Motorized valves 2 and 3 way up to 150°C

BR216GF - BR316GF

+ Electric actuators

MC55(Y) - MC65(Y) - MC100 - MC160 - MC161 - MC250 - MC400 - MC500- MC1000

3-way valve BR316GF
+ actuator MC55(Y)

2-way valve BR216GF
+ actuator MC500

1. Caractéristiques

- **Suitable for the control of hot and chilled water (0...+150°C) in HVAC systems control of heating plants.**

  Above 130°C valves should only be mounted in the horizontal position.
- **Suitable for water with antifreeze compounds down to –10°C**
- **Tight shut-off in the closed position**
- **Microprocessor controlled**
- **Automatic self-calibration on start up**

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2. Technical data valve

	BR216GF	BR316GF
Form	2-way	3-way
Diameter nominal	DN 15 ... DN 150	DN 15 ... DN 150
Pressure rating	PN16	PN16
Characteristic	A → AB equal %	A → AB equal % B → AB linear
Stroke	14 mm (DN 15-50) 20 mm (DN 65) 30 mm (DN 80-100) 50 mm (DN 125-150)	14 mm (DN 15-50) 20 mm (DN 65) 30 mm (DN 80-100) 50 mm (DN 125-150)
Rangeability	DN 15 50:1 DN 20...150 100:1	DN 15 50:1 DN 20...150 100:1

Function	BR216GF as two-way valve BR316GF as mixing or on-off valve
Connection type	Flanges acc. EN 1092-2 type 21
Face to face dimension	Acc. EN 558-1 basic series 1
Leakage rate	EN 1349 – seat-leakage VI G 1 (tight sealing)
Body	Cast iron EN-JL1040
Plug	Brass CW614N
Stem	CrMo-steel 1.4122
Stem sealing	O-rings EPDM

Valve variant and accessories

- Plug made of CrNi-steel 1.4305
- Suitable for water with antifreeze compounds down to –10°C
  24 Vac, 50/60 Hz
  DN 15 – DN 50 and DN 125 – DN 150 Power consumption Pmax. ≈ 400 VA
  PN ≈ 45 VA
- Epoxy resin special varnish as a corrosion resistant in case of condensed water, max. 80°C
- Usable for media based on mineral oil basis (stem sealing made of FKM)
- Technical silicon free version

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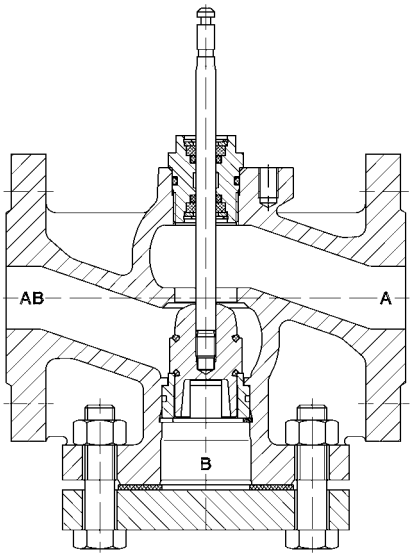
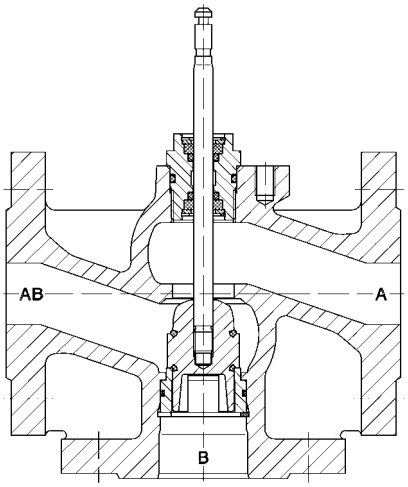
Drawing

