

# Assembly and operating instructions

## PCD7.T4850-RF

### BE AWARE!

The range is reduced with regard to reception interferences caused by walls, roofs, equipment and furniture.

### Natural interference sources

Since electromagnetic waves are involved in the wireless signals, the signal is attenuated between the transmitter and the receiver. That means that both the electrical and the magnetic field intensity are reduced in inverse proportion, in fact, to the square of the distance from transmitter and receiver ( $E, H \sim 1/r^2$ ).

To this natural range limitation we can add other interference factors: metal parts, e.g., reinforcements in walls, metal heat insulation foils, and metal-reinforced, steamcured heat protection glass reflect electromagnetic waves. That is why a "radio deadspot" is formed behind them.

Admittedly, radio waves can penetrate walls, but then the heat attenuation increases even more than with radiation in the free field.

### Penetration of wireless signals:

Material	Penetration
Uncoated wood, plaster and glass	90%...100%
Brick and chipboard	65%...95%
Reinforced concrete	10%...90%
Metal and aluminium lamination	0%...10 %

### Multiple influences and disturbing factors

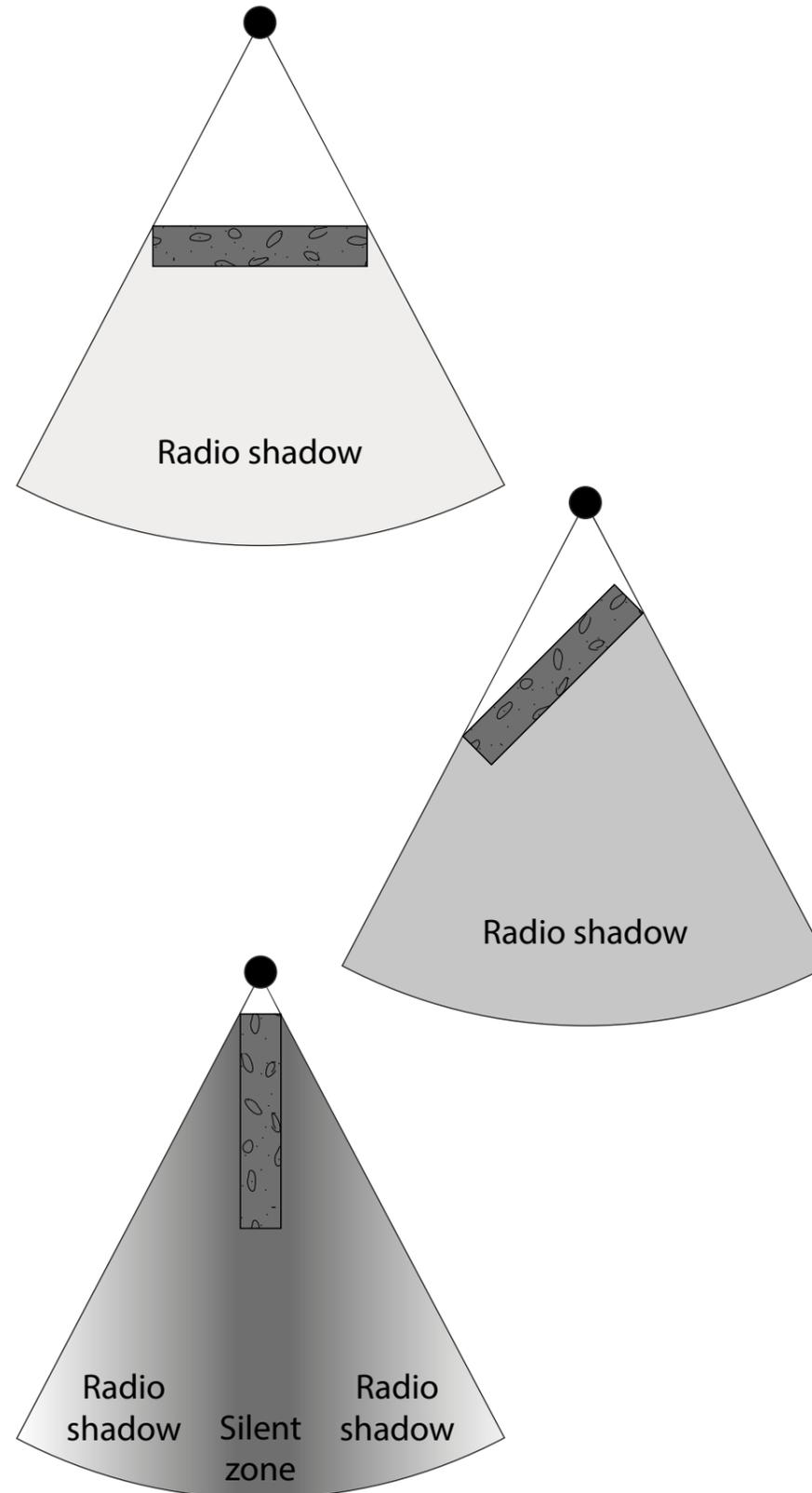
Penetrating more than 1 walls, reduces the radio distance with a nonlinear factor.

