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VG8000V Series Flanged Valves DN 15 - DN 150 • Nodular Iron • PN 16

Introduction

The VG8000V Series electrically and pneumatically operated nodular iron valves are designed primarily, to regulate the flow of water in response to the demand of a controller mainly in heating, but also in ventilating, and air conditioning systems. They are available in two-way configurations and three-way mixing configurations. A variety of electric and pneumatic actuators are available.



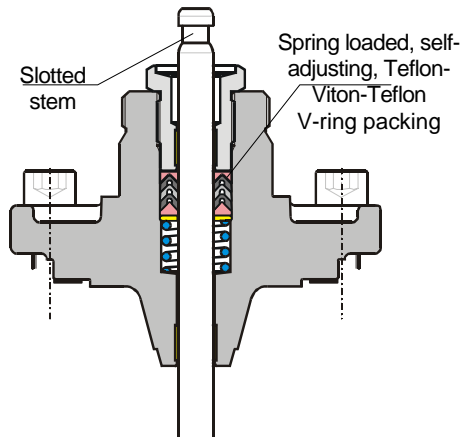
**VG8000V Series Valves
With the PA-2000 Pneumatic (left) and
RA-3000 Electric Actuators**

Features and Benefits

<p><input type="checkbox"/> Valves in two-way and three-way mixing configurations.</p>	<p>Covers common HVAC applications up to 140°C.</p>
<p><input type="checkbox"/> PN 16 rated nodular iron valve bodies.</p>	<p>Compact, lighter and more ductile than ordinary cast iron.</p>
<p><input type="checkbox"/> Use of standard Johnson Controls spring loaded, self-adjusting Teflon-Viton-Teflon V-ring packing.</p>	<p>Reliable, field-proven seal, applicable to a wide operating temperature range. No readjustment required.</p>
<p><input type="checkbox"/> Low leakage rate for two and three-way valves.</p>	<p>Provides maximum energy efficiency.</p>
<p><input type="checkbox"/> Electric and Pneumatic actuators available, either factory mounted or separately for in-situ installation, for all valve configurations.</p>	<p>Allows optimum actuator selection.</p>
<p><input type="checkbox"/> Slotted stem with clamp-coupler system for simple actuator attachment.</p>	<p>Quick and easy fitting reduces installation costs.</p>

Application Overview

Valve bodies are made of nodular cast iron and are available from sizes DN 15 to DN 150. Flanged fittings comply with DIN and BS standards. The valve trim is made of stainless steel. The valve packing consists of spring loaded Teflon-Viton-Teflon V-rings.



The VG8000V valves are available in two-way configuration for Push-Down-To-Close operation and in three way configurations, which are available as mixing valves.

Two-way valves have equal percentage relationship between valve stroke and flow at a constant pressure drop. Three-way valves have a combination of equal percentage and linear characteristic. An arrow is on one side of the valve body indicating the direction of flow for correct installation.

Varieties of electric and pneumatic actuators are available and can be ordered as factory fitted valve / actuator combination or separately for in-situ installation.

Refer to this and following pages for ordering data and additional details.

Note: It is recommended to use the correct water treatment. Normal tap water can mostly be used without further preparation when contained in a closed system and when it has been allowed to stabilise chemically. If however, due to water loss the system is constantly being replenished, then the water must be treated. Guidelines can be found in VDI 2035.

Ordering codes for Valve Bodies

Two-way PDTC and three-way mixing configurations

VG8 V1N

	Size		k_{vs}
A2	DN	15	2.5
A1	DN	15	4.0
B1	DN	20	6.3
C1	DN	25	10
D1	DN	32	16
E1	DN	40	25
F1	DN	50	40
G1	DN	65	63
H1	DN	80	100
J1	DN	100	160
K1	DN	125	250
L1	DN	150	350
Valve Body Type			
2	2-way Valve PDTC		
8	3-way Mixing valve		

For example:

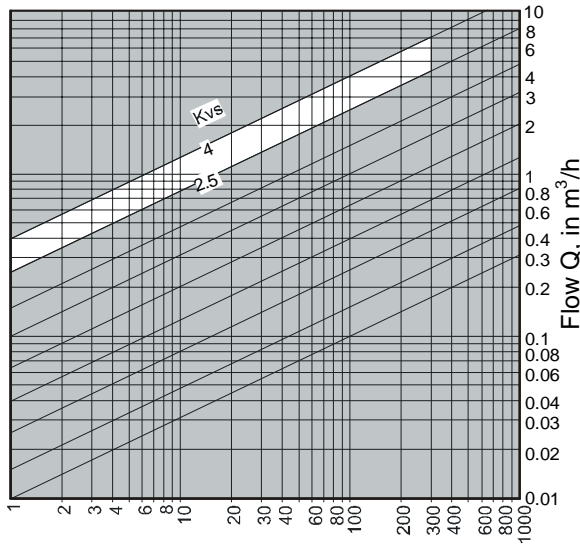
For a two-way valve, DN 65, k_{vs} 63, PN 16, the ordering code is:

VG82G1V1N

Valve Selection

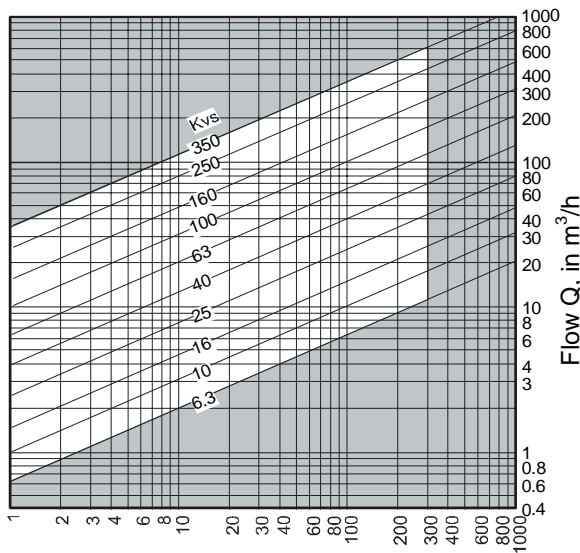
The valve size for water applications can be defined using the diagrams below, where the intersection of the pressure drop across the valve and the flow must be within the white area.

k_v selection diagram for DN 15 valves:



Pressure drop Δp in kPa (100 kPa = 1 bar)

k_v selection diagram for DN 25...150 valves:



Pressure drop Δp in kPa (100 kPa = 1 bar)

Valve - Actuator Combinations

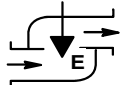




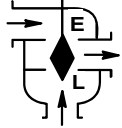




The VG8000V series flanged nodular iron valves can be combined with the following series pneumatic and electric actuators:

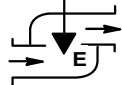




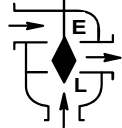




- MP-8000 pneumatic actuators (DN 15 ...40)
- PA-2000 pneumatic actuators (DN 15 ...150)
- VA78x0 electric non-spring & spring return actuators (DN 15 ...40)
- VA1000 electric non-spring & spring return actuators (DN 15... DN150)
- RA-3000 electric actuators (DN 15 ...150)
- FA-3300 heavy duty electric actuators (DN 100, 125 and 150)

Please see the relevant product bulletin for more details.

Actuator Selection

Flow through the valve is dependent on the position of the plug, as indicated in the tables below. The function of the actuator / valve combination is dependent upon the action of the actuator and the type of valve used.

Pneumatic actuator →	Direct Acting pneumatic actuators MP-822xxxx0 and PA-2xx0-3x1x		Reverse Acting pneumatic actuators MP-832xxxx0 and PA-2xx0-3x2x	
	Air pressure extends stem	Spring-return retracts stem	Air pressure retracts stem	Spring-return extends stem
 2-way PDTC VG82..V1N				
 3-way mixing VG88..V1N				

Electric actuator →	Control mode		Power fail position (spring return only)	
	Actuator extends stem	Actuator retracts stem	spring force retracts stem	spring force extends stem
	VA7810-xxx-12, VA1225-GGA-1, RA-3xxx-7x2x, RA-3100-8x2x, FA-2xxx-7x1x and FA-33xx-741x		VA7820-xxx-12 VA1220-GGA-1	VA7830-xxx-12 VA1420-GGA-1
 2-way PDTC (NO) VG82...				
 3-way mixing VG88...				

E = Equal percentage control characteristic	▲ = Flow
L = Linear control characteristic	△ = No flow

Pneumatic Actuator Selection

The pneumatic actuators can be combined with two-way PDTC and three-way valve configurations.

All actuators are reversible for Normally Closed or Normally Open operation on a two-way PDTC valve body.

The actuators can also be optionally equipped with a factory fitted positioner and/or a hand wheel. The PY-1010 positioner is direct acting and can be used with D.A. or R.A. actuators of the MP8000 and PA-2000 series.

The actuators are available for valve sizes:

Valves DN 15 – 40 : MP8000 series

Valves DN 15 – 150 : PA-2000 series

Mounting kits for in-situ installation: Hand wheel, feedback assembly and auxiliary switches are available on request.

Ordering codes for Pneumatic Actuators

PA-2000 series

PA-2 -3

Spring Range	
2	20... 50 kPa
7	70...100 kPa
Action	
1	Direct Acting (D.A.)
2	Reverse Acting (R.A.)
Size	
2	150 cm ² for DN 15...DN 40
3	300 cm ² , standard for DN 50...DN 80
6	600 cm ² , standard for DN 100...DN 150
Options	
0	None
3	2 kΩ Feedback pot. and (2) auxiliary switches (PQ-1000)
Positioner, factory fitted	
0	None
3	DA type (PY-1010)
Hand wheel	
0	None
1	With hand wheel

MP8000 series

MP8 2 20

Options	
0	None
2	2 kΩ Feedback pot. and (2) auxiliary switches (PQ-1000)
Options (Positioner and hand wheel)	
5	None
6	Positioner D.A., PY-1010
7	Positioner D.A., PY-1010 with hand wheel
8	Hand wheel
Spring Range	
C	20...50 kPa
E	60...90 kPa
Action, size	
2	D.A., 160 cm ²
3	R.A., 160 cm ²

Electric Actuator Selection

VA78x0 Electric Actuators

The VA78x0 non-spring return and spring return actuators with 1000N thrust for valves in heating, ventilation and air conditioning applications is available for floating (3-point) control or proportional control.

All models have manual override as standard. Proportional models are **self-calibrating**. The actuator is intended for use with Johnson Controls VG8000V flanged valves.

