# SIEMENS

3<sup>840</sup>



Desigo™ RXC

# Room controller, basic module    RXC30.1/ RXC30.5

for chilled ceiling/radiator control and for control of lighting,

with LONMARK®-compatible bus communications

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**The RXC30 controller is used for the control of temperature and lighting in individual rooms.**

- **PI or PID control (depending on application) for chilled ceilings and radiators**
- **Switch control of two groups of lights**
- **Extension modules available for control of lighting and blinds**
- **Downloadable application software**
- **LONMARK®-compatible bus communications**
- **For use in the Desigo building automation and control system**
- **Control of 2 x 2 thermic valve actuators (AC 24 V)**
  or one AC 24 V 3-position valve actuator (only with special applications)
- **Volt-free relay contacts for lighting control (12 A)**
- **Operating voltage AC 230 V**

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## Application

The RXC30 controller is optimized for the control of radiators and chilled ceilings and for on/off control of lighting in individual rooms. The controller can be used in conjunction with extension modules RXC40 and RXC41, allowing additional control of dimmable lights and electric motors for blinds.

For operation, either conventional room units and momentary contact switches, or integrated room units with a bus connection, may be used.

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 Desigo RXC applications library.
(V1: CA2A3810, V2: CA110300).
The controllers are delivered with basic application 00030.
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 RXC30 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 pulse control with AC 24 V or volt-free relay contacts). In this case, the controller is loaded with basic application 00030. 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 (V1: CA2A3810, V2: CA110300).

When Desigo RXC is integrated into a building automation and control system, additional functions become available, such as time scheduling, central control of setpoints etc. (refer to the Desigo INSIGHT documentation for further information).

## Types

| Type | SSN | Description |
|------|-----|-------------|
| **RXC30.1** | | Room controller, basic module |
| **RXC30.5** | S55373-C114 | |
| **RXZ30.1** | | Accessory: Terminal covers |

## Ordering

When ordering, please specify the quantity, product name and type code.
The controllers are delivered with basic application 00030.

The RXZ30.1 terminal covers are supplied in packs of 1 pair and must be ordered separately.

*Example:*

| **30** | **Room controllers** | **RXC30.5/00030** |
|--------|---------------------|-------------------|
| **30** | **Pairs of terminal covers** | **RXZ30.1** |

## Compatibility

The RXC30 can be used in conjunction with extension modules RXC40 for lighting control (data sheet 3842) and RXC41 for the control of blinds (data sheet 3843). For this purpose, the RXC30 controller must be loaded with an application corresponding to the selected combination.  Possible combinations and the associated applications are described in the Desigo RXC applications library (V1: CA2A3810, V2: CA110300).

For operation, a room unit from the QAX… series may be used in conjunction with conventional momentary contact switches for lighting control. Alternatively, the flexible room units, QAX50.1 or QAX51.1 may be used.

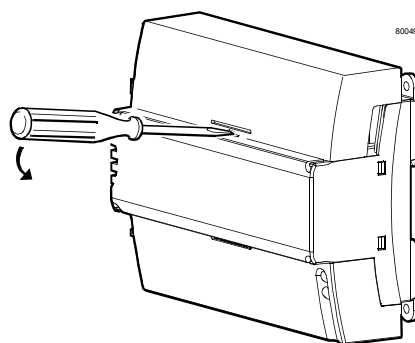See the RX hardware overview, CA2N3804, for a summary of the available field devices.

## Mechanical design

The RXC30 controller consists of a housing base, a housing cover and the printed circuit board with connection terminals. The controllers also have a connector base for the extension modules, a tool socket, a service LED and a service pin.
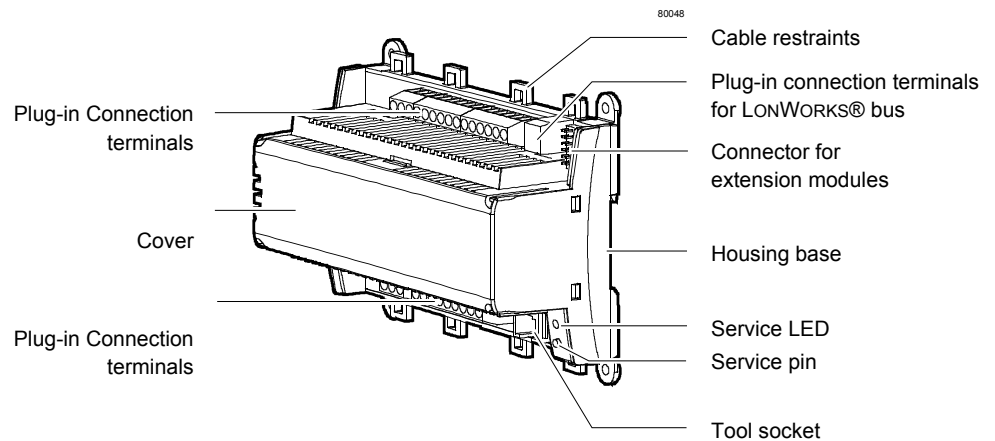


