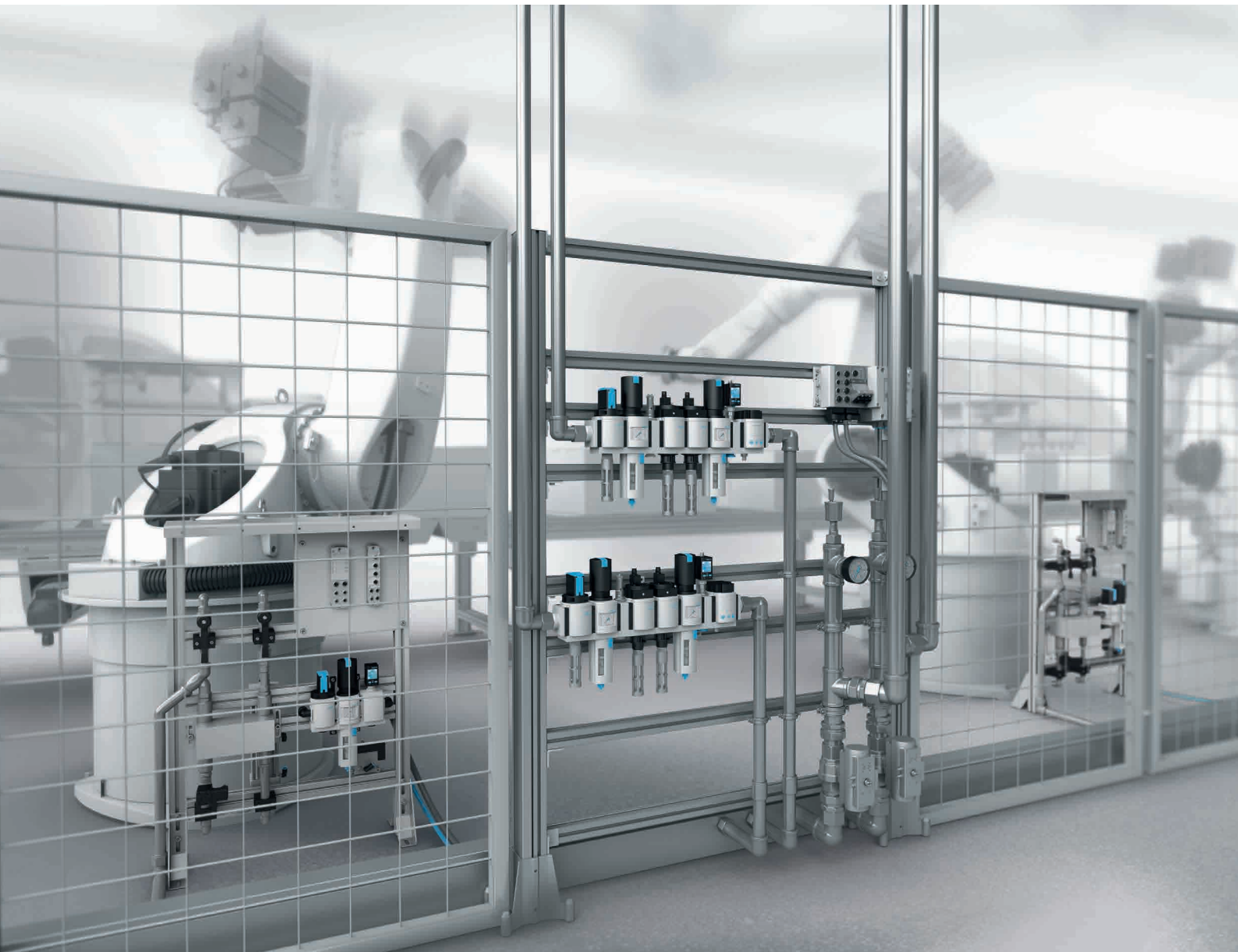


Compressed air and cooling water supply for robots in the automotive industry

FESTO



Reliable, efficient and optimally tailored to your application: ready-to-install complete solutions pay off, whether they are used to control and monitor the compressed air and cooling water supply of entire welding lines or individual welding robots. Both in body shop and the assembly process.

Reliable and efficient control and monitoring of media

If reliably supplying complete welding lines or individual welding robots with compressed air and cooling water is important for you, then invest now in the future. With an efficient solution that is tailored to your application, that is quick and easy to integrate in your environment and that can also rise to the demands of Industry 4.0.

Our experts will be happy to help you with the implementation. They know your specific needs and have a thorough understanding of factory and process automation. Whether you require individual components or ready-to-install, tested complete solutions, Festo technologies can be perfectly integrated into your production environment.

And don't forget: at Festo, you get everything from a single source worldwide – from configuration to construction and testing to complete documentation – as a package with just one part number. This means you save time and money right from when you place the order, and especially during the entire project development process. This will help you gain a competitive edge.



Festo – your partner

Hall installation plates

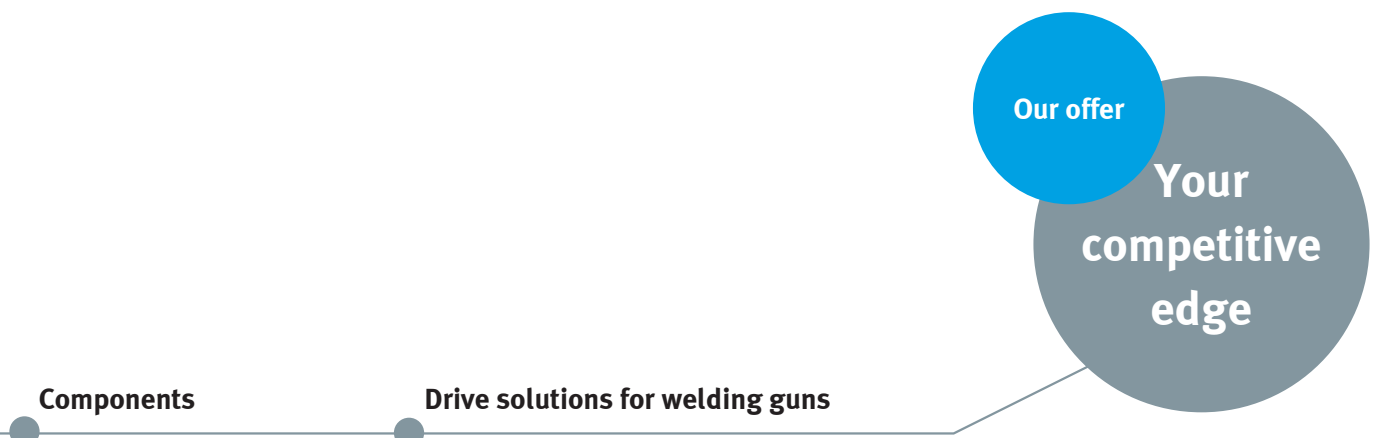
Robot installation plates

Integrated bundling of the compressed air and cooling water supply

The complexity of the solution usually increases when different media are used. After all, there are numerous parameters to be taken into account, from development to maintenance. Festo helps you to reduce this complexity. Thanks to many years of experience, including in the car body production environment, we are able to build individually configurable hall and robot installation plates (HIP/RIP) on which the supply of compressed air and cooling water is bundled. And you decide which components will be used.

