

## VG7000 Series Female Threaded Bronze Valves

### Introduction

The VG7000 Series electrically and pneumatically operated bronze valves with female threaded connection are designed primarily to regulate the flow of water and steam in response to the demand of a controller, in heating, ventilating, and air conditioning systems. These valves are available in normally open (N.O.) "push down to close", (N.C.) "push down to open", and three way mixing configurations. Both electric and pneumatic actuators are available.



VG7000 3-way with VA-7200 electric actuator

### Features and Benefits

<input type="checkbox"/> Complete family of DN15 through DN50 Bronze Valves, in two-way N.O., N.C. and three-way mixing configurations	Covers all common HVAC applications
<input type="checkbox"/> Electric and pneumatic actuators available for all valves	Allows applications of the best suited and most cost-effective actuator
<input type="checkbox"/> Every valve tested for tight shutoff	Provides maximum energy efficiency and ensures occupant comfort
<input type="checkbox"/> Uses Standard Johnson Controls Ring Pack Packings	Provides industry-leading reliability and operating life
<input type="checkbox"/> Flexible features and options ordering template	Easy-to-select the right valve combination for your specific application
<input type="checkbox"/> Standard Bonnet and stem design	Allows easy field retrofit, easy field mounting, and interchangeability of actuators.

## Ordering data

### Ordering code for valve bodies

VG7					
					<b>Stem Type</b>
					<b>T</b> Standard threaded stem
					<b>S</b> Slotted stem and small bonnet (for VA-7310 electric and V-3801 pneumatic actuators)
					<b>L</b> Large threaded stem (for V-500 pneumatic actuator only)
					<b>Size/k<sub>v</sub></b>
				<b>A</b> DN 15 / 0.25	<b>L</b> DN 20 / 6.3
				<b>B</b> DN 15 / 0.4	<b>N</b> DN 25 / 10
				<b>C</b> DN 15 / 0.63	<b>P</b> DN 32/16
				<b>D</b> DN 15 / 1.0	<b>R</b> DN 40/25
				<b>E</b> DN 15 / 1.6	<b>S</b> DN 50/40
				<b>F</b> DN 15 / 2.5	
				<b>G</b> DN 15 / 4.0	
					<b>Trim and Flow Characteristic</b>
				<b>1</b> Brass Trim, Equal%	(2-way body style only)
				<b>2</b> Brass Trim, linear in both ports	(3-way body style only)
				<b>3</b> Stainless Steel Trim, Equal%	(2-way body style only)
				<b>4</b> Stainless Steel Trim, linear in both ports	(3-way body style only)
					<b>End Connection</b>
				<b>0</b> BSP Parallel Threaded	
				<b>2</b> BSP Taper Threaded	
				<b>4</b> NPT Threaded	
					<b>Body Type</b>
				<b>2</b> 2-way PDTC (Normally Open)	
				<b>4</b> 2-way PDTO (Normally Closed)	
				<b>8</b> 3-way mixing	

