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## 1. GENERAL INFORMATION

### 1.1. General description of the SAFEasy™ safety light curtains

The SAFEasy™ safety light curtains – SE Series – are optoelectronic multibeam devices that are used to protect working areas that, in presence of machines, robots and automatic systems in general, can become dangerous for operators that can get in touch, even accidentally, with moving parts.

The SAFEasy™ devices are Type 2 or Type 4 intrinsic safety systems, used as accident-prevention protection devices and are manufactured in accordance with the international Standards in force for safety, in particular:

**CEI EN 61496-1: 2004** Safety of machinery:  
electro-sensitive protective  
equipment. General  
requirements and tests.

**CEI IEC 61496-2: 1997** Safety of machinery:  
electro-sensitive protective  
equipment. Particular  
requirements for equipment  
using active opto-electronic  
protective devices.

The device, consisting in one emitting and one receiving units housed inside strong aluminium profiles, generates infrared beams that detect any opaque object positioned within the light curtain detection field.

The emitting and the receiving units are equipped with the command and control functions. The connections are made through a M12 connector located in the lower side of the profile.

The synchronisation between the emitter and the receiver takes place optically, i.e. no electrical connection between the two units is required.

The microprocessors guarantee the check and the management of the beams that are sent and received through the units: the microprocessors – through some LEDs – inform the operator about the general conditions of the light curtain and about eventual faults (see section 7 “Diagnostic functions”).

During installation, two yellow LEDs facilitate the alignment of both units (see section 5 “Alignment procedures”).

As soon as an object, a limb or the operator’s body accidentally interrupts the beams sent by the emitter, the receiver immediately opens the OSSD output and blocks the machine (if correctly connected to the OSSD).

**Note:** *The following abbreviations, defined by the Standards in force, will be used in this manual:*

**AOPD** *Active opto-electronic protective device*

**ESPE** *Electro-sensible protective equipment*

**OSSD** *Output signal switching device (switching output)*

**TX** *Emission device*

**RX** *Receiving device*

Some parts or sections of this manual containing important information for the operator are preceded by a note:



Notes and detailed descriptions about particular characteristics of the **SAFEasy™** safety devices in order to better explain their functioning; special instructions regarding the installation process.



The information provided in the paragraphs following this symbol is very important for safety and may prevent accidents. Always read this information accurately and carefully follow the advice to the letter.

This manual contains all the information necessary for the selection and operation of the **SAFEasy™** safety devices.

However, specialised knowledge not included in this technical description is required for the planning and implementation of a safety light curtain on a power-driven machine.

As the required knowledge may not be completely included in this manual, we suggest the customer to contact DATASENSOR Sales Technical Service for any necessary information relative to the functioning of the SE series light curtains and the safety rules that regulate the correct installation (see section 8 “Checks and periodical maintenance”).

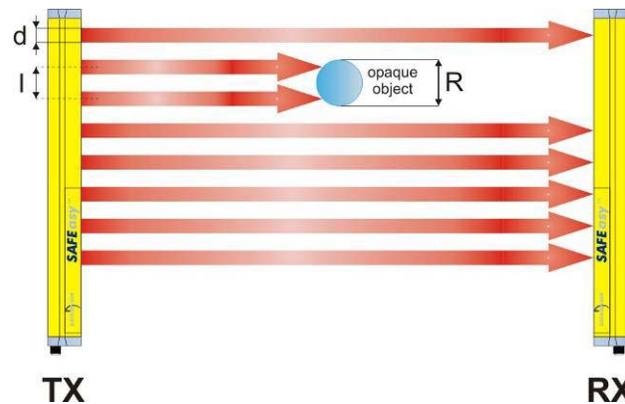
**1.2. How to choose the device**

There are at least three different main characteristics that should be considered when choosing a safety light curtain:

- **The resolution** strictly depending on the part of the body to be protected:

R = 14mm	finger protection	
20mm ≤ R ≤ 40mm	hand protection	 
R > 40mm	body protection	 

 The resolution of the device is the minimum dimension which an opaque object must have in order to obscure at least one of the beams that constitute the sensitive area.  
As shown in Fig.1, the resolution only depends on the geometrical characteristics of the lenses, diameter and distance between centres, and is independent of any environmental and operating condition of the safety light curtain.



**Fig. 1**

The resolution value is obtained applying the following formula:

$$R = l + d$$

Fig.2 shows the optical distance between the optic interaxis (I) and the resolution (R), with reference to the safety light curtains for body protection.

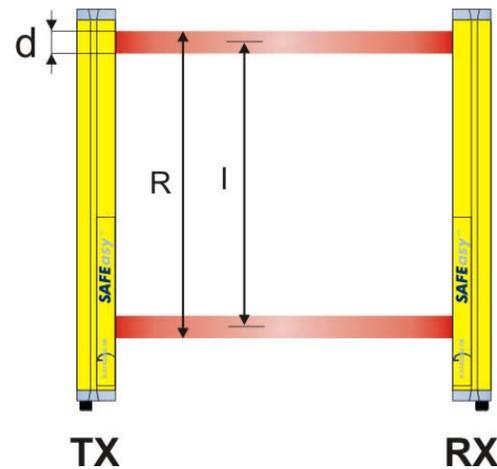


Fig. 2

The values of the safety light curtains for body protection (standard production) are shown in the table.

Model	Optic interaxis mm (I)	N° optics (n)	Resolution mm (R)	Optics Ø mm (d)	Operating distance m
SE*-P2-050	500	2	515	15	50
SE*-P3-080	400	3	415	15	50
SE*-P4-090	300	4	315	15	50
SE*-P4-120	400	4	415	15	50
SE4-Q2-050	500	2	515	15	25
SE4-Q3-080	400	3	415	15	25
SE4-Q4-090	300	4	315	15	25
SE4-Q4-120	400	4	415	15	25

(\*) 2 or 4 depending on the safety category.

**Note:** Safety light curtains for body protection with sensitive area heights and optic interaxis different from the standard versions can be manufactured upon specific request.

English

- **The height of the protected area**

It is important to distinguish between “Height of the sensitive area” and “Height of the controlled area” (see Fig.3).

- The height of the sensitive area is the distance between the lower and the upper limits respectively of the first and the last lens.
- The height of the controlled area is the effectively protected area; it delimits the area where an opaque object with larger or equal dimensions respect to the resolution of the safety light curtain may certainly cause the interruption of a beam.

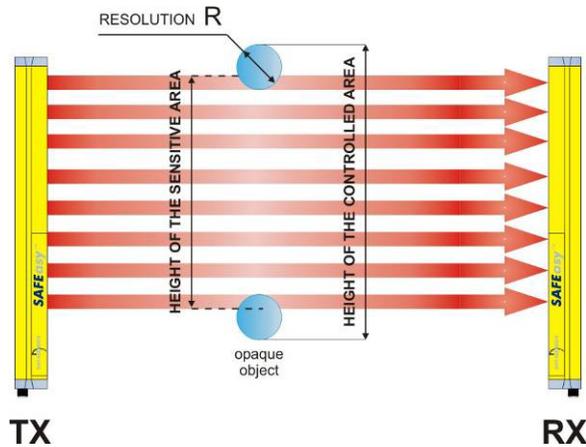


Fig. 3

- **The safety distance**

It is important to carefully calculate the distance between the point where the safety device will be placed and the possible danger associated with the machine to be protected (see *section 2 “Installation mode”* for the calculation of the safety distance).

### 1.3. Typical applications

The **SAFEasy™** safety light curtains are used in all automation fields where the control and protection of access to dangerous zones is necessary.

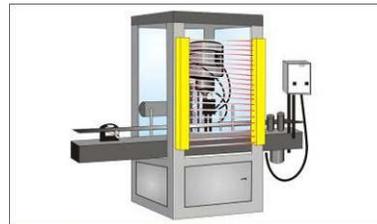
In particular they are used to stop the moving mechanical parts of:

- Automatic machines
  - Packaging machines, handling machines, storing machines
  - Wood working machines, glass working machines, ceramics working machines, etc.
  - Automatic and semi-automatic assembly lines
  - Automatic warehouses
- Presses, punching machines, benders and cutters



In food industry applications, DATASENSOR Technical Service has to verify the compatibility of the material of the safety light curtain housing with any chemical agents used in the production process.

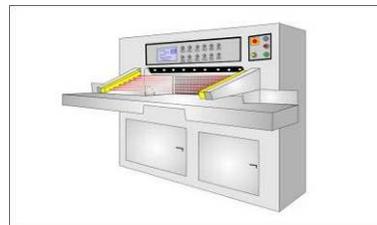
The following pictures show some main applications.



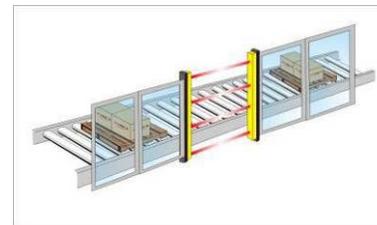
*Automatic packaging machines*



*Presses and punching machines*



*Benders and cutters*



*Conveyor belts*

#### 1.4. Safety information



The following points must be observed for a correct and safe use of the **SAFEasy™** safety device:

- The stopping system of the machine must be electrically controllable.
- This control system must be able to instantly stop the dangerous movement of the machine during all the phases of the working cycle.
- Mounting and connection of the safety light curtain must only be carried out by qualified personnel, according to the indications included in the special sections (*refer to sections 2; 3; 4; 5; 6*).
- The safety light curtain must be securely placed in a particular position so that access to the danger zone is not possible without the interruption of the beams (*see section 2 "Installation mode"*).
- The personnel operating in the dangerous area must be well trained and must have adequate knowledge of all the operating procedures of the safety light curtain.
- The TEST/START button must be located outside the protected area as the operator must check the protected area during all the Test, Override and Reset operations.
- The external signalling lamp of the active Muting must be visible from any operating side

## 2 INSTALLATION MODE

### 2.1. Precautions to be observed for the choice and installation of the device



- Make sure that the protection level assured by the SAFEasy™ (2 or 4 Type) is compatible with the real danger level of the machine to be controlled, according to EN 954-1.
- The outputs (OSSD) of the ESPE must be used as stopping devices of the machine and not as command devices. The machine must have a own START command.
- The dimension of the smallest object to be detected must be larger than the resolution level of the ESPE.
- The ESPE must be installed in a place compatible with the technical characteristics shown in section 9.
- Do not place the device, in particular the receiving unit, near any intense light sources.
- Strong electromagnetic interferences can compromise the correct functioning of the device. DATASENSOR suggests contacting its own Technical Service when this problem occurs.
- The operating distance of the device can be reduced by 50% in the presence of smog, fog or airborne dust.
- A sudden change in environment temperature, with very low minimum peaks, can generate a small condensation layer on the lenses and so jeopardise functioning.

English

**2.2. General information on the device positioning**

The device should be carefully positioned, in order to reach a very high protection standard. Access to the hazardous area must only be possible by passing through the protecting safety light beams. Fig.4a shows some examples of possible accesses to the machine from the top and the bottom sides. These situations may be very dangerous so and so the installation of the safety light curtain at sufficient height in order to completely cover the access to the dangerous area (Fig.4b) becomes necessary.

