



# RCF-230CD

Room thermostat with communication for fan-coil applications with 230 V AC on/off outputs.

Intended to control heating and/or cooling in 2- or 4-pipe installations. Setpoint and fan speed are set using the buttons on the front. Communication via Modbus, BACnet or EXOline.

RCF-230CD is a thermostat for controlling heating and/or cooling in a room via on/off outputs. It also has a function for three-speed fan control (for fan-coil).

The thermostat uses 230 V AC supply voltage. It has triac outputs for 230 V AC heating/cooling and built-in 230 V AC fan relays, which means that a separate relay module is not required for the fan and actuators.

RCF-230CD has communication via RS485 (Modbus, BACnet or EXOline) for integration into systems. The device can be configured using the Regio tool<sup>®</sup> software, downloadable free of charge from Regin's website ([www.regincontrols.com](http://www.regincontrols.com)).

## Applications

The thermostat is suitable in buildings where you want optimal comfort and reduced energy consumption, for example offices, schools, shopping centres, airports, hotels, hospitals etc.

## Easy to install

Its modular design, featuring a separate bottom plate for wiring, makes the thermostat 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 wall socket.

## Control function

The thermostat controls heating and/or cooling in a room via on/off outputs. It has a settable hysteresis and the setpoint can be changed using the INCREASE (▲) and DECREASE (▼) buttons on the front.

See also the section "Display information and handling" on page 3.

### Short facts about RCF-230CD

- Supply voltage 230 V AC
- Inputs for presence detector and/or window contact
- Built-in relays for a 3-speed fan, 230 V AC
- Input for automatic change-over cooling/heating
- BTL tested from software version 1.2-1-00

### Built-in or external sensor

The thermostat has a built-in sensor. Alternatively, the input for an external PT1000-sensor can be used.

### On/off control outputs

RCF-230CD has outputs for control of e.g. 230 V AC on/off actuators.

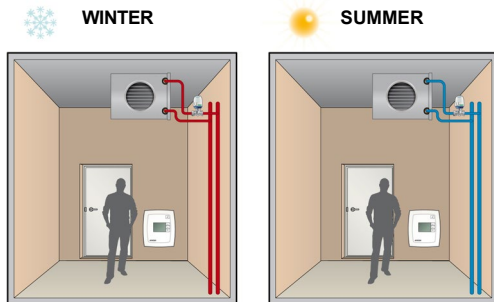
### Communication protocols

The room thermostat has automatic detection and switch-over between Modbus and EXOline. BACnet must however be set manually via the display or by using Regio tool<sup>®</sup>.

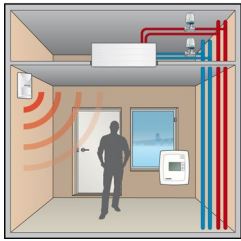


## 2- and 4-pipe installations

In 2-pipe installations, the same pipe system is used for heating and cooling depending on the current season. Chilled water circulates through the system during summer and heated water during winter. When RCF-230CD is configured for a 2-pipe system, output DO4 is used for controlling heating or cooling (depending on the season (fluid temperature)) via an actuator, a valve or similar (change-over function).



In 4-pipe installations, there are two separate water systems for heating and cooling with separate valves. The thermostat uses two outputs for control of heating and cooling in sequence.



### Automatic cooling/heating change-over

RCF-230CD has an input for change-over which is used when the thermostat is configured for 2-pipe installations. It sets output DO4 to operate with heating or cooling function depending on the fluid temperature (season).

The change-over input can be connected to a potential-free relay contact or a PT1000-sensor.

The input function for the relay contact can be set to normally open (NO) or normally closed (NC). If the change-over input is not used, we recommend that it is left disconnected and set to NO (factory setting).

When using a sensor, it must be mounted so that it can measure the temperature on the supply pipe to the coil. To ensure satisfactory function, the system must also have continuous primary circuit circulation. Using a sensor, the output function is set to heating when the fluid temperature exceeds 28°C and to cooling when the temperature falls below 16°C.

At heating function "HEAT" is shown in the display and at cooling function "COOL" is shown.

### Occupancy detection for saving energy


By connecting an occupancy detector or a keycard switch (in hotels) to a digital input, you can alternate between Comfort and Economy mode. This way, the temperature is controlled from requirement, making it possible to save energy while maintaining the temperature at a comfortable level.

Using occupancy detection, you can delay activation and/or inactivation of Comfort mode to avoid switching mode if someone temporarily enters or leaves the room.

A window contact can be connected to either digital input 1 or universal input 1. The window contact will set the controller to "Off" mode if a window is opened, thereby minimising energy consumption.


### Operating modes

There are four different operating modes, Comfort, Economy (Standby), Off and Window. Switching between these modes is performed locally or via the SCADA system.

