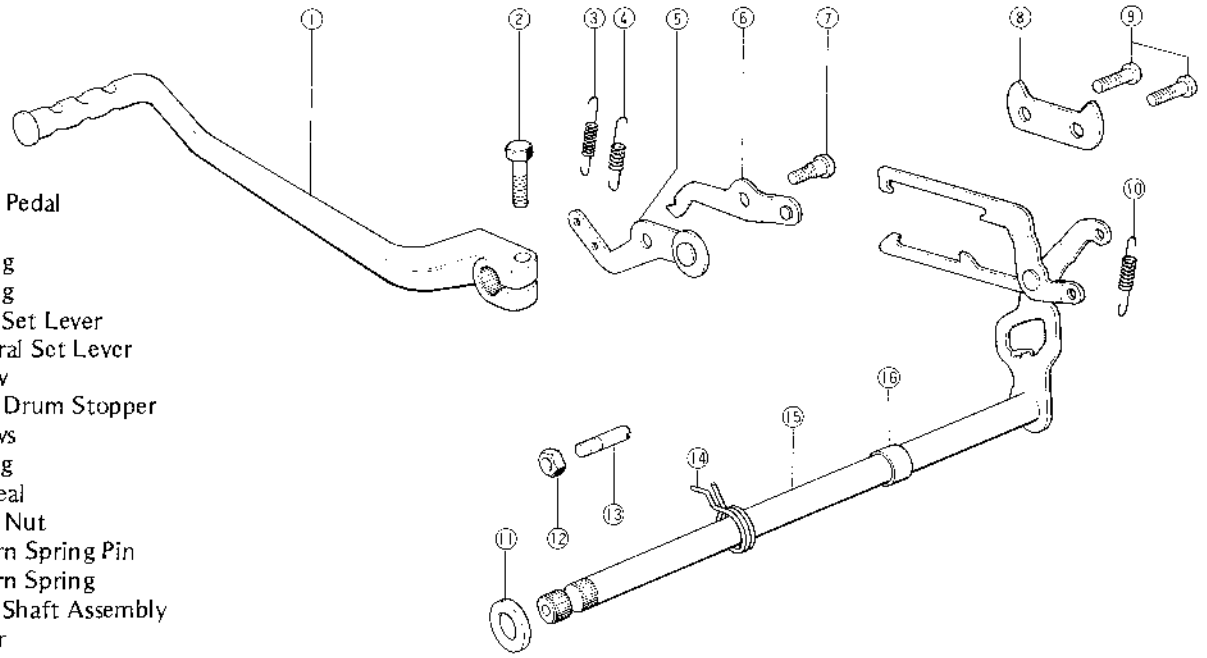
○Remove the shift drum stopper.
○Remove the output shaft idle gear circlip and thrust washer.



○Pull off the output shaft idle gear and another thrust washer.

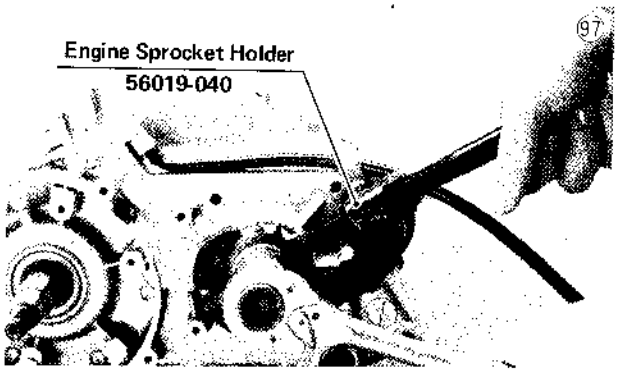
●Remove the Engine Sprocket.
○Flatten the bent portion of the engine sprocket splined washer.

External Shift Mechanism



1. Shift Pedal
2. Bolt
3. Spring
4. Spring
5. Gear Set Lever
6. Neutral Set Lever
7. Screw
8. Shift Drum Stopper
9. Screws
10. Spring
11. Oil Seal
12. Lock Nut
13. Return Spring Pin
14. Return Spring
15. Shift Shaft Assembly
16. Collar

○Using the engine sprocket holder (special tool) to hold the engine sprocket stationary, remove the engine sprocket nut (27 mm) and splined washer.

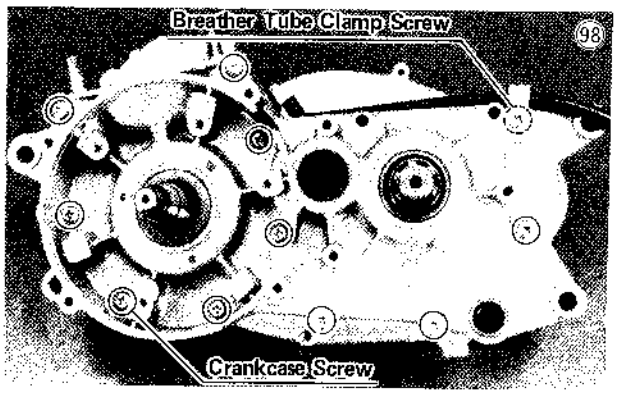


○Pull off the engine sprocket.

●Remove the Transmission.

NOTE: Due to close tolerance between the crankshaft and crankshaft bearings, a press will be necessary for the following procedure. Do not attempt to service the transmission and shift drum if a press is not available.

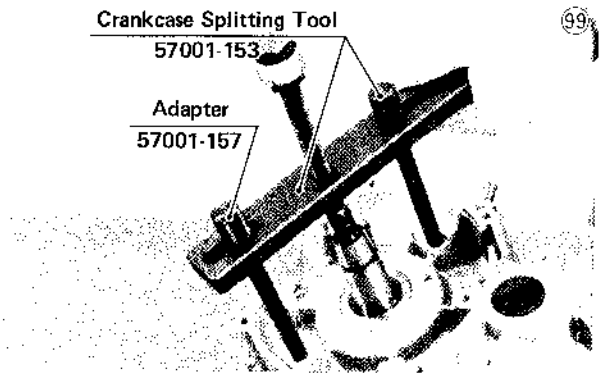
○Remove the screw and the breather tube clamp.



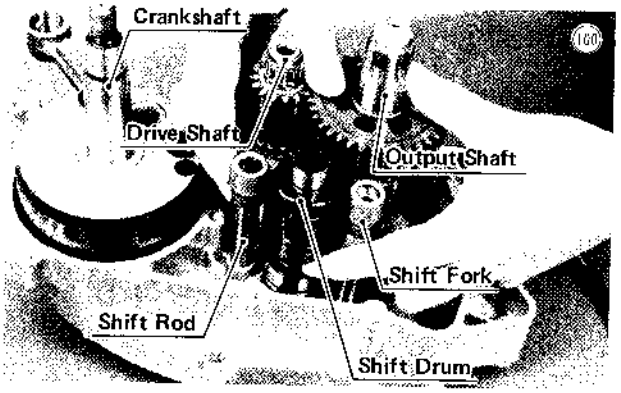
○Remove the remaining crankcase screws (10).

○Screw the crankcase splitting tool and adapter (special tools) into the left side of the crankcase. Be certain to screw the tool in all the way.

○Tighten the bolt (19 mm) on the crankcase splitting tool to split the crankcase.



○Once the crankcase is split, remove the crankcase splitting tool, and lift off the left crankcase half. Remove the shift rods (2), shift forks (3), shift drum, and output and drive shaft assemblies.

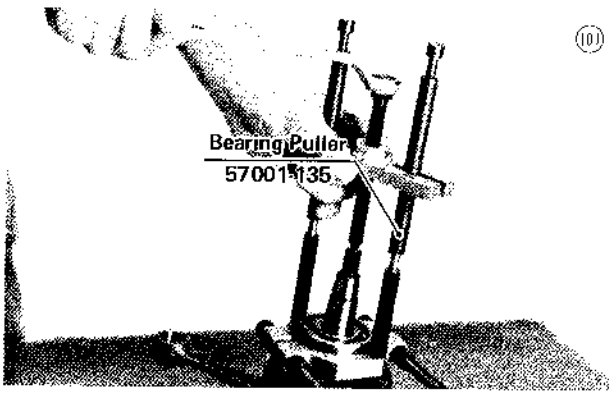


○Remove the output shaft sleeve and O ring from the left crankcase half.

○Remove the breather tube from the right crankcase half.

●Remove the Crankshaft from the right crankcase half using a press.

●Remove the bearing on the left side of the crankshaft with the bearing puller (special tool).



Assembly

●Any oil seal that is removed must be replaced. Press in the oil seal using a press and suitable adapters so that the face of the seal is level with the surface of the crankcase.

Apply a little amount of heat durable grease to the inner lip of the oil seal.

●Install the ball bearings using a press and the bearing driver and bearing driver holder (special tools). Install the shift drum needle bearing using a press and the shift drum bearing driver (special tool).

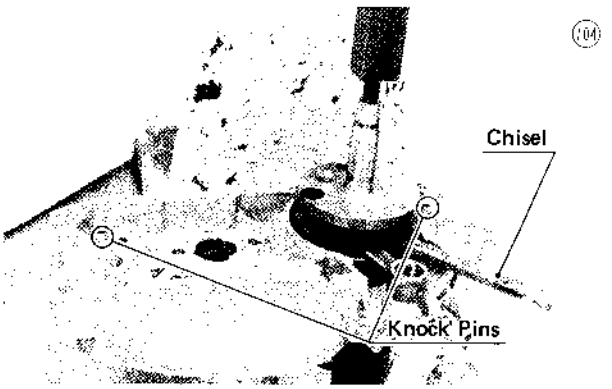




Table 3 Bearing Drivers Necessary for Crankcase Assembly

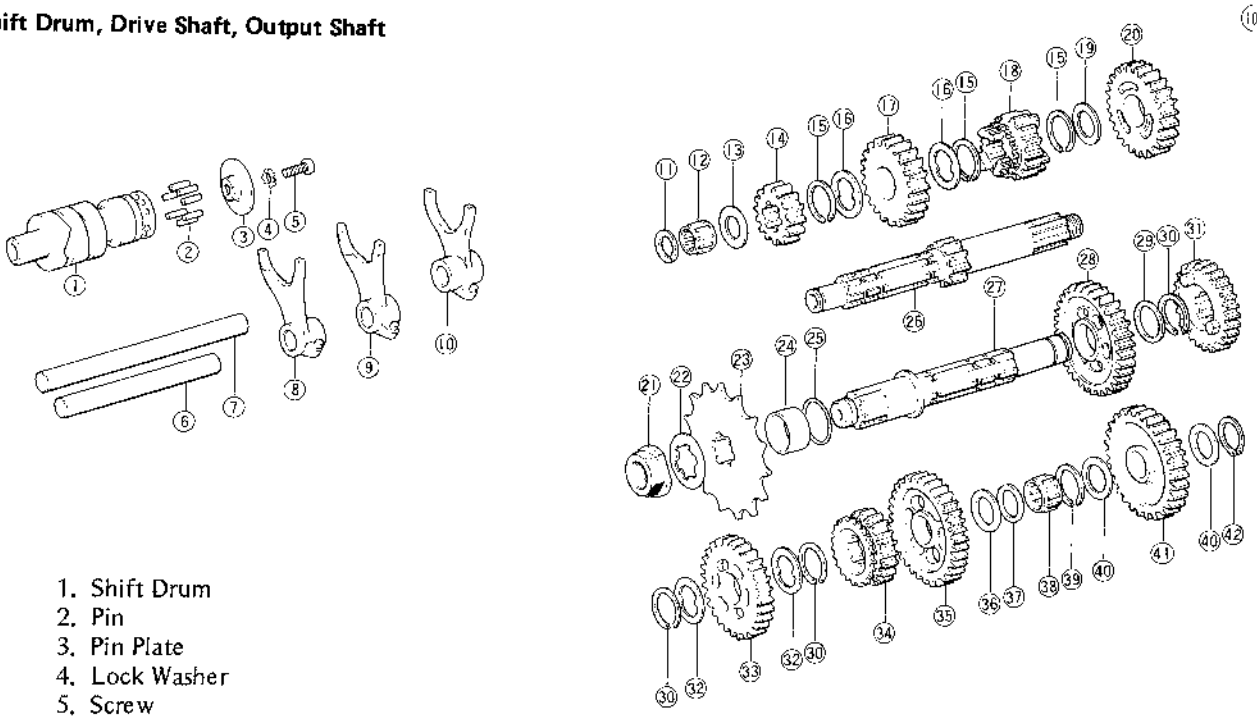
			Parts Number
Left Crankcase Half	Ball Bearing	Crankshaft	57001-296
		Output Shaft	57001-289
Right Crankcase Half	Ball Bearing	Crankshaft	57001-296
		Drive Shaft	57001-290
	Shift Drum Needle Bearing		57001-287

- Clean out the crankcase, and clean off any grime on the transmission and crankshaft parts with some kind of solvent having a high flash point.
- Insert a chisel or wedge between the crankshaft flywheels opposite the connecting rod big end to protect flywheel alignment as shown in the figure, and fit the crankshaft into the right crankcase half using a press.



- Replace the crankcase knock pins (2) if they were removed.
- Replace the Transmission.

