RHEINMETALL AUTOMOTIVE

Capital Markets Day 2019
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OUR HEART BEATS FOR YOUR ENGINE.
**Mechatronics profile**

Leading technology provider for efficiency, emission and electrification

### 2018 Automotive KPI

- **Sales**: €2.9bn (55%)
- **Operating profit**: €262 m (63%)

### Division Mechatronics
- Actuators
- Automotive Emission Systems
- Commercial Diesel Systems
- Pump Technology
- Solenoid Valves

### Market trend
- **Negative**
- **Positive**
- **Very positive**

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DISRUPTIVE MOBILITY

Carless cities

Carsharing

Autonomous Driving

E-Mobility

Connectivity
From carburator to e-mobility

INNOVATION IS OUR STRENGTH
Market trends
The growth drivers of Mechatronics remain strong

The innovation pipeline for all three trends is packed!
Mechatronics order intake

Favorable increase of book to bill ratio due to rising order intake

- Book to bill ratio:
  - 2015: 1.5x
  - 2016: 1.5x
  - 2017: 1.5x
  - 2018: 1.7x
  - 9m 2019: 2.0x

- >50% of order intake for new business
Innovations for ICE
Electric vapor pump
First to market with an innovative product for ICE

USP Mechatronics

- Regulatory requirements for emissions increased
- Serial production started in mid-2018
- High delivery at low pressure levels
- Serial production of > 750k units in 2019
- Production in USA and China

€700m orders booked until 2026
Innovations for E-mobility
**Electric cooling pumps**
Leveraging our capabilities

**Application**

- Cooling / Heating of high performance batteries
- Cooling of e-engine
- Cooling of DC-DC Converter, Inverter, Onboard Charger
- **Global market leader in electric cooling pumps (20-450W)**
- Life time > 40.000h
- NVH sensitive
- **Market 2025 ~25m vehicles @ ~ >€1.6bn total value**
Electric Climate Compressor (eCC)
Functionality is important for every day use

De-icing windscreen

De-fogging windscreen

Air stream

Air stream
**Electric Climate Compressor (eCC)**

We created outstanding USP for the product

**USP Mechatronics**

- Designed for AC, heat pump and battery cooling operation
- High efficiency over the entire operating range:
  - innovative scroll design
  - high flow rate due to robust back pressure system
- Optimized NVH performance
- Market size 2025 > €2.5bn
HV Contactors are mandatory for all EVs with HV battery.

- HV Contactors have to safely interrupt the electric circuit and secure a safe (i.e. voltage-free) state.

- Market size 2025 > €0.6bn
Innovations for fuel cell technology
Strategic product
Fuel Cell is a pioneering technology

Application

- Maintain product leadership for hydrogen recirculation blower
- Capitalize our capabilities
- Participate in growth potential of the fuel cell technology

Under development contract from German Premium OEM

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Innovations outside the powertrain

Compact
Door Actuator
Compact Door Actuator
Door handling is crucial for autonomous cars

Functionality

- Automated door handling
- Hold function in any door position, even on a slope or an incline
- Servo function = easy movement of the door, especially on slopes
Compact Door Actuator
Our product differentiates

USP Mechatronics

- Compact design
- Innovative gear design for low noise level
- Powerless holding function
- Total market of electric side door > 4 million vehicles in 2025
Mechatronics strategic focus

HOW TO FILL THE GAP

w/o Acquisition

illustrative

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