

MANUAL

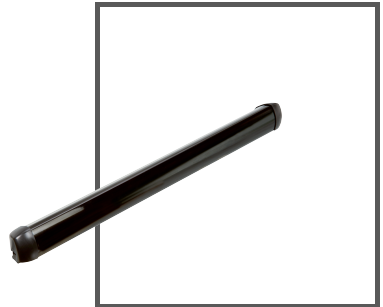
TopScan-S / TopScan-S-T0V1

EN Translation of the original instructions

DE Originalbetriebsanleitung

FR Traduction des instructions originales

IT Traduzione delle istruzioni originali



EN

With regard to the supply of products, the current issue of the following document is applicable: The General Terms of Delivery for Products and Services of the Electrical Industry, published by the Central Association of the Electrical Industry (Zentralverband Elektrotechnik und Elektroindustrie (ZVEI) e.V.) in its most recent version as well as the supplementary clause: "Expanded reservation of proprietorship"

DE

Es gelten die Allgemeinen Lieferbedingungen für Erzeugnisse und Leistungen der Elektroindustrie, herausgegeben vom Zentralverband Elektroindustrie (ZVEI) e.V. in ihrer neusten Fassung sowie die Ergänzungsklausel: "Erweiterter Eigentumsvorbehalt".

FR

Les conditions de vente générales pour les produits et les services de l'industrie des équipements électriques publiées par la Fédération de l'industrie électronique (ZVEI) s'appliquent dans leur toute dernière version, tout comme la clause complémentaire "Réserve de propriété élargie".

IT

Valgono le condizioni generali di fornitura dei prodotti e delle prestazioni dell'industria elettronica ed elettrotecnica, pubblicate nella versione più attuale dall'associazione centrale dell'industria elettronica ed elettrotecnica tedesca (ZVEI - Zentralverband Elektroindustrie e.V.), nonché la clausola integrativa: "Riserva di proprietà omnibus".

1	Introduction.....	4
2	Safety	5
2.1	Safety-Relevant Symbols	5
2.2	Intended Use	5
2.3	Operation, Maintenance, Repair	5
2.4	Delivery, Transport and Storage	5
3	Product Description	6
3.1	Active Infrared Scanner.....	6
3.2	Indicators and Operating Controls	6
3.3	Connections.....	7
3.4	Included in Delivery.....	7
4	Installation.....	8
4.1	Unpacking.....	8
4.2	Mounting the Aluminum Profile	8
4.3	Mounting the Module	8
5	Commissioning.....	10
5.1	Setting the Leading Edge Monitoring Beam.....	10
5.2	Master/Slave Extension of the Detection Area	11
5.3	Test—Pulse Diagram of the Time Sequence.....	12
5.4	Connection to the Door Controller.....	13
6	Settings	14
6.1	Optical Adjustment of the Sensor.....	14
7	Troubleshooting.....	17
7.1	Troubleshooting	17
8	Appendix	18
8.1	Technical Data	18
8.2	EC Declaration of Conformity	20

Introduction

Informative Symbols



Note!

This symbol brings important information to your attention.



Action

This symbol indicates a paragraph with instructions.

Contact

If you have any questions about the device, its functions, or accessories, please contact us at:

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68307 Mannheim
Telephone: +49 621 776-4411
Fax: +49 621 776-274411
E-Mail: fa-info@pepperl-fuchs.com

Device Version

This manual applies to device version V.01

2 Safety

2.1 Safety-Relevant Symbols



Danger!

This symbol indicates an imminent danger.
Non-observance will result in personal injury or death.



Warning!

This symbol indicates a possible fault or danger.
Non-observance may cause personal injury or serious property damage.



Caution!

This symbol indicates a possible fault.
Non-observance could interrupt devices and any connected facilities or systems, or result in their complete failure.

Standards



This symbol draws the user's attention to DIN 18650/EN 16005.
All points described there are required to comply with DIN 18650/EN 16005.

2.2 Intended Use

The TopScan-S is an active infrared triangulation sensor. The TopScan-S is designed for mounting on a swinging door panel.



The TopScan-S is intended for providing protection for automatic revolving doors according to DIN 18650/EN 16005. When used as intended, the sensor should only be able to influence the movement of the door via the door controller rather than directly, as the combination of a safe door controller and a sensor is a prerequisite for the system to be considered a protective device according to EN ISO 13849-1, Performance Level "c" Category 2.

