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, for communication and machine concepts
- Highly modular
- Open for future developments
- 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 ranges 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 the valve terminal.

Machine concepts are a priority
The VTUX is clearly geared to the control architecture of the machine – it always fits!

Superb communication
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 push-in fittings can be configured to the required tubing diameter, saving space and ensuring optimised air flows. 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, making it ideal for use 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

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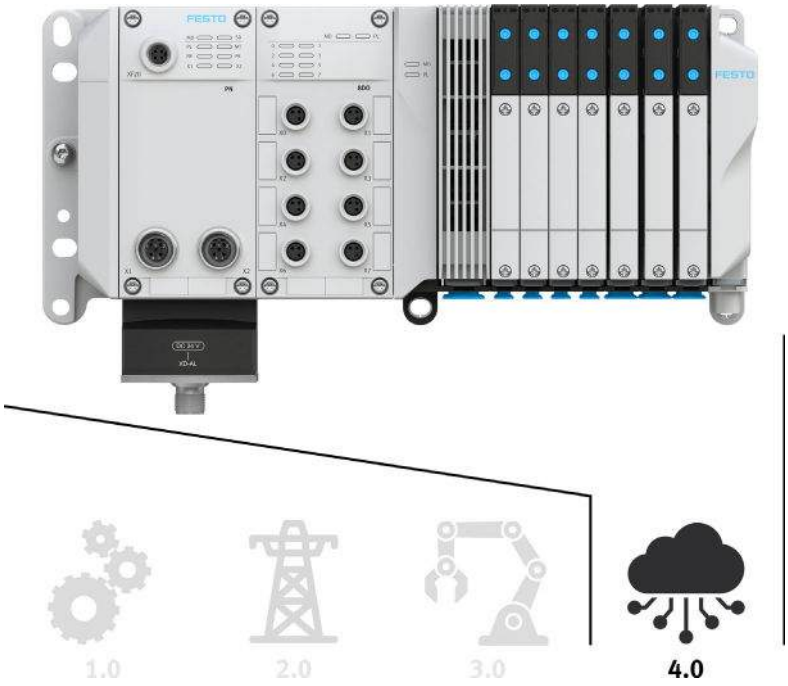
At a glance

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).
- Compact and lightweight: this saves space and weight in the machine and increases productivity through 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 ideal for decentralised machine concepts.



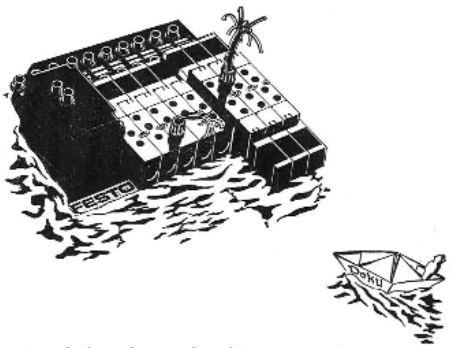
The Festo ★ Core Range

Simply part of the solution

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 on the demands placed on the products we manufacture and use. They should be more economical, for example, 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, making it open for today's and tomorrow's innovations that can be perfectly 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!

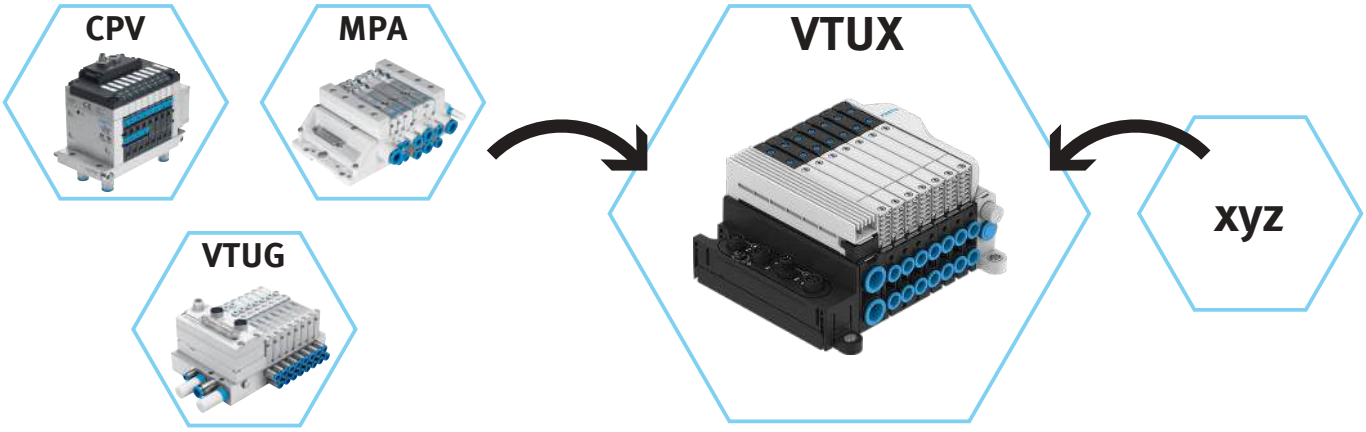


A look back at the history of valve terminals (sometimes also called "valve islands"): the voyage of discovery back in 1987 proved to be a very successful one!

