



HOTEL SOLUTION™

## Room controller

## HRC3.1

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Room controller for temperature, energy and access control, and for hotel room management

- For 2-pipe or 4-pipe fan-coil systems
- For radiators and cooling via 2-pipe fan-coil system
- Auxiliary heating for bathroom
- 2-pipe fan-coil systems with electric reheater (FNC03)
- Centrally programmable room temperature setpoint with individual setpoint adjustment from the guest's room
- Control of room lighting based on room occupancy
- Energy management for individual room control system based on room occupancy
- Room access control via magnetic, chip, or transponder card
- Access control for access to general areas such as car park and main doors
- Acquisition of messages and alarms and transfer to the database server
- Downloadable standard applications
- Customized application software available as an option

## Application

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The HRC3.1 room controller integrates temperature control, energy management, access control and the management of a hotel room, at room level.

For operation, room operator units, access card readers and access card holders with bus connection and switch e.g. to turn on the lights are used.

## Functions

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The functions are determined by the downloadable application software. The room controllers are delivered with the standard application (the basic features are described in this data sheet).

In special cases, the standard application can be overwritten with a customized application software. A commissioning and service tool is available for this purpose.

### Temperature control

#### **The following options can be implemented with fan-coil units:**

- 4-pipe heating/cooling with 3-position or PWM output
- 2-pipe heating/cooling with 3-position or PWM output with changeover
- 2-pipe system with internal electric heating, 2-position or PWM output, and cooling with 3-position or PWM output
- 2-pipe system with external electric heating, 2-position or PWM output, and cooling with 3-position or PWM output
- 4-pipe heating via external radiator and cooling with 3-position or PWM output
- Auxiliary heating in bathroom, additional radiator or underfloor heating with 2-position, 3-position or PWM output

#### **Room temperature setpoints:**

- Centrally programmable room comfort temperature setpoint
- Individual setpoint adjustment of room comfort room temperature setpoint in guest's room
- Precomfort setpoints when guest is absent
- Economy setpoints for free rooms (i.e. from which guests have checked out)
- Remote room temperature setpoint adjustment in rooms unoccupied for long periods

#### **Energy-saving features:**

- Energy management for individual room control system and lighting based on room occupancy
- Summer/winter strategy (i.e. avoid heating in summer and avoid cooling in winter)
- Fan disabled if window is opened

### Energy management

#### **Electricity:**

- Master switch function: to switch electrical consumers on and off
- Switch-on control of courtesy light function upon entry to room
- Electrical consumers enabled and disabled by pre-programmed guest-dependent or hotel-staff dependent function
- Water supply shut off in absence of guest or hotel staff (only possible with magnetic valve installed)
- Control of blinds or curtain

### Access control

- Receipt of access code from the connected magnetic, chip, or transponder card reader
- Control of access to guest rooms, suites and general access areas
- Receipt of access codes for guests, hotel staff and emergency access cards from the central management station at the reception
- Management of all access codes
- Activation of door opening mechanism when access is granted

## Management

- SOS alarm or bathroom alarm
- "Do not disturb" and "Room service call" or "Make up room"
- "Guest present" indicator for hotel staff only
- Bell disabled in conjunction with "Do not disturb"
- Alarm message if door is opened in unoccupied room (door intrusion)
- Alarm message if window is opened in unoccupied room (window intrusion)
- Registration and transfer of messages and alarms to the database server
- Optionally, other functions can be programmed and linked to inputs and outputs

## Building automation and control

- Room controller parameter setting
- Remote adjustment of room comfort setpoint
- Alarm monitoring and message display
- Room status monitoring
- Automatic registration of temperature data
- Trend graph for past three days
- Configurable outputs (guest-dependent or staff-dependent)
- Interface to front-office system (FOS) via the hotel room management station HSW3.1

## Communication

- Online communication over building bus
- Konnex/EIB bus connection (in LTE mode)\*
- RS485 room bus for communication with room operator units, card readers and card holders

## Note

\* Konnex communications take place in LTE mode. S-mode-communication is available, but can be used only for customer-specific applications.

