

RXL

## Room controller

## RXL24.1

Communicating controller for chilled ceiling and radiator applications CC-02

The RXL24.1 room controller is used for temperature control in individual rooms.

- For chilled ceiling and radiator systems
- PI control
- Proprietary bus communication
- Integration into the DESIGO building automation and control system via PX KNX
- Integration into Synco
- Control of AC 24 V PDM <sup>1)</sup> thermic valve actuators or 3-position AC 24 V motorized valve actuators
- Commissioning with Synco ACS or "HandyTool"
- AC 24 V operating voltage
- Screw terminals

1) PDM = Pulse Duration Modulation

## Application

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The RXL24.1 room controller is optimized for control of chilled ceiling and radiator systems in individual rooms.

The application of each controller is determined by the application software.

The controllers are delivered with a fixed set of applications, each of which contains various individual applications. The relevant application is selected and activated during commissioning using one of the following tools:

- Synco ACS
- "HandyTool" (the QAX34.3 room unit includes a tool function allowing you to parameterize the connected RXL controller).

### No use of spare inputs/outputs

Unlike the RXB controllers, the RXL controllers do NOT support the use of spare inputs and outputs by the building automation and control system.

## Functions

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The room controller functions are determined by the selected application and its parameters, and by the input/output configuration.

For details, refer to the CLC and RAD description of functions, document CA110784.

When DESIGO RXL controllers are integrated into a building automation and control system, or into a Synco system, additional functions become available such as time scheduling, central control of setpoints, etc.

## Applications

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The following applications are available for the RXL24.1 room controllers:

Application group (type)	Applications
<b>CC-02 (with RXL24.1)</b>	CLC01 Chilled ceiling with dew point monitoring
	CLC02 Chilled ceiling with dew point monitoring, radiator with downdraft compensation
	RAD01 Radiator with downdraft compensation

Note Only one application at a time can be activated with the tool (Synco ACS or "HandyTool").

## Types

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The RXL24.1 room controller has the following outputs:

Type	AC 24 V triac outputs
<b>RXL24.1</b>	For 2 thermic valve actuators or two 3-position actuators
<b>RXZ20.1</b>	Accessories: Terminal covers

## Ordering

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When ordering please specify the quantity, product name, type code and application group.

Example: **30 Room controllers, type RXL24.1/CC-02**

## Compatibility

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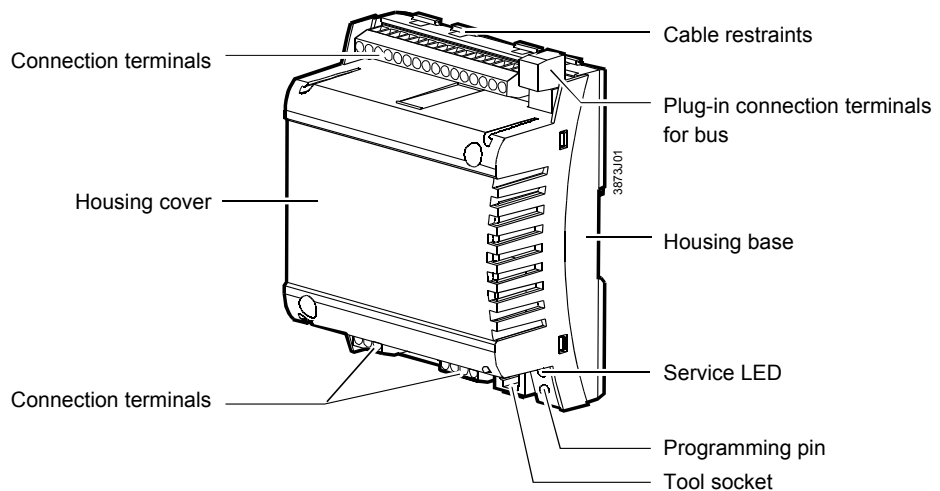
The RXL24.1 room controller is compatible with field devices from Siemens Building Technologies.

For details, refer to the DESIGO RX hardware overview, CA2N3804.

