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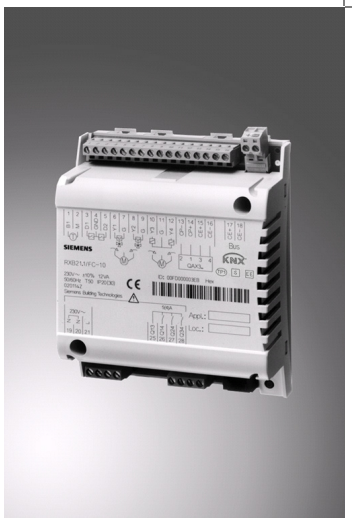
Building Technologies



RXB room automation system

System overview

KNX®

Contents

Comfort and well-being in every room

Most people in the industrial world spend 90 % of their time indoors. About one third of this time is spent at work. In this context it is clear that good indoor air quality, the right room temperature and draught-free air renewal are vital prerequisites for motivation and a sense of well-being.

The RXB room automation system ensures individual demand-based comfort for room users in public buildings, offices, schools, hotels and so on.

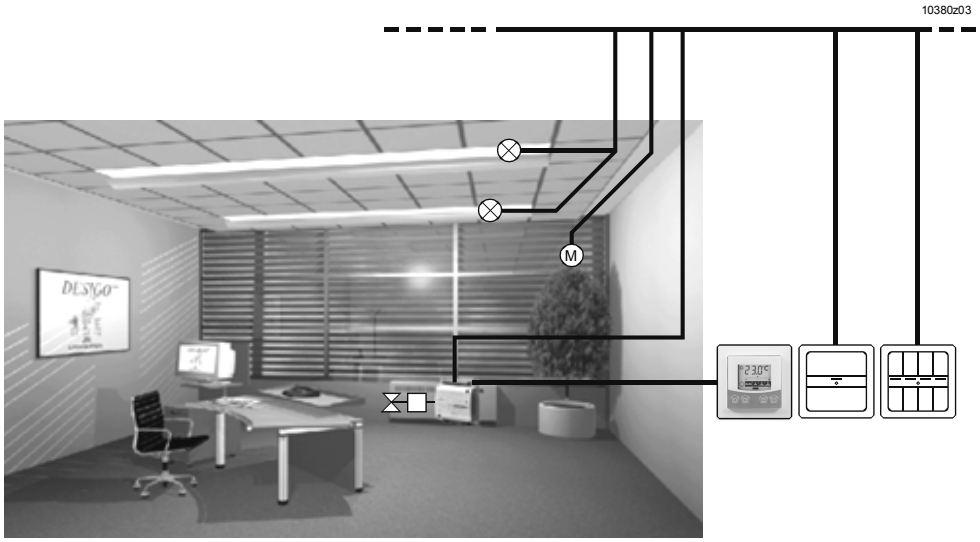
The RXB controllers provide control and monitoring of the specific comfort conditions in rooms and other enclosed spaces. These functions are individually adapted to suit the requirements of each area of application (room or zone). This makes it possible to satisfy the demand for individual comfort and create a sense of well-being, while at the same time saving energy.

One bus for HVAC, lighting and blinds

The RXB controllers perform all the HVAC functions, while, for the control of lighting and blinds, various solutions are available on the market from different manufacturers. This third-party equipment is easy to combine with the RXB controllers, due to the clarity of the KNX specifications, the certification procedure and the use of ETS, the KNX Tool software.

Stand-alone operation at field level, or integration into a building automation and control system

The RXB controllers use the standard KNX protocol to communicate with each other and with other KNX devices. Devices at the field level can be integrated seamlessly into a building automation and control system. This is where all the higher-level control and coordination tasks, such as time scheduling, display, or energy optimization are performed.



Operation of HVAC equipment, lighting and blinds

Range overview

RXB is an innovative range of room controllers and room units. Data communications are based on KNX technology.

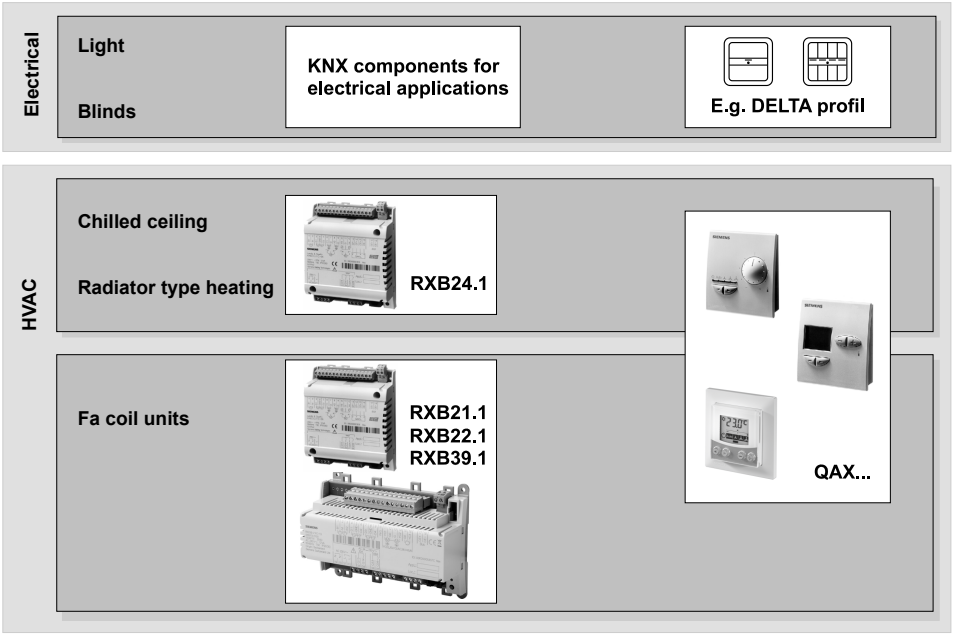
The RXB devices are certified by the Konnex Association.