## Ordering

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When ordering, please specify the quantity, product name and type code.  
The HCS3.1 terminal kit can be ordered separately.

Example:	<b>20</b>	<b>Room controllers</b>	<b>HRC3.1</b>
	<b>20</b>	<b>Terminal kit for HRC3.1</b>	<b>HCS3.1</b>

## Compatibility

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Please refer to the product range overview, N6301.

## Mechanical design

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The HRC3.1 room controller comprises a housing base unit (galvanized sheet steel), a housing cover (galvanized and painted sheet steel) and a printed circuit board with plug-in terminals along one side. The printed circuit board and the housing cover are screwed to the base unit. The room controller also has a female connector for an external operator or monitoring unit.

The connection terminals can be orders as the HCS3.1 terminal kit (see "Ordering").

## Display elements (service LEDs)

The room controller has four LEDs to indicate the status.

The four service LEDs show the operating states for the HRC3.1 room controller. The service LED states are:

Operating state	LED display
Normal operation	CTRL LED1: green, flashing OK LED2: green, flashing at high frequency FAULT LED3: off COM LED4: off
Application (task) stopped	CRTL LED1: off OK LED2: green, flashing at high frequency FAULT LED3: steady red light COM LED4: off
Operating system loading	OK LED2: Continuous on for ca. 3 seconds COM LED4: Continuous on for ca. 3 seconds Then: All LEDs are off
Loaded operating system incorrect	All 4 LEDs illuminated

## Settings

- **DIL switch:**  
Externally accessible quadruple DIL switch S6  
The DIP switches can be used in the application and, if necessary, described there.  
In the standard application, DIL1 should be set to OFF for transponder card access, or to ON for magnetic card access.
- **Bridge BR200:**  
This bridge activates the bootstrap loader when power is restored after a power failure.  
The bridge must be connected before switching on the room controller supply voltage.

## Response in the event of a fault

- If the management system or communication link fails, local operation is not affected.
- The power supply component for the room controller has two 1A fusible links which cannot be replaced.  
If these fuses are defective, it is probable that the electronic circuitry is faulty and that the device needs to be repaired in any case.
- External fuses are required for the 24 V electrical consumers.

