Data Sheet

Manual presetting valves LENO™ MSV-BD

Description

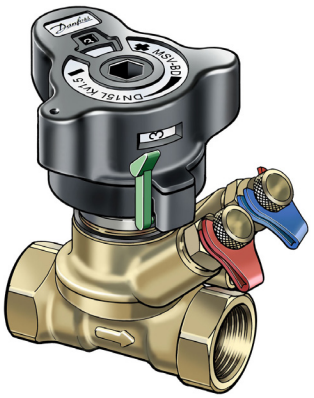
LENO™ MSV-BD is a range of manual valves for balancing flow in heating, cooling and domestic hot water systems.

LENO™ MSV-BD is a combined presetting and shut off valve with a range of unique features:

- Removable hand wheel for easy mounting.
- 360° turnable measuring station for convenient measuring and draining.
- Numeric presetting scale, visible from more angles.
- Easy locking of presetting.
- Built-in test plugs for Ø 3 mm needles.
- Drain connection with separate draining of inlet and outlet side of valve.
- Open-close with Allen key for extra force.
- Open-closed colour indicator.

It is recommended to use LENO™ MSV-BD in constant flow systems. The valve may be mounted in flow or return.

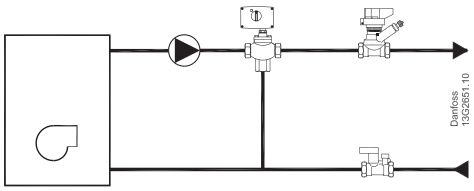
DN 15 and 20 valves are available with internal or external thread. Other dimensions with internal thread.



Danfoss PFM 5001/PFM 100 measuring instruments contain valve data for LENO™ MSV-BD in memory.

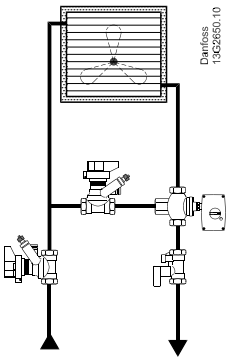
Application

Boiler, flat station or heat pump in 1-family houses



- For balancing.
- Shut-off function for service/repair.

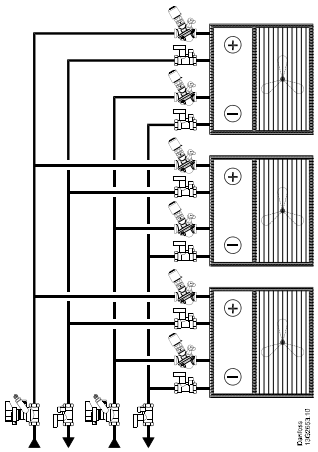
Air handling unit



- For constant flow.
- For balancing.
- Shut-off function for service/repair.

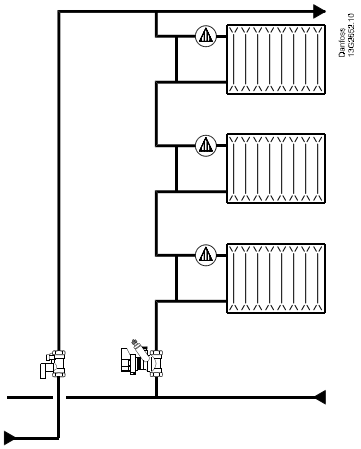
Application

Fan coils



- For flow verification.
- Shut-off function for service/repair.

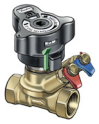
1-pipe system



- For balancing.
- Shut-off function for service/repair.

Ordering

LENO™ MSV-BD valve with internal thread

Type	Material	Size	k_{VS}(m³/h)	Connection	Quantity	Code no.
	DZR brass [1]	DN 15 LF	2.5	½"	1	**003Z4000**
		DN 15	3.0	½"	1	**003Z4001**
		DN 20	6.6	¾"	1	**003Z4002**
		DN 25	9.5	1"	1	**003Z4003**
		DN 32	18	1¼"	1	**003Z4004**
		DN 40	26	1½"	1	**003Z4005**
		DN 50	40	2"	1	**003Z4006**
		DN 15	3.0	½"	8	**003Z4261**
		DN 20	6.6	¾"	8	**003Z4262**
		DN 25	9.5	1"	8	**003Z4263**

LENO™ MSV-BD valve with external thread

Type	Material	Size	k_{VS}(m³/h)	Connection	Code no.
	DZR brass [1]	DN 15 LF	2.5	G ¾ A [2]	**003Z4100**
		DN 15	3.0	G ¾ A [2]	**003Z4101**
		DN 20	6.6	G 1 A	**003Z4102**

LENO™ MSV-BD/S set solution

Type	Material	Size	k_{VS}(m³/h)	Drain flow [3] (l/h)	Connection	Code no.
	DZR brass [1]	DN 15	3.0	281	½"	**003Z4051**
		DN 20	6.6	277	¾"	**003Z4052**
		DN 25	9.5	316	1"	**003Z4053**
		DN 32	18	305	1¼"	**003Z4054**
		DN 40	26	208	1½"	**003Z4055**
		DN 50	40	308	2"	**003Z4056**

[1] Corrosion resistant brass
[2] Eurocone DIN V 3838
[3] Drain flow is measured at 1 bar static pressure and 0.1 bar differential pressure.

Accessories

Accessories

Type	Code no.
Standard test plugs, 2 pcs.	**003Z4662**
Measuring test plugs, 53 mm, red and blue	**003Z3946**
Operating handle	**003Z4652**
Drain connection, ½" thread	**003Z4096**
Drain connection, ¾" thread	**003Z4097**
Flow measuring instrument PFM 5001 (10 bar)	**003L8343**
Flow measuring instrument PFM 5001 (20 bar)	**003L8344**
Identification tag & strips, 10 pcs.	**003Z4660**
MSV-BD insulation, DN 15	**003Z4781**
MSV-BD insulation, DN 20	**003Z4782**
MSV-BD insulation, DN 25	**003Z4783**
MSV-BD insulation, DN 32	**003Z4784**
MSV-BD insulation, DN 40	**003Z4785**
MSV-BD insulation, DN 50	**003Z4786**

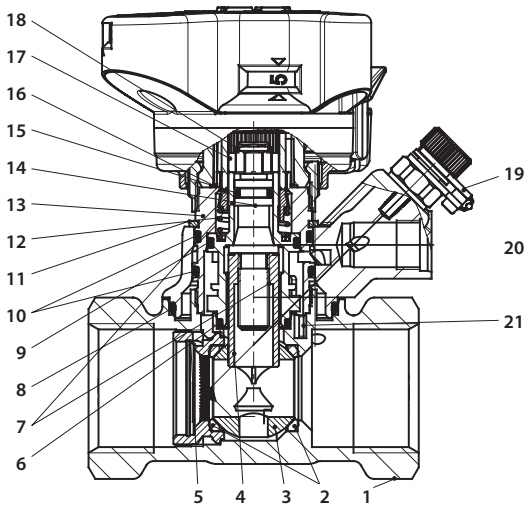
Compression fittings for valves with external thread

Pipe (mm)	Valve thread	PEX fittings, code no.	Alupex fittings, code no.
12 x 1.1	G ¾	**013G4150**	
12 x 2	G ¾	**013G4152**	**013G4182**
13 x 2	G ¾	**013G4153**	
14 x 2	G ¾	**013G4154**	**013G4184**
15 x 1.7	G ¾	**013G4165**	
15 x 2.5	G ¾	**013G4155**	**013G4185**
16 x 1.5	G ¾	**013G4157**	
16 x 2	G ¾	**013G4156**	**013G4186**
16 x 2.25	G ¾		**013G4187**
17 x 2	G ¾	**013G4162**	
18 x 2	G ¾	**013G4158**	**013G4188**
18 x 2.5	G ¾	**013G4159**	
20 x 2	G ¾	**013G4160**	**013G4190**
20 x 2.5	G ¾	**013G4161**	**013G4191**

Compression fittings for valves with external thread

Steel/copper pipes	Dimension	Code no.
	G ¾ x 15	**013G4125**
	G ¾ x 16	**013G4126**
	G ¾ x 18	**013G4128**
	G 1 x 18	**013U0134**
	G 1 x 22	**013U0135**

Design



1. Valve body
2. Ball seat
3. Ball
4. Throttle bush
5. Support screw
6. O-ring
7. Shut-off bush
8. O-ring
9. O-ring
10. O-ring
11. Retaining ring (corrosion protected)
12. Spring
13. Valve top
14. Spindle
15. O-ring
16. Rotation lock
17. Spindle head
18. Retaining ring, corrosion protected
19. Strips, 2 pcs.
20. Hose connection
21. Stop plug

Materials and parts in contact with water	
Valve body	DZR brass
O-rings	EPDM
Ball	Brass/chromium plated
Ball sealing	Teflon

Technical data

Max. static working pressure	20 bar
Static test pressure	30 bar
Max. differential pressure across valve	2.5 bar (250 kPa)
Max. flow temperature	120 °C
Min. temperature	-20 °C
Cooling liquids	Ethylene glycol / propylene glycol and HYCOOL (max. 30 %)

Fitting

Before fitting the valve the installer must ensure that the pipe system is clean and:

1. the valve can be turned 360 degrees (if threaded pipe is used).
2. the valve is fitted according to the flow direction arrow.

Removal of the handle

1. Set the handle at 0.0.
2. Release the setting lock (green).
3. Unscrew the union nut.

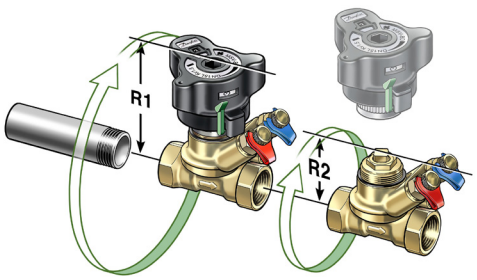
Calibration of the handle

Before refitting, ensure that the handle setting is 0.0.

For DN 15 - 20 valves with external thread

Danfoss offers a complete range of compression fittings for steel, cobber and PEX pipes.

DN	R1/R2 (mm)
15	86/67
20	89/69
25	91/71
32	118/84
40	118/84
50	124/90

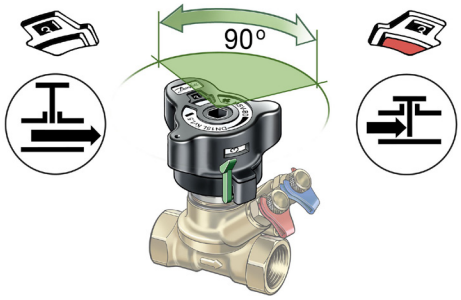


Shut-off

In order to shut-off the valve the handle must be pressed down.

The shut-off function features a ball valve, which only requires a 90 degree turn to shut the valve completely.

An indicator window shows the actual setting:
- red = closed
- white = open

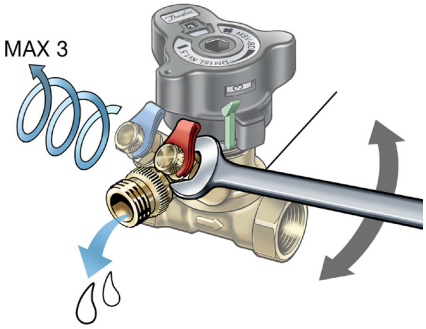


Draining

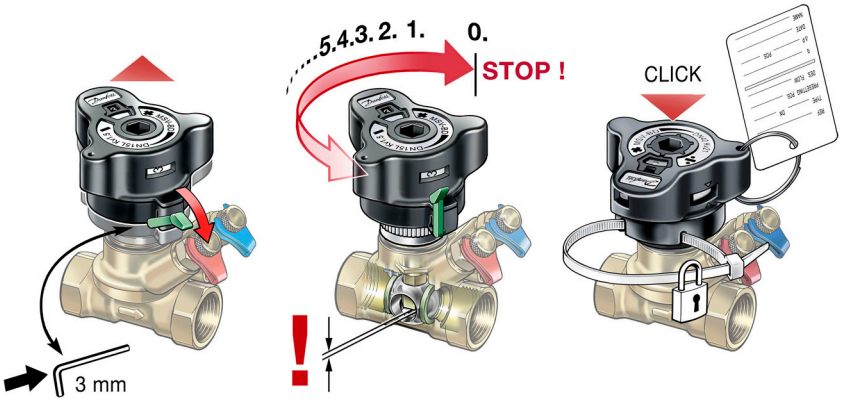
Note!
The drain connection is an accessory and must be purchased separately.

The drain tap can rotate 360 degrees for convenient operation.

Draining the system pipes can be done selectively: When the red test plug is opened, the valve inlet pipe is drained.
Opening the blue test plug will drain the pipe on the valve outlet side.



Setting and sealing



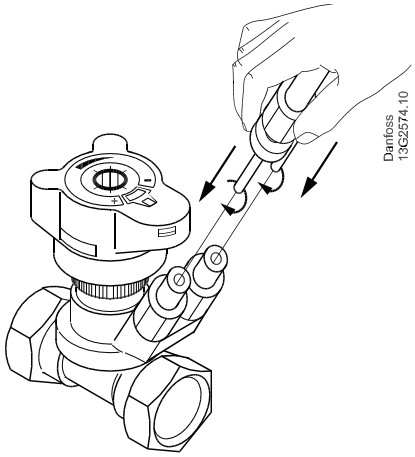
The valve has a presetting feature for setting/adjusting flow ratings.

Setting the required flow is made in 5 steps:
1. In open position, release the lock using the green lever or a 3 mm Allen key.
2. The handle pops up automatically.
3. The calculated value can now be set.
4. The setting is locked when the handled is pressed to click.
5. The setting can be sealed by using a strip as shown.

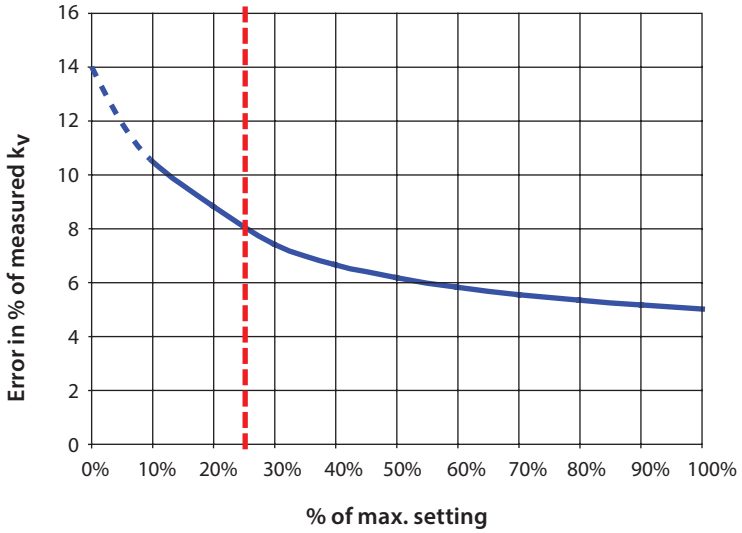
Measuring

The flow through the LENO™ MSV-BD valve can be measured using Danfoss PFM 5001 or other brands of measuring instruments.
The LENO™ MSV-BD valve is supplied with two test plugs for Ø3 mm needles.
A twin bracket enables the user to connect both needles simultanously.

Procedure for flow measuring:
1. Select flow measuring.
2. Select valve brand.
3. Select valve type and dimension.
4. Enter presetting.
5. Connect valve and instrument.
6. Calibrate static pressure.
7. Measure the flow.



Measuring accuracy



LENO™ MSV-BD is very accurate, due to the separate functions for presetting and shut-off.

The red line indicates 25% of max. flow.

