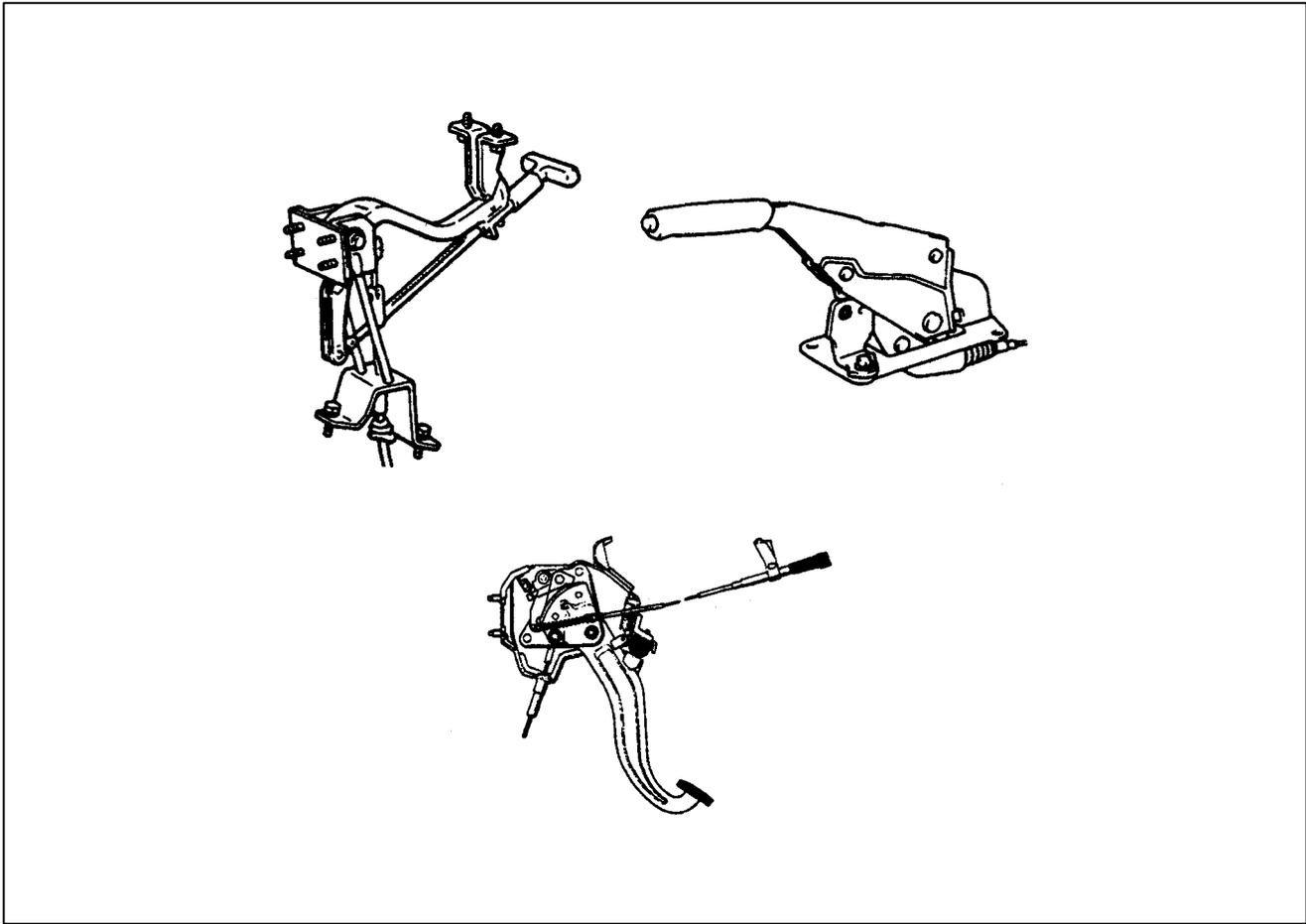


PARKING BRAKE



- Lesson Objectives**
1. Describe the purpose of the parking brake system.
 2. Explain the clutch spring and sleeve nut function in maintaining the adjustment of the caliper parking brake.
 3. Describe the procedure to reseal the piston of the caliper parking brake during pad replacement.
 4. Explain the operation of the exclusive parking brake assembly.

