belparts
BUILDING HVAC COMPONENTS

dynamx

DXMB2P20B.111621

dynamx™ variable flow-control valves, series DXMB_B

- Electronic pressure-independent flow control
- 2-port or 3-port flow control valves
- Integrated flow measurement
- Integrated ΔT measurement
- Power supply U_v : AC 24Volt
- Flow setpoint via ctrl signal Y_1 : 0..10Vdc or digital
- MP *MultiProtocol* : MODBUS RTU and BACnet MSTP communication
- Wireless commissioning through Bluetooth® communication
- Available with integrated application control functions [1]

0..20'000 l/h

DN15..DN50

Dynamic Flow Networking®

The *dynamx™* flow-control valves are designed for automatic and dynamic hydronic balancing and real-time flow-control at the same time, thus eliminating the need for extra balancing valves. The *dynamx™* flow-control valves provide a perfect hydraulic balance in the hydraulic net, at full load as well as in part load, without any extra components: Dynamic Flow Networking® (DFN).

DFN™

Advantages

- ✔ 4-in-1 solution
- ✔ automatic balancing
- ✔ V_{max} easily adjustable
- ✔ permanent flow measurement + control
- ✔ flow and energy recording
- ✔ MP *MultiProtocol* communications
- ✔ Bluetooth® on-board communication

Description

The *dynamx™* Modular valves, series DXMB_B, are electronic, pressure-independent flow-control valves. They combine four functions in one device: 1) a flow-control valve, 2) a dynamic, pressure-independent balancing valve a 3) shut-off valve and 4) an energy-monitoring device.

DXMB_B is used in HVAC systems with variable flow and is designed e.g. for AHU, heat exchangers, etc. DXMB_B replaces the (static) balancing valve, as well as the control valve.

The DXMB_B series are available as 2-port or 3-port valves and can be used in HVAC systems for buildings with a nominal system pressure of 16 bar (PN16) and water temperatures: +5°C..+90°C [2] (non-condensing).

THE ORIGINAL
INNOVATION
BY BELPARTS

Patented technology
EP2307938
EP2706425
EP3812870

Content

[1] optional
[2] the pressures mentioned are maximum values, limited by the maximum admissible temperatures in the pressure-temperature flowchart

1. How it works

dynamx ™ flow-control valves are designed to accurately control the flow rate in any consumer. To do this, *dynamx*™ has 4 basic building blocks, namely a:
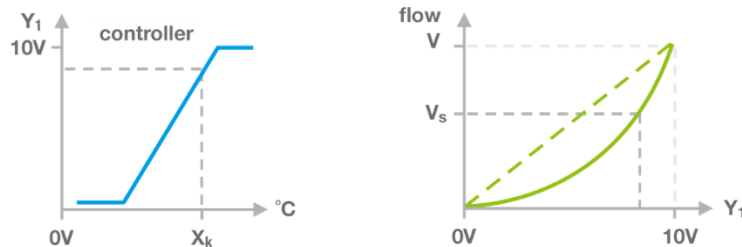
- control valve
- drive
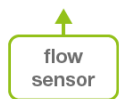- flow sensor
- flow controller
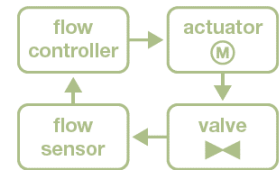
Additional functions can be added on top of these basic building blocks, such as bus communication, wireless communication, additional inputs or for example a water temperature controller.
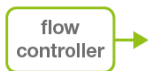
In analog mode, the internal flow controller of the *dynamx*™ valve receives a setpoint from the external controller Y_1: 0..10Vdc. Internally this setpoint is converted into a flow setpoint, either for heating or cooling. Example:
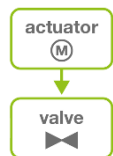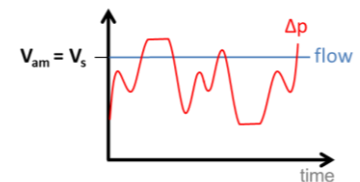
The integrated flow sensor measures continuously the actual flow. The intern control loop will compare the actual flow with the desired flow and adjust the position of the control valve until the measured flow is equal to the required flow rate setpoint.
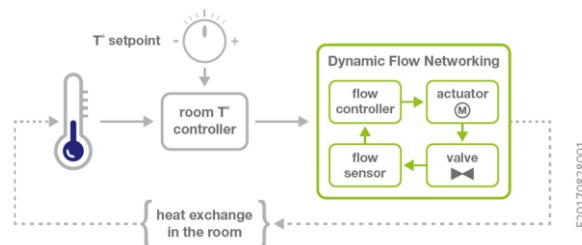
DXMB_B will control the flow rate to a specified set point, independent of any pressure changes in the system at e.g. part load. The control valve automatically adapts to the system parameters and searches for the ideal set point, aiming for maximum user comfort with minimum energy consumption.

