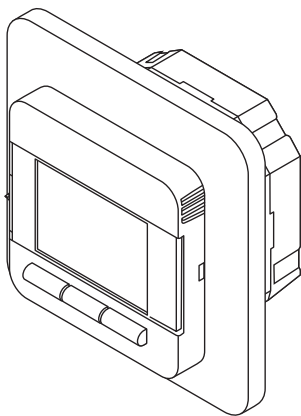


Raychem

NRG-DM

Software Version 1.60



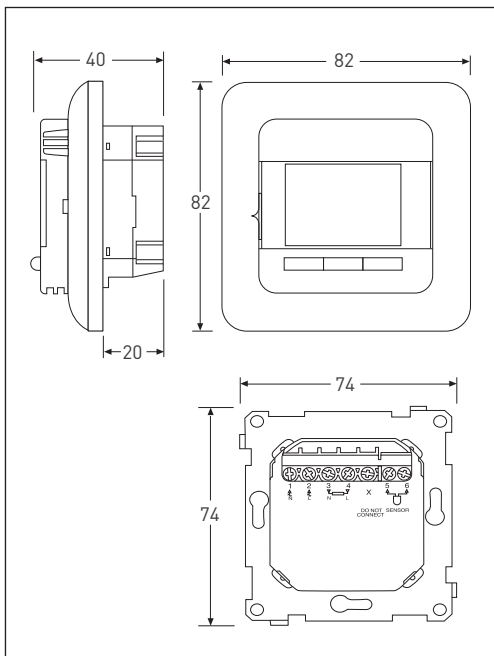


Figure 1

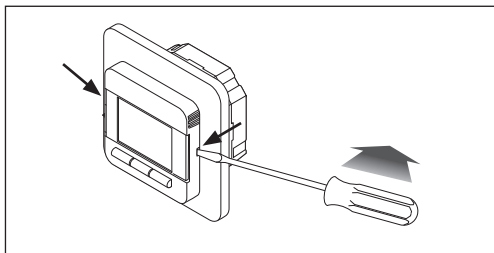


Figure 2

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Attention:

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

2 DESCRIPTION

The Raychem NRG-DM thermostat is a smart electronic thermostat designed for electrical under floor heating. It is designed to control your under floor heating in order to give you the best possible comfort at the lowest possible energy consumption. The NRG-DM is equipped with an ambient sensor and a floor sensor and is thus capable of monitoring and controlling your floor heating cables in 4 different modes (Room sensing mode / Floor sensing mode / Room sensing mode with floor limiter / No sensor mode) depending on your needs. The NRG-DM will switch on and off your floor heating in order to obtain the set-temperature. When the NRG-DM is switching on the electrical floor heating, the symbol (≡) is visible on the display.

The NRG-DM is controlling your electrical floor heating in 3 working modes (see Table 1).

Working mode	Description	Symbol
Constant Mode	In the Constant Mode, the NRG-DM is aiming for 1 temperature only. You can easily adapt this set temperature by using the +/- button	
Event Mode	In the Event Mode, the thermostat is working according to a weekly schedule. The Event Mode is created in order to maximize the comfort while minimizing the energy consumption of your electrical floor heating system	
Boost Mode	The Boost Mode is a temporary override of the Constant Mode or the Event Mode. When activating the Boost Mode, you can choose a temporary Set temperature and a duration for the Boost Mode. After this duration, the NRG-DM will automatically switch back to the last used Mode (Constant or Event)	 or 

Table 1

3 NAVIGATION PRINCIPLE

The NRG-DM is a thermostat with a big and clear display of 1.8".

1. On/OFF switch
2. Day and time
3. Working Mode
4. Heating Symbol
5. Display temperature
6. 3 Commands
7. 3 Buttons



Figure 3

Use the button (7) in order to execute the command (6).

In the example on figure 3:

- The Left and Right buttons show “-” & “+”, this means that you can change the set temperature with 0.5°C by using these buttons
- The Middle button shows “Menu”, this means that you can enter the Menu by using this button

4 GETTING STARTED

When you power up the NRG-DM for the first time, you will be asked to follow a set-up wizard with 4 simple questions.

