

# **SG: Installation Supplement**

R1-1-20



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**SG**

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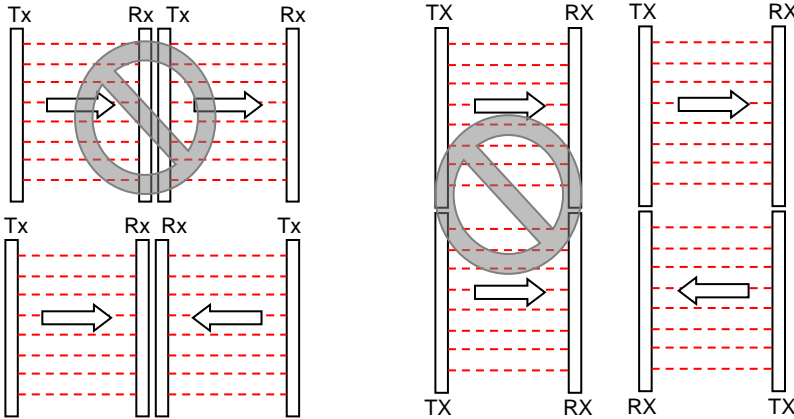
In order for machinery to be guarded by the Smartsan SG light curtain system, the machinery must be capable of stopping at any point in the machine cycle. The guarded machine must be wired such that any interruption of the defined area will cause immediate arrest of the dangerous motion of the guarded machine.

Smartsan's SG's ability to perform this function depends upon the appropriateness of the application and upon the Smartsan SG 's proper mechanical and electrical installation and interfacing to the machine being guarded. If all mounting, installation, interfacing and commissioning procedures are not followed properly the Smartsan SG system cannot provide the protection for which it was designed. The user has the responsibility to ensure all local, state, national laws, rules, codes or regulations relating to the installation and use of this system in any particular application are satisfied.

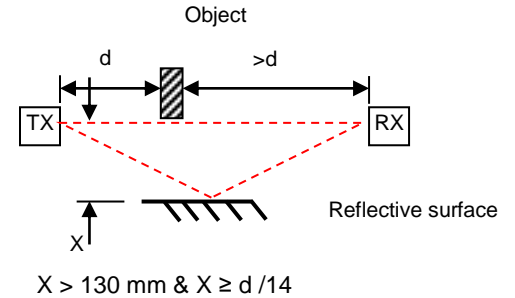
The user has the sole responsibility to ensure that the Smartsan SG system is installed and interfaced to the guarded machine by "qualified persons" in accordance with this manual and applicable safety regulations. A "qualified person" is defined as " a person or persons who, by possession of a degree or certificate of professional training, or who, by extensive knowledge, training and experience has successfully demonstrated the ability to solve problems relating to this subject matter and work" (ANSI/AME B30.2-1983)

## Light Curtain Orientation

TX - Transmitter RX - Receiver

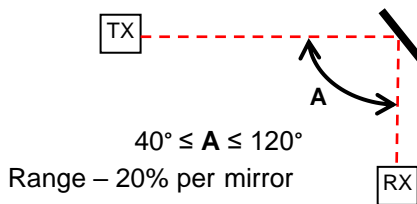


## Proximity to reflective surfaces

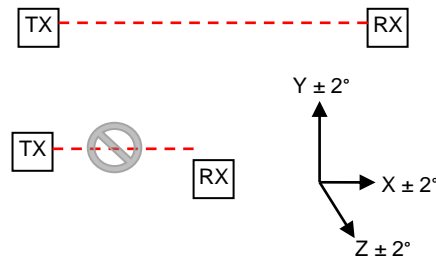


$\underline{X}$  is minimum distance between the light and the reflective surface. The closest distance of TX or RX to the object approaching the light curtain is  $\underline{d}$ .

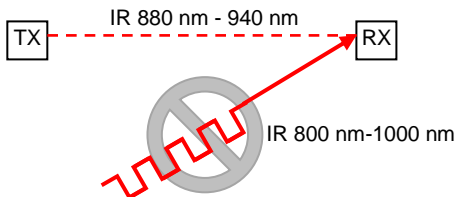
## Use with Mirrors



## Light Curtain Alignment



## Optical Short Circuit Prevention



## Light Curtain Mounting

Light curtain must be securely mounted such that the operator cannot reach the hazard without passing through the light curtain sensing region.

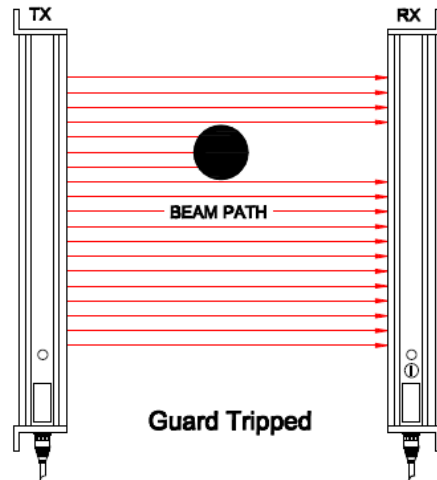
The operator should not be able to reach over, reach under or walk past the protective device without interrupting its sensing region. Additional guarding may be required to achieve this task.

**Warning;** Physical damage to the SG light curtain system could create an un-safe condition that may cause a serious injury including death. Contact Smartscan for more information.

**Warning:** Do not repair or modify the SG Light curtain. The SG safety light curtain is not site/field repairable and can only be repaired at the Smartscan.

# Principle Of Operation

The Smartscan sensing unit consists of a transmitter and a receiver column that face each other across an area to be safeguarded. The transmitter (TX) contains a row of infrared, light emitting diodes that sequentially transmit parallel beams of infrared light to corresponding receiver diodes in the receiver (RX) column. When the control/monitoring unit detects an obstruction in the optical path of one, or more of the beams that form the sensing field, the Safety Outputs (OSSD's) will immediately turn-OFF.



**Transmitter Column (TX)**

**Receiver Column (RX)**

- Power ON (Red) **PWR**
- Alignment ON (Green) **STAT**
- Mute ON (Yellow) **MUT**
- Mute 1 ON (Blue) **MU1**
- Mute 2 ON (Blue) **MU2**

- ON** OSSD's ON (Green)
- OFF** OSSD's OFF (Red)
- LO1** Internal Fault (Yellow)
- LO2** Mute Disparity Fault (Yellow)
- EDM** EDM (Yellow)

Mute Enable (Red)      Status (Green)

- DIP 1 (RD)
- DIP 2 (YE)
- DIP 3 (GN)
- DIP 4 (BU)
- DIP 5 (RD)
- DIP 6 (OR)

All of these dipswitch indicators LED's maybe be blue in color if the model number starts with 055 (055-XXX)

## Status Indicators

Status indicators are located in the top of both the transmitter and receiver columns. Below is a brief explanation of the indicator functions by column. For more detailed information concerning these functions go to page 3.

### Transmitter Indicators

Top of transmitter column

Power ON (**PWR**): Indicates that the transmitter column has power. LED ON

Alignment OK (**STAT**): Indicates light curtain is aligned (On). LED ON

Mute ON (**MUT**) Indicates that the light curtain is in the "MUTED" state. LED turns ON.

Mute 1 ON (**MU1**): Indicates that the light curtain has received external mute signal 1 (ON)

Mute 2 ON (**MU2**): Indicates that the light curtain has received external mute signal 2 (ON)

Bottom of transmitter column

Mute Enable: Indicated that the mute enable input is being applied: LED ON

Status Output: Indicates that the status output signal is ON. LED ON

### Receiver Indicators

Top of receiver column

OSSD's ON (**ON**): Indicate that the safety outputs are energized (ON). LED ON

OSSD's OFF (**OFF**): Indicates that the safety outputs are de-energized (OFF) LED ON.

OSSD Fault: (**LO1**) Internal Fault Detected. LED ON.

Mute Disparity (**LO2**): Mute Disparity fault detected. LED ON

External Device Monitoring (**EDM**): Indicates that the EDM circuit is complete. LED ON

Bottom of receiver column

Dip switches (1- 6): Indicate when dip switches are in the on position. LED ON

Dipswitch 1 = Red LED

Dipswitch 2 = Yellow LED

Dipswitch 3 = Green LED

Dipswitch 4 = Blue LED

Dipswitch 5 = Red LED

Dipswitch 6 = Orange LED

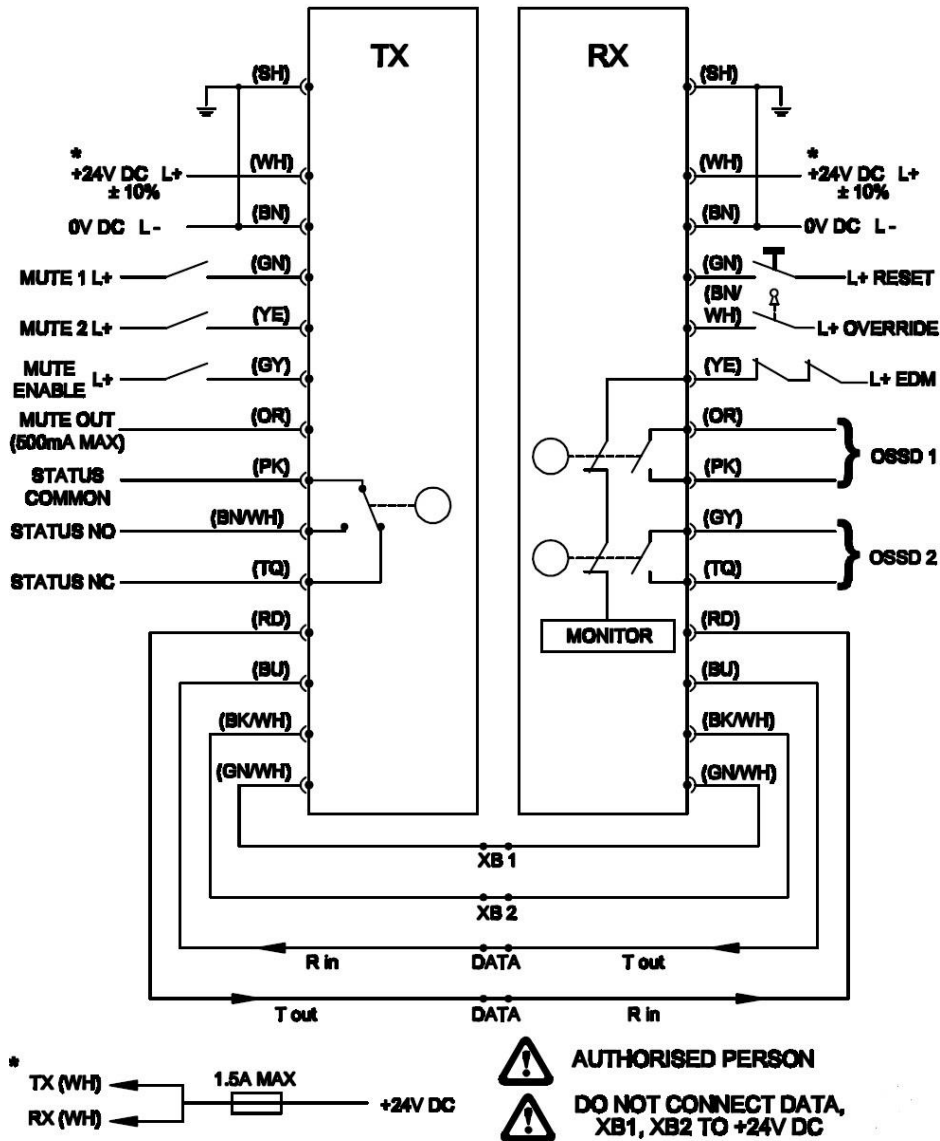
### General Set-up Diagnostics

If during set-up LED OSSD's Fault and Mute Disparity start to flash alternately this is due to the Transmitter (TX) head cable not being connected.