It provides 1000 N nominal stem force and can be used with DN 15...DN 40 valves in accordance with the max. close-off pressure ratings specified.

Ordering codes for VA7810 Electric Actuators

Ordering code	Actuator Description
On/Off & Floating Control	
VA7810-ADA-12	AC 230 V
VA7810-ADC-12	AC 230 V, (2) Aux. switches
VA7810-AGA-12	AC 24 V
VA7810-AGC-12	AC 24 V, (2) aux. switches
VA7810-AGH-12	AC 24 V, 2k Ω Feedback pot.
Proportional Control	
VA7810-GGA-12	AC 24 V DC 0(2)...10 V or 0(4)... 20 mA + Floating or On/Off control
VA7810-GGC-12	AC 24 V 2 Aux. switches DC 0(2)...10 V or 0(4)... 20 mA + Floating or On/Off control

Ordering code	Actuator Description
Spring Return Actuators	
VA7820-GGA-12 (Spring return retracts)	1000N; AC 24 V Supply DC 0(2)...10 V Feedback Proportional DC 0(2)...10 V
VA7830-GGA-12 (Spring return extends)	or 0(4)... 20 mA control + Floating or On/Off control
VA7820-GGC-12 (Spring return retracts)	1000N; AC 24 V Supply DC 0(2)...10 V Feedback 2 Aux. switches
VA7830-GGC-12 (Spring return extends)	Proportional DC 0(2)...10 V or 0(4)... 20 mA control + Floating or On/Off control

VA1000 Electric self-adjusting actuators

The VA1000 2500N thrust non-spring return and 2000N thrust spring return valve-actuators are self-adjusting and therefore have a greatly reduced installation and commissioning time. They are of modular construction so that for instance, the required type of control signal is achieved simply by fitting a module with the required function in-situ.

This actuator can be used with DN15... DN150 valves in accordance with the close-off pressures specified.

24V Actuator ordering codes

Ordering code	Description
VA1125-GGA-1	2500N; Non-spring return
VA1220-GGA-1	2000N; spring return retracts
VA1420-GGA-1	2000N; spring return extends

Accessory modules for in-situ installation

VA1000-M230	AC 230V module
VA1000-P2	2k Ω feedback potentiometer
VA1000-S2	2 SPDT aux. switches
VA1000-SRU	Split range unit module for proportional actuators only

111 6348 011	Cable adaptor M20x1.5
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111 6349 011	Cable adaptor M16x1.5
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Either feedback potentiometer or aux. switches can be fitted not both.

C lose-off pressures

Maximum Close-off Pressures for Pneumatic Valve / Actuator combinations (kPa)

Actuator model		Body Size (mm) (DN)	k _{vs} coefficient	2-way PDTC with reverse acting actuator (actuator spring-return closes valve) or 3-way See Table "Actuator Selection"		2-way PDTC with direct acting actuator (actuator supply air pressure closes valve) or 3-way See Table "Actuator Selection"			
Stroke (mm)	Eff. area (cm ²)			with 0 kPa supply		with 120 kPa supply		with 160 kPa supply	
				Spring range (kPa)		Spring range (kPa)		Spring range (kPa)	
				20-50	70-100; 60-90 for MP8000	20-50	70-100; 60-90 for MP8000	20-50	70-100, 60-90 for MP8000
MP8000		15	2.5 / 4	600	1600	1600	1600	1600	1600
13	160	20	6.3	200	1600	1600	890	1600	1600
		25	10	80	1600	1600	560	1600	1600
		32	16	-	1000	1250	230	1600	1250
		40	25	-	580	740	100	1380	740
PA-2000-3200		15	2.5 / 4	440	1600	1600	1600	1600	1600
13	150	20	6.3	120	1600	1600	120	1600	1600
		25	10	30	1600	1600	30	1600	1600
		32	16	-	1140	1140	-	1600	900
		40	25	-	670	670	-	1280	520
PA-2000-3300*		50	40	40	850	850	400	1500	690
25	300	65	63	20	650	650	200	1160	530
		80	100	-	300	300	-	550	230
PA-2000-3600		100	160	40	490	480	40	820	390
42	600	125	250	10	290	290	10	510	240
		150	350	-	170	170	-	310	140

* Higher close-off pressures are available on request

Maximum Close-off Pressures for Electric Valve / Actuator combinations (kPa)

Actuator	Stroke (mm)	Thrust (N)	Body Size DN										
			15	20	25	32	40	50	65	80	100	125	150

Non Spring Return Actuators

VA7810-xxx-12	13	1000	1600	1600	1570	770	440	-	-	-	-	-	-
RA-3000-712x	13	1600	1600		1250	1250	-	-	-	-	-	-	-
RA-3000-722x	25	1800	-	-	-	-	-	700	540	240	-	-	-
RA-3000-732x	42	3000	-	-	-	-	-	1350	1050	500	310	190	110
FA-3300-741x	42	6000	-	-	-	-	-	-	-	-	740	460	280
VA1125-GGA-1		2500	1600				1080	830	390	230	140	75	

Spring Return Actuators

VA78x0-xxx-12	13	1000	1600	1600	1570	770	440	-	-	-	-	-	-
VA1x20-GGA-1		2000	1600				800	630	380	160	90	40	

*) For higher close-off pressures, please contact your JC supplier

Installation and Servicing

When mounting the VG8000V series valves, please follow the instructions below:

- It is recommended that the valves be mounted upright, in a conveniently accessible location.
- Do not cover the actuator with insulating material.
- Sufficient clearance must be allowed for actuator removal (refer to the dimension drawings).
- Install the valve as indicated by the arrow(s) on the valve body so that the plug seats against the flow.
- Johnson Controls must approve use of the VG8000V series valves with fluids other than specified.
- On electrically actuated valve assemblies, all wiring must be in accordance with applicable electrical code and ordinances.
- Input lines to the actuator must be wired correctly to open or close the valve as is functionally required.

