JOHNSON CONTROLS

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	
❑ **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
❑ **Electric and pneumatic actuators available for all valves**	Allows applications of the best suited and most cost-effective actuator
❑ **Every valve tested for tight shutoff**	Provides maximum energy efficiency and ensures occupant comfort
❑ **Uses Standard Johnson Controls Ring Pack Packings**	Provides industry-leading reliability and operating life
❑ **Flexible features and options ordering template**	Easy-to-select the right valve combination for your specific application
❑ **Standard Bonnet and stem design**	Allows easy field retrofit, easy field mounting, and interchangeability of actuators.

Order Nr. DS 10.457 Rev. A

Ordering data

Ordering code for valve bodies

VG7 □□□□□

Stem Type

T	Standard threaded stem
S	Slotted stem and small bonnet (for VA-7310 electric and V-3801 pneumatic actuators)

Size/k_V

A	DN 15 / 0.25	**L**	DN 20 / 6.3
B	DN 15 / 0.4	**N**	DN 25 /10
C	DN 15 / 0.63	**P**	DN 32/16
D	DN 15 / 1.0	**R**	DN 40/25
E	DN 15 / 1.6	**S**	DN 50/40
F	DN 15 / 2.5		
G	DN 15 / 4.0		

Trim and Flow Characteristic

1	Brass Trim, Equal %	(2-way body style only)
2	Brass Trim, linear in both ports	(3-way body style only)
3	Stainless Steel Trim, Equal %	(2-way body style only)
4	Stainless Steel Trim, linear in both ports	(3-way body style only)

End Connection

0	BSP Parallel Threaded
2	BSP Taper Threaded
4	NPT Threaded

Body Type

2	2-way PDTC (Normally Open)
4	2-way PDTO (Normally Closed)
8	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, kvs 6.3, standard threaded stem)
VA-7150-1001+M (VA-7150-1001 incremental type actuator with standard 24VAC supply)

Ordering Code

Ordering of factory mounted assemblies of BSP parallel threaded valves and pneumatic actuators.

VG7x0xxx + □□□□□□

Positioner

P	Factory mounted positioner (not available on V3801 actuators)
blank	None

Spring Range

B	21 – 42 kPa recommended for N.O. valves
E	63 – 91 kPa recommended for N.C. and mixing valves

Factory mounted pneumatic actuators

3801	V-3801-8001 series	requires stem type “S”
3008	V-3000-8001 series	requires stem type “T”
V400	V-400 – 8nn series	requires stem type “T”

Ordering of factory mounted assemblies of BSP taper threaded valves and pneumatic actuators.

VG7x2xxx + □□□□□□

Positioner

P	Factory mounted positioner
blank	None

Spring Range

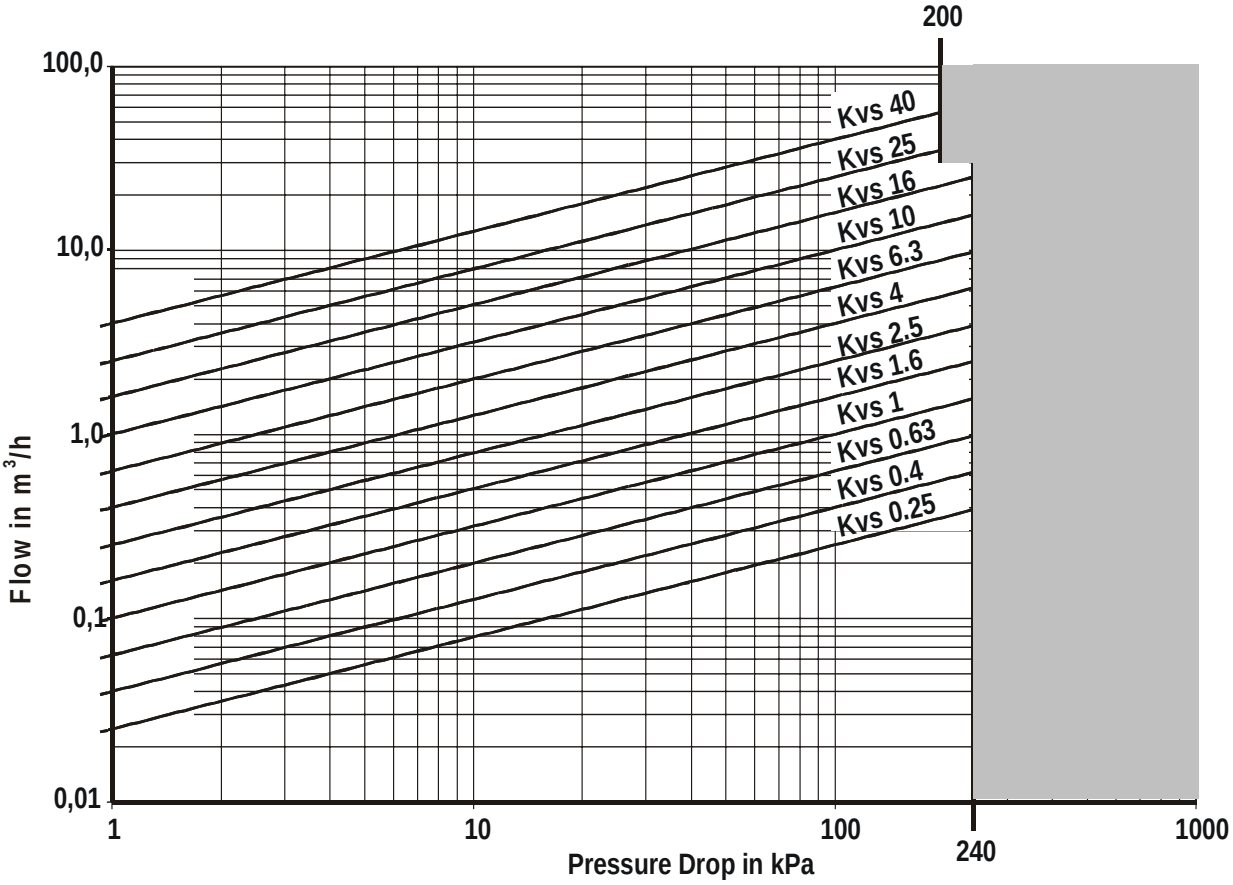
B	21 – 42 kPa recommended for N.O. valves
E	63 – 91 kPa recommended for N.C. and mixing valves

