

IV. Frame

1. FRAME

1) Construction

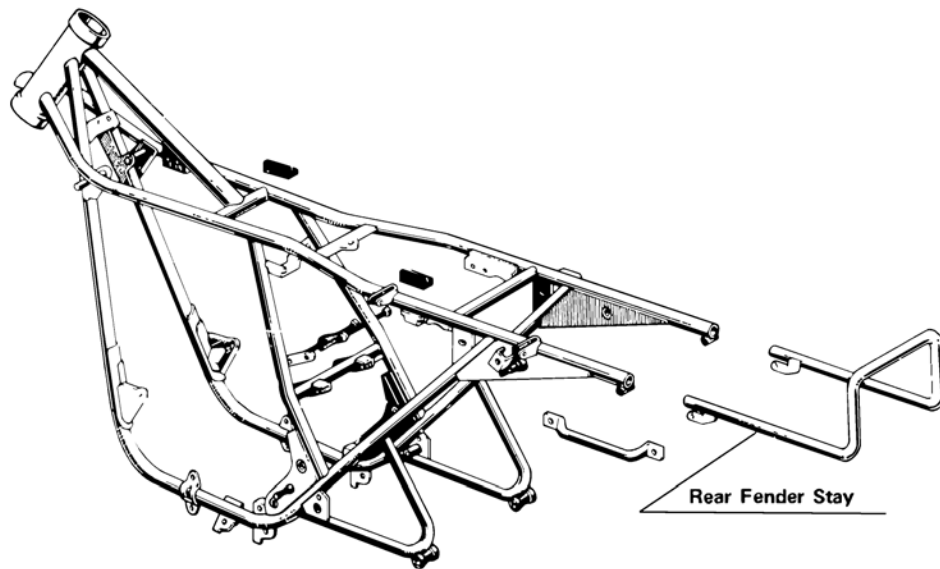
Two types of frames are generally used in motorcycle manufacture, the pipe frame and the pressed steel frame. In the H Series machines,

a rigid, light-weight double cradle pipe frame is used.

In the H1 the brake pedal shaft extends through the frame out both sides so that the brake pedal can be located on either side according to the rider's preference. The gear shift pedal, of course, can also be relocated.

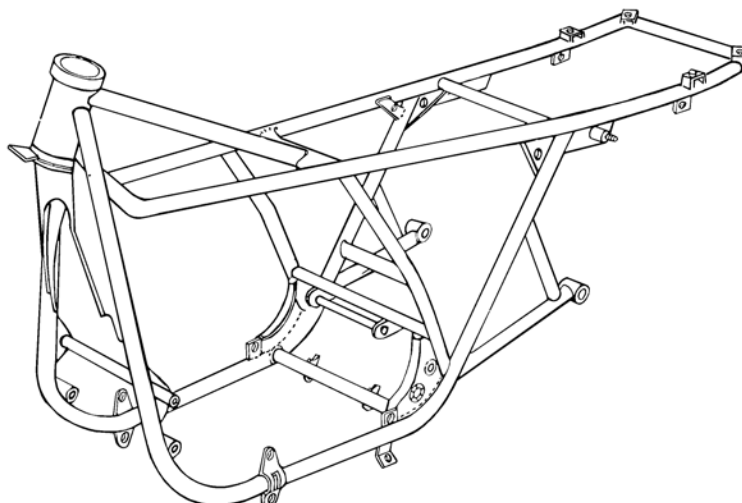
H1 Frame

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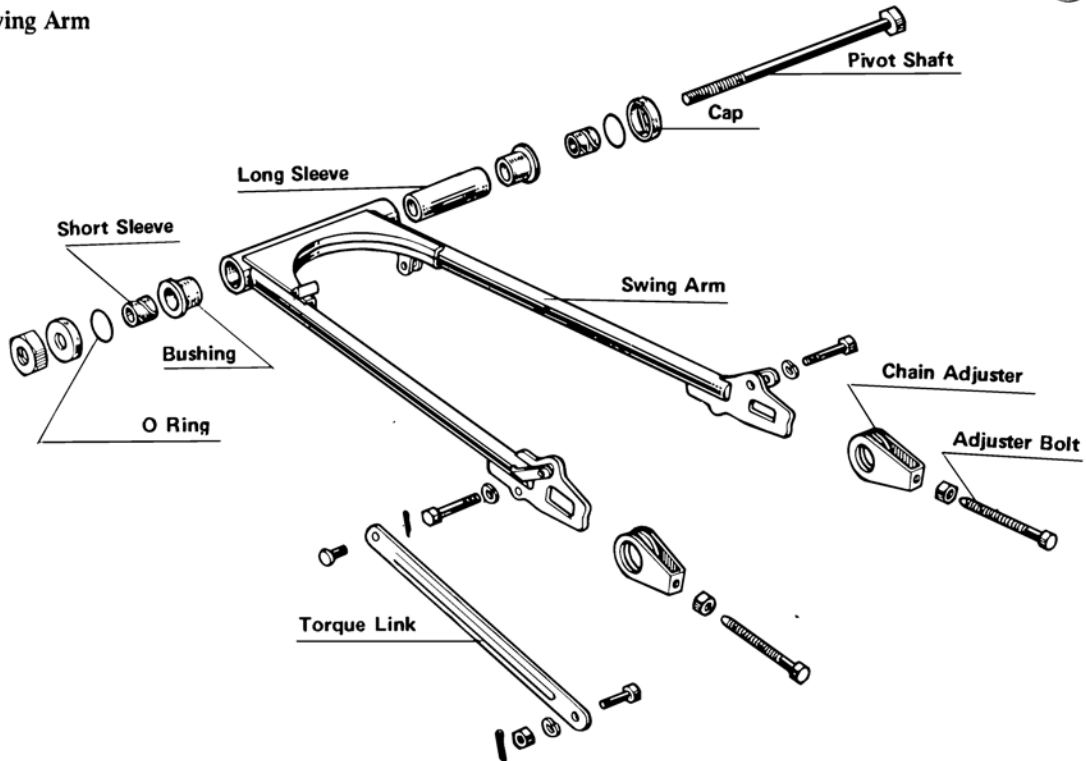
H2 Frame

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2. SWING ARM

H1 Swing Arm



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1) Construction

The swing arm works together with the rear shock absorbers as a buffer device. The front of the swing arm is attached to the frame by the pivot shaft, and the rear part through the shock absorber, moving up and down with the pivot shaft as a reference.

2) Disassembly

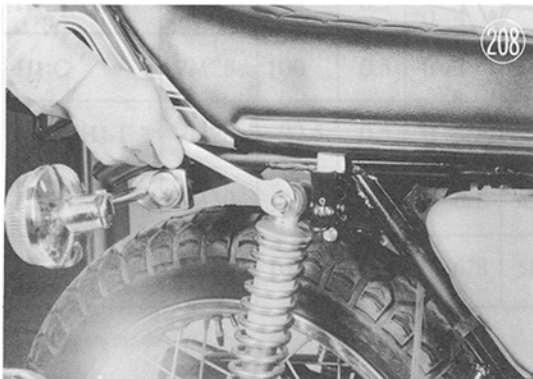
First remove the rear wheel and coupling. For removal procedure see page 58.

Unhook the brake lamp switch spring, and on the H1 also remove the rear brake cable.



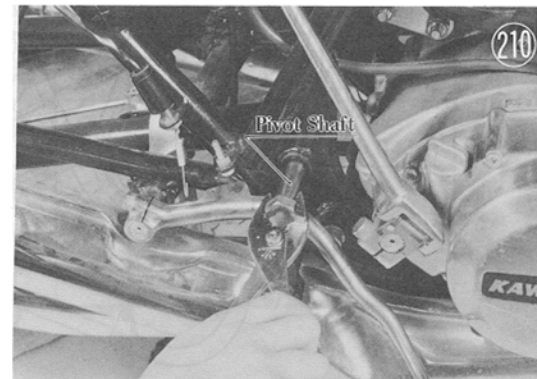
209

Unbolt the lower (H1) or upper (H2) shock absorber mountings.



208

Take off the lock nut, pull out the pivot shaft and remove the swing arm.



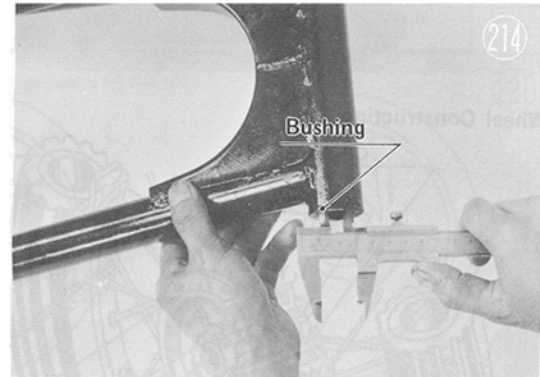
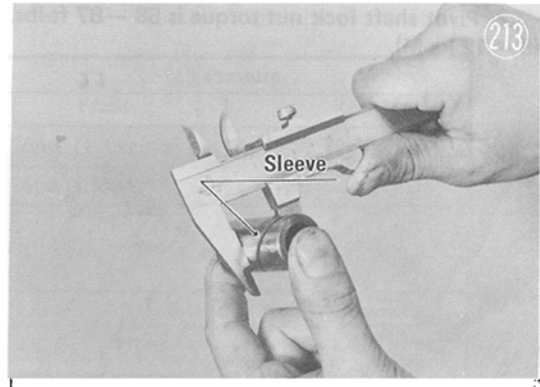
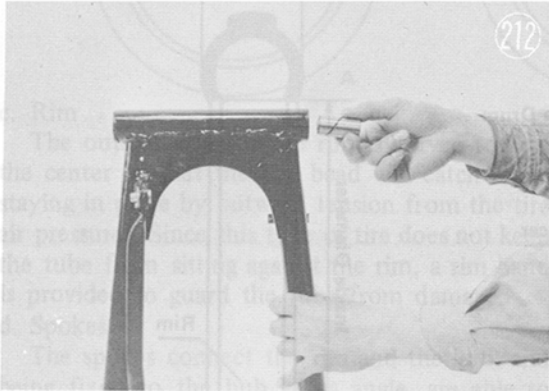
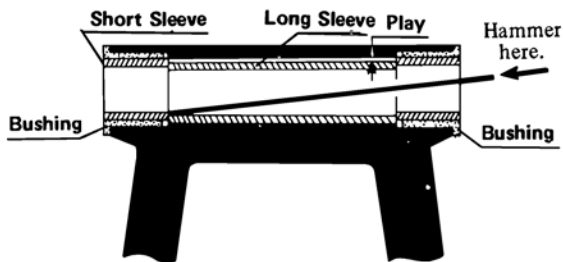
210

Remove the short sleeves by inserting a rod or starting punch into the pivot shaft and hammering it lightly.

The long sleeve comes out easily after either short sleeve is removed.

Remove the bushing from the swing arm only if it requires replacement, since it cannot be reused once removed.

Swing Arm Pivot

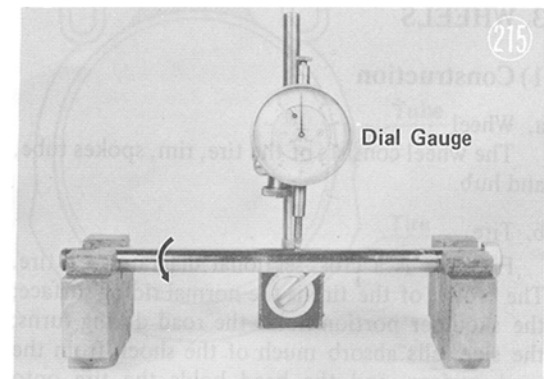


b. Pivot Shaft

Measure pivot shaft runout with a dial gauge.

Table 23 Pivot Shaft Runout

Standard	Service Limit
Under .004" (.1 mm)	.0055" (.14 mm)



3) Overhaul

a. Sleeve and Bushing

The swing arm pivot point is continually moving due to vibration from the road, and this causes sleeve and bushing wear and works the nut loose. Inspect these parts for looseness or excessive wear, and replace any out of tolerance. Be especially attentive to wear of the bushing on the chain side, as this bushing wears more than the other. Play in either bushing will cause wheel vibration.

Table 22 Sleeve, Bushing Wear

	Standard	Service Limit
Sleeve outer dia.	.8661" (22.00 mm)	.8602" (21.85 mm)
Bushing inner dia.	.8720" (22.15 mm)	.8819" (22.40 mm)
Sleeve/Bushing clearance	.0059" (0.15 mm)	.0217" (0.55 mm)

c. Swing Arm Warp

Swing arm warp or bending will cause the front and rear wheels to go out of alignment, resulting in steering difficulty and handlebar oscillation. If the swing arm is warped, replace it.

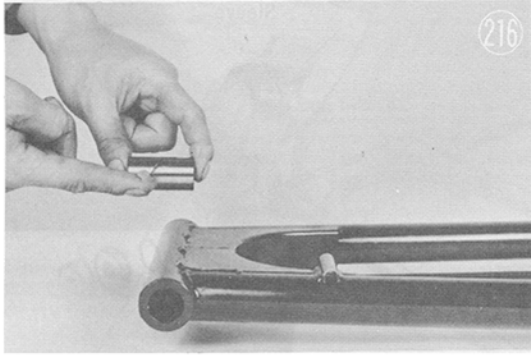
4) Assembly

Assembly is in the reverse order of disassembly.

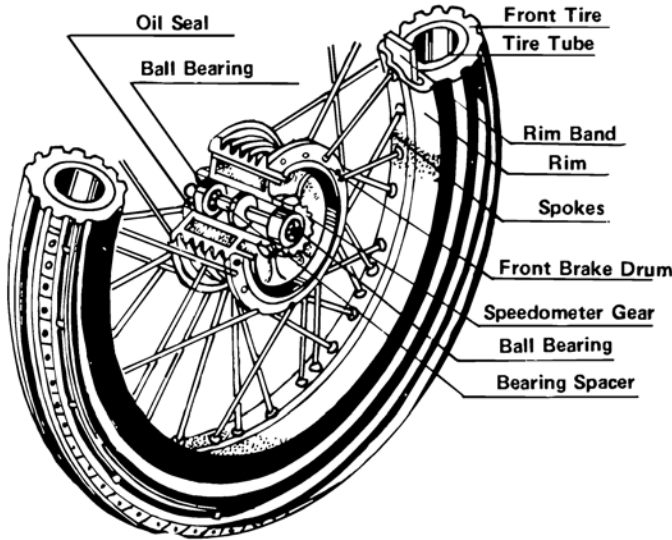
Caution:

1. Use a good quality grease on the sleeve when inserting it, to prevent seizure from overheating.

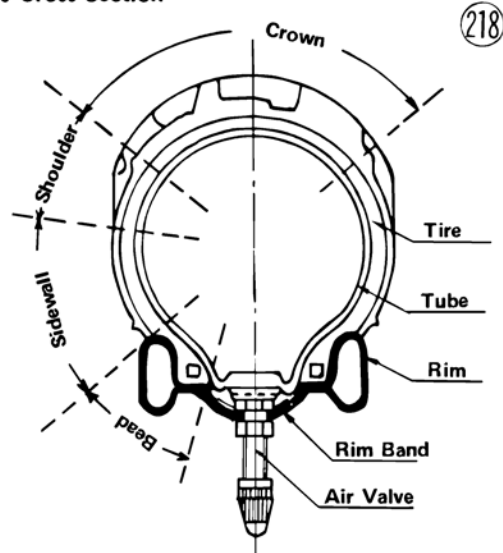
2. Pivot shaft lock nut torque is 58 – 87 ft.-lbs.
(8 – 12 kg-M).



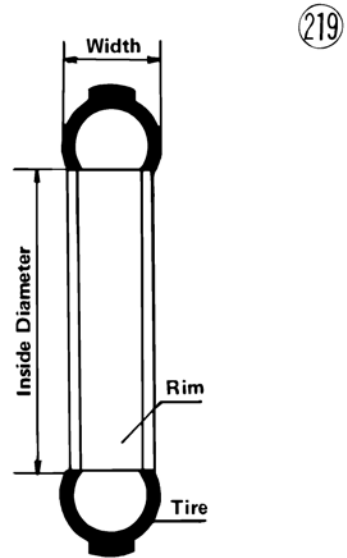
Wheel Construction



Tire Cross Section



Tire Size



3. WHEELS

1) Construction

a. Wheel

The wheel consists of the tire, rim, spokes tube, and hub.

b. Tire

Fig. 218 is a cross-sectional diagram of a tire. The crown of the tire is the normal riding surface; the shoulder portion holds the road during turns; the sidewalls absorb much of the shock from the road surface, and the bead holds the tire onto the rim.

Various tread patterns are manufactured into tires to allow selection of a tire suitable for its intended use. A rib pattern resists side slippage, and is desirable on a front tire. A tire with a block pattern tread has greater friction with the road surface and so is employed chiefly on the rear to improve braking and acceleration efficiency.

The tire size marking shows tire dimensions in inches. For example a 3.00-18 tire has an overall width of 3.00 inches, and fits on an 18 inch rim, i.e. its inside diameter is 18 inches. An "S" after the width number indicates a tire for high speed use.

Tire Construction

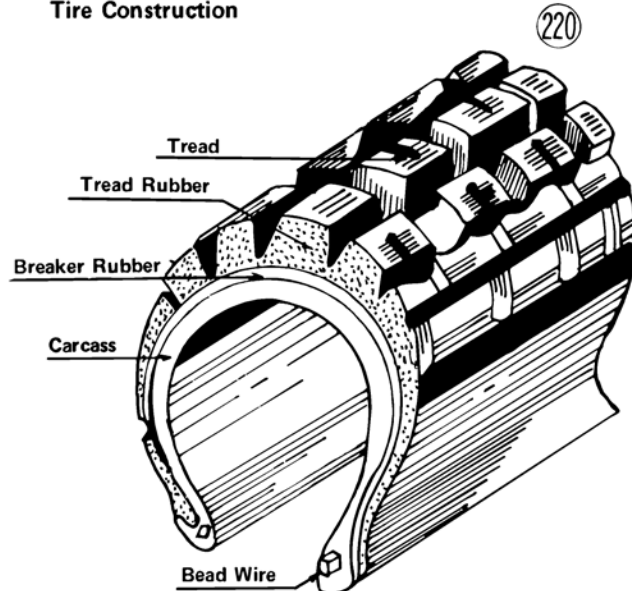
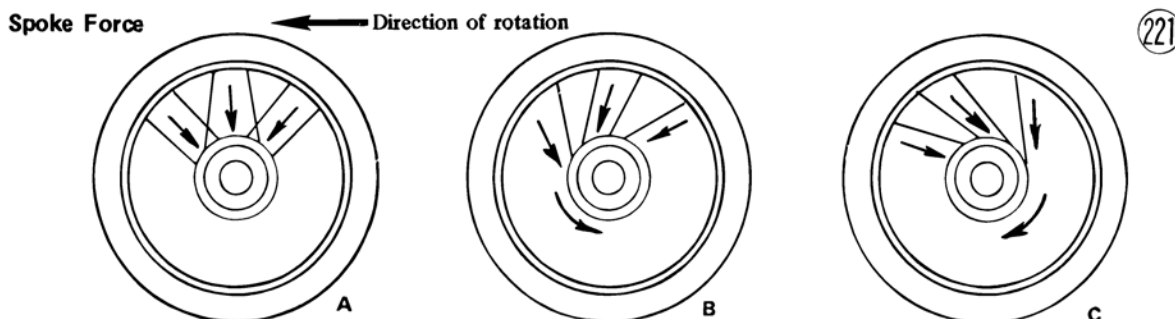


Table 24 Tires

Model	Tire Size		Air Pressure	
	Front	Rear	Front	Rear
H1	3.25-19 4PR	4.00-18 4PR	26psi (1.8 kg/cm ²)	31psi (2.2 kg/cm ²)
H2	3.25S19 4PR	4.00S18 4PR	26psi (1.8kg/cm ²)	31psi (2.2kg/cm ²)

Table 25 Wheels

Model	Rim Size		Spoke Size	
	Front	Rear	Front	Rear
H1	1.85B X 19W	2.15B X 18W	9(3.5 mm ϕ)	9(3.5 mm ϕ)
H2	1.85B x 19W	2.15B x 18W	9 (3.5 mm ϕ) (.138 in. radius)	9 (3.5 mm ϕ) (.138 in. radius)



c. Rim

The outside edge of the rim is curved toward the center so that the tire bead will catch on it, staying in place by outward tension from the tire air pressure. Since this type of tire does not keep the tube from sitting against the rim, a rim band is provided to guard the tube from damage.

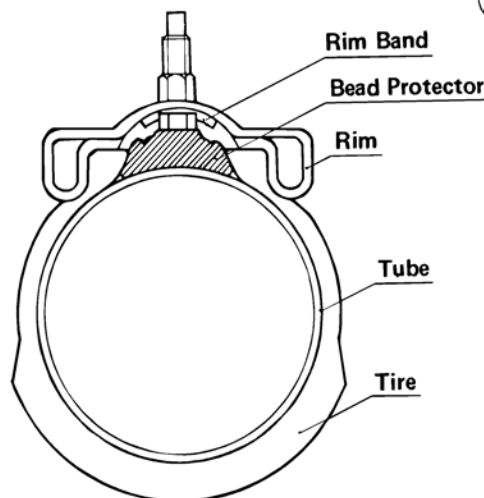
d. Spokes

The spokes connect the rim and the hub, and being fixed to the hub at an angle, are able to support the vehicle and load force under any conditions. Figure 221 shows the force applied to the spokes: Spokes A support the standing weight of the vehicle and receive the force of road shocks; spokes B work during acceleration and normal forward movement; spokes C receive their heaviest load during braking.

e. Bead Protectors

The rear wheel on the H Series is equipped with bead protectors which prevent damage to the tube during high speed braking, by keeping the bead from slipping on the rim.

Bead Protector



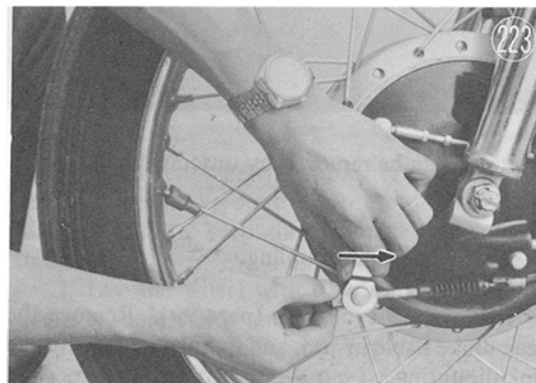
f. Wheel Balance

Inertia of the wheel increases as the square of the angular speed of the wheel, which means that the faster the wheel turns, the more that even a small difference of weight around the wheel will affect stability. To maintain wheel stability and prevent vibration at high speeds, wheel balancing weights are fixed to the outer end of the spokes.

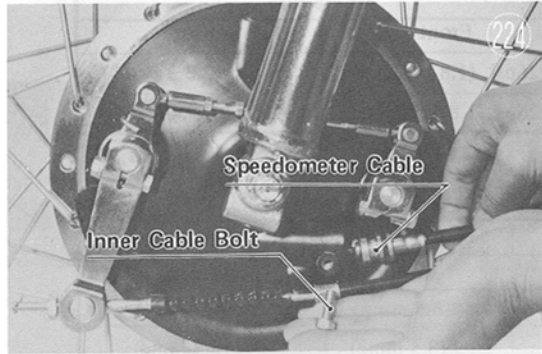
2) Disassembly

a. Front Wheel

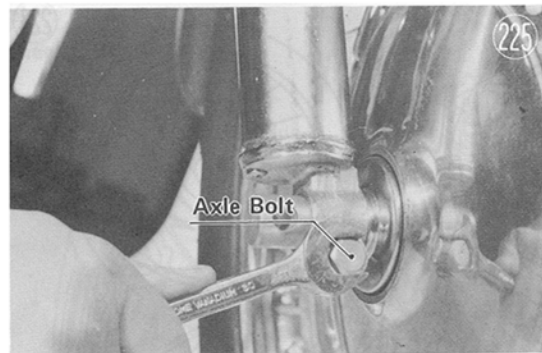
- (1) Expansion brake models
Remove the front brake cable.



Remove the inner cable bolt and pull the speedometer cable from the brake panel.



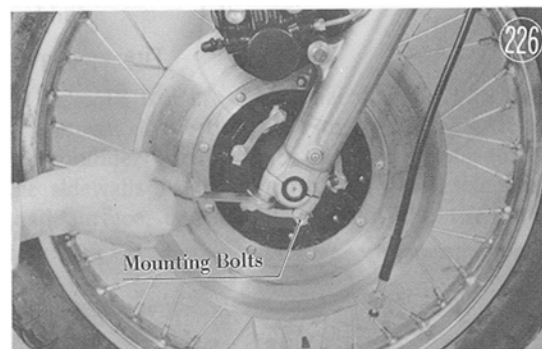
Remove the front axle bolt.



Place a stand under the engine to raise the front wheel off the ground. Unscrew the axle, and remove the wheel and brake panel as an assembly.

(2) Disc brake models

Unscrew the speedometer cable. Take out the four axle mounting bolts and the wheel can be removed.

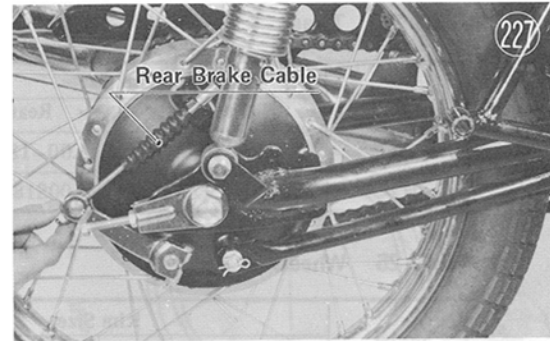


The axle can be removed by unscrewing it.

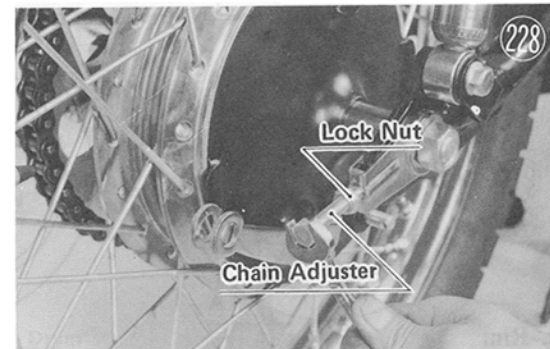
b. Rear Wheel and Coupling

(1) H1

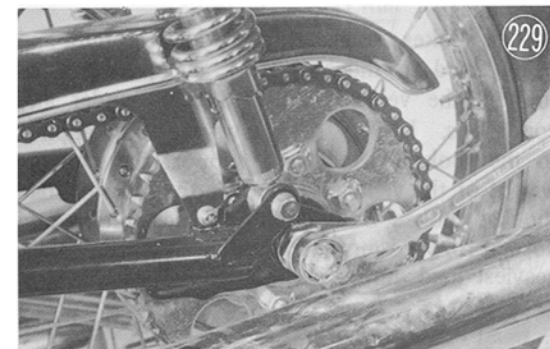
Remove right mufflers (page 99). Remove the rear brake cable or rod, and unbolt the rear torque link mounting.