Find out more about the possible solutions on the following pages so you too can make the most of the benefits:

- + Built to suit the customer application: from basic functions to solutions with integrated functions such as process monitoring, diagnostic management and energy-saving technologies
- + Manufactured in accordance with all standards, directives, product approvals and specific requirements
- + Protection against environmental conditions through the use of special materials, such as tubing and fittings that are resistant to welding spatter
- + Ready to install via customised mechanical, pneumatic and electrical interfaces
- + With removable fittings for easier access to individual components during maintenance
- + Minimised water leakage when replacing electrode caps thanks to the intelligent control of the cooling water circuit and an integrated water retract cylinder
- + Compact and modular solutions are also available



Hall installation plates (HIP)

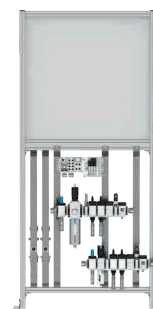
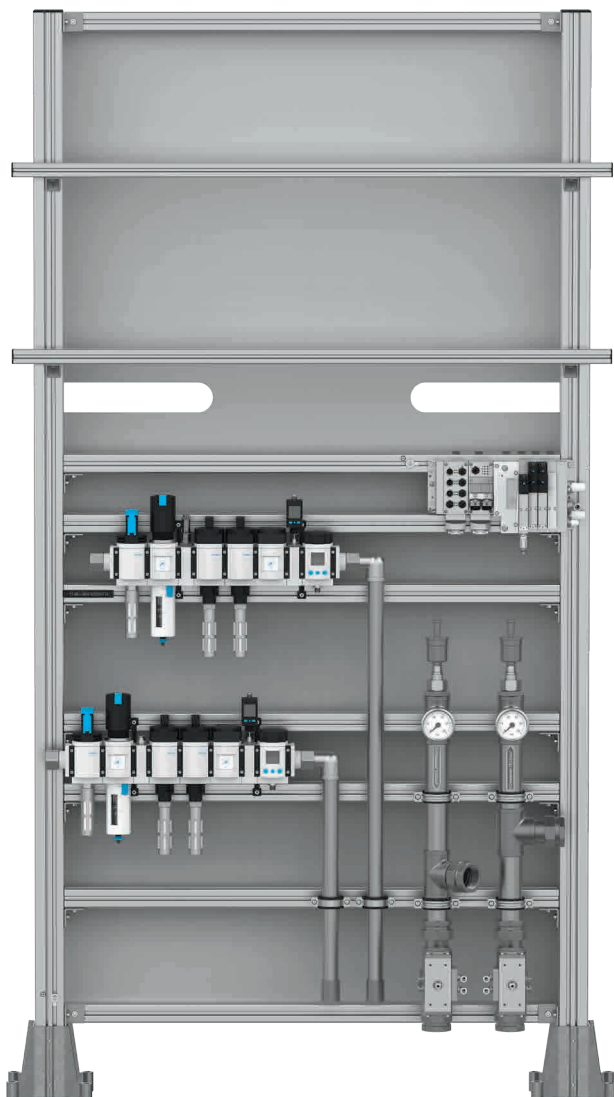
Hall installation plates for welding cells

Hall installation plates (HIP) filter, control and monitor the compressed air and cooling water supply of complete welding cells. Since production cells have to be accessible from the outside, the HIPs are often integrated into the safety barrier.

In addition, they can be equipped with components that slowly build up the pressure or with energy-saving modules. If required, HIPs also communicate sensor and actuator data to the central controller via a remote I/O module and the in-plant fieldbus for evaluation.

Intelligent connection

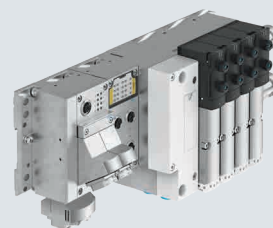
The following standard solution for low pressure, high pressure and cooling water is equipped on one side. The integrated soft-start module as well as the high-flow standards-based valve terminal VTSA with switchable auxiliary pilot air, AIDA push-pull bus connection and system supply offer enhanced performance.



Also available as a variant with stainless steel brackets and equipment on both sides.



Standards-based valve terminal VTSA-F with CPX terminal

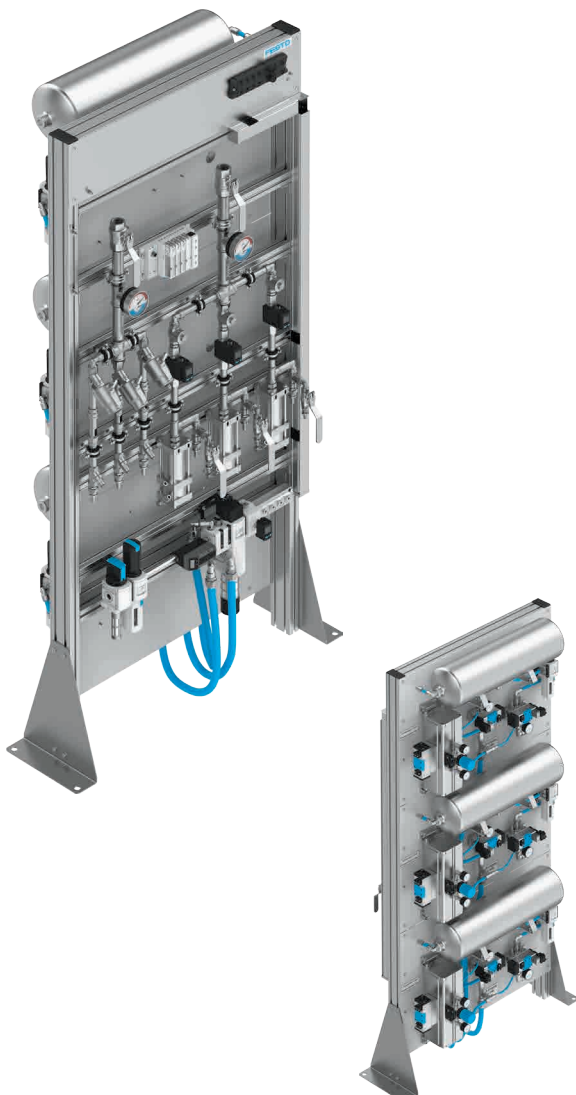


Core functions:

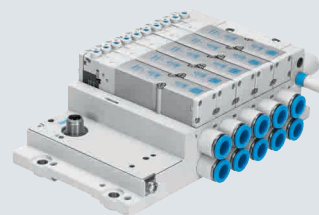
- + Combination of five valve sizes possible on one terminal
- + Very high flow rate of up to 4,000 l/min
- + Communication with higher-order PLC via fieldbus node
- + PROFIsafe: input and shut-off module can be integrated via CPX. Up to Performance Level e can be achieved

Space-saving combination

The 2-in-1 solution that is created by integrating several robot installation plates (RIPs) on one hall installation plate saves space and reduces installation effort. It is used especially if the confined installation space in the welding cell means that RIPs cannot be mounted. In addition to standard components for supplying compressed air and cooling water, pressure amplifiers ensure a reliable and consistent working pressure, even when the requirements for the compressed air network vary. The compressed air is controlled by the integrated valve terminal MPA-L with an I/O-Link® interface that also enables easy communication with sensors and actuators.



Universal valve terminal MPA-L



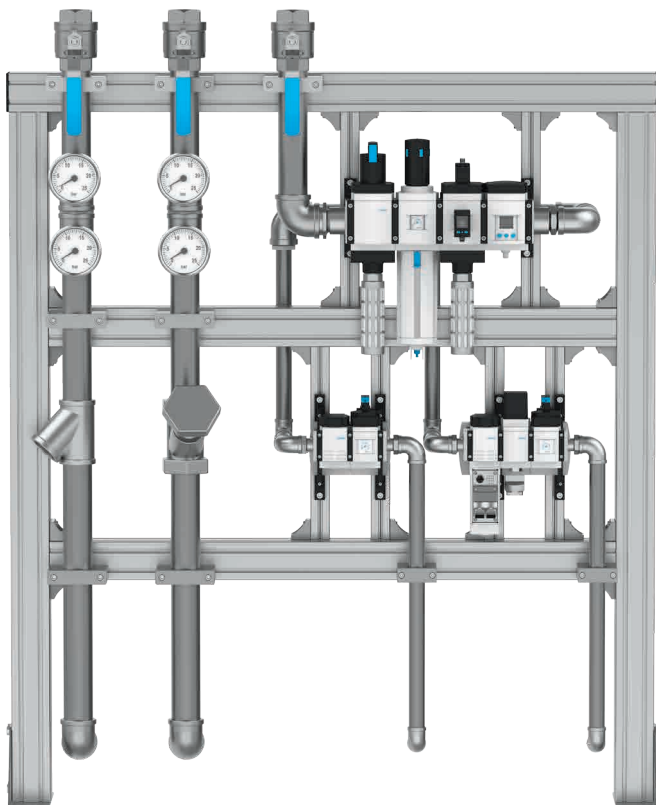
Core functions:

- + Quick and direct connection to all common fieldbus technologies
- + Integrated I/O-Link® interface
- + Flexible and space-saving thanks to individual sub-bases for valve expansion in single increments
- + Combination of three valve sizes for a flow rate of up to 850 l/min, optionally in polymer or metal design

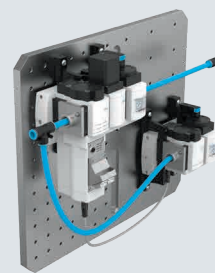
Hall installation plates (HIP)

Energy-efficient control

It has never been so easy to save energy with compressed air and cooling water. The concept behind it is based on the energy-efficiency modules MSE-6-C2M/D2M integrated on the HIP that, on the one hand, ensure a constant flow rate thanks to the efficient actuation of a water flow control valve. On the other hand, they shut off the compressed air after production has stopped for a certain amount of time, and prevent the system pressure from falling below a specific stand-by pressure level. They also act as a data provider for condition monitoring or process monitoring and combine pressure regulator, on/off valve, sensors and fieldbus communication in one unit.



Energy efficiency modules MSE6-C2M/D2M



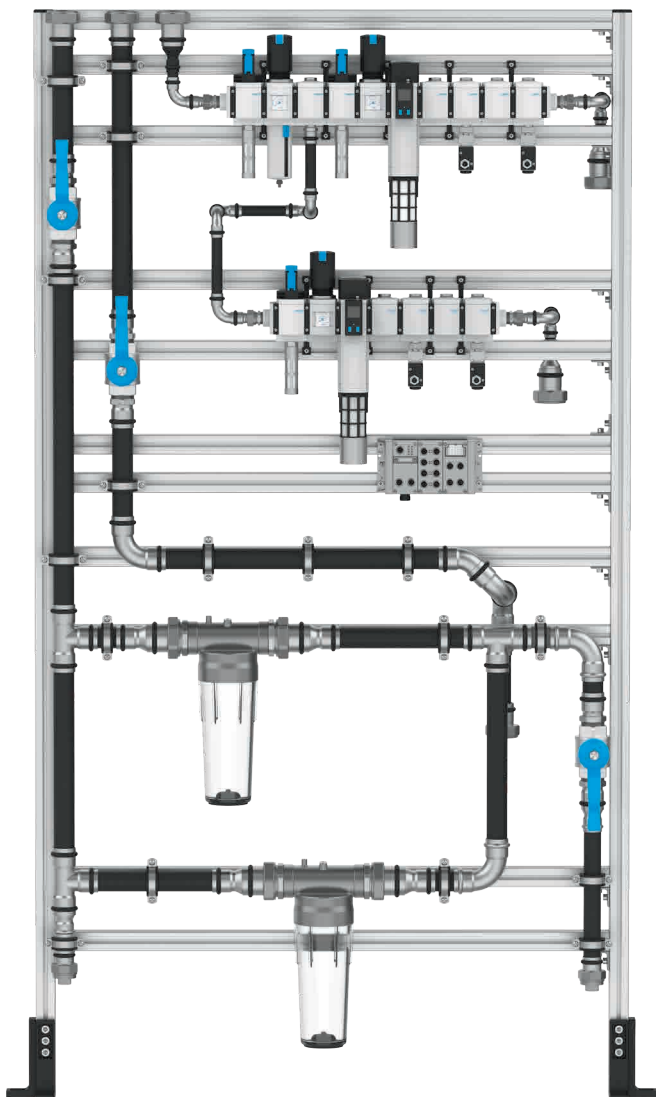
Core functions:

- + Continuous pressure and flow measurement
- + Optimised consumption through adjustable, controlled output pressure
- + Leak detection by evaluating the pressure drop in stand-by mode
- + Adjustable pressure increase (soft-start)
- + Data provider for condition monitoring and the process data gathering system

Safe shut-off

The one-sided HIP with pressed stainless steel piping is integrated into the safety fence for ease of access and is equipped with back-wash water filters. The integrated safety valve MSE6-SV-E protects people and machinery. Despite its small size, it is sturdy, reliable and offers a high air supply and exhaust flow rate.

