Recognising and setting trends – by the leader in innovation and technology for valve terminals

Successful automation today consists of three subject areas: pneumatics, electrical engineering and networking. Only those who master these areas and can provide them from a single source to achieve the synergies which go beyond today’s standards, and set trends demanded by the tough industrial competition. As a leader in innovation and technology in the area of valve terminals, Festo meets this criterion, even with regard to intelligent installation systems with an AS-interface. Find out for yourself on the following pages!
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AS-interface – the ideal combination ...
... for optimised operation at reduced costs. Ideal wherever decentralised solutions are required. Fast, low-cost and sturdy, AS-interface is suitable for binary and analogue actuators and sensors, as well as small valve terminals and intelligent cylinders. At actuator/sensor level, this makes it the ideal companion for fieldbus systems or industrial Ethernet.

Positioning and potential of the individual bus systems at field level
All-round versatility: AS-interface for fast and flexible assembly and easy commissioning.

Benefits for designers
- Freely selectable network topology with a wide range of mounting options
- Connection to almost any fieldbus system. Communication and power supply in one cable
- Up to 30% shorter cycle times and 50% less air consumption thanks to shorter tubing
- Optimum performance due to harmonised system components
- A standard system with innovative enhancements in accordance with the AS-interface Specification V3.0 make for a safe investment
- Backward compatibility from Spec. V3.0, V2.1 to V2.0 provides peace of mind

Benefits for purchasers
- One installation system for many Festo components
- Flexible assembly reduces installation time
- Flexible use of slaves – fewer stock items reduce financial outlay
- Economical connection technology: average costs for material and assembly 25 - 40% lower
- Lower procurement costs as well as total costs

Benefits for commissioning and maintenance
- Faster assembly due to features such as insulation displacement technology, modular solutions and polarity-safe cable profiles
- Simple commissioning: no extra programming required
- Simple expansion and fast and reliable switching of modules due to auto-programming
- Fast diagnostics and maintenance, high machine availability

Decentralisation: shorter cycle times with AS-interface
Pneumatics: optimised by simulation
In-house expertise: own R&D, labs and production
Basic principles and features of the bus system

AS-interface is a non-proprietary, open installation system with a large and growing share of the market at the lowest level of the decentralised production and process automation hierarchy.

The non-proprietary and open characteristics of the system are guaranteed by the European standard EN 50295 and the international standard IEC 62026-2. Certified products bear the logo of the AS-International Association. The AS-International Association and its affiliated organisations represent the interests of all manufacturers with an interest in the AS-interface.

Simple communication

The AS-interface system permits the transfer of power and data using a single cable. The advanced technology used to connect stations to the yellow cable and the low connection costs mean that even stations with a small number of inputs and outputs can be networked.

Built-in savings potential

Depending on the system type, reductions in installation costs can range from 26 to 40%. This solution is an ideal low-cost option for connecting individual or small groups of actuators, valves and sensors to a master controller. New developments such as the parameterisable profile 7.4 and the AS-interface Safety at Work concept as per Specification V2.1, published at the start of 2000, opened the door to new areas of application and facilitated considerably more efficient installation and networking concepts.

Specification V3.0 published in 2005 represents another giant leap forward, facilitating convenient activation of analogue I/O, complex slaves or serial text and data transfer, for example.
Benefits of AS-interface Specification V3.0

- Slaves as per Specifications V2.0 and V2.1 will also run under V3.0 – the system is fully backward compatible.
- Providing all the benefits of the easiest installation system since Spec. V2.0
- Up to 400% more I/Os per master
- Improved peripheral error diagnostics
- More functions within Spec. V2.1 and V3.0, e.g. easy integration of complex 16-bit slaves, fast analogue modules, DTM integration, asynchronous serial protocol, safety slaves
- Slave profiles for specific functions as well as interchangeability. Mix of different vendors and products, e.g. for parameters or communication services.

AS-interface with A/B operation gives you 100% more

In A/B operation, each slave address is used twice. An output bit is used for A/B address differentiation (see table for case distinctions).

The cycle time for pneumatic chains is generally more than adequate.

