



## TECH NOTE



# QUAIFE ATB DIFF INTO M32 SIX-SPEED BOX



Words and photos: Dougie

Whether it's the flashing yellow 'TC' light on the dash or perpetual wheel spin out of corners, a limited slip differential will sort your front-drive Vauxhall out. Here we show Vauxhall tuning experts Courtenay Sport fitting a Quaife Automatic Torque Biasing differential to a Corsa VXR.

The lack of a limited slip differential is something that's bugged performance Vauxhall drivers since the days of the MkII Astra GTE 16V. There was a car that was crying out for an LSD to harness the substantial grunt of the 20XE engine.

Perhaps oddly, Vauxhall have never bothered with LSDs on anything beyond the Omega, Carlton and Senator. Powerful front-wheel drive cars have been made to make do with traction control systems of varying effectiveness over the years, but none have ever come close to the improvement in control that a proper differential offers. The way in which many of their cars are transformed makes Vauxhall's decision not to even offer one on the options list all the more confusing.

Modern cars such as the Corsa VXR and many others are fitted with the brilliant M32 six-speed gearbox,

which is a revelation compared to the older five-speed variants. While the Corsa, Astra, Vectra and even Zafira and Meriva all have excellent handling capabilities for their class, once the performance is increased the cars could really benefit from a limited slip diff.

Leading manufacturer Quaife have a huge range of differentials for Vauxhalls. One of the newer additions to the lineup is suitable for fitment in the M32 gearbox. It's the same unit as fitted to the Focus RS from the factory, and widely regarded as playing a major part in the car's brilliant handling.

Courtenay are able to supply and fit a Quaife ATB differential to any suitable Vauxhall. Our step-by-step guide outlines the procedure on a Corsa, which requires removal of the engine bed (although this is not required on the Astra). It is possible to carry out the work yourself - essential tools include a full set of female torx sockets, ball joint splitters and a torque wrench. Courtenay advise that sometimes it is possible to re-use the original diff bearings, but most of the time they will be impossible to remove, and to avoid any problems they always fit new ones.



1



Lock the steering column and undo the pinch bolt on the coupling at the steering rack. Ensure the steering wheel is not moved, as the rack is removed with the engine bed.

2



With the car on ramps or raised on axle stands, remove the oil drain plug from the left hand side of the gearbox and drain the oil into a suitable container.

3



Supporting the rear of the gearbox with a stand or jack, next remove the rear-mounting bolt.

4



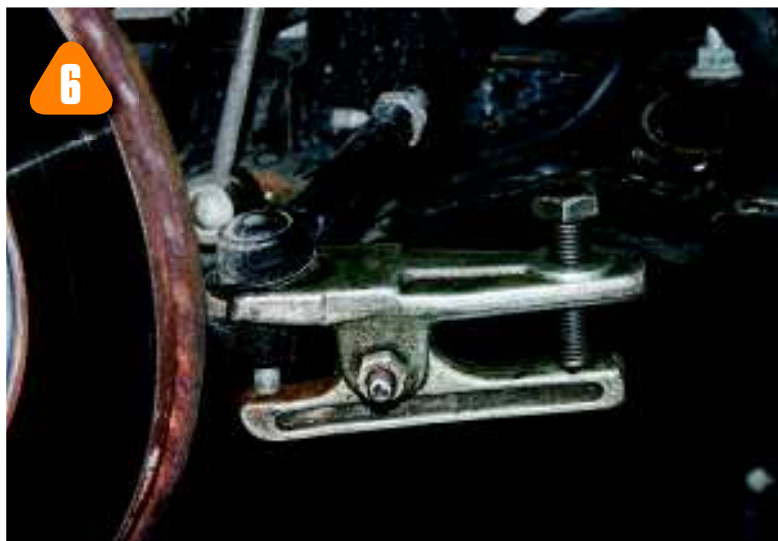
Remove the screws holding the plastic cover to the underside of the engine.

5

Undo the track rod end nut. Using an airgun can help as the thread can start to spin.



6



The track rod end must be separated from the strut. Use a suitable ball joint splitter as shown.





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Undo the bottom ball joint nut and remove the bolt.

8



Separate the ball joint from the strut by using a small chisel. The ball joint should then lever apart.

9



The anti-roll bar link must be counter-held at the rear to remove the nut. Undo it, and separate it from the strut.

10



Undo the large nut on the end of the driveshaft and then pull the strut free from the shaft.

