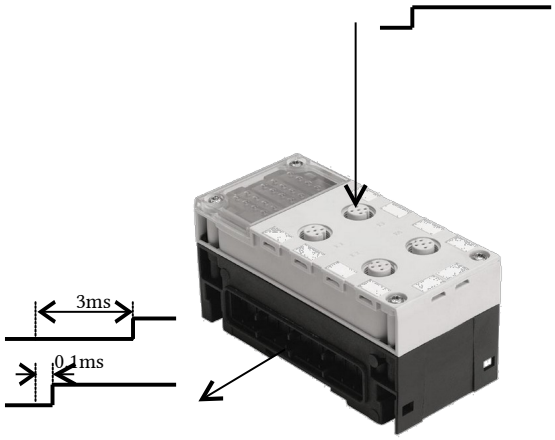
Winery Engineers Conference 2008
Products for Tank Farm Automation

1. CPX-MPA valve terminals
2. Ethernet Based Fieldbus Components
3. Actuated Valves
4. Tubing and fittings

CPX / MPA Valve terminal

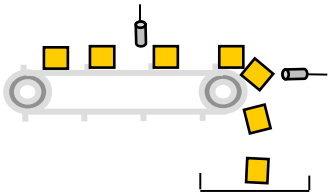
1. Combines electrical I/O as well as Pneumatic valves in the one terminal.
2. Supports 9 different fieldbuses.
3. Up to 10 electrical modules may be installed in one terminal.
4. Up to 128 3/2 valves in one terminal.
5. Supports 2 valve sizes in a mixed configuration.
6. 512 inputs / 512 outputs in one terminal
7. Modular design with several different types of electrical connection options available.
8. Voltage zoning
9. Pressure zoning

Digital Input / Output modules with configurable parameters.



Input Modules with 4, 8 or 16 channels per module.
Output modules with 4, or 8 channels.
Combined 8 IN / 8 OUT module.
The following features may be set by means of parameter transfer via fieldbus:

- **De-bounce time for input channels.**
- **Pulse stretching time for input channels.**
- **Behaviour after short circuit.**
- **Sold state short circuit protection.**
- **Behaviour after short circuit**
- **Output behaviour after fieldbus interrupt.**



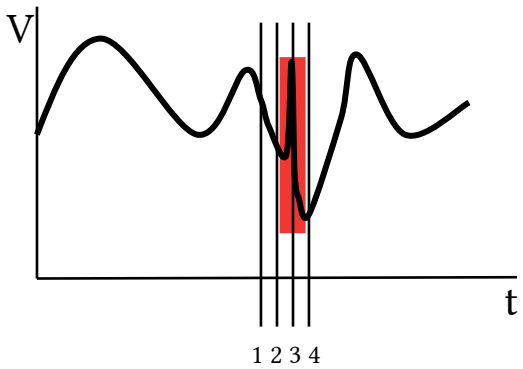
Overview of Analogue modules.

Module	Signals	Signal Range		Channels	Connection
CPX-2AO-U-I	Voltage and current (Channel based)	0 - 10 V	0 – 20 mA 4 – 20 mA	2 Output	2, 3 or 4-wire
CPX-2AI-U-I	Voltage and current (Channel based)	0 - 10 V	0 – 20 mA 4 – 20 mA	2 Input	
CPX-4AI-I	Current		0 – 20 mA 4 – 20 mA	4 Input	
CPX-4AI-T	Platinum temperature resistors: Pt100, Pt200, Pt500, Pt1000 Nickel temperature resistors: Ni100, Ni120, Ni500, Ni1000 (Channel based)	Pt-Sensors: Standard –200°C to +850°C Climatic –120°C to +130°C	Ni-Sensors: –60°C to +180°C	4 Input	

Vertraulich

Features – Measured values smoothing

Signal form



Without smoothing	With smoothing
1 = 1678	1 = 1678
2 = 1674	2 = 1674
3 = 1698	3 = 1670
4 = 1666	4 = 1666

