

Technical data lumina MS4/RC

1. Product description



The LON multisensor lumina MS4/RC is a combination of occupancy sensor, two light sensor, external temperature sensors, infrared remote control receiver and EnOcean radio receiver.

The sensitive 4-element-PIR sensor technology for occupancy detection guarantees reliable detection of occupants even when they are seated.

Multisensors are therefore ideally suited for occupancy related control functions within LON networks.

The light sensors provide the basis of automatic lighting functions, such as constant light control or daylight switching. One light sensor measures the global room brightness whereas the second light sensor measures the brightness directly beneath the multisensor (spot measurement).

Lights or blinds can be operated and scenes can be selected by means of the optional IR remote control. Additionally, a fan stage can be selected manually.

Optional external temperature sensors for ceiling mounting or pendular temperature sensors can be connected.

Alternatively presence detectors of type lumina PM (order no.: 910 121 or 910 122) can be connected for expanding the presence detection range.

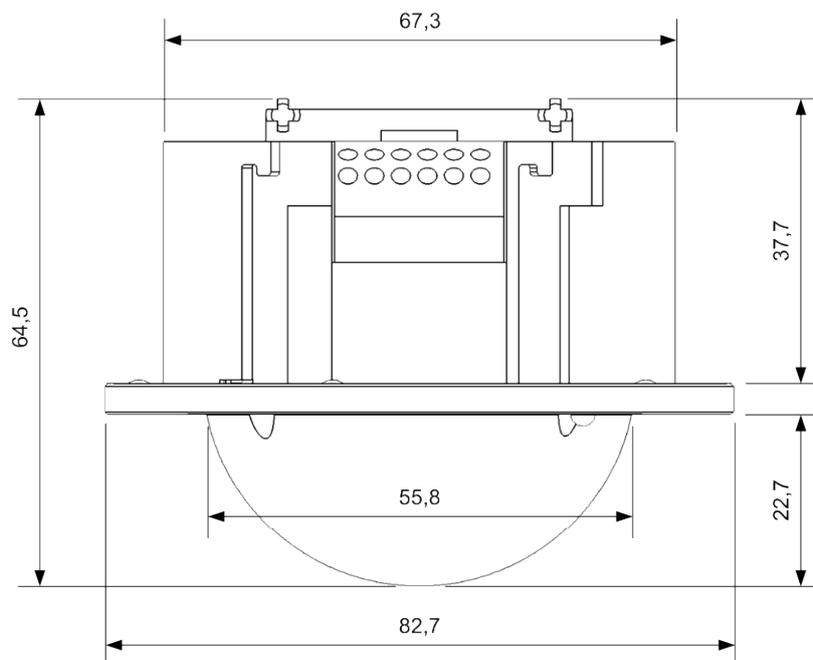
The LON radio receiver with EnOcean Dolphin technologie serves as a gateway between EnOcean radio transmitters and the LON network. Possible EnOcean sensors are: radio switches, wireless window contacts, temperature sensors and remote control transmitters. The signals are transformed to standard network variables. The range inside buildings without obstacles is up to 30m.

The multisensor is available in two versions. The EB version is suitable for installation in suspended ceilings, ceiling sails or recessed junction boxes. The AP version allows surface mounting.

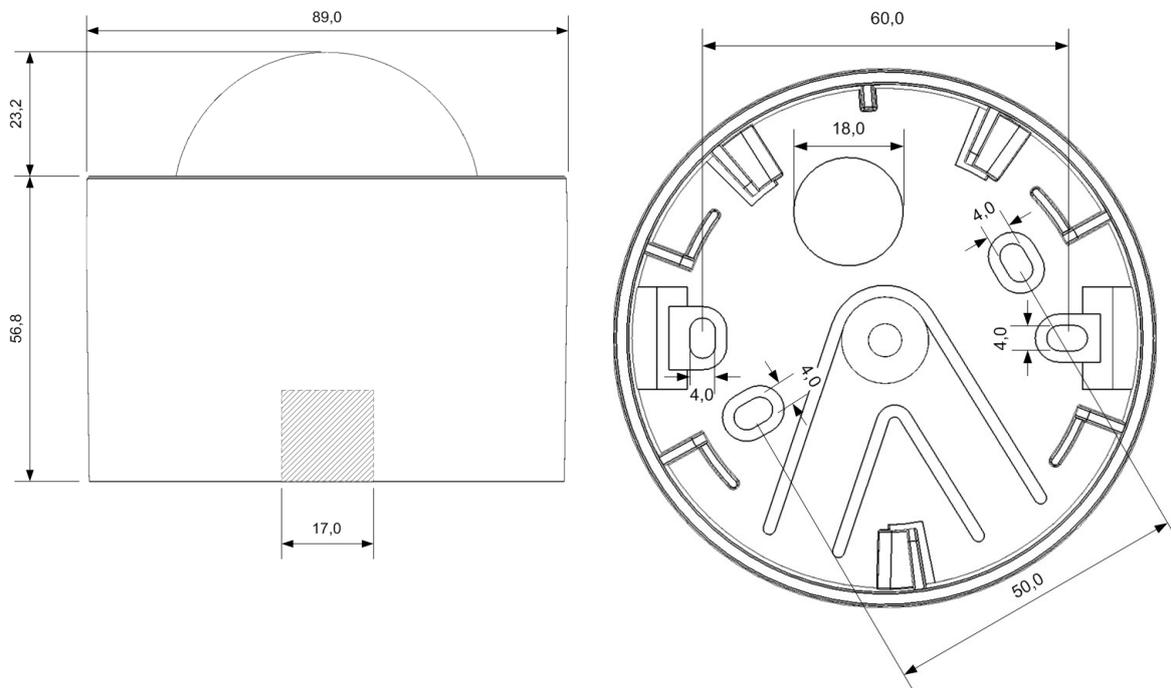
For configuration purposes, comfortable LNS plug-ins are available.