According to BS7350:1990 flow rates must be within following values:
± 18% at 25% open position
± 10% at fully open position

Kv-signal

kv-signal values are used for non-Danfoss measuring instruments. Danfoss PFM 5001 have all data in memory, and the instruments are using this formula:

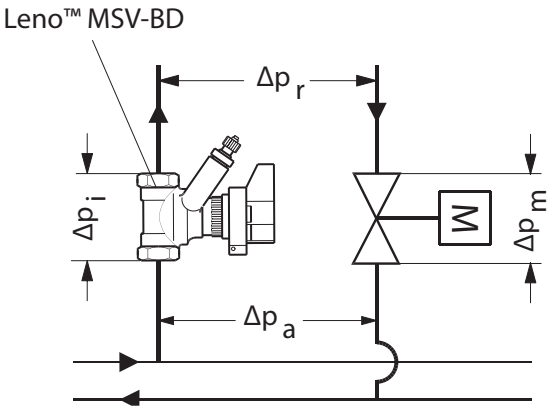
$$\Delta P_{val} = \Delta P_{sig} \left(\frac{k_{v\text{-}sig}}{k_{v\text{-}val}} \right)^2$$

Δp across the test plugs ($k_{v\text{-}sig}$) and Δp across the valve ($k_{v\text{-}val}$) is not the same due to turbulence influence for pressure measuring.

K_V-signal values

Setting	DN 15LF	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50
0.0	0.07	0.10	0.12	0.34	0.51	1.05	1.75
0.1	0.08	0.11	0.16	0.44	0.73	1.20	2.01
0.2	0.09	0.12	0.20	0.53	0.92	1.36	2.25
0.3	0.11	0.13	0.26	0.61	1.10	1.55	2.47
0.4	0.12	0.14	0.32	0.67	1.26	1.74	2.69
0.5	0.13	0.16	0.38	0.73	1.43	1.95	2.91
0.6	0.15	0.19	0.45	0.79	1.60	2.17	3.12
0.7	0.16	0.21	0.53	0.84	1.78	2.40	3.35
0.8	0.17	0.24	0.60	0.90	1.97	2.64	3.58
0.9	0.19	0.26	0.67	0.95	2.18	2.88	3.82
1.0	0.20	0.29	0.74	1.01	2.39	3.13	4.07
1.1	0.21	0.32	0.82	1.08	2.62	3.39	4.33
1.2	0.23	0.34	0.89	1.14	2.87	3.64	4.60
1.3	0.25	0.37	0.96	1.22	3.12	3.90	4.89
1.4	0.27	0.40	1.03	1.29	3.38	4.16	5.18
1.5	0.30	0.44	1.09	1.37	3.64	4.43	5.49
1.6	0.32	0.47	1.16	1.46	3.92	4.69	5.80
1.7	0.35	0.51	1.23	1.55	4.19	4.96	6.13
1.8	0.37	0.54	1.30	1.65	4.48	5.24	6.46
1.9	0.40	0.58	1.38	1.75	4.76	5.51	6.80
2.0	0.43	0.61	1.45	1.85	5.05	5.80	7.14
2.1	0.46	0.65	1.53	1.96	5.35	6.08	7.49
2.2	0.49	0.69	1.61	2.07	5.65	6.38	7.84
2.3	0.52	0.73	1.69	2.18	5.96	6.68	8.19
2.4	0.56	0.77	1.78	2.29	6.27	6.99	8.55
2.5	0.59	0.80	1.87	2.41	6.60	7.30	8.91
2.6	0.62	0.85	1.97	2.53	6.94	7.63	9.27
2.7	0.66	0.89	2.07	2.65	7.29	7.98	9.64
2.8	0.69	0.93	2.17	2.77	7.67	8.33	10.00
2.9	0.73	0.97	2.29	2.89	8.06	8.70	10.37
3.0	0.76	1.01	2.40	3.01	8.48	9.08	10.74
3.1	0.80	1.04	2.52	3.13	8.92	9.48	11.11
3.2	0.83	1.08	2.65	3.25	9.38	9.90	11.49
3.3	0.87	1.12	2.78	3.37	9.87	10.33	11.88
3.4	0.90	1.16	2.91	3.49	10.38	10.79	12.27
3.5	0.94	1.20	3.05	3.62	10.91	11.26	12.67
3.6	0.97	1.25	3.19	3.74	11.46	11.74	13.09
3.7	1.01	1.30	3.33	3.87	12.02	12.25	13.51
3.8	1.06	1.35	3.47	4.00	12.58	12.77	13.95
3.9	1.10	1.41	3.61	4.13	13.12	13.30	14.41
4.0	1.14	1.47	3.75	4.26	13.64	13.85	14.88
4.1	1.18	1.53	3.89	4.39	14.12	14.41	15.38
4.2	1.23	1.59	4.02	4.53	14.52	14.98	15.89
4.3	1.27	1.66	4.15	4.68	14.84	15.55	16.44
4.4	1.31	1.73	4.28	4.82		16.13	17.00
4.5	1.35	1.81	4.40	4.98		16.69	17.59
4.6	1.39	1.91	4.52	5.13		17.25	18.21
4.7	1.43	2.00	4.62	5.29		17.80	18.86
4.8	1.47	2.08	4.72	5.46		18.32	19.54
4.9	1.51	2.16	4.82	5.64		18.80	20.24
5-0	1.54	2.23	4.90	5.81		19.25	20.97
5.1	1.60	2.30	4.97	6.00		19.65	21.73
5.2	1.66	2.36	5.04	6.19		19.98	22.51
5.3	1.72	2.41	5.09	6.38		20.24	23.30
5.4	1.79	2.46	5.14	6.57		20.41	24.12
5.5	1.87	2.50	5.18	6.77		20.48	24.94
5.6	1.93	2.54	5.21	6.96			25.76
5.7	1.99	2.57	5.24	7.15			26.58
5.8	2.04		5.27	7.34			27.38
5.9	2.09			7.52			28.16
6.0	2.14			7.69			28.90
6.1	2.18			7.85			29.59
6.2	2.22			7.98			30.21
6.3	2.26						30.74
6.4							31.17
6.5							31.47
6.6							31.61

Valve size and presetting



Δp$_i$ *Pressure drop across LENO™ MSV-BD valve*
Δp$_m$ *Pressure drop across valve*
Δp$_r$ *Necessary pressure for the riser*
Δp$_a$ *Available pressure for the riser*

Example

Given:	Max. pipe flow Q	=			2.0 m³/h
	Δp_r	=			15 kPa
	Δp_a	=			45 kPa
	Δp_m	=			10 kPa
	Δp_i	=			$\Delta p_a - \Delta p_v - \Delta p_m$
	Δp_i	=	45 kPa - 15 kPa - 10KPa	=	20 kPa

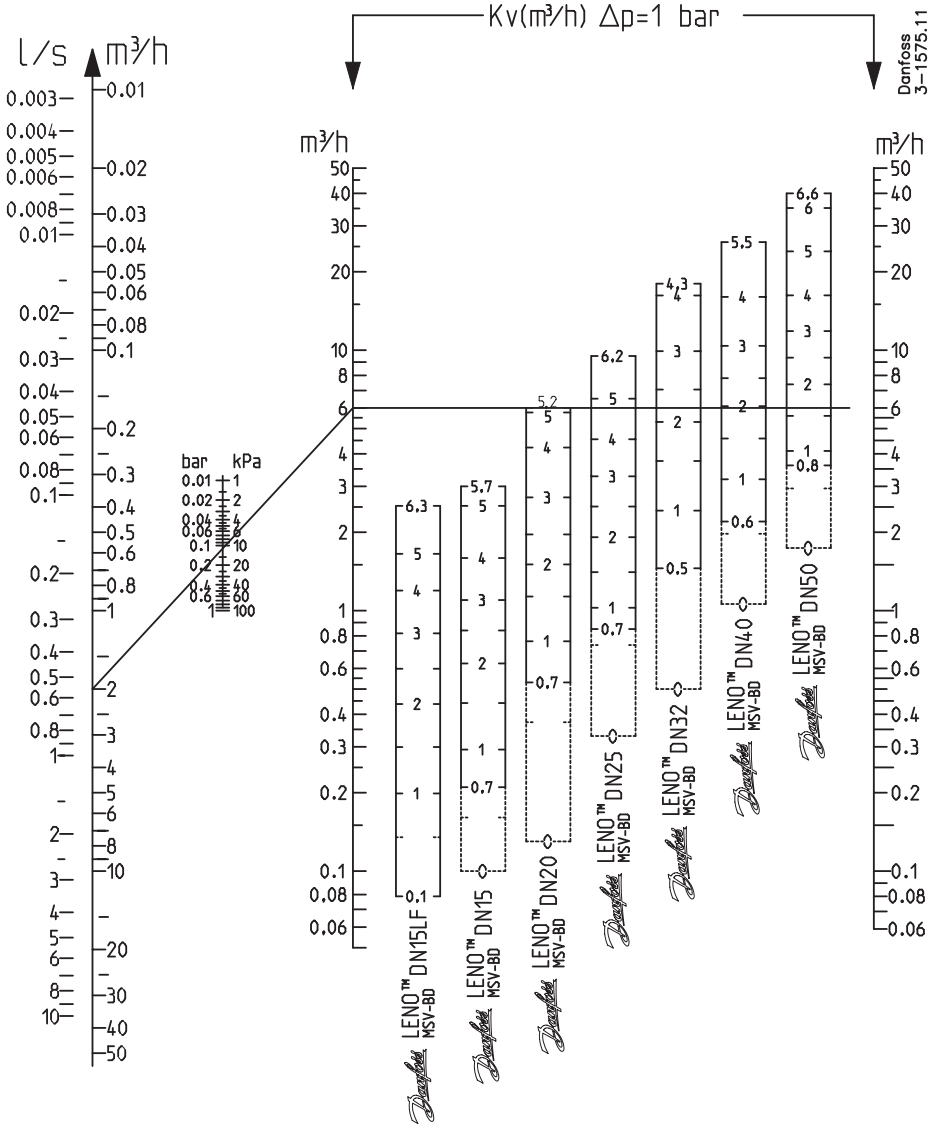
Correct valve size and presetting is found in the sizing and flow diagrammes, pp 9.

$Q = 2.0\ m^3/h$ and $\Delta p_i = 20$ kPa

Setting can be also calculated from the formula:

$$k_v = \frac{Q[m^3/h]}{\sqrt{\Delta p_i}[bar]} = \frac{2.0}{\sqrt{0.20}} = 4.5\ m^3/h$$

Sizing



Correction factors

Medium: Ethylene glycol / propylene glycol percentage (max. 30 %).

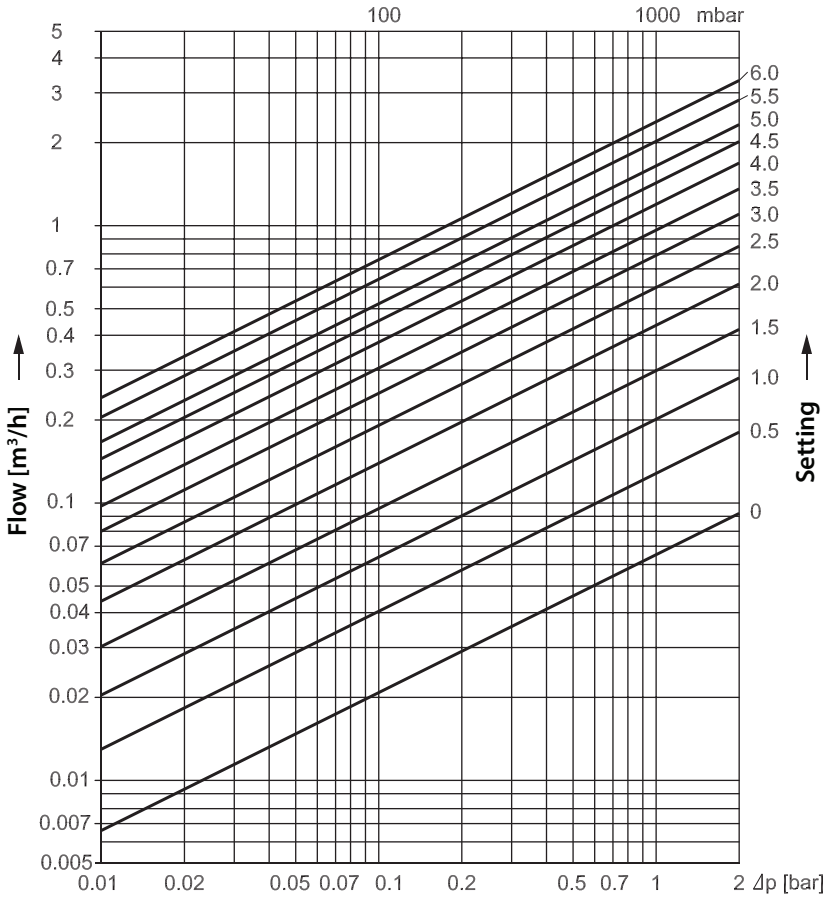
Temp. °C	Flow, m³/h						
	25	30	40	50	60	65	100
-40.0	1)	1)	1)	1)	0.89	0.88	1)
-17.8	1)	1)	0.93	0.91	0.90	0.89	0.86
4.4	0.95	**0.95**	0.93	0.92	0.91	0.90	0.87
26.6	0.96	0.95	0.94	0.93	0.92	0.91	0.88
48.9	0.97	0.96	0.95	0.94	0.93	0.92	0.90
71.1	0.98	0.98	0.96	0.95	0.94	0.94	0.95
93.3	1.00	0.99	0.97	0.96	0.95	0.95	0.92
115.6	2)	2)	2)	2)	2)	2)	0.94

1) Below freezing point *2) Above boiling point*

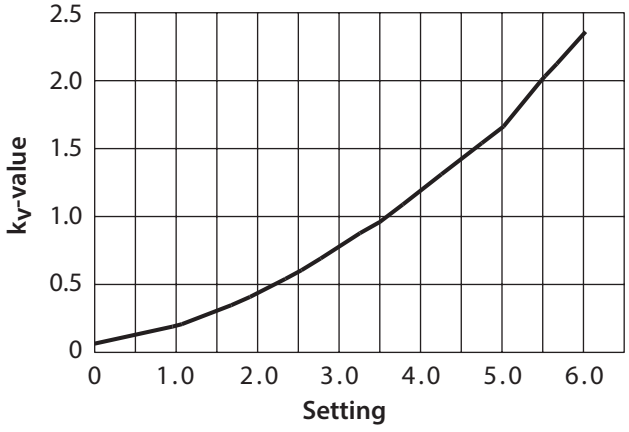
Example
Flow needed .....30 m³/h
Flow after correction .....30 x 0.95 = 28 m³/h

