

ACVATIX™

## 2-port shutoff valves and 3-port changeover ball valves, PN 40, with externally threaded connection

VAG60.., VBG60..L, VBG60..T



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

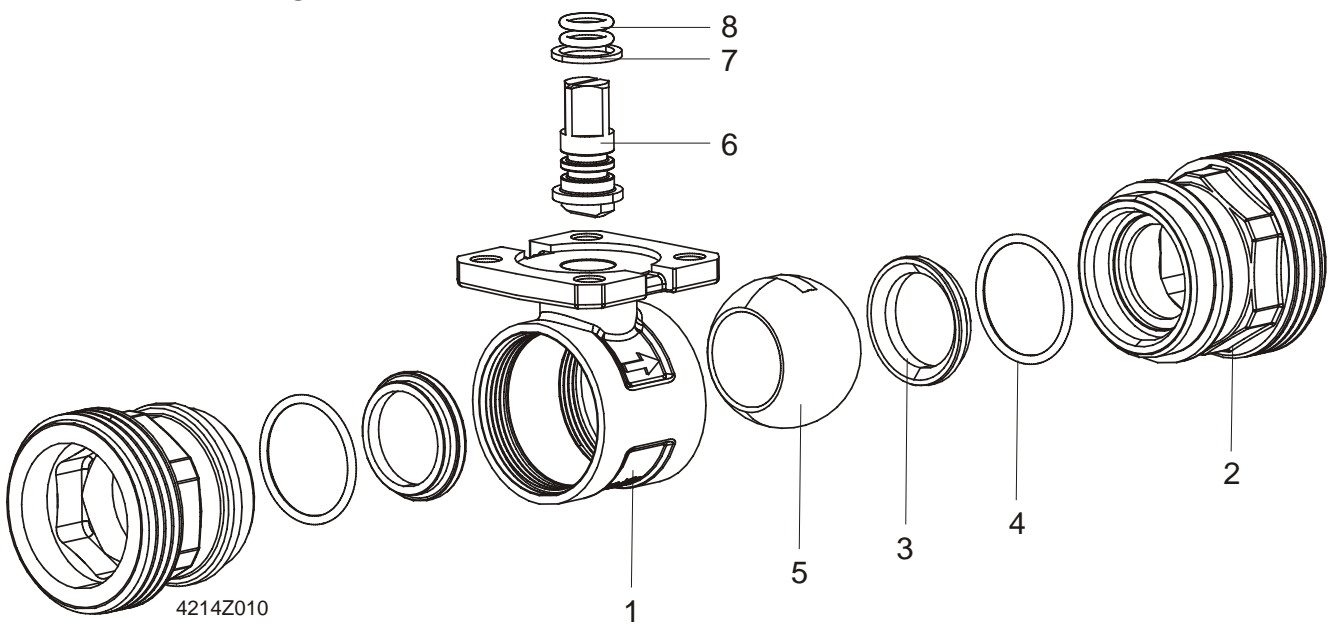
- Ball valve body made of brass CW602N (DZR)
- DN 15...50
- $k_{vs}$  5...96 m<sup>3</sup>/h
- Flat sealing, externally threaded connections G..B, as per ISO 228-1
- Fitting sets ALG.. with threaded connection
- Rotational angle 90°
- Can be combined with electromotoric rotary actuators GQD..9A, GMA..9E with spring return and GSD..9A, GDB..9E, GLB..9E without spring return
- For applications with auxiliary functions (e.g. auxiliary switches, potentiometers, standard rotary actuators from the DAC product range can also be combined)

## Features

- Moderately priced:  
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, pre-mounted on the actuators, means you can mount them on the ball valves without tools.

