

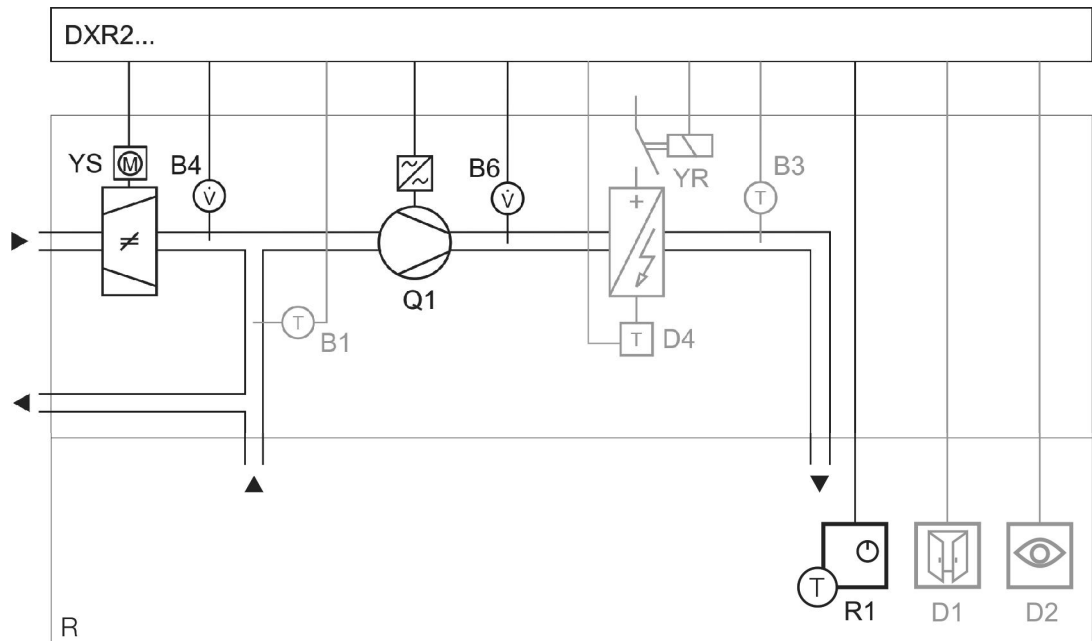
Fan powered box with series fan on analog output and staged electric reheater on analog output

DXR2.E18-102A



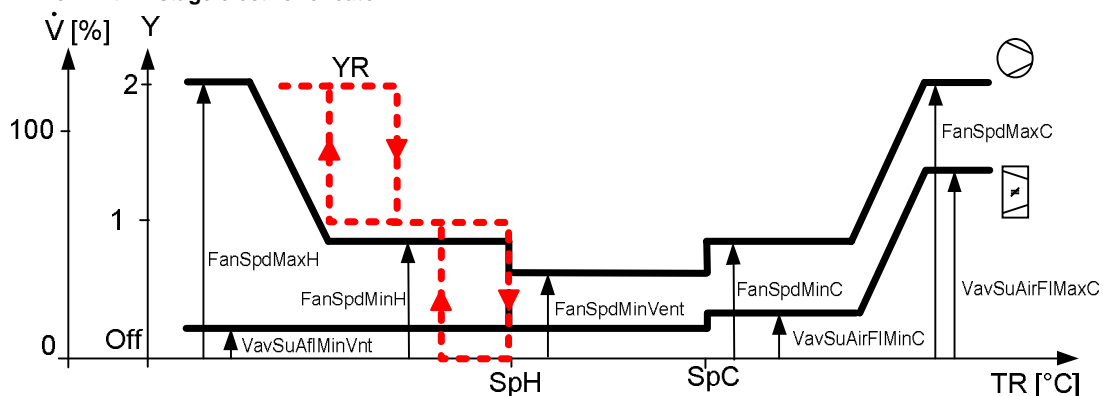
- VAV control with damper on triac output
- Series or parallel fan (supply air), modulating control
- Room temperature control
- 2-stage electric reheater with on/off or modulating control
- Room temperature and fan speed operation via KNX PL-Link room operator unit with temperature, air quality & relative humidity measurement

Plant diagram



DXR2...	Room automation station	D2	Presence detector
B1	Extract air temperature sensor	D4	Over-temperature sensor
B3	Supply air temperature sensor	R	Room
B4	Differential pressure sensor (primary air)	R1	Room operator unit with temperature sensor
B6	Differential pressure sensor (supply air)	Q1	Variable speed fan
D1	Window contact	YR	Electric reheater, 2-stage
		YS	Primary air control

Function diagrams Air flow with 2-stage electric reheater



YR	Electric reheater 2-stage	VavSuAirFIMaxC	Max. volume, cooling
VavSuAfMinVent	Min. air flow ventilation	VavSuAirFIMinC	Min. volume, cooling
SpC	Effective cooling setpoint	FanAirFIMaxC	Max. fan speed cooling
SpH	Effective heating setpoint	FanAirFIMinC	Min. fan speed cooling
TR	Room temperature	FanAirFIMaxH	Max. fan speed heating
V	Volumetric flow	FanAirFIMinH	Min. fan speed heating

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Description of functions

Basic functions

- PID control for supply air and temperature.
- 3-position damper controlled by triac outputs for VAV control.
- Internal air flow controller controls damper actuator.
- The serial fan speed 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

- Air supply functions to coordinate demand signals for pressure optimized fan control.
- Green Leaf (RoomOptiControl) function.
- Multisegment use of DXR2 automation stations with FPB application.
- 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

- 2-stage electric reheater.
- Parallel fan (supply air), modulating control.
- 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.

