

ACVATIX™

2-port and 3-port ball valves PN40 with externally threaded connections

VAG61.. VBG61..



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

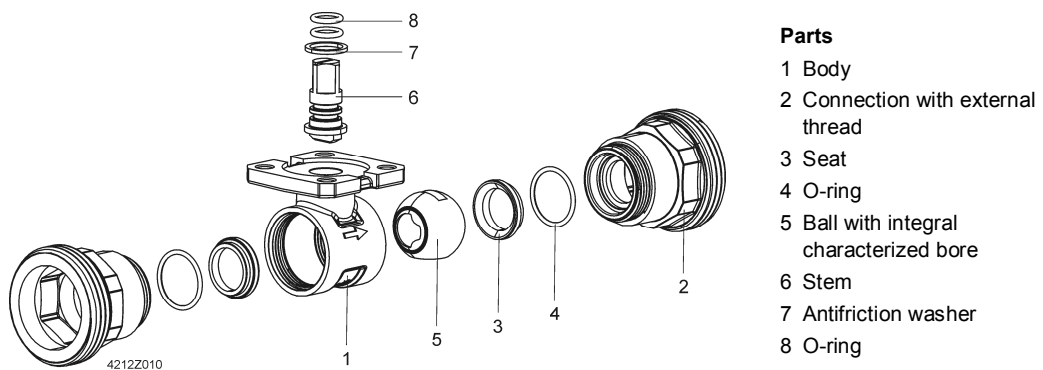
- Brass CW602N (DZR) ball valve body
- DN 15...50
- k_{vs} 1...63 m³/h
- Flat sealing connections with external thread G..B to ISO 228-1
- Sets of ALG.. with threaded connection
- Angle of rotation 90°
- For use with rotary actuators GQD..9A, GMA..9E with spring-return and GDB..9E, GLB..9E without spring return
- Applications with auxiliary functions (e.g., switch, potentiometer) can also be combined with standard rotary actuators belonging to the DAC range.

Features

- **Less-expensive:**
Optimized to the maximum flow rate for each nominal size. Permits the use of smaller, less-expensive valves. Low torque thanks to O-Ring protective sleeves and well-designed construction. Permits motorization using smaller, less-expensive actuators.
- **Higher product life expectancy:**
Service-free maintenance, also thanks to the friction-optimized spindle and the ball made of DZR brass, chrome, and polished.
- **Simplest assembly:**
The actuators are pre-mounted on the ball valve consoles. 100% assembly without tools and no parts to lose.