**Comfort:**  is shown in the display and the room is in use. The temperature is held at the comfort level with a deadband (DB) between activation of heating and cooling.

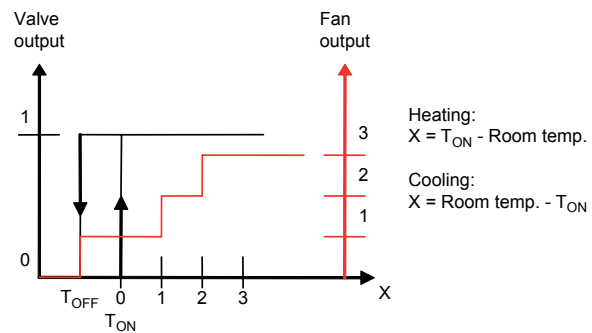
**Economy (Standby):** "Standby" is shown in the display. The room is in an energy saving mode and is not used at the moment. This can for example be during nights, weekends, evenings etc. or during daytime when there is no one in the room. The thermostat is prepared to change operating mode to Comfort if someone enters the room. Heating and cooling have freely adjustable setpoints.

**Off:** "Off" is shown in the display and the backlight is switched off. The thermostat neither heats or cools and the fan stops (except if mould protection has been selected, in which case the fan will keep running). Off mode is selected by pressing the On/Off button.

**Window:**  is shown in the display and the thermostat is in off mode and the fan stops (except if mould protection has been selected, in which case the fan will keep running).

### Fan speed control

The current fan speed is shown in the display and can be set manually to Low → Medium → High → Auto by pressing the fan button. In Auto mode, fan speed is controlled by the difference between the setpoint and actual value of the room.



When there is no heating or cooling demand in the Auto position, the fan will run at its lowest setting. This can be changed to make the fan stop when there is no heating or cooling demand. The fan is also deactivated when in modes Off and Window. However, it will continue to run if mould protection has been configured.

If the fan has been configured to not be affected by controller output, the "AUTO" option will not be shown when pressing the fan button.

### Mould protection

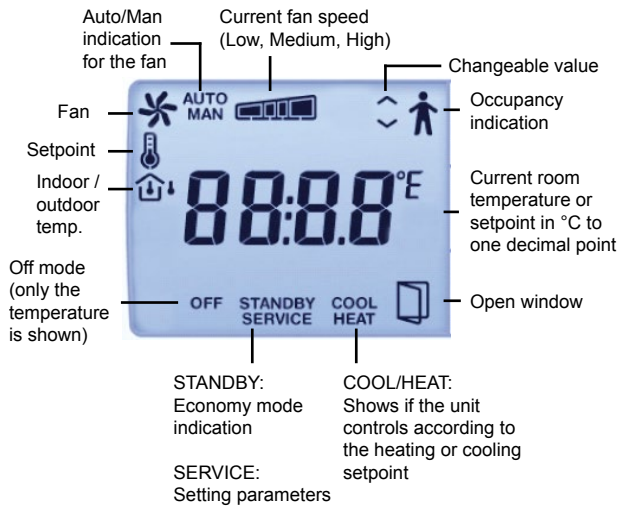
When this function has been configured, the fan will always run at the lowest speed and circulate air in the room to minimise the risk of mould growth in the fan-coil unit. The function is deactivated on delivery.

### Automatic valve exercise

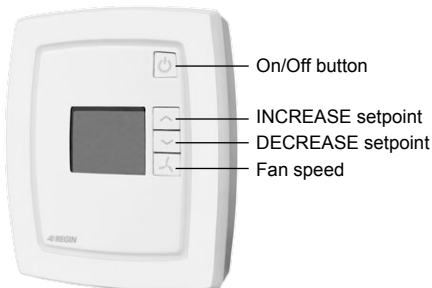
To ensure proper functionality, the thermostat has a function for valve exercise, even during periods when they are not in use. At regular intervals the output is overridden to close for a moment in order to open and close the valves. The exercise interval can be set individually for heating and cooling. The exercise function can also be inactivated if desired.

### Display information and handling

The display has the following indications:



The display is handled using the buttons on the thermostat:



#### On/Off button

By pressing the On/Off button, RCF-230CD will switch between Off mode and Comfort/Economy mode.

#### Setpoint buttons

The INCREASE and DECREASE buttons are used to change the setpoint value. The basic setpoint can be changed within adjustable min./max. limits.

#### Fan button

By pressing the fan button, the fan speed is set to Low, Medium, High or Auto.

#### Blocking

The buttons of the controller, the configuration menu and the manual fan control can all be blocked in order to prevent settings from being changed by unauthorized individuals.

### Configuration

The factory settings can be changed by using the display and buttons on the thermostat, or alternatively by using Regio tool®.

The parameter values are changed with the INCREASE and DECREASE buttons and changes confirmed with the On/Off button.

