

DXUB2F080C.111621

dynamx™ variable flow-control valves, series DXUB_C

- Electronic pressure-independent flow control (MID)
- 2-way or 3-way flow-control valves PN16
- Integrated flow measurement
- Integrated ΔT measurement
- Power supply 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..272000 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™* flow-control valves provide perfect hydraulic balancing in the hydraulic network, both at full and part load, without additional 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™* ball control valves, type DXUB_C, are electronic and pressure-independent flow-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-way or 3-way 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).

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Patented technology

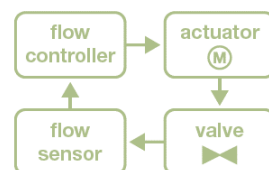
EP2307938
EP2706425
EP3812870
WO2020157612 ⁽¹⁾

- ⁽¹⁾ the pressures listed are maximum values limited by the maximum allowable temperatures in the pressure-temperature diagram
- ⁽²⁾ patent pending

1. How it works

The *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:

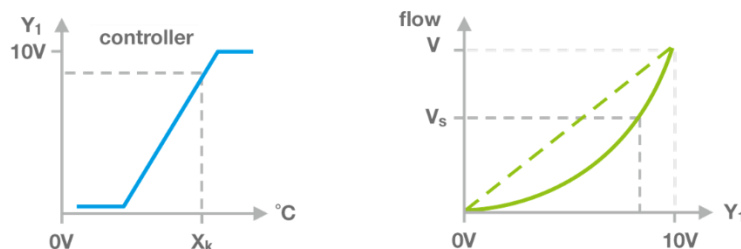
- control valve
- actuator
- flow sensor
- flow controller



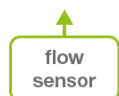
Additional functions can be added on top of these basic building blocks, such as bus communication, wireless communication or additional inputs.



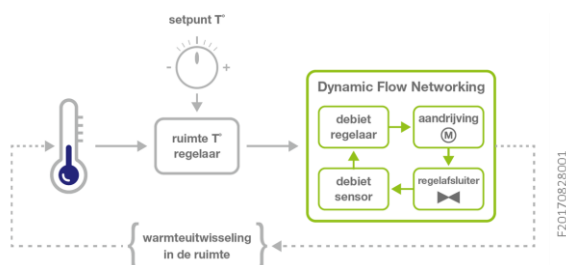
In analog mode, the internal flow controller of the *dynamx*™ control valve receives a set point from an external controller Y_1 : 0..10Vdc. Internally, this set point is converted to a flow set point, for heating or cooling. Example:



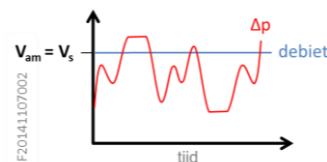
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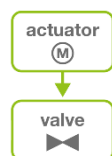
The integrated flow sensor continuously measures the actual flow rate. The internal control loop compares the actual flow rate with the desired flow rate and adjusts the position of the control valve so that the measured flow rate matches the flow rate set point.



F20170828001



F20141107002



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, indicates the current flow rate and can be used to monitor the current flow rate.



Thanks to this innovative technology, *dynamx*™ flow-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 flow-control valves are equipped with MP *MultiProtocol* communication allowing them to be integrated into both MODBUS and BACnet networks.

2. Technical Data

1 | 2

Electric

Supply voltage U_v	AC 24 volts ($\pm 20\%$), 50Hz DC 24 volts ($\pm 20\%$)
Consumption	<i>during control</i> 3.5W (5VA) <i>Stand-by</i> 2W
Control signal Y_1	0..10Vdc (0.17mA)
Feedback signal X_1	0..10Vdc (≤ 2 mA) actual flow rate, scaled according to the max flow rate heating or cooling
Electrical wiring	PVC cable, 7x 0.5mm ² , length 1m

Flow measurement

Sensor type MID	ultrasonic TTM, no moving parts
Sensor class	in accordance with the 2014/32/EU and EN1434-4:2007
Measuring accuracy	class 2
Unit of measurement	m ³ /h ⁽¹⁾ , l/s, l/min, gpm (UK), gpm (US)

Temperature measurement

Sensor type MID	Pt500 or Pt1000 ⁽¹⁾ in accordance with EN60751
Paired sensors	compliant with MID-2014/32/EU, EN1434-4:2007
MID module	Module B (heat)

Hydraulic

Construction	DXUB2_C 2-way DXUB3_C 3-way, mixing
Nominal pressure	PN16 (16 bar) ^(2) 0)
Control characteristic	equiprocentual ^(1) 0) or linear
Leakage rate	<i>control port</i> 0.01% of the valve's Kvs-value <i>3-port bypass</i> 1% of the valve's Kvs-value
Differential pressure	<i>min.</i> no minimum differential pressure required <i>max.</i> 200 kPa (maximum recommended)
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 to EN1092-2 Type 21 and 16
Startup time	3..5 min 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 allowable temperatures in the pressure-temperature diagram.

