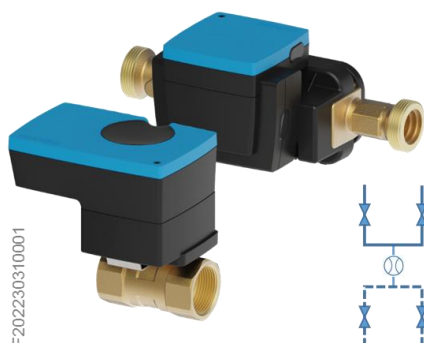




F202230310001

**DXMB4P040C.111621**

#### dynamx™ flow-control control valves 'Quattro', type DXMB4\_

- Electronic pressure-independent flow control
- Integrated flow measurement
- For change-over heating/cooling systems (4-pipe)
- Dynamic hydraulic balancing at full load and partial load
- Supply voltage  $U_v$  : AC/DC 24Volt
- Flow rate setpoint via control signal Y1: 0..10Vdc
- Integrated  $\Delta T$  measurement
- MP *MultiProtocol*: MODBUS RTU and BACnet MSTP communication
- Wireless commissioning via Bluetooth® communication and APP

0..20,000 l/h



DN15..DN50

#### Dynamic Flow Networking®

The dynamx™ valves are designed for automatic and hydraulic balancing and simultaneous real-time flow control, eliminating the need for static balancing valves. The dynamx™ valves ensure perfect hydraulic balance in the hydraulic network, both at full load and partial load, without the need for additional components: Dynamic Flow Networking® (DFN).



DFN™



#### Advantages

- ✓ 5-in-1 solution
- ✓ Variable flow rate
- ✓ Automatic balancing
- ✓ Flow and energy registration
- ✓ MP *MultiProtocol* via RS485
- ✓ separate setpoints  $V_{smax}$  for heating/cooling
- ✓ extremely simple cabling
- ✓ wireless commissioning
- ✓ patented technology

#### Description

The dynamx™ 'Quattro' valves, series DXMB4\_, combine five functions: (1) a control valve, (2) a dynamic pressure-independent balancing valve, (3) a shut-off valve, (4) an energy meter, and (5) a change-over valve.

DXMB4\_ is used in HVAC systems with variable flow rates and is designed for air handling units, heat exchangers, etc. DXMB4 \_C replaces both the (static) balancing valve and the control valve and change-over valves.

The DXMB4\_ series is available with different flow rates for optimal dimensioning.

DXMB4\_ can be used in HVAC systems for buildings with a nominal system pressure of 16 bar (PN16) and water temperatures: +2°C..+100°C <sup>1)</sup> (non-condensing).

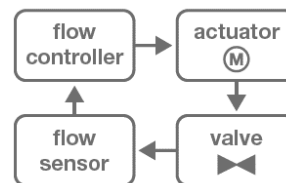
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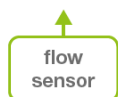
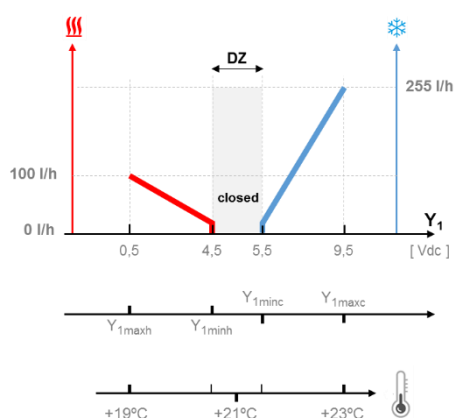
## 1. Operation

The dynamx™ valves are designed to accurately control the flow rate in each consumer. To this end, dynamx™ has four basic building blocks:

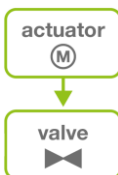
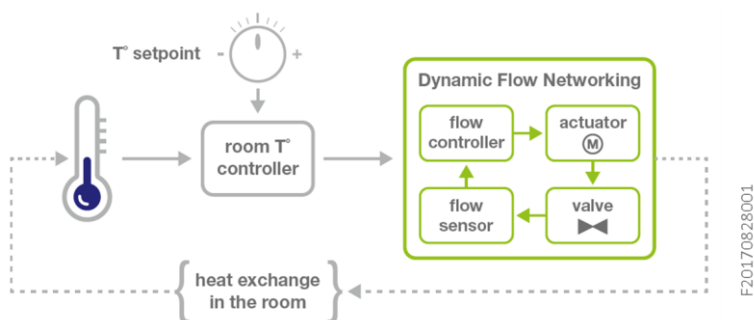
- a control valve
- an actuator
- a flow sensor
- a flow controller



In *analog* mode, the internal flow controller of the dynamx™ receives a setpoint from the room T° controller via a split range  $Y_1$  : 0..10Vdc control signal (heating : 0.5..4.5Vdc and cooling : 5.5..9.5Vdc). Internally, this setpoint is converted to a flow rate setpoint, i.e. heating or cooling. Example:



The integrated flow sensor continuously measures the actual flow rate. The internal control loop compares the actual flow rate with the desired flow rate and adjusts the position of the control valve so that the measured flow rate corresponds to the flow rate setpoint.



