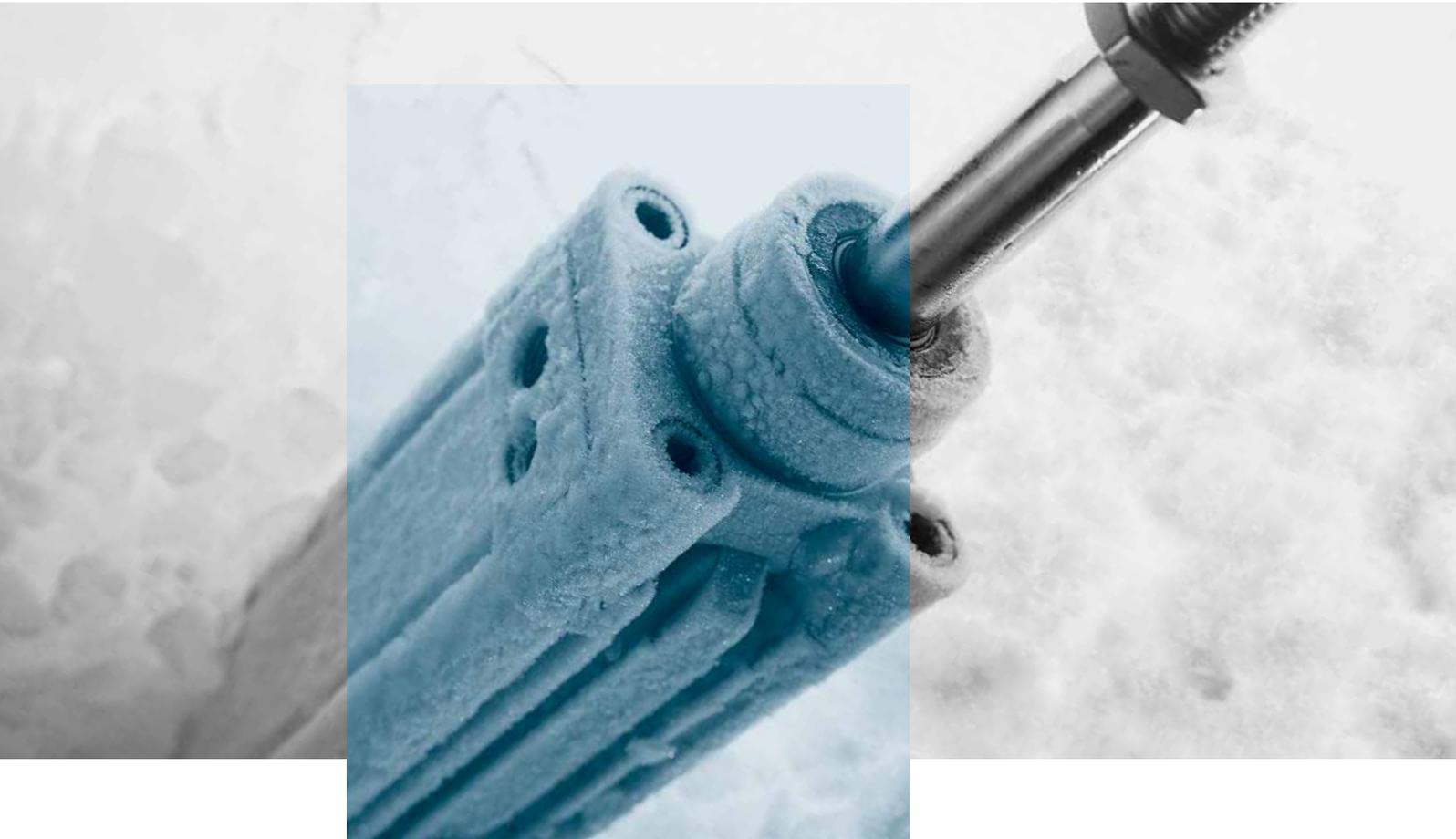


# Special Applications Guide

**FESTO**



Partner for customised solutions

# Finding the right solution together...



**Customised solutions**

04



Special designs



**Product development**

06



In dialogue with the customer



From discussion to prototype



Reliability twice over: The pilot series



The launch - series production



**Sustainability**

14



High availability-strategy



Overall costs - always in mind



**Services**

18



Throughout the value chain



**... to increase the productivity of our customers!**

Because increased productivity is created wherever processes and efficiency are cumulatively simplified and/or accelerated.

