

Built on WABCO
Technology



iEBS

Intelligent Electronic Braking System for Trailers –
Scalable for all applications



Beyond Braking: A New Era of Intelligent Trailers

Electronic braking systems for trailers offer many advantages, such as faster anti-lock and response times, as well as better brake pressure distribution. With its iEBS system, ZF enables numerous additional features that increase driving safety, efficiency, and comfort.

ZF is taking its established ABS and EBS systems to a new level: the trailer brake control is becoming intelligent. iEBS – the intelligent Electronic Braking System – is part of ZF's global platform of braking systems for trailers.

More than 40 additional functions – enabled by the integration of the trailer braking system, sensor technology, and electronic chassis control programs – enhance the safety and comfort of truck-trailer combinations. This is all based on a modular platform featuring ZF's iABS or iEBS, available in various configurations to meet every market need – from steel to air suspensions and in Basic, Standard, and Premium designs.

Platforming – the leaner way to go

All variants use common components and are based on a uniformly high technology level with defined cabling and standard interfaces. This enables faster installation, maintenance, and servicing with leaner stockholding for trailer builders and workshops – increasing operational efficiency and uptime for fleets.



Trailblazing future vehicles

In the coming decades, ACE [autonomous, connected, and electric] trailers will become more common in road freight transport. In accordance with modern functional safety standards, iEBS is the building block for driving vehicle automation, electrification and simplified connectivity.



Integrated emergency functions

In case of a disruption or loss of pressure in the red pneumatic supply line, iEBS recognizes whether the trailer is driving. If so, the system intelligently applies an ABS-controlled emergency braking operation on both sides of the vehicle using the service brake. This prevents harsh and uncontrolled braking maneuvers with the wheels locked, a circumstance that usually occurs when the parking or spring brake is applied for emergency braking purposes.



Quick drive-off after parking

With ZF's innovative iEBS technology, trailers are parked using the reliable spring brake. This eliminates the need for long air reservoir recharging times and enables drivers to start driving immediately after longer parking periods. Complemented by ZF's patented Park Release Valve [PRV], which features a unique single-button design for safer parking and shunting maneuvers, iEBS redefines trailer parking convenience, ensuring efficiency and safety on every journey.



Integrating more systems seamlessly

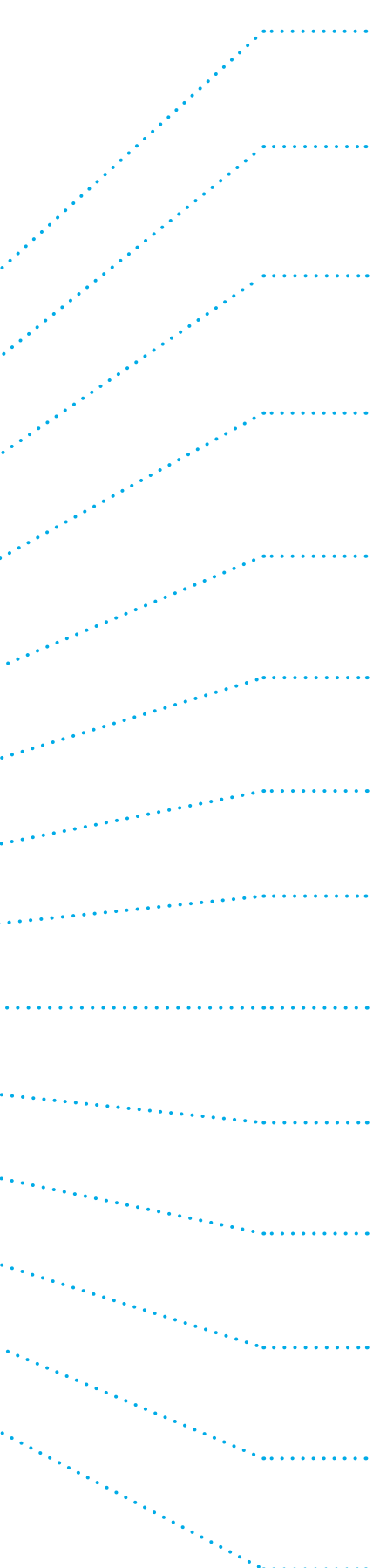
There are costs in terms of time and money associated with accidents, which can include tire blowouts due to loss of tire pressure as well as maneuvering accidents when reversing. Both can be avoided by safety systems like OptiTire and TailGUARD*. These can now be integrated into iEBS – provided the appropriate sensors are fitted to the vehicle. Tire Pressure Monitoring Systems [TPMS] are mandated by law in regions such as the EU. With TailGUARD, the system detects static and moving objects in the blind spot behind the vehicle. The system supports the driver during reversing by triggering a warning and active braking.

