SIEMENS

Desigo™ RXC

Room controller   RXC39.5

Communicating room controller
for fan-coil applications

The RXC39.5 room controller is used for temperature control in individual rooms.

- **For fan-coil systems with ECM fan**
- **PI / PID control (depending on application)**
- **Downloadable application software**
- **LONMARK®-compatible bus communications**
- **For use in the Desigo building automation and control system**
- **0 … 10 V control of valve actuators, fan, and electric heating coil**
- **Volt-free relay contacts for release of the fan and the electric heating coil**
- **Commissioning with RXT10 or standard LONWORKS tool**
- **AC 24 V operating voltage**
- **Pluggable screw terminals**

Use

The RXC39.5 room controller is optimized for control of fan-coil systems with ECM fans in individual rooms.

The controller application is determined by downloadable application software, also referred to simply as the "application". The various applications and the associated functions are described in detail in the applications library: CA110300.

The controller is delivered with basic application 00039. The basic application, which contains only I/O module functions, is overwritten with the definitive application in the commissioning phase. The RXT10 commissioning and service tool is used for this purpose (see "Commissioning").

Use as an I/O module
In conjunction with a building automation and control system, the RXC39.5 controller can also be used as a universal I/O module, e.g. to register digital signals or to control various equipment (ON/OFF or modulating). In this case the controller is loaded with basic application 00039. The inputs can then be read and the outputs overridden via the building automation and control system.

Functions

The controller functions are determined by the selected application and its parameters. For a detailed description of functions refer to the Desigo RXC applications library CA110300.

Ordering

Product number	Stock number	Designation
RXC39.5/00039	S55373-C118	Room controller

|		
Accessories RXZ30.1		Terminal covers

Equipment combinations

The RXC39.5 room controller is compatible with field devices from Siemens Building Technologies.

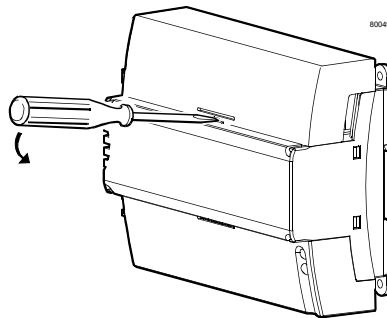For details, refer to the Desigo RX hardware overview, CA2N3804

The RXC39.5 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 programming LED and a programming button.
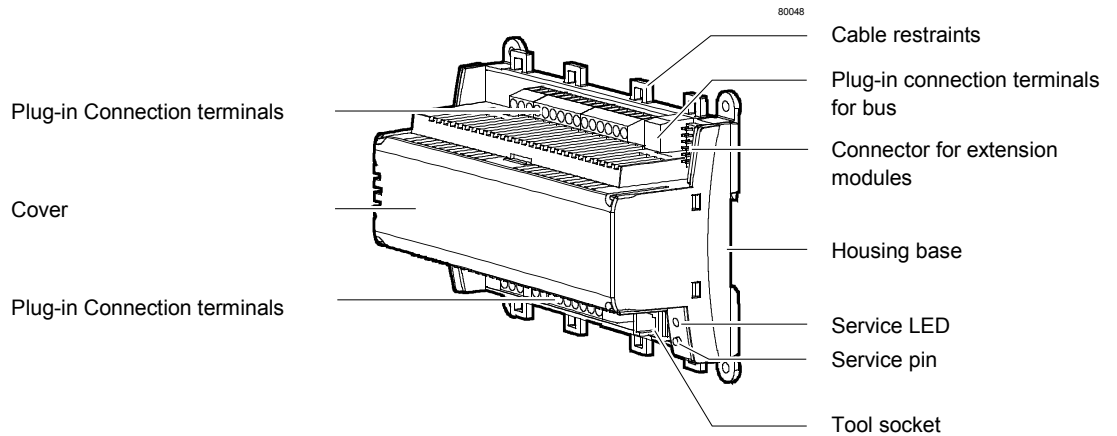
Terminal cover

Terminal covers (RXZ30.1) are available as an option, to protect the connection terminals from physical contact and dirt. The programming LED remains visible when the terminal covers are in place, and the programming button can be operated with a pointed implement.

Removing the terminal cover

Label

Note   Options for use of the labeling fields "Appl." and "Loc.":

− Hand-written entry of the location and the actual application … or
− Printed adhesive label (printed from the RXT10 commissioning and service tool)

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Connection terminals

All connection terminals are detachable plug-in terminals. They are arranged so that, under normal circumstances, all incoming and outgoing cables can be connected without crossing.

