

## VKR: 2-way regulating ball valve with female thread, PN 40

### How energy efficiency is improved

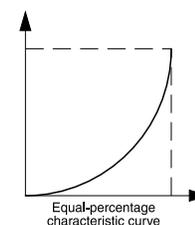
Efficiency means precise control and working with minimum leakage

### Features

- 2-way regulating ball valve for continuous control of cold and hot water in closed circuits
- In combination with valve actuators AKM 105(S), 115(S) and AKF 112, 113(S) as a control unit
- Equal-percentage ball valve characteristic; control contour in the ball directly integrated
- Characteristic can be set with SUT rotary actuator (SAUTER Universal Technology) to linear or quadratic
- Spindle with large sliding surface and PTFE glide ring
- Low torque due to collar mounted on O-ring
- Ball valve with female thread as per ISO 7/1 Rp or NPT
- Body made of DZR (dezincification-resistant) cast brass
- Spindle made of DZR brass with PTFE glide ring
- Ball made of DZR brass, chrome-plated and polished surface
- Spindle seal with double O-ring made of EPDM
- Strainer and screw fitting available as accessories
- Water quality as per VDI 2035
- Regulating ball valve with French drinking water approval ACS



VKR040F300



### Technical data

#### Parameters

Nominal pressure	40 bar
Valve characteristic	Equal-percentage
Control ratio of ball valve	500:1
Control ratio with actuator	> 50:1
Leakage rate	0.001% of $K_{VS}$ value
Angle of rotation	90°

#### Ambient conditions

Operating temperature <sup>1)</sup>	-10...130 °C, no condensation
Operating pressure	40 bar (-10...50 °C) 35 bar (130 °C)

#### Standards and directives

Pressure and temperature data	EN 764, EN 1333
Flow parameters	EN 60534 (page 3)

#### Overview of types

Type	Nominal diameter	Connection ISO 7/1 Rp	$K_{VS}$ value	Weight
VKR015F350-FF	DN 15	Rp 1/2"	1 m³/h	0.29 kg
VKR015F340-FF	DN 15	Rp 1/2"	1.6 m³/h	0.29 kg
VKR015F330-FF	DN 15	Rp 1/2"	2.5 m³/h	0.29 kg
VKR015F320-FF	DN 15	Rp 1/2"	4 m³/h	0.29 kg
VKR015F310-FF	DN 15	Rp 1/2"	6.3 m³/h	0.29 kg
VKR015F300-FF	DN 15	Rp 1/2"	10 m³/h	0.29 kg
VKR020F320-FF	DN 20	Rp 3/4"	4 m³/h	0.32 kg
VKR020F310-FF	DN 20	Rp 3/4"	6.3 m³/h	0.32 kg
VKR020F300-FF	DN 20	Rp 3/4"	10 m³/h	0.32 kg
VKR025F320-FF	DN 25	Rp 1"	6.3 m³/h	0.49 kg
VKR025F310-FF	DN 25	Rp 1"	10 m³/h	0.49 kg
VKR025F300-FF	DN 25	Rp 1"	16 m³/h	0.49 kg
VKR032F320-FF	DN 32	Rp 1 1/4"	10 m³/h	0.73 kg
VKR032F310-FF	DN 32	Rp 1 1/4"	16 m³/h	0.73 kg

<sup>1)</sup> At operating temperatures <5 °C and >100 °C, the appropriate accessories must be used.



Type	Nominal diameter	Connection ISO 7/1 Rp	K <sub>vs</sub> value	Weight
VKR032F300-FF	DN 32	Rp 1¼"	25 m³/h	0.73 kg
VKR040F320-FF	DN 40	Rp 1½"	16 m³/h	1.1 kg
VKR040F310-FF	DN 40	Rp 1½"	25 m³/h	1.1 kg
VKR040F300-FF	DN 40	Rp 1½"	40 m³/h	1.1 kg
VKR050F320-FF	DN 50	Rp 2"	25 m³/h	1.76 kg
VKR050F310-FF	DN 50	Rp 2"	40 m³/h	1.76 kg
VKR050F300-FF	DN 50	Rp 2"	63 m³/h	1.76 kg

