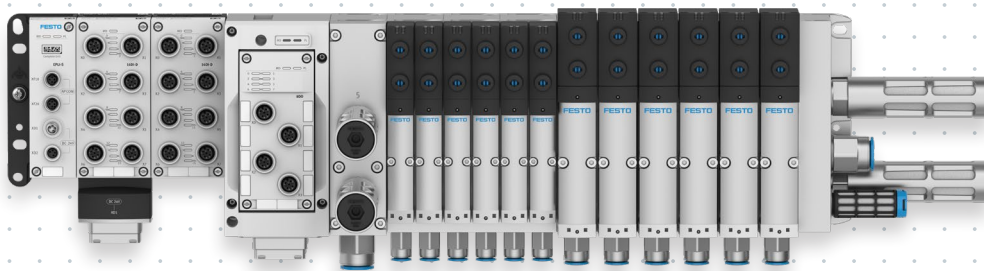




Standards-based valve terminal VTSA

Maximum functionality – now with CPX-AP-A / -I



Highlights

- **New:** serial communication with VTSA-F-CB
- Maximum function integration
- Very high flow rate – up to 2,900 l/min
- 4 valve sizes on one terminal possible without an adapter
- Certifications: CE, UKCA, ATEX, UL-us, UL-ca, KC-EMV, C-Tick, BIA, RoHS
- Valve replacement during operation (hot swap)
- Reverse operation of valves and pressure regulators
- V ACuum generators
- Pressure zones
- Diagnostic concept
- Vertical stacking
- Safety@Festo, PROFIsafe

The VTSA is ideal for maximum pneumatic and electrical function integration. And the mix of 4 valve sizes on one valve terminal is unique! Fully ISO 15407-2 and ISO 5599-2 but highly integrative. It can also be used as a complete installation solution for large-scale machine concepts. For optimal flow rates, choose the VTSA-F. For optimal communication, select VTSA-F-CB.

Flexible and easy electrical installation!

The terminal CPX can be used with all common fieldbus systems or Ethernet. It also has an integrated diagnostics concept.

Integrated safety

Intelligently combined standard components and safety valves fulfil the requirements of ISO 13894-1 and the EU Machinery Directive.

Total process safety

It can even be used in harsh environments: the sturdy metal housing, completely sealed valves, as well as the ducted exhaust air and pilot air protect against failure in fine dust environments.

Communicative

Serial communication for significantly more applications: the internal bus system provides 96 valve addresses and up to 4 voltage zones, of which 3 can be safely disconnected. In addition, there are even more powerful

modules such as the soft-start valve or the integrated V ACuum generator for VTSA-F-CB.

Cost-efficient

Having four valve sizes on one valve terminal together with the modular system saves energy and money because the required flow rate can be better adjusted per valve position.



Additional information:

Industrial electrical automation
> <http://www.festo.com/ea>

Product pages

> [VTSA](#)
> [CPX-AP-A](#)

Engineering tools

> [Festo Automation Suite](#)
> [Engineering tools](#)
> [Connectivity Finder](#)

Support tools

> [Conceptualisation and design](#)
> [Assembly and commissioning](#)
> [Operation and modernisation](#)



VTSA plus CPX-AP-A: Standards-based perfection – integrated communication and safety

Function integration for maximum efficiency

It's all thanks to function integration: never before has an ISO valve terminal offered such a degree of flexibility. The sturdy, highly adaptable and modular design of the VTSA makes it very popular with the automotive industry. It is also well-thought of by many other industry segments that prefer standardised products and high flow rates yet also require high flexibility and modularity. Both the VTSA-F with its optimised flow rates and maximum output, and the safety functions of the VTSA contribute to this success, while the VTSA-F-CB with serial communication is new to the range. This is Safety@Festo – directly in the application.

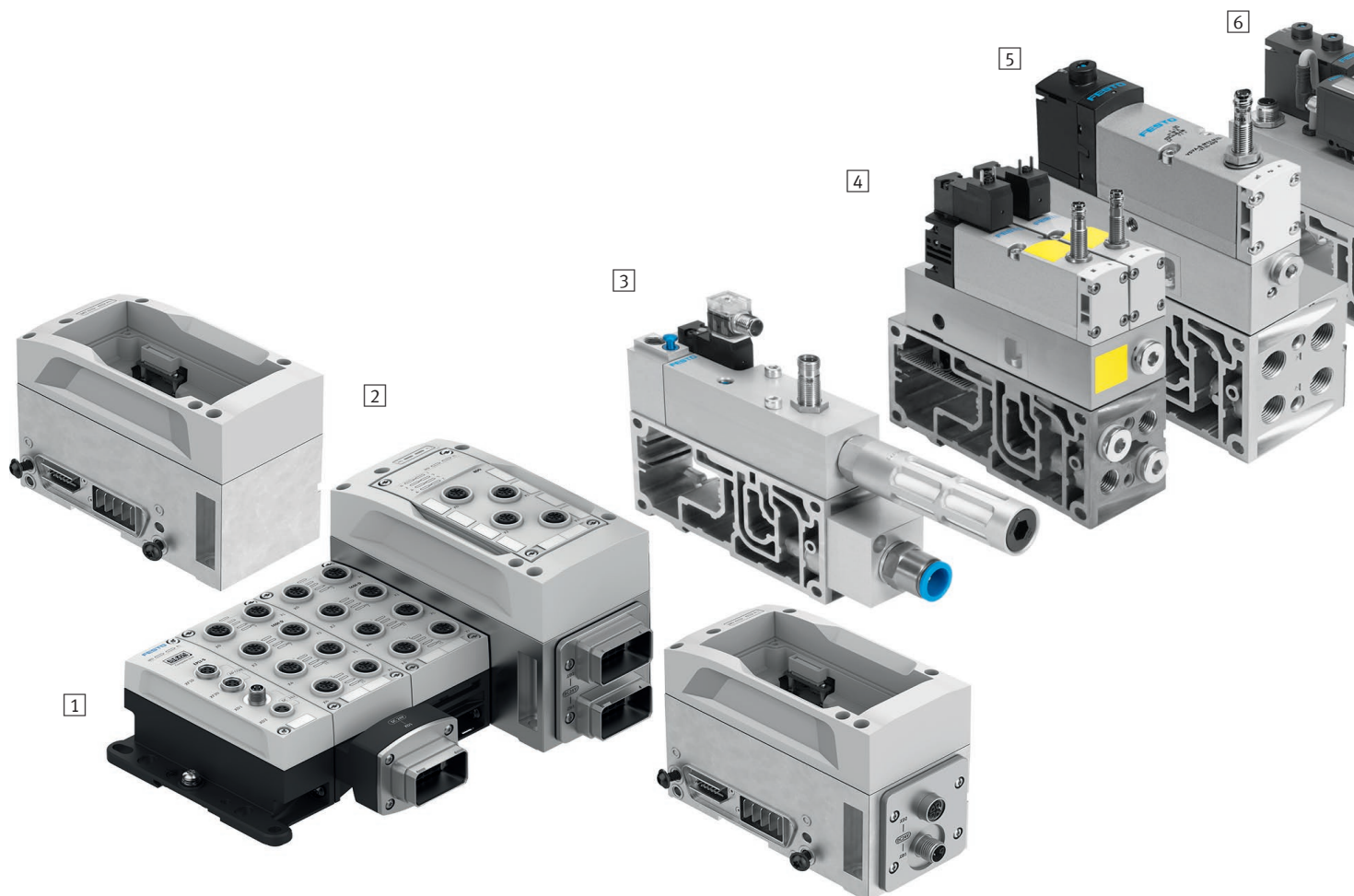
VTSA thus minimises your total cost of ownership (TCO).

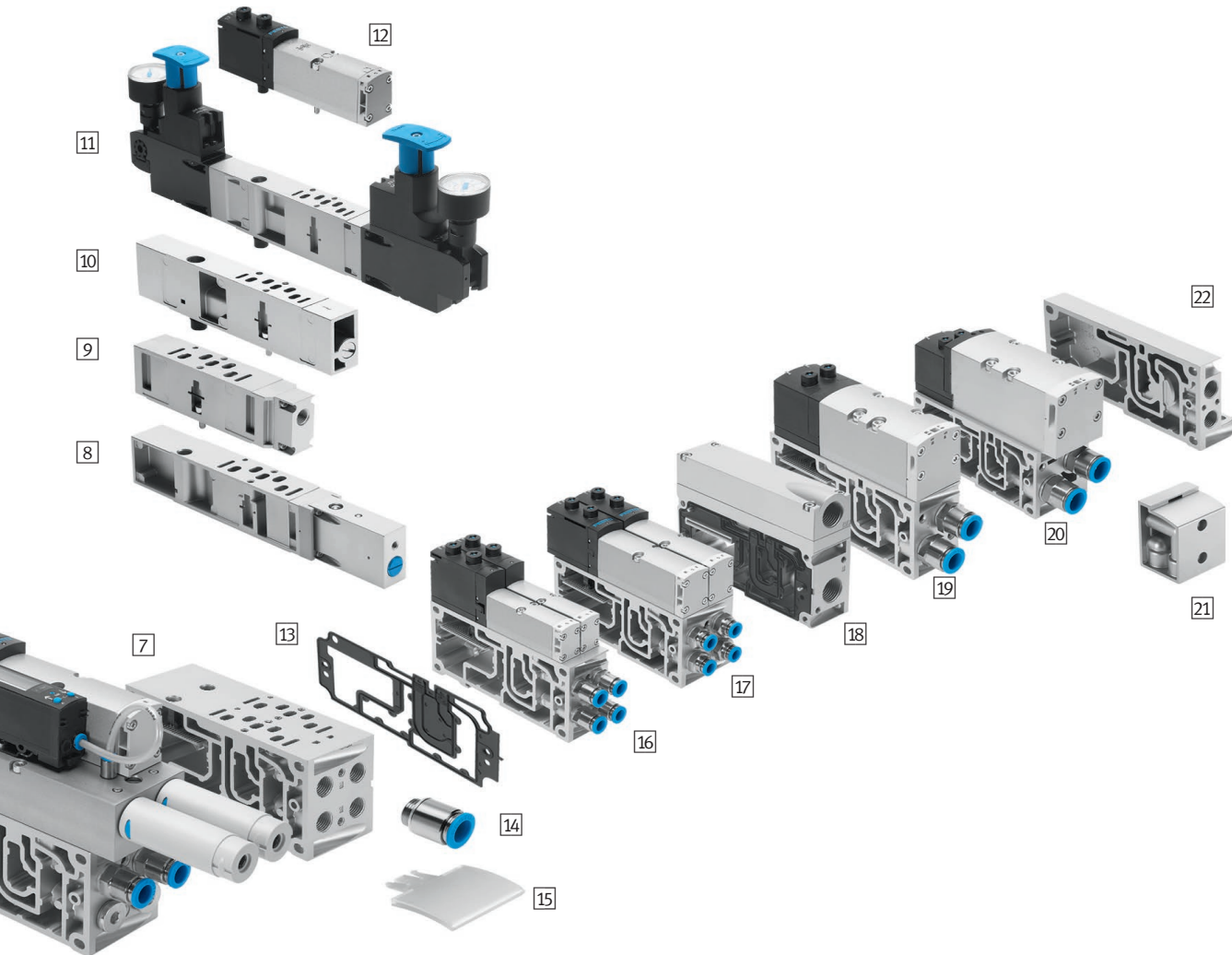
Valve terminal VTSA – overview of functions

Tip for fine dust environments

Making converting valves easy!