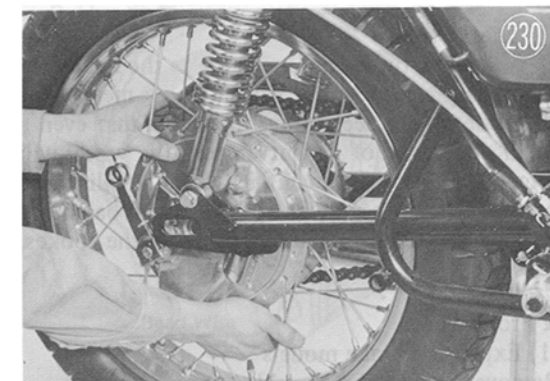
To make reassembly easy, loosen the chain adjuster lock nut and back off the adjuster screw 2 or 3 turns.



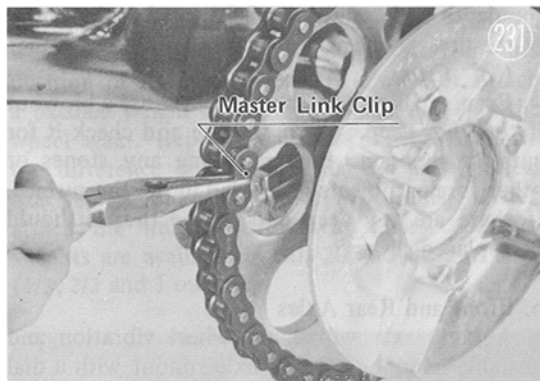
Pull out the cotter pin and take out the axle. The right chain adjuster collar will come off at the same time.



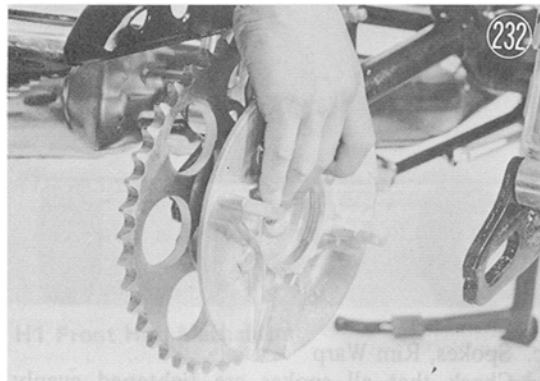
When the wheel is removed, the coupling remains.



Remove the master link clip from the master link with pliers. Take out the master link and remove the chain.

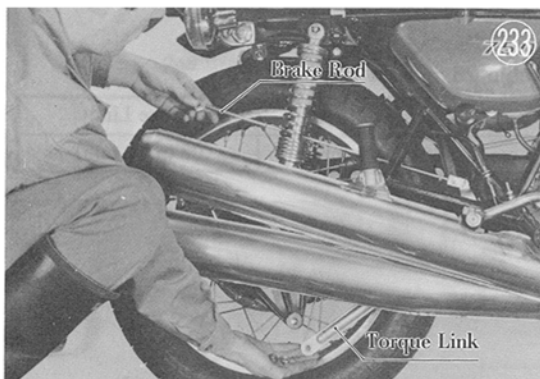


Remove the sleeve nut, and take off the coupling as assembled with the rear sprocket, and take off the left chain adjuster.



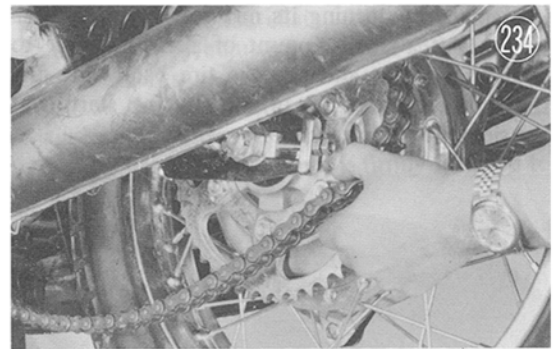
(2) H2

Take out the cotter pin, unscrew the nut and pull the torque link off the stud. Unscrew the rear brake rod nut.



Loosen the axle nut and loosen both chain adjusters. Push the rear wheel forward to slip the chain off the sprocket, and pull the chain up over the chain guard out of the way. The wheel can now

be pulled off together with the sprocket.

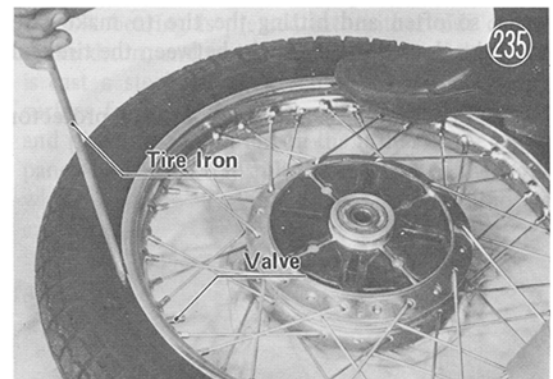


c. Tube and Tire Removal, Mounting

Take out the valve core and let out all the air.

Remove the tube valve nut, and for those models with bead protectors, loosen the bead protector nuts.

Stand on the side of the tire opposite the valve stem and push the bead to the center of the rim to give the tire play. Use tire irons to pry the tire off the rim, starting at the valve.



Remove the tube.



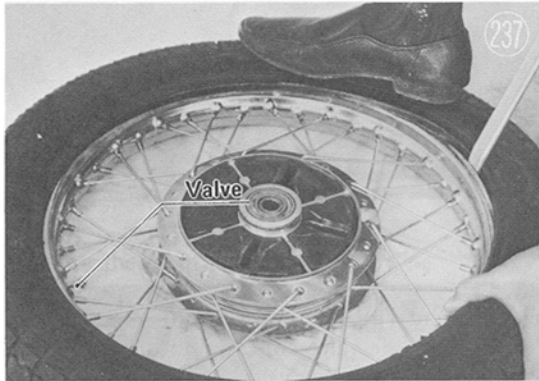
NOTE:

1. When removing the tube, spread cardboard or rags on the ground to prevent hub or rim damage and to keep dirt from getting into the bearings.

2. Lay the wheel with the drum side down to make it more stable and easy to work with.

3. It is only necessary to pry one side of the tire off the rim to remove the tube.

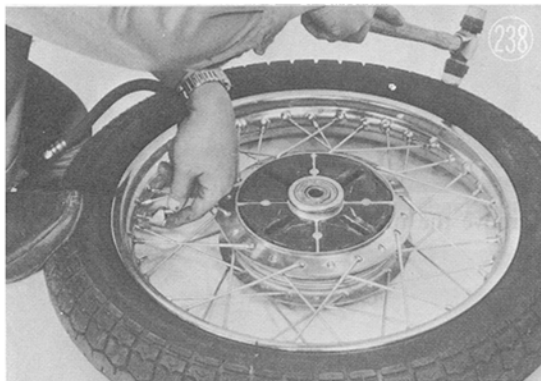
When mounting the tire/tube, first push the tube valve through the valve opening and hold it in place by turning its nut down two or three turns. Put a small amount of air in the tube to straighten it out and pry the tire back onto the rim in the reverse order of unmounting, starting at the side opposite the valve.



NOTE: If the valve stem nut is put on tightly at first, the tube may get pinched between the tire and rim when the tire is mounted.

After the tire is completely mounted on the rim, put air in a little at a time, stopping every so often and hitting the tire to make sure the tube does not get caught between the tire and rim.

Tighten the valve nut and the bead protector nuts.



3) Inspection

a. Tire

For running stability and long tire life, tires should be chosen to match their use and riding conditions, and tire air pressure set to the correct level. If tire pressure is too high the center of the tire will wear excessively, the tire will get damaged easily, it may slip on the road, and every small irregularity in the road surface will be transmitted to the rider. If tire pressure is too low the sides of the tire crown will wear badly, the cord may be damaged and the tire may crack. Steering will be difficult, gas mileage will drop, and the tire may slip on the rim and damage the tube (in the case of the front tire, which has no bead protector).

(1) Wear

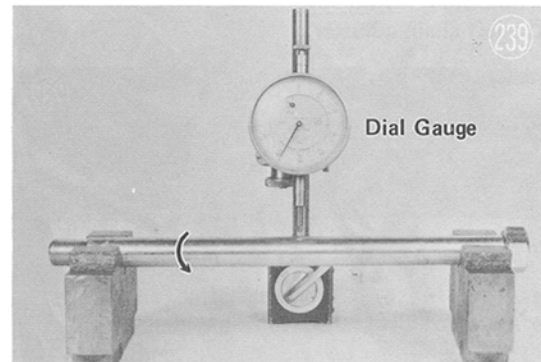
A worn tire is very dangerous in that it will slip easily during sudden braking or on curves, and becomes punctured easily. Judge tire wear by the depth and condition of the tread at the center of the tire.

(2) Cuts

Even small cuts in the tire can cause a blowout if they are deep. Wash the tire and check it for cuts, at the same time removing any stones or other foreign objects imbedded in the tire surface. If there are any deep cuts in the tire, it should be replaced.

b. Front and Rear Axles

A bent axle will cause wheel vibration and unstable handling. Check axle runout with a dial gauge. If runout is over .028" (0.7 mm) and cannot be corrected to within this tolerance, replace the axle. A new axle has under .008" (0.2 mm) runout.

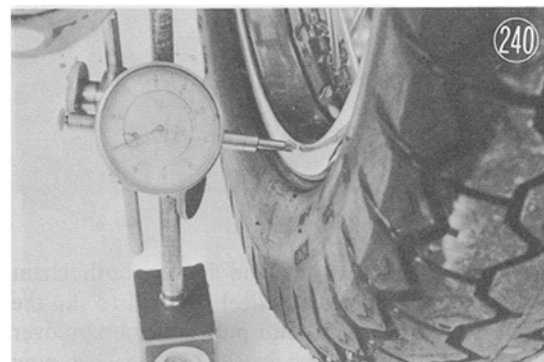


c. Spokes, Rim Warp

Check that all spokes are tightened evenly. Generally loose or unevenly tightened spokes will not only hasten spoke and spoke nipple wear, but will cause the rim to warp and spokes to break. Conversely, a certain degree of rim warp can be corrected by tightening the spokes properly. As illustrated, spin the wheel and check runout with a dial gauge. If runout exceeds the service limit and is not correctable, replace the rim. Also replace any bent spokes.

Table 26 Rim Runout

Standard	Service Limit
Less than .04 in. (1 mm)	.08 in. (2 mm)



d. Wheel Balance

Wheels out of balance will vibrate and cause handlebar oscillation. The balance is checked with the wheel mounted, and in the case of the rear wheel, with the chain removed. Spin the wheel lightly and see if it will stop in any position of its own accord. If it will not, attach a balance weight to the lightest side and spin the wheel again. Repeat the process as necessary until the difference between the lightest and heaviest side is less than 1/3 ounce (10 grams). Then attach the weights firmly with pliers. Balance weights are available in 10, 20 and 30 gm. sizes (1/3, 2/3 and 1 ounce)



4) Assembly

Assembly is in the reverse order of disassembly.

H1 Front Hub Mechanism

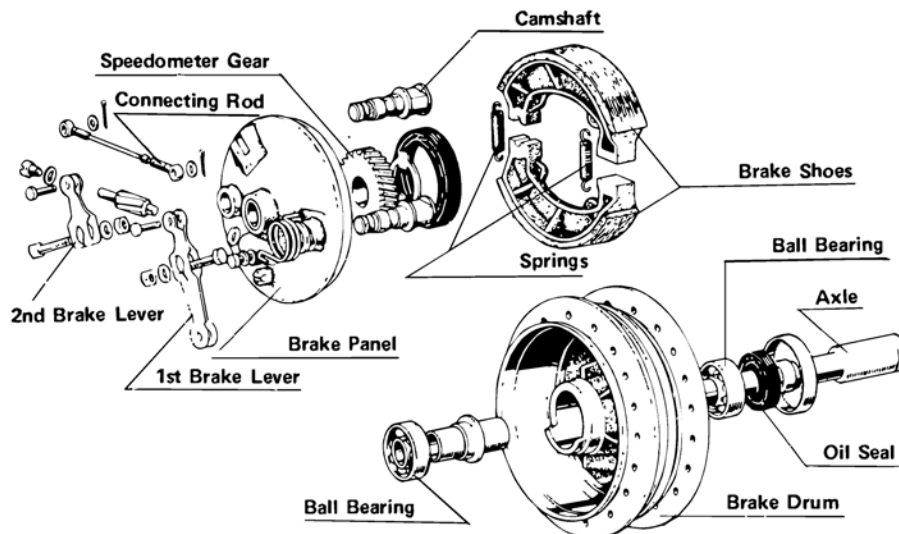


Table 27 Front Wheel

Model	Bearing		Oil Seal	
	Drum	Panel	Drum	Panel
H1	6303	6303Z	25 47 8	BJN58 72 6
H1,* H2	6203	6203	BJN25406	BJN54656

*Disc brake models

NOTE:

1. When mounting the rear wheel, align the wheels and adjust the chain. Wheel alignment is accomplished by adjusting the right and left chain adjuster marks to coincide with the alignment marks on the swing arm. At this time also adjust chain length. (See page 94.)

2. Be sure the torque link is firmly fastened to the brake panel.

3. On the H1 1969 – 71 models tightening torque for the front axle is 51 – 65 ft-lbs (7 – 9 kg-M), and on the H1 and H2 from 1972 model, tightening torque for the front axle clamp nuts is 11.5 – 16 ft-lbs (1.6 – 2.2 kg-M). Rear axle torque is 72 – 101 ft-lbs (10 – 14 kg-M).

4. Ensure that the brakes are adjusted properly as outlined in the next section.

4. HUBS · BRAKES · SPROCKET

All front hub and front brake information for the H2 and for H1 models with disc brakes is covered in the disc brake section beginning on page 69.

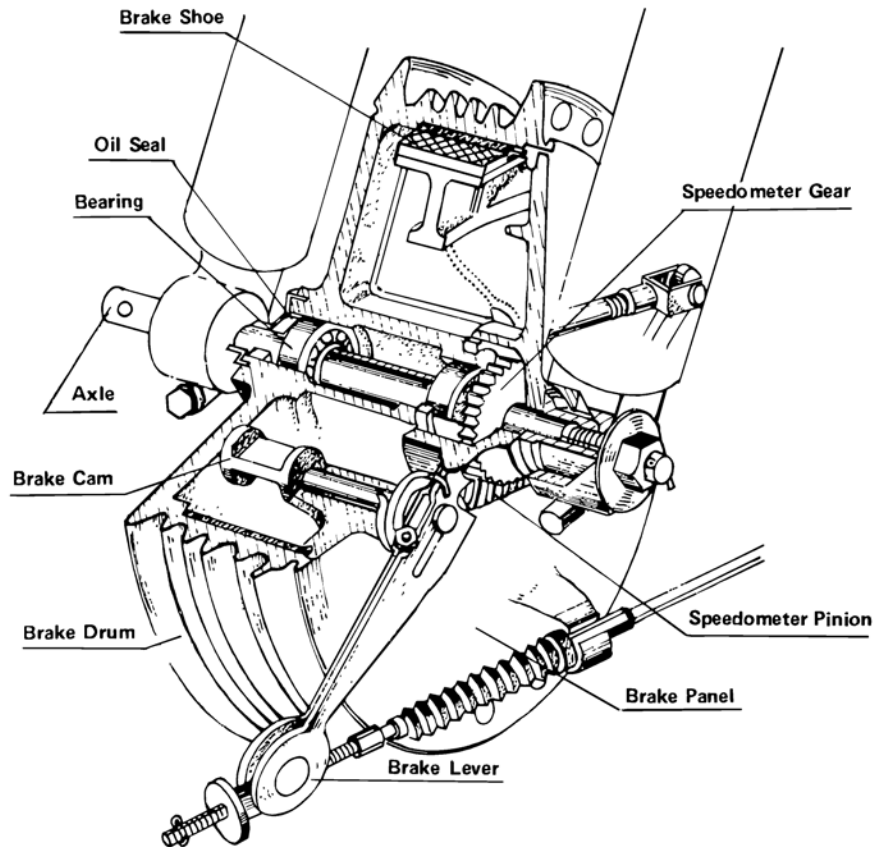
1) Construction

a. Front Hub

The front hub includes the brake drum and brake mechanism – the brake panel, brake shoes, etc. A bearing is pressed into either side of the brake drum, and on the inner surface of the drum is cast a steel sleeve, which serves as the braking surface for the brake shoes. The speedometer gear and pinion are mounted on the inside of the brake panel, and these transmit the rotation of the front wheel to the speedometer via the speedometer cable.

Front Brake Drum Assembly

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b. Rear Hub

The rear hub consists of the brake drum; rear brake mechanism – brake panel, brake shoes; the sprocket which receives engine power and turns the rear wheel; and the coupling. The brake panel is mounted on the right side of the brake drum, and the coupling on the left side. The rear brake

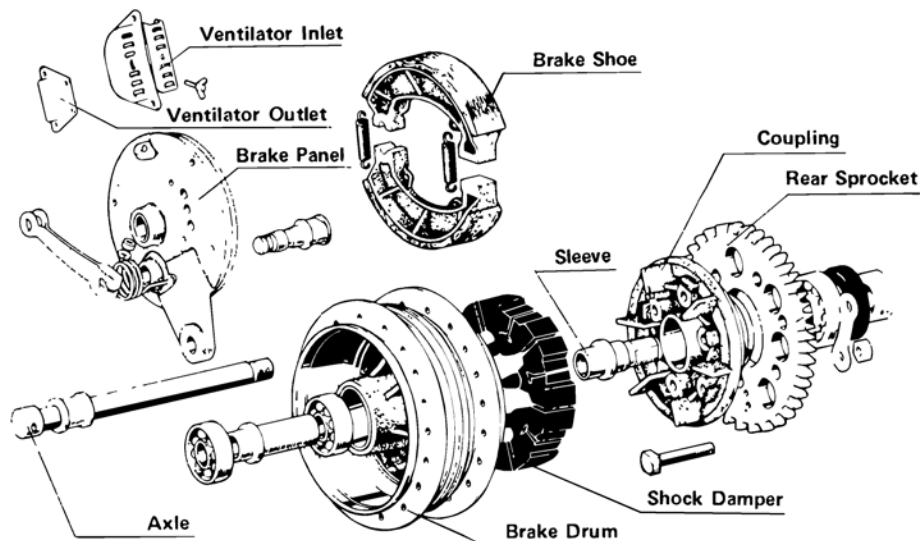
drum, which is of the same construction as the front drum, fits against the coupling separated by rubber shock dampers that buffer torque changes.

A bearing and oil seal are pressed into the coupling, and the sprocket is bolted against it.

In the H1 a ventilator is provided in the rear brake panel.

Rear Hub Mechanism

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Rear Brake Drum Assembly

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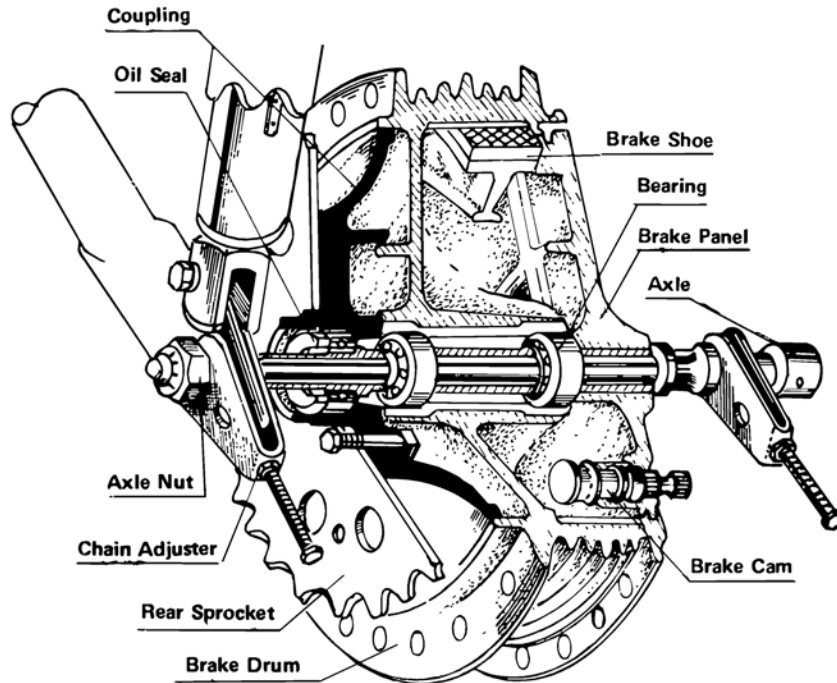


Table 28 Rear Wheel

Model	Bearing			Oil Seal
	Drum	Coupling	Panel	Coupling
H1	6303Z	6305	6205Z	AJN40 62 7
H2	6304Z	6206	6304	AJN40 62 7

c. Brake Mechanism

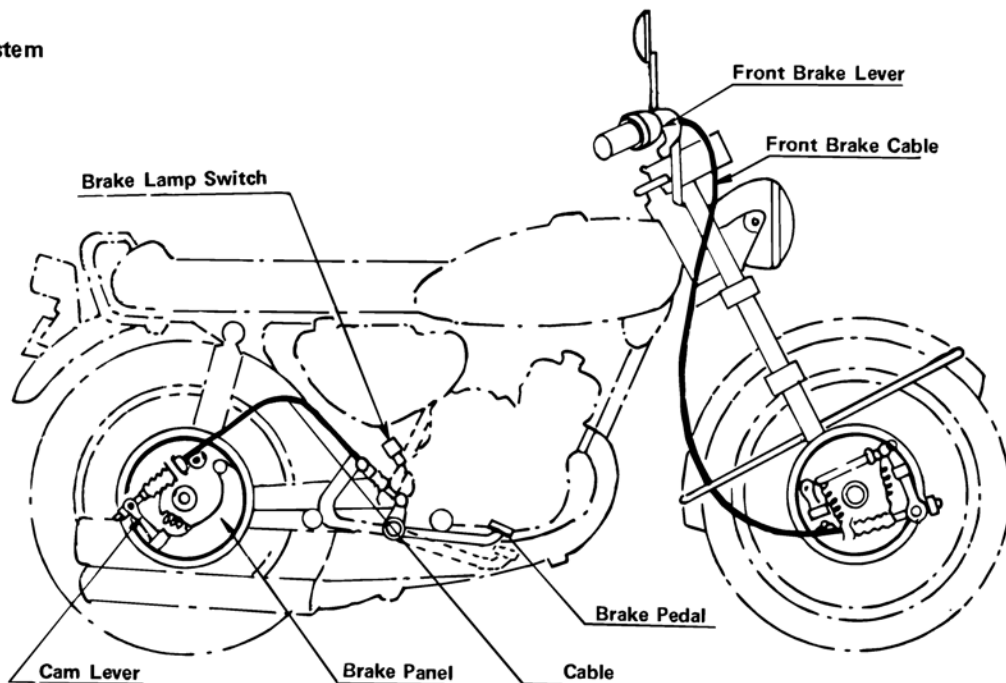
The brake mechanism consists of the brake lever or brake pedal, the brake panel assembly, and the brake drum. The brake panel assembly comprises the cam lever, cam shaft (two levers

and shaft for the front brake), brake shoes, brake shoe springs, and the brake panel itself.

Both the front and rear brakes are the expansion type: the front is "two leading shoe", and the rear is "leading trailing".

Brake System

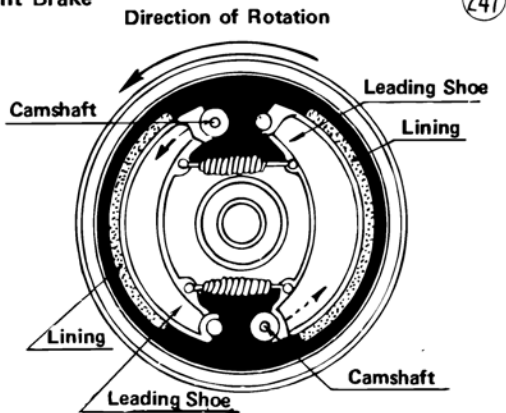
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(1) Two leading shoe (front brake)

The two brake shoes fit symmetrically against the two cams as illustrated. When the brake lever is pulled, the two cams are turned simultaneously by the cam lever via the brake cable and lever link, and the cams push the brake shoes against the inside surface of the brake drum. The friction of the shoe against the drum slows down the rotation of the wheel. Since both shoes expand in the direction of wheel rotation this braking method is called the two leading shoe type, and has about one and a half times the braking capacity of the leading trailing type.

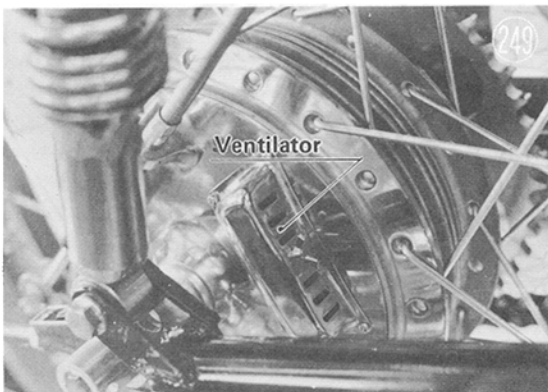
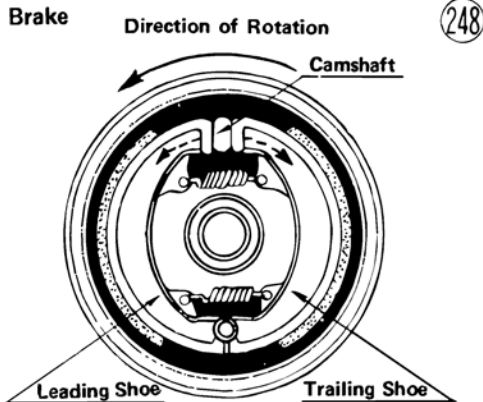
Front Brake



(2) Leading trailing (rear brake)

When the pedal is stepped on, the brake cable pulls the cam lever, which turns the cam shaft that forces the shoes to expand against the drum. At this time one shoe (trailing shoe), expands in direction B opposite drum rotation, and the other shoe (leading shoe) expands in direction A, the direction of drum rotation.

Rear Brake



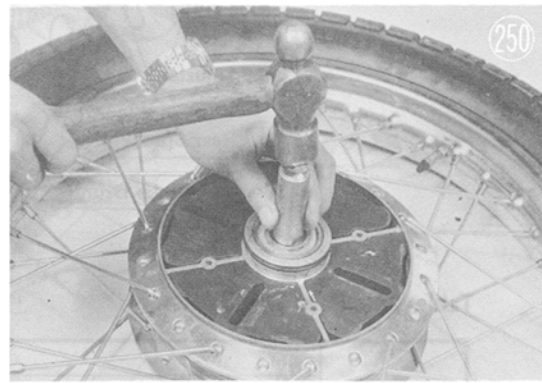
(3) Ventilator

H1 models are equipped with a closable ventilator in the rear brake panel. This can be opened during high speed or prolonged braking to cool the drum and prevent reduction in braking efficiency. During rain or while riding on a dusty road it can be closed to keep out water or dust.

2) Disassembly

a. Bearing and Oil Seals

Each bearing can be removed together with its oil seal (if applicable). Remove the first bearing by hitting the bearing spacer to knock it out. Remove the remaining bearing by setting a rod or starting punch to its inner side and knocking it out. To avoid damage to the surface against which the bearing sits, tap the bearing evenly around its circumference.