Flow diagrammes, DN 15 LF

LENO™ MSV-BD DN 15 LF



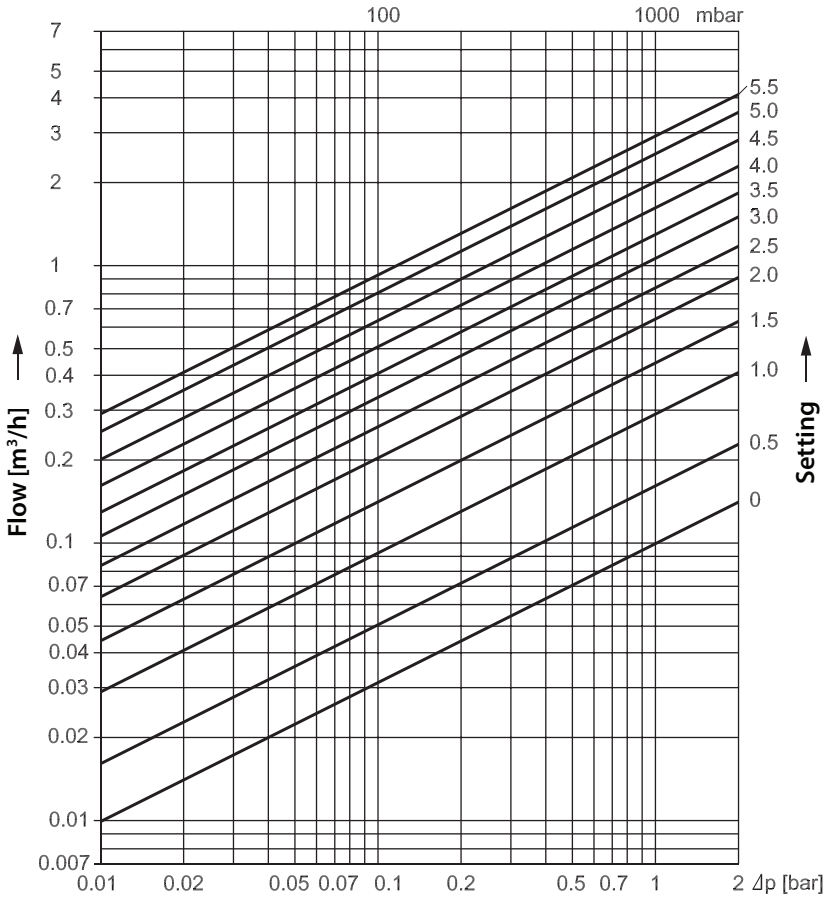
Flow characteristics



Setting	k_v-value
0.0	0.07
0.1	0.08
0.2	0.09
0.3	0.11
0.4	0.12
0.5	0.13
0.6	0.15
0.7	0.16
0.8	0.17
0.9	0.19
1.0	0.20
1.1	0.22
1.2	0.23
1.3	0.25
1.4	0.28
1.5	0.30
1.6	0.32
1.7	0.35
1.8	0.38
1.9	0.41
2.0	0.44
2.1	0.47
2.2	0.50
2.3	0.53
2.4	0.56
2.5	0.60
2.6	0.63
2.7	0.67
2.8	0.71
2.9	0.74
3.0	0.78
3.1	0.82
3.2	0.86
3.3	0.89
3.4	0.93
3.5	0.97
3.6	1.01
3.7	1.05
3.8	1.10
3.9	1.15
4.0	1.19
4.1	1.24
4.2	1.29
4.3	1.33
4.4	1.38
4.5	1.43
4.6	1.48
4.7	1.52
4.8	1.56
4.9	1.61
5.0	1.65
5.1	1.72
5.2	1.78
5.3	1.86
5.4	1.94
5.5	2.03
5.6	2.10
5.7	2.17
5.8	2.23
5.9	2.30
6.0	2.36
6.1	2.42
6.2	2.47
6.3	2.53

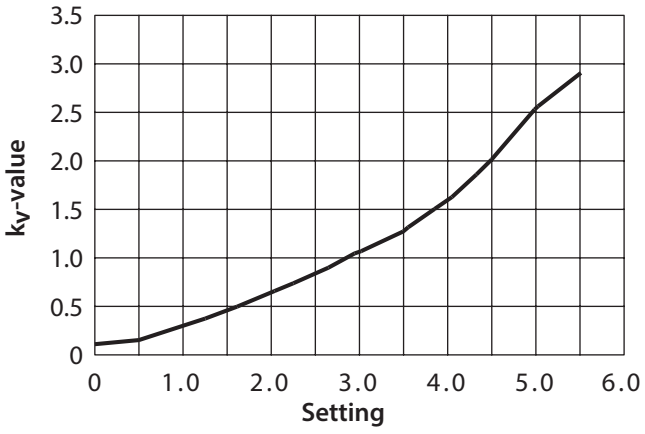
Flow diagrammes, DN 15

LENO™ MSV-BD DN 15



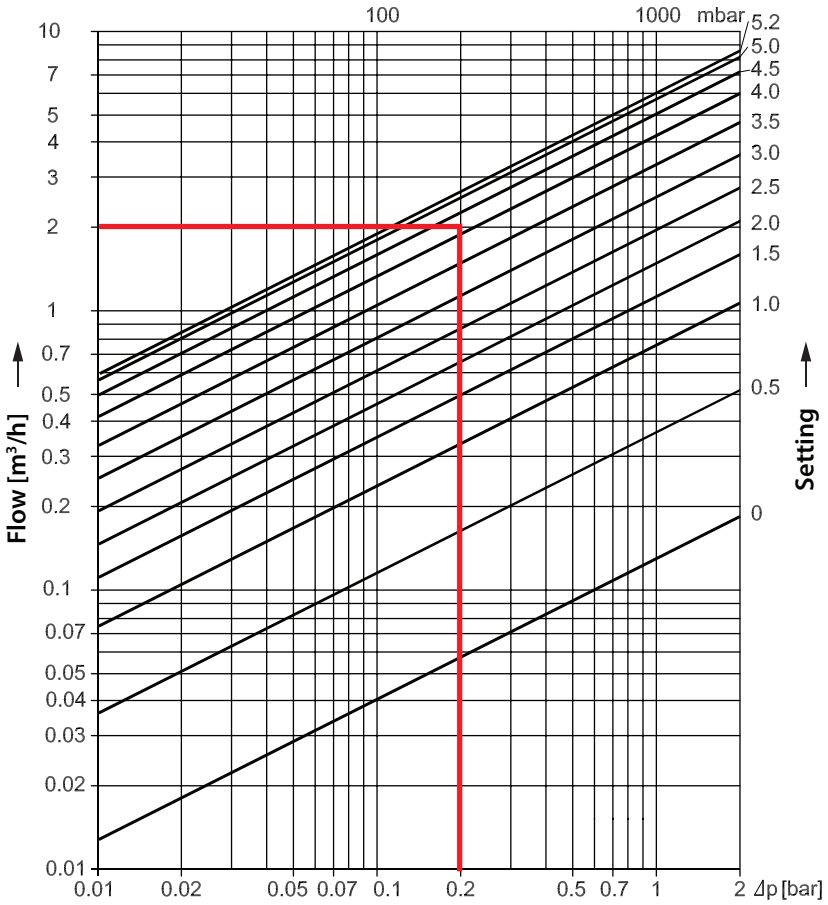
Setting	k_v-value
0.0	0.10
0.1	0.11
0.2	0.12
0.3	0.13
0.4	0.14
0.5	0.16
0.6	0.19
0.7	0.21
0.8	0.24
0.9	0.27
1.0	0.29
1.1	0.32
1.2	0.35
1.3	0.38
1.4	0.41
1.5	0.44
1.6	0.48
1.7	0.51
1.8	0.55
1.9	0.59
2.0	0.63
2.1	0.67
2.2	0.71
2.3	0.75
2.4	0.80
2.5	0.84
2.6	0.88
2.7	0.93
2.8	0.97
2.9	1.02
3.0	1.06
3.1	1.10
3.2	1.14
3.3	1.19
3.4	1.23
3.5	1.28
3.6	1.34
3.7	1.40
3.8	1.46
3.9	1.52
4.0	1.59
4.1	1.66
4.2	1.74
4.3	1.82
4.4	1.91
4.5	2.00
4.6	2.12
4.7	2.23
4.8	2.33
4.9	2.43
5.0	2.53
5.1	2.61
5.2	2.70
5.3	2.77
5.4	2.84
5.5	2.90
5.6	2.95
5.7	3.00

Flow characteristics

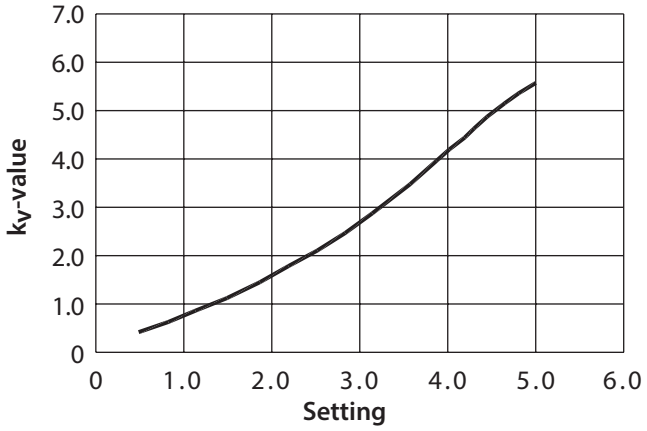


Flow diagrammes, DN 20

LENO™ MSV-BD DN 20



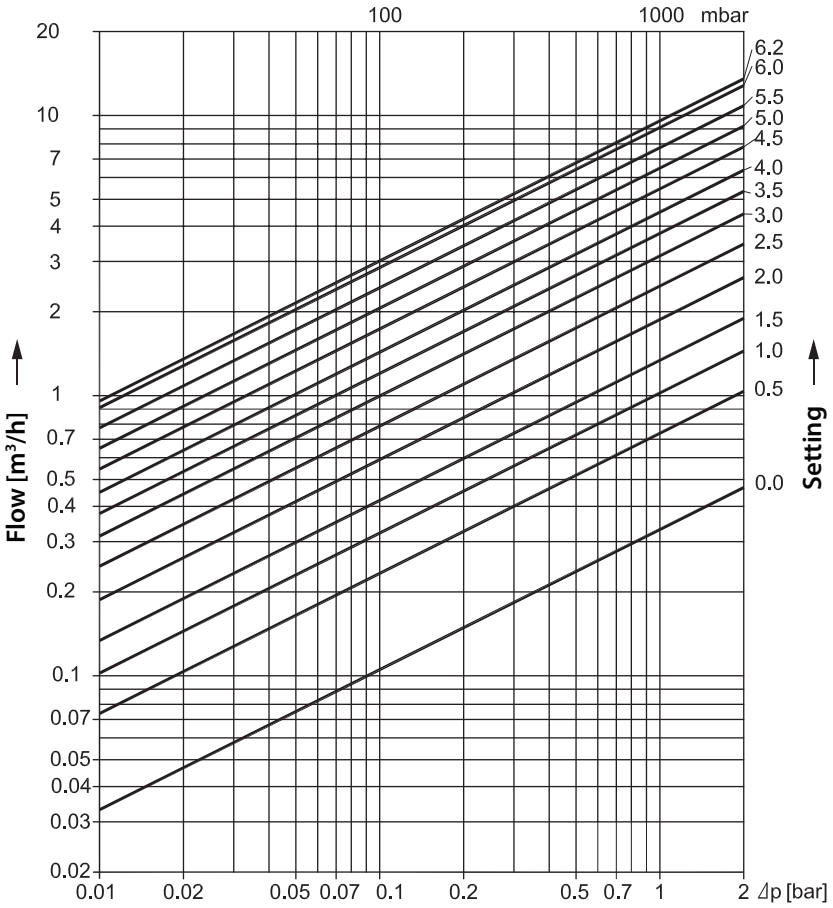
Flow characteristics



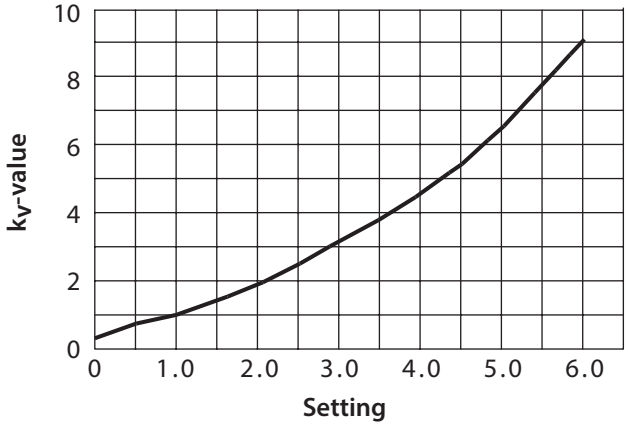
Setting	k_V-value
0.0	0.13
0.1	0.15
0.2	0.19
0.3	0.24
0.4	0.30
0.5	0.37
0.6	0.45
0.7	0.53
0.8	0.61
0.9	0.68
1.0	0.76
1.1	0.84
1.2	0.92
1.3	0.99
1.4	1.06
1.5	1.13
1.6	1.21
1.7	1.28
1.8	1.35
1.9	1.43
2.0	1.50
2.1	1.59
2.2	1.67
2.3	1.76
2.4	1.86
2.5	1.96
2.6	2.07
2.7	2.19
2.8	2.31
2.9	2.44
3.0	2.58
3.1	2.72
3.2	2.87
3.3	3.03
3.4	3.19
3.5	3.36
3.6	3.53
3.7	3.70
3.8	3.87
3.9	4.05
4.0	4.23
4.1	4.40
4.2	4.58
4.3	4.75
4.4	4.91
4.5	5.07
4.6	5.22
4.7	5.37
4.8	5.51
4.9	5.64
5.0	5.77
5.1	5.88
5.2	6.00
5.3	6.09
5.4	6.19
5.5	6.29
5.6	6.39
5.7	6.49
5.8	6.60

Flow diagrammes, DN 25

LENO™ MSV-BD DN 25



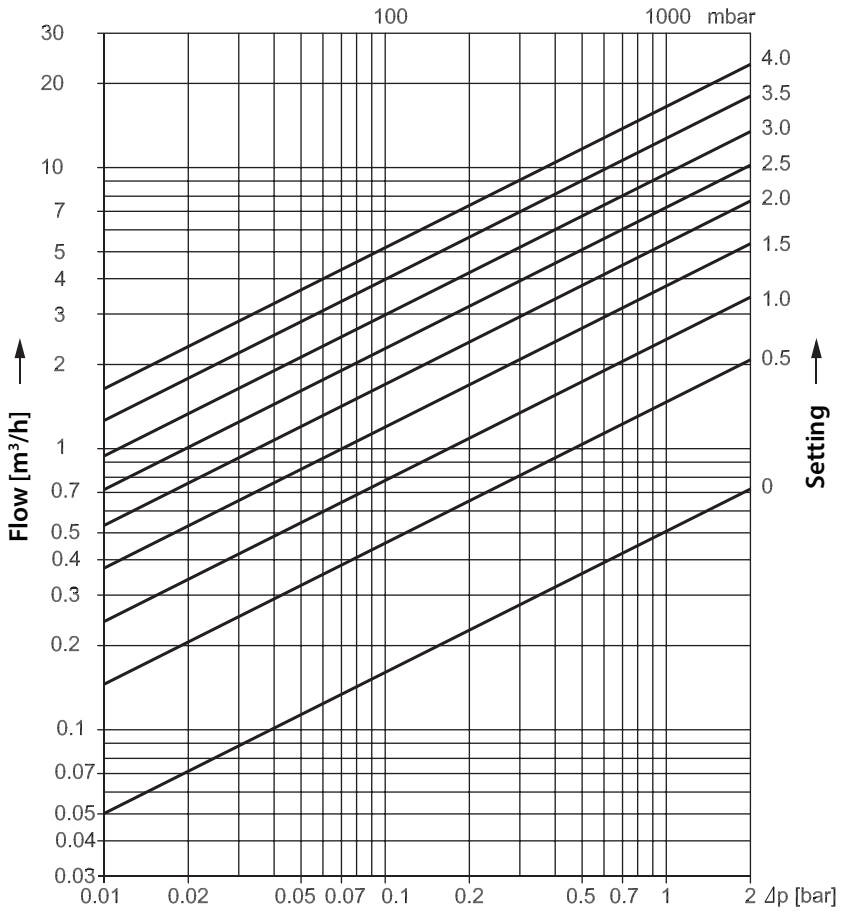
Flow characteristics



Setting	k_v-value
0.0	0.33
0.1	0.44
0.2	0.53
0.3	0.61
0.4	0.68
0.5	0.74
0.6	0.79
0.7	0.85
0.8	0.91
0.9	0.96
1.0	1.03
1.1	1.09
1.2	1.16
1.3	1.24
1.4	1.32
1.5	1.41
1.6	1.50
1.7	1.60
1.8	1.70
1.9	1.80
2.0	1.91
2.1	2.03
2.2	2.15
2.3	2.26
2.4	2.39
2.5	2.51
2.6	2.64
2.7	2.76
2.8	2.89
2.9	3.02
3.0	3.15
3.1	3.28
3.2	3.41
3.3	3.54
3.4	3.68
3.5	3.81
3.6	3.95
3.7	4.09
3.8	4.24
3.9	4.39
4.0	4.55
4.1	4.71
4.2	4.88
4.3	5.05
4.4	5.23
4.5	5.42
4.6	5.62
4.7	5.83
4.8	6.05
4.9	6.27
5.0	6.51
5.1	6.75
5.2	7.00
5.3	7.26
5.4	7.53
5.5	7.80
5.6	8.06
5.7	8.33
5.8	8.59
5.9	8.84
6.0	9.08
6.1	9.30
6.2	9.50