DN 15-65

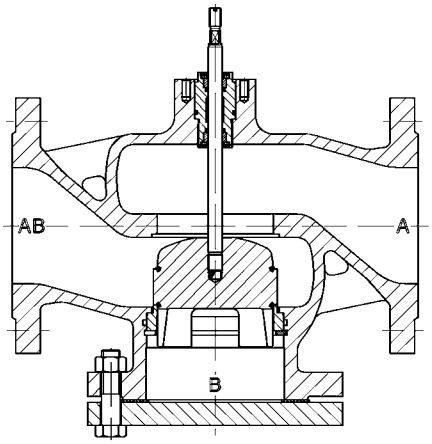
BR216GF

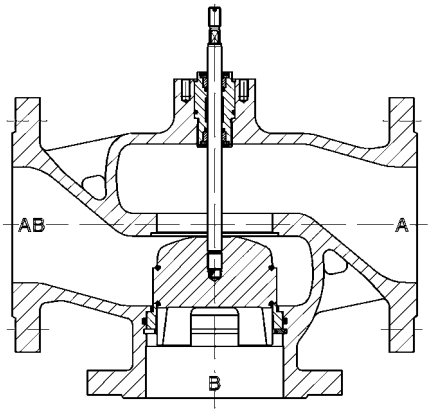


BR316GF

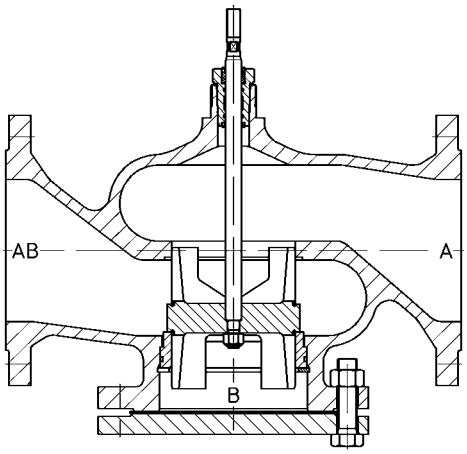


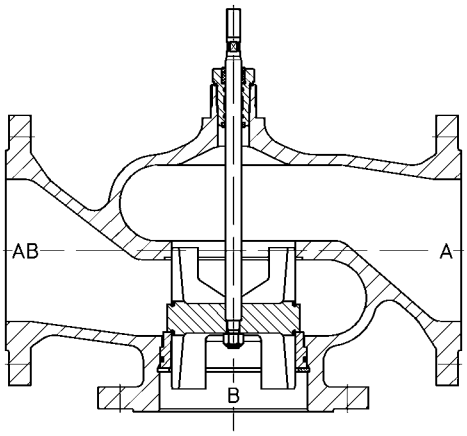
DN 65-100





DN 125-150





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3. Technical data actuator MC55 and MC65

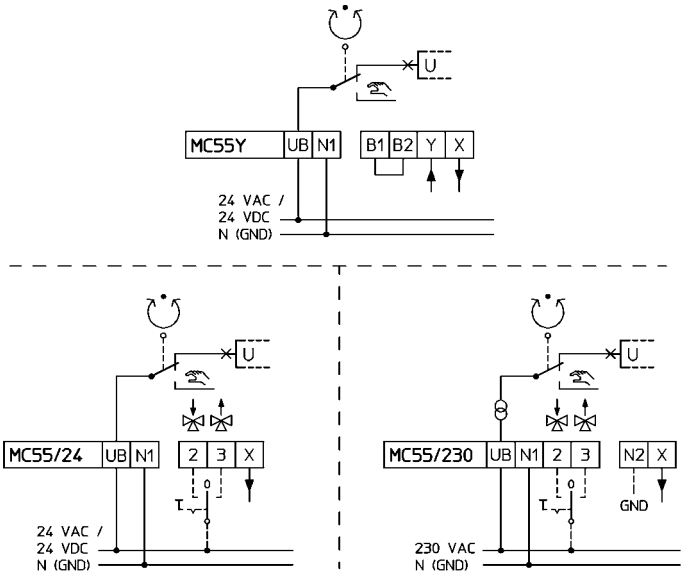
		MC55/24	MC65/24	MC55/230	MC65/230	MC55Y	MC65Y
Actuating time[1]	s/mm	9 . 5*		9 . 5*		9 . 5*	
Actuating thrust	kN	0.6		0.6		0.6	
Stroke	mm	max. 14	max. 20	max. 14	max. 20	max. 14	max. 20
Power supply	Vac	24 ±10%		230 +6% -10%		24 ±10%	
Power supply[2]	Vdc	24 ±10%		-		24 ±10%	
Frequency	Hz	50/60 ±5%		50/60 ±5%		50/60 ±5%	
Power consumption	VA	3.5		7		3.5	
Input signal[3]		3-point		3-point		0/2 ... 10 Vdc 77kΩ 0/4 ... 20 mA 0.51kΩ	
Output signal[3]		0 ... 10 Vdc max. 8 mA min. 1200Ω		0 ... 10 Vdc max. 8 mA min. 1200Ω		0 ... 10 Vdc max. 8 mA min. 1200Ω	
Hysteresis	V	0.3		0.3		0.3	

Enclosure protection	IP 54 in automatic operation IP 30 in manual operation	
Resolution	electric mechanical	0.04 VDC 0.06 mm
Mains connection	Actuator with terminal	
Operating mode	S3-50% ED c/h 1200 EN 60034-1	
End position switch-off	load-dependent	
Ambient temperature	0°C ... +60°C	
Weight	1.5 kg	

Actuator variant and accessories

- Voltage : 115 VAC
- Adapter with coupling for external products

Circuit diagram



Y = command signal
X = recopy the position (0 ... 10 Vdc)

Nota : B1/B2 Connection of a binary signal (e.g. frost safety)

[1] *Actuating time freely adjustable, presetting is marked with **

[2] *only retified alternating voltage*

[3] *Invertible input and output signal*

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4. Technical data actuator MC100 to MC1000

		MC100/24	MC100/230	MC160/24	MC161/24	MC160/230	MC161/230
Actuating time[1]	s/mm	12 . 9* . 4 . 1.9	12 . 9* . 4 . 1.9	6 . 4*		6 . 4*	
Actuating thrust	kN	1.0	1.0	1.6		1.6	
Stroke	mm	max. 20	max. 20	max. 30	max. 20	max. 30	max. 20
Power supply	Vac	24 ±10%	230 +6% -10%	24 ±10%		230 +6% -10%	
Power supply[2]	Vdc	24 ±10%	-	24 ±10%		-	
Frequency	Hz	50/60 ±5%	50/60 ±5%	50/60 ±5%		50/60 ±5%	
Power consumption	VA	6	12	6		12	
Input signal[3]		3-point 0/2 ... 10 Vdc 77kΩ 0/4 ... 20 mA 0.51kΩ	3-point 0/2 ... 10 Vdc 77kΩ 0/4 ... 20 mA 0.51kΩ	3-point 0/2 ... 10 Vdc 77kΩ 0/4 ... 20 mA 0.51kΩ		3-point 0/2 ... 10 Vdc 77kΩ 0/4 ... 20 mA 0.51kΩ	
Output signal[3]		0 ... 10 Vdc max. 8 mA min. 1200Ω	0 ... 10 Vdc max. 8 mA min. 1200Ω	0 ... 10 Vdc max. 8 mA min. 1200Ω		0 ... 10 Vdc max. 8 mA min. 1200Ω	
Hysteresis[4]	V	0.15 . 0.5	0.15 . 0.5	0.05 . 0.15 . 0.3 . 0.5		0.05 . 0.15 . 0.3 . 0.5	

