RCC-C3DOCS...

Pre-programmed room controller with built-in CO_2 sensor, display and communication

RCC-C3DOCS... 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. It has a built-in CO_2-sensor, a display and communicates via Modbus, BACnet or EXOline for easy system integration.

✓ Communication via RS485 (Modbus, BACnet or EXOline)

✓ Quick and simple configuration via Application Tool

✓ On/Off or 0...10 V control

✓ Built-in CO_2-sensor

✓ Input for motion detector, CO_2-sensor, window contact, condensation-sensor, or change-over function

✓ Supply air temperature limitation

Application

The Regio controllers are suitable for use in buildings requiring optimum comfort and reduced energy consumption, such as offices, schools, shopping centres, airports, hotels and hospitals.

Function

The controller is a PI controller with configurable P-band, I-time and setpoints for different operating modes.

The controller has a built-in sensors for room temperature and CO_2-levels. An external sensor (Pt1000) for room temperature, change-over or supply air temperature limitation can also be connected, as well as an external sensor for CO_2.

It can control 0...10 V DC valve actuators and dampers and/or 24 V AC thermal actuators or On/Off actuators with spring return.

The controller can be connected to a central SCADA system via EXOline, BACnet or Modbus and configured for a specific application using the free configuration software Application Tool.

Installation

The modular design, featuring a separate bottom plate for wiring, makes the entire Regio range of controllers easy to install and commission. The bottom plate can be put into place before the electronics are installed. Mounting takes place directly on a wall or on a wall box.

HEAD OFFICE SWEDEN

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Web: www.regincontrols.com
E-mail: info@regincontrols.com

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Configuration

The controller is pre-programmed upon delivery, but can be configured using Application Tool.

Application Tool is a PC-based program that makes it possible to configure and supervise an installation and change its settings using a comprehensive user interface.

The program is available as a free download on Regin's website www.regincontrols.com.

The controller can be configured for different control modes/control sequences:

- ✓ Heating
- ✓ Heating/Heating
- ✓ Heating/Cooling via change-over
- ✓ Heating/Cooling
- ✓ Heating/Cooling with VAV-control and forced supply air function
- ✓ Heating/Cooling with VAV-control
- ✓ Cooling
- ✓ Cooling/Cooling
- ✓ Heating/Cooling/VAV
- ✓ Change-over with VAV function

Appearance

Buttons

The arrow buttons on the controller is used to change set points in the display, and to access and work with the parameter values. It is possible to block the button functionality to prevent unauthorised users making changes.

The occupancy button ⏻ is used to change operating mode and to confirm changes in the parameters.

Display
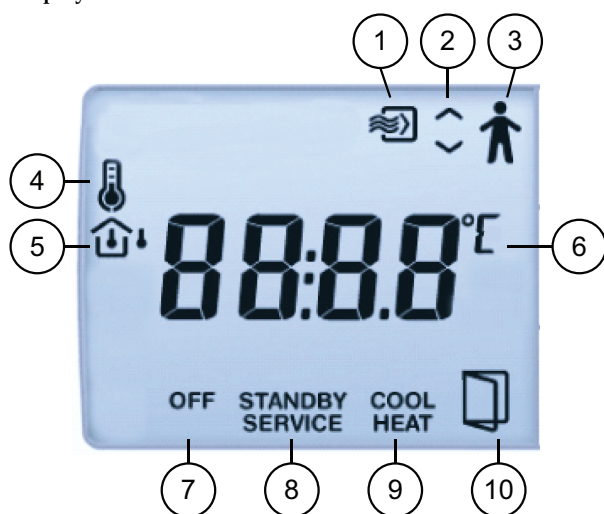
Number	Description
1	Forced ventilation
2	Changeable value
3	Occupancy detection
4	Temperature setpoint
5	Indoor/outdoor temp
6	Current room temperature / CO_2 level
7	The controller is turned off
8	STANDBY: Standby indication SERVICE: Parameter list
9	Shows if the unit controls accoding to the cooling or heating setpoint
10	Open window indication

Features

Operating modes

There are five different operating modes: *Off*, *Unoccupied*, *Stand-by*, *Occupied* and *Bypass*. They are used to configure the behaviour of the controller.

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

Bypass can also be activated if CO_2 levels are high.

Occupied: The room is in use and a comfort mode is activated. The temperature setpoints are close to keep a good climate in the room.