Cable strain relief

The conductors to the connection terminals can be secured with cable ties to the housing base.
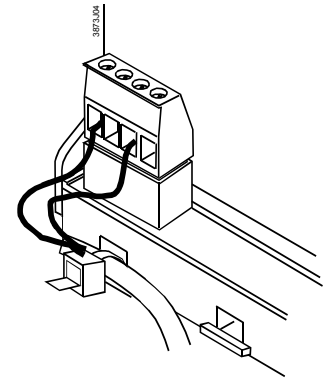
Communication

The RXC39.5 controller communicates with other devices via the following interfaces:

- LONWORKS bus (terminals CLA and CLB) for communication with:
  - the PXR system controller or the NIDES.RX interface (to Desigo)
  - other Desigo RXC devices
  - LONMARK-compatible third party devices (e.g. presence detector)
- PPS2 (terminals CP– and CP+):
  - Interface to the QAX… room units. (In addition to PPS2, the LONWORKS® bus is also looped to the tool socket on the room unit.)
- Tool socket (RJ45) on the controller or room unit, for:
  - RXT10 commissioning and service tool (LONWORKS® bus)
  - RXT20.1 service terminal (PPS2)

LONWORKS® bus

The diagram below shows the wiring of the LONWORKS® bus and PPS2 interface when a QAX… room unit is connected. It also shows the options for connecting the RXT10 commissioning and service tool and the RXT20.1 service terminal.
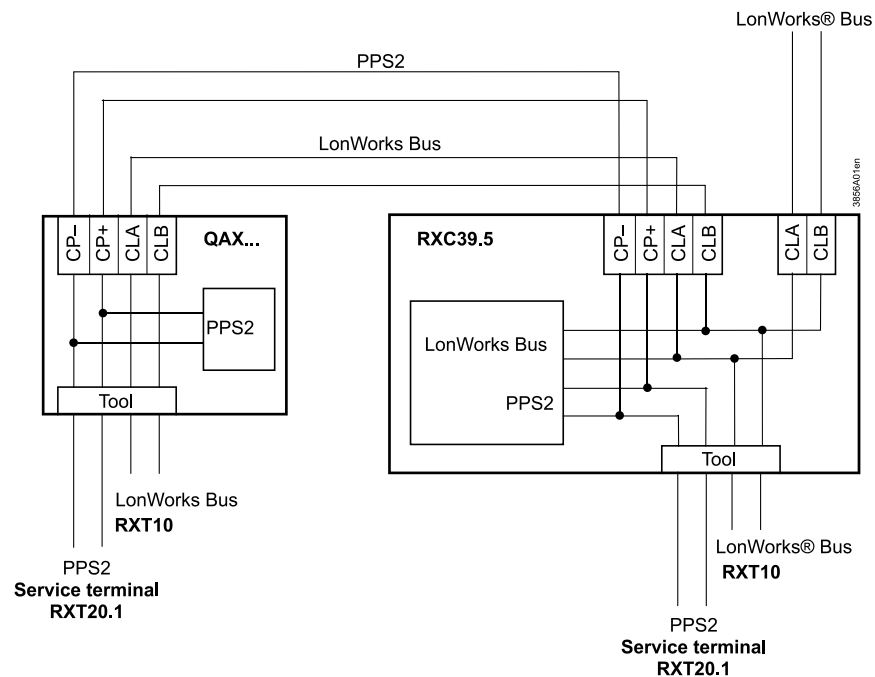
Service LED	The yellow service LED shows the current operational status of the controller by means of different flashing patterns (see the RXT10 user manual, CM110669).
Service pin	The service pin is used to identify the controller in the commissioning phase. When the pin is pressed the controller's identification number is transmitted to the RXT10 commissioning and service tool.

Disposal

The devices are classified as waste electronic equipment in terms of the European Directive 2012/19/EU (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

The Desigo RXC installation guide, document CA110334, contains the relevant engineering information for the LONWORKS® bus (topology, bus repeaters, bus termination, etc.) and for the selection and dimensions of connecting cables for the supply voltage and field devices.
See "Connection diagrams" for information on connecting field devices.

AC 24 V supply
The controller operates with an AC 24 V supply voltage (SELV). The supply cable must be protected with at least 10 A.
The controlled devices (valve / damper actuators) are supplied directly from the controller. The maximum load on the outputs must not be exceeded (see "Technical data").

This device has no circuit breakers for supply lines to external consumers (field power supply)!

Line insulation must always be sufficient for the available rated voltage.

Caution ⚠
When forwarding supply voltage (**for 24 V low voltage as well**) to external consumers, the wiring cross sections must at any rate be adapted to the preswitched overcurrent protection device. Please comply under all circumstances with local regulations.

The power consumption of the connected devices must be taken into account when sizing the transformer.

RXC40.1 and RXC41.1 extension modules
The plug-in connection for the extension modules incorporates both the communications and the power supply. The power supply is limited to a maximum of two extension modules. The possible combinations are determined by the available applications.
See the Desigo RXC applications library, CA110300.

Volt-free relay outputs AC 230 V
- The volt-free releasing relay output for the fan allows the switching of a load up to AC 250 V, 2(2) A.
- The circuits must be externally fused ($\leq$ 10 A) as there are no internal fuses.
- The cables connected to the room controller must be secured with cable ties.