Technical design

Mechanical design

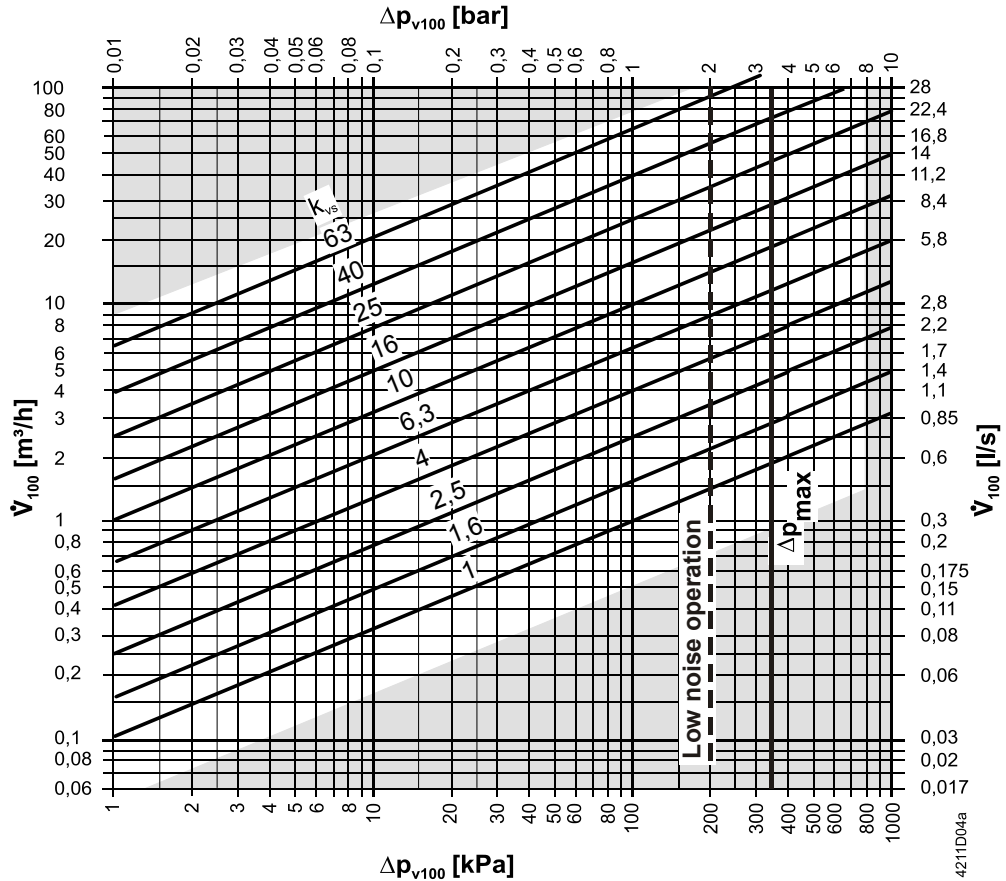


Parts

- 1 Body
- 2 Connection with external thread
- 3 Seat
- 4 O-ring
- 5 Ball with integral characterized bore
- 6 Stem
- 7 Antifriction washer
- 8 O-ring

Sizing

Flow diagram

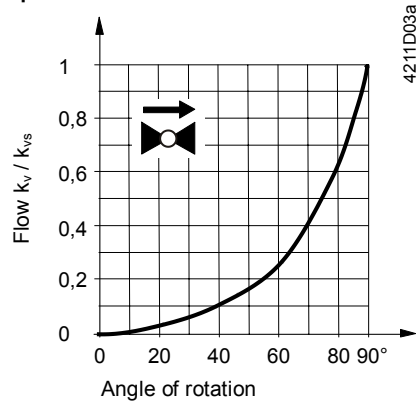


---- = Δp_{max} für VAG61.. and VBG61..., see table equipment combinations for details

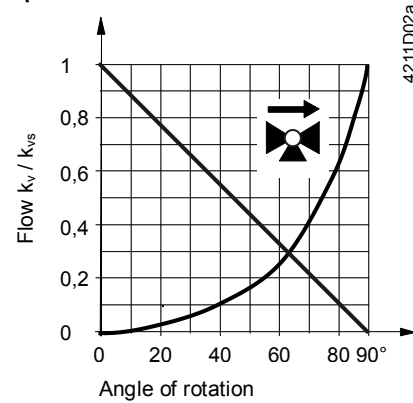
- Δp_{\max} = maximum permissible differential pressure across the ball valve, valid for the entire actuating range of the motorized ball valve; for low noise operation, we recommend a maximum permissible differential pressure of 200 kPa
- Δp_{v100} = differential pressure across the fully open ball valve and the ball valve's control path at a volumetric flow V_{100}
- \dot{V}_{100} = volumetric flow through the fully open ball valve
- 100 kPa = 1 bar \approx 10 mWS
- 1 m³/h = 0,278 l/s water at 20 °C

