



Braukmann V7000 Kombi-Auto

Differential Pressure Control Valve

APPLICATION

The V7000 Kombi-Auto differential pressure control valve is used to maintain automatically a hydronic balance in residential or commercial hydronic heating and cooling systems. It shall be installed in the return pipeline.

It is used in systems with variable volume flows, for example two-pipe heating systems, and creates a hydronic balance by keeping differential pressure over consumers at a constant preset level even under changing flow or pump pressure conditions, for example in part load states.

Hydronic balance is a significant requirement for efficient operation of a hydronic system. In an unbalanced system under- or oversupply of energy to individual circuits or heat exchangers can occur. Apart from correct selection of radiator valves, regulation of individual circuits is necessary and in some countries required by national standards or regulations.

APPROVALS

- CE

SPECIAL FEATURES

- Automatic balancing of differential pressure
 - Highest energy saving potential due to efficient energy transfer and minimised pump speed
 - Lower noise emission on control valves
 - High authority over the control valves
 - Dividing systems into pressure independent zones
 - No complex calculation needed for selection
 - No balancing method needed for commissioning
- Wide range of application
 - Wide presetting ranges
- Easy commissioning
 - Presetting by hand without the need of tools
- Maintenance friendly
 - Shut-off function
 - Various measuring possibilities for problematic applications

VALVE EFFICIENCY

	low				high
Energy efficiency	●	●	●	●	●
Commissioning effort	●	●	○	○	○
Calculation effort	●	●	●	○	○



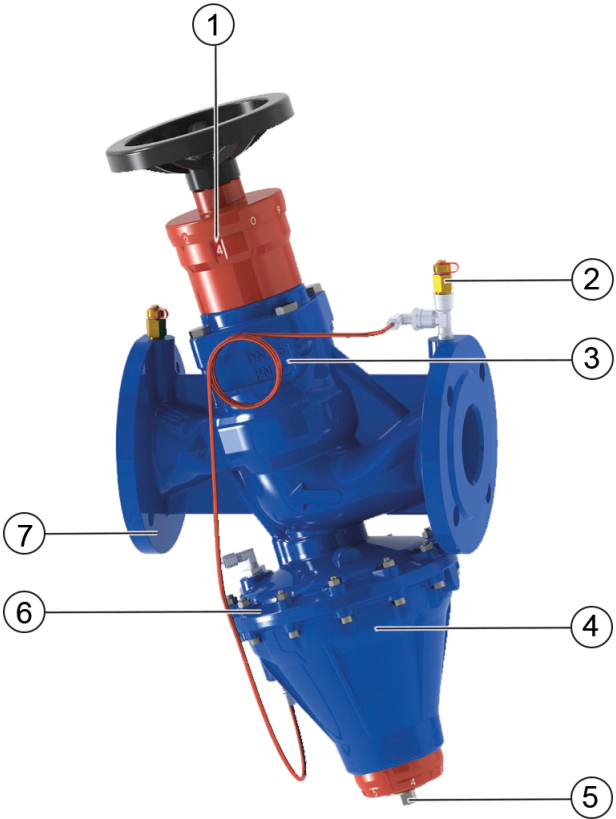



TECHNICAL DATA

Media	
Medium:	Water or water-glycol mixture, quality to VDI 2035 (up to 50 % Glycol)
Pressure values	
Max. static pressure:	16 bar
Max. differential pressure:	4 bar (400 kPa)
Operating temperatures	
Min. operating temperature:	-10 °C
Max. operating temperature:	120 °C
Connections/Sizes	
Nominal sizes:	DN65 - DN150

Note: Not suitable for gas. Do not use with oils, hydrocarbons. Do not use with hazardous, corrosive and abrasive fluids. Not for potable water.

Note: **WARNING:** The maximum operating pressure decreases with the temperature, see chapter "Technical Characteristics - Pressure/temperature chart".

CONSTRUCTION

Overview	Features
	<p>1 Position indicator may be adjusted to 4 positions for easy reading.</p> 
	<p>2 SafeCon™ pressure test valve</p>
	<p>3 The shutter with EPDM seal produces a perfect seal, when maintenance work is done on the system.</p>
	<p>4 Safety pressure relief bypass: limits the allowable differential pressure value across the membrane and prevents the risk of damages and breakage.</p>
	<p>5 Differential pressure regulation screws. The associated position indicator allows easy setting of the differential pressure.</p> 
	<p>6 The large diameter membrane allows accurate measuring of the pressure.</p>
	<p>7 Internal and external epoxy coating, high temperature resistance, environmentally friendly water-based paint.</p> 