* Availability of functions is subject to region, product/release stage, and compatibility

The Industry's Game Changer for Intelligent Trailer Brake Control

Leveraging more than 35 years of experience





iEBS variants bring market-leading intelligence and safety to pneumatically and mechanically suspended trailers

Closing the technology gap: **Improved vehicle control** also for mechanically suspended trailers through **ABS and RSS**

Integrated Emergency Function with ABS-controlled emergency braking and quick drive-off after parking, enhancing safety, uptime and installation [with new PRV]

Comes with a **unique single button Park Release Valve [PRV]** to improve control of trailer [un]coupling procedures, replacing conventional two-button PREVs

Compliant with **ISO 26262 functional safety standard** for greater reliability and robustness, accelerating autonomous and electrified driving

Intelligent **3-dimensional axis acceleration sensing** for unparalleled trailer utilization monitoring and mounting flexibility

Evolutionary **electric connection concept** and **modular cable portfolio** to conveniently connect more devices faster

Advanced pneumatic design speeds up installation and serviceability with integrated components and a simplified layout

Scalable and **customizable 'brain'** for all trailer types and fleet needs [variants, 5V CAN, GIOs, etc.]

Superb space efficiency with **17% smaller volume and 29% less weight** compared to the previous generation

Flexible multi-voltage capability provides connectivity to all types of trucks [8 to 32 V] in different regions

New diagnostics software tool supports touch screens and single-window concept for quick end-of-line tests

iEBS Standard integrates OptiTire TPMS ECU and is electronically controlled air suspension [ECAS] supported

iEBS Premium integrates OptiTire TPMS ECU and TailGUARD reversing aid ECU and is ECAS supported

Welcome to The New Trailer Brain

ZF's intelligent electronic braking systems not only are responsible for improved vehicle safety and shorter stopping distances but are also evolving to be the advanced trailer control center thanks to available sensor data: Connected – intelligent – easy to install.

Data is the new gold – which is why **connectivity** is so important for truck-trailer combinations. And that's also where ZF's intelligent systems like iEBS come in. iEBS offers easy trailer telematics connectivity that provides unparalleled insights into the technical performance and health state of any trailer park. As a leader in connected vehicle technology, ZF provides the optimum solution for digital trailer management. This enables the next level of efficiency for the entire trailer ecosystem, including manufacturers, rental companies, and fleets, so that uptime and performance are maximized while costs are reduced.



How versatility is made

The iEBS concept allows to connect more devices faster and enables more functions with modular standard cabling – even for the building of customized complex trailers – while providing easy stockholding and assembly.



More 5V Controller Area Network [**5V CAN**] communication ports made available to further increase functional scalability.

The Generic Input/Output Ports [**GIO** Ports] of ZF's iEBS variants enhance functional scalability by enabling control of trailer equipment beyond braking.

Variants from iEBS **Basic** to iEBS **Standard** to iEBS **Premium** offer scalable functionality and versatility.

Various **functions** of ZF's **Intelligent Trailer Program** are supported, depending on the iEBS variant and the sensors installed.

Modular approach

The technology is available in three different performance and value levels, ranging from Basic and Standard to Premium. Solutions for trailers with air or steel suspension are also available to close the technology gap: ABS and RSS [Rollover Stability Support] are now available for steel suspended trailers with less installation and service effort.

