

## **Master Cylinder Installation**

**Last updated: July 31, 2002 by Dale Black**

### **929 Master Cylinder Install for 3rd Gen RX-7 (for big brakes)**

When you upgrade to larger brake calipers, your brake pedal movement may increase because more brake fluid has to be moved to power the bigger (or more) pistons. Upgrading to the Mazda 929's master cylinder (MC) can bring the pedal movement and feel back to stock (or better than stock). The only tricky part of this procedure is the fabrication of a 12 inch length of brake line which can be done pretty easily if you have a pipe cutter and pipe double flare tool. NOTE: Some stores (ie – Advance) offer brake lines with the correct fittings, so there is no need to cut your old one to reuse the fittings.

### **What You Will Need**

- A 93 Mazda 929 master cylinder (ABS version) - The stock master cylinder is 15/16" in diameter, the 929's is 1" in diameter and about 1/4" longer. That 1/16 of an inch larger piston pushes quite a bit more fluid.
- 12-inch length of 3/16-inch flared brake line with “Japanese” fittings (AGS PN: BLJ-312 available at Advance Auto Parts and other retailers)
- Two new copper crush washers for the MC's banjo bolt (HELP! PN: 66223)
- A pipe cutter (only necessary if you can't find a brake line with the proper metric fittings and are forced to reuse your current ones)
- A “double-flare tool” (only necessary if you can't find a brake line with the proper metric fittings and are forced to reuse your current ones)
- Tool for properly bending the brake line (AmPro PN: T70742)
- A pack of various size vacuum plugs (HELP! PN 41050)

### **Removing the Master Cylinder**

**WARNING:** Do not attempt this modification yourself unless you are a competent mechanic and/or are very mechanically inclined. A short brake line may need to be fabricated and a single point of failure in the brake system can result in the total loss of brakes leading to possible damage, injury, or death!

1. Before you remove any of the brake fittings, carefully clean all around them, so that dirt doesn't get into the system as the fittings are opened.
2. Put some rags below the master cylinder. If your car has cruise control, unbolt the assembly and swing it out of the way, for example, over the upper intake plenum.
3. Use a 10mm wrench or the SST (Special Service Tool as per the RX-7 Workshop Manual) to loosen the brake lines that go into the top of the double brass fitting next to the filler cap. By disconnecting the brake lines here, very little fluid will drip out. Put vacuum plugs on each of the two brake lines.
4. Remove the hydraulic clutch hose and cap off at the reservoir and the line.
5. Remove the two nuts that hold the MC to the brake vacuum chamber.
6. Remove the large vacuum line running to the vacuum chamber to relieve the vacuum pressure and remove the MC. If you don't release the vacuum you will have trouble getting the MC out.
7. Swap the master cylinders' reservoirs because the 929's doesn't have a hydraulic clutch connection. Remove the Phillips head screw below the reservoir and pop off both reservoirs and then swap them. Use a little hydraulic fluid on the rubber seals to make

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the installation of the reservoir easier. Reinstall the phillips head screw to secure the reservoir.

8. The 929 MC has a fitting for one of the two brake lines on the engine side, rather than towards the fender like on the RX-7 MC, making the existing line too short to reach around. A new, slightly longer brake line will have to be used to run from the engine side of the MC to the double brass fitting. You have two options for dealing with this:
  - a. You can buy a prefabricated, 12-inch long 3/16-inch brake line, cut off one end, remove the flare fittings, put on one of the original metric flare fittings from the old line, bend it to get a nice 180 degree bend, cut it to fit with a pipe cutter, put the other original metric flare fitting on and double flare the new line.
  - b. You can buy PN: AGS PN: BLJ-312 available at Advance Auto Parts and bend it to fit using the proper tool.
9. Connect the new brake line and torque the connectors to 113 to 190 inch pounds (10 to 15 foot pounds). NOTE: Read section on "Bleeding The Master Cylinder" first.
10. The other brake line is a perfect fit. Use two new copper crush washers and bolt the banjo bolt on the new MC. I don't know what the torque value for the banjo bolt is but I had to tighten it as tight as I could with an 8-inch ratchet to stop it from leaking.

Helpful Hint: A 10mm brake line tool will help you torque the brake fittings properly (it's hard to do with a 5 inch long 10mm wrench).

### **Bleeding The Master Cylinder (Optional, but recommended)**

If you bleed your master cylinder, you will minimize the amount of air you push through the brake lines and ABS. If you don't do this you may have a really tough time getting the air out of the brake system (and use lots of brake fluid and suffer a spongy brake pedal for years!). This procedure is well worth \$10 and a little time.

1. Get a master cylinder bleeding kit at Mechanics Auto Parts, HELP! part # 13999, Metric Master Cylinder Bleeder Kit, \$9.49. The kit consists of several plastic fittings and rubber hose.
2. Mount the master cylinder in your car by securing the two nuts and connecting the hydraulic clutch line but don't hook up the brake lines yet.
3. Screw the correct size bleeding kit fittings into the two line connectors at the double brass pipe fitting and run the hose from the fittings up into the master cylinder reservoir (the fluid loops around from the master cylinder's outputs back into its reservoir).
4. Fill the MC reservoir with brake fluid and pump the brake pedal until you don't see any more bubbles coming out of the hoses. It took me about 5 minutes of pumping.
5. Remove the bleed hoses one at a time and hook your brake line up quickly so you'll minimize the amount of fluid that runs out. Torque the brake lines to 113 to 190 inch pounds (10 to 15 foot pounds).
6. Bleed the brake system and do a pressure check. I had very little air in the brake system (the MC bleeding worked).

Be careful during your test drive, your brake vacuum will take a few seconds to replenish.