



**AVL SIGNATURE Line with AVL SPECTRA™ Inside**  
Product line for high-speed e-motor and high-dynamic powertrain testing.

# AVL SPECTRA™ Inside

Better testing with Heart, Brain, and Bones.



## THE HEART

### AVL SPECTRA™ SmartStack

- Full silicon-carbide (SiC) MosFET technology for ultra-fast switching up to 100 kHz
- Flexible multi-purpose areas of application possible with the six parallel half-bridges
- Future-proof design due to output frequencies from 4 kHz
- Fully designed, manufactured, and tested
- Energy efficient operation also at partial load
- STO interface



## THE BRAIN

### AVL SPECTRA™ Control Unit

- State of the art FPGA based control unit with 1 MHz cycle time
- 10 kHz EtherCAT real time interfaces
- High resolution speed sensor interface
- Various integrated monitoring inputs (DI/DO, temperature, vibrations, ...)
- Modbus and CAN interfaces

## THE BONES

### AVL SPECTRA™ Module

- Power modules equipped with advanced high-end passive components
- Ready for use in various applications
- Complete converter cabinets available
- Modular, future-proof design with common DC bus
- Compact design with lowest possible footprint
- Ready for NVH testing



When testing electric motors, e-axes, or powertrains, you can rely on our fully standardized, modular, and future-proof test equipment: dynamometers (load units), inverters, DC sources, and more.

Depending on your testing needs, you can choose from either the SIGNATURE or PERFORMANCE Line. Only the SIGNATURE Line provides you with state-of-the-art **AVL SPECTRA™ Technology Inside!**

# High Quality Test Results with AVL SIGNATURE Line



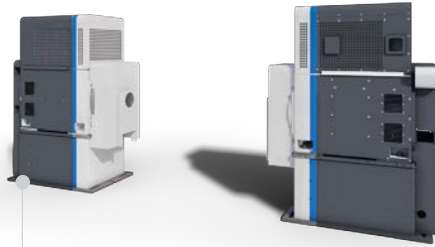
Use Case	SIGNATURE Line with AVL SPECTRA™ Technology Inside	PERFORMANCE Line
<b>Test your e-motor / e-drive</b> <ul style="list-style-type: none"> <li>• Performance</li> <li>• Efficiency</li> <li>• Thermal</li> <li>• Durability</li> <li>• NVH</li> <li>• EMC</li> </ul> and beyond.	<ul style="list-style-type: none"> <li>• AVL SPECTRA™ E-Motor Load Unit</li> <li>• Optional:                             <ul style="list-style-type: none"> <li>• AVL SPECTRA™ Universal Inverter</li> <li>• AVL SPECTRA™ DC Source</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Load Unit (PMM, ASM) incl. Dyno Inverter, Grid Converter</li> <li>• Optional:                             <ul style="list-style-type: none"> <li>• DC Source</li> </ul> </li> </ul>
<b>Test your e-motor without inverter</b> <ul style="list-style-type: none"> <li>• Efficiency</li> <li>• Durability</li> <li>• Controller software</li> <li>• Control strategies</li> </ul> and beyond.	<ul style="list-style-type: none"> <li>• AVL SPECTRA™ E-Motor Load Unit</li> <li>• AVL SPECTRA™ Universal Inverter</li> <li>• Optional:                             <ul style="list-style-type: none"> <li>• AVL SPECTRA™ DC Source</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Load Unit (PMM, ASM) incl. Dyno Inverter, Grid Converter</li> <li>• Optional:                             <ul style="list-style-type: none"> <li>• DC Source</li> </ul> </li> </ul>
<b>Test your e-axle and powertrain</b> <ul style="list-style-type: none"> <li>• Durability</li> <li>• Performance</li> <li>• NVH</li> <li>• Playback of road data</li> <li>• Gear change</li> <li>• WLTP cycles</li> </ul> and beyond.	<ul style="list-style-type: none"> <li>• AVL SPECTRA™ Wheel Load Unit</li> <li>• Optional:                             <ul style="list-style-type: none"> <li>• AVL SPECTRA™ Universal Inverter</li> <li>• AVL SPECTRA™ DC Source</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Load Unit (PMM, ASM) incl. Dyno Inverter, Grid Converter</li> <li>• Optional:                             <ul style="list-style-type: none"> <li>• DC Source</li> </ul> </li> </ul>
<b>Test your vehicle on powertrain</b> <ul style="list-style-type: none"> <li>• Vehicle dynamic simulation</li> <li>• Electric range</li> <li>• Drivability optimization</li> <li>• Energy flow and efficiency</li> <li>• ADAS/AD</li> <li>• NVH</li> </ul> and beyond.	<ul style="list-style-type: none"> <li>• AVL SPECTRA™ Wheel Load Unit</li> <li>• Optional:                             <ul style="list-style-type: none"> <li>• AVL SPECTRA™ Universal Inverter</li> <li>• AVL SPECTRA™ DC Source</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Load Unit (PMM, ASM) incl. Dyno Inverter, Grid Converter</li> <li>• Optional:                             <ul style="list-style-type: none"> <li>• DC Source</li> </ul> </li> </ul>
<b>Test your battery pack</b> <ul style="list-style-type: none"> <li>• Durability and lifecycle</li> <li>• Performance and optimization</li> </ul> and beyond.	<ul style="list-style-type: none"> <li>• AVL SPECTRA™ Active Front End</li> <li>• AVL SPECTRA™ DC Source</li> </ul>	<ul style="list-style-type: none"> <li>• AVL E-STORAGE™ Lineup</li> </ul>