The parameter list can be found in the instruction for RCF-230CD and in the manual for RCF.

### Display configuration

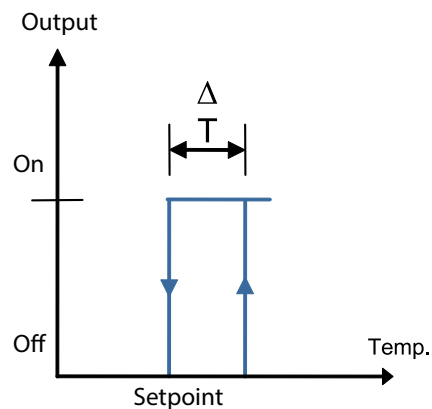
The desired contents of the display can be configured via the parameter list. There are four alternatives:

1. The actual value is normally shown. The setpoint is shown when it is changed using the INCREASE and DECREASE buttons.
2. The actual value is normally shown. The setpoint displacement is shown when it is changed using the INCREASE and DECREASE buttons.
3. The setpoint value is shown (factory setting).
4. The setpoint adjustment is shown.

### Control principles

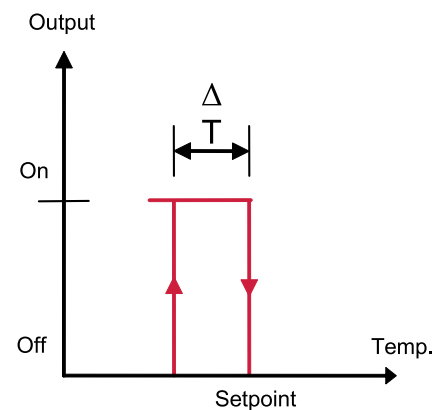
#### Control principle at cooling function

During control of cooling, the output is activated when the temperature rises above the setpoint by the set hysteresis. The output closes when the setpoint value is reached.



#### Control principle at heating function

During control of heating, the output is activated when the temperature falls below the setpoint by the set hysteresis. The output closes when the setpoint value is reached.



**Technical data**

Supply voltage	230 V AC $\pm 10\%$ , 50/60 Hz
Power consumption	3 W, class II construction
Ambient temperature	0...50°C
Storage temperature	-20...+70°C
Ambient humidity	Max. 90 % RH
Protection class	IP20
Communication	RS485 (Modbus or EXOline with automatic detection/switching), or BACnet
Modbus	8 bits, 1 or 2 stop bits. Odd, even (FS) or no parity.
BACnet	MS/TP slave and master
Communication speed	9600, 19200, 38400 bps (EXOline, Modbus and BACnet) or 76800 bps (BACnet only)
Pollution degree	2
Overvoltage category	3
Display	LCD with backlight
Built-in temperature sensor	NTC type, measuring range 0...50°C
Terminal blocks	Lift type for max. cable area 2.1 mm <sup>2</sup>
Material, casing	Polycarbonate, PC
Colour	
Cover	Polar white RAL9010
Bottom plate	Light grey
Mounting	Indoor, wall mounting, fits on a standard wall socket
Dimensions (HxWxD)	120 x 102 x 29 mm
Weight	0.18 kg



**LVD, Low Voltage Directive / EMC emissions & immunity standards:** This product conforms to the EMC and LVD requirements in the European harmonised standards EN 60730-1:2000 and EN 60730-2-9:2002. It carries the CE mark.

**RoHS:** This product conforms to the Directive 2011/65/EU of the European Parliament and of the Council.

**Inputs**

External sensor, AI1	PT1000-sensor. Suitable sensors are TG-R5/PT1000, TG-UH/PT1000, TG-A1/PT1000 and TG-K3-PT1000 from Regin.
UI1	Change-over, potential-free contact or PT1000-sensor. Suitable sensor is TG-A1/PT1000 from Regin or window contact.
Presence/window contact, DI1	Potential free contact. A suitable occupancy detector is IR24-P from Regin.

**Outputs**

Fan control, DO1, 2, 3	3 outputs for speed I, II and III, 230 V AC, max. 3 A fan-coil
Valve, DO4, DO5	2 outputs, 230 V AC, max. 300 mA (3 A initially)