#### Accessories

Type	Description
0510240001	Assembly kit for VK**/BK** ball valves as spare part and as accessory for rotary actuators ASF 112, 113 from index B
0510240011	Adaptor required when temperature of the medium < 5 °C
0510420001	Adaptor required when temperature of the medium > 100 °C
0560284015	Screw fitting in brass, flat sealing, female/male thread for DN 15
0560284020	Screw fitting in brass, flat sealing, female/male thread for DN 20
0560284025	Screw fitting in brass, flat sealing, female/male thread for DN 25
0560284032	Screw fitting in brass, flat sealing, female/male thread for DN 32
0560284040	Screw fitting in brass, flat sealing, female/male thread for DN 40
0560284050	Screw fitting in brass, flat sealing, female/male thread for DN 50
0560332015	Strainer in gun metal, -10...150 °C, mesh aperture 0.5 mm, DN 15
0560332020	Strainer in gun metal, -10...150 °C, mesh aperture 0.8 mm, DN 20
0560332025	Strainer in gun metal, -10...150 °C, mesh aperture 0.8 mm, DN 25
0560332032	Strainer in gun metal, -10...150 °C, mesh aperture 0.8 mm, DN 32
0560332040	Strainer in gun metal, -10...150 °C, mesh aperture 0.8 mm, DN 40
0560332050	Strainer in gun metal, -10...150 °C, mesh aperture 0.8 mm, DN 50

## Combination of VKR with electrical actuators

- i** *Warranty: The technical data and pressure differences indicated here are applicable only in combination with SAUTER valve actuators. The warranty does not apply if used with valve actuators from other manufacturers.*
- i** *Definition of  $\Delta p_s$ : Maximum admissible pressure drop in the event of a malfunction (pipe break after the ball valve) at which the actuator reliably closes the ball valve using the return spring.*
- i** *Definition of  $\Delta p_{max}$ : Maximum admissible pressure drop in control mode at which the actuator reliably opens and closes the ball valve.*

## Pressure differences

Actuator	AKM105F100 AKM105F120	AKM105F122	AKM105SF132	AKM115F120	AKM115F122	AKM115SF132	AKM115SF152
Rotational torque	4 Nm	4 Nm	4 Nm	8 Nm	8 Nm	8 Nm	7 Nm
Control signal	2-/3-point	2-/3-point	2-/3-point, 0...10 V	2-/3-point	2-/3-point	2-/3-point, 0...10 V	2-/3-point, 0...10 V, 4...20 mA
Running time	30/120 s	30/120 s	35/60/120 s	120 s	120 s	35/60/120 s	6 s
Operating voltage	230 V~	24 V~	24 V~/V=	230 V~	24 V~	24 V~/V=	24 V~/V=

 $\Delta p$  [bar]

Closes against the pressure	$\Delta p_{max}$						
VKR015F350-FF VKR015F340-FF VKR015F330-FF VKR015F320-FF VKR015F310-FF VKR015F300-FF VKR020F320-FF VKR020F310-FF VKR020F300-FF VKR025F320-FF VKR025F310-FF VKR025F300-FF	1.8	1.8	1.8	3.5	3.5	3.5	3.5
VKR032F320-FF VKR032F310-FF VKR032F300-FF VKR040F320-FF VKR040F310-FF VKR040F300-FF VKR050F320-FF VKR050F310-FF VKR050F300-FF	1.2	1.2	1.2	2.4	2.4	2.4	2.4

Cannot be used to close with the pressure

Actuator	AKF112F120	AKF112F122	AKF113F122	AKF113SF122
Rotational torque	7 Nm	7 Nm	7 Nm	7 Nm
Control signal	2-point	2-point	3-point	0...10 V
Running time	90 s	90 s	90 s	90 s
Operating voltage	230 V~	24 V~/V=	24 V~/V=	24 V~/V=

 $\Delta p$  [bar]

