

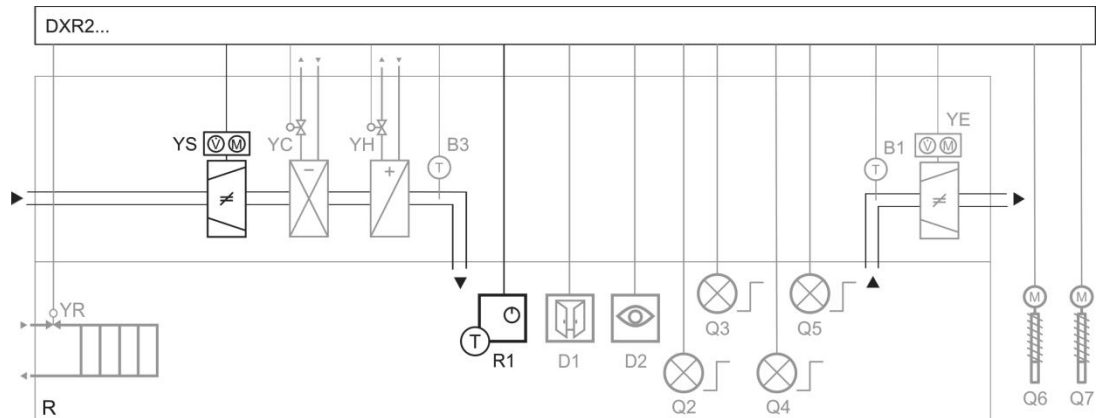
**Supply and extract VAV with KNX PL-Link VAV controller, heating and cooling coil, hot water radiator on triac output including lighting and blinds operation**

DXR2..18-102A



- Supply & extract air volume control with compact KNX PL-Link VAV controller
- Room temperature control
- Heating with LTHW radiator on triac output
- Downdraft compensation
- Including the control of 4 lighting zones & 2 blinds
- Room temperature and rapid ventilation operation via KNX PL-Link room operator unit with temperature measurement & lighting and blinds operation

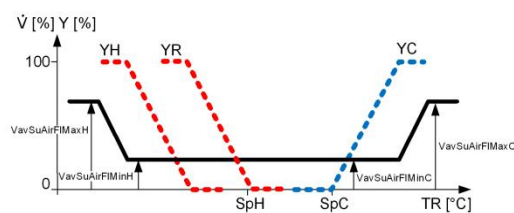
**Plant diagram**



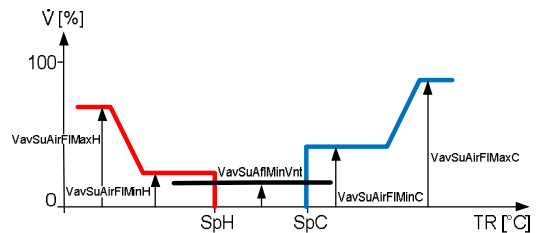
DXR2...	Room automation station	R	Room
B1	Extract air temperature sensor	R1	Room operator unit with temperature sensor
B3	Supply air temperature sensor	YC	Cooling coil valve
D1	Window contact	YE	Extract air control
D2	Presence detector	YH	Heating coil valve
Q2, Q3, Q4, Q5	4 lighting zones	YR	Radiator valve
Q6, Q7	2 blinds motors	YS	Supply air control

**Function diagrams**

**Heating and cooling valve**



**Airflow**



SpC	Effective cooling setpoint
SpH	Effective heating setpoint
TR	Room temperature
V	Volume flow rate
VavSuAfMinVent	Min. air flow ventilation
VavSuAirFIMaxC	Max. volume, cooling
VavSuAirFIMaxH	Max. volume, heating

VavSuAirFIMinC	Min. volume, cooling
VavSuAirFIMinH	Min. volume, heating
Y	Output signal
YC	Cooling valve
YH	Heating valve
YR	Radiator valve

## Supply and extract VAV with KNX PL-Link VAV controller, heating and cooling coil, hot water radiator on triac output including lighting and blinds operation

DXR2..18-102A

### Description of functions

#### Basic functions

##### HVAC

- PID control for supply VAV and temperature.
- The temperature is measured in the room operator unit.
- The application allows customers to adjust the room temperature setpoints and rapid ventilation via the room operator unit including the operation of lighting and blinds.
- The operating modes are Comfort, Pre-Comfort, Economy and Protection.
- The air flow for heating and cooling is operated in sequence to the valves. Parallel operation can be configured.
- VAV actuator on KNX PL-Link.

##### Lighting

- The application allows room users to control lighting via a standard function switching and/or
- The application allows customers to control lighting operation via room unit.

