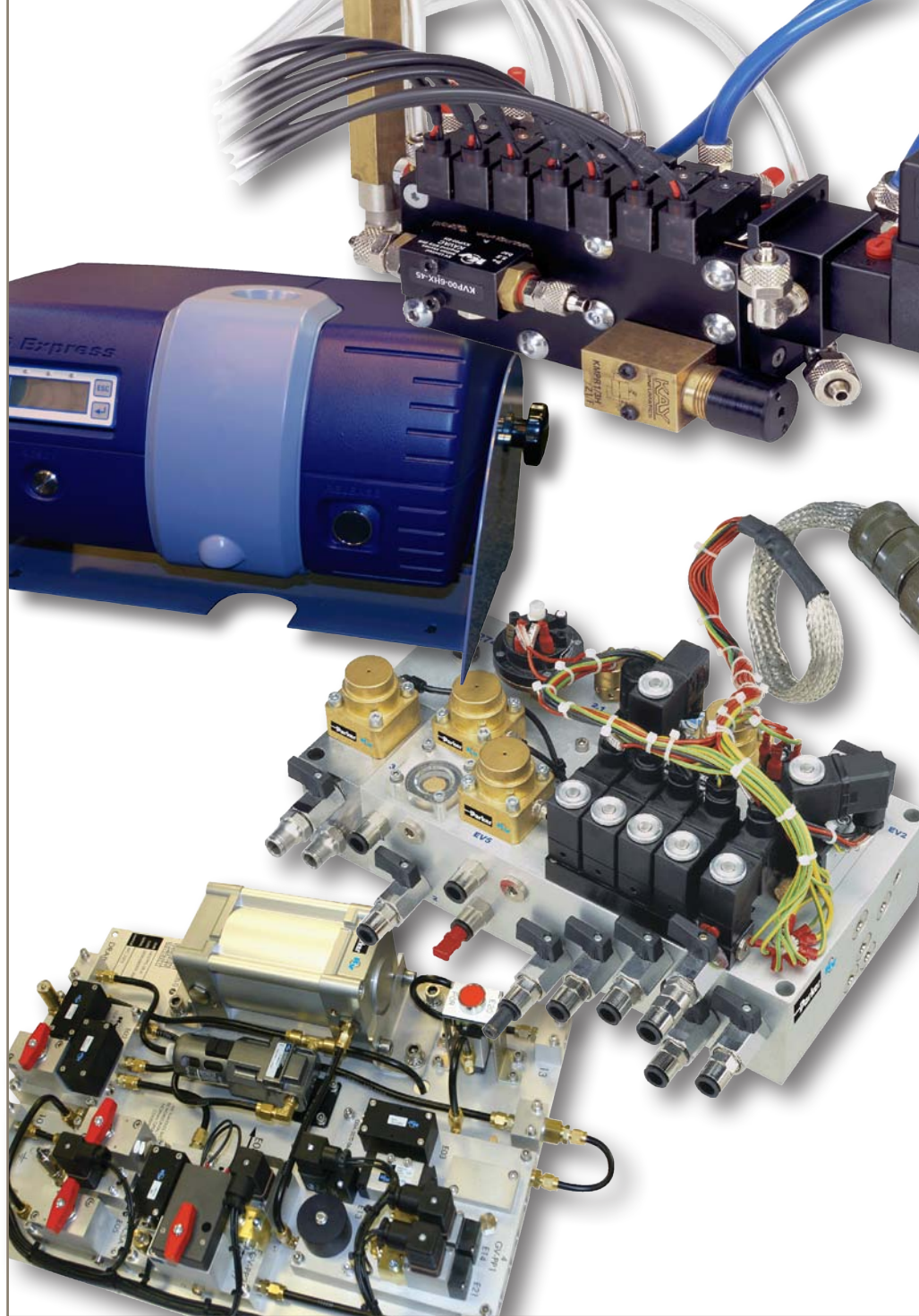
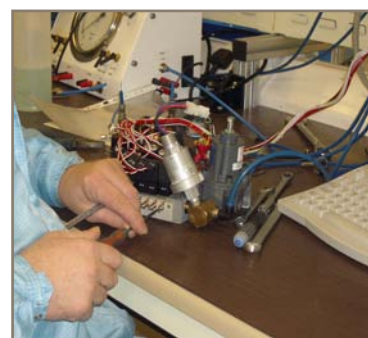


aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



Parker KV Division

A World of Possibilities...