Closes against the pressure	$\Delta p_{max}$	$\Delta p_s$						
VKR015F350-FF	3.5	5.4	3.5	5.4	3.5	5.4	3.5	5.4
VKR015F340-FF								
VKR015F330-FF								
VKR015F320-FF								
VKR015F310-FF								
VKR015F300-FF								
VKR020F320-FF								
VKR020F310-FF								
VKR020F300-FF								
VKR025F320-FF								
VKR025F310-FF								
VKR025F300-FF								
VKR032F320-FF	2.4	3.5	2.4	3.5	2.4	3.5	2.4	3.5
VKR032F310-FF								
VKR032F300-FF								
VKR040F320-FF								
VKR040F310-FF								
VKR040F300-FF								
VKR050F320-FF								
VKR050F310-FF								
VKR050F300-FF								

Cannot be used to close with the pressure

### Description of operation

The regulating ball valve can be moved to any intermediate position with an electric actuator. Closing against the operating pressure is possible with actuator AKM 105, 115(S) or valve actuator with spring return AKF 112, 113(S); closing with the operating pressure is not admissible.

### Closing procedure against the pressure



These regulating ball valves are characterised by their reliability and precision and make an important contribution towards environmentally friendly regulation. They meet difficult challenges such as the quick-closing function, overcoming differential pressures, controlling media temperatures and performing the shut-off function, all with a low noise level.

The spindle of the ball valve is automatically connected to the spindle carrier of the actuator. The brass ball controls the equal-percentage flow rate in the control passage. The tightness of the ball is ensured by the PTFE collars incorporated into the body. An O-ring made of EPDM is inserted behind these two collars. These O-rings enable the ball and the two collars to make a small axial movement, providing a high level of tightness and small torques.

The tightness of the spindle is ensured by two O-rings. These cannot be replaced.

### 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 regulations must also be adhered to. Changing or converting the product is not admissible.

### Engineering and fitting notes

The ball valves are combined with rotary actuators with or without a spring return. The actuator is mounted directly on the ball valve and fastened with a bayonet connector. The actuator shaft is automatically connected to the spindle, whereby the stem of the ball valve is in an intermediate position. When the system is commissioned, the SUT actuator moves to the open position, and the two devices are connected automatically. The angle of rotation of the ball valve is also detected by the actua-

tor, and no further adjustments are required. With the SUT actuators, the characteristic can be set to linear or quadratic as required. To avoid the ball valve being jammed in the end positions, the SUT actuator makes a movement of approx. 30° angle of rotation if the end positions of the positioning signal have not changed within three days.

So that impurities are retained in the water (welding beads, rust particles, etc.) and the PTFE collar is not damaged, it is necessary to install dirt filters, for example one for each floor or pipe run. For dirt filters, see the accessories, and note the usage and temperature range for each type. Requirements for water quality as per VDI 2035.

All ball valves must be used in closed circuits only. In open circuits, an excessively high oxygen mixture can destroy the ball valves. To avoid this, an oxygen binding agent must be used; here the compatibility must be clarified with the manufacturer of the solution with regard to corrosion. The material list shown below may be used here.

The fittings are usually insulated in the systems. However, note that the flange into which the actuator is inserted is not insulated.

To prevent any disturbing flow noise from being audible in quiet rooms, the pressure difference over the ball valve must not exceed 50% of the specified values.

The crank handle is fixed to the actuator. To operate this crank handle, the manual adjustment knob on the actuator must be pushed downwards. The actuator remains inactive until this knob is shifted into the top position again. There is also a squared end on the crank handle that matches the squared end on the spindle of the ball valve.

### Additional technical data

Technical information	
Technical manual on control units	7 000477 001
Parameters, fitting notes, control, general information	Applicable EN, DIN, AD, TRD and accident prevention regulations
CE conformity as per PED 2014/68/EU	Fluid group II, no CE label

### Using with water

When using water mixed with glycol or an inhibitor, the compatibility of the materials and seals used in the ball valve should be clarified with the manufacturer. The material list in the Declaration on materials and the environment MD 56.090 can be used for this purpose. When glycol is used, we recommend using a concentration of between 20% and 50%.

