Process automation
Product overview

www.festo.com
Festo - The automation company

Festo is a leading industrial automation supplier with main emphasis on pneumatic and electromechanical systems. Festo serves 300,000 customers worldwide and invests 8.5% of its turnover in Research & Development.

With 59 independent national companies, more than 250 subsidiaries and a close knit service network in 176 countries worldwide, Festo strives to ensure that customers can obtain components, subsystems and systems for automation in next to no time.

Festo – the industry segment partner

Product range for process technology and process engineering

Festo is keeping abreast with the fast pace of technological progress by continually expanding the range of products for this industry segment.

In addition, the functionality of products has been adapted to particular functions of the process technology and process engineering such as explosion protection, corrosion resistant, etc.

Connection to third party products

With regards to integrating Festo products to third party products, flexible components of Festo facilitates the connection to most of the industrial standard.

The crucial factor is the system concept which integrates, complements and/or improves the existing functionality of a system with new component.

Quality assurance

As an automation specialist in production industry, Festo has an enormous potential of know-how experience. Furthermore, all products – components, subsystems, etc; are tested under the most extreme conditions and technically optimized.

Worldwide industry segment advice

Festo technical consultants, engineers and experts ensure that high quality yardstick synonymous with Festo is implemented to optimum effect worldwide. Our international presence ensures maximum availability of products and our proverbial quality of services.
For more than 8 decades, Festo develops products catering for digital and analogue automation in the field of pneumatic automation.

Initiated as a supplier for automated components – actuated valves, tubings, air preparation units, various pneumatic connections to solenoid valves; Festo successfully integrated solenoid valves with electrical input/output modules and employs latest fieldbus technology for communication. User thereby gets the benefit of optimized investment – reduced cable to the field, associate installation/infrastructure cost, etc.

Furthermore, the ability to incorporate standard diagnostic features of solenoid valves will assist in the accurate identification of problem, leading to more effective maintenance activities.

With such comprehensive range of products, engineering competencies and strong experiences in pneumatic design; Festo is in a unique position to be your fieldbus automation partners.

“Total Field Pneumatic Control Solution Supplier”
### Comparison of pneumatics, electric and hydraulics

<table>
<thead>
<tr>
<th></th>
<th>Pneumatics</th>
<th>Electric</th>
<th>Hydraulic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy storage</strong></td>
<td>by mean of air tanks and compressed air bottles</td>
<td>with batteries, although only in small quantities</td>
<td>with the helps of gases</td>
</tr>
<tr>
<td><strong>Energy transmission</strong></td>
<td>easily up to 1,000m (pressure drop is possible)</td>
<td>unlimited, but voltage drop up to 100m (pressure drop)</td>
<td></td>
</tr>
<tr>
<td><strong>Leakage</strong></td>
<td>no disadvantages (minimal energy loss)</td>
<td>danger of exposed cables</td>
<td>contamination</td>
</tr>
<tr>
<td><strong>Environmental conditions</strong></td>
<td>explosion-proof, temperature insensitive, ice hazard with non dried compressed air in winter</td>
<td>explosion hazard in certain areas, temperature insensitive, heating required for outdoor use</td>
<td>sensitive to temperature fluctuations, fire risk in the event of leakage</td>
</tr>
<tr>
<td><strong>Handling</strong></td>
<td>simple</td>
<td>only with specialised technical knowledge</td>
<td>more difficult than with pneumatics, return piping is necessary</td>
</tr>
<tr>
<td><strong>Generation of linear movements</strong></td>
<td>simple with excellent adjustable speed</td>
<td>associated with major expenditure, gear units</td>
<td>simple with cylinder, good adjustable</td>
</tr>
<tr>
<td><strong>Forces</strong></td>
<td>overload-proof, no energy consumption for retention forces</td>
<td>not overload-proof, impaired efficiency as a result of downstream mechanical elements</td>
<td>overload-proof, permanent energy consumption for retention forces</td>
</tr>
</tbody>
</table>
**Standard in practice**

In ensuring the interchangeable of tremendous numbers of process automation products, which vary greatly in construction, material, size, service life, quality and price; the standards and guidelines has been drawn up over a period of time. These standards or guidelines refer to the mechanical interfaces and are intended to facilitate the assembly of a complete control unit (process valve/ actuator/ end position sensing device).

These interfaces are:
- ISO 5211/5210 – process valve and process actuator
- DIN 3337 – process valve and process actuator
- VDI/VDE 3845, NAMUR – actuator, end position sensing device
- VDI/VDE 3845, NAMUR – actuator, solenoid valve
- ATEX explosion protection

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**Service reliability**

**Worldwide support**

By locating the engineering centre in each region, Festo brings engineering know-how and experts closer to the customers. In addition, this also allows each engineering centre to tap on each other experience in bringing customers more advance solutions.