The MSE6-SV-E with Performance Level e guarantees that safety-critical system components are exhausted and de-energised quickly and reliably in the event of a sudden emergency stop. Thanks to its soft-start function, it also enables a gentle and safe restart without the need for any further complex programming of the controller.



Safety valve MS6-SV-E



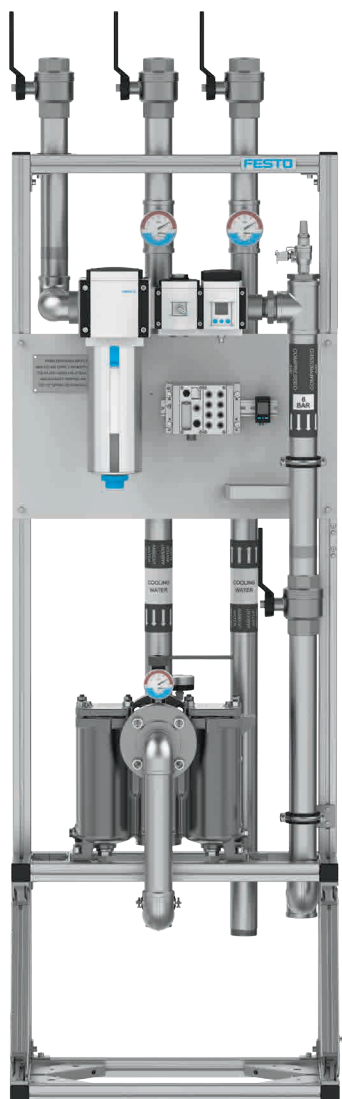
Core functions:

- + Integrated soft-start function
- + IFA certification to DIN EN ISO 13849-1, category 4, Performance Level e
- + Available either as an individual device or as part of a service unit

Hall installation plates (HIP)

High-flow filtering

This HIP in stainless steel design is used wherever high standards are required for cleanliness and compressed air flow rate. The integrated sintered filter MS12-LF with centrifugal separation removes dirt, rust and condensate from the compressed air and, depending on the connection, enables a flow rate of up to 16,000 l/min. It is supplemented by an integrated, switchable duplex water filter with differential pressure display. This enables easy maintenance during operation.



Filter MS12

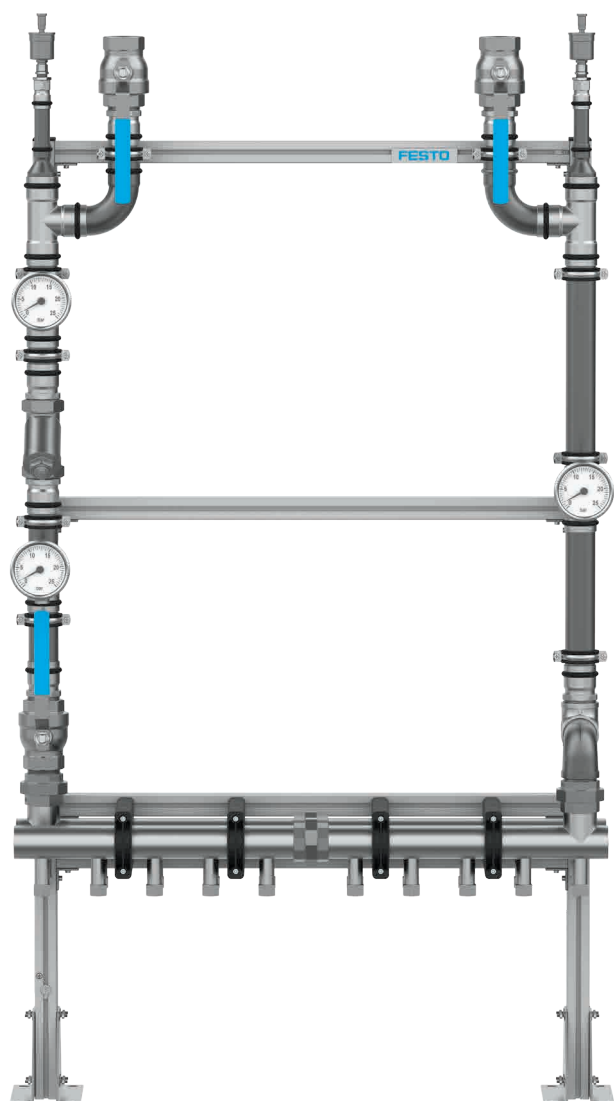


Core functions:

- + High flow rate of up to 16,000 l/min
- + Choice of 5 µm or 40 µm filter inserts
- + Available with automatically controlled condensate drain
- + Good particle and condensate separation
- + Interchangeable filter cartridges

Flexible connection

The HIP, made entirely from pressed stainless steel, has five direct outlets for robot installation plates and can be easily extended to up to 10 connections, making it ideal for supplying cooling water at high flow rates. Its integrated ball valve VAPB is resistant to acids and corrosion.



Ball valve VAPB



Core functions:

- + Corrosion- and acid-resistant versions available
- + Blow-out proof shaft safely fitted from the inside and two leakage ducts in the head flange
- + Spindle with female thread for fastening the hand lever

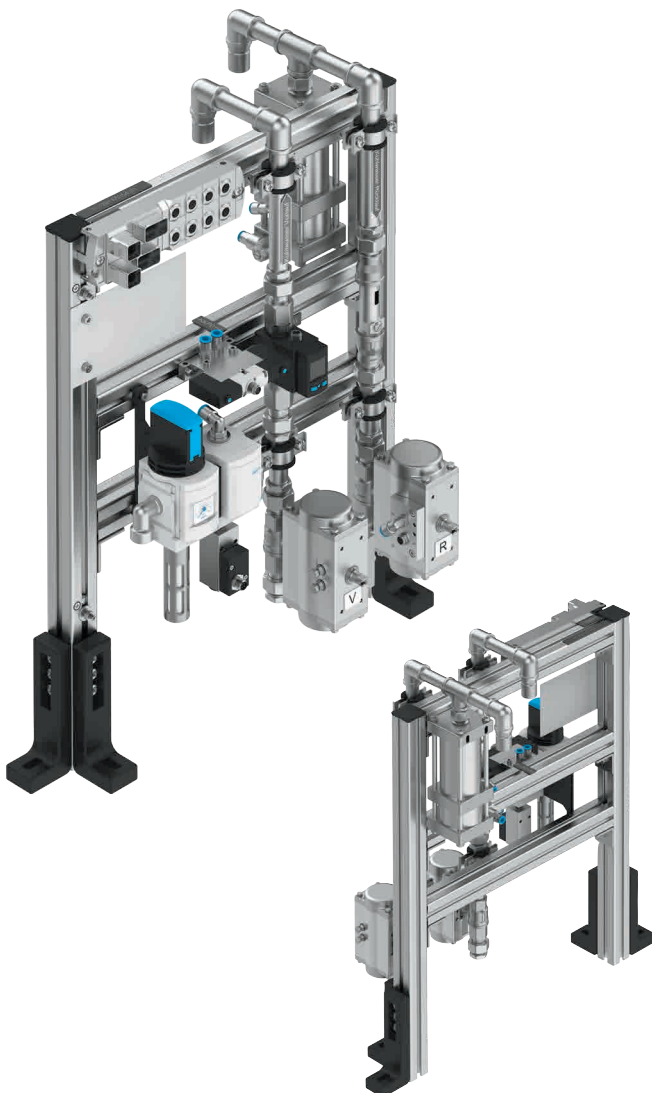
Robot installation plates (RIP)