Always operate the device as described in these instructions to ensure that the device and connected systems function correctly. The protection of operating personnel and plant is only guaranteed if the device is operated in accordance with its intended use.

2.3 Operation, Maintenance, Repair

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismounting lies with the system operator.

Mounting, installation, commissioning, operation, maintenance and disassembly of any devices may only be carried out by trained, qualified personnel. The instruction manual must be read and understood.

Only use accessories specified by the manufacturer.

The devices must not be repaired, changed or manipulated.

If there is a defect, the product must be returned to the manufacturer Pepperl+Fuchs.

2.4 Delivery, Transport and Storage

Check the packaging and contents for damage.

Check if you have received every item and if the items received are the ones you ordered.

Keep the original packaging. Always store and transport the device in the original packaging.

Always store the device in a clean and dry environment. The permitted storage temperature (see data sheet) must be considered.

3 Product Description

3.1 Active Infrared Scanner

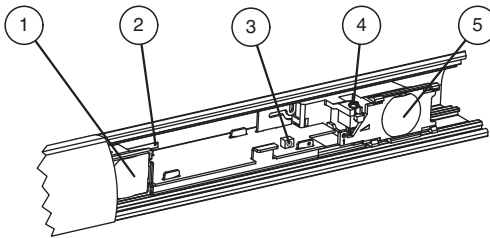
Functional Principle

Objects that enter the sensor's protection area are detected by infrared beams and cause the relay contact output to become disabled. The light spot created on the floor by the infrared beam measures approx. 1.1 cm x 8.3 cm (at an installation height of approx. 2 m). The two lens systems can be adjusted to change the angle. This allows a detection range (detection height of objects) of up to 2.5 m to be set.

The sensor is set to the maximum detection range by default and is equipped with an optical adjustment accessory. The sensor generally reacts to objects in the detection range irrespective of their surface color and structure. Even reflective and extremely dark objects are detected.

Multiple sensors can be operated in a master/slave combination to adapt the protection field to the appropriate requirements. See chapter 5.2. A 6-pin screw terminal is used to connect the master module with the door controller. The slave modules are connected to the master module by ribbon cables, and are powered via the master module. The master module and slave module are located in the same aluminum profile.

3.2 Indicators and Operating Controls



No.	Designation	Color	Description
1	Emitter		Emitter beam exit opening
2	Left/right adjuster switch		Setting the monitoring beam on the leading edge
3	Function indicator	Red/green	LED red: Object detected LED green: Clear protection field and sensor sees the ground
4	Detection range adjustment		Setting the detection range
5	Receiver		Receiver beam entry opening

Table 3.1 Indicators and Operating Controls

3.3 Connections

The following device connections are found on all sensors:

Power Supply, Test Input, and Relay Output

Inside the housing, there is a 6-pin terminal for connecting the power supply, a test input, and the relay output. The following diagram shows the pinning:

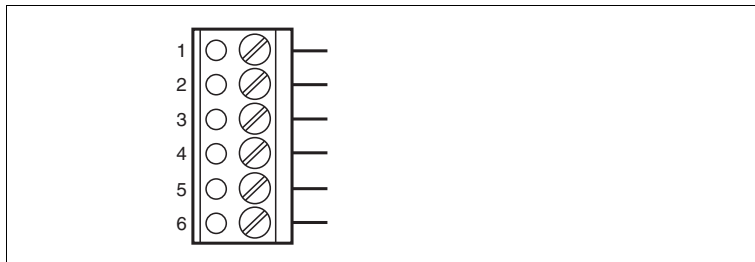


Figure 3.1 Power supply, test input, and relay output connection layout

- 1 Ground (GND)
- 2 24 V power supply
- 3 Center contact relay
- 4 NC contact relay
- 5 NO contact relay
- 6 Test input

Information about the test input and relay circuitry can be found in the technical data. See chapter 8.1.

3.4 Included in Delivery

The delivery package contains:

- TopScan-S
- Operating instructions
- Declaration of Conformity

4

Installation

4.1

Unpacking

Check the product for damage while unpacking. In the event of damage to the product, inform the post office or parcel service and notify the supplier.

Retain the original packaging in case the device must be stored or shipped again at a later date.

Should you have any questions, please direct them to Pepperl+Fuchs.