**Engineering tools**

“Delivering value” to Festo means more than just being a partner, but to offer competitive advantage support. The engineering tools created are used in assisting the engineers in dimensioning and simulating. This is to ensure the reliability from the start.

**Global collaboration**

In this globalization world, seeing the world as one customer and working on international level has become inevitable. With its global existence, Festo is able to provide a competitive advantage support worldwide.

**Commissioning**

Ready, tested control systems are installed by service personnel directly, where Festo will be on site to ensure the system is up and run.

In addition, Festo also offers a range of automation related training courses.
**Actuator**

**Semi-rotary actuator – DFPB**
- Flange hole patterns to ISO 5211
- Clockwise / counter-clockwise rotation is possible (valve interface on both sides)
- Assembly interface to VDI/VDE 3845
- Rack and pinion mechanism

<table>
<thead>
<tr>
<th>Function</th>
<th>Ambient temperature [°C]</th>
<th>Size</th>
<th>Torque at 6 bar [Nm]</th>
<th>Swivel angle [°]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double-acting</td>
<td>-20...80</td>
<td>10...1,050</td>
<td>7...945</td>
<td>0...90</td>
</tr>
<tr>
<td>Single-acting</td>
<td>-20...80</td>
<td>105...5,205</td>
<td>1...882</td>
<td>0...90</td>
</tr>
</tbody>
</table>

**Semi-rotary actuator – DAPS**
- Flange hole patterns to ISO 5211
- Assembly interface to VDI/VDE 3845
- Namur port pattern for solenoid valves to VDI/VDE 3845
- Scotch-yoke mechanism, twin piston balanced pinion force
- Available variant: Epoxy coating, PTFE coating and low temperature (-50°C)

<table>
<thead>
<tr>
<th>Function</th>
<th>Ambient temperature [°C]</th>
<th>Size</th>
<th>Torque at 5-6 bar [Nm]</th>
<th>Swivel angle [°]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double-acting</td>
<td>-20...80</td>
<td>8...8,000</td>
<td>8...8,000</td>
<td>0...90</td>
</tr>
<tr>
<td>Single-acting</td>
<td>-20...80</td>
<td>15...4,000</td>
<td>15...4,000</td>
<td>0...90</td>
</tr>
</tbody>
</table>

**Manual semi-rotary actuator – DAPS-MW**
- Flange hole patterns to ISO 5211
- Namur port pattern for solenoid valves to VDI/VDE 3845
- Scotch-yoke mechanism
- Direct hand wheel actuating on piston without need of gearbox

<table>
<thead>
<tr>
<th>Function</th>
<th>Ambient temperature [°C]</th>
<th>Size</th>
<th>Torque at 6 bar [Nm]</th>
<th>Swivel angle [°]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double-acting</td>
<td>-20...80</td>
<td>15...1,920</td>
<td>15...1,920</td>
<td>0...90</td>
</tr>
<tr>
<td>Single-acting</td>
<td>-20...80</td>
<td>15...960</td>
<td>15...960</td>
<td>0...90</td>
</tr>
</tbody>
</table>

**Semi-rotary actuator – DRD/DRE**
- Flange hole patterns to ISO 5211
- Assembly interface to VDI/VDE 3845
- Namur port pattern for solenoid valve to VDI/VDE 3845
- Available variant: Spring force (closing/opening), adjustable end-position limitation and corrosion resistant version, swivel angle up to 180°

<table>
<thead>
<tr>
<th>Function</th>
<th>Ambient temperature [°C]</th>
<th>Size</th>
<th>Torque [Nm]</th>
<th>Swivel angle [°]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double-acting</td>
<td>-20...80</td>
<td>1...880</td>
<td>7.44...8,814</td>
<td>0...90</td>
</tr>
<tr>
<td>Single-acting</td>
<td>-20...80</td>
<td>2...880</td>
<td>2...880</td>
<td>0...90</td>
</tr>
</tbody>
</table>

**Linear actuator – DLP**
- Positioning sensing
- Integrated Namur working ports
- Piston rod with male thread
- Namur port pattern for solenoid valves to VDI/VDE 3845
- Mounting hole pattern to ISO 5211

<table>
<thead>
<tr>
<th>Function</th>
<th>Operating pressure [bar]</th>
<th>Piston Ø [mm]</th>
<th>Stroke length [mm]</th>
<th>Force [N]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double-acting</td>
<td>6</td>
<td>80...320</td>
<td>40...2,000</td>
<td>2,800...48,255</td>
</tr>
</tbody>
</table>

