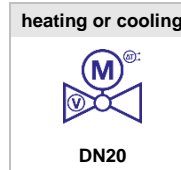




**DXC**

**Variable flow-control valve, series DXC**

- Pressure independent variable flow-control
- Dynamic hydronic balancing in full load and part load
- Integrated flow and temperature measurement
- Power supply  $U_v$ : AC 24Volt
- Flow setpoint via ctrl signal  $Y_1$ : 0..10Vdc
- Remote commissioning
- With MODBUS RTU/MSTP or BACnet MSTP
- Integrated room temperature controller (optional)



**Dynamic Flow Networking<sup>®</sup>**

The *dynamx*<sup>™</sup> 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*<sup>™</sup> valves take care of a perfect hydraulic balance in the hydraulic net, at full load as well as in part load without any extra components: Dynamic Flow Networking<sup>®</sup> (DFN).



**Advantages**

- ✓ 4-in-1 solution
- ✓ perfect variable flow control
- ✓ flow and energy registration
- ✓ no minimal  $\Delta p$  required
- ✓ energy saving
- ✓ automatic hydronic balancing
- ✓ remote commissioning
- ✓ patented technology
- ✓ insulated valve body
- ✓ noiseless operation
- ✓ near zero power in standby

**Description**

The *dynamx*<sup>™</sup> Compact DXC valve combines four functions: (1) a flow-control valve, (2) a dynamic, pressure-independent balancing valve a (3) shut-off valve and (4) an energy monitoring device.

DXC is used in HVAC systems with variable flow and is designed e.g. for climate ceilings or fan coil units (2-pipes systems). DXC replaces the (static) balancing valve, as well as the control valve.

The DXC series are available as 2-port valve with G $\frac{3}{4}$ " flat connections. DXC can be used in HVAC systems for buildings with a nominal system pressure of 16 bar (PN16) and water temperatures: +15°C..+80°C <sup>1)</sup> (non- condensing).

Optional assembly bracket, tail pieces, ball valves etc. can be supplied.

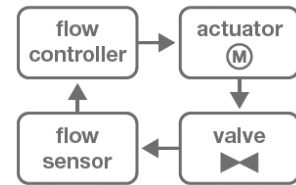
**Content**

|     |                                                 |   |
|-----|-------------------------------------------------|---|
| 1.  | How it works .....                              | 2 |
| 2.  | Technical data .....                            | 3 |
| 3.  | LCD display .....                               | 4 |
| 4.  | Electrical wiring.....                          | 4 |
| 5.  | MODBUS / BACnet Interface .....                 | 4 |
| 6.  | Process connections.....                        | 5 |
| 7.  | Flow range.....                                 | 6 |
| 8.  | Commissioning tool dxLink <sup>™</sup> .....    | 6 |
| 9.  | Accessories .....                               | 7 |
| 10. | Other resources.....                            | 7 |
| 11. | Brands, trademarks & intellectual property..... | 7 |
| 12. | Ordering information.....                       | 8 |

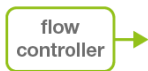
**1. How it works**

The *dynamx*™ valves are designed to accurately control the flow through each consumer device. In order to achieve this, *dynamx*™ has 4 basic building blocks:

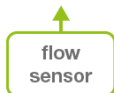
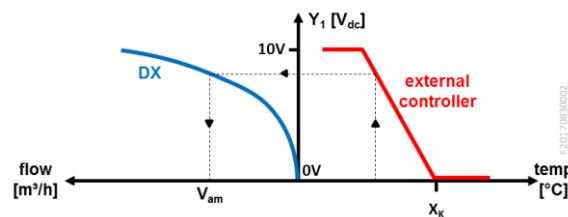
- a valve
- an actuator
- a flow sensor
- a flow controller



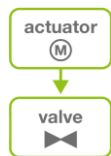
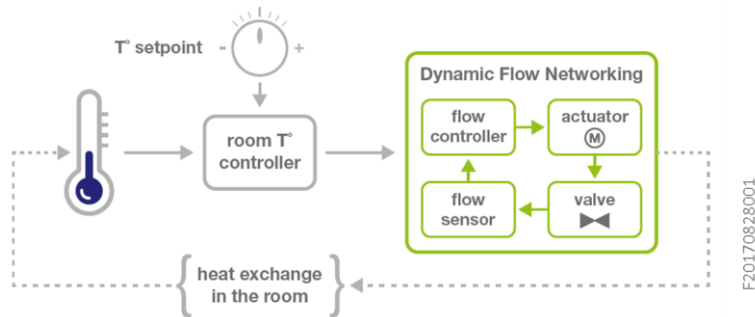
On top of these basic building blocks additional features can be added like for example a room temperature controller.



