belparts®
BUILDING HVAC COMPONENTS

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 ΔT 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).

DFN ™

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[1] (non-condensing).

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


Patented technology

EP2307938
EP2706425
EP3812870
WO2020157612 [1]

[1] the pressures listed are maximum values limited by the maximum allowable temperatures in the pressure-temperature diagram

[2] patent application pending

Content

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:
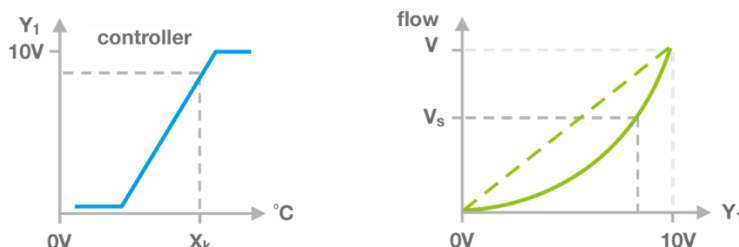
- control valve
- drive
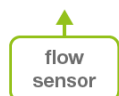- flow sensor
- flow controller
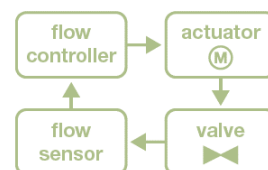
Additional functions can be added on top of these basic building blocks, such as bus communication, wireless communication or additional inputs.

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:
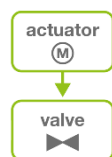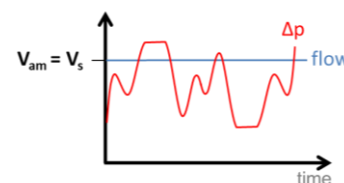
The integrated flow sensor continuously measures the actual flow rate. The internal control loop compares the actual flow rate with the desired flow rate and adjusts the position of the control valve so that the measured flow rate matches the flow rate set point.
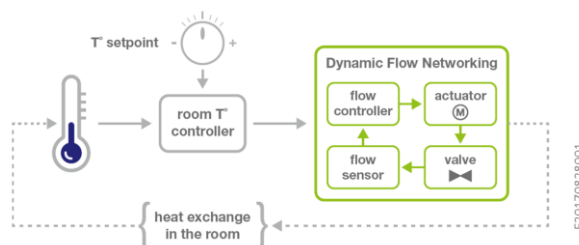
DXUB_C will control the flow rate to a specified set point, independent of any pressure changes in the system at e.g. part load. The control valve automatically adapts to the system parameters and searches for the ideal set point, aiming for maximum user comfort with minimum energy consumption.

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 Characteristics   1 | 2

Electric

Supply voltage U_v		AC 24 Volts (±20%), 50Hz
		DC 24 volts (±20%)
Consumption	*during arranging*	7.5W (9,5VA)
	at standstill	2,5W
Control signal Y_1		0..10Vdc (0.17mA)
Feedback signal X_1		0..10Vdc (≤ 2mA) actual flow rate, scaled
		according to max flow rate heating or cooling
Electrical connection		PVC cable, 7x 0.5mm², length 1m

Flow measurement

Sensor type	ultrasonic TTM, no moving parts
Sensor class	according 2014/32/EU and EN1434-4:2007
Unit of measurement	m³/h[1] , l/s, l/min, gpm (UK), gpm (US)

Temperature measurement

Sensor type	Pt1000 in accordance with EN60751
Paired sensors	compliant MID-2014/32/EU, EN1434-4:2007

Hydraulic

Construction	DXUB2_C	2-port
	DXUB3_C	3-port, mixing
Nominal pressure		PN16 (16 bar) [2]
Control characteristic		Equal percentage[1] or linear
Leakage rate	*control port*	0.01% of the valve's Kvs-value
	3-port bypass	1% of the valve's Kvs-value
Differential pressure Δp_{min}	*min.*	no minimum differential pressure required
Δp_s	*max.*	690kPa [3]
Setting flow rate set point		analog (Y_1), via bus communication or via APP
Medium		water (glycol-free)
Medium quality		in accordance with VDI 2035
Medium temperature		+2°C..+100°C
Connections		flanges PN16 according EN1092-2 Type 21, 16
Startup time		3..5min after power on

