



# RCFM-230D

Thermostat for fan-coil applications with on/off outputs and manual change-over function

RCFM-230D is a thermostat for controlling heating and/or cooling in 2-pipe installations. Setpoint and fan speed are set using the buttons on the front.

- Supply voltage 230 V AC
- Temperature control on/off, 230 V AC outputs
- Built-in relays for a 3-speed fan, 230 V AC

- Backlit display
- Input for occupancy detector or window contact
- Manual change-over via button on the front panel

RCFM-230D is a thermostat for controlling heating and/or cooling in a room via on/off outputs. It also has a 3-speed fan control function (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.

### 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.

### 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.

### Built-in or external sensor

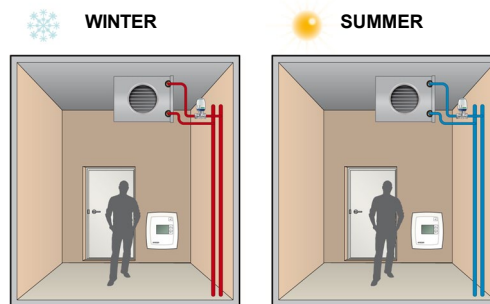
The thermostat has a built-in sensor. Alternatively, the input for an external PT1000-sensor can be used.

### On/off control outputs

RCFM-230D has outputs for control of 230 V AC on/off actuators or similar.

### 2-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 RCFM-230D is intended for control of 2-pipe systems. Output DO4 is used for controlling heating or cooling (depending on manual change-over) via an actuator, a valve or similar (change-over function).



### Manual switching between heating/cooling (change-over function)

The thermostat has manual change-over. By pressing the "M"-button on the front, the thermostat will be set to operate with heating or cooling function.

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 mode

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

**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)).

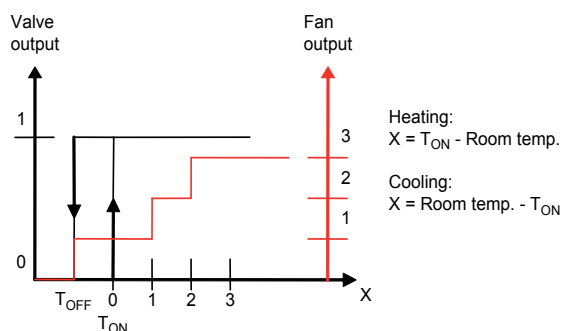
**Economy (Standby):** "Standby" is shown in display. The room is in energy save mode and is not used at the moment. This can for example be during nights, weekends, evenings etc. or during daytime when there is no one in the room. The thermostat is prepared to change operating mode to Comfort if someone 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 stops (unless mould protection has been selected, in which case the fan will still run). Off mode is selected by pressing the fan button until "Off" is shown in the display and the backlight is switched off.

**Window:**  is shown in the display, the thermostat is off and the fan stops (unless mould protection has been selected, in which case the fan will still run).

### Fan control

The current fan speed is shown in the display and can be set manually to Low→Medium→High→Auto→Off by pressing the fan button. In Off mode, the controller is switched off. In Auto mode, the 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 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.

If the fan has been configured not to be affected by the heating or cooling demand, "AUTO" will not be shown when pressing the fan button.

### Mould protection

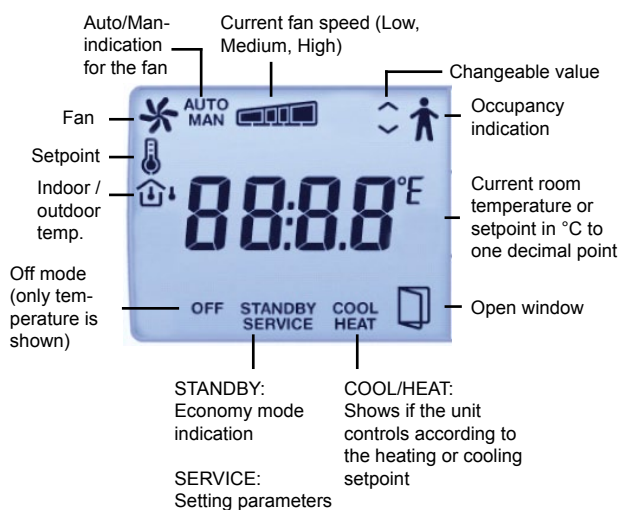
When this function has been configured, the fan will continually run (at its lowest speed, if not set otherwise) and circulate air in the room so as to minimise the risk of mould growth in the fan-coil unit. The function is deactivated on delivery.

### Automatic exercise of valves

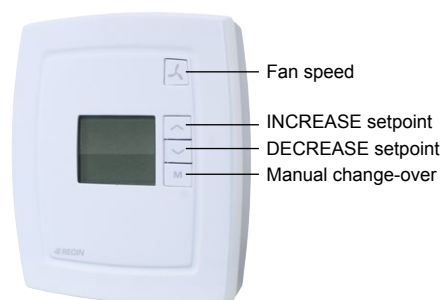
The thermostat has a function for exercising the valves, even during periods when they are not being used, to ensure proper function. Every 23 hours (factory setting), the output is overridden to close for a moment in order to open and close the valves. The exercise interval can be set individually for 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:



**Fan button**

By pressing the fan button, you set the fan speed to Low, Medium, High, Auto and Off. In Off mode, the control function is also inactivated.

