

# cegard/Pro CabSafe 2D Light Curtain

## Installation and Operation Manual



CEDES AG is certified according to ISO 9001: 2015



English

Pages

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**1 About this manual**

This installation and operation manual in English, with metric measurements is the **original version**.

The version number is printed at the bottom of each page.

To make sure you have the latest version, visit [www.cedes.com](http://www.cedes.com) where this manual and related documents can be downloaded.

**1.1 Measurements**

Measurements are, if not stated otherwise, given in mm (non-bracketed numbers) and imperial dimensions (numbers in brackets).

**1.2 Related documents**

116 105 CE confirmation  
 115 944 User manual CabSafe 3D Sensor and CabSafe Controller

**1.3 CEDES headquarters**

CEDES AG  
 Science Park  
 CH-7302 Landquart  
 Switzerland

**2 Safety information**

**IMPORTANT READ BEFORE INSTALLATION!**

The cegard/Pro (CabSafe 2D) light curtain system 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.

The cegard/Pro (CabSafe 2D) light curtain system should only be installed by authorized and fully trained personnel! The installer or system integrator is fully responsible for the safe integration of the sensor. It is the sole responsibility of the planner and/or installer and/or buyer to ensure that this product is used according to all applicable standards, laws and regulations in order to ensure safe operation of the whole application.

Any alterations to the device by the buyer, installer or user may result in unsafe operating conditions. CEDES is not responsible for any liability or warranty claim that results from such manipulation.

Failure to follow instructions given in this manual and/or other documents related to the CabSafe system may cause customer complaints, serious call backs, damage, injury or death.

**2.1 Non-intended use**

The cegard/Pro (CabSafe 2D) light curtain system must not be used for:

- Protection of dangerous machine such as presses
- Equipment in explosive atmospheres
- Equipment in radioactive environments
- Outside the specified environments



Figure 1: Non-intended use

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

**2.2 Intended use**

The cegard/Pro (CabSafe 2D) light curtain system is intended for automatic doors in elevator applications where it detects persons or objects standing between the elevator doors. All other applications must be approved by CEDES.



The cegard/Pro (CabSafe 2D) light curtain system should only be installed by authorized and fully trained personnel! The installer or system integrator is fully responsible for the correct integration of the sensor. It is the sole responsibility of the planner and/or installer and/or buyer to ensure that this product is used according to all applicable standards, laws and regulations in order to ensure correct operation of the whole application.

**3 Symbols, safety messages**

**3.1 Symbols**

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
<b>Important</b>	Important information for the correct use of the sensor

**3.2 Safety message category**

**Warning of 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**



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**



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

#### 4 Introduction

The cegard/Pro (CabSafe 2D) light curtain systems are opto-electronic devices that are used to detect objects or persons in the vicinity of elevator doors.

The cegard/Pro (CabSafe 2D) light curtain system were designed and developed to be used in combination with the CEDES Cabsafe 3D sensor and CabSafe Controllers (see CEDES user manual: 115 944) to fulfill the requirements of the US/Canadian standard: ASME A17.1-2019 / CSA B44:19. For a correct function of the complete CabSafe System, only light curtain components described in this document shall be used. A connected CabSafe Controller tests the function as well as detects the signals from the entrance area sensor and the light curtain together. Depending on an internal sequencing, it either holds the door open, allows it to reverse or allows it to close despite an occupied 3D entrance area sensor if none enters or leaves the elevator cab.

The cegard/Pro (CabSafe 2D) light curtain system is designed for and can be used in center-opening as well as left or right side-opening elevator applications and is suitable for dynamic as well as static installations.

This document contains the technical specifications of the cegard/Pro (CabSafe 2D) light curtain and their installation procedure.

A cegard/Pro (CabSafe 2D) light curtain system can also be used in applications which have to fulfill the European requirements of EN 81-20. In such applications the cegard/Pro (CabSafe 2D) light curtain system can be used without the CabSafe 3D sensor and CabSafe Controller.

In general, door protection systems do not provide absolute safety for elevator passengers passing through the doorway. They cannot be used as fail-safe devices of the door mechanism. This safety function must be provided by other means.

#### 4.1 Light curtain system applications

Figure 2 shows the principal of the CabSafe system architecture. The cegard/Pro (CabSafe 2D) transmitter (Tx) and receiver (Rx) as well as the CabSafe 3D sensor are connected to the CabSafe Controller.

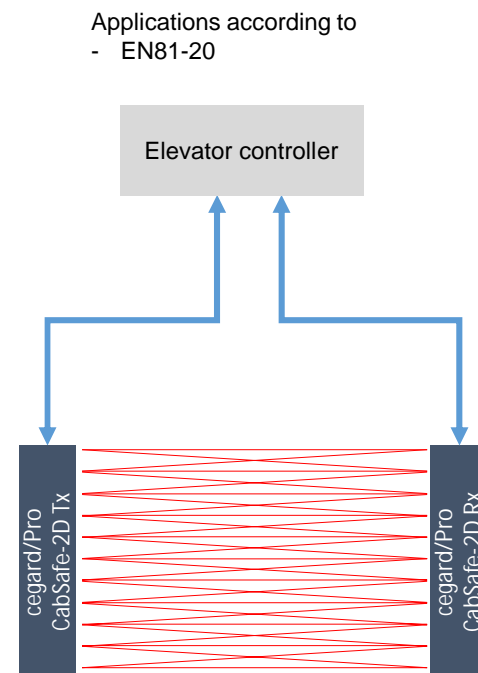
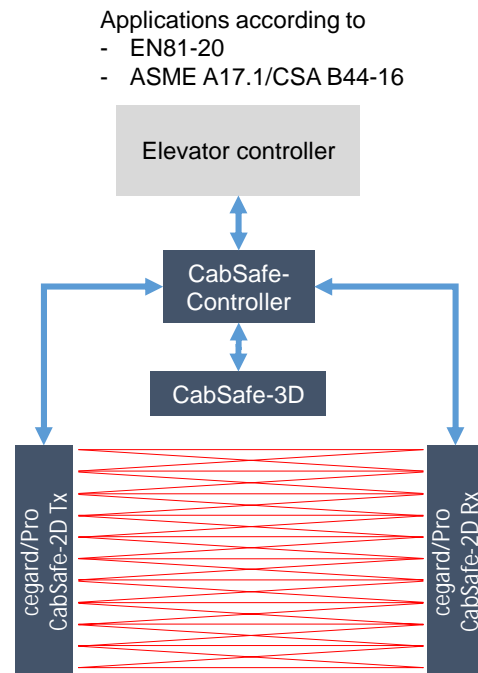


Figure 2: Principal CabSafe system architectures

Figure 2 also shows that the cegard/Pro (CabSafe 2D) light curtain can be used without the CabSafe Controller and CabSafe 3D sensor. Such an architecture is only allowed for applications which require no detection of approaching passengers according to ASME A17.1-2019 / CSA B44:19.

