

ACVATIX™

2-port and 3-port control ball valves, PN 40, with externally threaded connection

VAG61.., VBG61..



For use in heating, ventilation, and air conditioning plants as control or shutoff valve. In closed circuits.

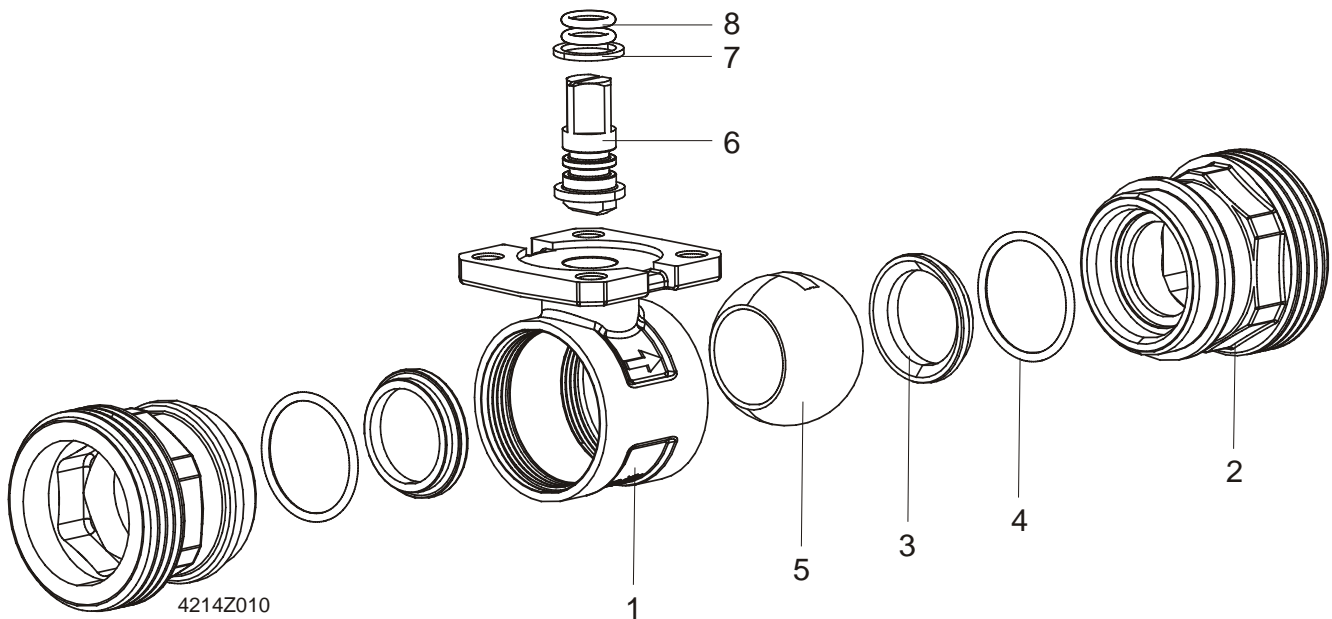
- Ball valve body made of brass CW602N (DZR)
- DN 15...50
- kvs 1...63 m³/h
- Flat sealing, externally threaded connections G..B, as per ISO 228-1
- Fitting sets ALG.. with threaded connection
- Rotational angle 90°
- Can be combined with electromotoric rotary actuators GQD..9A, GMA..9E.. with Spring return and GSD161.9A, GDB..9E.., GLD161.9E.., GLB..9E.., GDD161.9E without spring return, including modbus variants
- For applications with auxiliary functions (e.g. auxiliary switches, potentiometers, standard rotary actuators from the DAC product range can also be combined)

Features

- **Moderately price:**
Optimized flow rates mean smaller ball valves can be selected. Low torque means you can combine them with small, less expensive rotary actuators.
- **Long life expectancy:**
Maintenance-free construction, also thanks to low friction stem and polished ball made of chrome-plated DZR brass.
- **Simple mounting:**
The brackets, premounted on the actuators, means you can mount them on the ball valves without tools.