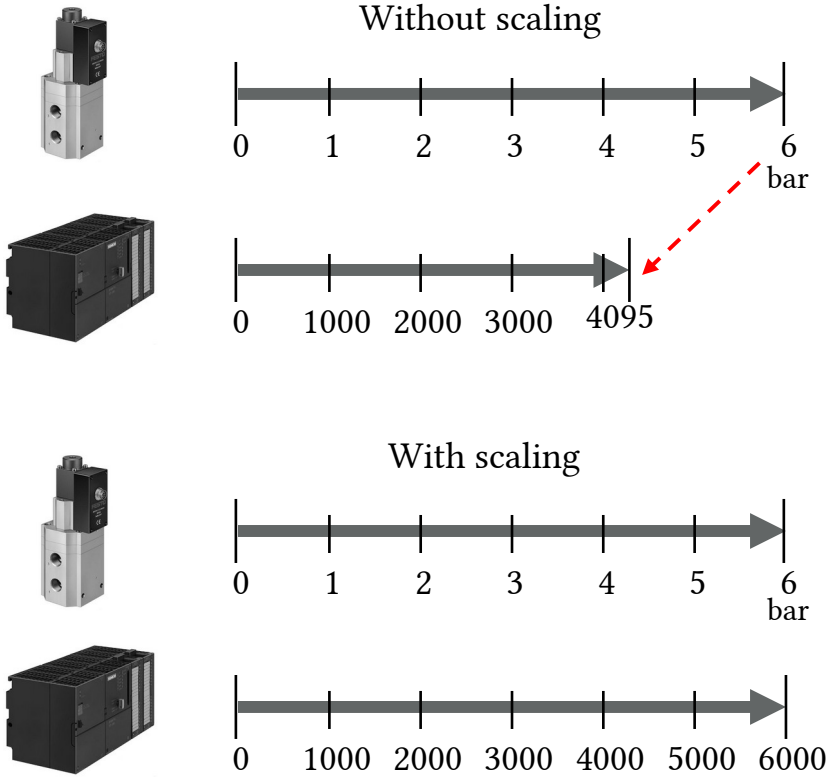
Smoothing values can be set by parameter.
Range: **0, 2, 4 or 8.**

CPX principle:
- Sum over 2, 4 or 8 values
- Subtraction of one average value
- Addition current value

Advantage: Suppress disturbances!

Vertraulich

Features – Scaling of analog values



CPX-2AO-U-I, CPX-2AI-U-I, CPX-4AI-I

With scaling any physical range can be converted to a logical range of values.

Example:
Proportional valve, pressure range e.g.
0-6 bar = 0-10V:

Without scaling	With scaling 0-6000
0 bar = 0	0 bar = 0
1 bar = 6821 bar = 1000	
2 bar = 1365	2 bar = 2000
***	
6 bar = 4095	6 bar = 6000

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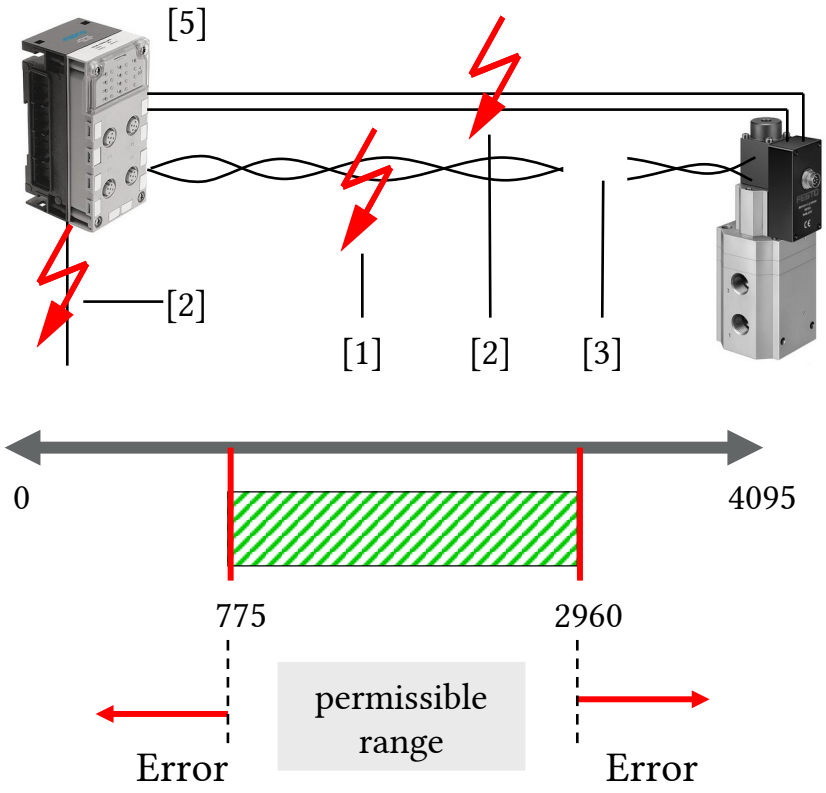
Features – Diagnostics



