

ACVATIX™

3-port changeover ball valves, PN 40,
with external thread

VBG60..L



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

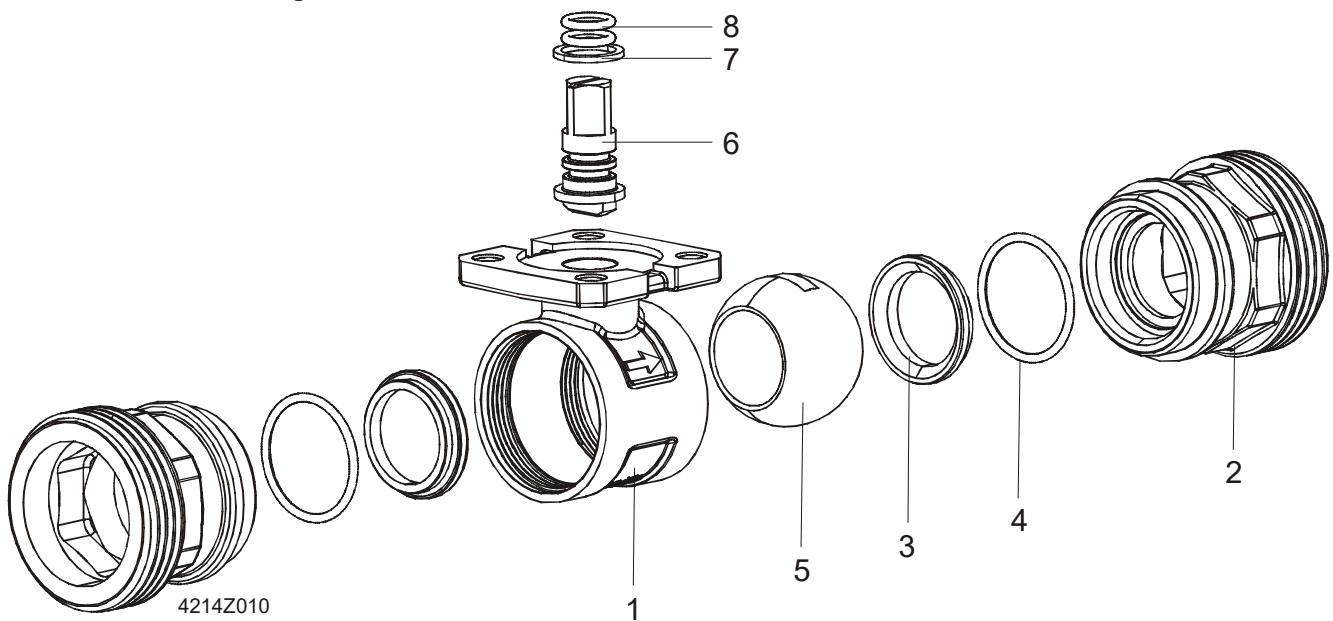
- Ball valve body made of brass CW602N (DZR)
- DN 20
- kvs 8 m³/h
- Flat sealing, external threaded connections G..B, as per ISO 228-1
- Fitting sets ALG.. with threaded connection
- Rotational angle 90°
- Can be combined with electromotorized rotary actuators GQD..9A, GMA..9E with spring return and GSD..9A, 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

- **Low cost:**
Optimized flow rates allow for selecting smaller ball valves. Low torque allows for combining them with small, less expensive rotary actuators.
- **Long life expectancy:**
Maintenance-free construction due to low friction stem and polished ball made of chrome-plated DZR brass.
- **Easy mounting:**
The actuators, premounted on the console, can be mounted on the ball valves without tools.