AC 24 V triac outputs	• The **simultaneous** load on outputs Y1, Y2 must not exceed 12 VA
	• The maximum load on **each** output must not exceed 12 VA

Example

Equipment	Y1, Y2	2 thermic valve actuators, type STP73	6 VA each
Simultaneous load:		2 thermic valve actuators *	6 W (12 W) **
			6 W (12 W)

* The heating and cooling sequences are never operative simultaneously. Therefore only the actuators for one of the two sequences need to be included when calculating the total load.

** When cold, thermic valve actuators have a consumption of approximately 6 W. A maximum of two thermic actuators may be connected to any one Y.. output.
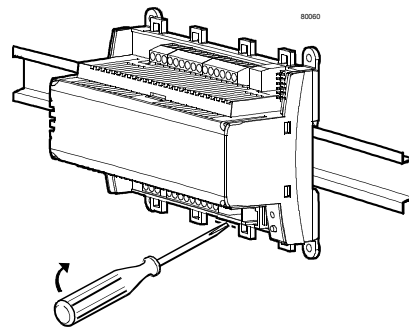
DC 0...10 V outputs

The DC 0...10 V control outputs YC...YC4 deliver max. 1.5 mA.

AC 24 V supply for field devices

The AC 24 V supply outputs for field devices (G, terminals 5, 27, 29, 33, 37)) may be charged with a total of max. 12 VA.
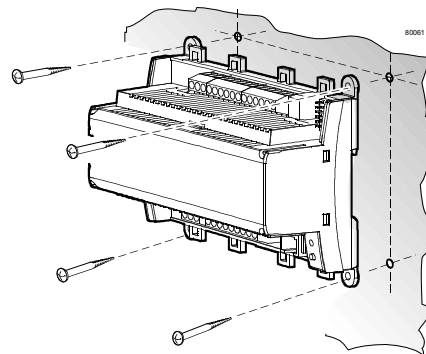
Mounting

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 EN50022-35x7.5 (can be released with a screwdriver)

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

When mounting note the following:

• The controller should not be freely accessible after mounting
• 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.

The RXC39.5 controller is commissioned with the RXT10 commissioning and service tool. This is connected to the LONWORKS bus via a tool socket (on the controller or room unit).

The commissioning procedure for the entire Desigo RXC range is described in detail in the RXT10 user manual, document CM110669.

Labeling

The labeling fields "Appl." and "Loc." on the controller are used to indicate the application actually loaded and the location of the controller, either in writing or by use of printed adhesive labels (see "Label" under "Mechanical design").

Function test

All applications (including basic application 00039) allow direct interrogation of the inputs and control of the outputs using the RXT10 commissioning and service tool. This makes it possible to test the installation and to operate connected plant provisionally before the complete Desigo RXC system is commissioned.

Notes
- The LONWORKS bus plug (terminals 23 and 24) can be removed and reconnected at any time, even while the controller is in operation. Only the original bus plug may be used.
- Overloading the triac outputs Y1, Y2 may cause the thermal fuse to trip and disable the controller. When the problem has been solved briefly disconnect and reconnect the power supply. The controller will resume normal operation after a delay of approximately 10 minutes.

(STOP) **Note!**   **Outputs Y1, Y2 are not protected against accidental connection to AC 24 V. This can damage the triacs.**

Technical data

Power supply	Operating voltage	AC 24 V $\pm$ 20% (SELV / PELV) or AC 24 V class 2 (US)
	Frequency	50/60 Hz
	Power consumption	
	without field devices	6 VA
	with connected field devices	Max. 33 VA
	Permissible transit power AC 24 V for supply of field devices	Max. 12 VA
	Internal fuse	Thermal, automatic reset
Caution ⚠	External supply line protection (EU)	Fuse slow max. 10 A or Circuit breaker max. 13 A Characteristic B, C, D according to EN 60898 or Power source with current limitation of max. 10 A

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Inputs (SELV)		
Signal inputs D1 … D4 (for volt-free contacts)	Contact voltage	DC 16 V
	Contact current	DC 5 mA
	Contact transfer resistance	Max. 100 Ω
	Contact insulation resistance	Min. 50 kΩ
	Switch time:	min. 20ms ON, min. 20ms OFF
Universal input X1	Compatible temperature sensors	LG-Ni 1000
	Measuring range	0…50 °C
	Sensor current	2.3 mA
	Resolution	≤ 0.2 K
	Measuring error (without cable)	± 0.2 K at 25° C
	or	
	Measuring input for DC 0 ... 10 V signals	
	Measuring range (nominal)	DC 0...10 V
	Over range	3.0 V
	Under range	0 V
	Resolution	20 mV
	Sample rate	≤ 1 s
Measured value input B2	Compatible temperature sensors	LG-Ni 1000
	Measuring range	0…50 °C
	Sensor current	2.3 mA
	Resolution	≤ 0.2 K
	Measuring error (without cable)	± 0.2 K at 25° C

