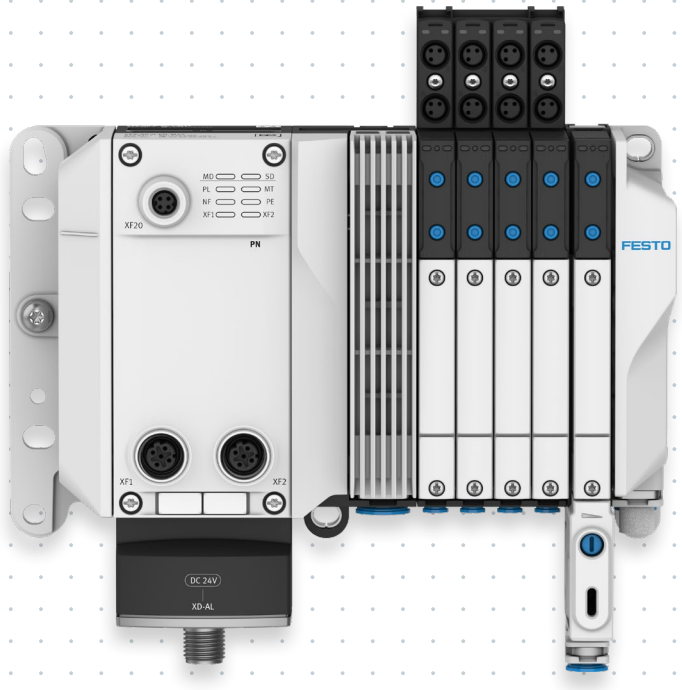
FESTO

Valve terminal VTUX – Platform for the future



Highlights

- High flow rates of up to 730 l/min
- Lightweight, made of high-performance polymer
- Extremely flexible to use and highly modular for all tasks, communication and machine concepts
- Vacuum integration with solutions for large bandwidths
- Integrated, space-saving switching position feedback directly assigned to the pneumatic components
- Open for future developments
- All in all, it combines all the benefits of CPV, MPA and VTUG in one platform

reddot winner 2025

DESIGN AWARD 2025

The VTUX sets new standards in terms of materials, modularity and communication. The successor to the established CPV, MPA-L, MPA-S and VTUG impresses with its high flow rate. And with the communication system AP-I and AP-A, it is the perfect platform for digitised production!

Flexible
Thanks to internal communication, the modules can be arranged as required. This provides maximum freedom when designing every single valve terminal.

Machine concepts are a priority
The VTUX is clearly made for the parameters of the machine – it always fits!

Extremely communicative
AP communication technology ensures the connections are really simple, even over long distances, as if all system participants were in the same place.

Tubing connections? Easy to configure!
Even the plug-in connections can be adapted to the required tubing diameter, saving space and ensuring a reliable supply. You can also define as many pressure zones as you like.

Can be used virtually anywhere
Not only can the VTUX be used with short compressed air lines, it also has a lightweight design and can be used on front end units, such as a gantry or robot arm.

Integrated functions

- Valves with digital inputs are easy to assign (M8, PNP or NPN)
- Vacuum solutions with air saving function
- Internal serial communication for access to parameters and diagnostics

Additional information:

Product page
> http://www.festo.com/vtux

Online Shop
> www.festo.com/shop/vtux

The time is right for a new generation of valve terminals

The world is changing at an ever faster pace. The great challenges that face us will have a big impact, all the way down to the demands placed on the products we manufacture and use. For example, they should be more economical, whether in terms of energy consumption, material use or storage space.
But the focus is also on the performance of the products: how easy is it to realise efficient communication between devices? And how can the set-up and commissioning be made as simple as possible?

One platform

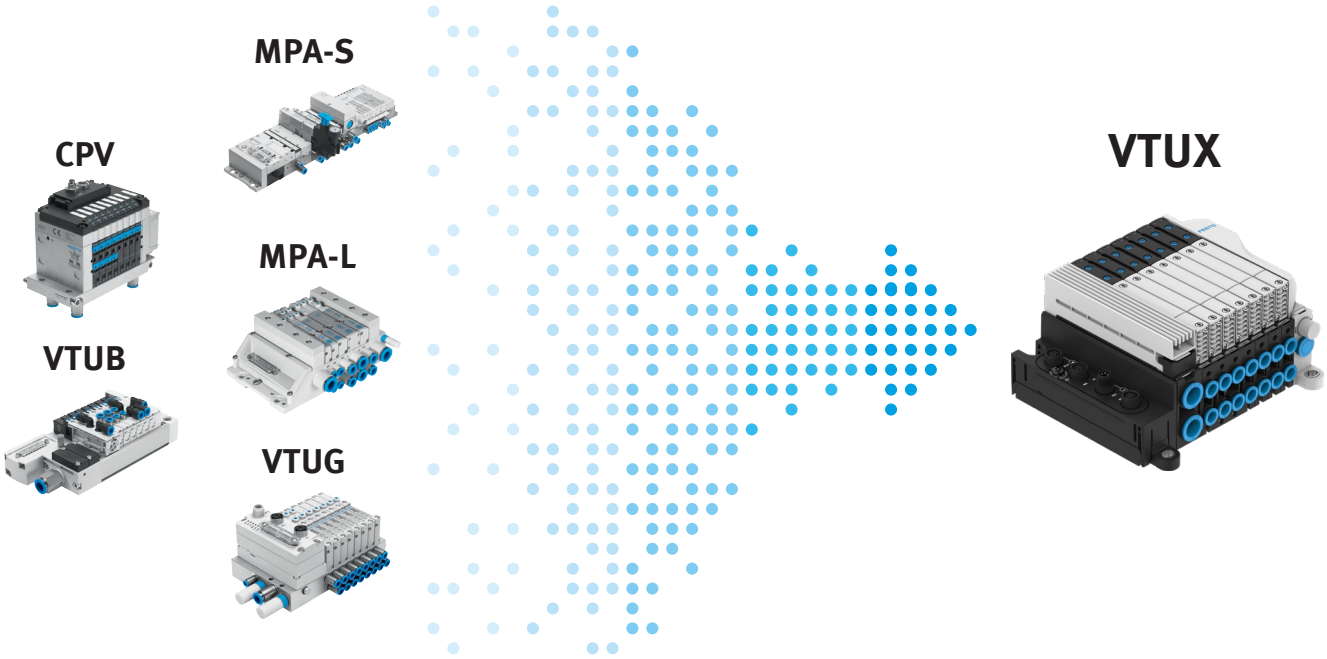
It is now time to combine the best features of the previous valve terminal worlds into a single platform. This is the concept on which the VTUX is based and it is open to today's and future innovations. These can also be integrated on this platform.
Since 1987, when Festo presented the world's first valve terminal, Festo has developed numerous other valve terminals, each with its own specific focus. The idea behind the adaptable valve terminal VTUX is based on all these focal points by offering a very expandable concept. This will help you shape the ever-increasing technical changes in your machine generations step by step, whether these relate to digitalisation, connection to the cloud or machine design issues.
Discover this fascinating new world and explore this innovative platform on the following pages!

Extremely compatible and flexible – Open architecture

Good to know: the existing and new valve terminal worlds are compatible, regardless of which valve terminal world you are using. At Festo, we have learnt what is required and have incorporated the best features from the previous valve terminals into the new VTUX:

- Modularity
- Connectivity
- Choice of basic or technology functionality
- … and much more!