## Design

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The RXL24.1 controller consists of a housing base, a housing cover and the printed circuit board with connection terminals. The controller also has a tool socket, a service LED and a programming pin.



**Service LED**

The programming LED shows the operational status of the room controller as follows:

Green flashing	OK, device is in operation
Red ON	<ul style="list-style-type: none"> <li>Addressing mode (ACS / ETS)</li> <li>Fault</li> </ul>
Orange / green flashing	Parameter download
OFF	<ul style="list-style-type: none"> <li>No supply voltage</li> <li>Fault</li> <li>Service LED disabled by software</li> </ul>
Other patterns	<ul style="list-style-type: none"> <li>Start-up (approx. 5.sec)</li> <li>Fault</li> </ul>

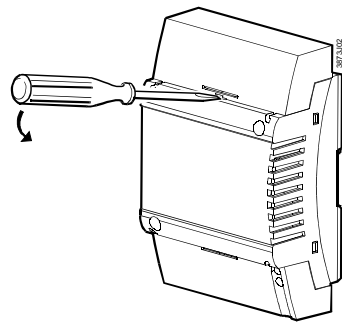
**Programming pin**

The programming pin is used to identify the controller in the commissioning phase. Pressing this pin causes the red programming LED to light up and remain on until identification of the controller is complete.

Once the programming pin has been pressed, the tool overwrites the hardware address in the room controller.

**Terminal cover**

Terminal covers (RXZ20.1) are available as an option, to protect the connection terminals from physical contact and dirt. The service LED remains visible when the terminal covers are in place, and the programming pin can be operated with a pointed implement.



Removing the terminal cover

**Label**

Identification number (unique serial number)

ID in bar-code form, code 128

Protection standard

Temperature range (0 ... 50 °C)

Serial No.

Test date, series (Z, A, B, C...)

Observe notes in this document

Activated application

Location

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
B1	M	N.C.	D1	GNDS	D2	Y1	G	Y2	Y3	G	Y4	CP-	CP+	CE+	CE-	CE+	CE-
												Bus					

**SIEMENS**

HVAC Products  
 RXL24.1/CS-02  
 EAN 7612944051218

AC 24V ±20% 5VA  
 50/60Hz T50 IP00(30)  
 060215B 513  
 Siemens Switzerland Ltd

CE

ID: 010025CA9900 Hex

QAX...  
 2 1 4 3

Appl.:

Loc.:

AC 24V SELV / PELV

19	19	21	21
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**Note** Options for use of the labeling fields “Appl.” and “Loc.”: Handwritten identification of the location and the activated application group.

**Connection terminals**

The connection terminals for the bus are detachable plug-in screw-terminals. All other terminals are fixed..

**Communication**

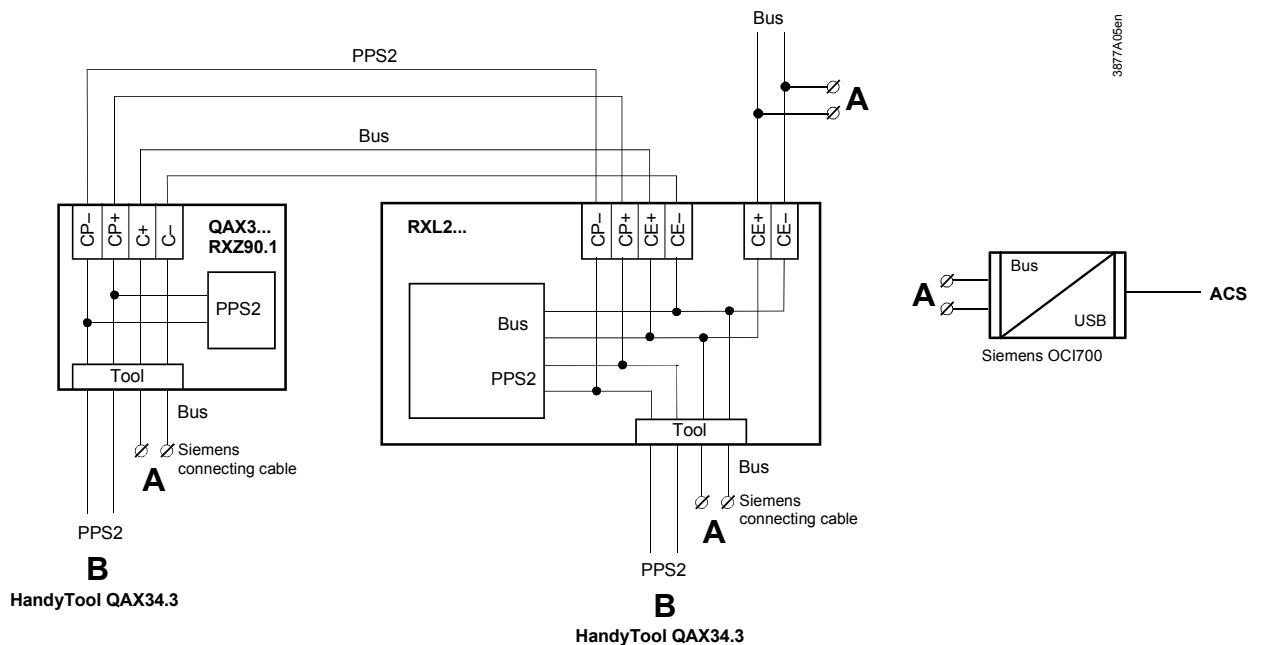
The RXL24.1 controller communicates with other devices via the following interfaces:

- PPS2 interface (proprietary) for the exchange of data with the room units
- Bus (terminals CE+ and CE-) for communication with:
  - PX/KNX interface (to DESIGO INSIGHT)
  - Interface OCI700 (to Synco)
  - Other DESIGO RXL controllers

**Connecting the tool**

To facilitate commissioning, the Synco ACS tool can be connected at three different points (marked **(A)** in the diagram) in the plant:

- to the bus cable at any point
- to the RXL2... controller (RJ45 tool socket)
- to the room unit (RJ45 tool socket)



**Notes**

- The tool socket is a proprietary socket. A Siemens connecting cable must be used (e.g. PXA-C1).
- The ACS tool, even if connected to a tool socket, requires an interface (OCI700).
- The "HandyTool" is connected to the tool socket of the room controller or to the tool socket of the room unit (QAX3..., RXZ90.1) (**B**).
- If you use OCI700 as an interface, it is connected to the service plug of the controller or of the room unit. **As long as the OCI700 is connected to the service plug, it must be supplied by the computer via the USB interface.** Otherwise the LCD display of the room unit will turn dark and the controller will switch to addressing mode.



**Caution!**

## Disposal



The device is classified as waste electronic equipment in terms of the European Directive 2002/96/EC (WEEE) and should not be disposed of as unsorted municipal waste.

The relevant national legal rules are to be adhered to.

Regarding disposal, use the systems setup for collecting electronic waste.

Observe all local and applicable laws.

## Engineering notes

### Bus

Topology	Line or star NO closed loops
Cable length	Max. 1000 m
Cable length	E.g. YCYM 2 x 2 x 0.8 mm
Number of RXL Controllers per Network	Max. 45
Bus supply	Up to 45 RXL-controllers: ACX95.320/ALG or 5WG1 125-1AB11
Bus terminator	Not required

### AC 24 V supply cables

- The RXL2... room controllers operate with a supply voltage of AC 24 V.
- The controlled devices (damper actuators) receive their power directly from the room controller. This means that a separate AC 24 V supply is not necessary for the field devices.
- The sizing and fuse protection of the power supply cables depends on the total load and on local regulations.

### AC 24 V triac outputs

The **simultaneous** load on outputs Y1 ... Y4 must not exceed 9.5 VA.

Example:

Y1 (heating)	2 thermic valve actuators, type STP72E	5 W
Y2 (cooling)	2 thermic valve actuators, type STP72E	5 W

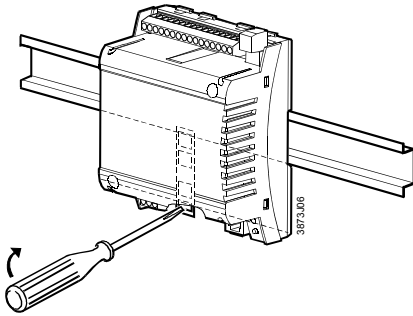
The maximum load is 9.5 VA for the heating sequence and 9.5 VA for the cooling sequence.