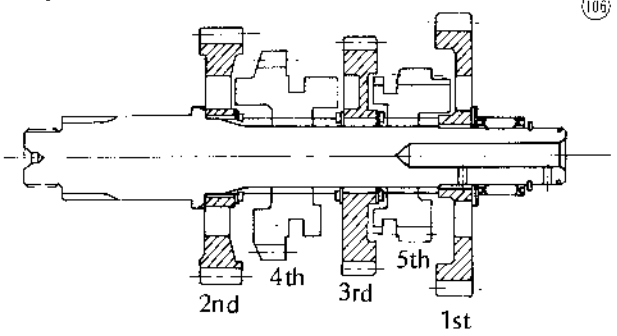
Shift Drum, Drive Shaft, Output Shaft



1. Shift Drum
2. Pin
3. Pin Plate
4. Lock Washer
5. Screw
6. Shift Rod
7. Shift Rod
8. Drive Shaft 3rd Gear Shift Fork
9. Output Shaft 4th Gear Shift Fork
10. Output Shaft 5th Gear Shift Fork
11. Circlip
12. Needle Bearing
13. Washer
14. 2nd Gear (D)
15. Circlip
16. Spline Washer
17. 4th Gear (D)
18. 3rd Gear (D)
19. Washer
20. 5th Gear (D)
21. Engine Sprocket Nut
22. Splined Washer
23. Engine Sprocket
24. Sleeve
25. O Ring
26. Drive Shaft
27. Output Shaft
28. 2nd Gear (O)
29. Washer
30. Circlip
31. 4th Gear (O)
32. Spline Washer
33. 3rd Gear (O)
34. 5th Gear (O)
35. 1st Gear (O)
36. Washer (Bronze)
37. Washer
38. Needle Bearing
39. Circlip
40. Thrust Washer
41. Ouput Shaft Idle Gear
42. Circlip

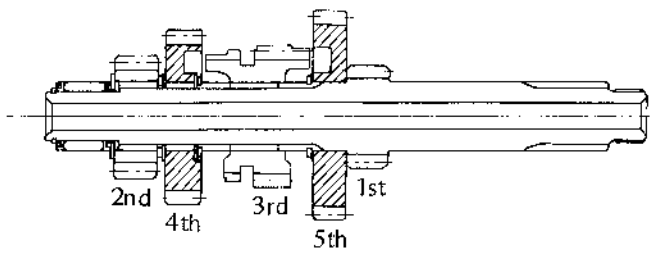
NOTES: 1. The output shaft gears can be recognized by size, the gear with the largest diameter being 1st gear, and the smallest one being 5th gear.
- 2nd gear – side with larger recess faces to the right
- 4th gear – fork groove on right side of gear teeth
- 3rd gear – dog recesses face left
- 5th gear – fork groove goes to left side of gear teeth
- 1st gear – plain side faces right

Output Shaft Gears

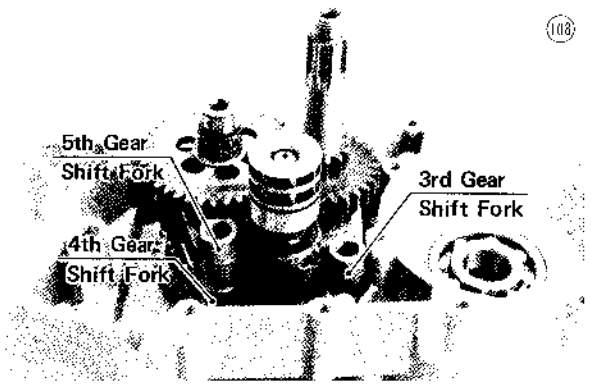


2. Drive shaft gears are opposite from those of the output shaft, the smallest being for 1st gear and the largest for 5th.
- 1st gear – part of drive shaft
- 5th gear – plain side faces right
- 3rd gear – fork groove goes to left side of gear teeth
- 4th gear – plain side faces to the left
- 2nd gear – Chamferred hole side faces left

Drive Shaft Gears

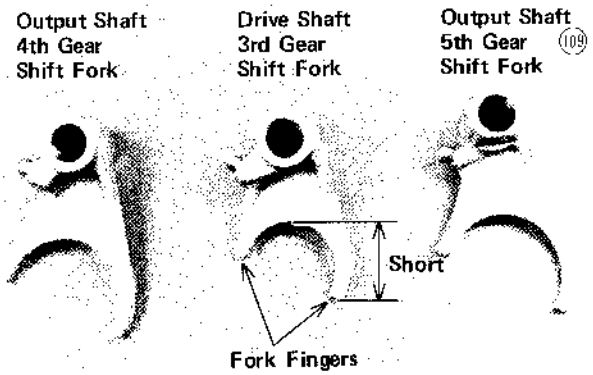


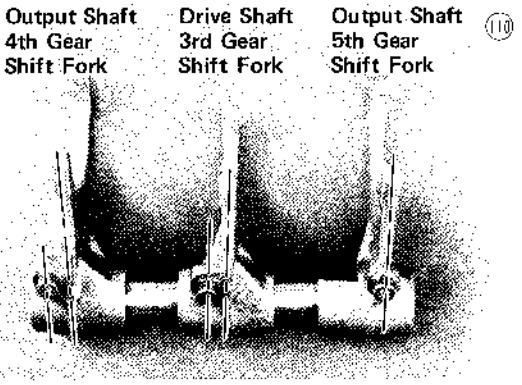
○Mesh the output shaft gears with those on the drive shaft, and simultaneously fit the shift drum, shift forks, and both assemblies into the left crankcase half.



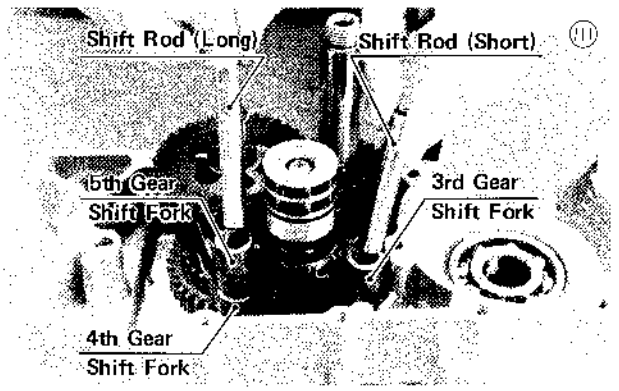
NOTE: Identification of the shift forks

Drive shaft 3rd gear shift fork	: fingers are shorter 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





○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.

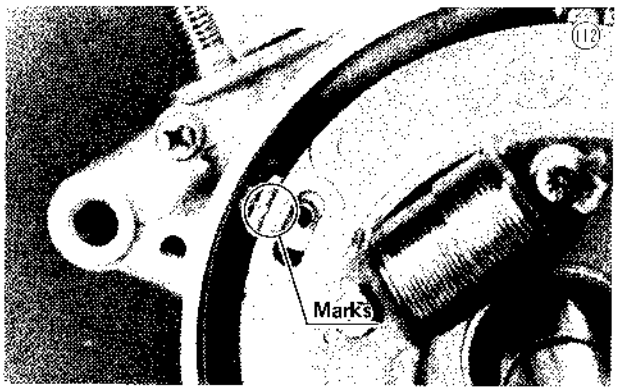


- ●Shift the transmission to neutral before reassembling the cases.
- ●Clean off and wipe dry the mating surfaces of the crankcase halves, and apply liquid gasket to the mating surface of the left crankcase half.
- ●Fit the breather tube to the right crankcase half.
- ●Fit the crankcase halves together using a press.

NOTE: Constantly check the alignment of the two halves, and the position of the transmission shafts. The front and rear of crankcase must be pulled together evenly.

- After the crankcase halves are fitted together, screw in the crankcase screws (10) and tighten them with an inpact 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.
- Fit a piece of 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.

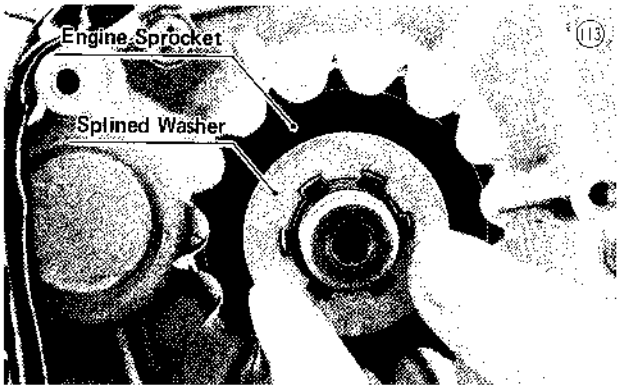
- Install the Magneto Stator.
  - Run the magneto output wiring through its crankcase hole, and push in the rubber grommet.
  - Replace the magneto stator so that its mark and the crankcase mark are aligned. Tighten its screws (3).



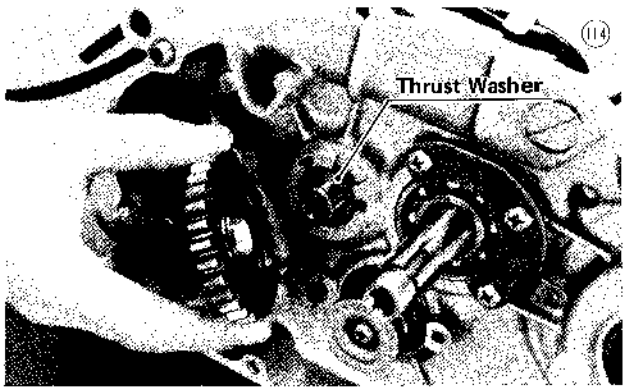
  - Fit the magneto output wiring into the guides (2), and screw the guides back onto the crankcase, tightening them with an impact driver.

- Install the Magneto Flywheel.
  - See that the woodruff key is properly in place in the crankshaft, and then fit the magneto flywheel in place so that the key fits into the groove in the flywheel hub. Push the flywheel into place by hand.
  - Once the flywheel is all the way back in place, replace the washer and lock washer, and tighten the magneto nut (19 mm) while holding the flywheel steady with the magneto flywheel holder (special tool). The tightening torque for the magneto nut is 9.0 ~ 10.0 kg-m (65 ~ 72 ft-lbs).
  - Replace the gasket and magneto cover.

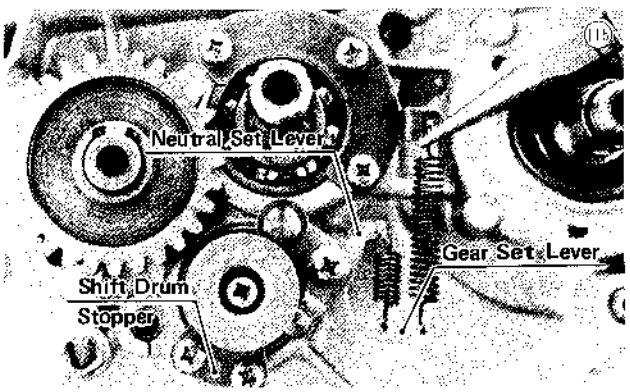
- Fit a new O ring onto the output shaft, and then replace the sleeve.
- Fit the engine sprocket onto the output shaft, and replace a new splined washer so that its teeth mesh with those of the splined output shaft.



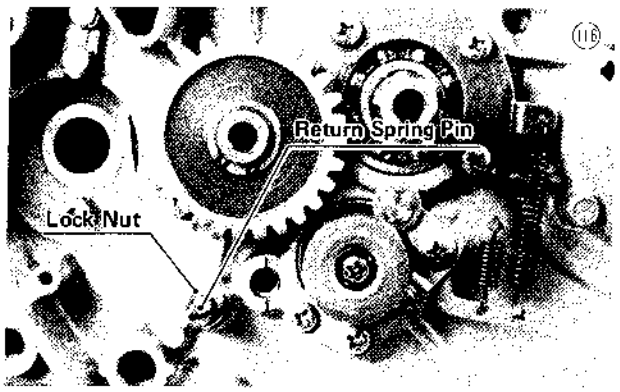
- Using the engine sprocket holder (special tool) to hold the engine sprocket stationary, tighten the engine sprocket nut with 7.5 ~ 8.5 kg-m (54 ~ 61 ft-lbs) of torque.
- Bend back one side of the splined washer over the nut.
- Replace the thrust washer, output shaft idle gear, thrust washer, and circlip. The side of the hub that protrudes the most, faces in.



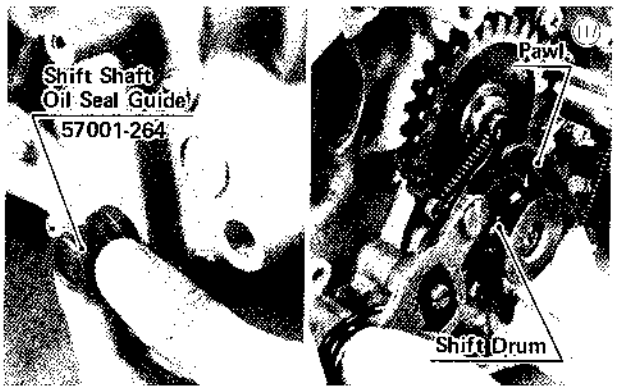
- Replace the shift drum stopper.
- Replace the neutral set lever and gear set lever, and put the two springs back into position.



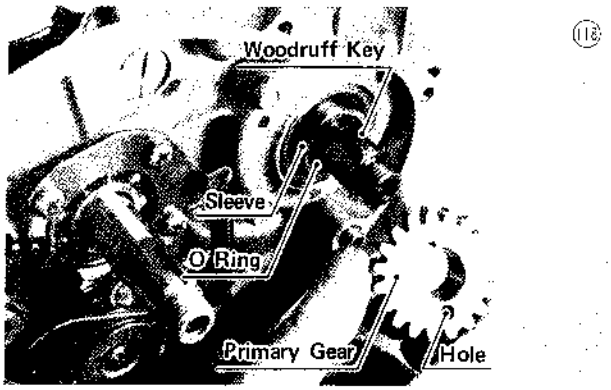
•Check to see if the return spring pin is loose or not. If it is loose, remove it and apply a locking agent to the threads. Then screw it back in tightening its lock nut.



•Install the External Shift Mechanism Shaft.
○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.

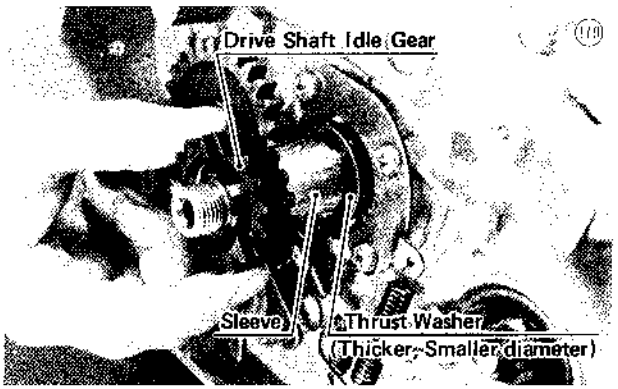


•Install the Primary Gear.
○Replace the sleeve, **O** ring, and the woodruff key on the right side of the crankshaft.
○Replace the primary gear by hand with the hole facing outward to accommodate the toothed washer.

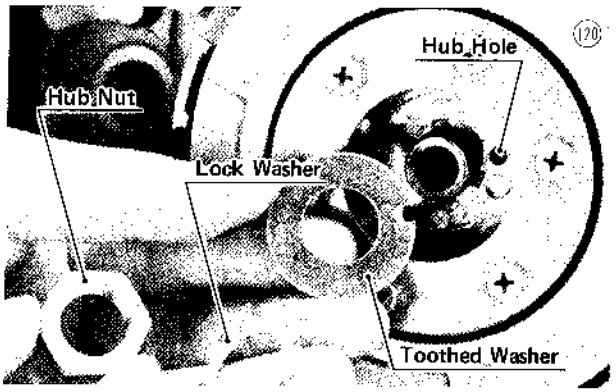


○Once the primary gear is fully in place, replace a new toothed washer with the tooth going into the hole in the primary gear, and replace the primary gear nut.
○Hold the primary gear with the gear holder (special tool), and tighten the primary gear nut with 4.5 ~ 5.0 kg-m (33 ~ 36 ft-lbs) of torque.
○Bend back part of the toothed washer against the side of the primary gear nut.

