

## OVERHAULING GIRLING FRONT BRAKE CALIPERS ( By Richard Dowling ).

### **Background information.**

1. One thing that is a problem for most people is the shims Jaguar fitted to the lower bolt securing the steering arm and caliper to the hub carrier. It is worth trying to make sure you collect them and later put them back in the right place. For this reason it is a good idea to spend 5 minutes per side with an old paintbrush and a jar of fuel or other suitable solvent. Clean up the area you will work in. Below is the "before" photo. This caliper was leaking brake fluid onto the wheel.



FIG 1.

Below is the area cleaned up, actually this also shows the rebuilt caliper in position. This car has the ABS sensor cable next to the brake pipe union.



FIG 2.

2. The shims are fitted on the lower bolt which has the security wire on it. The shims are mostly fitted between the black steering arm and the blue caliper body. However you can also find one between the caliper body and the tapped hole in the hub carrier which the bolt fits into. It is never easy to collect shims as you withdraw the bolt – be warned.
3. Before starting order seal kits for the calipers. It is also worth thinking about replacing the OEM pistons with stainless steel ones. The OEM pistons can be damaged and will wreck new seals if they are not in perfect condition. There are a number of spare parts suppliers stocking them. I bought my last set from a list member in Melbourne who makes them. Contact address: [ed\\_ward@iprimus.com.au](mailto:ed_ward@iprimus.com.au) **Procedure:**
  4. First remove the brake pads from the calipers. Watch you do not lose the anti-chatter spring, it really goes a long way if you do not hold it as you take out the pad retaining pins. Next push the brake pedal to try and pop all the pistons out as far as possible. If you have a seal which is leaking badly that piston will only travel a short distance and then you lose pressure and cannot move any more of the pistons. You can try pushing that piston back into the bore and then pack it so it will not move. The reason for this exercise is it can be difficult to grip the pistons and pull them out once the caliper is removed from the car.
  5. Next plug the flexible brake line union. For this you can make a tapered plug out of a bit of plastic dowel or bamboo BBQ skewer – you need a taper around 2mm diameter to plug the union. Remove the union from the clip first.
  6. The 4 bolts holding the caliper halves can be very, very tight. If you have time apply a rust penetrating fluid to the threads as much as you can before starting on the job. I find it is easier to put a ring spanner or socket on the 4 bolts and crack them while the caliper is still solidly attached to the hub carrier. The last calipers I tackled needed a 1 metre tube over the ring spanner for extra torque plus hitting the spanner with a big hammer to crack the bolts.
5. Withdraw the 2 bolts holding the steering arm and caliper body, collecting the shims as you do so. Remove the caliper body from the hub carrier.

If it is difficult to pull the caliper body free you can just about get a spanner on the bolt above the stub axle nut. You can see this bolt to the right and a little below the upper calliper retaining bolt in FIG 2., right behind the shock absorber.

Loosen this bolt maybe 1 turn and it provides more "give" in the steering arm to help you.

6. Now take the 4 bolts out that hold the caliper halves together.

Grip the pistons in a vice and pull them out of the caliper halves.

Use any suitable solvent to clean up the caliper halves. I use fuel and a compressed air source to clean it all up. I finish with a solvent such as paint thinners.

The instruction to only use very special and expensive brake cleaner is a joke when you see all the crap and corruption that has been sitting in your calipers the last 20 years.

7. FIG 3. shows a cleaned up caliper.

The 4 lower bolts are the caliper half bolts.

The 2 upper bolts are to secure the caliper to the hub carrier. Also shown are the 4 shims fitted on the longer of these 2 bolts.

There are 4 seals already installed in the bores. Also seen are 4 piston covers and 2 O rings to seal the caliper joint faces.

8. These pistons in FIG 3. are new stainless types. Kirby Palm mentions in his book the ones he bought needed polishing to make sure the seals run on a smooth surface and avoid damage.

That was true of the first set I bought in 1995. The last set from Ed Ward had a surface finish similar to that produced on a centreless grinder, so they did not need a polish.

Ed says the finish is straight off the lathe, no grinding is done. It is impressive.



FIG. 3.

9. It can be difficult to get the old seals out of the bores, because the seals are probably rock hard. If you use fuel to clean out the caliper halves it tends to soften the old seals and make them easier to remove.

Once the old seals are out, very carefully clean out the grooves and fit the new seals. The seals are a square section, but the groove is reputed to be slightly tapered to tilt the seals slightly and make them work effectively.

