

# LCF02 Cooling

Electronic FanCoil Thermostat (flush mounting)

**thermokon**<sup>®</sup>  
HOME OF SENSOR TECHNOLOGY

## Datasheet

Subject to technical alteration  
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### » APPLICATION

The fan coil room thermostat has been designed for individual control of temperature in commercial, industrial and residential buildings. It is tailored for two-pipe fan coil with two-wire electric valves. With its flush mounted modern design the device combines digital technology with a large LCD display and additional buttons, which enables the single room controller to be used intuitively.

### » SECURITY ADVICE – CAUTION

The installation and assembly of electrical equipment should only be performed by authorized personnel.



The product should only be used for the intended application. Unauthorised modifications are prohibited! The product must not be used in relation with any equipment that in case of a failure may threaten, directly or indirectly, human health or life or result in danger to human beings, animals or assets. Ensure all power is disconnected before installing. Do not connect to live/operating equipment.



**CAUTION! Risk of electric shock due to live components within the enclosure, especially devices with mains voltage supply (usually between 90..265 V).**

Please comply with

- Local laws, health & safety regulations, technical standards and regulations
- Condition of the device at the time of installation, to ensure safe installation
- This data sheet and installation manual

### » NOTES ON DISPOSAL



As a component of a large-scale fixed installation, Thermokon products are intended to be used permanently as part of a building or a structure at a pre-defined and dedicated location, hence the Waste Electrical and Electronic Act (WEEE) is not applicable. However, most of the products may contain valuable materials that should be recycled and not disposed of as domestic waste. Please note the relevant regulations for local disposal.

## » MOUNTING ADVISE ROOM SENSORS

The Accuracy of the room sensors are influenced by the technical specifications as well as the positioning and the installation type.

### During Assembly:

- Seal mounting box (if present).
- Installation type, air draught, heat source, radiation heat or direct sunlight can affect the measurement.
- Bulding material specific properties of the installation place (*brick-, concrete-, partition wall, cavity wall, ...*) can affect the measurement. (e.g.: *Concrete accepts room temperature variation slower than cavity walls*)

### Assembly not recommendet in...

- Air draught (e.g.: close to windows / doors / fans ...)
- Near heating sources,
- Direct sunlight
- Niches / between furniture / ...

## » TECHNICAL DATA

Measuring values	temperature	
Output voltage	<b>terminal 8 – AO</b> 0..10 V = (cooling via PI control)	
Output switch contact	<b>terminal 1..3 – LO   ME   HI</b> 3x normally open contact, 250 V load max. 5 A, Fan	<b>terminal 4 – VA1</b> normally open contact, 250 V load max 5A (cooling via 2-point control or PWM)
Power supply	24 V =   24 V ~ SELV	
Power consumption	3 W (24 V =)	
Measuring range temp.	+1..+50 °C	
Accuracy temperature	±1 K (typ. at 21 °C, offset adjusted <sup>1</sup> )	
Inputs	<b>terminal 9 – ESI   DP</b> input digital for floating contact, window contact, dew point sensor	<b>terminal 10 - OCC</b> input digital for floating contact, occupancy sensor
Control functions	set point adjustment +1..+50 °C, (default +16..+30 °C)	
Display	LCD 64x41 mm, white background lighting	
Enclosure	ABS, pure white	
Protection	IP20 according to EN 60529	
Cable entry	rear entry	
Connection electrical	terminal block max. 1,5 mm <sup>2</sup>	
Ambient condition	-10..+50 °C, max. 95% rH non-condensing	
Weight	160 g	
Mounting	flush mounted with standard EU box (Ø=60 mm)	

<sup>1</sup> This accuracy can be set using the offset to ensure that precise measurements can be carried out even under very different operating conditions (structural conditions).