## Technical design

### Design



1 Housing

2 Connection with external threading

3 Seat

4 O-ring seal

5 Marble

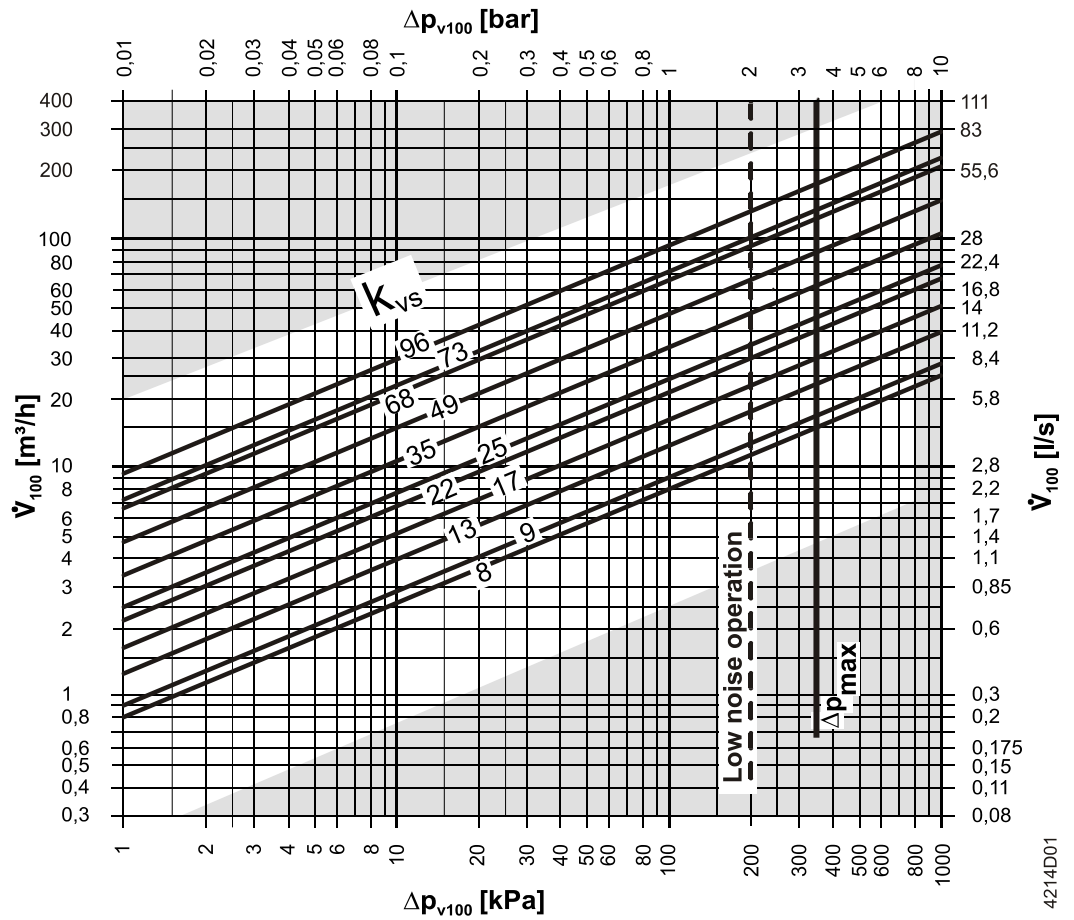
6 Stem, squared

7 Slide clutch

8 O-ring seal

## Sizing

Flow diagram:



---  $\Delta p_{max}$  for VAG60.. and VBG60..., for details, see table on equipment combinations

$\Delta p_{max}$  = 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

$\Delta p_{v100}$  = 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

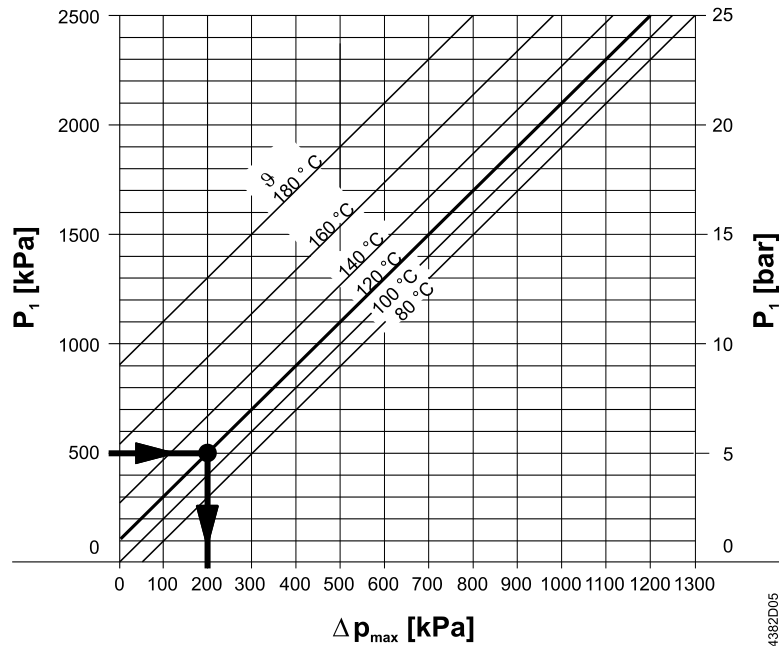
100 kPa = 1 bar  $\approx$  10 mWS

1 m³/h = 0.278 l/s water at 20 ° C

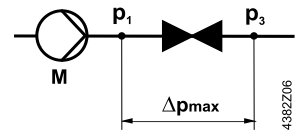
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## Cavitation

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.



