INSTRUCTION MANUAL



> SG BODY
COMPACT MUTING
Safety Light Curtains

DATALOGIC

ORIGINAL INSTRUCTIONS (ref. 2006/42/EC)
This product is covered by one or more of the following patents.
Italian Patent IT 1,363,719

Additional patents pending

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SG BODY COMPACT MUTING Instruction Manual

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1 GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF THE SAFETY LIGHT CURTAIN

The safety light curtains of the SG BODY COMPACT series, are optoelectronic multibeam devices that can be used to protect working area that, in presence of machines, robots, and automatic systems in general, can become dangerous for operators that get in touch, even accidentally, with moving parts.
The light curtains of the SG BODY COMPACT series are 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:

EN 61496-1:2013	Safety of machinery: electro-sensitive protective equipment. Part 1: General prescriptions and tests.
EN 61496-2:2013	Safety of machinery: electro-sensitive protective equipment - Particular requirements for equipment using active optoelectronic protective devices.
EN ISO 13849-1:2008	Safety of machinery. Safety-related parts of control systems. Part 1: General principles for design
EN 61508-1:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems. Part 1: General requirements
EN 61508-2:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems. Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems
EN 61508-3:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems. Part 3: Software requirements
EN 61508-4:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems. Part 4: Definitions and abbreviations
EN 62061:2005/A1:2013	Safety of machinery. Functional safety of electrical/ electronic/programmable electronic safety-related control systems.

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	**Emitting device**
RX	**Receiving device**
EDM	**External device monitoring**

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 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 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 DATASENSING Sales Technical Service for any necessary information relative to the functioning of the SG BODY COMPACT 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

The SG BODY COMPACT series light curtains efficiently satisfy all applications that require the Muting function thanks to pre-assembled, pre-cabled and pre-aligned Muting sensors.
T-shaped models are available with integrated Muting sensors for bidirectional Muting, L-shaped models for unidirectional Muting and linear models without integrated Muting sensors are available.
Muting is available in 2 versions: arms with retro-reflex sensors (part no. ending with W) and arms with through-beam sensors (part no. ending with T).
The integrated Muting solution with "L" configuration facilitates sensor installation and suits applications requiring one-way object passage direction.
The integrated Muting solution with "T" configuration facilitates sensor installation and is ideal for applications requiring a bidirectional object passage movement.
The version with arms equipped with through-beam sensors is especially suitable for applications where the material is wrapped in a few layers of film, that might cause disturbance to the retro-reflex sensors. This version also covers a longer distance compared to the version with arms equipped with sensors (whose range is 3 m), so that it is also suitable for applications requiring light curtains installation farther away (more than 3 m) (see Chapter 9 *"Technical Data"*).
The linear models, presenting a specific connector allowing easy connection of the Muting sensors, is recommended for difficult or particular applications.
Sensor positioning has to be carried out by the operator, respecting the precautions listed in the following chapters.

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

- The resolution strictly depends on the part of the body to be protected.

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 conditions of the safety light curtain.

The resolution value is obtained applying the following formula:

R = l + d

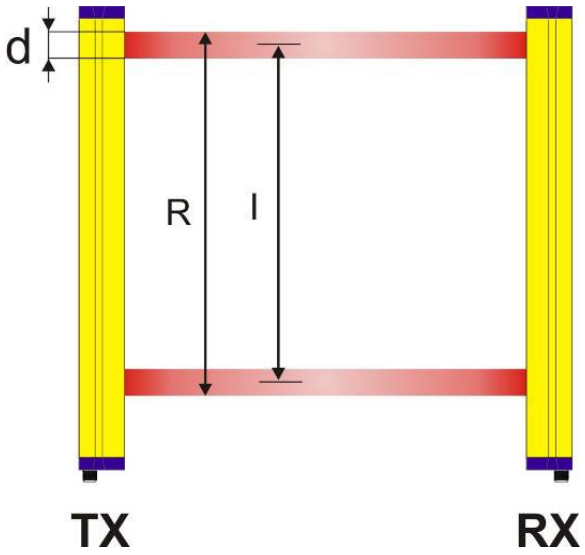


Fig. 1

The following table shows the values of the optic interaxis (**I**), the resolution (**R**) and the optic diameter (**d**), of the safety light curtains.

Model	Optic interaxis mm (**I**)	N°. optics (**n**)	Resolution mm (**R**)	Optics Ø mm (**d**)	Operating distance m
SG2-S2-050-PP-x	500	2	515	15	0.5..50
SG2-S3-080-PP-x	400	3	415	15	0.5..50
SG2-S4-090-PP-x	300	4	315	15	0.5..50
SG2-S4-120-PP-x	400	4	415	15	0.5..50
SG2-L2-050-PP-x	500	2	515	15	0.5..3
SG2-L3-080-PP-x	400	3	415	15	0.5..3
SG2-T2-050-PP-x	500	2	515	15	0.5..3
SG2-T3-080-PP-x	400	3	415	15	0.5..3
SG4-S2-050-PP-x	500	2	515	15	0.5..50
SG4-S3-080-PP-x	400	3	415	15	0.5..50
SG4-S4-090-PP-x	300	4	315	15	0.5..50
SG4-S4-120-PP-x	400	4	415	15	0.5..50
SG4-L2-050-PP-x	500	2	515	15	0.5..3
SG4-L3-080-PP-x	400	3	415	15	0.5..3
SG4-T2-050-PP-x	500	2	515	15	0.5..3
SG4-T3-080-PP-x	400	3	415	15	0.5..3

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.

- 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.2).

- 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.

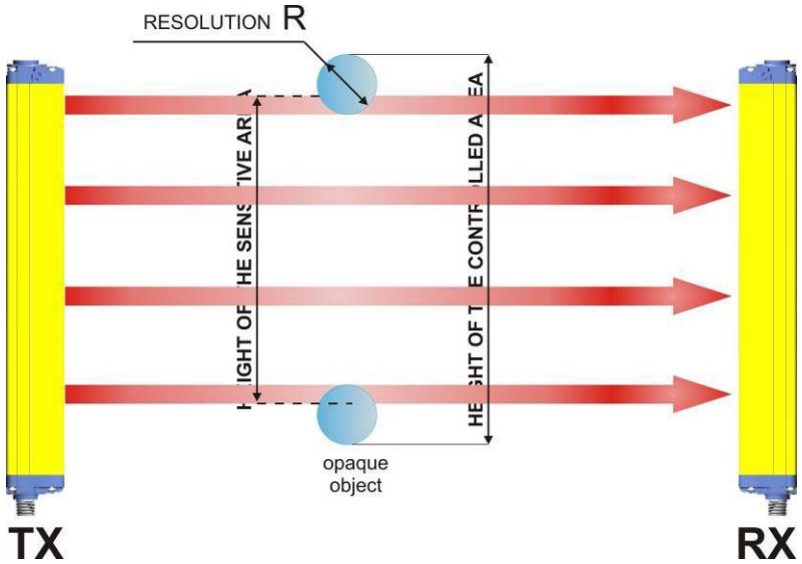


Fig. 2

- 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 SG4-S…-PP-N FAMILY

SG4N Light Curtains series includes models featuring a single 8-pole connector Pin-to-Pin compatible with SE-…-PP-W models.
SG4N series include a list of modified functions:

OVERRIDE	Activation from pattern signal on single input instead of edges on two inputs
EDM / RESTART	Feedback shared with test/restart input instead of dedicated input

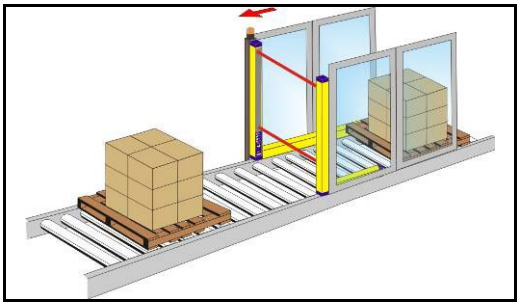
1.4 TYPICAL APPLICATIONS

The safety light curtains of the SG BODY COMPACT series are used in all automation fields where control and protection of the access to dangerous zones is necessary, as well as allowing, by means of the Muting function, material passage inside a dangerous zone during working.
In particular they are used to stop the moving mechanical parts in:

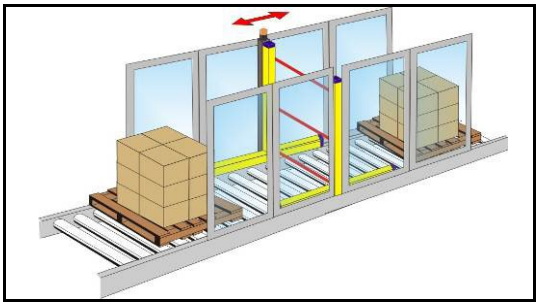
- Palletisers / depalletisers;
- Packaging machines, handling machines, storing machines;
- Automatic and semi–automatic assembly lines;
- Automatic warehouses;
- Robotics.

☞ In food industry applications, DATASENSING 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.

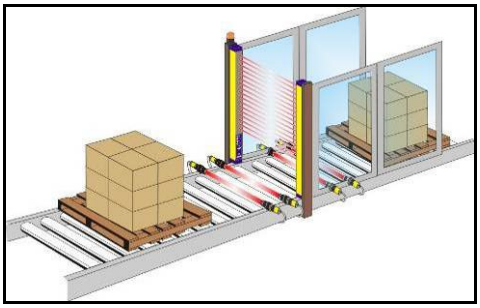
The following pictures show some main applications.



L-shaped version with integrated Muting sensors for unidirectional Muting



T-shaped version with integrated Muting sensors for bidirectional Muting



Linear version with external Muting sensors

1.5 SAFETY INFORMATION

The following points must be observed for a correct and safe use of the safety light curtains of the SG BODY COMPACT series:

- The stopping system of the machine must be electrically controlled.
- 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 because the operator must check the protected area during all the Test and Reset operations.
- The OVERRIDE buttons must be located outside the protected area because the operator must check the protected area during all the Override operations.
- The external signalling lamp of the active Muting must be visible from all operating sides.
- Please carefully respect the mounting instructions for the correct functioning of the Muting devices.
- The function of the external device monitoring (EDM) is active only if the specific wire is correctly connected to the device. Please carefully read the instructions for the correct functioning before powering the light curtain.

2 INSTALLATION MODE

2.1 PRECAUTIONS TO RESPECT FOR THE CHOICE AND INSTALLATION OF THE DEVICE



- Make sure that the protection level assured by the (Type 4 or Type 2) is compatible with the real danger level of the machine to be controlled, according to ISO 13849-1.

- The outputs (OSSD) of the ESPE must be used as machine stopping devices and not as command devices.
  The machine must have its 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 respecting the technical characteristics indicated in section 9.
- Do not place the device, in particular the receiving unit, near intense light sources.
- Strong electromagnetic interferences can compromise the correct functioning of the device. DATASENSINGsuggests 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.
- The Muting function is signalled by a specific Muting signalling lamp. Ensure that the signalling device has sufficient lighting and visibly positioned near the dangerous zone.
- Ensure to correctly use Muting sensors as described in the instructions supplied hereinafter.
- Avoid incongruent connections that cannot be controlled and thus excluding undesired potentially dangerous activations.

2.2 GENERAL INFORMATION ON DEVICE POSITIONING

2.2.1 Minimum installation distance

The safety device must be placed at a specific safety distance (Fig.3). 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 ISO 13855, 775 and 294 Standards:

1. Response time of the ESPE (the time between the effective beam interruption 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).
   ESPE resolution.
3. Approaching speed of the object to be detected.

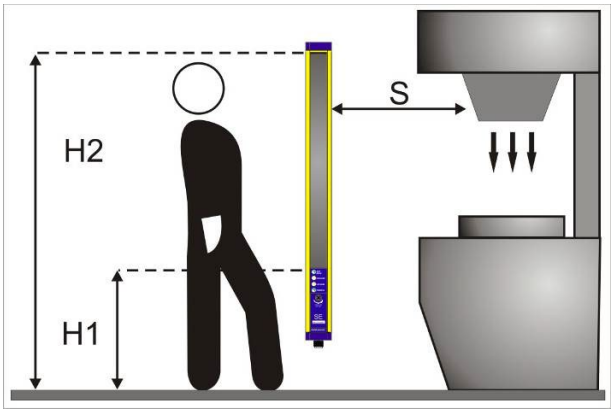


Fig. 3

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_1 = Response time of the ESPE in seconds (*see section 9) "Technical data"*)
t_2 = Machine stopping time in seconds.
d = Resolution of the system.
C = 850 mm for device with resolution > 40mm

Note: The value of K is:
2000 mm/s if the calculated value of S is ≤ 500 mm
1600 mm/s if the calculated value of S is > 500 mm

When devices with >40 mm resolution are used, the height of the top beam has to be ≥ 900 mm (H2) while the height of the bottom beam has to be ≤ 300 mm (H1).

2.2.2 Minimum distance from reflecting surfaces

Reflecting surfaces placed near the light beams of the device (over, under or laterally) can cause passive reflections. These reflections can compromise the recognition of an object inside the controlled area (see Fig.4).
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.

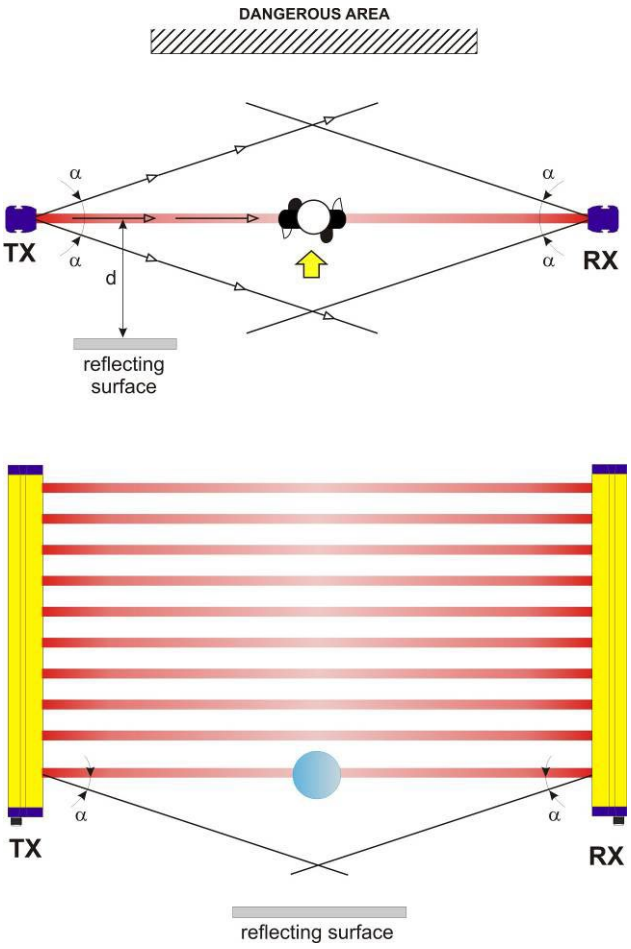


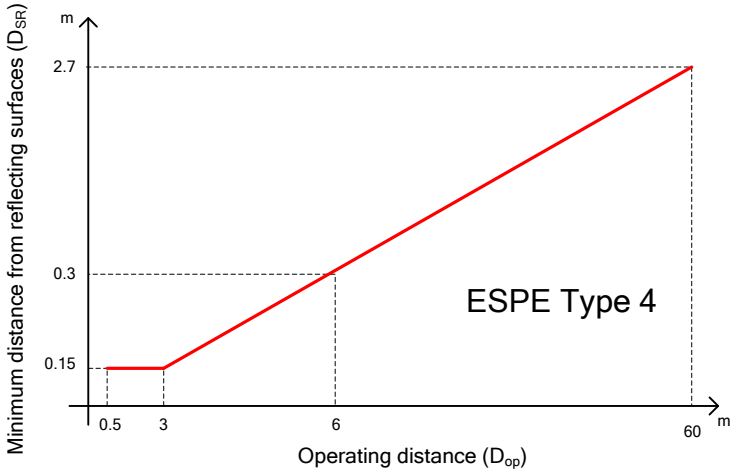
Fig. 4

It is thus important to position the safety light curtain according to the minimum distance from reflecting surfaces. The minimum distance depends on:

- Operating distance between emitter (TX) and receiver (RX);
- Maximum aperture angle of the light beam emitted by the safety light curtain, depending on the type of the device; in particular:
- - 5° for ESPE type 4 (± 2.5° as to the optic axis)
- - 10° for ESPE type 2 (± 5° as to the optic axis)

Type 4 ESPE

Diagram in the following figure shows the minimum distance from the reflecting surface (D_{sr}), based on the operating distance for a Type 4 ESPE:

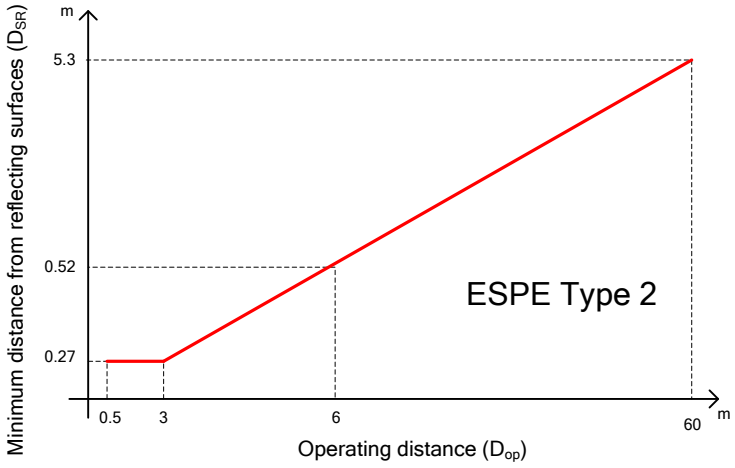


The formula to get D_{sr} for a Type 4 ESPE is the following:

D_{sr} (m) = 0.15 for operating distance < di 3 m
D_{sr} (m) = 0.5 x operating distance (m) x tg 2α for operating distance ≥ di 3 m

Type 2 ESPE 2

Diagram in the following figure shows the minimum distance from the reflecting surface (D_{sr}), based on the operating distance for a Type 2 ESPE:



The formula to get D_{sr} for a Type 2 ESPE is the following:

D_{sr} (m) = 0.27 for operating distance < di 3 m
D_{sr} (m) = 0.5 operating distance (m) x tg 2α for operating distance ≥ di 3 m

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

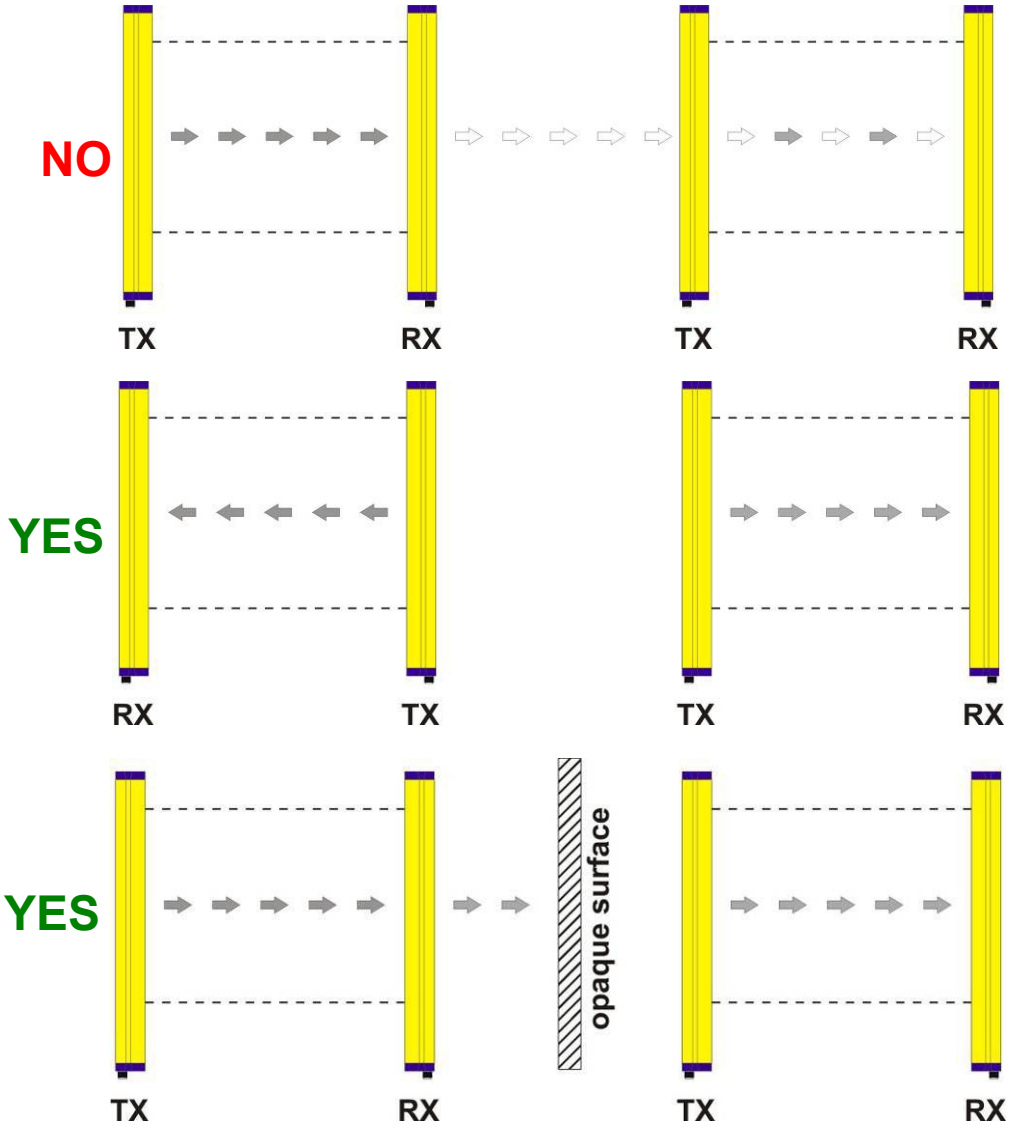


Fig. 6

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

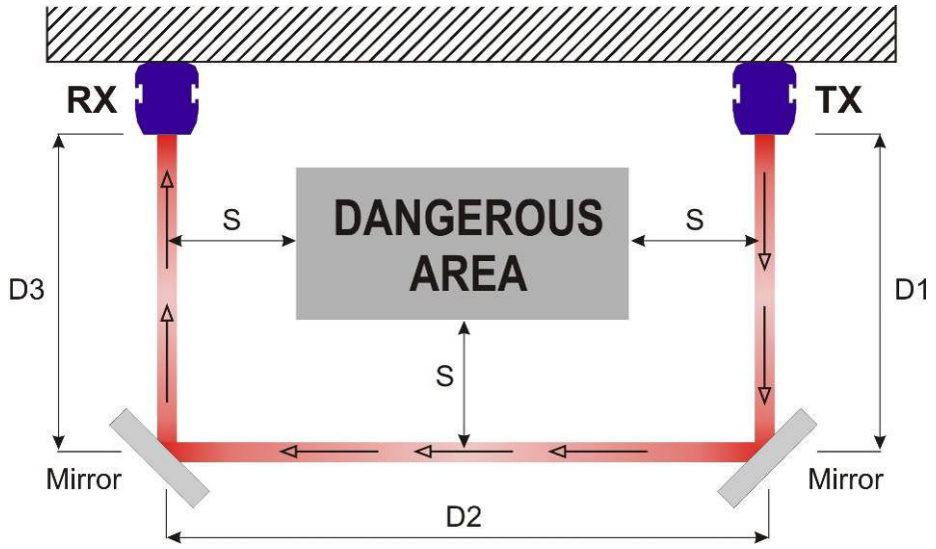


Fig. 7

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

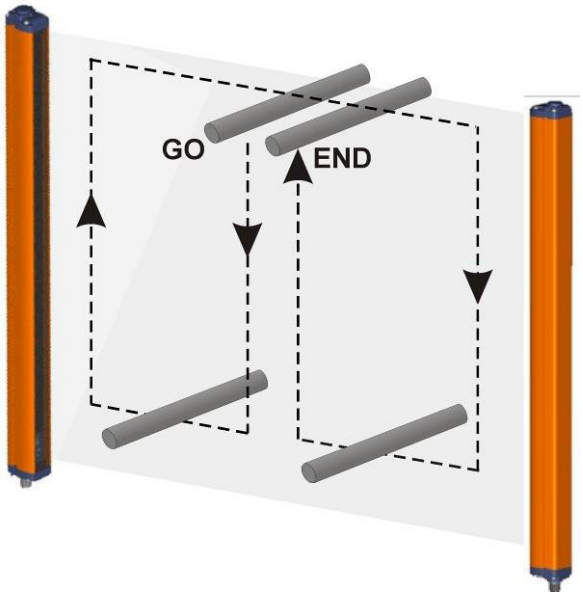
- The alignment of the emitter and the receiver can be a very critical operation when deviating mirrors are used. Even a very small angular displacement of the mirror is enough to loose alignment. A laser pointer (available as an accessory) can be used to avoid this problem.
- The minimum safety distance (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 refer to the technical specifications of the mirrors used).
- Do not use more than three mirrors for each device.
- The presence of dust or dirt on the reflecting surface of the mirror causes a drastic reduction in the range.

