

Do-It-Yourself Brake Bleeder and Fluid Flush Gismo

By Bob Fuelleman

This article is intended for Porsche 928 owners. While the pictures are specific, the unit will probably work with any car that has a secure reservoir cap.

The pictures:

At the end of this article is a diagram that shows the assembly of the 928 cap. There is a picture that shows the sprayer tank, with the hose splicer and the quick-disconnect fittings. The 928 cap is shown attached to the hose with the quick-disconnect fitting. You can see where I drilled a couple small holes in the top of the sprayer to secure that hose with tie-wraps. Takes some strain off of that short hose and the splice. I started to redo the fitting on the tank, but the splice turned out to be the best/easiest method. The originally supplied with the tank turns out to be the same hose used on the 928 washer system. If you have six feet of that stuff lying around, use it!

What to do:

I took a spare stock master cylinder reservoir cap, and drilled a half-inch hole in the middle after removing the vent pieces. It's important that you drill in the center, so that the fitting can be installed with a socket that fits inside the vent cavity. From the bottom of the cap, a 1/8nptf x 1/4npt brass reducer bushing is inserted with a little gasket RTV, and it threads into the female end of the male air line disconnect fitting. Look at the picture to see the assembled cap, and look at the way the fitting sits on there. You can also see where I filled in around the fitting with the RTV inside the cavity where the vent diaphragm used to live. I added the 1/2" flat washer on the outside of the cap to this sandwich, with a thin layer of that same RTV to seal it to the cap. This distributes any mechanical stress around the whole top of the cap. Install the short 1/8 npt nipple into the bottom of the bushing so it extends down inside the cap.



At Home Depot, I picked up a 1-gallon plastic pump garden sprayer, the kind you might use to spray for bugs on your roses. There are now smaller ones available that will work just as well. About \$11. The hose between the tank and the wand is 1/4" id plastic hose, so I cut it off short at the tank and added about six feet of 1/4" reinforced plastic hose to that with a little barbed hose splicer. At the far end, a barbed hose fitting attaches the other (female) side of that air line coupler. Add clamps to the hose fittings. All the parts except the reservoir cap came from the Home Depot bins. The air line disconnect fittings are in the tool area, by the way.



Getting Ready:

Once all that's assembled, add a couple quarts of new brake fluid to the tank, assemble the cap fitting into the hose fitting, and get the air out of the hose. I just held the end of the hose up high, and pumped a couple times on the sprayer pump to get the fluid flowing slowly. When it gets real close to the end, pull the disconnect fitting apart to stop the flow.

Now to the car:

Put a plastic bib on the fender while you work. I used a heavy-duty trash bag held on with some masking tape. The intent here is to make absolutely sure that no stray drops of brake fluid get on your paint. **Very Important!** Brake fluid will quickly ruin the paint on the car, including paint in the engine bay.

Raise the car and remove the wheels so you can access the bleeder valves on the calipers. Later 928 models with 4-piston calipers have two bleeder valves on each caliper. You will bleed the inner section first, then the outer.

Replace the original master cylinder reservoir cap with the modified one, and attach the hose from the tank to the cap. Pump the tank a few times to get just a little pressure on the system.

Bleed the Master Cylinder:

If there is air trapped in the master cylinder itself (not referring to the reservoir), bleed from the valve at the end of the master cylinder before moving to the wheels. This might be needed because of a new or rebuilt cylinder install, replacement of the reservoir grommets, or because the system ran too low on fluid for some reason.

Porsche recommends that you cycle the brake pedal occasionally while bleeding, to make sure any debris that might be in the front of the master cylinder bores gets flushed through. Do this pedal pushing very slowly with the bleeder valve open, so that the front piston in the master cylinder doesn't become stuck at the forward position. If you can, do all of your pedal pumping while bleeding the master cylinder valve. There is no reason to push junk into or through any ABS valves if you can help it.

Bleed the Calipers:

Starting at the right rear, put a length of plastic hose over the bleeder valve and route it into one of those empty brake fluid containers. Open the valve, and then go pump up the tank some until fluid starts to flow slowly through the bleeder valve tube into the bottle. Don't pump it up any more than it takes to maintain a slow flow. The old fluid may be a little rusty brown, so let it flow for a while until new fluid is coming out of the hose.