**Terminal covers**

Terminal covers (RXZ30.1) are available as an option, to protect the connection terminals from physical contact and dirt. **The terminal covers must be used on equipment mounted outside the control panel or distributor box.** When fitting the terminal covers, make sure that they snap into position correctly. These covers also provide strain relief for the cables connecting the extension modules. The service LED remains visible when the terminal covers are in place, and the service pin can be operated with a pointed implement.



Removing the terminal cover

3/14

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CA2N3840en_08
2014-08-06

**Label**

Bar code, Code 39
(ID number)

Protection standard

Temperature range
(0 … 50 °C)

Observe the warning
notes in this data sheet

Test date, series
(Z, A, B, C…)

Serial No.

Neuron ID

Factory-loaded
application

Definitively loaded
application

Location



*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)

**Connection terminals**

All connection terminals are detachable plug-in terminals. To avoid incorrect wiring, terminals which can be connected to AC 230 V (supply and relay outputs) are physically separate from the other terminals. The terminals are arranged so that in normal circumstances, all incoming and outgoing cables can be connected without crossing.

**[STOP] Note!**

Cable restraints must be used for the wires to terminals 19 … 28 (AC 230 V). The conductors must be secured with cable ties (see diagram).
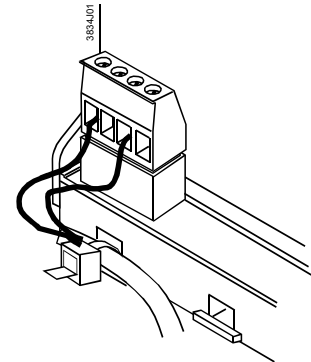


**⚠ Warning!**

**Ensure that the power is off before inserting or removing plug-in terminals connected to a mains voltage.**

**Communication**

The RXC30 controller communicates with other devices via the following interfaces:

- LONWORKS® bus (terminals CLA and CLB) for communication with:
  − the system controller PXR or the NIDES.RX interface (to Desigo)
  − Other Desigo RXC devices
  − LONMARK®-compatible 3rd 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)
- PE bus (plug-in connection):
  − Interface to the RXC40 and RXC41 extension modules.

LONWORKS® bus
and PPS2

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.
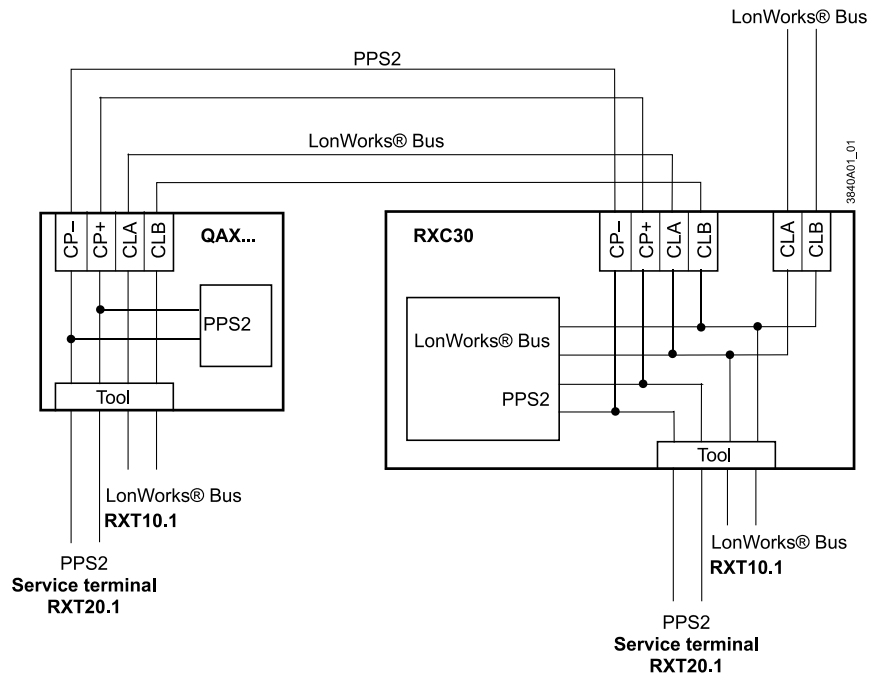


**Service LED**

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.