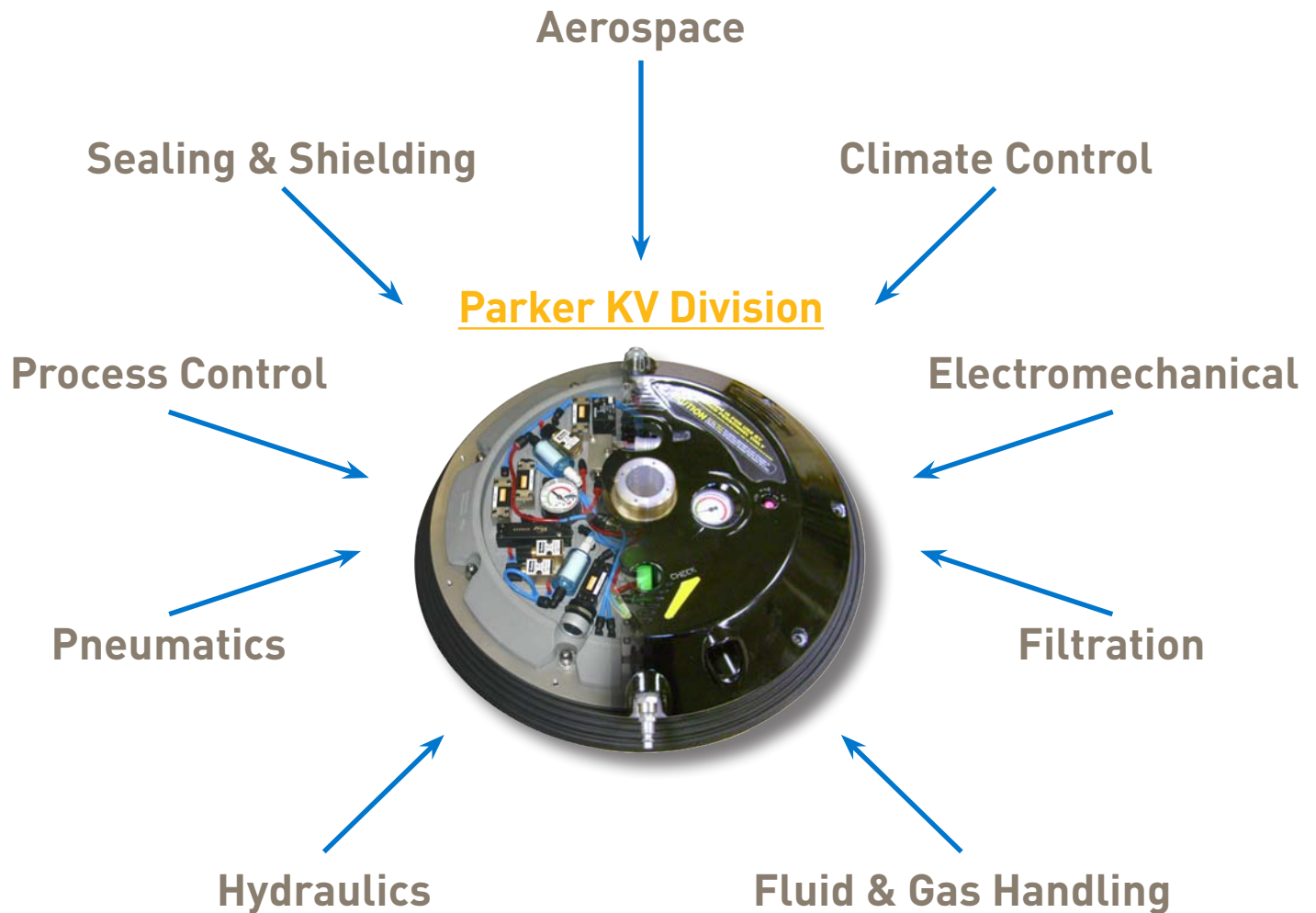
ENGINEERING YOUR SUCCESS.



Providing your integrated system solutions

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Imagine the possibilities...

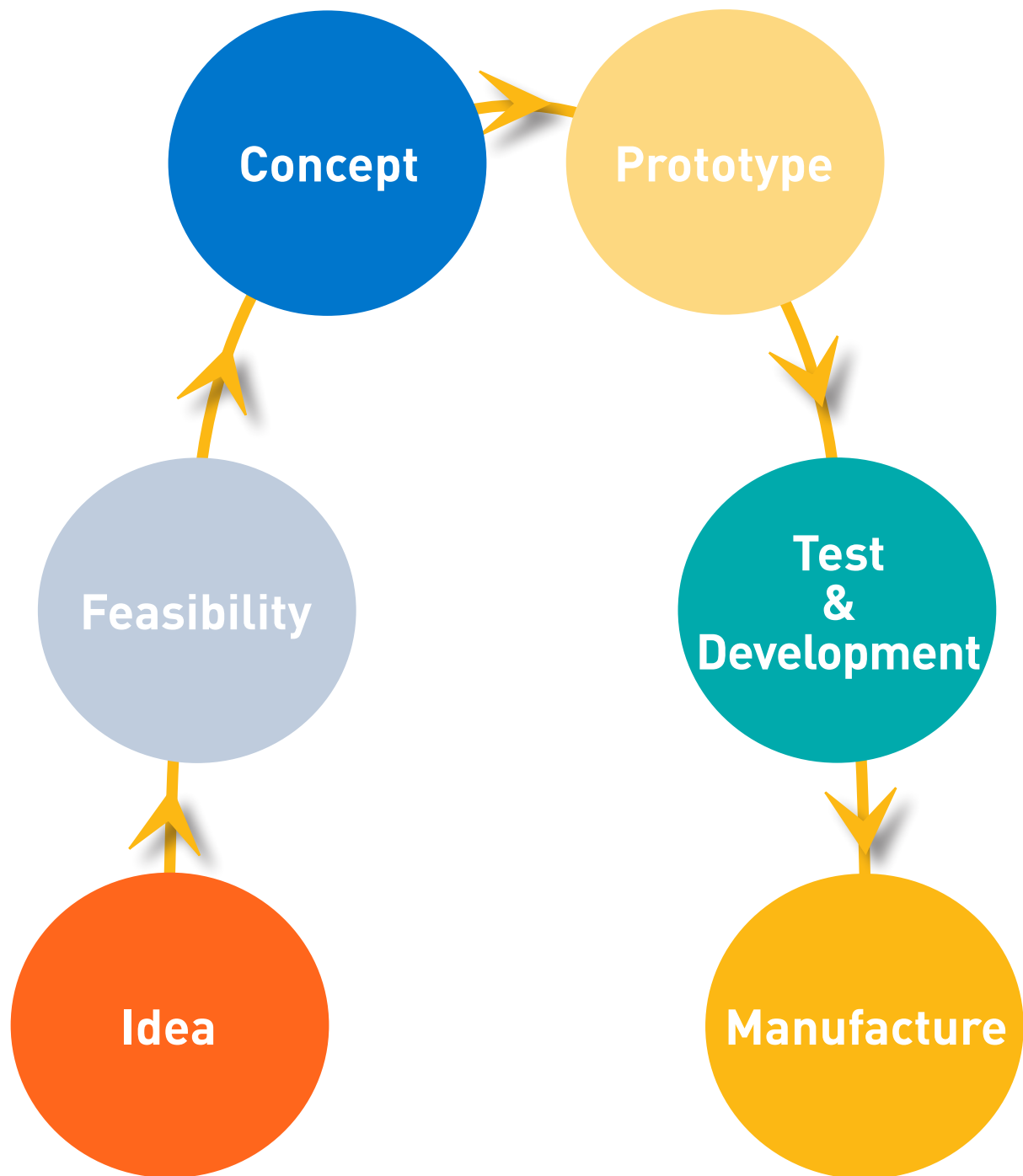


...Integrate the Power of Parker

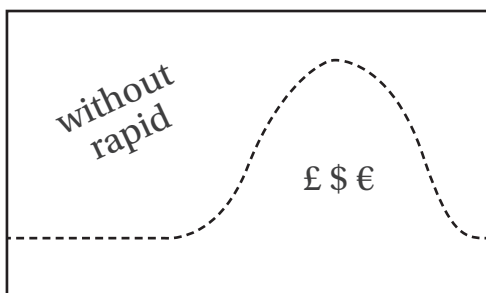
Results

- Reduced Cost of Ownership
- Rapid Product Development
- Reduced Cost of Acquisition
- Increased Productivity

