TOYOTA
REPAIR MANUAL

MODEL FJ

BRAKES

BRAKES

GENERAL

The Toyota Land Cruiser, in order to insure positive braking, is equipped with main brakes of the 4-wheel, internal expanding, hydraulic type, and parking brake of the external contracting, mechanical, propeller shaft type actuated by hand lever.

On the main brakes, the pressure exerted on the foot pedal is transmitted to the piston inside the master cylinder where it is transformed into hydraulic pressure of the brake fluid This is transmitted through the pipes to actuate the pistons inside the wheel cylinders equipped on the wheels. The pistons expand the brake shoes to contact the brake drums and through its frictional force perform the braking action. On the parking brake, the brake drum is equipped on the rear end of the transmission spline shaft and the brake band surrounding this drum is mechanically tightened by operating the hand lever, the action of which is transmitted through cam and links to effect the braking action

SPECIFICATIONS

Main Brakes

Type			4-wheel, internal expanding, hydraulic type
Master Cylinder	Bore		25 4 mm (1 inch)
Wheel Cylinder	Bore	Front	25 4 mm (1 inch)
		Rear	25 4 mm (1 inch)
Brake Drum Cylinder			304 8 mm (12 inches)
No. of Brake Shoes			2 on each wheel
Brake Lining	Width		44 5 mm (1 3/4 inch)
	Length		305 0 mm (12 008 inches)
	Thickness		4. 80 mm (3/16 inch)
Total Braking Surface			1085 cm² (Aluite)

Parking Brakes

Type		External contracting, mechanical type, propeller shaft brake
Brake Drum	Diameter	146 mm
Brake Lining	Width	45 mm
	Length	420 mm
	Thickness	5 mm
	Diameter	146 mm
Total Braking Surface		170. 1 cm²

MAIN BRAKE SYSTEM

FOOT BRAKES

On the main brakes or foot brakes, the master cylinder is bolted on to the pedal bracket on the upper part of the cowl The brake pedal is similar to the clutch pedal in that it is of the same pendant type being suspended in same manner from the cowl. The master cylinder is always kept full of brake fluid so that by shifting the piston through the foot pedal, a hydraulic pressure is built up inside the cylinder The master cylinder is connected to the wheel cylinders installed on the flange inside the brake drums with strong metallic tubings and flexible hoses The two pistons inside the wheel cylinder are made to shift outwards to expand the brake shoes and contact the inner surface of the brake drum

In operation, depressing the foot lever shifts the piston inside the master cylinder to build up hydraulic pressure. This pressure is transmitted equally and immediately to all the wheel cylinders through the tubings and flexible hoses, and through the expansion of the brake shoes, all wheels are equally braked. Increasing the pressure on the brake pedal increases the hydraulic pressure inside the wheel cylinders to give stronger braking action.

Releasing the foot pedal eliminates the hydraulic pressure inside the cylinders and the brake shoes are pulled back by the tension of the return springs to their former positions to release the braking action At the same time, the brake fluid returns back to the master cylinder through the brake tubings and flexible hoses.

FOOT BRAKE SPECIFICATIONS

Master Cylinder		
Master Cylinder Inside Diameter		25 4 mm (1 inch)
Master cylinder Return Spring		
	Free Length	94 mm
	Tensile Strength	9 5 mm deflection at 1 kg. load
Piston Clearance		0. 002 to 0 003 inch
Brake Fluid Capacity		0. 32 liter
Front and Rear Wheel Cylinder		
Wheel Cylinder Inside Diameter		25. 4 mm (1 inch)
Wheel Cylinder Return Spring		
	Free Length	58 mm
	Tensile Strength	0 7 kg (at 90 mm height)
Piston Clearance		0. 002 to 0 003 inch
Brake Shoe Retracting Spring		
	Installed Length	175 mm
	Installed Load	20 kg (at 17 mm deflection)

Brake Lining	
Material	Semi-mold
Length	305 mm
Width	44.5 mm
Thickness	4.8 mm
Depth of Rivet Holes	3 mm
Rivet	
Material	Brass
Diameter	4.8 mm
Length	8 mm
Diameter of Rivet Head	9 mm
Thickness of Rivet Head	1.5 mm

MASTER CYLINDER

A. Construction and Operation

The master cylinder is of special cast iron, the master cylinder body and the supply tank above being made as one casting. The supply tank is always kept 3/5 full of brake fluid. The cylinder part and the supply tank are connected together through the inlet port and the compensating port, these ports serving the following two functions. The first is to maintain a constant amount of brake fluid in the system regardless of any contraction or expansion caused by temperature changes. The second is to perform as a pump during bleeding operations.

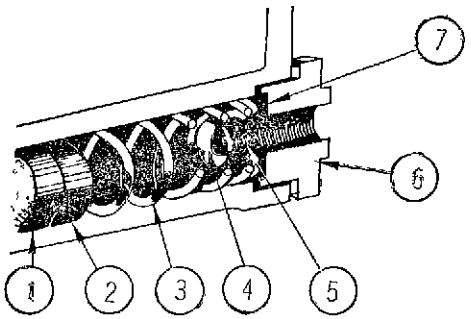
In addition to the cylinder main body, the master cylinder comprises of the valve assembly, return spring, piston cup, piston, push rod, and rubber boot. The valve assembly together with the return spring, piston cup, and piston are inside the cylinder and held together with piston stop and lock wire. The valve is pressed against the cylinder valve by the return spring. The piston is of aluminum alloy and is provided with 6 small holes in the head and an external tooth lock washer shaped piston cup spacer rivetted on to the center of the head. The teeth on this spacer is shaped to fit over the 6 holes in the head.

