CEDES

Installation and Operation Manual (North America Version)

Light Curtain for Elevator Door Protection cegard/Max-NT





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☑ IMPORTANT NOTES

FOLLOW THE INSTRUCTIONS GIVEN IN THIS MANUAL CAREFULLY. FAILURE TO DO SO MAY CAUSE CUSTOMER COMPLAINTS OR SERIOUS CALL BACKS. KEEP INSTRUCTION MANUAL ON SITE.

IT IS THE RESPONSIBILITY OF THE SPECIFIER, PURCHASER AND INSTALLER TO ENSURE THAT ON COMPLETION, THE INSTALLATION COMPLIES WITH ALL RELEVANT FEDERAL, STATE AND LOCAL CODES AND REGULATIONS THAT APPLY TO YOUR APPLICATION.

FOR ELEVATOR APPLICATIONS, PARTICULAR ATTENTION SHOULD BE GIVEN TO CLAUSE 2.13.5 REOPENING DEVICES FOR POWER-OPERATED CAR DOORS OR GATES OUTLINED IN ANSI-ASME A17.1-2016 / CSA B44-16 SAFETY CODE FOR ELEVATORS AND ESCALATORS OR AN EARLIER VERSION OF THIS STANDARD REQUIRED BY THE AUTHORITY HAVING JURISDICTION (AHJ).

THIS PRODUCT CANNOT FULFILL ANSI-ASME A17.1-2019 / CSA B44-19 SAFETY CODE FOR ELEVATORS AND ESCALATORS OR LATER VERSIONS DUE TO NEW REQUIREMENTS FOR SELF-MONITORING AND INTEGRATION OF APPROACHING OBJECT DETECTION. CONTACT YOUR LOCAL CEDES REPRESENTATIVE IF YOU NEED ASSISTANCE WITH PRODUCT SELECTION TO FULFILL THE REQUIREMENTS IN THIS VERSION OF THE CODE.

THESE LIGHT CURTAIN SYSTEMS MUST BE INSTALLED ONLY BY AUTHORIZED AND FULLY TRAINED PERSONNEL. FOLLOW ALL NECESSARY SAFETY PRECAUTIONS DURING THE INSTALLATION PROCESS, INCLUDING TAKING THE ELEVATOR AND DOOR OUT OF SERVICE DURING INSTALLATION.

PLEASE TAKE NOTE THAT OBJECTS THINNER THAN THE BEAM SPACING MAY NOT BE DETECTED.



<u>DO NOT USE</u> THIS PRODUCT FOR THE PROTECTION OF DANGEROUS MACHINERY OR IN EXPLOSIVE ATMOSPHERES OR RADIOACTIVE ENVIRONMENTS. USE ONLY SPECIFIC AND APPROVED TYPES OF SAFETY DEVICES FOR SUCH APPLICATIONS. OTHERWISE SERIOUS INJURY OR DEATH MAY OCCUR.







WHEN SUPPLY VOLTAGES GREATER THAN 42 VOLTS ARE USED, THE INTERFACE WIRING TO THE POWER SUPPLY AND TO THE DOOR DRIVE MUST BE MADE THROUGH A GREENFIELD FITTING.

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1. Operation

The cegard/Max-NT is ideal for improved comfort and safety in elevator door protection applications where nudging and fire recall functions are required in the light curtain controller. Complete modernization kits, a vast range of accessories and special configurations are available.

The cegard/Max-NT infrared light curtain kits generally include a control unit the following components:

- (A) Transmitter edge with white connector
- (B) Receiver Edge with blue connector
- (C) Transmitter cable with white connectors
- (D) Receiver cable with blue connectors
- (E) Control unit.

Kits may also include the following components:

- Mounting profiles (MP),
- Spacer profiles (SP),
- Vision shields (VS)
- Ccable guide wires (CGW)
- Protective tubing (PT), and
- Additional hardware (e.g. screws, ties, etc.)
- Other accessory items

The transmitter and receiver should be mounted so that the LEDs are facing opposite each other such that the protective field that is formed between the transmitter and receiver units provides the desired coverage (e.g. the elevator cab entrance).

The cegard/Max-NT control unit is mounted within reach of the ends of the transmitter and receiver cables (e.g. on the car top or in a nearby operating panel). The control unit acts as an interface between the light curtain system and the door control system.

