

Audi UrS4 Clutch Master Cylinder Replacement

One of the “inevitable” UrS failures is the actuating rod on the clutch master cylinder. After a number of cycles, the rod snaps, the pedal goes to the floor, and you get to drive home in first gear, perfect your clutchless shifts, or call a flatbed – your choice. Mine failed around 227,000 kms.

Verify the Failure

There are several failures that could cause the clutch pedal to go to the floor. To verify the master cylinder rod has broken, remove the under dash heater vent and trim strip and the knee bar cover. Reach up under the left side of the pedal mount and check to see if the master cylinder rod is intact. If it has broken, the clevis will be loose on the pin at the pedal eye.

Failure Mode

The failed cylinder is shown in Photo 1. The rod is welded to a plate that is crimped into the large round boss at the end of the cylinder boot. This plate sits on a flat rubber ring located between the plate and the cylinder side of the boss. On my cylinder the rubber ring flowed out on one side, allowing the top plate to cock. This stressed the rod and resulted in a fatigue failure.



Photo 1 - failed master cylinder

Remove Old Cylinder

1. The clutch master cylinder is fed brake fluid from the brake master cylinder reservoir. The hose to the clutch master cylinder is connected to the left side of the reservoir. Remove the strainer from the filler spout on the reservoir and remove enough brake fluid to get the level below the hose to the clutch master cylinder. I used a MightyVac and a suction bottle to suck the fluid out of the reservoir.
2. Open the bleeder valve on the clutch slave cylinder and gravity drain the fluid out of the clutch master cylinder. The bleeder screw takes an 11 mm wrench. You can get at it from above through the engine bay or from under the car. There isn't much room to swing a wrench – I used a gear wrench and a stubby box end to loosen & tighten the bleeder screw. Draining the system limits the amount of fluid that will drain into the cabin when you remove the hard line from the master cylinder. You have to be able to open the bleeder screw to bleed the system after you replace the master so you might as well find out at this point that it is seized and you are going to snap it off trying to loosen it. Close the bleeder screw after the system has drained.
3. Push the clutch pedal to the floor. The over-centre spring will hold it there. This gives access to the clevis pin through a hole in the front of the clutch/brake pedal mount. A spring clip on the left side of the pin secures the pin. Slide your hand up between the end of the relay panel and the pedal mount and slide the spring clip off. Push out the clevis pin. Remove the clevis and the attached broken section of rod. Pull the clutch pedal back up.
4. Place plastic on the floor and slide it up under the master cylinder. Place some old newspapers or facsimile thereof on the plastic to soak up any brake fluid that drains out of the cylinder. Remove the hard line at the bottom of the cylinder (12 mm wrench) and the rubber line halfway up the cylinder. Remove the two Allen screws securing the cylinder to the pedal mount (6 mm Allen wrench). Clearance is tight – I had to use an Allen key for the back screw rather than an Allen socket. Remove the old cylinder.

Install the New Cylinder

The new cylinder is shown in Photo 2. This cylinder cost less than half of the Audi part and is the identical cylinder with the Audi logo ground off. The new part comes without the clevis, pin, and locknut – you'll have to reuse these parts off the old cylinder



Photo 2 - new master cylinder

1. Thread the locknut and clevis onto the new cylinder. The distance from the centre of the clevis-pin hole to the face of the cylinder-mounting flange has to be set to $109.5 \text{ mm} \pm 0.5 \text{ mm}$ (see Photo 3). To beef up this rod I inserted two washers of appropriate thickness and tightened the bolts and clevis so everything was clamped together and the specified distance was obtained. This may prevent a future failure – or may result in something else failing, only time will tell.
2. Push the clutch pedal to the floor. Insert the cylinder into the mounting hole and fit the clevis over the eye on the pedal. Insert the clevis pin (there, that sounds easy). Access to this area is limited and I finally had to give up on the invective and put the brain to work. I crazy-glued the clevis pin to the end of a 6-inch length of $3/8$ " wood dowel and inserted the pin above the steering column through the hole in the right side of the pedal-mounting bracket (see Photo 4). Slide the spring clip on the left end of the pin, twist off the dowel, and the pin is in.
3. Pull the clutch pedal up and guide the cylinder into place. Install and tighten the two Allen mounting screws. Install and tighten the hard line at the bottom of the cylinder and the rubber line from the reservoir.
4. Set the vacuum switch clearance by pushing down the pedal, pushing the switch in (the "threaded" section slides through the retainer) and pulling the pedal up to the stop. This pushes back the switch body and sets the switch position.