Error detection

[1] Short circuit analogue output

[2] Under voltage actuator power supply, Short circuit sensor- or actuator power supply

[3] Wire cut

[4] Lower or upper limit exceeded

[5] Faulty parameterization

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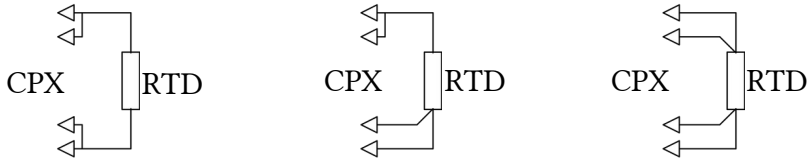
CPX-4AE-T 4 channel analogue temperature module.

2,3 or 4 wire configuation

Different wire configurations may be used for higher accuracy.



Direct interface

By directly interfacing to Platinum or Nickel temperature resistors you save the cost of the 4-20mA current sender.

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CPX with an integrated PLC - IT in automation

CPX-FEC: Ethernet always on board

- Web server for visualisation of status and diagnosis of CPX terminal and the process via Internet browsers such as Microsoft Explorer or Netscape
- E-mail as status or messaging function, generated by a process event
- Monitoring of process and statistical machine data in Excel using DDE access
- Communication with process visualisations via standard OPC interface
- Remote maintenance via public networks (IntraNet in conjunction with secure connection, e.g. VPN)

Ethernet

- 10 BaseT/100 BaseTx
- Ethernet interface RJ45 in IP20 and IP65/IP67
- Integrated web server with approx. 550 KB user memory

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Ethernet Based Fieldbuses

Communication between master control system and remote cabinets is via an Industrial communications network, (FIELDBUS).

There are many Fielbuses on the market to choose from.

However the long distances encountered in tank farms favours Ethernet based Fieldbuses.

Ethernet Based Fieldbuses

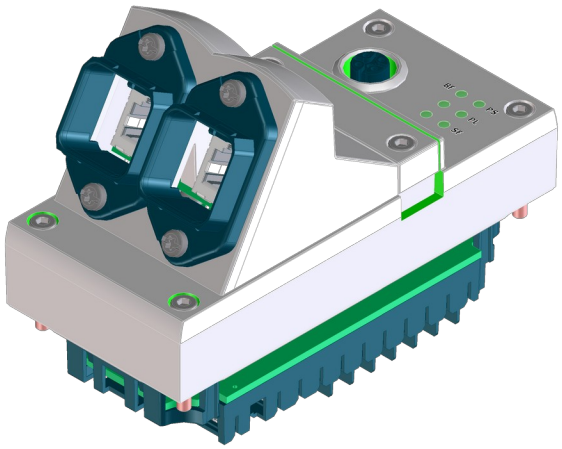
The following Ethernet based Fieldbuses are supported by the CPX:

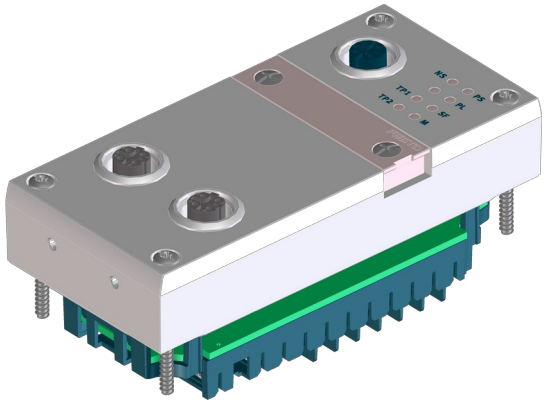
EtherCat

EtherNet/IP

Modbus over TCP/IP

ProfiNet

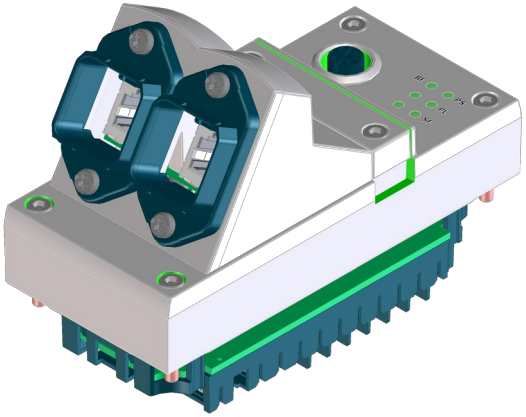


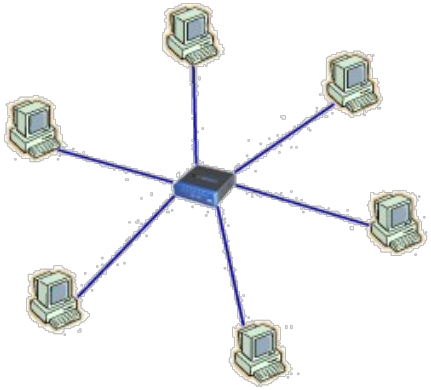


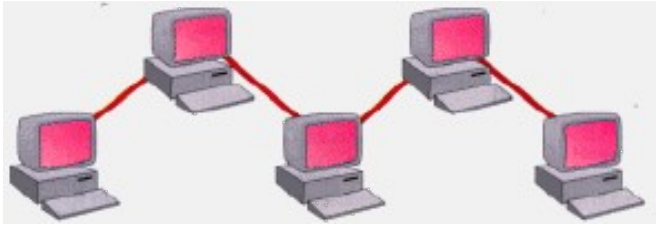
Ethernet Based Fieldbuses

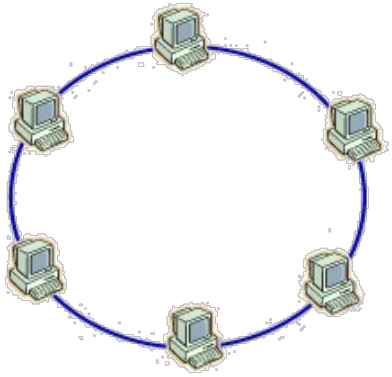
Long distances are not a problem:

- **Max 100m per segment using twisted pairs (copper technology) 100Base-TX**
- **Max 412m per segment using fibre optics 100Base-FX**
- **Devices with integrated switch eliminates the need for an ethernet switch in each cabinet.**

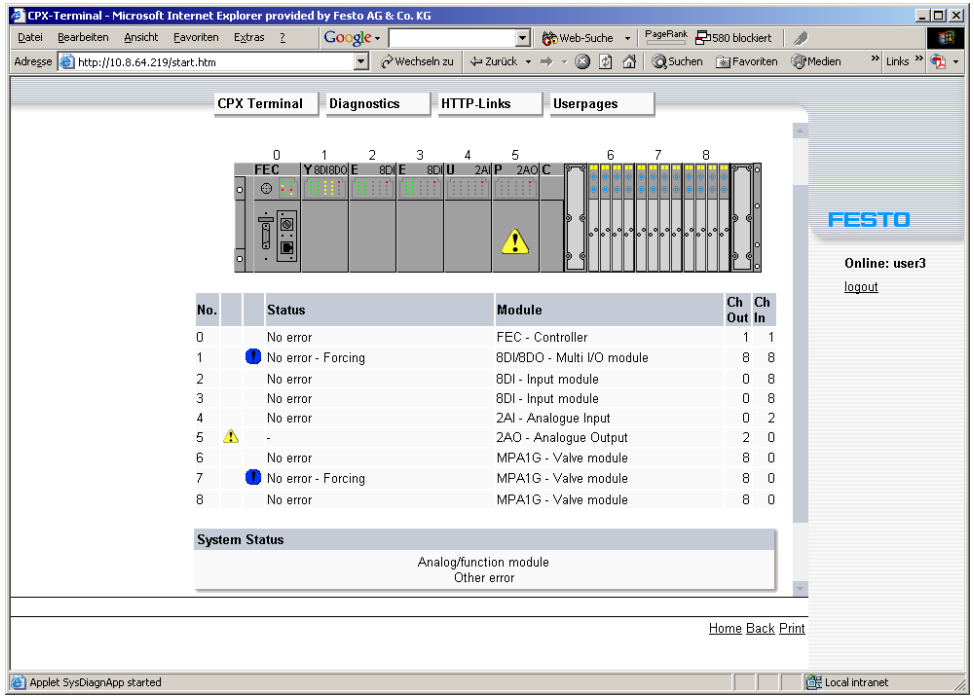








IT-services



The CPX Ethernet modules support the following IT-services:

1. Web server for integration of browser based device and process visualizations.
   Use of *WebMonitor* and *PageEditor* Tool
2. Setting up of email-alarms with the Web Monitor
3. Direct connection with parameter and diagnostic tools via the intranet