To increase the lifetime of the electronic components, especially the infrared transmitter elements, the control unit continuously controls the light emitting power based on the distance between the transmitter and the receiver. When the doors are closed, the emitting power is nearly zero. This function also prevents optical bypassing at the car door sill.

The mounting components included in the cegard/Max-NT light curtain kit support both side opening door and center opening elevator applications. The components are suitable for new installations and the modernization of existing elevators.

2. Failsafe Operation

☑ Important

During normal operation, the cegard/Max-NT light curtain system provides comfort for passengers by signaling the elevator control system to reopen the elevator cab doors. That said, infrared door protection systems, including the cegard/Max-NT light curtain system, cannot provide absolute safety for elevator passengers passing through the elevator cab entryway as they are only a component of the overall elevator door protection system.

Light curtains are not allowed to be the final failsafe device of the door mechanism. A failsafe force and kinetic energy limiter must provide the ultimate safety function.

Due to the nature of door system designs, there are extremely rare occurrences when the elevator doors can close even when an object or person is present. Therefore, federal, state and local codes require other safety means to prevent passengers from being hurt by the elevator doors during closure. These dangerous situations should be detected by the elevator control, which should take the elevator out of service. Final safety responsibility remains with the elevator integrator and/or contractor.

3. Power Supply

The cegard/Max-NT control unit contains state-of-theart-technology that supports a wide-range of supply voltages without any adjustment or special wiring.

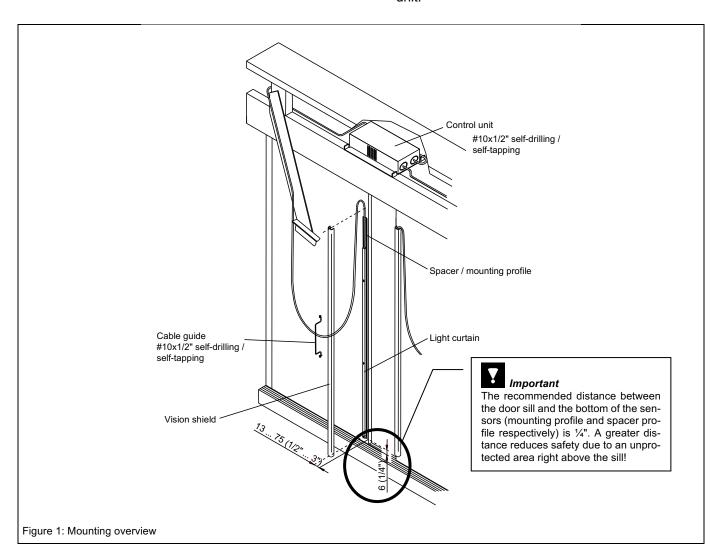
Voltages from 17 ... 265 Volts AC or DC can be used and the cegard/Max-NT light curtain system. When DC voltage is used the polarity of terminals P and N is irrelevant. This feature is very useful, especially for modernization, where the supply voltage on the car top may not be precisely known.

The incoming power must be fused with a maximum fuse rating of 10 A.

4. Installation

The following sequence should be followed for installation:

- Open the shipping box and verify that all components are all present according to the bill of material (See Chapter 7)
- 2. Use proper barricading and displays to prevent public entry into the work area
- 3. Ensure that the elevator is taken out of service to prevent movement during installation (e.g. lockout / tagout procedure).
- 4. Install the transmitter / receiver with the mounting or spacer profile to the door wings or to the slam post (additional description provided later in this section).
- Guide the cables of the transmitter and receiver to the control unit using the cable binders provided. Install the cable guide to minimize cable swing during operation.
- Install the control unit on the car top or in the control cabinet.
- 7. Connect power to the controller.
- 8. Power-up the controller and perform testing.
- 9. Snap on the vision shields to cover the transmitter and receiver units and install the cover to the control unit.



4.1. Mounting transmitter and receiver

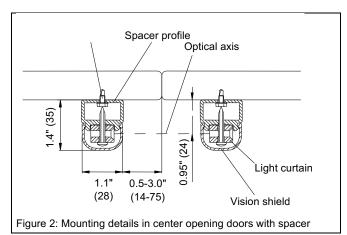
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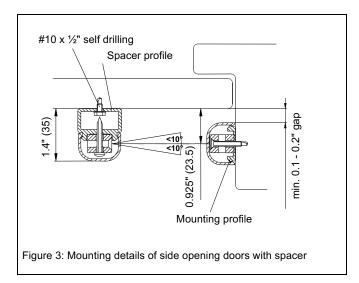
Important

It is important that the active parts of the transmitter and receiver units are mounted so that they face each other. The active sensor part is the side with the round black lenses. When used, the top end of the mounting profile should be fixed with a self tapping screw. Transmitter and receiver should be securely fastened and not be bent or exposed to tension.