**Controlled linear actuator – DFPI**
- Integrated displacement encoder, valve manifold and positioner
- Robust design for harsh environment
- Fast commissioning
- Use to control gate valves and plug valves in outdoor
- Special strokes on request

<table>
<thead>
<tr>
<th>Function</th>
<th>Operating pressure [bar]</th>
<th>Piston Ø [mm]</th>
<th>Stroke length [mm]</th>
<th>Force [N]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double-acting</td>
<td>3...8</td>
<td>100...320</td>
<td>40...990</td>
<td>4,417...48,255</td>
</tr>
</tbody>
</table>
SS Cylinder – DAIG

- Compact stainless steel cylinder
- Corrosion resistance to harsh environment
- Use in mining industry
- Accessories: bellow (to protect piston rod seal)

<table>
<thead>
<tr>
<th>Function</th>
<th>Operating pressure [bar]</th>
<th>Piston Ø [mm]</th>
<th>Stroke length [mm]</th>
<th>Force [N]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double-acting</td>
<td>3...8</td>
<td>320</td>
<td>40...990</td>
<td>46,380...48,250</td>
</tr>
</tbody>
</table>

Safety shutter AEVU-SA

- Safety shutter actuator with integrated inert gas pipe clamping
- Prevent human interference in safety critical environment
- Mechanical spring to extend
- Use in inert gas application

<table>
<thead>
<tr>
<th>Function</th>
<th>Operating pressure [bar]</th>
<th>Piston Ø [mm]</th>
<th>Stroke length [mm]</th>
<th>Piston cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety shutter</td>
<td>6</td>
<td>63...70</td>
<td>20...75</td>
<td>Normally extended</td>
</tr>
</tbody>
</table>

Knocker – KNO

- Pneumatic knocker
- High impact force
- Maintenance free
- Easy mounting
- Use for silos, hoppers and bulk goods movement
- Operating pressure: 2...8 bar
- Piston Ø: 40...80mm

3 position actuator

- Use in filling and dozing application
- For rough and fine dozing without the use of complex equipment
- Digital control, no analogue required

Valves / Process valves

Butterfly valve

- Centric design
- Standard double / single acting actuator
- Face-to-face dimension in accordance with EN 558-1

<table>
<thead>
<tr>
<th>Seat principle</th>
<th>Direction of flow</th>
<th>Ambient temperature [°C]</th>
<th>Temperature of medium [°C]</th>
<th>Nominal pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soft</td>
<td>Reversible</td>
<td>-20...80</td>
<td>-23...82 (NBR) -40...135 (FDM)</td>
<td>PN10</td>
</tr>
</tbody>
</table>

Ball valve

- Full port ball valve
- Combination of a pneumatic quarter turn actuator and a ball valve
- Combination comes in fail close or fail last ball valve
- Operating medium: compressed air, water neutral gases, neutral fluids, vacuum

<table>
<thead>
<tr>
<th>Valve seal</th>
<th>Connection size (G or NPT)</th>
<th>Temperature range [°C]</th>
<th>Torque [Nm]</th>
<th>Operating pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soft PTFE</td>
<td>¼...4</td>
<td>-20...150</td>
<td>4...107.8</td>
<td>25...40</td>
</tr>
</tbody>
</table>

Angle seat valve VZXF – 2/2-way valve

- Pneumatic controlled 2/2-way valve
- Do not require different pressure between inlet and outlet
- Suitable for steam, high viscosity up to 600mm²/s, dirty media

<table>
<thead>
<tr>
<th>Max viscosity [mm²/s]</th>
<th>Connection size (G or NPT)</th>
<th>Material</th>
<th>Flow rate [Kv]</th>
<th>Operating pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>600</td>
<td>½...2</td>
<td>- Brass</td>
<td>2.8...47.5</td>
<td>4...10</td>
</tr>
</tbody>
</table>
Diaphragm valve – VZWP

- Simple sturdy design
- High working pressure using small solenoid coils
- Normally close (N.C.) guarantees valve closed on voltage failure
- Can be operated with air, neutral gas and neutral liquid

<table>
<thead>
<tr>
<th>Design</th>
<th>Connection size (G)</th>
<th>Variant seal</th>
<th>Flow rate [Kv]</th>
<th>Operating pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piloted piston poppet</td>
<td>¼...1</td>
<td>NBR (Standard)  FPM</td>
<td>1.5...11.5</td>
<td>0.5...40</td>
</tr>
</tbody>
</table>