Extremely compatible for an easy transition

It is good to know that the existing and the new valve terminal worlds are compatible! No matter which valve series you use today, we make the transition easy for you.

- In terms of dimensions, so that you can simply swap old for new.
- In terms of communication issues, so that the transition between the old and new valve terminal ranges is simple and reliable.



The adaptable VTUX offers you a highly flexible concept in which the modules can be flexibly placed within the valve terminal. And you can control each terminal within a hybrid, decentralised machine architecture.

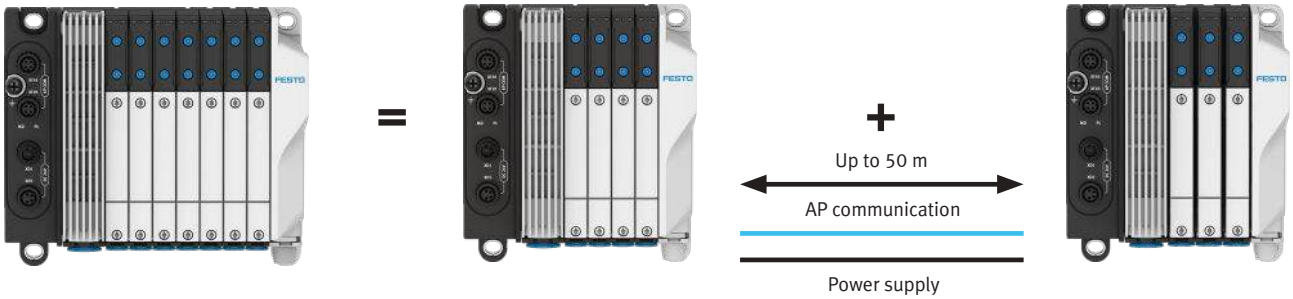
Flexibility for every design concept

In a central design concept, many of the pneumatic tubes have to bridge long distances. In a decentralised concept, on the other hand, the distances to the actuators are shorter and long distances can be covered with only one pneumatic supply line. The communication connections are easy and cost-effective to implement.

That is exactly what the VTUX is made for:

- By splitting the module units as required
- By bridging even long distances in terms of communication and supply technology with reduced cabling and tubing
- Thanks to the lightweight construction, the VTUX can be mounted decentrally, even on moving elements.

With the VTUX, both concepts can be implemented individually and in combination.

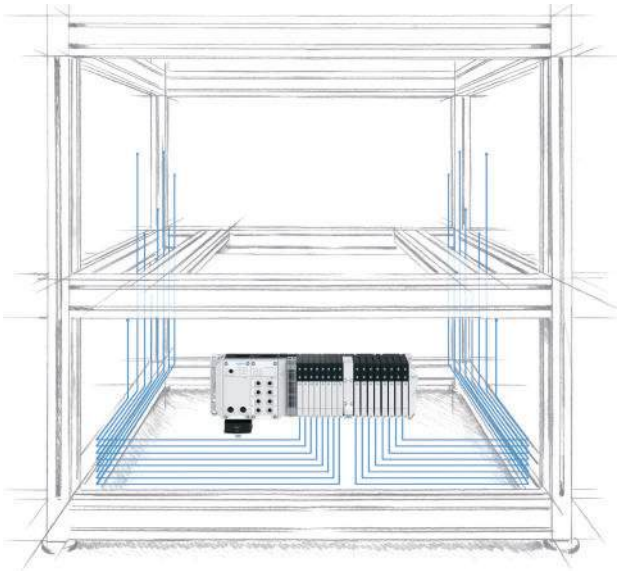


The valves can be split and arranged as needed

Long distances can be bridged

Centralised or decentralised concept? The advantages and disadvantages

Centralised valve terminal with the highest valve density



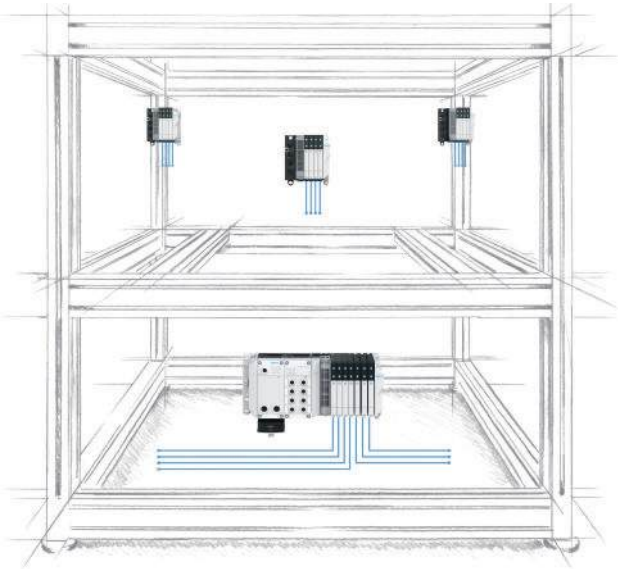
Advantages

- Clear layout
- 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
- Slower response times
- Requires larger control cabinet, impacting cost and space

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



Advantages

- Short, energy-saving tubing
- Only two electric cables needed for distances up to 50 m
- Shorter cycle times

