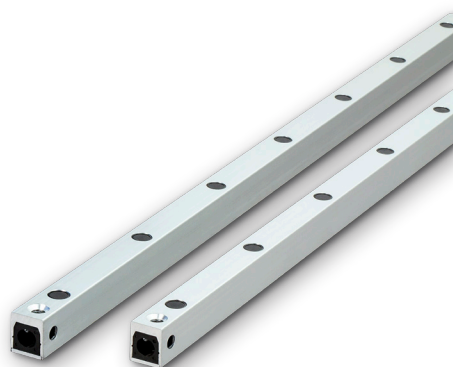


Micro MF UL version

Installation and Operation Manual



CEDES AG is certified according to ISO 9001: 2015

English

Pages

2 – 8

Original version

1. Safety information

IMPORTANT!
READ BEFORE INSTALLATION!

The Micro MF was developed and manufactured using state-of-the-art systems and technologies. However, injury and damage to the sensor can still occur.

To ensure safe conditions:

- ▶ Read all enclosed instructions and information.
- ▶ Follow the instructions given in this manual carefully.
- ▶ Observe all warnings included in the documentation and attached to the sensor.
- ▶ Do not use the sensor if it is damaged in any way.
- ▶ Keep the instruction manual on site.

Failure to do so may cause customer complaints or serious call backs. When the Micro MF light curtain is used as a replacement for mechanical safety edges, it is the responsibility of the installer to ensure that on completion, the installation complies with all the relevant local, state, regional and national Standards and Regulations that pertain to the use of optical devices in your application.

This light curtain system must be installed by authorized and fully trained personnel only. Follow all necessary safety precautions during the installation process, including taking the elevator or door out of service during installation. It is important to note that objects thinner than the beam spacing may not be detected.

1.1 Non-intended use

The Micro MF **must not be** used for:

- Protection of dangerous machines
- Equipment in explosive atmospheres
- Equipment in radioactive environments



Use only specific and approved safety devices for such applications, otherwise serious injury or death or damage to property may occur!

2. Symbols, safety messages

Symbol	Meaning
▶	Single instruction or measures in no particular order
1. 2. 3.	Sequenced instructions
•	List, in no order of importance
→	Reference to a chapter, illustration or table within this document
Important	Important information for the correct use of the sensor

2.1 Safety messages categories

Warning of serious health risks

WARNING
Serious health risks

Highlights critical information for the safe use of the sensor. Disregarding these warnings can result in serious injury or death.

- ▶ Follow the measures highlighted by the triangle-shaped arrows
- ▶ Consult the safety information in Chapter 2 of this manual

Caution of possible health risk

CAUTION
Possible health risks

Highlights critical information for the safe use of the sensor. Disregarding these warnings can result in injury.

- ▶ Follow the measures highlighted by the triangle-shaped arrows
- ▶ Consult the safety information in Chapter 2 of this manual

Notice of damage risk

NOTICE
Risk of damage

Disregarding these notices can lead to damage to the sensor, the door controller and/or other devices.

- ▶ Follow the measures highlighted by the triangle-shaped arrows

3. Introduction

The Micro MF light curtain is designed to monitor the opening in doors and provide UL325 protection. It does not require an external control box because all control circuits, electronics and optics are fully integrated into the emitter and receiver edges. The compact and robust design of the Micro MF - with a cross section of only 12 x 16 mm - makes it easy to integrate into a variety of doors applications.

3.1 Functional description

The infrared light curtain Micro MF consists of emitter (Tx) and receiver (Rx) edges, both of which have a built-in controller. The Micro MF system utilizes optical synchronization and no electrical connection is required between the emitter and receiver edges.

When mounted, aligned and powered, a detection area that consists of multiple straight and criss-cross beams is created between the emitter and receiver edges. The emitter and receiver must be mounted so that they directly face each another.

The number of beams is model dependent. By using a criss-cross beam concept, the total number of beams is generally higher than the number of elements used.

The Micro MF offers an 2-wire monitored light curtain. It is certified according to UL325 and can be used as primary safety device.