2.2.5 Controls after first installation

- The control operations to carry-out after the first installation and before machine start-up are listed hereinafter. The controls must be carried-out by qualified personnel, either directly or under the strict supervision of the person in charge of machinery Safety.

Verify that:

- ESPE remains in SAFE state ( ) intercepting the beams along the protected area using the specific test piece (TP-40, TP-50, TP-90), following the scheme in the following figure.

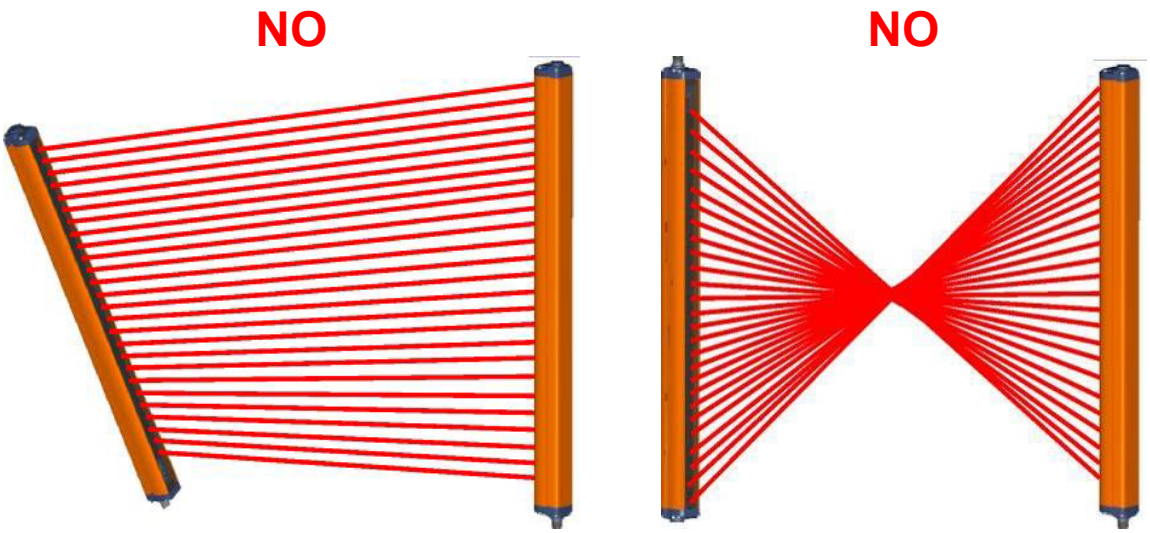


- ESPE is correctly aligned: press slightly on the product side in both directions the red LED must not turn on .
- The activation of the TEST function causes the opening of the OSSD outputs (red LED on and controlled machine stop).
- The response time at machine STOP, including the ESPE and machine response times, is included in the limits defined in the calculation of the safety distance (refer to paragraph 2.2.1).
- The safety distance between the dangerous parts and ESPE complies with the requirements indicated in paragraph 2.2.1.
- Nobody can access or remain between ESPE and the dangerous parts of the machine.
- Access to the dangerous areas of the machine is not possible from any unprotected area.
- ESPE is not disturbed by external light sources, ensuring that it remains in NORMAL OPERATION condition for at least 10-15 minutes and, placing the specific test piece in the protected area, in the SAFE state for the same period.
- Verify the correspondence of all the accessory functions, activating them in the different operating conditions.

2.2.6 Emitter and receiver orientation

The two units shall be assembled parallel each other, with the beams arranged at right angles with the emission and receiving surface, and with the connectors orientated towards the same direction.

The configurations shown in the following figure must be avoided:



3 MECHANICAL MOUNTING

The emitting (**TX**) and receiving (**RX**) bars 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.8 and Fig.9).

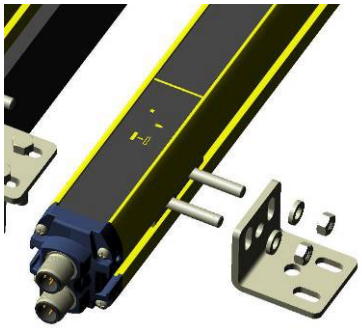


Fig. 8

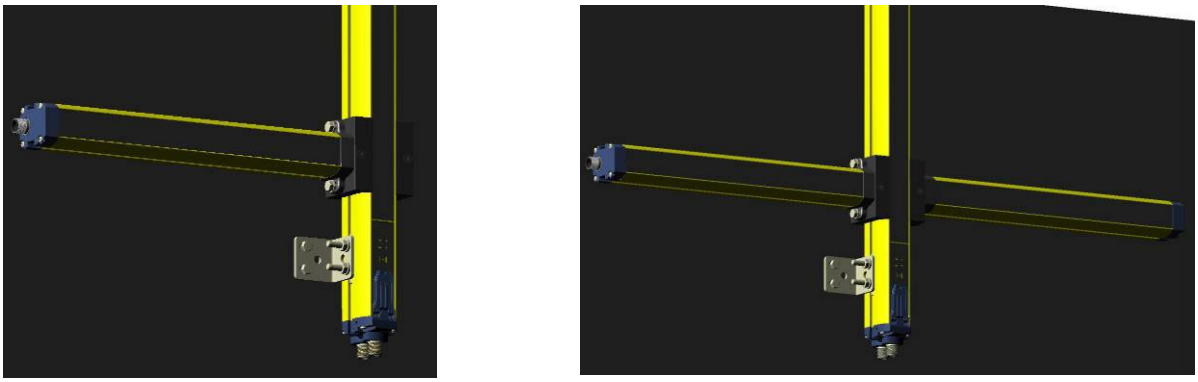


Fig. 9

In presence of strong vibrations fixing brackets for the Muting arms mounting are compulsory (Fig.10).

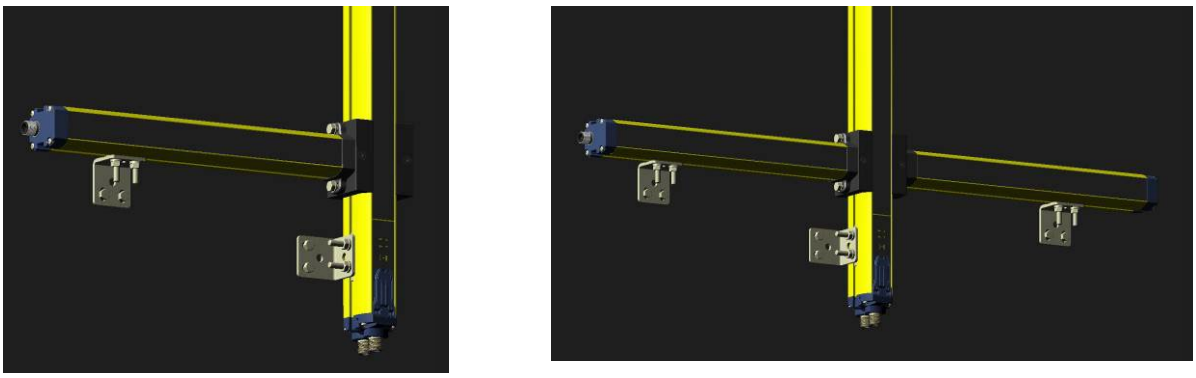
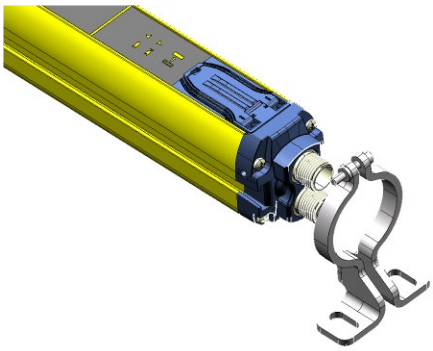
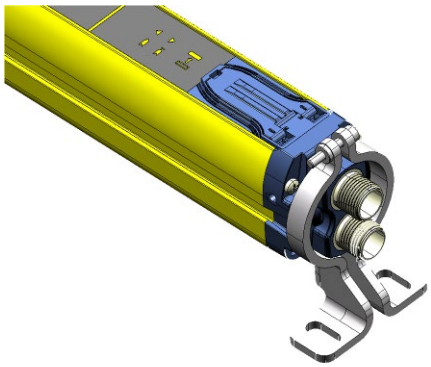


Fig. 10

Fixing brackets can be used where no large mechanical compensation is required during the alignment operation.

It is possible to adjust angular position of the light curtain by means of ST-K4ROT-SG BODY COMPACT rotating brackets. The brackets and the round design of the closing caps allow a 360° rotation of the product on its own axis. For further information see Chapter 12 "Accessories".
For further information refer to chapter 12 "Accessories".





The rotating supports for the correction of the bar inclination of ±5° max. are available on request (see section 12 *"Accessories"*).

In case of applications with particularly strong vibrations, anti-vibration shock absorbers, together with threaded pins, rigid brackets and/or rotating supports, are recommended to reduce the impact of the vibrations.

3.1 MECHANICAL ARM MOUNTING

To mount the Muting arms on both the "L" and "T" version, use the fixing bracket shown in Fig. 11a. This accessory guarantees the perfect alignment of the arms and the perpendicularity to the main unit. Position the bracket on the main unit, after having mounted the arm or arms, as shown in Fig. 11b. Verify the correct functioning position and block the group using the two plates and the screws and tightening them with a CH.2.5 Allen key (Fig.11c).

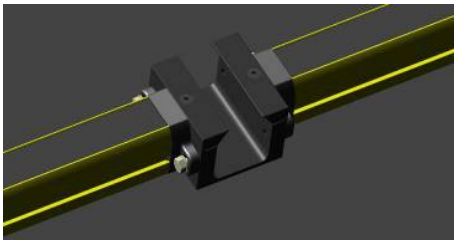


Fig.11a

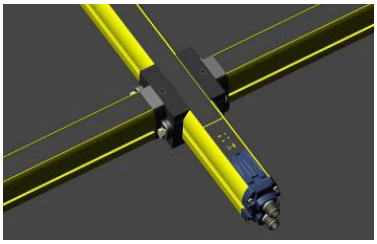


Fig.11b

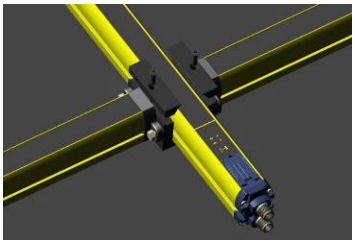
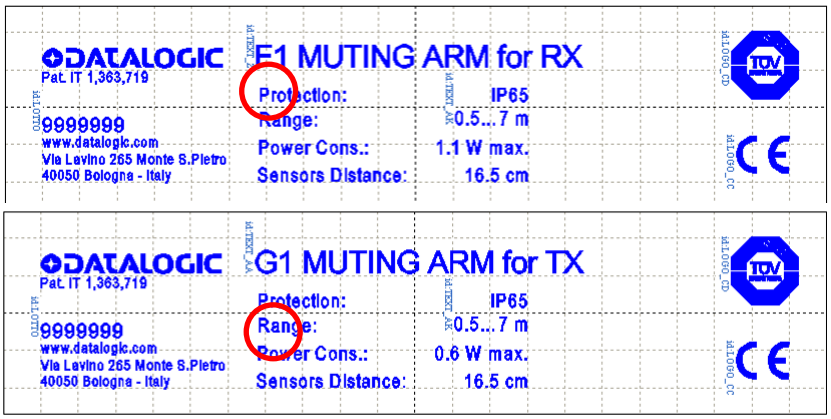


Fig.11c

3.2 MECHANICAL ARM MOUNTING (THROUGH-BEAM)

The following aspects have to be considered during the mechanical arm mounting for the “L” and “T” light curtain models:

- Mount the arm with the active Muting sensors on the receiving unit and the arms with the reflectors on the emitting unit.
- Make sure that TX arm G1 is level with RX arm F1 and that TX arm G2 is level with RX arm F2; please refer to figure that shows markings at the back of each arm.



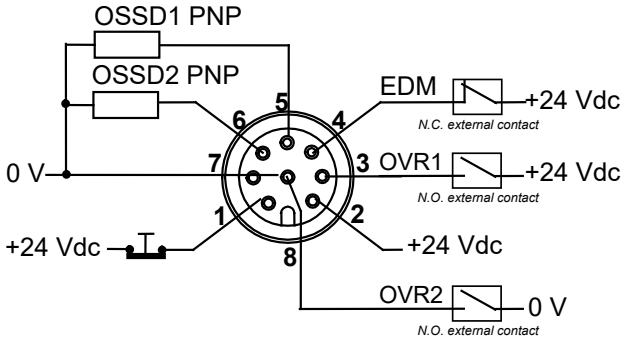
- In the “L” version mount the arms in order to intercept the object before entering in the light curtain sensitive area.
- The two arms have to be mounted in order to be the most parallel and aligned possible. The sensors have default alignment, but the rotation around the main arm can be further adjusted by regulating the specific fixing bracket.
- In critical applications due to the presence of strong vibrations, the arms have to be fixed using the specific fixing brackets (Fig.11).
- The use of arms for the Muting function limits the maximum operating distance to 3 meters.
- The Muting arms can be adjusted vertically according to the application and to the connecting cable lengths (typical range is 14 cm).

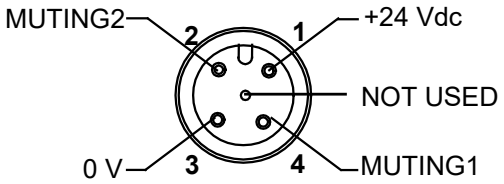
4 ELECTRICAL CONNECTIONS

All electrical connections to the emitting and receiving units are made through a male M12 connector, located on the lower part of the safety light curtain.

4.1 SG2/4-S…-PP-W ELECTRICAL CONNECTIONS

RECEIVER (RX)

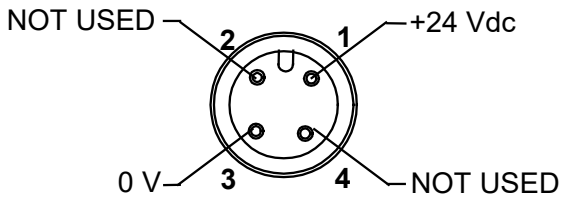


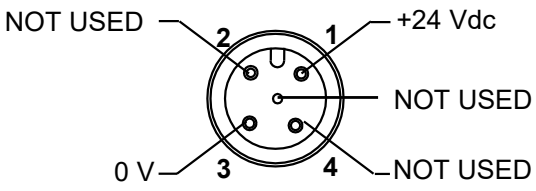


1 = WHITE = TEST/START
2 = BROWN = +24 VDC
3 = GREEN = OVERRIDE 1
4 = YELLOW = EDM
5 = GREY = OSSD1
6 = PINK = OSSD2
7 = BLUE = 0 V
8 = RED = OVERRIDE 2

1 = BROWN = +24 VDC
2 = WHITE = MUTING2
3 = BLUE = 0 V
4 = BLACK = MUTING1
5 = GREY = NOT USED

EMITTER (TX)



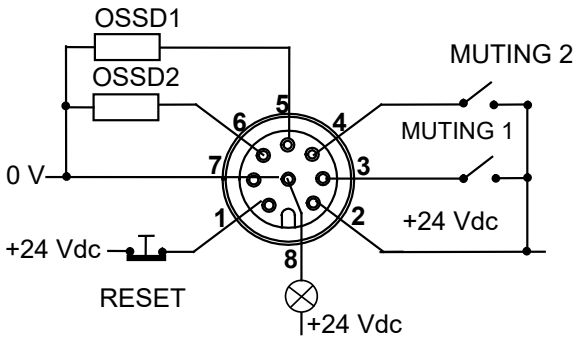


1 = BROWN=+24 VDC
2 = WHITE=NOT USED
3 = BLUE=0 V
4 = BLACK=NOT USED

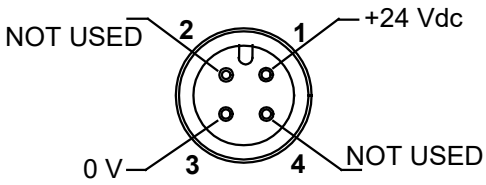
1 = BROWN = +24 VDC
2 = WHITE = NOT USED
3 = BLUE = 0 V
4 = BLACK = NOT USED
5 = GREY = NOT USED

4.2 SG4-S…-PP-N ELECTRICAL CONNECTIONS

RECEIVER (RX)



EMITTER (TX)



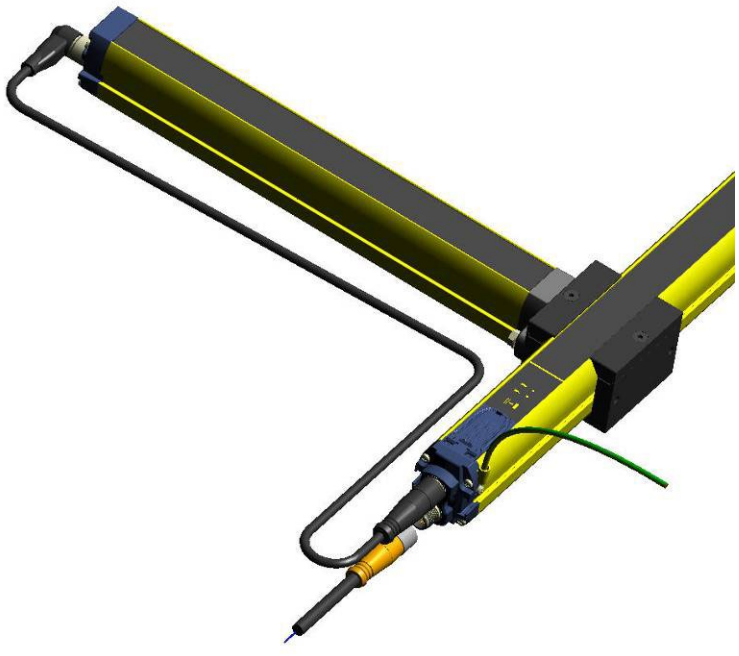
1 = WHITE = RESTART / RESET / EDM / OVERRIDE
2 = BROWN = +24 VDC
3 = GREEN = MUTING 1
4 = YELLOW = MUTING 2
5 = GREY = OSSD1
6 = PINK = OSSD2
7 = BLUE = 0 V
8 = RED = MUTING LAMP

1 = BROWN = +24 VDC
2 = WHITE = NOT USED
3 = BLUE = 0 V
4 = BLACK = NOT USED

4.3 NOTES ON CONNECTIONS

For the correct functioning of the safety light curtains of the SG BODY COMPACT series, the following precautions regarding the electrical connections have to be respected.

- Use only shielded cables for the connection of the two units.
- The light curtain has been developed to offer an adequate immunity level against disturbances in the most critical working conditions.
- It is possible to connect to ground the device housing using the mechanical part supplied for ground connection (refer to configuration illustrated in Fig.12).



-

Fig. 12

- Do not place connection cables in contact or near high-voltage cables (e.g. motor power supplies, inverters, etc.);
- 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. Push the specific 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 and Reset operation. (see section 6 *"Functioning mode"*).

- The EDM wire has to be connected to a 24 Vdc normally closed contact, before powering. The monitoring function, if selected, is not activated if at powering the wire is not correctly connected; in this case the light curtain enters in a failure condition.
- The Muting function is activated only if the wires are connected to the sensors, as thus is enable di Muting lamp integrated on Rx side.

⚠

- The OVERRIDE button/key must be located in such a way that the operator can check the protected area during any test. (see section 6 *"Functioning mode"*).

- The device is already equipped with internal overvoltage and overcurrent suppression devices. The use of other external components is allowed but not recommended.
- Read the "Functioning mode" section 6 relative to the Muting function, its use and the positioning of the activating sensors.
- 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 screw supplied, which can be put into the proper threaded hole on the cap (*see Fig.13*).

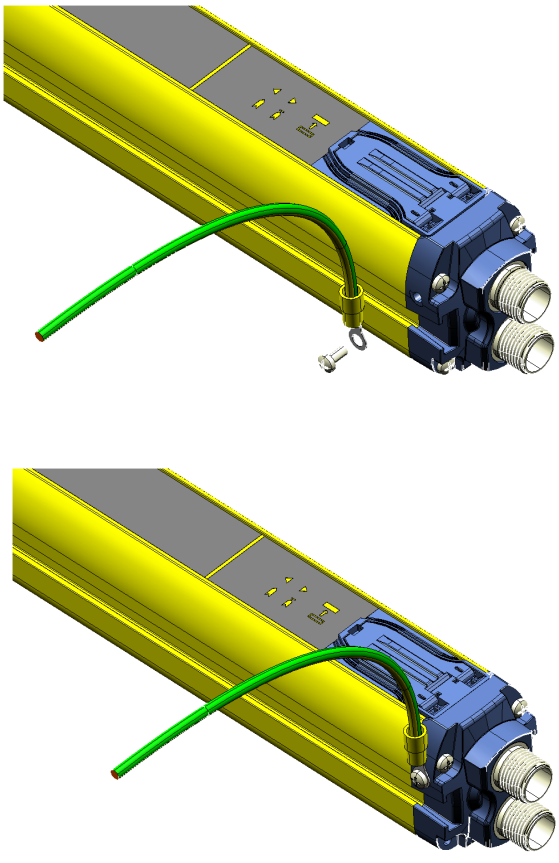


Fig. 13

- 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”).
- Connect both OSSD to the activating device.