### Ordering of factory mounted valves and electric actuators assemblies

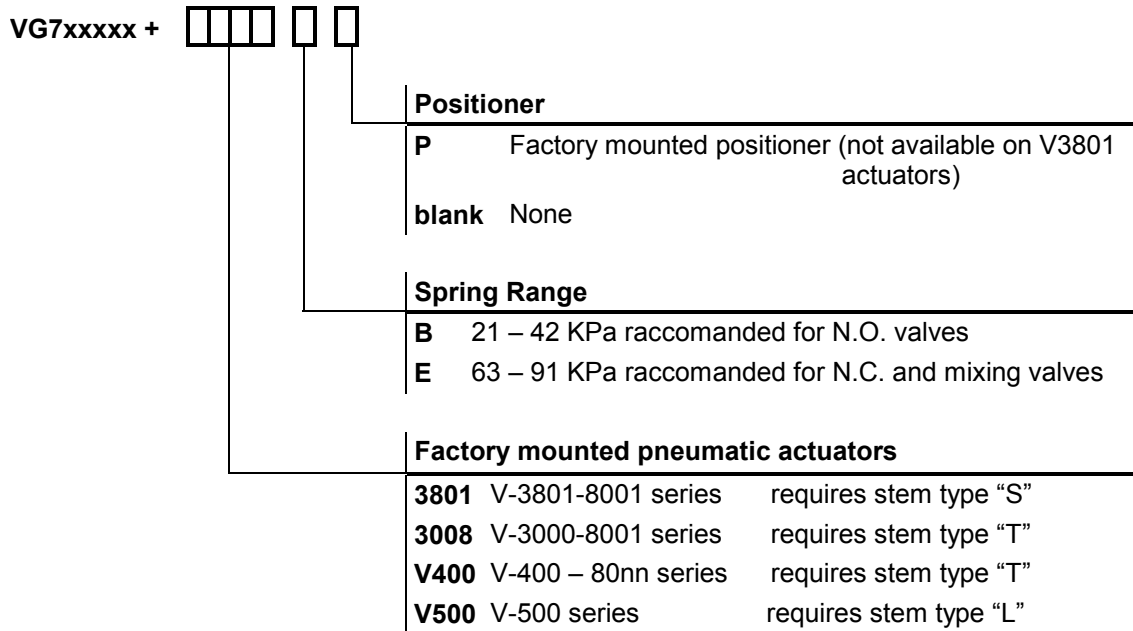
The valves and actuators can be ordered separately or factory mounted.  
When factory mounted, please add “**+M**” to the order code for the actuator.

#### For example:

**VG7201LT** (2way N.O., BSP parallel , brass equal%, DN20, k<sub>vs</sub> 6.3, standard threaded stem)

**VA-7150-1001+M** (VA-7150-1001 incremental type actuator with standard 24VAC supply)

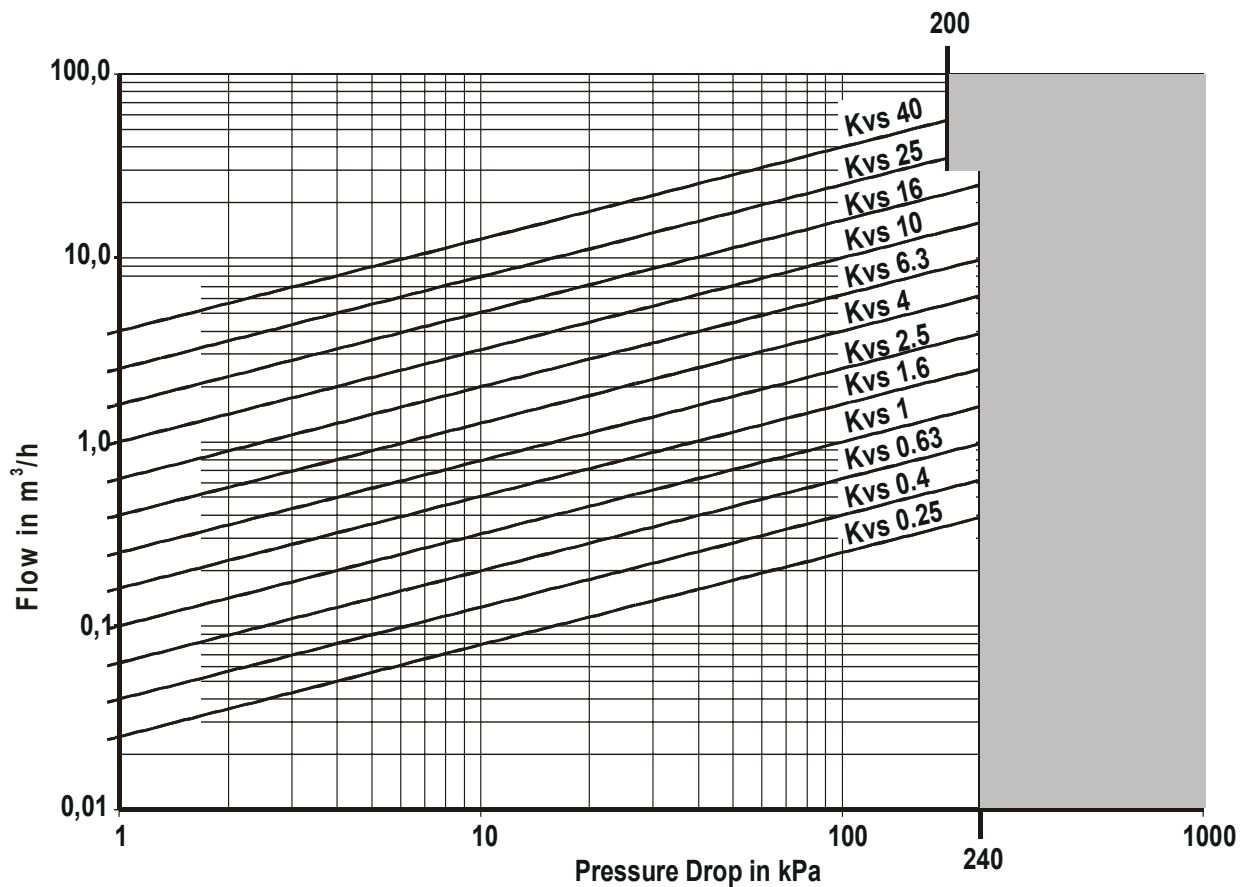
### Ordering of factory mounted assemblies of valves and pneumatic actuators



