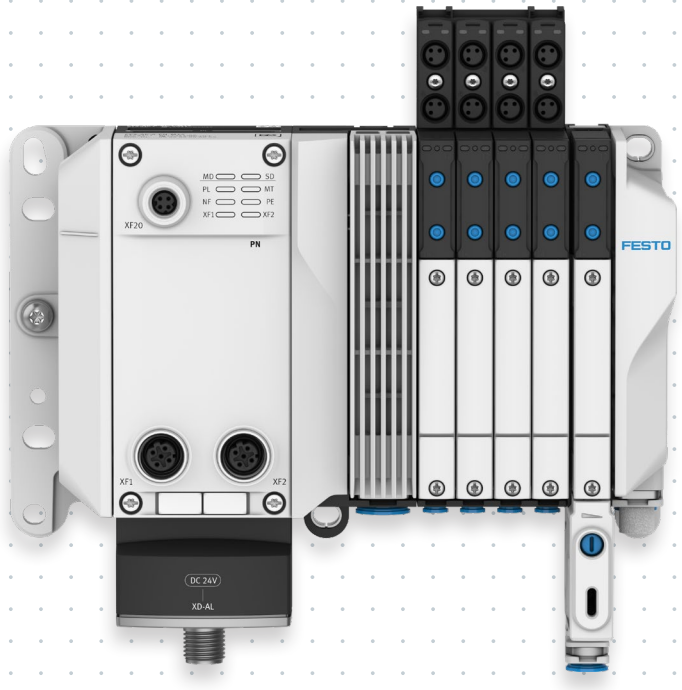
FESTO

VTUX valve terminal – 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

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.

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

Machine concepts are a priority
The VTUX is clearly geared to the framework conditions 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.

Additional information:

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

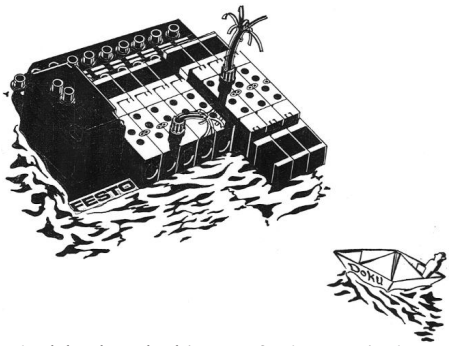
Online Shop
> www.festo.com/shop/vtux

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!



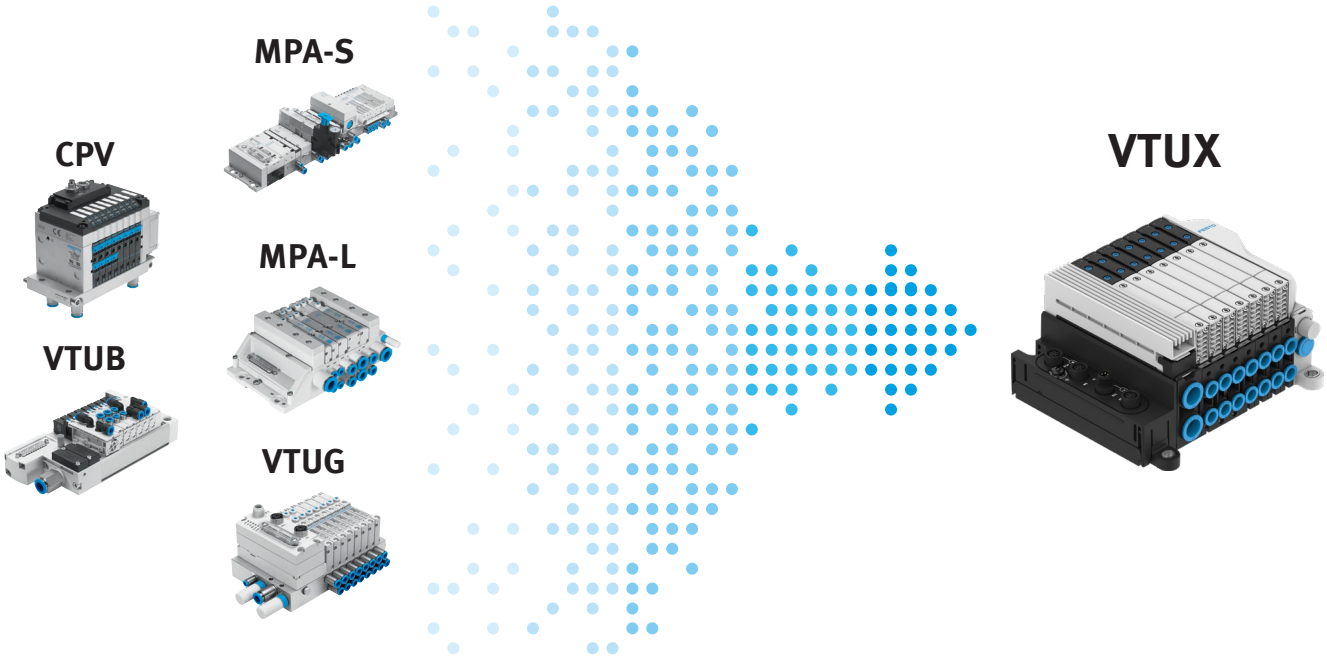
A look back at the history of valve terminals: they were first developed as early as 1987 and were a successful development story.

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.



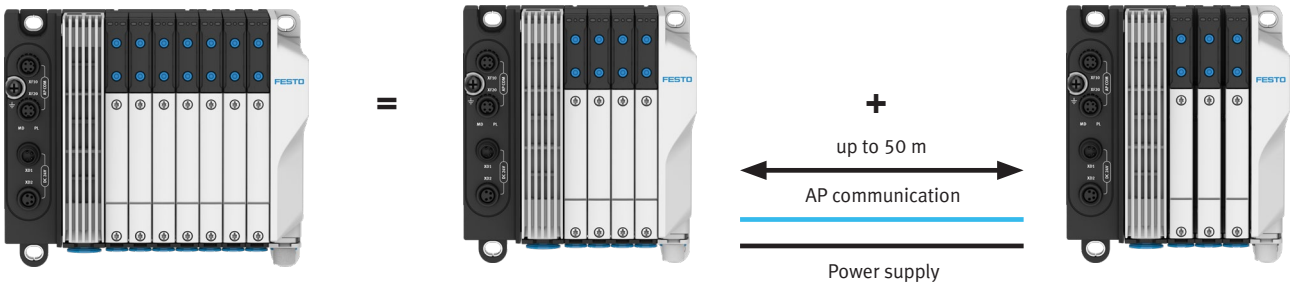
Flexibility for every design concept

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 as well as combined.

