

Mx-RBW

Room Control Module



Application

Solar-powered room control module with LCD and controls, with smart communication management for measuring room temperature and for wireless transmission of measured values, occupancy, setpoint and weekly schedule. The Mx-RBW supports the EnOcean radio standard ISO/IEC 14543-3-10 for direct communication with the Mx-D15 radio small actuator or an EnOcean gateway. It uses EEP D2-10-01* for connection to an EnOcean gateway. In combination with the Mx-D15, the Mx-RBW constitutes a functional unit for controlling the room temperature.

Safety Instructions

This data sheet contains information on installing and commissioning the product "Mx-RBW". Each person who carries out work on this product must have read and understood this data sheet. 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, the protection provided will be impaired. Applicable regulations must be observed when installing and using the device. Within the EU, these include regulations regarding occupational safety and accident prevention as well as those from the VDE (Association for Electrical, Electronic & Information Technologies). If the device is used in other countries, it is the responsibility of the system installer or operator to comply with local regulations. Mounting, installation and commissioning work on the devices may only be carried out by qualified technicians. Qualified technicians are persons who are familiar with the described product and who can assess given tasks and recognize possible dangers due to technical training, knowledge and experience as well as knowledge of the appropriate regulations.

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Technical Specifications

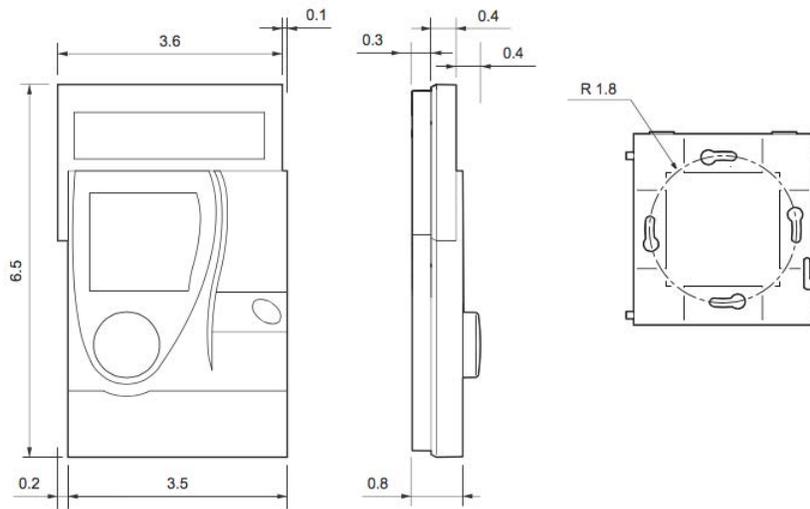
Part Numbers (Frequency Dependand)	M9-RBW (902 MHz - North America) M8-RBW (868 MHz - Europe and China) MJ-RBW (928 MHz - Japan)
Power	Dual power supply consisting of a solar cell and an internal energy storage unit with priority management. Internal energy storage unit with priority management.
Measured Value	Room temperature of spaces in homes or offices
Measuring System	Integrated digital sensor
Temperature Units	Can be set to °C or °F
Measuring Range	0 to 50°C or 32 to 122°F
Relative Measurement Precision	0.1 K
Display	LCD: -Time -Weekly Schedule -Icon display to indicate operating mode -Setpoint in the temperature units selected 10 to 30°C, in 0.1 K increments or 50 to 85°F, in 1°F increments
Controls	- Knob with push button for setting: setpoint, party mode, vacation mode, weekly schedule, time, date, display options (e.g. 12/24 hour display) and service data - Occupancy button: Manual switch between present / absent
Interfaces	- Radio telegram: EnOcean radio telegram, bidirectional - Operating range: Approx. 30 m in buildings (depending on building structure) - Duty Cycle: < 1% - Cyclic transmission / reception intervals
Transmission Power	< 10 mW
illumination Strength	Min. 150 lux recommended
Operating Range	Approx. 30 m in buildings (depending on building structure)
Housing	Plastic housing, RAL 9010 (pure white) Other colors on request
Protections Class	III
Degree of Protection	IP30
Ambient Temperature	0 to 50°C
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
Weight	0.22 kg
Dimensions	WxHxD: 90 x 153.7 x 26.7 mm

