Mark Böttger
Head of Communication and Marketing

mark.boettger@berghof.com
Tel.: 07121/894-267

Berghof GmbH
Arbachtalstr. 26
72800 Eningen

www.berghof.com

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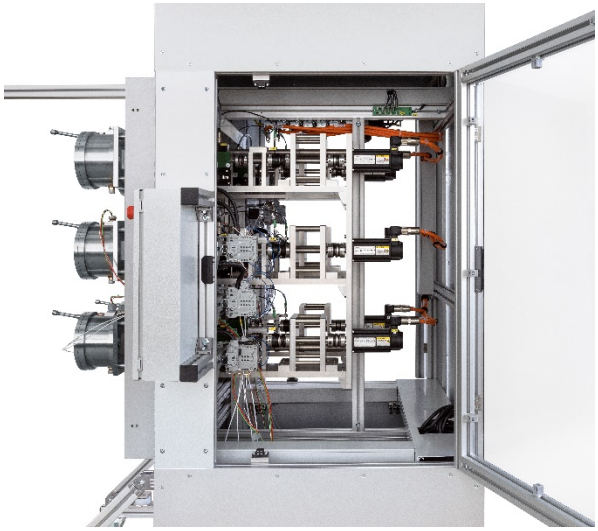
HEADLINE

Our drive: E-Mobility

Unique test systems from Berghof for quality assurance in laboratory and production



TEASER

Manufacturers of energy storage systems as well as of BLDC engines in the automotive industry place high demands on their test systems: For example, they need to simulate highly dynamic load cycles as realistically as possible, as well as the entire environment in the real application case. Berghof meets these high requirements with flying colours: With its climatic endurance tester for electrical and mechanical testing of BLDC drives – if desired even in oil baths. And also with its many years of experience with test systems for drive batteries for electric cars and for high-voltage storage systems.

TEXT

Numerous electric motors in current vehicles ensure a high level of comfort and safety. The preferred technology today is brushless DC motors (= Brushless DC / BLDC motors) because they are dynamic, low-maintenance and have low wear. Electromobility has further increased the number of such small drives in vehicles: All drives that used to rely on the mechanical energy of the internal combustion engine, such as the air conditioning system, now need an alternative in the electric vehicle. The air conditioning systems of buses have therefore been relying on electric motors for their air conditioning systems for a long time. In hybrid vehicles, the hydraulics in the automatic transmission are also coupled with a small electric motor to generate the hydraulic pressure for the shifting processes. Even with pure combustion engines, the trend is to decouple all engines from the mechanical power of the drive and instead work with an electric motor to reduce fuel consumption.

Regardless of the type of drive, electric motors are used in many other places in modern vehicles. Pure comfort features include electric seat adjustment and opening the tailgate at the push of a button. However, there are also many safety-relevant functions in which electric motors are used – such as steering aids and braking systems. When it comes to the safety of a car, manufacturers of such components

must comply with the highest standards before the components are approved for vehicle production.

For this reason, the engines already undergo endurance tests in the laboratory, which can take up to eight months at a time. And also, later in production, regular audit tests of the drives are necessary.

In endurance testing, the biggest challenge is to recreate highly dynamic load cycles over the entire life of the drive as realistically as possible. In addition, for the test to be as realistic as possible, it is necessary to simulate the real environment of the engine in the vehicle. In the automatic transmission, for example, the drives are in oil, which exhibits different degrees of soiling depending on the age – and that in temperature ranges from -40 to +125°C.

The endurance tester for BLDC engines from Berghof meets all these challenges with flying colours: For the first time, our experts have succeeded in combining electric and hydraulic engine testing in a single test bench. Oils with different degrees of soiling can be used here and up to six test items can be tested in parallel in the oil bath. A climate chamber displays the entire temperature range in the environment. The system records test data from up to 30 channels per test item over months with a high sampling rate of 20 kHz. All this happens completely self-sufficient – in the event of an error message, the operator can easily intervene via remote maintenance.