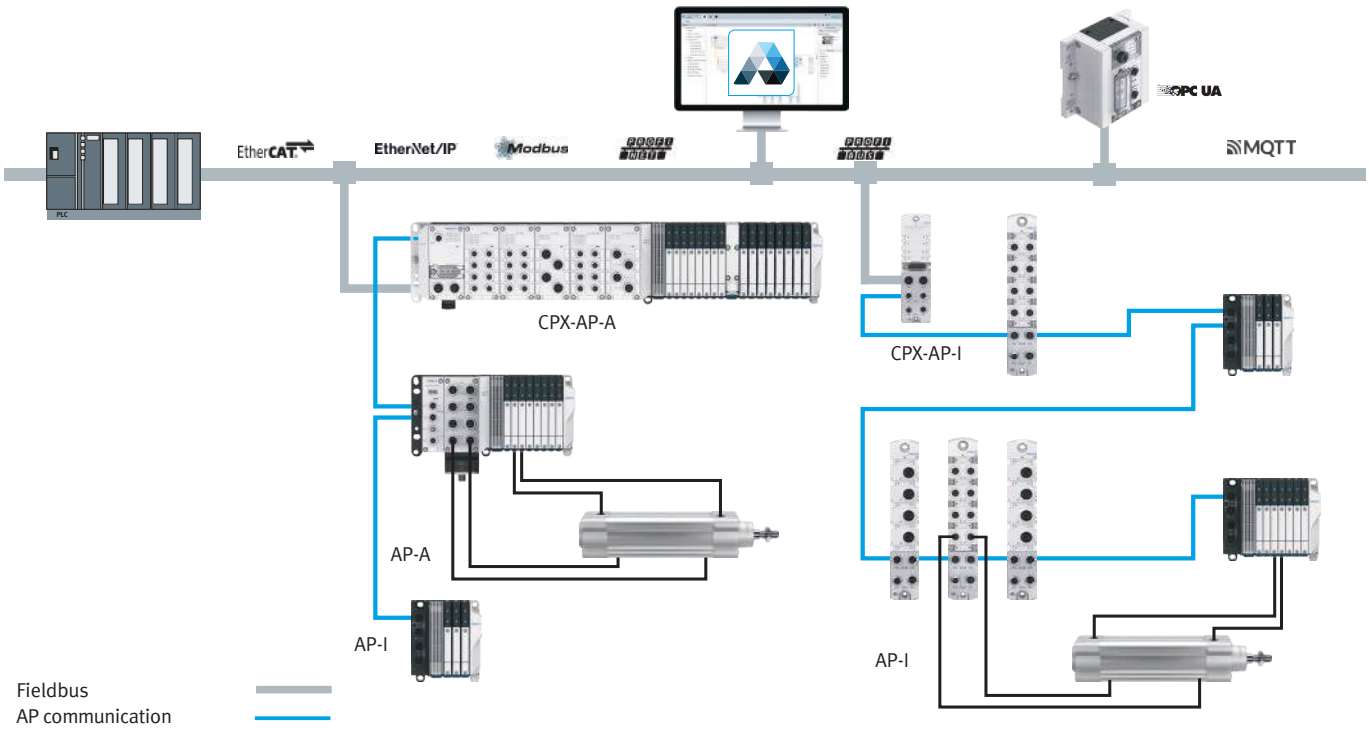
Disadvantages

- Possibly limited access in the workspace

A communication boost – the new automation platform AP

The newly created I/O communication protocol 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 components, now and in future automation architectures:

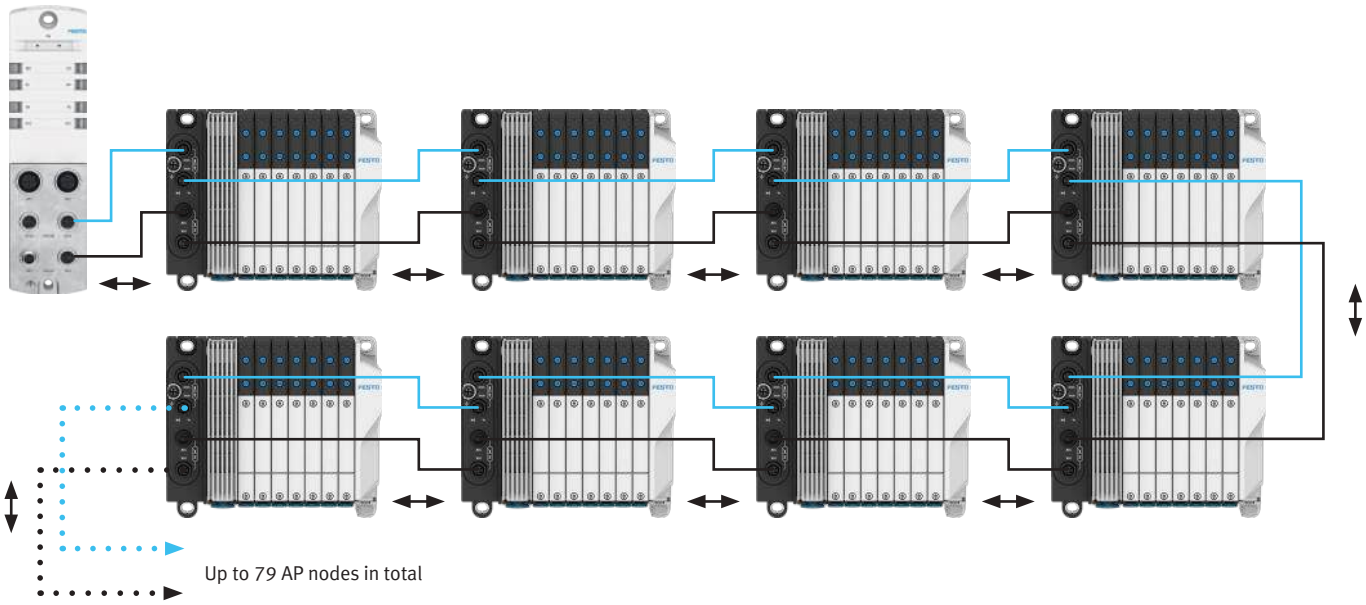
- Faster data rates up to 200 MBaud
- Faster cycle times up to 250 µs
- Process data processing 2 kByte input / 2 kByte output
- Real-time communication to the valve terminal
- Power can be supplied separately for each module or centrally to all modules
- Creation of voltage zones
- Stable data transfer
- The AP modules save space through function integration, e.g. in the end plates
- Saves weight as the modules can be arranged freely, and there are virtually no limits to the flexibility of the system
- Simplified engineering without additional software
- The AP nodes also considerably reduce costs