## Disposal

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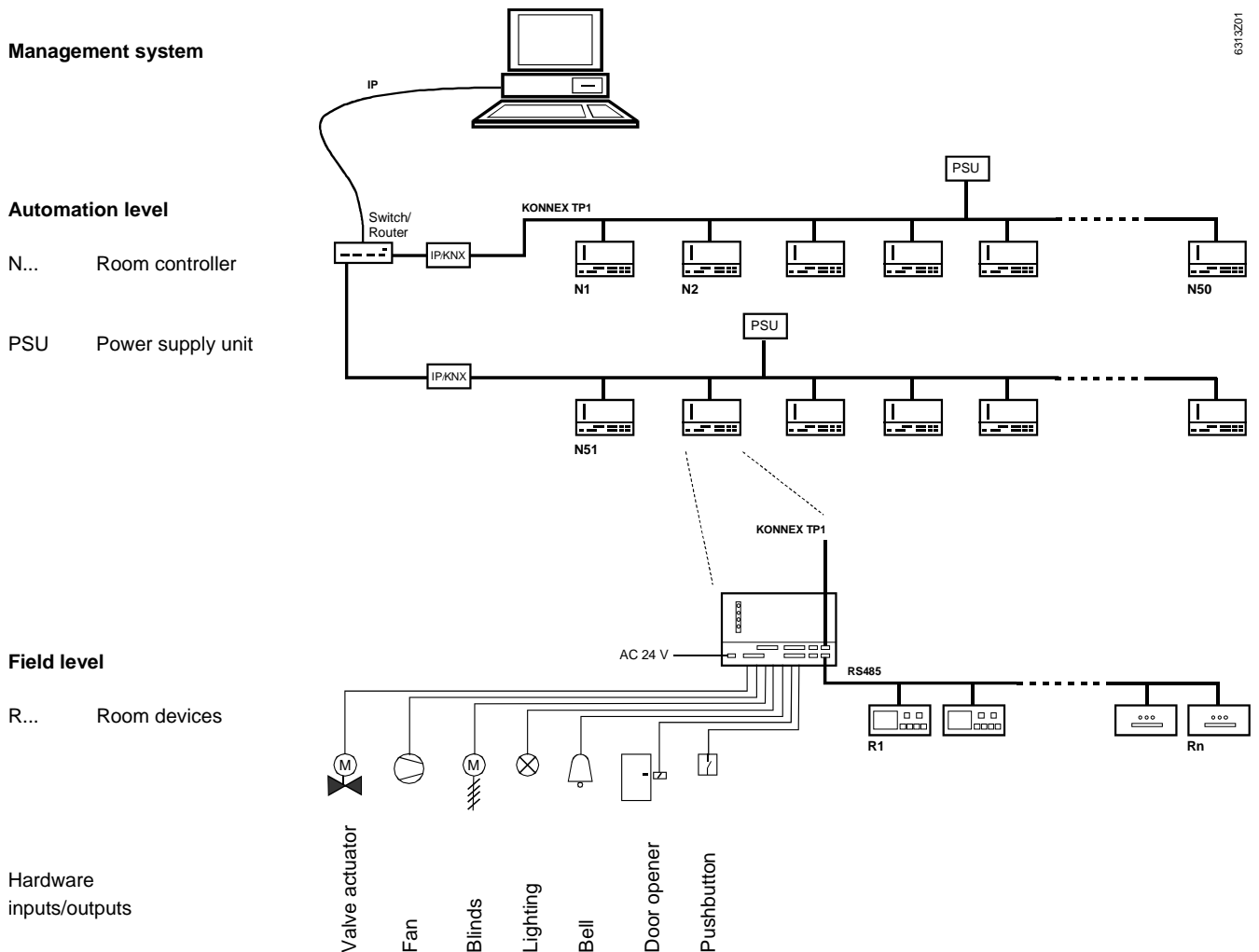


The device includes electrical and electronic components and must not be disposed of as domestic waste.

**Observe all current local regulations.**

## Topology

6313201



## Engineering notes

- A transformer with an output voltage of AC 24 V $\pm$  15% (SELV extra low voltage) is required for the room controller power supply. The transformer rating must be sufficient for
  - the room controller and associated 24 V electrical consumers (max. 35 VA)
  - all electrical consumers connected to the 24 V relay outputs
- A line coupler from the EIB range is required after every 120 room controllers. In practice, however, a line coupler needs to be connected after approximately 50 rooms, because the maximum cable length is 1000 m, and the cable length between rooms is typically 20 m.
- The room controller must be installed in a control panel or covered enclosure, which can only be opened with a key or tool.
- The relevant technical, and health and safety regulations must be observed, including local electricity company regulations applicable to connection of devices to the electricity network.
- The connection terminals can be ordered as an HCS3.1 terminal kit (see "Ordering").
- The management level PCs must be protected with a UPS (uninterruptible power supply).
- A mechanical safety lock must be provided to allow the door to be opened from the outside in extreme emergencies.

## AC 230 V supply cables

The sizing and fuse protection of the power supply cables depends on the total load and on local regulations. The supply cables must be secured with cable restraints.

