# RC-CDOC

## Pre-programmed room controller with display and communication

**RC-CDOC is a complete pre-programmed room controller from the Regio Midi series intended to control heating, cooling and $CO_2$ in a zone control system.**

- Awarded design
- Communication via RS485 (Modbus or EXOline)
- Fast and safe configuration via Regio Tool©
- Simple installation

- On/Off or 0...10 V control
- Backlit display
- Input for occupancy detector, window contact, condensation detector and CO2 - sensor.

RC-CDOC is a room controller from the Regio series. It has a display and communication via RS485 (Modbus or EXOline) for integration into systems.

### Regio
Regio is a wide series of controllers which handle heating and cooling.

The controllers are divided into three different series, Mini, Midi and Maxi. Mini are pre-programmed, stand-alone controllers. Maxi consists of freely programmable controllers with communication. The Midi group, to which RC-CDOC belongs, are pre-programmed controllers with communication.

### Applications
The Regio controllers are suitable in buildings where you want optimal comfort and low energy consumption, for example offices, schools, shopping centres, airports, hotels and hospitals etc.

See application examples on page 3.

### Design
The controllers have a modern design. The design has been awarded the 2007 "iF product design award".

iF
product
design
award
2007

### Sensor
The controller has a built-in temperature sensor. An external Pt1000-sensor can also be used. There is also input for a $CO_2$- sensor.

### Actuators
RC-CDOC can control 0...10 V DC actuators for valves or dampers and/or 24 V AC thermal actuators and damper.

### Easy to install
The modular design with a separate bottom plate for wiring makes the whole Regio series easy to install and commission. The bottom plate can be put into place before the electronics are installed. Mounting is directly on the wall or on an electrical connection box.
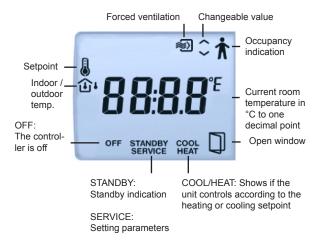
### Flexibility with communication
RC-CDOC can be connected to a central SCADA-system via RS485 (EXOline or Modbus) and configured for a particular application using the cost-free configuration tool Regio Tool©. Read more about Regio Tool© on page 3.

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## Display handling

The display has the following indications:



It is possible to set different parameter values in a parameter menu in the display, using the buttons on the controller. You change parameter values with the INCREASE and DECREASE buttons and confirm changes with the Occupancy button.



## Control states

RC-CDOC can be configured for different control states/control sequences:

- Heating
- Heating/Heating
- Heating/Cooling
- Heating/Cooling with VAV-control and forced supply air function
- Heating/Cooling with VAV-control
- Cooling
- Cooling/Cooling

## Operating modes

There are five different operating modes: Off, Unoccupied, Stand-by, Occupied and Bypass. Occupied is the preset operating mode. It can be changed to Stand-by in the parameter menu in the display. The operating modes can be activated via a central command, an occupancy detector or the Occupancy button.

**Off:** Heating and cooling are disconnected. However, the temperature must not drop below the set minimum temperature (Factory setting (FS)=8°C). Operating mode Off is activated on open window.

**Unoccupied:** The room where the controller is placed is not used for an extended period, for example during holidays or long weekends. Both heating and cooling are disconnected within a temperature interval with configurable min/max temperatures (FS min=15°C, max=30°C).

**Stand-by:** The room is in an energy save mode and is not used at the moment. This can for example be during nights, weekends, evenings etc. The controller is prepared to change operating mode to Occupied if someone enters the room. Both heating and cooling are disconnected within a temperature interval around the applicable setpoint (FS heating setpoint value=-3°C, cooling setpoint=+3°C).

**Occupied:** The room is in use and is therefore in a comfort mode. The controller regulates the temperature around a heating setpoint (FS=22°C) and a cooling setpoint (FS=24°C).

**Bypass:** The temperature in the room is controlled in the same way as in operating mode Occupied. The output for forced ventilation is also active. Bypass is useful for example in conference rooms, where many people are present at the same time for a certain period of time.