If the Power LED starts to flash during set-up the Receiver (RX) head cable is not connected.

# SG: Controls Diagram

## ELECTRICAL CONNECTION



**Warning:** Any wire terminating or re-terminating of the light curtain must be done with the power supply disconnected.

Any input or output signals that are not being used must be individual isolated.

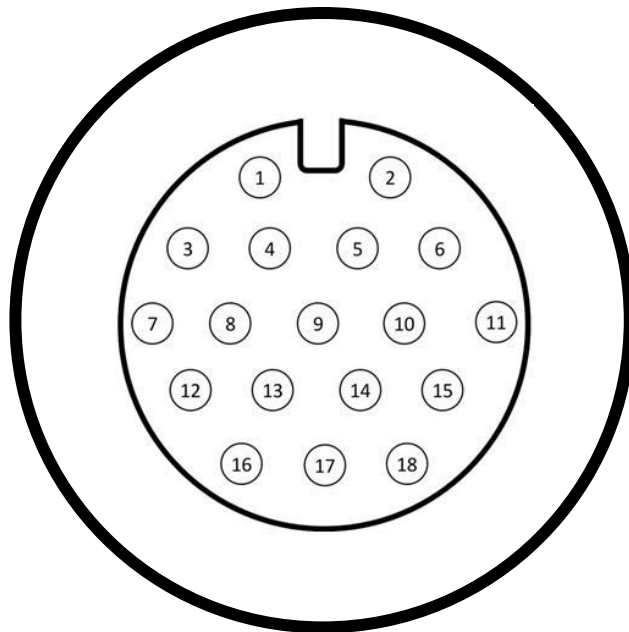
Do not disconnect the cables from the Transmitter (TX) or Receiver (RX) head with the power still connected to the SG series light curtain.

The cables shields must be connected to 0 VDC, failure to do so may cause intermittent tripping and/or damage to the light curtain.

## Function Table

The colors refer to the conductors of the cable connector below.

Cable Pin #	Cable Color Code	Transmitter Cable Functions	Receiver Cable Function
1	Black	-	-
2	Red	Data Tout	Data Rin
3	Green	Mute 1 Input	Reset Input
4	White	+ 24V DC	+24V DC
5	Brown	0V DC	0V DC
6	Blue	Data Rin	Data Tout
7	Orange	Mute Output	Safety Output 1 (SO1)
8	Pink	Status Relay Common	Safety Output 1 (SO1)
9	Gray	Mute Enable	Safety Output 2 (SO2)
10	Violet	-	-
11	Yellow	Mute 2 Input	EDM
12	Brown/White	Status Relay N/O Contact	Guard Override
13	Orange/White	-	-
14	Black/White	X Beam 2	X Beam 2
15	Red/ White	-	-
16	Shield	Earth	Earth
17	Turquoise	Status Relay N/C Contact	Safety Output 2 (SO2)
18	Green/White	X Beam 1	X Beam 1



## **SG: Controls**

**Power supply** - Use a regulated supply +24V DC  $\pm 10\%$ . Protect the +24V input with a 1.5 A fuse. Connect the power supply to both the transmitter (TX) and receiver (RX) cables as follows: Connect conductors of both the transmitter and receiver to **WHITE** wire to +24V DC and the **BROWN** wire to 0V DC.

**PWR LED (Red):** LED ON = Power Connected

**The cables shields must be connected to 0 VDC, failure to do so may cause intermittent tripping and/or damage to the light curtain.**

**EDM (External Device Monitoring)** - This input is used to monitor external switching devices to ensure those devices respond each and every time the light curtain is interrupted. There is an LED indicator located in the receiver (RX) column that illuminates when the EDM circuit is complete.

When monitoring a switching device one side of the Normally Closed circuit will connect to the **YELLOW** wire of the **receiver (RX)** cable the other side to +24V DC. If the EDM function is not required +24Vdc must be connected to the **YELLOW** wire otherwise the system will remain tripped and will not reset.

**EDM LED (Yellow):** LED ON = EDM On      LED OFF = EDM Off

**Note:** - If EDM is not applied properly the light curtains OSSD's will remain OFF.

**Reset** - A push button or key switch is required. To give the system a manual restart signal apply +24Vdc to **Green** wire of the **receiver (RX)** cable, releasing the switch will restart the safety outputs to an ON condition, providing the light curtain is clear of obstruction and the operator has checked to ensure that the dangerous area is safe. If using a PLC to pulse the reset signal the pulse width should be 100 ms or more. For more information about reset modes see page 18.

+24Vdc should **NOT** be continuously applied to the Reset input. This may prevent the system from resetting or cause permanent damage to the guard

**Safety Relay Outputs (OSSD's)** – These safety outputs respond to interruption of the light curtain (unless muted or blanked). The relays close (ON) when the curtain is clear and open (OFF) when the curtain is blocked. They are cross-monitored voltage free contacts with a maximum contact switching power 24Vdc @ 2A additionally there are status LED's located in the top of the receiver column that illuminate when the safety outputs are in the ON or OFF state.

OSSD1 (Safety Output 1): Receiver (RX) cable – **ORANGE** wire & **PINK** Wire

OSSD2 (Safety Output 2): Receiver (RX) cable – **GRAY** wire & **TURQUOISE** Wire.

**ON LED (Green):** OSSD (1 & 2) LED On = Light Curtain Clear

**OFF LED (Red):** OSSD (1 & 2) LED On = Light Curtain Blocked

**Warning:** - OSSD's should be wired to prevent machine operation unless the OSSD's are in the ON state.

**Warning:** - Bypassing the light curtain safety relay outputs (OSSD's) has been known to cause serious injury including death.



## SG: Controls

**Status Output** – The status output is a change over NON-SAFETY relay output. The status relay output consist of (1) common, (1) normally open position and (1) normally closed position. The status relay output is synchronous with the safety output. Additionally there is an LED located in the bottom of the transmitter (TX) column that illuminate when the status output is in the ON.

Status Output (Common): Transmitter (TX) cable – **PINK** wire.

Status Output (Normally Open): Transmitter (TX) cable – **BROWN / WHITE** wire

Status Output (Normally Closed): Transmitter (TX) cable – **TURQUOISE** Wire

**Status LED (Green):** LED ON = Status On      LED OFF = Status Off

**Mute Inputs (Mute1, Mute2)** - Mute inputs (Mute 1, Mute 2) are mute inputs that should be applied to suitable external mute initiating devices. Both mute inputs (mute1 & mute 2) must switch within 2 seconds of each other or the light curtain will not mute (The time interval known as disparity, can be change via dipswitches in the Learned Mode of the light curtain see page 23) When both inputs are active ON (receive 24Vdc), the light curtain will mute (\*full mute or \*\*partial mute), e.g. the guards' safety outputs (OSSD's) will not respond to an interruption of the light curtain. The light curtain will remain muted for a maximum time (15 minutes or infinite) that can be selected via dipswitch 3 in the standard mode (see page 18). Additionally there are mute LED indicators located in the top of the transmitter (TX) column that illuminate when the mute signals are applied. Once either of the mute inputs is deactivated (turned OFF) the system will remain muted for an additional 2 seconds as a default. The mute delay off time can be adjusted in the learned mode see page 23.

\*Full Mute: The entire sensing region of the light curtain will mute. (Default)

\*\*Partial Mute: A window (specified number of beams) will mute; the remainder of the light curtain is active. Selectable via dipswitches in the **Learned** mode.

Mute1: To apply mute 1 signal the **GREEN** wire of the **transmitter (TX)** cable must receive a +24Vdc signal.

Mute2: To apply mute 2 signal the **YELLOW** wire of the **transmitter (TX)** cable must receive a +24Vdc signal.

**Mute 1 LED (Blue):** LED On = Mute 1 input applied      LED Off = Mute 1 input not applied

**Mute 2 LED (Blue):** LED On = Mute 2 input applied      LED Off = Mute 2 input not applied

**Note:** The external mute input signals should come from separate sources so that a single fault cannot cause a failure of protective function.

**Note:** If mute inputs do not agree within specified time (Disparity) the system will not mute and Mute disparity indicator LO2 (Yellow) on receiver (RX) unit will illuminate.

**Note:** Mute inputs must be turned off before initial startup or cycling of power. If mute inputs are ON during system power up the system will not mute.

## **SG: Controls**

**Mute enable input** – This signal must be applied for muting to occur. It may be used as a 3<sup>rd</sup> mute signal. When self-muting light curtains are used on conveyor systems” Conveyor Run” can start the muting sequence. This technique makes deliberate bypass of the light curtain more difficult. The mute enable signal has a status LED located in the bottom of transmitter (TX) column that illuminates when the mute enable signal is applied.

Mute Enable: To apply the mute enable signal, the **GRAY** wire of the **transmitter (TX)** cable must receive a +24Vdc signal.

**Mute Enable ON LED (Red):** LED On = Mute Enable On    LED Off = Mute Enable Off

**Mute Output** - Some machines require a signal to indicate that the light curtain is muted. The mute output is an electronic NON-SAFETY output that is ON =+24Vdc when the light curtain is muted and OFF = 0vdc when the light curtain is not muted. This electronic output is rated 24VDC@500mA and has a status LED located in the transmitter (TX) column that illuminates when the light curtain is muted.

Mute Output: To complete the mute output circuit the **ORANGE** wire of the **transmitter (TX)** cable must be connected to 0Vdc.

**Mute ON LED (Yellow):** LED On = Mute On    LED Off = Mute Off

**Guard Override:** Turning and holding the activate switch in the ON state will automatically turn-on the safe output relay switching contacts for a period of 3 minutes, providing the light curtain is in a tripped condition e.g. with the curtain blocked by a loaded pallet. As soon as the loaded pallet clears the light curtain the safety system will automatically reactivate to a ‘fully guarded’ condition. Now, release the activate switch and restart the safety system in the normal manner.