⁽³⁾ The closing pressure $\Delta p_{(s)}$ refers to the value at which the actuator is able to properly close the control valve. The pressure differential Δp_s for the 3-way versions is 345kPa.

For normal operation and to ensure quiet operation of the control valve, it is recommended to operate the control valve with a differential pressure of ≤ 200 kPa.

2. Technical Data

2 | 2

Surroundings

Temperature	<i>area</i>	+10°C .. +45°C
	<i>storage</i>	-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

3. MP MultiProtocol



The *dynamx™* DXUB_C flow-control valves can optionally be supplied with an RS485 bus communication interface with the MP *MultiProtocol* functionality for easy integration¹⁾ 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™* flow-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
Topology		1 stop bit
		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

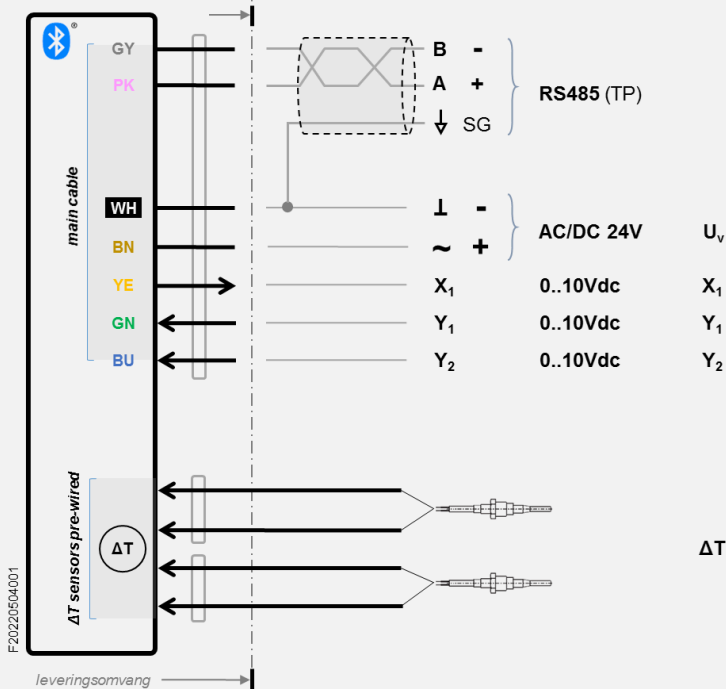
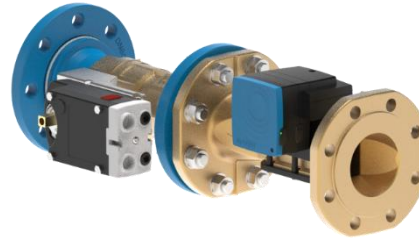
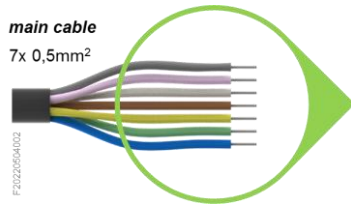
²⁾ can be set via the Bluetooth® dxLink21™ APP or via the dxLink™ MS Windows commissioning tool via MODBUS communication

³⁾ factory default

4. Electrical connection

1 | 2

DXUB_C. 111621



voedingsspanning

feedback signaal (actueel debiet V_{am})

stuursignaal (setpunt debiet)

extra sensor input ¹⁾ (remote I/O)

actuele water temperatuur (T_{am1})

actuele water temperatuur (T_{am2})

¹⁾ optioneel

SG : common (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.