Crossing more than 1 wall made of different material, reduces the radio distance with a nonlinear factor.

The real radio distance can not be calculated. It can just be estimated and tested in reality.

### The angle does matter

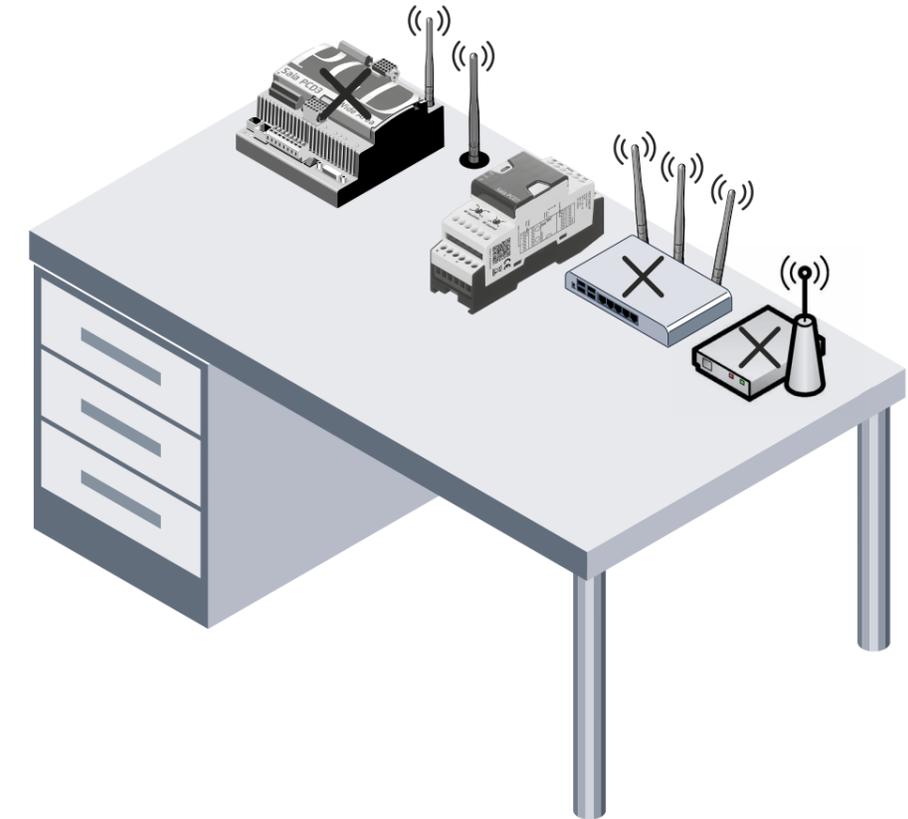
When radio waves must penetrate walls, the loss will increase with the way of the radio waves in the wall. That means, when the wall is vertical to the transmission path, the way is shortest. When the angle increases, the way trough the transmission path also increases. The biggest way trough the transmission path is when the angle is rectangular.



### Other radio devices

Other radio devices working in the near of the RF-Modem causes disturbances.