<table>
<thead>
<tr>
<th>Specification Version</th>
<th>Inputs</th>
<th>Outputs</th>
<th>Bus cycle (ms)</th>
<th>No. of slaves</th>
<th>I/O</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>31</td>
<td>248</td>
</tr>
<tr>
<td>2.1</td>
<td>4</td>
<td>3</td>
<td>10</td>
<td>62</td>
<td>434</td>
</tr>
<tr>
<td>3.0</td>
<td>4/8/16</td>
<td>4/8/16</td>
<td>20</td>
<td>62</td>
<td>992</td>
</tr>
</tbody>
</table>

For more information on the performance of AS-interface, please visit www.as-interface.net
AS-interface components

Basic features

Simple connection technology
• One cable for power and data
• Cable profile prevents polarity reversal
• Error control means there is no need for screening
• Plugs with insulation displacement connection technology guarantee Festo plug and work®
• Alternative bus connection technology M12, 4-pin (standardised)

Ideal for pneumatic applications
Local control of small groups of actuators or individual, decentralised actuators covering an extensive area means
• short tubing lengths
• high cycle rates
• low air consumption
Installation and communication are carried out via AS-interface components.

A powerful system component
AS-interface is clearly subordinate to the fieldbuses already in use. As such, it is not a competing product, but a technically necessary and economically advisable expansion.

Everything from a single source
Festo is your single source supplier for the AS-interface. This means:
• One contact
• Competent solutions from the market leader
• Convenient ordering system
• Complete delivery service
• Harmonised solutions for motion and control
• Worldwide service round the clock

Valve terminal VTSA – functional
AS-interface master CESA
Power supply unit SVG – powerful
Optimised cycle rates
Decentralised solutions at the AS-interface permit optimised electropneumatic control loop systems as valve response times and optimum combinations of cylinder diameter and stroke save up to
• 20% cycle time with standard components
• 30% cycle time with fast switching valves
• 40% installation costs
• 50% air consumption/flow rate

Product range overview
Drives
• Intelligent drives DNCV with integrated valve, sensor and diagnostic module

Valves
• A universal solution for an individual valve interface or a compact solution with 16 valves
• Integrated inputs on individual valve interfaces and valve terminals CPV, CPA, MPA and VTSA/VTSA-F
• More inputs thanks to 4-way and 8-way input modules
• Application-specific valves and integration solutions available on request

Master
• The heart of every AS-interface system
• Built-in gateway to master fieldbus systems such as Profibus and CANbus

I/O modules
• Combined digital input and output modules allow connection of sensors and can be used to activate actuators

Power supply units
• Network power supply with 24 V DC nominal voltage
• Safe isolation
• Symmetrical network and data disconnection

Valve terminal CPV – compact
MPA valve terminal – modular
Individual valve interface ASI-EVA
ASI I/O module
Safety-oriented components can be easily incorporated into an AS-interface network with the AS-interface Safety at Work system. Safety components and standard components function on a single cable at the same time. The AS-interface master views the safety slaves just like all other slaves and incorporates them into the network. The transmission protocol and the cables in the AS-interface system are laid out so that they are also capable of transmitting safety-oriented telegrams. The required safety is ensured via additional signal transmission between the safety slaves and the safety monitor.

Expansion at any time

The safety components can be used at any time to expand any existing system that uses the AS-interface. A safety monitor and safety slaves are added to the existing AS-interface components and operated in the same AS-interface network. The master views the safety slaves just like all other slaves and incorporates them into the network.

The AS-interface system cable is also suitable for transmitting safety protocols. The safety function is ensured via additional signal transmission between the safety slaves and the safety monitor. This signal is transmitted with a special safety protocol. In case of emergency, the corresponding system components are switched off within a defined time using the safety monitor or the safety outputs.

Software tool ASImon

The software tool ASImon is used to configure one and two-channel safety monitors with standard PCs using windows. The safety monitor and the configuration software communicate via a serial RS232 interface. Configuration data can be saved as files on a data storage medium. The safety system can be configured quickly using drag and drop.

What does ASImon do?

- Assignment of the slaves to the output switching elements
- Parameterisable operating modes
- Password-protected download of generated files
- Tamper protection for configuration data
- Configuration protocol
- Monitoring of system status in case of errors
The soft-start/quick exhaust valve MS6-SV-ASIS ensures maximum safety for man and machine if there is a sudden emergency stop in a safety-critical system area, the valve exhausts quickly and reliably. At the same time, it also creates the highest possible machine availability using safe and reliable processes.