Simply turn the valve seal for ducted exhaust air/pilot air. The valves can then be used in fine dust environments.





- 1 Modular remote I/O CPX-AP-A (details → page 6)
- 2 Pneumatic interface, optionally with power supply
- 3 Safety@Festo: soft-start valve VABF-S6
- 4 Security@Festo: 5/2 safety control block
- 5 Safety@Festo: control air switching valve size 02, 18 mm
- 6 V ACuum generators
- 7 Manifold sub-base
- 8 Vertical pressure shut-off plate
- 9 Vertical supply plate
- 10 Throttle plate
- 11 Manual pressure regulator plate, optional for dual-pressure operation

- 12 Sub-base valve with captive screws
- 13 Separating seal
- 14 Push-in fitting
- 15 Inscription label
- 16 2x valve size 2, 18 mm
- 17 2x valve size 1, 26 mm
- 18 Pneumatic supply plate
- 19 1x valve size. 1, 42 mm
- 17 1x valve size 2, 52 mm
- 21 Angled connection plate
- 22 Selector end plate with coding cover



Modular remote I/O system CPX-AP-A – stand-alone or with valve terminal

The goal is to have unrestricted and seamless connectivity, embedded in future-ready and compatible concepts for the flexible automation of complete machines or individual machine modules. That is why Festo offers mechanical, electric and intelligent automation modules that work together perfectly and do not impose any technical limitations.

Combined on the Automation Platform (AP)

The Automation Platform (AP) from Festo forms the basis for a new generation of remote I/O or RIO systems that enables a freely scalable, flexible and powerful system architecture. The AP uses a hybrid approach to combine modular CPX-AP-A and decentralised CPX-AP-I structures. Remote I/O and control technology are thus combined with electric and pneumatic automation technology to create a comprehensive architecture.

Combined with pneumatics

Many of the valve terminals from Festo, such as MPA, VTUX, VTSA and VTUG, can be very flexibly integrated into the system using AP communication. They are either connected directly to the CPX-AP-A or integrated into a decentralised system as a stand-alone valve terminal using the AP interface. In addition, all IO-Link®-capable valve terminals can be integrated into the AP via IO-Link® master. This means that both CPX remote I/O systems and AP communication allow the valve terminals to be freely and flexibly integrated in the machine architecture.

Combined with electric drives

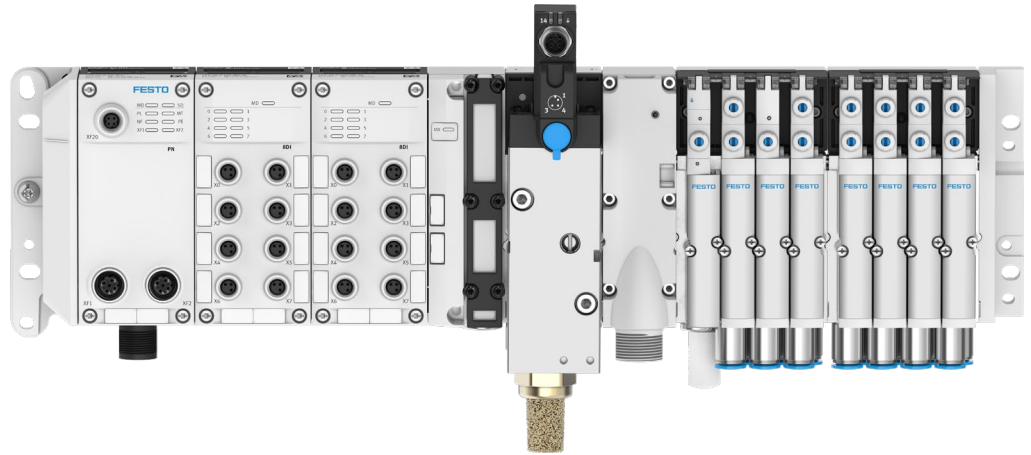
All electric drives from the Simplified Motion Series can be connected directly to the remote I/O systems via IO-Link®. A wide variety of linear and rotary electric movements can thus be an integral part of technology-independent automation concepts based on AP and can be flexibly integrated into different networks.





Highlights

- Highly flexible remote IO system in IP65/IP67
- Stand-alone system or in combination with a valve terminal from Festo
- Various I/O modules and IO-Link® are available, including for electric drives
- Maximum level of performance thanks to AP communication in real time: 200 MBaud and 250 µs cycle time
- Simple and convenient configuration, quick commissioning of the entire AP system architecture



The lightweight CPX-AP-A remote I/O system is integrated directly into Ethernet-based networks that are available worldwide. A variety of additional input and output modules as well as IO-Link® master modules are also available. Pneumatic valve terminals and proportional technology as well as Controlled Pneumatics that are adapted directly or integrated via AP communication, can be used to create a scalable system topology.

Electric drive technology for linear and rotary movements can be connected via IO-Link®.

Modular

The complete terminal with up to 15 I/O modules forms the backbone of state-of-the-art automation topologies that are open for future developments. The CPX-AP-A is highly flexible, both in terms of electrics and mechanics thanks to I/O modules, flexible connection technology, valve terminals and a variable voltage concept. The AP communication combines modular and decentralised structures that are freely scalable in terms of terminal size and range of functions to match the requirements of the application.

Highly communicative

The AP communication takes place in real time with a transmission rate of 200 Mbit full duplex and processes a large amount of incoming and outgoing process data of 2 kByte each. An AP communication system comprises up to one master and 80 modules, including I/O modules and IO-Link® master modules with powerful point-to-point communication from the CPX-AP-A and AP-I to the valve terminals and sensors.





Modularity of the CPX-AP-A at a glance

The remote I/O system CPX-AP-A is all about modularity. The modules can be combined and positioned as required and they can be arranged in a way that best suits your control concept. Rearranging them later on is not a problem either, and can be done mechanically or during commissioning and programming using the Festo Automation Suite. All I/O modules, the IO-Link® master and especially the fieldbus

module provide this high degree of flexibility. All modules can be freely positioned, independently of the power supply and possible voltage zones. This high level of modularity applies equally to electric and pneumatic systems of the most important valve terminals.

1 Intelligent end plate

Cost-effective and compact AP communication interface on the stand-alone RIO or RIO terminal with valve terminal

- For connection with other AP participants
 - Modular RIO terminal CPA-AP-A
 - Decentralised RIO modules CPX-AP-I
 - Valve terminals with AP interface
- Two variants for 24 V DC power supply
 - Only voltage output for additional AP participants, internal power supply with system supply at the RIO terminal
 - Voltage input for the RIO and voltage output for other AP participants without valve terminals
- Mounted in place of the left end plate

2 Input and output modules

All modules can be combined as required and can be flexibly connected in series.

- Digital 8/16-way input and output modules, in future also 32-way
- Analogue 4/8-way input and output modules
- Connection technology M8, M12 and terminal strip (IP20).

3 Interlinking module

The modules without power supply forward voltage and communication from one module to the next and to the valve terminal.