**Especially when they are working with the same frequencies!**



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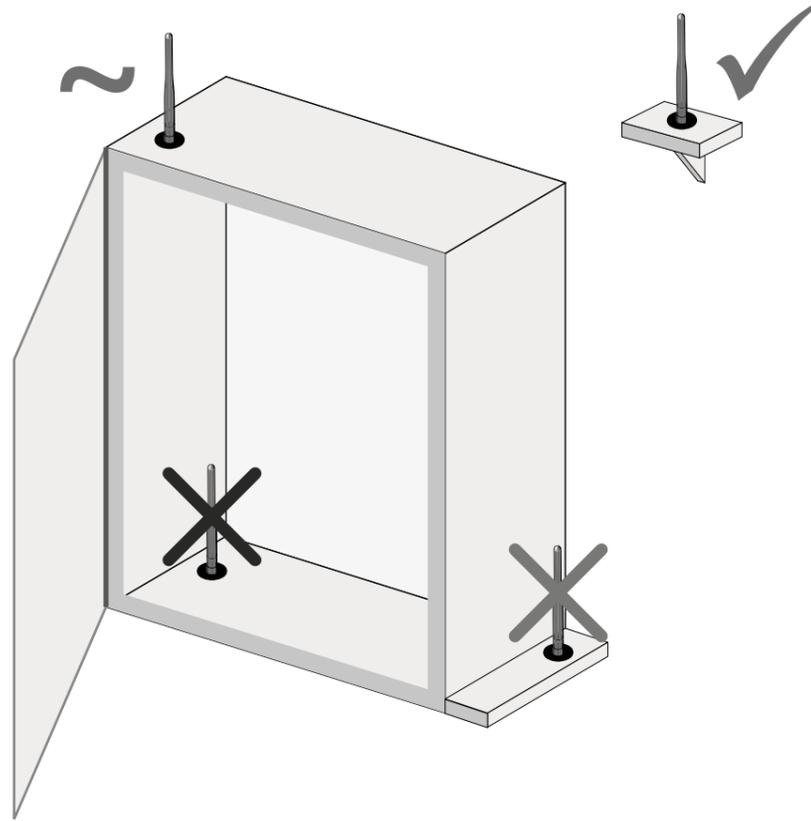
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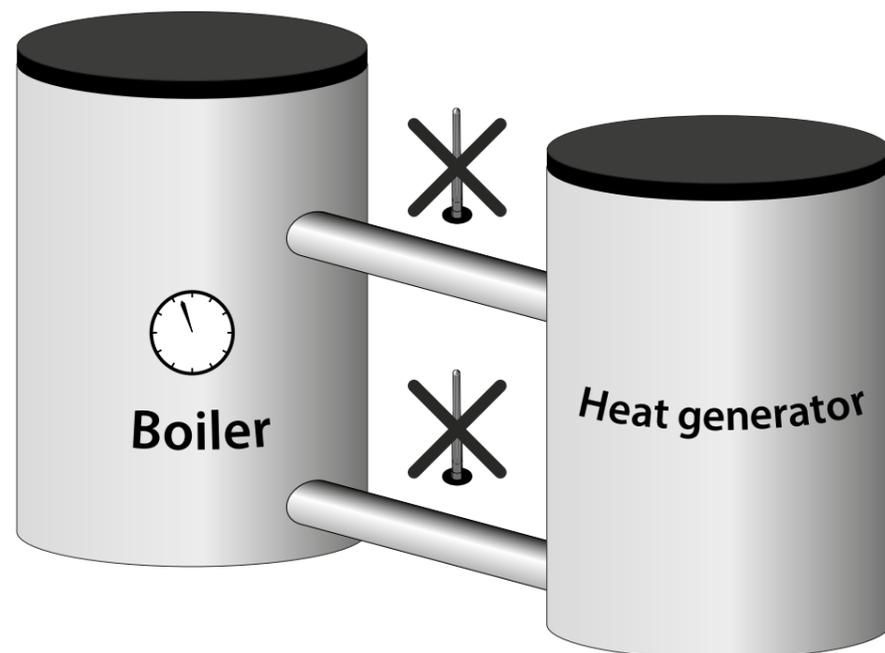
### Mounting the RF modem in switch cabinets

- ▶ The internal antenna can not be used, when the module is mounted in a metal made switch cabinet.
- ▶ The external antenna should be placed apart from the switch cabinet.



### Mounting in special rooms

- ▶ Avoid installation in basements, tunnels, caverns and metallic constructions.
- ▶ If there is not other way use a RF modem per room.

