

AVM 234S: Valve actuator with SUT positioner

How energy efficiency is improved

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

Areas of application

For use with through or three-way valves in the V/BUD and V/BUE DN65...150 series, and V/BUG, V/BUS, VUP and V/B6R DN15...150. For controllers with continuous output (0...10 V or 4...20 mA) or switching output (2-point or 3-point control).

Features

- Pushing force of at least 2500 N
- Stepping motor with SUT (Sauter Universal Technology) electronic control unit and electronic load-dependent cut-off
- Automatic detection of control signal applied (continuous or switching), indicated by two LEDs
- The type of characteristic (linear, quadratic or equal-percentage) can be set on the actuator
- Automatically adapts to valve stroke between 8 and 49 mm; captive even in the event of a power failure
- Direction of travel can be selected via screw terminals when making electrical connection or remotely
- Coding switches for selecting the characteristic and the running time (2, 4 or 6 s/mm)
- Lever for external manual adjustment, with motor cut-off, and for triggering a re-initialisation
- Easy assembly with valve; spindle is connected automatically when control voltage is applied
- The availability of numerous adaptors enables the actuator to be fitted to third-party valves

Technical description

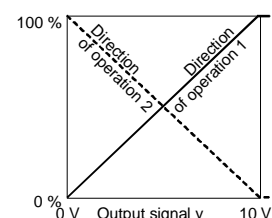
- Power supply 230 V with modules or direct connection for 24 V~ or 24 V=; continuous activation also permissible at 230 V
- Two-part housing made of fire-retardant yellow plastic and seals to IP66
- Maintenance-free gearbox of sintered steel, gearbox plate of steel
- Patented actuator–valve coupling
- Mounting column made of stainless steel; mounting bracket (for fitting the valve) of cast light alloy
- Electrical connections (max. 2.5 mm²) with screw terminals
- Three pre-scored cable inlets for M20×1.5 (2×) and M16×1.5
- Installation position: vertically upright to horizontal, but not upside down



T10427



Y07552



B07650

Type	Run time s/mm	Stroke mm	Pushing force N	Power supply ¹⁾	Weight kg
Valve actuator for valves: VUD / BUD, VUE / BUE, VUG / BUG, VUS / BUS and VUP					
AVM 234S F132	2 / 4 / 6	14...40	2500	24 V~/=	4.1
matching with assembly for valve series: V6R / B6R					
AVM 234S F132-5	2 / 4 / 6	14	2500	24 V~/=	4.1
AVM 234S F132-5	2 / 4 / 6	40	2500	24 V~/=	4.6
Positioner: ¹⁾					
Control signal 1	0...10 V, R _i > 100 kΩ		Starting point U ₀	0 or 10 V	
Control signal 2	4...20 mA, R _i = 50 Ω		Control span ΔU	10 V	
Position feedback signal	0...10 V, load > 2.5 kΩ		Switching range X _{sh}	300 mV	
Power supply	24 V~	± 20%, 50...60 Hz	Degree of protection	IP 66 (EN 60529)	
	24 V=	± 15%	Protection class	III (IEC 60730)	
with accessories	230 V~	± 15%	Response time for 3-point	200 ms	
Power consumption	10 W	18 VA ²⁾	Wiring diagram	A10357	
Stroke	8...49 mm		Dimension drawing	M10356	
Max. temperature of medium	130 °C ³⁾		Fitting instructions	MV 505919	
Permitted ambient temperature	-10...55 °C		Material declaration	MD 51.377	
Permitted ambient humidity	< 95% rh without condensation				

1) Also for 2-point or 3-point depending on the connection for 24 V~

2) Design the transformers for this value, otherwise functional faults may occur.

