

**DXUB2F080C.111621**

**dynamx™ flow-control control valves, type DXUB\_C**

- Electronic pressure-independent flow control
- 2-port or 3-port flow control control valves PN16
- Integrated flow measurement
- Integrated  $\Delta T$  measurement
- Supply voltage  $U_v$  : AC/DC 24Volt
- Flow rate set point via control signal Y1 : 0..10Vdc or digital
- MP *MultiProtocol* : MODBUS RTU and BACnet MSTP communication
- Wireless commissioning via Bluetooth® communication

0..272.000 l/h

DN65..DN150

**Dynamic Flow Networking®**

The *dynamx*™ flow-control valves are designed for automatic and hydraulic balancing while providing real-time flow control, eliminating the need for static balancing valves. The *dynamx*™ control valves provide perfect hydraulic balancing in the hydraulic network, both at full and part load, without additional components: Dynamic Flow Networking® (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*™ Ultima Ball control valves, type DXUB\_C, are electronic and pressure-independent control valves that combine four functions: 1) a control valve, 2) a dynamic pressure-independent balancing valve, 3) a shut-off valve and 4) energy monitoring.

DXUB\_C is used in HVAC systems with variable flow rates and is designed e.g. for AHU coils, heat exchangers, etc. DXUB\_C replaces both the (static) inlet valve and the control valve.

DXUB\_C series is available as 2-port or 3-port control valve with different flow ranges for optimal sizing. DXUB\_C can be used in HVAC systems for buildings with a nominal system pressure of 16 bar (PN16) and water temperatures between +2°C..+100°C<sup>1)</sup> (non-condensing).

**Content**

1.	How it works.....	2
2.	Technical data.....	3
3.	MP <i>MultiProtocol</i> .....	4
4.	Electrical wiring.....	5
5.	Flow rate and pressure range.....	7
6.	Temperature sensors.....	8
7.	Status LED.....	9
8.	Wireless commissioning.....	9
9.	Software tool.....	9
10.	Related information.....	10
11.	Intellectual property.....	10
12.	Dimensions.....	11
13.	Article reference numbers.....	13
14.	Overview.....	14



Patented technology

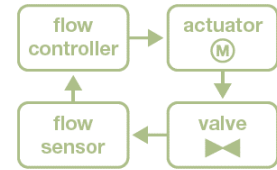
EP2307938  
EP2706425  
EP3812870

<sup>1)</sup> the pressures listed are maximum values limited by the maximum allowable temperatures in the pressure-temperature diagram

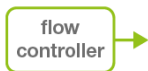
**1. How it works**

**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:

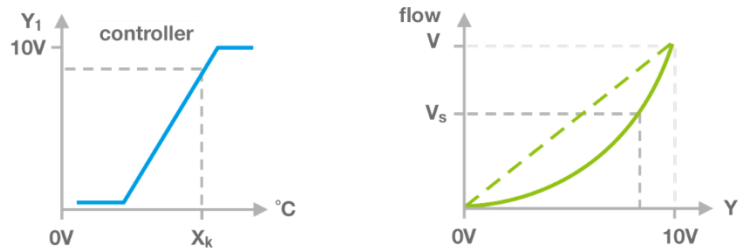
- control valve
- drive
- flow sensor
- flow controller



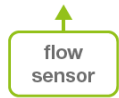
Additional functions can be added on top of these basic building blocks, such as bus communication, wireless communication or additional inputs.



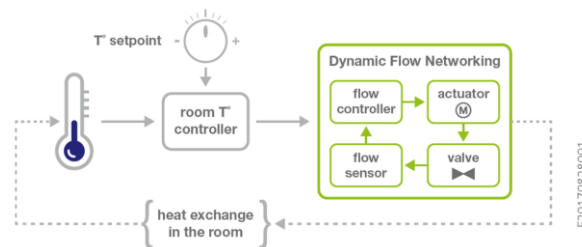
In analog mode, the internal flow controller of the **dynamx**™ control valve receives a set point from an external controller  $Y_1$  : 0..10Vdc. Internally, this set point is converted to a flow set point, for heating or cooling. Example:



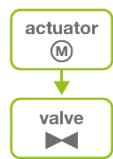
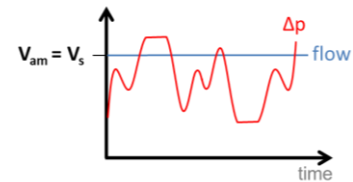
F20180601014



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 matches the flow rate set point.