When Bypass has been activated by a press on the Occupancy button, the controller will automatically return to the preset operating mode (Occupied or Stand-by) after a configurable time (FS=2 hours). If an occupancy detector is used, the controller will automatically return to the preset operating mode after 10 minutes absence.

Bypass can also be activated by a high level of $CO_2$.

### $CO_2$ - control

$CO_2$ – sensor connects to AI2.
In control modes where VAV (Variable Air Volume) is chosen, UO2 (dampers) are affected by the $CO_2$ – level. On increasing $CO_2$ – level the damper opens to increase the quantity of air, regardless of the temperature requirements of the controller. The damper starts opening when the $CO_2$ – level exceeds "$CO_2$ – level for starting opening damper", and is fully opened at "$CO_2$ – level for fully opened damper".

### Occupancy detector

By connecting an occupancy detector, RC-CDOC can switch between Bypass and the preset operating mode (Occupied or Stand-by). The temperature is then controlled according to requirement, which saves energy and keeps the temperature at a comfortable level.

### The Occupancy button

If you press the Occupancy button for less than 5 seconds when the controller is in the preset operating mode, the controller changes to operating mode Bypass. If you press the button for less than 5 seconds when the controller is in Bypass, it changes operating mode to the preset operating mode.

When the Occupancy button is held depressed for more than 5 seconds, the controller changes operating mode to "Shutdown" (Off/Unoccupied), regardless of the current operating mode. Via the display or Regio Tool©, you can configure which operating mode, Off or Unoccupied, should be activated on "Shutdown" (FS=Unoccupied). If you press the Occupancy button for less than 5 seconds in Shutdown, the controller returns to Bypass.

## Forced ventilation

Regio has a built-in function for forced ventilation. A short press on the Occupancy button transmits 24 V AC (digital) between connection block 20 and output UO3 for example for a damper.

## Setpoint

In Occupied mode, the controller operates from a heating setpoint (FS = 22°C), or a cooling setpoint (FS = 24°C) that can be changed using the INCREASE and DECREASE buttons.

Pressing on INCREASE increases the current setpoint by 0.5°C with each press up to the max. limit (FS = +3°C). Pressing on DECREASE decreases the current setpoint by 0.5°C with each press down to the min. limit (FS = -3°C).

Switching between heating and cooling setpoints is done automatically in the controller depending on the heating and cooling requirement.

## Built-in safety functions

RC-CDOC has an input for a condensation detector which prevents condensation. The controller also has frost protection. It prevents frost damages by ensuring that the room temperature does not drop below 8°C when the controller is in Off-mode.

## Actuator exercise

All actuators are exercised. The exercise takes place at set intervals in hours (FS=23 hours interval). An opening signal is sent to the actuator for as long time as the run time has been configured. Then a closing signal is sent for as long time and the exercise is finished. The exercise is switched off if the interval is set to 0 hours.
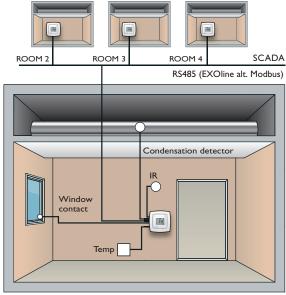
## Configuration and supervision with Regio Tool©

RC-CDOC is pre-programmed on delivery, but can be configured using Regio Tool©.

Regio Tool© is a PC-based program that makes it possible to configure and supervise an installation, and change settings, via a clear and easy user interface.
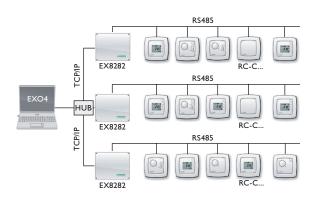
The program can be downloaded free of charge from Regin's homepage www.regin.se.



