

# DIAGNOSING A LOW, SPONGY OR DROPPING BRAKE PEDAL

Start Here

Perform Line Lock Test

Check system for leaks visually. If problem is related to hydraulic service just performed, then bleed using manufacturer's procedures.

If system has open-face master, then pump pedal up and check for gyser when pedal is released quickly. If gyser is present, that circuit of hydraulic system has air. Rebleed.

If problem is still present after above steps, then proceed with flowchart. This flowchart covers most vehicles and systems, but is not meant to be all inclusive. Use boxes next to each step to chart path taken. It is sometimes necessary to retest to ensure accurate results.

Important: Follow these steps carefully to prevent damage to master cylinder seals.

1. Loosen brake line at master and have assistant push pedal down approximately 1/2 inch and hold in that position.
2. Install line locks on each brake hose in hydraulic system — use only approved type.
3. Have assistant depress brake pedal and hold pressure on system — while pressure is on system, try and rotate each tire. If line locks are installed properly, tires will spin freely. If tire will not spin or drags, repeat steps 1 and 2.
4. Have assistant continue to hold pressure on pedal while performing the steps below.

Condition 1

With the line locks installed, pedal is high and hard

System is good from master cylinder to line locks. Problem is at one or more of the wheels. To isolate the problem, follow the procedure below.

Condition 2

With line locks installed, pedal is still low or spongy

If wheels are properly isolated, the problem is in front of line locks, between

Is vehicle equipped with RWAL or RABS ABS?

Note: For RWAL/RABS-equipped vehicles, check EH valve for by-passing dump valve.

Cylindrical Body Valve: Remove accumulator cap screw and spring. Have assistant apply brake while holding screwdriver against accumulator piston. If piston moves during brake apply, dump valve is leaking and valve needs to be replaced.

Block Style Valve: Remove rubber dust cap from accumulator cap screw. Insert paper clip until it bottoms against accumulator piston. Have assistant apply brake while holding screwdriver against accumulator piston. If piston moves during brake apply, dump valve is leaking and valve needs to be replaced. See June 1999 issue, page 44 for more details and illustrations.

1. Remove brake lines from master cylinder.
2. Install plugs or dummy lines in master cylinder.
3. Bleed at each outlet fitting using single stroke method, making sure not to exceed 3/4 pedal travel.
4. Loosen one outlet fitting and depress brake pedal 1 inch, tighten fitting.

1.2: DETERMINE TYPE OF HYDRAULIC SYS-

- Front to rear split system
- Diagonal split system
- Quick-Take-Up Master Cylinder

With brake pedal still depressed, remove line lock on rear brake

With brake pedal still depressed, remove line lock on right rear brake

1.2A: Check Pedal Condition

- Pedal is high and
- Pedal is low and spongy

With brake pedal still depressed, remove line lock on rear brake

1.2B: Check Pedal Condition

- Pedal is high and
- Pedal is low or spongy

Problem is not in rear brake circuit, problem is one or both front brakes. With brake pedal still depressed, remove right front line lock.

Rear brake(s) are causing pedal condition. Check the following possible causes (Drum Brakes):

- Rear brake and parking brake adjustment;
- Drum size and condition;
- Lining condition; and
- Excessive wheel bearing play.

A failed QTU valve can cause a low, spongy pedal on vehicles equipped with QTU master cylinders. Diagnosis of the QTU valve is not straight forward.

Best method of diagnosis is to use a process of elimination. Follow the steps below.

1. Is low pedal gone with line locks on front brake hoses?
2. If no, then problem is not in front brakes or QTU valve. If yes, then check for all conditions listed below.

- Air at front brakes;
- Binding or incorrectly installed pad(s);
- Seized sliders or pads;
- Separated linings;
- Excessive rust build-up behind pads or shims;
- Excessive wheel bearing play; and
- Ballooning brake noise.

If any of the above is found, then correct and retest. If none of the above is found, then problem is most likely a by-passing or non-functioning QTU valve. Replace master cylinder and bleed according to manufacturer's instructions.

Pedal is high and

1. Reconnect secondary brake line to master cylinder.
2. Bleed at fitting.
3. Open fitting and depress brake pedal one inch, tighten fitting.

Pedal is still low or spongy

Seals are bypassing internally in master cylinder. Replace master cylinder. See note.

NOTE: If master cylinder has just been installed, bench bleed unit again following the correct procedure and retest.

Pedal is high and

- 1.3C: Secondary Circuit Good.
1. Connect primary circuit brake line to master cylinder.
  2. Bleed line at fitting.
  3. Open fitting and depress brake pedal one inch, tighten fitting.

Pedal is low or spongy

- 1.3D: Air in Secondary Circuit Between Lock and Master Cylinder:
1. Locate next component in Secondary Circuit.
  2. Plug outlet of component and bleed fitting.
  3. Open fitting and depress brake pedal one inch, tighten fitting.

1.2C: Check Pedal

- Pedal is high and
- Pedal is low or spongy

Problem is not in right front wheel. With brake pedal still depressed, remove left front line lock.

1.2D: Check Pedal

- Pedal is high and
- Pedal is low or spongy

This condition should not occur. If pedal is high and hard with all line locks removed, then problem may be intermittent. Retest and if pedal is good, test drive vehicle.

If when either one or both of the front line locks are removed the low-pedal condition is duplicated, then check for the following possible causes:

- Proper caliper installation (bleeders at highest point);
- Pad installed wrong, binding on guide rails, or friction material not secured to backing plate properly;
- Excessive wheel bearing play;
- Inspect brake hoses for ballooning (line lock at top of hose);
- Excessive rotor runout;
- Defective calipers causing the piston to retract too far into the bore; and
- Excessive rust build-up between pad/shim and caliper housing.

Pedal is high and

Primary Circuit Good.

If pedal is high and hard at this time, the problem was probably a pocket of air that was removed during test procedure. Remove line locks at wheels and check pedal. If pedal is good, test drive vehicle. If still low, retest system.

Pedal is low or spongy

- 1.3E: Air in Primary Circuit Between Line Lock and Master Cylinder:
1. Locate next component in primary circuit.
  2. Plug outlet of component and bleed fitting.
  3. Open fitting and depress brake

Pedal is high and

Secondary Circuit Good.

If pedal is high and hard at this time, the problem was probably a pocket of air that was removed during the test procedure. Reconnect primary line and bleed at fitting. If pedal is high and hard, remove line locks at wheels and check pedal. If pedal is good, test drive the vehicle. If pedal is still low, retest

Pedal is low or spongy

- 1.3F: Air in Secondary Circuit Between Line Lock and Master Cylinder.
1. Locate next component in secondary circuit.
  2. Plug outlet of component and bleed at fitting.
  3. Open fitting and depress brake pedal one inch, tighten fitting.

Pedal is high and

- Component tested is not source of problem.
1. Locate next component in system and repeat previous step.
  2. Repeat this procedure until faulty component is isolated.

Pedal is low or spongy

- Component being tested is cause of pedal condition.
1. Attempt to bleed component.
  2. If bleeding does not change pedal condition, replace component and retest system.

Pedal is high and

- Component tested is not source of problem.
1. Locate next component in system and repeat previous step.
  2. Repeat this procedure until faulty component is isolated.

Pedal is low or spongy

- Component being tested is cause of pedal condition.
1. Attempt to bleed component.
  2. If bleeding does not change pedal condition, replace component and retest system.