The controller operates with an AC 230 V mains supply voltage. The controlled devices (valves) are supplied directly from the controller. This means that a separate AC 24 V supply is not necessary for the RXC30 controller and the associated field devices.

| | |
|---|---|
| **RXC40 and RXC41 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.<br>See the Desigo RXC applications library (V1: CA2A3810, V2: CA110300). |
| **Signal inputs** | The cables for signal inputs D1 … D4 (SELV / PELV) must be routed separately from the AC230 V cables and must comply with SELV / PELV requirements. The low voltage and mains voltage must not be routed in the same cable. |
| **Important** | **Only volt-free pulsed momentary contact switches may be connected to signal inputs D3 and D4. Signal inputs D1 and D2 may be used for volt free permanent contacts (e.g. window switches).** |

**Power supply cables up to AC 250 V**

- The dimensions and fuse protection for the supply cables depend on the total load and on local regulations.
- Connection terminals for the supply voltage are duplicated, so that the supply cables can be looped on the controller. The cables must be secured with cable restraints.
- If serial wiring is applied on the terminal block 19 … 21, the connection will be interrupted if the block is removed from the controller (the jumpers 18-19 and 20-21 are on the PCB, not in the block, see terminal diagram on page 9).
- Different phases may be connected to the terminals18 / 19 (L) and 22 (Q13)
- AC 230 V conductors must be secured with cable ties.

**AC 250 V volt-free relay outputs**

- The volt-free relay outputs may be used to switch filament lamps up to 2.5 kW or fluorescent lamps up to 1.5 kVA. The cable dimensions depend on the connected load and the local installation regulations.
- Neutral and protective conductors are looped on the controller so that there is no need for external terminals.
- The circuits must be protected with external fuses (max. 16 A, Q13) as there are no internal fuses.
- Different phases may be used for the terminals18 / 19 (L) and 22 (Q13)
- **The relays are not suitable for SELV / PELV circuits**
- The cables must be secured with cable restraints.

**AC 24 V switching outputs**

The simultaneous load on outputs Y1 and Y2 must not exceed 6 VA.

| Example: | Y1 (heating) | 2 thermic valve actuators, type STP73 | 5 W |
|---|---|---|---|
| | Y2 (cooling) | 2 thermic valve actuators, type STP73 | 5 W |

The maximum load is 5 VA for the heating sequence and 5 VA for the cooling sequence. This is acceptable because the two sequences never operate at the same time.
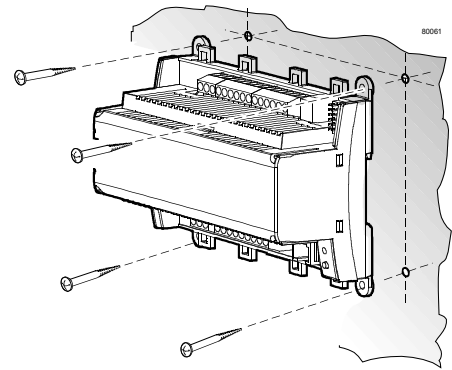
When using small loads (< 2VA), the voltage tolerance may be > + 20%
(see technical data, Triac outputs below)

The controller can be mounted in any orientation and fixed as follows:
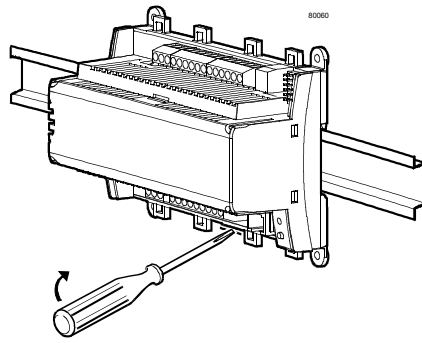


*Rail mounting*
The housing base is designed for snap-mounting on DIN rails, type EN50022-35x7.5 (can be released with a screw-driver)

*Surface mounting*
There are four drill holes for screw-mounting (see "Dimensions" for drilling template). The housing base is fitted with raised supports.
Screws: Max. diameter 3.5 mm

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.

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

**Mounting with extension modules**

The controller and extension modules (RXC40 and RXC41) must be mounted on the same DIN rail.
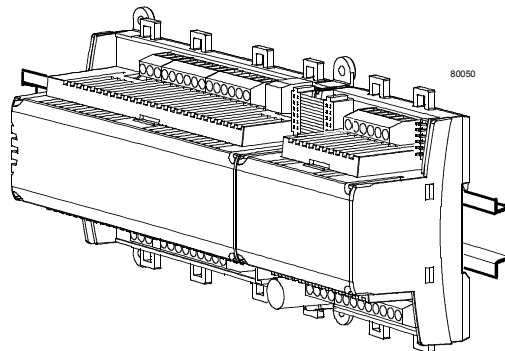


*Note*

If different types of extension module are used, they must be arranged in the following order: RXC30 → RXC40 → RXC41

**Commissioning**

The RXC30.1 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.