- $\Delta p_{max}$  = 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

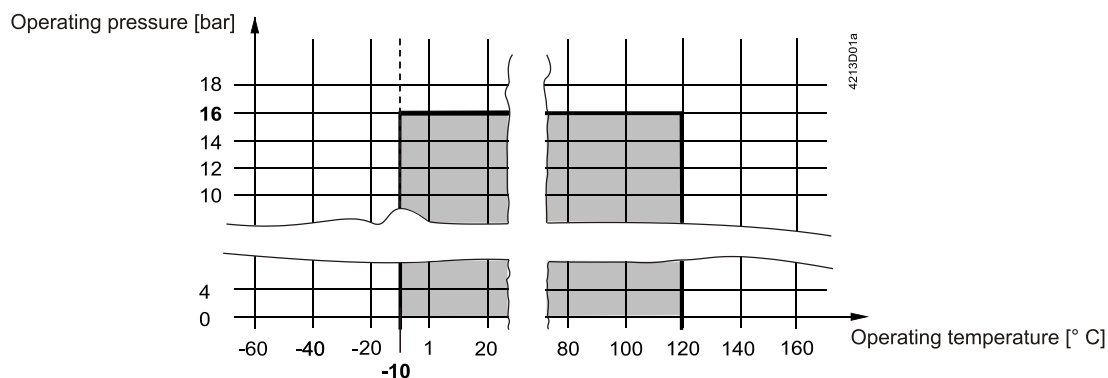
The above diagram clearly indicates that the maximum permissible differential pressure is  $\Delta p_{max} \rightarrow 200$  kPa (2 bar) at a nearly closed ball valve.

### Note on chilled water applications:

UTo 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 <sub>vs</sub>
Shut-off ball valve 2-port		Change-over ball valve 3-port (T)		Change-over ball valve 3-port (L)			
Product no.	Stock number	Product no.	Stock number	Product no.	Stock number		
-	-	-	-	VBG60.15-5 L	S55230-V215	15	5
-	-	VBG60.15-8T	S55230-V136	-	-		8 <sup>1)</sup>
VAG60.15-9	S55230-V130	-	-	-	-		9
-	-	-	-	VBG60.20-8 L	S55230-V202	20	8
-	-	VBG60.20-13T	S55230-V137	-	-		13 <sup>1)</sup>
VAG60.20-17	S55230-V131	-	-	-	-		17
-	-	-	-	VBG60.25-9 L	S55230-V216	25	9
-	-	VBG60.25-13T	S55230-V138	-	-		13 <sup>1)</sup>
VAG60.25-22	S55230-V132	-	-	-	-		22
-	-	-	-	VBG60.32-13 L	S55230-V217	32	13
-	-	VBG60.32-25T	S55230-V139	-	-		25 <sup>1)</sup>
VAG60.32-35	S55230-V133	-	-	-	-		35
-	-	-	-	VBG60.40-25 L	S55230-V218	40	25
-	-	VBG60.40-49T	S55230-V140	-	-		49 <sup>1)</sup>
VAG60.40-68	S55230-V134	-	-	-	-		68
-	-	-	-	VBG60.50-37 L	S55230-V219	50	37
-	-	VBG60.50-73T	S55230-V141	-	-		73 <sup>1)</sup>
VAG60.50-96	S55230-V135	-	-	-	-		96

<sup>1)</sup> k<sub>vs</sub> Bypass B > 50 % of k<sub>vs</sub> A – AB

DN = Nominal size

k<sub>vs</sub> = Flow nominal value for chilled water (5…30 ° C) through a fully opened ball valve at a differential pressure of 100 kPa (1 bar)

**Temperature adapter ALJ100**



**⚠ DANGER**

**Hazard to life for the combination ALJ100 with GMA and ASK77.2!**

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 inappropriately.