F20170828001



DXUB\_C 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 DXUB\_C 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, **dynamx**™ control valves can be used in a much larger flow range than conventional control valves.



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



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

**2. Technical data**

1 | 2

<b>Electrical data</b>		
<b>Supply voltage U<sub>v</sub></b>		AC 24 Volt (±20%), 50Hz DC 24 Volt (±20%)
<b>Power consumption</b>	<i>during control</i>	<b>DN65 – DN80</b> 3.5W (5VA)   <b>DN100-DN150</b> 7.5W (9,5VA)
	<i>stand-by</i>	2W   2,5W
<b>Control signal Y<sub>1</sub></b>		0..10Vdc (0.17mA)
<b>Feedback signal X<sub>1</sub></b>		0..10Vdc (≤ 2mA) actual flow rate, scaled according to max flow rate heating or cooling
<b>Electrical connection</b>		PVC cable, 7x 0.5mm <sup>2</sup> , length 1m
<b>Flow measurement</b>		
<b>Sensor type</b>		ultrasonic TTM, no moving parts
<b>Sensor class</b>		according 2014/32/EU and EN1434-4:2007
<b>Unit of measurement</b>		m <sup>3</sup> /h <sup>1</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 MID-2014/32/EU, EN1434-4:2007
<b>Hydraulic</b>		
<b>Construction</b>	<i>DXUB2_C</i>	2-port
	<i>DXUB3_C</i>	3-port, mixing
<b>Nominal pressure</b>		PN16 (16 bar) <sup>2)</sup>
<b>Control characteristic</b>		Equal percentage <sup>1)</sup> or linear
<b>Leakage rate</b>	<i>control port</i>	0.01% of the valve's Kvs-value
	<i>3-port bypass</i>	1% of the valve's Kvs-value
<b>Differential pressure</b>	$\Delta p_{min}$	no minimum differential pressure required
<b>Maximum flow rate set point</b>	$V_{max}$	analog (Y <sub>1</sub> ), via bus communication or via APP
<b>Medium</b>		water (glycol-free)
<b>Medium quality</b>		in accordance with VDI 2035
<b>Medium temperature</b>		+2°C..+100°C
<b>Connections</b>		flanges PN16 according EN1092-2 Type 21, 16
<b>Startup time</b>		3..5min after power on
<b>Material</b>		
<b>Housing</b>		polypropylene, steel
<b>Wet parts</b>		brass, bronze, EPDM seal, stainless steel (1.4401, 1.4122, 1.4301), thermoplastics, PTFE ceramic materials, AS-1145HS

<sup>1)</sup> Factory default

<sup>2)</sup> The pressures given are maximum values limited by the maximum temperatures allowed in the pressure-temperature diagram

## 2. Technical data

2 | 2

### Environment

<b>Temperature</b>	<i>ambient</i>	+10°C .. +45°C
	<i>storage</i>	-20°C .. +50°C
<b>IP degree of protection</b>		IP54
<b>Humidity</b>		maximum 90% HR, non-condensing
<b>Mechanical environment</b>		M1 (fixed installation with minimal vibration)
<b>Maintenance / calibration</b>		maintenance-free, without calibration
<b>Height</b>		< 2000m

## 3. MP MultiProtocol



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

Thanks to this MP *MultiProtocol* communication, the DXUB\_C valves can be integrated into different types of networks:

- MODBUS
- BACnet
- Bluetooth<sup>®</sup>

By integrating the *dynamx*<sup>TM</sup> 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

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

<sup>1)</sup> the installer is responsible for compliance with local EMC regulations when installing, connecting and commissioning the DXUB\_C in a communications bus network

