



Useful info

DIFFICULTY RATING



TIME TAKEN
One day



ESSENTIAL TOOLS

Universal centering tool

Angle gauge

Trolley jack

Engine crane

MK4 ASTRA TURBO FLYWHEEL UPGRADE

A stronger clutch and a lighter flywheel are better for coping with extra torque and better acceleration from power upgrades. Words and photos: Martyn Williams

Lighter flywheels are guaranteed to put some extra zing into any engine by reducing its rotating mass. The easiest way to imagine the role of this component is to think for a moment about the opposite effect. What would happen if an Astra flywheel was doubled from its standard 9.6 kilograms to nearly 20 kg? The result would be a sluggish engine response as it drags the flywheel up to speed. Inertia on the overrun would also take all the snap out of the downshifts.

Courtenay Sport have come up with a popular flywheel upgrade for the Zafira GSi Turbo, Astra Mk4 GSi Turbo, SRi Turbo, and Coupe Turbo models (the Astra here is a Stage 4 Triple 8). The replacement flywheel is 4 kilograms lighter at 5.6 kg and is machined from billet steel and plated for extra durability. It costs £225.00 and

with more power to tame, goes together well with a Courtenay fast road clutch assembly (cover and plate) at £195.00. This is good for outputs up to 300 bhp, but beyond that, an uprated competition type clutch is best at £395.00. Clutch life under normal use tends to be good, so it's worth making sure that other components will perform reliably over the same period of time by splashing out on a new hydraulic slave cylinder. This is £99.00 from Courtenay with the clutch.

Removing the gearbox and fitting a new flywheel and clutch is an advanced DIY task but it's mainly a nut-and-bolt job that includes disconnecting cabling, gear linkages and the driveshafts. The two important tasks are supporting the engine and dropping the engine bed. Most critical is making sure that this subframe - which has about 10 mm of movement in the captive nuts - is properly aligned when it goes back.

Aligning the frame without using a jig needs careful preparation before removal. It will need some reference points marked between the body and frame, ideally with a metal scribe and steel ruler for maximum accuracy. If there are any doubts about how accurately it's been screwed back, it's always possible to have it checked with a jig later. This is worth doing anyway, because there is no way of telling if the bed was previously misaligned. Keeping the engine in a raised position while the frame is dropped is done professionally using a supporting beam that locates in the wing channels. A DIY solution is to use an engine crane. Alternatively, it's not rocket science to cobble up a homemade steel beam assembly using a bolt with chain attached to the engine to keep it in position. If this all sounds like a lot of work, it's worth knowing that Courtenay normally charge about £295.00 for fitting a supplied flywheel

and clutch providing no other problems crop up along the way.

Reassembly of the flywheel and clutch includes centering the friction plate with the cover to allow the gearbox splined input shaft to glide into place as it's replaced. One way to be sure of an accurate result is to use a universal centering tool. A basic tool can be bought for as little as £15.00. Cheaper alternatives include an old gearbox first motion shaft, or a piece of pipe or a jack handle that is the right size to fit into the friction plate. Then while the cover is only just nipped up - allowing for the friction plate to be moved - the plate can hopefully be centred by eye, but this can be a bit hit and miss. Once everything is back in its place, one of the final jobs will be filling the gearbox. It's not advisable to re-use the original oil even if the gearbox has only done low mileage because it is probably not synthetic.



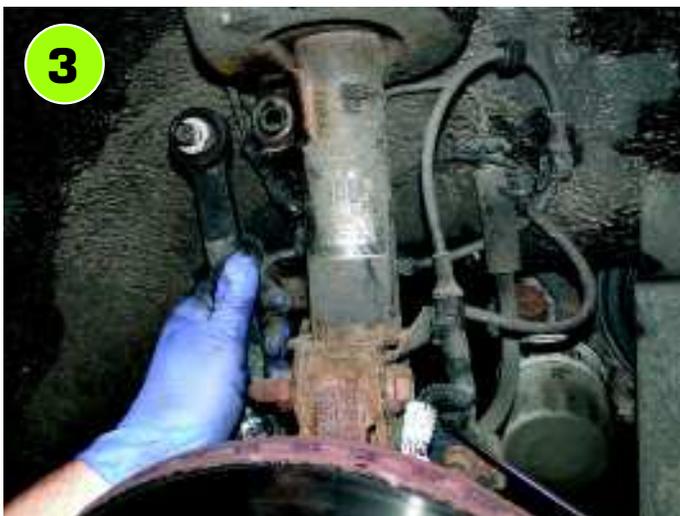
1

Before the column pinch bolt is removed, make sure the column is locked, which should ensure that (if the rack is not disturbed), it will slot into the same position when reassembled. It also prevents the wheel from over-rotating, which can damage airbag wiring.