#### 4.2 General operation

The cegard/Pro (CabSafe 2D) light curtain systems are supplied as a pair with a transmitter (Tx) and receiver (Rx) edge and two connection cables. The edges are built with anodized aluminum profiles. The

transmitter projects an array of infrared light beams to the receiver which consists of a number of photoelectric cells. The beam pattern of the light curtain is displayed in Figure 6. Interruption of one or multiple infrared beams triggers the output to change state (signaling an object is present in the detection field to the upstream CabSafe Controller). Once the detection field is clear again, the output changes state again to indicate that the area is "clear".

The light beams emitted from the transmitter are sequenced, one after the other, and pulsed at a specific frequency. The receiver is designed to only accept the specific pulse and frequency from its dedicated transmitter. This enables the rejection of ambient light and thus enhances their robustness in various environments.

Each cegard/Pro (CabSafe 2D) system is equipped with two different output types:

- Push-Pull output; and
- "Frequency Safety Signal Low-output" (= FSSL-output), a pulsed signal that is operated with a maximum frequency of 1.8 kHz. The output frequency changes with the distance between the emitter and receiver edge allowing for dynamic installations to rely on the cegard/Pro (CabSafe 2D) light curtain to indicate to the CabSafe Controller that the door is closing or opening.

Which output type is active depends on the wiring (connection of the white wire, see chapter 4.6.4).

**4.3 Features**

- Large operating range
- LED indication
- IP65 enclosure rating
- Frequency safety signal output (FSSL)
- Push-pull output
- Integrated distance recognition (used in a CabSafe System)
- Easy alignment
- Front and side mounting holes implemented
- Slim design of only 12 mm x 16 mm (0.47 in. x 0.63 in.)

**4.4 General instructions and precautions**



- ▶ Never scratch or paint the optical diodes or elements 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!
- ▶ Chemical can damage the profile and optical characteristic. Contact must be avoided at all times!

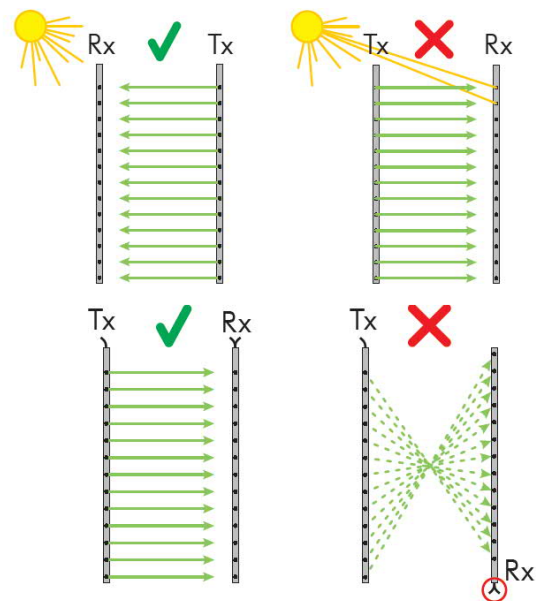


Figure 3: Installation hints

- ▶ Although the cegard/Pro (CabSafe 2D) system is insensitive to direct sunlight, avoid unnecessary exposure when possible, especially the receiver unit (Figure 3).
- ▶ Avoid interference from blinking lights or infrared light sources such as photocells or other light curtains.
- ▶ Do not install the cegard/Pro (CabSafe 2D) system in places where the emitter and receiver edges are directly exposed to light sources such as fluorescent tubes or energy saving lamps.
- ▶ Make sure to orient the connection plugs for both the emitter and receiver at the same end (Figure 3).

**CAUTION**  
Damage to the eye

Although the cegard/Pro (CabSafe 2D) light curtain does not emit dangerous amounts of infrared light, long exposure to intense infrared light sources can result in damage to the eyes.

- ▶ Never look directly into the active infrared emitter from a close distance.

### 4.5 Integration

The following precautions must be followed when the cegard/Pro (CabSafe 2D) light curtain is integrated into a CabSafe System:

- The cegard/Pro (CabSafe 2D) light curtain must be connected to the CabSafe Controller (see user manual “CabSafe 3D sensor and CabSafe Controller”).
- For static installations of the cegard/Pro (CabSafe 2D) light curtain, a door position signal has to be provided that informs the CabSafe Controller about the door position (signal from the elevator control or from a sensor).
- The max. door speed shall not exceed 0.5 m/s (1.64 ft/s).

### 4.6 Installation

#### 4.6.1 Alignment

The optical axis of the emitter (Tx) and the receiver edge (Rx) need to be aligned towards each other to ensure the light curtain functions reliably.

#### 4.6.2 Mechanical installation



**WARNING**  
Electrical and mechanical Hazards

Electrical shock and unexpected movement of the protected application can cause serious injury or death.

