

# Test Center BEG

## Electric Drivetrain Testing



### E-machine test benches

- Individual implementation of special setups with virtual “live access” to the test bench control system
- Autonomous development of test cases and test strategies based on applicable standards and legal requirements
- Independent preparation, implementation and documentation of measuring campaigns
- Independent analysis and resolution of problems in close cooperation with the responsible software developers, application engineers and hardware developers
- Analysis of partial and overall efficiency as well as continuous performance of your drive system in fully automated driving cycles
- Validation of safety functions under testing conditions that can be controlled very precisely depending on the application and in the corresponding simulation environment
- Execution of short-term adjustments at our testbench setup or your drive system through the connected prototype workshop and HV-laboratory
- Provision of an inspiring working environment in the shape of an open workspace for your engineers, technicians and operators

#### Test bench 1

#### Test bench 2

#### Test bench 3

#### Test bench Data

Rotational speed	20.000 rpm	20.000 rpm	27.200 rpm
Power output	500 kW	500 kW	650 kW
Torque	400 Nm (cont.) 575 Nm (peak)	600 Nm (cont.) 850 Nm (peak)	1.400 Nm (cont.) 1.680 Nm (peak)

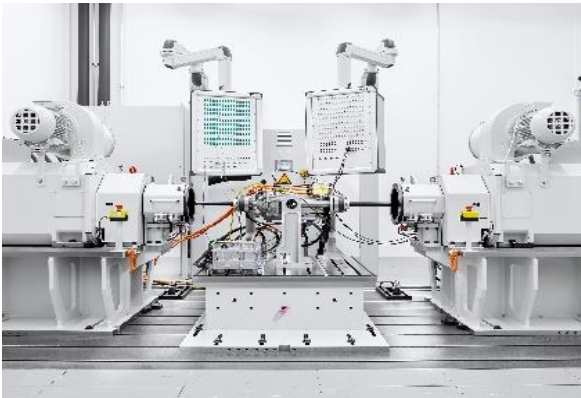
#### Battery Simulation

Voltage	0 – 1.000 V	50 – 1.200 V	0 – 1.000 V
Current	600 A	1.800 A	1.200 A
Power output	250 kW	500 kW	500 kW

#### Measuring Equipment / Conditioning

Analyzers	1 x Yokogawa WT3000 1 x Yokogawa DL950	2 x Yokogawa WT1800 1 x Yokogawa DL950	1 x Yokogawa WT5000 1 x Yokogawa DL950
Transducers	1 x HBM T12 1 kNm	1 x HBM T12 5 kNm	1 x HBM T40MSS2 2 kNm
Interfaces	ASAM, CAN, CAN-FD, FlexRay, LIN, XCP, Ethernet, Ether-CAT, Profibus		
NVH equipment	NVH equipment optional available on project demand		
Conditioning	<ul style="list-style-type: none"> <li>▪ Coolant conditioning: two independent temperature- and flow-controlled cooling circuits (-35 - 130°C   0.5 - 20 l/min)</li> <li>▪ Oil conditioning: a temperature- and flow-controlled oil circuit (0 - 150°C   0.5 - 20 l/min)</li> <li>▪ Inverter conditioning: atmospheric conditioning of the Inverter (-30 - 105°C)</li> </ul>		

# Test Center BEG Electric Drivetrain Testing



## E-Axle & Power electronics test bench

## High voltage Lab

- Individual implementation of special setups with virtual “live access” to the test bench control system
  - Autonomous development of test cases and test strategies based on applicable standards and legal requirements
  - Independent preparation, implementation, and documentation of measuring campaigns
  - Independent analysis and resolution of problems in close cooperation with the responsible software developers, application engineers and hardware developers
  - Analysis of partial and overall efficiency as well as continuous performance of your drive system in fully automated driving cycles
  - Validation of safety functions under testing conditions that can be controlled very precisely depending on the application and in the corresponding simulation environment
  - Execution of short-term adjustments at our test bench setup or your drive system through the connected prototype workshop and HV-laboratory
  - Provision of an inspiring working environment in the shape of an open workspace for your engineers, technicians and operators
- Hardware and software tests at different ambient and coolant temperatures according to LV123/ LV124
  - Design of circuit diagrams and printed circuit boards
  - Independent fault analysis and realization of customized set-ups
  - Complete electrical and thermal testing of components
  - Provision of an inspiring working environment with up to 6 workstations

### E-Axel test bench

### PE test bench

### HV-Lab

#### Test bench Data

<b>Rotational speed</b>	3.000 rpm	n.a.	n.a.
<b>Power output</b>	500 kW	500 kW	n.a.
<b>Torque</b>	8.000 Nm (cont.) 12.000 Nm (peak)	emulated	n.a.

#### Battery Simulation

<b>Voltage</b>	50 – 1.200 V	50 – 1.000 V	0 – 1.200 V
<b>Current</b>	1.800 A	1.200 A	32 A
<b>Power output</b>	500 kW	500 kW	32 kW

#### Measuring Equipment / Conditioning

<b>Analyzers</b>	2 x Yokogawa WT1800 1 x Yokogawa DL950	1 x Yokogawa DL850	1 x Yokogawa DL850
<b>Transducers</b>	2 x HBM T12 5 kNm	n.a.	n.a.
<b>Interfaces</b>	ASAM, CAN, CAN-FD, FlexRay, LIN, XCP, Ethernet, Ether-CAT, Profibus		
<b>NVH equipment</b>	NVH equipment optional available on project demand		
<b>Conditioning</b>	<ul style="list-style-type: none"> <li>▪ See E-machine test benches</li> </ul>	<ul style="list-style-type: none"> <li>▪ Coolant conditioning: two independent temperature- and flow-controlled cooling circuits (-35 - 100°C   1 - 20 l/min)</li> <li>▪ Oil conditioning: based on customer request</li> <li>▪ Inverter conditioning: atmospheric conditioning of the Inverter (40 - 120°C)</li> </ul>	

