



NORGREN®

Norgren Rail Sector

Application overview



Rail

- » Customised solutions for customers within the Metro, Inter-city, Freight, High-speed and Permanent way rail industries for over 25 years
- » Extensive range of products which are reliable, proven and safe
- » Products ranging from actuators to pressure switches, airline equipment to valves, fittings to modular bespoke solutions for industry leaders
- » Six technology leaders drive innovative new developments for air main, brakes, couplers, doors, pantographs and toilet applications



What is Railine?

- » Rail demands are different from other types of industrial applications. Rail applications typically require:
 - » Temperature ranges from -40°C to $+80^{\circ}\text{C}$
 - » High resistance to shock and vibration
 - » Voltage tolerances of $\pm 30\%$
 - » Very high degree of safety and reliability
- » Railine offers a range of products which meet these requirements (see: <http://www.norgren.com/rail>)



Actuators



- » Available to NFPA, ISO6431, VDMA24562 and FNE49-003-1 standards
- » Extensive range of standard and customised mountings available
- » Wide range of seal options for high life and extreme temperature variations
- » High performance, stability and reliability
- » Heavy duty and customer specific actuator designs

Solenoid valves



- » Extensive range of sizes and porting available
- » Resistant to voltage fluctuations, eg +/-30%
- » Resistant to extreme temperature fluctuations
- » Direct actuated poppet and indirect actuated spool versions
- » High cycle life, fast response, low leakage
- » 2/2, 3/2, 5/2 and 5/3 functions
- » Shock & Vibration tested to EN 61373

Fluid control valves



- » Large range of porting options
- » Suitable for high and low temperatures
- » Normally Closed or Normally Open function
- » Pressure range up to 40 bar
- » Suitable for neutral, aggressive and contaminated fluids

Filters



- » Port size from 1/8" to 2 1/2"
- » Optional service life indicators
- » Modular construction for fast installation and simple servicing
- » Coalescing elements for high efficiency particle and oil removal
- » Heavy duty, large capacity metal bowls
- » Heavy duty, high flow filter elements

Regulators



- » Balanced valve design for optimum pressure control
- » Modular construction for fast installation and simple servicing
- » Precision regulators for accurate and consistent pressure control
- » High relief flow ensures quick response to changing conditions
- » Pilot operated regulators for high flow requirements

Flow control valves



- » Size M5 to 1"
- » Standard & heavy duty models
- » Uni-directional & Bi-directional models available
- » High flow rates
- » Choice of seal & body materials

Non return valves



- » Simple, reliable design
- » Low cracking pressure
- » Choice of body & seal materials
- » High flow rates
- » Options for -40°C up to $+150^{\circ}\text{C}$

Ball valves



- » Wide range of types including 3-way, exhausting & lockable versions
- » High flow & high pressure
- » Variety of body & seal materials
- » Wide range of sizes

Fittings

- » Norgren solution
 - » Comprehensive range of fittings for rail vehicles
 - » -45°C to +200°C
 - » High vibration resistance
 - » Pre assembled units
 - » Can be remade
 - » Can be used with thinner section tube (0.8mm) reducing weight and cost, and greater flow rates
 - » Available in brass or light weight corrosion resistant alloy for copper, brass & stainless tubing



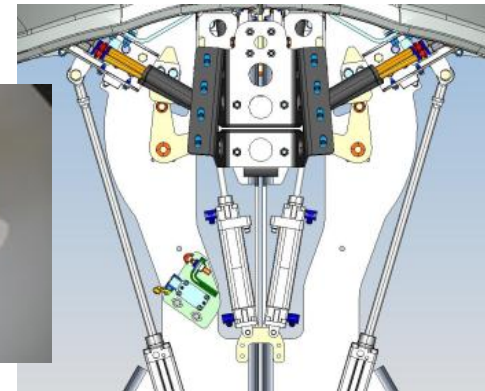
Pneumatics for Railway Vehicles

(Main areas pneumatics are applied on modern trains)



Coupling system

- » Norgren solution
 - » Special pneumatic cylinder / valve systems
 - » Special compact cylinders with integrated valve, position sensing and speed controls designed to save space, weight and installation time
 - » Heavy duty limit sensing valves
 - » Compact, light weight, modular valve manifold solutions
 - » Heavy duty fittings and filters



Braking system components

- » Norgren solution
 - » Special solenoid valves, regulators and special pressure switches
 - » Compact Solenoid valves with +/-30% voltage tolerance and surge suppression for fluctuating power supplies
 - » Pressure switch vibration resistance to 15g
 - » -40°C ~ +85°C temperature range
 - » Rapid response time and long life
 - » High repeatability & accuracy

