DESIGO™ RXC

Room controller, basic module

RXC34.1

Optimized for extract ventilation control in laboratories, with LONMARK®-compatible bus communications

The RXC34.1 controller is used for air volume and temperature control in individual rooms:

- Ideal for the control of fast air extraction in laboratories
- For VAV control in general
- For combination with extension modules
- Downloadable application software
- LONMARK®-compatible bus communication
- PPS2 interface
- Integrated into the DESIGO building automation and control system
- 2 volt-free relay contacts (normally-closed and normally-open)
- 2 (non-volt-free) digital inputs
- AC 24 V digital outputs (triac)
- 4 analog inputs, DC 0…10V
- 1 combined analog input DC 0…10V / LG-Ni1000
- 3 analog outputs, DC 0…10V
- AC 24 V operating voltage
Application

The RXC34.1 room controller is a universal controller, specifically designed for use as a fast volume flow rate controller. The addition of extension modules (e.g. RXC41.1) provides scope for the integration of further applications.

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 downloading the relevant application software, also referred to simply as the “application”. The various applications and associated functions are described in detail in the RXC applications library (CA110300).

The RXT10 commissioning and service tool is used to download the application and to commission the RXC34.1 (see "Commissioning notes").

The controller is delivered with laboratory application LAB01 for use in laboratories.

Functions

The room controller functions are determined by the selected application and the associated parameters.

For a detailed description of functions, refer to the DESIGO RXC Applications library, document CA110300.

Integrating the DESIGO RXC room automation system into the building automation and control system makes additional functions available, such as time scheduling, central control of setpoints, etc. (refer to the DESIGO INSIGHT documentation).

Types

| RXC34.1  | Room controller |
| RXZ30.1  | Accessories: Terminal covers |

Ordering

When ordering please specify the quantity, product name, type code and application. The controllers are delivered with laboratory application LAB01 for use in laboratories. The RXZ30.1 terminal covers are supplied in packs of 10 pairs and must be ordered separately.

Example:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>Room controller</td>
<td>RXC34.1/LAB01</td>
</tr>
<tr>
<td>30</td>
<td>Pairs of terminal covers</td>
<td>RXZ30.1</td>
</tr>
</tbody>
</table>
Compatibility

The RXC34.1 controller can be combined with extension modules, such as the RXC40.1 for lighting control (data sheet 3842) and the RXC41.1 for the control of blinds (data sheet 3843). In such cases, the RXC34.1 controller must be loaded with an application which matches the selected combination of extension modules. The possible combinations and the associated applications are described in the applications library (CA110300).

For operation, a room unit from the QAX3… series may be used in conjunction with conventional momentary contact switches for lighting control, or the flexible room units, QAX50.1 or QAX51.1 may be used.

Refer to the RX hardware overview, document CA2N3804 for an overview of the available field devices.

Design

The RXC34.1 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 lock 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

**Label**

- Bar code, Code 39 (ID number)
- Protection standard
- Temperature range (0 … 50 °C)
- Observe notes in this document
- Neuron ID
- Factory-loaded application
- Definitive application
- Location

**Note**

Options for use of the labeling fields “Appl.” and “Loc.”:
- Handwritten entry of location and currently loaded application
- Printed adhesive label (printed from the RXT10 commissioning and service tool)

**Connection terminals**

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

**Caution**

- The cable restraints on the housing base must be used for the connections to relay terminals 23 … 26. The conductors must be secured with cable ties (see diagram).

- For safety reasons, the mains voltage (230 VAC) and the SELV for the two relay contacts (terminals 23 … 26) must not be combined.

**Communication**

The RXC34.1 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 controllers
  - LONMARK®-compatible third-party devices (e.g. occupancy sensors)
- **PPS2 (terminals CP– and CP+):** Interface to the QAX3... room units. (In addition to PPS2, the LonWorks® bus can also be 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 extension modules such as the RXC40.1 and RXC41.1.

The diagram below shows the wiring of the LonWorks® bus and PPS2 interface when a QAX3... 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, CA110412).

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

**Current local legislation must be observed.**

### Engineering notes
The DESIGO RX installation guide (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.

**Note!**
In the case of line topology the length of the spur or stub between the RXC34.1 and the QAX... room unit is limited to 3 m.
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. Refer to the RXC applications library (CA110300).

The cables for signal inputs D1 and D2 (SELV) must be routed separately from the AC230 V cables and must comply with SELV requirements. The low voltage and mains voltage must not be routed in the same cable.

**Note!**

Signal inputs D1 and D2 may be used for volt-free maintained contacts (e.g. window switches). N.B.: No pulse control.

**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 (valves and damper actuators) are supplied directly from the controller.

The maximum load on the outputs must not be exceeded (see “Technical data”). The power consumption of the connected devices must be taken into account when sizing the transformer.

**Volt-free relay outputs up to AC 250 V**

The volt-free relay outputs allow switching of loads up to AC 250 V, 5 A (4 A). The cable dimensions depend on the connected load and the local installation regulations.