When servicing the VG8000V series valves, make sure that:

- The pneumatic or electrical power to the actuator is isolated.
- You do not touch or attempt to connect or disconnect wires when electrical power is on.

⚠ WARNING

Shock Hazard
Disconnect the power supply before wiring connections are made to prevent personal injury.

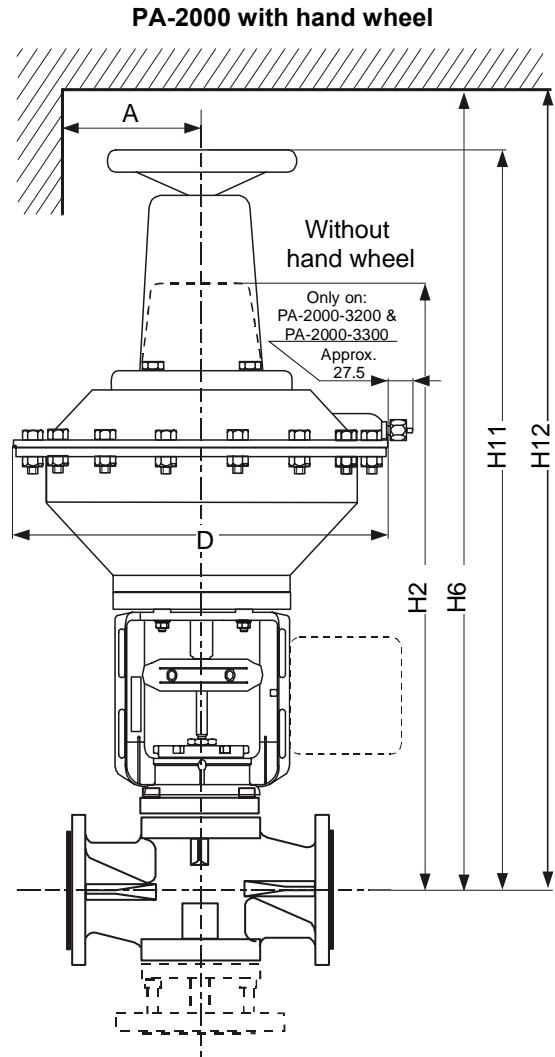
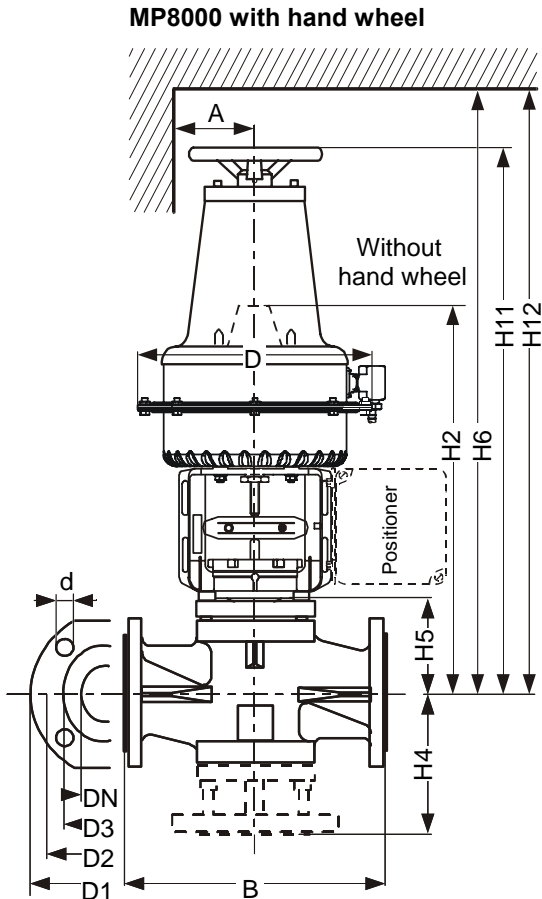
Equipment Damage Hazard
Make and check all wiring connections before applying power to the system. Short circuited or improperly connected wires may result in permanent damage to the unit.

- No air pressure is applied to the piping system when servicing the valve.
- No attempt is made to remove the spring of a pneumatic actuator from its housing.

