

# Plug-in card modules CM-RF



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Products, data sheets, documentation, MR12-SCHEMA-calculator: [www.schneid.at](http://www.schneid.at)

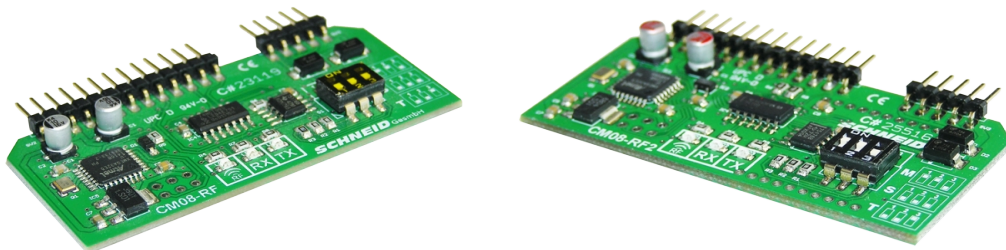
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## SCHNEID plug-in card modules CM-RFx for radio transmissions

with integrated RS485; for SCHNEID communication base modules

**Order number:** 130.xxxxx (see variants)

**Order code:** Steckkartenmodul CM-RFx (see variants)



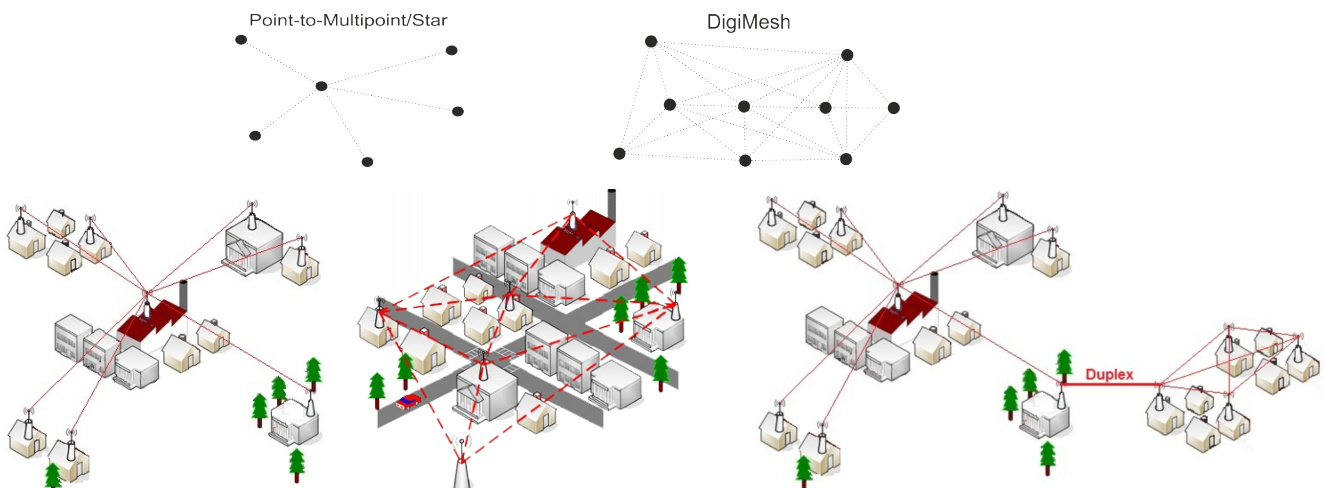
### Overview:

The SCHNEID plug-in card module CM-RFx is only suitable for the SCHNEID communication basic modules of the module control series. With this module card, the controller can transmit data using radio technology.

### Function description:

#### RF radio module (CM-RFx)

This module card uses radio technology with a mesh function for data transmission. Each module in a network is connected to one or more others. The information is forwarded from one module to another until it has reached its destination. The modules act as routers and clients at the same time. With this technology, long ranges can be achieved on the one hand and the network is self-healing and therefore very reliable. If a connection is blocked or has failed, the data is automatically redirected and the network is still operational. In addition to 128-bit AES encryption, different preambles or network IDs can also be used to set up independent subnets, which do not influence each other.



