

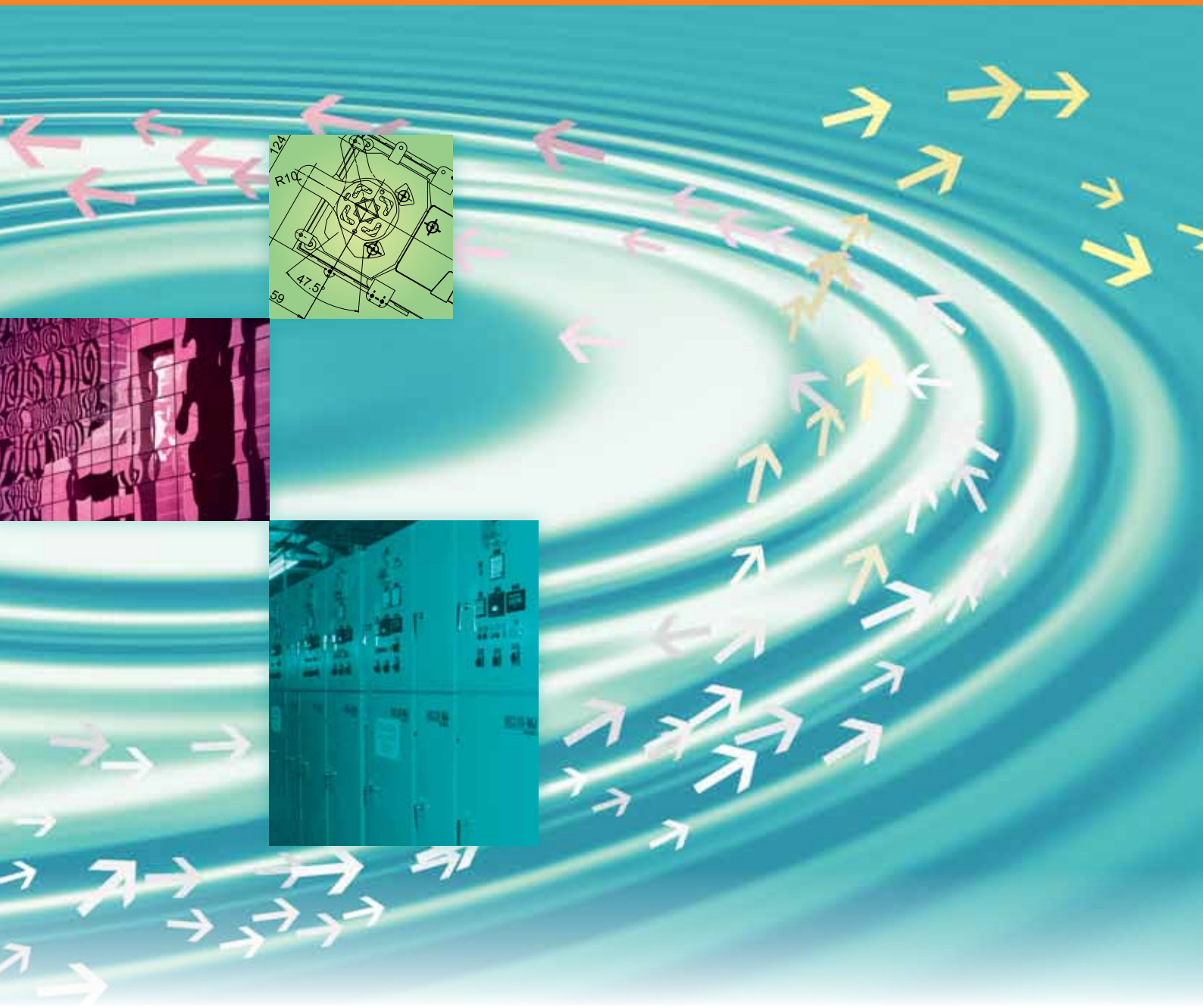
Belimo Pressure Independent Control Valve Range

- EPIV



Technical Databook

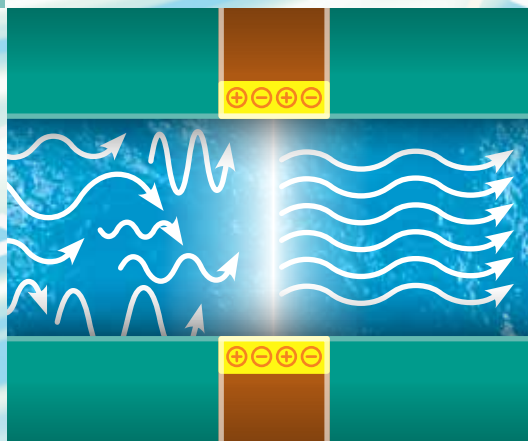
Version 3.2



Electronic Pressure Independent Control Valve (EPIV)



EPIV – uses a flow sensor and an electronic controller instead of a mechanic regulator to allocate a defined flow



| Electronic Pressure Independent Valve EPIV | Model No. | Frequency [Hz] | DN [mm] | Torque [Nm] | Nominal Flow | | Adjustable max. flow rate [m³/h] |
|--|----------------|----------------|---------|-------------|--------------|---------|----------------------------------|
| | | | | | [l/s] | [l/min] | |
| | EP015R+MP | 50/60 | 15 | 5Nm | 0.35 | 21 | 0.38...1.26 |
| | EP020R+MP | 50/60 | 20 | 5Nm | 0.65 | 39 | 0.7...2.34 |
| | EP025R+MP | 50/60 | 25 | 5Nm | 1.15 | 69 | 1.24...4.14 |
| | EP032R+MP | 50/60 | 32 | 10Nm | 1.8 | 108 | 1.94...6.48 |
| | EP040R+MP | 50/60 | 40 | 10Nm | 2.5 | 150 | 2.7...9 |
| | EP050R+MP | 50/60 | 50 | 20Nm | 4.8 | 288 | 5.18...17.28 |
| | EP050R+MP-N | 50/60 | 50 | 20Nm | 6.3 | 378 | 6.8...22.68 |
| | P6065W800E-MP | 50 | 65 | 20Nm | 8 | 480 | 8.64...28.8 |
| | P6080W1100E-MP | 50 | 80 | 20Nm | 11 | 660 | 11.88...39.6 |
| | P6100W2000E-MP | 50 | 100 | 40Nm | 20 | 1200 | 21.6...72 |
| | P6125W3100E-MP | 50 | 125 | 40Nm | 31 | 1860 | 33.48...111.6 |
| | P6150W4500E-MP | 50 | 150 | 40Nm | 45 | 2700 | 48.6...162 |
| | P6065W806E-MP | 60 | 65 | 20Nm | 8 | 480 | 8.64...28.8 |
| | P6080W1106E-MP | 60 | 80 | 20Nm | 11 | 660 | 11.88...39.6 |
| | P6100W2006E-MP | 60 | 100 | 40Nm | 20 | 1200 | 21.6...72 |
| | P6125W3106E-MP | 60 | 125 | 40Nm | 31 | 1860 | 33.48...111.6 |
| | P6150W4506E-MP | 60 | 150 | 40Nm | 45 | 2700 | 48.6...162 |

Note:

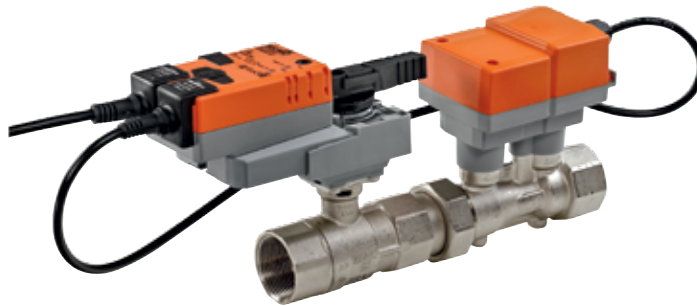
- The Electronic Pressure Independent Valve (EPIV) must be ordered together with the Rotary Actuator.
- Ordering example:
No part on EPIV can be ordered as a standard product.
- Electronic Fail-Safe Actuators are available for EPIV.

Content

| | |
|------------------------------|-----------|
| Product Overview | 4 |
| EPIV | |
| EP..R+MP | 5 |
| P6..W..E-MP | 7 |
| Technical Data | 9 |
| Mounting Instructions | 15 |

Characterised control valve (CCV) with sensor-operated flow control, 2-way, with internal thread

- Nominal voltage AC/DC 24V
- Control modulating
- For modulating water-side control of air handling units and heating systems
- Communication via Belimo MP-Bus or conventional control
- Conversion of (active) sensor signals and switching contacts


Type overview

| Model No. | Frequency [Hz] | \dot{V}_{nom} [l/s] | \dot{V}_{nom} [l/min] | kvs theor.* [m ³ /h] | DN [mm] | DN ["] | ps** [kPa] | n(gl) [l] |
|-------------|----------------|-----------------------|-------------------------|---------------------------------|---------|--------|------------|-----------|
| EP015R+MP | 50/60 | 0.35 | 21 | 2.9 | 15 | 1/2 | 1600 | 3.2 |
| EP020R+MP | 50/60 | 0.65 | 39 | 4.9 | 20 | 3/4 | 1600 | 3.2 |
| EP025R+MP | 50/60 | 1.15 | 69 | 8.6 | 25 | 1 | 1600 | 3.2 |
| EP032R+MP | 50/60 | 1.8 | 108 | 14.2 | 32 | 1 1/4 | 1600 | 3.2 |
| EP040R+MP | 50/60 | 2.5 | 150 | 21.3 | 40 | 1 1/2 | 1600 | 3.2 |
| EP050R+MP | 50/60 | 4.8 | 288 | 32.0 | 50 | 2 | 1600 | 3.2 |
| EP050R+MP-N | 50/60 | 6.3 | 378 | 32.0 | 50 | 2 | 1600 | 3.2 |

