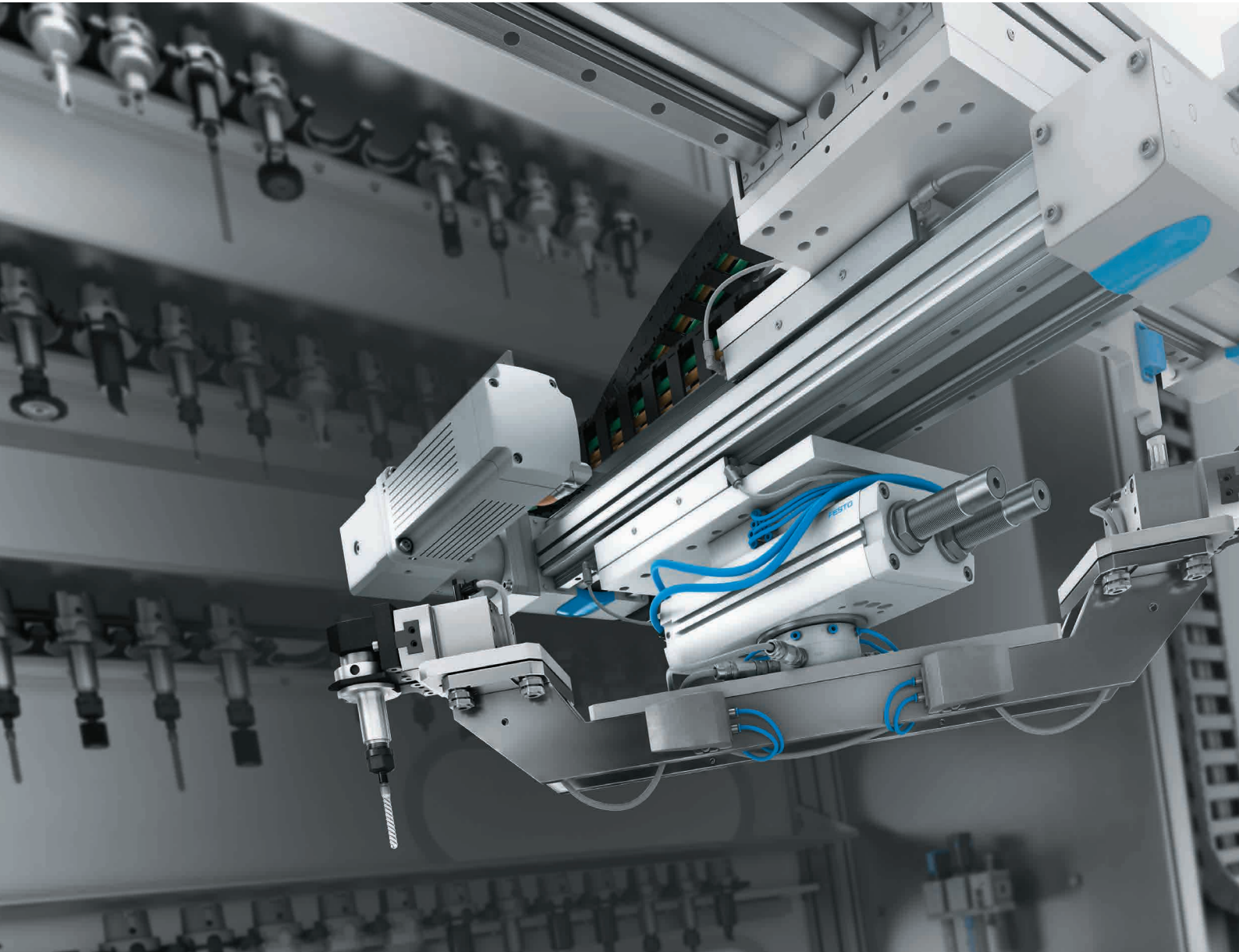


Machine tool industry

FESTO



The wide range of application areas for machine tools requires a very high level of flexibility, customer orientation and further technological development. Automation, system efficiency, high productivity, retooling flexibility and, last but not least, digitalisation require tailor-made concepts and solutions. Festo considers itself to be a technology partner in this process. We can develop the best solutions together with you, thanks to our wide product portfolio and a high level of problem-solving expertise.



You want shorter chip-to-chip time.
You need maximum precision.
We are your pathway to more productive machines.

→ WE ARE THE ENGINEERS OF PRODUCTIVITY.

Machines for maximum productivity

Top speed and maximum precision are the main requirements for machine tools. They are crucial when it comes to complete processes with all steps in one machine as well as 6-sided processing of parts with few clamping operations.

Other features demanded by machine tool users these days are very short chip-to-chip times for maximum system efficiency, integrated parallel processes like tool magazines or loading and unloading, and high machine availability.

As an established partner in many industry segments like the automotive and tier 1 supplier industry, Festo can also provide cross-technology solutions combining pneumatics, electrics and mechatronics for your applications. And always using the technology that is most suitable.

Know what will help you advance.

Find out more about what will put you on the road to success with Festo at → www.festo.com/machinetools

“At DMG MORI, we appreciate in particular how intensively the Festo automation experts were involved in the joint developments in order to help shape Industry 4.0 and digitalisation in the machine tools sector.”

Christian Thönes,
Chairman of the Management Board at DMG MORI AKTIENGESELLSCHAFT.



Solutions developed in partnership

We will always be happy to discuss your requirements with you right from the beginning since that is the only way to create a solution that fits your machine concept. You can benefit from rapid prototyping as well as from the finite element method (FEM) or simulations and analysis. Our experts pay special attention to a high level of modularity and open interfaces for all common CNC machinery. We prefer the simplest possible concepts based on standard products or system solutions. But we also use industry segment-specific and customised solutions where necessary.

The benefits to you at a glance

- **Concentrate on your core business:** save time and costs by using function modules and ready-to-install solutions.
- **Everything from a single source:** pneumatic, electric and process-related automation from Festo. You save time and resources.
- **A wide range of engineering and configuration tools** to accelerate the engineering phase and to avoid any possible engineering or selection errors.
- **Global presence:** Festo guarantees service and support all around the world
- **Digitalisation:** open interfaces enable all parameter data to be recorded and transmitted to a cloud.



Process optimisation along the entire value creation chain

From the engineering phase to commissioning the machine, Festo will help you to recognise the potential for optimisation and to implement suitable solutions. Irrespective of whether you want to concentrate on individual components or on the entire application, preventive maintenance and reliable production processes are a matter of course with intelligent products from Festo. All relevant product and production data is digitalised and securely transmitted to the Festo cloud, or into other cloud infrastructures. There, the data is visualised using dashboards, thus providing valuable information for data analysis and process optimisation.

Tool handling

Store and change the tools for your machine by integrating a ready-to-install handling system.

Counterbalancing cylinder

Shorter cycle times and a higher level of energy efficiency with counterbalancing cylinders for vertical movements.

Compressed air preparation

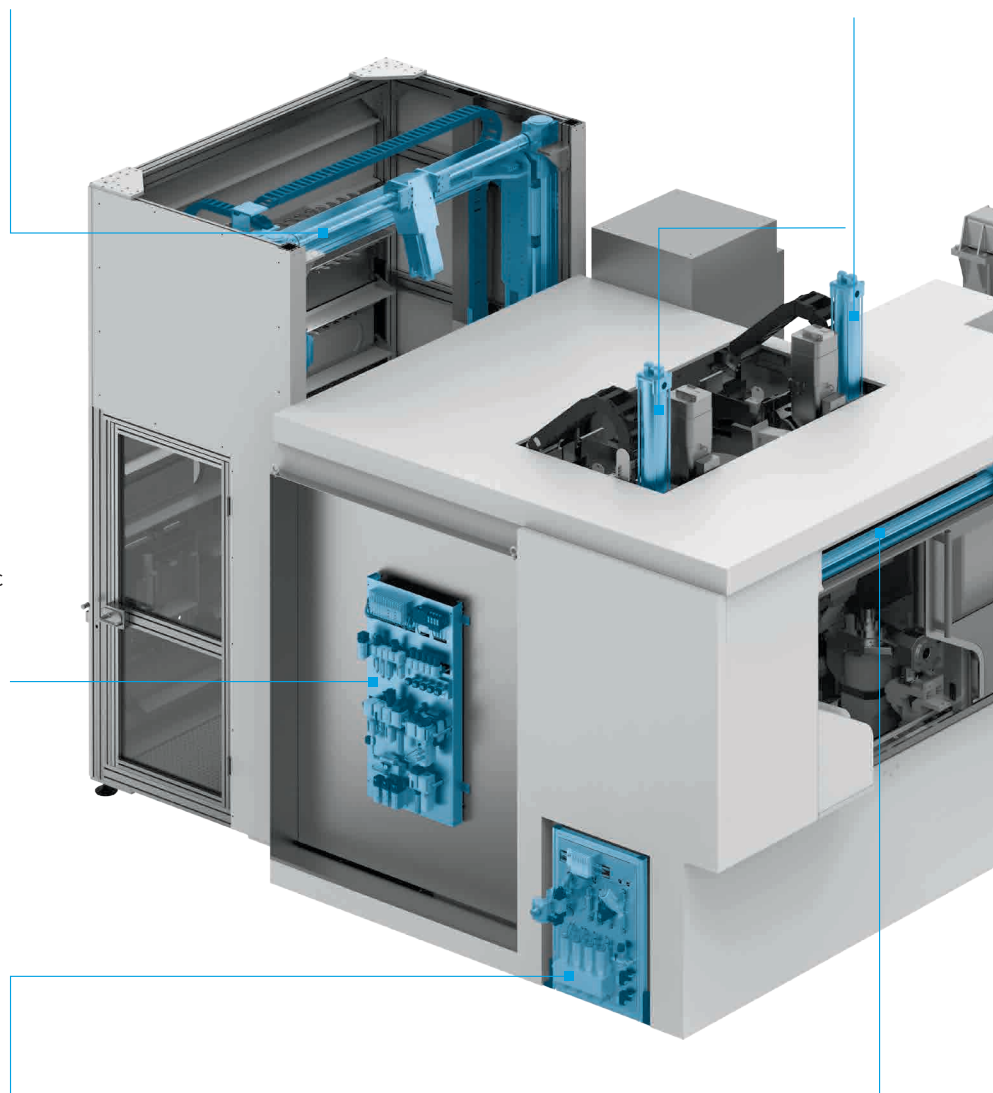
Reliable processes thanks to perfect compressed air preparation. The right components for every function. The standard air preparation for pneumatic drives, fine filters, ultra-fine filters and activated carbon filters for sealing air, flow sensors for monitoring consumption and energy saving.

Cooling and lubrication

Control and monitor the cooling and lubrication system of your machine by integrating our process valves or sensors.

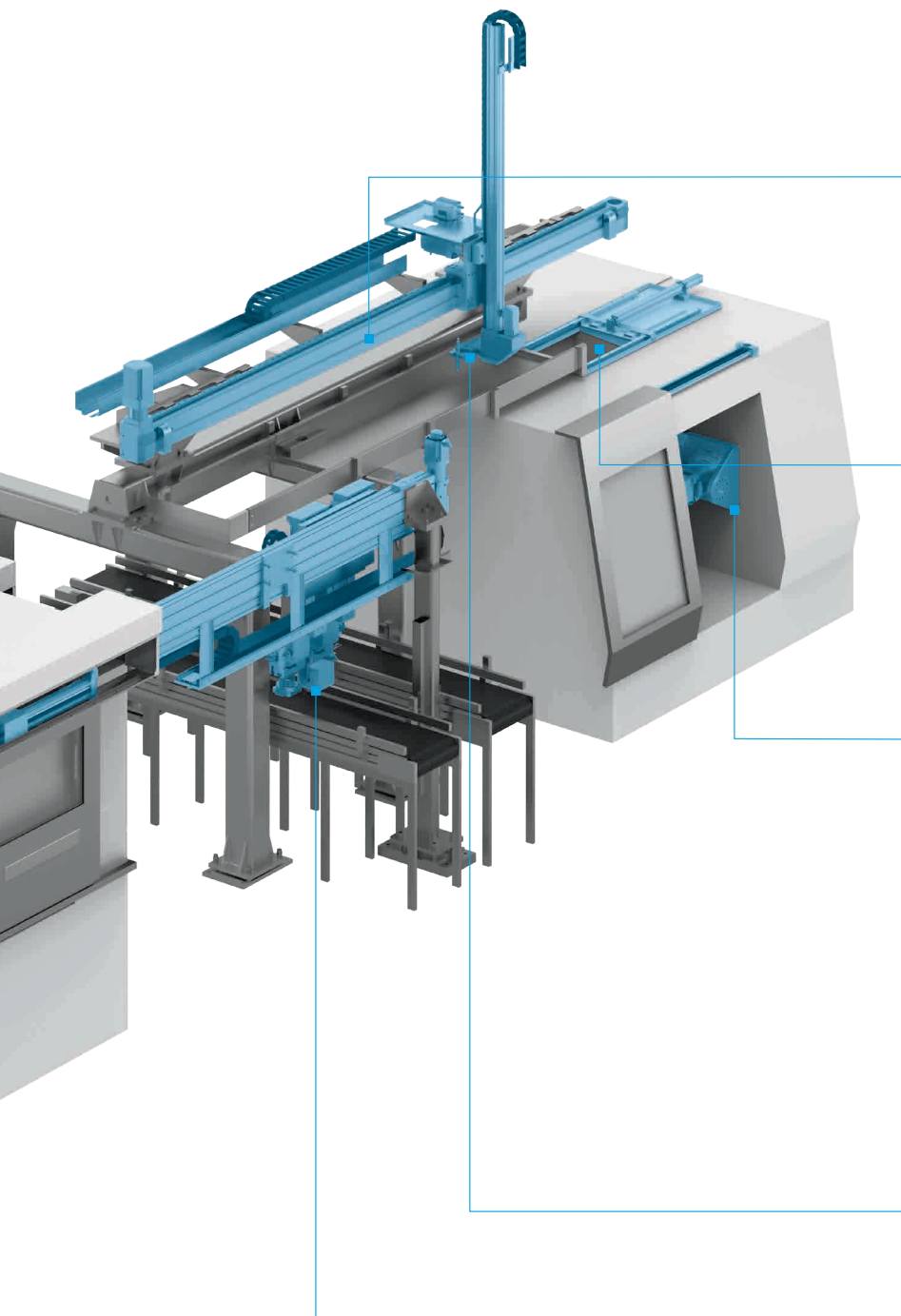
Door automation

Increase the performance with the shortest possible travel times for safety doors. Automation is carried out using electric or pneumatic drives depending on the requirements profile. Numerous safety functions that can be integrated make the movements safe (STO, SS1, SOS, SS2, SLS).