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Dimensions

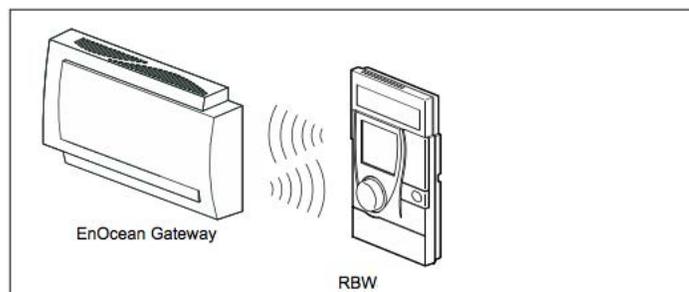


Radio Interface

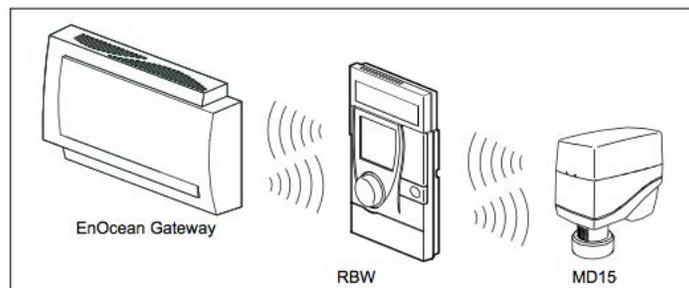
Communication with the radio partner is cyclical, bidirectional and includes an intelligent synchronization process. If the radio communication between the Mx-RBW and the Mx-D15 is interrupted, an internal resynchronization procedure starts automatically.

Radio Connection

-Gateway operation



-Gateway and pair operation

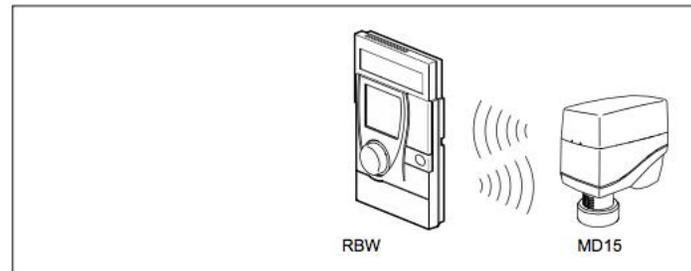


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Radio Interface (continued)

- Pair operation



Installation

CAUTION:

This product description contains the specific settings and functions of the Mx-RBW. In addition to these instructions, the product description of the Mx-D15 must also be observed.

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.

Before installation and assembly, the building structure must be analyzed and a series of measurements must be made to determine the specific ranges within the building.

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:

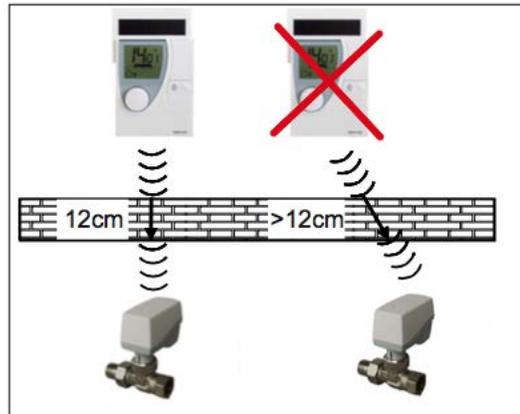
Recommendation: Plan radio paths horizontally on a single level with max. 30 m between the transmitting and receiving modules.

- 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.

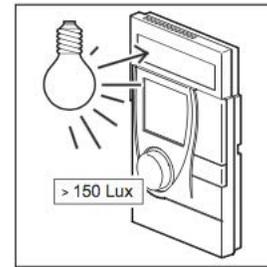
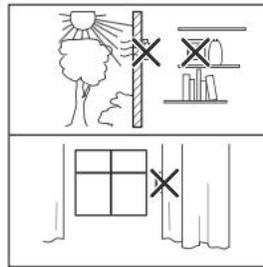
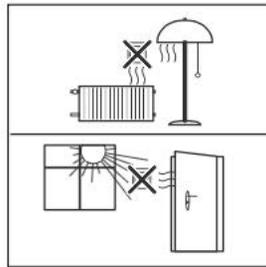
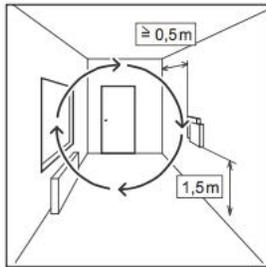
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Installation (continued)



- 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).
- The room control modules are to be mounted in a location where they are exposed to the air circulation in the room so that they can quickly and accurately measure the room temperature.