4.2

Mounting the Aluminum Profile

1. Place the module brackets in the aluminum profile and position the module brackets at the points where the modules will be fitted later.
2. Drill the mounting holes centrally between the module brackets (the gray areas in the illustration). Make sure that no chips remain in the aluminum profile. Seal the boreholes when mounting so that dripping water cannot penetrate. Mechanical details to make screw positioning easier:

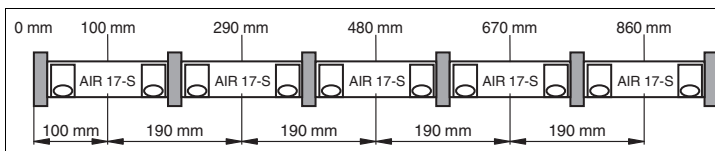


Figure 4.1 Mounting the aluminum section

3. To mount the aluminum profile, use flat head screws only and mount the aluminum profile at the intended mounting height (maximum 2.5 m).



Note!

Saw Recommendation for Aluminum and Plastic Profiles

For both profiles, use a miter box saw with a hacksaw blade. Make sure that the plastic profile rests with the convex side facing outward. Saw carefully at a low feed rate (risk of breakage). The aluminum profile is noncritical during processing.

4.3

Mounting the Module

1. Set the emitters of the modules identically on all modules to be used. -> Always push the emitter adjustment toward the door hinge side (the door hinge side is opposite the leading edge) → see Figure 5.1 on page 10.

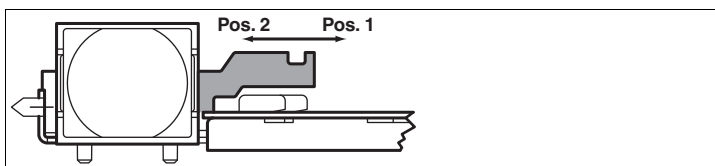


Figure 4.2 Setting the monitoring beam to the leading edge

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2. Connect all required ribbon cables to the modules before mounting the modules. -> For the master module, use the long ribbon cable (24 cm), and for the slave module, use the short ribbon cable (20 cm).
3. Make sure that the master module is always on the door hinge side.
4. Connect the screw terminal on the master module to the adapter cable of the door controller.
5. Click the module bracket into the aluminum profile from the front.
6. Place the modules between the module brackets. Then tighten the M2.5 screw **1** to the module bracket.

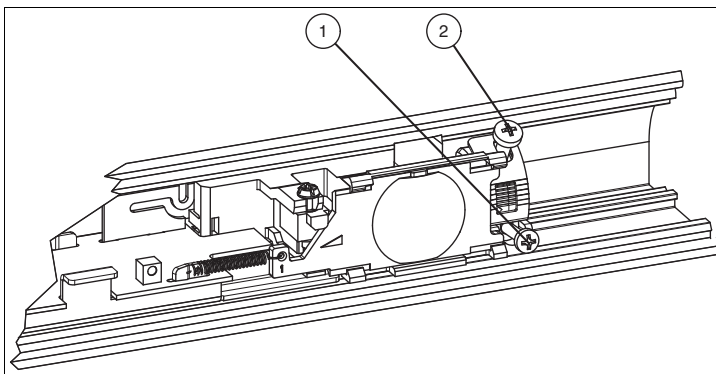


Figure 4.3 Module holder

7. On the last module (last slave module or master module if individual device), use pliers to cut the configuration bridge out of the PCB see chapter 5.2.
8. Set the inclination angle and the detection range see chapter 6.1, and then tighten the upper M3 fastening screw to the module bracket **2**.
9. Position the housing cover on top.
10. Screw the end covers onto both sides of the aluminum profile.
11. Check the detection range for each beam.

↳ The module is now mounted.



Note!

Adapter Cable and IP54 Protection Class

The adapter cable to the door controller can be introduced through the side of the end cover using a cable bushing. The TopScan-S profile can be sealed to IP54 standard using the optional profile seal.

