

**AVM321S, 322S: Actuator SAUTER vialoq® AVM 1000 with SAUTER Universal Technology (SUT®)****Improving energy efficiency**

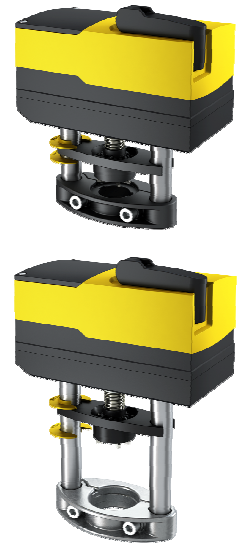
Automatic adaptation to valve, optimal operator convenience, precision control and high energy efficiency with minimal operating noise.

**Areas of use**

In ventilating air conditioning systems<sup>1)</sup> for actuation of 2- and 3-way valves of the series V6R, VUD, VUE, VUG, VUN, VUP, VUS, B6R, BUD, BUE, BUG, BUN, BUS. For controllers with constant output (0...10 V / 4...20 mA) or switching output (2-point or 3-point control)

**Features**

- BLDC motor (brushless DC) with electronic control unit SUT® (SAUTER Universal Technology) of the third generation and electronic load-dependent cut-off
- Automatic recognition of applied control signal (constant or switched), operating display with bi-coloured LED
- Independent adaptation to the stroke of the valve, between 8 and 20 mm
- Very low operating noise
- With the built-in absolute distance measurement system, the position is always maintained in case of power failure
- The direction of operation, characteristic (linear / equal percentage), positioning time and control signal (voltage/current) can be adjusted with coding switches
- Integrated forced operation can be set with coding switches (with selectable direction of operation)
- Easy re-initialisation using a coding switch
- Crank handle for external manual adjustment with motor cut-off
- Simple assembly with valve; spindle is automatically connected after control voltage is applied
- Numerous adaptors enable the unit to be fitted onto non-SAUTER valves
- Electrical parallel operation of 5 actuators
- Parameterisation option available through bus interface

**Technical description**

- Power supply 24 V~ or 24 V=
- Three-piece housing of flame retardant yellow/black plastic and seals with degree of protection IP54
- Maintenance-free gearbox made of plastic; threaded spindle and gearbox base-plates made of steel
- Patented drive-valve coupling
- Mounting column made of aluminium
- Fixing bracket made of cast light alloy for the valve fitting with 20 mm stroke and made of plastic for the valve fitting with 8 mm stroke
- Electrical connections (max. 1.5 mm<sup>2</sup>) with screw terminals
- Two break-out cable inlets for metric screw fittings made of plastic M20×1.5
- Fitting position, vertically upright to horizontal, not hanging
- Nominal thrust 1000 N<sup>2)</sup>

**Products**

Type	Positioning time (s/mm)	Nominal stroke (mm)
AVM321SF132 <sup>2)</sup>	12 (4)	8
AVM322SF132 <sup>2)</sup>	6 (4)	20

1) Applications outside of HVAC applications only after consultation with the manufacturer.

2) CSA-certified actuators on request

## Technical data

### Power supply

Operating voltage	24 V~	±20%, 50...60 Hz
	24 V=	-10%...+20%
with accessory module	230 V~	±15%
Power consumption (at nominal voltage, with movement)		< 1.7 W, < 3.5 VA
For more performance data, see page 6		

### Parameters

Nominal force <sup>1)</sup>	1000 N
Operating noise <sup>2)</sup> (at nominal force)	< 30 dB(A)
Response time	> 200 ms
Media temperature <sup>3)</sup>	0...100 °C
Nominal voltage	24 V~/=
Characteristic Positioner <sup>4)</sup>	Linear / equal percentage
Control signal y	0...10 V, R <sub>i</sub> ≥ 50 kΩ
Control signal y	4...20 mA, R <sub>i</sub> ≤ 50 Ω
Positional feedback signal y <sub>0</sub>	0...10 V, load ≥ 5 kΩ
Starting point U <sub>0</sub>	0 or 10 V
Starting point I <sub>0</sub>	4 or 20 mA
Control span ΔU	10 V
Hysteresis Xsh	160 mV
Control span ΔI	16 mA
Hysteresis Xsh	0.22 mA