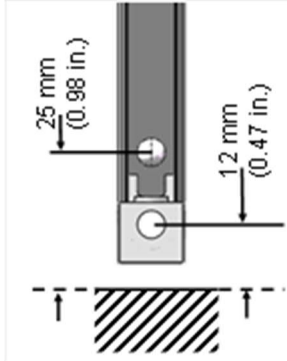
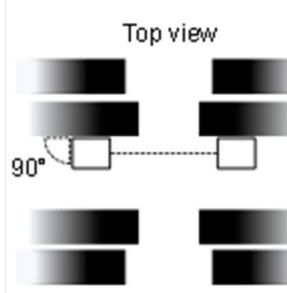
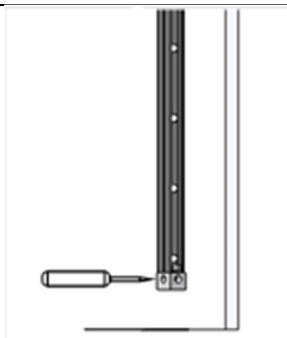
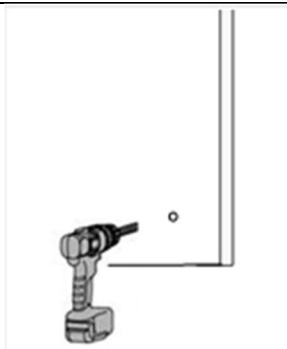
- ▶ Follow all applicable safety measures.
- ▶ Use only specific and approved tools.
- ▶ If the cegard/Pro (CabSafe 2D) light curtain has to be adjusted, the main power supply must be switched off and marked as out of service.
- ▶ Connection cord with length exceeding 2 m (6.56 ft.) shall be protected in a raceway.

**NOTICE**  
Mechanical damage to the cegard/Pro (CabSafe) 2D light curtain

- ▶ Do not drill additional holes into the light curtain.
- ▶ Do not overtighten the mounting screws.
- ▶ Mount the edges on a flat surface
- ▶ Do not bend the edges during transport or during the installation.

**Important:**

- ▶ Switch off main power to the control unit and mark clearly that this system is out of service before performing any work on the system.

1.1		<p>Receiver and emitter need to mount at the same height and both connectors are on top.</p>
1.2	<p>Top view</p> 	<p>Check the alignment of the edges. The receiver needs to be mounted 180° to the emitter.</p> <p><b>Important:</b> Make sure the optical elements are facing each other</p>
1.3		<p>For back side or side mounting: mark the mounting holes.</p>
2		<p>Drill the holes for mounting on the marked positions.</p>

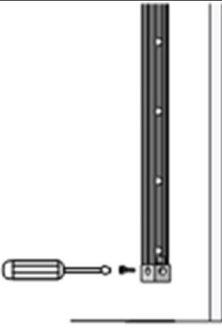
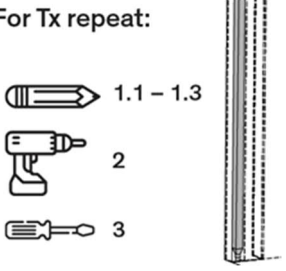
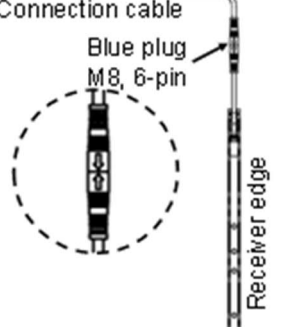
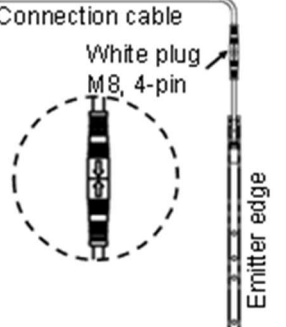
3		<p>Mount the edge with the screws from the front or the side in the drilled holes.</p>
4	<p>For Tx repeat:</p> 	
5		<p>Connect the connection cable (blue plug) on the receiver edge and guide the cable to the control unit.</p>
6		<p>Connect the connection cable (white plug) on the emitter edge and guide the cable to the control unit</p>
7	<p>Make sure the detection area between the edges is not interrupted by door wings, cables, etc.                  Guide the connection cables using appropriate mounting material, e.g. cable protection tubes, neoprene cable ties or cable guide wires depending on the type of mounting kit used. Connection cord with length exceeding 2 m (6.56 ft) shall be protected in a raceway. Improperly fixed and guided cables can reduce cable lifetime drastically</p>	

Table 1: Mounting steps

### 4.6.2.1 Installation height

To be compliant to the code the light curtain must be installed so that the lowest beam (bottom end) is positioned  $\leq 25$  mm (0.984 in.) above floor (Figure 4).

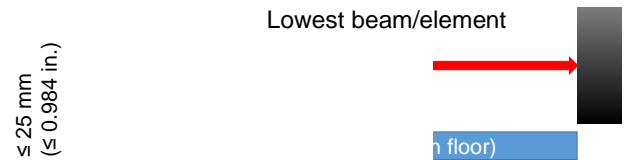


Figure 4: Installation height cegard/Pro CabSafe 2D light curtain

### 4.6.2.2 Horizontal positioning

For dynamic installations, when the light curtain is installed at the doors, the cegard/Pro (CabSafe 2D) light curtain can be used to inform the CabSafe Controller about the distance of the light curtain. The frequency of the FSSL output changes depending on the distance of the emitter and receiver edge (see chapter 4.7).

Important for installations in a CabSafe system: for a reliable detection of the door closing/opening is, that the light curtain edges have a distance "A"

- less than 100 mm (3.94 in.)
- but more than 10 mm (0.394 in.)

when the door is in the fully closed position (Figure 5).

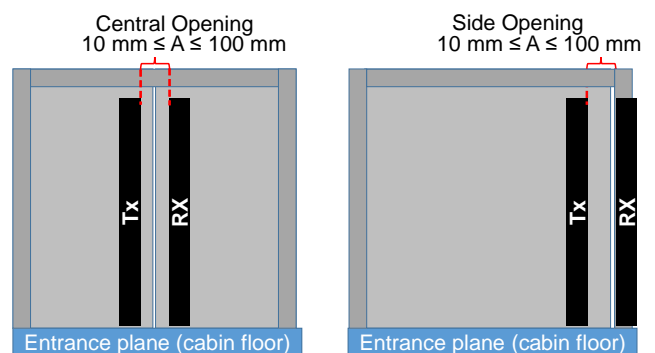


Figure 5: Installation distance cegard/Pro CabSafe 2D light curtain for dynamic installation (door closed)

### 4.6.2.3 Mounting according to EN 81-20

EN 81-20 requires a detection capability of 50 mm (1.97 in.) up to a height of 1'600 mm (5.25 ft.) of the door opening. The cegard/Pro CabSafe 2D light curtain with 36 elements achieves a 50 mm (1.97 in.) resolution even at a distance of minimum „10 mm“ (0.39 in.) between the two edges for both: dynamic and static installations.