Variants

- Continuous damper controlled by 0...10 V analog output for VAV control.
- VAV actuator on KNX PL-Link.
- 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, 24 V, DIN housing, 2 DI, 4 UI, 8 DO triacs, 4 AO 0...10 V	N9205	DXR2.E18-102A	1
	B4	Differential pressure sensor, AC 24 V, DC 0...10 V	N1910-1	QBM2030-...	1
	B6	Differential pressure sensor, AC 24 V, DC 0...10 V	N1910-1	QBM2030-...	1
	R1	KNX PL-Link room operator unit with temperature sensor, segmented backlit display, touchkeys	N1602	QMX3.P34	1
	YS	Rotary air damper actuator, AC 24 V, 3-position, 5 Nm, 150 s	N4634	GDB131.1E	1

Optional ¹⁾	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

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

²⁾ Further documents on www.siemens.com/gamma-td.

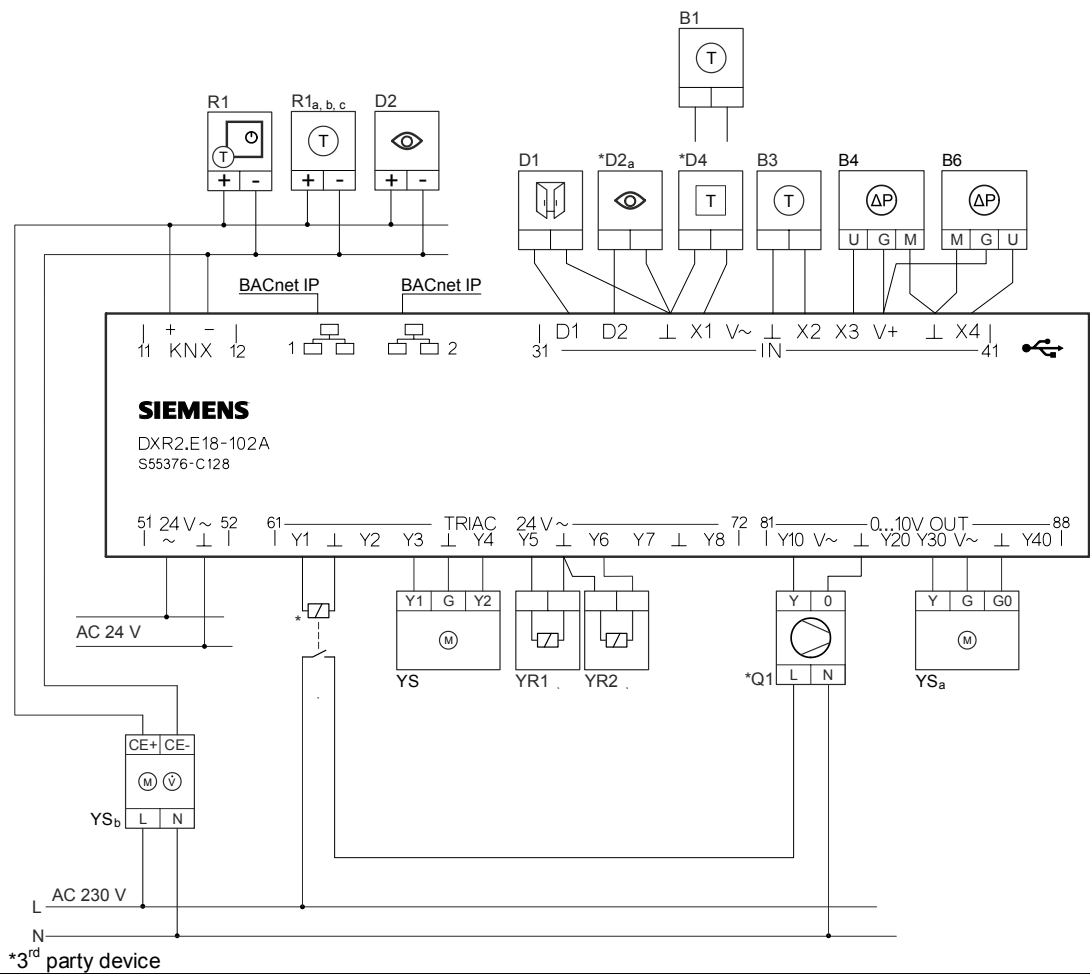
³⁾ Type of operation (NO or NC). Multiple devices of the same type can be connected.