### Admissible ambient conditions

Operating temperature	-10...55 °C
Storage and transport temperature	-40...80 °C
Humidity	5...85% rh No condensation

### Installation

Dimensions W x H x D (mm)	AVM321S	160x187x88
	AVM322S	160x241x88
Degree of protection	IP 54 (EN 60529)	
Weight (kg)	AVM321S	1.5
	AVM322S	1.6

### Standards and directives

Protection class	III (EN 60730-1), EN60730-2-14
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### Additional information

Fitting instructions	MV P100011900
Declaration on materials and the environment	MD 51.375
Declaration of incorporation	P100012470
Dimension drawing	M11511
Connection diagram	A10764

1) Actuating power 1000 N under nominal conditions (24 V, 25 °C ambient temperature, 50 Hz).

With boundary conditions (19.2 V~ / 28.8 V~ / 21.6 V= / 28.8 V=, -10 °C / 55 °C, 60 Hz) and positionin g time, the actuating tensile force is minimised to 800 N

2) Noise level with the slowest positioning time, test distance 1m

3) Use the appropriate accessory when the temperature of the medium is > 100 °C (temperature adaptor). Use the appropriate accessory when temperature of the medium is < 0 °C (stuffing box heater)

4) Also for 2- or 3-point, depending on type of connection

## Accessories

Type	Description
0372336 180	Temperature adaptor for media temperature > 100 °C ... 150 °C
0372336 240	Temperature adaptor for media temperature > 130°C ... 200°C
0510220001	Configuration tool for CASE Drives
0500420001*	Splitrangle unit module
0500420002*	4...20 mA feedback module
0500420003*	Constant 230 V module
0510600001	Cable module, 1.2 m, 3-wire, PVC
0510600002	Cable module, 1.2 m, 3-wire, halogen-free
0510600003	Cable module, 1.2 m, 6-wire, PVC
0510600004	Cable module, 1.2 m, 6-wire, halogen-free
0510600005	Cable module, 5 m, 3-wire, PVC
0510600006	Cable module, 5 m, 3-wire, halogen-free
0510600007	Cable module, 5 m, 6-wire, PVC
0510600008	Cable module, 5 m, 6-wire, halogen-free
0510240012	Mounting set V6.. / B6.. up to 20 mm stroke
0510390006	Adaptations for non-Sauter valves by Siemens For Siemens valves with stroke up to 20 mm and spindle diameter of 10 mm
0510390013	Adaptations for non-Sauter valves by Siemens For Siemens valves with stroke up to 20 mm and spindle diameter of 14 mm

\*) Dimension drawing or connection diagram is available under the same number

0510390007	Adaptations for non-Sauter valves by JCI <ul style="list-style-type: none"> <li>• VBD-4xx4 DN 15 ... 40</li> <li>• VBD-4xx8 DN 15 ... 40</li> <li>• VBF-2xx4</li> <li>• VBF2xx8</li> <li>• VBB-2xxx</li> <li>• VG82xx VG84xx</li> <li>• VG88xx VG89xx</li> </ul>
0510390008	Adaptations for non-Sauter valves by Honeywell <ul style="list-style-type: none"> <li>• V5025A DN 15 ... 80</li> <li>• V5049A or B DN 15 ... 65</li> <li>• V5049B DN 15 ... 65</li> <li>• V5050A DN 15 ... 80</li> <li>• V5095A DN 15 ... 80</li> <li>• V5328A DN 15 ... 80</li> <li>• V5329A DN 15 ... 80</li> </ul>
0510390009	Adaptations for non-Sauter valves by LDM <ul style="list-style-type: none"> <li>• RV113 R/M, DN15-80</li> </ul>
0510390010	Adaptations for ITT-Dräger <ul style="list-style-type: none"> <li>PSVF DN 15 ... 32</li> <li>PSVD DN 15 ... 32</li> <li>SVF DN 15 ... 32</li> <li>SVD DN 15 ... 32</li> </ul>
0510390012	Adaptations for non-Sauter valves by Belimo <ul style="list-style-type: none"> <li>• H6..R DN15...65</li> <li>• H7..R DN15...65</li> <li>• H4..B DN15...50</li> <li>• H5..B DN15...50</li> <li>• H6..N DN15...65</li> <li>• H7..N DN15...65</li> </ul>