One end of the piston rod fits into the piston and the other end links on to the brake pedal through the brake push rod. The piston rod is covered with a bellow-like rubber boot to prevent dust and dirt from entering the master cylinder.

In operation, depressing the brake pedal pushes the piston inside the master cylinder forward. When the piston moves beyond the return port, the brake fluid inside the master cylinder being subjected to compression pushes open the valve to flow under pressure through the brake tubings and flexible hoses to the wheel cylinders on all four front and rear wheels. This pushes out the pistons on the wheel cylinders to expand the brake shoes and give a strong braking action to the brake drums. When the brake padal is released, the pressure on all pistons

are also released and the master cylinder piston is pulled back by the return spring At the same time, the brake shoes are pulled back by the retracting spring and presses the pistons inside the wheel cylnders inwards so that the brake fluid inside these cylinders flow back to the master cylinder through the brake tubings and flexible hoses. Since there is a small delay in the brake fluid returning back to the master cylinder, there is a negative pressure built up on the front side of the piston in the master cylinder which prevents the piston to return back quickly to its former position However, the fluid which entered the back side of the piston through the inlet port now passes through the six small holes in the piston head and around the rim of the piston cup into the front side of the cylinder to eliminate this negative pressure and allow the piston to return back quickly After the piston cup passes the compensating port, any surplus fluid which enters the cylinder passes through this port into the supply tank

Master Cylinder Outlet Valve

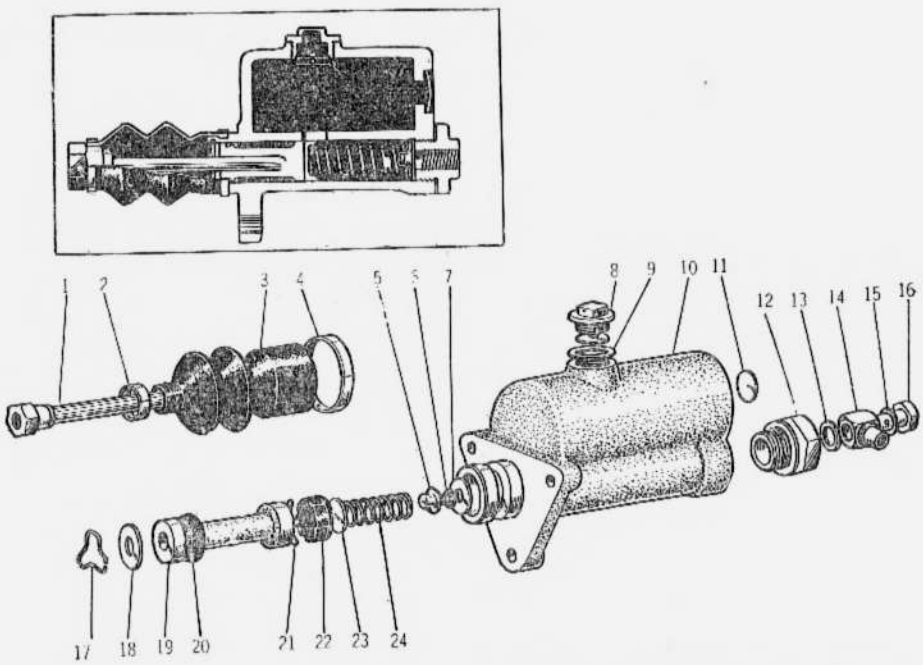


① *Piston*
② *Piston Cup*
③ *Return Spring*
④ *Outlet Valve Seat*
⑤ *Outlet Valve*
⑥ *Tube Connection*
⑦ *Valve Seat Packing*

In the above manner, a constant amount of brake fluid is maintained in the system to assure positive action and also can be made to serve as a pump when bleeding air out from the system.

It should be noted that when brake pedel is depressed quickly, the brake pedal play will be increased and at the same time, the brakes will act more effectively.

Master Cylinder



① *Piston Rod*
② *Boot Snap Ring (Small)*
③ *Boot*
④ *Boot Snap Ring (Large)*
⑤ *Outlet Valve Seat*
⑥ *Outlet Valve*
⑦ *Valve Seat Packing*
⑧ *Cap*
⑨ *Cap Packing*
⑩ *Master Cylinder*
⑪ *Plate Plug*
⑫ *Plug*
⑬ *Union Bolt Packing*
⑭ *Tube Connection*
⑮ *Union Bolt Seat Packing*
⑯ *Stop Switch Screw*
⑰ *Piston Stop Ring*
⑱ *Piston Stop*
⑲ *Piston*
⑳ *Piston Packing*
㉑ *Piston Cup Spacer*
㉒ *Piston Cup*
㉓ *Return Spring Seat*
㉔ *Return Spring*

B. Overhauling Master Cylinder

The following procedures should be observed in overhauling the master cylinder.

a. Disassembling Procedure

1. Remove master cylinder cap and drain out brake fluid.

2. Remove master cylinder boots. By removing the snap rings, the boots will come off together with the piston rod.

3. Remove piston stop ring by prying off with screwdriver. Then by taking off piston stopper, the piston cup will be forced out by the spring inside the cylinder

4 Remove rubber outlet valve seat packing by unscrewing plug on outlet side

5 If the piston packing at the base of the piston is to be replaced, it can be removed by prying off with a screwdriver

This completes the disassembly of the master cylinder. The parts are then washed taking care to observe the following precautions.