- 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	Stock number	Description
ALG..2	BPZALG..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									
	GSD..9A		GQD..9A		GDB..9E..		GMA..9E..		GLB..9E..	
	$\Delta p_{\max}$	$\Delta p_s$	$\Delta p_{\max}$	$\Delta p_s$	$\Delta p_{\max}$	$\Delta p_s$	$\Delta p_{\max}$	$\Delta p_s$	$\Delta p_{\max}$	$\Delta p_s$
	[kPa]									
VAG60.15-9	350	1400	350	1400	350	1400	350	1400	350	1400
VAG60.20-17										
VAG60.25-22										
VAG60.32-35	-	-	-	-	-	-	-	1000		
VAG60.40-68								800		
VAG60.50-96								600		
VBG60.15-8T	350	-	350	-	350	-	350	-	350	-
VBG60.20-13T										
VBG60.25-13T										
VBG60.32-25T	-	-	-	-	-	-	-	-	-	-
VBG60.40-49T										
VBG60.50-73T										
VBG60.15-5L	350	-	350	-	350	-	350	-	350	-
VBG60.20-8L										
VBG60.25-9L										
VBG60.32-13L	-	-	-	-	-	-	-	-	-	-
VBG60.40-25L										
VBG60.50-37L										

$\Delta p_{\max}$  = Maximum permissible differential pressure over the ball valve 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  $\leq 200$  kPa

$\Delta p_s$  = 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 <sup>1)</sup>		Operating voltage	Positioning		Spring return		Data sheet
Product no.	Stock number		Signal	Time	Function	Time	
GSD141.9A <sup>2)</sup>	BPZ:GSD141.9A	AC/DC 24 V	Open-close <sup>3)</sup>	30 s	-	-	N4655
GSD341.9A <sup>2)</sup>	BPZ:GSD341.9A	AC 230 V					
GQD121.9A <sup>2)</sup>	BPZ:GQD121.9A	AC/DC 24 V	2-position	30/15 s <sup>4)</sup>	Ja	15 s	N4659
GQD321.9A <sup>2)</sup>	BPZ:GQD321.9A	AC 230 V					
GMA121.9E	BPZ:GMA121.9E	AC/DC 24 V					
GMA321.9E	BPZ:GMA321.9E	AC 230 V	3-position	90/15 s <sup>4)</sup>	-	-	N4658
GMA131.9E	BPZ:GMA131.9E	AC/DC 24 V					
GDB141.9E <sup>2)</sup>	S55499-D200	AC/DC 24 V	2- or 3-position	150 s	-	-	A6V10636203
GDB341.9E <sup>2)</sup>	S55499-D201	AC 100-240 V					
GLB141.9E	S55499-D204	AC/DC 24 V	2- or 3-position	-	-	-	A6V10636150
GLB341.9E	S55499-D205	AC 100...240 V					

<sup>1)</sup> Actuator type: electromotoric

<sup>2)</sup> Actuator only approved for medium temperature  $> 0^\circ \text{C}$

<sup>3)</sup> 2-wire SPDT (single pole double throw)

<sup>4)</sup> open / close

## Ordering

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

Material	Article type	Order text	Quantity
VAG60.25-22	VAG60.25-22	Open/close ball valve, externally threaded, 2-port	2
GLB131.9E	GLB131.9E	Electromotoric rotary actuator without spring return for ball valves	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.. 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 GMA..1.9E
GDB..1E (without spring return)		ASK77.3 Accessory Kit BV for GDB..1.9E
GLB..1E (without spring return)		ASK77.3 Accessory Kit BV for GLB..1.9E
GQD..1A (with spring return)	Auxiliary switch	ASK77.5 Accessory Kit BV for GQD..1.9A
GSD..1A <sup>1)</sup> (without spring return)		ASK77.5 Accessory Kit BV for GSD..1.9A

<sup>1)</sup> GSD..4..1A are not compatible with ball valves.

## Product documentation


Title	Content	Document ID
Mounting instructions Ball valve VAG60.., VBG60..L, VBG60..T	Mounting instructions	M4214 (74 319 0923 0)
Rotary actuators for ball valves GSD..41.9A	Data sheet: product description	N4655
Rotary actuators for ball valves GQD..9A	Data sheet: product description	N4659
Rotary actuators for ball valves GMA..9E..	Data sheet: product description	N4658
Rotary actuators for ball valves GDB..9E..	Data sheet: product description	A6V10636150
Rotary actuators for ball valves GLB..9E..	Data sheet: product description	A6V10636203
Mounting instructions Mounting kit ASK77.2, ASK77.3	Mounting instructions	M4696 (74 319 0648 0)
Mounting instructions Mounting kit ASK77.5	Mounting instructions	A6V11171911 (A5W00032790)


