



aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



Global Transportation

Application Solutions for Rail, Truck and Bus



ENGINEERING YOUR SUCCESS.

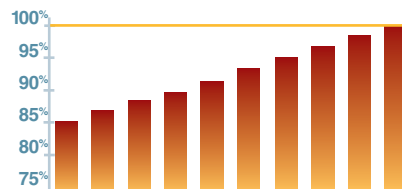
Parker Hannifin Corporation

A global, Fortune 300 company with annual sales exceeding \$10 billion in fiscal year 2010 and over 500,000 customers in 48 countries, Parker Hannifin is the world's leading diversified manufacturer of motion and control technologies, providing precision engineered solutions for a wide variety of commercial, mobile, industrial, and aerospace markets.

Excellence is imprinted on our corporate DNA. We are the only manufacturer offering customers a choice of hydraulic, pneumatic, electromechanical, or computer technologies.

Total Systems Solutions

Parker's team of highly qualified applications engineers, product development engineers, and system specialists can turn pneumatic, Hydraulic structural extrusion, and electromechanical products into an integrated system solution. And our Selectable Levels of Integration™ program provides the components, subsystems, and controlled motion systems for the level of integration you choose.



Parker consistently raises the bar for its manufacturing plants and distributors, measuring its on-time delivery percentage to customer request date.

1st in Delivery, Field Sales and Distribution

Parker boasts the industry's largest global distribution network, with more than 8,600 distributors worldwide. With factories located strategically on five continents, we can maintain matchless on-time delivery rates.

Expect industry's fastest response and delivery by customer request date when you contact Parker or one of its distributors. Plus, Parker's army of engineers works hand-in-hand with you and your local distributors during the design process to ensure the best products, services, and application performance.

Parker Distribution offers the next level in premier customer service. Each location has significant on-hand inventory to keep your down time to a minimum. And many distributors have in-house design and assembly capability to support your system and subsystem requirements.



Training

Parker's best-in-class technology training includes hands-on classes, Web-based training, and comprehensive documents for employees, distributors, and customers. Parker also provides computer based training, PowerPoint presentations, exams, drafting and simulation software, and trainer stands.



Parker world headquarters in Cleveland



www.parker.com

The industry's most comprehensive Web site is your single source for:

- Product information
- Downloadable catalogs
- 3-D design files
- Training materials
- Product configuration software
- RFQ capabilities

24/7 Emergency Break-down Referrals

The Parker product information center is available any time of the day or night at 1-800-C-Parker. Our operators will connect you with on-call representatives who will identify replacement parts or services for all motion technologies. Talk to a real person!

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Parker Hannifin's Charter

To be the world's leading diversified producer of motion control technologies and systems.



Major Reasons To Call On Us In The Transportation Industry

The Global industry is on the move. Around the world, public and private organizations are making significant investments in new infrastructures and platforms. These can best be defined as a collection of assets that share integrated products and technologies. At Parker Hannifin, our transportation solutions range from individual components to complete motion and control systems. Parker goes way beyond the mere assemblage of parts

with its ability to deliver entire systems. Our regional, national and global presence provides the resources for product development that is flexible and agile enough to accommodate the unique requirements of various transportation applications. And Parker engineering boasts decades of practical application knowledge that will improve today's current system challenges while continuing to look to innovating solutions for tomorrow's needs.

Parker's time, money and engineering expertise have been invested into developing broad on-board motion and control components and systems that specifically address our customers' needs. Across a number of market sectors including rail, bus and truck, a clear picture is developing which will precisely define the platforms and technological innovations for our clients worldwide. Parker has taken the leadership role for the future.



The Parker Promise

“We contribute value by helping the world in new and better ways, propelling technology, industry and services ever forward.”

Parker is engineering.

Parker is moving the transportation industry with a never-ending line of new product releases, offering improved features and performance characteristics that are designed to deliver direct application benefits. Parker recognizes that the customer has many choices. To that end, Parker is dedicated to providing quantifiable value in terms of cost savings, performance, reliability and increased sales/ROI. In total, it is all about providing the best overall customer experience.



While many motion and control solutions for rail, truck and bus applications may involve standard off-the-shelf products, the trend is moving to providing best practice solutions for the ever-changing demands of specific/unique transportation applications. This can involve creating assemblies, sub-systems or complete operating systems. Additionally, many of today's applications require customized components. At Parker, our customers select the level of integration that best fits their needs.

Our comprehensive line of products includes:

- **Air Cylinders**
- **Valves**
- **Vacuum Generators**
- **Modular Air Preparation**
- **Electric and Rodless Actuators**
- **PMAC Motors and Generators**
- **AC, DC and PMAC Servo Drives**
- **Touch Screen and Systems**
- **SRX Feed Back Cylinders**
- **Parker Parflex Fast-Store®**
- **Position and Motion Control**
- **Energy Storage and Charging Systems**

You pick the level of customization that is right for you.





Field Application Specialists

Parker has the industry's most dedicated field application support personnel, providing a single contact for transportation motion and control analysis and troubleshooting. Additionally, these specialists define system requirements, gather data, prepare documentation and establish system performance requirements.

Design Engineering Support

Parker's transportation engineers can assist in the development of any motion and control solution. Using the latest design technology, Parker can build a solution using existing products or design new or modified products that get the job done. Parker uses the latest technology in 3-D modeling software to assure design integrity. Additionally, customers are provided complete approval drawings with downloadable CAD files.

Parker's Value Proposition

For today's customer, an outstanding total experience is the benchmark by which many suppliers are evaluated. At Parker, we deliver tangible and measurable benefits that are designed to reduce your total cost while increasing vehicle performance and productivity and eliminating customer frustrations.





Sales Support

Selecting Parker as your design and manufacturing partner provides the highest level of customer support. For our rail, bus and truck customers, that translates into a worldwide network of technical support that speaks the local language. Parker has both company and distribution personnel in all the major transportation markets that offer the industry's best product and service manuals, on-hand inventory, design assistance, sub-assembly and fabrication capabilities.

Parker into the future

We cannot think about the future without a reference to the past. And without tradition, progress is not possible. With over 92 years of experience as a pioneer in the manufacture of products and systems for use in hostile environments, Parker has provided the Aerospace, Mobile and Industrial markets with world-class solutions.

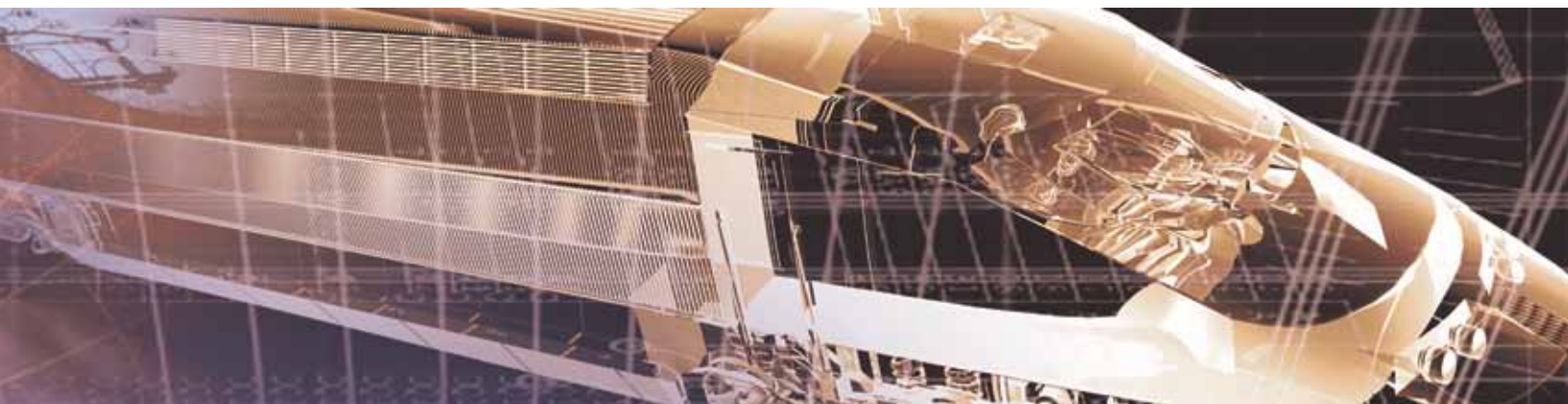
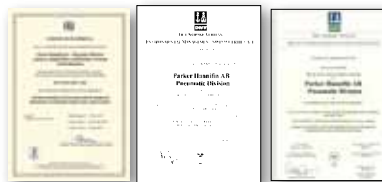
Lean Manufacturing

Parker's Lean initiatives are found in 316 manufacturing facilities located on 5 continents. Parker's product engineering and manufacturing capabilities form the cornerstone of everything we offer. We utilize the latest Pro-E design stations linked to computer-aided manufacturing machine centers to meet or exceed today's stringent demands for quality, performance and delivery.

Parker is ISO certified and continues to invest in both manufacturing technology and people, performing precision metal work that is second to none. Customers benefit from world class lean manufacturing with greater efficiencies, higher quality, lower cost and shorter lead times.

Product Testing and Certification

All manufactured products from Parker Hannifin are carefully scrutinized for safety and reliability. Transportation solutions, whether individual components, sub-assemblies or systems, are inspected and thoroughly tested to ensure in-field performance. Parker adheres to all applicable national and international Quality-Management Systems including ISO 9001, ISO/TS 16949 and product approvals by the DET NORSKA VERITAS classifications.






Parker Solutions for the Rail Industry

Today's rail traffic must function on time, every time, driven by the demands of its customers. Parker is continually creating accessible and unique solutions for both the commercial and private rail sectors. Whatever technology is needed, customers can be assured that Parker pneumatic and electro-pneumatic solutions are tailor-made to meet or exceed any specified requirement.