* : Theoretical kvs value for pressure drop calculation

** : Maximum allowable pressure

Technical data

| | | |
|-------------------------|--------------------------------------|---|
| Electrical data | Nominal voltage | AC/DC 24V |
| | Nominal voltage frequency | 50/60Hz |
| | Nominal voltage range | AC 19.2...28.8V / DC 21.6...28.8V |
| | Power consumption in operation | 4.5W |
| | Power consumption in rest position | 1.4W |
| | Power consumption for wire sizing | 7VA |
| | Connection supply / control | Cable 1m, 4x 0.75mm ² |
| Flow measurement | Parallel operation | Yes (note the performance data) |
| | Measuring principle | Ultrasonic volumetric flow measurement |
| | Measuring accuracy | ±2% (of 25...100% \dot{V}_{nom} at 20°C, Glycol 0% vol.) |
| Functional data | Min. flow measurement | 0.5% of \dot{V}_{nom} |
| | Torque motor | 5Nm (DN 15...25) / 10 Nm (DN 32 + 40) / 20Nm (DN 50) |
| | Positioning signal Y | DC 0...10V |
| | Operating range Y | DC 2...10V |
| | Operating range Y variable | Start point DC 0.5...24V End point DC 8.5...32V |
| | Position feedback U | DC 2...10V |
| | Position feedback U variable | Start point DC 0.5...8V End point DC 2...10V |
| | Sound power level motor max. | 45dB(A) |
| | Adjustable flow rate \dot{V}_{max} | 30...100% of \dot{V}_{nom} |
| | Control accuracy | ±5% (of 25...100% \dot{V}_{nom} at 20°C, Glycol 0% vol.) |
| | Media | Cold and hot water, water with glycol up to max. 60% vol. |
| Media temperature | -10°C...120°C | |

Technical data

| | | |
|------------------|--|--|
| | Pressure rating | PN16 |
| | Closing pressure Δp_s | 1380kPa |
| | Differential pressure Δp_{max} | 350kPa |
| | Flow characteristic | Equal percentage (VDI/VDE 2178), linear |
| | Leakage rate | Air bubble-tight (Leakage rate A, EN12266-1) |
| | Pipe connections | Internal thread (ISO 7-1/ EN10226-1) |
| | Installation position | Upright to horizontal (in relation to the stem) |
| | Maintenance | Maintenance-free |
| | Manual override | Gear disengagement with push-button, can be locked |
| | Running time | 90s |
| Safety | Protection class IEC/EN | III Safety extra-low voltage |
| | Degree of protection IEC/EN | IP54 |
| | EMC | CE according to 2004/108/EC |
| | Mode of operation | Type 1 |
| | Rated impulse voltage supply / control | 0.8kV |
| | Control pollution degree | 3 |
| | Ambient temperature | -30...50°C |
| | Non-operating temperature | -40...80°C |
| Materials | Ambient humidity | 95% r.h., non-condensing |
| | Housing | Brass body, nickel-plated |
| | Measuring pipe | Brass body, nickel-plated |
| | Ball | Stainless steel AISI 316 |
| | Stem | Stainless steel AISI 304 |
| | Stem seal | O-ring EPDM |

Safety notes



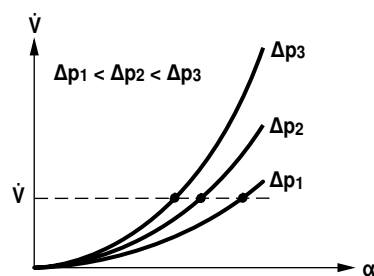
- The device has been designed for use in stationary heating, ventilation and air conditioning systems and is not allowed to be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied with during installation.
- The connection between the control valve and the measuring tube should not be separated.
- The device contains electrical and electronic components and is not allowed to be disposed of as household refuse. All locally valid regulations and requirements must be observed.

Product features

Mode of operation

The actuator is comprised of three components: characterised control valve (CCV), measuring pipe with volumetric flow sensor and the actuator itself. The adjusted maximum flow (\dot{V}_{max}) is assigned to the maximum positioning signal (typically 10V/100%). The actuator control can be either communicative or analogue. The medium is detected by the sensor in the measuring pipe and is applied as the flow value. The measured value is balanced with the setpoint. The actuator corrects the deviation by changing the valve position. The angle of rotation α varies according to the differential pressure through the final controlling element (see volumetric flow curves).

Flow rate curves



Characterised control valve (CCV) with sensor-operated flow control, 2-way, with flange PN16

- Nominal voltage AC/DC 24V
- Control modulating
- For modulating water-side control of air handling unit and heating systems
- Communication via Belimo MP-Bus or conventional control
- Conversion of (active) sensor signals and switching contacts


Type overview

| Model No. | Frequency [Hz] | \dot{V}_{nom} [l/s] | \dot{V}_{nom} [l/min] | kvs theor.* [m ³ /h] | DN [mm] | DN ["] | ps** [kPa] | n(gl) [] |
|----------------|----------------|-----------------------|-------------------------|---------------------------------|---------|--------|------------|-----------|
| P6065W800E-MP | 50 | 8 | 480 | 45 | 65 | 2 1/2 | 1600 | 3.2 |
| P6080W1100E-MP | 50 | 11 | 660 | 65 | 80 | 3 | 1600 | 3.2 |
| P6100W2000E-MP | 50 | 20 | 1200 | 115 | 100 | 4 | 1600 | 3.2 |
| P6125W3100E-MP | 50 | 31 | 1860 | 175 | 125 | 5 | 1600 | 3.2 |
| P6150W4500E-MP | 50 | 45 | 2700 | 270 | 150 | 6 | 1600 | 3.2 |
| P6065W806E-MP | 60 | 8 | 480 | 45 | 65 | 2 1/2 | 1600 | 3.2 |
| P6080W1106E-MP | 60 | 11 | 660 | 65 | 80 | 3 | 1600 | 3.2 |
| P6100W2006E-MP | 60 | 20 | 1200 | 115 | 100 | 4 | 1600 | 3.2 |
| P6125W3106E-MP | 60 | 31 | 1860 | 175 | 125 | 5 | 1600 | 3.2 |
| P6150W4506E-MP | 60 | 45 | 2700 | 270 | 150 | 6 | 1600 | 3.2 |

* : Theoretical kvs value for pressure drop calculation

** : Maximum allowable pressure

Technical data

| | | |
|-------------------------|--|---|
| Electrical data | Nominal voltage | AC/DC 24V |
| | Nominal voltage frequency | 50/60Hz (upon request) |
| | Nominal voltage range | AC 19.2...28.8V / DC 21.6...28.8V |
| | Power consumption in operation | 9.5W |
| | Power consumption in rest position | 6.5W |
| | Power consumption for wire sizing | 13VA |
| | Connection supply / control | Cable 1m, 4 x 0.75 mm ² |
| Flow measurement | Parallel operation | Yes (note the performance data) |
| | Measuring principle | Magnetic inductive volumetric flow measurement |
| | Measuring accuracy | ±2% (of 25...100% \dot{V}_{nom} at 20°C, Glycol 0% vol.) |
| Functional data | Min. flow measurement | 1.25% of \dot{V}_{nom} |
| | Torque motor | 20Nm (DN 65...80) / 40Nm (DN 100...150) |
| | Positioning signal Y | DC 0...10V |
| | Operating range Y | DC 2...10V |
| | Operating range Y variable | Start point DC 0.5...24V End point DC 8.5...32V |
| | Position feedback U | DC 2...10V |
| | Position feedback U variable | Start point DC 0.5...8V End point DC 2...10V |
| | Sound power level motor max. | 45dB(A) |
| | Adjustable flow rate max | 30...100% of \dot{V}_{nom} |
| | Control accuracy | ±5% (of 25...100% \dot{V}_{nom} at 20°C, Glycol 0% vol.) |
| | Media | Cold and hot water, water with glycol up to max. 60% vol. |
| | Media temperature | -10°C...120°C |
| | Pressure rating | PN16 |
| | Closing pressure Δps | 690kPa |
| | Differential pressure Δp_{max} | 340kPa |
| Flow characteristic | Equal percentage (VDI/VDE 2178), linear | |
| Leakage rate | Air bubble-tight (Leakage rate A, EN12266-1) | |
| Pipe connections | Flange (ISO 7005-2 / EN 1092-1) | |

Technical data

| | | |
|------------------------|--|--|
| Functional data | Installation position | Upright to horizontal (in relation to the stem) |
| | Maintenance | Maintenance-free |
| | Manual override | Gear disengagement with push-button, can be locked |
| Safety | Running time | 90s |
| | Protection class IEC/EN | III Safety extra-low voltage |
| | Degree of protection IEC/EN | IP54 |
| | EMC | CE according to 2004/108/EC |
| | Mode of operation | Type 1 |
| | Rated impulse voltage supply / control | 0.8kV |
| | Control pollution degree | 3 |
| Materials | Ambient temperature | -10...50°C |
| | Non-operating temperature | -20...80°C |
| | Ambient humidity | 95% r.h., non-condensing |
| | Housing | EN-JL1040 (GG25 with protective paint) |
| | Measuring pipe | EN-GJS-500-7U (GGG50 with protective paint) |
| | Ball | Stainless steel AISI 316 |
| | Stem | Stainless steel AISI 304 |
| Stem seal | EPDM Perox | |

Safety notes



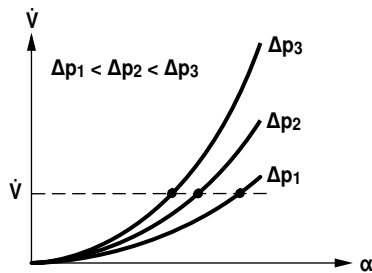
- The device has been designed for use in stationary heating, ventilation and air conditioning systems and is not allowed to be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied with during installation.
- The connection between the control valve and the measuring tube should not be separated.
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Product features

Mode of operation

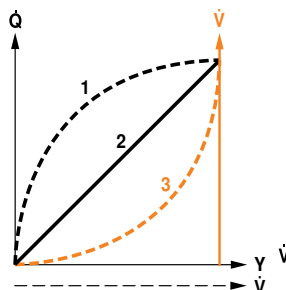
The actuator is comprised of three components: characterised control valve (CCV), measuring pipe with volumetric flow sensor and the actuator itself. The adjusted maximum flow (\dot{V}_{max}) is assigned to the maximum positioning signal (typically 10V). The actuator control can be either communicative or analogue. The medium is detected by the sensor in the measuring pipe and is applied as the flow value. The measured value is balanced with the setpoint. The actuator corrects the deviation by changing the valve position. The angle of rotation α varies according to the differential pressure through the final controlling element (see volumetric flow curves).