DXMB4\_ will control the flow rate to a specified setpoint, regardless of any pressure changes in the system, e.g., during partial load. The control valve automatically adjusts to the system parameters and searches for the ideal setpoint with the aim of maximizing user comfort with minimum energy consumption. The feedback signal  $X_{(1)}$  : 0..10Vdc indicates the current flow rate and can be used to monitor the current flow rate.



Thanks to this innovative technology, dynamx™ valves can be used in a much wider flow range than conventional control valves. The dynamx™ valves are available in different flow ranges, allowing for optimal selection and reduced pump energy consumption.



dynamx™ DXMB4\_ valves can be supplied with an optional MODBUS RTU/MSTP or BACnet MSTP bus communication interface. By integrating dynamx™ valves into a MODBUS or BACnet network, the setpoint can be adjusted via the bus, the flow rate can be managed remotely, etc. A selection of commissioning settings can also be adjusted via the bus.

## 2. Technical characteristics

|                                            |                                                                                                               |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>Electrical</b>                          |                                                                                                               |
| <b>Supply voltage U<sub>v</sub></b>        | AC 24 Volt (±20%), 50Hz<br>DC 24 volts (±10%)                                                                 |
| <b>Input signal Y<sub>1</sub></b>          | 0..10Vdc (0.17mA) , split range                                                                               |
| <b>Feedback signal X<sub>1</sub></b>       | 0..10Vdc (≤ 2mA) actual flow rate, scaled to max. set flow rate heating or cooling                            |
| <b>Electrical connection <sup>1)</sup></b> | 1m PVC cable, 7x 0.5mm <sup>2</sup>                                                                           |
| <b>Connection of drives</b>                | 1m PVC cable, 4x 0.5mm <sup>2</sup>                                                                           |
| <b>Flow measurement</b>                    |                                                                                                               |
| <b>Sensor type</b>                         | ultrasonic TTM, no moving parts                                                                               |
| <b>Sensor class</b>                        | compliant with 2014/32/EU and EN1434-4:2007                                                                   |
| <b>Measurement unit</b>                    | m <sup>3</sup> /h <sup>2)</sup> , l/s, l/min, gpm (UK), gpm (US)                                              |
| <b>Temperature measurement</b>             |                                                                                                               |
| <b>Sensor type</b>                         | Pt1000 in accordance with EN60751                                                                             |
| <b>Paired sensors</b>                      | compliant with MID-2014/32/EU, EN1434-4:2007                                                                  |
| <b>Hydraulic</b>                           |                                                                                                               |
| <b>Nominal pressure</b>                    | PN16 (16 bar) <sup>3)</sup>                                                                                   |
| <b>Control characteristic</b>              | equal percentage <sup>2)</sup> or linear                                                                      |
| <b>Leakage rate</b>                        | 0.001% of K <sub>vs</sub> value                                                                               |
| <b>Differential pressure</b>               | <i>min.</i> no minimum differential pressure required<br><i>max.</i> 240 kPa                                  |
| <b>Flow rate setpoint adjustment</b>       | analog (Y <sub>1</sub> ), via bus communication or via Bluetooth® communication and license-free APP          |
| <b>Medium</b>                              | water (without glycol)                                                                                        |
| <b>Medium quality</b>                      | in accordance with VDI 2035                                                                                   |
| <b>Medium temperature</b>                  | +2°C to +100°C                                                                                                |
| <b>Connection</b>                          | <i>flow sensor</i> flat coupling external thread ISO228-1<br><i>2-port valves</i> internal thread ISO7/1 (Rp) |
| <b>Start-up time</b>                       | 3..5min after switching on power supply                                                                       |
| <b>De-energized position</b>               | last position                                                                                                 |
| <b>Material</b>                            |                                                                                                               |
| <b>Housing</b>                             | polypropylene, steel                                                                                          |
| <b>Wet parts</b>                           | brass, bronze, EPDM, stainless steel (1.4401, 1.4122, and 1.4301), thermoplastics<br>ceramic materials        |
| <b>Environment</b>                         |                                                                                                               |
| <b>Humidity</b>                            | maximum 90% RH, without condensation                                                                          |
| <b>Mechanical environment</b>              | M1 (fixed installation with minimal vibrations)                                                               |
| <b>Maintenance/Calibration</b>             | No maintenance, no calibration                                                                                |
| <b>Temperature</b>                         | <i>Environment</i> +10°C to +45°C<br><i>storage</i> -20°C .. +50°C                                            |