5

Commissioning

5.1

Setting the Leading Edge Monitoring Beam

1. Set the emitter beam or receiver beam vertically to ensure optimal coverage of the leading edge.

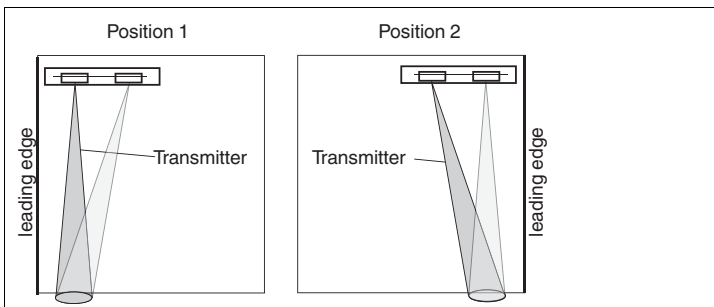


Figure 5.1 Explanation of the monitoring beam setting on the leading edge

2. Use the two grid positions on the emitter to set a monitoring edge flush with the left or right.

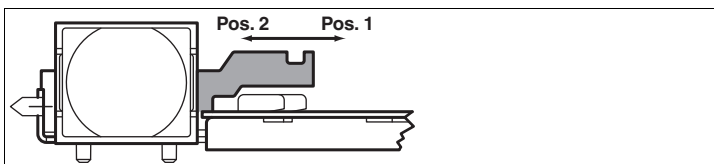


Figure 5.2 Setting the monitoring beam to the leading edge

↳ The monitoring edge is now set.

In the default settings, all the emitter modules are preset to position 1 and the detection range is set to the maximum. Position 1 means that the emitter sits straight and the leading edge is on the left. If using several slave modules, ensure that the emitters are all set the same (same emitter grid position)! The master module must have the same emitter settings.

5.2

Master/Slave Extension of the Detection Area

Difference between Master and Slave Modules

In addition to one master module, it is possible to install up to seven more slave modules. The difference between the master module and the slave module is the number of connectors and the presence of a relay.

Master module	with relay; 6-pin connector; one red socket
Slave module	no relay; no 6-pin connector; two red sockets

Mounting the Modules

When mounting the master module and the slave modules, make sure the chassis plate locks neatly into the module bracket. The chassis plate must lock into the module bracket as follows

- Make sure that the module bracket's stem locks neatly into the borehole of the chassis
- The chassis clip must be visible in the middle of the module bracket
- Connect only the master module to the door controller using the 6-pin screw terminal
- Connect the slave modules with the 20 cm ribbon cables provided
- The master module is connected to the next slave module via the longer 24 cm ribbon cable

Removing the Configuration Bridge

Make sure you disconnect the configuration bridge ② on the PCB on the last sensor module (slave). The bridge must still be disconnected if you are using a master as an individual device only, otherwise the device will not work. Disconnect the bridge only when the module is de-energized. Before carrying out this step, ground yourself on the chassis lever ①.

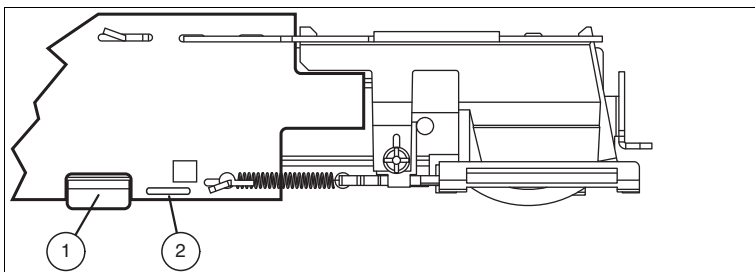


Figure 5.3 Configuration bridge

5.3 Test—Pulse Diagram of the Time Sequence



The following test must be carried out via the door controller only when operating as a safety sensor according to DIN 18650/EN 16005.

If you use the TopScan-S as a protective device, the device must be tested at regular intervals by the door controller. Perform the test only if no object is detected. We recommend performing the test while the door is fully open. Connect the door controller test signal to the master module via the 6-pin screw terminal (pin 6).

Test Sequence

- | | |
|------------|--|
| Time t_0 | The door controller activates the test request. |
| Time t_1 | After the response time of max. 70 ms, the sensor must move to detection mode. |
| Time t_2 | After 200 ms, the sensor must still be in detection mode. After this point, the test request from the door controller can be canceled. |

This action ends the test and the sensor is available again after about 70 ms.

On TopScan-S-T0V1-MS sensors, the test input is active at $U = 0$ VDC.