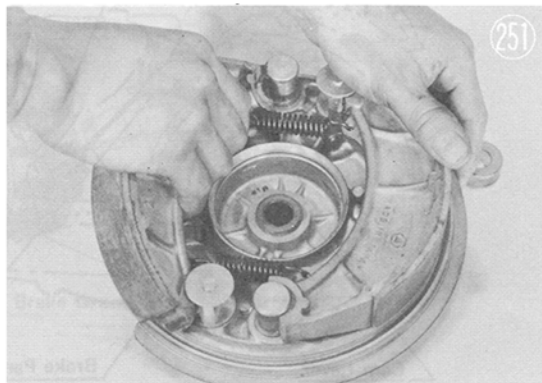


b. Brake Shoes

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

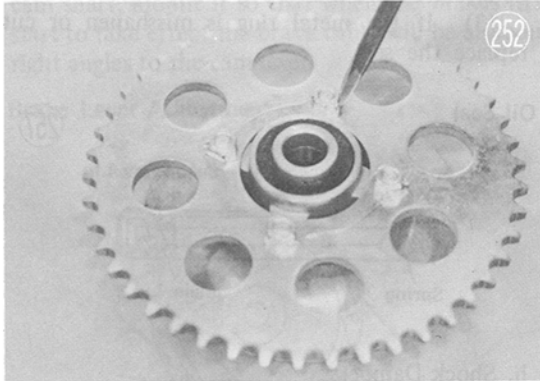
1. Never blow brake lining dust with compressed air.
2. If any components are to be cleaned, wash with detergent, then immediately discard the cleaning solution and wash your hands.
3. Do not grind any brake lining material unless a ventilation hood is available and properly used.

If the front or rear brake panel is removed, the shoes, cam, cam lever, etc. come out with it. To take the shoes off the front panel, pull up one side first, at right angles to the brake panel. With the rear brakes, pull both shoes straight up off the pivot studs and remove them together. The linings are bonded to the shoe and cannot be removed.



c. Rear Sprocket

- (1) Remove the rear wheel.
- (2) Take the coupling off the wheel.
- (3) Straighten the lock washers and unbolt the sprocket.



3) Overhaul

a. Brake Drum

After long use, the inner surface of the brake drum wears down from friction with the brake shoes. Measure the inside diameter of the drum and replace it if it is worn out of tolerance.

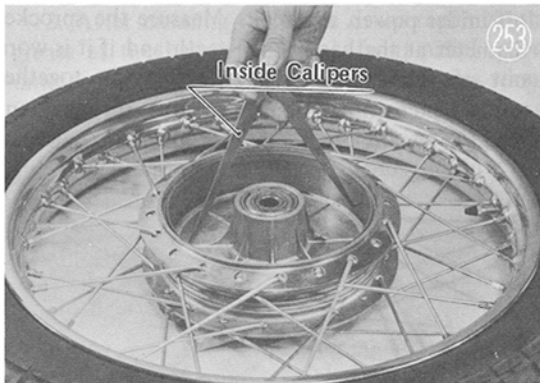


Table 29 Inside Drum Diameter

Model	Standard		Service Limit	
	Front	Rear	Front	Rear
H1	7.874" (200 mm)	7.087" (180 mm)	7.904" (200.75 mm)	7.116" (180.75 mm)
H2	—	7.874" (200 mm)	—	7.904" (200.75 mm)

Table 30 Lining Thickness

Model	Standard		Service Limit	
	Front	Rear	Front	Rear
H1, H2	.20 in. (5 mm)	.20 in. (5 mm)	.12 in. (3 mm)	.12 in. (3 mm)

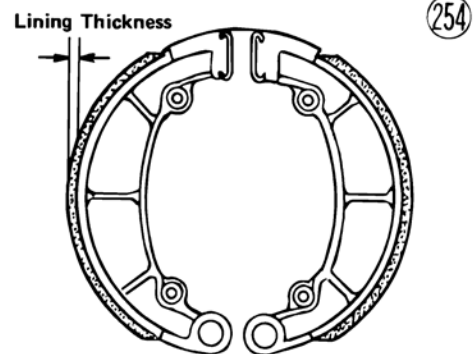
Table 31 Spring Length

Model	Standard		Service Limit	
	Front	Rear	Front	Rear
H1	2.36 in. (60 mm)	2.62 in. (66.5 mm)	2.48 in. (63 mm)	2.74 in. (69.5 mm)
H2	—	2.62 in. (66.5 mm)	—	2.74 in. (69.5 mm)

b. Brake Linings

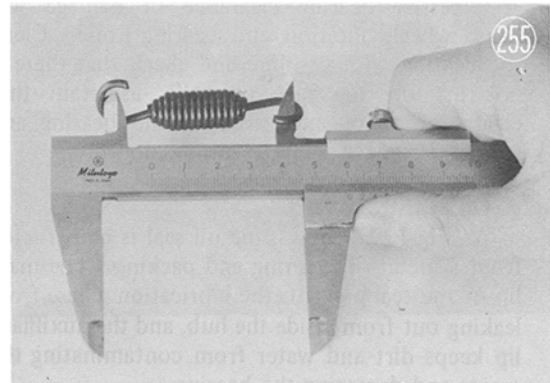
Measure the thickness of the brake linings and replace them if they are worn down to less than the service limit. If the linings are worn unevenly, correct the high spots with emery cloth. With a wire brush, remove any foreign particles imbedded in the lining surface.

Brake Lining Measurement



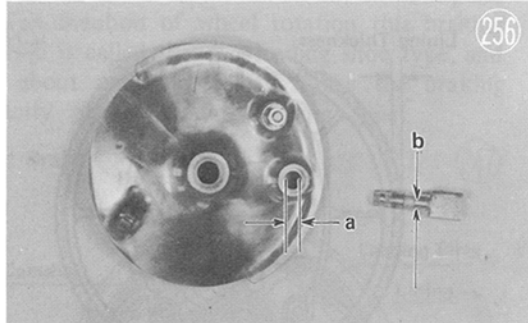
c. Brake Shoe Springs

Check the free length of the brake shoe springs with vernier calipers. If the springs are stretched out of tolerance they will not return the shoes properly, causing them to continually drag on the drum. Replace the springs if they are excessively stretched.



d. Brake Cam Shaft Play

As the cam shaft and cam shaft hole wear, play develops, the brake shoes are not expanded effectively, and positive braking action is not ensured. Measure the diameter of the cam shaft and the inside diameter of the cam shaft hole in the brake panel. If clearance is excessive, replace the cam shaft and brake panel as a set.



e. Ventilator (H1 only)

Dust and dirt entering through the ventilator opening, in addition to dust produced from brake shoe/drum friction, reduces braking efficiency and scratches the braking surface if it gets between the shoes and drum. Remove any foreign matter that has collected.

f. Bearings

Excessive bearing clearance or damage will cause wheel vibration and bearing noise. Clean the bearing with gasoline and check that there is no rust on the race or balls; ascertain that clearance is not excessive; oil the bearing and spin it to check that it turns smoothly.

g. Oil Seals

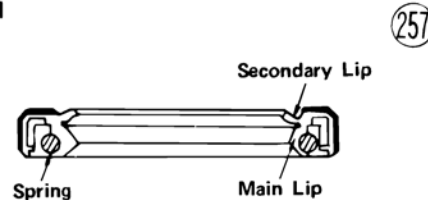
As Fig. 277 shows, the oil seal is constructed from a metal ring, spring and packing. The main lip of the seal prevents the lubrication grease from leaking out from inside the hub, and the auxilliary lip keeps dirt and water from contaminating the grease and damaging the bearing.

(1) Replace the oil seal if the lips are misshapen or otherwise damaged.

(2) If the seal lips have hardened and developed clearance, dust will be allowed to reach the bearing. If the lips have hardened, or deteriorated and changed in color, replace the seal.

(3) If the metal ring is misshapen or cut, replace the seal.

Oil Seal



h. Shock Dampers

Inspect the shock damper rubber and replace it if it is shrunken or cracked. If the rubber is shrunken, a gap is formed between the damper and brake drum; when power is transmitted to the rear wheel it is received with a jolt due to the gap, and thus buffering action is lost.

i. Rear Sprocket

Worn sprocket teeth will cause the chain to slip off under power, or break. Measure the sprocket diameter at the base of the teeth and if it is worn out of tolerance, replace the sprocket together with the chain. Also replace the sprocket and chain if the teeth are badly worn on one side.

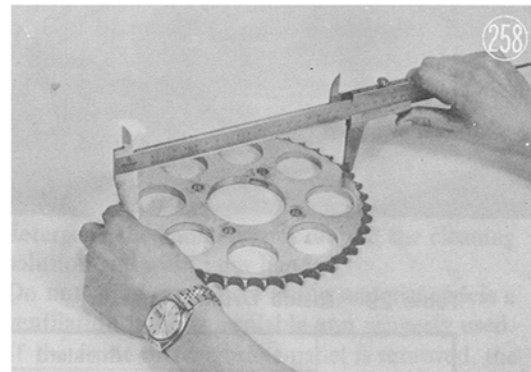


Table 32 Brake Cam Shaft Clearance*

*Same values apply to front and rear.

Measurement	Standard	H1	Maximum	Standard	H2	Maximum
	Shaft hole dia.	.5906" – .5916" (15.000 – 15.027 mm)	.6004" (15.25 mm)		.6693" – .6704" (17.000 – 17.027 mm)	
Cam shaft dia.	.5899" – .5889" (14.984 – 14.957 mm)	.5807" (14.75 mm)		.6687" – .6676" (16.984 – 16.957 mm)		.6594" (16.75 mm)
Clearance	.0008" – .0028" (0.02 – 0.07 mm)	.0197" (0.50 mm)		Same as H1		

Table 33 Rear Sprocket Diameter

Model	No. of Teeth	Dia. at base of teeth	
		Standard	Limit
H1	45	8.56 in. (217.4 mm)	8.48 in. (215.5 mm)
H2	47	8.96 in. (227.5 mm)	8.88 in. (225.5 mm)

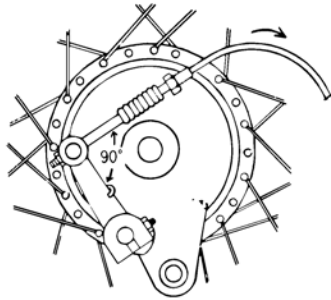
4) Assembly

Assembly is the reverse of disassembly.

NOTE:

1. When assembling the brake cam lever to the cam shaft, mount it so that when the brakes first start to take effect the brake cable will be at about right angles to the cam lever.

Brake Lever Adjustment

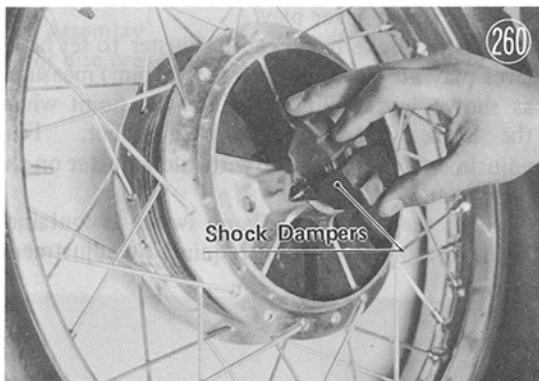


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2. When pressing the bearings and oil seals into the brake drums, use a press or other means to ensure that the bearings/seals are at right angles to the drum hole, and therefore with the axle.

3. After cleaning the brake drum replenish the grease at the bearing, oil seal, front panel speedometer pinion gear, and any other surfaces where friction must be reduced. Do not allow grease on the brake linings or drum braking surface as this will prevent the brakes from holding and make driving dangerous. If any grease should get on these parts, clean it off thoroughly with gasoline or an oil-free solvent.

4. On the H Series shock dampers there is a projection in the center. Align this projection with the corresponding hole in the rear brake drum.



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5) Adjustment

a Rear Brake

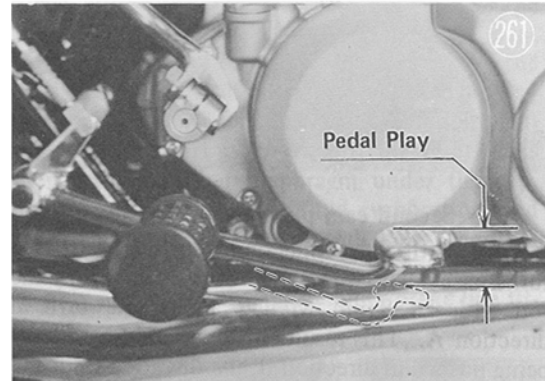
(1) H1

Adjust the rear brake with the adjuster nut on the brake panel so that the brake starts to take effect after $\frac{3}{4}$ to $1\frac{1}{4}$ inch (20-30 mm) of brake

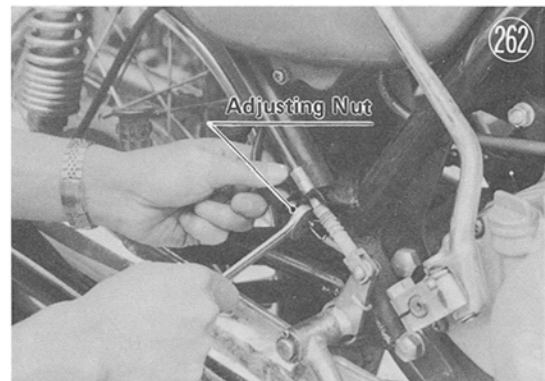
pedal travel. At this time also set the rear brake lamp to light after $\frac{5}{8}$ - $\frac{3}{4}$ inch (15-20 mm) – depending on the brake adjustment – of pedal movement, using the two mounting nuts on the switch body. Do not turn the switch body as the wires may break off.

(2) H2

The method for H2 rear brake and brake lamp adjustment is the same as for the H1, except that adjustment values differ. Set the brake pedal play to $\frac{1}{8}$ to $\frac{5}{8}$ inch (12-15 mm), and the brake light to come on after $\frac{3}{8}$ inch (10 mm) of travel.



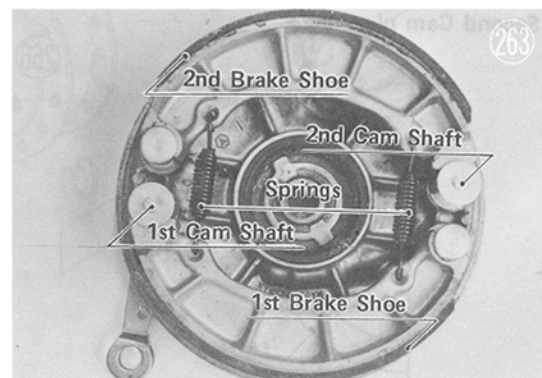
261



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b. Front Brake

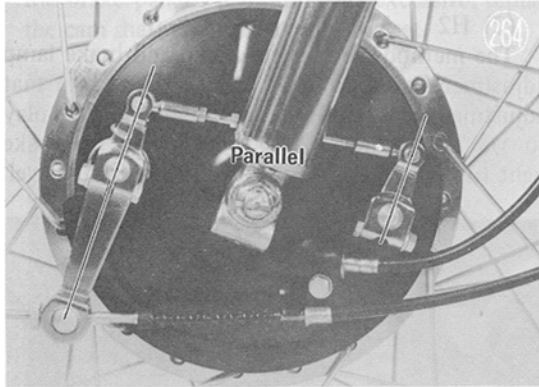
The two leading shoe type front brake must be adjusted so that both shoes contact the drum at the same time. When the brake cam, brake shoes or related parts are replaced, the brake should be completely readjusted according to the following procedure to avoid uneven shoe contact and realize good braking performance.



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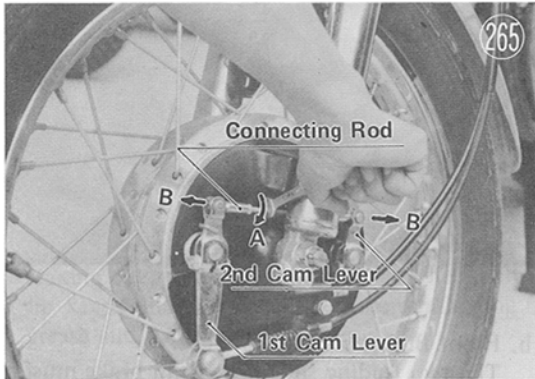
(1) Brake cam levers

Align the first cam lever with the serrations in the cam shaft, and mount it so that it is at a 90° angle to the brake cable when the brake first starts to take effect. Install the second cam lever on its cam shaft parallel to the first lever.



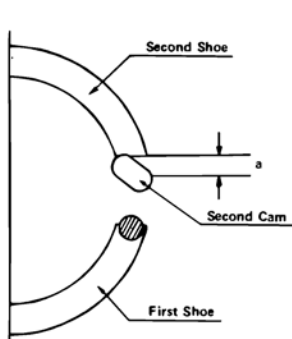
(2) Second cam play

(i) With the connecting link free (so that it turns easily with the touch of a finger), turn the rod with an 8 mm wrench about one turn in direction A. This results in the second cam lever being pushed in direction B, the direction opposite in which it moves when the brake is applied. This procedure backs off the second brake shoe so that it will not operate when the first shoe is adjusted in paragraph (3).



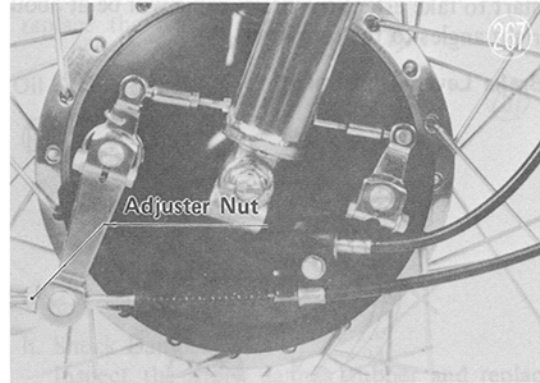
(ii) The second cam is now in the position shown in Fig. 266. Measurement "a" is the second cam's play, this amount being sufficient to avert second shoe contact with the drum when the front brake is operated.

Second Cam play



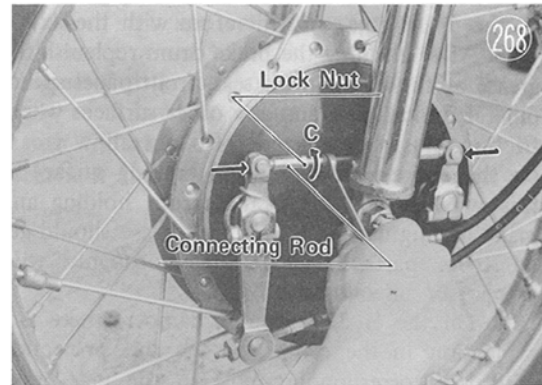
(3) First brake shoe

Raise the front wheel off the ground and spin it lightly. Tighten the brake cable adjuster nut on the first cam lever side to the point where the first shoe starts touching the drum and there is a slight drag on the wheel.



(4) Second brake shoe

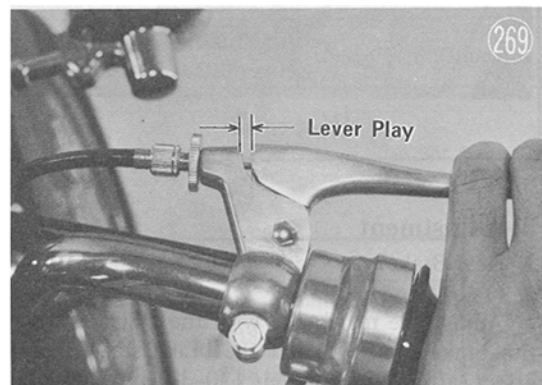
Spin the front wheel and turn the connecting rod in direction C until the second brake shoe just starts dragging on the drum. Fix the rod securely in this position with the lock nut.



(5) Brake lever play

Use the brake panel cable adjuster to set brake lever play at 1/4 – 3/8 inch (7–10 mm) measured as shown in the illustration at the point where the brake first starts to take effect. Fine adjustment can be made with the adjuster on the handlebar.

Since the front brake lamp switch is contained inside the brake cable, it requires no adjustment.



4a. DISC BRAKE

This section is laid out as follows:

Construction and Operation

Disassembly – Assembly

Master Cylinder

1. Disassembly
2. Assembly

Brake Pads

1. Disassembly
2. Assembly

Caliper

1. Disassembly
2. Assembly

Brake Line

Maintenance

Adjustment

Bleeding the Brake

Brake Fluid

1. Specifications
2. Changing the Brake Fluid

Master Cylinder

Caliper

Brake Line

Construction and Operation

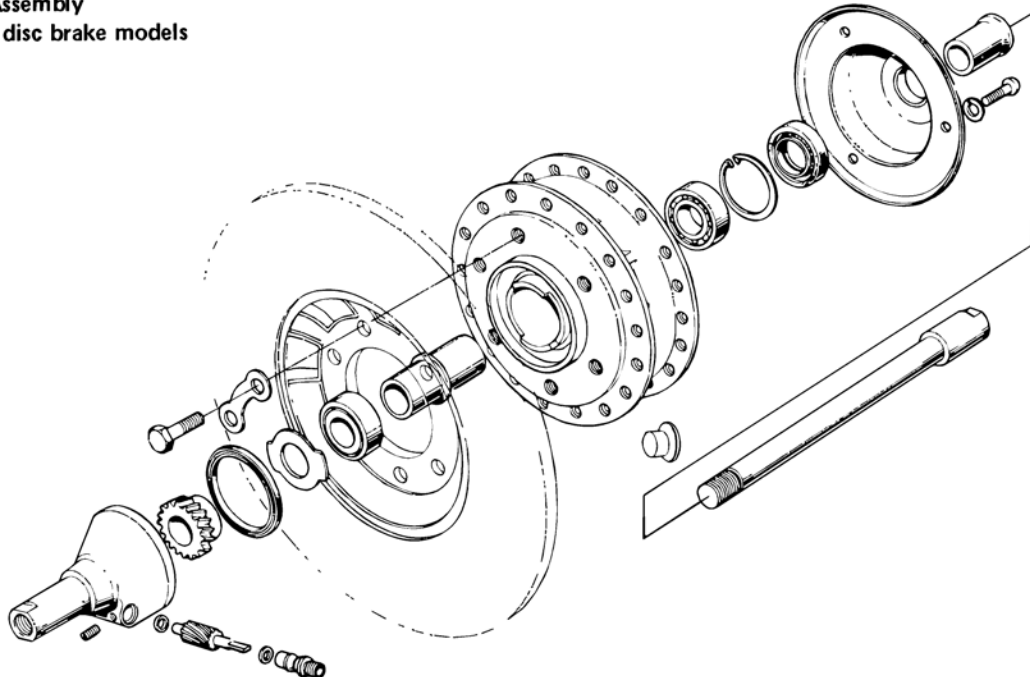
Hydraulic disc brakes are used for their superior braking performance and high reliability. The major components of the disc brake are the brake lever, master cylinder, brake fluid pressure switch, brake line, caliper assembly and disc. The brake lever is pulled to move a piston in the master cylinder and pressurize the brake fluid. Fluid pressure operates the brake lamp pressure switch and is transmitted by the brake line to operate the calipers. The switch turns on the brake lamp, and the calipers grip the disc attached to the front wheel, thereby stopping wheel rotation.

The brake fluid is an extra heavy duty type with a high boiling point, to withstand the heat produced from friction of the caliper pads on the disc. Since the fluid's performance and boiling point could be reduced by contamination with water vapor or dirt from the air, the reservoir is sealed with a rubber diaphragm under the cap. This cap seal also prevents fluid evaporation, and spillage should the motorcycle fall over. The fluid is further protected by dust covers in the caliper assembly and at the master cylinder brake line fitting.



(271)

**Hub Assembly
for disc brake models**



The caliper assembly comprises the piston, A and B pads, and A and B calipers. The calipers are held together by two shafts, on which the caliper mountings are also fitted to hold the assembly onto the front fork. When the calipers move, the shafts slide back and forth through the holder and keep the brake pads parallel with the disc.

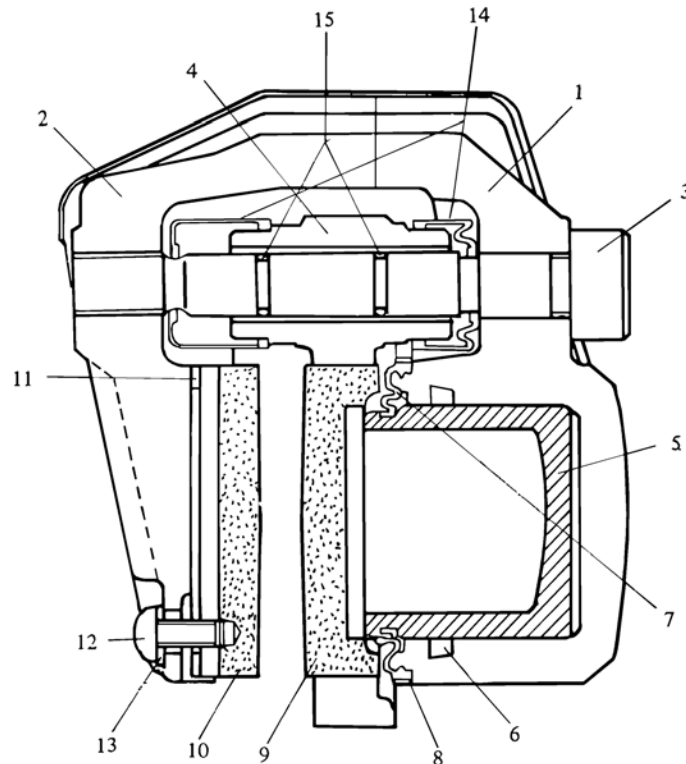
Unlike drum-type brakes, the components of the disc brake which perform the actual braking action, i.e. the disc and pads, are open to direct contact with the air flow past the motorcycle. This provides for excellent dissipation of the heat from brake friction, and reduces the possibility of brake fade common to drum brakes.

When oil pressure is developed inside caliper A's cylinder, the piston is pushed and exerts pressure against the brake pad which in turn presses against the brake disc. The pressurized oil is prevented from leaking by a rubber seal fitted into the cylinder wall. The seal presses against the piston, and instead of sliding when the piston moves, the seal

only bends, allowing no oil leakage at all. When the brake lever is released and oil pressure lowers, the elasticity of the seal returns the piston to its original position. After the brakes are used for awhile and the pads wear slightly, the rubber seal will no longer be able to bend the additional amount to conform with piston travel. Instead, when piston travel forces the seal past its limit, the seal slips slightly on the piston, and now returns the piston to a new rest position a little further out. A small amount of oil from the reservoir supplements the oil in the brake line to compensate for the difference in piston position, so that the length of the brake lever stroke remains unchanged, and the brake never needs adjustment.

The caliper A oil seal and the cup at the head of the master cylinder piston are made of an oil and heat resistant rubber composition for best performance and to prevent their contaminating the brake fluid by deterioration. For this reason, only standard parts should be used.

Caliper Assembly



- | | | | |
|---------------------|--------------|-----------|-----------------|
| 1. Caliper A | 5. Piston | 9. Pad A | 13. Lock washer |
| 2. Caliper B | 6. Ring | 10. Pad B | 14. Dust seal |
| 3. Shaft | 7. Dust seal | 11. Ring | 15. O ring |
| 4. Caliper mounting | 8. Band | 12. Screw | |

Braking Stroke

When the brake lever is pulled, the piston in the master cylinder is pushed and moves forward against the force of the return spring. At this time, the primary cup at the head of the piston closes the 1/64 inch (0.4 mm) relief port which connects the pressure chamber and the reservoir. Until this port is fully closed, the brake fluid does not start being pressurized, in spite of the forward movement of the piston.