		MC250/24	MC250/230	MC400/24	MC400/230
Actuating time[1]	s/mm	5 . 2.5*	5 . 2.5*	0.6 . 0.4*	0.6 . 0.4*
Actuating thrust	kN	2.5	2.5	4.0	4.0
Stroke	mm	max. 60	max. 60	max. 60	max. 60
Power supply	Vac	24 ±10%	230 +6% -10%	24 ±10%	230 +6% -10%
Power supply[2]	Vdc	24 ±10%	-	-	-
Frequency	Hz	50/60 ±5%	50/60 ±5%	50/60 ±5%	50/60 ±5%
Power consumption	VA	max. 18	max. 25	max. 50	max. 63
Input signal[3]		3-point 0/2 ... 10 Vdc 77kΩ 0/4 ... 20 mA 0.51kΩ	3-point 0/2 ... 10 Vdc 77kΩ 0/4 ... 20 mA 0.51kΩ	3-point 0/2 ... 10 Vdc 77kΩ 0/4 ... 20 mA 0.51kΩ	3-point 0/2 ... 10 Vdc 77kΩ 0/4 ... 20 mA 0.51kΩ
Output signal[3]		0 ... 10 Vdc max. 8 mA min. 1200Ω	0 ... 10 Vdc max. 8 mA min. 1200Ω	0 ... 10 Vdc max. 8 mA min. 1200Ω	0 ... 10 Vdc max. 8 mA min. 1200Ω
Hysteresis[4]	V	0.05 . 0.15 . 0.3 . 0.5	0.05 . 0.15 . 0.3 . 0.5	0.05 . 0.15 . 0.3 . 0.5	0.05 . 0.15 . 0.3 . 0.5

		MC500/24	MC500/230	MC1000/24	MC1000/230
Actuating time	s/mm	5 . 2.5*	5 . 2.5*	1	1
Actuating thrust	kN	5.0	5.0	10	10
Stroke	mm	max. 60	max. 60	max. 60	max. 60
Power supply	Vac	24 ±10%	230 +6% -10%	24 ±10%	230 +6% -10%
Power supply[2]	Vdc	24 ±10%	-		
Frequency	Hz	50/60 ±5%	50/60 ±5%	50/60 ±5%	50/60 ±5%
Power consumption	VA	max. 18	max. 25	max. 50	max. 63
Input signal[3]		3-point 0/2 ... 10 Vdc 77kΩ 0/4 ... 20 mA 0.51kΩ	3-point 0/2 ... 10 Vdc 77kΩ 0/4 ... 20 mA 0.51kΩ	3-point 0/2 ... 10 Vdc 77kΩ 0/4 ... 20 mA 0.51kΩ	3-point 0/2 ... 10 Vdc 77kΩ 0/4 ... 20 mA 0.51kΩ
Output signal[3]		0 ... 10 Vdc max. 8 mA min. 1200Ω	0 ... 10 Vdc max. 8 mA min. 1200Ω	0 ... 10 Vdc max. 8 mA min. 1200Ω	0 ... 10 Vdc max. 8 mA min. 1200Ω
Hysteresis[4]	V	0.05 . 0.15 . 0.3 . 0.5	0.05 . 0.15 . 0.3 . 0.5	0.05 . 0.15 . 0.3 . 0.5	0.05 . 0.15 . 0.3 . 0.5

[1] *Actuating time freely adjustable, presetting is marked with **
[2] *Only retified alternating voltage*
[3] *Invertible input and output signal*
[4] *Freely adjustable*

