PDS 56.091 | en Product Data Sheet | BKR015...050

BKR: 3-way ball valve with female thread, PN 40

How energy efficiency is improved

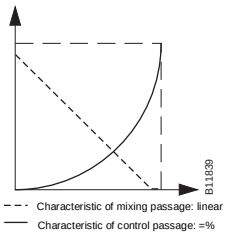
Precision control and working without losses through leakage means efficiency.

Areas of application

Control ball valve for continuous control of cold water, hot water or air in closed networks[1]. Water quality as per VDI 2035, the use of strainers is recommended. Together with actuators AKM105, 115(S) and AKF112, 113(S) as regulating unit.

Features

- Nominal pressure 40 bar [2]
- Nominal diameter DN 15 to DN 50
- Equal percentage control passage ball valve characteristic, integrated directly into ball
- Linear mixing passage ball valve characteristic
- Control passage characteristic can be set to linear or quadratic with SUT rotary actuator
- Spindle with large sliding surface and Teflon glide ring
- High control ratio of 500 : 1
- Low torque thanks to collar with O-ring bearing



Technical description

- Ball valve with female thread as per ISO 7/1 Rp or NPT
- Body made of DZR (dezincification resistant) cast brass
- Axle made of DZR brass
- Ball made of DZR brass, chrome-plated and polished surface
- Axle seal with double O-ring made of EPDM
- Strainer and screw fitting available as accessories

Products

Type		Nominal diameter (DN)	Connection		k_{VS} Value, Control passage (m^3/h)	Weight (kg)	
ISO 7/1 Rp	NPT		ISO 7/1 Rp	NPT		ISO 7/1 Rp	NPT
BKR015F340-FF	BKR015F340-UU	15	Rp ½"	½ NPT	1.6	0.312	0.319
BKR015F330-FF	BKR015F330-UU	15	Rp ½"	½ NPT	2.5	0.312	0.319
BKR015F320-FF	BKR015F320-UU	15	Rp ½"	½ NPT	4	0.312	0.319
BKR015F310-FF	BKR015F310-UU	15	Rp ½"	½ NPT	6.3	0.328	0.336
BKR020F320-FF	BKR020F320-UU	20	Rp ¾"	¾ NPT	4	0.398	0.413
BKR020F310-FF	BKR020F310-UU	20	Rp ¾"	¾ NPT	6.3	0.398	0.413
BKR025F310-FF	BKR025F310-UU	25	Rp 1"	1 NPT	10	0.628	0.648
BKR032F310-FF	BKR032F310-UU	32	Rp 1¼"	1 ¼ NPT	16	0.966	0.997
BKR040F310-FF	BKR040F310-UU	40	Rp 1½"	1 ½ NPT	25	1.394	1.421
BKR050F310-FF	BKR050F310-UU	50	Rp 2"	2 NPT	40	2.267	2.292

Technical data

General characteristics

Nominal pressure	PN 40
Operating pressure	40 bar (-10...50 °C)
	35 bar (+130 °C)

Version

k_{VS} value of mixing passage	-10…-30% of control passage
Valve characteristic	
Control passage	equal-percentage
Mixing passage	linear
Control ratio, ball valve	500:1 (typical)
Control ratio with actuator	> 50:1 (typical)
Leakage rate	
Control passage	0,001% of k_{VS} value
Mixing passage	< 1%
Rotation angle	90°

Permissible operating conditions

Operating temperature [3]	-10...130 °C

Additional information

Fitting instructions	
BKR	P100002038
AKM105, 115S	P100001578
AKF112, 113S	P100002659
Material declaration	MD 56.091
Dimension drawing	M11429

1) See engineering and fitting notes for open circuits

2) For air, low-pressure steam: DN40 - PN25, DN50 - PN20

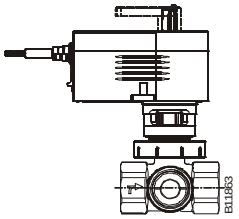
3) No stuffing box heater required at temperature of less than 0 °C, use temperature adapter at temperatures above 100 °C (accessory).

