



HANDBUCH / MANUAL / MANUAL / MANUALE

Radar-Bewegungsmelder
Radar Motion Sensor
Avisador de movimientos radar
Rilevatori di movimento radar
RMS-FRW



1	Introduction	32
1.1	Warranty	32
2	Declaration of conformity	34
3	Safety	35
3.1	Symbols used	35
3.2	General safety instructions	36
3.3	Standard-relevant safety settings	37
4	Product description	38
4.1	Displays and operating elements	38
4.2	Scope of delivery	39
4.3	Accessories	40
5	Installation	40
5.1	Storage and transportation	40
5.2	Unpacking the device	40
5.3	Mounting and connecting the device	41
6	Commissioning	43
7	Operation	43
7.1	Keypad menu operation	43
7.2	Remote control operation	46
8	Maintenance and repair	49
9	Troubleshooting	49
10	Appendix	50
10.1	Explanation of sensor parameters	50
10.2	Overview of sensor parameters	54
10.3	Overview of remote control menu structure	55
10.4	Technical Data	56
10.5	Note	58

1 Introduction

Congratulations

You have chosen a device manufactured by Pepperl+Fuchs. Pepperl+Fuchs develops, produces and distributes electronic sensors and interface modules for the automation technology market on a worldwide scale.

Contact

If you have any questions about the device, accessories or further functions, contact:

Pepperl+Fuchs GmbH

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1.1 Warranty

Pepperl+Fuchs manufactures its hardware products in accordance with industry-standard practices. Pepperl+Fuchs warrants its products will be free from defects in materials and workmanship, provided that the products are used under normal operating conditions intended by the manufacturer. This warranty is provided to the original owner only and is not transferable to any third party. This warranty is subject to any and all accompanying disclaimers, limitations and other terms of this section.

Exclusion of liability

The warranty shall not apply to products that:

- have been repaired, modified or manipulated, unless carried out or expressly authorized by Pepperl+Fuchs,
- have not been maintained in accordance with the operating and handling instructions supplied by Pepperl+Fuchs,
- have been exposed to abnormal physical or electrical loads, immersed in liquids, or have been subject to one of the following:
 - breaking,
 - crushing,
 - incorrect use,

- abuse,
 - power shortage,
 - unsuitable voltage supply,
 - incorrect polarity,
 - negligence or accident
- have been used for a purpose other than that described in the operating and handling instructions. Preventive maintenance is the responsibility of the customer and is not covered under this warranty.

General

With the exception of the above-mentioned warranties, Pepperl+Fuchs shall not accept warranties of any kind for products supplied hereunder, neither of an explicit nor implicit nature, including, but not restricted to, implicit warranties for defects and warranties of suitability for a special purpose and non-infringement of third-party rights. The above-named explicit warranties replace all obligations and liabilities on the part of Pepperl+Fuchs with regard to damage, including, but not limited to, special, indirect or consequential damage in conjunction with the use or design of the product. The liability of the seller to the buyer and other persons (irrespective of the reason for liability, whether contract, warranty, impermissible activity, abuse and/or other causes) in conjunction with the use of a product shall, under no circumstances, exceed the original purchase price of the product. Under no circumstances shall Pepperl+Fuchs be liable for consequential damage, special and indirect damage, collateral damage or fines or lost profits, turnover or data loss, even if Pepperl+Fuchs has been informed of this possibility in writing.

2 Declaration of conformity

EC conformity:

The products

RMS-FRW

are compliant with Directive 1999/5/EC, device class 2 and the following harmonized standards
EN 62311, EN 60950-1, EN 301 489-1, EN 301489-3, EN 300 440-2.



A complete version of the declaration of conformity is available for download at
www.pepperl-fuchs.com.

Caution:

This device can be used in all countries within the European Union with the exception of Great Britain and France. In other countries, all applicable national regulations must be observed.

Pepperl+Fuchs GmbH, in D-68301 Mannheim, has a certified quality assurance system in accordance with ISO 9001.

C E 0682 !



3 Safety

3.1 Symbols used

Safety-relevant symbols



Danger!

This symbol indicates an imminent danger.
Failure to avoid this danger can lead to serious injury or death.



Warning!

This symbol indicates a possible fault or danger.
Failure to avoid this warning can lead to serious injury or serious property damage.



Caution!