Flow rate curves



Flow characteristic of the characterised control valve

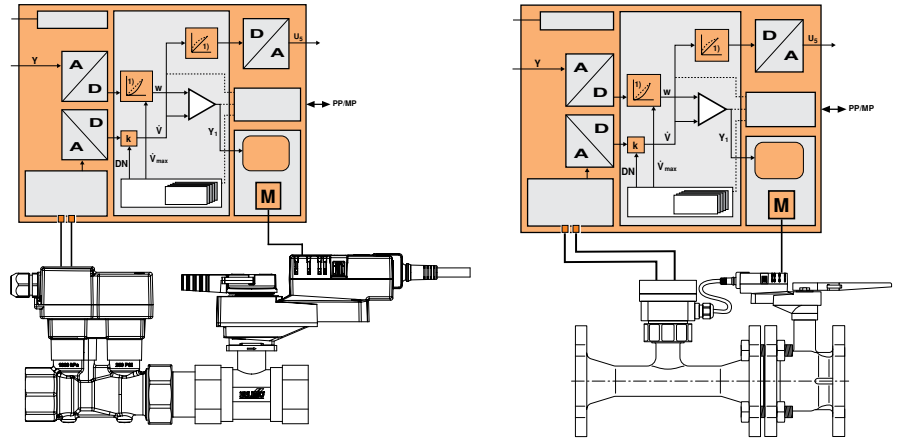
Heat exchanger transfer response
Depending on the construction, temperature spread, medium and hydraulic circuit, the power Q is not proportional to the volumetric flow of the water \dot{V} (curve 1). With the classical type of temperature control, an attempt is made to maintain the control signal Y proportional to the power Q (Curve 2) and is achieved by means of an equal-percentage valve characteristic curve (Curve 3).



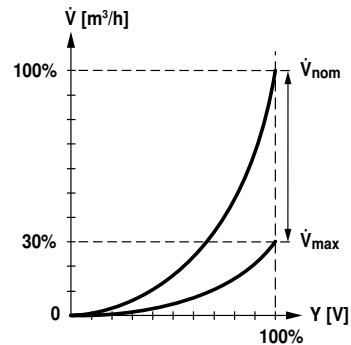
Product features

Control characteristics The velocity of the medium is measured in the measuring component (sensor electronics) and converted to a flow rate signal. The positioning signal Y corresponds to the power Q via the exchanger, the volumetric flow is regulated in the EPIV. The control signal Y is converted into an equal-percentage characteristic curve and provided with the \dot{V}_{max} value as the new reference variable w. The momentary control deviation forms the positioning signal Y1 for the actuator. The specially configured control parameters in connection with the precise flow rate sensor ensure a stable quality of control. They are however not suitable for rapid control processes, i.e. for domestic water control. U5 displays the measured volumetric flow as voltage (factory setting). As an alternative, U5 can be used for displaying the valve opening angle.

Block diagram



Definitions \dot{V}_{nom} is the maximum possible flow.



\dot{V}_{max} is the maximum flow rate which has been set with the greatest positioning signal, e.g. 10V. \dot{V}_{max} can be set to between 30% and 100% of \dot{V}_{nom} .

\dot{V}_{min} 0% (non-variable).

Creep flow suppression Given the very low flow speed in the opening point, this can no longer be measured by the sensor within the required tolerance. This range is overridden electronically.

Opening valve

The valve remains closed until the volumetric flow required by the positioning signal Y corresponds to 1% of \dot{V}_{nom} (DN15-DN50) / 2.5% of \dot{V}_{nom} (DN65-DN150). The control along the valve characteristic curve is active after this value has been exceeded.

Closing valve (DN15-DN50)

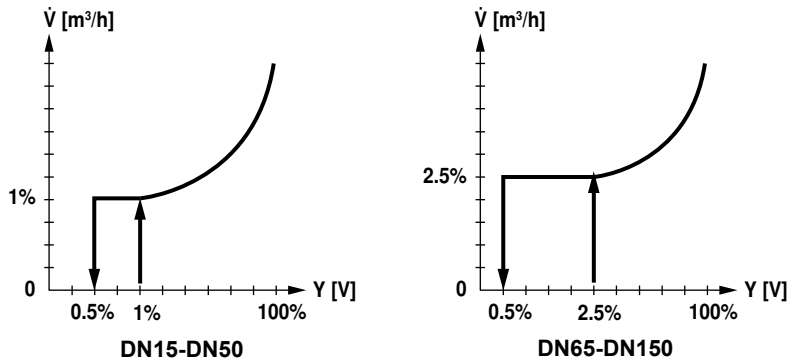
The control along the valve characteristic curve is active up to the required flow rate of 1% of \dot{V}_{nom} . Once the level falls below this value, the flow rate is maintained at 1% of \dot{V}_{nom} . If the level falls below the flow rate of 0.5% of \dot{V}_{nom} required by the reference variable Y, then the valve will close.

Closing valve (DN65-DN150)

The control along the valve characteristic curve is active up to the required flow rate of 2.5% of \dot{V}_{nom} . Once the level falls below this value, the flow rate is maintained at 2.5% of \dot{V}_{nom} . If the level falls below the flow rate of 0.5% of \dot{V}_{nom} required by the reference variable Y, then the valve will close.

Product features

Creep flow suppression



Converter for sensors

Connection option for a sensor (active sensor or switching contact). The MP actuator serves as an analogue/digital converter for the transmission of the sensor signal via MP-Bus to the higher level system.

Adjustable-parameter actuators

The factory settings cover the most common applications. Individual parameters can be altered with the Belimo service tool MFT-P or with the service tool ZTH AP.

Positioning signal inversion

This can be inverted in cases of control with with an analogue positioning signal. The inversion causes the reversal of the standard behaviour, i.e. at a positioning signal of 0%, regulation is to \dot{V}_{max} or Q_{max} , and the valve is closed at a positioning signal of 100%.

Hydraulic balancing

With the Belimo-Tools, the maximum flow rate (equivalent to 100% requirement) can be adjusted on-site, simply and reliably, in a few steps. If the device is integrated in the management system, then the balancing can be handled directly by the management system.

Manual override

Manual override with push-button possible - temporary, permanently. The gear is disengaged and the actuator decoupled for as long as the button is pressed / latched.

High functional reliability

The actuator is overload protected, requires no limit switches and automatically stops when the end stop is reached.

Home position

The actuator moves to the home position when the supply voltage is switched on for the first time, i.e. at the time of commissioning or after pressing the "gear disengagement" key. The actuator then moves into the required position in order to ensure the flow rate defined by the positioning signal.

Accessories

| | Description | Type |
|-------------------------------|--|---------|
| Electrical accessories | Gateway MP to KNX/EIB, AC/DC 24 V, EIBA certified | UK24EIB |
| | Gateway MP for LonWorks®, AC/DC 24 V, LonMark-certified | UK24LON |
| | Gateway MP to Modbus RTU, AC/DC 24 V | UK24MOD |
| | Gateway MP to BACnet MS/TP, AC/DC 24 V | UK24BAC |
| Service Tools | Service tool, for MF/MP/Modbus/LonWorks actuators and VAV controller | ZTH AP |
| | Belimo PC-Tool, software for adjustments and diagnostics | MFT-P |

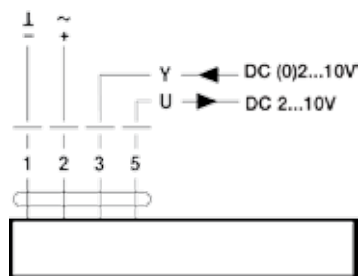
Electrical installation

Notes

- Connection via safety isolating transformer.
- Parallel connection of other actuators possible. Note the performance data.