Material

Housing	polypropylene, steel
Wet parts	brass, bronze, EPDM seal, stainless steel
	(1.4401, 1.4122, 1.4301), thermoplastics, PTFE
	ceramic materials, AS-1145HS

[1] factory default

[2] the pressures given are maximum values limited by the maximum temperatures allowed in the pressure-temperature diagram

[3] the close-off differential pressure Δp_s refers to the rating at which the actuator will be able to provide tight shutoff of the DXUB2F_ 2-port valve. The close-off differential pressure Δp_s for 3-port versions DXUB3_ is 345kPa.
For normal operation and in order to ensure a quiet operation of the valve, it is recommended to operate the valve with a differential pressure of ≤200kPa.

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Surroundings

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

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3. MP *MultiProtocol*

The *dynamx*™ DXUB_C 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 DXUB_C 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 at 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 DXUB_C 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
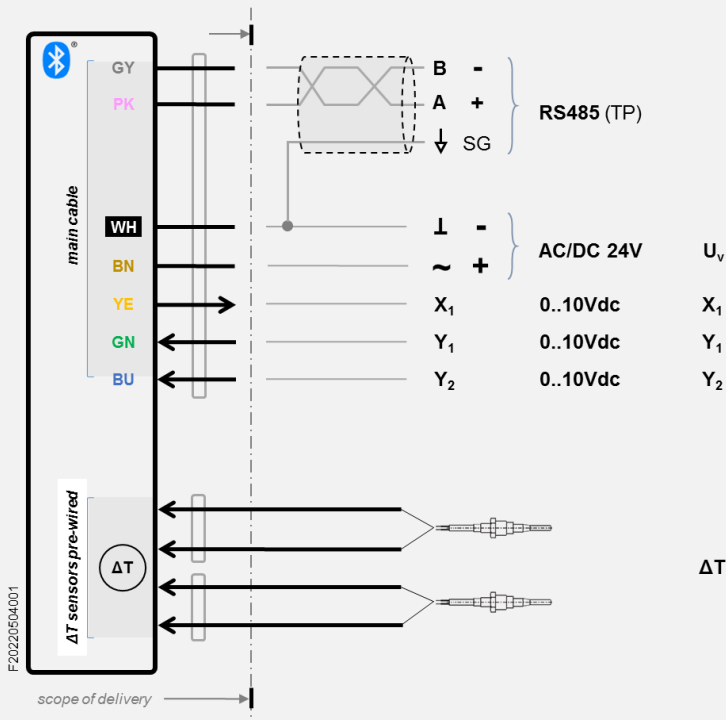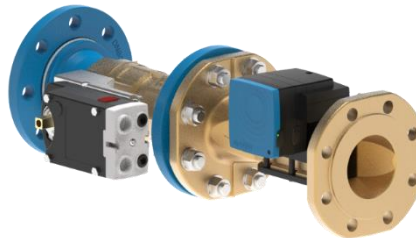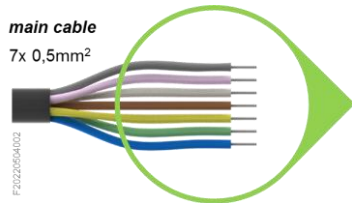
[3] factory default

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DXUB_C. 111621   ▲ Standard design

main cable
7x 0,5mm^2

main cable

| GY |
| PK |
| WH |
| BN |
| YE |
| GN |
| BU |

B -
A +
↓ SG   **RS485** (TP)

⊥ -
~ +   AC/DC 24V U_v **power supply**
X$_1$ 0..10Vdc   X$_1$ **feedback signal** (actual flow V_{am})
Y$_1$ 0..10Vdc   Y$_1$ **control signal** (flow setpoint)
Y$_2$ 0..10Vdc   Y$_2$ **extra sensor input** [1] (remote I/O)

ΔT sensors pre-wired

ΔT

actual water temperature (Tam$_1$)

ΔT

actual water temperature (Tam$_2$)

[1] optional
SG : signal ground

scope of delivery

MP multiprotocol — Modbus / BACnet

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)