- Customized for flexible designs
- Long in-service reliability backed up by customer service that exceeds expectations
- Modularity that is easily utilized in different configurations

- Space gained from ingenious fastening techniques of the interior vehicle
- Standard products tailor-made for customer solutions
 - Door and coupler designs
 - Control panels and assemblies
 - Advanced logistics with EDI facilities
- Technology that encompasses a full array of standard pipe thread and metric products
- High flow compact construction
- Approved test conditions

 For detailed product information, please speak to a Parker Transportation Application Specialist.





Principal application areas:

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



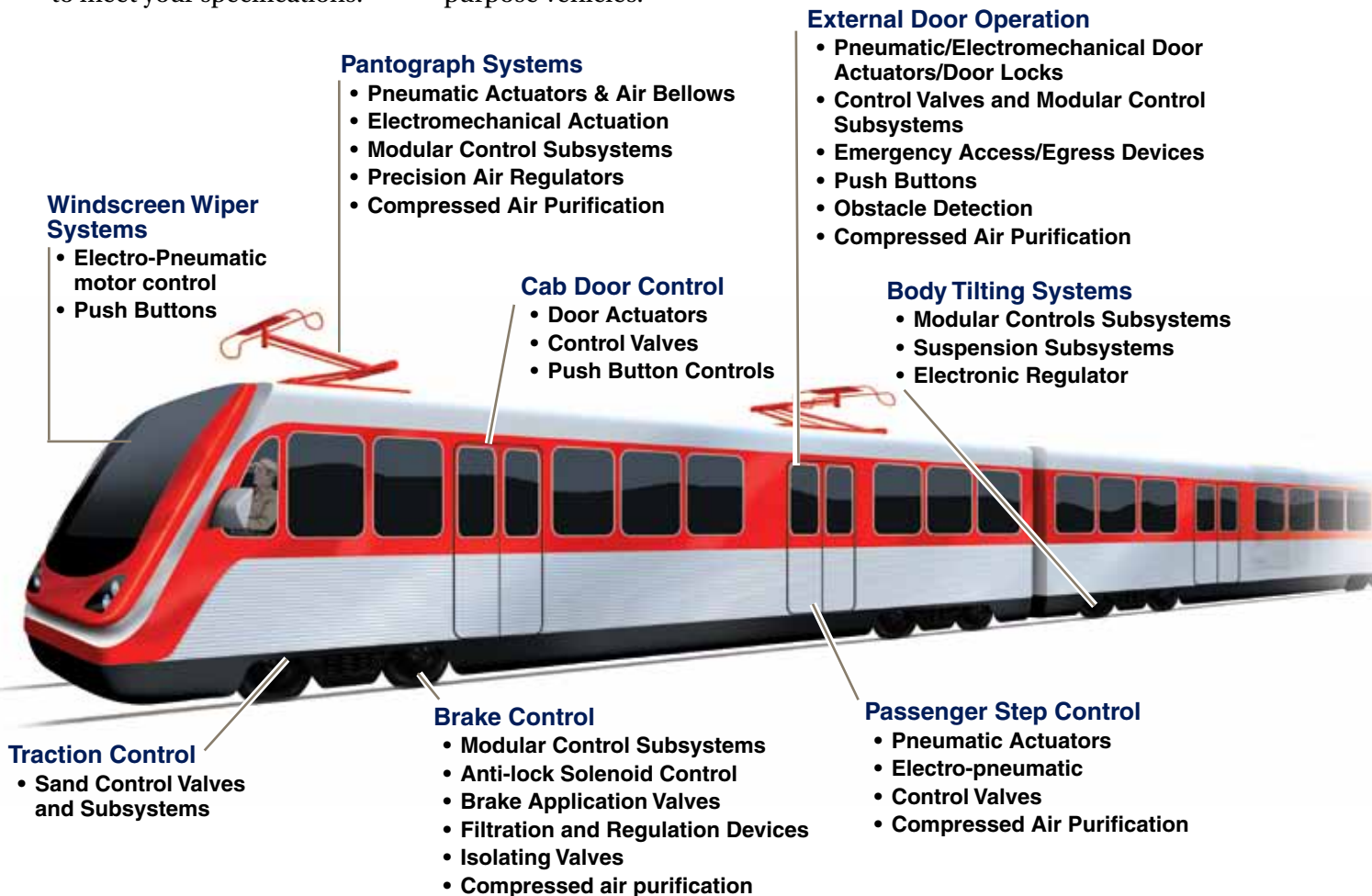


Global Railway Products

All applicable actuator and valve assemblies comply with manufacturing standards.

Whether you require a main entry door on a car/carriage or an air coupling for a locomotive or high speed train, Parker offers a spectrum of products to meet your specifications.

Choose a single component or an entire system for high speed and passenger transit traffic, locomotive and multiple units, as well as freight and special-purpose vehicles.



Ancillary Controls

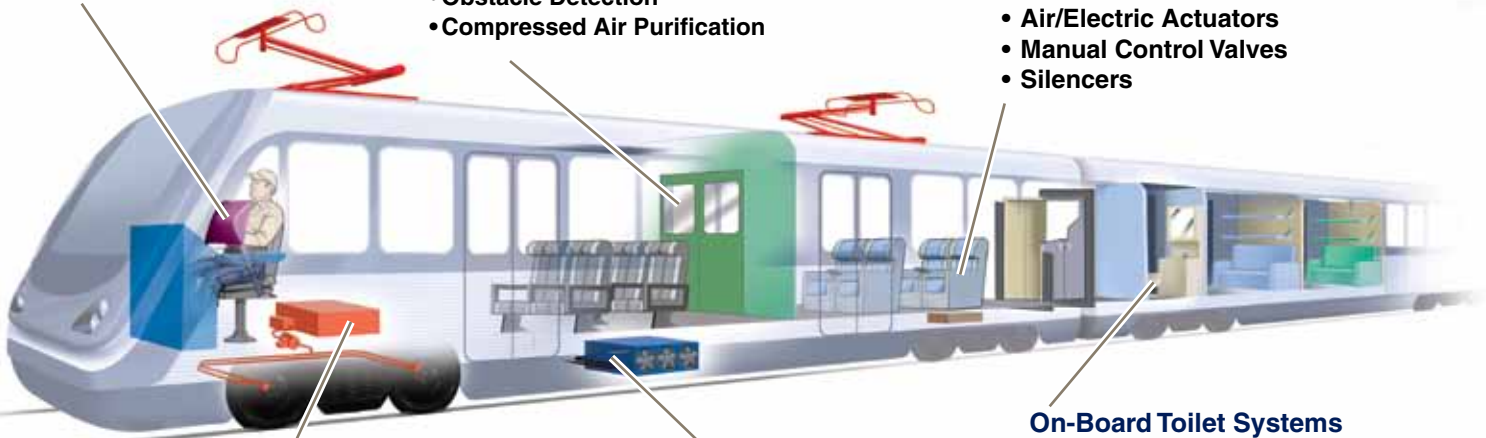
- Retractable Mirrors
- Horn Control
- Wiper Control

Automatic Interconnecting and Internal Doors

- Pneumatic/Electromechanical Door Actuators
- Control Valves and Modular Control Subsystems
- Push Buttons
- Obstacle Detection
- Compressed Air Purification

Seat Controls

- Actuators
- Air/Electric Actuators
- Manual Control Valves
- Silencers



Ancillary Air Distribution

- Ball Valve Isolation
- Solenoid Valves
- Air Horn Control Valves

Air-Conditioning

- Vent Actuators
- Control Valves

On-Board Toilet Systems Modular Control Subsystems

- Liquid Media Control Valve
- Vacuum Control Valve
- Waste Valve

Parker's key rail products are proven in Europe and have been validated to:

- Shock and Vibration: IEC61373:1999 Category 1, Class B
- Low Temperature Climatic: EN60068-2-1, test Ad
- High Temperature Climatic: EN60068-2-2, test Bd
- Humidity Climatic: BS2011: Part 2.1 Db: 1981



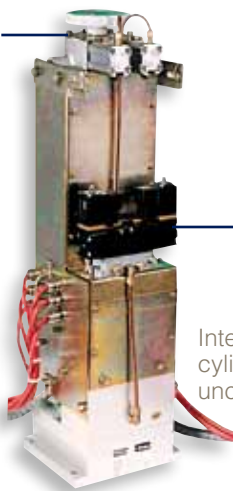
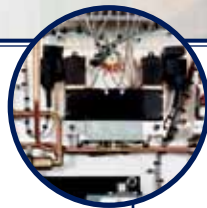
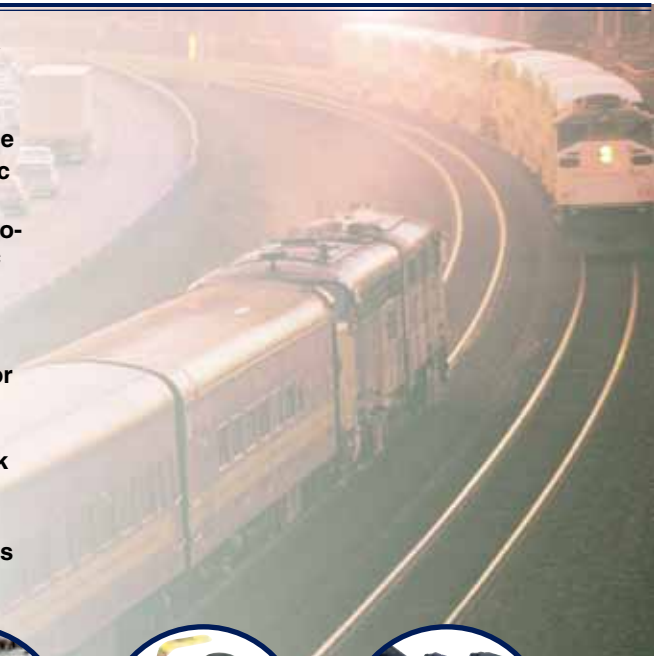


Rail Application Solutions

For over 35 years, Parker has partnered with the rail industry to deliver cost-effective and profitable motion and control solutions. Parker can offer its customers any degree of flexibility to meet any growing needs. Parker's engineering expertise, world class manufacturing and distribution can provide stand alone products or modular component sub-assemblies solutions. All designed to yield the highest quality while providing greater performance at a lower cost.