## Volt-free relay outputs AC 230 V

- Loads up to AC 250 V, 5 A (4 A) can be switched with the volt-free relay outputs
- The cable sizing depends on the connected load and on local installation regulations
- The circuits must be externally fused ( $= \leq 10$  A) as there are no internal fuses
- The cables must be secured with cable restraints
- The relay group on connector X3 may EITHER be connected to mains voltage 230 V OR to SELV 24 V. The same restriction is also valid for connector X4. Mixed operation is not allowed. However, it is possible to connect mains voltage to X3 and SELV voltage to X4 and vice versa.
- **The fans must not be connected in parallel (use separating relays!)**



Caution

## Mounting

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- The HRC3.1 room controller is installed in the corridor with other installed devices, behind the wall.
- There must be a means of dissipating the heat generated during operation. Adequate air circulation must be ensured.
- Subject to certain conditions, the HRC3.1 room controller can be installed in suspended ceilings. Potential noise problems caused by the switching of relays should be clarified in a sample room.
- As installation is the same for all types of room (e.g. single rooms or suites), it is recommended that a sample room should be set up in cooperation with the electrical installer, for each room type.
- Ensure that there is access to the room controller for commissioning and service work.
- The device is designed for fixed installation in a dry, enclosed space.
- Commissioning must be carried out by trained personnel only

### Local safety and installation regulations must be observed

## Konnex building bus (terminal block X11)

### Wiring

- EIB standard cable with 2 twisted pairs for connection of the Konnex gateway to all room controllers (2 wires are spare or for PPS2)
- EIB standards must be observed
- No bus termination resistances are required.

## PPS2 interface (terminal block X11)

### Wiring

As a maximum two room devices (room unit QAX84.1) can be connected to PPS2.

- Cable with 2 twisted pairs for connection of the Controller to all room units (2 wires are spare or for Konnex)

Width	Diameter	Cable Length
1 mm <sup>2</sup>	1.15 mm	125 m
0.75 mm <sup>2</sup>	0.98 mm	115 m
0.5 mm <sup>2</sup>	0.8 mm	75 m

## RS485 room bus (terminal block X12)

As a maximum, the following room devices can be connected to the room controller via the room bus:

- 5 room operator units
- 4 card readers
- 4 card holders

## Wiring

Cable: 2 twisted pairs, max. 0.5mm<sup>2</sup> screened

Recommendation: There is normally no need to earth the cable screen.

If the bus cable is routed parallel to mains cables over long distances, we recommend that the bus cable should be connected, at a point near the room controller, to the protective earth conductor.



## Caution

**Adequate EMC precautions must be taken when installing the equipment.  
The room bus and building bus conductors must not be routed in the same conduit as high voltage conductors.**

## Commissioning

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- Before commissioning, the room controller address (EIB address) must be set from a laptop computer (tool) or an operator unit (external operator/monitoring unit) connected to service socket X13.
- The controller must be connected to the supply voltage for this purpose.
- In the case of customer-specific applications, the customized application software must be downloaded either from a laptop connected to service socket X13 or via the building bus.
- The application can be downloaded to individual room controllers while the bus is in normal operation.
- The room controllers are already loaded with the standard application on delivery. It is then only necessary to adjust the parameters with the commissioning software.
- Settings: DIL1 = OFF for transponder card access or DIL1 = ON for magnetic card access.