Ordering Code for Replacement Packing Kits

Ordering Code	For valves
Standard packing kit:	
121 4393 011	DN 15...40
121 4409 011	DN 50...80
121 4433 011	DN 100...150

Dimensions Pneumatic Actuators (in mm)



Valve and Actuator Dimensions

Valve body				MP8200 & MP8300							PA-2000-3200					
DN	B	H4	H5	A	A *)	D	H2	H6	H11	H12	A	D	H2	H6	H11	H12
15	130	100	76	160	220	219	342	492	448	600	220	205	372	522	460	610
20	150	106	70	160	220	219	342	492	448	600	220	205	372	522	460	610
25	160	106	76	160	220	219	342	492	448	600	220	205	372	522	460	610
32	180	123	81	160	220	219	347	497	553	600	220	205	377	527	465	615
40	200	140	79	160	220	219	345	495	551	600	220	205	375	525	463	613

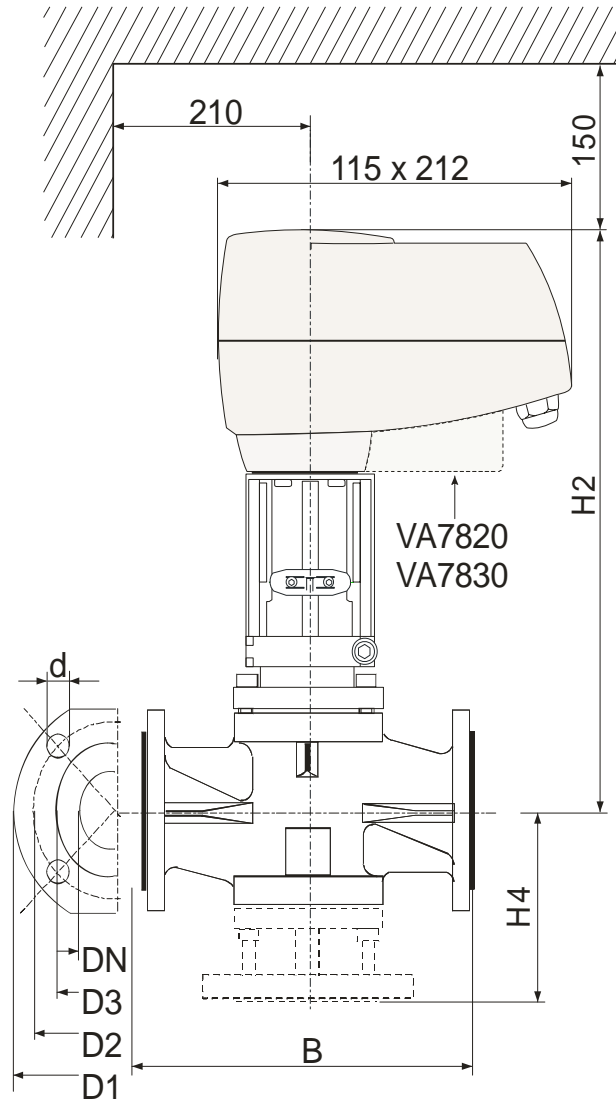
*) For actuator with positioner

Valve body				PA-2000-3300						PA-2000-3600					
DN	B	H4	H5	A	D	H2	H6	H11	H12	A	D	H2	H6	H11	H12
50	230	145	101	235	290	479	629	593	743	-	-	-	-	-	-
65	290	156	102	235	290	480	630	594	744	-	-	-	-	-	-
80	310	180	108	235	290	486	636	600	750	-	-	-	-	-	-
100	350	225	136	-	-	-	-	-	-	250	384	644	844	802	1002
125	400	255	155	-	-	-	-	-	-	250	384	663	863	821	1021
150	480	290	175	-	-	-	-	-	-	250	384	683	883	841	1041

Flange Dimensions

DN	D1	D2	D3	d	Bolts	Holes	DN	D1	D2	D3	d	Bolts	Holes
15	95	65	45	13.5	M12 x 45	4	80	200	160	138	17.5	M16 x 65	8
20	105	75	58	13.5	M12 x 50	4	100	220	180	158	17.5	M16 x 70	8
25	115	85	68	13.5	M12 x 50	4	125	250	210	188	17.5	M16 x 75	8
32	140	100	78	17.5	M16 x 55	4	150	285	240	212	22	M20 x 75	8
40	150	110	88	17.5	M16 x 55	4							
50	165	125	102	17.5	M16 x 60	4							
65	185	145	122	17.5	M16 x 60	4							

Dimensions in mm - Electric Actuator VA78x0 (DN 15 - 40)



