



## VNT™ Technology



The introduction of VNT™ (Variable Nozzle Turbine) turbochargers in 1989, and its evolution throughout the 1990s and into the 21st Century, makes the technology the most successful engine-boosting concept the world has ever seen. The system makes it easier for car manufacturers to fully deploy the torque and fuel economy advantages of direct injection diesel engines.

The technology involves the use of a turbine housing that can change its internal configuration to adapt to variations in the engine's air boost requirements. VNT™ enables the turbocharger to supply greater engine boost at lower speeds, yet match the performance of a larger turbo at higher speeds. VNT™ turbochargers also help to control the emission of NOx from diesel-powered vehicles by introducing exhaust gas recirculation (EGR) into the engine. (source: [www.honeywell.com](http://www.honeywell.com))

It has always been the view of turbocharger manufactures that VNT™ controlled turbos can not be rebuilt or remanufactured because a product to set-up the variable vanes is not available to the market place. Failure to set the variable vanes correctly can result in turbo boosting, fuel consumption and emission issues?

### *Air Flow Rig*

We agree there is not an 'off the shelf' product available; however we have successfully developed the technology to overcome this problem.

We have developed an Air Flow Rig that reproduces the exact conditions required to flow exhaust gases across the variable vanes inside all the remanufactured turbos we produce. By adjusting the variable vanes system we can set the flow rate to the correct figure for the turbo.

### *Common issue with VNT™ controlled turbos*

The vehicle can experience a problem with a lack of power (boost). Sometimes the engine management light appears and the car can drop into 'limp mode'. A common phrase used when describing this problem is 'the turbo has sticky vanes'.

### *What causes this?*

In the majority of cases the vehicle is running rich (fuelling issue) and the exhaust gases become very sooty. The sooty exhaust gases pass through the turbo and around the variable vanes leaving carbon deposits. Over a period of time these carbon deposits build-up and can impair the full range of movement of the variable vanes which can result in the power (boosting) issues experienced by the user. It can appear as a 'turbo over boost pressure' fault code on diagnostic equipment.



### *Frequently Asked Question (FAQ)*

A popular question we are asked is 'can you just clean away the carbon build-up from the variable vanes to free them'?

Unfortunately the answer to that is 'no' on two counts:

- Once cleaned you need to make sure the variable vanes are calibrated correctly otherwise you run the risk of suffering further turbo boosting and/or fuelling issues.
- From our experience it is really important to identify what might be causing the sooty exhaust gases in the first place as the vast majority of turbo problems are created by issues external to the turbo such as a faulty Mass Air Flow Meter (MAM) or EGR valve.

So what on the face of it appears to be a turbo only problem, can with further investigation on the vehicle, turn out to be faulty controlling components affecting the running.