The RXB hardware

The range comprises room controllers and room units for HVAC operation.

The input and output configurations of the compact controllers, and the style of housing are fully optimized to suit their field of application.

The HVAC functions are operated via standard room units.



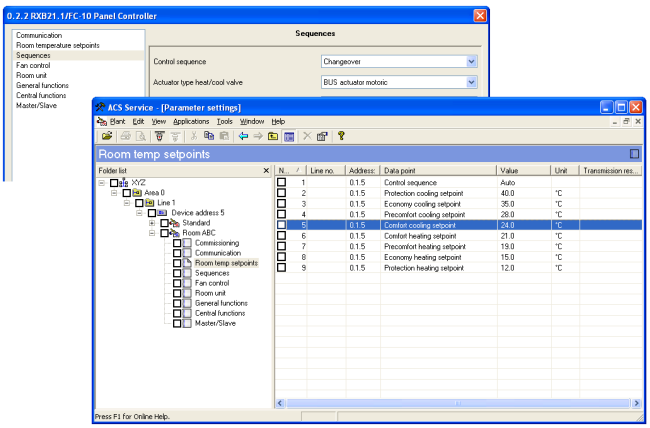
Controllers Operation

RXB software

Each RXB controller is loaded with software (referred to in this document as the "application") comprising a set of HVAC applications. The application actually required is enabled in the commissioning phase.

Siemens Building Technologies holds a library of applications (see Overview, page 10).

For the engineering and commissioning of a network of RXB controllers, use is made of ETS, ACS or a "HandyTool".



Coordinated room controllers

RXB21.1, RXB22.1 and RXB39.1 compact room controllers for fan-coil units

The input/output configuration and mounting options of these room controller s makes them ideal for fan coil applications. They can be installed in fan coil units, in control panels or on ducting.

RXB24.1 compact room controller for chilled ceilings and radiators

This controller contains chilled ceiling and radiator applications, and is designed for installation in ceiling voids or for underfloor or sill mounting.

Inputs and outputs

The functions of the inputs and outputs are determined by the particular application and its parameters. So, for example, the AC 24 V outputs can be configured either for thermic valve actuators or for 3-position actuators (depending on the application).

Connections / Functions RXB	21.1	22.1	24.1	39.1
Power supply	AC 230	AC 230	AC 230	AC 230
KNX bus	✓	✓	✓	✓
PPS2 interface for standard room unit (PPS2)	✓	✓	✓	✓
Digital inputs [1]	2	2	2	4
Analog input for LG-Ni 1000 temperature sensor	1	1	1	2
AC 24 V outputs [2]	4	2	4	4
Volt-free relay outputs [3]	3	3		
Relay for electric heating coil		1		1
Analog outputs DC 0...10 V [4]				3
Relay for fan release				1

1) For window switches, presence detectors and dew point sensors
2) For control of valve actuators (2-position, 3-position or both, depending on application)
3) For fan control
4) For fan control and control of valve actuators

The room units: the key to individual comfort

The room units of the RXB range cover the widely varying requirements of individual room occupants. When designing these stylish room units, the designers also paid special attention to ergonomic factors.

The HVAC system, lighting and blinds can be operated in various ways:

- In the conventional way, with standard room units for HVAC and electric switches to control lighting and blinds
- Wireless room units for HVAC, which can be located anywhere in the room
- KNX switches and KNX actuators from third-party manufacturers

Conventional HVAC room operation

The standard QAX… room units are available for HVAC applications. They are connected to the RXB controller via a special (PPS2) interface. In addition to the built-in room temperature sensor, the QAX3... und QAX9 room units incorporate a bus socket for the interface to the tool.