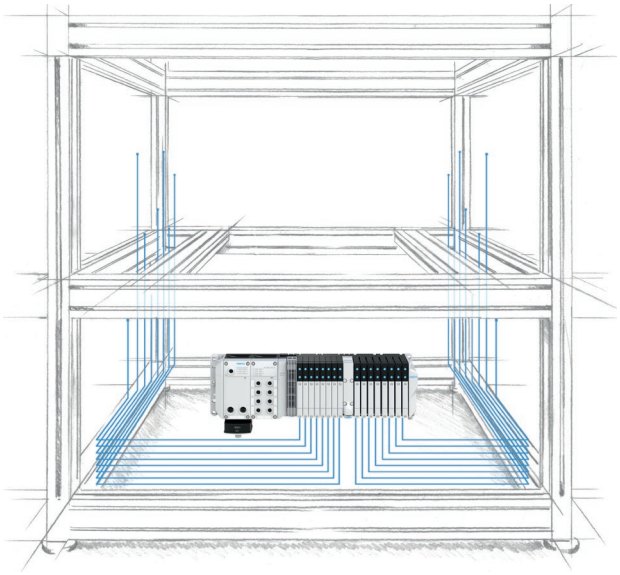


Any division and any layout of the valves

Long distances can be bridged

Centralised or decentralised concept? The advantages and disadvantages

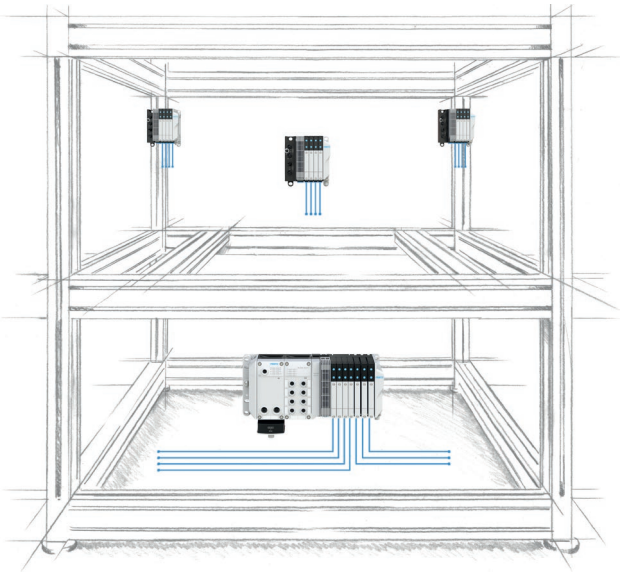
Central valve terminal with the highest valve density



Advantages
- Clear
- Easy to access and to maintain
- Expandable at a defined point
- Less assembly and earthing effort

Disadvantages
- Long tubing and cable runs
- Thick tubing and cable bundles
- Long reaction times

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



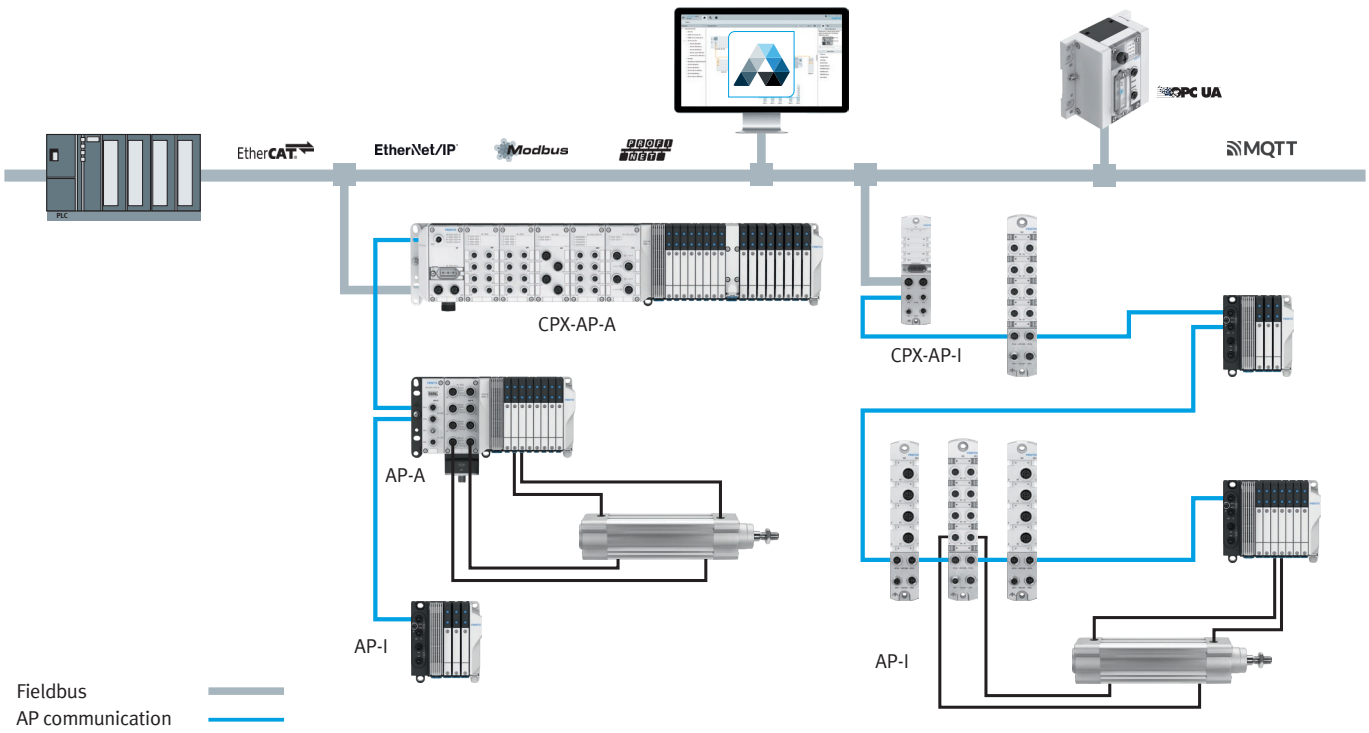
Advantages
- Short, energy-saving tubing
- Only two electric cables up to 50 m to bridge the distances
- Shorter cycle times

Disadvantages
- Possibly limited access in the workspace

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:

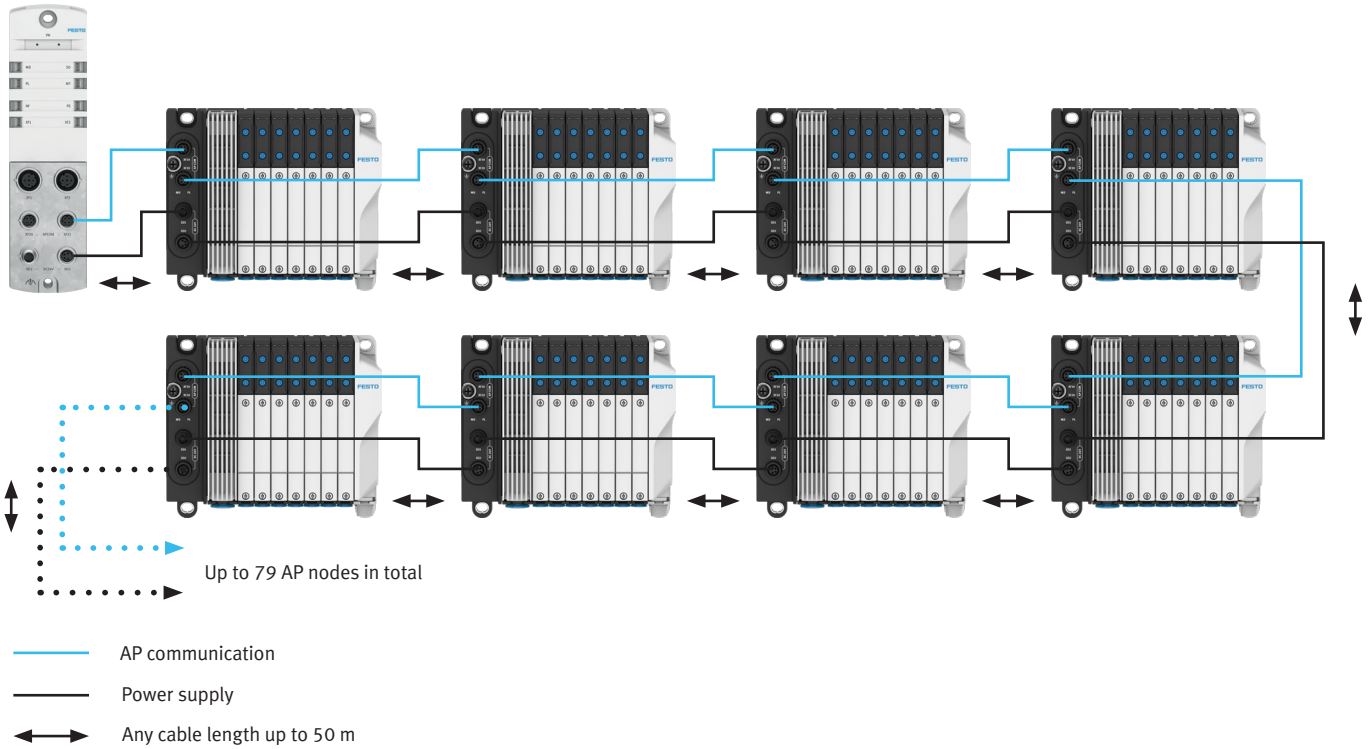
- Faster data rates up to 200 MBaud
- Faster cycle times up to 250 µs
- Process data processing 2 kByte input / 2 kByte output
- Real-time communication to the valve terminal
- Power can be supplied separately for each module or centrally from module to module
- Creation of voltage zones
- Stable data 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 decentralised installation
AP-A-... : communication nodes docked to functional units for a central installation
CPX-AP-A-... /CPX-AP-I-... components to convert between AP and other communication protocols with gateways as a transition from fieldbus to AP communication

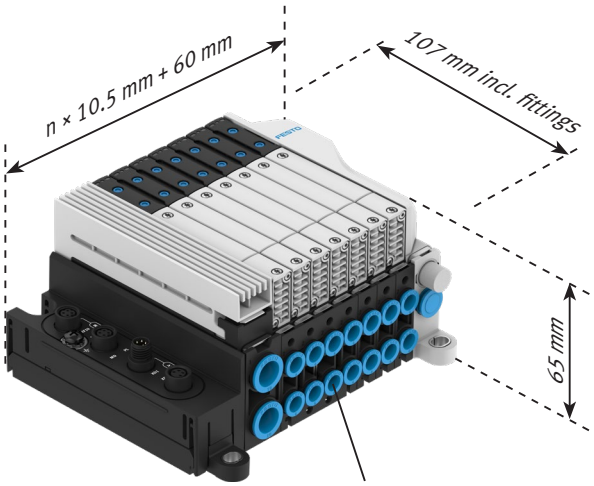
Direct connections save space and costs

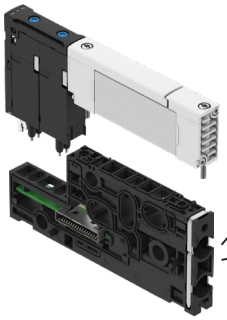
The cost-effective integration of units into the AP communication network avoids having more complex bus connections. At the same time, you can optimise the grid dimensions. In terms of pure connection costs, this amounts to a saving of up to 30% for a system with 20 participants.



An overview of the features of the valve terminal VTUX

Mechanics





The 10 mm valve can be mounted on both grid sizes

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

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

Pneumatics

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

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

Electrics (communication)

Serial remote IO
- Decentralised connection of input and output signals

VTUX-A-P-APA-...
- Interface for application programming

An overview of the features of the valve terminal VTUX

Vacuum integration

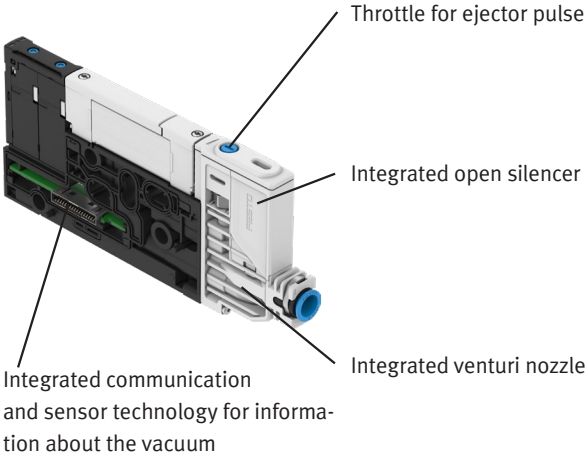
VTUX offers the perfect platform for valves and fully integrated vacuum solutions for a tailored and modular configuration. The high-performance platform enables bidirectional feedthrough from the PLC to the vacuum generator.

Terminal with a mix of valves and individual sub-bases 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 from 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

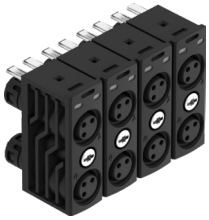


An overview of the features of the valve terminal VTUX

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 a suitable manifold sub-base

Terminal with digital inputs for terminal block IP20

- Terminal block (IP20) – three-wire 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)*)

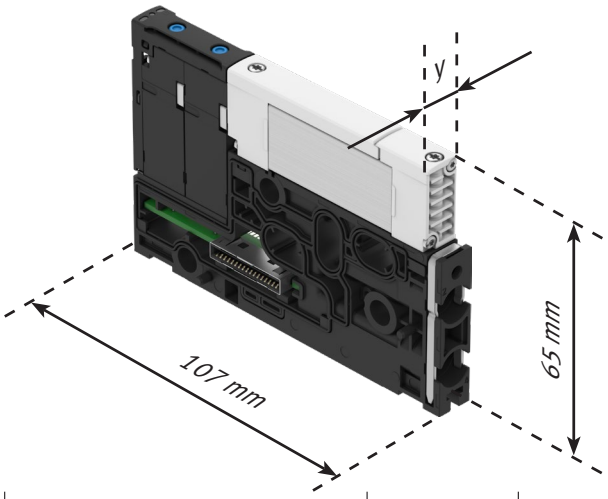
*) In combination with a suitable manifold sub-base