3) If the temperature of the medium is higher (180 °C or 240 °C), an adaptor is required (see accessories)

Accessories

- 0313529 001*** Split-range unit to set sequences, MV 505671; A09421
- Module, plug-in type**, for 2-/3-point and continuous activation, additional power 2 VA
- 0372332 001*** 230 V \pm 15% power supply, MV 505901
- 0372332 002*** 100 V to 110 V \pm 10% power supply, MV 505901
- Auxiliary change-over contacts** (2 pcs. each) 12...250 V~
- 0372333 001*** Infinitely variable, min. 100 mA and 12 V, additional load 6(2) A, MV 505866
- 0372333 002*** Gold-plated contacts, from 1 mA and up to 30 V; further range 3(1) A; MV 505866
- 0372334 001*** Potentiometer 2000 Ω , 1 W, 24 V; installation as per MV 505894
- 0372334 002*** Potentiometer 130 Ω ¹⁾, 1 W, 24 V; installation as per MV 505894
- 0372334 006*** Potentiometer 1000 Ω , 1 W, 24 V; installation as per MV 505894
- 0372336 180*** Adaptor ²⁾ (required for medium between 130 °C and 180 °C, MV 505902)
- 0372336 240*** Adaptor ²⁾ (required for medium between 180 °C and 240 °C, M V 505902)
- Fitting kit** for AVM 234S F132 on Sauter valves (for 0372338 002, no adaptor required)
- 0372338 001** V/B6 up to DN 50 and V/BXD, V/BXE up to DN 50 with stroke 14 mm. MV 505903
- 0372338 002** V/B6 of DN 65...150 and V/BXD, V/BXE from DN 65 with stroke 40 mm. MV 505903
- 0372338 003** Conversion kit for AVM 234S F132-5 on standard actuator AVM 234S F132, MV 505903
- 0372338 004** Conversion kit for AVM 234S F132-6 on standard actuator AVM 234S F132, MV 505903
- Set of adaptors** for non-Sauter valves
- 0372376 010** Siemens with 20 mm stroke or spindle \varnothing 10 mm, MV 505974
- 0372376 014** Siemens with 40 mm stroke or spindle \varnothing 14 mm, MV 505974
- 0372377 001** JCI DN15...150 with 14, 25 or 40 mm stroke or spindle \varnothing 10, 12 or 14 mm, MV 505975
- 0372378 001** Honeywell with 20 mm stroke, MV 506069
- 0372378 002** Honeywell with 38 mm stroke, MV 506069
- 0372386 001** LDM Typ RY113 R/M, MV P100000538
- 0372387 001** Fitting kit SAUTER-Satchwell VZF1727
- 0372389 001** ITT-Dräger, DN 15...32, MV P100000376
- 0372389 002** ITT-Dräger, DN 40...50, MV P100000376
- 0378263 001** End stop guide (required for V/BXD, V/BXE DN15...50, V/B6 DN15 with $kvs \leq 1 \text{ m}^3/\text{h}$)
- 0386263 001** Screwed cable fitting, M16x1,5
- 0386263 002** Screwed cable fitting, M20x1,5

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

1) This potentiometer may only be used as a voltage divider.

2) Adaptor not required for the F132-6 version

Operation

Depending on the type of connection (see the wiring diagram), the actuator may be used as a continuous (0...10 V and/or 4...20 mA), 2-point (OPEN/CLOSED) or 3-point (OPEN/STOP/CLOSED) device with an intermediate position.

The actuator's running time can be set according to the specific requirements, using switches S1 and S2. Switches S3 and S4 are used to set the characteristic (equal percentage, linear or quadratic).

The external lever allows you to adjust the position manually. When the lever is folded out, the motor cuts out. When the lever is folded back into place, the setpoint position is adopted again (without initialisation). If the lever is folded out again, the actuator stays in this position.

Initialisation and feedback signal

When used as a continuous actuator, the device initialises itself automatically. As soon as power is applied to the actuator for the first time, it moves to the valve's lower limit, thus enabling automatic connection with the valve spindle. Then it moves to the upper limit and the value is recorded and saved by a travel measurement system. The control signal and the feedback signal are adjusted to this actual stroke. There is no re-initialisation in the event of a power failure. The values are saved.

To re-initialise, the actuator must be connected to the power supply and there must be a continuous input signal at 3u or 3i. To trigger an initialisation, fold the lever out and back in again twice within 4 s. Both of the LEDs will then flash red.

During initialisation, the feedback signal is inactive, or it corresponds to a value of 0. Initialisation uses the shortest running time. The re-initialisation is not valid until the entire procedure has been completed. Folding the lever out again will interrupt the procedure.

If the valve actuator detects a blockage, it will report this by setting the feedback signal to 0 V after approx. 90 s. However, the actuator will try to overcome the blockage during this time. If the blockage can be rectified, the normal control function is activated again and the feedback signal is restored.

