REGIN RC-CDFO Pre Programmed Room Controller with Display Communication and Fan Button Owner's Manual

Contents

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Product Information

RC-CDFO Pre-Programmed Room Controller

The RC-CDFO is a pre-programmed room controller from the Regio Midi series designed to control heating and cooling in fan-coil systems. It features communication via RS485 (Modbus, BACnet or EXOline), quick and simple configuration via Application Tool, easy installation, and on/off or 0…10 V control. The controller has a backlit display and an input for occupancy detector, window contact, condensation sensor, or change-over function. It also has a built-in room temperature sensor and can be connected to an external sensor for room temperature, change-over, or supply air temperature limitation (PT1000).

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.

Actuators

The RC-CDFO can control 0…10 V DC valve actuators and/or 24 V AC thermal actuators or on/off actuators with spring return.

Flexibility with Communication

The RC-CDFO can be connected to a central SCADA system via RS485 (EXOline or Modbus) and configured for a specific application using the free configuration software Application Tool.

Display Handling

The display has indications for heating or cooling setpoint, standby indication, service parameter settings, unoccupied/off indication (also shows temperature), indoor/outdoor temperature, and setpoint. The controller also has occupancy, increase/decrease, and fan buttons.

Control Modes

The RC-CDFO can be configured for different control modes/control sequences, including heating, heating/heating, heating or cooling via change-over function, heating/cooling, heating/cooling with VAV-control and forced supply air function, heating/cooling with VAV-control, cooling, cooling/cooling, heating/heating or cooling via change-over, and change-over with VAV function.

Product Usage Instructions

Before installing and using the RC-CDFO pre-programmed room controller, please read the user manual carefully and follow the instructions provided.

Installation

The modular design of the Regio range of controllers makes them easy to install and commission. To install the RC-CDFO:

1. Place the separate bottom plate for wiring into position before installing the electronics.
2. Mount the controller directly on the wall or on an electrical connection box.

Configuration

The RC-CDFO can be configured for a specific application using the free configuration software Application Tool. The parameter values can be changed using the INCREASE and DECREASE buttons on the controller’s display and confirmed with the Occupancy button. To prevent unauthorized users from making changes to the settings, it is possible to block button functionality and parameter menu access.

Control Modes

The RC-CDFO can be configured for different control modes/control sequences. Please refer to the user manual for detailed instructions on configuring the controller for your specific application.

Usage

The RC-CDFO is designed to control heating and cooling in fan-coil systems. It features communication via RS485 (Modbus, BACnet or EXOline), quick and simple configuration via Application Tool, easy installation, and on/off or 0…10 V control. The controller has a backlit display and an input for occupancy detector, window contact, condensation sensor, or change-over function. It also has a built-in room temperature sensor and can be connected to an external sensor for room temperature, change-over, or supply air temperature limitation (PT1000). The display has indications for heating or cooling setpoint, standby indication, service parameter settings, unoccupied/off indication (also shows temperature), indoor/outdoor temperature, and setpoint. The controller also has occupancy, increase/decrease, and fan buttons. The RC-CDFO can control 0…10 V DC valve actuators and/or 24 V AC thermal actuators or on/off actuators with spring return. Please refer to the user manual for detailed instructions on configuring the controller for your specific application.

RC-CDFO is a complete pre-programmed room controller from the Regio Midi series intended to control heating and cooling in fan-coil systems.

RC-CDFO

Pre-programmed room controller with display, communication and fan button

- Communication via RS485 (Modbus, BACnet or EXOline)
- Quick and simple configuration via Application Tool
- Easy installation
- On/Off or 0…10 V control
- Backlit display
- Input for occupancy detector, 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 etc.

Function
RC-CDFO is a room controller in the Regio series. It has a button for three-speed fan control (fan-coil), display, as well as communication via RS485 (Modbus, BACnet or EXOline) for systems integration.

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).

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

Flexibility with communication
RC-CDFO can be connected to a central SCADA system via RS485 (EXOline or Modbus) and configured for a specific application using the free configuration software Application Tool.