Independent of the operating mode, the DXMB_B can be applied for variable or constant flow control or for maximum flow limitation. The feedback signal X_1 : 0..10Vdc, reflects the actual flow rate and can be used to monitor the actual flow rate.

Thanks to this innovative technology, the *dynamx*™ valves can be used in a much larger flow range compared to traditional control valves.

DXMB_B has wireless Bluetooth® communication on board, which allows easy wireless commissioning via a smartphone or tablet, even from several meters away.

The dynamx™ DXMB_B control valves are equipped with MP *MultiProtocol* communication allowing them to be integrated into both MODBUS and BACnet networks.

dynam**x**

2. Technical specs

Electric

Supply voltage U_v	AC 24 Volts (±20%), 50Hz (±5%)
Power consumption *controlling*	3,5W (4VA)
stand-by	1,5W
Input signal Y_1	0..10Vdc (0.17mA)
Optional sensor input Y_2	0..10Vdc (0.17mA)
Feedback signal X_1	0..10Vdc (≤ 2mA) actual flow rate, scaled according to the max flow rate heating or cooling
Electrical connection [1]	1m PVC cable, 7x 0.5mm²

Flow rate measurement

Sensor type	ultrasonic TTM, no moving parts
Unit of measurement	m³/h[2] , l/s, l/min, gpm (UK), gpm (US)

Temperature measurement

Sensor type	Pt1000 in accordance with EN60751
ΔT measurement	paired sensors

Hydraulic

Nominal pressure	PN16 (16 bar)
Control characteristic	equal percentage [1] or linear
Differential pressure Δp_{min}	no minimum differential pressure required
Maximum flow rate set point V_{max}	separate heating and cooling setting
Flow rate set point setting	analog (Y_1), via bus communication, or via APP
K_{vs} value	2,9 m/h³
Medium	water (without glycol)
Medium quality	in accordance with VDI 2035
Medium temperature	+5°C..+90°C
Connection	threaded connections
Startup time	3..5 min. after power on

Material

Housing	ABS
Parts in contact with water	CW602N brass, CW617N brass, EPDM, composites, stainless steel (1.4401 and 1.4301)

[1] Factory default

2. Technical specs

Environment

Temperature	*ambient*	+10°C .. +45°C
	storage	-20°C .. +50°C
IP degree of protection		IP54 (drive IP43)
Humidity		maximum 90% HR, non-condensing
Maintenance / calibration		no maintenance nor calibration required

3. MP *MultiProtocol*

The *dynamx™* DXMB_B flow-control valves can optionally be supplied with an RS485 bus communication interface with the MP *MultiProtocol* functionality for easy integration[1] into any building management system (BMS).

Thanks to this MP *MultiProtocol* communication, the DXMB_B flow-control valves can be integrated into different 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 provides the ability to customize a selection of settings.

System Integration

Protocol	**MODBUS**	RTU/MSTP, slave
	BACnet	MSTP, slave
	Bluetooth®	with license-free APP, dxLink 21™
Physical layer wired network		RS485, not isolated
Type of bus cable		2-wire twisted pair with common
		shielded twisted pair STP or FTP
Unit load		1/8
Terminal resistance		120Ω end resistor (R_{TERM}) to each
		end of the bus
Communication settings [2]		9600, 19200 or **38400**[3] Baud
		1 starter bit
		even[3] / odd / no parity
		8 data bits
		1 stop bit
Topology		multi-drop bus, maximum length 1,000m
Stub length		maximum 1m, preferably in daisy chain

[1]   the installer is responsible for compliance with local EMC regulations when installing, connecting and commissioning the DXMB_B in a communications bus network

[2]   can be set up via the Bluetooth® dxLink21™ APP or via the dxLink™ MS Windows commissioning tool via MODBUS communication