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



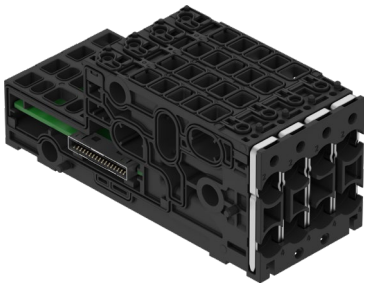
		Size 1	Size 2
Size y		10.5 mm	12.5 mm
Tubing connection	Metric	4, 6 mm	6, 8 mm
	inch	5/32", 1/4"	1/4", 5/16"

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.
- Pressure zone separator 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

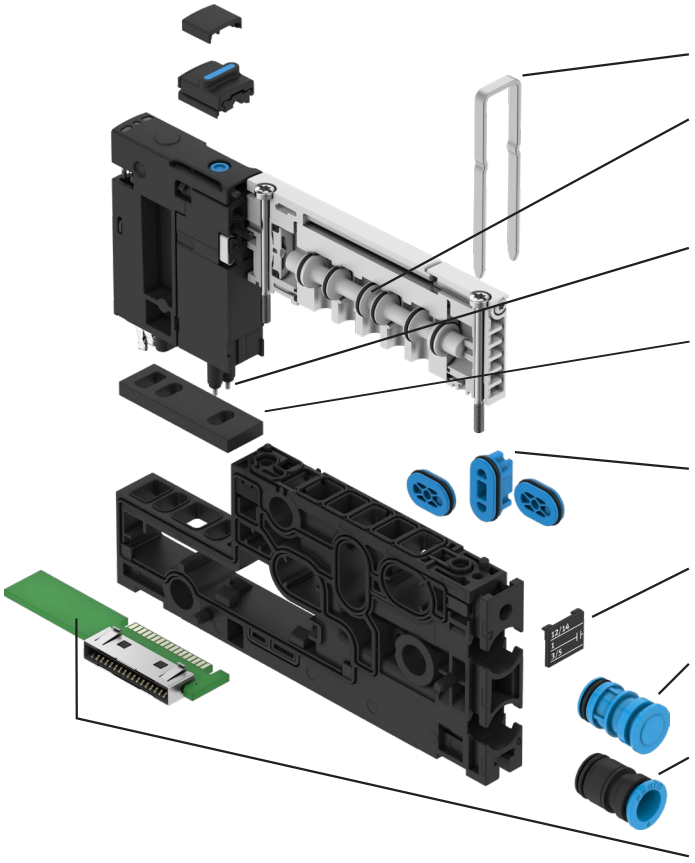


Economical block of four with one-piece circuit board

- 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

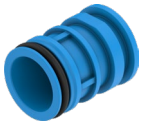
The features of the valve terminal VTUX in detail

Mechanics



Push-in connectors NPQX

For grid size 1



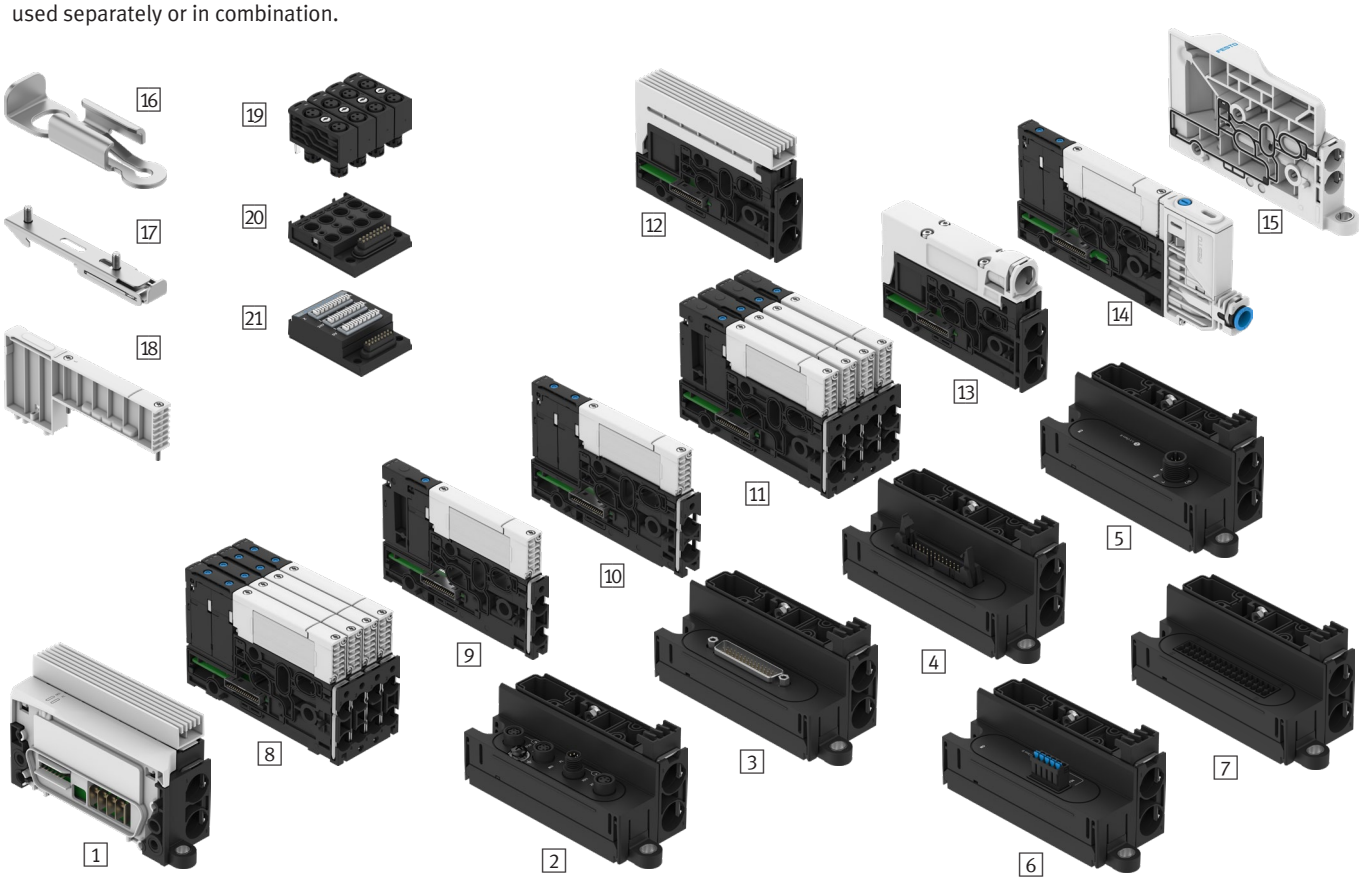
For grid size 2

- 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 manufacturing applications (metric sizes)

The features of the valve terminal VTUX in detail

Overview of the mechanical modules

The functions can be flexibly combined and the performance classes are scalable. Small, compact and large, powerful valve terminals can be used separately or in combination.



