

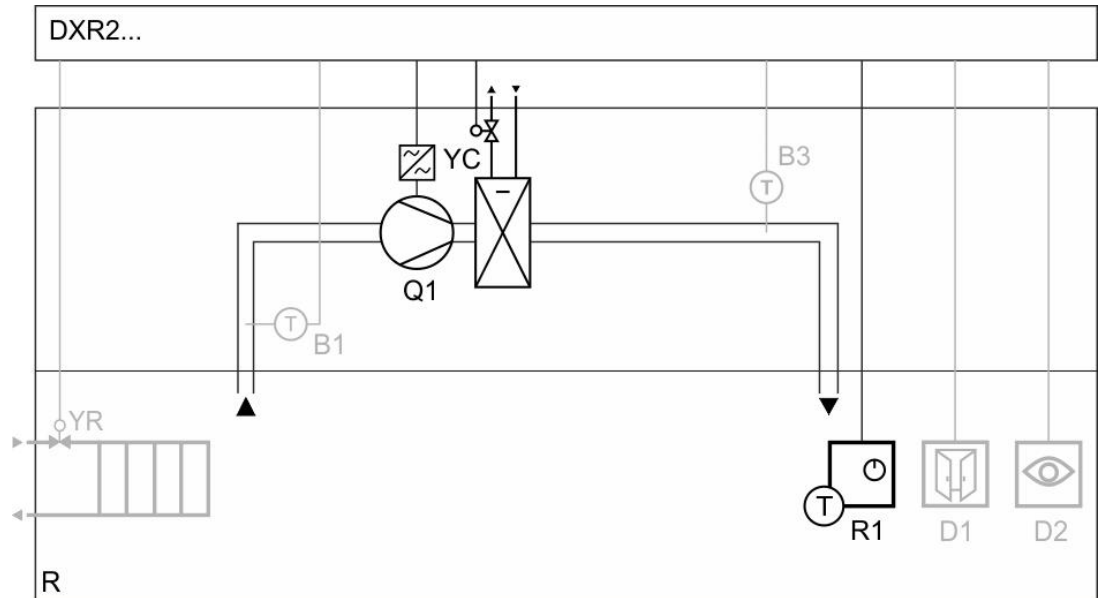
Active chilled beam with variable fan, cooling coil and hot water radiator on triac output

DXR2.E09T-101A



- Cooling with active chilled beam on triac output
- Optional heating with LTHW radiator on triac output
- Automatic or manual variable fan speed control DC 0...10 V
- Room temperature and fan speed operation via KNX PL-Link room operator unit with temperature measurement

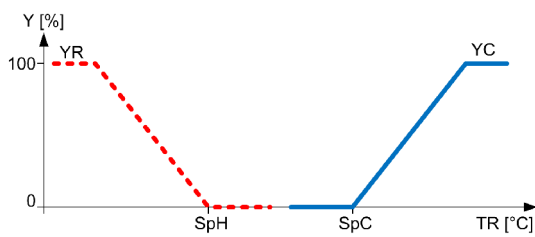
Plant diagram



|         |                                |    |  |
|---------|--------------------------------|----|--|
| DXR2... | Room automation station        | R  | Room                                       |
| B1      | Extract air temperature sensor | R1 | Room operator unit with temperature sensor |
| B3      | Supply air temperature sensor  | YC | Cooling coil valve                         |
| D1      | Window contact                 | YR | Radiator valve                             |
| D2      | Presence detector              |    |  |
| Q1      | Variable speed fan             |    |  |

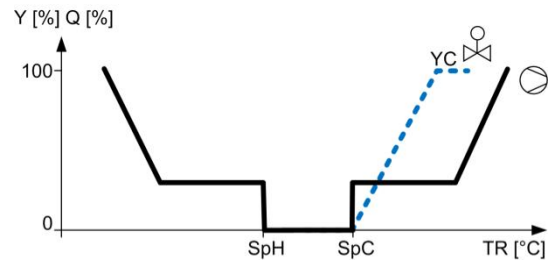
Function diagrams

Heating/cooling valves



|     |                            |
|-----|----------------------------|
| Q   | Fan output signal          |
| SpC | Effective cooling setpoint |
| SpH | Effective heating setpoint |
| TR  | Room temperature           |

DC 0...10 V fan



|    |                     |
|----|---------------------|
| Y  | Valve output signal |
| YC | Cooling coil valve  |
| YR | Radiator valve      |

## Active chilled beam with variable fan, cooling coil and hot water radiator on triac output

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### Description of functions

#### Basic functions

- PID control for cooling.
- 3-position valves are controlled by triac outputs for cooling.
- The fan is controlled manual on the room operator unit or automatic with variable speed.
- The temperature is measured in the room operator unit.
- The application allows customers to adjust the room temperature setpoints via the room operator unit.
- The operating modes are Comfort, Pre-Comfort, Economy and Protection.
- Change of operating mode via room unit, presence detector, window contact or central command.
- The air flow for heating and cooling is operated in sequence to the valves. Parallel operation can be configured.

