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

CUSTOMER BENEFITS
- Versatility of functionality and options, e.g.
  - Parking position
  - Maintenance position
  - Middle parking position at vacant cab
  - Emergency operating unit (manual)
  - Life-time of at least 10,000 operating hours
  - Optimal aerodynamic design of the wiper arm
  - Variable and adjustable washing plant position
- Optimal availability through emergency operating and travaill mode
- Lower than 4% of losses in service operation

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CLASSIC ELECTRIC SYSTEMS
- Park position
- Maintenance position
- Middle parking position at vacant cab
- Emergency operating unit (manual)
- Lifetimes of at least 10,000 operating hours
- Optimal aerodynamic design of the wiper arm
- Variable and adjustable washing plant position
- Optimal availability through emergency operating and travaill mode
- Lower than 4% of losses in service operation

EAS
- This very reliable and durable electrical system was specifically developed for the rail vehicle industry by KÖNNER. In comparison to the EBS systems but offers enhanced features:
  - Two stabilized wiping speeds
  - Intermittent wiping with different pause times
  - Lifetimes of at least 20,000 operating hours
  - Original parts supply guaranteed for 10 years
  - Screen wash fluid supply integrated into drive unit (optional)
  - Rain sensor for automatic operation (optional)
  - Rear and side window diagnosis interface

PNEUMATIC SYSTEMS
- These pneumatic systems are unique 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
  - Emergency position without air pressure
  - Continuous wiping (adjustable: 30-60 sec.)
  - Pure pneumatic system, no electric control required
  - Segment and parallel wiping field
  - Emergency at level of 1000 operating hours
  - Optional availability through emergency operating and travaill mode

EBS
- The wiping movements and wiping angles are adjusted with levers and hinged rods. These low-cost and plug and play systems offer the following features:
  - Parking function
  - Two wiping speeds
  - Intermittent wiping
  - Lifetimes of at least 1900 operating hours
  - Wiping function with slow wiping mode and very low wiping speed
  - Segment and parallel wiping field

ECS
- 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, check encoder and control system. Additional features compared to the EAS systems are:
  - flashing positioning (e.g. mobile attachment)
  - Lifetimes of at least 20,000 operating hours
  - Screen wash fluid supply integrated into drive unit
  - Emergency operating unit: passive wiper system
  - Adaptive torque control (also for self actuating systems)
  - Optional availability through emergency operating and travaill mode

PWB
- This electromechanical high-end next generation system is specifically developed for high-speed and very high-speed trains with very large sized front windows. An electrical control module transmits signals from the operating element and wiper drive into functions via an electromechanical unit. Key functions are:
  - Parking position
  - Maintenance position (mobile attachment)
  - Middle parking position at vacant cab
  - Emergency position without air pressure
  - Optional availability through emergency operating and travaill mode

WIPER AND WASH SYSTEMS
- A clean view under all weather conditions
- Efficient technology worldwide
- Long-term commitment to maintaining original parts supply
- Compliance with all railway standards (e.g. DVM requirement)
- Customized systems for every vehicle type
- Long-term experience at all vehicle types
- Proven components such as electropneumatic unit, key functions are:
  - Life-time of at least 10,000 operating hours
  - Higher system availability through emergency operating unit
  - Variable and adaptable parallel wiping field
  - Based on 20 years experience in high-speed train wiper systems
Efficient Technology Worldwide

THE DEMANDS ON WINDSCREEN WIPER AND WASH SYSTEMS VARY ENORMOUSLY, according to the application involved. Irrespective 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 the increasing special customer demands, Knorr-Bremse started to develop specialized systems, tailored to the needs of the railway sector based on a modular system.

Today, at its site in Mödling, Austria, Knorr-Bremse is producing a wide range of solutions for a huge variety of different applications. A large number of systems and functionalities are available consisting of proven components such as drive system, control electronics and system functions. Additional features compared to the EAS systems are:

- Driving position
- Maintenance position without air pressure
- Interval wiping (adjustable: 2-30 sec.)
- Continuous wiping (adjustable: 40-300 double strokes/minute)
- Pneumatic system, no electric control required
- Segments and parallel wiping field
- Automatic torque control (also for self locking)
- Emergency operating unit (manual)
- Lifetime of at least 30.000 operating hours
- Emergency operating unit (automatic)
- Wiper arm
- Wiper blade
- Wiper arm

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

- Parking position
- Maintenance position without air pressure
- Interval wiping (adjustable: 2-30 sec.)
- Continuous wiping (adjustable: 40-300 double strokes/minute)
- Dry wiping
- Permanently adapted to specific requirements
- Future developments of self-deduction
- Pneumatic system with electric control and diagnosis

THE DEMANDS ON WINDSCREEN WIPER AND WASH SYSTEMS VARY ENORMOUSLY, according to the application involved. Irrespective 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.