## Plug-in card modules CM-RF

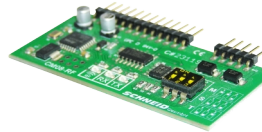
### Variants:

#### SCHNEID radio plug-in card module CM-RF1

Order number: 130.15948

Order code: Steckkartenmodul CM-RF1

**Use:** Sub-communications from controller to controller.

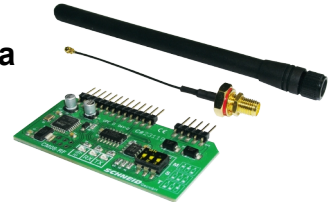


#### SCHNEID radio plug-in card module CM-RF1 with screw antenna

Order number: 130.15949

Order code: Steckkartenmodul CM-RF1 Schraubantenne

**Use:** Sub-communications from controller to controller.

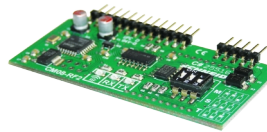


#### SCHNEID radio plug-in card module CM08RF2

Order number: 130.15914

Order code: Steckkartenmodul CM-RF2

**Use:** Main communication from controller to visualisation.  
Via external unit or directly on the controller.

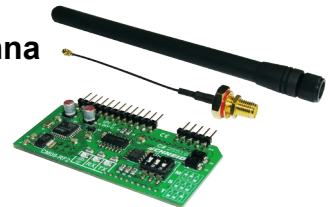


#### SCHNEID radio plug-in card module CM08RF2 with screw antenna

Order number: 130.15915

Order code: Steckkartenmodul CM-RF2 Schraubantenne

**Use:** Main communication from controller to visualisation.  
Via external unit or directly on the controller.



### Antennas and adapter cables:

#### SCHNEID antenna for radio module standard

Order number: 020.14266

Order code: Antenne für Funkmodul Standard



#### SCHNEID antenna adapter cable 80mm for BT, RF (radio) and GPRS

Order number: 020.14254

Order code: Antennen-Adapterkabel 80



#### SCHNEID antenna adapter cable 250mm for BT, RF (radio) and GPRS

Order number : 020.14255

Order code: Antennen-Adapterkabel 250



#### SCHNEID antenna adapter cable 500mm for BT, RF (radio) and GPRS

Order number: 020.16196

Order code: Antennen-Adapterkabel 500



### Special equipment:

#### SCHNEID antenna for radio module 868MHz 8dBi

Order number: 020.16463

Order code: Antenne für Funkmodul 868MHz 8dBi

Antenna for radio module 868MHz 8dBi, vert. 17 °,  
Ant. Gain up to 8dBi, including adapter type N / SMA St / St.



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## Plug-in card modules CM-RF

### Repeater module radio:

#### SCHNEID repeater module radio with 422

Order number: 020.15921

Order code: Repeatermodul Funk mit 422

#### SCHNEID repeater module radio with 485

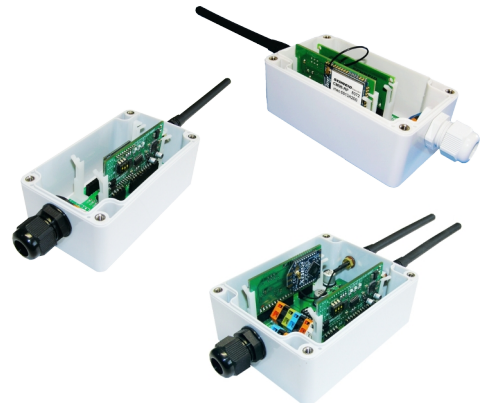
Order number: 020.15922

Order code: Repeatermodul Funk mit 485

#### SCHNEID repeater module radio duplex with 2 x CM-RF2

Order number: 020.14543

Order code: Repeatermodul Funk Duplex mit 2 x RF2



### Serviceadapter Funk:

#### SCHNEID Serviceadapter FUNK zur Kommunikation mit allen SCHNEID-Modulreglern

Order number: 020.15976

Order code: Serviceadapter Funk für alle Reglerversionen

The service adapter is used to scan and configure a radio network.



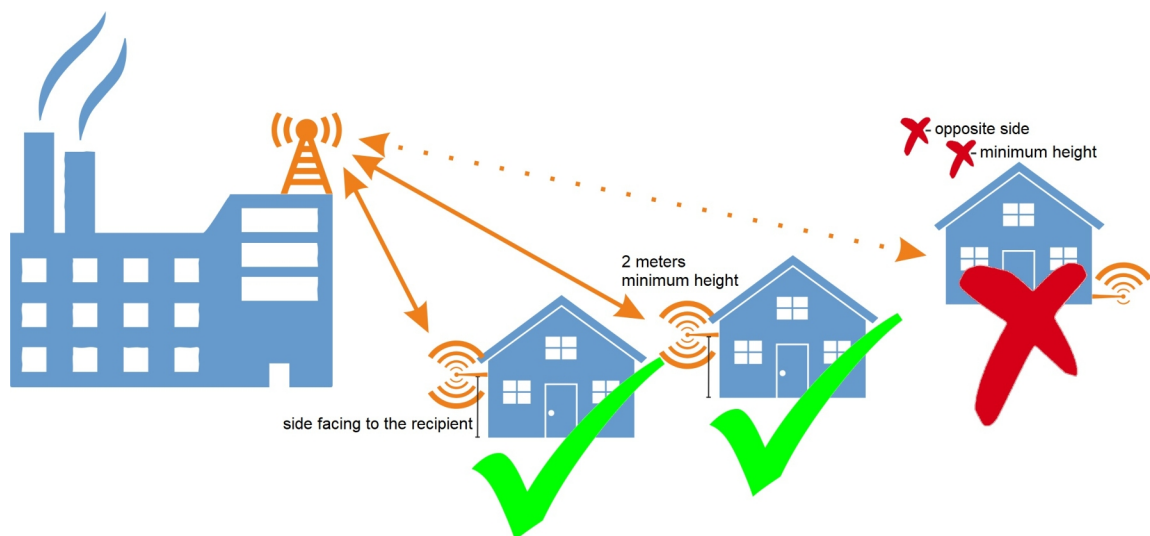
### Installation:

#### Assembly:

The module card can be installed directly in the COM base board of a controller. However, the antenna must not be more than 30 cm away and must be installed outside the controller housing.

Since in most cases the control device is installed in the basement, it is necessary to mount the transmitter unit on the outside of the building. The outdoor unit COM-RF-LP-AE485 is available for this application. This outdoor unit consists of a weatherproof housing with antenna, a CM09-R base board and an RS485 interface card for connection to the control unit. This outdoor unit is connected to the control unit via a 4-pin cable connection (2 wires for bus, 2 wires for power supply 12VDC). An RS422 interface card can be used instead of the RS485 for the integration of older control devices. The cabling must then be 6-pin.

The possible cabling options for using the RF module are shown on the following pages.



### Visual vs. Line-of-Sight:

The presence of an RF Line-of-Sight (LOS) between the transmitting and receiving antennas is essential to achieve a long range in wireless communication systems.

There are two types of LOS that are typically used to describe an environment:

-> Visual LOS is the ability to see from one location to another.

It only requires a straight linear path between two points.

-> RF LOS requires not only visual LOS, but also a football-shaped path free of obstacles in order to optimally send data from one point to another. This is also called the Fresnel zone



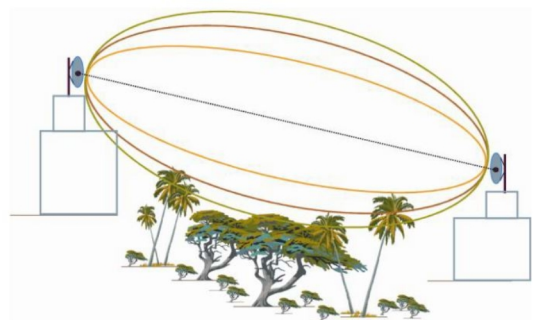
To achieve the greatest range, the Fresnel zone in which the radio waves travel must be free of obstacles. Buildings, trees or other obstacles in the way reduce the communication area.

If the antennas are barely mounted on the ground, half of the Fresnel zone is obstructed by the earth, which leads to a significant reduction in the area. To avoid this problem, the antennas should be mounted high enough from the ground so that the earth does not disturb the central diameter of the Fresnel zone.

It is also important to understand that the environment can change over time due to growing vegetation, building construction, etc.

If there are obstacles between two points, the antennas can be raised at one end or at both ends to remove the obstacles from the Fresnel zone.

The diameter of the Fresnel zone determines how far above the ground and other obstacles the antennas must be. The diameter of the Fresnel zone depends on the frequency and the distances between the two transmitters.



Various data points have been inserted into Fresnel zone formulas to provide some reference points.