Technical design

Design



1 Housing

3 Seat

5 Marble

7 Slide clutch

2 Connection with external threading

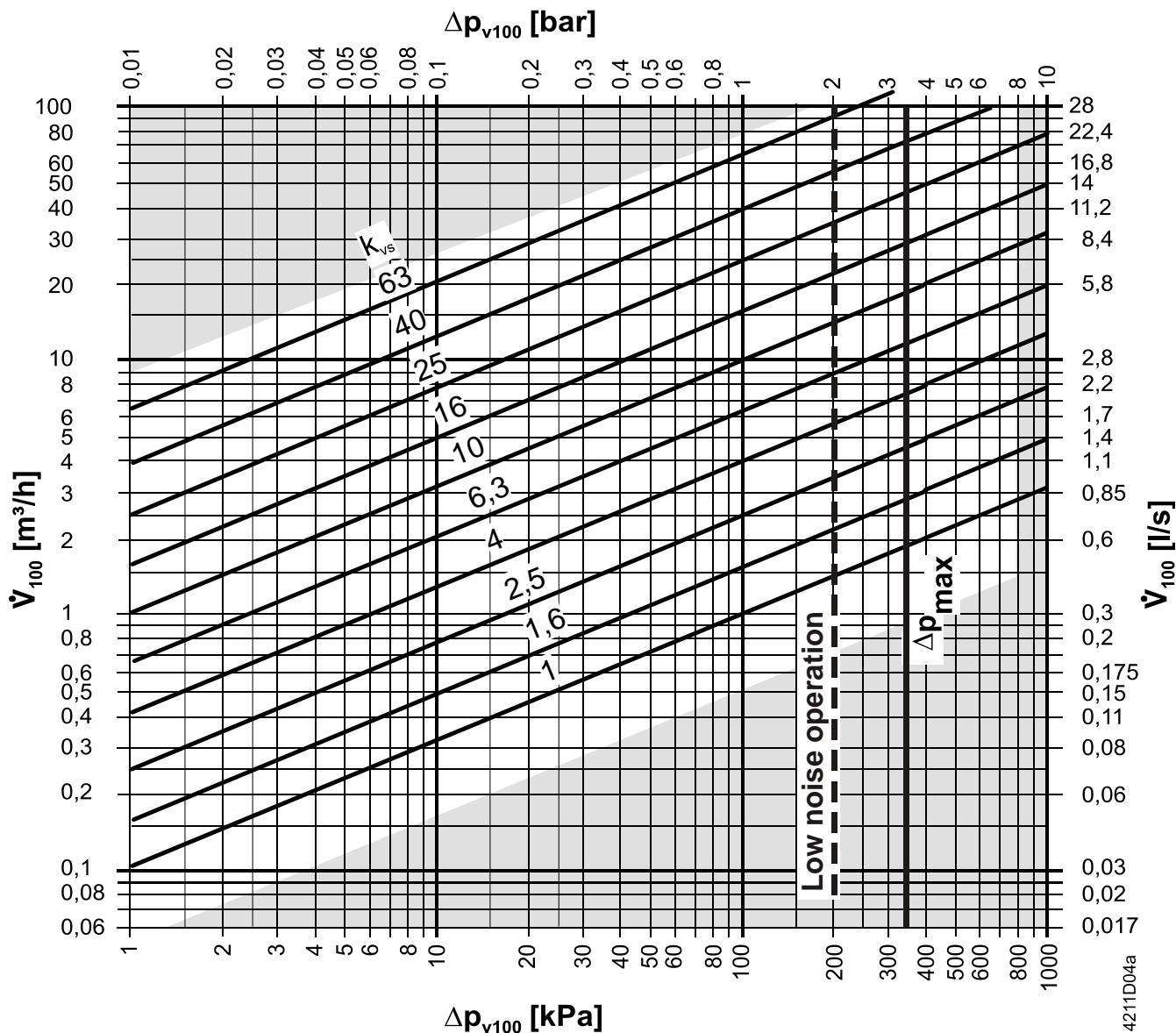
4 O-ring seal

6 Stem, squared

8 O-ring seal

Sizing

Flow diagram:



4211D04a

--- Δp_{max} for VAG61.. and VBG61..., for details, see table on equipment combinations

Δp_{max} = Maximum permissible differential pressure over the ball valve, valid for the entire positioning range of the ball valve rotary actuator unit; if low noise operation is desired, we recommend a maximum permissible differential pressure of 200 kPa

Δp_{v100} = Differential pressure over the fully opened ball valve and over the control path at a volume flow \dot{V}_{100}

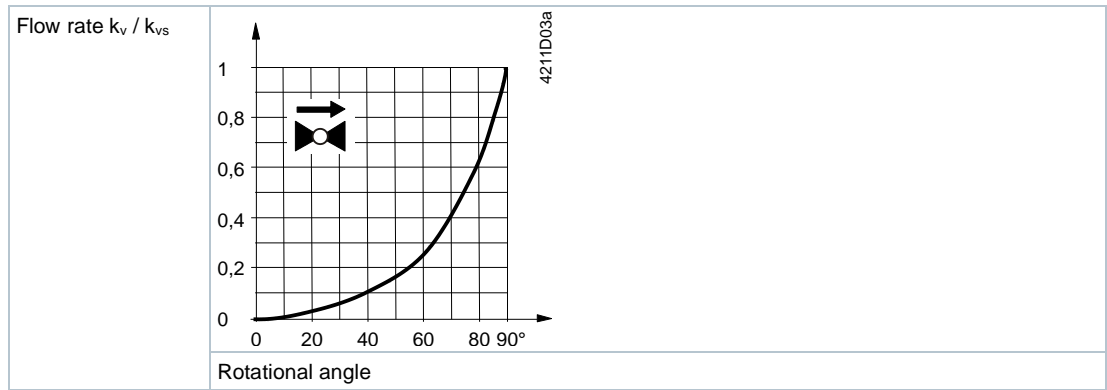
\dot{V}_{100} = Volume flow through the fully opened ball valve