•Install the Clutch.
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), steel plates (4), and steel rings (5) to facilitate clutch assembly. The sequence is friction plate, steel ring, steel plate, friction plate, steel ring, etc. finishing with a steel ring. Screw in the clutch spring bolts (6) 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 thrust washer, sleeve, drive shaft idle gear (dogged side facing out), clutch housing, and thrust washer in that order. The outer thrust washer is thinner and has a larger diameter.

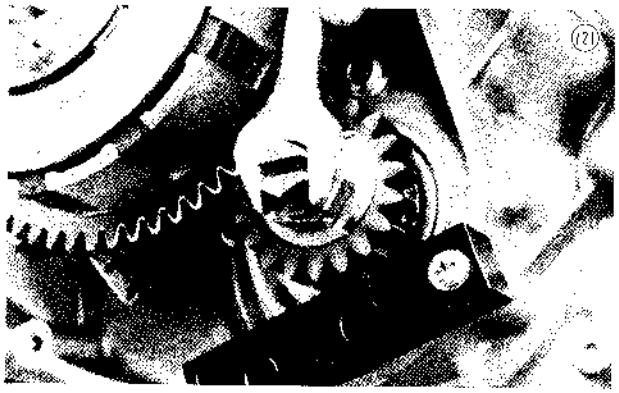


○Replace the clutch hub assembly while meshing the friction plate tabs with the clutch housing fingers, and clutch hub hole with the splined portions of the drive shaft. If necessary, loosen the 10 mm clutch bolts (6) so that the friction plates can be moved by hand to align the tabs.
○If the clutch bolts were loosened, cross tighten them evenly by hand rather than use compressed air, which might make spring pressure uneven. The torque for the bolts is 0.4 ~ 0.5 kg-m (35 ~ 43 in-lbs).
○Replace the toothed washer, fitting its tooth into the hub hole, and replace the lock washer and the hub nut.

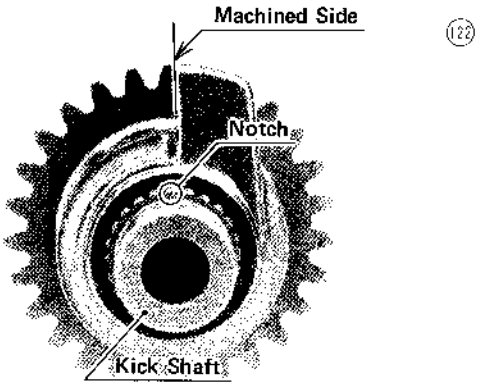


○Hold the clutch hub with the gear holder and tighten the hub nut (22 mm) with 4.0 ~ 5.0 kg-m (29 ~ 36 ft-lbs).

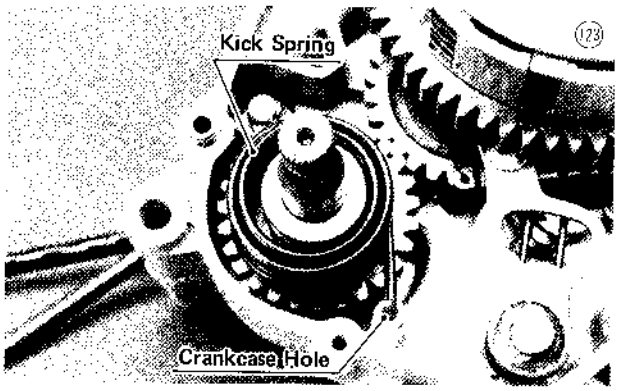
●With a new lock washer fitted on the crankshaft bolt (13 mm), tighten the bolt securely. Bend back part of the lock washer against the side of the crankshaft bolt.



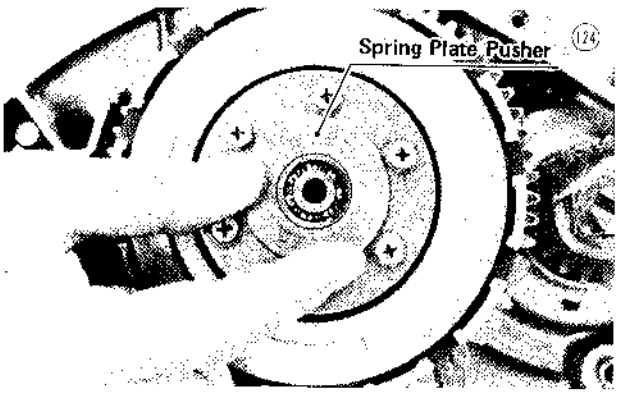
○Remove the gear holder.
●Install the Kickstarter.
NOTE: When installing the ratchet on the kick shaft, the machined side of the ratchet lever should be lined up with the notch on the kick shaft.



○Replace the kickstarter assembly with the thrust washer and turn the kick shaft all the way clockwise.
○Fit the kick spring back into the crankcase hole.



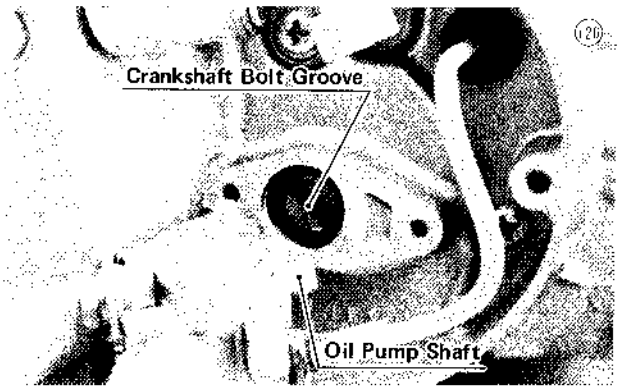
●Install the Right Engine Cover.
○Stick the spring plate pusher to the clutch with a thin layer of grease.



○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 (8).
CAUTION: Do not attempt to install the cover with the oil pump installed, or the pump may be broken.



●Install the Oil Pump.
○Turn the oil pump shaft so that it will fit into the groove on the crankshaft bolt.

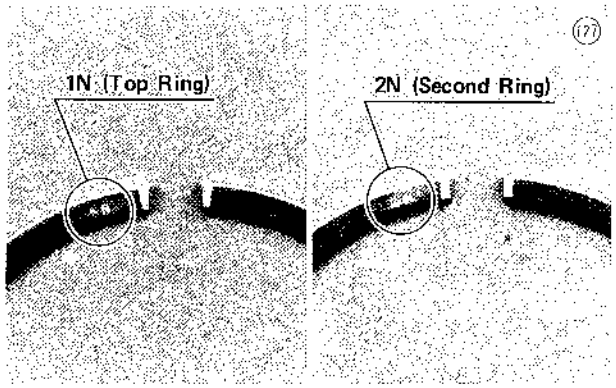


○When installing the connector back onto the pump, be sure that there is a washer on each side of the connector. Tighten the banjo bolt with 0.4 ~ 0.5 kg-m (35 ~ 43 in-lbs) of torque. Check to see that the oil pump lever turns freely from its closed position to the full open position.

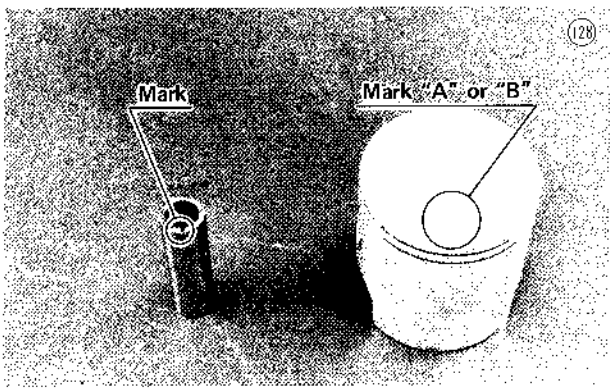
●Install the Piston.
NOTES: 1. If the piston is replaced with a new one, piston to cylinder clearance changes (Pg. 38). Also,

when a new piston or piston pin is used, check the piston to pin clearance (Pg. 39).

2. Install the piston rings so that the correct side (marked "N") faces up. Do not mix up the top and second ring. The top ring is the Keystone type and marked "1N", the second ring is the standard type with an expander ring and marked "2N".



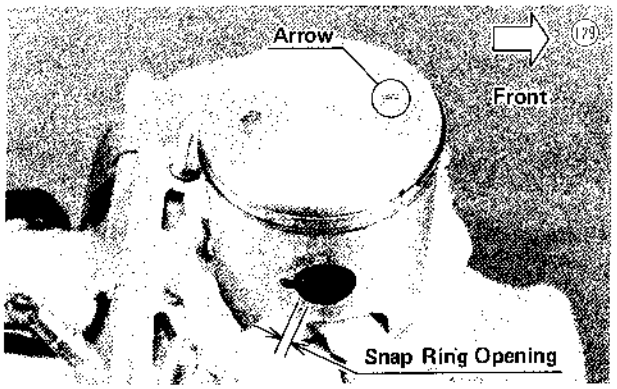
To the Dealer: When possible, match parts from stock so that a marked pin is assembled with an "A" piston, and an unmarked pin with a "B" piston.



○Apply 2-stroke oil to the connecting rod needle bearing before insertion, fit it into the connecting rod.

○Replace the piston and piston pin. The arrow on the top of the piston must point towards the front.

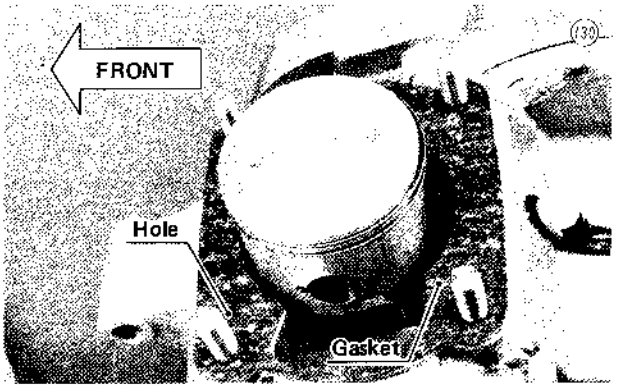
○Install a new piston pin snap ring in place of every one that is removed since removal weakens and deforms the ring. After installation, turn the snap ring so that its opening does not coincide with the groove in the side of the piston.



●Install the Cylinder and Cylinder Head.

○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.



○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 14 mm cylinder base nuts (4) with 3.3~3.7 kg-m (24~27 ft-lbs) of torque.

○Place the cylinder head gasket and the cylinder head on the cylinder.

○Cross tighten the 13 mm cylinder head nuts (6) evenly with 2.0~2.4 kg-m (14.5~17.5 ft-lbs) of torque.

NOTES: After assembling and installing the engine, be sure to do the following.

1. Fill the engine with oil and check the level (Pg. 6).
2. Bleed the oil pump and adjust the oil pump cable (Pgs. 12, 42).

Maintenance

CARBURETOR

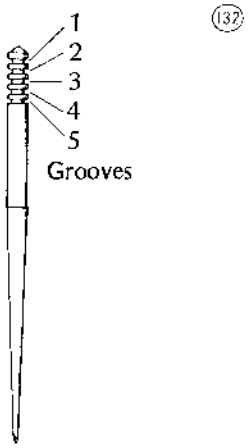
The carburetor specifications (Table 4) have been chosen for best all around performance, and ordinarily will not require any change. However, sometimes an alteration may be desirable for improved performance under special conditions, and when proper mixture is not obtained after the carburetor has been properly adjusted and all parts cleaned and found to be functioning properly.

Table 4 Carburetor Specifications

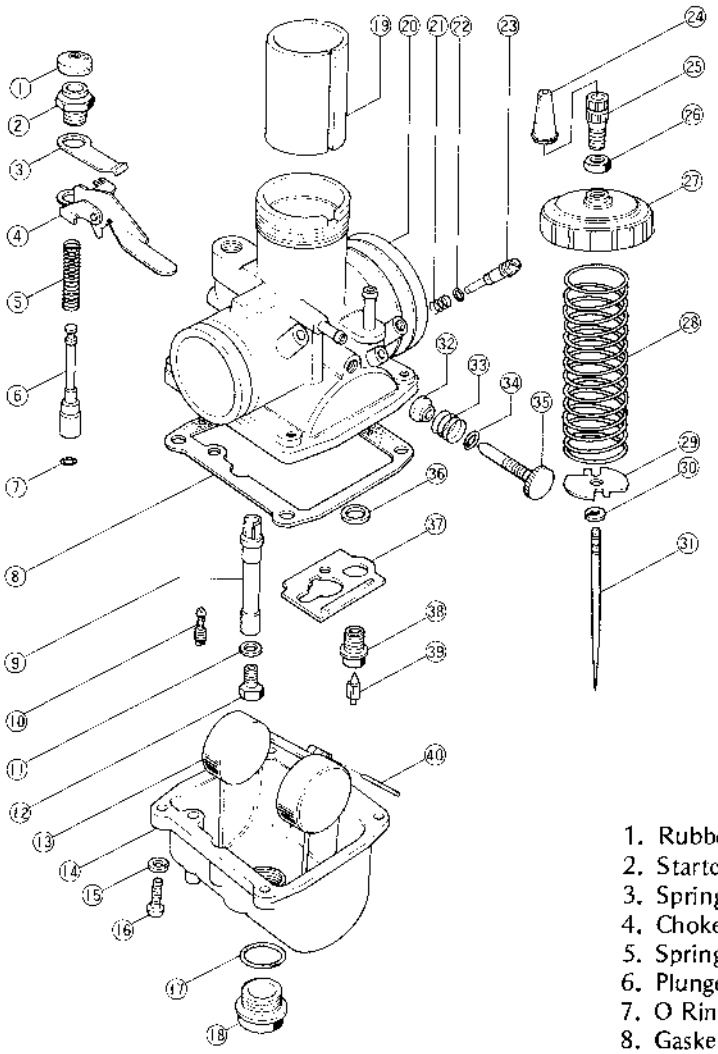
Main Jet	85R
Air Jet	2.5
Jet Needle	5D1-3*
Needle Jet & Badge #	O-8/8 172
Cutaway	2.0
Pilot Jet	30
Air Screw (turns out)	1½
Fuel Level	30.5~32.5

*The "1" in 5D1-3 is the lot number, which may be vary. The "3" is the jet needle clip position and is not stamped on the needle. The clip position is found by counting the grooves in the top of the jet needle from the top down.