## Function

Depending on the type of connection (see connection diagram), the actuator can be used as a continuous (0...10 V or 4...20 mA), 2-point (OPEN/CLOSE) or a 3-point actuator (OPEN/STOP/CLOSE).

The positioning time of the actuator can be set with the S1 switches according to the respective requirements. Using switch S2, the direction of operation can be changed.

In the end positions (valve limit stop or when the maximum stroke is reached) or upon overload, the electronic motor cut-off (no limit switch) responds and turns off the motor.

The external crank handle enables manual positional setting. After the crank handle is folded back, the target position is approached again (without initialisation). If the crank handle is unfolded, the actuator remains in this position.

### Connection as 2-point actuator (24 V)

The OPEN/CLOSE activation is via two wires.

The actuator is connected to permanent voltage via the terminal MM and terminal 01.

When voltage (24 V) is applied to terminal 02, the coupling rod extends into the end position.

After switching off the voltage at terminal 02, the actuator automatically retracts into the basic position.

Terminal 03 may not be connected or come into contact with other contacts. We recommend that you insulate them.

### Connection as 3-point actuator (24 V)

If voltage is applied to the terminals MM and 01 (or 02), the valve can be moved to any desired position.

If voltage is applied to terminal MM and 01, the coupling rod retracts.

If the electrical circuit is closed on terminal MM and 02, the coupling rod extends.

If there is no voltage on terminals 01 and 02, the actuator remains in the respective position until voltage is applied.

Terminal 03 may not be connected or come into contact with other contacts. We recommend that you insulate them.

### Connection to a control voltage (0...10 V or 4...20 mA)

The built-in positioner controls the actuator as a function of the controller positioning signal y. A voltage signal (0...10 V) at terminal 03 serves as the control signal. Coding switch S4 can be switched to a current input (4...20 mA).

In case of voltage on the terminals MM/01 and rising positioning signal, the coupling rod extends. The direction of operation can be reversed with coding switch S2.

The starting point and control span are fixed. For setting partial ranges (only for voltage input), a Splitrange unit is available as an accessory (see function Splitrange unit).

After connection of the power supply and initialisation, the actuator goes to between 0% and 100% with each valve stroke, depending on the control signal. Thanks to the electronics and the absolute distance measurement system, no stroke is lost, and the actuator does not require periodic re-initialisation.

If the control signal 0...10 V is interrupted in the direction of operation 1, the spindle retracts completely.

If the control signal 0...10 V is interrupted in the direction of operation 2, the spindle extends completely.

This is true if the forced operation is switched off. (Coding switch S5 OFF)

With coding switch S3, the characteristic of the valve/actuator combination can be adjusted. An equal-percentage characteristic can only be generated when the actuator is used as a continuous actuator.

### Initialisation and feedback signal

The actuator initialises itself automatically when it is connected as a continuous actuator (not in 2-/3-point mode). Once a voltage is applied to the actuator for the first time, the actuator first moves to the first and then to the second valve limit stop or to the internal actuator stop. The two values are recorded and stored by the absolute distance measurement system. The control signal and the feedback are adapted to this effective stroke.

After initialisation, the actuator goes to between 0% and 100% with each valve stroke, depending on the control voltage.

In case of a power failure or the removal of the power supply, no re-initialisation needs to be carried out. The values remain saved.

If the initialisation is interrupted, the initialisation is started again when the voltage is re-applied.

You trigger a re-initialisation by switching the coding switch S8 from OFF to ON or vice versa.

When the process is triggered, the LED blinks green.