1 Communication interface AP-A (parallel or serial)
2 Communication interface AP-I (parallel or serial)
3 Sub-D end plate
4 End plate flat cable
5 End plate IO-Link®, M12
6 End plate IO-Link®, push-in
7 End plate 34-pin with terminal block
8 Manifold sub-base with 4 valves, 10 mm grid dimension
9 Manifold sub-base with 1 valves, 10 mm grid dimension
10 Single valve sub-base, 12 mm grid dimension
11 Manifold sub-base with 4 valves, 12 mm grid dimension
12 Pressure supply plate with exhaust
13 Pressure supply plate with ducted exhaust air
14 Individual vacuum generator on sub-base, 12 mm grid
15 End plate with pneumatic connections for pilot air
16 Wall mounting VAME-XA-W
17 H-rail mounting VAME-XA-H
18 Cover plate VAME-XA-10-W
19 M8 connection sockets, 3-pin for 8 inputs
20 8 inputs (M8, 3-pin)*)
21 8 inputs (push-in)*)

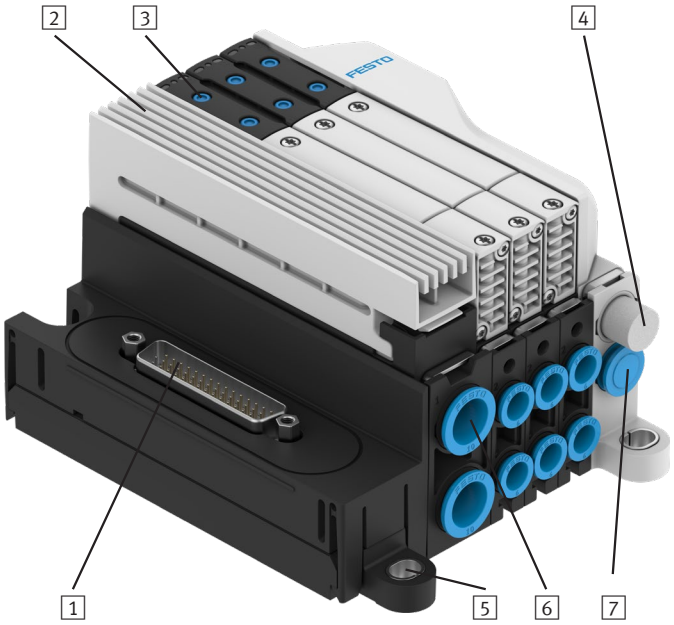
*) In combination with a suitable manifold sub-base

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

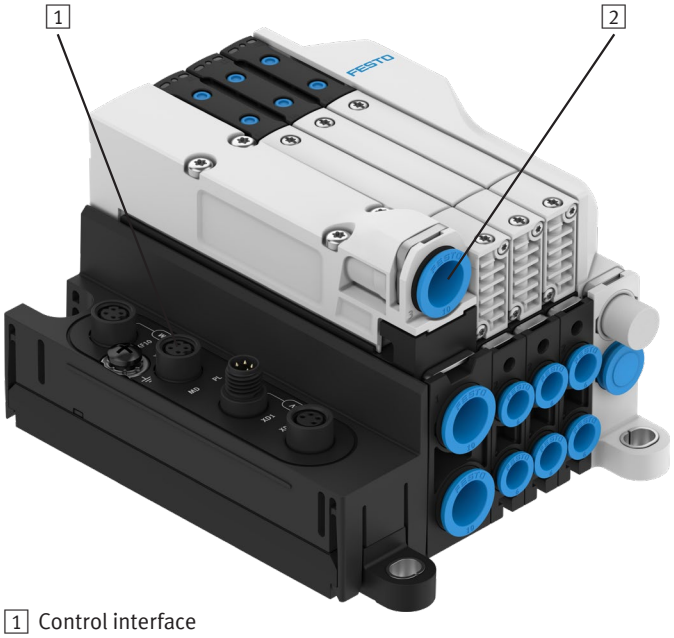
Pneumatics



1 Multi-pin interface
2 Silencer (can be changed without tools)
3 Manual override (standard version: non-detenting)
4 Auxiliary air supply
5 Space-saving lugs for direct mounting
6 Supply air
7 Silencer or ducted auxiliary exhaust air

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 IP65/67
- 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 linkage via AP technology VTUX-A-S for up to 128 solenoid coils

Control interface AP-I/AP-A/IO-Link®
- LED version for yellow switching position indicator: parallel subbase link of up to 32 solenoid coils
- Degree of protection IP40 or IP65/67
- 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
Certification	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

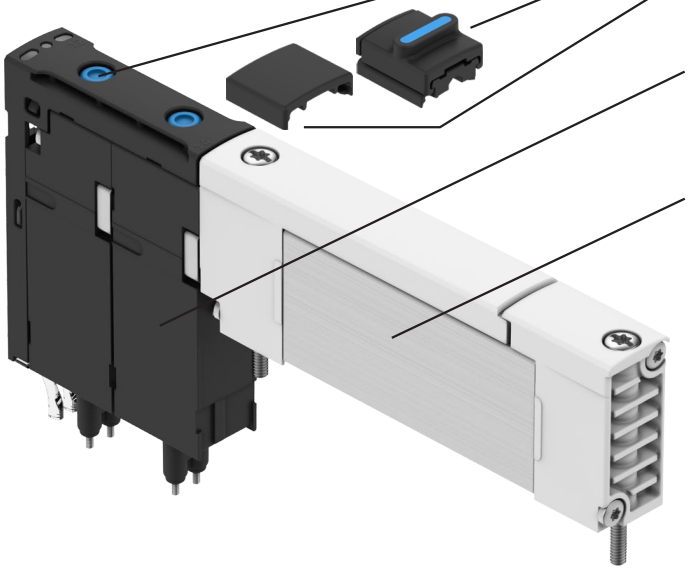
Valve type code	Valve code	Valve type
VUVX-BK10-M52-A1ZH-F-1T1L	M	5/2-way valve, single solenoid, pneumatic reset
VUVX-BK10-M52-MZH-F-1T1L	A	5/2-way valve, single solenoid, mechanical reset
VUVX-BK10-B52-ZH-F-1T1L	J	5/2-way valve, double solenoid
VUVX-BK10-T32C-A1ZH-F-1T1L	KC	2x3/2-way valve, normally closed, pneumatic reset
VUVX-BK10-T32CV-A1ZH-F-1T1L	KV	2x3/2-way valve, normally closed, pneumatic reset, for vacuum generator
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

Selection criteria for VTUX valve terminals

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.