Wireless HVAC room operation

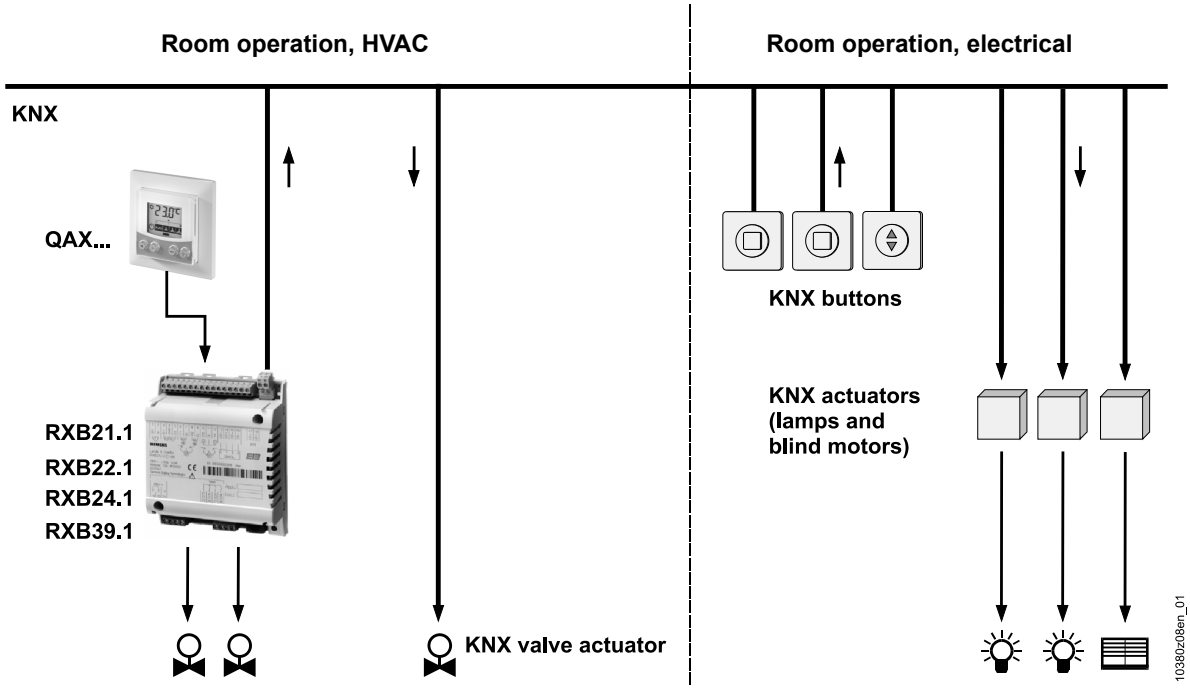
Wireless room units are ideal

- for use in renovation projects (no wiring required)
- in rooms with flexible partitioning and furnishing

The wireless EnOcean room units, types QAZ9x.4 are used in conjunction with the RXZ97.1/KNX gateway.

Electrical room operation

A wide range of KNX devices is available on the market for the control of lighting and blinds.



Functions of the room units

Type Functionality of the room units	QAX 30.1, 31.1	QAX 32.1	QAX 33.1	QAX 34.3	QAX 84.1/ PPS2	QAX 39.1	QAX 9x.4
							 
Built-in room temperature sensor	✓	✓	✓		✓		✓
Room temperature setpoint adjustment	QAX 31.1	✓	✓		✓	✓	QAX 96.4 97.4 98.4
Selection of operating mode (⏻/Auto)[1)]		✓	✓		✓		QAX 97.4 98.4
Selection of operating mode (⏻/Auto)[1)] and fan speed			✓		✓		QAX 98.4
LCD display for room temperature, operating mode and fan speed					✓		
PPS2 interface to RXB room controller	✓	✓	✓		✓	✓	
Wireless room units [2)]							✓
Batteryless EnOcean technology [2)]							✓
KNX Bus communications							✓
"HandyTool" (Parameter setting for KNX RXB controllers)				✓			

1) Operating mode Auto: *Comfort* mode
⏻: *PreComfort (Standby)* or *Economy*, depending on control from the building automation and control system (see page 15)

2) For the QAX9x.4 EnOcean room units, the KNX interface is the RXZ97.1 KNX gateway

Applications

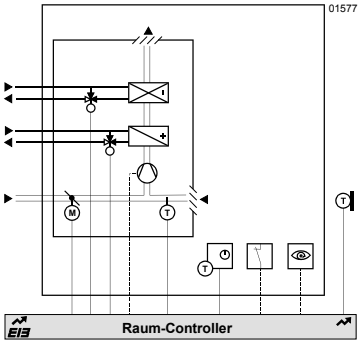
The scope of the RXB controllers is defined by the pre-programmed application modules.
The following is an overview of the various applications and associated controllers.

The controllers are shipped from the factory pre-programmed with a set of applications. The required application is then enabled with a tool (ETS, ACS or the "HandyTool").

Due to the fact that the applications are largely pre-defined, engineering simply involves the definition of a small number of parameters, e.g.:

- 2-position or 3-position control of valves and actuators (depending on application)
- Temperature setpoints
- Manual or automatic fan control

Fan coil systems (examples)



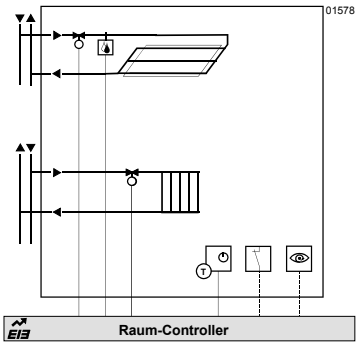
Appl.	Description	Controller
FNC02	Two-pipe system with change-over	RXB21.1 / FC-10, RXB39.1 / FC-13
FNC04	Four-pipe system	RXB21.1 / FC-10, RXB39.1 / FC-13
FNC08	Four-pipe system with room supply air cascade control	RXB21.1 / FC-10, RXB39.1 / FC-13
FNC20	Four-pipe system with control of a single damper	RXB21.1 / FC-10
FNC10	Two-pipe system with change-over outside air damper	RXB21.1 / FC-11
FNC12	4-pipe system with outside air damper	RXB21.1 / FC-11
FNC18	Two-pipe system with change-over and radiator	RXB21.1 / FC-11
FNC03	Two-pipe system with change-over and electric heater	RXB22.1 / FC-12, RXB39.1 / FC-13
FNC05	Four-pipe system with electric heater	RXB22.1 / FC-12

Common functions

- Window contact, presence detector, four operating modes
- Manual fan control via room unit
- Automatic 3-speed or continuous fan control
- Options with two-pipe systems: Heating only, cooling only or changeover via KNX bus

For a detailed description of the applications available, refer to the Applications library, CM110385 und CM110672.

