

Technical Datasheet dialog RC-E

1. Product description

The dialog RC-E LON radio receiver serves as a gateway between EnOcean radio transmitters and the LON network. The purpose of the radio receiver is to receive and process telegrams from light or blind switches, window contacts or room temperature sensors with or without setpoint adjuster. Based on modern Dolphin technology there is also bi-directional communication possible. The range for visual contact in buildings is up to 30m.



dialog RC-E



Optional magnetic mount antenna

Up to 8 room control units, 8 temperature sensors and 32 push/switch and signal functions for lighting, sun protection and window status are supported. Thereby a maximum of 40 EnOcean radio transmitters can be managed.

The antenna can be rotated and tilted to get optimal reception at the installation location. Optional a magnetic mount antenna with 2.5m cable is available.

LEDs display radio activity and the operating status of the device. Individual radio receivers which have failed can be replaced using the service pin.

The application of the dialog RC-E provides universal sensor objects, which purposefully read out information from the radio telegrams and process them in a LonMark-compatible manner. The sensor objects can be adjusted to suit the standardized functional objects Switch, OccupancySensor and TemperatureSensor or the spega

objects StepSwitch and SetpointAdjuster. The types of network variables can be changed according to the relevant requirements. Furthermore, there are ScenePanel objects, via which each radio transmitter binary value delivered can be used as a scene control pushbutton.

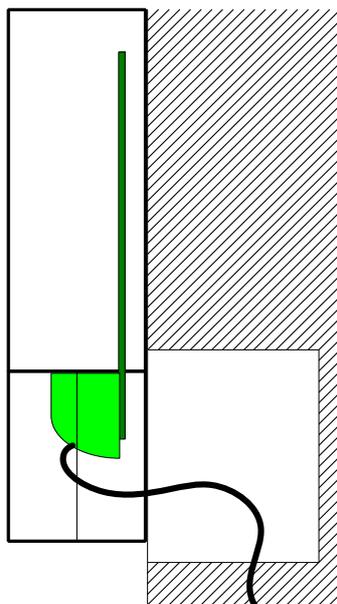
A device plug-in as well as plug-ins for the functional objects are provided for the detailed configuration of the dialog RC-E.

2. Mounting and installation

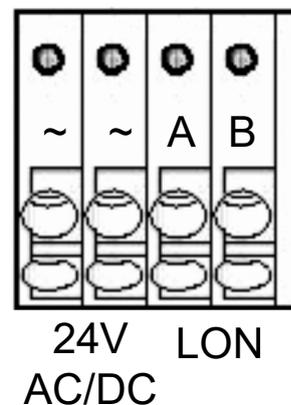


Electrical devices must be assembled and installed by trained personnel only.

Installation of the dialog RC-E on a wall or hollow-wall/flush-type socket can be done using the enclosed screws. When carrying out the installation, ensure that the receiver is mounted in a location with good radio reception.



Assembly of the device on a wall



Connections

The terminal can be reached by a removable opening at the underside or the bottom of the device. To reach the terminals only the lower Lid of the enclosure has to be opened. The Lid must be unlatched with a small pointed object (screw driver).

The dialog RC-E has a LON connection with TP/FT transceiver. The required operating voltage is 24V DC/AC.

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!

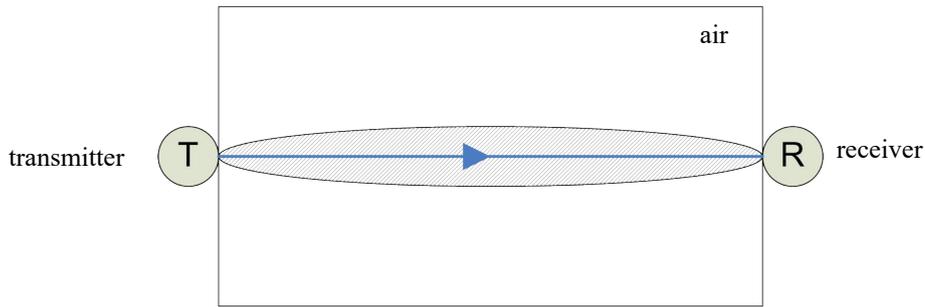


figure 1: unhampered radio signal propagation

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.

