



**Advanced Valve System  
Flexible, Intelligent  
and future-oriented**

## **AVENTICS™ Advanced Valve System**

The innovative solution for flexible pneumatic control applications



# The AV family: success through advancement

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Our Advanced Valve system has proven successful in a broad spectrum of applications. The recipe for success: Long-term research in the area of valve technology, continuous further development of the materials used, as well as fast implementation of innovative ideas to expand our modular concept.

The AV systems provide a reliable basis for both compact handling systems and complex automation solutions. In the area of machine safety in particular, the AV family offers intelligent solutions that significantly reduce your effort in creating a safe design.





Sophisticated thanks to use in a wide variety of practical applications, driven forward through constant development: The Advanced Valves (AV) have made quite an impression since entering the market. The AV family continues to grow – finding modern answers to current requirements in industrial automation.

## One solution for many automation requirements: the AV family at a glance

Important performance data reveals just how much an innovative material selection and sophisticated pilot valve technology pay off in practice: With a weight reduced by up to 70% and current consumption cut by 80%, the AV system makes a major contribution to your energy-efficient automation solution.

### Systematic success – modern advancement

With their diagonal spool, the AV family valves – AV03 and AV05 – have set benchmarks in both sizes. They feature an excellent volume-to-flow ratio as well as a record-breaking energy balance.

With the serial Advanced Electronic system (AES) interface, the AV valve system effortlessly communicates with modern control systems via all standard fieldbus systems. The modular electronics form the basis for high networking, flawless data transmission, and integration into Internet of Things concepts.

*“With the remarkable AV and AES product range, our customers find a solution for virtually all problems and are ideally prepared for future IIoT requirements.”*

Tomas Kälble,  
Manager Product Marketing  
Valves & valve systems





AES and AV as complete solution for the integration of electronics and pneumatics.

## Fully integrated or as a stand-alone solution: AV-EP

Available in a range of variants, electropneumatic proportional valves regulators supplement the AV family. Our many years of experience in electropneumatic proportional technology are reflected in our AV-EP, which can be integrated into the valve system achieving both functional and visual perfection – with minimum effort required for installation, parameterization, and commissioning, and maximum control behavior performance.

## Convenience by design and configuration

The selection of materials and design make the AV valve system the ideal solution for use under demanding conditions. AV systems also cover the requirements of global automation technology, even under UL specifications and in ATEX areas.

The online configurator helps during system layout, providing useful information and documentation for spare part and system documentation in the design phase, speeding up your machine development. The QR code also grants you direct access to all configuration and spare part data – including on your mobile device.

# Impressive range of functions: the AV family system

## EASY-2-CONFIGURE

- Can be configured completely online
- User navigation with default specification and plausibility check
- Time-saving creation of technical documents
- Options such as UL and ATEX available
- One material number, no code conversion required, available for order online immediately
- Available in inch or metric versions