Chilled ceiling and radiator (example)



Appl.	Description	Controller
CLC01	Chilled ceiling	RXB24.1 / CC-02
CLC02	Chilled ceiling and radiator	RXB24.1 / CC-02
RAD01	Radiator	RXB24.1 / CC-02

Common functions

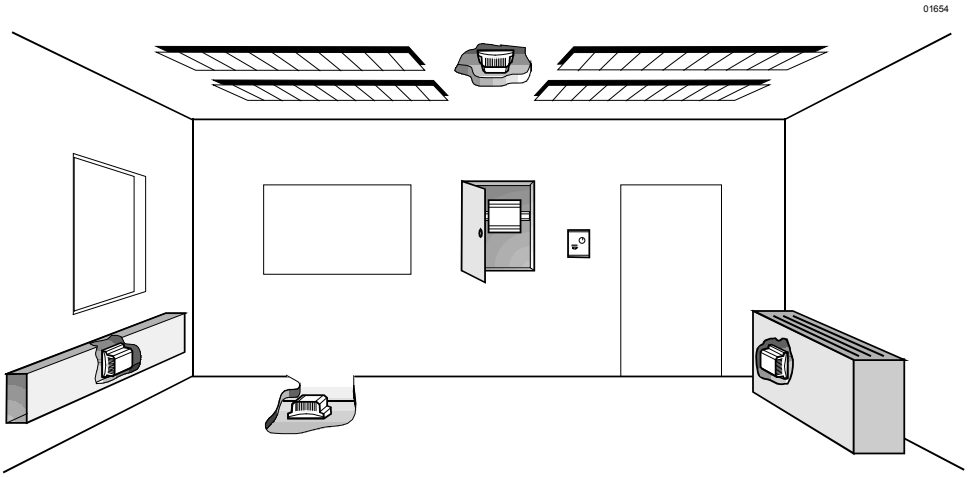
- Window contact, presence detector, four operating modes
- Dew point sensor (CLC)
- Downdraft compensation (radiator)

For a detailed description of the applications available, refer to the Applications library, CM110384 und CM110671.

Installation

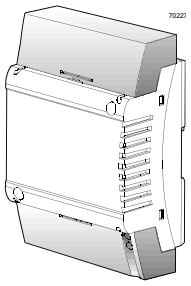
The RXB controllers are designed for various types of installation (mounted with screws or on DIN rail):

- In fan coil units
- In control panels
- In ceiling voids
- Under floors
- In sill or floor ducting.



Various options for installation

Terminal covers are required when mounting the controllers outside control panels or fan coil units (see page 18, Accessories).



Example: RXB21.1 with terminal covers

Engineering and commissioning

The RXB controllers can be operated either as stand-alone controllers or in conjunction with a building automation and control system.

They are commissioned with one of the following tools, depending on their intended function:
– ETS Professional
– ACS
– The "HandyTool" (parameter-setting function of the QAX34.3 room unit)

Engineering involves defining the number of RXB controllers needed on the basis of the room partitioning and zoning of the building, and specifying how these controllers are to be connected to each other and to third-party equipment.

Commissioning involves downloading the data defined at the engineering stage (network structure, application, parameters and KNX connections etc.) into the RXB controllers.

Project structure

Depending on the size of the building, it may be advisable to create a project structure, e.g. by dividing the building into floors or wings.

ETS supports this process with its own "Building View". A suitable bus structure can also be created with the ACS tool. The "HandyTool" does not support this process. Instead, a separate "addressing tool" based on an Excel spreadsheet is used.