The avoided connection of an OSSD to the activating device jeopardises the system safety degree that the light curtain has to control.

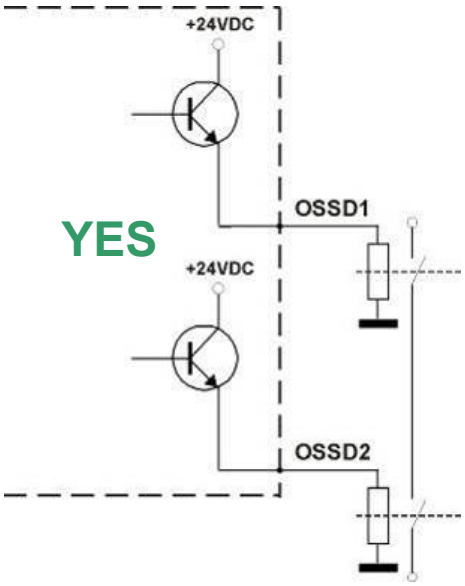


Fig. 14

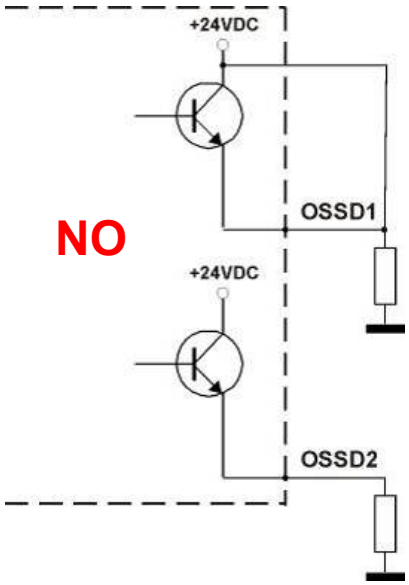


Fig. 15

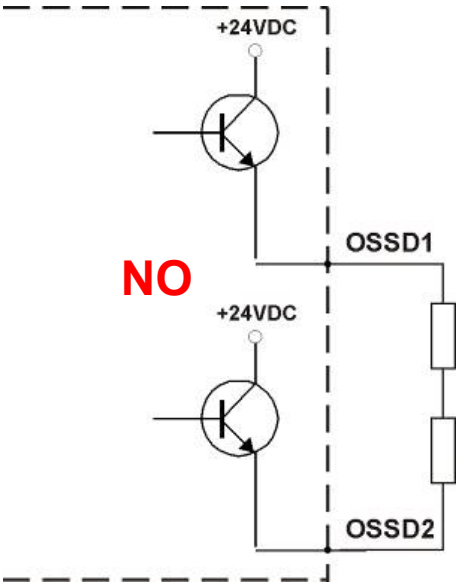


Fig. 16

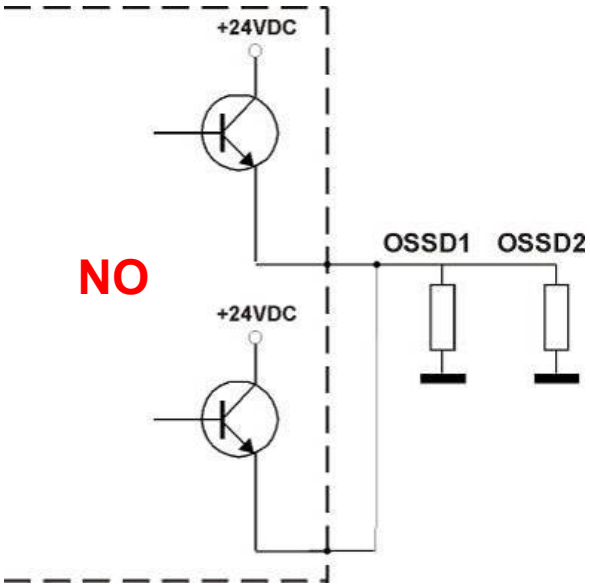


Fig. 17

5 ALIGNMENT PROCEDURE

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 LIGHT CURTAIN 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 light curtain.
- 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 (NORMAL OPERATION); if they are ON, the unit is running correctly.
- Verify that one of the following conditions is present on the RX unit:
    1. Red LED (SAFE) ON: non-alignment condition.
    2. Green LED (NORMAL OPERATION) ON: light curtain already aligned condition; in this case also the two yellow LEDs will be ON (HIGH ALIGN, LOW ALIGN).
- 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 transmission 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 transmission unit until the upper yellow LED (HIGH ALIGN) is ON; in this conditions red LED (SAFE) must turn off and green LED (NORMAL OPERATION) must turn ON.

Note: ensure that the green LED (NORMAL OPERATION) mode is ON and steady.

C. Delimit the area in which the green LED (NORMAL OPERATION) 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 light curtain.
- Re-connect the power supply.
- Verify that the green LED is ON on the RX unit (condition where the beams are free, NORMAL OPERATION) and verify that, if even one single beam is obscured, the green LED turns OFF and the red LED turns ON (condition where an object has been detected, SAFE).

5.2 CORRECT MUTING ARM ALIGNMENT PROCEDURE

Once effected the safety light curtain alignment and the mechanical arm mounting and the relative connection, ensure the correct alignment of the arm sensors regulating the fixing bracket.

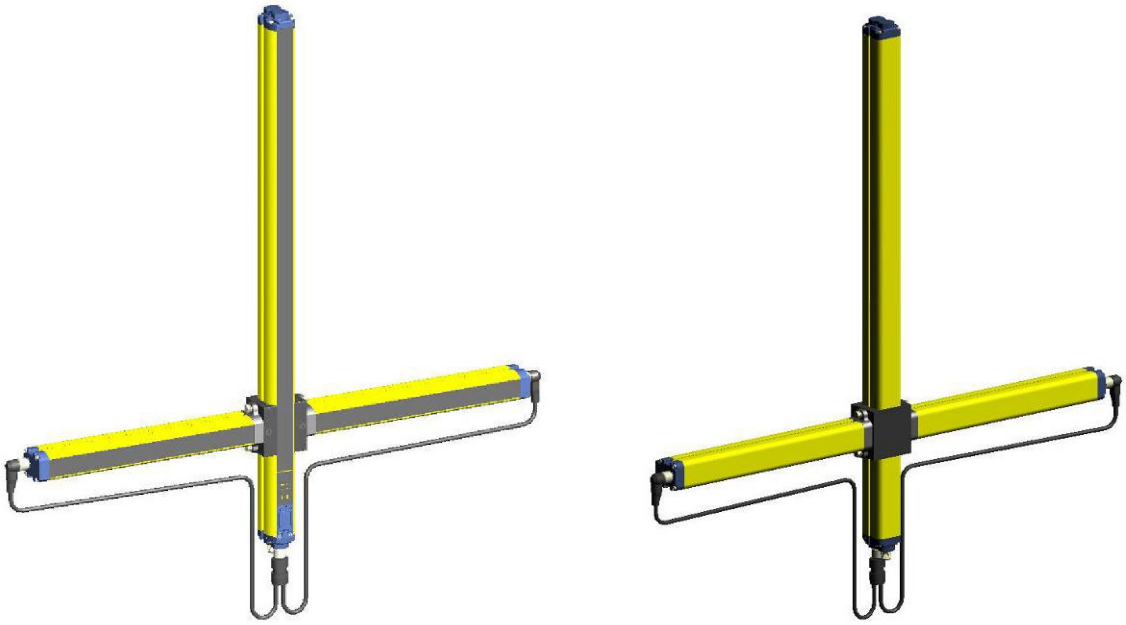


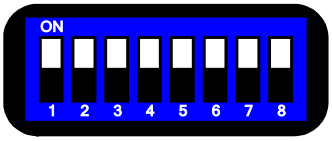
Fig.18

The arm position can be modified vertically and horizontally respect to the main axis.
Avoid unsafe alignment conditions; carefully check the status of the red warning LEDs on active arms sensors (on the retro-reflex version) or located on RX arms sensors (on the through-beam version). The alignment is perfect if all the warning LEDs are off. Moreover, in the through-beam version, on TX arm two green LEDs will be on (one per sensor) to indicate that TX sensor is ON.

6 FUNCTIONING MODE

6.1 DIP-SWITCH SELECTABLE FUNCTIONS

A slot situated in the front side of the RX unit (Fig. 19), that can be easily opened using a screwdriver, facilitates the access to the internal dip-switches.



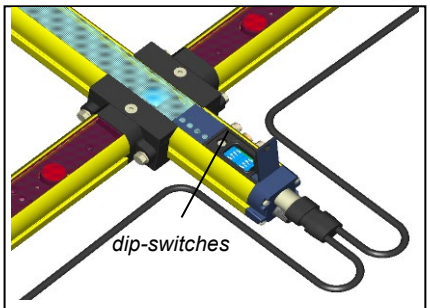
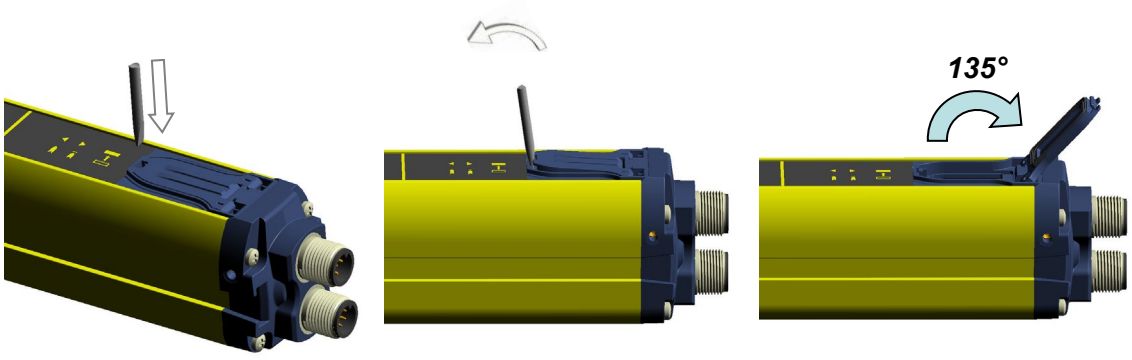


Fig. 19



Insert a screwdriver point into the dedicated pocket of the hinged lid and lever up slightly until the snap happens. Rotate the lid until you reach the 135° angle.
A light brake will provide to keep the wide position.
To close the lid press on the zone where is the pocket until you get the closing snap.
By means of the dip-switches it is possible to set the functions described in the following table:

dip-sw	Function	ON	OFF
1,5	Muting time-out	10 min.	∞
2,6	Muting	T config. (4 beams)	L config. (2 beams)
3,7	EDM	Deactivated	Activated
4,8	Reset	Automatic	Manual

⚠ **Muting time-out "∞" does not comply with the requirements of IEC 61496-1. Therefore all possible risks must be considered and related precautions undertaken before selecting the "∞"option.**

⚠ 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.

N.B.: Like shown in the figure and in the previous table, each function is associated with two different dip-switches; it is necessary that the two different dip-switches associated to a particular function are configured in the same way.

6.2 STANDARD CONFIGURATION

The device is supplied with the following standard configuration:
- Muting time-out = 10 min
- Muting in the T configuration (4 beams)
- EDM deactivated
- Automatic Reset

Note: The Muting function can only be activated if Muting 1 and Muting 2 inputs are properly connected and the integrated Muting lamp operates correctly. 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.

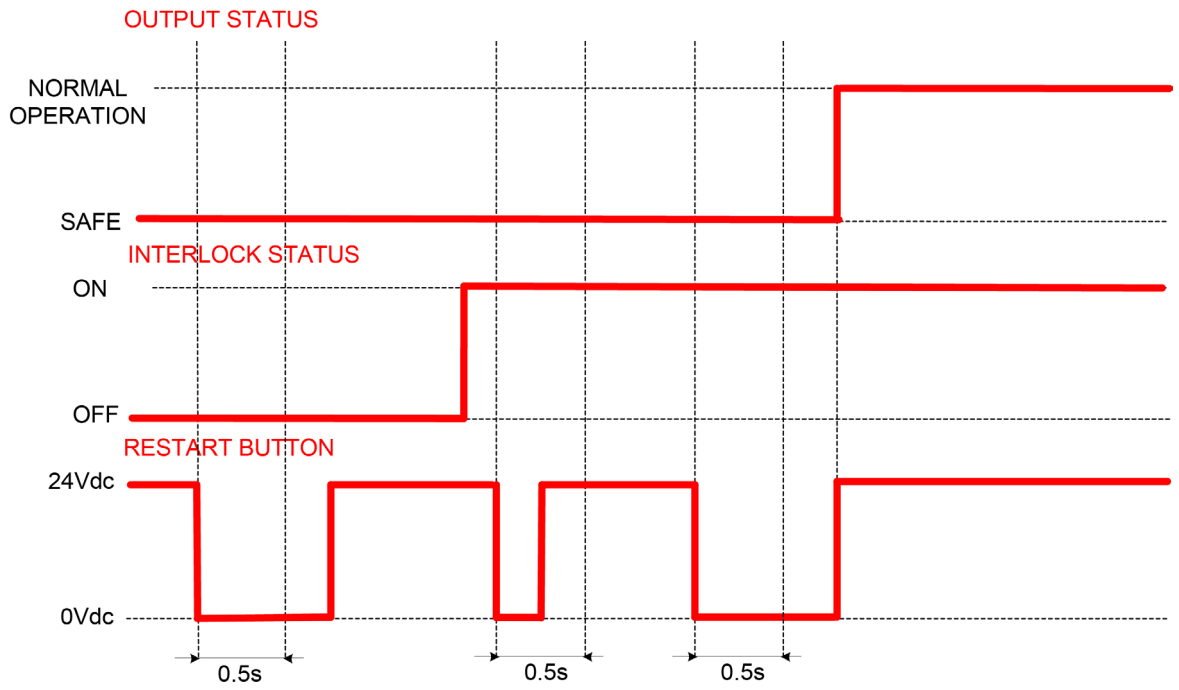
Note: When "L" configuration model is used, is strictly necessary to set dip-switch 2 and 6 in OFF position.

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

- **Automatic Restart**: when an opaque object is detected, the ESPE enters in the SAFE 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.

SG2/4-S…-PP-W Models Manual Restart Diagram



SG4-S…-PP-N Models Manual Restart Diagram

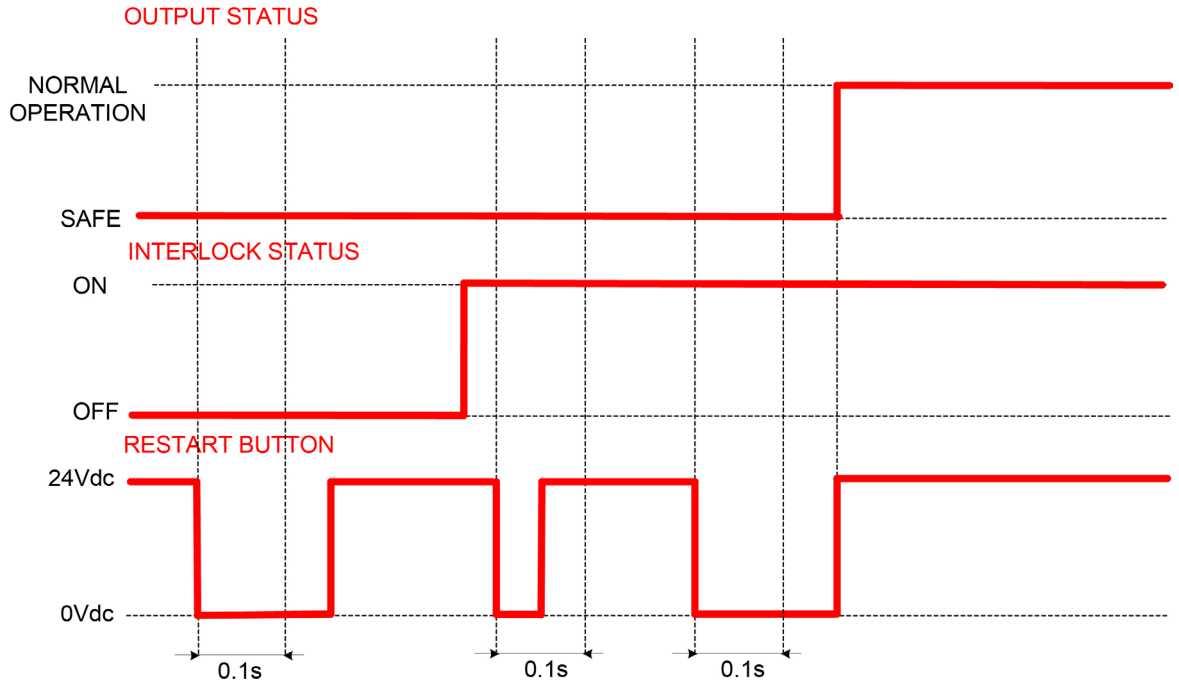


Fig.20 below shows the two functioning modes:

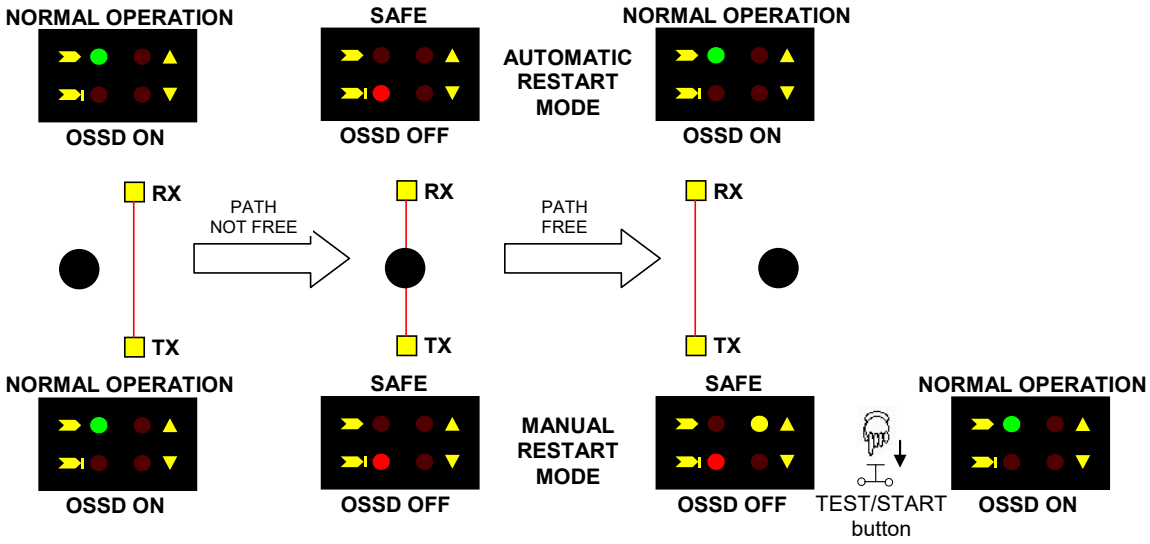
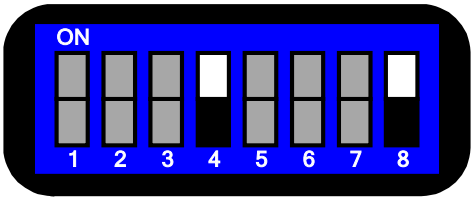


Fig. 20

The selection of the manual/automatic Restart mode is made through the dip–switches placed under the slot of the receiving unit. In particular, 4 and 8 dip-switches must be ON to activate the automatic Restart mode, OFF for the manual Restart mode.

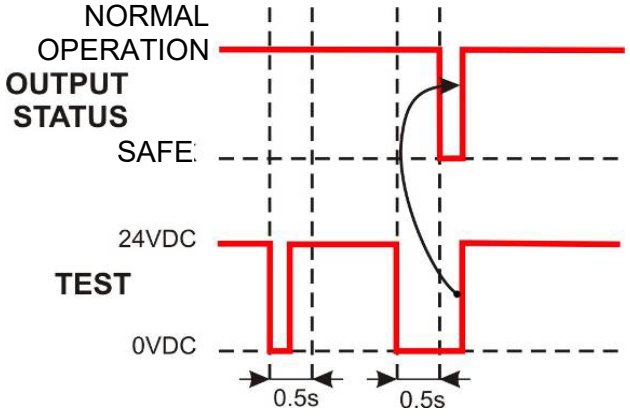


Note: The dip-switches not used for this function are in grey. The lever position of the specific dip-switch is in white (ON) in the automatic Restart mode.

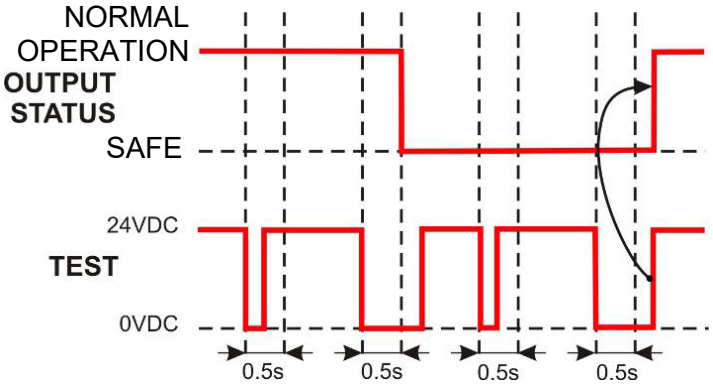
6.4 TEST FUNCTION

The TEST function can be activated by simply pressing the external push-button for at least 0.5 seconds as shown in the following timing diagram.

