CSRCF-230TD

Room controller for fan-coil applications with outputs for two thermal or one 3-position actuator or function for an electric heater

CSRCF-230TD is a room controller 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**
- **230 V AC output, thermal or 3-position actuator**
- **Built-in relays for a 3-speed fan, 230 V AC**

- **Function for an electric heater**
- **Backlit display**
- **Input for occupancy detector or window contact**
- **Input for automatic change-over cooling/heating**

CSRCF-230TD is a controller for controlling heating and/or cooling in a room. It is intended for control of thermal actuators or an actuator with 3-position function (increase-decrease), and also has a function for three-speed fan control (for fan-coil).

The controller 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 controller 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 controller 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 controller controls heating and/or cooling in a room. Control parameters like P-band and I-time can be set in the parameter list via the display. The setpoint can be changed using the INCREASE ($\wedge$) and DECREASE ($\vee$) buttons on the front.

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

Built-in or external sensor

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

Output function for thermal actuators

This function is activated on delivery. When using thermal actuators, the controller works with time-proportional output, which gives continuous setting of the opening position for the valve. Actuators which can be used are CSRTAM-230 or CSRTAOM-230 from Regin together with a suitable valve. Using thermal actuators, the controller can control heating and cooling in sequence with one actuator for heating and one for cooling.

Output function for 3-position actuators

This function can be configured to be used instead of the above factory setting, in the parameter list via the display. When using an actuator with 3-position function, CSRCF-230TD will control it using an increase-decrease signal, in order to achieve continuous opening of the valve that varies with the temperature requirement.
For optimal function, the correct running time for the actuator should be set in the controller (factory setting = 120 s). An actuator with 3-position function can only be used in 2-pipe systems or when only controlling a cooling or a heating valve.

Function for control of an electric heater

CSRCF-230TD has a function for pulse/pause control of an electric heater, similar to control of a thermal actuator. When using an electric heater, the fan will continue to run for 2 minutes after the heater has been switched off in order to cool down the heater.

When using an electric heater, an external unit (e.g. PULSER-ADD or a solid state relay) is to be connected between CSRCF-230TD and the battery.

Note: CSRCF-230TD does not indicate fan breakdown or overheating of the heating coil. Therefore, all connections must be made externally. An overheating protection or similar can be used to disconnect the supply voltage.

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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 CSRCF-230TD is configured for a 2-pipe system, output DO4 is used with two thermal actuators for controlling heating or cooling (depending on the season (fluid temperature)) via an actuator, a valve or similar (change-over function). When using an actuator with 3-position function, the actuator is connected to DO4 and DO5 for increase-decrease function.
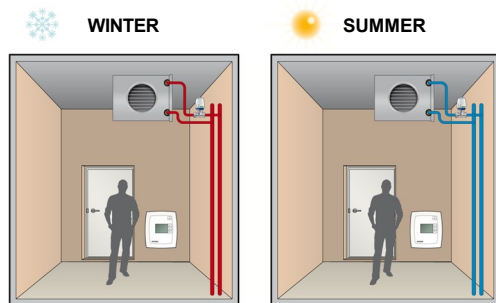
In 4-pipe installations, there are two separate pipe systems for heating and cooling with separate valves. The controller uses two outputs for control of heating and cooling in sequence with two thermal actuators.
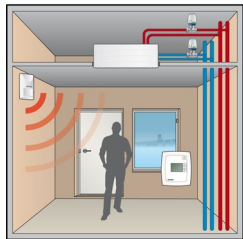
Automatic change-over cooling/heating (so-called change-over function)

CSRCF-230TD has an input for change-over which is used when the controller 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.

When using an electric heater and the change-over function is set to heating, the sequence of operation for CSRCF-230TD will be heating/heating and DO5 will be activated first.

If a change-over sensor is not connected, the sequence will be heating/heating. If cooling is to be used in the sequence, parameter 2 (change-over mode) must be changed manually.

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 controller 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 controller 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 controller does not heat or cool and the fan stops (unless mould protection has been selected or the cool-down function for the electric heater is running, in which case the fan will still run). Off mode is selected by pressing the On/Off button.

Window: ☐ is shown in the display, the controller is off and the fan stops (unless mould protection has been selected or the cool-down function for the electric heater is running, 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 by pressing the fan button. In Auto mode, the fan speed is controlled by the controller output.