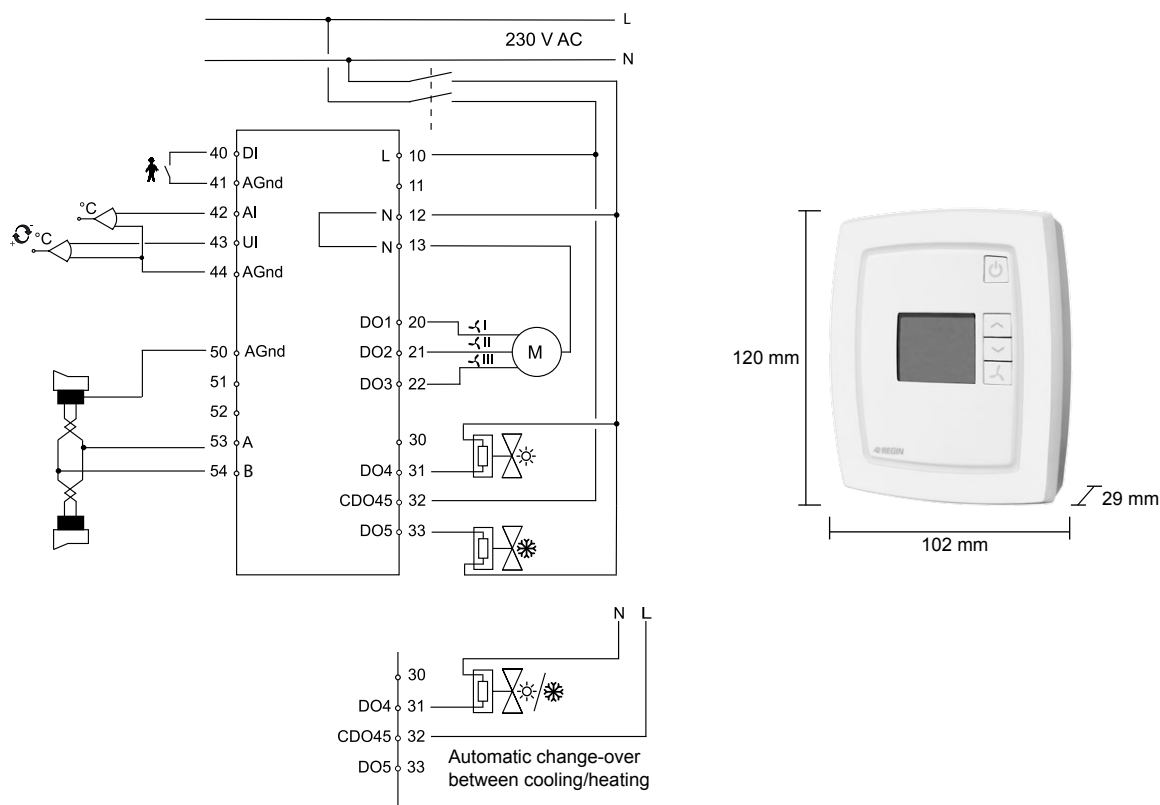
**Settings**

	Possible settings	Factory setting (FS)
Basic setpoint	5...50°C (0...100°C with Regio tool <sup>®</sup> )	22°C
Internal sensor calibration	-10...10 K	0 K
External sensor calibration	-10...10 K	0 K
Hysteresis	0.5...50 K	1 K
DB, deadband at Comfort	0.1...10 K	2 K
Installation type	2- or 4-pipe	2-pipe
Input DI1	Normally open (NO) or normally closed (NC)	NO
Input UI1	NO or NC, when used as a relay contact input	NO
Output DO4	NO or NC	NC
Output DO5	NO or NC	NC
Valve exercise	Individually settable for heating and cooling outputs	23 hours interval

## Wiring and dimensions

10	L	230 V AC L	Supply voltage
11	-	Not connected	
12	N	230 V AC N	Supply voltage (internally connected to terminal 13)
13	N	Fan-coil common / 230 V AC N	Common fan-coil connector (internally connected to terminal 12)
20	DO1	Fan-coil output 1 for fan control	Relay, 230 V AC*, 3 A
21	DO2	Fan-coil output 2 for fan control	Relay, 230 V AC*, 3 A
22	DO3	Fan-coil output 3 for fan control	Relay, 230 V AC*, 3 A
30	-	Not connected	
31	DO4	Digital output 4 for heating/cooling	Digital output. 230 V AC, max. 300 mA (3 A initially).
32	CDO45	Common DO4 & 5	Common connection for digital outputs 4 and 5
33	DO5	Digital output 5 for cooling	Digital output. 230 V AC, max. 300 mA (3 A initially).
40	DI	Digital input	Floating (potential-free) window contact or occupancy contact. Configurable for NO/NC.
41	Agnd	Analogue ground	
42	AI	Analogue input	PT1000, external room sensor or supply sensor
43	UI	Universal input	Change-over input, floating (potential-free) switch (configurable for NO/NC) or PT1000, alternatively a window contact.
44	Agnd	Analogue ground	
50	Agnd	Analogue ground	
51-52	-	Not connected	
53	A	RS485-communication A	
54	B	RS485 communication B	

\*The sum of the current through DO1-DO3 is protected by a fuse



## Product documentation

Document	Type
Instruction RCF-230CD	Instruction for RCF-230CD
Manual RCF	Manual for the RCF range

The documents can be downloaded from [www.regincontrols.com](http://www.regincontrols.com).

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