In *analog* mode, the internal flow controller of the *dynamx*™ valve receives a setpoint from the room T° controller  $Y_1$ : 0..10Vdc. Internally this setpoint is converted into a setpoint for the flow, either 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.



Thus DXC will control the flow towards the desired setpoint, independent of potential pressure fluctuations in the system e.g. in case of part load. The control valve adapts automatically to the system parameters and search for the ideal setpoint to guarantee a maximum comfort for the user with minimal energy consumption. The output signal  $X_1$ : 0..10Vdc representing the measured flow can be used for monitoring the actual flow.



Thanks to this innovative technology, the *dynamx*™ valves can be used in a much larger flow range compared to traditional control valves. In order to enable optimal sizing and reduce pump energy to the absolute minimum, *dynamx*™ valves are available in different flow ranges.



The *dynamx*™ DXC valves can optionally be supplied with a MODBUS RTU/MSTP or BACnet MSTP bus-communication interface.



## 2. Technical data

### Electrical

|                                          |                                                                                              |
|------------------------------------------|----------------------------------------------------------------------------------------------|
| <b>Power supply U<sub>v</sub></b>        | AC 24 Volt (-10%/+20%), 50Hz                                                                 |
| <b>Consumption</b> <i>during control</i> | 2W typical, 8W at peak (8VA)                                                                 |
| <b>Input signal Y<sub>1</sub></b>        | 0..10Vdc (0.17mA)                                                                            |
| <b>Feedback signal X<sub>1</sub></b>     | 0..10Vdc (≤ 2mA) the actual flow, scaled to the maximum flow settings for heating or cooling |
| <b>Electric wiring <sup>1)</sup></b>     | PVC cable, 4x 0,5mm <sup>2</sup> (length L <sub>C</sub> )                                    |
| <b>Bus connection</b>                    | RJ45 connector                                                                               |

### Flow measurement

|                          |                                                                  |
|--------------------------|------------------------------------------------------------------|
| <b>Sensor type</b>       | ultrasonic TTM, no moving parts                                  |
| <b>Flow sensor class</b> | approved according to MID-2014/32/EU and EN1434-4:2007           |
| <b>Measuring unit</b>    | m <sup>3</sup> /h <sup>2)</sup> , l/s, l/min, gpm (UK), gpm (US) |

### Temperature measuring

|                       |                                             |
|-----------------------|---------------------------------------------|
| <b>Sensor type</b>    | Pt500 according to EN60751                  |
| <b>Sensor pairing</b> | according to MID-2014/32/EU EN1434-4 : 2007 |

### Hydronics

|                                          |                                                                                                                        |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Nominal pressure rating</b>           | PN16 (16 bar)                                                                                                          |
| <b>Control characteristic</b>            | equal percentage <sup>2)</sup> or linear                                                                               |
| <b>Valve seat leakage</b>                | tight sealing (sealing 100%)                                                                                           |
| <b>Differential pressure</b> <i>min.</i> | no minimum differential pressure required                                                                              |
| <i>max.</i>                              | 1,5bar (150kPa)                                                                                                        |
| <b>Flow setpoint control</b>             | analog (Y <sub>1</sub> ), via bus communication or via LCD                                                             |
| <b>K<sub>vs</sub> value</b>              | 1.9m <sup>3</sup> /h                                                                                                   |
| <b>Medium</b>                            | water (glycol free)                                                                                                    |
| <b>Medium quality</b>                    | according to VDI 2035                                                                                                  |
| <b>Medium temperature</b>                | +15°C..+80°C                                                                                                           |
| <b>Connections</b>                       | G <sup>3</sup> / <sub>4</sub> " flat connection, according to ISO228/1 with tailpieces outside thread R1/2" on request |
| <b>Start-up time</b>                     | 3..5min after power-up                                                                                                 |
| <b>Powerless position</b>                | normally closed (NC)                                                                                                   |

### Material

|                  |                                                                  |
|------------------|------------------------------------------------------------------|
| <b>Housing</b>   | polypropylene, steel                                             |
| <b>Wet parts</b> | brass, EPDM, stainless steel (1.4401 and 1.4301), thermoplastics |