##### Blinds

- The application allows room users to operate the blinds via the following commands:
  - Move up/down
  - Step up/down
- The reference model applied ensures exact positioning of the shading products.
- The application allows customers to control shading operation via room unit.

#### Auxiliary functions

- Green Leaf (RoomOptiControl) function.
- Multisegment use of DXR2 automation stations with VAV application.
- Standard hot 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.

##### Lighting

- The application allows for control via centralized commands (e.g. scheduler program).
- The application function supports runtime totalization for each lighting group for maintenance and service purposes (burn in/operation h/EOL end of life cycle).

##### Blinds

- The application allows for control via centralized commands (e.g. scheduler program or weather station).

#### Options

##### HVAC

- Extract VAV actuator on KNX PL-Link.
- PID control LTHW radiator heating.
- Heating and cooling coils with 3 position valves controlled by triac outputs.
- Downdraft compensation.
- Outside temperature (for downdraft compensation) distributed over BACnet.
- Optimal energy efficiency by including the option for room/supply air cascade control, presence detector or window contact.
- Optional system alarms displayed on the management station notify building operators of possible faults.
- Optional trends can be activated for room sensors.

##### Lighting

- Optional system alarms displayed on the management station notify building operators of possible faults (e.g. defective electronic control gear or lamps).
- Optional trends can be activated for room lighting.

##### Blinds

- Optional system alarms displayed on the management station notify building operators of possible faults (e.g. defective actuator).
- Reliable, central override of local operation only for emergencies, service, and cleaning.
- Central weather protection function preventing damages to shading products due to high winds or frost.
- Optional trends can be activated for room blinds.

#### 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
- KNX PL-Link switches for lighting and blinds operation.
- Presence can be detected by KNX PL-Link sensor or binary sensor.

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DXR2..18-102A

Siemens devices	Legend	Type of unit	Data sheet	Product No.	Qty.
	DXR2...	Compact room automation station, BACnet/IP, 24 V, DIN housing, 2 DI, 4 UI, 8 DO triacs, 4 AO 0...10V	N9205	DXR2.E18-102A	1
			N9207	DXR2.M18-102A	
	R1	KNX PL-Link room operator unit with temperature sensor, segmented backlit display, configurable touchkeys, LED display	N1602	QMX3.P37	1
	Q2, Q3	Lighting output	2)	UP 510/13	2
	Q4, Q5	Lighting output	2)	UP 510/13	2
	Q6, Q7	Blinds actuator, 2 x AC 230 V, 6 A	2)	RL 521/23	1
	YS	VAV compact controller KNX PL-Link, AC 24 V, 5 Nm, 150 s, 300 Pa	N3547	GDB181.1E/KN	1

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

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 with brightness sensor	2)	UP 258D12	1 - 4
	YE	VAV compact controller KNX PL-Link, AC 24 V, 5 Nm, 150 s, 300 Pa	N3547	GDB181.1E/KN	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
	YH	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
	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