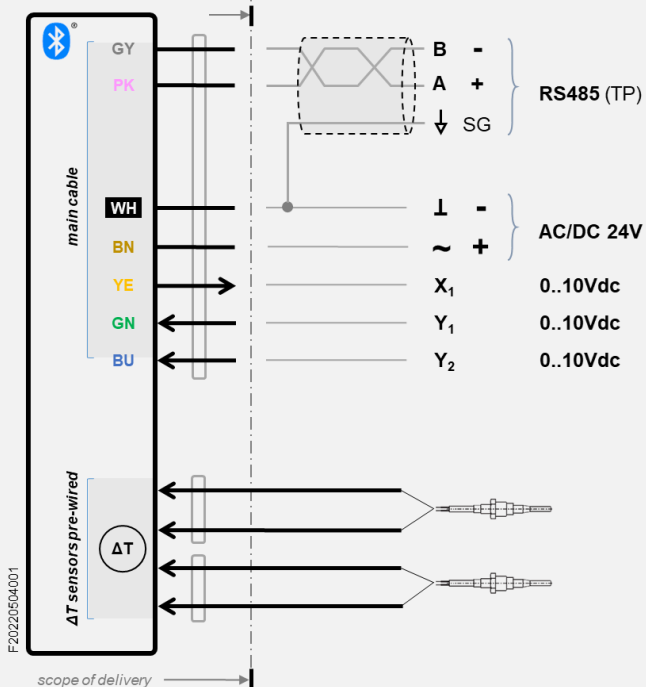
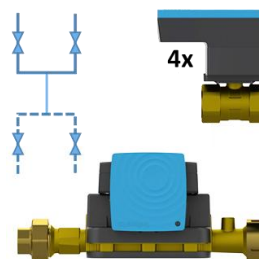
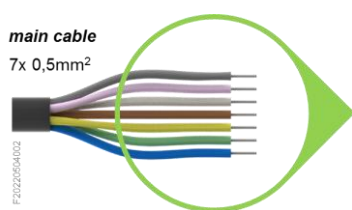
<sup>1)</sup> Number of wires depending on the version number

<sup>2)</sup> factory default setting

<sup>3)</sup> The specified pressures are maximum values limited by the maximum permissible temperatures in the pressure-temperature diagram.

### 3. Electrical connection

DXMB4\_ 111621



power supply

feedback signal (actual flow V<sub>am</sub>)

control signal (flow setpoint)

extra sensor input <sup>1)</sup> (remote I/O)

<sup>1)</sup> optional

SG : signal ground

| WH    | BN    | GN    | YE     | BU    | PK   | GY    |
|-------|-------|-------|--------|-------|------|-------|
| white | brown | green | yellow | blue  | pink | grey  |
| wit   | bruin | groen | geel   | blauw | roos | grijs |
| blanc | brun  | vert  | jaune  | bleu  | rose | gris  |
| weiß  | braun | grün  | gelb   | blau  | pink | grau  |

Individual wires are color coded, no numbering. Color coding according DIN 47100.



A low-voltage transformer must be used in accordance with local regulations.



Always maintain the correct polarity with alternating current!

Complies with the Electromagnetic Compatibility Directive 2014/32/EU, according to the applicable standards

- EN 61000-3-2 (2014)
- EN 61000-3-3 (2013)
- EN 61000-6-1 (2007)
- EN 61000-6-3 (2007) ( A1: 2011 / AC: 2012 )

#### 4. MP MultiProtocol



The *dynamx*™ DXMB4\_ control valves can optionally be supplied with an RS485 bus communication interface with MP *MultiProtocol* functionality for easy integration<sup>1)</sup> into any building management system (BMS).

Thanks to this MP *MultiProtocol* communication, the DXMB4\_ valves can be integrated into various types of networks:

- MODBUS
- BACnet
- Bluetooth®

By integrating the *dynamx*™ control valves into a MODBUS or BACnet network, the set point can also be controlled by the bus, the actual flow rate can be monitored remotely, etc. The bus also offers the possibility to adjust a selection of settings.