The circuits must be protected with external fuses (max. 10 A) as there are no internal fuses.

The cables must be secured with cable restraints. The combining of mains voltage (AC 230 V) with SELV (e.g. AC 24 V) is not permissible.

**AC 24 V triac outputs**

The maximum load on each output must not exceed 12 VA.

The simultaneous load on outputs Y1 and Y2 must not exceed 24 VA.

**Mounting instructions**

The controller can be mounted in any orientation 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 diagram). 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 (e.g. RXC40.1 and RXC41.1) should be mounted on the same DIN rail, if possible. In any case, the length of the connecting cable must never exceed 3 meters.

Notes

- When different types of extension modules are used, they are mounted in a specific order for each application, and this must be adhered to.
- The maximum permissible cable length (3 meters) applies to the complete module assembly.

**Commissioning**

The RXC34.1 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 (CA110412).

**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**

The direct interrogation of the inputs and control of the outputs with the RXT10 commissioning and service tool is supported as a function of the application. This makes it possible to test the installation, and to operate the connected plant provisionally, before the complete DESIGO RXC system is commissioned.

Notes

The LonWorks® bus plug (terminals 19 and 20) can be removed and reconnected at any time, even while the controller is in operation. Only the original bus plug may be used.

**Caution**

There is no protection against the accidental connection of AC 230 V on the AC 24 V side.
## Technical data

### Power supply

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage</td>
<td>AC 24 V ± 20 %</td>
</tr>
<tr>
<td>SELV safety low voltage in accordance with HD 384</td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Power consumption without field devices</td>
<td>7 VA</td>
</tr>
<tr>
<td>Power consumption with field devices and extension modules</td>
<td>Max. 34 VA</td>
</tr>
<tr>
<td>Internal fuse</td>
<td>Thermal, self-resetting</td>
</tr>
<tr>
<td>Supply cable protection (external fuse)</td>
<td>≤ 10 A</td>
</tr>
</tbody>
</table>

### Inputs

- **Signal input for volt-free contacts**
  - Number of inputs: 2 (D1, D2)
  - Contact voltage (SELV to HD 384): DC 33 V
  - Contact current: DC 8 mA
  - Contact transition resistance: Max. 100 Ω
  - Contact insulation resistance: Min. 50 kΩ
  - Not suitable for pulse control, as the inputs are for static detection only

- **Measured value input for temperature measurement**
  - Number of inputs: 1 (X1)
  - Suitable temperature sensor: LG-Ni 1000
  - Measuring range: –40 ... 110 °C
  - Sensor current: 2.5 mA at 0 °C
  - Resolution: ≤ 0.2 K
  - Accuracy: At 25 °C ± 0.2 K

- **Measured value input for DC 0 ... 10 V signals**
  - Number of inputs: 5 (X1, U1 ... U4)
  - Measuring range (nominal): DC 0 ... 10 V
  - Overrange: 0.5 V
  - Subrange: 0 V
  - Resolution: 25 mV
  - Sample rate: ≤ 200 ms (U1... U4)
  - ≤ 1 s (X1)

### Outputs

- **Relay outputs**
  - SELV and non-SELV voltages must not both be connected to one RXC34 controller.
  - Number of outputs: 2 (Q11/12 N/C, Q21/22 N/O)
  - Relay type: Monostable
  - Contact rating with AC voltage:
    - Switching voltage: Max. AC 250 V, min. AC 19 V
    - Nominal current, resistive/inductive: Max. AC 5A / 4A (cosφ = 0.6)
    - Making current 200 ms half-time: Max. 20 A
    - Switching current at AC 19 V: Min. AC 10 mA
  - Contact rating with DC voltage:
    - Switching voltage: Max. DC 250 V, min. DC 5 V
    - Switching current at DC 5 V: Min. DC 100 mA
    - Switching capacity: Max. 20 W
    - Inductive load L/R: Max. 7 ms
    - External fuse: Max. 6 A (slow blow)

- **AC 24 V triac outputs**
  - Number: 2 (Y1, Y2)
  - Output voltage:
    - AC 24 V on/off, PDM or 3-position (can be configured)
    - Max. 0.5 A
  - Output current: Max. 24 VA
  - Total nominal load: Max. 12 VA

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1) X1 changeover option in RXT10 tool: LG-Ni 1000 ↔ 0 ... 10 V
### Control outputs
- **Number**: 3 (Y1 ... Y13)
- **Voltage range**
  - Nominal: DC 0 ... 10 V
  - Overrange: 5.5 V
- **Resolution**: 8 bits (50 mV)
- **Output current**: Max. 1mA
- **Time constant**: 100 ms

### Interface to room units
- **Max. number of room units**: Max. 1
- **Interface type**, 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**: FT-X1
- **Baud rate**: 78 kbit/s
- **Bus topology and bus termination**: See Installation guide, CA110334