Jet Needle



Carburetor



1. Rubber Cap
2. Starter Plunger Cap
3. Spring Plate
4. Choke Lever
5. Spring
6. Plunger Assembly
7. O Ring
8. Gasket
9. Needle Jet
10. Pilot Jet
11. Washer
12. Main Jet
13. Float
14. Float Bowl
15. Lock Washer
16. Screw
17. O Ring
18. Drain Plug
19. Throttle Valve
20. Carburetor Body
21. Spring
22. O Ring
23. Air Screw
24. Rubber Cap
25. Cable Adjuster
26. Lock Nut
27. Carburetor Cap
28. Spring
29. Spring Seat
30. Circlip
31. Jet Needle
32. Cap
33. Spring
34. O Ring
35. Idling Screw
36. Gasket
37. Plate
38. Valve Seat
39. Valve Needle
40. Pin

Since the carburetor regulates and mixes fuel and air going to the engine, there are two general types of carburetor trouble: too rich a mixture (too much fuel); 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 5 Mixture Trouble Symptoms

Mixture too rich	Mixture too lean
Engine is sluggish	Engine overheats
Smoky exhaust	Runs better with choke lever pushed down
Runs worse when warm	Spark plug burned white
Spark plug fouled black	Running is unstable
Runs better without air cleaner	No power

(1) 0~1/8 throttle

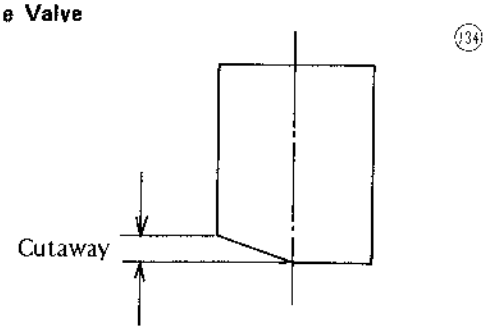
The fuel is metered by the pilot jet in this throttle range, which provides the rich mixture necessary at low rpm. Alteration of this mixture is effected by the position of the air screw. As the air screw is turned in, the mixture becomes richer.

To achieve the standard air screw setting, turn in the air screw lightly until it stops, and then back it out 1½ turns.

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

(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.



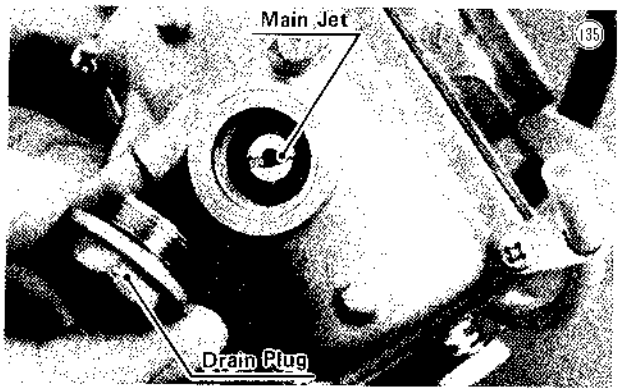
(3) 1/4~3/4 throttle

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.

(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.



(5) Influence of atmospheric pressure and temperature on carburetor settings

- In areas at high altitude, 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:

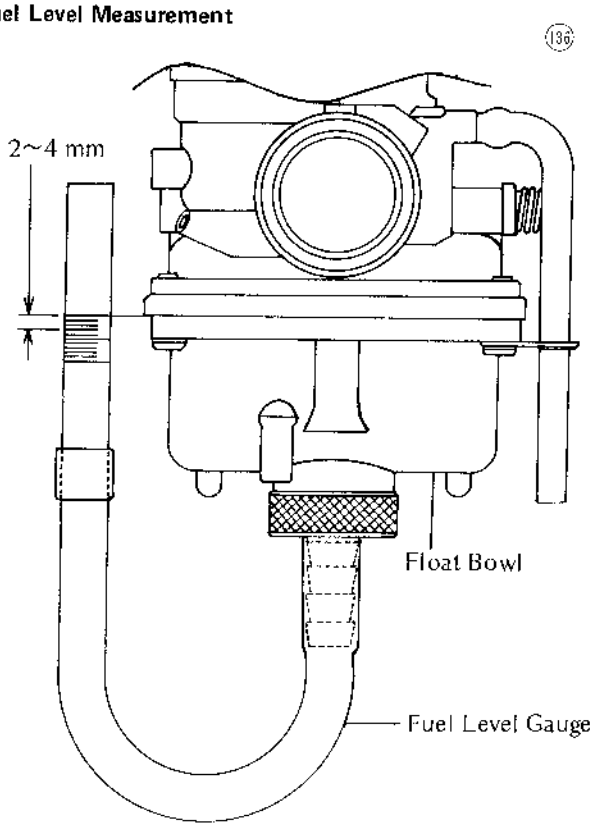
- Highest rpm.
- Smooth transition when accelerating from low rpm.
- Spark plug burning properly.
- Engine lugs without knocking.

(7) Adjusting the fuel level

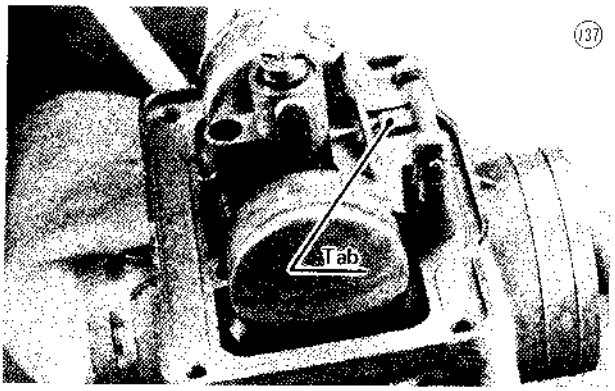
- Close the fuel tap, and remove the carburetor. The fuel hose and carburetor cable do not have to be removed to inspect the fuel level.
- Remove the drain plug from the bottom of the float bowl, and screw the fuel level gauge (special tool) into the plug hole.
- Open the fuel tap so that fuel will flow 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 4~6 mm 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.

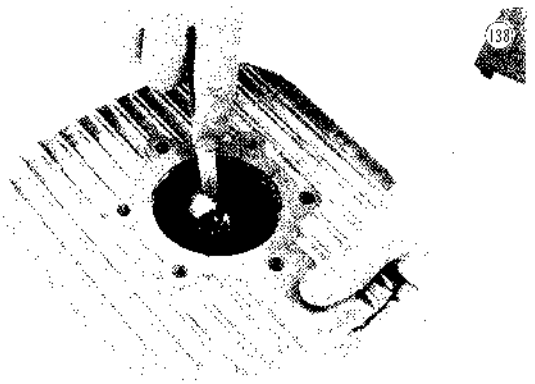


DECARBONIZATION

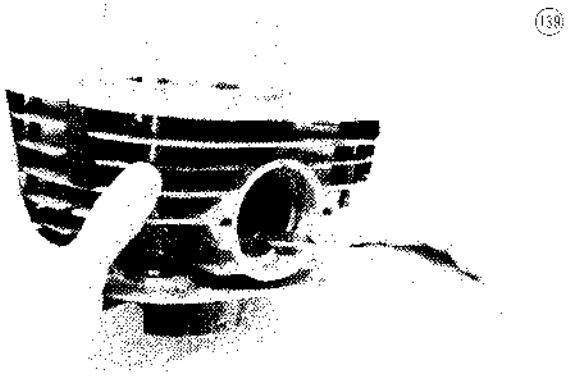
The exhaust system (i.e., baffle tube, muffler, piston head, exhaust port and cylinder head) can fill up with carbon and other exhaust by-products over an extended period of operation, resulting in a drop in performance. Decarbonization of the exhaust system should be done periodically.

•Remove and disassemble the muffler. Clean the baffle tube with a wire brush and by striking it gently, or by burning the carbon out,

•Remove the cylinder head, scrape out any carbon, and clean the head with solvent having a high flash point.



•Remove the cylinder, scrape out the carbon from 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 piece of broken piston ring or some other 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 with 2.0~2.4 kg-m (14.5~17.5 ft-lbs) of torque and cylinder base nuts with 3.3~3.7 kg-m (24 ~ 27 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 kickstarter several times until the compression gauge stops rising.

The compression is highest reading obtainable.

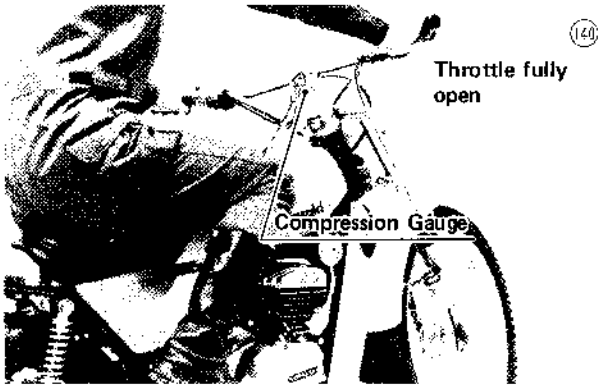


Table 6 Cylinder Compression

Standard	Service Limit
11.5 kg/cm^2 (164 psi)	8.0 kg/cm^2 (114 psi)

Cylinder wear

Since there is a difference in cylinder wear in different directions, take a side to side and a front to back measurement 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 between any two measurements, the cylinder must be repalced or bored to oversize and then horned. There are two sizes of oversize pistons available: 0.5 mm and 1.0 mm. Oversize pistons require oversize rings.

Cylinder Inside Diameter Measurement

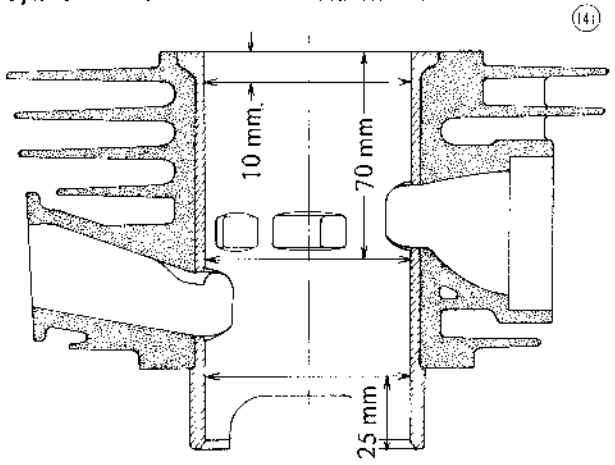


Table 7 Cylinder Inside Diameter

Standard	Service Limit
69.500~69.520 mm	69.60 mm

Piston wear

Measure the outside diameter of the piston 5 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.

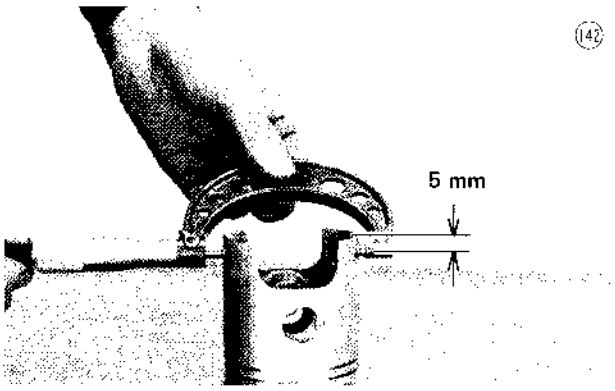


Table 8 Piston Diameter

Standard	Service Limit
69.446~69.466 mm	69.31 mm

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 9 Piston/Cylinder Clearance

Standard
0.050~0.058 mm

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 ring is overworn and must be replaced.

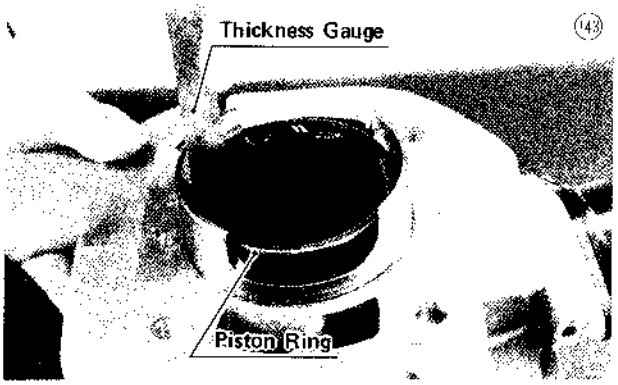


Table 10 Ring End Gap

Standard	Service Limit
0.2~0.4 mm	0.7 mm

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 repalced.

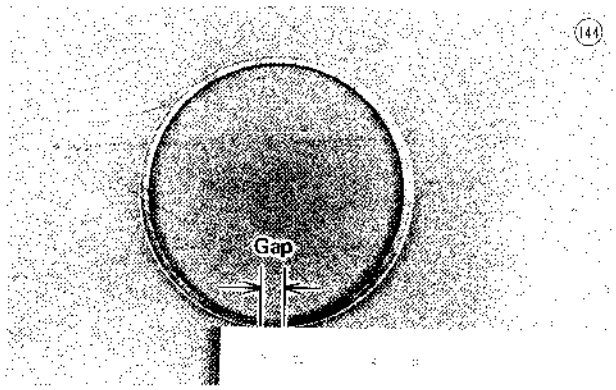


TAble 11 Ring Free Gap

Standard	Service Limit
about 6.5 mm	3.5 mm

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.

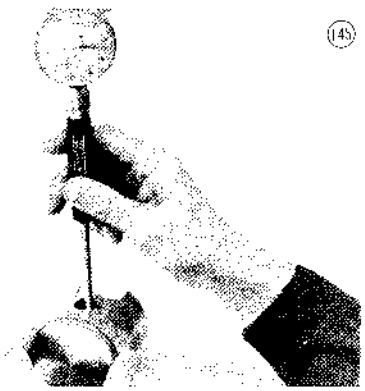


Table 12 Piston Pin, Piston Pin Hole, Small End Dia.

	Standard	Service Limit
Piston pin	17.994~18.000 mm	17.96 mm
Piston pin hole	18.005~18.013 mm	18.08 mm
Small end I.D.	22.003~22.014 mm	22.085 mm

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 (Fig. 34).

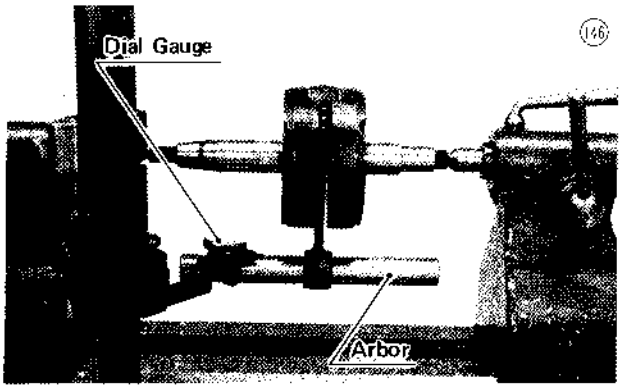
NOTE: When a new piston or pin is used, check that piston to pin clearance is 0.005 ~ 0.019 mm.

CRANKSHAFT

Connecting rod bending, twisting

Set the crankshaft in a flywheel alignment jig 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 length to determine the amount the connecting rod is bent.



Using the arrangement shown in the figure, measure the amount that the arbor varies from being parallel with the crankshaft over a 100 mm 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.