This is acceptable because the two sequences never operate at the same time.

## Mounting instructions

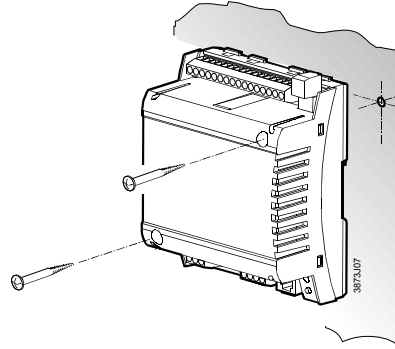
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The room controllers can be mounted in any orientation, and fixed as follows:



### Rail mounting

The housing base is designed for snap-mounting on DIN rails, type EN50022-35 x 7.5 (can be released with a screwdriver).



### Surface mounting

There are two drill holes for screw-mounting (see "Dimensions" for drilling template). The housing base is fitted with raised supports.

Screws: Max. diameter 3.5 mm, min. length 38 mm



### Note!

**Tightening torque for fixing screws max. 1.5 Nm**

When mounting note the following:

- The controller should not be freely accessible after mounting. It must be mounted in a cabinet or behind a cover that can only be opened / removed with a key or a tool.
- Ensure adequate air circulation to dissipate heat generated during operation.
- Easy access is required for service personnel
- Local installation regulations must be observed.

Mounting instructions and a drilling template are printed on the controller packaging.

## Commissioning

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The RXL24.1 room controller is commissioned with one of the following tools:

- Synco ACS via the OCI700 interface
- "HandyTool" via PPS2.

### Labeling




The definitive application and the controller's location are handwritten in the labeling fields "Appl." and "Loc" in the commissioning stage.

### Function test

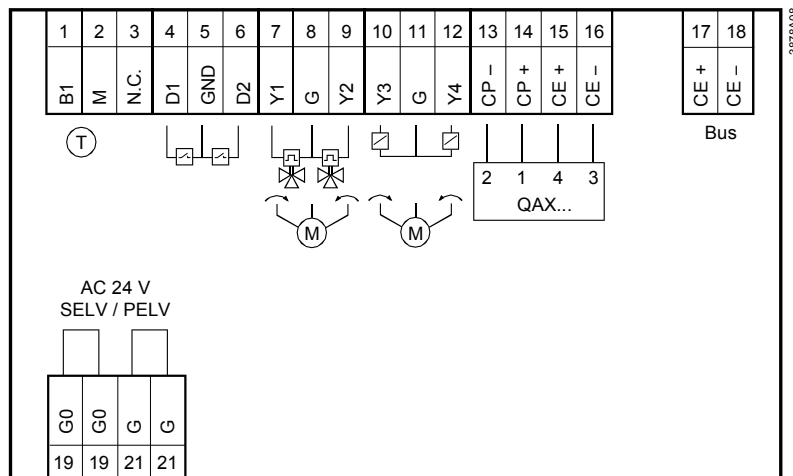
A special test mode (HandyTool) is available for operation of the outputs and interrogation of the inputs.