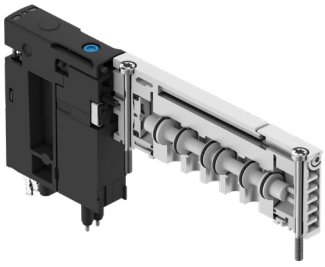
Manual override
- Non-detenting (standard)
- Detenting with slider (optional)
- Blocked

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

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

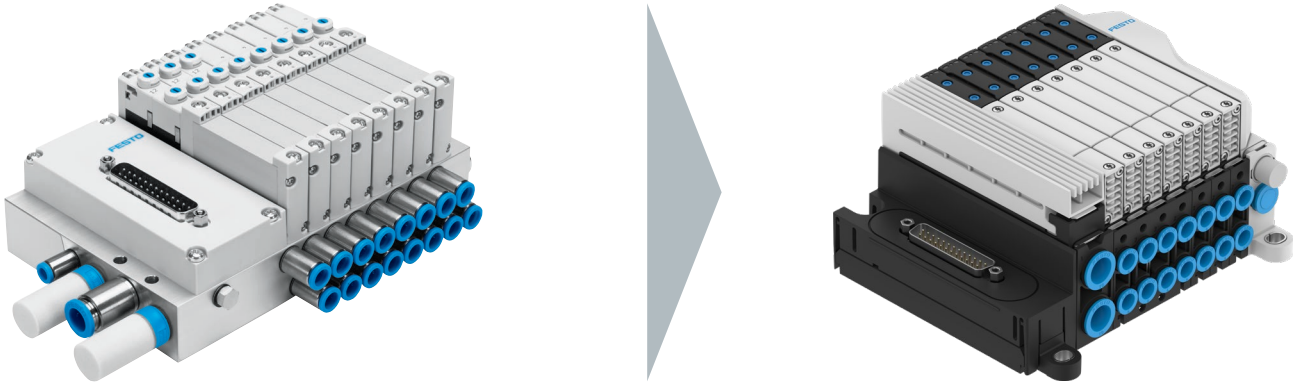
One valve size 10 mm with high flow rate
- Can be placed on manifold sub-bases size 1 or 2
- Reduces the number of different parts

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

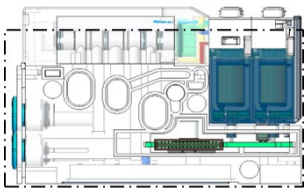


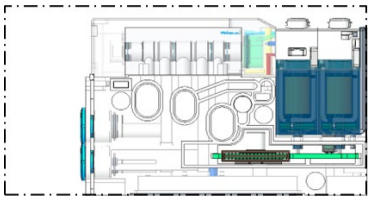
Spool valve
- All functions including 5/3-way
- High flow rate
- Metal/polymer housing

VTUX – the further development of the valve terminal VTUG



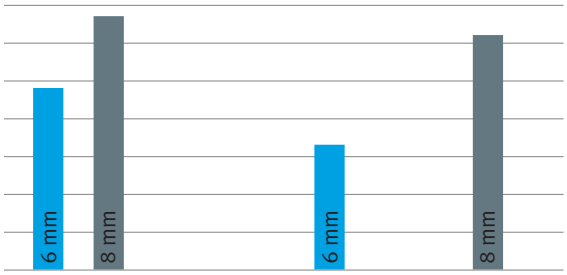
Comparison of dimensions and flow rates

VTUG-10 vs. VTUX with tubing ⌀ 6 mm		Grid dimension [mm]	Height [mm]	Length without fitting [mm]	Length with fitting [mm]
 VTUG-10 — · — · — · —	VTUG-10	10.5	56	92	107
	VTUX	10.5/12.5	65	104	107

VTUG-14 vs. VTUX with tubing ⌀ 8 mm		Grid dimension [mm]	Height [mm]	Length without fitting [mm]	Length with fitting [mm]
 VTUG-14 — · — · — · —	VTUG-14	16	69	110	132
	VTUX	10.5/12.5	65	104	107

VTUX – the further development of the valve terminal VTUG

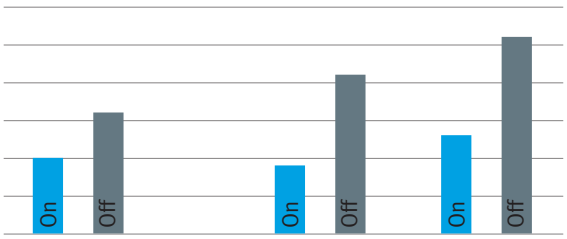
Flow rate 1 ➔ 2/4



VTUX 10 mm | VTUG 10 mm | VTUG 14 mm
5/2, single solenoid*)

*) with pneumatic reset

Switching times



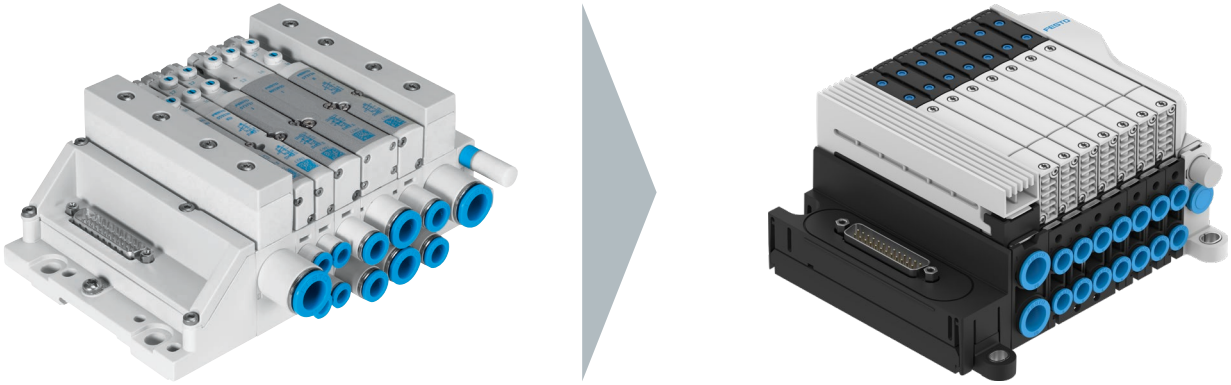
VTUX 10 mm | VTUG 10 mm | VTUG 14 mm
5/2, single solenoid*)

One size fits all – with its high flow rate, the VTUX's 10 mm valve is equivalent to the VTUG's 10 and 14 mm valves.