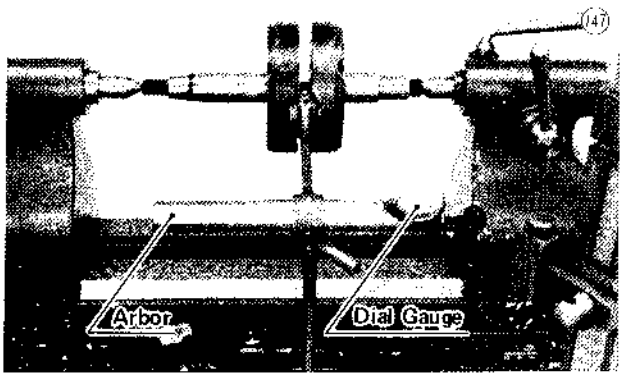


Table 13 Connecting Rod Bend, Twist

Standard	Service Limit
under 0.05 mm/100 mm	0.20 mm/100 mm

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.

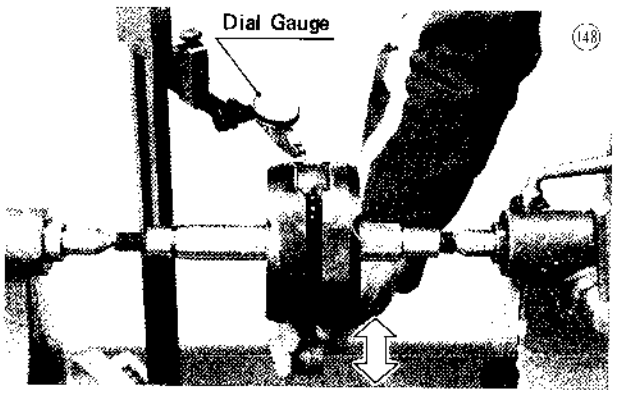


Table 14 Connecting Rod Big End Radial Clearance

Standard	Service Limit
0.040~0.052 mm	0.10 mm

Crankshaft 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.

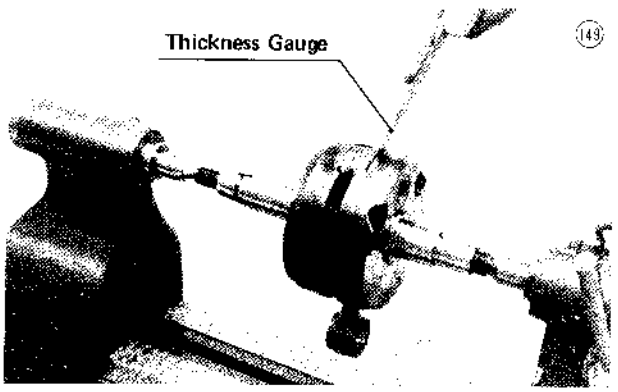


Table 15 Connecting Rod Big End Side Clearance

Standard	Service Limit
0.45~0.50 mm	0.70 mm

Crankshaft runout

Set the crankshaft in a flywheel alignment jig, and place a dial gauge on each side of the crankshaft where crankshaft ball bearing fits. 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.

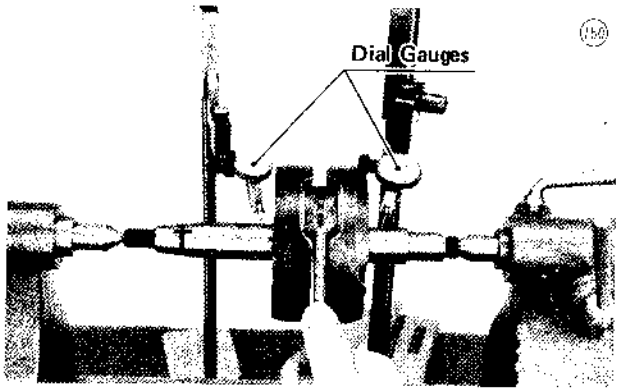


Table 16 Crankshaft Runout

Standard	Service Limit
under 0.03 mm	0.10 mm

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 tension on the clutch plates.

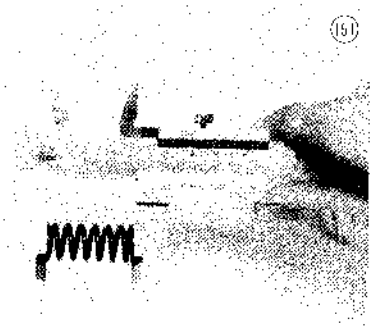


Table 17 Clutch Spring Free Length

Standard	Service Limit
33.1 mm	31.6 mm

Friction plate wear, damage

Visually inspect the friction plates to see whether or not 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

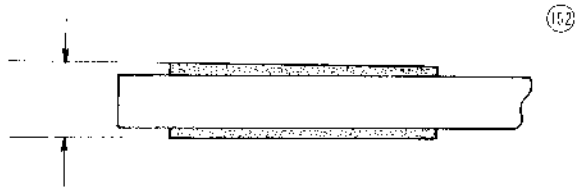


Table 18 Friction Plate Thickness

Standard	Service Limit
2.9~3.1 mm	2.5 mm

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 (153)

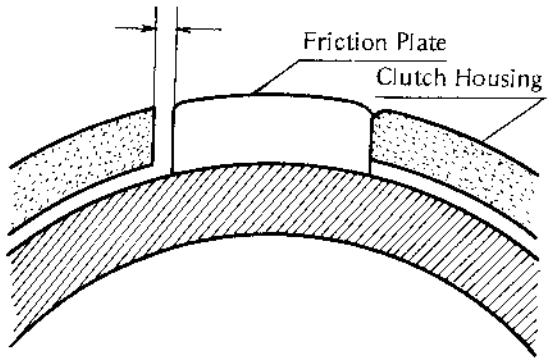


Table 19 Friction Plate/Clutch Housing Clearance

Standard	Service Limit
0.05~0.45 mm	0.65 mm

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.

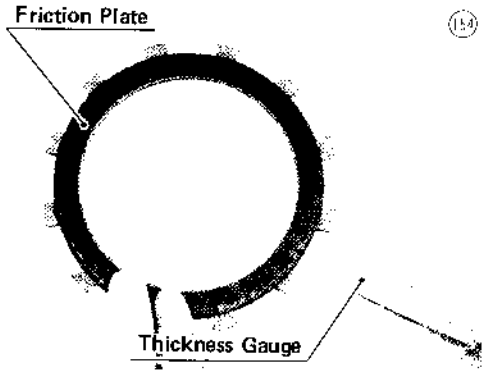


Table 20 Clutch Plate Warp

	Standard	Service Limit
Friction plate	under 0.3 mm	0.45 mm
Steel plate	under 0.3 mm	0.50 mm

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.

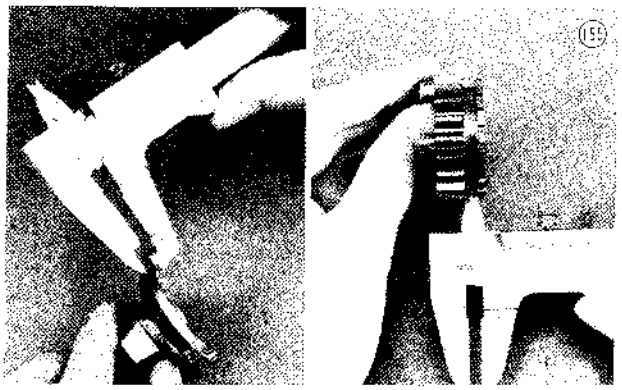


Table 21 Shift Fork Thickness

Standard	Service Limit
4.4~4.5 mm	4.3 mm

Table 22 Gear Shift Fork Groove Width

Standard	Service Limit
4.55~4.65 mm	4.75 mm

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.

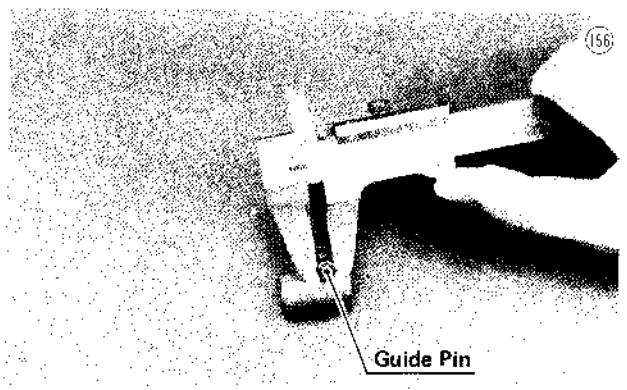


Table 23 Shift Fork Guide Pin Diameter

Standard	Service Limit
5.9~6.0 mm	5.85 mm

Table 24 Shift Drum Groove Width

Standard	Service Limit
6.05~6.20 mm	6.25 mm

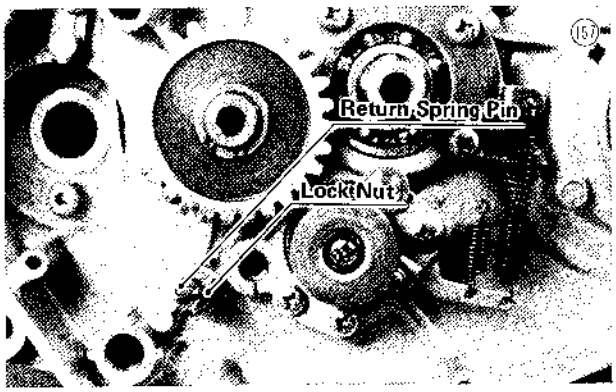
Transmission gear damage

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 lock nut.

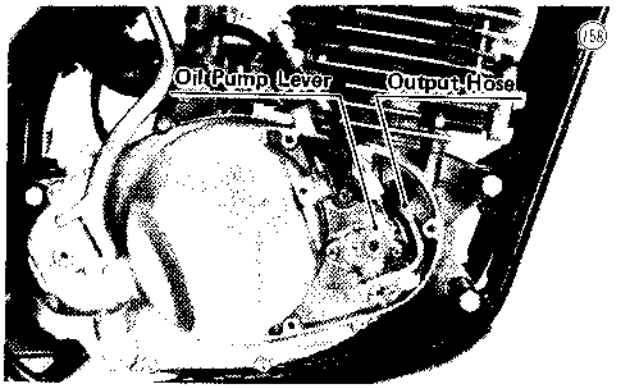


OIL PUMP

In the Kawasaki Superlube System, oil is kept in a tank separate from the engine and pumped by an oil pump to the engine where it mixes with the fuel/air mixture from the carburetor. The rate at which the oil is pumped is controlled by both throttle opening and engine speed so that the quantity of oil will vary with engine need. For normal motorcycle operation, this system as compared to a system whereby oil is premixed with the fuel, results in better engine lubrication, which means better engine performance and durability.

Bleeding the oil pump

When either of the oil pump hoses has been removed, air may become trapped inside and obstruct oil flow. See that oil flows from the oil tank outlet hose before reconnecting it to the pump. Bleed the air from the output hose by idling the engine (below 2,000 rpm) while pulling up on the oil pump cable as shown in Fig. 158 in order to maximize the plunger stroke. Keep the engine idling until the air is completely pumped out. If air bubbles continue to appear in the output hose, check the oil hose connections at the pump.



Oil pump performance test

If a drop in oil pump performance is suspected, check the rate that the oil is being pumped.

- Remove the oil pump cover.
- Detach the banjo bolt from the cylinder, and run the output hose into a container.

CAUTION: DURING THE OIL PUMP TEST, USE A 20:1 RATIO OF GASOLINE TO OIL IN THE FUEL TANK IN PLACE OF THE GASOLINE NORMALLY USED.

- Remove the magneto cover.
- Start the engine, attach a hand tachometer to the center of the flywheel, and set the engine to 2,000 rpm.

NOTE: Two people are necessary to carry out the oil pump performance test.

- Holding the oil pump lever fully open by pulling up the cable, and collect the oil that is being pumped for 3 minutes. If the quantity of oil collected corresponds with the table, the oil pump is operating properly.

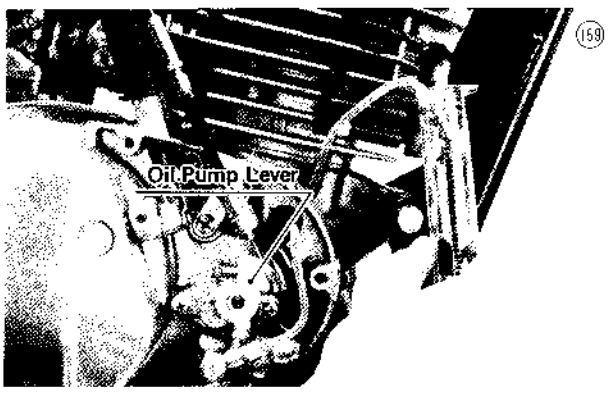


Table 25 Oil Pump Output

Output/3 minutes @2,000 rpm
3.5~4.1 cc

- If oil pump output is low, disassemble the pump and clean it. If this does not correct the problem, replace the oil pump as an assembly. The pump is precision made with no allowance for replacement of individual parts since the parts are well lubricated and wear is minimal.
- Replace the banjo bolt, bleed the pump, and replace the oil pump cover.

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, loosen some spokes and tighten others to change the position of different parts of the rim. If the rim is badly bent, however, is should be replaced.

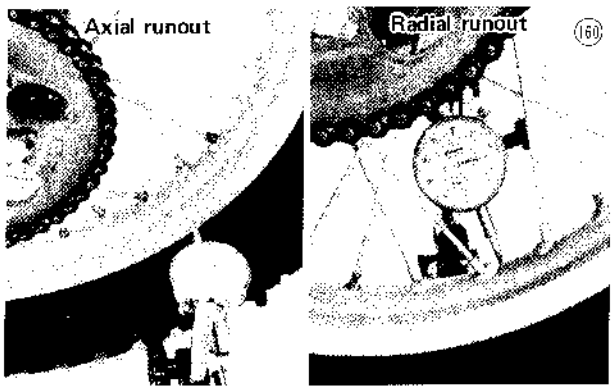


Table 26 Rim Runout

	Standard	Service Limit
Axial	under 0.8 mm	3.0 mm
Radial	under 1.0 mm	2.0 mm

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 apart, and set a dial gauge to the axle at a point halfway between the blocks. Turn the axle to measure the runout. The amount of runout is the amount of dial variation.

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

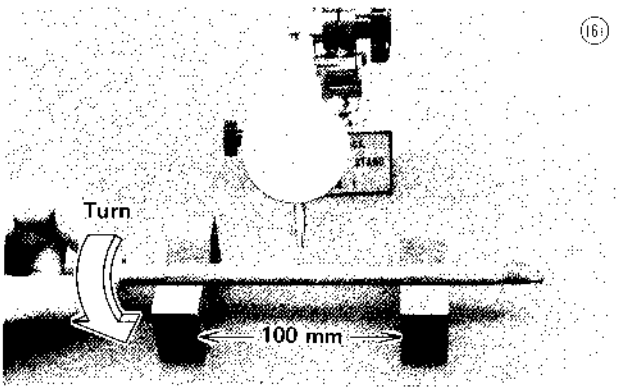


Table 27 Axle Runout/100 mm

	Standard	Service Limit
Front	under 0.1 mm	0.2 mm
Rear	under 0.05 mm	0.2 mm

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.