Components	Materials
Body	Cast iron EN GJL250
Bonnet	Cast iron EN GJL250
Spring housing	Aluminium*
Inside trim	Brass CuZn40Pb2
Seat seal	EPDM
Membrane	EPDM - reinforced
Spring	Stainless steel
O-Ring	EPDM
Handwheel	Carbon steel
Adapter	Brass CuZn39Pb3

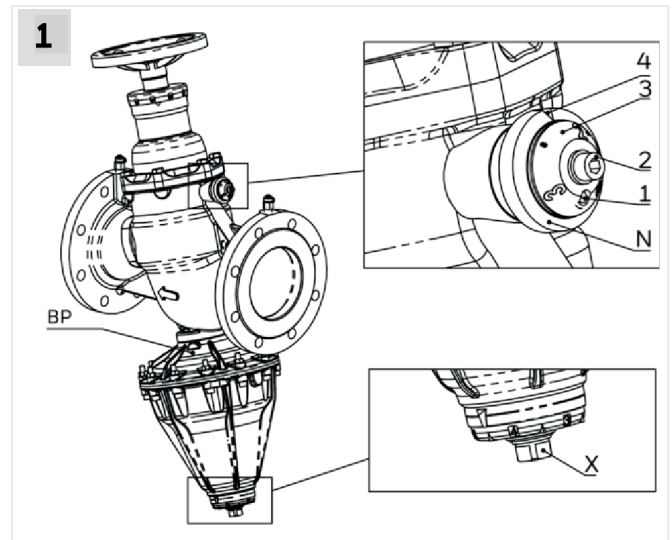
*Epoxy coated inside-outside

Components and accessories made in steel different from stainless steel, even if protected by painting or galvanizing, if used in outdoor environments, in conditions of high humidity/condensation or in aggressive environments, may exhibit a limited protection span against oxidation.

METHOD OF OPERATION

- A) To regulate the differential pressure, turn the command screw (X): turn clockwise to increase the differential pressure, and to stabilize it up to the required value, as indicated in the working range chart. Refer to the digital position indicator as shown in the table below to set the required differential pressure value.
- B) **WARNING:** for valves DN125 and DN150, to assure the correct operation, the regulation needle (N) shall be adjusted to match the value set for the position indicator of the command screw (X).
- Loosen the socket head screw (1)
 - By acting on the screw (2) turn the indicator (3), until the required value is read in correspondence of notch (4)
 - Tighten socket head screw (1) to lock the position

Note: The position indicator/differential pressure table is given to ease the set-up and cannot substitute a direct pressure measurement.



Code	DN	Differential pressure ΔP (mbar)									
		200	300	400	500	600	800	1000	1200	1400	1600
V70001065	65	0	1	1.5	2	2.3	2.8	3.1	-	-	-
V70002065	65	-	-	-	-	-	0	0.5	1	1.5	2
V70001080	80	0	0.5	0.8	1.2	1.7	3	3.5	-	-	-
V70002080	80	-	-	-	-	-	0	1	1.7	2.2	2.5
V70001100	100	0	1	1.5	2	2.7	3.5	3.8	-	-	-
V70002100	100	-	-	-	-	-	0	1	2	2.3	2.5
V70001125	125	0	0.5	1	1.5	2	3	3.4	-	-	-
V70001150	150	0	0.5	1	1.5	2	3	3.4	-	-	-

IMPORTANT: If the differential pressure acting on the membrane is too high, it can lead to damage the membrane itself or other components and thus compromising the valve functionality.

Series V7000 is equipped with a safety pressure relief bypass (BP, see the picture above) that limits the allowable differential pressure value across the membrane and prevents the risk of damages and breakage.

We recommend anyway to check the correctness of capillary pipes connection as well as the correctness of plant set-up (e.g. the correct position open/close of isolation valves) before plant start-up.

INSTALLATION GUIDELINES

Setup requirements

Before carrying out maintenance or dismantling the valve: ensure that the pipes, valves and fluids have cooled down, that the pressure has decreased and that the lines and pipes have been drained in case of toxic, corrosive, inflammable and caustic liquids.

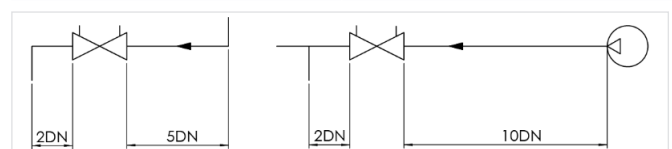
Temperatures above 50 °C and below 0 °C might cause damage to people.