The pressure stroke starts as soon as the relief port is closed. Brake fluid being used as a pressure medium, the piston compresses the fluid and forces it through the check valve and out into the brake line. Pressure from the line is felt in the cylinder of caliper A and pushes the piston toward the disc. Pad A at the end of the piston is pushed against the disc, but since the disc is immovable, further pressure cannot move the pad any further. Instead, the cylinder and entire caliper assembly move in the reverse direction so that pad B is pulled toward the disc. In this manner the disc is pinched between the two pads and braking action is performed.

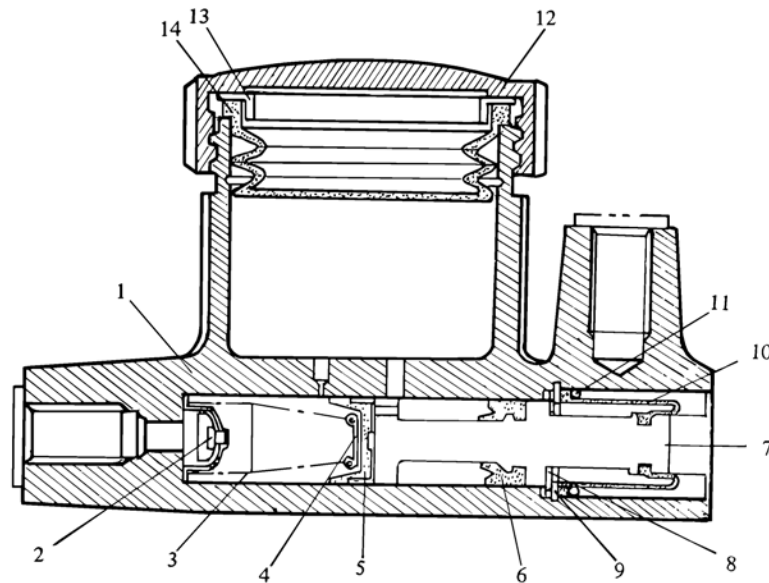
Braking Release Stroke

When the brake lever is released, the piston in the master cylinder is quickly returned toward its rest position and brake fluid pressure in the line and in the caliper master cylinder suddenly drops. The elasticity of the oil seal in caliper A's cylinder then pulls back the piston. This leaves no pressure against either pad A or B so that slight friction against the disc pushes them both a hair-breadth away from the disc.

As the master cylinder piston moves back further the brake fluid in the line, which still has some pressure, rushes to fill the low pressure area in front of the primary cup at the piston head. But the fluid is prevented from moving too fast by the check valve and the pressure in front of the reservoir drops lower. At this time, fluid from the reservoir flows through the large supply port into the space between the primary and secondary cups and escapes around the edges of the primary cup to fill the vacuum. When the piston finally returns to its rest position, the small relief port is uncovered and the brake fluid still returning from the line pushes any excess fluid through the relief port back into the reservoir until pressure in the line is again normal.

Master Cylinder

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- | | | | |
|-------------------------|--------------------|------------------------|--------------|
| 1. Master cylinder body | 5. Primary cup | 9. Circlip | 13. Plate |
| 2. Check valve | 6. Secondary cup | 10. Dust seal | 14. Cap seal |
| 3. Spring | 7. Piston | 11. Stopper, dust seal | |
| 4. Spring seat | 8. Stopper, piston | 12. Cap | |

Disassembly/Assembly

To ensure safe brake operation, observe the recommended torque during disc brake assembly.

Table 34 Disc Brake Assembly Torque

	Torque		
Brake lever	43–61	in-lbs	0.5–0.7 kg-M
Brake lever adjuster	13.0–16.5	ft-lbs	1.8–2.3 kg-M
Master cylinder clamp	52–78	in-lbs	0.6–0.9 kg-M
Fitting (banjo) bolts	21–22	ft-lbs	2.9–3.1 kg-M
Brake pipe nipple	12.0–13.5	ft-lbs	1.7–1.9 kg-M
3-way fitting mounting	61–78	in-lbs	0.7–0.9 kg-M
Front brake light switch	19–22	ft-lbs	2.6–3.0 kg-M
Caliper shafts	17.5–20	ft-lbs	2.4–2.8 kg-M
Caliper mounting	25–33	ft-lbs	3.4–4.6 kg-M
Bleeder valve	61–87	in-lbs	0.7–1.0 kg-M
Disc mounting bolts	25–33	ft-lbs	3.4–4.6 kg-M

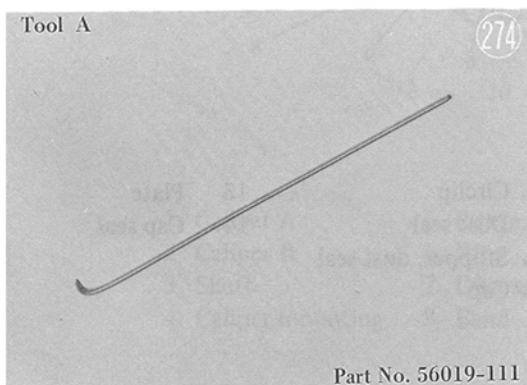
CAUTION:

1. Do not use gasoline or any other type of mineral base oil when cleaning disc brake parts, as it cannot be properly cleaned off again and will cause deterioration of the brake components. Brake parts are made resistant to the glycol base brake fluid, but are harmed by a mineral base oil. Use ONLY brake fluid, ethyl alcohol or isopropyl alcohol for cleaning.

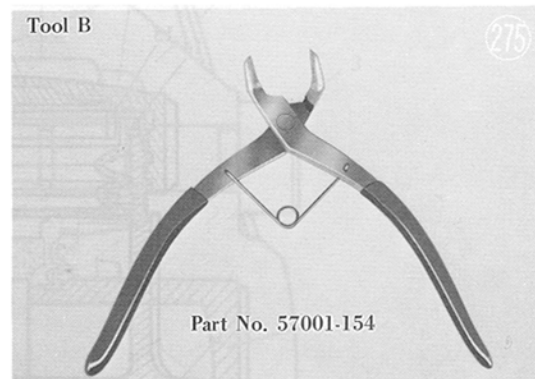
2. Do not leave any rubber parts in contact with alcohol for more than 30 seconds.

The following special tools are necessary for disc brake maintenance:

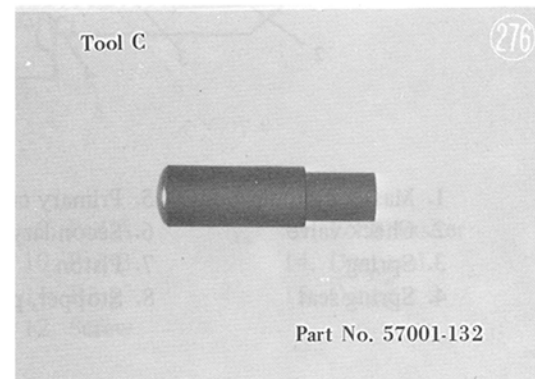
A. A hooked shaft for working with oil and dust seals. (Part No. 56019-111)



B. Retaining ring pliers for removing inside circlip.



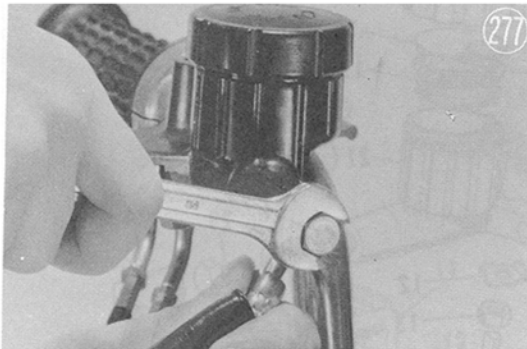
C. A mounting tool for pushing seals, O rings, etc. into place. (Part No. 57001-132)



Master Cylinder

1. Disassembly

Take the brake line off the master cylinder assembly.

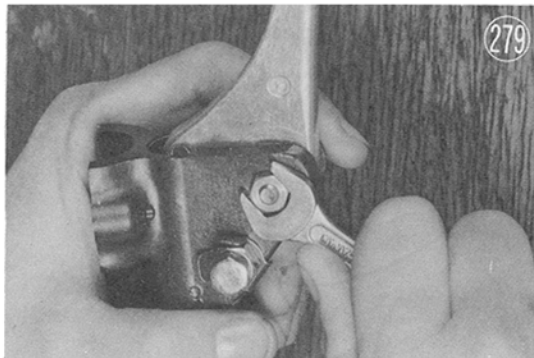


Remove the two mounting bolts, and take the cylinder assembly off the handlebars.

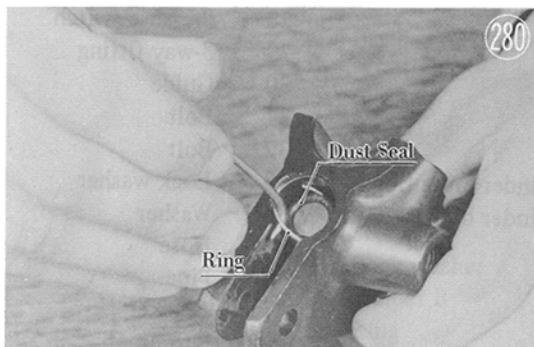


Take off the reservoir cap and remove its cap seal and plate. Empty the brake fluid from the reservoir.

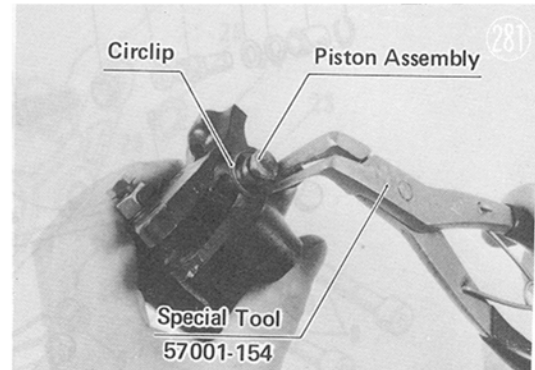
Unscrew the nut and bolt and take off the brake lever.



Use special tool A to remove the ring, and take out the dust seal. Take care not to damage the seal.



Take out the circlip using retaining ring pliers. This allows removal of the stopper plate piston assembly, primary cup, spring assembly and check valve. If these parts do not come out, blow lightly into the hose end of the cylinder.



NOTE:

1. Do not remove the secondary cup from the piston.
2. Do not remove the spring seat from the spring.
3. Do not clamp the cylinder body tightly in a vise as it may become misshapen.

2. Assembly

● Before reinserting the piston assembly, primary cup and check valve, dip them in brake fluid, and apply brake fluid to the cylinder walls.

● Insert the primary cup and piston assembly into the cylinder body in that order.

CAUTION: During assembly, be sure that the check valve and primary cup do not turn sideways or backwards.

● First insert the stopper and then put the snap ring into the groove in the cylinder body. Make sure that the ring is properly in place by sliding it around the groove after insertion. If the snap ring is misshapen, replace it.

● Use tool A to fit the flange on the inside of the dust seal into the groove in the piston.

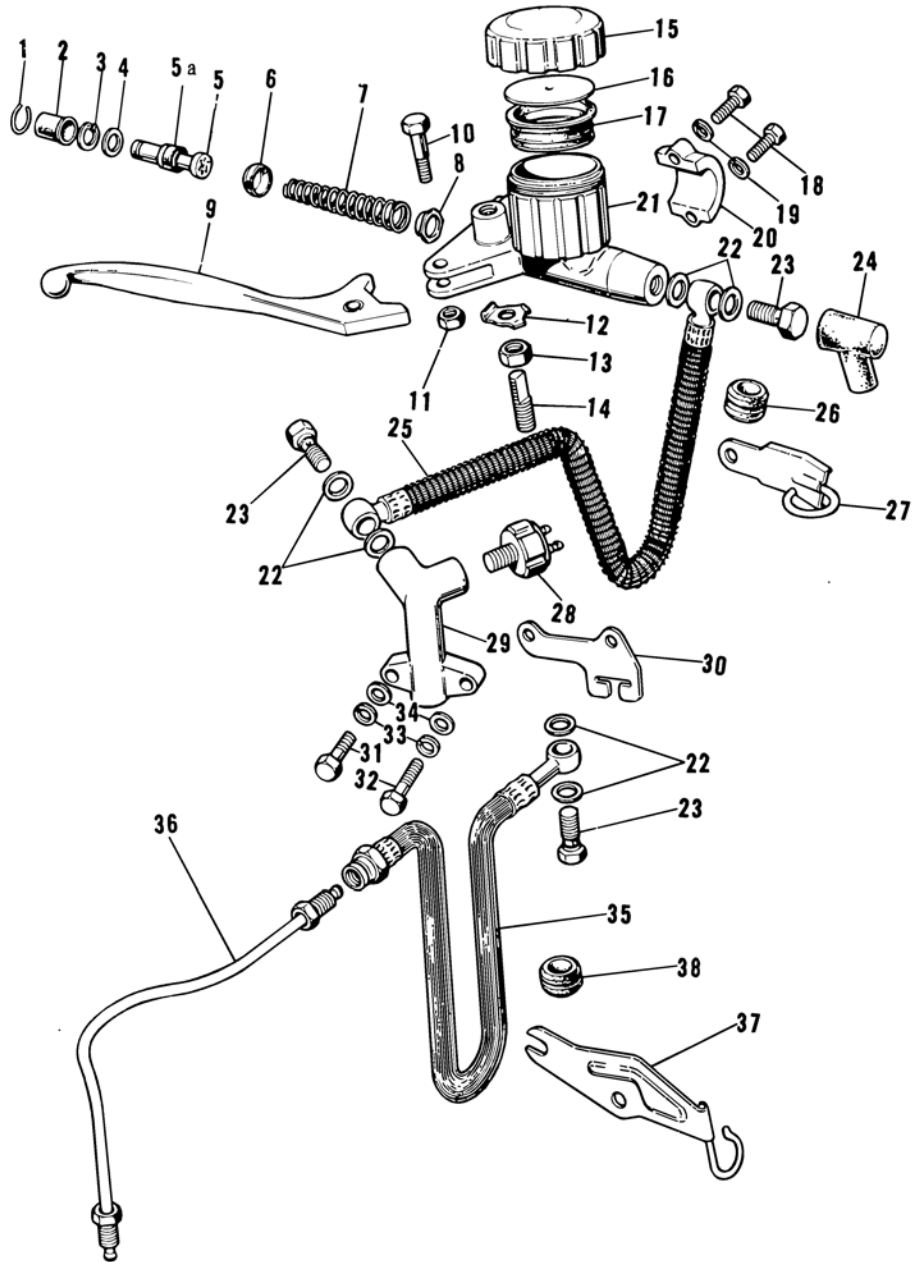
● Use tool C and push in the dust seal stopper as far as the tool will allow.

● Fit the brake lever to the master cylinder.

● Hold the cylinder and squeeze the brake lever to see if it operates smoothly. Put a finger over the hose connection opening and see if there is suction when the lever is released.

Master Cylinder and Brake Line Assembly

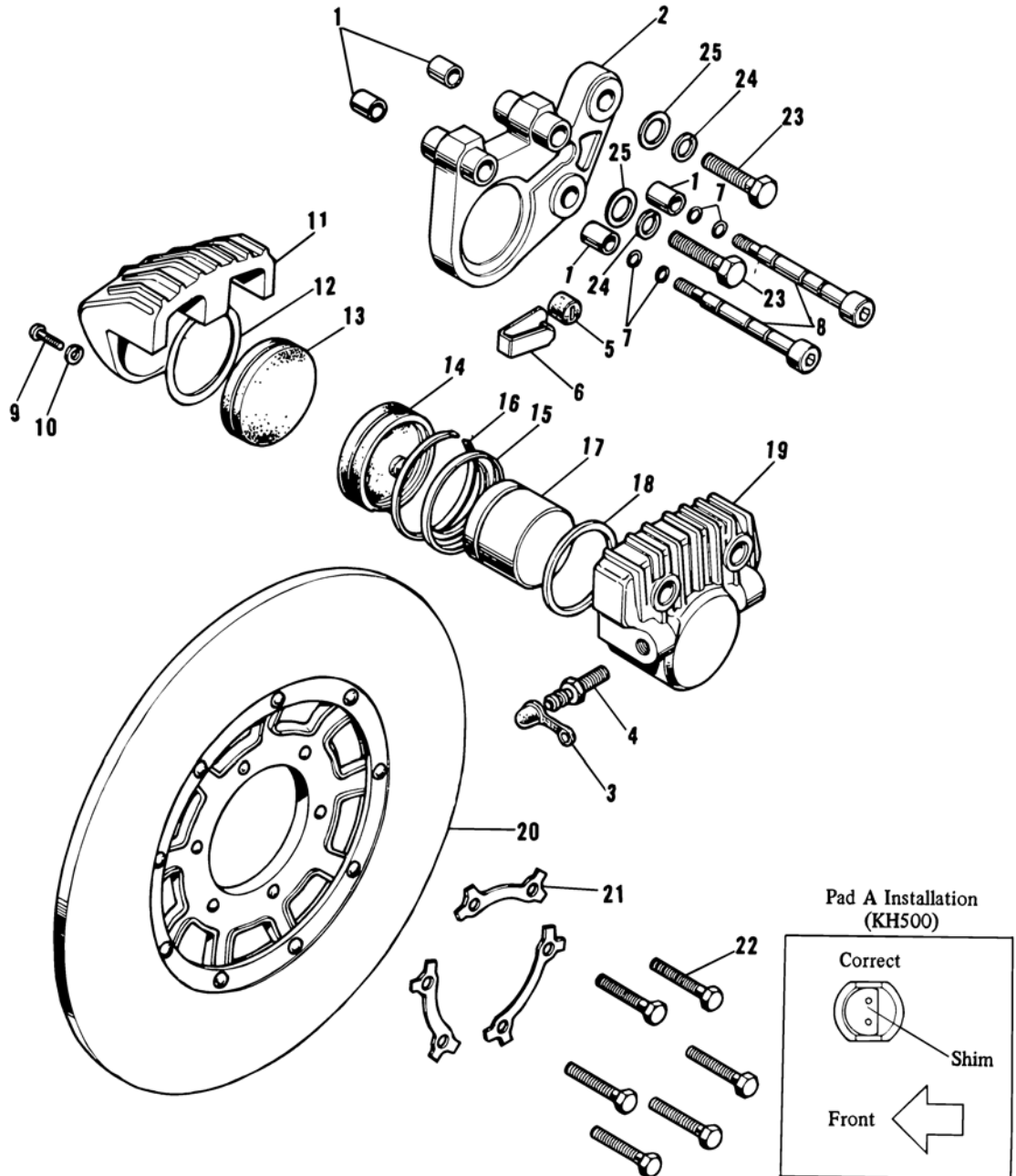
(282) a



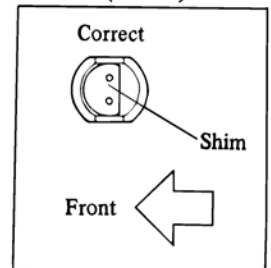
1	Stopper, dust seal	13	Nut	26	Grommet
2	Dust seal	14	Bolt	27	Bracket
3	Circlip	15	Cap	28	Pressure switch
4	Stopper, piston	16	Plat	29	3-way fitting
5	Piston assembly	17	Cap seal	30	Guide
5a	Secondary cup	18	Bolt	31	Bolt
6	Primary cup	19	Washer	32	Bolt
7	Spring assembly	20	Master cylinder mounting	33	Lock washer
8	Check valve assembly	21	Master cylinder body	34	Washer
9	Brake lever	22	Washer	35	Hose
10	Bolt	23	Banjo bolt	36	Pipe
11	Nut	24	Dust cover	37	Bracket
12	Lock washer	25	Hose	38	Grommet

Disc and Caliper assembly

(282) b



- | | | | |
|----|-------------------|----|-------------|
| 1 | Dust seal | 14 | Pad A |
| 2 | Caliper mounting | 15 | Dust seal |
| 3 | Bleeder valve cap | 16 | Band |
| 4 | Bleeder valve | 17 | Piston |
| 5 | Bushing | 18 | Ring |
| 6 | Stopper | 19 | Caliper A |
| 7 | O ring | 20 | Disc |
| 8 | Shaft | 21 | Lock washer |
| 9 | Screw | 22 | Bolt |
| 10 | Lock washer | 23 | Bolt |
| 11 | Caliper B | 24 | Lock washer |
| 12 | Ring | 25 | Washer |
| 13 | Pad B | | |

Pad A Installation
(KH500)

●Fill the reservoir with brake fluid, screw on the cap and check the following.

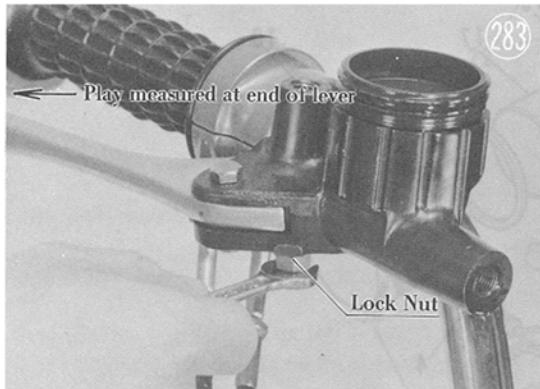
(a) Squeeze and release the lever several times and see if fluid starts being pumped from the outlet opening.

(b) Squeeze the lever, cover the outlet with a finger and release the lever suddenly. The lever should return quickly and smoothly to its original position.

CAUTION: Do not squeeze the lever as far as it will go as the secondary cup will be damaged.

●Mount the assembly on the handlebars, tightening the top mounting bolts first.

●Loosen the lock nut and turn the adjuster bolt to set brake lever play to less than 3/16 inch (5 mm), measured at the tip of the brake lever.

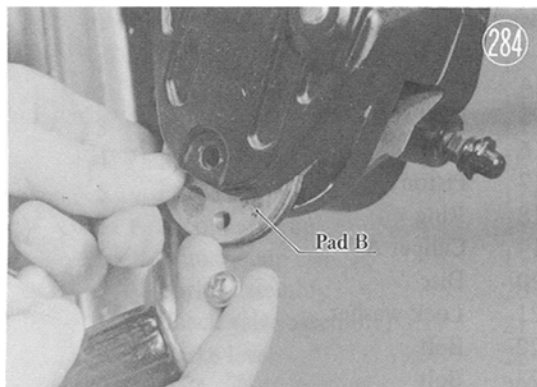


●Attach the brake line to the cylinder assembly fill the reservoir with brake fluid and bleed the line (page 78).

BRAKE PADS

1. Disassembly

Remove the front wheel (page 58). Remove the screw and take out pad B.

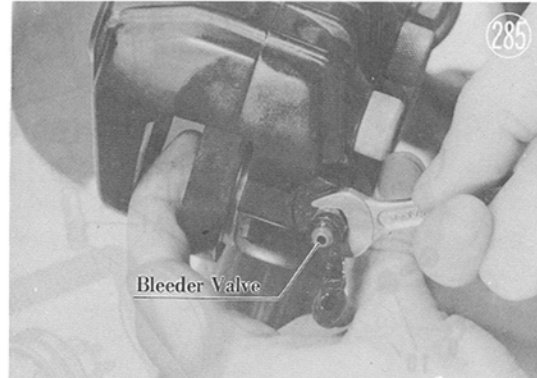


Squeeze the brake lever to push out pad A and remove the pad.

2. Assembly

●Wipe off the pads and clean them with alcohol.

●Open the bleeder valve slightly to release oil pressure, push in the piston fully and close the valve.



●Insert pad A, aligning its groove with the positioning pin to insert it. Check that the pad moves in and out easily.

NOTE: If pad A of KH500 has a shim, fit pad A into the caliper mounting so that the shim is toward the front of the motorcycle (Fig. 282 b).



●Insert pad B, apply a small amount of "loc-tite" to the screw and screw it into place.

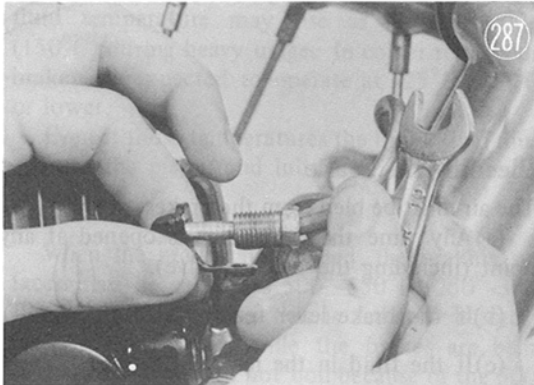
●Remount the front wheel. Because the bleeder valve was opened check whether or not air has entered the brake line by squeezing the brake lever. If it pulls too easily, bleed the air from the line (page 78).

●Spin the front wheel lightly and make sure the pads are not rubbing against the disc. If they are, it is possible that (a) pad A has not been fully pushed into place; (b) the oil seal around the piston has been damaged or knocked out of place; or (c) the disc is warped.

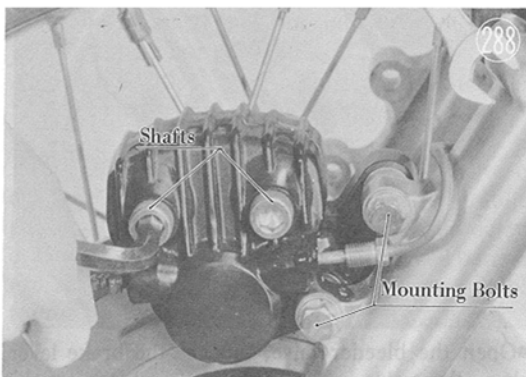
Caliper

1. Disassembly

Remove the caliper end of the brake line pipe and cap it with the rubber cap from the bleeder valve to prevent the fluid from leaking.

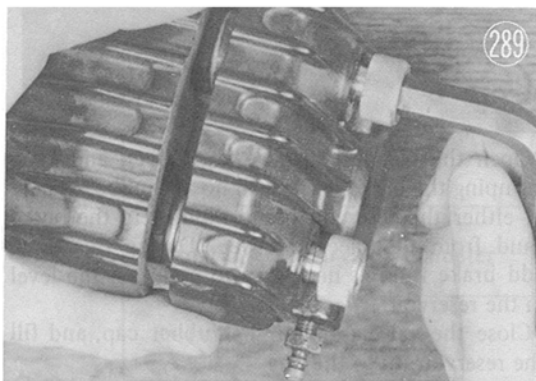


Loosen the two allen head shafts (10 mm allen wrench) as they will be difficult to loosen once the calipers are taken off the fork. Remove the two mounting bolts and take off the caliper assembly.

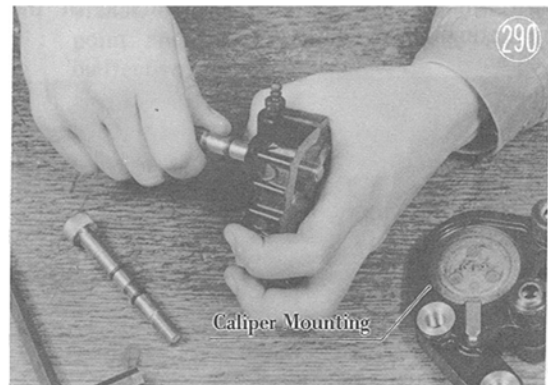


Remove the pads. Unscrew the two allen head shafts and take off one side of the calipers.

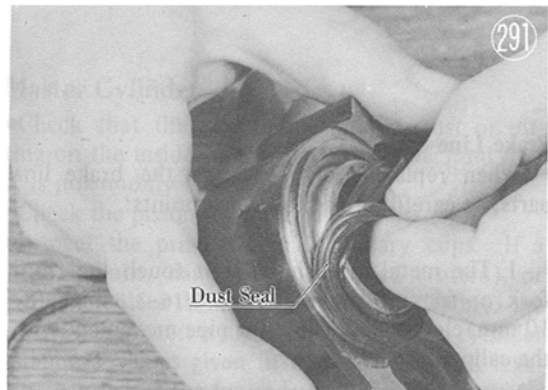
CAUTION: To avoid damage to the seals and O rings, unscrew each shaft in turn a little at a time to remove them evenly.



