

# elero – Radio system

## Instructions for range planning

The elero radio system offer a high degree of flexibility and ease of installation compared to hard wired systems.

However some conditions have to be fulfilled in order to permit defect-free and thus convenient (radio) operation for the user.

### Basics for radio signals inside buildings

Radio waves are electromagnetic waves containing information such as a travel command which is „sent“ from the transmitter to the receiver.

The range of the radio signal strongly depends on obstructions, which have to be penetrated. These are the materials used in buildings, which more or less weaken (attenuate) the signal depending on their nature. Poor transmitter and receiver installation locations also have a negative effect on the radio range.

The following table and sketches provide information about radio ranges in buildings in relation to the type of material used and the installation location.

#### Radio ranges with respect to different building materials used:

Line of sight connection:

approx. 70m range in corridors, up to 100m in halls

Plasterboard / wooden walls:

approx. 40m range through a max. of 5 walls

brick/ cellular concrete:

approx. 30m range through a max. of 3 walls

reinforced walls / ceilings:

approx. 12m range through a max. of 2 walls

Building materials weaken (attenuate) radio signals and are thus partially responsible for reducing the radio range:

#### Material Attenuation

wood, plaster, uncoated glass, without metal	0.....10%
brick, fibre board	5.....35%
iron reinforced concrete	10.....90%
metal, aluminium covering	90.....100%

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Other criteria which reduce the radio range:

Installation of the switch on a metal wall →  $\emptyset$ -value = 30% range loss

Use of a metallic switch surround →  $\emptyset$ -value = 30% range loss

Hollow lightweight walls with insulation wool on metal foil

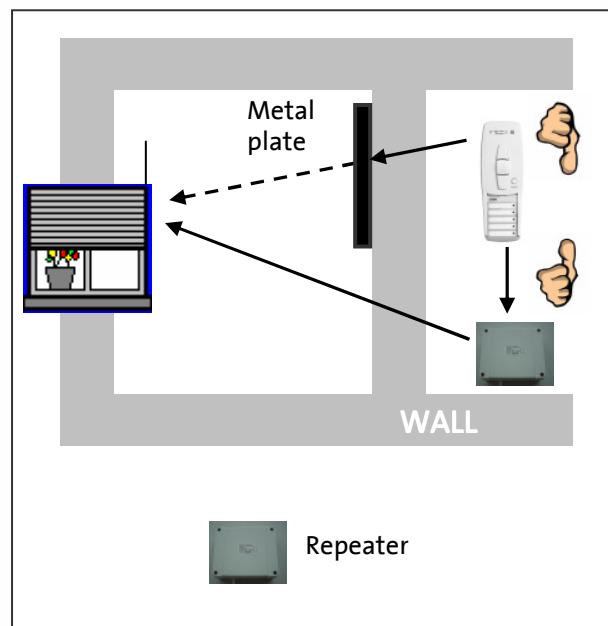
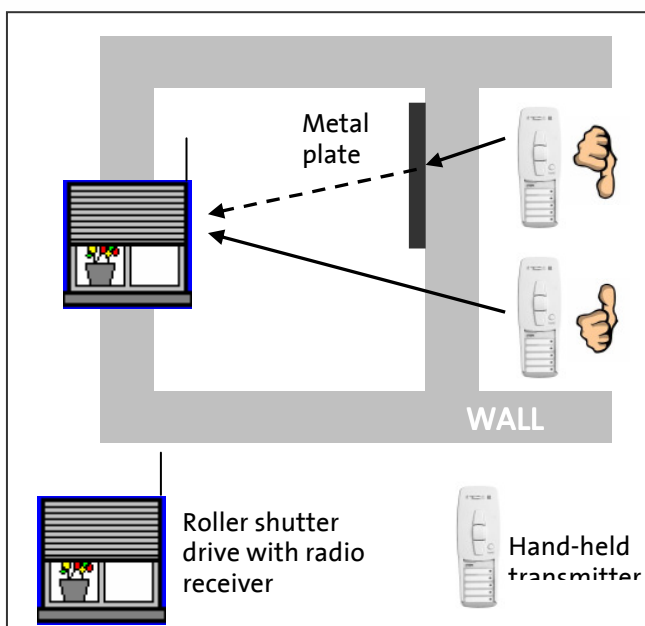
False ceiling with metal or carbon fibre panels

Lead glass or metal coated glass, steel furniture

## Installation tips:

Firewalls, lift shafts, stair wells and supply areas usually have special partitioning.

The **partitioning**, or radio shadows as they are called, can be overcome by re-positioning the transmitter and/or receiver. Alternatively a repeater (amplifier) can be used.