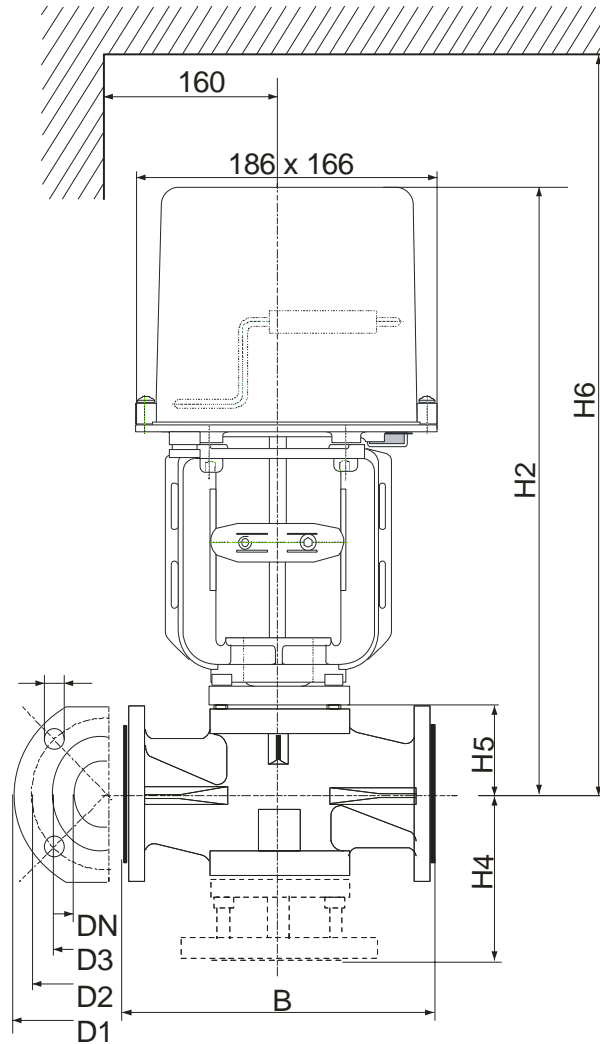
Flange Dimensions

DN	D1	D2	D3	d	Bolts	Holes
15	95	65	45	13.5	M12 x 45	4
20	105	75	58	13.5	M12 x 50	4
25	115	85	68	13.5	M12 x 50	4
32	140	100	78	17.5	M16 x 55	4
40	150	110	88	17.5	M16 x 55	4

Valve and Actuator dimensions

DN	Valve body			VA7810
	B	H4	H5	H2
15	130	100	76	383
20	150	106	76	383
25	160	106	76	383
32	180	123	81	388
40	200	140	78	386

Dimensions in mm, RA-3000 Electric Actuator (DN 15 – 40)



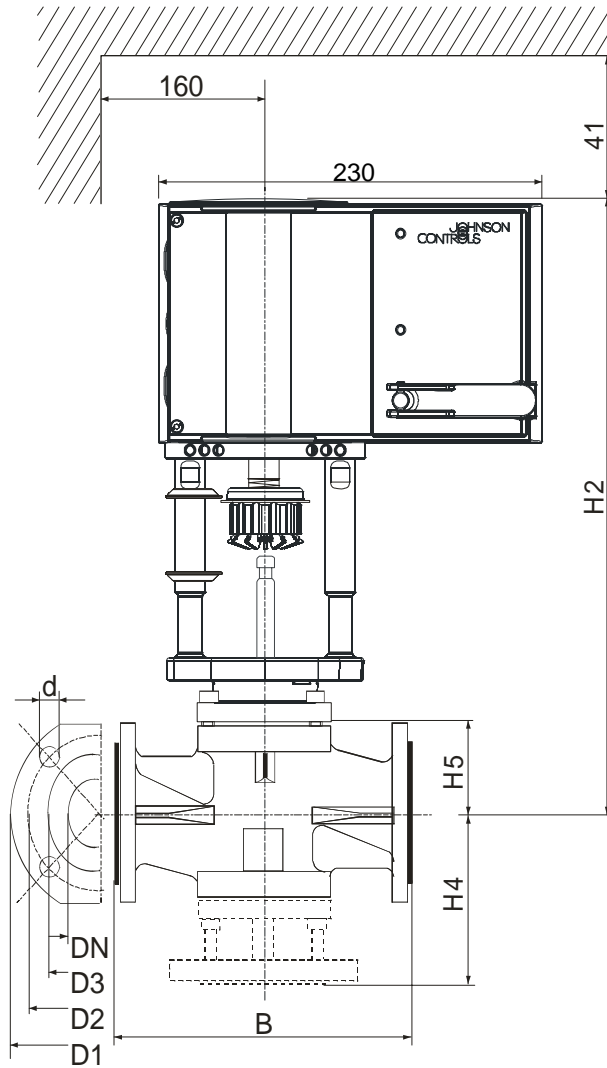
Flange Dimensions

DN	D1	D2	D3	d	Bolts	Holes
15	95	65	45	13.5	M12 x 45	4
20	105	75	58	13.5	M12 x 50	4
25	115	85	68	13.5	M12 x 50	4
32	140	100	78	17.5	M16 x 55	4
40	150	110	88	17.5	M16 x 55	4

Valve and Actuator dimensions

DN	Valve body			RA-3000	
	B	H4	H5	H2	H6
15	130	100	76	383	550
20	150	106	76	383	550
25	160	106	76	383	550
32	180	123	81	388	550
40	200	140	78	388	550

Dimensions in mm, VA1125-GGA-1 & VA1x20 Electric Actuators
for DN 15 – 40 valves.