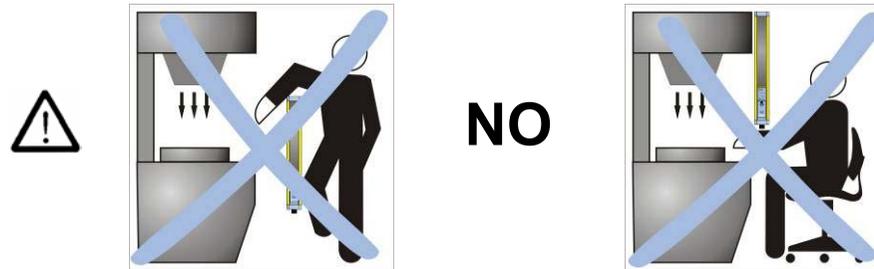


Fig. 4a

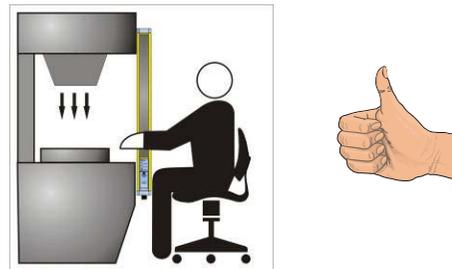


Fig. 4b

In normal operating conditions, the starting of the machine must not be possible while operators are inside the hazardous area. When the installation of the safety light curtain near to the dangerous area is possible, a second light curtain must be mounted in a horizontal position in order to prevent any lateral access (as shown in Fig.5b).

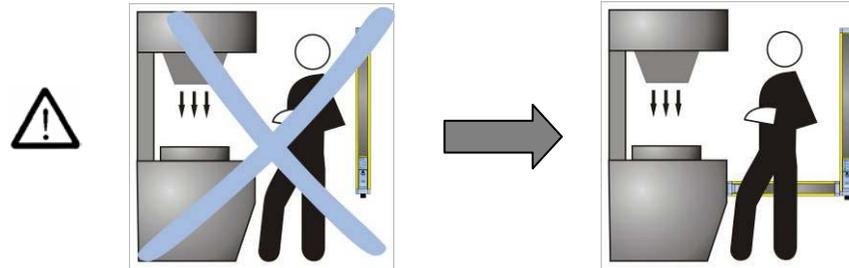


Fig. 5a

Fig. 5b

If the operator is able to enter the dangerous area and is not intercepted by the beams, an additional mechanical protection must be mounted to prevent the access.

English

### 2.2.1. Minimum installation distance

The safety device must be placed at a specific safety distance (Fig.6). This distance must ensure that the danger zone cannot be reached before the dangerous motion of the machine has been stopped by the ESPE.

The safety distance depends on 4 factors, according to the EN-999, 775 and 294 Standards:

- 1 Response time of the ESPE (the time between the effective interception of the beams and the opening of the OSSD contacts).
- 2 Machine stopping time (the time between the effective opening of the contacts of the ESPE and the real stop of the dangerous movement of the machine).
- 3 ESPE resolution.
- 4 Approaching speed of the object to be intercepted.

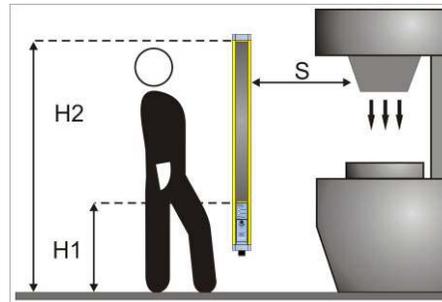


Fig. 6

The following formula is used for the calculation of the safety distance:

$$S = K (t_1 + t_2) + C$$

where:

- S** = Minimum safety distance in mm.
- K** = Speed of the object, limb or body approaching the dangerous area in mm/sec.
- t<sub>1</sub>** = Response time of the ESPE in seconds (see section 9 "Technical data")
- t<sub>2</sub>** = Machine stopping time in seconds.
- d** = Resolution of the system.
- C** = **8 (d -14)** for device with resolution ≤ 40mm  
= **850 mm** for device with resolution > 40mm

**Note:** The value of K is:

**2000 mm/s if the calculated value of S is  $\leq$  500 mm**

**1600 mm/s if the calculated value of S is  $>$  500 mm**

When the dangerous area can be reached through the upper and lower sides of the machine, where devices with  $>40$  mm resolution are used, the height of the top beam has to be  $\geq$  900 mm (H2) while the height of the bottom beam has to be  $\leq$  300 mm (H1).

If the safety light curtain must be mounted in a horizontal position (Fig.7), the distance between the dangerous area and the most distant optic beam must be equal to the value calculated using the following formula:

$$S = 1600 \text{ mm/s } (t_1 + t_2) + 1200 - 0.4 H$$

where:

**S** = Minimum safety distance in mm

**t<sub>1</sub>** = Response time of the ESPE in seconds (see section 9 "Technical data")

**t<sub>2</sub>** = Machine stopping time in seconds

**H** = Beam height from ground. This height must always be less than 1000 mm.

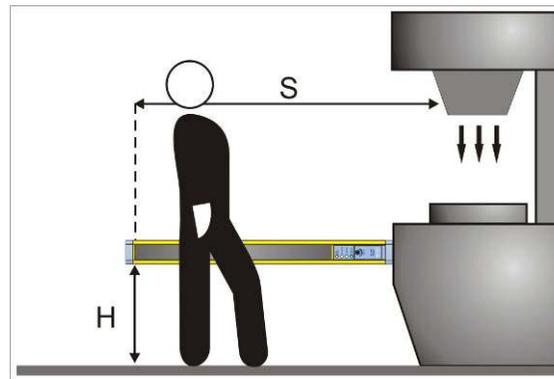
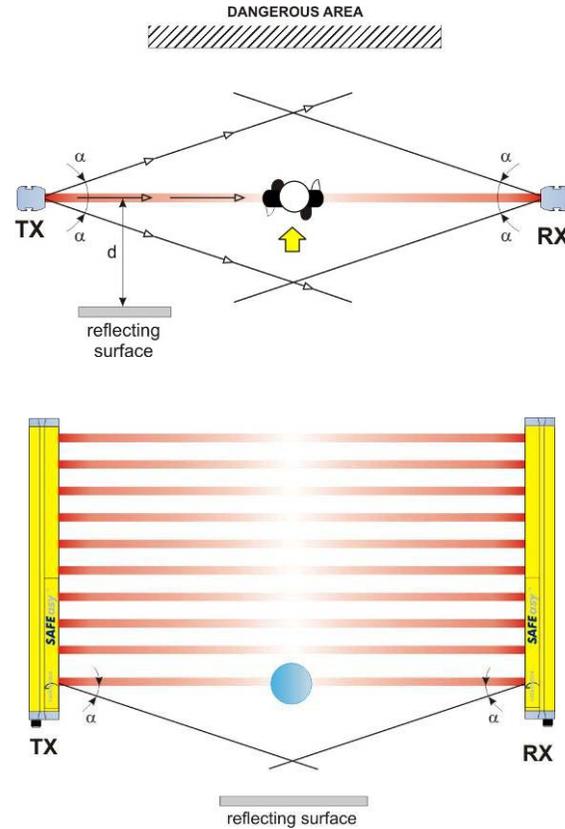


Fig. 7

English

### 2.2.2. Minimum distance from reflecting surfaces

Reflecting surfaces placed near the light beams of the **SAFEasy™** device (over, under or laterally) can cause passive reflections. These reflections can compromise the recognition of an object inside the controlled area (see Fig.8).



**Fig. 8**

However, if the **RX** receiver detects a secondary beam (reflected by the side-reflecting surface) the object might not be detected, even if the object interrupts the main beam.

It is thus important to position the safety light curtain according to the minimum distance from any reflecting surface.

The minimum distance depends on:

- Operating distance between emitter (TX) and receiver (RX);
- Maximum opening angle of the light beam sent by the safety light curtain, depending on the type of the device; in particular:
  - 5° for ESPE Type 4 ( $\pm 2.5^\circ$  as to the optic axis);
  - 10° for ESPE Type 2 ( $\pm 5^\circ$  as to the optic axis)

The graphic in Fig.9 shows the data of the minimum distance.

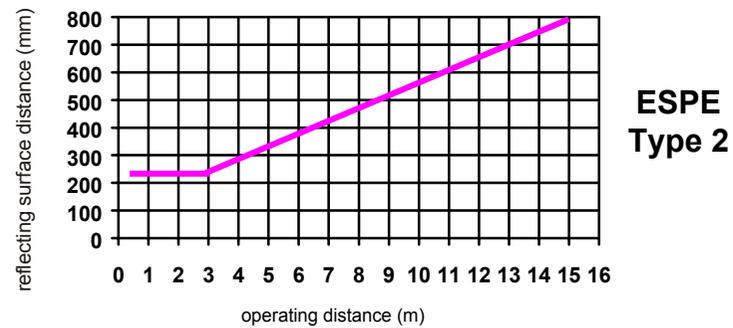
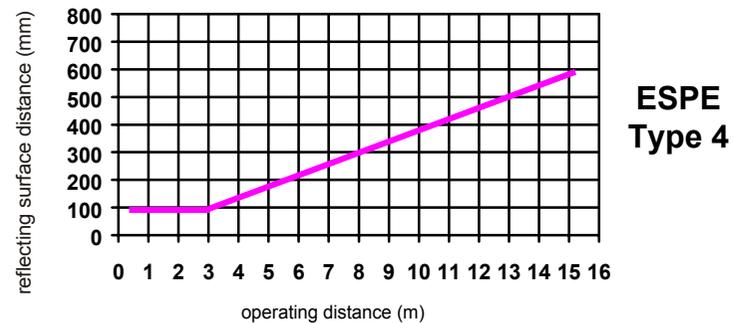


Fig. 9

English

2.2.3. Installation of several adjacent safety light curtains

When several safety devices must be installed in adjacent areas, interferences between the emitter of one device and the receiver of the other must be avoided.

Fig.10 provides an example of possible interferences between different devices and two pertinent solutions.

