

Mx-RPW

Room Control Module (Built-In Occupancy Sensor)



Application

Solar-powered, self-learning room sensor with LCD and smart communication management for measuring room temperature, independent generation of utilization time profiles and their continuous dynamic adjustment/optimization and for wireless transmission of measured values. Occupancy button for manually changing the comfort mode or economy mode status. In combination with the Mx-D15 valve controller, the Mx-RPW room sensor constitutes a functional unit for easy room temperature control.

The following EnOcean Equipment Profiles (EEP) are supported: EEP D2-10-02 *

* You can find information about the protocol description on the EnOcean Technology website http://www.enocean-alliance.org/en/enocean_standard/

Safety Instructions

This data sheet contains information on installing and commissioning the product "Mx-RPW". Read this product description prior to installation, commissioning or operation. No previous special knowledge is required to commission and operate this product. If you have any questions that are not resolved by this data sheet, you can obtain further information from the supplier or manufacturer. If the product is not used in accordance with this data sheet, intended use could be impaired. Unauthorized conversion and modifications to the device are not permitted for safety reasons and will result in the loss of all claims against the manufacturer. The applicable local regulations must be observed when installing and using the device.

Mx-RPW

Room Control Module (Built-In Occupancy Sensor)



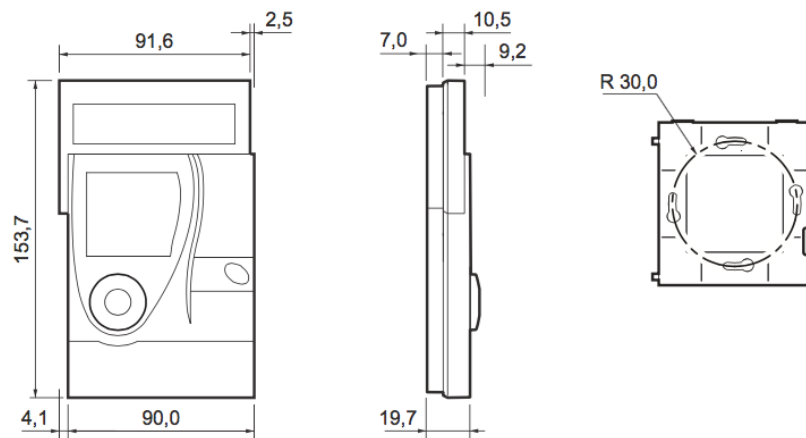
Technical Specifications

Part Numbers (Frequency Dependant)	M9-RPW (902 MHz - North America) M8-RPW (868 MHz - Europe and China) MJ-RPW (928 MHz - Japan)
Nominal Voltage	Dual power supply consisting of a solar cell and an internal energy storage unit with priority management Lithium battery (AA) AC 2.3 V; 0,08 W
Measured Quantity	Room temperature in homes or offices
Measuring System	Temperature sensor: - Integrated digital sensor Occupancy sensor: - Integrated PIR ("Passive infrared") sensor
Measuring Range	0 to 40°C or 32 to 104°F
Relative Measurement Precision	0.1 K
Display	LCD: - Room temperature/time, optionally - Status indicators
Controls	- Occupancy button: manually switch between comfort mode/ economy mode
Interfaces	EnOcean® wireless interface: - Radio telegram: EnOcean radio telegram, bidirectional - Duty cycle: < 1 % - Cyclic transmission/reception intervals
Communication Cycle	10 min
Transmission Power	< 10 mW
Illumination Strength	Min. 100 lux recommended
Operating Range	Radio: Approx. 30 m in buildings (depending on building structure) Occupancy Sensor: Approx. 10 m
Housing	Plastic housing, RAL 9010 (pure white), 7001 Other colors on request
Protections Class	III
Degree of Protection	IP30
Ambient Temperature	0 to 50°C or 32°F to 122°F
Ambient Humidity	During Operation: 20 to 85% rH, non-condensing; Out of Operation: 5 to 90% rH; non-condensing
Installation	Flexible mounting using screws or adhesive
Maintenance	Maintenance-Free
Weight	0.22 kg
Dimensions	WxHxD: 90 x 153.7 x 26.7 mm

Mx-RPW

Room Control Module (Built-In Occupancy Sensor)