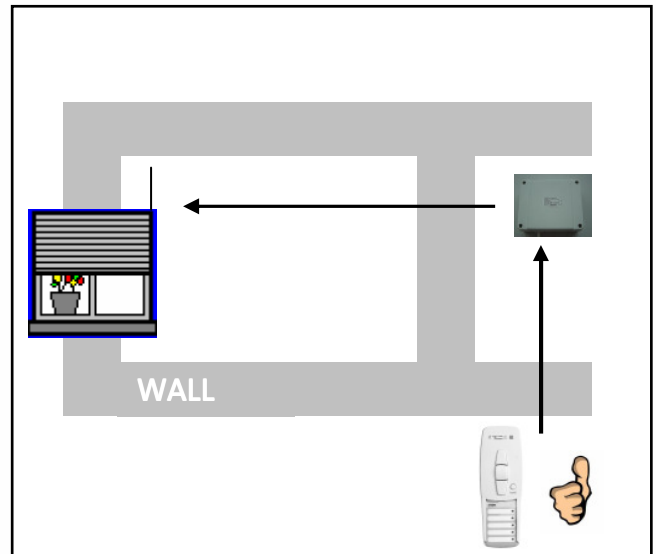
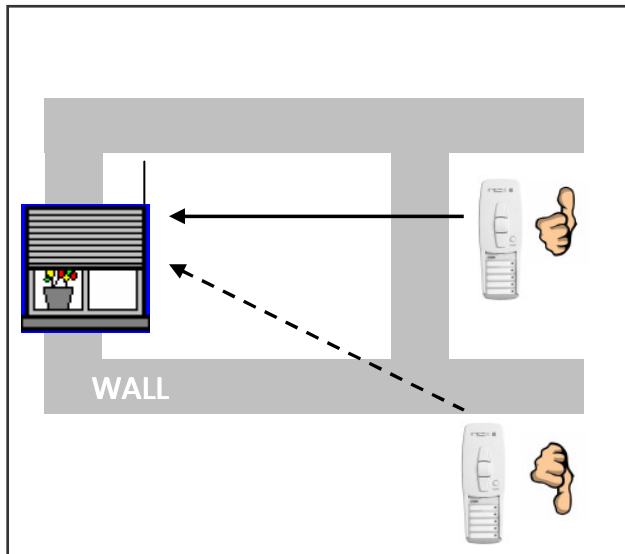


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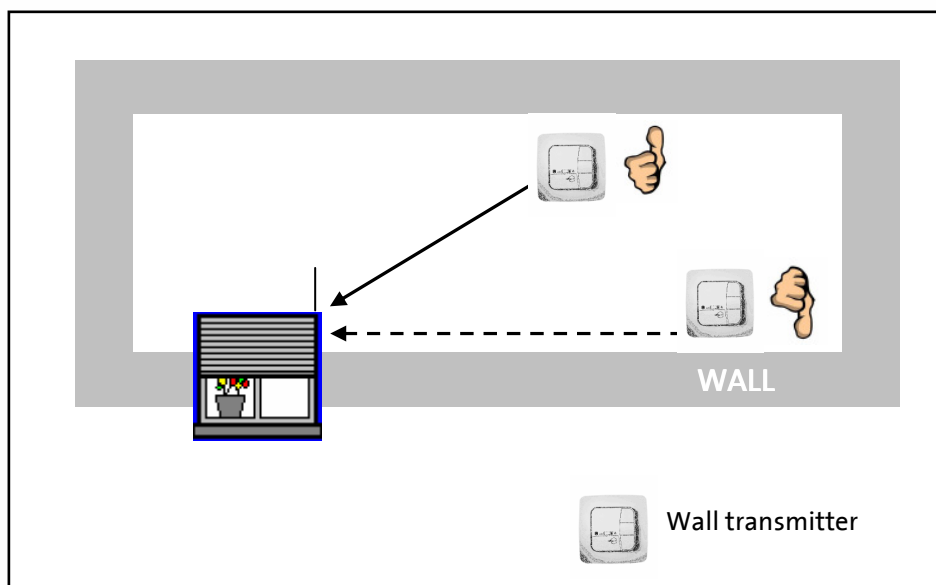
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### Penetration angle:

The angle, at which the radio signal hits the wall is plays an important role. If possible the signals should penetrate as perpendicular to the brickwork as possible. Wall niches are to be avoided.



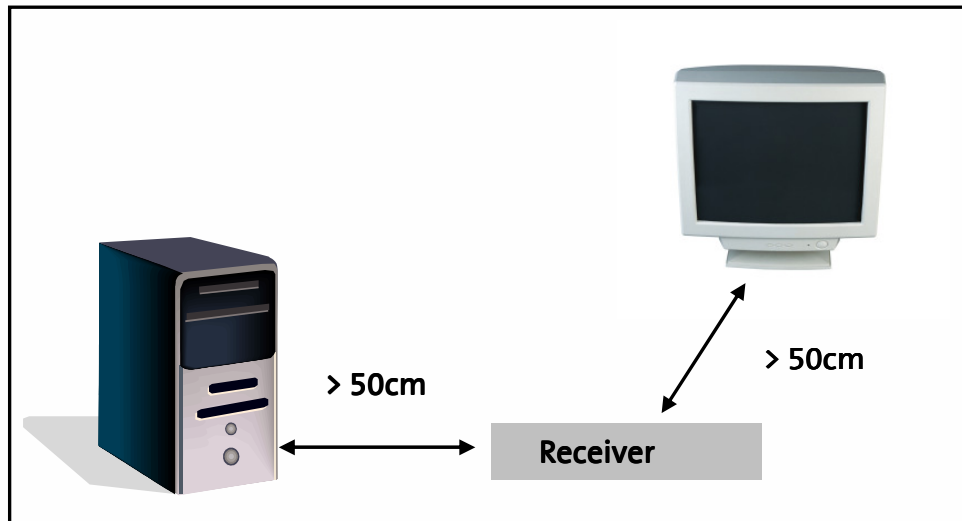
Devices with internal receiver antenna should not be installed on the same side of the wall as the transmitter. It is better to install on the opposite or adjacent wall surface.



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## Distance between the receiver and other radio sources

The distance to other radio sources (e.g. GSM/DECT/Wireless LAN) and high frequency interference sources (computer, Audio and Video systems) should be at least **50 cm**.



## Use of repeaters:

In case of problems with the quality of the reception the use of a radio amplifier or so called „Repeater“ can be helpful. The elero 868 repeater does not require any configuration. It receives the radio signal and relays it thus increasing the range almost two fold.

## Field intensity measurement device:

Elero has developed the RadioTester for optimised transmitter and receiver position determination. The field intensity is displayed simply by three LEDs on the device. These LEDs are used for help in determining the best location.