Guard Override: To apply the guard override signal, the **BROWN / WHITE** wire of the **receiver (RX)** cable through a normally open contact to +24VDC.

**Note:** When guard override is applied the EDM light will turn OFF. Only the safety relays actuate not the status relay.

## **SG: Controls**

**Cross Beam Communication Link** - The cross beam communication conductors must be connected properly for the self-muting system to work, they relay information between the transmitter and receiver columns. Connect the **BLACK / WHITE** wire of the transmitter (TX) to the **BLACK / WHITE** wire of the receiver (RX). Connect the **GREEN / WHITE** wire of the transmitter (TX) to the **GREEN / WHITE** wire of the receiver (RX).

**Warning** - Do not apply any other voltage sources to the cross beam communication conductors this will damage the light curtain system and void warranty.

**Communication Link** - The communication conductors must be connected properly for the system to work, they relay information between the transmitter and receiver columns. Connect the **RED** wire of the transmitter (TX) to the **RED** wire of the receiver (RX). Connect the **BLUE** wire of the transmitter (TX) to the **BLUE** wire of the receiver (RX).

**Warning** - Do not apply any other voltage sources to the communication conductors this will damage the light curtain system and void warranty.

**Note** - The maximum total cable length from the transmitter (TX) unit to the receiver (RX) unit must not exceed 40 meters.

## SG Series Muting: L Style System

The 'L' type system must **NOT** be used at infeed zones.

To ensure correct operation of the safety system both mute inputs must switch within 2 seconds of each other or the light curtain will not mute (The time interval known as disparity, can be change via dipswitches in the Learned Mode of the light curtain see page 23) When both inputs are active ON the light curtain will e.g. the guards' safety outputs (OSSD's) will not respond to an interruption of the light curtain.

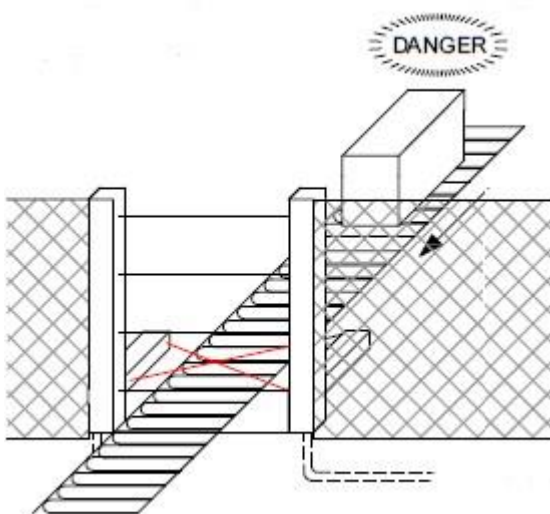
Once both cross-beams are blocked the light curtain system will remain muted for a maximum mute dwell time of (15 minutes or infinite) that can be selected via dipswitch 3 in the standard mode (see page 18). If the mute dwell time period is exceeded the system will trip.

There is a short period of time when the trailing edge of a pallet load 'clears' the detection field of both mute sensors but is still interrupting the light curtain. Once either of the mute inputs is deactivated (turned OFF) the system will remain muted for an additional 2 seconds as a default. The mute delay off time can be adjusted in the learned mode see page 23.

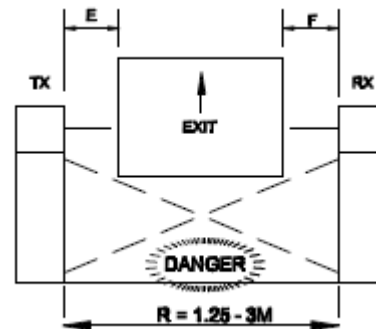
Suitably position the light curtain to ensure a pallet load does not stop after clearing the mute beams but still interrupting the light curtain.

### Suggested Pallet load positioning

Ensure that the pallet position on entering and exiting the light curtain does not have a gap greater than 300mm between the transmitter (Tx) and the edge of the pallet load on one side and the same on the receiver (Rx) side. These are marked in the diagram below, E and F. The distance for E and F should be the same +/- 100mm.



$E = F \pm 100\text{mm}$   
 $E > 500\text{mm}$   
 $F > 500\text{mm}$



Top View

## SG Series: MUTING T Style

The 'T' type systems can be used for infeed and by direction product flow

To ensure correct operation of the safety system both mute inputs must switch within 2 seconds of each other or the light curtain will not mute (The time interval known as disparity, can be change via dipswitches in the Learned Mode of the light curtain see page 23) When both inputs are active ON the light curtain will e.g. the guards' safety outputs (OSSD's) will not respond to an interruption of the light curtain.

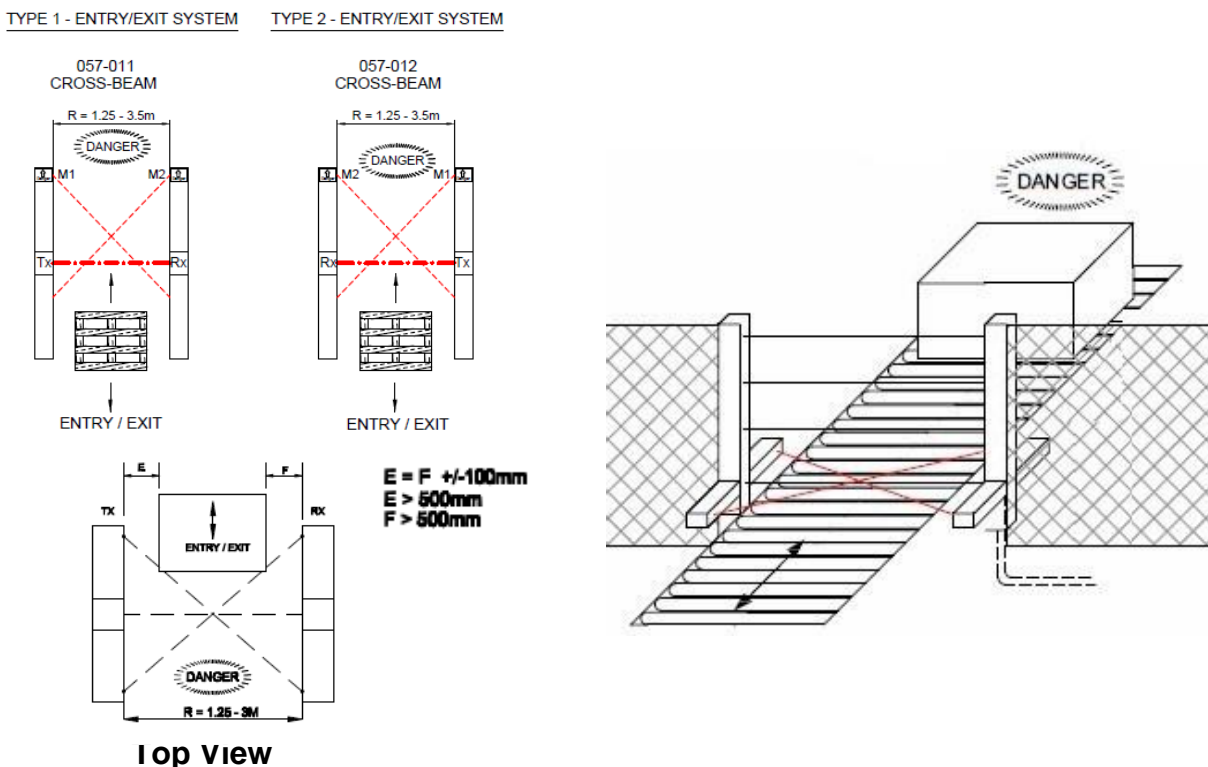
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Suitably position the light curtain to ensure a pallet load does not stop after clearing the mute beams but still interrupting the light curtain.

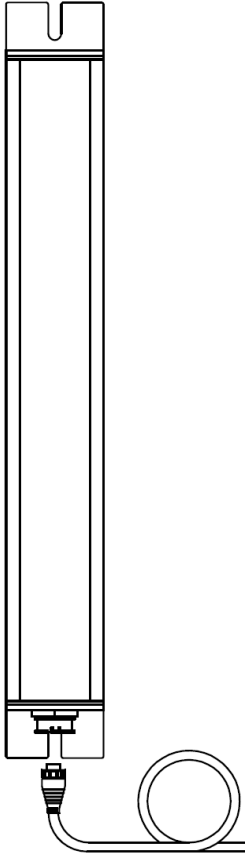
### Suggested Pallet load positioning

Ensure that the pallet position on entering and exiting the light curtain does not have a gap greater than 300mm between the transmitter (Tx) and the edge of the pallet load on one side and the same on the receiver (Rx) side.

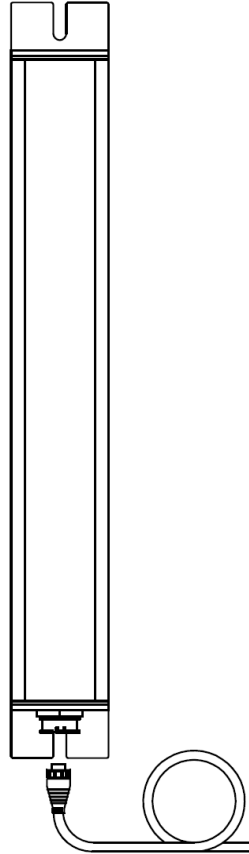


## SG: Physical Set-up

Transmitter  
Column  
(TX)