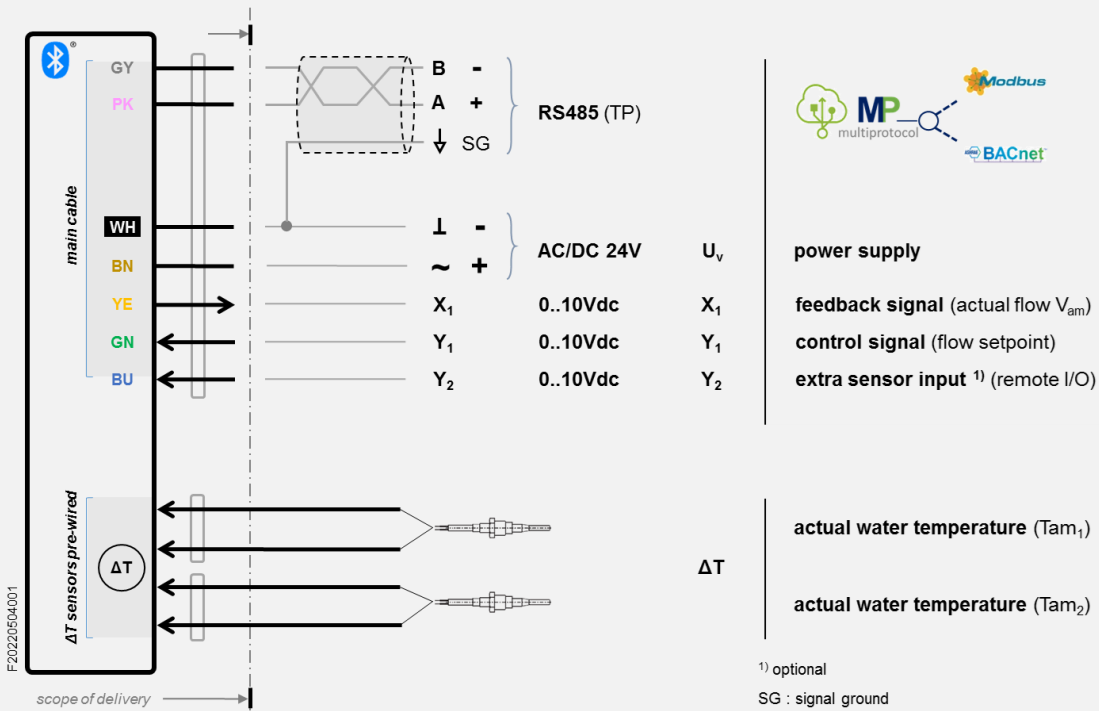
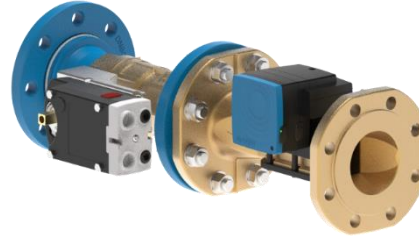
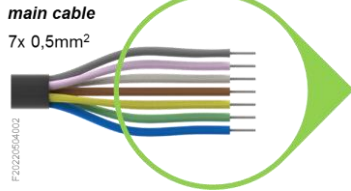
<sup>2)</sup> can be set up via the Bluetooth<sup>®</sup> dxLink21<sup>TM</sup> APP or via the dxLink<sup>TM</sup> MS Windows commissioning tool via MODBUS communication