We recommend installation of the sensors as far away as possible from the leading door edges to prevent them from being damaged, e.g. by vandalism.

Figures 2 and 3 provide mounting examples for mounting the transmitter and receiver edges in different applications. The edges may be directly mounted to the surfaces, or utilize mounting profiles, spacer profiles and vision shields as shown in the diagrams.

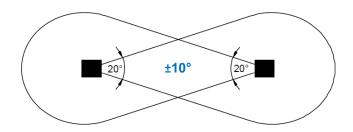




Important Notes

Do not bend the long components! The transmitter and receiver units are optoelectronic devices that can be damaged when they are bent. The long components in the kit may also be damaged (e.g. mounting profiles) if excessive bending occurs.

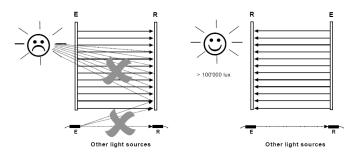
It is important that the alignment angle of the transmitter to the receiver is less than \pm 10° when the door is fully closed. We recommend that you keep the optical angle close to zero (see Figures 2 and 3).



When light curtains are used for modernization, the alignment angle between the transmitter and receiver may be more than \pm 10°. In this case a spacer profile can be used to shift the sensor unit by 0.63" toward the same axis as the sensor unit. See ordering information for these components.

When using vision shields, you need to provide a minimal gap between the mounting profile of the light curtain and a perpendicular mounting surface immediately to the left or right of the mounting profile. Otherwise, you will be unable to snap on the vision shield over the light curtain (see Figure 3).

The cegard/Max-NT light curtain is designed to have high immunity to ambient light conditions (100 kLux). Avoid exposing the receiver unit to sources of light that exceed this value (e.g. strobe lights, other optical sensors and direct sunlight) as it may be "blinded" by the light source. For these applications, orient the receiver such that it is not exposed to the light source or by installing it in a U-channel that prevents the light source from being seen directly by the receiver.



4.2. Cable guidance

The cegard/Max cables are color coded. The transmitter cable features white connectors and the receiver cable features blue connectors. The round cable end connects to the corresponding color-coded transmitter or receiver edge and the RJ-45 end plugs directly into the corresponding color-coded plug on the control board.

☑ Important

Pay close attention to 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 in applications where the light curtain is mounted on a moving door, while a poorly installed cable may break after less than 100,000 door movements.



Do not expose the cables to oil or other greasy liquids.

Ensure that the cable bending radius is greater than 3.2 inches (80 mm) when cables are mounted.

As shown in Figure 4, guide the cables of the transmitter and receiver to the control unit. A small bending radius reduces the cable lifetime dramatically. Use the cable binder **A** to fix the cable in place. Do not use plastic cable ties to secure the cable directly as this reduces the lifetime of the cable. Install the cable guide wire **B** to minimize potential cable swing.

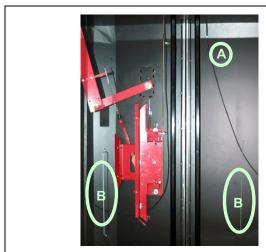


Figure 4: Cable protection tube

The standard cable length of is 16 ft (5 m). An extension cable of 10 ft (3 m) is available to extend the total length to a maximum of 26 ft (8 m). Extension cables are often used for tall elevator cars with door heights up to 10 ft (3 m)

4.3. Installation of the control unit

The cegard/Max-NT control unit (see Figure 5) can be mounted horizontally or vertically using #10 x $\frac{1}{2}$ " self drilling / self tapping screws. An ideal mounting location is shown in Figure 1.



Important

Printed Circuit Boards (PCBs) are sensitive to electrostatic discharge and must therefore be handled with care to prevent damage. Be sure to implement antistatic procedures when handling control boards.