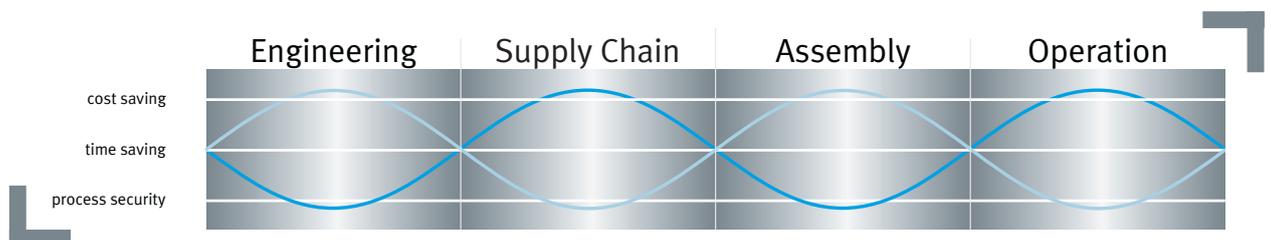
The highly productive concept of “customer connectors” is based on one of the most important assets of Festo, our know-how surrounding the value chain of the customer.

This involves systematically and worldwide integrated sophisticated product strategies and numerous services throughout your value chain combined with an international strategy of high availability.

One important component part of these sophisticated product strategies is the development and production of customised special designs. Festo creates efficient and cost effective special designs based on the highest standards in line with a tradition going back over several decades

and in an ongoing dialogue with our customers – wherever the more than 20,000 standard components from our catalogue portfolio do not meet specific customer requirements. At Festo technical innovations are not reproduced, we create them.

With one goal: Satisfied customers – today, tomorrow and in the future.



# Maximum functionality for every requirement



**Customised solutions**



**Product development**



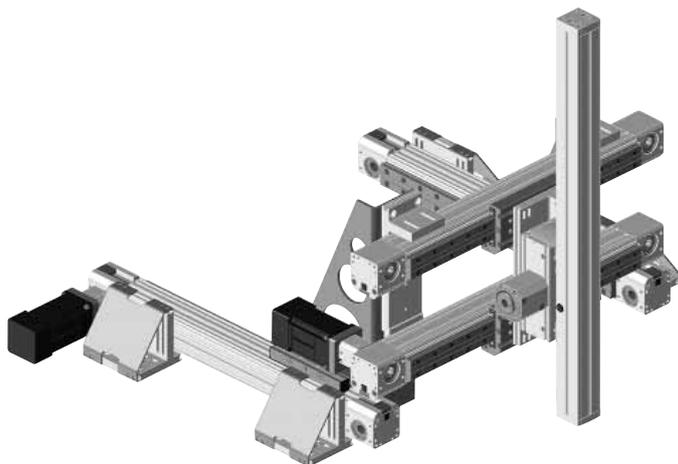
**Sustainability**



## **Standard practice**

In effect, all solutions from Festo are "customised", since all customers receive exactly what they require – be it standard components, systems or application-specific special designs. No matter what, the principle is always maximum functionality.

In order to meet this challenge, Festo has developed a sophisticated product strategy. More than 20,000 standard components from the catalogue cover a broad spectrum of applications and, in the sense of a modular system, are generally compatible.



## **With services to modular products and systems**

With the integration of services, Festo offers its customers the possibility of outsourcing a part of their production thereby enabling them to concentrate on their core competences. The benefit is time-saving solutions adapted to individual functions.

From a simple prepacked and pre-assembled solution to turn-key pneumatics, from integration technology in the form of machine components through to systems, Festo offers its customers ample opportunity to obtain ready to connect and highly individual catalogue products. Orders via one part number, one package and one contact person are an additional benefit as regards logistics. Naturally all with tested quality.



Services



**More than catalogue solutions – special applications**

Individuality through and through with application-optimised solutions to customer-specific products with individual requirements regarding function and size. Available in two variants, depending on requirement:

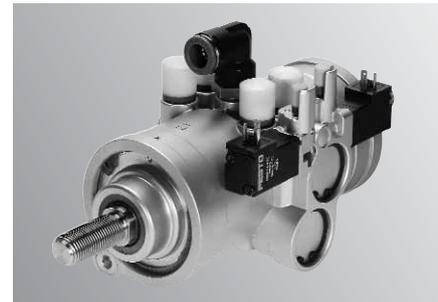
Sometimes minor modifications are all that's needed to enable the application-specific use of a component. In other cases, completely new designs are required, which are tailored precisely to the specific requirements of an application; irrespective of whether it is a matter of modified dimensions, harsh ambient conditions or the optimisation of technical data to increase response times.