Parking Brake Mechanisms

The parking brake system is a secondary braking system used to hold a parked car in position. They are applied independently of the service brakes. Since there is no inertia to overcome, less braking power is required to hold the vehicle stationary and less force is required to apply. The application of only two of the four brake assemblies are required to hold the vehicle.

There are three styles of rear parking brake systems. Two types use the service brake and the other is an exclusive parking brake design. The service type parking brake uses part of the ordinary service brake mechanism and operates the shoe or piston mechanically.

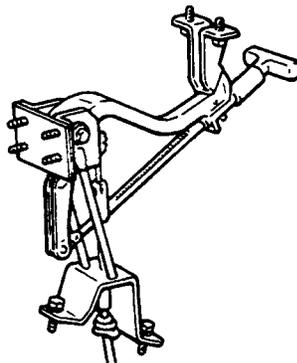
The parking brake lever is located near the driver's seat. Pulling the parking brake lever by hand or pressing the pedal with the foot, operates the brake via a cable connected to the parking brake lever of the brake assembly.

There are a number of different types of parking brake levers, as shown below. Application depends upon the design of the driver's seat and the desired operating effort.

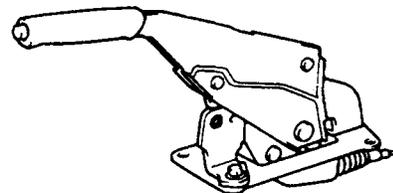
The parking brake lever is provided with a ratchet locking mechanism to maintain the lever at the position to which it was set, until released. Some parking levers have an adjusting screw near the brake lever so the amount of brake lever travel can be easily adjusted. Travel is determined by the number of clicks of the ratchet mechanism found in the Repair Manual.

Parking Brake Levers

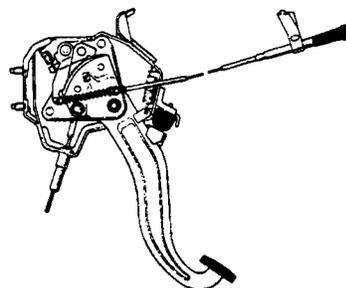
A ratchet locking mechanism holds the lever in position when set.



Stick Type



Center Lever Type



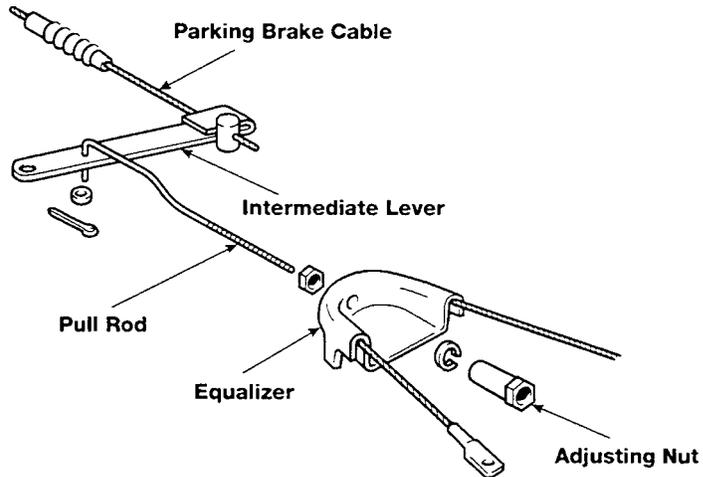
Pedal Type

Parking Brake Linkage

The parking brake cable transmits the lever movement through a typical series of components, as shown below, to the brake drum subassembly. The Intermediate Lever multiplies the operating force to the Equalizer. The Equalizer divides the lever operating force to brake assemblies at both wheels. The two major parts may vary in design however, their function remains the same.