1 Alcohol or other liquids of similar nature should always be used in washing the parts Gasoline or light oils of mineral origin should never be used as they will deteriorate the rubber parts. If alcohol is not available, wash the parts with soap and water taking care to rinse thoroughly with clean water

2 Special care should be taken to clean the compensating and inlet ports in the master cylinder.

3 It will be found convenient if the old brake fluid is saved for washing parts

b Inspecting Parts

After the parts have been thoroughly cleaned, all parts should be carefully inspected in accordance with the following procedure

1 Check for amount of wear in master cylinder bore Also check to see that the compensating port is not plugged.

Master cylinder bore . . . 1 inch

If found worn over 0 003 inch, replace with new part.

2. Check to see if the master cylinder piston cup, piston packing, valve seat packing and other rubber parts are not damaged or deteriorated. If found defective, replace with new parts

3 Check clearance between master cylinder and piston.

Proper clearance 0 002 to 0.003 inch

4 Check strength of master cylinder return spring.

If found weakened, it is necessary that it be replaced

Return spring free height 94 mm

deflection 9.5 mm at 1 kg load

c. Reassembly Precautions

1 Soak piston, piston cup, valve, and other parts in brake fluid before inserting into master cylinder

2. Do not damage the piston packing be forcing or straining when inserting into master cylinder.

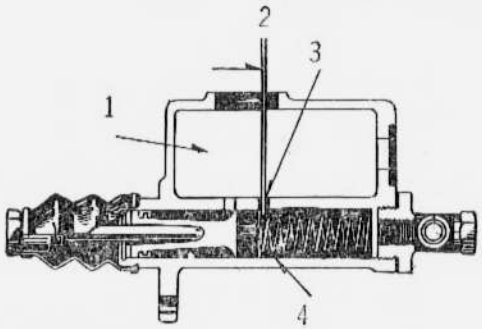
3. Be careful to place the bleeder port downwards when installing rubber boot.

d. Inspection after Reassembly

After assembly is completed, check to see if the piston cup is not obstructing the compensating port when the piston is at its full return position by inserting a

wire through the port. If found obstructed, check to see if correctly assembled, or if the piston cup or spring is defective.

Checking Compensating Port

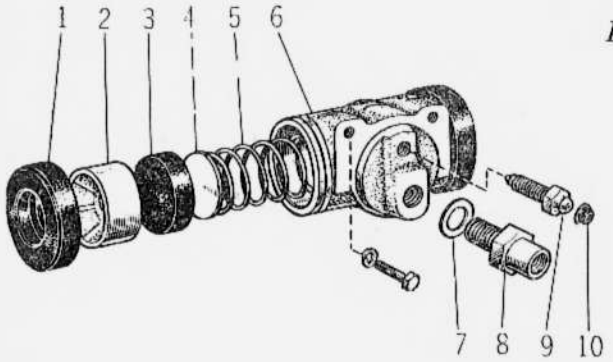


① *Supply Tank*
② *Wire*
③ *Compensating Port*
④ *Cylinder*

WHEEL CYLINDER

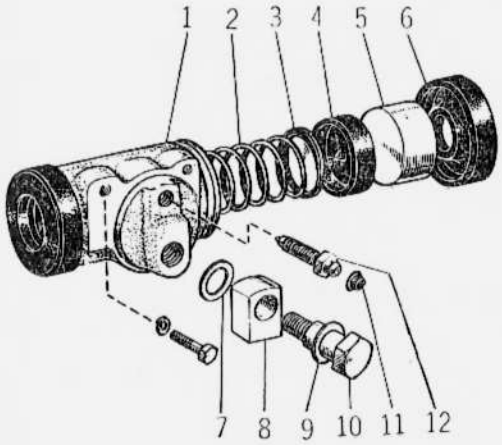
A. Construction and Operation

The wheel cylinders are installed on all wheels at the upper part of brake flange plate and are connected to the brake line through a union equipped with a bleeder valve.



Front Wheel Cylinder

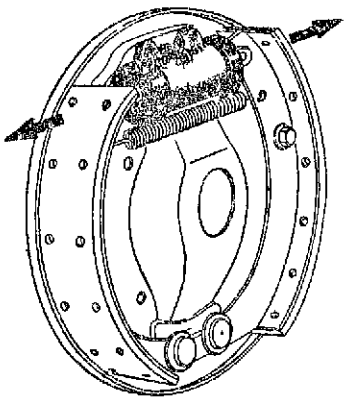
① *Cylinder Cover*
② *Piston*
③ *Piston Cup*
④ *Spring Seat*
⑤ *Spring*
⑥ *Wheel Cylinder*
⑦ *Seat Packing*
⑧ *Cylinder Joint*
⑨ *Bleeder Plug*
⑩ *Rubber Cap*



Rear Wheel Cylinder

① *Wheel Cylinder*
② *Cylinder Spring*
③ *Spring Seat*
④ *Piston Cup*
⑤ *Piston*
⑥ *Cylinder Cover*
⑦ *Seat Packing*
⑧ *Cylinder Union*
⑨ *Seat Packing*
⑩ *Union Bolt*
⑪ *Rubber Cap*
⑫ *Bleeder Plug*

The inner construction comprises of a spring with rubber piston cup and aluminum alloy piston placed on each side Both ends of the cylinder are covered with rubber boots to prevent sand and dirt from entering cylinder



Operation of Wheel Cylinder

When the brake pedal is depressed, the brake fluid inside the master cylinder being subjected to compression flows out through the brake lines into each wheel cylinder through the inlet ports. The pistons inside the wheel cylinders are pushed outward to expand the brake shoes through the push rods The brake lining riveted on to the outer surface of the brake shoe pushes against the frictional surface of the brake drum to produce a strong braking action

When the brake pedal is released, the hydraulic pressure in the brake line is also released and at the same time, the retracting spring on the brake shoes pulls these shoes back inward to release the braking action on the wheel The brake fluid inside the wheel cylinders then flows out through the inlet ports back to the master cylinder through the brake lines.