Securely transmitting data from Festo systems to the cloud

Monitor the energy consumption, any possible leaks, the service life of the components, the machine's standstill periods or any other relevant parameters. This data is available to you globally in a well-prepared and visualised overview via the Festo dashboard.



Loading and unloading the workpiece:

Increase the productivity of your machine by using our electric axes that have been specially developed for use in harsh conditions in machine tools.

Loading and unloading of workpieces

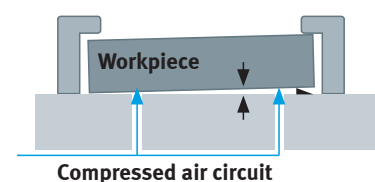
The right handling system for your machine. Available either as configurable, standard handling units from the catalogue, or as a customer-specific solution tailor-made to your requirements and installation conditions.

Hatch and flap automation

Increase the productivity of the machine with fast, vibration-free movements, optionally with pneumatic or electric drives.

Contact monitoring

Reliable and efficient production processes enable the throughput of large volumes at a high level of precision. To achieve this, both the workpiece and the tool must be accurately positioned. This is made possible by the positioning check.



Grippers

The gripper systems can be integrated quickly and easily into the handling system using standard interfaces. A wide range of suction grippers, pneumatic and electric grippers gives you the flexibility you need.

Compressed air preparation and valve technology to suit your preferences

Valve terminal VTUG

Compact design and high flow rate. Several pressure zones are possible. Cost-effective electrical connection via fieldbus or IO-Link®

IO-Link

Time control valve

Increases the energy efficiency of your system by switching off the air after a delay when it is no longer required

Fine filtration

A fine filter and micro filter with 1 and 0.01 µm and an activated carbon filter can, for example, supply technically oil-free compressed air as sealing air

Service unit components MS series

A ready-to-install module, configured according to your requirements. The numerous functions of the service unit component series MS are impressive, as are its compact design and the high flow rates

Pressure booster with switching valves

For controlling components that have to work with high pressures or forces, for example tensioning/clamping functions or safety brakes

Contact monitoring

Monitors the correct position of the workpiece and the tool before machining

IO-Link

Pressure regulating valve manifold

Supplies each function with the operating pressure required. Includes a digital pressure display and pressure monitoring

Intelligent, networked service unit component MSE6-E2M

Reduces and monitors the air consumption of the machine and automatically detects leaks

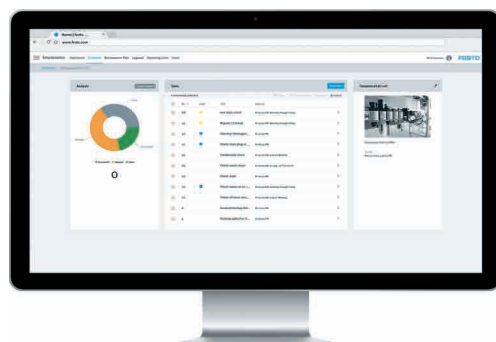
Lubrication unit

Supplies the relevant components and assembly units with lubricated air

Little effort, big effect

Suitable compressed air preparation will increase the service life of your machine tools and reduce the number of machine failures and standstill periods. With integrated monitoring functions, you will always know the status of the compressed air filter which will enable you to plan needs-based maintenance. One specific advantage is that, thanks to the high flow rates and compact dimensions of our service

units, you can select one that is one size smaller than normal. It can be configured for all common applications in line with ISO 8573-1:2010 such as for class (7:4:4) as well as for demanding applications that require extremely pure compressed air, e.g. class (1:4:1) for optical displacement encoders or class (1:2:1) for laser cutting systems.



Festo Dashboard

Connect Festo devices to the cloud via the CPX-IOT module and obtain an overview of both real-time and historical process measurement values.



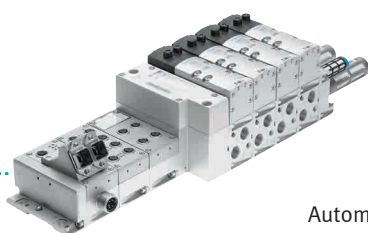
Festo IoT gateway
CPX-IOT



Energy efficiency and
monitoring device
MSE6-E2M



Automation platform and
valve terminal CPX-MPA



Automation platform and
valve terminal CPX-VSVA



Safety valve
MS...-SV-E, -D, -C

It has never been so easy to save energy!

MSE6-E2M automatically monitors and regulates the compressed air supply for your system. It actively switches off the supply air in standby mode, detects and reports leakages and can transmit these data to the cloud without any problems. The product is available with PROFINET (M12, RJ345 and SCR1), Ethernet/IP, Modbus® TCP/IP and EtherCAT and is now also available in the product versions MSE6-C2M and MSE6-D2M.

Maximum function integration with MPA-S and CPX

The combination of MPA-S with the automation platform CPX is the best solution for complex tasks. The platform has all commonly used fieldbus and Industrial Ethernet nodes, many electronic and technology modules, serial connection to multiplexes and a variety of diagnostics functions, even via the dashboard. In addition, it offers numerous other useful features such as proportional pressure regulation, manual pressure regulation, pressure monitoring and PROFIsafe.

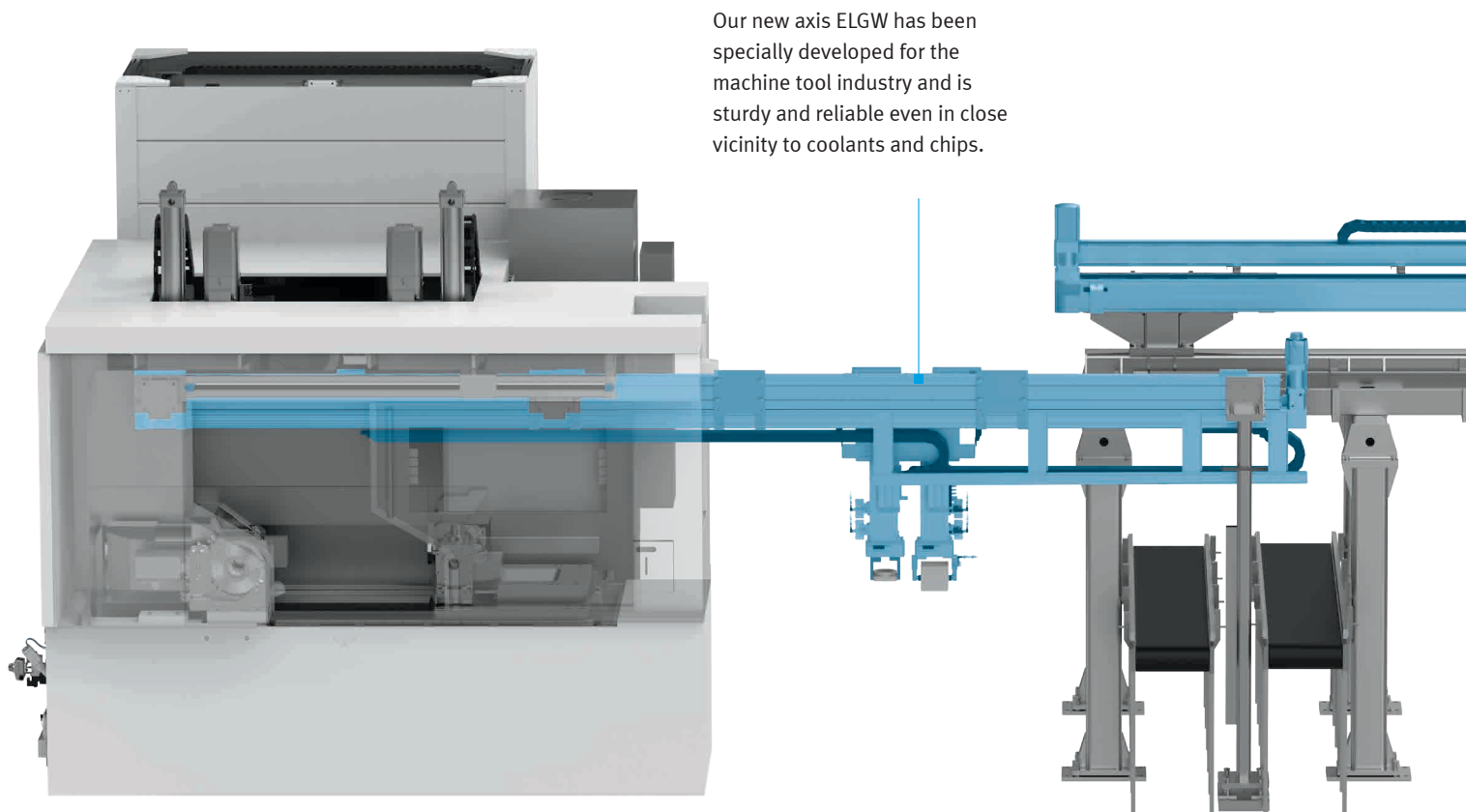
More communication and greater reliability with VTSA-F-CB

Now with serial and parallel communication, the VTSA series offers considerably more application options. The internal bus system has more than 96 valve addresses and up to four voltage zones, of which three can be disconnected safely. Furthermore, there are many new functions such as soft-start/quick exhaust, control air switching valves and vacuum generators that can be integrated in the platform.

Safety valve MS.../-SV... with a soft-start and quick exhaust function

PL e is achieved immediately with the MS6-SV-E without any additional, time-consuming programming. The solution has been approved by the Institute for Occupational Safety and Health of the German Social Accident Insurance (IFA) as per DIN EN ISO 13849-1 for the category 4 PL e. MS6-SV-D is ideally suited for manufacturers of series machines. In order to obtain a coverage up to PL e however, the safety PLC must be programmed accordingly.

Automating the loading and unloading systems of your machine across all levels



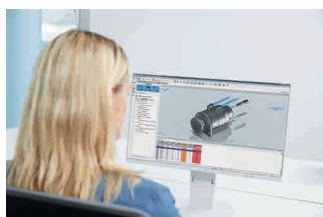
Our new axis ELGW has been specially developed for the machine tool industry and is sturdy and reliable even in close vicinity to coolants and chips.

Gain specific advantages

It has never been easier to automate the loading and unloading of machines than with our integrated digital approach. It provides you with a host of opportunities, from engineering to commissioning, to develop your applications. Complete automation solutions in various sizes and technologies are available to you at Festo, from mechanics to servo motors and controllers

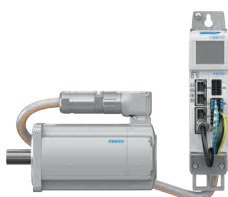
Based on actual practice for real applications

Additional scrapers, toothed belts made of different materials such as polyurethane, seals with specific chemical-resistant properties, protective bellows or sealing air will help you to adapt your machine to the ambient conditions.



Festo engineering software

Enables you to find the best axis and drive package with just a few clicks.

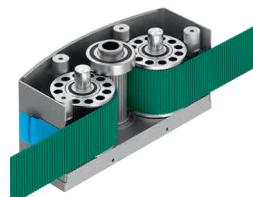


Festo drive package

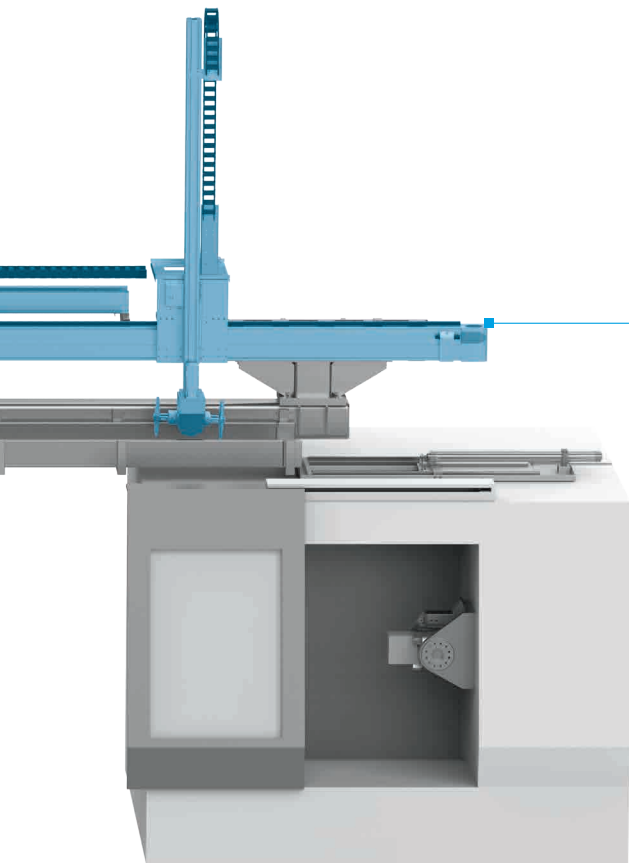
Consisting of the drive CMMT and servo motor EMMT



Protective bellows



Toothed belts made from different materials



Our new generation of axes will inspire innovative ideas

- You can combine electric and pneumatic products to get the most efficient and cost-effective solution for your loading and unloading tasks.
- Using our modules, you can design a complete handling system easily and cost-effectively. This will save you development time which will be beneficial for your core business.
- Make the most of different technologies (toothed belt, spindle or rack and pinion axis) and various stroke lengths (up to 10 metres for the horizontal axis and 2.5 metres for the vertical axis).
- By using the best materials for belts or seals, you will obtain a sturdy and reliable system that is optimally suited for the ambient conditions of your application.