Accessories

Type	Description
0510420001*	Temperature adapter (>100 °C to max. 130 °C) for AKM and AKF, P100002660
0560283015*	1 screw fitting made from brass for DN 15 female thread
0560283020*	1 screw fitting made from brass for DN 20 female thread
0560283025*	1 screw fitting made from brass for DN 25 female thread
0560283032*	1 screw fitting made from brass for DN 32 female thread
0560283040*	1 screw fitting made from brass for DN 40 female thread
0560283050*	1 screw fitting made from brass for DN 50 female thread
0560332015*	Strainer made from gun metal, -10 - 150°C, mesh aperture 0,5 mm, DN 15
0560332020*	Strainer made from gun metal, -10 - 150°C, mesh aperture 0,8 mm, DN 20
0560332025*	Strainer made from gun metal, -10 - 150°C, mesh aperture 0,8 mm, DN 25
0560332032*	Strainer made from gun metal, -10 - 150°C, mesh aperture 0,8 mm, DN 32
0560332040*	Strainer made from gun metal, -10 - 150°C, mesh aperture 0,8 mm, DN 40
0560332050*	Strainer made from gun metal, -10 - 150°C, mesh aperture 0,8 mm, DN 50

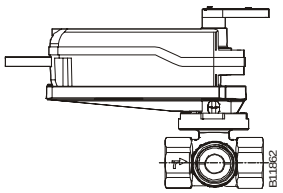
*) Dimension drawing or connection diagram available under same number

Combination of BKR and electric rotary actuator



Actuator				**AKM105**				**AKM115F12.**	**AKM115S**
Running time:				**35 s**				**120 s**	**35/ 60/120 s**
Input:				**2-/3-pt**				**2-/3-pt**	**2-/3-pt 0…10 V**
Ball Valve	Against pressure				Against pressure				
	Δp_{max}	**Δp_s**	**close/off pressure**		**Δp_{max}**	**Δp_s**	**close/off pressure**		
BKR015	1.8	–	1.8		2	–	6		
BKR020	1.8	–	1.8		2	–	6		
BKR025	1.8	–	1.8		2	–	6		
BKR032	1.2	–	1.2		2	–	6		
BKR040	1.2	–	1.2		2	–	6		
BKR050	1.2	–	1.2		2	–	6		

Combination of BKR and electric rotary actuator with spring return



Actuator				**AKF112F120**	**AKF112F122**	**AKF113F122**	**AKF113SF122**
Running time:							
Motor:				**90 s**	**90 s**	**90 s**	**90 s**
Spring:				**15 s**	**15 s**	**15 s**	**15 s**
Input:				**2-pt 230 V**	**2-pt 24 V**	**3-pt 24 V**	**0…10 V 24 V**
Ball Valve	Against pressure						
	Δp_{max}	**Δp_s**	**close/off pressure**				
BKR015	2	5.4	6				
BKR020	2	5.4	6				
BKR025	2	5.4	6				
BKR032	2	3.5	6				
BKR040	2	3.5	6				
BKR050	2	3.5	6				

Valve:	F variant, see valve type table for technical data and accessories
Actuators:	F variant, see section 51 for technical data, accessories and installation position
Example:	BKR015F310 / AKM115SF132

Δp_{max} [bar]=	Maximum permissible pressure difference across the valve at which the drive can still reliably open and close the valve taking Δp_v into consideration.
Δp_s [bar]=	Maximum permissible pressure difference across the valve in the event of a problem (pipeline break downstream of valve) at which the drive can reliably close with “fast” stroke passage
close/off pressure [bar]=	Maximum possible pressure difference across the valve during control operation at which the drive can still open and close the valve. A shorter service life can be expected if this method is used. Cavitation, erosion and pressure surges can damage the valve. The values only apply to the assembled combination of the valve fitted to the drive.

Operation

Using an electric actuator, the three-way ball valve can be moved to any position. Using either the AKM105/115(S) actuator or the AKF112/113(S) actuator with spring return, it is possible to implement a mixing function across the three-way ball valve. A diverting function is not permissible.