Robot installation plates for welding cells

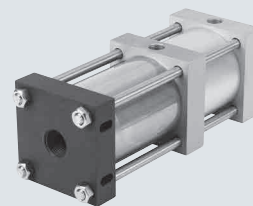
Robot installation plates (RIP) are generally installed inside the welding cell next to or on the robot foot and some can be accessed, for example for maintenance purposes. Their sensors and actuators filter, control and monitor the compressed air and cooling water flow rate to the robot. In addition, they can communicate data to the central controller via the remote I/O module and the plant-specific fieldbus. If necessary, both media can also be filtered.

Maintenance-friendly operation

To minimise leakages that occur when changing the electrode caps, an integrated retract cylinder draws the cooling water out of the welding gun circuit in the RIP below.



Retract cylinder D-63X2-....-SA

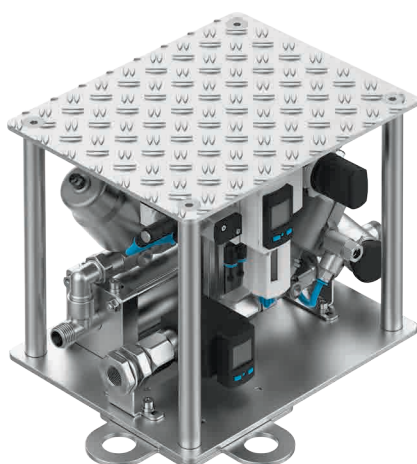
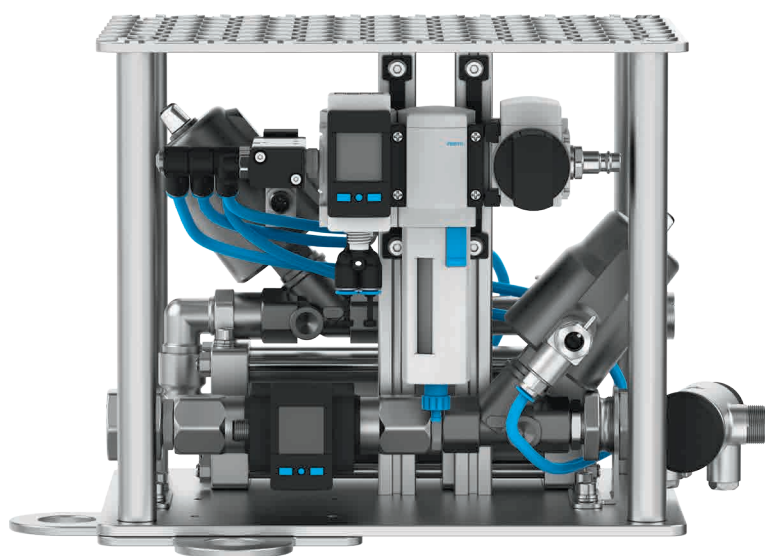


Core functions:

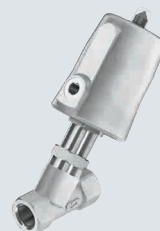
- + Retraction volume 100 ml or 200 ml
- + Any mounting type
- + Resistance to media
- + Side that comes into contact with media in stainless steel
- + Operating pressure up to 12 bar

Compact installation

The RIP in the compact square design has an interface so that it can be mounted directly on the robot foot. It is walkable and is extremely easy to maintain thanks to the removable plate. Although compact in design, this solution has all the components needed to filter, control and monitor the pressure and flow rate. The sturdy angle seat valve VZXF ensures a high level of protection against pressure loss in the control circuit.



Angle seat valve VZXF



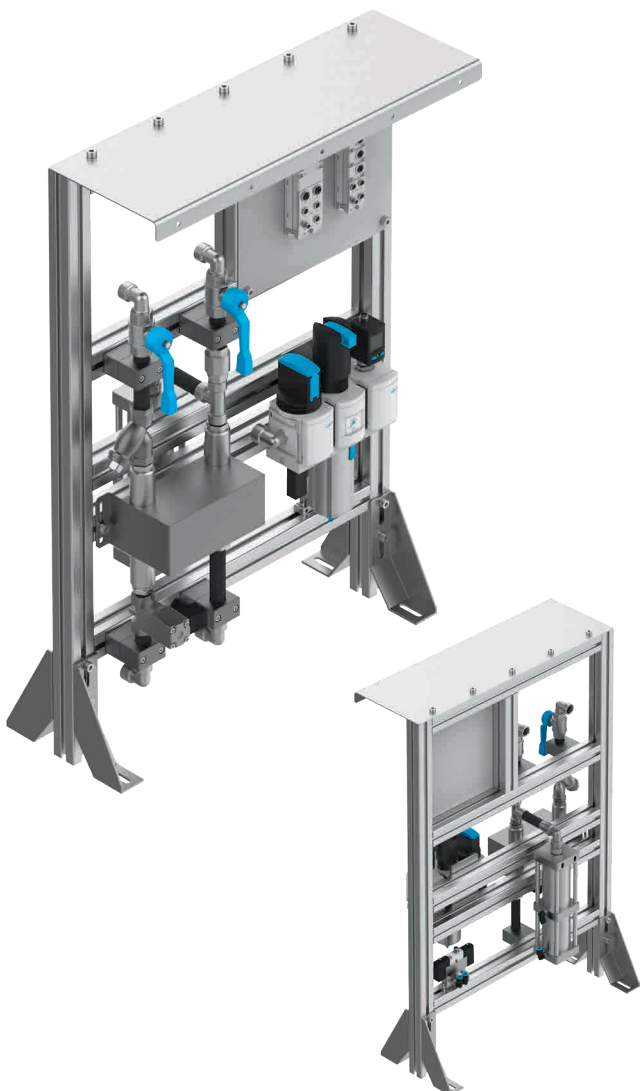
Core functions:

- + Robust enough for even viscous or contaminated media
- + Variants for different pressures, including for vacuum
- + Special material combinations and designs available
- + Safe even in case of pressure loss
- + Excellent value for money

Robot installation plates (RIP)

Decentralised communication

In addition to standard components for pressure and flow rate, there is also a flexible, decentralised remote I/O system with protection to IP65/IP67 integrated in this RIP variant: CPX-AP-I communicates with a higher-order controller using a real-time protocol, for example via PROFINET. This means that diagnostic messages can be recorded centrally and the causes of faults can be read out. Digital input/output modules also enable sensors and electrical loads to be connected.