3.2 Features of the Micro MF

- UL325 certified device
- 2-wire monitored output
- For all kinds of industrial doors applications
- Simple and quick to install thanks to the universal mounting kit
- Plug-and-play system
- Optical synchronization between emitter and receiver
- LED indicator integrated in the edge
- High EMC immunity
- Criss-cross beams

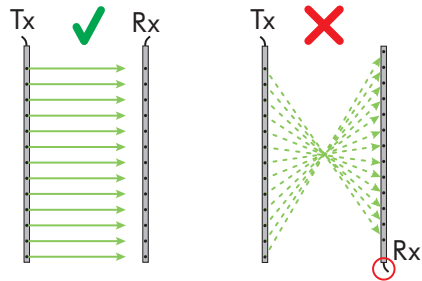
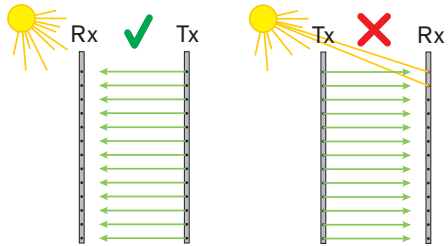
4. Installation

4.1 General instructions and precautions



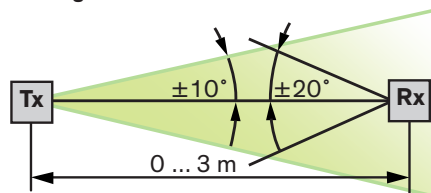
- ▶ Never scratch or paint the optical lenses because they form the light path! Do not drill additional holes into the profile. Unpack the profiles just before installation in order to avoid damage.
- ▶ Do not bend or twist the edges!

- ▶ Oil can damage the cables. Contamination must be avoided at all times!
- ▶ Chemicals can damage the profile and optical characteristics. Contact must be avoided at all times!



- ▶ Although the Micro MF is insensitive to direct sunlight, avoid all unnecessary exposure if possible, most especially to the receiver.
- ▶ Avoid interference from blinking lights or infrared light sources such as photo cells or other light curtains.
- ▶ Do not install the Micro MF in places where the emitter and receiver edges are directly exposed to light sources such as FL tubes or energy saving lamps.
- ▶ Make sure to place the connection plugs for both the emitter and receiver at the same end.

4.2 Alignment



- ▶ The surface with the opto elements of the emitter (Tx) and the receiver (Rx) should point to each other face-to-face!
- ▶ Align the optical axis of the emitter (Tx) and the receiver (Rx) as close as possible in order to achieve best performance (Tx $\pm 10^\circ$ and Rx $\pm 20^\circ$ at 3 m distance)!



Reflective surfaces near to or parallel to the safeguarded area can cause reflections and interfere with the Micro MF's functions. Keep a reasonable distance between the sensor edges and any reflective surface.

4.3 Mechanical installation

The installation should be done in the following sequence:

1. Switch off main power and mark clearly that the system is out of service.
2. Mount the emitter and the receiver.
The emitter and the receiver edge can be mounted either onto the door wings, or onto one door wing and the slam post.

The black 'optical elements' in the aluminum profile of the emitter have to 'look at' the corresponding elements in the receiver.

NOTICE

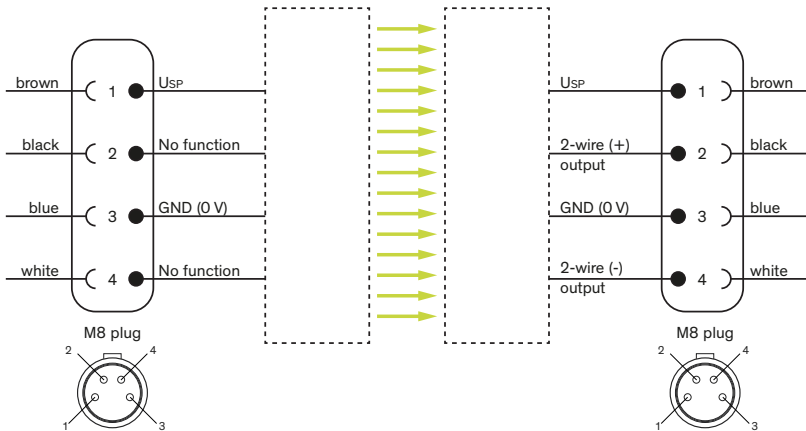
Please note that objects smaller than the sensor grid may not be detected! Make sure that the number of elements in the Micro MF system corresponds to the requirements of your application.