4 LEDs for diagnostics

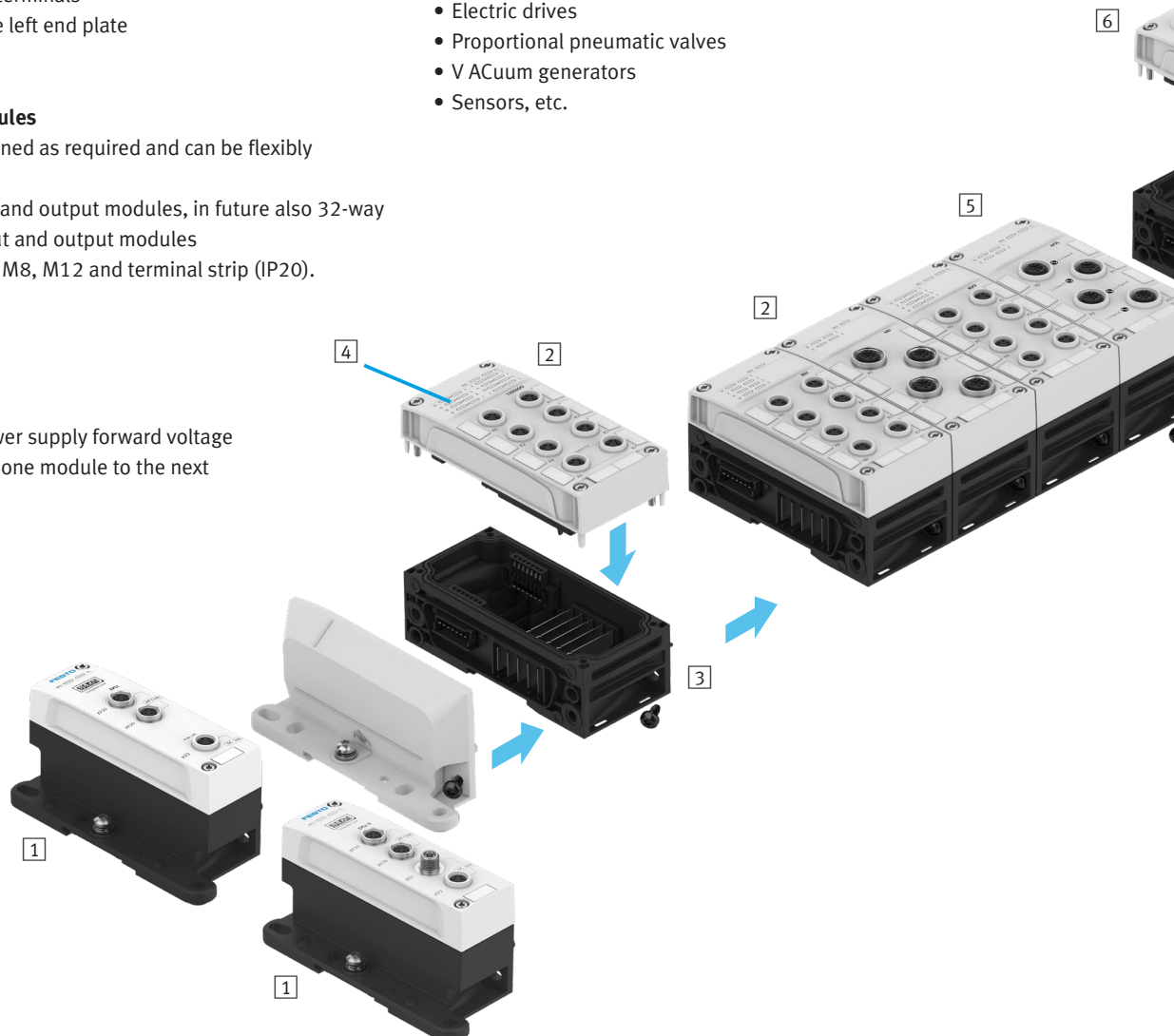
Module-specific LEDs indicate the operating status of the module or the connected sensors and actuators, such as

- Communication
- Power supply
- Channel status
- Input/output diagnostics

5 IO-Link® master

For exchanging data with any decentralised IO-Link® device at field level, such as

- Electric drives
- Proportional pneumatic valves
- V ACuum generators
- Sensors, etc.





6 Fieldbus module

- The CPX-AP-A is connected to a higher-level control system via the bus interface for communication in Ethernet-based networks.
- High data transfer rate
- Transmission of non-real-time-critical information, e.g. for diagnostics and configuration
- Sufficient Ethernet bandwidth to transmit real-time and non-real-time data in parallel
- The position of the module can be freely selected, regardless of the 24 V DC system supply.

8 Pneumatic interface

The pneumatic interface is the mechanical adapter between the RIO modules and the attached valve terminal

- Interfaces for VTUX and MPA-S
 - Integrated flat plate silencer
 - Compressed air supply port
 - Internal pilot air / external pilot air
- Interface for valve terminals VTSA
 - Module position for any CPX-AP-A module, e.g. bus interface, I/O module, IO-Link master
 - Optional voltage supply and voltage forwarding
 - Short-circuit shutdown, short-circuit diagnosis

9 Valve terminal variants

There is a choice of different valve terminals. These are permanently connected to the modular RIO via their pneumatic interface:

- Sturdy and powerful: VTSA
- Highly modular: VTUX
- Very compact: MPA-S

Material selection

The modules and interlinking blocks are made of sturdy, high-quality polymer with fibreglass.

- Flame retardant and halogen-free, e.g. for welding
- High electromagnetic compatibility
- Lightweight
- Without epoxy resin, environmentally friendly and easily recyclable
- Metal is used wherever necessary because of standard requirements or for assembly.
- Metal screw connections on the system supply
- Metal sleeves for shielding on plug connectors
- End plates and pneumatic interfaces between the electrical system and valve terminal

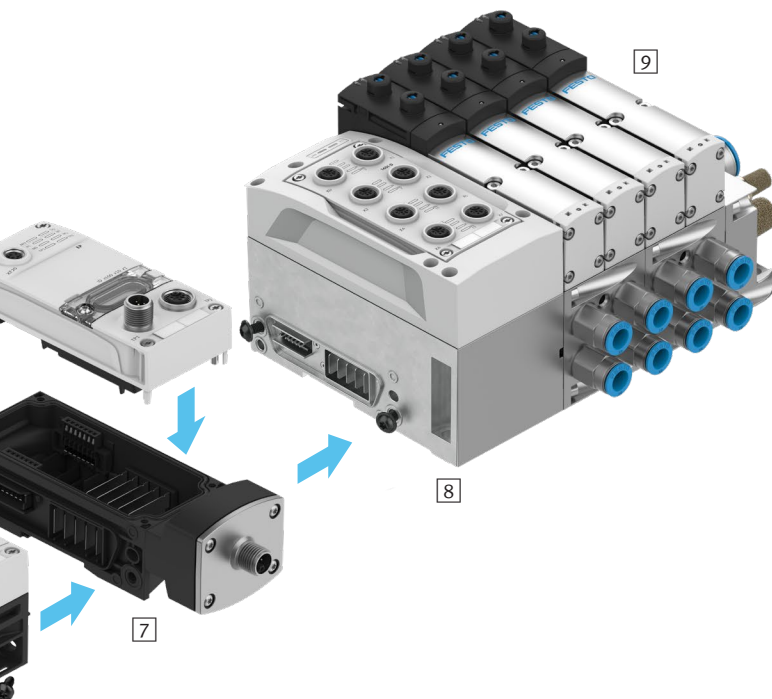
Assembly of the CPX-AP-A remote I/O

The interlinking blocks are made of high-quality polymer with fibreglass and are mechanically connected using screws instead of tie rods.

- The connection can be undone and fastened again several times.
- The RIO terminal can therefore be flexibly expanded at any time.

Maximum number of modules per terminal: 15

These consist of a fieldbus, intelligent end plate, inputs and outputs, IO-Link® master.



7 Interlinking module with power supply

The 24 V DC supply voltage is supplied to the CPX-AP-A at the interlinking modules and reliably forwarded to the CPX-AP-A modules and the valve terminal:

- Electronics of the automation system CPX-AP-A (system voltage)
- Inputs, outputs and valves (load voltage)

In addition, there are special variants for supplying outputs, as well as valves for creating voltage zones. The electronics are still supplied by the main power supply:

- Supply to the right
- Supply to the left only

In each case, one side is separated from the other. There are also interlinking modules with 24 V DC forwarding supply. These supply additional AP participants or external components.



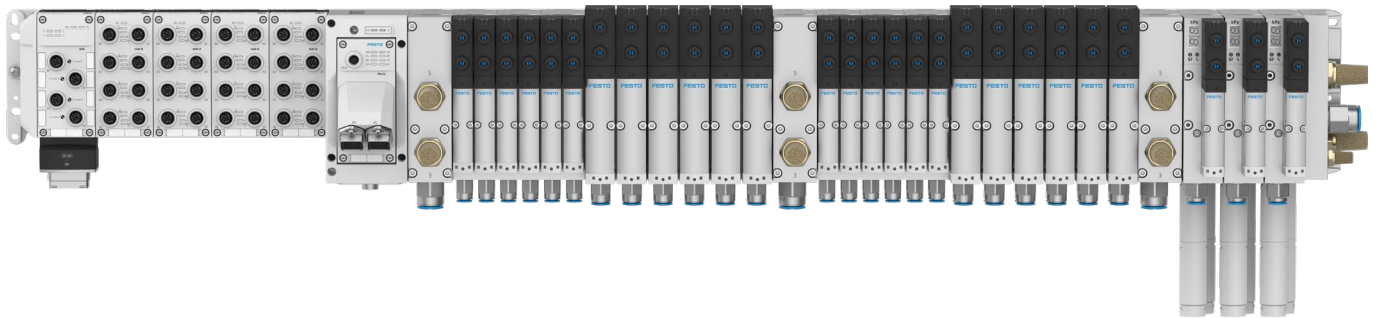
CPX-AP-A – a complete terminal: Modular remote I/O plus directly adapted valve terminal

Up to 15 modules in IP65/67 can be integrated into the modular remote I/O CPX-AP-A. Together with the connected valve terminals, which are also available as industry and application-specific versions, this creates a complete terminal with a high level of functional integration. This terminal can be installed directly in the machine, both in terms of the electrics and the pneumatics.

It can be quickly, easily and reliably configured and commissioned as a single unit in the Online Shop using the Festo Automation Suite. The product is delivered fully assembled and always fully tested.

3 highlights

- 1 terminal: electric RIO and pneumatic valve terminal
- Many I/O modules to choose from
- Configuration, ordering, delivery and assembly as a full-service unit



This flexibly configurable valve terminal is sturdy and durable, and is available in several sizes in accordance with ISO 15407-2 / 5599-2 (VTSA-FB-AP) or as a flow-optimised variant (VTSA-F-FB-AP / VTSA-F-CB-AP). Four sizes can be mixed and matched without an adapter plate. The VTSA features various options for function integration, innovative functional modules (pneumatic and mechanical) and numerous safety functions.

The advantages of this combination speak for themselves: the remote I/O with the valve terminal represents 1 component that you can simply install directly in the application. This makes your system layout clearer, as everything is centralized in one place in the machine. And seamless engineering from initial configuration through to commissioning greatly reduces your workload.