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:

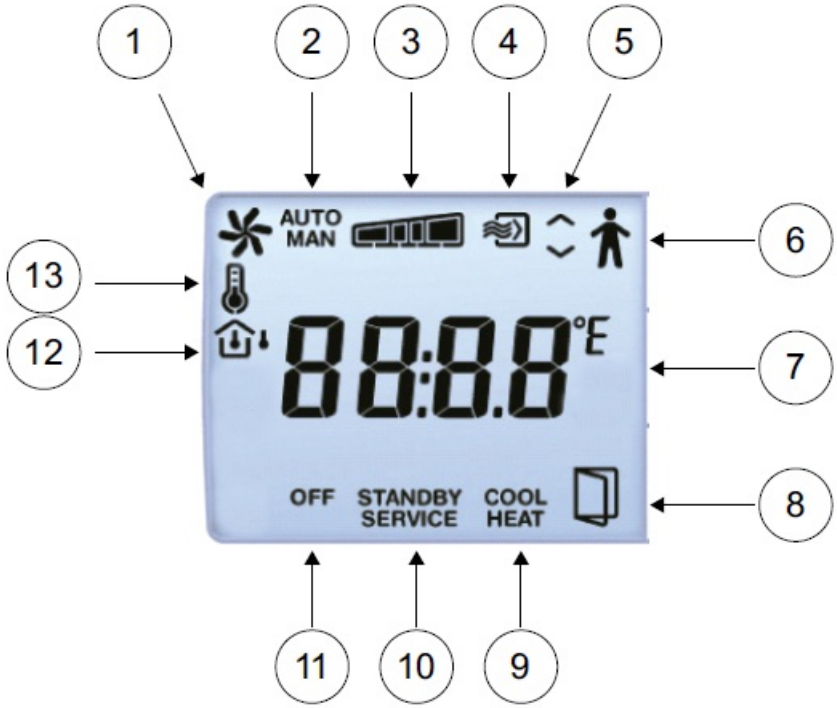


Fig. 1 Display indications

1	Fan
2	Auto/Manual indication for the fan
3	Current fan speed (0, 1 ,2, 3)
4	Forced ventilation
5	Changeable value
6	Occupancy indication
7	Current room temperature in °C to one decimal point
8	Open window
9	COOL/HEAT: Shows if the unit controls according to the heating or cooling setpoint
10	STANDBY: Standby indication, SERVICE: Parameter settings
11	OFF: Unoccupied (also shows temperature) or Off indica- tion (only OFF)
12	Indoor/Outdoor temperature
13	Setpoint

The buttons on the controller enable 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 are confirmed with the Occupancy button.

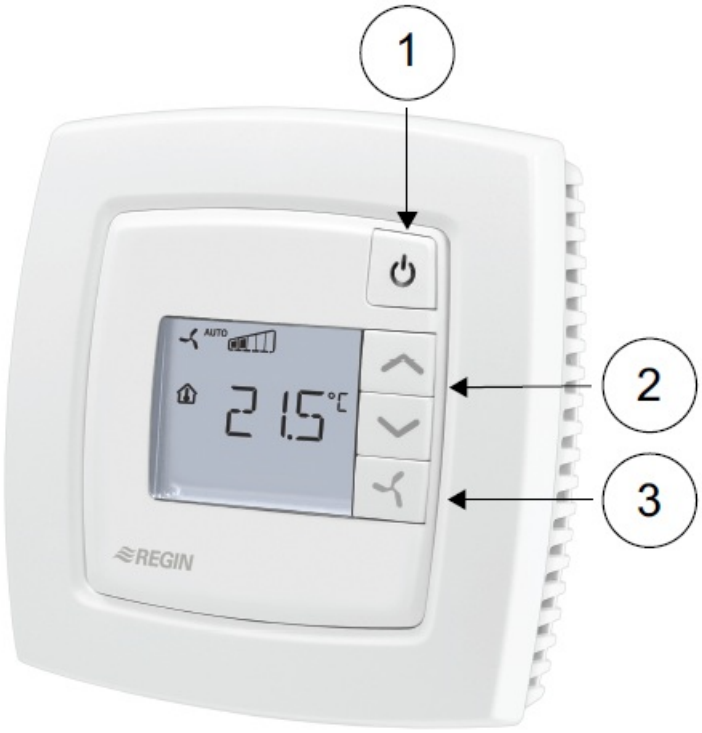


Fig. 2 RC-CDFO with occupancy, increase/decrease and fan buttons

1	Occupancy button
2	Increase (∧) and Decrease (∨) buttons
3	Fan button

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

Control modes

RC-CDFO can be configured for different control modes/ control sequences:

- Heating
- Heating/Heating
- Heating or cooling via change-over function
- Heating/Cooling
- Heating/Cooling with VAV-control and forced supply air function
- Heating/Cooling with VAV-control
- Cooling
- Cooling/Cooling
- Heating/Heating or Cooling via change-over
- 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 the 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 Standby) 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.

Occupancy detector

By connecting an occupancy detector, RC-CDFO can switch between the preset operating mode for presence (Bypass or Occupied) and its preset operating mode. This way, the temperature is controlled by the 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. Application Tool or the display enables selecting which operating mode, Off or Unoccupied, should be activated on "Shutdown" (FS=Unoccupied). Pressing the button for less than 5 seconds when the controller is in Shutdown mode will cause it to revert to Bypass mode.

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 (DO4). This can for instance be used to open a damper. The function is terminated when the settable forcing interval has run out.

Change-over function

RC-CDFO 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.

Control of the electrical heater

Models offering fan functionality have a function for controlling a heating coil on UO1 in sequence with a change-over on UO2. To activate this function, parameter 11 is used to set the control mode "Heating/Heating or Cooling via change-over". The change-over function will then be used to switch between summer and winter mode. UO2 will be used as a cooling actuator in summer mode and as a heating actuator in winter mode. When in summer mode, RC-CDFO functions as a heating/cooling controller and when in winter mode as a heating/heating controller. UO2 will initiate first, followed by UO1 (heating coil).

The heating coil connected to UO1 will activate only if the coil on UO2 cannot fulfill the heating requirement by itself.

Note that Regio has no input for monitoring fan status or overheating of the heating coil. These functions must instead be supplied by a SCADA system.

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.

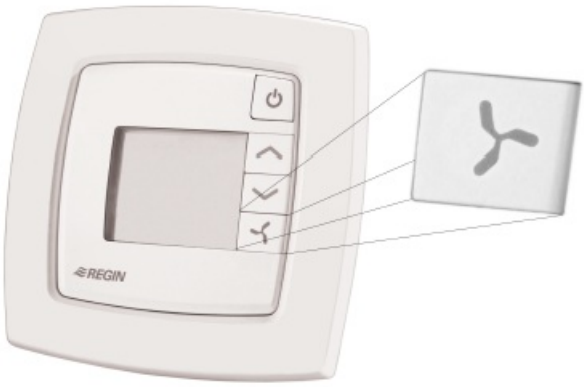
Built-in safety functions
RC-CDFO has an input for a condensation sensor to detect moisture accumulation. If detected, the cooling circuit will be stopped. The controller also has frost protection. This prevents frost damages by ensuring that the room temperature does not drop below 8°C when the controller is in mode Off.

Supply air temperature limitation
AI1 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. The actuator exercise is switched off if the interval is set to 0.

Fan control
RC-CDFO has a fan button used for setting the fan speed. Pressing the fan button will cause the fan to move from its current speed to the next.
The controller has the following positions:

Auto	Automatic control of the fan speed to maintain desired room temperature
0	Manually off
I	Manual position with low speed
II	Manual position with medium speed
III	Manual position with high speed



In operating modes Off and Unoccupied, the fan is stopped regardless of the display setting. Manual fan control can be blocked if desired.

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.

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 the 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.

Relay module, RB3
RB3 is a relay module with three relays for controlling fans in fan-coil applications. It is intended to be used together with RC-…F… model controllers from the Regio range. For more information, see the instruction for RB3.

