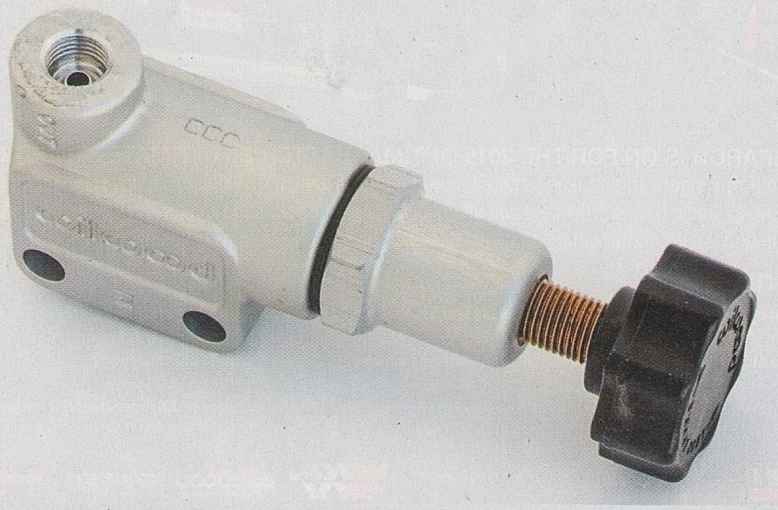
Jeff Pitts Asks...

Does a Four-Wheel Disc-Brake System Need a Proportioning Valve?

Marlan Davis

Q: I'm building a 1939 Plymouth pickup with a 330ci DeSoto Hemi, a 727 TorqueFlite trans, and an 8¾-inch Chrysler rearend. I have the usual front axle setup with disc brakes from Pete & Jake's. I have a rear disc kit from The Right Stuff Detailing. I'm told I should put in a proportioning valve to make sure the rears don't lock before the fronts. Is this correct? If so, how do I *safely* set the valve? I've never scratch-built a car before—always just restored them. By the way, the car weight should be about 2,500 pounds (no fenders, shortened bed, custom frame).



[Wilwood's knob-style adjustable proportioning valve lets you fine-tune the front to rear braking balance by proportionally decreasing the rear brake-line pressure. It weighs only 5.2 ounces and has two ¼-inch mounting holes spaced 1-inch apart. Shown is PN 260-10922 with 3/8-24 threads for SAE 3/16-inch inverted-flare tube nuts. Mount it anywhere in the line going to the rear brakes.

WILWOOD KNOB-STYLE ADJUSTABLE PROPORTIONING VALVES

DESCRIPTION	PART NO.
Knob-style proportioning valve with 1/8-27 NPT ports (comes with inverted-flare tube-nut adapters for installation of 3/16" tubing	260-8419
Knob-style proportioning valve with 3/8-24 inverted-flare seats for direct installation to 3/16" tubing with 3/8-24 inverted-flare nuts	260-10922
Knob-style proportioning valve with M10 x 1 bubble-flare inlet and outlet ports	260-12927

A: The guiding principle is the rear brakes should not lock-up before the front brakes—otherwise, the car can go into a flat spin. Proportioning valves are always required with a front disc/rear drum setup because of their widely different lockup characteristics, but I also recommend installing at least a basic proportioning valve on a street car's all-drum or all-disc brake system. True, professionally built, closed-circuit race cars may not run a proportioning valve—but they operate within narrowly defined parameters. Professional track cars go through extensive testing and development, allowing the expert driver and his chassis experts to custom balance the car by adjusting rotor and caliper sizes, as well as brake master-cylinder bore-and-stroke parameters, or independently adjusted master cylinders with a balance bar between front and rear circuits.

That's not the case on a street car, where the brakes must operate under a wide range of differing parameters: low- and high-speed stops; moderate to heavy braking; varying numbers of passengers, fuel loads, and cargo weights; wet and dry roads; different road surfaces; dissimilar tire sizes and compounds; and generic nonmatched brake setups, often based on widely available passenger-car parts not optimized for anything but the production cars they were originally used on. We don't know the specifics of your brake system, but obviously they are from two different companies; as a custom street rod, the pickup likely has the dissimilar front and rear tire size issues, and generically any pickup truck may carry widely varying bed loads. Yup, definitely a proportioning valve candidate.

OK, so yes a proportioning valve is needed, but what kind? On a custom-built street rod, certainly not the generic factory-style, nonadjustable configuration with its preset knee and differential points. Instead, go for a generic adjustable valve plumbed into the rear brake line only. Wilwood is one source for these valves and offers several variations (*see table*).

When it comes to valve adjustment, outside of finding a friendly racetrack, you'll have to use your judgement as to what constitutes a safe test area. I personally like large, deserted parking lots or sparsely traveled roads well outside of town.

To start, the brakes system must be operating properly, fully bled, and leak-checked. Ideally, the pads and rotors should be properly bedded in first. Load the vehicle to replicate as closely as possible its most common real-world operating parameters: the number of passengers most often carried, the normal load in the bed (be sure everything's safely secured or tied down), and approximately half a tank of gas. Initially turn the valve's adjustment knob counterclockwise to its full "less-brake" position; this cuts pressure to the rear brakes by 57 percent. Make sure the pads and rotors are warmed up to normal operating temperature (aren't cold).

If possible, have someone stand outside to observe the tests and verify which set of brakes locks up first (you can't always tell from behind the steering wheel). Perform a series of full-on "panic-stop" deceleration runs from 30–0 mph. A 30-mph starting point is usually sufficient for the average daily driver; at higher speeds, weight transfer is greater, causing the rear tires to have less traction, delaying their lockup.

With the valve in its "full-out" (maximum "less brake") position and the brake system otherwise operating properly, initially the front brakes should easily lock-up before the rear brakes. Assuming that's the case, turn the adjustment knob in one

ASK MARLAN A TECH QUESTION: PITSTOP@HotRod.com

full turn (clockwise) to increase the amount of pressure to the rear brakes and repeat the test. Keep on repeating the test followed by the one-turn knob-adjustment until the rear brakes start locking up, then back out about a half-turn toward less brake. If the valve's full range of adjustment is not sufficient to properly balance the brake system's bias, the brakes are mismatched and changes to other components within the system may be necessary.

Contact

WILWOOD ENGINEERING; Camarillo, CA; 805.388.1188; Wilwood.com