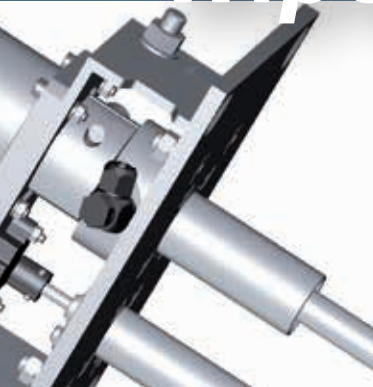


# *Windscreen Wiper and Wash Systems*



## **APPLICATIONS**

High-Speed Trains | Light Rail Vehicles | Locomotives | Metros |  
Monorails | People Movers | Regional and Commuter Trains |  
Special Vehicles

## A CLEAR VIEW UNDER ALL WEATHER CONDITIONS



**THE DEMANDS ON WINDSCREEN WIPER AND WASH SYSTEMS VARY ENORMOUSLY** according to the application involved. Irrespectively whether for a mass transit application or very high-speed train, operating in moderate or extreme climatic conditions, Knorr-Bremse is always able to offer the optimal solution.

### VARIETY

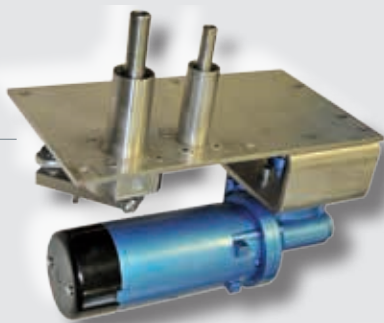
Early electric windscreen wiper and wash systems for trains were based on components originally developed for the automotive industry. When it became clear that these modified systems were no longer sufficient to meet increasingly specific customer demands, Knorr-Bremse started to develop specialized systems, tailored to the needs of the rail sector based on a modular system.

Today, at its site in Moedling, Austria, Knorr-Bremse is producing a wide range of solutions for a huge variety of different applications. All systems are subject to the highest quality standards all the way from the design to the final assembled and tested product.

### CUSTOMER BENEFITS

- Optimal life-cycle cost performance
- Wide variety of functionalities and options, e. g.
  - Rain detector
  - Integrated screen wash fluid supply (unique)
- High system availability
- Long-life components
- Long-term commitment to maintaining original parts supply
- Compliance with all railway standards (e.g. EMC, fire protection)
- Customized systems for every vehicle type
- Long-term experience in all vehicle types

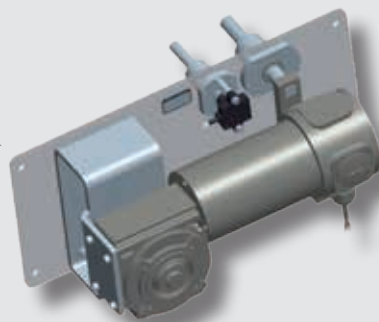
## ELECTRIC SYSTEMS



### EBS

The wiping movements and wiping angles are realized with levers and hinged rods. These low-cost and plug and play systems offer the following features:

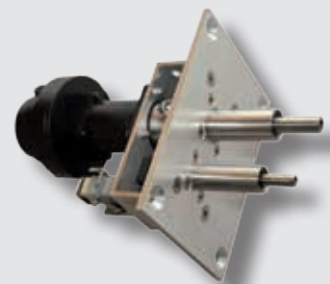
- Parking function
- Two wiping speeds
- Interval wiping
- Lifetime of at least 1000 operating hours
- Washing function with slow wiping mode and dry wiping
- Segment and parallel wiping field



### EAS

This very reliable and durable electrical system was specifically developed for the rail vehicle industry by Knorr-Bremse. It is comparable to the EBS systems but offers enhanced features

- Two stabilized wiping speeds
- Interval wiping with different pause times
- Lifetime of at least 3000 operating hours
- Original parts supply guaranteed for 30 years
- Screen wash fluid supply integrated into drive unit (optional)
- Rain detector signal for automatic operation (optional)
- Binary and coded diagnosis interface



### EDS

The electrical disc systems are high-end systems, specially developed for heavy rail vehicle operation and are based on proven components such as drive system, rotary encoder and control system. Additional features compared to the EAS systems are:

- Washing plant position (e.g. middle of windscreen)
- Lifetime of at least 8000 operating hours
- Screen wash fluid supply integrated into drive unit
- Watering of windscreen prior to wiping saves wear (optional)
- Maximum torque of 200 Nm
- Adaptive torque control (also for self protection in failure cases)
- Synchronization of two wipers' drives without mechanical wiping link
- Flexible adaptation of park position, wiping angle and speed
- Rain detector signal for automatic operation (optional)