## Technical data

Power supply (from external transformer)	Working voltage (SELV)	24 VAC +/-15 %
	Power consumption of controller plus connected 24 V consumers	Max. 1.5 A
	Power consumption of electrical consumers connected to the 24 V relay outputs	<b>Must be determined separately, based on the transformer sizing</b>
Interfaces	X1 to X4	WAGO terminal strips AWG 12-28
	X5 to X12	WAGO terminal strips AWG 14-28
Inputs	16 digital inputs	DC 12V / 5mA (no electrical isolation)
	1 analog input	For LG-Ni 1000 temperature sensor, sensor current 0.45 mA
Wiring	Screened twisted pair signal conductors	Connect conductor screen to a shield bus before the room controller
Outputs	8 relay outputs 230 V volt-free	Max. AC 250 V, max. AC 5 A / 4 A (cosφ = 0.6)
	6 relay outputs 24 V non-floating	Max. AC 24 V, max. AC 1 A / 0.8 A (cosφ = 0.6)
	1 DC <sup>1)</sup> output for door opener (door solenoid), non-floating	DC 12V / 300mA <sup>1)</sup> short-circuit proof
	1 AC output for door opener (door solenoid), non-floating	AC 24V / max. 1 A
	8 digital outputs, non-floating	DC 12 V, max. 80 mA per output <sup>1)</sup> short-circuit proof (short-circuit current 100 mA)
	RS485 room bus <sup>1)</sup>	DC 12V, max. 0.5 A <sup>1)</sup>
	PPS2 interface	for room units QAX84.1
	<b><sup>1)</sup> Total of all DC 12 V currents</b>	<b>DC12V, max. 0.5 A</b>
Mounting	DIN rail	EN 50022, 37 x 7.5 mm
Environmental conditions	Operating temperature:	0...50°C
	Transport temperature:	-30...70°C
	Humidity class:	F to DIN 40040
	Air pressure during operation:	Min. 700hPa (3000m above sea level)
	Air pressure during transportation:	Min. 700hPa (10, 000m above sea level)
Standards	Automatic electronic controls for household and similar use	IEC 60730-1
Electromagnetic compatibility	Emitted interference in residential areas	EN 61 000-6-3
	Interference immunity in industrial areas	EN 61 000-6-2
Housing protection	to EN 60 529	IP 20
Protection class	to EN 61 140	III
CE conformity	Meets the requirements of:	
	EMC Directive	89/336/EEC
	Low Voltage Directive	73/23/EEC
Environmental compatibility	Environmental product declaration	ISO 14001 (environment)
	CK1E6313 provides data on environmentally compatible product design and assessment (material composition, packaging, disposal)	ISO 9001 (quality)
UL/CUL conformity		UL/CUL 916



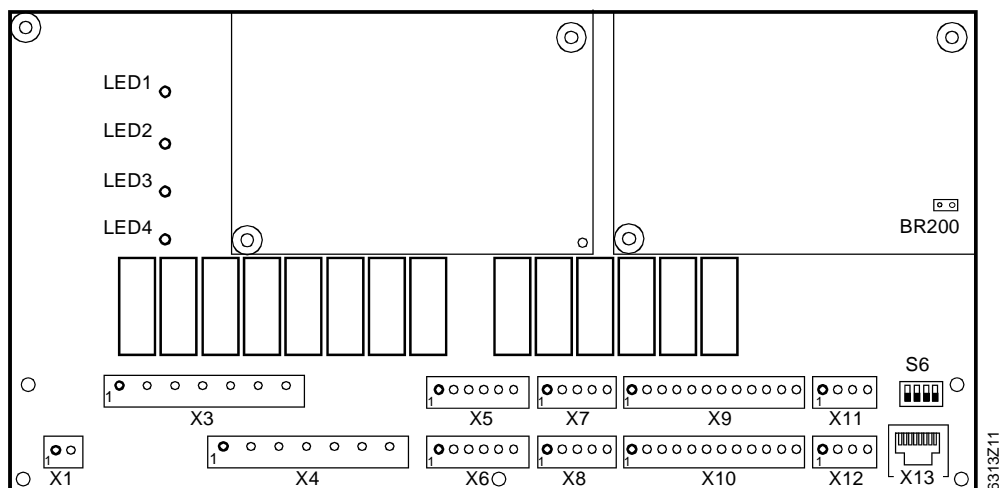
### Caution



Dimensions	See also dimension diagrams	284 x 160 x 57 mm
Weight	Excluding packaging	1.3 kg
Color	Housing	Black RAL 7016

## Pins

### Interface layout



### Interfaces:

X1:	AC 24V +/-15% supply voltage
X3, X4:	8 relay outputs max. AC 230V
X5, X6:	6 relay outputs max. AC 24V
X7, X8:	8 digital outputs DC 12V
X9, X10:16	Digital inputs DC 12V
X11:	PPS2 and Building bus (Konnex)
X12:	Room bus (RS485)
X13:	Service socket (RS232): 8-pin RJ45 socket
BR200:	Bootstrap loader bridge
S6:	Address switch