This symbol warns of a possible fault.
Failure to observe the instructions given in this caution may result in the devices and any connected facilities or systems developing a fault or failing completely.

Informative symbols



Note!

This symbol draws your attention to important information.



Instruction

This symbol indicates an instruction.

3.2 General safety instructions

The operator of the system is responsible in terms of planning, mounting, set-up, operating and maintenance.

Installation and set-up of all devices must be performed by a trained professional only.

Protection of operating personnel and the system is not ensured if the module is not used in accordance with its intended purpose.

Conformance to the laws and regulations applicable to the specified or intended usage should be ensured. The devices are only approved for proper professional usage in accordance with the intended purposes. Improper handling will void any claim made under the warranty and any manufacturer's liability.

Only use recommended original accessories.

If serious faults occur, stop using the device. Secure the device against inadvertent operation. In the event of repairs, send the device to Pepperl+Fuchs. Independent interventions and separate modifications are dangerous and will void the warranty and exclude the manufacturer from any liability.

Dispose of the defective device in accordance with country-specific legal requirements.

Correctly dispose of the sensor by handing it over to a designated collection point for the recycling of electrical and electronic equipment waste.



In order to satisfy the safety requirements specified in EN60950-1 and UL508, the sensor must be operated from an SELV supply where output is limited to 100 W.
The output can be limited using a T2.5 A fuse.
This device must be installed and maintained only by qualified, trained personnel.

3.3 Standard-relevant safety settings

Some functions permit settings that are not in accordance with AutSchR: 1997 (Directive for automatic sliding doors in escape and rescue routes):

3.3.1 Settings for doors in escape and rescue routes:

Connecting the sensor:

The two relay contacts are galvanically separated. For safety reasons, series or parallel connection is not permissible. Both contacts must be evaluated separately on the door control system. The output signal is only valid if the two relay contacts of the movement output are in the same state.

Sensitivity of the movement detection:

The field depth must be at least 1.5 m!

Output hold time movement detector:

The setting "Off" is not permissible!

Polarity output movement detector:

The setting "Active" is not permissible!

4 Product description

Approval for escape and rescue routes

The radar sensor RMS-FRW is certified in accordance with AutSchR and bears the TÜV seal of approval. Typical areas of application include escape and rescue routes with airlock function. Escape and rescue routes with windscreen function in both directions are possible in conjunction with the devices RMS-D or RMS-M from the same family.

4.1 Displays and operating elements

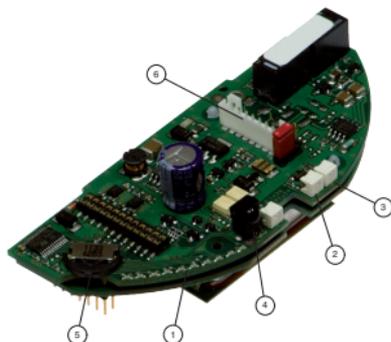


Illustration 41 Displays and operating elements

No.	Designation
1	Bargraph with 10 LEDs
2	LED red/green

No.	Designation
3	IR transmitter
4	IR receiver

No.	Designation
5	Navigation key
6	Connection plug

Table 4.2 Displays and operating elements

4.1.1 Overview of LED displays

Switch-on / initialization		
LED red/green	Bargraph	Description
Flashes red/ green	-	The sensor is being initialized.

Standard operation / detection		
LED red/green	Bargraph	Description
Illuminates green	-	The sensor is ready to operate, no detection.
Illuminates red	-	Detection by movement detector

Operation with RMS Remote Control		
LED red/green	Bargraph	Description
Flashes 3x green	-	Command received from remote control

Error		
LED red/green	Bargraph	Description
Flashes red	Error code	The sensor has identified an error. The bargraph display indicates an error code.

4.2 Scope of delivery

The scope of delivery includes:

- RMS-FRW
- 3 m connection cable with 8-pin connector strip
- Self-adhesive mounting template sticker
- Screws for mounting
- Operating instructions

4.3 Accessories

The following products are available as accessories:

No.	Designation	Illustration	Description
1	RMS Remote Control		Infrared remote control
2	RMS Weather Cap		Weather cap and mounting bracket for ceiling mounting

5 Installation

5.1 Storage and transportation

For storage and transport purposes, package the unit using shockproof packaging material and protect it against moisture. The best method of protection is to package the unit using the original packaging. Furthermore, ensure that the ambient conditions are within the allowable range.