[3]   default settings

4. Electrical connection

DXMB_B_11_621
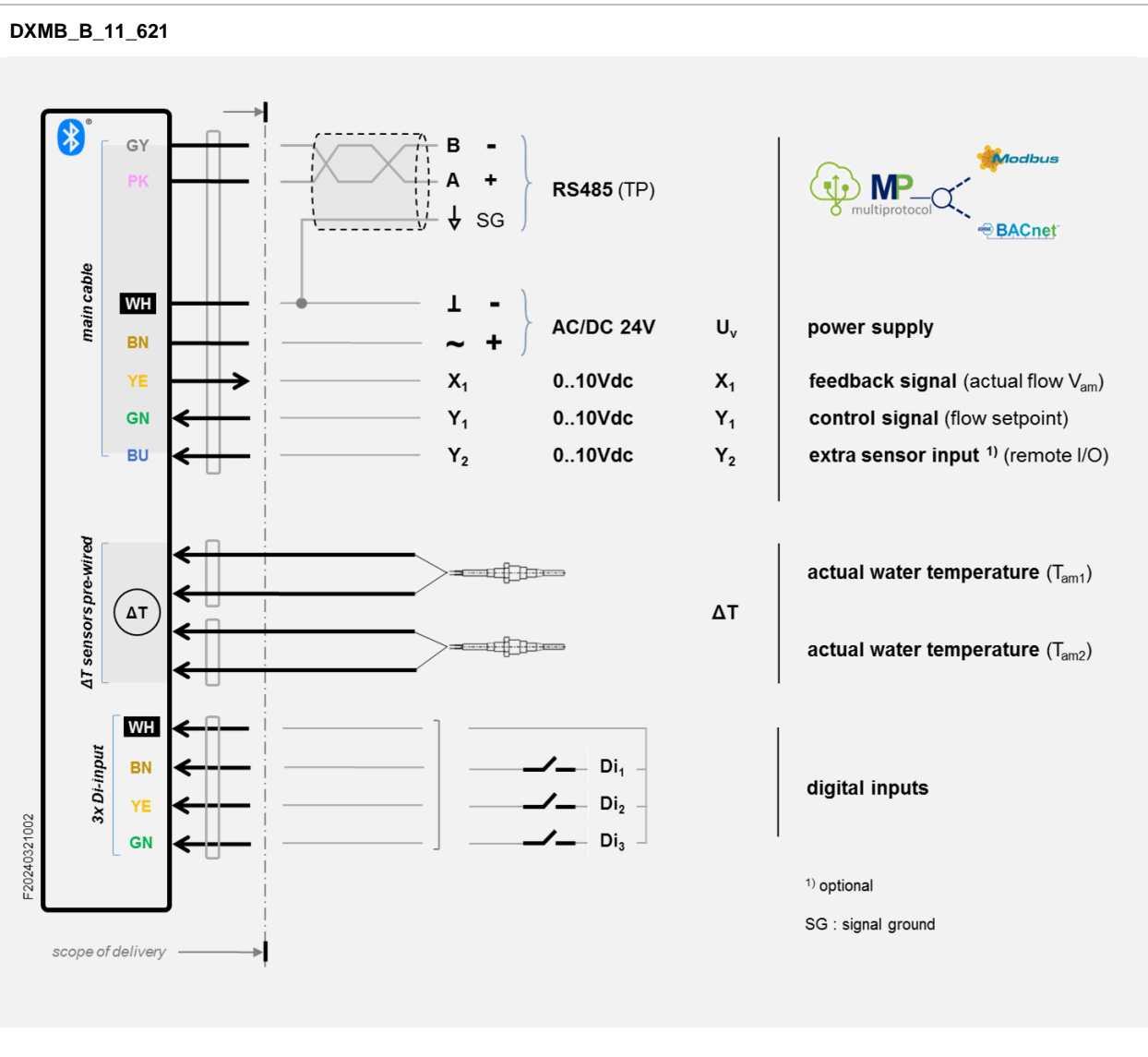
| WH	BN	GN	YE	BU	PK	GY
white	brown	green	yellow	blue	pink	grey
wit	bruin	groen	geel	blauw	roos	grijs
blanc	brun	vert	jaune	bleu	rose	gris
weiß	braun	grün	gelb	blau	pink	grau

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

ⓘ A low voltage transformer should be used in accordance with local regulations.