Factory mounted pneumatic actuators

3008	V-3000-8001 series	requires stem type “T”

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_V 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 ▶ = flow ▷ = no flow	
2-way NO, PDTC *)	Actuator stem down	Actuator stem up
2-way NC, PDTO *)	Actuator stem down	Actuator stem up
3-way, mixing	Actuator stem down	Actuator stem up

*) PDTC = Push down to close
PDTO = Push down to open

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

Item code	Power supply	Manual override
Incremental models		
VA-7310-8001	24 VAC	Yes
Proportional models		
VA-7312-8001	24 VAC	Yes

● VA-7150 electric actuator series

Item code	Power supply	Manual override
Incremental models		
VA-7150-1001	24 VAC	No
VA-7150-1003	230 VAC	
Proportional models		
VA-7152-1001	24 VAC	No

● VA-77xx-100x electric actuator series

Item code	Power supply	Manual override
Incremental models (3-point)		
VA-7700-1001	24 VAC	No
VA-7700-1003	230 VAC	No
VA-7740-1001	24 VAC	Yes
VA-7740-1003	230 VAC	Yes
Proportional models (0…10 VDC / 0…20mA)		
VA-7706-1001	24 VAC	No
VA-7746-1001	24 VAC	Yes

● VA-7200 electric actuator series

Item code	Power supply	Manual override
Incremental models (3-point)		
VA-7200-1001	24 VAC	No
VA-7200-1003	230 VAC	No
VA-7240-1001	24 VAC	Yes
VA-7240-1003	230 VAC	Yes
Proportional models (0…10 VDC / 0…20mA)		
VA-7202-1001	24 VAC	No
VA-7242-1001	24 VAC	Yes

● 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)

Mounting kit for pneumatic actuator
(upper spring seat, spring stem extension, set screw)

Item code	Spring Range
VG7000-1010	21-42 kPa
VG7000-1012	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)

Mounting kit for pneumatic actuator
(upper spring seat, spring stem extension, set screw)

Item code	Spring Range	Valve Size
VG7000-1001	21-42 kPa	DN15…20
VG7000-1003	63-91 kPa	
VG7000-1004	21-42 kPa	DN25…32
VG7000-1006	63-91 kPa	
VG7000-1007	21-42 kPa	DN40…50
VG7000-1009	63-91 kPa	

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

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

Item code	Span	Valve Size
V-9502-6801	44 kPa	DN15…20
	73 kPa	DN25...32
	145 kPa	DN40...50
V-9502-6802	116 kPa	DN15…20
	174 kPa	DN25…32
V-9502-6803	58 kPa	DN40…50

● V-400 pneumatic actuator series

For field mounting the pneumatic actuator with spring and the mounting kit have to be ordered.

Pneumatic actuator with spring

Item code	Spring Range	Valve Size
V-400-8001	21-42 kPa	DN15…20
V-400-8002	63-91 kPa	
V-400-8005	21-42 kPa	DN25…32
V-400-8006	63-91 kPa	
V-400-8007	21-42 kPa	DN40…50
V-400-8008	63-91 kPa	

Mounting kit for pneumatic actuator

Item code	Body Size
VG7000-1013	DN 15 + 20
VG7000-1014	DN 25…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-9502-810x Positioner Springs

Item code	Span	Valve Size
V-9502-8100	21-90 kPa	DN15…20
V-9502-8102		DN25…32
V-9502-8106		DN40…50

Maintenance Parts

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

Applications

Maximum Close-Off Pressures, in kPa for electrically actuated brass Trim Valves

Valve Size	Maximum k_V	Actuators series		
		VA-731x	VA-715x VA-77xx	VA-720x
DN15	0.25 0.4	1600	1600	--
DN15	0.63 1.0 1.6	700	1600	--
DN15	2.5 4.0	400	1490	--
DN20	6.3	250	950	--
DN25	10	--	595	1235
DN32	16	--	360	750
DN40	25	--	235	480
DN50	40	--	145	310

Maximum Close-Off Pressures, in kPa for electrically actuated Stainless Steel Trim Valves