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

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



## Safety

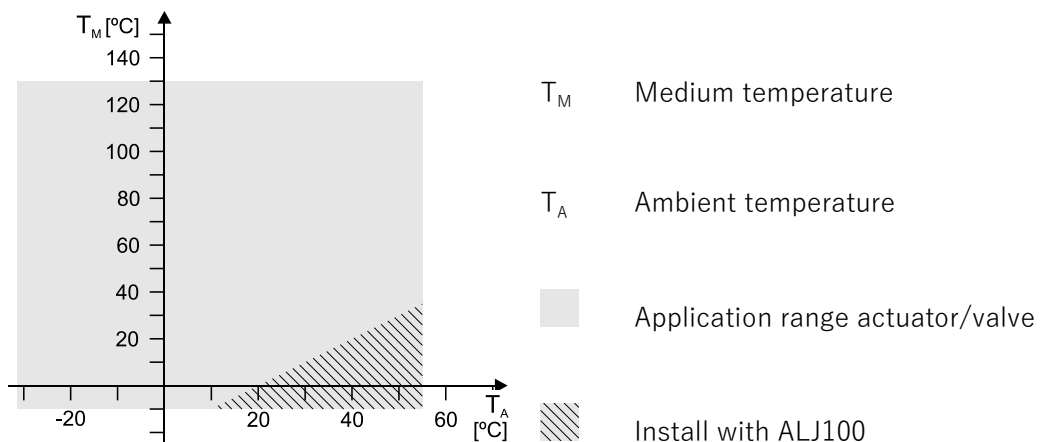
	<b>⚠ DANGER</b>
	<p><b>There is a risk to operating personnel and device when working on the unit</b></p> <p>Failure to comply with these safety notes can result in personal injury and damage to property from pipe pressure, electrical voltage, or device in operation.</p> <p>▷ Note the following when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

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

## 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  $\leq 0^\circ \text{C}$ .



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

### Permissible media

Using the ball valve in combination with potassium formate-based media, such as Hycool or Temper, 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.

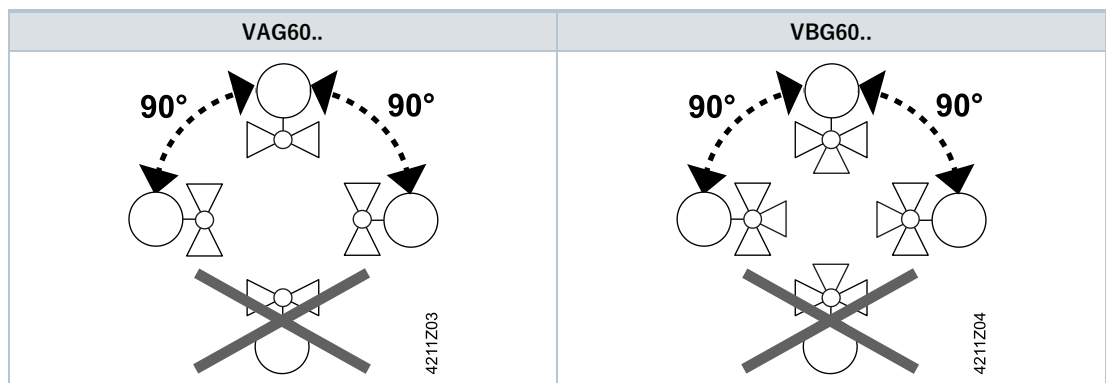
Siemens rejects any and all liability for damages or consequential damages resulting from the use of this media in combination with our ball valves.

## 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 VAG60.. / VBG60.. is supplied together with mounting instructions M4214 (7431909230).

### Mounting position



### Pipe connection

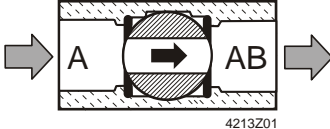
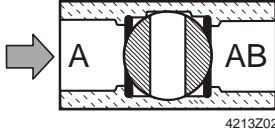
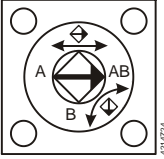
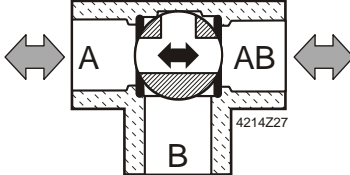
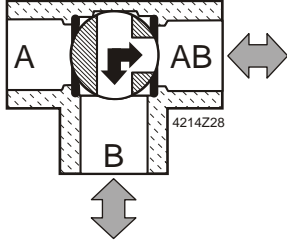
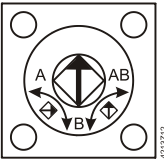
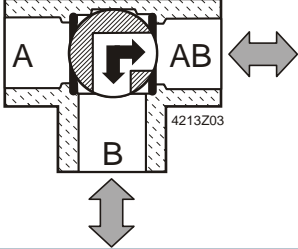
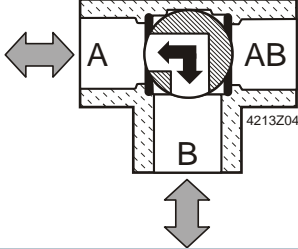
Avoid leakage:

- 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:

VAG60..	VBG60..
→	T →

Ball valve	Laser marking	Position as delivered	90° turned (clockwise)
VAG60.. 2-port shut-off ball valve	-	 A – AB = 100 %	 A – AB = 0 %
VBG60..T 3-port change- over ball valve, T-shaped		 A – AB = 100 % B – AB = 0 %	 A – AB = 0 % B – AB = 100 %
VBG60..L 3-port change- over ball valve, L-shaped		 B – AB (AB – B) = 100 %	 A – B (B – A) = 100 %

## Maintenance

Ball valves VAG60.. and VBG60.. are maintenance free.

## Disposal

The valve should not be disposed of as domestic garbage.

- Special treatment for individual components may be required by law or make ecological sense.
- Comply with 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.

## Technical data

Functional data			
	VAG60..	VBG60..L	VBG60..T
PN class	PN 40 per ISO 7268		
Operating pressure	per ISO 7005 within the permissible media temperature as per section Technical design [→ 2]		
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 A (Flow B - AB) Leakage AB (Flow A - B)	-	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: section Engineering [→ 9]		
Medium temperature	-10...120 ° C <sup>1)</sup>		
Rotational angle	90 °		

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

Dimensions / Weight	
See section Dimensions [→ 13]	
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) <sup>3)</sup>
EAC compliance	Eurasien compliance
Environmental compatibility	Environmental Declaration CE1E4214en <sup>4)</sup> contains data on environmental-compatible product design and assessment (RoHS compliance, compositions, packaging, environmental benefits and disposal).

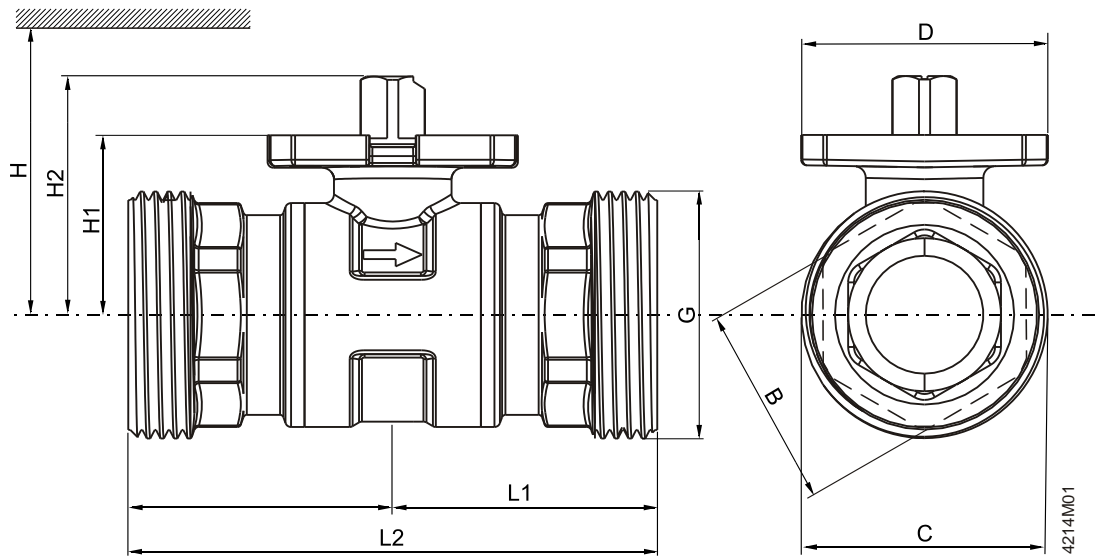
<sup>1)</sup> Only GLB., GLD. and GMA. actuators are approved for medium temperatures ≤ 0 ° C.

<sup>2)</sup> Dezincification resistant

<sup>3)</sup> Fittings for a product where PS x DN < 1000 do not require special testing and cannot have CE labeling.

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

VAG60..