100 kPa = 1 bar \approx 10 mWS

1 m^3/h = 0.278 l/s water at 20 °C

Ball valve characteristic curve

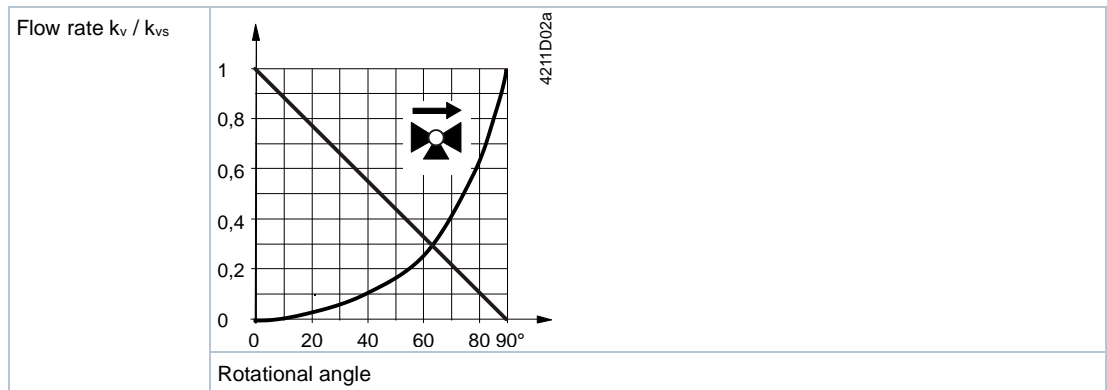
Through-port



Flow characteristics

0...100 % -> A – AB equal percentage, $n_{gl} = 3.9$ per VDI / VDE 2173

3-port



Through-port

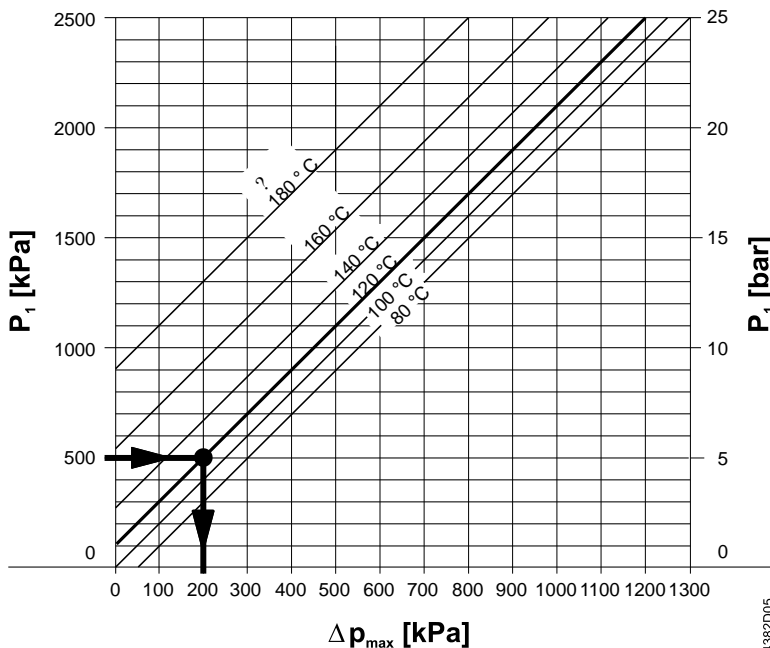
0...100 % -> A – AB equal percentage, $n_{gl} = 3.9$ per VDI / VDE 2173

Bypass

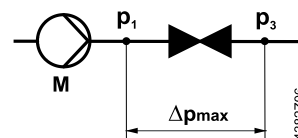
0...100 % -> B – AB linear, k_{vS} greater than 70 % of A – AB

Cavitation

Cavitation increases wear and tear of the ball and seat and results in unwanted noise. Cavitation can be prevented by not exceeding the differential pressures as per the flow diagram and maintaining the static pressures depicted below.



- Δp_{max} = Differential pressure at a nearly closed ball valve to largely avoid cavitation
- p_1 = Static pressure at the ball valve inlet
- P_3 = Static pressure at the ball valve outlet
- M Pump
- J Water temperature



Example with hot water:

Pressure p_1 at ball valve inlet: 500 kPa (5 bar)

Water temperature: 120 °C

The above diagram clearly indicates that the maximum permissible differential pressure is $\Delta p_{max} \rightarrow 200$ kPa (2 bar) at a nearly closed ball valve.

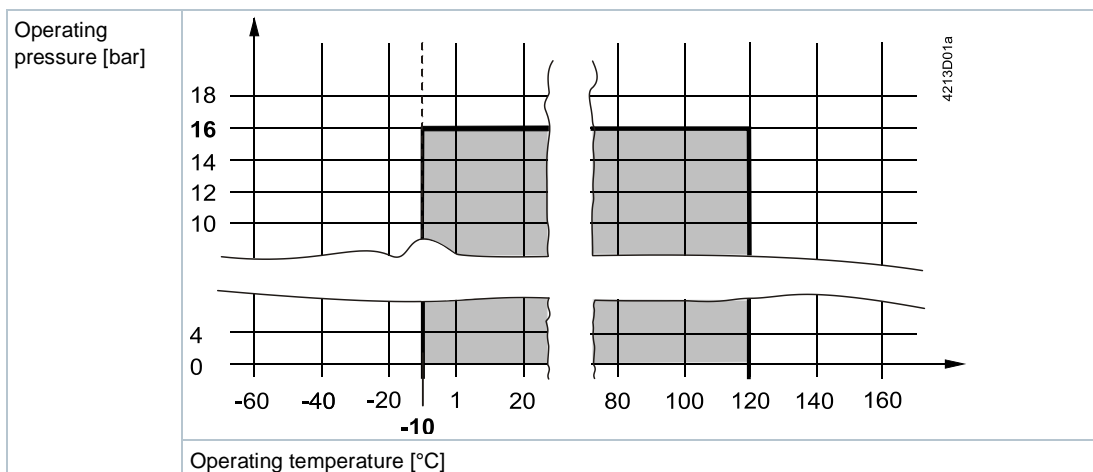
Note on chilled water applications

To prevent cavitation in chilled water circuits, sufficient counter pressure must be supplied to the ball valve outlet, e.g. using an additional butterfly valve downstream of the ball valve.

Maximum permissible differential pressure over the ball valve: See 80 °C curve in the above diagram.

Operating pressure and operating temperature

Liquids:



Operating pressure and medium temperature per ISO 7005
(Observe all local and applicable laws).