E-Motor Load Unit and Wheel Load Unit consist of dynamometer, dyno inverter, and active front end.



# SIGNATURE Line with AVL SPECTRA™ Technology Inside

Level up your testing. Our highly performant and superior testing solutions.



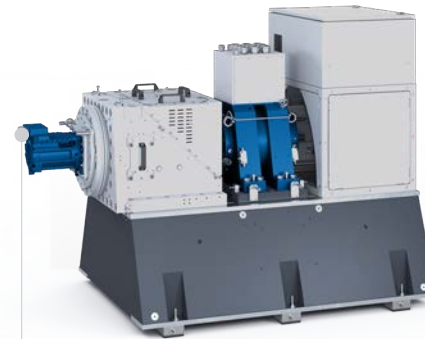
## Wheel Load Unit

- Up to 70 % inertia compensation possible
- Low noise and vibration
- Ready for driveability tests
- Perfect low speed control



## Universal Inverter

- Supports IM/PMSM/EESM
- 100 kHz switching frequency
- 4 kHz output frequency
- 1,260 Arms
- 40 - 1,000 Vdc



## E-Motor Load Unit

- Up to 550 kW
- Up to 650 Nm
- Up to 30,000 rpm
- 20,000+ hours bearing lifetime
- Perfect low speed control

## DC Source

- Full SiC technology
- 500 kW in parallel operation
- 1,200/1,500 V
- 1,000 Arms per channel
- Galvanic isolation



## Active Front End

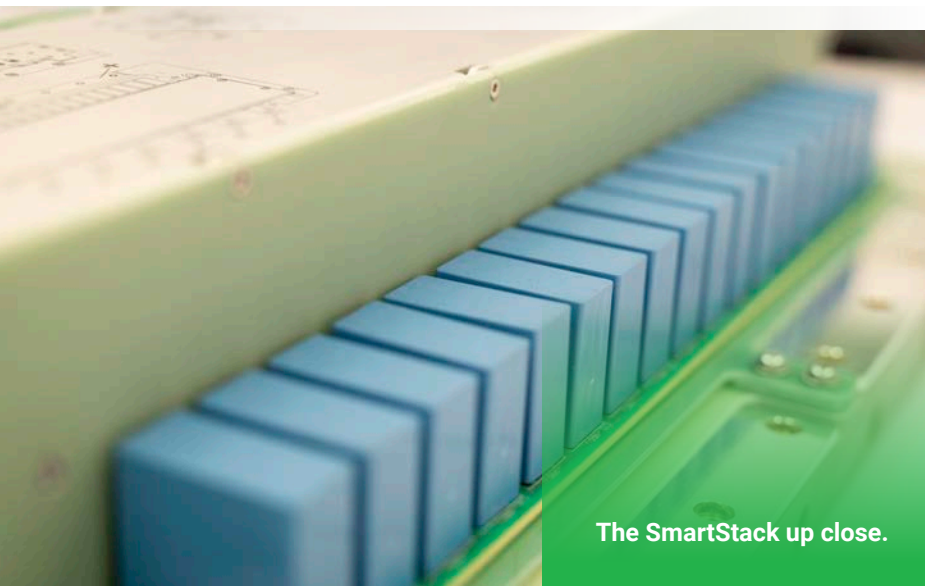
- Full SiC technology
- Modular future proof design
- Common DC bus architecture
- Direct water cooling
- IP54 design
- Smallest possible footprint