<sup>3)</sup> factory default

4. Electrical wiring

1 | 2

DXUB\_C. 111621



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.*

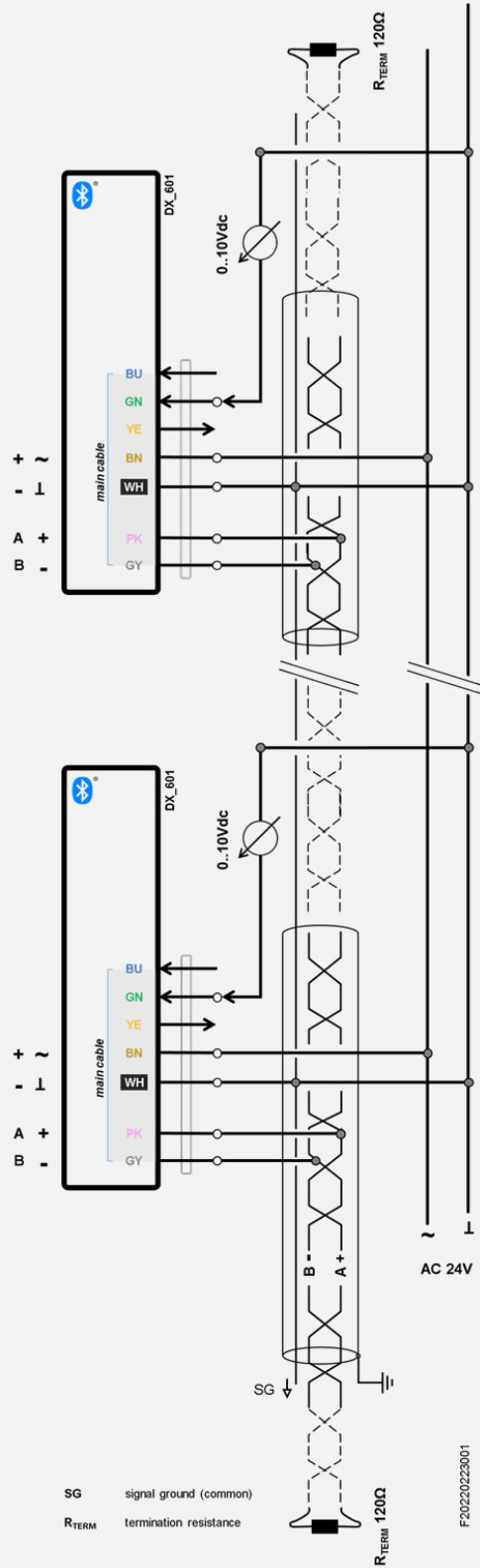
**i** A low voltage transformer must be used in accordance with local regulations.

**i** With alternating current, always observe the correct polarity!

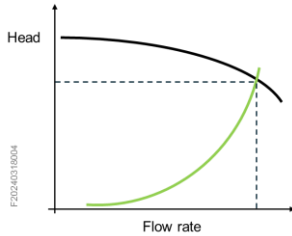
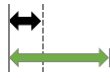
In accordance with the Electromagnetic Compatibility Directive 2014/32/EU, according to the applied standards

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

DXUB\_C. 111621



## 5. Flow rate and pressure range



To enable optimal sizing and reduce pumping energy to the absolute minimum, *dynamx*<sup>TM</sup> flow-control valves, DXUB\_ series, are available with different flow ranges.

During normal operation a differential pressure  $\Delta p$  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  $\Delta p$  is preferably verified as provided in the BELPARTS calculation tools.

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

Type	DN [ mm ]	$\Delta p_s$		$K_{vs}$ [ m <sup>3</sup> /h ]	$V_{min}$ [ l/h ]	$V_5$ [ l/h ]	$V_{10}$ [ l/h ]	$V_{20}$ [ l/h ]	$V_{nom}$ [ l/h ]
		2-port [ kPa ]	3-port						
DXUB_F065C_	65	690	-	48,8	250	10.900	15.420	21.800	48.000
DXUB_F080C_	80	690	-	70,7	400	15.811	22.360	31.620	70.000
DXUB_F100C_	100	690	-	114,4	600	25.588	36.185	51.170	114.000
DXUB_F150C_	150	690	-	272,2	1.500	60.865	86.070	121.730	272.000

### Flow rate range depending on the differential pressure $\Delta p$ over the valve

Flow	$\Delta p$
$V_5$	5kPa
$V_{10}$	10kPa
$V_{20}$	20kPa

### Legend

<b>DN</b>	DN size of the valve
<b><math>\Delta p_s</math></b>	maximum close-off differential pressure
<b><math>K_{vs}</math></b>	$K_{vs}$ -value of DXUB_C
<b><math>V_{min}</math></b>	minimum flow rate of the DXUB_C
<b><math>V_{nom}</math></b>	maximum flow rate of the DXUB_C