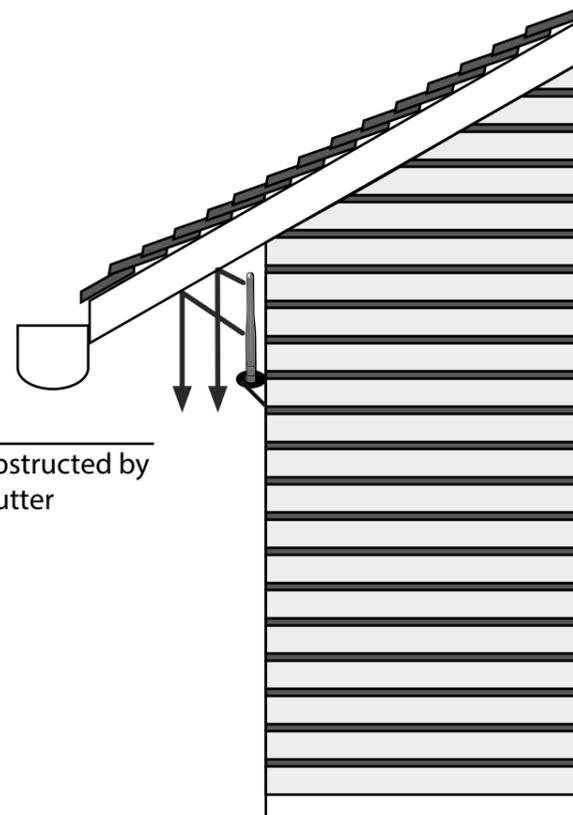


### Outdoor mounting of the antenna

- ▶ Antenna should have the protection class IP65.
- ▶ The external antenna should be placed apart from the walls.

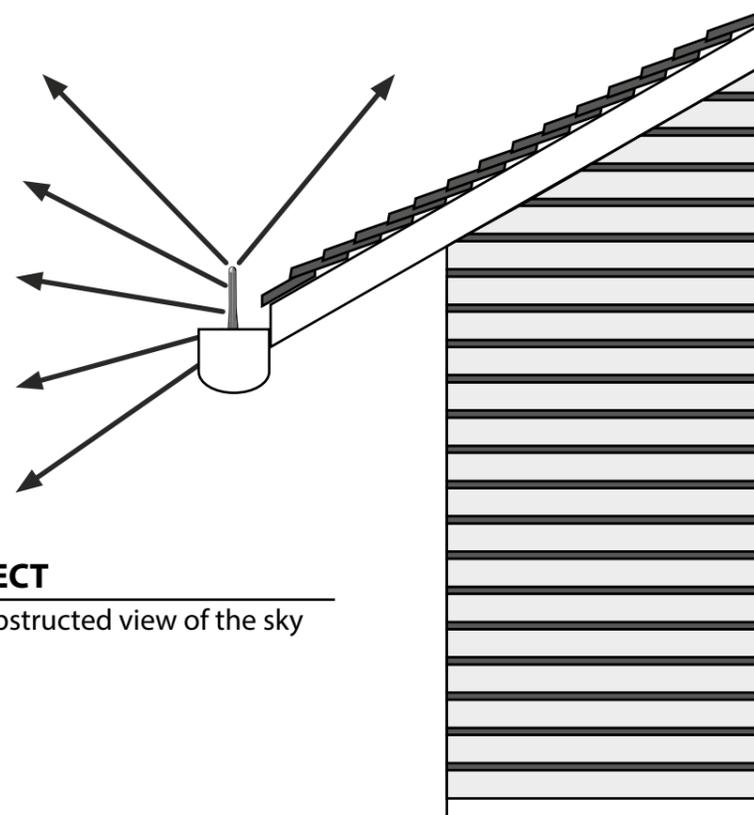
#### INCORRECT

- ▶ View of the sky is obstructed by the soffit and the gutter



#### CORRECT

- ▶ Unobstructed view of the sky



### Antenna protection class

- ▶ The antenna PCD7.K840 from SBC has the protection class IP65

### FAQs

- 1. COMMUNICATION DOESN'T WORK AT ALL**
  - a. If possible, try to communicate without RF Modem and see if it works like this
  - b. Have both RF Modem the same configuration (RF baud rate, channel, sub-network)?
  - c. If the RS-485 configuration has been changed during use, were both RF Modems restarted (autobauding only on power-ON)?
- 2. COMMUNICATION WORKS, BUT THERE IS A LOT OF RETRIES**
  - a. Is there a terminal resistor on both sides of the communication bus?
  - b. Is the minimum response timeout correctly set? See timeout calculator sheet on the support website.
- 3. COMMUNICATION PROVOCES ERRORS WHEN I'M USING NFC**
  - This behavior is normal. When you're using NFC, the device have to refresh information and can't in the same time correctly handle the communication.
- 4. I changed the RF power to 20 dBm, but when I read the configuration out, the power is less than 20 dBm.**
  - The maximum power value is defined by the configuration of the device. The value of 20 dBm is only available if the device is in the following configurations:
    - ▶ RF baud rate = 2K4
AND/OR
    - ▶ RF channel = 1

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