Once planned, always available again – wherever possible Festo makes use of synergy effects for serial development and production and integrate application-optimised solutions into close-to-standard production. Often, highly specific solutions are therefore available in next to no time.

Small, highly qualified project groups ensure that efficient solutions remain cost effective. At the same time, you can avail yourself of the knowledge pool of a major, globally active company, since the know-how of more than 11,000 employees can be called upon at the click of a mouse.



Cylinder-valve combination in diecast aluminium



Optimised cylinder in Polymer with integrated mountings and air connection



Round cylinder with special piston rod and end cap



# Design in creative dialogue with the customer



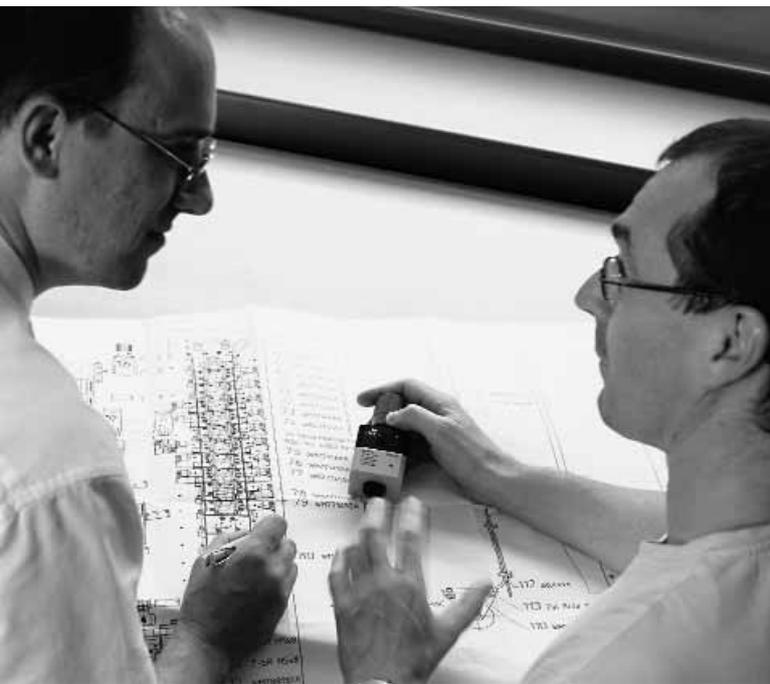
Customised solutions



Product development



Sustainability



## Ongoing dialogue ...

... is a prerequisite for success – particularly in the area of special designs. Only in this way, when each party contributes its specific know-how, can the optimal solution be reached. This is why Festo's specialists place great emphasis on dialogue from the outset when customers search for a solution.

Agreement throughout the entire design process and beyond ensures that the design accurately meets the requirements. Always in line with the motto "as functional as required, as cost effective as possible" or ideally even better than originally envisaged and that at the same price.

With years of experience our engineers often know even after the initial discussion whether a minor modification is sufficient to meet the requirements of a particular application, for instance with regard to temperature, or whether a major modification or in the last instance a new design is necessary. This establishes the initial prerequisites for a special design: the project acceptance and definition of a product specification.



Services



Application  
from actual practice



#### The quicker way to success

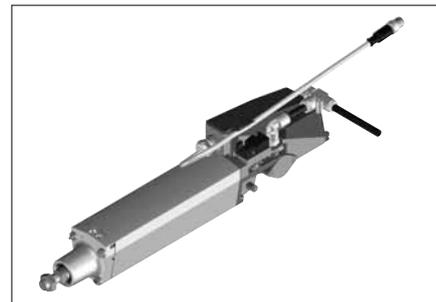
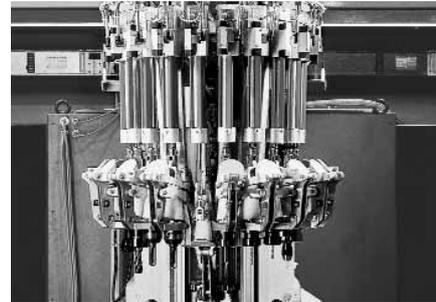
In the case of machine tools, tool change plays a crucial role in respect of performance and as such the cost effectiveness of a machine. As part of a joint development project between a machine manufacturer and Festo, an optimised cylinder/valve combination was developed for this particular application. This resulted in a solution which enables a tool change in less than 1s. Furthermore, this special solution is particularly suitable for use with cooling/lubricating agents, chips and swarf.



