

Installing an ASD Differential in a non-ASD car and set up for fully locking manual operation:

A 201 or 124 ASD diff has an inherent ~ 25-30% LSD effect before the hydraulics kick in, i.e. the ASD clutch pack, etc. has a built in LSD effect.

An ASD diff along with its prop and half shafts installed in a non-ASD 201 or 124 will give a limited LSD effect. It can however be set-up using a manually actuated hydraulic system to give full lock-up when desired.

General information:

---The standard 201 open differential is the smallest bodied Mercedes differential. The diff, the rear section of the prop shaft, and half shafts were only used on open diff 190's.

There was a change in the drive flange bolt circle somewhere along the line so, although the differential will bolt into the sub-frame, the half shafts may or may not mate to the diff drive flanges.

If you source a replacement open diff make sure the existing half shafts will bolt up or source the replacement complete with half shafts.

---The 201 (16V) LSD uses a larger 124 differential body. Because of the longer nose on the diff, the rear prop shaft section of a 16V LSD is ~25mm shorter than the open diff. prop shaft.

16V LSD half shafts are shorter than open diff half shafts and were only used on LSD equipped 190's. If you source a 16V LSD diff for installation in a non-LSD 190 make sure you get the prop shaft rear section and the half shafts.

16V LSD available ratios: 3.07 or 3.27.

---ASD differentials used on both the 201 and the 124 are identical. They use the same differential body and rear prop shaft section as the 16V LSD but due to the increased width of the ASD differential drive flange to drive flange, ASD half shafts are shorter than 16V half shafts and are unique to ASD equipped 190's.

--- 201 & 124 half shafts ASD (or LSD) will not interchange due to the 124's wider track; ie the 124 half shafts are longer.

---ASD ratio range: 2.65, 2.82, 2.87, 3.07, 3.27, 3.29

Differential drive flange to drive flange measurements:

201 open diff: 22.5cm

201 (16V) LSD: 24cm

201 ASD : 28.5cm

124 open diff: 24cm

124 ASD : 28.5cm

Easy Swaps:

Any 201 open diff into a non-LSD/ASD201 = YES

16V LSD w/half shafts/rear prop shaft into any 201 = YES

201 ASD w/half shafts/rear prop shaft into any 201 = YES

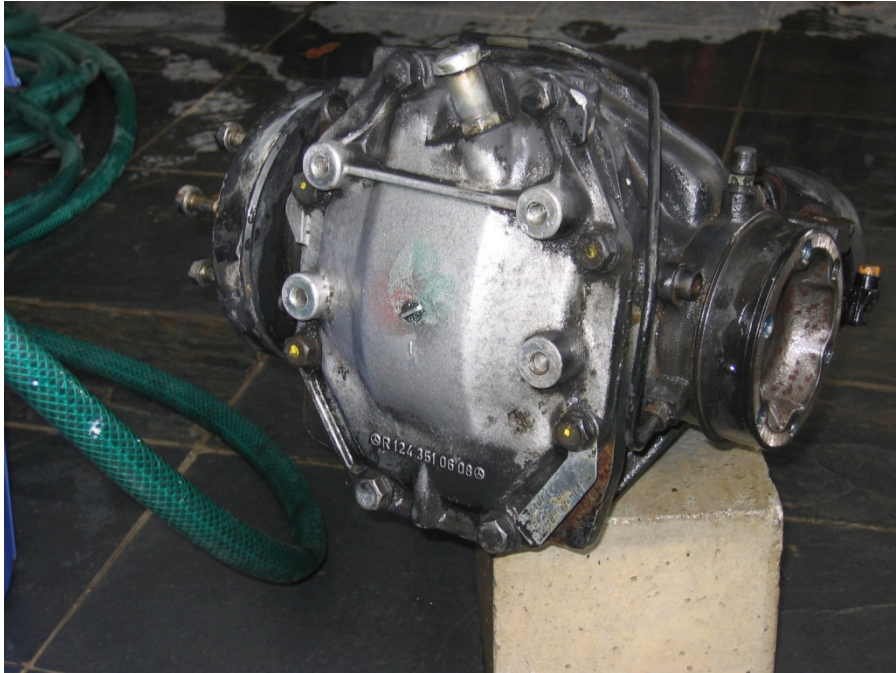
124 open diff into a 16V after changing rear cover = YES

201 (16V) LSD into a 124 using 124 half shafts = YES

Not So Easy Swap:

124 ASD into any 201 = YES, if you can find a set of 201 ASD

half shafts and rear prop shaft section. If not, it will involve machine work.



201 ASD differential. Note: 1) the hydraulic hard line running across the top of the casing, 2) the four bolt rear cover, 3) the small tag at 5 o'clock, and 4) the "pie plate" left drive flange.



Same differential showing the “pie plate” on one drive flange and the hydraulic line to the ASD actuator pistons. The pistons are connected by the hard line across the top. There is a hydraulic bleed screw on the other side.

I have never found the reason why some differentials have two pie plates, some only one, and some none. If anyone knows the reason please let me know.



124 ASD differential. Note 1) the hydraulic hard line, 2) the two bolt end cover, 3) no “pie plates”. The small lube tag at 5 o’clock has been painted over but is there.