7/14

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CA2N3840en_08
2014-08-06

**Labeling**

The labeling fields "Appl." and "Loc." 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 applications 00030) 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.

*Note*

The LONWORKS® bus plug (terminals 16 and 17) can be removed and reconnected at any time, even while the controller is in operation. Only the original bus plug may be used.

(STOP) **Note!**

- **In the event of a long-term short circuit (approx. 4 minutes) or overload, the thermal fuse in the transformer may trip. Subsequently, the device must be exchanged.**
- **The controller is not protected against accidental connection to AC 230 V on the SELV / PELV side.**
- **Mains AC 230 V for the supply and for the relays must be disconnected before plugging and unplugging the terminal blocks (danger of electric shock!)**
- **If serial wiring is applied on the terminal block 19 … 21, the connection will be interrupted if the block is removed from the controller (the jumpers 18-19 and 20-21 are on the PCB, not in the block, see terminal diagram on page 9).**

## Technical data

| ⚠ **Power supply** | Operating voltage | AC 230 V ± 10 % |
|---|---|---|
| | Rated voltage | AC 230 V |
| | Frequency | 50/60 Hz |
| | Power consumption including extension modules and field devices | Max. 12 VA |
| | Internal fuse | Thermal, non-resetting |
| **Operating data** | Control algorithm | PI or PID |
| **Inputs** | | |
| Signal inputs D1, D2 | Quantity | 2 |
| (for volt-free contacts) | Contact voltage | RXC30.5: DC 19 V |
| | | RXC30.1: DC 33 V |
| | Contact current | DC 8 mA |
| | Contact transfer resistance | Max. 100 $\Omega$ |
| | Contact insulation resistance | Min. 50 k$\Omega$ |
| | (not suitable for pulse control) | |
| Signal inputs D3, D4 | Quantity | 2 |
| (for volt-free momentary | Contact voltage | DC 33 V |
| contact switches) | Contact current | DC 8 mA |
| | Contact transfer resistance | Max. 100 $\Omega$ |
| | Contact insulation resistance | Min. 50 k$\Omega$ |
| **Outputs** | | |
| AC24 V triac outputs , Y1, Y2 | Quantity | 2 |
| | Output voltage | AC 24 V +/–20% |
| | | **(may exceed +20% with loads < 2VA)** |
| | | control of 2 x 2 thermic valve actuators AC 24 V ON/OFF, PDM |
| | | or one AC 24 V 3-position valve actuator |
| | | (only if supported by application) |
| | Output current | Max. 0.5 A |
| | Total nominal load | Max. 6 VA |
| | (at both outputs simultaneously) | (e.g. 2 thermic valves, type STA73 per heating and cooling sequence |

| ⚠ Relay outputs Q14, Q24 | Quantity | 2 |
|---|---|---|
| | Relay type | Single pole |
| | Contact rating | |
| |   External fuse (Q13) | 16 A |
| |   Switching voltage | Max. AC 250 V |
| |   Nominal current, resistive / inductive | Max. AC 12 (4) A ($\cos\varphi$ = 0.6) |
| | | (VDE approved for 16A) |
| |   Filament lamps | Max. 2.5 kW |
| |   Fluorescent lamps | Max. 1.5 kVA (compensation: max. 60 μF) |

**Interfaces**

| Interface to room unit | Number of room units connectable | Max. 1 |
|---|---|---|
| | Interface type     for room unit | PPS2 |
| |              for RXT10 | LONWORKS® |
| | PPS2 baud rate | 4.8 kBit/s |
| | LONWORKS® baud rate | 78 kBit/s |
| LONWORKS® bus | Interface type | LONMARK®-compatible, electrically isolated |
| | Transceiver | On RXC30.1: FTT-10A, on RXC30.5: FT 5000 |
| | Baud rate | 78 kBit/s |
| | Bus topology, bus termination | See installation guide, CA110334 |
| Interface to extension modules | Interface type | Serial PE bus (for power supply and data) |

| **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 connector sleeves | 1 x 0.2 ... 2.5mm2 or 2 x 0.2 ... 1.5 mm2 |
| | Stranded conductors with connector sleeves (DIN 46228/1) | 1 x 0.25 ... 2.5mm2 or 2 x 0.25 ... 1.0 mm2 |
| | Max. tightening torque | 0.6 Nm |
| | Connecting cable for extension modules | 10-core ribbon cable |
| | Single cable lengths | See also installation guide, CA110334 |
| |   Signal inputs D1…. D4 | Max. 100 m with diameters $\geq$ 0.6 mm |
| |   AC24 V triac outputs , Y1, Y2 | Max. 100m where A $\geq$ 1.5 mm$^2$ |
| |   Relay outputs Q14, Q24 | Variable according to load and local regulations |
| |   Interface to room unit | Max. 115 m where A= 0.75 mm$^2$ |
| | | (including tool connecting cable) |
| |     Cable type | 2- or 4-core, twisted pair, unscreened |
| |   LONWORKS® bus | See installation guide, CA110334 |
| |     Cable type | See installation guide, CA110334 |
| |   Tool connecting cable | Max. 3 m |