AUTOMATIC VERSION



MANUAL VERSION

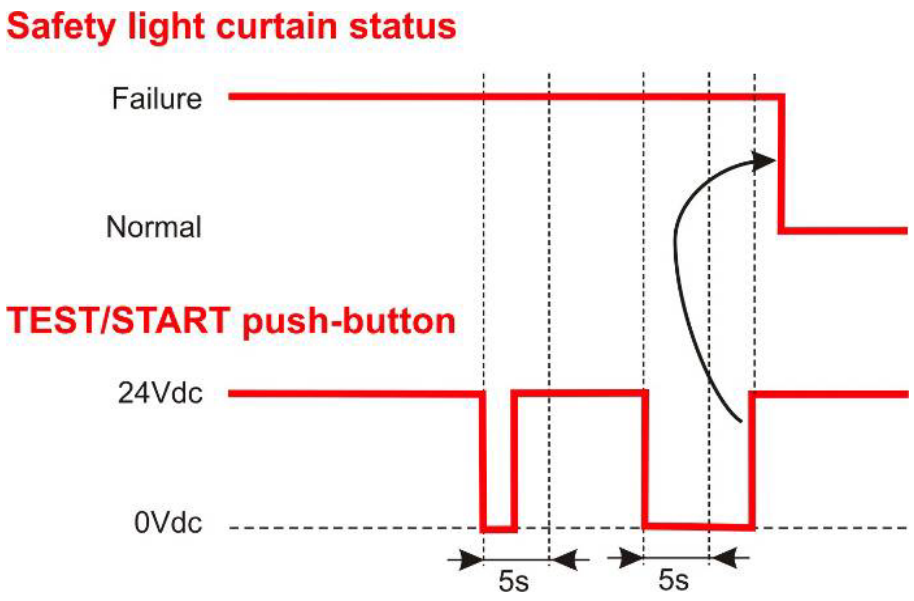


6.5 RESET FUNCTION

The light curtain has a Reset function that is activated in presence of an internal failure.
The operator has to press the TEST/START button resetting the break condition and thus return to normal functioning.
The button has to be kept pressed for at least 5 seconds in one of the following conditions:

- *output failure;*
- *optic failure;*
- *failure of the Muting signalling device;*
- *failure of EDM test function.*

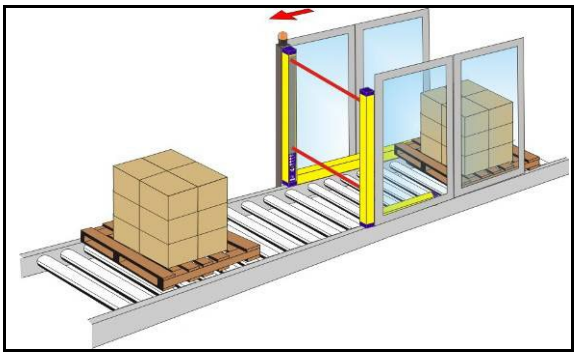
Temporal diagram of the Reset function



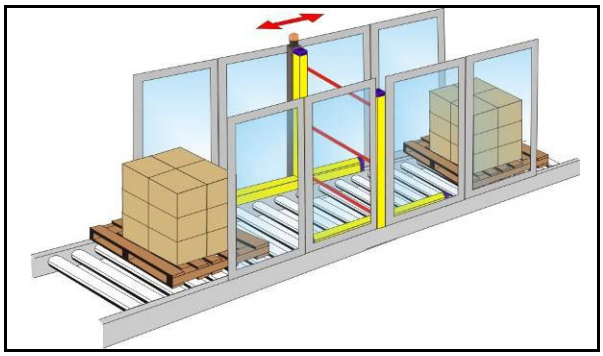
6.6 MUTING FUNCTION

The Muting sensors must be able to 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.

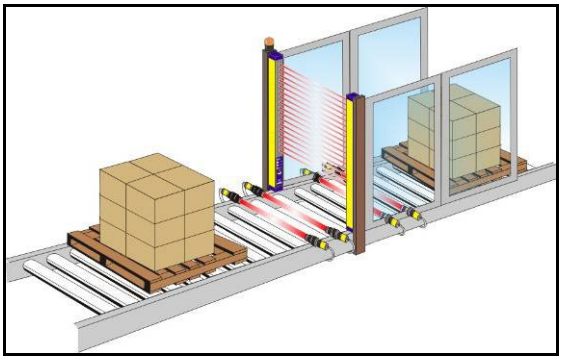
- The Muting function, excludes the light curtain during functioning, maintaining active the OSSD outputs, according to particular operating requirements (Fig.21).



L-shaped version with integrated Muting sensors for unidirectional Muting



T-shaped version with integrated Muting sensors for bidirectional Muting



Linear version with external Muting sensors

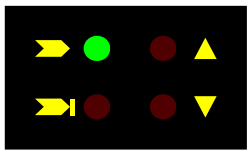
Fig. 21

- 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 use 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.
- State of Muting is signalled by Muting Lamp integrated on the top of receiver side.
- During the installation take care to place the Muting Lamp in as visible as possible position.
- If the Muting lamp is 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. 22 shows an example of Muting functioning:



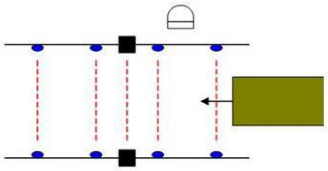


Fig. 22a

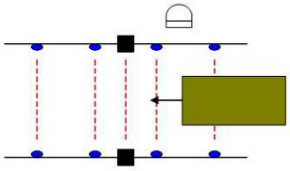


Fig. 22b

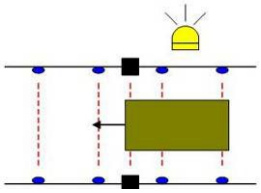


Fig. 22c

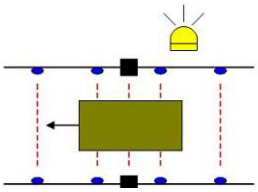


Fig. 22d

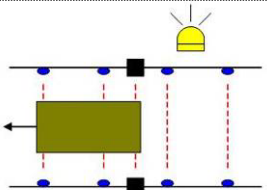


Fig. 22e

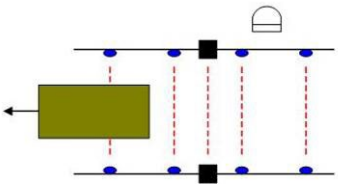


Fig. 22f

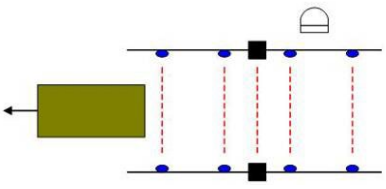
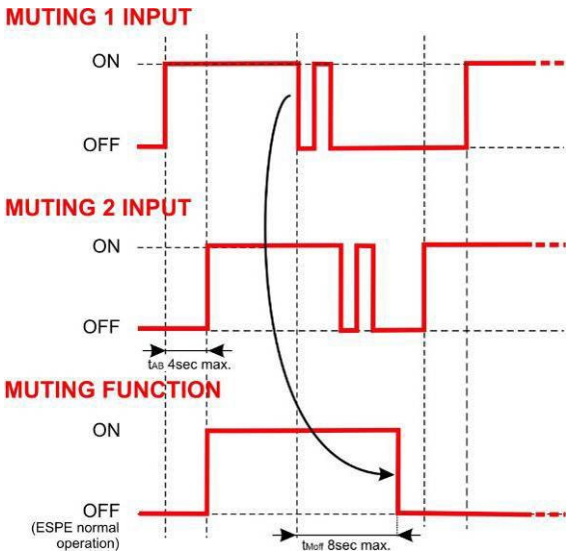
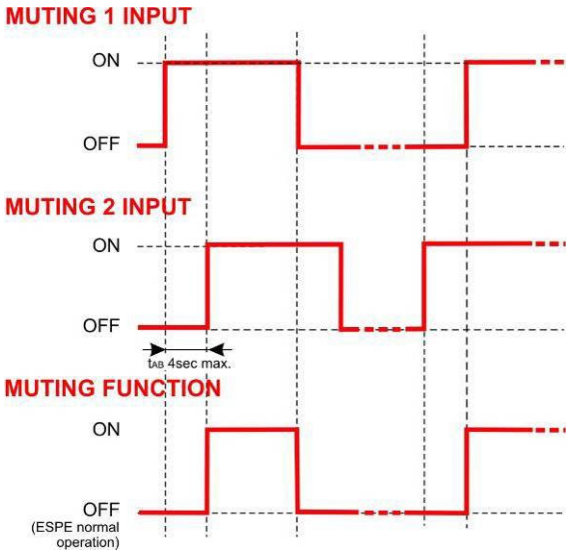


Fig. 22g

Temporal diagram of the Muting function for two-sensor configuration ("L-shaped" or crossed-beam versions)



Temporal diagram of the Muting function for four-sensor configuration ("T-shaped" version)

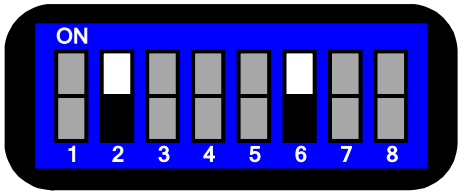


6.7 INSTALLATION MODE OF MUTING SENSORS

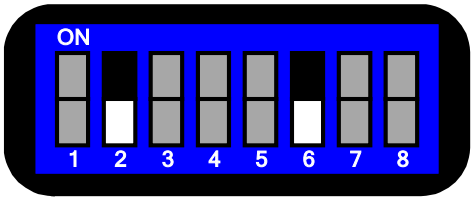
The safety light curtains of the SG BODY COMPACT series have a dip-switch dedicated to the Muting configuration selection.

The requested configuration is obtained using the dip-switches n° 2 and 6 present on the receiving unit.

With Dip 2 in the ON position, the “T” configuration (4 sensors) is selected.



With Dip 2 in the OFF position, the “L” configuration (2 sensors) is selected.



Select carefully the configuration, as a wrong configuration can cause the incorrect functioning of the Muting function and a reduction of the safety level.

- 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 activating the Muting1 first and then the Muting2, or vice versa.
- If the activations occur in sequence, the second activation should occur within 4 sec. after the first; otherwise the Muting will not be activated.

Any Muting request cannot be made if the ESPE is in the SAFE condition (red LED is ON and the beams are interrupted).

6.7.1 SG2-S and SG4-S models

Fig.23 provides an installation example of a linear 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.

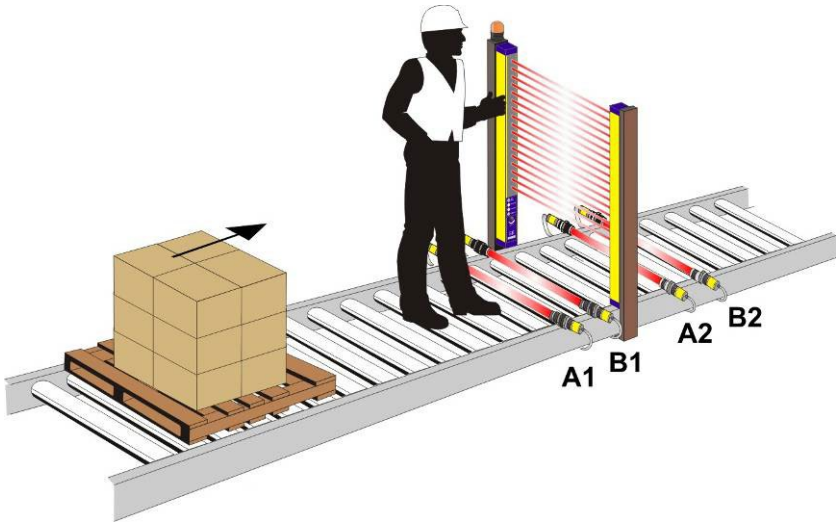


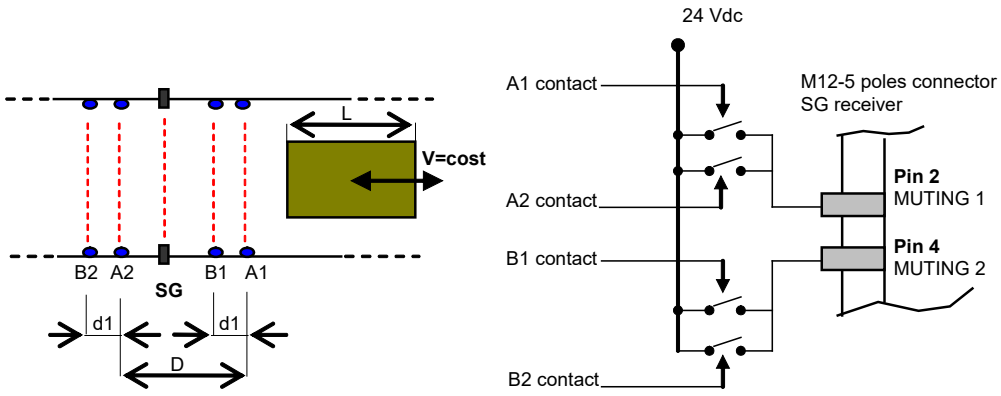
Fig. 23

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: parallel-beam configuration***

The solution is suitable for applications requiring bidirectional movements of objects.
For correct functioning, position the dip-switches 2 and 6 in the ON position.

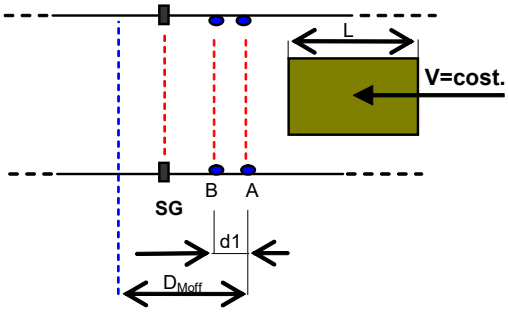
Muting sensors connection:

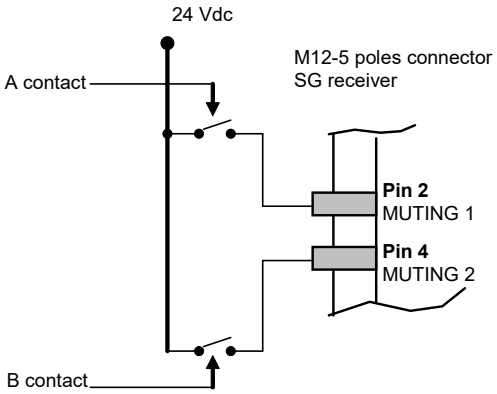


Symbol	Unit	Formula	Min	Typ	Max	Description
D	cm		L			Interaxis between sensors connected to the same Muting input
d_1	cm	= V * t_{AB} * 100	0.1			Interaxis between sensor A and sensor B
t_{AB}	sec	***Compulsory condition***	0.01		4	Activation time of the second sensor after first sensor activation (A→B) (B→A)
D_{OA}	cm		d_1 + D			Distance to respect between adjacent objects to obtain the correct Muting functioning
L	cm		D			Object dimension to activate the Muting function passing between the sensors
V	cm/sec	= d_1 / t_{AB}			250 *(suggested)*	Object speed to activate the Muting function passing between the sensors

- ***Application with 2 optoelectronic sensors: parallel-beam configuration***
  The solution is suitable for applications requiring unidirectional movements of objects.
  For correct functioning, position the dip-switch 2 and 6 in the OFF position.
  The reset of normal Muting functioning is obtained at a DMoff distance from sensor A.

Muting sensors connection:

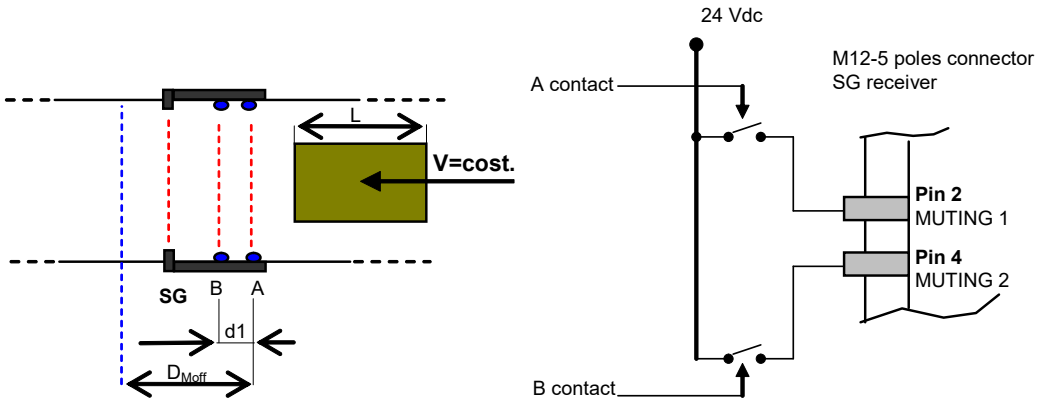




Symbol	Unit	Formula	Min	Typ	Max	Description
D_1	cm	= V * t_{AB} * 100	0.1			Interaxis between sensor A and sensor B
D_{Moff}	cm	***Compulsory condition***		33		Distance from sensor A at which the Muting function is deactivated and the light curtain returns to normal functioning
t_{AB}	sec	***Compulsory condition***	0.01		4	Activation time of the second sensor after first sensor activation (A→B)
t_{Moff}	sec	= D_{Moff} / V	0.132 *(at max. suggested speed)*		8	Time period, referred to sensor A, after which the Muting function is deactivated and the light curtain returns to normal functioning
D_{OA}	cm	= D_{Moff}	33			Distance to respect between adjacent objects to obtain the correct Muting functioning
L	cm		d_1			Object dimension to activate the Muting function passing between the sensors
V	cm/sec	= d_1 / t_{AB}	4.125		250 *(suggested)*	Object speed to activate the Muting function passing between the sensors

6.7.2 SG2-L and SG4-L models

Muting sensors connector:

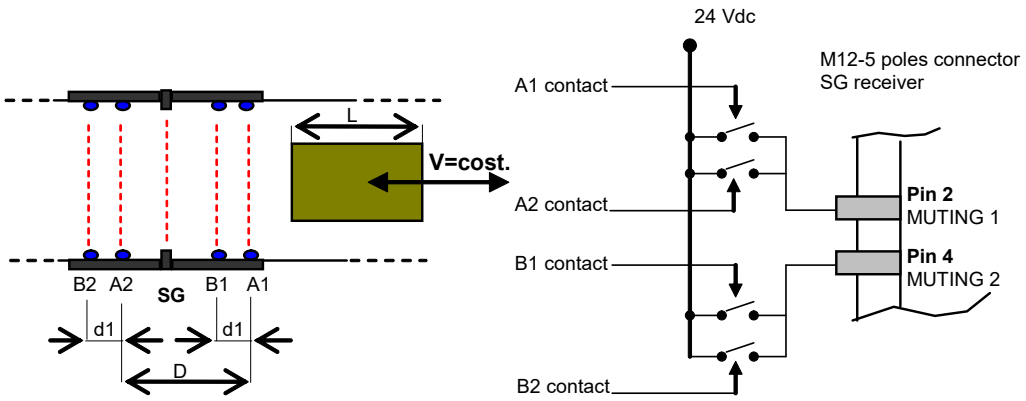


The L-configured solution with integrated Muting facilitates sensor installation and suits applications with unidirectional object passage.
For correct functioning, position the dip-switch 2 and 6 in the OFF position.
The reset of normal Muting functioning is obtained at a D_{Moff} distance from sensor A.

Symbol	Unit	Formula	Min	Typ	Max	Description
d_1	cm	***Compulsory condition***		16.5		Interaxis between sensor A and sensor B
D_{Moff}	cm	***Compulsory condition***		33		Distance from sensor A at which the Muting function is deactivated and the light curtain returns to normal functioning
t_{AB}	sec	***Compulsory condition***	0.01		4	Activation time of the second sensor after first sensor activation (A→B)
t_{Moff}	sec	= D_{Moff} / V	0.132 *(at max. suggested speed)*		8	Time period, referred to sensor A after which the Muting function is deactivated and the light curtain returns to normal functioning
D_{OA}	cm	= D_{Moff}	33			Distance to respect between adjacent objects to obtain the correct Muting functioning
L	cm		d_1			Object dimension to activate the Muting function passing between the sensors
V	cm/sec	= d_1 / t_{AB}	4.125		250 *(suggested)*	Object speed to activate the Muting function passing between the sensors

6.7.3 SG2-T and SG4-T models

Muting sensors connection:



The T-configured solution with integrated Muting facilitates sensor installation and suits applications with bidirectional object passage.
For correct functioning, position the dip-switch 2 and 6 in the ON position.
The reset of normal Muting functioning is obtained at the deactivation of the A2 sensor (or B1 according to the object passage direction).

Symbol	Unit	Formula	Min	Typ	Max	Description
D	cm	***Compulsory condition***		34.5		Interaxis between sensors connected to the same Muting input
d_1	cm	***Compulsory condition***		16.5		Interaxis between sensor A and sensor B
t_{AB}	sec	***Compulsory condition***	0.01		4	Activation time of the second sensor after first sensor activation (A1→B1) (B2→A2)
t_{Moff}	sec	= D_{Moff} / V	0.132 ***(at max. suggested speed)***		8	Time period, referred to sensor A2(B1), after which the Muting function is deactivated and the light curtain returns to normal functioning
D_{OA}	cm		d_1 + D = 51			Distance to respect between adjacent objects to obtain the correct Muting functioning
L	cm	= D	34.5			Object dimension to activate the Muting function passing between the sensors
V	cm/sec	= d_1 / t_{AB}	4.125		250 *(suggested)*	Object speed to activate the Muting function passing between the sensors

6.8 OVERRIDE FUNCTION

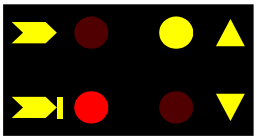
This function allows forcing a Muting condition when machine reset is necessary, even if one or more beams are interrupted by passing material.
The purpose is to clear the protected area of any material accumulated consequently to a failure in the working cycle.
For example, if a pallet stops in front 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.

6.8.1 Override function for SG2/4-S…-PP-W models

- Activation of the Override function

- From a lockout condition it is not possible to actuate the override function.
  When the requirements for the activation are met, a signalling is provided onto the LED display in order to inform users that an override is possible and required.

fixed RED →



← blinking when is possible to require override

Two input lines are provided for the override function, OVR1 and OVR2, that must be connected to +24 Vdc and to 0 Vdc respectively by means of two normal open contacts.
Standard requires the use of spring return hold-to-run devices or secure momentary action pushbuttons, located so that it will not possible to enter the hazardous zone whilst maintaining the action on devices.
Override function can be actuated closing both contacts: whatever contact can be activated first.
The maximum out-of-sync interval time allowed is 400 ms, while the minimum one is 0 ms, as shown in the timing diagram.
While override is actuated, the integrated lamp will be blinking.
Override function will automatically terminate when one of the following condition will be given:

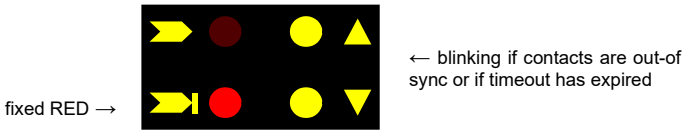
- all the muting sensors are de-actuated (*);
- the pre-determined time limit has expired;
- the requirements for actuation are not met any more (at least one override input line is deactivated).

(*) This is true for light curtains configured as T Muting. For light curtains configured as L Muting, override will terminate when muting sensors are de-actuated AND the light curtain's beams are free.

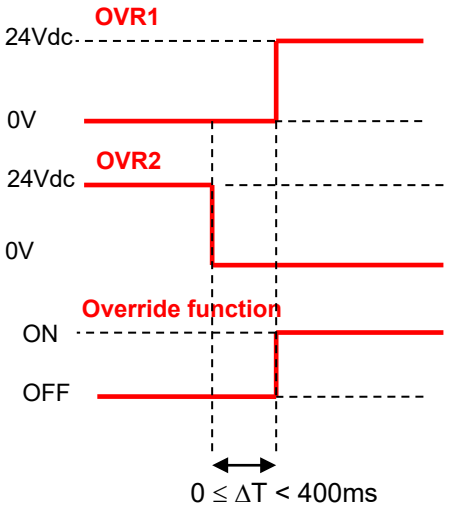
- Keep the button pressed until the clearance of the protected area has been completed.
- The maximum length of the Override function is 120 sec. After that time, the ESPE returns to normal functioning, even if the OVERRIDE button is pressed. Obviously, if the button is released within the 120 seconds, the Override function stops immediately.
- When override is de-actuated, the light curtain will return into the normal operation.