Outputs (SELV)		
Field supply (G, G0)	Output voltage	AC 24 V (transit power)
	Fuse	No internal fusing
Caution ⚠		Fusing on the supply line required under all circumstances
Triac (Y1, Y2)	Output voltage	AC 24 V
	Permissible load current	Max. 0.5 A
	Power limitation	Fuse T 2 A, can not be changed (common for both triacs)
	Total nominal load (load on both outputs simultaneously)	Max. 12 VA
DC 0 … 10 V (YC1...YC4)	Resolution	3 mV
	Accuracy	100 mV
	Output current	Max. 1.5 mA
Supply output G (SELV)	Voltage / Max. load	AC 24 V / Max. 6 VA
⚠ Relays (Q12, Q22)	Relay type	Monostable
	Contact rating with AC voltage	
	Max. switching power (resistive)	Max. AC 250 V, 10 A
	External fusing	Max. 10 A, see Power supply

Interface to room unit	Number of room units connectable	1
	Interface type for room unit	PPS2
	for ACS	Bus
	PPS2 baud rate	4.8 kbit/s
	Baud rate on the LONWORKS bus	78 kbit/s
LONWORKS Bus	Interface type	LONMARK-compatible, electrically isolated
	Physical layer	FT 5000
	Baud rate bus	78 kbit/s
	Bus topology and bus termination	See Installation guide, CA110334

Cable connections	Plug-in terminal blocks	Rising cage terminals
	Solid conductors	1 x 0.2 ... 2.5mm2
		or 2 x 0.2 ... 1.0 mm2
	Stranded conductors without	1 x 0.2 ... 2.5mm2
	connector sleeves	or 2 x 0.2 ... 1.5 mm2
	Stranded conductors with connector	1 x 0.25 ... 2.5mm2
	sleeves (DIN 46228/1)	or 2 x 0.25 ... 1.0 mm2
	Max. tightening torque	0.6 Nm
	Single cable lengths for field devices	See also the RXC installation guide, CA110334
	Signal inputs D1…D4	Max. 100 m with diameters $\geq$ 0.6 mm
	Measured value input X1, B2	Max. 100 m with diameters $\geq$ 0.6 mm
	Triac outputs Y1...Y6	Max. 100 m where A $\geq$ 1.5 mm^2
	DC 0…10 V outputs YC1...YC4	Max. 100 m where A $\geq$ 1.5 mm^2
	Relay outputs Q12, Q221	Depends on load and local regulations
	Interface to room unit	Max. 115 m where A= 0.75 mm^2 (including connecting cable for tool)
	Cable type	4-core, twisted pair, unscreened
	LONWORKS Bus	See Installation guide, CA110334
	Cable type	See Installation guide, CA110334
	Tool connecting cable	See Installation guide, CA110334
Housing protection standard	Protection standard to EN 60529	IP30 with terminal cover fitted and wall mounted without DIN rail IP20 for all other mounting arrangements
Protection class	Insulation protection class to EN 60730-1	III
Ambient conditions	Normal operation	Class 3K5 to IEC 60721-3-3
	Temperature	0 … 50 °C
	Humidity	< 85 % r.h.
	Transport	Class 2K3 to IEC 60721-3-2
	Temperature	– 25 … 65 °C
	Humidity	< 95 % r.h.
Standards, directives and approvals	Product standard EN 60730-1	Automatic electrical controls for household and similar use
	Electromagnetic compatibility (Applications)	For use in residential, commerce, light-industrial and industrial environments
	EU conformity (CE)	CM2T3856xx *)
	UL certification (US)	UL 916, http://ul.com/database
	RCM-conformity (EMC)	CA2T3834en_C1 *)
	EAC conformity	Eurasia conformity

eu.bac	Meets the requirements for eu.bac certification
	See product list at: http://www.eubaccert.org/licences-by-criteria.asp

Type	License	Application	Control accuracy [K]		
RXC39.5	213296	Fan-Coil 2 pipes	heating / coooling	0.2 / 0.1
		Fan-Coil 2 pipes 2 wires	heating / coooling	0.2 / 0.3
		Fan-Coil 4 pipes	heating / coooling	0.2 / 0.1

Environmental compatibility	Product environmental declaration (contains data on RoHS compliance, materials composition, packaging, environmental benefit, disposal)	CA2E3840 *)
Dimensions	See dimension diagrams	
Weight	excluding packaging	0.270 kg
	including packaging	0.300 kg

*) The documents can be downloaded from http://siemens.com/bt/download.