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

Mounting

The installation location must have sufficient lighting; using the device in unlit rooms (such as interior kitchens/bathrooms) shortens the length of the maintenance cycle.

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.

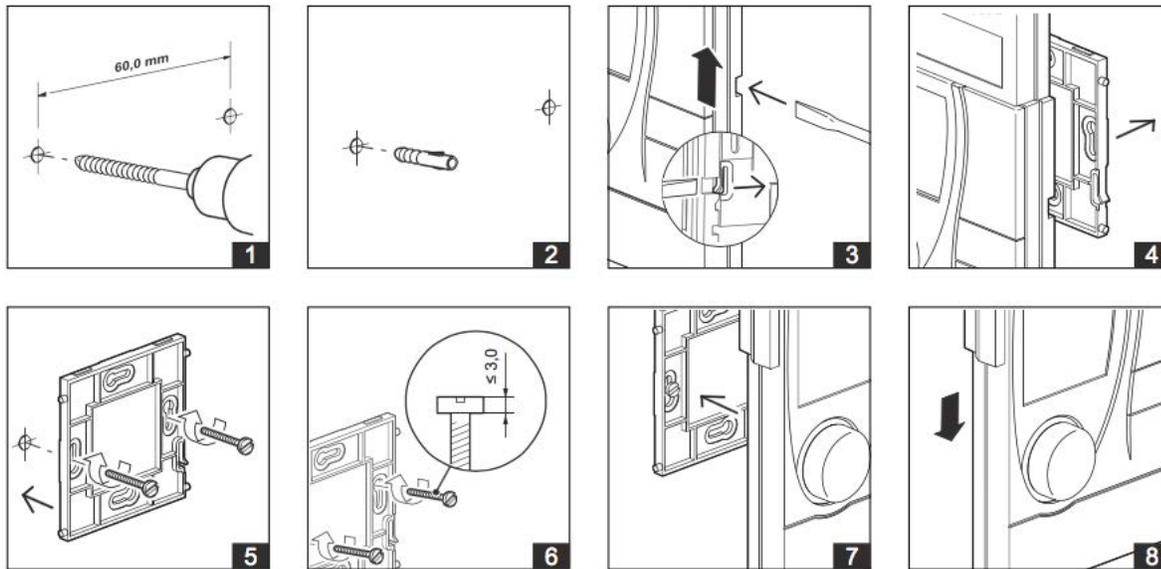
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Installation (continued)