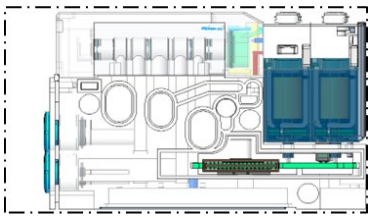
The benefits to you of the VTUX:

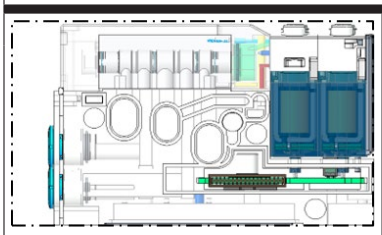
- All tubing outlets in one direction ➔ reduced overall width
- Mounting points on the end plate contribute to the small overall width
- Modular number of valves
- Lighter thanks to high-performance polymer
- Higher flow rate
- Only one valve width required
- The manifold sub-bases with width 10 mm and 12 mm can be combined
- Up to 128 valve functions through internal serial links
- Can be combined with CPX-AP-A remote I/O system
- Versatile pressure supply
- Many pressure zones
- Simple electrical connection via the left end plate
- Safe exhausting thanks to valves with negative overlap

VTUX – the further development of the valve terminal MPA-L



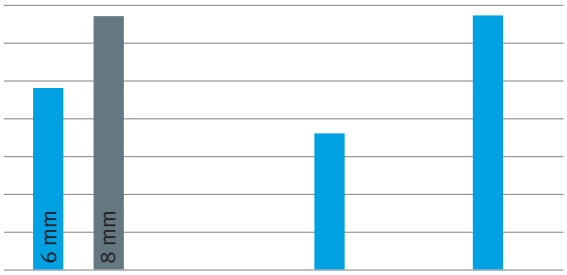
Comparison of dimensions and flow rates

MPA-L-10 vs. VTUX with tubing ø 6 mm		Grid dimension [mm]	Height [mm]	Length without fitting [mm]	Length with fitting [mm]
 MPA-L-10 — · — · — · —	MPA-L-10	10.7	66	107	117
	VTUX	10.5/12.5	65	104	107

MPA-L-14 vs. VTUX with tubing ø 8 mm		Grid dimension [mm]	Height [mm]	Length without fitting [mm]	Length with fitting [mm]
 MPA-L-14 — · — · — · —	MPA-L-14	14.7	66	107	116
	VTUX	10.5/12.5	65	104	107

VTUX – the further development of the valve terminal MPA-L

Flow rate 1 ➔ 2/4

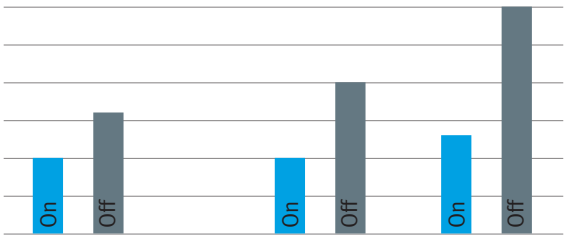


VTUX 10 mm | MPA-L 10 mm | MPA-L 14 mm

5/2, single solenoid*)

*) with pneumatic reset

Switching times



VTUX 10 mm | MPA-L 10 mm | MPA-L 14 mm

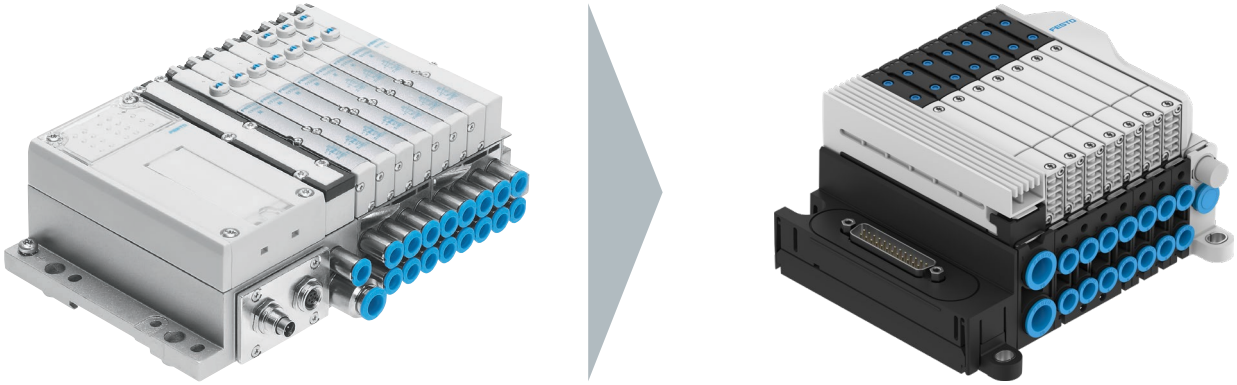
5/2, single solenoid*)

One size fits all – with its high flow rate, the VTUX's 10 mm valve is equivalent to the MPA-L's 10 and 14 mm valves.

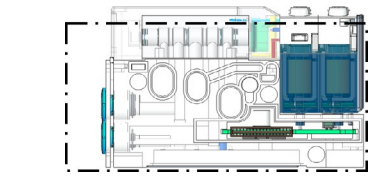
The benefits to you of the VTUX:

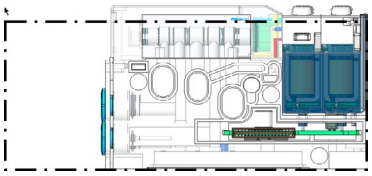
- Mounting points on the end plate contribute to the small overall width
- Lighter thanks to high-performance polymer
- Same or better flow rate
- Only one valve width required
- Simple electrical connection via the left end plate
- Safe exhausting thanks to valves with negative overlap
- Better footprint

VTUX – the further development of the valve terminal MPA-S



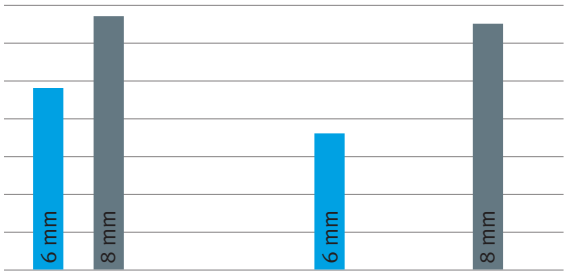
Comparison of dimensions and flow rates

MPA-S-10 vs. VTUX with tubing ø 6 mm		Grid dimension [mm]	Height [mm]	Length without fitting [mm]	Length with fitting [mm]
 MPA-S-10	MPA-S-10	10.5	59	107.3	119.3
	VTUX	10.5/12.5	65	104	107

MPA-S-14 vs. VTUX with tubing ø 8 mm		Grid dimension [mm]	Height [mm]	Length without fitting [mm]	Length with fitting [mm]
 MPA-S-14	MPA-S-14	16.4	59	107.3	125.5
	VTUX	10.5/12.5	65	104	107

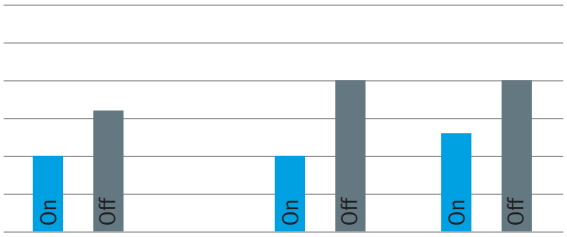
VTUX – the further development of the valve terminal MPA-S

Flow rate 1 ➔ 2/4



VTUX 10 mm MPA-S 10 mm MPA-S 14 mm
5/2, single solenoid*)
*) with pneumatic reset