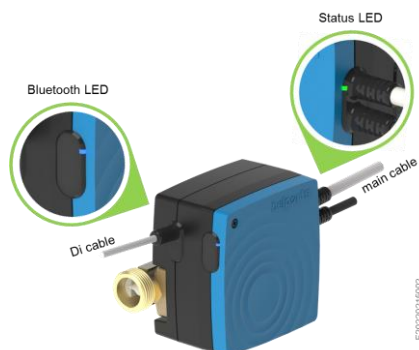
##### System integration

|                                             |                   |                                                                                                                                            |
|---------------------------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Protocol</b>                             | <b>MODBUS</b>     | RTU/MSTP, slave                                                                                                                            |
|                                             | <b>BACnet</b>     | MSTP, slave                                                                                                                                |
|                                             | <b>Bluetooth®</b> | with license-free APP dxLink 21™                                                                                                           |
| <b>Physical layer wired network</b>         |                   | RS485, non-isolated                                                                                                                        |
| <b>Bus cable type</b>                       |                   | 2-wire twisted pair with common shielded twisted pair STP or FTP                                                                           |
| <b>Unit load</b>                            |                   | 1/8                                                                                                                                        |
| <b>Terminating resistor</b>                 |                   | 120Ω terminating resistor at each end of the bus                                                                                           |
| <b>Communication settings <sup>2)</sup></b> |                   | 9600, 19200, or <b>38400</b> <sup>3)</sup> Baud<br>1 start bit<br><b>even</b> <sup>3)</sup> / odd / no parity<br>8 data bits<br>1 stop bit |
| <b>Topology</b>                             |                   | multi-drop bus, maximum length 1,000 m                                                                                                     |
| <b>Stub length</b>                          |                   | maximum 1 m, preferably in daisy chain                                                                                                     |

<sup>1)</sup> The installer is responsible for complying with local EMC regulations when installing, connecting, and commissioning the DXMB4 in a communication bus network.

<sup>2)</sup> Can be set via the Bluetooth® dxLink21™ APP or via the dxLink™ MS Windows commissioning tool via MODBUS communication

## 5. Status LED



The integrated LEDs provide useful information that can assist with the start-up and commissioning of the installation.

### Status

-  Power supply voltage
-  Bluetooth® communication
-  bus network

## 6. Wireless commissioning

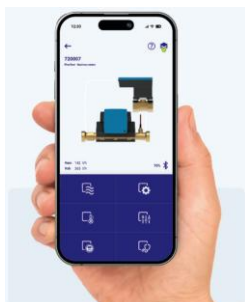
dxLink21™

Thanks to integrated Bluetooth® technology, DXMB4\_ valves offer a wireless interface for commissioning purposes.

There is no easier way to install and correctly commission your hydraulic systems than with the dxLink™21 APP.

This function can be used simultaneously with MODBUS or BACnet bus communication.

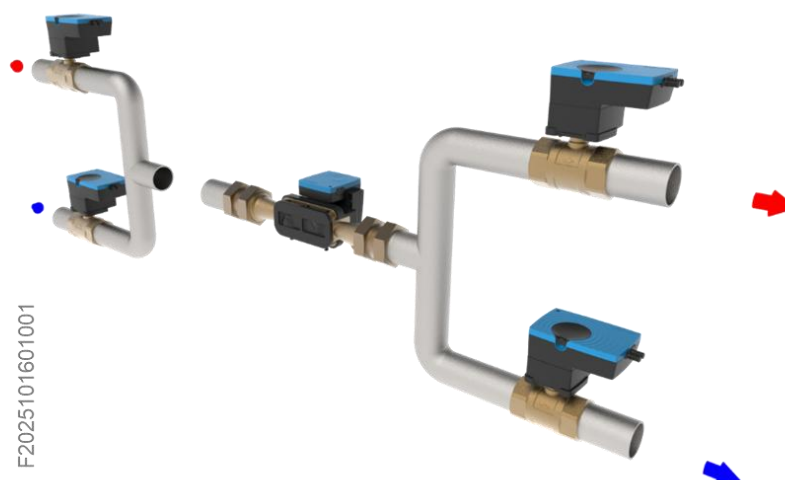
*Note: these functions may not be available on all versions, please check the order information*



## 7. Hydraulic connection

### Flow direction

Both the 2-way valves of the DXMB4\_ and the *dynamx*™ flow control unit have a fixed flow direction. An arrow on the valve body and flow sensor indicates the inlet and outlet ports.

