

AVM 321S, 322S: Valve actuator

How energy efficiency is improved

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

Features

- In ventilation air conditioning units¹⁾ For actuating 2-way and 3-way valves of the V6R, VUD, VUE, VUG, VUN, VUP, VUS, B6R, BUD, BUE, BUG, BUN, BUS series
- For controllers with constant output (0...10 V / 4...20 mA) or switching output (2-point or 3-point control)
- BLDC motor (brushless DC) with SUT (SAUTER Universal Technology) electronic control unit of the third generation and electronic load-dependent cut-off
- Automatic recognition of applied control signal (continuous or switched), operating display with bi-colour LED
- Automatic 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 the case of power failure
- The direction of operation, characteristic (linear / equal percentage), positioning time and control signal (voltage / current) can be adjusted via coding switches
- Integrated forced operation can be set via 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 five actuators
- Parameterisation option via the BUS interface
- Three-piece housing made of flame-retardant yellow/black plastic and seals with degree of protection IP54
- Maintenance-free gear unit 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 valve fitting with 20 mm stroke and made of plastic for valve fitting with 8 mm stroke
- Electrical connections (max. 1.5 mm²) with screw terminals
- Two break-out cable inlets for metric cable glands made of plastic M20 × 1.5
- Fitting position vertically upright to horizontal, not suspended
- Nominal thrust 1000 N²⁾



AVM32*SF132

Technical data

Power supply

Power supply 24 V~	±20%, 50...60 Hz
Power supply 24 V=	-10...20 °C
Power supply 230 V~	±15%
Power consumption	< 1.7 W, < 3.5 VA (at nominal voltage, with movement)

Parameters

Nominal force ³⁾	1000 N
Operating noise ⁴⁾	< 30 dB (A) at nominal force
Response time	> 200 ms

¹⁾ To be used outside HVAC applications only after consultation with the manufacturer

²⁾ CSA-certified actuators on request

³⁾ Actuating power 1000 N under nominal conditions (24 V, 25 °C ambient temperature, 50 Hz). Actuating power 1000 N under nominal conditions (24 V, 25 °C ambient temperature, 50 Hz).

⁴⁾ Noise level with the slowest positioning time, measuring distance 1 m

Temperature of medium ⁵⁾	0...100 °C
Nominal voltage	24 V~/=
Characteristic	Linear/equal percentage
Control signal y ⁶⁾	0...10 V, R _i ≥ 50 kΩ 4...20 mA, R _i ≤ 50 Ω
Positional feedback y ₀	0...10 V, load ≥ 5kΩ
Starting point U ₀	0 or 10 V
Starting point I ₀	4 or 20 mA
Control span ΔU	10 V
Control span ΔI	16 mA
Hysteresis X _{sh}	160 mV 0.22 mA

Ambient conditions

Operating temperature	-10...55 °C
Storage and transport temperature	-40...80 °C
Humidity without condensation	5...85 % rh

Standards and directives

	Type of protection	IP 54 (EN 60529)
	Protection class	III (EN 60730-1), EN 60730-2-14
CE conformity according to	EMC directive 2004/108/EC	EN 610000-6-1, EN 610000-6-, EN 610000-6-3, EN 610000-6-4
	Low-voltage directive 2006/95/EC	EN 60730-1, EN 60730-2-14 (AVM32*F110 and F120)
	Over-voltage categories	III
	Degree of contamination	II
	Max. altitude	2000 m
	Machine directive 2006/42/EC (according to appendix IIB)	EN 12100

Overview of types

Type	Nominal voltage	Positioning time (s/mm)	Nominal stroke	Dimensions W x H x D	Weight
AVM321SF132	24 V~/=	12 (4)	8 mm	160 × 187 × 88	1.5
AVM322SF132	24 V~/=	6 (4)	20 mm	160 × 241 × 88	1.6

Accessories

Type	Description
0372336180	Temperature adaptor for media temperature > 100...150 °C
0372336240	Temperature adaptor for media temperature > 130...200 °C
0510220001	CASE Drives configuration tool
0500420001	Split-range unit module
0500420002	4...20 mA feedback 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 (Siemens) with stroke up to 20 mm and spindle diameter of 10 mm
0510390007	Adaptations for non-SAUTER valves, JCI: VBD-4xx4 DN 15...40, VBD-4xx8 DN 15...40, VBF-2xx4, VBF2xx8, VBB-2xxx, VG82xx VG84xx, VG88xx VG89xx

⁵⁾ At media temperature > 100 °C, appropriate accessory must be used (temperature adaptor). At media temperature < 0 °C, appropriate accessory must be used (stuffing box heater).

