



VAI61..



VBI61..

ACVATIX™

2-port and 3-port ball valves PN40

VAI61..
VBI61..

with internally threaded connections

- Brass UNS C35330 (DZR) ball valve body
- DN 15...50
- k_{vs} 1...63 m³/h
- Internally threaded connections Rp as per ISO 7-1
- Angle of rotation 90°
- For use with rotary actuators GQD..9A, GMA..9E with spring-return and GDB..9E, GLB..9E without spring return

Use

For use in heating, ventilating and air conditioning plants as a control or safety shutoff valve.

For closed circuits (avoid cavitation, see page 5).

Type summary

Type		DN	k_{vs} [m ³ /h]	S_v
2-port	3-port			
VAI61.15-1	-	15	1.0	> 500
VAI61.15-1.6	VBI61.15-1.6		1.6	
VAI61.15-2.5	VBI61.15-2.5		2.5	
VAI61.15-4	VBI61.15-4		4.0	
VAI61.15-6.3	VBI61.15-6.3		6.3	
VAI61.15-10	-		10	
VAI61.20-4	VBI61.20-4	20	4	
VAI61.20-6.3	VBI61.20-6.3		6.3	
VAI61.20-10	-		10	
VAI61.25-6.3	-	25	6.3	
VAI61.25-10	VBI61.25-10		10	
VAI61.25-16	-		16	
VAI61.32-10	-	32	10	
VAI61.32-16	VBI61.32-16		16	
VAI61.32-25	-		25	
VAI61.40-16	-	40	16	
VAI61.40-25	VBI61.40-25		25	
VAI61.40-40	-		40	
VAI61.50-25	-	50	25	
VAI61.50-40	VBI61.50-40		40	
VAI61.50-63	-		63	

DN = nominal size

k_{vs} = nominal flow rate of cold water (5...30 °C) through the fully open ball valve at a differential pressure of 100 kPa (1 bar)

S_v = rangeability k_{vs} / k_{vr}

k_{vr} = smallest k_v value at which the flow characteristic tolerances can still be maintained at a differential pressure of 100 kPa (1 bar)

Mounting sets

Type	Description
ASK77.2	Mounting set for rotary actuators GMA..1E with spring-return, for special types with switches or potentiometer
ASK77.3	Mounting set for rotary actuators GDB..1E and GLB..1E without spring-return, for special types with switches or potentiometer
ASK77.4	Mounting set for rotary actuators GQD..1A with spring-return, for special types with switches or potentiometer

Note: GAP19../GNP19.. are not compatible with mounting set ASK77.2.

Ordering

When ordering please give type, stock number, description and quantity.

Example:

Type	Stock No.	Description	Quantity
VAI61.25-16	VAI61.25-16	Ball valve	2
GLB161.9E	GLB161.9E	Rotary actuator	2

Delivery

Ball valves, rotary actuators and mounting sets are supplied in separate packaging and not assembled prior to delivery.

Spare parts, Rev. no.

See overview, page 10.

Equipment combinations

Type	Rotary actuators							
	GQD..9A		GDB..9E		GMA..9E		GLB..9E	
	Δp_{\max}	Δp_s	Δp_{\max}	Δp_s	Δp_{\max}	Δp_s	Δp_{\max}	Δp_s
Ball valve	[kPa]							
VAI61.15..	350	1'400	350	1'400	350	1'400	350	1'400
VAI61.20..								
VAI61.25..								
VAI61.32-10	350	1'400	350	1'400	350	1'000	350	1'000
VAI61.32-16					240		240	
VAI61.32-25					350	800	350	800
VAI61.40-16					240		240	
VAI61.40-25					350	600	350	600
VAI61.50-25					240		240	
VAI61.50-40	350	1'400	350	1'400	350	1'400	350	1'400
VAI61.50-63								
VBI61.15..	350	1'400	350	1'400	350	1'400	350	1'400
VBI61.20..								
VBI61.25-10								
VBI61.32-16	350	1'400	350	1'400	240	800	240	800
VBI61.40-25					240		240	
VBI61.50-40					240		240	
VBI61.50-40					240		240	

Δp_{\max} = maximum permissible differential pressure across ball valve's control path, valid for the entire actuating range of the motorized ball valve; for low noise operation, we recommend a maximum permissible differential pressure of 200 kPa

