# Radar MultiView RMV
# RMV-D2

Operating and installation manual

EN Version 1.0

Measuring radar motion detector
for energy efficient opening of
automatic door systems



**senso|tek**®
Intelligent Sensor Solutions

Radar MultiView RMV | RMV-D2

# Operating and installation manual

**EN Version 1.0**

Order designation: measuring radar motion detector for energy efficient opening of automatic door systems.

**Art.Nr. 10001471**

# Table of content

# 1. Introduction

## 1.1 Content of the document

This document contains information that you need for the use of your product in the relevant phases of the product life cycle. This may include:

- Product identification
- Delivery, transportation and storage
- Assembly and installation
- Commissioning and operation
- Maintenance and repair
- Troubleshooting
- Disassembly
- Disposal

The documentation consists of the following parts:

- Available document
- Data sheet

In addition, the documentation may consist of the following parts, if applicable:

- Certificate of conformity
- Certificates

## 1.2 Personnel qualifications

The activities described in this document may only be carried out by qualified personnel.
Persons designated as "professionals" have appropriate technical training and experience with the technology and use. Professionals using their skills to identify and minimize risks to themselves and others when carrying out actions. The conditions specified by the manufacturer and applicable standards and regulations must be observed by the professional when carrying out actions.

**Danger!** Disconnect the electrical circuit before installing or servicing the device.
The device may only be operated with safety extra low voltage that complies with the Safety Extra Low Voltage (SELV) requirements in the safety standards based on IEC 60950.

## 1.3 Symbols used

This document contains symbols to identify warnings and informative notes.

### 1.3.1 Warnings

You will always find warnings when your actions could be dangerous.
It is essential that you observe these warnings for your personal safety and to avoid damage to property.
Depending on the risk level, the warnings are displayed in descending order as follows:

**Danger!**
This symbol warns you of an imminent danger.
Failure to observe this warning may result in personal injury or even death.

**Warning!**
This symbol warns you of a possible fault or danger.
Failure to observe this warning may result in personal injury or serious damage to property

**Caution!**
This symbol warns you of a possible fault.
If you ignore this warning, the product or connected systems and installations may be disrupted or fail completely.

### 1.3.2 Informative notes

**Note:**
This symbol indicates important information.

## 1.4 EC Declaration of Conformity

**EC Declaration of Conformity - Extract**
The product RMV-D2 is compliant with Directive 2014/53/EU, equipment class 1 and the harmonized standards
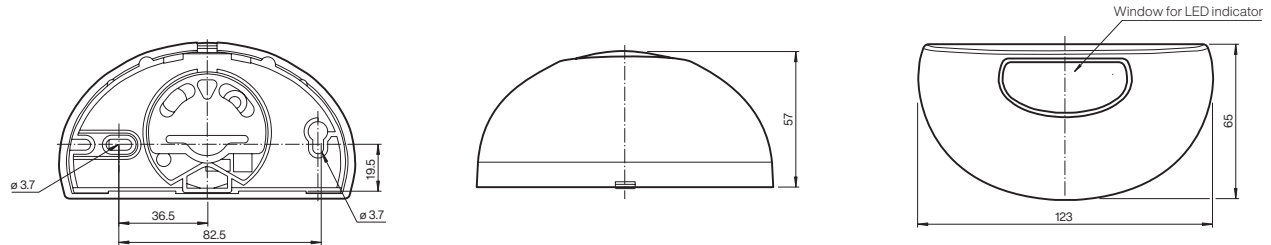EN 62311,
EN 62368-1,
EN 300440 V2.2.1,
EN 301489-1 V2.2.3,
EN 301489-3 V2.1.1,

The complete declaration of conformity can be downloaded at www.sensotek.com

# 2. Scope of delivery and device description

## 2.1 Scope of delivery

- Radar MultiView RMV-D2



Window for LED indicator

- 2 x screws (tapping screws)

- 1 x wire harness, 4 wire cord, 3.5 m length

- 1 x Drilling template

- QR Code in the housing of the RMV-D2; for establishing the connection to the web server; see chapter 4.4.1

- Password for initial login in the RMV-D2 housing; for logging in to the web server; see chapter 4.4.2

- QR Code for downloading the operating manual

## 2.2 Device description

The intelligent measuring 2-D-Radar MultiView RMV-D2 enables energy efficient opening of automatic doors by precisely determined time and duration of opening based on five input parameters (movement, direction, speed, distance, angle), which are processed inside the intelligent radar unit.

