

## Rear Caliper Rebuild

1. **Release handbrake** – There can be no tension from the cables coming out of the central tunnel
2. **Disconnect Brake Line**- Using a 10 mm flare nut wrench, loosen and separate upper brake line connection. Cap line to prevent leakage. \* Note: If the flare nut does not come off readily, STOP!!! Shoot some penetrating oil into the threads and wait until it moves. You can use heat, as well but do not mangle the compression fitting nut! Patience is rewarded here!
3. **Disconnect E- Brake cable from caliper.** In between the recessed cable sheath cap holder in the front of the caliper, and the recessed cable ball stop in the rear of the actuator arm, there is a small section of the e-brake cable that is protected by a ribbed rubber dust boot. The dust boot is held in place by an internal spring which forces one metal cap at each end into recessed holes in the caliper. In order to remove the E-Brake cable from the caliper, it's necessary to compress both ends of this spring loaded section and pull the cable through a slit that runs through the entire path of the cable, in the caliper. The slit is only wide enough for the cable to pass through. Any associated caps or ends must be pulled away from their recessed position before the cable can pass through the slit. There are nifty e-brake compression tools that are available. (In my opinion they are worth every penny). However, if you don't have access to one of these specialty pliers, here's a trick to make removal of the e-brake cable easier.... NOTE: it's best to do this in the following sequence... You will be pulling the cable through the slit associated with each of these sections, as you go.
  1. Remove ball stop at cable end from its recessed holder in actuator arm.
  2. Remove (rear facing) dust boot cap from its recessed position in caliper.
  3. Remove (front facing) dust boot cap from its recessed position in caliper.
  4. Remove metal cable sheath cap from its recessed position in the front of caliper.
- 3 a "Manually" compress the e brake actuator arm as far as it will go. "While compressed" slide an 11mm socket (or the equivalent diameter cylindrical object) in between the back of the arm (short side) and the cable stop. This will relieve the tension against the ball at the end of the cable and allow you to remove it "first". With a pair of pliers pull the ball and cable back towards the rear of the car, and down through the slot in the actuator arm.



- 3 b Insert a needle nose pliers between the lip of the rear dust boot cap and the caliper and push up, separating the cap from its recessed hole in the caliper. Pull the cap away from the hole and pull the cable down through the slit.
- 3 c Repeat above for the front facing dust boot cap, and pull the cable down through the slit.
- 3 d Pull cable sheath end cap toward front of car and slide cable through slot in caliper.

**NOTE: Installation is the reverse of the above. (Don't forget to remove your socket from its place on the Actuator arm)**

- 4. Remove caliper from bracket and place upside down in bench vise.



- 5. Remove flex brake line and bleeder screw from caliper
- 6. Insert a flat piece of steel that fits snugly into the slot on the face of the piston, and unscrew the piston from the threads on the e-brake actuator rod. **NOTE:** At some point the piston will spin off the threads of the actuator rod and continue to turn, but no longer have any lateral movement away from the caliper. At this point you can grab the sides of the piston face (the smaller diameter part that pushes on the pads) with a pair of channel locks, being careful not to touch the wider outer diameter of the piston. Rotating the piston back and forth using lateral pressure away from the caliper you should be able to free the piston.



I found a cut off piece of shift linkage that worked perfect for me



- 7. With a hooked pick (or dental tool) grab and remove the outer dust seal and inner piston seal. Being careful not to scratch or mar the surface of either channels the seals sit in, or the piston bore.
- 8. Remove spring or retaining clip and pull back large rubber boot from rear of caliper.
- 9. Remove the retaining cir-clip that holds the actuator arm shaft in place.
- 10. Slide the actuator arm shaft out of the caliper, being careful not to lose the wedge key.
- 11. Pull the e brake actuator rod out of the hole in the rear of the caliper

12. Clean and inspect all parts for wear, corrosion, etc.

You may want to take this time to clean-up, and paint your caliper. I just wire wheeled mine and left the original aluminum finish.