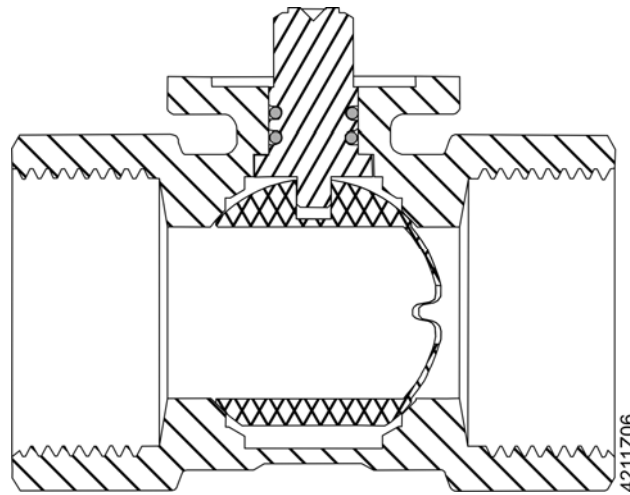
Δp_s = maximum permissible differential pressure at which the motorized ball valve will close securely against the pressure (close off pressure)

Rotary actuator overview

Type / Stock no.	Actuator type	Operating voltage	Positioning signal	Positioning time	Spring return function	Spring return time	Data Sheet
GQD131.9A	Electro-motoric	AC/DC 24 V	3-position	30/15 s ¹⁾	Yes	15 s	N4659
GQD161.9A			DC 0...10 V				
GDB331.9E	Electro-motoric	AC 230 V	3-position	150 s			N4657
GDB131.9E		AC 24 V					
GDB161.9E							
GMA131.9E	Electro-motoric	AC 24 V	3-position	90/15 s ¹⁾	Yes	15 s	N4658
GMA161.9E			DC 0...10 V				
GLB331.9E	Electro-motoric	AC 230 V	3-position	150 s			N4657
GLB131.9E		AC 24 V					
GLB161.9E							