Dimensions



General Installation Instructions

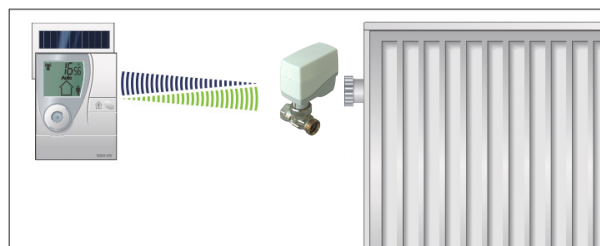
It is not always possible to freely select the installation location of devices which communicate wirelessly, as radio data transmission is influenced to a greater or lesser extent by structural or spatial factors. In order to establish operational and reliable communication paths, the following aspects must be considered before and during planning:

- Structural factors restrict the transmission ranges which can be reached. Building materials and screening elements (e.g. suspended ceiling elements, installation shafts, fire doors, etc.) must be taken into consideration during planning.

CAUTION: Elevated humidity increases natural signal damping

NOTE: Recommendation: Plan radio paths horizontally on a single level with max. 30 m between the transmitting and receiving modules.

- Designed only for use in rooms.
- Observe minimum distances to potential sources of interference.
- Min. 0.5 m to high-frequency sources of interference (such as microwaves, transformers or computers)
- Min. 3.0 m to transmitters of other radio systems (such as a cordless telephone or headphones)
- Min. 0.1 m to metal and door frames
- Minimize the effect of wall thickness (for example partition walls or room dividers) by ensuring that the radio signal passes through the walls at as close to a right angle as possible.
- Do not select installation locations in the radio shadow of screening building parts/structures -> No direct reception possible.
- Where the device is installed at the limits of reliability, change the position of the transmitter/ receiver slightly if possible (reduce overlapping effects of radio waves).

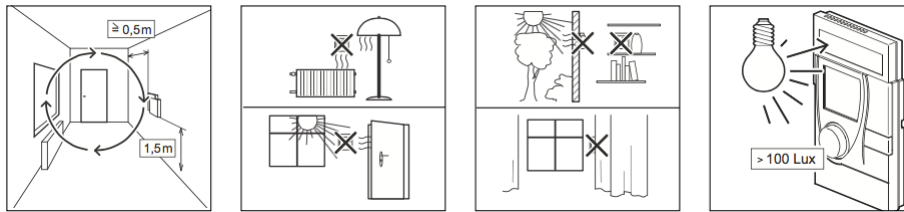


Mx-RPW

Room Control Module (Built-In Occupancy Sensor)

Product Description

- To quickly and accurately determine the room temperature, the room sensor should be mounted in a location where it is exposed to the air flow in the room.

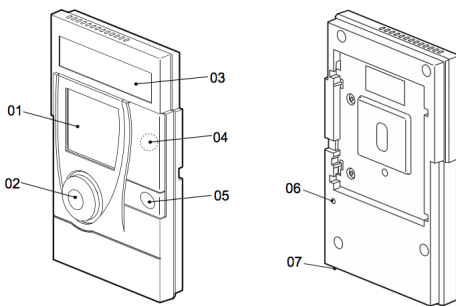


- As a result of the autonomous operation and wireless installation of Mx-RPW, the selected installation location can be changed and optimized at any time without additional effort.

The installation location must have sufficient lighting; using the device in unlit rooms (such as interior kitchens/bathrooms) shortens long-term functionality. The solar cell is optimized for indoor use and it works particularly efficiently with diffuse lighting.

CAUTION: Prolonged illumination at high intensities, e.g.

- Direct sunlight or
- Artificial light (such as halogen emitters) can cause damage to the solar cell.