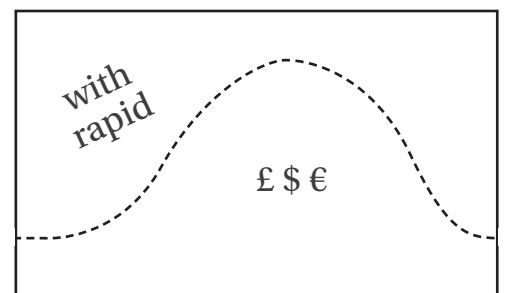
Rapid Design & Development...



Reduce your time to market with Rapid!

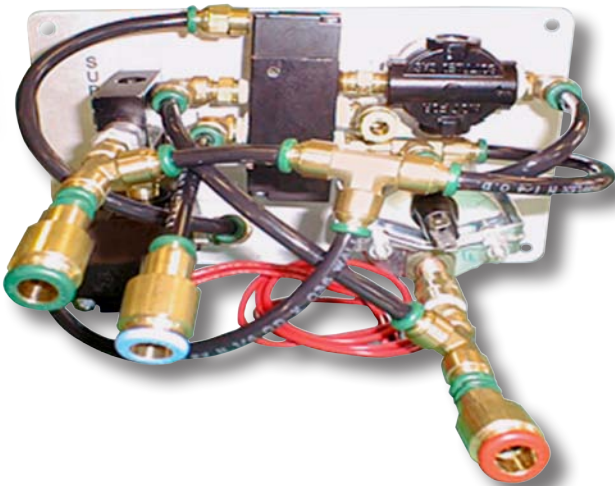


Shows reduced product development time.



Reduced Cost of Acquisition

Here is a typical competitor solution, in a typical application. This solution has a high cost of acquisition and cost of ownership.

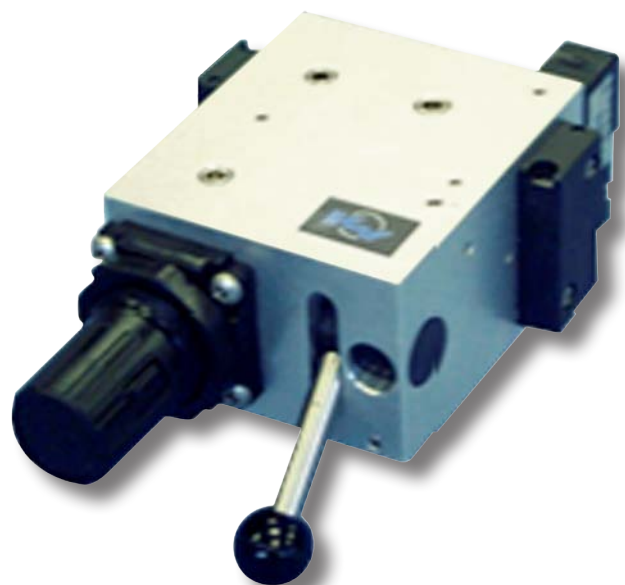


- 28 individual components to order
 - 7 different suppliers to source
 - Multiple expedites
 - 7 delivery charges
 - 28 items to book into stores
 - 78 connections
 - 28 items to assemble
 - Inventory reduced
- Testing, validating and approval

OR

- Reduction in cost of ownership & acquisition
 - 1 part number / 1 order
 - Fully function tested
 - 1 delivery charge
 - 1 supplier

...costs reduced



Solution Examples

PD Express & CD Express

Problem

The customer has seen his market in the West reach saturation point, for calibration equipment used in manufacture of cigarettes. Manufacturing is moving nearer to the growing markets of cigarette consumption where the need is for low tech calibration equipment to satisfy minimum standards in Asia, Africa and South America. The equipment should be sympathetic towards fluctuation in air and electrical supply.



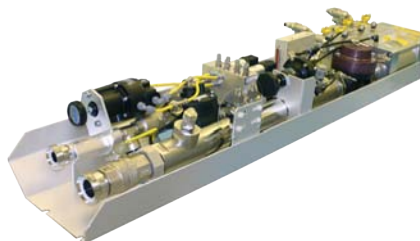
Solution

Because Parker KV Division took the projects on from concept to production the customer had fixed visible development costs. Using the Rapid method for the case manufacture, low quantity mouldings with low cost tooling could be achieved.

Cleanroom - PFU Unit

Problem

A leading supplier of semiconductor equipment asked Parker KV Division to provide a means of regulating vacuum and large quantities of Clean Dry Air (CDA) to ISO 8573-1 class 1.3.1. One of the requirements was that the output pressure of the CDA would be very stable with very low pressure drop to allow the use of a standard 8 bar compressor. Full monitoring was required and the solution had to be realised in a very short time frame.



Solution

The regulation system for the CDA System was designed using specially modified standard components. To ensure the output was to the required standard of cleanliness the output was filtered. Both pressure and vacuum input and output pressures were monitored by pressure sensors providing balanced outputs using a bespoke electronic PCA. All components were washed in a dedicated washer and assembled in an ISO 14644 class 6 cleanroom.

Rail Door System

Problem

The customer had an internal door refurbishment project they were working on for a French train operator. The existing system, that was designed and supplied by Origa, was only capable of detection in the 'close' direction and the customer's requirement was for double detection (open and close). The solution was also required to fit within an existing space envelope.