Valve Size	Maximum k_V	Actuators series		
		VA-731x	VA-715x VA-77xx	VA-720x
DN15	0.25 0.4	--	1600	1600
DN15	0.63 1.0 1.6	--	1600	1600
DN15	2.5 4.0	--	930	1600
DN20	6.3	--	595	1220
DN25	10	--	370	770
DN32	16	--	230	470
DN40	25	--	145	300
DN50	40	--	90	190

Maximum Close-Off 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	kvs	21 to 42	63 to 91	21 to 42	63 to 91
V-3000	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
V-3801	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
V-400	25	10	1600	985	400	1275
	32	16	1220	600	240	780
	40	25	785	385	160	495
	50	40	500	250	95	315

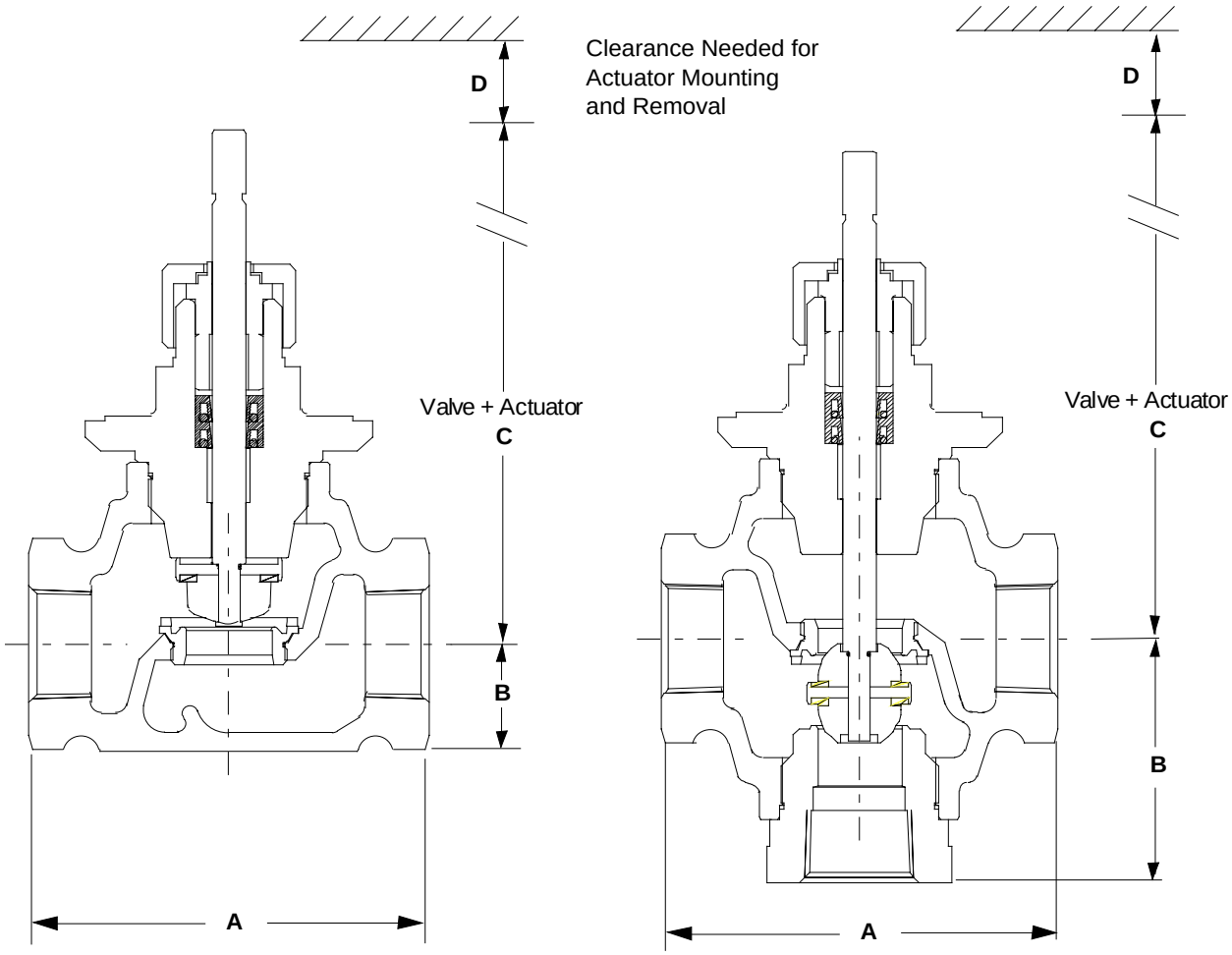
* The recommended spring ranges for use with a V-9502 Positioner are: 21 to 42 kPa for N.O. valves, 63 to 91 kPa for N.C. valves and 63 to 91 kPa for three way valves.

Maximum Close-Off 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	kvs	21 to 42	63 to 91	21 to 42	63 to 91
V-3000	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
V-400	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

* 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.

