

Pallet Safe3: Installation Supplement

Rev. 1-11-20



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Pallet Safe3 series

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In order for machinery to be guarded by the Smartsan Pallet Safe3 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.

Smartsans Pallet Safe3's ability to perform this function depends upon the appropriateness of the application and upon the Smartsan Pallets Safe '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 Pallet Safe3 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.

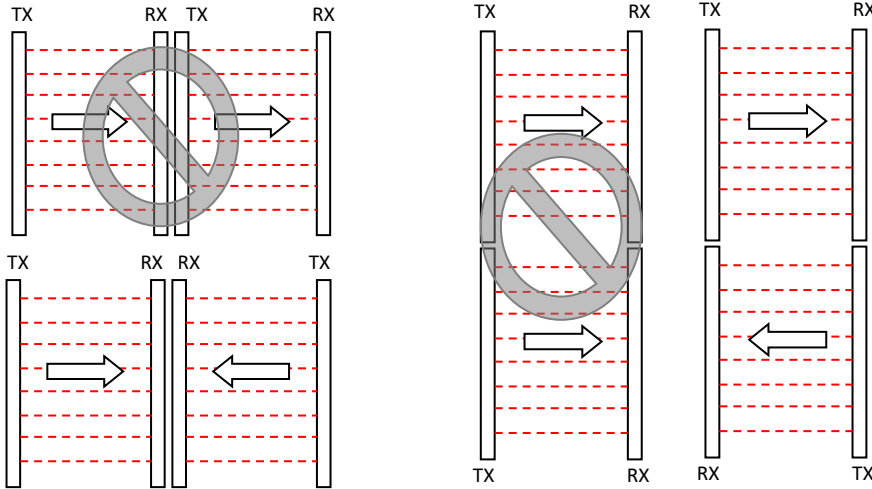
The user has the sole responsibility to ensure that the Smartsan Pallet Safe3 system is installed and interfaced to the guarded machine by "qualified persons" in accordance with this manual and applicable safety regulations. A "qualified person" is defined as " a person or persons who, by possession 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)

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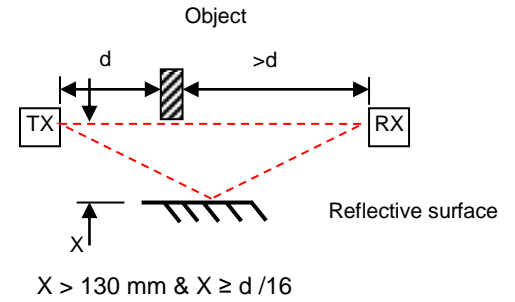
Curtain Mounting Considerations

Light Curtain Orientation

TX - Transmitter RX - Receiver

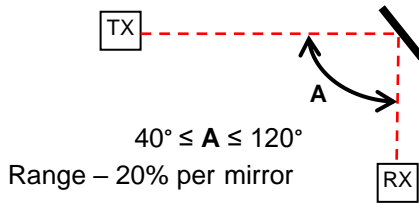


Proximity to reflective surfaces

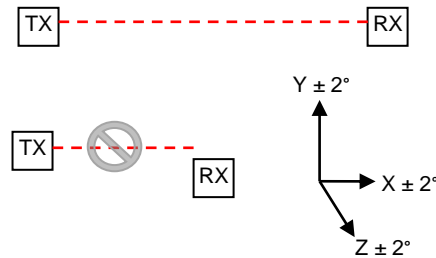


X is minimum distance between the light and the reflective surface. The closest distance of TX or RX to the object approaching the light curtain is d .

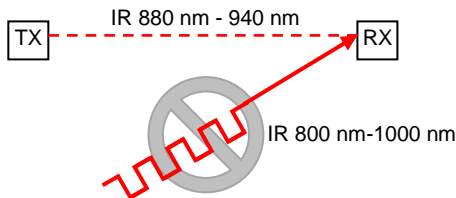
Use with Mirrors



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.