**Maximum safety ...**
... using soft start and quick exhaust for extra-fast pressure reduction. The facts: exhaust flow rate of 6000 l/min (from P2 to P3), 1.5 times more exhaust performance as well as continuous monitoring of the quick exhaust function at any time.

**All in one ...**
... because traditional switch on and pressure build-up functions have been functionally integrated in the exhaust valve. And its compact dimensions give the MS6-SV great flexibility for installation – whether as a part of the MS module or stand-alone.

**Tested safety ...**
... with German Technical Control Board (TÜV) certification to DIN EN ISO 13849-1, Category 4 Performance Level e. Documented so you can be sure that the machine operator is protected at all times.

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**Technical data**

<table>
<thead>
<tr>
<th>Type MS6-SV</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid dimension [mm]</td>
<td>62</td>
</tr>
<tr>
<td>Operating pressure [bar]</td>
<td>3.5 to 10</td>
</tr>
<tr>
<td>Function</td>
<td>Solenoid actuated 3/2-way valve with soft start</td>
</tr>
</tbody>
</table>

**Flow rates**

| P1 > P2 [l/min] | 4300 |
| P2 > P3 [l/min] | 6000 |

**Certification**

DIN-EN ISO 13849-1, category 4, performance level e

**Connections**

| Pneumatic connection 1, 2 | 1, 2 G 1/2, NPT 1/2-14 |
| Pneumatic connection 3 | 3 G 1*, NPT 1* |
| Electrical connection | AS-interface M12, 5-pin |
| Protection class | IP 65 |
| Supply voltage [V] | 24 |
| Short circuit protection | Built-in |
A range of options for almost any application: the world of AS-interface from Festo. Valve terminals, masters, modules and power supply units at a glance.

### At a glance: All Festo ASI products

<table>
<thead>
<tr>
<th>Module</th>
<th>Specification</th>
<th>Digital inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASI-EVA MF...</td>
<td>2.1</td>
<td>2 4 8</td>
</tr>
<tr>
<td>ASI-EVA MZB...</td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td>ASI-EVA MEB...</td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td>ASI-EVA K1...</td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td>ASI-EVA-4E-M12-5-POL</td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td>ASI-8DI-M8</td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td>ASI-4DI-3DO-M12-Z</td>
<td>2.1</td>
<td></td>
</tr>
</tbody>
</table>

### Valve terminal Specifications

<table>
<thead>
<tr>
<th>Valve terminal</th>
<th>Specification</th>
<th>Flow rate</th>
<th>Electrical inputs</th>
<th>Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>VTSA/VTSA-F-ISO 15407-2 and 5599-2</td>
<td>2.0</td>
<td>550/700 1100/1400 1500/1800</td>
<td>4 8</td>
<td>M8</td>
</tr>
<tr>
<td>MPA/MPA-F</td>
<td>Universal, modular, versatile, serial Valve actuation, with electrical I/O</td>
<td>2.0</td>
<td>360 700 900</td>
<td></td>
</tr>
<tr>
<td>CPV</td>
<td>Universal, compact, high performance</td>
<td>2.0 2.1 3.0</td>
<td>400 800 1600</td>
<td>* *</td>
</tr>
<tr>
<td>CTEU-AS</td>
<td>Universal, innovative, compact</td>
<td>3.0</td>
<td>Dependent on terminal type</td>
<td></td>
</tr>
</tbody>
</table>

* Dependent on the number of valves
<table>
<thead>
<tr>
<th>Connect. inputs</th>
<th>Digital outputs</th>
<th>Connection outputs</th>
<th>Diagnostics</th>
<th>Connect. AS-interface</th>
<th>Mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8</td>
<td>M8</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>M12</td>
</tr>
</tbody>
</table>

Connect. inputs:
- M8
- Harax
- Terminal
- Sub-D

Max. no. of coils:
- Directly actuated
- Pilot actuated
- Vacuum
- Several pressure zones

Valve characteristics:
- LED
- Status bit
- Flat cable
- M12

Dependent on terminal type
<table>
<thead>
<tr>
<th>Power supply unit</th>
<th>Voltage</th>
<th>Current</th>
<th>Display</th>
<th>Connection</th>
<th>Mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SVG-1/230VAC-ASI-5A</td>
<td>230VAC 30VDC</td>
<td>4.8 2.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SVG-1/230VAC-24VDC-5A</td>
<td>230VAC 24VDC</td>
<td>5 1.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SVG-1/230VAC-24VDC-10A</td>
<td>230VAC 24VDC</td>
<td>10 2.8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Master</th>
<th>Specification</th>
<th>Gateway</th>
<th>Diagnostics</th>
<th>Connect. AS-interface</th>
<th>Connect. for fieldbus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CESA-GW-AS-PB</td>
<td>3.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CESA-GW-AS-PB</td>
<td>3.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
AS-interface in the system