In accordance with the Electromagnetic Compatibility Directive 2014/32/EU, according to the applied 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)

5. Flow rate and pressure range
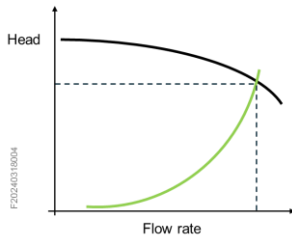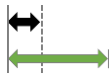
To enable optimal sizing and reduce pumping energy to the absolute minimum, *dynamx*™ flow-control valves, DXMB_B series, are available in 6 different flow ranges.

During normal operation a differential pressure Δp is generated across the flow-control valve. As a rule of good practice and energy-friendly plant design, control valves at the design flow rate should be selected so that the differential pressure at this design flow rate is as low as possible. When selecting the flow range of the flow-control valve, the actual differential pressure Δp is preferably verified as provided in the BELPARTS calculation tools.

For normal operation and to ensure low-noise operation, it is recommended that the DXMB_B flow-control valves be used at all times with a differential pressure Δp lower than 200kPa.

Type	DN	Δp$_s$ 2-port	Δp$_s$ 3-port	K$_{vs}$	V$_5$	V$_{10}$	V$_{20}$	V$_{nom}$
	[mm]	[kPa]	[kPa]	[m³/h]	[l/h]	[l/h]	[l/h]	[l/h]
DXMB_P20B_	20	1.400	-	2,9	648	917	1.297	2.900

Flow rate range depending on the differential pressure Δp over the valve

Flow	Δp
V$_5$	5kPa
V$_{10}$	10kPa
V$_{20}$	20kPa

Legend

DN	DN size of the valve
Δp$_s$	maximum close-off differential pressure
K$_{vs}$	K$_{vs}$-value of DXMB_B
V$_{nom}$	maximum flow rate of the DXMB_B

V$_{max}$ design flow rate = maximum flow rate set point in% (max.100% of V$_{nom}$)

1 bar ≈ 100 kPa

1 m/h³ = 1.000 l/h = 16.7 l/min = 0.28 l/s

6. Temperature sensors

DXMB_B flow-control control valves come standard with two paired temperature sensors, for measuring supply and return water temperature. Both temperature sensors T_{am1} and T_{am2} have a free cable length of 2m.

DXMB_B is available with two temperature sensors, for measuring the in- and outlet water temperature:

$$\Delta T = T°_{in} - T°_{out} = |\, T_{am1} - T_{am2}\,|$$


F20190327001
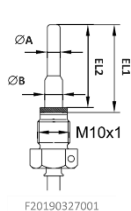
Both water temperature sensors are electrically connected to the DXMB_B unit ex works and is hydraulically mounted on site.

009056

In the standard scope of delivery of the DXMB_C, one nipple (1pc, article ref.nr. 009056) is provided for mounting the temperature sensor T_{am2}. This nipple with R½ "external thread is provided with M10x1 female thread for the water temperature sensor T_{am2}.

Remark: other accessories for the mounting of temperature sensors are not part of the delivery and can be ordered separately.
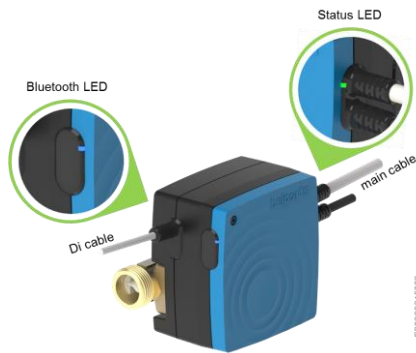
7. Status LED
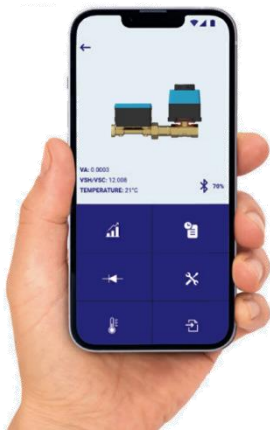
The integrated LEDs provide useful information that can help with startup and commissioning.

Status LED

Bluetooth LED

Di cable   main cable

F20220215002

Status	
🟢	power supply
🔵	Bluetooth® communication
🟡	bus network

8. Wireless commissioning   dxLink21™

Thanks to the integrated Bluetooth® technology, the DXMB_ valves provide a wireless interface for commissioning purposes.