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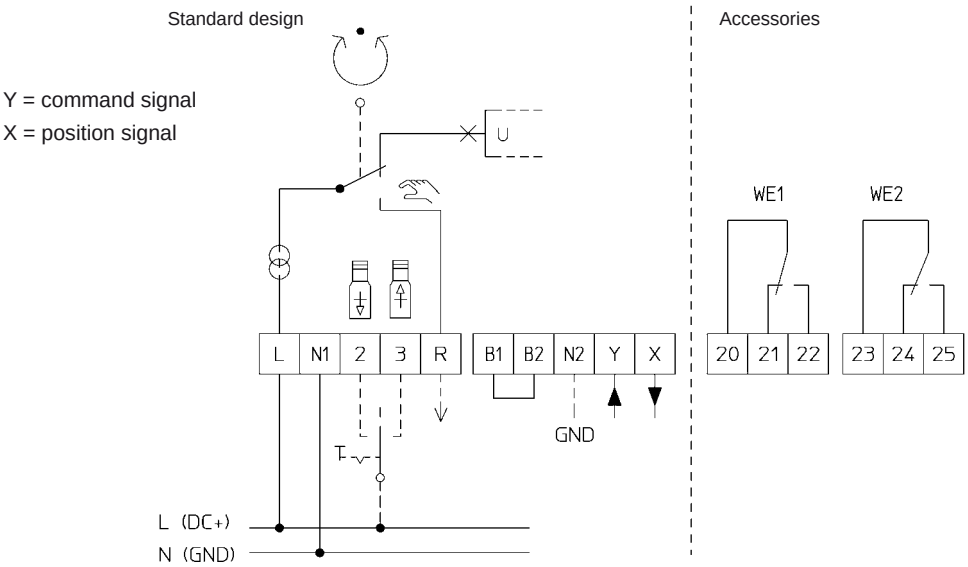
Enclosure protection	IP 54		
Resolution	MC...	electric	0.04 VDC
	MC100	mechanical	0.095 mm
	MC160 / MC161	mechanical	0.05 mm
	MC250 / MC500	mechanical	0.04 mm
	MC400	mechanical	0.12 mm
	MC1000	mechanical	0.05 mm
Operating mode	MC100 – MC500	S3-50% ED c/h 1200 EN 60034-1	
	MC400 / MC1000	S3-30% ED c/h 1200 EN 60034-1	
End position switch-off	load-dependent		
Ambient temperature	MC100/MC160/MC161	0°C ... +60°C	
	MC250/MC500/MC1000	-10°C ... +60°C	
Weight	MC100	2.5 kg	
	MC160 / MC161	3.2 kg	
	MC250/24 / MC500/24	7.0 kg	
	MC250/230 / MC500/230	8.2 kg	
	MC1000	11.0 kg	

Actuator variant and accessories

- Voltage — 115 VAC
- Position switch unit[1)] — 2 switches (WE1/WE2), potential free, infinitely adjustable
  - Rated load: 8 A / 250 VAC; 8 A / 30 VDC
  - Turn-on voltage: max. 400 VAC
  - max. 125 VDC
- Enclosure protection — IP 65
- Board for output signal[1)] — X = 0/4 ... 20 mA
- Adapter with coupling for external products

Circuit diagram

MC100 / MC160 / MC161



Nota : LB1/B2 Connection of a binary signal (e.g. frost safety)

[1)] *MC100 / MC160: Position switch unit and output signal 0(4)...20 mA not in combination*

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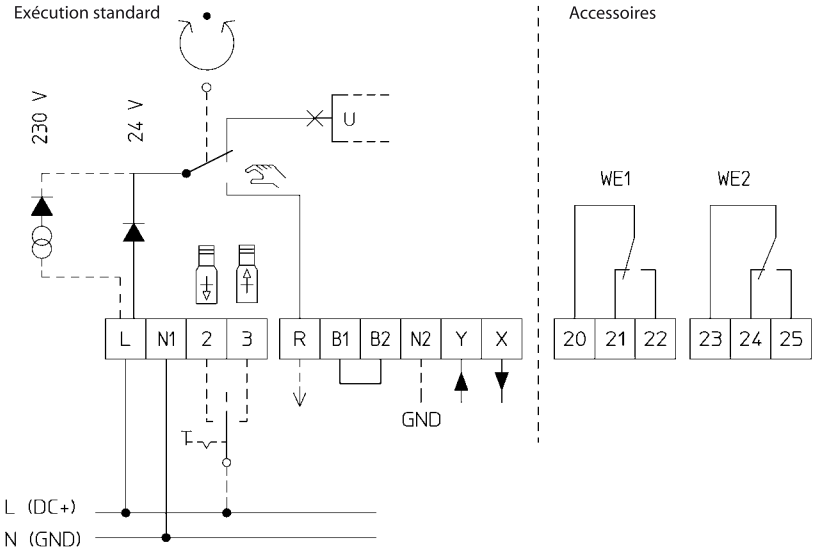
MC250 / MC400 / MC500 / MC1000

Nota : B1/B2 Connection of a binary signal (e.g. frost safety)



5. Technical data valve with actuator

DN			15	20	25	32	40	50	65	65	80	100	125	150
KVS-value		m^3/h	4 2.5 1.6 1.25 0.63	6.3 5	10 8	16 12.5	25 20	40 31.5	63 50	63 50	100 80	160 125	250	315
Stroke		mm	14						20	30			50	
MC55/24 MC55/230 MC55Y	Actuating time[1]	s	125 . 70*											
	Closing pressure	kPa	1 500	1 250	750	450	250	150						
MC100/24 MC100/230	Actuating time[1]	s	170 . 125* . 55 . 30						240 180* 80 40					
	Closing pressure	kPa	1 600	1 600	1 500	900	550	350	150					
MC161/24 MC161/230	Actuating time[1]	s				95 . 55*			120 80*					
	Closing pressure	kPa				1500	950	600	350					
MC160/24 MC160/230	Actuating time[1]	s								80* 120	180 . 120*			
	Closing pressure	kPa								350	230	140		
MC250/24 MC250/230	Actuating time[1]	s								50* 100	150 . 75*		250 . 125*	
	Closing pressure	kPa								600	350	250	160	120
MC400/24 MC400/230	Actuating time[1]	s								15 10*	20 . 15*		30 . 20*	
	Closing pressure	kPa								950	650	400	200	130
MC500/24 MC500/230	Actuating time[1]	s								50* 100	150 . 75*		250 . 125*	
	Closing pressure	kPa								1 250	850	500	370	270
MC1000/24 MC1000/230	Actuating time[1]	s											50	
	Closing pressure	kPa											800	550

100 kPa = 1 bar = 10 mWS

[1] *Actuating time freely adjustable, presetting is marked with **

Technical data can be changed without prior notice.