B. Overhauling Wheel Cylinder

a Removing and disassembling

The following procedure should be followed in removing and disassembling the wheel cylinders for inspection and repairs.

1 Jack up the chassis and remove brake drum together with the wheel.

2 Remove brake shoe return spring and disconnect brake fluid pipe at union.

3 Unscrew 2 mounting bolts from wheel cylinder and remove from flange plate.

4 Remove wheel cylinder boots and take out pistons, piston cups, and spring from inside the cylinder

This completes the disassembly of the wheel cylinder. The parts are then washed in the same manner as for master cylinder

b Inspecting parts

After parts are washed, inspect in accordance with the following procedure.

1. Check for amount of wear in wheel cylinder bore

   Wheel cylinder bore . 1 inch

2. Check clearance between wheel cylinder and piston.

   Proper clearance . . 0 002 to 0 003 inch

3. If piston cup is found damaged or distorted, replace with new part.

4 Check for strength of wheel cylinder spring

   Replace if found weakened

c Reassembly Precautions

1 Soak piston, piston cup, cylinder, and other parts in brake fluid before reassembling

2 Take care not to reverse position of piston and piston cups when placing into cylinder.

3 After making sure that the wheel cylinders are installed securely, bleed air out from cylinders and brake lines

BRAKE DRUM

The brake drum consists of the cast iron drum part and the pressed sheet steel plate part, both parts being welded together around the rim to form a single body. The front wheel brake drum is held between the front axle hub flange and front brake drum strap and these three parts are tightly fixed with the serrated part of the axle hub bolts. The following procedure is used to remove the front wheel brake drum.

1 Jack up front axle and remove front wheels.

2 Pry off front drive shaft flange cap with screwdriver and unscrew front drive shaft flange mounting bolts to remove flange

3 Remove front wheel adjusting nut, lock washer, and nut washer and pull out front wheel bearing

4. Then hold brake drum with both hands and pull out backwards to remove drum together with the hub

5 To remove drum from hub, knock out the 6 hub bolts but care should be taken not to damage the threaded parts.

The rear wheel brake drum fastens on to the 6 hub bolts fixed on the flanged part of the rear axle shaft and is fixed with 2 set screws so that the drum turns together with the rear axle.

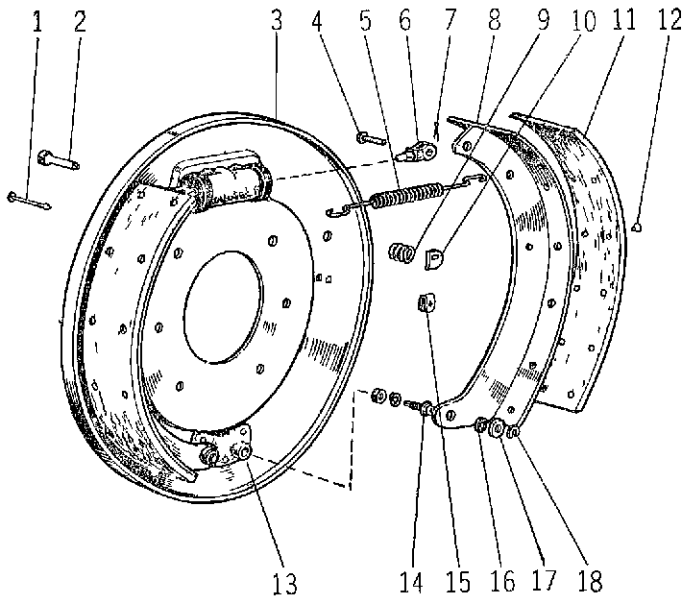
To remove this drum, jack up the rear axle and remove wheel. Then by unscrewing the 2 set screws, the drum only can be removed

The inner surface of the brake drum is an exceedingly important part since it is subjected to tremendous frictional forces every time the brake is applied so that it is necessary that it be inspected whenever possible. If the frictional surface is found worn unevenly, scored through burning, or deformed, it should be repaired immediately by machining on a lathe but if it should become too thin, it should be replaced

BRAKE SHOE

The brake shoe consists of the plate part and the flange part welded together to form one body, and a lining riveted on to the outer surface of the flange part. The lower ends of both left and right shoes pivot on the adjusting pins on the

Brake Shoes



① *Shock Stop Pin*
② *Adjusting Cam Shaft*
③ *Brake Flange*
④ *Rod Pin*
◯ *Return Spring*
⑥ *Cylinder Rod*
⑦ *Cotter Pin*
⑧ *Brake Shoe*
⑨ *Adjusting Cam Spring*
⑩ *Adjusting Cam*
⑪ *Brake Lining*
⑫ *Lining Rivet*
⑬ *Adjusting Pin Bearing*
⑭ *Adjusting Pin*
⑮ *Brake Shoe Supporter*
⑯ *Adjusting Pin Felt*
⑰ *Adjusting Pin Retainer*
⑱ *"C" Washer*

flange plate and are fixed with C washers This adjusting pin is formed as an eccentric cam and serves to adjust lower pivot point of the shoes when adjusting drum to lining clearance.