1. Select Language



Figure 4

2. Confirm Time



Figure 5

3. Confirm Date



Figure 6

4. Select Sensor



Figure 7

Remark: This wizard will only be requested when installing the thermostat for the first time or when you choose to reset to the factory settings (see **7.3.8 Factory reset**)

In select Sensor (see figure 7) you have the choice between:

- Factory = Sensor delivered in the box of the NRG-DM
- NRG-Temp = in case of retrofitting of an NRG-Temp
- Other = in case of retrofitting of a thermostat with a different type of sensor. Compatible types are 2k Ω , 10k Ω , 12k Ω , 15k Ω and 33k Ω sensor. If you have the sensor reference value table, please use this to set the correct reference values at 15°C, 20°C, 25°C and 30°C. Otherwise use the standard table settings by confirming the values with the OK button.

5 NAVIGATION STRUCTURE

In the NRG-DM, it is very easy to navigate in the Menu structure to activate working modes or to change settings.

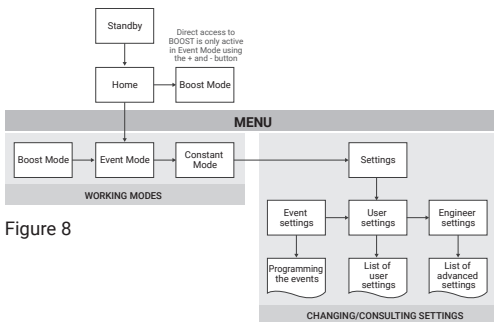


Figure 8

When entering the MENU, you can directly activate the working modes (Boost Mode, Event Mode or Constant Mode) or enter the Settings.

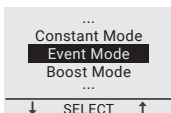


Figure 9

The settings are divided in 3 categories:

- Event settings = program the weekly schedule (see **7.1 Event settings**)
- User settings = for users to make small changes (see **7.2 User settings**)
- Engineer settings = for installers or experienced users (see **7.3 Engineer settings**)

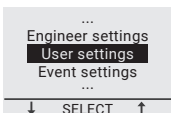


Figure 10

6 WORKING MODES

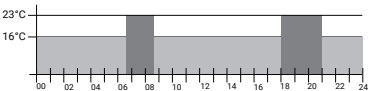
6.1 EVENT MODE (weekly schedule mode)

The Event Mode is the Energy efficient mode. In this mode a weekly schedule has been set-up and can easily be adapted to your needs.

The weekly schedule in the Event Mode is based on a 7 days schedule where each day can be defined as 1 to 6 events. Events are a combination of a duration (From – To) and a temperature.

The Event Mode is pre-programmed as follows:

Schedule	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6
Mon-Fri	00:00-06:30	06:30-08:30	08:30-18:00	18:00-21:00	21:00-24:00	N/A
	16°C	23°C	16°C	23°C	16°C	N/A



Sat-Sun	00:00-08:00	08:00-24:00	N/A	N/A	N/A	N/A
	16°C	23°C	N/A	N/A	N/A	N/A

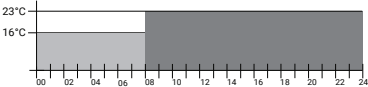


Table 2

To program the weekly schedule (see **7.1 Event settings**).

Remark: You can temporarily step away from the weekly schedule by activating the Boost Mode (see **6.3 Boost Mode**)

6.2 CONSTANT MODE (single temperature mode)

The Constant Mode is a simple working mode where the NRG-DM is aiming for 1 temperature only. In this mode, you can choose the temperature by using the + & - buttons.

Remark: You can temporarily step away from the Constant Mode by activating the Boost Mode (see **6.3 Boost Mode**).

6.3 BOOST MODE (temporary override mode)

The Boost Mode is a temporary override of the working mode (Event Mode or Constant Mode). At the end of the Boost Mode, the NRG-DM thermostat will continue working in the mode that was active just before the activation of the Boost Mode.

When activating the Boost Mode, the NRG-DM will ask you to confirm the requested temperature and duration of the temporary override.

The Boost Mode is identified on the screen by the Boost Icon:

- When coming from the Constant Mode: 
- When coming from the Event Mode: 

In order to stop the Boost Mode, simply press on the Stop button.



Figure 11

In order to activate the Boost Mode, press on the Menu button, navigate to the Boost Mode and then press on select.

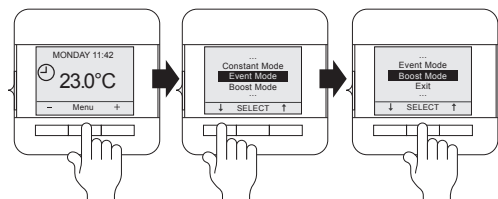


Figure 12

Note: If you are running in Event Mode, you can activate the Boost Mode by pressing on the + or – button directly.