Two separate areas can be individually defined according to customer requirements: the **activation area** and the **near area**. The activation area can be defined with a maximum of 8 points in the form of a polygon.

**Activation areas** are the key to prefectly functioning doors or gates. On the one hand, only desired movement events in a defined activation area triggers the door or gate and, on the other hand, actions of moving objects outside the activation field are suppressed.
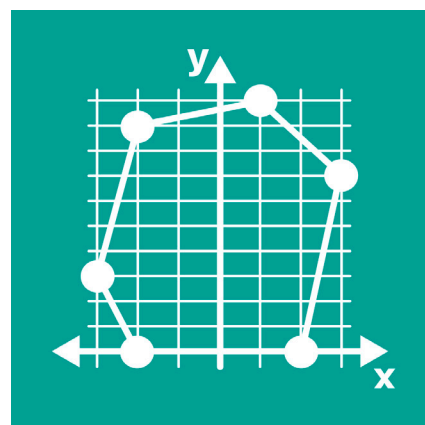
Sensors are **parameterized** via an in the sensor integrated web server using any smartphone or tablet.

**Installation** is mainly reduced to simply mounting the devices on the hinge and opposite hinge side above the door. With the integrated web server, subsequent optimization can be carried out securely without requiring a ladder. This means that installation can be completed in just a few steps.

The **cloning function** enables quick set-up of several identical installation points.
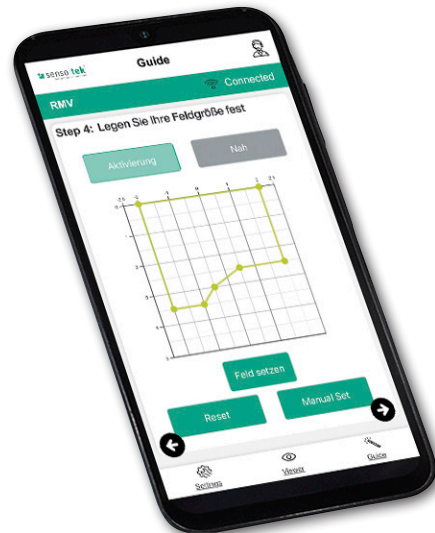
The operating principle is based on radar technology. The Radar MultiView RMV can be operated in all European countries and North America. Proper use also includes observing the mounting and operating instructions. Any other or additional use is considered improper.

**Warning!** Improper use or unauthorized modifications of the product can result in danger to life and limb or damage to the product and other property. Use only original spare parts. The manufacturer/supplier is not liable for any consequential damages. The user himself is responsible for any risk.

## Technical Data

### General Specifications

| | |
|---|---|
| **Function principle** | Measuring 2-D-Radar with 3 operating areas:<br>Detection area: determined by the mounting height<br>Activation area: adjustable to application via Web-Interface<br>Near area: adjustable to application via Web-Interface |
| **Mounting position** | Above the door, in the middle, left or right; integrated mounting aid with IMU for all 3 spatial angles |
| **Mounting height** | Min. 2 m; max. 4 m |
| **Detection speed** | Min. 0.1 m/s, max. 8.0 m/s |
| **Setting angle** | Vertical: -90° ... +90° |
| **Operating frequencies** | 24.150 GHz; can be switched to 24.050 GHz and 24.250 GHz; enables the operation of 3 radar units mounted close to each other |
| **Transmitter radiated power (EIRP)** | < 20 dBm |
| **Radar radiation angle** | 34° x 80° |
| **Minimum sensing range Width x depth** | f (H, α) indication via Interface |
| **Cross-traffic suppression** | Adjustable: on (100%, no triggering), middle (50%), off (0%) |
| **Opening speed of the door** | Adjustable in [m/s] |
| **Parameter setting** | WLAN (OTA) |
| **Integrated temperature** | °C / °F / °K, output via interface |
| **Aprovals and certificates** | CE; UL |

### Indicators / Operating elements

| | |
|---|---|
| **Function indicator** | 1 x LED (rgb) |
| **Control elements** | None |