Quicker tool change



The solution:  
the integration cylinder



# From discussion to prototype



Customised solutions



Product development



Sustainability



## Experience and know-how matter

Festo design documentation is drawn up on the basis of many years' experience, knowledge and command of every technology and manufacturing process and with the help of data bases and value analyses. Ultimately, Festo prototype construction means putting theory into practice. The latest production processes such as rapid prototyping and 5-axis NC-machining are used to create prototypes.

Product development not only entails application-specific basic research, simulation, for instance with regard to flow and calculation, but also the vast know-how from standard product design. This knowledge transfer ensures the high standard of an application-specific solution.



Services



Application  
from actual practice



**Optimised high performance spinning machines**

The textile industry involves high value, low cost production in large volumes. A leading textile machinery manufacturer therefore wanted to optimise his high performance spinning machines.

Consequently, the previously manually operated slide for thread handling should be automated in order to markedly reduce personnel, production and maintenance costs and largely eliminate potential error sources. For this application – to move a synthetic fibre over a distance of 3.5 m – standard components were overdimensioned.

Festo's specialists develop exactly the right component in the form of a special-application variant of a rodless drive with an integrated valve. The jointly-conducted development process drew on the partners' know-how of textile-machinery construction and pneumatics respectively.

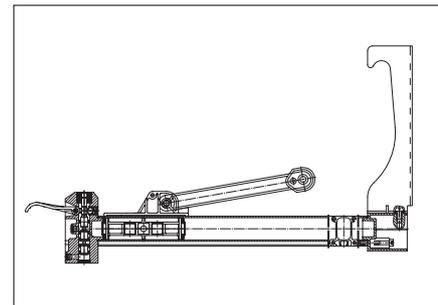
On either side of the 25 m long machine are rows of 216 rodless drives. These allow up to 1200 m of thread to be spun every minute. The synergy effects of the fusion of know-how of textile-machinery construction and pneumatics result in considerably greater benefits compared with normal industry solutions – easier operation, higher productivity and greater cost-effectiveness.



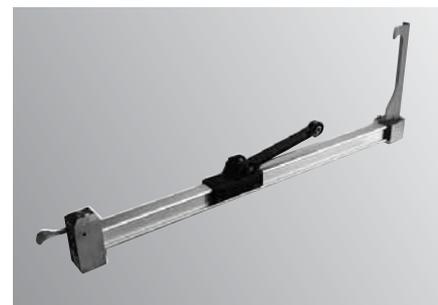
+ High performance spinning machine



+ Special design...



+ ...of a rodless drive



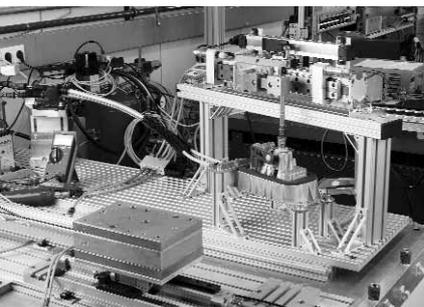
# Reliability twice over – the pilot series



+

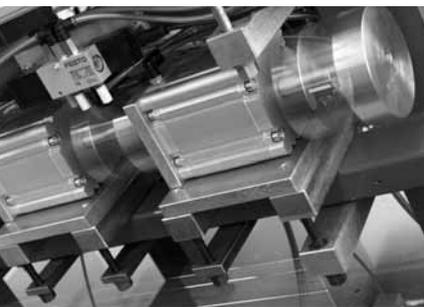
+

--- CAT measurement



+

--- Test laboratory



+

--- measuring technology



**Product development**

## Testing for long life

After the prototypes comes the pilot series which, in the interests of the customer, is dealt with rather robustly at Festo. Functionality comes first, especially where harsh environmental conditions have to be considered.

Hence extensive CAT measurements ensure that the specification required by the customer is met:

- Measurement of all relevant physical sizes
- Qualification of test specimens
- Testing for environmental sustainability
- Microscopic testing

**Sustainability**

In order to eliminate weak areas, specific long-term testing is carried out in endurance-testing chambers, internally also known colloquially as “torture chambers”:

- Fast motion tests
- Corrosion tests
- Wear tests

This is what we understand by Festo quality, because only once the special designs have passed the torture chamber tests and meet the data required in the product specification do they move on to series production.