Standard handling systems for top-loading applications can be designed with just a few clicks using the Festo Handling Guide Online (HGO). You can find more information on page 27.



For the vertical axis:

- Take advantage of electric or pneumatic solutions – with toothed belts, spindle or rack and pinion technology.
- Move up to 200 kg with high dynamic response and precision thanks to the stainless steel profile of the EMMH axis.
- Configure your axis so that it has a clamping unit on the guide or a pneumatic locking unit that prevents objects from falling during an emergency stop, power failure or maintenance work.



EMMH



ELCC



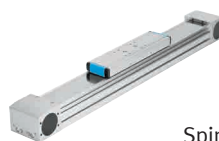
DGSL/EGSL

For horizontal axes:

- Take advantage of the comprehensive range of sturdy axes with single or twin guide (EGC/EGC-HD) or covered guide (ELGA).
- Improve the reliability of your system under harsh conditions by using additional scrapers, polyurethane belts and a central lubrication kit.
- Define a cost-effective solution with a combination of electrics and pneumatics.



Spindle/toothed belt axis EGC-HD



Spindle/toothed belt axis ELGA



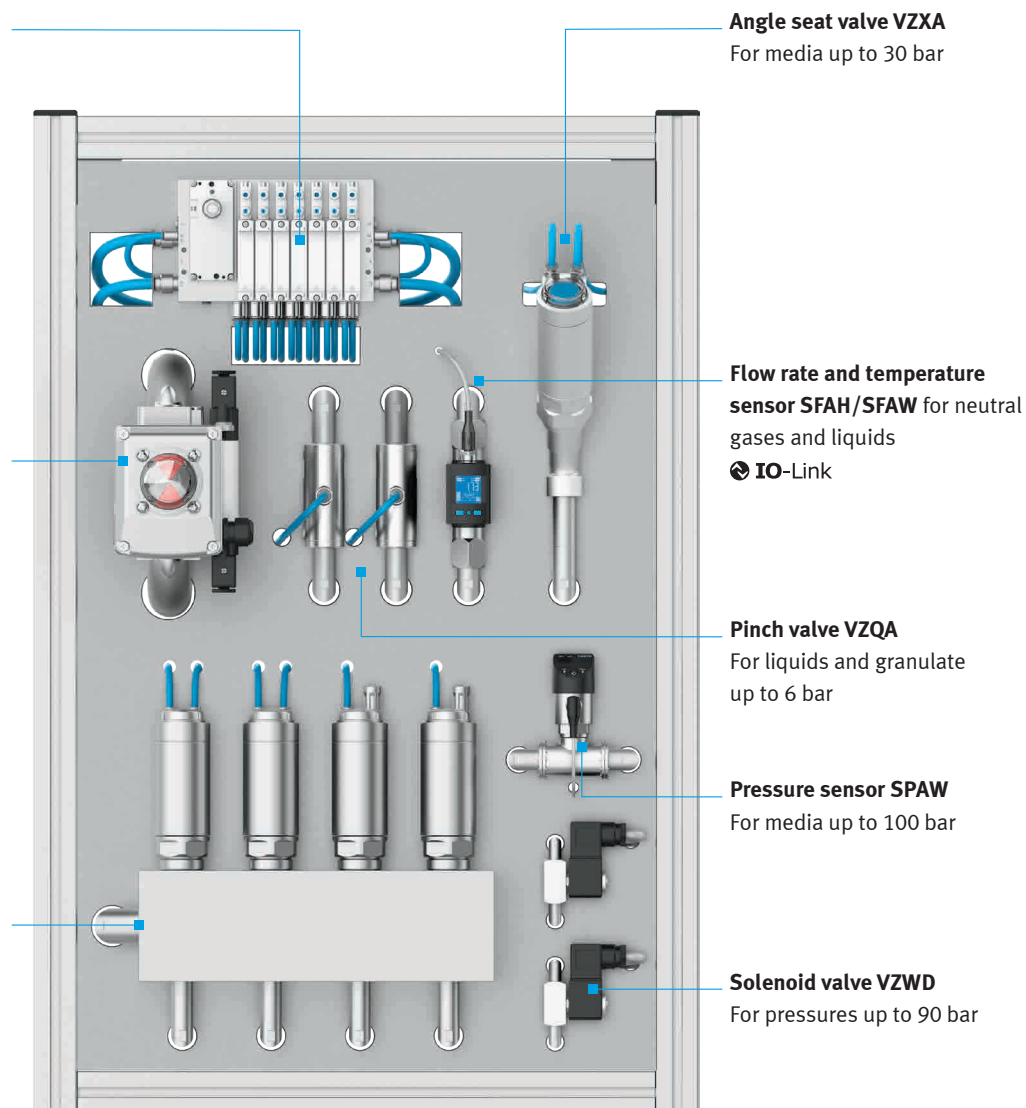
Linear drive DGC/DGC-HD

Cleverly controlling cooling, lubrication and cleaning circuits

Compact valve terminal
VTUG controlled via IO-Link®
or fieldbus systems
🔗 **IO-Link**

Pneumatically actuated **ball valve KVZB** with sensor box

Distributor with integrated
angle seat valves DFPK in a
compact, individual design.



Angle seat valve VZXA
For media up to 30 bar

**Flow rate and temperature
sensor SFAH/SFAW** for neutral
gases and liquids
🔗 **IO-Link**

Pinch valve VZQA
For liquids and granulate
up to 6 bar

Pressure sensor SPAW
For media up to 100 bar

Solenoid valve VZWD
For pressures up to 90 bar

Media valves and automation technology from one source

Process valves from Festo are your first choice when handling coolants and lubricants. By combining both technologies, you will be able to act globally as well as more quickly, easily and cost-effectively

One interface is all you need for ordering as well as invoicing and logistics processes.



Online configurator for process valves

You can find the right solution in record time with the configurator for process valve units. Because product search, configuration, sizing, documentation, ordering and delivery, whether for manually actuated or fully automatic valves, can be carried out with just one tool. It includes a system ID for quick and precise reordering with correctly configured CAD data. The butterfly valves KVZA and KVZB will open up a new era of configuration for you.

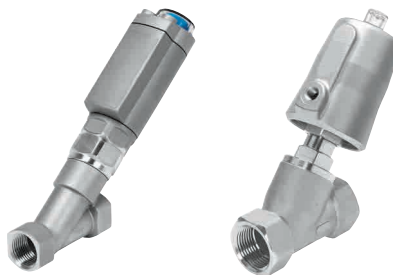
Pinch valves for low pressure applications

- Available in two versions: normally open for up to 4 bar and normally closed for up to 6 bar
- Optimal media flow thanks to the large Kv of the valve, suitable for cooling using water jets and lubrication.
- With internal diaphragms of NBR, EPDM or silicone for maximum media compatibility.



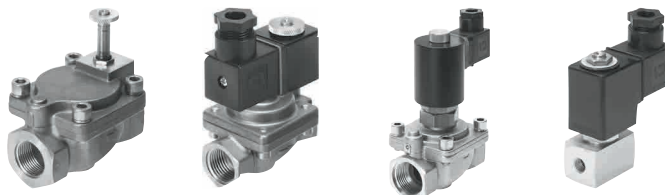
Sturdy and flexible angle seat valves

- Sturdy when used with media that may also contain residual metal particles
- The valve principle for high switching frequencies that don't affect the service life
- The actuator is effortless to replace without opening the pipe and internal seal
- Available in different sizes and materials: stainless steel, brass or polymer

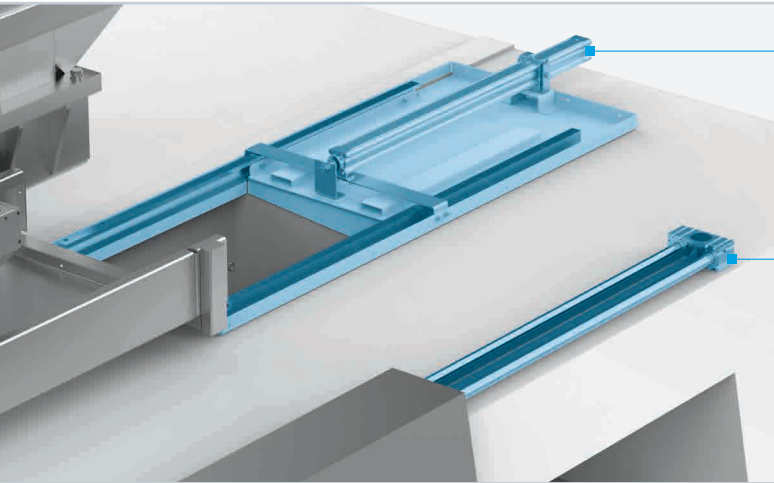


Solenoid valves compatible with oil and cutting emulsions

- Available with NBR or FKM seals
- Pressure up to 90 bar
- VZW and VZW switch without differential pressure



Perfectly automated doors – electric and pneumatic



Automation with pneumatic cylinders

DSBC or electric cylinder ESBF

Automation package for safety doors

(single or double leaf)

Numerous combination options according to your needs



Toothed belt axis ELGR/ELGG



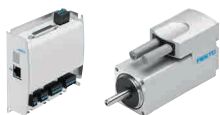
Electric cylinder ESBF



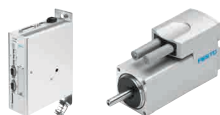
Linear guide axis EGC



Toothed belt axis ELGA



Controller CMMO-ST and
stepper motor EMMS-ST



Controller CMMS-ST and
stepper motor EMMS-ST



Servo drive CMMT-AS and
motor controller EMMT



Servo drive CMMP-AS* and
motor controller EMME/S

*Safety: CAMC-G-S3 (optional)

With our **large product portfolio**, we are able to supply you with all the components that you need to automate your machine's **doors/hatches/flaps**. You can find sturdy toothed belts, gear racks and spindle drives with individual or double slides and electric cylinders in our product range. Our drive package ranges from simple and cost-

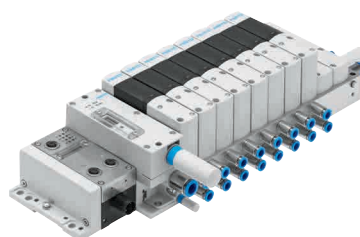
effective servo-lite technology (for moderate requirements) to brushless technology with integrated extended safety functions (**STO, SS1, SOS, SS2, SLS** up to **cat. 3** and **PL d**, in line with the requirements for safety doors).



Automation package for safety doors
(door supported by robust ball bearing axis)

Maximum flexibility with the Festo Motion Terminal

- Reduce the cycle time and vibrations via the self-adjusting feature of the Motion App “Soft Stop”.
- Maximise the energy efficiency of your machine with the Motion App “Eco Drive”.
- Use the valves of the Motion Terminal to automate different parts of the machine.
- Take advantage of a high level of flexibility.
- Gain time for regulation and optimisation, from initial commissioning and right through the entire product lifecycle of the machine



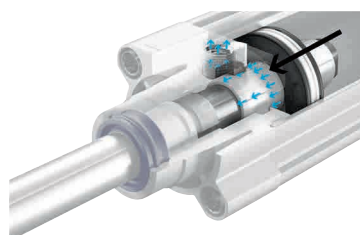
Automation with the integrated drive EMCA

- You can rely on the solution being very compact. It combines power electronics and control electronics in the motor housing.
- Be able to communicate flexibly via numerous digital I/O or fieldbus interfaces such as CANopen, Ethernet/IP, EtherCAT and PROFINET.
- Choose between degree of protection IP54 or IP65, for both the housing and the connections.
- Save both time and money with ready-to-use connecting plates for our electric linear drive.

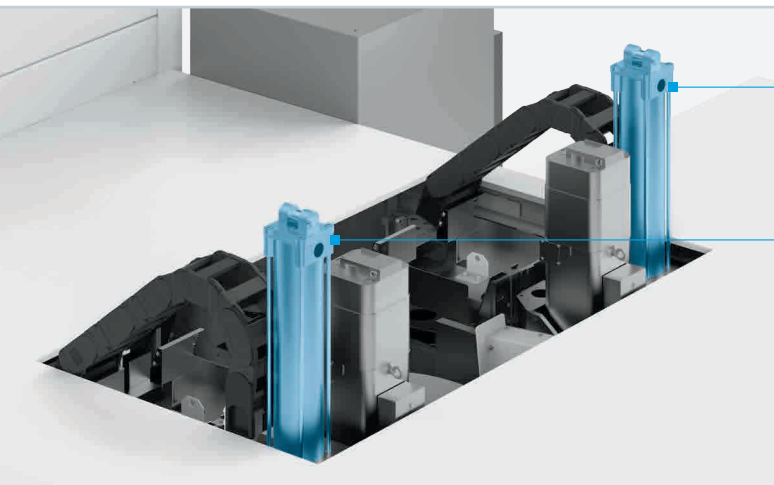


Self-adjusting end-position cushioning PPS

- The pneumatic cushioning allows the air to escape via longitudinal slots and also enables dynamic and smooth movements into the end position under different loads.
- With PPS, you can save valuable adjustment time when automating doors that are not easy to access, and you will achieve a vibration-free solution.