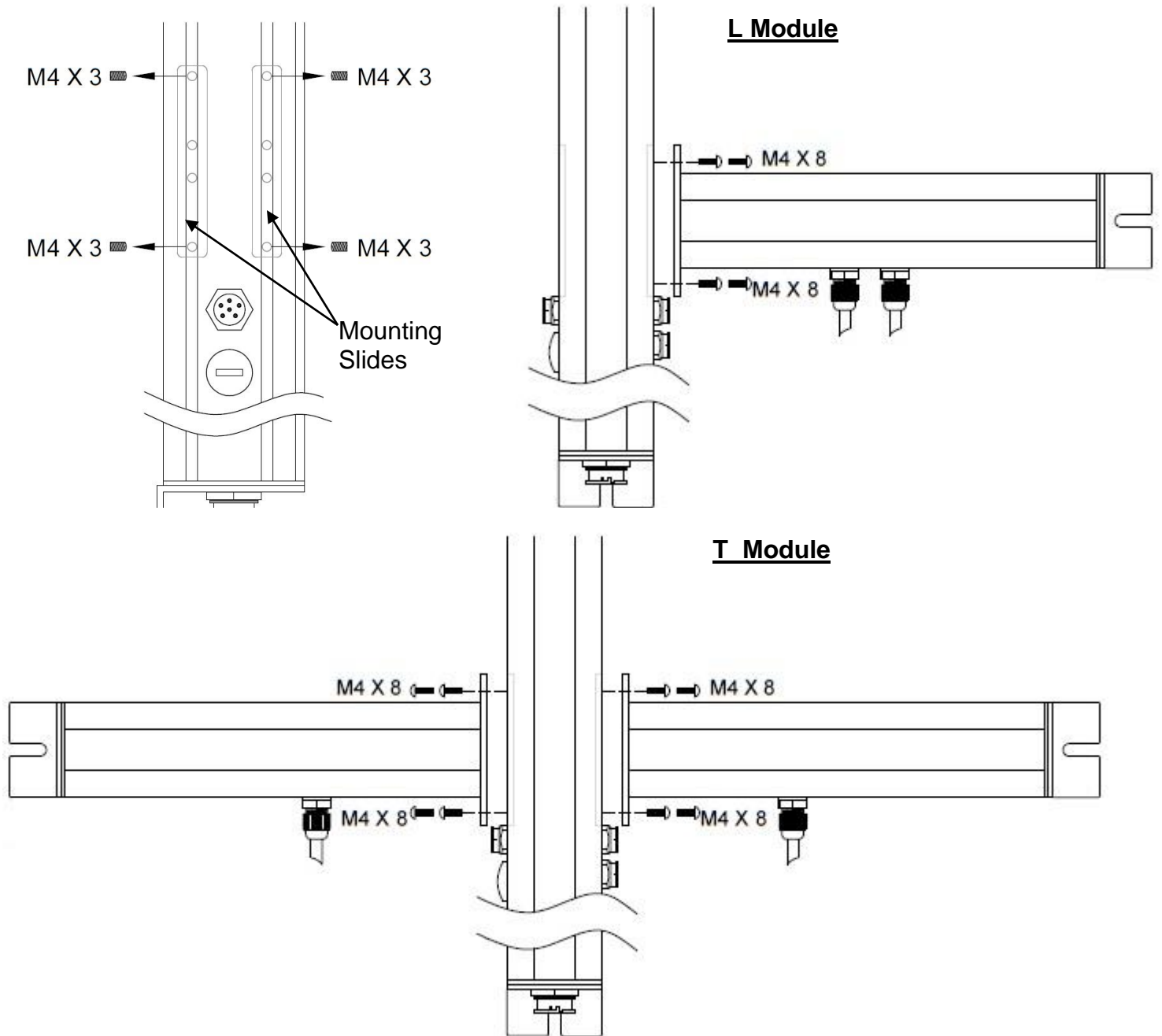


Receiver  
Column  
(RX)



The SG requires (2) cables (1) for the transmitter and (1) for the receive. The maximum cable length is 40 meters combined.

## SG Module Mounting



Mounting 'L' or 'T' mute modules to the main light curtain columns is very easy.

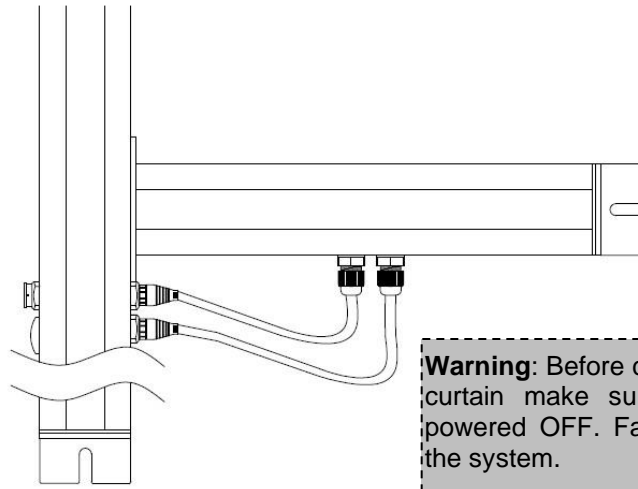
- 1) Remove the M4 x 3 slide set screws with an M4 Allen-key. There are 2 slides per side.
- 2) Align flat side of muting module with slides in main light curtain column.

**NOTE:** Mount TX module to TX and RX module to RX.

- 3) Screw in and tighten M4 x 8 screws provided with each module into slide.

## SG Physical Set-up of Self muting systems

### L Module Configuration

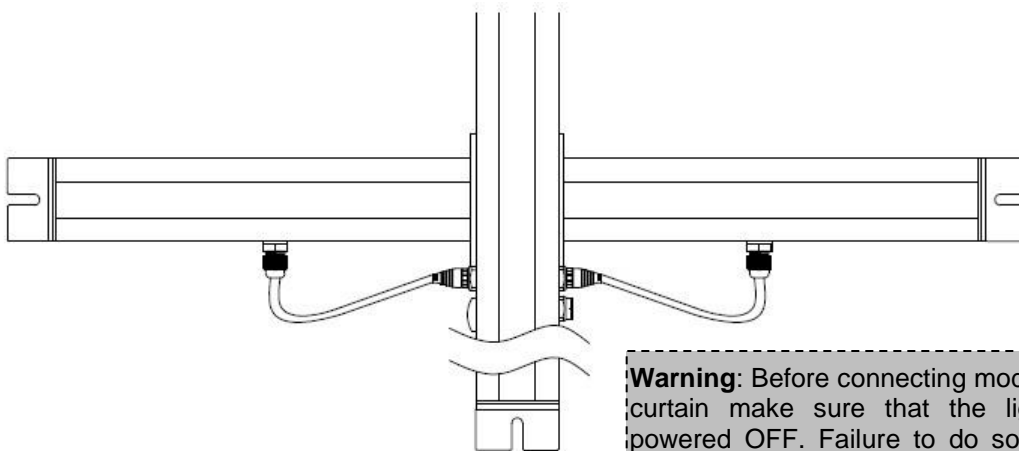


**Warning:** Before connecting module to the light curtain make sure that the light curtain is powered OFF. Failure to do so may damage the system.

### L Module

Make sure the light curtain is powered OFF. Plug the module connections in as the diagram above. Both connections should be on one side. L1 of module to L1 of light curtain; L2 of module to T2/L2 light curtain.

### T Module Configuration



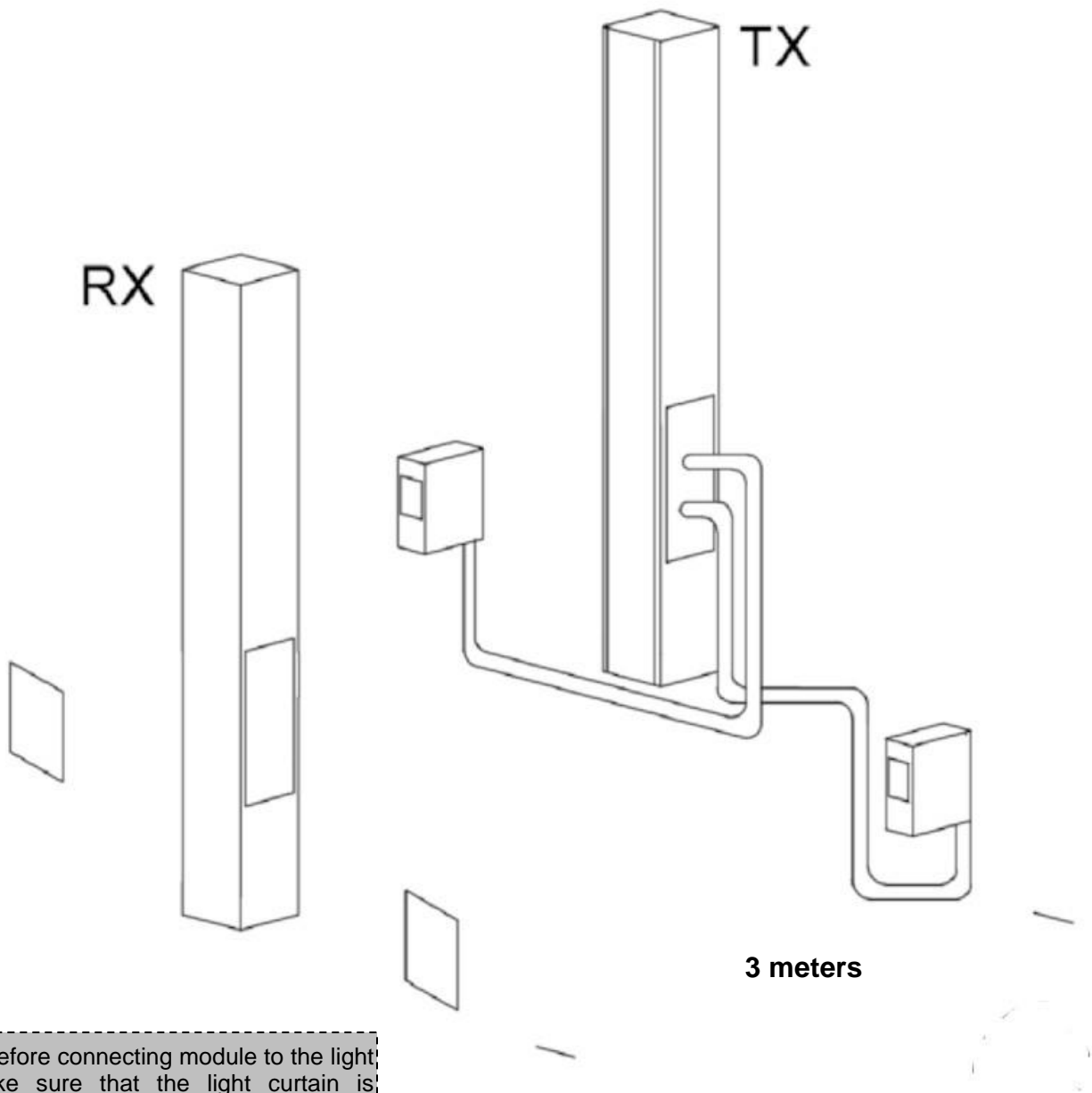
**Warning:** Before connecting module to the light curtain make sure that the light curtain is powered OFF. Failure to do so may damage the system.

### T Module

Make sure light curtain is powered OFF. Plug the module connections in as the diagram above. Each module connection should be on the side that the module is mounted, one connection per side. T1 of module to T1 of light curtain; T2 of module to T2/L2 light curtain.