Direction of flow

Description

These ball valves are notable for their great reliability and accuracy, and make a major contribution to providing environmentally-friendly control. They comply with the most demanding requirements, such as a quick-closing function, coping with differential pressures, controlling media temperatures and providing a shut-off facility – and almost silently.

The spindle of the ball valve is automatically connected to the pin of the actuator. The brass ball regulates an equal-percentage flow in the control passage and a linear flow in the mixing passage. The tightness of the ball is safeguarded by the Teflon collars that are fitted in the body. An EPDM O-ring is inserted behind these two collars in the control passage. These O-rings permit the ball and both collars to make a small axial movement, which provides an extremely good seal and generates little torque.

The tightness of the spindle is safeguarded by two O-rings; these cannot be replaced.

Engineering and fitting notes

The ball valves are combined with rotary actuators with or without spring return. The actuator is directly attached to the ball valve and held in place by a bayonet connection. The actuator axle is connected to the spindle automatically, for which purpose the axle of the ball valve should be in an intermediate position. When the system is being put into service, the SUT actuator moves to the open position (for the control passage), and both devices are connected automatically. The angle of rotation of the ball valve is also detected by the actuator; no further settings are necessary. These SUT actuators allow the characteristic of the control passage to be changed from linear to quadratic or vice versa. In order to prevent the ball valve from blocking in the end positions, the SUT actuator makes a movement of about 30° if the positioning signal has not changed in the end positions for three days.

In order to prevent impurities (e.g. welding beads, rust particles etc.) from entering the water and damaging the Teflon collars, strainers (dirt traps) should be fitted, e.g. on each floor or in each duct run. For strainers, see accessories; observe usage recommendations and temperature range for each type. The composition of the water should be in accordance with VDI2035.

All ball valves should be used only in closed circuits. If used in open circuits, an excessive oxygen mixture may damage the ball valves. To prevent this from happening, use an oxygen binding agent, but consult the manufacturer of the binding agent with regard to compatibility and corrosion. Please refer to the materials list below.

The fittings are usually insulated in the systems. However, the flange that holds the actuator should not be insulated.

In order to prevent flow noise in quiet rooms, the pressure difference across the ball valve should not exceed 50% of the specified values.

The crank handle is fixed to the actuator. To operate the crank handle, the manual adjuster on the actuator should be pushed downwards, The actuator will not operate until this knob is moved back to the upper position. There is also a squared end on the crank handle that matches the squared end of the ball valve's spindle.