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.
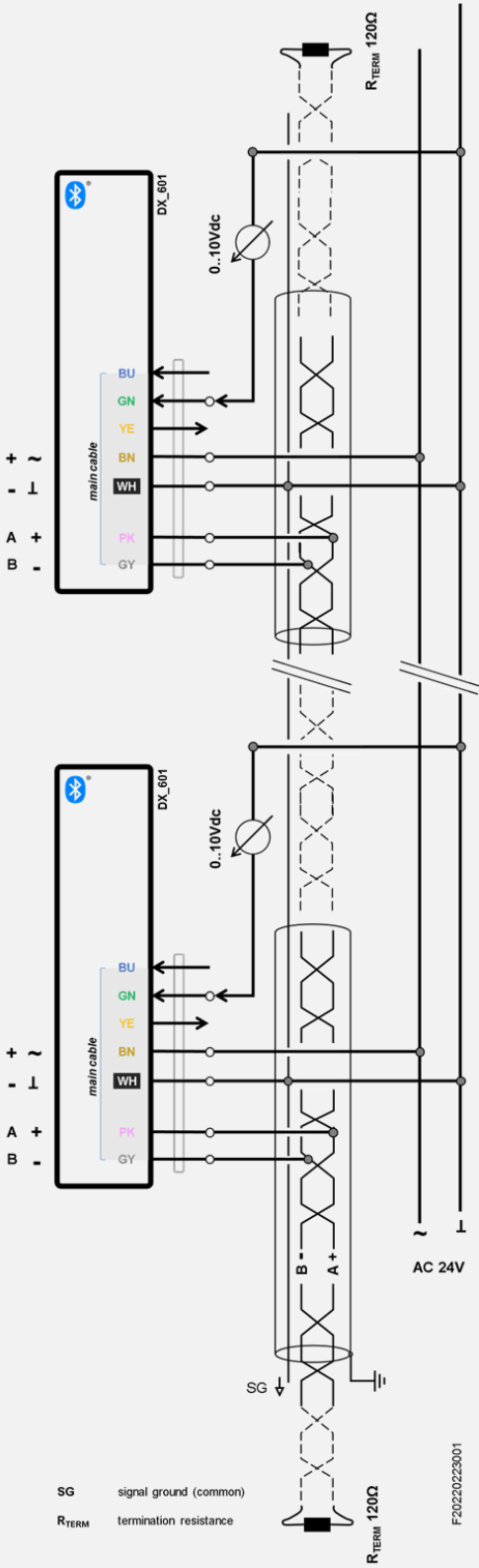
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DXUB_C. 111621

SG   signal ground (common)

R$_{TERM}$ termination resistance

5. Flow rate range

To enable optimal sizing and reduce pumping energy to the absolute minimum, *dynamx*™ flow-control valves, DXUB_ series, are available in 4 different flow ranges.

Type	DN	K$_{vs}$	V$_5$	V$_{10}$	V$_{20}$	V$_{min}$	V$_{nom}$
	[mm]	[m³/h]	[l/h]	[l/h]	[l/h]	[l/h]	[l/h]
DXUB_F065C_	65	48,8	10.900	15.420	21.800	250	48.000
DXUB_F080C_	80	70,7	15.811	22.360	31.620	400	70.000
DXUB_F100C_	100	114,4	25.588	36.185	51.170	600	114.000
DXUB_F150C_	150	272,2	60.865	86.070	121.730	1.500	272.000

1 bar ≈ 100 kPa

1 m/h³ = 1000 l/h = 16.7 l/min = 0.28 l/s

Legend		flow rate range at Δp	
K$_{vs}$	K$_{vs}$-value of DXUB_C	V$_5$	5kPa
V$_{min}$	minimum flow rate of the DXUB_C	V$_{10}$	10kPa
V$_{max}$	maximum flow rate set point (design flow rate) = max.100% V$_{nom}$	V$_{20}$	20kPa
V$_{nom}$	maximum flow rate of the DXUB_C		

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.