## Technical data

<b>⚠ Power supply</b>	Operating voltage	SELV / PELV AC 24 V ± 20 %	
	Rated voltage	AC 24 V	
	Frequency	50/60 Hz	
	Power consumption with connected field devices	Max. 15 VA	
	Internal fuse	None	
<b>Operating data</b>	Control algorithm	PI	
<b>Inputs</b>			
Signal inputs D1, D2 (for volt-free contacts)	Quantity	2	
	Contact voltage	DC 16 V	
	Contact current	DC 5 mA	
	Contact transfer resistance	Max. 100 Ω	
	Contact insulation resistance	Min. 50 kΩ	
Measured value input B1	Switch time:	min. 20ms "ON", min. 20ms "OFF"	
	Compatible temperature sensors	LG-Ni 1000	
	Quantity	1	
	measuring range	0 ... 50 °C	
	Sensor current	0.5 mA	
	Resolution	0.1 K	
	Measuring error at 25 °C sensor temp. (without cable)	max. 0.5 K	
<b>Outputs</b>			
AC24 V triac outputs , Y1 ... Y4	Quantity	4	
	Output voltage (equal to supply voltage)	AC 24 V ON/OFF, PWM or 3-position	
	Output current	Max. 0.5 A	
	Total nominal load (at both outputs simultaneously)	Max. 9.5 VA (e.g. 2 thermic valve actuators STA72E per heating and cooling sequence)	
<b>Ports/interfaces</b>			
Interface to room unit	Number of room units connectable	1	
	Interface type for room unit	PPS2	
	Interface type for ACS	Bus	
	PPS2 baud rate	4.8 kbit/s	
Bus	Baud rate on bus	9.6 kbit/s	
	Interface type	Electrically isolated	
	Bus current	5 mA	
	Baud rate	9.6 kbit/s	
Bus topology	Bus topology	Refer to "engineering", page 6	
	<b>Cable connections</b>		
	Connection terminals for signals and power supply	Solid or stranded conductors 0.25 ... 2.5 mm <sup>2</sup> or 2 x 1.5 mm <sup>2</sup>	
	Bus connection terminals (plug-in screw terminals)	Solid or stranded conductors 2 x max. 1.0 mm <sup>2</sup> e.g. YCYM 2x2x0.8	
Single cable lengths	For field devices, see also the RXB & RXL installation guide, CM110381		
Signal inputs D1, D2	Max. 100 m with diameters ≥ 0.6 mm		
Measured value input B1	Max. 100 m		
AC24 V triac outputs , Y1 ... Y4	Max. 100m where A ≥ 1.5 mm <sup>2</sup>		
Interface to room unit	Max. 115 m where A= 0.75 mm <sup>2</sup> (including connecting cable for tool)		
Cable type	4-core, twisted pair, unshielded		
Bus	Max. 500 m, see "engineering", page 6		
Tool connecting cable	Max. 3 m		

<b>Housing protection standard</b>	Protection standard to EN 60529	IP30 with terminal cover fitted and wall mounted without DIN rail
		IP20 for all other mounting arrangements
<b>Protection class</b>	Suitable for use in systems with protection class I or II	
<b>Ambient conditions</b>	Normal operation	Class 3K5 to IEC 60721-3-3
	Temperature	0 ... 50 °C
	Humidity	< 85 % rh
	Transport	Class 2K3 to IEC 60721-3-2
<b>Standards and directives</b>	Temperature	- 25 ... 65 °C
	Humidity	< 95 % rh
	Product safety	
	Automatic electronic controls for household and similar use	EN 60730-1
	Electromagnetic compatibility	
	Immunity (industrial & domestic)	EN 60730-1
	Emissions (domestic)	EN 60730-1
	Home and Building Electronic Systems (HBES)	EN 50090-2-2
	Electronic individual zone control equipment	EN 15500
	 compliance:	
	Meets requirements of EMC directive	2004/108/EC
	Low Voltage Directive	2006/95/EC
	 C-Tick conformity (EMC)	AS/NZS 61000-6-3
	<b>eu.bac:</b> Meets the requirements for eu.bac certification	
See product list at: <a href="http://www.eubaccert.org/licences-by-criteria.asp">http://www.eubaccert.org/licences-by-criteria.asp</a>		
Type	License	Application
RXL24.1/CC02	20862	Heating Systems (Radiator)
		Chilled Ceiling Systems
		Control accuracy [K]
		0.4
		0.3
 Reduction of hazardous substances	2002/95/EC	
<b>Dimensions</b>	See dimension diagrams	
<b>Weight</b>	excluding packaging	0.250 kg
	including packaging	0.380 kg

RXL24.1



**Measured value input**

- B1 1 Measured value input for LG-Ni 1000 sensors
- M 2 Measured value input ground