Using with water

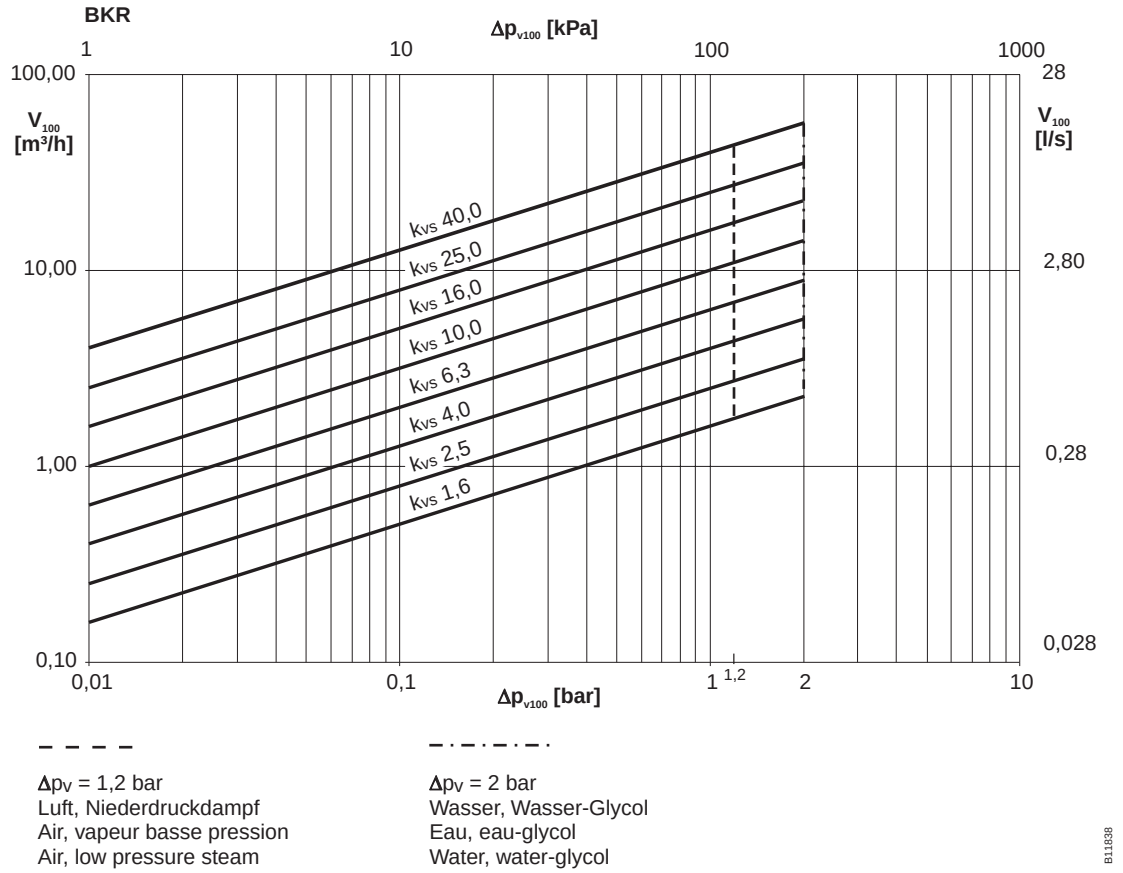
When using water, mixed with glycol or an inhibitor, consult the manufacturer with regard to the compatibility of the materials and seals used in the ball valves. Please refer to the list of materials shown in Material Declaration MD 56.091. If glycol is used, we recommend a concentration of between 20% and 50%.

The ball valves are not suitable for use in potentially explosive areas. The materials that have been selected have been approved for use with drinking water. The ball valve as a whole has not been certified for use with drinking water.

Permissible fitting positions

The control unit can be fitted in any position; however, we do not recommend fitting it in the upside-down position. The ingress of condensate, drops of water etc. into the actuator should be prevented.

Flow diagram



Additional technical data

Technical information	
Pressure and temperature specifications	EN 764, EN 1333
Flow parameters	EN 60534 Page 3
Manual: 'Valves and actuators'	7000477001
Parameters & fitting notes Control, general information	Valid EN & DIN regulations

Additional specifications

The body of the ball valve is made from DZR moulded brass (EN 12165) with cylindrical female thread as per ISO 7/1 Rp. Spindle seal with double O-ring of ethylene propylene.

Material numbers as per DIN

	DIN material no.	DIN code
Body of ball valve	CW602N	CuZn36Pb2As
Connection	CW602N	CuZn36Pb2As
Ball, polished, chrome-plated	CW602N	CuZn36Pb2As
Spindle	CW602N	CuZn36Pb2As
O-ring	EPDM	
Collar	PTFE	

Explanation of terms used

Δp_V:

Maximum permissible pressure difference across the valve in any stroke position, limited by the noise level and erosion.

The valve, as a traversed element, is characterised by this parameter specifically in its hydraulic behaviour. By monitoring cavitation, erosion and the noise thus produced, improvements can be achieved in both life expectancy and operational capacity.

Δp_{max}:

Maximum permissible pressure difference across the valve at which the actuator can reliably open and close the valve.
Static pressure and fluidic influences are taken into account. This value helps to maintain a smooth stroke action and the high level of sealing. In doing so, the valve's Δp_V value is never exceeded.