Remote Sensor Configuration



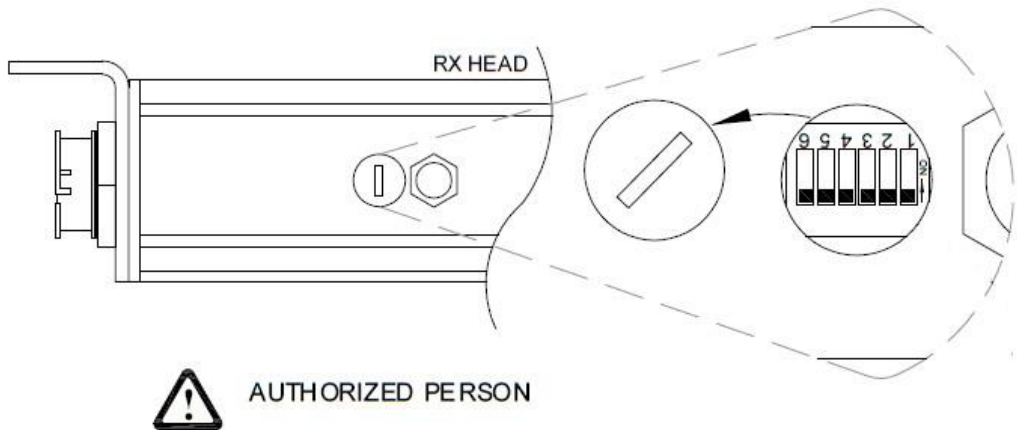
**Warning:** Before connecting module to the light curtain make sure that the light curtain is powered OFF. Failure to do so may damage the system.

Remote Sensors

Make sure light curtain is powered OFF. Both sensors must be block before the light curtain mutes. Connect the retro-reflective sensors to the Transmitter (TX) side of the light curtain.

## SG: Dip Switch Settings

The dip switches are located under the removable door on the end cap (near the cable connector) of the receiver column (labeled RX). The dipswitches should only be accessed by qualified persons. Additionally there is an LED located in the bottom of the receiver (RX) column that illuminate when each dipswitch are in the ON.



**NOTE:** Once dipswitches are accessed remember to place protective cover back to its original position to prevent contaminants from entering the light curtain.

There are two modes of dip switch setting for the SG light curtain system:

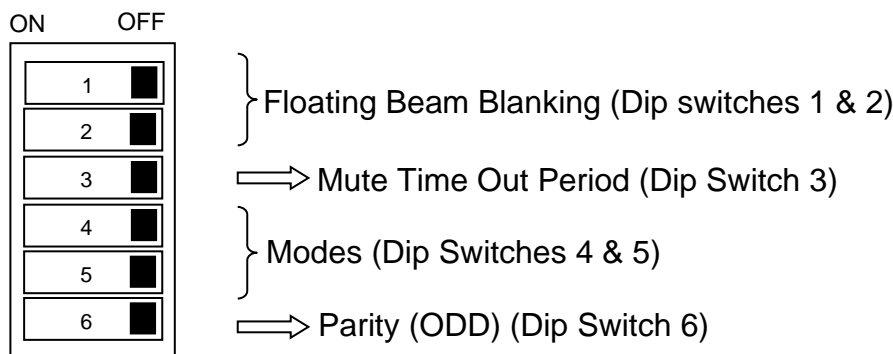
### **Direct Settings** **Learn Settings.**

Direct settings are the functions that are available “out of the box”. No steps are needed to reach these functions. Place the dipswitches in the desired position, cycle power then the functions are selected. There are (4) four features available in the Direct Settings mode:

- 1) Floating blanking
- 2) Mute dwell time
- 3) Modes
- 4) Parity

**Note:** To implement dip switch settings or change the dip switch settings requires the light curtain power to be turned off and then on again.

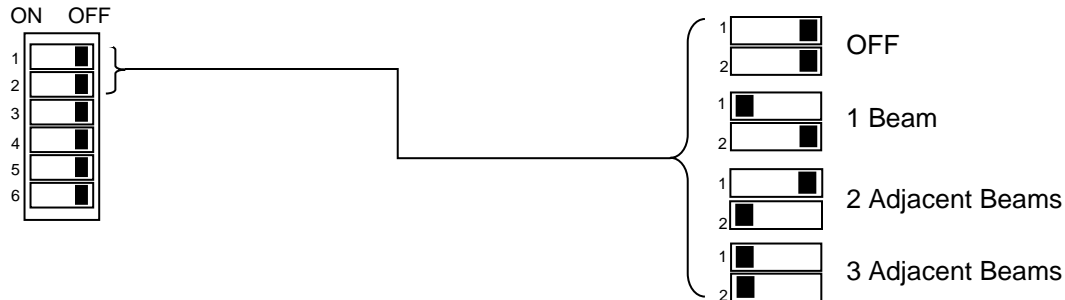
Below is a diagram of the dipswitches in the Direct Setting mode:



**Note:** If the parity check is set incorrectly, or any dipswitch is changed while the light curtain is in operation the OSSDs (outputs) will turn OFF. See page19 for parity information.

## Floating Beam Blanking

Floating beam blanking allows the user to create a larger unprotected opening in the light curtain safe guarding barrier. The name floating beam blanking originated due to the fact that the disabled beams are not fixed at a specific location. The light curtain will allow a specified number of beams (Maximum of 3 adjacent beams) to be blocked without it sending a stop signal to the safe guarded machine. Floating blanking allows the operator to manipulate the work piece safely without shutting down the machine. There are four options, 1) OFF, 2) 1 beam, 3) 2 adjacent beams and 3) 3 Adjacent beams. These options are selectable at dipswitches 1 & 2 in the direct settings mode.



Floating Beam Blanking (14 mm Detection Capability)				
Beams Blanked	0	1	2	3
Object Detection Capability (ODC)	14 mm	24 mm	33mm	43 mm

Floating Beam Blanking (30 mm Detection Capability)				
Beams Blanked	0	1	2	3
Object Detection Capability (ODC)	30 mm	55 mm	80 mm	105 mm

Floating Beam Blanking (40 mm Detection Capability)				
Beams Blanked	0	1	2	3
Object Detection Capability (ODC)	40 mm	63 mm	88 mm	113 mm

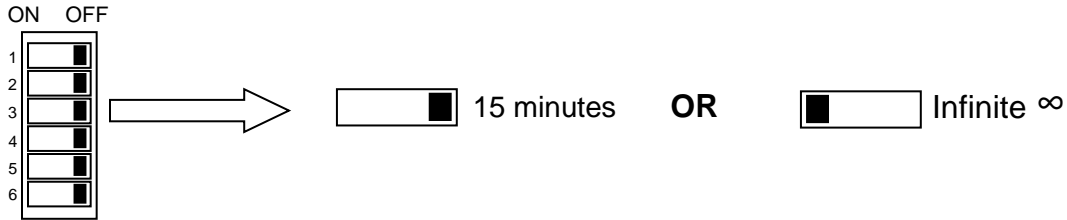
**Warning:** Use of floating beam blanking will change the light curtains object detection capability and could require the light curtain to be move a further distance from the danger area (increase of safety distance) Applicable safety distance standards should be applied when using floating beam blanking.

**Note:** Multiple object blockages in the light curtains sensing region will cause the OSSD's to turn OFF.

**Note:** If the parity check is set incorrectly, or any dipswitch is changed while the light curtain is in operation the OSSDs (outputs) will turn OFF. See page19 for parity information.

## Mute Dwell Time

Mute dwell is the amount of time that the light curtain can remain in the muted state. There are two options: 1) 15 minutes and 2) Infinite. These options are selectable at dipswitch 3 in the direct settings mode. **Note:** If the parity check is set incorrectly, or changed while the light curtain is in operation the OSSDs (outputs) will turn OFF. See page 19 for parity information



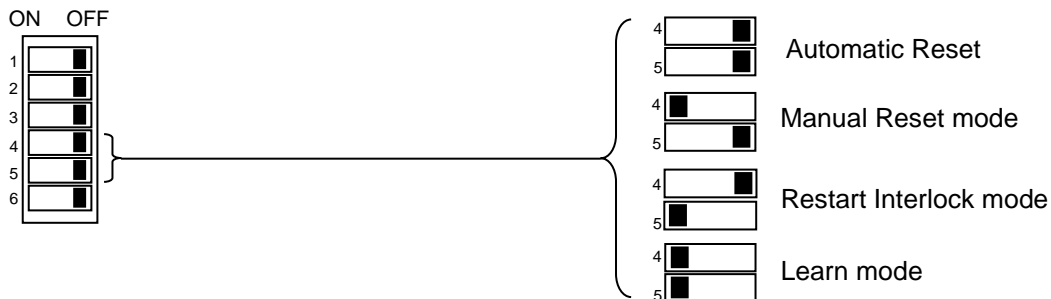
## Modes of Operation

**Automatic Reset:** After initial “Power Up” the light curtain OSSD’s become active (OSSD’s are “ON”). If the light curtains sensing unit is blocked the OSSD’s turn “OFF”. Once the obstruction has been removed from the sensing unit the light curtain automatically reactivates itself. (OSSD’s turn “ON”).

**Manual reset (Latched):** After initial “Power Up” the light curtains OSSD’s remain “OFF” until a Reset signal is received. Once the reset signal is received the OSSD’s turn “ON”. If tripped, once the obstruction has been removed from the sensing unit the OSSD’s will remain “OFF” until a reset signal is applied, upon which time the OSSDs will turn “ON”.

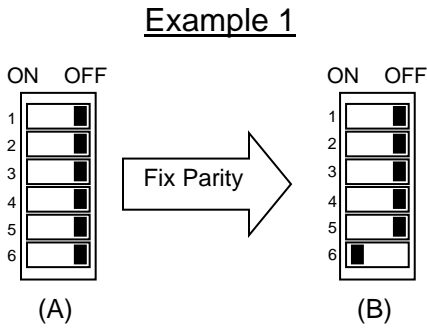
**Restart Interlock mode:** After initial “Power Up” the light curtains OSSD’s become active (OSSD’s turn “ON”). If the light curtains sensing unit is blocked the OSSD’s turn “OFF”. Once the obstruction has been removed from the sensing unit the OSSD’s will remain “OFF” until a reset signal is applied

**Learned mode:** Is the mode that allows the user to access additional features of the light curtains. These features include, fixed beam blanking, partial muting and mute disparity /mute delay off options. See page 21 to see how to enter learned mode & select options.



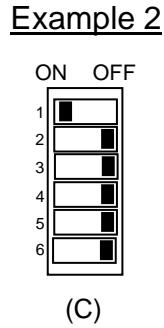
## Parity (ODD)

The parity switch (Position 6) is used as a functionality check for the dip switches, making sure no dip switch has failed. The light curtain counts how many of the 6 switches are in the ON position. This sum must be an odd number. If the number is not odd then the systems OSSD's will remain OFF. Below are examples of ODD parity.



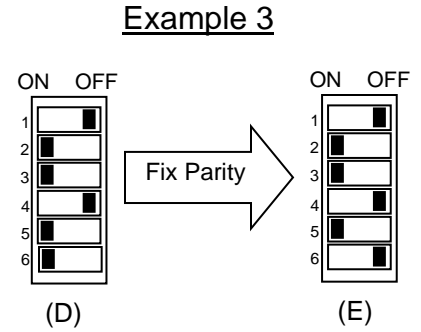
### Example 1

Zero dip switches are in the ON position (A). Zero is not an ODD number. **The OSSD's will remain OFF** until the parity switch is move to the ON position (B).