Solution

Using our expertise in circuit design and integrated solutions, Parker KV Division designed a fully pneumatic train door system with double obstacle detection to fit within the existing space envelope. The design incorporated a number of group products from Legris and PDE including fittings and control valves already approved by the French Railways.

Changeover Valve - Anaesthesia

Problem

In anaesthesia there is a requirement to switch the gas flow from N₂O to Air. This procedure needs to be monitored and a positive indication given that the gas change has taken place. Parker KV Division's customer needed to have a positive indication that the valve spool physically moved. Also, they required this special valve in an electronic version as well as a manual one.



Solution

Using our expertise in circuit design, integrated solutions and advanced manufacturing systems, Parker KV designed new and bespoke components that fully met the customer's specification and fitted within the smallest space envelope.

Emergency Brake Tripcock

Problem

The customer required a control panel to isolate ancillary air operated equipment i.e. horns, whistles, doors. The system was required to supply controlled air to the horn for correct operation of pitch and volume.

Due to space restraints there was also a need to integrate a previously separate control system for emergency brake tripcock control. This system interfaces with a body mounted tripcock valve which is operated, by a mechanical contact, in emergency situations when a vehicle passes through a red light signal initiating an emergency brake operation.



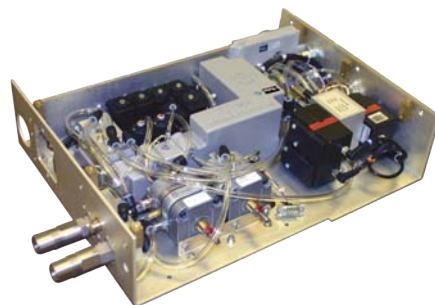
Solution

A combined ancillary air control and tripcock panel, fulfilling the customer's need to combine the two previously separate systems. Parker KV also achieved the ability to use the ancillary air control as a stand-alone system, with the facility to retro-fit the tripcock system in situ on the train.

Neonatal Ventilator

Problem

Our customer found that their current design of the Neonatal control system was extremely difficult to set up and was inconsistent in testing. Also, as the demand for their equipment was increasing this placed an unprecedented burden on their production and resources. However, they could not consider a complete redesign and required a solution that was backwards compatible with their existing chassis.



Solution

Parker KV Division was able to deliver a single solution to both of the customer's problems. Through our extensive knowledge of fluidics we were able to re-design several key components within the system to achieve the required performance and enhanced reliability. At the same time, through our use of advanced manufacturing techniques, we were able to offer a modular solution that was contained within the existing space constraints.

Rapid Prototyping & Manufacture

Advanced Manufacturing Technologies

Rapid Prototyping/Manufacture

With the advent of 3D CAD, the improvements in materials and new technologies such as SLS and SLA, the capability to simply translate CAD data into a physical 3D model is now a reality.

These innovative process technologies now allow the optimum design of new components using a 'material on' rather than a 'material off' process, removing the bonds of traditional manufacturing techniques.

Using this principle, Parker KV are able to supply complex sintered or moulded parts, in metal or plastic, directly from the 3D model, in a fraction of the time it would take to manufacture them using conventional techniques.

By utilising a range of in-house services Parker KV are able to support customers in getting their products to market, ahead of the competition.

SLS (Selective Laser Sintering)

Unlike the SLA, the SLS uses a variety of 'real' engineering materials to build durable, functional parts in a fraction of the time normally associated with conventional machining processes. Components are created directly from a 3D CAD model by slicing the design into thin cross-sections or layers. A laser then sinters / fuses each layer of material together to form a solid three-dimensional object from the original 3D CAD model. Selective Laser Sintered parts are used in applications requiring functional prototypes and can be manufactured from a variety of materials in as little as 24 hours.

Benefits:

- Produces accurate, detailed parts, prototypes, patterns, and tools - quickly and inexpensively.
- Rapidly generates small runs of production parts - without the need for tooling.
- Produces large volumes of parts with maximum efficiency.
- Uses a range of materials with properties comparable to machined or injection moulded parts.

Current SLS Materials*:

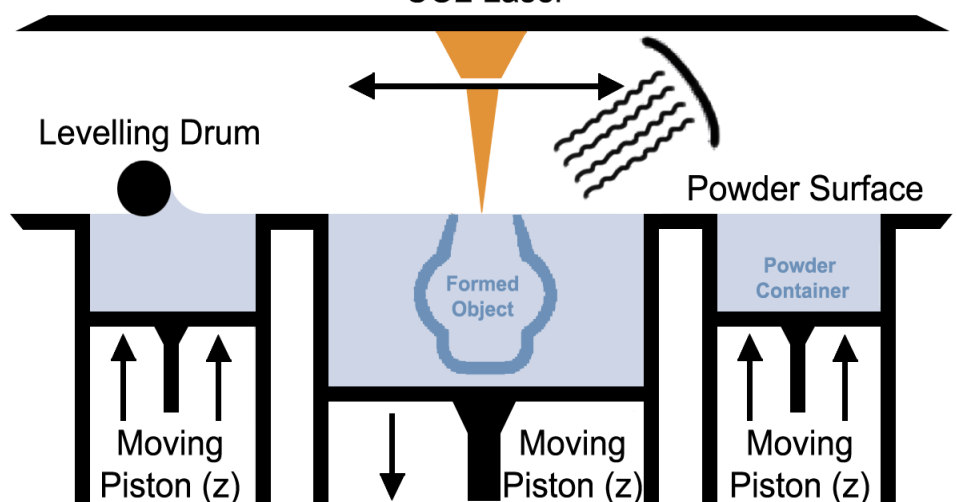
- Nylon PA
- Glass filled PA
- Fibre filled PA
- EX PA (Black and White)
- Flex (rubber type) In Blue & Black
- A6 Steel and bronze composite.

*Contact us for data sheets.



SLS Process

CO2 Laser



FDM (Fused Deposition Modeling)

FDM uses a ultra-fine strand of real material (polycarbonate*) This is extruded under control of a 3 axis head 'laying down' the finished parts. It can be used for models and RM parts when designed for the technology. Our Fortus 400 offers one of the largest build beds available today.