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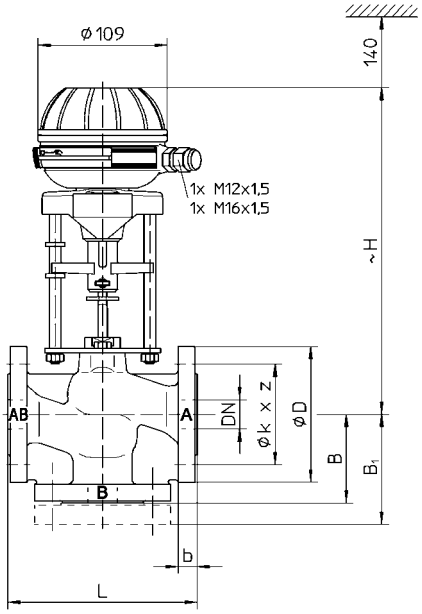
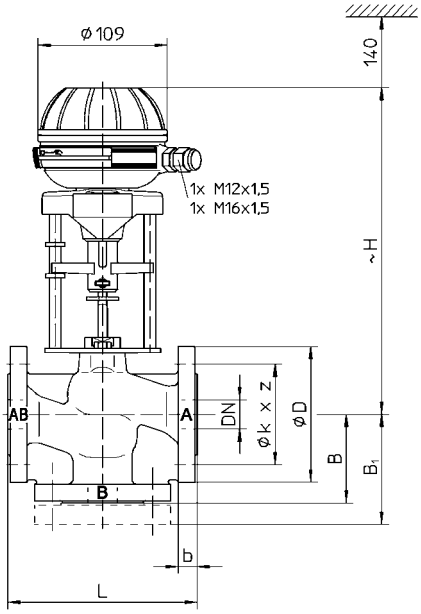
Drawing