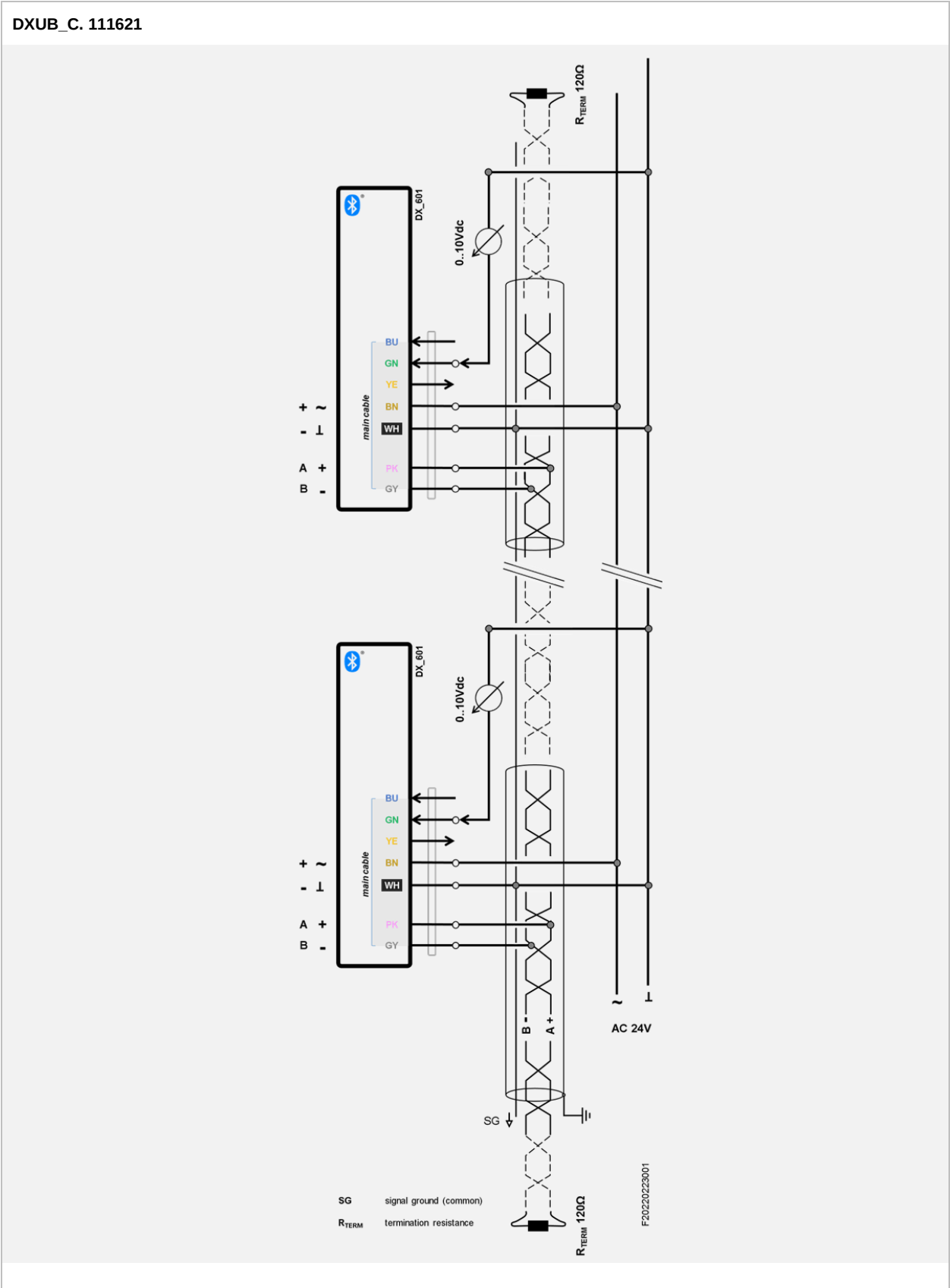
i A low voltage transformer must be used in accordance with local regulations.

i Even for alternating current, always observe the correct polarity!

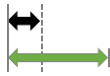
In accordance with the Electromagnetic Compatibility Directive 2014/32/EU, according to the applied standards

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

4. Electrical connection Application example 2 | 2



5. Flow rate and pressure range



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

Type	DN [mm]	K _{VS} [m ³ /h]	V ₅ [l/h]	V ₁₀ [l/h]	V ₂₀ [l/h]	V _{(m) (in)} [l/h]	V _{nom} [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