Ball valve flow characteristic

2-port



3-port

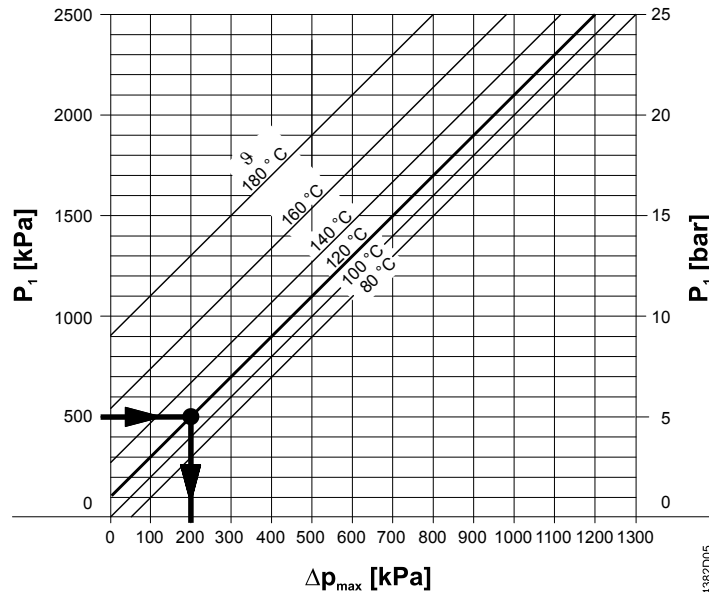


Flow characteristic

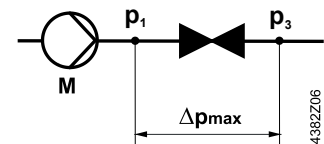
- 0...100 %: → A – AB equal-percentage, $n_{gl} = 3,9$ as per VDI / VDE 2173
- Through-port** 0...100 %: → equal-percentage, $n_{gl} = 3,9$ as per VDI / VDE 2173
- Bypass** 0...100 %: → B – AB linear, $k_{vs} > 70\%$ of A – AB

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 2, 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

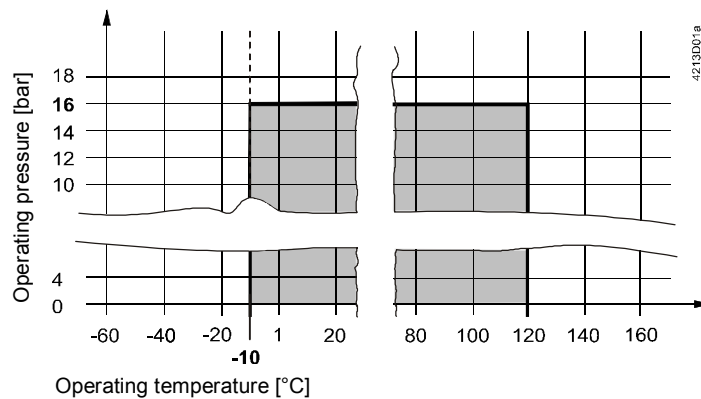
From the diagram above, it will be seen that with the ball valve almost closed, the maximum permissible differential pressure Δp_{\max} → is 200 kPa (2 bar).

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

Mediums



Operating pressure and medium temperature as per ISO 7005

Current local legislation must be observed.

Type summary

Type	Stock no.	Type	Stock no.	DN	k_{vs}	S_v
2-port		3-port				
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	—	—	25	10	
VAG61.25-6.3	S55230-V108	—	—		6,3	
VAG61.25-10	S55230-V109	VBG61.25-10	S55230-V126		10	
VAG61.25-16	S55230-V110	—	—	32	16	
VAG61.32-10	S55230-V111	—	—		10	
VAG61.32-16	S55230-V112	VBG61.32-16	S55230-V127	40	16	
VAG61.32-25	S55230-V113	—	—		25	
VAG61.40-16	S55230-V114	—	—	50	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}	=	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 kv value at which the flow characteristic tolerances can still be maintained at a differential pressure of 100 kPa (1 bar)

Accessories

Screwed fittings

Type	Stock no.	Description
ALG..2	ALG..2	Set of 2 screwed fittings, pipe side threaded for 2-port valves, consisting of 2 union nuts, 2 discs and 2 flat seals ALG..2B are brass fittings, for media temperature up to 100 °C.
ALG..2B	S55846-Z1..	
ALG..3	ALG..3	Set of 3 screwed fittings, pipe side threaded for 3-port valves, consisting of 3 union nuts, 3 discs and 3 flat seals ALG..2B are brass fittings, for media temperature up to 100 °C.
ALG..3B	S55846-Z1..	