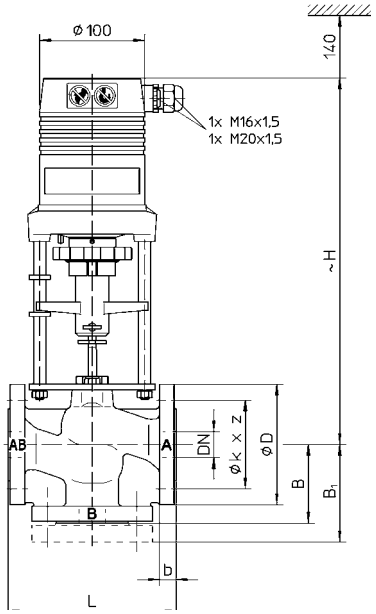
DN 15 - DN 50 MC55



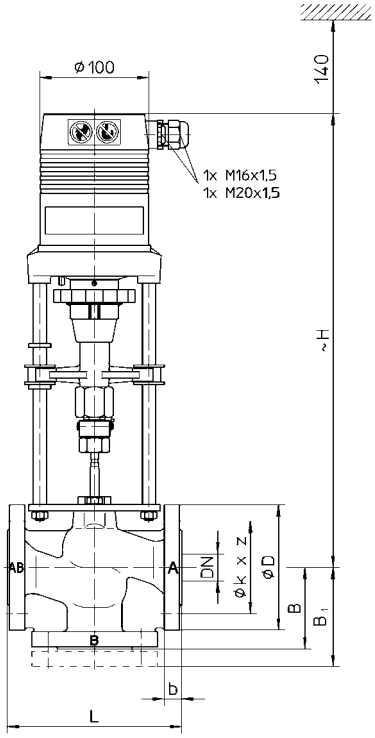
DN 65 (stroke 20) MC55



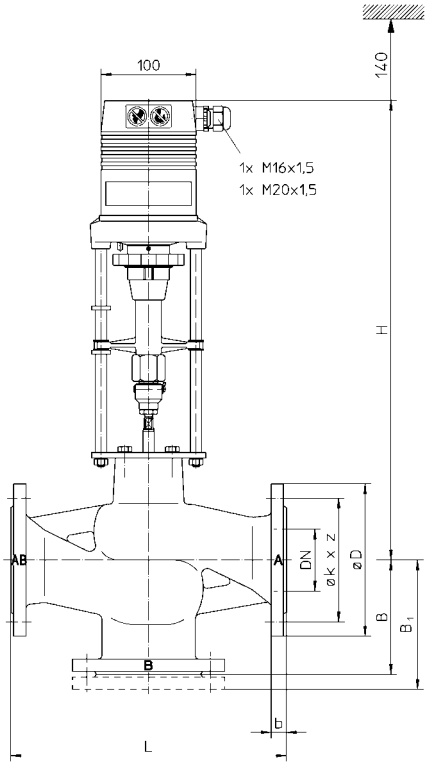
DN 15 - DN 65 (stroke 20) MC100



DN 32 - DN 65 (stroke 20) MC161



DN 65 (stroke 30) - DN 100 MC160



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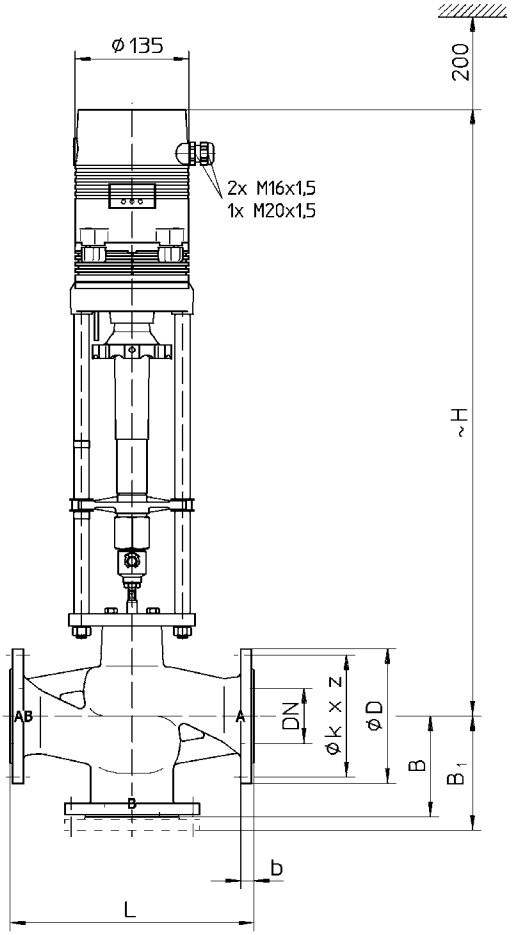
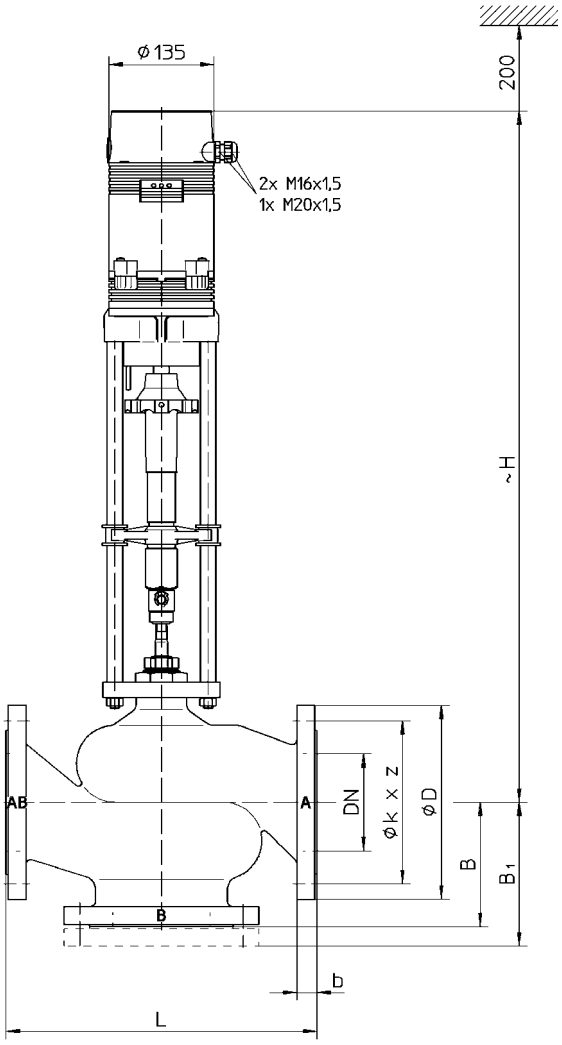
MC250 / MC400 / MC500 / MC1000

DN 65
(course 30)
DN 100



DN 125 - DN 150



Installation instruction

Valve trim could be damaged by dirt in the pipe system. Therefore we recommend the installation of strainers.

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Dimension

DN				15	20	25	32	40	50	65	80	100	125	150
L			mm	130	150	160	180	200	230	290	310	350	400	480
B			mm	65	70	75	95	100	100	120	130	150	160	170
B_1			mm	89	96	101	123	128	130	150	162	182	194	207
Ø D			mm	95	105	115	140	150	165	185	200	220	250	285
Ø k			mm	65	75	85	100	110	125	145	160	180	210	240
z			mm	4 x Ø 14			4 x Ø 18				8 x Ø 18			8 x Ø 22
b			mm	14	16	16	18	18	20	20	22	24	26	26
H	MC55	24 Vac / 230 Vac	mm	267	272	277	277	282	282					
	MC65									335				
	MC100	24 Vac	mm	343	348	353	353	358	358	408				
		230 Vac	mm	368	373	378	378	383	383	433				
	MC161	24 Vac	mm				443	448	486	486				
		230 Vac	mm				468	473	473	511				
	MC160	24 Vac	mm							486	496	506		
		230 Vac	mm							511	521	531		
	MC250	24 Vac / 230 Vac	mm							645	655	665	805	805
	MC400	24 Vac / 230 Vac	mm							695	705	715	855	855
	MC500	24 Vac / 230 Vac	mm							645	655	665	805	805
	MC1000	24 Vac / 230 Vac	mm										895	895
m	MC55	BR216GF	kg	5.6	6.8	8.1	11.5	13.3	16.8					
		BR316GF	kg	4.6	5.5	6.5	9.1	10.6	13.1					
	MC65	BR216GF	kg							26.3				
		BR316GF	kg							21.5				
	MC100	BR216GF	kg	6.6	7.8	9.1	12.5	14.3	17.8	27.3				
		BR316GF	kg	5.6	6.5	7.5	10.1	11.6	14.1	22.5				
	MC161	BR216GF	kg				13.2	15.0	18.5	28.0				
		BR316GF	kg				10.8	12.3	14.8	23.2				
	MC160	BR216GF	kg							28.0	33.0	46.1		
		BR316GF	kg							23.2	27.2	39.2		
	MC250 MC500 24 Vac	BR216GF	kg							31.8	36.8	49.9	69.0	97.0
		BR316GF	kg							27.0	31.0	43.0	59.0	84.0
	MC250 MC500 230 Vac	BR216GF	kg							33.0	38.0	51.1	70.2	98.2
		BR316GF	kg							28.2	32.2	44.2	60.2	85.2
	MC400	BR216GF	kg							34.3	39.3	52.4	71.5	99.5
		BR316GF	kg							29.5	33.5	45.5	61.5	86.5
	MC1000	BR216GF	kg										73.0	101.0
		BR316GF	kg										63.0	88.0