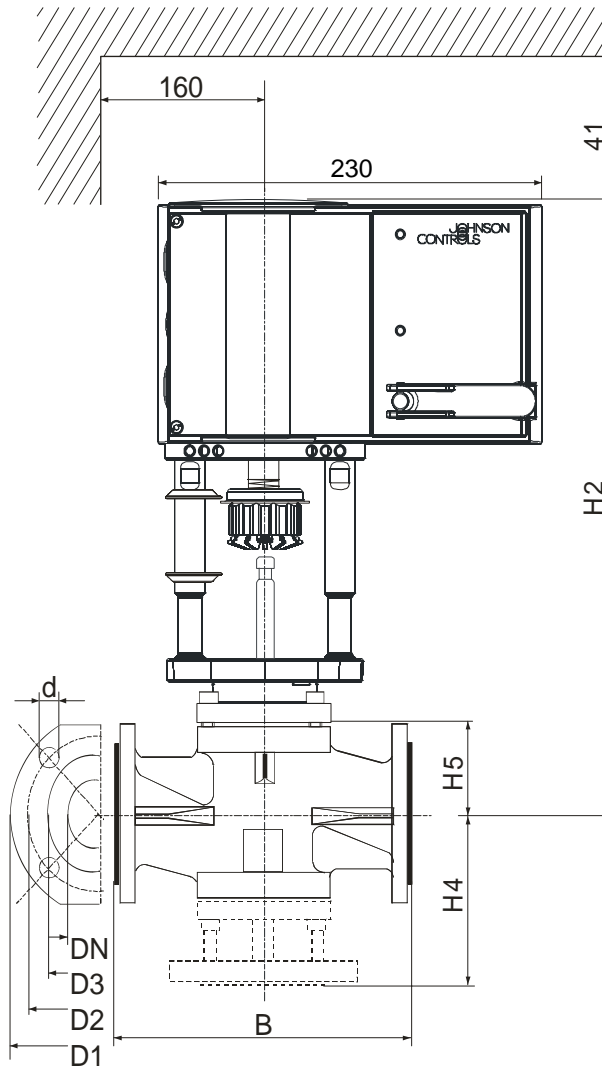
Flange Dimensions

DN	D1	D2	D3	d	Bolts	Holes
15	95	65	45	13.5	M12 x 45	4
20	105	75	58	13.5	M12 x 50	4
25	115	85	68	13.5	M12 x 50	4
32	140	100	78	17.5	M16 x 55	4
40	150	110	88	17.5	M16 x 55	4

Valve and Actuator dimensions

DN	Valve body			VA1000
	B	H4	H5	H2
15	130	100	76	359
20	150	106	76	359
25	160	106	76	359
32	180	123	81	364
40	200	140	78	364

Dimensions in mm, VA1125-GGA-1 VA1x20-GGA-1 Electric Actuators
for DN 50 – 150 valves