## Developed and Manufactured in the Heart of Europe.

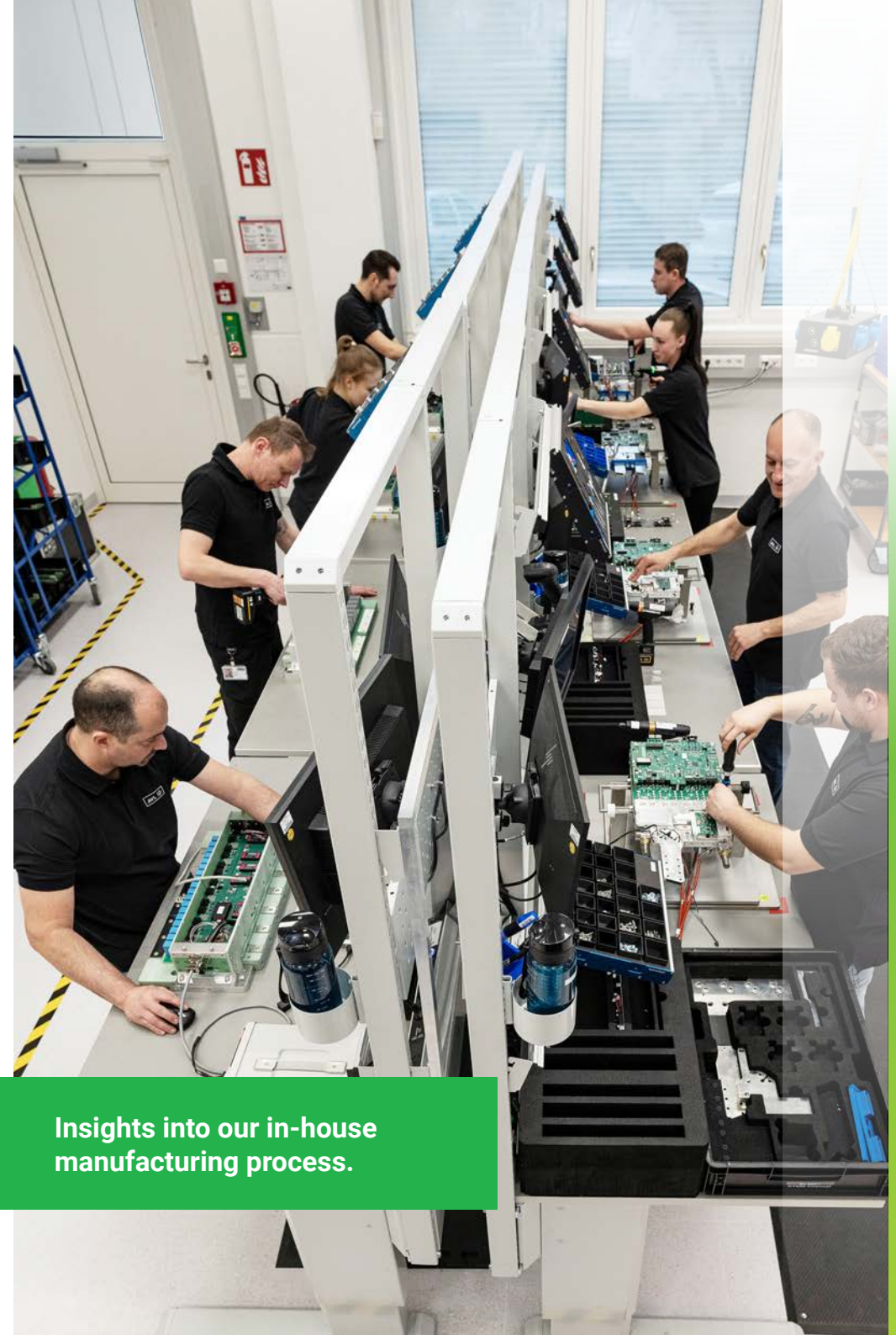
### Why Choose the AVL SIGNATURE Line?

Our SIGNATURE Line with AVL SPECTRA™ Technology Inside is the culmination of over 75 years of design and testing experience – integrated into a single product line.

- Covers all possible high-speed test applications in various fields
- Optimal for applications from 23,000 rpm and up
- For electric motor applications, with proven and supplied solutions for 30,000 rpm
- Excellent low speed control
- Modular approach ensures future scalability
- Solution designed and manufactured in the heart of Europe, 100 % tested and approved before shipment
- Highly efficient solutions that also take energy consumption into account
- Space efficient with smallest possible footprint
- Lowest noise emissions during testing



The SmartStack up close.



Insights into our in-house manufacturing process.



# *Reimagining Motion*

For a greener, safer, better world of mobility.

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