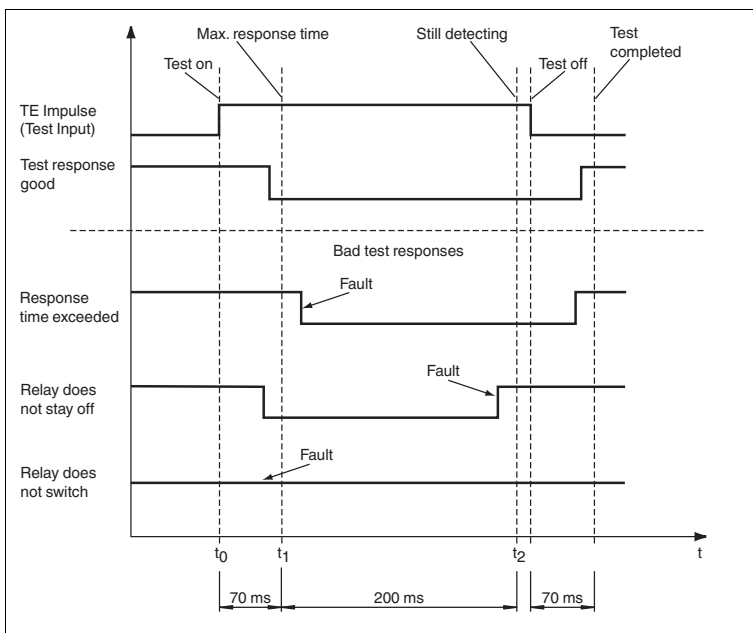


Figure 5.4 Pulse diagram of the time sequence

The door controller must query the sensor at times t_1 and t_2 . The interior and exterior sides of the door must be switched on and off alternately (muting) -> and/or removed from the evaluation by the door controller.

TopScan-S-M

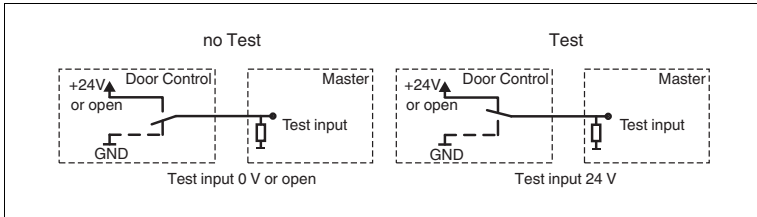


Figure 5.5 Electrical Test Input Circuitry

TopScan-S-T0V1-M

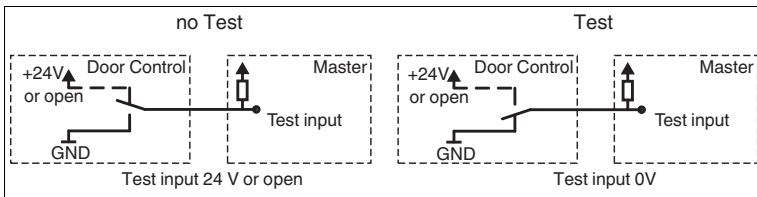


Figure 5.6 Electrical Test Input Circuitry

If the device is not used as a safety sensor in accordance with DIN 18650/EN 16005, there is no need to connect the test input.

5.4

Connection to the Door Controller

The interior and exterior sides of the door must be switched on and off alternately (muting) -> and/or removed from the evaluation by the door controller. If the device is not used as a safety sensor in accordance with DIN 18650/EN 16005, there is no need to connect the test input.



Note!

Special Cable Connectors

If the modules on the interior and exterior sides of the door are supplied simultaneously via a door adapter cable, special connectors (e.g., 3M Scotchlok UB2 single-strand connector) are recommended which allow another cable to be crimped onto the supply cable.

6

Settings

6.1

Optical Adjustment of the Sensor

Setting the Inclination Angle

The adjustment of the inclination angle according to DIN 18650/EN 16005 can be found below in the table.

You can adjust the inclination angle to swivel the detection area away from or toward the door. The inclination angle can be varied to any position from 0° to +25°. Use the handle on the chassis plate to adjust the inclination angle (1). Use

the M3 screw on the top of the module bracket to fix the inclination angle (2). → see Figure 6.1 on page 14.

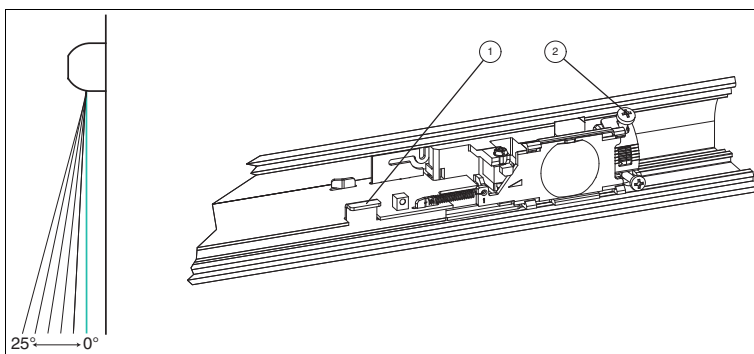


Figure 6.1 Setting the detection angle

Setting the Detection Range

The adjustment of the detection range according to DIN 18650/EN 16005 can be found below in the table.

