

RC-C3DOC...

Pre-programmed room controller with display and communication



RC-C3DOC is a complete pre-programmed room controller from the Regio Midi series intended to control heating, cooling and CO₂ in a zone control system.

- ✓ Communication via RS485 (Modbus, BACnet or EXOline)
- ✓ Quick and simple configuration via Regio tool[®]
- ✓ Easy installation
- ✓ On/Off or 0...10 V control
- ✓ Backlit display
- ✓ Input for occupancy detector, window contact, condensation sensor, CO₂ detector or change-over function
- ✓ Supply air temperature limitation

Function

RC-C3DOC is a room controller in the Regio series. It has display and communication via RS485 (Modbus, BACnet or EXOline) for systems integration.

Regio

Regio is an extensive range of controllers for control of heating and cooling.

The controllers are divided into three different series; Mini, Midi and Maxi. Mini consists of pre-programmed, stand-alone controllers. Maxi consists of freely programmable controllers with communication. The Midi controllers, of which RC-C3DOC is a part, consists of pre-programmed controllers with communication.

Applications

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 etc.

See application examples on page 6.

Sensor

The controller has a built-in room temperature sensor. An external sensor for room temperature, change-over or supply air temperature limitation can also be connected (PT1000). There is also an input for CO₂ sensors.

Actuators

RC-C3DOC can control 0...10 V DC valve actuators and/or 24 V AC thermal actuators or On/Off actuators with spring return and dampers.

Flexibility with communication

RC-C3DOC can be connected to a central SCADA system via RS485 (EXOLine, BACnet or Modbus) and configured for a specific application using the free configuration software Regio tool®. Read more about Regio tool® on page 4.

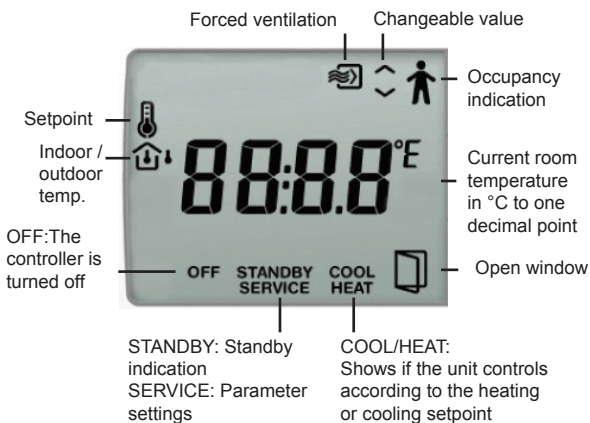


Easy to install

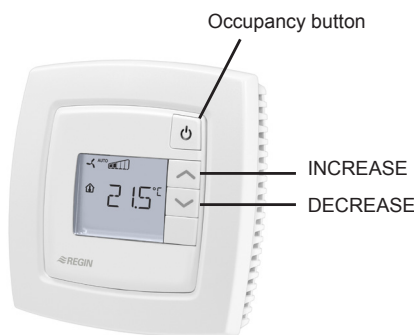
The modular design, featuring a separate bottom plate for wiring, makes the entire Regio range of controllers easy to install and commission. The bottom plate can be put into place before the electronics are installed. Mounting takes place directly on the wall or on an electrical connection box.

Display handling

The display has the following indications:



The buttons on the controller enables easy setting of parameter values using a parameter menu shown in the display. The parameter values are changed with the INCREASE and DECREASE buttons and changes confirmed with the Occupancy button.



To prevent unauthorised users from making changes to the settings, it is possible to block button functionality. Parameter menu access may also be blocked.

Control modes

RC-C3DOC 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.

Operating modes

There are five different operating modes: Off, Unoccupied, Stand-by, Occupied and Bypass. Occupied is the preset operating mode. It can be set to Stand-by using 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, frost protection is still active (factory setting (FS))=8°C). This mode is activated if a window is opened.

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

Stand-by: The room is in an energy saving mode and is 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. Both heating and cooling are kept within a temperature interval with configurable min/max temperatures (FS min=15°C, max=30°C).