Connection terminals
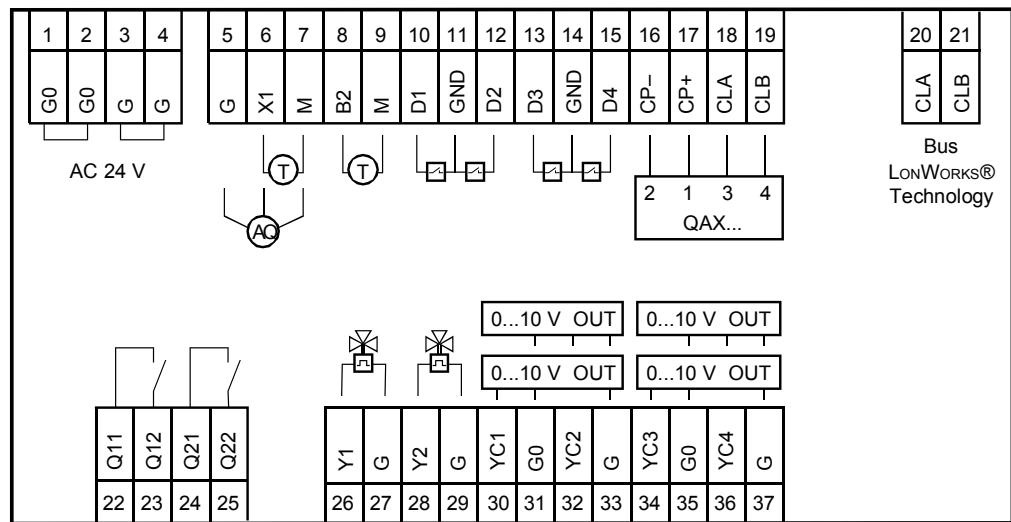
AC 24 V supply
G0   1,2   Controller ground
G   3,4   AC 24 V supply

Measured value input
G   5   AC 24 V supply for sensors, actuators
X1   6   Universal input (LG-Ni 1000, or DC 0…10 V for air quality sensor)
M   7   Measured value input ground
B2   8   Measured value input for LG-Ni 1000 sensors
M   9   Measured value input ground

Signal inputs for volt-free contacts
D1   10   Signal input
GND   11   Signal ground
D2   12   Signal input
D3   13   Signal input
GND   14   Signal ground
D4   15   Signal input

Room unit
CP–   16   PPS2 ground
CP+   17   PPS2 data
CLA   18   LONWORKS Data A
CLB   19   LONWORKS Data B

LONWORKS **Bus**
CLA   20   LONWORKS Data A
CLB   21   LONWORKS Data B

Relay outputs
Q11   22   Feed for Q12
Q12   23   Normally-open contact, max. AC 250 V, 1.8 KW
Q21   24   Feed for Q22
Q22   25   Normally-open contact, max. AC 250 V, 1.8 KW

Triac outputs
Y1   26   AC 24 V, 0.5 A switching output
G   27   AC 24 V actuator supply
Y2   28   AC 24 V, 0.5 A switching output
G   29   AC 24 V actuator supply

0 … 10 V outputs
YC1   30   DC 0 … 10 V control output for actuator
G0   31   Controller ground
YC2   32   DC 0 … 10 V control output for actuator
G   33   AC 24 V supply for sensors, actuators
YC3   34   DC 0 … 10 V control output for actuator
G0   35   Controller ground
YC4   36   DC 0 … 10 V control output for actuator
G   37   AC 24 V supply for sensors, actuators

⚠ **Caution**	• **Observe the technical data for the relay outputs: max. AC 250 V, 1.8 KW**
	• **External fuse (essential!): max. 10 A**
	• **Local installation regulations must be observed.**

Tool socket   Proprietary RJ45-type tool socket
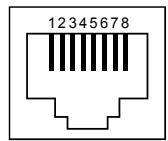
1 2 3 4 5 6 7 8	1	LonWorks®, Data A (CLA)	5	Not used
	2	LonWorks®, Data B (CLB)	6	Not used
	3	Not used	7	CP+
3206Z01	4	Not used	8	CP–