VTUX is also scalable, flexible, and open to innovation. Developed from scratch, clever, and therefore optimally future-proof.



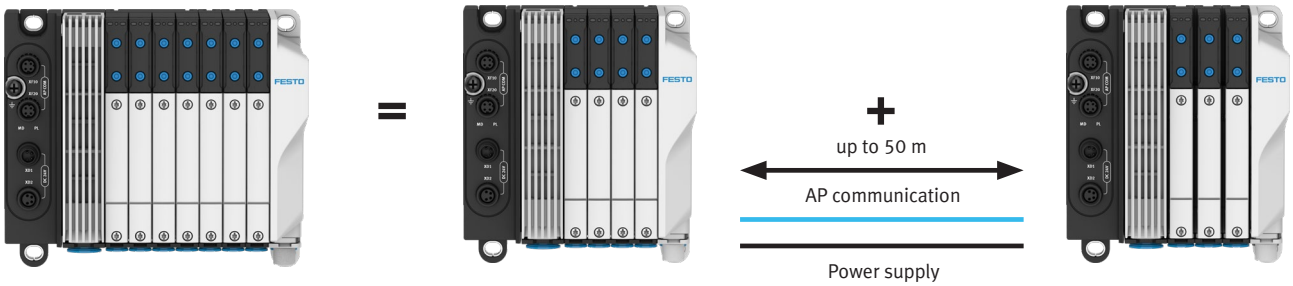
Flexibility for every design concept

In a centralised design concept, many air ducts have to bridge long distances. In a decentralised concept, on the other hand, the distances to the actuators are shorter and long distances are covered with just one air duct. The communicative connection should also be easy and cost-effective to realise.

This is precisely what the VTUX is made for:

- By dividing the module units as required
- By bridging even long distances with reduced cable routing through communication and supply technology
- Thanks to its lightweight design, VTUX can also be installed decentrally on moving elements.

With the VTUX, these two concepts can be easily implemented and combined.

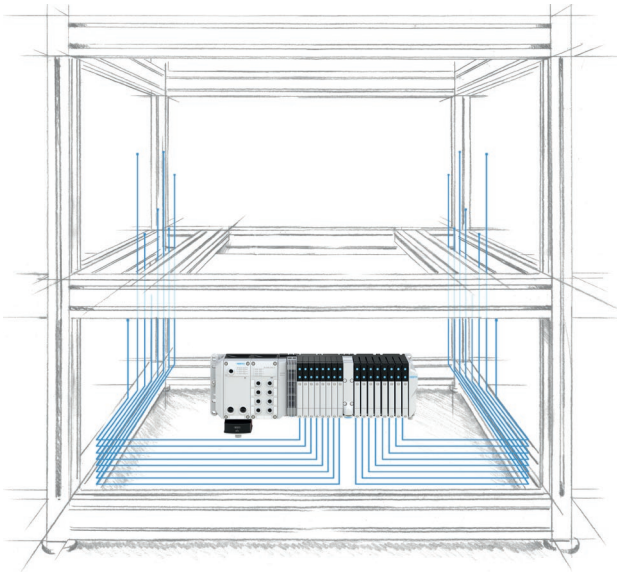


Any division and any layout of the valves

Long distances can be bridged

Centralised or decentralised concept? The advantages and disadvantages

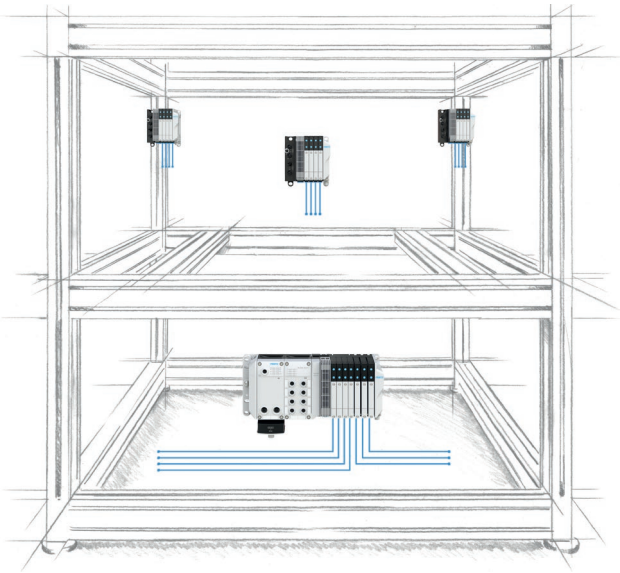
Centralised valve terminal with maximum valve density



Advantages
- Clear layout
- Easy to access and maintain
- Can be extended at specific points
- Less installation and earthing effort

Disadvantages
- Long tubing and cable runs
- Thick tubing and cable bundles
- Longer response times

Decentralised valve terminals with extremely short compressed air supply lines to the actuators



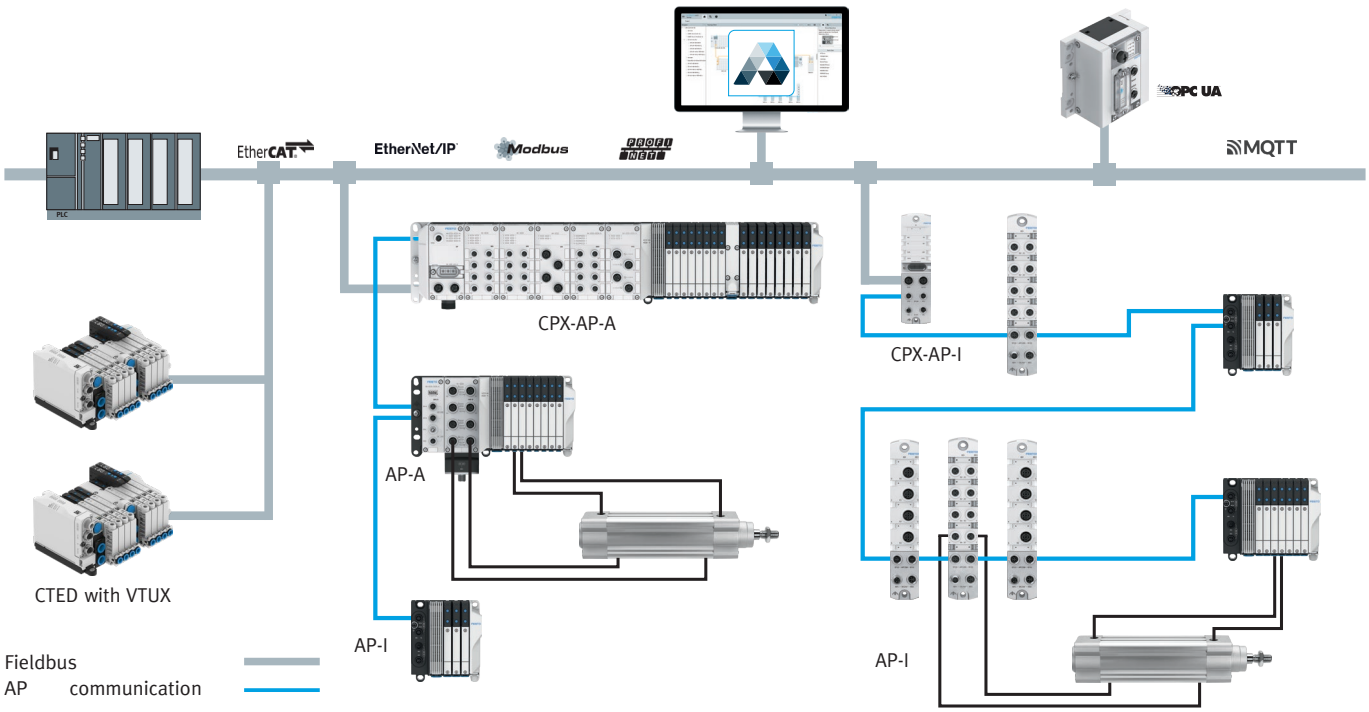
Advantages
- Short, energy-saving tubing
- Only two electric cables up to 50 m to bridge the distances
- Faster cycle times

