Partner for automation
with PROFIBUS and PROFINET
For smooth cooperation: PROFIBUS and PROFINET solutions from Festo

Products, systems and customised solutions with added value can only be created in an environment where knowledge and innovation are a matter of course and high-quality expertise abounds. This is especially true of fieldbuses like PROFIBUS and PROFINET. To enable these fieldbuses to achieve maximum productivity in your company, Festo focuses on four topics.

- Positioning and potentials of the individual bus systems on the field level
- Compact manual workstations
- Automation cell
- Interlinked, station-based machines
- Automated systems

Application complexity (sensors and actuators)

- Communication
- Motion control
- > 20% regulated
- Pre-processing
- > 20% analogue
- > 90% digital

They all share a mechatronic approach:
1. State-of-the-art knowledge
2. Products and solutions
3. Mechatronics
4. Advantages on the bus
1 Fuel for innovation: state-of-the-art knowledge.

As a member of all leading fieldbus organisations, our experience goes right back to the start. This allows us to pass on our information advantage. As the inventor of valve terminals, we give our customers a clear competitive edge by ensuring our innovations are at the core of modern automation systems. Integration of functions, such as motion control, proportional technology, measurement, control and diagnostics, make Festo valve terminals the automation platform for the 21st century: more economical, reliable and efficient.

2 Trend-setting and economical: products and solutions. Festo was the first supplier to deliver I/O modules rated to IP65 for valve terminals. And, with the patented modular I/O concept for the CPX electric terminal, it takes controlling automation solutions into a new dimension. The combination of valve terminals MPA or VTSA with the CPX terminal results in a standardised platform for pilot valves, remote I/O, classic pneumatics, measurement, control and diagnostics. Everything is integrated, including motion control. The integration of the motion control functions with electric and servopneumatic drives makes it the perfect platform for trend-setting mechatronics.

Standardised automation links process automation and factory automation applications. These control cabinets, which all share the same modular construction, make maintenance and diagnostics easier.
3 Specially for industries: mechatronic systems that fit. Fieldbus systems and valve terminals are customised for specific industry applications, for example via connection technologies compliant with AIDA for the automotive industry, fast start-up for robots, interlock functions for the semiconductor industry, EX-i versions or clean design in IP69K for food production. Solution packages in handling technology, from consultation to turnkey/ready-to-install solutions and delivery with a single part number. The range also includes control cabinets with matching control technology and visualisation for sub-systems and solution packages, e.g. for process automation or the food industry.

4 Integration and combination: advantages on the bus. Optional connection technology makes integrating bus systems in existing standards child’s play. The combination of a fieldbus device and remote control via the embedded CoDeSys controller creates undreamt of synergies in practical applications and results in autonomous, intelligent sub-systems. Consistent diagnostic concepts and forward-looking condition monitoring systems with OPC interfaces provide clarity from the device level to mechatronic sub-systems and even up to the control system for pneumatic and electrical engineering components and motion control. This significantly reduces or avoids downtime.

Robust metal designs for body assembly and welding
Fast tool change thanks to fast start-up
Compact fieldbus nodes. Compliant with SEMI Specification 3.152 and EN50170
Successful automation – everything from a single source
Everything matches because the technology is provided by a single source. From controllers to pneumatics, electrical engineering and networking to networking on all levels. The advantages at a glance:

Networking – synergies through function integration
• Can communicate up to web level: Ethernet and web-based diagnostics concepts, e.g. remote diagnostics via fieldbus, Ethernet, integrated web server
• Selectable pre-processing, including through valve ASIC for the simplest of valve diagnostics, integrated mini control system (remote or embedded control) and extensive monitoring functions

Pneumatics – innovation is always built in
• Robust, flexible, modular, can be diagnosed, high flow rate
• Standardised, universally or application-optimised, such as Clean Design
• Safety technology, pressure control technology and servo-pneumatics built in
• Always 100 % checked, pre-assembled and easy to install

Electrical engineering – flexibility for communication
• High degree of freedom and independence thanks to modular electrical I/O terminals, installation systems and a direct fieldbus connection for valve terminals
• Maximum connection versatility
• Extensive electrical peripherals, I/O modules on terminals or separately
• Open to all established fieldbus standards, from AS-interface to the Ethernet
• Universally integrated diagnostics concept, such as condition monitoring and channel-oriented diagnostics

Clean Design for maximum ease of cleaning and corrosion resistance.
Networking: mounting plate with valve terminal and air preparation unit
Pneumatics: optimised by simulation
In-house expertise: own R&D, labs and production
There are five big trends which Festo pursues with its pneumatics, electrical engineering and networking concepts.