Connection diagram

Connection of field devices, room unit, bus and power supply
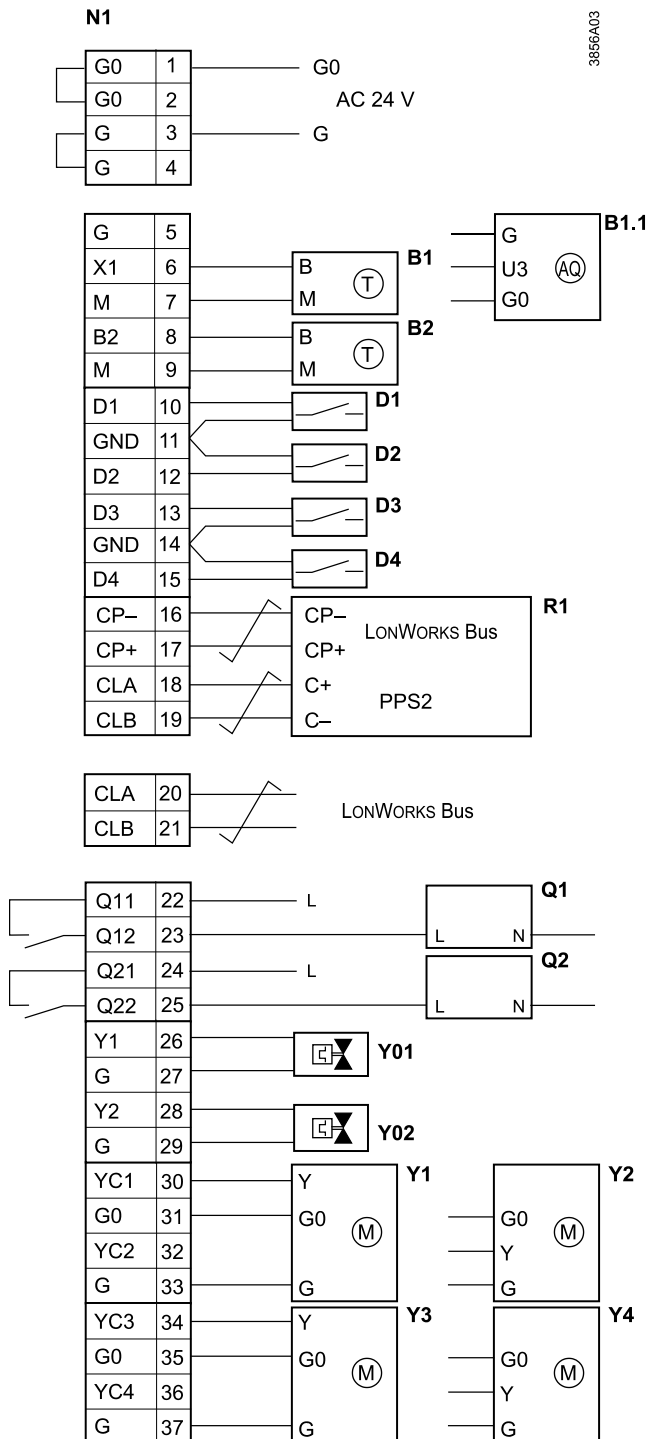
N1	RXC39.5
B1, B2	LG-Ni 1000 temperature sensor
B1.1	Air quality sensor (DC 0...10 V)
D1...D4	Volt-free contacts (window contact, occupancy sensor, etc.)
R1	QAX... room unit
Q1, Q2	AC 230 V loads
Y01, Y02	Thermal actuators
Y1...Y4	Motorized AC 24 V actuators
⟋	Twisted pair

🛑 **Note!**

For Q1, Q2, use external fuses of max. 10 A to protect the PCB tracks.

Notes
- Do not exceed the maximum simultaneous load on outputs Y1, Y2 (see "Engineering").
- A power amplifier may be used to connect additional valve actuators to Y1 and Y2 (see Desigo RXC installation guide, CA110334).
- For information on actuators compatible with the RXC39.5 controller, refer to the RX Hardware overview, N3804).
- The AC 24 V supply (G) for devices such as the DC 0 …10 V damper actuators, can be derived either from the controller or from an external source (see Desigo RXC installation guide CA110334). If the connected devices receive their supply from the controller the power consumption of these devices must be taken into account when sizing the transformer.

Parallel connection of several thermal actuators

Up to 2 thermal actuators can be connected directly to each triac output of the room controller. In the case of more than 2 actuators a power amplifier is required.
The example holds for Y2 analogously.

Note that the simultaneous load on outputs Y1 and Y2 must not exceed 12 VA.
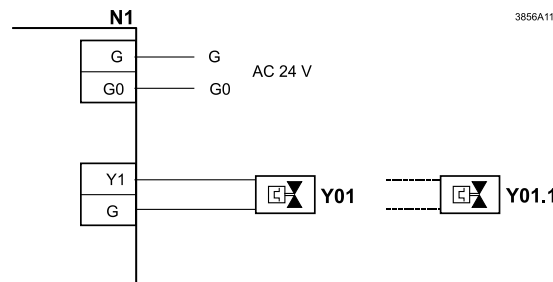
Power consumption at input X1 of the UA1T: 0.5 VA.

⬙ Note!

Mixed operation: **Connecting thermic actuators to the controller as well as to the power amplifier is NOT allowed.**

Differing voltage of the power supply of the controller and the supply of the power amplifier may cause big differences in the position of the valves.

Connection to controller

N1   RXC39.5
N2   UA1T (see data sheet CA2N3591)
Y5   AC 24 V thermal valve actuator
Y5.1 AC 24 V thermal valve actuator