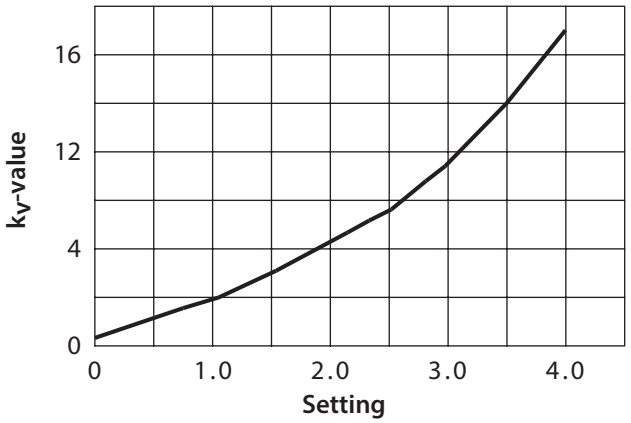
Flow diagrammes, DN 32

LENO™ MSV-BD DN 32



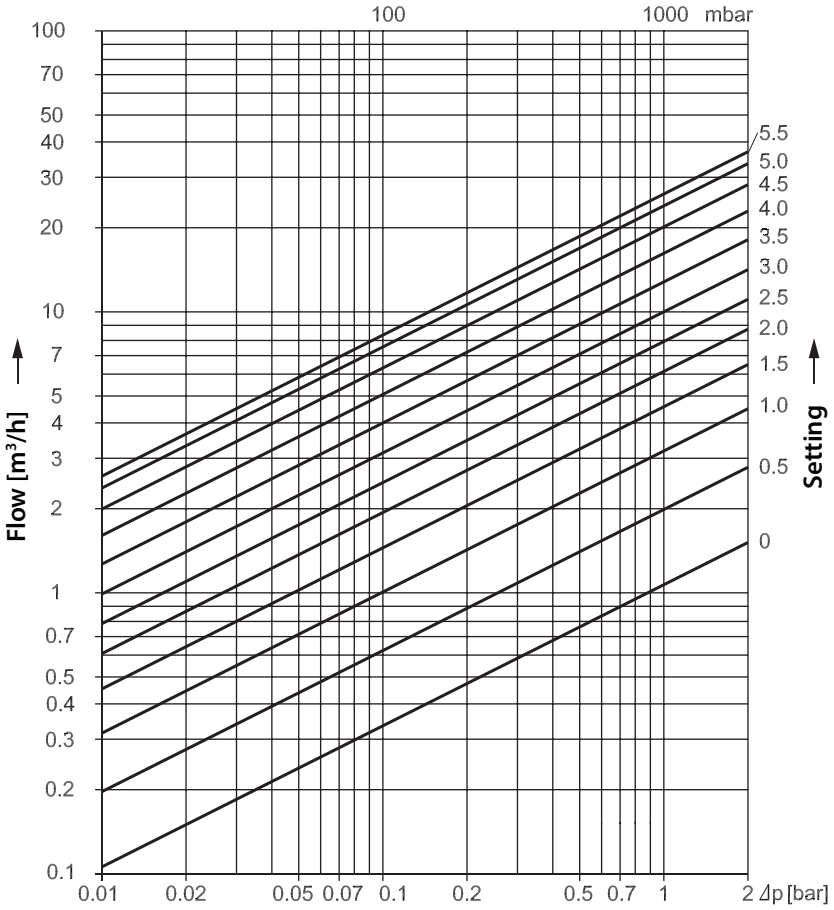
Setting	k_v-value
0.0	0.50
0.1	0.75
0.2	0.95
0.3	1.13
0.4	1.29
0.5	1.45
0.6	1.62
0.7	1.80
0.8	1.99
0.9	2.20
1.0	2.42
1.1	2.66
1.2	2.92
1.3	3.19
1.4	3.47
1.5	3.75
1.6	4.05
1.7	4.36
1.8	4.67
1.9	4.98
2.0	5.30
2.1	5.63
2.2	5.97
2.3	6.32
2.4	6.68
2.5	7.06
2.6	7.46
2.7	7.89
2.8	8.34
2.9	8.83
3.0	9.35
3.1	9.92
3.2	10.52
3.3	11.16
3.4	11.85
3.5	12.51
3.6	13.23
3.7	13.98
3.8	14.74
3.9	15.49
4.0	16.23
4.1	16.91
4.2	17.51
4.3	18.00

Flow characteristics

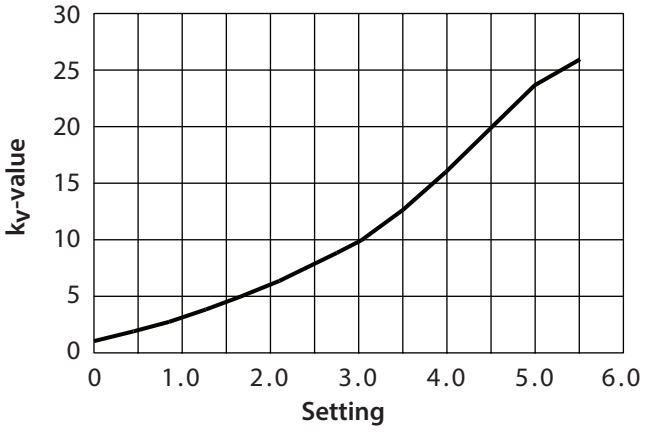


Flow diagrammes, DN 40

LENO™ MSV-BD DN 40



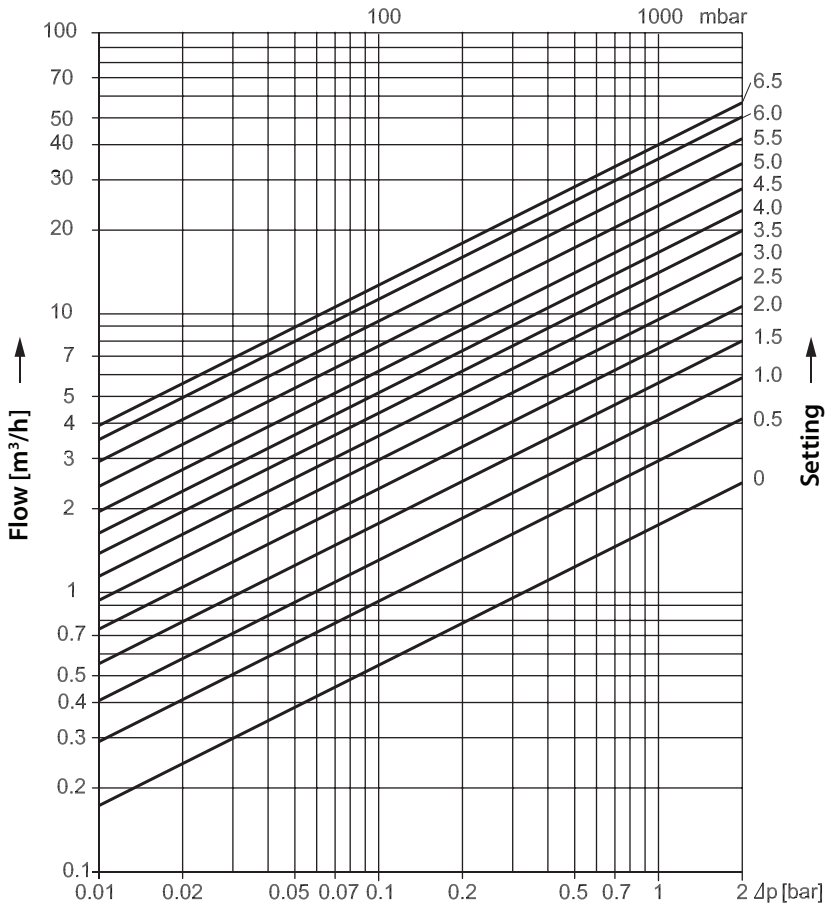
Flow characteristics



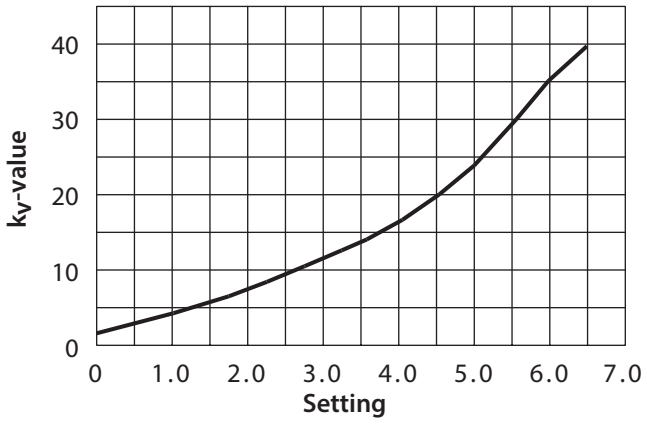
Setting	k_v-value
0.0	1.06
0.1	1.21
0.2	1.38
0.3	1.56
0.4	1.76
0.5	1.97
0.6	2.20
0.7	2.43
0.8	2.68
0.9	2.93
1.0	3.19
1.1	3.46
1.2	3.73
1.3	4.01
1.4	4.29
1.5	4.58
1.6	4.87
1.7	5.17
1.8	5.47
1.9	5.78
2.0	6.09
2.1	6.41
2.2	6.74
2.3	7.09
2.4	7.44
2.5	7.80
2.6	8.18
2.7	8.58
2.8	9.00
2.9	9.44
3.0	9.90
3.1	10.38
3.2	10.89
3.3	11.43
3.4	12.00
3.5	12.60
3.6	13.22
3.7	13.88
3.8	14.56
3.9	15.28
4.0	16.02
4.1	16.79
4.2	17.57
4.3	18.38
4.4	19.19
4.5	20.02
4.6	20.82
4.7	21.61
4.8	22.38
4.9	23.12
5.0	23.81
5.1	24.44
5.2	25.00
5.3	25.46
5.4	25.80
5.5	26.00

Flow diagrammes, DN 50

LENO™ MSV-BD DN 50

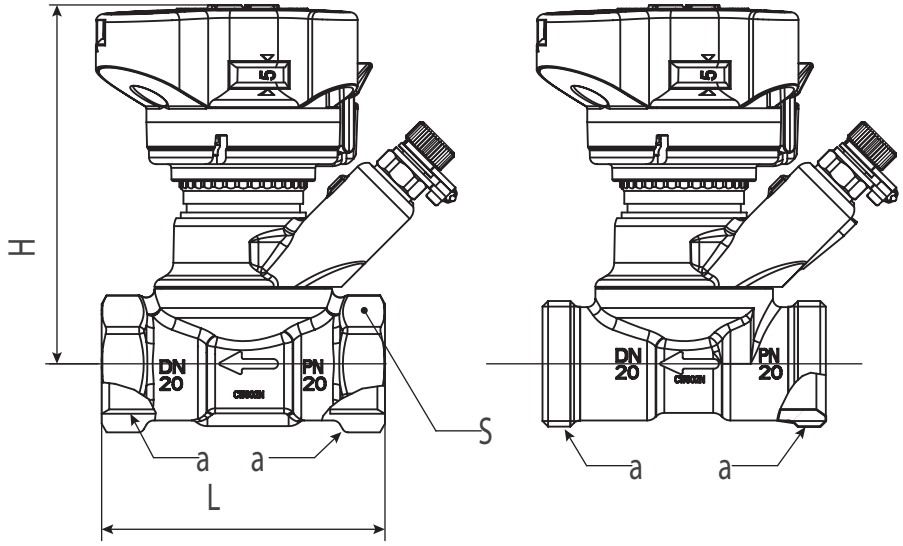


Flow characteristics



Setting	k_v-value
0.0	1.74
0.1	2.03
0.2	2.28
0.3	2.51
0.4	2.73
0.5	2.95
0.6	3.16
0.7	3.38
0.8	3.61
0.9	3.85
1.0	4.10
1.1	4.37
1.2	4.65
1.3	4.95
1.4	5.26
1.5	5.59
1.6	5.93
1.7	6.28
1.8	6.64
1.9	7.01
2.0	7.39
2.1	7.78
2.2	8.17
2.3	8.56
2.4	8.96
2.5	9.36
2.6	9.76
2.7	10.17
2.8	10.58
2.9	10.99
3.0	11.41
3.1	11.84
3.2	12.27
3.3	12.71
3.4	13.16
3.5	13.62
3.6	14.10
3.7	14.60
3.8	15.12
3.9	15.66
4.0	16.23
4.1	16.84
4.2	17.47
4.3	18.14
4.4	18.84
4.5	19.59
4.6	20.38
4.7	21.21
4.8	22.08
4.9	23.00
5.0	23.96
5.1	24.96
5.2	26.00
5.3	27.07
5.4	28.17
5.5	29.30
5.6	30.44
5.7	31.64
5.8	32.83
5.9	34.01
6.0	35.14
6.1	36.23
6.2	37.24
6.3	38.14
6.4	38.93
6.5	39.56
6.6	40.00

Dimensions



MSV-BD	Size	a Thread ISO 228-1	L (mm)	H (mm)	S (mm)
003Z4000	DN 15 LF	G ½	65	92	27
003Z4001	DN 15	G ½	65	92	27
003Z4002	DN 20	G ¾	75	95	32
003Z4003	DN 25	G 1	85	98	41
003Z4004	DN 32	G 1¼	98	121	50
003Z4005	DN 40	G 1½	100	125	55
003Z4006	DN 50	G 2	130	129	67
003Z4100	DN 15 LF	G ¾ A	70	92	-
003Z4101	DN 15	G ¾	70	92	-
003Z4102	DN 20	G 1 A	75	95	-

Tender specifications

LENO™ MSV –BD can be used in heating, cooling and domestic hot water systems.

Features	*LENO™ MSV-BD*
Balancing / Commissioning	•
Presetting	•
Fixed orifice	
Self sealing test plugs	•
Digital visible scale from more sides	•
Shut-off function (ball valve)	•
Draining / filling	•
Draining / filling on both sides of the valve	•
Removable handle	•
Closing indicator	•
Allen key for ball valve	•
Parallel test plugs	•
360° rotating measuring station (drain tap and test plugs)	•

Presetting values are visible on top of the valve and from all sides.
Presetting is locked by pressing down the handle. When locked, the shut-off function can be used without changing the presetting.
The handle is released with the green key or with a 3 mm Allen key.
To prevent unintended changes of the presetting, the handle can be sealed by using a strip.

The system can be drained and filled on both sides of the ball valve.

External thread versions comes in sizes DN 15 and DN 20 and are prepared for Danfoss standard fittings. DN 15 is designed with Euro cone, according to DIN V 3838.

LENO™ MSV-BD has a leakage rate A according to ISO 5208, the ball valve is 100% tight.

The LENO™ MSV-BD measuring accuracy is 8% at 25% of max. setting.
Accuracy is according to BS 7350 : 1990.

Measuring instruments must be equipped with Ø3 mm measuring needles. Danfoss measuring instruments PFM 5001 contain all relevant valve data.

Valve sizes ..... DN 15 (LF) – DN 50
Pressure class PN20
Static test pressure ..... 30 bar
Working temperature ..... -20°C to 120°C
Working area ..... 10-100% of the k_{VS}-value

The valve body is made of DZR brass.
The ball is made of chromium plated brass.
O-rings are made from EPDM rubber.