Type summary

Type				DN	k _{vs} [m ³ /h]	S _v
Control ball valve 2-port		Control ball valve 3-port				
Product no.	Stock number	Product no.	Stock number			
VAG61.15-1	S55230-V100	—	—	15	1.0	> 500
VAG61.15-1.6	S55230-V101	VBG61.15-1.6	S55230-V120		1.6	
VAG61.15-2.5	S55230-V102	VBG61.15-2.5	S55230-V121		2.5	
VAG61.15-4	S55230-V103	VBG61.15-4	S55230-V122		4.0	
VAG61.15-6.3	S55230-V104	VBG61.15-6.3	S55230-V123		6.3	
VAG61.20-4	S55230-V105	VBG61.20-4	S55230-V124	20	4	
VAG61.20-6.3	S55230-V106	VBG61.20-6.3	S55230-V125		6.3	
VAG61.20-10	S55230-V107	—	—		10	
VAG61.25-6.3	S55230-V108	—	—	25	6.3	
VAG61.25-10	S55230-V109	VBG61.25-10	S55230-V126		10	
VAG61.25-16	S55230-V110	—	—		16	
VAG61.32-10	S55230-V111	—	—	32	10	
VAG61.32-16	S55230-V112	VBG61.32-16	S55230-V127		16	
VAG61.32-25	S55230-V113	—	—		25	
VAG61.40-16	S55230-V114	—	—	40	16	
VAG61.40-25	S55230-V115	VBG61.40-25	S55230-V128		25	
VAG61.40-40	S55230-V116	—	—		40	
VAG61.50-25	S55230-V117	—	—	50	25	
VAG61.50-40	S55230-V118	VBG61.50-40	S55230-V129		40	
VAG61.50-63	S55230-V119	—	—		63	



DN = Nominal size

k_{vs} = Flow nominal value for chilled water (5...30 °C) through a fully opened ball valve at a differential pressure of 100 kPa (1 bar)

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

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

Temperature adapter ALJ100

	 DANGER
	<p>Hazard to life for the combination ALJ100 with GMA and ASK77.2!</p> <p>Combining temperature adapter ALJ100 with ASK77.2 and rotary actuator GMA operated at AC 230 V ~ or rotary actuator GMA with auxiliary switch voltage AC 230 V ~ can result in life-threatening shocks if used inappropriate.</p> <ul style="list-style-type: none"> • Never combine rotary actuator GMA operated at voltage of AC 230 V ~ with temperature adapter ALJ100. • Never combine rotary actuator GMA with auxiliary switch voltage AC 230 V ~ with temperature adapter ALJ100.

Type	Stock number	Description
ALJ100	S55846-Z115	Temperature adapter for ball valves

Fittings

Type	Article number	Description
ALG..2	BPZ:ALG..2	2 piece fittings set for 2-port valves, existing of 2 cap nuts, 2 insert nuts, and 2 flat seals. ALG..2B are fittings made of brass for media temperatures up to 100 °C
ALG..2B	S55846-Z1..	
ALG..3	BPZ:ALG..3	3 piece fittings set for 3-port valves, existing of 3 cap nuts, 3 insert nuts, and 3 flat seals. ALG..3B are fittings made of brass for media temperatures up to 100 °C
ALG..3B	S55846-Z1..	

Equipment combinations

Type	Rotary actuators													
	GQD..9A		GSD161.9A		GDB..9E..		GMA..9E..		GLD161.9E..		GLB..9E..		GDD161.9E	
	Δp_{max}	Δp_s	Δp_{max}	Δp_s	Δp_s	Δp_{max}	Δp_{max}	Δp_s	Δp_{max}	Δp_s	Δp_{max}	Δp_s	Δp_{max}	Δp_s
	[kPa]													
VAG61.15..														
VAG61.20..	350	1400	350	1400	350	1400		1400		1400		1400	350	1400
VAG61.25..														
VAG61.32-10														
VAG61.32-16								1000		1000		1000		
VAG61.32-25														
VAG61.40-16							350		350		350			
VAG61.40-25	—	—	—	—	—	—		800		800		800	—	—
VAG61.40-40														
VAG61.50-25														
VAG61.50-40								600		600		600		
VAG61.50-63														
VBG61.15..														
VBG61.20..	350		350		350								350	
VBG61.25-10		—		—		—	350	—	350	—	350	—		—
VBG61.32-16														
VBG61.40-25	—		—		—								—	
VBG61.50-40														

Δp_{max} = Maximum permissible differential pressure over the valve ball control path, valid for the entire positioning range of the ball valve rotary actuator unit; if low noise operation is desired, we recommend a differential pressure of 200 kPa

Δp_s = Maximum permissible differential pressure (closing pressure) at which the ball valve rotary actuator unit securely closes against the pressure

Overview of rotary actuators for ball valves

Type ¹⁾		Operating voltage	Positioning		Spring return		Data sheet
Product no.	Stock number		Signal	Time	Function	Time	
GQD131.9A ²⁾	BPZ:GQD131.9A	AC/DC 24 V	3-position	30/15 s ³⁾	Yes	15 s	N4659
GQD161.9A ²⁾	BPZ:GQD161.9A		DC 0...10 V				
GSD161.9A ²⁾	S55499-D232	AC/DC 24 V	DC 0...10 V	30 s	—	—	A6V10636056
GDB141.9E ²⁾	S55499-D200	AC/DC 24 V	2 or 3 point	150 s	—	—	—
GDB341.9E ²⁾	S55499-D201	AC 100-240 V					—
GDB161.9E ²⁾	S55499-D275	AC/DC 24 V	0/2...10 V	150 s	—	—	A6V10636150
GDB161.9E/MO ²⁾	S55499-D682	AC/DC 24 V	Modbus RTU				
GMA131.9E	BPZ:GMA131.9E	AC/DC 24 V	3-position	90/15 s ³⁾	Yes	15 s	N4658
GMA161.9E	BPZ:GMA161.9E		DC 0...10 V				
GMA161.9E/MO	S55499-D683		Modbus RTU				
GLD161.9E	S55499-D278	AC 24 V / DC 24...48 V	DC 0/2...10 V	30 s	—	—	A6V11171770
GLD161.9E/MO	S55499-D695		Modbus RTU				
GLB141.9E	S55499-D204	AC/DC 24 V	2 or 3 point	150 s	—	—	A6V10636203
GLB341.9E	S55499-D205	AC 100-240 V					
GLB161.9E	S55499-D277	AC/DC 24 V	0/2...10 V	150 s	—	—	A6V10881143
GLB161.9E/MO	S55499-D681	AC 24 V	Modbus RTU				
GLB111.9E/MO	S55499-D206		AC 24 V	Modbus RTU	150 s	—	—
GDB111.9E/MO ²⁾	S55499-D202						
GLB111.9E/KN	S55499-D207	AC 24 V	KNX-TP	150/120 s	—	—	A6V10754768
GDB111.9E/KN ²⁾	S55499-D203						
GDD161.9E ²⁾	S55499-D736	AC/DC 24 V	DC 0/2...10 V	30 s	—	—	A6V12725064