Configuration and supervision using the Application Tool

RC-CDFO is pre-programmed upon delivery but can be configured using the 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 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
Material, casing	Polycarbonate, PC
Weight	110g
Colour	Signal white RAL 9003

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

Inputs

External room sensor or s upply air temperature limit ation sensor	PT1000 sensor, 0…50°C. Suitable sensors are Regin's TG-R5/PT1000, TG-UH3 /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, win dow contact	Regin's condensation sensor KG-A/1 resp. potential-free contact

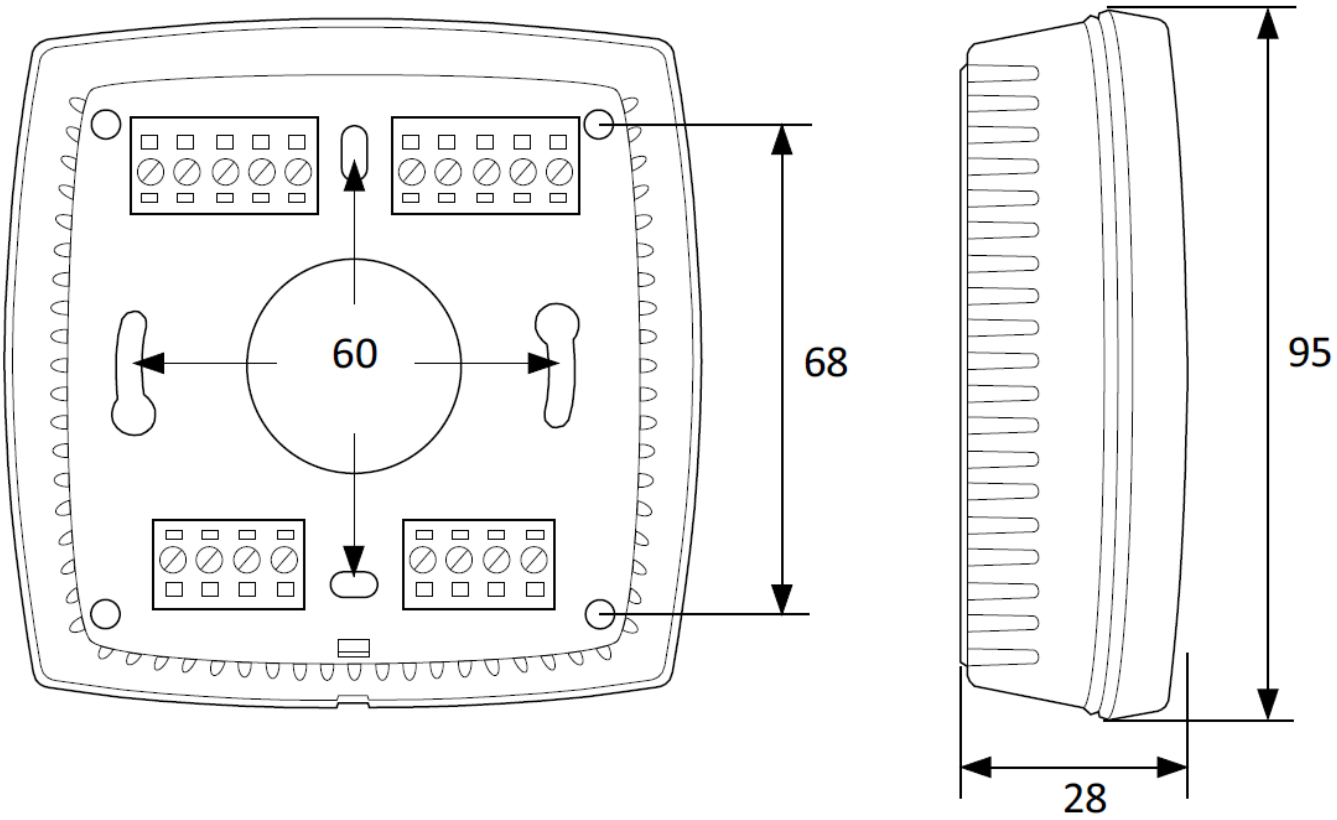
Outputs

Valve actuator (0…10 V), alt. 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)
Fan control		3 outputs for speed I, II and III respectively, 24 V AC, max 0.5 A
Forced ventilation		24 V AC actuator, max 0.5 A
Exercise		FS=23 hours interval
Terminal blocks		Lift type for max cable cross-section 2.1 mm2

