

**\*\*These instructions are specific to official BMW QUAIFE ATB Differentials only. Procedures for some applications may vary. Contact Birds for further information.\*\***

## Replacing differential in final drive.

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

**Caution!** Under no circumstances should you alter the preload of the pinion bearings. In particular, on final drives with a large single nut that connects the cardan shaft to the pinion, you must not use the large castellated nut for bracing whilst disconnecting the cardan shaft.

It is assumed that in all cases, the technician responsible for the installation is competent, and has sufficient skills to work in a clean environment, and can carry out work to a perfect standard.

Drain off fluid.

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

Remove output shaft seals and bearing outer race circlips.

Clean out all oil and use clean working practices.



**Caution!** do not mix up bearing races and circlips. The preload 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 or altered in any way.

Remove complete differential gear set from casing.

Press off bearing Inner races. Ensure that the bearing inner races are retained with the matching outer races and circlips. If the vehicle has covered more than 50,000 miles, they might require replacement.

Press or tap off crown wheel (cold).



## Installation.

Heat the crownwheel to 100 °C. (immerse in boiled water), and place it onto the Quaife LSD, 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.

Press on bearing inner races to new LSD gear set. Ensure that the races are fully pressed home up to the bearing shoulders.



Install LSD gear set into the casing, lubricate bearings with gear oil. Install the left outer race and install the circlip. Press the Quaife gently from the right hand side to ensure the circlip is in the seated position. Install the right outer race and circlip. It may be necessary to press or tap in the right circlip, as this preloads the output bearings.

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 may produce driveline backlash (exactly like the BMW M-Differential, which runs with 0.20mm backlash)



Before installation of the output flange, ensure the round wire snap ring is fully seated in the groove of the shaft so that both ends are fully recessed in the groove. 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 inside parts of the final drive, and the joint faces, then install rear cover using BMW sealant or gasket as appropriate.

Reinstall differential into car and fill with oil. Use BMW recommended or 75w 90 synthetic gear oil, but not LSD oil. Do NOT use additives or any other fluids designed to reduce gear friction. Our recommendation is Titan Sintopoid 75w90.

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.

**Birds**

BMW & Mercedes Differentials



---

Kevin Bird Garages LTD (Birds) – Exclusive QUAIFE Distributor  
2, The Ridgeway, Iver, Buckinghamshire, Great Britain, SL0 9HW  
+44 1753 657 444 | [quaife@birdsauto.com](mailto:quaife@birdsauto.com) | [www.birdsauto.com](http://www.birdsauto.com)

---

20/04/2018