

Pneumatics technology to enhance profitability in transport applications



and lift axle control of refuse trucks to pantographs, door systems and coupling on rolling rail stock. Perhaps most importantly, using pneumatic components that can withstand extremes of temperature and vibration will provide safe and reliable service, while enabling you to reduce installation and life cycle costs considerably.

Compact braking systems

The latest pneumatics technology helps to create brake control systems that are compact, lightweight, effective and safe, contributing to greater reliability and efficiency, as well as helping to keep operating costs down.

For example, a compact modular regulator assembly designed by Parker Hannifin is eliminating the need for inter-connecting pipework between units on an air supply frame from a leading manufacturer, reducing considerably the size and weight of the system.

This assembly simply comprises a ball valve, regulator, two manifold blocks and integral mounting brackets and regulates air pressure effectively from the main reservoir to the required system level. Furthermore, the ball valve isolates the main reservoir supply for simpler, faster maintenance, while test point connections and a safety valve are incorporated into the manifold blocks.

Air powered coupling

To keep the time needed for operations

Vehicles within the commercial transport sector, whether it be a passenger train or a construction vehicle, is consistently expected to operate reliably in some of the most challenging conditions. Indeed, it is crucial that these machines can withstand extreme temperatures, aggressive contamination, shock and vibration, ensuring engineering technology that is robust, dependable and long lasting. In addition, as transport operators are always looking for ways to make their fleets as energy efficient and cost effective as possible, these systems and components also need to be compact, lightweight and simple to install and maintain.

Creating the perfect balance to achieve these goals is no mean feat, however one proven option is through the use of the

latest pneumatics technology. Indeed, pneumatics are widely used in the transport sector, offering considerable potential for operators to benefit. In particular, the latest modular technology has been developed to reduce leak paths and energy wastage, minimise the envelope, footprint and weight of systems, and extend maintenance intervals, even for equipment that has to withstand extreme temperatures, shock and vibration.

It is, however, important to take a holistic approach to complete systems, exploring how they can be improved, in order to realise the full benefits. In particular, working with a total solutions supplier can help you find new and more efficient ways of re-designing entire systems, ranging from brake control, gear shifting

such as coupling and uncoupling, fully automated systems are increasingly common. However, system designers are faced with a challenge as the requirement for automatic coupling must be balanced by the need to be able to hand-operate the coupler in an emergency situation. Parker engineers have worked closely with manufacturers and operators in the truck and rail sectors to develop a series of cylinders and valves that can be combined in an integrated system that meets both these requirements.

Similarly, pneumatics are essential in a series of innovative uncoupler units used on trains in the UK. These complete pneumatic systems comprise a multi-function electrical switch control module together with pneumatic valve controls. 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 simple and fast changes in car arrangements and train lengths, and putting vehicles back in operation.

Axle lift control

Designed specifically for lift axle control on multi-axle vehicles with air suspension, Parker has introduced an innovative fully integrated, modular axle



lift control system. This plug-in and go, fully automatic system, lowers the lift axle once the preset load is reached and automatically raises it when the load is sufficiently reduced.

In particular, this all-in-one module helps to reduce fuel consumption and tyre wear considerably, while improving brake balance when the vehicle is unladen and increasing load carrying capacity, which ultimately reduces cost of ownership.

The integrated design of the system eliminates the need for component assembly by the user, reducing the need for multiple parts and the associated purchasing costs and engineering time, while the use of standard push-in fittings and short pipework significantly reduce installation time and the number of possible leakage points. Furthermore, the new axle lift control system ensures optimum safety as it features automatic overload protection and air

bag protection, and conforms to the Road Traffic Act 1988 Regulation 2000 numbers 5 and 6.

Automating with pneumatics

Pneumatics feature extensively inside transport cabins, from automated door operations to toilet flushing systems. It's worth noting that the design of these internal elements can have a considerable impact on vehicle reliability and energy efficiency.

For example, pneumatically driven internal door systems can be supplied that incorporate all the necessary components, such as generic door cylinders with extended cushioning, a control panel ensuring automatic function, a sensing valve for obstacle detection and various external components. With lighter, more compact designs possible, automation can be introduced throughout the car to ensure passenger safety and comfort in the most efficient way.

One example is a complete pneumatic door control block that has been developed for use on high speed trains in Italy. The block enables several functions to be carried out using a single compact system, including the opening and closing of doors, the control pressure regulation and safety sensing during door closing, as well as safety features such as automatic unlocking, if pressure is below a set point and additional emergency opening systems. These kinds of bespoke assemblies can simplify the design of on-board automation systems drastically, allowing all components to be sourced from a single supplier.

Onboard systems

Pneumatics systems are widely available to assist in the automation on a broad variety of onboard transport systems. For example, seat controls have been developed that incorporate a powered reclining system. A unique twin cylinder air-oil system ensures infinitely variable precise positioning control, while the seat can be adjusted using a lightweight and compact valve located in the arm rest.

Self contained pneumatic units have also been used in luxury cabins to enable the



rake and angle of seats to be adjusted via a rocker switch in the arm rest. In addition, pneumatic valves and cylinders can also be used as an integral part of heating and ventilating systems, and toilets and water control. For instance, the latest electro-pneumatic technology has contributed to the design of an integrated low energy toilet system which efficiently conserves the use of water and controls the use of compressed air, vacuum and exhaust.

The onboard toilet flush and wash basin system on vehicles can be controlled by pneumatic circuit blocks onto which are mounted control valves and pneumatic timers. This system regulates water consumption and conserves water during operation, helping to minimise the need for routine maintenance and costs.

In summary

While pneumatics technology has been used in the transport industry for some time, the latest generation of specially developed valves, cylinders and filtration and regulation units are enabling operators to meet specific design requirements and increase the efficiency and reliability of their vehicles. By working with a global solutions provider that can combine pneumatics with other technologies such as hydraulics and electromechanics, operators can increase their profitability considerably, sourcing complete automation and control systems from a single supplier.



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