The ball valves are not suitable for potentially explosive atmospheres.

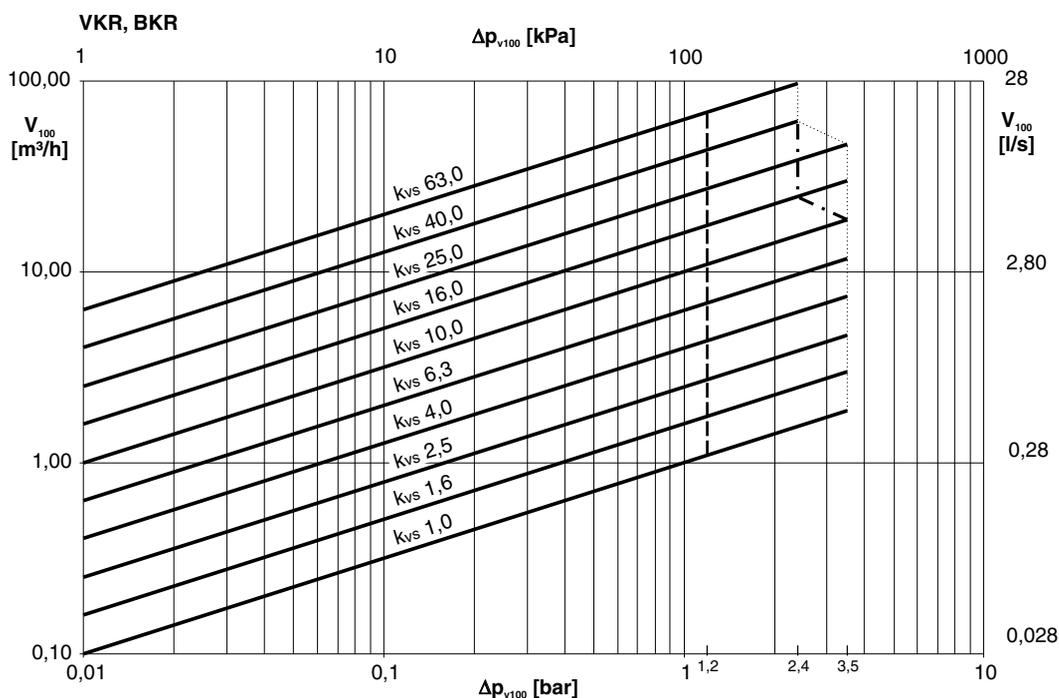
### Application with drinking water

The ball valves have the French drinking water approval ACS. Screw fittings and strainers are not approved for drinking water.

### Fitting position

The control unit can be fitted in any position, but the hanging position is not recommended. Condensate, drops of water, etc. must be prevented from entering the actuator.

**Flow-rate chart**



$\Delta p_v = 1,2$  bar  
 Air, low pressure steam

$\Delta p_v = 3,5$  bar  
 Water, water-glycol

$\Delta p_v = 2,4$  bar  
 VKR / BKR 032F300  $k_{vs}25$   
 VKR / BKR 032F310  $k_{vs}16$   
 VKR / BKR 040F310  $k_{vs}25$

**Additional version information**

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

**Material numbers as per DIN**

Component	DIN material no.	DIN designation
Body of the ball valve	CW602N	CuZn36Pb2As
Connectors	CW602N	CuZn36Pb2As
Ball, polished, chrome-plated	CW602N	CuZn36Pb2As
Stem	CW602N	CuZn36Pb2As
O-ring	EPDM	—
Collar	PTFE	—

**Additional details on the definitions of pressure difference**

**$\Delta p_v$**

Maximum admissible pressure difference over the ball valve at every stroke position, limited by noise level and erosion.

With this parameter, the ball valve is characterised as a flow element with specific hydraulic behaviour. Monitoring the cavitation and erosion along with the associated noise increases both the service life and the operational capacity.

**$\Delta p_{max}$**

Maximum admissible pressure difference over the ball valve at which the actuator can reliably open and close the ball valve.