Pull the caliper mounting off the shafts evenly, being careful not to damage the shafts, O rings or seals. Take out the shafts.



Take the band and dust seal off the piston. Blow compressed air into the caliper inlet to push out the piston. If compressed air is not available, reconnect the brake line and pump the piston out with the brake lever.

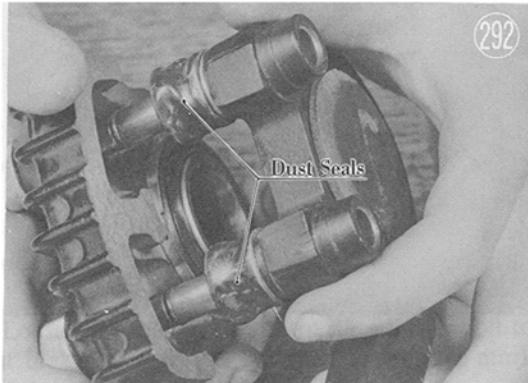


Remove the oil seal from the cylinder.

2. Assembly

- Clean all the parts, especially the seal groove inside the cylinder, and the shaft holes in the caliper mounting.
- Apply brake fluid to the oil seal and piston, and insert them in that order. Push the piston fully in.
- Fit the dust seal and band onto the piston, without getting oil on them.
- Mount the two O rings on each shaft and apply a thin layer of PBC (PolyButulCuprysil) grease to the shaft between the rings. (PBC grease is a special high-temperature, water-resistant grease.)

- Insert the two shafts into caliper A, put the first two dust seals onto the caliper mounting, and slide the mounting onto the shafts. Make sure the dust seals are in place around the outside of the mounting.



- Fit the next of dust seal onto each shaft and screw on caliper B.
- Move the caliper mounting back and forth on the shafts to see that it moves smoothly.
- Remove the caliper onto the fork, fit on the brake line pipe, and bleed the line.

Brake Line

When replacing or inspecting the brake line parts, be careful of the following points:

1. The metal pipe should not touch the front fork or frame. Leave at least $5/16$ - $3/8$ inch (8-10 mm) clearance to allow for pipe movement with the calipers.
2. When screwing on the hose and pipe fittings hold the pipe or hose so that it does not turn with the screw. Don't mount them so that there are any sharp bends in the line at any point.
3. Use "loc-tite" on the threads when screwing in the pressure switch, but do not use so much that the excess may clog the switch intake.

Maintenance

Adjustment

As explained earlier, the disc brakes are self adjusting, so brake adjustments are neither necessary nor possible.

If brake lever play develops, use the adjuster screw to set it at less than $3/16$ inch (5 mm). See Figure 283.

The brake lamp switch for the front brake is a pressure switch and no adjustment is necessary. If the switch will not turn on the brake light with light pressure on the brake lever, it is defective and should be replaced.

Bleeding the Brake

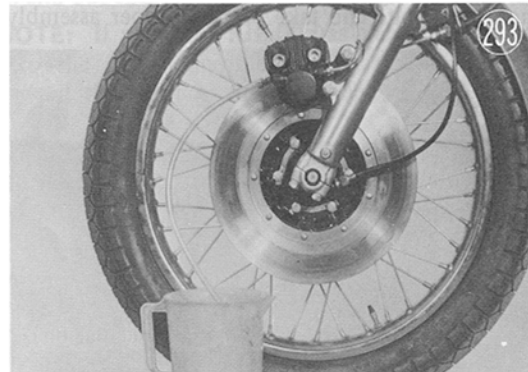
The air must be bled from the brakes:

(a) Any time the brake line is opened at any point (including the bleeder valve).

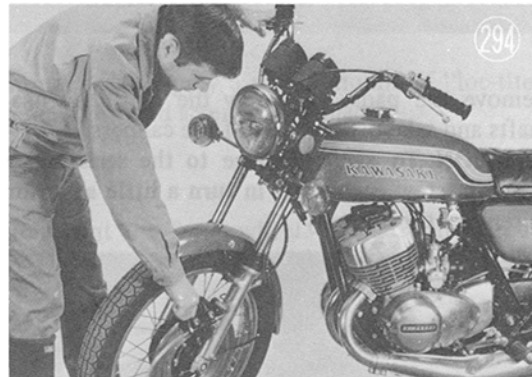
(b) If the brake lever feels soft (easy to pull).

(c) If the fluid in the reservoir gets too low or becomes empty.

- Fill the reservoir and keep the level high at all times during the air bleeding operation.
- Pull off the rubber cap and fit a clear plastic hose onto the bleeder valve. Put the other end of the hose into an open container holding some brake fluid.



- Open the bleeder valve, squeeze the brake lever, close the valve, release the lever. Repeat this sequence several times until the hose is full of fluid.



- Open the bleeder valve, leave it open and keep pumping the brake lever until no air bubbles appear in either the reservoir brake fluid or in the brake fluid from the bleeder valve. During this time, add brake fluid as necessary to maintain the level in the reservoir.
- Close the valve, replace the rubber cap, and fill the reservoir up to the line.

Brake Fluid

1. Specifications

Viscosity

The brake fluid must have a suitable viscosity throughout the operating temperature range. Brake fluid temperature may rise as high as 300°F (150°C) during heavy usage. In colder regions the brakes are expected to operate at -25°F (-30°C) or lower.

Even at those temperatures the brake fluid must operate the piston and lubricate internal moving parts.

Boiling Point

When the brakes are applied, the braking surfaces may be as hot as 500°-650°F (250°-350°C) although a part of this is radiated before it reaches the fluid. While the brakes are being applied the fluid will not boil because of the 300-600 lbs/sq.in. (20-40 kg/cm²) pressure in the line. As soon as the brake lever is released, however, the effects of the temperature are felt and a fluid with a low boiling point will turn to gas and cause a vapor lock in the brake line.

Care must be taken that no moisture is absorbed into the fluid, or introduced into the fluid through the reservoir since this will lower the boiling point.

Ignition Point

The brake fluid should have a high ignition point to minimize the possibility of fire in the event of brake line leakage.

A fluid with a high boiling point can be expected to have a high ignition point.

Non-Corrosive

The brake fluid must not have a corrosive or deleterious effect on either the metal or rubber parts of the brake mechanism. If the fluid deteriorates or swells the rubber, corrodes metal parts or causes the formation of sludge, it is not suitable for use in disc brakes.

2. Changing the Brake Fluid

Change the brake fluid completely –

- (a) After one year or 6,000 miles (10,000 km)
- (b) If water or moisture becomes mixed with the fluid.
- (c) When the fluid appears dirty or cloudy.

CAUTION:

1. Never re-use old brake fluid.
2. Do not mix two types of fluid for use in the brakes. This lowers the brake fluid boiling point and could cause the brake to be ineffective.
3. Don't leave the reservoir cap off for any length of time as moisture may be absorbed into the fluid.
4. Don't change the fluid in the rain, or when a strong wind is blowing.

To change the fluid:

- Attach a hose to the bleeder valve, inserting the other end of the hose into a container.
- Open the bleeder valve and pump the brake lever until all the fluid is drained and only air comes out of the hose.
- Fill the reservoir with new brake fluid and pump the brake lever until the brake line is completely filled with fluid, and no more air bubbles come out of the hose. Do not let the fluid in the reservoir run out at any time during this operation.
- Close the bleeder valve and fill the reservoir up to the line.
- Check that the lever pulls hard.

Master Cylinder

- Check that there are no scratches, rust or pitting on the inside of the master cylinder, and that it is not unduly worn.
- Check the piston for these same faults.
- Inspect the primary and secondary cups. If a cup is worn, damaged or softened (rotted), or swollen, replace it. When inserting the cup into the cylinder see that it is slightly larger than the cylinder (standard values given in the table). If oil leakage is noted at the brake lever, the cups should be replaced. (The secondary cup is part of the piston assembly).
- Check that the spring is not damaged and is not shorter than the service limit.
- Inspect all other rubber parts and replace any that are worn, damaged, etc.

Table 35 Master Cylinder Parts

Measurement	Standard	Service Limit
Cylinder inside diameter	.5512-.5529 inch (14.000-14.043 mm)	.5543 inch (14.080 mm)
Piston outside diameter	.5495-.5506 inch (13.957-13.984 mm)	.5496 inch (13.960 mm)
Primary, secondary cup diameter	.577-.596 inch (14.65-15.15 mm)	.571 inch - (14.50 mm)
Spring length (free)	2.01 inch (51 mm)	1.89 inch (48 mm)

Caliper

Pads

Inspect the pads for wear. If the surface of either pad is worn down through the red line, replace both pads as a set.

NOTE: 1. Use only Kawasaki parts for pad replacement.

2. If any oil is spilled on the pads, clean them with trichlorethylene or gasoline. If the oil cannot be thoroughly cleaned off, replace the pads.

Oil Seal

The oil seal around the piston maintains the proper pad/disc clearance. If this seal is bad, pad wear will increase, and constant pad drag on the disc will raise brake and brake fluid temperature.

Replace the oil seal under any of the following conditions: (a) oil leakage near pads; (b) brakes overheat; (c) there is a large difference in A and B pad wear; (d) the seal is stuck to the piston. Also replace the seal every other time the pads are changed.

Piston, Cylinder

Replace the cylinder or piston if it is worn out of tolerance, if it is badly scratched, or if rust has set in.

Seals

Check that the oil and dust seals and O rings are not cracked, worn, swollen or otherwise damaged. Replace as necessary.

Brake Line

The high pressure inside the brake line can cause oil to leak or the pipe to burst if the pipe is not properly maintained.

Bend and twist the rubber hose while examining it. Replace it if any cracks or bulges are noted.

The pipe is made of plated steel, so if the plating is scratched through it will rust. Check the pipe for badly scratched plating, rust, or cracking, especially at the fittings.

Disc

Measure disc thickness and replace the disc if it is worn out of tolerance.

Check runout (warp) as illustrated, replacing the disc if indicated. If the disc is warped it will cause the brake to drag and wear down the pads and disc, and overheat.

If there is any oil on the disc, clean it off with trichloroethylene or gasoline.

Table 36 Caliper Parts

Model	Part	Standard	Service Limit
H1 H2	Cylinder inside diameter	1.5031 – 1.5039 inch (38.180 – 38.200 mm)	1.5045 inch (38.215 mm)
	Piston outside diameter	1.5006 – 1.5019 inch (38.180 – 38.200 mm)	1.5002 inch (38.105 mm)
KH500	Cylinder inside diameter	1.6870 – 1.6890 inch (42.850 – 42.900 mm)	1.690 inch (42.92 mm)
	Piston outside diameter	1.6846 – 1.6858 inch (42.788 – 42.820 mm)	1.683 inch (42.75 mm)

Table 37 Disc

Measurement	Standard	Service limit
Thickness	0.276 inch (6.9–7.1 mm)	0.217 inch (6.0 mm)
Runout	less than 0.004 inch (less than 0.1 mm)	0.012 inch (0.3 mm)

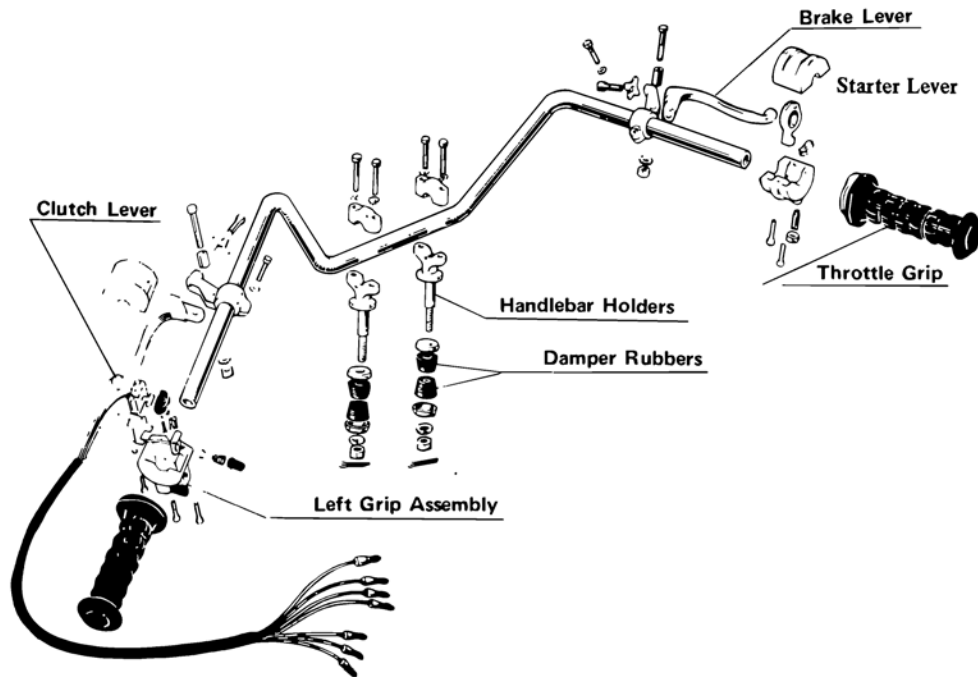
5. HANDLEBARS

1) Construction

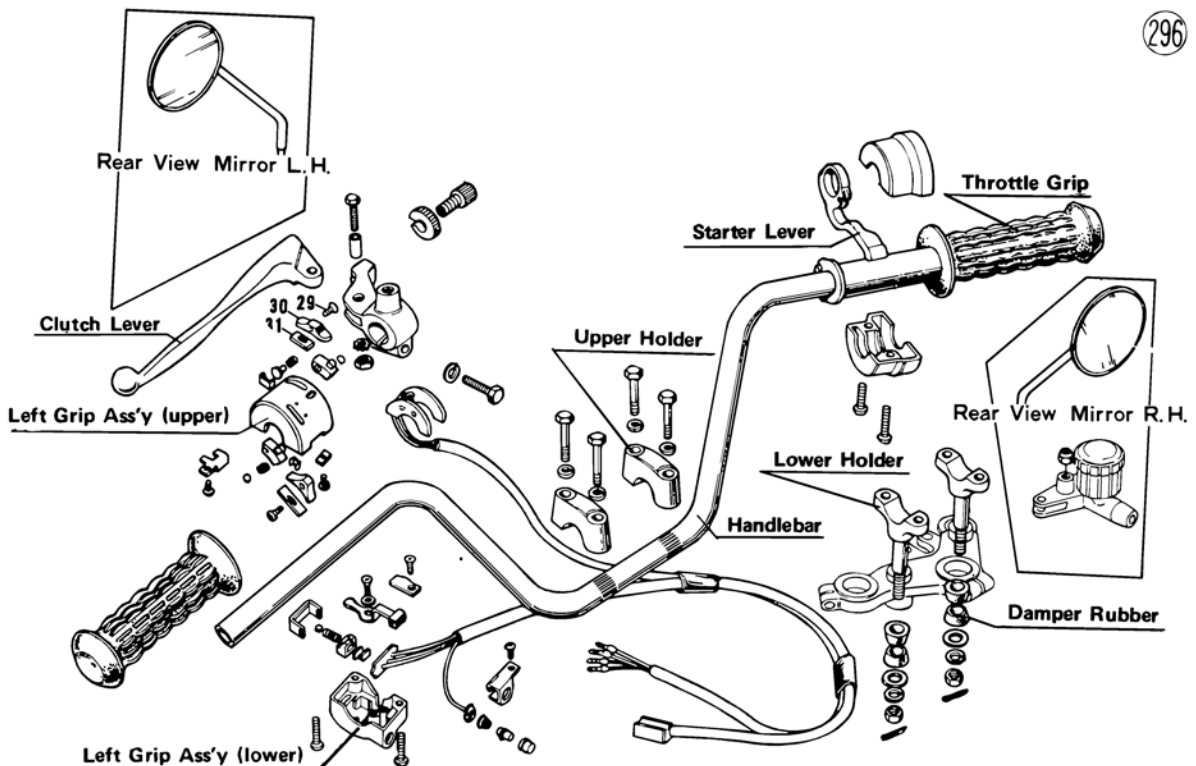
The handlebars are manufactured from drawn steel pipe, the shape of which is designed with consideration to rider comfort during long rides,

to high speed riding, and to general riding safety. On the right side of the handlebars are the starter lever, throttle grip assembly, and front brake lever. For disc brake models, the brake fluid reservoir is also located on the right side. Mounted on the left side are the turn signal, horn and headlight switches in the left grip assembly, and the clutch lever.

H1 Handlebar Assembly

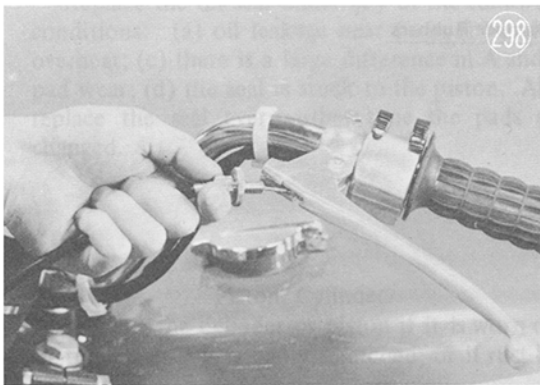
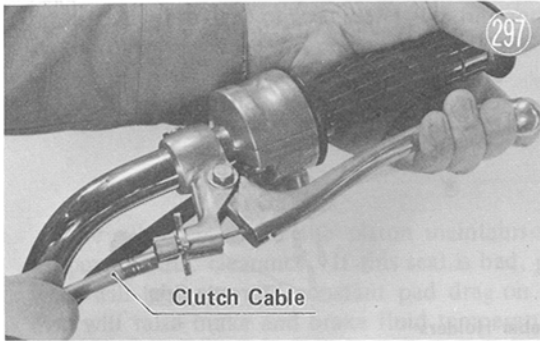


H2 Handlebar Assembly

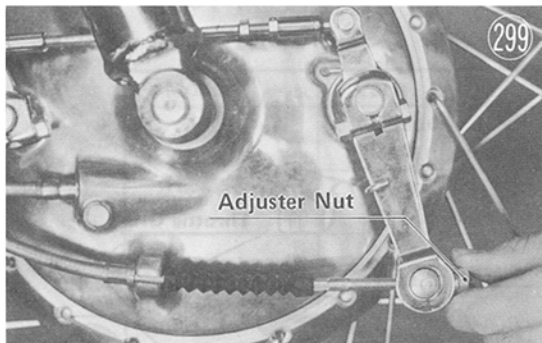


2) Disassembly

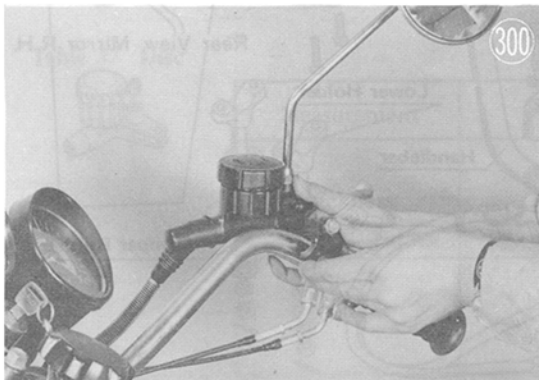
Loosen the clutch cable lock nut, and screw in the clutch cable adjusting bolt. This gives the cable sleeve enough play to enable removal of the cable from the clutch lever. To take off the cable, grab the cable outer sleeve with one hand and pull in the clutch lever with the other. While pulling on the cable, release the lever slowly, and pull the cable out of its slot.



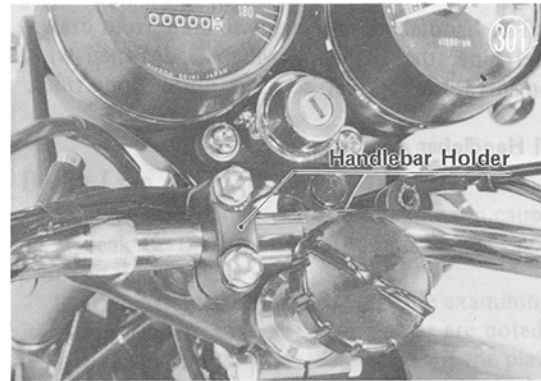
Loosen the front brake adjusting nut and pull the cable off the brake lever. (Expansion brake models)



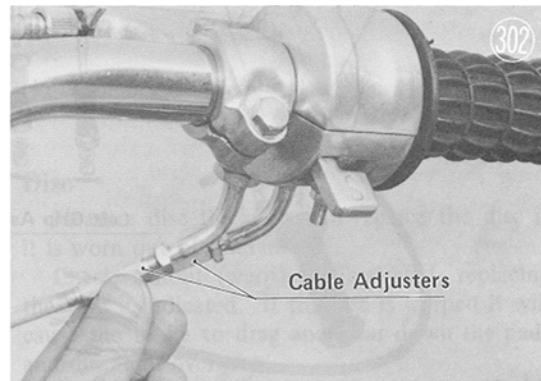
Remove the disc brake master cylinder assembly.



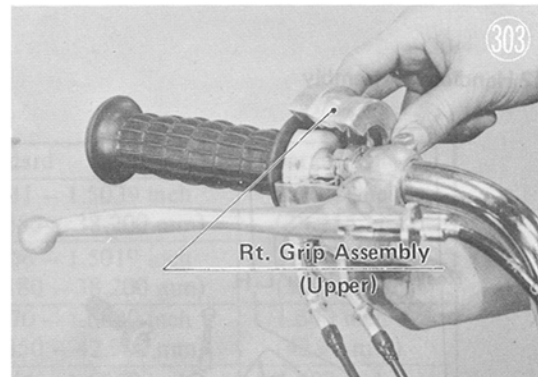
Loosen the handlebar mountings, remove the right upper mount, move the handlebar to the left for easy cable removal, and tighten the left mounting.



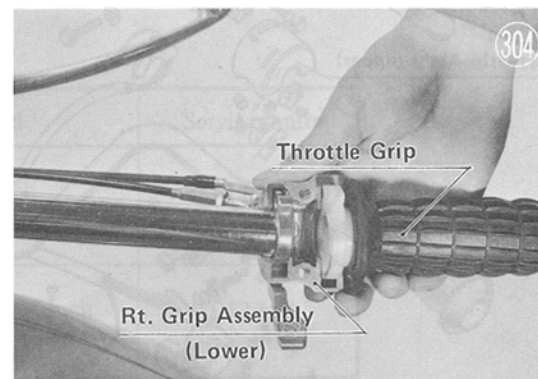
Screw in the throttle and starter cable adjusters completely to give the cables plenty of play.



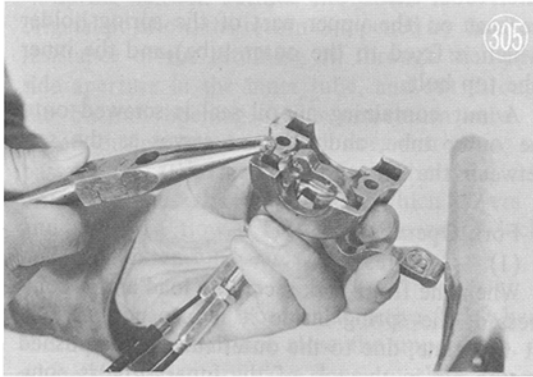
Take off the upper half of the right grip assembly.



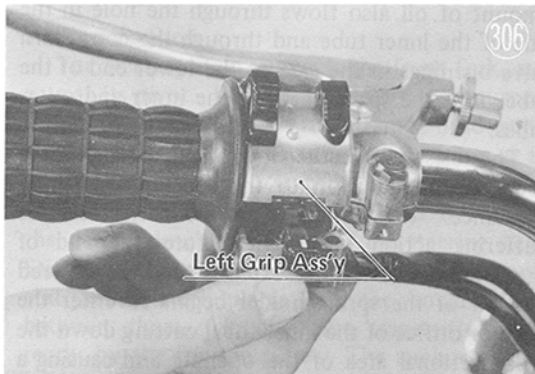
Pull the throttle grip off together with the bottom half.



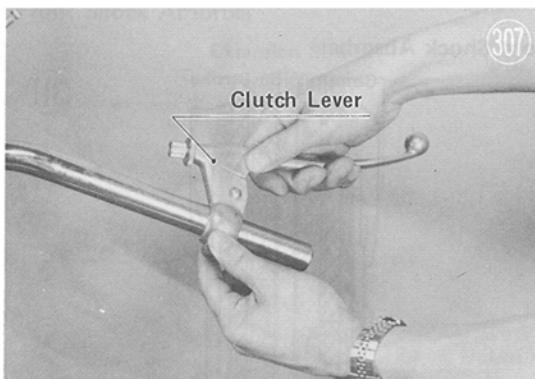
Remove the throttle and starter cable wires.



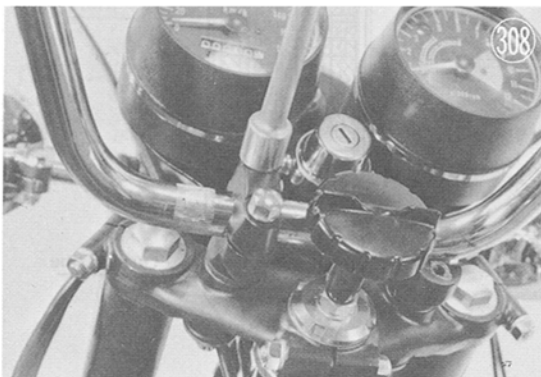
Remove the left grip assembly.



Remove the clutch and brake lever assembly.



Unbolt the upper half of the left mounting and remove the handlebar.



3) Inspection

a. Handlebar

Check that the handlebar is not bent or cracked.

b. Bushings

Inspect the rubber bushings and replace any bushing that has deteriorated, cracked or become worn. Such a bushing will not effectively perform its function of dampening shock and vibration to the handlebar.

4) Assembly

Assembly is in the reverse order of disassembly.

NOTE: The handlebar is usually mounted at an angle conforming to that of the front fork. For mounting bolt torque, see the appendix.

5) Adjustment

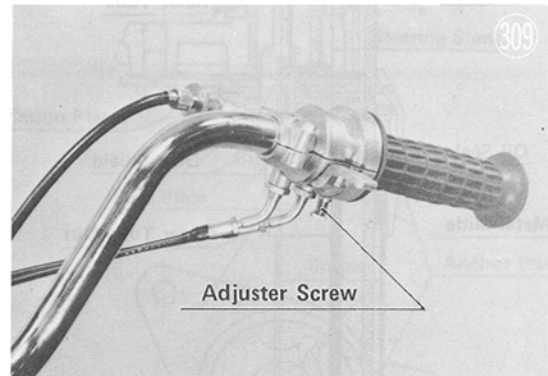
a. Throttle Cable (Page 9)

b. Starter Lever (Page 11)

c. Clutch Lever (Page 12)

d. Front Brake Lever (Expansion brakes only—page 68)

e. Throttle Grip: Adjust throttle grip stiffness to individual preference by turning the adjuster screw under the right grip assembly. (only on '69~'73 model)



6. FRONT FORK · STEERING STEM

On disc brake models, details of front shock absorber construction and operation differ from that shown here. However, both types of shocks damper movement by oil flow resistance, which is greater on the extension stroke, and oil locks occur at the ends of the stroke. Disassembly, inspection and assembly is generally the same.