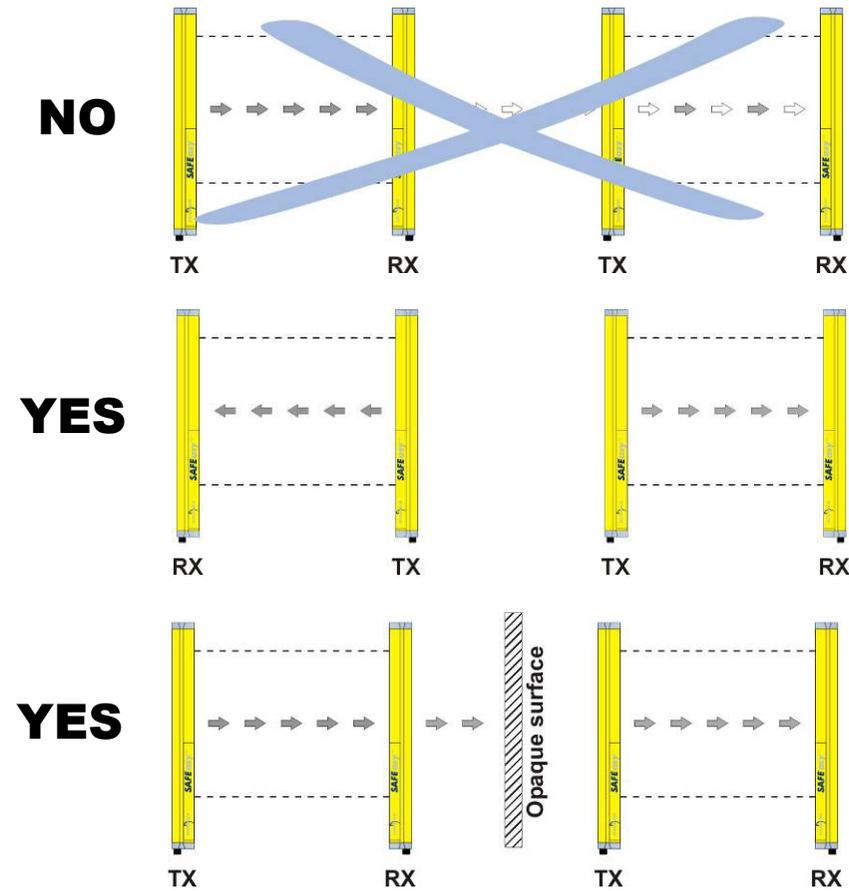


Fig. 10

#### 2.2.4. Use of deviating mirrors

The control of any dangerous area, with several but adjacent access sides, is possible using the linear version without integrated Muting sensors and well-positioned deviating mirrors (see section 12 "Accessories").

Fig.11 shows a possible solution to control three different access sides, using two mirrors placed at a 45° angle respect to the beams.

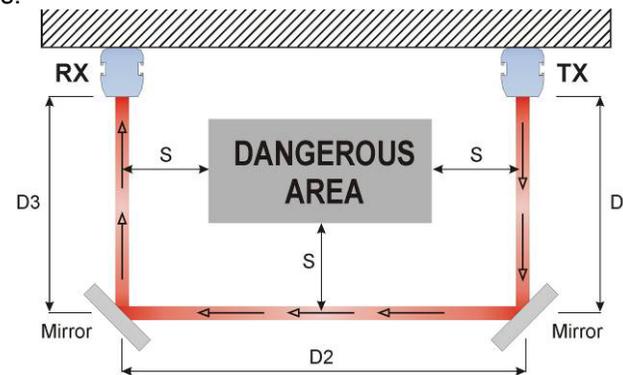


Fig. 11

The operator must observe the following precautions when using the deviating mirrors:

- The alignment of the emitter and the receiver may be a very critical operation when the deviating mirrors are used; a very small angular displacement of the mirror is enough to lose the alignment. A laser pointer (available as an accessory) can be used to avoid this problem.
- The minimum safety distance (S) must be respected for each single section of the beams.
- The effective operating range decreases by about 15% by using only one deviating mirror, the percentage further decreases by using 2 or more mirrors (for more details make reference to the technical specifications of the used mirrors).
- Do not use more than three mirrors for each device.
- The eventual presence of dust or dirt on the reflecting surface of the mirror causes a drastic reduction in the range.

English

### 3. MECHANICAL MOUNTING

The emitting (**TX**) and receiving (**RX**) units must be installed with the relevant sensitive surfaces facing each other. The connectors must be positioned on the same side and the distance must be included within the operating range of the model used (see section 9 “*Technical data*”).

Once positioned the two units, the two bars should be aligned and parallel as much as possible.

The next step, if necessary, is the fine alignment, as shown in section 5 “*Alignment procedures*”.

To mount the device, use the threaded pins supplied, inserting them into the slots on the two bars (Fig. 12)

The operator can use the pins and/or the rigid mounting brackets – supplied with the device – depending on the particular application and/or the type of support on which the two bars must be mounted (see Fig.13).



Fig. 12

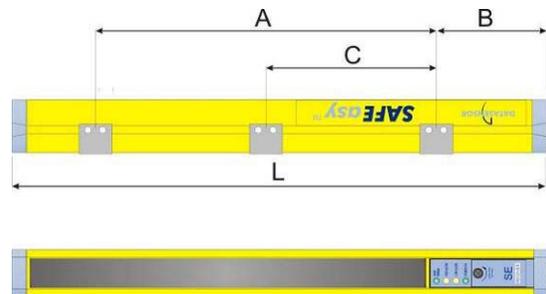


Fig. 13

Rigid brackets can be used where no large mechanical tolerances require compensation, during the alignment operation. The rotating supports for the correction of the bars' inclination are available on request.

In case of applications with particularly strong vibrations, it is advisable to use some anti-vibration shock absorbers able to reduce the impact of the vibrations – together with threaded pins, rigid brackets and/or rotating supports (see section 12 "Accessories").

The recommended mounting positions according to the length of the safety light curtain are shown in the following drawing and table:



MODEL	L (mm)	A (mm)	B (mm)	C (mm)
SE*-YY-015-PP-W	246	86	80	-
SE*-YY-030-PP-W	393	193	100	-
SE*-YY-045-PP-W	540	300	120	-
SE*-YY-060-PP-W	687	387	150	-
SE*-YY-075-PP-W	834	474	180	-
SE*-YY-090-PP-W	981	581	200	-
SE*-YY-105-PP-W	1128	688	220	-
SE*-YY-120-PP-W	1275	875	200	438
SE*-YY-135-PP-W	1422	1022	200	510
SE*-YY-150-PP-W	1569	1121	220	565
SE*-YY-165-PP-W	1716	1216	250	608
SE*-P2-050-PP-W	642	342	150	-
SE*-P3-080-PP-W	942	542	200	-
SE*-P4-090-PP-W	1042	602	220	-
SE*-P4-120-PP-W	1342	942	200	472
SE4-Q2-050-PP-W	642	342	150	-
SE4-Q3-080-PP-W	942	542	200	-
SE4-Q4-090-PP-W	1042	602	220	-
SE4-Q4-120-PP-W	1342	942	200	472

(\*) 2 or 4 depending on the safety class

YY Resolution (14mm – 20mm – 30mm – 35 mm)

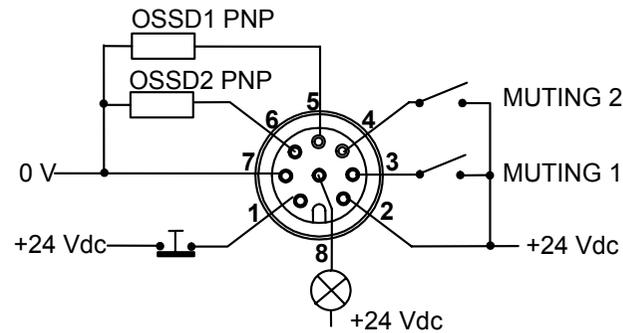
English

#### 4. ELECTRICAL CONNECTIONS

Every electrical connection to the emitting and receiving units is made through a male M12 connector, located in the lower part of the safety light curtain.

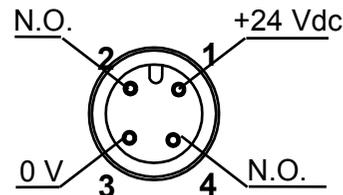
A M12 8-pole connector is used for the receiver and a M12 4-pole connector for the emitter.

##### RECEIVER (RX):



- 1 = white = TEST/START
- 2 = brown = +24 Vdc
- 3 = green = MUTING 1
- 4 = yellow = MUTING 2
- 5 = grey = OSSD1 1
- 6 = pink = OSSD2 2
- 7 = blue = 0 V
- 8 = red = LAMP

##### EMITTER (TX):



- 1 = brown = +24 Vdc
- 3 = blue = 0 V

#### 4.1. Notes on the connections

For the correct functioning of the **SAFEasy™** safety light curtain, it is necessary to observe the following precautions regarding the electrical connections:

- Use only shielded cables for the connection of the two units.



Fig.14 shows the correct connection of both the units and the cable when ground connection is used.

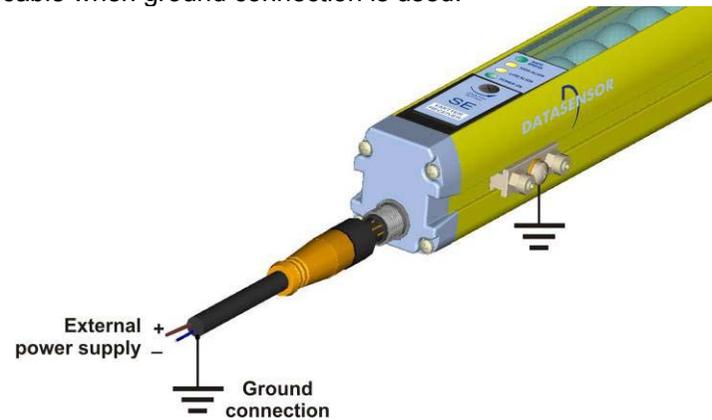


Fig. 14

- Do not place connection cables in contact or near high-voltage cables (e.g. motor power supplies, inverters, etc.). The correct functioning of the safety device can be compromised by the presence of strong electro-magnetic fields.
- Do not connect in the same multi-pole cable the OSSD wires of different light curtains.
- The TEST/START wire must be connected through a N.C. button to the supply voltage of the ESPE. A daily manual test is necessary to verify the correct functioning of the safety light curtain. Press the relevant button to activate the test.



- The TEST/START button must be located in such a way that the operator can check the protected area during any Test, Override and Reset operation. (see section 6 "Functioning mode").

English

-  Put one fuse with 500 mA rated interruption current between the connection of the external signalling lamp of active Muting and the RX unit. The signalling lamp should be placed in such a way that it can be seen from all operating sides.
- Read the "*Functioning mode*" section 6 relative to the Muting function, its use and the positioning of the activating sensors.

**Note: If the Muting devices (Muting sensors and Muting lamp) are not used, the 3, 4 and 8 cable pins of the receiver must be electrically insulated.**

- The OSSD1 and OSSD2 safety contacts cannot be connected in series or in parallel, but can be used separately (Fig.14). If one of these configurations is erroneously used, the device enters into the output failure condition (see cap.7 “Diagnostic functions”).
- If only one OSSD is used, the system loses its safety category.

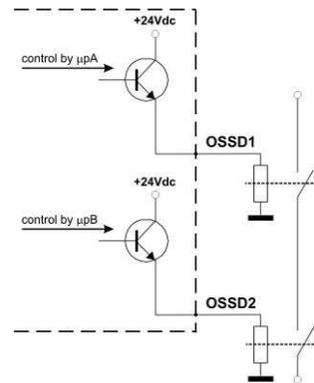


Fig. 15

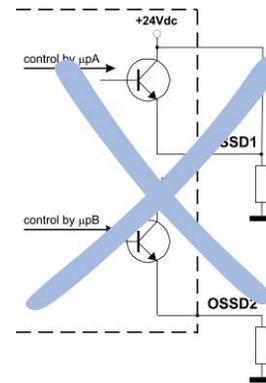


Fig. 16

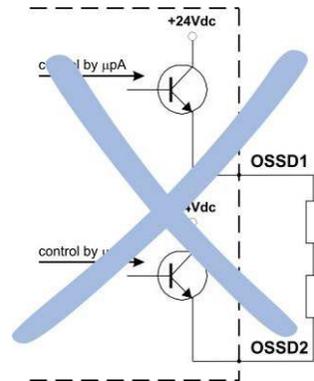


Fig. 17

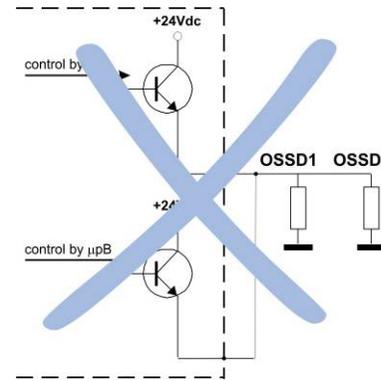


Fig. 18

English

The ground connection of the two units depends on the electrical protection class to be guaranteed (see section 9 "Technical Data" for more information).