Disadvantages
- Potentially limited access in the working space

Infrastructure for technology modules – The new automation platform AP

The newly created I/O communication protocol is the answer to and solves many existing connectivity challenges. The new booster technology forwards and processes input signals (I) such as sensor feedback, status signals, etc. The same applies to output signals (O) such as trigger pulses, start signals and similar signals.
AP thus ensures flawless communication between the components of any future automation system:

- Faster data rates up to 200 MBaud
- Faster cycle times up to 250 µs
- Process data processing 2 kByte input / 2 kByte output
- Real-time communication to the valve terminal
- Power can be supplied separately for each module or centrally from module to module
- Creation of voltage zones
- Stable data transfer
- The AP modules save space through function integration, e.g. in the end plates
- Saves weight as the modules can be arranged flexibly, there are no specifications for any particular combination
- Simplified engineering without additional software
- Cost saving for the connection modules

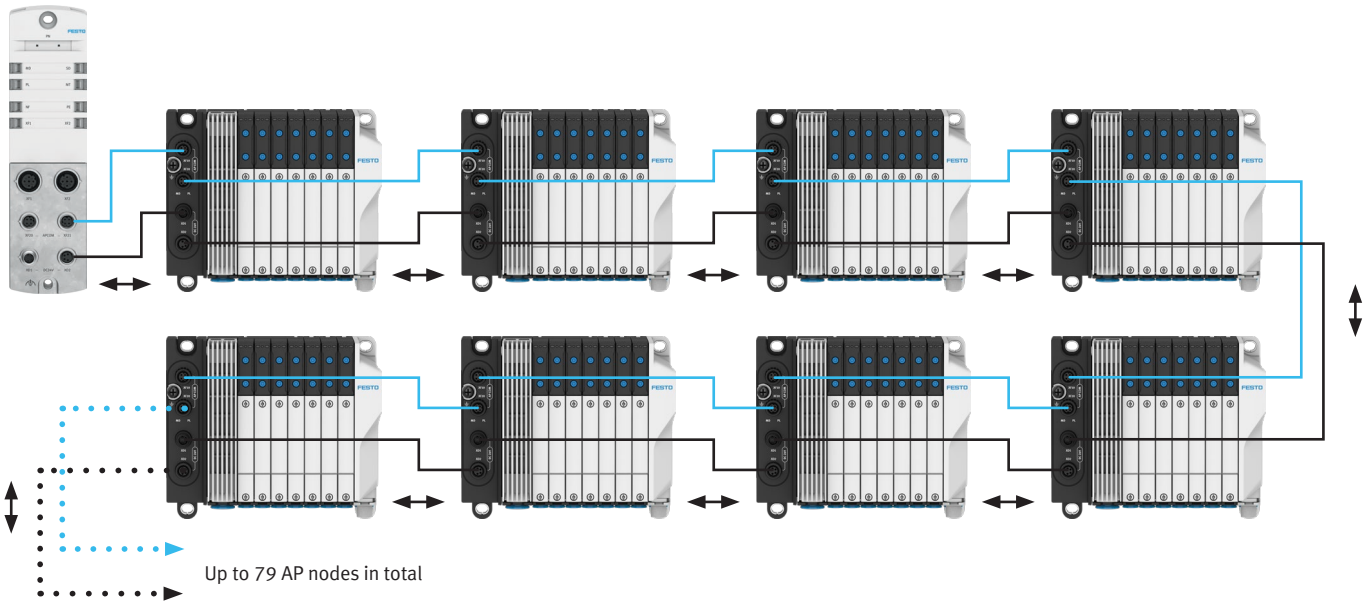


The components of the Festo Automation Platform (AP) are categorised as follows:

- AP-I-... : individual communication nodes for a decentralised installation
- AP-A-... : communication nodes docked to functional units for a centralised installation
- CPX-AP-A-... /CPX-AP-I-... : components to convert between AP and other communication protocols with gateways as a transition from field-bus to AP communication
- CTED: the compact, flexible multi-protocol interface for direct connection to the fieldbus

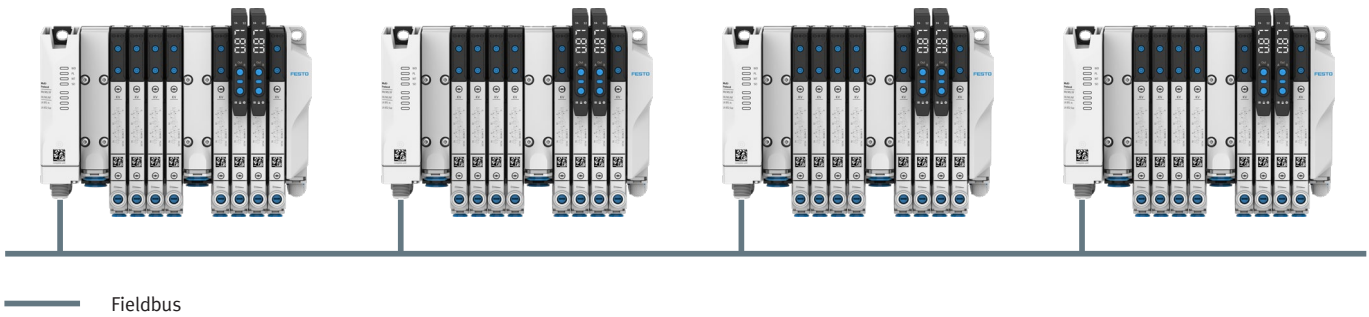
Direction connections save costs

The cost-effective integration of units into the AP communication network avoids having more complex bus connections. At the same time, you can optimise the grid dimensions.



