Pneumatic Systems and Components for the Rail Industry

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Parker is the world leader in motion and control technologies, providing systematic, precision-engineered solutions for a variety of commercial, industrial and aerospace markets.

Throughout the world, Parker Hannifin is working together with companies to make their machines more reliable and more productive.

Parker products are in operation on satellites orbiting the earth: in machine tools and mobile plant; on oil rigs and refineries; in hospitals and laboratories. In fact, wherever there are machines which depend on motion or fluid control, you’ll find innovative and reliable Parker components and systems.

Parker’s unique product capability is supported by an organisation which is structured to provide local customer service, encompassing distribution, comprehensive technical support and after-sales service throughout the world.

Parker has over 200 manufacturing facilities in Europe, North and South America, the Far East and Australasia as well as over 150 administrative and sales offices and 7500 distributors in 58 countries around the world.

Parker’s operations are organised into eight specialist product groups, as outlined on the back of this brochure.
Parker Solutions for the Rail Industry

Parker Pneumatic are part of the Automation Group and operate from a number of manufacturing plants in Europe, with European headquarters at Cannock, Staffordshire UK.

Parker’s many years of experience in designing pneumatic products and systems for the rail industry has produced a depth of ‘industry specific’ knowledge unrivalled in the market place, with a wealth of products, both standard and custom built ideally suited to a wide range of applications.

Throughout Europe Parker have a team of Application Engineers and Design and System Engineers who work closely with customers to understand their requirements and to ensure the optimum engineering solution is provided.

This brochure explains many of the applications that Parker are involved with and highlights the products most suited to the rail industry.

The principal application areas that Parker have experience in include:

- Brake Control
- Pantograph Operation
- Internal and External Door Actuation and Control
- Door Step Control
- Coupling Systems
- Engine Retarder Control
- Horn Operation
- Sanding Control Systems
- Shoe Gear Control Systems
- Tilting Train Control
- Heating and Ventilating Control
- Passenger Seat Adjustment
- Vacuum Toilet and Water Control Systems

Photo’s courtesy B. Morrison

For further information on Parker products visit www.parker.com
Brake Control Systems

Knorr-Bremse Westinghouse Brakes and Parker working together

Parker Solenoid Valves for Brake Systems

Parker solenoid valves form an integral part of the Closed Loop Analogue Unit (CLAU) manufactured by Knorr-Bremse Westinghouse Brakes UK Ltd.

A bank of five solenoid valves are employed to control the level of braking on each car. Two of the valves are used to supply varying pressure when applying the brakes and another two control the release of the brake pressure. This ensures smooth acceleration and retardation when the brakes are operated. The fifth valve operates as a change over valve and also the emergency stop.

Parker Solenoid Valves for Wheelslide Protection Systems

Knorr-Bremse Westinghouse Brakes UK Ltd manufacture a Wheelslide Protection System, winner of the Eurostar award for technology. The system has a novel control technique which uses maximum available adhesion to minimise stopping distances, air consumption and wheel damage on a wide variety of vehicle configurations from light metros to heavy locomotives. This train anti-lock brake system uses axle-speed sensors, an electrical control unit and pneumatic dump valves. A bank of four solenoid valves manufactured by Parker form an integral part of the pneumatic dump valve. The solenoid valves control the flow of air to and from the brake actuators thus controlling the applied force of the friction brake. The fast consistent response of the solenoid valves operating over a wide ambient temperature band is key to the performance of the system.
Brake Control Systems

Regulator Assembly for Air Supply Frame

As part of the brake control system package Knorr-Bremse Westinghouse Brakes UK Ltd manufacture a Generic Air Supply Frame supplied on contracts with Adtranz and Alstom. A regulator assembly, designed by Parker regulates air pressure from the main reservoir to the required system level. The modular assembly comprises a ball valve, regulator, two manifold blocks and integral mounting brackets. With this compact design inter-connecting pipework between units is eliminated, thus reducing the assembly size. The ball valve isolates the main reservoir supply for ease of maintenance whilst test point connections and a safety valve are incorporated into the manifold blocks.

Tilting Train Control

Electro-Pneumatic Pressure Regulator for the Pendolino Train

The Pendolino Tilting Train manufactured by Fiat Ferrovia Italy uses electro-hydraulic and electro-pneumatic systems to control the movement of each car as it enters a camber. Pneumatic cylinders ensure that the cars remain level and independent from the bogies. Parker Electro-Pneumatic Regulators are used to control the pneumatic cylinders. Using two regulators per cylinder one controls the air feeding the cylinder, while the other controls the air draining from the cylinder.

The EPP Regulators are also fitted to the new Virgin Trains for the West Coast Line in the UK.
Control Systems

Talbot Bombardier and Parker working together

Control systems manufactured by Parker are currently in service on the regional Talent trains in Germany. The three control systems have been developed in close cooperation with Talbot Bombardier utilising proven Parker products which are used in the following applications:

- Engine Retarder Control System
- Horn Control System
- Sanding and Coupling Control System

The Retarder System is also fitted on the tilting version of the Talent train for NSB Norwegian Railways.

This is fitted with a heating system to counter the extreme environmental conditions prevalent in a Norwegian winter.

Engine Retarder Control System

Horn Control System
Control Systems

Pneumatic Control Systems

As well as brake control systems Knorr-Bremse Westinghouse Brakes UK Ltd also design Pantograph Control Panels which have been supplied for use on the Heathrow Express and Northern Spirit trains in the UK.

The panel controls the operation of the pantograph which enables the connection to the overhead line when in use.