Stand-by: The room is in energy saving mode and not used at the moment. This can, for instance, be during nights, weekends and evenings. The controller stands by to change operating mode to *Occupied* if presence is detected. The dead band between the setpoints is extended to save energy.

Unoccupied: The room is not used for a extended time period. The dead band is extended even more to save energy.

Off: Heating and cooling are disconnected. Frost protection is still active.

CO_2 control

In control modes where VAV (Variable Air Volume) has been selected, the damper will be affected by the CO_2 levels. If the CO_2 concentration rises, the damper will open to increase air volume regardless of controller temperature requirements. If an external CO_2 detector is configured for AI2, this overrides the internal detector.

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Automatic calibration of built-in CO₂ detector

The sensor uses ABC-logic, a self-calibration technique which eliminates the need for recalibration. The sensor will typically reach its operational accuracy after 24 hours of operation. If immediate consistency is desired, the sensors may be single point calibrated using reference gas or ambient air measured by a reference sensor.

Occupancy control

If a connected motion detector indicates movement, the control mode (see above) will change in a pre-determined way, and the temperature is controlled from requirement, making it possible to save energy while maintaining the temperature at a comfortable level.

EC fan control

It is possible to select whether the fan should run in Heating, Cooling or both Heating and Cooling.

The fan has both a boost function and a kickstart function.

Change-over function

The controller has an input for change-over that automatically changes the control mode based on the temperature difference between the room temperature and the water temperature in the pipes.

Optionally, a potential-free contact can be used. When the contact is open, the controller will operate using the heating function, and when closed using the cooling function.

Forced ventilation

Regio has a built-in function for forced ventilation. If activated the air flow into the room will increase. It can be activated via presence detection, the buttons on the controller or via communication.

Setpoint adjustment

The user can change the setpoint by pressing the arrow buttons on the controller.

Switching between heating and cooling setpoints takes place automatically in the controller depending on heating or cooling requirements.

Lighting control

The controller can be set to control lighting. When occupancy is detected, lighting is activated, remaining switched on for as long as someone is in the room.

Supply air temperature limitation

The controller can be used with a supply air temperature limitation sensor. A room controller will then work together with a supply air temperature controller using cascade control, resulting in a calculated supply air temperature maintaining the room temperature setpoint.

Built-in safety functions

The controller has an input for a condensation sensor to detect moisture accumulation. If detected, the cooling circuit will be stopped.

The controller also has frost protection. This prevents frost damages by ensuring that the room temperature does not drop below 8°C when the controller is in mode Off.

Actuator exercise

The controller has a function for actuator exercise. The exercise takes place at intervals, settable in hours.

Application examples

The controller can be used in for example hotels, office buildings, residential buildings and shopping centers. It can be connect to BMS via Modbus, BACnet or EXOline. The controller is mainly suitable for VAV systems even if an EC-fan can be controlled as well.
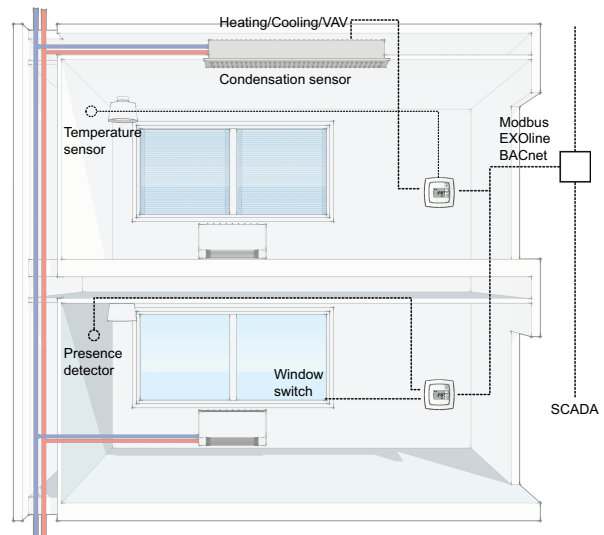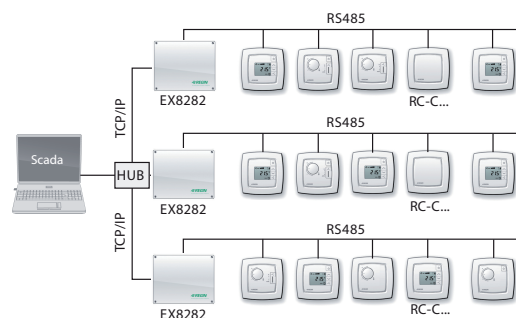