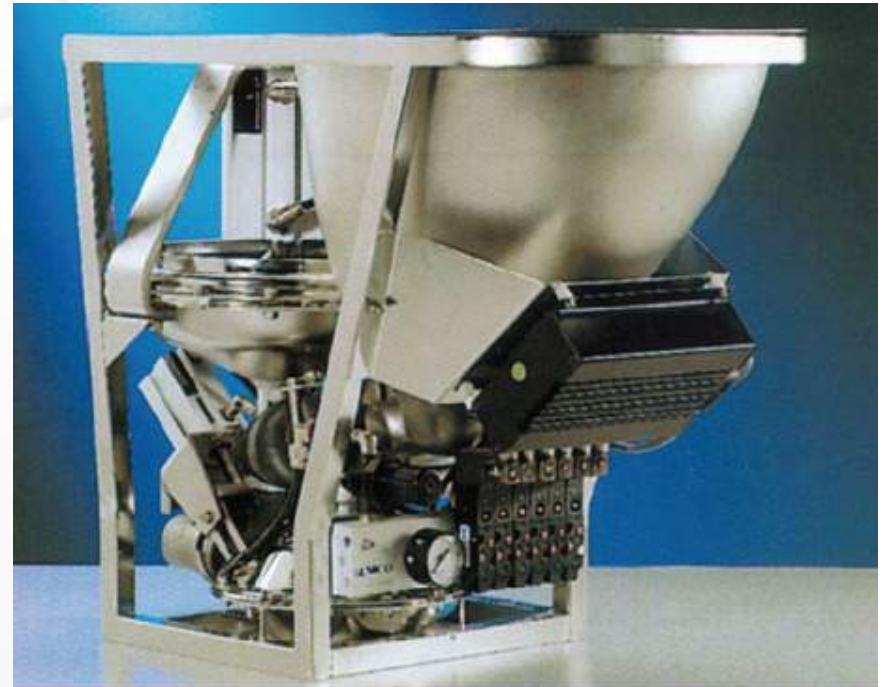


Brake Module



Toilet control

- » Norgren solution
 - » Modular system consisting of special valves, actuators & regulators and integrated electro-pneumatic control system
 - » Ultra low water consumption
 - » Optional integrated diagnostics
 - » Customized control systems & “Plug and Play” designs
 - » Optional system monitoring, feedback and isolation



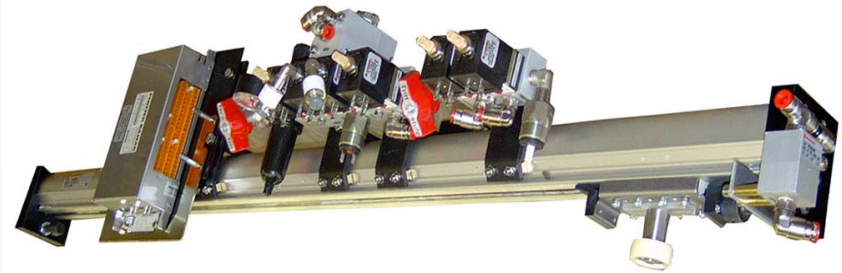
Retractable mirror control

- » Norgren solution
 - » Special pneumatic actuator and controls
 - » Force resistant at high speed
 - » External speed & cushion adjustment
 - » Fully integrated design
 - » Wide temperature range
 - » Highly reliable operation



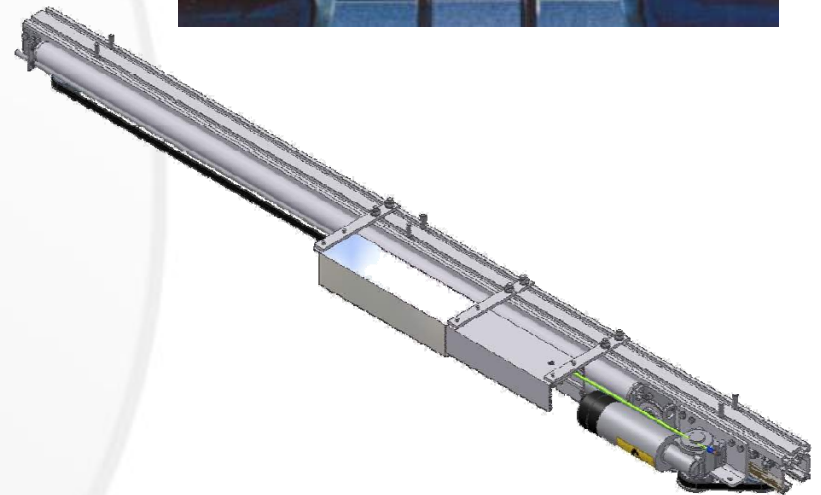
External door systems

- » Norgren solution
 - » Special pneumatic rodless cylinder with integrated control system for external plug and sliding door
 - » Safe, reliable and secure operation
 - » Interlocking and feedback drive systems
 - » Extended cushioning and increased side load stability
 - » Entrapment protection



Internal door systems

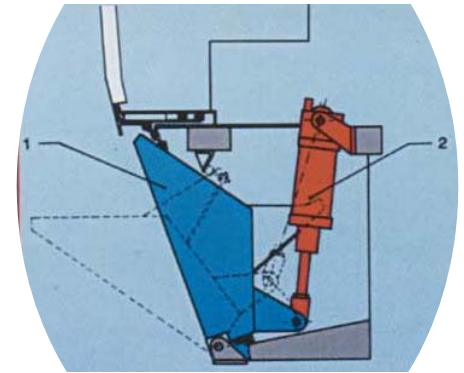
- » Norgren solution
 - » Special pneumatic & electric rodless cylinder with integrated control system
 - » Safe, reliable and secure operation
 - » Interlocking and feedback drive systems
 - » Fire resistant to BS 6583 Cat 1B
 - » Entrapment prevention
 - » Smooth, quiet design with variable speed drive



Retractable step control

» Norgren solution

- » Special pneumatic cylinders
- » Slide and swing operation options integrated with train framework
- » Compact, robust construction
- » Optional integrated interlocking function
- » Resistant to harsh environments



Water control

- » Norgren solution
 - » Customised valves and control system
 - » Modular, space saving design
 - » Can be integrated with other systems
 - » Eliminates need for electric pumps and float / pressure switches
 - » Reduces pipework and need for additional water storage tanks
 - » Simple, reliable design



Retarder cylinders

- » Norgren solution
 - » Special pneumatic actuators
 - » -40°C to +80°C temperature range
 - » High side load resistance from oversized rod and heavy duty bearing
 - » Special seal materials to withstand harsh environments
 - » Stainless steel piston for corrosion resistance
 - » Robust construction

