

The new Continental Powertrain Division:

Innovative and cost-efficient solutions for reducing emissions, optimizing fuel consumption and delivering outstanding driving performance

Regensburg, June 2007. The recently established Powertrain Division within the international automotive supplier Continental AG brings together innovative and efficient system solutions affecting every aspect of a vehicle's drivetrain. The objective of the Powertrain Division is not only to make driving more affordable and environmentally friendly but also to make it a less stressful and more pleasurable experience. With its comprehensive portfolio, from gasoline and diesel systems including sensors, actuators and tailor-made electronics, to fuel supply systems, engine management and transmission control units, right the way through solutions for hybrid drives, the Division can offer its customers a full range of systems and components. By combining its strengths in innovation with its systems and manufacturing expertise in state-of-the-art drive technology, the Powertrain Division has confirmed Continental AG's position amongst the top automotive suppliers. The Division's advanced development and systems know-how provide great diversity and ensure its place in the world's top three.

Taking the 2006 revenue figure of over €5 billion as its benchmark, the Division is aiming to achieve significantly higher growth than the market average. With activities in all markets, it is a truly global player.

Continental's Powertrain Division, based in Regensburg, is divided into the following business units:

- § Engine Systems;
- § Sensors & Actuators;
- § Transmission and
- § Hybrid Electric Vehicle.

Dr. Karl Thomas Neumann heads the Division, which employs around 26,000 people. The Powertrain Division is located at more than 60 sites throughout the world.

Engine Systems

The expertise of the Engine Systems business unit lies in particularly advanced electronically controlled injection systems for gasoline and Diesel engines. Those systems have a big hand

in making combustion engines fit for the future. Already back in 2000 Piezo technology revolutionized common-rail injection systems for Diesel engines. The Piezo injectors atomize the diesel fuel more finely and inject it more precisely and have ensured more efficient combustion this way. So Piezo technology will help to comply with the emission limits for nitrogen oxides and particulate matter (Euro 6 and US Tier 2) which come into effect in 2014. Piezo technology also reduces CO₂ emissions by a further 3 percent compared with traditional direct Diesel injection. Engines fitted with Piezo common-rail injection are more economical and quieter, while simultaneously offering improved performance. In 2006 the pioneering Piezo technology was launched in gasoline engines. As well as in Diesel engines Piezo ceramic actuated valves meter fuel instead of solenoids too. Compared with conventional manifold injection, this reduces both consumption and CO₂ emissions by up to 20%. However, Engine Systems' manifold injection and direct injection systems likewise contribute to a reduction in fuel consumption, both for conventional fuel (gasoline) and for alternative fuels such as natural gas, liquid petroleum gas, or ethanol. These innovative products make Engine Systems one of the world's three major suppliers. It is no. 1 on the market for Piezo injection systems.

Turbochargers, particularly in conjunction with direct injection, offer "downsizing" opportunities, i.e. the use of smaller, more economical gasoline engines without compromising performance. With potential reductions of more than 15 percent in CO₂ emissions, gasoline engines are beginning to rival the latest diesel engines. The Turbocharger business unit is pressing on with turbocharger developments. The project will be brought towards production readiness together with pilot customers.

Transmission

The Transmission business unit develops and produces electronics for controlling the latest automatic transmissions, such as stepped automatic transmissions, continuously variable transmissions (CVT), automatic gearshift systems, double-clutch transmissions, transfer boxes and all-wheel drive systems. The product portfolio extends from external control units to mechatronics, including sensors and electrical or hydraulic actuators built into the transmission. Sophisticated electronics, particularly used in double-clutch transmissions, provide rapid, smooth gear changing without traction interruption and can ensure maximum driving comfort and reduced fuel consumption and thus lower emissions. Mass production of this innovative transmission technology, at the heart of which lie the Continental control electronics built into the transmission, began in 2003.

Sensors & Actuators

Without exception, every future drivetrain component and system • from new combustion techniques to exhaust-gas aftertreatment and hybrid drives • will be electronically controlled. Sensors and actuators will play a key role in this. They will help, reducing emissions and fuel consumption even further and improving performance, service life, comfort and safety. One of the unit's notable innovations are sensors for measuring nitrogen oxide in exhaust gases. This enables us to monitor and comply with the emission limits for nitrogen oxides. Among other things, actuators trigger electrical signals for opening and closing valves. Electromotive-operated valves are able to control the air intake or exhaust emissions much more efficiently than mechanically-operated valves and can be more easily integrated into the engine management system. Ultimately targeted for divestment, the fuel supply systems operations are still part of Sensors & Actuators. The business unit is the global market leader for components such as fuel supply systems, electronic throttle valves and is the leading supplier of pressure and passive sensors.

Hybrid Drives

The hybrid drive • a combination of internal combustion engine and electric motor • reduces consumption and emissions by up to 25 percent and even makes driving more pleasurable. For the developer, however, the perfect interplay between internal combustion engine and electric motor extends far beyond the components of the two drive systems. The transmission, the engine management unit, ancillary assemblies, the energy storage unit and the electrical consumers must all be able to respond to the demanding energy flows of the combined drive system. The electronics will ensure that the electric motor and the internal combustion engine function properly together in all traffic conditions. The prerequisite for this is electronic energy management. To meet this demand, the Hybrid Drives business unit is developing components and complete systems for series production and possesses know-how about energy storage units and electrical machines, drivetrain management and power electronics. Continental's systems expertise in hybrid drives is underpinned by highly capable partners.

Future technologies

Continental's Powertrain Division is already working on new innovative technologies aimed at permanently reducing CO₂ emissions and is pioneering long-term technological trends which are beginning to take shape. The effects of these trends and projects will be for all to see on roads in the coming years. This includes electrifying the drivetrain by directly integrating the electrical components used in the drive system, steering, shock absorption system and the



brakes into the wheels of tomorrow's vehicles. The experience gained from intelligent hybrid technology system solutions will form the basis for these developments. In parallel with our work on hybrid drives (which will continue to be vigorously pursued and which, in the long term, will create the pre-conditions for further electrification of the drive system,) Continental will remain focused on further developments to gasoline and diesel engines. There is still much potential for developing the internal combustion engine, which will remain the dominant drive system for the next decade. This is why the Powertrain Division has also set itself the goal of developing systems and components which can constantly optimize both gasoline and diesel engines. This will make it possible to further reduce fuel consumption in gasoline engines and to drive down emissions from diesel engines even further.

Uncompromising quality and reliability

Product reliability is the Powertrain Division's top priority. To achieve this, state-of-the-art engine test rigs and roller test benches are installed in seven locations around the world for testing the electrical, mechanical and functional integration of all electronic components. Throughout the development phase, teams of experts employ precise measuring techniques to ensure that all the engine management system's components • injectors, control software, sensors and exhaust-gas aftertreatment systems • interact smoothly.

Quality is a core competence at Continental and naturally the same applies to the Powertrain Division. Our customers consider both our products and our services to be market leaders and regard the Division as the one partner with whom they can achieve perfect quality. The Division's high quality standards have set the benchmark for the automotive industry. In order to achieve the utmost quality, we actively involve suppliers in our processes at a very early stage. Quality is an issue for every employee in the Powertrain Division. Striving for perfection in products, processes and actions is a personal commitment to constant improvement - we can only succeed if we travel this road together.

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