DXUB_ with paired temperature sensors pre-mounted ex-works.
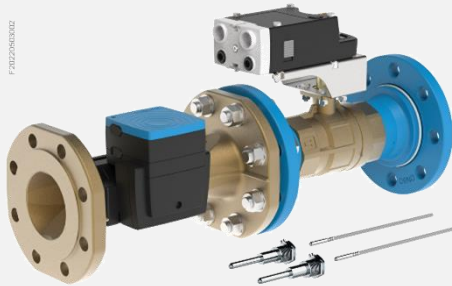
T_{am11} + T_{am2} to measure the temperature difference of the medium, $\Delta T = | T_{am1} - T_{am2} |$

T_{am1}	T_{am2}	92mm

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 R½ (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

copper compression fitting   012416

F20240312001

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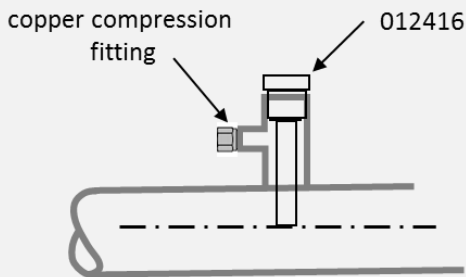
7. Status LED

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

Status	
	power supply
	Bluetooth® communication
	bus network

Main cable

Status LED

LED Bluetooth communicatie

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

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	Assembly Instructions	MI 20211029001A
2	MODBUS RTU - register list	MI 20220105001A
3	BACnet MSTP - PICS	MI 20220105002A
4	REVIT data files (BIM)	www.belparts.com

11. Intellectual property

DXUB_ is based on technology protected by international patents:

- European Patent No. EP2307938
- European Patent No. EP2706425
- European Patent No. EP3812870
- European Patent No. EP3280937
- European Patent No. EP3918236 (patent pending)
- 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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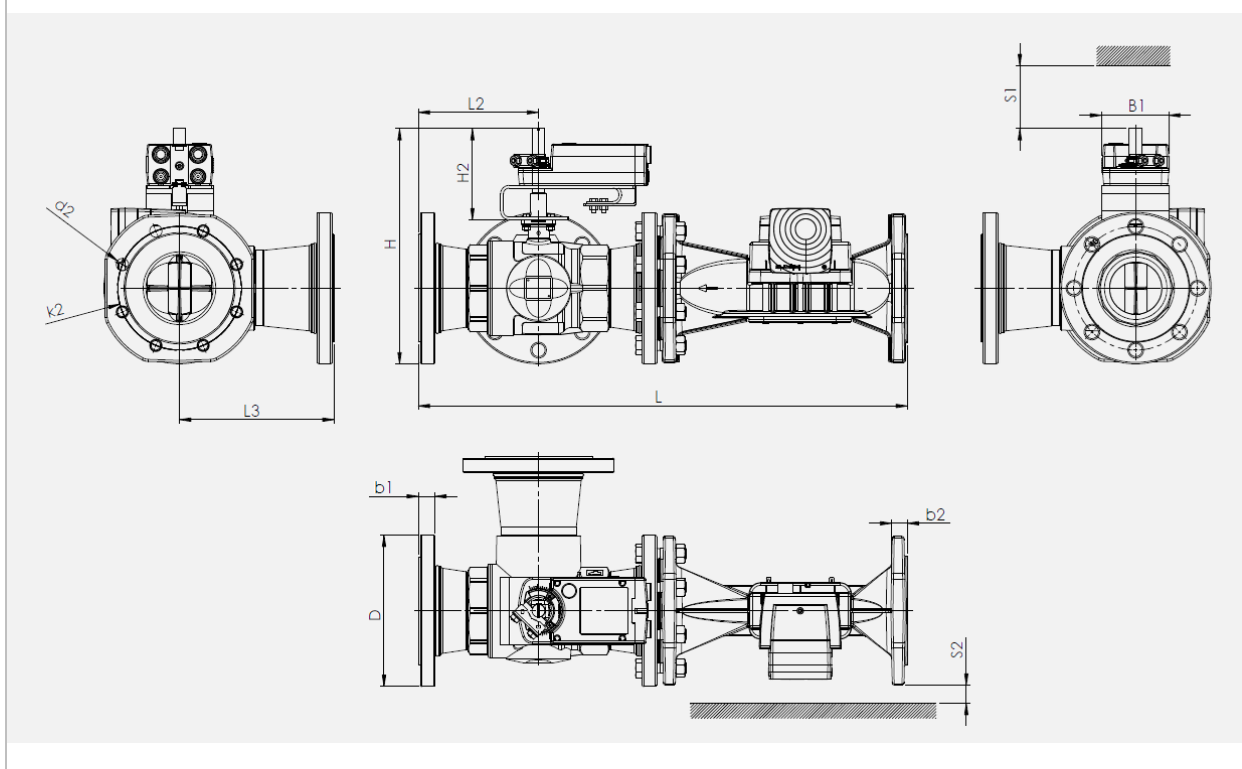
12. Dimensions