5.2 Unpacking the device

Check to see that no parts are damaged. In the case of damage, report it to the post office or carrier and notify the supplier.

Check the scope of delivery against the original purchase order and the shipping documents.

Keep the original packing material in case the device has to be placed into storage or for possible future reshipment. If you have any questions, contact Pepperl+Fuchs.

5.3 Mounting and connecting the device

Positioning the sensor

Make sure that the printed circuit board is fitted horizontally (0°) in the inside of the housing.

The sensing area is 2500 mm x 3500 mm (D x W) at 2200 mm mounting height.

The printed circuit board can be adjusted by a maximum of 10° . (Max. two notches downwards)

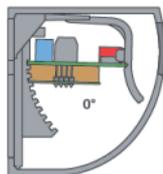


Illustration51 *Mounting the RMS-FRW*



Mounting the RMS-FRW

Proceed as follows to mount the sensor:

1. Open the housing with a slotted screwdriver from below.
An indentation is located underneath the housing.
Do not open the housing from above!
2. Place the template (included with sensor) in desired location.
3. Drill mounting holes.
4. Pull the enclosed cable with the connector side through the provided opening.
5. Mount the base plate using the screws enclosed in the housing.



Connecting the RMS-FRW

The sensor is supplied with power via the connection plug. It is also possible to directly connect to the relay contact on the connection plug. Proceed as follows:

1. Connect the cable to the power supply.
2. Insert the socket on the cable into the connection plug on the printed circuit board.
3. Connect the safety sensor terminal on the controller (door control) with the relay contacts or the corresponding voltage or frequency output of the movement detector. For this, use the suitable wires of the cable coming from the RMS-FRW.
4. For all further steps, refer to Set-up (see section 6)
5. After completing all the settings for the sensor, push the cover over the base plate. Hook the cover on to the upper end of the base plate and press the cover until it clicks into place.

The plug has the following pin assignment:

<u>Pin-out according 8-pin plug strip</u> (Relay output)			<u>Pin-out according 8-pin plug strip</u> (Voltage output)			<u>Pin-out according 8-pin plug strip</u> (Frequency output)		
<u>Pin</u>	<u>Signal</u>	<u>Color</u>	<u>Pin</u>	<u>Signal</u>	<u>Color</u>	<u>Pin</u>	<u>Signal</u>	<u>Color</u>
1	+12 ... 36 V DC	white	1	+12 ... 36 V DC	white	1	+12 ... 36 V DC	white
2	GND	brown	2	GND	brown	2	GND	brown
3	Relay 1	green	3	Uout +	green	3	Fout +	green
4	Relay 1	yellow	4	Uout -	yellow	4	Uin -	yellow
5	Relay 2	grey	5	No Connection	grey	5	Uin +	grey
6	Relay 2	pink	6	No Connection	pink	6	No Connection	pink
7	No Connection	blue	7	No Connection	blue	7	No Connection	blue
8	No Connection	red	8	No Connection	red	8	No Connection	red

6 Set-up

When switching on the RMS-FRW, make sure to remove all objects in the door area that do not belong in the usual vicinity of the door.



Set-up

To set-up the sensor, proceed as follows:

1. Switch on the power supply.
2. Set the output movement detector on the RMS-FRW or select the standard profile door control. (see section 10.1)
3. Set the sensor address.
4. Set the mounting height on the RMS-FRW.
5. Set the movement detection on the RMS-FRW.
6. Check the settings by pacing through the dynamic field.

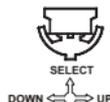
You can also program the sensor using the remote control with the hood placed in position. In such a case, the sensor address needs to have been previously set.