No initialisation is performed with 2-point or 3-point control. The feedback signal is inactive.

Connected as a 2-point valve actuator (24 V)

This type of activation (OPEN/CLOSED) can be achieved by two wires. Power is applied to terminals 1 and 2a. By applying power (24 V) at terminal 2b, the shaft extends. When the power is switched off, the actuator moves to the opposite end position. The motor's electronic cut-out responds in the end positions (valve limit, or when maximum stroke is reached) or in the event of an overload (no limit switches).

The coding switch can be used to set the run times. The characteristic cannot be selected in this case (resulting in the characteristic for the valve). Terminals 3i, 3u and 44 must not be connected.

Connected as a 3-point valve actuator (24 V)

Applying power at terminal 2a (or 2b) makes it possible to move the valve to any desired position. If power is applied at terminals 1 and 2b, the shaft extends. It retracts if power is applied at terminals 1 and 2a.

In the end positions (at the valve stop, or when the maximum stroke is reached), or in the event of an overload, the motor's electronic cut-out is activated (no limit switches). The direction of the stroke can be changed by transposing the connections.

The coding switch is used to set the running times. In this case, the characteristic cannot be selected (resulting in the characteristic for the valve). Terminals 3i, 3u and 44 must not be connected.

Connected (with 230 V) as a 2-/3-point or with continuous control (accessory 0372332)

The accessory module is slotted into place in the terminal compartment and then connected accordingly. The coding switch on the board is used to select the running times. The characteristic can be selected only in the case of continuous activation; the characteristic for the valve is applicable. On this actuator (which has no spring return action), the switching lever is in the lower position.

Connected to a control voltage (0...10 V and/or 4...20 mA)

The in-built positioner controls the actuator in accordance with the controller output signal y .

The control signal used is a voltage signal (0...10 V-) at terminal 3u, or a current signal at terminal 3i. If a control signal is present at both terminals (3u (0...10 V) and 3i (4...20 mA)) simultaneously, the input with the higher value takes priority.

Mode of action 1 (mains voltage to internal connection 2a): as the output signal increases, the shaft extends.

Mode of action 2 (mains voltage to internal connection 2b): as the output signal increases, the shaft retracts.

The starting point and the control span are fixed. To set partial ranges, a split-range unit (for voltage input 3 u only) is available as an accessory (see the description below); this unit can be fitted in the actuator.

When the power supply is applied and initialisation has been carried out, the actuator moves to every valve stroke between 0% and 100%, depending on the control signal. The electronics and the travel measurement system ensure that no stroke is lost, and the actuator does not require re-initialisation at intervals. When the end positions are reached, the position is checked, adjusted as necessary and stored again. This ensures parallel running of several drives of the same SUT type. Feedback signal $y_0 = 0...10$ V corresponds to the effective valve stroke of 0 to 100%.

If the 0...10 V control signal is interrupted in direction of action 1, the spindle retracts completely. So that the shaft can extend (direction of action 1), a voltage of 10 V must be applied at terminals 1 and 3u, or it is necessary to switch over to direction of action 2.

The coding switch can be used to set the characteristic for the valve. Equal-percentage and square characteristics can be produced only if the actuator is used as a continuous actuator. Further switches can be used to select the running times (can be used for 2-point, 3-point or continuous functions).

Continuous activation can also be used with 230 V or 110 V. Note that the controller's neutral conductor should be connected to the control voltage. The neutral conductor of the power supply should be used only for the module.

LED indicators (dual-colour, red and green)

Both LEDs flashing red:	initialisation procedure
Upper LED lit red:	upper limit or "CLOSED" position reached
Lower LED lit red:	lower limit or "OPEN" position reached
Upper LED flashing green:	actuator running, moving towards "CLOSED" position
Upper LED lit green:	actuator stationary, last direction of running "CLOSED"
Lower LED flashing green:	actuator running, moving towards "OPEN" position
Lower LED lit green:	actuator stationary, last direction of running "OPEN"
No LED lit:	no power supply (terminal 2a or 2b)
Both LEDs flashing red and green:	actuator is in manual mode

Split-range unit (accessory 0313529)

This accessory can be fitted either in the actuator itself or externally in an electrical distribution box. The starting point U_0 and the control span ΔU can be set with the help of a potentiometer. This makes it possible to operate several regulating units in sequence or in a cascade with the control signal from the controller. The input signal (partial range) is converted into an output signal of 0...10 V.

