PENTAIR

Raychem GREEN LEAF

PROGRAMMABLE THERMOSTAT FOR ELECTRICAL FLOOR HEATING
INSTALLATION INSTRUCTIONS

CONTENTS

1. DESCRIPTION

The Raychem Green Leaf Thermostat is a Programmable Thermostat designed for Electrical Floor Heating. The thermostat is designed to control your Electrical Floor Heating in order to give you the best possible comfort and the lowest possible energy usage.

The Thermostat can work in 3 different temperature sensing modes:

• Floor Sensing mode
• Room Sensing mode
• Room Sensing mode with floor temperature limiter

The Thermostat has 2 programs to choose from:

• Manual ON/OFF (Constant Single temperature)
• Timer programme (4 timer events/day)

To change from one programme to the other, just press on the intelligent leaf button "⊘".

2. MOUNTING AND INSTALLATION

Mounting the Thermostat

Green Leaf is intended for flush mounting in a wall box. It should be positioned approximately 1.5 meters above the floor, protected from direct sunlight and draughts. All electrical conduits passing into the wall box that contain cables must also be sealed to protect the thermostat against draughts, e.g. with a piece of insulation in the conduit outlet.

Step 1: Switch off the power supply

Step 2: Detach the metallic support from the Thermostat using a screwdriver
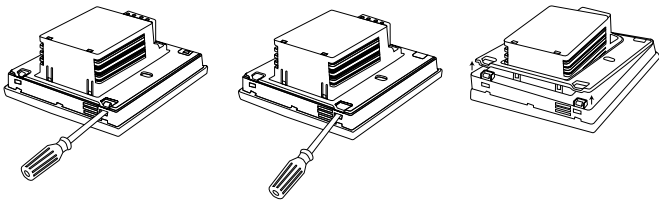
**Step 3:** Screw the metallic support frame to the in-wall box
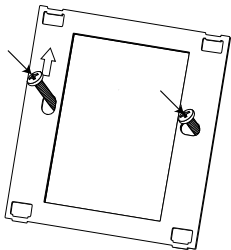
Step 4: Install the floor sensor (mandatory for floor sensing mode or room sensing mode with floor temperature limiter). The floor sensor should be installed in a separate flexible conduit all the way to the end, covering the end of the sensor, for easy replacement and to avoid possible signal disturbance on the sensor. For best control performance, position the floor sensor between two heating cables as close as possible to the top floor surface.

Do not position the floor sensor tip closer than 3 cm to the heating cable.

The floor sensor cable can be extended up to 100 m with a separate standard installation cable 2 x 1.5 mm^2 (230VAC).

Step 5: Connect the electrical power supply, the sensor and the cold lead of the electrical floor heating system to the Green Leaf according to the electrical diagram. If you connect heating cables exceeding 13A for constant wattage or 10A for self-regulating cables you must use a contactor with an integrated suppression device.
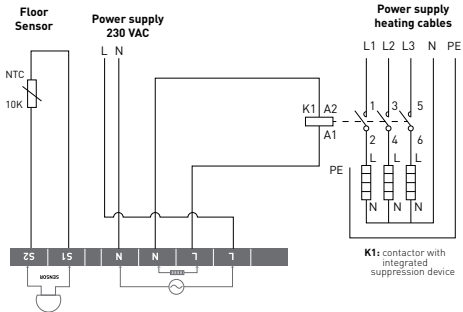
For the earth connection of the floor heating, you must use a separate earth terminal connection block.

Floor Sensor

NTC
10K

PE

Heating cable 230 VAC Max. 13A*

L
PE
N

Power supply 230 VAC

L N

S2 S1 N N L L
SENSOR
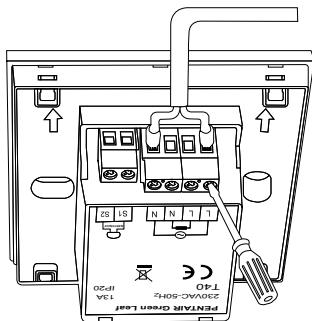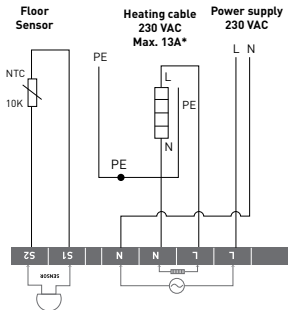
Direct connection – e.g. single heating circuit
* Max 13A for constant wattage cable, Max 10A for self-regulating cables

Floor Sensor

NTC
10K

Power supply 230 VAC

L N

Power supply heating cables

L1 L2 L3 N PE

K1 A2
A1

1 3 5
2 4 6

L L L
N N N

PE

S2 S1 N N L L
SENSOR

K1: contactor with integrated suppression device

Connection via contactor – e.g. 3 heating circuits
⚠ Do not use contactor without suppression device.