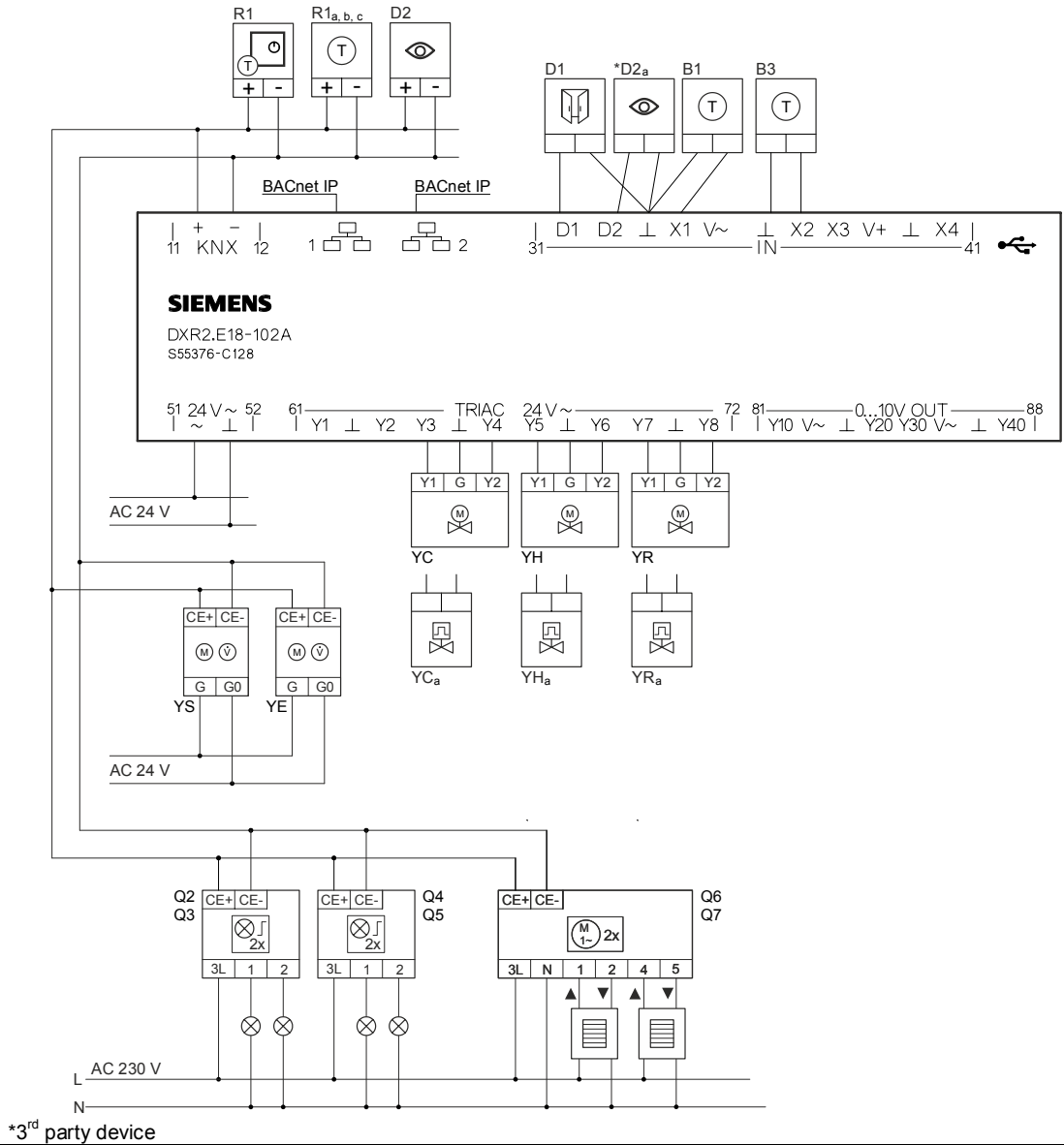
1) Can be combined according to available on-board I/Os on controller.  
2) Further documents on [www.siemens.com/gamma-td](http://www.siemens.com/gamma-td).  
3) Type of operation (NO or NC). Multiple devices of the same type can be connected.

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... 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
	YH <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

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DXR2..18-102A

Connection diagram



**Supply and extract VAV with KNX PL-Link VAV controller, heating and cooling coil, hot water radiator on triac output including lighting and blinds operation**

DXR2..18-102A

**Application configuration**

	Equipment	Values/Range	Template settings
KNX PL-Link devices	Room operator unit device 1	QMX3.P37; General HVAC; 4x dimming QMX3.P37; General HVAC; 2x dimming, 2x blinds QMX3.P37; General HVAC; 4x toggle, 2x blinds	QMX3.P37; General HVAC; 4x toggle, 2x blinds
	Supply air VAV device	GDB181.1E/KN GLB181.1E/KN	GDB181.1E/KN
	Lighting device 1	RL 512/23 - JB 512C23; 1x lighting, switching RL RS 510/23 - JB 510C23; 2x lighting, switching UP 510/03; 2x lighting, switching UP 510/13; 2x lighting, switching RS 525/23 - JB 525C23; 1x lighting, dimming UP 525/03; 1x lighting, dimming UP 525/13; 1x lighting, dimming	UP 510/13; 2x lighting, switching
	Lighting device 3	RL 512/23 - JB 512C23; 1x lighting, switching RL RS 510/23 - JB 510C23; 2x lighting, switching UP 510/03; 2x lighting, switching UP 510/13; 2x lighting, switching RS 525/23 - JB 525C23; 1x lighting, dimming UP 525/03; 1x lighting, dimming UP 525/13; 1x lighting, dimming	UP 510/13; 2x lighting, switching
	Blinds device 1	RS 520/23 - JB 520C23; 1x blinds RS 520/23 - JB 520C23; 1x awnings UP 520/03; 1x blinds UP 520/03; 1x awnings UP 520/13; 1x blinds UP 520/13; 1x awnings RL 521/23 - JB 521C23; 2x blinds RL 521/23 - JB 521C23; 2x awnings	RL 521/23 - JB 521C23; 2x blinds