#### Auxiliary functions

- Green Leaf (RoomOptiControl) function.
- Multisegment use of DXR2 automation stations with fan coil unit application.
- Standard hot and cold water supply chain control.
- The application allows for control via centralized commands (e.g. scheduler program for room operating mode).
- Central optimum start control provides best room comfort at the start of occupancy.
- Central operation or reset of setpoints, timed valve kick function or outside temperature dependent heating limit.
- Central override functions for valves.
- Seasonal compensation of room temperature setpoints.

#### Options

- Optimal energy efficiency by including the option for room/supply air cascade control, presence detector or window contact.
- Optional radiator.
- PID control for LTHW radiator heating.
- Optional system alarms displayed on the management station notify building operators of possible faults.
- Optional trends can be activated for room sensors.

#### Variants

- PWM constant (incl. spring return) or PWM thermal control can be selected for valves.
- The room temperature can be measured by:
  - KNX PL-Link wall-mount sensor
  - KNX PL-Link flush-mount room operator unit
  - KNX PL-Link flush-mount sensors
  - Analog extract air temperature sensor
- Presence can be detected by KNX PL-Link sensor or binary sensor.

| Siemens devices | Legend  | Type of unit  | Data sheet | Product No.    | Qty. |
|-----------------|---------|---|------------|----------------|------|
|                 | DXR2... | Compact room automation station, BACnet/IP, 230 V, flat housing, 1 DI, 2 UI, 1 DO relay, 4 DO triacs, 1 AO 0...10 V | N9204      | DXR2.E09T-101A | 1    |
|                 | R1      | KNX PL-Link room operator unit with temperature sensor, segmented backlit display, touchkeys                        | N1602      | QMX3.P34       | 1    |
|                 | YC      | 2-port, 3-port valve or 3-port valves with bypass, PN16   | N4847      | V..P47..       | 1    |
|                 |         | Motorized 3-positioning actuator for V..P47..., AC 24 V   | N4864      | SSP81..        | 1    |

| Optional <sup>1)</sup> | Legend | Type of unit  | Data sheet | Product No. | Qty.  |
|------------------------|--------|---|------------|-------------|-------|
|                        | B1     | Cable temperature sensor PVC 2 m, LG-Ni1000             | N1831      | QAP22       | 1     |
|                        | B3     | Cable temperature sensor PVC 2 m, LG-Ni1000             | N1831      | QAP22       | 1     |
|                        | D1     | Door/window contact, white                              | 2)         | S 290/11    | 3)    |
|                        | D2     | KNX PL-Link presence detector                           | 2)         | UP 258D12   | 1 - 4 |
|                        | YR     | 2-port, 3-port valve or 3-port valves with bypass, PN16 | N4847      | V..P47..    | 1     |
|                        |        | Motorized 3-positioning actuator for V..P47..., AC 24 V | N4864      | SSP81..     | 1     |

<sup>1)</sup> Can be combined according to available on-board I/Os on controller.

<sup>2)</sup> Further documents on [www.siemens.com/gamma-td](http://www.siemens.com/gamma-td).