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How to use the chart

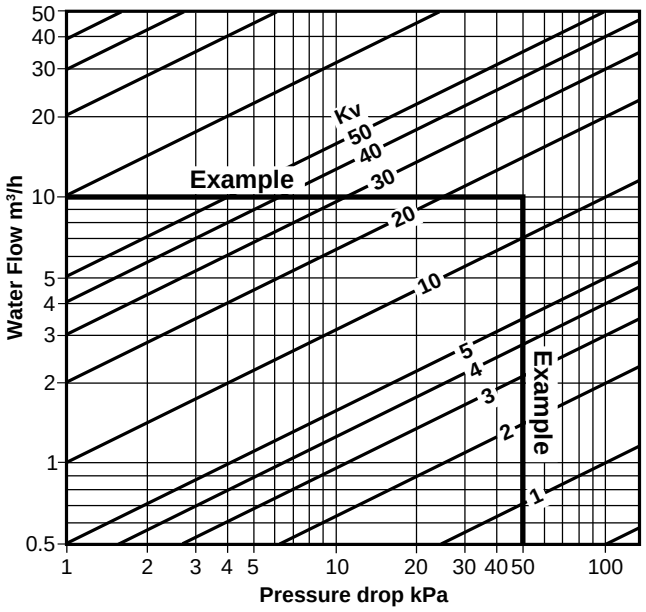
Note: *the chart below is used for the following example only. A complete chart is shown overleaf.*

Example:

- The heat exchanger has a MTHW demand of = 10 m³/h
- The full-load pressure drop P1 = 50 kPa (established from 'Valve authority' -see below-).
- Go to the selection chart below:
  - Draw a horizontal line from 10 m³/h
  - Run a vertical line from 50 kPa until it crosses 10 m3 / h line.
  - Kv is given at this crossing point i.e. Kv ≈ 14

Refer to the Kv values given on the appropiate Technical Information Sheet for each valve type.

Self-acting, electronic and pneumatic controls should be sized on maximum Kv value.



Valve authority

The ratio of pressure drop across the valve when fully open to that across the complete circuit is termed the 'Valve authority' (N) and is expressed as:

$$N = \frac{P_1}{P_1 + P_2}$$

Where: N = Valve authority

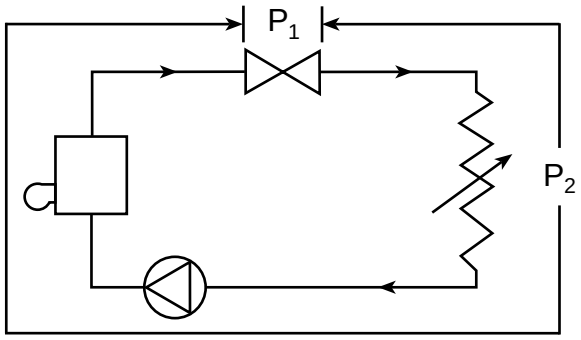
P_1 = Pressure drop across the fully open valve

P_2 = Pressure drop across the remainder of the circuit

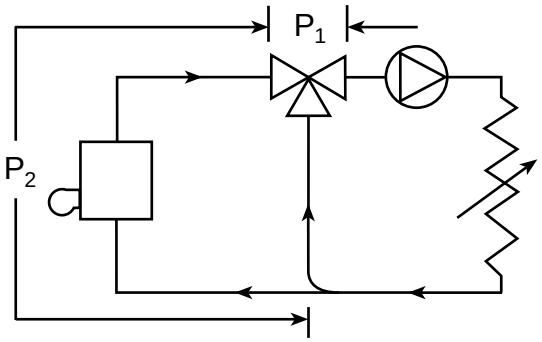
The diagrams opposite illustrate P_1 and P_2 more fully.

Valve authority is a means of selecting a valve size on a water system with due regard to economic viability and good control. When selecting a valve size, the valve authority should be between 0.2 and 0.5 (and preferably 0.5). This will ensure that each small valve movement will influence some authority over the flow whilst not excessively increasing pumping power costs.