Commissioning, decommissioning and maintenance interventions must be carried out by trained staff, taking account of instructions and local safety regulations.

Advice for plan layout

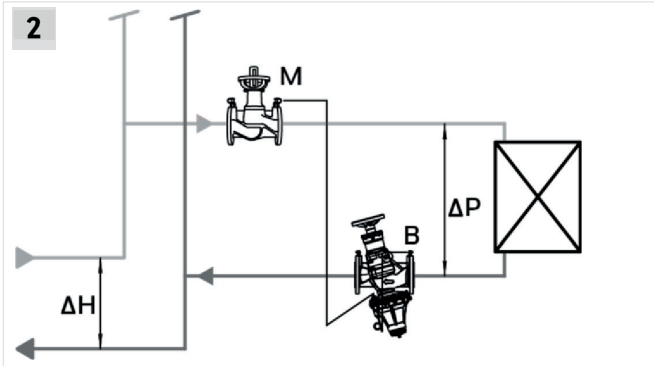
- In order to ensure that temperature and pressure limits are not exceeded, the system should be fitted with a thermostat and pressure switches
- Observe the following minimum distances between the valve and other system components

Minimum distance before the valve	
Pumps	10 x DN
Bends, tees	5 x DN
Minimum distance after the valve	
Pumps	-
Bends, tees	2 x DN



In order to ensure that valve works properly, it is important to ensure that the differential pressure ΔH user unit connection to the riser (upstream of the valve) has at least one and half value of the differential pressure ΔP across the user unit ($\Delta H > 1,5 \times \Delta P$).

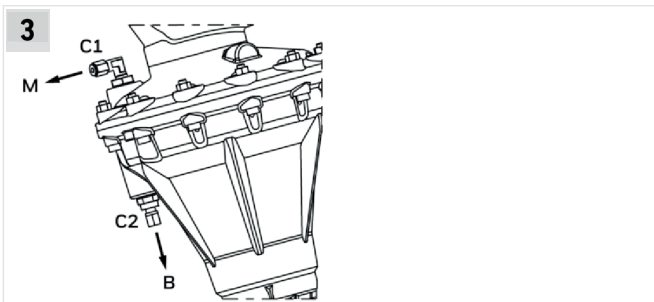
The differential pressure ΔH should not exceed 4 bar, if cavitation is to be avoided.



Connections

Valve shall be installed on the return pipe and connected:

- To the supply pipe by the mean of a capillary tube, fitted to connection point C1



- To the return pipe, by the mean of the test plug indicated B. Valves are supplied with this connection realized by the manufacturer

About cavitation

NB: the flow must be free of cavitation.

As the liquid flows through the valve, as a result of section reduction, its velocity, and its dynamic pressure, increase, and the corresponding static pressure decreases.

If the static pressure value drops below the vapour pressure level, steam bubbles will form. These bubbles will be carried away by the fluid, and implode when the static pressure exceeds the vapour pressure again. Bubble implosion generates high temperatures and pressure shock waves locally, which will damage the valve and cause vibrations and noise.

Higher temperatures, lower static pressure and higher pressure drops across the valve usually increase the risk of cavitation.

Storing

- Keep the valve in a dry place, protect from damage and dirt
- Handle with care, avoid knocks, especially on the weaker parts (handwheel)
- Do not lift the valve by the handwheel
- Use suitable, sturdy packing for transport

Installation

Do not lift the valve by the handwheel.

Before installation, check that:

- The piping is clean
- The valve is clean and undamaged
- The flange sealing surfaces are clean and undamaged

The valve is unidirectional. Respect the flow direction indicated by the arrow on the body.

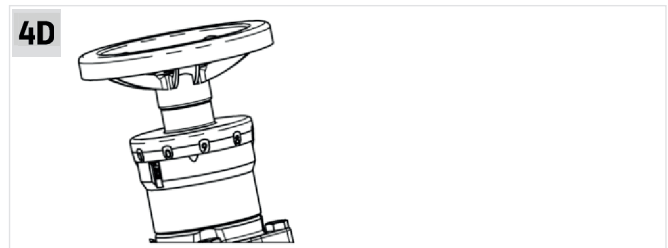
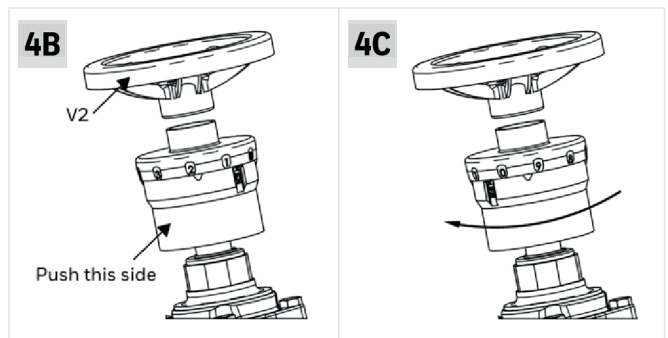
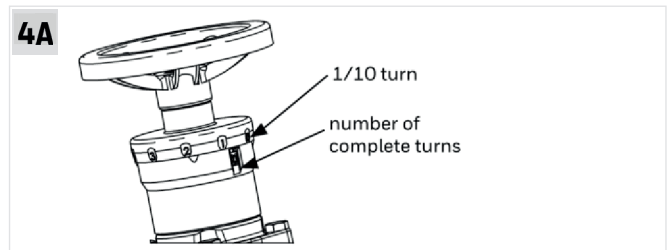
Install the valve on the return side and connect the capillary pipe as shown in the related chapter.