• Networking concepts – a central prerequisite for
• installation
• function integration
• diagnostics
• energy efficiency

They are all ingredients for successful automation. The most important trend with regard to industrial communication is undoubtedly the networking concept. It directly affects, to varying degrees, the system and machine options – regardless of whether it’s about installation, function integration, diagnostics or energy efficiency.

Festo’s many years of experience as a market and technological leader for valve terminals provide an answer to the requirements demanded by today’s and tomorrow’s market. Reliable products in pneumatics and electrical engineering for all types of industrial communication – worldwide! Integral solutions and universal system concepts are the central success factors.

See the Festo homepage for more information on the mega-trends:
www.festo.com

> Products
> Valve terminals

The 5 big trends

**Networking**
Valve terminals from Festo are very adaptable!
Different levels, different requirements.

**Installation**
Improved cycle times of up to 35%!
Central, decentralised or hybrid machine concept, modular or compact.

**Function integration**
Enhanced efficiency of up to 60%!
By means of the most extensive function integration, e.g. with a CPX terminal

**Diagnostics**
Up to 35% less downtime!
Active diagnostics management and condition monitoring can save up to €10,000 per minute!

**Energy efficiency**
Reduce energy costs by up to 60%!
By means of energy savings along the production processes.
Maximum productivity will be greatly influenced by industrial communication in the future. To control and analyse individual processes with high efficiency, it is mandatory that the communication levels, which are still often separated today, be networked. For example, with PROFIBUS and PROFINET.

The “control technology pyramid” shows the different communication requirements on each individual level.

The general advantages
The combination of PROFIBUS, PROFINET and Ethernet: overall, the most modern type of automation with specific advantages for each level.

Management level – holistic communication all the way to the office
Ethernet
• Remote diagnostics and maintenance of controls and devices from the office network
• Networking applications and machines
• Storage of process and device information
• Use of Ethernet infrastructure components (wireless LAN)

Control level – monitoring of production and processes
Ethernet and PROFINET
• Changing device parameters via the fieldbus network and configuration tools
• Saving configurations and parameters within PLC projects
• Integration of device status and diagnostics in PLC programs or in visualisation systems
• Module-oriented illustration of device levels
• Integration of PROFIBUS in PROFINET networks
• Acyclic communication via “TCP/IP” or PROFINET IO possible for parameters and diagnostics

Field/device level – indicates on-site safety/reliability
PROFIBUS and PROFINET
• Fast device exchange via DIP switches (PROFIBUS) or memory card (PROFINET)
• Easy identification of the network status of field devices via LEDs
• Definition of device behaviour in the event of a communication error
• Setting of network and communication attributes for adjusting machine performance
• Supported Profsafe profile means network can be used for normal and safety-oriented communication
• On-site diagnostics with LEDs and HMI
• Acyclic communication with “DPV1” possible for parameters and diagnostics

Networking concepts: fundamental for the world of fieldbus

Management level
- Holistic communication all the way to the office
  - Ethernet
  - Remote diagnostics and maintenance of controls and devices from the office network
  - Networking applications and machines
  - Storage of process and device information
  - Use of Ethernet infrastructure components (wireless LAN)

Control level
- Monitoring of production and processes
  - Ethernet and PROFINET
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At the centre of networking: control platforms and technologies

The topology: networks and control technology

Typical control platforms

Siemens (PROFIBUS and PROFINET)
Products, systems and services for drive, control and information technology, from components all the way to holistically integrated systems.

Typical products:
- Controllers: SIMATIC, modular controller e.g. S7-300 or S7-400 range
- Software tools: Step 7 for configuring and programming a PROFIBUS or PROFINET network.