Some of these innovations in pneumatic technology:

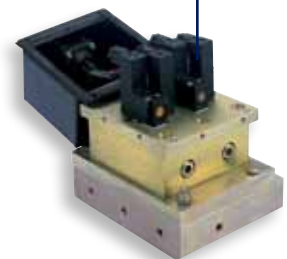
- Retractable step-control with pressure sealed door entrance
- Pantograph electro-pneumatic control panel
- Automatic coupler with electro-pneumatic control for electric train lines
- Emergency brake system for people-mover cars
- Air/oil twin-cylinder control for seat recline adjustment
- Ancillary isolation air control panel with additional trip cock emergency brake interface
- Traction control
- Internal/External door controls



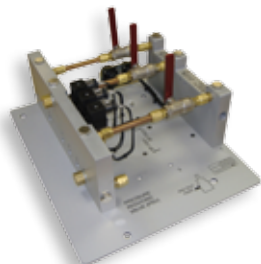
Integral valve & cylinder controls for uncoupler units



Pantograph control panel



Integral solenoid control for wheelslide & dump valve system



Air ancillary control system



Control module for brake and suspension

Engineered Door Solutions for All Surface Rail

Parker's advanced application experience enables passengers to move easily from place to place. Our experience in understanding both the rail industry specifications and application requirements achieves customer savings by meeting the stringent criteria for reliability, long life and ease of maintenance.

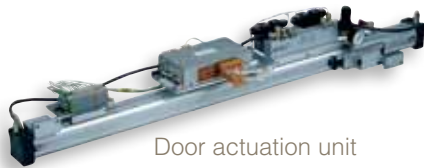
Parker's range of customized controls enhances door opening systems, and obstruction detection that achieves fast door times accomplished in primary application areas through pneumatic and electromechanical products.

From the Far East to the Western Hemisphere-proven semi-intelligent control systems for both external and internal doors designed to suit the particular requirements specified for pneumatic and electromechanical actuators.

- **Designs are fully factory tested and preset**
- **Cost savings versus traditional piped assemblies**
- **Flexible geometries**
- **Tailor-made solutions**

Application innovation in pneumatic technology:

- **Doors operated by means of push button controls**
- **Actuation and control system solutions adapted to suit non-pressure or pressurized sealed doors**
- **Pneumatic actuator with piston rod-free cylinders fully interchangeable with electromechanical actuators**
- **Obstruction detection is invariably an inherent part of Parker's solution specific installations for sliding doors, double hinged doors and interior-parting doors, suitable for all types of vehicles.**



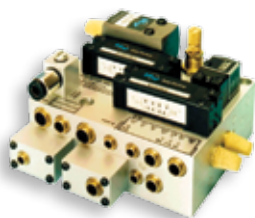
Door actuation unit



Door timing release module



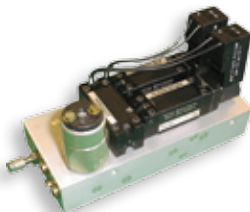
Retractable step system



Control unit operating door opening & closing motion



Compact robust lock actuators single or double acting options specially designed to meet the application demands



Passenger locking door module



Door actuator designed with extended cushion both ends to provide smooth closing at end of stroke adjustment and ports on same face for easy access.



Controlling passenger door sequence, speed, global detection and soft start module

Toilet Systems and Solutions

Toilet systems from Parker are designed to customer specifications and requirements for performance, space envelope and functionality. Consideration is made to materials of construction for both weight and fluidic contact while providing the optimised design solution. Control systems can include functions such as self priming, self cleaning and offer control of pressure, vacuum and fluidic elements.

Parker's solutions integrate proven products meeting rail industry standards, offering

reliable products integrated into a control system designed to provide ease of installation and maintenance. Electrical and pneumatic interfaces to industry standard connectors and fittings are provided to customer requirements further aiding simple and fast installation.

Parker can also provide a range of custom designed and standard product solutions for toilet applications including sluice and waste valve solutions, vacuum ejectors and fluidic control valves.

- **Compact design—easier to Service / Install / Remove**
- **Corrosion resistant design easier maintenance with push-in fittings**
- **Fully integrated solenoid voltage will tolerate wide voltage variations**
- **Self priming, self cleaning, and detergent handling modules**
- **Unique liquid media pneumatic waste valves**
- **Vacuum controlled performance instead of fixed time**



Automatic fully integrated air/vacuum, water and detergent cycle module



Dual function vacuum ejector



Waste line valve module

Rail Solutions for Articulated & Non-articulated Cars

Parker's years of engineered experience, application solutions and understanding drive them to provide products that are robust. Products that require rugged solutions on trains equipped with single or double-skinned bellows for gangway / barrier construction. Products that impose effective sealing against pressure differentials encountered when entering tunnels or passing another rail car against gangway compression, with continued stability. Parker's practical

technological solutions for real world problems have provided customers with money saving results.

Our years of experience in manufacturing, assembly and design have established close alliance partnerships with transport authorities all over the world.

- **Rapid delivery**
- **Produce accurate detailed parts and maximum efficiency**
- **Design systems flexibility**
- **Tailor-made solutions**

Application areas from conception to implementation:

- **Door locking cylinder**
- **Folding and sliding steps**
- **Passenger door (lock/unlock, obstruction sensing)**
- **Secondary locking**
- **Complete door control systems**



Extend, lock or tilt cylinder on gangway or barrier constructed car



Rail Couplers for Surface Rail

Parker complements the global high-speed and passenger rail markets providing innovative products to form mutually beneficial relationships with our customers. Rigors of stop and go commuter operation of any vehicle depends on its structural integrity. Whatever the pneumatic system chosen, linear, rotary, or electro-pneumatic, the system makes connections when carriages are pushed together either by retaining or unlocking a coupler mechanism. Parker

offers a complete range of robust actuators and controls which provide continuity between automatic couplers.

Functions and controls are designed to meet customers' specifications and industry needs including:

- **Robust actuators with low temperature capability for reliable operation**
- **Custom designed modular control systems providing reduced air leak paths, space saving, weight saving and improved overall reliability**



Rail Coupling Control Systems



P1K Series actuators
compact overall dimension
low temperature option



Compact short stroke actuators
low temperature option
single or double acting

Clean and Dry Compressed Air for the Railway Industry

Parker Domnick Hunter offers dedicated solutions with a range of railway and transportation air purification and separation systems, designed specifically to combat the problems experienced with today's rolling stock.

Compressed air rail applications are well known, but to operate efficiently, it must always be clean, oil free and dry to prevent poor equipment performance, system breakdowns, unscheduled maintenance and costly repairs.

Parker Domnick Hunter railway filter / dryer packages will provide maximum protection and are based on a patented extruded aluminum design, independently tested to exacting standards including shock and vibration, EMC and flammability.

The quiet, compact, lightweight designs can be installed in the smallest space envelope, either horizontally or vertically, and are suitable for all climatic conditions making this range ideal for new builds and companies involved in rolling stock refurbishment.

Options:

- 70°C (158°F) dewpoint suppression
- OEM design and build
- Electronic condensate drains
- Pneumatic condensate drains
- Trace heating

Features:

- Fully corrosion protected, alocrom treatment and epoxy paint treatment
- Flexible installation, can be installed vertically, horizontally, internally or externally

- Independently validated for shock, vibration, EMC and flammability
- Quiet operation, low operating noise level
- Electrical supply, designed to customer specifications

Benefits:

- Highest quality compressed air, meets international standards
- Optimal performance guaranteed, continued protection in any climate
- Compact and lightweight, can be installed almost anywhere
- Modular design, simple to install
- Low maintenance, simple and easy to maintain
- Compatible with all compressor oils
- Cost effective, low operational costs



Comprises water separator, general purpose filter and high efficiency filter w/ dust removal filter



Modular compressed dryer

Framework to Raise and Enable Pantograph Reach

The variety of configurations that suit locomotives or multiple-unit trains, including high-speed passenger trains, provide many dynamic behaviors of the pantograph systems. This requires precision controls developed to regulate and stabilize uncertain pantograph systems by time-varying stiffness to the wire.

These Z shaped sliding bows to the wires almost all use electrically powered and compressed air designs. Parker designs and manufactures modular control systems that incorporate pressure sensors,

electro-pneumatic control valves, pneumatic cylinders and precision air regulators to maintain consistent power connection and protect against single point failure. This delivers reliability and durability for stringent criteria with varying stiffness between the pantograph and contact wire to maintain almost constant contact force.

Parker offers a vast range of transport approved products used extensively world-wide to provide economy of installation with modular solutions and operation.

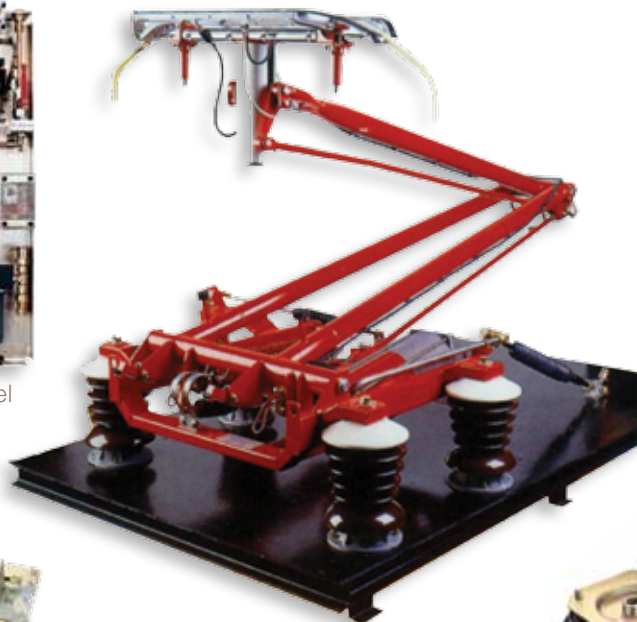
- Custom tailor-made solution engineered for pneumatic or electric
- Complex molding and space envelopes can be achieved
- Common pneumatic and electrical connections
- Proven technology- meet temperature, vibration, and body corrosion resistsants
- Modular pneumatic/ electric design
- Intelligent valve systems



Pantograph control panel



Pantograph control panel



Bellows for raise and lower of pantograph

Rail Valves

Car/Carriage

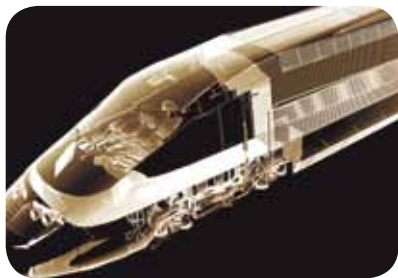


Corrosion resistance; excellent airflow capability with standard to low temperature ranges, as required by today's railway applications.