1) Construction · Operation

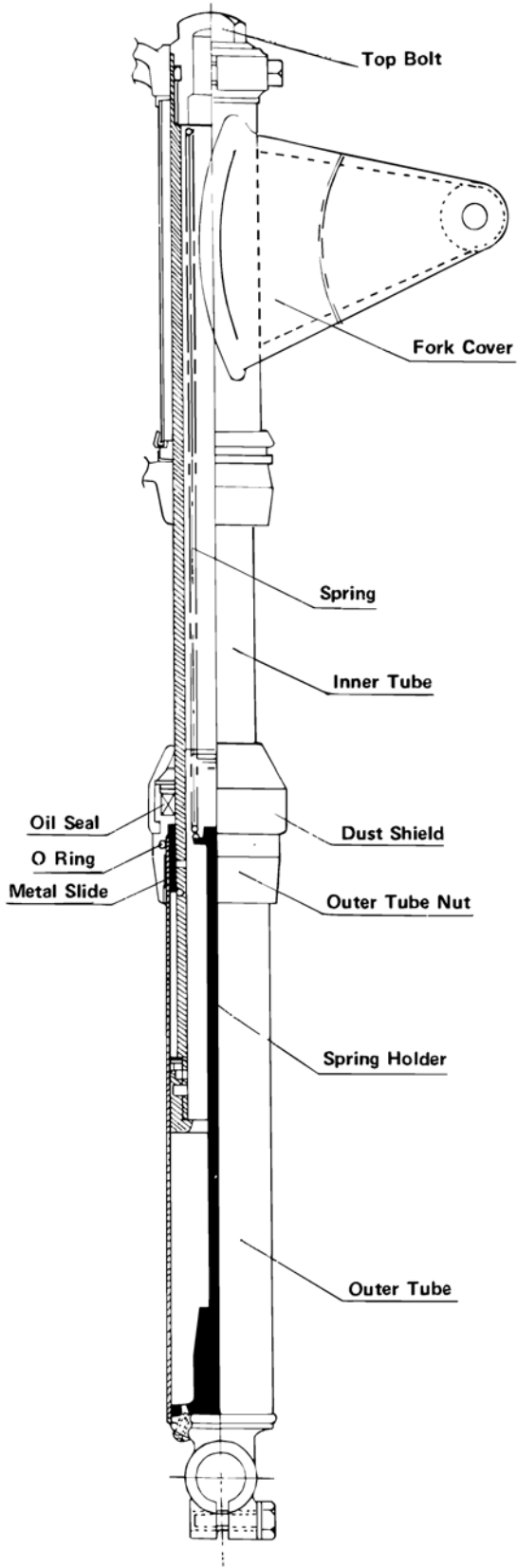
a. Fork

The front fork serves as the shock absorbing device for the front wheel. The fork consists of two telescopic tubes mounted to the frame head pipe with brackets via the steering stem.

The shock absorbing telescopic tubes include the inner tube, outer tube, spring holder and spring, damping action being provided by the spring tension and by the resistance of the flow of oil inside the tube.

Front Shock Absorber

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As illustrated, the inner tube is fitted into the outer tube, and the spring is positioned between the seat on the upper part of the spring holder (which is fixed to the outer tube) and the inner tube top bolt.

A nut containing an oil seal is screwed onto the outer tube, and this nut serves as the seal between the inner and outer tubes.

b. Fork Operation

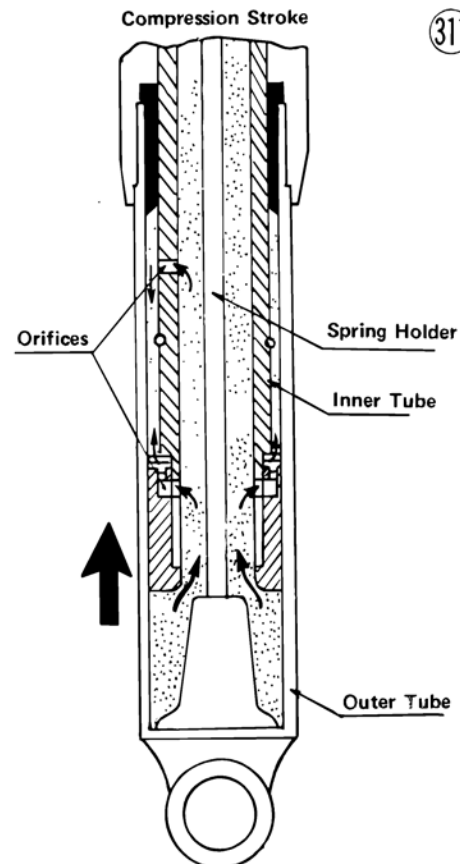
(1) Compression

When the front fork receives a load and is compressed, the spring inside it is also compressed. At this time, due to the outer tube being pushed up, the air in the top of the inner tube is compressed, while oil in the outer tube is forced to flow up into the inner tube through the piston orifice in the bottom of the inner tube. A small amount of oil also flows through the hole in the side of the inner tube and through the non-return valve openings in the side of the lower end of the tube, into the space between the inner and outer tubes.

The resistance to the flow of oil through these apertures, in addition to the air and the spring resistance to compression, constitutes the buffering action until just before the end of the compression stroke. At this time the tapered portion of the spring holder begins to enter the bottom orifice of the inner tube, cutting down the cross-sectional area of the opening and causing a sharp increase in flow resistance. The taper gradually fills the opening until just before the stroke end when the opening is completely closed, forming an oil lock and stopping all movement.

Front Shock Absorber

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(2) Extension

Spring tension returns the outer tube to its original position, the return dampened by the flow resistance of the returning oil through the upper side aperture in the inner tube, and out through the bottom opening. The non-return valve is closed during extension and does not allow oil passage. If the fork extends further, the side orifice reaches the metal slide which covers it and stops oil flow. This results in an oil lock, and fork extension ceases.

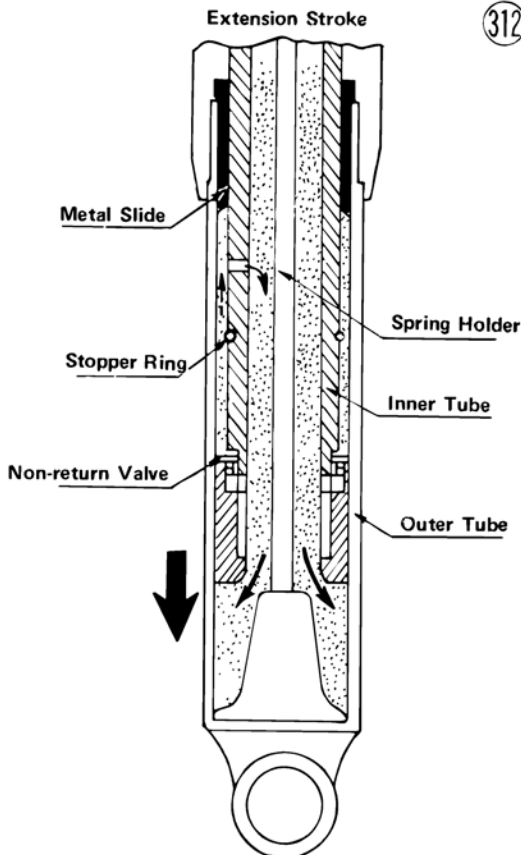
NOTE: In a badly worn or defective fork where the metal slide will not close the upper hole, or where the non-return valve does not close, the oil lock will not occur and a metal-striking-metal sound will be heard as the stopper ring of the inner tube hits the metal slide.

c. Steering Stem

The steering stem supports the front fork, and acts as its pivot. When the handlebars are turned, the stem turns inside the frame head pipe, friction being reduced by the ball bearings at its upper and lower ends.

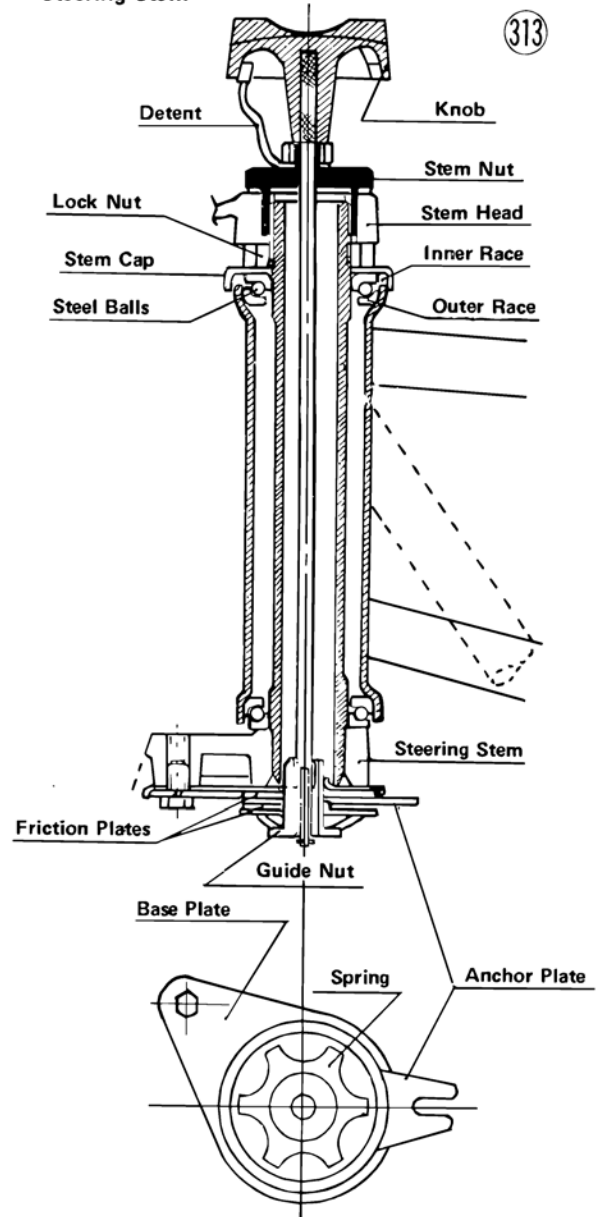
Steering stiffness can be adjusted by turning the damper knob at the top of the steering stem. Stiffness results from friction between the upper and lower steel plates and the anchor plate between them, friction being transmitted indirectly by the friction plates. The anchor plate is held stationary with respect to the frame, by a projection of the frame that fits into the plate notch; the steel plates turn with the handlebars.

Front Shock Absorber

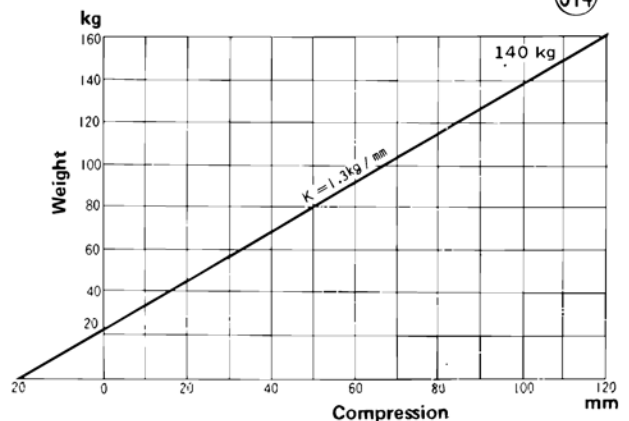


When the knob is turned in, the damper spring is pulled up, increased spring tension forces the steel, friction and anchor plates harder together, and the increased friction stiffens steering.

Steering Stem



H1, H2 Front Spring Force

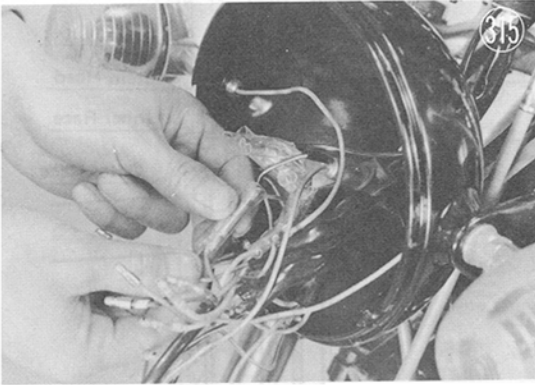


2) Disassembly

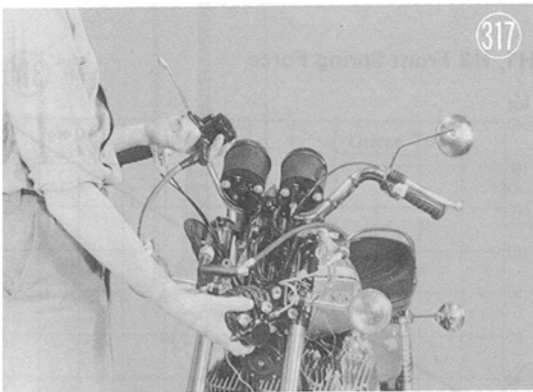
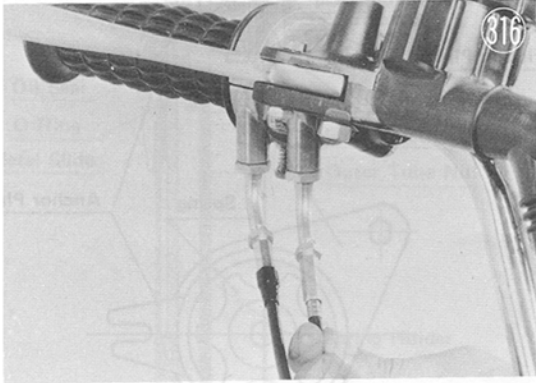
The front fork and steering stem are removed after first taking off the front wheel and fender.

a. Front Fork

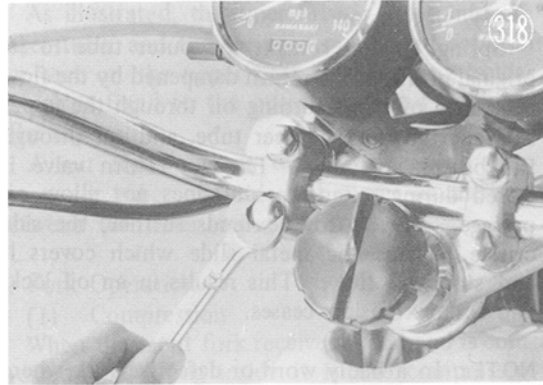
Disconnect the wiring inside the headlight and pull the wires out of the headlight body, then remove the headlight.



Remove the starter, throttle, clutch and front brake cables from the handlebar. On disc brake models, remove the complete disc brake assembly in one piece.



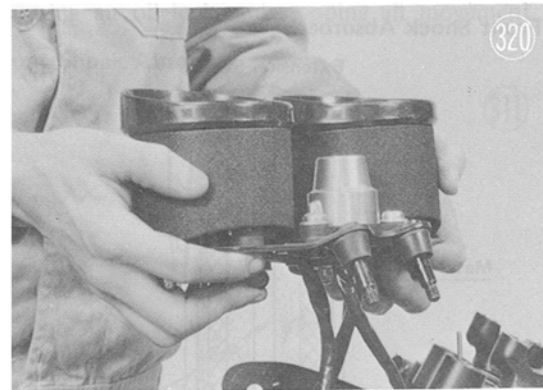
Unbolt the handlebar and remove it.



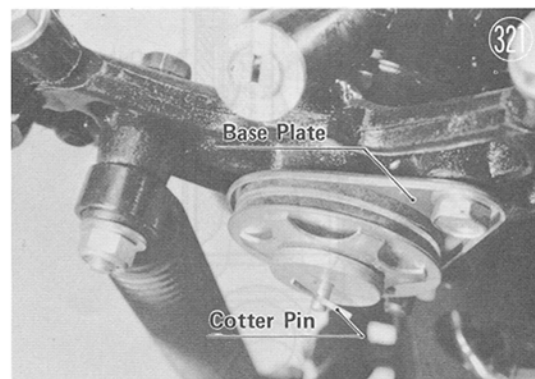
On disc brake models, remove the fuel tank and undo the ignition switch and left handlebar switch wiring.

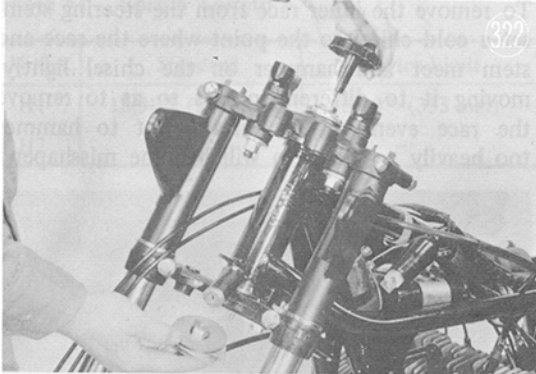


Take off the speedometer and tachometer cables and remove the meters, bracket and ignition switch as an assembly.

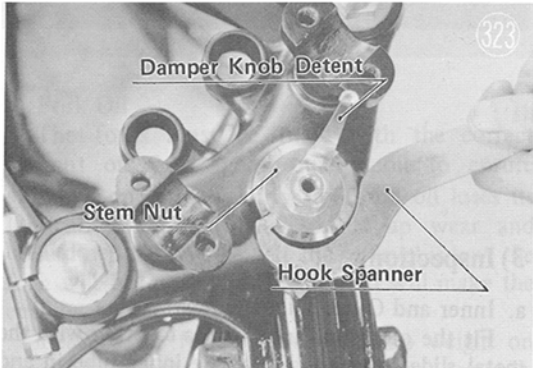


Pull out the cotter pin from the lower end of the steering damper and turn the damper knob to the left to remove it.

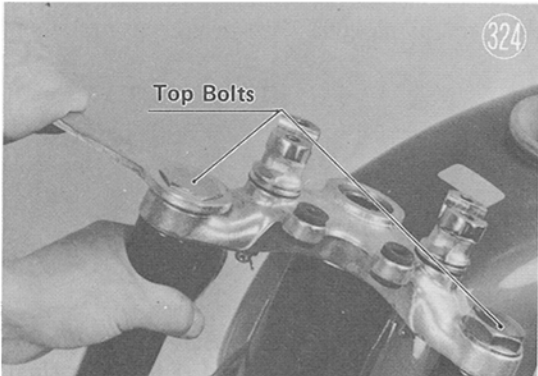




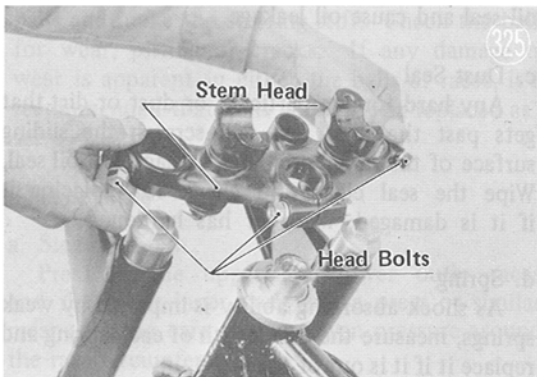
Using a hook spanner (special tool), loosen the steering stem nut and remove it. It is not necessary to remove the damper knob stopper and nut from its top.



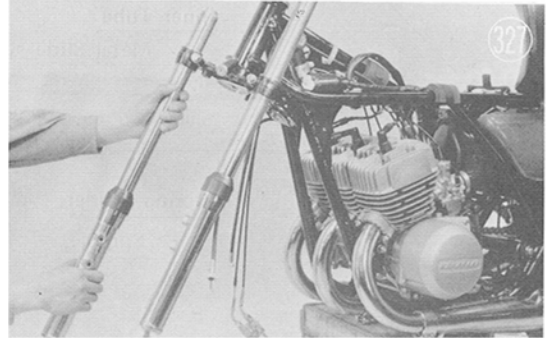
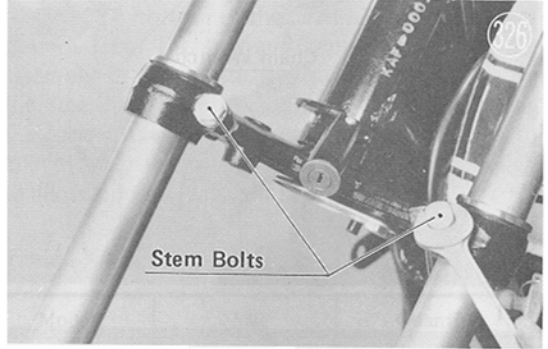
Unscrew the top bolts and take off the steering stem head. (Expansion brake models)



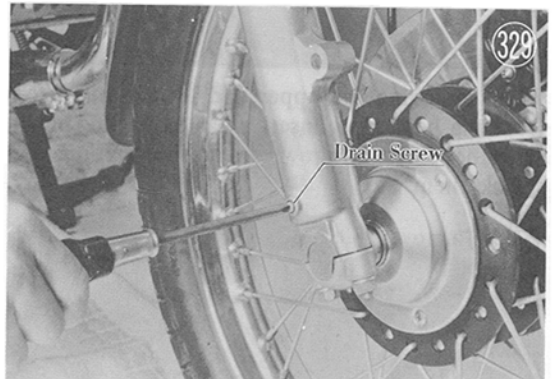
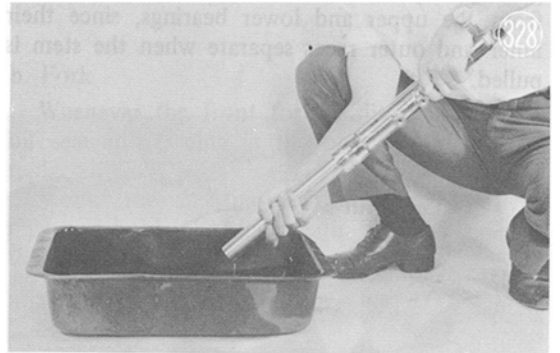
Take out the steering stem head bolts and remove the stem head. (Disc brake models)



Remove the steering stem bolts and pull out the front forks and covers.

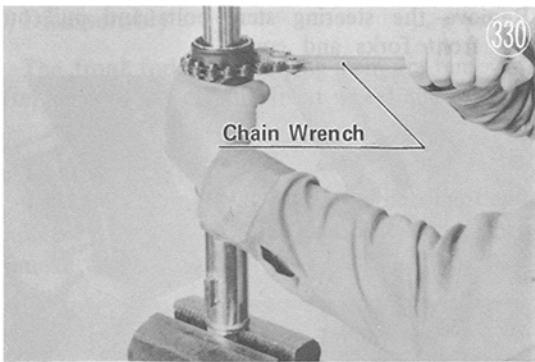


Take out the spring and pour out the oil. The oil can also be removed with the fork still attached to the frame, by removing the screw at the bottom of the fork and draining the oil.

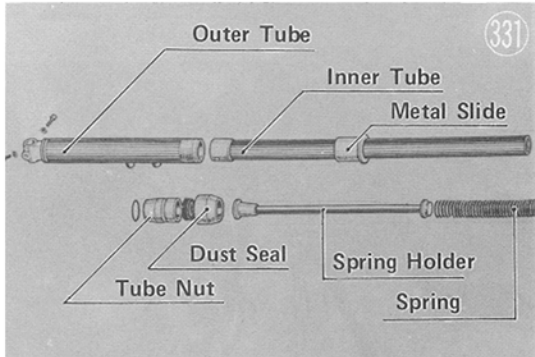


Clamp the lower end of the fork in a vise. Wrap it with a piece of tire tube or other rubber to prevent scratching, and loosen it with a chain wrench or pipe wrench.

H1

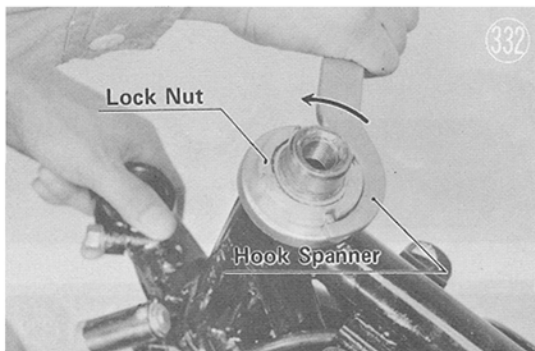


H1



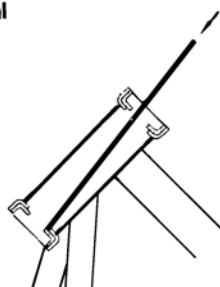
b. Steering Stem

(If it is installed, first remove the hydraulic steering damper.) Remove the steering stem lock nut with a hook spanner (special tool) and pull the steering stem out of the head pipe. When pulling this out be careful not to lose the balls from the upper and lower bearings, since their inner and outer races separate when the stem is pulled.

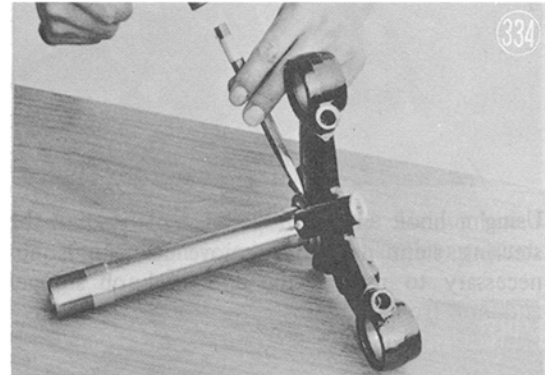


When removing the upper and lower outer races from the head pipe, insert a bar or starting punch into the pipes, as shown in the illustration, and knock them out.

Race Removal



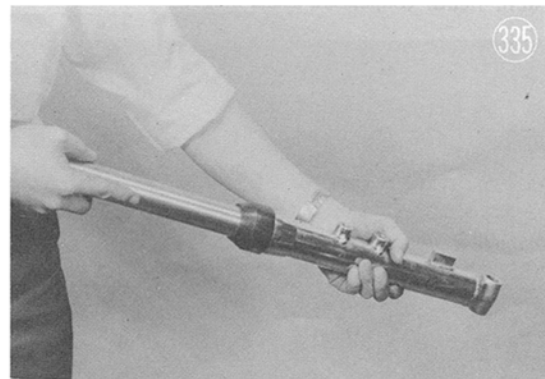
To remove the inner race from the steering stem, set a cold chisel to the point where the race and stem meet and hammer on the chisel lightly, moving it to different points so as to remove the race evenly. Be careful not to hammer too heavily as the stem will become misshapen.



3) Inspection

a. Inner and Outer Tubes

Fit the outer and inner tubes together with the metal slide in place. Move the inner tube in and out, checking for smooth movement.



b. Inner Tube

If the sliding surface of the inner tube is dented, scratched or bent, it must be repaired or replaced as the uneven surface will damage the lip of the oil seal and cause oil leakage.

c. Dust Seal

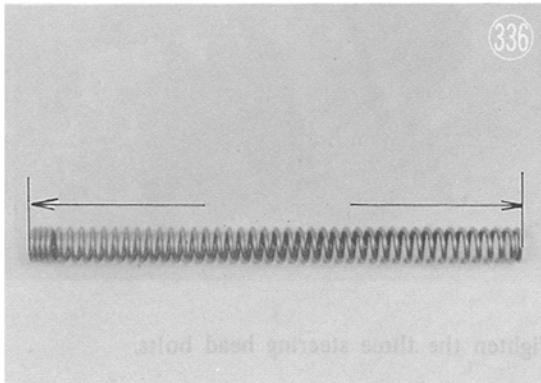
Any hard foreign particles, or dust or dirt that gets past the dust seal will scratch the sliding surface of the inner tube and damage the oil seal. Wipe the seal clean and check it, replacing it if it is damaged, worn or has hardened.

d. Spring

As shock absorbing ability is impaired by weak springs, measure the free length of each spring and replace it if it is out of tolerance.