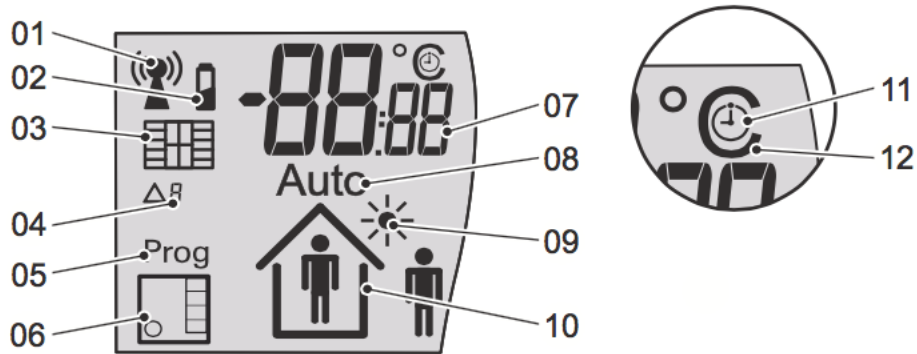


Item	Designation	Explanation
01	Display	Displays information regarding the current status
02	Occupancy Sensor	Detects presence / absence for the utilization time profile
03	Solar Cell	Generates energy for the room sensor
04	Magnetic Contact (below the housing)	Switches the display between room temperature / time
05	Occupancy Button	-Switching between comfort mode / economy mode - For switching the Mx-RPW ON/OFF (together with the setting button) - For the time and date setting functions
06	Setting Button	-Switches the room sensor on (together with the presence button) - Starts the login process - Resets the room controller to factory settings
07	Service Connection (underside)	For authorized service technicians only

Mx-RPW

Room Control Module (Built-In Occupancy Sensor)

Indicators on the Display



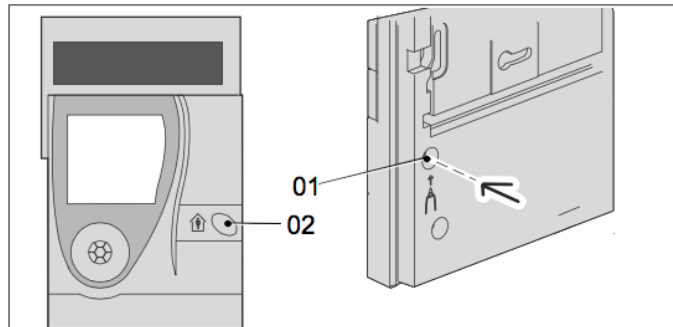
Item	Icon / Display	Explanation
01	Antenna	Status of the radio connection
02	Battery	Room sensor energy storage unit charging state < 30%
03	Windows	Rapid temperature drop detected
04	Code	Status and malfunction messages
05	Prog	Radio partners can be registered, registration status active
06	Gateway	Remote access through the EnOcean system gateway
07	Information Field	Display of the room temperature, time (= initial display, can be configured) or messages
08	Auto	Learned utilization time profile is active
09	Sun	The solar cell is active (test installation location). Summer mode is active
10	Occupancy	Occupancy sensor is active (test installation location), detected presence / absence and vacation mode
11	Clock	The information field displays the time (hh:mm)
12	Degrees Celsius	The information field displays the temperature (°C)

Mx-RPW

Room Control Module (Built-In Occupancy Sensor)

Commissioning

Switching the Device ON / OFF



(01) Setting button
(02) Occupancy button

- Switching on

The device is delivered in storage mode (switched off).

All functions are deactivated and the device does not consume any power. The energy storage unit has been fully charged at the factory for initial commissioning.

- Press the “Occupancy button (02)” and the “Setting button (01)” simultaneously for 5 seconds.

The display is activated. The icons “Δ”, “Sun” and “Occupancy” appear.

The occupancy sensor and the solar cell are active. (= installation/commissioning mode for evaluating the installation location).

NOTE: The “Test installation location” function is active as long as the “Δ” icon is displayed.

The Mx-RPW room sensor switches OFF again if a radio partner is not taught-in within 15 minutes.

- Switching off

The room sensor must be decommissioned (switched off) before transportation or storage.

The device does not consume any power and is sufficiently charged when recommissioned.

- Press the “Setting button (01)” for 5 seconds.

- The “dEI” text briefly appears on the display, followed by “rEs.”
- The icons “Δ” and “Sun” then also appear on the display.
- The display disappears completely after 15 minutes.

or

- Run the “Restore default settings and switch off room sensor” on the service level

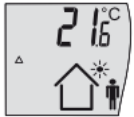
NOTE: The taught-in radio partners are then deleted and the room sensor is reset to the default settings.

Mx-RPW

Room Control Module (Built-In Occupancy Sensor)

“Test installation location” function

The room sensor supports the optimum selection of the installation location.



This function is active after switching the device on (see the “Switching the Device On/ Off” section page 10), unless a radio partner has not been registered (for maximum 15 minutes).

The “Δ” icon is displayed.

- Switch the room sensor on.
- The display switches on. The icons “Δ”, “Sun” and “Occupancy” appear. The occupancy sensor and the solar cell are active.
- Position the room sensor at the potential installation location.
- Check the “Sun” icon on the display.
- Move about in the room and check the “Occupancy” icon.