The following are considered: Static pressure and flow effects. This value ensures trouble-free stroke movement and tightness. The value  $\Delta p_v$  of the ball valve is never exceeded.

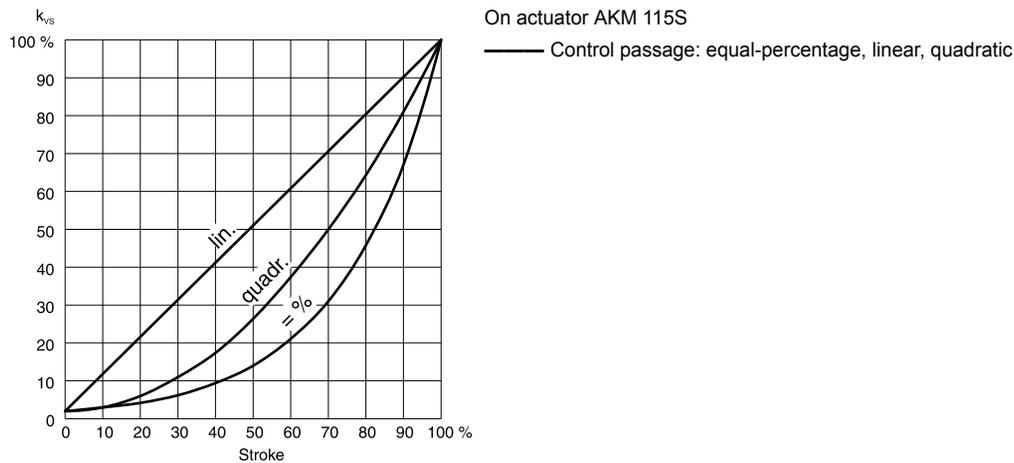
**$\Delta p_s$**

Maximum admissible pressure difference over the ball valve in the event of a malfunction (e.g. power failure, excessive temperature or pressure, pipe break) at which the actuator can close the ball valve tightly and, if necessary, maintain the entire operating pressure against atmospheric pressure. Because this is a quick-closing function with a rapid angle of rotation change,  $\Delta p_s$  can be greater than  $\Delta p_{max}$  or  $\Delta p_v$ . The disruptive flow effects that arise here are quickly passed through and are of minor importance in this method of operation.

**$\Delta p_{stat}$**

Line pressure behind the ball valve. This essentially corresponds to the idle pressure when the pump is switched off, caused for example by the fluid level in the system, increased pressure due to pressure tanks, steam pressure, etc.

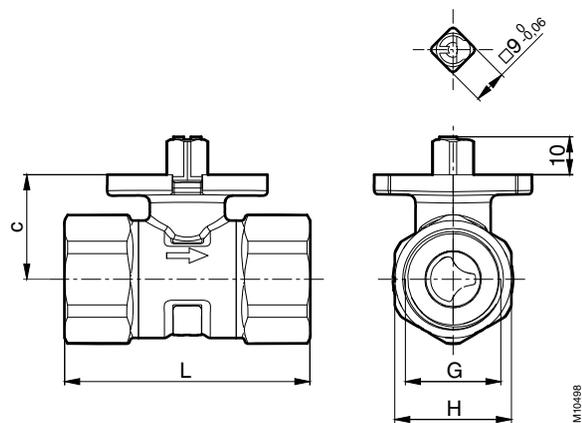
**Characteristic for control passage for actuators with positioner**