Data sheet

Manual presetting valve
MSV-F2, PN 16/25, DN 15 - 400

Description

MSV-F2 DN 15-150

MSV-F2 DN 200-400

MSV-F2 valves are manual presetting valves. They are used for balancing the flow in heating and cooling installations.

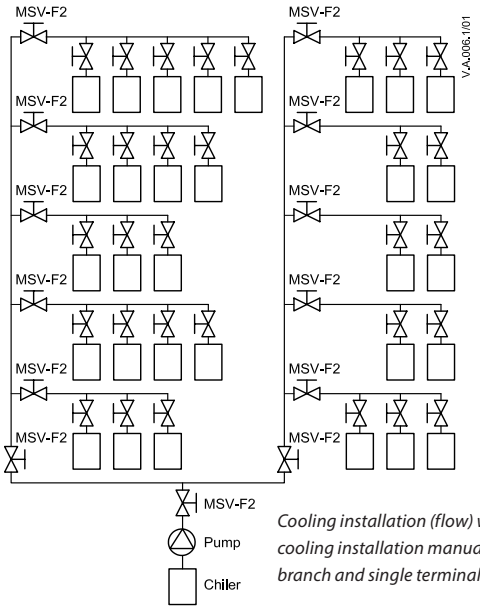
The valves have position indicator and stroke limiter as standard. Hood of spindle is integrated with stroke limiter.

Setting can be locked. Valve characteristics are set up in measuring device PFM 5001/PFM 100. Valves are free of asbestos.

Shut-off function.

Main data:
- DN 15-400
- PN 16:
  - Flow temperature: –10 °C … 130 °C
- PN 25:
  - Flow temperature: –10 °C … 150 °C
- Valves are mounted on flow or return pipe.

Application

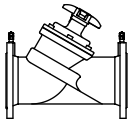
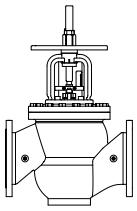


Cooling installation (flow) with manual presetting valves. In order to balance the cooling installation manual presetting valves should be mounted under each riser, branch and single terminal unit (LENO™ MSV-BD).

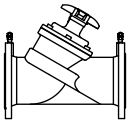
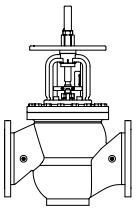
In constant flow installations MSV valves keeps constant pressure drop. Its value may be set on several levels depending on presetting.

Ordering

MSV-F2 valves - PN 16

Picture	DN [1] (mm)	k_{VS} (m^3/h)	$T_{max.}$ (°C)	PN (bar)	Code No. (with needle test plugs)
	15	3,1	130	16	**003Z1085**
	20	6,3			**003Z1086**
	25	9,0			**003Z1087**
	32	15,5			**003Z1088**
	40	32,3			**003Z1089**
	50	53,8			**003Z1061**
	65	93,4			**003Z1062**
	80	122,3			**003Z1063**
	100	200,0			**003Z1064**
	125	304,4			**003Z1065**
	150	400,8			**003Z1066**
	200	685,6			**003Z1067**
	250	952,3			**003Z1068**
	300	1.380,2			**003Z1069**
	350	2.046,1			**003Z1090**
	400	2.584,6			**003Z1091**

MSV-F2 valves - PN 25

Picture	DN [1] (mm)	k_{VS} (m^3/h)	$T_{max.}$ (°C)	PN (bar)	Code No. (with needle test plugs)
	15	3,1	150	25	**003Z1092**
	20	6,3			**003Z1093**
	25	9,0			**003Z1094**
	32	15,5			**003Z1095**
	40	32,3			**003Z1096**
	50	53,8			**003Z1070**
	65	93,4			**003Z1071**
	80	122,3			**003Z1072**
	100	200,0			**003Z1073**
	125	304,4			**003Z1074**
	150	400,8			**003Z1075**
	200	685,6			**003Z1076**
	250	952,3			**003Z1077**
	300	1.380,2			**003Z1078**
	350	2.046,1			**003Z1097**
	400	2.584,6			**003Z1098**

[1] *Flange valves dimension DN 15-40, 350 and 400 available on request.*

Accessories

Type	Code No.
Rectus test plugs, 2 pcs.	**003Z0108**
Standard test plugs with O-ring, 2 pcs.	**003Z0104**
Extension piece for test plugs 45 mm, 2 pcs.	**003Z0103**
Extended test plugs mounted under pressure, 2 pcs.	**003Z3946**
Flow measuring instrument PFM5001 (10 bar)	**003L8343**
Flow measuring instrument PFM5001 (20 bar)	**003L8344**
Flow measuring instrument PFM100 (10 bar)	**003L8260**

Type		Code No.
Hand-wheel	DN 15-50	**003Z0179**
	DN 65-150	**003Z0180**
	DN 200	**003Z0181**
	DN 250-300	**003Z0182**
	DN 350-400	**003Z0183**

Technical data

MSV-F2 valves - PN 16

Nominal diameter	DN	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400
k_{VS}	m^3/h	3,1	6,3	9,0	15,5	32,3	53,8	93,4	122,3	200,0	304,4	400,8	685,6	952,3	1380,2	2046,1	2584,6
Nominal pressure	bar	16															
Max. pressure drop		1,5															
Leakage rate		Grade A; According to ISO5208, Table 5 (No visible leakage)															
Flow medium		Water and water mixtures with secondary coolants (like glycols [1]) for closed heating and cooling systems															
Max. flow temperature	°C	130															
Connections		Flanges according to EN 1092-2															
Weight	kg	2,3	2,9	3,8	5,6	7,2	9,4	17	21	32	44	56,5	231	354	497	747	890
Material																	
Body		Cast iron EN-GJL 250 (GG 25)															
Seat sealing		EPDM															
Cone		CW602N											Casted stainless steel				

[1] Please verefy compability between materials and secondary coolants with supplier.

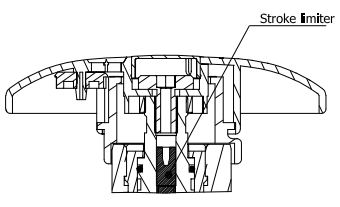
MSV-F2 valves - PN 25

Nominal diameter	DN	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400
k_{VS}	m^3/h	3,1	6,3	9,0	15,5	32,3	53,8	93,4	122,3	200,0	304,4	400,8	685,6	952,3	1380,2	2046,1	2584,6
Nominal pressure	bar	25															
Max. pressure drop		2,0															
Leakage rate		Grade A; According to ISO5208, Table 5 (No visible leakage)															
Flow medium		Water and water mixtures with secondary coolants (like glycols [1]) for closed heating and cooling systems															
Max. flow temperature	°C	150															
Connections		Flanges according to EN 1092-2															
Weight	kg	2,3	3,0	3,8	5,8	7,2	9,4	17	21	33	44	56,5	228	345	488	748	900
Material3, we ha																	
Body		Ductile iron EN-GJS 400-15 (GGG-40)															
Seat sealing		EPDM															
Cone		CW602N											Casted stainless steel				

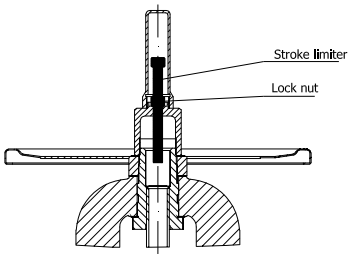
[1] Please verefy compability between materials and secondary coolants with supplier.

Pressure-temperature classification (flanges according to EN 1092-2)

Material	PN		Temperature			
			–10 °C	120 °C	130 °C	150 °C
EN-GJL 250 (MSV-F2 DN 15-150)	16	bar	16	16	15,5	-
EN-GJL 250 (MSV-F2 DN 200-400)	16		16	16	15,5	-
EN-GJS 400-15 (MSV-F2 DN 15-150)	25		25	25	-	24,3
EN-GJS 400-15 (MSV-F2 DN 200-400)	25		25	25	-	24,3

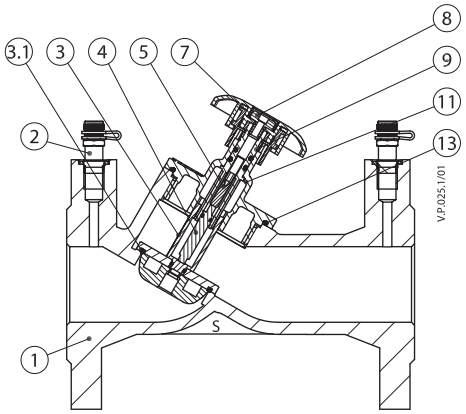


Valves have built in flow limitation

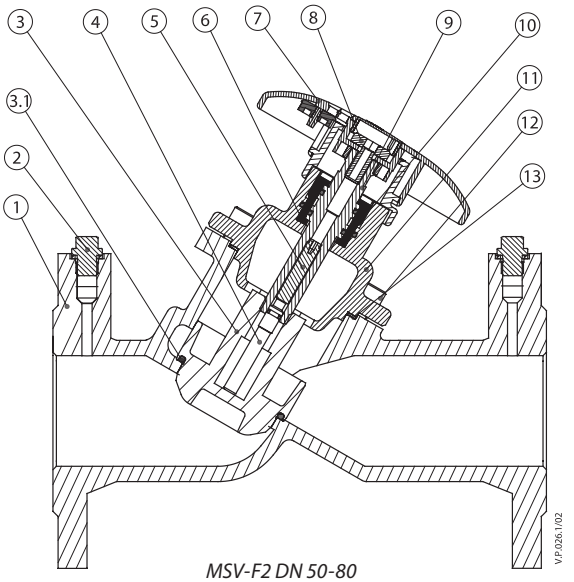


Valves have stroke limiter locked by lock-nut

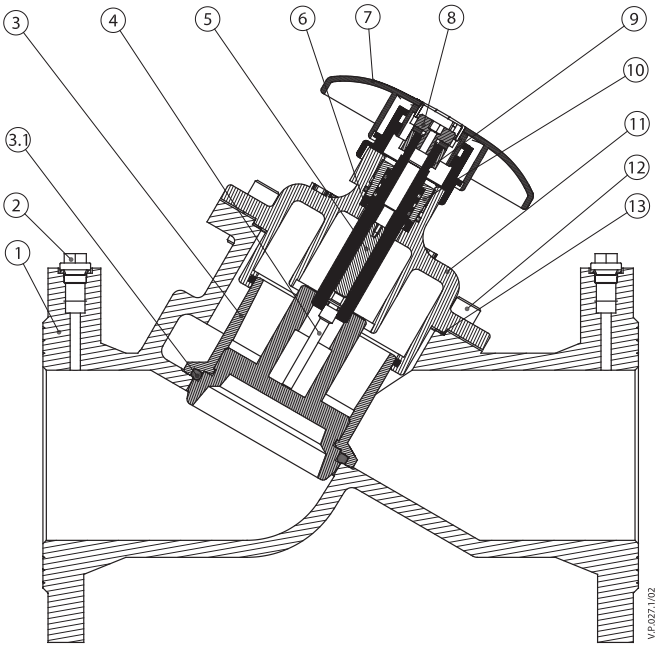
Design



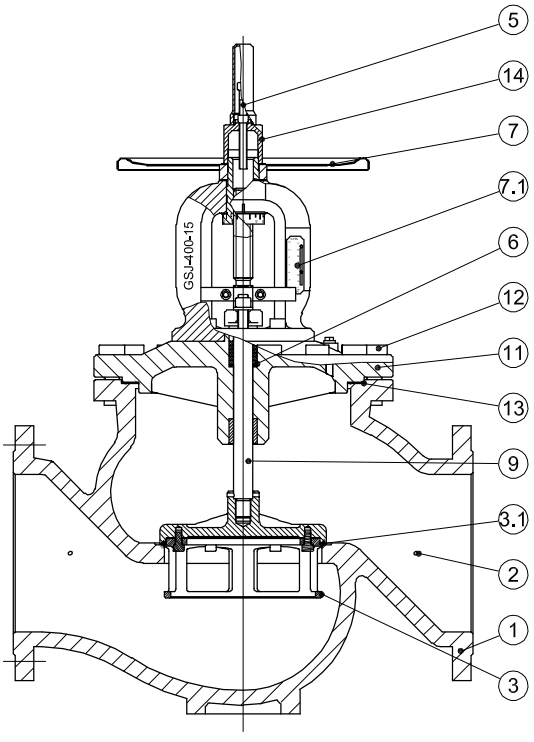
MSV-F2 DN 15-40



MSV-F2 DN 50-80



MSV-F2 DN 100-150



MSV-F2 DN 200-400

1 Body EN-GJL250
2 Plug
3 Valve cone
3,1 Seat soft sealing
4 Rod
5 Stroke limiter/Allen screw
6 Gasket
7 Handwheel with digital display
- DN 15-150 plastic
- DN 200-400 metal

7,1 Display
8 Fixed screw
9 Spindle
10 Stuffing box
11 Bonnet
12 Allen screw /Hexagon screw
13 Flat gasket
14 Hood with stroke

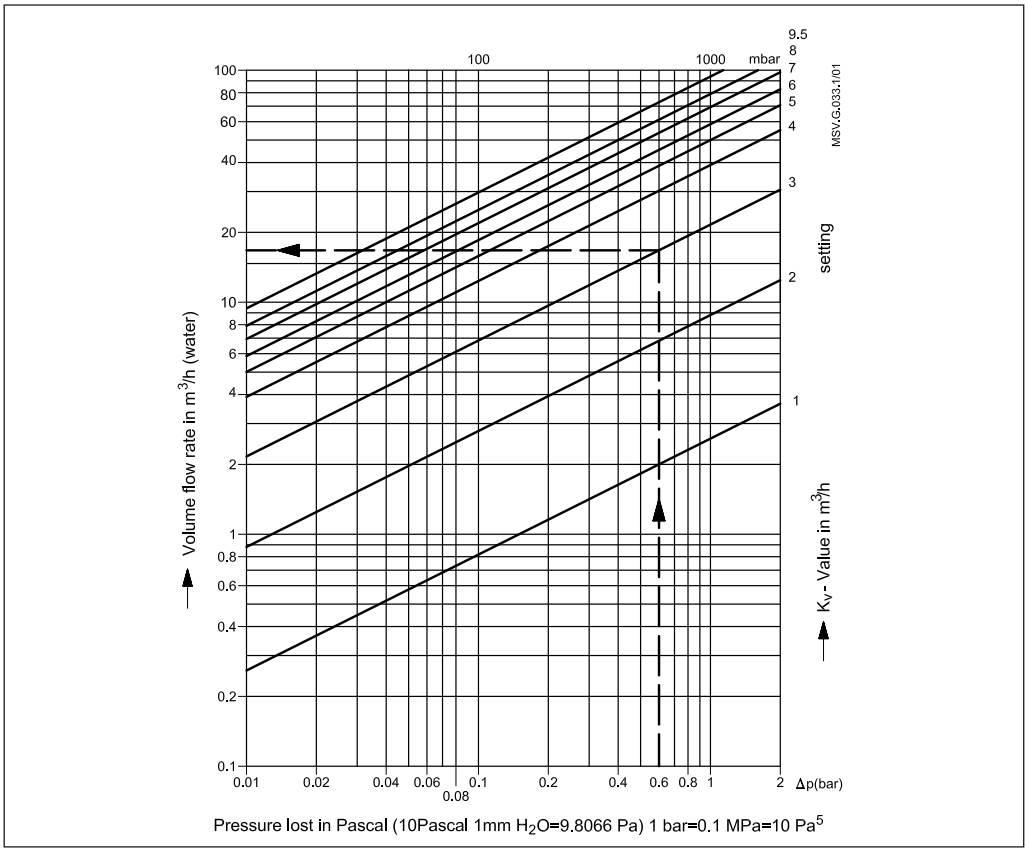
Setting

Ethylenglycol correction factor

Formula: $C_2H_6O_2$
Density at 20 °C: $\rho_{water} = 1\ kg/dm^3$
$\rho_{glycol} = 1{,}338\ kg/dm^3$

$$Q_{corr.} = \frac{Q_{water}}{\sqrt{\text{Share of water} \times \rho_{water} + \text{Share of glycol} \times \rho_{glycol}}}$$