PROFINET interface CPX-AP-I



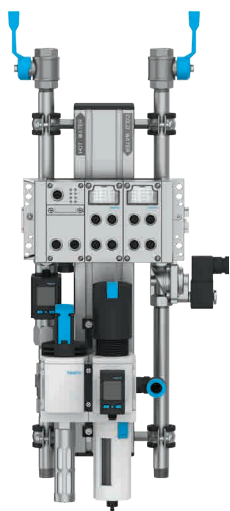
Core functions:

- + Connection of the field level to the IoT via CPX-IoT gateway
- + Short bus cycle times up to 250 μ s
- + 2 kB of I/O process data
- + Parallel data processing of real-time and non-real-time data
- + Connection of up to 80 individual modules or valve terminals via bus interface

Flexible and space-saving installation concepts

Column shape

The RIP solution on a column-shaped aluminium profile enables easy installation on the wall yet does not compromise on functionality. The service unit, controller, pressure sensor and flow sensor are optimally integrated. And the integrated sensor SFAW in the water return continuously monitors flow rate, consumption and temperature.



Flow sensor SFAW

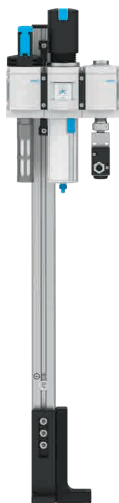


Core functions:

- + Rotatable display with colour changes
- + Modular electrical output concept for easy integration into various controllers
- + I/O-Link® capable

Zone stand

This simple and low-cost RIP design has a very small footprint yet covers the entire compressed air supply for the welding robots, even within a welding cell. An on/off valve, filter and integrated pressure switch PEV with switch function are ergonomically mounted and guarantee a basic functionality that is second to none.



Pressure switch PEV



Core functions:

- + Easy pressure adjustment
- + Switch function
- + M12 connection

Suitable components at a glance

Exactly as you imagine it

Make sure your production is ready for the future. Our range offers you plenty of flexibility, along with the option of standardisation in order to minimise spare parts storage and the amount of training required. Simply select the right components for you, and we ensure that everything in the solution works perfectly together.

Valve terminals



Automation platform CPX

- Integration of electric and pneumatic functions on one platform
- Integrated diagnostic and maintenance functions
- Safety on board
- Industry 4.0 compatible

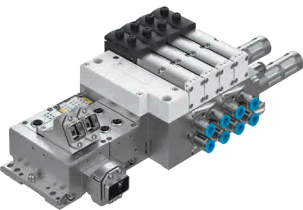
→ www.festo.com/catalogue/cpx



Decentralised remote I/O system CPX-AP-I

- I/O-Link® master and I/O-Link® device tool
- Digital and analogue inputs/outputs
- Short bus cycle times up to 250 µs
- Parallel data processing of real-time and non-real-time data
- Up to 500 modules in line, star and tree topology

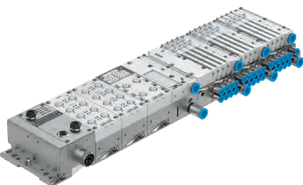
→ www.festo.com/catalogue/n_cpx_ap_zub



Universal standards-based valve terminal VTSA-F

- Five valve sizes can be combined on a single terminal
- Flow rate up to 4,000 l/min
- Electronic actuation: Ethernet, fieldbus, multi-pin, modular electrical terminal CPX, integrated controller, AS-Interface connection
- PROFIsafe, safety functions and diagnostic concepts can be integrated

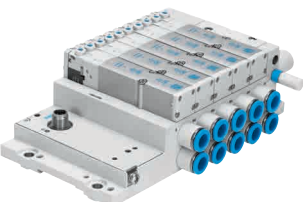
→ www.festo.com/catalogue/vtsa-f



Universal valve terminal MPA-FB-VI

- Fieldbus connection via modular electrical terminal CPX
- Three valve sizes
- Flow rate up to 700 l/min

→ www.festo.com/catalogue/n_pa_vimpa_f_b

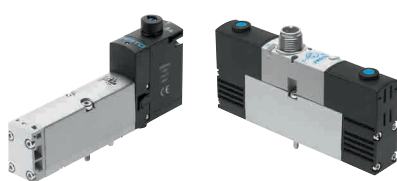


Universal valve terminal MPA-L

- Three valve sizes can be freely combined
- Tamper-proof fixed flow restrictor
- Multi-pin plug connection, I-Port/I/O-Link® and fieldbus connection via modular electrical terminal CPX

→ www.festo.com/catalogue/mpa-l

Valves



Standards-based valve VSVA

- Solenoid valve (single or double solenoid)
- Electrically actuated, piloted
- Flow rate 500 ... 2,900 l/min
- Sturdy metal housing

→ www.festo.com/catalogue/vsva



Universal directional control valve VUVS

- Solenoid valve (single or double solenoid)
- In-line valve as individual valve (piston spool valve)
- Pneumatic spring return
- Flow rate 550 l/min

→ www.festo.com/catalogue/vuvs

Pneumatic actuators



Quarter turn actuator DFPD

- Single-acting or double-acting
- Rack and pinion principle for constant torque characteristics
- Sturdy, non-slip and easy-to-clean aluminium housing
- Long service life, low wear

→ www.festo.com/catalogue/dfpd



Retract cylinder D63x2-...-SA

- For fast replacement of electrode caps without any water leaks
- Fast withdrawal of the cooling water from the welding gun's cooling water circuit and reliable shut-off of the water inlet and outlet
- Double-acting tandem cylinder
- Media resistance: side that comes into contact with media in stainless steel
- Retraction volume 100 ml, 200 ml

Suitable components at a glance

Compressed air preparation



MS series service units

- Individually configurable service units consisting of filter regulator, filter, lubricator, on/off valve, soft-start valve
- Grade of filtration 0.01 ... 40 µm
- Integrated sensors and safety functions

→ www.festo.com/catalogue/msb



Filter MS...-LF

- Filter for purifying the compressed air for various quality classes
- Flow rate 1,000 ... 16,000 l/min
- High flow rate performance with minimal pressure drop
- Choice of manual or automatic condensate drain