¹⁾ Actuator type: Electromotive

²⁾ Actuator only approved for medium temperature > 0 °C

³⁾ Open/close

Ordering

Please indicate material, article type, order text, and quantity; example:

Material	Article type	Order text	Quantity
VAG61.25-16	VAG61.25-16	Ball valve, externally threaded, 2-port	2
GLB161.9E	GLB161.9E	Actuator for ball valve, NSR	2

Delivery

Ball valves, rotary actuators, and mounting kits are not assembled and are delivered in individual packaging.

Applications with auxiliary functions

A standard actuator with corresponding functionality can be used if a ball valve application requires a rotary actuator with auxiliary functions (e.g. auxiliary switch or potentiometer). In this case, mounting kit ASK77.x is required in **addition** to the rotary actuator.

Follow the mounting instructions when mounting.

Rotary actuator	Options	Order text: Mounting kit
GMA..1E (with spring return)	Potentiometer, auxiliary switch	ASK77.2 Accessory Kit BV for GMAxx1.9E
GDB..1E / GLB..1E (without spring return)	Potentiometer, auxiliary switch	ASK77.3 Accessory Kit BV for GLBxx1.9E
GQD..1A (with spring return)	Auxiliary switch	ASK77.5 Accessory Kit BV for GQDxx1.9A
GSD..1A ¹⁾ (without spring return)	Auxiliary switch	ASK77.5 Accessory Kit BV for GSDxx1.9A

Note

¹⁾ GSD141.1A (S55499-D281) and GSD341.1A (S55499-D282) are not compatible with ball valves.


Product documentation


Related documents such as environmental declarations, CE declarations, etc., can be downloaded at the following Internet address:

<http://siemens.com/bt/download>

Notes

Safety

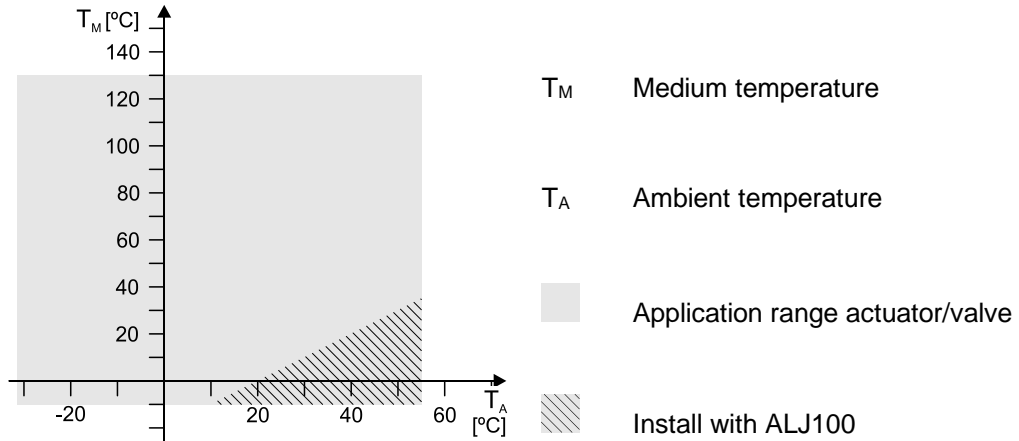
	<p>⚠ DANGER</p>
	<p>There is a risk to operating personnel and device when working on the unit Failure to comply with these safety notes can result in personal injury and damage to property from pipe pressure, electrical voltage, or device in operation.</p> <p><input type="checkbox"/> Note the following when servicing a ball valve/rotary actuator:</p> <ul style="list-style-type: none"> • Switch off both pump and operating voltage. • Close shutoff valves. • Release pressure in the pipes and allow them to cool down completely. • Disconnect electrical connections from the terminals as needed. • The rotary actuator must be properly installed prior to recommissioning the ball valve.

	<p>⚠ CAUTION</p>
	<p>National safety regulations Failure to comply with national safety regulations may result in personal injury and property damage.</p> <ul style="list-style-type: none"> • Observe national provisions and comply with the appropriate safety regulations.

Engineering

We recommend installing the ball valve with spring return since temperatures are lower on heating plants which increases the lifespan of the sealing gland on the stem.
 Ensure there is no cavitation (see Section Technical design [→ 2]).
 A filter must be installed upstream of the ball valve to increase functional safety.

We recommend using temperature adapter ALJ100 in locations exposed to condensation to protect the actuator. Lubricate the adapter axle with silicon grease at medium temperatures $\leq 0\text{ }^{\circ}\text{C}$.



Only use GDB.., GSD.., QGD.. and GDD actuators at medium temperatures $> 0\text{ }^{\circ}\text{C}$.

Permissible media

Using the ball valve together with potassium formate-based media can result in leakage over the stem to the outside. The reason is the high level of penetration at low surface tension of media based on potassium formate.