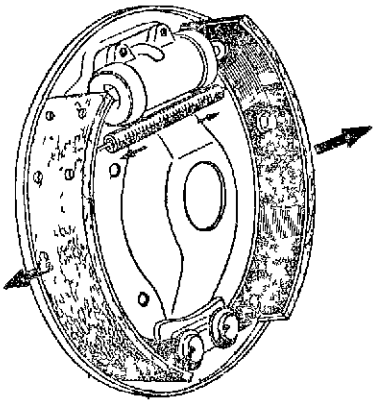
The upper end of the shoe connects on to the cylinder rod through the rod pin The end of this rod fits into the hollow part of the outer side of the piston inside the wheel cylinder Both shoes are pulled inwards by the retracting spring

When the hydraulic pressure inside the wheel cylinder rises, the pistons are pushed outwards and both shoes overcome the tension of the retracting spring to spread outwards and exert a tremendous braking force between the linings and the drum When the hydraulic force inside the cylinder is released, the shoes are pulled back by the retracting spring to return immediately back to their former

positions and release the braking action Eccentric adjusting cams are provided on the upper inner side of both shoes and contact the inner part of the shoe flange to serve in adjusting the opening of the upper parts of the shoes

In addition, shock pins with springs are provid ed at the center part of both shoes to support the shoes on the flange plate

When the lining on the outer surface of the shoe becomes worn and necessitates replacement, the shoes are dismantled by the following pro cedure

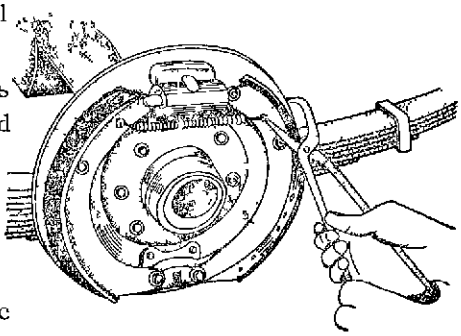


Operation of Brake Shoe

1 Remove retracting spring with special pliers

2 Hold end of shock stop pin with pliers and holding upper seat, turn 90 degrees and this part will come off easily

3 Unloosen nut fixing adjusting pin a lower part and by removing C washer, th shoe can be removed from the flange plate.



Removing Retracting Pin

4. When brake shoes are removed, take care not to step on the brake pedal This will push out the piston inside the wheel cylinder and cause the brake fluid to shoot out.

5 Check brake shoe retracting spring for tension and is found weak, replace with new spring

6. If the shoe is found to protude at the center part so that the shoe forms a larger arc, the shoe itself should be corrected before relining.

To assemble, follow the above procedure in reverse order.

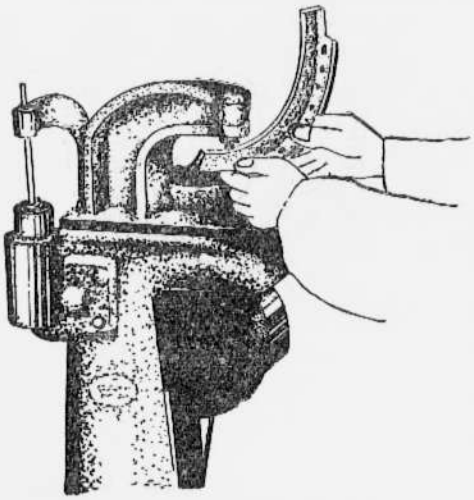
RELINING BRAKE SHOES

When the brake lining becomes worn or burned so that its rivets are rubbing against the brake drum or if the lining slips and fails to give proper braking action, the lining must be replaced

To reline, knock off the old rivets completely using a chisel and clean the flange part of the shoes thoroughly Place the new lining properly against the outer surface of the shoe and drill a hole through the lining from the inner surface of the shoe using the center hole as drill guide Countersink this hole from the outside to a depth of about 2 mm Insert proper size rivet into this hole and rivet tightly on riveting machine Then pressing the lining tightly against the

shoe, drill and rivet outwards alternately toward the ends.

After the rivets are installed, careful check should be made to see that none of the rivet heads are protuding and that the lining is uniformally and tightly on the shoe. Also its contact with the inner surface of the drum should be checked by making the following test.



Brake Shoe Riveting Stand

Rub chalk against the inner surface of the drum and press the shoe tightly against drum rotating the shoe. From the chalk adhering to the lining, its contacting condition can be determined. If found uneven, dress down the lining with a rough file or rasp.

In relining the brake shoes, the following precautione should be observed

1. Proper riveting

The rivet heads should not protude above the surface of the lining as this will cause damage to the brake drum. The rivets should be installed tightly as loose rivets will eventually break off.

2. Deformation of brake shoe

The brake shoes tend to deform easily due to rotational effect of the brake drum so that before relining, the brake shoes should be checked for deformation.

3. Checking brake drum

If the drum is worn and ridged, scored, or deformed, it will cause excessive wear in the linings so that the drum should be carefully checked. Corrections can be made by machining on a lathe but if the drum should become too thin, it should be replaced.

AIR BLEEDING BRAKE LINE

When air gets into the brake lines of the hydraulic brakes, the hydraulic pressure will not be transmitted uniformally and the pressure will be decreased considerably to seriously affect the braking action. If the main brake lines are removed from the master cylinder or if the brake fluid is changed, the air in the main brake line should always be removed through the bleeder valves in each wheel cylinder. When any wheel cylinder is removed, it will only be necessary to bleed the air out from that particular cylinder but in this case, it is preferable to also bleed all the wheel cylinders. Air bleeding is also performed when the brake pedal play becomes too small.

Air bleeding from the wheel cylinder is performed in accordance with the

following procedure

1 Remove cap screw from bleeder valve and screw on bleeder wrench with hose attached Insert lower end of hose in bottle full of brake fluid

2 Unscrew bleeder valve on wheel cylinder back 1/2 to 1 turn

3. Depress and release brake pedal carefully several times This forces the air contained in the brake line out through the hose into the bottle so that this action is continued until the bubbles cease to appear in the bottle Meanwhile, keep adding new brake fluid into the supply tank in master cylinder to keep it constantly half full

4 When the air is completely removed, close the bleeder valve tightly after which remove bleeder wrench and install cap screw.