- Use gaskets and check that they are correctly centered
- Do not weld the flanges to the piping after installing the valve
- Water hammers might cause damage and ruptures. Avoid inclination, twisting and misalignments of the piping which may subject the installed valve to excessive stresses. It is recommended that elastic joints be used in order to reduce such effects as much as possible
- Tighten screws crosswise

NB: check that the handwheel is fully open (complete anti-clockwise rotation):

Position indicator can be set in 4 positions for an easier reading, without changing the valve preset regulation position. (pictures 4A – 4D):

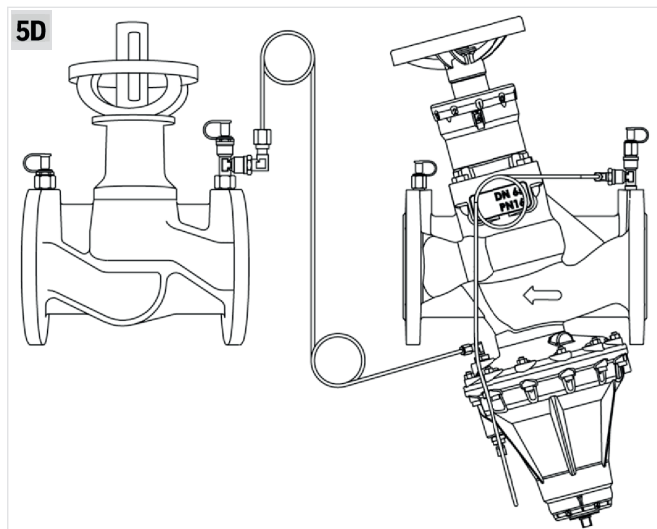
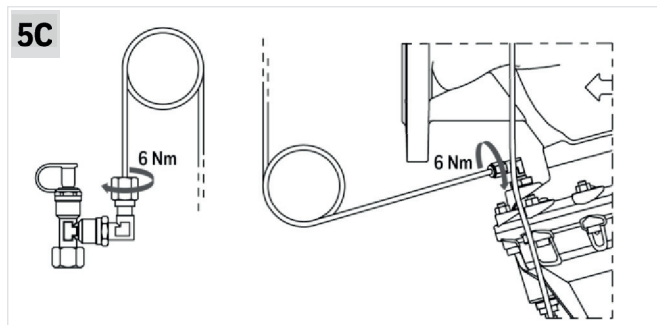
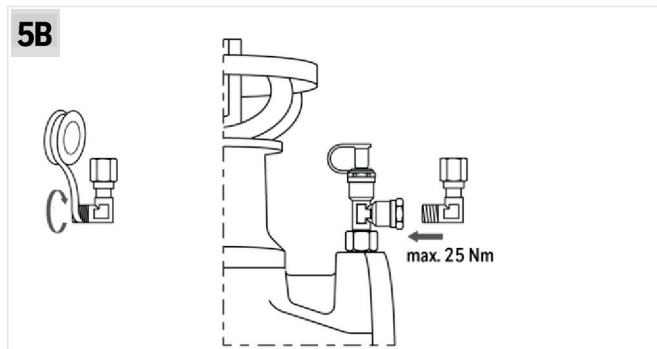
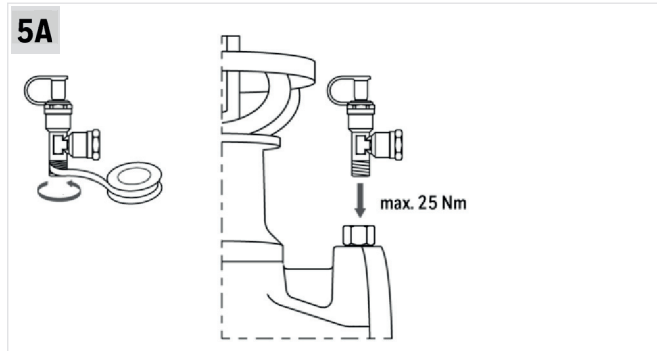
- Remove the hand wheel "V2" and take the position indicator out by pushing on its lower part
- Set the indicator position by rotating it by 90-180-270° (fig. 4C)
- Screw the hand wheel back on (fig. 4D), taking care to match the gear teeth on the stem and position indicator