### Environment

|                                   |                                          |
|-----------------------------------|------------------------------------------|
| <b>Humidity</b>                   | maximum 90% HR, without condensation     |
| <b>Maintenance / calibration</b>  | without maintenance, without calibration |
| <b>Temperature</b> <i>ambient</i> | +10°C .. +45°C                           |
| <i>storage</i>                    | -20°C .. +50°C                           |

<sup>1)</sup> number of wires depends on the version number, length L<sub>C</sub> (see ordering table)

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



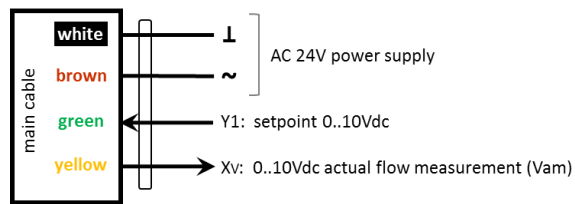
LCD display with navigation pad

### 3. LCD display

DXC is delivered with an LCD display. The display shows the flow, the water temperature and other key values.

The built-in keyboard push buttons enables the user to read and/or modify settings of all major operating parameters of the DXC.

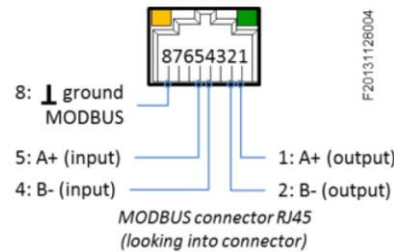
### 4. Electrical wiring



F20170921001

#### Notes

- a low voltage safety transformer should be used according to local regulations
- complies to the Electromagnetic Compatibility Directive 2014/30/EU, applying standards
  - EN 61000-6-3 (2007)
  - EN 61000-3-2 (2006)
  - EN 61000-3-3 (1995) + am1(2001)
  - EN 61000-6-1 (2005)



F20131128004

### 5. MODBUS / BACnet Interface

The DXC valves can optionally be delivered with a bus communication interface for an easy integration<sup>1)</sup> into each Building Management System (BMS):



- MODBUS RTU/MSTP
- BACnet MSTP

These types of bus communication are very well adapted for communication on a field level. It is simple, while offering reliable and robust data communication. The MODBUS communication technology is open, license-free and is available for each BMS-system on the market.

#### Technical specifications

|                                             |                                                                                                    |
|---------------------------------------------|----------------------------------------------------------------------------------------------------|
| <b>MODBUS protocol</b>                      | RTU/MSTP, slave                                                                                    |
| <b>BACnet protocol</b>                      | MSTP, slave                                                                                        |
| <b>Physical layer</b>                       | RS485, 2-wire twisted pair                                                                         |
| <b>Bus termination</b>                      | 120Ω terminal resistor at each end of the bus                                                      |
| <b>Communication settings</b> <sup>2)</sup> | 9600, 19200 of 38400 Baud, 1 start bit, even <sup>3)</sup> /odd/no parity, 8 data bits, 1 stop bit |
| <b>Topology</b>                             | multi-drop bus, maximum length 1.000m                                                              |
| <b>Drop length</b>                          | maximum 2m, preferably in daisy chain                                                              |
| <b>Bus cable type</b>                       | shielded twisted pair STP or FTP                                                                   |

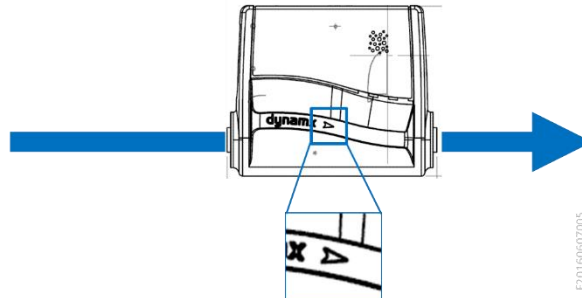
<sup>1)</sup> the installer is responsible for complying to local EMC regulations when installing, connecting and commissioning DXC to a communication bus

<sup>2)</sup> can be set via the LCD display (when ordered) or via dxLink™ commissioning tool over MODBUS communication

**6. Process connections**

**Flow direction**

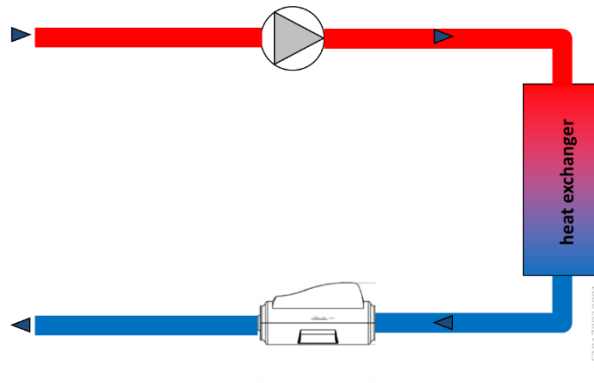
The DXC valves have a fixed flow direction as specified in the drawing. An arrow on the valve body indicates the inlet and outlet of the valve.