Diaphragm valve – VZWM

- Solenoid activated diaphragm control valve
- Various voltage 24 V DC, 110/230 V AC

<table>
<thead>
<tr>
<th>Nominal diameter [DN]</th>
<th>Connection size (G)</th>
<th>Material</th>
<th>Flow rate [l/min]</th>
<th>Operating pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>8...50</td>
<td>¼...G2</td>
<td>- Brass</td>
<td>1,400...31,000</td>
<td>10</td>
</tr>
</tbody>
</table>

Operated 2/2-way valve VZWD

- High pressure rating
- Direct solenoid activation
- Use for small flow rates and/or high pressure application

<table>
<thead>
<tr>
<th>Max. viscosity [mm²/s]</th>
<th>Connection size</th>
<th>Material</th>
<th>Flow rate [Kv]</th>
<th>Operating pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>1/8...¾</td>
<td>- Brass</td>
<td>0.06...0.4</td>
<td>0...90</td>
</tr>
</tbody>
</table>

Forced pilot operated valve – VZWF

- Forced lifted of the valve diaphragm
- Different pressure is not required
- 2/2-way normally closed
- Suitable for cooling, filling, vacuum, liquid gas, bottling systems

<table>
<thead>
<tr>
<th>Variant seal</th>
<th>Connection size (G)</th>
<th>Material</th>
<th>Flow rate [Kv]</th>
<th>Operating pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBR (standard), EPDM, FPM</td>
<td>¼...2</td>
<td>- Brass</td>
<td>1.8...28</td>
<td>0...10</td>
</tr>
</tbody>
</table>

Pulse valve – VZWE

- High flow rate
- Fast switching cycle
- Suitable for clean bag house filters and anti pollutant equipment

<table>
<thead>
<tr>
<th>Pressure [bar]</th>
<th>Connection size (G)</th>
<th>Material</th>
<th>Nominal size [mm]</th>
<th>Operating voltage [V]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.35...8</td>
<td>3/4...3</td>
<td>-ast aluminium</td>
<td>22...76</td>
<td>24 DC 110, 220 AC</td>
</tr>
</tbody>
</table>

Manual ball valve – CRQH

- Pipe thread in accordance to ANSI B2.1
- Blow out proof stem / full port
- Stainless steel ASIS 316 (DIN 14408)

<table>
<thead>
<tr>
<th>Function</th>
<th>Connection (NPT)</th>
<th>Material</th>
<th>Flow rate [GV]</th>
<th>Nominal pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2pc design</td>
<td>¼...4</td>
<td>S/S316 body PTFE seal</td>
<td>6.6...780</td>
<td>up to 40</td>
</tr>
<tr>
<td>3pc design</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Solenoid valves**

**Pilot valve – VOFD (Namur)**
- Sturdy design and high resistance to corrosion make these valves suitable for outdoor use
- Port pattern to Namur for direct mounting of a drive as well as G and NPT threaded connections
- Suitable for use in safety related systems up to and including SIL 4 to IEC 61508; and protection class IP65
- Duty cycle: 100%

<table>
<thead>
<tr>
<th>Constructional design</th>
<th>Flow rate [l/min]</th>
<th>Ambient temperature [°C]</th>
<th>Pneumatic connection (G, NPT, Namur)</th>
<th>Operating pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poppet</td>
<td>450</td>
<td>10...60</td>
<td>14</td>
<td>2...8</td>
</tr>
</tbody>
</table>

**Pilot valve – VOFC (Namur)**
- Use within chemical and petrochemical systems – frequently used as pilot valves for flaps and drives
- The surface of the valve housing is treated with hard Ematal
- Port pattern to Namur for direct mounting of a drive as well as G and NPT threaded connection
- Suitable for use in safety related systems up to and including SIL 4 to IEC 61508; and protection class IP65
- Duty cycle: 100%

<table>
<thead>
<tr>
<th>Constructional design</th>
<th>Flow rate [l/min]</th>
<th>Ambient temperature [°C]</th>
<th>Pneumatic connection (G, NPT, Namur)</th>
<th>Operating pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poppet / Spool</td>
<td>600...3,000</td>
<td>-25...60</td>
<td>14, 15</td>
<td>2...8</td>
</tr>
</tbody>
</table>

**Solenoid valve – VSNB (Namur)**
- 3/2-way or 5/2-way mono or bistable
- CNOMO interface for simple connection to the pilot control
- Port pattern to Namur – VDI/VDE 3845