- Many valve variants with multiple functions : 5/2, 5/3 and 2x 3/2, as well as 2x 2/2-way with special functions
- Up to 96 solenoid coils in multiple voltage zones (VTSA-F-CB-AP)
- High flow rates from 550 ... 2,900 l/min
- Comprehensive vertical stacking, e.g.
 - Pressure regulating plates on one or both sides, with pressure gauge
 - Throttle plates and pressure shut-off plates
- Option to create multiple pressure zones thanks to additional supply and exhaust plates
- Freely selectable module sequence
- 1 type code for RIO and VI
- Delivered 100% tested
- Easy, direct access to the machine
- Clear machine layout
- Cost-efficient design

A technical sensation with many highlights

- Remote I/O with protection class IP65/67
- Up to 15 modules in the RIO, connected in series as required
- Communication via Ethernet-based fieldbus and AP communication
- 4/8-way input and output modules, in future also 32-way
- Freely positionable voltage supply
- Separated system voltage and load voltage
- Intermediate supply for voltage zones
- Power forwarding for other system components
- Lightweight thanks to sturdy, high-quality polymer with fibreglass
- Application-optimised valve terminal variants
- Full range of functions and valve terminal range in every size
- Pneumatic interface with diagnostics LED and special additional features for each valve terminal type
- 100% electrically, mechanically and pneumatically tested
- Digitalisation of pneumatics all the way to the cloud via AP



CPX-AP-A – decentralised architecture:

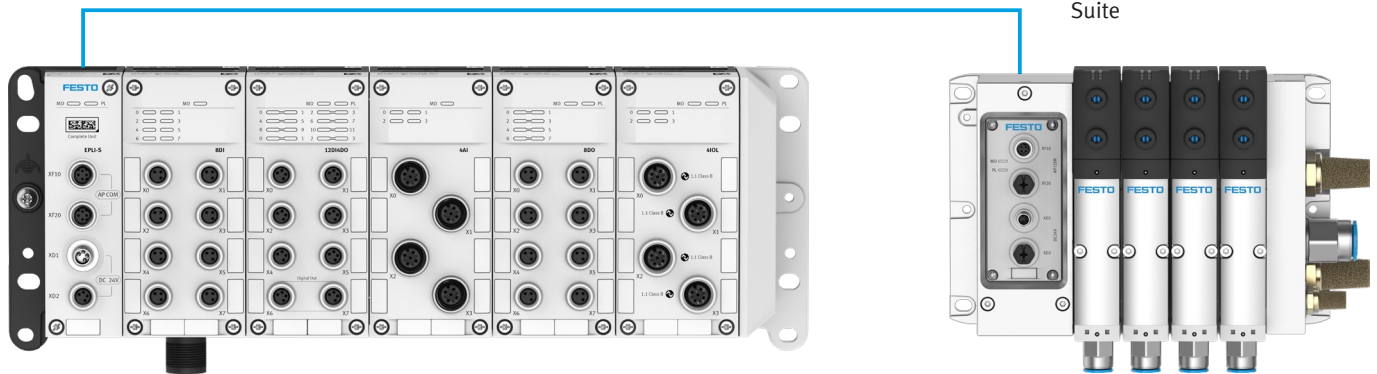
Modular remote I/O stand-alone system plus valve terminals via AP communication

The modular stand-alone RIO CPX-AP-I communicates with up to 15 modules in real time. The valve terminals are connected via AP communication. Thanks to protection class IP65/67, the RIO and the terminals can be directly installed in the machine, even in the case of industry- and application-specific valve terminals.

Configuration of the individual modules in the Online Shop is flexible, quick, easy and reliable, since they can all be commissioned together via the Festo Automation Suite.

3 highlights

- The modular stand-alone RIO and pneumatic valve terminal communicate in real time
- Wide range of I/O modules and valve terminal types to choose from
- Quick and easy commissioning of all participants as a system using the Festo Automation Suite



The versatile and configurable standard valve terminal VTSA offers many optional function integrations and safety functions. The 4 valve sizes can be combined on a valve terminal without an adapter plate. Up to 96 solenoid coils can be fitted in several voltage zones on one valve terminal VTSA. Thanks to its sturdy and durable components the VTSA is also suitable for demanding industrial applications.

- Numerous valve variants with a wide range of functions: 5/2, 5/3 and 2x 3/2, as well as 2x 2/2-way valves
- Extensive vertical stacking options
- Supply and exhaust plates for multiple pressure zones are available

A technical sensation with many highlights

- Remote I/O with protection class IP65/67
- Up to 15 freely stackable modules in the RIO
- Communication with the higher-level control system via Ethernet-based fieldbus
- AP communication between the RIO and the valve terminal and other AP participants
- 4/8-way input and output modules, in future also 32-way
- 24 V DC voltage input and forwarding on to the AP interface for electronics and valves
- Freely positionable voltage supply on the RIO
- Voltage forwarding for other system components on the RIO
- Lightweight thanks to sturdy, high-quality polymer with fibreglass
- Application-optimised valve terminal variants
- Full range of functions and valve terminal range in every size
- AP interface on valve terminal with AP input and output
- 100% electrically, mechanically and pneumatically tested
- Digitalisation of pneumatics all the way to the cloud via AP

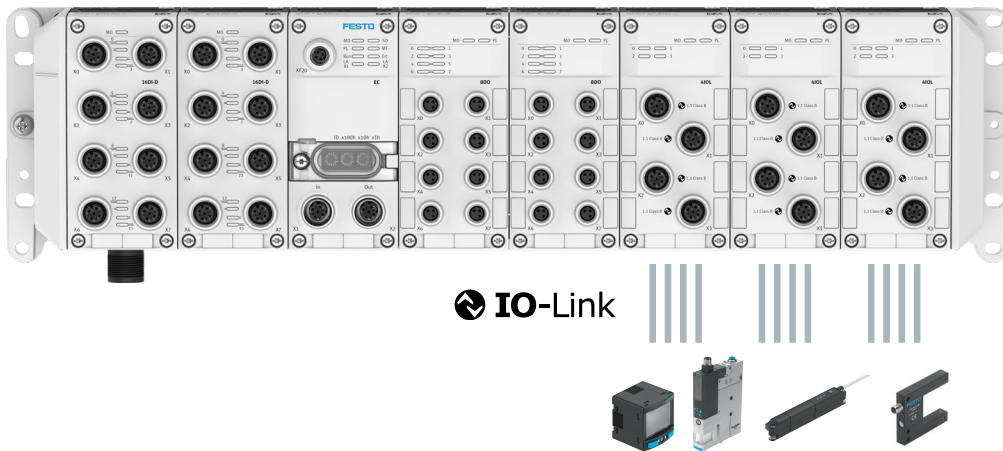


CPX-AP-A – Powerful, decentralised point-to-point communication: Modular remote I/O with IO-Link® master

The modular RIO CPX-AP-I can accommodate up to 15 I/O modules and IO-Link® master modules on one terminal, either as a stand-alone system or with a valve terminal. Thanks to IP65/67, the system can be installed directly in the machine and then configured and commissioned using the Festo Automation Suite. The device descriptions (IODD) are readily available in the tool. Simply download these and then parameterise the system using the IO-Link® plug-ins

3 highlights

- Modular RIO stand-alone system with up to 4 devices per IO-Link® master module
- You can search for and directly download device descriptions (IODD) in the Festo Automation Suite
- Fast and convenient commissioning as a system using the Festo Automation Suite



IO-Link® configuration

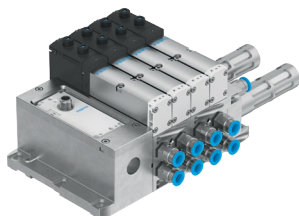
The IO-Link® tool and the IO-Link® extensions are already integrated in the Festo Automation Suite (FAS). Search for the relevant device descriptions (IODD) in the FAS search field, download them and save them in the repository. All you have to do now is configure the IO-Link® product in the FAS, and to parameterise it using the corresponding IO-Link® plug-ins. And that's it!

This applies to all IO-Link® products from Festo, but also to products from other manufacturers. You can find out more about the Festo Automation Suite on page 23.

Integrate pneumatic components into AP communication via IO-Link®

There are many aspects to realising cost-efficient pneumatics: product costs, installation costs, compressed air consumption, as well as process speed and cycle times. All these costs are lower the closer to the consuming device the compressed air distribution is located, and production is more efficient. The aim of modern automation should be to realise small, decentralised solutions that are positioned as closely to the consuming device as possible.

Valve terminal VTSA with IO-Link®



The versatile and configurable standard valve terminal VTSA offers many optional function integrations and safety functions. Thanks to its sturdy and durable components the VTSA is also suitable for demanding industrial applications.

- Numerous valve variants with a wide range of functions: 5/2, 5/3, 2 x 3/2 and 2x 2/2-way valves
- High flow rates from 550 ... 2,900 l/min
- Extensive vertical stacking options



VTSA: General technical data

Pneumatics – VTSA	ISO 15407-2		ISO 5599-2	
Valve functions	5/2, 5/3, 2x 3/2, 2x 2/2, special functions			
Manual override	Detenting/non-detenting, detenting/sturdy, concealed			
Design	Piston spool valve			
Number of valve positions	VTSA /VTSA-F: max. 32 valve addresses (solenoid coils) VTSA-F-CB: max. 96 valve addresses via 4 zones with max. 24 valve addresses (solenoid coils) per zone			
PROFIsafe	VTSA /VTSA-F: external via CPX modules, valves can only be actuated via external cabling. VTSA-F-CB: optionally integrated in the pneumatic interface. 3 zones or 2 zones and an external PROFIsafe outlet			
Size [mm]	ISO-02 18	ISO-01 26	ISO-1 42	ISO-2 52
Flow rate [l/min] up to	VTSA 550 VTSA-F 700 VTSA-F-CB 700	1100 1350 1350	1300 1860 1860	2900 2900 2900
Working ports ¹⁾	G1/8, 1/8 NPT	G1/4, 1/4 NPT	G3/8, 3/8 NPT	G1/2, 1/2 NPT
Supply ports ¹⁾	G1/2, 1/2 NPT or G3/4, 3/4 NPT			
Operating pressure [bar]	3 ... 10 (internal pilot air) -0.9 ... 10 (external pilot air)			
Temperature range [°C]	−5 ... 50 °C			

1) VTSA-F-CB only with G-thread. Alternatively, the hybrid fittings can be configured with imperial tubing diameter.