### 4.6.3 Electrical installation

#### 4.6.3.1 Connected to a CabSafe Controller

The cegard/Pro (CabSafe 2D) light curtain is connected to a CabSafe Controller (Figure 2). The connection to the upstream CabSafe Controller is realized with specific plugs:

- Colored M8 plugs are used for the connection of the cables to the pigtails at the edges.
- Terminal connectors are used to connect the cables to the CabSafe-Control unit.

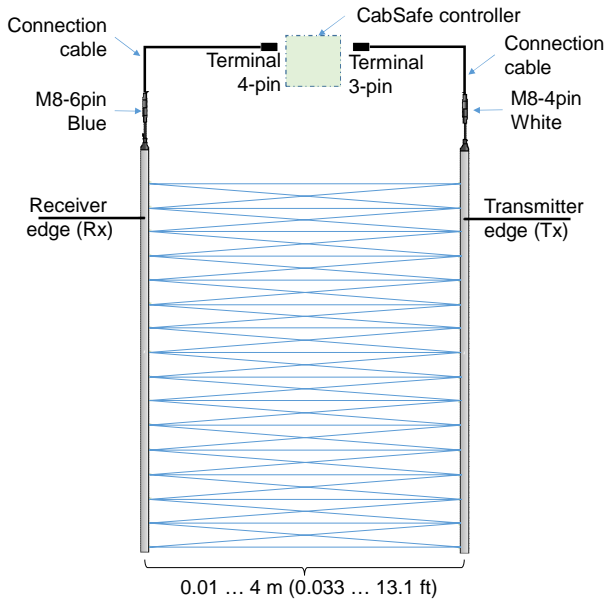
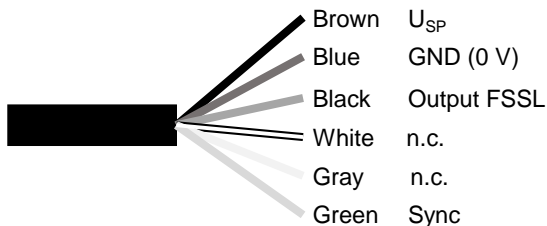


Figure 6: Overview cegard/Pro CabSafe 2D light curtain system

For the Rx: the white and the gray wires are not used when connected to a CabSafe Controller.  
 For the Tx: the white wire is not used.

#### Receiver Rx cable connection



#### Emitter Tx cable connection

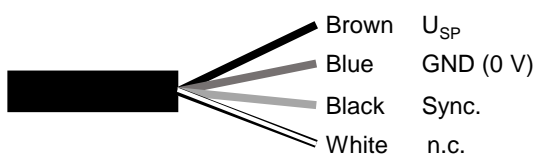


Figure 7: Electrical connection to a CabSafe Controller (n.c. = not connected)

#### Important:

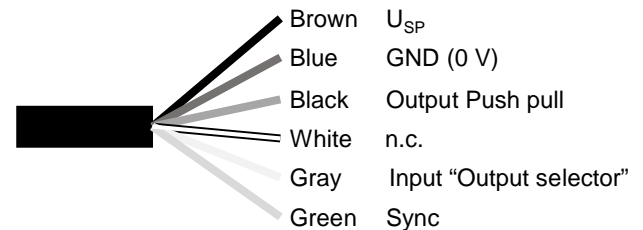
- Any unconnected (not used) wire must be separated and isolated.
- The maximum cable length shall not exceed 14 m (45.9 ft.) per edge.

Information: Typically the cegard/Pro (CabSafe 2D) light curtain is shipped together with the connection cables and the plugs for the connection to the CabSafe Controller are already connected.

#### 4.6.3.2 Connected to an elevator controller

The cegard/Pro (CabSafe 2D) light curtain is directly connected to an elevator control (Figure 8 and Figure 2).

#### Receiver Rx cable connection



#### Emitter Tx cable connection

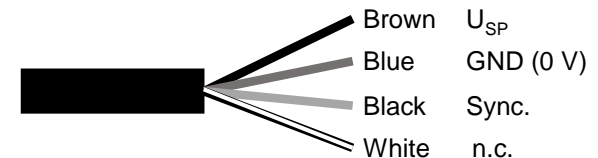


Figure 8: Electrical connection to an elevator controller (n.c. = not connected), see also Figure 10

#### 4.6.4 Output

When an object enters the safeguarded area (OBJECT DETECTED) the cegard/Pro (CabSafe 2D) light curtain output changes state after response time  $t_2$  (see Figure 12). When the object leaves the safeguarded area (NO OBJECT) the cegard/Pro (CabSafe 2D) light curtain output switches back after release time  $t_3$  (see Figure 12).

The output logic of the cegard/Pro (CabSafe 2D) is set using the gray wire. The logic will be defined by the power-up sequence. After the power up the logic will not change until the next power-up is made. The default logic is Light ON (LO) (which is shown in Figure 12). The output logic is LO if the gray wire is connected to GND (0 V). Connecting the gray wire to  $U_{SP}$  changes the output logic to Dark ON (DO).

If the gray wire is not connected (floated), the output logic changes to the FSSL output signal (see chapter 4.6.4.1).



### 4.6.4.1 FSSL output

The FSSL (Frequency Safety Signal Low) output is a frequency safety output signal allowing for safeguarding. As long as the safeguarded area is free, the FSSL output sends a pulsed signal. The frequency depends on the distance between the Tx and the Rx edge (see chapter 4.16.4).

The default logic is Light ON (LO) (Figure 9). When an object enters the safeguarded area (OBJECT DETECTED), the FSSL output switches to LOW/GND (0 V). When the object leaves the safeguarded area (NO OBJECT) the frequency starts again.

