IMPORTANT NOTICE

FOLLOW THE INSTRUCTIONS GIVEN IN THIS MANUAL CAREFULLY.

FAILURE TO DO SO MAY CAUSE CUSTOMER COMPLAINTS AND CALL BACKS.

KEEP INSTRUCTION MANUAL ON SITE.
# Instruction Manual

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## 9. NOTES
1. Operation
The infra red light curtain cegard/Max consists of three active parts: a control unit (A), an emitter unit (B) and a receiver unit (C) plus mounting parts (D) and this instruction manual (E). The emitter unit and the receiver unit are generally mounted on the edge of the car door together with the mounting parts, opposite each other, covering the elevator entrance.

The control unit is generally mounted on the car top or in the car operating panel and acts as an interface between any given supply voltage and the emitter/receiver. The control unit contains the operating system for the light curtain and controls the sensors in the emitter/receiver unit. To increase the lifetime of the electronic components, especially the infra red emitters, the control unit continuously controls the light emitting power according to the distance between the emitter and the receiver. When the doors are closed, the emitting power is almost zero. This function also prevents optical bypassing at the car doorsill.

2. Applications
The mounting parts are configured so that they may be used for side opening doors as well as for center opening doors. The whole kit can be used for new installations as well as for modernization of existing elevators. Please refer to the appropriate kit type.
3. Fail Safe
The system is designed to be fail safe. If power to the system is lost, the output relay is de-energized resulting in re-opening of the elevator doors. Please take note that a door drive with the nudging feature may override the output relay of the light curtain and force the doors to close.

The proper operation of the microprocessor is protected by a watch-dog circuit which restarts the program if the processor fails to execute the normal program sequence. In such a case the output relay will be opened immediately to open the elevator doors.

4. Automatic Power Supply Adaption
The control unit contains state-of-the-art-technology to operate with any supply voltage available without any adjustments or special wiring. Any voltage in a range between 17 Volts and 240 Volts AC or DC can be used and the light curtain will operate properly. If DC voltage is used the polarity to the terminals P and N is irrelevant. This feature is very useful especially for modernization, where the supply voltage on the car top has a given value.

5. Application Restrictions

**DANGER**

DO NOT USE THIS LIGHT CURTAIN FOR THE PROTECTION OF DANGEROUS MACHINERY NOR IN EXPLOSIVE ATMOSPHERES NOR RADIOACTIVE ENVIRONMENTS! USE ONLY SPECIFIC AND APPROVED TYPES OF SAFETY DEVICES FOR SUCH APPLICATIONS OTHERWISE SERIOUS INJURY OR DEATH OF PERSONNEL MAY OCCUR!

**Important Notice**
- Please take note that objects thinner than the sensor spacing may not be detected!
- When the cegard/Max 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 state codes, local codes and regulations that pertain to infra red and photoelectric door protection devices.
6. Installation

The installation should be done in the following sequence:

1. Install the emitter/receiver with the mounting- or spacer profile to the door wings or to the slam post
2. Guide the cables of the emitter/receiver to the control unit using the cable protection tube and cable ties and install the cable guide to prevent possible cable swing
3. Install the control unit
4. Electrical installation
5. Power-up and test
6. Snap-on the vision shields to cover the emitter/receiver and install the cover to the control unit

The following picture shows an overview of the installation. Details are described more in detail in the following sections.

Fig. 4: Mounting Overview
6.1. Install Emitter/Receiver

6.1.1. Center Opening Doors (New Installation and Modernization)

The emitter/receiver units together with the mounting profiles are mounted to the car door wings with 3 no. 6 self drilling/self tapping screws. The mounting profile has a label which indicates the bottom side.

⚠️ Important

It is important that the active sensor sides of the emitter/receiver units are looking "face-to-face". The active sensor sides are recognizable by the round black plastic lenses.

The top end of the mounting profile also has to be fixed with self tapping no. 6 no. 10 x 0.5" screws.

We recommend to install the sensors as far away as possible from the leading edge of the door to prevent them from damage, e.g. vandalism (refer to Fig. 5 Mounting Details of Center Opening Doors and Fig. 4: Mounting Overview).

6.1.2. Side Opening Doors (New Installation)

For new installations, the slam post should be designed so that the same kits required for center opening doors can be used. The unit which is mounted to the slam post has to be turned 90° so that the sensors are looking "face-to-face". On the slam post sink screws have to be used.