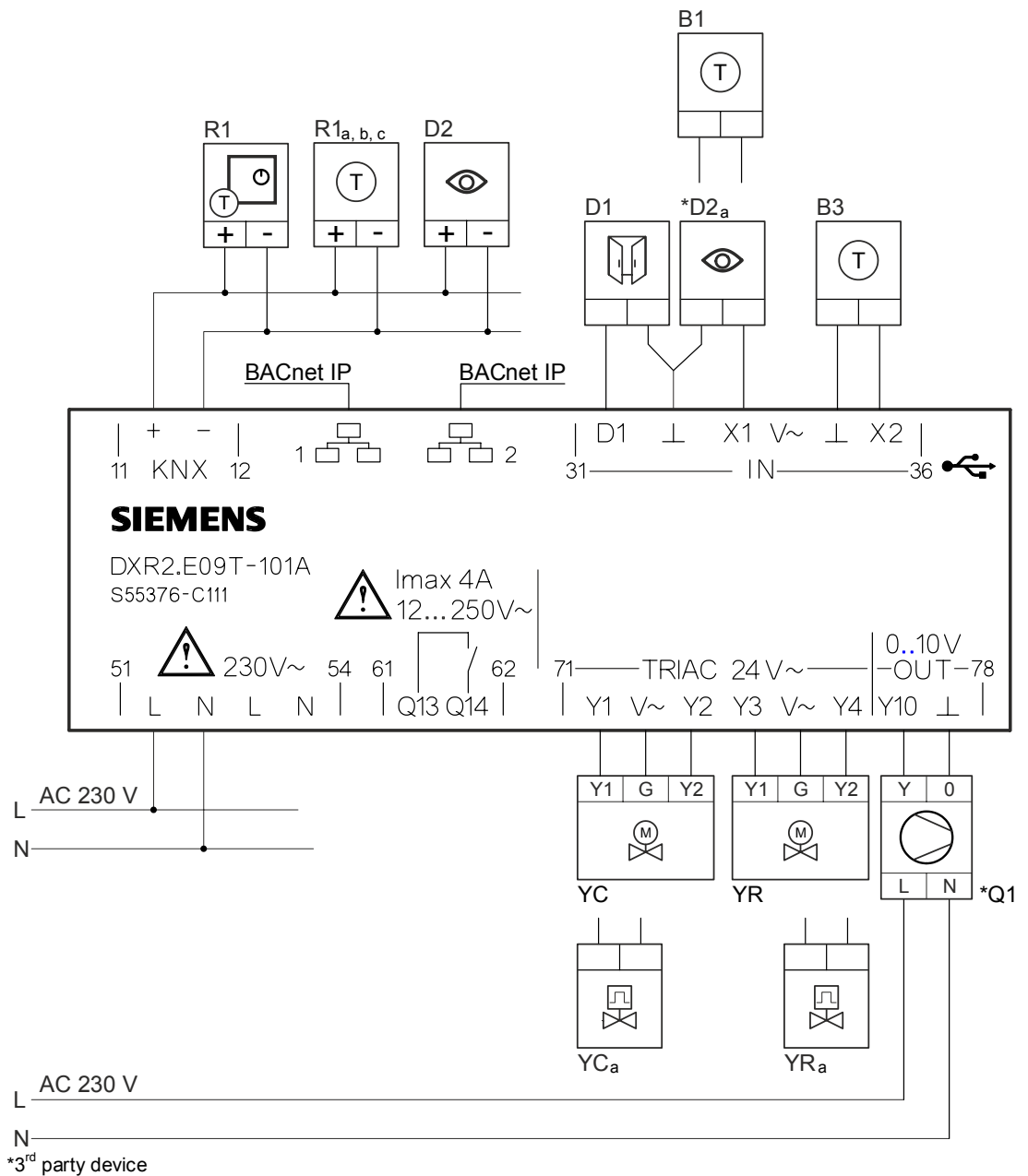
<sup>3)</sup> Type of operation (NO or NC). Multiple devices of the same type can be connected.

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| Variants        | Legend | Type of unit  | Data sheet | Product No.            | Qty. |
|-----------------|--------|---|------------|------------------------|------|
| R1 <sub>a</sub> |        | KNX PL-Link wall-mount room sensor for temperature      | N1602      | QMX3.P30               | 1    |
| R1 <sub>b</sub> |        | KNX PL-Link flush-mount room operator unit              | N1601      | QMX3.P36               | 1    |
| R1 <sub>c</sub> |        | KNX PL-Link flush-mount room sensors                    | N1411      | AQR253...<br>AQR257... | 1    |
| YC <sub>a</sub> |        | 2-port, 3-port valve or 3-port valves with bypass, PN16 | N4847      | V..P47..               | 1    |
|                 |        | Thermal actuator, AC/DC 24 V, NO, 2P, 1 m               | N4884      | STP73                  | 1    |
| YR <sub>a</sub> |        | 2-port, 3-port valve or 3-port valves with bypass, PN16 | N4847      | V..P47..               | 1    |
|                 |        | Thermal actuator, AC/DC 24 V, NO, 2P, 1 m               | N4884      | STP73                  | 1    |

Connection diagram



## Active chilled beam with variable fan, cooling coil and hot water radiator on triac output

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### Application configuration

|                     | Equipment                   | Values/Range  | Template Settings                       |
|---------------------|-----------------------------|---|---|
| On-board output     | Fan speed                   | Variable speed; Y10; 0...10 V   | Variable speed; Y10; 0...10 V           |
|                     | Enable fan speed            | Q14; Normally open  | Q14; Normally open                      |
|                     | Cooling coil valve position | Water; Y1, Y2; 3-position<br>Water; Y1; Pulse width modulation thermal<br>Water; Y1; Pulse width modulation spring return<br>DX; Y1; Normally open<br>DX; Y1, Y2; Normally open<br>Chilled beam active; Y1, Y2; 3-position<br>Chilled beam active; Y1; Pulse width modulation thermal<br>Chilled beam active; Y1; Pulse width mod.spring return | Chilled beam active; Y1, Y2; 3-position |
| KNX PL-Link devices | Room operator unit device 1 | QMX3.P02, QMX3.P34, QMX3.P36, QMX3.P37, QMX3.P74  | QMX3.P34                                |