## » PRODUCT TESTING AND CERTIFICATION

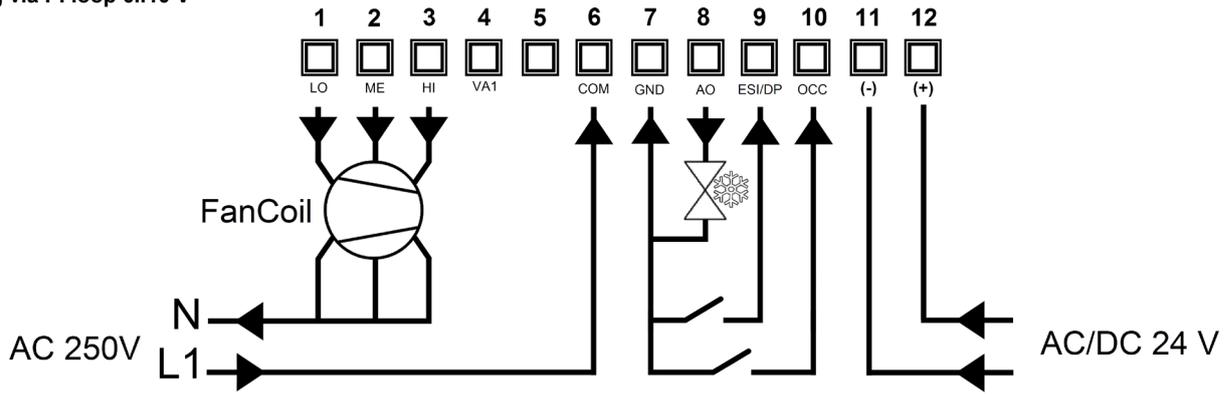


### Declaration of conformity

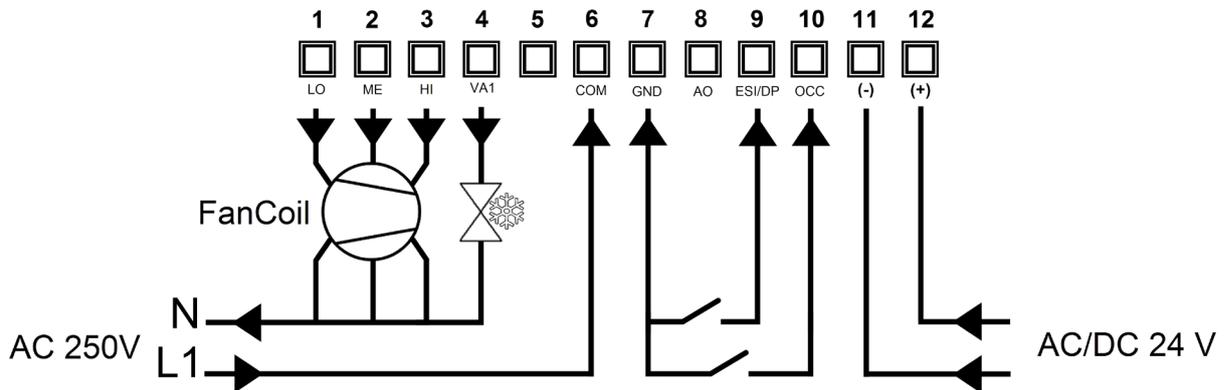
The declaration of conformity of the products can be found on our website <https://www.thermokon.de/>