Commissioning

It is advisable to flush the system clean. Keep the valve fully open when flushing.

If a system pressure test is required, the maximum allowed pressure PS may be exceeded by up to a maximum of 24 bar. Pressure tests must be carried out at room temperature and with the valve fully open.



Measuring the flow rate

Pay close attention during measurement, in the case of hot media.

- Pressure test plugs are self-sealing
- Remove the pressure test plug cap and click on pressure probe
- We recommend placing an isolation valve upstream of the probe
- After measuring click off the pressure probe and apply plug cap back
- Open the valve fully (complete anti-clockwise rotation)
- Screw the pressure gauge connection to the pressure plugs
- Turn the hand wheel clockwise observing the pressure gauge connection. The gauge indicator is stable as long as the flow rate does not change
- Stop turning as soon as the gauge indicator moves (differential pressure increasing)
- Take note of differential pressure reading on pressure gauge

Calculate the flow rate with the formula:

$$Q = K_v \cdot \sqrt{\Delta P}$$

ΔP bar Differential pressure reading on the pressure gauge

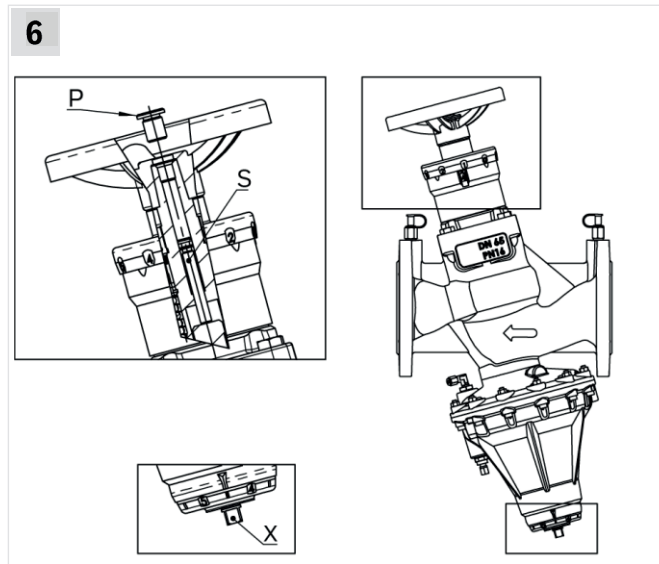
K_v Coefficient of flow rate, taken from the K_v chart, in correspondence with the number of turns made, read on the hand wheel position indicator

Q (m³/h) Coefficient of flow rate

- When the measurements have been done, put the valve in the fully open position (complete anti-clockwise rotation of the hand wheel)

Regulation of the differential pressure

- Open the valve fully (complete anti-clockwise rotation)
- Remove the upper cover "P", fig. 6
- Using a screwdriver with a flat head, unscrew air vent "S" and let any air out
- Tighten until it stops turning, and replace the cover "P"
- To regulate the differential pressure, turn the command screw "X": turn clockwise to increase the differential pressure, up to the preset value, as indicated in the operation field chart, see chapter "Method of operation".



Disposal

For valve operating with hazardous media (toxic, corrosive...), if there is a possibility of residue remaining in the valve, take due safety precaution and carry out required cleaning operation. Personnel in charge must be trained and equipped with appropriate protection devices.

Prior to disposal, disassemble the valve and separate the component according to various materials. Please refer to product literature for more information. Forward sorted material to recycling (e.g. metallic materials) or disposal, according to local and currently valid legislation and under consideration of the environment.

DIRECTIVES AND STANDARDS

In conformity with directive 2014/68/UE (ex 97/23/CE PED).