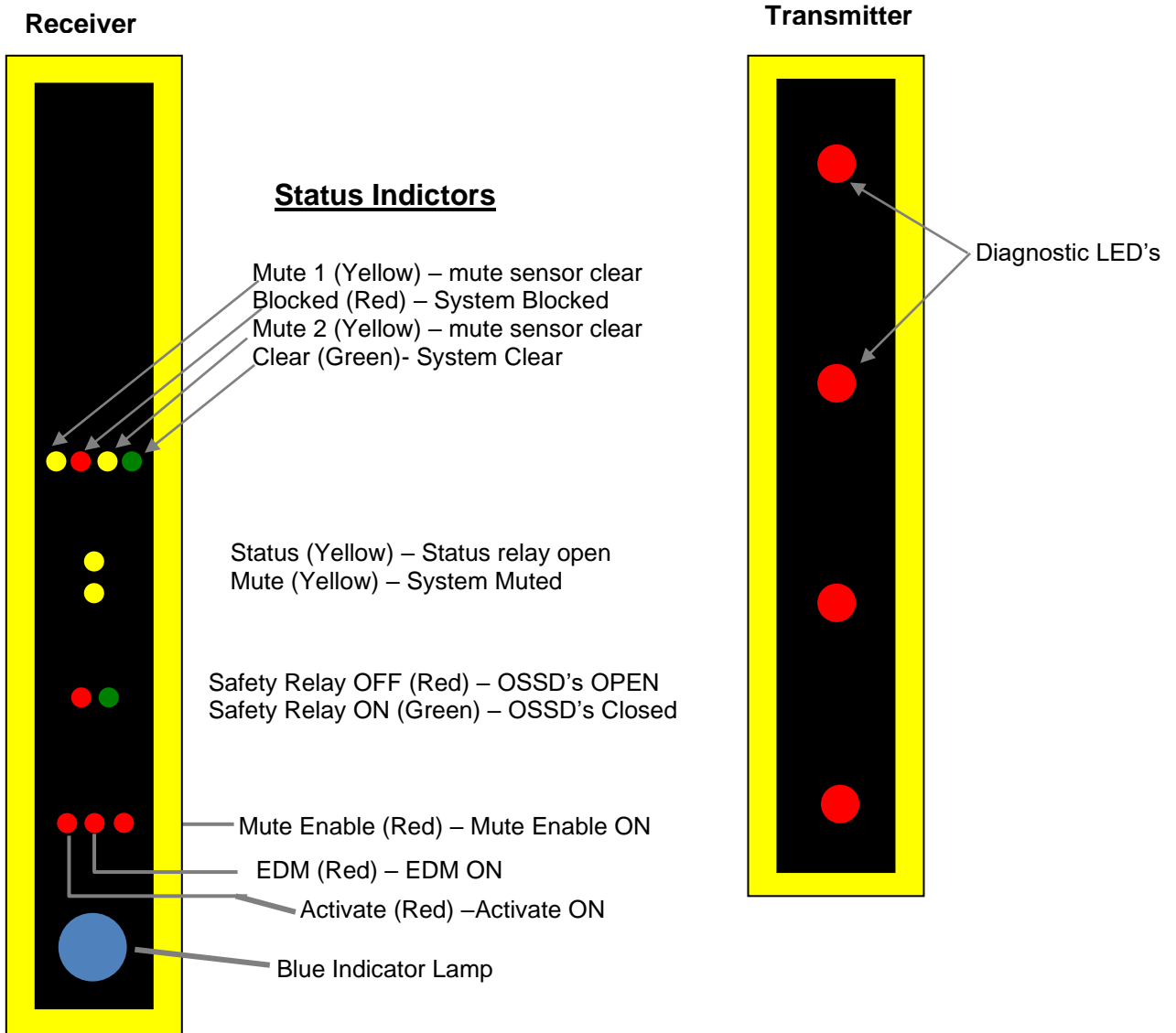
The operator should not be able to reach over, reach under or walk past the protective device without interrupting its sensing region. Additional guarding may be required to achieve this task.

Warning; Physical damage to the Pallet Safe3 light curtain system could create an un-safe condition that may cause a serious injuring including death. Contact Smartsan for more information.

Warning; Do not repair or modify the Pallet Safe3 Light curtain. The Pallet Safe safety light curtain is not cite/field repairable and can only be repaired at the Smartsan.

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 contains a row of infrared, light emitting diodes that sequentially transmit parallel beams of energy to corresponding receiving diodes in the receiver 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 output signal switching devices (OSSD's) will turn-OFF immediately.