7 Operation

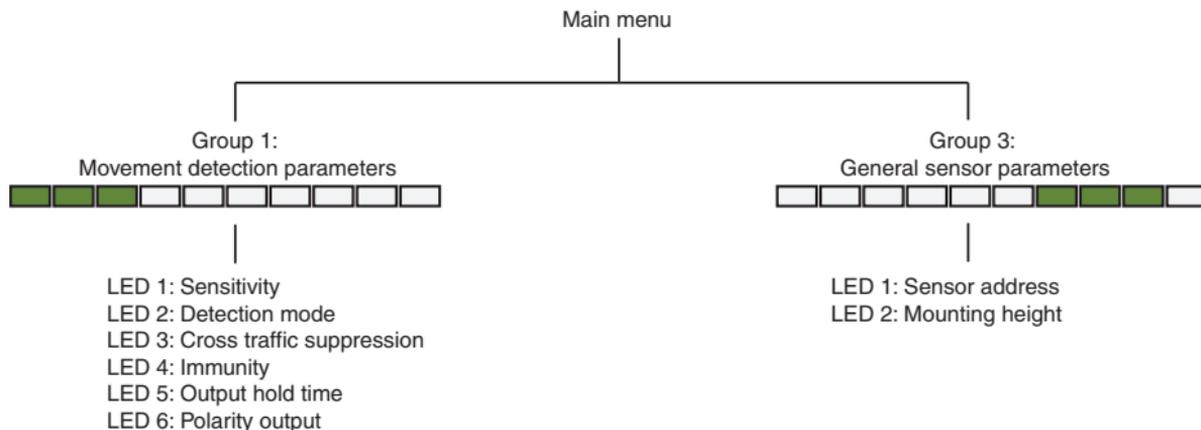
7.1 Keypad menu operation

7.1.1 General setting instructions

In the keypad menu the sensor can be set by means of the navigation key and the bar graph display. The sensor function is maintained even in the keypad menu. The programming can be checked immediately.



RMS-FRW parameters

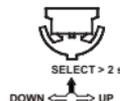


7.1.2 Start / end keypad menu

Start the keypad menu by pressing the SELECT key for 2 s. The bar graph display begins to flash.

Exit the keypad menu by pressing the SELECT key for 2 s.

If no setting takes place over a period of 10 minutes, the keypad menu is automatically exited.



7.1.3 Setting parameters

Use the UP and DOWN keys to select and change the parameters.

Use the SELECT key to confirm the set value.

1. Selecting the parameter group

The bar graph display shows the selected parameter group by flashing.

Use the UP and DOWN keys to select the parameter group and confirm by pressing the SELECT key.



2. Selecting parameters

The bar graph display indicates the parameter selected by flashing.

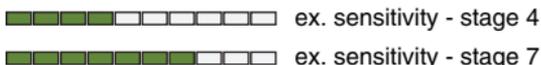
Use the UP and DOWN keys to select the parameter group and confirm by pressing the SELECT key.

Display		Movement detection	Sensor general
	Parameter 1	Sensitivity	Sensor address
	Parameter 2	Detection mode	Mounting height
	Parameter 3	Cross traffic suppression	
	Parameter 4	Immunity	
	Parameter 5	Output hold time	
	Parameter 6	Polarity output	
	Parameter 7		
	Parameter 8		
	Parameter 9		

3. Setting the parameter value

The bar graph display indicates the current value of the selected parameter.

Use the UP and DOWN keys to select the parameter group and confirm by pressing the SELECT key.



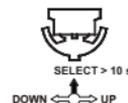
7.1.4 Fast entry

You can use the fast entry to change the "Sensitivity of the movement detection" directly. To edit or display the current parameter value there is no need to change over to the keypad menu. To do this, proceed as follows:

- The SELECT key shows the current value.
- The UP and DOWN keys immediately change the parameter value.
- The current value is shown for a period of 10 s.

7.1.5 Restoring the factory default settings (RESET)

If the navigation key is kept pressed for a period longer than 10 s, then the parameters are returned to their default settings, followed by a reset of the sensor.



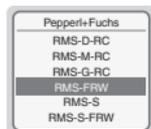
7.2 Remote control operation

Use the remote control to optimally program the sensor from the ground easily and quickly. The sensor function is maintained even in programming mode. The programming can be checked immediately.

7.2.1 Establishing the connection

Read the remote control operating instructions before programming. Switch on the sensor. The green LED lights. Direct the remote control such that it is aimed directly at to the sensor.

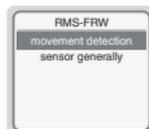
Establishing connection without code



Select sensor "RMS-FRW"

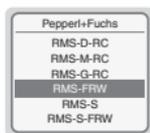


Select the address



Set the sensor

Establishing connection with code



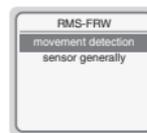
Select sensor "RMS-FRW"



Select the address



Enter 4-digit code



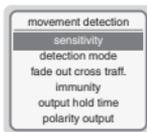
Set the sensor

When the connection has been established, a selection window with all setting options of the sensor appears. The black bar marks the current setting.