Step 6: Click the Green Leaf into the metallic support frame.
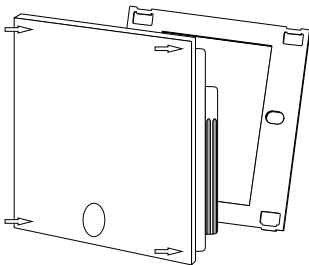
Step 7: Switch on the power again

Product specific information

The thermostat is compatible with CeraPro, T2QuickNet, T2Blue, T2Red heating solutions.

T2QuickNet

T2QuickNet heating mats are approved with the Green Leaf thermostat working in floor sensor mode. Be aware that the floor sensor must be installed and activated for any installation with T2QuickNet.

T2Red

Self-regulating heating cables have an inrush current when the floor is cold. In order to guarantee the life time of the thermostat, the maximum load of the self-regulating application in nominal conditions is limited to 10A.

A 13A self-regulating load will reduce the life time of the relay contacts.

3.USING THE THERMOSTAT

The Display

Display in manual on/off programme
The following icons are visible in the Manual ON/OFF:

Active sensor display
- Floor sensing mode (🌡)
- Room Sensing mode (🏠)
- Room Sensing mode with Floor
  temperature limiter (🏠)

Heating display
The heating display is flashing when the heating is on.

Temperature

The temperature on the display depends on the selected sensing mode.

- Floor sensing mode => Floor temperature on the display
- Room sensing mode => Room temperature on the display
- Room sensing with floor temperature limiter mode => Room temperature on the display

  Remark: When pushing on the "<" or ">" button, the set point temperature appears on the display blinking for 5 seconds

Installer Menu

- Press on the M button for 5 seconds to enter the Installer Menu

Display in timer programme

The following icons are visible in the Timer Programme:

Time and day

The actual day is displayed on the screen with the 3 letters (MON-TUE-WED-THU-FRI-SAT-SUN).

The time can be set in 24H or 12AM/PM mode (see INSTALLER MENU).

4 Event display

The 4 events are displayed with the symbols:

☼⌂ Event 1

⌂ Event 2

⌂☼ Event 3

⌂☾ Event 4

The manual on/off programme

When switching on the thermostat for the first time (pressing on the Green Leaf button for 2 seconds), it will start in MANUAL ON/OFF programme using the floor sensing mode as a standard (see INSTALLER MENU to change the sensing mode).

You will see the following screen:

Press the "❮" or the "❯" to show the set point temperature. It will blink for 5 seconds.

1. Press the "❮" within the 5 seconds => set point = set point - 0.5°C
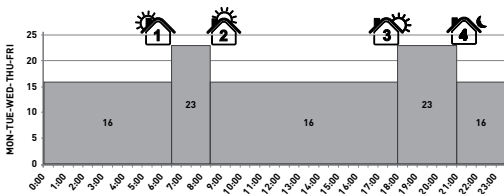2. Press the "❯" within the 5 seconds => set point = set point + 0.5°C

To switch from Manual ON/OFF to Timer Programme, press on the "⊘" button once.

To switch off the thermostat, press on the "⊘" button for 2 seconds.

The timer programme

The Green Leaf can be programmed with 4 events per day. Different temperatures can be maintained for each event of the day. The days can be programmed independently or per cluster of days.

The default Timer Programme is shown on the graph below. You can easily adapt the programme to your needs (see PROGRAMMING THE TIMER PROGRAMME)
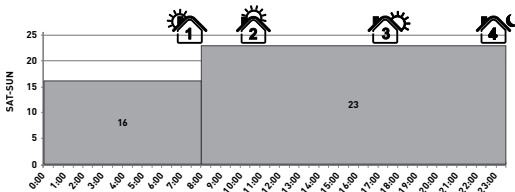
- Press on the "🕐" button to set the clock and day of the week

- Press on the "🕐" button for 3 seconds to program the timer programme (see page 14 for more details).