Ethylenglycol part xg (%)	0	10	20	30	40	50	60	70	80	90	100
Correction factor	1,0	0,983	0,968	0,953	0,939	0,925	0,912	0,899	0,887	0,876	0,864

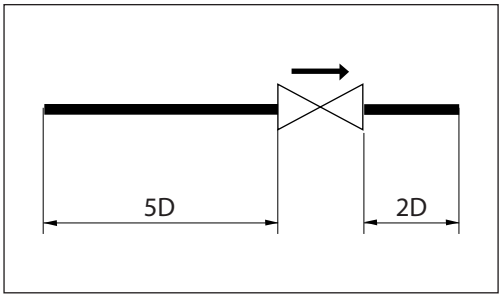


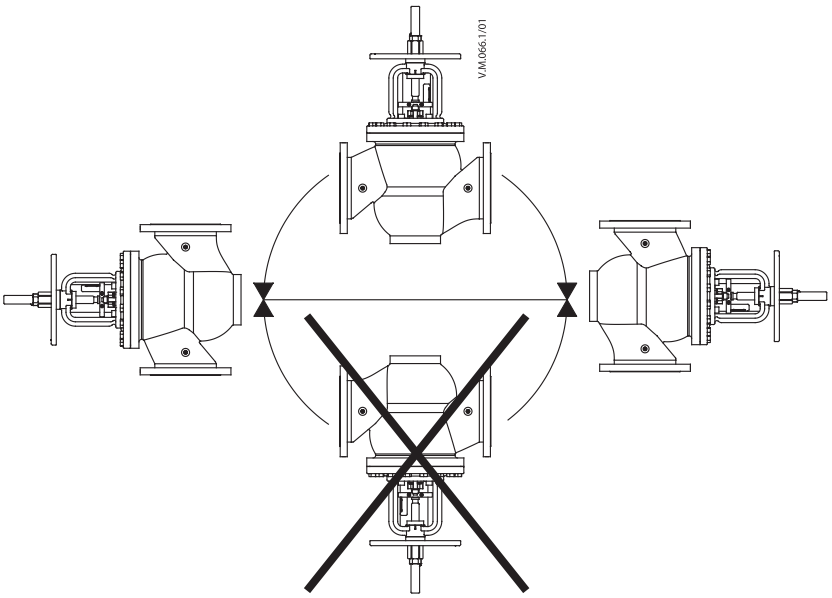
MSV-F2 DN 65
Δp = 0,6 bar
Hand wheel setting: 3,0
Flow: 16,8 m³/h
30 % glycol
$Q_{corr.}$ = 16,8 m³/h × 0,953 = 16,0 m³/h
It refers to all types of valves.

Installation

Always install the valve with the arrow on the body in the same direction as the flow. In order to avoid turbulence, which will affect the measuring accuracy, it is recommended to have a straight length of pipe up and down stream from the valve as shown (D - diameter of pipe).

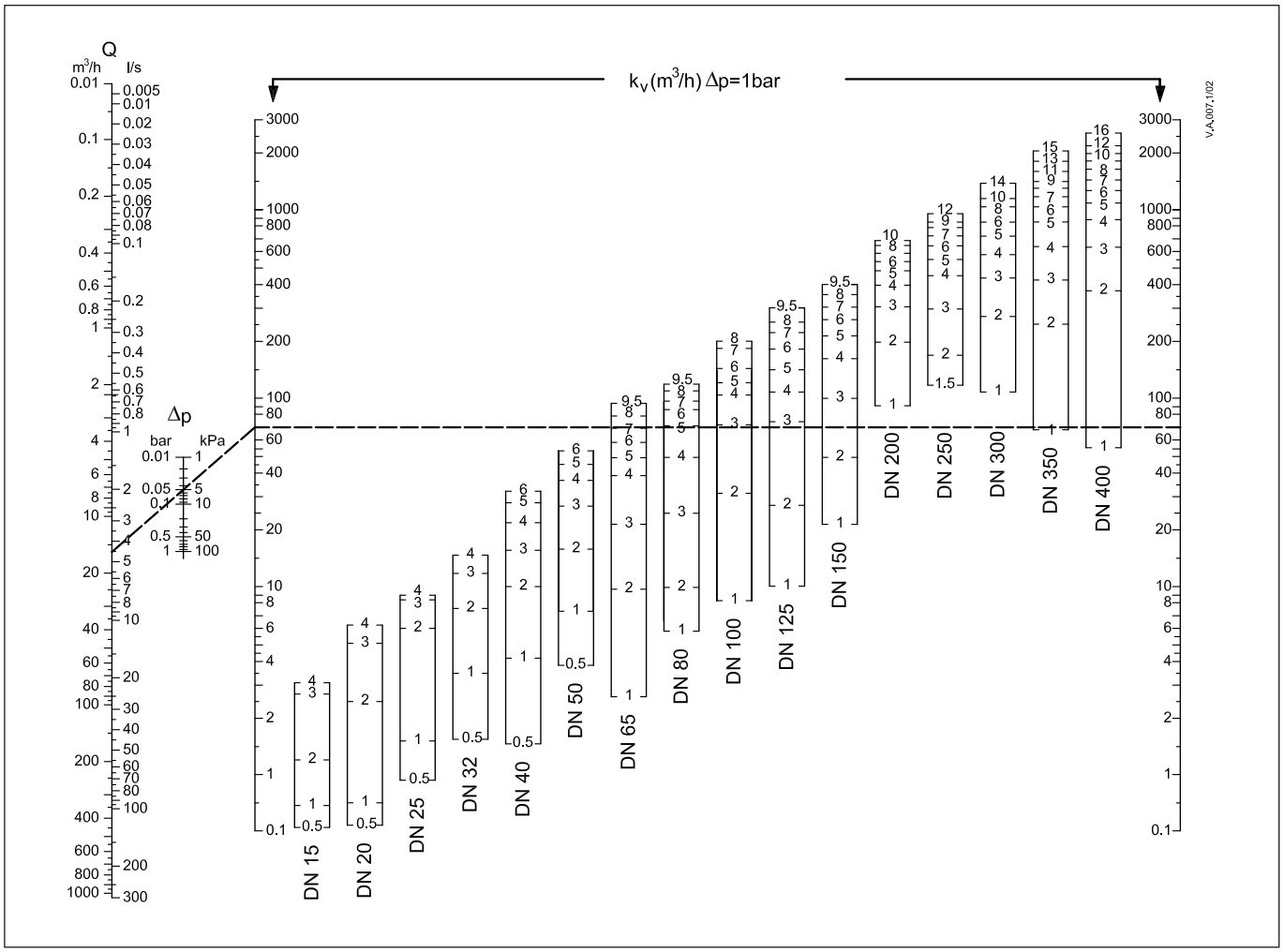
The influence of turbulence, if our recommendations are not adhered to, can influence the flow up to 20 %.





MSV F2 DN 200-400 may not be mounted with handle pointing down.

Sizing



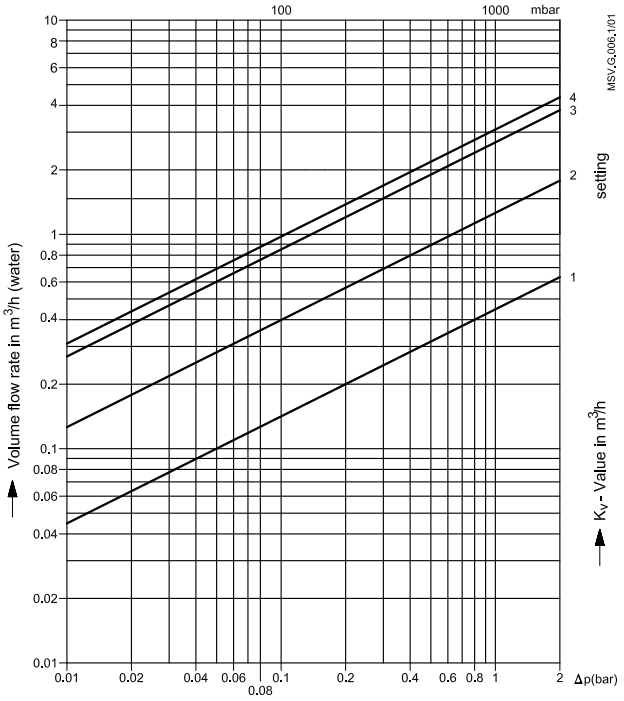
Example:
MSV-F2 DN 65
Q = 16 m³/h
Δp = 5 kPa

Calculation of setting for valve:
In the diagram a straight line connecting the bars for flow 16 m³/h, differential pressure 5 kPa and k_v value shows the relationship between these three variables.

A horizontal line from intersection with the k_v bar shows the presetting value for each valve size.

Result:
presetting 7,0

Flow diagrams



Pressure lost in Pascal (10Pascal 1mm H_2O=9.8066 Pa) 1 bar=0.1 MPa=10 Pa^5

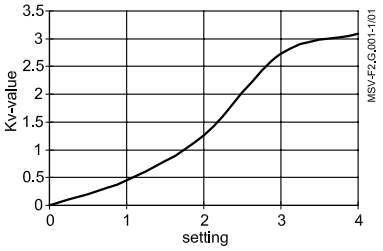
DN 15 / PN 16 / PN 25

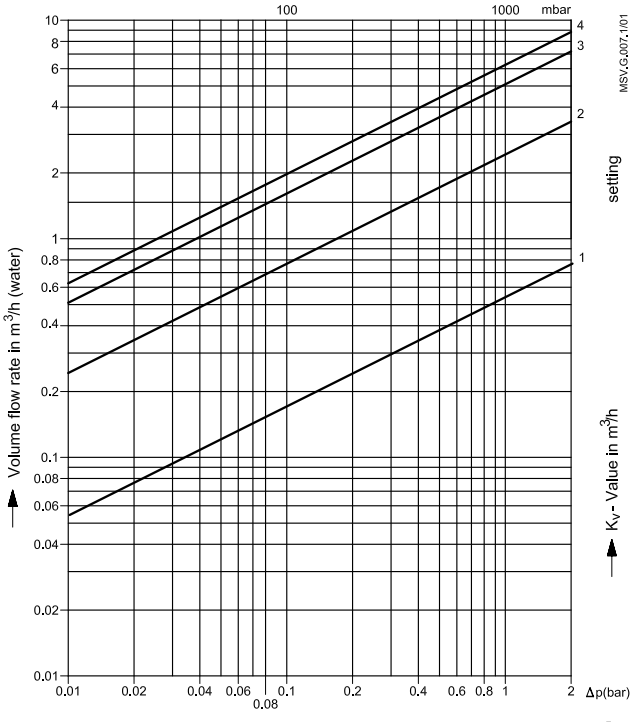
Setting	k_v-value
1	0,45
2	1,26
3	2,73
4	3,09

Max. permissible differential pressure in throttling function 1,5/2,0 bar.
Max. permissible flow speed: ≤ 4 m/s
Condition:

- The flow must be free of cavitation.

Flow characteristic





Pressure lost in Pascal (10Pascal 1mm H_2O=9.8066 Pa) 1 bar=0.1 MPa=10 Pa^5

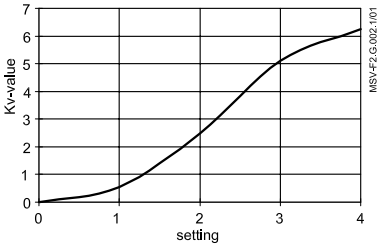
DN 20 / PN 16 / PN 25

Setting	k_v-value
1	0,54
2	2,48
3	5,11
4	6,26

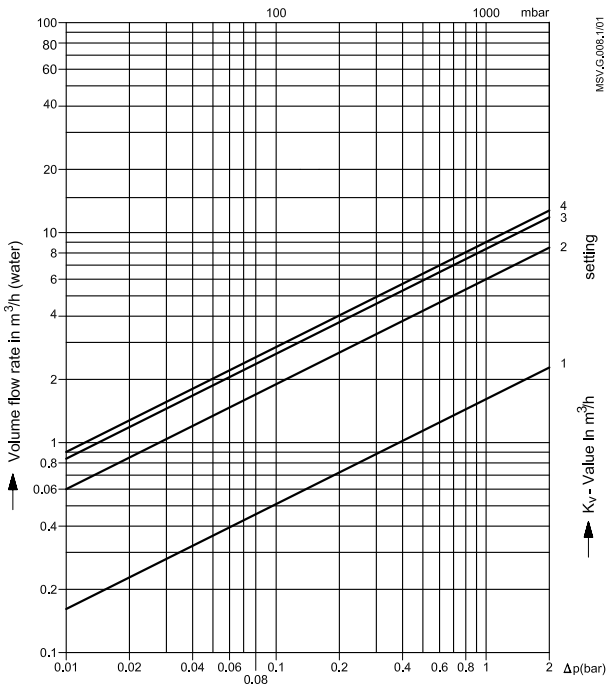
Max. permissible differential pressure in throttling function 1,5/2,0 bar.
Max. permissible flow speed: ≤ 4 m/s
Condition:

- The flow must be free of cavitation.

Flow characteristic



Flow diagrams *(continued)*



Pressure lost in Pascal (10Pascal 1mm H_2O=9.8066 Pa) 1 bar=0.1 MPa=10 Pa^5

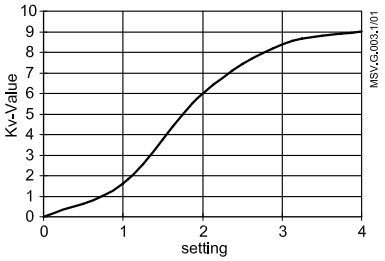
DN 25 / PN 16 / PN 25

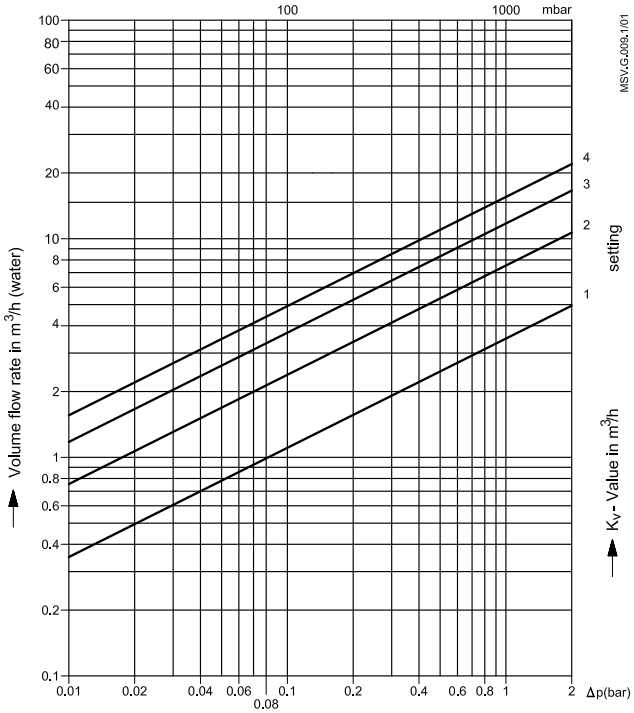
Setting	k_v-value
1	1,61
2	6,0
3	8,38
4	9,01

Max. permissible differential pressure in throttling function 1,5/2,0 bar.
Max. permissible flow speed: ≤ 4 m/s
Condition:

- The flow must be free of cavitation.