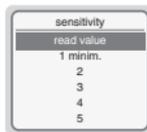
7.2.2 Setting the sensor

Use the operating buttons to select the required setting based on the indicated values.

Example: set the sensitivity of the movement detection



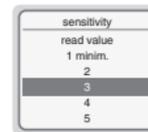
Select "Sensitivity of the movement detection"



Select menu option "Read value"



The current value is displayed



Set the value

If the connection is interrupted, a transmission error is indicated. The transmission must be repeated. The new setting can be checked immediately after the transmission.

7.2.3 Address

If several sensors are within range of the remote control, the sensors must be programmed with different addresses. This setting can only be made with the keypad menu.

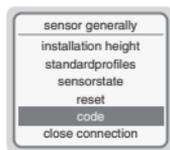
7.2.4 Security

Access without code:

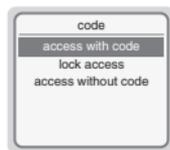
Access with the remote control is possible at any time.

Access with code:

The sensor can be secured against unauthorized access with a 4-digit code. The programming mode can then only be accessed by entering the code.



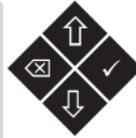
Select "Code"



Select "Access with code"



Enter 4-digit code



Repeat 4-digit code

Lock access:

If the sensor is secured with "Lock access", the device is locked. Access with the remote control is no longer possible. The configuration mode is automatically left 30 minutes after the last transfer. cycling power the sensor is in the "Access without code" state for 30 minutes.

8 Maintenance and repair

Maintenance

Conformance to all applicable laws and regulations regarding maintenance must be ensured.

The sensor is largely maintenance-free.

However, periodically check the technical safety of the sensor system for damage to the housing.

The sensor should be checked occasionally for contamination. To clean the sensor, wipe the sensor with a dry or damp soft cloth at regular intervals. This assures optimal functioning.

The housing is made of plastic. Therefore avoid contact with acetone and cleaning agents containing solvents.

Repairs

If safe operation is no longer possible, the sensor system must be disconnected and protected against accidental use. In the event of repairs, send the device to Pepperl+Fuchs. Independent interventions and separate modifications are dangerous and will void the warranty and exclude the manufacturer from any liability.

9 Troubleshooting

Interfering influences

- The sensor must be mounted securely and not subject to any vibration.
- The sensor must not be installed behind a cover
- The sensing area should be free of moving objects (ex. fans, plants, trees, flags etc.)
- The sensor should be mounted with suitable rain protection. (For recommended accessories see section 4.3)
- The sensor should not be mounted close to fluorescent lighting

Eliminating interfering influences

Error source	Remedy
LED red flashes	The sensor has identified an error. The bargraph display indicates an error code.

10 Appendix

10.1 Explanation of sensor parameters

10.1.1 Movement detection

Sensitivity

Using this sensitivity setting, the size of the sensing area can be changed.

The setting options range from 1 (smallest sensing area) to 10 (largest sensing area).

This setting can be set using the remote control or the keypad menu.

Detection mode

The direction recognition can be changed with the detection mode.

Setting	Description
Mono	Detects forward and backward movement
Forward	Detects movement towards the sensor
Backward	Detects movement away from the sensor

This setting can be set using the remote control or the keypad menu.

Suppression of cross traffic

This mode can be used to change the strength of cross traffic suppression. The setting options range from 1 (off), 2 - 5 (low) to 6 - 10 (high). High cross traffic suppression means strong suppression (fade out) of cross traffic.

This setting can be set using the remote control or the keypad menu.

Immunity

In principle, the sensor is immune against any interfering influences. However, special installation situations or major sources of interference may sometimes cause incorrect triggering. The immunity setting can be used to minimize various interfering influences (vibrations, reflections, fluorescence lighting etc.).

The setting options range from 1 (off), 2 - 5 (low) to 6 - 10 (high).

This setting can be set using the remote control or the keypad menu.

Output hold time

In the case of the setting "Off", together with the function "Polarity - output", the door could remain open or closed indefinitely.