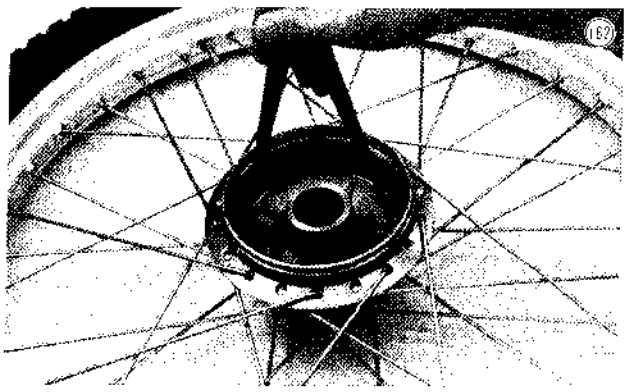


Table 28 Brake Drum Inside Diameter

	Standard	Service Limit
Front	120.00~120.14 mm	120.75 mm
Rear	130.00~130.16 mm	130.75 mm

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 some kind of solvent having a high flash point. In case the linings are damaged or the surface cannot be restored by sanding and cleaning, the shoes must be replaced.

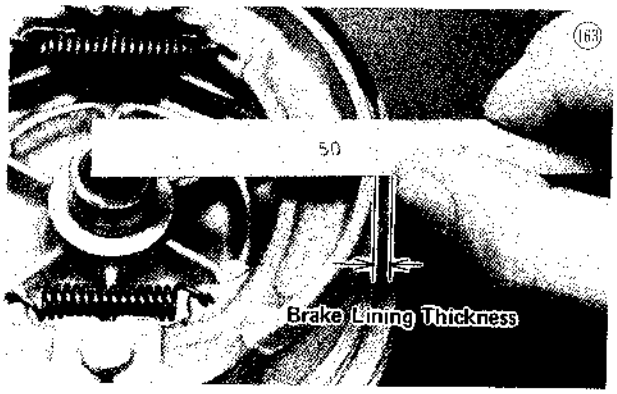


Table 29 Brake Lining Thickness

Standard	Service Limit
3.95~4.15 mm	2.0 mm

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.

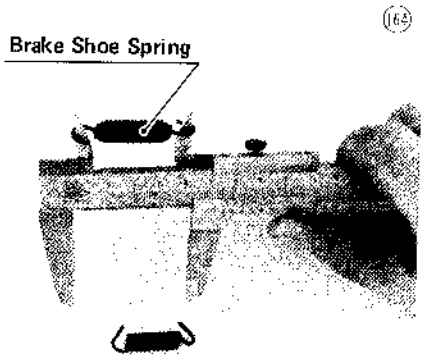
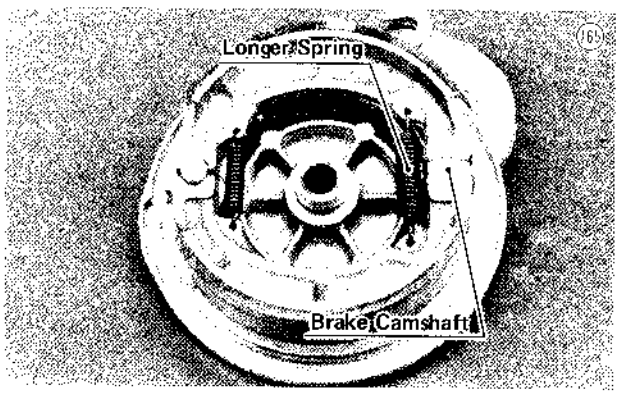


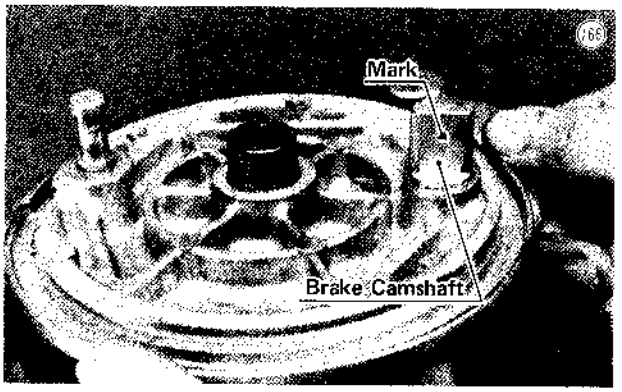
Table 30 Brake Spring Free Length

	Standard	Service Limit
Long	44.5~45.5 mm	48 mm
Short	30.8~31.2 mm	34 mm

NOTES: 1. When fitting, the brake shoe springs onto the brake shoes, the longer spring should be on the camshaft side.



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



GREASE SEALS, OIL SEALS AND BEARINGS

Ball bearing wear, damage

Since the ball bearings are made to extremely close tolerance, the clearance cannot normally be measured. Therefore, the condition of the bearings must be judged by feel. Wash each bearing with some kind of solvent having a high flash point, 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 either bearing, replace it.

Grease, oil seal damage

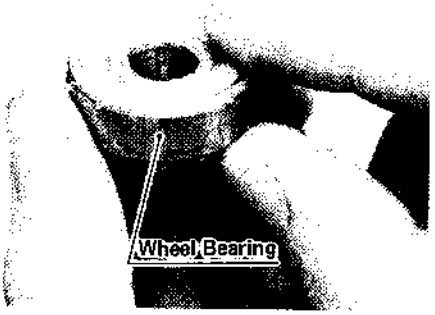
Inspect the oil seals or grease seals, and replace any with the lips misshapen, discolored (indicating the rubber has deteriorated), hardened, or otherwise damaged. Since oil seals or grease seals are nearly always damaged on removal, any removed oil seals or grease seals must be replaced. When pressing in an oil seal which is marked, press in the mark facing out.

Lubricating the wheel bearings

If the same bearing is to be used again, wash it with some kind of solvent having a high flash point,

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 and the front hub gear (speedometer gear) periodically.

(167)



NOTE: When installing the speedometer gear housing in the hub, turn the speedometer gear receiver so that it fits in the hub notches.

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 tensioner, 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 pin center of the 1st pin to pin center of the 21st pin. If the length is greater than the service limit, the chain should be replaced.

(168)

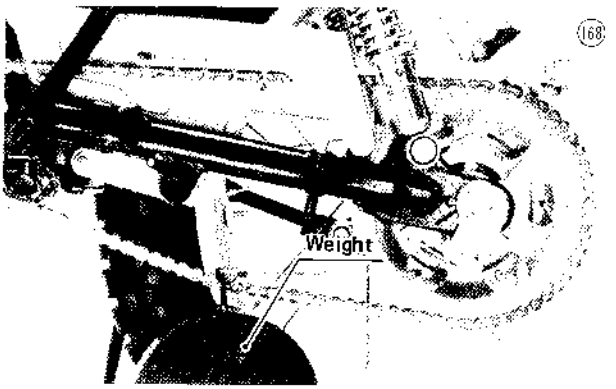


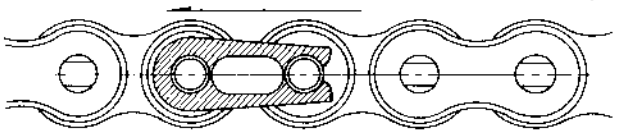
Table 31 Drive Chain Length

	Standard	Service Limit
20-link Length	254 mm	259 mm

NOTES: 1. The drive system was designed for use with the Daido D.I.D. 428-TM 120 link chain. For maximum strength and safety, the Daido D.I.D. 428-TM 120 link chain must be used for replacement.

2. 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. See Fig. 169.

Direction of Chain Rotation (169)



Chain tensioner wear

Visually inspect the drive chain tensioner rubber. If it is worn down or damaged, replace it.

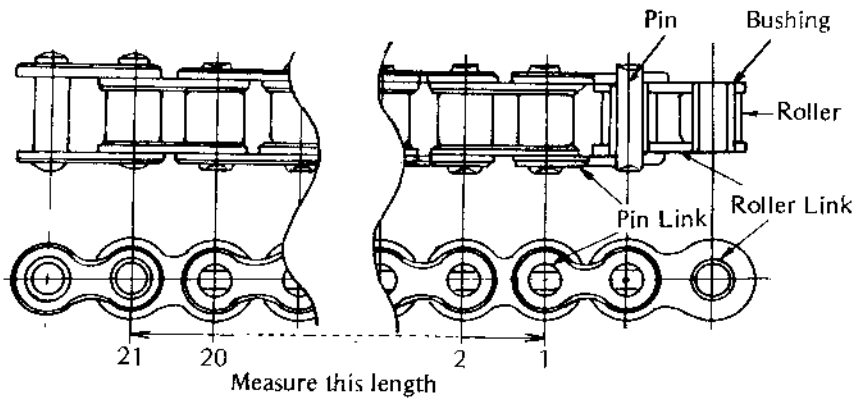
SPROCKETS

Sprocket wear

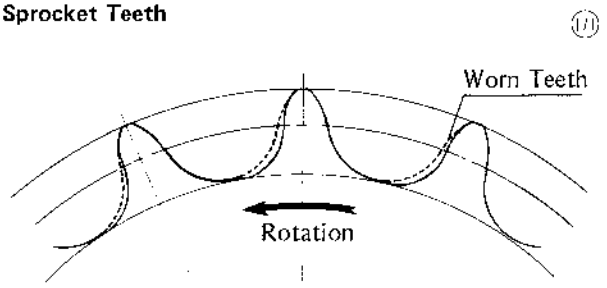
Visually inspect the sprocket teeth. If they are worn as illustrated, replace the sprocket.

Drive Chain

(170)



Sprocket Teeth



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.

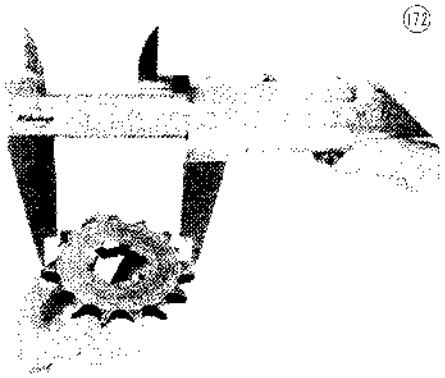


Table 32 Sprocket Diameter

	Standard	Service Limit
Engine	52.05~52.25 mm	51.8 mm
Rear	201.83 mm	200.0 mm

NOTE: After installing the engine sprocket, bend up one side of the lock washer against the mounting nut. For the rear sprocket, bend up the lock washers against one side of each bolt.

FRONT 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.

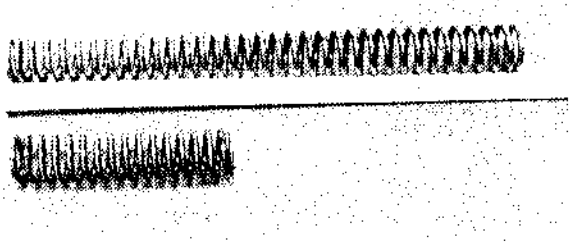
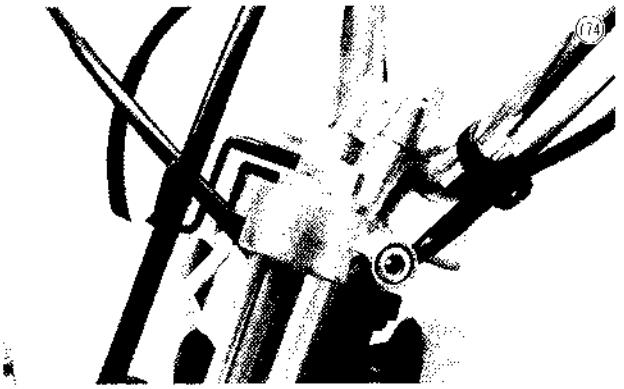


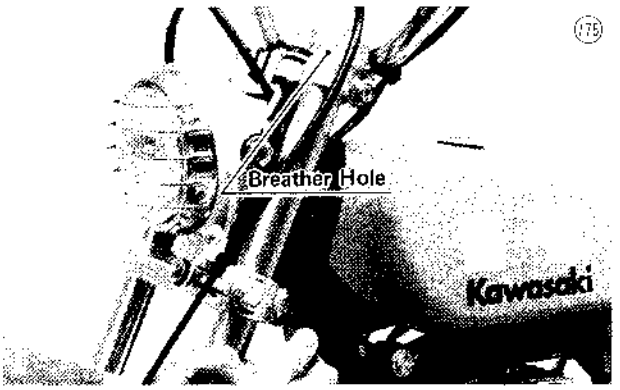
Table 33 Front Fork Spring Free Length

	Standard	Service Limit
Long	258.8 mm	251 mm
Short	106.6 mm	104 mm

NOTE: When installing the front fork, check that: 1. the upper surface of the inner tube is even with the upper surface of the stem head,



2. the air breather hole of the front fork top bolt comes to the front.



When assembling the front fork after disassembly, apply a non-permanent locking agent to the Allen bolt at the bottom of the outer tube.

STEERING STEM BEARINGS

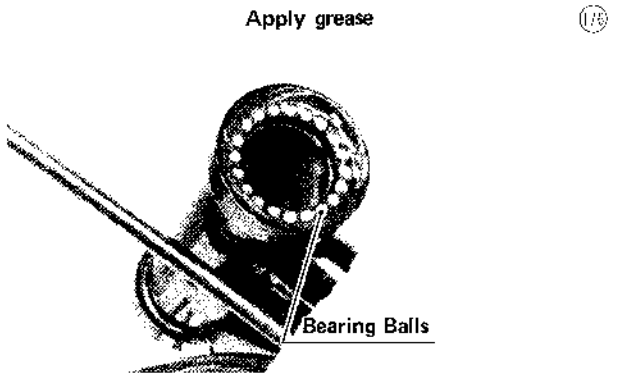
From overtightening or from a heavy shock to the steering stem, the bearing race surfaces may become dented. Damaged bearing races will cause the handlebar to jerk or catch when turned.

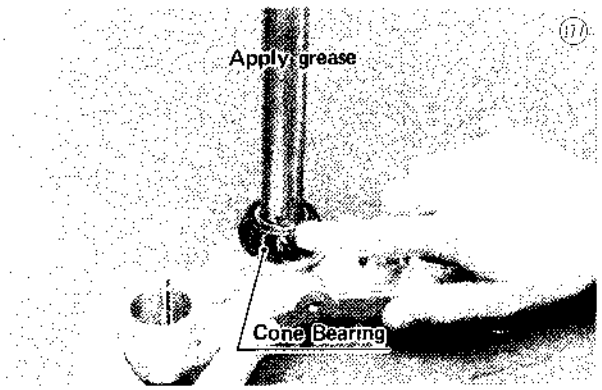
Bearing lubrication

In accordance with the periodic maintenance chart (Pg. 52), and whenever the steering stem is disassembled, the steering stem bearings should be re-lubricated.