- Press on the "M" button for 5 seconds to enter the Installer Menu

- Press on the "⊘" button to switch from Timer to Manual ON/OFF mode

- Press on the "⊘" button for 2 seconds to put the Thermostat into OFF (standby) mode

- Press the "<" or the ">" to show the set point temperature. It will blink for 5 seconds

     3. Press the "<" within the 5 seconds => set point = set point - 0.5°C

     4. Press the ">" within the 5 seconds => set point = set point + 0.5°C

**Remark:** The adapted temperature is valid until the next timer Event.

4. SETTING THE CLOCK

- Press on the "🕐" button to set the clock and day of the week
- Press the "**<**" or the "**>**" to change the hours
- Press on the "🕐" button to validate
- Press the "**<**" or the "**>**" to change the minutes
- Press on the "🕐" button to validate
- Press the "**<**" or the "**>**" to change the day of the week
- Press on the "🕐" button to validate

  Remark: In case of battery drainage after long period of power failure, you might have to re-programme the clock

5. PROGRAMMING THE TIMER PROGRAMME

- Press on the "🕒" button for 3 seconds to program the Timer Programme
- Press the "❮" or the "❯" to choose the day (or the sequence of days) you want to program
- Press on the "🕒" button to validate

MON TUE WED THU FRI

🕒   ❮   ❯

🍃
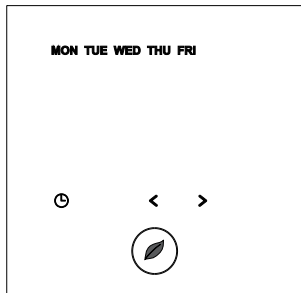
Day Sequences are:
🕒 MON
🕒 TUE
🕒 WED
🕒 THU
🕒 FRI
🕒 SAT
🕒 SUN
🕒 **MON TUE WED THU FRI**
🕒 SAT SUN
🕒 MON TUE WED THU FRI SAT SUN

For Event 1

- Press the "❮" or the "❯" to change hours of Event 1
- Press on the "🕒" button to validate
- Press the "❮" or the "❯" to change the minutes of Event 1
- Press on the "🕒" button to validate
- Press the "❮" or the "❯" to change the set point temperature for Event 1
- Press on the "clock" button to validate

For Event 2, 3 and 4

- Repeat the actions for event 1 for the Events 2, 3 and 4

Press on the "⌀" button, at any time during the programming, to save your changes and return to the Timer Programme.

If needed, you can repeat the complete procedure to program other days or sequences of days.

6. INSTALLER MENU

Press on the "**M**" button for 5 seconds to enter the installer Menu

| #	Description	Range	Default setting
1	Sensing mode selection	Floor sensing mode Room sensing mode Room sensing mode with floor temperature limiter	Floor Sensing mode
2	12 vs 24 hours display	12 / 24	24
3	Motion sensor. When getting close to the thermostat (5cm range) the display lights up automatically	ON / OF	ON
4	Floor sensor calibration (Floor sensor on display = Real Floor sensor °C – OFFSET)	0 .. 10°C	4°C

#	Description	Range	Default setting
5	Room sensor calibration	Measured sensor temperature +/- 5°C	Measured sensor temperature
6	Minimum temperature set point for the Floor Sensor	Floor sensing mode: 5 .. 15°C	5°C
		Room sensing mode: OF	OF
		Room sensing mode with floor temperature limiter: OF	OF
7	Maximum temperature set point for the Floor Sensor	Floor sensing mode: Minimum temperature set point floor sensor (installer menu 6) +5°C .. 35°C	35°C
		Room sensing mode: OF	OF
		Room sensing mode with floor temperature limiter: 10 .. 35°C	27°C
8	Minimum temperature set point for the Room Sensor	Floor sensing mode: OF	OF
		Room sensing mode: 5 .. 15°C	5°C
		Room sensing mode with floor temperature limiter: 5 .. 15°C	5°C

#	Description	Range	Default setting
9	Maximum temperature set point for the Room Sensor	Floor sensing mode: OF	OF
		Room sensing mode: Minimum temperature set point room sensor (installer menu 8) +5°C .. 40°C	40°C
		Room sensing mode with floor temperature limiter: Minimum temperature set point room sensor (installer menu 8) +5°C .. 40°C	40°C
10	Adjustable hysteresis	0.5 .. 2.0°C	1.0°C

Floor sensor calibration

The temperature of the floor surface can differ from the temperature measured by the floor sensor due to the floor construction, the floor type and the position of the floor sensor. In order to calibrate your thermostat to this difference you can use the floor sensor calibration OFFSET in installer Menu 4.

