



RCF-230CD

Room thermostat for fan-coil applications with on/off outputs

RCF-230CD is a room thermostat 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. RCF-230CD offers communication via Modbus or EXOline.

- Supply voltage 230 V AC
- On/off temperature control, 230 V AC outputs
- Built-in relays for a 3-speed fan, 230 V AC
- Backlit display

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

The thermostat has supply voltage 230 V AC. 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.

For integration into a system, RCF-230CD has communication via RS485 (Modbus or EXOline). The device can be configured using the application Regio tool, which can be downloaded from the Regin web site (www.regin.se).

Applications

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

Design

The thermostat has a modern design, inspired by the award-winning design of Regin's Regio controllers.

Simple installation

The modular design with 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 is directly on the wall or on a wall socket.

Control function

The thermostat controls heating and/or cooling in a room via on/off outputs. It has settable hysteresis, factory setting 1 K (°C). The setpoint can be changed using the INCREASE (↗) and DECREASE (↘) buttons on the front.

See also the section "Display information and handling" on page 2.

- Input for occupancy detector or window contact
- Input for automatic change-over cooling/heating
- Communication

Built-in or external sensor

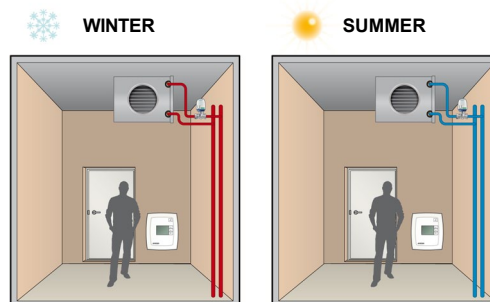
The thermostat has a built-in sensor. Alternatively, the input for an external PT1000-sensor can be used.

On/off control outputs

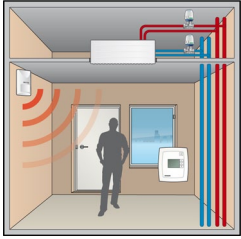
RCF-230CD has outputs for controlling 230 V AC on/off actuators or similar.

2- and 4-pipe installations

In 2-pipe installations, the same pipe system is used for heating and cooling, depending on the season. Chilled water is distributed in 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 pipe systems for heating and cooling with separate valves. The thermostat uses two outputs for control of heating and cooling in sequence.



Automatic change-over cooling/heating (so-called change-over function)

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, it is possible to change between Comfort and Economy mode. This way you can control the temperature according to requirement, which saves energy and keeps the temperature at a comfortable level.

Using occupancy detection, it is possible to delay activation and/or inactivation of Comfort mode, to avoid switching mode if a person temporarily enters or leaves the room.

Alternatively, a window contact can be connected to the input. This sets the thermostat to Off if a window is open with the purpose of minimising energy consumption.

Operating modes


There are four different operating modes, Comfort, Economy (Standby), Off and Window. Switch-over between these modes is performed locally or through the master system.

Comfort:  is shown in the display and the room is in use. The temperature is held at the comfort level with a neutral zone (NZC) between activation of heating and cooling (factory setting for NZC = 2 K (°C)).

Economy (Standby): "Standby" is shown in display. The room is in energy save mode and is not used at the moment. This can for example be during nights, weekends, evenings etc. or during daytime when there is

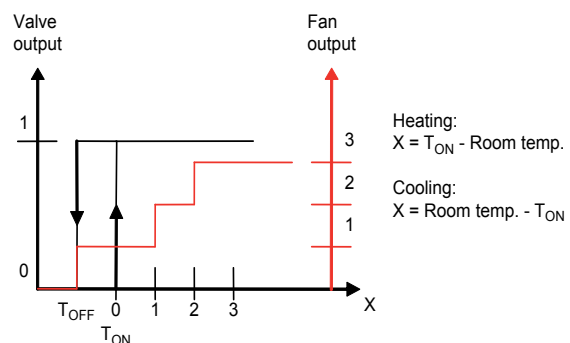
no one in the room. The thermostat is prepared to change operating mode to Comfort if someone enters the room. The heating and cooling setpoints are freely adjustable. Factory settings: heating=15°C, cooling=30°C.

Off: "Off" is shown in the display and the backlight is switched off. The thermostat does not heat or cool and the fan is inactive, unless mould protection function has been configured, in which case the fan will continue to run. Off mode is selected by pressing the On/Off button.

Window:  is shown in the display. The thermostat is in Off mode but the display is lit. Mould protection is active if it has been configured.

Automatic fan speed control

The current fan speed is shown in the display and can be set manually to Low, Medium or High speed. It can also be set to Auto, which means that the fan speed is controlled by the difference between the room's actual value and setpoint value.



The fan speed is set to Low → Medium → High → Auto by pressing the fan button.

When there is no heating or cooling demand in the Auto position, the fan will run at the lowest speed. This can be changed in parameter 31 so that the fan stops when there is no heating or cooling demand. The fan is inactive in the Off and Window modes. However, it will continue to run if mould protection has been configured.