## Valve selection

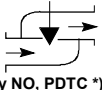








The valve size for water applications can be defined using the diagrams below, where the intersection of the pressure drop over the valve and the flow has to stay within the white area.

### *k<sub>v</sub>* selection diagram



# Operation

When the stem of the valve is moved down by the actuator, it opens the N.C. port or closes the N.O. port of a valve.

Valve Type	Stem movement / flow
 2-way NO, PDTTC *)	 Actuator spindle down  Actuator spindle up
 2-way NC, PDTTO *)	 Actuator spindle down  Actuator spindle up
 3-way, mixing	 Actuator spindle down  Actuator spindle up

\*) PDTTC = Push down to close  
 PDTTO = Push down to open

## VA-7200 electric actuator series

VA-72   -100

<b>Power supply</b>
1 24 VAC
3 230 VAC (only for floating models)
<b>Control Type</b>
0 Floating
2 Proportional
<b>Manual Override</b>
0 None
4 Manual handwheel

## Valve actuator combinations

(see pertinent actuator bulletins)

The VG7000 series female threaded cast bronze valve can be combined with following pneumatic and electric actuator series:

### VA-7310 electric actuator series

VA-731  - 8001

<b>Control type</b>
0 Floating
2 Proportional

### VA-7150 electric actuator series

VA-715  -100

<b>Power supply</b>
1 24 VAC
3 230 VAC (only for floating models)
<b>Control type</b>
0 Floating
2 Proportional

## FA-1000 Spring return actuator series

FA-10  0 -110

<b>Power supply</b>
1 230 VAC (only for floating models)
6 24VAC
<b>Control Type</b>
0 Floating
4 Proportional

## M-130 Spring return actuator series

These actuators are not available as factory mounted.

When ordering the actuators and the linkage have to be selected

VG7000-M130 Linkage kit

M-130-    M-130 Spring Return actuator

<b>Spring Range</b>
8001 Floating
8201 Proportional

**V-3801 pneumatic actuator series**

For field mounting the housing, piston and the mounting kit have to be ordered

**V-3801-8001 pneumatic actuators (without spring)**

**VG7000 - 101**  **Mounting kit for pneumatic actuator (upper spring seat, spring stem extension, set screw)**

Spring Range	
<b>0</b>	Spring range 21-42 kPa
<b>2</b>	Spring range 63-91 kPa

**V-3000 pneumatic actuator series**

For field mounting the housing, piston and the mounting kit have to be ordered

**V-3000-8001 housing and piston (without spring)**

**VG7000 - 100**  **Mounting kit for pneumatic actuator (upper spring seat, spring stem extension, set screw)**

Spring Range	Valve Size
<b>1</b> 21-42 kPa	DN15...20
<b>3</b> 63-91 kPa	DN15...20
<b>4</b> 21-42 kPa	DN25...32
<b>6</b> 63-91 kPa	DN25...32
<b>7</b> 21-42 kPa	DN40...50
<b>9</b> 63-91 kPa	DN40...50