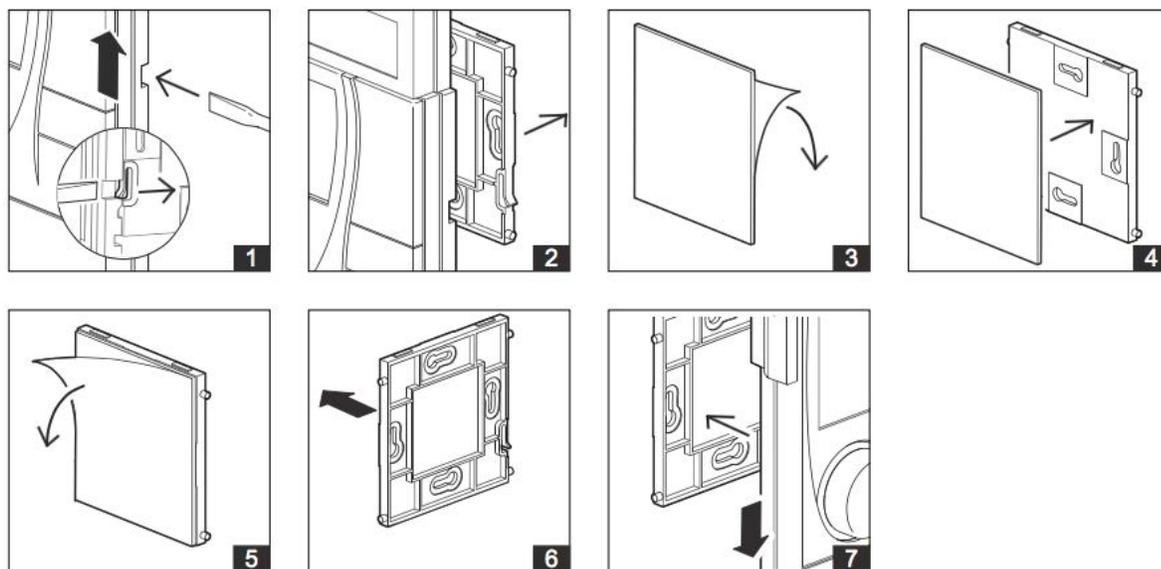
Wall Mounting

- Flexible screw mounting



Wall Mounting

- Flexible adhesive mounting with double-sided transparent adhesive strips



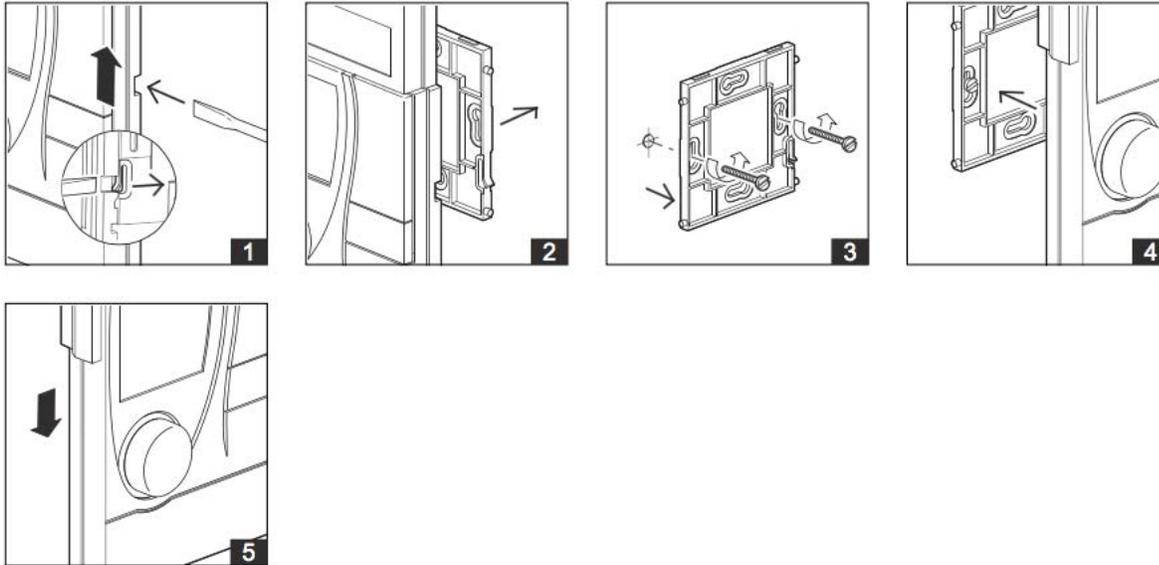
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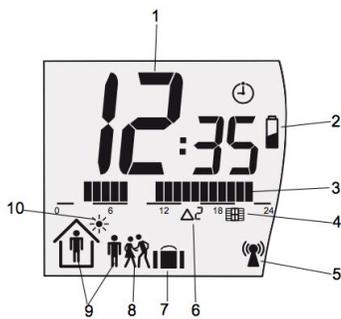


Installation (continued)

Removal



Indicators on the display



1	Time display, temperature or setpoint = Initial display, adjustable
2	Energy storage indicator The indicator appears when the remaining charge in the energy storage unit of the Mx-RBW is < 10%
3	Weekly schedule (current daytime usage times)
4	Window Open Detection display Message is displayed when a radio partner transmits this message
5	<ul style="list-style-type: none"> • Radio communication indicator = Radio communication present , at least one radio partner has been taught-in • Radio symbol visible Radio symbol not visible = No radio communication present, no radio partners have been taught-in or all radio partners are malfunctioning • Radio symbol flashing = Radio telegram in transmission / teach-in process
6	Operating message and malfunction message, 12/24 hour display or the number of the usage time
7	Vacation mode indicator This icon appears on the display when vacation mode is activated
8	Party mode indicator This icon appears on the display when party mode is activated
9	Occupancy indicator
10	Summer mode indicator This icon appears on the display when summer mode is activated