### Interface to extension modules
- **Connection terminals for signals and power supply (screw terminals)**: Solid conductors 0.25 ... 2.5 mm² or 2 x 1.5 mm² or confectioned cable
- **LonWorks® bus connection terminals (plug-in screw terminals)**: Solid conductors 2 x 1.0 mm²
- **Connecting cable for extension modules**: 10-core ribbon cable

### Single cable lengths
- **Signal inputs**: D1, D2 Max. 100 m with diameters ≥ 0.6 mm
- **Measured value input**: X1, U1 ... U4 Max. 100 m with diameters ≥ 0.6 mm
- **AC 24 V triac outputs**: Y1, Y2 Max. 100 m where A ≥ 1.5 mm²
- **Control outputs DC 0 ... 10 V**: Y1 ... Y13 Max. 100 m where A ≥ 1.5 mm²
- **Interface to room unit**: Max. 115 m where A= 0.75 mm² (including tool connecting cable) 4-core, unscreened
- **VAV compact controller with PPS2 interface (YC1, YC2)**: Max. 230 m where A = 1.5mm², for all compact VAV controllers together See Installation guide, CA110334

### Housing protection standard
- **Protection standard to EN 60529**: IP30 with terminal cover fitted and wall mounted without DIN rail
- **All other mounting arrangements**: IP00

### Protection class
- **Suitable for use in systems with protection class I or II**

### Ambient conditions
- **Class**: 3K5 to IEC 60,721-3-3
- **Temperature**: 0 ... 50 °C
- **Humidity**: < 85 % rh
- **Transport Class**: 2K3 to IEC 60,721-3-2
- **Temperature**: – 25 ... 65 °C
- **Humidity**: < 95 % rh

### Industry standards
- **Product safety**: Automatic electronic controls for household and similar use EN 60730-1
- **Special requirements for energy controllers**: EN 60730-2-11
- **Electromagnetic compatibility**: Interference immunity EN 61000-6-1
- **Emitted interference**: EN 61000-6-3

### CE marking:
- **Meets the requirements of**: EM Directive 89/336/EEC
- **Low Voltage Directive**: 73/23/EEC

### Dimensions
- **See dimension diagrams**
- **Width in DIN modular spacing units**: 8,5

### Weight
- **Excluding packaging**: 0.28 kg
Connection terminals

Power supply
- G0 1 Controller ground
- G0 2 Controller ground
- G 3 AC 24 V supply
- G 4 AC 24 V supply

Triac outputs
- Y1 5 AC 24 V, 0.5 A switching output
- G 6 AC 24 V supply
- Y2 7 AC 24 V, 0.5 A switching output

Analog inputs / outputs
- G 8 AC 24 V (phase)
- Y11 9 Analog OUT 0 … 10 V
- G0 10 Controller ground
- U1 11 Analog IN 0 … 10 V
- M 12 Measuring neutral (G0)
- U2 13 Analog IN 0 … 10 V

Measured value inputs for temperature sensors or 0 … 10 V devices
- G 14 AC 24 V (phase)
- X1 15 Analog IN LG-Ni 1000 / 0…10 V
- M 16 Measuring neutral (G0)

Room unit
- CP− 17 PPS2 ground
- CP+ 18 PPS2 data
- CLA 19 Data A
- CLB 20 Data B

LonWorks® bus (plug-in)
- CLA 21 Data A
- CLB 22 Data B
Relay outputs
Q11 23 N/C contact
Q12 24 N/C contact
Q13 25 N/O contact
Q14 26 N/C contact

Analog inputs / outputs
Y12 27 Analog OUT 0 … 10 V
G0 28 Controller ground
Y13 29 Analog OUT 0 … 10 V
G 30 AC 24 V (phase)
U3 31 Analog IN 0 … 10 V
M 32 Measuring neutral (G0)
G 33 AC 24 V (phase)
U4 34 Analog IN 0 … 10 V
M 35 Measuring neutral (G0)

Signal input for volt-free contacts
D1 36 Signal input
GND 37 Signal input ground
D2 38 Signal input

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

Tool socket
Standard RJ45 tool socket for LonWorks® devices.

Connector for extension modules
G0 Ground
ADDRz Module address
ATTNz Handshake
VCC DC 5 V
CLK Clock
DG Electronics ground
Connection diagrams

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

Note: For information on actuators compatible with the RXC34.1 controller, see the relevant application description. Refer to the RXC applications library, 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 output Y3.

Note that the simultaneous load on outputs Y3 and 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 power supply of the controller and the supply of the power amplifier may cause big differences in the position of the valves.

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

Connection to controller

Connection to power amplifier

N1 RXC32.1
N2 UA1T (see data sheet CA2N3591)
Y3 AC 24 V thermic valve actuator
Y3.x AC 24 V thermic valve actuator (max. 2 STA71 / STP71 actuators per Y1 output on the UA1T)
Dimensions in mm

Without terminal covers

With terminal covers

Drilling diagram