

Courtenay Sport Ltd - Dump Valve Information

Dump Valve Fitting Recommendations

This is a guide for fitting a dump valve and eliminating dump valve related drivability issues on Astra G and H, Zafira A and B and VX220 fitted with the Z20LET - LEL - LER - LEH engines.

The dump valve for these engines must be a twin piston unit as the car has air mass metering. The twin piston unit stops the valve breathing un-metered air on vacuum, confusing the engine ECU.

How a Dump Valve Works

Traditionally a dump is fitted in the boost pipe close the inlet manifold; it has a vacuum - boost trigger pipe taken from the inlet manifold between the throttle body and the engine. When driving the car hard on boost there is boost pressure pushing on the dump valve, however there is equal boost pressure pushing on the dump valve diaphragm on the other side. This holds the dump valve shut in equilibrium. When you lift off the throttle the throttle body closes this creates a vacuum in the manifold thus in the boost - trigger pipe, this vacuum pulls on the dump valve diaphragm and with the boost pressure in the inlet pipe pushes the valve open releasing the air into the engine bay with a whoosh.

How is this Vauxhall Engine Different ?

These engines work as above, with one major difference. The boost - vacuum trigger pipe is run through a vacuum storage capsule, and a solenoid that is triggered by the engine ECU. There are switches on the pedals so the ECU knows when you de-clutch and trips the solenoid to create the vacuum quicker to the original equipment recirculation dump valve built into the side of the turbo.

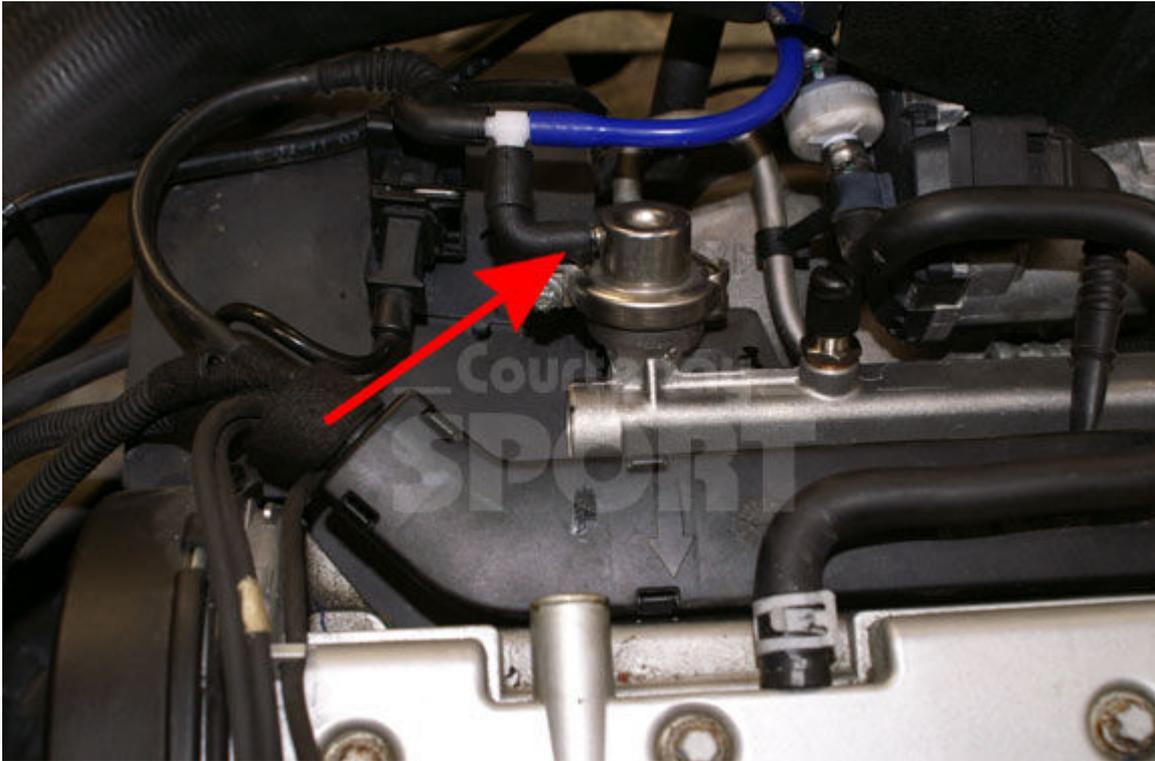
This vacuum solenoid arrangement is also used on part throttle to regulate the air mass to the engine, i.e. when the turbo is trying to make boost due to its small size but the load demands and throttle angle do not require boost, it opens and shuts the factory re-circ valve to regulate boost improving drivability, kind of like a secondary throttle.

This is the source of the trouble. If you use this trigger source (i.e. from the original vacuum storage) for the aftermarket dump valve it will pulse the new valve on part throttle, the previously metered air is then released into the engine bay and will cause driveability issues on the fuelling. In some circumstances the car will also go lean, in this situation the TC (traction control) light can come on.

The Fix

The cure is to give the aftermarket dump valve its signal from a true non interrupted vacuum source; we recommend the fuel pressure regulator (see picture below). For further improved driveability, it is possible to leave the original equipment valve still working so the engine management can regulate, control and pulse this valve. However the aftermarket valve will operate slightly quieter.

Fuel Pressure Regulator Location



Fuel Pressure Regulator (arrowed) showing take-off point for a vacuum feed for an aftermarket dump valve.

For Astra G and H: The fuel pressure regulator is located at the left hand end of the fuel rail when viewed from the front of the car. It is partially obscured by the cross-over pipe.

For VX220: The fuel pressure regulator is located at the right hand end of the fuel rail when viewed from the rear of the car.