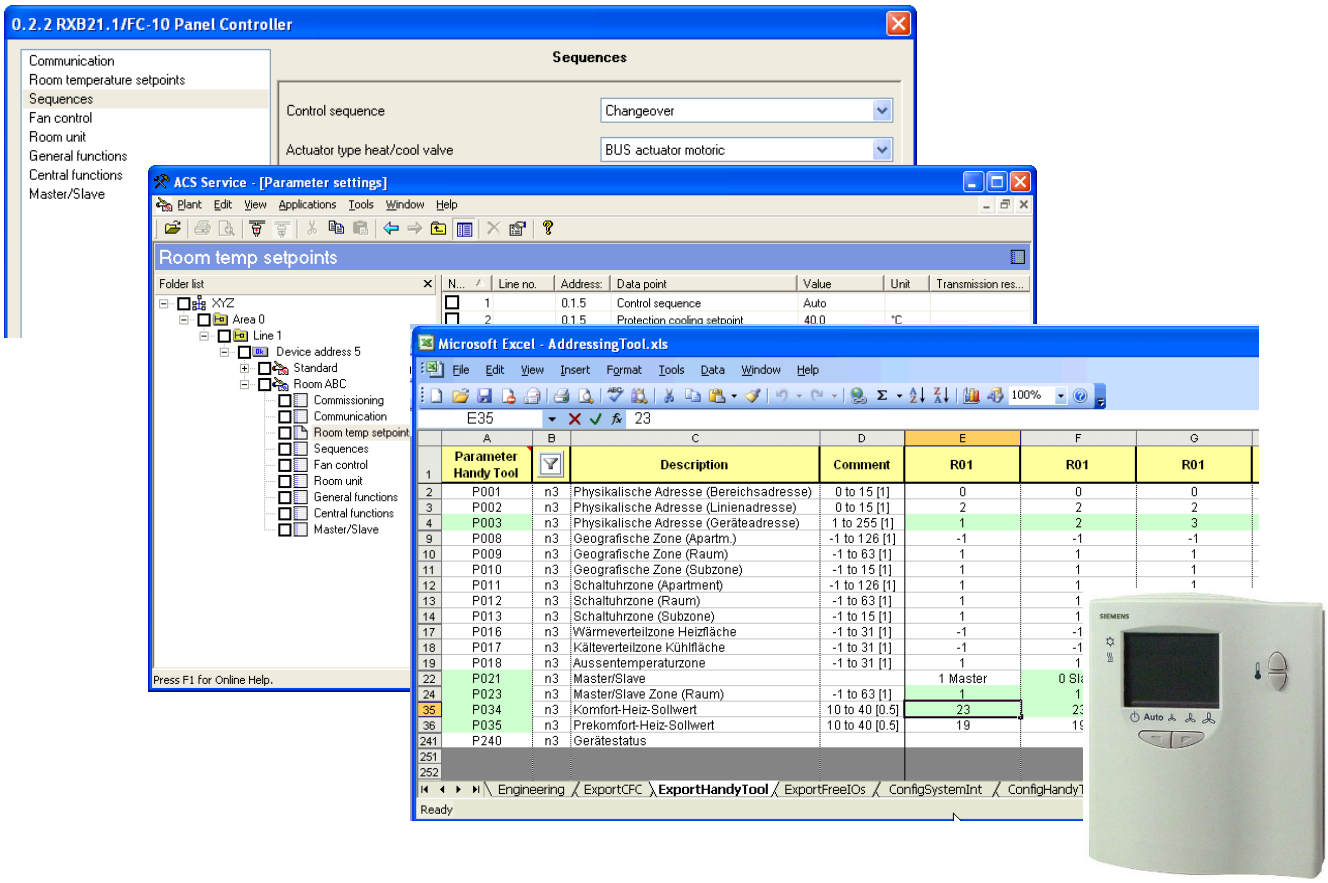
The tools and their functions

Tool / Activity	ETS	ACS	"HandyTool"
Available from	Konnex Association, Brussel www.konnex.org	Siemens Building Technologies	
Create project	**X**	**X**	**AT *)**
Select room controllers	**X**	**X**	**AT *)**
Select applications	**X**	**X**	**X**
Address room controllers	**X**	**X**	**X**
Configure/set parameters of room controllers	**X**	**X**	**X**
Create Konnex S-mode connections (for Desigo and third-party systems)	**X**	**--**	**--**
Create Konnex LTE-mode connections based on zones (for Synco)	**X**	**X**	**X**
Project documentation	**X**	**X**	**AT *)**

*) AT = Addressing Tool – Utility based on Excel
– Supplied by SBT free of charge