Schneider (PROFIBUS)
Products and systems for automation and control technologies.

Typical products
Most controllers available have Hilscher SyCon cards.

Phoenix Contact (PROFINET)
Products, systems and services for connection technology in the world of automation and for industrial communication.

Typical products:
- Controllers: AUTOMATIONWORX, e.g. mini control systems from the ILC range
- Software tools: PCWorX for configuring and programming a PROFINET network.

For further information about the networks (e.g. installation guidelines) and commissioning them, go to www.profibus.org

The current GSD and GSDML file for CPX terminals can be found on the Festo website at: www.festo.com/fieldbus
At the centre of networking: PROFIBUS and PROFINET

The communication components

PROFIBUS
A joint research project was started by various companies and institutes in Germany in 1987 with the aim of propagating a bit-serial fieldbus. This was followed in 1993 by the specification of a simpler and significantly faster protocol: PROFIBUS DP.

PROFIBUS DP is used to control field devices with sensors and actuators in manufacturing technology via a central control system. Central to this are the many standard diagnostic options and the connecting “distributed intelligence”, that is, networking multiple control systems with one another. Data rates of up to 12 Mbps are possible on twisted two-wire cables and/or fibre optic cables.

With 25 million devices, the PROFIBUS DP fieldbus standard is the global market leader in production automation.

PROFIBUS PA is used in process technology to control measuring devices by means of a process control system. This version is suitable for potentially explosive areas in ex zones 0 and 1. The bus lines only conduct a weak current, ensuring an intrinsically safe circuit so that even in the event of a malfunction, no sparks capable of producing an explosion occur. PROFIBUS PA typically has a slower data transmission rate of 31.25 kbps.

Features:
• Line topology
• Device identification based on HW addresses in slave
• Number of I/O devices limited to 127
• Number of parameters restricted to a max. of 242 bytes

PROFINET
Is the open Industrial Ethernet standard from PROFIBUS and PROFINET International (PI). PROFINET uses TCP/IP and IT standards, is real-time Ethernet-capable and enables the integration of fieldbus systems. The concept is designed to be modular so that users can select their own functions. These functions are essentially differentiated by the type of data exchange required to fulfil the speed requirements.

In PROFINET, data is transmitted at 100 Mbps based on a typical Ethernet mechanism with twisted pair cables or fibre optic cables.

Features:
• Topology: line, star, tree
• Device identification based on logical names and IP addresses
• Number of I/O devices limited to 255
• Unrestricted parameter configuration

Profisafe electronics module CPX-FDVA

Safe, trouble-free shut-off. Integrated into valve terminals for the first time, CPX-FDVA-P safely shuts off two outputs and the power supply to valves MPA and VTSA without any trouble – via ProfiSafe for Profinet (CPX-FB33, FB34, FB35). No integration or interoperability problems, no separate authorisation, no wiring.
• Simple planning, engineering and installation thanks to integrated solution
• PL e and SIL3 possible
• Three digital output channels
• All channels are self-monitoring and dual-channel, category 3 acc. to ISO 13849
Solution expertise: always built into the product at Festo

The ideal combination of maximum performance and process reliability for every conceivable application in pneumatics, electrical engineering and networking: Festo’s valve terminal range. Unique, intelligent solutions that can be adapted to all the requirements of your systems – and with a convincing price/performance ratio.

Field level:

Fast device exchange via LLDP/memory card (PROFINET) or DIP switches (PROFIBUS)

- Reduce downtimes by quickly replacing products

Sub-D (IP65) 2x M12 Profibus (B-coded) 2x M12 Profinet (D-coded)

At the centre of networking: advantages of the field level ...
Easy identification of the network status of field devices
• Can be very quickly recognised via LEDs

Definition of device behaviour in the event of a communication error
• Fail-safe: defined state of valves and electrical outputs in the event of communication errors and when the program is stopped (idle mode)
• Parameterise a preferred actuator state depending on the machine concept
• Module-specific parameterisation of the diagnostic behaviour in the event of an error