Table 37 Spring Length

Model	Standard	Service Limit
H1	13.58" (345 mm)	13.19" (335 mm)
H2	"	"

**e. Fork Oil**

The forks must be filled with the correct amount of clean, good quality oil to ensure effective operation. Dirty, oxidized oil loses its lubricating capacity and speeds up wear and breakdown of the fork. If the oil level is low, the fork will be noisy; a high oil level will make the cushion harder.

Measure the fork oil level with no weight on the fork (front wheel raised off the ground). Unscrew the top bolt, insert a rod into the inner tube, and measure the distance from the top of the inner tube to the surface of the oil. This measurement, along with the amount of oil to pour into an empty fork, is given in the table below.

Table 38 Front Fork Oil

Model	Standard Quantity	Level from Top	Oil
H1*	7.8 oz. (230 cc)	15" (380 mm)	SAE 10
H2	5.4 oz. (160 cc)	17 5/8 in. (448 mm)	SAE 10

*For H1 disc brake models, use H2 figures in above table.

f. Steering Stem

Inspect the steering stem and straighten it or replace it if it is bent.

g. Ball Bearings

Check the inner and outer races for wear or pitting. This will cause uneven pressure on the balls and make the steering stiff. Check the balls for wear, pitting or cracks. If any damage or wear is apparent in either the balls or races, it is recommended that balls and races be replaced as a set.

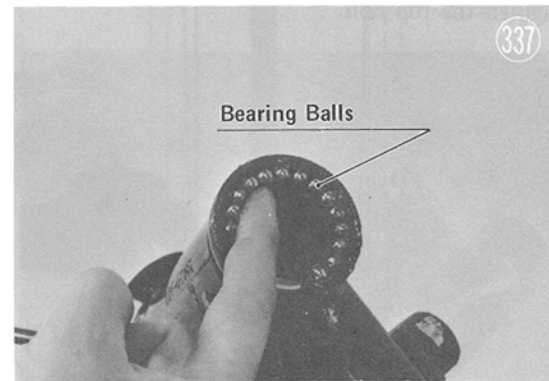
4) Assembly**a. Steering Stem**

Press in the upper and lower outer races and the lower inner race with a press or similar means, taking care to exert even pressure around the race circumference.

Spread grease on the upper and lower outer races in the head pipe, and set the balls in place in them. Insert the steering stem up through the bottom of the head pipe, fit the upper race in from the top and temporarily hold the assembly in place with the lock nut. Then move the steering stem back and forth while tightening the lock nut. The nut should be tight enough to take all play out of the steering, but loose enough to allow smooth, easy steering movement.

Table 39 Bearing Balls

Model	Size	Quantity
H1, H2	1/4 inch	19 each bearing

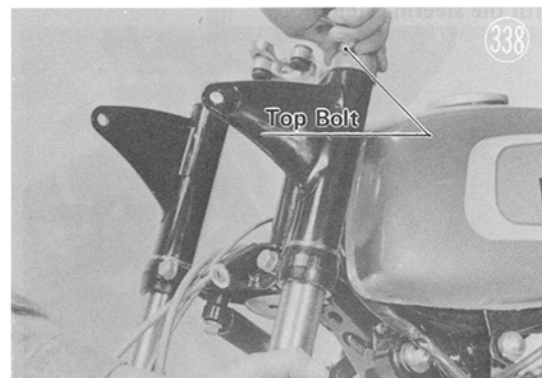
**b. Fork**

Whenever the front fork is disassembled, the oil seal and O ring in the outer tube must be replaced.

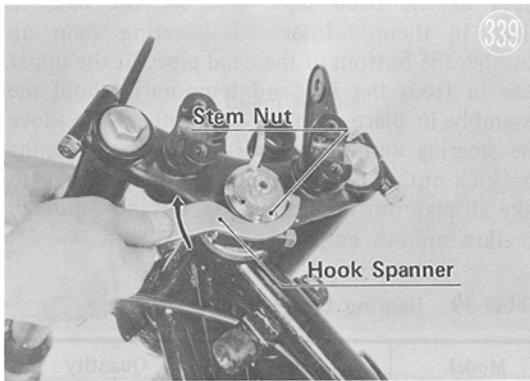
Mount the steering stem head on the head pipe and hold it in place with stem nut. Leave the nut loose for easy fork assembly.

(1) Expansion brake models

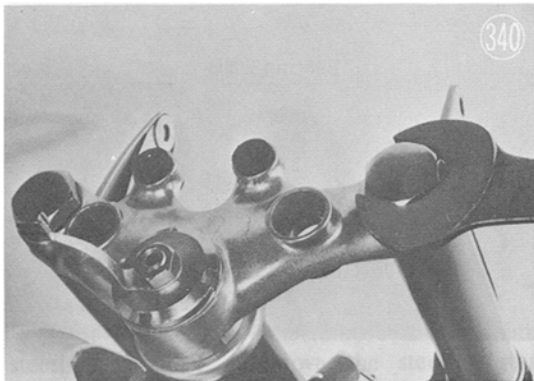
Put on the fork covers and insert each fork up through the bottom of the steering stem, screwing in the top bolt loosely.



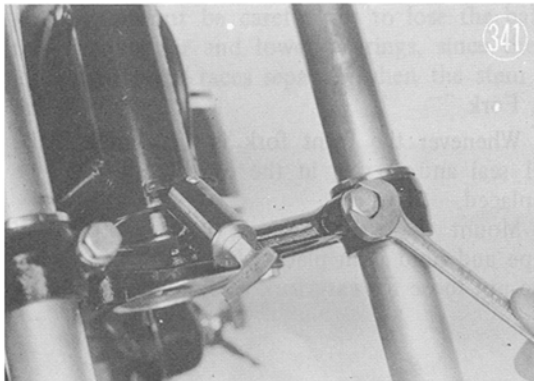
Tighten down the steering stem nut.



Push the inner tube into the stem hole until the top of the tube hits the step in the hole, and tighten the top bolt.

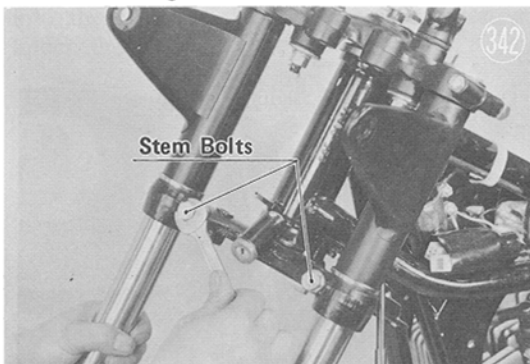


Tighten the steering stem bolts.

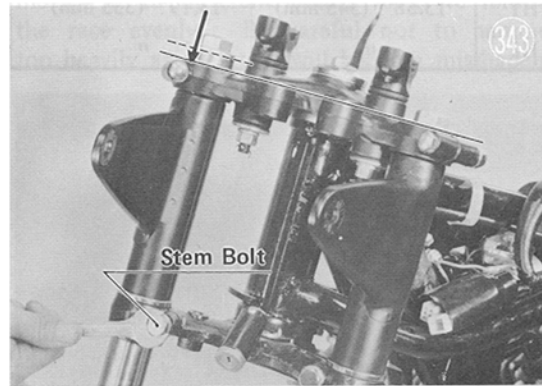


(2) Disc brake models

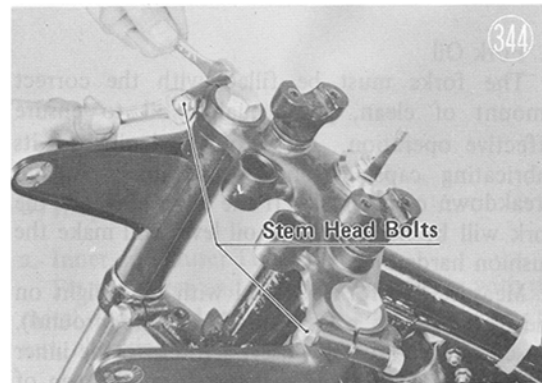
Put on the fork covers; insert each fork up through the stem until it is even with the upper surface of the stem, holding it in place temporarily with the steering stem bolt.



Tighten down the steering stem nut. Align the tops of the tubes evenly with the upper surface of the stem head and tighten the stem bolts.



Tighten the three steering head bolts.



c. Fork Assembly Inspection

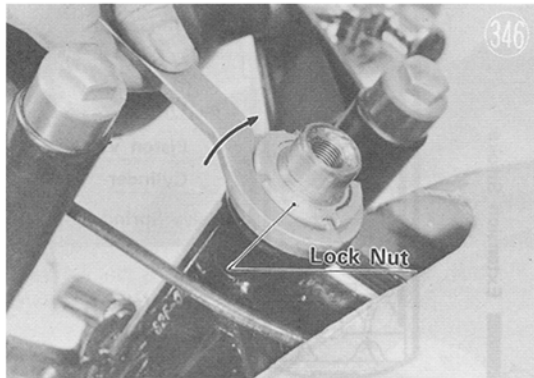
The lower bracket must have no play, and steering must be smooth and easy. After assembling the front fork and wheel to the frame, check this in the following manner:

Move the forks back and forth to see that there is no play in the stem.

With the front wheel lifted up off the ground, give the handlebars a light push and see if they will move to the right and left smoothly under their own momentum.

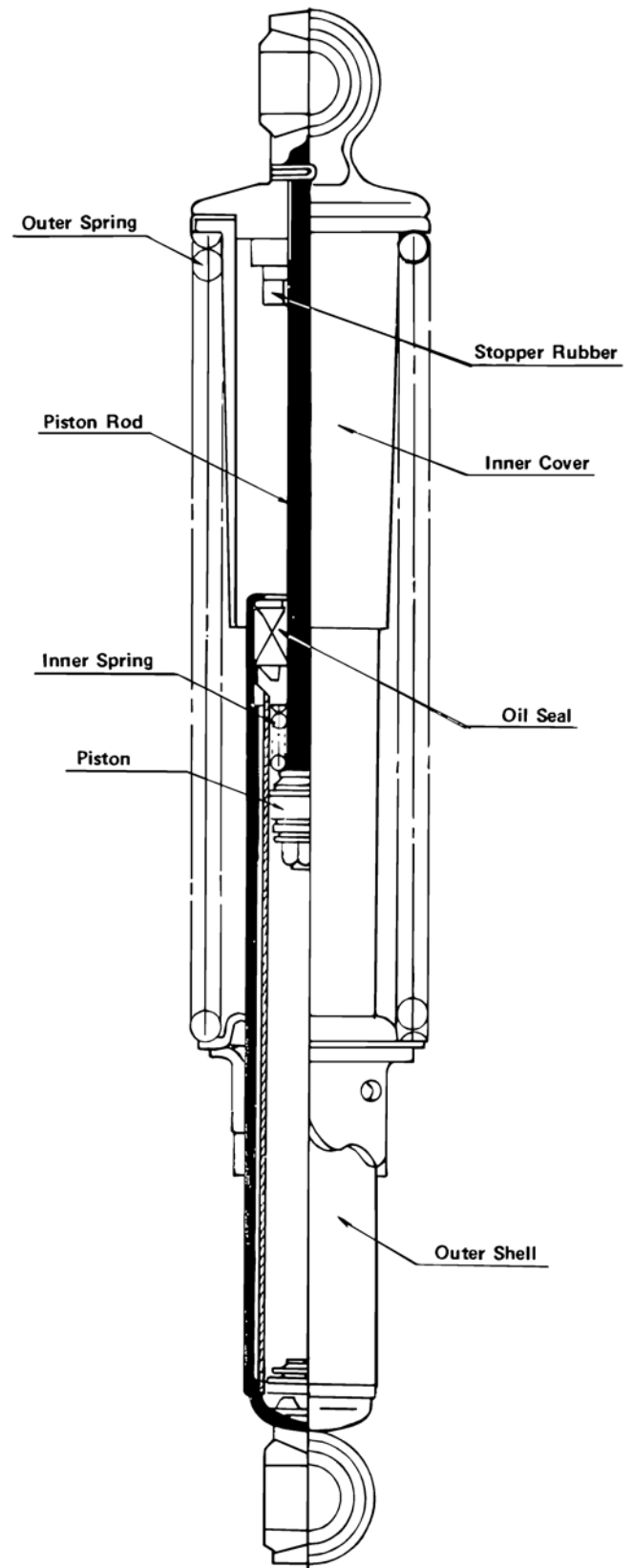


If the preceding inspection revealed play in the steering stem, the lock nut is not tightened sufficiently; if the steering was stiff, the lock nut is too tight and must be loosened.



Rear Shock Absorber

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7. REAR SHOCK ABSORBERS

1) Construction

The shock absorbers constitute the rear suspension, protecting the rider and vehicle from road shock and vibration, and thereby increasing riding comfort and lengthening vehicle life. To further absorb vibration from small irregularities in the road surface, the shock absorbers are mounted with rubber bushings at the top and bottom.

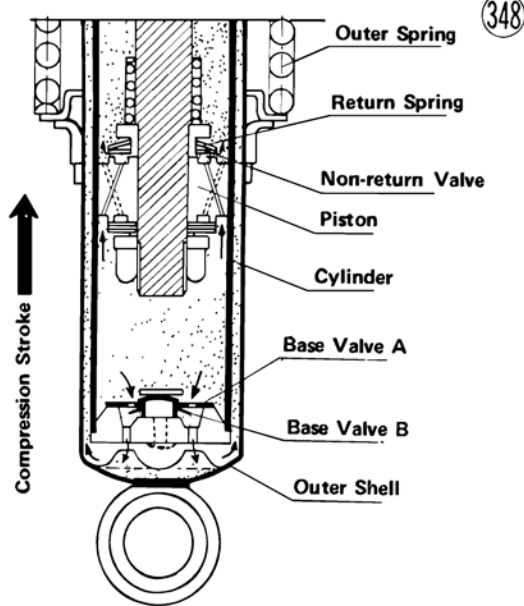
The shock absorber consists of springs, an inner cover, outer shell, cylinder, piston rod, piston, and shock absorbing oil. The basic tension of the spring (the initial load) is adjustable in three steps to conform with road and loading conditions, and rider comfort.

2) Operation

a. Compression

When the rear shock absorber receives a load, the outer spring is compressed, and at the same time the cylinder rising in the outer shell causes pressure on the oil underneath the piston. The oil flows through the piston orifice, pushes up the non-return valve held down by valve spring C, and enters the space above the piston. A small amount of oil also flows through the opening of base valve A, pushes down base valve B and enters the oil chamber between the cylinder and the outershell. The resistance to this oil flow, in addition to spring tension, constitutes buffering action. The compression stroke is terminated when the cylinder strikes the rubber at the top end of the piston rod.

Rear Shock Absorber



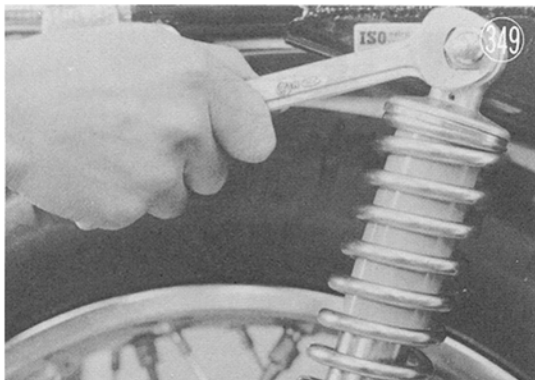
b. Extension

When the outer shell moves downward together with the cylinder due to spring force, the oil in the space above the piston goes through the piston orifice, pushes down the piston valve, goes through the valve and back into the space under the piston. At this same time, the oil in the space between the cylinder and the outer shell also returns to underneath the piston by pushing open base valve A normally held shut by valve spring D. The resistance of the flowing oil checks the tendency of the outer spring to suddenly expand to its full length. The extension stroke is completed when the inner spring hits the stopper at the top of the cylinder.

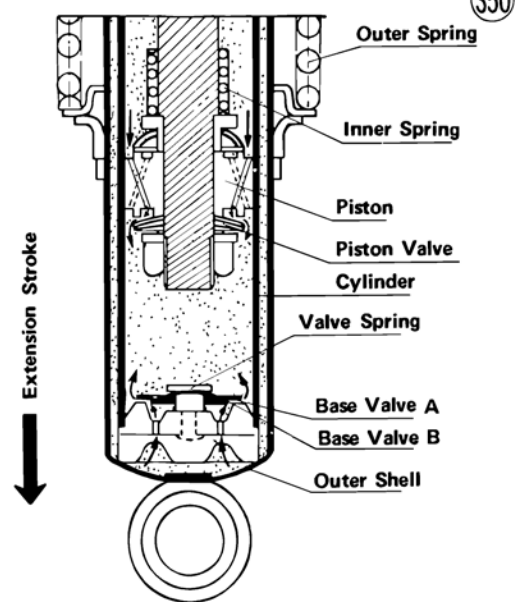
3) Disassembly

The rear shock absorbers are a non-disassembly part and must be replaced as an assembly if defective.

To remove the shock absorbers, take out the mounting bolts.



Rear Shock Absorber



4) Inspection

a. Check the shock absorbers for leaking oil. A leaking unit should be replaced.

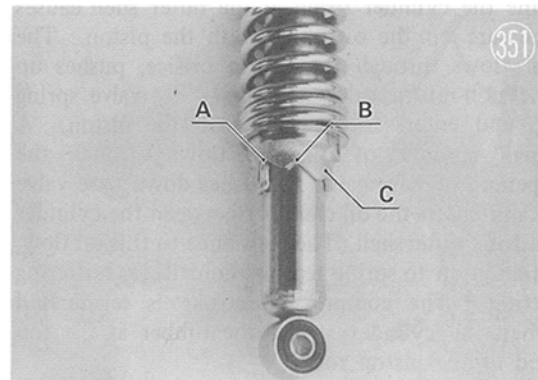
b. Since during compression the spring force is much greater than the oil damping force, this damping force is very difficult to check. The damping force during expansion can be easily inspected, however. Compress the shock absorber and release it. If it does not return smoothly without jerking or snapping back, or if other abnormalities are noted, replace it.

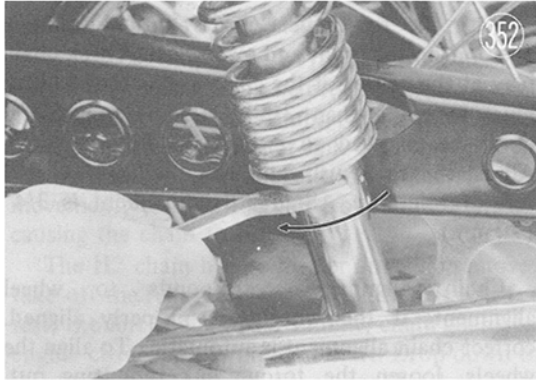
NOTE: Riding with one bad shock absorber will soon cause the other one to break down. If inspection reveals a defective shock, replace it as soon as practicable.

c. Check that the rubber shock absorber mountings are not worn, cracked or hardened.

5) Adjustment

By turning the outer spring seat, the spring seat is raised or lowered, increasing or decreasing minimum spring tension and changing the length of the spring stroke. Use a spanner (special tool) or screwdriver to turn the seat. Turning from A to B to C increases tension; turning in the opposite direction decreases tension. Minimum spring force for each position is given in the graphs.





8. HYDRAULIC STEERING DAMPER

[Optional on all H2 models and on some U.S. H1 models]

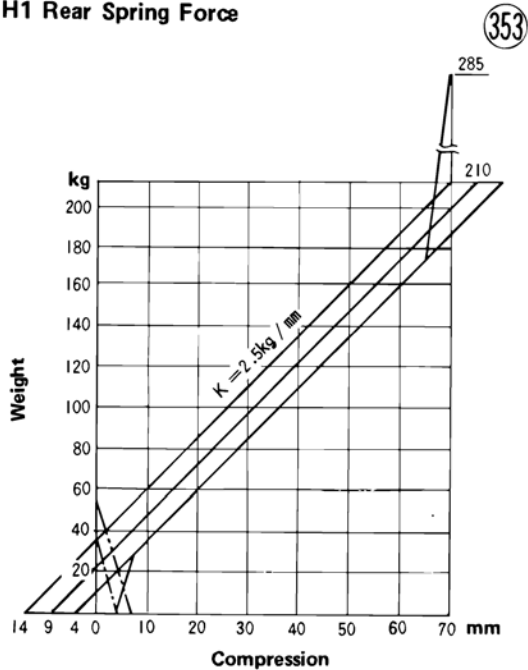
1) Construction and Operation

This steering damper is connected between the steering stem and the frame, and serves to minimize handlebar vibration at high speeds.

It consists mainly of a piston rod inside an oil-filled cylinder. As the handlebars move from side to side, the piston moves back and forth inside the cylinder, and oil is forced to flow through a small hole in the head of the piston. Resistance to that flow of oil prevents too sudden handlebar movement and in this manner dampens vibration.

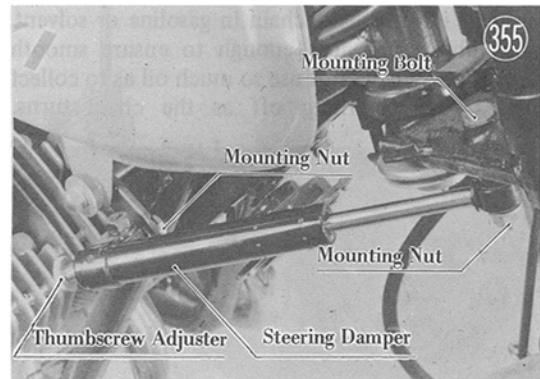
On some newer models the damping force is adjustable by turning a thumbscrew on the end of the damper.

H1 Rear Spring Force

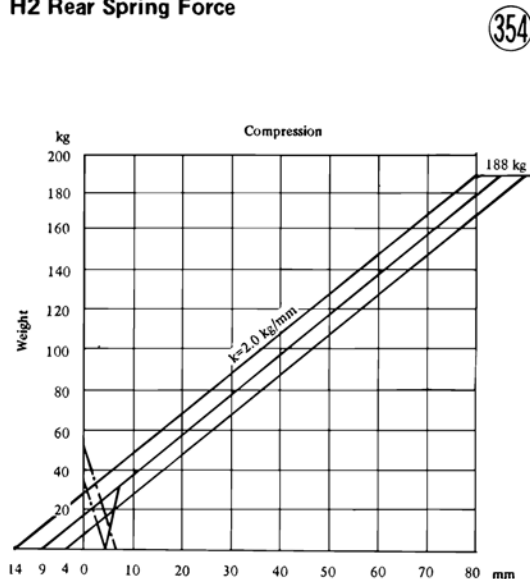


2) Disassembly

Remove the two mounting nuts and take off the damper.



H2 Rear Spring Force



3) Inspection

Inspect the steering damper for oil leakage. If it is leaking, it must be replaced as a unit since it is a non-disassembly part.

9. DRIVE CHAIN

1) Construction · Operation

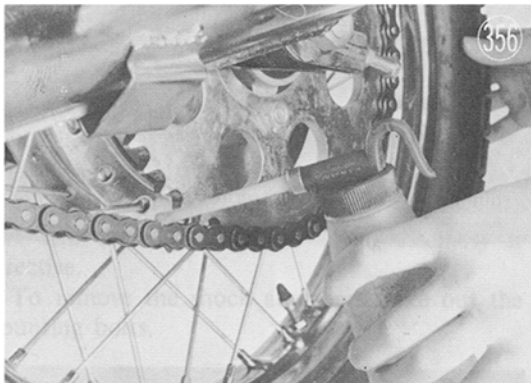
The drive chain transmits engine power to the rear wheel and, together with the front and rear sprockets, performs secondary reduction. Chain construction is illustrated below. Wear occurs between the pin and bushing, and bushing and roller due to chain movement and tension, and causes the chain to lengthen. Chain slack is also produced from wear of the roller surfaces against the sprockets. If chain play becomes great enough it can cause the chain to snap or come off the sprocket, so this play should be checked and adjustment made at regular intervals. And along with chain adjustment, wheel alignment must also be taken into consideration. Misalignment will cause the chain to snap or slip off the sprocket, and cause abnormal chain and sprocket wear, reducing power transmission efficiency.

Table 40 Chain Specifications

Model	No. of Links	Type
H1	102	EK530 SH-T1G
H2	110	EK530 SH-T2G

2) Inspection · Adjustment

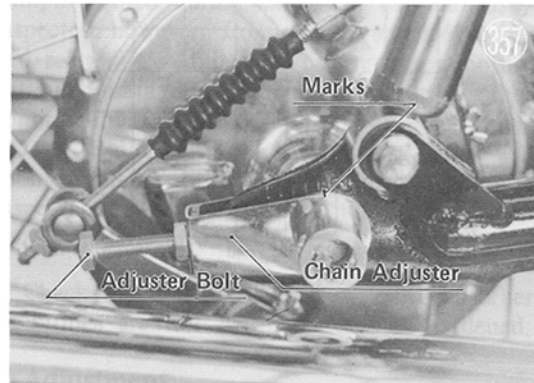
a. Lack of lubrication will greatly hasten chain wear, as will dirt sticking to the chain and grinding against it. Wash the chain in gasoline or solvent, and lubricate it just enough to ensure smooth operation, but do not use so much oil as to collect dirt or to be flung off as the chain turns.



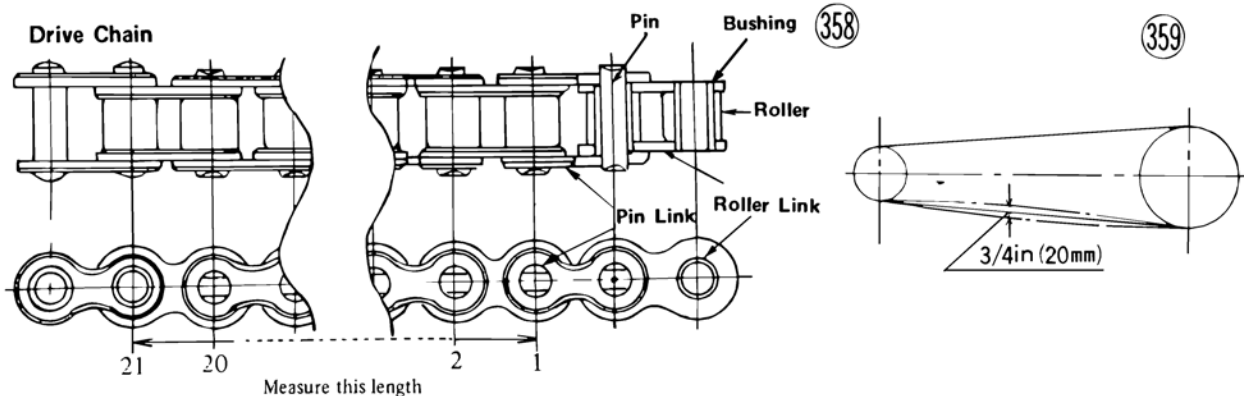
With the motorcycle in its normal standing position on the front and rear wheels, check chain play at the center of the chain as illustrated. Play must be more than 3/8" (10 mm) and should never be allowed to exceed 1 1/2" (40 mm). Adjust the chain using the chain adjusters if it is out of tolerance. Standard adjustment is 3/4" (20 mm).

Chain alignment corresponds to wheel alignment; if the wheels are properly aligned, correct chain alignment is automatic. To align the wheels, loosen the torque link mounting nut, axle nut, axle sleeve nut (H1 only), and adjuster bolt lock nuts, in that order; turn the chain adjuster bolts (or nuts) seeing that the adjuster marks coincide with the same swing arm marks on both sides of the wheel. After adjustment do not fail to tighten all the parts that were loosened, and to check rear brake and brake light adjustments.