It is important that the alignment angle of the emitter to the receiver is less than ±10° when the door is fully closed (Fig. 6: Mounting Details of Side Opening Doors).

⚠️ Important

We strongly recommend to keep this angle as close to zero as possible!

⚠️ Important

Please take note to have a minimal gap between the mounting profile of the light curtain and the edge of the slam post. Otherwise you will fail to snap-on the vision shield to cover the light curtain (refer to Fig. 6: Mounting Details of Side Opening Doors).
6.1.3. Side Opening Doors (Modernization)

When light curtains are used for modernization, the alignment angle between the emitter and receiver can be more than ±10°. In this case the spacer profile should be used to shift the sensor unit at the door wing by 160 mm towards the same axis as the sensor unit mounted at the slam post.

Installation procedure is as follows:

1. Install the spacer profile to the door wing with 6 self tapping screws (note the "bottom" – label).
2. Install the sensor unit to the spacer profile with 3 self tapping screws.
3. Install the opposite unit on the slamming post so that the alignment is as good as possible when the door is fully closed.

6.2. Cable Guidance

⚠️ Important

It is very important to pay close attention to a proper cable installation to ensure the highest possible reliability and lifespan of the light curtain. A properly installed cable will withstand more than 20 million door movements, while a poorly installed cable will break after less than 100'000 cycles.

Guide the cables of the emitter/receiver to the control unit. A small bending radius will reduce the cable lifetime dramatically. Use the cable binder A to fix the cable. Use the cable binders furnished in the parts kit. Do not use cable ties as this reduce the lifetime of the cable. Install the cable guide wire B to prevent possible cable swing. Install the cable guide wire to prevent possible cable swing.

The cables are detachable with a connector at the end of the emitter/receiver units. The length of the cables is 5m. An extension cable of 3m is available to extend the total length to a maximum of 8m. This extension is used for tall elevator cars (up to 3m).
6.3. Installation of the Control Unit

The control unit comes in two different types:

1. With a protective housing, most suitable for new installations and modernization where the control unit is installed on the car top.
2. A bare printed circuit board which is installed inside the car terminal or inside a protective box on the car top. This model is suitable only for new installations.

6.3.1. Control Unit with Protective Housing

The control unit can be mounted horizontally or vertically using self tapping no. 6 screws. An ideal mounting position is drawn in Fig. 4: Mounting Overview.

When the supply voltage or the voltage at the relay terminal is below 42 volts, use the standard cable entrance gaskets to connect the emitter, the receiver, the relay and the power.

6.3.2. Bare Board as Control Unit

The control unit is also available as a bare board which is a cost savings option. It can be installed very easily with the pre-assembled snap-in fasteners to sheet metal with a thickness between 1 mm to 3 mm.

This way of mounting is most suitable for new installations where the control unit boards are installed in the elevator factory to the car terminal or to the door drive controls.

**NOTICE:**

The PCB is sensitive to electro static discharge and must be handled with care to prevent call backs. Use anti-static procedures when handling these boards.
### 6.4. Electrical Installation

#### 6.4.1. Power Supply

- **N**: Neutral for AC, plus or minus for DC
- **P**: Phase for AC, plus or minus for DC
- **⊕**: Protective earth

#### 6.4.2. Emitter

The white emitter connector has to be plugged into the white marked plug.

#### 6.4.3. Receiver

The blue receiver connector has to be plugged into the blue marked plug.

#### 6.4.4. Timer

The potentiometer near to the blue receiver plug is used to set a door open hold time between 0 and 10 seconds. This function is useful e.g. in hospitals, where the doors should not close immediately after removing objects from the door zone. The factory setting is zero.

#### 6.4.5. Muting Function

By setting jumper JP1 the muting function is activated. Blocked or defective elements are detected. After appr. 45 seconds the light curtain ignores these elements according to following muting rule:

- **cegard/Max** max 2 elements

The muting function may be deactivated by removing JP 1 depending on national codes and regulations, i.e. all light beams are used for object detection. The installer is fully responsible for complying to local codes and correct installation.

- Muting of elements is active: JP1 set
- No muting allowed: JP1 removed

#### 6.5. Power-Up and Test

Ensure that all job site wiring and connections are correct and then apply power. The buzzer produces an intermittent beeping for appr. 2-3 seconds. After this start-up beeping the relay is energized so that the doors can close. However, when there is any obstacle in the protected area, the relay will remain de-energized until the whole area is free and all beams are established.