Technical design

Design



1 Housing

3 Seat

5 Ball

7 Slide clutch

2 Connection with external threading

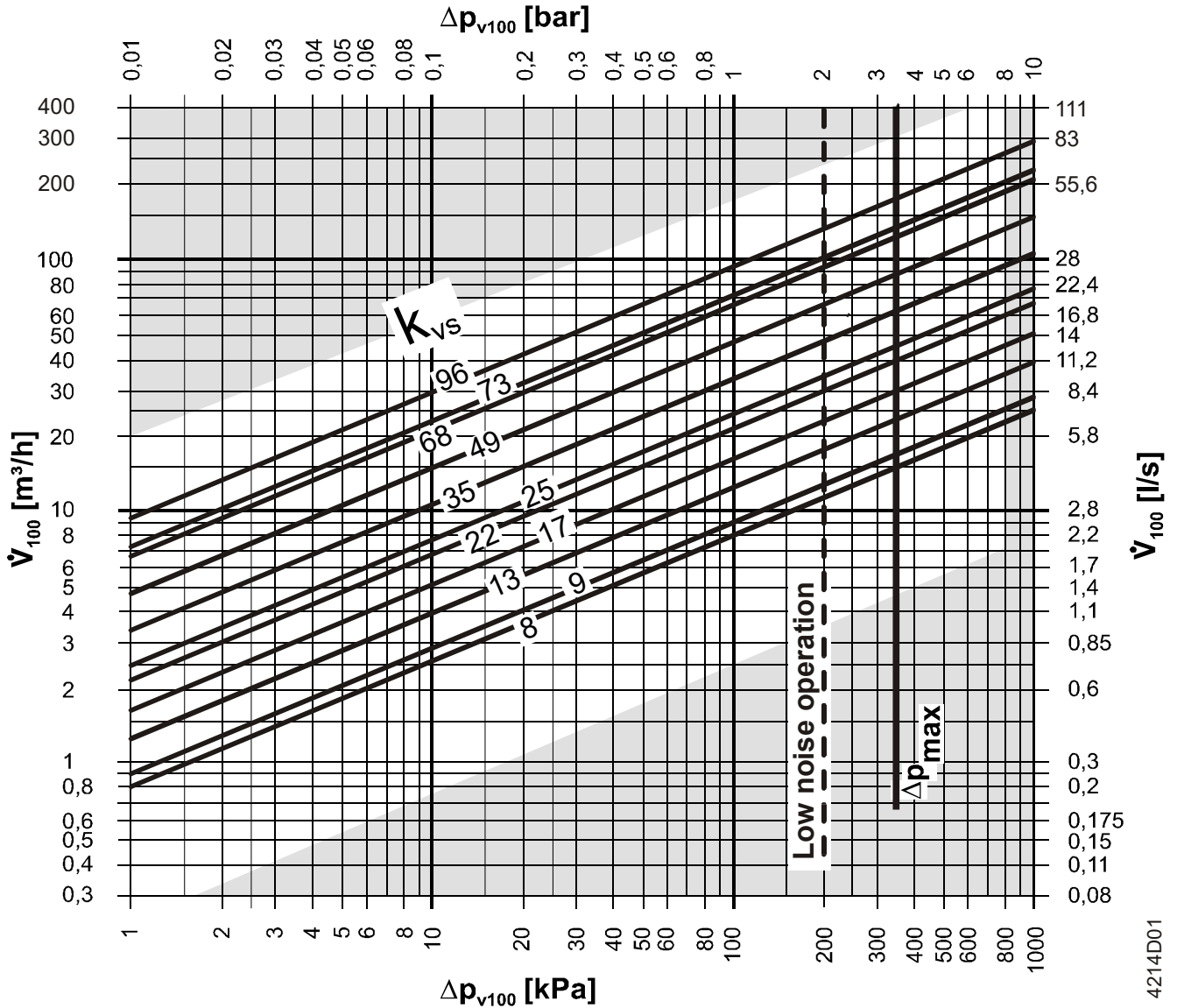
4 O-ring

6 Stem, squared

8 O-ring

Sizing

Flow diagram:



-- Δp_{\max} for VBG60..., for details, see table Equipment combination

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 V_{100}

V_{100} = Volume flow through the fully opened ball valve

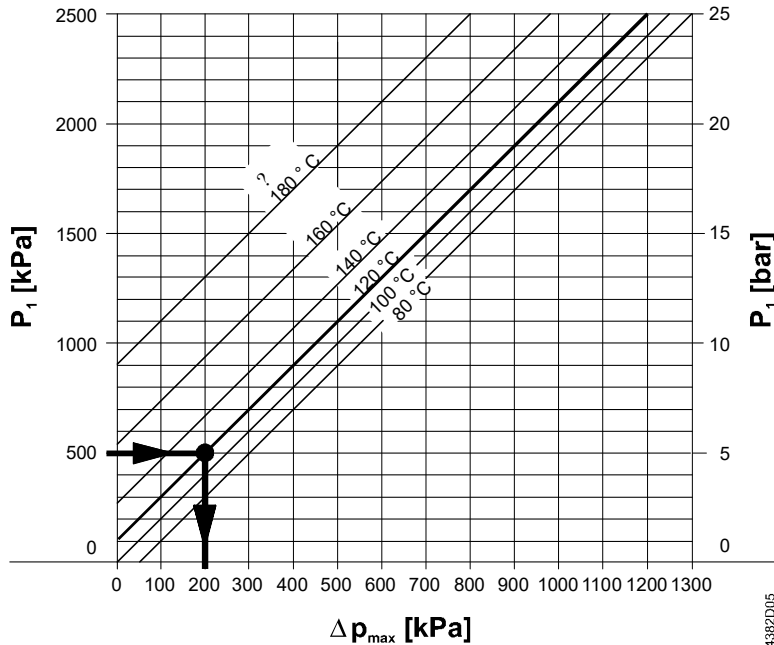
100 kPa = 1 bar \approx 10 mWS

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.



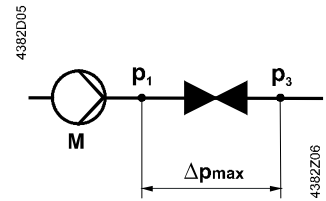
Δp_{\max} = Differential pressure at a nearly closed ball valve to largely avoid cavitation

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

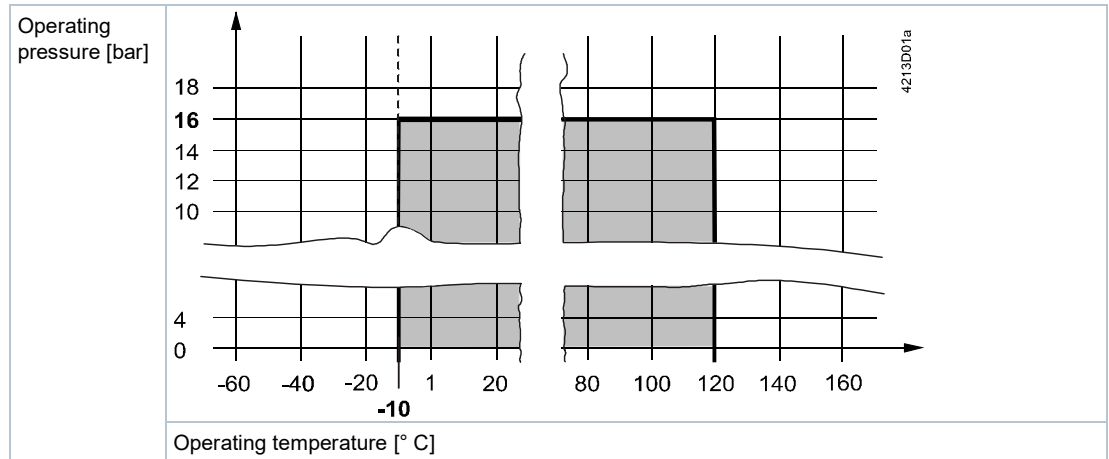
The above diagram clearly indicates that the maximum permissible differential pressure is $\Delta p_{\max} \rightarrow 200$ kPa (2 bar).

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 as per ISO 7005
(Observe all local and applicable laws).