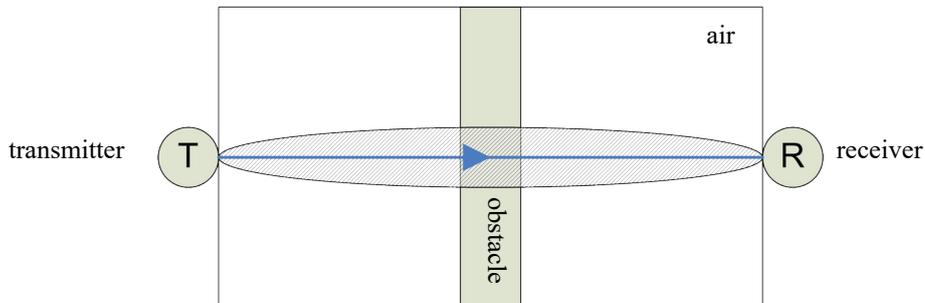


figure 2: radio signal propagation with obstacle

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

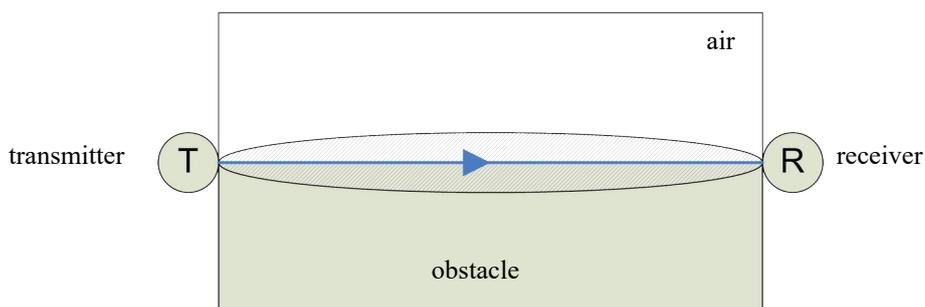


figure 3: radio signal propagation along an obstacle

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.

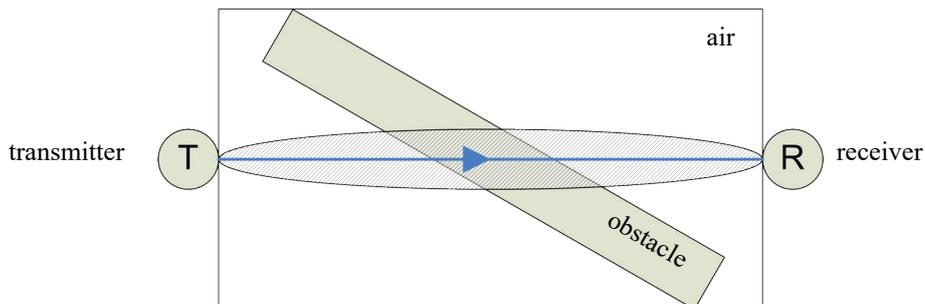


figure 4: radio signal propagation with slanted obstacle

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.

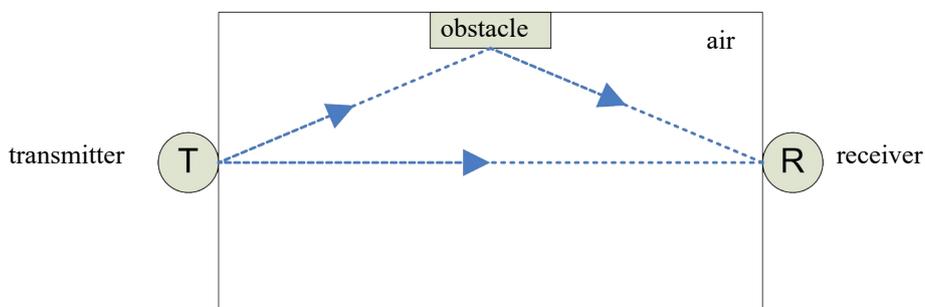


figure 5: reflected signals with possible extinction of the received signals

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.

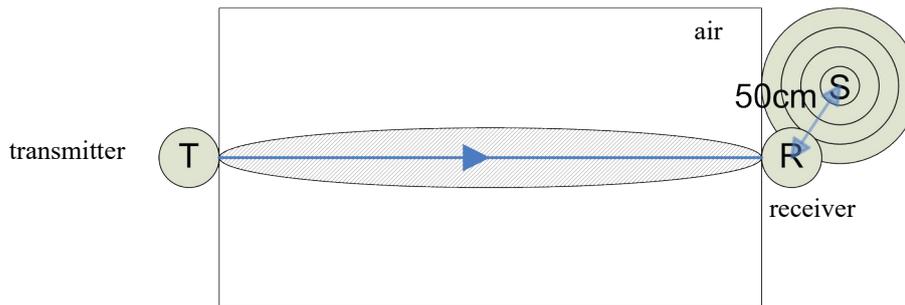


figure 6: Sources of interferences nearby the receiver

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 4-pin detachable plug-in terminal connection for
Power supply wire cross sections 0.2 - 1.5 mm² (solid and flex),
Antenna SMA socket for connecting external antennas

Display

LED multi-coloured status led

Radio receiver

Frequency, Modulation EnOcean Dolphin Transceiver, 868.3 Mhz, ASK
Antenna bendable lamda/4 Antenna with male SMA connectors

Enclosure

Type of protection IP 20 (EN 60529)
Dimensions installation 54mm x 122mm x 26mm (W x H x D, w/o antenna)
variant

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
441 301 C	dialog RC-E LON radio receiver
412 906	dialog RC-A Magnetic mount antenna, SMA with 2.5m cable

6. Support

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

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