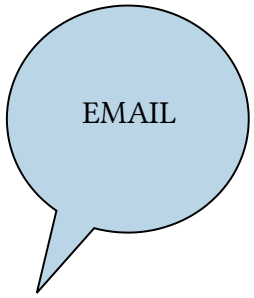
Vertraulich

Email

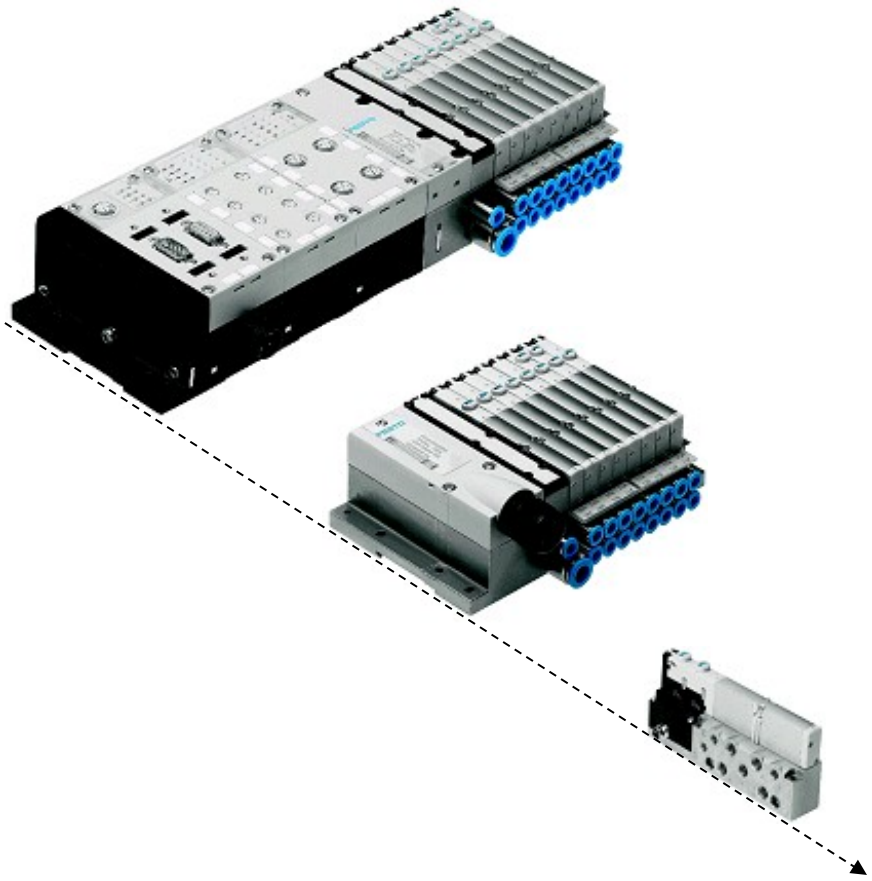
TO: supervisor@winery.com

SUBJECT: Tank 12 High Temperatue

MESSSAGE: Warning wine temperature at 32 deg C!



MPA - product overview



The MPA family members

„general purpose valves“

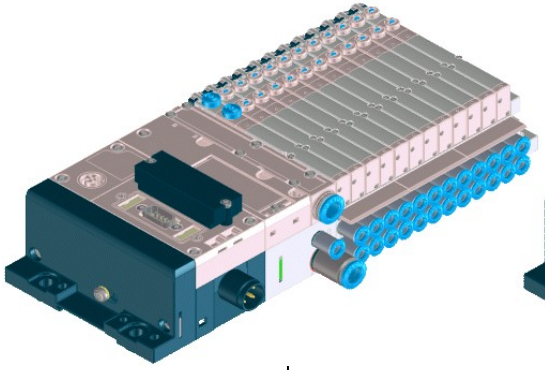
Fieldbus valve terminal

Multipin valve terminal

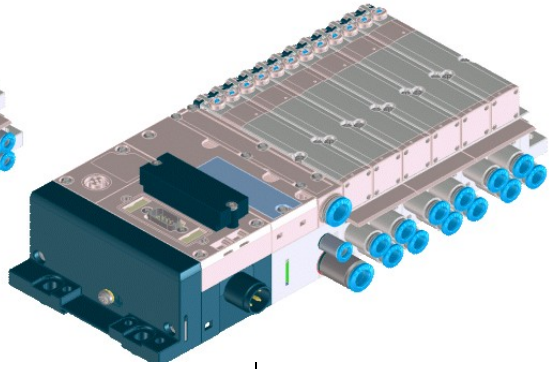
Single valve (on subbase)