### Electrical specifications

| | |
|---|---|
| **Operating voltage** | AC: 8 ... 35 V AC +/- 10%<br>DC: 8 ... 45 V DC +/- 10% |
| **Power consumption** | < 2.5 W |

## Technical Data

### Radiated frequencies

| | |
|---|---|
| BLE (Bluetooth®) Transmission power | 2.402 GHz ... 2.480 GHz<br>< 10 mW |
| WLAN Transmission power | 2.412 GHz ... 2.472 GHz<br>< 100 mW |
| Radar Transmission power | 24.050 GHz ... 24.250 GHz<br>< 10 mW |

### Connections

| | |
|---|---|
| USB C | 1 x USB C female connector on board |
| Screw terminal | 1 x voltage, 1 x relay |
| Extension | 1 x internal connector |

### Connection cable set

| | |
|---|---|
| USB cable | 2 m (not included in delivery) |
| cable, 4 pin plug | 4 m (included in delivery) |

### Output

| | |
|---|---|
| | Short circuit protected, normally open/closed (NO/NC) and event (see below) configureable via Web-Interface |
| Signal output | Solid-state relay |
| Switching voltage | Up to 60 V AC/VDC |
| Switching current | Max. 0.5 A |
| Holding time | Adjustable in [s] |

### Events

| | |
|---|---|
| | Events can be assigned to outputs via parameter setting. Triggering in people, fast opening, turtle opening, counting of people at the door, temperature control. |

### Digital interface

| | |
|---|---|
| ESP-NOW | Short range protocol, max. 25 m |

### Ambient conditions

| | |
|---|---|
| Special features | Resistance against weather and vibrations |
| Operating temperature | -40 ... 80° C (-40 … 176° F) |
| Storage temperature | -40 ... 80° C (-40 … 176° F) |
| Relative humidity | Max. 90% non condensing |

### Mechanical specifications

| | |
|---|---|
| Degree of protection | IP54 |
| Housing | ABS, black |
| Mass | 650 g |
| Dimensions | 123 mm x 65 mm x 57 mm |

### Parameter setting

| | |
|---|---|
| Method | All parameters can be sit via WEB-Interface |
| Operating ranges | Detection area of up to 10 x 10m, depending on mounting height and setting angle<br>Activation area: configurable inside the detection area as a polygon with max. 8 points.<br>Near area: configurable inside the detection area as a polygon with max. 8 points. |

# 3. Installation

## 3.1 Installation

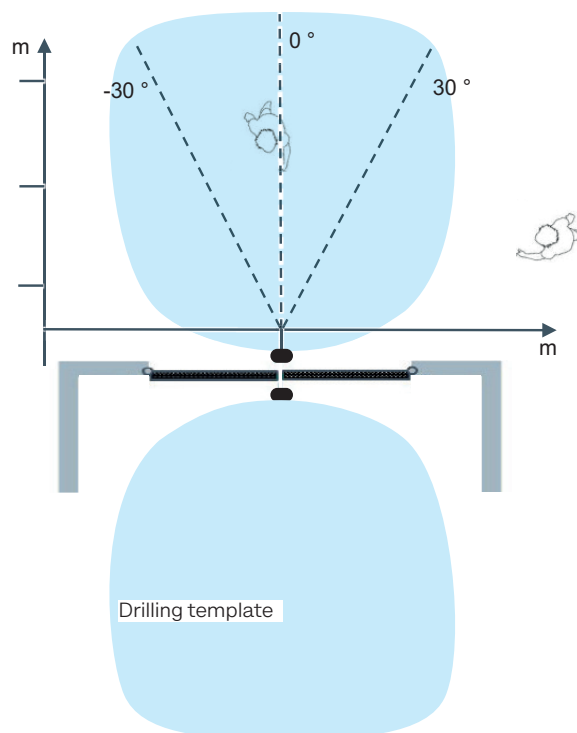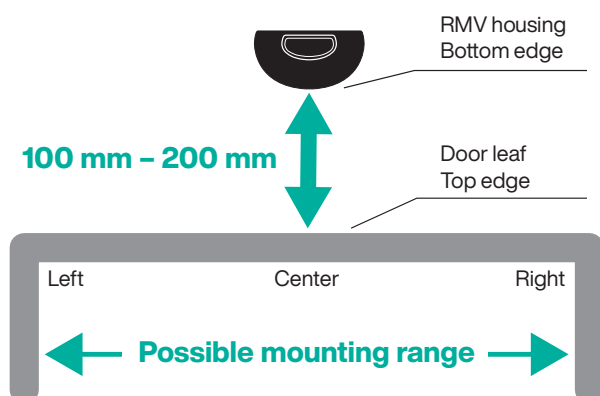The product is preferably mounted above the automatic doors on the hinge/opposite hinge side.