» CONNECTION PLAN

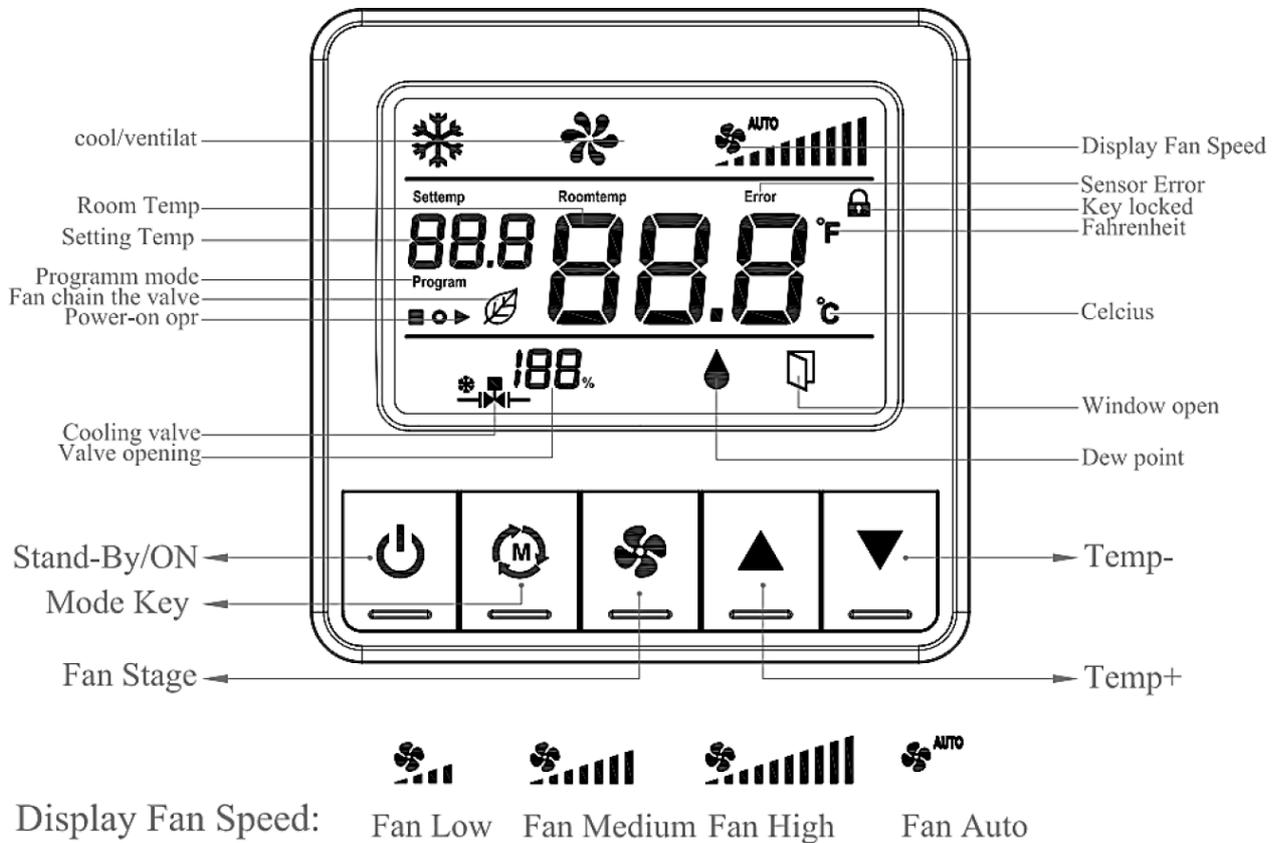
Cooling via PI loop 0..10 V



Cooling via 2-point control or PWM



» DISPLAY PANEL



## » FUNCTION DESCRIPTION

Device informationen



The device information (version and type number) are displayed on the start screen for a short time.

The thermostat is designed for a 2-pipe cooling fan coil only.

## » OPERATING MODE

Press the "Mode Key" , to adjust the mode cyclically (Cooling > Ventilating > Cooling...).

**Valve (control) function (Parameter 16)** In cooling mode, the cooling valve is regulated according to parameter 16.

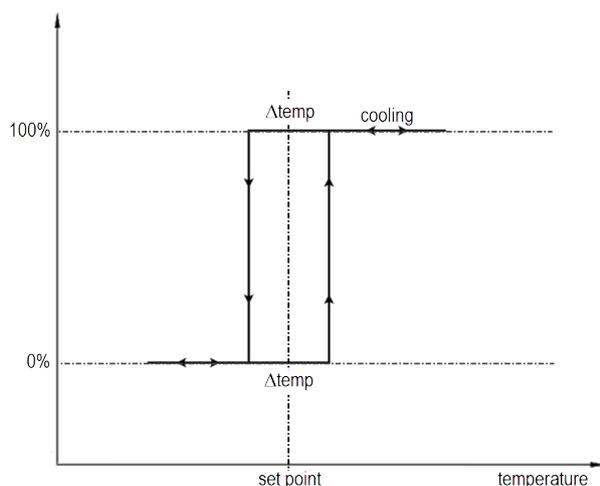
Valve can be 2-point control or thermal actuator with PWM connected to VA1 or proportional valve (0..10V) connected to AO. If the valve selection is PWM (1 or 4), the valve output port is VA1. The PI loop's output will be converted to a pulse width modulation using the PWM Cycle time (parameter 12). In case the valve selection is 0 or 3 (proportional) PI loop's output will be converted to an analogue voltage (AO: 0% = 0.0V, 100% = 10.0V or 0% = 10.0V, 100% = 0.0V, depending on valve type)

→ **2-point control selection:**

The cooling valve will be open if the Room temperature exceeds the setpoint by 1°C / 1,5°F

The cooling valve will be closed if the Room temperature drops below the setpoint by 1°C / 1,5°F

Valve position



→ **PWM selection:**

According to the calculated control variable (0-100%) of the PI controller, the thermal valve actuator is switched on and off as a pulse width modulated signal (PWM). The PWM cycle time can be set with parameter 12.

→ **PI control selection:**

According to the calculated control variable of the PI controller (0-100%), the continuous valve actuator is controlled with 0-10V. Using the parameters 13 and 14 the PI controller can be adjusted individually.

**Fan stages (1..3/auto)**

With the button  the desired fan stage can be set cyclically (Low > Med > Hi > Auto > Low ...)

Depending on the controller selection, the fan speed is switched differently in automatic mode.

