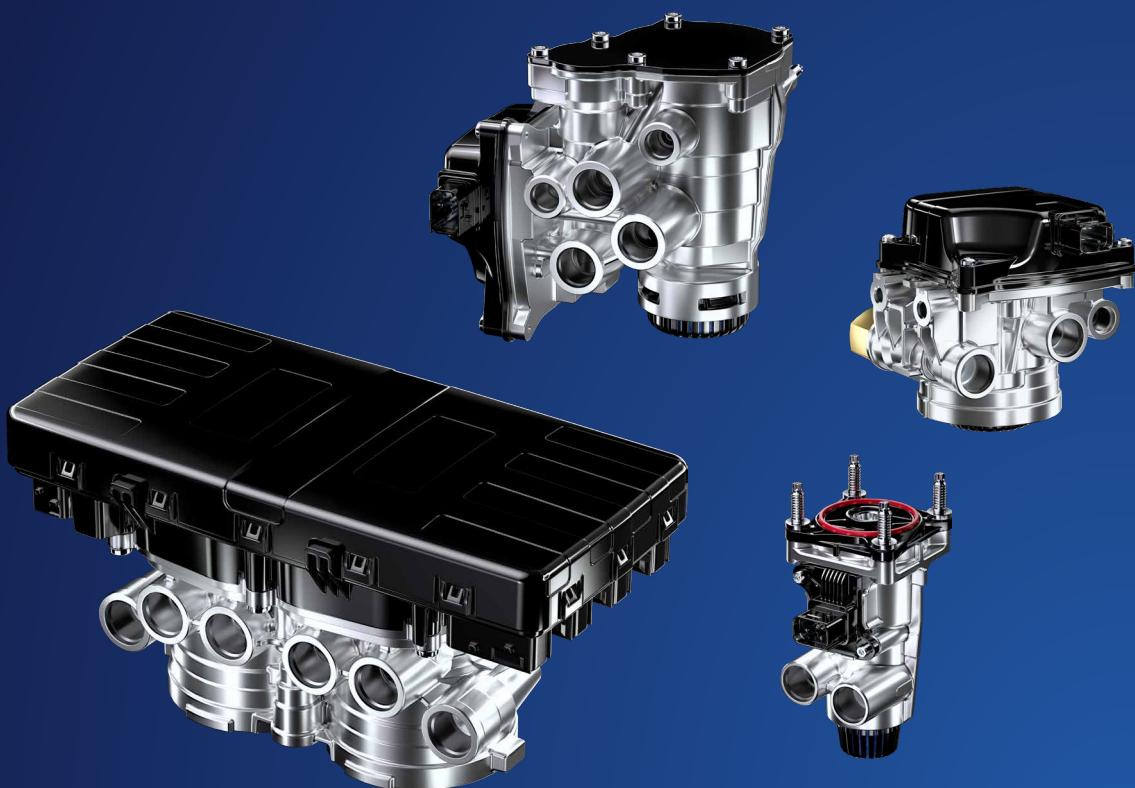


mBSP™

Modular Braking System Platform

mBSP XBS

A modular and scalable braking platform offers higher levels of integration and automation



The Modular Braking System Platform mBSP XBS

This pneumatic braking system platform for trucks and buses is the next evolution of ZF's leading brake control technology for the CV market. It offers functionalities spanning from ABS to EBS and is ready for up to L5 automation on the same platform. With a simplified system layout and the innovative central electronic control unit for the entire system CMAx, mBSP XBS offers higher levels of integration and cybersecurity that serves today's market requirements while preparing for future needs.

The ZF Difference

- Works seamlessly with a broad range of ZF systems including OnGuard, OnHand, eDRIVE, Steering, PowerLine
- Offers higher levels of integration and centralized intelligence with simplified system layout
- ECU integration on CMAx saves space in the cabin
- Supports automation up to L5 with only one additional component

Value to Customers

- Provides higher performance and safer system while reducing components
- Higher level of system integration simplifies the system layout, reduces installation space requirements and helps ease assembly process
- Helps reduce Total Cost of Ownership (TCO) and facilitate life-time management through the simplified system layout
- Contributes to sustainability through improved braking energy recovery
- Provides cybersecurity protection from assembly line to operation on public roads and during maintenance
- Supports OEMs' autonomous driving implementation