Linkage Components

The intermediate lever multiplies the operating force to the equalizer. The equalizer divides the force to brake assemblies at both wheels.

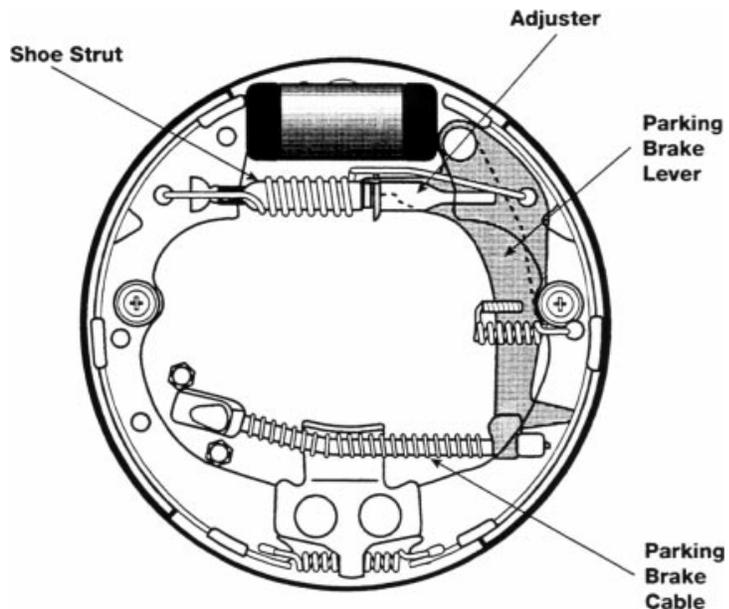


Drum Parking Brake

On all models using drum brakes on the rear, the cable pulls the parking brake lever. The lever is attached to the secondary shoe at the top and transfers the lever action to the primary shoe through the shoe strut. When released, the brake shoe springs return the shoes to their retracted position.