- Ethernet
  - PLC with fieldbus master
  - Electrical terminal CPX with CoDeSys Controller CPX-CEC
  - Modular controller CECX

- Fieldbus
  - PLC with AS-interface master
  - Gateway CESA Fieldbus/AS-interface

- AS-interface
  - Soft-start/quick exhaust valve MS6-SV
  - Individual valve interface ASI-EVA
  - Valve terminal CPV with inputs, standard or A/B operation to Spec. V2.0, Spec. V2.1, Spec. V3.0
  - CPX-Compact MPA with selectable inputs
  - CPX-Compact VTSA/VTSA-F valve terminal with selectable inputs
  - Compact I/O modules and valve interfaces
Valve terminals for the AS interface

The brief product overview on the following pages should help you to quickly locate further information on individual valve terminals and other services and support. It complements and expands on the matrix on pages 12 to 14.

The number at the end of each section refers to the corresponding information brochure about that particular valve terminal. These brochures, like the electronic catalogue, contain a full description of the valve terminals as well as information on order processing.

You can order information brochures from the address specified at the back or download them from our download area on the Internet: www.festo.com

The manuals for valve terminal pneumatics and fieldbus systems are also available there.

**Valve terminal type VTSA to ISO 15407-2 and 5599-2 (plug-in)**

The valve terminal VTSA can be expanded into a complete installation solution.

- Modular, subsequently convertible and expandable standard sub-base concept
- Standard valves 18, 26 and 42 mm
- Flow rate 550 to 3,000 l/min
- 2x 3/2, 5/2, 5/2-way double solenoid, 5/3-way valve
- Safety valves for presses, valves with piston position sensing, slow start-up pressurisation, manual clamping devices and rotary/lifting cylinders
- 1 to 8 valve positions on the AS-interface
- Separating seals for the creation of pressure zones
- Suitable for vacuum
- Comprehensive range of vertical stacking components: controller and pressure gauge for maximum pressure accuracy at each valve position, flow control plate, supply plate, pressure shut-off plate for changing valves under pressure (hot swap)
- Mixture of sizes: ISO 26 mm (01), ISO 18 mm valves (02) and ISO 1 (42 mm) on one terminal

**Subsequent expansions optional – using vacant positions – through valve terminal conversion**

- Integrated diagnostic concept via LED and AS-interface feedback
- 4 or 8 inputs with choice of connection technology: M12, M8, quick connector, spring-loaded terminal or Sub-D

**Info 242, PSI+ ISO valve terminal VTSA**

**Valve terminal type VTSA-F**

Significantly increased flow rate compared to VTSA thanks to sub-bases with optimised flow rate. This next step towards overall system integration can be expanded in the same way until a complete installation solution is created!

- All functions as per VTSA
- Flow rate 700 to 1800 l/min with ISO (size 02, 01 and 1)

**Compact valve terminal type MPA1/MPA2**

Fieldbus terminal, multi-pin terminal or individual valve in IP65 – solid-metal valve body and manifold block.

- Valves on a sub-base: individual valves can be easily replaced
- Valve terminals can be expanded subsequently
- Mix of MPA1/2 on a valve terminal possible for optimised flow rates and control loop systems
- Electropneumatic installation concept: centralised, decentralised, hybrid together with excellent function integration (on the fieldbus)
- 2 to 8 valve positions on the AS-interface
- Flow rate 360 to 700 l/min
- All valve functions, controllers and pressure gauges for variable pressure adjustment per valve position.
- 2 x 2/2, 2 x 3/2, 5/2, 5/2-way double solenoid valves, 5/3-way valves, 1 x 3/2-way valve with external power supply
- Manual pressure regulators
- Pressure shut-off plates (hot swap): valve change under pressure