Figure 13

7 CHANGING/CONSULTING SETTINGS

7.1 EVENT SETTINGS (programming a weekly schedule)

The Event settings are used in order to program or adapt a weekly schedule used in the Event Mode.

Programming the weekly schedule is done in 3 steps:

Step 1: Select a day or a sequence of days to program

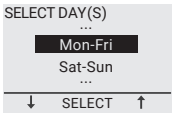


Figure 14

Step 2: Program up to 6 periods for this day:

Period 1:

- Duration = From 00:00 to xx:xx

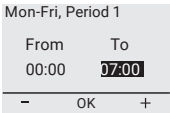


Figure 15

- Temperature = xx.x °C

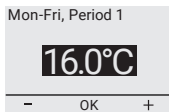


Figure 16

Period 2:

- Duration = From 07:00 to xx:xx

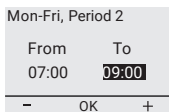


Figure 17

- Temperature = xx.x °C

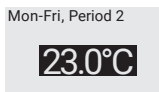


Figure 18

Period 3 -6 (or when 24:00 is reached)

Step 3: Decide if you want to copy this programming for the next day

You can repeat steps 1 to 3 for other days if needed.

7.2 USER SETTINGS

7.2.1 TIME AND DATE

With the Time and date setting, you can adjust the clock and calendar.

7.2.2 CHILD LOCK

By activating the child lock, the NRG-DM will go to the home screen and a lock sign will appear on the screen.



Figure 19

The child lock will prevent the thermostat settings to be changed by accident.

To unlock the NRG-DM, press and hold the 3 buttons for 5 seconds.

7.2.3 DISPLAY SETTINGS

In the display settings, you can decide to customize what appears on the display.

You can make changes to:

- **Time and Day:**

Show/hide the time and day on the home screen

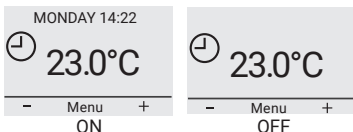


Figure 20

- **Temperature:**

Show the desired temperature (called set temperature) or the measured temperature (called actual temperature)

- **Screen saver:**

You can activate or deactivate the screen saver. The screen saver shows the temperature, time and day after 60 seconds of inactivity of the thermostat



Figure 21

- **Screen mode:**

The screen can be displayed in standard mode or in inverted mode.

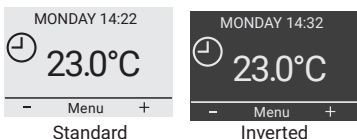


Figure 22

7.2.4 ENERGY MONITORING

You can display some statistics of the use of the NRG-DM. In order to be able to do this, the currency, the load and the cost of energy need to be filled in. In the energy monitoring menu, you will find:

- Currency (what currency do you use)
- Load (how much electrical heating cable is installed in this room in kW)
- Cost/unit (cost of 1 kWh)

In the energy monitoring menu, you will see the values calculated for the last 2 days, for the last month & for the last year.

7.3 ENGINEER SETTINGS

7.3.1 TEMPERATURE CALIBRATION

When running in Floor sensor mode (see 7.3.3 Sensor setting)

You can calibrate the floor sensor to the actual floor temperature by using the calibration menu. The floor temperature can differ from temperature measured by the floor sensor depending on the floor construction.

When running in Room sensor mode (see 7.3.3 Sensor setting)

You can calibrate the ambient sensor to the actual room temperature by using the calibration menu.

The NRG-DM is performing an auto calibration of the Room Sensor after each factory reset (or after first installation). The manual calibration of the Room sensor should only be

performed after this automatic calibration and only in the few cases where the automatic calibration seems not to be 100% accurate.

7.3.2 ADAPTIVE FUNCTION

Thanks to the adaptive function, the NRG-DM will know when to switch your heating on, in order to obtain the desired temperature at the desired time. The Adaptive function is only active in the Event Mode and is activated from factory. You can de-activate the Adaptive function in the Adaptive function menu.

The Adaptive function will optimize the energy consumption to the desired comfort of the user.

7.3.3 SENSOR SETTING

The NRG-DM can operate in different sensor settings. Some of the settings are activated in the thermostat when a physical floor sensor is installed; others are activated when there is no external sensor installed.

- **When there is a floor sensor installed and connected**

- **Floor**

- The NRG-DM is regulating the temperature based on the input given by the floor sensor (embedded in the floor)

- **Room/limit**

- The NRG-DM is regulating the temperature based on the input of the room sensor (integrated in the thermostat) but is making sure the floor is not exceeding a desired temperature measured by the floor sensor

- **When there is no external sensor installed or connected**

- **Room**

- The NRG-DM is regulating the temperature based on the input of the room sensor (integrated in the thermostat)

- **No sensor**

- The thermostat works like a regulator. It will work in duty cycles and it will activate the electrical heating cables during a percentage of this duty cycle.