## EASY-2-USE

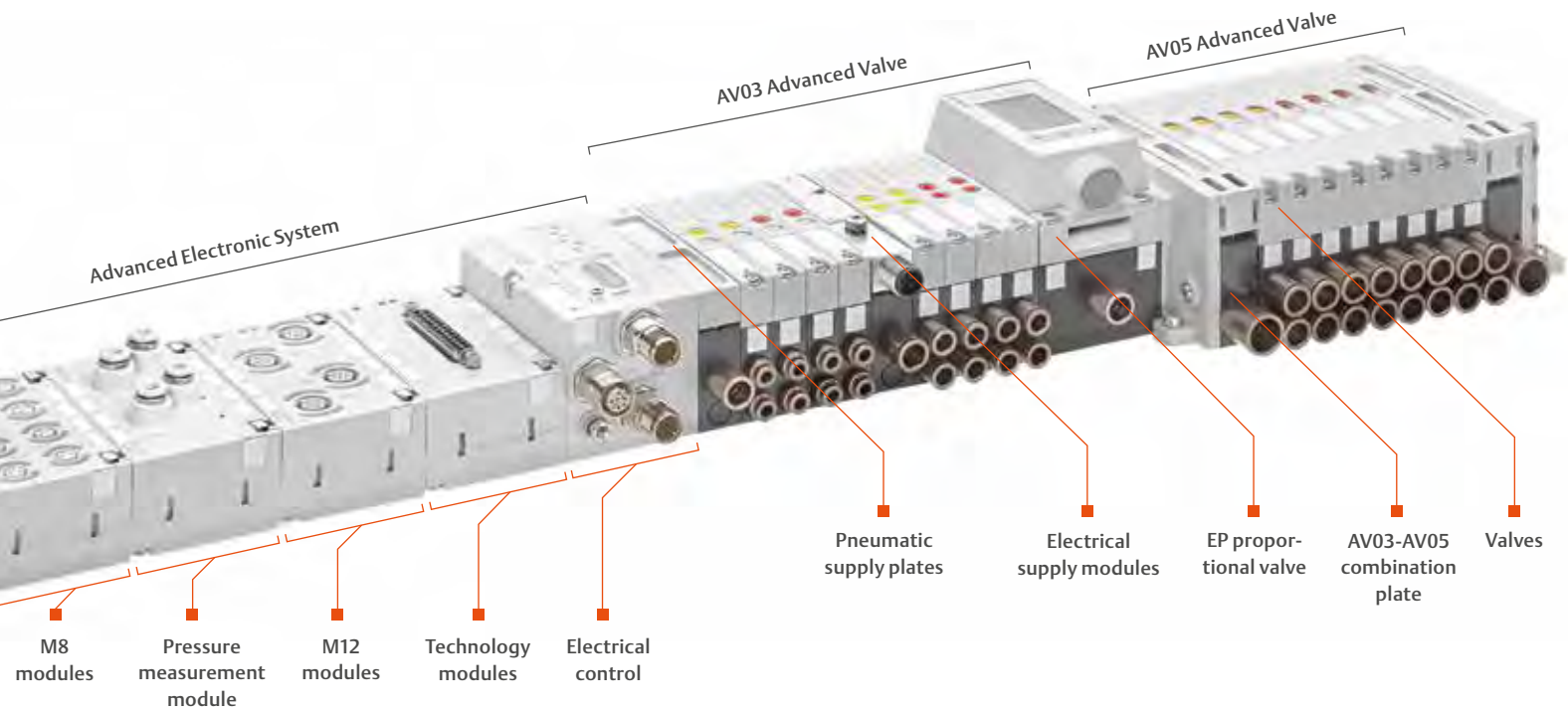
- Small, compact dimensions
- All standard fieldbus protocols available
- Configuration code and driver files available for fast commissioning
- Consistent LED diagnosis, ring LED for improved visibility in I/O modules
- EPLAN macros for faster machine development

## EASY-2-EXTEND

- Simple subsequent extension of valve positions, pressure regulators, and I/O modules
- Tool-free connection of I/O modules
- Valve assembly with one screw
- Exchangeable fittings
- Extension with function modules
- Minimal PLC configuration adjustment after extension

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Planning, configuration, commissioning, use, extension, or service.  
 With the AV family, every phase of your application is easier to manage.

## AV03 and AV05 valve systems for flexible application

Two size options with impressive performance: AV03 with 300 l/min nominal flow, 8 ms switching time, or the AV05 with 700 l/min nominal flow, 13 ms switching time. Benefit from a higher power density in compact dimensions: 45% less space and 40% lower weight. With the adapter plate to HF02-LG is it also possible to extend the valve system up to 1400l/min.

The diagonal spool in the flexible base plate system, the modularity of the power concept: these valve systems are extremely adaptable and intelligent. Up to 64 base plate valves can be positioned variably in the valve system. With electrical and pneumatic supply plates, individual valve and pressure zones can be integrated based on the requirements.

### Small valves – high speeds

You can also custom-configure your cylinders with our online Engineering Tools. In combination with the AV valves, you achieve outstanding results: With the AV03 a cylinder with diameter of 32 mm reaches speeds of up to 1 m/s. With AV05, even cylinders with a diameter of 80 mm manage speeds of 0.4 m/s. The variety of components enable a wide range of combination options – thanks to a compact design, the size remains small.



The diagonal arrangement of the spool reduces the size of the Advanced Valves and optimizes the performance of the supply and exhaust channels.