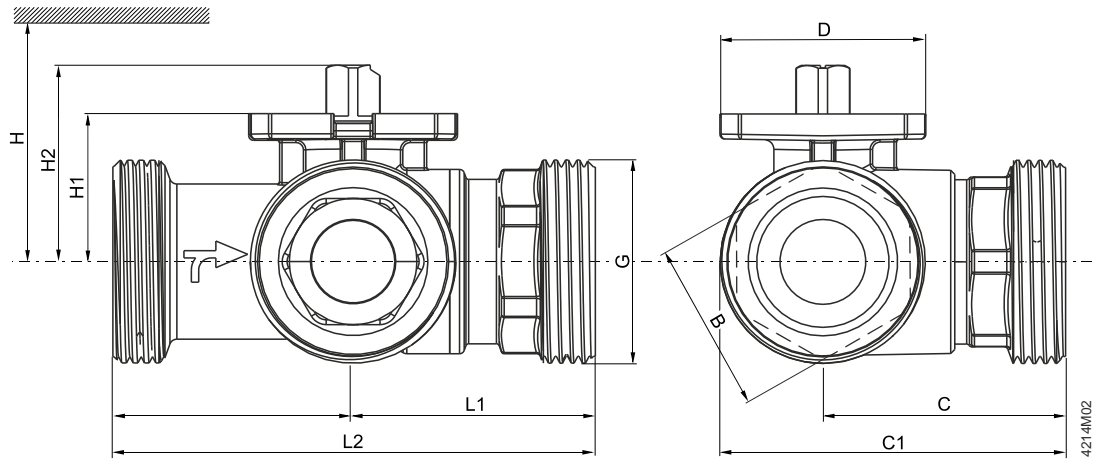


- DN = Nominal size
- H = Total height of actuator plus minimum mounting distance to wall or ceiling, for mounting, connection, operation, maintenance, etc.
- H1 = Dimension from the pipe to the center to install actuator (upper edge)

Type	DN	B	C	D	G	L1	L2	H1	H2
VAG60.15-9	15	27	33	42	G 1 B	43.5	87	27.6	37.6
VAG60.20-17	20	35	42		G 1 ¼ B	44.7	89.4	30.5	40.5
VAG60.25-22	25		48		G 1 ½ B	44.7			
VAG60.32-35	32	38	59.7		G 2 B	50.1	100.2	34.3	44.3
VAG60.40-68	40	49	65.7		G 2 ¼ B	58.3	116.6	39.8	49.8
VAG60.50-96	50	61	81.6		G 2 ¾ B	62	124	52.8	62.8

Type	H					Weight
	GSD..9A	GQD..9A	GDB..9E..	GMA..9E..	GLB..9E..	
	mm					kg
VAG60.15-9	> 300	> 300	> 300	> 300	> 300	0.36
VAG60.20-17						0.55
VAG60.25-22	> 320	> 320	> 320	> 320	> 320	0.57
VAG60.32-35	-	-	-			0.84
VAG60.40-68						1.29
VAG60.50-96				> 335	> 335	1.98

## VBG60..



DN = Nominal size

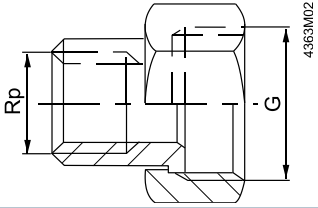
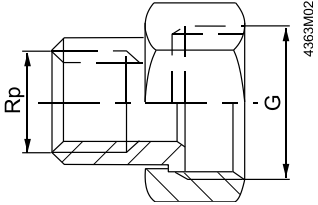
H = Total height of actuator plus minimum mounting distance to wall or ceiling, for mounting, connection, operation, maintenance, etc.

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

Type	DN	B	C	C1	D	G	L1	L2	H1	H2
VBG60.15-8T	15	27	44.4	61	42	G 1 B	44.3	88.6	27.6	37,6
VBG60.20-13T	20	35	49.5	70		G 1 ¼ B	49	98	30.5	40.5
VBG60.25-13T	25			73		G 1 ½ B	49.2	98.4		
VBG60.32-25T	32	38	63.7	94		G 2 B	57	114	34.3	44,3
VBG60.40-49T	40	49	74.3	107		G 2 ¼ B	63.8	127.6	39.8	49.8
VBG60.50-73T	50	61	82,3	123		G 2 ¾ B	69	138	52.8	62.8
VBG60.15-5L	15	27	44,4	61	42	G 1 B	44,3	88,6	27,6	37,6
VBG60.20-8L	20	35	49,5	70		G 1 ¼ B	49	98	30,5	40,5
VBG60.25-9L	25			73		G 1 ½ B	49,2	98,4		
VBG60.32-13L	32	38	63,7	94		G 2 B	57	114	34,3	44,3
VBG60.40-25L	40	49	74,3	107		G 2 ¼ B	63,8	127,6	39,8	49,8
VBG60.50-37L	50	61	82,3	123		G 2 ¾ B	69	138	52,8	62,8