1 bar  $\approx$  100 kPa

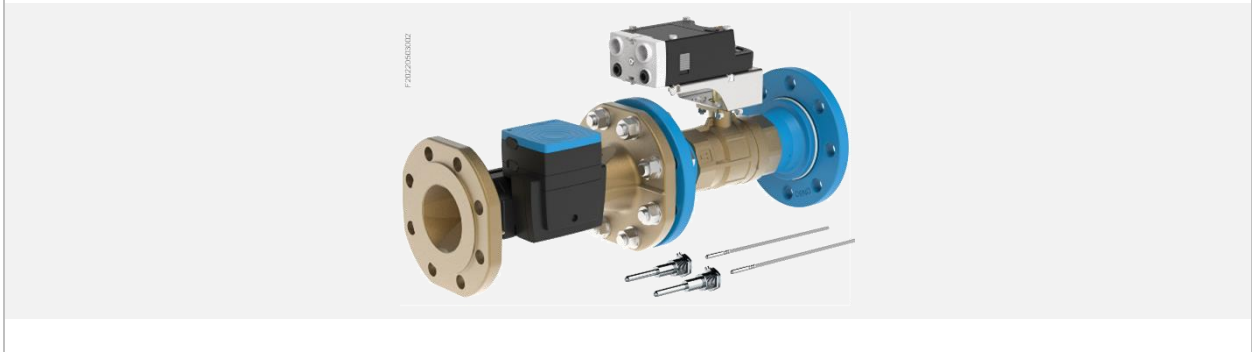
1 m<sup>3</sup>/h<sup>3</sup> = 1000 l/h = 16.7 l/min = 0.28 l/s

**6. Temperature sensors**

DXUB\_ 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 and should be mounted on-site.

$T_{am1} + T_{am2}$  to measure the temperature difference of the medium,  $\Delta T = |T_{am1} - T_{am2}|$

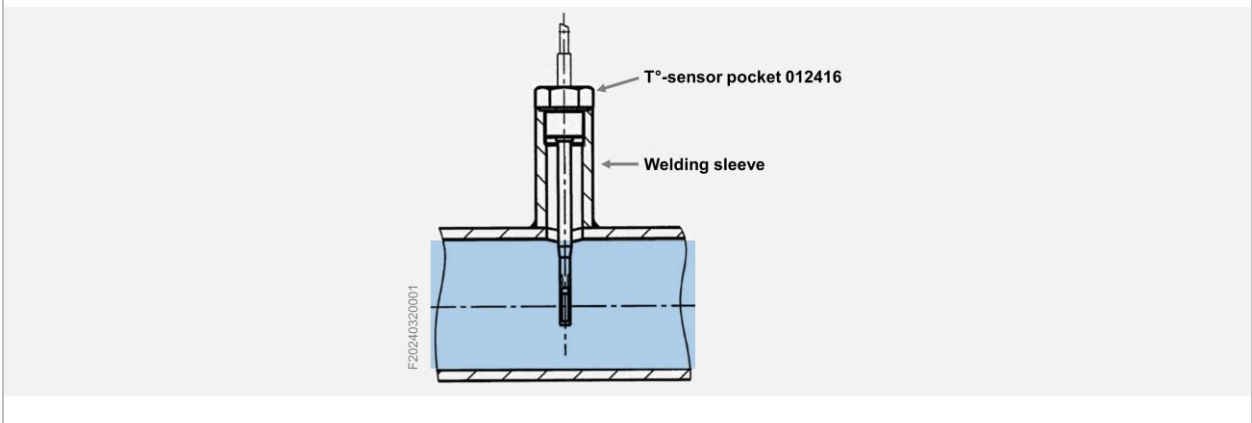
**DXUB\_ with paired temperature sensors pre-mounted ex-works**



Type	012416		
DXUB_F065C.111621	1pc	1pc	2pcs
DXUB_F080C.111621	1pc	1pc	2pcs
DXUB_F100C.111621	1pc	1pc	2pcs
DXUB_F150C.111621	1pc	1pc	2pcs

- 1) Stainless steel AISI 304 (1.4301), process connection R $\frac{1}{2}$  (2 immersion sleeves 6x92mm, Item ref.nr. 012416, are included in the scope of delivery).
- 2) Other accessories for mounting temperature sensors are not part of the delivery and must be ordered separately.

