Valve terminal MPA – serial communication for comprehensive diagnostics concepts

Maximum function integration, serial communication for electrics and pneumatics and a comprehensive diagnostics concept - that's what MPA stands for. It is extremely compact and has more valve functions than any other valve terminal.

State of the art valve technology
In IP65 for centralised and decentralised installation concepts. The valves are durable, flat and robust while the sub-bases are made of solid metal or plastic.

MPA-S – communicative
Has all the advantages including reduced total costs, even in complex installation situations.

MPA + CPX = even more options
The perfect combination for an even larger range of applications for MPA-L and -S. Ideal as the standard in factory automation or the process industry. Maximum process reliability and minimum installation effort mean optimised economic efficiency.

MPA-L – highly modular
Modular in single steps! More flexible, lighter and less expensive per component. Perfect for machine building and the process industry.

MPA-L + CTEU = elementary fieldbus communication
plug and work®: for the simple and direct connection of valve terminals with all standard field bus technologies. Can be expanded into small installation systems.

Compact

www.festo.com
Valve terminals MPA cover the majority of all possible applications in the core areas of factory automation and process automation.

- Compact and space-optimised for high performance directly on the drive.
- Or as modular, easy-to-service and configure sub-base valve terminals for centralised installation.

The optimised design and varied configuration of the pneumatic port patterns and electrical connection technology are at the heart of the terminals. Perfect for minimising overall costs in terms of the total cost of ownership (TCO).

All valves have the same compact dimensions, with a length of 107 mm and a width of 10.5 or 14 mm. The MPA-S, with a height of 55 mm, perfectly matches the electrical peripherals of the CPX.

- Vertical valve stacking
- Manual pressure regulator
- Pressure shut-off plate (hot-swap)
- Variable:
  - 64 valve positions/128 solenoid coils (fieldbus)
  - 24 valve positions/24 solenoid coils (multi-pin)
- Space-saving: flat valves and flat plate silencer
- Various valve functions

Having different flow rates in an application no longer poses a problem!

An extremely economical and energy-efficient combination: MPA1/MPA14/MPA2. It avoids the use of oversized valves.