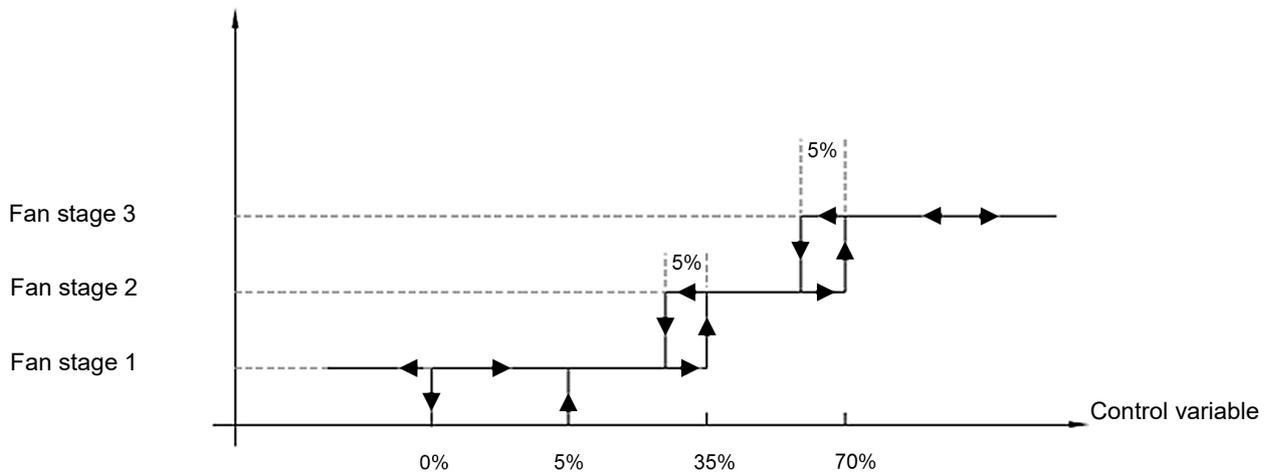
→ **2-point control selection:**

The stages are switched depending on the temperature difference between setpoint and current temperature value.

Differenz Sollwert zu Istwert	Lüfterstatus
$\Delta T \leq 1 \text{ }^\circ\text{C}$	1 / Low
$1 \text{ }^\circ\text{C} < \Delta T < 3 \text{ }^\circ\text{C}$	2 / Medium
$\Delta T \geq 3 \text{ }^\circ\text{C}$	3 / High

→ **PI-control or PWM selection**

The fan stages are switched depending on the calculated control variable of the PI controller.



**Ventilating mode running logic**

In ventilating mode, the valve is closed, the fan speed is according the manual selection: Low > Med > Hi. In case Fan-Auto is selected in Ventilating mode, it will follow table above (2-point controller is active with 1 K Hysteresis).

If the fan speed  is set to Auto the steps are switched depending on the temperature difference between the setpoint value and the current temperature value.

**Fan mode (Parameter 7):**

With this parameter, the behavior of the fan can be defined in automatic mode if the calculated control variable is <5% (Temperature difference <1K with 2-point control).

**°F/°C selective**

With the device switched ON, press “▲” and “▼” key at the same time for more than 3s, to change from °F to °C or vice versa. Temp display range is 32 °F..99 °F, respectively 0 °C..50 °C (factory default is °C).

**Temperature offset correction**

The internal sensor will be affected by the Thermostat's self-heating. As a consequence it would display a higher room temperature than the average of indoor temperature (real value). Item 1 of the parameter table does contain the correction of temperature offset (resolution 0,1 °C).

**Set the Temperature set point range**

Press “▲” or “▼” key to adjust the temperature set point range. Factory default (°C) is 16 °C..30 °C. When °F has been selected Temp range is 60 °F..86 °F (Item 4 and item 5 of the parameter table).

**Key lock selection**

Please see item 2 in parameter table. If a key is pressed that is locked, the lock symbol  will appear for 2s and blink 2x but no further action is taken.

**Power failure – Restart selection**

Please see item 3 in parameter table to set.

Symbol Description



Keep thermostat switched OFF



Switch thermostat to last state before power failure (Record and Memorize)



Turn the thermostat ON

**Memo while the power failure (Parameter 3)**

The status will be kept in EEPROM, while the power failure, so no data will be lost.

**LCD backlight selection**

Please see item 6 in parameter table to set.