Adjust the detection range using the detection range screw (2). The detection range can be adjusted by turning the detection range screw (2) using a screwdriver, thereby moving the receiver lens. An optical adjustment accessory (green/red LED (1)) aids precise adjustment of the detection range above the ground → see Figure 6.2 on page 15.

If the sensor is not used for protection according to DIN 18650, a higher setting (but not above 80 cm) is possible.

LED Display

LED Color	Description
Red	Object detected
Green	Clear protection field and sensor sees the ground

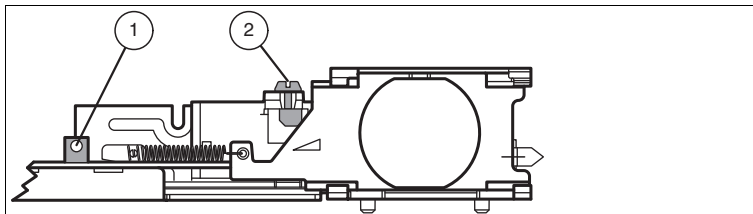


Figure 6.2 Adjustment of the sensing range

Setting the Inclination Angle According to DIN 18650/EN 16005



Use the optional adjustment accessory (test card + test body) to aid adjustment.

Sensor Inclination Angle

1. Place the test card on the ground with the mark parallel to the door
2. Place the door side of the test body on the mark
3. The sensor looks down vertically
4. Swivel the sensor forward using the chassis lever until it detects the 20 cm high test body (LED = red)
5. Slowly continue to swivel the sensor forward until it just sees the ground again (LED changes from red to green)
6. Now fasten the module to the module bracket using the M3 screw. The inclination angle is now set
7. The adjustment is complete
8. Check the detection range setting again using the test card

Table 6.1 Setting the inclination angle according to DIN 18650/EN 16005

Setting the Detection Range According to DIN 18650/EN 16005



Use the optional adjustment accessory (test card + test body) to aid adjustment.

Sensor Detection Range Setting

9. Using the chassis lever, set the module on the first line of the mark on the module bracket, and fasten it with the M3 screw
10. Turn the detection range screw counter-clockwise until the overwind protection is heard (slight "click"). You have now set the maximum detection range
11. Take the test card and position it on the test body so that it is 12.5 cm above the ground
12. Turn the detection range screw clockwise until the LED indicator changes from red to green (if necessary, turn back to red and then turn clockwise until it just turns green)
13. The detection range adjustment is complete

Table 6.2 Setting the detection range according to DIN 18650/EN 16005



Increasing/Reducing the Detection Area

Note!

The following sensor characteristics do not comply with the safety regulations outlined in the EC Declaration of Conformity:

- The distance from the modules to the leading edge is more than 10 cm
- Gaps are left between the modules
- The right/left adjustment of the modules is not aligned to the leading edge
- The modules are set to a detection height of more than 20 cm above the ground

Depending on requirements and the door width, a master module can be extended with up to seven slave modules. We recommend that the straight emitter/receiver beam of the relevant sensor module be mounted no more than 10 cm from the leading edge. Mounting information for different door widths can be found in the following illustration → see Figure 6.3 on page 16.