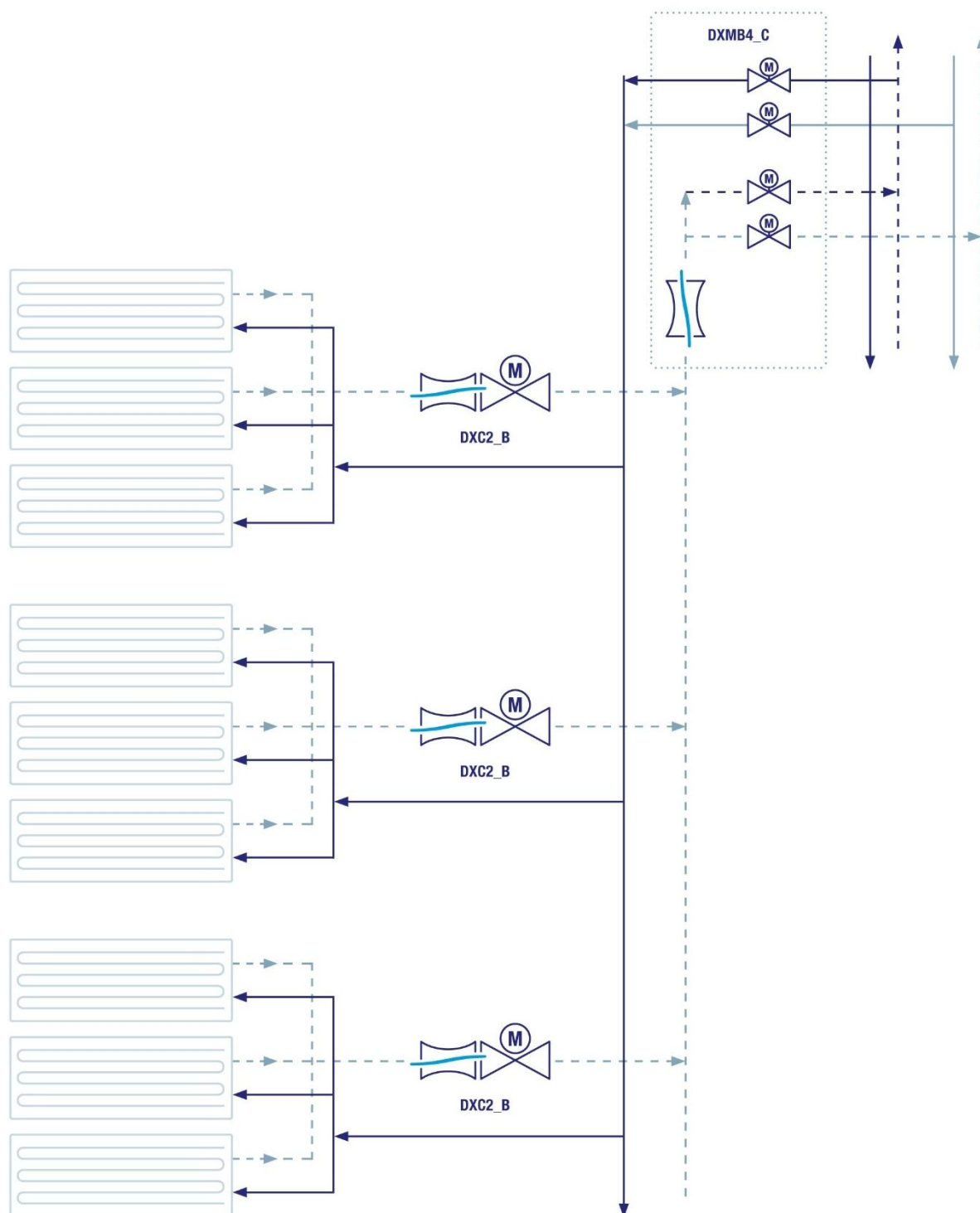


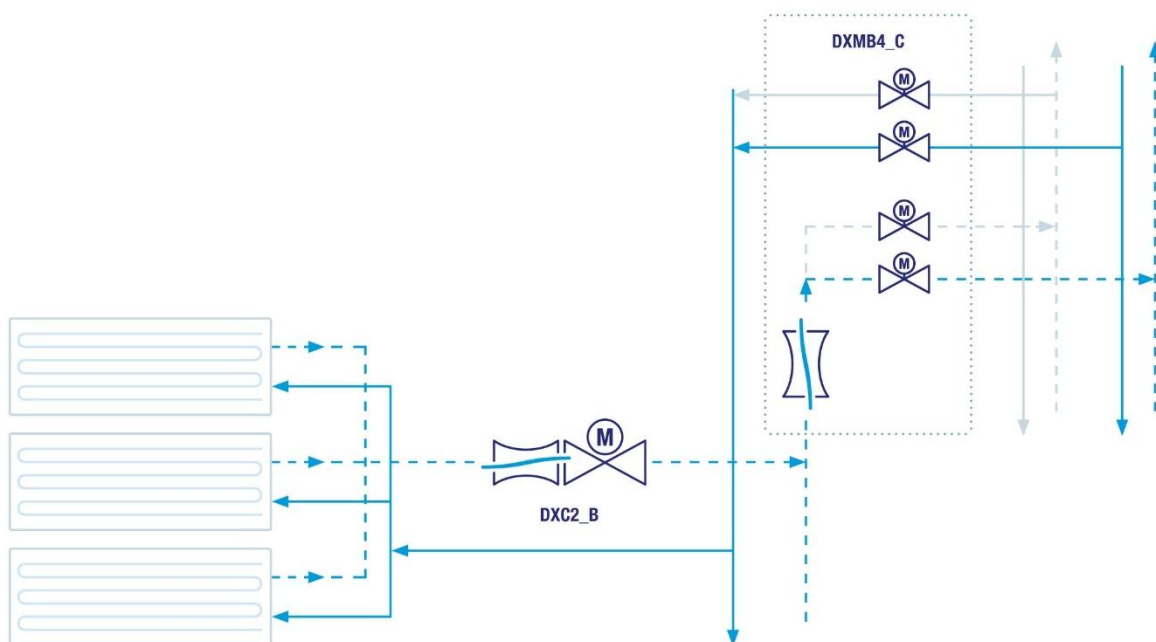
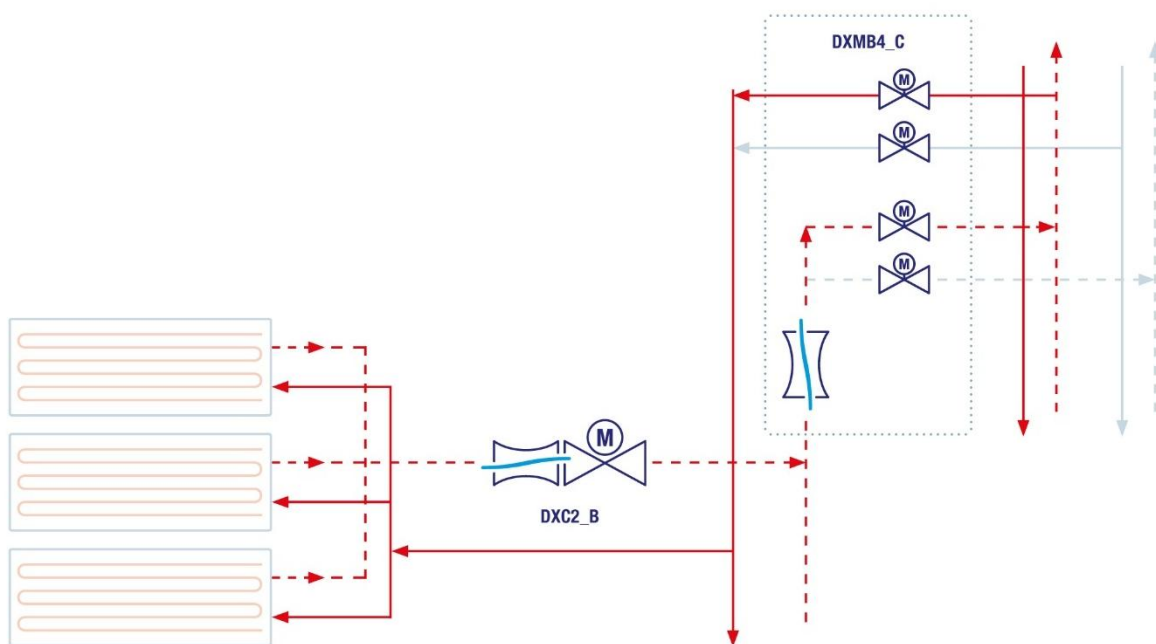
### Changeover

DXMB4\_ Quattro has a built-in safety feature that prevents cold and hot water from mixing, specifically during changeover. This is achieved by checking for zero flow after closing one circuit before opening the other circuit.