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.
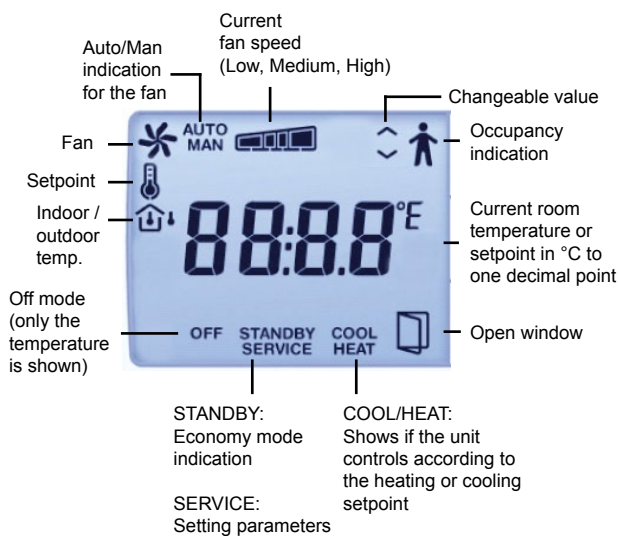
Mould protection

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.
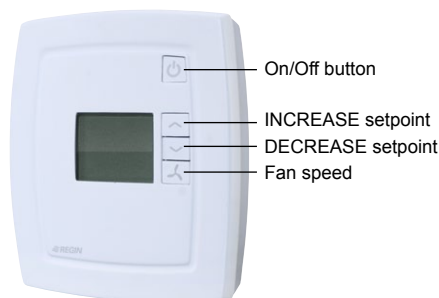
Automatic exercise of valves

The controller 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)
Fan
Setpoint
Indoor / outdoor temp.
Off mode (only the temperature is shown)
Changeable value
Occupancy indication
Current room temperature or setpoint in °C to one decimal point
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 controller:

On/Off button
INCREASE setpoint
DECREASE setpoint
Fan speed

On/Off button

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

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).

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 controller.

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-230TD.

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.
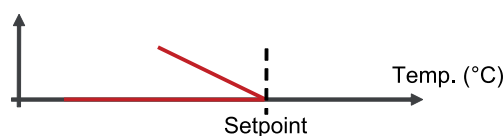
Control principles

Control principle at cooling function, 2-pipe installations

When the controller is set to cooling, the output starts to increase when the temperature exceeds the setpoint value.
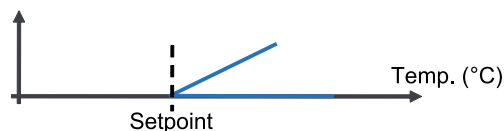

Control principle at heating function, 2-pipe installations

When the controller is set to heating, the output starts to increase when the temperature falls below the setpoint value.

Control principle at 4-pipe installations

At Comfort mode, neither heating nor cooling is used when the temperature is in the neutral zone, in order to minimise the energy consumption. The heating output is activated when the temperature falls below the set value for the neutral zone. The cooling output is activated when the temperature exceeds the set value for the neutral zone. The neutral zone is divided into two equal parts with one part below and one part above the setpoint. See the figure below. The factory setting for NZC is 2 K.
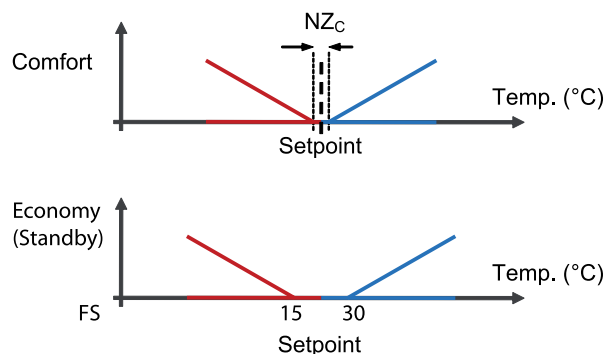
The above schematic drawings of the control principle show the corresponding requirement of the controller function. This requirement is recalculated by the controller to a value for the actuator output, depending on the selected output function.

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

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.
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
Actuator, DO4, DO5	2 outputs, 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
P-band	1...300°C	10°C
I-time	0...1000 s	300 s
NZC, neutral zone at Comfort	0.1...10 K	2 K
Installation type	2- or 4-pipe or electric heating	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

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 or opening with 3-point actuator	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 (or heating when using an electric heater) or closing with 3-point actuator	Digital output. 230 V AC, max. 300 mA. Max. 2 A during 20 ms.
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	Universal input	Change-over input. Potential-free switch (configurable for NO/NC) or PT1000.
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
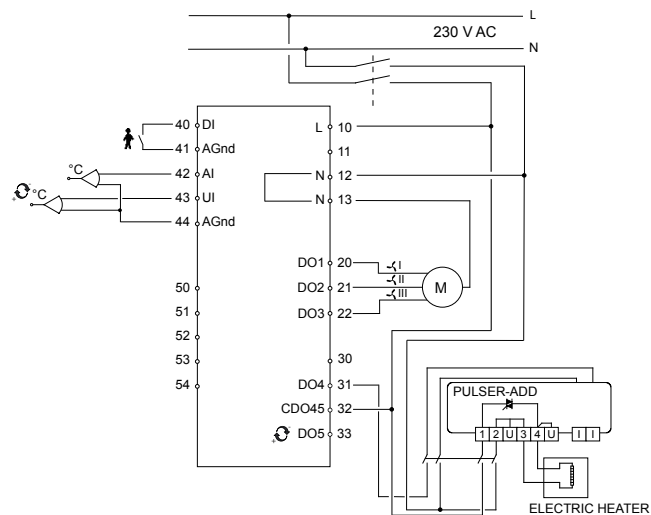