¹⁾ open/close

Ball valve cross-section

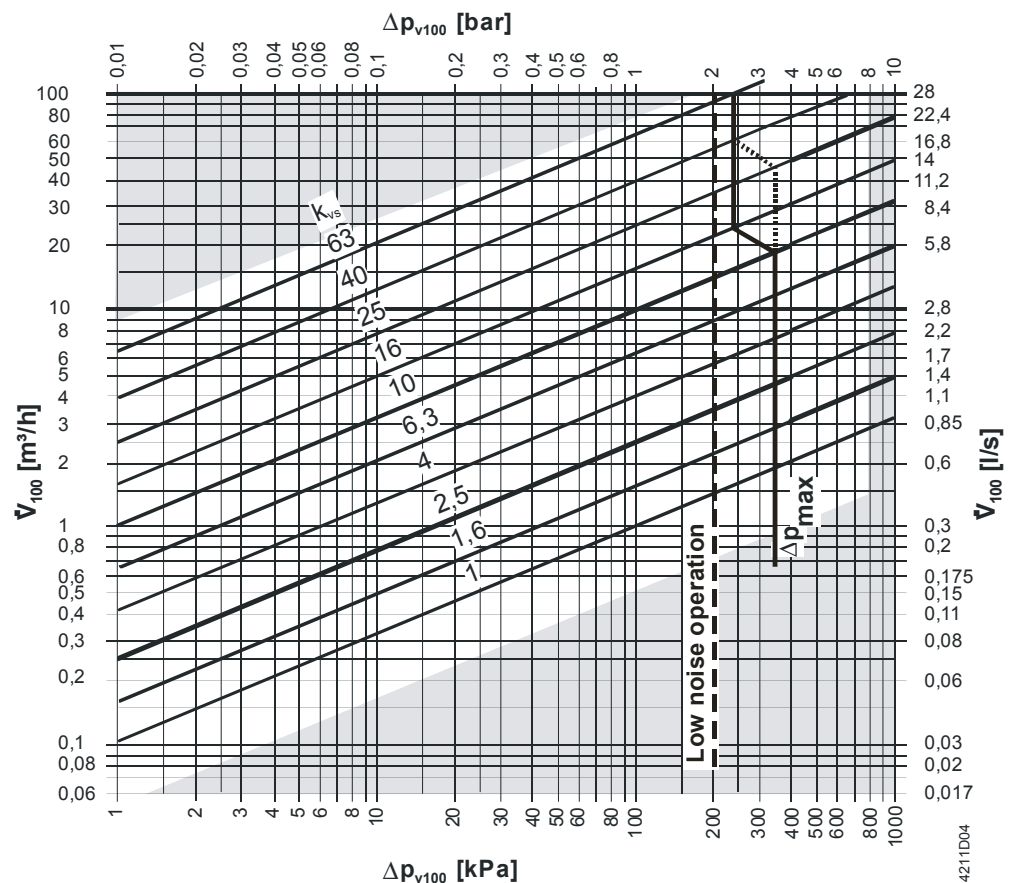


Ball with integrated control characteristic

Special PTFE seat ring design for low torque operation

Sizing

Flow diagram



----- Δp_{max} for VAI61.. and VBI61.. see table equipment combinations for details

Δp_{max} = maximum permissible differential pressure across the ball valve, valid for the entire actuating range of the motorized ball valve; for low noise operation, we recommend a maximum permissible differential pressure of 200 kPa

Δp_{v100} = differential pressure across the fully open ball valve and the ball valve's control path at a volumetric flow V_{100}

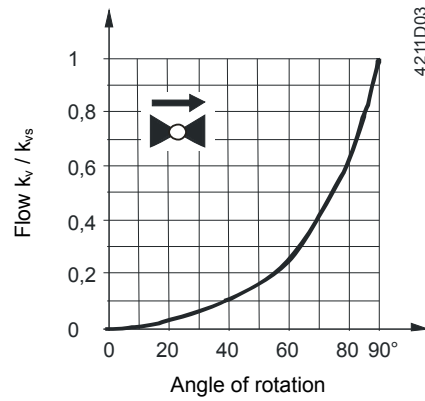
V_{100} = volumetric flow through the fully open ball valve

100 kPa = 1 bar \approx 10 mWC

1 m³/h = 0.278 l/s water at 20 °C

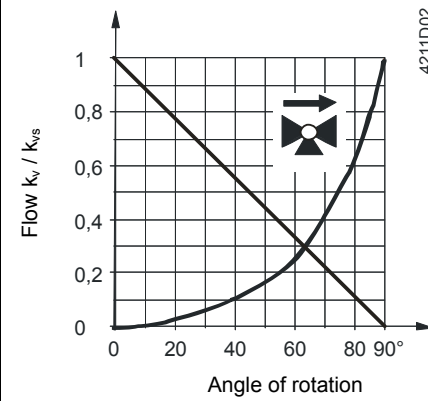
Ball valve flow characteristic

2-port



0...100 %: → equal-percentage, $n_{gl} = 3.9$
as per VDI / VDE 2173

3-port

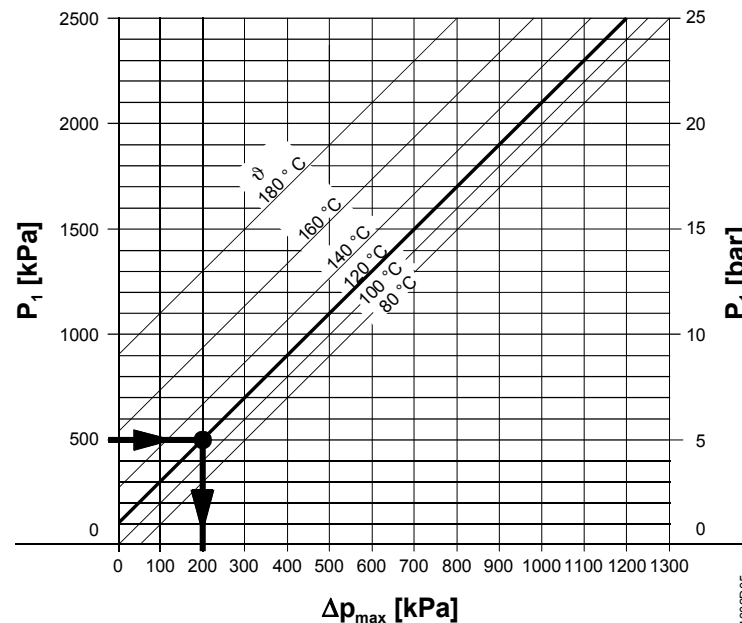


Through-port 0...100 %: → equal-percentage,
 $n_{gl} = 3.9$ as per
VDI / VDE 2173