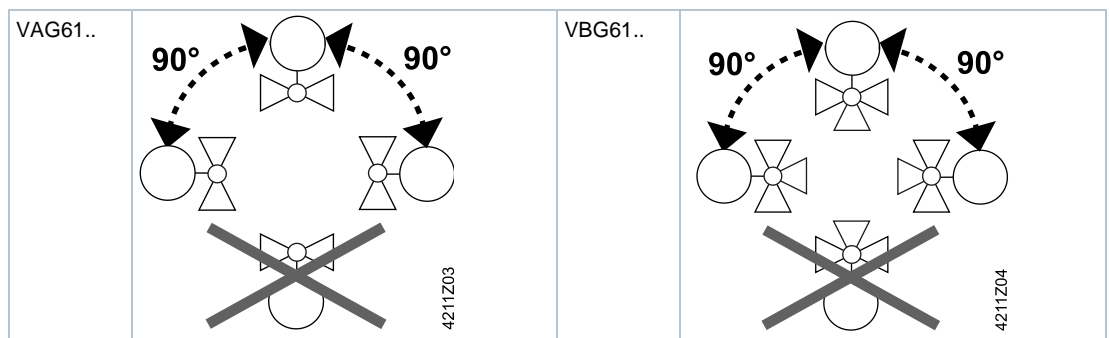
Siemens rejects any and all liability for damages or consequential damages resulting from the use of this media together with our ball valves.

Mounting

It is easy to assemble the ball valve and rotary actuator; it can be done at the construction site. No special tools or settings required.

Ball valve VAG61.. / VBG61.. is supplied together with mounting instructions M4212 (7431909220).

Mounting position



Pipe connection

Avoid leakage:

- Install fittings as per ISO 7-1. Ball valves (internal threading) = "Rp"; Piping (external threading) = "R".
- Do not use too much hemp or PTFE tape.
- Do not tighten pipe threading to the very end.
- Place the pliers/wrench on the ball valve union nut that is closer to the pipe to be tightened or loosened.

Flow direction

Make sure that the valve is mounted in the proper flow direction. A symbol is applied to the ball valve body:



Ball valve	Laser marking	Position as delivered	90 ° turned (clockwise)
VAG61.. Control ball valve 2-port	-	<p>A – AB = 100 %</p>	<p>A – AB = 0 %</p>
VBG61.. Control ball valve 3-port		<p>A – AB = 100 % B – AB = 0 %</p>	<p>A – AB = 0 % B – AB = 100 %</p>

Maintenance

Ball valves VAG61.. and VBG61.. are maintenance free.

Disposal

Do not dispose of the device as part of domestic waste.

- Special handling of individual components may be required by law or make ecological sense.
- Adhere to all local and currently applicable laws and regulations.

Warranty

Technical data on specific applications are valid only together with Siemens products listed under "Equipment combinations". Siemens rejects any and all warranties in the event that third-party products are used.

Functional data		
	VAG61..	VBG61..
PN class	PN 40 per ISO 7268	
Operating pressure	Per ISO 7005 within the permissible media temperature as per Section Technical design [→ 2]	
Ball valve characteristic curve Through-port: 0...100 %	Equal percentage, $n_{gl} = 3.9$ per VDI / VDE 2173	
Ball valve characteristic curve Bypass: 0...100 %	—	Linear
Leakage through-port	Water proof per EN 60534-4 L/1, improved class 5	Water proof per EN 60534-4 L/1, improved class 4
Leakage bypass	-	< 1 %
Permissible media	Chilled water, low temperature hot water, hot water, water with antifreeze. Recommendation: Water treatment per VDI 2035 Note: Page 11	
Medium temperature	-10...120 °C ¹⁾	
Rangeability Sv	> 500	
Rotational angle	90 °	

Materials	
Ball valve body	Dezincification-resistant hot-pressed brass (DZR ²⁾), CW602N
Marble	Dezincification-resistant hot-pressed brass (DZR ²⁾), CW602N, chrome plated
Stem	Dezincification-resistant hot-pressed brass (DZR ²⁾), CW602N
Sealing gland	EPDM-O rings

Dimensions / Weight	
See Dimensions [→ 14]	
Connections with external threading	G..B per ISO 228-1

Standards, directives and approvals	
Pressure Equipment Directive	DGR 2014/68/EU
Pressure accessories	Range: Article 1, para. 1 Definition: Article 2, para. 5
Fluid group 2	Without CE certification as per article 3, para. 3 (generally applicable engineering practice) ³⁾
EAC compliance	Eurasian compliance
Environmental compatibility	Environmental Declaration CE1E4212en ⁴⁾ contains data on environmental-compatible product design and assessment (RoHS compliance, compositions, packaging, environmental benefits and disposal).

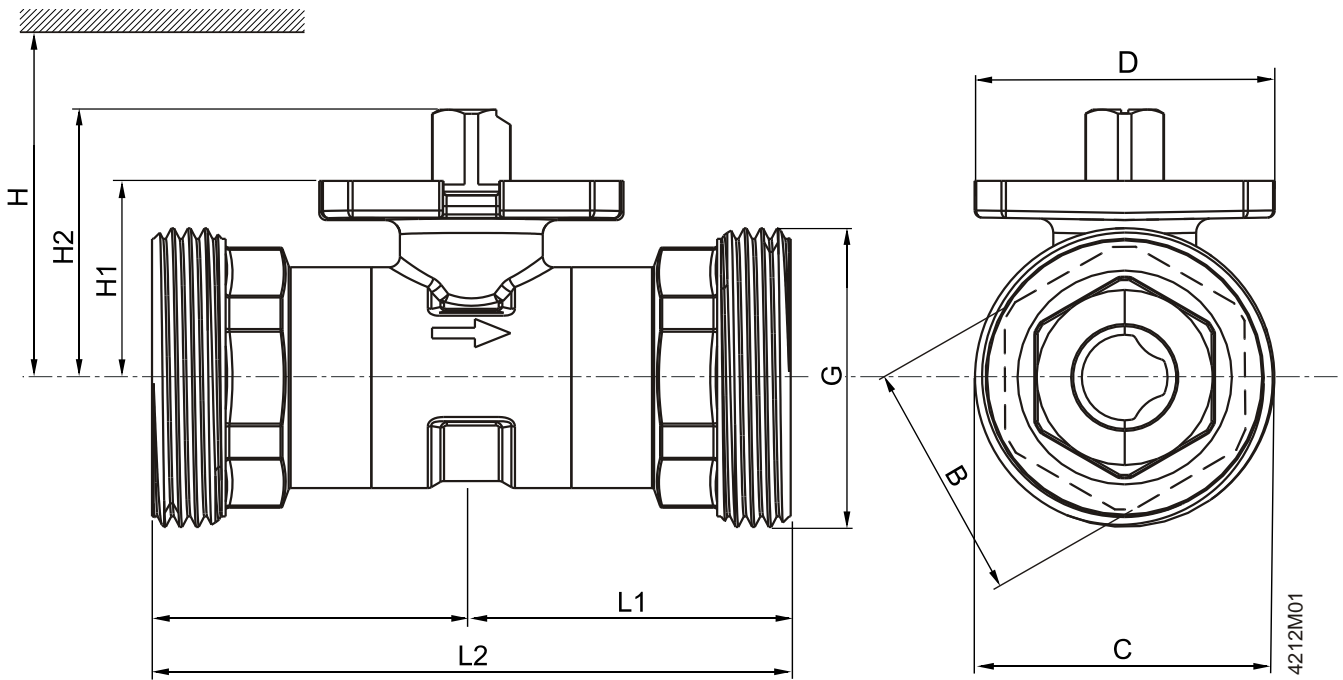
¹⁾ Only GLB.., GLD.. and GMA.. actuators are approved for medium temperatures ≤ 0 °C.