**Signal inputs**

- D1 4 Signal input
- GND 5 Signal ground
- D2 6 Signal input

**Triac outputs**

- Y1 7 AC 24 V, 0.5 A switching output
- G 8 AC 24 V actuator supply
- Y2 9 AC 24 V, 0.5 A switching output
- Y3 10 AC 24 V, 0.5 A switching output
- G 11 AC 24 V actuator supply
- Y4 12 AC 24 V, 0.5 A switching output

**Room unit**

- CP- 13 PPS2 ground
- CP+ 14 PPS2 data
- CE+ 15 Bus
- CE- 16 Bus

**Bus (plug-in connection)**

- CE+ 17 Bus
- CE- 18 Bus

**Power supply**

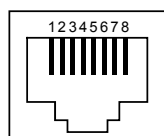
- G0 19 Controller ground
- G 21 AC 24 V +/- 20 %

**Caution**

- **Local installation regulations must be observed.**

**Tool socket**

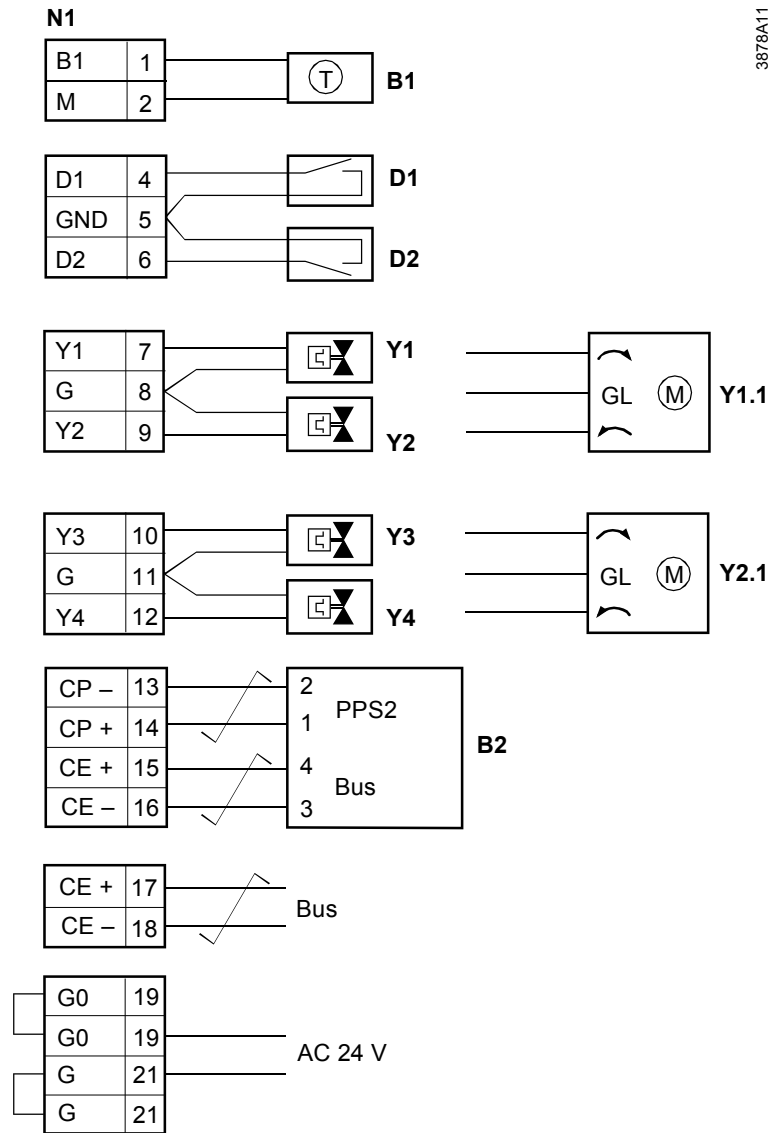
Proprietary RJ45-type tool socket



- |             |                    |
|-------------|--------------------|
| 1 Bus (CE+) | 5 +12VDC           |
| 2 Bus (CE-) | 6 RxD              |
| 3 Not used  | 7 PPS2 (CP+) / TxD |
| 4 Not used  | 8 PPS2 (CP-)       |

