

MODDING YOUR STOCK RECIRC VALVE FOR PERFORMANCE IMPROVEMENTS

Replacing the factory recirculation valve (aka blow-off valve or BOV) is often one of the first jobs on the modification list for many SR20 owners. But this is often misguided and can result in performance losses rather than gains.

The BOV is fitted to relieve the pressure that builds up between the turbo and the throttle body when the throttle is closed.

BENEFITS OF USING A BOV

- It gives the turbo an easier life as it's not trying to compress air into a closed cavity.
- Because the turbo maintains rotational speed boost comes up sooner when the throttle is opened again. This is particularly noticeable when changing gears at part load. At full noise you don't notice much difference.
- Air doesn't reverse direction and blow back through the airflow meter. Which is a very good thing – the airflow meter will happily measure air in either direction. So when you close the throttle it gets a sudden slug of air. The then ECU gets a signal from the airflow meter that results in injecting fuel to match the airflow. Which is exactly what you don't want when the throttle is closed!

ATMOSPHERE VENTING vs RECIRCULATING

The factory EFI system is designed to use a recirculating BOV system. The stock BOV is often changed to an atmosphere venting setup but this has numerous downsides:

- It's actually illegal in most places as it effects emissions
- When the throttle is closed and the BOV opens to atmosphere it relieves pressure on the turbo very effectively. But the airflow is measured by the airflow meter and this once again results in the ECU injecting unneeded fuel during gearchanges, causing pops, bangs and exhaust smoke when the fuel gets ignited.
- It's noisy. If you're 12 you probably like this as it makes the car sound like a race car. But for most people the noise wears thin very quickly on a daily driver. And it's like waving a big red "Come and defect me!" flag to the cops.
- Recirculating valves tend to be more responsive than atmosphere venting. Meaning that they respond faster to closing throttle. Which keeps the turbo spinning and results in a faster transition back to boost. The reason for this is that recirculating valves can be open at idle. While atmosphere venting valves need to be closed at idle or the engine will suck unmeasured air into the engine and result in poor idle and stalling. Average manifold vacuum is around -20psi – where the stock BOV is well and truly open. The atmosphere venting valve needs vacuum well beyond this level before it will open. The difference is quite noticeable on gearchanges when full boost hasn't quite arrived.

Return to idle is also something worth mentioning. SR20's seem to suffer worse than other engines. Particularly if the airflow meter has been upgraded to Z32 style. They can tend to stumble and then recover. Some will even stall. The factory BOV helps a lot because it's so sensitive – even a small rev at standstill can cause air reversion back into the airflow meter if the BOV doesn't open soon enough.

HOLDING BOOST

OK, so all this is great but if the factory BOV won't hold the boost level you want to run then it's a bit useless. And in stock form it won't. They have a "bypass port" in them which acts as a protection mechanism against overboosting. So at around 12psi they'll spoil your fun. Even worse – they'll leak even before you reach 12 psi. Effectively resulting in a boost leak – and sluggish boost response. No fun at all.

OK, so to the mods required to fix this problem. This is a bit like pumping up underinflated tyres on your car – the performance improvement far outweighs the effort required! It's simply a matter of blocking this pesky bypass port. You can use whatever you like. I had a piece of brass rod in the shed that happened to fit nicely. But anything around 5mm dia will do. Hold in place with a dab of RTV and reassemble. The lid actually holds the blockage in place anyway.

I recently bought some 5mm "grub screws" that work a treat. Simply tap an M5 thread in the hole and fit the grub screw. Proper job.



Please note that this mod will most likely affect your boost level if you're running any more than stock boost. So be careful first time you run it up. You may need to turn boost down a tad to get peak boost back down to where it was.