Balancer applications for vertical movements



Counterbalancing cylinder



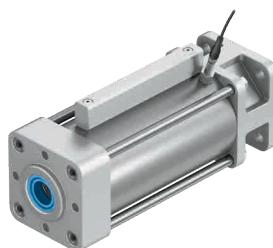
Counterbalancing cylinders

- To counterbalance the weight forces for vertical axes
- Enables higher speeds and acceleration
- Optionally with safety brake



Proportional-pressure regulators

- The VPPM can be controlled with IO-Link® and ensures flexibility for differing masses.
- Available in three sizes and different pressure ranges



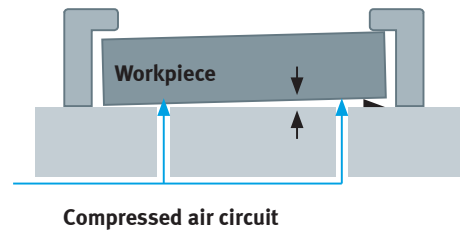
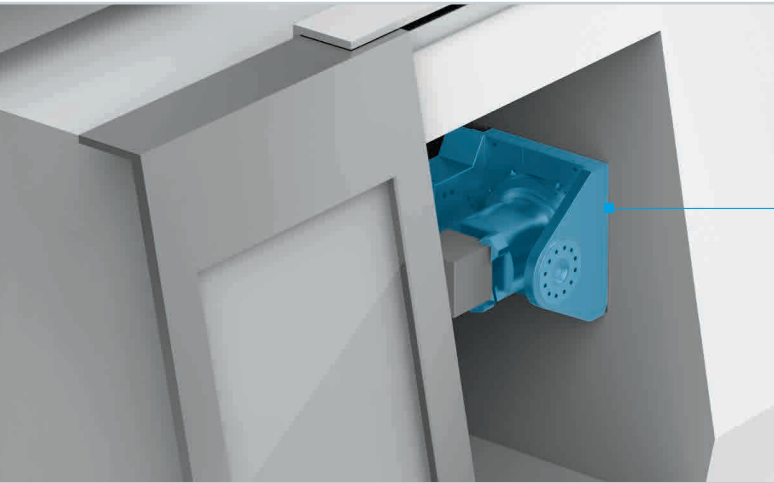
Safety brake DACS

- Pneumatically released holding brake that is clamped with spring force for use in safety-relevant applications.
- Static holding and dynamic emergency stop function with optional sensor.
- The safety brake can be used in controllers up to PL c/category 1 to EN ISO 13849-1.

Pneumatic weight force compensation

Combine the vertical drive train with a pneumatic counterbalancing cylinder to create a high-performance and energy-efficient hybrid system. The effect is a higher dynamic response, lower operating costs and considerably less wear of the module. The counterbalancing cylinders can be delivered with larger or double supply ports, lubrication systems and safety brakes.

Checking workpieces are correctly clamped



Make your process safe and reliable by monitoring workpiece clamping:

- Make the process in automated machines safe by monitoring the correct positioning of your workpiece.
- Teach in the threshold value with one click on the sensor.
- Take advantage of secure data transfer and flexible parameterisation during operation with the IO-Link® interface. The threshold value can be assigned to the workpiece with great flexibility in the CNC program.
- Reduce measurement errors with the cleaning air pulse function. Blow high-pressure air out through the nozzle to keep the measurement channel clean of liquids or interfering particles.



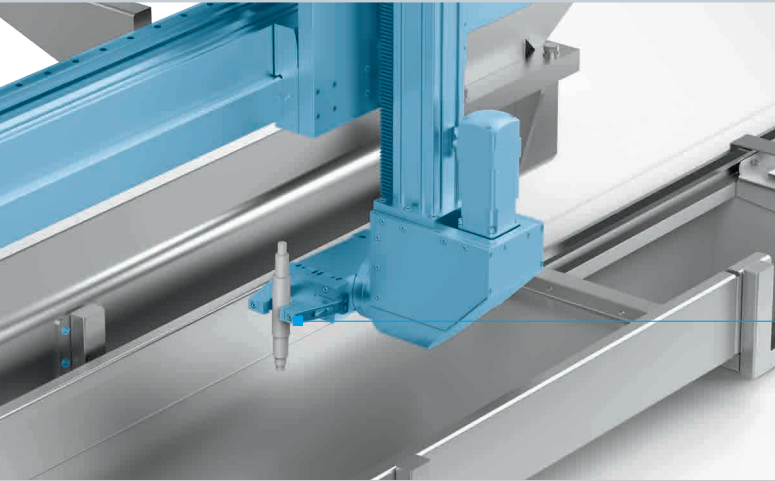
Air gap sensor SOPA
IO-Link

Process safety is extremely important

Every time raw material is clamped in the machine, contamination or splinters could prevent it from being correctly positioned or aligned. Our SOPA sensors will prevent such errors. They record the correct positioning of a workpiece on the reference table with a resolution of 2.5 µm and in a wide range from 10 to 200 micrometres. They operate

according to a pneumatic principle and only require a nozzle with a diameter of 1 mm to 2 mm on the reference table. If this is contaminated, a high-pressure air impulse will be triggered to release the measurement channel again.

Clamping and gripping workpieces



Sturdy, sealed gripper HGPT with NBR seals



Highly flexible grippers that can be integrated

- Sturdy, sealed gripper HGPD and HGDD with two or three fingers – compact and available in several different sizes.
- Fully encapsulated gripper kinematics for use in extremely harsh ambient conditions



Bernoulli gripper OGGB

- In the event of oil mist and particles in the loading and unloading system, it is recommended to use a vacuum generator based on the Bernoulli principle.
- It can be integrated in the tool holder for direct loading and unloading via the machine's milling head



Linear/swivelling clamping unit CLR

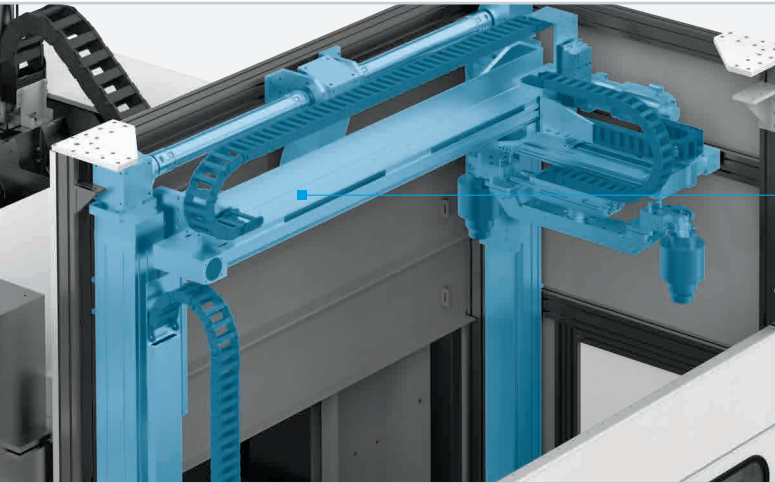
- A compact and sturdy solution for clamping parts during machining
- Ideal for pick & place applications as the piston rod rotates 90° when retracting

You can rely on this completely

Optimum holding, sufficient clamping force, precise positioning and reliable movement – that is what's important when gripping workpieces. Festo can provide you with a wide range of solutions, from components for simple gripping movements to components that enable the front end unit to be rotated, screwed in and moved.

Whether with or without a seal, every gripper is available with a standard interface plate for quick connection to the Festo automation platform. Selecting the correct gripper and the correct vacuum system is incredibly easy thanks to our free of charge online engineering tools.

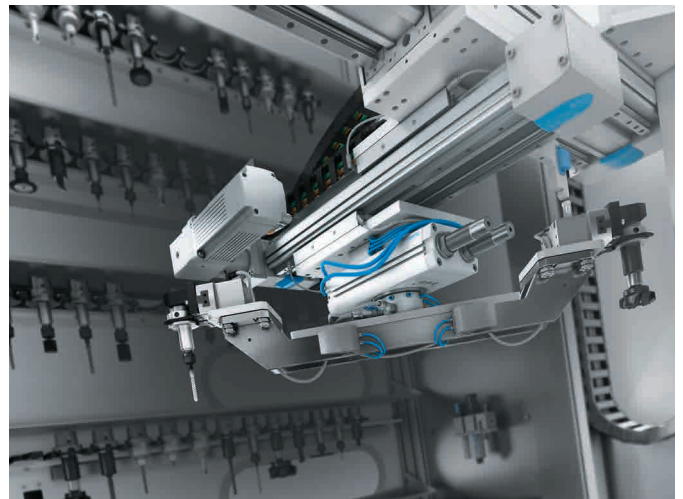
Extending the tool storage using gantry systems



Handling and gripping system for tools in tool storage

Tool storage

- The ideal choice to expand the tool capacity of your machine
- Compact and flexible design thanks to the integrated extendable axis
- Maximum flexibility of gripper size and positioning
- Flexible number of tools, depending on the requirements of the machine
- Suitable for tools weighing up to 12 kg per piece



Tool storage



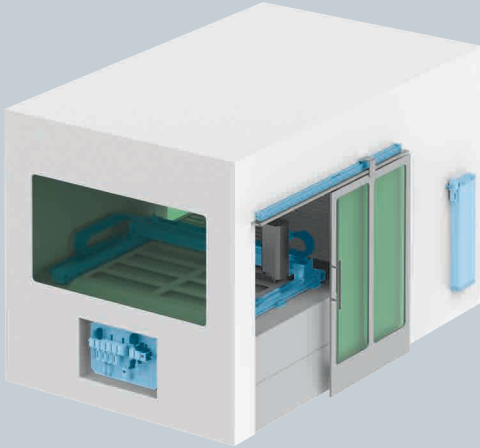
Handling and gripping system

Supplementary magazines for a maximum flexibility:

An increasing number of tools are needed in machines to be able to machine a greater variety of workpieces. That is why we have developed a flexible and modular system for supplementary magazines that will hold up to 350 tools. It can be adapted to your machine with some small specific adjustments.

Automation – it's your choice how and where to start

Machine tools are based on completely different technologies, depending on the type of machine. But everyone would like to have digital connections and complete automation. By integrating Festo solutions, machine builders will be able to meet these future requirements and trends right now.



For laser machine, it's the need for high quality air that is the main priority. Our components are perfectly equipped for this task:

- Service units with filters ranging from fine to activated carbon filters with integrated contamination sensor
- Adsorption dryer or membrane dryer units to reduce the dew point of compressed air up to class 1:2:1 to ISO 8573-1:2010
- Service units with integrated dew point sensor in order to monitor the quality of the compressed air in real time
- Proportional pressure regulator VPPM/L for the quick and precise regulation of process gases



Service unit with integrated dew point sensor and bypass valve



Service unit for fine filtration up to 1:2:1 as per ISO 8573-1:2010



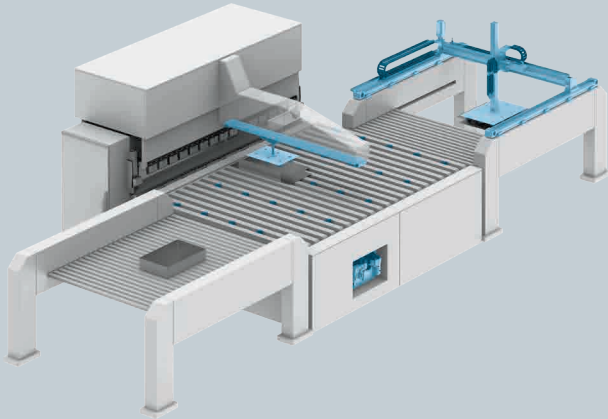
Proportional pressure regulator VPPM/L



Cold regenerating adsorption dryer PDAD to reach the pressure-dew point of -70°C



Proportional flow control valve VEMD for dosing air and gases



To get the best from bending machines, it is important to increase the productivity of the machines. With our handling technology, we are in a position to automate the loading and unloading phases of the machine or any other tasks:

- Suction cups of different materials and shapes hold the workpiece
- Intelligent vacuum generator OVEM with IO-Link® interface and energy efficiency functionality ensure that the workpieces are held securely
- Swivel clamp system CLR with free picking area outside the clamping position guarantee minimal wastage



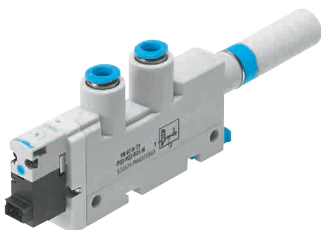
Suction gripper with connector
ESG



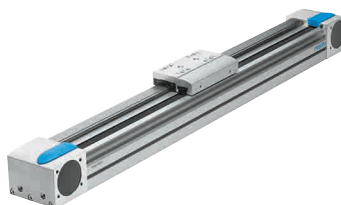
Flat suction cup OGVM



Intelligent vacuum generator
OVEM with energy efficiency
characteristics



Vacuum generators VN

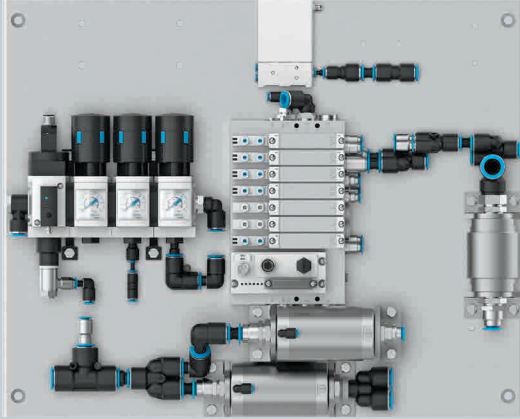


Linear axis EGC



Linear-swivel clamp CLR

Additive manufacturing/3D printing



Flexibility during process optimisation

Stable additive manufacturing processes can only be achieved with continuous air preparation and a stable, protective gas atmosphere. This requires innovative flow and pressure regulation products.

Festo will assist you along the entire process, from engineering and selection of the components to assembly, supply and support.