2. Mounting and installation

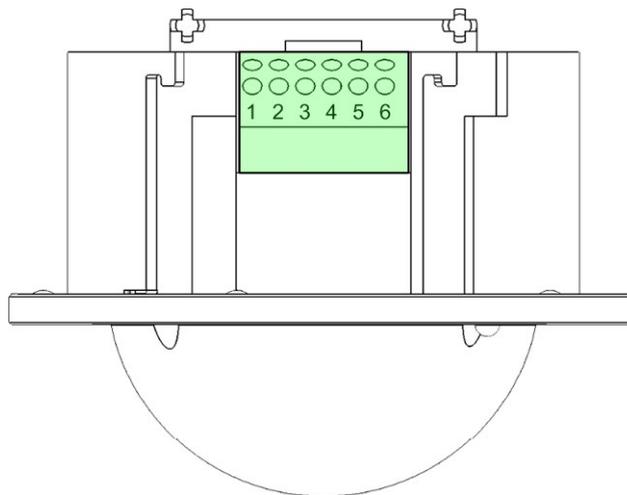
2.1. Dimensions installation variant



2.2. Dimensions surface mount variant



2.3. Connections



Pin	Meaning
1	24V ~/+ power supply
2	24V ~/- power supply
3	LON A
4	LON B
5	RTD (temperature sensor or presence detector lumina PM)
6	

2.4. Note for connecting a temperature sensor

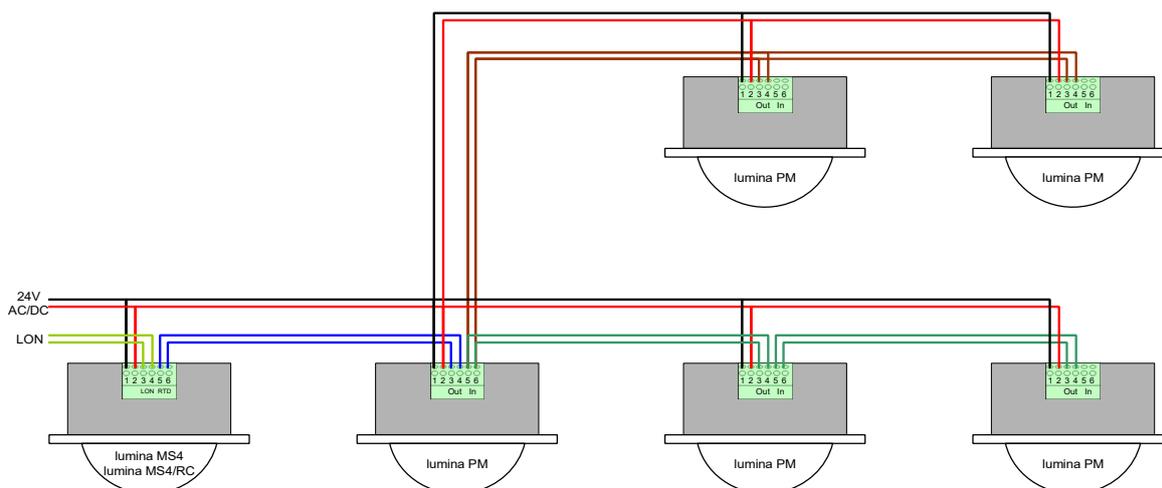
When connecting an external temperature sensor, the installation distance between its cable and potential disturbing sources, e.g. mains supply lines, must be considered. Disturbances have a negative impact on the measuring accuracy.