**Mounting example**



The length of the welding sleeve (not included in the delivery) should be determined so that the depth of the T°-sensor pocket and temperature sensor meets the applicable guidelines.






## 7. Status LED



The integrated LED's provide useful information that can help with startup and commissioning.

### Status

-  power supply
-  Bluetooth® communication
-  bus network

## 8. Wireless commissioning

dxLink21™



Thanks to the integrated Bluetooth® technology, the DXUB\_ 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*



## 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 20211029001A
2	MODBUS RTU - register list	MI 20220105001A
3	BACnet MSTP - PICS	MI 20220105002A
4	REVIT data files (BIM)	<a href="http://www.belparts.com">www.belparts.com</a>

## 11. Intellectual property

DXUB\_ 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



Belparts, dynamx, dynamic flow networking, DFN and dxLink™ are registered trademarks and/or trademarks of BELPARTS Group NV. All rights reserved.

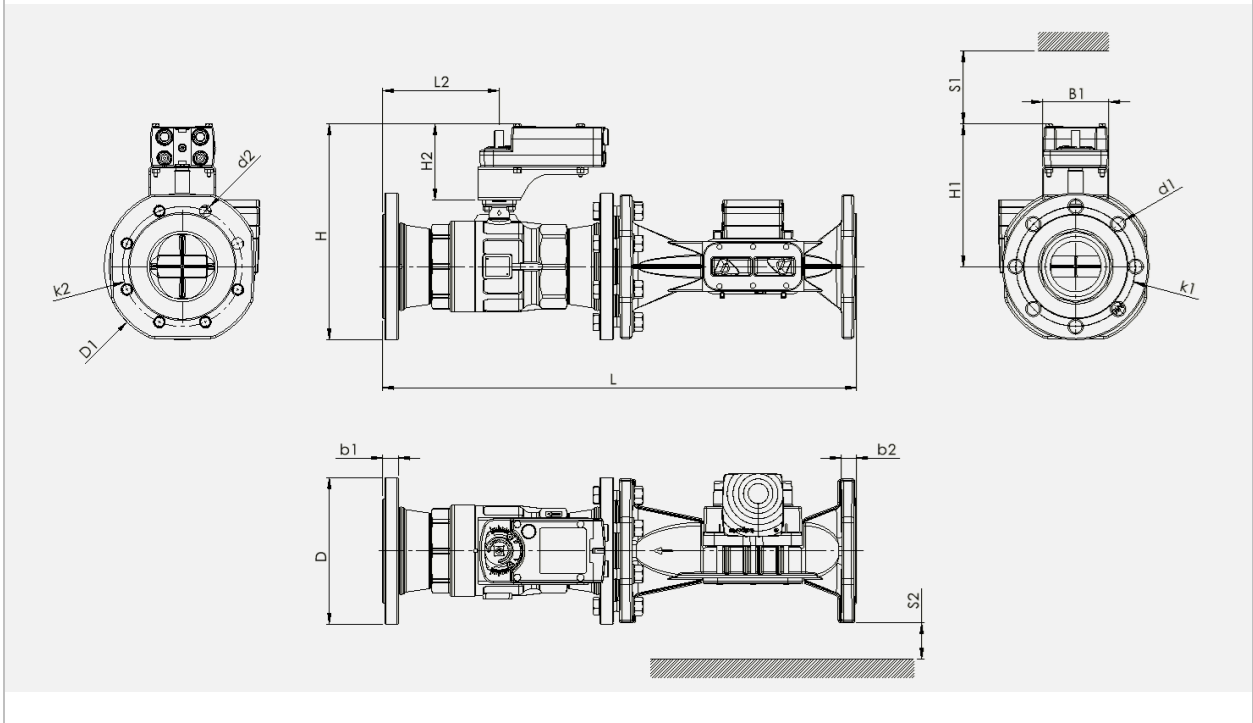
MS Windows is a registered trademark of Microsoft Corp. MODBUS is a registered trademark of Schneider Electric. BACnet is a registered trademark of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (Ashrae).