Diagnostic Indicators

For diagnostic purposes visible red LED indicators adjacent to each infrared transmitting diode are provided, in the transmitter column.

Status Indicators

The physical location of these indicators can be viewed on page 5.

Guard ‘clear’ indicator - A green LED indicator located in the top cluster of the receiver unit illuminates when the light curtain is clear of obstruction.

Guard ‘block’ indicator - A red LED indicator located in the top cluster of the receiver unit illuminates when the light curtain is blocked.

Mute ‘clear’ indicators Mute 1 and Mute 2 - Yellow LED indicators located in the top cluster of the receiver unit extinguish when mute sensors mute 1 and mute 2 are blocked.

Mute condition ‘on’ indicator - Yellow LED indicator located in the center cluster of the receiver unit illuminates when the light curtain output relays are in a muted condition.

Status output indicator – A Yellow LED indicator located in the center cluster of the receiver unit is illuminated when the status relay is de-energized, but extinguishes when the status relay energizes.

Safe output ‘on’ - A green LED indicator located in the bottom cluster of the receiver unit illuminates when the safe output switching relays are ON (Closed).

Safe output ‘off’ - A red LED indicator located in the bottom cluster of the receiver unit illuminates when the safe output switching relays are OFF (Open).

Mute Enable ‘on’ - A red LED indicator located in the bottom cluster of the receiver unit illuminates when the mute enable signal is applied.

EDM ‘on’ - A red LED indicator located in the bottom cluster of the receiver unit illuminates when the EDM circuit is complete.

Activate ‘on’ - A red LED indicator located in the bottom cluster of the receiver unit illuminates when the activate signal is applied.