Legend

flow rate range at Δp

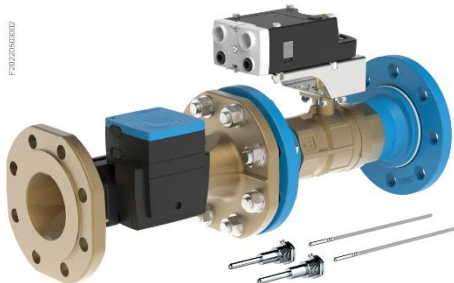
K _{VS}	K _{VS} -value of DXUB_C	V ₅	5 kPa
V _{(m) (in)}	minimum flow rate of the DXUB_C	V ₁₀	10 kPa
V _{max}	maximum flow rate set point (design flow rate) = max.100% V _{nom}	V ₂₀	20 kPa
V _{nom}	maximum flow rate of the DXUB_C		

1 bar ≈ 100 kPa

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

6. Temperature sensors

The DXUB_C flow-control flow-control valves are supplied standard with two temperature sensors, for measuring supply and return water temperature. Both temperature sensors $T_{(am)} (1)$ and $T_{(am)} (2)$ have a free cable length of 2m and must be mounted on-site.



$T_{(am1)} (1) + T_{(am)} (2)$ to measure the temperature difference of the medium, $\Delta T = |T_{(am)} (1) - T_{(am)} (2)|$

temperature sensor with immersion sleeve ¹⁾

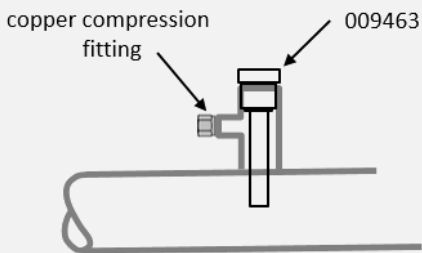
			
$T_{(am)} (1)$	$T_{(am)} (2)$	65mm	90mm

Type			009463	009681
DXUB_F065C.111621	1st	1st	2pcs	-
DXUB_F080C.111621	1st	1st	2pcs	-
DXUB_F100C.111621	1st	1st	-	2pcs
DXUB_F150C.111621	1st	1st	-	2pcs

¹⁾ Stainless steel AISI 304 (1.4301), process connection R $\frac{1}{2}$ (standard 2 pieces of immersion sleeves included in delivery).

²⁾ Other accessories for mounting temperature sensors are not part of the delivery and must be ordered separately.

Assembly example



7. Status LED



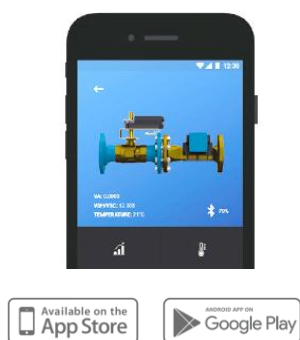
The integrated LEDs provide useful information that can help with startup and commissioning.

Status

- power supply
- Bluetooth® communication
- bus network

8. Wireless commissioning

dxLink21™



Thanks to the integrated Bluetooth® technology, the DXUB_C flow-control 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™ flow-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™ flow-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



- 01 Assembly Instructions
- 02 MODBUS RTU - register list
- 03 BACnet MSTP - PICS
- 04 REVIT data files (BIM) - contact us

11. Intellectual property

DXUB_C is based on technology protected by international patents:

- European Patent No. 2307938
- European Patent No. 2706425
- European patent no. 3812870
- Chinese patent no. ZL200880130728.9
- United States Patent No. 9823666
- United States Patent No. 10394257
- Registered community model RCD No. 004030633-0001
- Registered community model RCD No. 004030633-0002
- Patent in application no. WO2020157612



