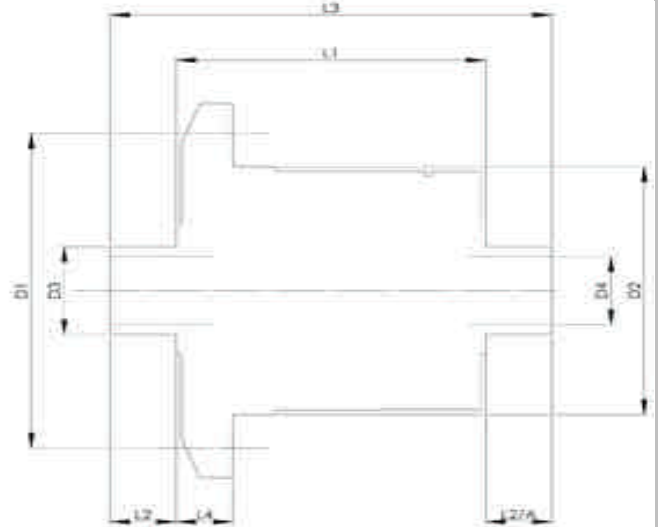




## Before You Start

Due to the extensive list of different final drives installed in BMW vehicles, particularly across different countries, there may be instances where the LSD gearset offered differs dimensionally with the gearset installed in the vehicle concerned. It makes good sense, therefore, to check the gearset installed in the car at the earliest possible time. In most cases, it is possible to remove the rear cover of the final drive to check the critical dimensions before committing to the conversion.

The critical dimension is the crownwheel to bearing dimension, marked L4. This can be checked visually by offering the LSD up to the existing open differential. If there is doubt about the configuration, then check the BMW number as below.



## BMW Part references, location on differentials



On a BMW "open" differential gearset, the last 7 digits of the part number are located on the rear of the crownwheel flange. (1 216 158)



On a BMW LSD, the BMW part number is located on the clutch drum. (1 117 242)

These numbers are the only absolute references that can enable a match to a Quaife ATB LSD. In most cases these numbers can be observed by removal of the rear cover. In some cases, however, it may be necessary to remove the entire final drive.

Please also give the following information

Final Drive Casing BMW Number  
(Seven digits cast into casing)

Chassis Number  
(Last seven characters)

Transmission Type  
(Manual/Auto/SMG)

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## Replacing differential in final drive.

Removing and installing final drive- refer to BMW TIS for the vehicle concerned.

Drain off fluid.

Secure final drive to BMW special tool 33 1 010 (retaining bracket) or similar.

Remove rear casing cover, and press off both drive flanges with a tyre iron.

Remove output shaft seals and bearing outer race circlips.



**Caution!** do not mix up bearing races and circlips. Changing the total thickness of circlips will change the friction torque value. The friction torque of the pinion bearings, the backlash and tooth contact pattern will **not** have to be adjusted again provided the circlips and bearing races are reinstalled in their original positions, and the pinion assembly is not disassembled.



Remove complete differential gear set from casing.

Press off Bearing Inner races. Take care not to bend the bearing cages. Ensure that the bearing inner races are retained with the matching outer races. If the vehicle has covered more than 50,000 miles, they might require replacement.

Press or tap off crown wheel (cold).





## Installation.

Press on bearing inner races to new LSD gearset.

Heat the crownwheel to 100 degrees (immerse in boiled water), and place it onto the new LSD gearset, taking care to align the bolt holes. Ensure no water remains in the bolt holes prior to installing the bolts. (risk of hydraulic locking)

Install the original crownwheel bolts using loctite 270. Torque specification for bolts is 100Nm +10/ -0, then torque angle 30' +4/-0.

It may be necessary to reduce the flange diameter of the crownwheel bolts to 22mm in order to clear the LSD cap head screws.



Install new LSD gearset assembly, lubricate bearings with gear oil.

*Note. In some cases, the complete assembly is too large for the rear aperture of the casing. In this case, it is necessary to disassemble the LSD gearset, reassembling with the gearset in-situ inside the casing. See separate instruction below.*

Lubricate with gear oil and carefully push in bearing outer races. Do not tap into position. If the bearing is correctly aligned, it will fall into place. Reinstall circlips in original positions, and install new output shaft seals.

Crownwheel tangential clearance (drive pinion backlash) should be checked with a dial gauge according to BMW procedure. It should not be necessary to adjust with shims. BMW tolerance for a new differential Backlash mm 0.06 to 0.14mm. (0.0024 to 0.0055in.). However, it is possible to run a differential with backlash of up to 0.20mm, but this will produce driveline shunt (exactly like the BMW M-Differential, which runs with 0.20mm backlash)

Before installation of the drive flange, place new round wire snap ring in groove of the LSD gearset so that both ends are recessed in the groove. (supplied) This prevents lateral bending of the ring.

Lubricate the inside diameter with a small amount of anti-seize compound. Lubricate drive flange shaft with gear oil. Push in drive flange by hand and turn slightly until wire snap ring is heard to engage.

Clean the faces and install rear cover using BMW sealant or gasket as appropriate.

Reinstall differential into car and fill with oil. Use BMW recommended gear oil, but not LSD oil. Do NOT use additives or any other fluids designed to reduce gear friction.

Test the final drive by running the car gently between full left and right turns to ensure oil is fully circulated. Drive the car normally for 10 miles before any aggressive use. No further running in is necessary.

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BMW



Mercedes

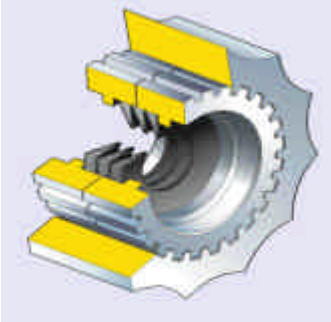


Mini



Interiors

## Additional Procedure for disassembling the LSD for loading into 188l casing

<p>If it is necessary to disassemble the differential to install it into the final drive casing, all thread locking material <b>MUST</b> be completely cleaned from the bolt holes and bolt threads. Warranty claims will be voided in cases where this procedure has not been carried out.</p>	
<p>Remove the allen head cap screws from the LSD gearset. Clean any excess thread locking agent from the screws using a die. Take care not to cut metal from the threads (use die by hand, not in a die stock)</p>	
<p>Tap apart or press the LSD casing apart, being careful not to allow the scroll gears to drop out. Clean any excess thread lock from the bolt holes with a plug tap (M8x1.25) If you loose the configuration of the centre shim stack, this pic. Shows how the arrangement should be.</p>	
<p>Load the crownwheel and LSD crownwheel flange into the final drive casing. It may be necessary to remove several of the long scroll gears to allow installation.</p>	
<p>Once the crownwheel assembly is in place, the scroll gears can be replaces, and the outer casing carefully put back into place. Note the position of the assembly dowel hole. This is not a bolt hole and must align up with the dowel hole in the LSD crownwheel flange correctly.</p>	
<p>Reinstall the LSD Allen head cap screws using Loctite 270, and torque to 37Nm. Ensure the bolt holes are free from oil or other materials. Do not over-use Loctite. Failure to ensure the bolt holes are clear might result in breakage of the housing due to hydraulic action.</p>	