In addition to the various small engines, electromobility has also brought a huge focus on another topic: Energy storage in the low-voltage and high-voltage range. The e-mobility offensive of the established car brands comes late, but it is all the more powerful. Well done to those who have tackled this issue in good time and have already built up the urgently needed know-how in recent years: After all, Berghof has already dealt intensively with high-voltage drive batteries for electric vehicles, when the subject was not on everyone's lips. Here, an entire team has been intensively involved in the subject of quality assurance for charging technology for years – and thanks to this rare and sought-after expertise, it has become an important partner for the automotive industry within a few years.

Working closely with the clients, the major automobile manufacturers, the team has developed and continuously optimized high-performance test systems for energy storage in the low and high voltage range – such as a test system for drive batteries and the high-voltage storage test system HVSP.

Berghof is now benefiting from this – now that e-mobility is really gaining momentum and time is increasingly becoming a decisive factor. Berghof can score points in terms of time savings in several respects. Point 1: Short development times. For safety reasons, drive batteries for electric cars are designed in such a way that they immediately switch to standby mode in the event of the slightest irregularity. In order to test the memory, the test bench must bring it exactly into the state it has in normal operation in the vehicle – the technical term for this is residual bus simulation.

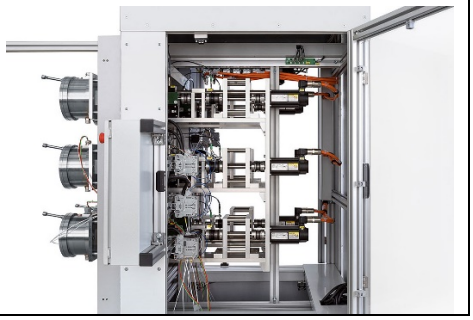
And the parameters for this simulation are sometimes very different from manufacturer to manufacturer and from vehicle to vehicle. Berghof's wealth of experience, the high flexibility to adapt quickly to new demands and the modular design of our system allow

us to keep the development times of test systems adapted to the specific requirements of our partners very short.

Point 2: Efficient test procedures. Due to the highly efficient processing of the test steps, the Berghof system significantly reduces the entire test process. Point 3: High availability. To keep downtime as low as possible, it is crucial to find and locate errors quickly. Therefore, Berghof software is programmed in such a way that customers receive a very detailed diagnostic management.

Ultimately, all of this has a common effect: Our HVSP saves time – and therefore money.

PICTURES

The endurance tester for BLDC engines is combining electric and mechanic engine testing in a single test bench.	
The oil baths of the test bench contain the original oil in which the engines also lie in the real transmission in the vehicle. Oils with different degrees of soiling can be used here and up to six test items can be tested in parallel in the oil bath. A climate chamber displays the entire temperature range in the environment.	
The system records test data from up to 30 channels per test item over months with a high sampling rate of 20 kHz.	

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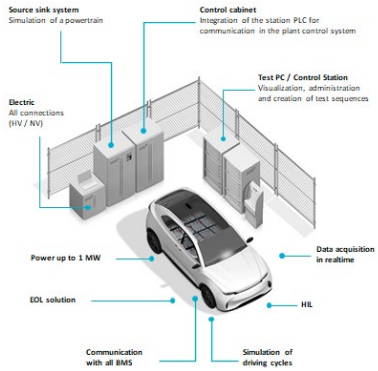
Due to the highly efficient processing of the test steps, the Berghof high voltage storage test system HVSP significantly reduces the entire test process, thus saving time and money.	

The Berghof Group at a glance:

Since its foundation in 1966, the Berghof technology and family-owned company has been synonymous with intensive knowledge transfer spanning a variety of disciplines. This collaborative approach is expressed today in the idea of the “Innovation Hub”, which staff live and breathe in nine different business units. As an adaptive, growing company and strong partnership network, we integrate expertise, technologies and resources into a first-class service. Our 450 experts work to make our customers more competitive by combining networking expertise with in-depth industry knowledge.
Find out more on **www.berghof.com**