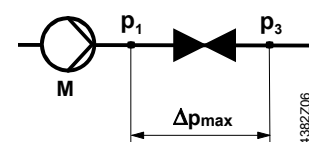
Bypass 0...100 %: → linear

Cavitation

Cavitation accelerates wear on the ball and seat, and also results in undesirable noise. Cavitation can be avoided by not exceeding the differential pressure shown in the flow diagram on page 4, and by adhering to the static pressures shown below.



Δp_{max} = differential pressure with ball valve almost closed at which cavitation can largely be avoided
 p_1 = static pressure at ball valve inlet
 p_3 = static pressure at ball valve outlet
 M = pump
 ϑ = water temperature



High temperature
hot water example:

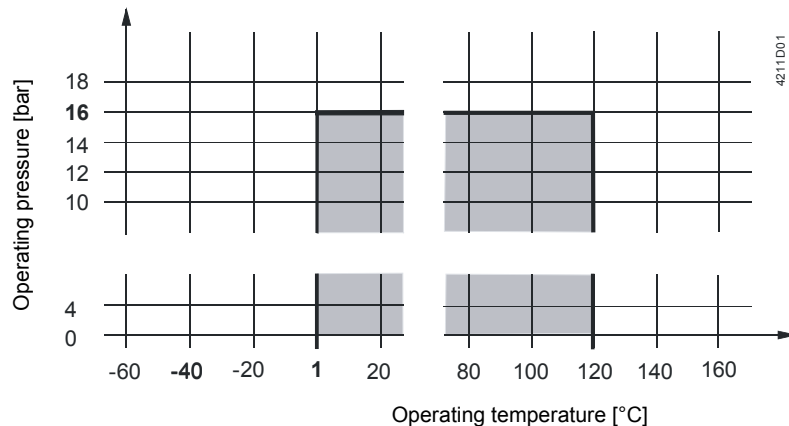
Pressure p_1 at ball valve inlet: 500 kPa (5 bar)
Water temperature: 120 °C

From the diagram above, it will be seen that with the ball valve almost closed, the maximum permissible differential pressure Δp_{max} is 200 kPa (2 bar).

Note on chilled water

To avoid cavitation in chilled water circuits, ensure sufficient counter-pressure at the ball valve's outlet, e.g. with an additional throttling ball valve downstream from the ball valve. Select the maximum differential pressure across the ball valve according to the 80 °C curve in the flow diagram above.

Operating pressure and temperature
Fluids



Operating pressure and medium temperature as per ISO 7005

Current local legislation must be observed.

Notes

Engineering

We recommend installation in the return pipe, as the temperatures in this pipe are lower for applications in heating systems, which extends the stem sealing gland's life.

Ensure cavitation-free flow (refer to page 5).

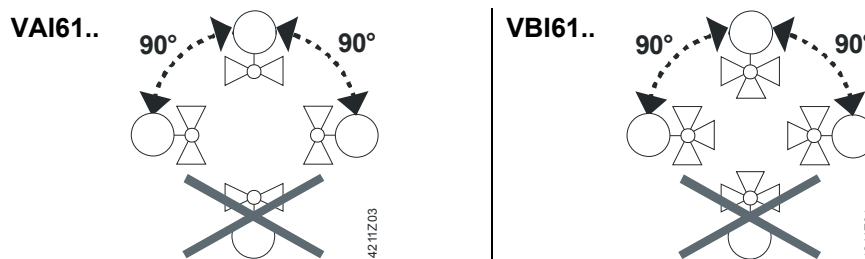
Always use a strainer upstream of the ball valve to increase the ball valve's functional safety.

Mounting

Ball valve and rotary actuator can easily be assembled on site. Neither special tools nor adjustments are required.

The ball valve is supplied with Mounting Instructions (VAI61.., VBI61..: 74 319 0647 0.

Orientation



Direction of flow

When mounting, pay attention to the ball valve's flow direction symbol.



Commissioning

Commission the ball valve only if the rotary actuator has been mounted correctly.