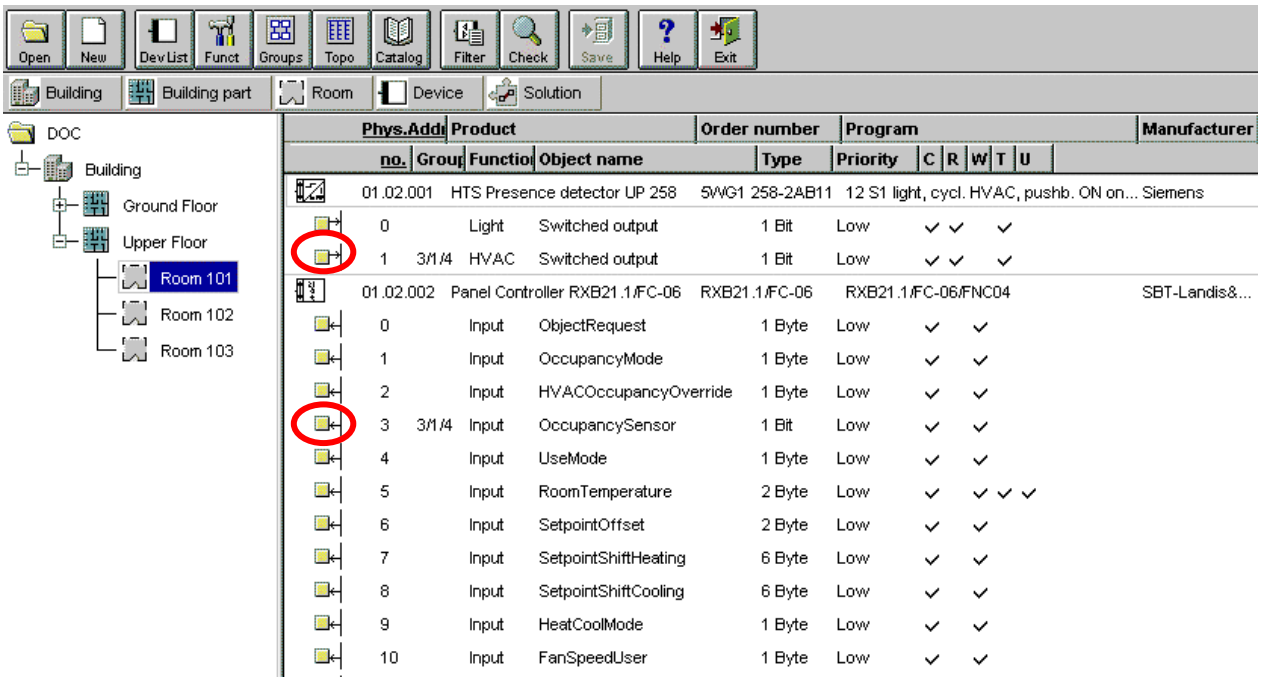
Parameter setting

For details, please refer to documents CM110384 and CM110385.



Communications links

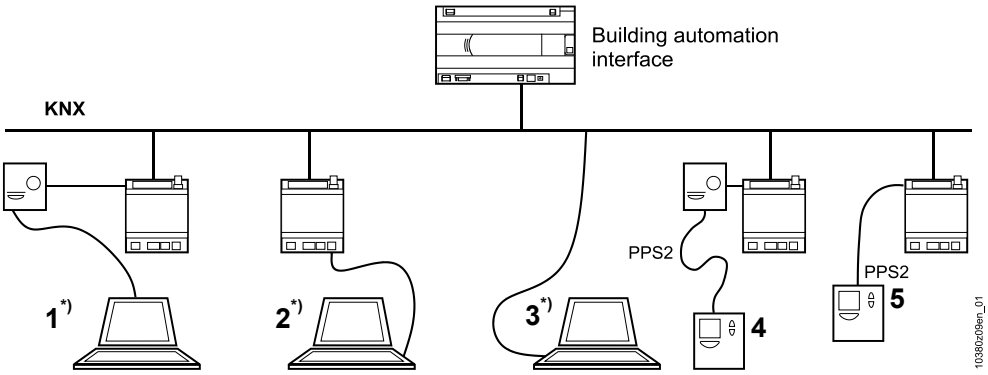
For the integration in building automation and control systems, communications links are created by use of group addresses (ETS).



Addressing

Every device must have its own physical address.
Addresses can be assigned with one of the three tools.