Occupied: The room is in use and a comfort mode is activated. The controller maintains 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 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.

When Bypass has been activated by pressing the occupancy button, the controller will automatically return to its preset operating mode (Occupied or Stand-by) after a configurable time has elapsed (FS=2 hours). If an occupancy detector is used, the controller will automatically return to its preset operating mode if no occupancy is detected for 10 minutes.

Bypass can also be activated if CO₂ levels are high.

CO₂ control

A CO₂ sensor is connected to AI2. In control modes where VAV (Variable Air Volume) has been selected, the damper will be affected by the CO₂ levels (UO2/UO3, depending on control mode). If the CO₂ concentration rises, the damper will open to increase air volume regardless of controller temperature requirements. The damper starts opening when the CO₂ levels exceed "CO₂ level for starting opening damper" and is entirely open at "CO₂ level for fully opened damper".

Occupancy detector

By connecting an occupancy detector, RC-C3DOC can switch between the preset operating mode for presence (Bypass or Occupied) and its preset operating mode. This way, the temperature is controlled from requirement, making it possible to save energy while maintaining the temperature at a comfortable level.

The occupancy button

Pressing the occupancy button for less than 5 seconds when the controller is in its preset operating mode will cause it to change to operating mode Bypass. Pressing the button for less than 5 seconds when the controller is in Bypass mode will change its operating mode to the preset operating mode.

If the occupancy button is depressed for more than 5 seconds will change the controller's operating mode to "Shutdown" (Off/Unoccupied) regardless of its current operating mode. Regio tool® or the display enables selecting which operating mode, Off or Unoccupied, should be activated on "Shutdown" (FS=Unoccupied). If the occupancy button is depressed for less than 5 seconds when in Shutdown mode, the controller will return to Bypass.

EC fan control

Control of an EC fan can be set using Regio tool®. It is possible to select whether the fan should run in Heating, Cooling or both Heating and Cooling.

Fan boost function

If there is a great difference between the room setpoint and the current room temperature, or if one simply wishes to hear the fan start, a boost function can be activated to make the fan run at top speed for a short start-up duration.

Built-in safety functions

RC-C3DOC 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.

Fan kickstart

When using today's energy-saving EC fans, there is always a risk the fan will not start due to the low control voltage preventing the fan from exceeding its starting torque. The fan will then remain at a standstill while power still flows through it, which may give rise to damage. To prevent this, a fan kickstart function can be activated. The fan output will then be set to 100 % for a set time (1...10 s) when the fan is set to run at its lowest speed when starting from an off position. In this way, the starting torque is exceeded. After the set time has elapsed, the fan will return to its original speed.

Change-over function

RC-C3DOC has an input for change-over that automatically resets output UO1 to operate with heating or cooling function. The input can be connected to sensors of type PT1000, with the sensor mounted so that it senses the temperature of the coil supply pipe. As long as the heating valve is more than 20 % open, or each time a valve exercise takes place, the difference between the media and room temperature is calculated. The control mode is then changed based on the temperature difference. 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 the occupancy operating mode has been configured for this function, a closing of the digital occupancy detector input will set the controller to Bypass mode and activate the output for forced ventilation (UO3). This can for instance be used to open a damper. The function is terminated when the settable forcing interval has run out.

Flow calculation

AI2 can be configured to act as an input for flow calculation. A flow is then set corresponding to 0 V as well as one corresponding to 10 V, and flow is then calculated linearly between these two endpoints.

Setpoint adjustment

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

Pressing INCREASE will increase the current setpoint by 0.5°C per press until the maximum offset (FI=+3°C) has been reached. Pressing DECREASE will decrease the current setpoint by 0.5°C per press until the maximum offset (FI=-3°C) has been reached.

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

Lighting control

UO3 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. The Standby/Occupied/Bypass operating modes are active as usual. If the controller is in Off-mode (Off/Unoccupied), the occupancy input will be active if UO3 is configured for lighting control.