## 8. Applications

1 | 2



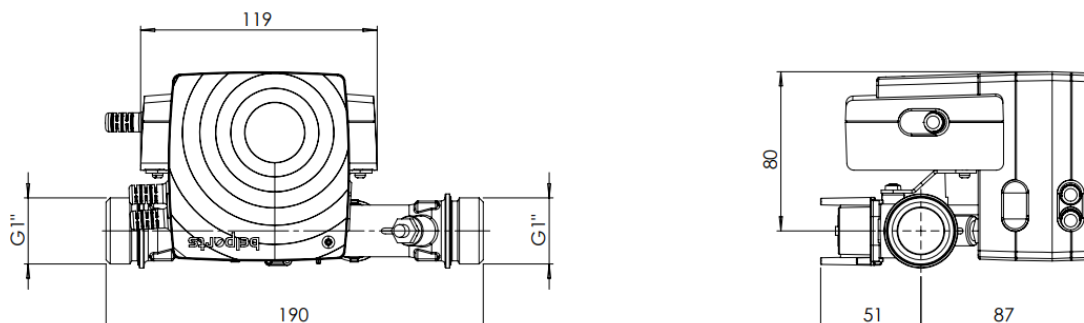


**9. Dimensions**

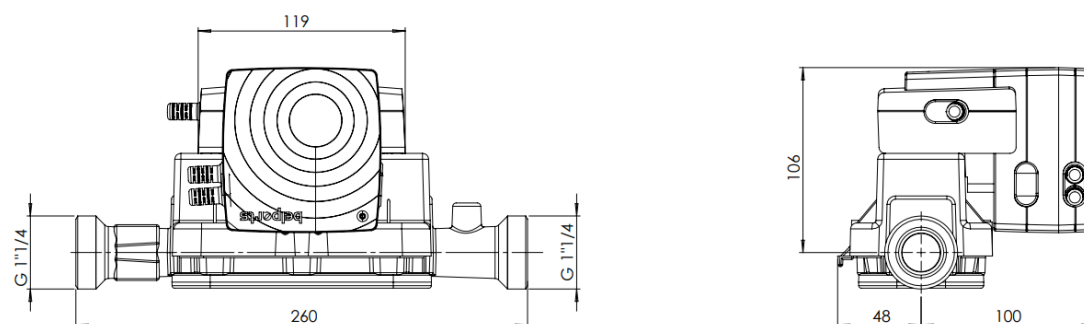
**Master Units**

**1 | 2**

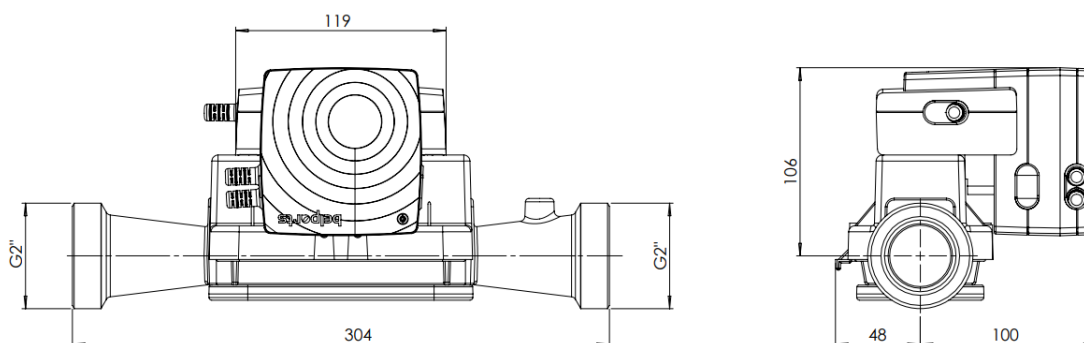
**DN15**



**DN20 / DN25 / DN32**



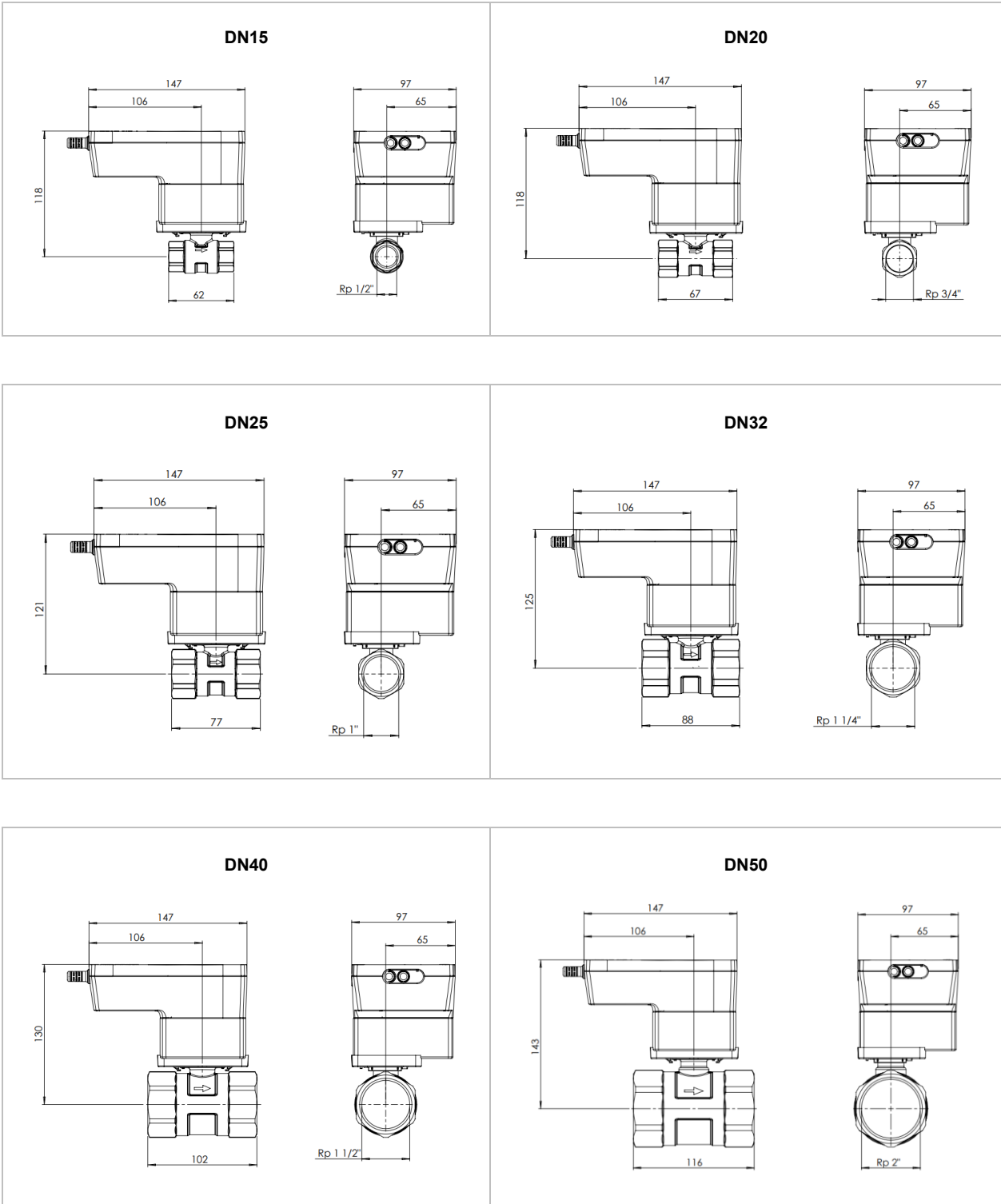
**DN40 / DN50**



**9. Dimensions**

**Slave Valves**

**2 | 2**



## 10. Intellectual property

DXMB4\_ is based on technology protected by international patents:

- European patent no. EP2307938
- European patent no. EP3812980
- European patent no. EP4177697
- Chinese patent no. ZL200880130728.9
- United States Patent No. US9823666
- United States Patent No. US10394257
- Registered Community Design RCD No. 004030633-0001
- Registered Community Design RCD No. 004030633-0002
- Patent pending No. WO2020157612

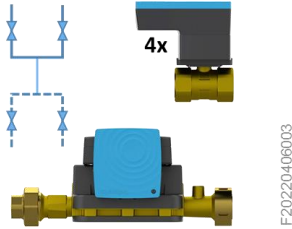


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11. Ordering information



| Type                | AC/DC 24<br>[ Volts ] | DN | V <sub>max</sub><br>[ l/h ] | Δp <sub>s</sub><br>[ kPa ] |  |  MODBUS |  BACnet | C/O | ΔT |  | L <sub>c</sub><br>[ m ] |
|---------------------|-----------------------|----|-----------------------------|----------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-----|----|-------------------------------------------------------------------------------------|-------------------------|
| DXMB4P015C.111621 ▲ | ●                     | 15 | 2,500                       | 240                        | ●                                                                                 | ●                                                                                         | -                                                                                         | ●   | ●  | ●                                                                                   | 1m                      |
| DXMB4P020C.111621 ▲ | ●                     | 20 | 4,300                       | 240                        | ●                                                                                 | ●                                                                                         | -                                                                                         | ●   | ●  | ●                                                                                   | 1m                      |