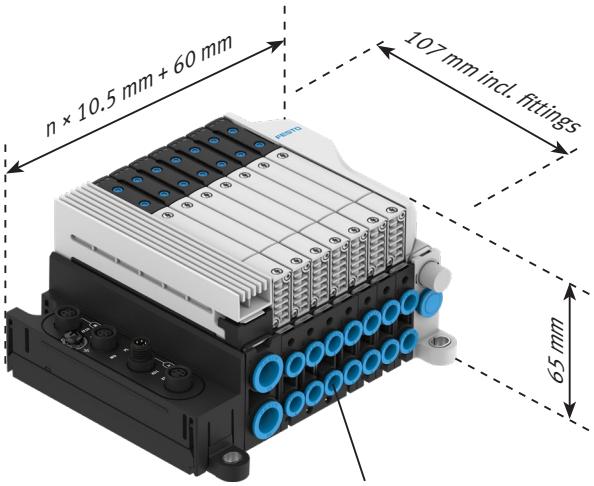
Direct connections save space

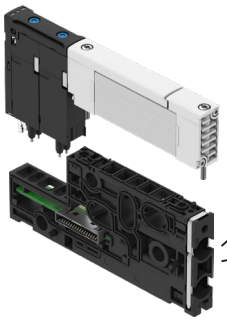
With the compact bus node CTED each valve terminal can be connected directly to the Industrial Ethernet network. It is a multi-protocol hardware that opens up all common host systems. In addition, it boasts a particularly space-saving design as well as tubing connections that have a small footprint. There are solutions for parallel control (Basic) and serial communication (Performance). You can choose between 3 connection types (M8, M12 or RJ45).



An overview of the features of the valve terminal VTUX

Mechanics





The 10 mm valve can be mounted on both grid sizes

Grid dimension 1: 10 mm
for tubing connections up to 6 mm

Grid dimension 2: 12 mm
for tubing connections up to 8 mm

Pneumatics

VTUX-A-P-...
Internal parallel control:
- Unidirectional control signals
- Max. 32 coils can be connected
- Coil control in the left end plate
- Yellow LED for indicating the switching status
- Electrical connection via multi-pin: Sub-D, ribbon cable, cable clamps
- Electrical communication via
  - IO-Link®, AP-I, AP-A, CTED

VTUX-A-S-...
Internal serial communication:
- Bidirectional AP communication
- Interface for application programming
- Max. 128 coils can be connected
- Serial conversion for coil control in the valve manifold sub-base
- Basis for technology functions such as integrated inputs
- Blue LED for indicating the switching status
- Electrical communication via
  - AP-I, AP-A, CTED

Electrics (communication)

Real-time connection
- Industrial Ethernet with CPX-AP-A, CPX-AP-I and CTED available.

Versatile IO modules
- Combine VTUX valves and CPX-AP-A remote I/O modules in one terminal or connect CPX-AP-I remote I/O modules decentrally

An overview of the features of the valve terminal VTUX

Vacuum integration

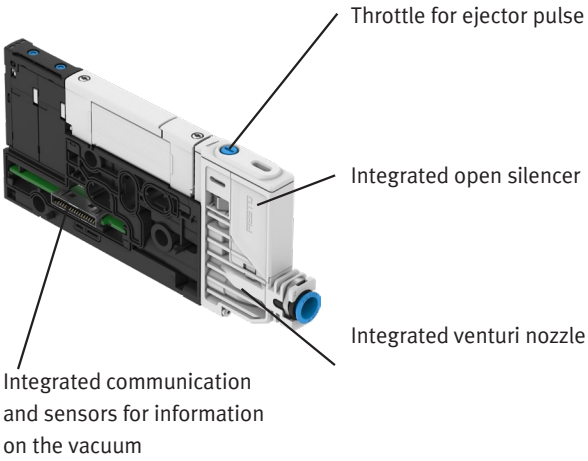
VTUX offers the perfect platform for valves and fully integrated vacuum solutions for a tailored and modular configuration. The high-performance platform enables bidirectional feedthrough from the PLC to the vacuum generator.

Terminal with a mix of valves and individual sub-base for vacuum

- Vacuum and ejector pulse can be individually controlled
- High vacuum or large suction volume flows
- Two power levels with a grid dimension of 12.5 mm: nominal width 0.7 mm / 1 mm
- Solutions for parallel actuation and serial communication
- Parameters can be changed via teach-in or via the PLC during operation
- Integrated vacuum sensor for continuous monitoring of the actual value
- Parameterisable air-saving function
- Monitoring function for early detection of faults or errors during operation

Pure vacuum terminal

Single vacuum generator on an individual sub-base



5/4-way valve with holding function, for vacuum suction nozzle

In normal operation, all functions are available as usual: vacuum generation and ejector pulse including air saving function. As soon as an emergency stop (switching off the load voltage and/or logic voltage) is triggered during vacuum generation, the vacuum generator remains in vacuum generation mode.

Features and benefits:

- Reliable vacuum generation in the event of a power failure
- To save energy, one pulse is enough to switch the vacuum on and off
- Integrated air-saving function
- Integrated sensor for continuously measuring the vacuum level

An overview of the features of the valve terminal VTUX

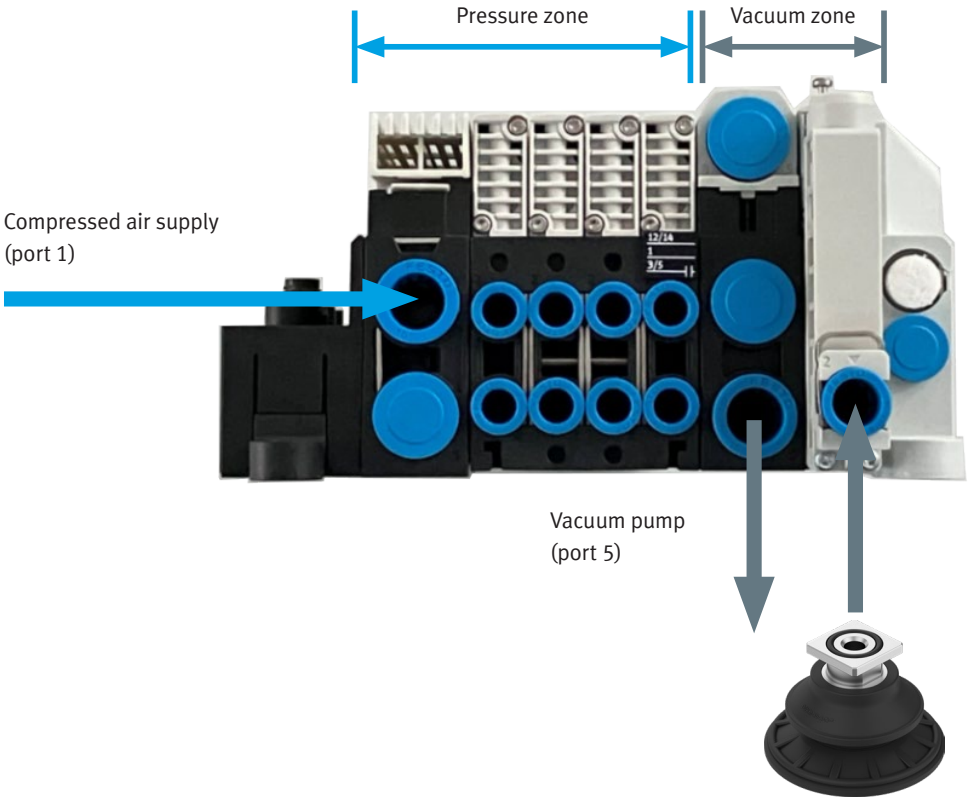
Vacuum integration

Vacuum switching unit

In addition to direct vacuum generation using vacuum generators on the valve terminal, it is also possible to control the vacuum flows of external vacuum pumps using the vacuum switching unit.