# Application examples

## Technical data

| | |
|---|---|
| Supply voltage | 18...30 V AC, 50...60 Hz |
| Internal consumption | 2.5 VA |
| Ambient temperature | 0...50°C |
| Storage temperature | -20...+70°C |
| Ambient humidity | Max 90% RH |
| Protection class | IP20 |
| Communication | RS485 (EXOline or Modbus) with automatic detection/change-over |
| Modbus | 8 bits, 1 or 2 stop bits. Odd, even (FS) or no parity. |
| Communication speed | 9600 bps (not changeable) |
| Display | LCD with background illumination |
| Built-in temperature sensor | NTC type, measuring range 0...50°C, accuracy +/-0.5°C at 15...30°C |
| Material, casing | Polycarbonate, PC |
| Weight | 110 g |
| Colour | Cover: Polar white RAL9010 |
| | Bottom plate: Light gray |

CE

This product conforms with the requirements of European EMC standards CENELEC EN 61000-6-1 and EN 61000-6-3, and the requirements of European LVD standard IEC 60 730-1. It carries the CE mark.

**Inputs**

| | |
|---|---|
| External room sensor | PT1000-sensor, 0…50°C. Suitable sensors are Regin's TG-R5/PT1000,TG-UH/PT1000 and TG-A1/PT1000. |
| Occupancy detector | Closing potential-free contact. Suitable occupancy detector is Regin's IR24-P. |
| Condensation detector alt. window contact | Regin's condensation detector KG-A resp. potential-free contact |
| $CO_2$ sensor 0...10V | Regin's CO2RT is suitable. |

**Outputs**

| | |
|---|---|
| Valve actuator alt. thermal actuator (UO1, UO2) | 2 outputs |
|    Valve actuator | 0…10 V, max 5 mA |
|    Thermal actuator | 24 V AC, max 2.0 A (time proportional pulse output signal) |
|    Control | Heating, cooling or VAV (damper) |
| | |
| Damper actuators (UO3) | 1 output |
|    Forced ventilation | 24 V AC, max 0,5 A |
|    Control | Forced ventilation |
| | |
| Actuator exercise | FS = 23 hours interval |
| Terminal blocks | Lift type for cable cross-section 2.1 mm² |

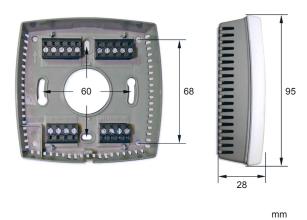**Setpoint settings via Regio Tool© or in the display**

| | |
|---|---|
| Basic heating setpoint | 5...40°C |
| Basic cooling setpoint | 5...50°C |
| Setpoint displacement | +/-0...10°C (FS = +/-3°C) |

## Wiring

| Terminal | Designation | Operation |
|---|---|---|
| 10 | G | Supply voltage 24 V AC |
| 11 | G0 | Supply voltage 0 V |
| 12 | | No function |
| 13-14 | | No function |
| 20 | GDO | 24 V AC out common for DO |
| 21 | G0 | 0 V common for UO (when 0...10 V actuator is used) |
| 22 | UO3 | Output for dampers. 24 V AC |
| 23 | UO1 | Output for 0...10 V valve actuator alt. thermal actuator. Heating or cooling. |
| 24 | UO2 | Output for 0...10 V valve/damper actuator alt. thermal actuator. Heating or cooling. |
| 30 | AI1 | Input for external sensor |
| 31 | A12 | Input for $CO_2$ - sensor, 0...10 V DC |
| 32 | DI1 | Input for occupancy detector |
| 33 | DI2/CI | Input for Regin's condensation detector KG-A alt. window contact |
| 40 | +C | 24 V DC out common for UI and DI |
| 41 | AGnd | Analogue ground |
| 42 | A | RU-Bus A |
| 43 | B | RU-Bus B |

## Dimensions



mm

## Product documentation

| Document | Type |
|---|---|
| Regio Midi Manual | Manual for the controllers from the Regio Midi series |
| Installation instruction Regio RC-CDOC | Installation instruction for RC-CDOC |
| Product sheet TG-R4/PT1000, TG-R5/PT... | Information about room sensors, outdoor sensors and |
| Product sheet TG-UH/PT... | $CO_2$- sensors suitable for RC-CDOC |
| Product sheet CO2RT (-D) | |
| Product sheet IR24-P | Information about occupancy detector suitable for RC-CDOC |
| Instruction IR24-P | Instruction for IR24-P |
| Product sheet KG-A | Information about condensation detector for the Regio controllers |

All product documentation is available on www.regin.se.

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