## Services



### Special designs for the food and packaging industry

Cylinders for low temperatures developed on behalf of a frozen foods manufacturer, which operate reliably even in arctic conditions of as low as  $-40^{\circ}\text{C}$ . These required minor modifications on the piston rod seal, wiper seal, cushioning and the use of cold resistant grease. SM-... series cylinder switches keep up with these requirements down to  $-30^{\circ}\text{C}$ .

The high-pressure valve manifold was developed for a manufacturer of PET bottles. The main requirements were process reliability, flexibility, fast cycle times, reproducibility and high performance fore-blowing, final blowing and venting. Maximum quality yet minimal size was another central requirement by the customer.

Suitable for pressures of up to 40 bar, the high-pressure valve manifold stands out not only because of its excellent reproducibility of  $\pm 2$  ms, a basic prerequisite for precision mould blowing. Extremely compact dimensions thanks to the integration of valve functions into a monoblock and the modular design of compact valve manifolds save space and permit compact bottle production systems.

Festo quality is manifest in the extremely high service life of more than 30 million operating cycles and only two maintenance intervals. With the high-pressure valve manifold, the PET bottle industry has a decidedly more cost effective alternative-at its disposal compared to existing valves and valve manifolds.



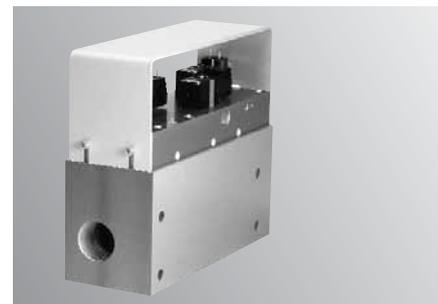
## Application from actual practice



--- Cylinders for low temperatures



--- High-pressure valve manifold



# The launch – series production



Customised solutions



Product development



Sustainability



## Joint development – mutual success

Once this stage and testing have been successfully completed, special design moves on to production. The production technology is selected depending on the number of units required, followed by the specialised series production in autonomous performance units.

Here the rule of “once planned, always available again” applies. Wherever possible we make use of the synergy effect between series development and production and integrate these application-optimised solutions into close-to-standard production. This means that highly specific solutions are often available again in next to no time.

Irrespective of the special production lot sizes required by the customer, here again the advantages of a globally active company with the corresponding production know-how extend across the entire control chain – cost savings included. Take the example of a cylinder housing made of plastic where the mounting elements are already integrated.



Services



Application  
from actual practice



**Survival specialist –  
the crust-breaker cylinder**

Developed especially for the aluminium producing industry, the crust-breaker cylinder is an example of the metamorphosis of a standard component into a cylinder for highly specialised applications. As a continually further developed classic from Festo, it has been preventing the forming of crusts in aluminium smelters since 1976.

Extreme requirements in terms of transverse loads and temperatures are involved in this smelting process. The crust-breaker cylinder in Festo quality has an extremely long service life and generally lasts for more than 5 years even when subject to high transverse loads. Sturdy technology and harmonised components form the basis for this length of service life.

The cylinder is able to withstand temperatures of as much as 250°C without complaining. It owes its ability to survive such extreme temperatures to features such as heat-resistant seals made of fluoro rubber and PTFE, hard but elastic wipers, special bearings and a piston-rod guide designed for 100% dry running.



Crust-breaker  
cylinder



Proven in the hars-  
hest environments



# Built-in sustainability



Customised solutions



Product development



Sustainability



## Always in mind – the complete product life cycle

We feel responsible for our developments, not only in terms of the best possible development for maximum functionality, but also in terms of availability, supply capability or replacement parts and even as far as obsolescence is concerned. In other words, Festo sees through the complete product life cycle from beginning to end.

This is because availability and services are equally as important as the development and production of application oriented solutions. Festo's high availability strategy is the result of a complex integration of sales, production, quality management and logistics and is designed to ensure the right product is in the right place at the right time.

In essence this begins for example with the agreement of target figures and delivery to customer requirement; be it using integrated packaging concepts such as re-usable packaging, delivery according to Kanban or just-in-time and continues with easier procurement, say via just one contact person or one part number, right through to the operating phase, whereby a customer can make use of Festo services. For Festo this means that only by taking into consideration the entire range of processes is it possible to be a real partner.