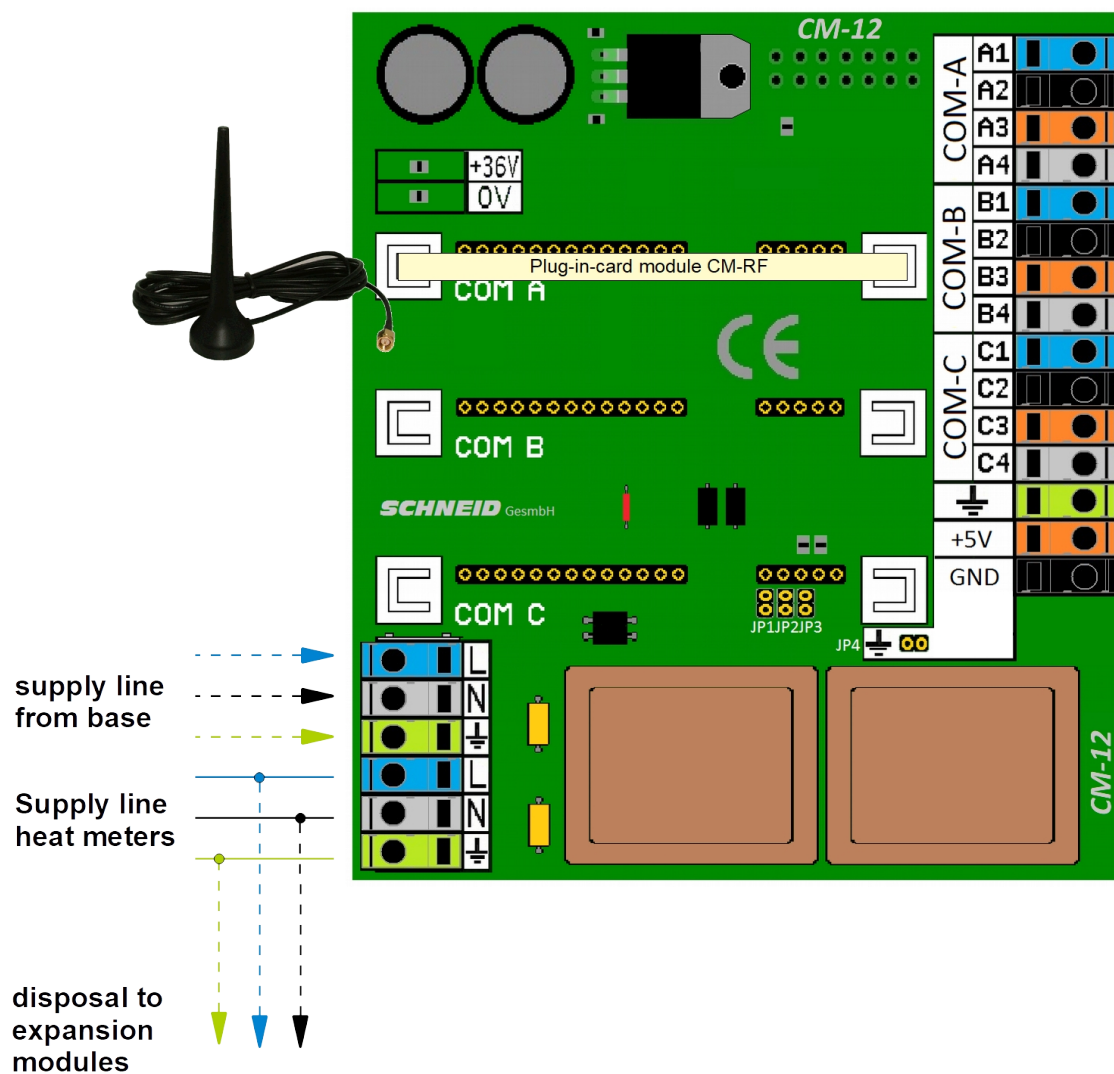
The following table provides approximate Fresnel zone diameters at 300m, 1.6km, 8km and 16km.

In order to have ground clearance, the combined antenna height should be equal to the diameter of the Fresnel zone.

| Range Distance   | Required Fresnel Zone Diameter (900 MHz Radios) | Required Fresnel Zone Diameter (2.4 GHz Radios) |
|------------------|-------------------------------------------------|-------------------------------------------------|
| 1000 ft. (300 m) | 16 ft. (7 m)                                    | 11 ft. (5.4 m)                                  |
| 1 Mile (1.6 km)  | 32 ft. (12 m)                                   | 21 ft. (8.4 m)                                  |
| 5 Miles (8 km)   | 68 ft. (23 m)                                   | 43 ft. (15.2 m)                                 |
| 10 Miles (16 km) | 95 ft. (31 m)                                   | 59 ft. (20.2 m)                                 |