### Cage clamp terminals

The following cage clamp terminals are **not** supplied with the room controller. They can be ordered separately with order code (ASN) **HCS3.1**:

Connector	WAGO cage clamp terminal
X1	2-pin 5.08mm WAGO 231-302/026-000 **)
X3,X4	7-pin 7.62mm WAGO 231-707/026-000 **)
X5,X6	6-pin 3.81mm WAGO 734-206 *)
X7,X8	5-pin 3.81mm WAGO 734-205 *)
X9,X10	12-pin 3.81mm WAGO 734-212 *)
X11,X12	4-pin 3.81mm WAGO 734-204 *)

Special screwdriver for WAGO terminals:

\*) For small terminals: WAGO order number 210-619

\*\*\*) For large terminals: WAGO order number 210-620

## Connection diagrams

The following table of functions applies to the standard application

Connector X1  
Supply voltage AC 24 V

		I/O	Function
G G0	1	G	AC 24 V supply
	2	G0	AC 24 V supply

Connector X3  
RH relay contacts  
Max. 230 VAC / 5 A

	1		Fan supply voltage
	2	RH 1	Fan speed 1
	3	RH 2	Fan speed 2
	4	RH 3	Fan speed 3
	5		Supply voltage for blinds
	6	RH 4	Blinds UP
	7	RH 5	Blinds DOWN

Connector X4  
RH relay contacts  
Max. 230 VAC / 5 A

	1		Supply voltage, lighting scenario
	2	RH 6	Courtesy light function
	3		Supply voltage, lighting scenario
	4	RH 7	Lighting scenario
	5	RH 8	Lighting scenario
	6		Supply voltage, lighting scenario
	7	RH 9	Lighting scenario or time scheduler

Connector X5  
RL relay contacts  
Max. 24 VAC / 1 A

	1	RL 1	Heating valve open
	2		G0
	3	RL 2	Heating valve closed
	4	RL 3	Cooling valve open
	5		G0
	6	RL 4	Cooling valve closed

G G0

Connector X6  
Relay contacts  
Max. 24 V

G G0		1	RL 5, max. AC 24V, max.1A, max. 6 s	Door opener AC
		2	G0	Door opener AC
+12V GND		3	RL5, DC +12V, max. 270mA, dauernd	Door opener DC +
		4	GND	Door opener DC -
		5	RL 6, max AC 24 V, max 1A, max. 6 s	External bell
		6	(External voltage)	External bell

Connector X7  
Digital outputs  
DC 12 V, max. 80 mA

Pin	I/O	Function
1	DO 1	
2	DO 2	"Service call" or "Make up room" LED
3	DO 3	"Do not disturb" LED
4	DO 4	"SOS call" LED
5	GND	

Connector X8  
Digital outputs  
DC 1 V, max. 80 mA

1	DO 5	Auxiliary heating control (on/off, PWM, 3-position open)
2	DO 6	Auxiliary heating control (on/off, PWM, 3-position closed)
3	DO 7	FNC03 electric reheater output (PWM)
4	DO 8	A time scheduler may be programmed
5	GND	

Connector X9  
Digital inputs  
DC 12 V / 5 mA

1	DI 1	ON/OFF button for main switch, RH7
2	DI 2	"Room service" or "Please clean room" button
3	DI 3	"Do not disturb" button
4	DI 4	"SOS Call"
5	GND	
6	DI 5	"Blinds UP" button
7	DI 6	"Blinds DOWN" button
8	GND	
9	DI 7	Window monitoring contact: window
10	DI 8	"Bell" button
11	DI 9	Card-holder contact: contact closed = person in room
12	GND	