**Installation of the Radar MultiView RMV-D2:**
The Radar MultiView RMV-D2 can be installed at a height of approx. 100 mm – 200 mm above the automatic door – in the middle or at any other position along the door leaf.
See ➝ Possible mounting area

> **Note:** The maximum installation height H is measured from the floor and is not allowed to be exceeded.



Drilling template

RMV housing
Bottom edge

**100 mm – 200 mm**

Door leaf
Top edge

Left       Center       Right

**Possible mounting range**

## 3.1.1 Opening the device:

- Insert the screwdriver into the available opening (1) – at the bottom of the rear side of the housing – and carefully press on the cover (2)
- Fold the cover upwards and pull it away (3)

> **Note:** The QR Code for connecting a mobile device with the RMV configuration tool is sticked in the cover.

### 3.1.2 Fastening the device:

- Fit the drilling template at the appropriate position and drill according to the specified markings (4)
- Pull the cable through the available openings (5)
- Fasten the base plate with the screws supplied with the set
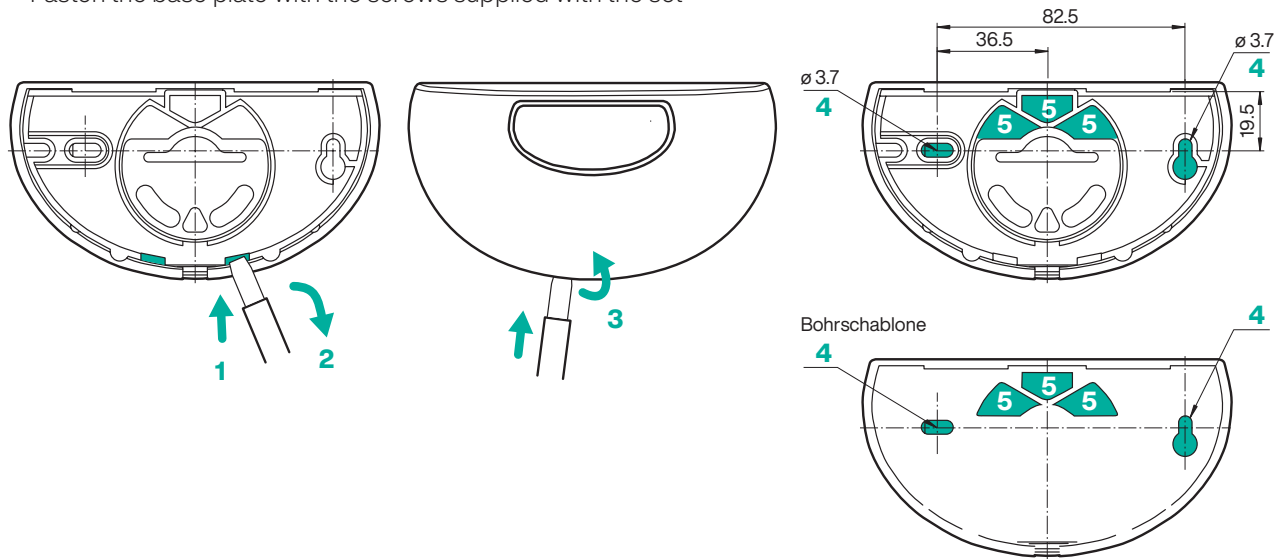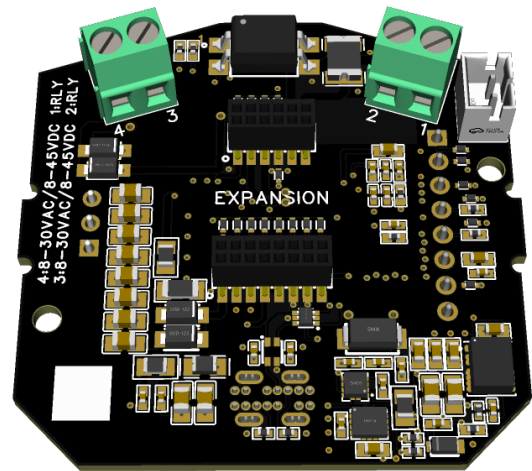