# The wide variety of components in the AV family: tailored for flexible application

## Base plates

2x, 3x, 4x  
Push-in fitting straight/angled  
Bottom-ported



## Combination plate

Adapter plate AV05-HF02-LG

AV03-AV05



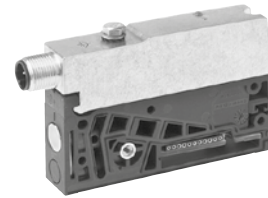
## Pneumatic supply plates

Int./ext. pilot air  
channel separation



## Electrical supply plate

For voltage zones



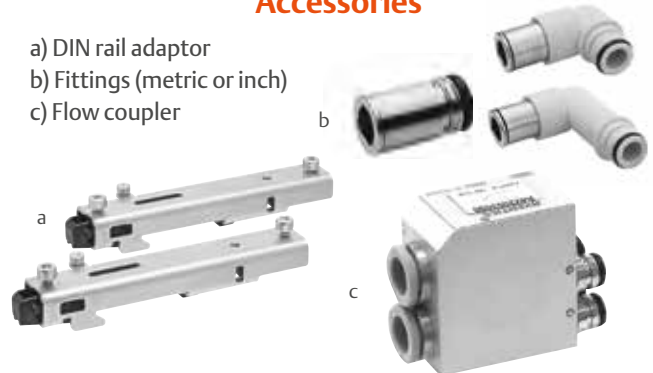
## Valve control module

For individual valve control



## Accessories

- a) DIN rail adaptor
- b) Fittings (metric or inch)
- c) Flow coupler



## Function modules

- a) Regulators
- b) Exhaust modules
- c) Throttle module
- d) Shut-off modules



For further information on these or any other AVENTICS product, visit [Emerson.com](http://Emerson.com)



## AES – Your interface to the superior controller

The AES Advanced Electronic system ensure smooth serial communication, connecting the AV system to all relevant controls. In addition, the AES offers a variety of input and output modules enabling easy integration of additional functions in the electronics.

No matter the electrical system structure – the Advanced Valve system offers the right interface. In addition to the parallel connection technology via D-Sub plugs, AV systems can also be connected to all standard fieldbus systems via the AES fieldbus coupler. For simple integration and commissioning, we provide driver files and configuration keys. The AV also equips you well for IoT requirements, providing consistent communication up to the valve, as well as an integrated web server.

### Connection magic with compact dimensions

The input and output modules are no higher than the valves, even with mounted plugs. In addition to the typical I/O modules, technology modules are also available that provide further advantages in wiring or application for special requirements.

The data width of the AES with 512 input bits and 512 output bits enables all conceivable combinations as well as the control of 64 double solenoid valves. Besides the modular AES components for fieldbus applications, the AV system also features a solution for IO-Link. With a direct M12 connection, the majority of all AV functions can be used, with extremely simple implementation in the IO-Link system.

AES highlights	
I/O data width	512-bit/512-bit
Number of I/O modules	Max. 10
Number of valves/coils	Max. 64 valves/128 coils
Internal cycle time	<1 ms
AES facts	
Protection class	Max. IP65
I/O functionality	Analog/digital
Connection options	M8, M12, D-Sub, spring clamp



# AES valve series

## AES I/O modules – connection variants



M8x1



M12x1



Spring clamp connection



D-Sub



Pneumatic connection D4



Additional voltage power

Module variants	M8x1	M12x1	Spring clamp connection	D-Sub*	D4	Additional voltage power
Digital input modules	●	●	●			
Digital output modules	●	●	●	●		
Digital input and output modules	●	●				
Analog input modules		●				
Analog output modules		●				
Analog combination module		●				●
Control module		●				●
Pressure measurement module					●	
Powermodul						●

\* optimized for connecting additional valve system via D-Sub connection

### Special modules

#### Analog combination module

Optimized for direct control of up to 2 EP proportional valves each with one analog input and output signal as well as a 24 V power supply on one plug

#### Control module

With integrated regulator for the direct control of e.g. up to 2 EP proportional valves and one external sensor. Suitable for superior control circuits and servo-pneumatic positioning

#### Pressure measurement module

Simple reading of four pressures with up to 10 bar and transfer to the control via the field bus

### Accessories



M8x1, M12x1 plugs and cables



Multipole plugs and cables



Decentralized I/O module



For further information on these or any other AVENTICS product, visit [Emerson.com](http://Emerson.com)



**Regulation, control, monitoring:  
all in a single system**



## **AV-EP – direct integration into the fieldbus, for single pressure or pressure zone control with high performance**

Emersons AVENTICS stands for the leading electropneumatic proportional pressure control control (EP) technology, but we are now taking it one step further. Integration, compact dimensions, and the wide range of variants of our AV03/AV05 EPs supplement the functionality of the AV family.

