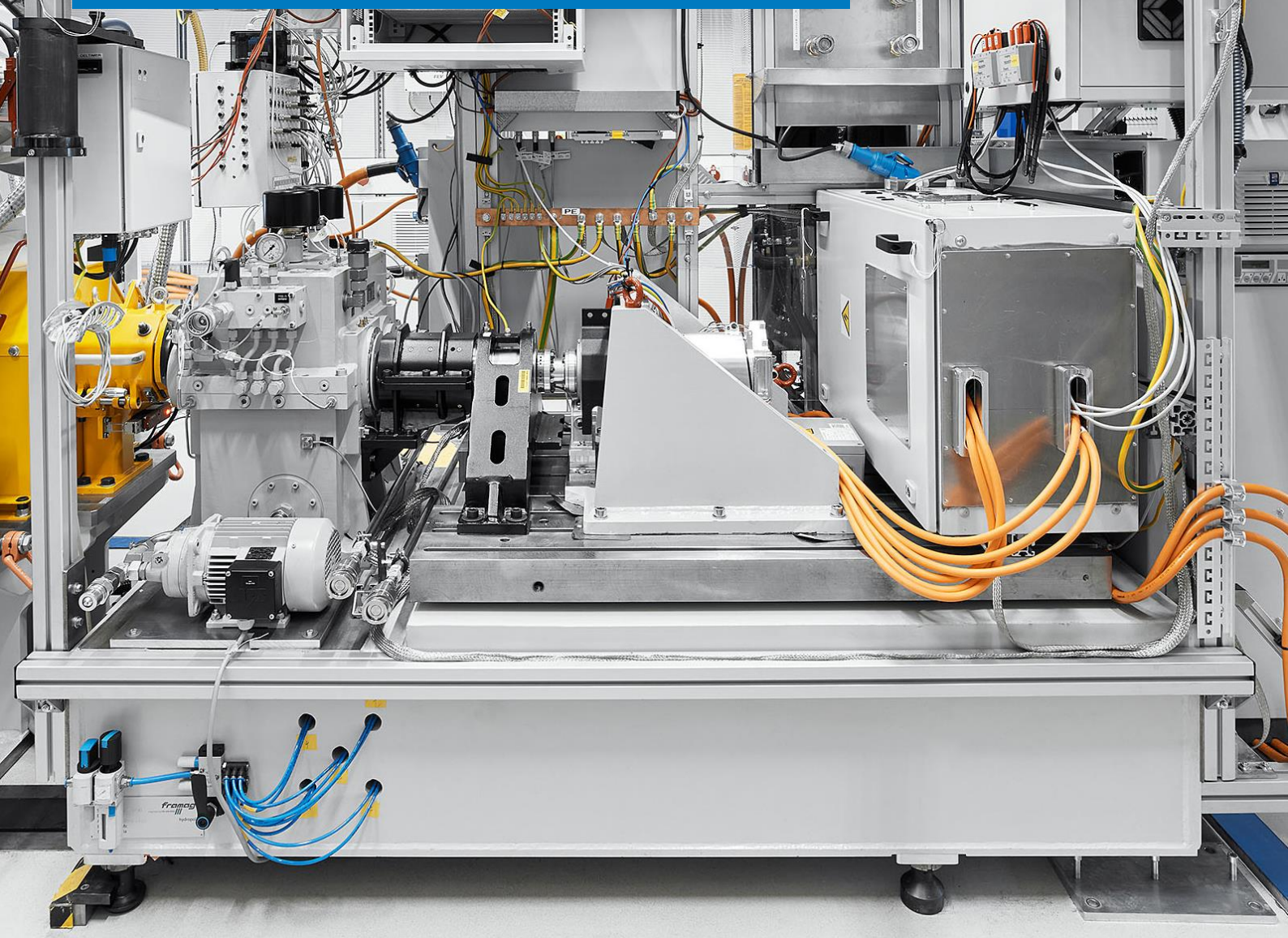




# E-machine test bench

650 kW | 1.680 Nm | 27.200 rpm



Bosch Engineering



**BOSCH**



## Highly dynamic and fully automated driving profiles

can be provided in four quadrants to ensure a targeted as well as resource saving development of electric drive systems