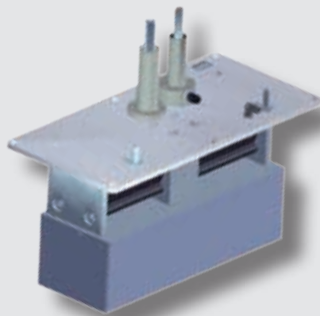
### PNEUMATIC SYSTEMS



#### PBS

These pneumatic systems are simple to use and do not require a power supply except 7 bar air pressure. A large number of variants and functionalities are available featuring:

- Parking position
- Maintenance position without air pressure
- Interval wiping (adjustable: 2-30 sec.)
- Continuous wiping (adjustable: 30-55 double strokes/min)
- Pure pneumatic system, no electric control required
- Segment and parallel wiping field
- Lifetime at least of 10.000 operating hours
- Optimal availability through emergency operating unit (manual)
- More than 40 years of in-service operation



#### PHX

This electropneumatic high-end, next generation system is specifically developed for high-speed and very high-speed trains with very large sized or even spheroidal front windscreens. An electrical control module converts signals from the operating element and wiper drive into functions via an electropneumatic unit. Key functions are:

- Parking position
- Washing plant position (middle of windscreen)
- Middle parking position at vacant cab for optimal aerodynamic behavior
- Maintenance position without air pressure
- Optimal aerodynamic design of the wiper arm
- Interval wiping (adjustable: 2-30 sec.)
- Continuous wiping (adjustable: 30-55 double strokes/min)
- 200 Nm breakaway torque
- Pneumatic system with electric control and diagnosis
- Lifetime of at least 10.000 operating hours
- Highest system availability through emergency operating unit (redundancy)
- segment parallel and adapted parallel wiping field
- Based on 20 years experience in high-speed trains wiper systems

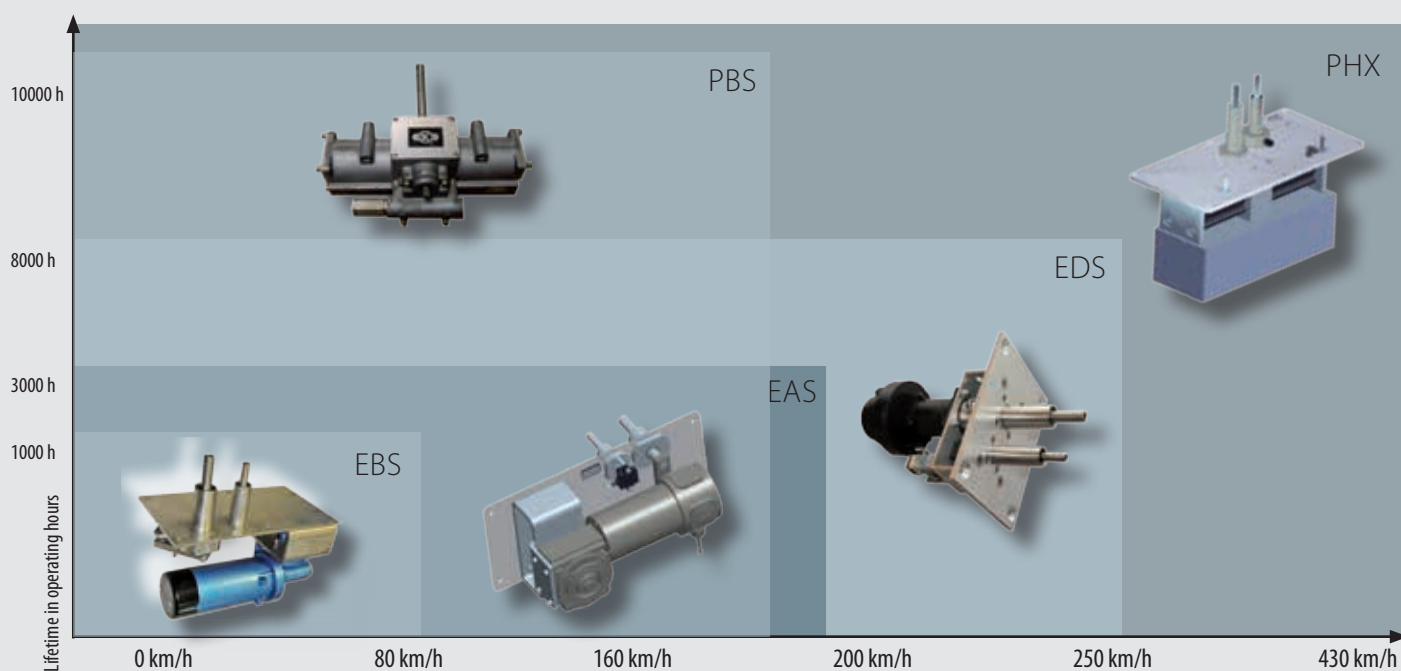


# WINDSCREEN WIPER AND WASH SYSTEMS

RAIL  
VEHICLE  
SYSTEMS



## WWWS – PRODUCT PORTFOLIO



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