Ball valve stem moves counterclockwise: Ball valve opens = increasing flow
Ball valve stem moves clockwise: Ball valve closes = decreasing flow

Maintenance

VAI61.. and VBI61.. ball valves are maintenance-free.

Warning

When doing service work on the ball valve / rotary actuator:

- Deactivate the pump and turn off the power supply
- Close the shutoff ball valves
- Fully reduce the pressure in the piping system and allow pipes to completely cool down

If necessary, disconnect the electrical wires.

Before putting the ball valve into operation again, make sure the rotary actuator is correctly fitted.

Disposal



Before disposal, the ball valve must be dismantled and separated into its various constituent materials.

Legislation may demand special handling of certain components, or it may be sensible from an ecological point of view.

Current local legislation must be observed.

Warranty

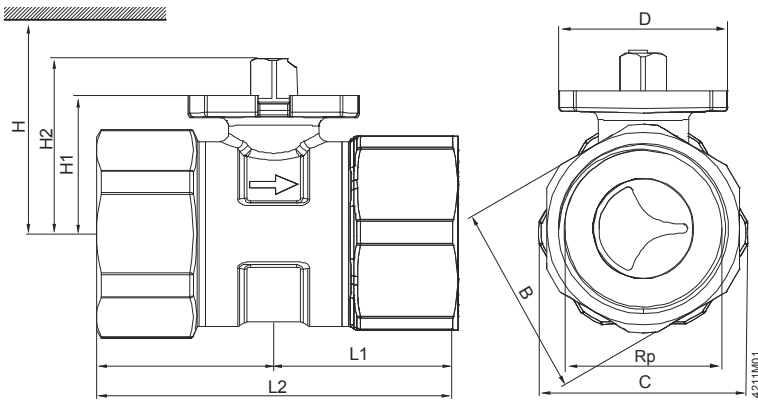
The technical data given for applications is valid only in conjunction with the Siemens rotary actuators listed under "Equipment combinations", page 3.

All terms of the warranty will be invalidated if rotary actuators of other manufacture are used.

Technical data

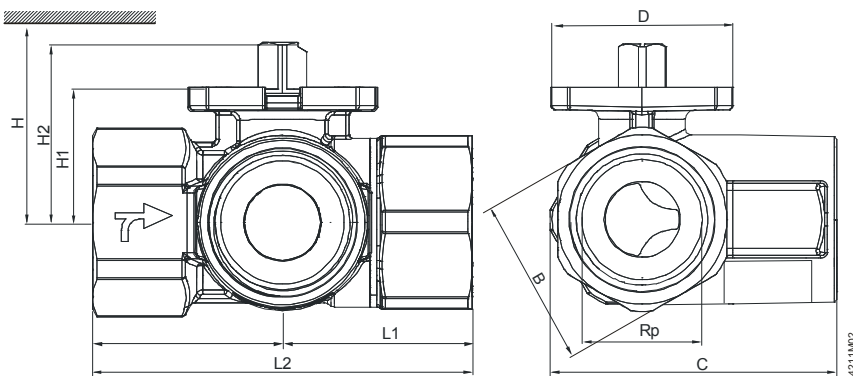
	VAI61..	VBI61..	
Functional data	PN class	PN 40 as per ISO 7268	
	Operating pressure	To ISO 7005 within the permissible medium temperature range according to diagram on page 6	
	Ball valve characteristic		
	Through-port 0...100 %	equal-percentage; $n_{gl} = 3.9$ as per VDI / VDE 2173	equal-percentage; $n_{gl} = 3.9$ as per VDI / VDE 2173
	Bypass 0...100 %		linear
	Leakage rate		
	Through-port	0...0.001 % of k_{vs} value	0...0.001 % of k_{vs} value
	Bypass		< 1 % of k_{vs} value
	Permissible media	Cold water, chilled water, low temperature hot water, high temperature hot water, water with anti-freeze. Recommendation: water treatment to VDI 2035	
	Medium temperature	1...120 °C	
	Rangeability S_v	> 500	
Angle of rotation	90 °		
Materials	Ball valve body	Brass UNS C35330 (DZR)	
	Ball	Brass UNS C35330 (DZR), chromium-plated	
	Stem	Brass UNS C35330 (DZR)	
	Gland	EPDM O-rings	
Dimensions / weight	Refer to "Dimensions" below		
	Internally threaded connections	Rp as per ISO 7-1	
Standards	Pressure Equipment Directive	PED 97/23/EC	
	Pressure accessories	As per article 1, section 2.1.4	
	Fluid group 2	Without CE marking as per article 3, section 3 (sound engineering practice)	
	Environmental compatibility	ISO 14001 (Environment) ISO 9001 (Quality) SN 36350 (Environmentally compatible products) RL 2002/95/EC (RoHS)	