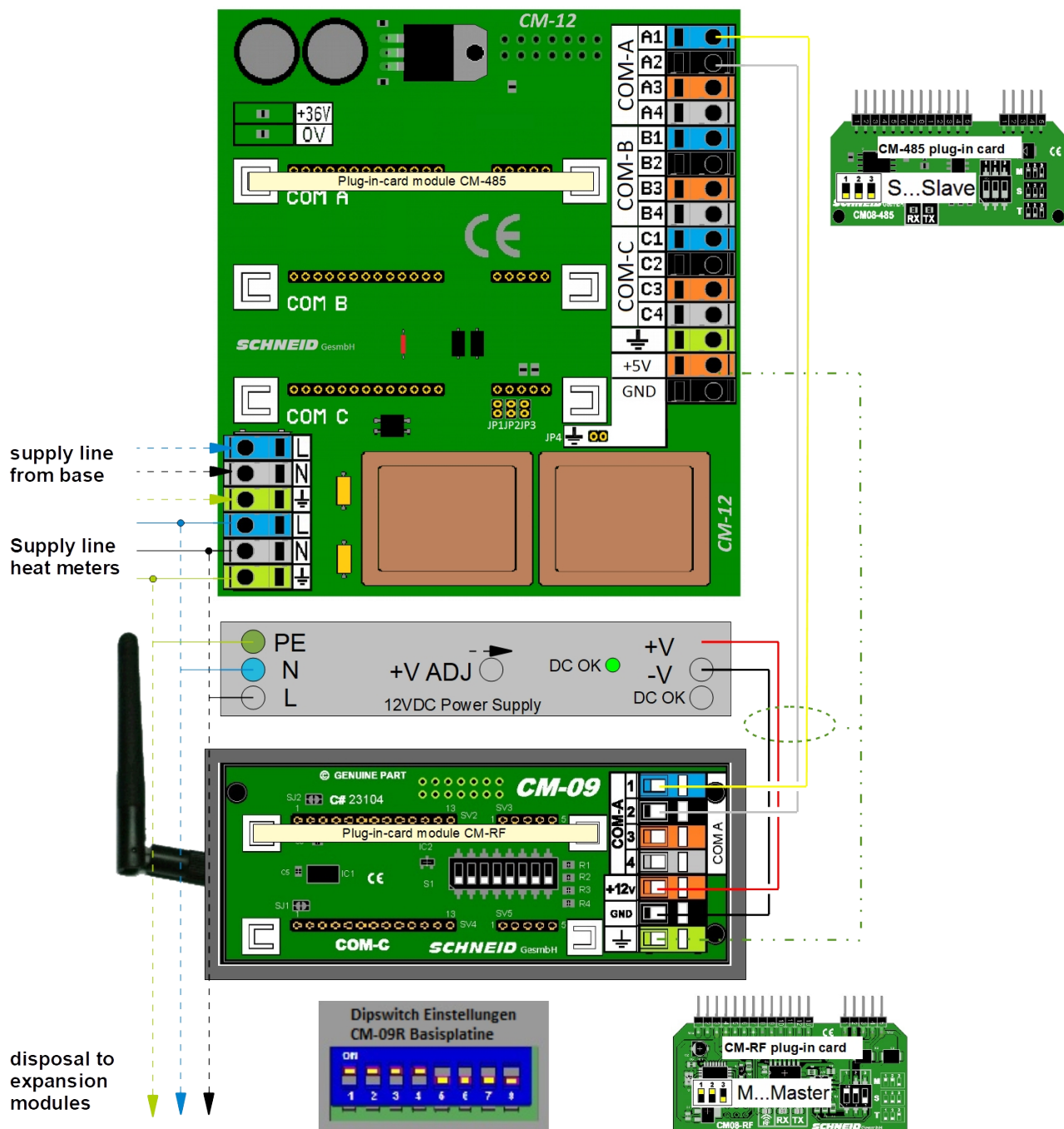
# Plug-in card modules CM-RF

## Terminal plan RF module on COM board



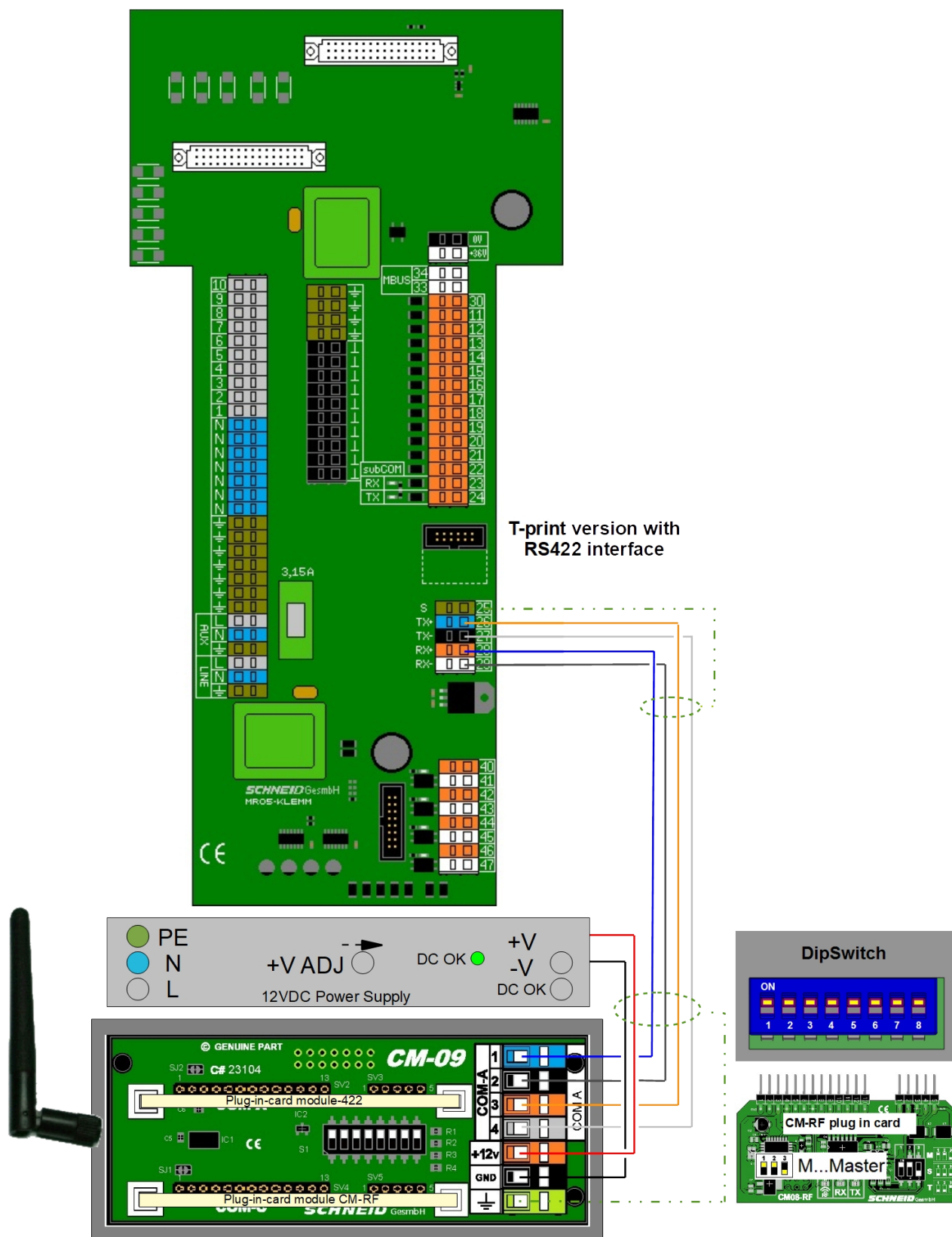
# Plug-in card modules CM-RF

## Terminal plan RF module with outdoor unit via RS485 connection



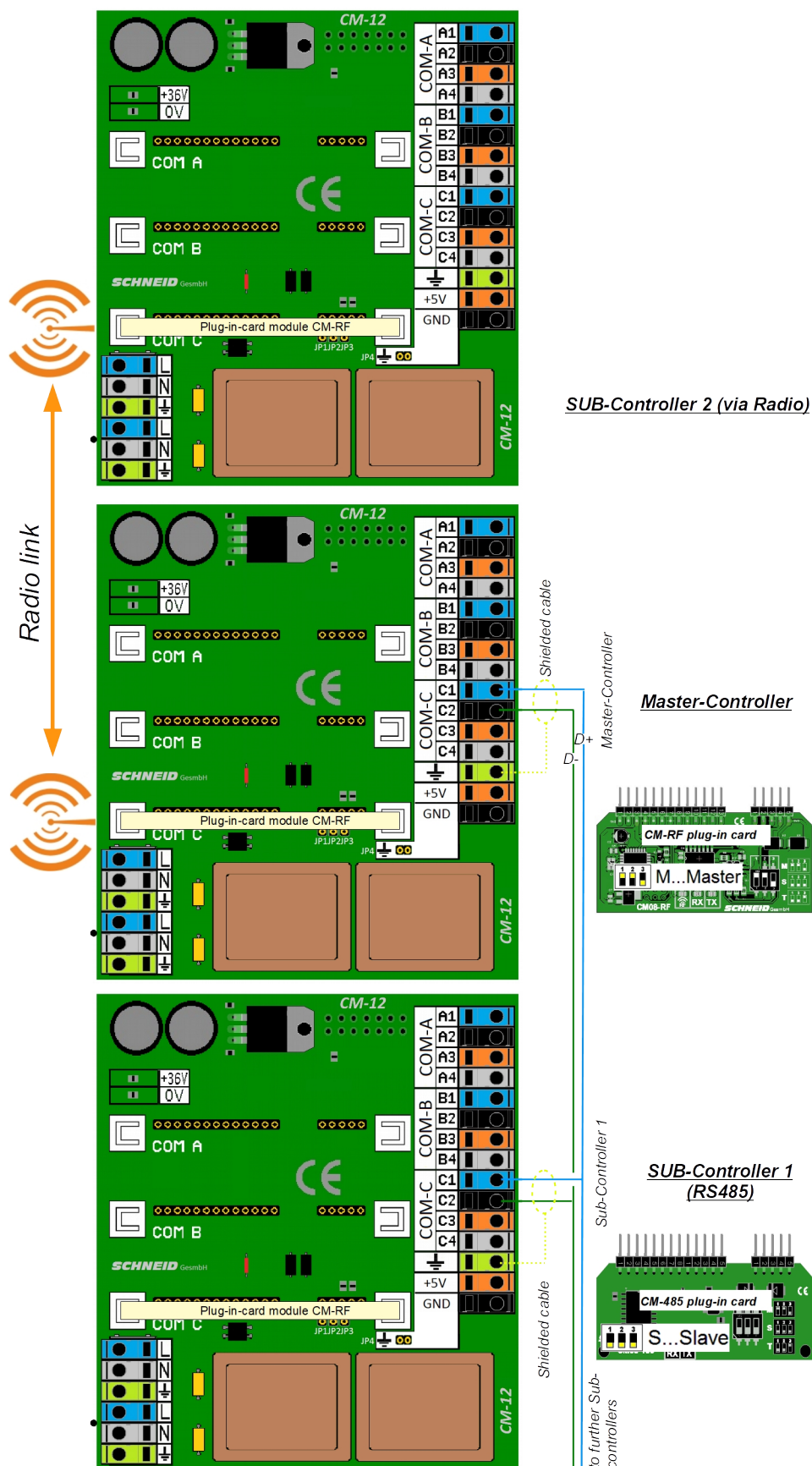
# Plug-in card modules CM-RF

## Terminal plan RF module with outdoor unit via RS422 connection



# Plug-in card modules CM-RF

## Terminal plan RF module with sub-communication to other controllers



## Plug-in card modules CM-RF

### Scope of delivery SCHNEID plug-in card module CM-RF:

- V1: SCHNEID plug-in card module CM-RF1 for radio transmission with adapter cable
- V2: SCHNEID plug-in card module CM-RF1 for radio transmission with adapter cable and screw antenna
- V3: SCHNEID plug-in card module CM-RF2 for radio transmission with adapter cable
- V4: SCHNEID plug-in card module CM-RF2 for radio transmission with adapter cable and screw antenna

### Technical data SCHNEID plug-in card module CM-RF:

|                              |                                                                                                                            |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Intrastat Number:            | 8537.10.91.90                                                                                                              |
| Country of origin            | no preferential origin                                                                                                     |
| Height, width, depth (in mm) | 38x65x10 (plug-in card module Rfx)<br>80x10x10 (adapter cable)<br>130x10x10 (antenna)                                      |
| Weight (in kg)               | 0.004 (adapter 80mm)<br>0.017 (plug-in card module Rfx + adapter)<br>0.030 (plug-in card module Rfx + adapter and antenna) |
| Degree of protection         | IP-00                                                                                                                      |