| **Housing protection standard** | Protection standard to EN 60529 | |
|---|---|---|
| |   With terminal covers, wall-mounted, no DIN rail | IP30 |
| |   All other mounting arrangements | IP20 |
| **Protection class** | Suitable for use in systems with protection class I or II | |

| **Ambient conditions** | Operation | Class 3K5 to IEC 60721-3-3 |
|---|---|---|
| |   Temperature | 0 ... 50 °C |
| |   Humidity | < 85 %rh |
| | Transport | Class 2K3 to IEC 60721-3-2 |
| |   Temperature | – 25 ... 65 °C |
| |   Humidity | < 95 %rh |

| Standards and directives | Product safety | |
|---|---|---|
| |   Automatic electronic controls for household and similar use | EN 60730-1 |
| | Electromagnetic compatibility | |
| |   Immunity (industrial & residential) | EN 60730-1 |
| |   Emissions (residential) | EN 60730-1 |
| | C€ compliance | |
| |   Meets requirements of EMC Directive | 2004/108/EC |
| |   Low Voltage Directive | 2006/95/EC |
| |   RoHS compliance | 2011/65/EU |
| | **UL** compliance | UL916 |
| | ⊘ C-Tick conformity (EMC) | AS/NZS 61000-6-3 |
| **Environmental compatibility** | The product environmental declaration CA2E3840 contains data on RoHS compliance, materials composition, packaging, environmental benefit, disposal | ISO 14001 (Environment) |
| | | ISO 9001 (Quality) |

| **Dimensions** | See dimension diagrams | |
|---|---|---|
| | Width in DIN modular spacing units | 8.5 |
| **Weight** | Weight excluding packaging | 0.59 kg |
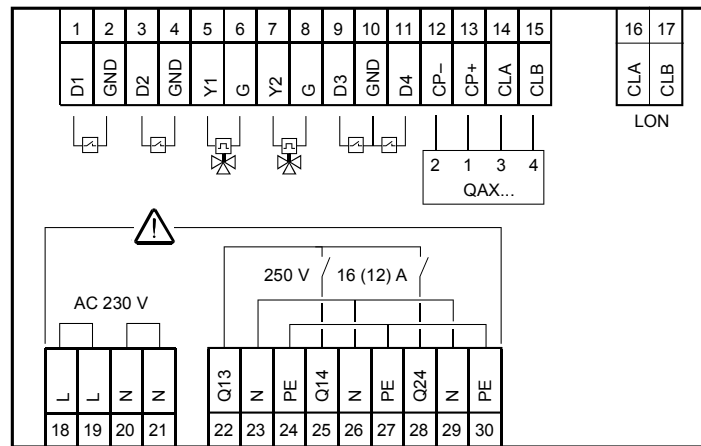
**Signal input for volt-free contacts**

| D1 | 1 | Signal input |
|----|---|--------------|
| GND | 2 | Signal ground |
| D2 | 3 | Signal input |
| GND | 4 | Signal ground |

**Triac outputs**

| Y1 | 5 | AC 24 V, 0.5 A switching output |
|----|---|--------------------------------|
| G | 6 | AC 24 V actuator supply |
| Y2 | 7 | AC 24 V, 0.5 A switching output |
| G | 8 | AC 24 V actuator supply |

**Signal input for volt-free momentary contact switches**

| D3 | 9 | Signal input |
|----|---|--------------|
| GND | 10 | Signal ground |
| D4 | 11 | Signal input |

**Room unit**

| CP– | 12 | PPS2 ground |
|-----|----|-------------|
| CP+ | 13 | PPS2 data |
| CLA | 14 | Data A |
| CLB | 15 | Data B |

**LONWORKS® bus (plug-in)**

| CLB | 16 | Data B |
|-----|----|--------|
| CLA | 17 | Data A |

**Power supply**

| L | 18 | Phase conductor AC 230 V |
|---|----|--------------------------|
| L | 19 | Phase conductor AC 230 V |
| N | 20 | Neutral conductor AC 230 V |
| N | 21 | Neutral conductor AC 230 V |

+/- 10%

**Relay outputs**

| Q13 | 22 | Common contact for Q14 and Q24 |
|-----|----|--------------------------------|
| N | 23 | Neutral conductor, max. AC 250 V |
| PE | 24 | Protective earth conductor |
| Q14 | 25 | N/O contact max. AC 250 V, 12 A |
| N | 26 | Neutral conductor, max. AC 250 V |
| PE | 27 | Protective earth conductor |
| Q24 | 28 | N/O contact max. AC 250 V, 12 A |
| N | 29 | Neutral conductor, max. AC 250 V |
| PE | 30 | Protective earth conductor |