This connection can be carried-out using the mechanical part supplied for ground connection (see Fig. 19).

Insert the support plate (M4x0.7 mm threaded holes) in one of the two slots visible laterally on the profile.

The two pins (M4x14) have to be screwed on the external support hole, leaving the central hole free.

We suggest to screw the pins using a Couple included between 2.2 and 2.5 Nm.

The Couple guarantees that the pin head passes through the paint allowing the contact with the metal housing.

Block the pins using the two M4 self-fixing nuts.

The nuts have to be tightened using a hexagonal CH.7 wrench.

The nuts avoid the unscrewing of the pins in presence of strong vibrations.

Insert the M4 ring and screw it on the central support hole.

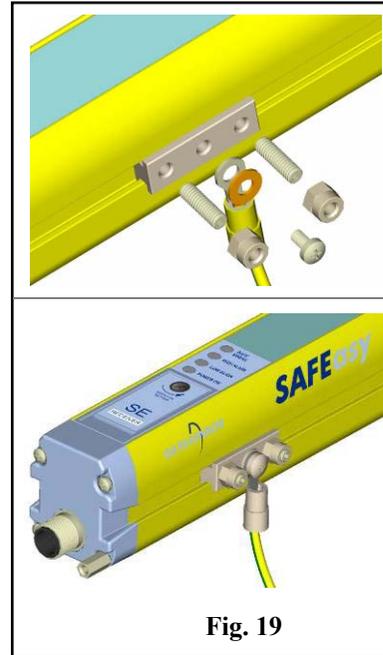


Fig. 19



The connection, illustrated in page 20 (Fig.14) has to be respected when ground connection of the entire system is necessary.

## 5. ALIGNMENT PROCEDURES

The alignment between the emitting and the receiving units is necessary to obtain the correct functioning of the light curtain.

The alignment is perfect if the optic axes of the first and the last emitting unit's beams coincide with the optic axes of the corresponding elements of the receiving unit. Two yellow LED indicators (HIGH ALIGN, LOW ALIGN) facilitate the alignment procedure.

### 5.1. Correct alignment procedure

When the mechanical installation and the electrical connections have been effected – as explained in the previous paragraphs – it is possible to carry-out the alignment of the safety light curtain, according to the following procedure:

- Disconnect the power supply to **SAFEasy™**.
- Press the TEST/START button and keep it pressed (open the contact).
- Re-connect the power supply.
- Release the TEST/START button.
- Check the green LED on the bottom of the TX unit (POWER ON) and the yellow LED (SAFE); if they are ON, the unit is running correctly.
- Verify that one of the following conditions is present on the RX unit:
  - 1 The green LED on the bottom is ON (POWER ON) and the light of the SAFE/BREAK LED on the top is red (BREAK): non-alignment condition.
  - 2 The green LED on the bottom is ON (POWER ON) and the light of the SAFE/BREAK LED on the top is green (SAFE): alignment condition (in this case also the two intermediate yellow LED HIGH ALIGN, LOW ALIGN, are ON).
- Continue with the following steps to change from condition 1 to condition 2:
  - A **Keep the receiving unit in a steady position and set the emitting unit until the yellow LED on the bottom (LOW ALIGN) is ON. This condition shows the effective alignment of the first lower beam.**

- B Rotate the emitting unit until the upper yellow LED (HIGH ALIGN) is ON: in this condition the upper LED must change from BREAK to SAFE (from red to green).**

**Note: Ensure that the green light of the LED is ON and steady.**

- C** Delimit the area in which the SAFE LED is steady through some micro adjustments - for the first and then for the second unit - then place both units in the centre of this area.

- Fix the two units firmly using pins and brackets.
- Disconnect the power supply to **SAFEasy™**.
- Re-connect the power supply.
- Verify that the green LED is ON on the RX unit (condition where the beams are free, SAFE) and verify that the same LED turns red if even one single beam is obscured (condition where an object has been detected, BREAK).
- It is important to do this check using the specific cylindrical "Test Piece" which presents an adequate 14mm, 20mm, 30mm or 35mm diameter depending on the device used (*see section 12 "Accessories"*).

**Note: When the Test Piece is passed from top to bottom, throughout the entire detection area at any distance between the two units, the red BREAK LED must always remain ON, without falsely switching.**

A daily test is recommended.

## 6. FUNCTIONING MODE

### 6.1. Dip-switches functioning mode

A slot situated in the front side of the RX unit (Fig.20), that can be easily opened using a screwdriver, facilitates the access to the internal dip-switches for the configuration of the following functions:

- Reset mode
- Total Muting function
- Partial Muting function



The device does not accept configuration changes during normal functioning. A change is accepted only beginning from the successive powering of the device.

Particular attention has to be taken during the configuration dip-switch management and use.

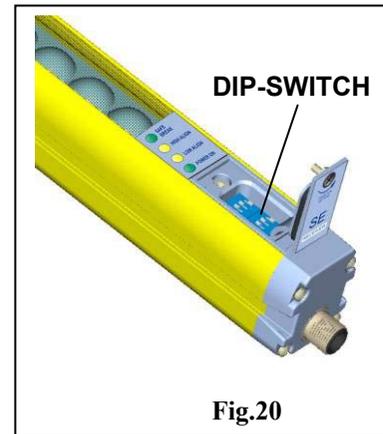


Fig.20

### 6.2. Standard configuration

The device is supplied with the following standard configuration:

- Automatic Reset
- Total Muting activated

**Note:** The Muting function can be activated only if the Muting1 and Muting2 inputs and the Muting lamp are correctly connected.

The EDM function can be activated only if the specific input is correctly connected to the appropriate device.

For further details of these functions see sections 6.3 and 6.4.

### 6.3. Restart mode

An opaque object detected by the beams causes the switching of the OSSD outputs (i.e. the opening of the safety contacts - BREAK condition).

The restart of the ESPE (i.e. the closing of the OSSD safety contacts - SAFE condition) can be carried-out in two different ways:

- **Automatic Restart:** when an opaque object is detected, the ESPE enters in the BREAK condition. Then, after the opaque object has been removed from the controlled area, the ESPE begins its normal functioning again.
- **Manual Restart:** after the ESPE has detected an opaque object in the controlled area, the light curtain begins its normal functioning again only by pressing the Restart button (TEST button) and after the object has been removed from the controlled area.

#### Temporal diagram (Manual Restart)

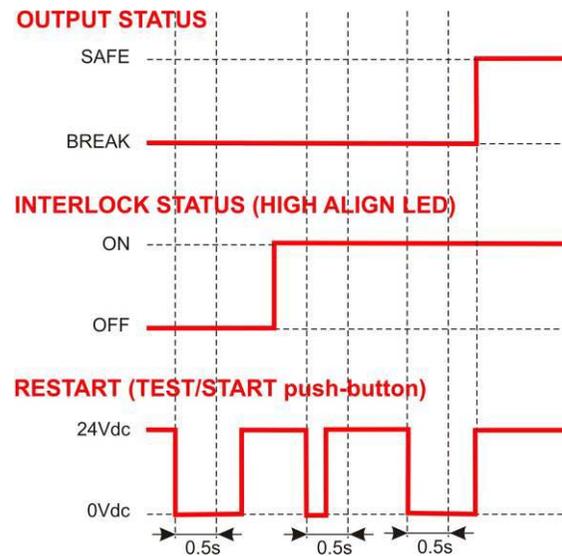
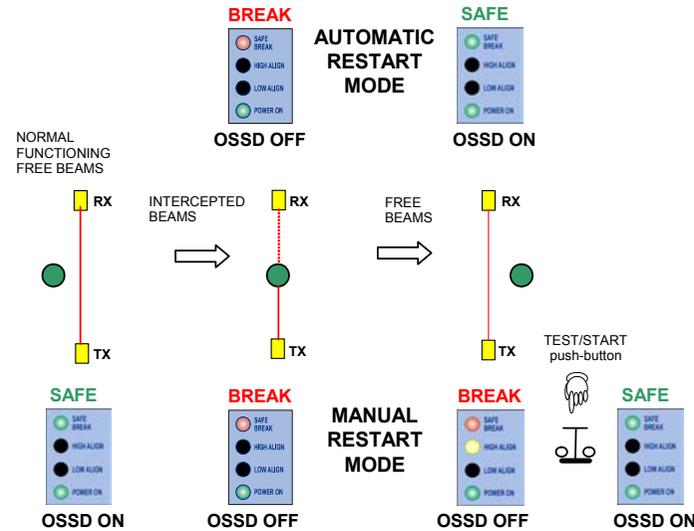


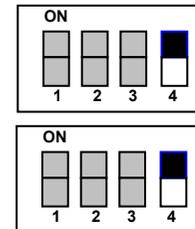
Fig.20 shows these two functioning modes.



English

Fig. 21

The selection of the manual/automatic Restart mode is made through the dip-switches placed under the slot of the receiving unit. In particular, the position 4 of both switches must be ON to activate the automatic Restart mode; OFF for the manual Restart mode.



**Note:** The dip-switches not used for this function are in grey. The lever position of the specific dip-switch is in black (ON) in the automatic Restart mode.

**Note:** SE4 devices must have both the higher and lower dip-switches configured in the same manner. Whereas, SE2 devices require the configuration of only the lower dip-switch. The position of the higher dip-switch does not condition functioning.

#### 6.4. Muting function

- The Muting function, excludes the light curtain during functioning, maintaining active the OSSD outputs, according to particular operating requirements (Fig.22).

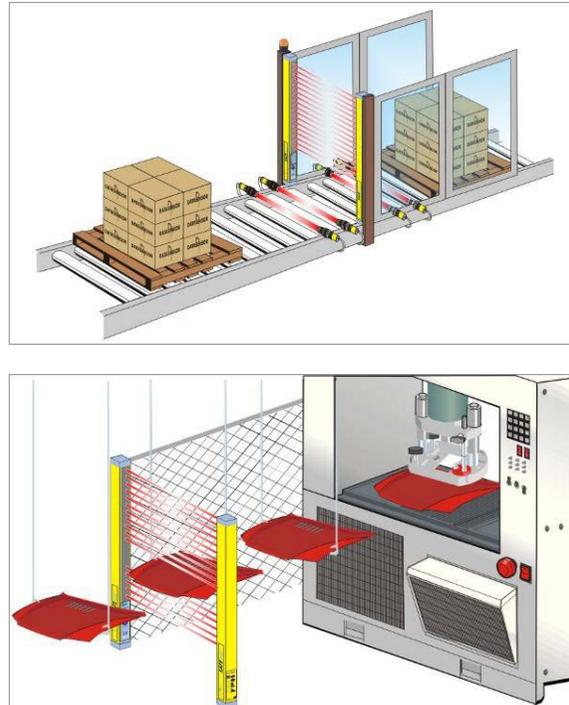


Fig. 22

- The safety light curtain is equipped with two inputs (Muting1 and Muting2) for the activation of this function, according to the Standards in force.
- This function is particularly suitable when an object, but not a person, has to pass through the dangerous area, under certain conditions.
- It is important to remember that the Muting function represents a forced system condition and therefore has to be used with the necessary precautions.