Supply air temperature limitation

All can be configured for use 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. It is possible to set individual min/max limitation setpoints for heating and cooling. Settable temperature range: 10...50°C.

Actuator exercise

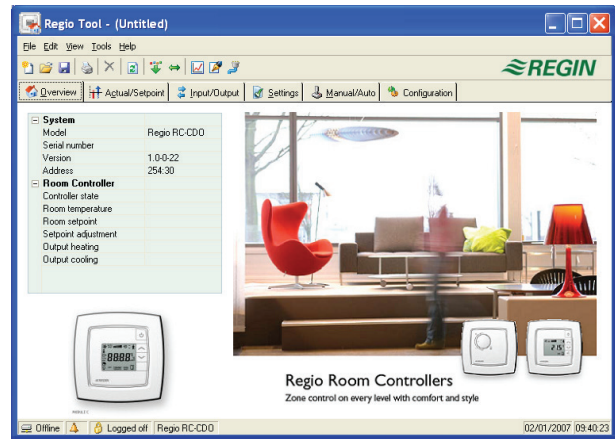
All actuators are exercised, regardless of type or model. The exercise takes place at intervals, settable in hours (FS=23 hours interval). An opening signal is sent to the actuator for as long time as its configured run time. A closing signal is then sent for an equal amount of time, after which the exercise is completed. Actuator exercise is switched off if the interval is set to 0.

Configuration and supervision using Regio tool®

RC-C3DOC is pre-programmed upon delivery, but can be configured using Regio tool®.

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

The program can be downloaded free of charge from Regin's website www.regincontrols.com.



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, 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
Built-in temperature sensor	NTC type, measuring range 0...50°C, accuracy ±0.5°C at 15...30°C
Material, casing	Polycarbonate, PC
Weight	110g
Colour	White: RAL 9003 / Black: RAL 9005

CE

This product carries the CE mark. For more information, see www.regincontrols.com.

Inputs

External room sensor or supply air temperature limitation sensor	PT1000 sensor, 0...50°C. Suitable sensors are Regin's TG-R5/PT1000, TG-UH/PT1000 and TG-A1/PT1000.
Change-over alt. potential-free contact	PT1000 sensor, 0...100°C. Suitable sensor is Regin's TG-A1/PT1000.
Occupancy detector	Closing potential-free contact. Suitable occupancy detector is Regin's IR24-P.
Condensation sensor, window contact	Regin's condensation sensor KG-A/1 resp. potential-free contact

Outputs

Valve actuator (0...10 V), thermal actuator(On/Off pulsing) or On/Off actuator (UO1, UO2)	2 outputs
Valve actuators	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)
Damper actuator, EC fan or lighting control (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	FS=23 hours interval
Terminal blocks	Lift type for max cable cross-section 2.1 mm ²

Setpoint settings via Regio tool[®] or in display

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

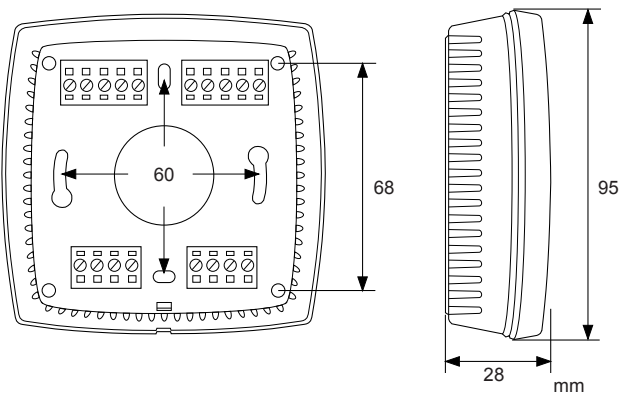
Models

Article	Description
RC-C3DOC	White pre-programmed room controller with built-in CO2 sensor, display and communication
RC-C3DOC-BLACK	Black pre-programmed room controller with built-in CO2 sensor, display and communication