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- Safety valves for presses, valves with piston position sensing, slow start-up pressurisation, manual clamping devices and rotary/lifting cylinders
- 1 to 8 valve positions on the AS-interface
- Separating seals for the creation of pressure zones
- Suitable for vacuum
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- Mixture of sizes: ISO 26 mm (01), ISO 18 mm valves (02) and ISO 1 (42 mm) on one terminal

**Info 242, PSI+ ISO valve terminal VTSA**
Compact Performance valve terminal type CPV
Maximum power density in the smallest of spaces. CPV: compactness in a fixed grid.
• Widths 10, 14, 18 mm
• Flow rate 400, 800 and 1,600 l/min
• Valve combinations of 2, 4 or 8 valve slices
• Extensive range of valve and additional functions
• Vacuum generation, relays and more in one unit
• 2 x 2/2, 2 x 3/2, 5/2, 5/2-way double solenoid valves, 5/3-way valves
• Special functions
• Additional functions
• New: poppet valves
• Separator plates for creating pressure zones
• Suitable for vacuum
• Optimised for control cabinet installation
• Smart tubing system via pneumatic multiple connector plate:
  – Rapid replacement of valve terminals
  – No internal tubing required for control cabinet installation
• Unused valve positions for subsequent expansion

• M8 inputs included for each valve position
• Ex-Zone 2, 22 – Standard operation (Spec. V2.0)
  – A/B operation (Spec. V2.1)
  – A/B operation (Spec. V3.0, profile 7.A.7)
• Direct connection and addressing via flat cable
  ➔ Info 213

Universal valve terminals
Innovative AS-interface connection CTEU-AS
• Up to 16 coils with just one address
• Bus and auxiliary power supply 2x M12 looped through
• Power capability 24
• Double address detection
• Automatic coil number detection
• Extended diagnostics
• Compatible with valve terminals -VTUB

Valve terminal type VTUB
Flexible and simple with an excellent price/performance ratio.
• Valve manifold with weight-optimised metal manifold rail or multi-pin terminal
• Robust and light thanks to polymer housing
• Integrated QS push-in connectors
• Just one screw is needed to connect the valve securely to the manifold rail

Size VB12
• 2 to 16 valve positions
• Pilot actuated poppet valve
• Short switching times
• Flow rate 400 l/min
• Width 12 mm
• 3/2, 5/2, 5/2-way double solenoid valves
  ➔ Info 252

Valve terminal MPA
• Connecting plate with integrated non-return valve
• Separating seals for the creating pressure zones
• Suitable for vacuum
• Expansions possible at a later date
  – using unused valve positions
  – through valve terminal conversion
• 4 or 8 inputs with a choice of connection technology: M12, M8, quick connector, spring-loaded terminal or Sub-D
• Selectable connection technology on the bus. Flat cable for the 4E4A version or M12 round cable for the 4E4A and 8E8A versions (where ‘E’ stands for inputs and ‘A’ outputs)
• Addressing – via bus connection (M12)
  ➔ Info 227, PSI+

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• Selectable connection technology on the bus. Flat cable for the 4E4A version or M12 round cable for the 4E4A and 8E8A versions (where ‘E’ stands for inputs and ‘A’ outputs)
• Addressing – via bus connection (M12)
  ➔ Info 227, PSI+

Valve terminal MPA
• Connecting plate with integrated non-return valve
• Separating seals for the creating pressure zones
• Suitable for vacuum
• Expansions possible at a later date
  – using unused valve positions
  – through valve terminal conversion
• 4 or 8 inputs with a choice of connection technology: M12, M8, quick connector, spring-loaded terminal or Sub-D
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I/O modules, gateways and accessories for the AS-interface

Compact I/O modules ASI-..., ASI-8DI-..., ASI-4DI3DO-...
- Highly compact modules
- Sturdy, encapsulated electrics
- Bus and auxiliary power supply 2x M12 looped through
- Inputs 200 mA
- Outputs 1A
- 8 inputs M8
- 4 inputs and 3 outputs M12

Individual valve interface ASI-EVA-...
The perfect solution for 1 or 2 distributed valves and sensors
- Optimum pneumatic configuration within a range from 10 to 30,000 l/min
- Select the appropriate individual valve
- Then connect it to the AS-interface using Festo plug and work®
- Offers the maximum in mechanical, pneumatic and electrical flexibility

Master and Gateways for AS-interface CESAl-...
The heart of any AS-interface network is the masters or gateways. Masters from Festo fulfil all the requirements expected of a modern installation system:
- Integrated earth fault monitoring system
- Double address detection
- Direct operation
- Graphic display
- Comprehensive diagnostics via LED and display
- Stainless steel housing
- Profibus or CANopen gateway
- Specification V3.0
Power supply units for AS-interface and 24 V DC SVG-...
- Power supply unit for AS-interface
- Primary switched modular power supply
- Compact, modular and energy-saving power supply for AS-interface, with integrated earth-fault monitoring system.
- AS-interface load: 4.8 A.