**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.

**Dimension drawing**

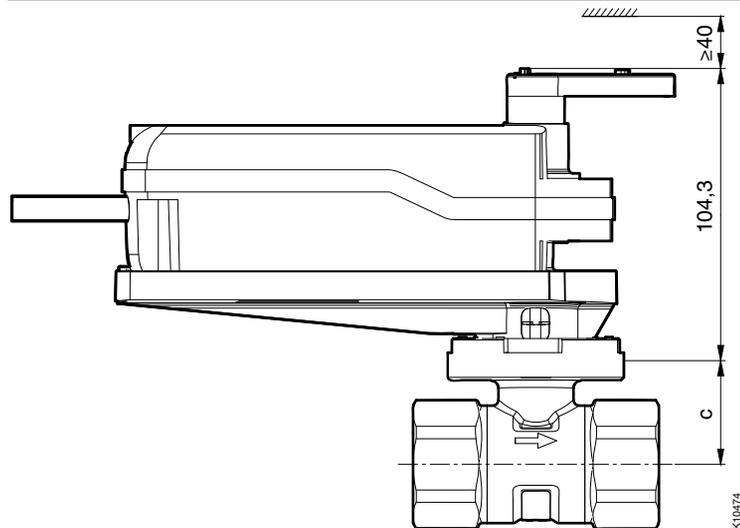


DN	c (mm)	G (inch)	L (mm)	H (mm)
15	27.6	Rp 1/2	61.6	26
20	27.6	Rp 3/4	67.4	31
25	30.5	Rp 1	76.8	39
32	34.3	Rp 1 1/4	88.0	48
40	39.8	Rp 1 1/2	101.8	55
50	52.8	Rp 2	116.2	67

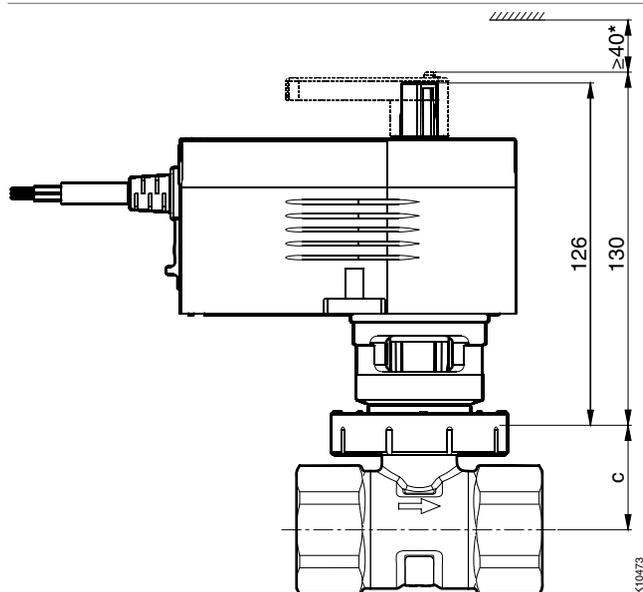
**Combinations**

*i* Dimension c, see table above.

AKF 112, 113(S)



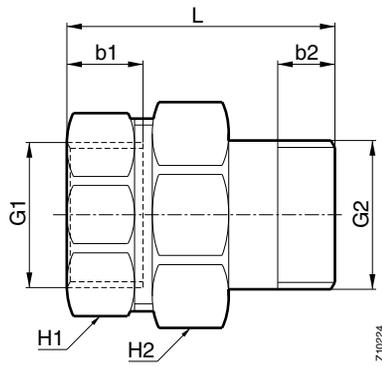
AKM 105, 115(S)



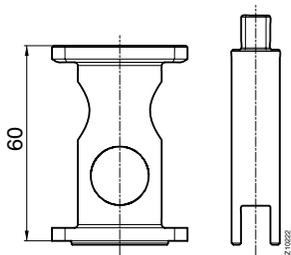
\*) With accessory 0510480001 and 0510480002: ≥ 72 mm

**Accessories**

05603320**	DN	b (mm)	c (mm)	G (inch) ISO 228-1	L (mm)	H (mm)
	15	12	38	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

05602840**	DN	b1 (mm)	b2 (mm)	G1 (inch) ISO 228-1	G2 (inch) ISO 7-1	L (mm)	H1 (mm)	H2 (mm)
 <p>Z10224</p>	15	10	10	G ½	Rp ½	46	26	30
	20	12	12	G ¾	Rp ¾	52	31	37
	25	14	14	G 1	Rp 1	60	40	46
	32	16	16	G 1¼	Rp 1¼	65	50	54
	40	17	17	G 1½	Rp 1½	76	54	64
	50	20	20	G 2	Rp 2	98	69	81

0510420001



0510240011