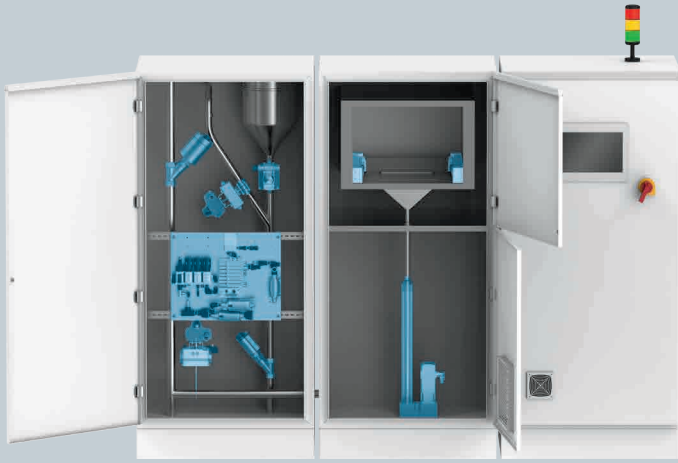
We supply everything from a single source: components, modules, ready-to-install solutions and complete sub-systems.

Catchphrases such as “high mix – low volume” and “time to market” describe the great challenge of having to meet customer-specific requirements in ever shorter time periods. One answer to this is additive manufacturing, which is also known as industrial 3D printing. As a generative manufacturing method, it is a revolutionary extension of the familiar, well-known subtractive manufacturing methods, such as milling or turning, and the formative manufacturing methods such

as casting or forging. Additive manufacturing works by adding layer after layer of materials, whether plastic, metallic alloy, ceramic or any other materials, and shaping them into three-dimensional objects. This automated process provides an almost infinite amount of freedom and complexity, as CAD data is transformed directly and immediately into real components.

→ www.festo.com/3dprinting

Products and solutions for powder bed machines

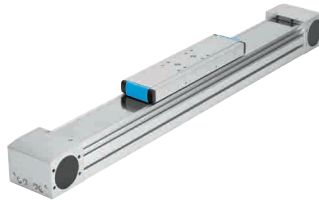


The benefits to you at a glance

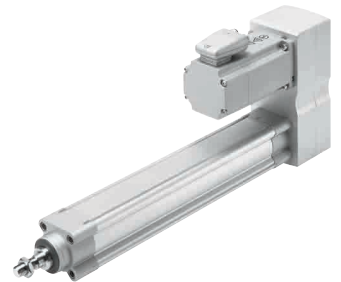
- Know-how and experience from numerous industry sectors and applications
- Fewer interfaces as everything is supplied from a single source: from engineering and procurement to support during commissioning
- From the appropriate components to ready-to-install solutions as a assembly
- From pneumatics via process automation to electric automation
- From the controller via software to the cloud service



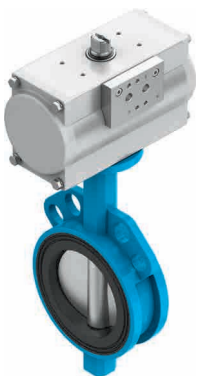
Pinch valves VZQA for regulating gas powder flows



Linear drive for applying the powder layers



Spindle drive for raising and lowering the build platform

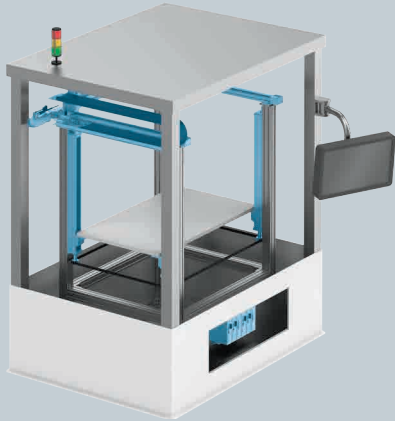


Process valves KVZA for high-volume gas powder flows



Proportional flow control valve VEMD for dosing air and gases

Products and solutions for FDM machines



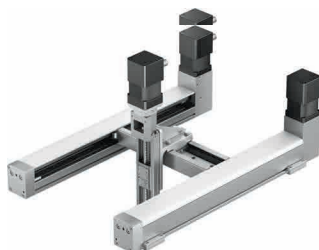
Only digitally networked and fully automated process chains will enable you to take full advantage of the added value of 3D printing and to use it cost-effectively in so-called smart factories from batch sizes of 1.

Intelligent transport and handling systems will take over the intralogistics and optimise the material flow, as the products will, for example, carry their manufacturing data in a module record.

Quality monitoring takes place inline so that the ongoing process can be controlled even in the event of the slightest deviation. By networking different manufacturing locations in the cloud, production can be decentralised and on-demand, enabling it to take place close to the market. Capacities can be optimally utilised and unnecessary transportation is avoided. Additive manufacturing will thus significantly change the industrial value creation chain.



Tripod delta kinematics EXPT



Three-dimensional gantry YXMR



Control systems CMCA and complete control cabinets

Graphic display and operating unit CDPX

Make sure everything is running smoothly with this complete package for human-machine applications. It visualises data and acts as a server, if necessary, for clients worldwide.

- Good communication options: straightforward networking and setup via the integrated Ethernet interface
- Very simple, intuitive project engineering and programming
- Perfect graphic displays



Servo drive CMMT-AS

The compact and powerful servo drive can handle demanding tasks. It can be integrated directly into any conventional Ethernet-based control system.

- Super-fast commissioning in just a few minutes using the Festo Automation Suite
- The smallest in its class: compact design and clever two-sided operating and connection concept
- Energy recovery via the intermediate circuit: simple and inexpensive energy compensation between drives
- Safety: numerous protective functions already built-in



Servo motor EMMT-AS

Create the ideal package by connecting the AC synchronous servo motor for demanding and precise applications to the servo drive CMMT-AS using an easy and compact single-cable solution. The electronic rating plate contains all the important motor data. This can be read by the CMMT-AS and then used to automatically set the parameters for the servo motor.

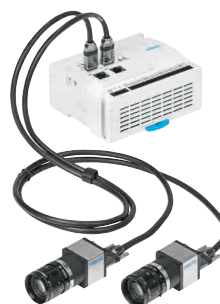
- Precise with high repetition accuracy
- High control quality and path accuracy even with high dynamic response



Smart camera SBRD

The smart camera SBRD is specially designed for multi-camera tasks. The two camera interfaces allow inspections to be carried out from several perspectives or with a large field of view, for example to check if the colour coding on the tread surface is correct.

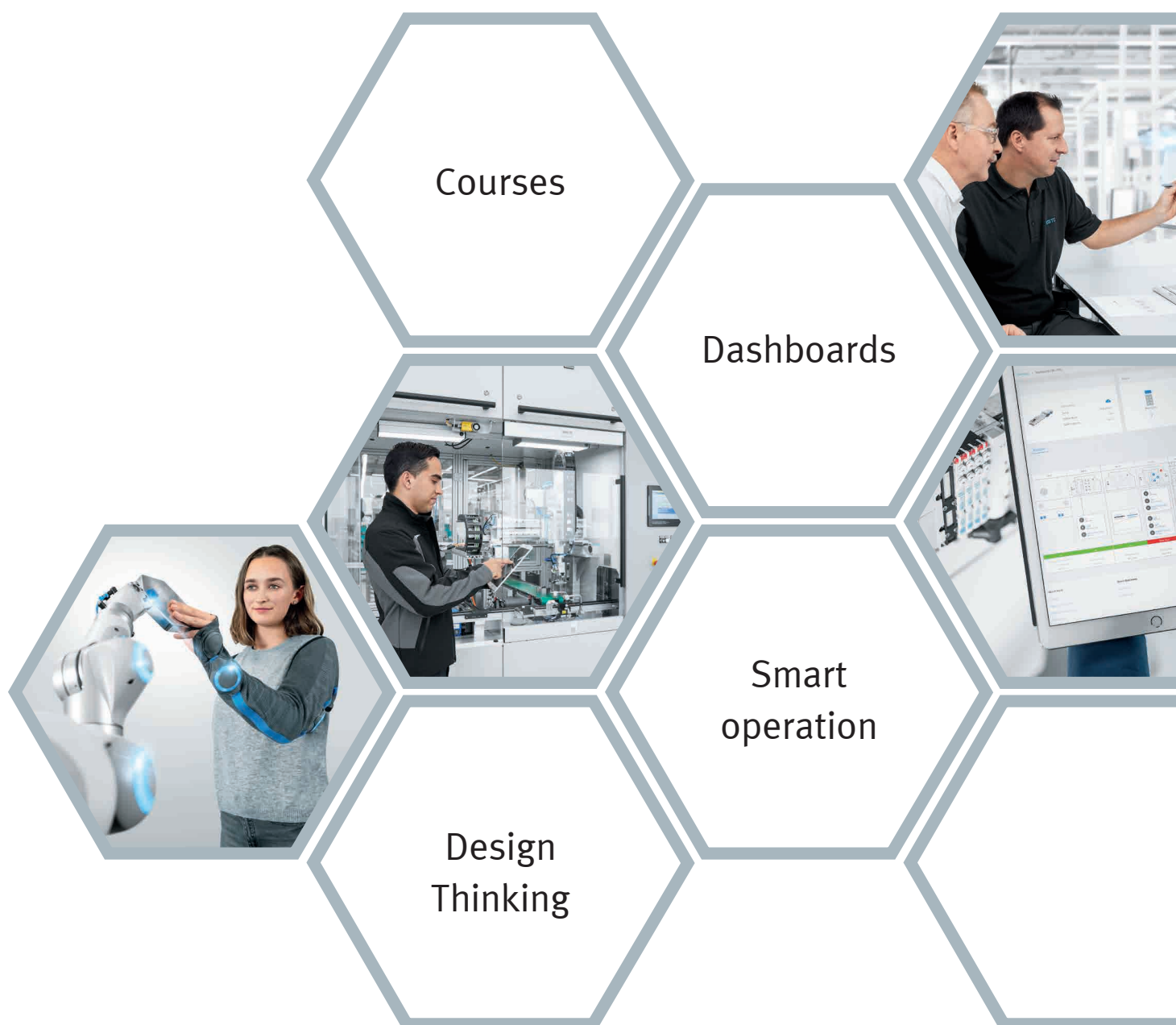
- Camera resolution up to 5 megapixels
- Time-saving, intuitive parameterisation
- Space-saving and lightweight
- Powerful processor and PROFINET interface
- Image analysis via intelligent image lists instead of individual reference images



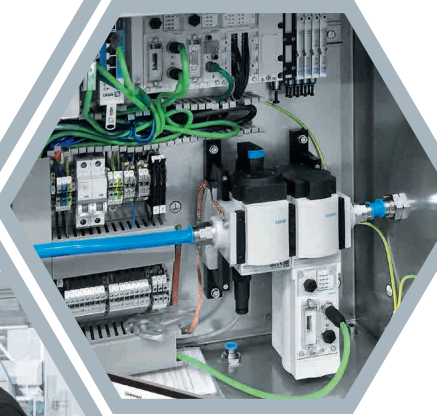
Always the right engineering tool for innovation and increasing productivity

We support our customers over the entire life cycle of their projects: from planning to commissioning right up to the operation and maintenance of the machine. Our comprehensive engineering and simulation software will enable you to start your projects quickly and prevent human errors. For example, you can automatically generate the Eplan schematic diagram for Eplan projects, thus saving time identifying and putting all the components together. The Automation Suite is a common platform with which all Festo products can be put into operation and can be coded immediately thanks to the CODESYS extension.

Our Handling Guide Online will enable you to design a complete handling system with just a few clicks, and single-axis modules can be implemented with minimal effort using the software PositioningDrives from Festo. And finally, the Festo Dashboard is used to monitor your machine's parameters on a cloud-based platform and to save historic data. It is generated automatically and can be personalised with your own widgets. This is ideal when proactively managing your maintenance tasks via the Smartenance service.



Engineering &
simulation



For
managers



FluidDraw

Industry 4.0

Festo
Automation Suite



For specialists



Festo Motion
Terminal VTEM

Handling systems – from extremely compact or sturdy to highly dynamic

From extremely compact or sturdy to highly dynamic

1D handling systems

Single-axis systems

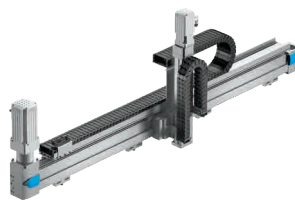
Ideal for long, one-dimensional strokes and heavy loads



2D handling systems

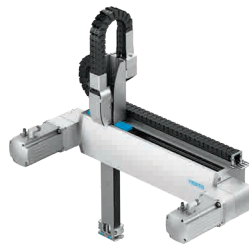
Linear gantry

For vertical movements in 2D



Highly dynamic linear gantry

Optimum dynamic performance with up to 90 picks/minute.