3. Guide the cables properly to prevent damage
Fix the cables properly using appropriate mounting material, e.g. cable protection tubes, neoprene cable ties, cable guide wires. If the cables are not properly fixed and guided, their lifetime could be reduced drastically.

5. Electrical connection

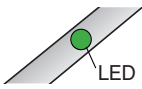
5.1 Installing emitter and receiver cable

- ▶ Make sure that the power supply voltage available for the Micro MF is between 18 and 30 VAC/DC. The power supply has to provide at least 100 mA for proper operation.
- ▶ The Micro MF meets all standards for resistance to electromagnetic interference (EMI). However, it is prudent to guard against interference.
- ▶ Therefore, do not attach Micro MF connection cables close to cables carrying high voltage and/or high current. The Micro MF cables should also be mounted as far away as possible from the door drive motor or motor inverter (VVVF-drives) to avoid EMI problems.



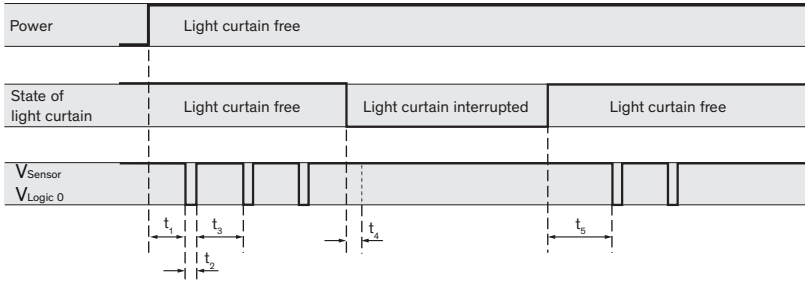
5.2 Power-up and test for correct function

After mounting and wiring the Micro MF, apply power to the Micro MF. The emitter (Tx) and receiver (Rx) edges each have one LED indicator that provides status information according to the table on the next page:



Edge	LED color	LED ON	LED OFF	LED BLINKING
Rx	Green	System free / no object detected	No Power	System interrupted / object detected
Tx	Orange	Power OK	No Power	

5.3 Timing



Value	Typ.
Power-up time t_1	500 ms
Pulse width t_2	500 μ s
Pulse rate t_3	3.07 ms (325 Hz)
Response time t_4	Max. 100 ms
Release time t_5	Max. 100 ms

6. Troubleshooting

Fault / Problem	Action
Emitter LED indicator (orange) is not illuminated	<ul style="list-style-type: none"> ▶ Make sure power is connected to the emitter edge (18 to 30 VAC/DC).
Receiver LED indicator (green) is not illuminated	<ul style="list-style-type: none"> ▶ Make sure power is connected to the receiver edge (18 to 30 VAC/DC). ▶ Make sure that the emitter and receiver edges are aligned. ▶ Ensure that the optical elements of the emitter and receiver face one another. ▶ Check to make sure that the protective field is clear of obstruction.
Receiver output is not stable	<ul style="list-style-type: none"> ▶ Make sure that the receiver cable and edge are located away from sources of electromagnetic interference (EMI) e.g. door inverters and door drives. ▶ Filter potential noise sources with external relay module or power line converter. ▶ Move the receiver cable away from sources of electrical noise. ▶ Ensure that there are no objects that enter the area between the emitter and receiver when the door operates. ▶ Ensure that the emitter and receiver are correctly aligned and remain in alignment during door closure (e.g. that vibrations do not cause edges to become misaligned). ▶ Ensure that the optical elements are free of dust or dirt. If necessary, clean using a soft cloth.

If a problem persists, please contact your local CEDES representative. Visit www.cedes.com for contact data.

7. Maintenance

The Micro MF is designed for maintenance free operation. Periodically, the Micro MF system should be checked to ensure that:

- The optical sensor elements are clear of dirt and dust. If necessary, clean the front surface with a soft towel.
- The edges continue to be fastened securely to the door wings or other mounting surfaces.
- The cables are fixed properly e.g. in accordance with mounting kit instructions.