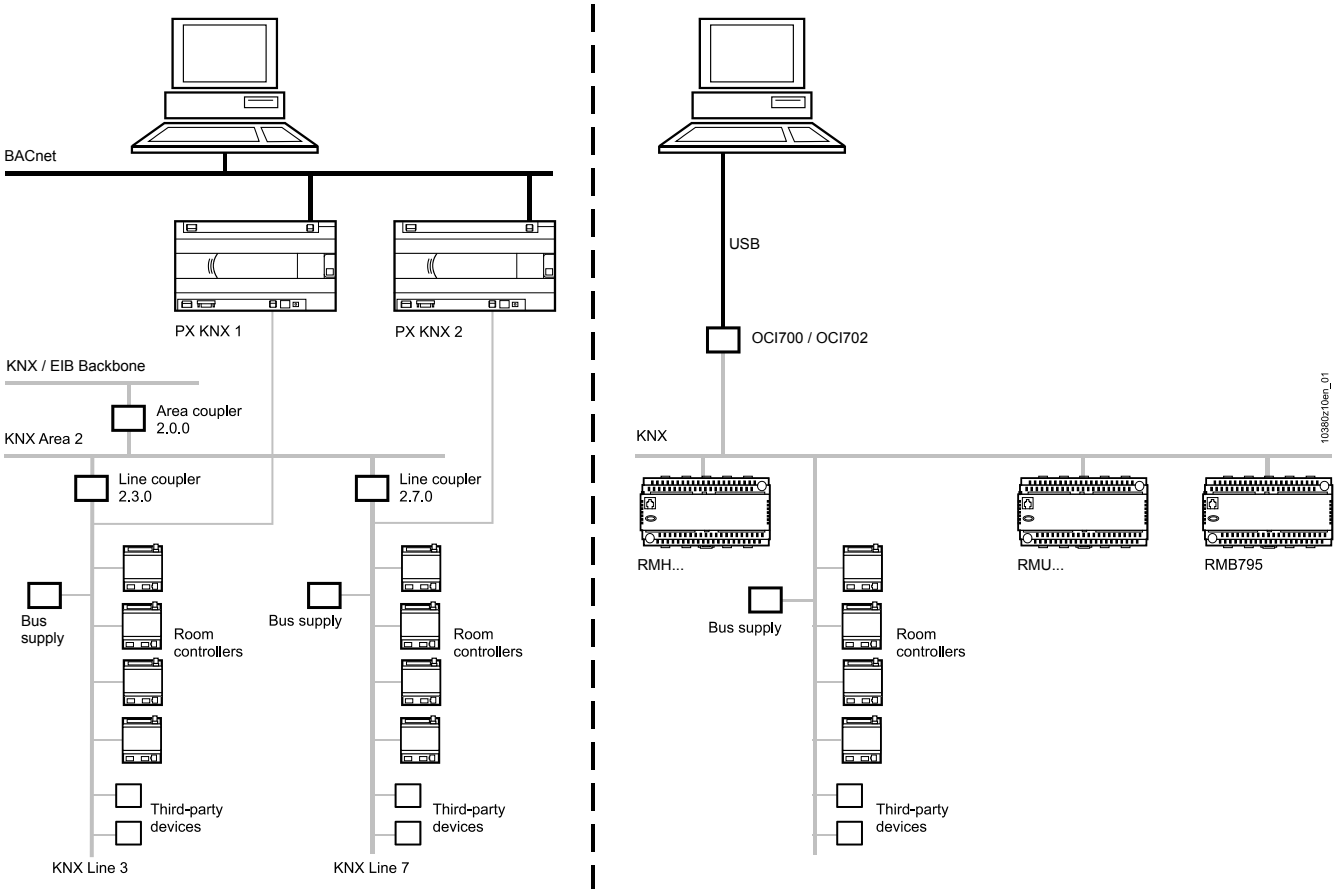
Options for connecting the tools



1. ETS or ACS connected to standard room unit *)
2. ETS or ACS connected to RXB controller *)
3. ETS or ACS connected to KNX bus *)
4. "HandyTool" connected to standard room unit
5. "HandyTool" connected to RXB controller

*) via OCI700 / OCI702 USB KNX port

Integration into building automation and control systems



Standalone operation at field level

The room automation system can be operated as a standalone system. All the necessary functions can be implemented by means of the KNX communications between RXB controllers, and between these and any KNX-compatible third-party equipment.

Integration into the automation level

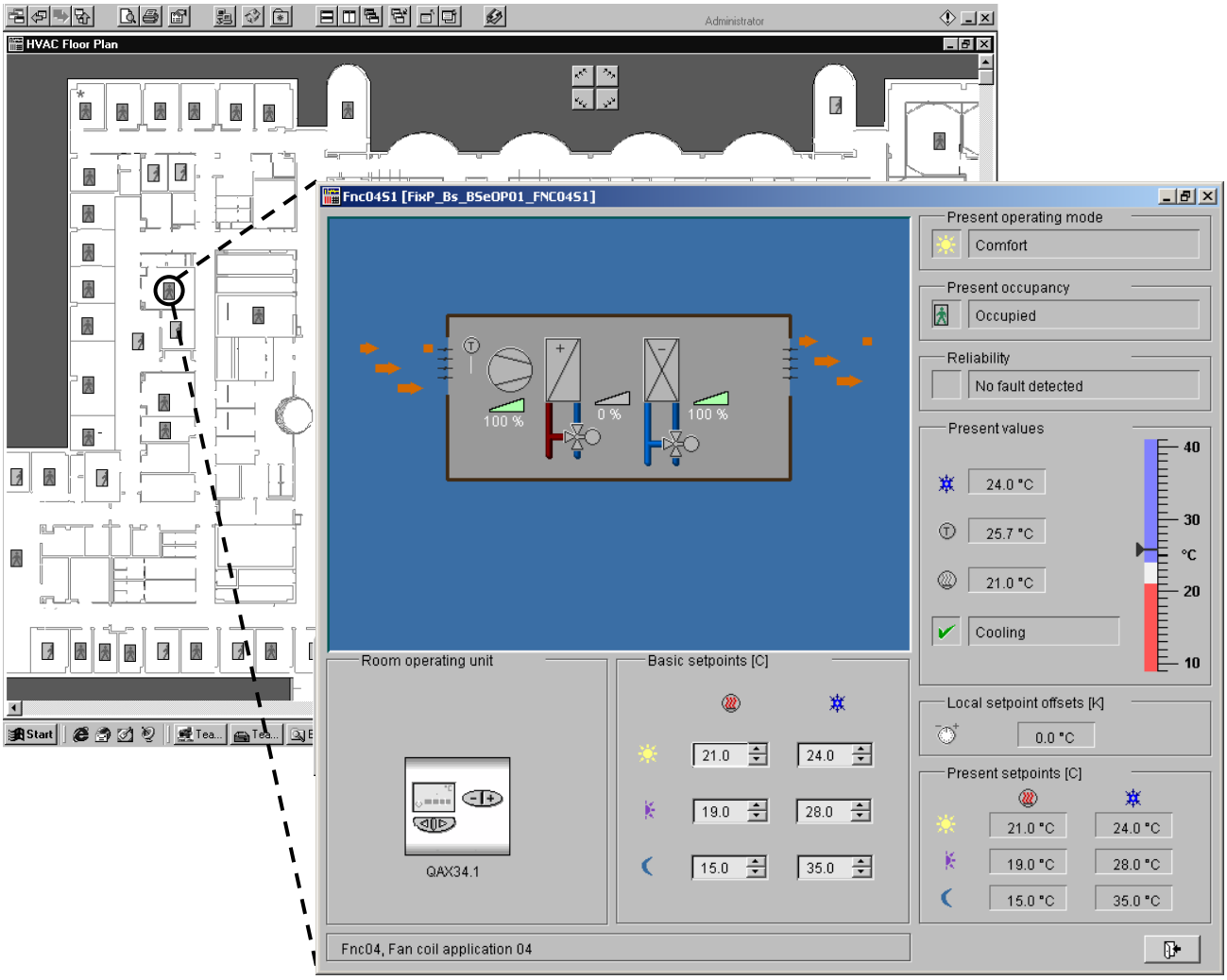
There are different possibilities for integrating RXB controllers into a building automation and control system:

- The PX-KNX integration station, which converts the KNX communication objects into BACnet data points. Typically up to 45 RXB controllers can be integrated per PX KNX interface controller.
- The OCI700 / OCI702 interface, which converts KNX information into USB format.