Dimensions *(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 as mounted on Brass Trim Valves *(mm)*

Actuator Series	C						D
	DN15	DN20	DN25	DN32	DN40	DN50	
VA-731x-8001	127	127	--	--	--	--	25
VA-715x-100x	195	195	219	219	233	233	64
VA-770x-100x	195	195	219	219	233	233	50
VA-774x-100x	212	212	236	236	250	250	33
VA-720x-100x	--	--	244	244	252	273	114
VA-724x-100x	--	--	271	271	279	300	114
V-3801-8001	102	102	--	--	--	--	60
V-3000-8001	120	120	147	149	151	157	90
V-400-800x	--	--	321	323	337	348	87

Actuator Dimensions, as mounted on Stainless Steel Trim Valves *(mm)*

Actuator Style	C						D
	DN15	DN20	DN25	DN32	DN40	DN50	
VA-715x-100x	214	219	228	234	239	244	64
VA-770x-100x	214	219	228	234	239	244	50
VA-774x-100x	231	231	245	251	256	261	33
VA-720x-100x	250	236	245	251	256	261	114
VA-724x-100x	--	--	272	278	283	288	114
V-3000-8001	138	138	152	158	--	--	90
V-400-800x	330	335	340	350	355	360	90

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

Specifications

Product	VG7000
Models	Normally Open, Normally Closed and Three Way Mixing
Service*	Hot Water, Chilled Water, Glycol Solutions, or Steam for HVAC Systems
Valve Body Size	DN15, DN20, DN25, DN32, DN40, DN50
K_{VS}	0.25, 0.4, 0.63, 1.0, 1.6, 2.5, 4.0 and 6.3
Body Thread	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)
Valve Stroke	8 mm for DN15 and DN20
	13 mm for DN25 and DN32
	19 mm for DN40 and DN50
Valve Body Rating	Meets Requirements of ANSI B16.15, Class 250 and PN 16
Leakage	**Brass Trim:** 0.01% of Maximum Flow per ANSI/FCI 70-2, Class 4
	SS Trim: 0.05% of Maximum Flow
Inherent Flow Characteristics	Equal Percentage: 2-way Valves Linear: 3-Way Valves
Rangeability**	25:1 for All Sizes
Spring Range Pneumatic Actuators	21 to 42 kPa 63 to 91 kPa
Maximum Recommended Operating Pressure Drop	240 kPa for DN15 and DN32 200 kPa for DN40 to DN50
Material Body	Cast Bronze
Material Bonnet	Brass
Materials Brass Trim Valves	**Stem:** Stainless Steel **Plug:** Brass **Seat:** Brass on Molded Elastomeric Disc **Packing:** Self-adjusting EPR (Ethylene Propylene Rubber) Ring Pack U-cups
Materials S.S. Trim Valves	**Stem / Plug / Seat:** Stainless Steel
	Packing: Spring loaded PTFE and Elastomer V-rings
Fluid Temperature Limits	**Brass Trim:** V-3801, V-3000 and V-7310 mtg: 2 to 120°C, 100 kPa Saturated Steam All other Pneumatic: and Electric mtg: 2 to 140°C, 100 kPa Saturated Steam
	SS Trim: 2 to 170°C, 690 kPa Saturated Steam
Ambient Temperature Limits	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

JOHNSON CONTROLS

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P/N 14-88356-6 Rev. A
Issue Date: 04 2002

VG7000 Series

Female Threaded Bronze Control Valve

• General Features

This installation sheet comprises the prescribed instructions for safe installation and operation of the valve. In the event of difficulties, which cannot be overcome with the aid of this installation sheet please consult the supplier.
This Installation sheet conforms to the relevant and valid EN-safety standards, as well as the current laws and regulations of the European Union. It is the responsibility of the operator or system administrator to ensure that valid national control standards are met.
The manufacturer maintains all rights for technical changes and improvements at any time.
Qualified personnel (see reference) are necessary to the application of this installation sheet.
Operating personnel shall receive installation sheet.

• Qualified personnel

These are persons conversant with installation, mounting, commissioning, operation and servicing of the product, through their activities and functions, such as:

- Instructors with obligation to ensure adherence to regional and internal ordinances and requirements.
- Trainers and instructors on safety standards, maintenance and utilisation of adequate safety and protective operation facilities.
- Trainers in first aid, etc.

• Application

The VG7000 – Control Valve serves to regulate the flow of water in heating, ventilation, and air-conditioning systems.
There are, however, differences in water composition. Normal tap water can usually be used without further preparation, as long as it remains in a closed system and it has, after a while, chemically "settled". When, however, due to water loss the system is constantly being refilled, then the water must be treated. Recommendations are contained in guideline VDI 2035.
Usage of other fluids is possible but must be confirmed by the manufacture.
Selection and adaptation of materials has been made in compliance with current EN and ANSI regulations. Mechanical and flow characteristics are in conformance with EN 12516-3 and EN 60534-2-4 standards. The area of valve application is the responsibility of the system administrator. Specific valve identifications must be observed. Electric control valve actuators are available for the regulation. These can be supplied individually or tested and mounted on to the valve.