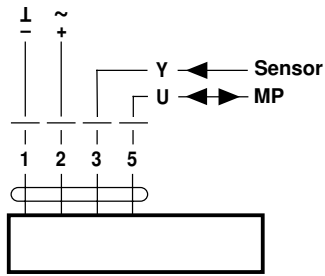
Wiring diagrams

AC/DC 24 V, modulating



Cable colours:
 1 = black
 2 = red
 3 = white
 5 = orange

Operation on the MP-Bus

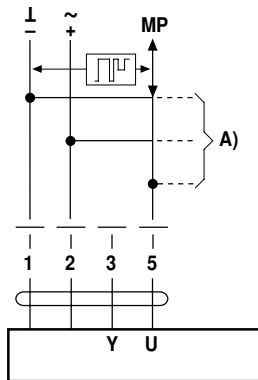


Cable colours:
 1 = black
 2 = red
 3 = white
 5 = orange

Functions

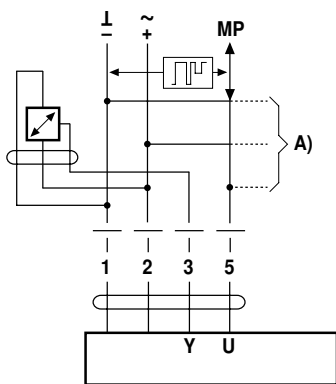
Functions when operated on MP-Bus

Connection on the MP-Bus



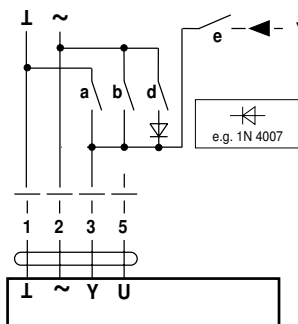
A) Additional actuators and sensors (max. 8)

Connection of active sensors



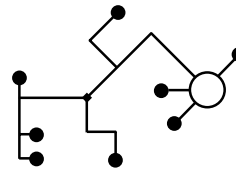
A) Additional actuators and sensors (max. 8)
 • Supply AC/DC 24V
 • Output signal DC 0 ... 10V (max. DC 0 ... 32V)
 • Resolution 30mV

Functions for actuators with specific parameters
Override control and limitation with AC 24 V with relay contacts



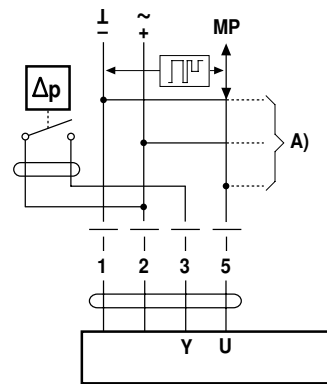
| | a | b | d | e |
|------------------|---|---|---|---|
| Close | ↗ | ↘ | ↗ | ↘ |
| V _{max} | ↗ | ↘ | ↗ | ↘ |
| Open | ↘ | ↗ | ↘ | ↗ |
| Y | ↘ | ↗ | ↘ | ↗ |

Power topology



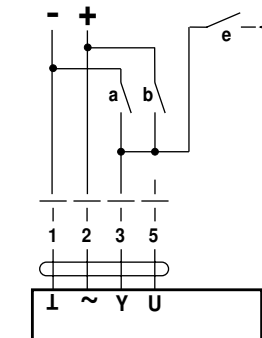
There are no restrictions for the network topology (star, ring, tree or mixed forms are permitted). Supply and communication in the same 3-wire cable
 • no shielding or twisting required
 • no terminating resistor required

Connection of external switching contact



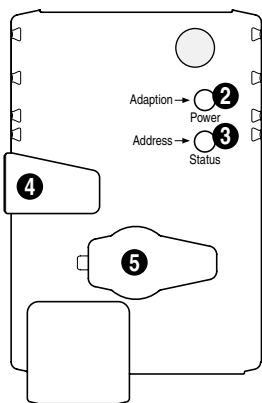
A) Additional actuators and sensors (max. 8)
 • Switching current 16 mA @ 24V
 • Start point of the operating range must be parameterised on the MP actuator as ≥ 0.6 V

Override control and limitation with DC 24 V with relay contacts



| | a | b | d | e |
|------------------|---|---|---|---|
| Close | ↗ | ↘ | ↗ | ↘ |
| V _{max} | ↗ | ↘ | ↗ | ↘ |
| Y | ↘ | ↗ | ↘ | ↗ |

Operating controls and indicators



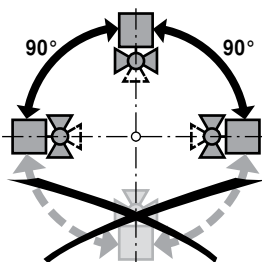
- ② Pushbutton and green LED display**
 Off: No voltage supply or malfunction
 Illuminated: Operation
 Press button: Switches on angle of rotation adaption followed by standard operation
- ③ Pushbutton and yellow LED display**
 Off: Standard operation without MP-Bus
 Illuminated: Adaption or synchronising process active
 Blinking: Addressing request sent to MP master
 Press button: Acknowledgment of addressing
 Flickering: MP communication active
- ④ Gear disengagement switch**
 Press button: Gear disengaged, motor stops, manual operation possible
 Release button: Gear engaged, synchronisation starts, followed by standard operation
- ⑤ Service plug**
 For connecting parameterising and service tools

Check voltage supply connection

- ② Off and ③ illuminated: Check the supply connections.
 Possibly \perp and ∇ are swapped over.

Installation notes

Recommended installation positions The ball valve can be installed upright to horizontal. The ball valve may not be installed in a hanging position, i.e. with the stem pointing downwards.



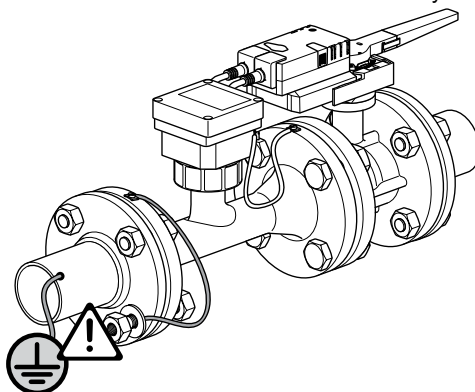
Installation position in return Installation in the return is recommended.

Water quality requirements The water quality requirements specified in VDI 2035 must be adhered to. Ball valves are regulating devices. The use of dirt filters is recommended in order to prolong their service life for performing control tasks.

Maintenance Ball valves, rotary actuators and sensors are maintenance-free.
 Before any kind of service work is carried out on the actuator, it is essential to isolate the rotary actuator from the power supply (by disconnecting the electrical cable). Any pumps in the part of the piping system concerned must also be switched off and the appropriate slide valves closed (allow everything to cool down first if necessary and reduce the system pressure to ambient pressure level).
 The system must not be returned to service until the ball valve and the rotary actuator have been properly reassembled in accordance with the instructions and the pipelines have been refilled in the proper manner.

Flow direction The direction of flow, specified by an arrow on the housing, is to be complied with, since otherwise the flow rate will be measured incorrectly.

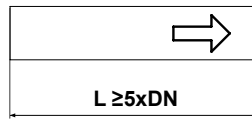
Earthing Above DN65, it is imperative that the measuring pipe be correctly earthed in order to ensure that the volumetric flow sensor does not make any unnecessary incorrect measurements.



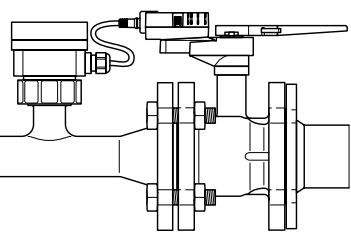
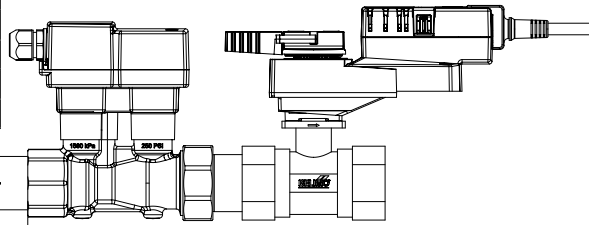
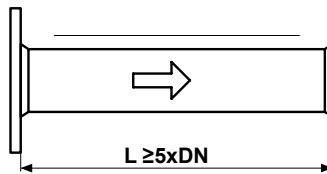
Installation notes

Inlet section In order to achieve the specified measuring accuracy, a flow-calming section or inflow section in the direction of the flow is to be provided upstream from the measuring pipe flange. Its dimensions must be at least 5 x DN.

| DN | L min. |
|----|--------------------|
| 15 | 5 x 15 mm = 75 mm |
| 20 | 5 x 20 mm = 100 mm |
| 25 | 5 x 25 mm = 125 mm |
| 32 | 5 x 32 mm = 160 mm |
| 40 | 5 x 40 mm = 200 mm |
| 50 | 5 x 50 mm = 250 mm |



| DN | L min. |
|-----|---------------------|
| 65 | 5 x 65 mm = 325 mm |
| 80 | 5 x 80 mm = 400 mm |
| 100 | 5 x 100 mm = 500 mm |
| 125 | 5 x 125 mm = 625 mm |
| 150 | 5 x 150 mm = 750 mm |



General information

Valve design The valve is determined using the maximum flow required \dot{V}_{max} . A calculation of the kvs value is not required.

$\dot{V}_{max} = 30 \dots 100\%$ of \dot{V}_{nom}

If no hydraulic data are available, then the same valve DN can be selected as the heat exchanger nominal diameter.

Minimum differential pressure (Pressure drop)

The minimum required differential pressure (pressure drop via the valve) for achieving the desired volumetric flow \dot{V}_{max} can be calculated with the aid of the theoretical kvs value (see type overview) and the below-mentioned formula. The calculated value is dependent on the required maximum volumetric flow \dot{V}_{max} . Higher differential pressures are compensated for automatically by the valve.