<table>
<thead>
<tr>
<th>Constructional design</th>
<th>Flow rate [l/min]</th>
<th>Ambient temperature [°C]</th>
<th>Operating voltage [V]</th>
<th>Operating pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piston spool</td>
<td>950</td>
<td>-10...60</td>
<td>24 DC</td>
<td>2.5...8</td>
</tr>
</tbody>
</table>

**Solenoid valve NVF3 (Namur)**
- 3/2-way or 5/2-way mono or bistable
- Port pattern to Namur – compliance to VDI/VDE 3845
- ATEX symbol: II 2 G c T6, II 2 D c 40°C, II 2 G Ex ia IIC T6, II 2 D Ex iaD IP65 T80°C

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3/2-way or 5/2-way,</td>
<td>900</td>
<td>-5...40</td>
<td>12, 24, 42, 48 DC</td>
<td>2...10</td>
</tr>
<tr>
<td>single solenoid</td>
<td></td>
<td></td>
<td>24, 42, 48, 110, 230, 240 AC</td>
<td></td>
</tr>
</tbody>
</table>

**Valve terminals**

**Valve terminal – CPV**
- Ready to install and tested unit
- Ideal for decentralised system structures
- Optimized assembly for control cabinets
- Pneumatic multiple connector plate – fast assembly without the need to replace connected tubing
- Up to sixteen 2/2-way or 3/2-way valve per valve terminal – thanks to two-valve function in each valve slide

<table>
<thead>
<tr>
<th>Type</th>
<th>Valve width [mm]</th>
<th>Flow rate [l/min]</th>
<th>Operating pressure [bar]</th>
<th>Ambient temperature [°C]</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPV10</td>
<td>10</td>
<td>400</td>
<td>-0.9...10</td>
<td>-5...50</td>
</tr>
<tr>
<td>CPV14</td>
<td>14</td>
<td>800</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPV18</td>
<td>18</td>
<td>1,600</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Valve terminal – MPA/MPA-F/MPA-L**
- Slim high performance valve in sturdy metal housing
- With multi-pin plug, AS-interface, CPI, fieldbus connection and control block
- Expandable to up to 128 solenoid coils
- The LEDs on the valves and diagnostics via fieldbus allows fast troubleshooting
- Up to sixteen 2/2-way or 3/2-way valve per valve terminal – thanks to two-valve function in each valve slide
- Vertical shut-off module – individual valve could be replaced without shutting down the whole manifold

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>-5...50</td>
<td>up to 700</td>
<td>10...21</td>
<td>24 DC</td>
<td>-0.9...10</td>
</tr>
</tbody>
</table>
Valve terminal – VTSA/VTSA-F
- High performance valves in sturdy metal housing
- Standardised from multi-pin plug to the fieldbus connection and control block
- Expandable to up to 32 solenoid coils
- Fast troubleshooting: LEDs on the valves and diagnostics via fieldbus
- Vertical shut-off module – individual valve could be replaced without shutting down the whole manifold
- Up to sixteen 2/2-way or 3/2-way valve per valve terminal – thanks to two-valve function in each valve slide
- Available in NPT thread

<table>
<thead>
<tr>
<th>Duty cycle [%]</th>
<th>Flow rate [l/min]</th>
<th>Valve width [mm]</th>
<th>Operating voltage [V]</th>
<th>Operating pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>400...2,900</td>
<td>18...52</td>
<td>24 DC</td>
<td>-0.9...10</td>
</tr>
</tbody>
</table>

Valve terminal CDVI
- Valve technology with a high resistant polymer materials
- Development with practical consideration in mind – hygienic, corrosion resistant and easy to clean
- Expandable to up to 24 solenoid coils

<table>
<thead>
<tr>
<th>Duty cycle [%]</th>
<th>Flow rate [l/min]</th>
<th>Valve width [mm]</th>
<th>Valve position</th>
<th>Operating pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>300...650</td>
<td>24</td>
<td>4...16</td>
<td>-0.9...10</td>
</tr>
</tbody>
</table>

Valve terminal CPV Ex-i for explosion areas
- Up to sixteen 2/2-way or 3/2-way valves per valve terminal – thanks to two-valve function in each slide
- Intrinsically safe valve terminal design to ATEX Category 2 (Zone1)
- Extremely robust thanks to the metal valve design
- Pneumatic multiple connector plate – fast replacement of the valve block without the need to replace the existing tubing connection
- Valve assembly optimized for control cabinets
- Available in NPT thread

