

MAHLE Powertrain eAxle Testing Facility

- > Functional development & durability testing
- Dynamic & transient conditions simulation
- High & low voltage system testing



eAxle Testing Facility

Electrified vehicles are expected to dominate all major markets in almost every sector for the foreseeable future. In most applications, an eDrive unit consisting of a traction motor, transmission and associated power electronics, will be employed to transfer energy to the wheels. Certain vehicles will use multiple eDrive units to deliver the required performance and/or off-road capabilities with all wheel drive configurations.

MAHLE Powertrain has invested in a state-of-the-art eDrive (or eAxle) testing and development facility to provide its customers with a wide range of support capabilities. To ensure compatibility with all potential vehicle drivetrain applications, both high and low voltage battery simulation systems have been installed, along with a high speed power analyser system.



>> Dedicated control room

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MAHLE Powertrain eAxle Testing Facility

At the heart of this new facility, the test bench uses two, oppositely mounted load machines connected to the output shafts from the eDrive unit being evaluated. High specification permanent magnet synchronous electric motors are used to replicate the loads applied by the driven wheels. A high capacity thermal conditioning system provides the capability for testing eDrives across a wide range of temperatures to accurately simulate the environmental conditions of the intended vehicle in use.



>> eDrive test bench

Testing Capabilities

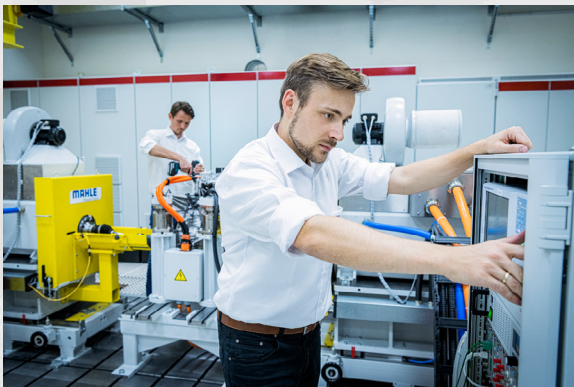
- Performance mapping
- Characterization
- Dynamic tracking tests with vehicle simulation
- Torque vectoring & wheel slip simulation
- Efficiency studies
- Thermal tests
- Endurance tests

System Specifications

Nominal power, kW	700 (350 per dyno)
Peak power, kW	840 (420 per dyno)
Nominal torque, Nm	7,000 (3,500 per dyno)
Peak torque, Nm	8,400 (4,200 per dyno)
Operating speed, rpm	954 (max 3,000)
Battery simulation:	
• High voltage, V / current, A	1000 / 1000 / 350 kW
• Low voltage, V / current, A	60 / 650 / 32 kW
EDU temperature control, °C	-30 ... +130



>> Thermal conditioning & control systems



Summary

- Data acquisition & measurement
 - › High speed power analyser system
 - › Vibration monitoring
 - › Torque & speed measurement
 - › Temperature measurement
- Automation and simulation system
 - › Automation system based on 'PATools' software
 - › Adaptable to a wide range of test requirements

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MAHLE product information 05/2022

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