All possible fault conditions at runtime are shown below.

Fault	Cause	Action
Contacts out-of-sync: when trying to actuate the override function, the activation timer expires.	A shortcut to VDC or GND may be present on one of the override input lines or a contact may be defective.	Override is not actuated: the fault is signalled onto the LED display. This is not a lockout condition: the override can be run after fixing the fault.



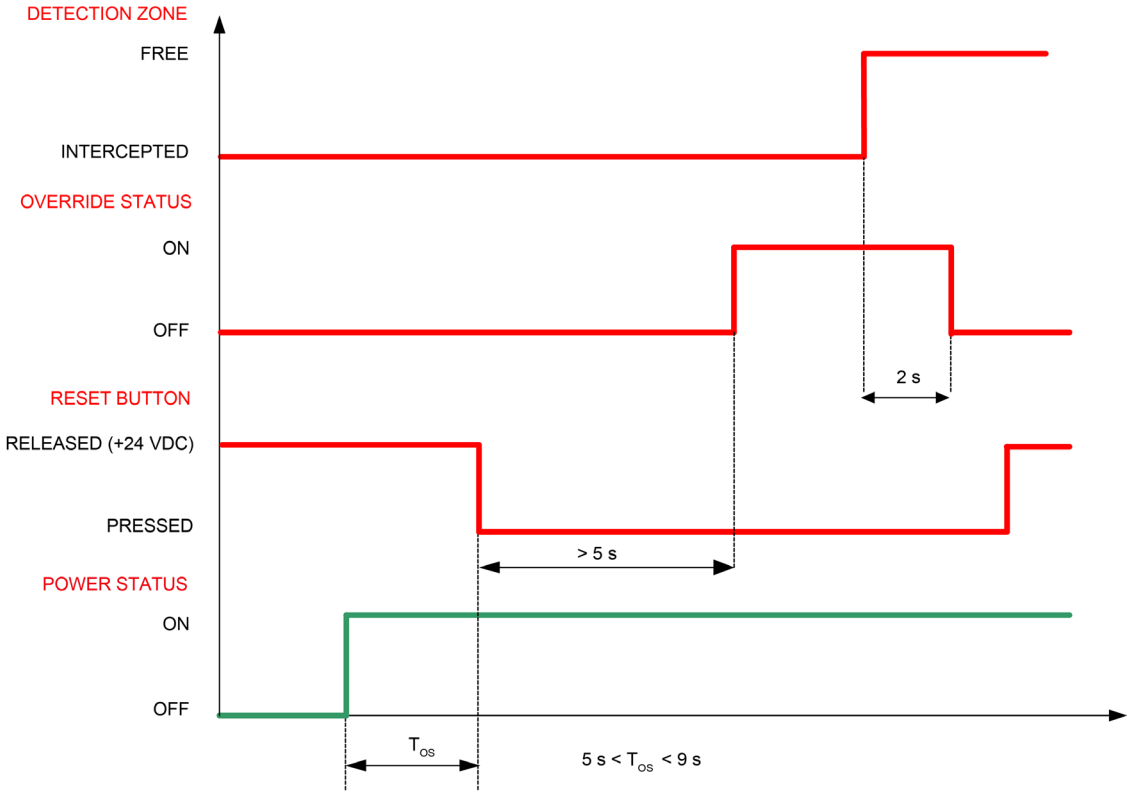
Temporal diagram of the Override function



6.8.2 Override function for SG4-S…-PP-N models

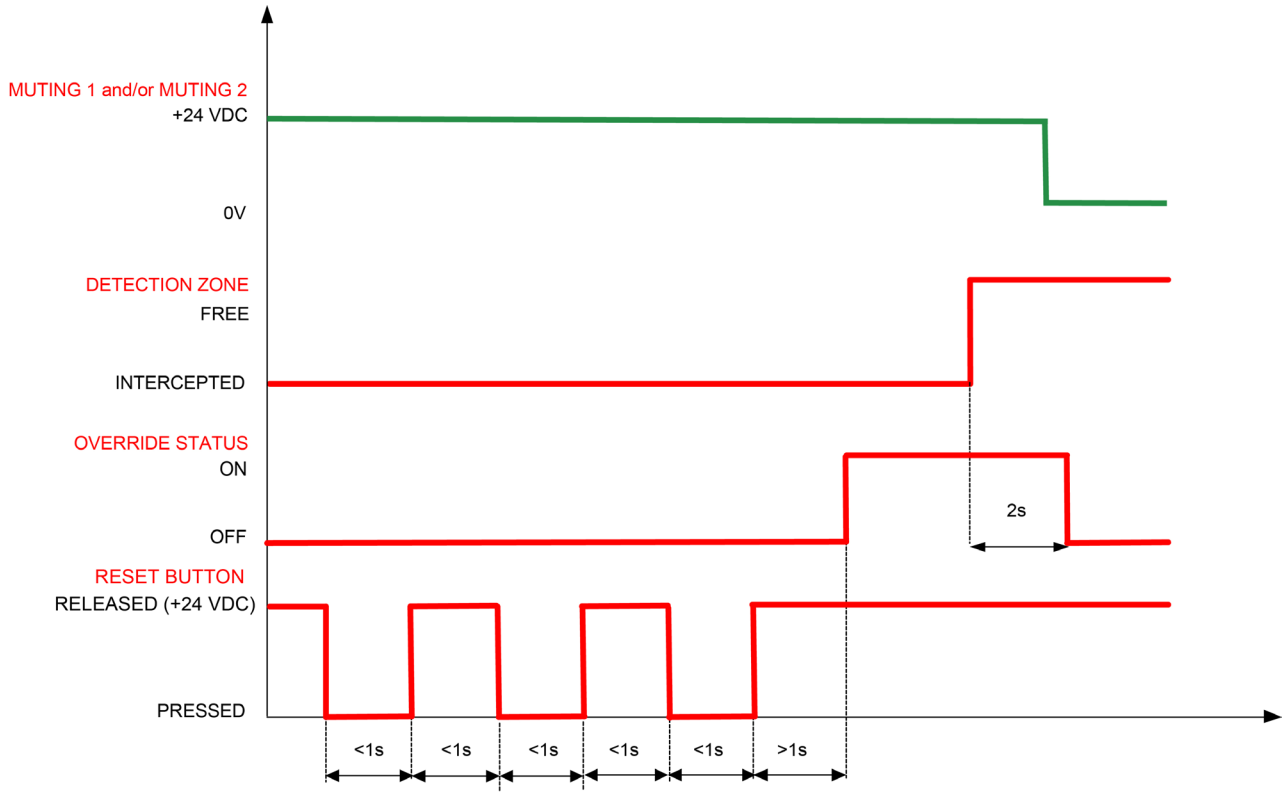
Override function at start-up

- Switch off the power supply.
- Restore the power supply and press the RESET button after approx. 5 s but within 9 s and keep it pressed for at least 5 s. The OSSD outputs switch on and remain activated for a maximum time of 600 s.
- The override function is now activated and the integrated lamp flashes. So does the external lamp if connected.
- If the AOPD is in Automatic Reset, the OSSD outputs remain on after the end of the override.
- If the AOPD is in Manual Reset, the RESET button must be pushed and released after the end of the override in order to switch the OSSD outputs on.



Override function at run time

- One or both muting inputs must be active.
- Press and release the RESET button 3 times < 1 s. The OSSD outputs will be activated for more than 2 s and 600 s max.
- The override function is now activated and the integrated lamp flashes. So does the external lamp if connected.
- If the AOPD is in Automatic Reset, the OSSD outputs remain on after the end of the override.
- If the AOPD is in Manual Reset, the RESET button must be pushed and released after the end of the override in order to switch the OSSD outputs on.

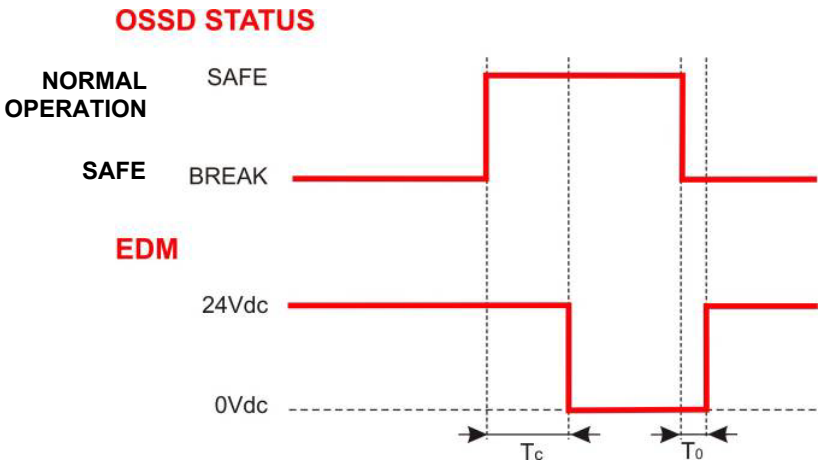


6.9 EDM FUNCTION

The External devices monitoring (EDM) function controls external devices by verifying the OSSD status.

To correctly use this function:
- select it using the specific dip-switches
- connect EDM input to the 24Vdc N.C. contact of the device to control.

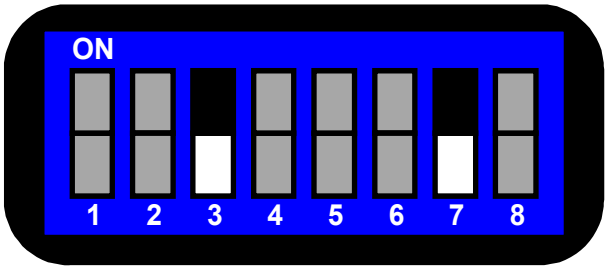
The function controls the N.C. contact switching according to the changes of the OSSD status.



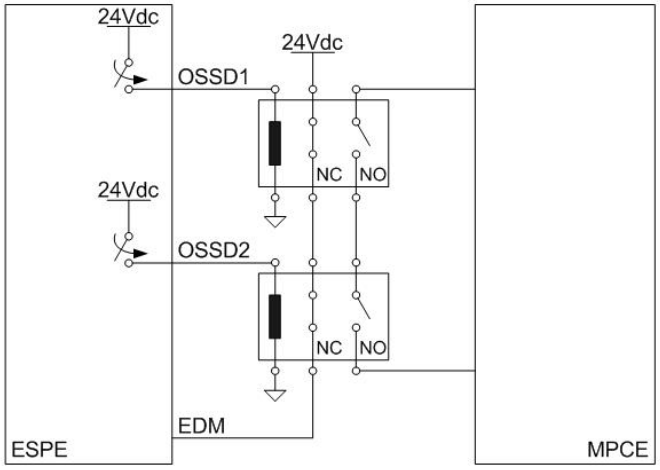
$T_c \geq 350msec$ time after the OSSD OFF-ON passage when EDM is carried-out
$T_0 \geq 100msec$ time after the OSSD ON-OFF passage when EDM is carried-out

The use of non-conform devices may cause failures.
The periodical testing of the function is recommended.

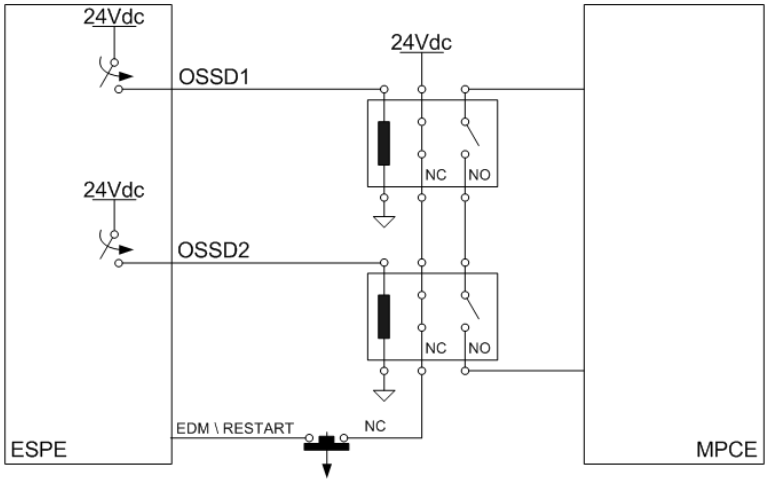
The correct dip-switch positioning (dip 3 and 7 OFF) for the function activation is shown below.



6.9.1 SG2/4-S…PP-W Models EDM Connection



6.9.2 SG4-S…-PP-N Models EDM Connection



7 DIAGNOSTIC FUNCTIONS

7.1 VISUALISATION OF THE FUNCTIONS

The operator can verify the operating condition of the light curtains through four LEDs positioned on the receiving unit and two LEDs on the emitting unit (Fig.24).

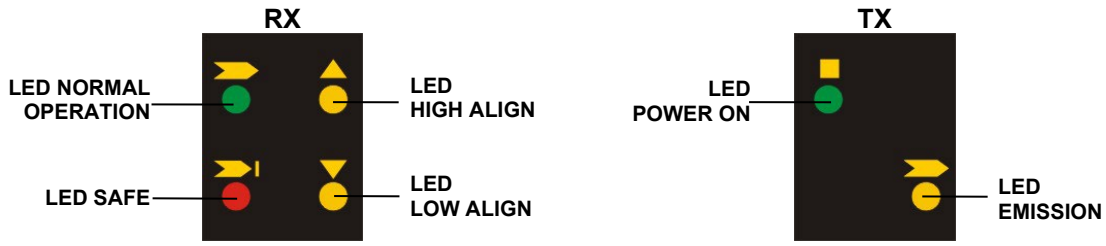


Fig. 24

The meaning of the LEDs positioned on the receiving unit **(RX)** depends on the light curtain operating mode.

7.2 ALIGNMENT MODE

In this condition the outputs are OFF (SAFE state).

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

7.3 OPERATING MODE

- **GREEN LED NORMAL OPERATION**: when ON, indicates that no objects have been detected by the device.
- **RED LED SAFE**: when ON, indicates that one object has been detected; in this condition the outputs are OFF.
- **YELLOW LED HIGH ALIGN**: when continuously ON, indicates the INTERLOCK state, so 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.

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

- **YELLOW LED NORMAL OPERATION**: when ON, indicates that the unit is emitting correctly.
- **GREEN LED POWER ON**: when ON, indicates that the unit is correctly powered.

7.4 FAULT AND DIAGNOSTIC MESSAGES

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

RECEIVING UNIT:

Failure	Cause	Check and repair
OFF *Blinking yellow*  *Blinking red* *Blinking yellow*	Output failure	- Check the output connections. - Check if the load characteristics are in accordance with the Technical data (*see section 9*)
OFF *OFF*  *Blinking red* *Blinking yellow*	Failure of external switching device (EDM test function)	- Control the EDM connections - Check the compatibility of external switching device with EDM test time - Switch OFF and switch ON the devices; is failure persists replace external switching device
OFF *Blinking yellow*  *OFF* *Blinking yellow*	Microprocessor failure	- Check the correct positioning of the configuration dip-switches. - Switch OFF and switch ON the device; if the failure continues contact DATASENSING
OFF *Blinking yellow*  *Red ON* *OFF*	It'is possible to require Override	-The signalling is NOT a failure. -Activate override to remove material from the protected zone.
OFF *Blinking yellow*  *Red ON* *Blinking yellow*	Override connection failure.	-Check connections of the override input lines.
OFF *OFF*  *OFF* *Blinking yellow*	Optic failure	- Check unit alignment. - Switch OFF and switch ON the device; if the failure continues contact DATASENSING
Blinking green *Blinking yellow*  *OFF* *Blinking yellow*	Failure of the integrated Muting signalling lamp	- Switch OFF and switch ON the device; if the failure continues contact DATASENSING.
OFF *OFF*  *OFF* *OFF*	Power supply failure or the power supply voltage is outside the allowed range. Main microprocessor failure	- Check power supply. - Switch OFF and switch ON the device; if the failure continues contact DATASENSING.

EMITTING UNIT:

Failure	Cause	Check and repair
ON green  *Blinking yellow*	Emitter side generic failure	- Check the power supply; if the failure continues contact DATASENSING and replace both units
OFF  *OFF*	Power supply failure	- Check the power supply; if the failure continues contact DATASENSING
ON green  *OFF*	The power supply voltage is outside the allowed range Main microprocessor failure	- Check the power supply; if the failure continues contact DATASENSING.

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.

- The ESPE stays in SAFE state (▶▶I) during beam interruption along the entire protected area, using the specific Test Piece (TP-40, TP-50. TP-90). See also section 2 *"Installation Mode".*
- The ESPE is correctly aligned. Press slightly product side, in both directions and the red LED (▶▶I) must not turn ON.
- Enabling the TEST function, the OSSD outputs should open (the red LED ▶▶I is ON and the controlled machine stops).
- The response time upon machine STOP (including response time of the ESPE and of the machine) is within the limits defined for 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 of a person between ESPE and machine dangerous parts is not possible nor is it possible for him/her to stay there.
- 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 SG BODY COMPACT safety devices do not require any particular maintenance, with the exception of the cleaning of the protection front 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, DATASENSING 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.



For information about the disposal of Waste Electrical and Electronic Equipment (WEEE), please refer to the website at www.datasensing.com.

8.3 WARRANTY (DATASENSING)

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

DATASENSING 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 both units to DATASENSING.

Sales Technical Service

www.datasensing.com

9 TECHNICAL DATA

Power supply = Vdd:	24 Vdc ± 20% (SELV/PELV)
Internal capacitance:	23 nF (Tx) /120 nF (Rx)
Emitter consumption (TX) S model:	30 mA max / 0.9W
Receiver consumption (RX) S model:	75 mA max (without load) / 2.2W
Muting sensor arm consumption:	60 mA max / 1.75W (with sensors off)
Outputs:	2 PNP outputs (2 NPN on request) short-circuit protection max: 1.4A at 55°C min: 1.1A at -10°C
Output current:	0.5 A max / each output
Output voltage - ON min:	Vdd –1 V
Output voltage - OFF max:	0.2 V
Leakage current:	< 1mA
Capacitive load (pure):	65 nF max at 25°C
Resistive load (pure):	56Ω min. at 24 Vdc
Response time:	From 14 to 16 ms
Emission type:	Infrared (880 nm)
Resolution:	315 mm (4 beams) 415 mm (3 and 4 beams) 515 mm (2 beams)
Operating distance:	0.5…3 m (SG2-T/L and SG4-T/L) 0.5…50 m (SG2-S and SG4-S)
Ambient light rejection	IEC 61496-2
Safety category:	Type 4 / Type 2 (ref. EN 61496-1) SIL 3 / SIL 1 (ref. EN 61508) SIL CL 3 / SIL CL 1 (ref. EN 62061) PL and Cat. 4 / PL c Cat. 2 (ref. EN ISO 13849-1 2008) See chapter 10 “List of available models”
Auxiliary functions:	Muting / Override Restart/EDM/Reset
Time-out period:	Muting: 10 minutes / ∞ Override: 2 minutes
Operating temperature:	- 10…+ 55 °C
Storage temperature:	- 25…+ 70 °C
Temperature class:	T6 (Tx/Rx/Arm)
Humidity:	15…95 % (no condensation)
Electrical protection:	Class 1 (**refer to note)
Mechanical protection:	*IP 65 (EN 60529)*
Ambient light rejection:	IEC-61496-2
Vibrations:	**0.35 mm width, 10 … 55 Hz frequency,** **20 sweep for each axis, 1octave/min** (EN 60068-2-6)
Shock resistance:	16 ms (10 G) 1.000 shock for each axis (EN 60068-2-29)
Housing material:	Painted alluminium (yellow RAL 1003)
Cap material:	PC Lexan 943A
Lens material:	PMMA
Connections:	Tx: conn. M12-4 poles + conn. M12-5 poles Rx: conn. M12-8 poles + conn. M12-5 poles

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

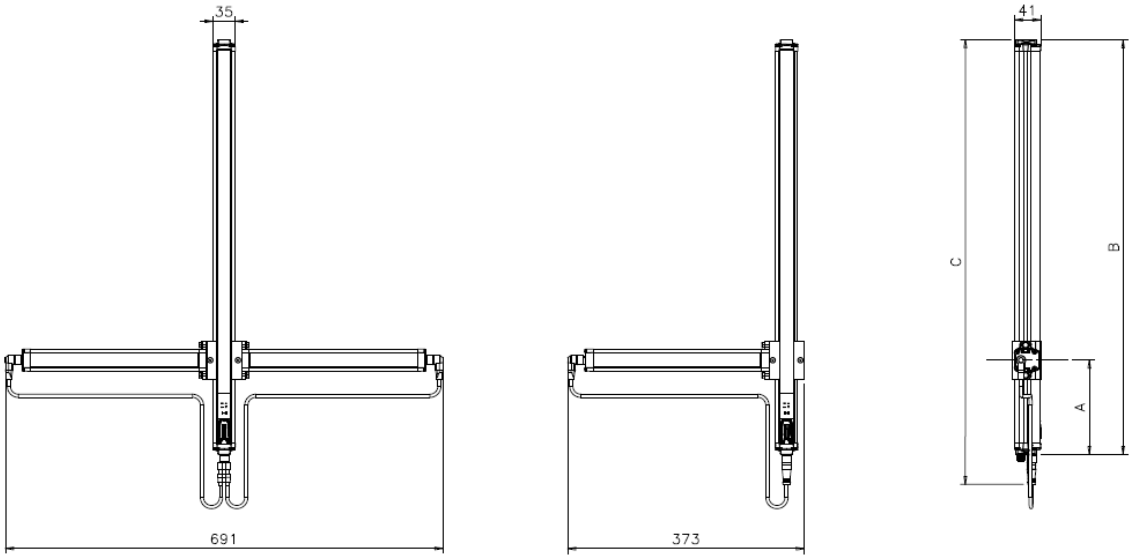
** Electrical protection	Class 1	Class 3
Protective grounding	Compulsory	Not accepted
Symbol for connection protective grounding	Compulsory	Not accepted
Protection by means of extra-low voltage with protective separation (SELV and PELV)	Recommended	Compulsory