Features and benefits:

- Combination of valve technology and vacuum switching unit on one platform
- Only one valve for switching the external vacuum pump (on/off) and generating an adjustable ejector pulse
- Integrated sensor for continuously measuring the vacuum level
- Integrated filter (40 µm) to protect the valve from dust



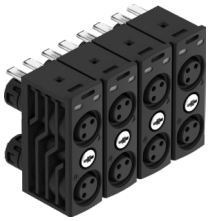
- Compressed air supply (port 1) and internal pilot air supply the valves in the pressure zone.
- The pilot air for vacuum valves is also supplied via port 1 (compressed air supply).

An overview of the features of the valve terminal VTUX

Integrated space-saving switching position feedback that is directly assigned to the valve position

Terminal with digital inputs M8

- M8 (IP6x) – detachable plug adapter for extremely high packing density and easy mounting
- Compact and cost-effective
- For internal serial links
- PNP or NPN
- 2 inputs per valve position
- For manifold sub-bases with 4 valves



M8 connection sockets, 3-pin for 8 inputs

8 inputs (M8, 3-pin)*)

*) In combination with suitable manifold sub-base

Terminal with digital inputs for terminal strip IP20

- Terminal strip (IP20) – three-conductor connection possible per input
- Compact and cost-effective
- For internal serial links
- PNP or NPN
- 2 inputs per valve position
- For manifold sub-bases with 4 valves

8 inputs (push-in)*)

*) In combination with suitable manifold sub-base

Innovative into the future: Pneumatics and software

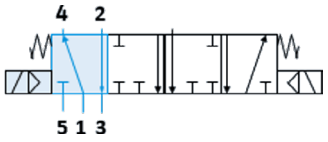
Smart Switching Lite with the 5/4-way multi-efficiency valve

The new 5/4-way multi-efficiency valve (expansion valve) offers the potential to save energy and improve cycle times on all VTUX variants, whether via multi-pin plug or fieldbus connection, by switching off the supply air during motion. The cylinder continues to reach the end position reliably with the help of expansion energy. This special valve allows the cylinder chambers to be pressurised and blocked individually. As the cylinder used reduced energy to reach the end position, the next movement can be carried out with higher dynamics.

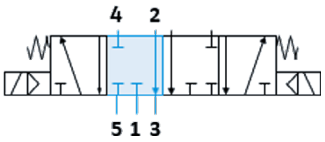
Smart Switching Lite (= SmSw lite) is a complete solution; in addition to the valve, the control logic is also available in the form of a PLC module (TIA/TwinCAT/CODESYS/Studio5000). The PLC module fits into your existing control logic, determines the necessary pressurisation time and detects when the end position is reached via your standard limit switches. Festo also provides matching application notes with further information on the PLC modules.

How Smart Switching Lite works

Cylinder advances

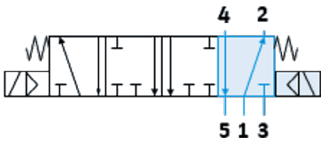


Left coil active

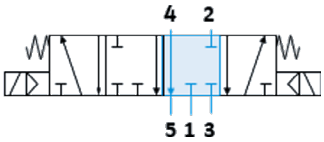


Expansion phase, no coil active

Cylinder retracts

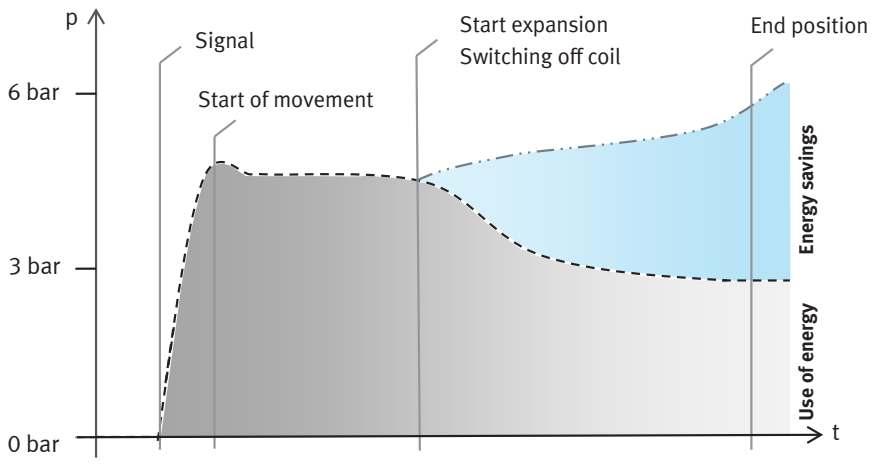


Right coil active



Expansion phase, no coil active

Your advantages



- Up to 60% air savings
- Up to 40% cycle time improvement
- In a standard valve body

Smart Switching Lite shows that new possibilities can be achieved by combining innovative valve technology and software. In order to be able to put Smart Switching Lite into operation quickly and easily, we offer PLC modules and a descriptive application note suitable for the common host systems for free download. With Smart Switching Lite, we achieve energy savings and cycle time improvement hand in hand. Our solution only consumes the energy required in your application.

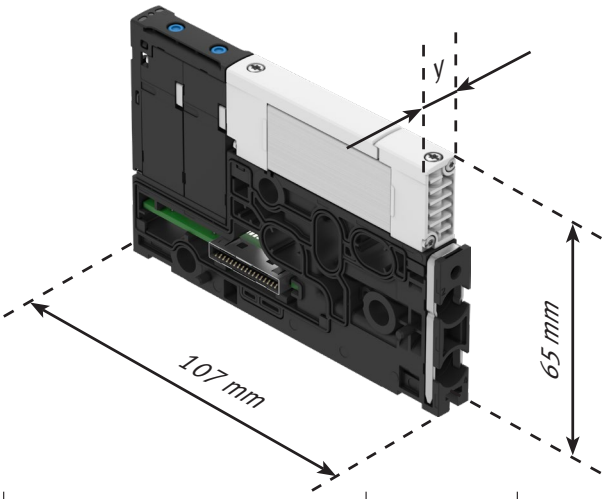
Are you interested? Here you will find the appropriate application notes:

The features of the valve terminal VTUX in detail

Mechanics

Latest technology in a compact design
- Valve control spool in a metal housing
- Latest generation of parallel or serial links
- Valve sub-bases with grid dimensions of 10 mm or 12 mm for tubing connections up to 6 mm or 8 mm
- Valve terminal with modular tie rods

State-of-the-art mix of materials
- Lightweight high-performance polymer
- Very sturdy, flame-retardant glass-fibre polymer
- Suitable for use in battery production



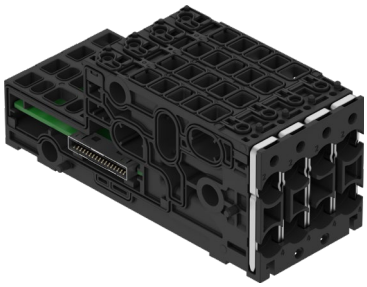
		Size 1	Size 2
Size y		10.5 mm	12.5 mm
Tubing connection	Metric	4, 6 mm	6, 8 mm
	Inch	5/32" or 1/4"	1/4", 5/16"