Design and testing standards (correspondences):

Face-to-face: EN 558-1 ISO 5752

Flanges: EN 1092 ISO 7005

Design: EN12516

Marking: EN19

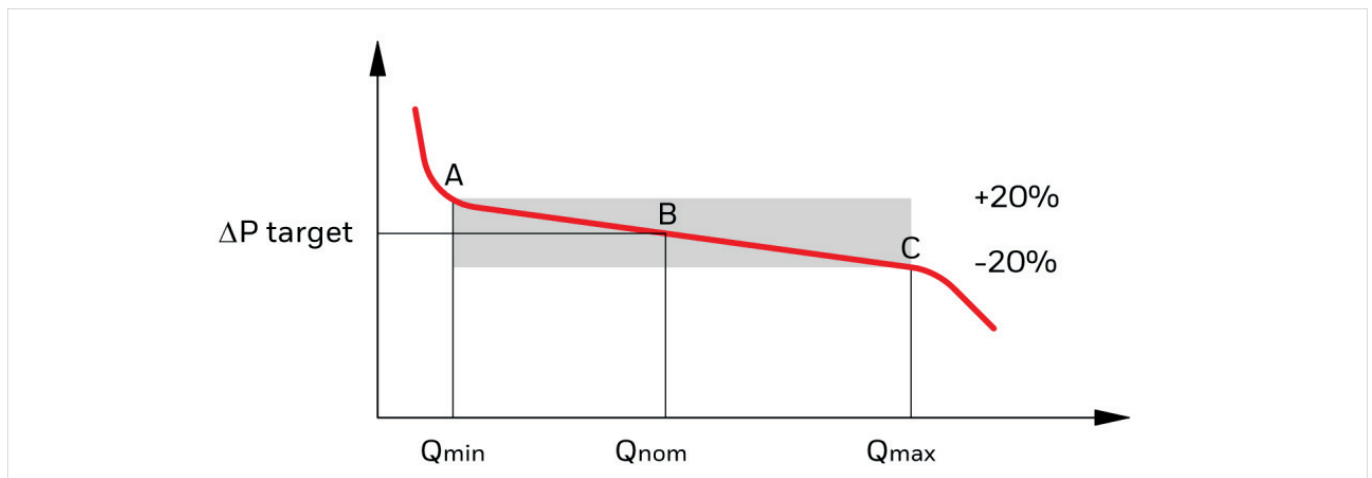
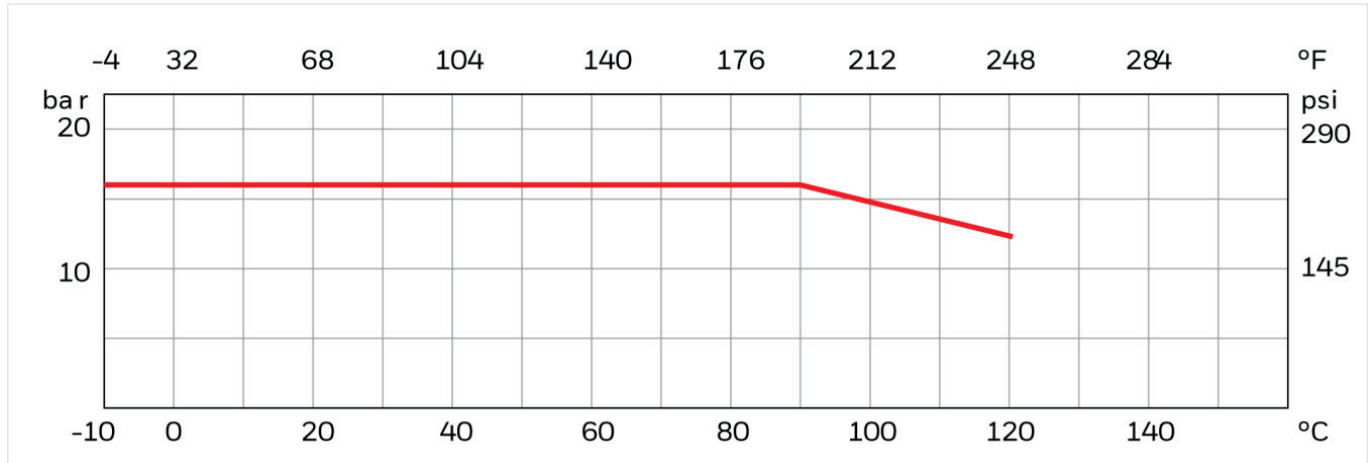
Testing: 100 % testing according to EN 12266

Declaration of Conformity NME - Nemzeti Műszaki Értékelés, only valid for Hungary.

Declaration of Conformity Сертифікат відповідності, only valid for Ukraine.