Insulation covers

For thermal insulation, separate insulation covers are available.

Type	Material	Density	Thermal conductivity at tm 40 °C	Temperature range
ALI..V..G..	Polyethylen foam	29 kg/m ³	0,0372 W/mK	-10 °C... 100 °C

Ball valve	Insulation cover	Stock no.
VAG61.15..	ALI15VAG60/61	S55845-Z162
VAG61.20..	ALI20VAG60/61	S55845-Z163
VAG61.25..	ALI25VAG60/61	S55845-Z164
VAG61.32..	ALI32VAG60/61	S55845-Z165
VAG61.40..	ALI40VAG60/61	S55845-Z166
VAG61.50..	ALI50VAG60/61	S55845-Z167

Ball valve	Insulation cover	Stock no.
VBG61.15..	ALI15VBG60/61	S55845-Z168
VBG61.20..	ALI20VBG60/61	S55845-Z169
VBG61.25..	ALI25VBG60/61	S55845-Z170
VBG61.32..	ALI32VBG60/61	S55845-Z171
VBG61.40..	ALI40VBG60/61	S55845-Z172
VBG61.50..	ALI50VBG60/61	S55845-Z173

Strainer

Mounting upstream of the ball valve.

Type	Stock no.	Description	DN	Mesh [mm]
ALX15	S55845-Z174	Strainer inside threaded	15	0.5
ALX20	S55845-Z175	Strainer inside threaded	20	0.8
ALX25	S55845-Z176	Strainer inside threaded	25	0.8
ALX32	S55845-Z177	Strainer inside threaded	32	0.8
ALX40	S55845-Z178	Strainer inside threaded	40	0.8
ALX50	S55845-Z179	Strainer inside threaded	50	0.8

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
[kPa]								
VAG61.15..	350	1400	350	1400	350	1400	350	1400
VAG61.20..								
VAG61.25..								
VAG61.32-10	—	—	—	—	—	1000	—	1000

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
[kPa]								
VAG61.32-16	—	—	—	—	350	800	800	350
VAG61.32-25	—	—	—	—				
VAG61.40-16	—	—	—	—				
VAG61.40-25	—	—	—	—				
VAG61.40-40	—	—	—	—		600	600	
VAG61.50-25	—	—	—	—				
VAG61.50-40	—	—	—	—				
VAG61.50-63	—	—	—	—				
VBG61.15..	350	—	350	—	—	350	—	
VBG61.20..		—		—				
VBG61.25-10		—		—				
VBG61.32-16		—		—				
VBG61.40-25		—		—				
VBG61.50-40		—		—				

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 actuators for ball valves (overview)

Type ¹⁾	Operating voltage	Positioning-		Spring return-		Data Sheet
		signal	time	function	time	
GQD131.9A	AC/DC 24 V	3-position	30/15 s ²⁾	Yes	15 s	N4659
GQD161.9A		DC 0...10 V				
GDB331.9E	AC 230 V	3-position	150 s	—	—	N4657
GDB131.9E	AC 24 V					
GDB161.9E						
GMA131.9E	AC/DC 24 V	3-position	90/15 s ²⁾	Yes	15 s	N4658
GMA161.9E		DC 0...10 V				
GLB331.9E	AC 230 V	3-position	150 s	—	—	N4657
GLB131.9E	AC 24 V					
GLB161.9E						

¹⁾ Actuator type: Electro-motoric

²⁾ open / close

Ordering

When ordering please give material, article type, purchase order text and quantity. Example:

Material	Article Type	Purchase Order (PO) text	Quantity
VAG61.25-16	VAG61.25-16	Ball valve outside threaded, 2-Port	2
GLB161.9E	GLB161.9E	Actuator for Ball valve, NSR	2

Delivery

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

Applications with auxiliary functions

If a ball valve application requires a rotary actuator with auxiliary functions (for example switch or potentiometer), a standard actuator with a corresponding function can be used. In this case, a mounting set ASK77.. is required **in addition** to the rotary actuator.