*Other materials available on request.



3D Printing

A fine powder (plaster based) is used in conjunction with a print head. The process produces non-functional 3D models. It's the least accurate of the processes, but it ensures high speed and lower cost.



SLA (Stereo Lithographic Apparatus)

Using a liquid resin, this process uses a laser to selectively solidify. With careful control very accurate and detailed models can be produced.



Concept Models / Prototypes

- Perfect for: solid visualisation of a concept
- Fast and easy communication with clients
- Identifying problems with ergonomics.
- Achieving design consensus.

Vacuum Casting

The integration of the SLA and SLS technologies for producing cost effective and accurate model masters together with the traditional techniques of vacuum casting with silicon moulds, has enabled Parker KV Division to refine a system for the effective manufacturing of low to medium volume production parts.



How does it work?

A component master is placed in a casting frame and a silicon mould is cast around it allowing for pouring gates & parting lines. Once the silicon mould is set, it is split on the parting line and the master is removed. The polyurethane resin and hardener are then mixed and poured, under vacuum, into the mould cavity and allowed to cure.

The silicon mould tool will last for approximately 50 castings and can accommodate single or multiple components dependent on the size.



After this, a new silicon mould can be cast from the original master.

The surface reproduction of a silicon mould is excellent with fine detail being easily replicated. This process is ideally suited for both prototyping and small batch production where the volumes do not justify the expensive cost of an injection mould tool.

Benefits:

- Cost effective small batch casting of thermoplastics
- Variety of material types & properties
- Fast turnaround
- No expensive mould tool
- Minimal financial commitment



Materials:

A wide range of materials can be selected based on the requirements of the customer, but are generally polyurethane based as the best compromise of cost and material properties.

The Cleanroom

Cleanroom Produced Systems

Products and Industry

The industries serviced by the Parker KV Cleanroom are numerous and varied, ranging as they do from the Semiconductor Industry to Medical and Precision Measurement and Instrumentation.

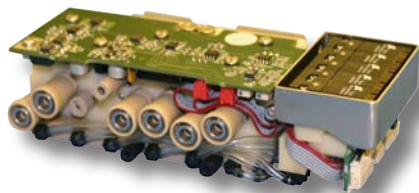
Parker KV Division houses one of the largest cleanroom facilities to be found in the pneumatics industry, with a total floor area of 380 square metres (4092 sq.ft.) It operates to ISO 14644-1, ISO Class 6 Standard, (FED Standard 209E, Class 1000) over the working areas and has its own dedicated material handling area and store.

The Parker KV cleanroom contains over 24 square metres of Laminar Flow Cabinets operating to ISO 14644-1, ISO Class 4 Standard (FED Standard 209E, Class 10)



Clamp Free Manifold

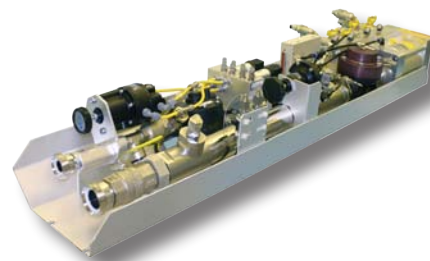
This unit controls five vacuum and air outputs to control the movement of a silicon wafer on a wafer chuck within a wafer processing machine. The unit adds minimal contamination and outgassing to the outputs and meets ISO 14644 class 3 cleanliness standards for particulates.



Outputs are monitored using pressure sensors and interfaced to the control system with the solenoid valves. Response time of the system is critical to ensure high throughput. The mass and size of the unit are kept to a minimum using advanced plastics to allow rapid acceleration of the wafer chuck.

Air / Vacuum Conditioning Unit

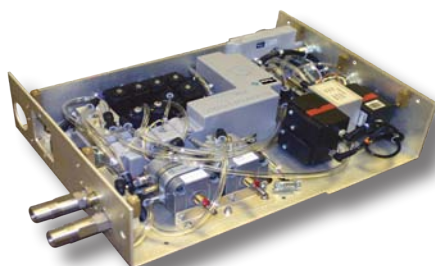
This system regulates CDA and Vacuum supplied by the compressor to the machine itself. Additionally, it stabilises the temperature of the CDA and filters the air after regulation. Some of its technical features include CDA to ISO 8573-1 class 1.3.1 at a pressure of 6 – 8 bar with a flow rate up to 3500 NI/min. Pressure drop across the unit is minimized to 0.2bar, without compromising the stability of the output pressure. Vacuum flows are also provided at up to 170 NI/min at – 0.6 bar with a pressure drop of 0.1 bar. Large flows of CDA & vacuum with a very stable output pressure, along with very low pressure drop, allow the use of smaller compressors / vacuum pumps.



To the machine builder and FAB owner this means reduced cost and energy consumption, backed up with a fully engineered solution tailored to meet demanding industry requirements.

Neonatal Ventilator

This module blends and controls a mixture of air and oxygen as the pneumatic part of a Neonatal Ventilator System. Very accurate regulators and carefully controlled solenoid valves give precise mixture control over a full range of oxygen concentrations.



Rapid response proportional control valves give the accuracy and control required for high frequency breathing cycles. Mounting of components onto manifolds gives a simple, robust and compact design with a vastly reduced component count. Reservoirs are incorporated into a moulded, aluminium filled polyurethane manifold, manufactured using Parker KV's patented Rapid Manufacturing process. Receipt of complete, fully developed and tested pneumatic systems allows the customer to concentrate on their core competencies.

Complete Pneumatic Sub-System

This unit is designed to provide the pneumatic functionality required to control the movement of the reticle in a lithographic machine used in the process of manufacturing wafers in a semiconductor fabrication plant.

The reticle is controlled with a conventional clamp free clean unit. Clean Dry Air (CDA) is used to break the vacuum and is kept to ISO 14644 class 3 standards to minimize particulate contamination. It also generates high levels of vacuum internally to allow rapid acceleration of the reticle. CDA is also regulated and supplied to various air bearings at similar levels of cleanliness.