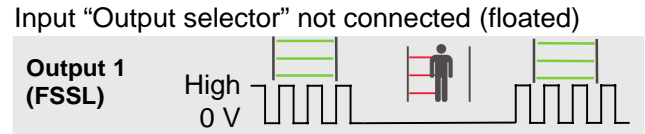


Figure 9: Principal timing diagram for the FSSL output

Gray wire	Output Logic
Not connected	FSSL LO

Table 2: FSSL output logic (Light ON)

### 4.6.4.2 PNP/NPN selection

The output type of the cegard/Pro (CabSafe 2D) light curtain can be configured with the gray wire. For the connection of the cegard/Pro CabSafe 2D light curtain to the CabSafe controller the output must be set to FSSL functionality (gray wire floated). For applications without the CabSafe controller (see Figure 2) the output can be set to a typical Push-Pull functionality.

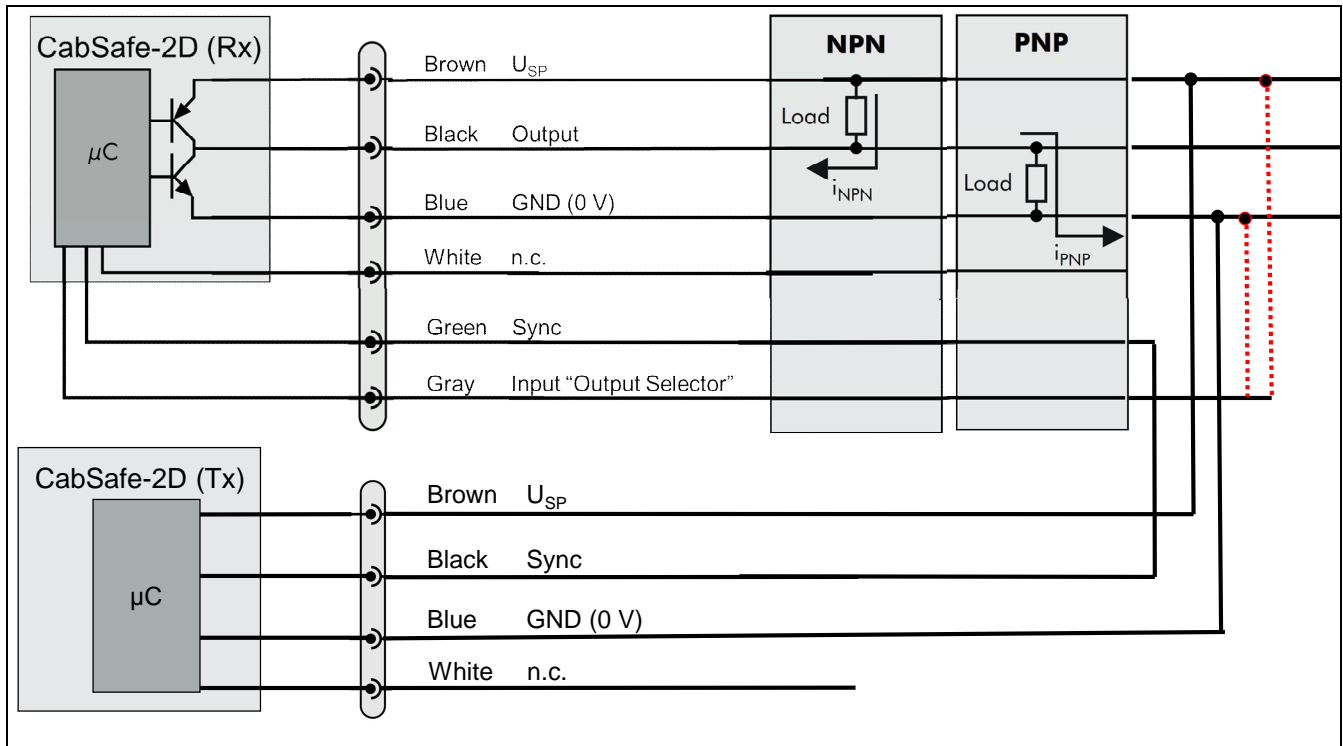


Figure 10: Connection Push/Pull output (n.c. not connected)

The green (Sync) of the Rx must be connected to the black (Sync) of the Tx.

The type of output (FSSL or Push-Pull output) as well as the logic of the push pull output is set using the gray wire (red dotted in).

The output logic is LO if the gray wire is connected to GND (0 V). Connecting the gray wire to U<sub>SP</sub> changes the output logic to DO (dark-on). Both options are indicated dotted in Figure 10.

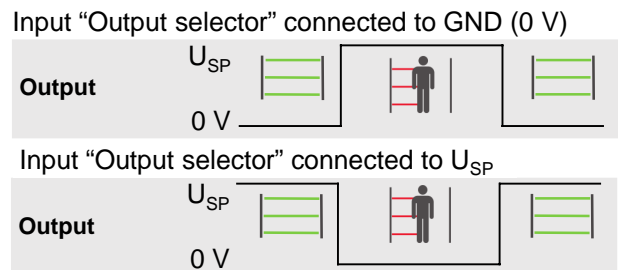


Figure 11: Configuration of the push-pull output and respective logic

Gray wire	Output Logic
Connected to GND (0V)	Push-Pull LO
Connected to USP	Push-Pull DO

Table 3: Push pull output logic

### 4.7 Timing diagram

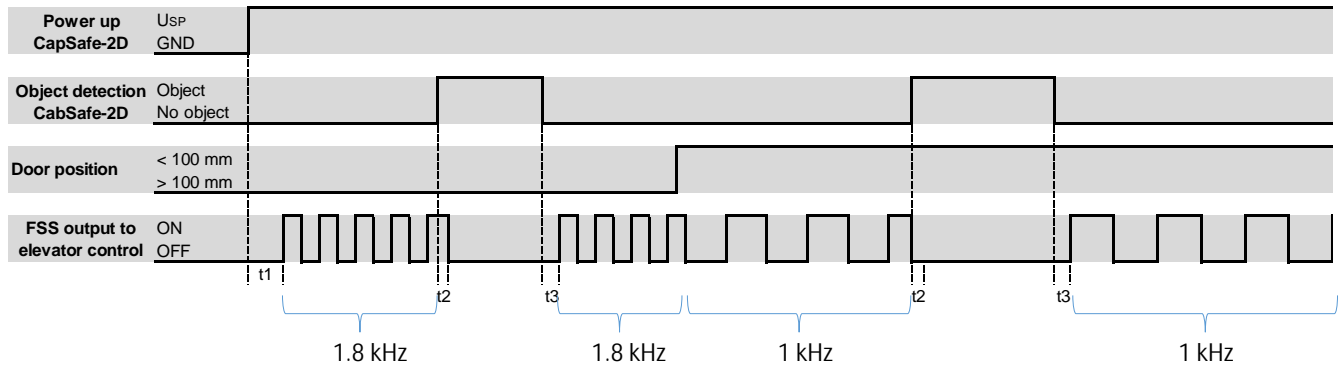


Figure 12: Timing diagram

	time	Value [ms]
Power Up time	t1	See Table 13
Response time	t2	
Release time	t3	

Table 4: Descriptions for the timings in Figure 12

There is no difference in the values of the times if FSSL output or if PNP/NPN output is selected.