Modular design principle
- Valves
  - Selectable valve functions
  - One valve size 10 mm for all manifold sub-bases
- Valve manifold sub-bases
  - For any combination of individual sub-bases as well as groups or manifold blocks of sizes 10 and 12 mm
- Left end plate
  - With integrated air supply or exhaust
- Right end plate
  - For supplying pilot air
  - Easy to change between internal and external pilot air
- Supply plates
  - For variable intermediate supply or exhaust.
- Separator for pressure zones VABD-XA-...
  For any pressure zones between separators incl. separate pressure supply VABX-A-...
- Can be precisely adapted to the application

Manifold sub-bases VABX

Single slice

Group of individual valve slices, each with a one-piece printed circuit board

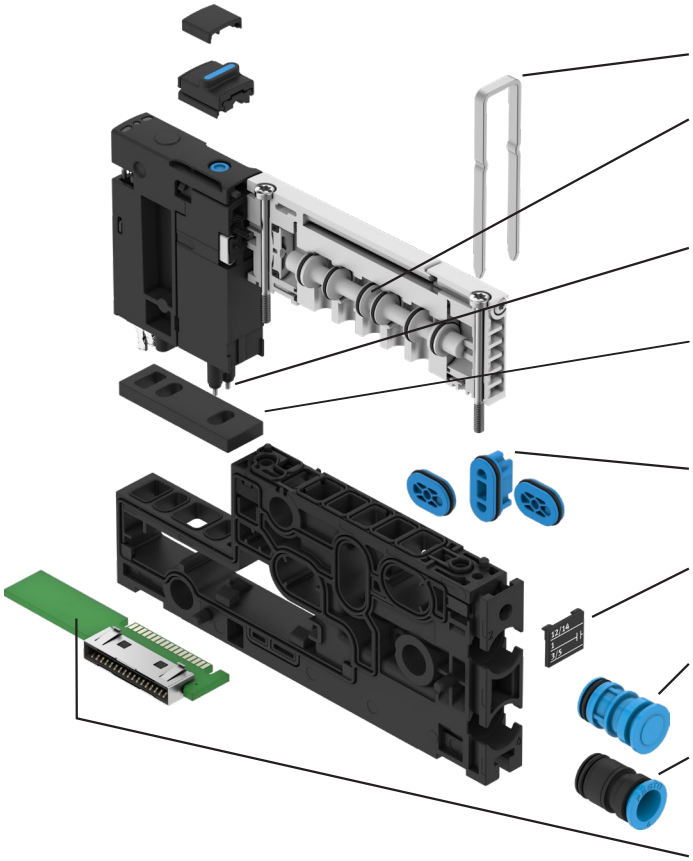


Economical block of four with one-piece circuit board

- The valve sub-bases VABX as an additional component can be individually equipped or configured with different tubing connection sizes
- They can be linked mechanically using modular, extendable tie rods

The features of the valve terminal VTUX in detail

Mechanics



Fixing clamp for tubing plug-in connections

Control spool with negative overlap for safely exhausting the valves

Spring contacts

Seal for protection class IP65
(depending on the end plate used)

Pressure zone separator for any number of pressure zones

Identification label for pressure zone limit

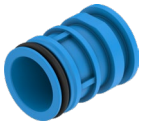
Blanking plug NPQX

Push-in fitting NPQX in various connection sizes

Marking of the valve type M=single solenoid / B=double solenoid

Push-in connectors NPQX

For grid size 1

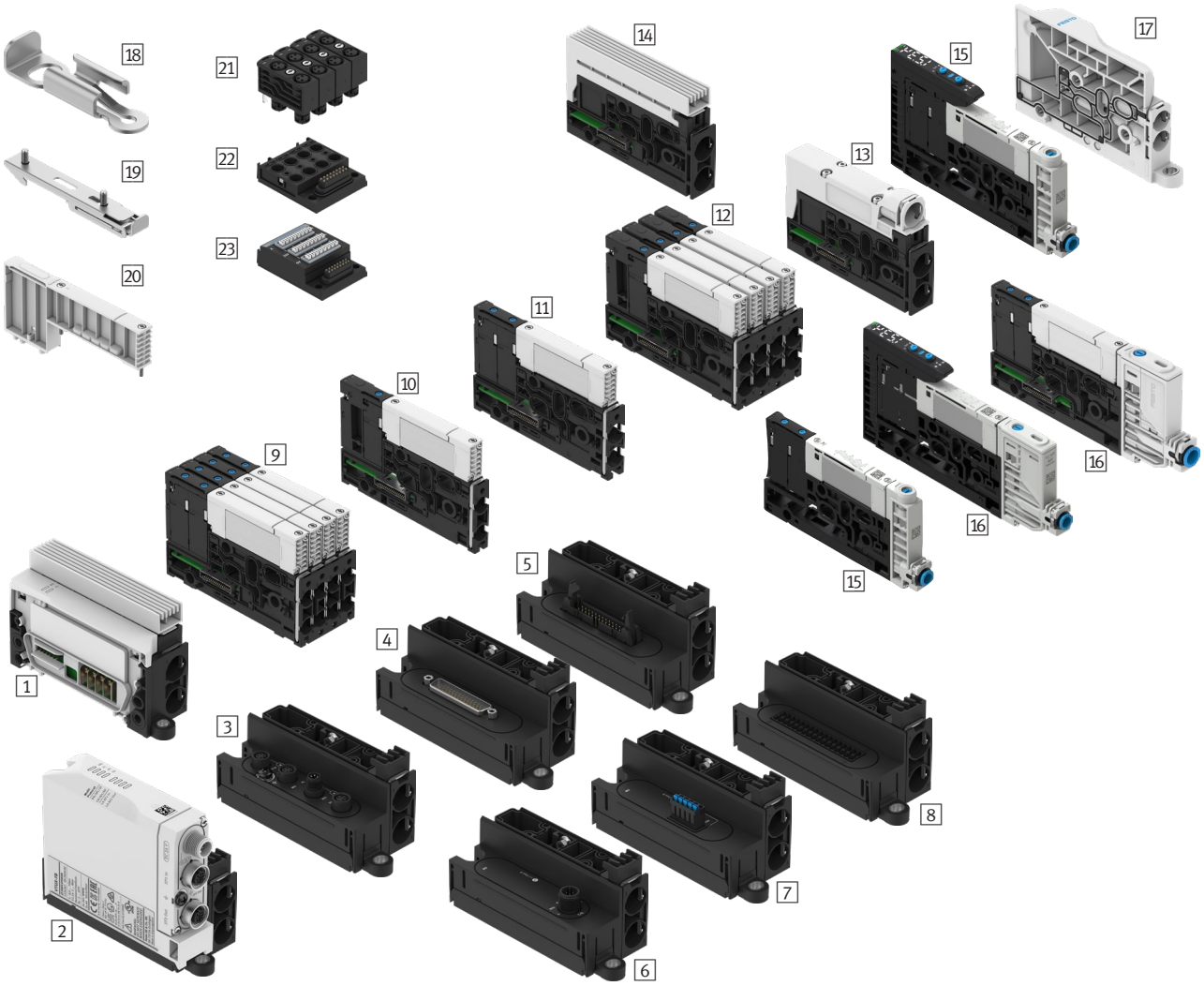


For grid size 2

- High flow rate
- Tube connection sizes
  - For valve manifold sub-bases size 1: 4 mm, 6 mm, 5/32", 1/4"
  - For valve manifold sub-bases size 2: 6 mm, 8 mm, 1/4", 5/16"
- Easy to access and replace
- Polymer material
- Suitable for battery production applications (metric sizes)