<table>
<thead>
<tr>
<th>Status</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>person or object detected</td>
<td>● ● normal operation</td>
</tr>
<tr>
<td>no object</td>
<td>● ○ normal operation</td>
</tr>
</tbody>
</table>

Problem Refer to chapter 7

Caption:
- ○: LED off
- ●: LED on
- @@: LED flashing

With the obstruction of one or more beams the output relay will release and the "OUT"-LED will be turned on to indicate a disrupted beam condition.
Installation Tip
When the buzzer is switched on with the sliding switch (refer to Fig. 11: Normal Operation, Buzzer Switch), a disrupted beam condition is also indicated with a buzzer signal. This function is very helpful after installation to check the proper function of the light curtain.
If the light curtain does not operate as described in this section, please refer to the chapter 7 "Trouble Shooting".

6.6. Snap-On The Vision Shield
The vision shield is a high-tech plastic part which covers the receiver/emitter from the human eye but allows the infra red light to pass through with virtually no power loss. The vision shield is made from a polycarbonate (PC) which is very tough and stable and is chemically resistant to many alcohols and cleaning solvents.

Important
Snap-on the vision shield to cover the emitter/receiver. This is done very easily, if the following procedure is followed!
Please take note, that the vision shield cannot be easily adjusted after complete installation. So a very precise alignment of the vision shield is required right at the beginning of the installation process, otherwise the whole vision shield must be removed and reinstalled again!

1. Start at the BOTTOM of the door! Align the end of the vision shield to the end of the mounting- or spacer profile!
2. Snap in the FIRST FEW CENTIMETERS by spreading the side walls of the vision shield!
3. Snap in FROM BOTTOM TO TOP and bend the vision shield slightly backwards (Fig. 12: Snap-On the Vision Shield)!
4. Clean the vision shield for a nice appearance with a soft and dry towel!

6.7. Finished
Congratulations, you have successfully installed one of the most powerful, reliable and cost effective door protection systems available today. It will benefit your customers for many years to come.

6.8. Maintenance
There is no special maintenance required for the light curtain. We recommend checking the proper function of the light curtain installation during normal elevator service. Proper function of the light curtain is evident when
- the doors reopen immediately after an obstruction of the protected area
- the sensors are fastened securely on the door wings and slam post
- the cables are routed properly as described in section 6.2 Cable Guidance

Important
Do not use any aggressive cleaning solvents like Acetone or Trichlore or mechanically abrasive towels to clean the vision shields. They may become blind and will not pass the infra red light anymore. We strongly recommend to use standard window cleaners or soap water for cleaning.

6.9. Disposal
The light curtain should only be replaced if a similar door protection device is installed. Disposal should be done through state of the art recycling technology according to local rules and laws. There are no harmful materials used in the design and manufacture of the light curtain. Traces of such dangerous materials could be used in the electronic components but not in quantities, which are harmful to health.
7. Trouble Shooting

If the light curtain does not operate as described in "6.5 Power-Up and Test", the following trouble shooting procedure should be used:

![Trouble Shooting Diagram](image)

**Problem** | **What to Check?** | **Refer to**
--- | --- | ---
No Function, Door Open (dead!) | ![LED off](image) | ![LED on](image) | • Power supply good?
• Fuse broken?
• Power wire broken?
• Defective control unit? | 6.1.1

Door Open, Free Protective Area | ![LED on](image) | ![LED on](image) | • Are all beams uninterrupted?
• Are the sensors looking "face-to-face"?
• Dirty sensors or vision shields?
• Bad alignment? Excessive EMC-interference e.g. from door drive or fluorescent lamps?
• No or bad grounding (PE) connection? | 6.1.2

Random Door Openings | ![LED on](image) | ![LED flashing](image) | • Dirty sensors or vision shields?
• Excessive EMC-interference e.g. from door drive or fluorescent lamps?
• No or bad grounding (PE) connection?
• Damaged cable to the receiver or emitter, check for break in cables by moving the cable by hand?
• Interference with other infra red sensors with the receiver directly or via mirroring from shiny surfaces? | 6.1.1, 6.1.2, 6.4.1

Receiver Problem | ![LED flashing](image) | | • Receiver not connected?
• Emitter connected to the receiver plug instead of emitter plug?
• Cable to the receiver broken or defective receiver?
• Extension cables too long? | 6.2

Emitter Problem | ![LED flashing](image) | | • Emitter not connected?
• Receiver connected to the emitter plug instead of receiver plug?
• Cable to the emitter broken or defective emitter?
• Extension cables too long? | 6.2