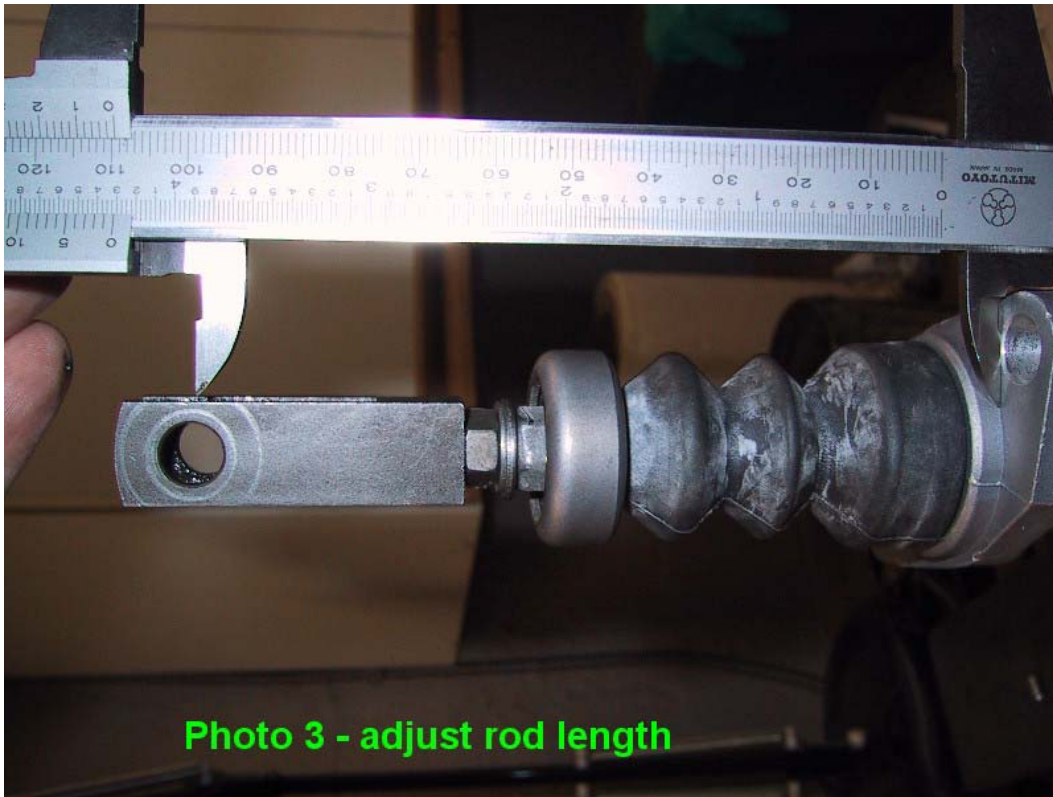


Photo 3 - adjust rod length

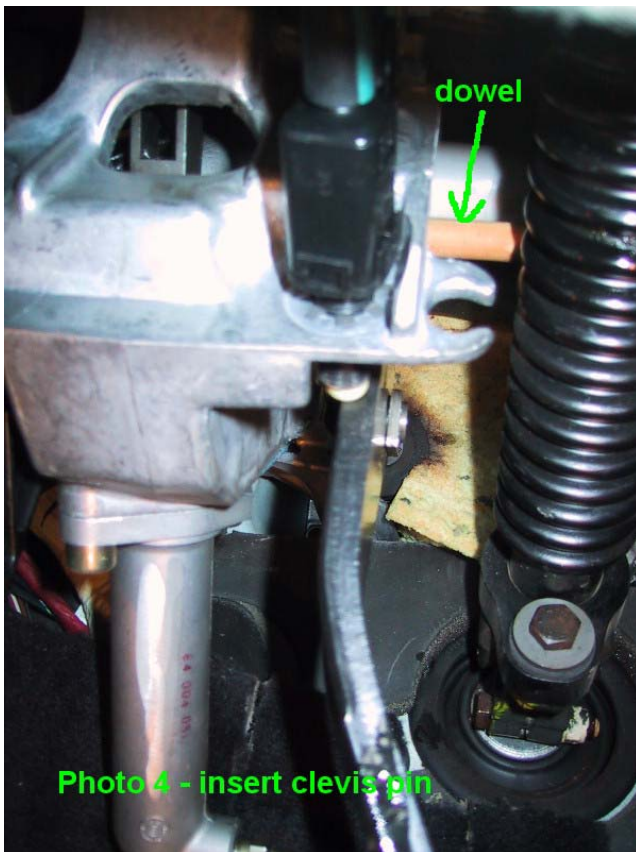


Photo 4 - insert clevis pin

Bleeding the Clutch Hydraulic Circuit

I used a pressure bleeder for this job as it makes it considerably easier.

1. Attach the pressure bleeder to the brake fluid reservoir. Open the slave cylinder bleeder screw and flush fluid through to clean out the old fluid. You may get lucky and have this purge the air, but this system typically has to be reverse bled.
2. Remove most of the fluid from the brake fluid reservoir. Attach the pressure bleeder to the bleeder screw on the slave cylinder and bleed the fluid up into the brake fluid reservoir. Fluid will leak out around the threads on the bleeder screw so be prepared to catch it. You don't want to flush dirty fluid into the brake fluid reservoir (ergo step 1. above).
3. Close the bleeder screw and try the clutch. If no pressure builds, repeat the bleeding procedure.

When I finished bleeding the clutch there was still some slack in the pedal that went away with repeated use – hey, maybe it's a self-bleeding design!

Fred Munro
October 7, 2004