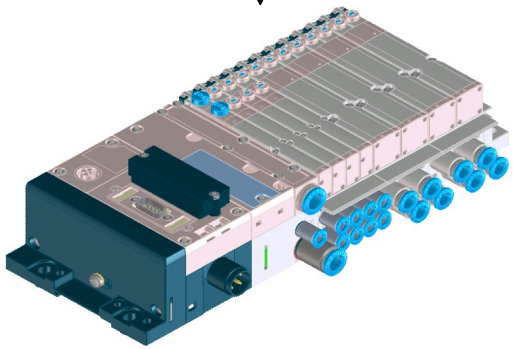
MPA – product design

MPA1: ~360 l/min



MPA2: ~700 l/min



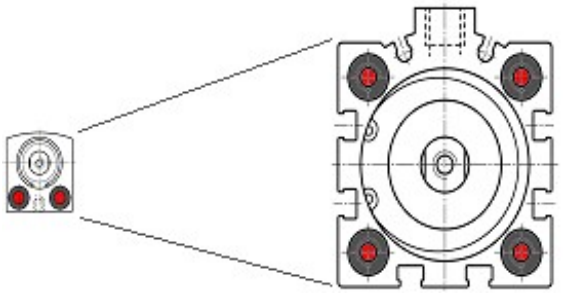


Mix of MPA1+MPA2

The modular concept

- Easy modification or extension
- Safe maintenance
- Reliable handling
- Durable components
- Mix of small and large valves