Formula

$$\Delta p_{min} = 100 \times \left(\frac{\dot{V}_{max}}{k_{vs \text{ theor.}}} \right)^2$$

$\Delta p_{min}: \text{kPa}$
 $\dot{V}_{max}: \text{m}^3/\text{h}$
 $k_{vs \text{ theor.}}: \text{m}^3/\text{h}$

Example (DN25 with the desired maximum flow rate = 50% \dot{V}_{nom})

EP025R+MP
 $k_{vs \text{ theor.}} = 8.6 \text{ m}^3/\text{h}$
 $\dot{V}_{nom} = 69 \text{ l/min}$
 $50\% * 69 \text{ l/min} = 34.5 \text{ l/min} = 2.07 \text{ m}^3/\text{h}$

$$\Delta p_{min} = 100 \times \left(\frac{\dot{V}_{max}}{k_{vs \text{ theor.}}} \right)^2 = 100 \times \left(\frac{2.07 \text{ m}^3/\text{h}}{8.6 \text{ m}^3/\text{h}} \right)^2 = 6 \text{ kPa}$$

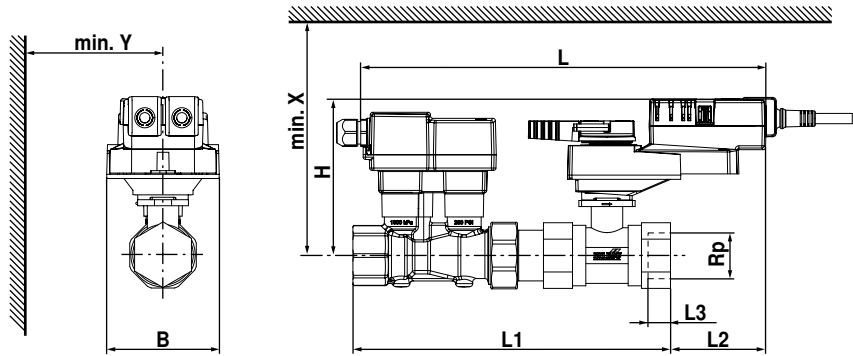
Example (DN100 with the desired maximum flow rate = 50% \dot{V}_{nom})

P6100W2000E-MP
 $k_{vs \text{ theor.}} = 115 \text{ m}^3/\text{h}$
 $\dot{V}_{nom} = 1200 \text{ l/min}$
 $50\% * 1200 \text{ l/min} = 600 \text{ l/min} = 36 \text{ m}^3/\text{h}$

$$\Delta p_{min} = 100 \times \left(\frac{\dot{V}_{max}}{k_{vs \text{ theor.}}} \right)^2 = 100 \times \left(\frac{36 \text{ m}^3/\text{h}}{115 \text{ m}^3/\text{h}} \right)^2 = 10 \text{ kPa}$$

Dimensions [mm] / weight

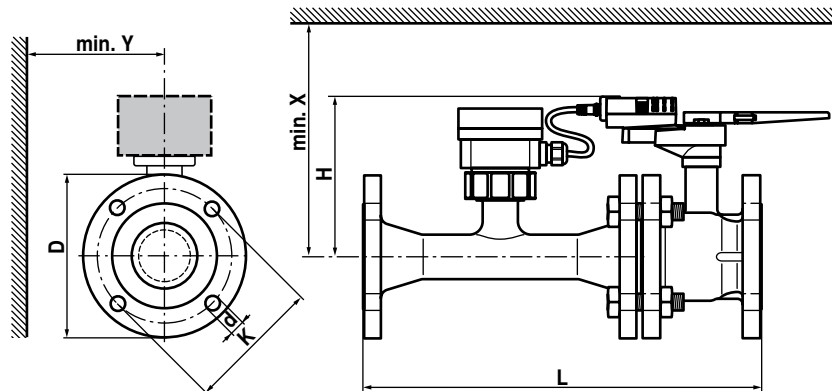
Dimensional drawings



| Type | DN [mm] | L [mm] | L1 [mm] | L2 [mm] | L3 [mm] | B [mm] | H [mm] | X [mm] | Y [mm] | Weight approx. [kg] |
|-------------|---------|--------|---------|---------|---------|--------|--------|--------|--------|---------------------|
| EP015R+MP | 15 | 276 | 191 | 81 | 13 | 75 | 125 | 195 | 77 | 1.5 |
| EP020R+MP | 20 | 283 | 203 | 75 | 14 | 75 | 125 | 195 | 77 | 1.8 |
| EP025R+MP | 25 | 296 | 231 | 71 | 16 | 75 | 127 | 197 | 77 | 2.0 |
| EP032R+MP | 32 | 322 | 254 | 68 | 19 | 75 | 131 | 201 | 77 | 2.8 |
| EP040R+MP | 40 | 332 | 274 | 65 | 19 | 75 | 141 | 211 | 77 | 3.3 |
| EP050R+MP | 50 | 339 | 284 | 69 | 22 | 75 | 142 | 212 | 77 | 4.4 |
| EP050R+MP-N | 50 | 339 | 284 | 69 | 22 | 75 | 142 | 212 | 77 | 4.4 |

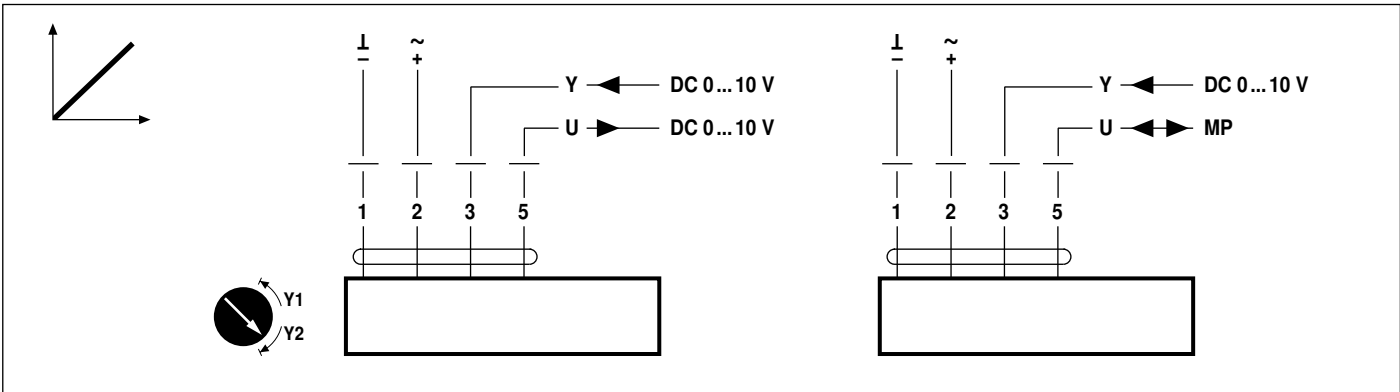
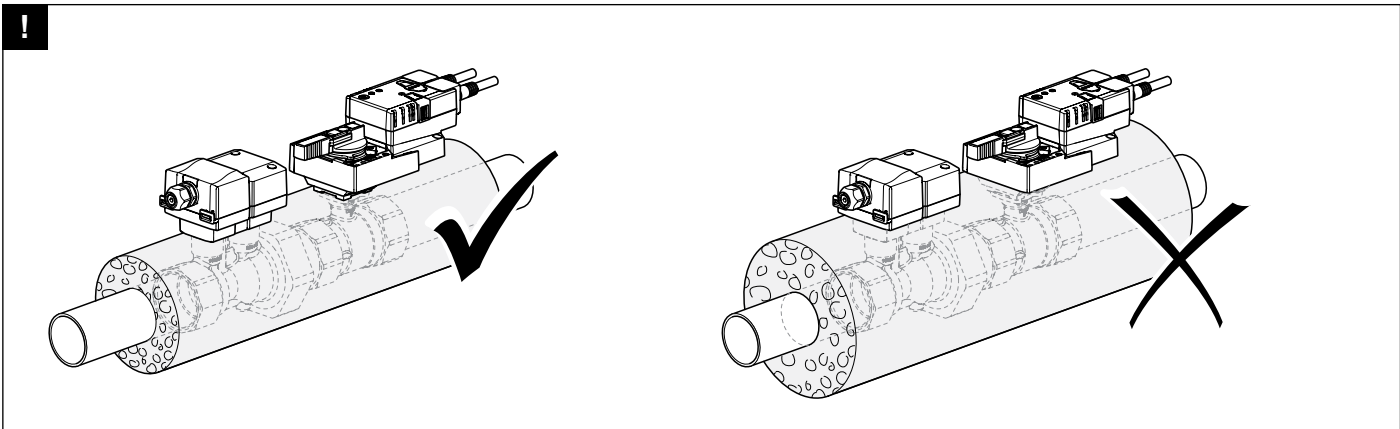
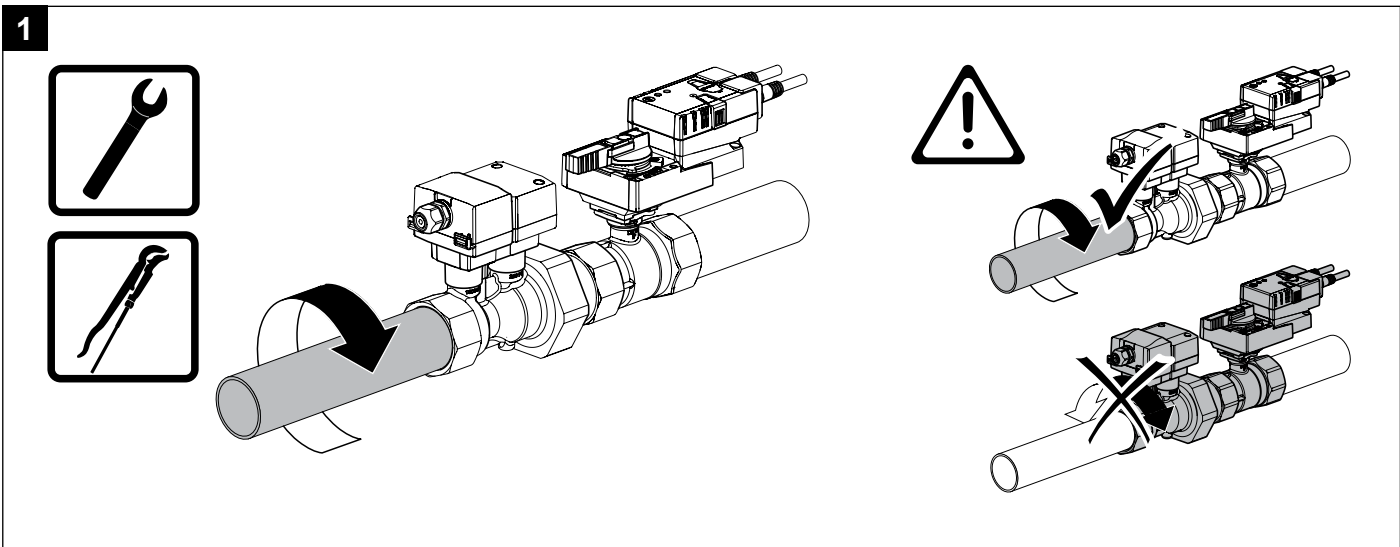
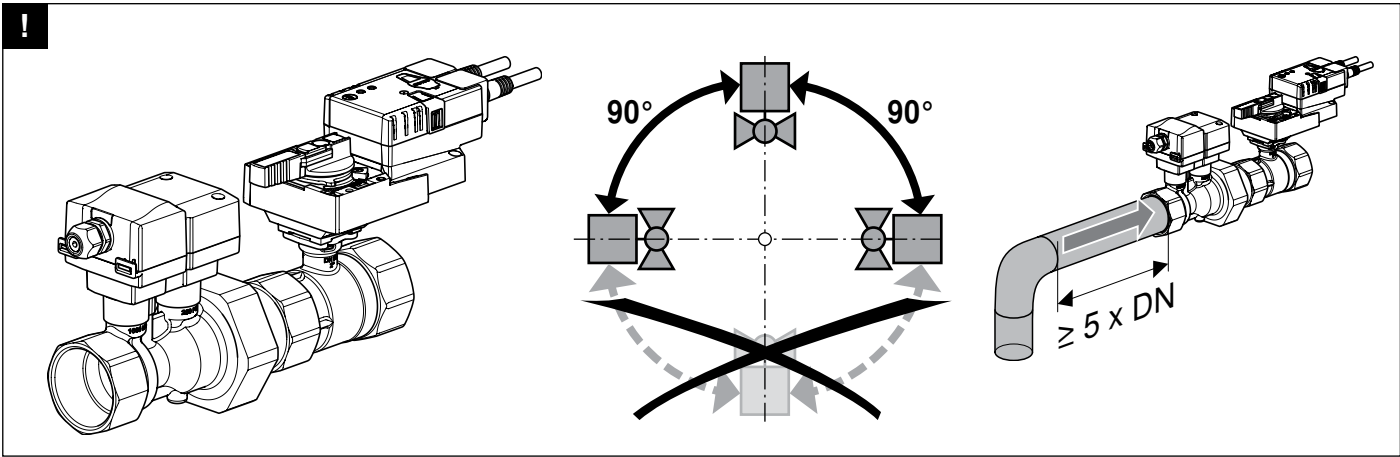
Dimensions [mm] / weight