4.4. Electrical Installation

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



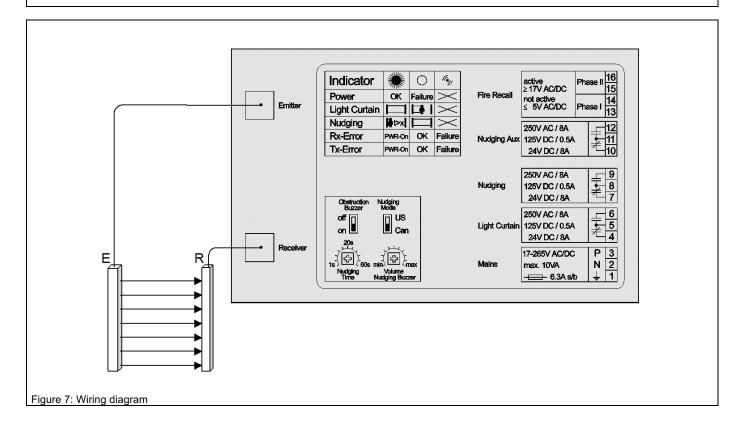
Connect all wiring with more than 42 V through a Greenfield Fitting.

Disconnect power before opening the control unit to prevent electrical shock.

Do not remove inside cover or fuse cap.



Figure 6: Final installation with Greenfield Fittings (e.g. from Thomas & Betts or other UL / CSA approved manufacturer)



☑ Important

Before connecting electrical power, please ensure that the power is switch to an off state in accordance with local regulations (i.e. lockout / tagout). You must ensure that system cannot inadvertently start up while you are connecting the devices.

4.4.1. Power supply

Connect power to terminals as shown in Figure 7.

N : AC neutral; plus or minus for DCP : AC Hot; plus or minus for DC

(1): Protective ground

The incoming power must be fused \leq 10 A current.

The label on the cegard/Max-NT controller provides terminal information for the electrical connections as well as LED status information and DIP switch and potentiometer settings.

4.4.2. Transmitter and Receiver Connections

The white transmitter connector must be plugged into the white marked plug. The blue receiver connector must be plugged into the blue marked plug.

4.4.3. Fire recall

Phase I: AC Hot, plus or minus for DC AC neutral, plus or minus for DC Phase II: AC Hot, plus or minus for DC Common II: AC neutral, plus or minus for DC

Fire Recall Phase I

If the input labeled "Fire Recall Phase I" is activated, the light curtain is disabled, and nudging is enabled. The nudging buzzer sounds and remains on during door close and until the car arrives at the designated landing. The buzzer remains on for 15 seconds after the "Fire Recall Phase I" input is deactivated.

Fire Recall Phase II

If the input labeled "Fire Recall Phase II" is activated, the light curtain output is disabled. The nudging function works independent of "Fire Recall Phase II". Operation of the doors is taken over by people (i.e. firemen) eliminating the need for automatic reopening and to guard against false opening caused by smoke.

☑ Important

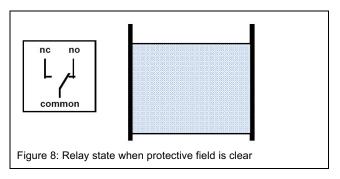
This cegard/Max-NT light curtain is not a safety rated device. A broken wire at the "Fire Recall Phase I" or "Fire Recall Phase II" terminal or the use of faulty electrical or electronic equipment may prevent the elevator from entering into the corresponding Fire Recall state. In this case, the corresponding "Fire Recall" input signal will not be recognized and doors will not close as required by code. The elevator integrator / contractor is responsible for ensuring that this condition cannot be allowed to occur.

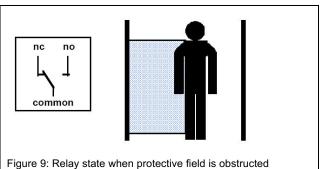
4.4.4. Output relay

The light curtain Normally Open contact of the output relay is energized when the detection beams are clear of any obstruction and the transmitter and receiver are aligned. The Normally Open contact of the output relay is deenergized during a beam obstruction, a fault condition or with no power applied.

☑ Important

The contact rating of the output relay is maximum $250 \, \text{VAC} / 8 \, \text{A}$, $125 \, \text{VDC} / 0.5 \, \text{A}$, $30 \, \text{VDC} / 8 \, \text{A}$, and minimum $5 \, \text{VDC} / 10 \, \text{mA}$. Make sure that you use a pilot relay when switching higher voltage DC loads greater than $0.5 \, \text{A}$.