Once the fluid is flowing clean and clear from the right rear, close the valve and move to the left rear. Use the same procedure there, then move to the right front, and finally the left front. After the rear is done, the fronts won't take nearly as much fluid to get cleaned out.

If you have the manual trans car, do the clutch system the same way, bleeding at the slave cylinder valve on the bellhousing.

Remove the Bleeder Hose:

Disconnecting the hose from the master cylinder reservoir requires that the pressure is released from the tank first. Slowly unscrew the pump from the sprayer tank until all the air pressure is relieved. Then remove the hose from the fitting on the cap using that air-line disconnect, and remove the cap from the reservoir. It's possible that the reservoir will be over-full at this point. Remove some of the fluid from that reservoir until it's down to the full line. Using the threaded nipple inside the cap reduces the amount of air that migrates back to the sprayer tank, but requires that you remove any screen from the reservoir opening before threading the cap on.

Caution:

Be aware that the level in the master cylinder reservoir will change as the brakes wear. If you have brakes that aren't new, leaving the reservoir full may cause you to spill some

out next time you replace the brakes. Just watch the level then when you compress the caliper pistons and avoid the spill.

Results:

Biggest thing you'll notice is that the pedal is higher and harder. With all the air and moisture out of the fluid, the system is more hydraulic than pneumatic again, plus the components will last a lot longer, and you'll get rid of some possible brake fade. Porsche recommends that the fluid be flushed and bled at no more than two-year intervals. The track tech sessions at SCCA require fluid less than six months old for most events. I think PCA Driver Education events are less strict at one year.

Clean-Up:

The little bit of fluid that remains in the sprayer tank after you are done can be left there. When you go to use the system again at a later time, drain and flush that fluid out before you start on another car. The fluid is just as hygroscopic in the tank as it is in the car, so old fluid should not be used.

Used brake fluid can usually be disposed of with used motor oil.

Additional Info:

"Real" repair shops are required to use a diaphragm-type pressure bleeder, where the pumped air is never in contact with the brake fluid. This keeps the fluid dry, and also pretty much guarantees that the user will never accidentally pump air into the brake system. Using new fluid and keeping the tank level from going dry will do this for the casual home technician. Don't skimp on brake fluid-- use plenty and make sure it's from new, unopened containers. Even the better fluids are less than about \$10 a quart.

Disclaimer:

*** As always, the descriptions and suggestions are for your reading enjoyment. No warranty is expressed or implied. Know your limitations and work within them. Always wear eye protection when working with pressurized fluids, wear gloves to protect your hands from the chemicals, and always use safety stands when working with the car or truck raised. Too many people are blind, sick and/or dead because they ignored some common-sense safety rules. Don't be a statistic! ***

Parts list:

- 1/2 or 1-Gal garden sprayer with the hand pump
- Six feet of 1/4" ID plastic pressure hose, the clear kind with the string reinforcing (see picture for a detail of this hose)
- Two feet of 1/4" ID clear plastic hose for the bleeder valve
- One 1/4x1/4" barbed hose coupler, to connect two pieces of hose together
- One 1/8nptf x 1/4npt reducer bushing fits inside the cap and threads into the male half of the quick-disconnect.
- One 1/8npt x 1.5" brass pipe nipple.
- One 1/4" barbed hose nipple with 1/4" male pipe thread on the other end, connects the hose to the female half.
- One air line quick-disconnect set, with female threads on both pieces. (I use a style that's different from my air tools)
- One 1/2" flat washer fits in a sandwich between the fittings on top of the cap.
- Three hose clamps that will clamp the 1/4" hose.
- A little RTV gasket maker to seal the cap parts together
- 2 Quarts of --new-- brake fluid. 928 Manual says one liter capacity, so I bought two quarts. Many are recommending the ATE super blue fluid, but I've had great experience with Castrol LMA in street-only cars so that's what went in due to local availability.

The Reservoir Cap:

928 International, 928 Specialists and Devex have this cap listed, and it's available at your local Porsche dealer. Costs range from five to maybe ten dollars. It looks to be the same as the cap from my now-deceased '86 Jetta, for what it's worth.

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