The consistent use of high-tech polymers in the AV-EP also ensures high functional integration and power density. You cut weight by 70% and current consumption by 80% compared with existing products. A major advantage is the direct integration into the AV03 and AV05 valve systems. The display enables direct input of parameters – tailored to the respective application – for example the desired operating pressure level. The AV-EP can be used within the valve system as a single pressure or pressure zone control.

### **Wide variety: typical AV**

AV-EPs are available in a wide range of variants: matching the AV03/AV05 system, fully integrated, as a stand-alone solution or EV03 single station control. A display or control via multipin as well as via fieldbus are further options. The EP proportional valve features 16-bit resolution and uses 10 bits for the pressure range: as a result, the proportional valve has a very precise resolution compared with competitor products. The AV-EP is ideal for applications where the set points rarely have to be changed. Of course, the AV-EPs feature all advantages of the AV switching valves: push-in fittings for fast operating line switching, visible status LEDs, and a low weight. Furthermore, it is easy to assemble with just two screws.

<b>Flows*</b>	<b>Single pressure control</b>	<b>Pressure zone control</b>
AV03-EP	600 l/min	800 l/min
AV05-EP	900 l/min	1.100 l/min

\* PV =7bar, P1=6 bar, P2 = 5 bar

## AV for control cabinet mounting

### AV-BP with bottom-ported connections optimized for control cabinet mounting

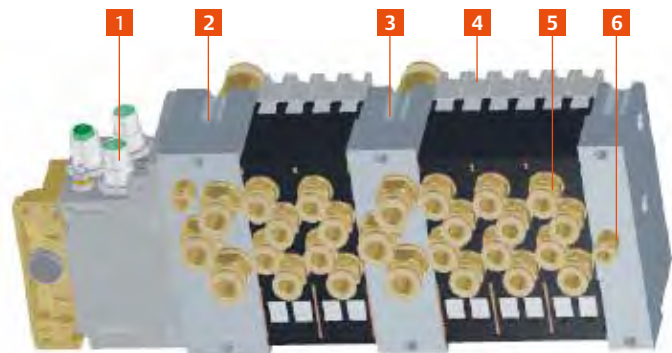
- Direct mounting in the control cabinet
- All ports on bottom
- Additional port on top for supply or distribution
- Pneumatic multipole in combination with adapter plate
- Adapter plates available for various configurations and applications



### Electrical connection options

In addition to the various pneumatic connection options, electrical connectivity leaves nothing to be desired. Whether with multipole D-Sub 25 and 44 pins or AES for fieldbus and I/O – the AV-BP valve system offers a wide range of connection options. Perfectly integrated!

- 1 AES for fieldbus and I/Os, D-SUB
- 2 First supply plate, restricted exhaust, internal/external pilot air
- 3 Center supply plate, supply and exhaust from top and bottom
- 4 Up to 8 valves between supply plates, 32 valves in total
- 5 Base plate with ports on bottom
- 6 Collected pilot exhaust



## AV for single wiring

Next to the full range of modular and functional design of the AV series AVENTICS offers with AV03-SW an even more flexible solution with single wiring. Due to the spring clamp connection in the base plate for all connectivity solutions the same valve is used. According to the wiring structure individual ground connection by baseplate as well as a common ground connection of the hole valve system it is possible to reduce number of wires in the control cable. The modular AV concept offers the possibility to configure systems up to 64 valves also to do self-assembly due to complete availability of all necessary component kits.