Set network and communication attributes for adjusting machine performance
• Set the optimum update time for the particular field device in PROFINET, or the transmission speed in the network for PROFIBUS
• Fast start-up with PROFINET for fast booting maximises system productivity, e.g. in tool change applications

Online and on the spot diagnostics
• Online: see each device status in plain text via, for example, Step 7 or integrate it into a control program
• Localise errors ultra-fast with LEDs or device diagnostics
• Get extended on-site data and detailed information without existing network infrastructure: with CPX-MMI or CPX-FMT

Optimum data transparency
• Position and characteristics for identifying products are clearly recognisable thanks to I&M function support in PROFIBUS and PROFINET

- 2x Profinet per AIDA (FO or CU) - CPX-MMI - CPX-FMT
At the centre of networking: advantages ... up to control/management level

Control level:

Changing and saving device parameters via the fieldbus network and configuration tools

- GSD files for including device-specific information in software tools, such as Step 7 for PROFIBUS and PROFINET
- Start-up parameterisation for assigning module-oriented parameters during the initialisation phase
- Significantly reduces time and probability of error as pre-configured parameters can be activated directly from the controller
- With PROFINET, the TCI function can be used to simplify access to the appropriate proprietary online software (CPX-FMT in this case), required for parameterisation and online monitoring, from the configuration interface for Festo’s PROFINET products (→ Tip)

Integration of device status and diagnostics in PLC program or in the visualisation systems

- Module and channel-specific display of errors in plain text via the online diagnostics in the project planning software
- Basic status of the valve terminal: simply transferred as optional status bits within the process data
- Status interface for additional information via CPX: optional via process data
- Targeted changing and querying of parameters and diagnostics: optimum data access via “diagnostic telegram” from PROFIBUS and PROFINET during PLC start-up and acyclically during the program run

Device status and diagnostics with network tools

- Read out module status or error trace of the CPX terminal online in plain text: extended diagnostic data, e.g. with Step 7
- Festo maintenance tools, such as CPX-FMT (→ Tip)

Integration of PROFIBUS in PROFINET networks

- PROFIBUS and PROFINET can coexist trouble-free (proxies)
- Controllers can work with several networks

Tip:
Festo valve terminals are communicated to the hardware catalogue simply by loading the GSD/GSDMLs and corresponding bitmaps. Clearly defined entries for the various valve terminal modules allow individual configurations to be created using a drag and drop function.

New: With the export function of the CPX-FMT, the configuration of a valve terminal can be imported directly into the hardware configuration (e.g. step 7).

Siemens Step 7
Station connection

Device status/diagnosis via online diagnostics
Management level:

Remote diagnostics and maintenance of controls and devices from the office network

- Access via the network can be realised with CPX-FMT from various computers for more transparency without additional investments in the infrastructure
- Simple and cost-effective: project planning using the PLC Ethernet connection via the PC network
- Driver modules for Simatic PCS7 available online on the Festo support portal

Networking of applications and machines

- Ideal, thanks to data bandwidth and flexibility: Industrial Ethernet
- For decentralised control concepts: communication with a higher-order controller via PROFINET thanks to the remote control mode of the CPX fieldbus node
- Extended device, machine and system information can be stored centrally on data servers within an Ethernet network. Status and diagnostic data can also be accessed on the CPX terminal with PROFINET via an integrated web server.
- The CPX web monitor HTML software package is optimised for visualising the CPX terminal via a web browser (e.g. in combination with CPX-FEC or CPX-CEC)

Use of Ethernet infrastructure components (wireless LAN)

- The existing infrastructure for industrial Ethernet makes integration in the automation environment or of special components for remote maintenance via the Internet (via VPN, for example) quick and inexpensive
- CPX PROFIBUS node on standard Ethernet technology is compatible with the infrastructure components

Transparency for process reliability also remotely. New: PCS7 driver modules
### Overview: The world of Festo valve terminals

Your selection matrix for valve terminals ... ... will guide you quickly to the right solution, enabling you to choose from a comprehensive variety of valve terminals. The matrix shows the most important technical features, together with recommendations to meet industry-specific requirements or for specific applications.