All outputs are monitored and interfaced with the solenoid valves to the customer's control system via dedicated electronics. Producing complete sub-systems allows the machine builder to concentrate on his core skills with the knowledge that the necessary pneumatic functions are taken care of.

Actuator for High Vacuum

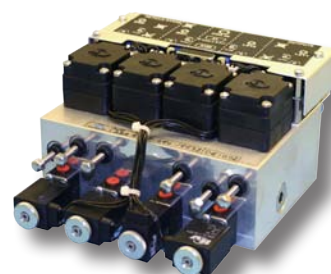
This actuator provides a 60mm stroke with very high repeatability ($\pm 0.1\text{mm}$) in a vacuum of 10^{-7} mbar and in an environment where the temperature range can vary repeatedly by 150°C . Levels of outgassing of organics (VOCs) are measured in the order of 10^{-7} mbar l/s.

Pneumatic actuators with low outgassing designed to work in high vacuum give more options for control in these severe environments.



Air Bearing Controller Manifold

This manifold controls flow to air bearings with interface to solenoids and pressure sensor monitoring to each output. Specially designed valves keep particle contamination to a minimum to achieve ISO 14644-1 class 3 cleanliness.



Market Specific Solutions

Integrated Solutions

Food & Beverage

Through the introduction of new technology and custom designed solutions, Parker KV Division is able to offer improvement in productivity and quality in an already well established market. Working hand in hand with the customer, the development of complete systems or even custom components enable these improvements.



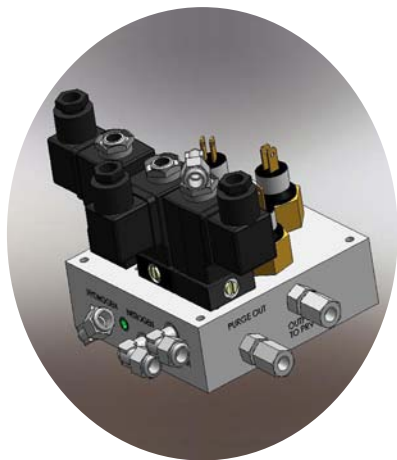
Automated Cow Milking

By combining Parker KV's knowledge of pneumatic system integration with the customer's own electronics and software experience enabled the development of a fully automated milking system. The product works with an upper traversing, vertically mounted robot attachment, equipped with a double-scanner system comprising a camera and ultrasound sensor. The special software supports the quick attachment to different teat types. The product also checks and confirms successful attachment to the livestock and when combined with remote animal tagging technology allows a truly autonomous production process.

Livestock Control and Hygiene

To facilitate the management of livestock, specialised actuators were designed for use in the arduous high moisture and ammonia rich environment. Using a combination of stainless steels, coated alloys and engineering plastics, actuators were developed combining dual in-line cylinder technology and custom mounting solutions. Additional customer requirements for sterilisation and animal hygiene led us to develop a range of customised sterilisation and dip spraying products and systems utilising well proven nozzle technology with Parker KV fluidic control products.





Power Generation

In remote locations where there is a requirement for autonomous electrical power, the utilisation of fuel cell technology provides a low-cost and environmentally friendly solution.

These power generation units utilise alternative fuels that are readily available and the only by-products are electricity and medically pure water.

By utilising the extensive product range available in the Parker organisation combined with the system solutions ability within Parker KV, a solution has been developed to manage all the gas controls within the power generation unit.

Alternative Fuels

Parker KV Division see the alternative energy market as a key strategic objective due to its global growth and environmental benefits.

By working closely with customers to develop new and exiting opportunities Parker KV can bring forward improved benefits by working hand in hand with the customer from the earliest stages of development.



Hydrogen Generation

In the commercial and private vehicle industry the adaption of hydrogen fuel cell technology for hybrid applications has resulted in Parker KV developing a control system for all the fluid handling in the product. Within the solution every component has been custom-designed to reduce size, weight and cost without compromising the performance or endurance of the system.

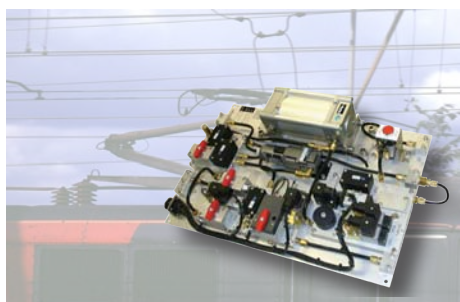


Market Specific Solutions

Transportation

Pantograph Systems

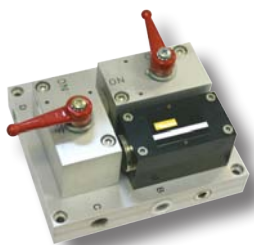
Parker KV specialises in modular control systems and components that meet the stringent criteria for reliability, long life and ease of maintenance in this vital rail application.



Application requirements can include but are not limited to raise and lower control, carbon contact strip wear monitoring, and auto lowering.

Ancillary Air Systems

Parker KV has designed a number of Ancillary Control Systems to meet customer requirements. These systems can provide air isolation of applications such as horns, wipers, doors, toilets etc to prevent operation or to isolate during maintenance. They also provide system status feedback, interlocks and other customer specified functionality.



Toilet Systems

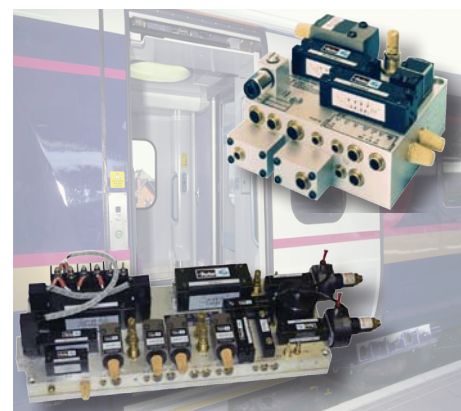
With sanitary waste stored within on-board retention tanks, and transferred via vacuum, the reliability of the Parker KV toilet system is widely known. It integrates the control of air/vacuum and fluids into a single module which optimises space and weight saving. Additional functions include self-priming, self-cleaning and detergent handling together with simple quick connectors and multi-core plugs for easy maintenance.