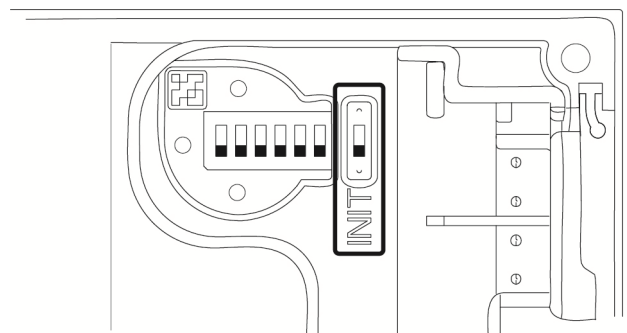
During initialisation, the feedback signal is inactive or equal to the value "0". Initialisation is carried out with the shortest positioning time. The re-initialisation is only valid if the whole process is complete.

If a change of the stroke is carried out, a re-initialisation must be triggered so that the new stroke can be adapted.

If the actuator detects jamming, it will report this by setting the feedback signal to 0 V after about 90 s. During this time, the actuator continues to try to overcome the jamming. If the jamming can be overcome, the normal control function is activated again, and the feedback signal is restored.

With 2-point or 3-point control without a feedback signal, no initialisation is performed.

Continuous activation can also be implemented with a 230 V power supply with the external accessory 0500570003 "230 V module". You must ensure that the neutral conductor of the controller is connected to the control voltage. The neutral conductor of the power supply may only be used for the 230 V module.



**AVM321S, 322S**

**Coding switch**

de Schalterstellung fr Position du commutateur en Switch position it Posizione dell'interruttore es Posición del interruptor sv Brytarläge nl Schakelaarstand	de Stellzeit fr Temps de positionnement en positioning time it tempo di manovra es tiempo de ajuste sv ställtid nl steltijd	de Wirksinn fr Sens d'action en Direction of operation it Direzione dell'azione es Sentido de mando sv Driftriktning nl Werkingsrichting	de Kennlinie Antrieb* fr Courb caractéristique du servomoteur en Actuator characteristic it Curva caratteristica attuatore es Curva característica del motor sv Kurva, drivning nl Karakteristiek aandrijving	de Stellsignal* fr Signal de positionnement en Positioning signal it Segnale di regolazione es Señal de mando sv Styrsignal nl Stuursignaal	de Zwangssteuerung* fr Commande forcée en Forced operation it Comando forzato es desmodrómico sv Tvångsstyrd ventil nl Dwangbesturing	de Schliesspunkt Zwangssteuerung* fr Point de fermeture de la commande forcée en Closing point for forced operation it Comando forzato punto di bloccaggio es Punto de cierre del mando desmodrómico sv Stängningspunkt, tvångsstyrd ventil nl Sluipunt dwangbesturing
	AVM321: 12 s/mm AVM322: 6 s/mm			DC 0...10 V	prio. off	
	AVM321: 4 s/mm AVM322: 4 s/mm					
				4...20 mA		
					prio. on	

**!**  
\*Gilt nur für stetig Modus  
fr \*S'applique uniquement au mode de régulation  
en \*Applies for continuous mode only  
it \*Vali solo per modo „continuo“  
es \*Se aplica solo para modo continuo  
sv \*Gäller endast för kontinuerlig reglering  
nl \*Geldt uitsluitend voor continuu modus

**LED**

LED	Description
Flashes green (T1s)	Valve adapting, initialisation
Flashes green (T3s)	Position reached
Lights up green	Spindle retracts/extends
Flashes orange	Manual adjustment activated
Flashes red	Actuator blocked, actuator at end stop
Lights up red	Incorrect configuration of forced operation, undervoltage, insufficiently adapted stroke

### Forced operation (in continuous mode)

Forced operation is activated with coding switch S5.

To use for this function, a 2 point controller must be attached to terminal 6. The 2 point controller is used as a normally-closed contact.

If the 2 point controller detects the electrical circuit, then the spindle extends into the end position defined in the coding switch S 6. Forced operation can be used only in continuous mode.

### 2p/3p operation making use of the reset signal

If terminal 6 is continuously connected to the power and the coding switch S5 is set to off, the feedback signal 0...10V can be used.