**Available sizes**
- MPA1: Width 10 mm
- MPA2: Width 20 mm
- MPA14: Width 14 mm

**Available variants**
- MPA-S: Communicative
- MPA-L: Highly modular
## Technical data

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<th>MPA-S</th>
<th>MPA-L</th>
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<td>CPX terminal</td>
<td>Profibus DP, DeviceNet, CANopen, CC-Link, Interbus</td>
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<td></td>
<td>CTEU fieldbus nodes</td>
<td>Ethernet/IP, ProfiNet, EtherCAT, front-end controller etc.</td>
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<tr>
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<td>Sub-D 25-pin</td>
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<td>Sub-D 25-pin</td>
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<tr>
<td><strong>Other</strong></td>
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</tr>
<tr>
<td></td>
<td>AS-interface (CTEU fieldbus node)</td>
<td>AS-interface (CTEU fieldbus node)</td>
</tr>
<tr>
<td><strong>Valve functions</strong></td>
<td>Metal housing, piston spool</td>
<td>5/2, 5/3, 2x3/2, 2x2/2, 1x3/2, special functions</td>
</tr>
<tr>
<td></td>
<td>Polymer housing, poppet valve</td>
<td>5/2, 3/2 special functions</td>
</tr>
<tr>
<td><strong>Valve size/flow rate (max.)</strong></td>
<td>MPA1 (10 mm) 360 l/min</td>
<td>670 l/min</td>
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<tr>
<td></td>
<td>MPA14 (14 mm) 360 l/min</td>
<td>650 l/min</td>
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<tr>
<td></td>
<td>MPA2 (20 mm) 670 l/min</td>
<td>850 l/min</td>
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<tr>
<td><strong>Solenoid coils/positions (max.)</strong></td>
<td>Fieldbus 128/64</td>
<td>32/32</td>
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<tr>
<td></td>
<td>Electrical multi-pin</td>
<td>24/24</td>
</tr>
<tr>
<td></td>
<td>CP installation system</td>
<td>8/8</td>
</tr>
<tr>
<td></td>
<td>AS-interface</td>
<td></td>
</tr>
<tr>
<td><strong>Sub-bases (valve positions)</strong></td>
<td>MPA1 4 valves</td>
<td>1x / 4 valves</td>
</tr>
<tr>
<td></td>
<td>MPA14 –</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MPA2 2x</td>
<td></td>
</tr>
<tr>
<td><strong>Sub-base material</strong></td>
<td>Metal</td>
<td>Plastic</td>
</tr>
<tr>
<td><strong>Pressure range (max.)</strong></td>
<td>-1 ... 10 bar</td>
<td></td>
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<tr>
<td></td>
<td>(Pressure ranges can be restricted dependent on the configuration)</td>
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<tr>
<td><strong>Supply port 1</strong></td>
<td>Tubing diameter (max.)</td>
<td>10 mm / 3/8”</td>
</tr>
<tr>
<td></td>
<td>Metric/imperial size</td>
<td>12 mm / 1/2”</td>
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<tr>
<td><strong>Working port 2, 4</strong></td>
<td>Tubing diameter (max.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Metric/imperial size</td>
<td></td>
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<tr>
<td></td>
<td>MPA1 4.6 mm / 3/16&quot;, 1/4”</td>
<td>3, 4, 6 mm</td>
</tr>
<tr>
<td></td>
<td>MPA14 –</td>
<td>6.8 mm / 1/4&quot;, 5/16”</td>
</tr>
<tr>
<td></td>
<td>MPA2 6.8 mm / 1/4&quot;, 5/16&quot;</td>
<td>8.10 mm / 5/16&quot;, 3/8”</td>
</tr>
<tr>
<td><strong>Additional pneumatic functions</strong></td>
<td>- Integrated proportional-control valves,</td>
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<tr>
<td></td>
<td>Pressure sensors</td>
<td></td>
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<tr>
<td><strong>Additional electrical functions</strong></td>
<td>- Manually-adjustable pressure regulators,</td>
<td></td>
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<td></td>
<td>Pressure shut-off plate, manifold block</td>
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<tr>
<td><strong>Fieldbus</strong></td>
<td>- Electrically isolated valves (CPI, CPX)</td>
<td></td>
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<tr>
<td></td>
<td>- Integrated pressure sensor module (CPX)</td>
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<tr>
<td></td>
<td>- Extended diagnostic function (CPX)</td>
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<tr>
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<tr>
<td><strong>Additional electrical functions</strong></td>
<td>Fieldbus, CP installation system</td>
<td>Electrical valve power supply</td>
</tr>
<tr>
<td><strong>Operating voltage</strong></td>
<td>24V ±25 %</td>
<td>24V ±10 %</td>
</tr>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>-5 ... 50 °C</td>
<td></td>
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<tr>
<td><strong>Protection class</strong></td>
<td>IP65*</td>
<td>IP40/IP65</td>
</tr>
</tbody>
</table>

* Observe possible restrictions of the IP (electrical) protection class ➔ ATEX declaration of conformity
The right solution for every situation thanks to the design of the MPA. With identical valves but different layouts, each variant has its own particular strengths.

In combination with CPX, the MPA-S is extremely interesting for manufacturers who prefer a configured, fully assembled and tested valve terminal with excellent communication characteristics and maximum function integration. The integrated serial network system makes this function integration, but also parameterisation or diagnostics possible.

- For smaller/medium drives
- Comprehensive communication and diagnostics
- Centralised, decentralised or hybrid electropneumatic installation concept
- Versatile function integration
- Integrated pressure sensors and proportional pressure regulators

Quick mounting: directly via screws or on an H-rail, automatic earthing
Safe operation: manual override, non-detenting/detenting or concealed

Reduced downtime: two-colour on-site LED diagnostics

Modular supply plates facilitate the creation of multiple pressure zones as well as numerous additional exhaust and supply ports

- Straightforward electrical connections
  - Multi-pin plug connection
  - Fieldbus connection
  - Integrated controller (Front-end controller)
  - AS-interface
  - CPI system

