We have been developing state-of-the-art transmissions and hybrid systems for 25 years. Our new Testing Center for Electromechanical Drive Systems marks a next stage in expanding our expertise in these domains: Whether all-electric drive, hybrid drive or conventional transmission – we can test all systems on the new transmission test bench.

Our aim here is to test and optimize the efficiency and durability of transmissions and entire powertrains. It makes no difference whether you are looking to develop an MT, AT, CVT or DCT: We can perform function and endurance tests for any design. Doing so, we can either examine the transmission in isolation or look at the entire powertrain. This is particularly important as modern, hybrid powertrains have become so complex that individual modules can no longer be developed independently of each other. It is always necessary to develop a complete system, comprising e-motor, transmission and energy units, to production level.

In response to these challenges, we can offer you an end-to-end package. All of the requisite measuring and testing facilities are concentrated at one site: transmission test bench, electric-motor test bench, battery-system test bench. Alongside our modern testing equipment, we can also provide you with comprehensive expertise – ranging from concept development, design, computation and simulation right through to integration, management, calibration and testing.

Transmitting and Powertrain Test Bench

in the New Testing Center for Electromechanical Drive Systems

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Broad base
The highly dynamic transmission test bench at the new Testing Center is complemented by an electric-motor test bench and a battery-system test bench. In addition to conventional drive systems, this means we can also test every aspect of all-electric and hybrid drives. In other words: We have everything it takes to develop drive systems for tomorrow.

Pictured on the left: Powertrain test bench set up for rear-wheel drive

Pictured on the right: Electric-motor test bench and hybrid system battery test bench
We provide a diverse range of services:

We can perform dynamics, vibration and rotational-irregularity tests. In addition to controlled resonance (endurance) tests, we also carry out endurance tests with shift sequences (digitally from control unit) following client specifications. We also calibrate transmission and driving-dynamics control units.

Simulating a combustion engine, the electrically driven test bench can reproduce an engine’s typical rotational irregularities with extreme precision. This allows us to compare and evaluate different engine concepts on one and the same transmission/powertrain without the need for modification work (e.g., 4-cylinder engine vs. 6-cylinder engine). We can also test and vary typical load profiles from real-life hybrid operation, such as start-stop mode or start-off.

Driving Dynamics Simulation

Multi-body system simulations (MBS) of the vehicle, including rest-bus simulation, enable us, for example, to validate realistic start-off cycles, cornering on various surfaces and slaloming on the test bench. This means our clients can reduce the size of their test-vehicle fleets. Components that do not yet exist in the real world can also be simulated at an early stage.

Huge flexibility is provided because we can reposition individual modules on the base plate. Sufficient package is available for simulating all single-axle drive cars, and the electric drive machine has been kept narrow deliberately so as to permit front-cross operation without adapter transmission. As the brakes can also be operated individually, we can also simulate direct drives (if necessary, also with intermediate transmission).

Test Bench Specification At a Glance:

Drive

• Power output: 370 kW
• Torque: 650 Nm
• Speed: 10,000 rpm
  (with additional transmission 20,000 rpm)
• Moment of inertia: 0.11 kgm²
• Dynamic: ∆n 46,000 rpm/s

Output (2x)

• Power output: 290 kW
• Torque: 4,200 Nm
• Speed: 3,000 rpm
• Moment of inertia: 4.7 kgm²
• Dynamic: ∆n 10,000 rpm/s

General Information

• 250 kW battery simulator
• Adaptation for high-speed application for all-electric drives
• Simulation of measured load populations, including online classification
• Integration of real-time calibrations based on MATLAB™ Simulink™