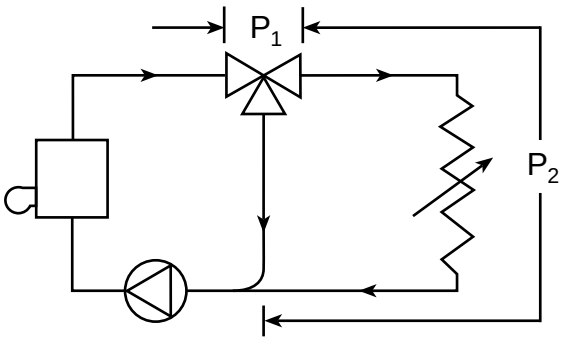
Valve authority will always relate to the circuit which has a varying flowrate.



Valve authority - Two-port valve



Valve authority - Three-port mixing valve



Valve authority - Three-port diverting valve

Note: $\dot{V} = Kv\sqrt{P1}$, $\dot{V}$ *= Water flow (m³/h), P1 = Pressure drop across the valve (bar), Kv = Flow coefficient (m³/h bar).*

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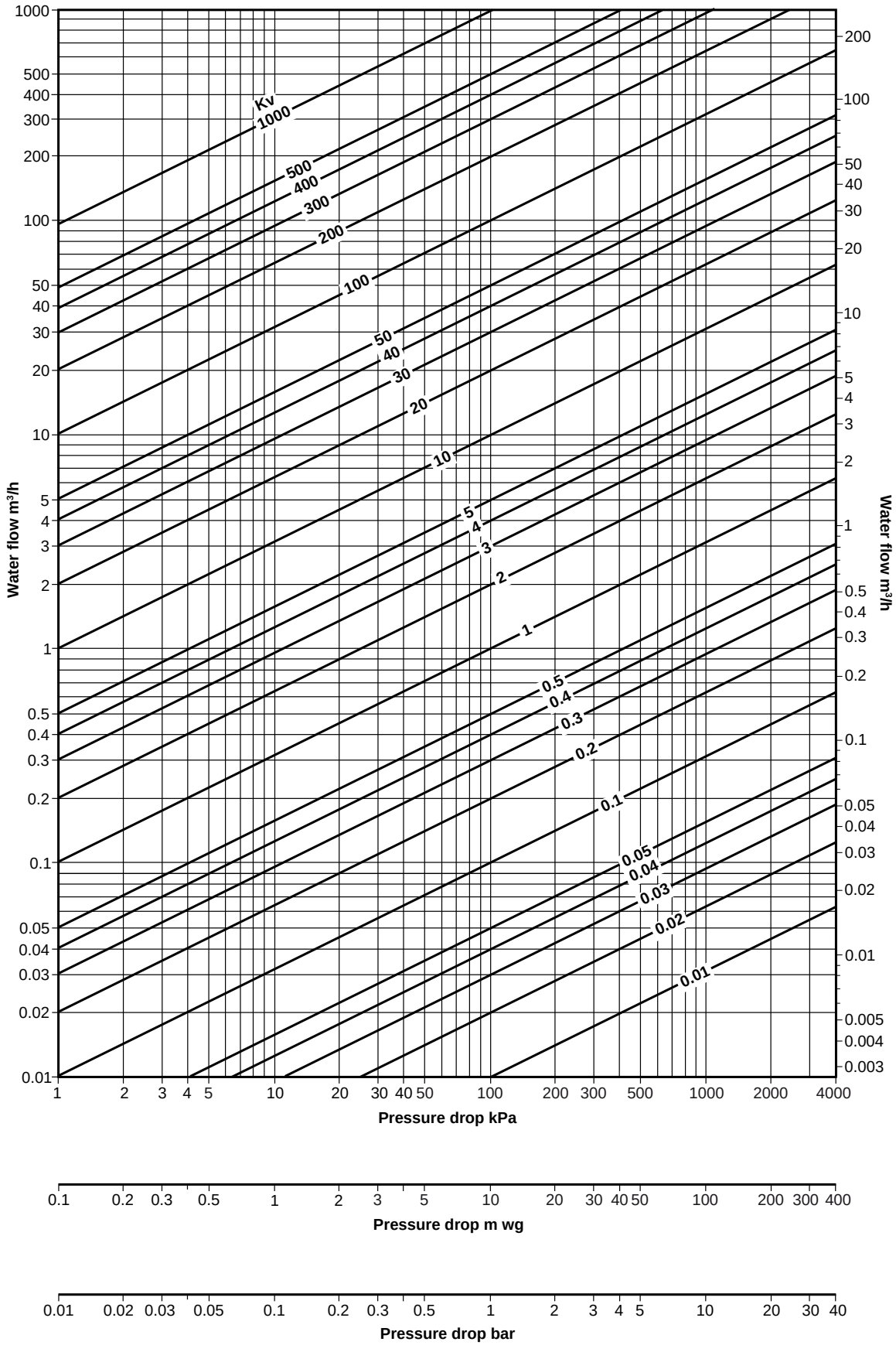
Water Valve
Sizing Chart



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Technical data can be changed without prior notice.
This chart assumes no cavitation after the control valve.

The selection of the index based on where the motorized valve is set up

1. Inside a building

a) In dry and frost protection premises
Protection ≥ IP30

b) In industrial premises without risk of water projection
Protection ≥ IP54

c) In wet premises and / or frost protection
Protection ≥ IP65 + anti-condensation resistance

d) In industrial premises with a risk of water projection
Protection ≥ IP65 + anti-condensation resistance
+ cowling insulation

2. Outside sheltered

Protection ≥ IP65 + anti-condensation resistance

3. Outside without shelter

Protection ≥ IP65 + anti-condensation resistance
+ cowling insulation

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