10 LIST OF AVAILABLE MODELS

Model	Length of the sensitive area	Interaxis	N°. Beams	Resolution (mm)	Response time (ms)	Operating distance (m)	Code
SG2-S2-050-PP-W	515	500	2	515	14	0.5..50	957851080
SG2-S3-080-PP-W	815	400	3	415	14	0.5..50	957851090
SG2-S4-090-PP-W	915	300	4	315	16	0.5..50	957851100
SG2-S4-120-PP-W	1215	400	4	415	16	0.5..50	957851110
SG2-L2-050-PP-W	515	500	2	515	14	0.5..3	957851120
SG2-L3-080-PP-W	815	400	3	415	14	0.5..3	957851130
SG2-T2-050-PP-W	915	500	2	515	14	0.5..3	957851140
SG2-T3-080-PP-W	1215	400	3	415	14	0.5..3	957851150
SG4-S2-050-PP-W	515	500	2	515	14	0.5..50	957851160
SG4-S3-080-PP-W	815	400	3	415	14	0.5..50	957851170
SG4-S4-090-PP-W	915	300	4	315	16	0.5..50	957851180
SG4-S4-120-PP-W	1215	400	4	415	16	0.5..50	957851190
SG4-L2-050-PP-W	515	500	2	515	14	0.5..3	957851200
SG4-L3-080-PP-W	815	400	3	415	14	0.5..3	957851210
SG4-T2-050-PP-W	515	500	2	515	14	0.5..3	957851220
SG4-T3-080-PP-W	815	400	3	415	14	0.5..3	957851230
SG4-S2-050-PP-N	515	500	2	515	14	0.5..50	957851640
SG4-S3-080-PP-N	815	400	3	415	14	0.5..50	957851650
SG4-S4-090-PP-N	915	300	4	315	16	0.5..50	957851660
SG4-S4-120-PP-N	1215	400	4	415	16	0.5..50	957851670

	EN ISO 13849-1	*EN 954-1*	*EN IEC 61508*	*EN IEC 62061*	*Prob. of danger failure/hour*	*Life span*	*Mean Time to Dangerous Failure*	*Average Diagnostic Coverage*	*Safe Failure Fraction*	*Hardware Fault Tolerance*
Description	**PL**	**CAT**	**SIL**	**SIL CL**	**PFHd (1/h)**	**T1 (anni)**	**MTTFd (anni)**	**DC**	**SFF**	**HFT**
SG2-S2-050-PP-W	c	2	1	1	1.00E-08	20	337	97.00%	98.14%	0
SG2-S3-080-PP-W	c	2	1	1	1.00E-08	20	337	97.00%	98.14%	0
SG2-S4-090-PP-W	c	2	1	1	1.00E-08	20	337	97.00%	98.14%	0
SG2-S4-120-PP-W	c	2	1	1	1.00E-08	20	337	97.00%	98.14%	0
SG2-L2-050-PP-W	c	2	1	1	1.00E-08	20	337	97.00%	98.14%	0
SG2-L3-080-PP-W	c	2	1	1	1.00E-08	20	337	97.00%	98.14%	0
SG2-T2-050-PP-W	c	2	1	1	1.00E-08	20	337	97.00%	98.14%	0
SG2-T3-080-PP-W	c	2	1	1	1.00E-08	20	337	97.00%	98.14%	0
SG4-S2-050-PP-x	e	4	3	3	2.62E-09	20	384	98.90%	99.38%	1
SG4-S3-080-PP-x	e	4	3	3	2.62E-09	20	384	98.90%	99.38%	1
SG4-S4-090-PP-x	e	4	3	3	2.62E-09	20	384	98.90%	99.38%	1
SG4-S4-120-PP-x	e	4	3	3	2.62E-09	20	384	98.90%	99.38%	1
SG4-L2-050-PP-x	e	4	3	3	2.62E-09	20	384	98.90%	99.38%	1
SG4-L3-080-PP-x	e	4	3	3	2.62E-09	20	384	98.90%	99.38%	1
SG4-T2-050-PP-x	e	4	3	3	2.62E-09	20	384	98.90%	99.38%	1
SG4-T3-080-PP-x	e	4	3	3	2.62E-09	20	384	98.90%	99.38%	1

11 DIMENSIONS



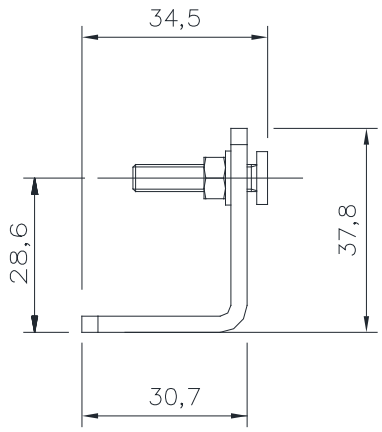
MODEL	A (mm)	B (mm)	C (mm)
SG T/L 2 050	120 - 260	653	700
SG T/L 3 080	120 - 260	953	1000
SG T/L 4 090	120 - 260	1053	1100
SG T/L 4 120	120 - 260	1353	1400

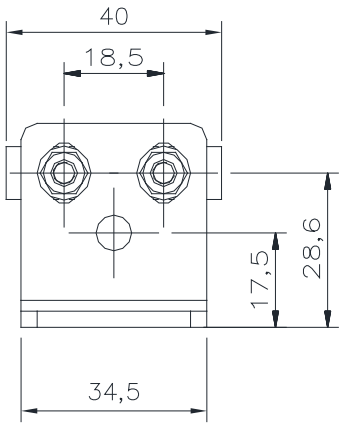
12 ACCESSORIES

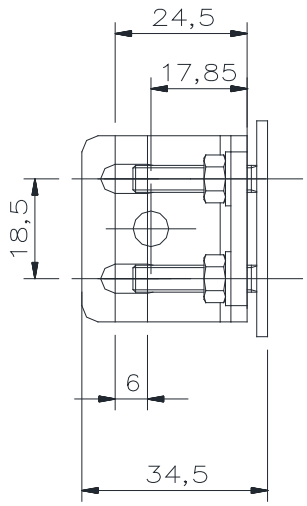
(dimensions in mm)

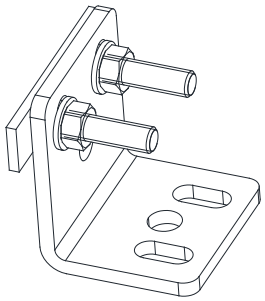
12.1 METAL ANGLED FIXING BRACKET (ST-KSTD)

MODEL	DESCRIPTION	CODE
ST-KSTD	Angled fixing bracket (4 pcs kit)	95ACC1670









Angled fixing bracket mounting with orientable and antivibration supports

MODEL	DESCRIPTION	CODE
ST-K4OR	Orientable supports (4 pcs kit)	95ACC1680
ST-K6OR	Orientable supports (6 pcs kit)	95ACC1690
ST-K4AV	Antivibration supports (4 pcs kit)	95ACC1700
ST-K6AV	Antivibration supports (6 pcs kit)	95ACC1710

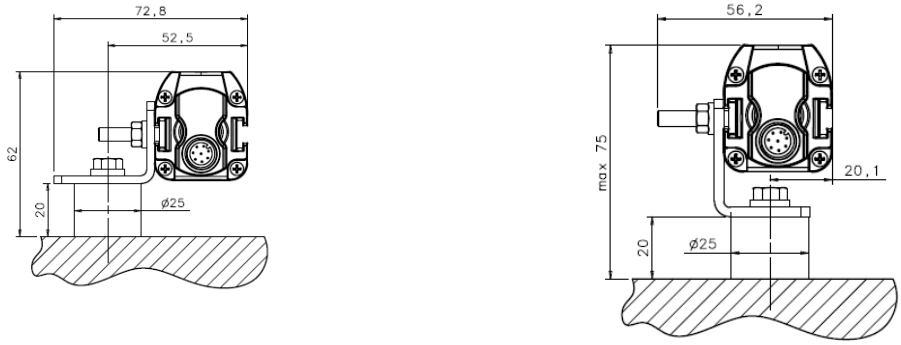
MOUNTING A *MOUNTING B*



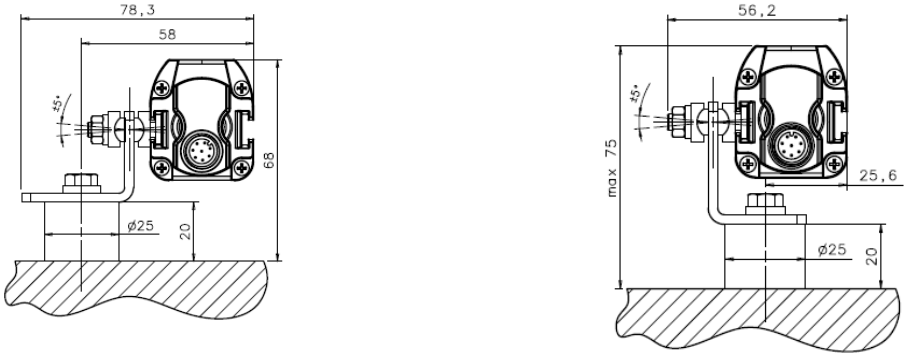
Angled fixing bracket



Angled fixing bracket + Orientable support

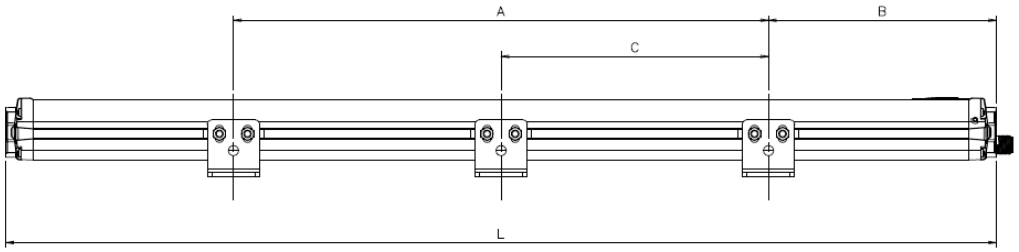


Angled fixing bracket + Antivibration support



Angled fixing bracket + Orientable support + Antivibration support

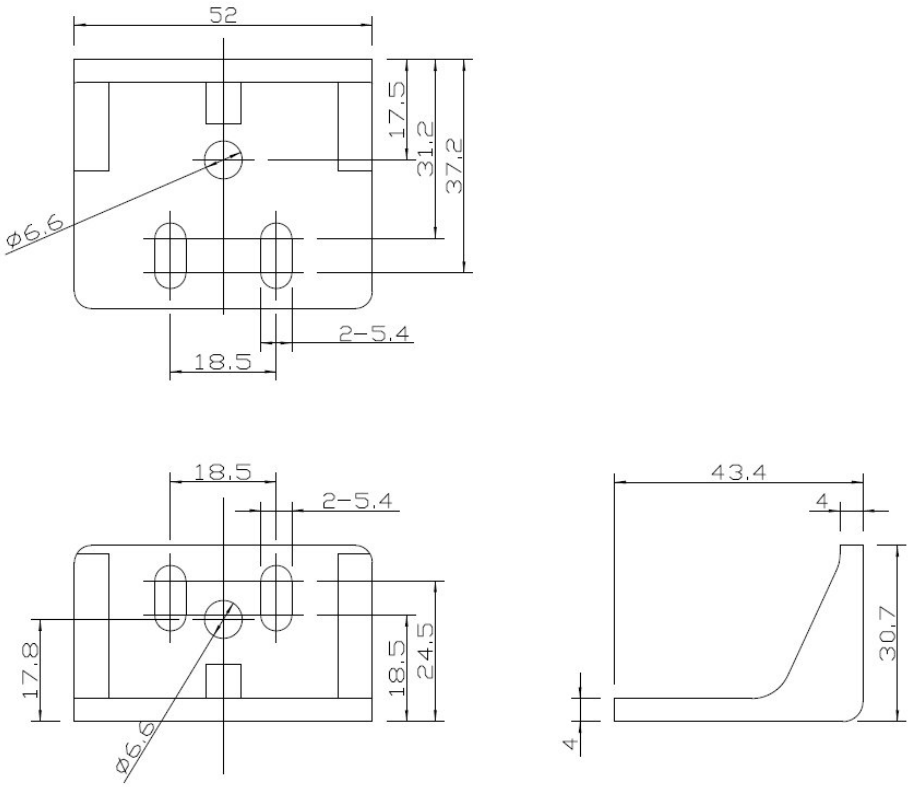
The recommended mounting positions according to the safety light curtain length are shown in the following drawings and table:



MODEL	L (mm)	A (mm)	B (mm)	C (mm)
SGx-S2-050-PP-x	653	342	150	-
SGx-S3-080-PP-x	953	542	200	-
SGx-S4-090-PP-x	1053	602	220	-
SGx-S4-120-PP-x	1353	942	200	472

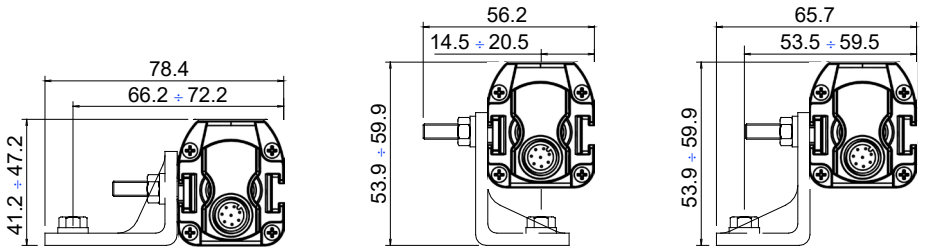
12.2 PLASTIC ANGLED FIXING BRACKET (ST-KPXMP)

MODEL	DESCRIPTION	CODE
ST-KP4MP	Angled fixing bracket (4 pcs kit)	95ASE1100
ST-KP6MP	Angled fixing bracket (6 pcs kit)	95ASE1110

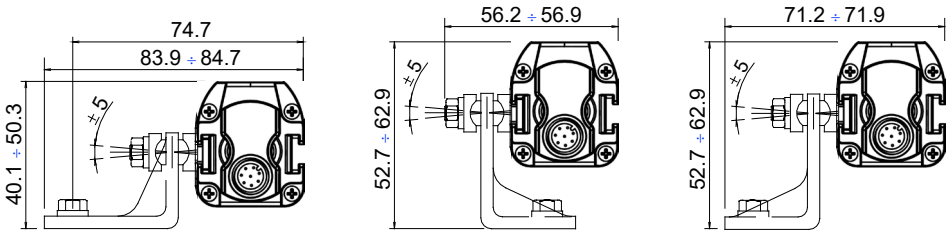


Angled fixing bracket mounting with orientable and antivibration supports

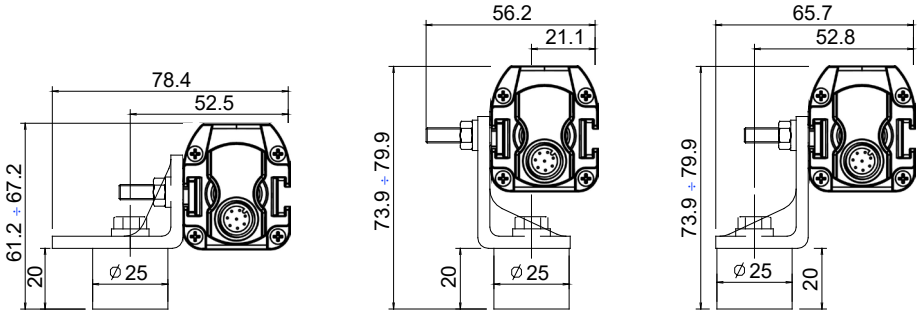
MODEL	DESCRIPTION	CODE
ST-K4OR	Orientable supports (4 pcs kit)	95ACC1680
ST-K6OR	Orientable supports (6 pcs kit)	95ACC1690
ST-K4AV	Antivibration supports (4 pcs kit)	95ACC1700
ST-K6AV	Antivibration supports (6 pcs kit)	95ACC1710



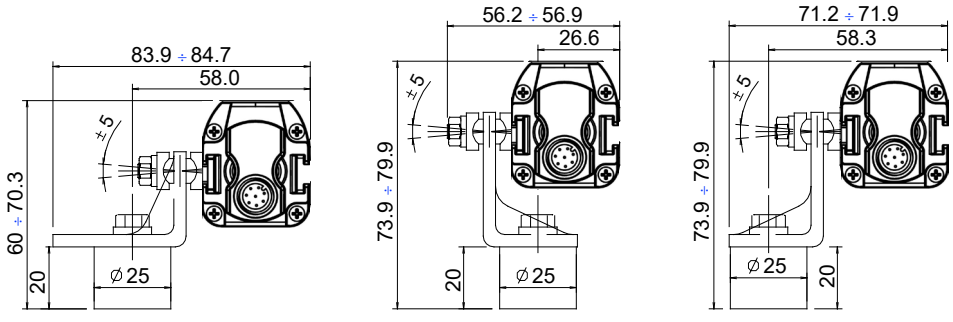
Angled fixing bracket



Angled fixing bracket + Orientable support



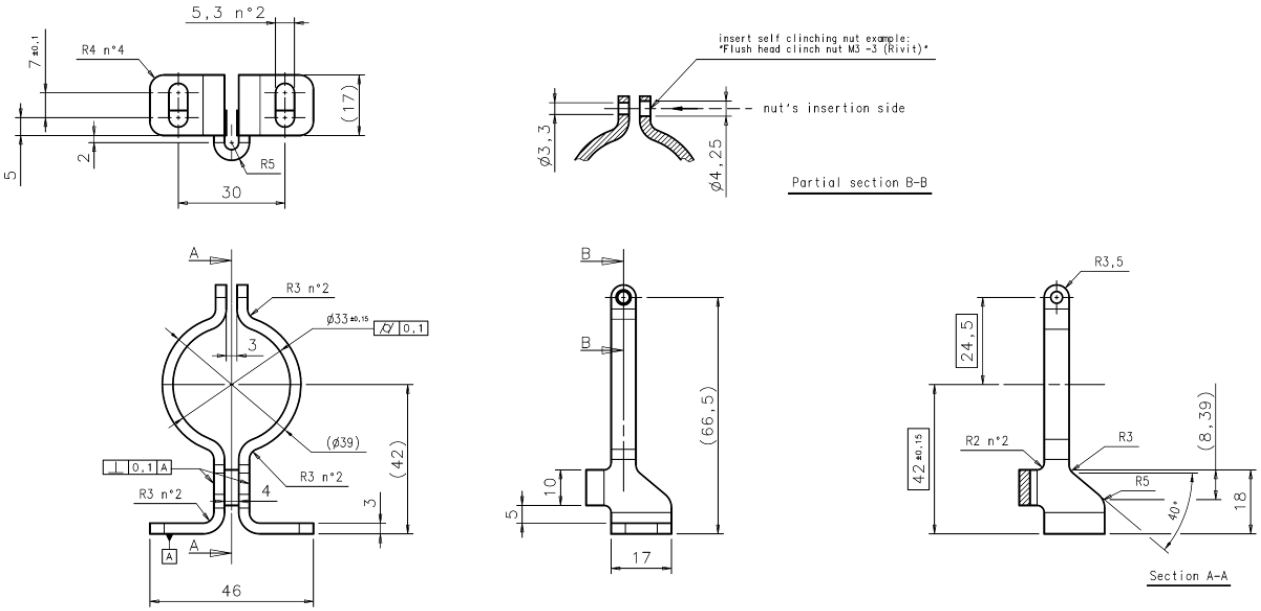
Angled fixing bracket + Antivibration support



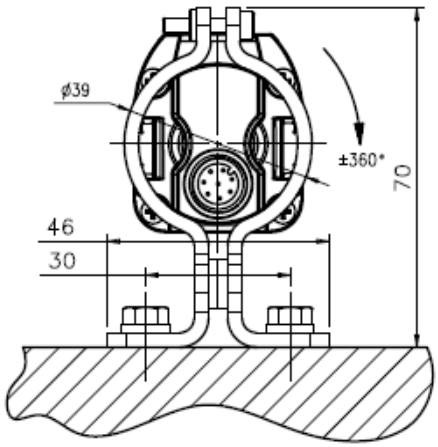
Angled fixing bracket + Orientable support + Antivibration support

12.3 ROTATIVE FIXING BRACKET (ST-K4ROT-SG BODY COMPACT)

MODEL	DESCRIPTION	CODE
ST-K4ROT-SG BODY COMPACT	Metal rotative fixing bracket (4 pcs kit)	95ASE2040



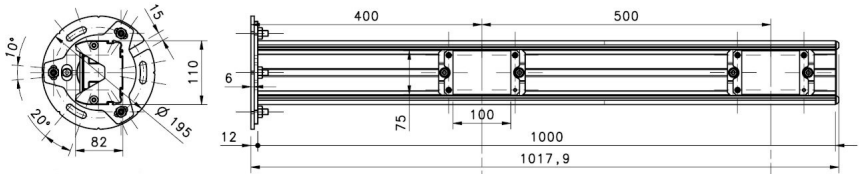
Rotative fixing bracket mounting



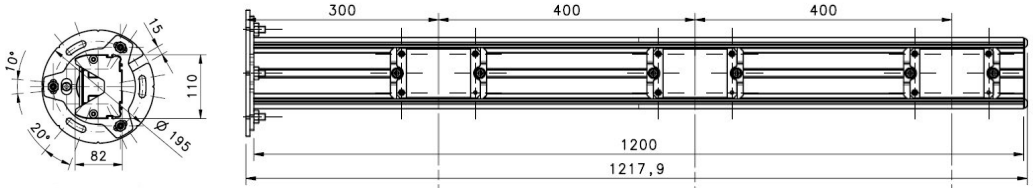
12.4 PROTECTIVE STANDS (SG-PSM)

MODEL	DESCRIPTION	CODE
SG-PSM-2-500	Protective stand with 2 mirrors H=500mm	95ASE2300
SG-PSM-3-800	Protective stand with 3 mirrors H=800mm	95ASE2310
SG-PSM-4-900	Protective stand with 4 mirrors H=900mm	95ASE2320
SG-PSM-4-1200	Protective stand with 4 mirrors H=1200mm	95ASE2330

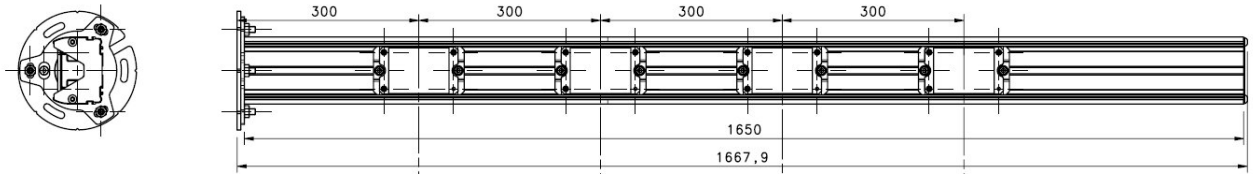
SG-PSM-2-500



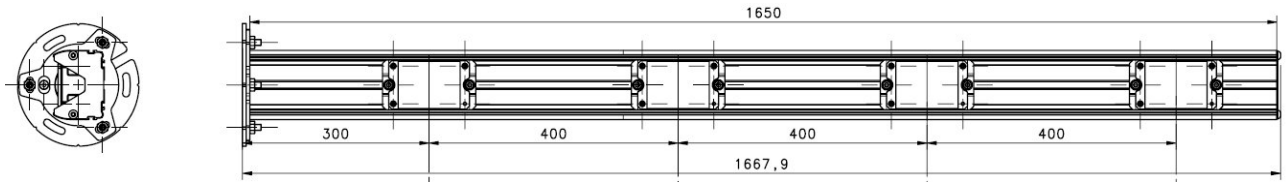
SG-PSM-3-800



SG-PSM-4-900



SG-PSM-4-1200



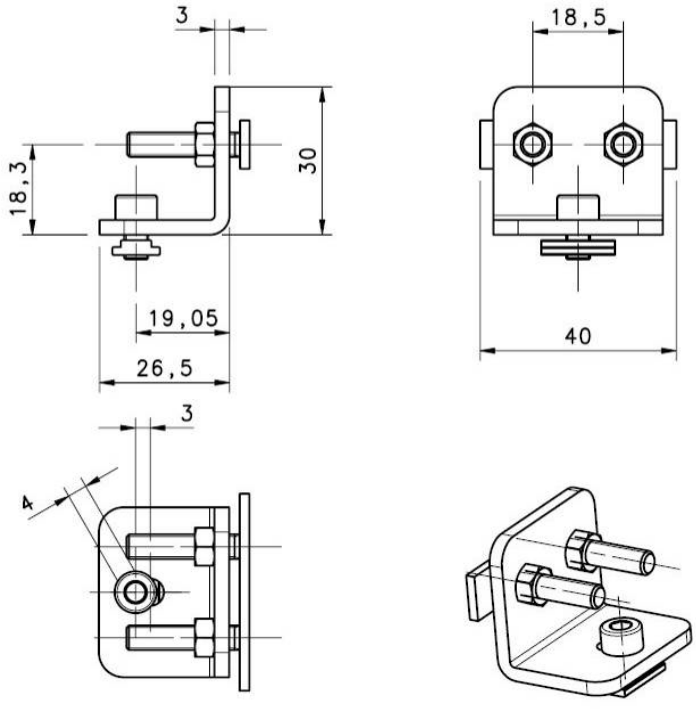
12.5 PROTECTIVE STANDS (SG-PSB)