Receiver and Emitter Problem | ![LED flashing](image) | ![LED flashing](image) | • Emitter and receiver not connected? | 6.2

*Fig. 13: Trouble Shooting*
8. Technical Data

8.1. Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of light beams max.</td>
<td>154</td>
</tr>
<tr>
<td>Max. response time</td>
<td>180 ms</td>
</tr>
<tr>
<td>Operating range</td>
<td>0 to 5 m</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>17 - 240 VAC/DC</td>
</tr>
<tr>
<td>Power consumption</td>
<td>max. 5 VA @ 115 / 230 VAC, 150 mA @ 24 VDC</td>
</tr>
<tr>
<td>Fuse</td>
<td>6.3 AT (5 x 20 mm)</td>
</tr>
<tr>
<td>Relay output</td>
<td>AC max.: 250 VAC / 8 A</td>
</tr>
<tr>
<td></td>
<td>DC max.: 125 V / 0.5 A, 30 VDC/ 8 A</td>
</tr>
<tr>
<td></td>
<td>DC min.: 5 V / 10 mA</td>
</tr>
<tr>
<td>Ambient light</td>
<td>&gt; 100,000 Lux</td>
</tr>
<tr>
<td>Temperature range operation</td>
<td>-20° ... +85°C</td>
</tr>
<tr>
<td>Temperature range storage and transport</td>
<td>-30° ... +85°C</td>
</tr>
<tr>
<td>Door speed</td>
<td>1.6 m/s</td>
</tr>
<tr>
<td>Cable life time (if correctly installed)</td>
<td>20 million door movements</td>
</tr>
<tr>
<td>Vibration and shock resistance</td>
<td>IEC 68-2-6 / IEC 68-2-29</td>
</tr>
</tbody>
</table>

8.2. Certificate of Compliance No. LR 109459-2

Issued to: **CEDES AG**, CH-7302 Landquart / Switzerland

Product: All types of **cegard/Max** are eligible to bear the CSA Mark. The NRTL/C indicator may appear adjacent to the CSA Mark

Applicable requirements

CSA C22.2 No. 0 - M91
CSA C22.2 No.14 - 95
CSA C22.2 No. 94 - M91
UL 508, 16th ed.
UL 50, 11th ed.
CSA - B44.1-96 / ASME - A17.5 -1996ed.

Quality: All **CEDES** products are developed and manufactured following generally accepted rules in industry and in compliance to a total quality management system certified to ISO 9001 and EN 46001 by TÜV CERT.
8.3. Dimensions

8.3.1. Emitter/Receiver cegard/Max-74

- Cross section of the sensors: 12 x 16 mm
- Diameter of mounting holes: 4.5 mm
8.3.2. Emitter/Receiver cegard/Max-114

- Cross section of the sensors: 12 x 16 mm
- Diameter of mounting holes: 4.5 mm
8.3.3. Emitter/Receiver cegard/Max-154

- Cross section of the sensors: 12 x 16 mm
- Diameter of mounting holes: 4.5 mm
8.3.4. Control Unit with Housing

Dimensions in mm (Inches)
8.3.5. Control Unit as Bare Board

Dimensions in mm (Inches)
### 8.4. Order Information

<table>
<thead>
<tr>
<th>Part. No.</th>
<th>Spare Parts and Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>101 231</td>
<td>Control Unit Max Standard 17 – 240 VAC/DC</td>
</tr>
<tr>
<td>102 920</td>
<td>Light curtain Emitter Unit</td>
</tr>
<tr>
<td>102 921</td>
<td>Light curtain Receiver Unit</td>
</tr>
<tr>
<td>102 787</td>
<td>Emitter cable 5m (white)</td>
</tr>
<tr>
<td>102 788</td>
<td>Receiver cable 5m (blue)</td>
</tr>
<tr>
<td>102 250</td>
<td>Vision shield 7'</td>
</tr>
<tr>
<td>102 751</td>
<td>Mounting Profile 7'</td>
</tr>
<tr>
<td>101 774</td>
<td>OKR Cable</td>
</tr>
<tr>
<td>102 973</td>
<td>Spacer Plastic (2100/35mm)</td>
</tr>
<tr>
<td>102 995</td>
<td>Cable guide wire</td>
</tr>
<tr>
<td>102 975</td>
<td>Hardware bag</td>
</tr>
<tr>
<td>103 276</td>
<td>Instruction manual</td>
</tr>
</tbody>
</table>
9. Notes