Optional auxiliary power supplies 24 V DC, load: 5 or 10 A

Addressing device – ASI-PRG-ADR
Addressing device with user-friendly operating and diagnostic functions for the entire AS-interface, for example to perform the following tasks in a fully installed network:
- Changing addresses
- Setting outputs
- Reading inputs

Electrical connection technology
Valve terminals are characterised by extremely varied electrical modules. The connection options range from individual, multi-pin and fieldbus connections through to diagnostic interfaces, power supply as well as inputs and outputs. The range of accessories includes plug sockets, corresponding cables, plug connectors and plug bases in M8, M12, Sub-D, Harax and IP20 spring-loaded terminals, selectable fieldbus connection technology and many more besides.

New: modular system for connecting cables type NEBU.

All the components are perfectly adapted to one another. For example, materials, temperature ranges, vibration sensitivity and plenty more – it all fits!

⇒ Info 240
Industrial partners

Trust counts – the automotive sector relies on Festo
Automotive manufacturers trust Festo, and for good reason. Festo helps to meet the daily challenge to achieve the most efficient production. Over 40 years of experience guarantee an excellent overall understanding of the individual production segments in the press shop, body production, in painting systems, engines or assembly lines. Suppliers, machine manufacturers and plant constructors in the associated sectors also rely on Festo.

Festo inside from A to Z – electronics industry
Electronic products, such as mobile phones, flat screens, navigation systems or pulse meters, but also solar cells, follow a clear trend: miniaturisation and function maximisation. From the manufacture of wafers and silicon wafers to the finished end product: Festo is involved in all production steps. Our comprehensive know-how is demonstrated by our product range that perfectly meets the specific handling and processing requirements of electronic and precision mechanics components for
• Light assembly
• Flat panel production
• Photovoltaics
Festo products also offer optimised ESD protection, clean room suitability, connection technology and are free of copper and PTFE. They also comply with directives such as RoHS and WEEE.

Sturdy metal design and safety engineering for body assembly, welding environments and manual workstations
Quick tool changeover thanks to the hot-swap option in the AS-interface
Compact valve terminals and fieldbus nodes, ideal for the electronics industry and small parts assembly
Simply clean – food and packaging industry
Mixing, sterilising, pasteurising, packaging, handling – components as well as system solutions from Festo contribute towards efficient automation, mostly in combination with continuous processes and factory automation.

With innovative Clean Design solutions, Festo can guarantee food safety in splash zones. Festo can also provide individual solutions worldwide thanks to the industry-specific expertise of our sales engineers.

Synergetic impulses – for more intelligent process automation
Centralised and decentralised automation concepts for process automation, for GMP, food or ATEX zones, for high and low temperatures, for harsh and corrosive ambient conditions.

Optional: FDA and HACCP conformity. Condition monitoring and interdisciplinary diagnostics concepts based on products with diagnostic capabilities reduce production downtime to a minimum.

However different the sectors are, their objectives are nevertheless the same. Our specialists will not only advise you on technology, safety and quality, but will also advise you on how to comprehensively reduce your total cost of ownership in the long-term. Discover for yourself our complete, single-source product range, from products to system solutions and services.
Customised solutions
If you require a certain amount of added individuality beyond valve terminals, electrical peripherals, function integration and sector orientation, then you’re in the right place.

It doesn’t matter whether you choose AS-interface, fieldbus or Ethernet, our customised solutions meet all current and future market requirements. As always, pneumatics, electrical engineering, motion and networking are all provided by a single source.

Build it yourself or have it built?
The decision is yours. But complete systems can save you as much as 50%. With ready-to-install systems you no longer need to undertake complex working processes.

Tell us what your requirements are and we will design, order, compile, test and deliver. We can also assemble and commission your system on request. You concentrate on your core tasks; that not only saves time and money, but brings maximum reliability with regard to function and optimal settings.