4.4.5. Nudging and Nudging-AUX relay

The nudging and nudging-AUX relays are energized when there is an obstruction longer than the Nudging time specified by the nudging potentiometer. These relays are deenergized in normal operation or with no power applied.

The nudging time can be set from 1 s up to 60 s. The factory setting is 20 s. The volume of the nudging buzzer can be set to a recommended level from normal to loud.

4.4.6. Nudging function

The interruption time of the light curtain is monitored. When this time exceeds the defined nudging time, the nudging relay will be energized and a warbling buzzer will sound. The nudging time can be adjusted by the corresponding nudging time potentiometer. Factory setting is 20 seconds. The volume of the nudging buzzer can

be adjusted with a potentiometer. Factory setting is maximum volume.

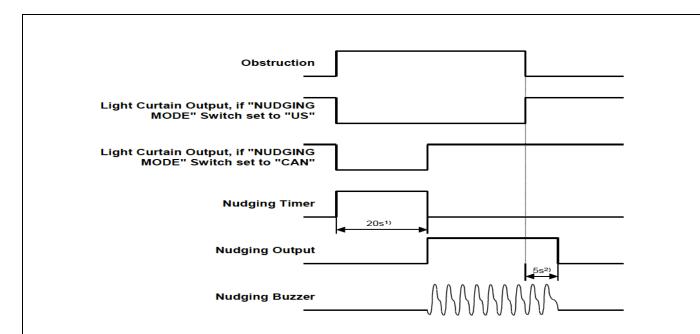
American / Canadian Nudging:

In some elevator controllers, it is desirable to drop the "Light Curtain" contact after nudging triggers. In other cases, it is not necessary. This issue was discovered in Canada and therefore the switch is dubbed the American / Canadian nudging option.

- American Version Light curtain relay drops for the duration of the obstruction
- Canadian Version Light curtain relay re-picks when nudging starts

☑ Important

The nudging relay and nudging-AUX relay contact rating is 250 VAC / 8 A, 125 VDC / 0.5 A, 30 VDC / 8 A, min. 5 VDC / 10 mA. Use a pilot relay if switching 125 VDC loads that exceed 0.5 A.



- 1) Nudging time is adjusted using the Nudging Time potentiometer. Factory default is 20 seconds.
- ²⁾ The nudging output is held for 5 seconds after the obstruction is removed to let the door close.

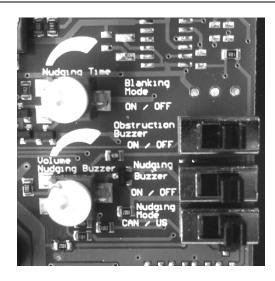
Figure 10. Nudging timing diagram

Specifications of the Nudging function:

poolitious of the stanging function.					
Designator	Min.	Max.	Comments		
Nudging time	1 sec.	60 sec.	Logarithmic adjustment by potentiometer. Factory setting to 20s.		
Nudging Hold Time	4 sec.	6 sec.	Fixed, Time nudging remains active after light curtain becomes clear		
Nudging Status Indicator	-	-	Green LED is ON when nudging is active		
Nudging Buzzer	-	-	Warbling tone when nudging is active. Volume adjustable via a potentiometer. Turn OFF using the Nudging Buzzer ON/OFF switch.		

4.5. Power-up and test

Ensure that all job site wiring and connections are correct and then apply power. The controller beeps several times for approximately 2-3 seconds. After this start-up beeping, the output relay will energize if no obstruction exists so that the doors can close. However, when there is any obstruction of the detection area, the relay will remain de-energized until the area is free and all light curtain beams are clear of obstruction.



Status LED	LED ON	C LED OFF	FLASH
Power	OK	No Power	N/A
Light curtain			N/A
Nudging			N/A
Rx Error	ON Constant	OK	Failure
Tx Error	ON Constant	ОК	Failure

Figure 11: Normal operation

With the obstruction of one or more beams the light curtain output relay will deenergize and the 'OUT' LED will illuminate to indicate an obstruction has occurred.

Installation tip

When the obstruction buzzers switch is in the ON postion using the sliding switch (see Figure 11), an audible signal occurs when a beam has been obstructed. If the nudging buzzer switch is in the ON position and an obstruction has occurred for longer than the nudging time, an audible warbling signal will occur. This function is very helpful after installation to check the proper function of the light curtain. To shut off all audible signals, set both the obstruction buzzer and the nudging buzzer switches to the OFF position.