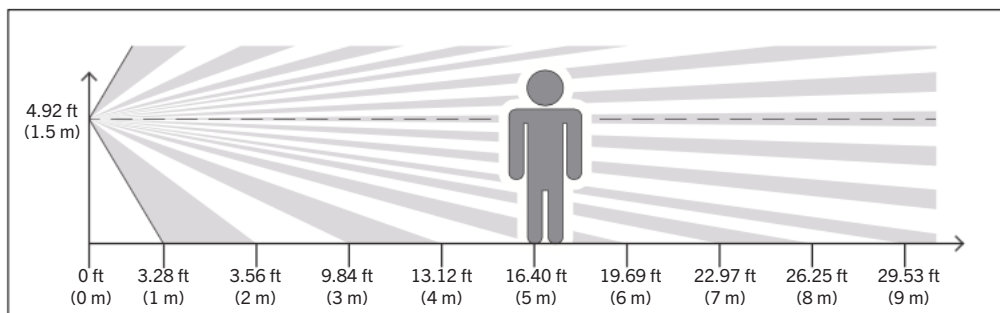
Evaluation	Display
Installation location good	The “Sun” icon is permanently displayed and the “Occupancy” icon switches from “Person inside the house” to “Person outside the house” and back again.
Installation location bad	The “Sun” icon is not displayed or the “Occupancy” icon does not switch to “Person inside the house” and remains unchanged.

NOTE: The room sensor automatically switches OFF if a radio partner has not been taught-in after 15 minutes

NOTE: If the energy storage unit is empty, the “Sun” icon will not appear even if the location is good. The energy storage unit has to be charged first. Charge the energy storage unit by placing the room sensor in a source of light for two hours (day light or artificial light, but not direct sun light).

Occupancy Sensor

The room sensor automatically detects presence with its occupancy sensor. Depending on the distance, the range of movement in the detection area is important. The further a person is away from the occupancy sensor, the greater the movement must be.



Mx-RPW

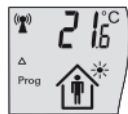
Room Control Module (Built-In Occupancy Sensor)

Teaching in the Mx-D15 radio partner with the Mx-RPW

Up to 4 Mx-D15 valve controllers can be taught-in on the room sensor



- Switch the room sensor ON

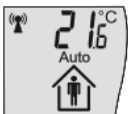


- Press the setting button (01) briefly. The “Antenna” icon flashes and the “Prog” icon appears.

- A teach-in radio telegram has to be triggered on the Mx-D15. Details can be found in the documentation of the Mx-D15

- If multiple Mx-D15 valve controllers are to be taught in, the teach-in radio telegrams must be triggered consecutively.

All valve controllers must be taught-in within a single teach-in sequence. The time between each valve controller teach-in may not exceed 15 seconds. The Mx-D15 acknowledges the start of the teach-in process with a signal tone. Successful registration of the Mx-D15 is acknowledged with two signal tones.



If the teach-in process was successful the “Antenna” icon permanently appears and the “Prog” icon disappears.

The icons “Δ” and “Sun” disappear following the first data exchange with the taught-in radio partner. The “Auto” icon appears. This can take up to 10 minutes.

CAUTION: An error has occurred and registration has failed if the Mx-D15 valve controller acknowledges registration with a downward sequence of tones (two long tones). Start the teach-in process again.

The valve controller is registered on the Mx-RPW. The room sensor now starts to learn the individual utilization time profile. The room sensor controls the room temperature using the default utilization time profile until it has learned the first utilization time profile.

Default utilization time profile:

Room Used:	6:00 AM - 8:00 PM, Comfort Temperature
Room Unused:	8:00 PM - 6:00 AM, Economy Temperature

NOTE: It is not possible to add an additional valve controller after the procedure is complete. If you want to do this, you must teach in ALL valve controllers again.

NOTE: If the room sensor was already switched on, the item “Switching on the device” is skipped and the room sensor uses the utilization profile already taught-in.

Mx-RPW

Room Control Module (Built-In Occupancy Sensor)

Mounting

The room sensor can be stuck to smooth, flat surfaces using the wall mount and the adhesive pad supplied, or it can be screwed directly onto level surfaces. Screws and wall plugs are not included in the scope of delivery of the room sensor.