- Flexible working pressures
- Extended voltage ranges
- Easily accessible adjustments
- Rapidly exhausting outlet pressure
- Eliminates dirt collecting pockets
- Designed for non-lubricated applications



Traction/Underframe



Rapid solenoid air or vacuum control including a number of hand lever controls for braking and traction control.

- Provides easy layout and service

- Solenoid control allows a variety of supplemental functions
- Vertical or horizontal installation
- Flexible design, suitable for retrofitting
- All temperature resistant material
- Compact body design



Freight/Maintenance Vehicles



Technology proven in decades of rugged heavy and light freight operations with multi-position control, regardless if solenoid, manual, or remote air-piloted.

- Low friction vulcanized spool seal technology
- Extreme temperature capability
- Minimum replacement parts
- Low friction seal technology





Rail Actuators

Car/Carriage



Pneumatic and electromechanical Internal and external door actuators provide reliably smooth and controlled door movement and locking functions.

- Low friction seal technology
- Extended end of stroke cushioning
- Easily accessible adjustments
- Multiple mounting styles
- Rounded lip piston seals for maximum life
- Case hardened piston rod, resulting in less friction



Traction/Underframe



Rugged stainless and aluminium body construction maximizes reliability in most harsh environments; ability to tailor the space requirement in high passenger density environments to fit vehicle builder's cantrail layout.

- Rod bearings provides maximum support
- Tube ID has excellent wear and seizure resistance
- Easily secured piston maximizes strength
- High speed capability
- User serviceable construction
- Multiple bore size



Freight/Maintenance Vehicles



Self contained, rugged air cylinders provide easy ballast and dump control for specified customer safety, with locking functions.

- Low friction seal technology
- Extended end of stroke cushioning
- Easily accessible adjustments
- High tensile strength
- Long thread engagement for shock absorption
- Proven 500,000 cycle life



Rail Air Prep



Moisture-free and dry compressed air provided to the equipment and applications which require continuous uninterrupted regulated operation.



- One-piece filter cartridge for fast maintenance
- Robust metal shell for extra safety
- Key lock metal bonnet
- Ideal for low and high flow applications
- Space saving package for optimal performance
- Precise regulation with balanced poppet
- Multi-porting options

For applications with lower temperatures, please contact Parker. (Air supply must be dry enough to avoid ice formation at temperatures below +2°C/+33°F.)



Low noise operation with the ability to withstand vibrations and extreme operating conditions.



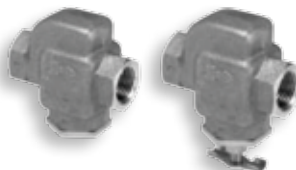
- Flexible design suitable for retrofitting systems
- Compact and lightweight housing material
- Electric or pneumatic drains
- Solid control piston for extended life
- Removable non-rising knob for panel mounting
- Dual or three-unit combinations

For applications with lower temperatures, please contact Parker. (Air supply must be dry enough to avoid ice formation at temperatures below +2°C/+33°F.)



Continuous operation and low maintenance are the results of correctly specified filter and regulator assemblies.

- Long filter life
- Excellent water removal efficiency



- Quick, accurate pressure regulation regardless of changing flow or pressure
- High flow metric or standard pipe threads
- Suitable for all types of railway and transport
- Corrosion protected specific housing
- Environmentally rugged, inline bronze filters with manual drain option

For applications with lower temperatures, please contact Parker. (Air supply must be dry enough to avoid ice formation at temperatures below +2°C/+33°F.)




Parker Solutions for the Truck Industry

Parker knows trucks! Whether you are developing a vehicle air suspension, improving a compressed air system or upgrading or designing an engine or transmission, Parker's Global Automation Group has you covered. We provide specific solutions for virtually any vehicle type from just about any producer in the world. Our unique combination of robust and easy to install products ensures that the occupant of heavy tractors and trailers maximizes safety, uptime and profit potential. Parker is committed to building and integrating complex subsystem solutions that meet the highest standards for quality and reliability.

Product performance benefits:

- **Flexible installation; minimum space is required**
- **Environmentally friendly products**
- **Ruggedized electronics with wide operating voltage range**
- **Light weight material**
- **Simplified design means easier maintenance**
- **Fewer wear parts than conventional designs**
- **Fewer parts to stock**

 For detailed product information, please speak to a Parker Transportation Application Specialist.



Principal application areas:

- Air Horn
- Air Seat Control
- Automatic Fifth Wheel
- Axle Lift Control System
- Container Handling
- Emission Control
- Engine Brake
- Exhaust Brake
- Cab Door System
- Aerodynamic Controls
- Gear Shift Knob
- PTO
- Rear Wheel Steering
- Steer Axle Control
- Tailgate Hatch
- Tanker Discharge Protection
- Transmission Control
- Trailer Roll-down Doors
- Trailer Sliding Undercarriage
- Garbage Truck Sliding Door





Global Truck Products

Plumbed for Performance

We build our reputation on keeping our fingers on the market pulse to offer well thought solutions, combined with the right engineering, to serve far reaching cities and countries throughout the world. Benefitting from continuous

interaction with our customers, Parker has been a global leader, with products to meet every transportation application – from the body, through the cab and powertrain.

As your one-stop solution, our product support includes:

- On site field engineers
- Value engineering
- Worldwide stocking
- Rapid response to field repairs
- Product testing to specific customer requirements or to Parker standards
- Endurance testing – part or type test

Gear Shift Knob

- Electronic
- Mechanical-Interlocks
- Electric-Over-Air switch
- Pneumatic Split/Range

Air Brake Tubing, Harnesses and Coils

Lift Axle Control System

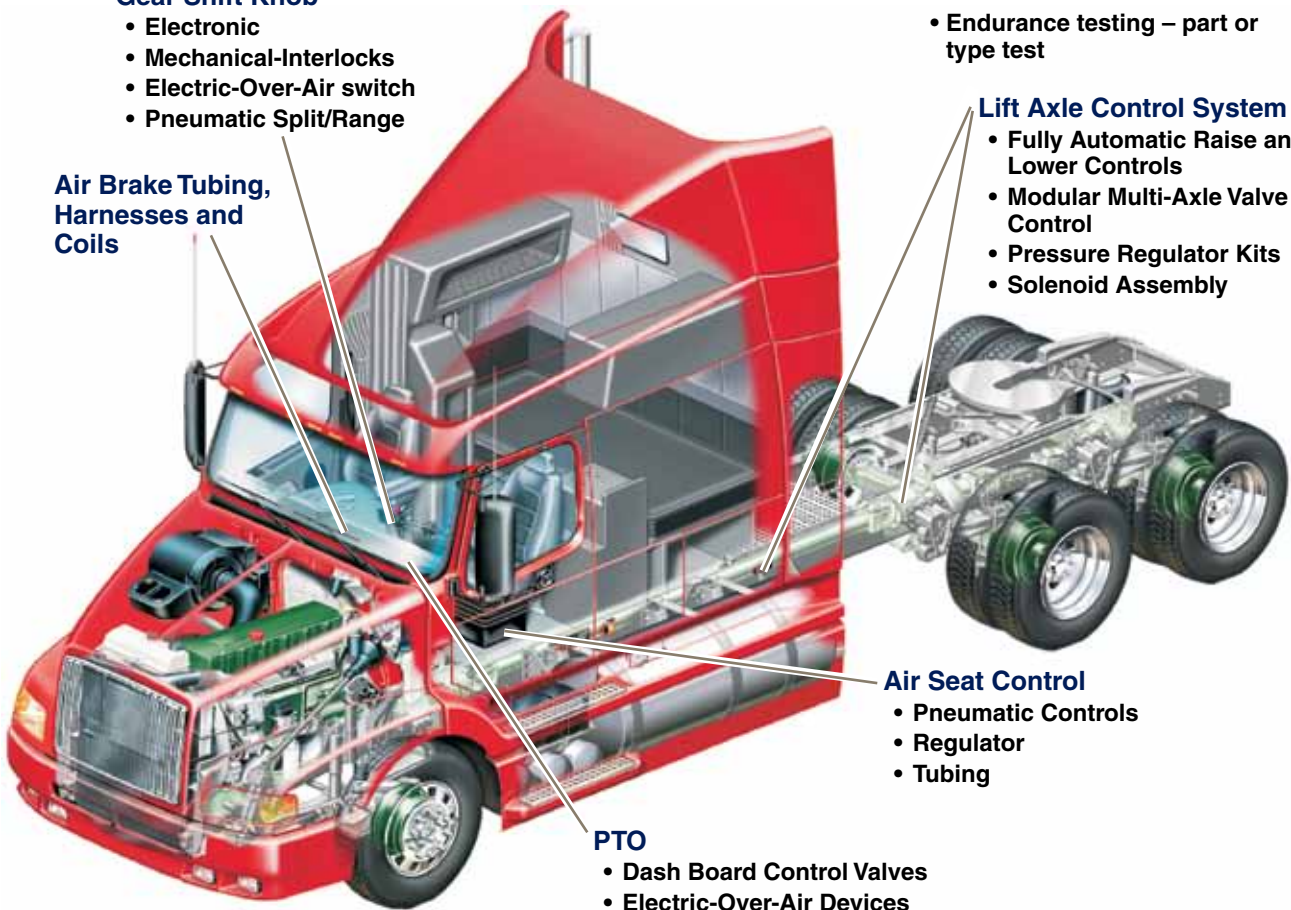
- Fully Automatic Raise and Lower Controls
- Modular Multi-Axle Valve Control
- Pressure Regulator Kits
- Solenoid Assembly