Connection to power amplifier
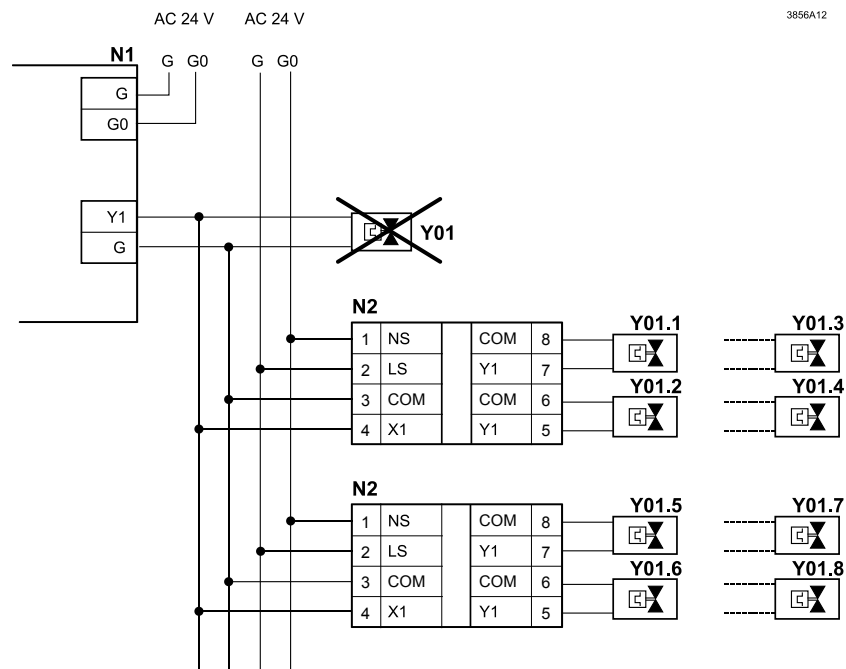
N1   RXC39.5
N2   UA1T (see data sheet CA2N3591)
Y5   AC 24 V thermal valve actuator
Y5.x AC 24 V thermal valve actuator (max. 2 STA73 / STP73 actuators per Y1 output on the UA1T)
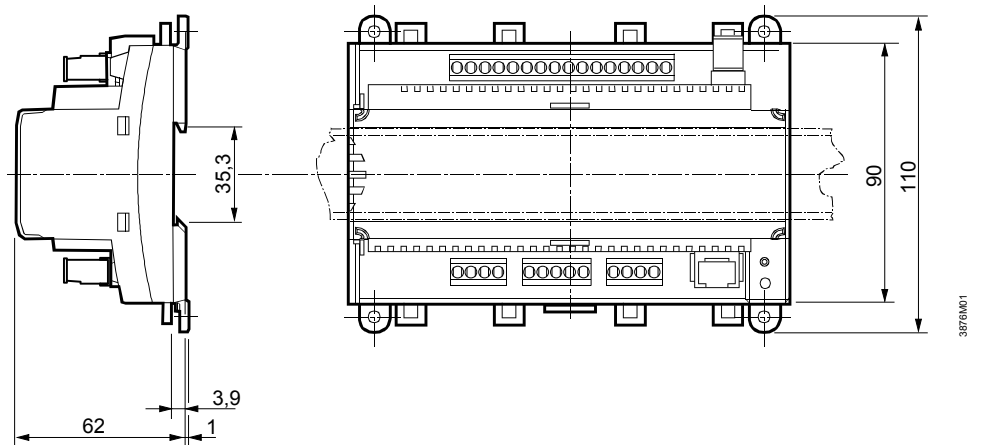
Notes
- The UA1T requires an AC 24 V supply voltage