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.



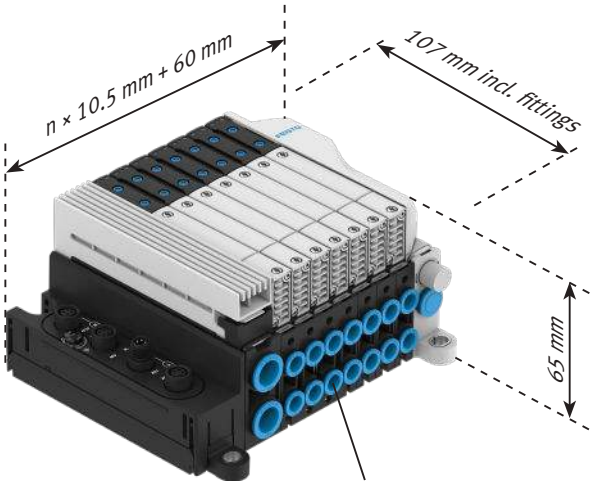
AP communication

Power supply

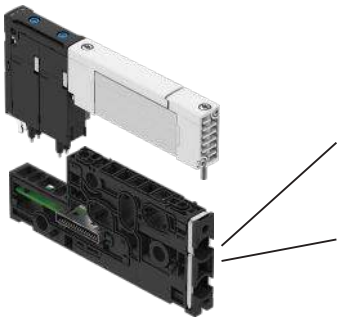
Any cable length up to 50 m

An overview of the features of the valve terminal VTUX

Mechanics



Push-in fittings
⌀ 4 ... 8 mm



The 10 mm valve can be mounted on both sub-base sizes

Sub-base size 1: 10 mm
for tubing connections
up to 6 mm

Sub-base size 2: 12 mm
for tubing connections
up to 8 mm

Electrics (communication)

Serial remote IO
- Decentralised connection of input and output signals

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

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
- Blue LED for indicating the switching status
- Electrical communication via
  - AP-I
  - AP-A

The features of the valve terminal VTUX in detail

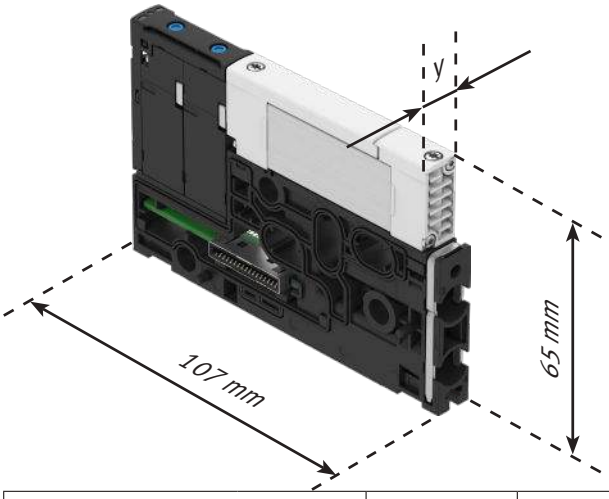
Mechanics

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 valve 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 flexibly adapted to the application