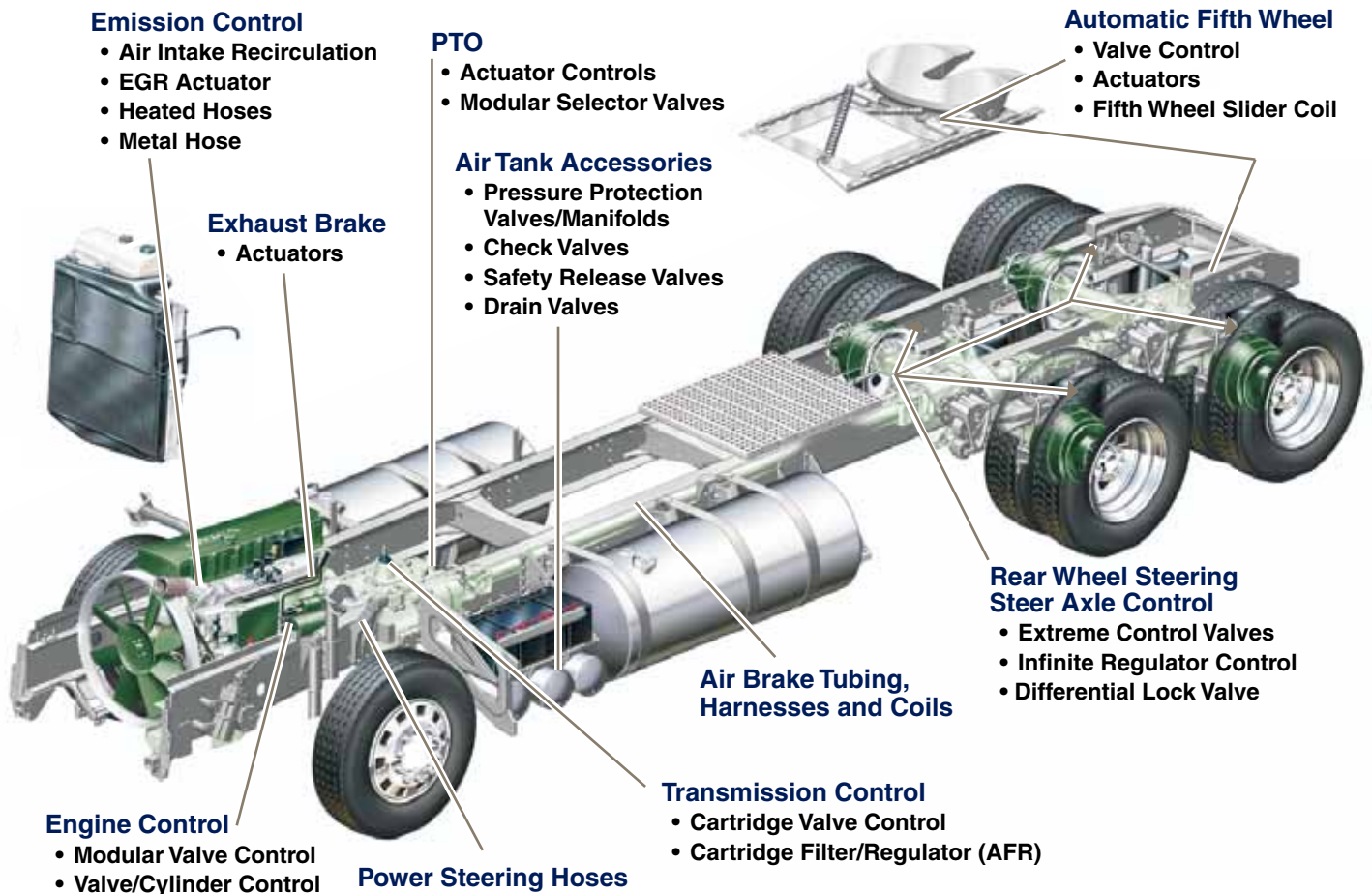
Air Seat Control

- Pneumatic Controls
- Regulator
- Tubing

PTO

- Dash Board Control Valves
- Electric-Over-Air Devices





- Emission Control**
- Air Intake Recirculation
 - EGR Actuator
 - Heated Hoses
 - Metal Hose

- Exhaust Brake**
- Actuators

- PTO**
- Actuator Controls
 - Modular Selector Valves

- Air Tank Accessories**
- Pressure Protection Valves/Manifolds
 - Check Valves
 - Safety Release Valves
 - Drain Valves

- Automatic Fifth Wheel**
- Valve Control
 - Actuators
 - Fifth Wheel Slider Coil

- Rear Wheel Steering Steer Axle Control**
- Extreme Control Valves
 - Infinite Regulator Control
 - Differential Lock Valve

- Transmission Control**
- Cartridge Valve Control
 - Cartridge Filter/Regulator (AFR)

- Engine Control**
- Modular Valve Control
 - Valve/Cylinder Control
 - Engine Exhaust Brake Cylinder
 - Engine Horn Valve
 - Teflon Hoses
 - Fuel Tubing

Power Steering Hoses

Air Brake Tubing, Harnesses and Coils

Other Applications

<p>Tailgate Hatch</p> <ul style="list-style-type: none"> • Actuator Control • Manual and Solenoid Valves • Automatic Valve Coupler Hitch <p>Tanker Discharge Protection</p> <ul style="list-style-type: none"> • Electro-pneumatic Control • Interlock and Logic Control • PTO Control • Liquid Media Control Systems 	<p>Container Handling</p> <ul style="list-style-type: none"> • Actuator • Modular Pneumatic Over Hydraulic Control <p>Tractor Coupler</p> <ul style="list-style-type: none"> • Manual and Automatic Valve Control <p>Road Sweeper Handler</p> <ul style="list-style-type: none"> • Actuator • Control Valve System
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Truck Conventional Trailer

- Axle Lift Control Systems
- Automated Rolldown Doors
- Tank Discharge Protection
- Trailer Extension ---
- In-Line Solenoid Valves 3/2, 4/2 and 5/2
- Air Prep
- Regulators
- Push/Pull Valves
- Remote Solenoid Manual Valves
- Toggle Valves
- Solenoid Valves
- Air Brake Tubing
- Air Brake Coils

Single Axle Tractor Trailer

Local delivery; Short haul.



Double

Mostly over-the-road; Long haul.



Tandem Axle Tractor Trailer

Dry freight; Refrigerated; Soft side; Short haul; Long haul.



Tanker

Fuel haulers; Cryogenic; Bulk haulers.



Tri-Axle Dump Trailer

Workhorse; Typically overloaded; Wide loads.



Flatbed

Universal multi-function; Short haul; Long haul.



Truck Utility

- PTOs
- Cylinders
- Special Cylinders
- Air Horn Valves
- Push/Pull 4/2 and 5/2
- Joy Stick Valve Controls
- Lift Axle Controls
- Solenoid Valves
- Hydraulic Hoses
- Pneumatic Tubing
- Air Pilot Manifolds

Road Sweeper

Street use with varied applications in harsh environments.



Mixer

Typical heavy loads, one-way applications; Can require moderate to severe duty depending on terrain and traffic congestion; Most of the time at construction sites.



Dump Truck

Typically severe to extremely severe duty; Typically paid by load; Most of the time off-road.



Refuse Truck

Front loaders; Side loaders; Rear loaders; Contamination a factor, as well as load/terrain.



Fire Tender

Emergency vehicles with complex control systems.



Truck Application Solutions

Parker is leading the world in innovative motion and control solutions for the global truck market. Technology is at the heart of everything we do. From new product design to complete systems, Parker is committed to providing the heavy vehicle market with solutions that are lighter and smaller. Additionally, Parker quality insures that your trucks work harder and run longer while providing greater cost efficiency.

- Simplified design means easier maintenance
- Lighter than conventional products
- Easy accessibility for simplified maintenance
- Fewer wear parts than with conventional designs

- Efficient testing methods by application
- Technology innovations:**
- Electric-over-pneumatic gear shift system
 - Bottom loading and vapor transfer pneumatic manifold
 - Automatic/Manual raise-lower axle lift system
 - Selector valve for power-take-off system
 - Vacuum engine brake cylinder
 - Manual or interlock range valve control
 - Electric or pneumatic lift axle controls
 - Emission control cylinder -EGR
 - Trailer sliding undercarriage
 - Automated trailer rolldown doors
 - Garbage truck sliding door



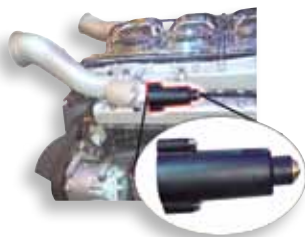
Manual or interlock range valve control



Bottom loading and vapor transfer pneumatic manifold



Electric-over-pneumatic gear shift system



Emission control cylinder -EGR



Vacuum engine brake cylinder



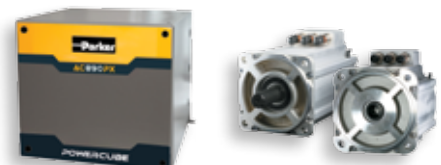
Automatic/Manual raise-lower axle controls



Trailer rolldown doors actuation systems



Locking system for sliding undercarriage



Inverters, motors for hybrid applications



Easy Shift Range-Change Control

For over thirty years Parker has developed pneumatic switching units for vehicle transmissions in close cooperation with leading manufacturers of equipment for heavy truck and buses. These switching units are manually or electrically preselected by the driver on a gear lever. To allow flexible switching for large gear ratios, these units split the ratios two or four times via a range or range/splitter valve system.