If the chain is stretched out of tolerance, replace it, also checking sprocket wear at this time (page 23, 66). To measure chain wear, loosen the nuts as for chain adjustment, and adjust the chain tight. Measure the length of 20 links (from pin center of first pin to pin center of 21st pin) on the straight part of the chain, replacing the chain if measurement is over 12 3/4 inch (324 mm). (Standard length is 12 1/2 inch 317.5 mm.)



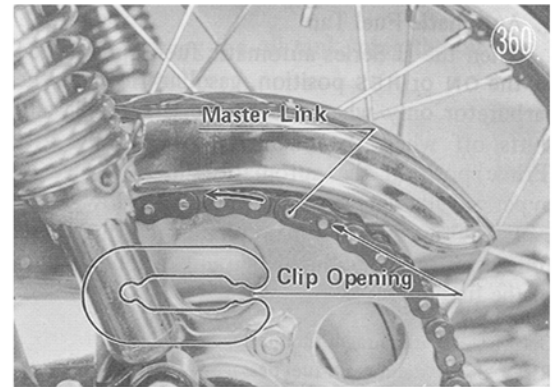
Oil the chain with SAE 90 gear oil at least every 200 miles (300 km). The H2 has a chain oil tank for this purpose, with a hose running down to drip oil on the chain. To oil the H2 chain, spin the rear wheel backward while pulling up on the oiler valve knob (attached to the frame at the rear of the engine oil tank).



3) Disassembly · Assembly

This is accomplished by removing or inserting the master link. It is helpful to give the chain some slack to make assembly/disassembly easier. When replacing the master link clip, the open end should face in the opposite direction to chain movement, to keep the clip from coming off and causing the chain to break.

The H2 chain has no master link. To remove it take off the rear wheel (page 59), the left rear foot rest, the left shock lower mount, chain guard, left engine cover, and swing arm shaft. Drop down the front of the swing arm and remove the chain.



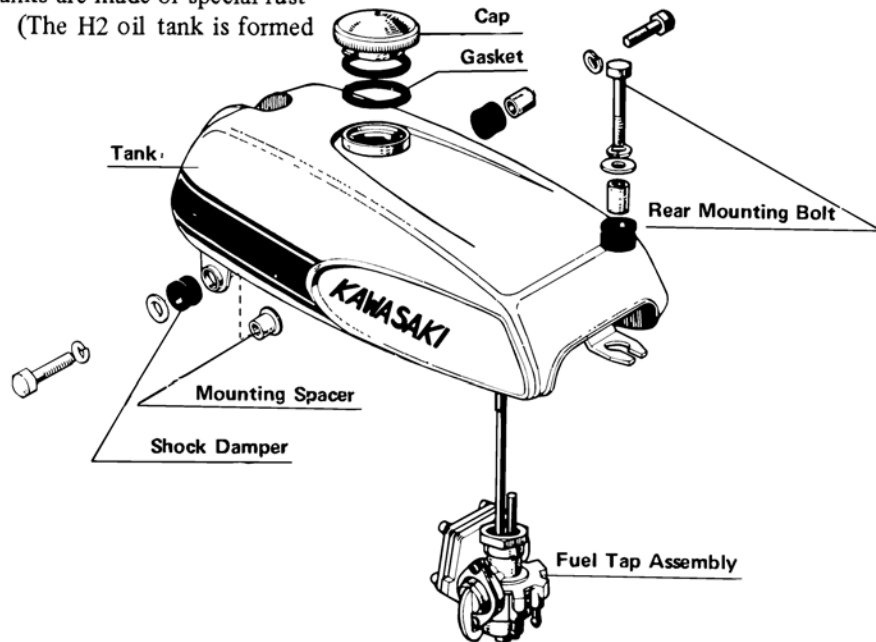
10. FUEL, OIL TANKS

1) Construction

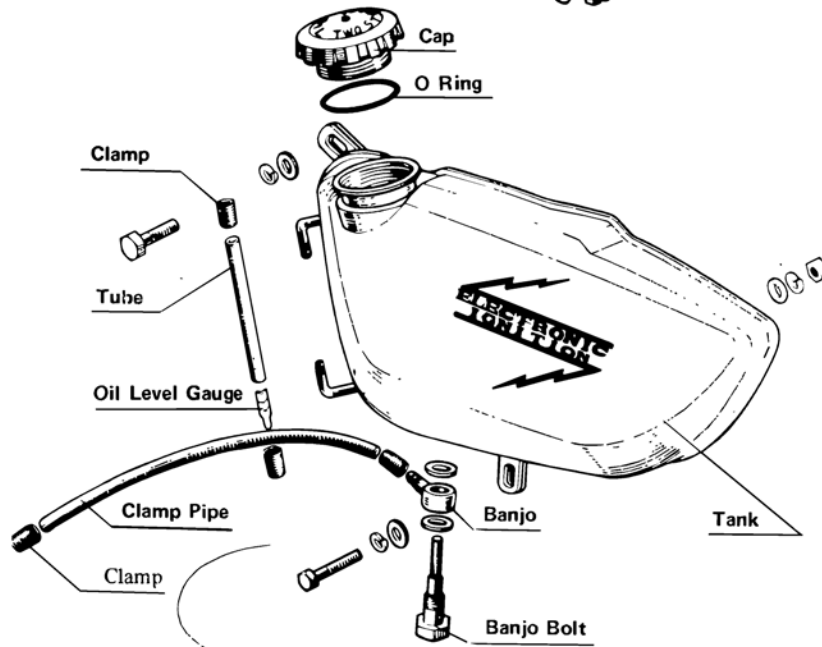
a. Tanks

The fuel and oil tanks are made of special rust-resistant steel plate. (The H2 oil tank is formed from polyethylene.)

H1 Fuel Tank



H1 Oil Tank



b. Automatic Fuel Tap

When the H Series automatic fuel tap is turned to the **ON** or **RES** position, gasoline flows to the carburetor only when the engine is running, and shuts off when the engine stops. In the **PRI** (Prime) position the automatic shut-off valve is bypassed, allowing continuous gasoline flow.

Fuel flow from the main pipe to the filter bowl follows different paths, depending on the position of the fuel tap lever.

- ON 1 → 2 diaphragm fuel passage → filter bowl
- RES 3 → 2 diaphragm fuel passage → filter bowl
- PRI 3 → 4 filter bowl

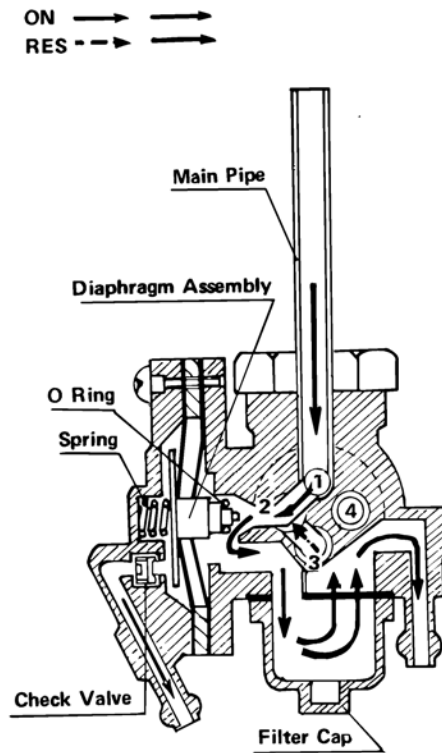
The gasoline that enters the filter bowl, or sediment bowl, is filtered and sent through the fuel pipe connections to each carburetor. The automatic valve in the fuel tap operates as follows: When the engine is started, negative pressure (vacuum) is created at the carburetor due to engine intake. A vacuum line is connected from the carburetor to the diaphragm cover, so that vacuum is felt at the outside of the diaphragm transmitted through the check valve. The vacuum pulls the diaphragm against its spring pressure, and the O ring at the other end of the diaphragm assembly is pulled out of its seat, allowing fuel passage between the O ring and seat. When the engine stops and vacuum is lost, air enters the diaphragm vacuum chamber through an air vent to the outside of the fuel tap, bringing chamber pressure back up to atmospheric pressure and allowing the diaphragm spring to push the diaphragm back into place and hold the O ring against the seat. This air vent is open at all times but due to its small size, the vacuum line keeps pumping a negative pressure in the chamber faster than the air vent can let air in to equalize it.

At different fuel tap lever positions, the fuel from the tank is taken from different places. With the lever in the **ON** position, fuel is taken out of the tank through a pipe extending up into the tank from the fuel tap. When the gasoline level drops below the level of the top of the pipe, fuel can no longer enter the tap and the remaining gasoline in the tank forms the reserve supply (about 3/4 U.S. gal, or 3 liters). With the lever in the **PRI** (prime) or **RES** (reserve) positions, fuel intake to the tap is from the bottom of the

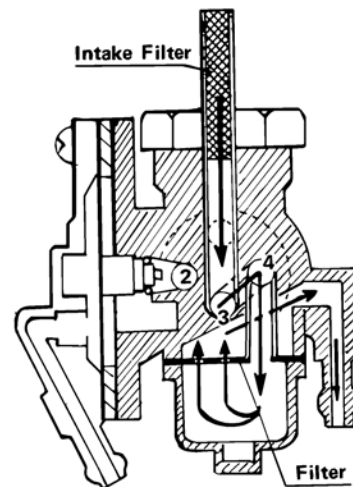
tank and gasoline can be used until the tank is completely empty.

Fuel Tap

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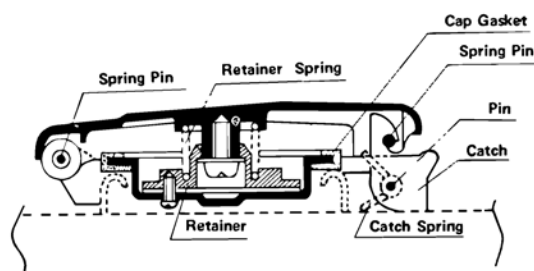


PRI Position



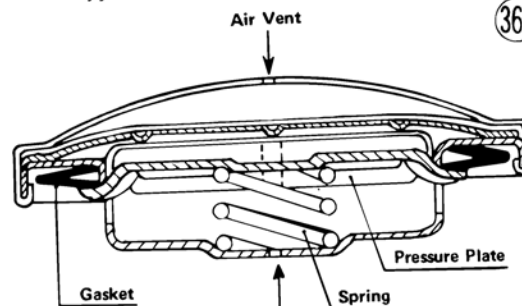
Snap-shut Tank Cap

363



Screw-type Fuel Tank Cap

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2) Disassembly

a. Fuel Tap

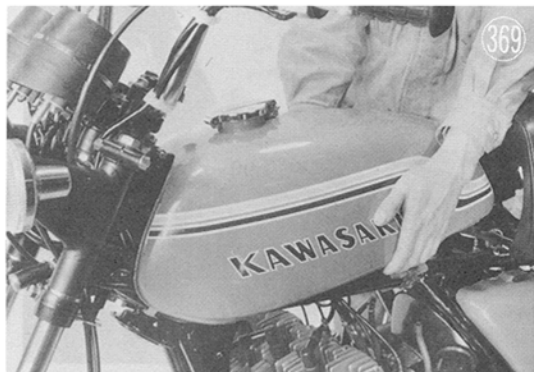
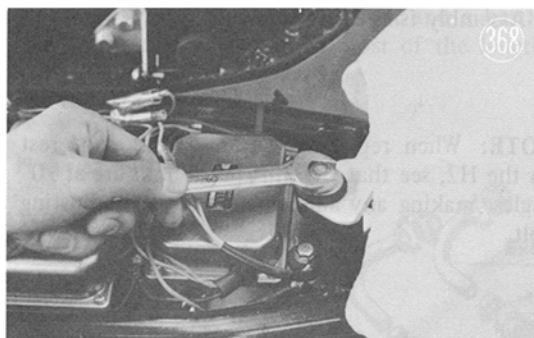
Remove the fuel and vacuum pipes and turn the tap to PRI to drain the gasoline. Remove the tap.



b. Fuel Tank

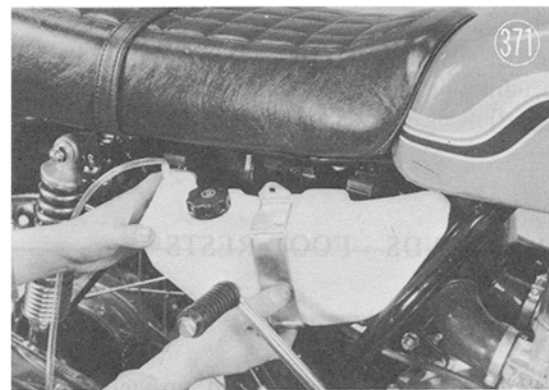
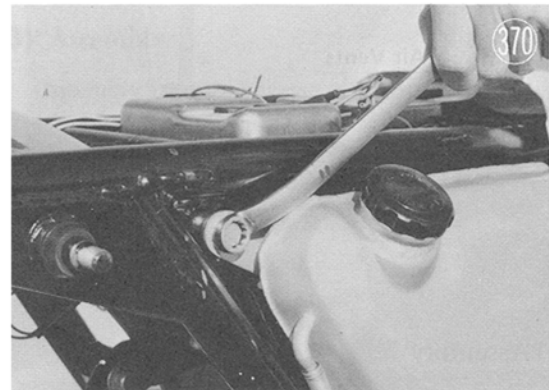
CAUTION: The main wiring harness is located under the fuel tank between the tank and the frame. When removing the tank be careful not to catch it on the wiring.

Turn the fuel tap to ON or RES to stop the flow of gasoline, and remove the fuel and vacuum pipes. Then remove the tank.



c. Oil Tank

Before removing the oil tank, plug the oil pipe to prevent spillage.



3) Inspection

a. Fuel, Oil Tanks

After the fuel and oil tanks are used for a long period, sediment collects in them and should be cleaned out to keep it out of the fuel tap and oil pump.

b. Fuel, Oil Tank Caps

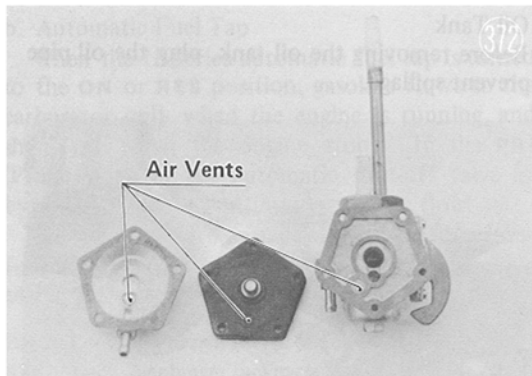
The caps not only keep the gasoline and oil from spilling, but allow air to enter the tanks through a vent hole in the cap. If air does not enter the tank, a partial vacuum will form at the top of the tank and prevent the oil or gas from flowing out the bottom. Clean the caps and check that the hole is not plugged.

c. Oil Tank Cap O Ring and Banjo Bolt Gasket

Check these parts for damage which may cause oil leakage.

d. Fuel Tap

Periodically remove the sediment bowl and empty out any collected sediment and water. Check that the filter is not clogged. Remove the diaphragm assembly and clean the parts and the air passage. Make sure the O ring and seat are clean and undamaged; if the O ring is prevented from seating properly or if it is damaged, gasoline flow will not stop when the engine is stopped, and may overflow from the carburetors. When replacing the diaphragm assembly, align the air vents as illustrated.



4) Assembly

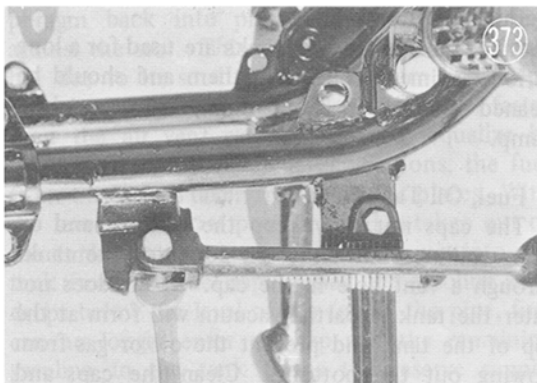
Assembly is in the reverse order of disassembly.

NOTE: Be sure there is no air leakage at the vacuum pipe connections, as this will stop gasoline from flowing.

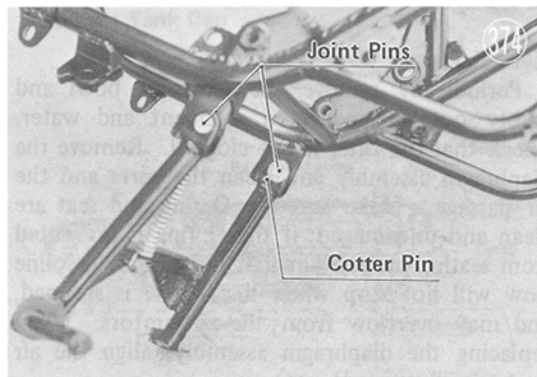
11. STANDS · FOOT RESTS

Disassembly

a. With the side stand kicked up, remove its mounting bolts, being careful not to damage the threads, and then remove the spring and stand.

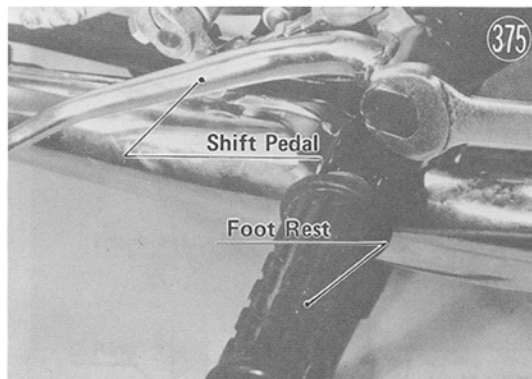


b. Take the spring off the center stand, pull out the cotter and joint pins, and remove the stand.



c. Footrests

All the footrests unbolt easily. The H2 front left footrest is taken off together with the shift pedal assembly.



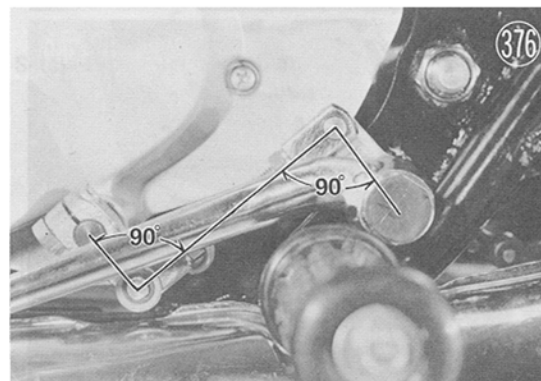
Inspection

Replace the side or center stand spring if it is stretched. If the springs do not keep the stands up properly, they may lower from vibration and cause an accident. Replace the footrest rubber if it is worn or chewed up.

Assembly

Assembly is in the reverse order of disassembly.

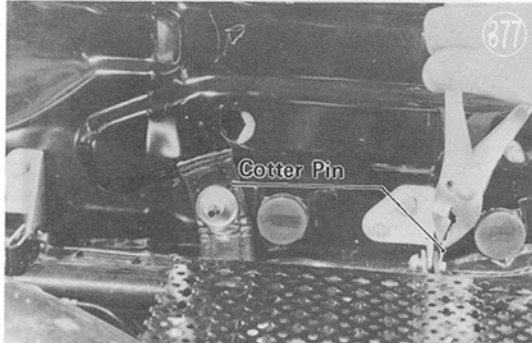
NOTE: When replacing the left front foot rest on the H2, see that the shift pedal links are at 90° angles, making any adjustment with the adjusting bolt.



12. SEAT

1) Construction

The dual seat is packed with sponge rubber for riding comfort. It is held in place by pins on one side, and a catch on the other.

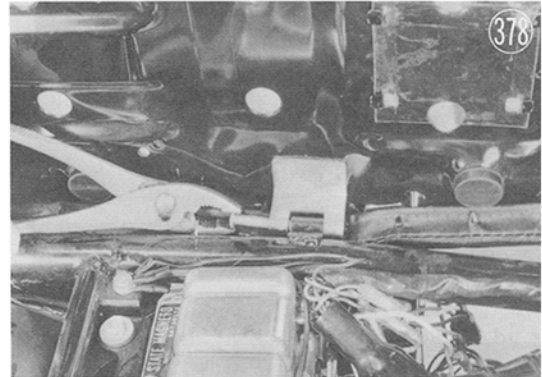


2) Removal

Remove the cotter pins and pull out the pivot pins.

3) Assembly

Assembly is in the reverse order of disassembly.



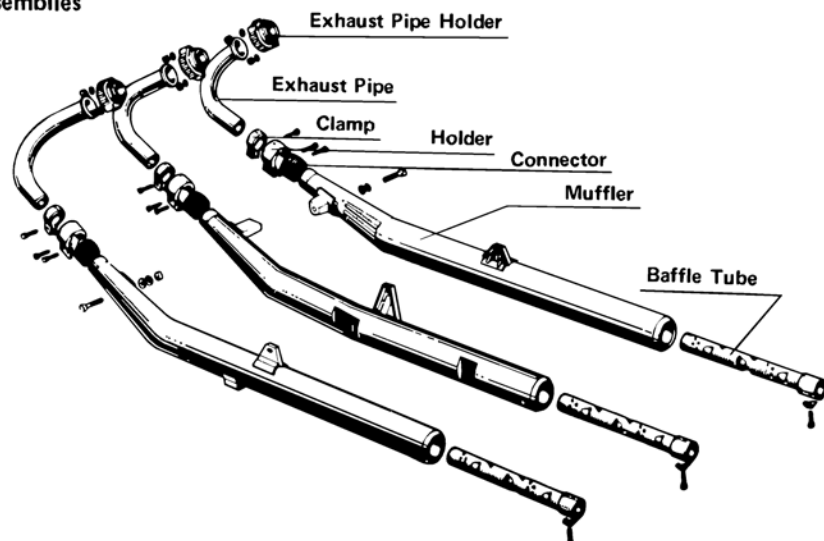
13. MUFFLERS · EXHAUST PIPES

1) Construction

The exhaust pipes conduct the exhaust gases from the engine to the muffler. Gas leakage is averted by a gasket mounting at the engine, and a heat-resistant rubber sleeve at the exhaust pipe/muffler connection. The mufflers, which are mounted by a bolt at the front end and by the foot rest stud at the rear, consist of an outer pipe with baffle plate projections inside, and a baffle tube inserted in and running most of the length

of the muffler. The exhaust gases from the engine are conducted to each muffler by the exhaust pipe. Inside the muffler the gas hits a baffle plate and enters the baffle tube through its many holes. When the gas strikes a baffle inside the tube, it exits into the muffler until it next hits one of the muffler baffles, then back into the baffle tube and so on until the gas reaches the muffler opening. During all this moving back and forth from baffle tube to each silencing chamber of the muffler, the gas is gradually expanding and the exhaust sound being muffled.

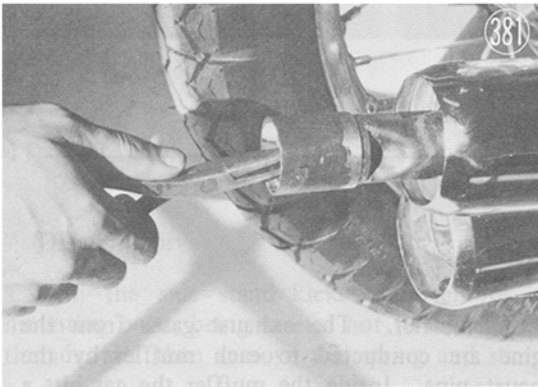
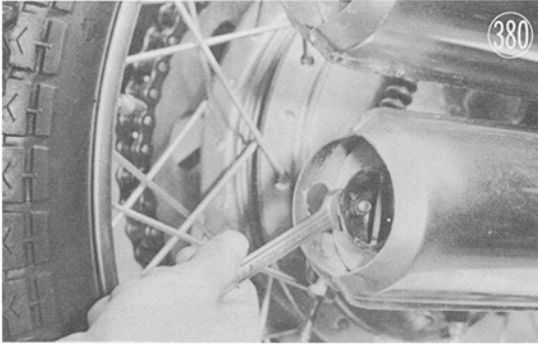
H Series Muffler Assemblies



2) Removal

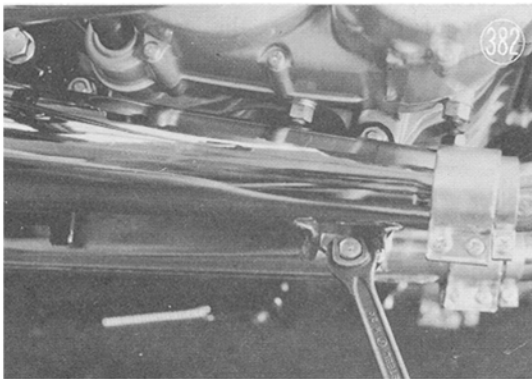
a. Baffle Tube

To remove the baffle tube for periodic cleaning, take out the mounting bolt inside the rear of the muffler and pull the tube out with pliers.



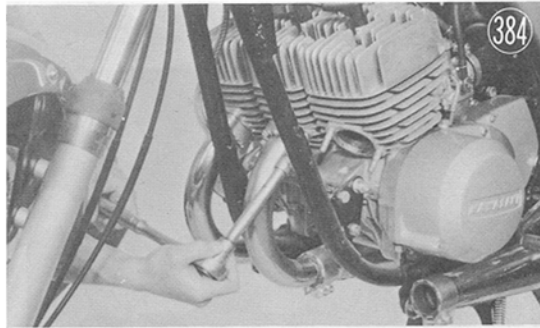
b. Muffler

To remove the muffler alone, loosen the clamp at the exhaust pipe connection, take out the front and rear mounting bolts (rear bolt is the foot rest), and remove the muffler.



c. Exhaust Pipe

To remove the exhaust pipe alone, first loosen the muffler mountings and the clamp at the muffler/pipe connection. Then remove the exhaust pipe mounting nuts and pull off the pipe.

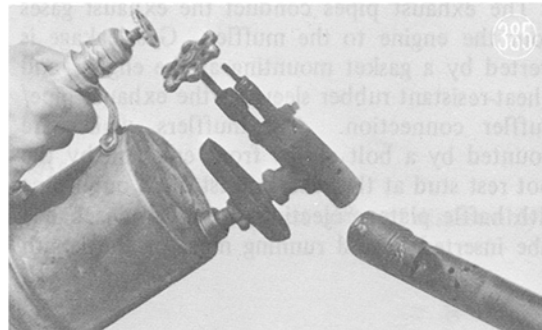


3) Inspection

a. Carbon build-up inside the exhaust pipe and muffler reduces exhaust efficiency and lowers engine output power.

(1) Remove carbon from the baffle tube with a wire brush. If the carbon is too thick to remove properly with the brush, burn it off with a torch or by setting the tube in a fire. After burning, the carbon will come off by striking the tube gently.

(2) To remove carbon from the exhaust pipe, use a long screwdriver to scrape it out, or run a chain through the pipe.



b. Check the rubber muffer connector sleeve and if it is hard, cracked or has deteriorated, replace it to avert exhaust leakage.

c. Replace the exhaust pipe if it is cracked, or if the surface that mounts to the cylinder is bent or damaged.

4) Assembly

Assembly is the reverse of disassembly.

NOTE: When the exhaust pipes are removed for inspection, repair, etc., it is recommended that the gasket at the cylinder end be replaced to prevent any possible exhaust gas leakage.