Planar surface gantry

For any movements in 2D space



Highly dynamic planar surface gantry

Large work area and high dynamic performance



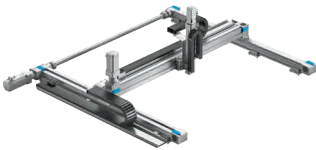
Compact planar surface gantry

Compact and flat for small installation spaces



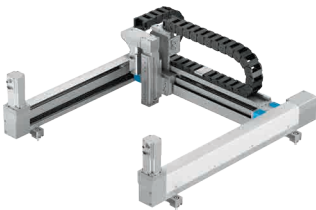
3D handling systems

Three-dimensional gantry for 3D movements in space



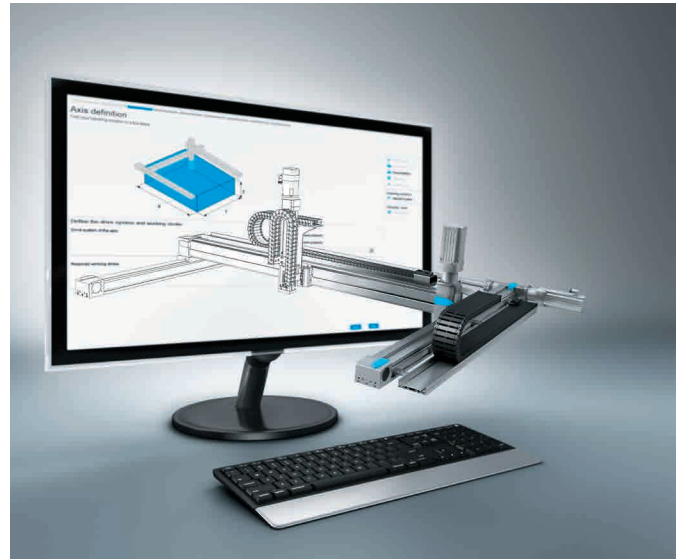
Highly dynamic three-dimensional gantry

Large work area and high dynamic performance



Compact three-dimensional gantry

Compact and flat for small installation spaces

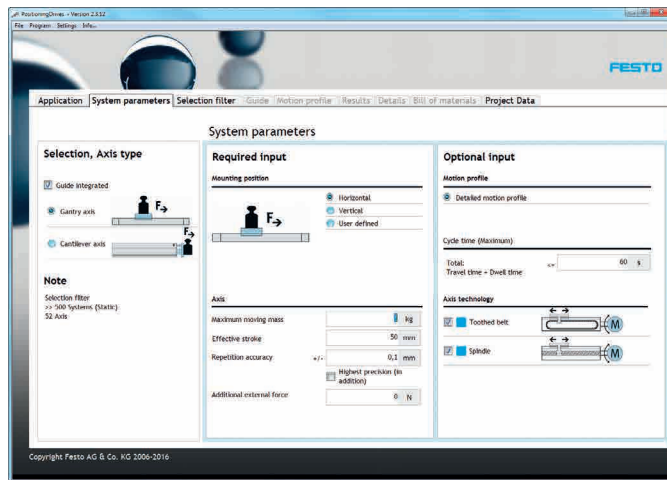


Handling Guide Online for correctly sizing industrial robots

Configure industrial robots – from a single-axis solution to 3D gantries – quickly and easily. Just enter the axis definition along with all the performance parameters needed, and in just 20 minutes you will have a perfect and ready-to-order system. We will deliver it, either ready to install or partially assembled, together with the CAD data and commissioning documents.

→ www.festo.com/hgo

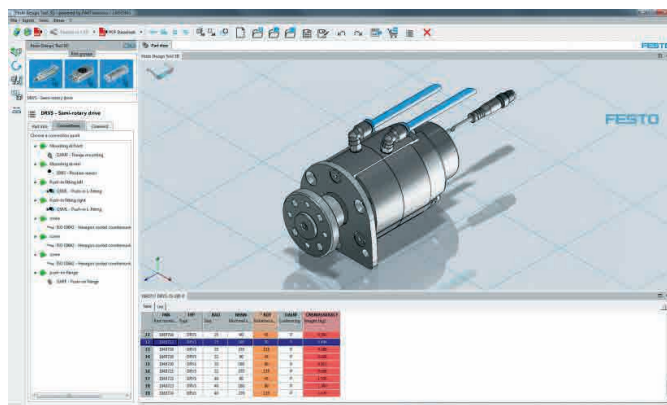
Engineering tools in detail



Energy-efficient and error-free sizing of linear axis systems with PositioningDrives

Would you like to specify and optimally coordinate mechanical systems and electric drives? This can be done without any complex and time-consuming procedures. Our engineering and selection software PositioningDrives provides support and assistance during the entire planning process and will simplify your search for the best mechatronic drive solution.

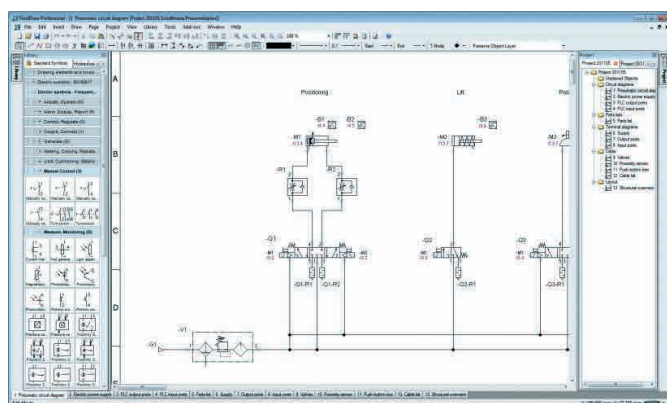
→ www.festo.com/positioningdrives



Configure modules in CAD format with the Festo Design Tool 3D

Our 3D product configurator will help you to assemble Festo product modules quickly, intuitively and without errors. It ensures that the components and accessories will be compatible, it creates clear parts lists and provides clear documentation. In the last step, you can order the module directly, and even completely pre-assembled if required. The tool generates a separate order code for this.

→ www.festo.com/fdt



FluidDraw creates electric and pneumatic circuit diagrams in an intelligent manner.

Our sizing software simplifies the planning of complete systems and the implementation of individual components. With access to the Festo catalogue and the databases that you have imported yourself, you can use the DIN-compliant symbol libraries, evaluation functions and assembly drawings. This will produce reliable, complete and standardised circuit diagrams.

→ www.festo.com/fluiddraw

EPLAN macros make design considerably simpler

We can provide EPLAN macros for more than 38,000 of our products and in 21 languages so you can create electrical engineering circuit diagrams in the CAE software EPLAN Electric P8 and fluid engineering circuit diagrams in EPLAN Fluid. The advantages will impress you:

Individual macros in the EPLAN data portal

Macros for Festo products can be conveniently found using the corresponding part number or the type code.

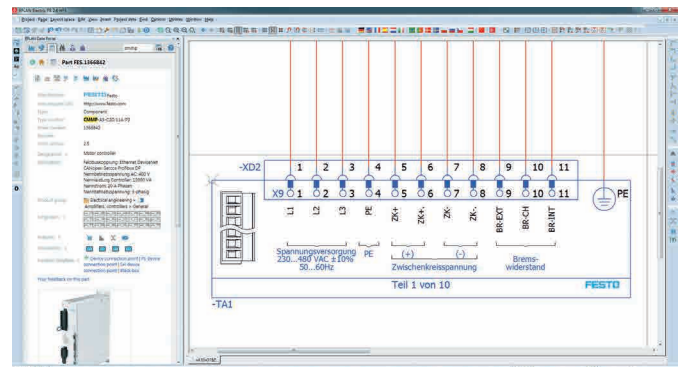
Creating complete Eplan projects quickly and easily

Producing manual documentation for a complex product, for example a valve block, is time-consuming and can lead to errors. However, our web service will automatically generate a correctly configured Eplan project based on the individual configuration of a product and the order code.

Easy-to-understand video tutorials on our YouTube channel will explain the procedure:

- Generate an Eplan valve block project in the Festo App World
- Integrate the valve block project in existing engineering projects
- Connect the valve block and allocate the functions

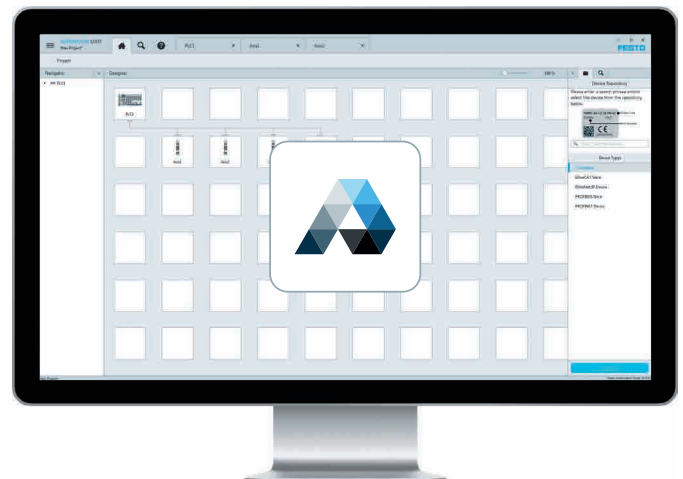
→ www.festo.com/eplan



Turnkey drive systems via Festo Automation Suite

Our commissioning software combines the parameterisation, programming and maintenance of Festo components in one program and enables the entire drive package, from the mechanical system to the controller, to be commissioned quickly. Perfect for making industrial automation simple, efficient and seamless.

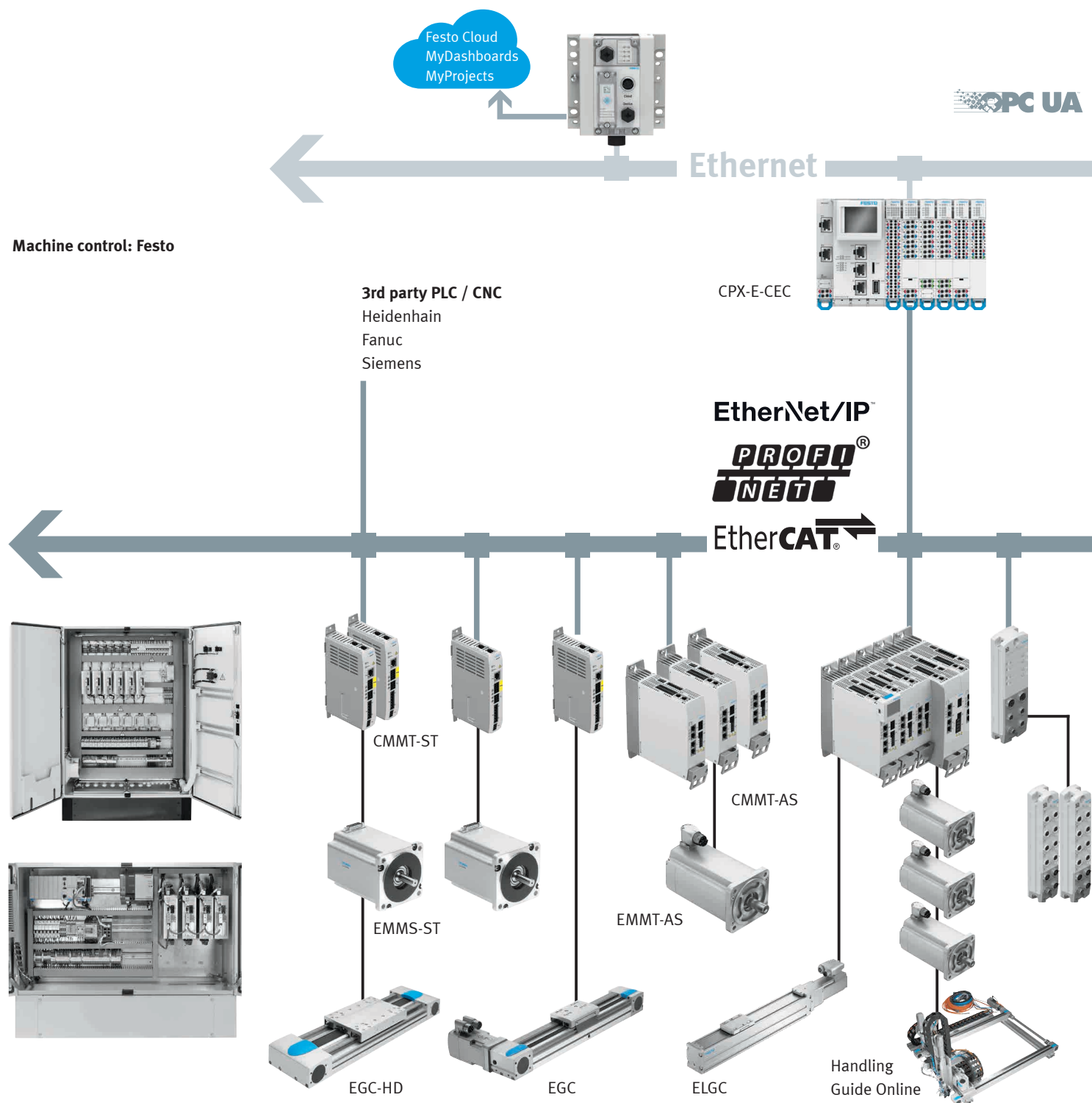
- More individual, intuitive and user-friendly than ever before
- Uniform user interface
- The basic functions of all Festo components have already been integrated
- Can be adapted via device plug-ins and add-ons
- Information about devices and operating instructions can be accessed directly using the software
- Available free of charge on the Festo Support Portal