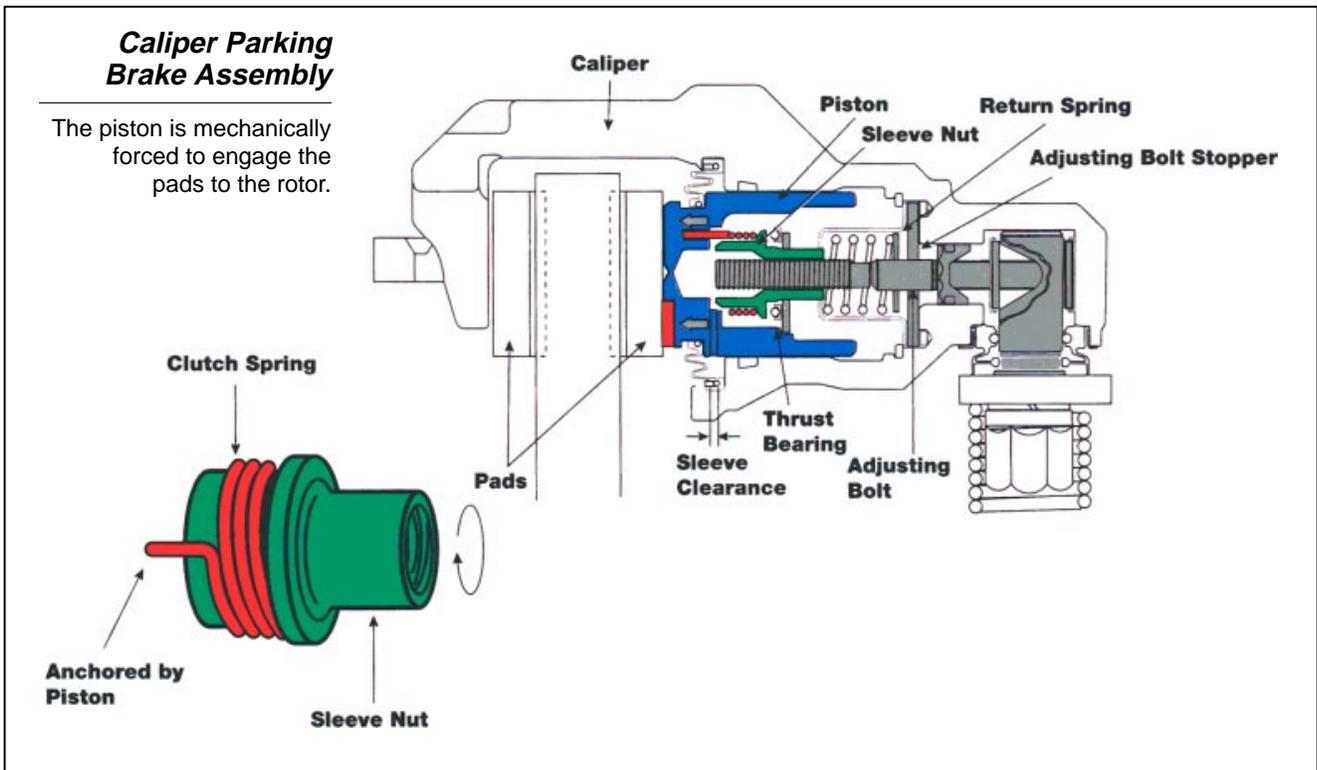
Drum Type Parking Brake Components

The cable pulls the parking brake lever and transfers the lever action to the primary shoe through the shoe strut.



Disc Parking Brakes There are two types of rear wheel parking brake systems for disc brakes. The first uses the brake caliper assembly to mechanically apply pressure to the disc. The second type is an exclusive drum brake assembly that applies pressure to an inside drum, which is an integral part of the disc rotor.

Caliper Parking Brake The parking brake is built into the caliper housing and is provided with an automatic adjusting mechanism to compensate for piston movement as the brake pads wear.



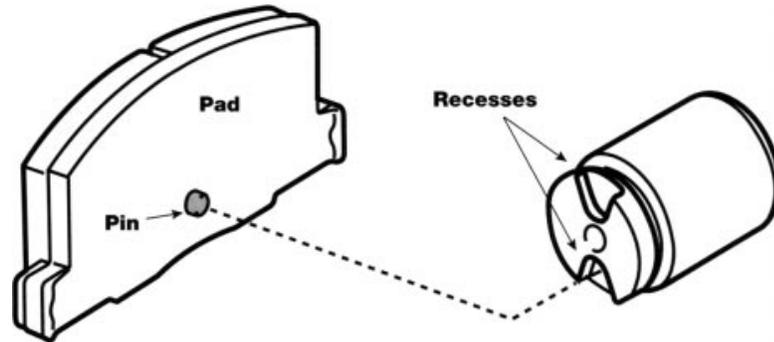
Automatic Adjusting Mechanism The automatic adjusting mechanism maintains the operating clearance between the pads and the rotor as the pads wear down with use. The primary assembly which makes this possible is the Sleeve Nut and Adjusting Bolt. The Sleeve Nut is held by the Clutch Spring which allows it to turn in one direction only. The diameter of the Clutch Spring is slightly smaller than the diameter of the sleeve nut and allows it to turn in the unwind direction only. The clutch spring is held stationary with one end attached to the piston.

When the brake pedal is depressed, hydraulic pressure forces the piston to move to the left. The movement of the Piston exerts pressure on the Thrust Plate and Thrust Bearing against the Sleeve Nut causing it to be screwed out from the stationary Adjusting Bolt. The Sleeve Nut can be easily screwed out because the Clutch Spring unwinds and therefore does not prevent the Sleeve Nut from rotating. The distance that the Sleeve Nut screws out from the Adjusting Bolt is equal to the amount of pad wear.