Flow characteristic





Pressure lost in Pascal (10Pascal 1mm H_2O=9.8066 Pa) 1 bar=0.1 MPa=10 Pa^5

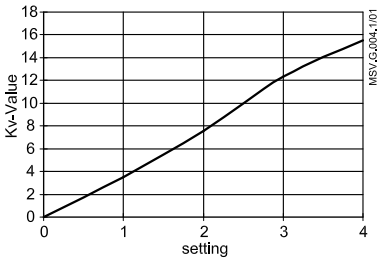
DN 32 / PN 16 / PN 25

Setting	k_v-value
1	3,53
2	7,56
3	12,32
4	15,54

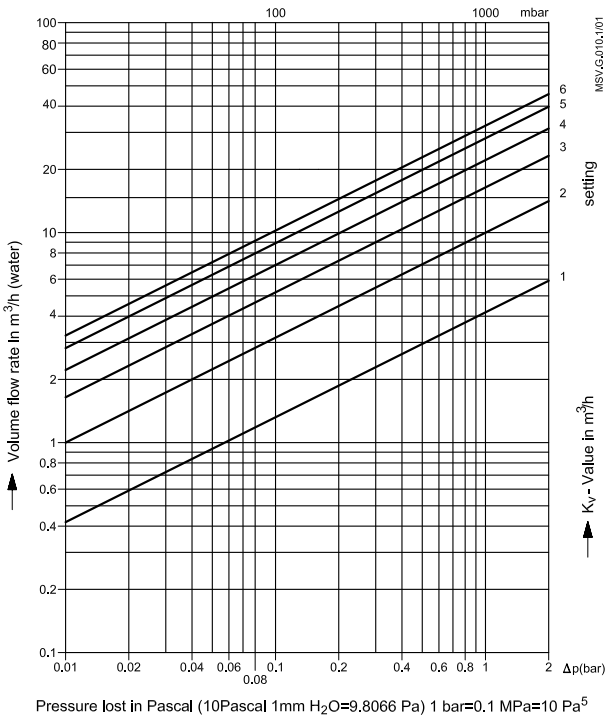
Max. permissible differential pressure in throttling function 1,5/2,0 bar.
Max. permissible flow speed: ≤ 4 m/s
Condition:

- The flow must be free of cavitation.

Flow characteristic



Flow diagrams *(continued)*



Pressure lost in Pascal (10Pascal 1mm H_2O=9.8066 Pa) 1 bar=0.1 MPa=10 Pa^5

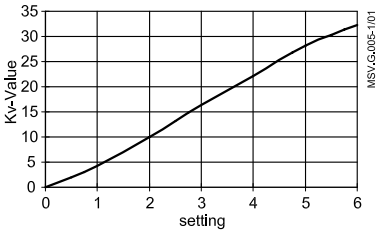
DN 40 / PN 16 / PN 25

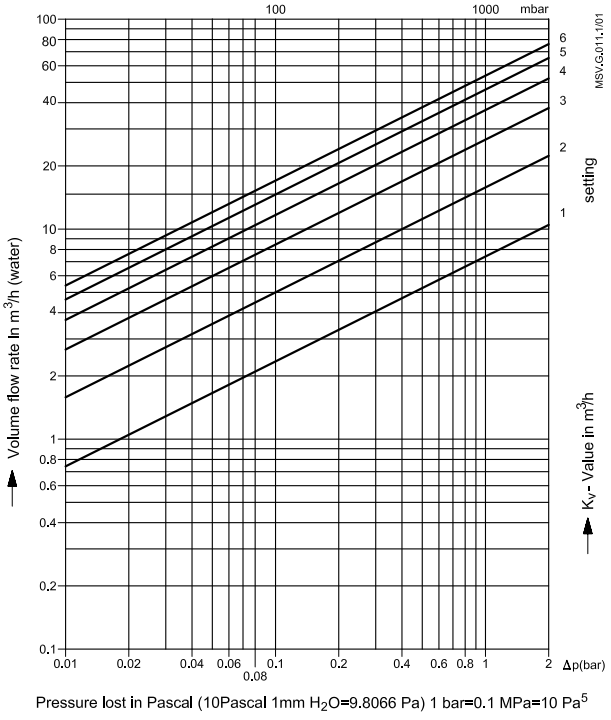
Setting	k_v-value
1	4,19
2	9,98
3	16,42
4	22,13
5	28,14
6	32,31

Max. permissible differential pressure in throttling function 1,5/2,0 bar.
Max. permissible flow speed: ≤ 4 m/s
Condition:

- The flow must be free of cavitation.

Flow characteristic





Pressure lost in Pascal (10Pascal 1mm H_2O=9.8066 Pa) 1 bar=0.1 MPa=10 Pa^5

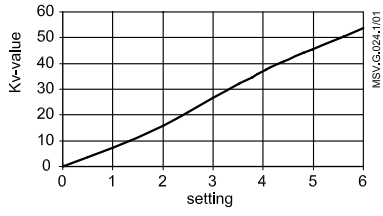
DN 50 / PN 16 / PN 25

Setting	k_v-value
1	7,4
2	15,8
3	26,7
4	36,9
5	46,2
6	53,8

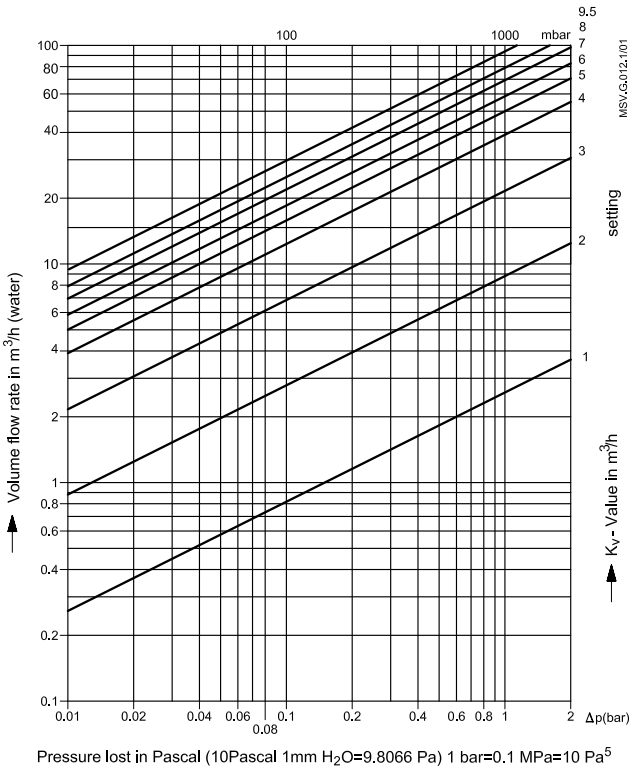
Max. permissible differential pressure in throttling function 1,5/2,0 bar.
Max. permissible flow speed: ≤ 4 m/s
Condition:

- The flow must be free of cavitation.

Flow characteristic



Flow diagrams *(continued)*



Pressure lost in Pascal (10Pascal 1mm H_2O=9.8066 Pa) 1 bar=0.1 MPa=10 Pa[5]

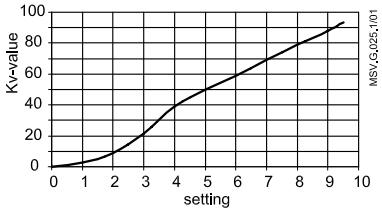
DN 65 / PN 16 / PN 25

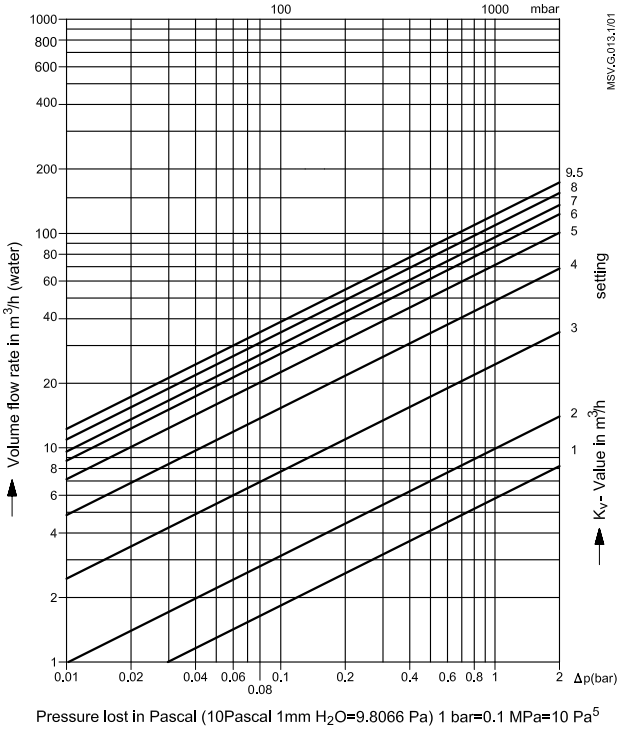
Setting	k_v-value
1	2,6
2	8,8
3	21,6
4	39,0
5	49,8
6	58,5
7	69,3
8	79,0
9	87,8
9,5	93,4

Max. permissible differential pressure in throttling function 1,5/2,0 bar.
Max. permissible flow speed: ≤ 4 m/s
Condition:

- The flow must be free of cavitation.

Flow characteristic





Pressure lost in Pascal (10Pascal 1mm H_2O=9.8066 Pa) 1 bar=0.1 MPa=10 Pa[5]

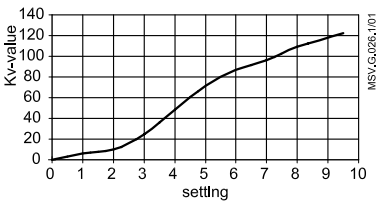
DN 80 / PN 16 / PN 25

Setting	k_v-value
1	5,8
2	9,9
3	24,5
4	48,5
5	71,3
6	87,0
7	96,4
8	109,3
9,5	122,3

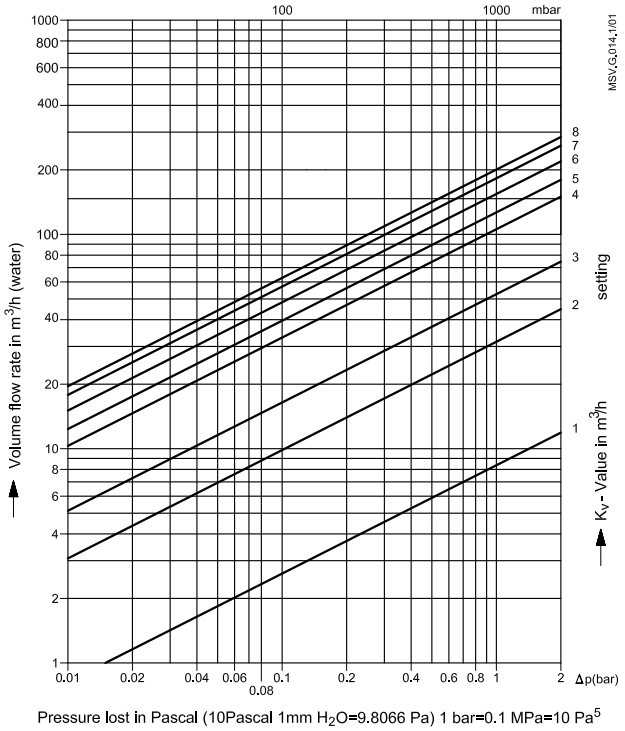
Max. permissible differential pressure in throttling function 1,5/2,0 bar.
Max. permissible flow speed: ≤ 4 m/s
Condition:

- The flow must be free of cavitation.

Flow characteristic



Flow diagrams *(continued)*



Pressure lost in Pascal (10Pascal 1mm H_2O=9.8066 Pa) 1 bar=0.1 MPa=10 Pa^5

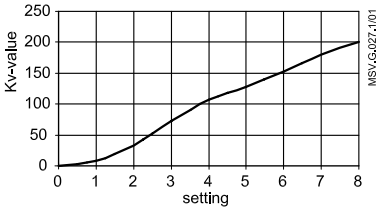
DN 100 / PN 16 / PN 25

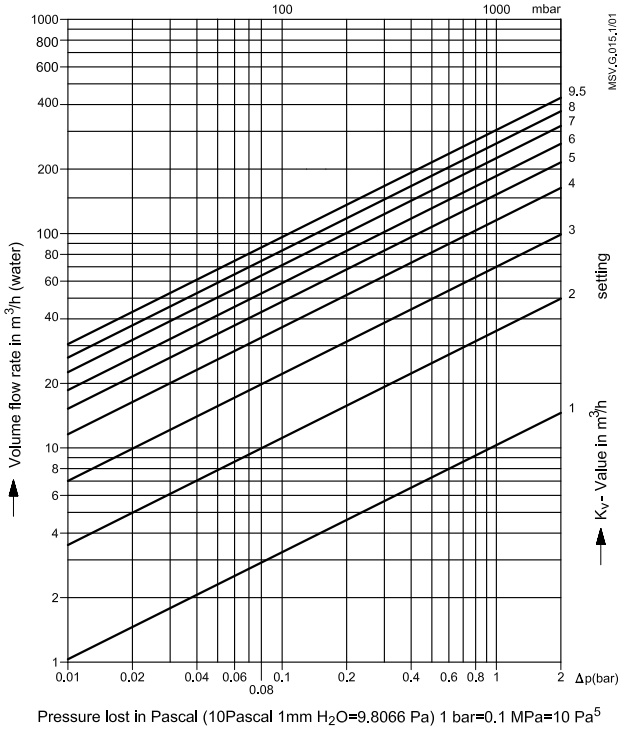
Setting	k_v-value
1	8,3
2	32,4
3	72,9
4	107,2
5	128,2
6	152,8
7	180,0
8	200,0

Max. permissible differential pressure in throttling function 1,5/2,0 bar.
Max. permissible flow speed: ≤ 4 m/s
Condition:

- The flow must be free of cavitation.

Flow characteristic





Pressure lost in Pascal (10Pascal 1mm H_2O=9.8066 Pa) 1 bar=0.1 MPa=10 Pa^5

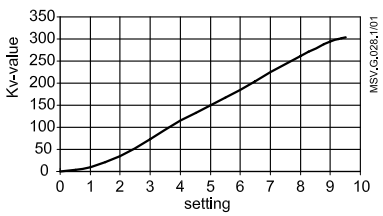
DN 125 / PN 16 / PN 25

Setting	k_v-value
1	10,3
2	35,4
3	73,0
4	114,9
5	150,5
6	185,2
7	225,1
8	261,1
9	294,2
9,5	304,4

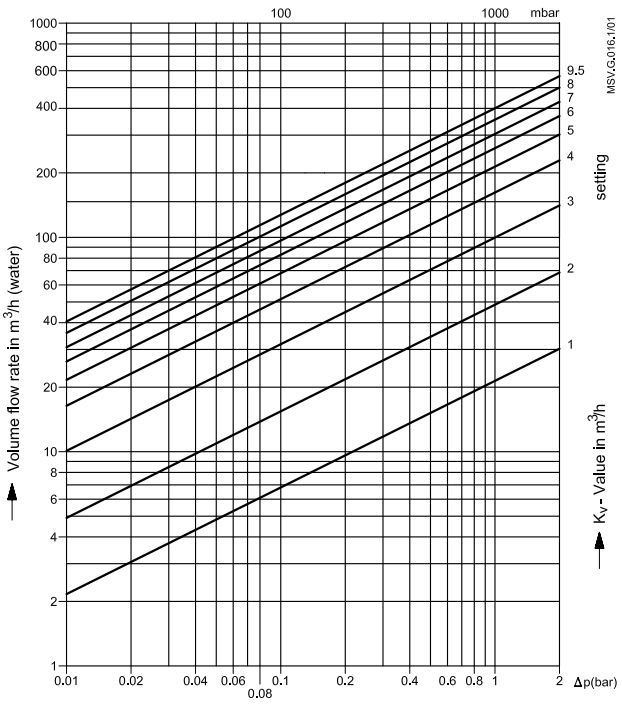
Max. permissible differential pressure in throttling function 1,5/2,0 bar.
Max. permissible flow speed: ≤ 4 m/s
Condition:

- The flow must be free of cavitation.