Rotary actuator	Option	Mounting set (order text)
GMA..1E (with spring-return)	Potentiometer, switches	ASK77.2 Accessory Kit BV for GMAxx1.9E
GDB..1E / GLB..1E (without spring-return)	Potentiometer, switches	ASK77.3 Accessory Kit BV for GDBxx1.9E
GQD..1A (with spring-return)	Switches	ASK77.4 Accessory Kit for BV GQDxx1.9A

Note:

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

Notes

Safety



⚠ Caution

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.

National safety regulations

Failure to comply with national safety regulations may result in personal injury and property damage.

- Observe national provisions and comply with the appropriate safety regulations.

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 3).

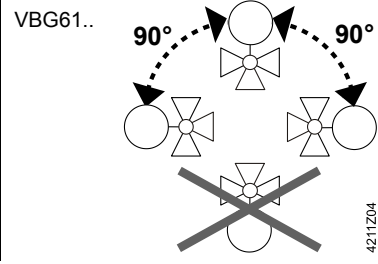
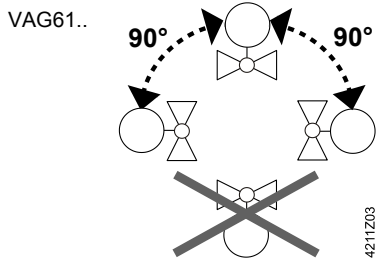
Always use a strainer upstream of the ball valve to increase the ball valve's functional safety.

Mounting

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

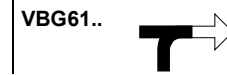
The ball valve is supplied with Mounting Instructions (VAG61.., VBG61..: 74 319 0922 0).

Orientation



Direction of flow

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



Ball valve	Laser mark	Delivery position	Turned 90 °
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>

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

VAG61.. and VBG61.. ball valves are maintenance-free.

Disposal



The valve is considered an electronics device for disposal in terms of European Directive 2012/19/EU and may not be disposed of as domestic garbage.

- Disassemble the valve into individual parts prior to disposing of it and sort the individual parts by the various types of materials.
- Comply with all local and currently applicable laws and regulations.