The piston head is provided with two recesses, one of which engages with a pin that protrudes from the backing plate of the brake pad. This pin prevents the piston from being rotated by the automatic adjuster. The adjusting bolt stopper prevents the adjusting bolt from rotating. The only part allowed to turn is the sleeve nut.

Piston Head Design

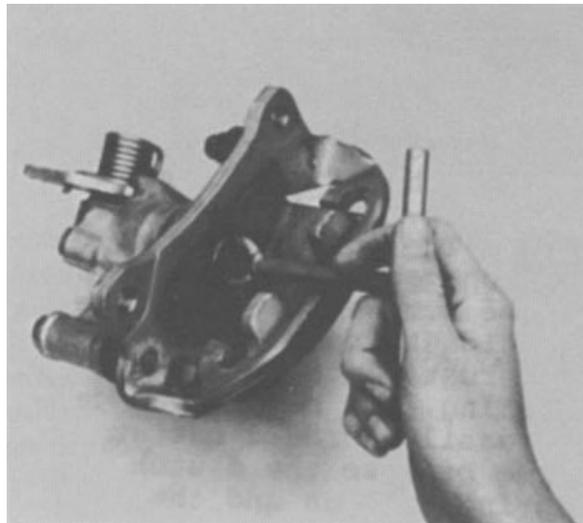
The pin on the brake pad is indexed to the recess of the piston head to prevent the piston from rotating.



When brake pads are replaced, the piston with the sleeve nut must be forcibly rotated into the cylinder with the Special Service Tool shown below (SST 09719-00020).

Rear Caliper Pad Replacement

The piston must be forcibly screwed into the cylinder with the SST.

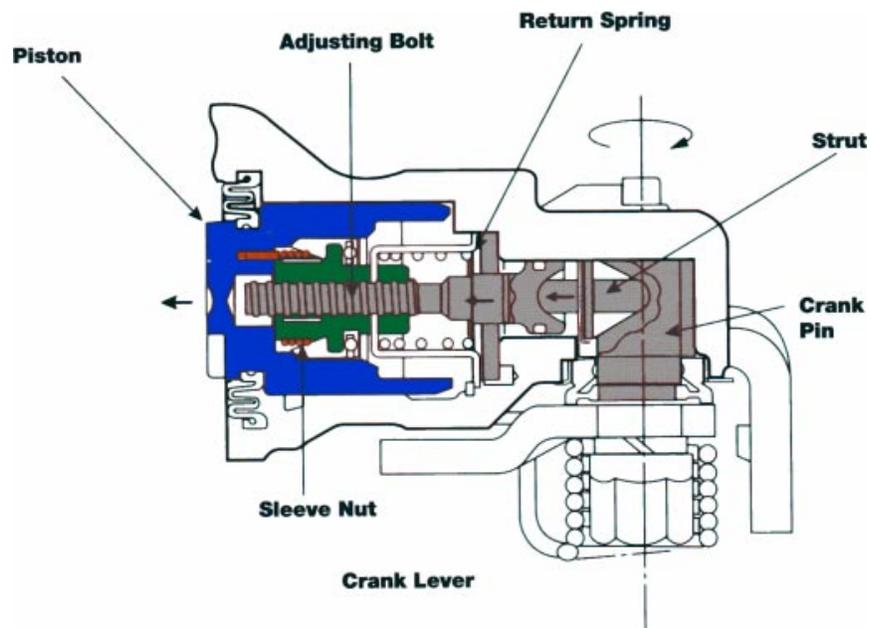


After pad replacement, the parking brake lever travel adjustment should be performed. Depress the brake pedal several times to activate the automatic adjustment within the caliper. Then adjust the cable for the proper number of clicks of the hand brake lever.

Parking Brake Operation When the parking brake is applied, the cable attached to the parking brake lever rotates the crank lever counterclockwise. The crank pin then pushes the strut to the left. The strut moves the adjusting bolt, sleeve nut, and piston toward the left. As the strut moves to the left, it also compresses the adjusting bolt return spring. The assembly moves until it presses the pads against the disc rotor.