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

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

Note: these features may not be available on all versions, check ordering information

Available on the App Store

ANDROID APP ON Google Play

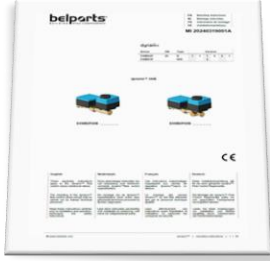## 9. Software tool   dxLink™

All dynamx™ control valves can be easily integrated into any building management system but can also be used as standalone control valves.

dxLink™ is a software tool that allows dynamx™ control valves to be commissioned remotely, using the MODBUS bus communication capabilities of the control valves. This means that commissioning of a dynamx™ control valve does not require on-site intervention but can be performed from a central location. This significantly reduces the time required to commission the HVAC system and makes the system less prone to errors.

The dxLink™ software works with the Windows operating system.

10. Related information

1	Mounting Instructions		MI 20240319001A
2	MODBUS RTU - register list		MI 20220105001A
3	BACnet MSTP - PICS		MI 20220105002A
4	REVIT data files (BIM)	🔗	www.belparts.com

11. Intellectual property

DXMB_B is based on technology protected by international patents:

- European Patent No. EP2307938
- European Patent No. EP2706425
- European Patent No. EP3812870
- Chinese patent no. ZL200880130728.9
- United States Patent No. US9823666
- United States Patent No. US10394257
- Registered community model RCD No. 004030633-0001
- Registered community model RCD No. 004030633-0002