If this function is used, the actuator automatically performs an initialisation during commissioning.

### Splitrange module, accessory 0500420002

The starting point  $U_0$  and the control span  $\Delta U$  can be set with the potentiometer. In this way, several control units can be operated by the control signal in sequence or in cascade. The input signal (partial range) is amplified into an output signal of 0...10V. This accessory cannot be built into the actuator but must be externally housed as add-on module in an electrical junction box, in an add-on module or in a cabinet.

### CASE Drives PC Tool, accessory 0372462001

CASE Drives allows you to set and read the actuator parameters in situ. The connection is via a serial port on the PC (laptop) and a socket contact on the actuator. The set consists of the software including installation and operating manual, fitting instructions, connection plug, cable (1.2 m long) and interface converter for the PC. The application is designed for commissioning and service engineers as well as experienced operators.

### Feedback signal converters, accessory 0500420002

With the accessory feedback signal converter 0500420002, the output signal  $y_0$  is converted from a voltage signal 0...10V into a current signal of 4...20mA.

### Engineering and fitting notes

The concept of a brushless DC motor/electronics ensures electrical parallel operation of up to five actuators of the same type.

The valve is mounted directly on the actuator and fixed with screws (no further adjustments are required). The actuator is connected with the valve spindle automatically.

As delivered ex works, the actuator spindle is in the middle position.

Penetration of the actuator by condensate and dripping water, etc., along the valve spindle must be avoided.

The housing contains two break-out cable inlets for two metric plastic screw fittings M20x1.5, which are broken out automatically when the cable inlet is screwed in.

The cross-section of the power cable must be selected depending on the cable length and the number of actuators. With five parallel actuators and a cable length of 50 m, a cable cross-section of 1.5 mm<sup>2</sup> and a line resistance of > 1.5  $\Omega$  must be used (power consumption of the actuator x 5).

If the line resistance > 1.5  $\Omega$ , the earth should be isolated, where possible, from the feed and the signal.

According to building installation regulations, the lines must be protected from overload or short circuit.

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Note for UL and CSA applications:

In the United States, the installed lines and cross-sections which are to be connected by the customer must comply with the requirements of NFPA70 (NEC), and in Canada they must comply with the requirements of the standard C22.1-12 (CE Code).

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The coding switches and the SLC interface function for Case Drives are accessible via an opening in the connection area of the actuator. Conversion and operation is possible while the actuator is energised.

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Note:

The actuators are not suitable for use

- in potentially explosive environments,
- on ships or vehicles,
- in plants or machinery where functional safety is required.

Specific standards such as IEC/EN 61508, IEC/EN 61511, EN ISO13849 and the like have not been taken into account.

Local requirements regarding installation, application, access, access rights, accident prevention, safety, dismantling and disposal must be taken into account.

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The housing must not be opened.

### Outdoor installation

In case of installation outside of buildings, the devices must also be protected from the weather!

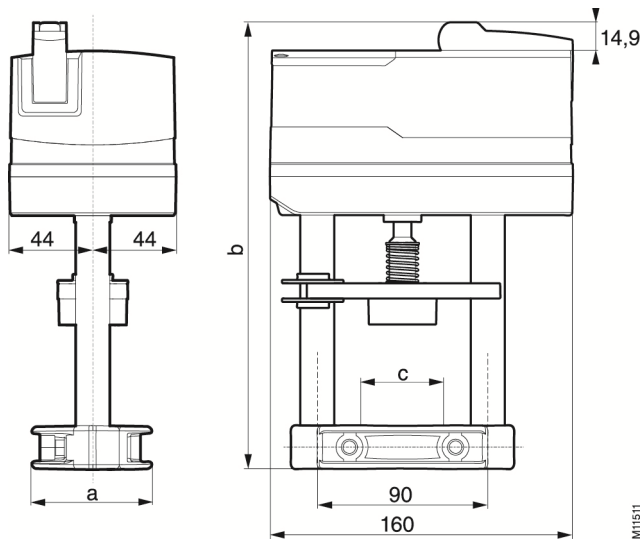
**Power consumption at nominal voltage**