Practical: robust metal thread or pre-assembled QS fittings

Convenient: large inscription labels

Widths: 10 and 20 mm
MPA-L – highly modular

Maximum modularity together with top pneumatic performance

- Inexpensive 4-valve sub-bases for additional cost advantages
- Lightweight materials with improved corrosion-resistant design
- Replaceable push-in fittings
- Pneumatic supply from the front or side
- Fieldbus terminal or multi-pin terminal in IP40 and 65
- Parallel internal valve linking module
- Extremely easy to configure with the product configurator; no special orders required

Robust and reliable

- Mechanical connection is by means of modular tie rods. Sub-bases and compressed air supplies can be combined with each other as required. Equally advantageous, especially for harsh operating conditions, are its outstanding durability and reliability for high flow rates and expandability for up to 32 valves. Simple, reliable assembly ensures total flexibility, in particular when changes to the machine and system design demand quick reactions.

Modular electrical terminal CPX

- I-port connection: Standardised communication system
- Extension with a small installation system with CAPC adapter: For 2 MPA-L or 2 input modules CTSL
- Multi-pin plug connection with Sub-D, terminal strip (cage clamp) or flat cable
- Plug and work®, for the simple and direct connection of valve terminals

Input module CTSL

MPA1: sub-bases equipped with 6 valves

CPX – CTEL: Up to 4 MPA or 4 input modules CTSL with I-Port

Interesting for special machine building and wherever maximum modularity and top pneumatic performance have to be combined at an attractive price: MPA-L. The flexible system with individual sub-bases is modular in single steps. The pneumatic performance can thus be perfectly adapted to any application and saves space and costs at the same time.

- Flexible and stable thanks to a modular tie rod system, which makes it possible to combine individual valves with each other at any time, or expand the valve terminal in single steps
- Individual valve functions can be assigned to a specific machine function

Maximum modularity together with top pneumatic performance

Valve terminal MPA – Subject to change – 2012/07
Modularity in single steps using the MPA-L as an example

Modular electrical terminal CPX-L
Reduces the price of your control cabinet thanks to a high number of channels in IP20, with unique 3-wire wiring, and simple, extremely inexpensive modules but which are however open for the high-end CPX modules or for many fieldbuses.

• CPX-L-16DE-16-KL-3POL: 16 digital inputs,
• CPX-L-8DE-8DA-16KL-3POL: 8 digital inputs and outputs
• Fits every time: electrics, pneumatics and drives from a single source
• Diagnostics: short circuit/overload per module, undervoltage outputs

Tip
As an IP20 remote I/O with harmonised valve terminal by Festo, this is has major advantages for you.

MPA-L IP40
Perfect for process automation. Robust and with adequate flow for pilot valves, the MPA-L makes the best use of the available space thanks to its single-step modularity. It can also be quickly and easily adapted on-site in the event of changes.

Advantages
• Extremely cost-effective, weight-optimised and corrosion-resistant plastic design
• Complete diagnostics and remote maintenance with CPX on-site
Electrical and pneumatic functionality

**MPA with fieldbus connection and CPX terminal**
For both small and large solutions for pneumatics and electronics: the integrated fieldbus node facilitates all options.

**Advantages**
- Internal serial communication and linking of fieldbus interfaces with up to 16 sub-bases (128 valves, up to 512 I/O)
- Module for electrical valve activation with or without galvanic isolation
- Electrical supply plates, configurable at any location
- Any compressed air supply and creation of pressure zones
- Fieldbus and Ethernet protocols
- Digital and analogue I/O
- Control of electric and pneumatic drives
- Diagnostics
- Condition monitoring

Available for: MPA-S MPA-L

**MPA with fieldbus node CTEU plug and work® for the simple and direct connection of valve terminals with all standard field bus technologies.**

**Advantages**
- Easy and quick to connect to the control environment
- Intelligent and low-cost alternatives to multi-pin solutions
- Basic diagnostics and basic parameters

Extension with a small installation system
- With CAPC adapter connection of 2 MPA-L or 2 input modules with only 1 fieldbus node
- CPX – CTEL can be expanded into a small installation system with up to 4 MPA-L or 4 input modules

Available for: MPA-L

**MPA with AS-interface**
For the simultaneous transmission of data and power. The coded cable shape prevents polarity reversal; electrical supply plates are not required. Ideal for installations that are spread out over a large area.