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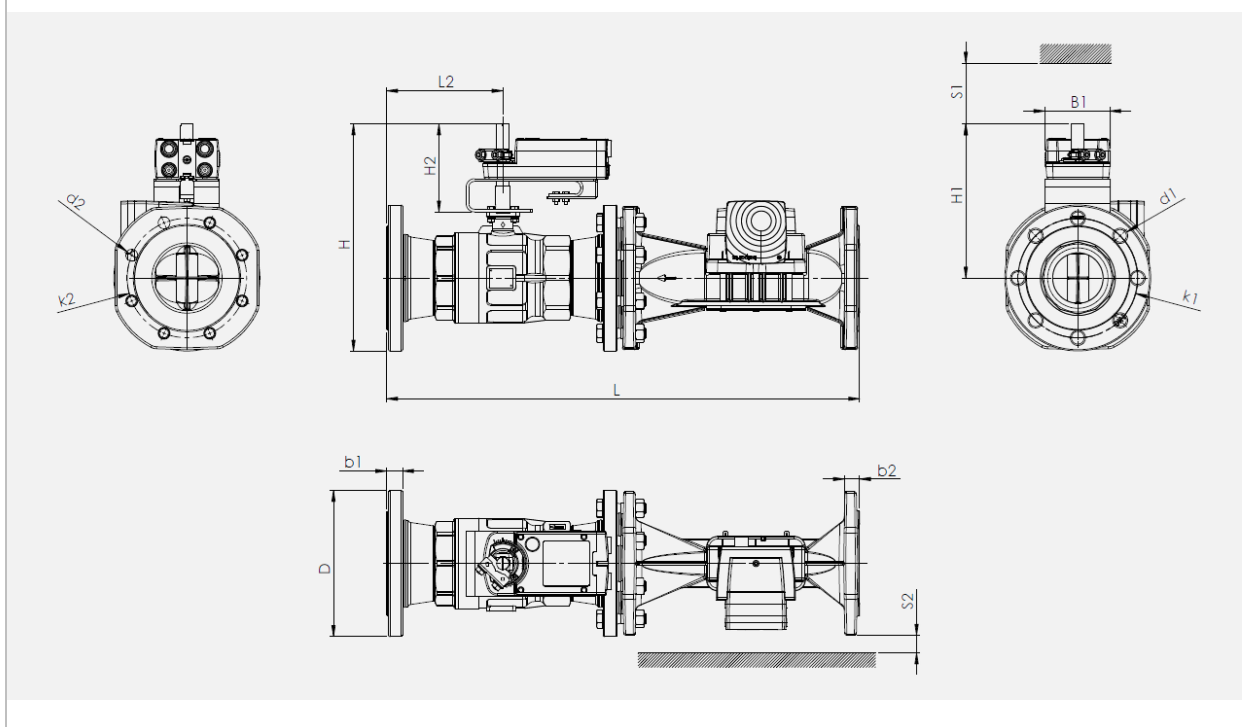
MS Windows is a registered trademark of Microsoft Corp. MODBUS is a registered trademark of Schneider Electric. BACnet is a registered trademark of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (Ashrae).