The panel build was undertaken by Parker for both contracts. Parker’s proven products were used in the design and the panels were built in accordance with the exacting standards of the industry.
**Internal Door Systems for SNCF Regional Trains**

SNCF in France are upgrading their regional trains and have looked to Fersystems to provide the pneumatically driven Internal doors.

Parker working in partnership with Fersystems have supplied a complete door operating package including generic rail door cylinder with extended cushioning, a control panel ensuring automatic function, a sensing valve for obstacle detection and various external components.

Passengers open the door via a manual pneumatic valve and after a fixed period of time the door automatically closes. For safety reasons if any obstacles are in the path of the door it automatically opens.

**Internal Door Systems for the Stanstead Express**

Railcare have refurbished 9 complete trains for the Stanstead Express service in the UK. Pneumatically operated automatic internal doors for access to the inter-vehicle gangways have been supplied by Peters Door Systems.

Parker working closely with Peters Door Systems have designed and manufactured the pneumatic actuators and control systems.
Uncoupler Systems

Uncouplers for Alstom and Adtranz

Craig and Derricott are a designer and manufacturer of uncoupler units, who have worked closely with Alstom and Adtranz to create specific uncoupler units for the Juniper and Electrostar trains in the UK.

The units comprise a multi-function electrical switch control module together with pneumatic valve controls. Parker engineers worked closely with Craig and Derricott to develop the pneumatic control systems and Parker now supply complete pneumatic systems incorporating valves and cylinders. The uncoupler operates by allowing the wedgelock coupler heads to isolate electrical and pneumatic circuits through the autocoupler. This sequence of operation then enables cars to be coupled and uncoupled allowing changes in car arrangements, train lengths etc.

Automatic Coupling Systems

Dellner Coupler AB in Fauln, Sweden, is a specialist manufacturer of couplers for railway vehicles. Modern railway practice often requires a completely automatic coupling system, whereby the mechanical coupling between rolling stock, the power supply and the compressed air engage in a totally automatic sequence.

The requirement for automatic coupling is tempered by the need to be able to hand-manoeuvre the coupler if needed in an emergency situation. The complexity of this application is why Dellner Coupler AB came to Parker to develop products for their coupler designs. Working in close cooperation, Dellner and Parker engineers have developed a series of cylinders and valves to meet the system specifications and performance requirements for this application.

The requirement for reliability and safety on such an application is paramount and with the extreme environmental conditions prevalent in a Swedish winter, high quality Parker products were a natural choice.
Parker’s 30 year close association with **London Underground Ltd** has resulted in the development of standard products specifically customised to suit the demanding application of underground rail systems. Parker is the prime supplier of door actuation systems for the London Underground network and also supply products for a wide range of other applications including the following:

- Heating and Ventilating Actuators
- Filters
- Whistle Control Valves
- Manual Door Cock Valves
- Train Monitoring Equipment
- Shunting Control Equipment
- Pressure Test Point Connectors
Other Applications

Passenger Seat Controls

**IMET in Italy** designed and manufactured the first class seats for the Italian high speed train the ETR500. The seats incorporate a powered reclining system designed and manufactured by Parker. The unique twin cylinder air-oil system ensures infinitely variable precise positioning control. Seat adjustment is via a compact, highly sensitive valve located in the arm rest.

Pneumatic actuation and control systems designed and manufactured by Parker are currently in service on the TGV high speed trains in France. Products were specially developed for **Alstom** in France to provide a powered reclining system for the luxury seats. The totally self contained pneumatic unit enables the rake and angle of each seat to be infinitely adjusted via a rocker switch in the arm rest.

Door Control Systems

A complete door control block for the Italian high speed train the ETR 500 has been developed by Parker engineers working in close cooperation with the supplier of the doors, **Faiveley Italia Spa**.

The control block has several functions:

- Manoeuvring, pressure regulation and sensing of door sealing.
- Automatic unlocking of door if pressure is below set point.
- Pressure sensing of system and of low pressure.
- Includes an emergency opening system.

Toilets and Water Control

Systems utilising Parker pneumatic products and PLC control have been used by Evac Vacuum Systems in Sweden and supplied to railways around the world, notably Taiwan Railways where 1000 systems are already installed.

Parker engineers assisted Evac in developing an intergrated electro-pneumatic low energy system which efficiently conserves the use of water and controls the use of compressed air, vacuum and exhaust.

Parker worked with **Alstom** in France and have supplied pneumatic circuit blocks to control the onboard toilet flush and wash basin system on the high speed TGV trains in France. Parker control valves and a pneumatic timer unit are mounted onto the block and this system regulates and conserves water consumption during operation.

Heating and Ventilating

Pneumatic valves and cylinders from Parker are an integral part of the heating and ventilating system developed by **Ebac Ltd UK** for the Channel Tunnel Nightstock Contract. The complete units designed and manufactured by Ebac were supplied to **Alstom**, designers and manufacturers of the Channel Tunnel Nightstock.
Products for the Rail Industry

Parker offers one of the most comprehensive product ranges available and can supply both standard and custom built products as well as systems ideally suited to a wide range of applications. Parker are conversant with the rail specifications and our key rail products have been fully validated to the exacting requirements of the industry.

Parker’s key rail products are proven in the industry and have been validated to:

- **European Shock and Vibration**  
  Standard IEC 61733
- **Low Temperature EN600608**
- **High Temperature EN600608**
- **Humidity BS2011**
Products for the Rail Industry

Filters, Regulators, Ball Valves

Ancillary Products Including:

Compression Fittings
Push-in Fittings
Blocking Fittings
Test Point Connectors
Plug & Lanyard
Check Valves
Flow Control Valves
Isolating Cocks
Mufflers
Tubing