Wipe all the old grease off the races and balls or rollers, if necessary washing them in some kind of solvent having a high flash point. Replace the bearing parts if they show wear or damage. Apply grease liberally to the upper and lower races, and stick the bearing balls in place with grease. Pack the cone bearing 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.

NOTE: To install the cone bearing and grease seal, drive them onto the steering stem using the transmission circlip driver (special tool).

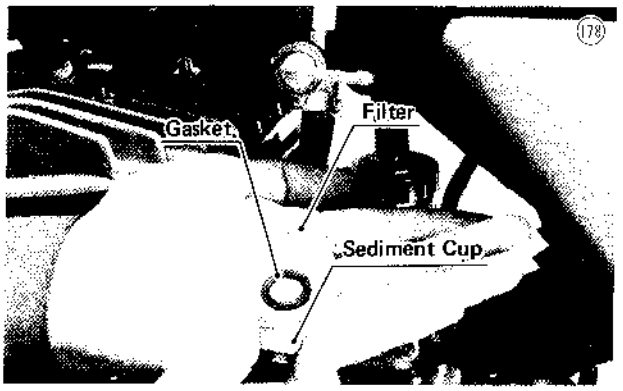
FUEL SYSTEM

Inspection and cleaning

If fuel leaks from the cap or from around the fuel tap; the cap, tap gasket, or O ring may be damaged. Visually inspect these parts and replace if necessary.

Examine the air vents in the cap to see if any are obstructed. Use thin wire to clear any obstructed vents.

Periodically inspect and clean the fuel tap filter and the sediment cup, using some kind of solvent having a high flash point and a fine brush on the filter. If the filter is damaged, it must be repalced. If the sediment cup contains much water or dirt, the fuel tank and the carburetor may also need to be cleaned.



To clean out the fuel tank, disconnect the fuel hose, remove the fuel tap, and flush out the tank with some kind of solvent having a high flash point. To clean out the carburetor float bowl, remove the carburetor, and remove the four screws to take off the bowl. Drain the fuel and clean out any sediment.

Appendix

PRE-TRIAL CHECK POINTS

Gasoline	Gasoline in tank
Engine oil	Engine oil level sufficient
Transmission oil	Transmission oil level correct
Tires	Check for wear, cracks and other damage Adjust the air pressure
Spokes and rims	Tighten any loose spokes
Drive chain	Check overall condition and chain slack Oil as necessary
Chain oil tank	Chain oil sufficient
Brakes	Check the brake adjustments
Spark plug	Tighten to correct torque
Cylinder, cylinder head	Tighten to correct torque
Clutch	Clutch functioning properly
Carburetor, air cleaner	Connected properly
Ignition timing	Ignition timing correct
Muffler	Muffler not damaged
Idling	Adjust idling (Pg. 11)
Throttle grip	Throttle grip play correct (Pg. 10)
Steering	Check that the steering turns freely but has no play (Pg. 14)
Front fork	When pushing down on the handlebar with the front brake fully applied, front fork functions properly and no oil leakage
Rear shock absorbers	Function properly, no oil leakage
Electrical equipment	Check that the headlight, tail/brake light and horn work
Bolts and nuts	Tighten any loose bolts and nuts (Pg. 53)
Fuel tank	Mounted securely
Engine and rear sprockets	Not worn or damaged

AFTER-TRIAL CHECK POINTS

After trial riding, first clean the motorcycle (Pg. 48), and then inspect the entire motorcycle, with special care to parts such as the air cleaner, carburetor, brakes, etc. that may have been submerged in water or splashed with water.

Carry out general lubrication (Pg. 20~22), and make adjustments as necessary (Pg. 10~19).

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, oil 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 replace the plug.
- Lubricate the drive chain and all the cables.
- Tie a plastic bag over the exhaust pipe to prevent moisture from entering.
- Set the mtorocycle 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.)
- Spray oil on all unpainted metal surfaces to prevent rusting. Avoid getting oil on rubber parts or in the brakes.
- 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.
- Check the engine oil (Pg. 6).
- Fill the fuel tank with fuel.
- Run the engine for about five minutes to warm the oil, and drain the transmission oil.
- Put in fresh transmission oil (Pg. 7).
- Check all the points listed under the Inspection and Adjustment section (Pg. 10~19).
- Lubricate the chain and the other points listed in the General Lubrication section (Pg. 20~22).

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, light switch housing, engine stop switch housing	Cover with plastic bags.
Ignition siwtch	Cover the keyhole with tape.
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 and the seat ..... 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 happnes, the motorcycle will not start and the affected parts must be wiped dry.

3) After washing

- Remove the plastic bags, and clear the air cleaner intake.
- Test the brakes before motorcycle operation.
- Lubricate the chain immediately to avoid rust.

TROUBLESHOOTING GUIDE

Engine doesn't start

- No gasoline in tank
- Gasoline not reaching carburetor
  - Fuel tap lever position incorrect
  - Fuel tap obstructed or defective
- Flooded
  - If the engine is flooded, kick it over with the throttle fully open to let more air in.
- Choke not working normally
  - Main switch or engine stop siwtch OFF
  - Fouled spark plug (replace)
  - Wire disconnected or pinched
  - Lever not returning
- Compression leakage
  - Spark plug loose
  - Cylinder head not sufficiently tightened down, or not evenly tightened down
- Spark plug not firing

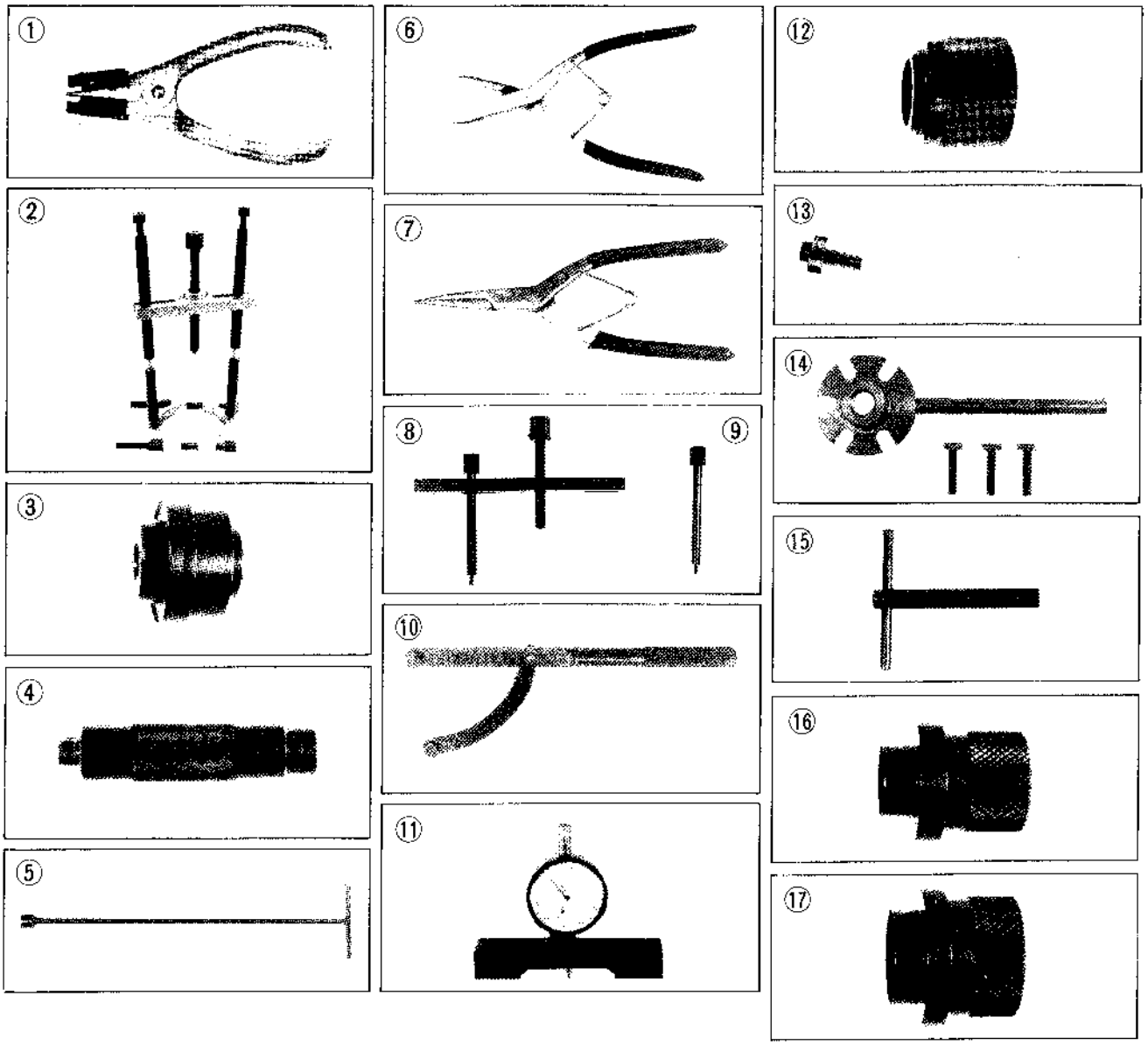
Engine stops

- No gasoline
- Fuel tap clogged or lever position wrong
- Fuel tank cap air vents obstructed
- Overheated
  - No engine oil
  - Transmission oil low
  - Incorrect spark plug
  - Carburetor adjusted too lean
  - Timing maladjusted
  - Carbon built up in combustion chamber

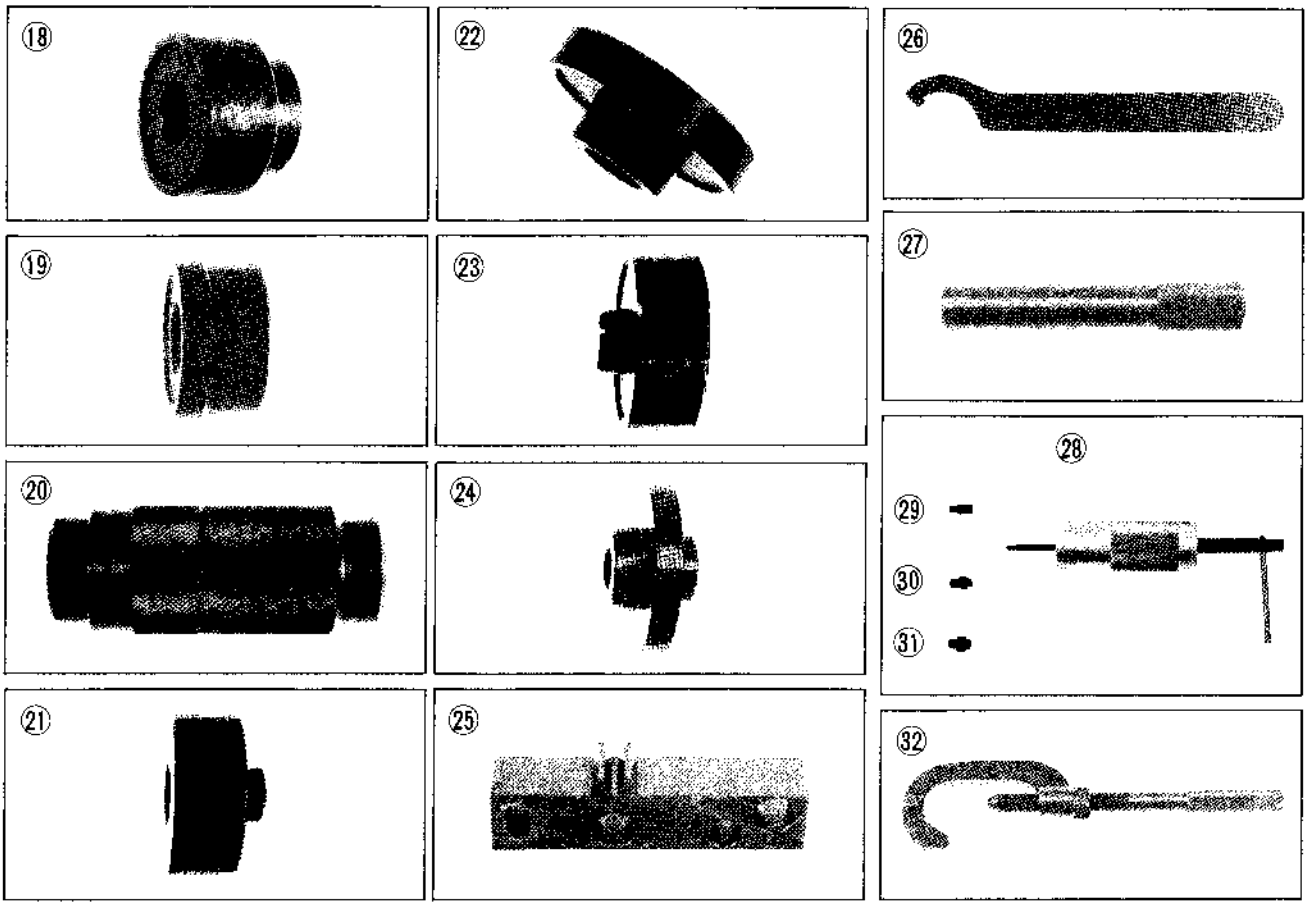
No power

- Compression leakage
  - Spark plug loose
  - Cylinder head not sufficiently tightened down, or not evenly tightened down
- Clutch slipping
  - Clutch maladjusted or worn
- Timing maladjusted
- Incorrect firing
  - Spark plug defective
  - Ignition coil defective

SPECIAL TOOLS



REF. NO.	TOOL NO.	DESCRIPTION
1	57001-115	PISTON RING PLIERS
2	57001-135	BEARING PULLER – Crankshaft Left Side
3	57001-138	STEERING STEM CAP DRIVER
4	57001-139	BEARING DRIVER HOLDER
5	57001-142	FRONT FORK CYLINDER HOLDER
6	57001-143	CIRCLIP PLIERS (Inside)
7	57001-144	CIRCLIP PLIERS (Outside)
8	57001-153	CRANKCASE SPLITTING TOOL
9	57001-157	CRANKCASE SPLITTING TOOL ADAPTER
10	57001-155	MAGNETO FLYWHEEL HOLDER
11	57001-160	DIAL GAUGE AND TDC FINDER "B" SET
12	57001-191	FRONT FORK OIL SEAL DRIVER
13	57001-202	FUEL LEVEL GAUGE
14	57001-259	MAGNETO FLYWHEEL PULLER
15	57001-116	ROTOR PULLER – Use with magneto flywheel puller
16	57001-264	SHIFT SHAFT OIL SEAL GUIDE
17	57001-265	KICK SHAFT OIL SEAL GUIDE