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.

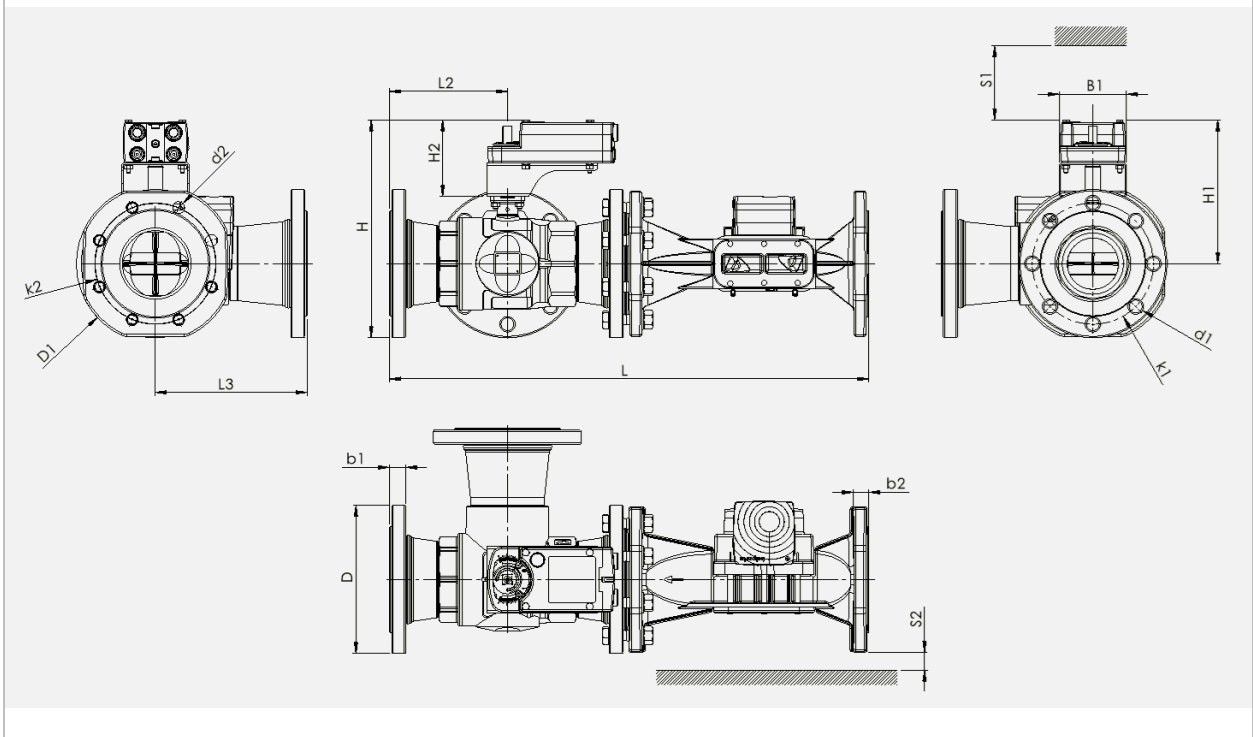
12. Dimensions

1 | 2

DXUB2F\_C



DXUB3F\_C



12. Dimensions

	2w		3w	Dimensions [ mm ]													
	k2	d2		L3	L	H	H <sup>1)</sup>	H2	H2 <sup>1)</sup>	L2	B1	b1	b2	D			
<b>DXUB2F065C</b>	●	145	18	-	591	281	291	114	124	145	100	21	20	174			
<b>DXUB3F065C</b>	-	145	18	149	591	281	291	114	124	145	100	21	20	174			
<b>DXUB2F080C</b>	●	160	18	-	611	288	298	114	124	155	100	22	22	188			
<b>DXUB3F080C</b>	-	160	18	158	611	288	298	114	124	155	100	22	22	188			
<b>DXUB2F100C</b>	●	180	18	-	712	324	334	114	124	175	100	22	24	220			
<b>DXUB3F100C</b>	-	180	18	225	712	324	334	114	124	175	100	22	24	220			
<b>DXUB2F150D</b>	●	240	23	-	992	357	367	114	124	240	100	34	26	280			
<b>DXUB3F150D</b>	-	240	23	287	982	357	367	114	124	240	100	34	26	280			