The cylinder(s) are actuated by a relay/slave valve which is a pilot operated pneumatic solution preventing mechanical

manual switching of inadmissible reduction ratios for the switching range-change.

Air pressure is delivered via single modular solutions even if the truck is moving.

- Custom engineered pneumatic or electric shift functions
- Range gear shift & Splitter gear shift function
- Wear resistant surface texture
- Ergonomic design saving wear on the driver
- Compact diecast body, corrosion resistant, enhanced safety functions
- Modular pneumatic/ electric design
- Wide temperature range, lightweight construction

Some of these innovations in pneumatic technology:

- Integrated Split/Range, split and range cylinder unit
- Electric integrated Hi –Low split/ range shift
- Cartridge air filter and valve assembly
- Rail gear interlock sensing valve
- EGR cylinder/venturi



Relay and interlock range valve



Splitter Valve



Modular on/off road interlocking selective gear shift knob

Axle Lift Systems

The extensive diversity of the commercial vehicle industry operates today in a variety of harsh environments. Driving durability has not always ensured the vehicle load stability. Over the years vehicles or trailers have been required to become compliant with worldwide standards and legislation. Parker has worked closely with various globally established industry vehicle builders to produce a fully automatic system which monitors the air pressure in the axle air bags and provides

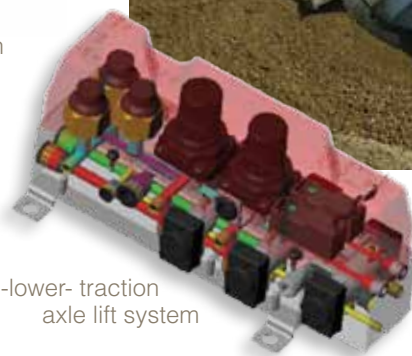
superior protection during service via pre-set switches. These switches will lower the lift axle once a preset load is reached and raise the lift axle when the load is sufficiently reduced. This ease of assembly is provided by light-weight, time-saving truck cab tubing using a pass through manifold assembly that assists with intended lift axle control on multi-axle vehicles with air suspension.

Air pressure is delivered via single modular solutions with functional flexibility even if the truck is moving.

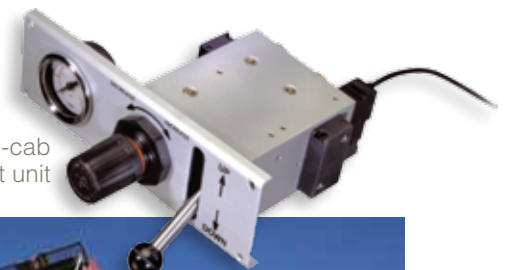
- Fewer tube connections having universal metric/imperial standard push-to-connect assembly – hardware requiring no tools
- Self compensation for correct ride height
- Meets sub zero environmental temperature conditions with IP67 protection
- Over-ride ability for traction control assistance
- Customer specific flow characteristics



Integral pass through air manifold



Modular raise-lower-traction axle lift system



Integral lift axle in-cab or external cabinet unit



Fully automatic lift/lower controls preventing vehicle overload



Bottom Load Loading Vapor Recovery

A growing global emphasis on safety, environmental concerns, and major Clean Air legislation is ever increasingly pressuring vehicles to be equipped for vapor recovery worldwide. Speed is a key component because tanks can be filled faster and a number of tank compartments can be loaded simultaneously. Parker's modules are among a sequence of customer specific solutions for the Freight Tanker sector using non-electrical air actuation controls with brake

interlocks specially designed for use in tanker environments. Included in this pneumatic control is an achieved blow down function that clears the pipes before the next fuel type is selected. The cross contamination of different fuels is prevented by pneumatic logic control.

- **Loading 6 compartment tankers could be accomplished in 15 minutes versus 40 minutes**
- **Vapors could be collected, processed and returned into products recovering valuable inventory**

- **Reduced personal injury claims**
- **Helps prevent cross contamination of fuels**

Some of these innovations in pneumatic technology:

- **Bottom loading vapor recovery control systems (BLVR)**
- **Bulk or hose reel delivery**
- **Engine and pump speed control**
- **By-pass valve control**
- **Dip tube interlocks**
- **Over fill protection**
- **Emergency stop valves**



Bottom loading vapor recovery control system module



Controls preventing any mix of different fuels in tanker



Interlock manifold control system



Panel mounted power-take-off valve

Emergency Road & All Terrain Vehicles

Emergency vehicles specially designed to cope with all road and weather conditions require a 100% reliability in pneumatically operated Fire Rescue services. They are expected to solve a variety of challenges on a very short time schedule. Parker value makes their process simple and operational

With specific functions for mixing foam/water/chemical substances on multi-purpose

or wildland fire-fighter vehicles that vary by class and type of body, Parker provides the flexibility.

- Convenient, centralized source for providing necessary air for system accessories
- Installation can be vertical or horizontal
- Operate in sub-zero temperature conditions
- Flexible geometries
- Tailor-made solutions

Customer specific applications from conception to implementation:

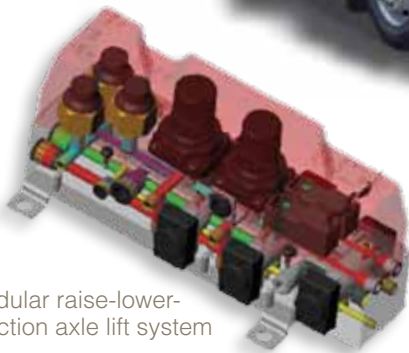
- Mast control
- Central locking doors/roller shutters
- Hydrant tank fill
- Hose reel automatic re-wind
- Throttle control
- Handbrake interlock



Compact locking/unlocking cylinders



Splitter Valve



Modular raise-lower-traction axle lift system



Fully integrated aerial mast control module



Hybrid/Electric Construction Equipment

Air quality and a reduced carbon footprint have become popular terms over the past decade, and are to a large degree, being mandated around the world. Parker has been working closely with today's customers in the development and commercialization of hybrid power solutions for the utility truck and commercial vehicle markets around the world, and offers a number of "Building Block" solutions. Parker can provide a greener approach to traditional internal combustion platforms with an efficient and quiet hybrid or all electric systems.

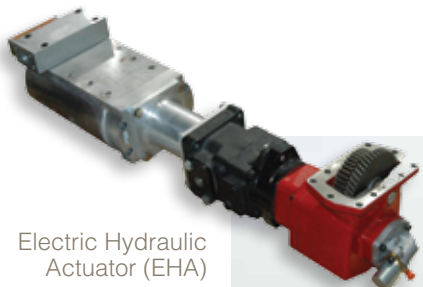
A typical system applied to aerial lift trucks allows engine-off operation of the hydraulic boom and other auxiliary functions, reducing fuel consumption and eliminating noise and emissions during periods while the vehicle is parked at a job site. The entire system solution provided by Parker includes battery storage, dual charging system (plug-in or engine PTO), electro-hydraulic pump and an inverter system. Export power for tools and cab comfort is also provided.

Hybrid-Electric benefits:

- Quieter operation
- Fuel savings
- Reduced emissions
- Satisfies anti-idling requirements
- Less maintenance and improved life cycle costs

Hybrid "building blocks":

- Inverters for induction or PMAC motors
- PMAC motors and generators
- Energy storage
- Electro-Hydraulic actuators



Electric Hydraulic Actuator (EHA)



Energy Storage Components



Vehicle hardened motors and generators



Mobile hardened inverter drive

Truck Valves

Cab



Highly versatile range of poppet to inline air-control panels for on and/or off-road vehicles assisting air suspension stability.

- Reduced frictionless seal technology
- Low pressure drop loss in actuation
- Robust die cast, plastic and anodized material
- Push button or toggle technology
- Normally open/normally closed operation
- Mono or bi-stable position operation
- Seat control valves



Chassis



Load distribution legislations in various countries utilize solenoid or vacuum, including hand-lever valves, to manually or automatically operate rugged, light and heavy freight operation.

- Wide operating temperature -40°C to +70°C
- Environmental conditions IP67
- Electric conditions between 12-24 VDC
- Stable seal performance technology
- Wide range of body sizes 1/8-3/4 (3mm-19mm)
- Easily accessible adjustments



Powertrain



Robust gear shift and engine controls, with low operating noise, have the ability to withstand vibrations while operating in extreme thermal conditions.

- Air cartridge valve technology
- Fixed air filter/regulator control
- Glide ring technology; no cross port leakage
- Low friction seal technology
- Extreme climatic operation -40°C to +130°C
- Power take-off, or differential lock





Truck Actuators

Cab



Providing reliably smooth, controlled clutch shift and steering radius adjustment and lock functions.

- Leak-proof design
- Wide bore size and end of stroke
- Adjustable indicator switches
- Inch or metric mounting holes
- Corrosion-resistant surface extends years of operation
- Easily removable end-caps for easy repair



Chassis



Pneumatic-assisted controls to suit your application to meet off-road conditions.

- Transfer tube design offers piping flexibility
- Stainless 304 tube with low friction seals
- Wide range cylinder bores sizes
- Low friction seal technology
- Long life, non-lube service and compact cylinders
- Surface finish provides long service life
- Trailer extension



Powertrain



Robust engine shift control, with multiple operating speeds, has the ability to withstand vibration while continuing to operate in extreme thermal conditions.

- Single integrated assembly technology
- Fewer air leak connections
- Easily accessible adjustments
- Multiple mounting styles
- Rounded lip piston seals for maximum life
- Universal mounting hardware



Truck Air Prep



Provides moisture-free and dry compressed air to the equipment and applications which require continuous and uninterrupted regulated operation.



- One-piece filter cartridge for fast maintenance
- Robust metal shell for extra safety
- Key lock metal bonnet
- Ideal for low and high flow applications
- Space saving package for optimal performance
- Precise regulation with balanced poppet
- Multi-porting options
- Custom cartridge style regulators



Low operating noise, with the ability to withstand vibration while operating in extreme conditions.