Connection of field devices, room unit, bus and power supply

3878A11



- N1 RXL24.1
- B1 LG-Ni 1000 temperature sensor
- D1, D2 Volt-free contacts (window contact, occupancy sensor, etc.)
- Y1...Y4 AC 24 V thermic valve actuators
- Y1.1 Motorized AC 24 V, 3-position valve actuator
- Y2.1 Motorized AC 24 V, 3-position valve actuator
- B2 QAX... room unit

Twisted pair

**Note** For information on the compatibility of field devices with the RXL24.1 room controller, refer to the various application descriptions (see the CLC and RAD description of functions, document CA110784)

## Parallel connection of several thermic valve actuators

Up to two thermic actuators per sequence may be connected directly to the room controller. With more than two thermic actuators, a UA1T power amplifier is required.

The principle is the same for output Y2. Do not exceed the maximum simultaneous load on outputs Y1 and Y2 (max. 9.5 VA).

Power consumption at input X1 of the UA1T: 0.5 VA.

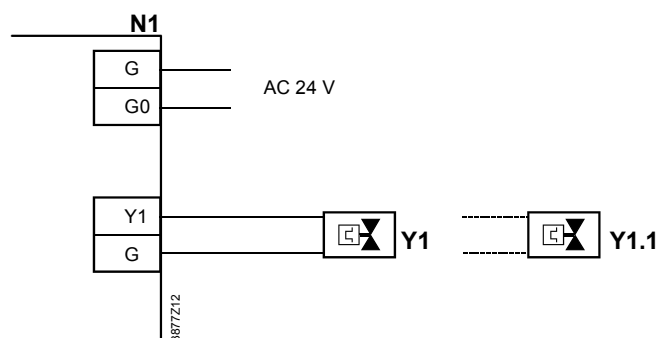


### Note!

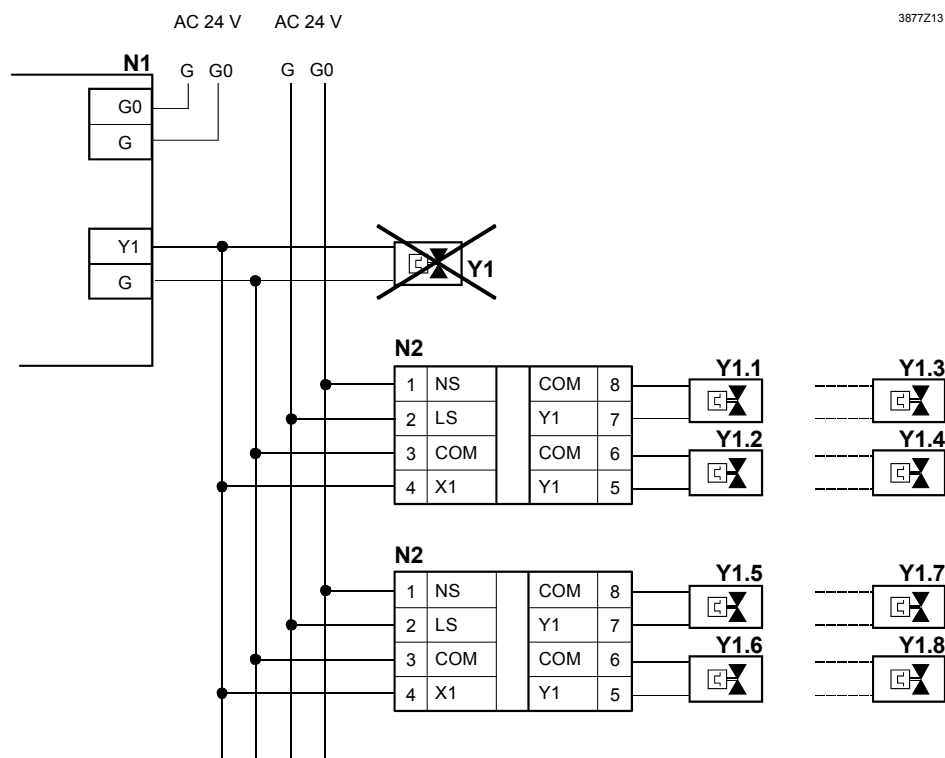
**Mixed operation: It is not permissible to connect thermic actuators both to the controller and to the power amplifier.**

Owing to the difference in voltage between the controller's internal transformer and the power supply of the UA1T, this could cause the valve positions to deviate substantially.