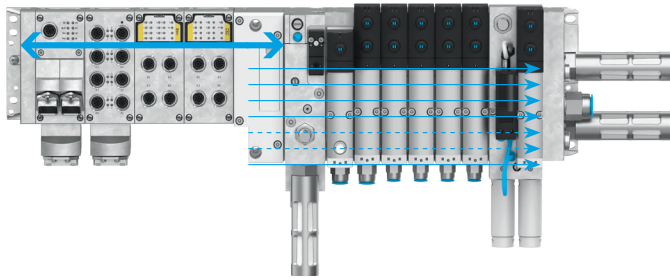
Please note that not all features are certified in accordance with the standards listed above. The valve terminal configurator will guide you to a suitable solution.



Serial communication with VTSA-F-CB for more options

Integrated benefit: serial and parallel communication in the VTSA

VTSA/VTSA-F

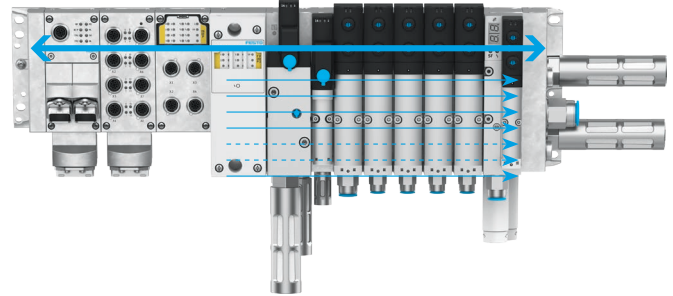


Serial communication: all CPX modules

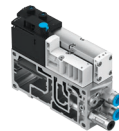


Parallel communication: all switching valves VTSA

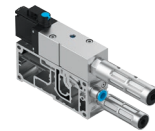
VTSA-F-CB



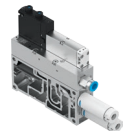
Serial communication: all CPX and selected VTSA modules:



Pressure sensor of the pilot air switching valve



Soft-start/quick exhaust valve



V ACuum generators

Make the most of both technologies

Combining the two communication technologies will greatly increase the benefits for you. The serial communication makes the previous external cabling unnecessary while the installation space remains the same. This means fewer additional components and reduced wiring. The number of valve positions has also increased. Now up to 96 valves with 4 voltage zones can be actuated. The VTSA/VTSA-F

linked in parallel permit a maximum of 32 valve addresses. If, for example, you used to need 2 valve terminals for 44 valve positions, with the VTSA-F-CB you now only have to have one valve terminal and only one fieldbus node. Serial communication gives the VTSA-F-CB modules new digital properties. For example, by measuring all V ACuum times or comparing them with a reference value, the

new V ACuum generator VTSA-F-CB can send warnings about any deviation directly to the machine controller.

Thanks to the simultaneous parallel communication of the valves, you can continue to use all previous directional control valves with the associated components.

Looking ahead, serial communi-

cation will make it possible to integrate proportional pressure regulators into the VTSA-F-CB in the future.

VTSA-F-CB: Benefits at a glance

- Up to 96 valve addresses via 4 zones with serial communication, up until now a maximum of 32 valve addresses
- PROFIsafe compactly integrated in the pneumatic interface
- Maximum flexibility thanks to various pneumatic interfaces for VTSA-F-CB
- New serial modules can be connected without external cabling
- All existing directional control valves and associated components such as throttle plates can still be used



New function integration options for VTSA-F-CB via serial communication

Previous solution with CPX/VTSA-F



Valve terminal 1 with:

- Bus node
- Two input/output modules
- PROFIsafe output module
- 6x 5/2-way double-solenoid valves and 2x 5/3-way valves (a maximum of 32 solenoid coils are possible)

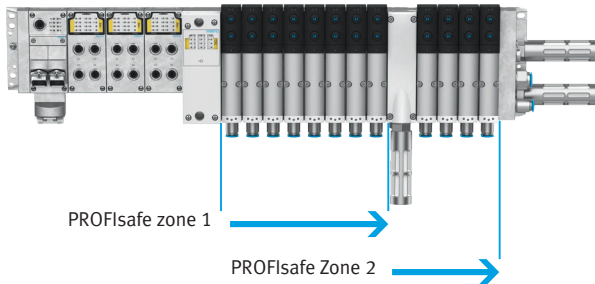
Valve terminal 2 with:

- Bus node
- PROFIsafe output module
- 2x 5/2-way double solenoid valves and 2x 5/3-way valves

Benefits:

- You save on a bus node, a PROFIsafe output module and the external cabling for control.
- Very compact design, as only one fieldbus node is needed and the PROFIsafe output module is integrated in the pneumatic interface of the VTSA-F-CB.
- Just one valve terminal and one order code

Solutions with CPX/ VTSA-F-CB



Pneumatic interface VTSA-F-CB



Pneumatic interface

With this pneumatic interface as well as all others, the option of coil diagnostics via "back-readable outputs" has now become standard. This means that, when necessary, the diagnostics on a wire break and short circuit can be processed via the process image directly as a bit in the controller.



Pneumatic interface with PROFIsafe for up to 3 zones

You can now safely disconnect up to 3 voltage zones with a maximum of 24 solenoid coils per zone with the PROFIsafe output. This allows you to, for example, integrate further soft-start/quick exhaust valves in one valve terminal with one pressure zone. This is not possible with the VTSA/VTSA-F.



Pneumatic interface with PROFIsafe and an external safe output

For example, if you want to switch off a valve on an individual sub-base directly at the actuator, you can use the external PROFIsafe output on the pneumatic interface. 2 further voltage zones can be created on the valve terminal and these can be disconnected using PROFIsafe.



Pneumatic interface with external supply voltage

Do not use PROFINET as the bus protocol, but instead use EtherNet/IP with the protocol CIP Safety; you can supply up to 3 safe outputs via this pneumatic interface. Up to 3 safe zones are thus possible with other protocols such as CIP Safety, openSAFETY or FAIL SAFE over Ethernet (FSaE).



VTSA: Maximum modularity and functionality

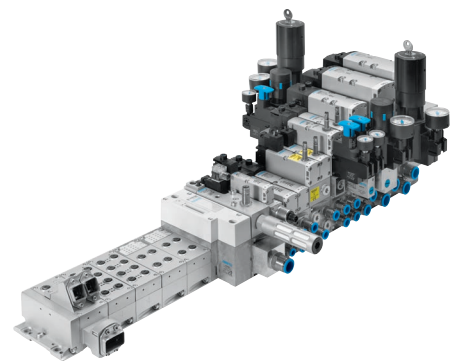
A large variety of components and vertical stacking modules

Valve terminal VTSA combined with electrical terminal CPX offers virtually limitless options thanks to maximum modularity and functionality. Reduce your engineering efforts and costs, shorten your ordering processes and accelerate and simplify assembly work. Whether it is for pneumatic or electric systems, motion control and networking, the terminal CPX from Festo provides extensive functionalities. This makes the VTSA genuinely flexible and modular.

VTSA for when you need standardisation to give you real benefits, such as valves and manifold sub-bases with electrical connections in compliance with ISO.

VTSA/CPX advantages

- 4 valve sizes mixed on one valve terminal: no more individual valves for flow rates of 2900 l/min. Having all 4 sizes on the VTSA-F is ideal for an even greater flow rate in the same installation space.
- Vertical stacking for all 4 valve sizes for technically and economically optimised control chains.
- Minimised installation space in the machine and control cabinet and optimized processes thanks to a mix of 4 valve sizes
- Motion package: measuring modules, positioning modules, parameterisation and control of electric drives, electronic end position control, servo-pneumatic positioning systems, camera systems for object and position detection



Vertical stacking – sturdy and modular

Complete vertical stacking range for all 4 sizes. Additional modules can be inserted at each valve position between the manifold sub-base and the valve. These modules are referred to as vertical stacking and enable special functions at the individual valve position.

New: **You can now mount valve sizes 18 and 26 mm together on one manifold sub-base.**



Vertical pressure shut-off plate

Uninterrupted production! Valves can be replaced under pressure during continuous operation (hot swap)

New: Can now also be locked.



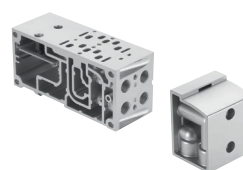
Throttle plate

For adjusting the speed of the drive.



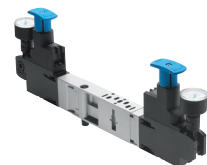
Vertical supply plate

For providing an individual operating pressure to a valve position using internal or external pilot air, to be connected in addition.



Angled connection plate

For alternative working port directions in the control cabinet or for sturdy installations.



Pressure regulator plate

Ensures a very wide range of pressure and functions. For different pressure levels, channels 1, 2, 4 or 2 – 4 can be separated.

New: Can now also be locked for valve sizes 42/52 mm.

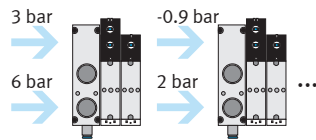


Benefits of the VTSA: reverse and dual-pressure operation

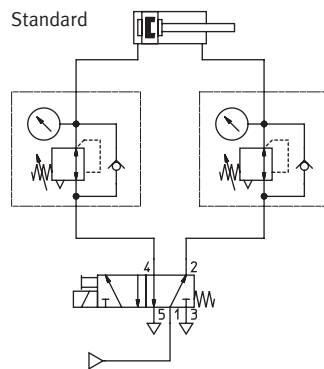
When used cleverly, reverse and dual-pressure operation can save the operator both energy and costs.

The advantages of dual-pressure operation:

- Energy savings of up to 50% by reducing the force for the return stroke, e.g. reversing with 3 instead of 6 bar.
- Balancing out the effective piston area. So the forward and return strokes are performed with the same force
- Only one valve for applications in which the V ACuum is to be generated externally and an ejector pulse is required
- 2x 3/2-way valves offer a very compact design for different applications or for a single-acting cylinder in dual-pressure operation.