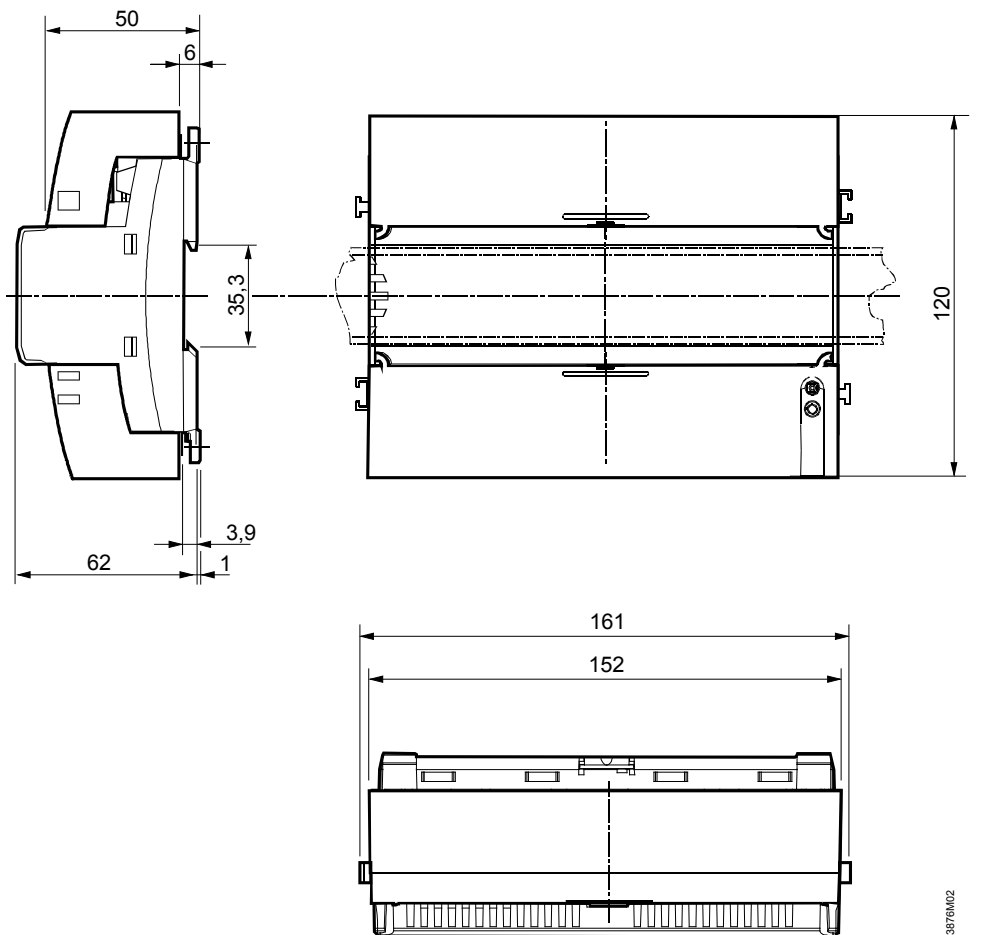- The UA1T is *not* suitable for the connection of 3-position actuators.
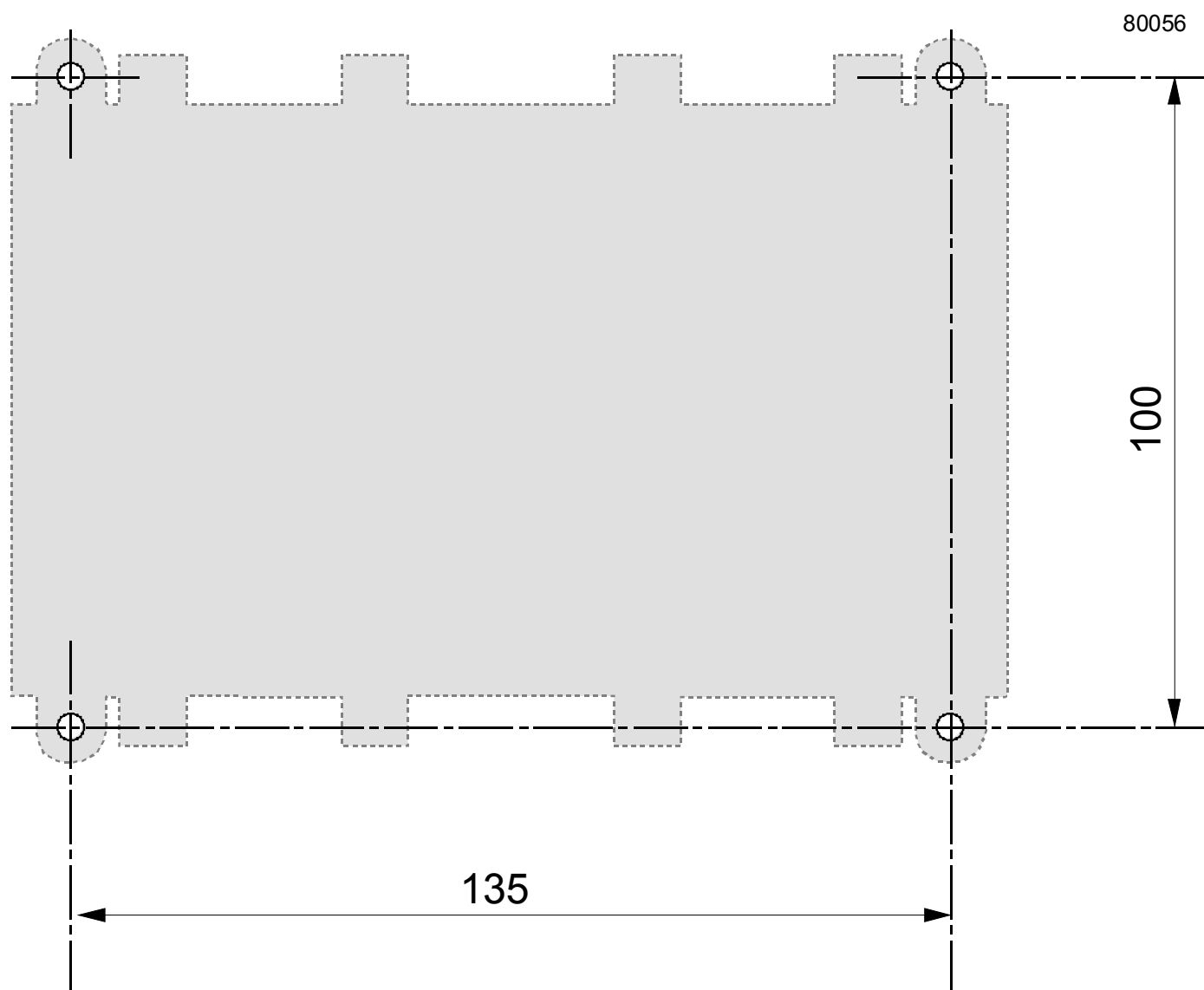
Dimensions

Dimensions in mm

Without terminal covers

With terminal covers

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Drilling diagram

100

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