REF. NO.	TOOL NO.	DESCRIPTION
18	57001-282	BEARING DRIVER – Front Hub
19	57001-284	BEARING DRIVER – Front Hub
20	57001-287	SHIFT DRUM BEARING DRIVER
21	57001-288	BEARING DRIVER – Rear Hub
22	57001-289	BEARING DRIVER "B" – Output Shaft
23	57001-290	BEARING DRIVER – Drive Shaft
24	57001-296	BEARING DRIVER – Crankshaft
25	57001-302	GEAR HOLDER – Primary Gear
26	57001-321	STEM NUT WRENCH
27	57001-380	TRANSMISSION CIRCLIP DRIVER – Steering Stem Cone Bearing
28	57001-910	PISTON PIN PULLER ASSEMBLY
29	57001-912	ADAPTER "A" – Not used for KT250
30	57001-913	ADAPTER "B" – Not used for KT250
31	57001-914	ADAPTER "C"
32	56019-040	ENGINE SPROCKET HOLDER

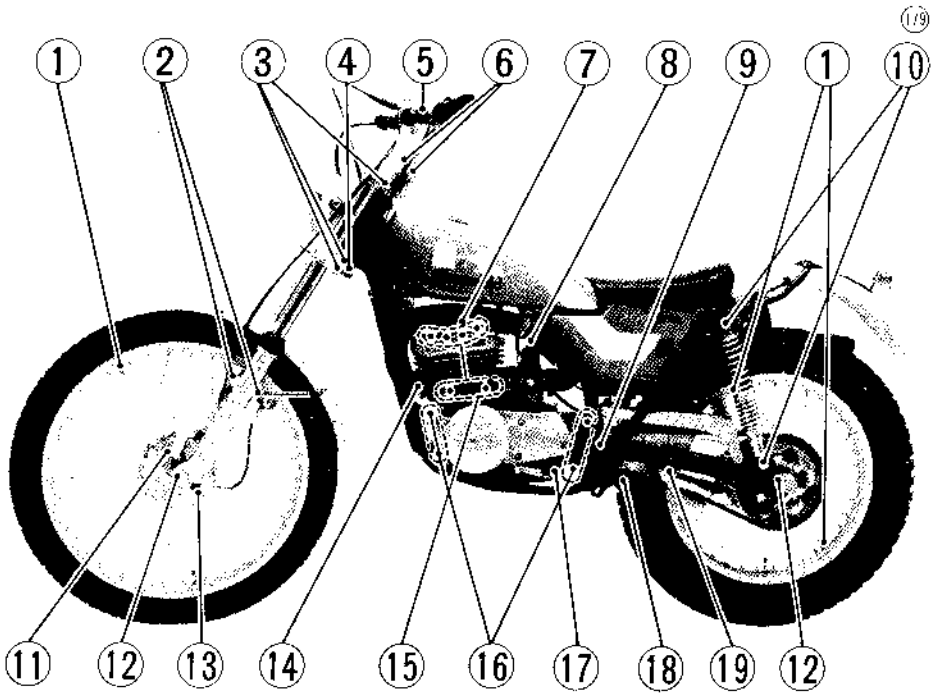
PERIODIC MAINTENANCE

Operation \ Frequency	After initial 800 km	After initial 3,000 km	Every subsequent 3,000 km	Every subsequent 6,000 km	See Page
Adjust brakes	•	•	•		16
Adjust drive chain	•	•	•		15
Check, adjust clutch	•	•	•		10
Check, adjust carburetor	•	•	•		11
Adjust throttle grip and oil pump cable	•	•	•		10,12
Check spoke tightness and rim runout	•	•	•		18,43
Tighten nuts and bolts	•	•	•		53
Clean fuel system	•	•	•		47
Clean, set spark plug gap	•	•	•		14
Check steering play	•			•	14
Check ignition timing	•	•	•		12
Clean air cleaner element		•	•		14
Carry out general lubrication		•	•		20
Check tire wear		•	•		18
Check drive chain wear		•	•		45
Change transmission oil	•	Every subsequent 5,000 km			7
Clean, lubricate drive chain	Every 300 km				20
Check brake wear	Every 6,000 km				43
Check front fork oil level	Every 6,000 km				19
Decarbon head and exhaust system	Every 6,000 km				37
Change air cleaner element	Every 10,000 km				14
Change front fork oil	Every 10,000 km				19
Regrease wheel bearings	Every 1 year or 10,000 km				22,44
Regrease speedometer gear housing	Every 1 year or 10,000 km				22,45
Regrease brake camshaft	Every 1 year or 10,000 km				21
Lubricate steering stem bearings	Every 2 years or 20,000 km				22,46

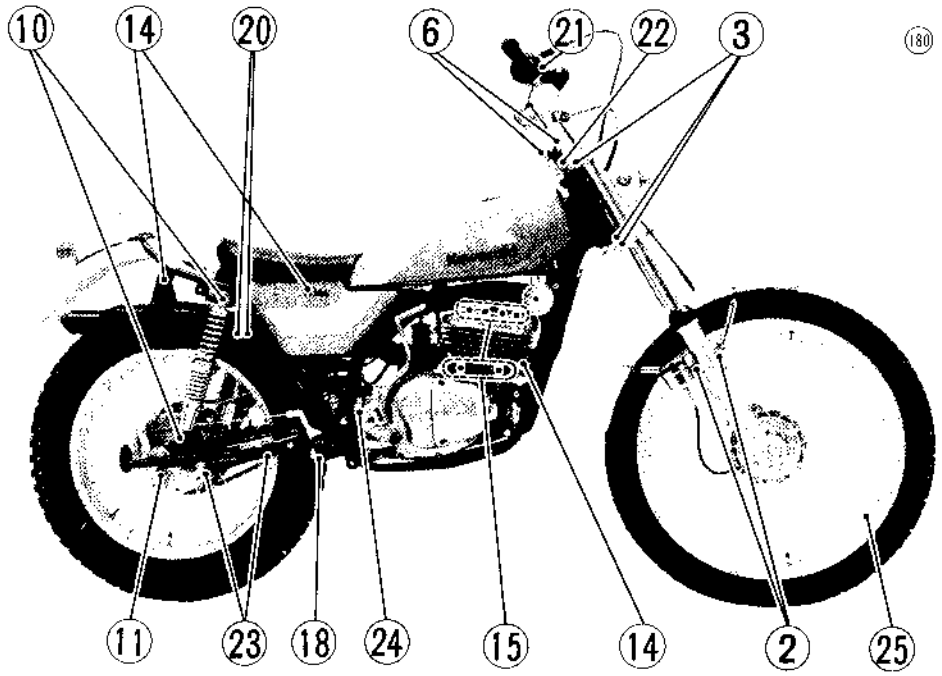
NOTE: Before and after trial riding, check and lubricate the points in the sections, "Pre-trial Check Points", and "General Lubrication".

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 Nut
2. Front Fender Mounting Bolts
3. Fork Clamp Bolts
4. Steering Stem Base Allen Clamp Bolt
5. Clutch Lever Holder Bolt
6. Handlebar Clamp Mounting Bolts
7. Spark Plug
8. Carburetor Cable End Safety Clip (Top of the Carburetor)
9. Pivot Shaft Nut
10. Rear Shock Absorber Mounting Screws
11. Brake Cam Lever Bolt
12. Axle Nut and Cotter Pin
13. Brake Panel Stopper
14. Muffler Mounting Bolts
15. Cylinder Head, Cylinder Base Mounting Nuts
16. Engine Mounting Nuts
17. Shift Pedal Bolt
18. Cotter Pin (Foot Peg)
19. Chain Tensioner Screw



20. Spark Arrester Muffler Connector
21. Front Brake Lever Holder Bolt
22. Steering Stem Head Bolt
23. Torque Link Nut, Cotter Pin
24. Kick Pedal Bolt
25. Spokes

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	English	See Pg.
Clutch Hub Nut	4.0 ~ 5.0 kg-m	29 ~ 36 ft-lbs	33
Clutch Spring Bolts (6)	0.4 ~ 0.5 kg-m	35 ~ 43 in-lbs	32
Cylinder Head Nuts (6)	2.0 ~ 2.4 kg-m	14.5 ~ 17.5 ft-lbs	34,37
Cylinder Base Nuts (4)	3.3 ~ 3.7 kg-m	24 ~ 27 ft-lbs	34,37
Engine Drain Plug	1.0 ~ 1.5 kg-m	7.0 ~ 11.0 ft-lbs	7
Engine Mounting Bolts (4)	3.5 ~ 4.5 kg-m	25 ~ 33 ft-lbs	—
Engine Sprocket Nut	7.5 ~ 8.5 kg-m	54 ~ 61 ft-lbs	31
Front Axle Nut	5.0 ~ 6.5 kg-m	36 ~ 47 ft-lbs	—
Front Fork Clamp Bolts (6)	2.2 ~ 2.3 kg-m	16.0 ~ 16.5 ft-lbs	15
Handlebar Clamp Bolts (4)	1.6 ~ 2.1 kg-m	11.5 ~ 15.0 ft-lbs	—
Magneto Flywheel Nut	9.0 ~ 10.0 kg-m	65 ~ 72 ft-lbs	31
Oil Hose Banjo Bolts (2)	0.4 ~ 0.5 kg-m	35 ~ 43 in-lbs	33
Primary Gear Nut	4.5 ~ 5.0 kg-m	33 ~ 36 ft-lbs	32
Rear Axle Nut	8.0 ~ 10.0 kg-m	58 ~ 72 ft-lbs	16
Rear Sprocket Bolts (6)	2.0 ~ 2.2 kg-m	14.5 ~ 16 ft-lbs	—
Spark Plug	2.5 ~ 3.0 kg-m	18.0 ~ 22 ft-lbs	14
Spokes	0.25 ~ 0.3 kg-m	22 ~ 26 in-lbs	18
Steering Base Allen Bolt 10ϕ	4.2 ~ 6.2 kg-m	30 ~ 45 ft-lbs	—
Steering Stem Head Bolt	4.7 ~ 6.8 kg-m	34 ~ 49 ft-lbs	15
Swing Arm Pivot Shaft Nut	6.5 ~ 8.0 kg-m	47 ~ 58 ft-lbs	—
Torque Link Nut	2.2 ~ 3.4 kg-m	16 ~ 25 ft-lbs	16

The table below, relating tightening torque to thread diameter and pitch, lists the basic torque for the botls and nuts used on Kawasaki Motorcycles. However, the actual torque that is necessary may vary among bolts and nuts with the same thread diameter and pitch. The bolts and nuts listed on Pg. 54 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. 54. All of these values are for use with dry solvent cleaned threads.

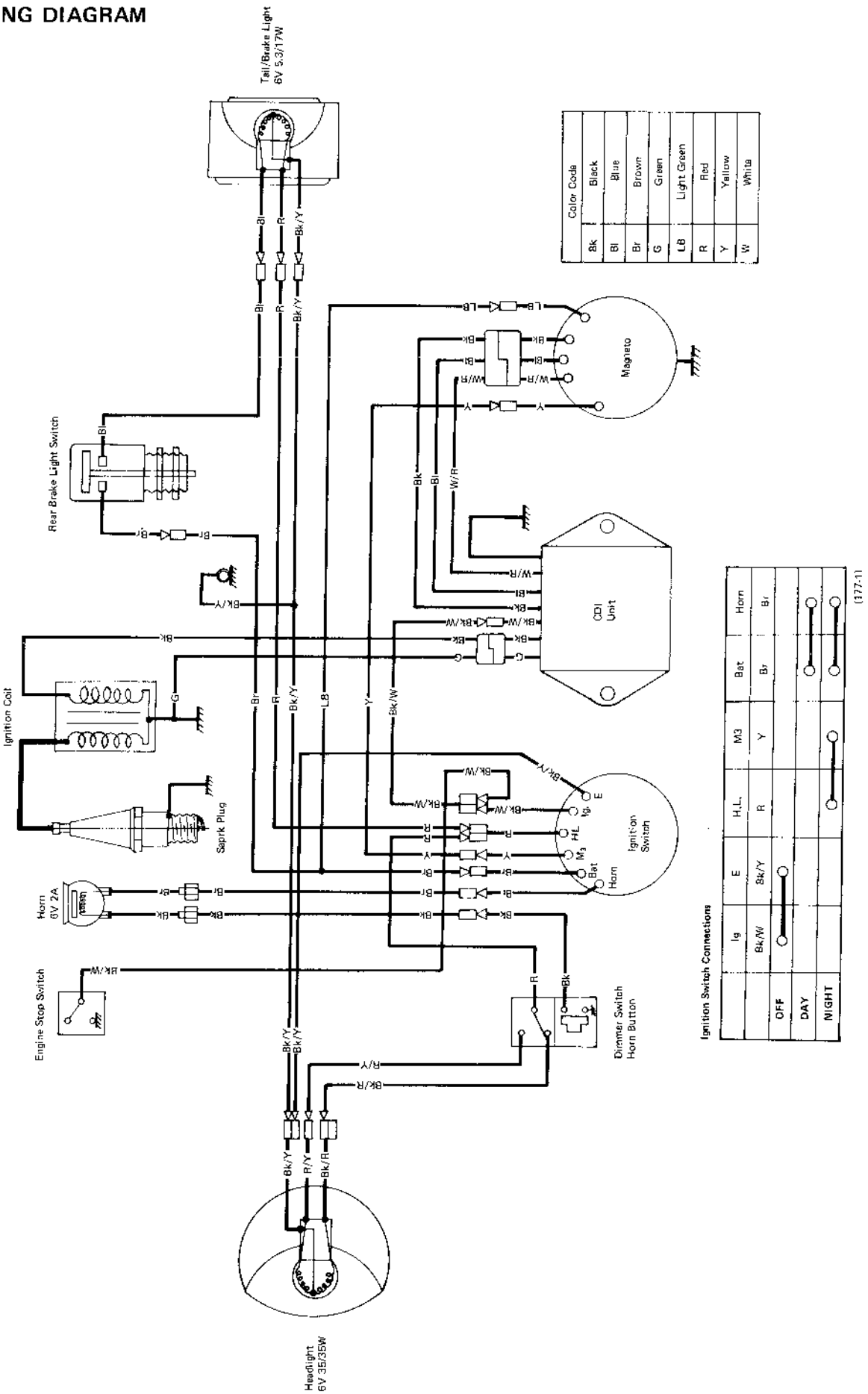
Coarse threads

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



KAWASAKI
HEAVY INDUSTRIES, LTD.
ENGINE AND MOTORCYCLE GROUP

Printed No. 99997-715 Jun. 1975. Ⓘ. 10. Ⓨ. Printed in Japan