### Example 2

One dip switch is in the ON position (C). One is an ODD number. OSSD's will turn ON.



### Example 3

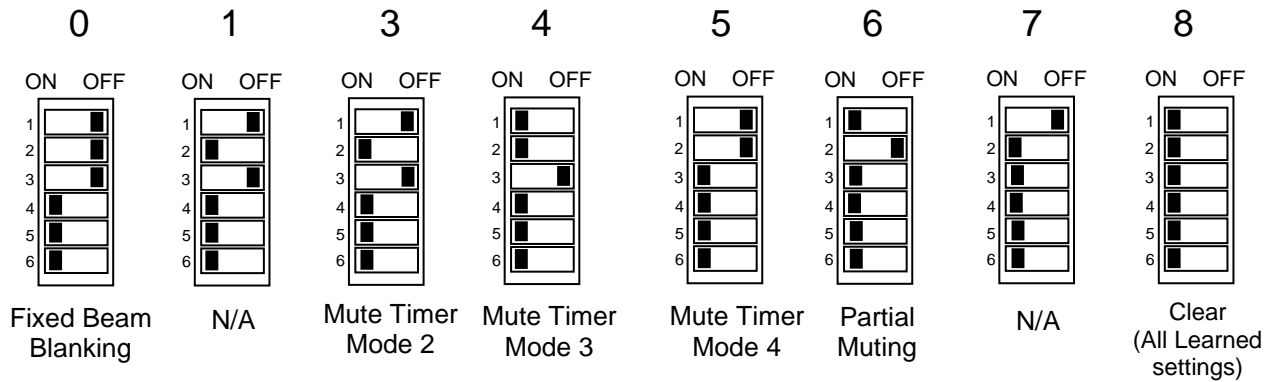
Four dip switches are in the ON position (D). Four is not an ODD number. **The OSSD's will remain OFF** until the parity switch is move to the OFF position (E).

If the number of dip switches (1-5) in the ON position equals an even number then parity switch (Position 6) must be in the ON position. If the number of switches in the ON position equals an odd number then parity switch (position 6) must be in the OFF position. Having set the switches in this way, if any switch subsequently fails, either on or off, the parity will go to an even number and the fault will be detected.

**Note:** If the parity check is set incorrectly, or changed while the light curtain is in operation the OSSDs will turn OFF

## Learned Mode

Learned Mode is the mode that allows the user to access the following functions: Fixed beam blanking, Partial (fixed beam) Muting, Mute Disparity/ Mute Delay OFF and Clear. Note: Parity is not required in learned mode.



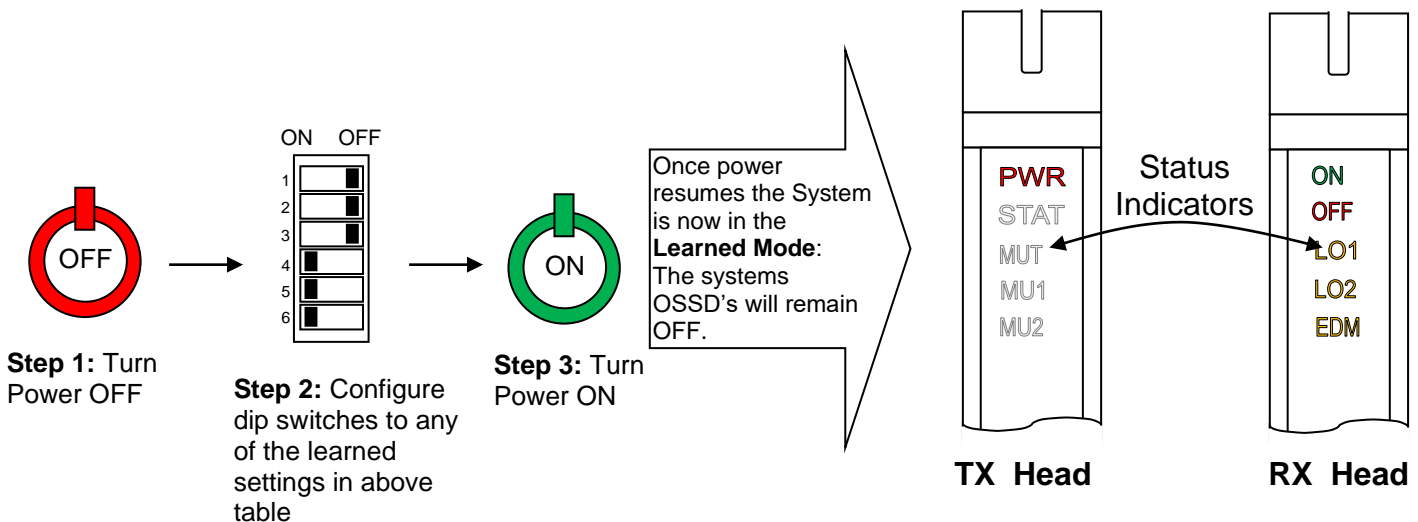
The following steps are required to enter the **Learned Mode**. Diagram below mirrors steps required.

**Step 1:** Turn Power OFF.

**Step 2:** Place dip switches in any desired learned settings configuration

**Step 3:** Turn Power ON.

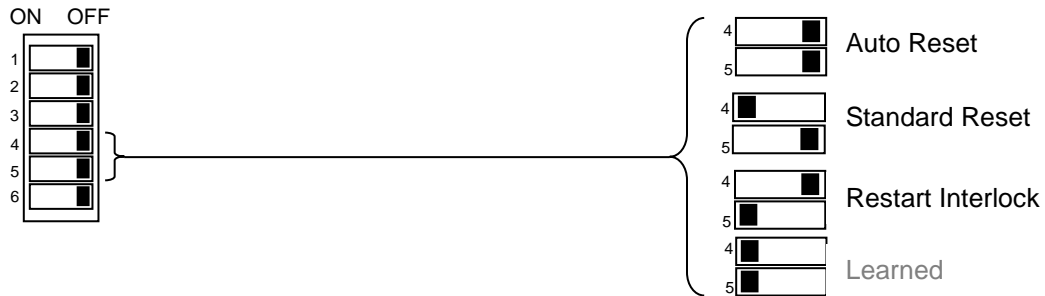
Once power turns ON. The all LED's in top the Receiver column (RX) will turn ON steady. At this time the safety outputs (OSSD's will remain OFF). The light curtain is now in **Learned Mode**.



**Warning:** The two hard-wired mute input connections to the light curtain must be disconnected when using the Learn mode.

## Exit Learned Mode

To exit the Learned Mode: Turn off the power, apply one of the three start up modes: 1) Automatic restart, 2) Standard or 3) Restart Interlock. (For explanations of these modes, see page 19). Then turn the power ON.



**Note:** If the parity check is set incorrectly, or changed while the light curtain is in operation the OSSDs (outputs) will turn OFF. See page 20 for parity information.

## Fixed Beam Blanking

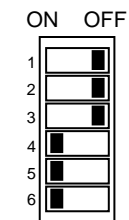
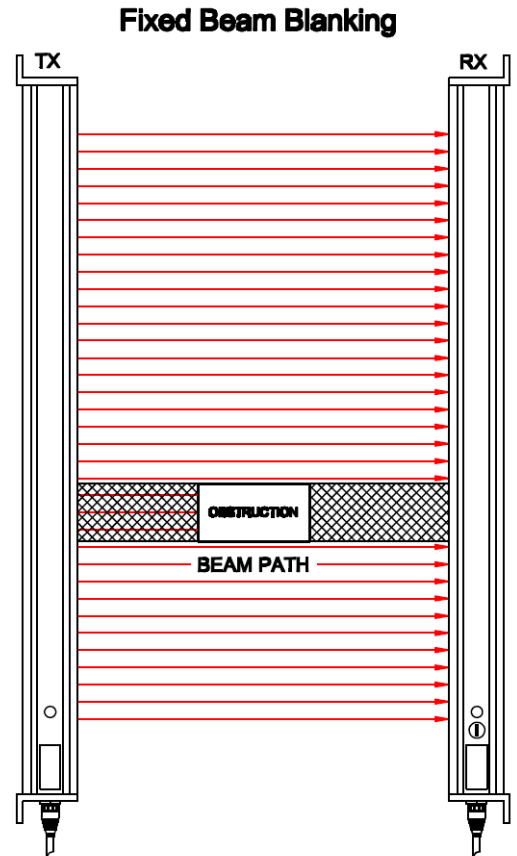
Fixed beam blanking allows the user to deselect a fixed area of beams in the Light Curtain's sensing field. This is typically used when stationary objects, fixtures, tables, etc are permanently obstructing a portion of the sensing field. The remaining unobstructed area of the light curtains sensing field remains active and if something obstructs the active sensing a signal is sent to the OSSD's unless other features are applied (i.e. muting, floating blanking)

**Warning:** Use of fixed beam blanking could change the light curtains object detection and could require the light curtain to be move a further distance from the danger area (increase of safety distance).

**Warning:** If fixed object located in the sensing region does not completely cover the light curtains sensing region additional guarding will be required.

**NOTE:** Once the sensing region is fixed blanked, removal of the object in that region will cause the OSSD's to remain OFF.

**NOTE:** Three beams must remain un-blanked in the sensing region of the light curtain, if not OSSD's remain OFF.



Fixed Beam Blanking

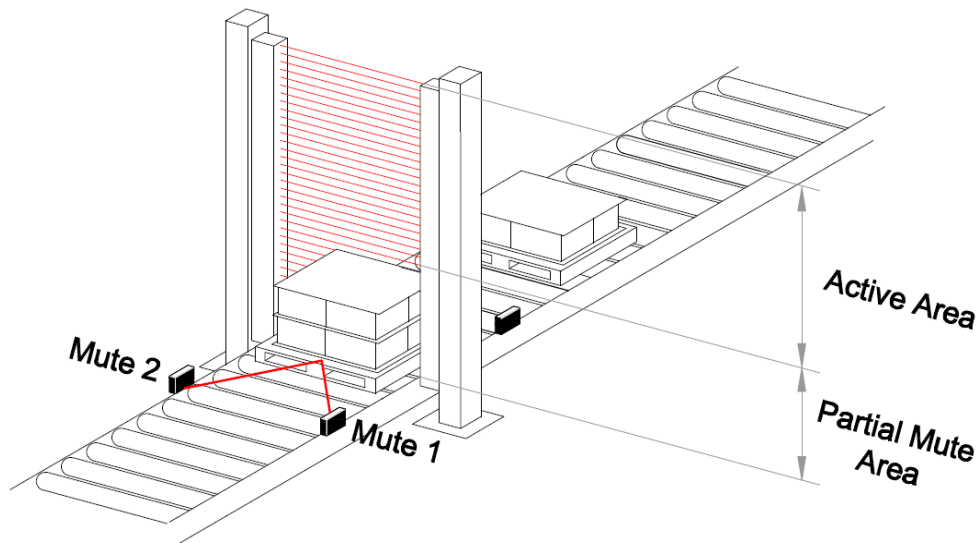
This feature is available in the **Learned Mode**. To configure Fixed Beam Blanking using the following steps:

- 1) Turn power OFF.
- 2) Configure dipswitches as in the diagram to the left
- 3) Place obstruction in light curtain. Obstruction can be placed in light curtain upon original startup.
- 4) Turn power ON wait for All LED's to illuminate in Rx column
- 5) Apply Exit Learned Mode procedure (See page 21) if finished with learned mode or apply another feature.



