

AVM 234S: Valve drive 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

Actuation of through or three-way valves in the V/BUD and V/BUE DN65 - 150 series, as well as 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 minimum 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), display via 2 LEDs
- The type of characteristic curve (linear, quadratic or equal percentage) can be adjusted in the drive
- Independent adaptation to valve stroke between 8 and 49 mm, captive even if the power is turned off
- Direction of travel can be selected via screw terminals when making electrical connection or remotely
- Coding switch for selection of characteristic and running time (35, 60 or 120 sec.)
- Hand crank for external manual adjustment with motor cut-off and as trip for re-initialisation
- Easy assembly with valve, spindle connection takes place automatically after application of control voltage
- Many adaptors allow assembly on third-party valves

Technical description

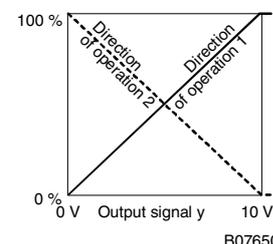
- Power supply 230 V with modules or direct connection for 24 V~ or 24 V=, continuous activation also permissible at 230 V
- Two-part housing made of self-extinguishing yellow plastic and sealing to IP66 protection class
- Maintenance-free gearbox in sintered steel, gearbox base-plate in steel
- Patented drive-valve coupling
- Mounting column made of stainless steel and mounting bracket for fitting valve made of cast light alloy
- Electrical connections (max. 2.5 mm²) with screw terminals
- Three knock-out cable entries for M20 x 1.5 (2x) and M16 x 1.5
- Installation position: vertical to horizontal, but not upside down



T10427



Y07552



B07650

Type	Run time s/mm	Stroke mm	Thrust N	Voltage ¹⁾	Weight kg
Valve drive for valves: VUD / BUD, VUE / BUE, VUG / BUG, VUS / BUS and VUP					
AVM 234S F132	2 / 4 / 6	0...40	2500	24 V~/=	4,1
matching with assembly for valve series: V / B6 and VXD, BXD, BXE					
AVM 234S F132-5	2 / 4 / 6	14	2500	24 V~/=	4,1
AVM 234S F132-6	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		
Voltage supply	24 V~ ± 20%, 50...60 Hz 24 V= ± 15% with accessories 230 V~ ± 15%	Level of protection	IP 66 to EN 60529		
		Protection class	III to IEC 60730		
Power consumption	10 W 18 VA ²⁾	Response time for 3-point	200 ms		
Stroke	8...49 mm	Connection diagram	A10357		
Max. temperature of medium	130 °C ³⁾	Dimensional drawing	M10356		
Permitted ambient temperature	-10...55(60) °C	Installation instructions	MV 505919		
Permitted ambient humidity	< 95 %rh without condensation	Declaration on materials	MD 51.377		

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) An intermediate piece is required for higher medium temperatures, 180 °C or 240 °C (see Accessories)

Accessories

- 0313529 001*** Split range unit to set sequences, MV 505671; A09421
Module, plug-in type, 3-point activation, additional power 2 VA
0372332 001* 230 V ± 15% voltage supply, MV 505901
0372332 002* 100 V ± 15% voltage supply, MV 505901
Auxiliary changeover switches (2 pcs. each) 12...250 V~
0372333 001* Continuously adjustable, 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 W, 24 V; installation as per MV 505894
0372334 006* Potentiometer 1000 Ω, 1 W, 24 V; installation as per MV 505894
0372336 180* Intermediate piece ¹⁾ (required for medium above 130 °C and up to 180 °C, MV 505902)
0372336 240* Intermediate piece ¹⁾ (required for medium above 180 °C and up to 240 °C, MV 505902)
Installation kit for AVM 234S F132 on Sauter valves (for 0372338 002, no intermediate piece 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 drive AVM 234S F132, MV 505903
0372338 004 Conversion kit for AVM 234S F132-6 on standard drive AVM 234S F132, MV 505903
Set of adaptors for non-Sauter valves
0372376 010 Siemens with 20 mm stroke or spindle ø10 mm, MV 505974
0372376 014 Siemens with 40 mm stroke or spindle ø14 mm, MV 505974
0372377 001 JCI DN15...150 with 14, 25 or 40 mm stroke or spindle ø10, 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
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 ≤ 1 m³/h)
0386263 001 Screwed cable fitting, M16 ×1,5
0386263 002 Screwed cable fitting, M20 ×1,5

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

1) Intermediate piece not required for the F132-6 version

Operation

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

The run time of the drive can be set according to the specific requirements, using switches S1 and S2. Switches S3 and S4 are used to configure the characteristic curve (equal percentage, linear or quadratic).

The external hand crank allows you to adjust the position manually. When the hand crank is folded out, the motor is switched off. After the hand crank is folded back, the setpoint position is adopted again (without initialisation). If the hand crank is unfolded, the drive stays in this position.