⁶⁾ Positioner: also for 2- or 3-point, depending on type of connection

Type	Description
0510390008	Adaptations for non-SAUTER valves, Honeywell: V5025A DN 15...80, V5049A oder B DN 15...65, V5050A DN 15...80, V5095A DN 15...80, V5328A DN 15...80, V5329A DN 15...80
0510390009	Adaptations for non-SAUTER valves, LDM: RV113 R/M, DN15-80
0510390010	Adaptations for ITT, Dräger: PSVF DN 15...32, PSVD DN 15...32, SVF DN 15...32, SVD DN 15...32
0510390012	Adaptation for non-SAUTER valves, Belimo: H6..R DN15...65, H7..R DN 15...65, H4..R DN 15...50, H5..B DN 15...50, H6..N DN 15...65, H7..N DN 15...65
0500570003	Constant 230 V module

Description of operation

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). When the crank handle is folded out, the actuator remains in this position.

Intended use

This product is only suitable for the purpose intended by the manufacturer, as described in the "Description of operation" section.

All related product documents must also be adhered to. Changing or converting the product is not admissible.

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.

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Condensate, dripping water, etc. must be prevented from entering the actuator along the valve spindle.

The housing contains two break-out cable inlets for two metric plastic cable glands M20×1.5, which are broken out automatically when the cable inlet is screwed in.

If the cable resistance > 1.5 Ω, the ground should be separated from the power supply and the signal if possible.

The cross-section of the power cable must be selected based 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 mm² and a line resistance of > 1.5 Ω must be used (power consumption of the actuator × 5).

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



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).

The coding switches and the SLC interface 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.



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, usage, access, access rights, accident prevention, safety, dismantling and disposal must be taken into account.

The housing must not be opened.

Outdoor installation

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

Additional information

Fitting instructions	P100011900
Declaration on materials and the environment	MD 51.375
Declaration of incorporation	P100012470

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

Connection as 2-point valve 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 actuator spindle extends into the end position.

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

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

Connection as 3-point valve 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 terminals MM and 01, the actuator spindle retracts.

If the electrical circuit is closed on terminal MM and 02, the actuator spindle 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 these.

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

The built-in positioner controls the actuator depending on controller's output signal y . A voltage signal (0...10 V) at terminal 03 serves as the control signal. Coding switch S4 can be used to switch to a current input (4...20 mA). If there is voltage on terminals MM/01 and a rising positioning signal, the actuator spindle 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 split-range unit is available as an accessory (see function split-range unit).

After the connection of the power supply and the initialisation, the actuator moves to every valve stroke between 0% and 100%, 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 actuator spindle retracts completely.

If the control signal 0...10 V is interrupted in the direction of operation 2, the actuator 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).

When 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 flashes green.

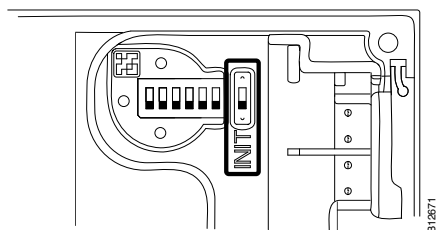
During initialisation, the feedback signal is inactive or equal to the value "0". The initialisation is carried out with the shortest positioning time. The re-initialisation is only valid when the whole process is complete.

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

If the valve actuator detects jamming, it reports this by setting the feedback signal to 0 V after approx. 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 control can also be implemented with a 230 V power supply with the external accessory 0500570003 "230 V module". You must ensure that the neutral wire 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.



Forced operation (in continuous mode)

Forced operation is activated via coding switch S5.

To use this function, an external on/off controller must be attached to terminal 6. The on/off controller functions as normally-closed contacts.

If the on/off controller opens the electrical circuit, the actuator spindle extends to the end position defined by coding switch S 6.

Forced operation can be used only in continuous mode.

2-/3-point operation using the reset signal

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

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

Split-range module, accessory 0500420002

Starting point U_0 and control span U can be set with the potentiometer. In this way, several control units can be operated in sequence or cascade by the control signal of the controller. 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 on site. The connection is via a serial port on the PC (laptop) and a socket 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 feedback signal converter accessory 0500420002, the output signal y_0 is converted from a voltage signal 0...10 V into a current signal 4...20mA.

Coding switch

de Schalterstellung fr Position du commutateur en Switch position it Posizione dell'interruttore es Posición del interruptor sv Byråställe nl Schakelaarstand	de Stelzeit fr Temps de positionnement en positioning time it tempo di manovra es tiempo de ajuste sv ställtid nl stelling	de Wirkpunkt fr Sens d'action en Direction of operation it Direzione dell'azione es Sentido de mando sv Driftriktning nl Werkingrichting	de Kennlinie Antrieb* fr Courbe 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 Mando 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	

LED

LED	Description
Flashes green (T1s)	Valve adapting, initialisation
Flashes green (T3s)	Position reached
Lights up green	Actuator spindle moves IN/OUT
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