## Partial Muting

Partial Muting allows the user to define a specified area (window) of the light curtain to be muted. Not the entire sensing region of the system.



This feature is available in the **Learned Mode**. Configure Partial Muting using the following steps:



Partial Muting

- 1) Turn power OFF
- 2) Configure dipswitches as in the diagram to the left
- 3) Place product that is to index through the in light curtain when muted in the light curtain's sensing region.
- 4) Turn power ON wait for All LED's to illuminate in Rx column
- 5) Apply Exit Learned Mode procedure (See page 21) if finished with learned mode or apply another feature.

## Mute Timer Mode 2

Mute timer mode 2 has a mute disparity of 2 seconds with a mute delay off of 1 seconds. Mute disparity is the time period that the mute inputs (Mute 1 & Mute 2) have to agree (Mute inputs both ON). Once either of the mute inputs is deactivated (turned OFF) the system will remain muted for an additional 1 seconds in mute timer mode 2.

The **default** disparity is 2 seconds and 2 second mute delay off.



Mute Timer  
Mode 2

This feature is available in the **Learned Mode**. Configure Mute Input Disparity using the following steps:

- 1) Turn power OFF
- 2) Configure dipswitches as in the diagram to the left
- 3) Turn power ON wait for All LED's to illuminate in Rx column (see page 13)
- 4) Apply Exit Learned Mode procedure (See page 14) if done with learned mode or apply another feature.

## Mute Timer Mode 3

Mute timer mode 3 has a mute disparity of 4 seconds with a mute delay off of 4 seconds. Mute disparity is the time period that the mute inputs (Mute 1 & Mute 2) have to agree (Mute inputs both ON). Once either of the mute inputs is deactivated (turned OFF) the system will remain muted for an additional 2 seconds in mute timer mode 3.

The **default** disparity is 2 seconds and 2 second mute delay off.



Mute Timer  
Mode 3

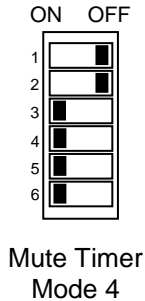
This feature is available in the **Learned Mode**. Configure Mute Input Disparity using the following steps:

- 5) Turn power OFF.
- 6) Configure dipswitches as in the diagram to the left
- 7) Turn power ON wait for All LED's to illuminate in Rx column
- 8) Apply Exit Learned Mode procedure (See page 21) if finished with learned mode or apply another feature.

## Mute Timer Mode 4

Mute timer mode 4 has a mute disparity of 200 milliseconds with a mute delay off of 0 seconds. Mute disparity is the time period that the mute inputs (Mute 1 & Mute 2) have to agree (Mute inputs both ON). Once either of the mute inputs is deactivated (turned OFF) the system will remain muted for an additional 0 seconds in mute timer mode 4.

The **default** disparity is 2 seconds and 2 second mute delay off.

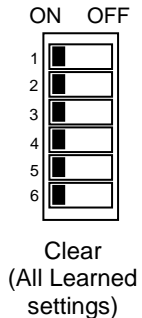


This feature is available in the **Learned Mode**. Configure Mute Input Disparity using the following steps:

- 1) Turn power OFF
- 2) Configure dipswitches as in the diagram to the left
- 3) Turn power ON wait for All LED's to illuminate in Rx column
- 4) Apply Exit Learned Mode procedure (See page 21) if finished with learned mode or apply another feature.

## Clear

Clears all features applied in the Learned Mode, returning the system to its original factory settings.



This feature is available in the **Learned Mode**. To clear all the features applied in the Learned Mode use following steps:

- 1) Turn power OFF
- 2) Configure dipswitches as in the diagram to the left
- 3) Turn power ON wait for All LED's to illuminate in Rx column
- 4) Apply Exit Learned Mode procedure (See page 21) if finished with learned mode or apply another feature.

<b>Original Factory Settings</b>	
Disparity	2 seconds
Mute Dwell Time	15 minutes
Fixed Beam Blanking	OFF
Partial Muting	OFF
Floating Beam Blanking	OFF
Mute Delay OFF	2 seconds

## SG: Specifications

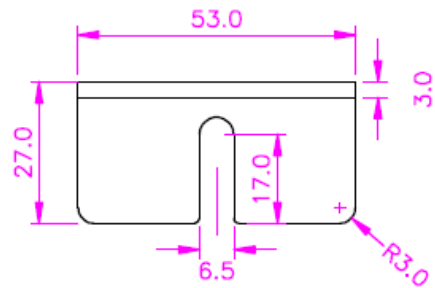
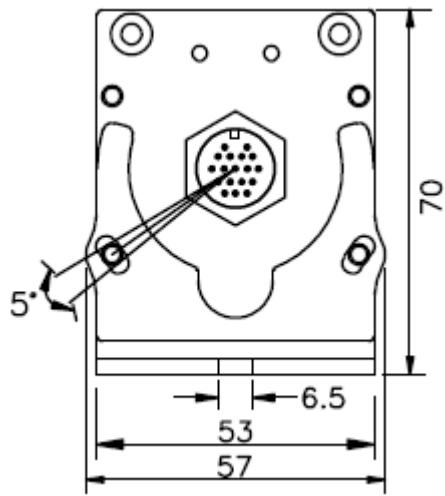
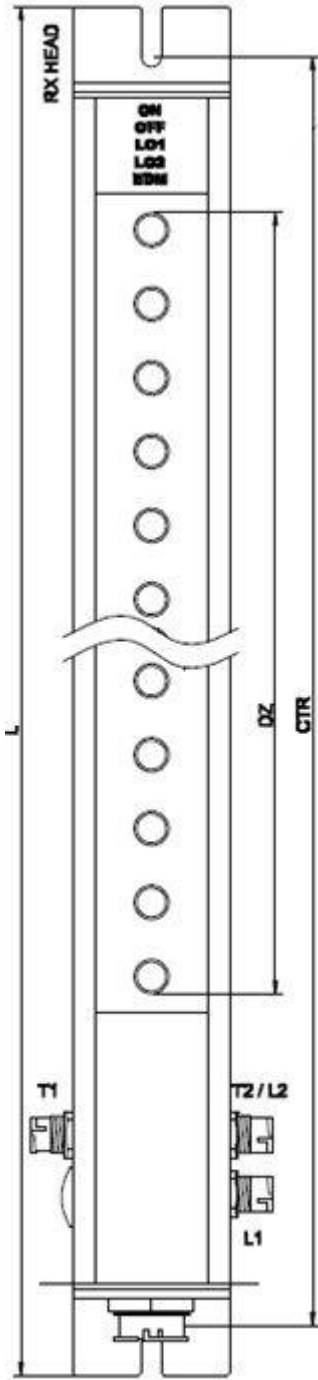
Number of beams	1 – 128
Detection height	141 – 2391 mm
Range	Perimeter guard - 15 meters 30 mm guard - 6 meters 40 mm guard - 15 meters
Light type	IR 880nm
Response time	25ms
Operating temperature	-30°C to +50°C (-22°F - 122°F)
Light curtain enclosure	•IP67
Power supply	24V DC
Current consumption	1.5 A maximum
Cables	Max. 40 meter length total (both TX & RX)
Light curtain connection	M12 - • IP67
Finish	Aluminum chromate treated, yellow polyester powder coated
Classification	EN 61496-1 Type 4 IEC 61496-2 Type 4 EN 954-1 Category 4 EN 62061 SIL 3 EN 13849 PL: e
Warranty	1 Year

<b>OUTPUTS</b>	
Safety Outputs OSSD1 & OSSD2	2 X N/O fail-safe switching contacts each rated at 24V 2A
Status Output	1 x N/O or 1 x N/C change over non-safety switching contact rated at 24V 1A
Mute Output	ON = +24Vdc; Electronic 500 mA
Status and Mute Indication	Status & condition LED's in light curtain

<b>INPUTS</b>	
Safety Monitoring (EDM)	ON = +24Vdc
Reset	ON = +24V DC
Mute	Dual mute inputs. ON = +24Vdc
Mute Enable	ON = +24Vdc
Guard Override	ON = +24V dc
Input Status	LEDs' located in light curtain

- For more information about IP or wash down rating contact Smartscan.

# SG: Dimensions



The dimensions (**L & CTR**) can be found in the light curtain model number table on the preceding pages.

**NOTE: Older models may have a prefix of 055-XXX all dimensional information for these older models is the same as below.**

**SG: 14mm Object Detection Capability**

**(0.5 - 4 meter range)**

Model Number	Item Number	Number of beams	Detection Zone (DZ)	Overall Length (L)	Fixing Centers (CTR)
SG-14-06	057-101	6	141	426	400
SG-14-12	057-102	12	291	576	550
SG-14-18	057-103	18	441	726	700
SG-14-24	057-104	24	591	876	850
SG-14-30	057-105	30	741	1026	1000
SG-14-36	057-106	36	891	1176	1150
SG-14-42	057-107	42	1041	1326	1300
SG-14-48	057-108	48	1191	1476	1450

**SG: 30mm Object Detection Capability**

**(0.5 - 6 meter range)**

Model Number	Item Number	Number of beams	Detection Zone (DZ)	Overall Length (L)	Fixing Centers (CTR)
SG-30-06	057-301	6	141	426	400
SG-30-12	057-302	12	291	576	550
SG-30-18	057-303	18	441	726	700
SG-30-24	057-304	24	591	876	850
SG-30-30	057-305	30	741	1026	1000
SG-30-36	057-306	36	891	1176	1150
SG-30-42	057-307	42	1041	1326	1300
SG-30-48	057-308	48	1191	1476	1450
SG-30-54	057-309	54	1341	1626	1600
SG-30-60	057-310	60	1491	1776	1750
SG-30-66	057-311	66	1641	1926	1900
SG-30-72	057-312	72	1791	2076	2050
SG-30-78	057-313	78	1941	2226	2200
SG-30-84	057-314	84	2091	2376	2350
SG-30-90	057-315	90	2241	2526	2500
SG-30-96	057-316	96	2391	2676	2650

**NOTE: Older models may have a prefix of 055-XXX all dimensional information for these older models is the same as below.**