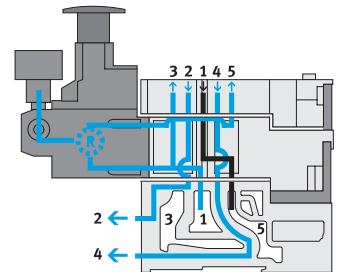
Left: 6 bar for working stroke and 3 bar for return stroke to save energy.
Right: -0.9 bar for V ACuum and 2 bar for ejector pulses.



Pressure is regulated downstream of the valve

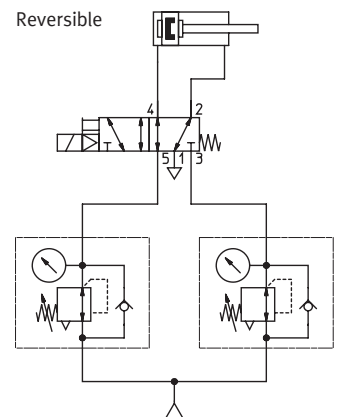
Reverse operation

VTSA valves and complete pressure zones can also be operated in reverse, because the valves are usually reversible and non-overlapping. Exhaust ports 3 and 5 are completely separated for compressed air supply in dual-pressure operation. The exhaust air is not separated and is exhausted through duct 1.



Benefits of pressure regulators operated in reverse:

- Higher exhaust performance
- Up to 50% faster exhaust
- Lower wear on the pressure regulator
- Pressure regulators can be adjusted independently of the valve switching
- Can be adjusted very accurately, perfect for very low operating pressures



Pressure is regulated upstream of the valve

VABF: Integrated V ACuum function

For greater performance, convenience and safety: the new V ACuum block VABF-S4-1-V2B1-C-VH-20 with ejector pulse, V ACuum switch and air saving function. The new block provides the VTSA/VTSA-F with all conceivable valve functions including V ACuum generation.

Save up to 90% on compressed air

Thanks to the integrated air saving functions and the controlled switch-on and switch-off of the suction function, you can save more than 90% on the compressed air, depending on the cycle.

Convenient thanks to function integration

The integrated V ACuum generation, ejector pulse and air saving functions with adjustable pressure sensor make V ACuum operation very convenient and also extremely efficient.

New: Even more functions with the V ACuum generator actuated in series for the VTSA-F-CB.

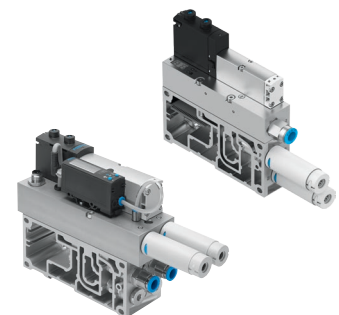
The V ACuum generator for the VTSA-F-CB no longer needs to be operated using pushbuttons; parameterisation is carried out directly in the CPX system. New smart functions have also been added. Thanks to the teach-in functionality, you can create a homing run. As all V ACuum

times are measured and compared with the homing run, there are warnings if the pre-set times deviate – another tool to support you with process monitoring and preventative maintenance. It is also possible to change the V ACuum limit values per dataset; format changeovers on the system are thus digital.

In addition, the new V ACuum generators for the VTSA-F-CB facilitate greater process safety. You can block the ejector pulse if a safety function is requested or if an error occurs, e.g. in the case of undervoltage.

Other additions include the air saving function with emergency off, the "Power ejector pulse" option for even shorter

process times and the selection of V ACuum types: H for high negative pressure or L for a high suction volume flow.





Maximum modularity and functionality

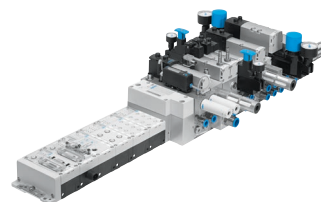
VTSA and CPX: the ideal total solution

The electrical terminal CPX and valve terminal VTSA are really made for each other. Combining them gives you a platform for all applications, in part because of the integration of all common fieldbus systems or Ethernet via terminal CPX. CPX provides sophisticated diagnostic concepts that reduce standstills, increase availability and cut operating costs.

Benefits

- Integration of many safety functions such as the PROFIsafe shut-off module.
- Comprehensive intelligent diagnostic concepts for up to 35% less unplanned downtime:
 - LED for fast troubleshooting
 - Ethernet web monitor for detecting faults
 - Condition monitoring for analogue modules
 - Individual channel diagnostics for I/O

- Modules for digital and analogue I/O functions with all common connection types
- Integrated pressure sensors
- Many technology modules, e.g. module CPX-CEC-M1 for 2.5-D movements or versatile electronic cam disc functions



CPX in plastic version

The modular electrical terminal CPX in all-metal version

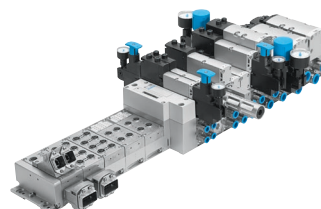
CPX on the inside, metal on the outside: the fully modular solution for harsh application areas such as the heavy machine building and automotive industries. With comprehensive function and system integration and all-metal I/O modules and connection blocks, individually expandable.

Benefits

- Dirt-resistant, smooth surface with few edges or recesses
- Longer service life of the sensitive sensors in harsh and dirty environments
- Perfect for protecting against welding spatter

Also available as CPX-AIDA

Connection technology for PROFINET and power supply using the Push-Pull principle in accordance with AIDA (Automation Initiative of German Automobile Manufacturers).



CPX in metal version with push-pull

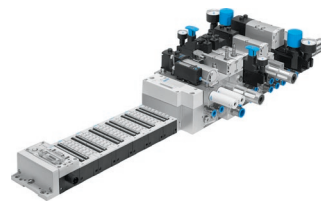
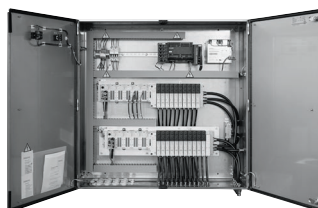


The modular electrical terminal CPX in control cabinet version

CPX-L with polymer connection blocks and economical I/O modules. Optimal for control cabinet installations due to the new push-in connection technology and three cores for each channel. Can be combined with all polymer-based CPX modules and bus nodes.

Benefits

- Attractively priced digital inputs and outputs with IP20
- Spring force push-in connectors for quick installation
- Reduced fitting space for compact control cabinets



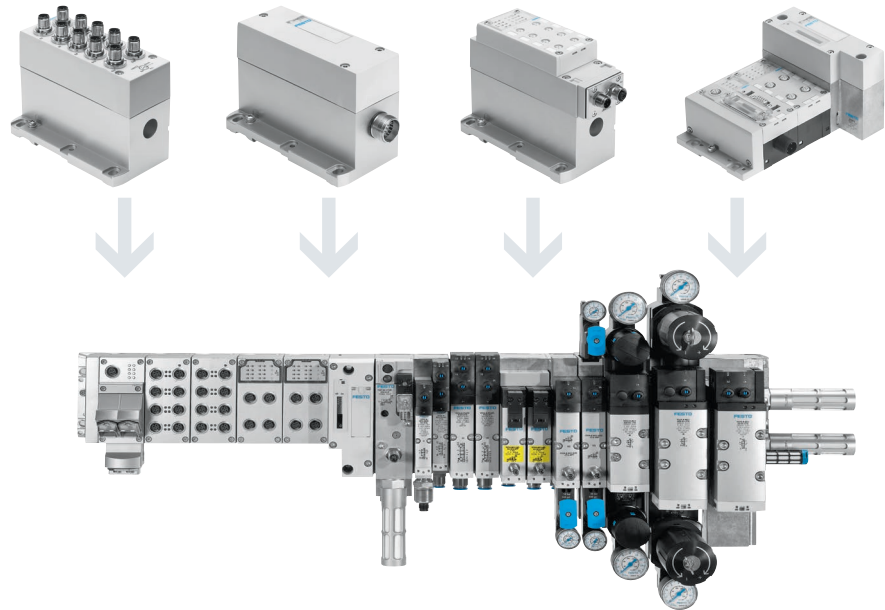
CPX for the control cabinet



Wide range of electrical connection options

Free choice of electrical installation at each stage

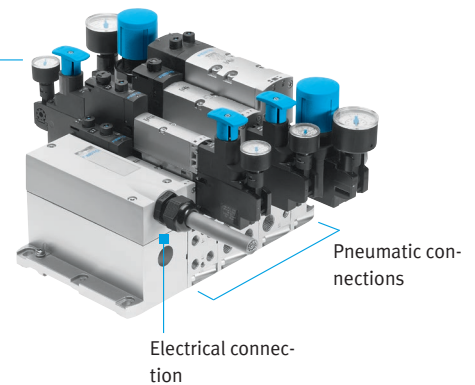
You can completely customize the electrical installation, from an individual valve to a highly complex system solution. This means that our configurator offers you individual connection, multi-pin plug, AS-Interface or, with the CPX, one of 12 common fieldbus and Industrial Ethernet protocols.



The VTSA system concept

- Option of having all working ports and supply ports in one direction: saves space, makes the installation simpler and clearer
- Mounting and operation in one direction
- Clear and functional design
- Large manifold sub-bases for maximum flow rate
- With robust metal thread G or NPT or with pre-assembled QS connections or silencers for quick and secure installation

Assembly and operating level



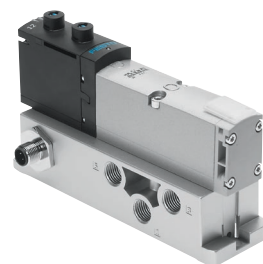
Connection variety at a glance

Electrical installation – advantages of the individual steps

Each individual connection type has different key advantages. To enable you to quickly decide on the appropriate installation solution to suit your requirements, we have provided an overview of them on this page and the next.