Mould protection

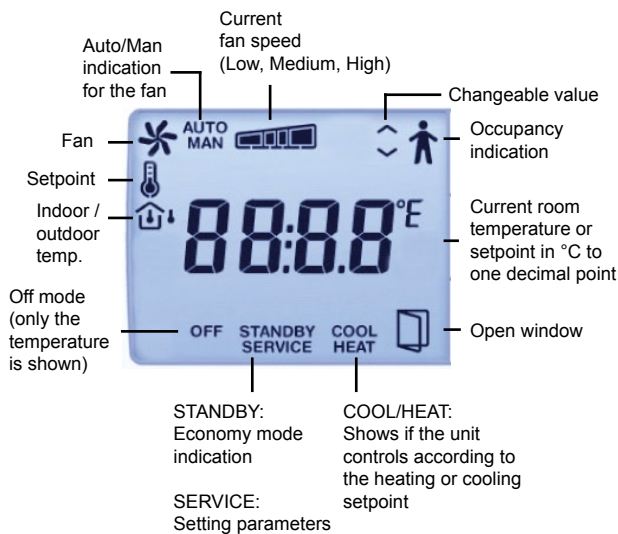
When this function has been configured, the fan will continually run (at its lowest speed, if not set otherwise) and circulate air in the room so as to minimise the risk of mould growth in the fan-coil unit. The function is deactivated on delivery.

Automatic exercise of valves

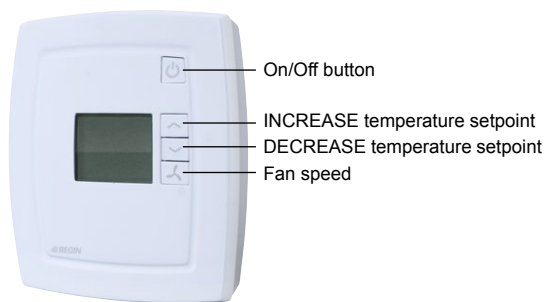
The thermostat has a function for exercising the valves, even during periods when they are not being used, to ensure proper function. Every 23 hours (factory setting), the output is overridden to close for a moment in order to open and close the valves. The exercise interval can be set individually for 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 for changing the setpoint value. What is shown in the display can be configured via the parameter list. There are four alternatives:

1. The actual value is shown, or, when the setpoint has been changed via the INCREASE and DECREASE buttons, the setpoint value is shown in the display (together with the setpoint (thermometer) symbol).
2. The actual value is shown, or, when the setpoint has been changed via the INCREASE and DECREASE buttons, the setpoint adjustment value is shown in the display (together with the setpoint (thermometer) symbol).
3. The setpoint value is shown (factory setting).
4. The setpoint adjustment is shown.

When the setpoint adjustment is displayed (alternatives 2 and 4), the basic setpoint is 22°C.

The minimum limitation of the setpoint value is settable 5...22°C and the maximum limitation is settable 22...35°C.

Fan button

By pressing the fan button, you set the fan speed to Low, Medium, High and Auto.

Configuration

The factory settings can be changed in the display using the buttons on the controller, or alternatively via Regio tool.

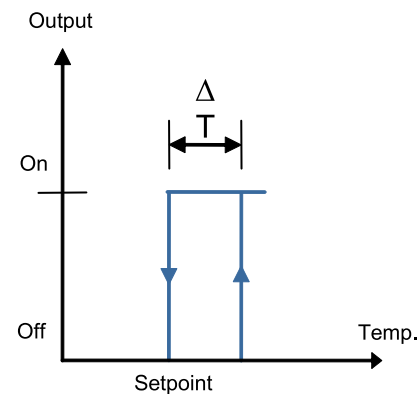
The parameter values are changed with the INCREASE and DECREASE buttons and changes are confirmed with the On/Off button.

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

Control principles

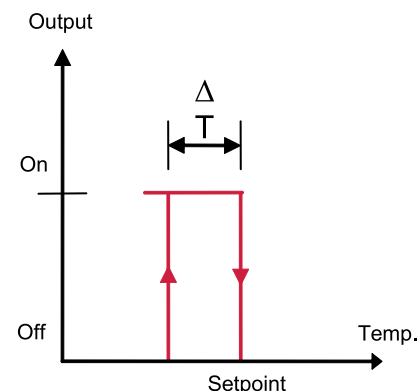
Control principle at cooling function

When the controller is set to 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

When the controller is set to 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 |
| 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 maximum cable area 2.1 mm ² |
| Material, casing | Polycarbonate, PC |
| Colour | |
| Cover | Polar white RAL9010 |
| Bottom plate | Light gray |
| Mounting | Indoor, wall mounting, fits on a standard wall socket |
| Dimensions (HxWxD) | 120 x 102 x 29 mm |
| Weight | 0.18 kg |
| CE | This product conforms to the EMC and LVD requirements in the European harmonised standards EN 60730-1:2000 and EN 60730-2-9:2002 and carries the CE mark. |