Initialisation and feedback signal

When used as a continuous drive, the device initialises itself automatically. As soon as voltage is applied to the drive for the first time, it moves to the lower limit stop on the valve, thus enabling automatic connection with the valve spindle. Then it moves to the upper limit stop and the value is recorded and saved with the help of a path measurement system. The control signal and the feedback signal are adjusted to this effective stroke. There is no re-initialisation if the voltage is interrupted or if the voltage supply is removed. The values remain saved.

To re-initialise, the drive must be connected to the voltage. To trigger an initialisation, fold the hand crank out and back in again twice within 4 seconds. Both 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 run time. The re-initialisation is only valid once the entire procedure has been completed. Folding the hand crank out again will interrupt the procedure.

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

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

Connection as a 2-point valve drive (24 V)

This activation (OPEN/CLOSED) can take place via two cables. The voltage is applied to terminals 1 and 2a. Applying the voltage (24 V) to terminal 2b opens the valve's control passage. After this voltage has been switched off, the drive moves to the opposite end position and closes the valve. The electronic motor switch-off responds in the end positions (valve limit stop, or when maximum stroke is reached) or in case of overload (no limit switches).

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

Connection as a 3-point valve drive (24 V)

Applying voltage to terminal 2a (or 2b) makes it possible to move the valve to any desired position. If voltage is applied to terminals 1 and 2b, the valve shaft moves out and opens the valve. It moves in and closes the valve when the electrical circuit is closed over terminals 1 and 2a.

In the end positions (at the valve stop, or when the maximum stroke is reached) or in case of an overload, the electronic motor switch-off responds (no limit switches). The direction of the stroke can be changed by transposing the connections.

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

Connection as a 3-point valve drive with 230 V (accessory 0372332)

The accessory module is plugged on in the connection area and is then connected for 3-point mode. If this accessory is used, only control in 3-point mode is available. The coding switch on the baseboard can be used to select the run times. The characteristic curve cannot be selected; the characteristic curve for the valve is applicable.

The module has a built-in switch which is automatically moved into the correct position when the module is installed. On this drive (which has no spring return action) the switching lever is in the lower position.

The accessory module is not suitable for 2-point activation.

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

The built-in positioner controls the drive depending on 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 valve shaft moves out and opens the valve (control passage).

Mode of action 2 (mains voltage to internal connection 2b):

as the output signal increases, the valve shaft moves in and closes the valve (control passage).

The starting point and the control span are fixed. To set partial ranges (and only for voltage input 3u), a split range unit is available as an accessory (see the split range unit function); this unit is intended for installation in the drive.

After the voltage supply is applied and after initialisation, the drive moves to each valve stroke between 0% and 100%, depending on the control signal. The electronics and the path measurement system ensure that no stroke is lost, and the drive does not require re-initialisation at intervals. When the end positions are reached, the position is checked, corrected as necessary and stored again. This ensures parallel running of several drives of the same SUT type. Feedback signal $y_0 = 0...10\text{ V}$ 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 and the valve is closed. So that the valve can be opened (direction of action 1), a voltage of 10 V must be connected between 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 only be produced if the device is used as a continuous-action drive. Further switches can be used to select the run-times (can be used for the 2-point, 3-point or continuous functions).

LED display

The display consists of two dual-colour LEDs (red / green).

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

Split range unit (accessory 0313529)

This accessory can be built into the drive or can be accommodated 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

Penetration of condensate or dripping water, etc. along the valve spindle into the drive should be avoided.

The valve is plugged directly onto the drive and is fixed with screws (no further settings are needed). The drive is automatically connected to the valve spindle. When the device is delivered, the drive spindle is in the middle position.

The housing contains three breakthrough-type cable leadthroughs which are broken open automatically when the cable leadthrough is screwed in.

The stepping motor/electronics concept guarantees parallel running of several valve drives of the same type. The cross-section of the connecting cable should be selected according to the line length and the number of drives. With five drives connected in parallel and a line length of 50 m, we recommend using a cable cross-section of 1,5 mm² (power consumption of the drive \times 5).

The drive can be assembled with a maximum of one 230 V module, one additional accessory component (auxiliary switch or potentiometer) and the split range unit.

Fitting outdoors. If the devices are fitted outdoors, we recommend that additional measures be taken to protect them against the effects of the weather.

Additional technical information

The yellow housing (consisting of the front and back sections and the connecting lid) only serves the purpose of a cover. The DC motor, the control electronics, the load-bearing parts and the maintenance-free gear unit are accommodated in the housing. The drive shaft and column are made of rustproof materials. The interior plates and the gear unit are made of steel. The valve axle guideway and the valve collar connection are made of die-cast aluminium.

Note on ambient temperatures: if the medium temperature in the valve is up to 110 °C, the ambient temperature may reach 60 °C. For medium temperatures above 110 °C, the ambient temperature must not exceed 55 °C, or insert accessory 0372336 180 (intermediate piece).

Auxiliary changeover switch

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 drive columns and the shaft may also reach high temperatures.
- If a failure of the final control element could cause damage, additional protective precautions must be taken.