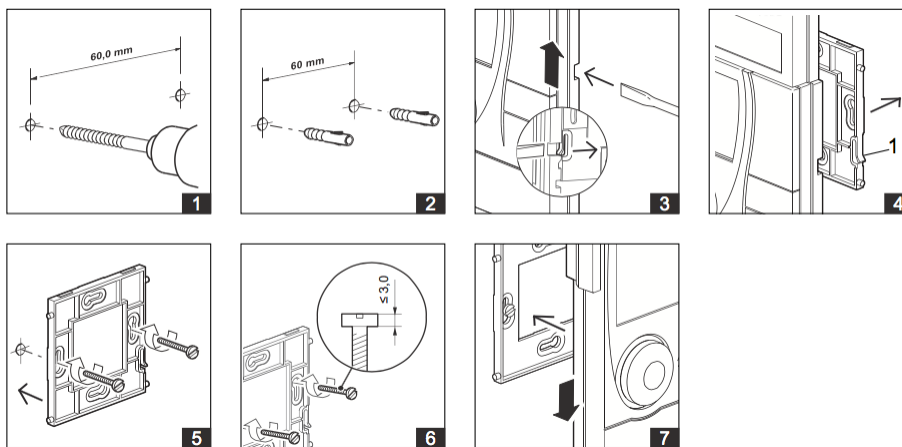
WARNING: Flush mounted cabling and piping at the installation location (electricity, gas, water)

Cabling and piping can be damaged by drilling. Check the installation location for flush mounted piping and cabling, or contact a specialist.

NOTE: Observe the orientation of the wall mount. The bar (1) must be on the right-hand, lower side when the device is installed.

Wall Mounting

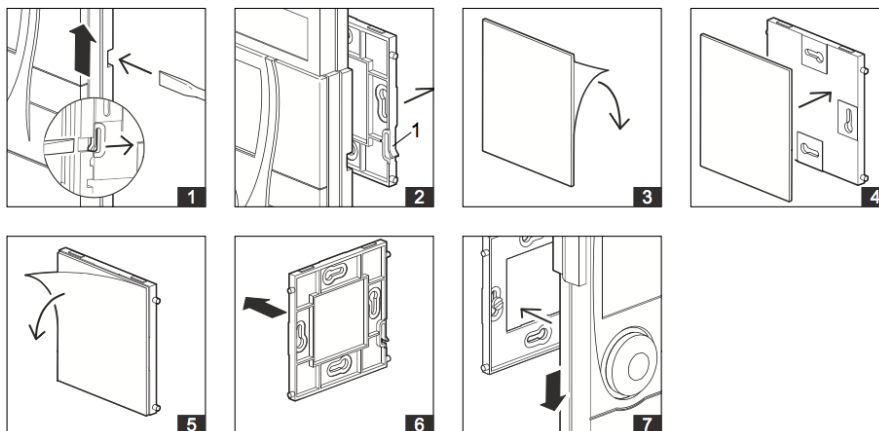
-Flexible screw mounting



Wall Mounting

-Flexible adhesive mounting with double-sided transparent adhesive strips

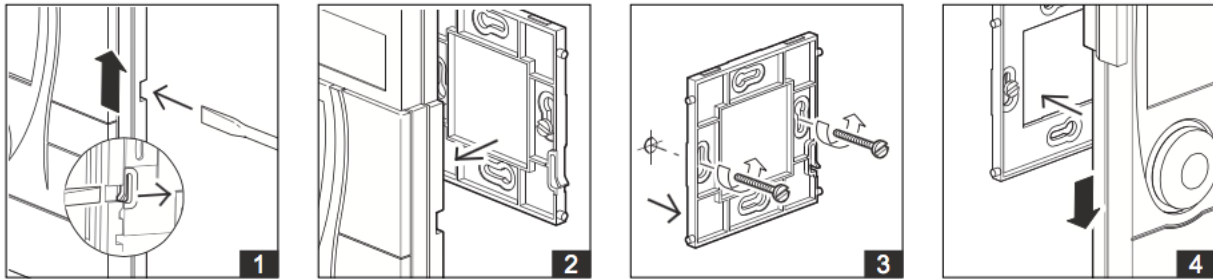
NOTE: For a permanent connection, remove any dust and grease from the adhesive surface on the wall mount and the wall.



Mx-RPW

Room Control Module (Built-In Occupancy Sensor)

Removal

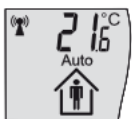


Settings

Setting the Time and Date

The hour, minutes, year, month and day can be set in sequence. The values to be set flash.

NOTE: Pressing the “Occupancy button” increases the current value by +1. Holding down the “Occupancy button” increases the value sequentially.