Engineering and installation notes

The ingress of condensate or water droplets etc. along the valve spindle and into the actuator should be prevented.

The valve is slotted straight onto the actuator and fixed with screws (no further action is required). The actuator is automatically connected to the valve spindle. The actuator spindle is supplied ex works in the middle position.

The housing has three pre-scored cable inlets which are broken open automatically when the cable inlet grommet is screwed in.

The combination of stepping motor and electronics unit enables several actuators of the same type to be run in parallel. The cross-section of the power cable's wires should be selected according to the cable length and the number of drives. With five drives connected in parallel and a cable length of 50 m, we recommend a cross-section of 1.5 mm² (power consumption of the actuator × 5).

The actuator can be fitted with a maximum of one 230 V module, one additional accessory (auxiliary contacts or potentiometer) and the split-range unit.

Fitting outdoors. If the devices are fitted outdoors, additional measures must be taken in order to protect them from the weather.

Additional technical information

The yellow housing (consisting of the front and back sections and the connecting lid) serves merely as a cover. The DC motor, the electronics control unit, the load-bearing parts and the maintenance-free gear unit are accommodated in the housing. The actuator shaft and column are made of rust-proof materials. The interior plates and the gear unit are made of steel. The valve spindle guide and the valve collar coupling are made of die-cast aluminium.

Note on ambient temperatures: if the temperature of the medium in the valve is up to 110 °C, the ambient temperature may be up to 60 °C. If the temperature of the medium is above 110 °C, the ambient temperature must not exceed 55 °C; alternatively use accessory 0372336 180 (adaptor).

Auxiliary change-over contacts

- 0372333 001** Switching capacity max. 250 V~, min. current 250 mA at 12 V (or 20 mA at 20 V)
Switching capacity max. 12...30 V=, max. current 100 mA
- 0372333 002** Switching capacity max. 250 V~, min. current 1 mA at 5 V
Switching capacity max. 0.1...30 V=, current 1...100 mA
Even if used only once above 10 mA or up to 50 V, the gold coating will be destroyed. The switch can then be used only for higher switching outputs.

Warnings

- If the temperature of the medium in the valve is high, the actuator columns and the shaft may also reach high temperatures.
- Additional protective precautions must be taken if a failure of the final control element would cause serious damage.

CE conformity

EMC Directive 2004/108/EC
EN 61000-6-2 *)
EN 61000-6-4

Low-Voltage Directive 2006/95/EC
EN 60730-1
EN 60730-2-14
Over-voltage category III
Degree of pollution III

*) HF immunity restriction. Feedback signal between 80 MHz and 1000 MHz: criteria B, otherwise criteria A

Desired character. curve	Switch coding	Characteristic curve for valve	Characteristic curve for drive	Effective on valve
Equal percentage				
Quadratic				
Linear				
Equal percentage				
Linear				

= factory setting

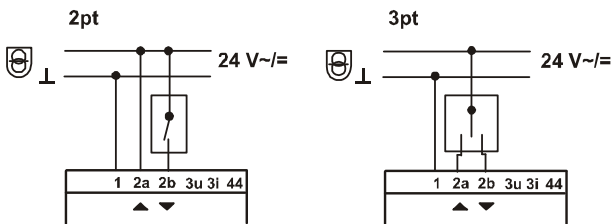
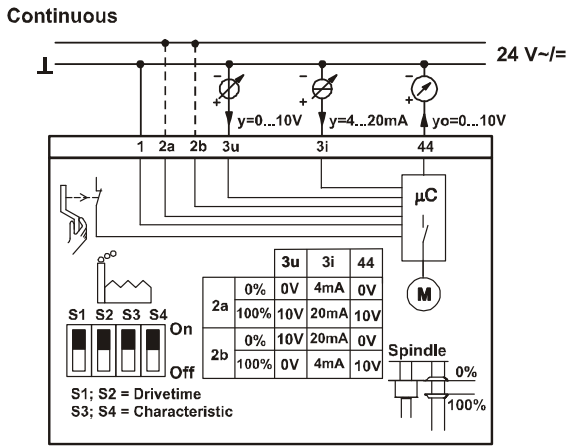
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Run time per mm	Switch coding	Run time for 14 mm stroke	Run time for 20 mm stroke	Run time for 40 mm stroke
2s		28s ± 1	40s ± 1	80s ± 2
4s		56s ± 2	80s ± 2	160s ± 4
6s	 	84s ± 4	120s ± 4	240s ± 8