Automatic change-over cooling/heating
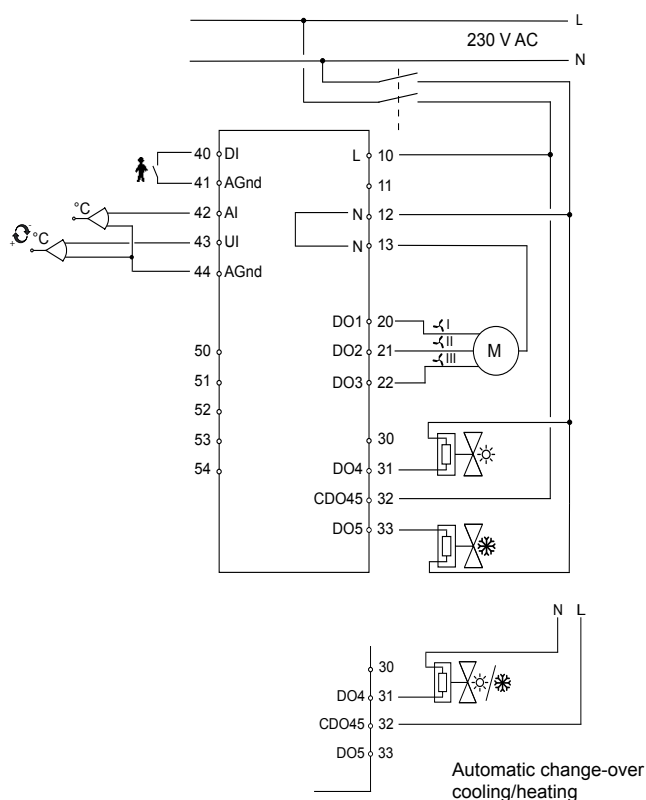
Wiring diagram for thermal actuator
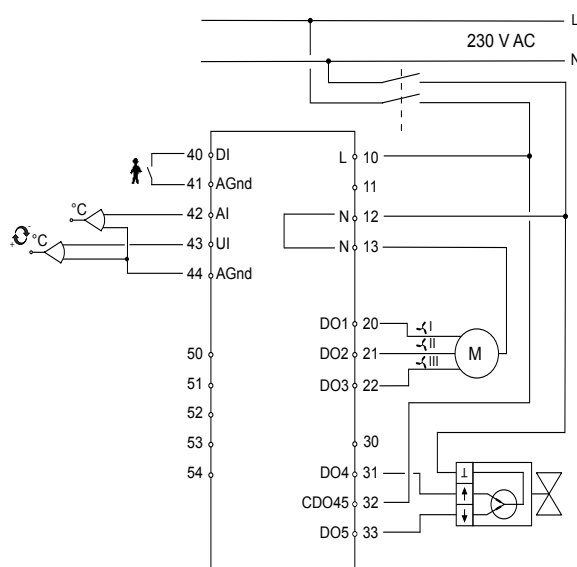
Wiring diagram for 3-point actuator
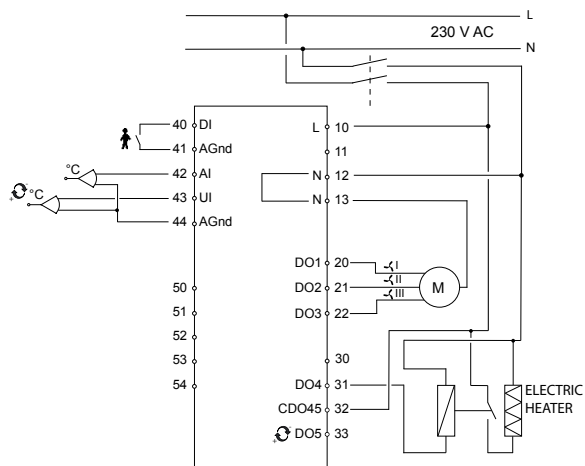
Wiring diagram for electric heater

Wiring diagram with PULSER-ADD for electric heater

Dimensions

120 mm

102 mm

29 mm
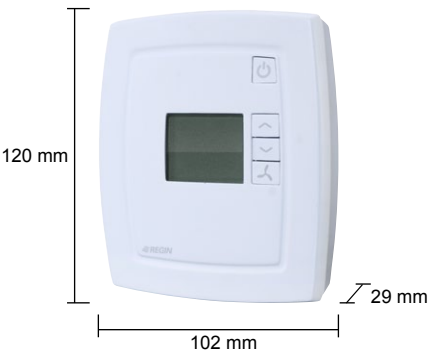
Product documentation

Document	Type
Instruction CSRCF-230TD	Instruction for CSRCF-230TD
Manual CSRCF	Manual for the CSRCF range