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• Technical data

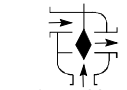
Models	Normally Open (PDTC), Normally Closed (PDTO) and Three Way Mixing
Service	Water, glycol solutions (max 30%) or steam for HVAC applications. Fluid Group 1 according 67/548/EEC. (proper water treatment is recommended, refer to VDI 2035)
Valve Body Size	DN15, DN20, DN25, DN32, DN40, DN50
K_{vs}	0.25, 0.4, 0.63, 1.0, 1.6, 2.5, 4.0, 6.3, 10, 16, 25 and 40
Body Thread	BSP Parallel (Gas Parallel) (DIN 259, ISO 228/1, BS 2779) BSP Taper (Gas Tapered) (DIN 2999, ISO R7, BS 21) NPT (American Standard Pipe Thread) (ANSI B 1.20.1)
Valve Stroke	8 mm for DN15 and DN20 13 mm for DN25 and DN32 19 mm for DN40 and DN50
Valve Body Rating	Meets Requirements of ANSI B16.15, Class 250 and PN 16 (EN 12360)
Leakage	**Brass Trim:** 0.01% of Maximum Flow per EN60534-4, Class IV **Stainless Steel Trim:** 0.05% of Maximum Flow
Inherent Flow Characteristics	Equal Percentage: 2-way valves Linear: 3-way valves
Rangeability	25:1 for all sizes (EN 60534-2-4)
Maximum Recommended Operating Pressure Drop	240 kPa for DN15 and DN32 200 kPa for DN40 to DN50
Material Body	Cast Bronze
Material Bonnet	Brass
Materials Brass Trim Valves	**Stem:** Stainless Steel **Plug:** Brass **Seat:** Brass on Molded Elastomeric Disc **Packing:** Self-adjusting EPR (Ethylene Propylene Rubber) Ring Pack U-cups

Fluid Temperature Limits		**VA-3801, V-3000 and V-7310:**	**All other Pneumatic and Electric:**
	Brass Trim:	2 to 120°C water or 100 kPa Saturated Steam	2 to 140°C water or 100 kPa Saturated Steam
	Stainless Steel Trim:	2 to 170°C 690 kPa Saturated Steam	

Ambient Temperature Limits	2 to 65°C
Compliance	**DN15…DN25:** PED (Pressure Equipment Directive) 97/23/EC (Paragraph 3, comma 3). CE marking is not applicable. **DN32…DN50:** PED (Pressure Equipment Directive) 97/23/EC (Category 1, mod. A). Subject to CE marking.

• 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	▶ = flow ▷ = no flow
 2-way NO, PDTC *)	 Actuator stem down	 Actuator stem up
 2-way NC, PDTO *)	 Actuator stem down	 Actuator stem up
 3-way, mixing	 Actuator stem down	 Actuator stem up

*) PDTC = Push down to close
PDTO = Push down to open

The following is valid for the flow direction:

Valve plug close-off movement must always be directed against the flow. This requirement is fulfilled when the valve is installed as directed by the symbols on valve body

Caution: Pressure test of the heating installation may only be performed with opened valves.

• Danger

Safe operation of the valve is only ensured if the valve is installed, activated, and serviced by qualified personnel in compliance with the warnings indicated in this SDI. In addition, the general installation and safety regulations for pipeline and system construction and the professional use of tools and safety equipment must be guaranteed. During all work on the control valve, these indications must be absolutely observed. Ignoring this information may cause physical or material damage.

• Storage

- Storage temperature -20°C to +65°C, dry and free of dirt.
- In rooms where moisture or condensation are present use heating or a drying agent to maintain a moisture free atmosphere.

• Transport

- Transport temperature -20°C to +65°C.
- Protect against external forces (shock, vibration etc.).

• Handling prior to installation:

- For valves with stem protection cap, remove these directly before actuator linking.
- Protect valve of adverse weather conditions e.g. rain, splash water, or use dehumidification agent.
- Careful treatment prevents damages.

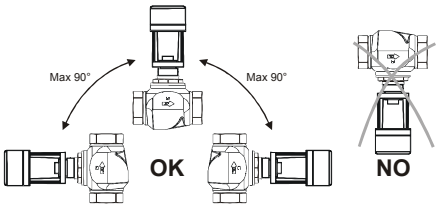
• General installation information

In addition to general installation instructions, please observe the following points:

- Ensure that valve body and piping are free of impurities.
- Pay attention to position of the valve relative to the flow direction. Note arrows on valve body.
- Ensure installation without tension and torque.
- Do not use the valve as a step or fixation point. Only piping supports it.
- Protect valve from dust or dirt on construction sites. Provide strainer or filter upstream of valve.
- Use compensators to balance thermal expansion of piping.
- Ensure that stem thread and shaft are kept free of paint.

• Installation site information

The valve installation site should be easily accessible and provide sufficient room for service and removal of actuators. Manual shut-off valves should be located up and downstream of the control valve, to facilitate service and repairs without drainage of the piping system. The control valve should preferably be installed in vertical or horizontal position. Do not install the actuator below the level of valve.
Piping should be insulated to protect actuators against high temperatures. Insulation should leave sufficient room for service of stem packing. To ensure trouble free function of the control valves the pipe immediately upstream of the valve should be straight for the length of at least. 2x DN and the pipe immediately downstream straight for the length at least 6x DN.



• Actuator mounting and removal information

The control valve is normally supplied complete with actuator. It is not permitted to remove or replace an actuator on systems in operation, under operating temperature and pressure. For conversion or service, the actuator mounting procedure should follow the actuator installation sheet. During mounting procedure the plug should NOT be rotated with downward pressure.