Manifold sub-bases VABX

Single sub-base

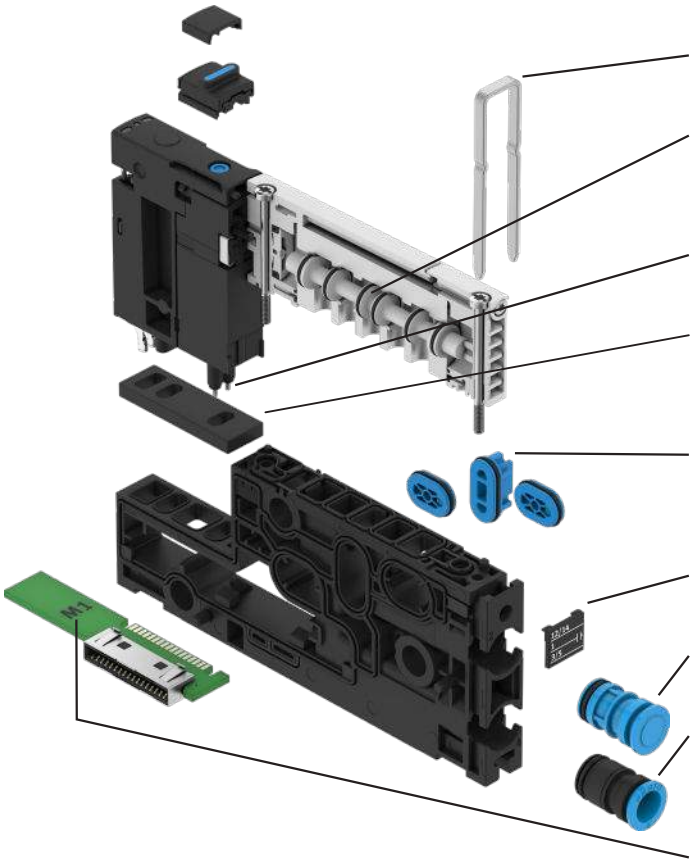
Group of individual sub-bases, each with a one-piece printed circuit board

Economical block of four sub-bases with one-piece circuit board

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

The features of the valve terminal VTUX in detail

Mechanics



Fixing clamp for tubing push-in fittings

Control spool with negative overlap for safely exhausting the valves

Spring contacts for reliable electrical connectivity

Seal for protection class IP65/67 (depending on the end plate used)

Pressure zone separator for any number of pressure zones

Identification label showing the 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 sub-base size 1