Free download of the software at

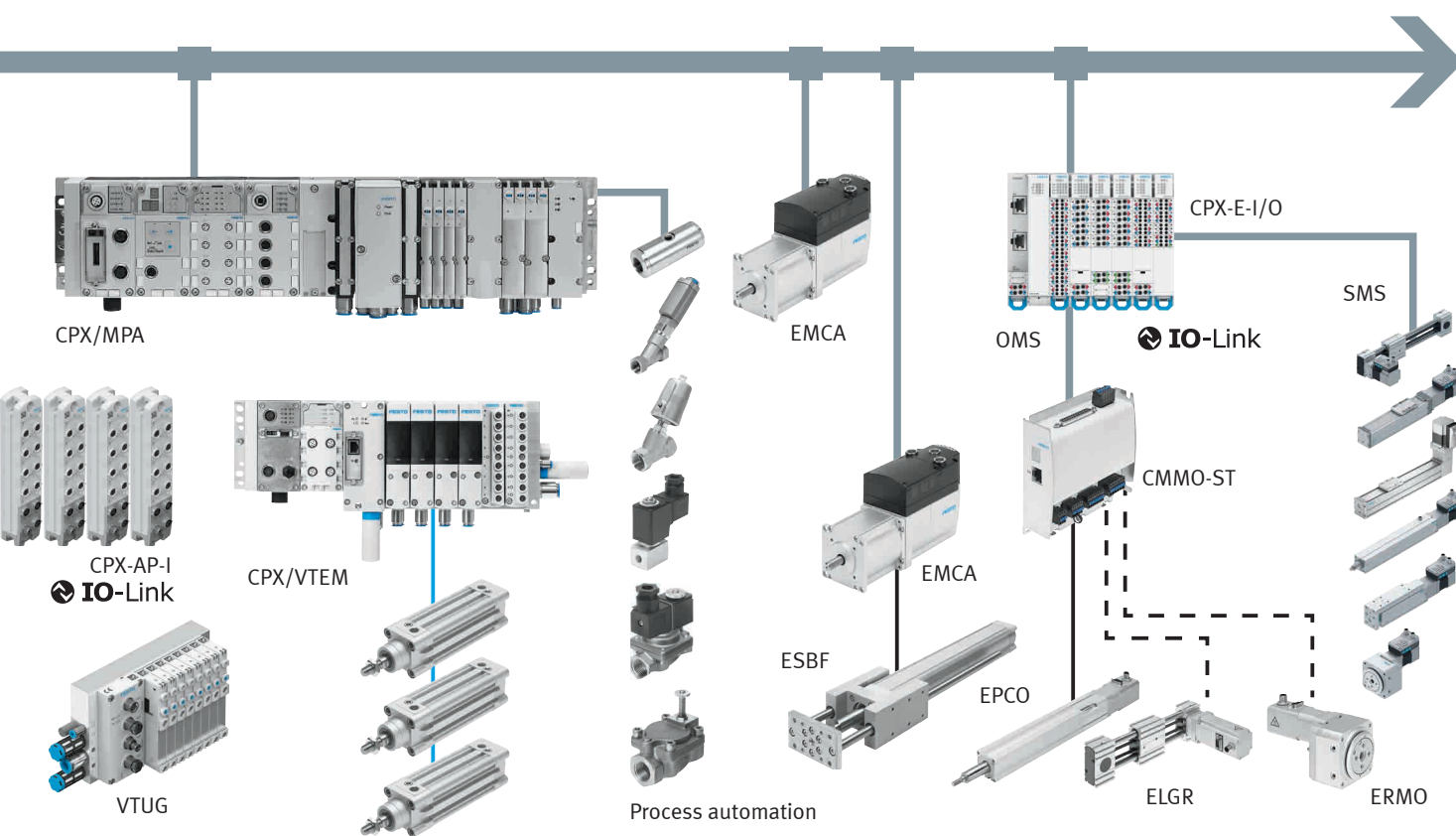
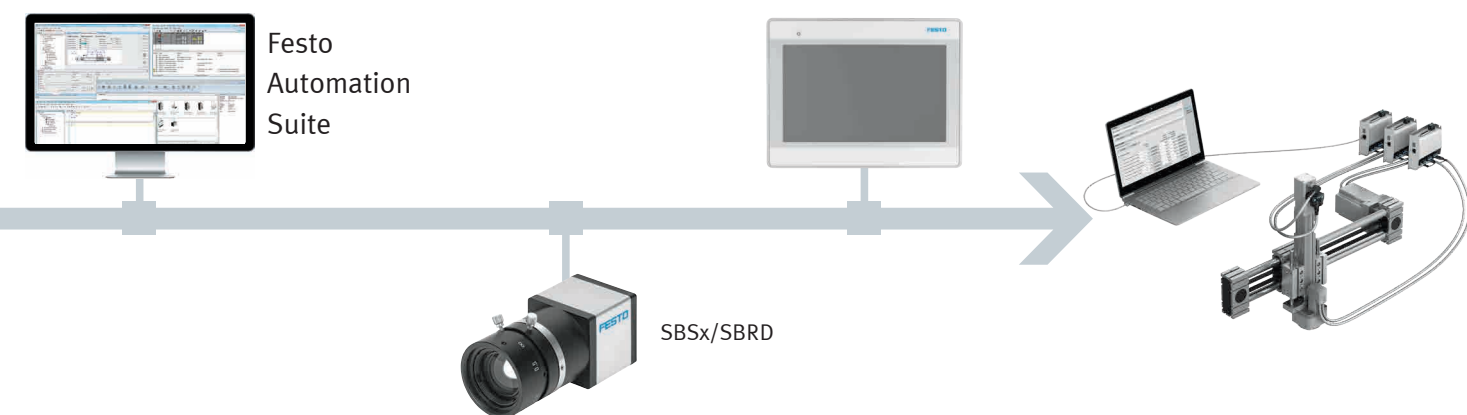
→ www.festo.com/AutomationSuite

What belongs together is brought together



Complete solutions

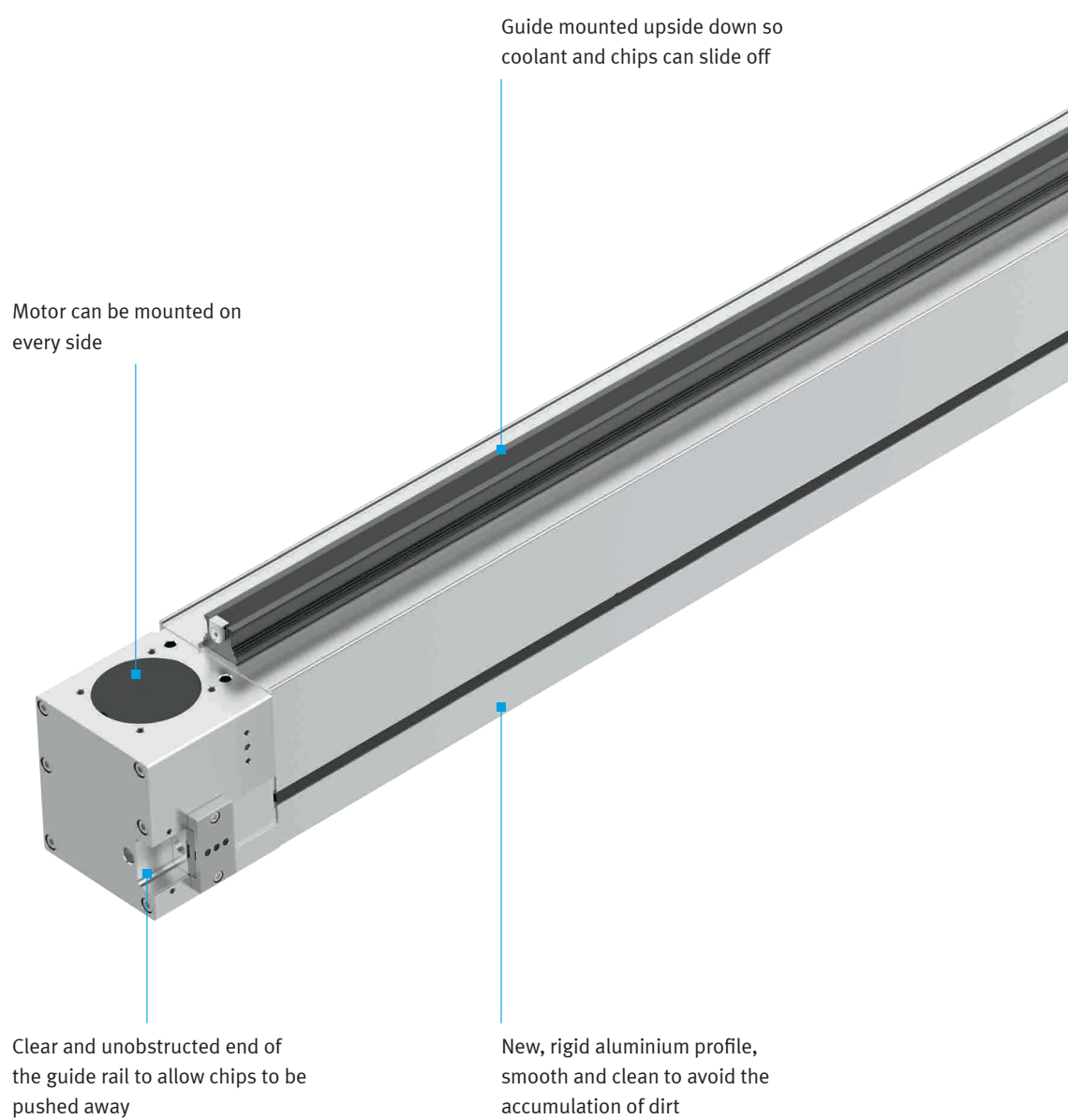
Advanced performance: electric drives – motors – servo drives – handling systems

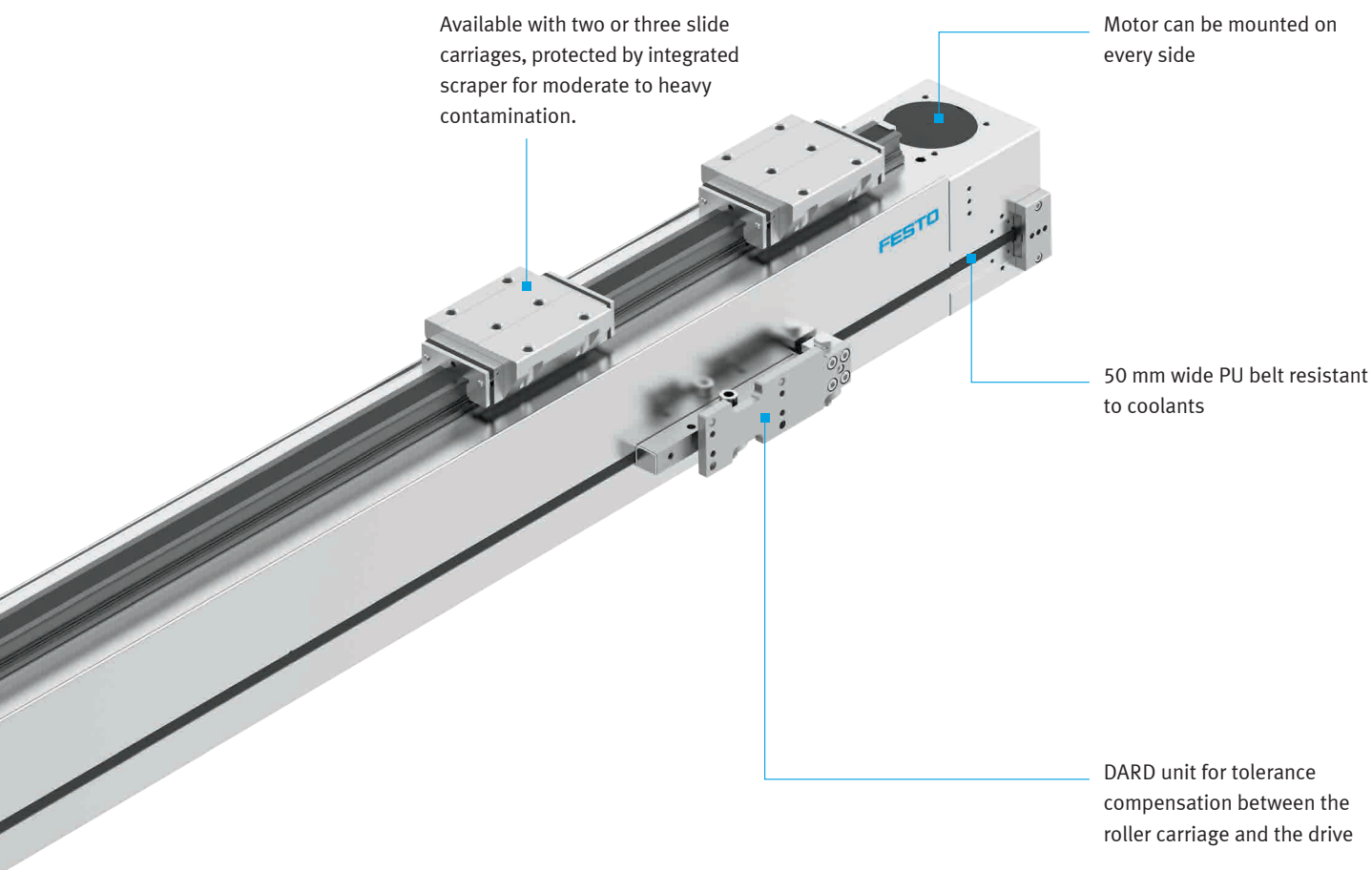


Optimised and Simplified Motion Series (OMS/SMS)

Product highlights: electric automation

Electromechanical toothed belt axis ELGW





Product highlights: electric automation



Toothed belt axes EGC-TB/BS

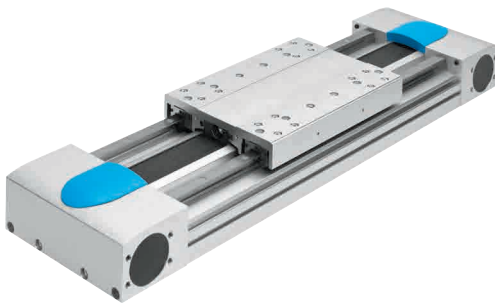
There are numerous versions of the electric axis EGC. Its excellent dynamic response and speed, maximum rigidity and high load-bearing capacity are very impressive. And there is also a high-performance mechatronic modular system for individual and complete system solutions. For use as:

Toothed belt axis

Dynamic drive for high speeds together with heavy loads and long strokes.

Spindle axis

Precision drive for accurate and quiet operation with heavy loads and long strokes.



Toothed belt axis EGC-HD-TB/BS with heavy-duty guide

The heavy-duty version HD with recirculating ball bearing guide completes the EGC range. It effectively absorbs transverse loads and torques. Whether as a toothed belt or a spindle drive with two parallel guides, this solution is ideal for cantilever systems and is also available with central lubrication.

Cantilever axis with toothed belt ELCC

The extremely rigid and light-weight high-performance cantilever axes ELCC can take on many functions quickly and reliably, especially in a wide range of positioning tasks with long strokes in vertical, horizontal or other installation positions. Thanks to its profile that moves inside and outside of the working area, the axis can be removed from this zone.