• Commissioning

- Prior to commissioning check information on material, pressure, temperature and flow direction in conjunction with the installation piping system plan.
- Follow National Control Standards.
- Impurities in the piping system and valves, such as dirt, welding beads etc. will cause the system to leak.
- Prior to commissioning a new installation or re-commissioning after repairs or service, ensure that:
  - Correct installation- and assembly work has been completed.
  - Only qualified personnel carry out commissioning.
  - Correct functional position of the valve is ascertained.
  - Maintenance of existing protective facilities is carried out.

• Maintenance, service and conversion

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

• Valve removal

In addition to general mounting guidelines and National Control Standards the following points should be observed:

- Pressure free piping system
- Cooled fluid
- Drained piping system
- With corrosive or aggressive fluids the piping system should be vented.
- Work to be performed by qualified personnel only.

VG7000 control valves with Brass Trim (VG7xx1x, VG7xx2x) can be combined with following actuators

DN	Stroke	Stem Type	Electric	Pneumatic
15, 20	8 mm	Slotted (VG7xxxxS)	VA-731x-8001 VA-710x-800x	V-3801-8001
		Threaded (VG7xxxxT)	VA-715x-100x	V-3000-8001
25, 32	13 mm	Threaded (VG7xxxxT)	VA-715x-100x VA-72xx-100x M-130-8x0x	V-3000-8001 V-400-8001
40, 50	19 mm	Threaded (VG7xxxxT)	VA-715x-100x VA-72xx-100x M-130-8x0x	V-3000-8001 V-400-8001

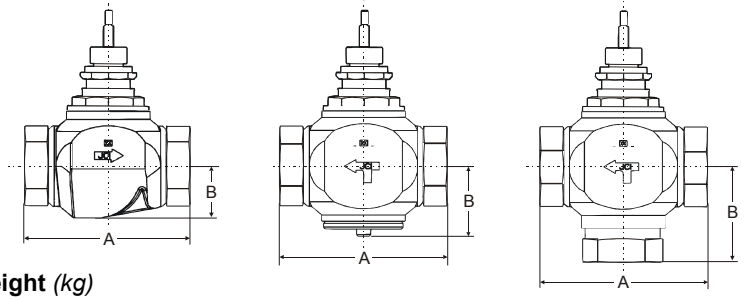
VG7000 control valves with Stainless Steel Trim Trim (VG7xx3x, VG7xx4x) can be combined with following actuators

DN	Stroke	Stem Type	Electric	Pneumatic
15, 20	8 mm	Threaded (VG7xxxxT)	VA-715x-100x VA-72xx-100x M-130-8x0x	V-3000-8001
25, 32	13 mm	Threaded (VG7xxxxT)	VA-715x-100x VA-72xx-100x FA-10x0-110x M-130-8x0x	V-3000-8001 V-400-8001
40, 50	19 mm	Threaded (VG7xxxxT)	VA-715x-100x VA-72xx-100x M-130-8x0x	V-400-8001

• Dimensions *(mm)*

Valve Body

Valve Size DN	Thread Size	A	B		
			2-ways N.O. PDTC	2-ways N.C. PDTO	3-ways
DN15	½"	75	21	39	46
DN20	¾"	80	24	41	54
DN25	1"	105	29	44	65
DN32	1¼"	120	34	51	70
DN40	1½"	130	55	70	85
DN50	2"	150	53	72	95



• Valves weight *(kg)*

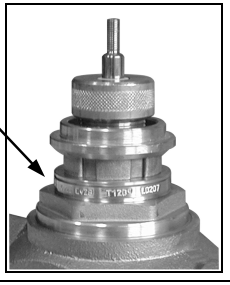
	Valve Size	2-way N.O. (PDTC)	2-way N.C. (PDTO)	3-way
Brass Trim	DN15	0.8	0.9	1.0
	DN20	1.0	1.2	1.3
	DN25	1.8	2.2	2.4
	DN32	2.5	2.8	3.1
	DN40	3.6	4.2	4.6
	DN50	5.6	6.1	7.1
Stainless Steel Trim	DN15	0.9	1.1	1.1
	DN20	1.2	1.4	1.5
	DN25	2.1	2.4	2.6
	DN32	2.9	2.4	3.7
	DN40	3.8	4.2	5.0
	DN50	5.8	6.4	7.3

• Location of valve data

The technical data are written onto the brass collar:

- Item code
- Kv / Cv
- max Fluid temperature
- Manufacturing date code

L yy ww
- ww — Week
- yy — Year
- L — Facility



• Danger analysis in accordance with the pressure equipment directive

Danger

General safety regulations must be observed unconditionally during repair.
Qualified personnel must always be present when repair and maintenance are carried out (see paragraph "Qualified Personnel").

Description of parts: Valve housing, bonnet
Function: Pressurised parts

Fault diagnosis	Effects	Cause	Remedial action/ Minimising risk
Cracks, Holes, Damage, Leakage	Leakage, flying shrapnel, danger of poisoning, burns danger, corrosive fluids danger, Environmental pollution	Piping stressed beyond permitted limits, recoil forces, pressure surges, valve used as fixed point, permitted pressure and temperature limits not observed	Reduce pressure and stress, change piping position, install compensators, select other materials, replace valve
Broken threads		Improper transport, bending stresses too great, thermal stress	replace valve, ensure that piping is laid free of stress or tension
Hot surface	Danger of burns	Valve without insulation, carrying hot fluid, too easily reached accidentally.	Insulate valve or install protective device

VG7000 Series
Union Sweat Control Valve

This installation sheet comprises the prescribed instructions for safe installation and operation of the valve. In the event of difficulties, which cannot be overcome with the aid of this installation sheet please consult the supplier.
This Installation sheet conforms to the relevant and valid EN-safety standards, as well as the current laws and regulations of the European Union. It is the responsibility of the operator or system administrator to ensure that valid national control standards are met.
The manufacturer maintains all rights for technical changes and improvements at any time.
Qualified personnel (see reference) are necessary to the application of this installation sheet.
Operating personnel shall receive installation sheet.