**Note!**

- **Observe the technical data for the relay outputs.**
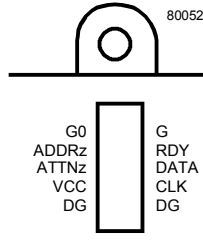- **Local installation regulations must be observed.**

**Tool socket**

Standard RJ45 tool socket for LONWORKS® devices.
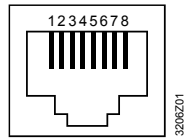


| | | | |
|---|---|---|---|
| 1 | LONWORKS®, Data A (CLA) | 5 | Not used |
| 2 | LONWORKS®, Data B (CLB) | 6 | Not used |
| 3 | Not used | 7 | PPS2 (CP+) |
| 4 | Not used | 8 | PPS2 (CP–) |

**Connector for extension modules**



| | | | |
|---|---|---|---|
| G0 | Ground | G | AC 24 V |
| ADDRz | Module address | RDY | Handshake |
| ATTNz | Handshake | DATA | Data |
| VCC | DC 5 V | CLK | Clock |
| DG | Electronics ground | DG | Electronics ground |

## Connection diagrams

**Connection of field devices, room unit, LONWORKS® bus and power supply**
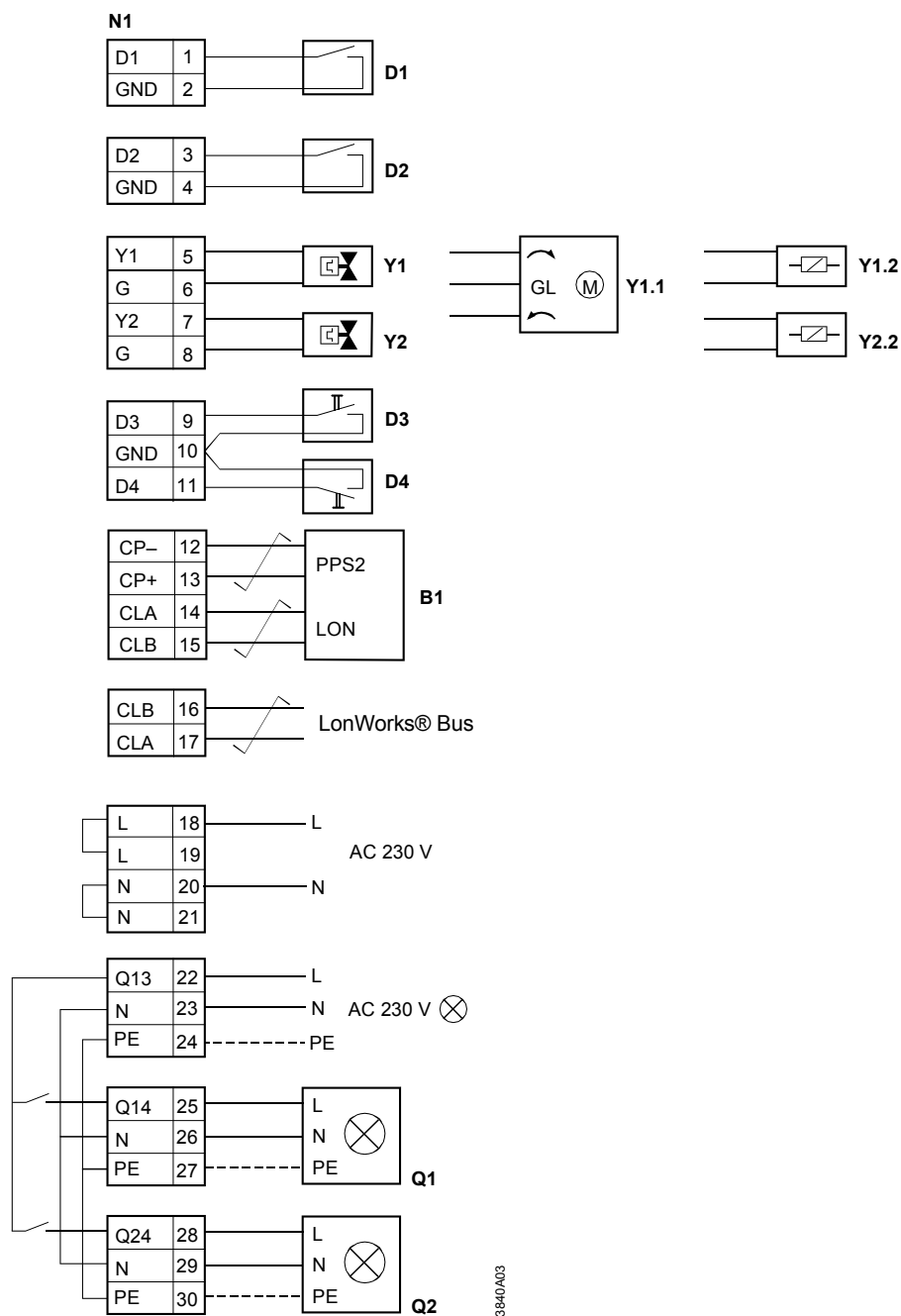


| | | |
|---|---|---|
| N1 | RXC30 | |
| D1, D2 | Volt-free contacts (window contact, occupancy sensor etc.) | |
| Y1, Y2 | AC 24 V thermic valve actuators | |
| Y1.1 | AC 24 V, 3-position valve or damper actuator (only if supported by application) | |