<table>
<thead>
<tr>
<th>Duty cycle [%]</th>
<th>Flow rate [l/min]</th>
<th>Valve width [mm]</th>
<th>Valve position</th>
<th>Operating pressure [bar]</th>
<th>Ambient temperature [°C]</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>400</td>
<td>10</td>
<td>4...16</td>
<td>-0.9...8</td>
<td>-5...50</td>
</tr>
</tbody>
</table>

Valve terminal – VTUB
- Universal from the individual valve up to the multi-pin plug
- Selectable valve functions: 3/2-way and 4/2-way
- Expandable to up to 16 valve positions on one valve terminal, max. 24 solenoid coil
- Sturdy polymer housing and metal manifold rail

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>up to 1,000</td>
<td>-5...50</td>
<td>12, 24 DC, 24, 110, 230 AC</td>
<td>-0.9...8</td>
</tr>
</tbody>
</table>

Modular electrical terminal – CPX
- Electrical input/output modules, bus nodes and pneumatic interface/electronic module for valves
- Extensive range of functions as connection options for the electrical modules
- Open to all fieldbus protocols and ethernet
- The extensive selection of LEDs on the bus node and on all I/O modules allow fast troubleshooting

<table>
<thead>
<tr>
<th>I/O modules CP interface Multi axis interface</th>
<th>Max. inputs capacity [byte]</th>
<th>Max. outputs capacity [byte]</th>
<th>Operating voltage [V]</th>
<th>Protection class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 9</td>
<td>64</td>
<td>64</td>
<td>24 DC</td>
<td>IP65/IP67/IP20</td>
</tr>
</tbody>
</table>

Handheld – CPX-MMI
- Fast access to the diagnostic history and the modules with diagnostic messaging
- Small, convenient commissioning and service device for the CPX terminal
- Display and modified the current status of the inputs and outputs of a module
- Advance commissioning through the monitoring/forcing of inputs and outputs without fieldbus master/PLC
- Data interface Protection class ATEX category Operating voltage [V] Time stamp

<table>
<thead>
<tr>
<th>Data interface</th>
<th>Protection class</th>
<th>ATEX category</th>
<th>Operating voltage [V]</th>
<th>Time stamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS 232 interface, 57.6 kBaud, M12 socket, 4 pins</td>
<td>IP65</td>
<td>II 3 G, II 3 D</td>
<td>18...30 DC</td>
<td>Display last 40 error occurrences</td>
</tr>
</tbody>
</table>
Installation system – CPI

• Complete concept for decentralised system structure
• Four CP strings up to 10m in length (radius) facilitate optimum decentralization
• Max. 32 inputs and 32 outputs valves per string
• Display of the input status of each input signal via an assigned LED

<table>
<thead>
<tr>
<th>No. of output</th>
<th>Protection class</th>
<th>Power supply [24 V DC]</th>
<th>Operating voltage [mA]</th>
<th>Operating voltage for sensors</th>
</tr>
</thead>
<tbody>
<tr>
<td>16...32</td>
<td>IP65</td>
<td>CP connection</td>
<td>typically 75</td>
<td>24</td>
</tr>
</tbody>
</table>

Sensors

Sensor box DAPZ

• Drive interface to VDI/VDE 3845 (Namur)
• Simple and quick assembly and connection
• Integration solenoid valve actuation
• AS-interface is available

<table>
<thead>
<tr>
<th>Operating voltage [V]</th>
<th>Max. current output [mA]</th>
<th>Sensing type</th>
<th>Ambient temperature [°C]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical</td>
<td>0...250 DC/AC</td>
<td>up to 16,000</td>
<td>- Basic version</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Explosion proof</td>
</tr>
<tr>
<td>Contactless</td>
<td>10...30</td>
<td>–</td>
<td>- Basic version</td>
</tr>
</tbody>
</table>

Sensor box SRBF

• Limit switch attachment with two mechanical switches in painted aluminium housing
• With 8-pin terminal block and yellow/red visual indicator
• Mounting standard: ISO 5211, DIN EN 60947-5-1

<table>
<thead>
<tr>
<th>Operating voltage [V]</th>
<th>Max. switching capacity</th>
<th>Measuring principle</th>
<th>Ambient temperature [°C]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct voltage DC</td>
<td>0...24</td>
<td>36 W</td>
<td>For mechanical, electrical proximity sensors</td>
</tr>
<tr>
<td>Alternating voltage AC</td>
<td>0...250</td>
<td>1,700VA</td>
<td>-25...80</td>
</tr>
</tbody>
</table>