CE conformity

EMC Directive 2004/108/EC	Machinery Directive 98/37/EEC/I/B	Low Voltage Directive 2006/95/EC
EN 61000-6-1	EN 1050	EN 60730-1
EN 61000-6-2		EN 60730-2-14
EN 61000-6-3		Over-voltage category III
EN 61000-6-4		Degree of pollution III

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

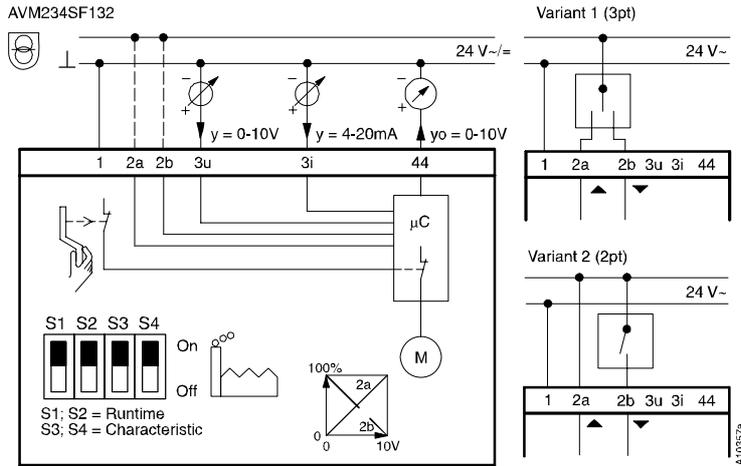
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Run time per mm	Switch coding	Run time for 14 mm stroke	Run time for 20 mm stroke	Run time for 40 mm stroke
2s		28s ± 1	40s ± 1	80s ± 2
4s		56s ± 2	80s ± 2	160s ± 4
6s		84s ± 4	120s ± 4	240s ± 8

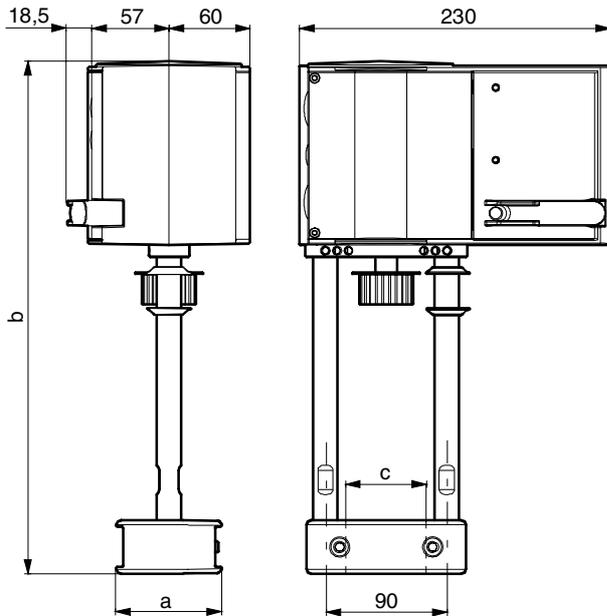
= factory setting

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Connection diagram



Dimensional drawing

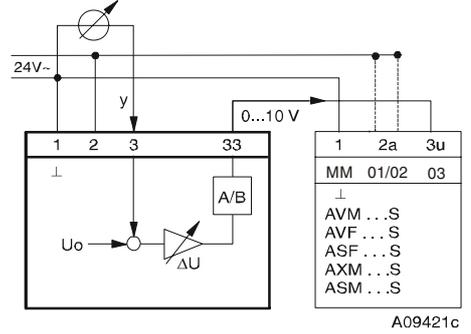


Type	a	b	c
AVM 234S F132	64	289	44
AVM 234S F132-5	58	289	38
AVM 234S F132-6	78	382	60

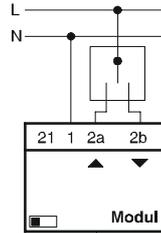
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Accessories

0313529

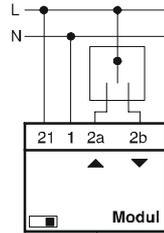


AVM 3pt



AVM 234S

AVN/AVF 3pt

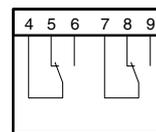


AVN 224S
AVF 234S

Modul	L/N
0372332 001	230 V~
0372332 002	100 V~

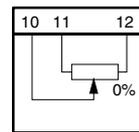
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372333



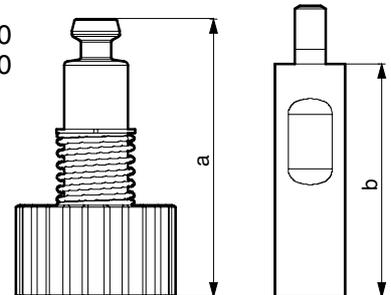
A10376

372334



A01363

0372336 180
0372336 240



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

M10217