- Flexible design suitable for retrofitting systems
- Compact and light weight housing material
- Electric or pneumatic drains
- Solid control piston for extended life
- Removable, non-rising knob for panel mounting
- Dual or three-unit combinations



Continuous operation and low maintenance are the results of correctly specified filter and regulator assemblies.

- Long life filter
- Excellent water removal efficiency



- Quick, accurate pressure regulation regardless of changing flow or pressure
- High flow metric or inch pipe threads
- Corrosion protected housings
- Environmentally rugged, inline bronze filters with manual drain option


For applications with lower temperatures, please contact Parker. (Air supply must be dry enough to avoid ice formation at temperatures below +2°C/+33°F.)



Parker Solutions for the Bus and Coach Industry

'Flexibility and Reliability' have become buzzwords for most vehicle builders. With the customer's increasing desire to improve reliability while maintaining a competitive edge, we have recognized the need to become more flexible within our approach as a systems solutions provider, providing modular solutions with state-of-the-art technology. Additionally, whatever the type of bus or coach, Parker Hannifin's comprehensive range of pneumatic and electromechanical products and solutions are tailored to meet current legislation in today's market.

- **Flexible mounting alternatives to accommodate vehicle types**
- **Designed and constructed with operational reliability in mind**
- **Standard products modified for customer specific solutions**
- **Optional seal materials for fluidic compatibility**
- **Simplified installation and maintenance**
- **Product 100% function tested prior to dispatch**
- **Full design and technical support**

 For detailed product information, please speak to a Parker Transportation Application Specialist.



Principal application areas:

- Automated Luggage Doors
- Belt Tension
- Door Control
- Door Safety Sensing
- Kneeling System
- Low Temperature Product Capability
- Pocket Door Control
- Slide-out
- Slip-steer Lift Axle
- Soft Start Control
- **Hybrid and Electric Vehicle Technologies**
 - * *Mobile hardened traction inverters & motors*
 - * *Battery charging and management systems*
 - * *Ancillary motors, generators, drives and inverters*



Global Bus and Coach Products

Choosing the correct products is the most important thing you can do to prevent wear and damage to your vehicle.

Building on innovation has become part of our culture at Parker.

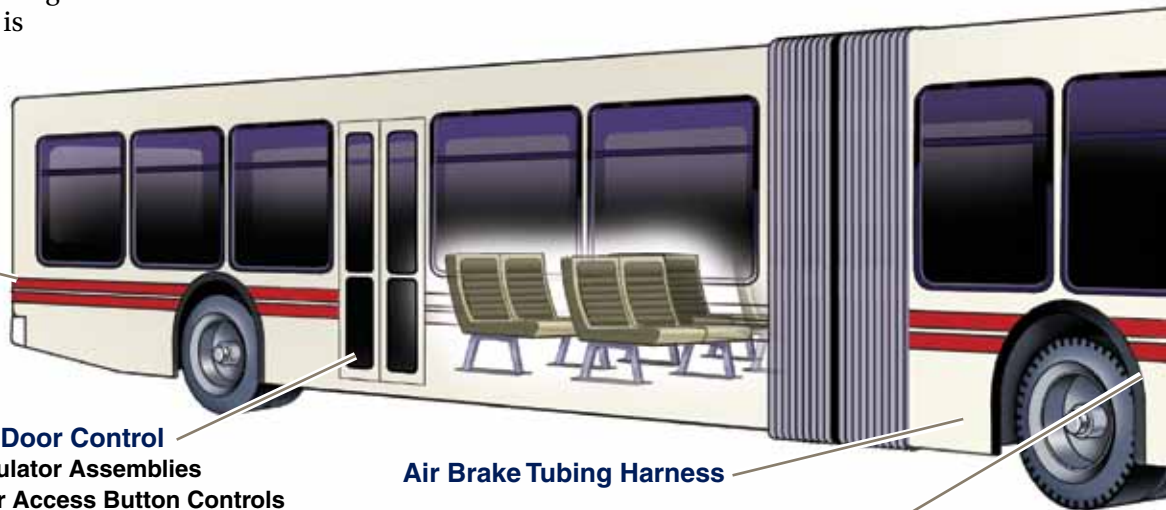
Product development, combined with industry competence throughout Parker's 93 year history, has enabled us to improve technology and exceed the requirements of the transportation market. Our comprehensive product range, supported by strong technical capabilities, is

manufactured within state-of-the-art facilities. Today, an entire family of products is specifically designed for sub-zero temperatures and arduous environments.

- **Emergency access door control push buttons**
- **Control valves with proven reliability in the transportation environment**
- **Solenoid valves with a variety of voltages suitable for transportation**
- **Passenger door obstacle detection valves provide passenger safety**
- **Emergency dump and soft-start valves provide door safety**
- **Independent door leaf control provided through optimized circuit design**
- **Compact filter-regulators to ensure good quality air supply**

Engine

- Teflon Hose
- Metal Hose
- Fuel Tubing



Low Floor Door Control

- Filter/Regulator Assemblies
- Passenger Access Button Controls
- Industry Specific Control Valves
- Soft Start Valves for Safety
- Emergency Air Dump Valves

Air Brake Tubing Harness

Suspension Control

- Control Valves Suitable for Extreme Temperatures
- Complete Modular Control Systems



Other Applications

- Coach Slide Out
- Luggage Compartment
- Cabin Toilet Control
- Lift and Slip-Axle Controls
- Hybrid Systems

Door Control

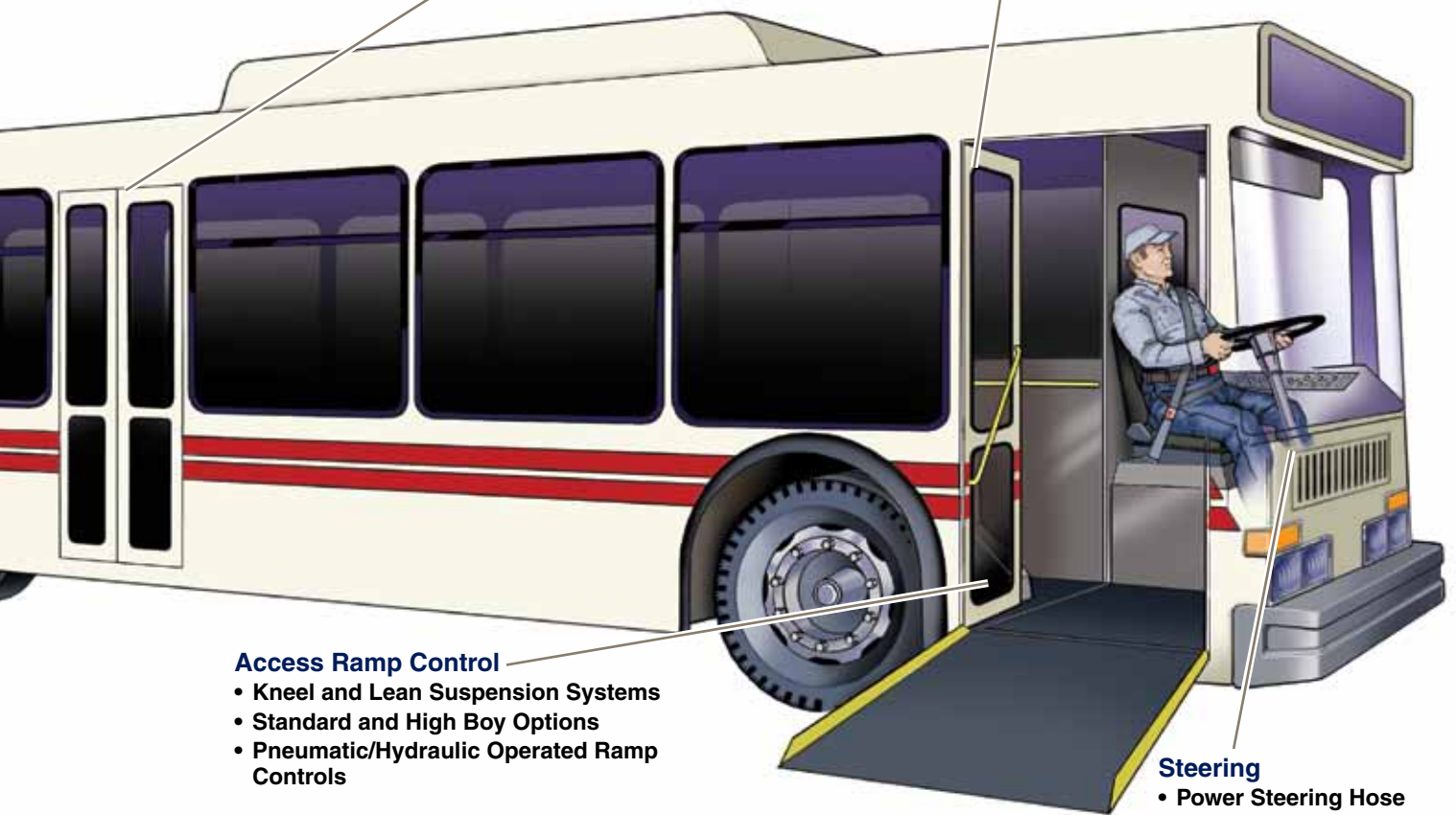
- Obstacle Detection
- Pneumatic or Electric Door Actuators
- Space Saving Rodless Actuators
- Door Lock Actuator and Controls
- Manually and Electrically Operated Door Control Valves
- Fully Designed Modular Door Control Systems

Access Ramp Control

- Kneel and Lean Suspension Systems
- Standard and High Boy Options
- Pneumatic/Hydraulic Operated Ramp Controls

Steering

- Power Steering Hose





Bus and Coach Application Solutions

Every day Parker Automation solutions are at work on buses in cities and on highways throughout the world. We are constantly evaluating the needs of our vehicle builders, operators and riders to innovate better solutions. Leadership in engineering and manufacturing, along with a commitment to quality and value, is a promise we make to every transportation customer.