5 In this air bleeding operation, begin from the wheel cylinder furthest away from the master cylinder in the following order · left rear, right rear, left front, and right front.

- *NOTE*—

1 In operating the brake pedal during air bleeding, special care should be taken to release the brake pedal slowly Failure to observe this will result in the air being sucked back into the brake lines through the bleeder hose

2 Care should be taken to see that the lower end of the bleeder hose is always submerged in the brake fluid The brake fluid discharged in the bottle must never be used to replenish the supply tank in master cylinder

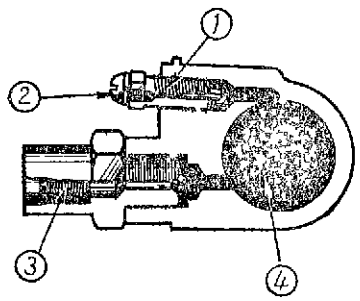
3. After completing air bleeding operation, the supply tank in master cylinder should be filled about 3/4 full with new brake fluid

REMARKS—If the bleeder wrench is not available for air bleeding operation, the following method can be used

1. Remove bleeder valve cap screw.

2 Depress the brake pedal several times until considerable resistance is felt at which time, loosen the bleeder valve and allow the air bubbles together with the brake fluid to discharge out from the wheel cylinder after which tighten the bleeder valve and release brake pedal.

3 Repeat the above operation several times until the air bubbles cease to come out with the brake fluid During this operation, the supply tank in master cylinder should be continually replenished and the operation should be performed from the wheel cylinder furthest away from the master cylinder as previously described.



Bleeder Valve

① *Bleeder Valve*
② *Cap Screw*
③ *Brake Hose Connector*
④ *Wheel Cylinder*

ADJUSTING BRAKES

The procedures outlined below covers the disassembly, adjustment, and inspection of the entire hydraulic brake system

A. Check-up Before Adjusting Brakes

1 Perform brake test to determine external brake defects.

2 Jack-up all 4 wheels and check and adjust wheel bearings for wear and looseness

3 Check fluid level in master cylinder supply tank together with condition of brake pedal play

B. Brake Pedal Play

The brake pedal play is the amount the piston cup travels inside the master cylinder before it closes the compensating port and this distance is equivalent to about 13 7 mm at the end of the pedal

Adjustment for pedal play is made as follows

1. Remove connection between pedal and push rod

2 Pull out push rod and insert wire through master cylinder cap part into compensating port to check if the piston cup is not blocking the port If found blocked, the master cylinder should be disassembled and inspected

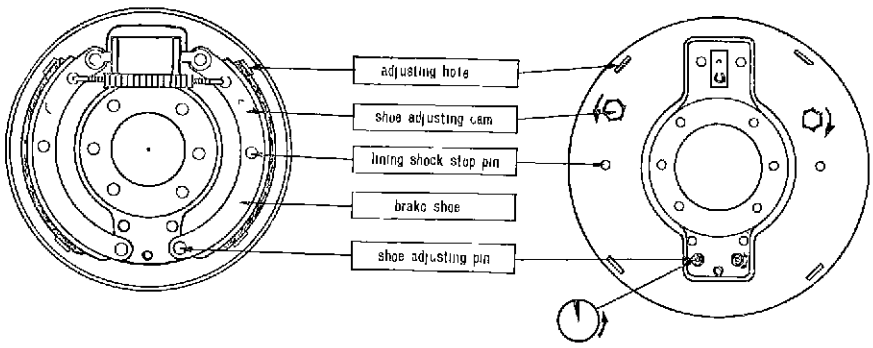
3. Care should be taken not to make the length of the push rod too long in order to increase pedal play as this may result in blocking the return port

4. After the link mechanism is connected up, the connection between the push rod and piston rod is adjusted through the adjusting nut to make the pedal play about 13.7 mm, that is, the amount necessary before the piston in the master cylinder actually begins toactuate.

C. Check All Parts of Brake Line for Brake Fluid Leakage, and Bleed Air

1 With brake pedal depressed hard, the entire brake line is carefully checked for brake fluid leakage.

2 The air is bled out from the entire system by the methods previously described



—*NOTE*—Arrow indicates opening direction of shoe

Brake Shoe Adjustment

D. Adjusting Brake Shoe Clearance

The clearance between the brake shoes and drum is adjusted by means of the adjusting cams at the upper part of the shoes and the adjusting pins at the lower ends of the shoes 4 inspection holes are provided in the flange plate and 1 hole in the drum Feeler gauge (0 008 inch) is inserted through these holes and adjustments made around the entire shoe The adjustments are made as follows

1. Feeler gauge is inserted through the upper inspection hole and adjustments made with the adjusting cam using a brake adjusting wrench for the purpose

2. The feeler gauge is then inserted through the lower inspection hole and using 2 wrenches to loosen the locknut on adjusting pin, the pin is turned slightly to obtain the desired clearance When adjustment is completed, the locknut is securely tightened taking care not to disturb the position of the pin

3 The feeler gauge is again inserted through the upper inspection hole to readjust the clearance at the upper part

4 The same procedure is followed to adjust the shoes on the left and right sides However, the clearance at the lower part is made slightly narrower than that of the upper part.