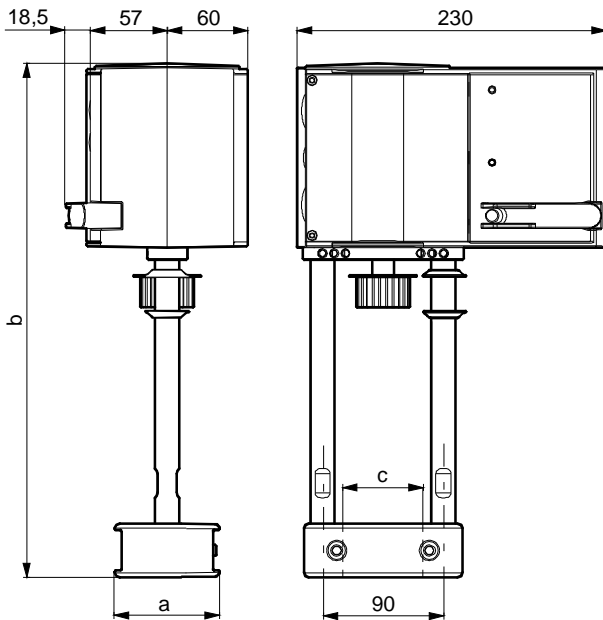
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Wiring diagram



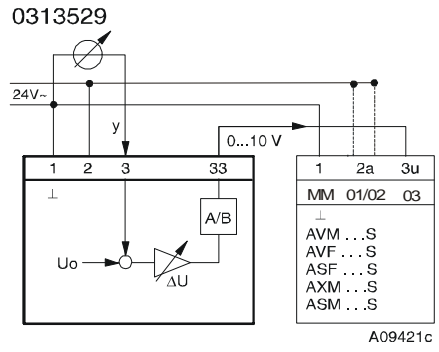
Dimension drawing



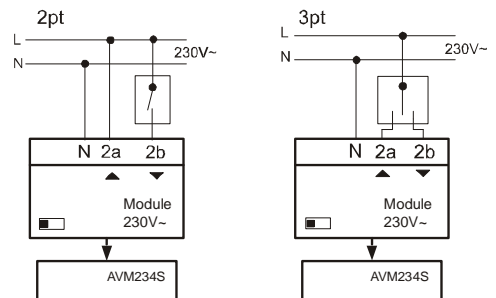
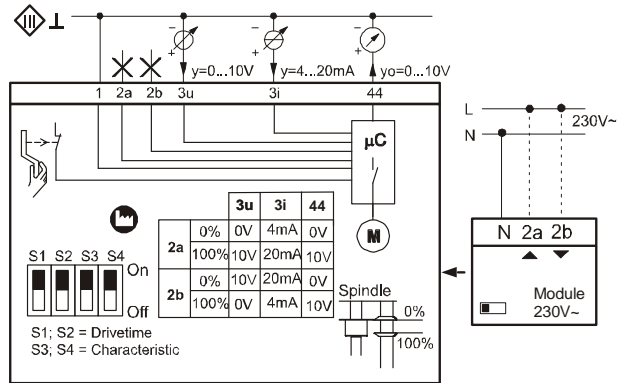
Type	a	b	c
AVM 234S F132	64	289	44
AVM 234S F132-5	58	289	38
AVM 234S F132-6	78	382	60

M10356a

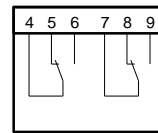
Accessories



0372332001

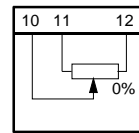


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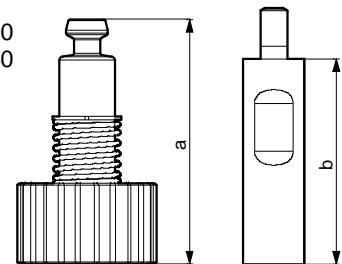
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372334



A01363

0372336 180
0372336 240



0372336	T (°C)	a (mm)	b (mm)
180	180	69,4	60
240	240	109,4	100

M10217