Δp_S:

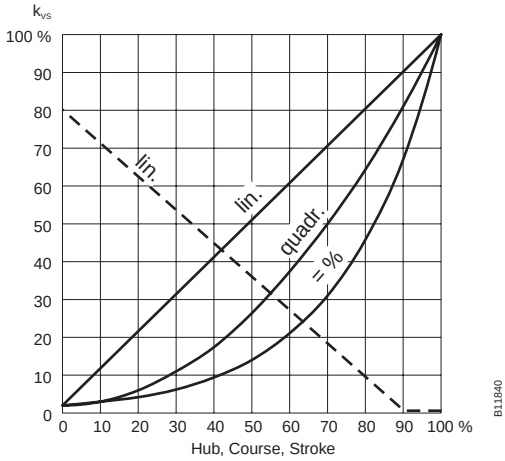
Maximum permissible pressure difference across the valve in the event of a malfunction (e.g. power failure, excess temperature or pressure, burst pipe) at which the actuator can firmly close the valve and, if necessary, hold the full operating pressure against atmospheric pressure. Since this is a quick-closing function with 'fast' rotation, Δp_S can be greater than Δp_{max} or. Δp_V. The resultant fluidic disturbances are soon overcome and play a minor role here.

Δp_{stat}:

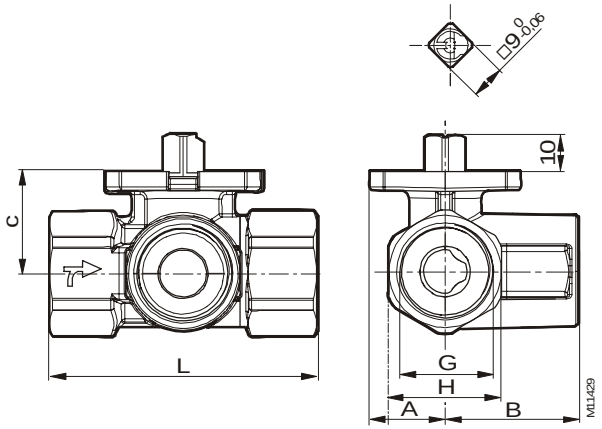
Line pressure behind the valve. This corresponds largely to the dead pressure when the pump is switched off, e.g. due to the level of liquid in the installation, an increase in pressure via the pressure store, steam pressure etc.

Characteristic of control passage on actuators with positioner

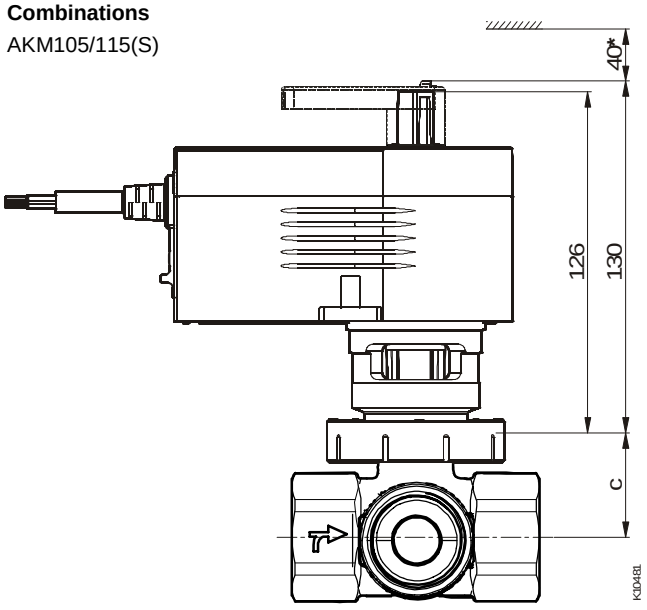
On AKM115S actuator
——— Control passage: equal-percentage/linear/quadratic
– – – – Mixing passage: linear



Dimension drawing



Combinations
AKM105/115(S)