For field mounted positioner the positioner mounting kit on V-3000 pneumatic actuators and the positioner springs has to be selected.

**V-9502-8033 Pneumatic positioner inclusive mounting kit on V-3000 pneumatic actuators series.**

**V-9502 - 680**  **Positioner Springs**

Span	Valve Size
<b>1</b> 44 kPa	DN15...20
	73 kPa
	145 kPa
<b>2</b> 116 kPa	DN15...20
	174 kPa
<b>3</b> 58 kPa	DN40...50

**V-400 pneumatic actuator series**

**V-400 - 80**  **Pneumatic actuator with spring**

Spring Range	Valve Size
<b>01</b> 21-42 kPa	DN15...20
<b>02</b> 63-91 kPa	DN15...20
<b>05</b> 21-42 kPa	DN25...32
<b>06</b> 63-91 kPa	DN25...32
<b>07</b> 21-42 kPa	DN40...50
<b>08</b> 63-91 kPa	DN40...50

For field mounted positioner is required the positioner mounting kit on V-400 pneumatic actuators and the positioner springs.

**V-9502-8043 Pneumatic positioner mounting kit on V-400 pneumatic actuators series.**

**V-9502 - 810**  **Positioner Springs**

Span	Size
<b>0</b> 21-90 kPa	DN15 / 20
<b>2</b> 21-90 kPa	DN25 / 32
<b>6</b> 21-90 kPa	DN40 / 50

**V-500 pneumatic actuator series**

**Actuators for field mounting are not available**

For field mounted positioner is required the positioner mounting kit on V-500 pneumatic actuators and the positioner springs.

**V-9502-8043 Pneumatic positioner mounting kit on V-500 pneumatic actuators series.**

**V-9502 - 810**  **Positioner Springs**

Span	Size
<b>0</b> 21-90 kPa	DN15...20
<b>2</b> 21-90 kPa	DN25...32
<b>6</b> 21-90 kPa	DN40...50

## Maintenance Parts

Description	Code Number
<b>Ring Pack Packing Kits for Brass Trim Valves:</b>	
Single Pack for DN15 or DN20 Valve	VG7000-6001
Single Pack for DN25 through DN50 Valve	VG7000-6002
<b>PTFE V-ring Packing Kits for Stainless Steel Trim Valves:</b>	
Single Pack for DN15 or DN20 Valve	VG7000-6011
Single Pack for DN25 through DN50 Valve	VG7000-6012

## Applications

### Maximum CloseOff Pressures, in kPa for electrically actuated brass Trim Valves

Valve Size	Maximum $k_v$	Actuators series			
		VA-731x	VA-715x	VA-720x	M130
DN15	0.25 0.4	1600	1600	--	--
DN15	0.63 1.0 1.6	700	1600	--	1600
DN15	2.5 4.0	400	1490	--	1525
DN20	6.3	250	950	--	970
DN25	10	--	595	1235	610
DN32	16	--	360	750	370
DN40	25	--	235	480	235
DN50	40	--	145	310	150

### Maximum CloseOff Pressures, in kPa for electrically actuated Stainless Steel Trim Valves

Valve Size DN	Maximum $k_v$	Actuators series				
		VA-731x	VA-715x	VA-720x	M130	FA-10xx
DN15	0.25 0.4	--	1600	1600	1600	1600
DN15	0.63 1.0 1.6	--	1600	1600	1600	1600
DN15	2.5 4.0	--	930	1600	955	1600
DN20	6.3	--	595	1220	605	1060
DN25	10	--	370	770	380	680
DN32	16	--	230	470	230	--
DN40	25	--	145	300	145	--
DN50	40	--	90	190	95	--