2.5. Note for connecting a presence detector lumina PM

When connecting an external presence detector, the installation distance between its cable and potential disturbing sources, e.g. mains supply lines, must be considered. Disturbances can cause a faulty presence detection. It is not allowed to connect more than one presence detector directly to the multisensor (see connection scheme).

2.6. Connection example for lumina PM

The following scheme shows an installation of a multisensor and several presence detectors. Please note that only one presence detector may be connected directly to the multisensor. For more information please see the data sheet of the presence detector lumina PM (order no.: 910 121 / 910 122).



2.7. LON Service-Pin

After the multisensor is connected you can commission the device by entering the neuron id manually or receiving it in the LON tool. Sending the neuron id (service pin message) can be triggered with a standard infrared remote control. For that press any button for at least 3 seconds.

Note: The remote control must use the popular NEC8 or NEC16 protocol.

When the spega remote control dialog DRC-10 is used, sending the neuron id (service pin message) can be triggered by holding the temperature button and pressing the right menu button "fan +" for 2 seconds.

3. Radio reception

3.1. General

The EnOcean wireless system operates at 868.3Mhz. The wavelength λ is about 34.6cm. A typical antenna is approx. 8.6cm long ($\lambda/4$).

The units can be operated in all countries of the European union. Before using them in other countries please check whether it is allowed to use them there. In some countries the use of 868Mhz is not allowed.

Transmitters at 868Mhz are required to have a duty cycle below 1%. This means that the reception of the transmitted signals can not be disturbed by a long lasting other signal.

The receiver is designed for one room or a maximum of two rooms.

3.2. Range of radio signals

The radio reception range depends on many factors. Not all of them are under our direct control.

3.2.1 Attenuation

The most important factor is the attenuation on the direct path from the transmitter to the receiver. The attenuation depends on the type of material being traversed and on the length of the path inside the material.

The higher the conductivity of the material, the more the signal is attenuated. But even in a "material free" environment the strength of the signal is reduced by the square of the distance to the transmitter.

Metal is impervious for radio signals. Radio signals are reflected by metal. Metal nearby an antenna often has a negative influence on the transmission/reception range.



Metal can be hidden inside of concrete or be in modern thermal insulations and can also be a coating on glass surfaces!

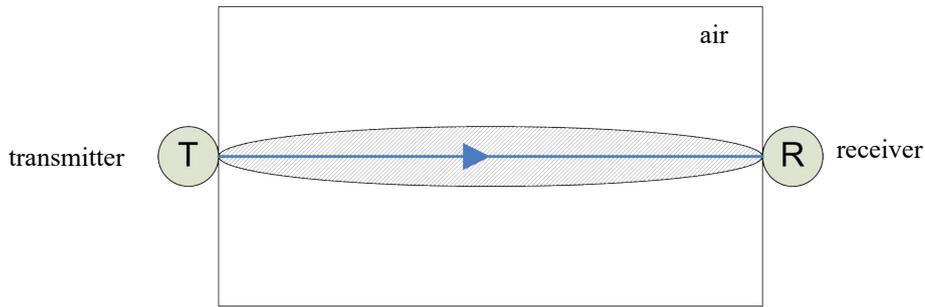


figure 1: unhampered radio signal propagation

Although the radio signal almost travels in a direct line, it also consumes a football shaped space called Fresnel zone (displayed as shaded area). For a distance between transmitter-receiver of 10 meters the diameter in the middle is about 1m. Any obstacles reaching inside this area create an additional attenuation of the signal.

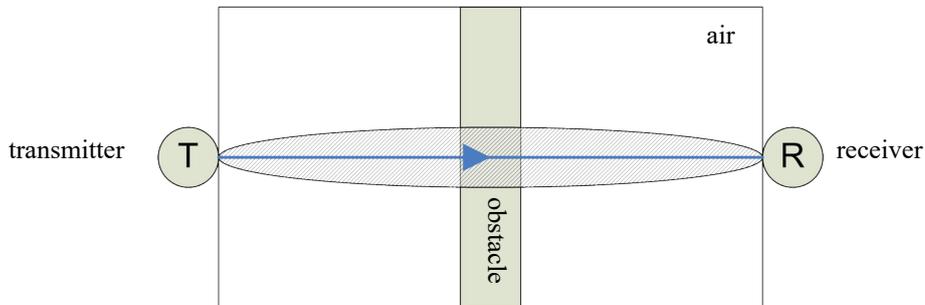


figure 2: radio signal propagation with obstacle

When the attenuation is too big, reception of the transmitted signal is not possible. The receiver or the transmitter must then be relocated.