| Y1.2, Y2.2 | AC 24 V contactors for electric heating coil | |
| D3, D4 | Volt-free momentary contact switches | |
| B1 | QAX… room unit | |
| Q1, Q2 | Lamp or group of lamps connected in parallel | |

Twisted pair

*Note*

For information on actuators compatible with the RXC30 controller, refer to the relevant application descriptions. See Desigo RXC applications library (V1: CA2A3810, V2: CA110300).

**Parallel connection of several thermic actuators**

Up to 2 thermic actuators can be connected directly to the room controller.
In the case of more than 2 actuators a power amplifier is required.

The same principle applies to outputs Y2 … Y4. Note that the simultaneous load on outputs Y1 … Y4 must not exceed 9.5 VA.
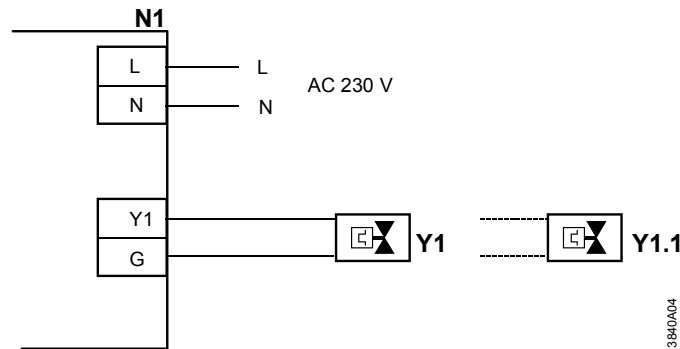
Power consumption at input X1 of the UA1T: 0.5 VA.
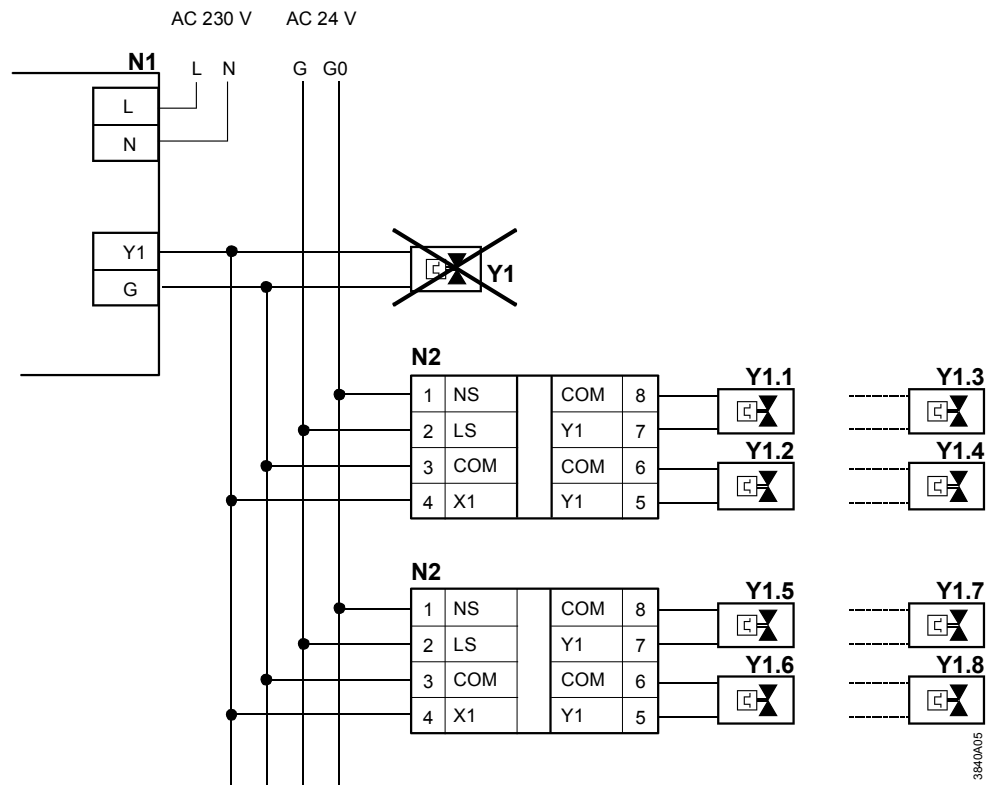
**Note!**

Mixed operation: **Connecting thermic actuators to the controller as well as to the power amplifier is NOT allowed.**
Differing voltage of the internal transformer of the controller and the supply of the power amplifier may cause big differences in the position of the valves.