**OCC Input function**

If the input is configured for an Occupancy sensor (Item 10 of parameter table to set OCC sensor). If the sensor indicates “UnOccupied” the current setpoint  will be replaced by the Eco Mode Setpoint Temp (parameter 15) The display will show the leaf symbol  to indicate the ECO mode. Once the room  occupancy is detected again the previously used Setpoint will be restored and the leaf symbol will not be showing any more.

**Window contact (ESI) function**

If the input is configured as window contact (Item 11 in parameter table to set window contact), the “Window open” Symbol will be displayed the thermostat will check every 3 seconds the input whether active. The cooling valve will be closed as long as the input will be active. The rest of the thermostat will work as usual, the user may change the setpoint or the fan stage, but the valve outputs will remain in valve closed position.

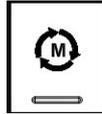
Depending on parameter 11 the “Window open”  or the Dew Point symbol  will be flashing. When the input will not be active, the thermostat's outputs return to normal operation and operates the outputs normally.

**Sensor failure alarm**

Room NTC temp sensor is open or short, thermostat switches fan to Med and the valve to 50% (5V output, 50% duty cycle for PWM and ON/OFF (based on the PWM cycle time, parameter 12). The display will show (possibly blinking) error code: “E1” Thermostat will allow to control fan manually as well as the valve output using the “▲” or “▼” keys. Every operation of the “▲” or “▼” keys will decrement / increment the output voltage by 1V = 10% AND the PWM by 10%. The percentage is shown in the display.

## Parameter table

Parameter menu



To enter the parameter menu:

- Press and hold "mode"-button for 5 seconds.
- Enter password: **(default: 987)**
  - o Digit selection: mode-button
  - o Arrow keys (▲/▼): increase / decrease value
- Select parameter with arrow keys



**After parameter selection / setting, don't press any button for 3 seconds to save the settings.**

No.	Name of parameter	Parameter definition	default
1	Temp offset	-100..+100 $\pm$ -10,0..+10,0 K	0
2	Key-lock	0x00 = unlocked 0x01 = lock "on/off" 0x02 = lock "mode" 0x08 = lock "fan speed" 0x10 = lock "temp setting" 0x1F = lock all keystrokes Once a locked key is pressed the LOCK symbol shall be displayed for 2 s and blink twice.	0
3	Power failure	0 - keep power off 1 - Memo status before power failure 2 - switch on with power on	0
4	Temp upper limit	range: 1 °C..+50 °C / 34 °F..+99 °F	30 °C / 86 °F
5	Temp lower limit	range: 1 °C..+50 °C / 34 °F..+99 °F	16 °C / 60 °F
6	LCD backlight	0 - backlight OFF, 1 - backlight ON	1
7	Fan Mode	0 - fan is ON permanently 1 - fan stops when valve closes	0
8	Minimal Control Variable	0 = 0.0V.. 40 = 4.0V	0
9	Maximal Control Variable	60 = 6.0V.. 100 = 10.0V	100
10	OCC Input	0 = OCC (Open when Occupied) 1 = OCC (Closed when Occupied) Default setting (0) will indicate Occupied in case no sensor is connected	0
11	ESI / DP input	0 = window contact (Open when window Open) 1 = window contact (Closed when window Open) 2 = dew point (Open when dew point is reached/exceeded) 3 = dew point (Closed when dew point is reached/exceeded)	1
12	PWM Cycle	Pulse Width Modulation Cycle-time [1..255 min]	15
13	KP	0 = 0.. 100 (0..+10.0 K)	25
14	KI	0 = 0.. 100	12
15	Eco Mode setpoint temp (unoccupied)	range : 1 °C..+50 °C / 34 °F..+99 °F	25 °C / 77 °F
16	Valve (control) function	0=PI control (0V = 0% ..10V = 100%) 1=PWM (0%= 0%PWM .. 100% = 100% PWM) 2=2-point control ON-OFF (ON = Valve Open, OFF = Valve Closed) 3=invers PI control (0V = 100% ..10V = 0%) 4=invers PWM (0%= 100%PWM .. 100% = 0% PWM) 5=invers 2-point control OFF-ON (OFF = Valve Open, ON = Valve Closed)	0
17	Language	0 = German 1 = English	0
18	Password	Password to change parameters	987

**» MOUNTING ADVICE**

For installing or repairing, please make sure the power is disconnected.

Insert the screw driver in the plastic tooth of thermostat. Clockwise rotation of the screwdriver will separate front cover from base plate. Please follow the wiring diagram to connect the wires. Fix the thermostat base plate to the wall through the four screw holes with distance between axes of 60 mm. Fasten base plate and front cover. Do not press the panel in order to protect LCD.

**» DIMENSIONS (MM)**