11



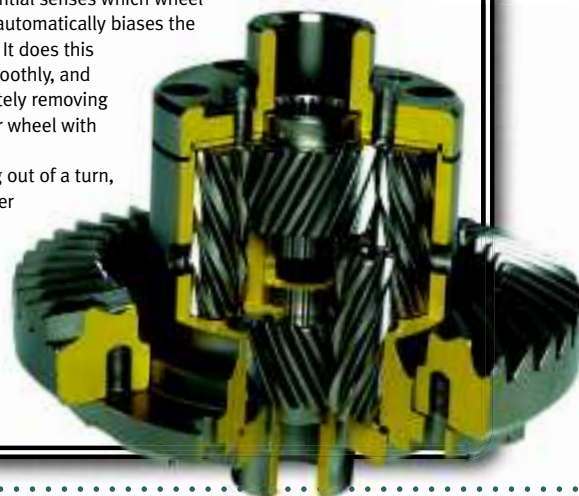
Before undoing any of the bolts for the engine bed, mark its position on the chassis with a marker pen to ensure it goes back in the same position.

### HOW DOES A QUAIFE ATB WORK?

With a normal open differential, power is wasted through wheel spin under acceleration. This happens because the open differential shifts power to the wheel with less grip, along the path of least resistance.

The Quaife differential senses which wheel has better grip, and automatically biases the power to that wheel. It does this continuously and smoothly, and without ever completely removing power from the other wheel with less resistance.

While accelerating out of a turn, the unit biases greater power to the outside wheel, reducing inside-wheel spin. This allows the driver to begin accelerating earlier, exiting the corner at a higher speed.





12



You can now undo the bolts holding the engine bed in place. Have an assistant support it as the bolts are removed. It can now be lifted free from the car.

13



Undo the bolts holding the equal length driveshaft mount and remove it.

14



Remove the driveshafts from the gearbox, they may need to be levered. Take care when doing this.

15



Remove the four bolts from the cover where the left hand shaft fits. Recover the washer and place the parts somewhere safe.





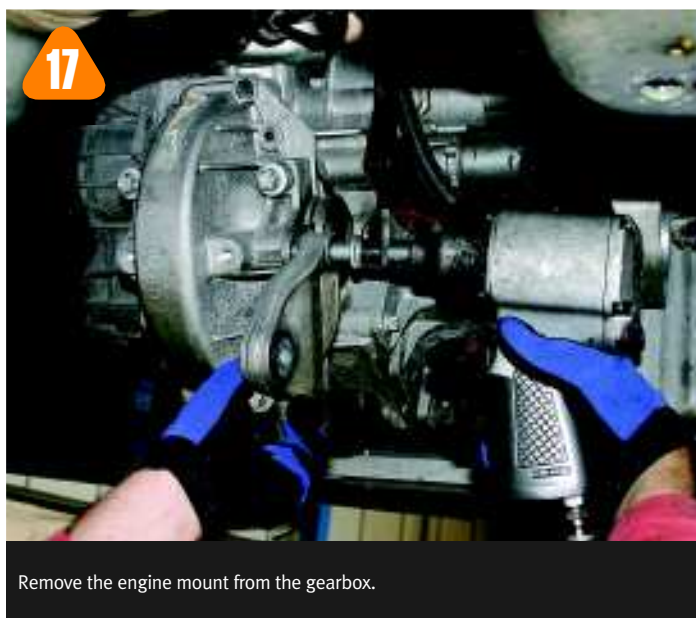
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16



Remove the bolts from the diff casing on the rear of the gearbox. Leave two bolts in slack.

17



Remove the engine mount from the gearbox.

18



Ensuring two bolts are still in place, give the casing a tap with a rubber or copper hammer to break the seal.

19



With the bolts removed, the complete diff and casing can be removed from the gearbox. Be careful with the crownwheel as the teeth are very sharp - wearing suitable gloves is advisable.

20



Place the diff on a clean level surface. Undo the bolts holding the diff to the crownwheel and separate the two.

21



Thoroughly clean the diff casing with degreaser and a cloth. Ensure that the swarf-collecting magnet is replaced with a smear of sealant.





22



The crownwheel bolts can be reused but must be cleaned of old sealant and degreased. With an assistant holding the diff, torque the bolts to 80 Nm, use loctite.



23

Using a suitable drift, tap the new outer diff bearing onto the diff. The inner diff bearing should simply push onto the diff. It's now ready to fit to the car.



24

Apply some suitable sealant to the mating surface of the gearbox.



25



26

Refit the cover on the outer driveshaft side, ensuring that the washer is in the correct position. With this done, it's a matter of refitting all the components. Remember to fill the gearbox with the correct amount of oil, that the steering rack or column has not moved, and that the engine bed is bolted back in the same position.



Fit the assembly into the gearbox, taking care to ensure it's the right way round. Have an assistant help out to support the outer casing as it's fitted.

#### CONTACTS

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#### COSTS

**QUAIFE DIFFERENTIAL, BEARINGS  
AND FITTING PACKAGE DEAL £999.00**

**QUAIFE ATB DIFF £645.00**

**REPLACEMENT DIFF BEARINGS  
£100.00**