



Section 4

# Spring Parking Brakes

## Spring Parking Brake Systems

### (Single circuit system only)

The installation of spring parking brakes and their piping arrangements into a vehicle air brake system will vary depending on the vehicle make.

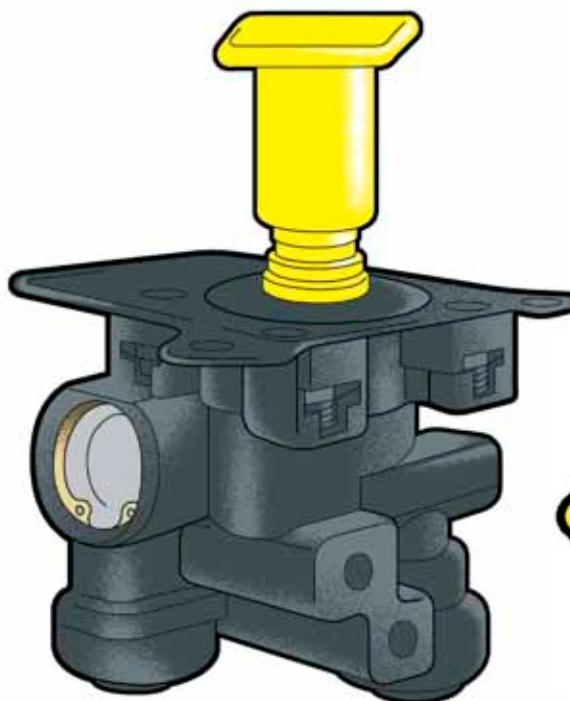
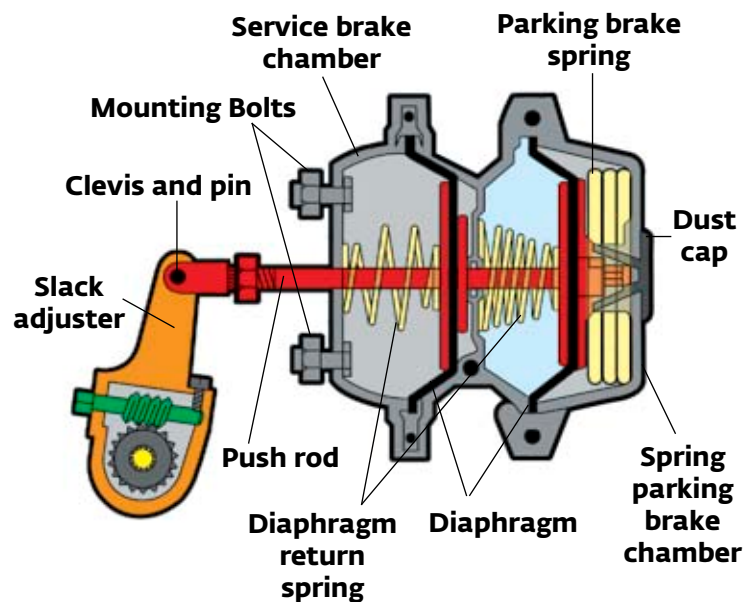
Spring parking brakes may be installed on an air brake-equipped vehicle for use as a reliable parking brake system. In the service brake system, the brakes are applied by air pressure and retracted by springs. In the spring parking brake system, the brakes are applied by spring pressure and retracted by air pressure. The spring parking brake chambers are attached to the service brake chambers and operate through the same linkage, therefore the effectiveness of the spring parking brake depends on the service brake adjustment. The spring parking brake control valve (operated by a square, yellow button) located in the cab allows the driver to exhaust air out of the spring parking brake circuit to apply the brakes, or pressurize the circuit to release them. Some systems may have an additional valve controlled by a blue button that applies only the tractor spring parking brakes and not the trailer spring parking brakes. The system can also act as an emergency brake. Loss of air from the system may automatically apply the brakes.

Control valves will vary, depending on the manufacturer and type of piping arrangements.

A spring-loaded valve requires that the valve be pushed in to release the spring parking brakes. This valve cannot be left in the released position with air pressure in the system below approximately 35 psi. Any time the reservoir pressure drops to approximately 35 psi, this valve will close automatically, placing the spring parking brakes into full application. On some older vehicles there may be a single type of push-pull control valve that does not have an automatic release feature. To apply the spring parking brakes, the valve must be operated manually, even though the reservoir pressure has been depleted.

During normal operation, air pressure cages (compresses) the spring, holding it ready for parking or emergency braking.