### Optional configuration

|                     | Equipment                              | Values/Range   | Template Settings         |
|---------------------|--|--|---------------------------|
| On-board output     | Radiator valve position                | Water; Y1, Y2; 3-position<br>Water; Y3, Y4; 3-position<br>Water; Y2; Pulse width modulation thermal<br>Water; Y3; Pulse width modulation thermal<br>Electric 1-stage; Y2; Normally open<br>Electric 1-stage; Y3; Normally open<br>Electric modulating; Y2; Pulse width modulation constant period<br>Electric modulating; Y3; Pulse width modulation constant period | Water; Y3, Y4; 3-position |
| On-board input      | Room temperature (B1)                  |  | X1; LG-Ni1000             |
|                     | Supply air temperature (B3)            |  | X2; LG-Ni1000             |
|                     | Presence detector 2 (D2 <sub>a</sub> ) |  | X1, Normally open         |
|                     | Window contact (D1)                    |  | D1; Normally closed       |
| KNX PL-Link devices | Sensor device 1...4 (D2)               |  | UP 258D12                 |

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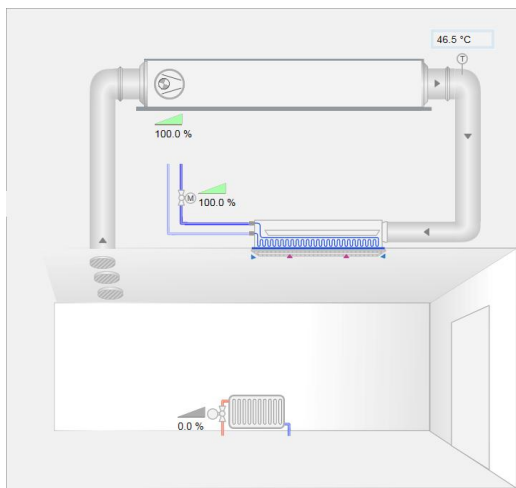
**Default values**

|                       | Parameter                              | Values/Range   | Template Settings        |
|-----------------------|--|--|--------------------------|
| Temperature setpoints | Cooling setpoint for Comfort           | 0 ... 50 °C  | 24 °C                    |
|                       | Delta cooling setpoint for Pre-comfort | 0 ... 10 K   | 1 K                      |
|                       | Cooling setpoint for Economy           | 0 ... 50 °C  | 35 °C                    |
|                       | Cooling setpoint for Protection        | 0 ... 50 °C  | 40 °C                    |
|                       | Heating setpoint for Comfort           | 0 ... 50 °C  | 21 °C                    |
|                       | Delta heating setpoint for Pre-comfort | 0 ... 10 K   | 1 K                      |
|                       | Heating setpoint for Economy           | 0 ... 50 °C  | 15 °C                    |
|                       | Heating setpoint for Protection        | 0 ... 50 °C  | 12 °C                    |
| Room operator unit    | Room unit, display temperature         | None<br>Display room temperature                         | Display room temperature |
|                       | Room unit, display windows status      | Yes, No  | No                       |
|                       | Room unit, display heat./cool. status  | Yes, No  | Yes                      |
|                       | Enable operation: room temp. setpoint  | Yes, No  | Yes                      |
|                       | Room unit, room temp. setpoint display | Absolute temperature setpoint<br>Relative setpoint shift | Relative setpoint shift  |
|                       | Enable operation: fan speed setpoint   | Yes, No  | Yes                      |
|                       | Enable operation: presence button      | Yes, No  | No                       |
|                       | Enable operation: temporary Comfort    | Yes, No  | No                       |
|                       | Enable operation: room op. mode        | Yes, No  | No                       |
|                       | Enable operation: Green Leaf           | Yes, No  | Yes                      |

**Engineering**

- ABT Site engineering tool is required to configure the DXR2 automation stations.
- See the Siemens Download Center at [www.siemens.com/bt/download](http://www.siemens.com/bt/download) for the latest application configuration and workflow tutorials.
- Option combination according to available on-board I/Os on controller.
- B1 (optional extract air temperature sensor) to be configured under 'Room temperature' in order to serve for room temperature control.
- D2<sub>a</sub> (on-board presence detector) to be configured in ABT Site under 'Presence detector 2' for maximum combination of optional devices.  
Type of operation (NO or NC). Multiple devices of the same type can be connected.

**Management station**



Sample presentation of an active chilled beam with hot water radiator application on the Desigo CC management station.

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