Door Control Actuation

The control systems for both external and internal doors are designed to meet individual customer specifications and to satisfy particular requirements specified by the customer for safety, operational needs, space availability and reliability.

Parker KV systems and components include a range of rod and rodless actuators providing complete solutions for all door types.



Other Parker KV experience in Rail Systems:

- Brakes/tripcock
- Passenger step control
- Seat adjustment
- Traction control
- Air conditioning
- Body tilting
- Retractable mirrors
- Windscreen wipers

Emergency Vehicles

100% reliability is a feature of the Parker KV systems and components used in the range of emergency vehicle applications. This includes Fire Tenders and Airport Crash Tenders where functions for fluid control and dispensing may be required. Applications include mast control, central locking doors and roller shutters, hydrant tank fill, hose reel auto-winding, throttle control and handbrake interlock.



Kneeling Suspension

These systems are designed to comply with disability legislation and for speed of passenger movement. Parker KV has a variety of kneeling suspension systems available, including those that allow the suspension system to inflate above the ride height (level lock out) giving the facility to clear obstacles or avoid bottoming out under load. Parker KV is one of the few pneumatic system manufacturers to provide a solution to the vehicle rocking from side to side, with its “Anti-Sway” system.



Coach Security

Securing luggage compartments and automation of luggage compartment doors are areas where Parker KV are able to design customer specific solutions.

- Bus & coach approved products
- Extensive bus & coach experience
- Central tyre inflation
- Low temperature operation



Passenger Access

Parker KV has developed a wide range of passenger access solutions to customer defined specifications including systems for door control and actuation.



- Door control systems
- Pneumatic door actuation
- Kneeling suspension

Axle Lift

Parker KV Axle Lift Systems are designed to meet international legislation, and can provide significant savings through reduced tyre wear and improved operational costs. Typically, the systems incorporate on-board load and position sensing, override facility for traction control assistance, IP67 compliance, correct ride height self-compensation, automatic axle load protection, wide temperature and voltage tolerance.



Other Parker KV experience in Commercial Systems:

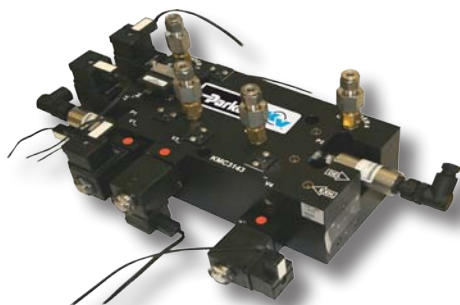
- Bottom loading control systems (BLVR)
- Bulk or hose reel delivery selection
- Engine and pump PTO speed control
- Central tyre inflation
- By-pass valve control
- Dip tube interlocks
- Guard bar interlocks
- Overfill protection systems
- Guard rail actuation
- Remote hatch loading actuation system

Market Specific Solutions

Life Science

Cryosurgery

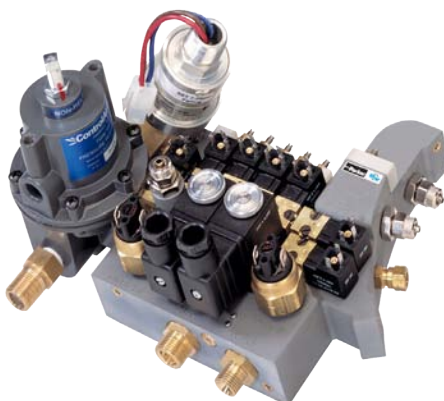
Cryogenic procedures are at the leading edge of some of today's most advanced surgery. Using the application of extreme cold, selective destruction of unwanted tissue has become a preferred method of treatment as it leaves minimal scarring and avoids hospitalisation or the need for anaesthesia.



Through close working partnerships, Parker KV has developed specialist modular control systems for liquid gas management within cryoanalgesic instruments, so that the critical aspects of rapid-freeze and slow-thaw are precisely monitored and controlled.

Gas / Liquid Chromatography & Mass Spectrometry

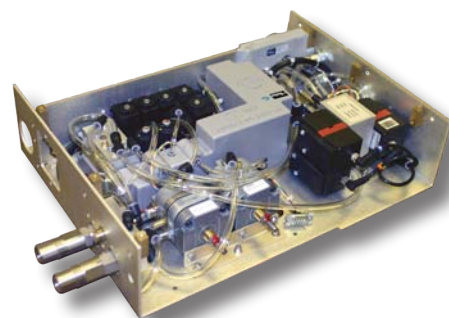
Working with low power and precise leak rates on specially selected gases such as nitrogen, helium, argon and carbon dioxide - are just some of the key challenges Parker KV has become familiar with, when acting as a key partner to some of the world's leading developers and providers of innovative life science solutions.



Since the early development of analysers, science has come a long way, with applications such as sequencing of DNA and proteins, providing worldwide benefits. Parker KV has built an enviable reputation for working to high standards associated with state-of-the-art fields of biology and medicine and is now recognised as a leading development partner.

Integrated Neonatal Ventilator

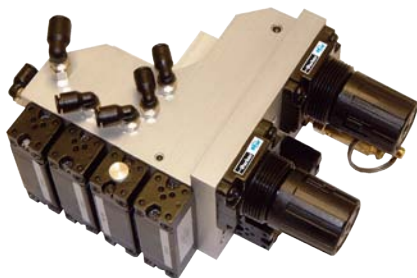
As part of a larger control system, Parker KV developed an integrated gas supply and mixing module for a neonatal ventilator. This module controls, mixes and blends air and oxygen. Bespoke pneumatic control and solenoid valves were developed and standard components integrated into a 'turnkey' control system.



Valves are both surface mounted and embedded as appropriate. The Parker KV patented AMT process is used to incorporate a complex pneumatic circuit, including volumes and a blending chamber. The component count was dramatically reduced over the previous hard piped system.

Air Abrasion

Air abrasion systems offer an alternative to the high-speed dental drill for some dental procedures. Small cavities can be prepared using air abrasion without the need for local anaesthetic. It does not harm the nerves or blood vessels that compose the tooth pulp.