### Brakes Off

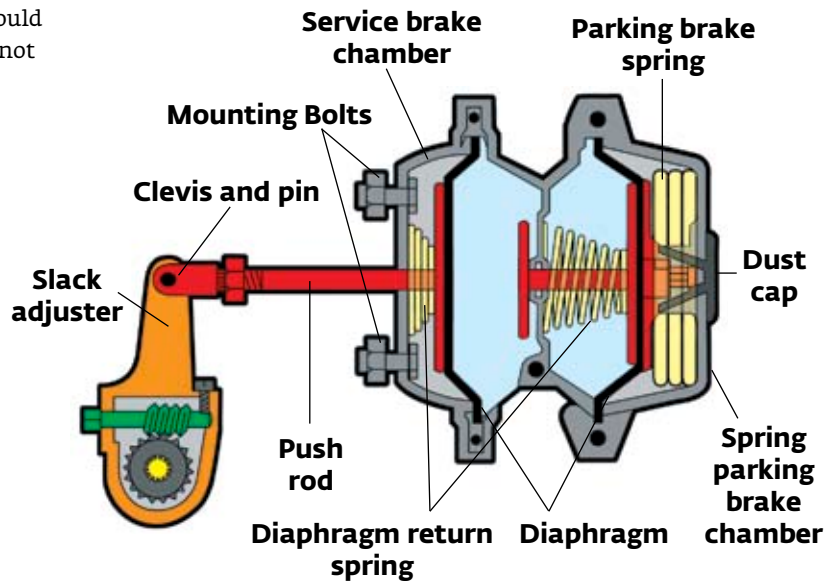


On the pre-trip air brake inspection (Section 9), you must ensure that the parking brake spring is not manually caged or it will not expand and apply the brake. The brake chambers should be checked for cracks and damage. The brake chamber should be fitted with a dust cap to ensure debris will not enter the chamber.

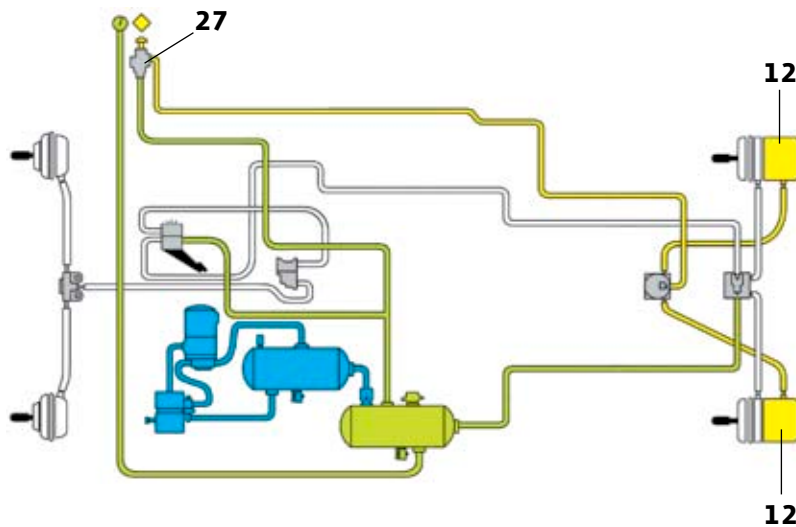
During normal service brake operation, the parking brake spring does not expand. Air pressure keeps the spring caged.

However, it takes approximately 90 psi of air pressure to keep the springs caged. If reservoir air pressure is allowed to drop below 90 psi the springs will start to move. At approximately 70 psi the brakes will be partially applied making it difficult to continue driving. If the air pressure drops below 60 psi the brakes will be fully applied making it impossible to move the vehicle until air pressure is built up to recage the spring parking brakes or the springs are manually caged.

### Service Brakes Applied Brake On



### Using a Spring Parking Brake

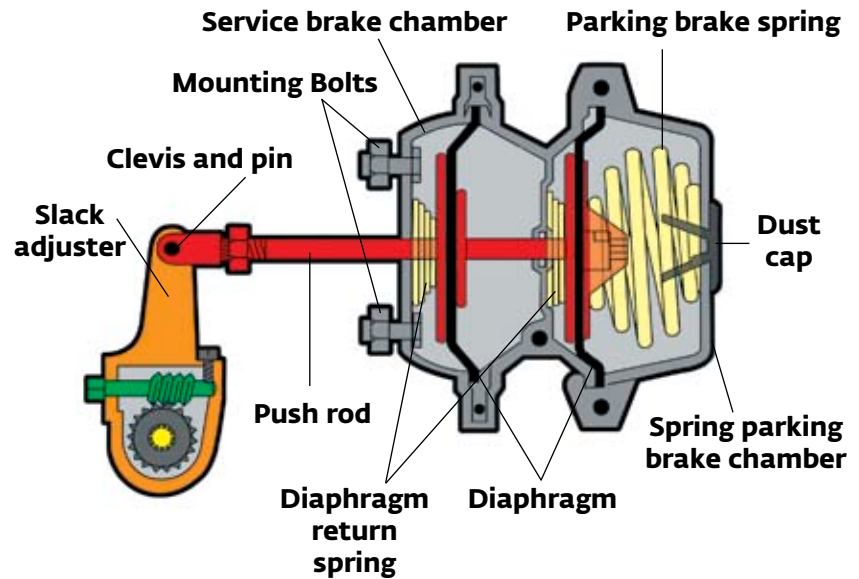


Spring parking brakes (12), added to the brake chambers of the rear axle on the single unit vehicle, are illustrated. A control valve (27) is mounted in the cab. A supply line of reservoir air is piped from the dry

reservoir to the control valve. Opening the control valve allows reservoir air pressure to flow to the spring parking brake chambers, releasing them.