**Optional configuration**

	Equipment	Values/Range	Template settings
On-board output	Cooling coil valve position	Water; Y3, Y4; 3-position Water; Y3; Pulse width modulation thermal Water; Y3; Pulse width modulation spring return Water; Y20; 0...10 V	Water; Y3, Y4; 3-position
	Heating coil valve position	Water; Y5, Y6; 3-position Water; Y5; Pulse width modulation thermal Water; Y5; Pulse width modulation spring return Water; Y30; 0...10 V Electric 1-stage; Y5; Normally open Electric 2-stage; Y5, Y6; Normally open Electric modulating; Y5; Pulse width modulation constant period Electric modulating; Y30; 0...10 V	Water; Y5, Y6; 3-position

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DXR2..18-102A

### Optional configuration

	Equipment	Values/Range	Template settings
	Radiator valve position 1	Water; Y3, Y4; 3-position Water; Y7, Y8; 3-position Water; Y3; Pulse width modulation thermal Water; Y7; Pulse width modulation thermal Water; Y3; Pulse width modulation spring return Water; Y7; Pulse width modulation spring return Water; Y20; 0...10 V Water; Y40; 0...10 V Electric 1-stage; Y3; Normally open Electric 1-stage; Y7; Normally open Electric modulating; Y3; Pulse width modulation constant period Electric modulating; Y7; Pulse width modulation constant period Electric modulating; Y20; 0...10 V Electric modulating; Y40; 0...10 V	Water; Y7, Y8; 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> )		D2; Normally open
	Window contact (D1)		D1; Normally closed
KNX PL-Link devices	Extract air VAV device	GDB181.1E/KN GLB181.1E/KN	GDB181.1E/KN
	Sensor device 1...4 (D2)		JP 258D12

### 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
Ventilation Control	Setpoint room air quality for Comfort	0 ... 2000 ppm	900 ppm
	Setp.room air quality for Pre-comfort	0 ... 2000 ppm	1100 ppm
	Setpoint room air quality for Economy	0 ... 2000 ppm	1500 ppm
	Setpoint room air quality for Protection	0 ... 2000 ppm	1500 ppm
Supply air VAV	Supply air VAV max.air vol.flow f.cool	0 ... 10'000 m <sup>3</sup> /h	100 m <sup>3</sup> /h
	Supply air VAV min.air vol.flow f.cool	0 ... 10'000 m <sup>3</sup> /h	50 m <sup>3</sup> /h
	Supply air VAV max.air vol.flow f.heat	0 ... 10'000 m <sup>3</sup> /h	100 m <sup>3</sup> /h
	Supply air VAV min.air vol.flow f.heat	0 ... 10'000 m <sup>3</sup> /h	50 m <sup>3</sup> /h
	Supply air VAV min.air vol.flow f.vent.	0 ... 10'000 m <sup>3</sup> /h	0 m <sup>3</sup> /h
Room operator unit	Room unit, display temperature	None 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 Relative setpoint shift	Relative setpoint shift
	Enable operation: fan speed setpoint	Yes, No	Yes
	Enable operation: presence button	Yes, No	No

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DXR2..18-102A

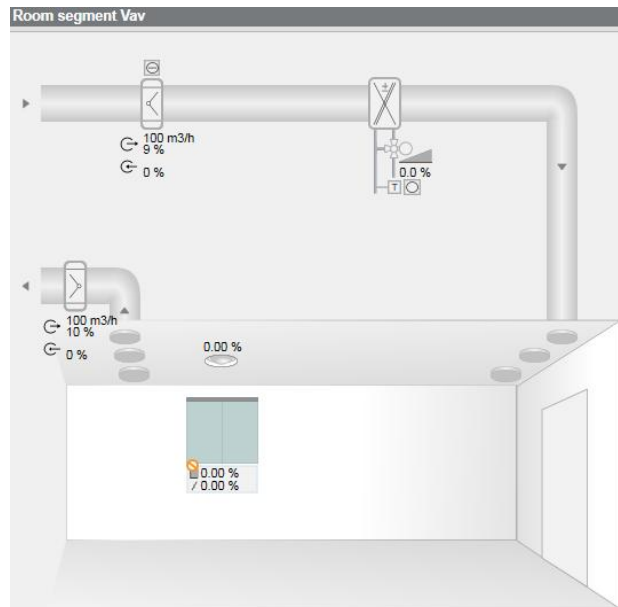
### Default values

	Parameter	Values/Range	Template settings
	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.
- All DXR2 can control two radiator device and two radiant ceilings. This configuration can control only one radiator device and one radiant ceiling device because of the limited I/O mix of the selected controller.

### Management station



Sample presentation of a VAV application with lighting and blinds operation on the Desigo CC management station.

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