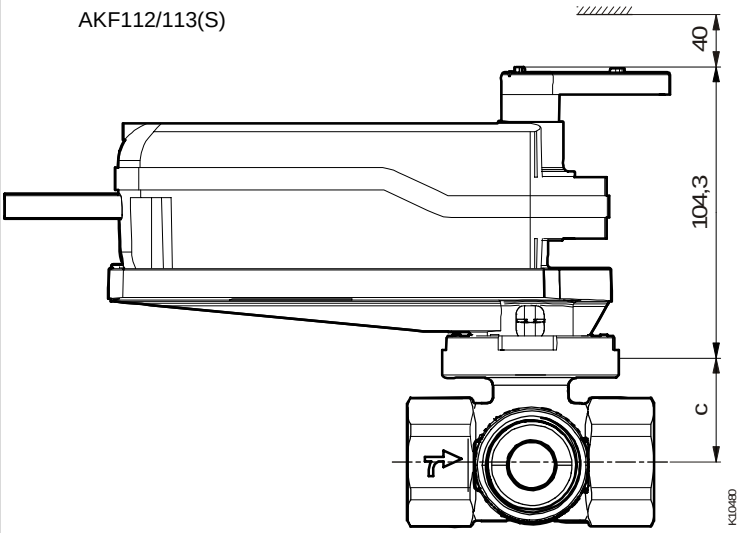
* with accessory 051048000 : 72 mm

DN	A mm	B mm	c mm		L mm		L mm		G	H mm
15	21	34	24 (28)*	NPT	67	ISO 7/1 Rp	67	ISO 7/1 Rp	Rp ½	26
20	21	37	28		72		72		Rp ¾	31
25	21	45	31		85		85		Rp 1	39
32	24	53	34		99		99		Rp 1¼	48
40	28	57	40		110		110		Rp 1½	55
50	34	69	53		131		131		Rp 2	67

* Dimension c equals 28 mm on types . . F310-FF

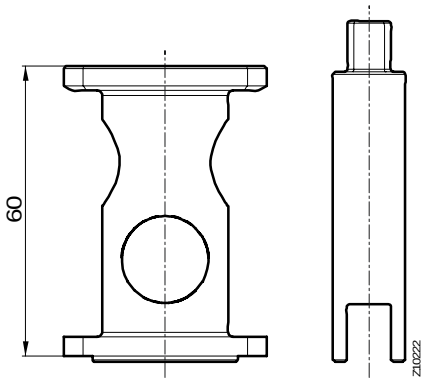
Dimension drawing (continued)

AKF112/113(S)



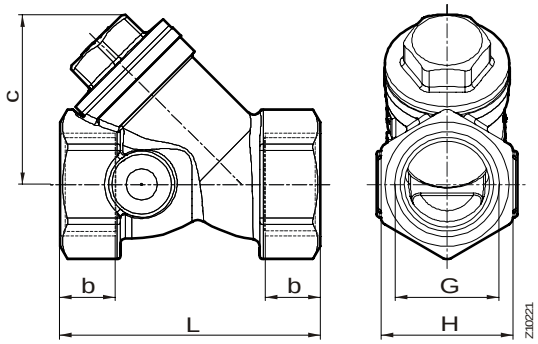
Accessory

0510420001



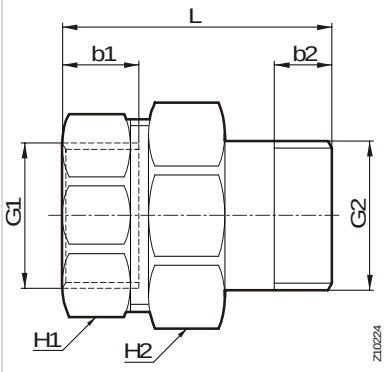
Accessory

05603320 …



DN	b mm	c mm		G inch	L mm	H mm
15	12	38	ISO 228-1	G ½	54	27
20	15	43		G ¾	67	34
25	16	53		G 1	79	41
32	17	64		G 1¼	98	51
40	18	70		G 1½	106	57
50	20	85		G 2	122	69

05602830 …



DN	b1 mm	b2 mm		G1 inch		G2 inch	L mm	H1 mm	H2 mm
15	10	10	ISO 7/1	Rp ½	ISO 228-1	G ½	46	26	30
20	12	12		Rp ¾		G ¾	52	31	37
25	14	14		Rp 1		G 1	60	40	46
32	16	16	ISO 228-1	G 1¼		G 1¼	65	50	54
40	17	17		G 1½		G 1½	76	54	64
50	20	20		G 2		G 2	98	69	81

Im Surinam 55
CH-4016 Basle
Tel. +41 61 - 695 55 55
Fax +41 61 - 695 55 10
www.sauter-controls.com
info@sauter-controls.com

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