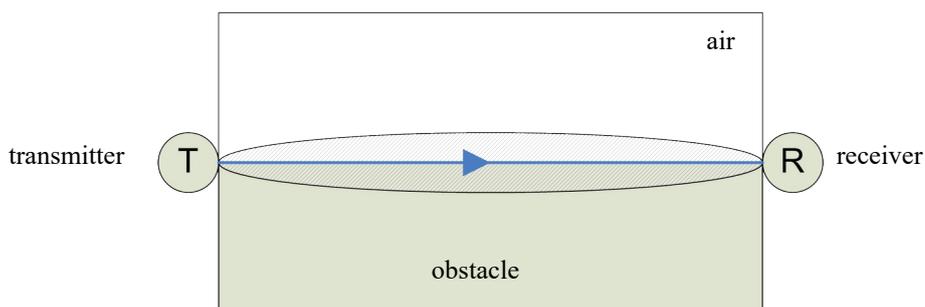


figure 3: radio signal propagation along an obstacle

Radio signals from a transmitter travelling alongside an obstacle to the receiver have also a high attenuation. Such constellations should be avoided.

3.2.2 Geometry influences

The angle of the radio waves in relation to obstacles is also relevant. Waves which run through a material at an angle have a longer path through the obstacle than waves which run vertically through the material. The attenuation increases and the range decreases.

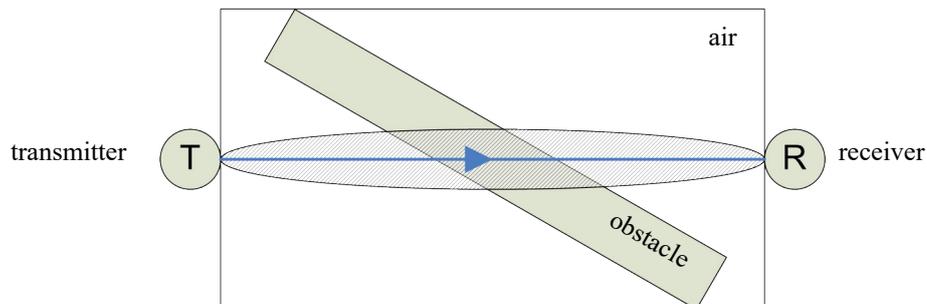


figure 4: radio signal propagation with slanted obstacle

3.2.3 Reflection and Extinction

Radio signals can be reflected. Reflected signals have a longer path to the receiver. Often both the reflected signal and the direct signal reach the receiver.

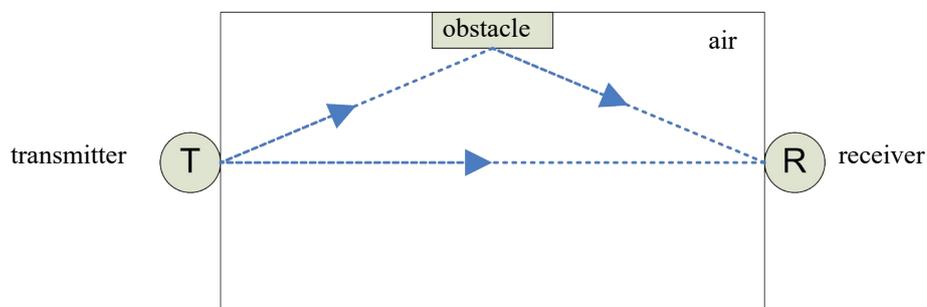


figure 5: reflected signals with possible extinction of the received signals

In this case the signals can interfere with each other and because of the underlying wave properties of the radio signals this results in an extinction of the received signals. No signal is received!

Radio signals are generally reflected by metal surfaces. They also can be reflected by people and furniture. In case of reflection it often helps to slightly relocate either the transmitter or the receiver for about halve a wave length (approx. 17cm).

3.2.4 Sources of interference

Transmitters for other radio services (GSM, DECT, Wireless LAN) as well as devices which process or generate high-frequency signals such as televisions, video recorders or computers may interfere with the reception. For this reason, the distance between these devices and the receiver should be at least 50cm.