... up to ~ Ø 80mm

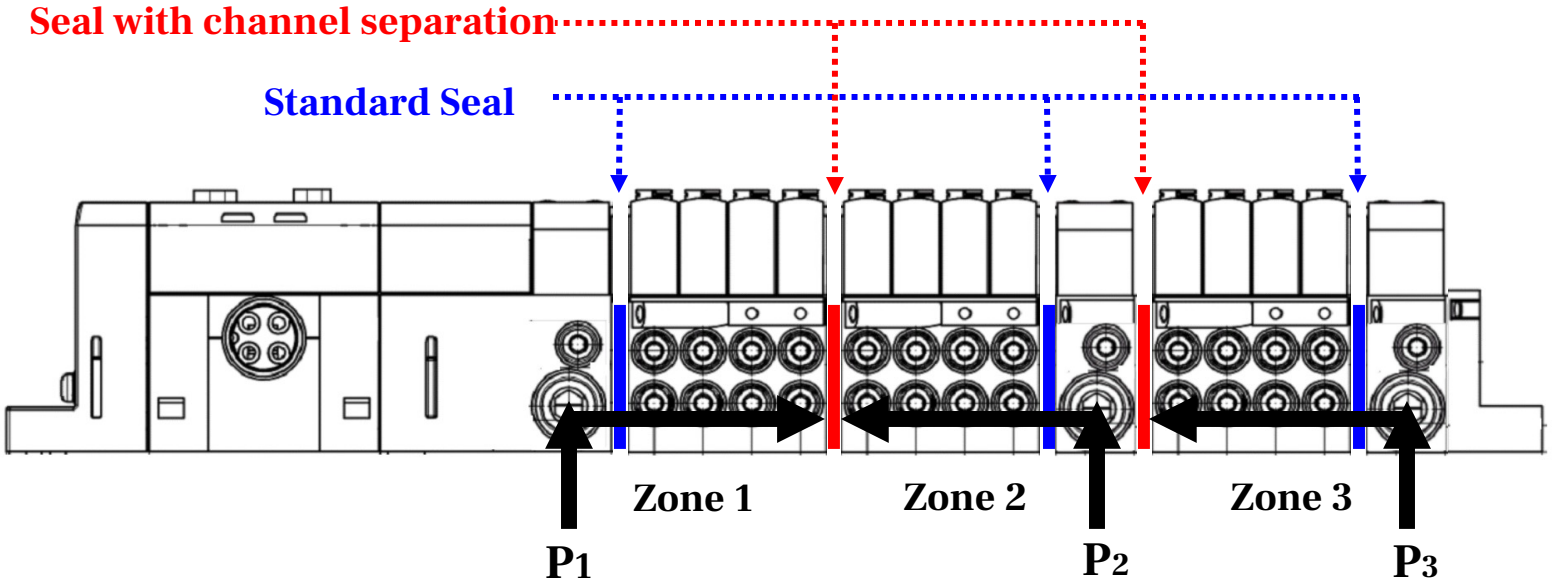


MPA – product design

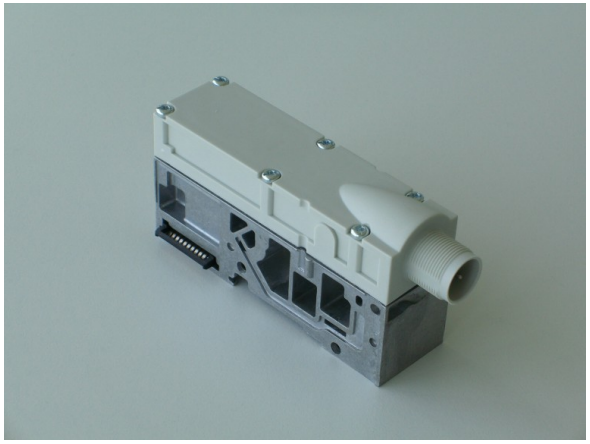
Subbase system – The pressure supply modules

- for additional supply of large valve terminals
  Recommendation:
  „After two subbases if high flow is required“

- for pressure zones (any location possible)



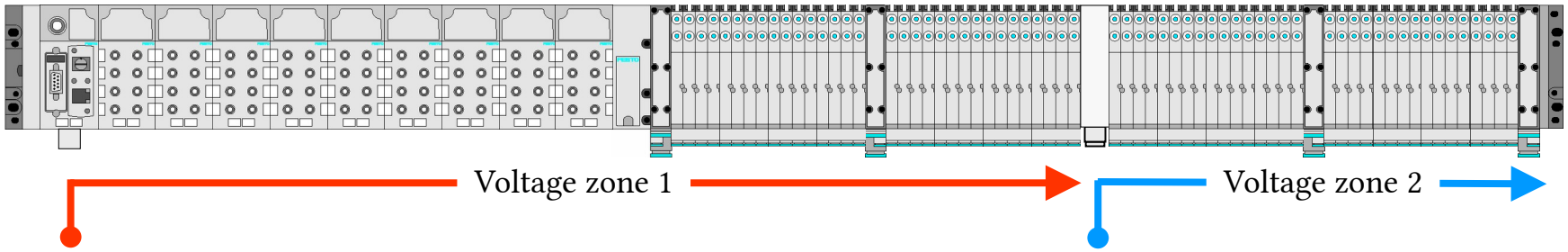
MPA – electrical supply plate - Features



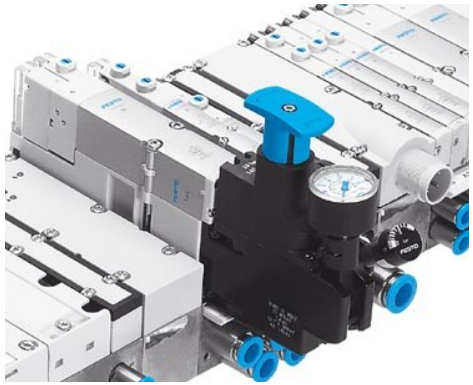
MPA – electrical supply plate

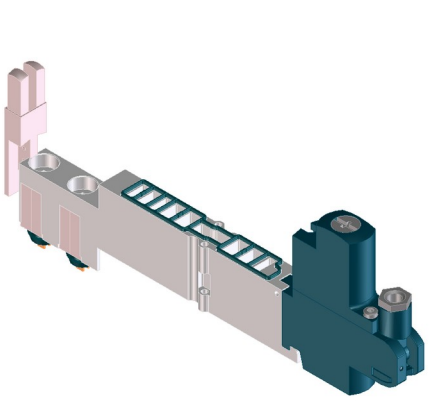
- Create voltage zones in valve sections
- Extend the number of valves positions with CPX/MPA up to:

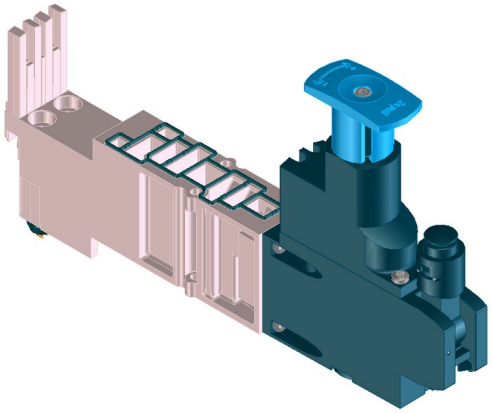
  64 valve positions = 128 MPA1 solenoids



