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**To All Distributors**

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When the Garrett® by Honeywell VNT™ (Variable Nozzle Turbine) turbocharger was first introduced into passenger cars in 1991, it heralded the arrival of a true breakthrough technology.

VNT™ satisfied the demand for rapid boost response in diesel engines – and in doing so helped to transform the driving habits of an entire continent. Over the last 15 years, more than 20 million turbochargers have been installed in passenger cars around the world, most notably in Europe where diesel engines now account for 50% of the marketplace.

Today, Honeywell supplies third generation VNT™ turbos to automotive manufacturers around the world, raising the bar still further on engine boosting performance. More power, more torque, greater fuel efficiency and lower emissions – VNT™ technology continues to set new standards.

Garrett® by Honeywell VNT™ turbos are highly complex units, engineered and calibrated to meet the exacting performance parameters of automotive manufacturers.

The first requirement is to set the turbo's critical minimum flow vane position. This intricate process takes account of the large number of parts and extremely tight tolerances within the VNT™ and involves using a highly accurate turbine flow bench to measure and compensate for any variation in gas flow through the vanes of the turbo. Highly skilled technicians then set and lock the minimum flow position to suit the requirements of each individual application. It is only when the 'minimum vane open' position is set that it is possible to calibrate the unit (to three decimal places), using four checkpoints to ensure correct operation.

Each of these steps is vital in ensuring the optimum performance of Garrett® by Honeywell VNT™ turbochargers. **Indeed, these engineering complexities cannot be compromised**

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Any attempt at remanufacture, using substitute parts, is fraught with difficulty because of the turbo's technical complexities and can lead to potentially serious problems, such as:

- Conflict with the engine management system
- Low flow/pressure, causing poor response, poor overall performance and increased emissions
- Over-rich diesel fuel/air mix, causing excessively high temperatures, damaging both the turbo and the engine
- High flow/pressure, leading to the over-speeding of the turbo, wheel bursting and damage to turbo and engine
- Excessive boost pressure, causing physical engine damage

*Therefore we have issued technical Bulletins 32, 34 and 42 outlining our Non Repair Policy for the Garrett® by Honeywell VNT™ turbochargers. With this letter we would like to remind you of this policy.*

*Please note your failure to respect this policy negatively impacts on the reputation of the Garrett® by Honeywell VNT™ turbocharger and will be seen as a fundamental breach of your commitments towards our Company.*

We are committed to safeguarding the interests of the car owner by protecting the integrity of the technology – and will therefore supply only new replacement Garrett® by Honeywell VNT™ turbochargers.

**All Distributors are also committed under the terms of our Distributor Contract to follow the same policy.**

A handwritten signature in black ink, appearing to read "T. Choi", is positioned above the name "Thomas Choi".

Thomas Choi

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# Garrett VNT™ Turbochargers To repair or not to repair ~ is it worth the risk?

*By Trevor Cass, Garrett IAM Product Support Engineer (Europe, Middle East & Africa)*

The turbocharger aftermarket has traditionally been a place where a customer had the choice of buying a brand new or a remanufactured turbo. However, the rapid development of the turbo, alongside developments in engines, fuel injection systems and engine management, has meant that this must change.

In order to comply with strict emission controls, our turbos have become much more technologically advanced – which, in turn, means they are more difficult to repair. Because the VNT™ is far more complex than a conventional turbo, **repair and remanufacture can't be done correctly without specialist equipment and information.** Indeed, even with the equipment in our factory, we ourselves don't remanufacture. We know that new units are the risk-free option.

When we build new turbos we calibrate them to three decimal places, with a number of checkpoints used to ensure correct operation. A remanufactured turbo would also need to be calibrated to the same degree of accuracy. But calibration of a VNT™ turbo on its own is completely worthless without the critical first stage being completed: setting the 'minimum vane open' position.

The Garrett VNT™ components are manufactured to extremely tight tolerances but, due to the large number of parts and the clearances needed for the safe and efficient operation of a VNT™, each individual turbo has to be tested and adjusted after assembly, to ensure that it meets the engine manufacturer's specified flow setting. Any disassembly of the VNT™ turbo will mean that the minimum vane open setting must be reset before the calibration process can be completed.

We set the minimum flow vane position by using a calibrated turbine flow bench which measures the actual airflow through the vanes of every single VNT™ that we make, and allows us to set and lock the minimum flow position to suit each application. It is not possible to set the calibration of the actuator to OE specification until the minimum vane open position is set. Without a turbine flow bench, a remanufacturer can only guess that the airflow is correct: the turbo may operate, but it is highly unlikely that it will work to its optimum efficiency.

## **The consequences**

The outcome of not being able to set the minimum vane open position accurately may be:

- Conflict with the engine management system, leading to error messages or running in 'limp home' mode.
- Low flow/pressure, which can cause poor response, poor overall performance and increased emissions – and possibly an MoT failure for your customer.
- Over-rich diesel fuel/air mix, which can cause excessive temperature, damaging the turbo and engine.
- High flow/pressure, which can lead to overspeeding of the turbo, wheels bursting and consequential damage to turbo and engine.



Setting the minimum flow vane position

- Excessive boost pressure, which may cause blown gaskets and physical engine damage.

**The 'real' cost of fitting an incorrectly remanufactured turbo.** You should also consider the real cost of replacing a turbo if the remanufactured one that you have fitted fails. Your supplier may replace the turbo free of charge, but who pays for the time to fit the second replacement? And if the failed remanufactured unit damages other parts of the engine, who would be liable for the repair?

Garrett will not sell spare parts for VNTs for these reasons:

It's just too big a risk. Your official Garrett distributor will sell genuine new turbos, to exactly the same specification and quality as supplied to the original equipment manufacturer, with a valid guarantee. They back this up with many years of specialist turbo knowledge to help you.

**Why risk a remanufactured VNT™? Use a new unit, for safety's sake and for the sake of your business.**



## This is how a turbo specialist treats failed variable turbine turbos.

Many new vehicles are fitted with variable turbine turbochargers (VNT™), which work by adjusting the gas throat section at the inlet of the turbine wheel in order to optimise turbine power with the required flow velocity. This gives the benefits of higher power and torque, improved transient response, lower fuel consumption, reduced emissions and better braking power.

However, they are highly complex pieces of machinery and it's only possible to meet the exacting standards and demanding tolerances at the point of manufacture. Trying to repair one is like trying to repair a microchip with a soldering iron - it's practically impossible.

In the Garrett factory, each individual turbo has to be tested and adjusted after assembly, to ensure that it meets the engine manufacturer's specified flow setting. This requires a calibrated turbine flow bench which measures the actual airflow through the vanes of every single VNT™ that they make, and allows them to set and lock the minimum flow position to suit each application. Only then can they calibrate it to the specification set by the vehicle manufacturer.

Any disassembly of the VNT™ turbo will mean that the minimum vane open setting would have to be reset before the calibration process can be completed. Without the turbine flow bench, a remanufacturer can only guess that the airflow is correct: the turbo may operate, but it is highly unlikely that it will work to its optimum efficiency. An incorrectly set up turbo will affect performance and emissions, as well as potentially causing extensive engine damage.

Garrett does not sell spare parts for VNTs for these reasons: it's just too big a risk. Even they don't remanufacture, so if someone tells you they can recondition a VNT™ unit, ask yourself where they are getting the parts from and how they propose setting the minimum vane open setting.

Don't risk your reputation or your business revenue by taking a chance. Fit a brand new VNT™ unit and have the peace of mind that it will work properly and not come back to haunt you!

**Garrett®**  
by Honeywell