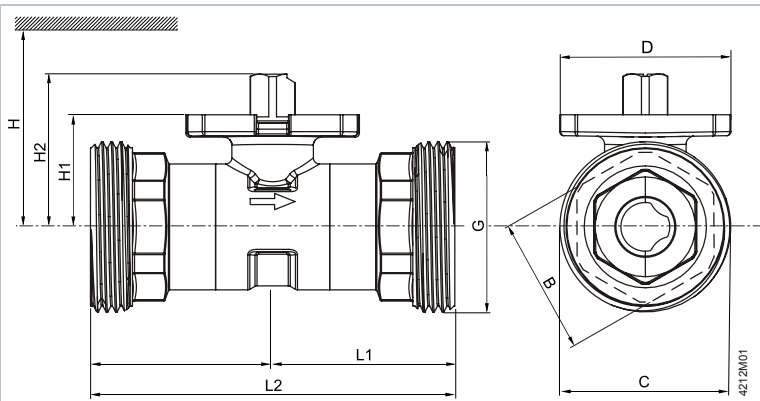
Warranty

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

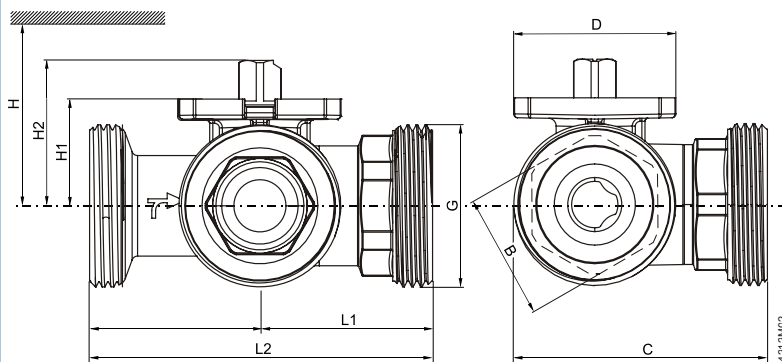
Functional data			VAG61..	VBG61..
PN class			PN 40 as per ISO 7268	
Operating pressure			To ISO 7005 within the permissible medium temperature range according to diagram on page 4	
Ball valve characteristic				
	Through-port	0...100 %	equal-percentage: $n_{gl} = 3,9$ as per VDI / VDE 2173	
	Bypass	0...100 %	—	linear
Leakage rate				
	Through-port		„Waterproof“ as per EN 60534-4 L/1, better than class 5	„Waterproof“ as per EN 60534-4 L/1, better than class 4
	Bypass		—	< 1 %
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			-10...120 °C	
Rangeability S_v			> 500	
Angle of rotation			90 °	
Materials				
Ball valve body			Brass CW602N (DZR)	
Ball			Brass CW602N (DZR), chromium-plated	
Stem			Brass CW602N (DZR)	
Gland			EPDM O-rings	
Dimensions / weight				
Refer to "Dimensions"				
Externally threaded connections			G..B as per ISO 228-1	
Standards, directives and approvals				
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			The product environmental declaration CE1E4212en contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	

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)

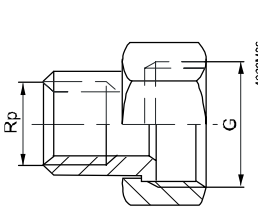
Type	DN	B	C	D	G	L1	L2	H1	H2	H				[kg]
										GQD..9A	GDB..9E	GMA..9E	GLB..9E	
		[mm]	[mm]	[mm]	[Inch]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
VAG61.15..	15	27	33	42	G 1 B	43.5	87	27.6	37.6	> 300	> 300	> 300	> 300	0.36
VAG61.20..	20	34	42	42	G 1 ¼ B	44.7	89.4	27.6	37.6	> 300	> 300	> 300	> 300	0.44
VAG61.25..	25	35	48	42	G 1 ½ B	44.7	89.4	30.5	40.5	> 320	> 320			0.57
VAG61.32..	32	38	59.7	42	G 2 B	50.1	100.2	34.3	44.3			> 320	> 320	0.84
VAG61.40..	40	49	65.7	42	G 2 ¼ B	58.3	116.6	39.8	49.8					1.29
VAG61.50..	50	61	81.6	42	G 2 ¾ B	62	124	52.8	62.8			> 335	> 335	1.98



- 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	C	D	G	L1	L2	H1	H2	H				[kg]
										GQD..9A	GDB..9E	GMA..9E	GLB..9E	
		[mm]	[mm]	[mm]	[Inch]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
VBG61.15..	15	27	59.5	42	G 1 B	43.5	87	24.2	33.7					0.41
VBG61.15-6.3		27	61	42	G 1 B	44.3	88.6	27.6	37.6	> 300	> 300	> 300	> 300	0.45
VBG61.20..	20	34	66	42	G 1 ¼ B	44.7	89.4	27.6	37.6					0.52
VBG61.25..	25	35	73	42	G 1 ½ B	49.2	98.4	30.5	40.5	> 320	> 320			0.75
VBG61.32..	32	38	94	42	G 2 B	57	114	34.3	44.3			> 320	> 320	1.2
VBG61.40..	40	49	107	42	G 2 ¼ B	63.8	127.6	39.8	49.8					1.84
VBG61.50..	50	61	123	42	G 2 ¾ B	69	138	52.8	62.8			> 335	> 335	2.83

Screwed fittings


	For 2-port valves VAG61.. (Set of 2)		For 3-port valves VBG61.. (Set of 3)		for valve type	G [Inch]	Rp [Inch]
	Type	Stock no.	Type	Stock no.			
	ALG152	S55846-Z100	ALG153	S55846-Z101	V..G61.15	G 1B	Rp ½
	ALG202	S55846-Z102	ALG203	S55846-Z103	V..G61.20	G 1¼B	Rp ¾
	ALG252	S55846-Z104	ALG253	S55846-Z105	V..G61.25	G 1½B	Rp 1
	ALG322	S55846-Z106	ALG323	S55846-Z107	V..G61.32	G 2B	Rp 1¼
	ALG402	S55846-Z108	ALG403	S55846-Z109	V..G61.40	G 2¼B	Rp 1½
	ALG502	S55846-Z110	ALG503	S55846-Z111	V..G61.50	G 2¾B	Rp 2

- On valve side: cylindrical thread to ISO 228-1
- On pipe side: with cylindrical thread to ISO 7-1
- ALG..B for media temperature up to 100 °C

Insulation covers for ball valves 2-port (VAG61..)