Closing the control valve shuts off the supply of reservoir air pressure and exhausts the existing pressure in the spring parking brake chambers. This motion allows the spring to expand, applying the brakes.

### Spring Parking Brakes Applied "Brakes On"



**Caution:** Parking brakes should be in the release position before making a service brake application. A full-brake application, made when the parking brakes are applied, can compound the force exerted on the slack adjusters and linkage and result in damage or brake failure. Compounding is the combination of two forces: the force applied by the spring brake chamber and the service brake chamber.

Spring brakes are primarily used as a parking brake, but in the event of loss of air pressure in the system, they can assist in stopping the vehicle. How quickly they will stop the vehicle depends on such factors as:

- the weight and speed of the vehicle;
- the steepness of the grade;
- the spring force of the spring brakes that have been installed; and,
- the adjustment of the service brakes.

If the brakes have overheated, such as during mountain driving or hard highway braking, care must be taken when parking the vehicle. If the spring parking brakes are applied when the brake drum has expanded because of extreme heating, when the brake drum starts to cool and contract, the pressure exerted by the spring parking brake may cause the brake drum to crack or warp. When parking a vehicle with over heated brakes, park on level ground, stop the engine and leave the transmission in the lowest gear and block the wheels. Do not set the spring parking brakes until you have verified the brake drum is cool to the touch.

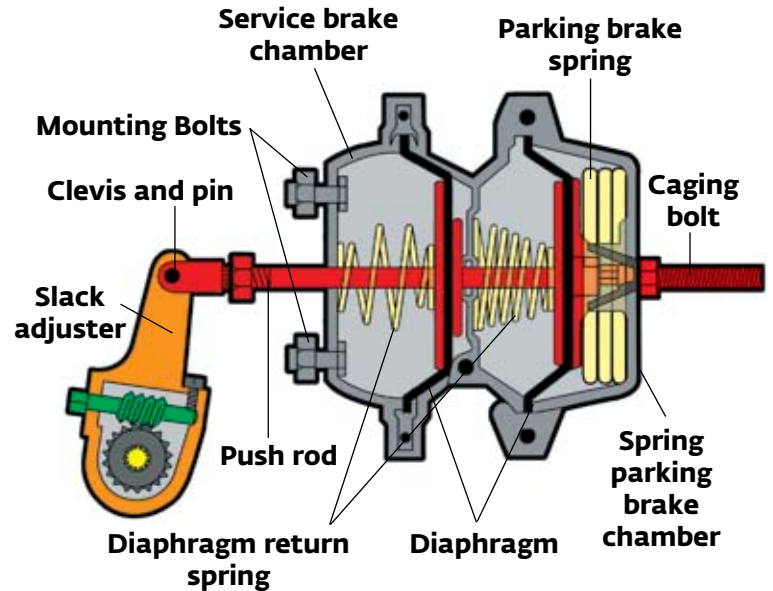
## Mechanical Release (Caging)

Some spring parking brakes can be released mechanically by “winding them off” or “caging” them. Caging means the brakes are being released. This is achieved with a bolt that runs through the centre of the chamber body, which is turned to compress the spring. It may be necessary to first remove a lock plate and stud to gain access to the head of the bolt. Other types have a dust cap that must first be removed and a bolt inserted. In some cases, a special wrench is required. Instruction on how to “cage” is usually on the body of the parking brake chamber. If all air is lost and the vehicle has to be towed, the parking brakes can be released by caging them. Always block the wheels when caging the parking brake spring.

### Warning

Spring parking brake chambers should never be disassembled without first compressing the spring with a caging bolt. These springs are under extreme pressure and could cause serious personal injury if disassembly is attempted by anyone not experienced in servicing these units. Disassembly of a spring brake chamber should only be performed by a qualified mechanic or technician.

### Parking Brake Spring Caged “Brakes Off”



## Section Summary Questions

1. What is meant by “compounding” the brakes?
2. Why are spring brakes a reliable type of parking brake?
3. How are parking brakes held in the released position?
4. What are the functions of the cab-mounted parking brake control valve?
5. Will parking brakes apply “automatically” in all braking systems?
6. What is the reason for releasing the parking brakes before making a full brake application test?
7. Why must you be careful parking a vehicle with overheated brakes?
8. How can some types of parking brakes be released without the use of air pressure?
9. What is the danger of disassembling a spring parking brake unit?