If the light curtain does not operate as described in this section, please refer to Chapter 6 'Troubleshooting'.

4.6. Snap on the vison shield

The vision shield is a protective plastic part that covers the transmitter and receiver and is available as part of several light curtain kits or as an optional component. It allows infrared light to pass through with virtually no loss of light intensity and is made from a polycarbonate material that is both robust and chemically resistant to many alcohols and cleaning solvents.

When vision shields are included in the light curtain kit, the installation of the vision shields is easy and simple. However, please take note that the vision shield cannot be easily adjusted once it is installed. Starting at the right point is optimal. Otherwise you may need to remove the vision shield and start 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 INCHES by spreading the side walls of the vision shield.
- 3. Snap in FROM BOTTOM TO TOP and bend the vision shield slightly backwards.
- 4. Clean the vision shield for a nice appearance with a soft and dry towel.

4.7. Maintenance

No special maintenance is required for the cegard/Max-NT light curtain system. We recommend checking the proper function of the light curtain installation during normal service of your system. Proper function of the light curtain is evident when

- Doors reopen immediately when an obstruction of the detection area occurs
- The transmitter and receiver are fastened securely
- · Cables are secured and mounted correctly

☑ Important

Do not use any aggressive cleaning solvents like acetone or trichloride or mechanically abrasive towels to clean the vision shields, the receiver edge or the transmitter edge. This may cause damage to the components and prevent proper operation. We strongly recommend using standard window cleaner or soap and water for cleaning.

4.8. Disposal

The cegard/Max-NT light curtain system has been designed to minimize environmental impact. It uses only a minimum of power and natural resources. At work, always act in an environmentally responsible manner. For this reason, please note the following information on disposal.

The light curtain should only be replaced if a similar door protection device is installed. There are no harmful materials used in the design and manufacture of the light curtain. Traces of such dangerous materials may be used in the electronic components but not in quantities that are harmful to health.

Always dispose of unserviceable or irreparable devices in compliance with applicable rules and regulations.

5. Troubleshooting

If the light curtain does not operate as described in Chapter 5.5 Power-up and Test, the following troubleshooting procedure is useful for remedying any installation problems:

		LED I	ndicator \$	Status			
Problem	Power	Light curtain	Nudging	Rx-Error	Tx-Error	What to check?	
No function door open	0	0	0	0	0	 Power supply good? Fuse blown? Power wire broken or not connected? Defect control unit? 	
Door open and Detection Zone is Clear	*	0	or O	0	0	 Verify that all beams are clear of obstruction. Are the sensor LEDs facing each other? Are sensors or vision shields dirty? Bad alignment? Excessive EMC interference e.g. from door drive or fluorescent lamps? No or bad grounding (PE) connection? 	
Random door opening	*	(P)	or O	0	0	 Are sensors or vision shields dirty? Excessive EMC interference e.g. from door drive or fluorescent lamps? No or bad grounding (PE) connection? Damaged cable to the receiver or transmitter, check for break in the cables by moving the cable by hand? Interference with other infra red sensors with the receiver directly or via mirroring from shiny surfaces? 	
Receiver problem	*	0	or O	6	0	 Receiver not connected? Transmitter connected to the receiver plug instead of the transmitter plug? Cable to the receiver broken or defective receiver? Extension cables too long? 	
Transmitter problem	*	0	or O	0	•	 Transmitter not connected? Receiver connected to the transmitter plug instead of the receiver plug? Cable to the receiver broken or defective transmitter? Extension cables too long? 	
Transmitter and receiver problem	*	0	or O	رمی	(a)	 Transmitter and receiver connected? Transmitter and receiver connected to the correct plug? 	

Caption:

∴ LED off∴ LED on

🎐 : LED Flashing

6. Technical Data

6.1. Specifications

Description	Value		
Number of criss-cross light beams	154		
Number of elements / straight light beams	32		
Typical response time	90 ms		
Maximum response time	180 ms		
Operating range	0 to 16 ft (0 to 5 m)		
Power supply voltage (see Important notes below)	17 265 VAC / DC		
Maximum Power consumption	10 VA at 115 / 230 VAC; 200 mA at 24 VDC		
Relay outputs (see Important notes below)	AC: 250 VAC / 8 A DC 125 VDC / 0.5 A 30 VDC / 8 A, min. 5 VDC / 10 mA		
Fire Recall I / Fire Recall II	Active : 17 265 VAC / DC, Inactive : 0 5 VAC / DC		
Ambient light resistance	> 100,000 Lux		
Temperature range			
- Operation	-5° to 150° F (-20+65°C)		
- Storage and transport	-20° to 220° F (-30+85°C)		
Maximum Door speed	5.3 ft/s (1.6 m/s)		
Standard cable length of the sensor (detachable)	16 ft (5 m)		
Extension cables for Tx and Rx (ordered separately)	10 ft (3 m)		
Cable lifetime (when correctly installed)	20 million door movements		
Enclosure rating			
- Sensors	Type 4 (IP 65)		
- Control unit	Similar to Type 1 (IP 30)		
Vibration and shock resistance	IEC 68-2-6 / IEC 68-2-29		
EMC	EMC Directive 89/336/EEC EN 12015 EN 12016		

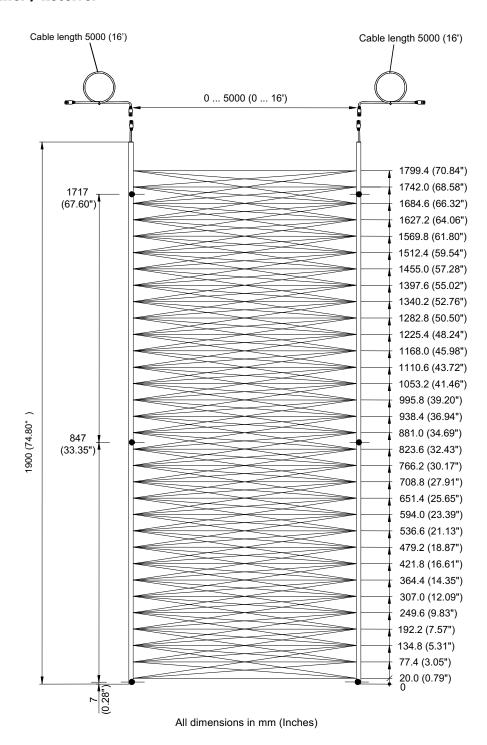
■ Important Notes:

Use "Greenfield Fittings" when Voltage connections above 42 Volts to the Controller.

Use a pilot relay (not included) for switching high voltage DC loads greater than 0.5A at the relay output(s).

6.2. Dimensions

6.2.1. Transmitter / Receiver



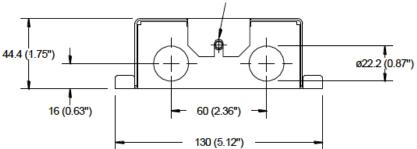
- Cross section of the transmitter / receiver edges:
- Diameter of mounting holes:

12 x 16 mm (0.47" x 0.63")

4.5 mm (0.18")

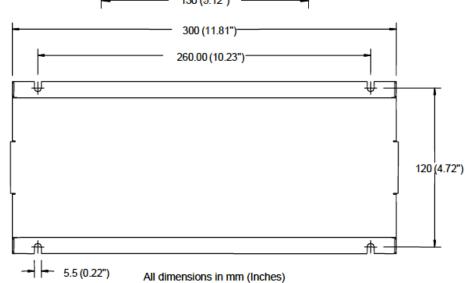
6.2.2. Control unit with housing

Use M5 bolt (included in hardware bag) at both ends of housing to secure cover.



For mounting the controller, use:

- Thruss head screw DIN 85 M5x10-St.4.8 Zinc or equivalent; with
- Serrated washer DIN 6798-A-5 FSt or equivalent



6.3. Bill of material and part numbers

CEDES Part Number: 106 700 cegard/Max-154NT kit consists of the following components:

CEDES Part No.	Description	Qty Included in Each Kit
103 117	cegard/Max NT control unit	1
103 979	cegard/Max-154 Receiver Unit	1
103 978	cegard/Max-154 Transmitter Unit	1
102 788	cegard/Max Receiver Cable, 16 ft (5 m) Length	1
102 787	cegard/Max Transmitter Cable, 16 ft (5 m) Length	1
102 995	Cable Guide Wire	2
102 973	Spacer Profile, 7 ft Length	2
102 751	Mounting Profile, 7 ft Length	1
102 250	Vision Shield, 7 ft Length	2
102 975	Hardware Bag - Including Screws and Cable Binders	1
106 258	Installation and Operation Manual	1