→ www.festo.com/catalogue/ms-lf



Filter regulator MS...-LFR

- Filter and regulator function integrated in a single unit to save space
- Flow rate 140 ... 24,000 l/min
- With or without secondary exhausting
- Lockable rotary knob

→ www.festo.com/catalogue/ms-lfr



Precision pressure regulator MS6-LRP

- Max. pressure hysteresis 0.02 bar
- As individual device and for manifold assembly
- Manifold assembly with through air supply
- Lockable rotary knob

→ www.festo.com/catalogue/ms6-lrp



On/off valves MS...-EE/MS...-EM

- For pressurising and exhausting pneumatic systems
- Manually or electrically actuated
- Optionally with pressure gauge, pressure sensor, silencer

→ www.festo.com/catalogue/ms-e



Soft-start valve MS6-DL

- 2/2-way valve for slowly pressurising pneumatic systems
- Adjustable pressure build-up time
- Operating pressure 2 ... 20 bar
- Pneumatically actuated

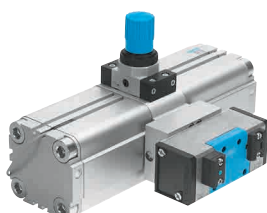
→ www.festo.com/catalogue/ms6-dl



Soft-start/quick exhaust valve MS6-SV

- For reducing pressure quickly and reliably and for building up pressure gradually
- Reliable 2-channel exhausting with self-monitoring up to Performance Level e
- Electrically actuated

→ www.festo.com/catalogue/ms-sv



Pressure booster DPA

- For boosting the pressure in one section of the system (pressure ratio 1:2)
- Flow rate 300 ... 3,000 NI/min
- Available with sensing option
- For greater energy efficiency through reduced network pressure and selective decentralised pressure boosting

→ www.festo.com/catalogue/dpa



Energy efficiency modules MSE6-C2M/D2M/E2M

- Combination of flow sensor and shut-off valve with pressure sensor
- Monitoring the compressed air consumption and supply
- Shuts off the compressed air supply after production has stopped for a certain amount of time
- Automatic leakage detection
- For energy-efficient operation of pneumatic systems

→ www.festo.com/catalogue/mse6

Suitable components at a glance

Sensors



Pressure switch PEV

- Electromechanical pressure switch
- Pressure range 1 ... 12 bar
- Adjustable switching point
- Certification: CCC, c UL us – Recognized (OL), RCM Mark

→ www.festo.com/catalogue/pev



Pressure sensor SPAN

- Pressure switch/vacuum switch
- Pressure measuring range –1 ... 16 bar
- High-contrast, blue backlit display
- Data exchange and parameterisation using I/O-Link®

→ www.festo.com/catalogue/span



Pressure sensor SPAU

- Pressure switch/vacuum switch
- Pressure measuring range –1 ... 16 bar
- Maximum flexibility thanks to a wide range of pneumatic adaptations and switchable electrical outputs
- M12 connection and I/O-Link®

→ www.festo.com/catalogue/spau



Flow sensor SFAM

- Flow measuring ranges 10 ... 15,000 l/min
- Stand-alone device or combined with components from the MS series service unit
- Supplies absolute flow information and accumulated air consumption measurements
- Large, illuminated LCD display

→ www.festo.com/catalogue/sfam



Flow sensor SFAW

- Flow rate range 1.8 ... 100 l/min
- Operating medium: liquid media, water, neutral liquids
- With optional integrated temperature sensor
- Connection to higher-order systems via 2 switching outputs, an analogue output and/or an I/O-Link® interface

→ www.festo.com/catalogue/sfaw

Other pneumatic devices



Air reservoir CRVZS

- Volume up to 20 l
- Corrosion-resistant, high-alloy steel
- With optional condensate drain
- Designs to EU Pressure Equipment Directive

→ www.festo.com/catalogue/crvzs

Connection technology



Fittings and tubing

- Push-in fittings made of plastic or stainless steel for high pressure and temperature ranges
- Designs resistant to welding spatter
- Tubing for corrosive media and aggressive ambient conditions, UV resistant, PTFE designs for especially high requirements

→ www.festo.com/catalogue/N_071000

Suitable components at a glance

Process valves



Ball valve QH

- Manually actuated with hand lever
- Suitable for compressed air and water as operating medium
- Connecting thread G1/4 ... G1 1/2

→ www.festo.com/catalogue/qh



Ball valve VAPB

- Automatable 2-way ball valve
- Corrosion-resistant and acid-resistant versions
- Blow-out proof shaft
- Flange hole pattern to ISO 5211

→ www.festo.com/catalogue/vapb



Solenoid valve VZWP

- Piloted poppet valve
- For high pressures and high flow rates with relatively small solenoids
- For controlling gaseous and liquid media in open circuits

→ www.festo.com/catalogue/vzwp



Angle seat valve VZXF

- For liquids, gases and other easily contaminated media
- Closes reliably when pressure drops thanks to N/C function
- Easy-to-clean design

→ www.festo.com/catalogue/vzxf



Globally manufactured, tested and delivered

We're there for you. Whether in China, Europe or America. Our competency centres and manufacturing facilities advise and support you in planning and implementing your projects.



While we design, build and document the perfect solution for you, you save time and money.



You can also rely on the quality since our components/ systems are extensively checked in our testing facilities before they are delivered.