- Two Muting sensors activate the Muting1 and Muting 2 inputs. These two sensors should be correctly connected and positioned in order to avoid undesired Muting or potentially dangerous conditions for the operator.
- The external Muting signalling lamp has to be connected in order to activate the Muting function. If the Muting lamp is not connected or broken, the ESPE is blocked. If the Muting lamp is not connected, the Muting or Override request causes the opening of the safety contacts and the device is blocked and the Muting lamp failure is signalled (see 7.4 “Fault and diagnostic messages”).
- Fig. 23 shows an example of Muting functioning:

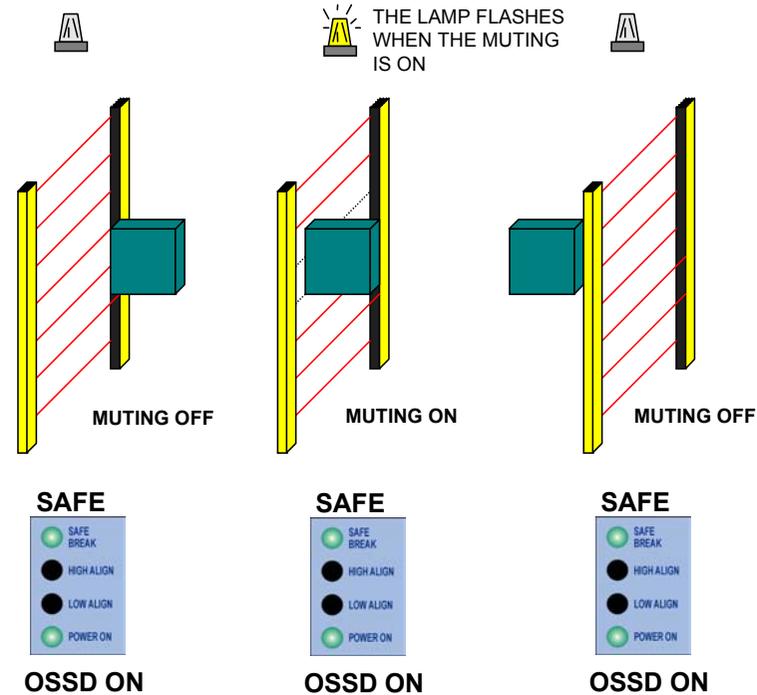


Fig. 23

#### 6.4.1. Partial Muting function

The SE series safety light curtains are equipped with an auxiliary partial Muting function that deactivates selected zones inside the detection area.

This function allows the check of 4 different zones (or optic groups) separately inside the detection area.

The width and the covering – total or partial – of the detection area change according to the height and resolution of the light curtain used.

The functioning control deactivation of the 4 selected zones generates different possibilities:

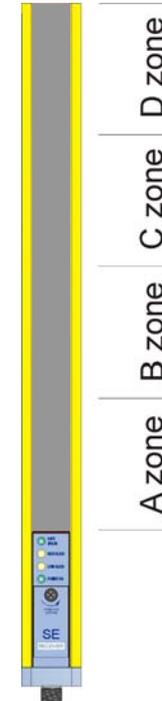
Deactivation of the 4 zones separately – one by one – (only A zone, only B zone, only C zone, only D zone; refer to drawing).

When the D zone includes the last optic beam of the light curtain, this beam will not accept partial Muting. It will continue to function normally as it controls the optical synchronisation between TX and RX units.

- Deactivation of zone groups; in particular: A + B zone; A + B + C zone; A + B + C + D zone.
- Deactivation of the entire detection area = total Muting.

The required configuration can be obtained using the dip-switches positioned on the receiving unit.

The table in next page shows the possible configurations depending on the different **SAFEasy™** models.



6.4.2. Muting configuration table

**Note:** SE4 devices must have both the top and low dip-switches configured in the same manner.

Whereas SE2 devices require the configuration of only the low dip-switch. The position of the high dip-switch does not condition the functioning.

Muting zones for partial/total muting	A	B	C	D	A+B	A+B+C	A+B+C+D	TOTAL
DIP SWITCH setting for the control of partial/total Muting								
Model	Length (mm) from...to							
SE4-14-015-X	0...21	21...42	42...63	63...84	0...44	0...63	0...84	0...147
SE4-14-030-X	0...42	42...84	84...126	126...168	0...84	0...126	0...168	0...294
SE4-14-045-X	0...63	0...126	126...189	189...252	0...126	0...189	0...252	0...441
SE4-14-060-X	0...96	96...196	196...294	294...392	0...196	0...294	0...392	0...588
SE4-14-075-X	0...105	105...210	210...315	315...420	0...210	0...315	0...420	0...735
SE4-14-090-X	0...147	147...294	294...441	441...588	0...294	0...441	0...588	0...882
SE4-20-015-X	0...14	14...28	28...42	42...56	0...28	0...42	0...56	0...147
SE4-20-030-X	0...28	28...56	56...84	84...112	0...56	0...84	0...112	0...294
SE4-20-045-X	0...42	42...84	84...126	126...168	0...84	0...126	0...168	0...441
SE4-20-060-X	0...147	147...294	294...441	441...581	0...294	0...441	0...588	0...588
SE4-20-075-X	0...147	147...294	294...441	441...588	0...294	0...441	0...588	0...735
SE4-20-090-X	0...147	147...294	294...441	441...588	0...294	0...441	0...588	0...882
SE4-20-105-X	0...147	147...294	294...441	441...588	0...294	0...441	0...588	0...1029
SE4-20-120-X	0...147	147...294	294...441	441...588	0...294	0...441	0...588	0...1176
SE4-20-135-X	0...147	147...294	294...441	441...588	0...294	0...441	0...588	0...1323
SE4-20-150-X	0...147	147...294	294...441	441...588	0...294	0...441	0...588	0...1470
SE4-20-165-X	0...147	147...294	294...441	441...588	0...294	0...441	0...588	0...1617
SE4-30/35-015-X	0...37	37...74	74...110	110...129	0...74	0...110	0...147	0...147
SE4-30/35-030-X	0...74	74...147	147...221	221...276	0...147	0...221	0...294	0...294
SE4-30/35-045-X	0...110	110...221	221...331	331...423	0...221	0...331	0...441	0...441
SE4-30/35-060-X	0...147	147...294	294...441	441...570	0...294	0...441	0...588	0...588
SE4-30/35-075-X	0...147	147...294	294...441	441...588	0...294	0...441	0...588	0...735
SE4-30/35-090-X	0...147	147...294	294...441	441...588	0...294	0...441	0...588	0...882
SE4-30/35-105-X	0...147	147...294	294...441	441...588	0...294	0...441	0...588	0...1029
SE4-30/35-120-X	0...294	294...588	588...882	882...1158	0...588	0...882	0...1176	0...1176
SE4-30/35-135-X	0...221	221...441	441...662	662...882	0...441	0...662	0...882	0...1323
SE4-30/35-150-X	0...294	294...588	588...882	882...1158	0...588	0...882	0...1176	0...1470
SE4-30/35-165-X	0...404	404...809	809...1213	1213...1599	0...809	0...1213	0...1617	0...1617
SE2-35-015-X	0...37	37...74	74...110	110...129	0...74	0...110	0...147	0...147
SE2-35-030-X	0...74	74...147	147...221	221...276	0...147	0...221	0...294	0...294
SE2-35-045-X	0...110	110...221	221...331	331...423	0...221	0...331	0...441	0...441
SE2-35-060-X	0...147	147...294	294...441	441...570	0...294	0...441	0...588	0...588
SE2-35-075-X	0...147	147...294	294...441	441...588	0...294	0...441	0...588	0...735
SE2-35-090-X	0...147	147...294	294...441	441...588	0...294	0...441	0...588	0...882
SE2-35-105-X	0...147	147...294	294...441	441...588	0...294	0...441	0...588	0...1029
SE2-35-120-X	0...294	294...588	588...882	882...1158	0...588	0...882	0...1176	0...1176
SE2-35-135-X	0...221	221...441	441...662	662...882	0...441	0...662	0...882	0...1323
SE2-35-150-X	0...294	294...588	588...882	882...1158	0...588	0...882	0...1176	0...1470
SE2-35-165-X	0...404	404...809	809...1213	1213...1599	0...809	0...1213	0...1617	0...1617
	inhibited optics							
SE4-P/02-050-X	1°	-----	-----	-----	1°...2°	-----	-----	1°...2°
SE4-P/03-080-X	1°	2°	-----	-----	1°...2°	1°...3°	-----	1°...3°
SE4-P/04-090-X	1°	2°	3°	-----	1°...2°	1°...3°	1°...4°	1°...4°
SE4-P/04-120-X	1°	2°	3°	-----	1°...2°	1°...3°	1°...4°	1°...4°
SE2-P2-050-X	1°	-----	-----	-----	1°...2°	-----	-----	1°...2°
SE2-P3-080-X	1°	2°	-----	-----	1°...2°	1°...3°	-----	1°...3°
SE2-P4-090-X	1°	2°	3°	-----	1°...2°	1°...3°	1°...4°	1°...4°
SE2-P4-120-X	1°	2°	3°	-----	1°...2°	1°...3°	1°...4°	1°...4°

English

### 6.5. Installation mode of the Muting sensors

The Muting sensors must recognise the passing material (pallets, vehicles, ...) according to the material's length and speed.



In case of different transport speeds in the Muting area, it is necessary to consider their effect on the total Muting duration.

Fig.24 provides an installation example of a linear **SAFEasy™** light curtain mounted on a conveyor, with the relative external Muting sensors.

The A1, A2, B1, B2 Muting activation sensors temporarily inhibit the ESPE if a package passes between the sensors.

The outputs of these sensors are connected to the Muting1 and Muting2 inputs of the receiving unit of the ESPE.

The contacts of these sensors are controlled by the receiving unit.