²⁾ Dezincification resistant

³⁾ Fittings for a product where $PS \times DN < 1000$, do not require special testing and cannot have CE labeling

⁴⁾ Related documents such as environmental declarations, CE declarations, etc., can be downloaded at the following Internet address: <http://siemens.com/bt/download>

Dimensions



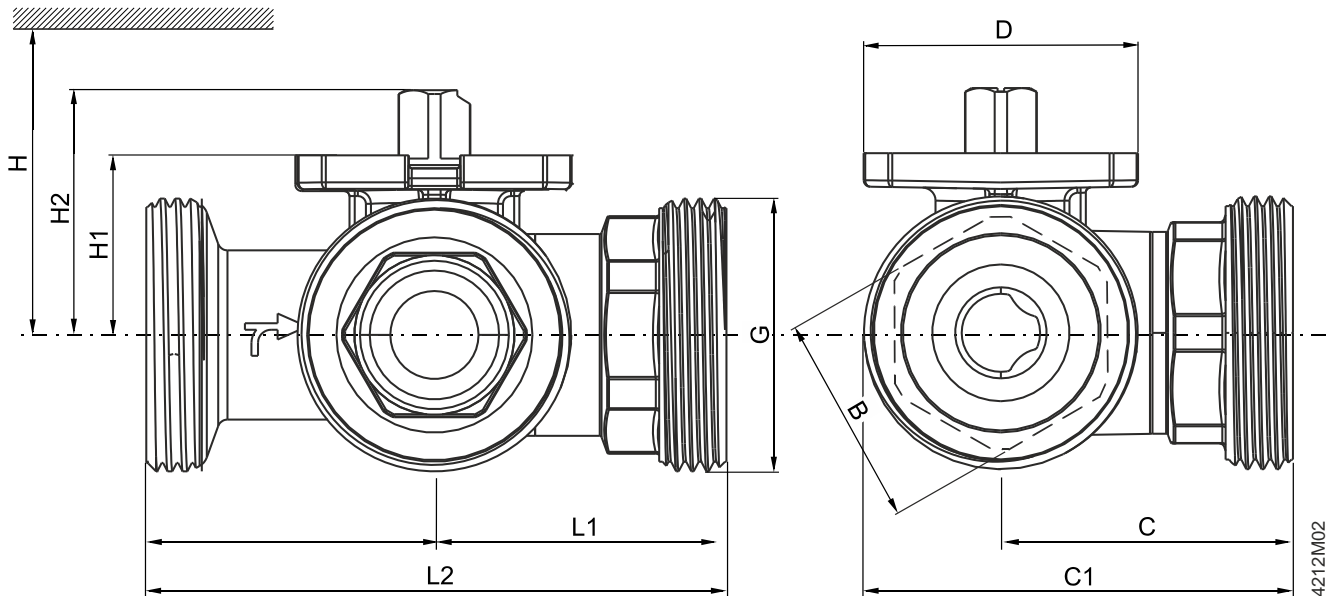
DN = Nominal size

H = Total height of actuator plus minimum mounting distance to wall or ceiling, for mounting, connection, operation, maintenance, etc.

H1 = Dimension from the pipe to the center to install actuator (upper edge)

Type	DN	B	C	D	G	L1	L2	H1	H2
		mm			Inch	mm			
VAG61.15..	15	27	33	42	G 1 B	43.5	87	27.6	37.6
VAG61.20..	20	34	42	42	G 1 ¼ B	44.7	89.4	27.6	37.6
VAG61.25..	25	35	48	42	G 1 ½ B	44.7	89.4	30.5	40.5
VAG61.32..	32	38	59.7	42	G 2 B	50.1	100.2	34.3	44.3
VAG61.40..	40	49	65.7	42	G 2 ¼ B	58.3	116.6	39.8	49.8
VAG61.50..	50	61	81.6	42	G 2 ¾ B	62	124	52.8	62.8

Type	H		Weight
	GQD..9A, GSD161.9A, GDB..9E.., GMA..9E.., GLD161.9E.., GLB..9E.., GDD161.9E		
	mm		
VAG61.15..	> 300	> 300	0,36
VAG61.20..			0,55
VAG61.25..	> 320	> 320	0,57
VAG61.32..	-		0,84
VAG61.40..	-		1,29
VAG61.50..	-	> 335	1,98



DN = Nominal size

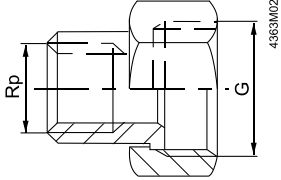
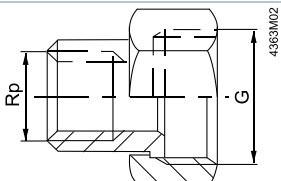
H = Total height of actuator plus minimum mounting distance to wall or ceiling, for mounting, connection, operation, maintenance, etc.