2

The Lambda sensor plug lurks here. Disconnect this and thread the Lambda lead down and tuck it back near the sensor. The downpipe/front section of the exhaust is removed.



3

The anti-roll bar linkage, steering knuckle and the bottom joint pinch bolt need to be detached to allow room for the CV joint to come out of the hub. The pinch bolt clamp usually needs to be gently opened up with a chisel.



4

Run the nut up flush to the top to protect the threads before tapping the CV joint free in its splines.



5

Clamp the flexible hydraulic hose to the clutch. Push the connector banjo down to take the pressure off the small wire clip sticking out of the side. Pull the clip out and also remove the seal shown. It has a tendency to fall out so should be stashed for refitting later.



6

The wiring to the steering motor has to be dropped down to avoid it snagging. Slide out the purple fuse and disconnect the connector plug shown. There is also an earth lead to disconnect which goes directly to the battery terminal to the motor.



7 Once the battery and its tray are removed, the three bolts retaining the engine mount bracket can be removed.



8 The engine support jig is fairly simple in its construction and wouldn't be difficult to replicate. The other DIY solution is to use an engine crane.



9 Easy removal of the front engine mounting bolt is assisted by jacking up the end of the mounting - a light touch is usually all that's needed to take the pressure off.



10 The rear engine-mount bracket is released at both ends, the back end being attached to the diff.



11 Once the engine bed is supported, shown here using the correct Vauxhall jig, the four main retaining bolts can be removed.



12 The jig serves a dual-purpose of indexing its position as well as supporting the engine bed. It could be carefully dropped using a trolley jack with a large piece of wood across the width. The balance point across the frame is about two-thirds from the front.



13 No prizes for spotting the oil leak. It turned out to be a simple cam cover gasket problem. Everything is now ready for the gearbox removal.



14 Oil needs to be drained from the gearbox before removing the driveshafts.



15

The CV joint is retained by an expansion clip on its splined shaft and only needs a strong flat-ended bar to lever it out.



16

The jack shaft can be pulled from the diff after removing the three bolts from the bearing cap to loosen it off before releasing the bearing bracket.



17

After detaching the auxiliary water pump bracket, it's recommended that it's fastened out of the way with a tie wrap to the fan housing (see inset).



18

The gear change cable ball-joints have sprung-loaded clips which means they only need careful levering to remove. The bracket retaining the end of the cable is held by two bolts.



19

As with all wiring around the engine bed, it's best to disconnect the oil pressure sensor plug and tuck it out of the way before removing the driveshaft.



20

The last couple of gearbox bell housing bolts to be removed should be at the top. Some of the bolts face towards the gearbox and screw into the housing on the engine/sump side.



21

Here the gearbox is being supported on a jack with a special frame. If the cup of a trolley jack is carefully-placed it should perform the same function, ideally with two pairs of hands supporting it.



22

The clutch cover is loosened evenly and removed. Flywheel bolts are tight and may need a tap with a hammer on the end of the spanner to get them loose.



23

The new lightened flywheel is plated and therefore needs to be scored to make sure it grips the friction plate OK. Use about 80 grade metal oxide paper or a similar abrasive pad.



24

Vauxhall specialists use a locking tool as shown. A steel bar or large screwdriver can be wedged between the ring gear and a strengthening rib where the housing face is close to the flywheel.



25

The flywheel is fastened with stretch bolts, so they need to be renewed. The tightening angle is best done with a gauge but a piece of cardboard marked using a protractor is one way round it.



26

The clutch friction plate needs to be centred with the cover. A universal centering tool can be bought for less than £15.00.



27

Thread lock on the cover bolts is a good idea, as are new bolts. Tighten it down evenly, working on opposite bolts across the flywheel.



28

Once the driveshafts are refitted, both the filler and level plugs can be removed and the gearbox filled until it starts to dribble out of the level hole near the diff at the back. The car needs to be level to fill accurately.

THANKS

Our thanks go to Courtenay Sport founders Jon and Mark and the dedicated team, and to Dave for twirling the spanners. Courtenay are based in North Walsham in darkest East Anglia, not far from Norwich. Visit their website at www.courtenaysport.co.uk or call them on 01692 404313.