

What You Need To Know About Your VGT

Variable-geometry turbochargers (VGTs) are a family of turbochargers that were designed to allow for the aspect ratio (A:R) to be changed with the velocity of the vehicle. At low speeds the Engine Control Module (ECM) tells the veins of the turbo charger to operate at a lower aspect ratio to maximize the velocity of the exhaust gasses entering the turbine. By doing this, VGT turbos can create more boost than a regular turbo at low speeds. As the vehicle's velocity increases the ECM communicates with the VGT telling it to increase it's aspect ratio. With a higher aspect ratio in the veins of the turbo, the VGT prevents the engine from choking its self out at higher speeds



One of the first vehicles to use VGT technology was the 1988 Honda Legend. It used a variable geometry turbo with an integrated water cooled intercooler installed on its 2.0 litre V6 engine. Although the VGT turbo alleviated a lot of problems with turbo lag, one of the biggest problems it had in the early years was that exhaust temperatures on gas engines were too high and even though there was a water cooling system in place to lower the temperatures of the exhaust the materials that were being used in pre millennium

engineering were not durable enough to withstand the stresses that the variable geometry turbos had to endure. For these reasons and probably others that I am not aware of, the Honda Legend was taken out of production two years later.

The Post-Millennium VGT

In 2006, Variable Geometry Turbines were utilized in Cummins engines to maximize the efficiency of engines in heavy trucks using engine gas recirculation (EGR) systems to lower emissions. Because of the lower exhaust temperatures created by diesel engines and the

availability of more durable materials, VGT systems were a huge success and have been used by Cummins ever since.

In 2012, Suprock Technologies, LLC released a VGT turbocharger controller that was capable of actuating Variable Geometry Turbochargers based on data provided by the ECM. By making use of information such as engine and exhaust temperatures, pressures and overall performance, this new controller was able to calculate the approximate A/R ratio that would be needed to maximize the performance of the Variable Geometry Turbo

Corrosion Is Your Enemy



Although the technology behind variable geometry turbos has been greatly improved since its appearance in the late 80's, the production vehicle VGTs are still far from perfect. The materials used in VGTs are often found to be corroded after years of use or they become caked with exhaust particulate which results in poor performance. Continuing to use a damaged VGT can cause your engine to be starved for air and often times you will not receive any warning lights to tell you there is a problem. It is for this reason that most owner / operators will remove their VGT before it becomes a problem and have it replaced with an aftermarket turbo charger.

Regardless of the fact that a typical turbocharger does not operate based on engine data, they are often much more durable and are currently a much more trustworthy method of creating boost. Even though the typical turbo experiences lag at low RPMs, technology has come a long way. Recently engineered turbos have compensated for their static veins by creating sophisticated patterns used to channel exhaust gasses at different stages of

acceleration to get rid of as much lag as possible while at the same time removing the danger of engine starvation at high speeds.

What Do We Recommend?

The removal of a VGT is a costly procedure but it is worth the money if your turbo is beyond saving. It can eliminate the risk of your VGT starving your engine which typically only happens in cases of severe neglect these days. We recommend this delete to those who have a big budget, no longer have to worry about warranty and have trouble finding a replacement. What you should keep in mind though is that switching to an analogue turbo will in fact increase turbo lag and only improve power on the top end of your fuel curve.

For those who wish to keep their variable geometry turbo for warranty purposes or simply because they wish to keep their VGT, there is another option that will improve your engine's performance although, unfortunately, it will not remove the possibility of corrosion or a build up of gunk. With an economy – performance tune by Krazy On Highways, we re-program your VGT system to decrease turbo lag at low RPMs and halt engine starvation at high speeds.