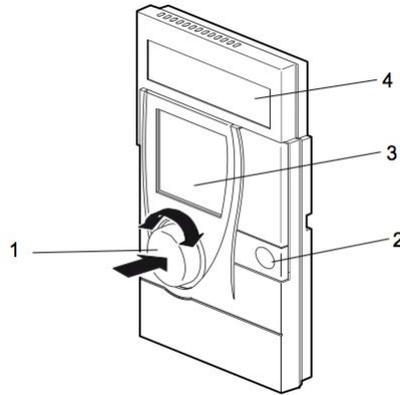
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Operation, Display and Settings

The Mx-RBW room control module is operated on three levels: the operating level, the configuration level and the service level. The descriptions for these can be found on the following pages.



1	[Knob] + [Push Button]	Rote: Set the value Left: Reduct Right: Increase Press: Change menus or confirm display setting
2		Occupancy button: Switch between “present” (comfort mode) and “absent” (economy mode) or “summer mode”.
3	Display	
4	Solar Panel	

NOTE:

If the occupancy button is switched to “absent” (economy mode) during an active usage time, the economy mode is active until the next switching point (start time) for “comfort mode”.

- Comfort mode: Operating mode for a room that is in use (usage status: “Present”). The controller operates with the specified comfort setpoint. This setpoint is set to a comfortable room temperature.
- Economy mode: Energy-saving operating mode (movement status: “Absent”/economy mode) for a room that is not in use. The controller operates with a predefined reduced set- point.
- Summer mode: Summer operating mode. The temperature is controlled using economy mode

Switching on the device

The device is delivered in a storage mode (display switched off)

-This standby state can be ended by simultaneously pressing the knob and the occupancy button for approximately 3 seconds.

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Operation, Display and Settings (continued)

Summer Mode



When the sun icon is displayed, it indicates that the device is operating in summer mode. The setpoint that has been set for economy mode is activated for the controller. If summer mode is active, the occupancy display, party mode and the weekly schedule are inactive. Summer mode is automatically activated for the time period from 1 June to 31 August or can be manually switched on or off using the occupancy button. Pressing the occupancy button for approximately 3 s switches summer mode on or off.

Operating Level

The operating level is reached by briefly pressing the knob.



The setpoint can only be changed in comfort mode. Only the setpoint for comfort mode can be changed.

- Briefly press the knob. The setpoint indicator flashes for 2 s.
- Select the desired setpoint turning the knob. The new selected value flashed for approximately 2 s; it is then automatically confirmed and the room control module switches to the initial display.
- A new setpoint can also be applied by pressing the knob quickly.

NOTE:

The individual setting functions are ended if the knob is pressed for approximately 2 s or if no settings are entered within approximately 30 s.

Setting party mode (usage time extension)

The maximum party time is 8 hours.

This can be set in steps of 30 minutes.



- Press the knob for 2s.
- Select the "Party Mode" function using the knob.



- Press the knob briefly; the display flashes. Current time = start of party mode (usage time extension).



- Set the end time for party mode (usage time extension) turning the knob. The selected comfort mode extension (usage time extension) is shown in the display by the bar indicator.
- Confirm the entry by briefly pressing the knob.

The display switches back to the initial display.

The comfort mode extension is effective immediately and comfort mode is switched on.



The activated party mode is indicated by the party icon on the display. Party mode can be ended early by pressing the occupancy button.

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Operation, Display and Settings (continued)



- Press the knob for 2 s.
- Select the “Vacation mode” function using the knob.



- Briefly press the knob
The month display flashes.
Vacation start, vacation end and the setpoint for the vacation time period are set in sequence:
The day / month to be set flashes on the display.

- Vacation start:

Set the month. Confirm setting by pressing the knob. Set the day. Confirm setting by pressing the knob.



- Vacation end:

Set the month. Confirm the setting by pressing the knob. Set the day. Confirm the setting by pressing the knob.



- Set the setpoint for the duration of the vacation. Confirm the setting by pressing the knob.
The display switches back to the initial display.