For a quick preselection: general characteristics and specific requirements at a glance.

#### Universal terminals
- Individual valves and valve terminals in one range: VTUG
- Modular valve terminals on sub-bases: MPA, VTSA
- Compact valve terminals: CPV

#### Specific requirements
- ISO standard: VTSA
  - Multi-pin/fieldbus (sizes 02, 01, 1, 2, 3): VSVA/VTIA
  - Individual connections: VSVA/VTIA
- Weight-optimised (polymer): VTUB
- Pilot valves (semicon, PA): VTOC
- Easy to clean: CDVI
- ATEX
  - Zone 2 (cat. 3): CPV, MPA, CPX
  - Zone 1 (cat. 2): CPV-EXi

### Valve terminals

<table>
<thead>
<tr>
<th>Valve terminals</th>
<th>Electrical periphery</th>
<th>Flow rate (litres/min. per valve, max.)</th>
<th>Electrical inputs (max. per valve terminal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSVA/VTIA - ISO 15407-1</td>
<td>Modular, individual connectors M8/M12, C-type</td>
<td>500/1000</td>
<td>8 16 72 92 144 512 8 16</td>
</tr>
<tr>
<td>CPX/VTSA/VTSA-F – ISO 15407-2 and S599-2</td>
<td>Modular, high pneumatic functionality, with electrical I/O</td>
<td>550/700 1100/1400 1800/1800 3000/3000 6500/ -</td>
<td>360 700 900</td>
</tr>
<tr>
<td>CPX/MPA-S/MPA-F/MPA-L</td>
<td>Universal, modular, flexible, serial valve control, with electrical I/O</td>
<td>400/800 800/1600</td>
<td></td>
</tr>
<tr>
<td>CPV</td>
<td>Universal, compact, high performance</td>
<td>300/600</td>
<td></td>
</tr>
<tr>
<td>VTUG</td>
<td>Universal, compact sub-base, high flow rate</td>
<td>200/400</td>
<td>12</td>
</tr>
<tr>
<td>VSVA/VTUB</td>
<td>Universal, high flow rate economical</td>
<td>400/800 200/500 800/1000</td>
<td>VB12 VB20 VB20</td>
</tr>
<tr>
<td>VTOC</td>
<td>Compact, flexible 2x 3/2-way pilot valves</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>CDVI</td>
<td>Clean Design IP65/67</td>
<td>650</td>
<td></td>
</tr>
<tr>
<td>CPX terminal: multifunctional, modular, flexible periphery. Independent platform, comprehensive diagnostics and function integration. Options: remote I/O, remote control and motion control.</td>
<td></td>
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</tr>
<tr>
<td>CPX system decentralised installation system. Up to 16 I/O modules and valve terminals. 3 platforms, for I/O modules, valve terminals and master modules.</td>
<td></td>
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</tr>
<tr>
<td>CTEU/CAPO</td>
<td>Flexible fieldbus and installation concept for up to 2 I/O modules or valve terminals.</td>
<td></td>
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</tr>
</tbody>
</table>

Quick planning aid: the valve terminal configurator in Festo’s electronic catalogue. At www.festo.com, you can configure almost 20 valve terminal series to suit your requirements.
<table>
<thead>
<tr>
<th>No. of valve coils (max. per valve terminal)</th>
</tr>
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<td>Valves properties</td>
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<tr>
<td>Electrical connection</td>
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<td>Communication protocol</td>
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<td>Diagnostic</td>
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<tr>
<td>Protection</td>
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<tr>
<td>Functional safety</td>
</tr>
</tbody>
</table>

### Functional Safety
- Decentralised
  - Pressure sensor
  - Proportional pressure regulator
  - Safety technology valves
  - Soft start/exhaust valves
  - Vertical stacking

### Electrical connection
- Multi-pin
- Multi-axis interface for electric axes
- Soft start/exhaust valves
- Electrical voltage zones

### Communication protocol
- IO Link, I-Port
- DeviceNet
- Profinet
- Modbus/TCP
- Profinet IO
- CANopen
- EtherCAT
- EtherCAT/JIP
- EtherCAT/IP
- CC Link
- DeviceNet
- AS Interface

### Valve properties
- Directly actuated
- Pilot
- Vacuum
- Several pressure zones
- Several pressure zones
- IP40
- IP65
- IP67
- Explosion-proof
- Status bit
- Module/channel-oriented
- Preventive maintenance
- Web-based, web monitor
Motors and controllers for PROFIBUS

Holistic mechatronic motion solutions from one source: from controllers to ready-to-install handling systems.