Type summary

Type			
Changeover ball valve 3-port	Article number	DN	k _{vs}
VBG60.20-8L	S55230-V202	20	8

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)


Accessories

Fittings

Type	Article number	Description
ALG203	BPZ:ALG203	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.
ALG203B	S55846-Z103	

Insulation shell

Insulation shells are available for heating/cooling insulation as a separate accessory:

Ball valve	Insulation shell	Article number	
VBG60.20-8L	ALI20VBG60/61	S55845-Z169	 <p>For dimensions, see Dimensions</p>

Filter

Installed upstream of the ball valve:

Type	Article number	Description	DN	Mesh width [mm]
ALX20	S55845-Z175	Filter with internal threading	20	0,8

Equipment combinations

Type	Rotary actuators							
	GSD..9A		GQD..9A		GMA..9E		GLB..9E	
	Δp_{\max}	Δp_s	Δp_{\max}	Δp_s	Δp_{\max}	Δp_s	Δp_{\max}	Δp_s
	[kPa]							
VBG60.20-8L	350	-	350	-	350	-	350	-

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⁾	Stock no.	Operating voltage	Positioning		Spring return		Data sheet
			signal	time	function	time	
GSD141.9A	GSD141.9A	AC/DC 24 V	Open-close ²⁾	30 s	-	-	N4655
GSD341.9A	GSD341.9A	AC 230 V					
GQD121.9A	GQD121.9A	AC/DC 24 V	2-position	30/15 s ³⁾	Yes	15 s	N4659
GQD321.9A	GQD321.9A	AC 230 V					
GMA121.9E	GMA121.9E	AC/DC 24 V	2-position	90/15 s ³⁾	Yes	15 s	N4658
GMA321.9E	GMA321.9E	AC 230 V					
GLB141.9E	S55499-D204	AC/DC 24 V	2- or 3-position	150 s	-	-	A6V10636203
GLB341.9E	S55499-D205	AC 100-240 V					
GDB141.9E	S55499-D200	AC 24 V ~ / DC 24...48 V $\overline{=}$					
GDB341.9E	S55499-D201	AC 100...240 V ~					

¹⁾ Actuator type: Electromotive

²⁾ 2-wire SPDT (single pole double throw)

³⁾ Open/close

Ordering

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

Materials	Article type	Order text	Number of pieces
VBG60.20-8L	VBG60.20-8L	3-port changeover ball valve, with external thread	2
GDB141.9E	S55499-D200	Electromotoric rotary actuators for open-close, three-position or modulating control 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 Mounting set KV for GMAxx1.9E
GLB..1E (without spring return)	Potentiometer, auxiliary switch	ASK77.2 Mounting set KV for GLBxx1.9E
GQD..1A (with spring return)	Auxiliary switch	ASK77.5 Mounting set KV for GQDxx1.9A
GSD..1A ¹⁾ (without spring return)	Auxiliary switch	ASK77.5 Mounting set KV for GSDxx1.9A

Note

¹⁾ GSDx4x.1A are incompatible with ball valves


Product documentation


Related documents such as environmental 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>▷ 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.

Permissible media

Using a ball valve together with media based on potassium formate such as Hycool or Temper may result in leakage via stem to the outside. This is caused by the high creeping ability of media based on potassium formate at low surface tension.

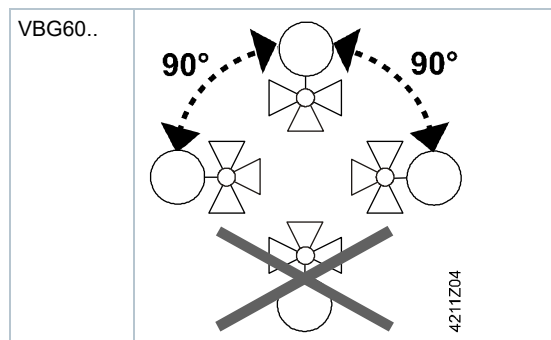
Siemens rejects any and all liability for damages or consequential damages caused by the use of these media in combination with our ball valves.

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 VBG60.. is supplied together with mounting instructions M4214 (74 319 0923 0).

