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Tech Corner

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Turbos for Euro V Diesel Engines

For diesel engines conforming to Euro V emissions regulations, a series of turbo models is available, dependent on engine size, power rating and vehicle range.

The options start with a new micro wastegate GT1238SZ unit which, whilst simple in design, utilizes the latest version of the one-piece combined journal and thrust “Z” bearing to control wheels rotating at speeds up to 266,000rpm. This is used across a wide range of vehicles from Fiat Group,Opel and Suzuki, which use the 1.3 L diesel engine.

For higher power ratings, the latest VNT™ turbos are proving successful. The models prefixed GTB 3rd Generation VNT™ and GTC 3rd Generation Optimized share the latest aerodynamics for both the turbine and compressor and include the cartridge concept nozzle assembly, which is fully assembled before being inserted into the turbine housing.This advanced design allows operation in more hostile exhaust gas conditions – a key feature as engine exhaust outlet temperatures are now reaching up to 830°C on some highly rated diesel engines.

With emissions regulation so tight, one of the most critical areas on any VNT™ turbo is the control of the moveable vanes. This can be achieved using either vacuum actuators with linear position sensors to give feedback on vane position … or alternatively, through full electronic control via Rotary Electronic Actuators (REA) or Simple Rotary Electronic Actuators (SREA).

Both offer rapid and accurate control plus positional feedback. Also, dependent on the model, they can offer error code storage to aid vehicle diagnosis and safe mode position in the event of problems.

These control systems for turbos are subject to constant development and updating, so there are already many variations of the REA and SREA in the market.

Light commercial vehicles (vans, light trucks and others) have also benefited from our latest VNT™ technologies. One notable recent launch was on the 3.0L SOFIM engine used in Fiat, Iveco and Mitsubishi vehicles, which specified the VNT™ DutyDrive™ turbo. This innovative design incorporates dual axles supporting the vanes (compared to the single axle in Passenger Vehicle VNT™ models) which allow the vanes to close completely, which has the effect of the turbo acting as an “engine brake”. This has enormous benefits for engine and vehicle designers as it avoids the added cost and complexity of separate exhaust brakes on commercial vehicles.

Perhaps the most exciting launch of all within the VNT™ range is the new GTB2260RVK. The letter “R” refers to Rolling Element or Ball Bearing…..but this is no ordinary ball bearing turbo! It uses an advanced ball bearing cartridge with ceramic hybrid balls, which are lighter than steel, more resistant to wear and offer considerable advantages in performance, particularly under low energy conditions, such as at low engine speeds. By combining a 3rd Generation VNT™ with an electronic actuator, ceramic hybrid ball bearings and water cooling, the response of this turbo is truly fantastic.