Services



Application  
from actual practice



**Pin-point positioning in the car industry – Euro-X welding tongs**

The ever growing requirements in spot-welding led to the development of a special pneumatic mechanism in Euro-X welding tongs for the car industry. Factors such as utmost repetition accuracy to set welding points needed to be considered as well maximum welding tong flexibility to ensure the different workpiece sizes can be efficiently welded in one operation. Depending on the position of the robot and the welding tong, it is also possible to change the weight ratios of a workpiece.

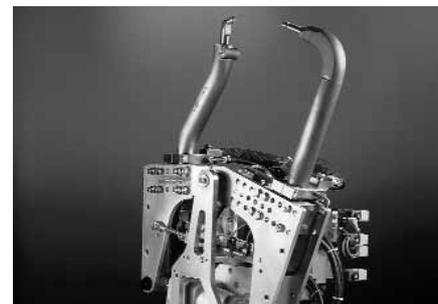
This is why the components of this solution consist virtually entirely of special designs – from drive cylinders and control block through to the regulator blocks. To gain time, the welding tong merely opens around the smaller working stroke and fully opens whenever obstacles are to be bypassed. At the same time, the compensating cylinder, actuated by the regulator block, compensates the weight of the electrodes in the working stroke in order to correct any deviations in robot position or welding sheet metal. Furthermore, the compensating cylinder can be pressurised using different pressures in order to balance out different weight ratios.



+ --- Drive cylinder for...



+ --- ...Euro-X welding tong



# Always in mind – the sum total, because the overall costs count



Customised  
solutions



Product development



Sustainability



## **In other words – cost effective maximum productivity**

Those who keep an eye on the overall costs of their systems, not only reckon with the actual purchasing and development costs, but also consider the much bigger picture, including maintenance, repairs and the operation of a system. Tailor-made and developed beyond the standard, these neither perform beyond or below requirements, but are tuned for maximum productivity. Consequently, these products are often more cost effective than over or under dimensioned standard products.

With Festo, the integration of innovation, product range, production quality and services enables you to reduce costs such as in the case of complex machine architectures, where special designs and standard products ideally complement one another. The basis for this at Festo is the high standard maintained equally in standard production throughout the entire value creation process.



Services



Application  
from actual practice



#### Clean – with cleanroom pneumatics

Cleanroom compatible pneumatic products from Festo only constitute special designs to a lesser extent, since the standard product portfolio from Festo is largely cleanroom compatible up to cleanroom class 4, in accordance with the defined quality concept. With one limitation: Although Festo products to cleanroom class 4 are not in stock, they are nevertheless available for delivery to the customer in the shortest possible time. The maxim is "as-close-to standard as possible and as individual as necessary".

If it is a matter of complying up to class 1, in accordance with the most stringent standardised criteria of VDI guideline 2083, Sheet 8, then products are manufactured according to the customer's special requirements. A specially created competence centre for cleanroom technology at Festo Singapore offers the necessary infrastructure for the production of cleanroom pneumatics.

In a nutshell, this product strategy saves money, because where others resort to special designs, Festo in many cases makes use of standard components. Maximum economic efficiency therefore in three variants, absolutely made for the semi-conductor, food and pharmaceutical industries, medical engineering, optics, microsystem technology and environmental technology.



+--- Cleanroom compatible...



+--- ...pneumatic products



# Our goal – winning together



Customised solutions



Product development



Sustainability



**When technology and efficiency join forces, the result is innovative new products.**

**When the customer is the focus of attention, tailor-made service goes without saying.**



**Your benefit: Services & Products**

Festo services are not just of interest for special applications, because a new dimension in service quality generates the maximum possible benefit for our customers in general. Services developed with your value creation structures in mind so that you can be certain that wherever you use Festo products in your value chain, whether in engineering, the supply chain, assembly and commissioning or operation – Festo has tailored its services for a precise match.

Throughout this Festo always keeps in mind the total cost of ownership philosophy. Plus we are never far away, with more than 250 regional offices and 53 fully owned companies to ensure your competitive edge in 176 countries with personalised and competent advice and over 1000 project advisors and technical consultants. Why not capitalise on the benefits of 24 hours a day service at [www.festo.com](http://www.festo.com) – the “electronic” consultant with catalogue and selection tools.