Integration into the management level

Depending on the degree of complexity required, a management station incorporates the following program modules for the user:

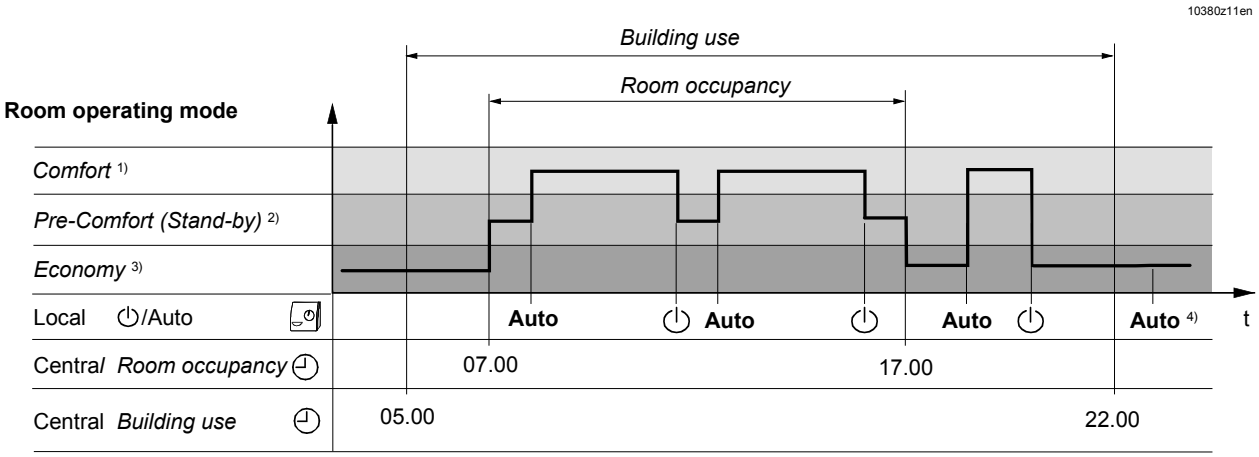
- Graphics-based operation of the site (plant graphics)
- Time schedules for a wide range of switching routines
- Display and modification of data point values
- Routing of alarm messages
- etc.



Example of a graphic user interface.

Central and local control of operating mode

The diagram below shows an example of how the central time schedules (*Building use* and *Room occupancy*) interact with the local ⏻/Auto control on the room unit (operating as an occupancy function in this case).
It is also possible to use a presence detector for local control.



Example of the routines over a typical day:

1) *Comfort*	In this mode, the room temperature is within the comfort range.
2) *PreComfort (Standby)*	The heating or cooling output is slightly reduced (during the temporary absence of the room occupant)
3) *Economy*	The heating or cooling output is reduced significantly.
4) - -	Outside the times defined by the *Building use* schedule, local operation has no influence on the operating mode

RXB overview

RXB room controllers		Document
RXB21.1, RXB22.1	Room controller for fan-coil units	CM2N3873
RXB24.1	Room controllers for chilled ceilings and radiators	CM2N3874
RXB room units		
QAX30.1	Room unit with temperature sensor	CA2N1741
QAX31.1	Room unit with temperature sensor and setpoint adjuster	CA2N1741
QAX32.1	Room unit with temperature sensor, setpoint adjuster and ⏻/Auto switch	CA2N1641
QAX33.1	Room unit with temperature sensor, setpoint adjustment and ⏻/Auto/Fan switch	CA2N1642
QAX34.1	Room unit with temperature sensor, setpoint adjustment, ⏻/Auto/Fan switch and LCD	CA2N1645
QAX39.1	Universal setpoint adjuster	CA2N1646
QAX84.1	Flush-mounting room unit with temperature sensor, setpoint adjuster, ⏻/Auto button / fan speed and LCD indication	CA2N1649
QAX9x.4	EnOcean room units	CM2N1663
RXZ97.1/KNX	EnOcean gateway with KNX interface	CM2N1662
RXB commissioning aids		
RXT20.1	Service terminal	CA2N3851
Integration interfaces		
PX KNX	Comprises PXC00-U and PXA30-K11	CA1N9221 CM1N9280
OCI700	USB-KNX interface	CE1N5655
OCI702	Service terminal + Service tool	A6V10438951 N5649
Accessories		
RXZ20.1	Terminal covers for RXB21.1 and RXB22.1 and RXB24.1	CM2N3873 CM2N3874
UA1T	Power amplifier for thermic valve actuators	CA2N3591
ACX95.320/ALG	Bus power supply 320 mA	CE2Q3663
Other RXB documentation		
	RXB (KNX) technical manual	CM110389
	RXB integration – S-Mode	CM1Y9775
	RXB / RXL integration – Individual addressing	CM1Y9776
	Third-party integration	CM1Y9777
	Synco integration	CM1Y9778
	Working with ETS	CM1Y9779
	System description Desigo	CM110660
	System description Synco	CE1S3110

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