TECHNICAL CHARACTERISTICS

Pressure/temperature chart



Legend

- A – Q_{min} Minimum flow where valve starts to control (Lowest control point)
- B – Q_{nom} Value where set Δp is in middle of hysteresis (Optimal control point)
- C – Q_{max} Maximum flow before flow curve drops off (Highest control point)

Working range

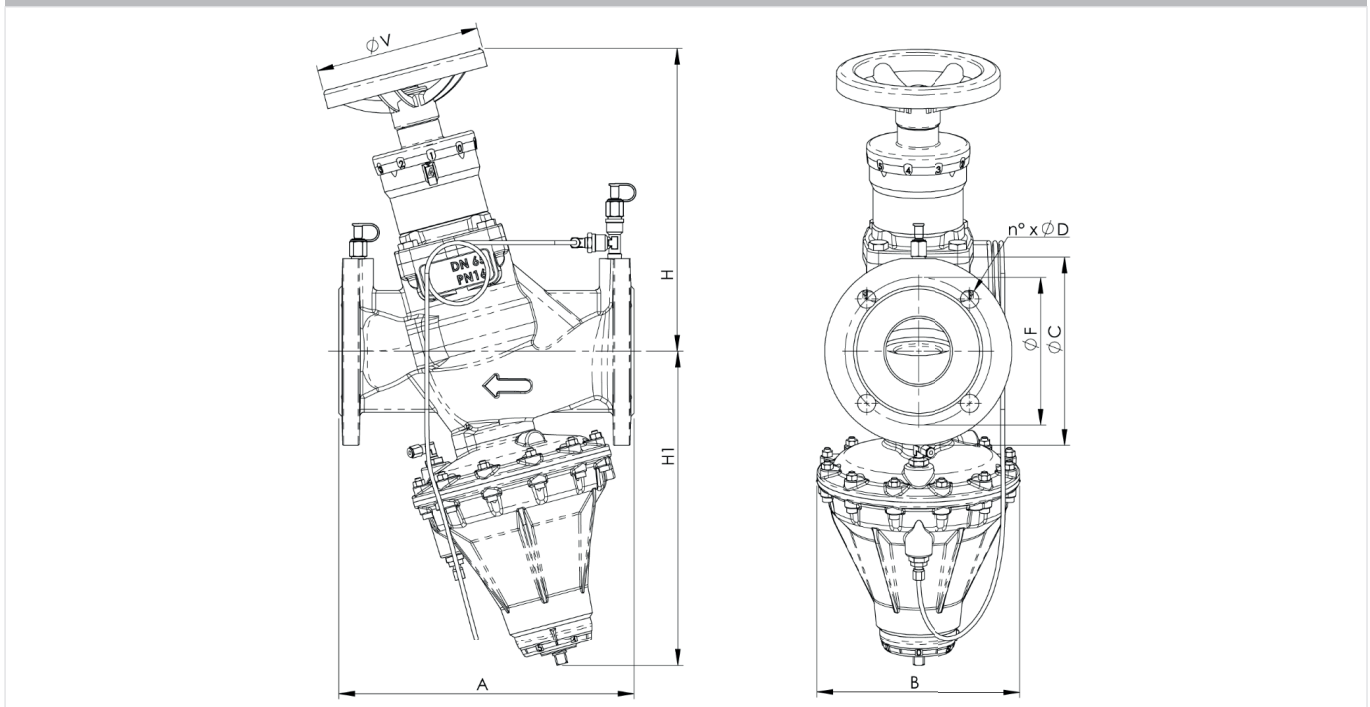
Refer also to chapter "Installation guidelines -Measuring the flow rate"

Code	DN		Differential pressure ΔP (mbar)									
			200	300	400	500	600	800	1000	1200	1400	1600
V70001065	65	min.	1	1	1	1	1	1	1	-	-	-
		max.	40	60	65	65	75	75	75	-	-	-
V70002065	65	min.	-	-	-	-	-	2	2	2	2	2
		max.	-	-	-	-	-	75	75	75	75	75
V70001080	80	min.	1.2	1.5	1.5	1.5	1.5	1.5	1.5	-	-	-
		max.	60	70	85	85	85	85	85	-	-	-
V70002080	80	min.	-	-	-	-	-	3	3	3	3	3
		max.	-	-	-	-	-	100	100	100	100	100
V70001100	100	min.	1.5	2	2	2	2	3	3	-	-	-
		max.	100	120	120	120	120	120	120	-	-	-
V70002100	100	min.	-	-	-	-	-	3	3	3	4	4
		max.	-	-	-	-	-	140	140	140	150	150
V70001125	125	min.	3	4	4	4	5	5	5	-	-	-
		max.	110	140	140	150	170	170	170	-	-	-
V70001150	150	min.	4	5	5	5	5	7	7	-	-	-
		max.	120	160	160	200	230	230	230	-	-	-