Flow characteristic



Flow diagrams *(continued)*



Pressure lost in Pascal (10Pascal 1mm H_2O=9.8066 Pa) 1 bar=0.1 MPa=10 Pa^5

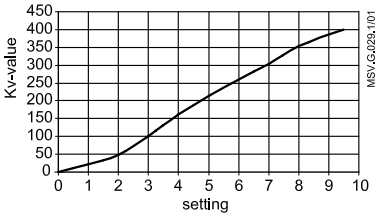
DN 150 / PN 16 / PN 25

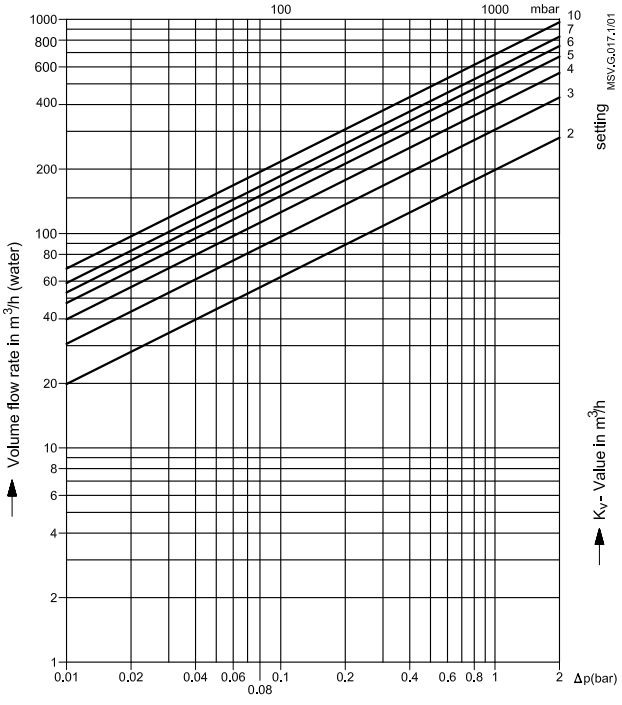
Setting	k_v-value
1	21,4
2	48,5
3	99,8
4	162,0
5	214,0
6	260,9
7	304,1
8	354,6
9,5	400,8

Max. permissible differential pressure in throttling function 1,5/2,0 bar.
Max. permissible flow speed: ≤ 4 m/s
Condition:

- The flow must be free of cavitation.

Flow characteristic





Pressure lost in Pascal (10Pascal 1mm H_2O=9.8066 Pa) 1 bar=0.1 MPa=10 Pa^5

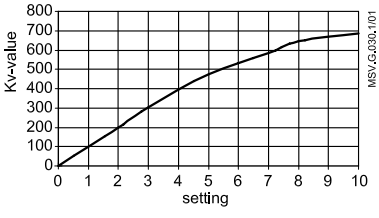
DN 200 / PN 16 / PN 25

Setting	k_v-value
2	198,2
3	305,3
4	397,5
5	474,0
6	530,4
7	586,8
8	645,9
10	685,6

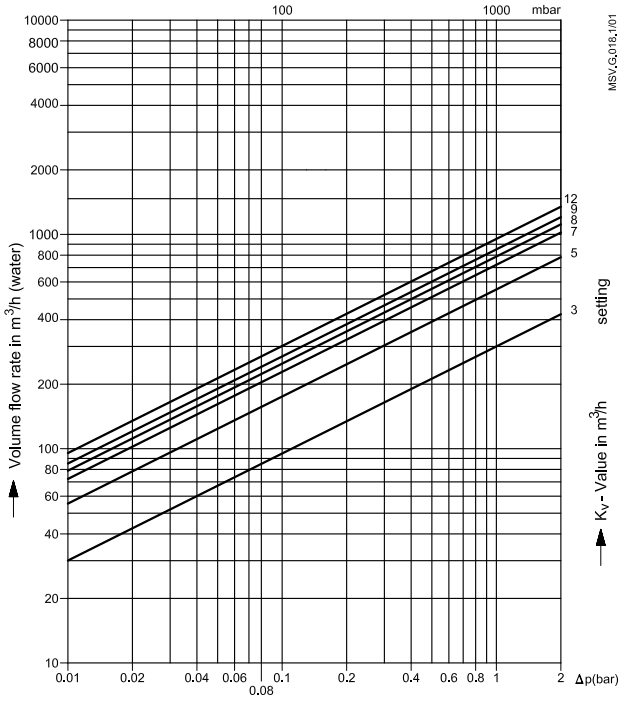
Max. permissible differential pressure in throttling function 1,5/2,0 bar.
Max. permissible flow speed: ≤ 4 m/s
Condition:

- The flow must be free of cavitation.

Flow characteristic



Flow diagrams *(continued)*



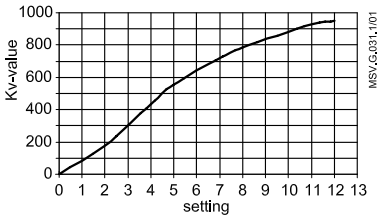
DN 250 / PN 16 / PN 25

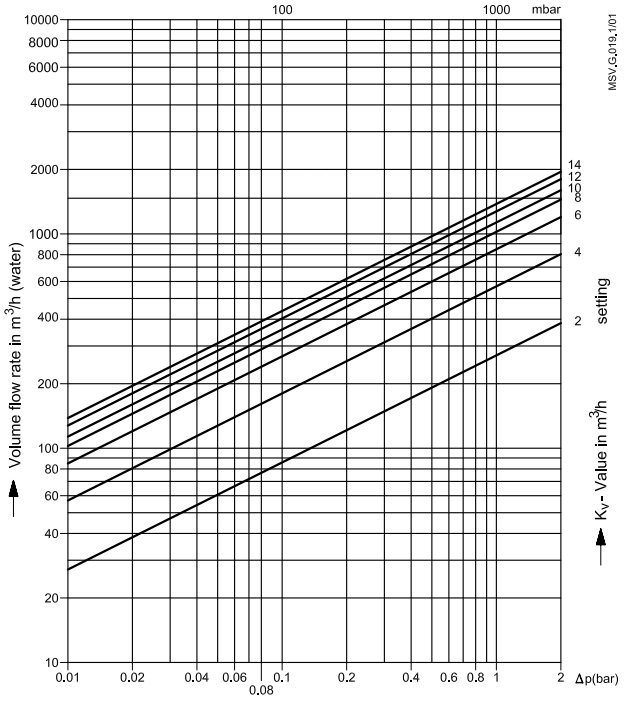
Setting	k_v-value
3	299,4
5	553,1
7	721,2
8	788,1
9	851,1
10	926,1
12	952,3

Max. permissible differential pressure in throttling function 1,5/2,0 bar.
Max. permissible flow speed: ≤ 4 m/s
Condition:

- The flow must be free of cavitation.

Flow characteristic





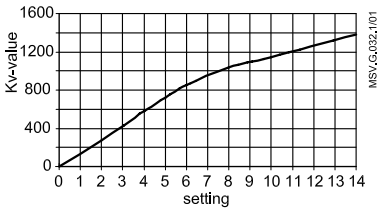
DN 300 / PN 16 / PN 25

Setting	k_v-value
2	270,9
4	575,8
6	856,0
8	1035,9
10	1142,8
12	1273,7
14	1380,2

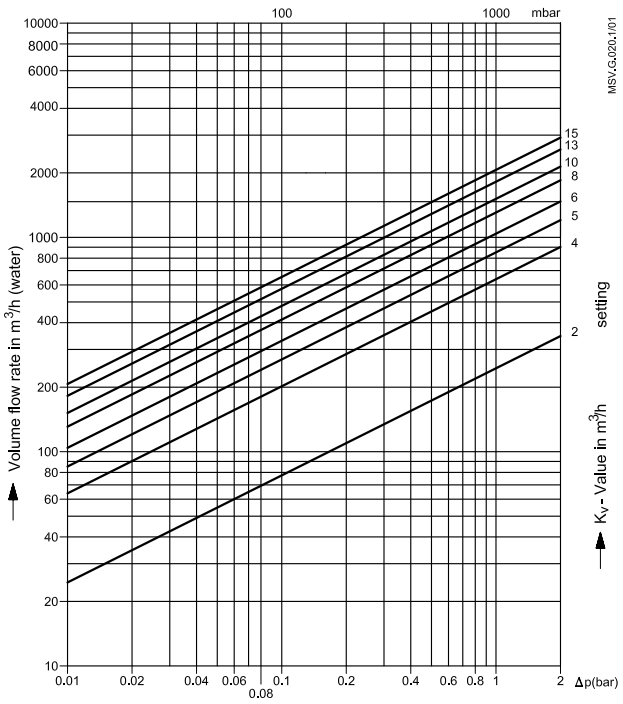
Max. permissible differential pressure in throttling function 1,5/2,0 bar.
Max. permissible flow speed: ≤ 4 m/s
Condition:

- The flow must be free of cavitation.

Flow characteristic



Flow diagrams *(continued)*



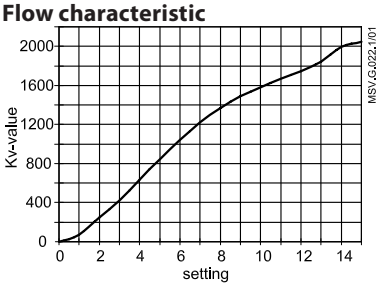
DN 350 / PN 16 / PN 25

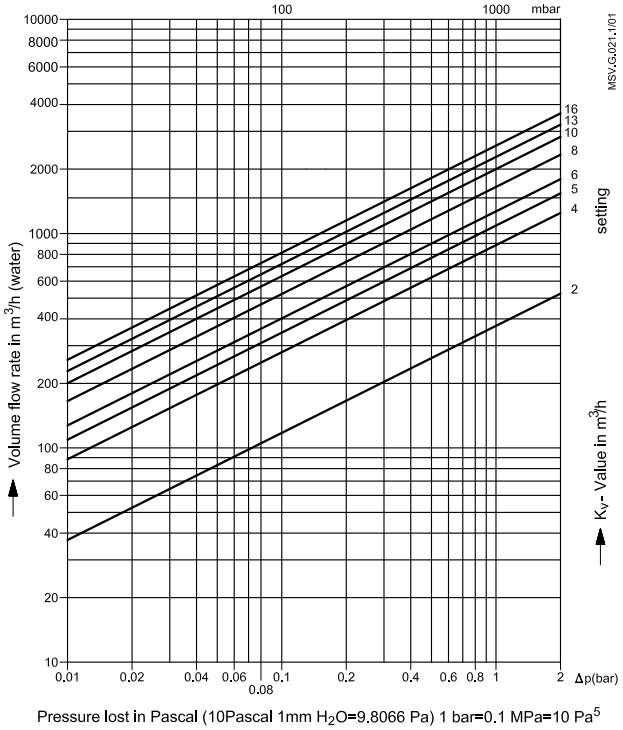
Setting	k_v-value
2	249,06
4	634,4
5	844,72
6	1041,93
8	1369,45
10	1580,67
13	1844,74
15	2046,14

Max. permissible differential pressure in throttling function 1,5/2,0 bar.
Max. permissible flow speed: ≤ 4 m/s
Condition:

- The flow must be free of cavitation.

Flow characteristic





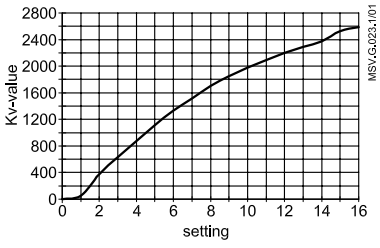
DN 400 / PN 16 / PN 25

Setting	k_v-value
2	371,75
4	875,26
5	1109,31
6	1328,86
8	1705,24
10	1980,56
13	2287,81
16	2584,95

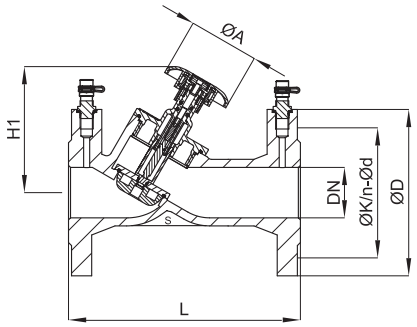
Max. permissible differential pressure in throttling function 1,5/2,0 bar.
Max. permissible flow speed: ≤ 4 m/s
Condition:

- The flow must be free of cavitation.

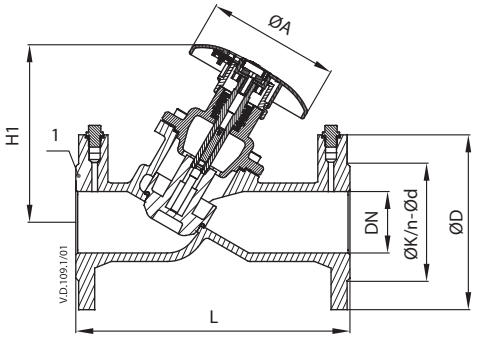
Flow characteristic



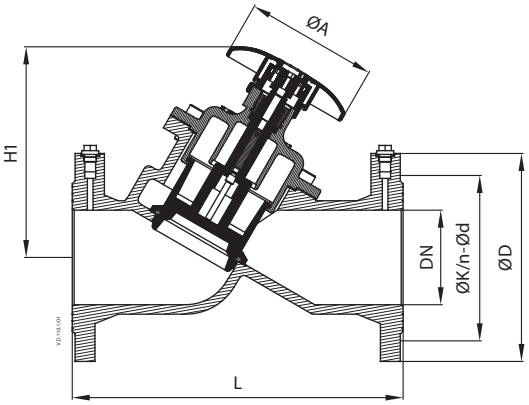
Dimensions



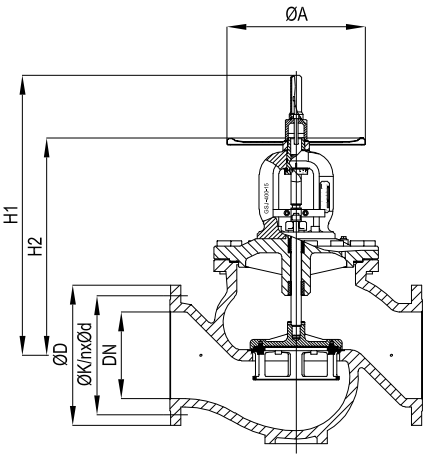
MSV-F2 DN 15-50



MSV-F2 DN 50-80



MSV-F2 DN 100-150



MSV-F2 DN 200-400

DN	L	H1	H2	ØA	PN 16			PN 25		
					ØD	ØK	n × Ød	ØD	ØK	n × Ød
	mm									
15	130	80	-	78	95	65	4 × 14	95	65	4 × 14
20	150	90	-	78	105	75	4 × 14	105	75	4 × 14
25	160	105	-	78	115	85	4 × 14	115	85	4 × 14
32	180	110	-	78	140	100	4 × 19	140	100	4 × 19
40	200	125	-	78	150	110	4 × 19	150	110	4 × 19
50	230	125	-	78	165	125	4 × 19	165	125	4 × 19
65	290	187	-	140	185	145	4 × 19	185	145	8 × 19
80	310	205	-	140	200	160	8 × 19	200	160	8 × 19
100	350	222	-	140	220	180	8 × 19	235	190	8 × 23
125	400	251	-	140	250	210	8 × 19	270	220	8 × 28
150	480	247	-	140	285	240	8 × 23	300	250	8 × 28
200	600	721	533	360	340	295	12 × 23	360	310	12 × 28
250	730	808	617	400	405	355	12 × 28	425	370	12 × 31
300	850	855	664	400	460	410	12 × 28	485	430	16 × 31
350	980	910	729	500	520	470	16 × 28	555	490	16 × 34
400	1100	960	762	500	580	525	16 × 31	620	550	16 × 37

Remark: "n" is number of holes in the flange.