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

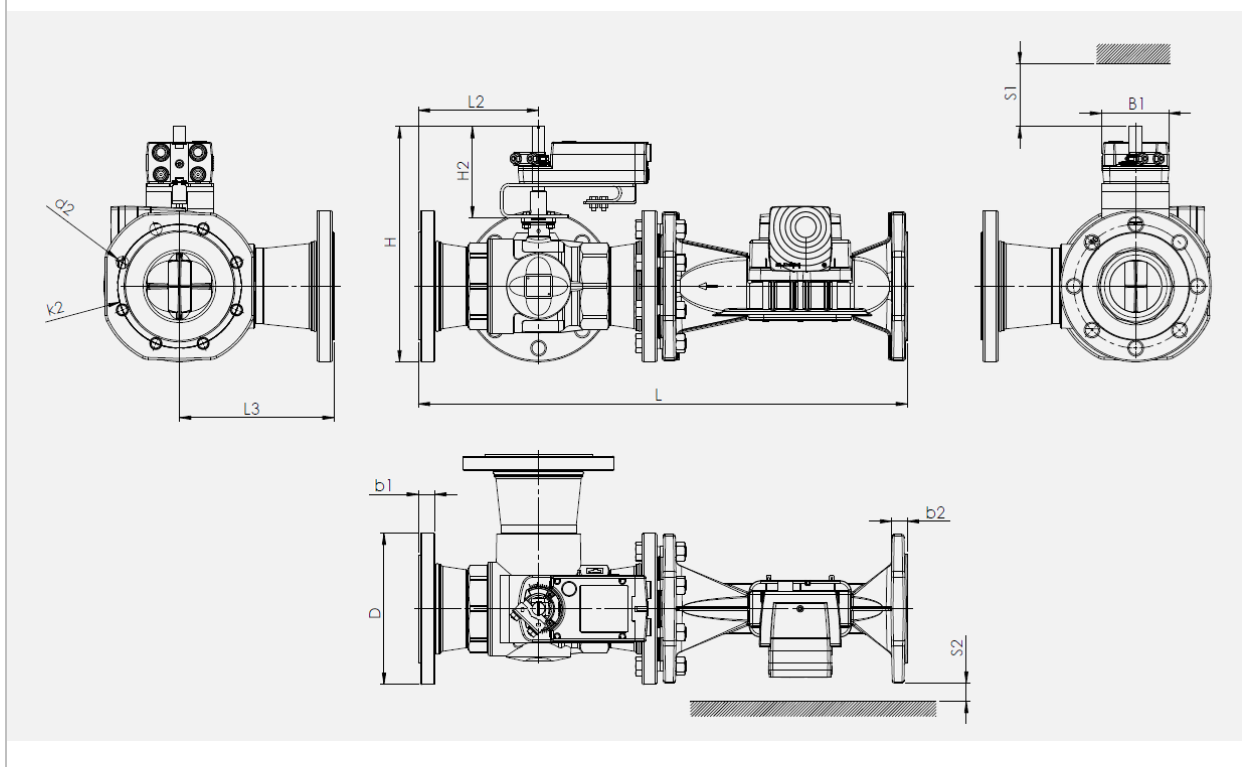
12. Dimensions

1 | 2

DXUB2F_C



DXUB3F_C



12. Dimensions

2 | 2

			Afmetingen											
	2w	3w	k2	d2	L3	L	H	H2	L2	B1	b1	b2	D	
	[mm]													
DXUB2F065C	●	-	145	18	-	591	229	133	145	98	21	20	174	
DXUB3F065C	-	●	145	18	149	591	299	133	145	98	21	20	174	
DXUB2F080C	●	-	160	18	-	611	307	133	155	98	22	22	188	
DXUB3F080C	-	●	160	18	158	611	307	133	155	98	22	22	188	
DXUB2F100C	●	-	180	18	-	712	342	133	175	98	22	24	220	
DXUB3F100C	-	●	180	18	225	712	342	133	175	98	22	24	220	
DXUB2F150D	●	-	240	23	-	992	376	133	240	98	34	26	280	
DXUB3F150D	-	●	240	23	287	982	376	133	240	98	34	26	280	

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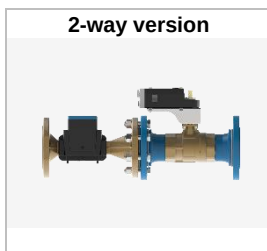
13. Article coding

DXUB	2	F	080	C	1	1	1	6	2	1	
SERIES				VERSION							
DXUB											Series <i>dynamx</i> ™ control valves DXUB <i>dynamx</i> ™ Ultima Ball
											Number of connections
	2										2 2-way control valve
	3										3 3-way control valve, mixing
											Assembly
		F									F with PN16 flange EN1092
											Size (DN)
			065								065 DN65
			080								080 DN80
			100								100 DN100
			150								150 DN150
											Features
				C							C standard flow control
											Supply voltage / LEDs
					1						1 AC/DC 24 volts with 2x LED
											Version
						1					1 standard version
											Wireless interface
							1				1 integrated Bluetooth® communication
							2				2 wireless Bluetooth® mesh networking
											Bus communication
								6			6 with MP MultiProtocol MODBUS, BACnet and Bluetooth®
											ΔT measurement
									2		2 With ΔT measurement (T _{am1} + T _{am2})
											Electrical connection
										1	1 standard (PVC) cable, length L _c)

14. Ordering Information

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		 MP multiprotocol	ΔT [°C]	L _c [m]
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2-way version



design flow rate at Δp	
5kPa	10kPa

DXUB2F065C.111621 ▲	●	65	48	10.900	15.420	21.800	200	●	●	●	●	1m
DXUB2F080C.111621 ▲	●	80	70	15.811	22.360	31.620	200	●	●	●	●	1m
DXUB2F100C.111621 ▲	●	100	114	25.588	36.185	51.170	200	●	●	●	●	1m
DXUB2F150C.111621 ▲	●	150	272	60.865	86.070	121.730	200	●	●	●	●	1m

3-way version



design flow rate at Δp	
5kPa	10kPa

DXUB3F065C.111621 ▲	●	65	48	10.900	15.420	21.800	200	●	●	●	●	1m
DXUB3F080C.111621 ▲	●	80	70	15.811	22.360	31.620	200	●	●	●	●	1m
DXUB3F100C.111621 ▲	●	100	114	25.588	36.185	51.170	200	●	●	●	●	1m
DXUB3F150C.111621 ▲	●	150	272	60.865	86.070	121.730	200	●	●	●	●	1m

Legend

DN	luminaire connection	V ₅	flow rate at Δp 5kPa	MP	MultiProtocol: MODBUS and BACnet
K _{vs}	K _{vs} value of the fixture	V ₁₀	flow rate at Δp 10kPa	ΔT	measurement ΔT medium 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