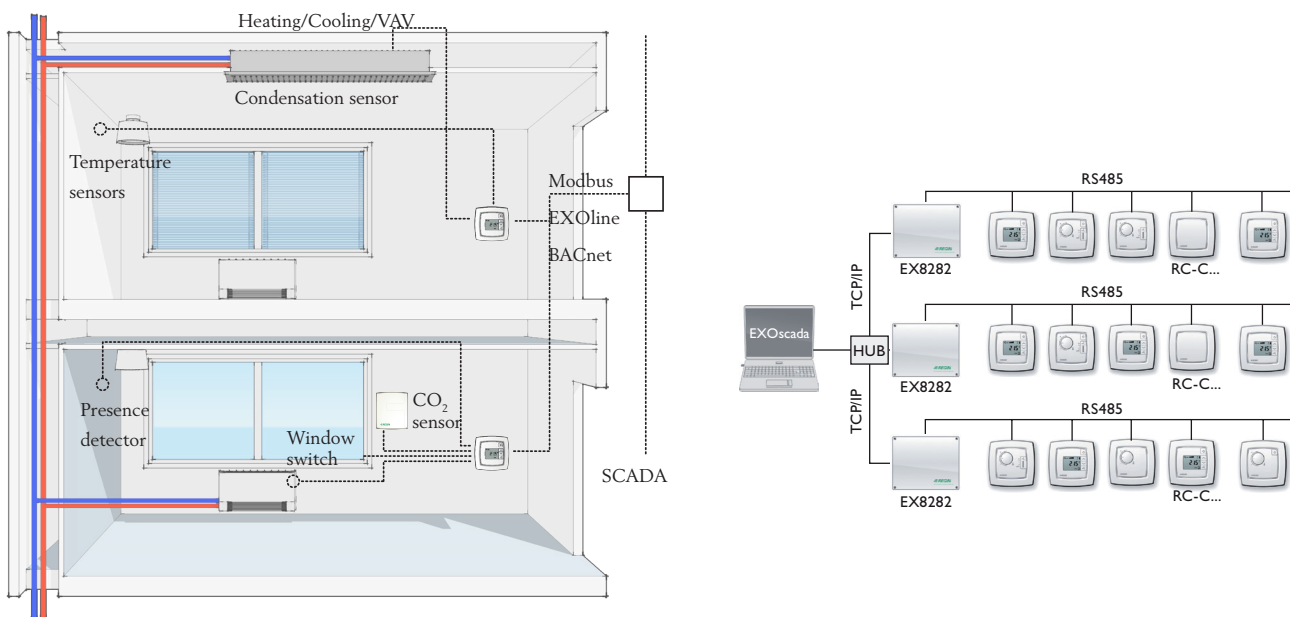
Wiring

Terminal	Designation	Function
10	G	Supply voltage 24 V AC
11	G0	Supply voltage 0 V
12-14		No function
20	GDO	24 V AC out common for DO
21	G0	0 V common for UO (if using 0...10 V actuators)
22	UO3	Damper output for forced ventilation (24 V AC), alt. EC fan (0...10 V DC), alt. damper following heating/cooling in sequence, alt. lighting control (on/off)
23	UO1	Output for 0...10 V valve actuator alt. thermal actuator alt. On/Off actuator, heating (FS), cooling or heating/cooling via change-over.
24	UO2	Output for 0...10 V valve actuator/damper actuator alt. thermal actuator alt. On/Off actuators, heating or cooling (FS).
30	AI1	Input for external sensor, alt. change-over sensor, alt. supply air temperature limitation sensor
31	AI2	Input for CO ₂ sensor, 0...10 V DC, alt. air speed
32	DI1	Input for occupancy detector, alt. window switch, alt. digital change-over
33	DI2/CI	Input for condensation sensor KG-A/1 alt. window switch alt. digital change-over
40	+C	24 V DC out common for UI and DI
41	AGnd	Analogue ground
42	A	RS485-communication A
43	B	RS485-communication B

Dimensions



Application examples



Product documentation

The product documentation can be downloaded from www.regincontrols.com