The features of the valve terminal VTUX in detail

Overview of the mechanical modules



1 Communication interface CPX-AP-A (parallel or serial)
2 End plate with CTED fieldbus interface
3 Communication interface CPX-AP-I (parallel or serial)
4 Sub-D end plate
5 End plate for ribbon cable
6 End plate with IO-Link®, M12
7 End plate with IO-Link®, spring-loaded terminal
8 End plate with terminal block 34-pin
9 Manifold sub-base with 4 valves, 10 mm grid dimension[1)]
10 Manifold sub-base with 1 valve, 10 mm grid dimension[1)]
11 Manifold sub-base with 1 valve, 12 mm grid dimension[1)]
12 Manifold sub-base with 4 valves, 12 mm grid dimension[1)]
13 Pressure supply plate with ducted exhaust air
14 Pressure supply plate with silencer
15 Vacuum switching unit[2)], 12 mm grid dimension, with and without display module
16 Vacuum generator[2)], 12 mm grid dimension, with and without display module
17 End plate with pneumatic connections for pilot air
18 Wall mounting VAME-XA-W
19 DIN rail mounting VAME-XA-H
20 Cover plate VAME-XA-10-W
21 M8 connection sockets, 3-pin for 8 inputs
22 8 Inputs M8, 3-pin[3)]
23 8 Inputs, spring-loaded terminal[3)]

1) With valves displayed
2) On manifold sub-base
3) In combination with suitable manifold sub-base

End plates

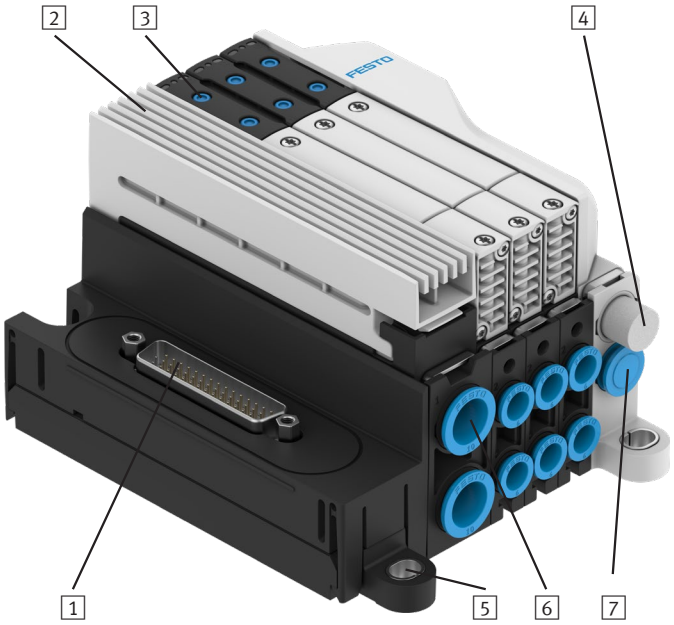
- Outlet direction of the tubing connections as with the valve manifold sub-bases
  - On the left with integrated air supply or exhaust
  - On the right for supplying pilot air
- Space-saving and functional

Valve manifold sub-bases

- With one or two addresses each for solenoid coils with parallel links. Can be combined as required
- With two addresses for solenoid coils with serial links (single-solenoid valves can also be actuated)
- Easy to expand

The features of the valve terminal VTUX in detail

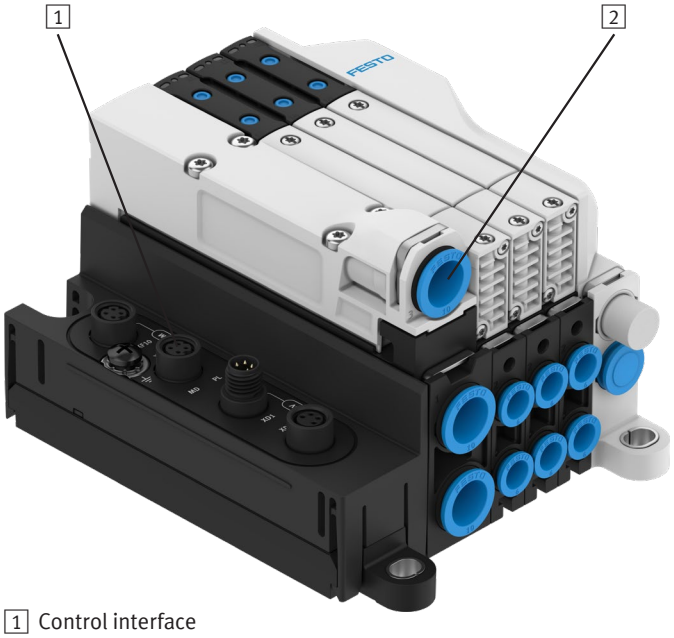
Pneumatics



1 Multi-pin interface
2 Silencer (can be changed without tools)
3 Manual override (standard version: non-detenting)
4 Silencer
5 Space-saving lugs for direct mounting
6 Supply air
7 Pilot air connection prepared

Connection dimensions
- For tubing O.D. 4 mm, 6 mm, 8 mm, 5/32", 1/4", 5/16"

Multi-pin control interface
- LED version of the switching position indicator in yellow: parallel links VTUX-A-P with electrical contacts for up to 32 solenoid coils (only actuation via solenoid coil)
- Degree of protection IP40 or IP65
- Connection variants:
  - Sub-D-25, rotatable Sub-D-25 or 26-pin flat cable for max. 24 valve solenoids
  - 34-pin push-in or Sub-HD 44 for max. 32 valve solenoids



1 Control interface
2 Ducted exhaust air

Connection dimensions
- For tubing O.D. 4 mm, 6 mm, 8 mm, 5/32", 1/4", 5/16"

Control interface AP-I/AP-A
- LED version of the switching position indicator in blue: serial bidirectional link via AP technology VTUX-A-S for up to 128 solenoid coils

Control interface AP-I/AP-A/IO-Link®
- LED version of the yellow switching position indicator: parallel subbase link of up to 32 solenoid coils
- Degree of protection IP40 or IP65
- Connection variants:
  - IO-Link® parallel for max. 32 valve solenoids
  - AP-I/AP-A for max. 32 valve solenoids

The features of the valve terminal VTUX in detail

Technical data – valves VUVX

Criterion	Type
Valve functions	5/2, 5/3, 2x 3/2 (with pneumatic spring or mechanical spring)
Grid dimension	10 mm
Valve technology	Spool valve
Safety design	Negative overlap (except valve function 5/3, mid position closed)
Performance data	0.35 W (standard) without electronics
Approvals	For battery production, UL*), CE, UKCA
Lubrication	NSF H1 (for food industry), water resistant
Manual override	Non-detenting (standard), detenting (optional), blocked (optional)
Electrical contact system	Spring loaded contacts