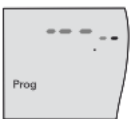
- Hold down the “Occupancy button” for 5 seconds until the display switches to the menu item for selecting the “Time and date” or “Vacation mode” settings.



- Release the “Occupancy button”. The display alternates between the “Time and date” and “Vacation mode” settings. Briefly press the “Occupancy button” when the setting menu item for “Time and date” appears on the display. The value being set flashes.



- Press the “Occupancy button” once only to confirm the hour displayed, or press it several times/hold it down until the desired set value is reached. - Release the “Occupancy button”. The next value to be set will start to flash after approximately 3 seconds. The setting procedure for minutes, year, month and day are the same as that for setting the hour.



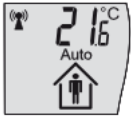
Once the last value for day has been entered, it is displayed by a moving line on the display; the “Prog” icon also appears for approximately 1 second. The time and date settings are complete and are saved. The display then switches to the initial display.

NOTE: If, when making settings, the “Occupancy button” is not pressed for more than 10 seconds, the display switches back to the initial display switches back to the initial display (temperature or time). Any settings that were previously made are not saved.

Mx-RPW

Room Control Module (Built-In Occupancy Sensor)

Setting vacation mode



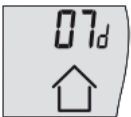
- Hold down the “Occupancy button” for 5 seconds until the display switches to the menu item for selecting the “Time and date” or “Vacation mode” settings.
- Release the “Occupancy button”.



The display alternates between the “Time and date” and “Vacation mode” settings.



- Briefly press the “Occupancy button” when the setting menu item for “Vacation mode” appears on the display. The value being set flashes. Briefly press the “Occupancy button” to set the duration of the vacation to a maximum of 31 days. Briefly pressing the “Occupancy button” increases the current value by +1. Setting 0 days deletes all previous settings.



After 3 seconds without input, the setting is applied and vacation mode is immediately in effect. The display switches back to the initial display.



If vacation mode is active, the room sensor is in economy mode. The display also shows the “home” icon. Briefly press the “Occupancy button” to end vacation mode prematurely.

Service Level

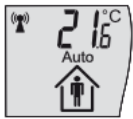
- The following functions are available on the service level:
- Teach in the Mx-D15 radio partner
- Teach in an EnOcean system gateway
- Delete all taught-in radio partners
- Display taught-in radio partners
- Restore default settings and switch off room sensor
- Software version display



A magnet (1) is used to switch to the service level

Mx-RPW

Room Control Module (Built-In Occupancy Sensor)



- Briefly press the magnet (1) against the upper right-hand side of the room sensor housing. The room sensor switches to the service level.



- Briefly press the “Occupancy button” repeatedly and the system will offer you the aforementioned functions one after the other.

If you do not take any other actions, the display will return to the initial display after 5 seconds.



Teaching in the Mx-D15

- Briefly press the “Occupancy button” to select the “ACt” function.

- Hold down the “Occupancy button” for about 3 seconds and the “Teach in the Mx-D15 radio partner” function will run



Teaching in an EnOcean Gateway

- Briefly press the “Occupancy button” repeatedly to select the “GAtE” function.

- Hold down the “Occupancy button” for about 3 seconds and the “Teach in an EnOcean system gateway” function will run.



A teach in radiogram is sent to the system gateway and a teach-in response is awaited.

You can find details in the documentation of the EnOcean system gateway. The display then returns to the initial display. If the teach-in process was successful, the wireless communication icon also appears.



Deleting all taught-in radio partners

- Briefly press the “Occupancy button” repeatedly to select the “dEL” function.

- Hold down the “Occupancy button” for about 3 seconds and the “Delete all taught-in radio partners” function will run.



NOTE: After all the taught-in radio partners have been deleted, the radio partners must be taught in again. Otherwise, the room sensor will switch off after 15 minutes.

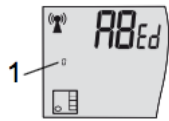
Mx-RPW

Room Control Module (Built-In Occupancy Sensor)

Displaying taught-in radio partners

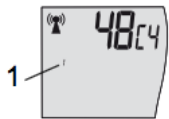
If no radio partners have been taught-in, this display does not appear.

- Briefly press the “Occupancy button” repeatedly to select the “Display taught-in radio partners” function. Press the “Occupancy button” once to display the taught-in radio partners.



- Press the “Occupancy button.”