Position	Kv CHART (m ³ /h)				
	DN65	DN80	DN100	DN125	DN150
0	0	0	0	0	0
0.5	0.9	4.7	6.3	1.6	1.9
1.0	2.4	7.4	8.8	3.1	3.7
1.5	3.4	10.0	12.1	4.5	5.0
2.0	5.3	12.5	17.7	5.7	5.9
2.5	7.4	14.9	22.8	6.6	7.6
3.0	10.0	20.8	27.0	7.3	9.8
3.5	13.5	27.8	32.4	7.7	14.4
4.0	16.0	34.1	42.8	8.4	20.6
4.5	18.4	40.7	52.2	9.8	28.8
5.0	23.2	46.3	58.5	12.6	38.3
5.5	28.7	50.6	63.6	18.8	48.2
6.0	32.5	54.3	68.7	30.6	58.3
6.5	36.4	57.8	74.7	41.0	69.8
7.0	40.8	61.4	79.9	49.0	82.1
7.5	42.8	64.9	83.6	55.8	94.4
8.0	44.1	66.7	87.1	63.0	106.7
8.5	46.2	67.7	90.6	72.2	119.2
9.0	47.6	68.4	94.1	83.0	131.9
9.5	-	68.9	94.3	93.1	143.4
10.0	-	69.3	99.7	103.0	154.1
10.5	-	69.7	101.5	112.6	161.6
11.0	-	70.0	102.8	119.5	166.9
11.5	-	-	103.8	123.9	170.3
12.0	-	-	104.4	127.0	172.5
12.5	-	-	104.9	129.3	174.8
13.0	-	-	105.3	131.5	177.0
13.5	-	-	105.4	133.9	184.5
14.0	-	-	105.5	136.0	182.1
14.5	-	-	-	137.5	187.4
15.0	-	-	-	138.5	190.0
15.5	-	-	-	139.0	190.2
16.0	-	-	-	130.0	190.5
17.0	-	-	-	-	190.8
18.0	-	-	-	-	191.0
19.0	-	-	-	-	191.0

DIMENSIONS

Overview



Parameter		Values				
Nominal sizes:	DN	65	80	100	125	150
Dimensions:	A EN 558-1/1	290	310	350	400	480
	H	305	316	326	367	381
	H1	310	400	414	436	460
	B	200	242	242	242	242
	V	200	200	200	200	200
	C	93	104	117	126	147
	F EN1092 PN16	145	160	180	210	240
Weight:	kg	24.5	30.6	36.1	51	80
	n x ØD	4 x 18	8 x 18	8 x 18	8 x 18	8 x 22

Note: All dimensions in mm unless stated otherwise.

ORDERING INFORMATION






The following information you need to make an order of an item of your choice. When ordering, please always state the type, the ordering or the part number.

- Nominal flow
- Differential pressure of the user unit ΔP (see chapter "Advice for plan layout" fig. 2 scheme)

ATTENTION: "Working range" table data are valid for a differential pressure ΔH across user unit connection to the riser (upstream of the valve) which is at least double the value of the differential pressure ΔP across the user unit ($\Delta H > 2.0 \times \Delta P$). In order to grant that valve works properly, it is important to assure that the $\Delta H / \Delta P$ ratio is greater than 1,5 ($\Delta H > 1.5 \times \Delta P$).

Note: Differential pressure regulator can operate also for $\Delta H / \Delta P$ ratios below that values, but the flow ranges and regulation accuracy are not guaranteed.

Accessories

	Description	Dimension	Part No.
	VM242A BasicMes-2 handheld measuring computer Note: To connect the VM241 BasicMes to SafeCon™ pressure test cocks please order measuring adapter VA3600C001 separately.		
	Computer is supplied with case and accessories	for all sizes	VM242A0101
	VS2600 Spare set of 2 pressure test cocks G¹/₄"		
	Set of SafeCon connections	for all sizes	VS2600C001
	VA3401A Draining valve		
		for all sizes	VA3401A008
	V6000D Kombi-F Partner valve for connection of included impulse tube, to extend measuring possibilities and to do a mass flow limitation on supply side		
		DN65	V6000D0065A
		DN80	V6000D0080A
		DN100	V6000D00100A
		DN125	V6000D00125A
		DN150	V6000D00150A
	VA5032A Draining adapter for SafeCon™ connections Can be used to drain the water from a SafeCon connection provided on the balancing valve families as shown below		
		for all dimensions	VA5032A001



Manufactured for
and on behalf of
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