F20160607005

**Mounting**

The DXC valves should preferably be mounted in the return pipe. This favors life-time of the device. Installation in the supply pipe is allowed but less recommended.



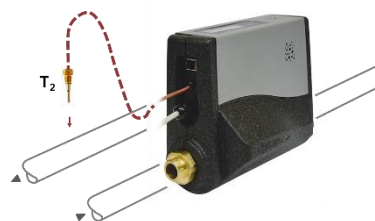
F20170830001

**Temperature sensors (water)**

DXC is available with two built-in temperature sensors. The first sensor  $T_1$  is built into the device and its reading is available over the bus communication and/or LCD display.

The second temperature sensor  $T_2$  has to be mounted in the pipework on site, and is pre-wired in the DXC unit. This sensor comes with 2,75m free cable length.

Mounting accessories are available on request.



F20151210001

|          |
|----------|
| <b>A</b> |
| <b>B</b> |
| <b>C</b> |

## 7. Flow range

| Type                 | DN<br>[ mm ] | K <sub>vs</sub><br>[ m <sup>3</sup> /h ] | V <sub>min</sub><br>[ l/h ] | V <sub>5</sub><br>[ l/h ] | V <sub>10</sub><br>[ l/h ] | V <sub>20</sub><br>[ l/h ] | V <sub>max</sub><br>[ l/h ] |
|----------------------|--------------|------------------------------------------|-----------------------------|---------------------------|----------------------------|----------------------------|-----------------------------|
| DXC2P020U. _ _ _ _ _ | 20           | 1,9                                      | 3                           | 430                       | 610                        | 860                        | 1.400                       |

### Legend

|                                                     |                                        |                                        |
|-----------------------------------------------------|----------------------------------------|----------------------------------------|
| V <sub>max</sub> flow range ( 0..V <sub>max</sub> ) | V <sub>5</sub> flow range at Δp 5kPa   | V <sub>20</sub> flow range at Δp 20kPa |
| V <sub>min</sub> minimum controllable flow          | V <sub>10</sub> flow range at Δp 10kPa |                                        |

## 8. Commissioning tool dxLink™

All *dynamx*™ valves can be integrated smoothly into each Building Management Systems or they can also be implemented as stand-alone devices.



### dxLink™ <sup>1)</sup>



dxLink™ allows you to remotely commission *dynamx*™ valves using the MODBUS bus-communication capability of the valve. This means that commissioning a *dynamx*™ device does not require any action on the device itself but only from one central remote location. This greatly reduces the time required to commission the HVAC system and makes the system less error-prone.






dxLink™ allows you to read and set *dynamx*™ configuration variables and to read the current value of all variables remotely.

The dxLink™ software will work on computer with the Windows Operating System, from XP to Win8.

| Type          | Description                                                                                                                                                                                                                                                                                                                                                 |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DX.10E.009940 |  <p><b>dxLink™ - software license</b></p> <ul style="list-style-type: none"> <li>- commissioning software for MS Windows</li> <li>- an unlimited number of <i>dynamx</i>™ devices can be commissioned</li> <li>- including 1 pc RS485-to-USB conversion cable</li> </ul> |
| DX.10E.009942 |  <p><b>RS485-to-USB conversion cable</b></p> <p>Used to connect a <i>dynamx</i>™ device with MODBUS RTU or BACnet (RS485) directly to a PC. Note: appropriate driver to be installed.</p>                                                                                |

<sup>1)</sup> requires a DXC MODBUS version

## 9. Accessories

| Type          |                                                                                                                             | Description                                                                                                                                                                                |
|---------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DX.10H.009056 |                                            | Nipple for temperature sensor R1/2" (outside thread)<br>inside thread M10 for temperature sensor                                                                                           |
| DX.10H.009702 |                                            | DN20 T-piece for T° sensor with integrated ball valve (inside thread G3/4")<br>3 <sup>rd</sup> port with inside thread M10 for water temperature sensor<br>temperature sensor not included |
| T.BK.G34.T34  |                                            | Tail piece with integrated ball valve : female G3/4" x female G3/4" (nut)                                                                                                                  |
| DX.10H.011404 |  | Reduction male G1/2" x female G3/4" for DXC                                                                                                                                                |
| DX.10H.009706 |                                            | Mounting bracket for DXC                                                                                                                                                                   |