Qualified personnel

These are persons conversant with installation, mounting, commissioning, operation and servicing of the product, through their activities and functions, such as:

- Instructors with obligation to ensure adherence to regional and internal ordinances and requirements.
- Trainers and instructors on safety standards, maintenance and utilisation of adequate safety and protective operation facilities.
- Trainers in first aid, etc.

Application

The VG7000 – Control Valve serves to regulate the flow of water in heating, ventilation, and air-conditioning systems.
There are, however, differences in water composition. Normal tap water can usually be used without further preparation, as long as it remains in a closed system and it has, after a while, chemically "settled". When, however, due to water loss the system is constantly being refilled, then the water must be treated. Recommendations are contained in guideline VDI 2035. Usage of other fluids is possible but must be confirmed by the manufacture.
Selection and adaptation of materials has been made in compliance with current EN and ANSI regulations. Mechanical and flow characteristics are in conformance with EN 12516-3 and EN 60534-2-4 standards. The area of valve application is the responsibility of the system administrator. Specific valve identifications must be observed. Electric control valve actuators are available for the regulation. These can be supplied individually or tested and mounted on to the valve.

Technical Specifications

Models	Normally Open (PDTC) and Three Way Mixing
Service	Water, glycol solutions (max 30%) or steam for HVAC applications. Fluid Group 1 according 67/548/EEC. (proper water treatment is recommended, refer to VDI 2035)
Valve Body Size	DN40, DN50
K_{vs}	25 and 40
Body Connection	Union Sweat Standard Tubing
Valve Stroke	19 mm for DN40 and DN50
Valve Body Rating	Meets Requirements of ANSI B16.15, Class 250 and PN 16 (EN 12360)
Leakage	**Brass Trim:** 0.01% of Maximum Flow per EN60534-4, Class IV
Inherent Flow Characteristics	Equal Percentage: 2-way valves Linear: 3-way valves
Rangeability	25:1 for all sizes (EN 60534-2-4)
Maximum Recommended Operating Pressure Drop	200 kPa for DN40 to DN50
Material	**Body:** Cast Bronze **Bonnet:** Brass **Trim:** **Stem:** Stainless Steel **Plug:** Brass **Seat:** Brass on Molded Elastomeric Disc **Packing:** Self-adjusting EPR (Ethylene Propylene Rubber) Ring Pack U-cups **Tail piece:** Copper **Fixing nut:** Cast Bronze
Fluid Temperature Limits	**Brass Trim:** 2 to 140°C water or 100 kPa Saturated Steam
Ambient Temperature Limits	2 to 65°C
Compliance	PED (Pressure Equipment Directive) 97/23/EC (Category 1, mod. A). Subject to CE marking.

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 ▶ = flow ▷ = no flow	
 2-way NO, PDTC*)	 Actuator stem down	 Actuator stem up
 3-way, mixing	 Actuator stem down	 Actuator stem up

*) PDTC = Push down to close

The following is valid for the flow direction:

Valve plug close-off movement must always be directed against the flow. This requirement is fulfilled when the valve is installed as directed by the symbols on valve body

Caution: Pressure test of the heating installation may only be performed with opened valves.

Danger

Safe operation of the valve is only ensured if the valve is installed, activated, and serviced by qualified personnel in compliance with the warnings indicated in this SDI. In addition, the general installation and safety regulations for pipeline and system construction and the professional use of tools and safety equipment must be guaranteed. During all work on the control valve, these indications must be absolutely observed. Ignoring this information may cause physical or material damage.

Storage

- Storage temperature -20°C to +65°C, dry and free of dirt.
- In rooms where moisture or condensation are present use heating or a drying agent to maintain a moisture free atmosphere.

Transport

- Transport temperature -20°C to +65°C.
- Protect against external forces (shock, vibration etc.).

Handling prior to installation:

- For valves with stem protection cap, remove these directly before actuator linking.
- Protect valve of adverse weather conditions e.g. rain, splash water, or use dehumidification agent.
- Careful treatment prevents damages.

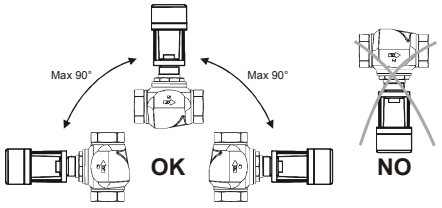
General installation information

In addition to general installation instructions, please observe the following points:

- Ensure that valve body and piping are free of impurities.
- Pay attention to position of the valve relative to the flow direction. Note arrows on valve body.
- Ensure installation without tension and torque.
- Do not use the valve as a step or fixation point. Only piping supports it.
- Protect valve from dust or dirt on construction sites. Provide strainer or filter upstream of valve.
- Use compensators to balance thermal expansion of piping.
- Ensure that stem thread and shaft are kept free of paint.