13. Thoroughly inspect the outer surface of the piston for any damage. Small rust deposits that form on the surface of the outer piston diameter can be “gently” filed off. Be careful not to accidentally scratch the surface of the piston that comes in contact with the bore/seal. After I removed some small rust deposits I “lightly” sanded the exterior of the piston with 1500 grit emery paper, being careful to constantly rotate the piston and never go “back and forth” over the same area. When I first removed my pistons they looked “pretty bad” to me, but after some light filing and sanding they cleaned up nicely. The most important thing to remember is you don’t really want to remove any of the piston material and change the diameter size. You only want to insure that the surface is clean and “generally” smooth, free of any defects that stand “above” the polished surface of the piston. Small imperfections and slight scratches that run parallel to the seals are not a problem, deep scratches or grooves that run perpendicular to the seals will leak brake fluid. If your pistons aren’t severely damaged and the outer diameters have a clean polished look to them, chances are you can reinstall them without a problem. NOTE: When reinstalling the pistons it’s a tight fit trying to get past the new inner seals. You can help by making sure the back side of the piston has a smooth and rounded radius to it, to assist in getting past the initial resistance of the seal. It also helps to coat the surface of the piston with brake fluid to lubricate the point where the new seal meets the back of the piston. Don’t concern yourself too much with the face of the piston that comes in contact with the brake pad. As long as there are no deformations that form significant high spots and the piston face is “generally” flat and parallel to the rear, it’s fine.



14. Thoroughly inspect and clean the interior of the caliper. Make sure there is no corrosion or deposits in the channels/seats that the seals sit in. These areas **MUST BE IMMACULATELY CLEAN**. Be sure to thoroughly rinse away any deposits, debris, or cleaning solutions. Shoot brake cleaner through every hole to insure there is no debris remaining. Use compressed air to make sure all orifices are clean and dry before you begin reassembly.
15. The actuator rod has 3 sets of "Belleville" washers. Each set has 2 washers that sit back to back against each other (a total of 6 washers). If you take these off to clean them, take note of the order in which they came off the rod. When the e-Brake is in use, the actuator rod is engaged by the rotation of the arm shaft, compressing the washers and squeezing them together (reducing the space between them) allowing the rod to push further into the caliper and engage the back of the piston. Don't lose them!



16. Remove the "O" ring seal on the actuator rod that sits just in front of the Belleville washers and replace with the new seal from the rebuild kit. Place a small amount of grease on the threads at the tip of the rod.
17. Insert the inner piston seal into the caliper bore. Do this "dry" and insure that it fits snugly and properly into the seat. Make sure that it is not twisted or out of round before you attempt to insert the piston. You can "very lightly" apply a small amount of brake fluid to the inner surface of the seal to assist with reassembly of the piston, just make sure it's not enough to get into the seat and allow the seal to slide around & be pulled out before the piston gets past it.
18. Insert the actuator rod through the hole on the back side of the caliper until the seal is past the opening and you can't push the rod any further, by hand. **IMPORTANT NOTE:** The head of the actuator rod that remains exposed is asymmetrical. There is a rounded groove formed in the center of the head where the wedge key engages the rod. On one side of this groove the head of the rod is taller/longer. With the caliper oriented "upside down" in the vice, it is important to insert the rod with the groove running horizontally (parallel to the actuator arm shaft), so the taller side of the rod head is on top. Place a small dab of whatever grease you are using to pack the boot, under the lip of this tab or taller side of the rod head. This grease will hold the wedge key in place during assembly. Place a small piece of flat stock up against the caliper bore opening. Place the screw side base of a 4" C-clamp against the flat stock and using only the very tip of the opposite side of the clamp, engage the flat spot on the longer portion of the actuator rod head. Making sure the C-clamp remains in place, use it to squeeze the rod into the caliper, collapsing the Belleville washers together, moving the rod further into the caliper body.