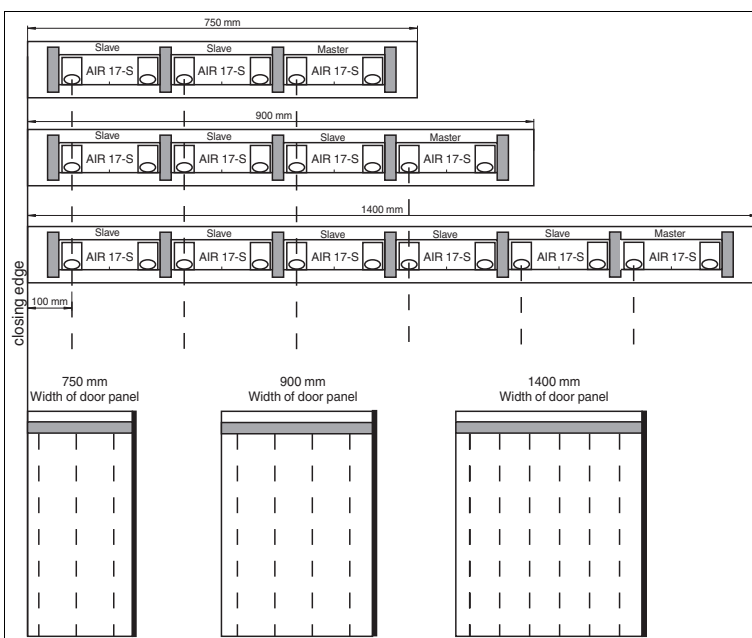


Figure 6.3 Detection area

The wider the door, the more slave modules are required.

7 Troubleshooting

7.1 Troubleshooting

Before requesting a service call, please check that the following actions have been taken:

- Equipment has been tested according to the following checklists,
- Telephone assistance has been obtained from the Service Center in order to isolate the problem.

Interference

- The sensor must be firmly mounted. It must not vibrate.
- The sensor must not be installed behind a cover.
- The sensor should be installed so it is protected from rain.

Fault Analysis

Source of Fault	Cause	Action
The sensor does not initialize or does not respond	Incorrect power supply	Check the power supply
Door opens and closes at regular intervals	The sensor is disturbed by the movement of the door The doors are detected by the sensor The door movement causes vibrations	Adjust the detection field angle Check the sensor mounting
Door opens and closes sporadically	There are objects in the detection area moving in the air flow	Remove the objects
Test body is not detected	Detection range is set incorrectly Inclination angle is set incorrectly	Check detection range with test body Set the inclination angle again

- If none of the above corrects the problem, please contact the Service Center.

8

Appendix

8.1

Technical Data

General Data

Detection range min.	0 mm ... 1500 mm
Detection range max.	0 mm ... 2500 mm
Reference object	Minimum degree of reflection of the floor: 6 % Minimum degree of reflection to objects being detected: 0 %
Light source	IRE D
Light type	Infrared, modulated light, 875 nm
Black-white difference (6 %/90 %)	< 2 % at 2000 mm detection range
Number of beams	1 (number of installed AIR sensor modules)
Operating mode	Background evaluation
Diameter of the light spot	1.1 cm x 8.3 cm at 2000 mm detection range
Resolution	Reference object CA DIN 186850-1/EN 16005 in all applicable locations

Indicators/Operating Controls

Safety integrity level (SIL)	SIL 1
Performance level (PL)	PL c
Category	Cat. 2
MTTF _d	880 a per module
Life time (T _M)	20 a
Diagnostic coverage (DC)	90 %

Indicators/Operating Controls

Function indicator	Red/green LED
Operating controls	Detection range adjuster; adjuster for edge monitoring left/right

Electrical Data

Operating voltage	24 VDC +/- 20 %
No-load current	75 mA

Input

Test input (TopScan-S-M)	Active at U = 11 VDC to 30 VDC; inactive at U = -3 VDC to 5 VDC
Test input (TopScan-S-T0V1)	Active at U = -3 VDC to +1 VDC; inactive at U = +4 VDC to 30 VDC

Output

Switching mode	Relay de-energized due to object within detection range
Signal output	Relay, 1 change-over contact
Switching voltage	5 VAC/VDC ... 30 VAC/VDC
Switching current	Max. 300 mA
Response time	≤ 70 ms

272349 2014-10

Conformity with Standards and Directives

Directive conformity	
Machinery Directive 2006/42/EC	EN 12978:2003 + A1:2009 EN ISO 13849-1:2008 + AC:2009 EN 16005:2012 Chapter 4.6.8
EMC Directive 2004/108/EC	EN 61000-6-2:2005; EN 61000-6-3:2007
Conformity with standards	
Standards	EN 61508-1:2010 DIN 18650-1:2010 Chapter 5.7.4 EN 62471:2009-03

Approvals and Certificates

CCC approval	Products with a maximum operating voltage of ≤ 36 V are not subject to approval and are therefore not assigned a CCC mark.
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Ambient Conditions

Ambient temperature	-10 °C ... 50 °C (14 °F ... 122 °F)
Relative humidity	Air humidity at 20 °C: < 90 % Air humidity at 60 °C: < 50 %

Mechanical Data

Housing length L	Min. 310 mm
Installation height	Max. 2500 mm
Protection class	IP52, IP54 optionally (with special seal)
Connection	Screw terminals; cable cross section 0.3 mm ... 1.3 mm ² (AWG26-16), single-stranded/multistranded CU
Material	
Housing	Aluminum/ABS
Optical face	PMMA
Cable length	Max. 30 m
Note	Device circuit breaker ≤ 1 A (inert) in accordance with IEC 60127-2 Sheet 1 Recommendation: Check device is working after a short circuit.