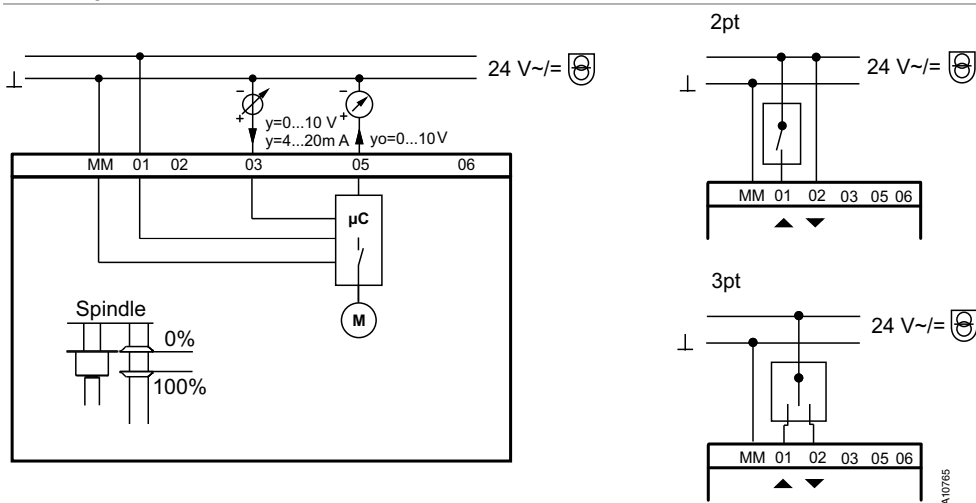
Disposal

When disposing of the product, observe the currently applicable local laws.

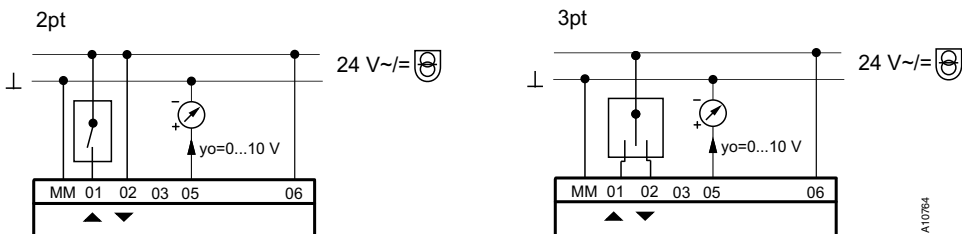
More information on materials can be found in the Declaration on materials and the environment for this product.

Connection diagram

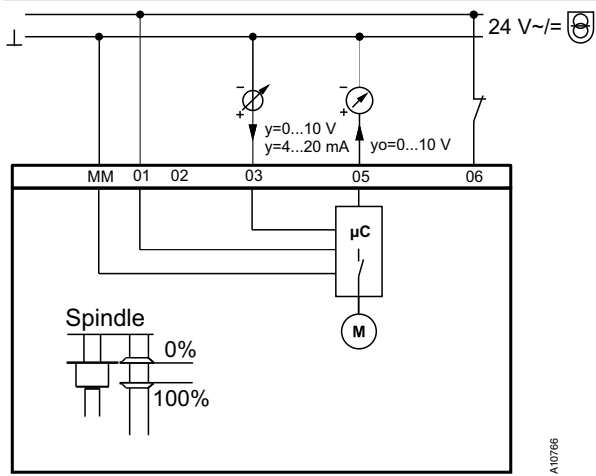
Modulating action



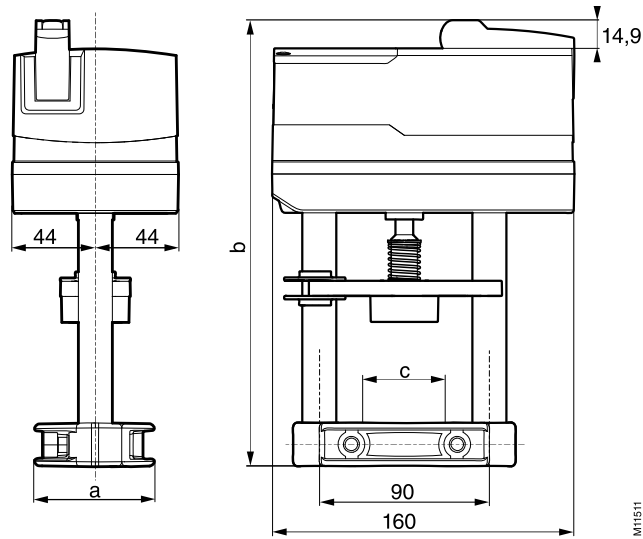
2pt/3pt multi-position action with feedback signal



Modulating action with forced operation



Dimension drawing



Type	a	b	c
AVM 321	53	187.4	33
AVM 322	64	241	44

Accessories

0500420001, 0500420002, 0500420003