**Setpoint buttons**

The INCREASE and DECREASE buttons are used for changing the setpoint value. The basic setpoint can be changed in parameter 64 (factory setting=22°C).

**Button for manual change-over (M-button)**

By pressing the "M"-button, the running mode for the change-over function will be set to operate with heating or cooling function.

**Configuration via the parameter list**

The factory settings are changed in the parameter list shown in the display using the buttons on the thermostat.

The parameter values are changed with the INCREASE and DECREASE buttons and changes are confirmed with the fan button.

The parameter list can be found in the instruction for RCFM-230D.

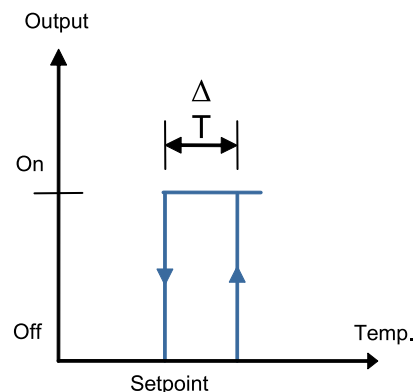
**Display configuration**

What is shown in the display can be configured via the parameter list. There are four alternatives:

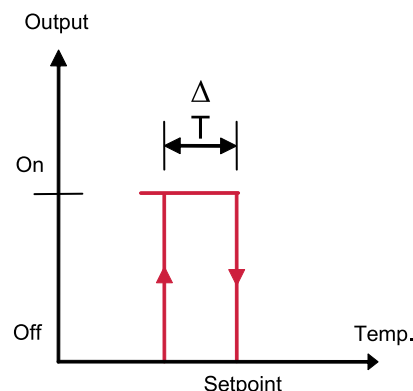
1. The actual value is shown, or, when the setpoint has been changed via the INCREASE and DECREASE buttons, the setpoint value is shown in the display (together with the setpoint (thermometer) symbol).
2. The actual value is shown, or, when the setpoint has been changed via the INCREASE and DECREASE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

**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                            |
| Installation type           | 2-pipe  |
| Ambient temperature         | 0...50°C  |
| Storage temperature         | -20...+70°C   |
| Ambient humidity            | Max. 90 % RH  |
| Protection class            | IP20  |
| Pollution degree            | 2   |
| Overtoltage 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 <sup>2</sup>  |
| 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   |

**Low Voltage Directive (LVD) standards / 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 and 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 and TG-A1/PT1000 from Regin. The setpoint range is 5...35°C. |
| Occupancy/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 AV, max. 3 A fan-coil |
| Valve, DO4             | 230 V AC, 300 mA max. (20 A max. 20 ms)                        |

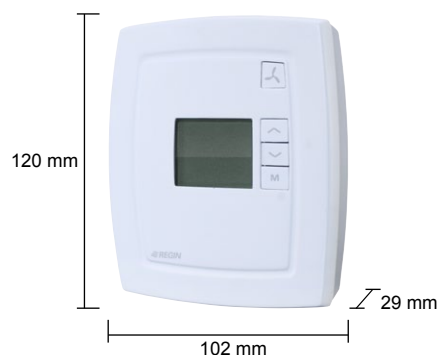
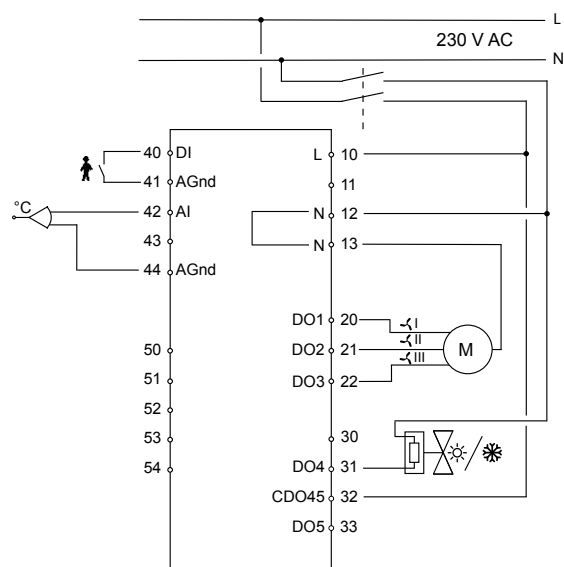
**Settings**

|                              |   | Factory setting (FS) |
|------------------------------|---|----------------------|
| Basic setpoint               | 5...50°C  | 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                  |
| NZC, neutral zone at Comfort | 0.1...10 K  | 2 K                  |
| Input DI1                    | Normally open (NO) or normally closed (NC)            | NO                   |
| Output DO4                   | 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                        | Supply voltage   |
| 11    | -     | 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    | -     | 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    | -     | Not connected                        |  |
| 40    | DI    | Digital input                        | Floating (potential-free) window contact or occupancy contact. Configurable for NO/NC. |
| 41    | Agnd  | Analogue ground                      |  |
| 42    | AI    | Analogue input                       | External PT1000 instead of the internal NTC  |
| 43    | UI    | Not connected                        |  |
| 44    | Agnd  | Analogue ground                      |  |
| 50-52 | -     | Not connected                        |  |
| 53-54 | -     | Reserved for future use              |  |

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



## Product documentation

| Document              | Type                      |
|-----------------------|---------------------------|
| Instruction RCFM-230D | Instruction for RCFM-230D |
| Manual RCF            | Manual for the RCF range  |

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

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