Setpoint settings via Application Tool or in display

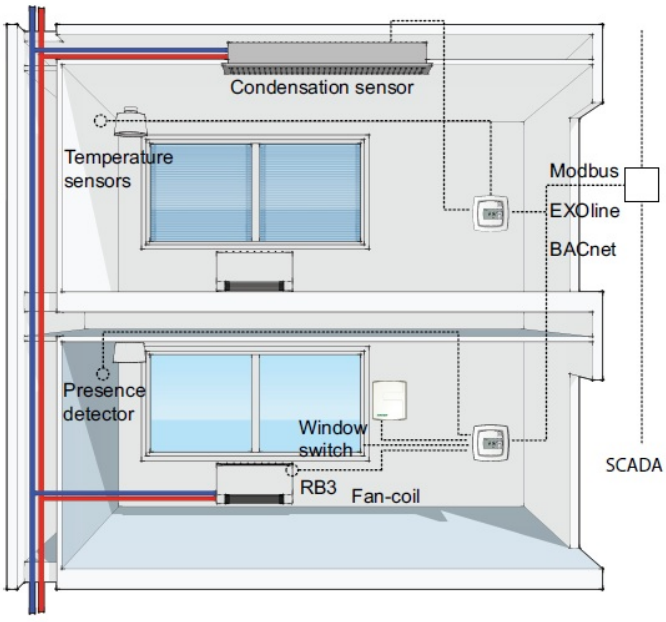
Basic heating setpoint	5…40°C
Basic cooling setpoint	5…50°C
Setpoint displacement	±0…10°C (FI=±3°C)

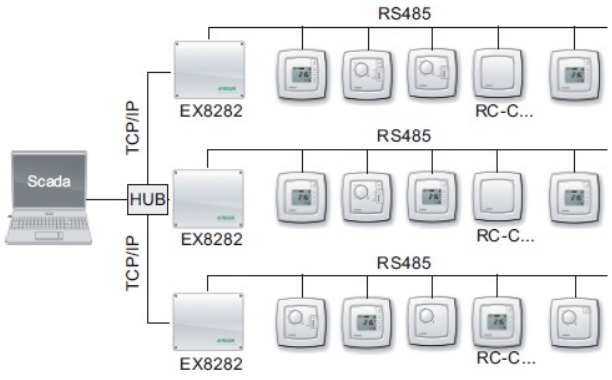
Dimensions



Wiring

Terminal	Designation	Function
10	G	Supply voltage 24 V AC
11	G0	Supply voltage 0 V
12	DO1	Output for fan control I
13	DO2	Output for fan control II
14	DO3	Output for fan control III
20	GDO	24 V AC out common for DO
21	G0	0 V common for UO (if using 0…10 V actuators)
22	DO4	Output for forced ventilation
23	UO1	Output for 0…10 V valve actuator alt. thermal or On/Off actuator. Heating (FS) Cooling or Heating or Cooling via change-over.
24	UO2	Output for 0…10 V valve actuator alt. thermal or On/Off actuator. Heating, Cooling (FS) or Heating or Cooling via change-over
30	AI1	Input for an external setpoint device, alt. supply air temperature limitation sensor
31	UI1	Input for change-over sensor, alt. potential-free contact
32	DI1	Input for occupancy detector, alt. window contact
33	DI2/CI	Input for Regin's condensation sensor KG-A/1 alt. window switch
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





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

HEAD OFFICE SWEDEN

- Phone: +46 31 720 02 00
- Web: **www.regincontrols.com**
- E-mail: **info@regincontrols.com**

Documents / Resources

	**REGIN RC-CDFO Pre Programmed Room Controller with Display Communication and Fan Button** [pdf] Owner's Manual RC-CDFO, RC-CDFO Pre Programmed Room Controller with Display Communication and Fan Button, RC-CDFO Pre Programmed Room Controller, RC-CDFO, Pre Programmed Room Controller with Display Communication and Fan Button, Pre Programmed Room Controller, Room Controller, Controller