Numerous safety functions

The ELCC offers many safety functions, for example a shut-off unit without axis extension, incremental position encoder and proximity switch, stainless steel cover strips, sealing air and shock absorbers.

Versatile and flexible

You can choose between four sizes with a stroke of up to 2 m, optional additional slides and you can select from different motor mounting options and toothed belt materials to match the application requirements.



Cantilever axis with gear rack EHHH

With its ability to move high payloads of up to 200 kg extremely dynamically, precisely and easily, this cantilever axis is most suitable for handling systems, e.g. for palletising and stacking in the packaging and automotive industries or for loading and unloading machine tools. And it has the long service life that is typical of rack and pinion technology.

Precise even with long stroke lengths

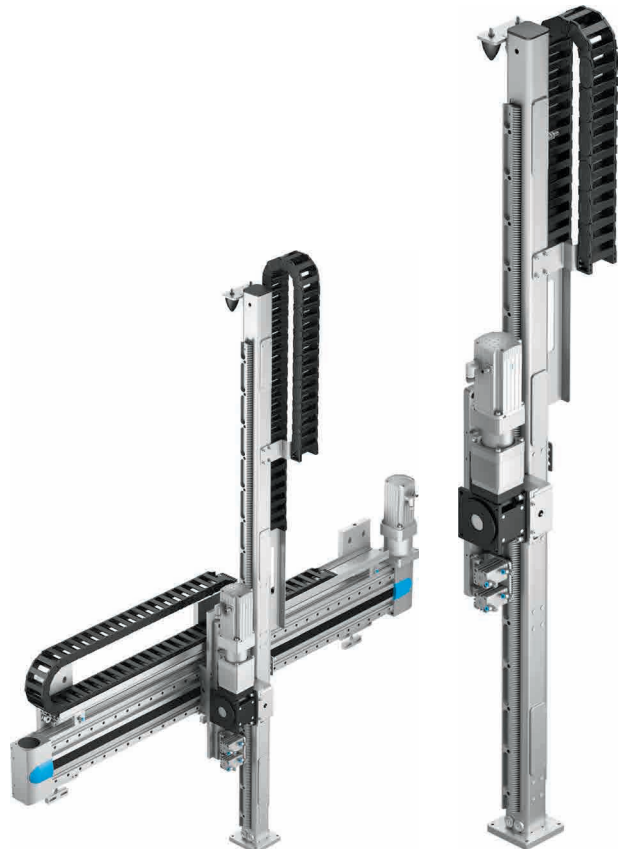
The cantilever axis masters every challenge completely effortlessly. The combination of a solid steel profile and high quality recirculating roller guide unit ensures a high level of rigidity and repetition accuracy. Particularly suitable for demanding requirements such as positioning tasks with long strokes.

Drop guard in vertical applications

An optional pneumatic locking unit or a shut-off unit are available for safe operation.

High level of effectiveness as a matter of course

The direct and slip-free torque transmission from the drive pinion to the gear rack generates a great amount of feed force.



Product highlights: electric automation

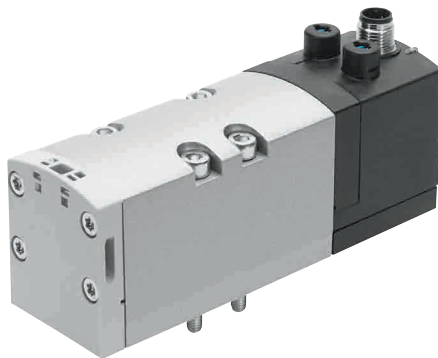


Electric cylinder ESBF

Take advantage of our wide range of products in the sizes 32, 40, 50, 63, 80 and 100 for increased forces and performance.

Features:

- Non-rotating pistons with plain-bearing guide
- With a piston rod thread as standard, optionally with female thread
- Optional extended piston rod
- Ball screw BS
 - Tolerance class G7 to DIN 69 051
 - Life-time lubrication
 - Three spindle pitches for each size apart from ESBF 32 which has two spindle pitches
 - Repetition accuracy higher than ± 0.015 mm (± 2)



Timer valve

Our time control valve supplies compressed air until the timer switches off, and the unit will not be supplied with current during the delay time. The energy is buffered or stored internally. This solution is currently included in the list of approved components for the automotive industry and is also ISO-1 compliant.



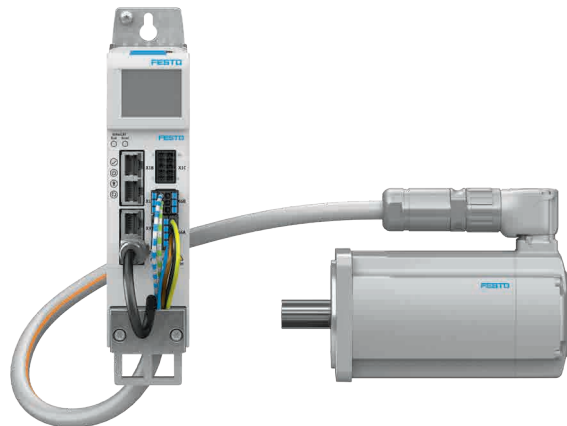
The time control valve can be integrated into our service unit combinations. Switching off the sealing air saves valuable energy.

Servo drive CMMT-AS and servo motor EMMT-AS

Well-connected hardware and software, extremely efficient, clever technology and simple operation – these are some of the most important advantages of the new servo drives CMMT-AS and the servo motors EMMT-AS. Dynamic movement and precise positioning, for both point to point and interpolation, are additional plus points. And last but not least, the entire system can be put into operation extremely quickly and easily.

One cable, reduced space requirements

It takes just one cable connector OCP to link the servo motor EMMT-AS to the CMMT-AS; this considerably reduces installation time and also saves space. As an open system for cost-effective servo motors, CMMT-AS impresses with its simple cabling and connection technology.



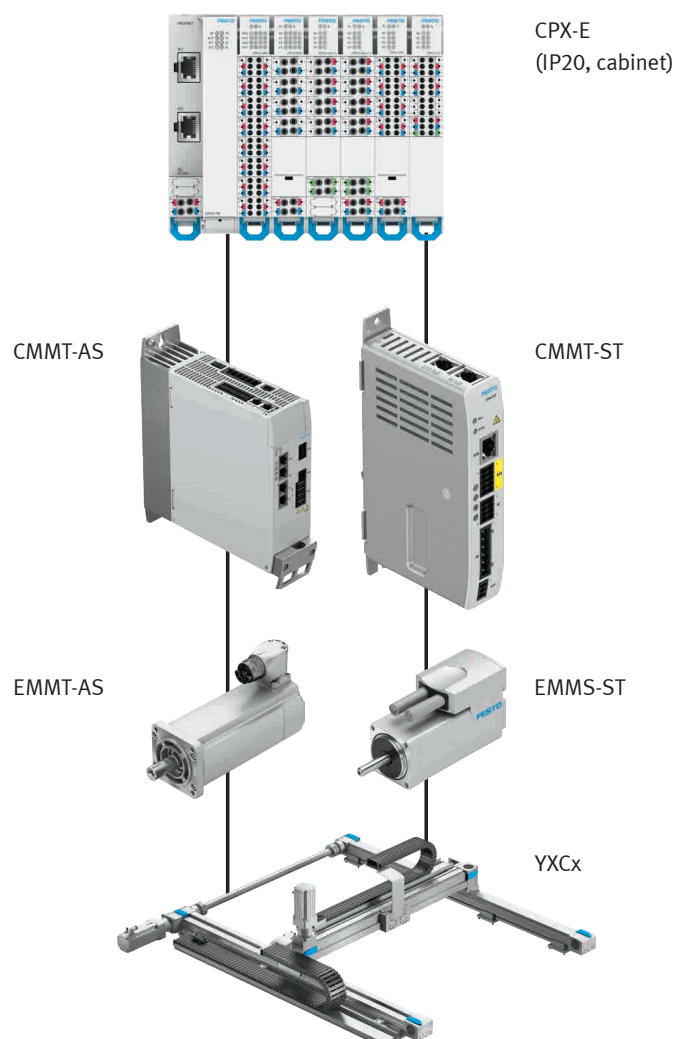
Modular control system CPX-E – for small and medium-sized production systems or sub-systems

The controller CPX-E is at the centre of compact or modular automation solutions that can be used to control small and medium-sized self-contained production systems or sub-systems. The controller, motor, regulation and mechanics form an optimal technical and economical combination.

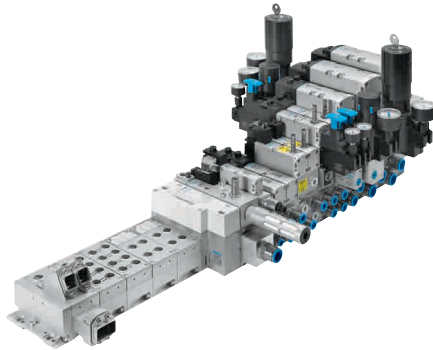


EtherNet/IP

EtherCAT



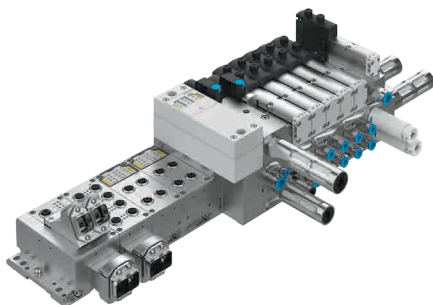
Product highlights: pneumatic automation



ISO valve terminal MPA

Maximum function integration, many electrical connection options, multi-pin plug, Festo I-Port, fieldbus and a comprehensive diagnostics concept – that is what MPA stands for. The valve terminal is extremely compact and has the latest valve technology in every version:

- New: MPA-C – perfectly hygienic
Sturdy, even during cleaning. With degree of protection IP69K and in the highest Festo corrosion resistance class, CRC4
- MPA-L + CTEU = basic fieldbus communication
A simple solution for quickly and directly connecting valve terminals with all commonly used fieldbus technologies, can be extended to a small installation system
- MPA-S – communication in a perfect format
Offers all the advantages even in complex installation situations and reduces the overall costs, for example with multiplexing
- MPA + CPX = even more options
Perfect for MPA-L and -S and ideal as an extremely cost-effective standard in factory automation or in the process industry – maximum process reliability at minimum installation effort



ISO valve terminal VTSA-F-CB

As an extension of the VTSA series, the new valve terminal with serial and parallel communication offers considerably more application options. The internal bus system now has 96 valve addresses and up to four voltage zones, of which three can be disconnected safely.

Take advantage of the best of two worlds

The combination of two communication technologies in one solution will significantly increase the benefits for you. The serial communication makes the external cabling that was used until now unnecessary while the installation space remains the same. At the same time, the address range for the valve positions is increased with fewer additional components and reduced effort for wiring. If, for example, you previously needed two valve terminals for 44 valve positions, now just one valve terminal and a bus node will be sufficient.

What's more, serial communication is suitable for very high bit rates. For instance, the new vacuum suction nozzle VTSA-F-CB can digitally report deviations to the machine control system once all vacuum times have been measured or compared with a reference run.

In future, proportional-pressure regulators will also be integrated in the valve terminal, without having to forgo any directional control valves that are already used. And parallel communication further ensures their suitability.

Benefits at a glance

- Up to 96 valve addresses across four zones via serial communication instead of the maximum 32 valve addresses until now.
- PROFIsafe integrated compactly in the pneumatic interface
- Maximum flexibility thanks to numerous pneumatic interfaces for VTSA-F-CB
- New serial modules can be connected without external cabling
- Compatible with all existing directional control valves and related components such as throttle valves

Connection technology - highly versatile

The tubing PUN-H and the push-in fitting QS are the perfect combination for many applications. They ensure optimum and failure-free operation of your systems at all times, are resistant to hydrolysis and can be used in environments with a high moisture content.



Highly versatile

Kink-resistant PUN-H is easy to install

Customised tubing from the modular tubing system

The modular system will enable you to specify individual lengths and packaging units, order individually printed and labelled tubes, and select from 7 basic colours, others are available on request.



Technical data			
Characteristic	Tubing PUN-H	Push-in fitting QS(M) ★	One-way flow control valve GRLA-D ★
Material	Casing: polyurethane	Housing: PBT/nickel-plated brass	Die-cast zinc
	Calibration: external	Sealing ring: NBR	NBR
		Releasing ring: POM	POM
		Tubing clip mechanism: stainless steel	Stainless steel
Version			
Tubing O.D. [mm]	2, 3, 4, 6, 8, 10, 12, 14, 16	2, 3, 4, 6, 8, 10, 12, 16, 22	3, 4, 6, 8, 10, 12
Colours PUN-H	Blue ★, black ★, silver ★, green, red, yellow		
Colours: transparent versions PUN-H-T (for Ø 4 – 12 mm)	Blue ★, natural ★, green, red, yellow, black		
Thread		M, G and R thread M3 – M7, 1/8 to 3/4	G thread M5, 1/8 to 1/2
Application			
Operating pressure [bar]	–0.95 ... +10	–0.95 ... +14	–0.2 ... +10
Operating temperature [°C]	–35 ... +60	–10 ... +80	–10 ... +60
Resistance and suitability**			
Chemical-resistant	+	+	
Hydrolysis-resistant	++	+++	
Food-safe*	FDA listed material	–	–
Media	Compressed air, vacuum, water***	Compressed air, vacuum, water	Compressed air

* See further information on materials

** +++ Highly suitable ++ Suitable + Moderately suitable – Not suitable

*** As per the manufacturer's declaration

PUN-H can be very flexibly used in standard applications. However, Festo also offers other reliable combinations tailored to your requirements in applications with environmental influences.



Productivity

Maximum productivity is a question of ambition

Do you share this attitude? We will be glad to help you achieve this goal – through our four outstanding qualities:

- Security • Efficiency • Simplicity • Competency

We are the engineers of productivity.

Discover new dimensions for your company:

→ www.festo.com/whyfesto