Parker KV has, through a design partnership, developed a compact system for the control of gas, fluid and abrasive within this procedure.

Using Parker KV Division's own, in-house rapid prototyping capabilities, Parker KV is able to bring innovational design into production within weeks. From foot controls to suction and air polishing systems, we can deliver the solution so the customer can feel the benefits.

Changeover Valve Anaesthesia

Parker KV Division has long been a key partner to some of the world leaders in the production of anaesthesia equipment.



Unique Parker KV control elements have been at the heart of the enhanced performance of many gas flow management systems used in modern operating theatres, intensive or critical care units and neonatal ICU.

Parker KV also has a range of systems, components and knowledge used within emergency resuscitation.

Gas Alarm Systems

In anaesthesia, the control of gases such as nitrous oxide is critical to prevent hypoxia.



The Gas Alarm Tray utilises a master/slave system whereby the control gas is oxygen. In the event of the control gas failing or decreasing in pressure, the supply of N₂O and/or any other slaved gases will be shut off immediately. Simultaneously, an audible alarm is activated to alert the medical team.



Market Specific Solutions

Aerospace

Fall Arrest System

When working on aircraft, the safety of maintenance staff is paramount. The fall arrest system developed and manufactured by Parker KV Division for a UK customer is fast becoming the industry standard solution to the problem of protecting individuals whilst working at height on aircraft.



The fall arrest system is a vacuum anchor system, using a large vacuum cup and associated control module system developed by Parker KV to manage the vacuum restraining the operative to the aircraft wing.



Auxiliary Pad

The module is a comprehensive monitoring and gas management system. In the event of a problem with the gas supply or the vacuum level an alarm will sound. The vacuum pads maintain a safe working vacuum for a minimum of 2 minutes to allow for safe recovery to the ground.



The system can be used as a single point anchor or as a multi-user system by using a number of vacuum pads with a single or pair of cables spanning between them. The system is powered by compressed air or nitrogen, without the need for batteries, electrical cables or large equipment. Being completely non-electrical and with no metal-on-metal moving contact, the system is inherently safe with open fuel tanks.



This fall arrest system is the smallest and lightest vacuum anchor in the world and it is very easy to use which is why Airbus now specify the system in the AMM* for all aircraft type. Boeing also used it during the build of the B787 Dreamliner.

*AMM Aircraft Maintenance Manual

Notes



History and Growth

KV Division

1966-1972

Kay Pneumatics Limited is formed. The company focuses on the design, development and manufacture of pneumatic valves. Soon Kay Pneumatics Ltd. establishes itself within the UK market and founds a sales subsidiary company, Kay Pneumatics BV in the Netherlands.

In the Sixties, the products gain an outstanding reputation for reliability in industry sectors such as Packaging, Agriculture and Medical. A major success is winning a contract with a Dutch company. It is for the supply of sophisticated systems for control of the automation processes used in Wafer Stepper production machinery. The success the company achieves in that period provides the foundation for the growth it subsequently enjoys.

1973

Vento Solenoids is formed in 1973 as a Sales and Distribution Company, representing Swiss and German manufacturers of Solenoid Valves.

1988-2006

The amalgamation of the two companies takes place in 1988 to optimise the design and engineering skills of Kay Pneumatics when combined with the sales, distribution and marketing expertise of Vento Solenoids.

The new company is called KV Limited and it continues to grow, and to develop new products. It also adds new products to the range of automation components offered to the market. KV Ltd. now establishes 'Points of Sale' throughout the world, in terms of wholly owned subsidiaries in the Netherlands, France, Spain and the USA. Distribution Agreements are established with companies in Eastern Europe, Asia, Australia and South America. KV also enters into a joint venture in India where it establishes a manufacturing operation from which the distribution network is supplied with pneumatic valves and fittings.

In those years the strategy of the company is built around the design expertise in the UK and the USA where Pneumatic Systems are designed and developed to meet customers' needs, combined with the low cost of manufactured components that KV Pneumatics (India) provides.

2007-present

In 2007 KV Ltd. is acquired by Parker Hannifin, World Leaders in Motion Control, and becomes Parker KV Division, bringing to Parker a unique and varied portfolio of integrated system products spanning a wide variety of industries.

Parker Hannifin

1918

Arthur Parker founds the Parker Appliance Company. "Our success is founded on fair dealing, hard work, coordination of effort and quality of products."

1924

After his inventory was lost when his truck went over a cliff, Parker begins anew, fuelled by the auto industry boom of the 1920s.

1926-1927

Arthur Parker develops a leak-free fuel system to sustain Lindbergh's Spirit of St. Louis for the first transatlantic flight.

1930-1940

Parker endures the Great Depression and establishes new headquarters with the purchase of the bankrupt Hupp Motor Car facility. Parker's enterprise employs 38 people.

1940-1945

Parker becomes a contract supplier of hydraulics, connectors and metering devices for aircraft industry. The company is 5,000 employees strong.

1945-1950

After Arthur's death, advisors recommend liquidation to Mrs. Helen Parker. She refuses, as son Patrick is poised to advance in the company upon graduating from Harvard Business School.

1950-1970

The company grows, merges with Hannifin. 1959 sales: \$43 million. International operations formed in 1960. 1969 sales: \$197 million.

1960-1970

Parker is essential to Apollo 11's historic landing. Upon man's first touchdown on the moon, Astronaut Harrison Schmidt commands, "Cycle that Parker valve."

April 1970

During the Apollo 13 crisis, Parker engineers test and develop oxygen flow solutions for the astronauts' safe return.

1970-1990

Parker expands to offer a wide variety of motion and control products, with a series of industrial & aerospace acquisitions. The commercial aerospace industry booms. 1980 sales reach \$1 billion.

1990-present

Parker grows to become more than 52,000 employees strong, with more than 300 sites around the globe and a modern world headquarters in Cleveland, Ohio. With annual sales exceeding \$10 billion, Parker Hannifin is today the world's leading diversified manufacturer of motion and control technologies and systems.

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