**MPA-S in two designs:**
- With 2 to 8 modular valve positions for 2 to 8 MPA1 or 2 to 8 MPA2 valves or a combination of both
- 4 or 8 integrated inputs

**MPA-L versions**
- Fieldbus node CTEU-ASI
- 2 to 16 valves with ASI-Profile 7.A.7
- Combination of MPA1, 14, 2 mm

Available for: MPA-S MPA-L

**MPA with multi-pin plug connection**
For max. 24 solenoid coils – also 4 to 24 MPA1 or 2 to 24 MPA2 valves (MPA-L: 32) or a combination of both.

**Advantages**
- Actuation via 24 V outputs
- Simple installation of the multi-pin cable
- Cable for energy chains
- Any compressed air supply and creation of pressure zones

Available for: MPA-S MPA-L

**MPA with individual connection**
Valves on individual sub-bases can also be used for actuators which are further away from the valve terminal. A 4-pin, threaded M8 electrical connection is required in this case.

Available for: MPA-S MPA-L
MPA for installation system CPI
For connection to a higher-level fieldbus node or as an integrated controller (Front End Controller) e.g. for the connection of decentralised I/O modules.

Advantages
• Power supply is integrated in the communications cable
• Electrical supply plates can be configured at any point
• All available valve functions

Centralised installation
• Large number of valves reduces costs
• Function integration saves time and money
• High-performance CPX installation system ensures maximum modularity and flexibility

Decentralised installation
• Tubing lengths for faster pneumatic connections: 30% shorter cycle times and 50% lower air consumption
• Direct connection of compact I/O possible
• Fieldbus connection

Electrical supply plate for serial valve actuation and large number of valves
It is possible to create voltage zones even on a single valve terminal and to expand the system for the greatest number of valves and valve functions. It means that several valve terminals can now be combined into a single valve terminal with common fieldbus nodes.

Advantages
• Voltage zones and targeted voltage-free switching
• Individual power supply to individual components
• M18 or 7/8” (4 or 5-pin) electrical connection

Freedom of choice for the compressed air supply through different pressure zones
• Space-saving flat plate silencer with excellent exhaust performance, thread for a conventional silencer or ducted exhaust air
• Generously sized channel cross-sections for high as well as simultaneous flow rates

• Freedom of choice for pilot air supply internal/external
• Various port sizes configured for optimised flow rates or uniform tubing sizes

Available for:
MPA-S
MPA-L
M18 or 7/8” (4 or 5-pin) electrical connection
Operating voltage for sensor/ electronic/ electrical outputs
Load voltage 24 V Zone 1 Valves 1-6
Load voltage 24 V Zone 2 Valves 7-12
**Vertical stacking**

Additional function modules can be added to each valve position between the sub-base and the valve. These so-called vertical stacking functions enable special modes of operation or control of the individual valve position.

**Advantages**

- One valve, variable pressure ranges
- Digitised analogue values: enable individual pressure and force control within processes
- 3 presets selectable via CPX: fast, universal, precise
- Commissioning via handheld terminal
- Integrated diagnostic functions, including remote maintenance, e-mail/SMS alarm, handheld terminal CPX-MMI or CPX maintenance tool

**Ready to install directly at the fieldbus: MPA pressure sensor**

Pressure information via fieldbus communication, via handheld terminal or on-site via LED. Pressure range 0 ... 10 bar.

**Advantages**

- Usable for ducts 1, 3, 5 and external pressure without any assembly and installation effort
- Parameterisation of the switching points in the central control system
- Excellent process reliability thanks to accurate and reliable pressure information
- Static and dynamic process control
- System diagnostics
- Protected against manipulation

**Unique worldwide: combined pressure control and pressure regulation with proportional pressure regulator VPPM-MPA**

Unique worldwide! Extremely accurate cascade control allows pressure changes during operation within a range of 0 ... 2/0 ... 6/0 ... 10 bar and with flow rates of 1400 l/min at the valve.