Swapping an ASD diff into a non-ASD car:

201 into 201:

A 201 ASD diff, rear prop shaft section and half shafts will bolt right into a non-ASD 201. I suppose it is possible to transfer the entire ASD system (ECU,sensors,

pump, piping, etc, etc) from a donor car but the work involved makes the job a practical impossibility.

A straight ASD differential swap without the rest of the ASD system will yield partial LSD action and a generally more robust differential. For more LSD action read on.....

124 into 201:

This is a bit more complicated. A 124 ASD diff will bolt into a 201 after:

- 1) changing the 124 two bolt rear cover plate for a 190 four bolt rear cover plate (they are interchangeable).
- 2) source a 190 LSD rear prop shaft section.
- 3) source a set of 201 ASD haft shafts with the same drive bolt pattern as the 124 diff to be installed.

We were not able to locate a set of 201 ASD half shafts and because the half shafts we could locate were too long for the narrower 201 rear track we shortened the half shafts.



In case anyone is interested here is how they were shortened:

Disassemble the half shafts, cut the shafts in a lathe to the correct length (cut 52mm from the middle of the shaft), make a slightly undersized 7.5cm long sleeve, taper the ends of the shaft for welding, heat and slip the sleeve onto one half of the cut shaft, weld the cut shaft together in a lathe, machine the welds to the shaft diameter, true the shaft straight, then heat the sleeve and bang it on over the weld and weld the sleeve to the shafts. It sounds like a lot of work but it was an easy two hour job at a cooperative machine shop.

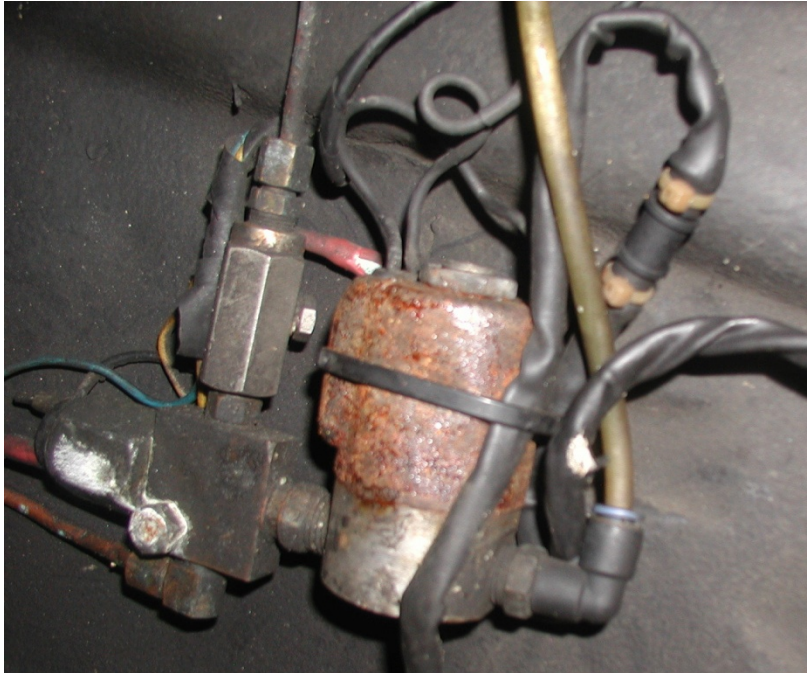
Manual Hydraulic System:

The manual system is basically a hydraulic hand pump actuating the ASD clutch pistons. There is a check valve in the pump line to hold pressure locking the diff, and a solenoid valve to bleed off pressure to un-lock the diff.

The pump is an eBay go-kart brake master cylinder with integral reservoir. The pump was fitted with a 20cm handle and mounted on a bracket next to the driver's seat. The pump has two outlets. The unused outlet was plugged off.

On the underside of the car below the driver's seat: a junk yard 1/8" four way brake "cross" fitting with: 1) a 1/8" in-line 2000psi (eBay) ball check valve, 2) a brake pressure switch, and 3) a 12v solenoid with a return line to bleed pressure back to the pump reservoir.

The solenoid is operated by a push button under the dash. The brake pressure switch is connected to an LED on the dash: the LED lights when the system is pressurized.



The check valve, pressure switch, and solenoid mounted on a small 1/8" 4-way block, under the car, below the driver's seat. The line top left is the pressure line from the pump feeding into the 4 way block through the check valve. On the left is the brake pressure switch. On the bottom, the copper hard line back to the diff. The solenoid & the plastic fluid return line are on the right.



The pump is mounted on a piece of 3" x 1" alum angle bolted to the floor next to the driver's seat. Four pulls on the lever locks the differential. The plastic line is the fluid return line from the solenoid. The pressure line is just visible on the lower right side of the pump.

The whole system cost ~\$75. The biggest expense was the \$30 go-kart master cylinder. The rest was hardware, some 5mm copper hard line and fittings, and a \$5 the brake switch. The 12V solenoid if bought new will run about \$25 from a pneumatic supplier.

Once all the components were in hand the assembly and installation took about three hours. The ASD differential is a 3.07 from a 124 4-Matic wagon which keeps the original speedometer and ABS system sane. We use Citroen hydraulic fluid.

Comments or Questions welcome: bobf@pd.jaring.my

Side Note: There was an excellent write up posted recently on the 190Rev Forum on rebuilding an ASD differential.





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