

AKM115S: Fast-action rotary actuator with SAUTER Universal Technology (SUT) for ball valves

How energy efficiency is improved

Automatic adaptation to ball valves, electronic cut-off, accurate control and a high level of energy efficiency with low noise levels.

Areas of application

For operating 2-way and 3-way ball valves of the VKR and BKR series. For controllers with continuous (0...10 V or 4...20 mA) or switched output (2- or 3-point control).

Features

- For ball valves up to DN 50
- Running time: 6 s
- 24 V~/=
- Signal input 0...10 V or 4...20 mA
- Direction of rotation is selected via DIP switches \cup and \cap
- Pulse length can be altered in 3-point mode, i.e. internal modification of the start-up time
- Degree of protection IP 54
- Transmission can be disengaged in order to position the ball valve by hand (with lever)
- Brushless motor with electronic control and electronic cut-off
- Maintenance-free
- Intelligent adaptation of the angle of rotation, including adaptation of the feedback signal
- Freely configurable using the CASE Drives PC tool
- Cuts out electronically, depending on load
- Can be fitted to the ball valve without the need to use any tools



T11058



Y07552

Technical description

- Housing made of fire-retardant plastic (lower section black, upper section yellow)
- Power cable 1.2 m long, 6 x 0.5 mm²
- Bracket and bayonet ring made from glass-fibre-reinforced plastic for attaching to ball valve
- Permissible fitting positions: any position between vertical (upright) and horizontal

Products

Type	Running time (s)	Angle of rotation	Characteristic	Power supply	Weight (kg)
AKM115SF152	6	90°	linear	24 V~/=	0.7

Technical data

Electrical supply

Power supply	24 V~ ± 20%, 50...60 Hz	
	24 V= ¹⁾ +20%, -10%	
Power consumption (at nominal voltage)		
AKM115SF152	6.5 W	9 VA

Specifications

Noise during operation (not under load)	< 49 dB (A)
Response time ²⁾	10 ms
Max. media temperature ³⁾	100 °C
Positioner	
Control signal y	0...10 V or 2...10 V, R _i = 100 kΩ
Control signal y	0...20 mA or 4...20 mA, R _i = 500 Ω
Positional feedback y ₀	0...10 V, load > 10 kΩ
Starting point U ₀	0 or 10 V (or 2 or 10 V)
Starting point I ₀	0 or 20 mA (or 4 or 20 mA)
Control span ΔU	10 V
Switching range .Xsh	100 mV
Control span ΔI	20 mA
Switching range .Xsh	0.1 mA

1) 24 V= for all functions

2) Also applies to 2- or 3-point, depending on type of connection

3) For media temperatures of > 100 °C, use the relevant accessories

Permitted ambient conditions

Operating temperature	-20...55 °C
Storage and transport temperature	-30...65 °C
Humidity	5...85% rh
	no condensation

Installation

Dimensions W x H x D (mm)	70 x 138 x 127
Weight (kg)	0.7

Standards and directives

Degree of protection (horizontal)	IP 54 (EN 60529)
Protection class	III (EN 60730)

Additional information

Fitting instructions	MV P100004173
Material declaration	MD 51.369
Dimension drawing	M11445
Wiring diagram	A10619

Accessories

Type	Description
0313529001*	Split-range unit for setting sequences; to be fitted in separate distribution box as per MV 505671
0372459102*	External circuit, 24 V versions, for parallel operation with ASM/AVM105, 115 or actuators with end switch, including distribution box; MV 506102
0372462001	CASE Drives PC tool for configuring actuators by computer; MV 506101
0510420001*	Temperature adaptor required if temperature of medium > 100 °C (recommended at a temperature of < 10 °C); MV P100002660

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

Operation

Depending on the type of connection (see plan), the actuator can be used as a continuous 0...10 V or 4...20 mA, a 2-point (open/closed) or 3-point (open/stop/closed) actuator with intermediate position.

The AKM115 is combined with ball valves with an equal-percentage basic characteristic curve like the VKR or BKR.

Manual adjustment is effected by disengaging the transmission (slide switch next to the power cable) and turning using the lever. The position of the actuator is visible.

Note

Return the slide switch to its original position after making manual adjustments (engage the transmission).

Connected as a 2-point actuator using the 6-core power cable

This open/close control is performed by using the switching cables for the preferred direction. Power is applied to the actuator via the power supply cable and the wires for the direction of rotation, MM, LS and 01. The wires LS and 01 are connected together. The drive moves in an anti-clockwise direction (looking from the drive to the spindle adaptor) to end position 1 (anti-clockwise direction to 100% angle of rotation), which causes the control passage of the ball valve to open. If power is also applied to cable 02, the drive turns in a clockwise direction to end position 2 (clockwise direction to 0% angle of rotation) and closes the ball valve. When power at cable 02 is switched off, the actuator moves back to end position 1 (anti-clockwise direction to 100% angle of rotation), and the control passage of the ball valve is again fully open. In the end positions (the stop due to the rotation-angle limiter, or on reaching the maximum angle of rotation of 95°) or in the event of an overload, the electronic motor cut-out is activated (no end switches).