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- 3 presets selectable via CPX: fast, universal, precise
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**Pressure zones on MPA**

Control of internal pressures/pressure zones, control of individual pressures from the process

**Available for:** MPA-S

**Pressure zones on MPA**

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**Available for:** MPA-S

**Pressure shut-off plate (hot swap)**

VMPA2 valve

**Available for:** MPA-S MPA-L

**Manifold block**

Pressure shut-off plate (hot swap)

**Available for:** MPA-S MPA-L
MPA pressure regulator
The force of the controlled actuator can be influenced via a pressure regulator.

Advantages
• Pressure regulation adjustable on-site

• Minor readjustments possible within the process at any time
• Rotatable, easily readable pressure gauge (optional) for monitoring purposes
• Ready to install, no assembly and installation effort required

Pressure shut-off plate (hot swap): uninterrupted production
Hot swapping valves under pressure and during operation for replacement, repair or maintenance. Controlled venting of the process drive increases safety.

Leading technology for excellent performance: the cartridge principle
The patented cartridge principle with its internal sealing structure, the contour of the seals and the special sealing materials make valves from Festo absolute top performers, even on valve terminals. They are extremely durable, highly flexible and offer outstanding flow rates.

• Up to 100% more flow
• Smaller valves with larger flow rates at reduced costs
• Higher pressures of up to 10 bar for maximised energy density and more power
• Vacuum compatible
• Reversible – two pressures at a single valve at the same time
• Very high temperature ranges
• Non-overlapping – completely reliable separation of the air ducts during dual pressure operation
• Minimal leakage

Patented: the design, layout and materials ensure their exceptionally high performance.

Reversible: two pressures in a single valve (ports 3 and 5) – the exhaust air flows through port 1.
Future-proof installations: internal serial communication technologies

The digital and analogue I/O modules enable the simple, flexible and individual connection of pneumatic and electrical control chains to an automation system. Available in all common types of connectors and with a further 10 connection technologies for sensors and actuators as well as controllers for electric drives with protection class IP20/IP65/IP67.

Extended range of applications: the application spectrum

The CPX terminal supports communication with all common fieldbus systems and via Ethernet. The all-metal design and the control cabinet variant are in protection class IP20.

For more information, see the CPX/CPI brochure in the Support/Downloads area on www.festo.co.uk/supportportal.

Perfect networking on MPA with CPX terminal

The combination of the valve terminal MPA with the modular electrical terminal CPX opens up completely new perspectives:

- Condition monitoring
- Pressure monitoring with integrated pressure sensors
- Seamless integration into available control systems
- Device and system diagnostics (FDT/DTM, OPC server)
- Modular/channel-oriented valve diagnostics

Comprehensive diagnostics for maximum process security

- Numerous IT services:
  - Error memory for the last 40 messages
  - E-mail/SMS alarm
  - CPX web monitor
  - Festo Maintenance Tool
  - Handheld terminal
- Pre-processing with integrated controllers for customer-specific diagnostics programming (CoDeSys)

Save up to € 10,000 per minute!

Independent studies have revealed that between 15 and 40% of all indirect system costs are maintenance costs. With the CPX terminal, sources of error are pinpointed 8 and even 16 times faster. And what’s more, a consistent condition monitoring system (CMS) prevents up to 35% of all unplanned downtime or reduces it greatly in 65% of all cases.

Services

- Monitoring of specified limit values at each module and valve manifold
- ePLAN: CPX macro library for quick and reliable planning and design with CPX modules
- Energy Monitoring System (GFDM) for
  - Compressed air quality analysis
  - Compressed air consumption analysis
  - Leakage and consumption measurements at machine level
- Energy-efficient design of the complete electropneumatic system for a further reduction of the total cost of ownership (TCO)

Designed and implemented by Festo: diagnostics/condition monitoring system for a tubular bag packaging machine

Maximised process reliability – saves time and money