MODEL	DESCRIPTION	L (mm)	CODE
SG-PSB 600	Protective stand H=600mm	600	95ASE2240
SG-PSB 1000	Protective stand H=1000mm	1000	95ASE2250
SG-PSB 1200	Protective stand H=1200mm	1200	95ASE2260
SG-PSB 1650	Protective stand H=1650mm	1650	95ASE2270
SG-PSB 1900	Protective stand H=1900mm	1900	95ASE2280



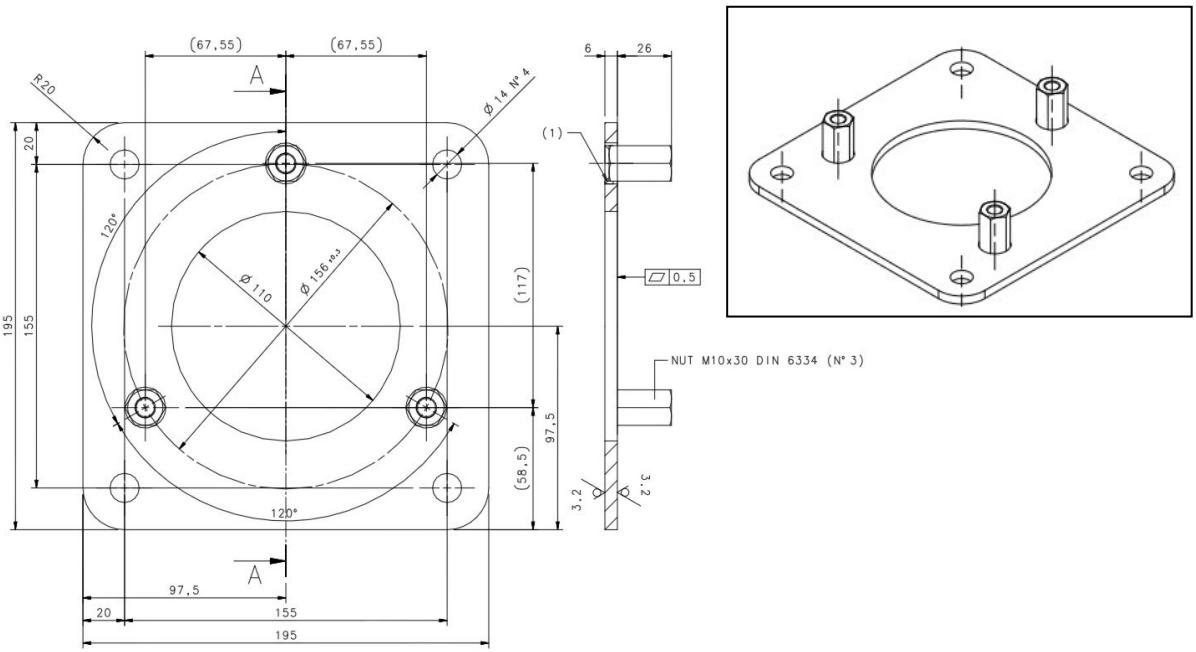
Fixing kit

MODEL	DESCRIPTION	CODE
ST-PS4-SG-SE	Mounting kit (4 pcs kit)	95ASE1750
ST-PS6-SG-SE	Mounting kit (6 pcs kit)	95ASE1760

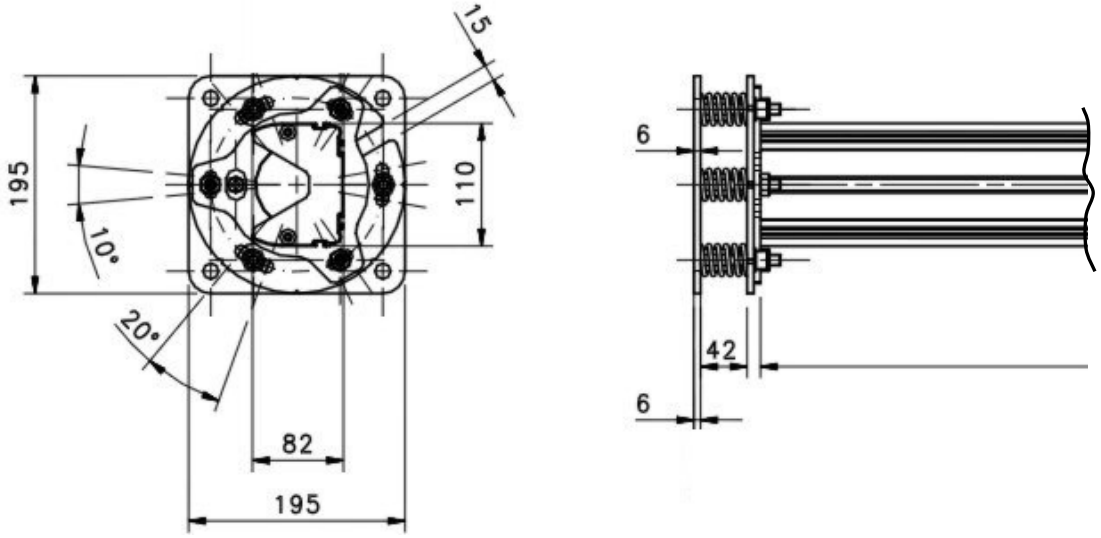


12.6 PLATE KIT FOR PROTECTIVE STANDS (SG-P)

MODEL	DESCRIPTION	CODE
SG-P	Plate kit for SG-PSB/SG-PSM	95ASE2290

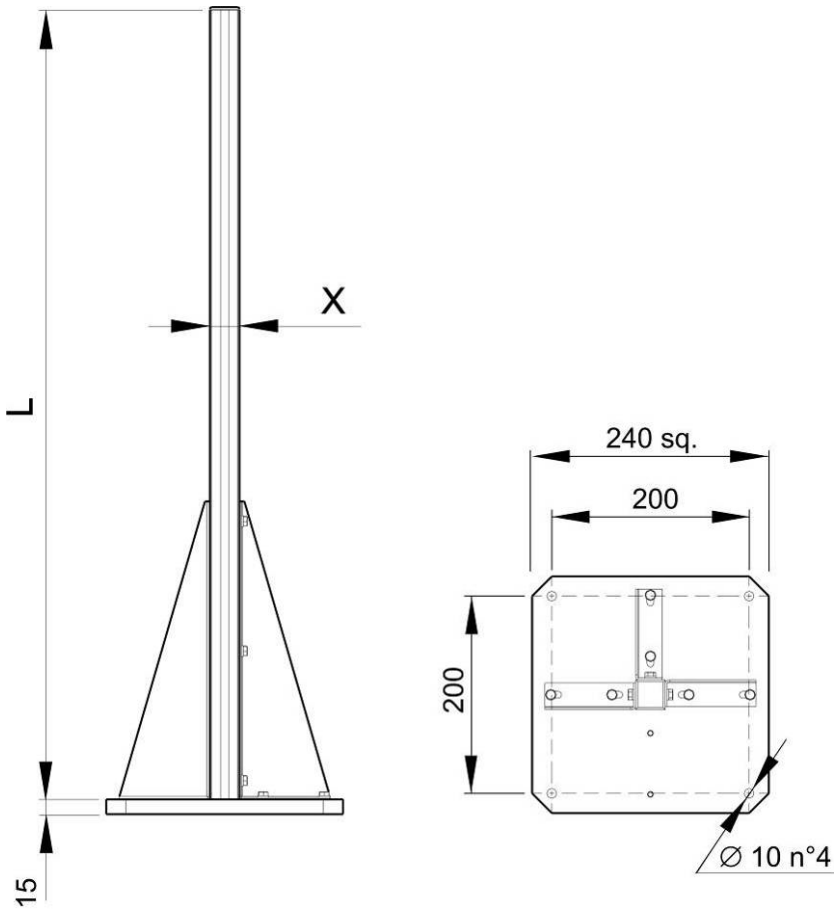


Mounting with SG-PSB/SG-PSM



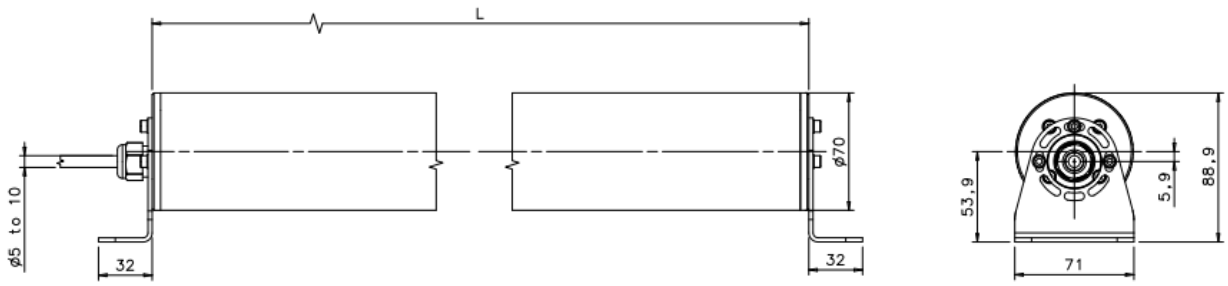
12.7 COLUMNS AND FLOOR STANDS (SE-S)

MODEL	DESCRIPTION	L (mm)	X (mm)	CODE
SE-S 800	Column and floor stand H= 800 mm	800	30x30	95ACC1730
SE-S 1000	Column and floor stand H= 1000 mm	1000	30x30	95ACC1740
SE-S 1200	Column and floor stand H= 1200 mm	1200	30x30	95ACC1750
SE-S 1500	Column and floor stand H= 1500 mm	1500	45x45	95ACC1760
SE-S 1800	Column and floor stand H= 1800 mm	1800	45x45	95ACC1770

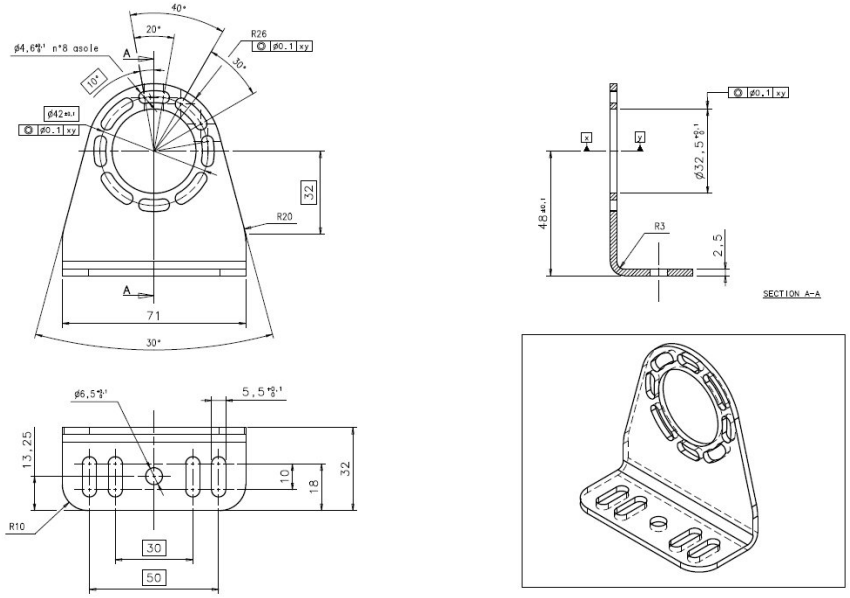


12.8 PROTECTION TUBES (SG-IP69K)

MODEL	DESCRIPTION	L (mm)	CODE
SG-IP69K-2-050	Tubular IP69K H=500mm	808	95ASE1410
SG-IP69K-3-080	Tubular IP69K H=800mm	1108	95ASE1420
SG-IP69K-4-090	Tubular IP69K H=900mm	1208,5	95ASE1430
SG-IP69K-4-120	Tubular IP69K H=1200mm	1508,5	95ASE1440



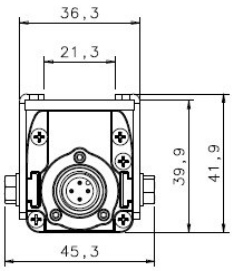
Fixing kit

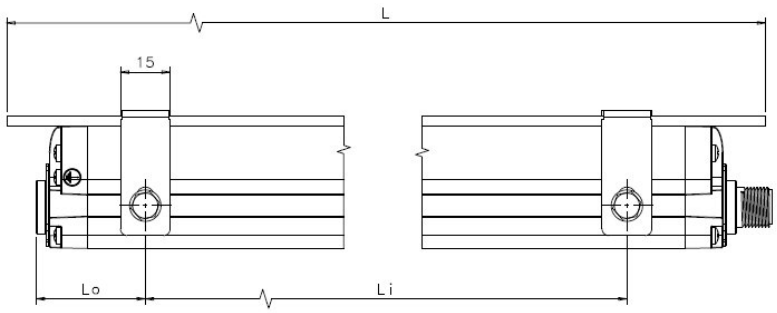


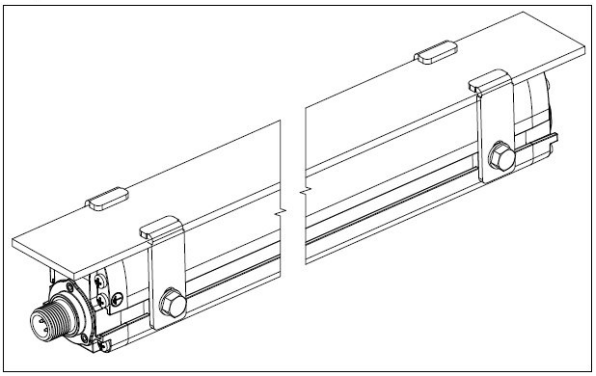
12.9 LENS SHIELD (SG-LS)

MODEL	DESCRIPTION	CODE
SG-LS 1800	Lens Shield H=1800mm (5pcs)	95ASE1560
SG-LS-2-050	Lens Shield H=500mm (5pcs)	95ASE1570
SG-LS-3-080	Lens Shield H=800mm (5pcs)	95ASE1580
SG-LS-4-090	Lens Shield H=900mm (5pcs)	95ASE1590
SG-LS-4-120	Lens Shield H=1200mm (5pcs)	95ASE1600

NOTE: Each package contains what is necessary to protect a single unit (TX or RX). To protect both TX and RX , two pieces of the same code are needed





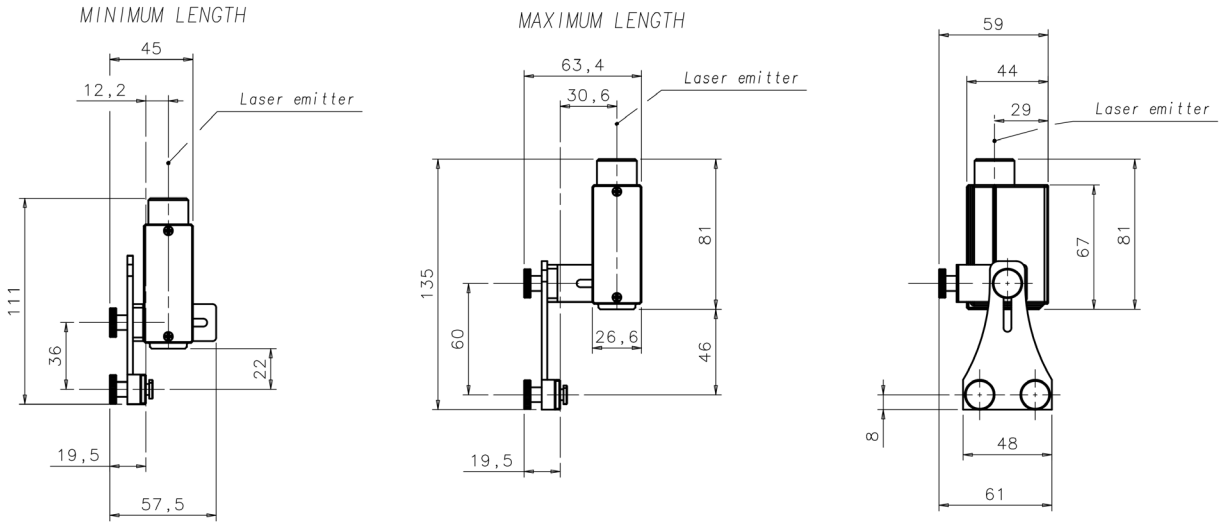


	MODELLO	L	Li	Lo
n° 2+2 brackets	2-050	642	490	75
	3-080	942	640	175
	4-090	1042	660	200
n° 3+3 brackets	4-120	1342	480	200
	180	1860	745	200

12.10 LASER POINTER (SG-LP)

MODEL	DESCRIPTION	CODE
SG-LP	Laser pointer	95ASE5590

The laser pointer of the **SG-LP** series represents a valid alignment and installation support for the safety light curtain series.
The pointer can be moved along the light curtain profile to verify the complete device alignment (top and bottom).



12.11 TEST PIECE (TP)

MODEL	DESCRIPTION	CODE
TP-14	Test piece Ø 14mm L = 300mm	95ACC1630
TP-20	Test piece Ø 20mm L=300mm	95ACC1640
TP-24	Test piece Ø 24mm L=300mm	95ASE2570
TP-30	Test piece Ø 30mm L=300mm	95ACC1650
TP-34	Test piece Ø 34mm L=300mm	95ASE2580
TP-35	Test piece Ø 35mm L=300mm	95ACC1660
TP-40	Test piece Ø 40mm L=300mm	95ACC1820
TP-50	Test piece Ø 50mm L=300mm	95ACC1790
TP-90	Test piece Ø 90mm L=300mm	95ACC1800

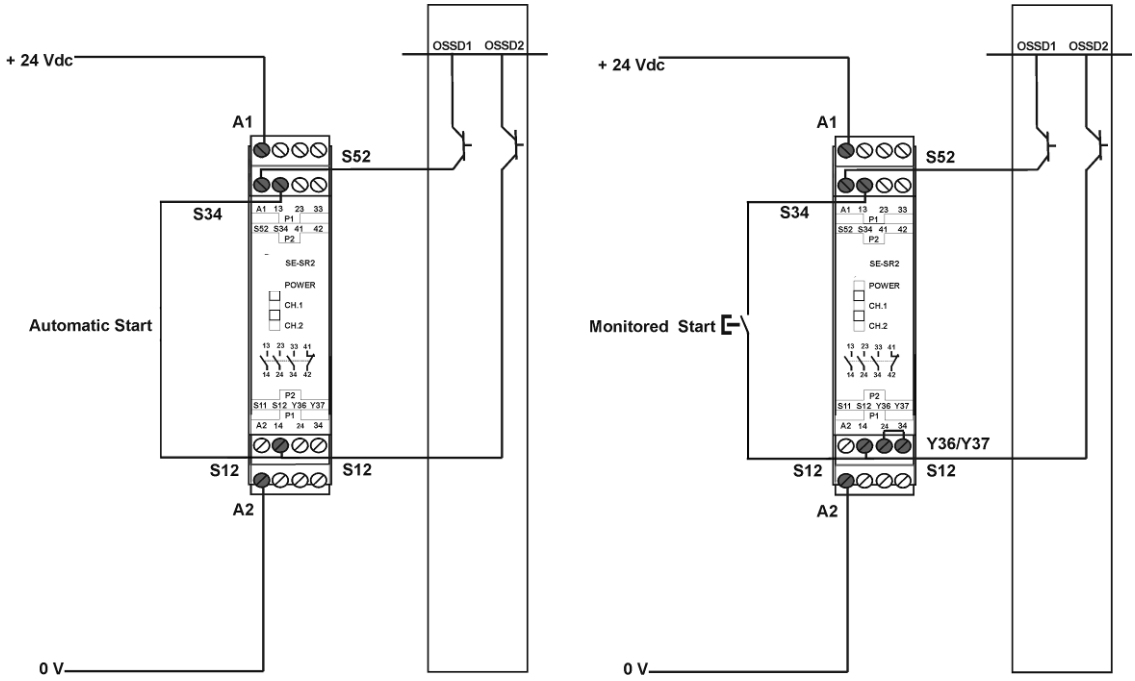
12.12 CONNECTION CABLES

MODEL	DESCRIPTION	CODE
CV-A1-22-B-03	Axial shielded 4-pin 3 m cable	95ACC1480
CV-A1-22-B-05	Axial shielded 4-pin 5 m cable	95ACC1490
CV-A1-22-B-10	Axial shielded 4-pin 10 m cable	95ACC1500
CV-A1-22-B-15	Axial shielded 4-pin 15 m cable	95ACC2070
CV-A1-22-B-25	Axial shielded 4-pin 25 m cable	95ACC2090
CV-A1-26-B-03	Axial shielded 8-pin 3 m cable	95ACC1510
CV-A1-26-B-05	Axial shielded 8-pin 5 m cable	95ACC1520
CV-A1-26-B-10	Axial shielded 8-pin 10 m cable	95ACC1530
CV-A1-26-B-15	Axial shielded 8-pin 15 m cable	95ACC2080
CV-A1-26-B-25	Axial shielded 8-pin 25 m cable	95ACC2100
CV-A2-22-B-03	Radial shielded 4-pin 3 m cable	95ACC1540
CV-A2-22-B-05	Radial shielded 4-pin 5 m cable	95ACC1550
CV-A2-22-B-10	Radial shielded 4-pin 10 m cable	95ACC1560
CV-A2-26-B-03	Radial shielded 8-pin 3 m cable	95ACC1600
CV-A2-26-B-05	Radial shielded 8-pin 5 m cable	95ACC1610
CV-A2-26-B-10	Radial shielded 8-pin 10 m cable	95ACC1620

12.13 SAFETY RELAY

MODEL	DESCRIPTION	CODE
SE-SR2	Type 4 safety relay - 3 NQ 1 NC	95ACC6170

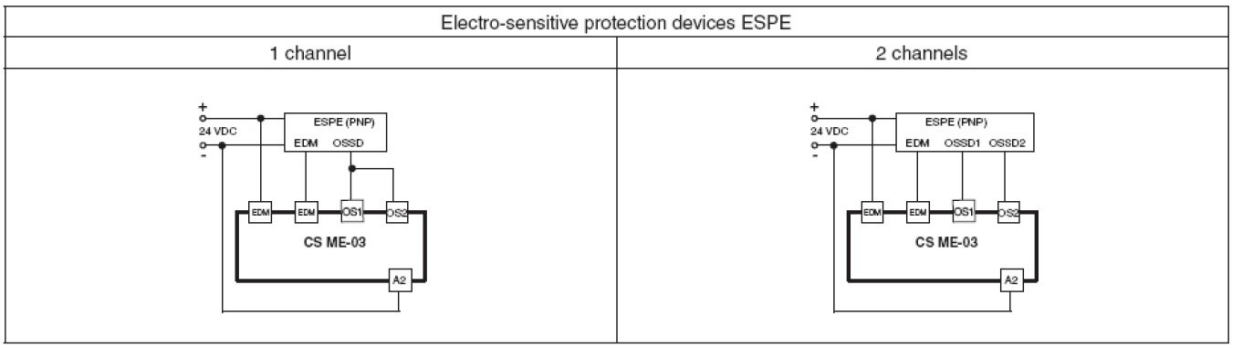
The drawing shows the connection between the safety light curtain and the type 4 safety relay of the SE-SR2 series operating in the automatic Restart mode.



