Merkur 2

Radar Motion Detector as an Opening Sensor for Automatic Doors

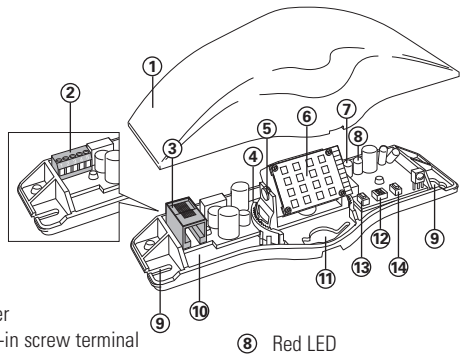
Translation of the original instructions

1 Safety Instructions

Read these operating instructions thoroughly before putting the device into operation and keep them for future reference. This product is designed to be mounted above an overhead pedestrian door. Do not use this product other than for its specified application. Only trained and qualified personnel may install and initialize the device. Failure to follow these safety precautions may cause damage to sensor or objects, serious personal injury, or death. It is the responsibility of the equipment installer to carry out a risk assessment and to install the system, in compliance with applicable local, national and international regulations, safety standards, codes and laws as well as the Machinery Directive 2006/42/EC, should this apply. Always consider the safety functions of your applications as a whole, never just in relation to one individual section of the system. The sensor should only be operated from a safety extra low voltage (SELV) system with safe electrical separation according to EN 61558. The wiring must be protected against mechanical damage. Avoid touching any electronic components.

2 Description of the Sensor

Article	Direction recognition (ES = energy saving)	Connection
Merkur 2 ES	Yes (can be deactivated)	Plug-in screw terminal
Merkur 2 ES.C	Yes (can be deactivated)	RJ connector
Merkur 2	No	Plug-in screw terminal
Merkur 2 C	No	RJ connector

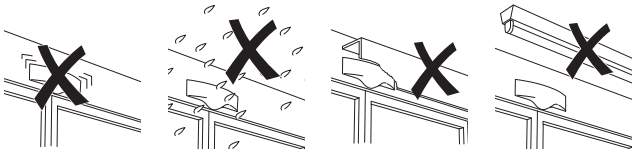


① Cover
② Plug-in screw terminal
③ RJ12 PCB socket
④ Grid for swivelling the radar module
⑤ Grid for tilting the radar module
⑥ Radar double field module
⑦ Green LED
⑧ Red LED
⑨ Recess for fastening the sensor
⑩ Floor plate
⑪ Cable feed-through
⑫ DIP switch (addressing)
⑬ Key [<]
⑭ Key [>]

3 Installation

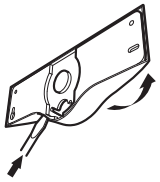
3.1 Installation instructions

– The sensor must be mounted on a flat surface (avoid vibrations)
– The sensor must be protected from rain and snow
– Objects (e.g. plants, flags, fans etc.) must not extend into the detection area
– The sensor must not be obscured by covers/signs
– Fluorescent tubes should not be placed in the immediate vicinity of the detection area

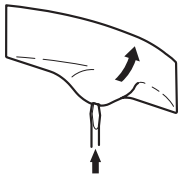


3.2 Opening the housing

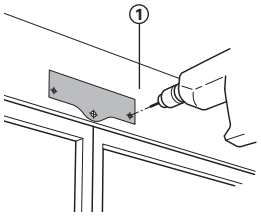
BEFORE installation

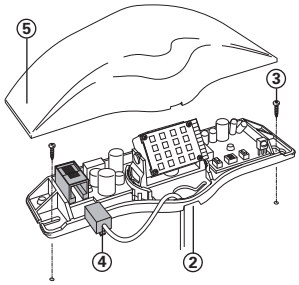


AFTER installation



3.3 Mounting

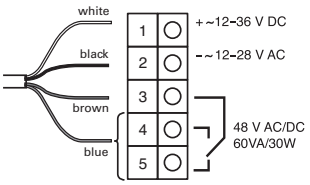




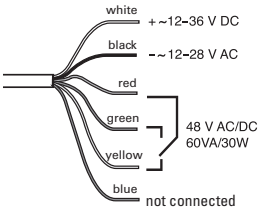
① Affix drilling jig to wall/ceiling and drill holes according to instructions
② Route cable through the appropriate opening in the floor plate – make sure length is sufficient for wiring
③ Fasten sensor
④ Connect cable (according to type plate or chap. 3.4)
⑤ Click cover onto floor plate

3.4 Electrical connections

Merkur with plug-in screw terminal



Merkur with RJ12 PCB socket



4 Displays on the Sensor

Start-up phase

Red LED	Lights up during startup for 3 s
Green LED	Afterwards, the green LED flashes a few times and indicates the software version (the sensor is already functional and programmable)