NOTICE

Damage to the optical elements

- ▶ Do not use any aggressive cleaning solvents like acetone or trichloride or mechanically abrasive towels to clean the vision shields, the receiver edge (Rx) or the emitter edge (Tx) as these will likely cause damage.
- ▶ Never use high-pressure water to clean the edges.
- ▶ Do not scratch the surface when cleaning the edges.
- ▶ We strongly recommend using standard window cleaners or soap and water for cleaning.
- ▶ Failure to follow these important notices may result in damage to your Micro MF system, potentially making it unable to detect persons or objects effectively.

8. Disposal

Should you need to replace your Micro MF system (e.g. due to damage beyond repair), ensure that the replacement device is in accordance with the door or other device manufacturer's specifications and any applicable local, state, regional or national standards and regulations.

The Micro MF system is designed and manufactured to have minimum impact on the environment. It uses only a minimum amount of power and natural resources. Unusable or irreparable devices should always be disposed of in accordance with applicable local, state, regional or national standards and regulations. We recommend 'electronic recycling' of these devices. Always act in an environmentally responsible manner.

9. Technical data

Optical

Operating range	1 ... 10 m (3 ... 33 ft)
No. of optical elements	8 / 16
Protection height	
- 8 elements	937 mm (36.9 in)
- 16 elements	1,792 mm (70.55 in)
No. of beams with	
- 8 elements	22 beams
- 16 elements	46 beams
Max. ambient light	100,000 Lux
Aperture angle	Tx: $\pm 10^\circ$ at 2 m Rx: $\pm 20^\circ$ at 2 m

Mechanical

Dimensions (w × h × l)	12 × 16 × max. 2,000 mm (0.47 × 0.63 × 78.74 in)
Housing material	Aluminum natural
Enclosure rating	IP67
Temperature range	-40°C ... +60°C (- 40°F ... +140°F)

Electrical

Supply voltage U_{sp}	18 ... 30 VAC/DC
Typ. current consumption	40 mA
Output	2-wire pulsed
Output load	10 ... 100 mA, 100 nF
Response time	70 ... 100 ms (depending on number of elements)

Connection cable

Emitter	
Cable length	5 m
Diameter	Ø 3.5 mm (0.17 in)
Material	PVC, black
Connection	M8, 4-pin
Plug color	White
Wires	AWG26
• brown	U_{sp}
• blue	GND (0 V)
• black	Not used
• white	Not used

Receiver

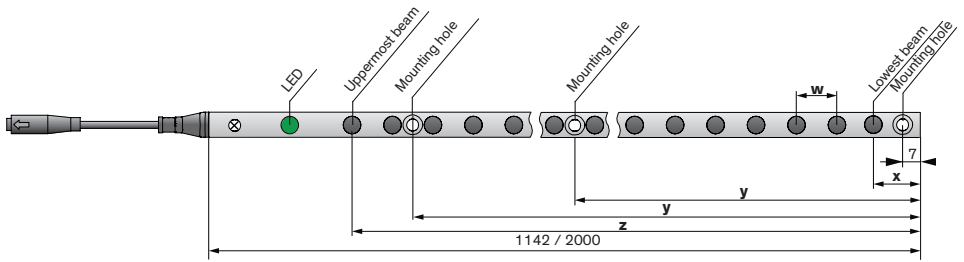
Cable length	5 m
Diameter	Ø 3.5 mm (0.17 in)
Material	PVC, black
Connection	M8, 4-pin
Plug color	Blue
Wires	AWG26
• brown	U_{sp}
• blue	GND (0 V)
• black	2-wire (+) output
• white	2-wire (-) output

General

EMC emission	EN 12015:2014
EMC immunity	EN 12016:2013
Vibration	IEC 60068-2-6:2007
Shock	IEC 60068-2-27:2008
Cable durability	IEC 60227-2:2003
RoHS	2011/65/EU
Certificates	CE, UL325 UL-US-2578064-0

10. Dimensions

(all dimensions in mm)



Types	Total edge length / protection height 'z' (in mm)	Number of elements	Number of beams	Lowest element 'x' (in mm)	Mounting hole 'y' (in mm)	Grid 'w' (in mm)
MF-1142-8	1142 / 937	8	22	22	7 / 463 / 851	131
MF-2000-16	2000 / 1792	16	46	22	7 / 867 / 1717	118