Individual valve with M12

Valves on individual sub-bases can be used for drives that are further away from the valve terminal. The electrical connection is made through a standardised plug M12, 24 V DC EN 61076-2-101. Alternatively, you can configure it yourself using a clamped terminal connection or cable ends 24 V DC or 110 V AC.





Wide range of electrical connection options

VTSA with individual connection M12

Simple and standardised

Control signals from the controller to the valve terminal are transmitted via standardised individual connecting cables. All the advantages of pneumatic interlinking can all be used to the full.

The valve terminal can be equipped with a maximum of 20 valves and a maximum of 20 solenoid coils. The electrical connection is made through several plugs M12, 24 V DC. Any compressed air supply and any pressure zones are possible.



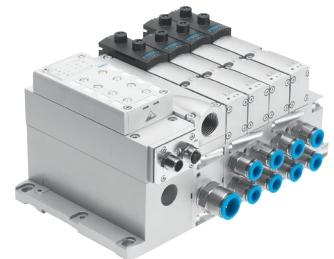
VTSA with AS-Interface

A special feature of the AS-Interface is the simultaneous transmission of data and supply power via a two-core cable. The encoded cable profile prevents connection with reverse polarity.

Versions

- From one to eight modular valve positions (max. 8 solenoid coils and with 4 or 8 integrated inputs – that corresponds to 1 to 8 valves.

- With all available valve functions. The connection technology used for the inputs can be selected as with the CPX: M8, M12, Harax quick connection, Sub-D, spring-loaded terminal.



VTSA with multi-pin plug connection

Control signals from the controller to the valve terminal are transmitted via a pre-assembled multi-core cable or a multi-pin plug connection assembled by the user (spring-loaded terminal). This substantially reduces installation time.

The valve terminal can be equipped with a maximum of 32 valves and a maximum of 32 solenoid coils.

Versions

- Multi-pin plug connection with terminal strip (spring-loaded terminal), 24 V DC or 110 V AC
- Pre-assembled connecting cable, 24 V DC
- Sub-D plug connector for assembly by the user, 37-pin
- Round plug connector M23 (19-pin)



VTSA with fieldbus connection

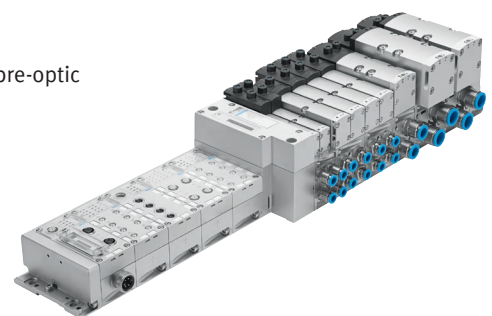
An integrated fieldbus node manages the communication connection with a higher-order PLC.

This enables a space-saving pneumatic and electrical solution to be implemented. Valve terminals with fieldbus interfaces can be actuated with up to 32 solenoid coils with valve diagnostics.

Optional: additional CODESYS controller for preprocessing or front-end control. Including CANopen master functionality, diagnostics and Soft-Motion.

Versions

- PROFIBUS DP
- INTERBUS® (+ fibre-optic cable)
- DeviceNet®
- CANopen
- CC-LINK®
- EtherNet/IP
- Modbus/TCP
- TCP/IP
- EtherCAT®
- Sercos III
- Powerlink
- PROFINET (M12, AIDA push-pull, fibre-optic cable)

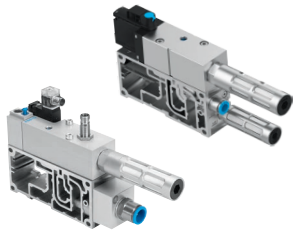




Focus on safety – Safety@Festo with VTSA

Components for implementing safety functions on the VTSA

Soft-start/quick exhaust valve VABF



Application

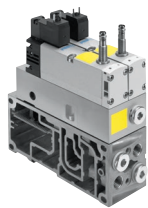
For slow start-up pressurisation, e.g. in order to reduce collisions, for quick exhaust and for building up a specific output pressure in a safe and controlled manner.

Safety functions

- Suitable for converting "safe de-energized switching (SDE)" and "prevention of unexpected start-up (PUS)"
- Category 1¹⁾
- Performance Level c¹⁾

- Diagnostics switching position sensing
- Control architecture: 1 channel¹⁾

VOFA – 5/2-way press safety valve



Application

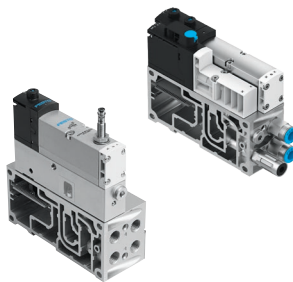
For reversing the motion, e.g. of a press cylinder, in the event of an emergency stop and as protection against unexpected start-up. Specified as a safety device according to the EC Machinery Directive 2006/42/EC.

Safety functions

- Safety function reversing and prevention of unexpected start-up
- Category 4¹⁾
- Performance Level e¹⁾
- Diagnostics, switching position sensing with inductive PNP/NPN proximity switch

- Control architecture: 2 channels¹⁾
- Safety device in accordance with EC MD 2006/42/EC

Pilot air switching valve VSVA



Application

For applications with increased safety requirements such as manual workstations. In these applications, the cylinder pressure must be maintained during the feeding-in process, but the pilot air for the valve must be exhausted.

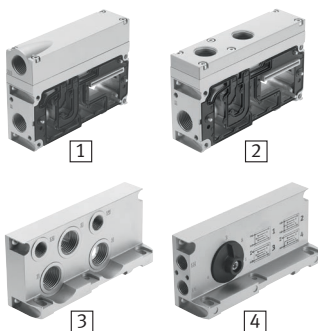
New: Manifold sub-base in the size combination 18/26 mm (ISO-02/ISO-01)

Safety functions

- Suitable for implementing "prevention of unexpected start-up" with a second directional control valve with switchable pilot air and a suitable fault exclusion

- Category 3¹⁾
- Performance Level d¹⁾
- Diagnostics switching position sensing
- Control architecture: 2 channels¹⁾

Pressure zones and selectable pilot air



- 1 Supply plate with common exhaust
- 2 For dual-pressure operation with separate exhaust
- 3 Right-hand end plate with threaded connections, and with a choice of internal or external pilot air
- 4 Right end plate with pilot air selector. Pilot air can be selected by simply turning

the pilot air selector. Optionally with ducted pilot exhaust air.

Application: pressure zones

For processes with various media or different pressures. Even if one pressure zone has to be exhausted while for safety reasons another one has to remain pressurised at the same time.

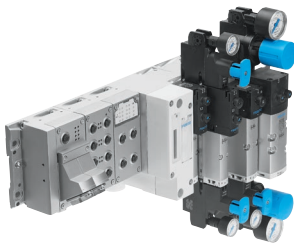
Application: selectable pilot air
Switchable pilot air enables protection against unexpected restart of a system up to PL level d. However, this would require additional components.

¹⁾ All specified values are maximum values that can be achieved via the suitable integration of the component into the complete system.



Focus on safety – Safety@Festo with VTSA

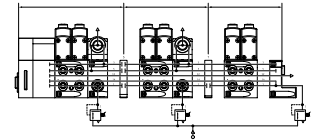
Pressure zones



Application

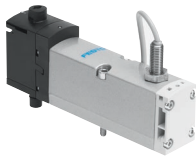
Safely exhausting valves or pressure areas: certain areas can be exhausted safely when used together with the valve MS6-SV, while the pressure is retained for specific valves or pressure zones. This is a common requirement for protective circuits.

New: Pressure zones can be configured with internal and external pilot air!



The illustration shows an example of how three pressure zones are built up and connected with duct separation, using internal pilot air.

Valves with mechanical spring return and switching position sensing



Application

For applications with increased diagnostic coverage. For example, for linking handling modules on a rotary indexing table. The spring return with switching position sensing can minimise the collision risk here.

Safety functions

- Suitable e.g. for implementing "PUS avoidance" or other safety functions that need diagnostic signals
- Category 1¹⁾

- Diagnostics, switching position sensing with inductive PNP/ NPN proximity switch
- Control architecture: 1 channel¹⁾

Valves for pneumatic stopping

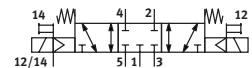


Application: mid-position closed

Suitable for temporarily blocking a movement. A lifting cylinder can thus be briefly held in position, depending on the leakage.

Application: mid-position 1 to 2 pressurised, 4 to 5 closed

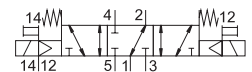
If necessary, the position can be permanently held by supplementary supply pressure.



VSVA-B-P53C-ZD-A2-2AT1L

Safety functions

- Category 1¹⁾
- Performance Level c¹⁾
- Control architecture: 1 channel



VSVA-B-P53F-ZD-D1-1T1L

Valve for pneumatic manual clamping processes



Application: mid-position exhausted

This means that the cylinder can be manually moved without force. Self-locking on one side in order for the clamping process to be carried out even in the event of a power failure.

Safety functions

- Category 1¹⁾
- Performance Level c¹⁾
- Control architecture: 1 channel



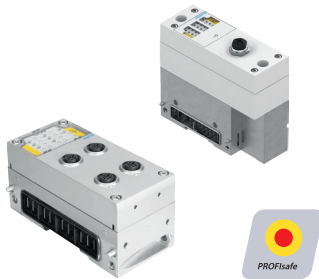
VSVA-B-P53ED-ZD-A1-1T1L

¹⁾ All specified values are maximum values that can be achieved via the suitable integration of the component into the complete system.



Electrical safety functions on the VTSA

PROFIsafe shut-off module for CPX



Application

For PROFIsafe-capable controllers for two-channel, self-monitoring, electrical switch-off of the supply voltage to the valves on the valve terminal. In addition, two further safety-relevant consuming devices can be connected to the module.

New: With VTSA-F-CB, the shut-off module is integrated in the pneumatic interface. This allows up to 3 safe voltage zones.