### 4.8 Start-up

After installation (chapter 4.6):

1. Switch on mains and power-up the elevator control unit. The LED on the receiver edge blinks during the start-up phase.
2. Check the LED on both edges (power, status).
3. Test if the system is working correctly by interrupting the cegard/Pro CabSafe 2D light curtain:
  - For ASME A17.1-2019 / CSA B44:19 use a non transparent test object with the dimensions stated in the code: 80 mm (3.15 in.) above floor level and 50mm (1.97 in.) at floor level. The cegard/Pro CabSafe 2D light curtain as well as the CabSafe Controller must signal object detected at all times during this test.
  - For EN 81-20: use a non transparent test object with the dimensions stated in the code: 50mm (1.97 in.) The cegard/Pro CabSafe 2D light curtain as well as the CabSafe Controller must signal object detected at all times during this test (from the bottom to the top of the protective field).

### 4.9 LED status description

#### 4.9.1 Receiver edge (Rx)

LED	Sensor Status
● Green ON	Light curtain uninterrupted
● Red ON	Light curtain interrupted
☀ Red/Off blinking	Start-up or auto calibration (see Table 7)
OFF	No power or edge is defective

Table 5: LED description Receiver edge

#### 4.9.2 Transmitter edge (Tx)

LED	Sensor status
● Green ON	Power OK
○ Green OFF	No power or edge is defective (see Chapter 4.10)

Table 6: LED description transmitter edge

● = LED on; ○ = LED off; ☀ = LED blinking

### 4.10 Troubleshooting

Tx LED	Rx LED	Action
OFF	OFF	<ul style="list-style-type: none"> <li>▶ Check electrical connections.</li> <li>▶ Check supply voltage of the door controller.</li> </ul>
OFF	Red ON/OFF blinking	▶ Check the power supply and the connection of the emitter (TX) cable (white connector).

Tx LED	Rx LED	Action
Green ON	Red ON/OFF blinking	<ul style="list-style-type: none"> <li>▶ Check alignment or remove object (Remark: the Rx-LED blinks red if the protective field is interrupted at power up (misalignment or object), it changes to green as soon as the protective field is free (edges aligned or object removed). Any subsequent interruption of the protective field will cause that the RX-LED change to Red ON)</li> <li>▶ Check power supply</li> <li>▶ Check connections</li> </ul>
Green ON	Red/Green blinking	<ul style="list-style-type: none"> <li>▶ Make sure the safeguarded area is clear of interruption.</li> <li>▶ Clean the elements.</li> <li>▶ Make sure that the cables and edges are located away from sources of electromagnetic interference.</li> <li>▶ Ensure that the emitter and receiver are correctly aligned and remain so during door closure (e.g. that vibrations do not cause edges to become misaligned).</li> <li>▶ Restart the system.</li> </ul>
Green ON	Red ON	<ul style="list-style-type: none"> <li>▶ Make sure the safeguarded area is clear of interruption.</li> <li>▶ Reopen door completely.</li> <li>▶ Clean the elements.</li> <li>▶ Check the alignment of the light curtain.</li> <li>▶ Measure the U<sub>SP</sub> voltage.</li> <li>▶ Restart the system.</li> </ul>
OFF	OFF	<ul style="list-style-type: none"> <li>▶ Check the connection and the power supply of the emitter (TX) and receiver (RX) cable.</li> </ul>
Green ON	OFF	<p><b>Internal error occurred</b></p> <ul style="list-style-type: none"> <li>▶ Check connections and power supply of the receiver (RX, blue connector)</li> <li>▶ Restart the system</li> <li>▶ Replace the Rx edge</li> </ul>

Table 7: LED description cegard/Pro CabSafe 2D Light Curtain

**Important:**

If a problem persists, please contact your local CEDES representative. Visit [www.cedes.com](http://www.cedes.com) for contact data.

**4.11 Maintenance**

Although the cegard/Pro (CabSafe 2D) Light Curtain does not need regular maintenance, a periodic functional check is strongly recommended:

- ▶ Make sure the optical elements are clear of dirt and dust. If necessary, clean the front surface with a soft towel.
- ▶ Make sure the edges are securely fastened.
- ▶ Check the mounting position, cable routing and connection of the sensor.
- ▶ Check the detection behavior of the cegard/Pro (CabSafe 2D) light curtain according to the requirements of local regulations.

**NOTICE**

**Damage to the optical elements**

- ▶ Never use any solvents, cleaners or mechanically abrasive towels or high-pressure water to clean the sensor.
- ▶ Avoid scratching the optical elements while cleaning.

**4.12 Product label**

Each cegard/Pro CabSafe 2D light curtain edge is labeled with two product labels. The labels are attached on the backside of the profile on each emitter as well as on each receiver edge.

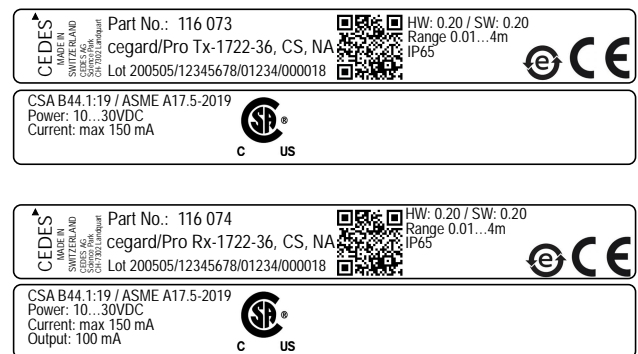


Figure 13: Product label cegard/Pro CabSafe 2D light curtain

The label includes information according to the table below:

1xx xxx	Part number existing of 6 numbers with space after the third
cegard/Pro CabSafe 2D Tx-1722-36	Description of the cegard/Pro CabSafe 2D edge (acc. to type description). 1722 refers to the profile length
Lot number	Manufacturing Date (200505), manufacturing job number (12345678), employee number responsible for final test (01234), and incremental counter (000018) build the lot number.