Setting	Hold time
0	off (no output signal)
1	0.2 s
2	0.5 s
3	1 s
4	2 s
5	3 s
6	4 s
7	5 s
8	10 s

This setting can be set using the remote control or the keypad menu.

Polarity

Using this function, it can be preset whether the output of the movement detector works with active or passive switching during detection.

Output type	RMS-FRW with relay	RMS-FRW with voltage output	RMS-FRW with frequency output
Active	Relay contacts closed at detection	Output voltage = on at detection	Output frequency = on at detection
Passive	Relay contacts open at detection	Output voltage = off at detection	Output frequency = off at detection

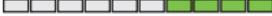
This setting can be set using the remote control or the keypad menu.

10.1.2 Sensor general

Sensor address

If several sensors are within range of the remote control, the sensors must be programmed with different addresses via the keypad menu.

16 fixed sensor addresses are available for selection.

Display	Address	Display	Address
	Sensor 1		Sensor 9
	Sensor 2		Sensor 10
	Sensor 3		Sensor 11
	Sensor 4		Sensor 12
	Sensor 5		Sensor 13
	Sensor 6		Sensor 14
	Sensor 7		Sensor 15
	Sensor 8		Sensor 16

This setting can only be made with the keypad menu.

Mounting height

For this parameter, set the height of the sensor from the ground up to the bottom edge of the sensor.

The following setting options are possible: 200 - 220 cm / 220 - 240 cm / 240 - 260 cm / 260 - 280 cm / 280 - 300 cm / 300 - 320 cm / 320 - 340 cm / 340 - 360 cm / 360 - 380 cm / 380 - 400 cm

This setting can be set using the remote control or the keypad menu.

Standard profile door control

Following the selection of the control system, the pre-defined settings (ex. polarity outputs, test input, etc.) will be automatically transferred to the sensor.

Please contact us directly, or consult the Internet page www.pepperl-fuchs.com for a list of the pre-defined door control systems with a listing of all settings.

This setting can only be made with the remote control.

Sensor status

The current sensor status can be read by means of this function.

Reset

Using this function, all device parameters are restored to the factory default settings, and then the sensor begins initialization.

This setting can be set using the remote control or the keypad menu.

Code

Access to the sensor can either be set with code, without code or locked completely.

This setting can only be made with the remote control.

Disconnection

This parameter can be used to immediately disconnect the connection between remote control and sensor.

This setting can only be made with the remote control.

10.2 Overview of sensor parameters

	Parameter	Value range	Default settings
Movement detection	Sensitivity	1 - 10	10
	Detection mode	Mono / forward / backward	Forward
	Cross traffic suppression	1 off 2 - 5 low 6 - 10 high	1
	Immunity	1 - 2 low 2 - 5 medium 6 - 10 high	2
	Output hold time	Off / 0.2 s / 0.5 s / 1 s / 2 s / 3 s / 4 s / 5 s / 10 s	1 s
	Polarity	Active / passive	Passive
Sensor general	Sensor address	1 - 16	1
	Mounting height	200 - 220 cm / 220 - 240 cm / 240 - 260 cm / 260 - 280 cm / 280 - 300 cm / 300 - 320 cm / 320 - 340 cm / 340 - 360 cm / 360 - 380 cm / 380 - 400 cm	200 - 220 cm
	Restore default settings	-	-
	Access code	Off or 4-digit code	Off

Table 10.1 Overview of sensor parameters (with factory default settings)