Connection to controller



Connection to power amplifier



N1    RXC30
N2    UA1T (see data sheet CA2N3591)
Y1    AC 24 V thermic valve actuator
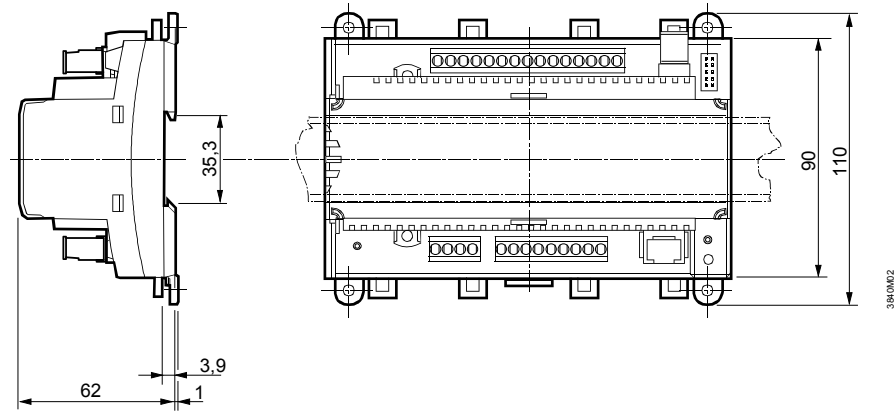Y1.1   AC 24 V thermic valve actuator (max. 2 STP73 / STP73 actuators per Y1 output on the UA1T)

*Notes*

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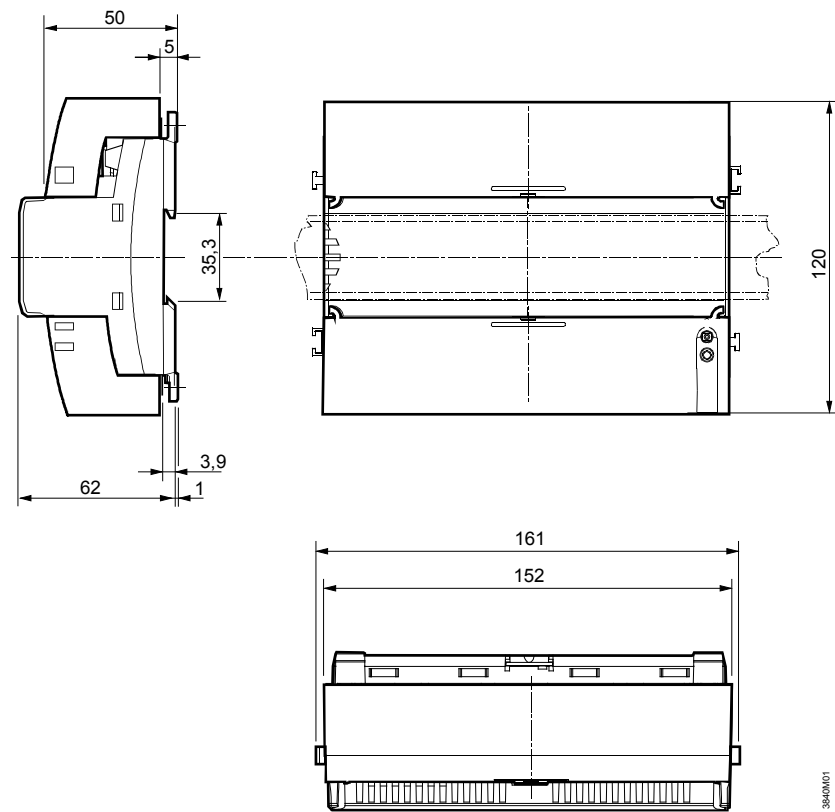– The UA1T is not suitable for the connection of 3-position actuators.

## Dimensions

All dimensions in mm

**Without terminal covers**

35,3

90

110

3840M02

62

3,9

1

**With terminal covers**

50

5

35,3

120

62

3,9

1

161

152

3840M01

**Drilling diagram**

80056

100

135

Subject to change

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RXC30 – Room controller, basic module

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