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Variants	Legend	Type of unit	Data sheet	Product No.	Qty.
R1 _a		KNX PL-Link wall-mount room sensor for temperature	N1602	QMX3.P30	1
R1 _b		KNX PL-Link flush-mount room operator unit	N1601	QMX3.P36	1
R1 _c		KNX PL-Link flush-mount room sensors	N1411	AQR253... AQR257...	1
YS _a		Rotary air damper actuator, AC 24 V, DC 0...10 V, 5 Nm, 150 s	N4634	GDB161.1E	1
YS _b		VAV compact controller KNX PL-Link, AC 24 V, 5 Nm, 150 s, 300 Pa	N3547	GDB181.1E/KN	1

Connection diagram



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Application configuration

	Equipment	Values/Range	Template settings
On-board output	Supply air VAV position	Y1, Y2; 3-position Y3, Y4; 3-position Y5, Y6; 3-position Y7, Y8; 3-position Y10; 0...10 V Y20; 0...10 V Y30; 0...10 V Y40; 0...10 V Air volume flow; Y10; 0...10 V Air volume flow; Y20; 0...10 V Air volume flow; Y30; 0...10 V Air volume flow; Y40; 0...10 V	Y3, Y4; 3-position
	Fan speed	1-stage; Y1; Normally open 2-stage; Y1, Y2; Normally open Variable speed; Y10; 0...10 V	Variable speed; Y10; 0...10 V
	Enable fan speed	Y1; Normally open	Y1; Normally open
On-board input	Supply air VAV differential air pressure	X3; 0...10 V	X3; 0...10 V
	Fan differential air pressure	X4; 0...10 V	X4; 0...10 V
KNX PL-Link devices	Room operator unit device 1	QMX3.P02, QMX3.P34, QMX3.P36, QMX3.P37, QMX3.P74	QMX3.P34
HVAC	Supply air VAV	Supply air VAV 12, press, duct area, ctr. Supply air VAV 13, press, flow conv, ctr.	Supply air VAV 13, press, flow conv, ctr.

Optional configuration

	Equipment	Values/Range	Template settings
On-board output	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	Electric 2-stage; Y5, Y6; Normally open
On-board input	Room temperature (B1)		X1; LG-Ni1000
	Supply air temperature (B3)		X2; LG-Ni1000
	Presence detector 2 (D2a)		D2; Normally open
	Window contact (D1)		D1; Normally closed
	Radiator overtemperature detector (D4)		X1; Normally open
KNX PL-Link devices	Sensor device 1...4 (D2)		JP 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
Heating coil	Enable overtemperature detector input	Yes, No	Yes
Supply air VAV	Supply air VAV max.air vol.flow f.cool	0 ... 10'000 m ³ /h	100 m ³ /h
	Supply air VAV min.air vol.flow f.cool	0 ... 10'000 m ³ /h	50 m ³ /h
	Supply air VAV min.air vol.flow f.vent.	0 ... 10'000 m ³ /h	0 m ³ /h
	Supply air VAV box coefficient	0 ... 10'000 m ³ /h/SqrtPa	150 m ³ /h/SqrtPa
	Enable monitoring for fan state	Yes, No	Yes
Fan	Maximum fan speed for cooling	0 ... 100 %	100 %
	Minimum fan speed for cooling	0 ... 100 %	50 %
	Maximum fan speed for heating	0 ... 100 %	100 %
	Minimum fan speed for heating	0 ... 100 %	50 %
	Minimum fan speed for ventilation	0 ... 100 %	50 %
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
	Enable operation: temporary Comfort	Yes, No	No
	Enable operation: room op. mode	Yes, No	No
	Enable operation: Green Leaf	Yes, No	Yes

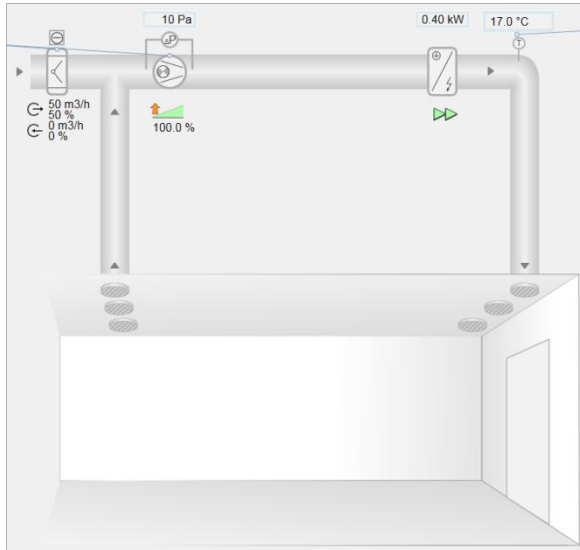
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Engineering

- ABT Site engineering tool is required to configure the DXR2 automation stations.
- See the Siemens Download Center at 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) must be configured under 'Room temperature' in order to serve for room temperature control.
- D2_a (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 a Fan powered box application on the Desigo CC management station.

	<p>⚠ WARNING</p>
	<p>Electric heat coils require safety limit thermostat Improper installation of electric heating coils can result in fire and cause destruction of life and property.</p> <ol style="list-style-type: none"> 1. Install a high temperature cut-out switch on all electric heating elements. 2. Ensure that all wiring and installation conform to applicable safety codes and regulations.

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