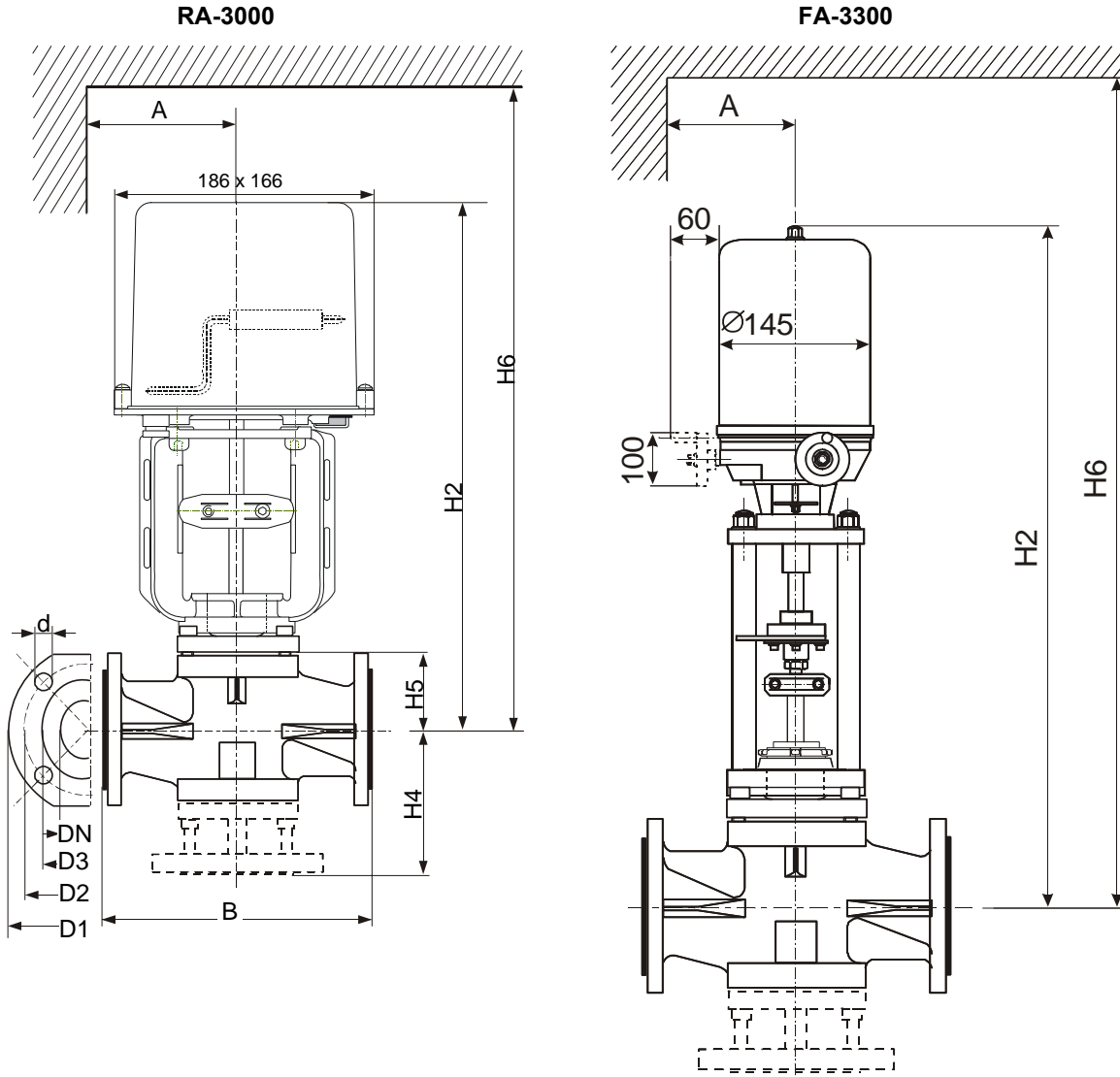
Flange Dimensions

DN	D1	D2	D3	d	Bolts	Holes
50	165	125	102	17.5	M16 x 60	4
65	185	145	122	17.5	M16 x 60	4
80	200	160	138	17.5	M16 x 65	8
100	220	180	158	17.5	M16 x 70	8
125	250	210	188	17.5	M16 x 75	8
150	285	240	212	22	M20 x 75	8

Valve and Actuator dimensions

DN	Valve body			VA1000
	B	H4	H5	H2
50	230	145	101	H2
65	290	156	102	384
80	310	180	108	385
100	350	225	136	391
125	400	255	155	419
150	480	290	175	438
50	230	145	101	458

Dimensions - Electric Actuators RA-3000 and FA-3300 in mm (DN 50 - 150)



Flange Dimensions

DN	D1	D2	D3	d	Bolts	Holes
50	165	125	102	17.5	M16 x 60	4
65	185	145	122	17.5	M16 x 60	4
80	200	160	138	17.5	M16 x 65	8
100	220	180	158	17.5	M16 x 70	8
125	250	210	188	17.5	M16 x 75	8
150	285	240	212	22	M20 x 75	8

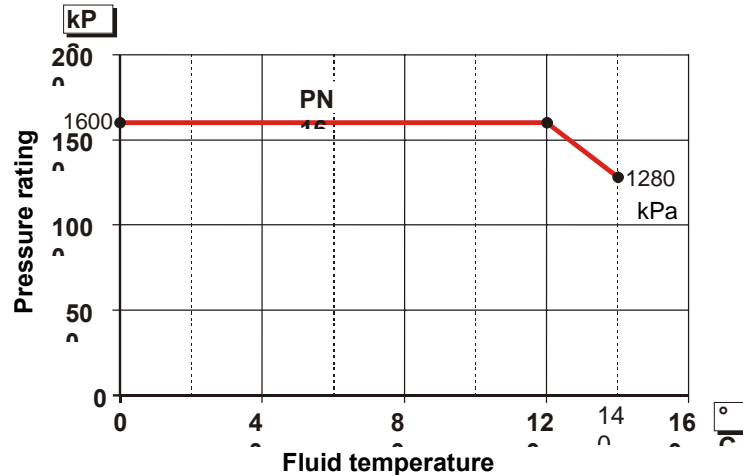
Valve and Actuator dimensions

DN	Valve body			FA-3300			RA-3000		
	B	H4	H5	A	H2 **)	H6 **)	A	H2	H6
50	230	145	101	-	-	-	160	408	580
65	290	156	102	-	-	-	160	409	580
80	310	180	108	-	-	-	160	415	580
100	350	225	136	300	608	820	160	443	600
125	400	255	155	300	626	840	160	462	630
150	480	290	175	300	637	860	160	482	640

**) Add 15 mm for models with positioner

Specifications

Product	VG8000V Series flanged valves											
Models	2-way (PDTC) DN 15...150, 3-way mixing DN 15...150											
Service	Water, glycol solutions (max 50%) for HVAC applications (proper water treatment is recommended, refer to VDI 2035)											
Valve body data:	DN	15	20	25	32	40	50	65	80	100	125	150
	k_{vs}	2.5 4	6.3	10	16	25	40	63	100	160	250	350
Weight (kg):	2-way	4.9	6.3	6.3	10.6	10.6	11.7	15.5	20.5	28.5	46	64.5
	3-way	5.4	7.5	7.5	13	13	15.5	20.5	27.5	37.5	61	83.5
Nominal stroke	13 mm						25 mm			42 mm		
Body pressure rating	PN 16; Limits in accordance with DIN 2401:											



Fluid temperature limits	0...+140 °C (above 120 °C limitations in accordance with DIN 4747 and DIN 4752)	
Material		
Body	Nodular cast iron GGG 40, EN-GJS-400-15	
Stem	Stainless steel, mat. spec. No.1.4305	
Seat	Machined into body	
Plug	Brass, mat. spec. No. 2.0401	
Packing	Teflon-Viton-Teflon V-ring combination, spring loaded and self adjusting	
Storage/Shipping	Temp. limits from – 20°C to 65°C	
Flange dimensions	DIN 2526 C form seal strip DIN 3202 F1 / DIN 2533 (Pre-welded flange, recommended in accordance with DIN 2633 – PN 16)	
Flow characteristics	Two-way valves and 3-way control port	3-way valves by-pass port
Characteristic	Equal percentage	Linear
Practical rangeability (k _{vs} / k _{vr})	100:1	
Sensitivity n_{gl} (ideal rangeability)	4.5 for k _{vs} ≥ 1 3.2 for k _{vs} 0.1...0.63	
Leakage	Max. 0.05 % of k _{vs}	
Operating pressure drop	300 kPa with water by fully open valve	

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. is not liable for damages resulting from misapplication or misuse of its products.

**JOHNSON
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