**Maximum CloseOff Pressures in kPa for Pneumatically Actuated Brass Trim Valves**

Actuator Series	Valves		2-Way Normally Open or 3-Way N.O. Port with 138 kPa Supply Spring Range kPa*		2-Way Normally Closed or 3-Way N.C. Port with 0 kPa Supply Spring Range kPa*	
	DN	k <sub>vs</sub>	21 to 42	63 to 91	21 to 42	63 to 91
<b>V-3801</b>	15	0.25 0.4	1600	1600	580	1600
	15	0.63 1.0 1.6	1180	530	165	715
	15	2.5 4.0	670	300	90	405
	20	6.3	430	190	55	255
<b>V-3000</b>	15	0.25 0.4	1600	1600	1430	1600
	15	0.63 1.0 1.6	2320	1100	405	1450
	15	2.5 4.0	1310	620	230	820
	20	6.3	835	390	145	525
	25	10	520	240	85	315
	32	16	320	145	50	195
	40	25	200	95	35	125
	50	40	130	60	20	85
<b>V-400</b>	25	10	1600	985	400	1275
	32	16	1220	600	240	780
	40	25	785	385	160	495
	50	40	500	250	95	315
<b>V-500</b>	40	25	1600	900	380	1170
	50	40	1170	580	240	750

\* The recommended spring ranges for use with a V-9502 Positioner are: 21 to 42 kPa for N.O. valves, 63 to 91 kPa for N.C. valves and 63 to 91 kPa for three way valves.

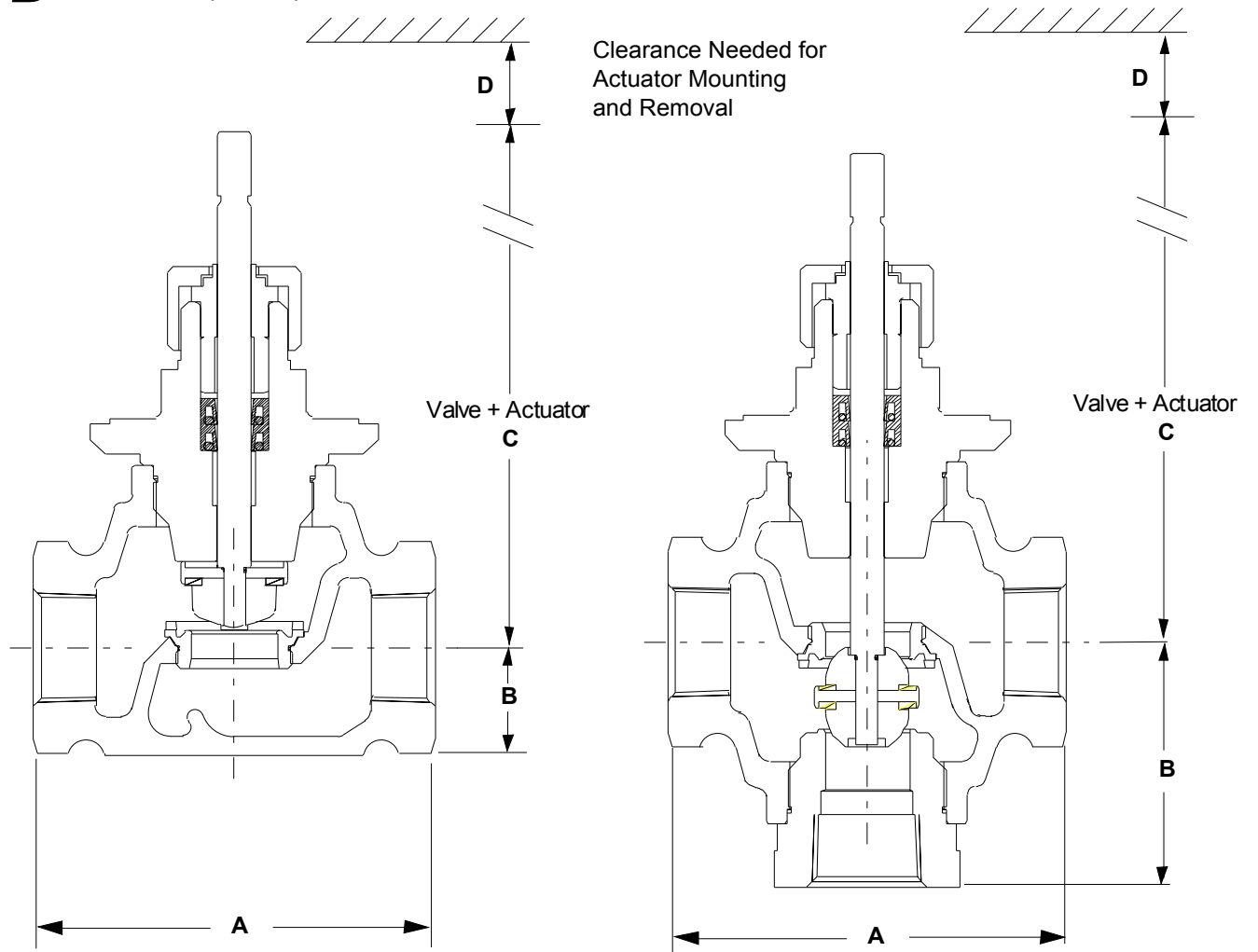
**Maximum CloseOff Pressures in kPa for Pneumatically Actuated Stainless Steel Trim Valves**

