



Restoring Cougar Brake Valves

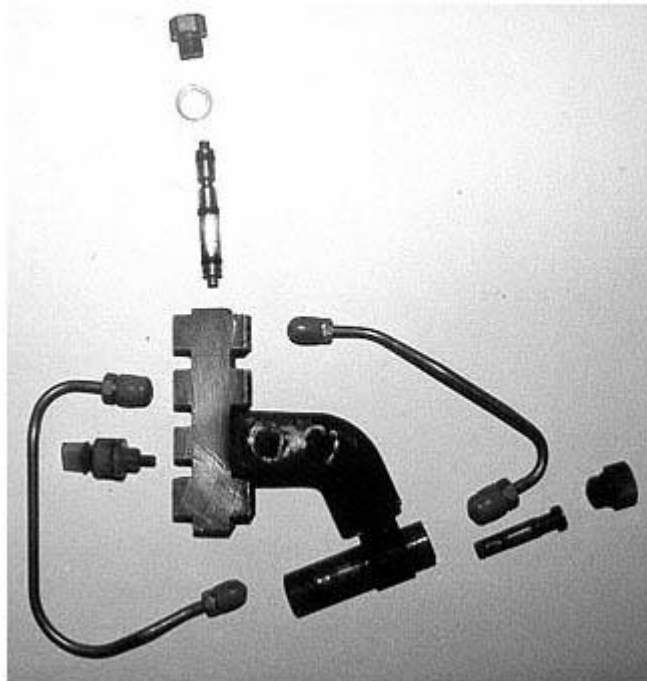
By Dick Hertzler

In 1967, Ford began using federally mandated dual braking systems in all its vehicles. A major safety improvement, dual braking systems replaced single-reservoir master cylinders with units that used separate reservoirs for the front and rear brakes. So, a leak and failure of one circuit wouldn't affect the performance of the other.

All Cougars with dual braking systems were fitted with a "pressure differential valve," which alerted the driver, by way of a dash warning light, to a loss of pressure in either the front or rear brake circuit. To accomplish this, the valve incorporated a spool in a chamber between the paths of fluid to the front and rear brakes. Loss of pressure on one side caused the spool to move to that side and trip a switch, which illuminated the dash light.

Further, cars with front disc brakes and rear drums included a "proportioning valve" in the braking system to ensure a greater share of braking power to the front brakes and guard against rear wheel lock-up during hard stops.

This article deals with cleaning and centering the pressure differential valve, which sometimes gets stuck in an off-center position (illuminating the brake warning light) when no actual pressure problem exists, and cleaning the proportioning valve on



disc brake cars. The pressure differential valve on all-drum cars cannot be disassembled and, therefore, will not be covered in this article.

A build-up of dried, crystallized brake fluid over 35 years or more generally is to blame for a stuck differential valve. So, you need to remove, clean and reinstall the valve. But that first step—removal—can be tricky, given tight quarters under the hood. Getting a tubing wrench in to loosen lines is nearly impossible. The new "gear wrenches" might be easier. I suggest removing the brake booster, steering column and front seat and accessing the valve fittings from inside the car, through the hole in the firewall.

Things were easier on my project car, which was undergoing a total restoration, including replacement of brake lines, meaning I had plenty of room to maneuver in the engine bay. Rather than rebuild the existing valve, I obtained another from a parts car and worked on that, then simply replaced the original when the new lines were installed. The photo shows the brake and proportioning valves disassembled. For greater detail, consult your shop manual, which includes good cut-away views of the valves.

After removal, soak the entire valve assembly in penetrating oil. Note that you are dealing with soft brass. You should be able to disassemble the two lines to the proportioning valve, and remove the end caps from each valve. Soak the assembly again to allow the penetrating oil to get inside the valves.

Then, use a very small diameter, non-taper drift punch through the tiny hole in the flared end (where the left front brake line connects) of the pressure differential valve and tap the valve spool out the other end. This might take several fairly heavy taps if the spool is stuck tight. Be careful not to damage the two O-ring seals on this spool—these are a tight fit, as they must seal off brake fluid under high pressure. Likewise, remove the spool from the proportioning valve. Use needle nose pliers and gently pull it out through the larger opening.

Now everything can be cleaned with alcohol, cotton swabs, tiny brushes, compressed air and anything else you think might work. Lubricate all parts before assembling with brake fluid. The pressure differential valve O-ring spool seals must compress to pass over two gaps in the brass valve as it is inserted. Once installed, you can "snap" the spool back and forth using the drift punch in one end and a wooden dowel in the other to observe the action. When centered, with the brake warning switch off (refer to the cutaway illustration in your shop manual), you should be able to pass a fine wire through the rear brake outlet and the proportioning valve outlet—the wire will clear the spool.

With everything installed, carefully bleed the brake system. If you press the pedal gently, the spool might stay centered. Even better, if you have the time, is the simple drip bleed approach—just open the bleeder at the wheel cylinder, install a length of vinyl tubing on it and allow fluid to drip into a jar for about a half-hour per wheel. Be sure the master cylinder stays full.

If the spool goes off-center during bleeding (check the status of the dash warning light), follow the shop manual procedure for resetting it. That is, open the opposite system from the one serviced, which should work as when the car was new. If you bleed the rear brakes first, then the front, and the light is lit, then it should be the rear system you need to open to re-center the valve. If the brake valve spool is moving freely, then a hard tap on the pedal should move the spool to center it and extinguish the light.

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