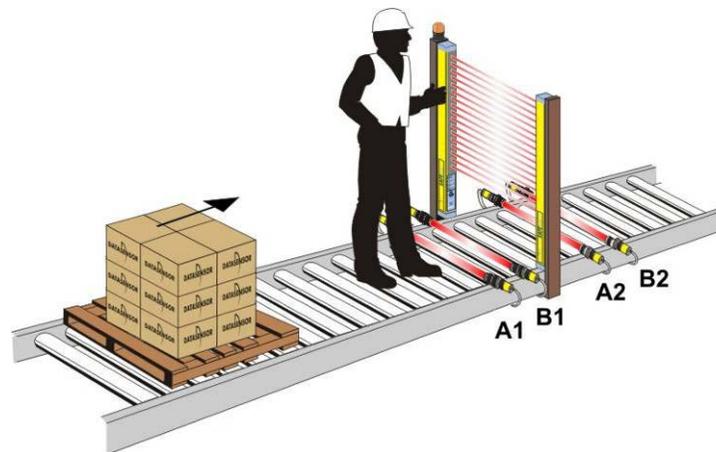
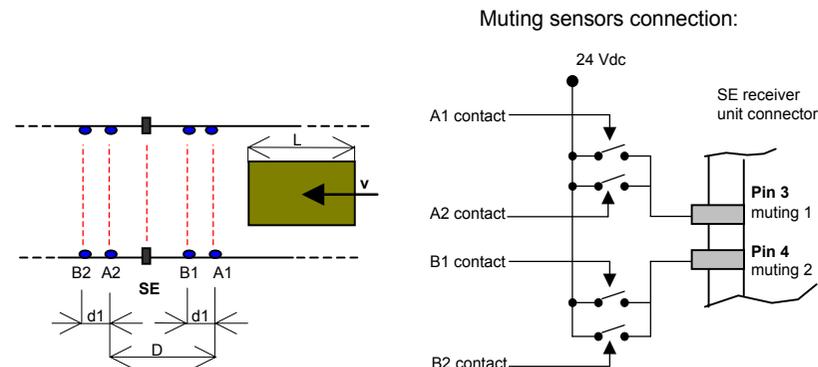


Fig. 24

Optoelectronic, mechanical, proximity sensors etc, can be used as Muting sensors, with closed contact in the presence of the object to be detected.

The following are some configuration examples when using the Muting function:

**- Application with 4 optoelectronic sensors:**



English

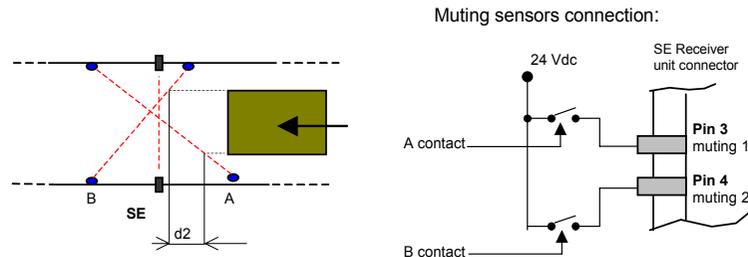
**D:** minimum distance required for the *Muting* sensors to maintain the request active. It depends on the length of the package:  $D < L$

**d<sub>1</sub>:** distance required for the Muting request to be accepted; this distance is relative to the speed of the package:

$$d_{1max} [cm] = v[m/s] * 0.5[s] * 100$$

$$d_{1min} [cm] \geq 0.1$$

### - Application with two optoelectronic sensors:



**d<sub>2</sub>**: distance required for the Muting request to be accepted. This distance is relative to the speed of the package:

$$d_{2max} [cm] = v[m/s] * 0.5[s] * 100$$

$d_{2min}$  should be such that the intersection point of the beams of the two sensors are inside the area controlled by the ESPE.



- The Muting sensors must be positioned in such a way that the activation of the Muting function is not possible with the accidental passing of a person.
- The Muting request can be performed in 2 manners:
  - activating the two Muting inputs contemporarily;
  - activating the Muting1 first and then the Muting2, or viceversa.
- If the activations occur in sequence, the second activation should occur within 0.5 sec. after the first; otherwise the Muting will not be activated.
- The maximum duration of the Muting request can not last more longer than 10 minutes. After this period, even if Muting is requested by the sensors, the Muting function is interrupted and the device will return to normal functioning. The Muting function can be reactivated by only repeating the Muting request as described previously.
- Any Muting request can not be made if the ESPE is in the BREAK condition (red LED is ON and the beams are interrupted).

### 6.6. Override function

This function allows to force a Muting condition when machine reset is necessary, even if one or more beams are interrupted by passing material.

The purpose is to clear the protected area of any material accumulated consequently to a failure in the working cycle.

For example, if a pallet stops in front of the protected area, the conveyor may not restart as the ESPE (that has one or more interrupted beams) opens the OSSD outputs and will not permit the controlled area clearance.

The activation of the Override function makes permits this operation.

#### **- Activation of the Override function**

- Switch OFF the device.
- Switch ON the device.
- To activate the Override function in the light curtain BREAK condition, press the TEST/START button within 10 seconds after turning on the device and keep it pressed for at least 5 seconds.
- Keep the button pressed until the clearance of the protected area has been completed.
- When the Override function is ON, the external Muting indicator signal blinks indicating the exclusion of the safety device.
- The maximum length of the Override function is 120 sec. After that time, the ESPE returns to normal functioning, even if the TEST/START button is pressed. Obviously, if the button is released within the 120 seconds, the Override function stops immediately.

**Note:** The external active Muting or Override signalling lamp must be visible from all operating sides.

## 7. DIAGNOSTIC FUNCTIONS

### 7.1. Visualisation of the functions

The operator can visualise the operating condition of the light curtains through four LEDs positioned on the receiving unit and two LEDs on the emitting unit (Fig.25).

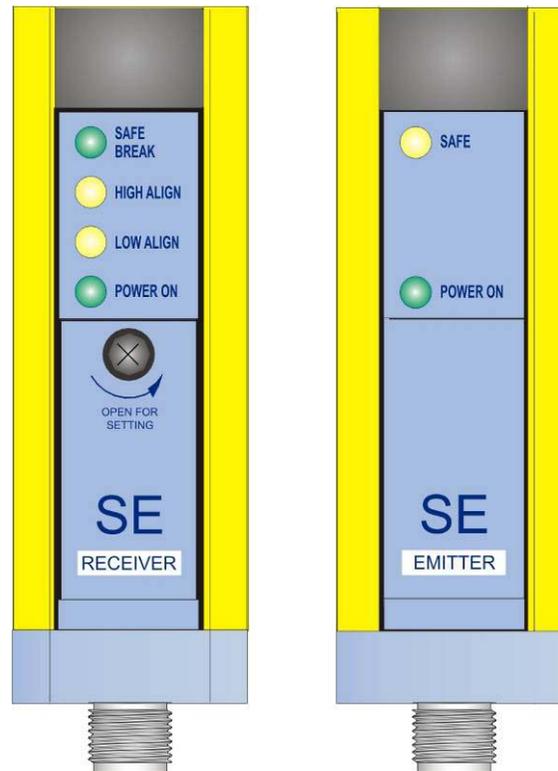


Fig. 25

The reason for the LEDs positioned on the receiving unit (RX) depends on the functioning mode of the safety light curtain.

## 7.2 Alignment mode

In this condition the outputs are OFF.

- **SAFE/BREAK LED:**  
**SAFE GREEN LED** when **ON**, indicates that no objects have been detected by the device.  
**BREAK RED LED** when **ON**, indicates that the receiving and the emitting units are not aligned, or that an object has been detected.
- **ALIGN HIGH LED: (yellow)** when **ON**, indicates the correct alignment of the last TX optic with the corresponding RX optic (top side of the device).
- **ALIGN LOW LED: (yellow)** when **ON**, indicates the correct alignment of the first TX optic with the corresponding RX optic (lower side of the device).
- **POWER ON LED: (green)** when **ON**, indicates that the unit is correctly powered.

## 7.3 Operating mode

- **SAFE/BREAK LED:**  
**SAFE GREEN LED** when **ON**, indicates that no objects have been detected by the device.  
**BREAK RED LED** when **ON**, indicates that one object has been detected; in this condition the outputs are OFF.
- **ALIGN HIGH LED: (yellow)** when **continuously ON**, indicates that it is necessary to press the TEST/START button to reset the device consequently to an object interception. This occurs only when the device runs under the manual Reset mode.
- **ALIGN LOW LED: (yellow)** when **blinking**, indicates the presence of an output short-circuit. This signalling is only a warning; the device continues to operate.

The LEDs located on the emitter (**TX**) have the following meanings:

- **SAFE LED (yellow):** when **ON**, indicates that the unit is emitting correctly.
- **POWER ON LED (green):** when **ON**, indicates that the unit is correctly powered.

**7.4. Fault messages and Diagnostics**

The operator is able to check the main causes of the system stop and failure, using the same LEDs used for the visualisation of the functions.

**RECEIVING UNIT:**

Failure	Cause	Check and Repair
Red blinking Yellow blinking Yellow blinking Green ON	Output failure	<ul style="list-style-type: none"> <li>- Check the output connections.</li> <li>- Check if the load characteristics are in accordance with the Technical data (see section 9)</li> </ul>
OFF Yellow blinking Yellow blinking Green ON	Microprocessor failure	<ul style="list-style-type: none"> <li>- Check the correct positioning of the configuration dip-switches.</li> <li>- Switch OFF and switch ON the device; if the failure continues contact DATASENSOR</li> </ul>
OFF OFF Yellow blinking Green ON	Optic failure	<ul style="list-style-type: none"> <li>- Check unit alignment.</li> <li>- Switch OFF and switch ON the device; if the failure continues contact DATASENSOR</li> </ul>
Green blinking Yellow blinking Yellow blinking Green ON	Failure of the external Muting signalling lamp	<ul style="list-style-type: none"> <li>- Check the integrity of the lamp</li> <li>- Check the connections</li> </ul>
OFF OFF OFF OFF	Power supply failure	<ul style="list-style-type: none"> <li>- Check the power supply.</li> <li>- If the failure continues contact Datasensor.</li> </ul>
OFF OFF OFF Green ON	The power supply voltage is outside of the allowed range.	<ul style="list-style-type: none"> <li>- Check the power supply.</li> <li>- If the failure continues contact Datasensor.</li> </ul>

**EMITTING UNIT:**

	<b>Failure</b>	<b>Cause</b>	<b>Check and Repair</b>
 SAFE  POWER ON	Yellow blinking  Green ON	Transmission failure	- Check the power supply. If the failure continues contact Datasensor and replace both units
 SAFE  POWER ON	OFF  OFF	Power supply failure	- Check the power supply. If the failure continues contact Datasensor.
 SAFE  POWER ON	OFF  Green ON	The power supply voltage is outside the allowed range	- Check the power supply. If the failure continues contact Datasensor.

English

## 8. CHECKS AND PERIODICAL MAINTENANCE

The following is a list of recommended check and maintenance operations that should be periodically carried-out by qualified personnel.

Check that:

- The ESPE stays locked during beam interruption along the entire protected area, using the suitable "Test Piece".
- Pressing the TEST/START button, the OSSD outputs should open (the red BREAK LED is ON and the controlled machine stops).
- The response time at the machine STOP (including response time of the ESPE and of the machine) is within the limits defined by the calculation of the safety distance (see section 2 "Installation Mode").
- The safety distance between the dangerous areas and the ESPE are in accordance with the instructions included in section 2 "Installation Mode".
- Access to the dangerous area of the machine from any unprotected area is not possible .
- The ESPE and the external electrical connections are not damaged.

The frequency of checks depends on the particular application and on the operating conditions of the safety light curtain.