Safety functions

- Category 3¹⁾
- Performance Level e¹⁾
- Diagnostic coverage = 90-99%
- Control architectures: 2 channels¹⁾
- Safety device to EC MD 2006/42/EC (German Technical Control Board (TÜV) Certificate)

PROFIsafe input module for CPX



Application

For PROFIsafe-enabled controllers for actuating up to 8 safety-related switching devices such as, for example, emergency stop, light barriers or roller levers (OSSD/contact-based sensors)

Safety functions

- Category 4¹⁾
- Performance Level e¹⁾
- Diagnostic coverage: 99%
- Safety device to EC MD 2006/42/EC (German Technical Control Board (TÜV) Certificate)

¹⁾ All specified values are maximum values that can be achieved via the suitable integration of the component into the complete system.

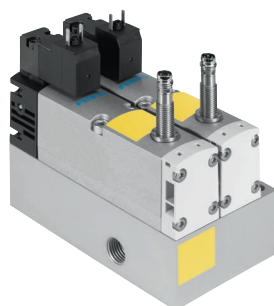
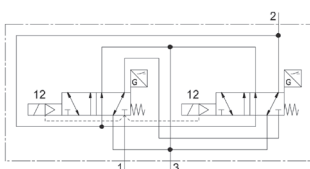
Even greater safety with VOFA

An addition to the VOFA range

If the switching frequency places a high strain on the valves, the control block VOFA replaces the soft-start/quick exhaust valves MS...SV-E. In addition to the VOFA 5/2-way safety valve for presses with protection against unexpected start-up in compliance with EN ISO 14118 and reversing of the cylinder movement, there is now control block VOFA-L26-T32C... for safe exhausting. The system operates

with two 5/2-way single solenoid valves with spring return and has 2 channels.

With the appropriate safety electronics for signal processing, up to Performance Level e can be achieved.



Control block VOFA-L26-T32C...





Unique services from Festo

Customised and comprehensive

Services from Festo cover the entire value added chain, from initial configuration of the VTSA through to operation.

Services

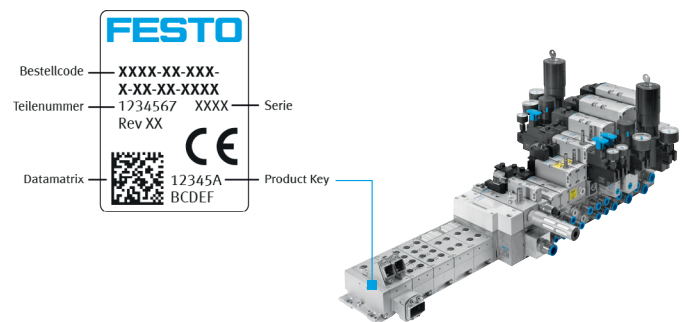
- Machine analysis for energy efficiency for a further reduction of the total cost of ownership (TCO)
- Services Energy Monitoring System (GFDM) for the
 - Compressed air quality analysis
 - Compressed air consumption analysis

- Leakage detection and elimination
- Product Key for fast and comprehensive information on the product
- Service2see videos and application notes for simple commissioning can be found on YouTube or the Festo Support Portal
- Schematic Solution for EPLAN projects are available in the Festo App World
- Order ID for quickly retrieving and reordering existing configuration short codes

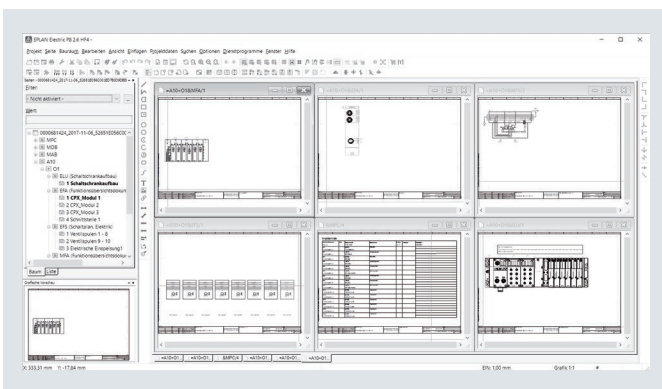
Product Key – the fast route to more information

Scan, look and discover with the Product Key as an auto ID function. Access the right information from anywhere at any time. Scan the data matrix code on the product to obtain all the information about the product. For example, you can use the product key to quickly find device description files, function

elements, drivers or supporting media like films and application notes for easy commissioning. Or break down a valve terminal into its individual components and search specifically for spare parts and then order them directly. Try it for yourself!



Schematic Solution for EPLAN projects from the Festo App World



This is what the documentation for your project looks like.

Manual

- Break down the order code into its individual components
- Search and download macros
- Manually create the circuit diagram

Results

- 2-4 hours per configuration
- High number of errors, depending on complexity
- Low added value

Automated

- Enter the order code
- Order the EPLAN project

Results

- Automated solution in just a few minutes
- Significantly fewer errors

Manually documenting an EPLAN project can take up to 4 hours. Depending on the complexity, this process can also be prone to errors. In general, it involves a well-paid engineer spending time on an activity that is not very productive. Schematic Solution allows you to use this time to add value instead – and to create project documentation without any errors.

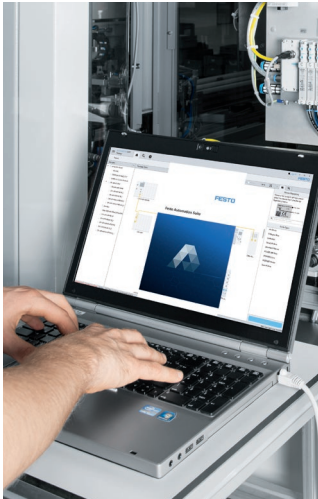
Interested? Then have a look:

→ [AppWorld](#)





Commissioning software Festo Automation Suite



The PC-based software Festo Automation Suite combines the parameterisation, programming and maintenance of Festo components in one program. It enables the entire drive package to be commissioned, from the mechanical system to the controller. The commissioning software is available free of charge and already contains the basic functionalities of all Festo components.

Plug-ins or add-ons can be installed directly in the program. In addition, device information, manuals and application descriptions can also be downloaded directly from the software without having to open a web browser.

Intelligent connectivity

With the integrated commissioning wizard, it only takes five steps to reliably configure a fully operational drive system. And with just two clicks, the servo drive CMMT-AS is integrated into the controller program of CPX-E. Optionally, the CODESYS add-on enables the motion control and robotics functions of CPX-E to be programmed.



Free download of the software under

→ www.festo.com/AutomationSuite

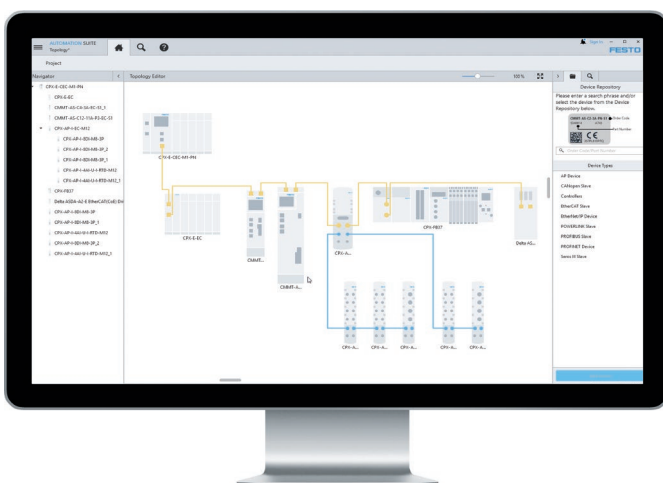
Highlights

- Just five steps to an operational drive system
- Customisable thanks to device-specific plug-ins and add-ons
- Integrated controller programming
- Access to device information and manuals directly from the software

The user interface has a uniform look across all functions, whether diagnostic information for valve terminals is requested, or a servo drive is parameterised or programmed in CODESYS.

3 Navigation similar to a web browser

Device-specific content is shown on tabs, so that you can conveniently move between the different contents.



1 Tried and tested display

List of all components used and hierarchical display of the communication relationships.

2 User-friendly design

Add the Festo components by dragging and dropping, then establish the communication connections by intuitively drawing the required lines. The software automatically calculates the basic parameters of the stations in the background.

4 Installing plug-ins

Search for the device you want using the part number or order code, and the Festo Automation Suite will automatically find and install the right plug-in.



VTSA: Competency in a single package.

ISO valve terminal VTSA encapsulates the expertise of our specialists and experts at Festo, the inventor of the valve terminal. It was created to help you be even more productive thanks to ...

... its flow rate performance
... the complete range of pneumatic functions
... the extremely communicative characteristics
... its sturdy and highly modular and flexible design
... the free choice of electrical installation
... the many function integration options
... the integrated safety features in accordance with ISO 13849-1 and the EU Machinery Directive.

In short: standardisation + modularity + function integration + Safety@Festo

This example from an application in fuel cell automation shows you how functions previously used separately have now been integrated in the valve terminal:

Protection class IP65/67

Ideal for harsh environments: VTSA with electrical terminal CPX in metal version. This fulfils the requirements of protection class IP65/67, and has extra dust protection.

Soft-start/quick exhaust valve

Minimises the risk of damage or accidents after an undefined stop (emergency stop) by a slow and controlled movement of the cylinder to its initial position.

5/2-way valve with pressure regulator, pressure gauge and exhaust air flow control

Six individual components are rolled into just one for the design engineer to install. This saves time during design, and fewer mounting holes are required on the machine.

Fieldbus interface

Bus systems offer time advantages when it comes to wiring, commissioning and troubleshooting.

Sensor input module

Avoids have to order and wire separate sensor/actuator boxes. This reduces the ordering workload and streamlines all the subsequent processes. The diagnostic function makes troubleshooting simpler.

Implementing safety functions

A high Performance Level d/e is often required in applications. With standard components and certified safety devices from a single source, such as the PROFIsafe shut-off module with VOFA control block, these performance levels can be easily achieved.

2x 3/2-way valves with pressure shut-off plate

It is not necessary to depressurise the whole system when replacing a valve. The clamping cylinders maintain their position, and the dancer tension is maintained. This saves material costs in the event of stops and restarts.