Parking Brake Operation

The crank pin pushes the strut and adjusting bolt, sleeve nut and piston toward the disc rotor.

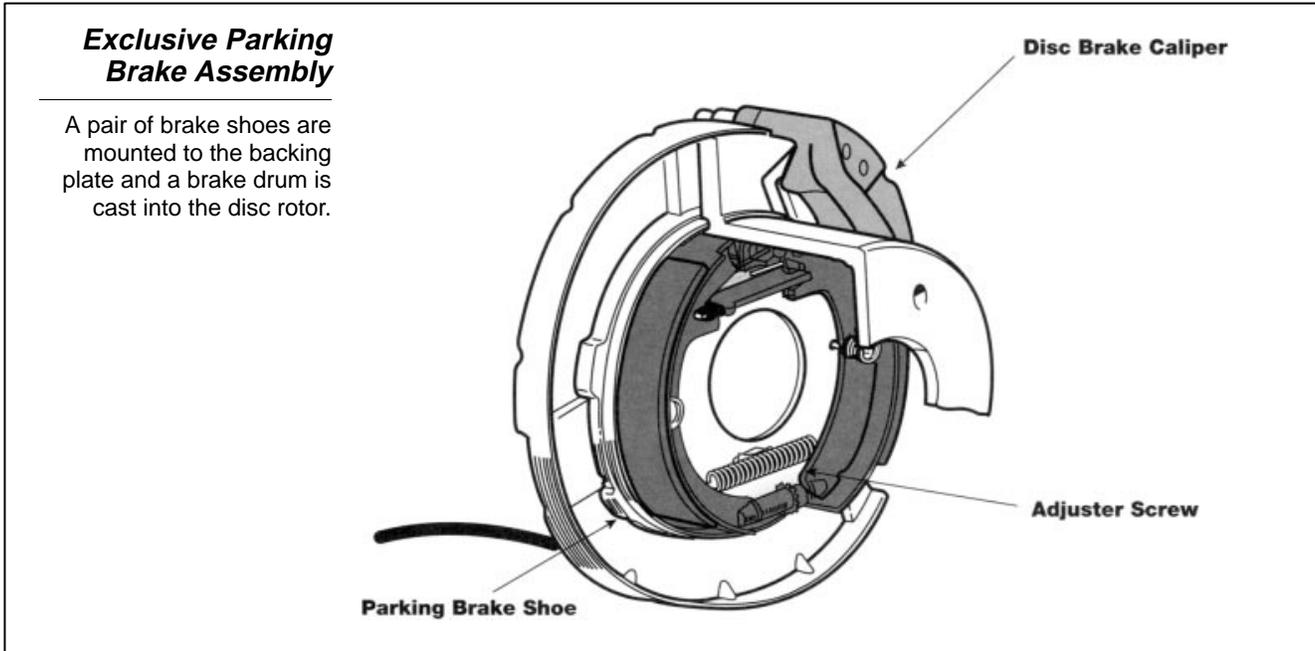


When the parking brake lever is released, the compressed Return Spring pushes the Adjusting Bolt and Piston back to their previous positions. As a result, the parking brake is released.

During this operation, the Clutch Spring prevents the rotation of the Sleeve Nut so that the force of the parking brake lever is transferred to the Piston via the Adjusting Bolt.

Exclusive Parking Brake

The exclusive parking brake is found on the LandCruiser, Supra, Celica, Previa, Avalon and Camry. As illustrated below, a drum brake is cast into the disc rotor. The shoes and other components are similar to a conventional dual-servo drum brake system but smaller and with no wheel cylinder.



Activating the parking brake is similar to applying the parking brake on conventional drum brakes. Adjustment to the exclusive parking brake is done manually at the Shoe Adjusting Screw Set (Star Wheel) and must be done periodically.