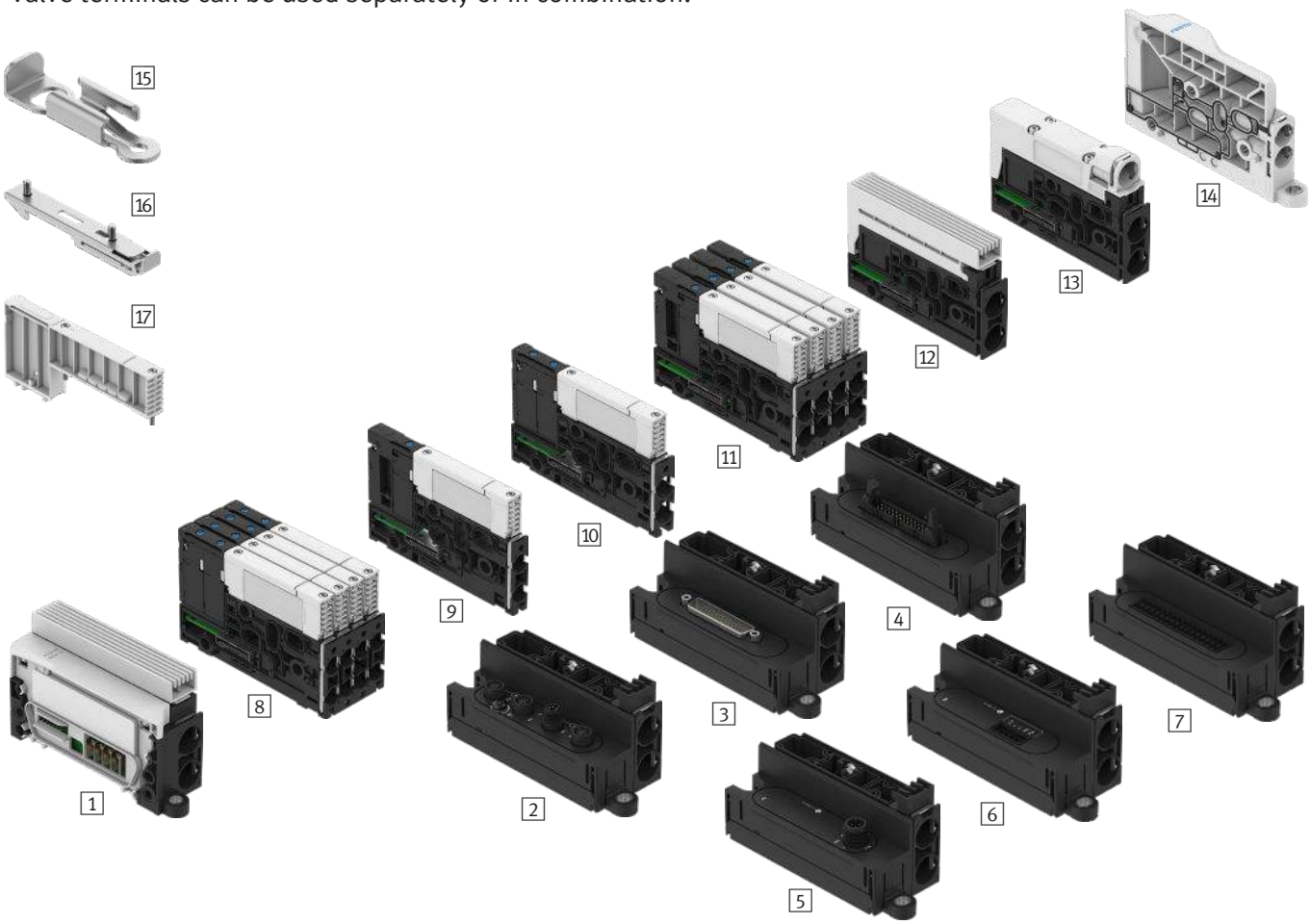
For sub-base size 2

- 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 manifolds 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 Connecting plate Sub-D
4 Connecting plate flat cable
5 Connecting plate IO-Link®, M12
6 Connecting plate IO-Link®, push-in
7 Connecting plate 34-pin with clamping terminal
8 4-way manifold sub-base, 10 mm grid
9 1-way manifold sub-base, 10 mm grid
10 1-way manifold sub-base, 12 mm grid
11 4-way manifold sub-base, 12 mm grid
12 Pressure supply plate with exhaust
13 Pressure supply plate with ducted exhaust air
14 End plate with pneumatic connections for pilot air
15 Wall mounting VAME-XA-W
16 H-rail mounting VAME-XA-H
17 Cover plate VAME-XA-10-W

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 exchanged 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

- Version with blue LED to indicate the switching position: serial bidirectional links via AP technology VTUX-A-S for up to 128 solenoid coils

Control interface AP-I/AP-A/IO-Link®

- Version with yellow LED to indicate the switching position: parallel links 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 0.3 W with electronic optimisation
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

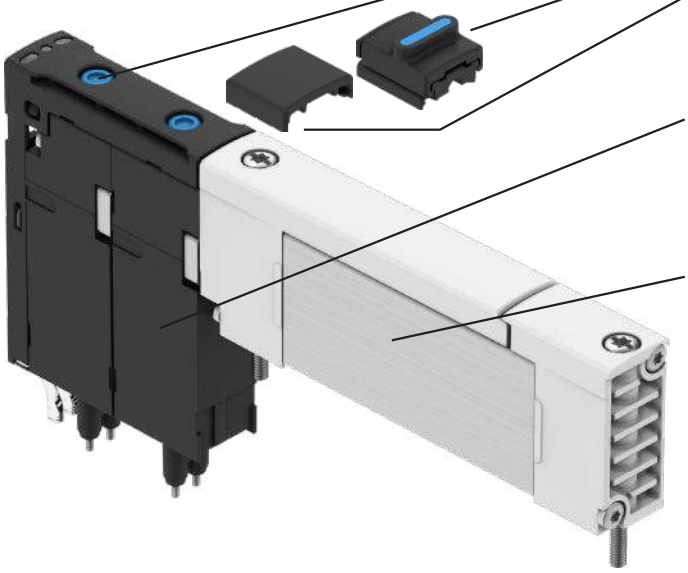
Valve type code	Valve code	Valve type
VUVX-BK10-M52-A1ZH-F-1T1L	M	5/2-way valve, single solenoid, pneumatic reset
VUVX-BK10-M52-MZH-F-1T1L	A	5/2-way valve, single solenoid, mechanical reset
VUVX-BK10-B52-ZH-F-1T1L	J	5/2-way valve, double solenoid
VUVX-BK10-T32C-A1ZH-F-1T1L	KC	2x3/2-way valve, normally closed, pneumatic reset
VUVX-BK10-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 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, blue LED)	Additional functions required (serial, yellow 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.



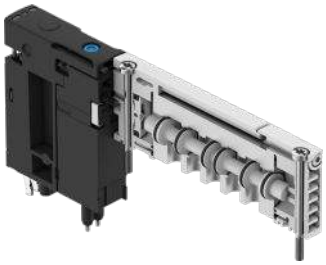
Manual override
- Non-detenting (standard)
- Detenting with slider (optional)
- Blocked

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

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

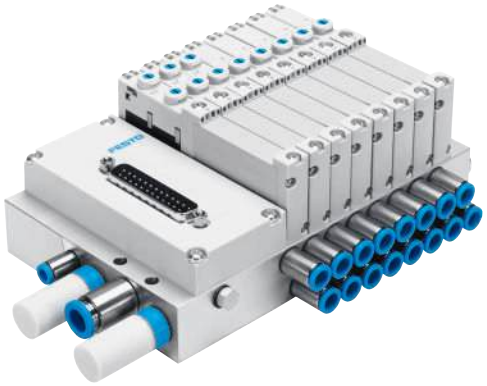
One valve size 10 mm with high flow rate
- Can be placed on manifold sub-bases size 1 or 2
- Reduces the number of different parts

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

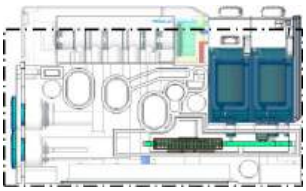


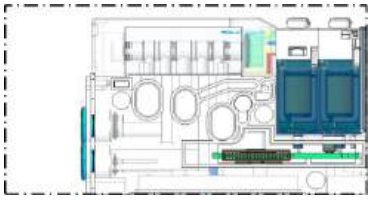
Spool valve
- All functions including 5/3-way
- High flow rate
- Metal/polymer housing