Dimensions



- DN = Nominal size
 H = Total actuator height plus minimum distance to the wall or the ceiling for mounting, connection, operation, service, etc.
 H1 = Dimension from the pipe centre to install the actuator (upper edge)

Type	DN	B [mm]	C [mm]	D [mm]	Rp [Inch]	L1 [mm]	L2 [mm]	H1 [mm]	H2 [mm]	H				[kg]
										GQD..9A [mm]	GDB..9E [mm]	GMA..9E [mm]	GLB..9E [mm]	
VAI61.15..	15	26	31 ¹⁾	42	Rp 1/2	31	62	27.6	37.6	> 300	> 310	>300	>300	0.3
VAI61.20..	20	31	34	42	Rp 3/4	33	68	27.6	37.6			>310	>310	0.35
VAI61.25..	25	39	42.5	42	Rp 1	38.5	77	30.5	40.5			>310	>310	0.5
VAI61.32..	32	48	52	42	Rp 1 1/4	44	88	34.3	44.3					0.7
VAI61.40..	40	55	61	42	Rp 1 1/2	48.5	102	39.8	49.8			>320	>320	1.1
VAI61.50..	50	67	74	42	Rp 2	56.5	119	52.8	62.8			>335	>335	1.8



- DN = Nominal size
 H = Total actuator height plus minimum distance to the wall or the ceiling for mounting, connection, operation, service, etc.
 H1 = Dimension from the pipe centre to install the actuator (upper edge)

Type	DN	B [mm]	C [mm]	D [mm]	Rp [Inch]	L1 [mm]	L2 [mm]	H1 [mm]	H2 [mm]	H				[kg]
										GQD..9A [mm]	GDB..9E [mm]	GMA..9E [mm]	GLB..9E [mm]	
VBI61.15..	15	26	48.5 ¹⁾	42	Rp 1/2	33.5	67	24.2	33.7	> 300	> 310	>300	>300	0.29
VBI61.15-6.3			49.5 ¹⁾					27.6	37.6					0.305
VBI61.20..	20	31	52	42	Rp 3/4	36	72	27.6	37.6			>310	>310	0.375
VBI61.25..	25	39	64.5	42	Rp 1	42.5	85	30.5	40.5			>310	>310	0.605
VBI61.32..	32	48	76.5	42	Rp 1 1/4	49.5	99	34.3	44.3					0.95
VBI61.40..	40	55	84.5	42	Rp 1 1/2	55	110	39.8	49.8			>320	>320	1.365
VBI61.50..	50	67	102.5	42	Rp 2	65.5	131	52.8	62.8			>335	>335	2.215

¹⁾ Body larger than union nut

Spare parts

None

Revision numbers

Product number	Valid from rev. no.	Product number	Valid from rev. no.
VAI61.15-1	..A		
VAI61.15-1.6	..A	VBI61.15-1.6	..A
VAI61.15-2.5	..A	VBI61.15-2.5	..A
VAI61.15-4	..A	VBI61.15-4	..A
VAI61.15-6.3	..A	VBI61.15-6.3	..A
VAI61.15-10	..A		
VAI61.20-4	..A	VBI61.20-4	..A
VAI61.20-6.3	..A	VBI61.20-6.3	..A
VAI61.20-10	..A	VBI61.20-10	..A
VAI61.25-6.3	..A		
VAI61.25-10	..A	VBI61.25-10	..A
VAI61.25-16	..A		
VAI61.32-10	..A		
VAI61.32-16	..A	VBI61.32-16	..A
VAI61.32-25	..A		
VAI61.40-16	..A		
VAI61.40-25	..A	VBI61.40-25	..A
VAI61.40-40	..A		
VAI61.50-25	..A		
VAI61.50-40	..A	VBI61.50-40	..A
VAI61.50-63	..A		