**SG: 40mm Object Detection Capability**

**(3 - 15 meter range)**

Model Number	Item Number	Number of beams	Detection Zone (DZ)	Overall Length (L)	Fixing Centers (CTR)
SG-40-06	057-401	6	141	426	400
SG-40-12	057-402	12	291	576	550
SG-40-18	057-403	18	441	726	700
SG-40-24	057-404	24	591	876	850
SG-40-30	057-405	30	741	1026	1000
SG-40-36	057-406	36	891	1176	1150
SG-40-42	057-407	42	1041	1326	1300
SG-40-48	057-408	48	1191	1476	1450
SG-40-54	057-409	54	1341	1626	1600
SG-40-60	057-410	60	1491	1776	1750
SG-40-66	057-411	66	1641	1926	1900
SG-40-72	057-412	72	1791	2076	2050
SG-40-78	057-413	78	1941	2226	2200
SG-40-84	057-414	84	2091	2376	2350
SG-40-90	057-415	90	2241	2526	2500
SG-40-96	057-416	96	2391	2676	2650

**SG: Torso Detection (Standard)**

**(0.5-6 meter range)**

Model Number	Item Number	Number of beams	Detection Zone (DZ)	Overall Length (L)	Fixing Centers (CTR)
SG-305-24	057-605	12	600	886	860
SG-230-36	057-606	18	900	1186	1160
SG-385-48	057-607	18	1200	1486	1460
SG-305-60	057-608	24	1500	1786	1760
SG-90-72	057-609	30	1800	2086	2060
SG-95-84	057-610	30	2100	2386	2360
SG-105-96	057-611	36	2400	2686	2660

**NOTE: Older models may have a prefix of 055-XXX all dimensional information for these older models is the same as below.**

**SG: Torso Detection (Perimeter)**

**(4-15 meter range)**

Model Number	Item Number	Number of beams	Detection Zone (DZ)	Overall Length (L)	Fixing Centers (CTR)
SG-305-24P	057-612	12	600	886	860
SG-230-36P	057-613	18	900	1186	1160
SG-385-48P	057-614	18	1200	1486	1460
SG-305-60P	057-615	24	1500	1786	1760
SG-90-72P	057-616	30	1800	2086	2060
SG-95-84P	057-617	30	2100	2386	2360
SG-105-96P	057-618	36	2400	2686	2660

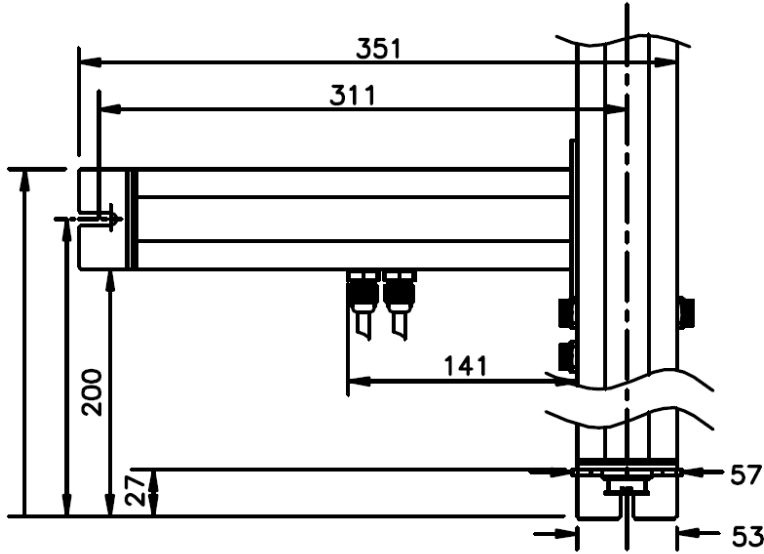
**SG: Interconnect Cables**

Model Number	Item Number	Cable Length (Meters)
SGCAB-05	084-105	5
SGCAB-10	084-210	10
SGCAB-20	084-220	20

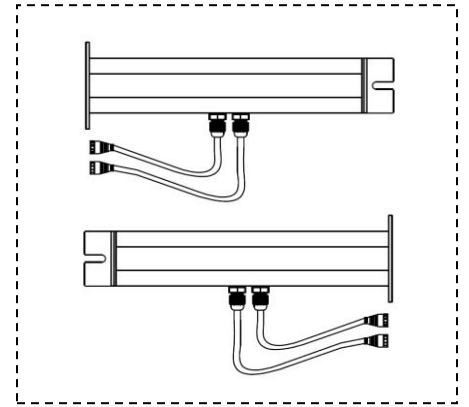




## SG L Module



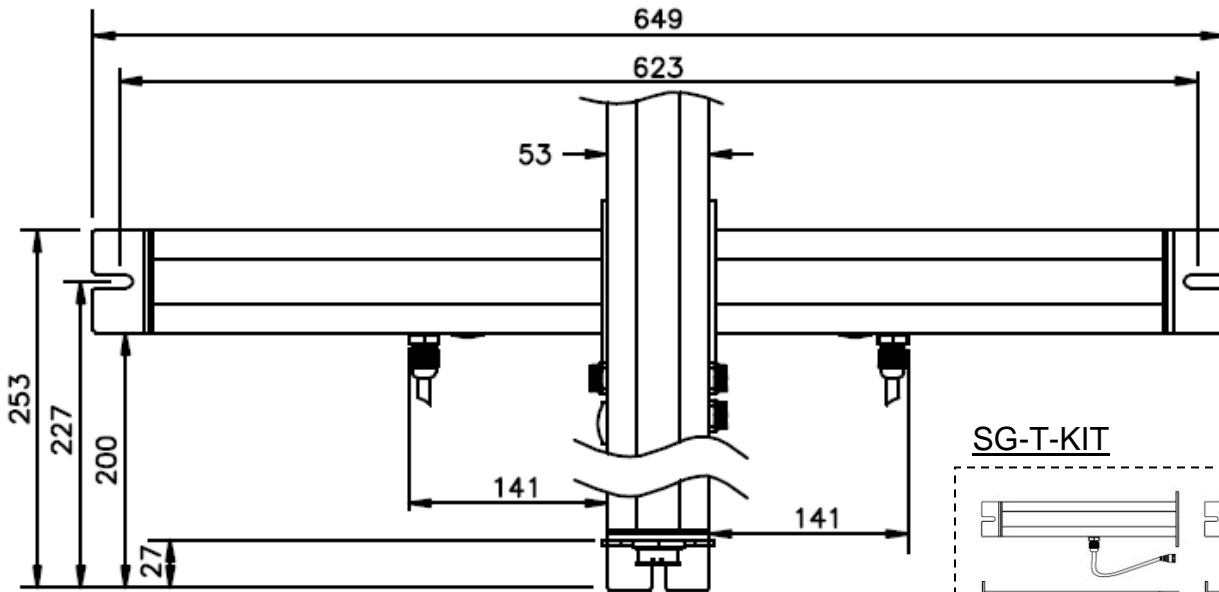
SG-L-KIT



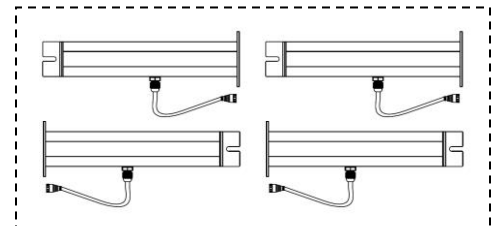
(1.25 - 3 meter range)

Model Number	Item number	Number of pieces	Tx & Rx Weight
SG-L-KIT	057-002	(1)Transmitter & (1) receiver module	5

## SG T Module



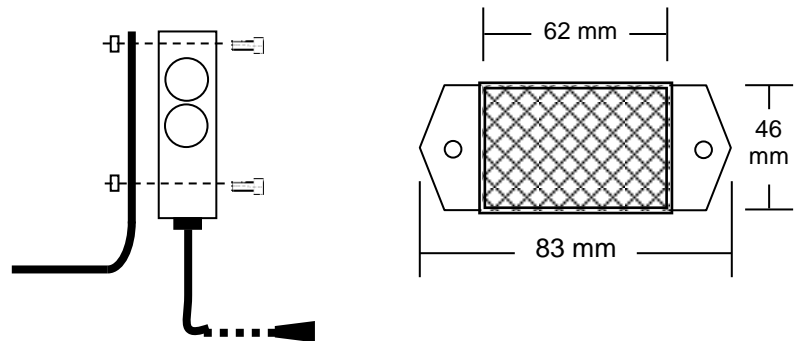
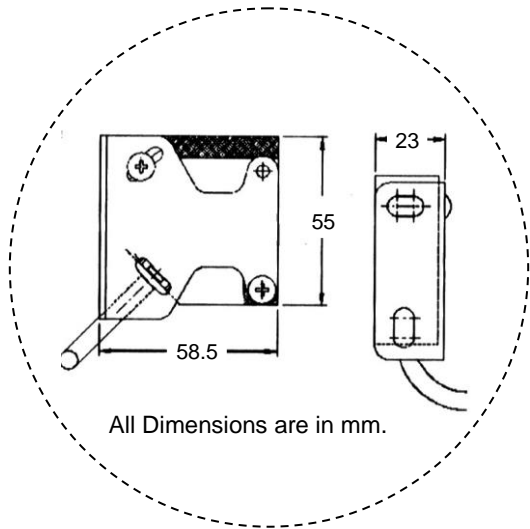
SG-T-KIT



(1.25 - 3 meter range) \*\*\*\* See page 12 for T1 & T2 orientation information\*\*\*\*

Model Number	Item number	Number of pieces	Tx & Rx Weight
SG-T1-KIT	057-011	(2)Transmitter & (2) receiver modules	5
SG-T2-KIT	057-012	(2)Transmitter & (2) receiver modules	5

## SG Remote Sensor Kit

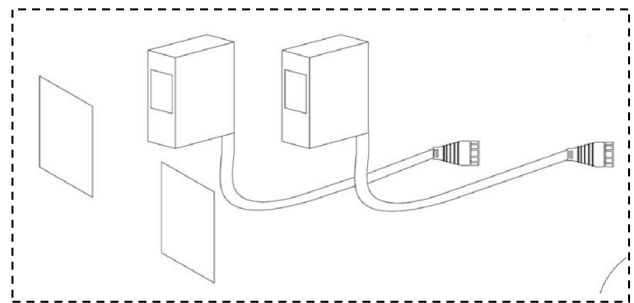


Function	Sensor lead Color Code
+24Vdc	Brown
0Vdc	Blue
N.O.	Black
COM	White
N.C.	Gray

Retro-reflective Sensor Specifications	
Range	3 meters
Response time	15ms
Output	3A@250VAC N.O or N.C
Sensor enclosure	*IP66
Power Supply	12-240VDC 24-240VAC
Current consumption	2VA max.
Sensor Cable	1.5 meter

\* For more information about IP or wash down rating contact Smartscan

### SG-PRS-KIT



### **(0.5 - 3 meter range)**

Model Number	Item number	Number of pieces	Tx & Rx Weight
SG-PRS-KIT	057-003	(2)Sensors & (2) reflectors	3