HW / SW Index	Increasing digits with the following meaning: <b>1.xx</b> : major changes, e.g. additional functionality <b>x.0x</b> : error correction, bug fix, new compilation, no additional functionality <b>x.x0</b> : 'cosmetic' update, no functional influence
2D Bar code	Part number and Lot number

Table 8

**4.13 Type description**

Standard -> cegard/Pro aa-bbbb-cc, dd  
 OEM systems -> cegard/Pro aa-bbbb-cc, dd, ee

- aa** SY System  
 Tx Emitter  
 Rx Receiver
- bbbb** Profile length in mm
- cc** Numbers of elements
- dd** Functionality  
 CabSafe compatible= CS;  
 Narrow Aperture=NA
- ee** Information about appearance or mechanical variation

Family	aa		bbbb		cc		dd		dd		ee
cegard/Pro	SY	-	1722	-	36	,	CS	,	NA	,	

Table 9

**Example:**

cegard/Pro SY-1722-36, CS, NA

- 1x Mounting kit

**4.14 Delivery package**

The packaging of a cegard/Pro CabSafe 2D light curtain comprises typically the following items:

- 1x cegard/Pro CabSafe 2D emitter (Tx)
- 1x cegard/Pro CabSafe 2D receiver (Rx)
- 1x Connection cable emitter (white connector) with the connector to the CabSafe-Controller already installed.
- 1x Connection cable receiver (blue connector) with the connector to the CabSafe-Controller already installed.

Depending on definition the mounting kit of a cegard/Pro (CabSafe 2D) system may include different installation accessories and/or screw types and/or mounting clips.

**4.15 Accessories**

**4.15.1 Vision shield and mounting profiles**

cegard/Pro CabSafe 2D light curtains are compatible with the mounting accessories available for CEDES cegard/Mini light curtains.

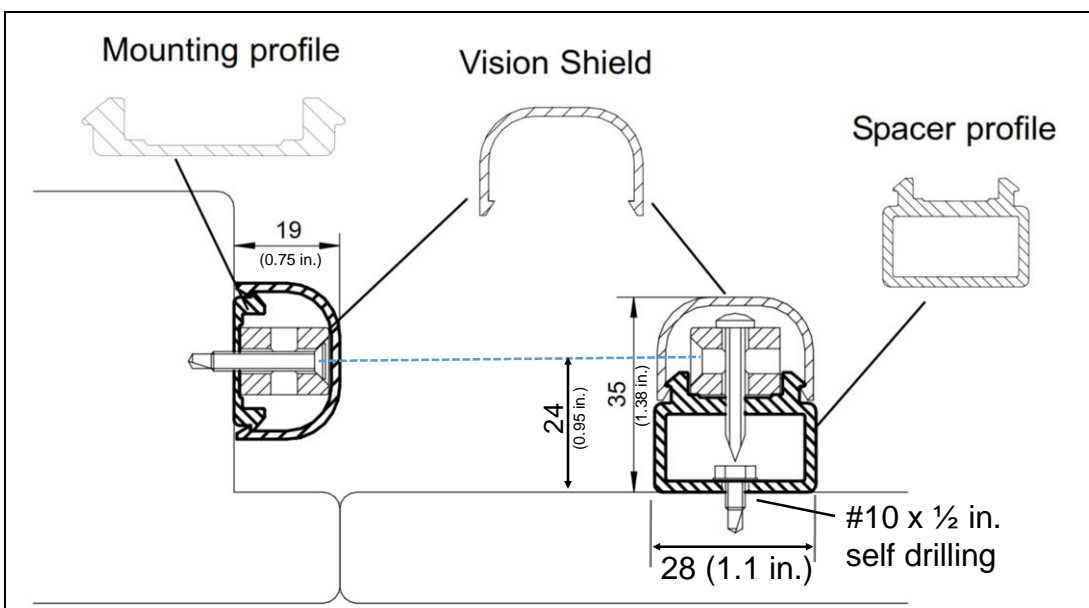


Figure 14: Vision shield and mounting profiles (dimensions in mm)

### 4.15.2 Mounting clips

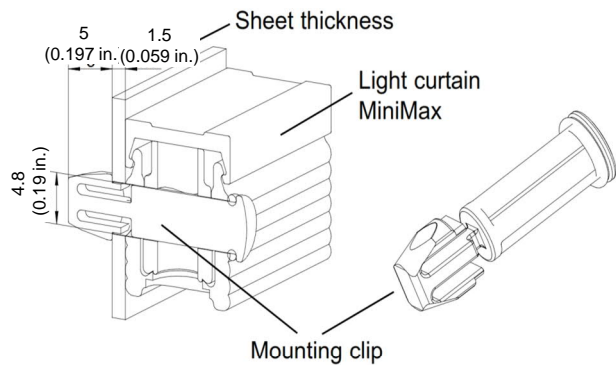


Figure 15: Mounting clips

## 4.16 Technical Data

### 4.16.1 Optical

Attribute	Value
Operating range	0.01 ... 4 m (0.0328 ... 13.1 ft)
Protection height	1'600 mm (5.25 ft)
No. optical elements	36
No. of beams	106
Wave length	Infrared, 850 nm

Table 10

### 4.16.2 Mechanical

Attribute	Value
Dimensions (w x h x l)	12 x 16 x 1'722 mm (0.47 x 0.63 x 67.8 in.)
Housing material	Aluminum natural anodized
Weight (pair)	960 g

Table 11

### 4.16.3 Environmental

Attribute	Value
Enclosure rating:	
Edges	IP65
Connectors	IP65
Temperature range (operation)	-30°C ... 60° C (-22°F ... 140°F)
Max. ambient light	100'000 Lux