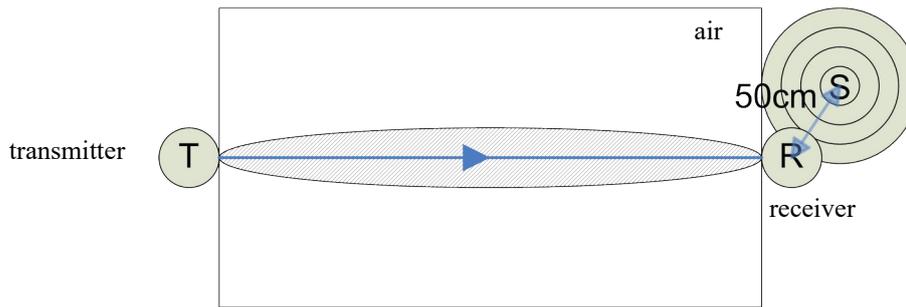


figure 6: Sources of interferences nearby the receiver

3.2.5 Typical reception ranges of radio signals

Normally (ideal circumstances) the following reception ranges can be achieved:

Material	Range
No obstacles	30-100m
Plaster/wooden walls	30m (max. 5 walls)
Stone walls	20m (max. 3 walls)
Reinforced concrete	10m (1 wall / ceiling)
Metal	0m

3.3. Testing reception

The reception of the radio telegrams can be checked using the Status LED on the receiver. Once a radio telegram is received, the LED briefly flashes shortly. If this is not the case, look for another location for either the transmitters or the receiver.

3.4. Good practice during mounting of the units

It makes sense to first determine the position of the transmitters and then by using the reception indicator on the receiver or with a field intensity meter checking the reception at the proposed mounting location of the receiver. To do this a second person is needed to either operate the transmitters or to check the signal reception.

If the reception is inadequate relocate the receiver. If the reason is extinction by reflection a few centimetres are sufficient. In case of the attenuation being too big usually large relocation distances are needed.



Always check at the mounting location that all transmitters are being received! If this is not the case, the mounting location is insufficient and needs to be changed!

3.4.1 Further information

Additional information on the range planning, which can be downloaded online for free, can be found on the EnOcean website (www.enocean.com).

4. Technical Data

Power supply

operating voltage, power 24V DC $\pm 15\%$, ca. 30mA, max. 65mA, power 0.7W
24V AC $\pm 15\%$, ca. 35mA, max. 80mA, power 1.2VA

Network

type of network FTT TP/FT-10 (78kbps)

Connections

Network 6-pin detachable plug-in terminal connection for
Power supply wire cross sections 0.2 - 1.5 mm² (solid and flex),
Temperature sensor two lines can be connected to each pin

Display

LED Multi color status led

Radio receiver

Frequency, Modulation EnOcean Dolphin Transceiver, 868.3 Mhz, ASK
Antenna Integrated, can also be deployed on the outside.

Occupancy PIR Sensor

Detection range, sitting 6m Ø, at 3m installation height
Detection range, walking 12m Ø, at 3m installation height

Light 10 ... 1000 Lux, Daylight and artificial light, V-Lambda-curve,
2 sensors for global and spot measurement

Angular aperture global 180°

Angular aperture spot 30°

Temperature -10° - 50°C, Accuracy ca. $\pm 0.5^\circ\text{C}$

External sensor (optional) PT1000, NI1000DIN, NI1000TK5000
2-wire Sensor. Cable length < 3m

Remote control

Infrared Range ca. 5m

Housing

Type of protection IP 20 (EN 60529)
 Dimensions installation variant 84 x 68 mm (Ø x Height)
 Fitting dimensions installation variant 68 x 40 mm (Ø x Depth)
 Dimensions surface mount variant 89 x 80 mm (Ø x Height)

Ambient conditions

Operating temperature -25°C ... +60°C
 Transport temperature -25°C ... +60°C
 Relative humidity Max 93% (w/o condensation)
 Installation height up to 2000 m above sea level

CE-Conformity

2004/108/EC Electromagnetic Compatibility
 2006/95/EC Low voltage directive
 1999/5/EG R&TTE

5. Order information

Order number	Description
911 313 W	lumina MS4/RC-EB LON multisensor w. EnOcean Dolphin radio receiver for suspended ceiling mounting, pure white
911 314 W	lumina MS4/RC-AP LON multisensor w. EnOcean Dolphin radio receiver for surface mounting, pure white
910 112	dialog DRC-10 infrared remote control with LC display, compatible with multisensors lumina MS4, lumina MS4/RC and clima DMS-20

6. Support

The information given in this manual was carefully compiled. Should you have any further questions regarding this product, please contact:

SafeSquare GmbH

Am Graben 2-6
42477 Radevormwald
Germany

Fon: +49 (2191) 56814-0
Fax: +49 (2191) 56814-89
Email: info@safesquare.eu