7.3.4 TEMPERATURE SCALE

The Temperature scale settings provide the possibility to limit the minimum and maximum settable temperature in the working modes (Event Mode, Constant Mode or Boost Mode).

7.3.5 BACKLIGHT

You can define how the backlight (blue light) of the NRG-DM is reacting.

There are 3 possible settings:

- **Auto**
The backlight is deactivated after 30 seconds of inactivity
- **On heat**
The backlight lights up every time the thermostat is heating
- **Constant On**
The back light does not go off

7.3.6 SENSOR

In the Sensor setting, you select the type of sensor that is installed. The possible sensors are:

- Factory = sensor delivered with the NRG-DM = 12k Ω sensor
- NRG-Temp = sensor of the NRG-Temp or Green Leaf thermostat = 10k Ω sensor
- 2 k Ω sensor
- 10 k Ω sensor
- 12 k Ω sensor
- 15 k Ω sensor
- 33 k Ω sensor

With the exception of the Factory sensor and the NRG-Temp sensor, you will be asked to give reference points of your sensor at 15, 20, 25 & 30°C. If you do not have these reference points of the sensor, the NRG-DM is proposing you a standard calibration of the sensor. This might not be 100% accurate but will be close to the real values.

7.3.7 LANGUAGE

The NRG-DM is translated in to 11 languages. In this menu you can choose to use the following languages for the firmware: Czech, Dutch, English, Finnish, French, German, Lithuanian, Norwegian, Polish, Russian or Swedish.

7.3.8 FACTORY RESET

If you need to reset all the settings to the factory settings, you can use the factory reset.

7.3.9 INFORMATION

In the information section of the thermostat, you will find information on how to contact us, on the measured temperatures and calibration and on the software version in the thermostat.

8 TROUBLE SHOOTING

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.

Number	Error type
E0	Room failure. NRG-DM is defective. Please replace the thermostat.
E1	Room sensor defective or short circuited. Please replace the thermostat.
E2	Floor sensor defective or short circuited. Please check or replace the external sensor *
E5	Internal overheating. Please inspect the installation

Table 3

* The floor sensor may be replaced by a new one (product reference = 1244-002952). In case of replacement of the floor sensor by a new sensor (1244-002952), the sensor selection needs to be performed and you need to choose the NRG-Temp sensor in the list of sensors (see **7.3.6 Sensor**).

9 TECHNICAL SPECIFICATION

Supply voltage	230VAC +/- 10%, 50Hz
Power consumption in Sleep mode	400 mW
Power consumption in Max. load	1000 mW
Main power switch	2-pole
Relay output	230V, max. 13A
Setpoint range	0°C to 40°C
Ambient temperature – transport	-20°C to +70°C
Protection class	IP21
Terminals	2,5 mm ² Screw cage clamp
Floor sensor with 3 m cable	12k @ 25°C +/- 0.75°C (no:38165)
Maximum length of floor sensor cable	100m, 2 x 1,5mm ² (230VAC cable)
Dimension with frame	84 X 84 X 40mm
Color rounded front	RAL 9010
Color square front	RAL 9003
Color switch gear frame	RAL 9010
Display	1.8" Dot Matrix LCD display (100 x 64 pixels) with blue backlight
Control modes	Floor Sensor (active when floor sensor installed and connected)
	Room Sensor with floor limiter (active when floor sensor installed and connected)
	Room Sensor (active when no floor sensor is connected)
	No Sensor % regulator with cycles of 20 minutes (active when no floor sensor is connected)
Working modes	Constant Mode, Event Mode, Boost Mode

Temperature regulation method	PWM (pulse with modulation method) with PI control loop
Accuracy – floor/room sensor	0.2°C in the range 0°C to +40°C
Back-up for set values	In non-volatile memory
Back-up for time and date	5 years storage or 10 years with 50% power on
Type of action	1.B. (39)*
Control pollution	degree 2 (49)*
Rated impulse voltage	4kV (75)*
Temperature for the ball pressure test	125°C (77)*
SELV limits realized	22 VDC (86)*

* According to the EN 60730-1 table 1

Table 4

10 APPROVALS AND DECLARATIONS



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Raychem-IM-EU0381-NRGDM-EN-2504