Table 12

### 4.16.4 Electrical

Attribute	Value
Supply voltage $U_{SP}$	10 ... 30 VDC
Typical current consumption at 24 VDC (pair)	< 50 mA (without load)
Max inrush current per edge	< 5 A (< 200 $\mu$ s)

Output	Selectable: - Push-Pull PNP/NPN - FSSL (*)
FSSL Frequencies	1.0 KHz to 2.0 KHz
FSSL output HIGH	3.4 ... 4.2 VDC (xxx) NPN Open Collector
FSSL output LOW	< 1 VDC
Max. output load (FSSL)	20 mA, 100 nF
Push pull output logic	NO / NC selectable
Max. output load (Push-Pull)	100 mA, 100 nF
PNP Output HIGH	> $U_{SP} - 2$ VDC
PNP Output LOW	< 2 VDC
Typical power up time	< 1'700 ms (36 elements)
Typical response time	< 100 ms (36 elements)
Typical release time	< 55 ms (36 elements)
1 LED indicator Tx	Green ON – Power
1 LED indicator Rx	Green ON – No object Red ON – Object detected

(\* FSSL = Frequency safety signal)

Table 13

### 4.16.5 Connection cable & electrical connection

Attribute	Value	
	Tx Transmitter	Rx Receiver
Connection cable		
Length	3.3 m or 5 m (10.8 ft. or 16.4 ft.)	
Max. cable length	14 m (45.9 ft.) per edge	
Cable material	PVC, black,	
Cable diameter	$\varnothing$ 3.5mm ( $\varnothing$ 0.138 in.)	$\varnothing$ 4.2mm ( $\varnothing$ 0.165 in.)
Connector	M8, $\varnothing$ 10 mm ( $\varnothing$ 0.394 in.)	
M8 Connector Color/pins	White, 4-pin	Blue, 6-pin
Wires		
AWG	26	
Brown	USP	
Blue	GND	
Black	Sync	OUT
White	na	na
Green	na	Sync
Gray	na	Output-Selector

Table 14

### 4.16.6 General

Attribute	Value
EMC emission	EN 12015:2014
EMC immunity	EN 12016:2013 ISO 22200:2009
Vibration	IEC 60068-2-6:2007
Shock	IEC 60068-2-27:2008
Cable durability	IEC 60227-2:2003
RoHS	2011/65/EU

Certificates:	
cCSAus	A17.5-2019 / CSA B44.1-19
Liftinstituut	A17.1-2019 / CSA B44-19
CE	EN 81-20

Table 15

### 4.17 Dimensions

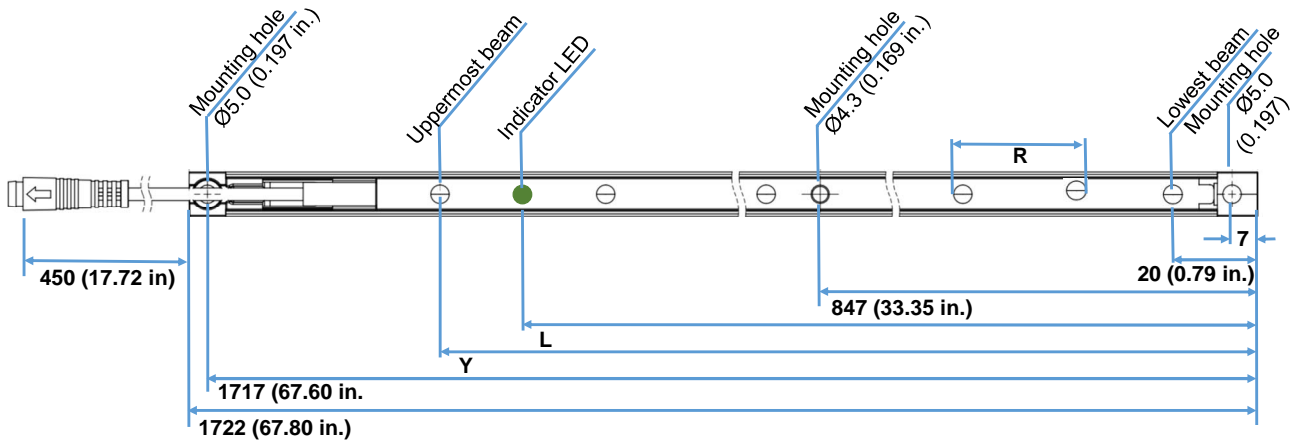


Figure 16: Dimensions cegard/Pro (CabSafe 2D) light curtain

Numbers of elements	Position lowest beam	Y (safety length)	Mechanical length	Resolution R	Indicator LED L	Mounting hole 1 Ø 5 mm (Ø 0.197 in.)	Mounting hole 2 Ø 4.3 mm (Ø 0.17 in.)	Mounting hole 3 Ø 5 mm (Ø 0.197 in.)
36	20 (0.787 in.)	1600 (63 in.)	1722 (67.8 in.)	≤ 50 (3.15 in.)	1574 (61.97 in.)	7 (0.276 in.)	847 (33.35 in.)	1717 (67.60 in.)

Table 16: Dimensions

## 5 Disposal

The CabSafe-System or components of the CabSafe-System should only be replaced if a similar protection device is installed. Disposal should be done using the most up-to-date recycling technology according to local regulations and laws. There are no harmful materials used in the design and manufacture of the sensor. Traces of such dangerous materials may be found in the electronic components but not in quantities that are harmful.

### Waste Electrical and Electronic Equipment (WEEE):

At the end of life, this equipment should be collected separately from any unsorted municipal waste.

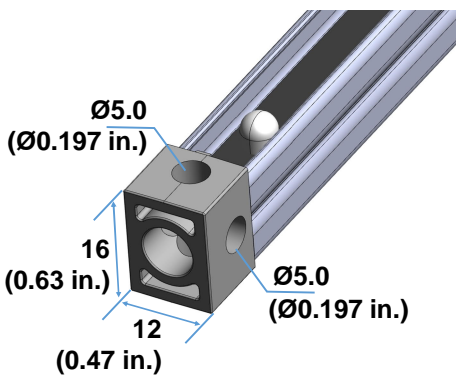


Figure 17: Cross section cegard/Pro (CabSafe 2D) light curtain