Analogue/binary sensor box – SRAP/SRBP

• The analogue version:
  • Reports the open/closed position of the semi-rotary actuator, detects the entire swivel range and reports this back to the controller via the analogue signal
  • The integrated sensors are based on proven 2D Hall Technology
• The binary version:
  • Position sensor for semi-rotary actuator and it reports the open and closed position of the actuator
  • Sensors are based on reed technology
• Drive interface to VDI/VDE 3845 (Namur)

<table>
<thead>
<tr>
<th>Output [mA]</th>
<th>Operating voltage [V]</th>
<th>Adjust angle [°]</th>
<th>Ambient temperature [°C]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analogue</td>
<td>4...20</td>
<td>15...30</td>
<td>0...270</td>
</tr>
<tr>
<td>Binary</td>
<td>up to 28.8 DC/AC</td>
<td>up to 28.8 DC/AC</td>
<td></td>
</tr>
</tbody>
</table>

Sensor box – QH-DR-E

• Operating medium: filtered compressed air, lubricated or non-lubricated (for pneumatic sensing)
• Quick and easy assembly
• Drive interface to VDI/VDE 3845 (Namur)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumatic sensing</td>
<td>-0.95...8</td>
<td>–</td>
<td>–</td>
<td>-10...60</td>
</tr>
<tr>
<td>Electrical sensing</td>
<td>–</td>
<td>0...250 DC/AC</td>
<td>16,000</td>
<td>-20...85</td>
</tr>
<tr>
<td>Inductive sensing</td>
<td>–</td>
<td>10...30 DC</td>
<td>200</td>
<td>-20...70</td>
</tr>
</tbody>
</table>
Proximity sensor – SME/SMT

- Insertable in slot from above, does not protrude over the cylinder profile
- Cable clip and inscription labels included in the scope of delivery
- Design for T-slot suitable for DLP, DFPI and DNG
- CE marking to EU directive for EMC and to EU directive explosion protection (ATEX)
- Explosion protection: up to Zone 0, 1, 2, 20, 21, 22 (ATEX)

<table>
<thead>
<tr>
<th>ATEX category gas/dust</th>
<th>Explosion ignition [°C]</th>
<th>Ambient temperature [°C]</th>
<th>Switch output</th>
<th>Protection class</th>
</tr>
</thead>
<tbody>
<tr>
<td>II 1 G/ II 1 D</td>
<td>115</td>
<td>-10...70</td>
<td>Namur</td>
<td>IP65/IP67</td>
</tr>
</tbody>
</table>

Displacement encoder – MLO-POT-...-LWG

- Connecting rod potentiometer
- Absolute measurement with high resolution
- Long service life
- High degree of protection
- Plug-in connection

<table>
<thead>
<tr>
<th>Resolution [mm]</th>
<th>Stroke length [mm]</th>
<th>Power supply [V DC]</th>
<th>Wiper current maximum [mA]</th>
<th>Ambient temperature [°C]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01</td>
<td>100...750</td>
<td>10</td>
<td>10^1</td>
<td>-30...100</td>
</tr>
</tbody>
</table>

1) Only permissible in the short term in the event of a fault

Accessories

Service unit – MS-Series

- Sturdy housing
- Modular system
- Complete product range
- High flow rates

<table>
<thead>
<tr>
<th>Connections</th>
<th>Grade of filtration [µm]</th>
<th>Flow rate [l/min]</th>
<th>Input pressure [bar]</th>
<th>Temperature range [°C]</th>
</tr>
</thead>
<tbody>
<tr>
<td>G¹/8, G¹/2</td>
<td>5 or 40</td>
<td>50...1,000</td>
<td>0.8...20</td>
<td>-10...60</td>
</tr>
</tbody>
</table>

Range of tubing

- Economical
- Hydrolysis resistant
- Pressure resistant
- Heat resistant
- Antistatic
- Resistant to cleaning agent
- Media resistant
- Flame retardant
- Resistant to welding spatter
- Food industry approved

Range of fitting

- More than 300 connectors
- Mini and standard series
- Versatile thread/tubing diameter combinations
- Flexible assembly, can be repositioned by 360° and combinable
- Leakage-free
- Flow control, non-return, shut-off and pressure regulating valves available with QS connection
- Corrosion and acid resistant design

Pipping system – QC

- Simple, fast installation: cut the length, insert and you’re done!
- Can be re-used a number of times
- Plug connector material is approved for use by the FDA (Food and Drug Administration)
- Leakage-free, corrosion-free