## 3.2 Wiring

The supplied wire harness must be used for wiring.
The screw terminals are provided for connecting the power supply and the outputs.
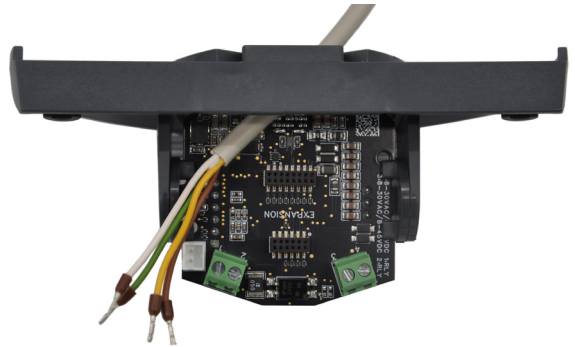
### 3.2.1 Connectors

**Functions of the connectors**

| U1 | S1 |
|---|---|
| Power supply U$_B$ 8 – 35 V AC / 8 – 45 V DC | Signal output 1 |
| ① NO / NC | ③ UB+ |
| ② COM | ④ GND |

| Electrical specifications | |
|---|---|
| Operating voltage | AC: 8 ... 35 V AC +/- 10% DC: 8 ... 45 V DC +/- 10% |
| Power consumption | < 2,5 W |

| Output | |
|---|---|
| Signal output | Solid-state relay |
| Switching voltage | Up to 60 V AC/VDC |
| Switching current | Max. 0.5 A |

### 3.2.2 Wiring

**Angle definition**



0 ≈ 0°
1 ≈ 10°
2 ≈ 20°
β
3* ≈ 30°
4 ≈ 40°
5 ≈ 50°
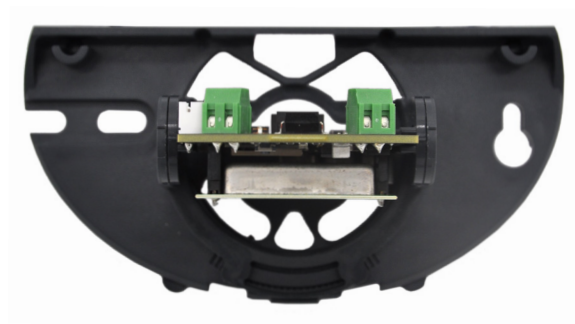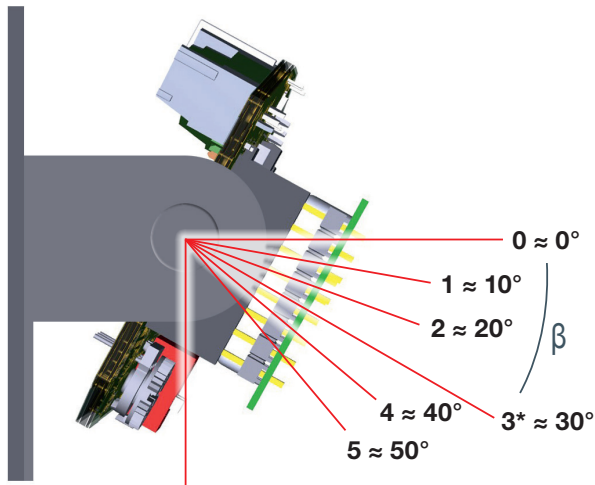




- Turn the tilt angle from the factory setting of 30° to 90°
- Strip the cable approx. 50 mm, strip the wires, apply the wire-end ferrules, insert the cable
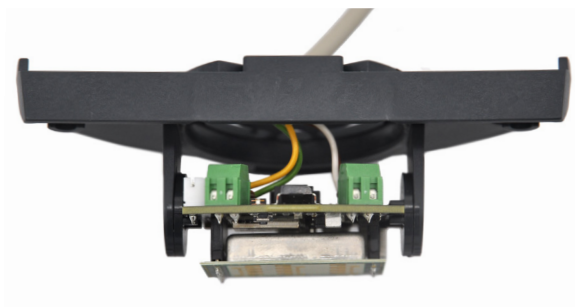




- Connect the wires and fix it
- Reset the RMV board to 30° tilt angle. The further information refers to this setting. Based on the physically manually set angle and the installation height, the real detection range is determined in the configuration tool and displayed for further settings.