Inputs

| | |
|-------------------------------|---|
| External sensor, AI1 | PT1000-sensor. Suitable sensors are TG-R5/PT1000, TG-UH/PT1000 and TG-A1/PT1000 from Regin. The setpoint range is 5...35°C. |
| Change-over, UI1 | Potential-free contact or PT1000-sensor. A suitable sensor is TG-A1/PT1000 from Regin. |
| Occupancy/window contact, DII | 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, 300 mA max. (20 A max. 20 ms) |
| Communication | RS485 (Modbus or EXOline) using automatic detection/switching |
| Modbus | 8 bits, 1 or 2 stop bits. Odd, even (FI) or no parity |
| Communication speed | 9600 bps (not changeable); communication variables are in the RCF manual, available via the Regin web site. |

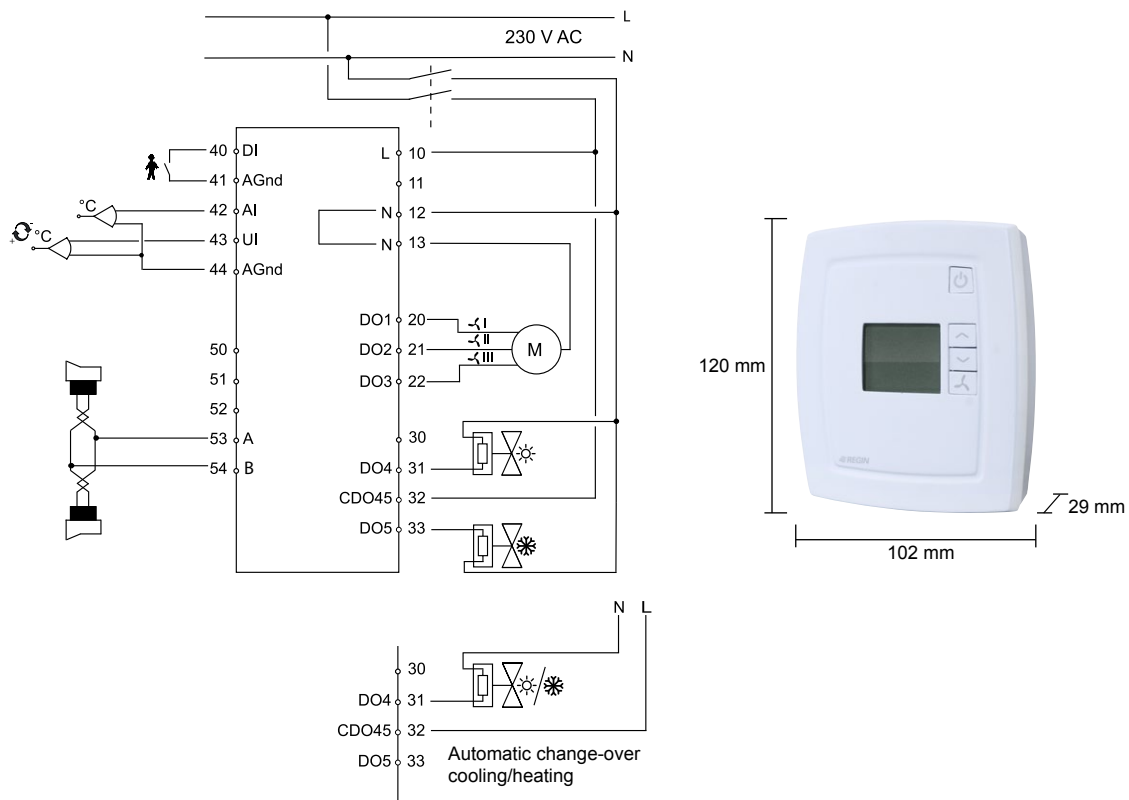
Settings

| | | Factory setting (FS) |
|------------------------------|---|----------------------|
| Setpoint | 5...35°C | 22°C |
| Setpoint, min. limit | 5...22°C | - |
| Setpoint, max. limit | 22...35°C | - |
| Internal sensor calibration | -10 K...10 K | 0 K |
| External sensor calibration | -10 K...10 K | 0 K |
| Hysteresis | 0.5...50 K | 1 K |
| NZC, neutral zone at Comfort | 0.1...10 K | 2 K |
| Installation type | 2- or 4-pipe | 2-pipe |
| Input DII | 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 Line | Power supply |
| 11 | NC | Not connected | |
| 12 | N | 230 V AC Neutral | Power supply (internally connected to terminal 13) |
| 13 | N | Fan-coil common / 230 V AC Neutral | 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 | NC | Not connected | |
| 31 | DO4 | Digital output 4 for heating/cooling | Digital output. 230 V AC, max. 300 mA. Max. 2 A during 20 ms. |
| 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. Max. 2 A during 20 ms. |
| 40 | DI | Digital input | Potential-free window contact or occupancy contact. Configurable for NO/NC. |
| 41 | 0 V | Analogue ground | |
| 42 | AI | Analogue input | External PT1000 instead of the internal NTC |
| 43 | UI | Universal input | Change-over input. Potential-free switch (configurable for NO/NC) or PT1000. |
| 44 | 0 V | Analogue ground | |
| 50-52 | NC | 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 |