Connector X10  
Digital inputs  
DC 12 V / 5 mA

1	DI 10	ON/OFF button for main switch RH7
2	DI 11	ON/OFF button for main switch RH7
3	DI 12	Switch or pulse contact for RH9, if no light scenario is programmed
4	DI 13	Minibar contact: door closed = contact closed
5	DI 14	ON/OFF button for RH6
6	GND	
7	DI 15	Door monitoring contact: door closed = contact closed
8	DI 16	Button for door-opening mechanism
9	GND	
10	AI 1	Ni1000 temperature sensor
11	+12V	Output voltage
12	GND	

Connector X11  
PPS2 interface and  
Konnex building bus

1	CP+ PPS2, Data
2	CP- PPS2, GND
3	CE+ (galvanically separated from room controller)
4	CE- (galvanically separated from room controller)

Connector X12  
Room bus

1	A+ RS485
2	B- RS485
3	DC +12V, max. 500 mA
4	GND



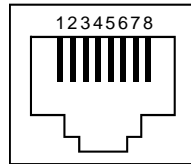
Caution

Fans connected to the relay outputs must not be operated in parallel.  
For parallel operation use cut-off relays or slave room controllers.

**Connector X13**  
8-pin RS232, RJ45

For general service and diagnostics, the RS232 interface is routed to connector X13.  
Purpose:

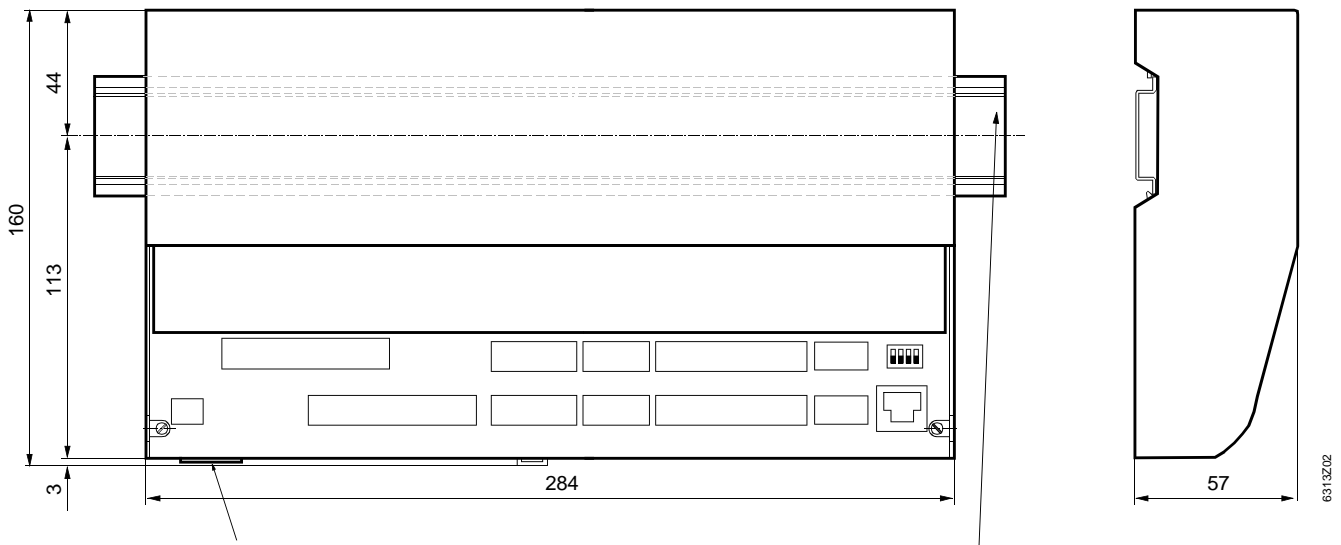
- Software download functions, such as the bootstrap loader.
  - Download of operating system.
  - Connection of an external operator/monitoring unit.
- A 12 V supply voltage is available to supply the above (+12 V at 2 pins). The voltage is short-circuit proof.



1	GND
2	RxD
3	RTS
4	TxD
5	CTS
6	+12V
7	+12V
8	GND

**Dimensions**

Dimensions in mm



Position of earth strap

DIN rail 37 x 7.5mm (EN50022)