Vacation mode begins on the set start date at 00:00 (12 a.m.) and ends on the set end date at 24:00 (midnight).

If a vacation time is set and has not yet begun, the suitcase icon is showing on the initial display.

If vacation mode is active, the vacation end date and the suitcase icon are shown on the display. If vacation mode is active, the weekly schedule is inactive.



Once the set vacation time has elapsed, the vacation mode function is deleted and the display switches back to the initial display.

End an active vacation mode early

- Press the knob for 2 s.

Delete or end vacation mode

- Set vacation start equal to vacation end. Perform settings as described above.

NOTE:

The vacation time must be at least 2 days, and it does not work retroactively.

If a vacation start is entered which is before the current date, the set dates will not be active until the next calendar year.

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Operation, Display and Settings (continued)

Setting the weekly schedule



A weekly schedule is available with the following week days: - MOFR Monday - Friday

- SASU Saturday - Sunday

- MOSU Monday - Sunday

- Individual days MO, TU, WE, TH, FR, SA and SU

Up to 4 usage times can be set per day.

A usage time consists of a start time and an end time (usage time block). These can be set of 15 minutes.



- Press the knob for 2 s.

- Using the knob, select the “weekly schedule” function and the desired week days (ex: **MOSU**)



- Press the knob.

First usage time / Start time is displayed and flashes icon is active.

- Turn the knob to set the start time. Press the knob to confirm the setting.



First usage time / End time is displayed and flashes icon is active.

- Turn the knob to set the end time. Press the knob to confirm the setting.

The display switches to the start time of the second usage time.

Set the **second, third and fourth usage times**, if desired.

The setting procedure is the same as for the first usage time block.

The display also shows which usage time block (1) is set.

Pressing the knob for approx. 2 s will end the setting of the utilization times and the display will

switch back to the pre-set initial display.

The usage times of the current day are shown by the bar indicator on the display.



If a usage time is active, the controller operates in comfort mode. In addition, this icon is shown on the display.

If the current time is outside of the set usage time blocks, economy mode is active. In addition, the icon is shown on the display.

Delete usage time:

WARNING: Deleting a usage time automatically deletes all subsequent usage time within the selected weekday span.

Be careful to select the correct weekdays for deletion.

- Select the end time of the usage time block to be deleted as described above.

- Turn the knob left until the end time = start time and then press the knob.

The corresponding usage time is deleted and no longer displayed.

Default settings: **MOSU** Monday - Sunday, 6:00 - 20:00 (6 a.m. - 8 p.m.)

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Operation, Display and Settings (continued)

Setting the setpoints for comfort mode and economy mode



- Press the knob for 2 s.
- Select the “Setpoint” (temperature display) function using the knob.



- Press the knob.
- The setpoint for comfort mode flashes and can now be set. The icon is active.
- Confirm the chosen setpoint for comfort mode by pressing the knob.



- The setpoint for economy mode flashes and can now be set.
- The icon is active
- Confirm the chosen setpoint for economy mode by pressing the knob.

Default setting: Comfort mode setpoint: 20°C
Economy mode setpoint: 15°C

Setting the time and date



- Press the knob for 2 s.
- Use the knob to select the “Time + Date” function TIME and press the knob.
The hour, minutes, year, month and day can then be set in sequence.
The values to be set are always flashing.
- Set the time:
Set the hour. Confirm setting by pressing the knob.
Set the minutes. Confirm setting by pressing the knob.
- Set the year:
Confirm setting by pressing the knob.
- Set the month and day:
Set the month. Confirm setting by pressing the knob.
Set the day. Confirm setting by pressing the knob.

Daylight saving time switching occurs automatically according to Central European standards.

Default setting: Current Central European time

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Operation, Display and Settings (continued)

Setting the time, temperature or setpoint for the initial display



- Press the knob for 2 s.
- Turn the knob to select the "Setting the initial display" function DISP and press the knob.



- Select the desired initial display using the knob: - "Initial display: time"



- "Initial display: temperature" or



- "Initial display: setpoint"

Confirm the setting by pressing the knob. The display switches to the initial display.

Default setting: Initial display: time

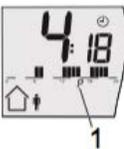
Setting the 12 / 24 hour display



- Press the knob for 2 s.
- Use the knob to select the "12/24 hour display" function 24h and press the knob.