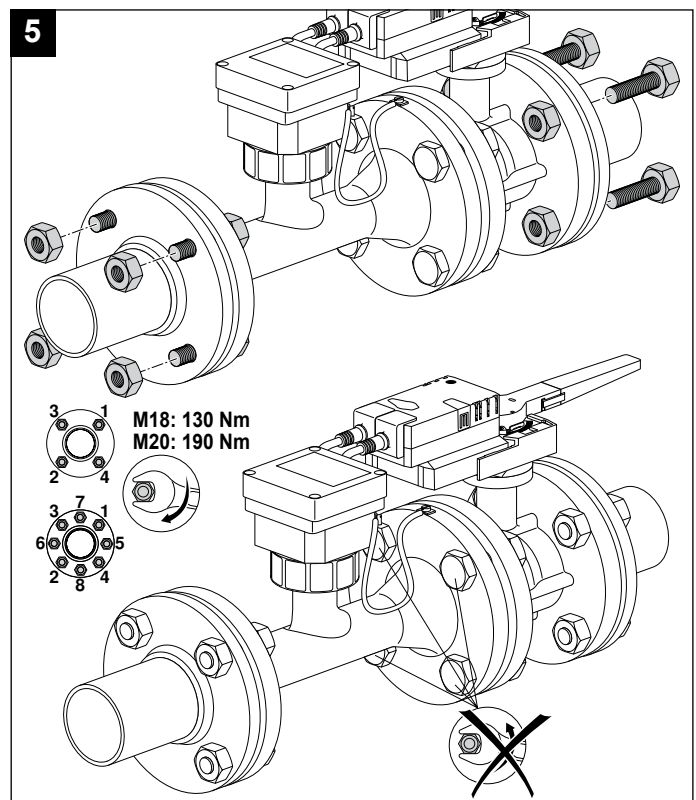
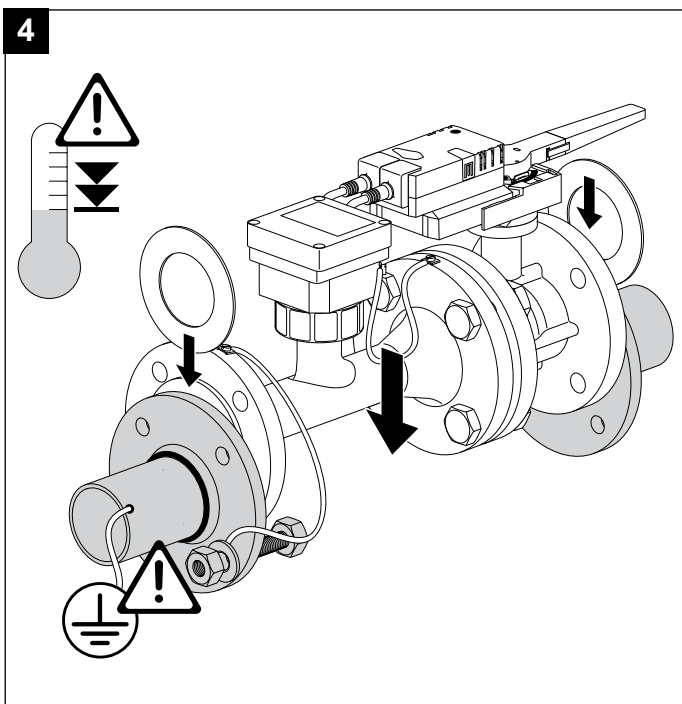
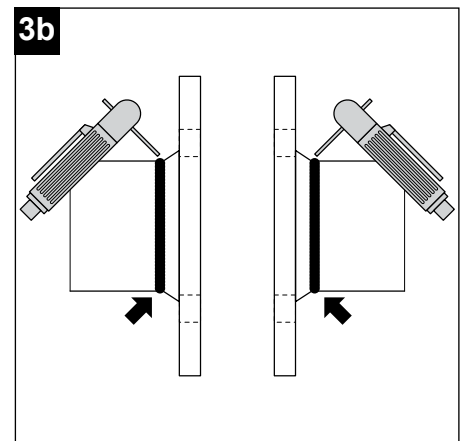
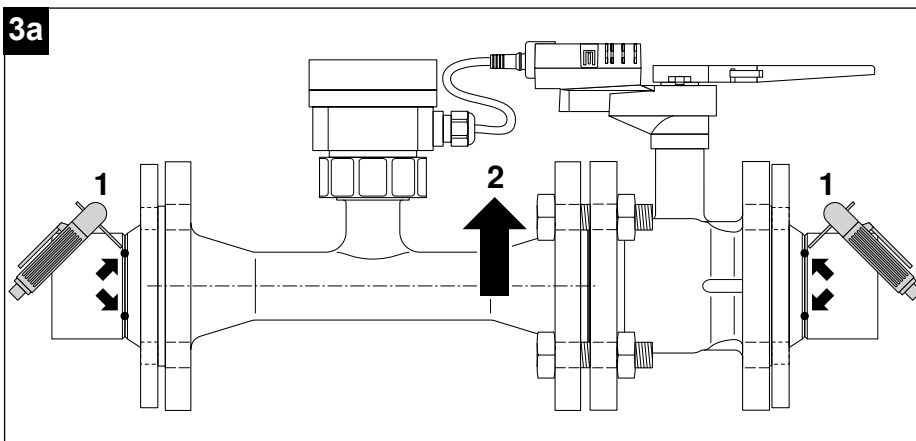
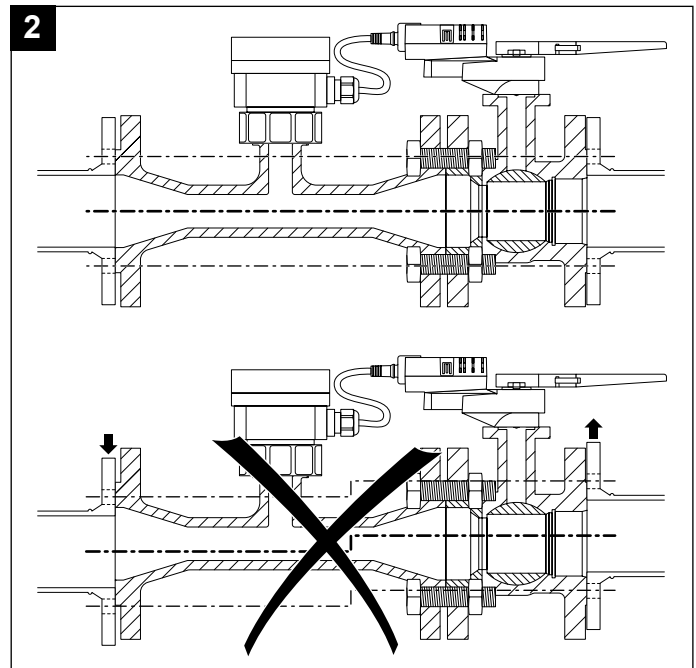
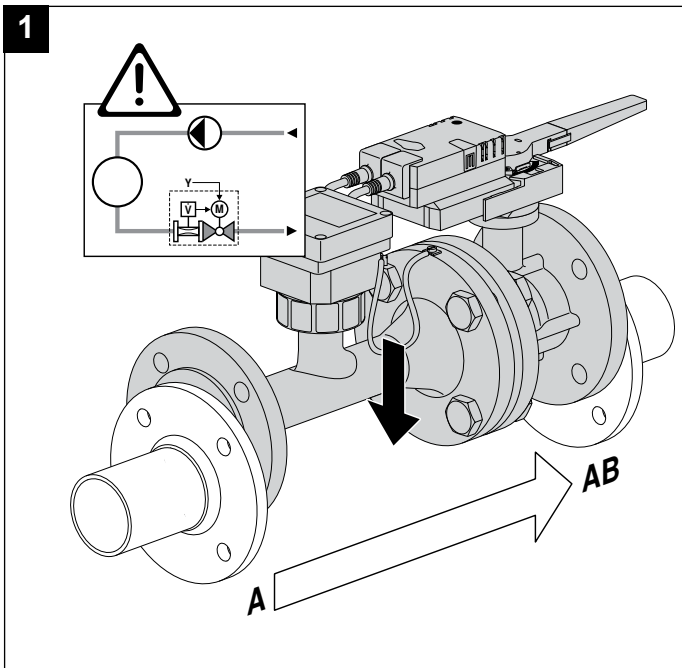
Dimensional drawings