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The Bluetooth® word mark and Bluetooth logos are registered trademarks owned by Bluetooth SIG, Inc. and any use of these marks by BELPARTS Group NV is under license.
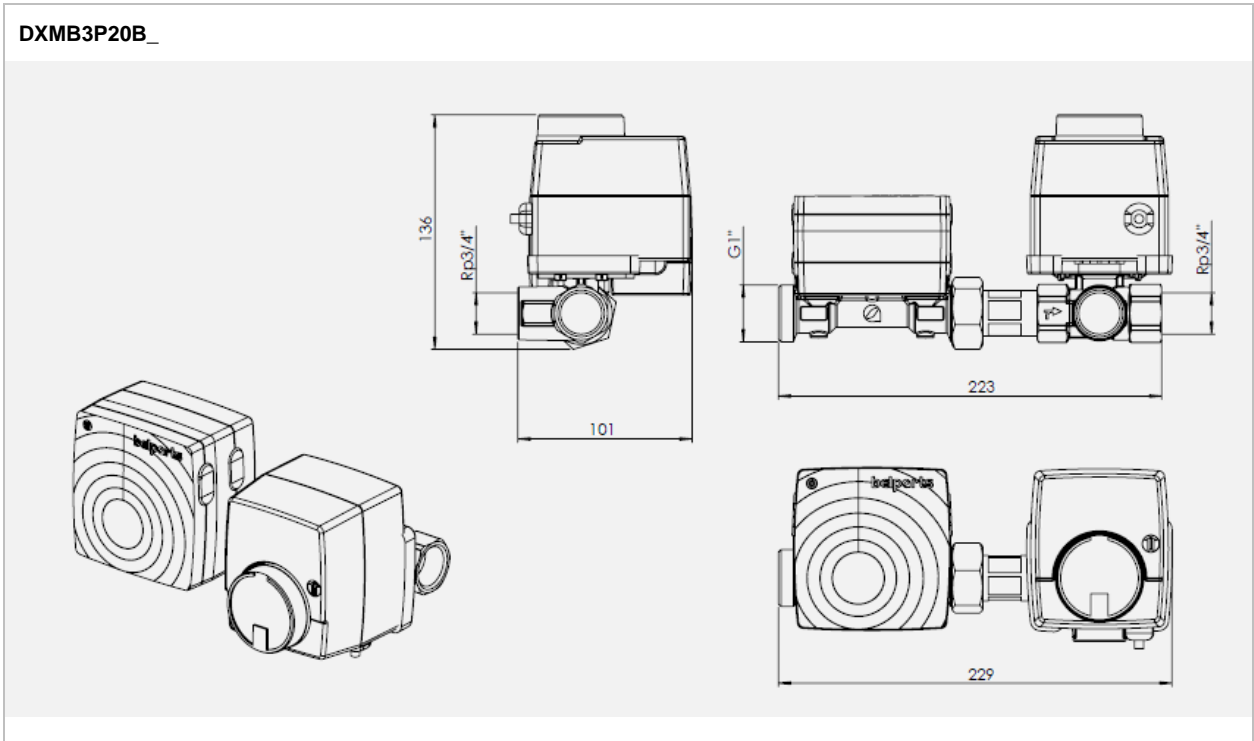
12. Dimensions
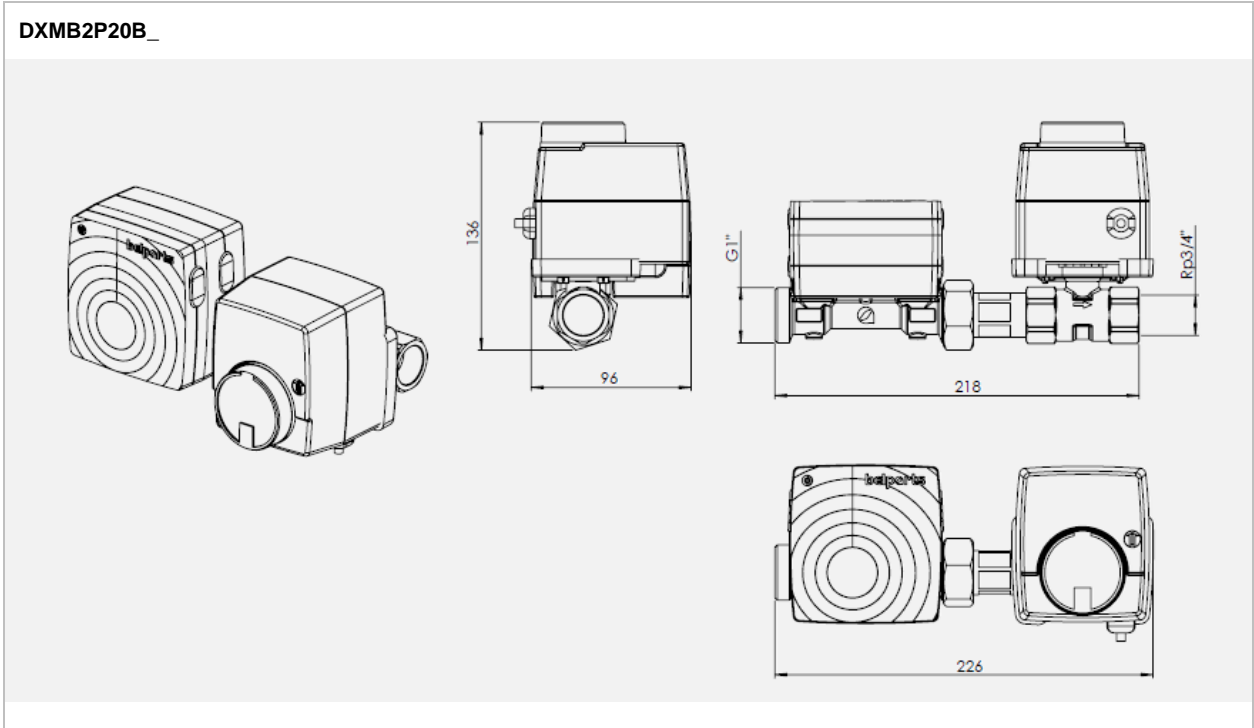
DXMB2P20B_

DXMB3P20B_

13. Item reference numbers

DXMB	2	P	20	B	1	1	1	6	2	1
SERIES				VERSION						

DXMB											**dynamx™ Series flow-control valves**
											DXMB dynamx™ Modular Ball

Number of ports
| 2 | 2-port flow-control valve |
| 3 | 3-port flow-control valve (mixing) |

Mounting
| P | threaded connections |

Size (DN)
| 020 | DN20 |

Function
| B | standard flow-control functionality |
| B00 | version B + Integrated Room Control (IRC) |

Power supply
| 1 | AC 24 Volt |

Version
| 1 | standard version |

User interface
| 1 | with integrated Bluetooth® communication |
| 2 | with integrated Bluetooth® Mesh communication |