Type		DN	B	C	D	D1	E	L	H				 [g]
Insulation cover	for valve type	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	GQD..9A	GDB..9E	GMA..9E	GLB..9E	
ALI15VAG60/61	VAG61.15..	15	64	92	66	32	21	170	> 300	> 300	> 300	> 300	24
ALI20VAG60/61	VAG61.20..	20	80	88	88	42	27	170	> 300	> 300	> 300	> 300	30
ALI25VAG60/61	VAG61.25..	25	90	95	100	48	34	185	> 320	> 320	> 320	> 320	32
ALI32VAG60/61	VAG61.32..	32	102	100	108	54	43	185	> 320	> 320	> 320	> 320	40
ALI40VAG60/61	VAG61.40..	40	118	105	124	60	48	215	> 320	> 320	> 320	> 320	52
ALI50VAG60/61	VAG61.50..	50	130	110	134	66	61	225	> 320	> 320	> 320	> 320	59

Isolationschalen für Regelkugelhähne 3-Weg (VBG61..)

Type		DN	C	C1	D	D1	E	L	H				 [g]
Insulation cover	for valve type	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	GQD..9A	GDB..9E	GMA..9E	GLB..9E	
ALI15VBG60/61	VBG61.15..	15	132	50	87	42	21	155	> 300	> 300	> 300	> 300	45
ALI20VBG60/61	VBG61.20..	20	135	58	97	49	27	170	> 300	> 300	> 300	> 300	55

ALI25VBG60/61	VBG61.25..	25	145	51	104	51	34	185	> 320	> 320			65
ALI32VBG60/61	VBG61.32..	32	175	61	124	60	43	210			> 320	> 320	88
ALI40VBG60/61	VBG61.40..	40	185	61	130	63	48	225					105
ALI50VBG60/61	VBG61.50..	50	195	65	138	67	61	235			> 335	> 335	115

Strainer

Typ	DN	b [mm]	c [mm]	G [Zoll] *	L [mm]	H [mm]	kg [kg]
ALX15	15	12	38	G ½	54	27	0.178
ALX20	20	15	43	G ¾	67	34	0.290
ALX25	25	16	53	G 1	79	41	0.410
ALX32	32	17	64	G 1¼	98	51	0.680
ALX40	40	18	70	G 1½	106	57	0.874
ALX50	50	20	85	G 2	122	69	1.428

* ISO 228-1

Revision numbers

Product number	Product number	Valid from rev. no.
VAG61.. (2-port)	VBG61.. (3-port)	
VAG61.15-1	—	..A
VAG61.15-1.6	VBG61.15-1.6	..A
VAG61.15-2.5	VBG61.15-2.5	..A
VAG61.15-4	VBG61.15-4	..A
VAG61.15-6.3	VBG61.15-6.3	..A
VAG61.20-4	VBG61.20-4	..A
VAG61.20-6.3	VBG61.20-6.3	..A
VAG61.20-10	—	..A
VAG61.25-6.3	—	..A
VAG61.25-10	VBG61.25-10	..A
VAG61.25-16	—	..A
VAG61.32-10	—	..A
VAG61.32-16	VBG61.32-16	..A
VAG61.32-25	—	..A
VAG61.40-16	—	..A
VAG61.40-25	VBG61.40-25	..A
VAG61.40-40	—	..A
VAG61.50-25	—	..A
VAG61.50-40	VBG61.50-40	..A
VAG61.50-63	—	..A

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