From modular and compact controller concepts for standard pneumatics to servo-pneumatic and electric positioning all the way to sensors and compact camera systems for process diagnostics and quality assurance.

With its controller and motor portfolio, Festo covers a wide range of servo and stepper motor functions, optimally adapted to all electrical drives.

Modular, flexible, universal: motor controllers for PROFIBUS

PROFIBUS

Motor controller
Servo motor controller
Stepper motor controller

SFC-DC
SFC-LACI
CMMP-AS
CMMS-AS
CMMD-AS
CMMS-ST

Servo motors
EMMS-AS
Stepper motors
EMMS-ST
Servo motors
MTR-DCI

Linear motor axes
Gantry axes
Cantilever axes
Slide unit

ELG-LAS
ELGA-TB-G
ELG
DGE-ZR-RF

EGGR/B-BS
EGS/EGSP
ELGR
ELG

EGSA
DGEA

EGSL
SLTE with DC motor

DNCE-LAS
Servo motor controller CMMP-AS/CMMS-AS/CMMD-AS
For special requirements: the highly functional controller CMMP-AS. For standard functions: the controller CMMS-AS and the economical double controller CMMD-AS.

Stepper motor controller CMMS-ST and stepper motor EMMS-ST
Stepper motor technology in a real plug and work package solution: the single-axis position controller CMMS-ST combined with stepper motors EMMS-ST for single and multi-axis handling with moving loads up to 20 kg. In ServoLite mode, the combination of CMMS-ST and EMMS-ST provides a full closed-loop servo system with maximum reliability and great dynamic response.

Motor controller SFC-DC
Simple selection and commissioning. The SFC-DC concept incorporates the easy input of positioning records at the controller via the human-machine interface or via the computer-aided Festo Configuration Tool (FCT). Perfect as a ready-to-install solution – Festo plug and work® in combination with the electric gripper HGPLE or electric slide SLTE.

Position controller SFC-LACI
The position controller also comprises the additional power electronics needed to actuate linear motor drives. Speed, force and position can be freely adjusted. Up to 31 motion profiles can be stored directly in the SFC-LACI for the linear motor cylinders DNCE-LAS and DFME-LAS.

Intelligent servo motor MTR-DCI
Includes all the required components – motor, gears, motor controller and power electronics. Wide torque range, ideal for positioning tasks.

Standard handling Systems
Pick & Place
Linear gantry (2D)
Three-dimensional gantry (3D)

Advanced handling systems
T-gantry (2D)
H-gantry (3D)
Tripod
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.

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

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

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 start:
- Correct selection thanks to software configuration
- Highly scalable thanks to extremely modular equipment design
- Diagnostics and condition monitoring service: from analysis and consultation right up to programming services
- Modular CAD models

**Procurement service**
Simplified procurement and logistics:
- Pre-assembled and checked modules and systems configured to the customer’s specific requirements – Festo plug and work®
- Order code: configure once and order using the same part number again and again
- Labelling service: valve terminals labelled as required

**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
- 24h 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
  - 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

**Training courses by Festo Didactic.** Festo Didactic is the global market leader in technical training and vocational education; over 42,000 participants benefit from our training courses every year. You and your employees can attend an event in one of the 20 training facilities throughout Germany.

- Festo valve terminals CPX – commissioning, conversion and troubleshooting (TERMINAL-CPX)
- Reliable pneumatic and electrical design of machines and systems (SEP-PILZ)
- Energy efficient system design, appropriate use of pneumatics (DESIGN 1 and 2)
- Pneumatics refresher and update (P-NEU)

Other courses and consulting services: www.festo-tac.de