The last four hexadecimal digits of the EnOcean system gateway’s wireless ID appear on the display.

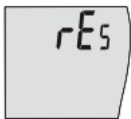


- Press the occupancy button.

The last four hexadecimal digits of the first taught-in valve controller’s wireless ID appear on the display. If other valve controllers have been taught in, pressing the occupancy button repeatedly will display this information.

The display (1) also indicates which EnOcean gateway or valve controller is currently shown.

- 0 = taught-in EnOcean gateway
- 1 to 4 = taught-in valve controllers 1 to 4

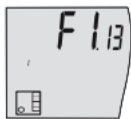


Restoring default settings and switching OFF the room sensor

- Briefly press the “Occupancy button” repeatedly to select the “rEs” function.

- Hold down the “Occupancy button” for about 3 seconds and the “Restore default” settings and switch off room sensor” function will run. The room sensor switches off. The display disappears completely.

NOTE: The taught-in radio partners are then deleted and the room sensor is reset to the default settings.



Software version display

- Briefly press the “Occupancy button” repeatedly to select the “Software version display” function. Displays the software version of internal processor 1.



Briefly press the “Occupancy button” again.

Displays the software version of the internal processor 2.

Mx-RPW

Room Control Module (Built-In Occupancy Sensor)

Setting the initial display to “Room temperature” or “Time”



The display is switched from “Room temperature” to “Time” or vice versa using a magnet (1)



- Hold the magnet (1) for approximately 5 seconds against the upper right-hand side of the room sensor housing, see figure.



The display is then switched from “Room temperature” to “Time” or vice versa.



The display switches to the newly set initial display.

Default setting: Initial display temperature

Manually switching between comfort and economy mode

- You can manually switch between comfort mode and economy mode and vice versa by pressing the “Occupancy button”.

This is displayed by the comfort mode or economy mode icons. The “Auto” icon also disappears from the display.

Changing from the comfort mode to economy mode:

Economy mode is active for 4 hours.

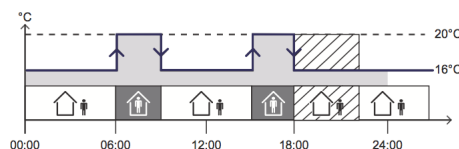
The utilization time profile is then active again and the “Auto” icon appears on the display.

Example 1:

Comfort temperature 20°C, economy temperature: 16°C

Room used: 6:00 AM - 9:00 PM

Absence set manually (by pressing the “Occupancy button”) 6:00 PM - 10:00 PM



Mx-RPW

Room Control Module (Built-In Occupancy Sensor)

Changing from economy mode to comfort mode:

Comfort mode is active for 2 hours.

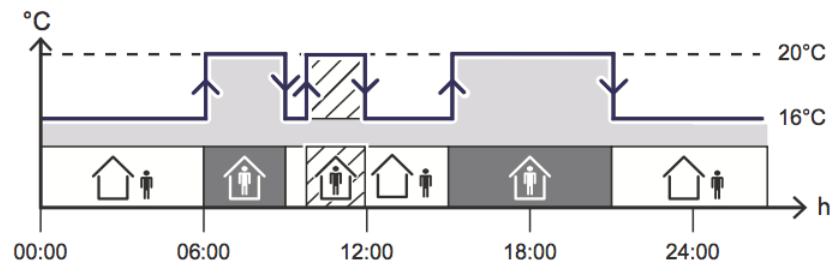
The utilization time profile is then active again and the “Auto” icon appears on the display.

Example 2:

Comfort temperature 20°C, economy temperature: 16°C

Room used: 6:00 AM - 9:00 AM and 3:00 PM - 9:00 PM

Presence set manually (by pressing the “Occupancy button”) 10:00 AM - 12:00 AM



Automatically switching between comfort and economy mode

Automatic switching between comfort or economy mode is performed according to the utilization profile learned.

The utilization profile is generated automatically, and is continuously and dynamically adjusted and optimized.

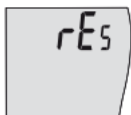
This is displayed by the comfort mode or economy mode icons. The “Auto” icon also appears in the display.

Presence / absence is recorded by the occupancy sensor in order to learn the utilization profile.

The room sensor continuously adapt the mode depending on real utilization behavior.

Restoring defaults

The learned utilization time profile and the radio connections are deleted when defaults are restored.



- Press the “Setting button” for 5 seconds.