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 in the ball valves.
- 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)
VBG60..L 3-port changeover ball valve, L shaped			
		$B - AB (AB - B) = 100 \%$	$A - B (B - A) = 100 \%$

Maintenance

The ball valves VBG60.. 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.
- Observe all local, applicable laws.

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.

Function data	
PN class	PN 40 as per ISO 7268
Operating pressure	As per ISO 7005 within the permissible media temperature according to Section Technical design [→ 2]
Leakage through-port	Water proof per EN 60534-4 L/1, improved class 4
Leakage bypass	< 1 %
Permissible media	Chilled water, cold water, low temperature hot water, hot water, water with frost protection. Recommendation: Water treatment as per VDI 2035 Note: See Notes on page 8
Medium temperature	-10...120 °C
Rotational angle	90 °

Materials	
Ball valve body	Dezincification-resistant hot-pressed brass (DZR ¹⁾), CW602N
Ball	Dezincification-resistant hot-pressed brass (DZR ¹⁾), CW602N, chromium-plated
Stem	Dezincification-resistant hot-pressed brass (DZR ¹⁾), CW602N
Sealing gland	EPDM-O rings

Dimensions / Weight	
See Dimensions [→ 11]	
Connections with external threading	G..B as per ISO 228-1

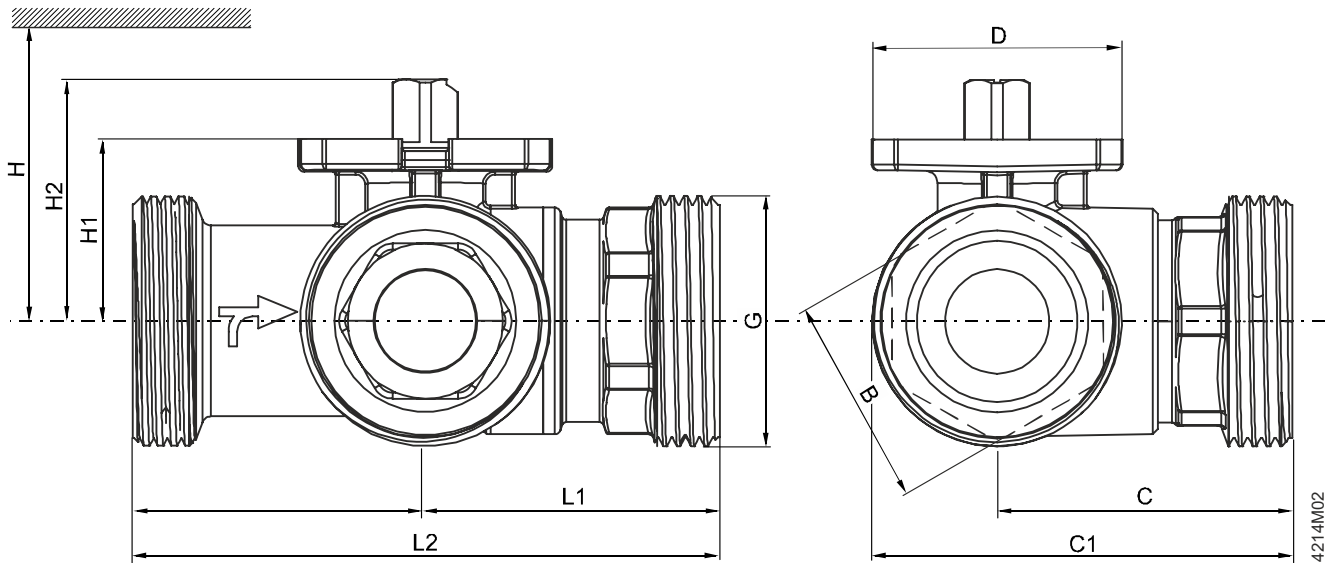
Standards, directives and approvals	
Pressure equipment directive	DGR 2014/68/EU
Pressure accessories	Range: Article 1, para. 1 Definition: Article 2, para. 5
Fluid group 2	Without CE certification as per article 4, para. 3 (generally applicable engineering practice) ²⁾
EAC compliance	Eurasian compliance
Environmental compatibility	The product environmental declaration CE1E4214en ³⁾ contains data on environmental-compatible product design and assessment (RoHS compliance, compositions, packaging, environmental benefits and disposal).