- Set 12 or 24 hour display.
- Confirm the setting by pressing the knob.



If the display (1) is activated, an additional **A** for AM or **P** for PM is shown in the display.

Default setting: 24h

Setting the temperature scale °C / °F



- Press the knob for 2 s.
- Use the knob to select the "Set the temperature units °C / °F" function **TEMP** and press the knob.



- Set the desired temperature units and confirm by pressing the knob.

The display switches to the initial display.

Default setting: °C

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Operation, Display and Settings (continued)

Service Level

Access Code



- Press the knob for 2 s.
- Use the knob to select the “Service level” function **SR**.
- Press the knob.



- Enter the 4-digit access code 4321. Each digit is entered individually and the entry is confirmed by pressing the knob. If the access code was entered incorrectly, the display **ER** appears.

Status display for taught-in radio partners



1

- If no radio partners have been taught-in, this status display does not appear.
- If radio partners have been taught-in, the following messages are displayed:

- EnOcean system gateway

EnOcean ID (the last four hexadecimal digits of the system gateway’s EnOcean ID, here 392d), radio status indicator, assigned radio partner (1) 0 (system gateway)



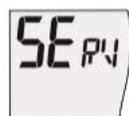
1

- Radio actuator

EnOcean ID (the last four hexadecimal digits of the radio actuator’s EnOcean ID, here C8D6), set-point (bar indicator, here 50 %), radio status indicator, assigned radio partner (1) 1 - 4 (radio actuator), if applicable, the Window Open Detection and battery indicator of the radio partner

- Turning the knob displays these status messages for every taught-in radio partner in sequence.

Valve Position for Service Purposes



- In the service level, use the knob to select the “Valve position for service purposes” **SERV** function.
- Press the knob.
- Turn the knob to select the desired valve position.

Confirm the setting by pressing the knob.

The display switches to the initial display.



Confirming the valve position sends the set valve position to all of the taught-in radio actuators with the next communication cycle.

Room temperature control is inactive for one transmission/reception interval.

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Operation, Display and Settings (continued)

Restore Default Settings



- In the service level, use the knob to select the “Restore default settings” **RES** function.
- Press the knob. The display flashes.
- Press the knob again. The “Restore default settings” function is carried out.

All settings are restored to the default settings, the taught-in radio partners are deleted and the device switches to its initial state (display is switched off, see page 10).

Software Version Display



- Use the knob to select the “Software version display” function **F**.
The current software version is displayed.



- Briefly press the knob.
Displays the software version of internal processor 1.



- Turn the knob:
Displays the software version of internal processor 2.

Teaching the Mx-D15 radio partner and EnOcean gateway on the Mx-RBW.

CAUTION: This product description contains the specific settings and functions of the Mx-RBW. In addition to these instructions, the product descriptions of the Mx-D15 radio partner and EnOcean gateway must also be observed.

- Before starting the teach-in process, check for the radio symbol on the display of the Mx-RBW to determine if a radio partner was already taught-in. If so, delete it.



- Select service level



- Use the knob to select the “Teach-in” function **T: IN**.

Teaching in the radio small actuator

Up to 4 Mx-D15 radio actuators can be taught-in on the Mx-RBW.



- Use the knob to select the “Teach-in radio small actuator” function **ACT**.

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Operation, Display and Settings (continued)



- Press the knob.
The radio icon flashes.
- A teach-in radio telegram has to be triggered on the MD15-FTL-xx.
- If multiple MD15-FTL-xx radio small actuators are to be taught in, the radio teach-in telegrams must be triggered consecutively.
The time between each teach-in may not exceed 15 s.
All radio actuators must be taught-in within a single teach-in sequence.
If the teach-in process is successful, the radio symbol will be continuously displayed.
Each Mx-D15 radio actuator confirms this visually (status LED lights up for approx. 3 s) and acoustically (beeping tone sounds twice).

NOTE:

The “Taught-in radio partners’ status display” function allows you to check which radio partners are taught-in.

Adding an additional radio actuator is not possible afterwards.

To add additional radio partners, **ALL** Mx-D15 units which have been taught-in on the Mx-RBW must first be deleted. Afterwards, all Mx-D15 radio partners must be taught-in.