| DXMB4P025C.111621 ▲ | ●                     | 25 | 6,400                       | 240                        | ●                                                                                 | ●                                                                                         | -                                                                                         | ●   | ●  | ●                                                                                   | 1m                      |
| DXMB4P032C.111621 ▲ | ●                     | 32 | 9,200                       | 240                        | ●                                                                                 | ●                                                                                         | -                                                                                         | ●   | ●  | ●                                                                                   | 1m                      |
| DXMB4P040C.111621 ▲ | ●                     | 40 | 15,200                      | 240                        | ●                                                                                 | ●                                                                                         | -                                                                                         | ●   | ●  | ●                                                                                   | 1m                      |
| DXMB4P050C.111621 ▲ | ●                     | 50 | 20,600                      | 240                        | ●                                                                                 | ●                                                                                         | -                                                                                         | ●   | ●  | ●                                                                                   | 1m                      |

Legend

|     |                     |                  |                                    |                |                           |
|-----|---------------------|------------------|------------------------------------|----------------|---------------------------|
| DN  | connection tap body | V <sub>max</sub> | flow range ( 0..V <sub>max</sub> ) | L <sub>c</sub> | cable length (main cable) |
| C/O | change/over         | Δp <sub>s</sub>  | maximum closing pressure           |                |                           |