10.3 Overview of remote control menu structure

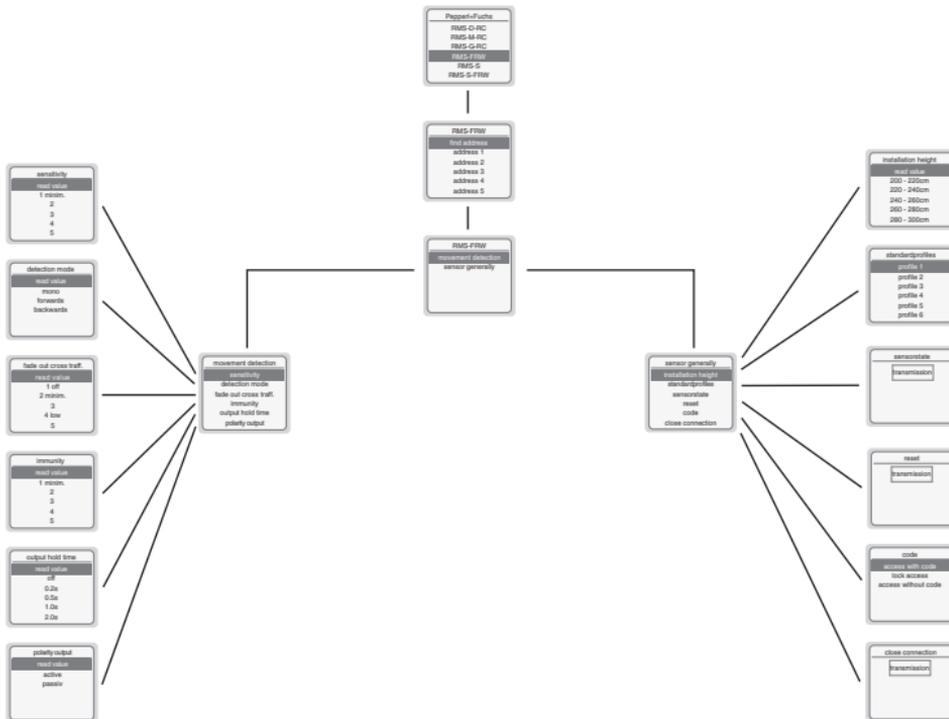


Illustration102 Remote control menu structure

10.4 Technical Data

General specifications		
Function principle		Microwave module
Detection speed		min. 0.1 m/s
Marking		CE
Mounting angle		0 ... 10° in steps of 5°
Sensing area		2500 x 3500 mm (D x W) at 2200 mm mounting height and of 0° tilt angle
Operating frequency		24.05 ... 24.25 GHz K-Band
Operating mode		Radarr Motion Sensor
Transmission power (EIRP)		< 20 dBm
Functional safety related parameters		
Performance level (PL)		PL d
Category		Cat. 3
MTTF _d		850 a
PFH _d		6.46 E-8
Diagnostic Coverage (DC)		low
Displays/operating elements		
Operation indicator		LED red/green & LED row green
Operating elements		Navigation key
Electrical data		
Operating voltage		12 ... 36 V DC
Current Consumption	I ₀	200 mA at 24 V DC
Power consumption	P ₀	< 3 W
Switching current		900 mA
FRW/31 output		
Output type		Relay output
Switching type		Active / passive
Signal output		2 relay outputs for dynamic output
Switching voltage		48 V DC / AC
Switching current		max. 1 A DC, 0.5 A AC

Switching capacity	30 W DC / 60 VA AC
FRW/163 output	
Output type	Voltage output
Switching type	Active / passive
Signal output	Potential-free voltage source
Max. open circuit voltage	No movement detection: ≤ 10 V DC / movement detection: ≤ 500 mV DC
Switching current	No movement detection: max. 10 mA at 3.2 V DC / movement detection: < 100 μ A
FRW/164 output	
Output type	Frequency output
Switching type	Transistor output (Open Collector)
Signal output	Short-circuit proof
Feeding the terminating stage	External: 10 V DC ... 36 V DC
Max. residual voltage	≤ 2 V DC
Max. output current	50 mA
Pulse/pause ratio	1:1 (deviation max. 10%)
Output frequency	100 Hz
Compliance with standards	
Standards	EN 60950:2000; EN 60335-1:1994; EN 301489-3 V1.4.1; EN 61000-6-1:2001, EN 61000-6-2:2001; EN 61000-6-3:2001; EN 61000-6-4:2001 ; EN 300440-2 V1.1.1; AutSchR: 1997
Ambient conditions	
Ambient temperature	-20 ... 60 °C (253 ... 333 K)
Operating temperature	-25 ... 60°C (248 ... 333K)
Storage temperature	-30 ... 70°C (243 ... 343K)
Relative humidity	max. 90 % non-condensing
Mechanical data	
Mounting height	max. 4000 mm
Protection category	IP54
Connection	8-pin connector strip with 3 m cable
Material	
Housing	ABS, anthracite
Mass	6.0 oz (140 grams)



10.5 Note

FACTORY AUTOMATION – SENSING YOUR NEEDS



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