Intelligent multi-dimensional axis sensing

Intelligent acceleration sensing provides data from all three dynamic directions of movement: longitudinal, lateral, and vertical. This forms the basis for the braking and stabilization functions. Intelligent sensing also enables unparalleled trailer utilization monitoring and improved installation flexibility with additional mounting direction options.

Seamless ADAS system integration

OptiTire [TPMS] and TailGUARD [reversing aid] controls are now integrated in some iEBS variants, further reducing installation time and on-board system complexity.

Easier installation

Advanced pneumatic piping and progressive electric cabling concept with improved port arrangement help to simplify installation.

New diagnostic software

ZF's new Trailer Braking Platform comes with an advanced brake diagnostics software tool. This intuitive tool enables simple end-of-line tests with comprehensive diagnostic functions. The convenient operation also reduces the amount of training required.

Configure Your ZF Intelligent Trailer

The future of mobility and transportation is based on software-enabled features facilitated by powerful hardware. This characterizes the integral relationship between ZF's iEBS and the Intelligent Trailer Program.

iEBS unlocks access to more than 40 functions of the Intelligent Trailer Program that further optimize daily freight operations and ensure greater safety, efficiency, and sustainability:

At the Yard – On the Road – At the Dock.

With this comprehensive portfolio of functions and customizable solutions, ZF is leading the way in trailer safety and efficiency.

Trailers can be optimally configured depending on the focus of interest, such as:

- Further increasing driving safety
- Ensuring greater cargo safety
- Increasing driver efficiency while offering more comfort
- Reducing fuel consumption and emissions
- Making operations significantly more efficient

This makes it possible for trailer manufacturers and fleets to easily adapt their trailers to specific requirements and individual needs.



iEBS features according to variant

Functions and supported components	Basic Steel	Basic Air	Standard	Premium
ABS Configuration	2S/2M – 4S/2M	2S/2M	2S/2M – 4S/2M	2S/2M – 4S/3M
Number of GIO ports	2	3	4	10
CAN 5 V [SUBSYSTEMS] ports	1	1	2	2
Power Supply for External Devices	✓ [1x SUBSYSTEM]	✓ [1x SUBSYSTEM]	✓ [2xSUBSYSTEM & via 2xGIO]	✓ [2xSUBSYSTEM & via 2xGIO]
Integrated Speed Switch ISS	✓ [as RtR or ISS]	✓ [as RtR or ISS]	✓ [as RtR or ISS or 2xISS]	✓ [as RtR or ISS or 2xISS]
Load Depending Brake Performance	✓* [with height sensor]	✓	✓	✓
Active Signals [RSS and ABS]	✓	✓	✓	✓
Stop Light Power	✓	✓	✓	✓
24 V CAN	✓	✓	✓	✓
# of separate Lift Axle Control	×	1	2	2[3**]
Shared Warning Lamp/Buzzer	×	×	✓	✓
Free Configurable Functions [FCF]	×	×	✓**	✓**
Speed signal Output	×	×	×	✓**