Actuator Series	Valves		Two Way Normally Open or Three Way N.O. Port with 138 kPa Supply Spring Range kPa*		Two Way Normally Closed or Three Way N.C. Port with 0 kPa Supply Spring Range kPa*	
	DN	k <sub>vs</sub>	21 to 42	63 to 91	21 to 42	63 to 91
<b>V-3000</b>	15	0.25 0.4	1600	1600	1090	1600
	15	0.63 1.0 1.6	1600	825	300	1085
	15	2.5 4.0	980	470	170	615
	20	6.3	630	295	110	395
	25	10	385	180	60	240
	32	16	240	110	35	145
<b>V-400</b>	15	0.25 0.4	1600	1600	1600	1600
	15	0.63 1.0 1.6	1600	1600	1345	1600
	15	2.5 4.0	1600	1600	760	1600
	20	6.3	1600	1175	485	1520
	25	10	1510	740	295	960
	32	16	925	450	185	585
	40	25	595	290	115	370
	50	40	380	185	75	240
<b>V-500</b>	40	25	1360	670	285	870
	50	40	870	430	180	550

\* The recommended spring ranges for use with a V-9502 Positioner are: 21 to 42 kPa for N.O. valves, 63 to 91 kPa for N.C. valves and 63 to 91 kPa for three way valves.



**D**imensions (in mm)



**Valve Body (mm)**

Valve Size DN	A	B		
		2-way PDTC	2-way PDTO	3-Way
DN15	76	21	39	46
DN20	81	24	41	54
DN25	104	29	44	65
DN32	119	34	51	70
DN40	130	55	70	85
DN50	150	53	72	95

### Actuator Dimensions, (mm) as Mounted on Brass Trim Valves

Actuator Series	C						D
	DN15	DN20	DN25	DN32	DN40	DN50	
V-3000-8001	120	120	145	149	161	172	90
V-3000-8003	135	135	166	167	162	172	90
V-3801-8001	102	102	--	--	--	--	60
V-400	--	--	321	323	337	348	87
V-500	--	--	--	--	470	482	140
VA-731x	127	127	--	--	--	--	25
VA-715x	195	195	219	219	227	237	80
VA-720x	--	--	244	244	270	280	101
M130	274	274	305	305	301	311	--