T20190520002

1)

different dimensions for versions with spring return

**13. Article reference numbers**

DXUB	2	F	080	C	1	1	1	6	2	1		
SERIES				VERSION								
DXUB												Series <i>dynamx</i> <sup>TM</sup> control valves DXUB dynamx <sup>TM</sup> Ultima Ball
												<b>Number of connections</b>
	2											2 2-port flow-control valve
	3											3 3- port flow-control valve, mixing
												<b>Mounting</b>
		F										F with PN16 flanges EN1092
												<b>Size (DN)</b>
			065									065 DN65
			080									080 DN80
			100									100 DN100
			150									150 DN150
												<b>Features</b>
				C								C standard flow control
												<b>Supply voltage</b>
					1							1 AC/DC 24 Volt
												<b>Version</b>
						1						1 standard version
												<b>Wireless interface</b>
							1					1 Bluetooth <sup>®</sup> communication
							2					2 Bluetooth <sup>®</sup> mesh networking
												<b>Bus communication</b>
								6				6 With MP <i>MultiProtocol</i> MODBUS, BACnet and Bluetooth <sup>®</sup>
												<b>ΔT measurement</b>
									2			2 with ΔT measurement ( T <sub>am1</sub> + T <sub>am2</sub> )
												<b>Electrical connection</b>
										1		1 standard (PVC) cable, length L <sub>c</sub>

All rights reserved © 2021-2024 BELPARTS Group NV | 03/2024 EN24v1.1 | Patented - European Patent No. EP2307938, EP2706425, EP3812870 | Subject to change without notice.

**14. Overview**

Type	DN [ mm ]	V <sub>5</sub> [ l/h ]	V <sub>10</sub> [ l/h ]	V <sub>20</sub> [ l/h ]	Δp <sub>s</sub> [ kPa ]	U <sub>v</sub> [ Volt ]	Y <sub>1</sub> [ Volt ]	Sensors			Ctrl	MultiProtocol				
								Flow	Di	ΔT	Flow			MODBUS	BACnet	
														MP multiprotocol		
						24 V	0..10Vdc		3x							



Design flow at Δp		
5kPa	10kPa	20kPa

▲ DXUB2F065C.111621	65	10.900	15.420	21.800	690	●	●	●	-	●	●	●	-	●	●
▲ DXUB2F080C.111621	80	15.811	22.360	31.620	690	●	●	●	-	●	●	●	-	●	●
▲ DXUB2F100C.111621	100	25.588	36.185	51.170	690	●	●	●	-	●	●	●	-	●	●
▲ DXUB2F150C.111621	150	60.865	86.070	121.730	690	●	●	●	-	●	●	●	-	●	●



Design flow at Δp		
5kPa	10kPa	20kPa

▲ DXUB3F065C.111621	65	10.900	15.420	21.800	-	●	●	●	-	●	●	●	-	●	●
▲ DXUB3F080C.111621	80	15.811	22.360	31.620	-	●	●	●	-	●	●	●	-	●	●
▲ DXUB3F100C.111621	100	25.588	36.185	51.170	-	●	●	●	-	●	●	●	-	●	●
▲ DXUB3F150C.111621	150	60.865	86.070	121.730	-	●	●	●	-	●	●	●	-	●	●

**Notes**

- The standard product types shown above, do not have a fail-safe function which ensures opening or closing the valve when power supply is. Interrupted. On request fail-safe versions can be supplied.

**Legend**

<b>DN</b>	valve size	<b>V<sub>5</sub></b>	design flow at Δp 5kPa	<b>Di</b>	digital input
<b>Δp<sub>s</sub></b>	maximum close-off differential pressure	<b>V<sub>10</sub></b>	design flow at Δp 10kPa	<b>ΔT</b>	water temperature difference
	Bluetooth® for wireless commissioning	<b>V<sub>20</sub></b>	design flow at Δp 20kPa		

▲ standard

△ on request (min. quantities and/or longer lead times may apply, please contact us)