8.2

EC Declaration of Conformity

The original can be found on the Internet at www.pepperl-fuchs.com for the relevant product.

EU-Declaration of conformity

EU-Konformitätserklärung

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Fax +49 621 776-1000

No. / Nr.: DOC-01188
Date / Datum: 2014-10-09

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www.pepperl-fuchs.com



Declaration of conformity / Konformitätserklärung

We, Pepperl+Fuchs GmbH declare under our sole responsibility that the products listed below are in conformity with the listed European Directives and standards.

Die Pepperl+Fuchs GmbH erklärt hiermit in alleiniger Verantwortung, dass die unten gelisteten Produkte den genannten Europäischen Richtlinien und Normen entsprechen.

Productfamily / Produktfamilie

Product family / Produktfamilie	Description / Beschreibung
TopScan-S-MSSL1400	Triangulation sensor for presence detection at swing doors: Triangulationsensor zur Anwesenheitserkennung an Drehtüren
TopScan-S-M/L310	See TopScan-S-MSSL1400
TopScan-S-M3S/L900	See TopScan-S-MSSL1400
TopScan-S-M2S/L750	See TopScan-S-MSSL1400
TopScan-S-MS/L750	See TopScan-S-MSSL1400
TopScan-S-MS/L900	See TopScan-S-MSSL1400
TopScan-S-M/L900	See TopScan-S-MSSL1400
TopScan-S-M2S/L900	See TopScan-S-MSSL1400
TopScan-S-M/L750	See TopScan-S-MSSL1400
TopScan-S-MS/L1400	See TopScan-S-MSSL1400
TopScan-S-T0V1-M/L310	See TopScan-S-MSSL1400
TopScan-S-T0V1-MS/L750	See TopScan-S-MSSL1400
TopScan-S-T0V1-M/L900	See TopScan-S-MSSL1400
TopScan-S-T0V1-MS/L900	See TopScan-S-MSSL1400

en/de

Directives and Standards / Richtlinien und Normen

EU-Directive EU-Richtlinie	Standards Normen
2004/108/EC (EMC)	EN 61000-6-3:2007 EN 61000-6-2:2005
2006/42/EC (MD)	EN 12978:2003+A1:2009 EN ISO 13849-1:2008 EN ISO 13849-1:2008/AC:2009 EN 16005:2012 Chapter 4.6.8

Supplemental Standards Sonstige Normen	Remarks Bemerkungen
DIN 18650-1:2005	-

Affixed CE Marking / Angebrachte CE-Kennzeichnung



Signatures / Unterschriften

Berlin, 09 October 2014

Prof. Dr. Frank Weber
Factory Automation –
Director Business Unit Opto

Dr. V. Hagen Kuhnhardt
I.V. Hagen Kuhnhardt
Factory Automation –
Standards Expert Business Unit
Opto

ANNEX 2006/42/EC (MD)

Authorised to compile the technical file

Bevollmächtigt zur Zusammenstellung der technischen Unterlagen

Pepperl+Fuchs GmbH
Lilienthalstraße 200
68307 Mannheim
Germany

The EC-Type-Examination and the marking of the equipment was performed in accordance with the following standards:

Die EG-Baumusterprüfung und die Kennzeichnung des Betriebsmittels wurden nach den folgenden Normen durchgeführt:

EN 12978:2003+A1:2009
DIN 18650-1:2010 Chapter 5.7.4
EN ISO 13849-1:2008
EN 16005:2012 Chapter 4.6.8

Certificates / Zertifikate

Products / Produkte	ELWMS
Serial number Seriennummer	Certificate Zertifikat
not applicable / nicht anwendbar	4420513095705
	0044

Key for Issuer ID / Schlüssel zur Aussteller ID

ID	Aussteller
0044	TUV NORD CERT GmbH & Co. KG Langemannstraße 20, 45141 Essen

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