Fig. 1 Room installation example

Fig. 2 Network setup example

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Technical data

Supply voltage	18...30 V AC, 50 / 60 Hz
Power 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,or BACnet)
Modbus	8 bits, 1 or 2 stop bits. Odd, even (FS) or no parity
BACnet	MS/TP
Communication speed	9600, 19200, 38400 bps (EXOline, Modbus and BACnet) or 76800 bps (BACnet only)
Display	Backlit LCD
Weight	110g

Technical data, built-in temperature sensor

Temperature sensor	NTC type
Temperature range	0...50°C
Accuracy	±0.5°C at 15...30°C

Technical data, CO_2-sensor

Temperature dependance	5 ppm per °C or 0.5 % of the reading per °C (whichever is greater)
Long term stability	< 2 % of FS over life of a sensor (15 years typical)
Response time	< 3 min. for 90 % step change typical
Warm-up time	< 2 min. (operational), 10 min. (maximum accuracy)
Measuring principle	NDIR (Non-Dispersive Infrared Technology)
Measuring range CO_2	0...5000 ppm
Accuracy	400...5000 ppm ±25 ppm ± 3 % of the reading
Signal update	Every 5 seconds

Material

Material, housing	Polycarbonate, PC

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Inputs

Input type	Sensor	Measuring range	Contact	Suitable Regin product
External room sensor	Pt1000	0…50°C	-	TG-R5/PT1000, TG-UH3/PT1000 and TG-A1/PT1000
Supply air temperature limitation sensor	Pt1000	0…50°C	-	TG-R5/PT1000, TG-UH3/PT1000 and TG-A1/PT1000
Change-over, temperature	Pt1000	0…100°C	-	TG-A1/PT1000
Change-over, digital	-	-	Closing potential-free contact	-
Occupancy detector	-	-	Closing potential-free contact	IR24-P
Condensation sensor	-	-	-	KG-A/1
Window contact	-	-	Potential-free contact	-
CO_2 sensor	CO_2	0…2000 ppm	-	CTRTA, CTRTA-D

Outputs

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)
	On/Off actuator	24 V AC, max. 2.0 A
	Output	Heating, cooling or VAV (damper)
UO3		1 output
	Forced ventilation	24 V AC, max. 2.0 A, alt. 0...10 V, max. 5 mA
	Output	Forced ventilation, alt. EC fan or damper following Heating/Cooling in sequence, alt. lighting control (on/off)
Exercise		Factory setting: 23 hours interval
Terminal blocks		Lift type for max. cable cross section 2.1 mm²

Setpoint settings via Application Tool or in Display

Basic heating setpoint	5…40°C
Basic cooling setpoint	5...50°C
Setpoint displacement	±0…10°C (FS=±3°C)

CE
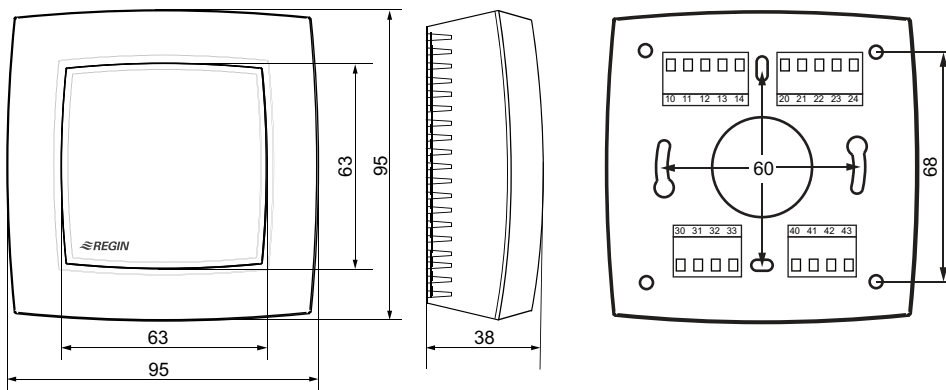
This product carries the CE-mark. More information is available at www.regincontrols.com.

Models

Model	Colour housing
RCC-C3DOCS	RAL 9003, Signal white
RCC-C3DOCS-BLACK	RAL 9005, Jet black

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Dimensions

[mm]

Documentation

All documentation can be downloaded from www.regincontrols.com.

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