VTUX – the further development of the valve terminal VTUG



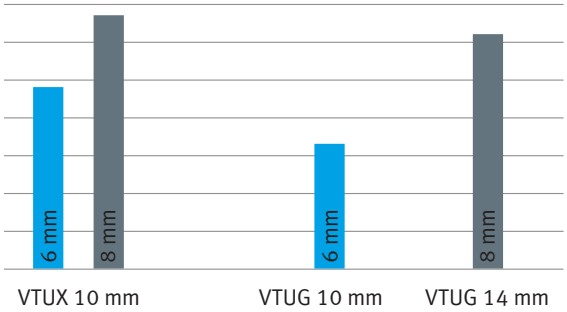
Comparison of dimensions and flow rates

VTUG-10 vs. VTUX with tubing ⌀ 6 mm		Grid [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 [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

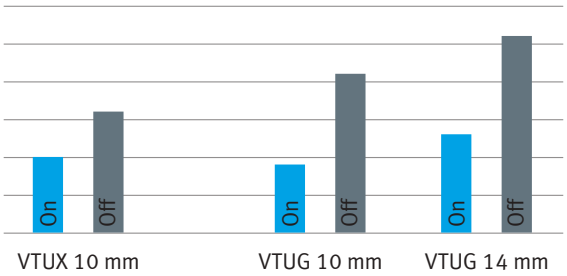
Flow rate 1 ➔ 2/4



5/2, single solenoid*)

*) with pneumatic reset

Switching times



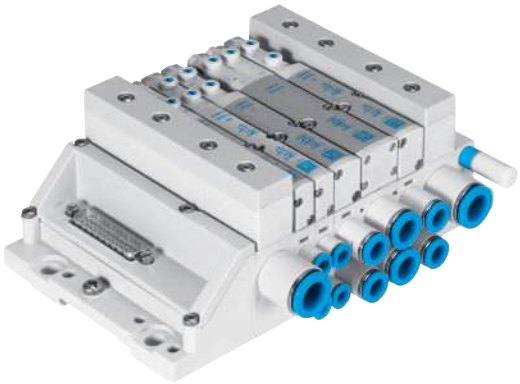
5/2, single solenoid*)

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.

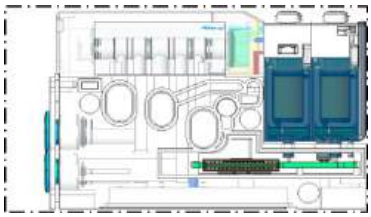
The benefits to you of the VTUX:

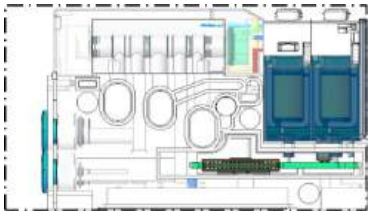
- All tubing connections in one direction ➔ reduced overall width
- Mounting points on the end plate contribute to the small overall width
- Modular number of valves
- Lighter thanks to increased use of high-performance polymer
- Higher flow rate
- Only one valve width required
- The manifold sub-bases with width 10 mm and 12 mm can be combined
- Up to 128 valve functions with 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



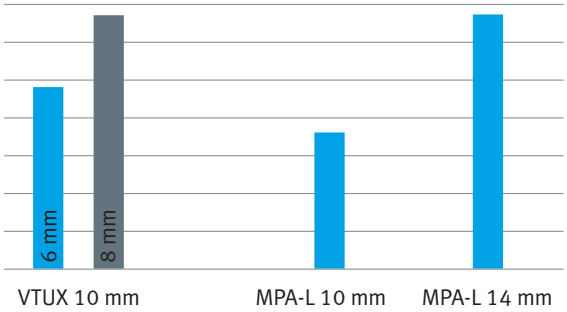
Comparison of dimensions and flow rates

MPA-L-10 vs. VTUX with tubing ⌀ 6 mm		Grid [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 ⌀ 8 mm		Grid [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

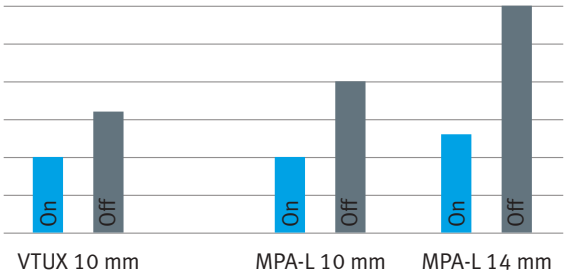
Flow rate 1 ➔ 2/4



5/2, single solenoid*)

*) with pneumatic reset

Switching times



5/2, single solenoid*)

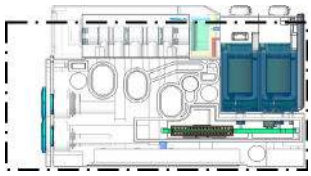
One size fits all – with its high flow rate, the VTUX's 10 mm valve is equivalent to the MPA-L's 10 and 14 mm valves.