## Up to 1.680 Nm (peak) and 27.200 rpm

can be realized up to an power output of 500 kW and enables us to test a wide range of drive systems



## 0 – 1.000 V

are covered by our battery simulator to test current as well as future drive technologies

### PRODUCT BENEFITS

With our e-machine test bench, we offer you comprehensive options to develop, test and approve electric drive systems.

Our expertise and our state-of-the-art testing and measuring equipment enables us to support you in commissioning of first prototypes till series release of your product.

Our ability to emulate diverse and reproducible environmental conditions gives you the advantage of close to reality measurements.

We ensure a significant reduction of development time and costs while complying with your quality goals.

### SCOPE OF SERVICE

- 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

### BRAKE DYNAMOMETER

|                  |                   |
|------------------|-------------------|
| Rotational speed | 10.000 rpm        |
| Power output     | 650 kW            |
| Torque (cont.)   | 1.400 Nm          |
| Torque (peak)    | 1.680 Nm          |
| Dynamic range    | up to 8.000 rpm/s |

### GEARBOX

|                  |                      |
|------------------|----------------------|
| Ratio            | 1,197 or 2,72        |
| Rotational speed | 11 970 or 27.200 rpm |
| Torque (cont.)   | 1 000 or 440 Nm      |

### BATTERY SIMULATION

|               |                            |
|---------------|----------------------------|
| Voltage       | 0 V– 1.000 V (max. 500 kW) |
| max. current  | 1.200 A (max. 500 kW)      |
| Power output  | 500 kW                     |
| Dynamic range | @400 V, 0 → 500 A < 1 ms   |

### CONDITIONING

|                       |  |
|-----------------------|--|
| Coolant conditioning  | <ul style="list-style-type: none"> <li>▪ two temperature- and flow-controlled independent cooling circuits</li> <li>▪ automated control possible</li> <li>▪ -30 - 105 °C   0,5 - 20 l/min</li> </ul> |
| Inverter conditioning | <ul style="list-style-type: none"> <li>▪ atmospheric conditioning of the Inverter</li> <li>▪ automated control possible</li> <li>▪ -30 - 105 °C</li> </ul>   |
| Oil conditioning      | <ul style="list-style-type: none"> <li>▪ one temperature- and flow-controlled oil circuit</li> <li>▪ automated control possible</li> <li>▪ 0 - 105 °C   0,5 - 20 l/min</li> </ul>                    |

## MEASURING EQUIPMENT

|                      |  |
|----------------------|--|
| Measurement channels | 128 x temperature measuring points (type K)<br>40 x HV-insulated temperature measuring points<br>32 x analog inputs<br>8 x analog outputs<br>16 x digital outputs/inputs<br>8 x telemetry channels, axial or radial<br>3 x acceleration sensors (1-dimensional)<br>2 x coolant flow rate and differential pressure |
| Analyzers            | 2 x Yokogawa WT5000<br>1 x Yokogawa DL950 (max. 100 MS/s) for transient measurements   |

|               |   |
|---------------|---|
| NVH equipment | <ul style="list-style-type: none"> <li>▪ optional</li> </ul>  |
| Setups        | <ul style="list-style-type: none"> <li>▪ integration of AC-short-circuit and main contactors</li> <li>▪ vehicle-like setups: &gt;0,8 m AC cable length</li> <li>▪ atmospheric Inverter conditioning</li> <li>▪ quick-change technology</li> </ul> |
| Interfaces    | ASAM, CAN, CAN-FD, FlexRay, LIN, XCP, Ethernet, Ether-CAT, Profibus   |
| Transducer    | 2 x HBM T40MSS2 2 kNm, 30 000 rpm   |

## SYSTEM OVERVIEW