For further information on these or any other AVENTICS product, visit [Emerson.com](https://www.emerson.com)



## AV valve system with AES fieldbus system – the ideal solution for machine safety

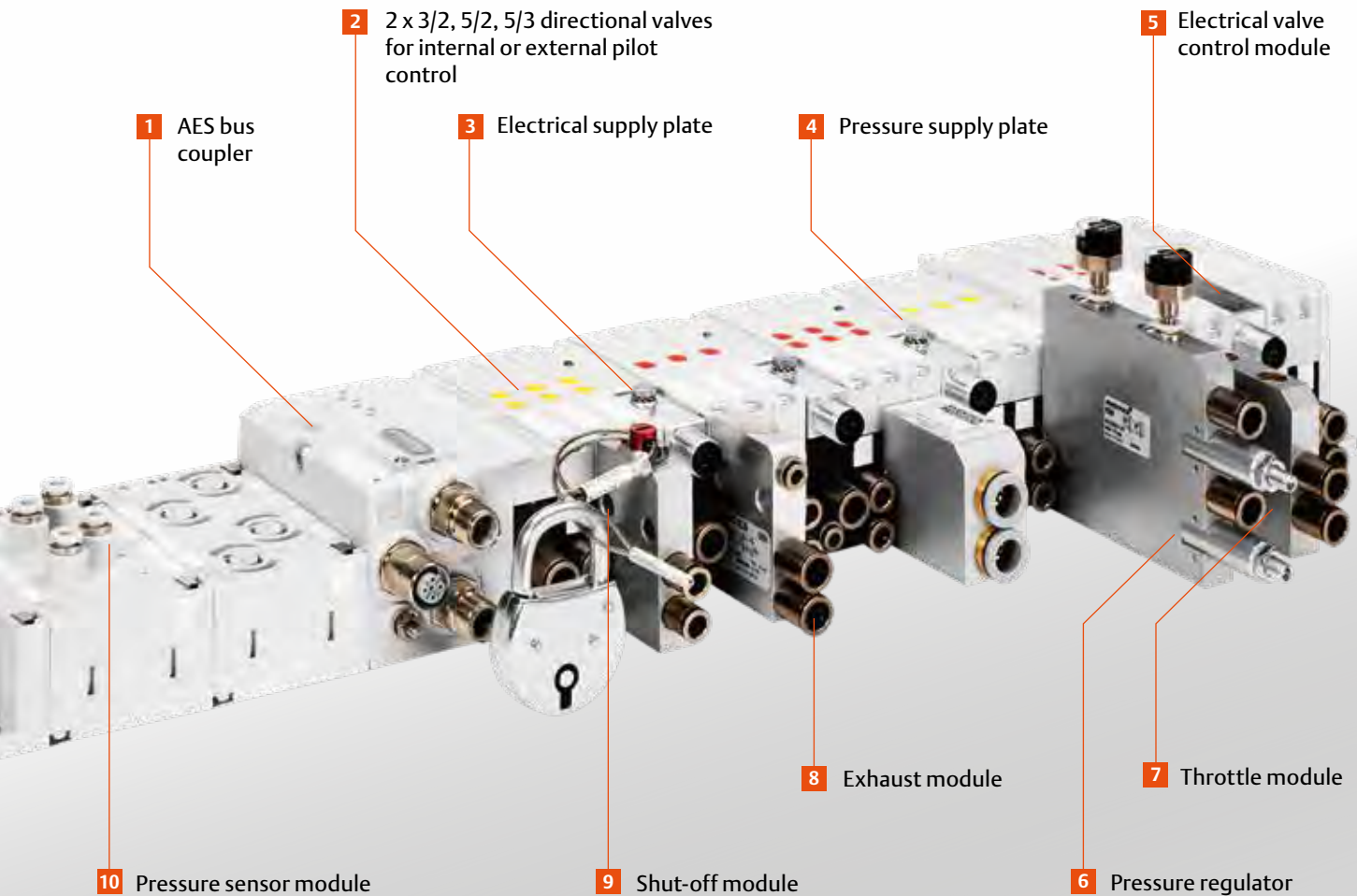
The consistent modular design simplifies your project planning with regard to machine safety, with each module making its own contribution:

- 1 AES bus coupler:** Galvanic isolation between the logic voltage (UL) and actuator voltage (UA) in the bus coupler; this achieves a safe separation of safety-related function from other functions in the application. The entire system features standardized M12 connections.
- 2 AV series valves** have an extremely long service life of over 150 million cycles. Excellent leakage values plus easy maintenance minimizes the risk of failure. Pilot air can be controlled internally or externally: should a problem occur, the valves switch to a defined safe state. The valves comply with basic and proven principles in safety-related controls.
- 3 The electrical supply plate** enables the formation of independent voltage zones with any number of valves. Safety functions thus remain separate from other functions. In addition, the supply plate makes it possible to use separate cables for logic and actuators, thus reducing the potential for error. The supply plate meets the safety principles specified in ISO 13849-2. MTTF values are also available for all relevant components.
- 4 Pressure supply plates:** Enable mutually independent pressure zones for customized pressure supply to different safety circuits and ensure adequate, rapid system exhaust.
- 5 Electrical valve control module:** For direct actuation of 2 valves in AV03 and AV05 valve systems. The valve control module can be integrated at the right end of D-Sub or fieldbus valve systems. The two following valve positions are controlled via the M12 connection. No electrical connection to the previous base plates exists. It is possible to use multiple valve control plates.
- 6 Pressure regulator:** Reduced working pressure in the operating lines for force limitation in cylinders.



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Thanks to its sophisticated modular and functional structure, the AV system can be easily adapted to the requirements of safety-oriented pneumatic controls.

**7 Throttle module:** With the two-channel pressure module, the flow in both operating lines can be limited, reducing the cylinder traversing speed. Optionally, a cover plate is available to safeguard against manipulation.

**8 Exhaust module:** In case of emergency stop, cylinder chambers may remain under pressure. To perform maintenance, release trapped personnel, or achieve correct workpiece positioning, the cylinder chambers must be exhausted to change the cylinder piston position. The solution: targeted system exhaust to disable the cylinder without application of energy.

**9 Shut-off module:** The large portfolio of shut-off modules serve to separate actuators from the pneumatic supply and offer easy integrated redundancy.

- a) Manually actuated for maintainance purpose
- b) pneumatically controlled or
- c) electrically controlled for safety relevant control cirtcuits already with integrated position detection to replace at least 3 other seperate components. Also availabel as stand alone version.



**10 Pressure sensor module:** Processes four pneumatic inputs (pressure) from a pneumatic control and converts the pressure into digital information. It safely monitors system pressures and provides reliable, fast information about the pressure conditions in all relevant modes of operation.

## Certified products, for specific requirements

### UL

The UL mark is frequently required for products that are to be sold on the North American market. During product certification, a major focus is placed on safety against electric shocks and fire hazards. According to these requirements, materials and components in the AV system were selected based on UL criteria, enabling simple extension to UL within the system configuration.



### ATEX

Pneumatics play an important role in potentially explosive atmospheres and, thanks to their simplicity, often feature major advantages over electrical actuator systems. For this reason, the ATEX option can be selected for AV systems during system configuration.