The direction of rotation is set using DIP switch 1. If this is left in position 0, the actuator behaves as described above. If the DIP switch is set to position 1, the end positions are transposed, i.e. end position 1 becomes end position 2 and vice versa.

The unused wires should not be connected and should not come into contact with other wires. For these reasons, they should be insulated separately.

Connected as a 3-point control unit using the 6-core power cable

The actuator should be connected to the power supply; by connecting power to the wires 01 or 02, the actuator can be moved to any position. Angle of rotation (as viewed from the actuator towards the ball valve's spindle):

- The spindle turns in a clockwise direction if power is applied to wire 01, and the ball valve closes.
- The spindle turns in an anti-clockwise direction if power is applied to wire 02.

In the end positions (the stop in the actuator, or on reaching the maximum angle of rotation of 95°) or in the event of an overload, the electronic motor cut-out is activated (no end switches). The direction of rotation can be changed by transposing the connections.

The direction of rotation can be set using DIP switch 1; if this is left in position 0, the actuator behaves as described above. If the DIP switch is set to position 1, the direction is transposed, i.e. end position 1 becomes end position 2 and vice versa.

The unused wires should not be connected and should not come into contact with other wires. For these reasons, they should be insulated separately.

Connection for control voltage 0...10 V or 4...20 mA using the 6-core power cable

The in-built positioner controls the actuator as a function of the controller's positioning signal y.

Angle of rotation (as viewed from the actuator towards the ball valve's spindle):

Direction of action 1:

The spindle adaptor turns in an anti-clockwise direction as the positioning signal rises, and the control passage of the ball valve opens.

Direction of action 2:

The spindle adaptor turns in an anti-clockwise direction as the positioning signal rises, and the control passage of the ball valve closes.

The direction of action can be set using DIP switch 1; if this is left in position 0, the actuator behaves as described above. If the DIP switch is set to position 1, the direction is transposed, i.e. end position 1 becomes end position 2 and vice versa.

Because the starting point and the control span are both pre-set, a split-range unit (accessory) is available for setting the partial ranges.

Initialisation and feedback signal

The actuator initialises itself automatically when it is connected to the power. When power is applied for the first time, the drive moves to the first stop. Then the drive moves to the second stop, determines the value via a path-measuring system and stores the value. The control signal and the feedback are matched to this actual path. If there is a power failure, no re-initialisation is carried out. The values are stored.

In order for the drive to be re-initialised, it must have power applied to it. An initialisation is started by using the manual adjuster twice within a period of 4 s.

During initialisation, the feedback signal is inactive or equals zero. The re-initialisation does not take effect until the whole procedure has been completed. To interrupt the procedure, simply use the manual adjuster again.

If the drive detects that a blockage has occurred, it reports it by setting the feedback signal to 0 V after about 90 s. However, the actuator tries to overcome the blockage during this time. If the

AKM115S

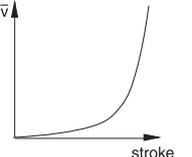
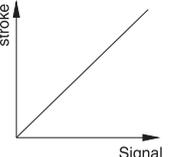
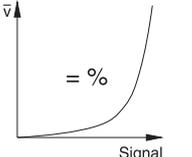
blockage can be overcome, the normal control function is re-activated and the feedback signal is re-stated.

The same initialisation is carried out in a 2- or 3-point control system. The feedback signal is then active again.

If the control signal (0...10 V) is interrupted and direction of operation 1 is set via DIP switch 1, the ball valve is fully closed (0% position).

Coding switches

AKM115SF152 90°	S1	S2	S3
	Direction of operation	Choice of voltage or current	Raise operating range
Direction of action 1 \cup	Off		
Direction of action 2 \cup	On		
Power supply		Off	
Current		On	
Input 03 Voltage 0...10 V / Current 0...20 mA			Off
Input 03 Voltage 2...10 V / Current 4...20 mA			On

Characteristic		
 Y01955	 Y07552	 Y01852
VKR/BKR equal-percentage	AKM rotary actuator linear	Regulating unit AKM + VKR/BKR equal-percentage
		

Split-range unit (accessory 0361529001)

The starting point U_0 and the control span ΔU can be set using the potentiometer. This makes it possible to activate several regulating units in sequence or in cascade using the controller's control signal. The input signal (partial range) is amplified into an output signal of 0...10 V. This accessory cannot be fitted in the drive, but should be located externally in an electric distribution box.

CASE Drives PC tool (accessory 0372462001)

CASE Drives enables all the drive's parameters to be set and viewed on site. Connection is via a serial port on the PC (laptop) and a socket on the drive. The set comprises: software including installation and operating instructions, fitting instructions, connectors, cable (1.2 metres in length) and an interface converter for the PC. The application is designed for commissioning and service technicians and for experienced users.

Engineering and fitting notes

The ingress of condensate, drops of water etc. along the spindle and into the actuator should be prevented.

When the electrical connection is made, please ensure that the cross-section of the wires is matched to the rating and the length. However, we recommend the use of wire with a cross-section of at least 0.75 mm².