| Ambient temperature          | 0°C....+40°C                                                                                                               |
| Operating voltage            | 5VDC                                                                                                                       |
| Power consumption            | 75mA                                                                                                                       |
| Max baud rate                | 115200 Bit/s                                                                                                               |
| Connection type              | Pin headers for base module                                                                                                |
| Mounting type                | Plug-in card module                                                                                                        |
| Operating time               | Continuous operation                                                                                                       |
| Degree of pollution          | 2                                                                                                                          |
| RF connection type           | u.FL Connector                                                                                                             |
| Frequency range              | 863 - 870 MHz                                                                                                              |
| Transmit power               | up to 13 dBm ERP                                                                                                           |
| Range                        | up to 1000m free field of vision                                                                                           |
| Temperature range            | -40°C to +85°C                                                                                                             |
| Encryption                   | 128-bit AES                                                                                                                |
| RF data rate                 | 80Kbps                                                                                                                     |
| Receiver sensitivity         | -106 dBm @ 80Kbps; -113dBm @ 10 Kbps                                                                                       |
| Network topologies           | DigiMesh, Repeater, Point-to-multipoint, Peer-to-peer<br>maximum 128 node                                                  |

## Plug-in card modules CM-RF

### Technical data SCHNEID antenna for plug-in card module CM-RFx:

#### Screw antenna 868 MHz:

|                              |                        |
|------------------------------|------------------------|
| Intrastat Number:            | 8529.10.69.00          |
| Country of origin            | no preferential origin |
| Height, width, depth (in mm) | 130x10x10              |
| Weight (in kg)               | 0,0130                 |
| Degree of protection         | IP-20                  |
| Operating temperatur         | -10°C~+75°C            |
| Storage temperature          | -30°C~+75°C            |
| Antenna cover                | TPU                    |
| Antenna base                 | PC                     |
| Connection coating           | black Nickel           |
| Interconnects                | RP-SMA                 |
| Frequency range              | 868 MHz                |
| Impedance                    | 50 Ohm                 |
| VSWR                         | < 2.0                  |
| Return loss                  | -24.213 dB at 868 MHz  |