Configuration

Green LED	– Indicates parameter or parameter level through frequency of flashing (with key configuration) – Flashes briefly: – When key configuration mode is exited – When the sensor has received the command from the remote control

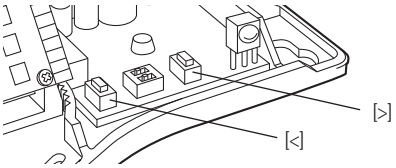
Operation

LED red	Lights up in the event of detection
Green LED	Lights up when SMD is active

5 Sensor Configuration

The sensor can be configured in two ways:
→ With keys on the sensor (basic settings)
→ With the remote control (complete setting options)

5.1 Configuration with keys



General procedure

1) Keep [<] and [>] pressed for a corresponding length of time, every 2 s the green LED will flash once
2) Frequency of the flashing green LED (1–9 times) indicates current parameter level
3) The parameter level can be decreased or increased with [<] and [>] respectively
4) Press [<] and [>] briefly to exit the programming mode (settings are saved)

Changing the field size: Press [<] and [>] for 2 s

Level	1, 2, 3	small
	4, 5, 6*	medium
	7, 8, 9	large

Changing the functionality: Press [<] and [>] for 4 s

for Merkur version with direction recognition

Level	1*	forwards, mounting height standard
	2	forwards, mounting height high
	3	backwards, mounting height standard
	4	backwards, mounting height high
	5	direction recognition OFF, mounting height standard
	6	direction recognition OFF, mounting height high
	7	forwards + MTO, mounting height standard (MTO, see chap. 7)
	8	forwards + MTO, mounting height high (MTO, see chap. 7)

for Merkur version without direction recognition

Level	1*	mounting height standard
	2	mounting height high

Changing the field geometry:Press [<] and [>] for 6 s

Level	1	narrow field
	2*	wide field

Restore factory settings: Press [<] and [>] for 8 s

Example

Changing the functionality from level 6 to level 2:
1) Keep [<] and [>] pressed for 4 s, the green LED blinks once after 2 s, once again after 4 s
2) Green LED flashes 6 times and thereby indicates the current parameter level
3) Press the key [<] four times in a row to decrease the parameter level (green LED flashes twice and indicates the new parameter level)
4) Press [<] and [>] at the same time

Note:
If no key is actuated for 25 s, the programming mode is automatically exited – however the sensor is still in the configuration mode. The settings made up to that point are saved.

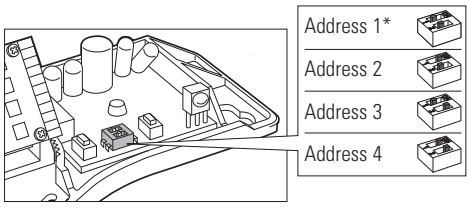
5.1.1 Status query with keys

The status query is to find out what parameters have been set.

Parameter	Step 1	Step 2
Field size	Press [<] briefly	Frequency of the flashing green LED (1-9 times) indicates the current parameter level
Functionality	Press [>] briefly	
Field geometry	Press [<] and [>] briefly at the same time	

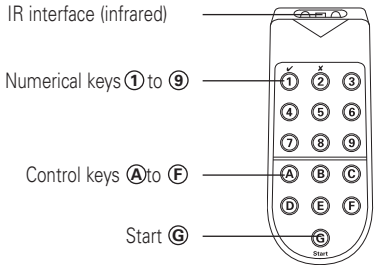
5.2 Configuration with remote control

5.2.1 Sensor addressing



Each sensor can be assigned an address (1*, 2, 3 or 4). Different addresses are necessary when several sensors are within the range of a remote control.

5.2.2 Mode of operation



The data transmission to and from the sensor is ensured by an IR interface. The connection between the remote control and the sensor can only be established when the sensor is in configuration mode.

Configuration mode

Activation: –Automatically after the sensor is connected to the supply voltage *or*
–Briefly disconnect the sensor from the supply voltage *or*
–Press either key [<] or [>] on the sensor

Exiting: –Press key Ⓐ + ③ combination *or*
–Automatically after 30 min.

Establishing the connection

Without addressing:
1. Press the Ⓖ start key

With addressing:
1. Cover the IR interface of the remote control with your hand
2. Press the Ⓖ start key → Ⓖ flashes
3. Release the IR interface (remove hand)
4. Press the corresponding numerical key (① to ④)

– **G and one of the keys 1 to 4 light up:** Connection successfully established
– **G flashes:** Connection not established
→ Activate configuration mode
→ Hold remote control closer to the sensor and point directly at it
→ Check batteries in remote control
– **No keys light up**
→ Check/replace batteries in remote control

Note:
If no entry is made for 30 s, the connection is ended. The settings made up to that point are saved.