DXUB2F_C

DXUB3F_C

Dimensions

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

$^{1)}$ different dimensions for versions with spring return

T20190520002

13. Article reference numbers

DXUB	2	F	080	C	1	1	1	6	2	1
SERIES					VERSION					

Series dynamx™ control valves
DXUB dynamx™ Ultima Ball

Number of connections
2 2-port flow-control valve
3 3- port flow-control valve, mixing

Mounting
F with PN16 flanges EN1092

Size (DN)
065 DN65
080 DN80
100 DN100
150 DN150

Features
C standard flow control

Supply voltage / LED's
1 AC/DC 24 volts with 2x LED

Version
1 standard version

Wireless interface
1 integrated Bluetooth® communication
2 wireless Bluetooth® mesh networking

Bus communication
6 With MP *MultiProtocol*
MODBUS, BACnet and Bluetooth®

ΔT measurement
2 with ΔT measurement (T_1 + T_2)

Electrical connection
1 standard (PVC) cable, length L $_c$

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14. Overview

Type	AC/DC 24 [Volts]	DN [mm]	K_{vs} [m³/h]	V_5 [l/h]	V_{10} [l/h]	V_{max} [l/h]	Δp_s [kPa]	0..10Vdc	Bluetooth	MP	ΔT [°C]	L_C [m]

2-port version

| | | | | design flow rate at Δp | | | | | | | | |
				5kPa	10kPa							
DXUB2F065C.111621 ▲	●	65	48	10.900	15.420	21.800	690	●	●	●	●	1m
DXUB2F080C.111621 ▲	●	80	70	15.811	22.360	31.620	690	●	●	●	●	1m
DXUB2F100C.111621 ▲	●	100	114	25.588	36.185	51.170	690	●	●	●	●	1m
DXUB2F150C.111621 ▲	●	150	272	60.865	86.070	121.730	690	●	●	●	●	1m

3-port version
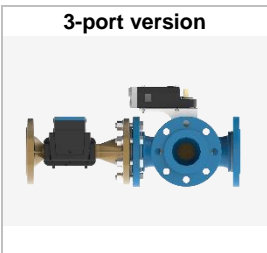
| | | | | design flow rate at Δp | | | | | | | | |
				5kPa	10kPa							
DXUB3F065C.111621 ▲	●	65	48	10.900	15.420	21.800	345	●	●	●	●	1m
DXUB3F080C.111621 ▲	●	80	70	15.811	22.360	31.620	345	●	●	●	●	1m
DXUB3F100C.111621 ▲	●	100	114	25.588	36.185	51.170	345	●	●	●	●	1m
DXUB3F150C.111621 ▲	●	150	272	60.865	86.070	121.730	345	●	●	●	●	1m

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.
- **Δp_s** The close-off differential pressure Δp_s refers to the rating at which the actuator will be able to provide tight shutoff of the DXUB_ flow-control valve. For normal operation and in order to ensure a quiet operation of the valve, it is recommended to operate the valve with a differential pressure of ≤200kPa.

Legend

DN	size	V_5	flow rate at Δp 5kPa	MP	*MultiProtocol*: MODBUS, BACnet, Bluetooth
K_{vs}	K_{vs} value of the valve	V_{10}	flow rate at Δp 10kPa	ΔT	measurement ΔT water temperature
V_{max}	flow range (0..V_{max})	Δp_s	maximum closing pressure	L_c	standard cable length (PVC)

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

△ special design, delivery times on request, min. quantities apply