MPA interface pressure regulator







MPA **manually adjustable pressure regulators**

Pressure range: 0..10 / 0..6 bar
Indication: Gauge

Regulator types:	MPA1	MPA2
P (channel 1)	x	x
B (ch. 2)	x	x
B (ch. 2) reverse	x	x
A (ch. 4)		x
A (ch. 4) reverse		x

Benefit of reverse pressure regulation:
- high exhaust flow => quick response
- gauge always shows actual pressure

3. Actuated Valves

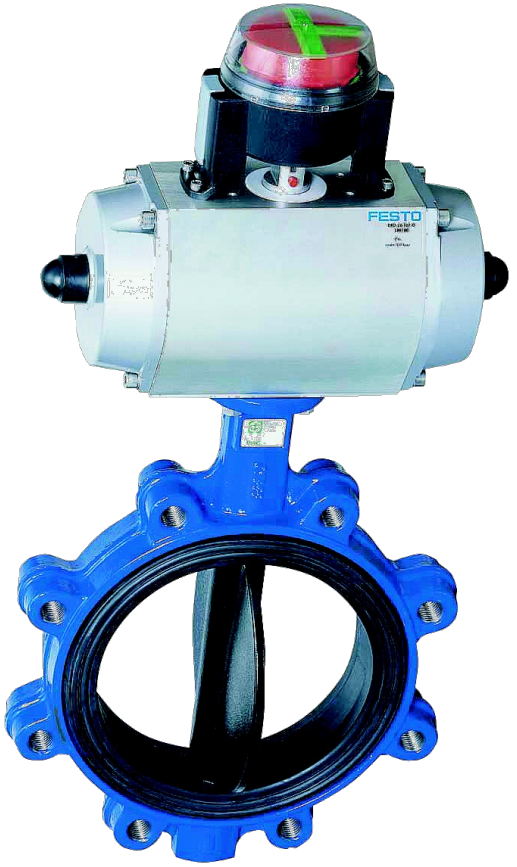
Pneumatically Actuated valves

- Ball Valves.
- Butterfly valves.
- Knifegate valves.

3. Actuated Valves

Butterfly valves

- With pneumatic actuator pre-assembled.
- Diameters from 50 to 300mm.
- Various seals for different media.
- With or without switchbox and indicator.
- Option of a positioner.



3. Actuated Valves

Knifegate valves

- Cast iron body or Stainless steel.
- With pneumatic actuator pre-assembled.
- Diameters from 50 to 300mm.
- Various seals for different media.
- Option of a positioner.

3. Actuated Valves

Ball valves

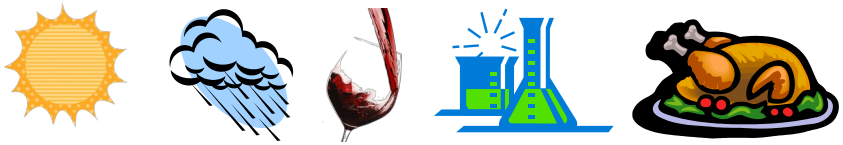
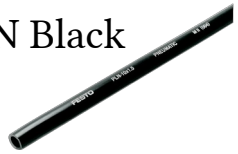
- With pneumatic actuator pre-assembled.
- Diameters from ¼” to 4”.
- Stainless Steel or Brass
- With or without switchbox and indicator.
- Pressures up to 63 bar
- Option of a positioner.
- 2 way or 3 way.
- 3 way valves available in L or T type pattern.

3. Actuated Valves

Positioners

- Electric / Pneumatic (4 – 20mA, 0 - 10V).
- Pneumatic / Mechanical
- For butterfly, ball or knifegate valves.
- Allows for proportional control.

4. Fittings and Tube selection

Tube Designation	Material	Resistance
PFAN	Perfluor - alkoxyalkan	
PUN-H (Black)	Polyurethane	
PLN Black 	Polyethylene	
		UV, hydrolysis, microbial, chemical, food approval.

6. Fittings and Tube selection

QS-F Fittings

Material

Brass; nickel- and chrome-plated

Characteristics

- Temperature range: -20 ... ✦**150° C**
- Pressure range: –0,95 ... 10 bar
- Diameters: 4, 6, 8, 10, 12 mm
- Connecting thread: G1/8, G1/4, G3/8, G1/2
- Resistant against the most common cleaning agents
- Sturdy and robust full-metal fitting
- Cost-optimised

Thank You For Your Attention!