H1 = Dimension from the pipe to the center to install actuator (upper edge)

Type	DN	B	C	C1	D	G	L1	L2	H1	H2
		mm			Inch	mm				
VBG61.15..	15	27	43.5	59.5	42	G 1 B	43.5	87	24.2	33.7
VBG61.15-6.3		27	44.1	61	42	G 1 B	44.3	88.6	27.6	37.6
VBG61.20..	20	34	44.7	66	42	G 1 ¼ B	44.7	89.4	27.6	37.6
VBG61.25..	25	35	49.5	73	42	G 1 ½ B	49.2	98.4	30.5	40.5
VBG61.32..	32	38	63.7	94	42	G 2 B	57	114	34.3	44.3
VBG61.40..	40	49	74.3	107	42	G 2 ¼ B	63.8	127.6	39.8	49.8
VBG61.50..	50	61	82.1	123	42	G 2 ¾ B	69	138	52.8	62.8

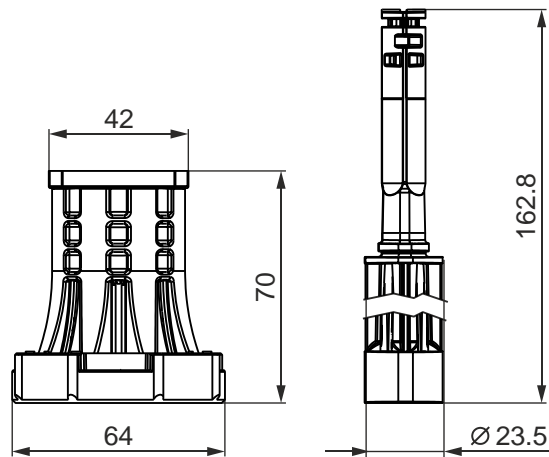
Type	H		Weight
	GQD..9A, GSD161.9A, GDB..9E.., GDD161.9E	GMA..9E.., GLD161.9E.., GLB..9E..	
	mm		kg
VBG61.15..	> 300	> 300	0,41
VBG61.15-6.3			0,45
VBG61.20..			0,52
VBG61.25..	> 320	> 320	0,75
VBG61.32..			1,2
VBG61.40..			1,84
VBG61.50..	-	> 335	2,83

Fittings

	Type	Article number	Type	Article number	Valve type	G	Rp
						Inch	Inch
	ALG152	BPZ:ALG152	ALG152B	S55846-Z100	VAG61.15..	G 1 B	Rp ½
	ALG202	BPZ:ALG202	ALG202B	S55846-Z102	VAG61.20..	G 1¼ B	Rp ¾
	ALG252	BPZ:ALG252	ALG252B	S55846-Z104	VAG61.25..	G 1½ B	Rp 1
	ALG322	BPZ:ALG322	ALG322B	S55846-Z106	VAG61.32..	G 2 B	Rp 1¼
	ALG402	BPZ:ALG402	ALG402B	S55846-Z108	VAG61.40..	G 2¼ B	Rp 1½
	ALG502	BPZ:ALG502	ALG502B	S55846-Z110	VAG61.50..	G 2¾B	Rp 2
	ALG153	BPZ:ALG153	ALG153B	S55846-Z101	VBG61.15..	G 1 B	Rp ½
	ALG203	BPZ:ALG203	ALG203B	S55846-Z103	VBG61.20..	G 1¼ B	Rp ¾
	ALG253	BPZ:ALG253	ALG253B	S55846-Z105	VBG61.25..	G 1½ B	Rp 1
	ALG323	BPZ:ALG323	ALG323B	S55846-Z107	VBG61.32..	G 2 B	Rp 1¼
	ALG403	BPZ:ALG403	ALG403B	S55846-Z109	VBG61.40..	G 2¼ B	Rp 1½
	ALG503	BPZ:ALG503	ALG503B	S55846-Z111	VBG61.50..	G 2¾B	Rp 2

- Valve side with cylindrical threading per ISO 228-1
- Pipe side with cylindrical threading per ISO 7-1
- ALG..B fittings up to 100 °C medium temperature

Temperature adapter (optional)



Revision numbers

Type	Valid from rev. no.	Type	Valid from rev. no.
Shutoff ball valve VAG61..		Changeover ball valve VBG61..	
2-port		3-port	
VAG61.15-1	..A	—	..A
VAG61.15-1.6	..A	VBG61.15-1.6	..A
VAG61.15-2.5	..A	VBG61.15-2.5	..A
VAG61.15-4	..A	VBG61.15-4	..A
VAG61.15-6.3	..A	VBG61.15-6.3	..A
VAG61.20-4	..A	VBG61.20-4	..A
VAG61.20-6.3	..A	VBG61.20-6.3	..A
VAG61.20-10	..A	—	—
VAG61.25-6.3	..A	—	—
VAG61.25-10	..A	VBG61.25-10	..A
VAG61.25-16	..A	—	—
VAG61.32-10	..A	—	—
VAG61.32-16	..A	VBG61.32-16	..A
VAG61.32-25	..A	—	—
VAG61.40-16	..A	—	—
VAG61.40-25	..A	VBG61.40-25	..A
VAG61.40-40	..A	—	—
VAG61.50-25	..A	—	—
VAG61.50-40	..A	VBG61.50-40	..A
VAG61.50-63	..A	—	—