Installation site information

The valve installation site should be easily accessible and provide sufficient room for service and removal of actuators. Manual shut-off valves should be located up and downstream of the control valve, to facilitate service and repairs without drainage of the piping system. The control valve should preferably be installed in vertical or horizontal position. Do not install the actuator below the level of valve.
Piping should be insulated to protect actuators against high temperatures. Insulation should leave sufficient room for service of stem packing. To ensure trouble free function of the control valves the pipe immediately upstream of the valve should be straight for the length of at least. 2x DN and the pipe immediately downstream straight for the length at least 6x DN.



Actuator mounting and removal information

The control valve is normally supplied complete with actuator. It is not permitted to remove or replace an actuator on systems in operation, under operating temperature and pressure. For conversion or service, the actuator mounting procedure should follow the actuator installation sheet. During mounting procedure the plug should NOT be rotated with downward pressure.

Commissioning

- Prior to commissioning check information on material, pressure, temperature and flow direction in conjunction with the installation piping system plan.
- Follow National Control Standards.
- Impurities in the piping system and valves, such as dirt, welding beads etc. will cause the system to leak.
- Prior to commissioning a new installation or re-commissioning after repairs or service, ensure that:
  - Correct installation- and assembly work has been completed.
  - Only qualified personnel carry out commissioning.
  - Correct functional position of the valve is ascertained.
  - Maintenance of existing protective facilities is carried out.

Maintenance, service and conversion

Description	Code Number
Ring Pack Packing Kits for Brass Trim Valves:	
Single Pack	VG7000-6002

• Valve removal

In addition to general mounting guidelines and National Control Standards the following points should be observed:

- Pressure free piping system
- Cooled fluid
- Drained piping system
- With corrosive or aggressive fluids the piping system should be vented.
- Work to be performed by qualified personnel only.

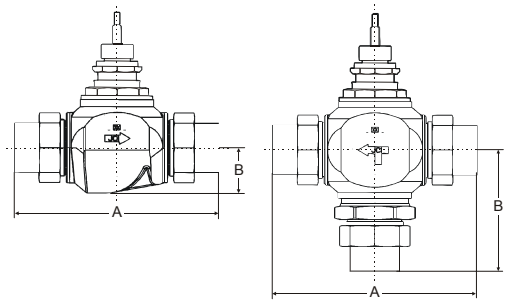
VG7000 control valves can be combined with following actuators

Electric	Pneumatic
VA-715x-100x VA-72xx-100x M-130-8x0x	V-3000-8001 V-400-8001

Dimensions *(mm)*

Valve Body

Valve Size DN	Thread Size	A	B	
			2-ways N.O. PDTC	3-ways
DN40	2 1/8" - 16 UN -2A	218	55	125
DN50	2 5/8" - 16 UN - 2A	240	53	142



Valves weight *(kg)*

	Valve Size	2-way N.O. (PDTC)	3-way
Brass Trim	DN40	3.6	4.6
	DN50	5.6	7.1

• Location of valve data

The technical data are written onto the brass tag:

- Item code
- Kv / Cv
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L yy ww
- ww — Week
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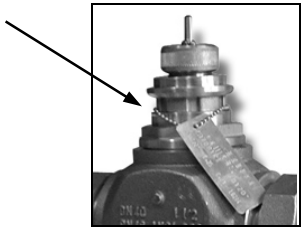

Danger analysis in accordance with the pressure equipment directive

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Fault diagnosis	Effects	Cause	Remedial action/ Minimising risk
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Hot surface	Danger of burns	Valve without insulation, carrying hot fluid, too easily reached accidentally.	Insulate valve or install protective device

Causes and remedies when malfunction occurs

When experiencing malfunction please check that the installation and adjustments were carried out in accordance with these operating instructions. Properly qualified personnel (see: Qualified personnel) must always be present during maintenance or repair.
Information about material, temperature and flow direction are to be checked. The conditions of usage must also correspond to these operating instructions, the data sheet and the technical information given on the ID collar.

Danger

During troubleshooting, safety regulations must be observed unconditionally. If the problem cannot be solved using the following troubleshooting table please contact the supplier/manufacturer.

See paragraphs: **"Valve removal"** and **"Commissioning"** for any work to be carried out on the valve.

Troubleshooting

Malfunction	Possible cause	Remedial action
No flow	Valve closed	Open valve (using actuator)
Low flow	Valve not sufficiently open	Open valve (using actuator)
	Dirty filters	Clean / replace filters Only when system is free of pressure!
	Blocked pipes	Check piping system
	Incorrect valve/ k_{vs} coefficient selected	Replace valve with valve of greater k_{vs} coefficient.
Valve stem/plug stuck	Very dirty seat and plug	Clean seat and plug
	The valve plug is jammed in the seat or guide due to deposits or solid particles in the fluid	Clean seat and plug
Leakage at stem	Stem seal leaking	Replace packing Observe by-pack instructions!
Leakage rate is too high when valve closed	Seat and plug dirty	Clean valve internal parts
	Actuator thrust too low	Use actuator with more thrust
Valve stem "knocking"	Flow through valve in wrong direction	Correct the flow direction

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