The “dEl” text briefly appears on the display followed by the “rEs” text and then the “Δ” and the “Sun” icons.

The learned utilization time profile is now deleted; the default utilization time profile is active.



NOTE: After the defaults are restored, the radio partners must be taught in again. Otherwise, the room sensor will switch off after 15 minutes.

Mx-RPW

Room Control Module (Built-In Occupancy Sensor)



Status Messages

Icon / Display	State	Explanation
Antenna	On	Fault-free radio connection
Δ	On	“Test installation location” evaluation function is active
Antenna Prog	Flashes On	Valve controllers can be registered
Antenna Δ1	On On	Radio connection interrupted (> 1 hour) At least one valve controller is transmitting
Antenna Δ1	Off On	Radio connection interrupted (> 1 hour) No valve controllers are transmitting
Antenna Δ2	On On	Radio connection interrupted (> 4 hours) At least one valve controller is transmitting
Antenna Δ2	Off On	Radio connection interrupted (> 4 hours) Initial registration failed or no valve controllers are transmitting
Battery	On	Room sensor Charge state < 30%
ΔE	On	Valve controllers (1 to 4), for at least one valve controller Charge state < 30% On the service level, the battery icon also appears next to each drive
Windows	On	Economy mode for max. 30 minutes
🏠	On	Longer absence - vacation
Sun	On	Summer mode
Occupancy	Off	System in energy saving mode
Δ6	On	Radio connection to EnOcean system gateway interrupted

Radio connection:

The “Antenna” displays the current state of the radio connection to the radio partners. The status of the radio connection is monitored continuously. A message is displayed if the radio connection status changes.

NOTE: Communication is continued automatically once the radio connection between the room sensor and the valve controllers is functioning properly again. “Δ1” or “Δ2” disappears and the “Antenna” icon permanently appears.

Energy storage unit

The “Battery” icon indicates the current stat of the room sensor energy storage unit. The room sensor continuously monitors the charge state of the energy storage unit. The “Battery” icon appears on the display if the charge state drops below 30%.

NOTE: Charge the energy storage unit by placing the Mx-RPW in a source of light for two hours (day light or artificial light, but not direct sun light).

Mx-RPW


Room Control Module (Built-In Occupancy Sensor)



Rapid temperature drop

If the room sensor detects a rapid drop in temperature (e.g. a window has been opened), economy mode is automatically active for max. 30 minutes. The “Window” icon appears on the Mx-RPW display. The rapid drop in temperature detected is not included in the learned utilization time profile.

Longer absence - vacation

The room sensor permanently monitors the room utilization. If the room sensor detects a longer absence (3 days without occupancy), the utilization time profile permanently switches to economy mode and the  icon appears on the display.

If the “Occupancy button” is pressed after a longer absence, or if the room sensor detects room occupancy for a period of 20 minutes, the utilization time profile switches to comfort mode and the learned utilization time profile is active again.

Summer mode

The room set detects longer periods of time, during which the valve controller is not supplied with thermal energy. The room set switches to summer mode if such a period of time is detected between June 1 and August 31 of a year. The “Sun” icon appears and the “Occupancy” icon disappears. If, following summer, the valve controller generates sufficient energy again, the room set switches back to automatic mode and controls the room temperature according to the last active utilization time profile. The “Occupancy” icon appears and the “Sun” icon disappears.

Malfunction messages

Icon / Display	State	Explanation
Antenna Δ8	Off On	Transmission function on the Mx-RPW malfunctioning
Δ3	On	Mx-RPW synchronization malfunctioning

Transmission function malfunctioning

The radio connection is continuously monitored. The “Δ8” icon appears on the display if a transmission function malfunction is detected in the room sensor. The following troubleshooting procedures can be implemented:

- Restore the room sensor to its default setting
- The “Δ8” icon disappears from the display
- Register the radio partner again
- The room sensor has a serious malfunction if the “Δ8” icon continues to appear. It should be checked by an authorized service technician.

Mx-RPW

Room Control Module (Built-In Occupancy Sensor)



NOTE: If the room sensor transmission function is malfunctioning, the valve controllers continuously operate in comfort mode without reducing to economy mode.

Synchronization

Synchronization is continuously monitored. The “Δ3” icon appears on the display if a synchronization malfunction is detected in the room sensor.

- Reset the time
- The “Δ3” icon disappears from the display.

The room sensor has a serious malfunction if the “Δ3” icon continues to appear. It should be checked by an authorized service technician.