### Actuator Dimensions, (mm) as Mounted on Stainless Steel Trim Valves

Actuator Style	C						D
	DN15	DN20	DN25	DN32	DN40	DN50	
V-3000-8001	138	145	165	175	--	--	90
V-3000-8003	155	160	165	175	--	--	90
V-400	330	335	340	350	355	360	90
V-500	--	--	--	--	490	495	90
VA-715x	205	210	230	240	245	250	80
VA-720x	245	250	275	280	285	290	105
M130	290	295	305	310	320	320	--

### Valves weight (Kg)

	Valve Size	2-way N.O. (PDTC)	2-way N.C. (PDTO)	3-Way
Brass Trim	DN15	0.8	0.9	1.0
	DN20	1.0	1.2	1.3
	DN25	1.8	2.2	2.4
	DN32	2.5	2.8	3.1
	DN40	3.6	4.2	4.6
	DN50	5.6	6.1	7.1
Stainless Steel Trim	DN15	0.9	1.1	1.1
	DN20	1.2	1.4	1.5
	DN25	2.1	2.4	2.6
	DN32	2.9	3.4	3.7
	DN40	3.8	4.2	5.0
	DN50	5.8	6.4	7.3

**N**otes:

## Specifications

<b>Models</b>	Normally Open, Normally Closed and Three Way Mixing	
<b>Service*</b>	Hot Water, Chilled Water, Glycol Solutions, or Steam for HVAC Systems	
<b>Valve Body Size</b>	DN15, DN20, DN25, DN32, DN40, DN50	
<b>Kvs</b>	0.25, 0.4, 0.63, 1.0, 1.6, 2.5, 4.0 and 6.3	
<b>Body Thread</b>	BSP Parallel (Gas Parallel) (DIN 259, ISO 228, BS 2779)	
	BSP Taper (Gas Tapered) (DIN 2999, ISO R7, BS 21)	
	NPT (American Standard Pipe Thread)	
<b>Valve Stroke</b>	8 mm for DN15 and DN20	
	13 mm for DN25 and DN32	
	19 mm for DN40 and DN50	
<b>Valve Body Rating</b>	Meets Requirements of ANSI B16.15, Class 250 and PN 16	
<b>Leakage</b>	<b>Brass Trim</b>	0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
	<b>SS Trim</b>	0.05% of Maximum Flow
<b>Inherent Flow Characteristics</b>	Equal Percentage: 2-way Valves Linear: 3-Way Valves	
<b>Rangeability**</b>	25:1 for All Sizes	
<b>Spring Range</b>	21 to 42 kPa	
<b>Pneumatic Actuators</b>	63 to 91 kPa	
<b>Maximum Recommended Operating Pressure Drop</b>	240 kPa for DN15 and DN32 200 kPa for DN40 to DN50	
<b>Material Body</b>	Cast Bronze	
<b>Material Bonnet</b>	Brass	
<b>Materials Brass Trim Valves</b>	<b>Stem</b>	Stainless Steel
	<b>Plug</b>	Brass
	<b>Seat</b>	Brass on Molded Elastomeric Disc
	<b>Packing</b>	Self-adjusting EPR (Ethylene Propylene Rubber) Ring Pack U-cups
<b>Materials S.S. Trim Valves</b>	<b>Stem / Plug / Seat</b>	Stainless Steel
	<b>Packing</b>	Spring loaded PTFE and Elastomer V-rings
<b>Fluid Temperature Limits</b>	<b>Brass Trim</b>	V-3801, V-3000 2 to 120°C and V-7310 mtg : 100 kPa Saturated Steam
		All other Pneumatic: 2 to 140°C and Electric mtg : 100 kPa Saturated Steam
	<b>SS Trim</b>	2 to 170°C 690 kPa Saturated Steam
<b>Ambient Temperature Limits</b>	2 to 65°C	

\* Proper water treatment is recommended (refer to VDI 2035 standard).

\*\* Rangeability is defined as the ratio of maximum flow to minimum controllable flow.

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. shall not be liable for damages resulting from misapplication or misuse of its products.

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