# 4. Set-up

## 4.1 Function signaling

| LED – RGB | Description |
|---|---|
| **LED flashes green (10 seconds after Power-Up)** | Start process |
| **LED is off, does not light up** | **The sensor is ready for operation** |
| **LED flashes yellow** | Motion detected (any direction) |
| **LED lights up red** | Opening impulse set |
| **LED flashes red purple** | Activation of the WLAN (ready for connection) |
| **LED flashes blue** | Parameterization via web active: Data connection is established |
| **LED flashes white** | Error display |

## 4.2 Radar function areas

- **Detection area:** It is the possible field of view of the radar with its antenna.

    **Note:** The maximum detection range is mainly determined by the installation height and the inclination angle.

- **Activation area:** Depending on the selected application there is an activation area within the detection area, in which **only** the opening function for the door opening is generated.
- **Near area:** depending on the application there is also a near area within the activation area, in which a movement will lead to opening of the door **in any case**.

## 4.3 Parameterization via the sensor's own web portal

The radar is operated using the configuration tool of the web server integrated in the radar in conjunction with a mobile device. The connection between the web server and the mobile device is established by scanning the QR Code shown in the cover.

**Note: The RMV-D2 does not work without parameterization via the web server, because the installation height must be entered via the web browser, for example, so that the RMV-D2 can determine its maximum detection range.**

The configuration tool explains how to carry out the parameterization step by step.

# 4.4 Commissioning the radar

- The Radar RMV-D2 must be mechanically mounted above the door. (see chapter 3)
- All cabling must be completed as per chapter 3.2. Check: After connecting voltage wires, the green RGB LED lights up for 10 seconds.

## 4.4.1 Connecting the radar and mobile device

**1. Automatically:**
Scan the QR Code in the cover of the RMV-D2 with the camera of the mobile device. The mobile device, tablet/smartphone immediately connects to the RMV-D2. The first menu is displayed: "Language selection".

**2. Alternative WLAN connection setup:**
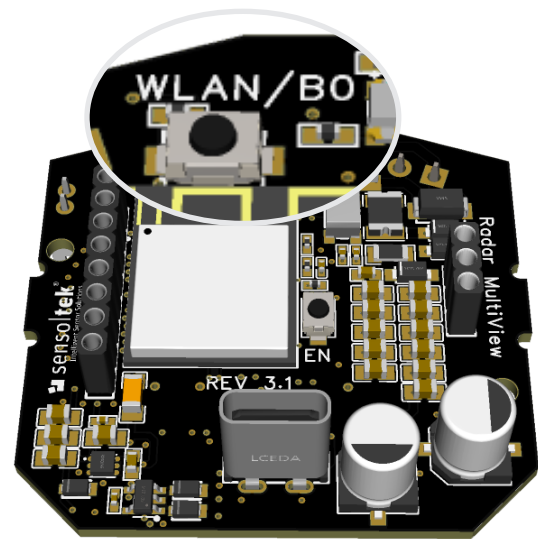A1. **Press the "WLAN/BO" button for five seconds** RGB LED flashes purple.
OR
A2. **Switch off the voltage**, wait 10 seconds ➤ Switch the voltage back on, wait until the green LED stops flashing

B. Smartphone: Deactivate **mobile data** Laptop: Disconnect **LAN/Internet connection** ➤ **Scan the QR code again to reestablish the WLAN connection**