5.2.3 Setting / changing parameters

After the connection has been successfully established, the parameters of the sensor can be changed.

Ⓐ + ① Keep the door open manually for 15 min. when making settings. Afterwards, the door will close if no object is in the detection area

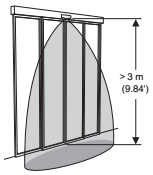
Ⓐ + ② Door closes when no object is in the detection area, afterwards standard operation

Ⓐ + ③ Configuration mode is ended, door closes when no object is in the detection area, afterwards standard operation

* Factory setting

Recommendation: First, select the enhanced function that is closest to the requirements and then change the parameter levels correspondingly.

Enhanced functions

Parameter / Key code		Ⓒ+①* Standard	Ⓒ+② Pavement	Ⓒ+③ Retirement home	Ⓒ+④ Entry hall	Ⓒ+⑤ Supermarket	Ⓒ+⑥ High mounting
							
Direction recognition Ⓑ:	Merkur 2 ES	ON, forwards	ON, forwards	OFF	ON, forwards	ON, forwards	ON, forwards
	Merkur 2	–	–	–	–	–	–
Field size Ⓓ		6	7	6	6	9	9
Relay hold interval	Ⓕ+①	1 s	0.8 s	2 s	0.2 s	1.5 s	1 s
Output signal	Ⓕ+②	Active	Active	Active	Active	Active	Active
SMD function	Ⓕ+③	Off	Off	Decreasing, 2 s	Off	Decreasing, 2 s	Off
Mounting height	Ⓕ+④	Up to 3 m	Up to 3 m	Up to 3 m	Up to 3 m	3–4 m	3–4 m
Cross traffic	Ⓕ+⑤	Low	Medium	Off	Low	Off	Medium
Interference suppression	Ⓕ+⑥	Off	Off	Off	Off	Off	Off
SMD field size	Ⓕ+⑦	1	1	5	1	5	1
Field geometry	Ⓕ+⑧	Wide	Narrow	Wide	Narrow	Wide	Wide

Configuration of individual parameters

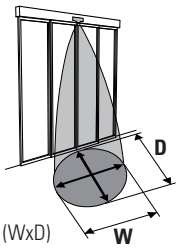
Key code	Parameter	Level	Short description	
Ⓒ	Enhanced functions	1*– 6	Predefined settings for standard applications (see table)	
Ⓑ	Direction recognition (only with Merkur 2 ES)	1 2 3* 4	Off Backwards Forwards Forwards with MTO (see chap. 7)	
Ⓕ+④	Mounting height	1 2*	High (3–4 m) Standard (up to 3 m)	
Ⓕ+⑧	Field geometry	1 2*	Narrow field Wide field	
Ⓓ	Field size	1 – 3 4 – 6* 7 – 9	Small Medium Large	
Ⓕ+①	Relay hold interval	1 2 3	0.2 s 0.5 s 0.8 s	Short
		4* 5 6	1.0 s 1.5 s 2.0 s	Medium
		7 8 9	2.5 s 3.0 s 4.0 s	Long
Ⓕ+②	Output signal	1* 2	Active: The relay picks ups when a detection takes place Passive: The relay drops out when a detection takes place	
Ⓕ+③	SMD function	1*	Off	
		2 3 4 5	0.5 s 1.0 s 1.5 s 2.0 s	Decreasing sensitivity
		6 7 8	0.5 s 1.0 s 1.5 s	Constant sensitivity
		9	2.0 s	(plus SMD+)
Ⓕ+⑦	SMD field size	1*– 3 4 – 6 7 – 9	Small Medium Large	
Ⓕ+⑤	CTM (cross traffic masking)	1 2*– 3 4 – 6 7 – 9	Off Low Medium High	
Ⓕ+⑥	Filter for interference suppression	1 2*	On Off	Prevention of possible spurious tripping by fluorescent tubes.

5.2.4 Explanation of individual parameters

Field size Ⓓ / field geometry Ⓕ+⑧

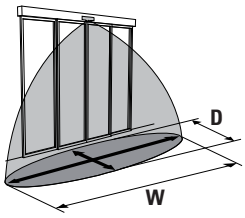
Depending on the field geometry (wide/narrow field), the field size can be set correspondingly.

Narrow field:



Min. 0.7 x 0.6 m (WxD)
Max. 2.7 x 1.9 m (WxD)

Wide field:



Min. 1.1 x 0.6 m (WxD)
Max.4.7 x 1.7 m (WxD)

Specified values measured with mounting height 2.2 m and inclination angle 35°.