ZF's Intelligent Trailer Program functions

Functions and supported components	Basic Steel	Basic Air	Standard	Premium
Advanced MultiVoltage	✓	✓	✓	✓
Anti-Lock Braking Function [ABS]	✓	✓	✓	✓
Brake Pad Wear Indicator	✓	✓	✓	✓
Operating Data Recorder	✓	✓	✓	✓
OptiFlow AutoTail	✓	✓	✓	✓
OptiTire	✓	✓	✓	✓
Return-to-Ride	✓	✓	✓	✓
Rollover Stability Support [RSS]	✓	✓	✓	✓
Router & Repeater	✓	✓	✓	✓
SCALAR EVO Pulse	✓	✓	✓	✓
SCALAR EVO Guard	✓	✓	✓	✓
ServiceMind	✓	✓	✓	✓
SmartBoard	✓	✓	✓	✓
OptiLock	✓	✓	✓	✓
SCALAR Software Services	✓	✓	✓	✓
OptiFlow Tail	✓	✓	✓	✓
OptiFlow TrailerSkirt	✓	✓	✓	✓
OptiTire [external ECU]	✓	✓	✓	✓
Lift Axle Control	✗	✓ [LACV]	✓ [LACV, LACV-IC]	✓ [LACV, LACV-IC, TAG]
Brake Release Function	✗	✗	✓	✓
Finisher Brake	✗	✗	✓	✓
Fuel Saving Suspension	✗	✗	✓	✓
Memory Level	✗	✗	✓	✓
Notebook Memory	✗	✗	✓	✓
OptiLevel	✗	✗	✓	✓
Optimum Traction	✗	✗	✓	✓
OptiTire [integrated]	✗	✗	✓ [only 480 102 31x 0 variants]	✓ [only 480 102 41x 0 variants]
OptiTurn	✗	✗	✓	✓
Overload Indicator	✗	✗	✓	✓
Return-to-Load Level			✓	✓
SafeStart [with service brake]	✗	✗	✓	✓
Steering Axle Lock	✗	✗	✓	✓
TiltAlert	✗	✗	✓	✓
Traction Help	✗	✗	✓	✓
Emergency Brake Alert	✗	✗	✓**	✓**
Immobilizer	✗	✗	✓**	✓**
Air Bellows Protector	✗	✗	✗	✓
Battery Control	✗	✗	✗	✓
Bounce Control	✗	✗	✗	✓
Forklift Control	✗	✗	✗	✓
OptiLoad	✗	✗	✗	✓
Trailer Extension Control	✗	✗	✗	✓**
Bounce Control	✗	✗	✗	✓**
OptiLevel 2-Point Control	✗	✗	✗	✓**
SafeStart	✗	✗	✗	✓**
TailGUARD	✗	✗	✗	✓**

* Function available only with calibrated height sensor connected. Axle load monitoring works under determined conditions.

** Availability of all functions is subject to region, product/release stage, and compatibility. Planned for a later release stage.

Benefits, Benefits, Benefits ...



Over 30 years of experience in the trailer brake business have gone into ZF's Intelligent Trailer Braking Platform. The solution features a significant understanding of the market and provides benefits for all users.

The Intelligent Trailer Braking Platform enhances cost and time efficiency across the entire trailer value chain – from building the trailer on the assembly line, its operations by fleets to aftermarket and workshop servicing.



Drivers

Retaining skilled drivers as well as supporting unexperienced drivers is the key to running an efficient operation. Thanks to ZF's state-of-the-art trailer technology all drivers are supported by comfort and effectiveness features that ensure less stressful driving, a safer journey, and easier trailer operation.



Trailer manufacturers

... will benefit from leaner production as well as from shorter installation times. These OEMs will be able to simplify their production lines and reduce cable and component stocks. Since ZF's IBP uses standard components, global production is also facilitated.



Fleet operators

... will benefit from the connectivity features. Every trailer can become intelligent and connected through a telematics unit without the need for a system upgrade. This results in better health condition monitoring, which enables preventive maintenance and leads to a significant increase in uptime.



Aftermarket resellers and workshops

... will benefit from the harmonized hardware platform and diagnostic software of ZF's IBP. Vehicle uptime is increased thanks to better parts availability and shorter installation and training times, allowing vehicles to be returned to service much faster.

**For further product details contact your sales representative.
For information about our product portfolio, visit: zf.com/cv
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About ZF

ZF, which acquired WABCO in Spring 2020, is a global technology company supplying advanced mobility products and systems for passenger cars, commercial vehicles and industrial technology. Its comprehensive product range is primarily aimed at vehicle manufacturers, mobility providers and start-up companies in the fields of transportation and mobility. ZF electrifies a wide range of vehicle types. With its products, the company contributes to reducing emissions, protecting the climate as well as enhancing safe mobility. Alongside the automotive sector – passenger cars and commercial vehicles – ZF also serves market segments such as construction and agricultural machinery, wind power, marine propulsion, rail drives and test systems.

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