RCF-230D

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

RCF-230D 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.

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

RCF-230D 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.

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.

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-230D 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-230D 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).

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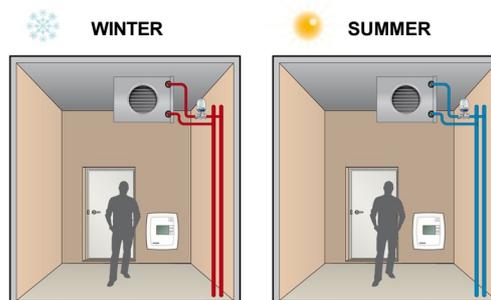
In 4-pipe installations, there are two separate pipe systems for heating and cooling with separate valves. The thermostat uses two outputs for control of heating and cooling in sequence.

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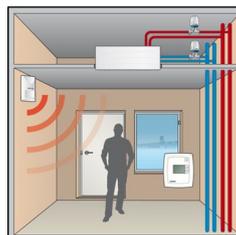
Automatic change-over cooling/heating (so-called change-over function)

RCF-230D 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.

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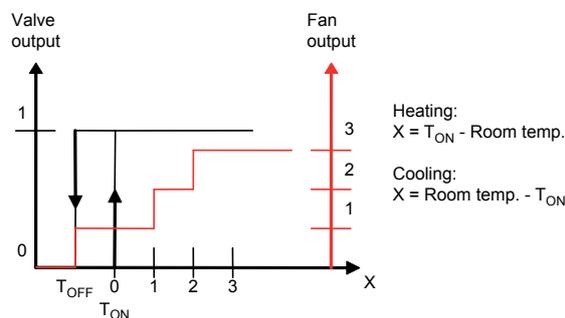
The fan speed is set to Low→Medium→High→Auto by pressing the fan button.

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:

- Auto/Man indication for the fan
- Current fan speed (Low, Medium, High)
- Changeable value
- Fan
- Occupancy indication
- Setpoint
- Indoor / outdoor temp.
- Current room temperature or setpoint in °C to one decimal point
- Off mode (only the temperature is shown)
- Open window

STANDBY: Economy mode indication

SERVICE: Setting parameters

COOL/HEAT: Shows if the unit controls according to the heating or cooling setpoint

The display is handled using the buttons on the thermostat:

- On/Off button
- INCREASE temperature setpoint
- DECREASE temperature setpoint
- Fan speed
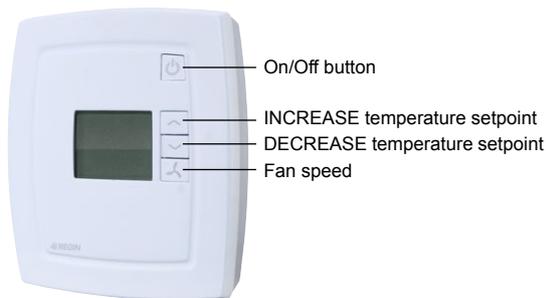
On/Off button

By pressing the On/Off button, RCF-230D 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 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 On/Off button.

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

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.
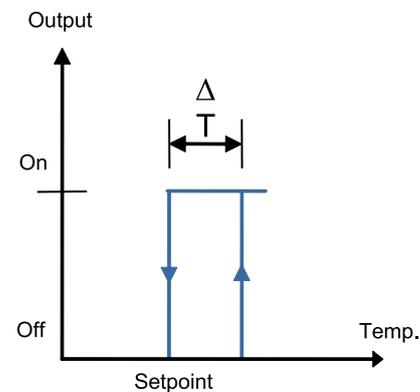
Control principle at heating function

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.
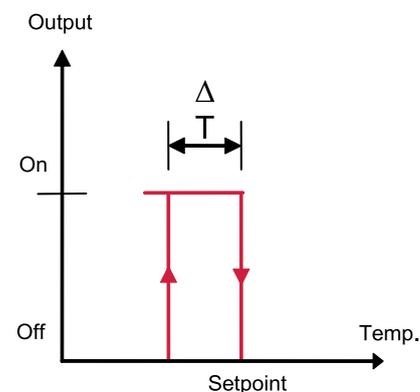
Technical data

Supply voltage	230 V AC ±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, 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, 300 mA max. (20 A max. 20 ms)

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 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 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	
53-54	NC	Reserved for future use	

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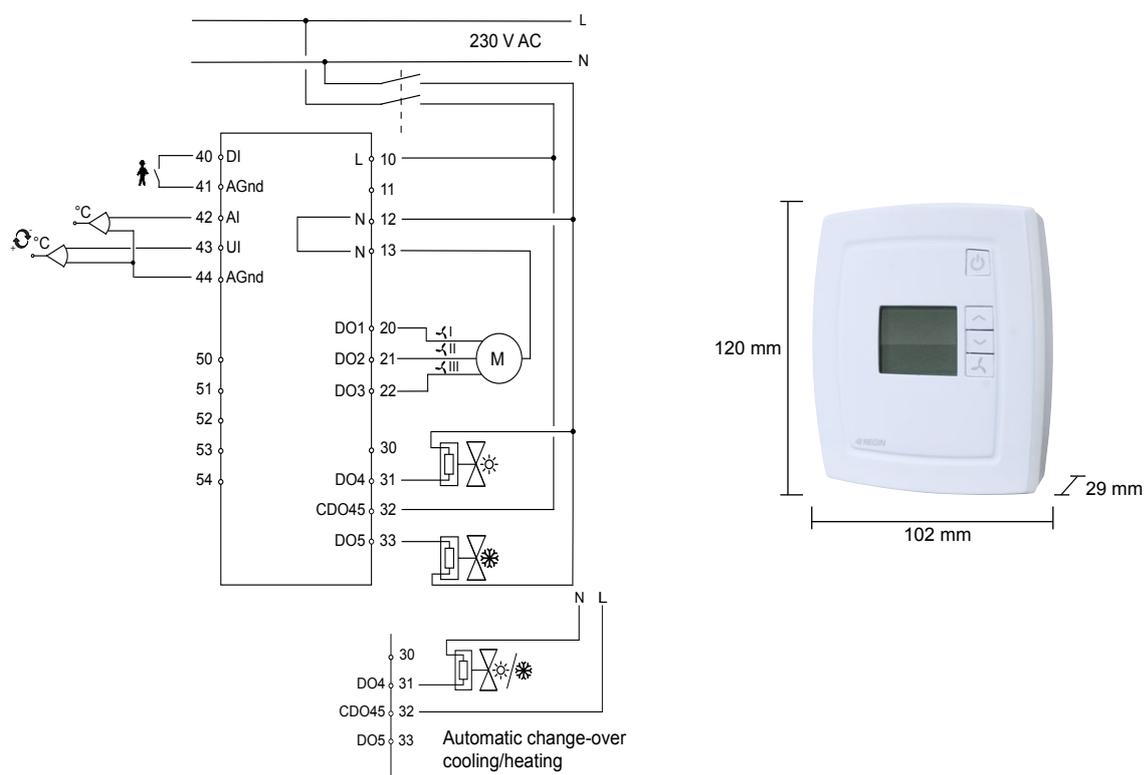
Product documentation

Document	Type
Instruction RCF-230D	Instruction for RCF-230D