### 8.1. Maintenance

The **SAFEasy**<sup>TM</sup> SE safety devices do not need any particular maintenance, with the exception of the cleaning of the protection frontal surfaces of the optics.

When cleaning, use a cotton cloth dampened with water.



**Do not under any circumstances use:**

- alcohol or solvents
- wool or synthetic cloths

## 8.2. General information and useful data



The safety devices fulfil their safety function only if they are correctly installed, in accordance with the Standards in force.

If you are not certain to have the expertise necessary to install the device in the correct way, DATASENSOR Technical Service is at your disposal to carry-out the installation.

Auto-regenerating type fuses are used. Consequently, in presence of a short-circuit, these fuses protect the device.

After the intervention of the fuses, it is necessary to disconnect the power supply and wait for 20 seconds so that the fuses can automatically restart normal functioning.

A power failure caused by interferences may cause the temporary opening of the outputs, but the safe functioning of the light curtain will not be compromised.

## 8.3. Warranty

All appliances are under a 36 month warranty from the manufacturing date.

DATASENSOR will not be liable for any damages to persons and things caused by the non-observance of the correct installation modes and device use.

The warranty will not cover damages caused by incorrect installation, incorrect use and accidental causes such as bumps or falls.

In presence of a non-functioning device, always return the emitting and receiving units for repair or replacement.



In presence of failures send the both units to DATASENSOR S.p.A.

### Sales Technical Service

Tel.: +39 051 6765611

Fax: +39 051 6759324

email: [service@datasensor.com](mailto:service@datasensor.com)

### 9. TECHNICAL DATA

Power supply:	24 Vdc ± 20% (SELV/PELV)
Emitter consumption (TX):	70 mA max / 2.1W
Receiver consumption (RX):	100 mA max (without load) / 3W
Outputs:	2 PNP outputs; (2 NPN on request) short-circuit protection and signal 0.68 A
Output current:	0.7 A max (total for the 2 outputs) 0.5 A max (on single output) 0.25 A max. total in the range 45 ... 55°C
Output voltage ON min.:	-2V power supply at 25°C and 50mA nominal load each channel
Output voltage OFF max.:	0.1 V
Leakage current:	< 1mA
Capacitive load (pure)	50 nF max at 24 Vdc + 20% [65 nF at 24 V ]
Resistive load (pure)	56Ω min. at 24 Vdc + 20%
Response time:	see "Available models"
Emmision type:	Infrared (880 nm)
Resolution:	14 mm finger protection (SE4-14...) 20 mm hand protection (SE4-20...) 30 mm hand protection (SE4-30...) 35 mm hand protection (SE*-35...) 300...500mm body protection (SE*-P/Qx-)
Operating distance:	0.2...6 m (SE4-14/20-...), 0.2...15 m (SE*-30/35-...) 0.5...50 m (SE2-Px-), 4...50 m (SE4-Px-) 0.5...25 m (SE4-Qx-)
Safety Category:	Type 2 for SE2... / Type 4 for SE4...
Auxiliary functions:	Total Muting / partial Muting / Override Automatic/Manual Reset
Time-out period:	Muting: 10 minutes / Override: 2 minutes
Operating temperature:	- 10...+ 55 °C
Storage temperature:	- 25...+ 70 °C
Humidity:	15...95 % (no condensation)
Electrical protection:	Classe 1 (** see note)
Mechanical protection:	IP 65 (EN 60529)
Ambient light rejection:	IEC-61496-2
Vibrations:	0.35 mm amplitude, 10 ... 55 Hz frequency, 20 sweep for every axis, 1octave/min (EN 60068-2-6)
Shock resistance:	16 ms (10 G) 1.000 shock for every axis (EN 60068-2-29)
Reference standards	EN 61496-1; IEC 61496-2
Housing material:	Painted aluminium (yellow RAL 1003)
Caps material:	PC MAKROLON
Lens material:	PMMA
Connections:	M12 4-pole connector (TX) / M12 8-pole connector (RX)
Cable length:	50 m. max (* see note) with 50nF capacitive load
Muting signlling device:	Lamp 24 V 3W min. (125 mA) / 7W max (300 mA)
Weight:	1.2 Kg max./m of total height

\* = if a longer cable has to be used, please verify that the same specifications are respected

** Electrical protection	Class 1	Class 3
Protective grounding	Copulsory	Not allowed
Symbol for connection protective grounding	Compulsory	Not allowed
Protection by means of extra- low voltage with protective separation (SELV and PELV)	Recommended	Compulsory

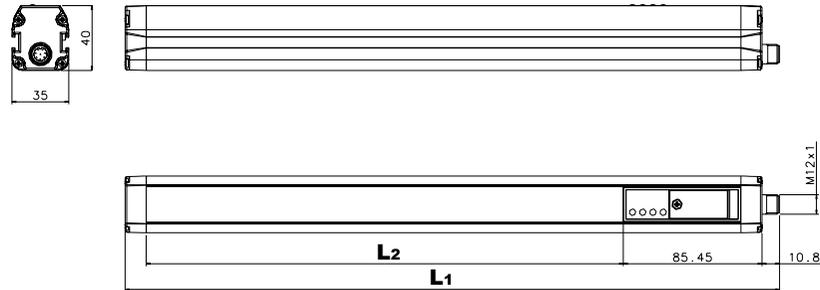
## 10. LIST OF THE AVAILABLE MODELS

Model	Length of the sensitive area	Length of the controlled area	N°. beams	Resolution (mm)	Response time (ms)	Operating distance (m)	
SE4-14-015-PP-W	147	161	21	14	18	0.2...6	
SE4-14-030-PP-W	294	308	42		22	0.2...6	
SE4-14-045-PP-W	441	455	63		26	0.2...6	
SE4-14-060-PP-W	588	602	84		31	0.2...6	
SE4-14-075-PP-W	735	749	105		35	0.2...6	
SE4-14-090-PP-W	882	896	126		40	0.2...6	
SE4-20-015-PP-W	147	161	11	20	16	0.2...6	
SE4-20-030-PP-W	294	308	22		18	0.2...6	
SE4-20-045-PP-W	441	455	33		21	0.2...6	
SE4-20-060-PP-W	588	602	44		23	0.2...6	
SE4-20-075-PP-W	735	749	55		25	0.2...6	
SE4-20-090-PP-W	882	896	66		27	0.2...6	
SE4-20-105-PP-W	1029	1043	77		29	0.2...6	
SE4-20-120-PP-W	1176	1190	88		32	0.2...6	
SE4-20-135-PP-W	1323	1337	99		34	0.2...6	
SE4-20-150-PP-W	1470	1484	110		36	0.2...6	
SE4-20-165-PP-W	1617	1631	121		39	0.2...6	
SE4-30-015-PP-W	147	180	8		30	15	0.2...15
SE4-30-030-PP-W	294	327	16			17	0.2...15
SE4-30-045-PP-W	441	474	24			18	0.2...15
SE4-30-060-PP-W	588	621	32	20		0.2...15	
SE4-30-075-PP-W	735	768	40	22		0.2...15	
SE4-30-090-PP-W	882	915	48	23		0.2...15	
SE4-30-105-PP-W	1029	1062	56	25		0.2...15	
SE4-30-120-PP-W	1176	1209	64	27		0.2...15	
SE4-30-135-PP-W	1323	1356	72	28		0.2...15	
SE4-30-150-PP-W	1470	1503	80	30		0.2...15	
SE4-30-165-PP-W	1617	1650	88	32		0.2...15	
SE2/4-35-015-PP-W	147	180	8	35		15	0.2...15
SE2/4-35-030-PP-W	294	327	16			17	0.2...15
SE2/4-35-045-PP-W	441	474	24			18	0.2...15
SE2/4-35-060-PP-W	588	621	32		20	0.2...15	
SE2/4-35-075-PP-W	735	768	40		22	0.2...15	
SE2/4-35-090-PP-W	882	915	48		23	0.2...15	
SE2/4-35-105-PP-W	1029	1062	56		25	0.2...15	
SE2/4-35-120-PP-W	1176	1209	64		27	0.2...15	
SE2/4-35-135-PP-W	1323	1356	72		28	0.2...15	
SE2/4-35-150-PP-W	1470	1503	80		30	0.2...15	
SE2/4-35-165-PP-W	1617	1650	88		32	0.2...15	
SE2-P2-050-PP-W	515	n.a.	2		515	14	0.5...50
SE2-P3-080-PP-W	815	n.a.	3		415	14	0.5...50
SE2-P4-090-PP-W	915	n.a.	4		315	14	0.5...50
SE2-P4-120-PP-W	1215	n.a.	4	415	14	0.5...50	
SE4-P2-050-PP-W	515	n.a.	2	515	14	4...50	
SE4-P3-080-PP-W	815	n.a.	3	415	14	4...50	
SE4-P4-090-PP-W	915	n.a.	4	315	14	4...50	
SE4-P4-120-PP-W	1215	n.a.	4	415	14	4...50	
SE4-Q2-050-PP-W	515	n.a.	2	515	14	0.5...25	
SE4-Q3-080-PP-W	815	n.a.	3	415	14	0.5...25	
SE4-Q4-090-PP-W	915	n.a.	4	315	14	0.5...25	
SE4-Q4-120-PP-W	1215	n.a.	4	415	14	0.5...25	

English

### 11. OVERALL DIMENSIONS

All the reported dimensions are in mm.



MODEL	L1 (mm)	L2 (mm)
SE4-14-015-..	256	147
SE4-14-030-..	403	294
SE4-14-045-..	550	441
SE4-14-060-..	697	588
SE4-14-075-..	844	735
SE4-14-090-..	991	882

MODEL	L1 (mm)	L2 (mm)
SE2/4-P2-050-..	652	543
SE2/4-P3-080-..	952	843
SE2/4-P4-090-..	1052	943
SE2/4-P4-120-..	1352	1243
SE2/4-Q2-050-..	652	543
SE2/4-Q3-080-..	952	843
SE2/4-Q4-090-..	1052	943
SE2/4-Q4-120-..	1352	1243

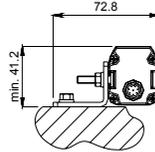
MODEL	L1 (mm)	L2 (mm)
SE2-35-015-..	256	147
SE2-35-030-..	403	294
SE2-35-045-..	550	441
SE2-35-060-..	697	588
SE2-35-075-..	844	735
SE2-35-090-..	991	882
SE2-35-105-..	1138	1029
SE2-35-120-..	1285	1176
SE2-35-135-..	1432	1323
SE2-35-150-..	1579	1470
SE2-35-165-..	1726	1617

MODEL	L1 (mm)	L2 (mm)
SE4-20/30/35-015-..	256	147
SE4-20/30/35-030-..	403	294
SE4-20/30/35-045-..	550	441
SE4-20/30/35-060-..	697	588
SE4-20/30/35-075-..	844	735
SE4-20/30/35-090-..	991	882
SE4-20/30/35-105-..	1138	1029
SE4-20/30/35-120-..	1285	1176
SE4-20/30/35-135-..	1432	1323
SE4-20/30/35-150-..	1579	1470
SE4-20/30/35-165-..	1726	1617