Type	Positioning time (s/mm)	Status	Active power P (W)	Apparent power S (VA)
AVM321S	12 / (4)	Operation	< 1.7	< 3.5
		Standstill	< 0.45	
		Sizing		≥ 4.5
AVM322S	6 / (4)	Operation	< 1.7	< 3.5
		Standstill	< 0.45	
		Sizing		≥ 4.5

**CE conformity**

<b>EMC Directive 2004/108/EC</b>
EN 61000-6-1
EN 61000-6-2
EN 61000-6-3
EN 61000-6-4
<b>Low-voltage Directive 2006/95/EC (AVM32xF110 &amp; F120)</b>
EN 60730-1
EN 60730-2-14
Over-voltage category III
Degree of contamination II
Maximum altitude. 2000 m
<b>Machinery Directive 2006/42/EC in accordance with Annex II B</b>
EN 12100

**Dimension drawing**

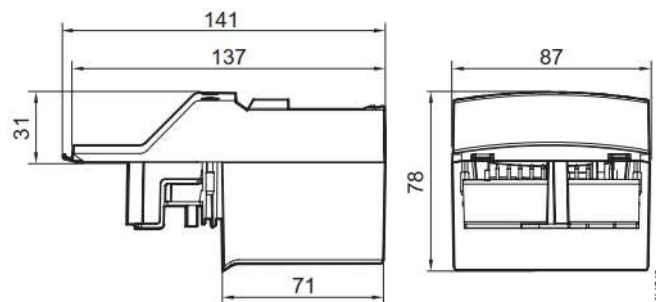


Type	a	b	c
AVM321	53	187,4	33
AVM322	64	241	44

**Accessories**

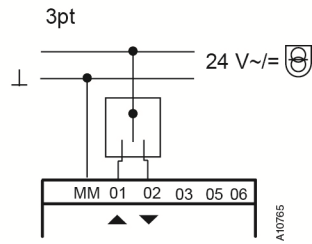
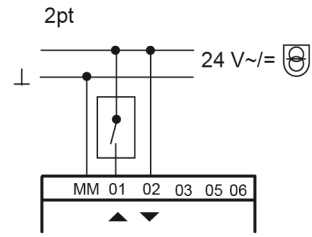
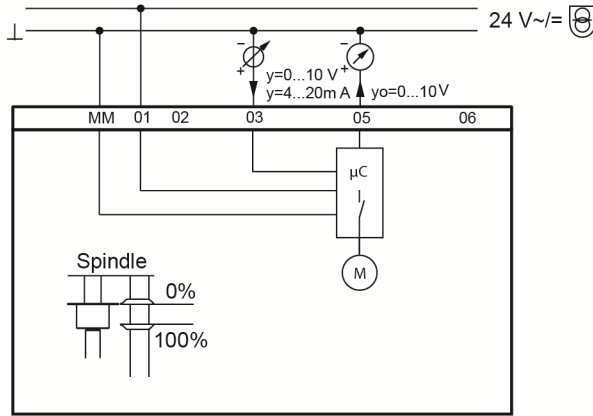
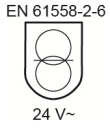
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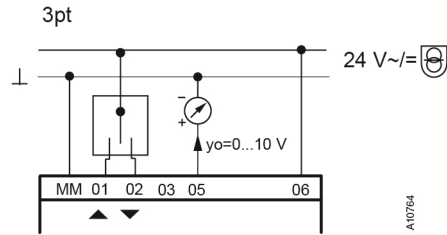
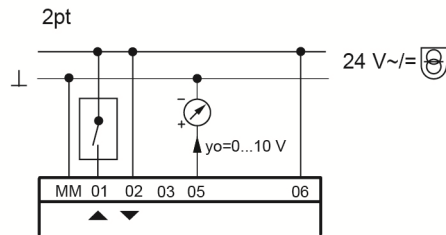


Connection diagram

Modulating action



2pt/3pt Multi-position action with feedback signal



Modulating action with forced operation