Bus-communication
| 6 | with *MultiProtocol* comm [1], RS485 not isolated |

ΔT measurement
| 2 | with ΔT measurement (T_{am1} + T_{am2}) |

Cable length
| 1 | standard cable length (PVC) |

[1] *MultiProtocol* : MODBUS RTU and BACnet MSTP

14. Ordering information

Type	DN [mm]	V$_5$ [l/h]	V$_{10}$ [l/h]	V$_{20}$ [l/h]	V$_{max}$ [l/h]	U$_v$ [Volts] AC 24 V	Y$_1$ [Volts] 0..10Vdc	Sensors Flow	Sensors Di 3x	Sensors ΔT	Ctrl Flow	Ctrl IRC	MultiProtocol Bluetooth	MultiProtocol network	MultiProtocol MODBUS	MultiProtocol BACnet

DXMB2P20B_

Design flow at Δp		
5kPa	10kPa	20kPa

2-port version | with *MultiProtocol* communication MODBUS RTU or BACnet MSTP

With integrated ΔT measurement

Type	DN	V$_5$	V$_{10}$	V$_{20}$	V$_{max}$	U$_v$	Y$_1$	Flow	Di	ΔT	Flow	IRC	Bluetooth	network	MODBUS	BACnet
▲ DXMB2P020B.111621	20	640	910	1.120	2.900	•	•	•	•	•	•	-	•	-	•	•

2-port version | with Bluetooth® Mesh communication

With integrated room temperature control (IRC - Integrated Room Control) and ΔT measurement

Type	DN	V$_5$	V$_{10}$	V$_{20}$	V$_{max}$	U$_v$	Y$_1$	Flow	Di	ΔT	Flow	IRC	Bluetooth	network	MODBUS	BACnet
▲ DXMB2P020B00.112621	20	640	910	1.120	2.900	•	•	•	•	•	•	•	-	•	•	•

Legend

DN	valve size	V$_{max}$	flow rate range (0..V$_{max}$)	L$_c$	standard cable length (PVC)
Δp$_s$	maximum close-off differential pressure	V$_5$	flow rate at Δp 5kPa		
IRC	with integrated room temperature control	V$_{10}$	flow rate at Δp 10kPa		
🅱	wireless Bluetooth® communication	V$_{20}$	flow rate at Δp 20kPa		

▲ Standard design (assembly to order, delivery times may vary)

△ Special design (delivery times on request, min. quantities apply)

Type	DN	V$_5$	V$_{10}$	V$_{20}$	V$_{max}$	U$_v$	Y$_1$	Sensors			Ctrl		MultiProtocol		
	[mm]	[l/h]	[l/h]	[l/h]	[l/h]	[Volts]	[Volts]	Flow	Di	ΔT	Flow	IRC	Bluetooth		
						AC 24V	0..10Vdc		3x						MODBUS	BACnet

DXMB3P20B_

Design flow at Δp: 5kPa | 10kPa | 20kPa

3-port version | with *MultiProtocol* communication MODBUS RTU or BACnet MSTP

With integrated ΔT measurement

Type	DN	V$_5$	V$_{10}$	V$_{20}$	V$_{max}$	U$_v$	Y$_1$	Flow	Di	ΔT	Flow	IRC	BT	Mesh	MODBUS	BACnet
▲ DXMB3P020B.111621	20	640	910	1.120	2.900	●	●	●	●	●	●	-	●	-	●	●

3-port version | with Bluetooth® Mesh communication

With integrated room temperature control (IRC - Integrated Room Control) and ΔT measurement

Type	DN	V$_5$	V$_{10}$	V$_{20}$	V$_{max}$	U$_v$	Y$_1$	Flow	Di	ΔT	Flow	IRC	BT	Mesh	MODBUS	BACnet
▲ DXMB3P020B00.112621	20	640	910	1.120	2.900	●	●	●	●	●	●	●	-	●	●	●

Legend

DN	valve size	V$_{max}$	flow rate range (0..V$_{max}$)	L$_c$	standard cable length (PVC)
Δp$_s$	maximum close-off pressure	V$_5$	flow rate at Δp 5kPa		
IRC	with integrated room temperature control	V$_{10}$	flow rate at Δp 10kPa		
✴	wireless Bluetooth® communication	V$_{20}$	flow rate at Δp 20kPa		

▲   Standard design (assembly to order, delivery times may vary)

△   Special design (delivery times on request, min. quantities apply)