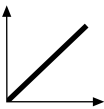
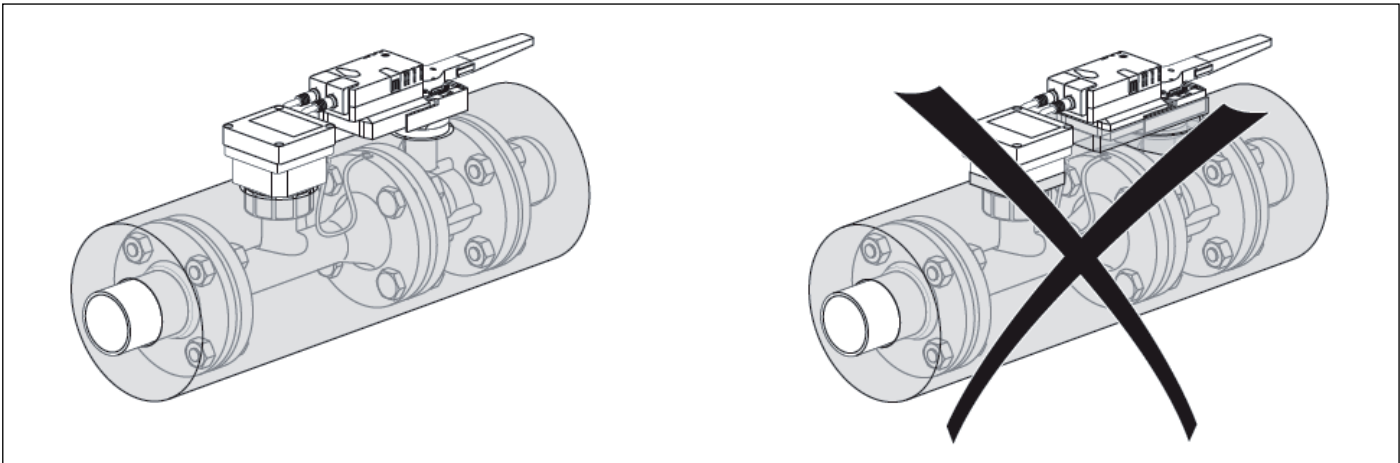
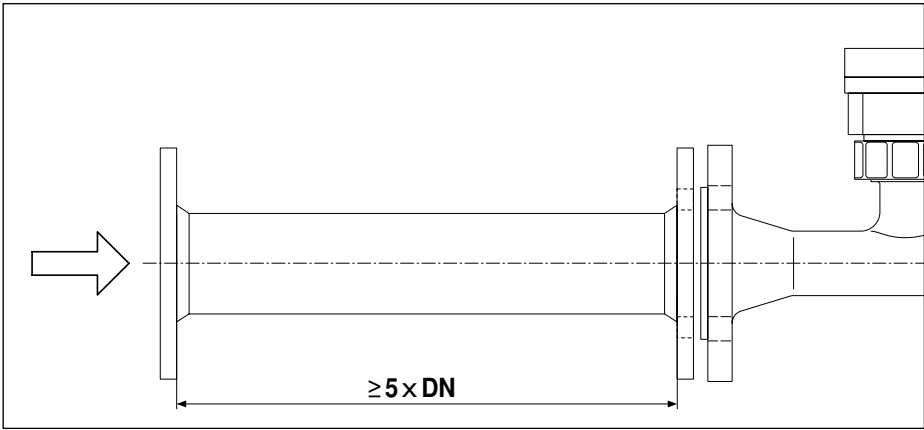
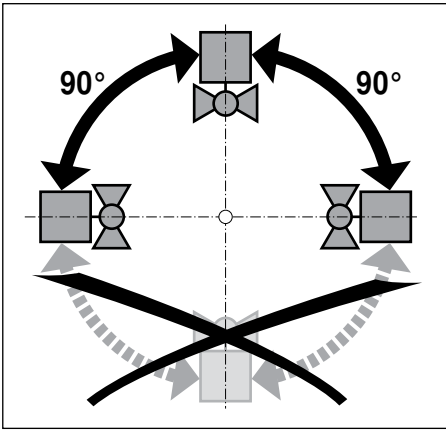


If Y < 180 mm, then the extension of the hand crank must be dismantled as necessary.

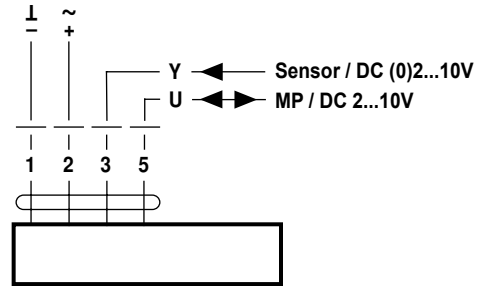
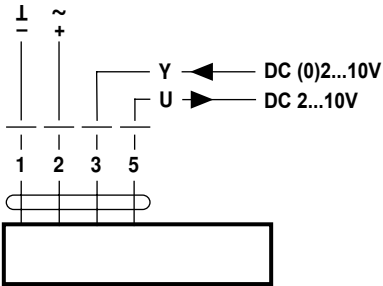
| Type | DN [mm] | L [mm] | H [mm] | D [mm] | d [mm] | K [mm] | X [mm] | Y [mm] | Weight approx. [kg] |
|----------------|---------|--------|--------|--------|--------|--------|--------|--------|---------------------|
| P6065W800E-MP | 65 | 454 | 200 | 185 | 4 x 19 | 145 | 220 | 150 | 23.2 |
| P6080W1100E-MP | 80 | 499 | 200 | 200 | 8 x 19 | 160 | 220 | 160 | 28.3 |
| P6100W2000E-MP | 100 | 582 | 220 | 229 | 8 x 19 | 180 | 240 | 175 | 41.2 |
| P6125W3100E-MP | 125 | 640 | 240 | 252 | 8 x 19 | 210 | 260 | 190 | 54.3 |
| P6150W4500E-MP | 150 | 767 | 240 | 282 | 8 x 23 | 240 | 260 | 200 | 69.6 |
| P6065W806E-MP | 65 | 454 | 200 | 185 | 4 x 19 | 145 | 220 | 150 | 23.2 |
| P6080W1106E-MP | 80 | 499 | 200 | 200 | 8 x 19 | 160 | 220 | 160 | 28.3 |
| P6100W2006E-MP | 100 | 582 | 220 | 229 | 8 x 19 | 180 | 240 | 175 | 41.2 |
| P6125W3106E-MP | 125 | 640 | 240 | 252 | 8 x 19 | 210 | 260 | 190 | 54.3 |
| P6150W4506E-MP | 150 | 767 | 240 | 282 | 8 x 23 | 240 | 260 | 200 | 69.6 |