5 When this adjustment is completed, the wheel is removed and the gauge inserted through the inspection hole in the brake drum side Then while turning the drum, the clearance around the entire circumfereuce is checked to complete the adjustment of the brakes

E. Brake Test

The wheels are then installed and after lowering the vehicle, the brakes are tested by running on level road To test if the brakes are actuating properly on all four wheels, the vehicle is braked several times and its tire marks carefully measured.

If the tire drags or the brakes are operating only on one side, the defective brake should be immediately readjusted until all four wheels are braking properly.

This completes the adjustment of the brakes but for safety, the entire brake system should be checked again to see that there is no brake fluid leakage or other defects

—CAUTION—

It should be noted that tire inflation and the amount of wear in tires have considerable effect on the braking action of the wheels.

COMMON CAUSES OF TROUBLES IN FOOT BRAKES

A. Brake Pedal Strikes Against Toeboard

1. Too large a clearance in brake shoe due to badly worn linings.
2 Brake fluid is leaking

3. Large amount of air mixed inside brake lines
4 Lack of brake fluid inside master cylinder supply tank
5. Piston cup inside master cylinder is deformed

B. Brakes Drag on All Four Wheels

1. Return port in master cylinder is plugged.
2 Piston inside master cylinder is rusted and fails to slide smoothly
3 Defective brake fluid used or mineral oil is mixed with brake fluid

C. Brake Drags on One Wheel

1 Brake shoe retracting spring is weakened
2 Brake shoe clearance is too small
3 Brake line is plugged
4 Piston or piston cup inside wheel cylinder is defective and fails to slide smoothly

D. Brakes Act on One Side Only

1 Relative position between brake shoe and drum is incorrect
2 Oil adhering on lining and inner surface of drum
3 Lining or drum is defomed
4 Tire inflation is not uniform between left and right sides

E. Brake Pedal Becomes Springy

1 Brake shoes are not correctly adjusted
2 Air contained inside brake lines

F. Brakes Difficult to Apply Requiring Large Force to Depress Brake Pedal

1. Clearance in brake shoe not correctly adjusted
2. Defective material used on brake lining
3 Grease or other matter adhering to lining and inside surface of brake drum

G. Brakes Screech

1. Flange plate is bent or brake shoe is distorted
2. Lining is worn out so that rivet heads are protuding.
3. Brake shoes retract poorly.
4 Poor grade of lining is used

BRAKE FLUID

The grade of brake fluid used greatly affects the performance of the hydraulic foot brakes Since the majority of the troubles arising in the hydraulic brakes are due to using defective brake fluid, special care should be exercised in its selection The properties which the brake fluid should possess are as follows.

1. Should be chemically stable and not change with time.
2. Should not corrode or affect rubber and metallic parts.

3 Should not evaporate readily and have low freezing point

4 Viscosity should remain fairly constant and not be affected by temperature changes

5. Should properly lubricate all moving parts regardless of temperature changes

6 Should be easily available and low in cost

The brake fluid capacity in the Toyota Land Cruiser is 0 32 liter and the recommended amount of fluid in the master cylinder supply tank is over 3/4 full Lack of brake fluid will cause air to get into the brake lines so that its amount should be checked every 2,000 kms and replenished as found necessary. (Brake fluid should be replaced about every 5,000 kms).

PARKING BRAKE SYSTEM

HAND BRAKE

On the Toyota Land Cruiser, the parking brake or, the hand brake or center brake as it is otherwise called, consists of a brake drum installed on the end of the transmission spline shaft with a brake band enclosing this drum By operating the hand lever, this band is tightened against the drum mechanically to brake the rotating motion of the propeller shaft

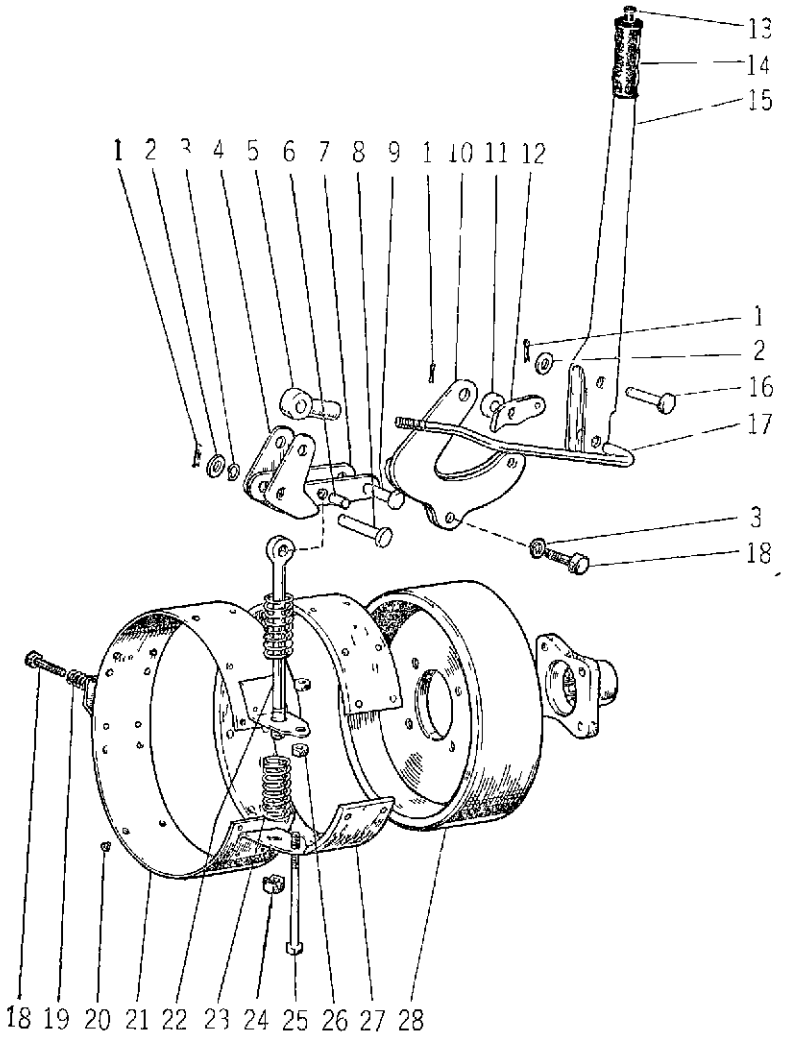
The brake drum with a machined outer surface is installed between propeller shaft front joint yoke and front joint yoke retainer attached to rear end of transmission spline shaft. The brake shoe assembly with the brake lining riveted on the inner surface encloses the brake drum. The ends of the brake shoe are held together with shoe rod containing 2 adjusting springs and is supported on the shoe bracket part provided on the retainer at rear end of transmission