A CLEAR VIEW UNDER ALL WEATHER CONDITIONS

CUSTOMER BENEFITS

- High degree of reliability
- Wide variety of function and options, e.g.
  - Rain detector
  - Integrated screen wash fluid supply (option)
- High system availability
- Long-life components
- Long-term commitment to maintaining original parts supply
- Compliance with all railway standards (e.g. EixC/EN50129)
- Customized systems for every vehicle type
- Long experience in all vehicle types

ELECTRIC SYSTEMS

- EBS
  - The wiping motions and wiping angles are realized with levers and hinged rods. These low-cost and plug and play systems offer the following features:
    - Parking function
    - Easy wiping speeds
    - Interval wiping
    - Lifetime of almost 15.000 operating hours
    - Wiping function with low side wiping mode and side wiping
    - Segments and parallel wiping field
- EAS
  - This very reliable and durable electric system was specifically developed for the rail vehicle industry by Knorr-Bremse. In comparison to the EBS systems but offers enhanced features:
    - Two stabilized wiping speeds
    - Interval wiping with different pause times
    - Lifetime of at least 30.000 operating hours
    - Original parts supply guaranteed for 50 years
    - Screen wash fluid supply integrated into drive unit (optional)
    - Field detector signal for automatic operation (optional)
    - Array and coded diagnostic interface
- EDS
  - The electrical disc systems are high end systems, specifically developed for heavy rail vehicle operation and are based on proven components such as drive system, control electronics and control system. Additional features compared to the EAS systems are:
    - Driving position (e.g. middle of windshield)
    - Maintenance position without air pressure
    - Interval wiping (adjustable: 2-30 sec.)
    - Continuous wiping (adjustable: 40-300 double strokes/minute)
- Pneumatic systems
  - These pneumatic systems are unique to use and do not require a power supply except 7 bar air pressure. A large number of systems and functionalities are available featuring:
    - Parking position
    - Maintenance position without air pressure
    - Interval wiping (adjustable: 2-30 sec.)
    - Continuous wiping (adjustable: 40-300 double strokes/minute)
- EDS
  - The electrical disc systems are high end systems, specifically developed for heavy rail vehicle operation and are based on proven components such as drive system, control electronics and control system. Additional features compared to the EAS systems are:
    - Driving position (e.g. middle of windshield)
    - Maintenance position without air pressure
    - Interval wiping (adjustable: 2-30 sec.)
    - Continuous wiping (adjustable: 40-300 double strokes/minute)
- EBS
  - The wiping motions and wiping angles are realized with levers and hinged rods. These low-cost and plug and play systems offer the following features:
    - Parking function
    - Easy wiping speeds
    - Interval wiping
    - Lifetime of almost 15.000 operating hours
    - Wiping function with low side wiping mode and side wiping
    - Segments and parallel wiping field

PNEUMATIC SYSTEMS

- PBS
  - These pneumatic systems are unique to use and do not require a power supply except 7 bar air pressure. A large number of systems and functionalities are available featuring:
    - Parking position
    - Maintenance position without air pressure
    - Interval wiping (adjustable: 2-30 sec.)
    - Continuous wiping (adjustable: 40-300 double strokes/minute)

PHK

- PHK
  - This electromechanical high-end, next generation system is specifically developed for high-speed and very high-speed trains with very large sized (even spherical front) windshields. An electromechanical control module converts signals from the operating element and wiper drive into functions via an electromechanical unit. Key functions are:
    - Parking position
    - Driving position
    - Maintenance position without air pressure
    - Interval wiping
    - Continuous wiping
    - Dry wiping
    - Emergency operating unit (automatic)
    - Emergency operating unit (manual)

WINDSCREEN WIPER AND WASH SYSTEMS

- EBS
  - The wiping motions and wiping angles are realized with levers and hinged rods. These low-cost and plug and play systems offer the following features:
    - Parking function
    - Easy wiping speeds
    - Interval wiping
    - Lifetime of almost 15.000 operating hours
    - Wiping function with low side wiping mode and side wiping
    - Segments and parallel wiping field

- EAS
  - This very reliable and durable electric system was specifically developed for the rail vehicle industry by Knorr-Bremse. In comparison to the EBS systems but offers enhanced features:
    - Two stabilized wiping speeds
    - Interval wiping with different pause times
    - Lifetime of at least 30.000 operating hours
    - Original parts supply guaranteed for 50 years
    - Screen wash fluid supply integrated into drive unit (optional)
    - Field detector signal for automatic operation (optional)
    - Array and coded diagnostic interface

THE DEMANDS ON WINDSCREEN WIPER AND WASH SYSTEMS VARY ENORMOUSLY according to the application involved. Irrespective 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.

CUSTOMER BENEFITS
-期限長達 40 年的在役使用經驗
- 高可用性
- 長時間的維護
- 客製化

VARIETY
- 多樣的車款
- 多樣的功能

THE DESIGN OF ELECTRIC SYSTEMS

EBS
- The wiping movements and wiping angles are varied with a wide and broad range of systems for a huge variety of different applications.
- Two stabilized wiping speeds
- Intermittent wiping with different pause times
- Optimal availability through redundancy

EAS
- This very reliable and durable electric system is specifically developed for the rail vehicle industry and is compared to the EBS systems but offers enhanced features.
- Two stabilized wiping speeds
- Intermittent wiping with different pause times
- Optimal availability through redundancy

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, stay, or control system. Additional features compared to the EAS systems are:
- Wiping position
- Wiper arm

WASHING SYSTEMS

PBS
- These pneumatic systems are angular to use and do not require a power supply except 3 bar air pressure. A large number of variants and functionalities are available featuring:
- Parking position
- Maintenance position without air supply

PHK
- This electromechanical high-end next generation system is specifically developed for high-speed and very high-speed trains with very large sized even spherical front windshields. An electrical control module transmits signals from the operating element and wiper drive into functions via an electromechanical unit. Key functions are:
- Parking position
- Maintenance position of windshield

THE DESIGN OF PNEUMATIC SYSTEMS

Pneumatic system with electric control and diagnosis

THE DESIGN OF WINDSCREEN WIPER AND WASH SYSTEMS

A CLEAR VIEW UNDER ALL WEATHER CONDITIONS