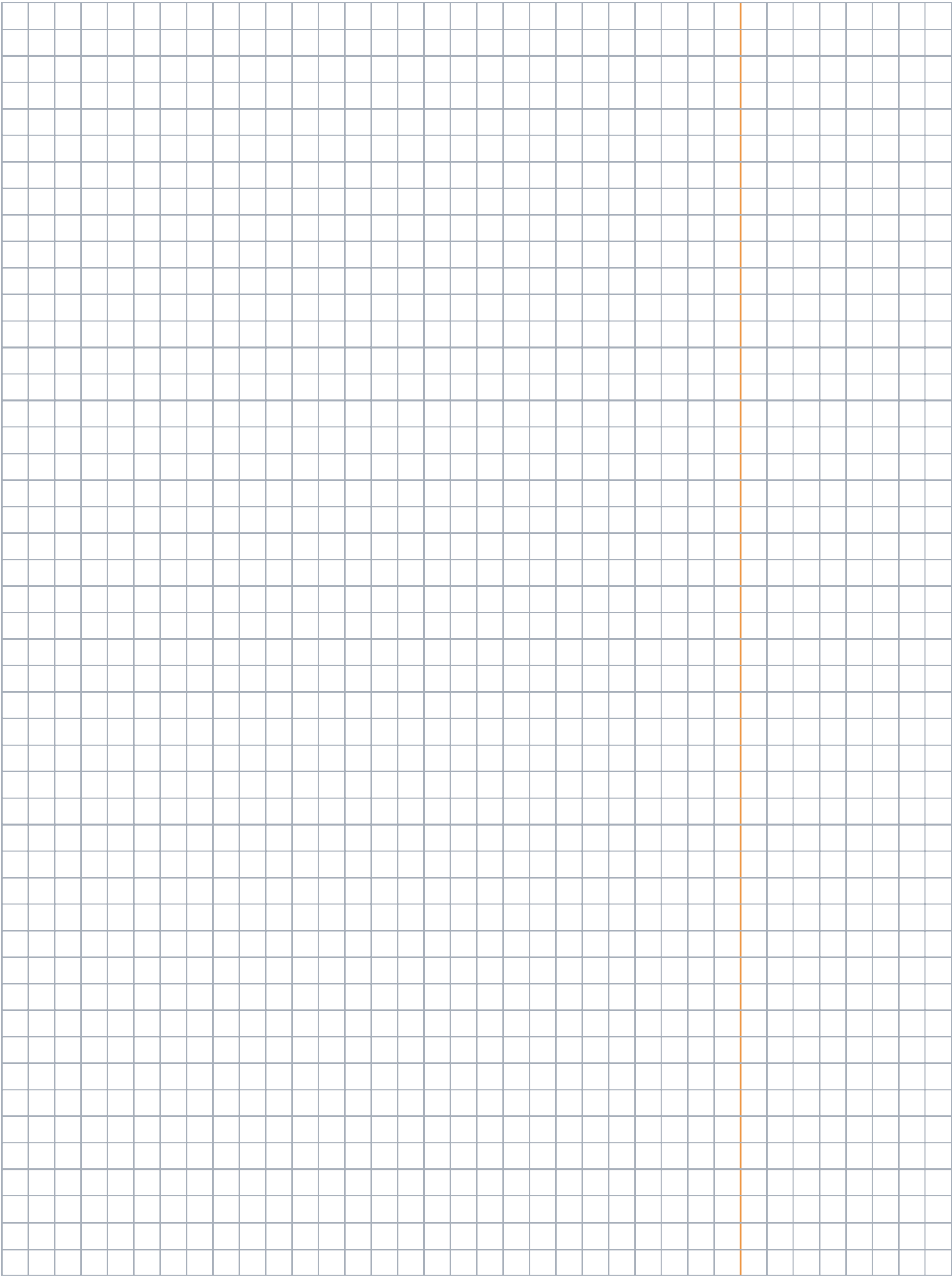






AC 24 V / DC 24 V





ASIA PACIFIC HEADQUARTERS**Belimo Actuators Ltd.**

Room 1601-6, 16/F, New Commerce Centre
19 On Sum Street, Shatin, N.T., Hong Kong
Tel: +852 2687 1716
Fax: +852 2687 1795
E-mail: info.asiapacific@belimo.ch

Belimo AUSTRALIA**Melbourne Office:**

Belimo Actuators Pty. Ltd.
12 Enterprise Court
Mulgrave Business Park
Mulgrave, VIC 3170, Australia
Tel: +61-(0)3-8585 7800
Fax: +61-(0)3-8585 7811
E-mail: info.australia@belimo.ch

Sydney Office:

Belimo Actuators Pty. Ltd.
Suite 2.20, 32 Delhi Road
North Ryde, NSW 2113, Australia
Tel: +61 (0)2 9805 1777
Fax: +61 (0)2 9805 1722
E-mail: info.australia@belimo.ch

Belimo CHINA**Shanghai Office:**

Belimo Actuators (Shanghai) Trading Ltd.
479 Chun Dong Road, Building C-2
Xin Zhuang Industry Park
Shanghai 201108, P.R. China
Tel: +86 21 5483 2929
Fax: +86 21 5483 2930
E-mail: info.shanghai@belimo.ch

Beijing Office:

Belimo Actuators Ltd.
Unit 1528-1530, 15F, Tower A,
Jiatai International Mansion,
No. 41, Middle East Fourth Ring Road,
Chaoyang District, Beijing, 100025, P.R. China
Tel: +86 10 6462 1382/1386
Fax: +86 10 6462 1383
E-mail: info.beijing@belimo.ch

Chongqing Office:

Belimo Actuators Ltd.
Room 4, 9th floor, Unit 7, Luoma Jiari Gardan
No. 36, Qing Ling Road, Nan'an District
Chongqing 400060, P.R. China
Tel: +86 23 6275 3155
Fax: +86 23 6280 33 80 *519
E-mail: info.chongqing@belimo.ch

Guangzhou Office:

Belimo Actuators Ltd.
Room 5217-5218, China International Centre,
Tower B, 33 Zhong Shan San Road, Yuexiu District,
Guangzhou 510055, P.R. China
Tel: +86 20 3435 1860
Fax: +86 20 3435 1870
E-mail: info.guangzhou@belimo.ch

Belimo HONG KONG**Hong Kong Office:**

Belimo Actuators Ltd.
Room 1601-6, 16/F, New Commerce Centre
19 On Sum Street, Shatin, N.T., Hong Kong
Tel: +852 2687 1716
Fax: +852 2687 1795
E-mail: info.hongkong@belimo.ch

Indonesia Office:

Belimo Actuators Ltd.
Graha Kencana Building 8th Floor Block B
Jl. Raya Perjuangan 88
Kebon Jeruk - Jakarta Barat 11530, Indonesia
Tel: +62 21 5367 8278
Fax: +62 21 5366 0688
E-mail: info.indonesia@belimo.ch

Japan Office:

Belimo Actuators Ltd.
2nd Floor, Yamaki Building III
3-1-5 Azumabashi, Sumida-ku
Tokyo 130-0001
Japan
Tel: +81 3 6823 6961
Fax: +81 3 3626 3911
E-mail: info.japan@belimo.ch

Malaysia Office:

Belimo Actuators Ltd
S-13-12, First Subang,
Jalan SS15/4G, 47500 Subang Jaya
Selangor, Malaysia
Tel: +03-56125833
Fax: +03-56125233
E-mail: info.malaysia@belimo.ch

Singapore Office

Belimo Actuators Ltd.
1 Tannery Road #08-04
One Tannery, Singapore 347719
Tel: +65 6842 1626
Fax: +65 6842 1630
E-mail: info.singapore@belimo.ch

Taiwan Office:

Belimo Actuators Ltd.
7F-2, No.343, Jhonghe Rd., Yonghe District,
New Taipei City 234, Taiwan
Tel: +886 2 2922 8805
Fax: +886 2 2922 8806
E-mail: info.taiwan@belimo.ch

Thailand Office:

Belimo Actuators Ltd.
90/2 Pensiri Place, Soi Phaholyothin 32
Phaholyothin Road, Chandrakasem, Jatujak
Bangkok 10900, Thailand
Tel: +662 9415582-3
Fax: +662 9415584
E-mail: info.thailand@belimo.ch

Belimo INDIA**Mumbai Office:**

Belimo Actuators India Pvt. Ltd.
23/ ABCD, Govt. Industrial Estate
Charkop, Kandivali West
Mumbai 400067, India
Tel: +91 22 4025 4800
Fax: +91 22 4025 4899
E-mail: info.india@belimo.ch

Bangalore office:

Belimo Actuators India Pvt. Ltd.
Sreerama Complex,
No. 13, 2nd Floor, 5th Cross Road
6th Block, Koramangala
Bangalore – 560097, India
Tel: +91-80-40906311
Fax: +91-80-40906288
E-mail: info.india@belimo.ch

New Delhi Office:

Belimo Actuators India Pvt. Ltd.
Flat No. 515, DLF Tower – B
Jasola Distt. Centre, Jasola
New Delhi 110025, India
Tel: +91 11 41078501
Fax: +91 11 41078508
E-mail: info.india@belimo.ch

Chennai Office:

Belimo Actuators India Pvt. Ltd.
Flat no.3B, Urmilla House
#15, ARK Colony, Eldams Road
Chennai-600 018, India
Tel: +91 44 24355154/5153
E-mail: info.india@belimo.ch

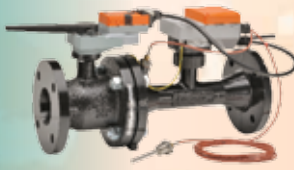
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Belimo regional head offices

EU BELIMO Automation AG
Brunnenbachstrasse 1
8340 Hinwil, Switzerland
Tel: +41 43 843 61 11
Fax: +41 43 843 62 68
E-mail: info@belimo.ch

AP Belimo Actuators Ltd.
Room 1601-6, 16/F, New Commerce Centre
19 On Sum Street, Shatin, N.T., Hong Kong
Tel: +852 2687 1716
Fax: +852 2687 1795
E-mail: info.asiapacific@belimo.ch

US BELIMO Aircontrol (USA), Inc.
33 Turner Road
Danbury, CT 06810
USA
Tel: +800 543-9038 / 203 791-9915
Fax: +800 228-8283 / 203 791-9919

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