The hand brake lever is attached to the outer side of the transmission case through its lever sector part The lower end of this lever links on to the shoe through the pull rod and the cam part which tightens the shoe

When the hand lever is pulled back, the brake cam is actuated through the links to contract the brake shoe strongly against the brake drum to produce braking action against the rotation of the propeller shaft In this operation, the hand lever through the action of the ratchet on this lever becomes fixed through resisting the forces of the shoe adjusting springs so that when the hand is released, the braking effect still remains to serve the purposes of the parking brake.

When the hand lever is pulled back and the knob on the top end of the lever is pushed in with the thumb, the mesh at the ratchet part is released so that by pushing the lever forward, the cam returns to its former position and the shoe releases the braking action through the forces of the springs.

Hand Brake



① *Cotter Pin*
② *Plate Washer*
③ *Spring Washer*
④ *Transmission Brake Cam*
⑤ *Adjusting Link*
⑥ *Shoe Rod Pin*
⑦ *Cam Retainer*
⑧ *Cam Pin*
⑨ *Cam Retainer Pin*
⑩ *Lever Sector*
⑪ *Pawl Spacer*
⑫ *Lever Pawl*
⑬ *Rod Knob*
⑭ *Lever Knob*
⑮ *Hand Brake Lever*
⑯ *Lever Pin*
⑰ *Pull Rod*
⑱ *Bolt*
⑲ *Lug Spring*
⑳ *Lining Rivet*
㉑ *Brake Shoe*
㉒ *Shoe Rod*
㉓ *Adjusting Spring*
㉔ *Adjusting Nut*
㉕ *Bolt*
㉖ *Nut*
㉗ *Brake Lining*
㉘ *Center Brake Drum*

HAND BRAKE SPECIFICATIONS

Hand Brake Lining	
Material	Woven Lining
Width	45 mm
Thickness	5 mm
Length	420 mm
Depth of Rivet Hole	3 mm
Hand Brake Lining Rivets	
Material	Brass
Diameter	4 8 mm
Length	8 mm
Head Diameter	9 mm
Head Thickness	1 5 mm

OVERHAULING HAND BRAKE

If the hand brake becomes defective due to worn or glazed lining, worn brake cam, broken springs, or other troubles, the disassembly for repairs and replacements is made by the following procedure

1 Disconnect hand brake pull rod from brake cam

Since all connecting parts are made with pin and fastened with cotter pin, the parts can be removed easily by pulling out the cotter pins.

2 Unscrew 4 bolts mounting brake drum to front universal joint yoke. Pull out joint assembly and drop propeller shaft

3 Remove brake shoe adjusting screws from both sides

4 Remove adjusting nut from bottom end of brake adjusting rod and pull out rod together with cams At same time, remove the 2 adjusting springs.

5 The brake shoe assembly together with the drum can now be removed from the transmission

6 The hand brake lever assembly can be removed by unscrewing the 2 bolts on the side of the transmission case

A. Relining Hand Brake

When the brake lining becomes worn so that the rivet heads are scraping against the drum, or when it becomes glazed and fails to give proper braking action, the brake lining should be replaced When relining, the same procedure as for the wheel brakes are followed The rivets are knocked off the old lining, the shoe cleaned, and the new lining riveted on with riveting machine

B. Adjusting Hand Brake

The hand brake adjustment consists of adjusting the clearance between the lining and drum and adjusting the action of the cams. This is effected through the

adjusting screw on the left and right sides and the adjusting nut at the bottom end adjusting rod

The adjustment is made as follows.

1 The clearance between the drum and lining is adjusted to 0 032 inch (0 8 mm) through the adjusting screw on the brake shoe lug at the opposite side of the brake lever

This adjusting screw is fixed with lock wire so that when adjustment is completed, make sure to fix this screw with the lock wire

2 The clearance between the lower face of drum and lining is next adjusted to the same value as above through the adjusting nuts on the adjusting bolt at the side of the adjusting rod

These adjusting nuts are on the upper and lower surfaces of the braket so that when adjustment is completed, the nuts should be tightened against each other

3 Finally, the clearance between the upper face of drum and lining is adjusted through the abjusting nut at the bottom end of the adjusting rod

This nut is hollowed at the contacting face to prevent turning so that determinations should be made at its lowest position.

4 All the above adjustments are made using a thickness gauge 0 032 inch (0.8 mm)

If after completing the above adjustments and the brake is still found to be ineffective, the length of the pull rod is varied to give more cam effect and the clearances at the upper and lower faces of the readjusted

After completing the adjustment, all frictional parts of the links are lubricated with engine oil

TOYOTA MOTOR SALES CO., LTD.