¹⁾ Dezincification resistant

²⁾ Fittings for a product where PS x DN < 1000, do not require special testing and cannot have CE labeling

³⁾ See Section Product documentation [→ 7]

Dimensions



DN = Nominal size

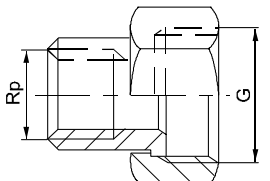
H = Total height of actuator plus minimum mounting distance to wall or ceiling, for mounting, connection, operation, maintenance, etc.

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

Type	DN	B	C	C1	D	G	L1	L2	H1	H2
		mm				Inch	mm			
VBG60.20-8L	20	35	49,5	70	42	G 1¼	49	98	30,5	40,5

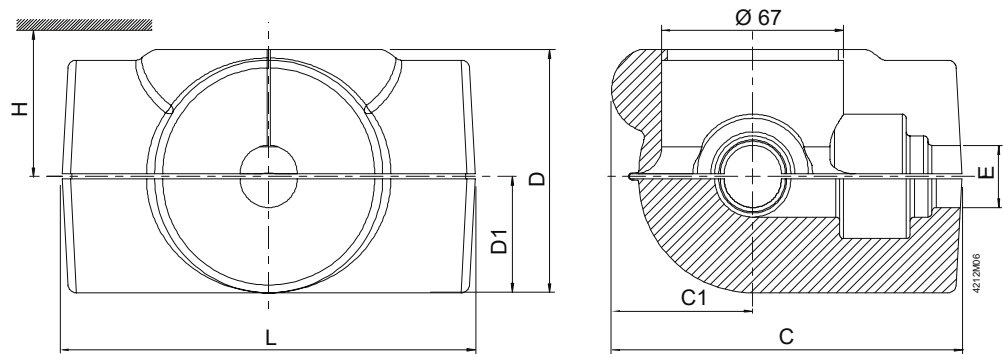
Type	H				Weight
	GSD..9A	GQD..9A	GMA..9E	GLB..9E	
	mm				kg
VBG60.20-8L	> 300	> 300	> 300	> 300	0,68

Fittings

	For 3-port valves VBG60.. (3 piece set)		Valve type	G
	Type	Article number		Inch
	ALG203	BPZ:ALG203	V..G60.20..	G 1¼
	ALG203B	S55846-Z103		G 1¼B

- 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

Insulation shells for 3-port control ball valves (VBG60..)



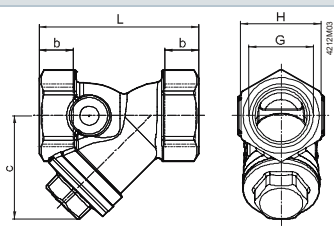
DN = Nominal size

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

Type		DN	C	C1	D	D1	E	L
Insulation shell	For ball valve		mm					
ALI20VBG60/61	VBG60.20..	20	135	58	97	49	27	170

Type		H				Weight
Insulation shell	For ball valve	GSD..9A	GQD..9A	GMA..9E	GLB..9E	
		mm				g
ALI20VAG60/61	VAG60.20..	>300	>300	>300	>300	55

Filter

	Typ	DN	b	c	G	L	H	K _{vs}	Weight
			mm	mm	Inch ¹⁾	mm	mm		kg
	ALX15	15	12	38	G ½	54	27	3,5	0,178
	ALX20	20	15	43	G ¾	67	34	5,8	0,290
	ALX25	25	16	53	G 1	79	41	9,1	0,410

¹⁾ ISO 228-1

Revision numbers

Type	Valid from rev. no.
Changeover ball valve VBG60..L	
3-port	
VBG60.20-8L	..A

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