Switching times



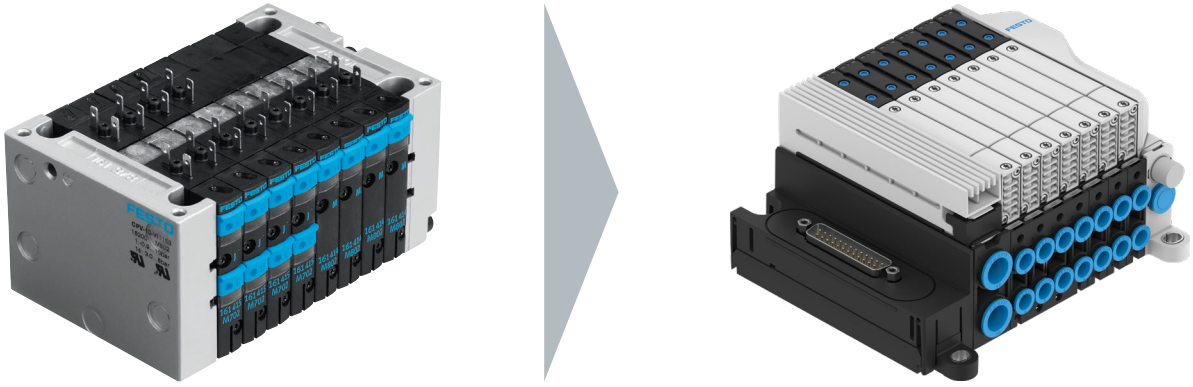
VTUX 10 mm MPA-S 10 mm MPA-S 14 mm
5/2, single solenoid*)

One size fits all – with its high flow rate, the VTUX's 10 mm valve is equivalent to the MPA-S's 10 and 14 mm valves.

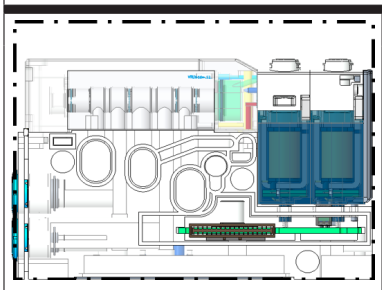
The benefits to you of the VTUX:

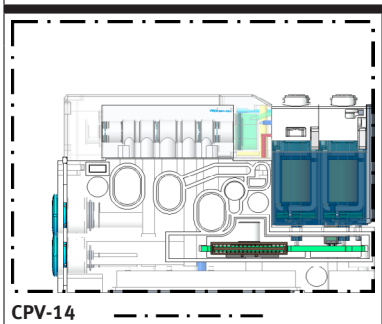
- Mounting points on the end plate contribute to the small overall width
- Lighter thanks to high-performance polymer
- Higher flow rate
- Only one valve width required
- Easy to convert from parallel internal links to serial internal links, thus open for innovations
- Simple electrical connection via the left end plate
- Safe exhausting thanks to valves with negative overlap
- Better footprint

VTUX – the further development of the valve terminal CPV



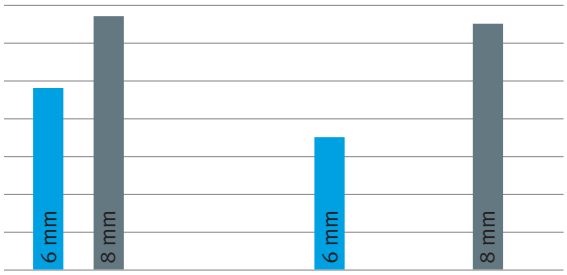
Comparison of dimensions and flow rates

CPV-10 vs. VTUX with tubing ø 6 mm		Grid dimension [mm]	Height [mm]	Length without fitting [mm]	Length with fitting [mm]
 CPV-10	CPV-10	10.5	71	52.8	64.8
	VTUX	10.5/12.5	65	104	107

CPV-14 vs. VTUX with tubing ø 8 mm		Grid dimension [mm]	Height [mm]	Length without fitting [mm]	Length with fitting [mm]
 CPV-14	CPV-14	14.5	89	58.8	77
	VTUX	10.5/12.5	65	104	107

VTUX – the further development of the valve terminal CPV

Flow rate 1 ➔ 2/4

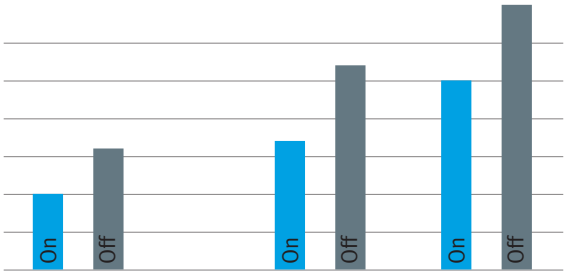


VTUX 10 mm | CPV 10 mm | CPV 14 mm

5/2, single solenoid*)

*) with pneumatic reset

Switching times



VTUX 10 mm | CPV 10 mm | CPV 14 mm

5/2, single solenoid*)

One size fits all – with its high flow rate, the VTUX's 10 mm valve is equivalent to the CPV's 10 and 14 mm valves.

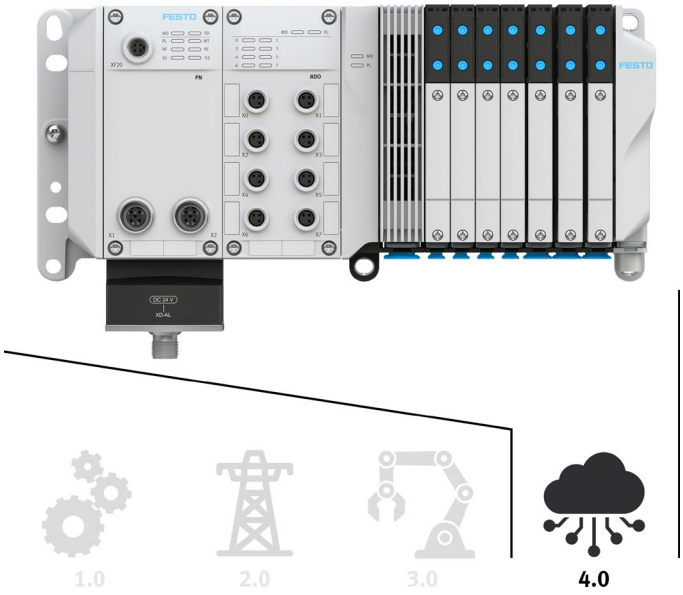
The benefits to you of the VTUX:

- All tubing outlets in one direction ➔ reduces the overall width
- Modular number of valves
- Same or better flow rate
- Only one valve width required
- The manifold sub-bases with width 10 mm and 12 mm can be combined
- Up to 128 valve functions through internal serial links
- Can be combined with CPX-AP-A remote I/O system
- Versatile pressure supply
- Versatile pressure zones
- Easy to convert from parallel internal links to serial internal links, thus open for innovations
- Simple electrical connection via the left end plate
- Safe exhausting thanks to valves with negative overlap

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!

The Festo ★ Core Range

Simply part of the solution

136123 en 2024/11 – Errors and omissions excepted