### Connection to the controller



### Connection to the power amplifier



- N1 Room controller RXL24.1
- N2 UA1T power amplifier (see data sheet CA2N3591)
- Y1 AC 24 V thermic valve actuators connected to the controller
- Y1.x AC 24 V thermic valve actuators  
(max. 2 STA72E/STP72E actuators per Y1 output on the UA1T)

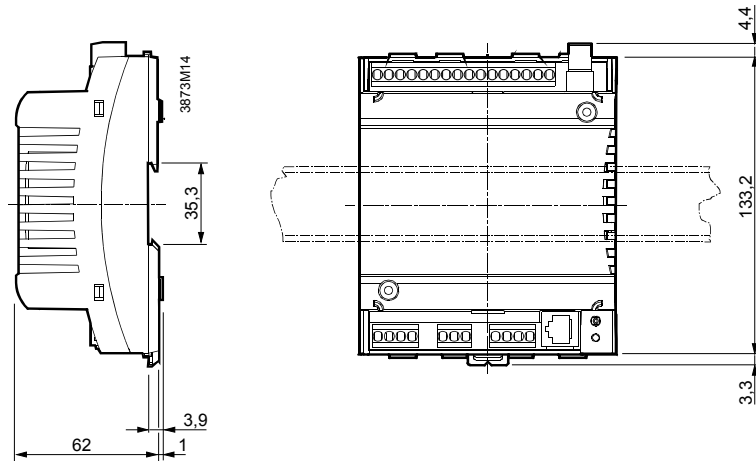
### Notes

- The UA1T requires an AC 24 V supply voltage
- The UA1T is *not* suitable for the connection of 3-position actuators.

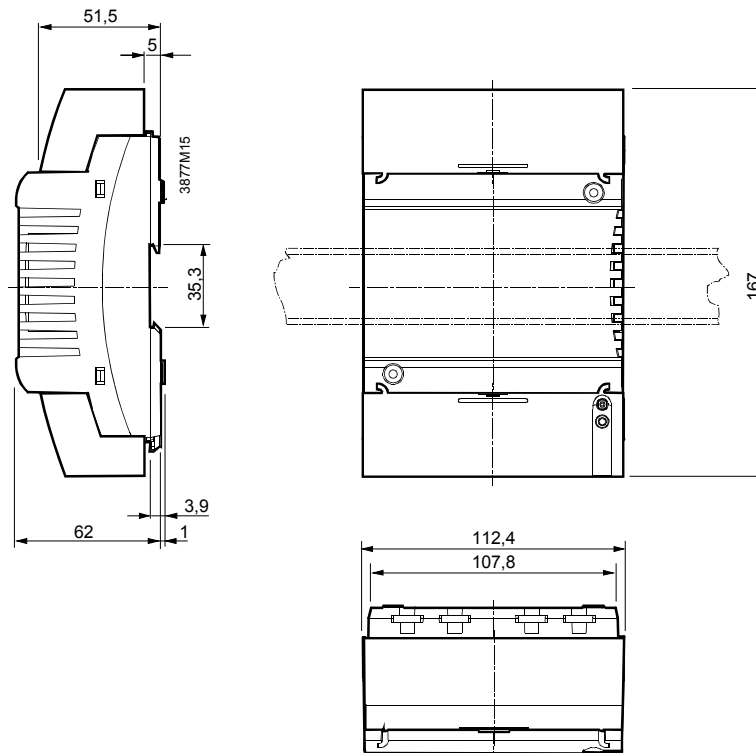
## Dimensions

Dimensions in mm

### Without terminal cover



### With terminal covers



Drilling diagram (1:1)