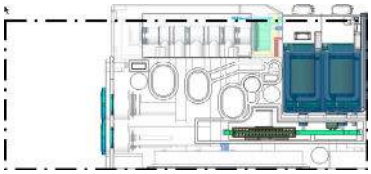
The benefits to you of the VTUX:

- Mounting points on the end plate contribute to the small overall width
- Lighter thanks to increased use of 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

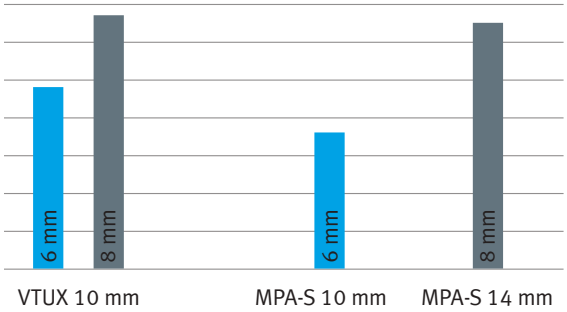
Comparison of dimensions and flow rates

MPA-S-10 vs. VTUX with tubing ⌀ 6 mm		Grid [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 ⌀ 8 mm		Grid [mm]	Height [mm]	Length without fitting [mm]	Length with fitting [mm]
 MPA-S-10	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

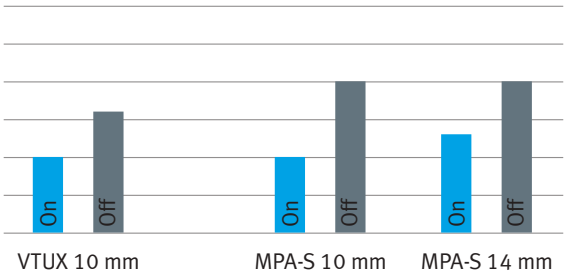
Flow rate 1 ➔ 2/4



5/2, single solenoid*)

*) with pneumatic reset

Switching times



5/2, single solenoid*)

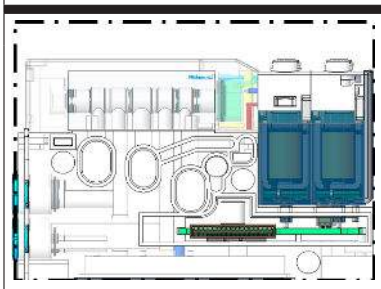
One size fits all – with its high flow rate, the VTUX's 10 mm valve is equivalent to the MPA-S's 10 and 14 mm valves.

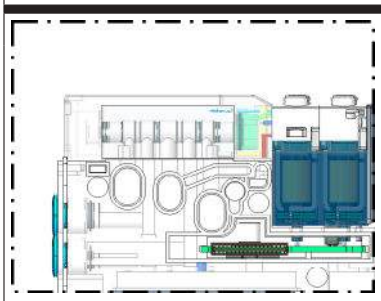
The benefits to you of the VTUX:

- Mounting points on the end plate contribute to the small overall width
- Lighter thanks to increased use of 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

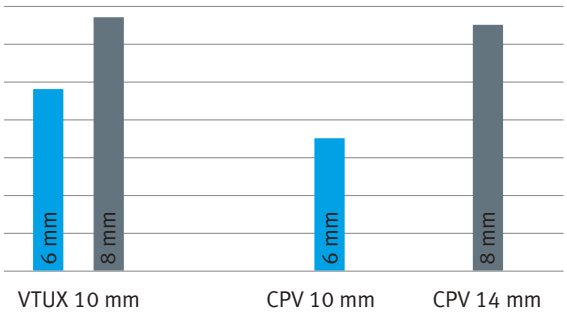
Comparison of dimensions and flow rates

CPV-10 vs. VTUX with tubing ⌀ 6 mm		Grid [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 ⌀ 8 mm		Grid [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

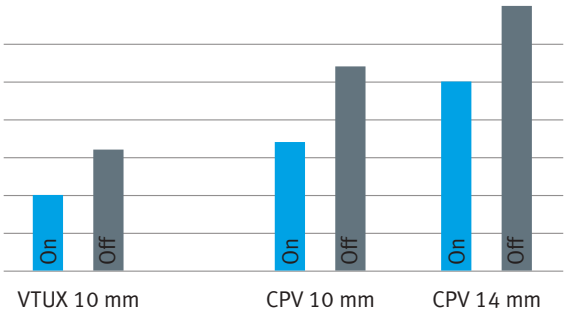
Flow rate 1 ➔ 2/4



5/2, single solenoid*)

*) with pneumatic reset

Switching times



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 valve terminal VTUX:

- All tubing connections 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

- Extremely modular and with Festo AP communication technology – the new standard for greater performance and lower costs.
- All requirements for predictive maintenance, safety features and data exchange integrated into the cloud (IIOT)
- Compact and lightweight – saves time as well as space and weight in the machine
- Ideal for decentralised machine concepts – light, compact, easy to connect

VTUX – the valve terminal platform of the future!

The Festo ★ Core Range

Simply part of the solution

136177 en 2023/10 – Errors and omissions excepted