*) In preparation

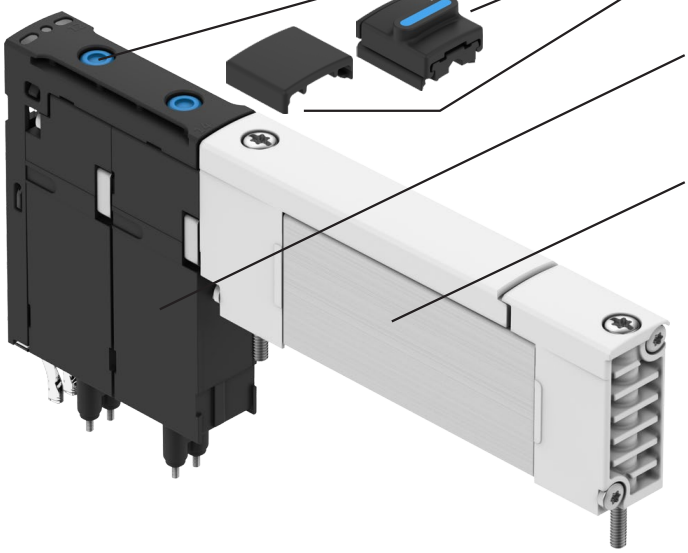
Valve type code	Valve code	Valve design
VUVX-BK10-M52-A1ZH-F-1T1L	M	5/2-way valve, single solenoid, pneumatic reset
VUVX-BK10-M52-MZH-F-1T1L	A	5/2-way valve, single solenoid, mechanical reset
VUVX-BK10-B52-ZH-F-1T1L	J	5/2-way valve, double solenoid
VUVX-BK10-T32C-A1ZH-F-1T1L	KC	2x3/2-way valve, normally closed, pneumatic reset
VUVX-BK10-T32C-MZH-F-1T1L	K	2x3/2-way valve, normally closed, single solenoid, mechanical reset
VUVX-BK10-T32U-MZH-F-1T1L	NS	2x3/2-way valve, normally open, single solenoid, mechanical reset
VUVX-BK10-P53C-MZH-F-1T1L	G	5/3-way valve, mid position closed
VUVX-BK10-P54E-ZH-F-1T1L	ND	5/4-way valve, multi-efficiency valve (➔ page 11)
VUVX-BK10-T32CV-A1ZH-F-1T1L	KV	2x3/2-way valve, normally closed, pneumatic reset, for vacuum generator
VUVX-BK10-P54CV-MZH-F-1T1L	NQ	5/4-way valve with holding function, for vacuum generator (➔ page 8)
VUVX-BK10-P53CD-MZH-F-1T1L	NL	5/3-way valve for vacuum switching unit (➔ page 9)

Selection criteria for valve terminals VTUX

The modular design of the valve terminal VTUX provides you with maximum flexibility when configuring your machine design:

Requirement	Only solenoid valves required (parallel, yellow LED)	Further functions required (serial, blue LED)
Direct control of the valve terminal	VTUX-A-P-... , part no. 8000800	VTUX-A-S-... , part no. 8000805
Integrated remote IO requirements (CPX-AP-A)	VTUX-A-P-APA, part no. 8000810	VTUX-A-S-APA, part no. 8000815

The VTUX can be configured according to your preferences, and can thus be perfectly adapted. The VTUX will always be the best choice as the product focus can be changed or upgraded at any time.



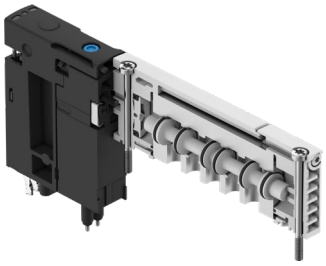
Manual override
- Non-detenting (standard)
- Detenting with slider (optional)
- Blocked

Improved solenoid technology
- No holding current reduction required
- Integrated spring contacts

Proven piston spool technology
- In a metal housing
- NSF-H1 (food grade)

One valve size 10 mm with high flow rate
- Can be placed on manifold sub-bases size 1 or 2
- Reduces the number of different parts

Valve characteristics:
- Negative overlap, i.e. safe exhausting in the case of a fault



Spool valve
- All functions including 5/3-way
- High flow rate
- Metal/polymer housing

VTUX – The further development of the well-known Festo valve terminals

Comparison of dimensions and flow rates

VTUX with tubing ø 6 mm vs. valve terminals in size 10	Grid dimension [mm]	Flow rate 1 → 2/4 [l/min][1)]	Height [mm]	Length without fitting [mm]	Length with fitting [mm]
VTUX-10	10.5	470[2)]	65	104	107
VTUG-10	10.5	330	56	92	107
MPA-L-10	10.7	360	66	107	117
MPA-S-10	10.5	360	59	107.3	119.3
CPV-10	10.5	350	71	52.8	64.8

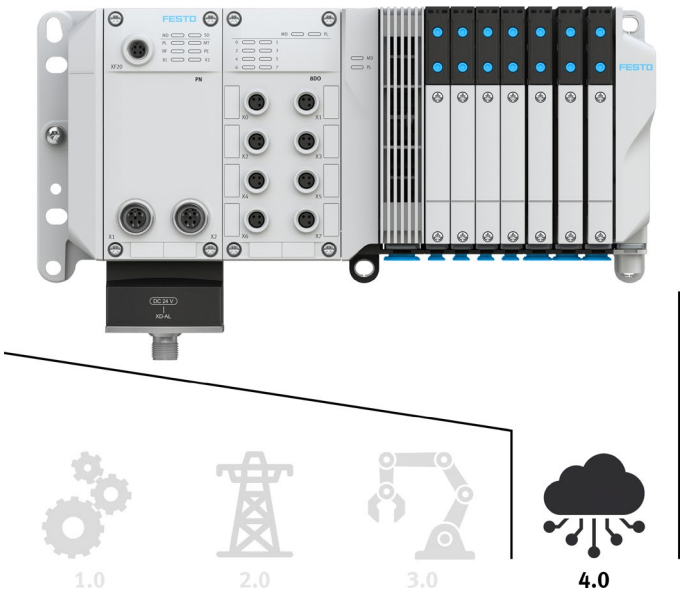
VTUX with tubing ø 8 mm vs. valve terminals in size 14	Grid dimension [mm]	Flow rate 1 → 2/4 [l/min][1)]	Height [mm]	Length without fitting [mm]	Length with fitting [mm]
VTUX-10	12.5	690[2)]	65	104	107
VTUG-14	16	630	69	110	132
MPA-L-14	14.7	670	66	107	116
MPA-S-14	16.4	650	59	107.3	125.5
CPV-14	14.5	650	89	58.8	77

1) Valve 5/2, single solenoid, with pneumatic reset
2) To ISO 8778

The adaptable valve terminal VTUX at a glance

The valve terminal VTUX marks the beginning of a new era in valve terminals. Its features make it the valve terminal platform of the future.

- AP technology from Festo, the new technological standard for communication, ensures lower costs and higher performance at the same time.
- Integrated: the prerequisites for safety designs, predictive maintenance and for data exchange with the cloud in the Industrial Internet of Things (IIOT).
- The compact and lightweight design saves space and weight in the machine and boosts productivity thanks to faster cycle times. The simple and modular design allows quick assembly and commissioning.
- The low weight, the very compact dimensions and the flexible connection options are perfect for decentralised machine concepts.



VTUX – The valve terminal platform of the future!

136177 en 2025/09 – Errors and omissions excepted