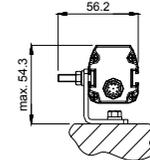
## 12. ACCESSORIES

### Fixing brackets

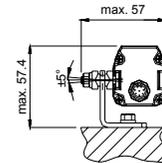
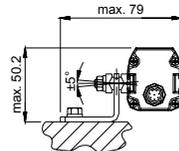
A MOUNTING



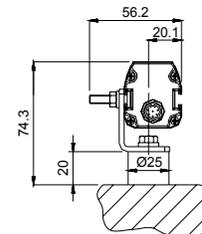
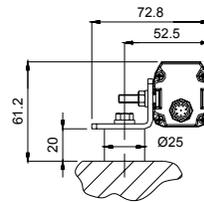
B MOUNTING



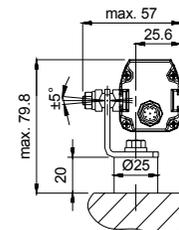
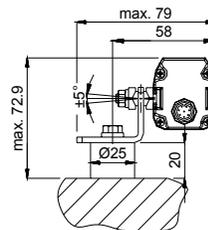
Standard bracket



Standard bracket + Orientable support



Standard bracket + Antivibration support



Standard bracket + Orientable support + Antivibration support

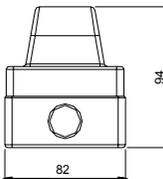
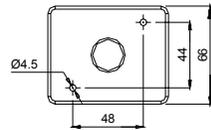
**MODEL**

**DESCRIPTION**

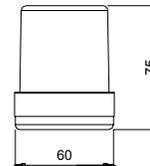
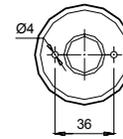
ST-KSTD	Fixing brackets for angle mounting (4 pcs kit)
ST-K4AV	Antivibration support (4 pcs kit)
ST-K6AV	Antivibration support (6 pcs kit)
ST-K4OR	Orientable support (4 pcs kit)
ST-K6OR	Orientable support (6 pcs kit)

English

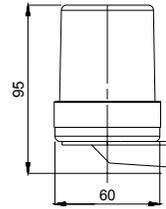
Muting signalling lamps



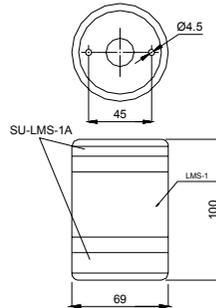
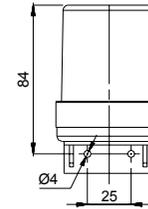
LMS Lamp



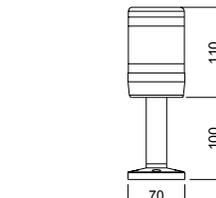
LMS-2 Lamp



LMS-3 Lamp



SU-LMS-1A Module+ LMS-1



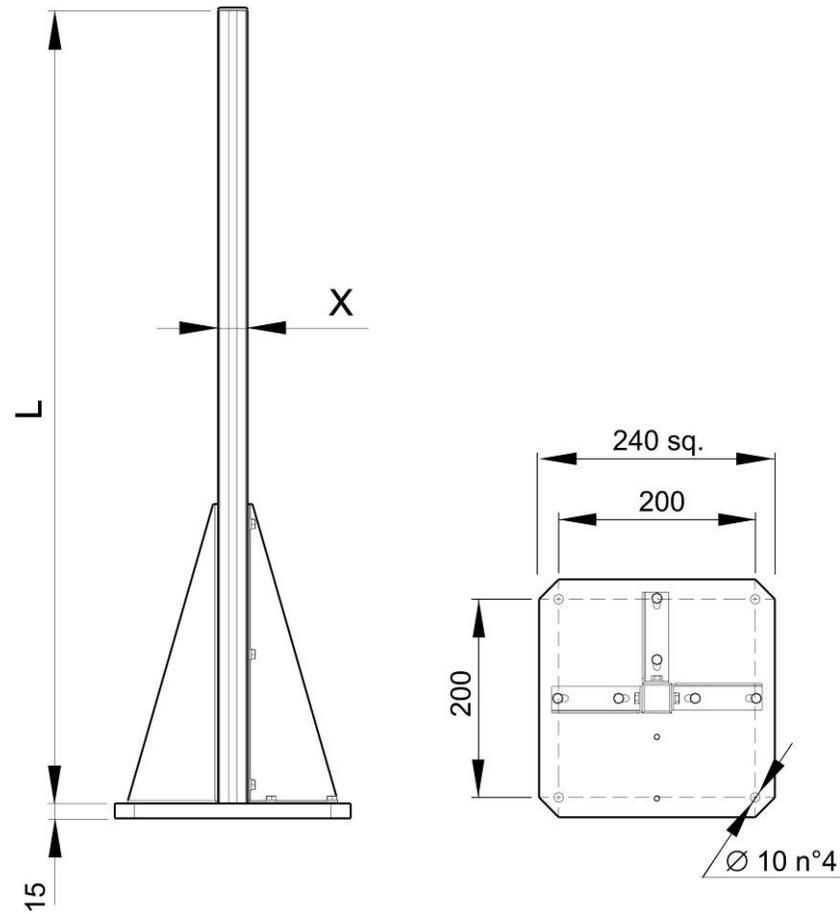
SU-LMS-1B Support + LMS-1

MODEL	DESCRIPTION
LMS	Muting lamp
LMS-1	Modular Muting lamp
LMS-2	Muting lamp - horizontal mounting
LMS-3	Muting lamp - vertical mounting
SU-LMS-1A	Basic module for LMS-1
SU-LMS-1B	Tower module for LMS-1

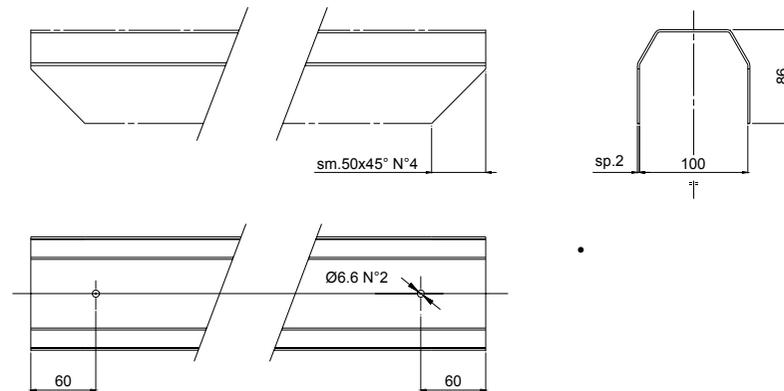


Columns and floor stands

MODEL	DESCRIPTION	L (mm)	X (mm)
SE-S 800	Column and floor stand H= 800 mm	800	30x30
SE-S 1000	Column and floor stand H= 1000 mm	1000	30x30
SE-S 1200	Column and floor stand H= 1200 mm	1200	30x30
SE-S 1500	Column and floor stand H= 1500 mm	1500	45x45
SE-S 1800	Ground support H= 1800 mm	1800	45x45



## Protective stands



English

MODEL	DESCRIPTION	L (mm)
SE-P 150	Protective stand H= 273 mm	273
SE-P 300	Protective stand H= 420 mm	420
SE-P 450	Protective stand H= 567 mm	567
SE-P 600	Protective stand H= 714 mm	714
SE-P 750	Protective stand H= 861 mm	861
SE-P 800	Protective stand H= 969 mm	969
SE-P 900	Protective stand H= 1069 mm	1069
SE-P 1050	Protective stand H= 1155 mm	1155
SE-P 1200	Protective stand H= 1302 mm	1369
SE-P 1350	Protective stand H= 1449 mm	1449
SE-P 1500	Protective stand H= 1596 mm	1596
SE-P 1650	Protective stand H= 1743mm	1743

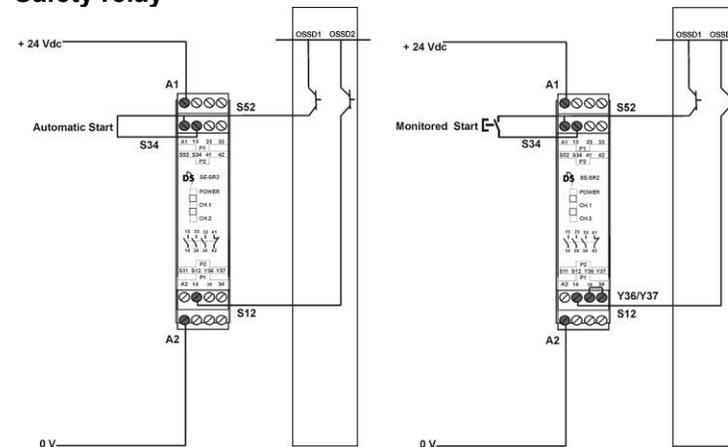
## Test piece

MODEL	DESCRIPTION
TP-14	Test piece Ø 14 mm
TP-20	Test piece Ø 20 mm
TP-30	Test piece Ø 30 mm
TP-35	Test piece Ø 35 mm

Connection cables

MODEL	DESCRIPTION
CV-A1-22-B-03	Axial shielded 4-pin 3 m cable
CV-A1-22-B-05	Axial shielded 4-pin 5 m cable
CV-A1-22-B-10	Axial shielded 4-pin 10 m cable
CV-A1-26-B-03	Axial shielded 8-pin 3 m cable
CV-A1-26-B-05	Axial shielded 8-pin 5 m cable
CV-A1-26-B-10	Axial shielded 8-pin 10 m cable
CV-A2-22-B-03	Radial shielded 90° 4-pin 3 m cable
CV-A2-22-B-05	Radial shielded 90° 4-pin 5 m cable
CV-A2-22-B-10	Radial shielded 90° 4-pin 10 m cable
CV-A2-26-B-03	Radial shielded 90° 8-pin 3 m cable
CV-A2-26-B-05	Radial shielded 90° 8-pin 5 m cable
CV-A2-26-B-10	Radial shielded 90° 8-pin 10 m cable

Safety relay



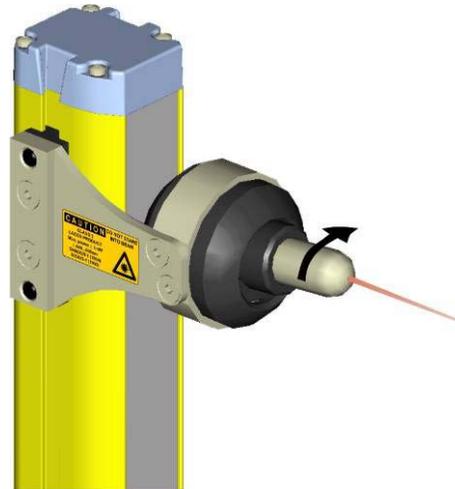
The drawings show the connection between the **SAFEasy™** safety light curtain series and the type 4 safety relay of the **SE-SR2** series operating in the automatic Restart mode (on the left) and manual Restart mode with monitoring (on the right).

MODEL	DESCRIPTION
SE-SR2	Type 4 safety relay - 3 NO 1NC

**Laser pointer**

The laser pointer of the **SE-LP** series represents a valid alignment and installation support for the SE safety light curtain series.

The pointer can be moved along the light curtain profile to verify the complete device alignment (top and bottom).

**English**

MODEL	DESCRIPTION
SE-LP	Laser pointer