The actuator and the ball valve are installed by fitting them together and turning the bayonet ring as far as it will go without any further adjustment. No tools are needed. The spindle of the ball valve is connected to the ball valve's driver axle automatically, either by moving manually to a rotation angle of 100% or by applying the power. To dismantle, simply open the bayonet ring and remove the actuator. The setting ex works is the centre position.

The combination of brushless motor, inductive path-measuring system and electronics unit allows several actuators of the same SUT type to be run in parallel.

When the actuator is without power, the holding torque falls typically to 1.5 Nm

The coding switches are accessible via a prepared opening with black plastic pins in the housing cover.

Note

Disconnect the power supply before removing the plastic pins.

Do not open the housing.

Outdoor installation

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

Additional technical data

The upper part of the housing contains the d.c. motor and the SUT-II electronics unit. The lower part contains the maintenance-free transmission, the gear-release lever and the spindle adaptor.

Power consumption at nominal voltage

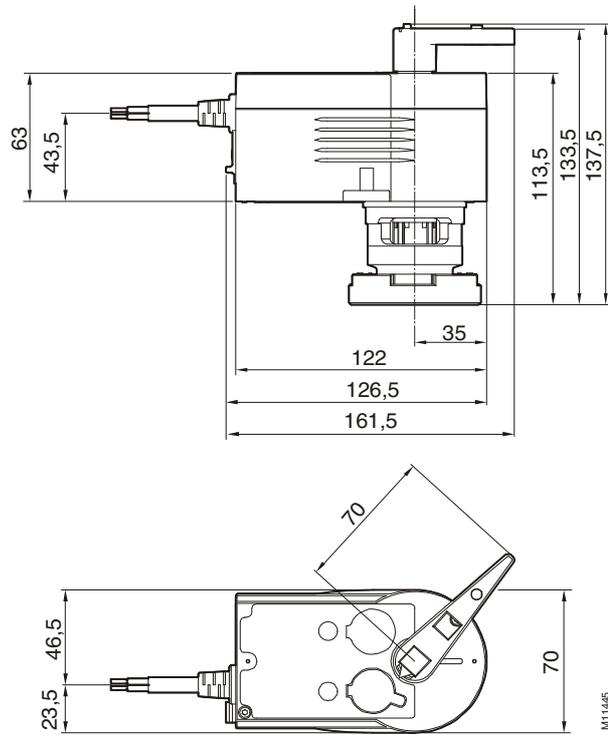
Type	Running time (s)	Status	Actual power P (W)	Apparent power S (VA)
AKM115SF152	6	in operation	6.5	
		standstill*	1	
		sizing		9

*) not under load

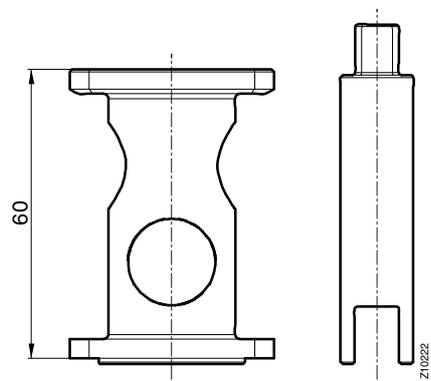
CE conformity

EMC Directive 2004/108/EC
EN 61000-6-1
EN 61000-6-2
EN 61000-6-3
EN 61000-6-4

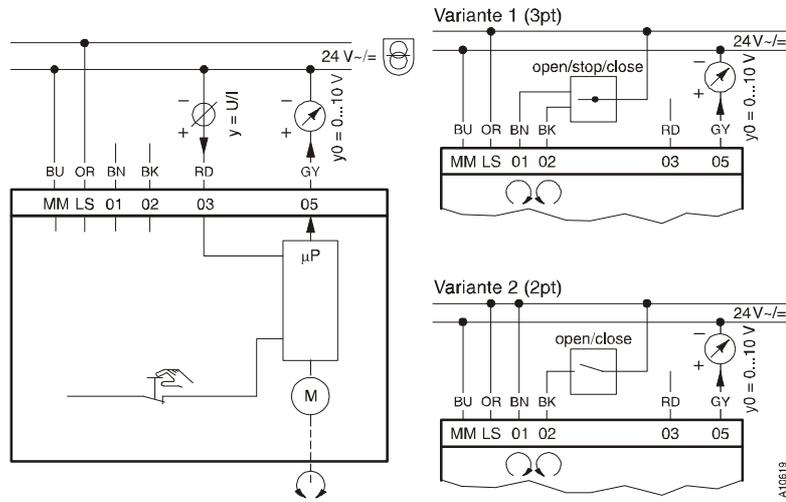
Dimension drawing



Accessories
0510420001



Wiring diagram



MM	LS	01	02	03	05
BU	OR	BN	BK	RD	GU
Blau	Orange	Braun	Schwarz	Rot	Grau
Blue	Orange	Brown	Black	Red	Grey
Bleu	Orange	Brun	Noir	Rouge	Gris

Accessories
0313529