After the temperature on the floor is stabilized, place a thermometer on the floor surface in order to sense the real temperature on the surface (Tsurface). Read the floor sensor temperature (Tsensor) on the thermostat and adjust the OFFSET accordingly to the formula:

$$OFFSET = T_{sensor} - T_{surface}$$
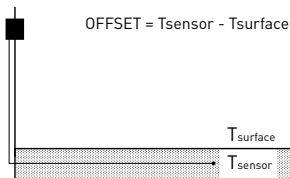
Room sensor calibration

If the value measured by the room sensor in the thermostat differs from the real room temperature, it is possible to calibrate the room sensor using the installer Menu 5.

After the temperature in the room is stabilized, place a thermometer close to the wall in order to sense the real room temperature. If this value differs from the one shown by the thermostat, adjust Menu 5 using the "**<**" or the "**>**" until the thermostat shows the same value as the reference thermometer.

7. TROUBLESHOOTING

In the event of damage or malfunction of one of the temperature sensors, the heating output cuts off (fail safe) and an error code is displayed.

Error Code	Description
ER1	Short circuit on floor sensor
ER2	Open circuit on floor sensor / Missing floor sensor
ER3	Short circuit on room sensor
ER4	Open circuit on room sensor
ER5	Check sensing mode

The floor sensor can be replaced by a new one. In the event of malfunction of the room sensor, the entire thermostat must be replaced.

The floor sensor has got the following temperature/resistance values:

Temperature	Resistance
15°C	15.8 kΩ
20°C	12.5 kΩ
25°C	10.0 kΩ
30°C	8.0 kΩ
35°C	6.5 kΩ

Error 5 occurs if the thermostat is set in Room Sensing Mode and the floor sensor is installed.

To resolve the error change the sensing mode in Floor sensing or Room sensing with floor temperature limiter. Otherwise, remove the floor sensor to work in room sensing mode.

8. TECHNICAL SPECIFICATION

Supply voltage	230VAC, +10%, −15%, 50Hz
Power consumption (Stand-by)	3 VA
Relay output	230V, maximum 13A resistive load (max. 3000W)
Ambient temperature – operation	0 .. 40°C, 5-95% RH (non condensing)
Ambient temperature – transport	−10 .. +60°C
Temperature range, floor sensor	+5 .. +35°C
Temperature range, room sensor	+5 .. +40°C
Switching hysteresis	1°C (Factory settings adjustable between 0.5-2.0°C)
Control modes	Floor sensing
	Room sensing
	Room sensing with floor temperature limiter
Temperature control	Manual ON/OFF
	Timer programme
Protection class	IP 20
Terminals	Max. 2,5 mm²
Floor sensor with 3 m cable	NTC, 10KΩ / 25°C
Maximum length of floor sensor Cable	100 m, 2 x 1,5 mm² (230VAC cable type)
Approvals	CE
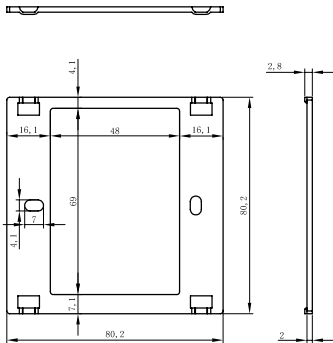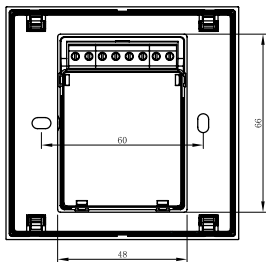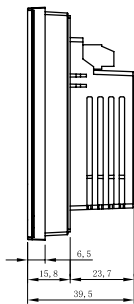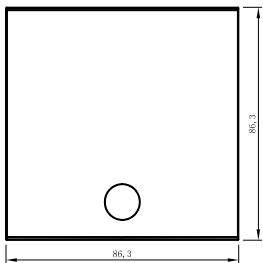
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