#### Antenna for radio module 868MHz 8dBi:

|                              |                        |
|------------------------------|------------------------|
| Intrastat Number:            | 8529.10.69.00          |
| Country of origin            | no preferential origin |
| Height, width, depth (in mm) | 1474x26x26             |
| Weight (in kg)               | 0,8700                 |
| Degree of protection         | IP-65                  |
| Operating temperatur         | -40°C~+60°C            |
| Storage temperature          | -40°C~+60°C            |
| Housing material             | GFK UV geschützt       |
| Frequency range              | 860-870 MHz            |
| Impedance                    | 50 Ω                   |
| Transmit power               | max. 100 W             |
| Mounting type                | Mast; Wand             |

## Scope of delivery SCHNEID repeater module radio xxx:

### SCHNEID repeater module radio with 422

#### Scope of delivery:

SCHNEID plastic housing for repeater CM09-R (400.14253)  
SCHNEID communication base module CM09-R (130.14548)  
SCHNEID plug-in card module CM-RF2 (130.15914)  
SCHNEID plug-in card module CM08-422 (130.13975)  
SCHNEID antenna for plug-in card module CM-RFx (020.14266)  
SCHNEID antenna adapter cable 80 (020.14254)

### SCHNEID repeater module radio with 485

#### Scope of delivery:

SCHNEID plastic housing for repeater CM09-R (400.14253)  
SCHNEID communication base module CM09-R (130.14548)  
SCHNEID plug-in card module CM-RF2 (130.15914)  
SCHNEID antenna for plug-in card module CM-RFx (020.14266)  
SCHNEID antenna adapter cable 80 (020.14254)

## Technical data SCHNEID repeater module radio with 422/485:

|                              |                                                                                  |
|------------------------------|----------------------------------------------------------------------------------|
| Intrastat Number:            | 8537.10.91.90                                                                    |
| Country of origin            | no preferential origin                                                           |
| Height, width, depth (in mm) | 270x65x56 (Repeatermodul Funk mit 422)<br>270x65x56 (Repeatermodul Funk mit 485) |
| Weight (in kg)               | 0,204 (Repeatermodul Funk mit 422)<br>0,196 (Repeatermodul Funk mit 485)         |
| Degree of protection         | IP-20                                                                            |
| Operating temperatur         | -25°C~+55°C                                                                      |
| Storage temperature          | -25°C~+55°C                                                                      |
| Mounting type                | Wandmontage                                                                      |
| Operating time               | Dauerbetrieb                                                                     |
| Degree of pollution          | 2                                                                                |
| Frequency range              | 868 MHz                                                                          |
| Impedance                    | 50 Ohm                                                                           |

## Plug-in card modules CM-RF

### Scope of delivery SCHNEID repeater module radio duplex with 2 x CM-RF2:

#### SCHNEID repeater module radio duplex with 2 x CM-RF2

##### Scope of delivery:

SCHNEID plastic housing for repeater CM10-R (400.15274)  
SCHNEID communication base module CM10-R (130.15260)  
2 x SCHNEID plug-in card module CM-RF2 (130.15914)  
2 x SCHNEID antenna for plug-in card module CM-RFx (020.14266)  
2 x SCHNEID antenna adapter cable 80 (020.14254)

### Technical data SCHNEID repeater module radio duplex:

|                              |                        |
|------------------------------|------------------------|
| Intrastat Number:            | 8537.10.91.90          |
| Country of origin            | no preferential origin |
| Height, width, depth (in mm) | 270x90x56              |
| Weight (in kg)               | 0,290                  |
| Degree of protection         | IP-20                  |
| Operating temperatur         | -25°C~+55°C            |
| Storage temperature          | -25°C~+55°C            |
| Mounting type                | Wandmontage            |
| Operating time               | Dauerbetrieb           |
| Degree of pollution          | 2                      |
| Frequency range              | 868 MHz                |
| Impedance                    | 50 Ohm                 |

## Plug-in card modules CM-RF

### Scope of delivery SCHNEID radio service adapter for all controller versions:

#### SCHNEID radio service adapter for all controller versions

##### Scope of delivery:

SCHNEID service adapter RADIO

SCHNEID antenna for plug-in card module CM-RFx

Micro USB cable.

### Technical data SCHNEID radio service adapter for all controller versions:

|                              |                     |
|------------------------------|---------------------|
| Intrastat Number:            | 8537.10.91.90       |
| Country of origin            | EU/AT               |
| Height, width, depth (in mm) | VPE 180x110x15      |
| Weight (in kg)               | 0,112               |
| Degree of protection         | IP-65               |
| Ambient temperature          | 0°C....+40°C        |
| Connection type              | Micro-USB-Anschluss |
| Mounting type                | Adapter             |
| Degree of pollution          | 2                   |