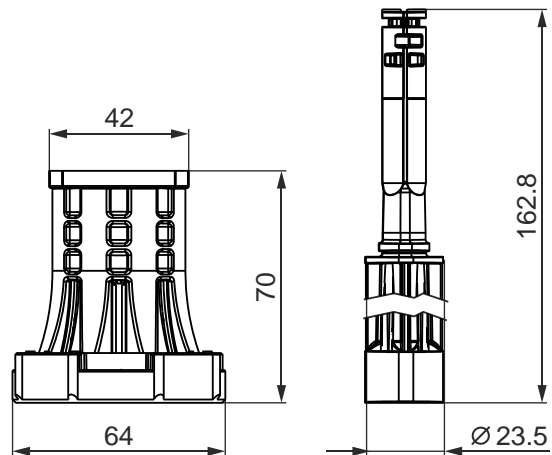
Type	H					Weight
	GSD..9A	GQD..9A	GDB..9E..	GMA..9E..	GLB..9E..	kg
	mm					
VBG60.15-8T	> 300	> 300	> 300	> 300	> 300	0.45
VBG60.20-13T						0.68
VBG60.25-13T	> 320	> 320	> 320	> 320	> 320	0.75
VBG60.32-25T	-	-	-			> 320
VBG60.40-49T				> 335	> 335	1.84
VBG60.50-73T				> 335	> 335	2.83
VBG60.15-5L	> 300	> 300	> 300	> 300	> 300	0,45
VBG60.20-8L						0,68
VBG60.25-9L	> 320	> 320	> 320	> 320	> 320	0,75
VBG60.32-13L	-	-	-			> 320
VBG60.40-25L				> 335	> 335	1,84
VBG60.50-37L				> 335	> 335	2,83

## Fittings

	Type	Stock number	Type	Stock number	Valve type	G	Rp
						Inch	Inch
	ALG152	BPZ:ALG152	ALG152B	S55846-Z100	VAG60.15..	G 1 B	Rp ½
	ALG202	BPZ:ALG202	ALG202B	S55846-Z102	VAG60.20..	G 1¼ B	Rp ¾
	ALG252	BPZ:ALG252	ALG252B	S55846-Z104	VAG60.25..	G 1½ B	Rp 1
	ALG322	BPZ:ALG322	ALG322B	S55846-Z106	VAG60.32..	G 2 B	Rp 1¼
	ALG402	BPZ:ALG402	ALG402B	S55846-Z108	VAG60.40..	G 2¼ B	Rp 1½
	ALG502	BPZ:ALG502	ALG502B	S55846-Z110	VAG60.50..	G 2¾B	Rp 2
	ALG153	BPZ:ALG153	ALG153B	S55846-Z101	VBG60.15..	G 1 B	Rp ½
	ALG203	BPZ:ALG203	ALG203B	S55846-Z103	VBG60.20..	G 1¼ B	Rp ¾
	ALG253	BPZ:ALG253	ALG253B	S55846-Z105	VBG60.25..	G 1½ B	Rp 1
	ALG323	BPZ:ALG323	ALG323B	S55846-Z107	VBG60.32..	G 2 B	Rp 1¼
	ALG403	BPZ:ALG403	ALG403B	S55846-Z109	VBG60.40..	G 2¼ B	Rp 1½
	ALG503	BPZ:ALG503	ALG503B	S55846-Z111	VBG60.50..	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.	Type	Valid from rev. no.
Shutoff ball valve VAG60..		Changeover ball valve VBG60..T		Changeover ball valve VBG60..L	
2-port		3-port		3-port	
VAG60.15-9	..A	VBG60.15-8T	..A	VBG60.15-5L	..A
VAG60.20-17	..A	VBG60.20-13T	..A	VBG60.20-8L	..A
VAG60.25-22	..A	VBG60.25-13T	..A	VBG60.25-9L	..A
VAG60.32-35	..A	VBG60.32-25T	..A	VBG60.32-13L	..A
VAG60.40-68	..A	VBG60.40-49T	..A	VBG60.40-25L	..A
VAG60.50-96	..A	VBG60.50-73T	..A	VBG60.50-37L	..A