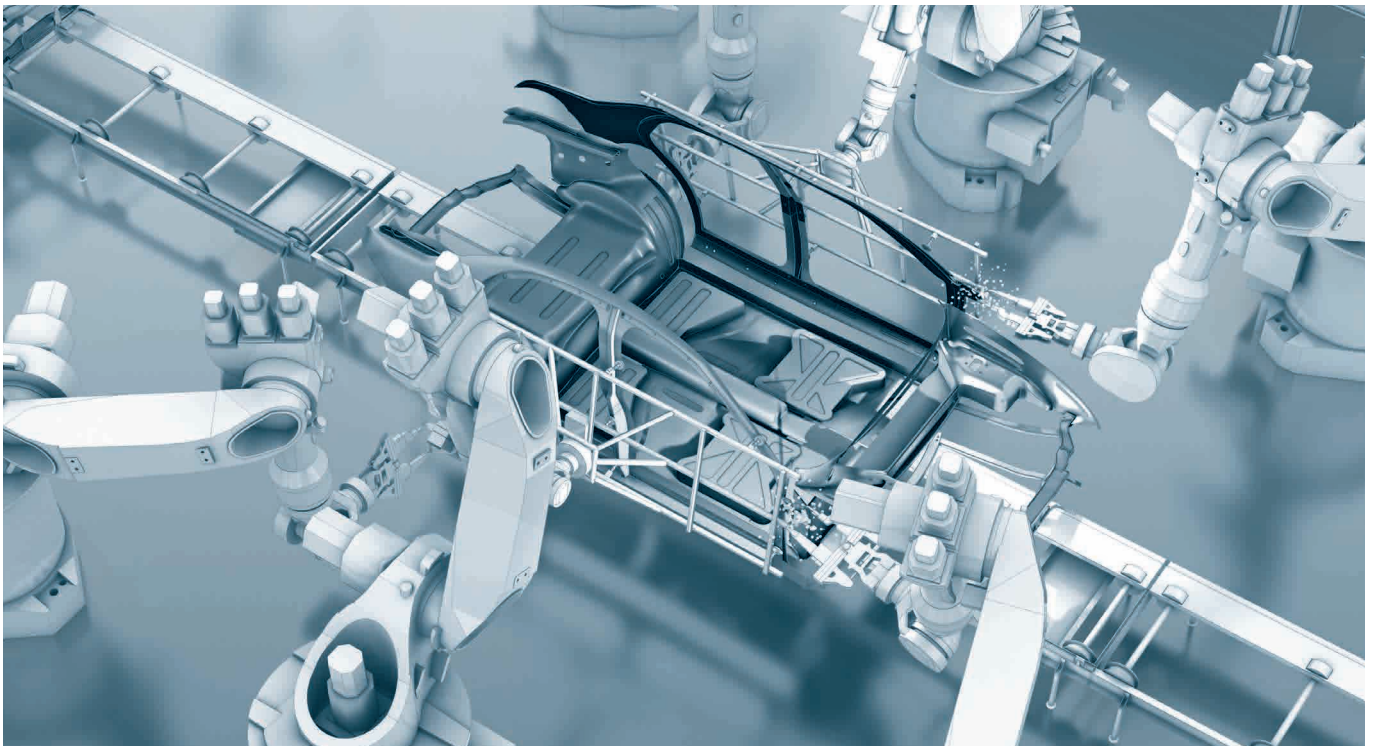
Drive solutions for welding guns

Festo offers more

Welding guns need to be precise and reliable, and are also subject to extreme conditions. It is not just the reproducibility of the spot welds that plays a significant role in the quality and efficiency of the welding process; flexibility and speed are just as important.

For many decades, we have been supporting our customers in automotive body manufacturing as an automation partner. We know the challenges and are constantly working on optimal solutions, like our drive solutions for welding guns. You decide which is best for you – the X gun or the C gun, servo-pneumatic or electric. We ensure that your welding guns are commissioned and working properly in no time at all.

Our drive solutions reduce the risk of sheet metal damage through pneumatic welding gun compensation, while reducing the time required for robot programming. With our drive concept, servo-pneumatic and electric welding guns can be combined in low-pressure networks. This can be done in one production line or cell thanks to the standardised maintenance and commissioning software. This reduces investment costs and the amount of training required.

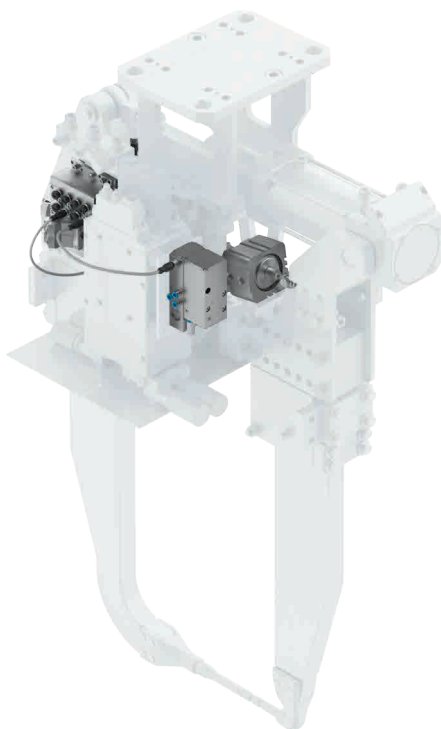


The benefits of our drive solutions at a glance:

- + A mix of technologies: servo-pneumatics and electrics can be easily combined in one welding cell or line
- + Standardised maintenance and commissioning software: automatically detects the welding gun and type in the cell and reduces investment costs and the amount of training required
- + Pneumatic compensation: reduces the risk of sheet metal damage and shortens the time required for robot programming
- + Intelligent system components: enable data exchange with the higher-order controller, monitoring of the processes and modelling in the Industry 4.0 environment
- + Standalone welding gun function: independent of the robot manufacturer or software packages

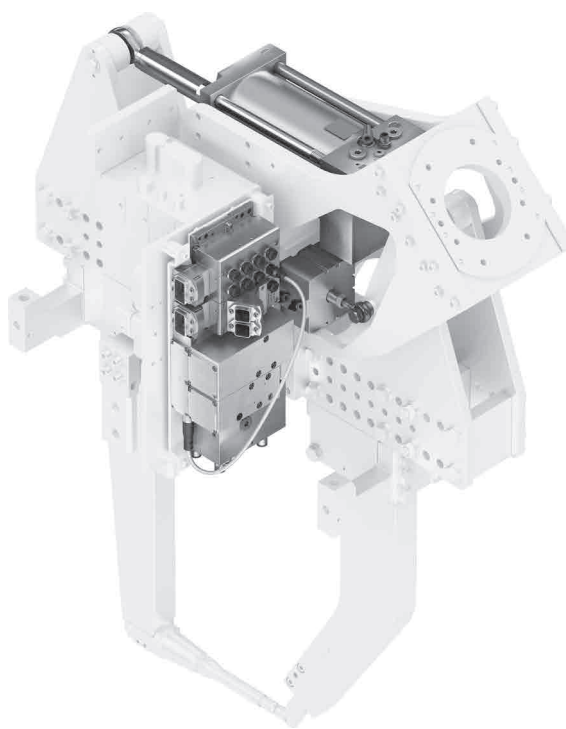
Electric drive solution

High energy efficiency with high forces



Servo-pneumatic drive solution

High speed and dynamic response thanks to different drive sizes



The data provided enables the intelligent system components to monitor the processes and model them in the Industry 4.0 environment. Bidirectional communication makes for easy commissioning as each component has an electronic rating plate so it can be clearly identified during commissioning and for condition monitoring during operation.



Mehdi Tohid
Project Manager HIP/RIP

“Benefit from our many years of experience and competency in Industry 4.0. As a future-oriented partner, we develop intelligent and energy-saving solutions for you – perfectly tailored to your application. Make it easy for yourself, talk to us!”

You rely on expert knowledge.
You want to free up time for your core competencies.
We will help you get ahead with our ready-to-install solutions.

→ **WE ARE THE ENGINEERS
OF PRODUCTIVITY.**