EDM Relay Box

MODEL	DESCRIPTION	CODE
CSME-03VU24-Y14	EDM Relay	95ASE1270

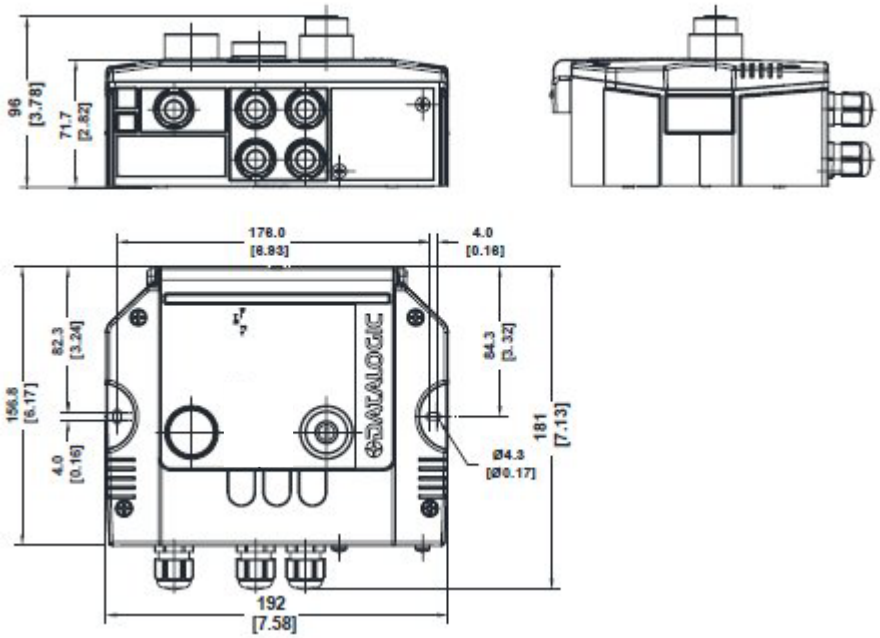
The figures show two practical examples of connection between safety light curtains and CSME-03VU24-Y14 device.



12.14 CONNECTION BOXES (SG-SRT)

MODEL	DESCRIPTION	CODE
SG-SRT-1	Muting connection box	95ASE2050



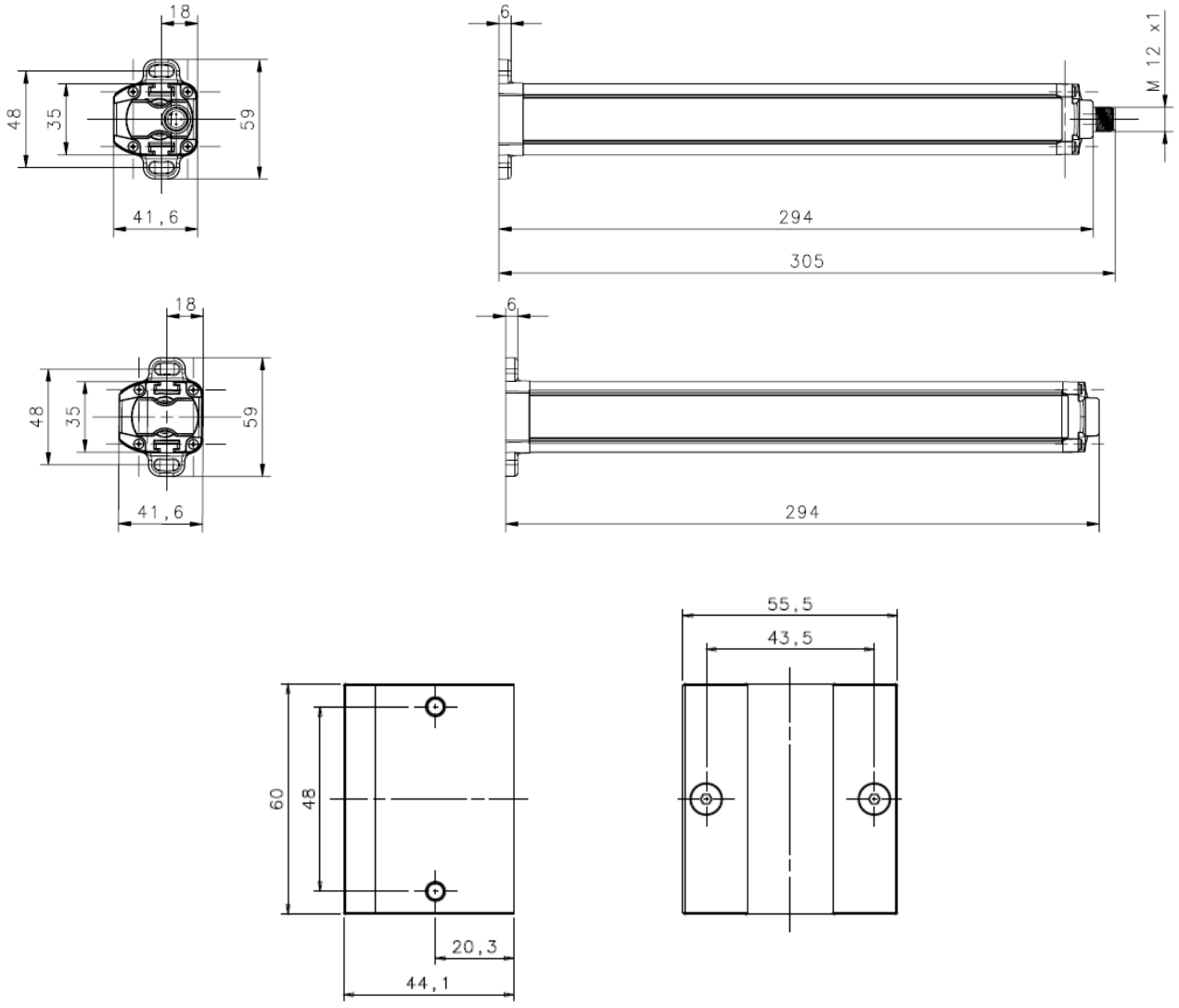


12.15 SINGLE MUTING ARMS

MODEL	DESCRIPTION	CODE
SG-AS-ARM	Single active arm with RRX sensors V2	95ASE1841
SG-PR-ARM	Single passive arm with reflectors V2	95ASE1851
SG-F1-G1-ARMS	F1-G1 Muting arms	95ASE1880
SG-F2-G2-ARMS	F2-G2 Muting arms	95ASE1890
SG-CB-C	Muting arms mounting bracket kit	95ASE1930

The SG BODY COMPACT series light curtains can be equipped with retro-reflective Muting arms to obtain the “T” or “L” configuration.

The following figures show, respectively, the dimensions of single active arms, of single passive arms, and the corresponding fixing bracket stand alone.



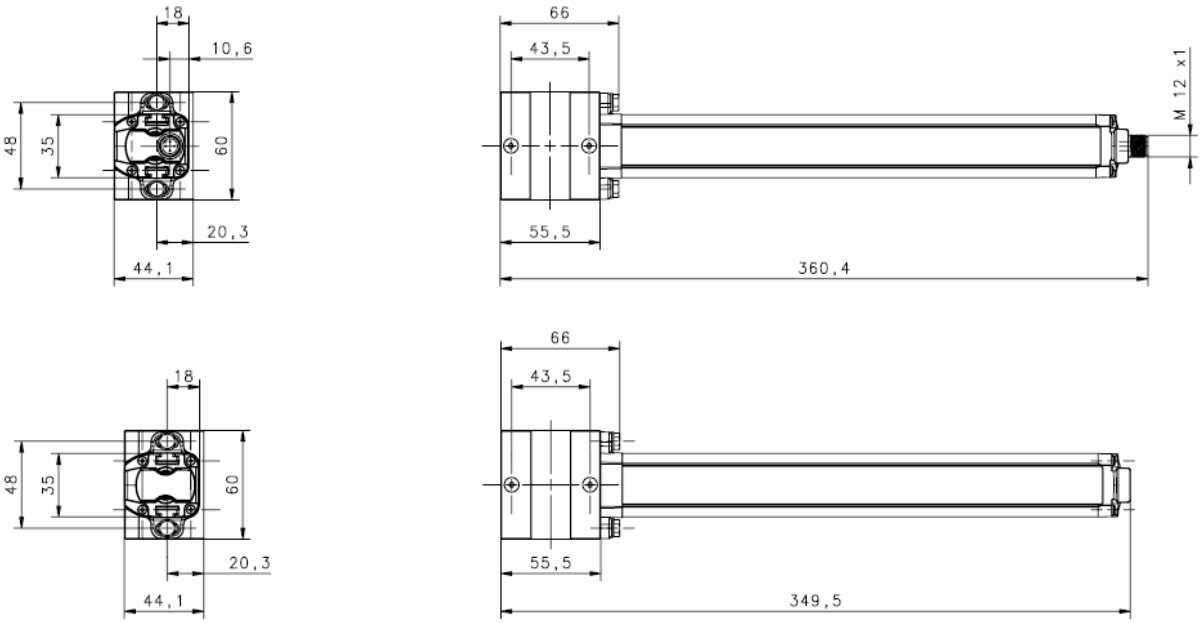
NOTE: To obtain a ‘L’ configuration with F/G arms use SG-F1-G1 ARM together with 2 pieces of SG-CB-C.
Please install F1 arm on RX unit and G1 arm on TX in order to have them facing one to another.
To obtain a ‘T’ configuration with F/G arms use SG-F1-G1 ARM and SG-F2-G2 ARMS together with 2 pieces of SG-CB-B. Please install F1 and F2 arms on RX unit and G1 and G2 arms on TX in order to have them facing one to another.

12.16 COUPLE MUTING ARMS

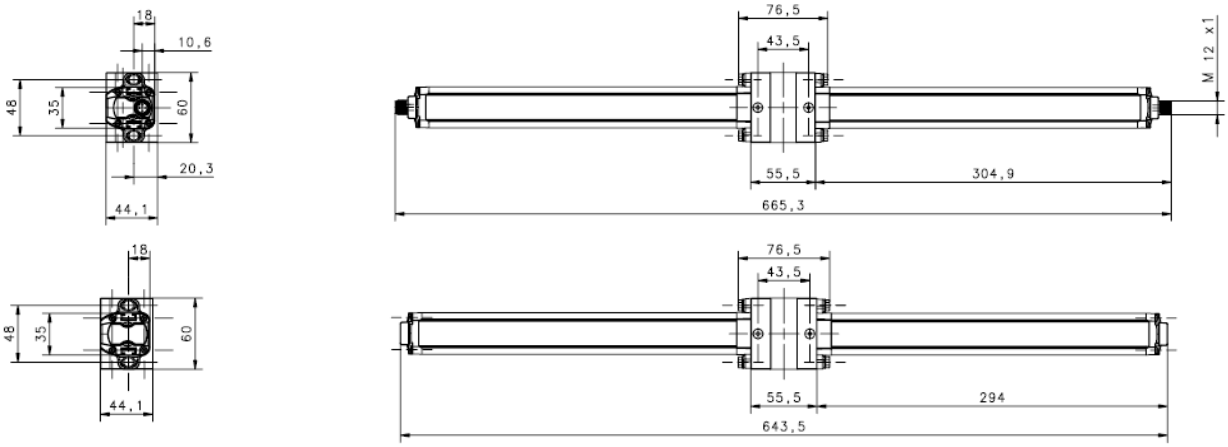
MODEL	DESCRIPTION	CODE
SG-L-ARMS	Active/Passive arms L couple V2	95ASE1861
SG-T-ARMS	Active/Passive arms T couple V2	95ASE1871

The following figures show, respectively, the dimensions of single active arms with fixing bracket mounted, of single passive arms with fixing bracket mounted, of double active arms with fixing bracket mounted, of double passive arms with fixing bracket mounted.

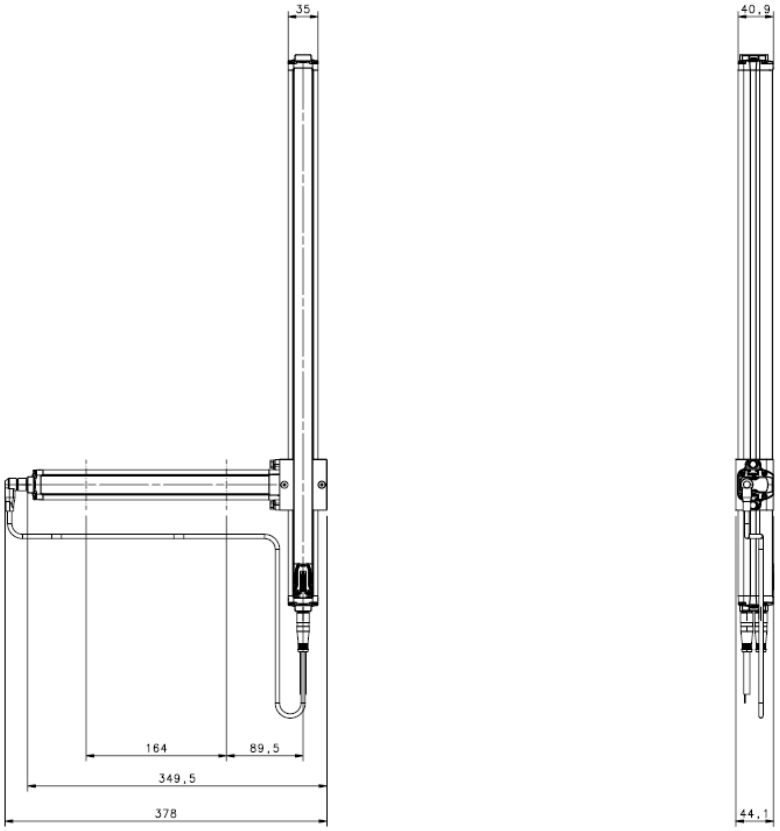
ACTIVE/PASSIVE ARMS L



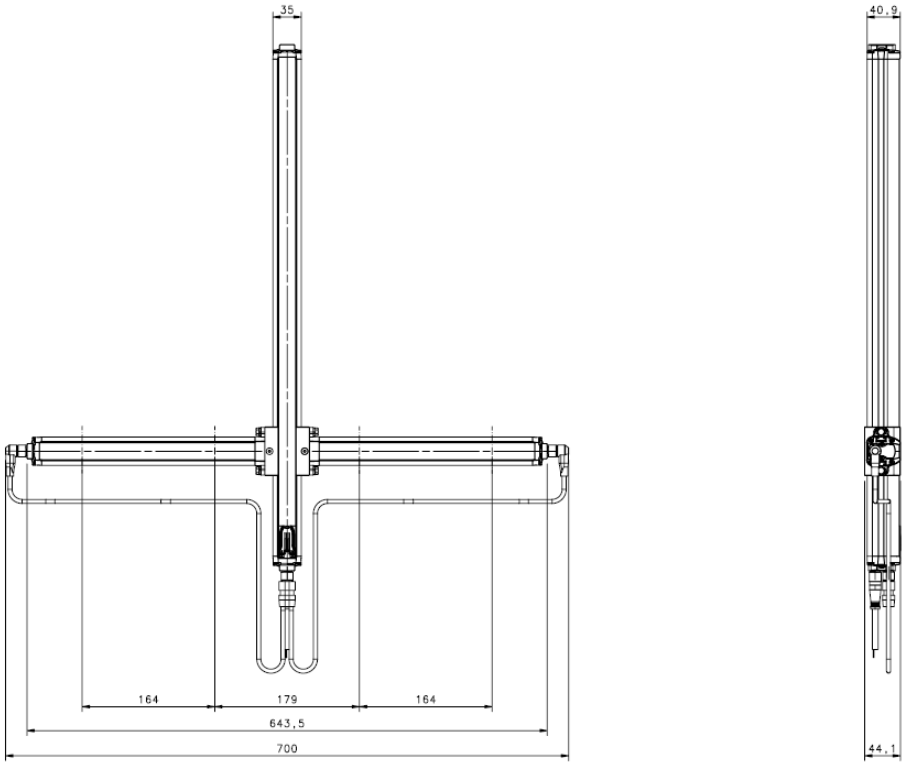
ACTIVE/PASSIVE ARMS T



SG BODY COMPACT + ACTIVE/PASSIVE ARMS L



SG BODY COMPACT + ACTIVE/PASSIVE ARMS T



13 GLOSSARY

ACTIVE OPTOELECTRONIC PROTECTIVE DEVICE (AOPD): its detection function is achieved thanks to the use of optoelectronic receivers and emitters detecting the optical beams interruptions inside the device caused by an opaque object present inside the specified detecting area.
An active optoelectronic protective device (AOPD) can operate both in emitter-receiver mode and in retro-reflective light curtains.

BLOCK CONDITION (=BREAK): status of the light curtain taking place when a suitably-sized opaque object (see DETECTING CAPACITY) interrupts one or several light curtain beams.
Under these conditions, OSSD1 and OSS2 light curtain outputs are simultaneously switched OFF within the device response time.

BREAK: see “Block condition” in the glossary.

CONTROLLED MACHINE: machine having the potentially-dangerous points protected by the light curtain or by another safety system.

CROSSING HAZARD: situation under which an operator crossing the area controlled by the safety device and this latter stops and keeps the machine stopped until the hazard is eliminated, and then enters the dangerous area. Now the safety device could not be able to prevent or avoid an unexpected restart of the machine with the operator still present inside the dangerous area.

DANGEROUS AREA: area representing an immediate or imminent physical hazard for the operator working inside it or who could get in contact with it.

DETECTING CAPACITY: sensor function parameter limit as specified by the manufacturer, which activates the electrosensitive protection equipment (ESPE). In case of an active optoelectronic protective device (AOPD), with resolution we mean the minimum dimension, which an opaque object must have in order to interrupt at least one of the beams that constitute the sensitive area.

EDM: see “External device monitoring” in the glossary.

ELECTROSENSITIVE PROTECTIVE EQUIPMENT (ESPE): assembly of devices and/or components working together to activate the protective disabling function or to detect the presence of something and including at least: a sensor, command/control devices and output signal switching devices.

EMITTER: unit emitting infrared beams, consisting of a set of optically-synchronised LEDs. The emitting unit, combined with the receiving unit (installed in the opposite position), generates an optical “curtain”, ***i.e.*** the detecting area.

EXTERNAL DEVICE MONITORING (EDM): *device used by the ESPE to monitor the status of the external command devices.*

FINAL SWITCHING DEVICE (FSD): part of the control system involving machine safety conditions. It breaks the circuit to the machine primary control element (MPCE) when the output signal switching device (OSSD) becomes inactive.

FORCE-GUIDED CONTACTS: Contacts can be guided forcibly when they are connected mechanically so that they can switch simultaneously, when the input stage is active.
If one contact of the series remains “hanged”, no other relay contact is able to move.
This function allows the control of the EDM status.

MACHINE OPERATOR: qualified person allowed to use the machine.

MACHINE PRIMARY CONTROL ELEMENT (MPCE): electrically-powered element having the direct control of machine regular operation so as to be the last element, in order of time, to operate when the machine has to be enabled or blocked.

MIN. INSTALLATION DISTANCE: min. distance necessary to allow machine dangerous moving parts to completely stop before the operator can reach the nearest dangerous point. This distance shall be measured from the middle point of the detecting area to the nearest dangerous point. Factors affecting min. installation distance value are machine stop time, total safety system response time and light curtain resolution.

N.O.: normally opened

N.C.: normally closed

OFF STATUS: status when the output circuit is interrupted and does not allow current stream.

ON STATUS: status when the output circuit is operational and allows current stream.

OUTPUT SIGNAL SWITCHING DEVICE (OSSD): part of the ESPE connected to machine control system. When the sensor is enabled during standard operating conditions, it switches to disabled status.

PROTECTED AREA: area where a specified test object is detected by the ESPE.

PROTECTIVE DEVICE: device having the function to protect the operator against possible risks of injury due to the contact with machine potentially-dangerous parts.

QUALIFIED OPERATOR: a person who holds a professional training certificate or having a wide knowledge and experience and who is acknowledged as qualified to install and/or use the product and to carry out periodical test procedures.

RECEIVER: unit receiving infrared beams, consisting of a set of optically-synchronised phototransistors. The receiving unit, combined with the emitting unit (installed in the opposite position), generates an optical “curtain”, i.e. the detecting area.

RESOLUTION: see “Detecting capacity” in the glossary.

RESPONSE TIME: max. time elapsing between the occurrence of the event leading to sensor activation and the reaching of the inactive state by the output signal switching device (OSSD).

RESTART: see “Restart Interlocking Device” in the glossary.

RESTART INTERLOCKING DEVICE: device preventing machine automatic restart after sensor activation during a dangerous phase of machine operating cycle, after a change of machine operating mode, and after a variation in machine start control devices.

RISK: probability of occurrence of an injury and severity of the injury itself.

SAFETY LIGHT CURTAIN: it is an active optoelectronic protective device (AOPD) including an integrated system consisting of one or several emitting elements and one or several receiving elements forming a detection area with a detecting capacity specified by the supplier.

START INTERLOCKING DEVICE (= START): device preventing machine automatic start if the ESPE is live or the voltage is disabled and enabled once again.

TEST PIECE: opaque object having a suitable size and used to test safety light curtain correct operation.

TYPE (OF ESPE): the Electrosensitive Protective Equipment (ESPE) have different reactions in case of faults or under different environmental conditions. The classification and definition of the "type" (ex. type 2, type 4, according to IEC 61496-1) defines the minimum requirements needed for ESPE design, manufacturing and testing.

WORKING POINT: machine position where the material or semi-finished product is worked.



DATALOGIC

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