Benefits:

- **Products subjected to in depth climatic testing**
- **Global technical support**
- **Extensive product range**
- **Designed with highest quality materials**
- **Field tested and industry approved products**
- **Systems fully designed and supplied**



Integrated control and actuator



Obstruction detection valve passenger safety



Fully integrated, modular control systems



Door cylinder control



Electromechanical door actuators



Kneeling control



Door entry/exit push-button control pneumatic/electric or both

Passenger Access and Door Control Systems

By developing partnerships with our customers from the very concept of a new product Parker can develop a broad variety of electric and pneumatic, fully tested, tailor-made control systems for direct movement such as: systems required to open and close doors, or raise and lower vehicles, access ramps, identify a sensitive edge or obstruction, make a safe soft start or door control actuation modules.

- Compact
- Rugged
- Flexible geometries
- Tailor-made solutions

Some of these innovations in pneumatic and electromechanical technology are:

- Internal or external release
- Passenger operated push buttons
- Integrating customer specific mount, flow controls, and valve actuation within the cylinder
- Cylinder geometry and method of actuation eliminates the need for conventional assembly construction
- Customized control systems for cylinders for doors and door interlocks
- Automatic door locking actuation.
- Security locking luggage compartments to prevent theft



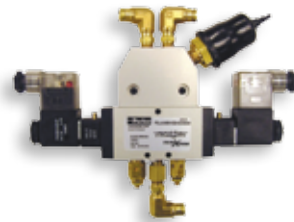
Low temperature directional control valves



Door cylinder control



Rodless cylinder & control module for passenger door



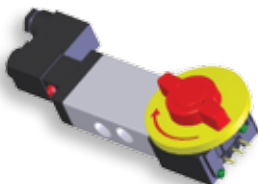
Obstruction detection valve



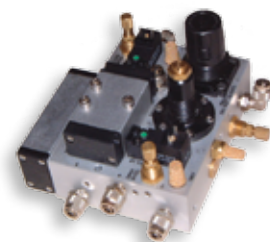
Multi functioned detection/obstruction module



Pneumatic/Electric pushbutton and toggle valves



Door emergency module



Controlling open/close sequence with regulated door detection system



Electro-pneumatic control system sensing door direction, obstruction and ancillary equipment



Bus and Coach Suspension Kneeling Systems

Pneumatic controls onboard vehicles can now greatly simplify many very sophisticated electronic controlled air suspension systems. Parker's diverse experience over years in the transportation industry allows simplified value solutions to address mobile medical vehicles, custom recreational vehicles and commuter type vehicles requiring "Hi-Ride" features which provide additional ground clearance. The "stop and hold" suspension also gives finite height adjustment scenarios. Parker solutions range from Kneeling systems to Lift axle controls, plus additional functions that can provide "anti sway" features to avoid rocking side to side by using integrated pressure regulators & optional electrical or manual selector switches. Parker offers all the benefits; automatic raise to

driving level, fast acting recovery in fractions of a second, and ability to kneel or lean vehicles side to side or front and back.

Additionally, Parker provides a magnetic rodless cylinder or electromechanical actuator module control for hand-capped units assisting the chairlift operation which does not require a sophisticated electronic controller, yet offers all the benefits.

- Hi-Flow rapid raise /lower operation
- Operational flexibility mode meets ADA* legislation conditions
- Modularity that can be easily fitted in different configurations
- Suspension system can inflate above the ride height (level lock out) giving vehicle ability to clear obstacles
- Sub-zero temperature operation (-40* F/C)

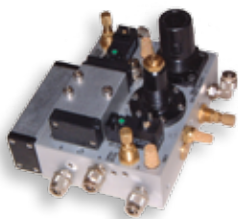
(*) America disabilities Act

Some of these innovations in pneumatic technology are:

- Stop and hold for infinite height adjustment, brake & throttle interlock and kneel which prevents movement when the bus is kneeled
- Standard module provides rapid raise or lower of the suspension air bags.
- High-Ride module feature which provides an additional ground clearance. Unique attribute to 'stop & hold' suspension offers finite height adjustment.
- Vehicle Front or Rear option has Right & Left Kneeling with High Boy for finite height adjustment.



Fully integrated kneeling system



Controlling open/close sequence with regulated door detection system



Mult-position kneeling raise, lower, or lean mode



Hi-flow recovery and kneel control system



Kneeling control w/ raise/lower and level lock out system

Hybrid Bus and Coach

Parker is moving the transportation industry by meeting the intense demands for hybrid and electric vehicles all over the world. As a leader in manufacturing AC & DC Drives, PMAC Motors and Generators and Systems, Parker has been working with the transportation market to meet the needs for breakthrough solutions in efficiency and cost saving technology. Parker can provide complete “Building Block” power

conversion solutions for hybrid transit buses, including the main traction drive inverter and motor (s), regenerative charging systems, and ancillary inverters and motors for fans, pumps, and compressors found on typical buses.

Hybrid-Electric benefits:

- Quieter operation
- Fuel savings
- Reduced emissions
- Satisfies anti-idling requirements
- Less maintenance and improved life cycle costs

Hybrid-Electric components:

- Inverters for induction or PMAC motors
- Advanced cooling solutions
- Human-Machine interface
- Motors
- Generators
- Energy storage
- Electro-Hydraulic actuators



Vehicle hardened traction drive & accessories drive modules



Vehicle hardened motors and generators

Bus and Coach Valves

Cab



Variable height control allows easy passenger access from any surface.

- Reduced friction seal
- Low pressure drop loss in actuation
- Robust die-cast, plastic and anodized material
- Push button or toggle technology
- Normally open/normally closed operation
- Mono or bi-stable position operation



Chassis



Robust design with the ability to withstand vibration and extreme operating conditions.

- Designed to simplify installation and servicing
- Solenoid control allows a variety of supplemental functions
- Flexible design, suitable for retrofitting
- All temperature resistant material
- Compact body design



Bus and Coach Actuators



Wide range of pneumatic and electromechanical actuators, designed to provide long life and reliability in a variety of applications.

- Low friction seal technology
- Extended end of stroke cushioning
- Easily accessible adjustments
- Multiple mounting styles
- Rounded lip piston seals for maximum life
- Case harden piston rod, less friction



Tailor the space requirement in high passenger density environments to fit vehicle layout; easy repair and minimum piston friction providing maximum seal life.

- Wide bore size and end of stroke
- Robust construction for vibration and shock
- Easy repairable assemblies
- Multiple mounting styles
- Easy accessible adjustments
- High speed capability





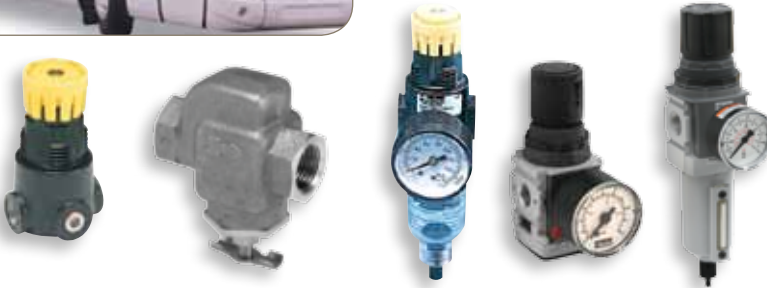
Bus and Coach Air Prep

Cab



Provides moisture-free and dry compressed air to the equipment and applications which require continuously changing regulated operation.

- Extremely light weight design
- Combination of filter water separator and pressure regulator
- Differing port sizes – NPT, BSPP, BSPT
- Worldwide service
- Modular assembly without tools
- For use in harsh environments
- Environmentally rugged, inline bronze filters with manual drain option

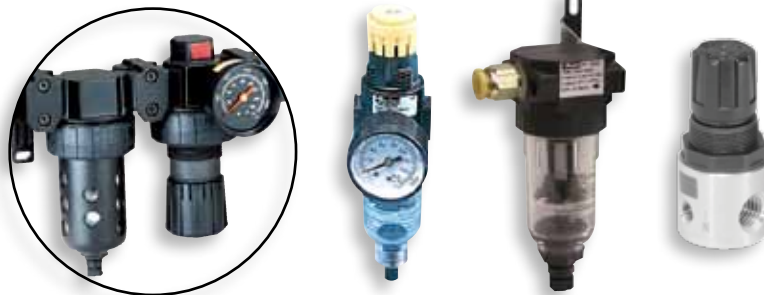


Chassis



Complete range of manual or modular combinations; fully compliant with ISO standards.

- High flow rates
- Cost and weight savings
- Temperature ranges of -20°C to +80°C (-4°F to 176°F) as standard, options available for lower temperatures
- Diverse container bowls



For applications with lower temperatures, please contact Parker. (Air supply must be dry enough to avoid ice formation at temperatures below +2°C/+33°F.)



WARNING - USER RESPONSIBILITY

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker-Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise.

The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

OFFER OF SALE

The items described in this document are hereby offered for sale by Parker-Hannifin Corporation, its subsidiaries or its authorized distributor. This offer and its acceptance are governed by the provisions stated in the detailed "Offer of Sale" elsewhere in this document.

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North America

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Tel: +001 206 285 7559

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Mexico – Toluca
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China – Guangzhou
Tel: +86 20 3878 1583

China – Shanghai
Tel: +86 21 6455 2002

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Japan – Tangerang
Tel: (62) 21 7588 1906

Korea – Seoul
Tel: (82) 2 559 0400

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New Zealand – Auckland
Tel: (64) 9 574 1744

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Tel: +55 12 3954 5100

Pan American Division
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Tel: +27 11 9610700

Egypt
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Europe

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Tel: +43 2622 23501

Belgium – Nivelles
Tel: +32 67 280 900

Czech & Slovak Republics – Klecany
Tel: +420 284 083 111

Denmark – Ballerup
Tel: +45 43 560400

Finland – Vantaa
Tel: +358 2 0 753 2500

France – Contamine
Tel: +33 450 25 80 25

Germany – Kaarst
Tel: +49 2131 4016-0

Greece – Athens
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