Technical Features

Scalability

- Provides a scalable range of value-added functionalities

Autonomous Driving

- Supporting autonomous driving with redundant CMax

Interactions

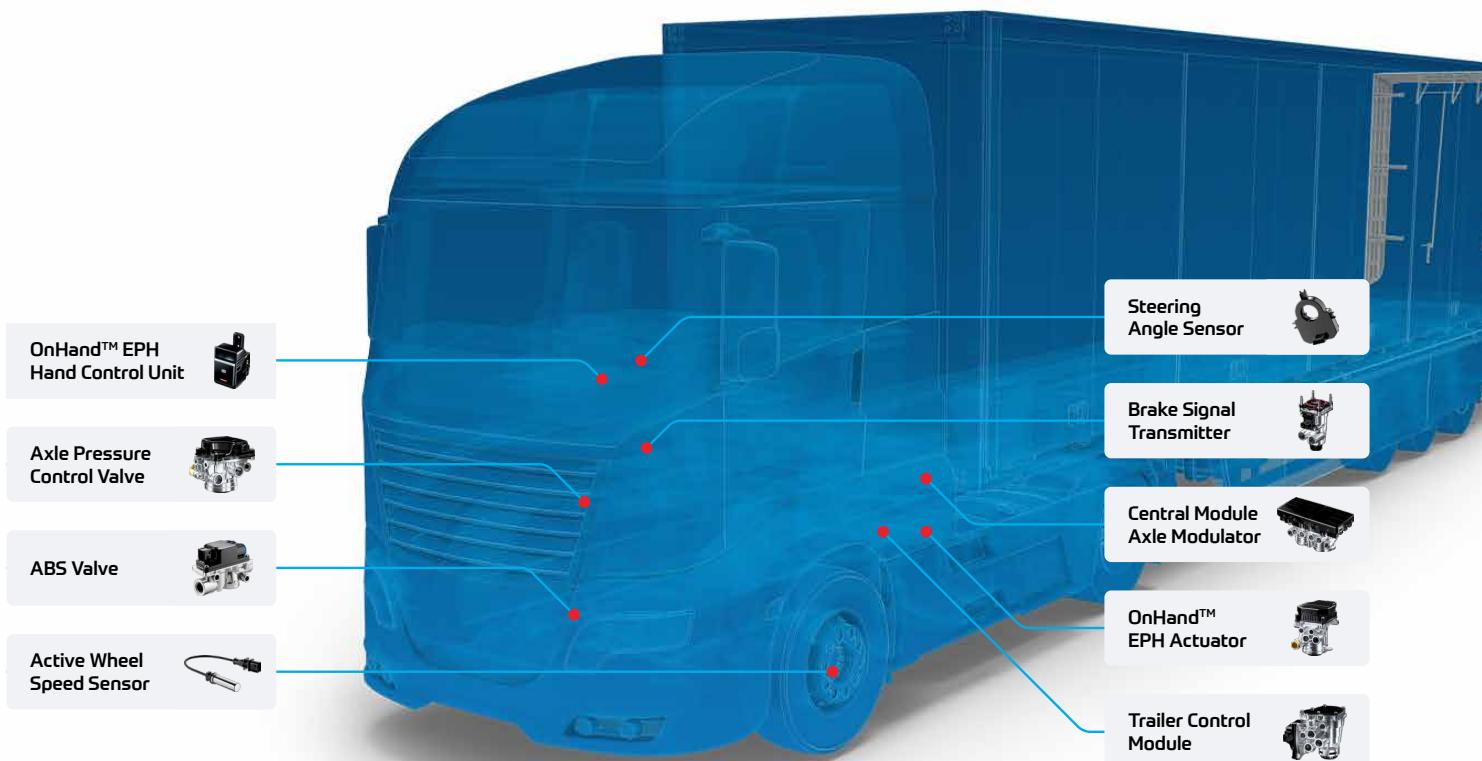
- Offers a higher level of system integration and performance with 30% fewer parts compared to ZF's previous EBS System (EBS3)
- Interacts seamlessly with a broad range of ZF systems
- Leverages ZF's active wheel speed sensor technology to monitor vehicle speed and direction very accurately
- Works with OnHand Electro-Pneumatic Handbrake (EPH) to enable automatic parking brake control

System

- Centralizes intelligence in a single ECU in the axle modulator hosting Autosar software platform
- Enables high-speed communication with ISO CAN FD
- Supports advanced braking energy recuperation installed in hybrid and fully electric vehicles
- Provides enhanced pneumatic redundancy concepts

Compliance

- Meets system-level regulatory cybersecurity requirements (UN ECE/GSR)
- Designed in full compliance with ISO26262 up to ASIL D



Function Overview



Brake Force Distribution



Brake Blending



Deceleration Control



Anti-Lock Braking Function (ABS)



Automatic Traction Control (ATC)



Yaw Control (YC)



Coupling Force Control



Halt Brake



Hill Start Aid (HSA)



Roll Stability Control (RSC)



Stability Optimization



Drag Torque Control



Brake Assist



Soft Start Control



Soft Stop Control



Trailer Control by Driver (TCD) stretch brake



Multitrailer Control by Driver (TCD)



Combination Stability Control

Brake Control

Stability Control



Performance Monitoring

System Functions



Brake Pad Wear Control



Temperature Monitoring



OnBoard Data Recorder



ADAS Function Support



Energy Recovery Support



External Brake Request (XBR)

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