NOTE:

After a successful teach-in process, the device ID of the radio partner is stored in the room control module. The teach-in process does not need to be performed again when the battery is changed.

If the teach-in process fails, the radio symbol is not visible on the display.

- The teach-in process must be performed again, or the radio communication path must be checked.

CAUTION:

If multiple radio partners are being taught-in, you must check during the teach-in process that each radio partner acknowledges the successful teach-in process visually (illumination of the status LED for approx. 3 s) and acoustically (2 signal tones in succession). If this does not occur for one of the radio partners, the entire teach-in process must be repeated.

Teaching in on an EnOcean system gateway



- Use the knob to select the “Teach-in system gateway” function GATE.



- Press the knob.
The radio icon flashes.
A teach-in radiogram is sent to the system gateway and a teach-in response is awaited.
If the teach-in process is successful, the radio symbol will be continuously displayed.

Operation, Display and Settings (continued)

Deleting the radio partner of the Mx-RBW



- Use the knob to select the “Delete” function **dEL** in the service level.
 - Press the knob until the radio icon on the display disappears (approx. 3 s).
- All taught-in radio partners are deleted.

Operating and Malfunction Messages

Icon on Display	Meaning
$\Delta 1$	Radio communication with at least one taught-in Mx-D15 radio partner has been interrupted for more than one hour. If no signal is received from the MD15-FTL-xx for an extended period of time, the display switches to $\Delta 2$. This warning disappears once the communication to the missing radio partner is re-established. If the radio communication to all taught-in radio partners is interrupted, the radio icon is no longer displayed.
$\Delta 2$	Radio communication with at least one taught-in Mx-D15 radio partner has been interrupted for more than four hours and a resynchronization has failed. This warning disappears once the communication to the missing radio partner is re-established. If the radio communication to all taught-in radio partners is interrupted, the radio icon is no longer displayed.
$\Delta 3$	Radio communication to the taught-in EnOcean system gateway is interrupted
ΔE	The battery capacity of at least one Mx-D15 is too low (<10%). The batteries of the radio small actuator must be replaced. If no signal is received from the Mx-D15 for an extended period of time, the display switches to $\Delta 2$.
$\Delta 8$	Room control module faulty, supersedes all other messages.

NOTE:

If the malfunction message $\Delta 2$ appears, the batteries of the Mx-D15 must be changed or the radio communication path must be checked.

NOTE:

Operating and malfunction messages have priority over the 12/24 hour display.

Appendix

Further information on using the EnOcean radio standard EEP D2-10-01

Custom Warnings

The Mx-RBW does not display sent warnings via the bits “Custom Warning 1” and “Custom Warning 2”.

Window Open Detection

The Mx-RBW does not have an open window detection function. It only uses the information from the radio messages from taught-in actuators or from a connected gateway.

Room Control Mode

The Mx-RBW supports the “Comfort”, “Economy” and “Building Protection” control modes. “Pre-Comfort” is not assigned to an assignment program.

Menu locks and Display Switch-Off

Menu lock and display switch-off commands are overridden if the radio connection to the gateway is interrupted.

Switching Between Daylight Savings/Standard Time

The Mx-RBW automatically switches between daylight savings and standard time. It follows the calendar for central Europe. This function can be activated or deactivated via the “Daylight Savings Time Flag” bit. When activating / deactivating this function, the Mx-RBW does not automatically detect whether the time should be adjusted straight away or not. The time should be synchronized immediately after making this kind of changes.

Date and Time Setting

If the defined validity ranges are exceeded, the dates and times transmitted by the gateway are rounded up or down to the valid ranges. The year can be set to a minimum of 2014.

Weekly Schedule Transmission and Setting:

The weekly schedule is transmitted via utilization time blocks (connected time period assigned with usage status or comfort mode) that are characterized by their start and stop time.

The Mx-RBW processes and saves the weekly schedule in 15 minute blocks. The utilization time periods should also be transmitted in whole quarters of an hour to prevent deviations between the set and copied weekly schedule.

A maximum of four utilization time blocks are permitted per weekday or weekday range. If more utilization time blocks are transmitted, the Mx-RBW uses the first four of each and discards the rest.

An increased radio load may occur due to the possible connection of weekly schedule messages (several telegrams that belong together). Unnecessary weekly schedule transmissions should, therefore, be avoided.