Ready-to-install solutions

Complete control cabinets with remote I/O and valve terminals give you a total solution, either stand-alone or with a fieldbus connection to your host system.

Ready-to-install mounting plates (pressure gauges, valves, service units): a turnkey, complete solution for a machine unit at the AS-interface.

We offer:
• Engineering
• Documentation
• Assembly
• Testing
• Commissioning
• Servicing during the operating phase

Special designs
Individual solutions:
• On integrated blocks
• On printed circuit boards
• Modular control units
• Under safety guards

Optimised and customised AS-interface solutions:
• Electric
• Pneumatic
• Mechatronic
• Integrated in machine profiles

Services and support – for more added value
Our services support you every step of the way, from planning to operation, and make the process faster, more reliable and more efficient. And as far as TCO is concerned, we help you to recognise and achieve potential savings.

**Engineering**
The optimum valve terminal right from the word go:
- Correct selection thanks to software configuration
- Highly scalable thanks to extremely modular equipment design
- Diagnostics and Condition Monitoring Service: from analysis and consultancy through to complete programming service for the pneumatic (sub)system
- Strong support: modular CAD models for valve terminals in all common formats (see information on the right)

**Procurement service**
Simplified procurement and logistics:
- Pre-assembled and tested units configured to the customer’s specific requirements with Festo plug and work®
- Order code: configure once and order with the same part number from then on
- Labelling service: valve terminals complete with inscription of your choice

**Commissioning service**
Know-how on request:
- Fast installation, fast connection, fast commissioning
- Additional ready-to-install solutions with further components available on request
- Circuit diagrams in EPLAN 5.1 and P8

**After-sales services**
Reliable operation of your valve terminal with:
- Technical hotline
- Online spare parts service
- Repair service, including express
- 24 h emergency service for registered customers
- On-site after-sales service
- Modular service contracts, preventative or for emergencies

**Strong support: CAD models for valve terminals**
Brief instructions for anyone requiring CAD models (2D/3D) for valve terminals from Festo:
- Festo website
  http://www.festo.com
- Click through to the Festo “Online Shop/Catalogue”
- Register if you haven’t already done so
- Log on
- Search for product, e.g. MPA
- Is the CAD symbol active? If so, the CAD files are available
- Configure valve terminal (and put in shopping basket if necessary)
- Click the CAD symbol to generate/order the CAD files

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Training courses

Festo Didactic is the global market leader in technical training and vocational education – over 42,000 participants benefit from our training courses every year.

Choose the course that best suits you and your employees, at one of over 20 locations within Germany. Or book a customised course to take place at your company.

A selection of our courses:

**Festo valve terminals – Commissioning, converting and troubleshooting (P-INSEL)**

Upon completion of this course, participants will be familiar with the components and design of a range of Festo valve terminals. They will be able to configure valve terminals for various applications, and order and fit the correct spare parts as required. They will also be able to detect and eliminate pneumatic and electrical faults.

**Safe design of pneumatic and electrical machines and systems (SEP-PILZ)**

Are you familiar with the specifications of DIN EN ISO 13 849-1 regarding the safety of machinery and systems? This course will tell you all you need to know. You will then be able to draw up requirements for safe electrics and pneumatics based on the standard, and you will know the relevant safety categories. You will learn how to meet these requirements and implement them in your day-to-day work.
**Introduction to bus technology SIMATIC S7 (S7-BUS)**
You will get to know the basic bus systems, how they work and where they can be used. You will be able to plan, implement and commission these systems in accordance with the latest standards and safety regulations. You will also be able to add more users to the bus systems and eliminate any faults that occur. In doing so, you will acquire the necessary experience to run bus systems in your company.

**Pneumatics refresher and update (P-NEU)**
What are the latest trends and developments in pneumatics? After this course, you will know what is going on in the field. You will know all the corresponding components as well as their uses, functions and methods of operation, and will be able to put this knowledge into practice by using the products in your company.

**Successful use of problem-solving technology (PLT)**
Participants learn the six phases of the problem-solving cycle and how to apply them. After completing this course, they will be able to communicate clearly with staff from other departments in order to determine the causes and effects of problems. They will also be able to use suitable techniques to develop the right solutions for the company and present their respective advantages and disadvantages.

An overview of these and other courses and consultancy can be found at www.festo-tac.com.