<table>
<thead>
<tr>
<th>Outer diameter Ø [mm]</th>
<th>Operating pressure [bar]</th>
<th>Room temperature [°C]</th>
<th>Temperature for water separator [°C]</th>
<th>Pipe material</th>
</tr>
</thead>
<tbody>
<tr>
<td>12...28</td>
<td>-0.95...15</td>
<td>-25...75</td>
<td>-25...75</td>
<td>Polyamide, aluminium</td>
</tr>
</tbody>
</table>
Adsorption dryer – LDM1

- Optimum final dryer with excellent operational reliability
- Suitable for use as an individual device or for integration in existing service unit combinations
- Flow rate dependent dew point reduction
- Wear-free function requiring no external energy
- Can be mounted near to point of use

<table>
<thead>
<tr>
<th>Pneumatic connection (G)</th>
<th>Flow rate [l/min]</th>
<th>Pressure dew point reduction [K]</th>
<th>Temperature range [°C]</th>
<th>Input pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>½...1)</td>
<td>300...1,000</td>
<td>17...20</td>
<td>2...50</td>
<td>3...12.5</td>
</tr>
</tbody>
</table>

1) with connection plates

Pressure booster – DPA

- Boost up to twice the supply pressure
- Any assembly position in the compressed air network
- Maintenance-free
- Temperature range: 5...60 °C
- Free of paint-wetting impairment substance (LABS-free)

Note:
Please refer to product data sheets for more technical details
## Product overview

<table>
<thead>
<tr>
<th>Operating level</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front End Display</td>
<td>FED (Key)</td>
</tr>
<tr>
<td>Front End Display</td>
<td>FED (Touch)</td>
</tr>
</tbody>
</table>

### Remote I/O level

#### Remote I/O

- Electrical terminal CPI
- Modular electrical terminal CPX
- Handheld MMI

### Valve terminals

- Valve terminal CPV
- Valve terminal MPA/MPA-F
- Valve terminal VTSA/VTSA-F
- Valve terminal CDVI
- Valve terminal for explosive areas CPV Ex-I

### Field level

#### Solenoid valves

- Pilot valve VOFD (Namur)
- Pilot valve VOFC (Namur)
- solenoid valve VSNB (Namur)
- Standard valve NVF3 (Namur)
- Manual ball valve CRQH

### Accessories

- Service unit
- Dryer LDM1
- Couplings
- Push-in fittings
- Plastic tubings
- Press DPA

### Sensors

- Sensor box DAPS
- Sensor box SRBF
- Analog / Binary sensor box SRAP/SRBP
- Sensor box QH DR-E
- Proximity sensor SME/SMT
- Diaphragm MLD-I

### Actuators

- Semi rotary actuator DFPB
- Semi rotary actuator DRD/DRQ
- Semi rotary actuator DAPS
- Manual semi rotary actuator DAPS
- Linear actuator DLP
- Centrifugal Df

### Valves / process valves

- Butterfly valve VZAB
- Ball valve VAPB/VZBA
- Ball valve VZBC
- Angle seat valve VZNF
- Pilot operated VZWM / VZWP
- Force pilot operated VZWF
- Direct operated valve VZWD

## Industry segments

- **Water & wastewater**
- **Biotechnology / pharmaceutical**
- **Food & beverage**
### Systems

- Modular valve terminal CPX/MPA
- Hygienic ball valve VZBB
- Linear actuator DLP with knife gate valve VZKA
- Linear actuator DLP with ball valve VZBB
- Linear actuator DLF with butterfly valve VZSA
- Semi-rotary actuator DAPS with ball valve VZAB
- Semi-rotary actuator DAPS with ball valve VZBB
- Semi-rotary actuator DAPS with ball valve VZCA
- Displacement encoder MLO-POT
- Displacement encoder MLO-POT
- Pressure booster
- Control cabinet for automatic and manual pneumatic operation
- Control cabinet for high and low temperature application
- Compact performance valve terminal LPV with stainless steel cover
- Customised control cabinet solutions, also for explosive areas
- Semi-rotary actuator DAPS with ball valve and sensor box

### Customized System

- Control cabinet for automatic and manual pneumatic operation
- Control cabinet for high and low temperature application
- Compact performance valve terminal LPV with stainless steel cover
- Customised control cabinet solutions, also for explosive areas
- Semi-rotary actuator DAPS with ball valve and sensor box

### Automation concept

1. **Centralised installation**
   - Centralised installation
   - Industrial Ethernet
   - Fieldbus

2. **Decentralised installation**
   - Decentralised installation
   - Industrial Ethernet
   - Fieldbus

3. **Hybrid installation**
   - Hybrid installation (centralised / decentralised)
   - Industrial Ethernet
   - Fieldbus

### Application Areas

- **Mining**
- **Chemical**
- **Pulp / paper processing**