10. Fitting the new pistons in the bores can be tricky. I find best way is to coat the seal and piston with a small amount of brake fluid. Then push the piston into the seal as square as you can without too much force. You need to avoid rupturing the new seal. If the piston is reluctant to go all the way in rock it slightly from side to side as you push and that will make it slide in easier.
11. The piston has to be pressed fully home so that you can then fit the rubber covers on the piston. It is doubtful the covers do much good. They fit on a groove in the piston, but there is no groove around the bore so they can slide off quite easily: See FIG 4.
12. Next fit the 2 O rings to the caliper body and bolt the 2 halves back together. I use anti-seize on the threads. You will note these bolts are not originally fitted with plain or spring washers. However there is quite a depth of thread and if they are torqued up tight they should not move. I did not use any washers when rebuilding the 1979 XJ-S front and rear calipers over 10 years ago and they are still good. There does not appear any reason not to use washers if you want to.

I find it easier to do the final tightening when the caliper is back on the car.

Fit the bleed nipple and pipe in position as shown in FIG. 5. The pipe will need moving when the caliper is installed, so do not tighten it down at this stage.

13. Here is the fun part. You have to get those shims back into position as you insert the bolt holding the steering arm and caliper onto the hub. One way is to loosen the top bolt holding the steering arm to the hub. That bolt is above the big nut holding the stub axle in FIG. 2, and is right next to the shock absorber and it can be very hard to get a ring spanner on that bolt. Do not forget to make sure the pipe is going to line up on the flexible hose union.

You can fit the shims on the caliper with thick grease and hope to slip the caliper into position without them coming adrift, then push the bolt through.

When it is all sorted out do not forget to tighten the 3 bolts holding the steering arm and caliper in position.

You can now also torque up the 4 caliper half bolts tight.



FIG.  
4.



FIG.  
5.

14. The pads and retaining hardware can be put back in place now. Make sure you have not overlooked anything.

15. There is a chance the small clips holding the pins can rotate and gouge holes in the rubber piston covers.

I fit a piece of soft copper wire between them as shown in FIG. 6. This keeps the sharp ends of those clips clear of the covers. Take care, those clips can be pulled out easily so use thin wire and moderate tension.

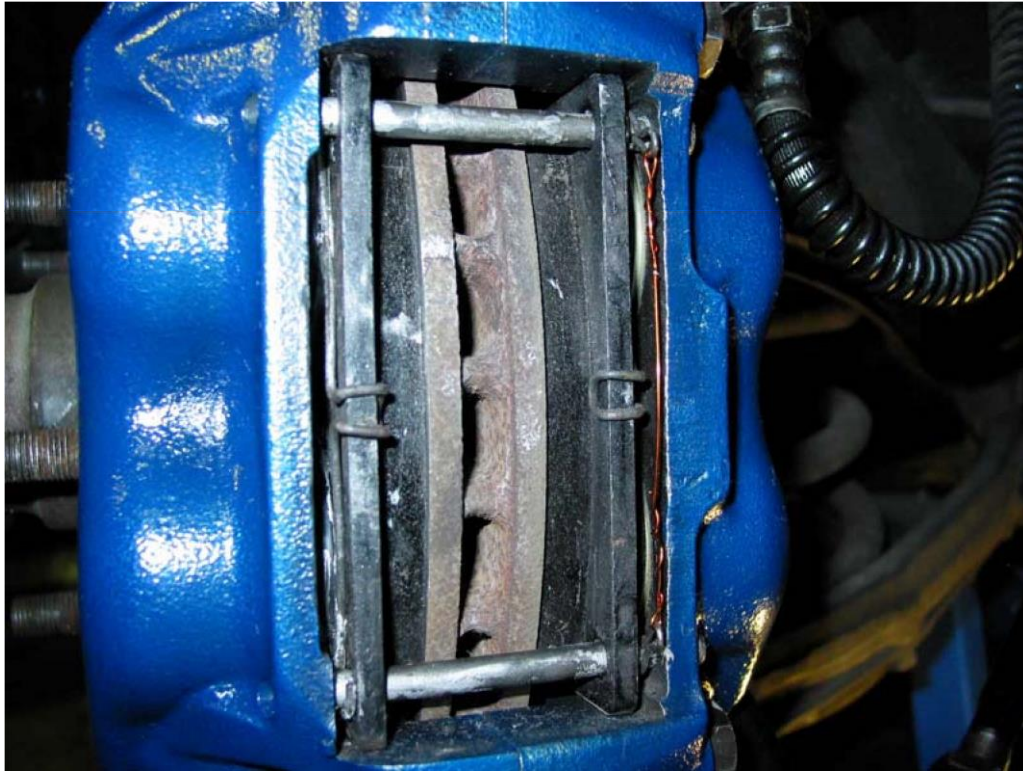


FIG. 6.

The above 'photos show an overhaul on my 1988 convertible which has ABS brakes. The blue paint is from a spraycan of high temperature brake calliper paint.

Previously the fronts and rears of my 1979 coupe were overhauled in a similar manner about 1995 using stainless pistons. I generally use Loctite on any nut or bolt which can vibrate loose. For other nuts and bolts I generally use either anti-seize or fishoil spray. This makes pulling things apart next time so much easier.

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