SMD function Ⓕ+③ and SMD+

SMD = Slow motion detection: Very small (quasi-static) movements are detected as soon as the sensor is activated. Only when no more movements are registered during the set monitoring period does the sensor relay the corresponding signal to the door controller. The sensitivity during this monitoring period can be set to decreasing or constant.

SMD+: Triggers the sensor when very slow movements occur. In this way, even objects < 5 $\frac{cm}{s}$ (35° inclination angle) that are not detected with the normal detection area are reliably identified (retirement home setting). In order to prevent the door from being kept open too long, the SMD+ field is half as large as the detection area.

SMD field size Ⓕ+⑦

The SMD field sizes approximately correspond to those of the detection area, i.e. Ⓕ+⑦ +⑤ ≈ Ⓓ+⑤

Cross traffic masking CTM Ⓕ+⑤

The CTM prevents a door from being inadvertently opened by peoply who only walk past it but do not want to enter.

Optimum sensor settings:
– Narrow field
– Inclination angle 30°–45°

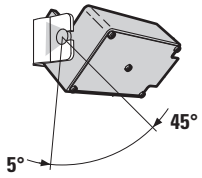
5.2.5 Status query with remote control

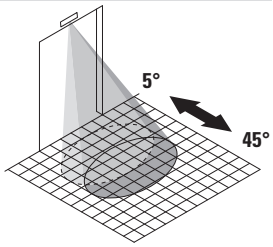
The status query is to find out what parameters have been set. For this to take place, the connection to the sensor has to be established and the corresponding key code has to be entered. Next, a numerical key lights up that indicates the respective parameter level.

* Factory setting

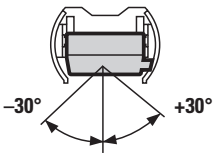
6 Mechanical Settings of the Microwave Field

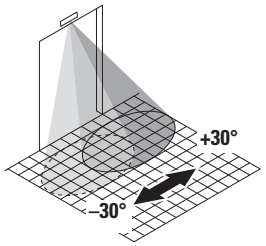
6.1.1 Tilting the microwave module





6.1.2 Swivelling the microwave module





7 Remedying Malfunctions

Symptom	Possible cause	Remedy	Refer to chapter
Door reverses	– Sensor sees door	– Change the inclination angle of the radar module	6.1.1
Door reverses	– Sensor sees swing door	– Install sensor higher and if possible directly above the door hinge	
		– Increase CTM level	5.2.3
		– Swivel the sensor in the direction of the door opening	6.1.1
Door opens inadvertently	– Interference source affects microwave field (e.g. fluorescent tubes)	– Activate the interference suppression filter Ⓕ+⑥+①	5.2.3
Door does not open – sporadic non-detection of an individual	– Large group of persons approaching	– Activate the special filter function MTO Ⓑ+④ (Mass Traffic Optimisation)	5.2.3
		– Decrease the CTM level (switch off)	5.2.3
Late detection or non-detection of persons	– Field too small	– Check field size Ⓓ	5.2.3
	– Installation too high	– Activate high mounting height Ⓕ+④+①	

8 Technical Data

Technology	Microwave motion detector with planar module technology
Transmitting frequency	24.125 GHz
Transmitting power	< 20 dBm
Operating voltage	12–36 V DC / 12–28 V AC, 50 Hz
Operating current	approx. 50 mA at 24 V DC, 24° C
Temperature range	–20° C to + 60° C
Air humidity	max. 90% relative, non-condensing
Mounting height	max. 4 m
Relay output	Potential-free changeover contact
Switching voltage	max. 48 V AC/DC

Switching current	max. 0.5 A AC / max. 1 A DC
Switching capacity	max. 60 VA / max. 30 W
Housing	Cover: PC; floor plate: ABS Dimensions (W x H x D): 176 x 62 x 52 mm
Weight	150 g (without cable)
Protection class (EN 60529)	IP54
Min. detection speed	5 cm/s (in sensor axis) < 5 cm/s with SMD+ (inclination angle 35°)
Cable length	3 m

9 EU Declaration of Conformity

CE See attachment

10 WEEE

Devices with this symbol must be treated separately during disposal. This must be done in accordance with the laws of the respective countries for environmentally sound disposal, processing and recycling of electrical and electronic equipment.

11 FCC approval

This device meets the requirements of Part 15 of the FCC regulations and the RSS-210 standard of Industry Canada.
Warning: Changes or modifications made to this device may void the FCC authorisation to operate this device.

12 Contact

BBC Bircher Smart Access, BBC Bircher AG, Wiesengasse 20, CH-8222 Beringen, www.bircher.com

Designed in Switzerland / Made in Bulgaria