### QR code Easier, faster, more direct



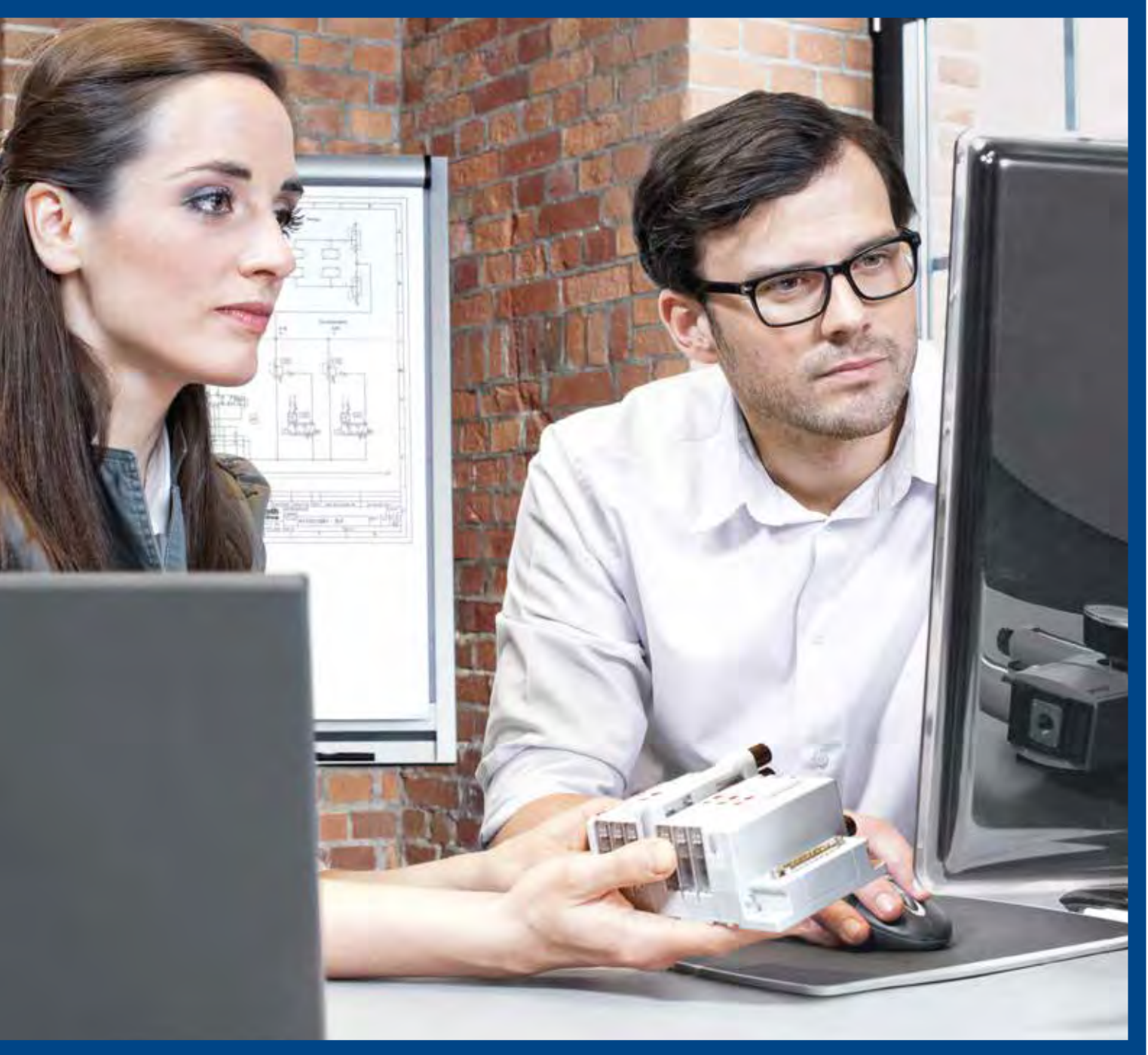
Just a single picture of the QR code on your product on your cell phone or tablet brings you straight to your configuration, wirelessly, from anywhere in the world. For easy reordering, additions, or fast contact to Service.

### Your advantages – small solution, major effect

The AV family is not only designed intelligently for highly flexible application – it is also continuously being upgraded. All information and new features can be found at [www.aventics.com](http://www.aventics.com) or [www.advanced-valve.com](http://www.advanced-valve.com). Always up-to-date.

The QR code below brings you directly to [www.advanced-valve.com](http://www.advanced-valve.com).





**Engineering tools**  
**Excellent service comes with the family**

## The homepage for non-stop service



Emersons AVENTICS Engineering Tools bundle the entire pneumatics range and comprehensive expertise at one convenient location – [www.engineering-tools.com](http://www.engineering-tools.com)

### CAD



Objects can be issued here directly as a CAD file in various formats, as a PDF file, or for further configuration in our customers' software.

### Configurators



To create customized products matching their individual requirements, customers can set their parameters in the configuration program, which then presents a product tailored to their specifications.

### Calculation programs



With transparent calculations, our customers can determine the size or durability needed for their products and can even keep an eye on energy consumption.

### Circuit diagram software



With the Scheme Editor, our customers can quickly and easily create circuit diagrams that are based on their components and linked their your catalog selection.

### Cross Reference Tool



This tool shows our customers the right alternatives to competitor products from within the Emersons AVENTICS catalog.

### CylinderFinder



This free online tool helps our customers find the right cylinder for their application with just a few clicks.

### Sales Partner Portal



The Sales Partner Portal establishes a direct connection between AVENTICS and our sales partners and speeds up communication. It also contains a great deal of valuable information.

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## Advanced valve technology, advantage for your solution



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