## 10. Other resources



|            |                             |
|------------|-----------------------------|
| A.101 - 01 | Dimensions drawings         |
| A.101 - 02 | Mounting instructions       |
| A.101 - 03 | User manual MODBUS RTU/MSTP |
| A.101 - 04 | User manual BACnet/MSTP     |
| A.101 - 05 | Data files 3D STEP          |
| A.101 - 06 | Data files REVIT            |

## 11. Brands, trademarks & intellectual property



DXC is based on technology protected by international patents:

- European patent Nr. 2307938
- Chinese patent Nr. ZL200880130728.9
- Patent pending Nr. US2011/0162742
- Registered community design RCD N° 001167076-0001

Belparts, dynamx, dynamic flow networking, DFN and dxLink are registered brands and/or trademarks of NV Belparts. 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).

**12. Ordering information**

**1. OVERVIEW**

| Type | AC 24<br>[ Volt ] | G <sub>v</sub> | IP | K <sub>vs</sub><br>[ m <sup>3</sup> /h ] | V <sub>max</sub><br>[ l/h ] | V <sub>10</sub><br>[ l/h ] | Δp <sub>s</sub><br>[ kPa ] |  |  |  |  | T <sub>1</sub> +T <sub>2</sub> | L <sub>c</sub><br>[ m ] |
|------|-------------------|----------------|----|------------------------------------------|-----------------------------|----------------------------|----------------------------|--|--|--|--|--------------------------------|-------------------------|
|------|-------------------|----------------|----|------------------------------------------|-----------------------------|----------------------------|----------------------------|--|--|--|--|--------------------------------|-------------------------|



Modbus

|                   |   |   |                                 |    |     |      |     |     |   |   |   |   |   |    |
|-------------------|---|---|---------------------------------|----|-----|------|-----|-----|---|---|---|---|---|----|
| DXC2P020U.11421   | ▲ | ● | G <sup>3</sup> / <sub>4</sub> " | 43 | 1,9 | 1400 | 610 | 150 | ● | ● | - | ● | ● | 1m |
| DXC2P020A00.11421 | △ | ● | G <sup>3</sup> / <sub>4</sub> " | 43 | 1,9 | 1400 | 610 | 150 | - | ● | ● | ● | ● | 1m |

BACnet

|                   |   |   |                                 |    |     |      |     |     |   |   |   |   |   |    |
|-------------------|---|---|---------------------------------|----|-----|------|-----|-----|---|---|---|---|---|----|
| DXC2P020U.11521   | ▲ | ● | G <sup>3</sup> / <sub>4</sub> " | 43 | 1,9 | 1400 | 610 | 150 | ● | ● | - | ● | ● | 1m |
| DXC2P020A00.11521 | △ | ● | G <sup>3</sup> / <sub>4</sub> " | 43 | 1,9 | 1400 | 610 | 150 | - | ● | ● | ● | ● | 1m |

**Legend**

|                 |                                       |                  |                                    |                |                                |
|-----------------|---------------------------------------|------------------|------------------------------------|----------------|--------------------------------|
| G <sub>v</sub>  | connections valve body                | V <sub>max</sub> | flow range ( 0..V <sub>max</sub> ) | T <sub>1</sub> | medium temperature sensor Nr.1 |
| Δp <sub>s</sub> | maximum close-off pressure            | V <sub>10</sub>  | flow range at Δp 10kPa             | T <sub>2</sub> | medium temperature sensor Nr.2 |
| IRC             | with integrated room control function | L <sub>c</sub>   | standard cable length (PVC cable)  |                |                                |

**2. OPTIONS**

|          |   |   |   |   |   |      |   |                                                |
|----------|---|---|---|---|---|------|---|------------------------------------------------|
| DXC_____ | . | - | - | - | - | .L02 | △ | 2m cable length (standard PVC cable)           |
| DXC_____ | . | - | - | - | - | .L05 | △ | 5m cable length (standard PVC cable)           |
| DXC_____ | . | - | - | - | - | .L10 | △ | 10m cable length (standard PVC cable)          |
| DXC_____ | . | - | - | - | 0 |      | △ | without medium temperature sensor              |
| DXC_____ | . | - | - | - | 1 |      | △ | with 1x medium temperature sensors (pre-wired) |

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