**If the language selection does not appear:**
C. Open web browser ➤ Enter and confirm the address: **https://rmv.local** ➤ **first menu: "Language selection"**
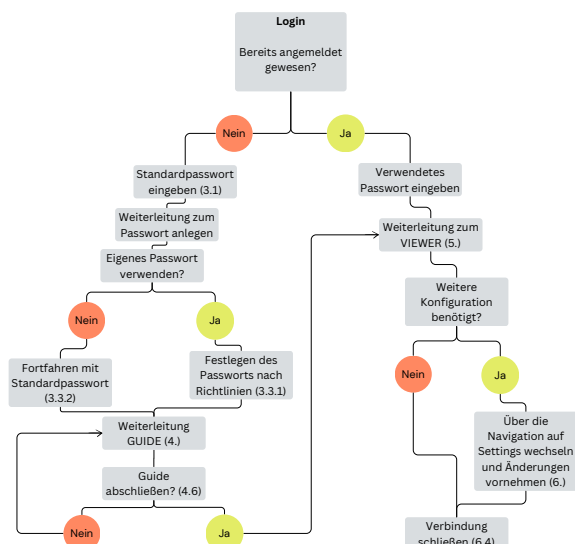
ℹ️ **Note:** If there is no interaction for a **max. of 5 minutes**, the WLAN connection is interrupted for data protection legal reasons. ➤ **Retrieve alternative WLAN connection setup (A. – C.)** ➤ first menu: "Language selection" appears

## 4.4.2 Settings on the web browser interface

1. Select language
2. Enter the password specified in the cover of the RMV-D2 radar
3. Assign a new password
4. Follow the device's instructions

ℹ️ **Note:** If you no longer have the login password, click on "Forgot password". You will be guided from here.

Login
Bereits angemeldet gewesen?

Nein — Standardpasswort eingeben (3.1)
Ja — Verwendetes Passwort eingeben

Weiterleitung zum Passwort anlegen
Eigenes Passwort verwenden?

Nein — Fortfahren mit Standardpasswort (3.3.2)
Ja — Festlegen des Passworts nach Richtlinien (3.3.1)

Weiterleitung GUIDE (4.)
Guide abschließen? (4.6)

Weiterleitung zum VIEWER (5.)
Weitere Konfiguration benötigt?

Nein
Ja — Über die Navigation auf Settings wechseln und Änderungen vornehmen (6.)

Verbindung schließen (6.4)

## 4.5 Angle setting

The angle setting has a significant impact on the detection range. The standard value should be an angle of inclination of approx. 30° (locking lug 3) when installing. The exact value can be set in conjunction with the user interface.

If the detection range shown in the configuration tool does not suit the application situation, the angle must be corrected accordingly using the locking lugs on the circuit board holder.



$0 \approx 0°$
$1 \approx 10°$
$2 \approx 20°$
$\beta$
$4 \approx 40°$  $3^* \approx 30°$
$5 \approx 50°$
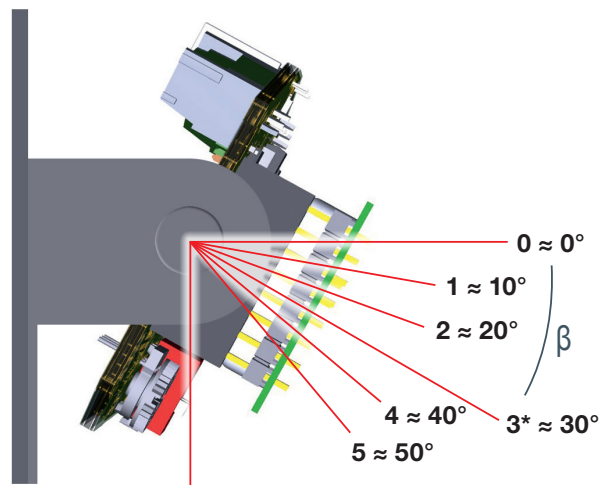
**Caution!** After changing the angle, always check the activation range and, if necessary, the close-up range, as these are automatically adjusted under circumstances.

# 5. Operation

Once the configuration is complete, the Radar MultiView RMV is set up and ready for operation without any further adjustments. If during the final test after set-up the door opens a little too early or too late, a fine adjustment for optimization with the potentiometer can be considered via the configuration tool.

**Caution!** Do not adjust the mounting angle of the radar (see 4.5)! If the mounting angle of the radar is adjusted, the setting of the ranges may need to be adjusted using the configuration tool.

# 6. Maintenance

If the housing is heavily soiled, the radar housing shall be cleaned.

# 7. ESD safety

**Warning!** Device contains sensitive electronic components that are sensitive to electrostatic discharge (ESD). Use appropriate ESD protection such as wristbands to protect the device from damage.

# 8. Decommissioning

**Note:** Device may be decommissioned only by trained personnel. Before dismantling, ensure that the supply voltage has been turned off.

# 9. Disposal

Device must be disposed in accordance with local regulations.
Electronic components must be recycled accroding to local regulations.