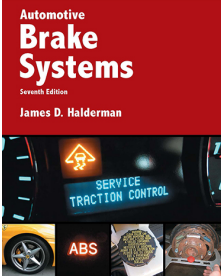


# Automotive Brake Systems



## CHAPTER 14

### Parking Brake Operation, Diagnosis, and Service

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## OBJECTIVES

- Discuss parking brake pedals and automatic parking brake release.
- Explain parking brake linkages.
- Describe drum parking brakes.
- Describe caliper-actuated disc parking brakes.
- Explain how to adjust a parking brake properly.

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## PEDALS, LEVERS, AND HANDLES

- Parking Brake Pedals
  - Applied by depressing with foot
  - Released by a pull or small T-handle or lever under dash
  - Some systems required driver to depress pedal to release parking brake once it was set
    - Rubber pad on parking brake pedal usually states “push to release”

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## PEDALS, LEVERS, AND HANDLES

- Automatic Parking Brake Release
  - Some vehicles with pedal-operated parking brakes have automatic release mechanism
  - Disengages parking brake using vacuum servo controlled by electrical solenoid
  - Metal rod connects vacuum servo to upper end of brake release lever

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## PEDALS, LEVERS, AND HANDLES

- Automatic Parking Brake Release
  - When engine running (to provide vacuum) and shifter placed in gear, electrical contact closes to energize solenoid and route vacuum to servo
  - Servo diaphragm retracts rod, releasing parking brake

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## PARKING BRAKE LINKAGES

- Transmit force from pedal, lever, or handle to brake friction assemblies
- Linkage Rods
  - Rods made from solid steel commonly used with floor-mounted actuating levers to span short distance to intermediate lever or equalizer

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## PARKING BRAKE LINKAGES

- Linkage Cables
  - Woven-steel wire encased in reinforced rubber or plastic housing
  - Housing fixed in position at both ends

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## PARKING BRAKE LINKAGES

- Linkage Cables
  - Routed under vehicle through mounting brackets that allow small amount of movement
  - Cable slides back and forth inside housing to transmit application force
  - Subject to damage from water, dirt, other debris thrown up by tires

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## PARKING BRAKE LINKAGES

- Linkage Levers
  - Driver cannot apply enough physical force to engage parking brake
  - All parking brake linkages contain one or more levers that increase application force

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## PARKING BRAKE LINKAGES

- Linkage Equalizers
  - Transmits equal force from parking brake control to each friction assembly
  - Simplest is cable guide attached to threaded rod
    - Pivots or allows inner cable to slide back and forth to even out force

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## PARKING BRAKE LINKAGES

- Linkage Equalizers
  - Simplest is cable guide attached to threaded rod
    - Another type installs in long application cable from linkage at front of vehicle to one rear brake

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## PARKING BRAKE LINKAGES

- Linkage Design
  - Most combine intermediate levers and equalizers in various ways
  - Most use from one to four cables to actuate friction assemblies

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**DRUM PARKING BRAKES**

- Most common types on vehicles and light trucks
- Make excellent parking brakes because of high static coefficient of friction combined with self-energizing action

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**DRUM PARKING BRAKES**

- Integral Drum Parking Brakes
  - Mechanically apply rear drum service brakes to serve as parking brakes
  - Most common type
  - All such brakes operate in essentially same manner

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**DRUM PARKING BRAKES**

- Rear Disc Auxiliary Drum Parking Brakes
  - Rear disc service brakes with fixed calipers commonly have parking brake drum formed into hub of brake rotor
  - Dual-servo parking brake friction assemblies operate in essentially same manner as service brakes except that wheel cylinder eliminated and friction assembly actuated mechanically

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## CALIPER-ACTUATED DISC PARKING BRAKES

- Basic Operation
  - Used on vehicles whose rear disc brakes equipped with floating or sliding brake calipers
  - Single-piston construction makes them easier to mechanically actuate than multiple-piston fixed calipers
  - Special mechanism in caliper applies caliper piston mechanically

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## CALIPER-ACTUATED DISC PARKING BRAKES

- Ball and Ramp Actuation
  - Found in Ford rear brake calipers
  - Has three steel balls located in ramp-shaped detents between two plates

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## CALIPER-ACTUATED DISC PARKING BRAKES

- As parking brake cable moves lever and rotates operating shaft, balls ride up ramps and force plates apart, applying brake
- Adjustment within the caliper automatic, and takes place during service brake application
- Screw, Nut, and Cone Actuation
  - General Motors' rear disc parking brake design

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**PARKING BRAKE CABLE ADJUSTMENT**

- Make certain that rear service brakes adjusted correctly and lining serviceable
- With drums installed, apply parking brake 3 or 4 clicks
  - Should be slight drag on both rear wheels

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**PARKING BRAKE CABLE ADJUSTMENT**

- Adjust cable at equalizer until slight drag on both rear brakes
- Release parking brake; both rear brakes should be free and not dragging
  - Repair or replace rusted cables or readjust as necessary

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**PARKING BRAKE CABLE ADJUSTMENT**

- To prevent possible parking brake cable adjustment problems when installing new rear brakes:
  - Both brake shoes should make contact with anchor pin at top
    - If not, check parking brake cable for improper adjustment or improper installation of brake shoes

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**PARKING BRAKE CABLE ADJUSTMENT**

- To prevent possible parking brake cable adjustment problems when installing new rear brakes:
  - Feel tension of parking brake cable underneath vehicle
    - Should be slightly loose (with parking brake “off”)

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**PARKING BRAKE CABLE ADJUSTMENT**

- To prevent possible parking brake cable adjustment problems when installing new rear brakes:
  - Lubricate parking brake cable to ensure that water or ice will not cause rust or freezing
    - Stuck parking brake cable could cause linings to remain out against drums

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**PARKING BRAKE CABLE ADJUSTMENT**

- To prevent possible parking brake cable adjustment problems when installing new rear brakes:
  - If parking brake needs to be adjusted, check and adjust rear brake adjustment before adjusting parking brake cable
  - Replace any stuck, corroded, or broken parking brake cable

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## SUMMARY

- Some vehicles with pedal-operated parking brakes have automatic release mechanism
- Most common types on vehicles and light trucks
- Adjust cable at equalizer until slight drag on both rear brakes

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