19. Place the wedge key into the rounded groove of the actuator rod head, and allow the grease to hold it in place.

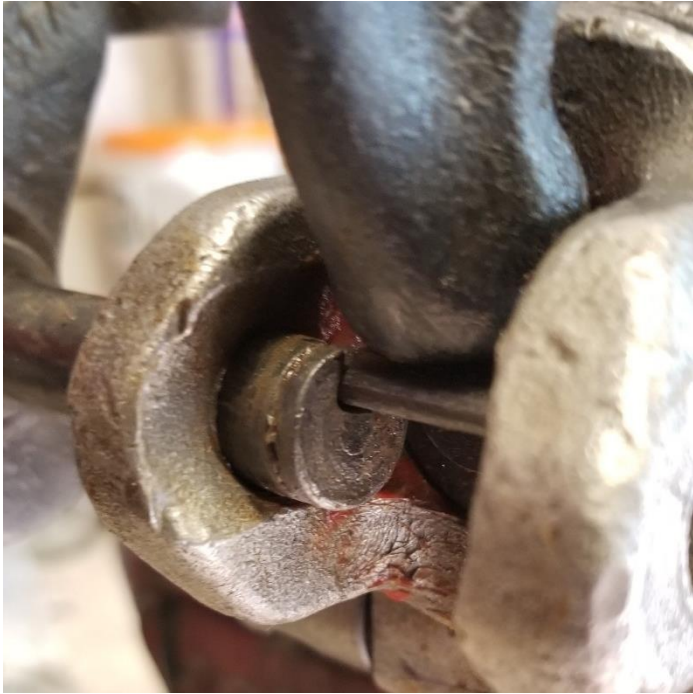
**IMPORTANT: The fat side of the wedge is what sits in the groove on the actuator rod. (or Fat side toward piston)**



20. Slide the large rubber boot over the e-brake actuator arm shaft, and temporarily peel it back over the arm, so as not to interfere with assembly.

21. Slide the shaft of the actuator arm into the caliper. Make sure that the arm is on the same side as the cable stop, and that when inserted it is facing straight up. You want to keep the flat groove of the arm shaft parallel to the wedge key. Slide the shaft under the wedge key making sure not to knock it off the actuator rod. Once you are past the key, continue sliding the shaft until it's through the hole on the other side of the caliper. Attach the cir-clip retainer and secure the shaft in place. NOTE: Some folks have reportedly ground the tip of the C-clamp to make it small enough to catch just the flat spot on top of the actuator shaft head, and not get in the way of inserting the arm shaft. I didn't have to do that. Whatever you do, do not force the shaft into the hole on the other side of the caliper. You could damage the bore and create slop in the seat for the shaft. Using the C-clamp method eliminates the need for any "violence" or undue stress being applied to the components.





22. Remove the c-clamp and actuate the arm to insure that the assembly functions as it should. The rod should depress further into the caliper and return when pressure on the arm is released.
23. Pack every exposed surface of the entire shaft and rod assembly with a thick coating of appropriately rated grease.



24. Pull large rubber boot back over to seal the entire rear half of caliper and secure with spring or retaining clip.

**It's time to re-insert the piston into the caliper. Some people like to insert the dust seal first and the piston second. I prefer to insert the dust seal after the piston has been screwed back in. I then take a pick and gently massage the seal into position to ensure that it's properly seated. So, when the piston is engaged and protrudes out of the caliper, the seal doesn't pull out with its movement. If you use this method be sure not to tear or cut the seal with the pick.**

25. Apply a light coat of new brake fluid to the outer diameter of the piston.
26. Push the piston into the bore opening until you meet resistance
27. Using whatever method you have devised to engage the slot on the face of the piston, put a fair amount of pressure against the piston face while simultaneously turning clockwise to tighten the piston onto the actuator rod threads. If all goes according to plan the piston will recess into the bore until its face is essentially flush with the inside of the caliper. Don't worry about turning the piston too much, or too far. Once fully seated the ratchet mechanism within the back of the piston will allow it to continue to spin.



28. Once fully seated, continue turning the face of the piston until the thin grooved line is on the same side as the bleed screw. So as to be parallel to the ground when the caliper is re-installed.



29. After bleeding the brakes, **(before engaging the E-Brake)** step firmly on the brake pedal 5 or 6 times to allow the ratchet mechanism inside the pistons to self-adjust. Pull the E-Brake handle to test function.

An idea I had after I completed this was to find an old one inch wide wood "spade bit", grind off the centering point and the edge of the bit until perfectly flat. Use this in a variable speed drill to insert into the slot in the piston face to screw the piston off and on. I'll do that for next time!

**GOOD LUCK!**