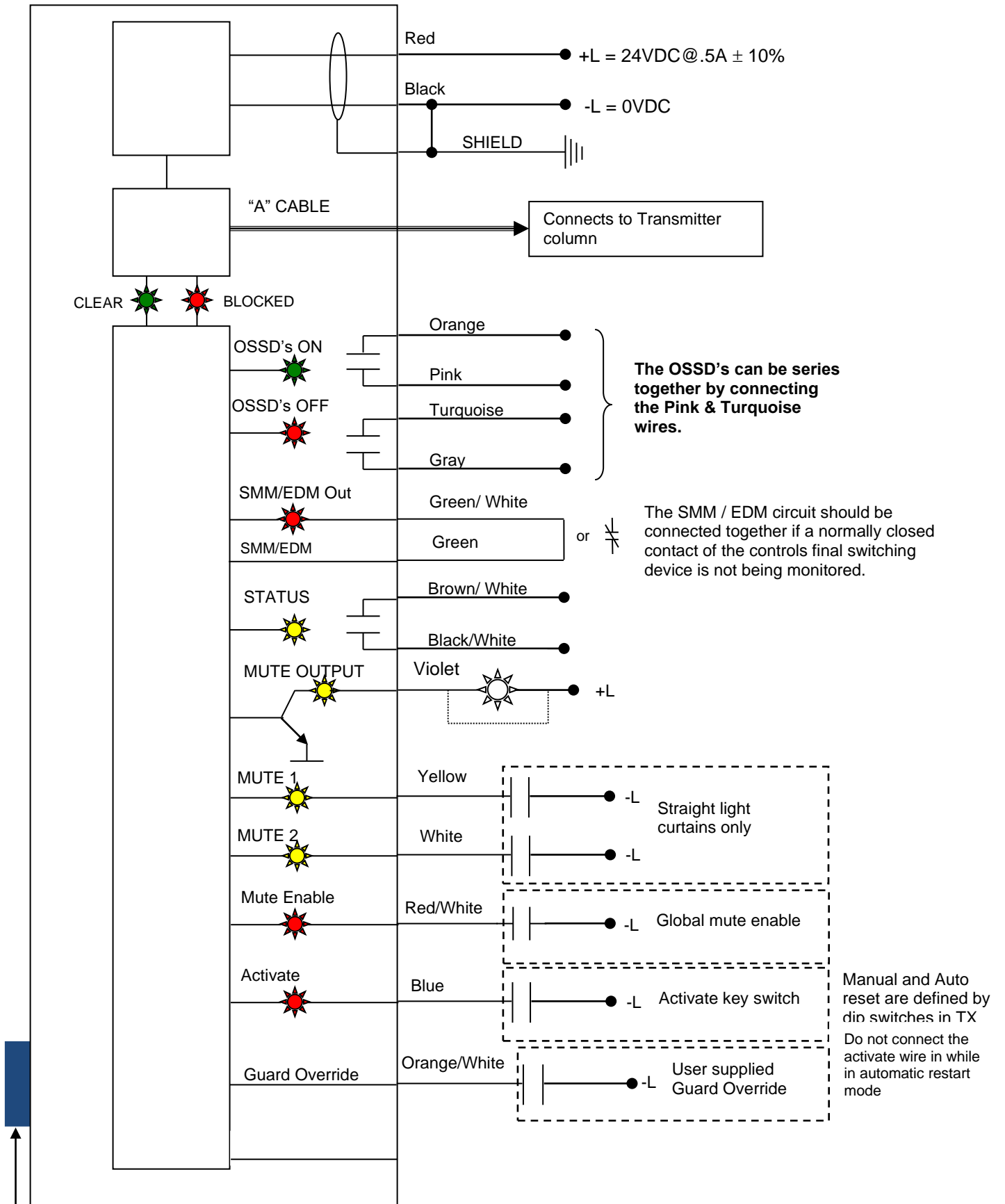
Indicator Lamp

Indicator lamp is “ON” Solid when the light curtain is muted

Indicator lamp is “ON” Solid when the light curtain is in Guard Override mode.

Pallet Safe3 Controls

“Qualified Persons”



Pallet Safe Series: Controls

Power supply - Use a regulated supply +24V DC, 1A ±10%. Protect the +24V input with a .5A fuse. Connect the power supply to cable B as follows: The **RED** wire to +24V DC and **BLACK** wire to 0V DC. Connect the shield to ground.

SMM / 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. A red LED in the receiver column of the light curtain illuminates when the EDM circuit is complete.

The EDM circuit must receive continuity to function properly; no external voltage should be applied. When monitoring a switching device one side of the Normally Closed circuit will connect to wire **GREEN/WHITE** wire (cable B), the other to wire **GREEN**. If the EDM function is not required connect wire **GREEN/WHITE** directly to wire **GREEN** otherwise the system will remain tripped and will not reset.

Reset Modes: DiPS3witches located in the horizontal section of the transmitter column controls the reset modes. There are two reset modes automatic reset and manual reset.

Manual Start- A push button or key switch is recommended. Turning the 'activate switch to ON and then releasing the switch will restart the safety outputs (OSSD's) to an ON condition, providing the light curtain is clear of obstruction. If a PLC is used to manually reset the light curtain a minimum pulse width of 150 ms is required. DiPS3witches in TX are in the OFF position.

Activate: **BLUE** wire to 0V DC.

Automatic Restart - No manual reset is needed; the light curtain restarts itself once the obstruction is cleared. The activate signal must be disconnected in this mode. dip switches in TX are in the ON position.

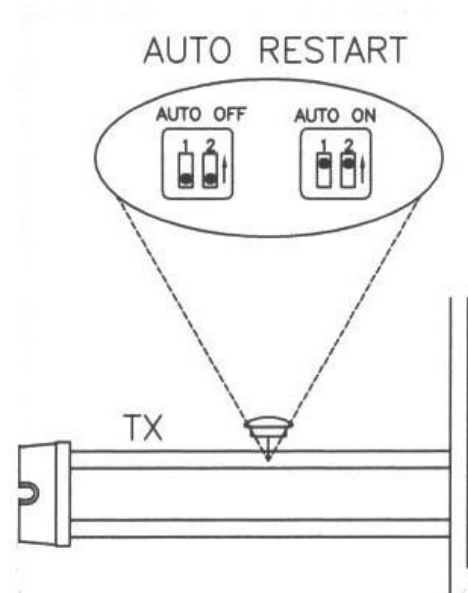
Note: - The reset mode of the system is set upon initial power up. Power must be cycled to change from Automatic Restart Mode to Manual Restart Mode or visa-versa.

Guard Override: Turning and holding the guard override 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 guard override switch and restart the safety system in the normal manner. Blue indicator will turn ON solid when system is in Guard Override.

Guard Override: **ORANGE/WHITE** wire to 0V DC.

Use guard override when:

- (a) The reason for the blockage has been established
- (b) The light curtain is in view
- (c) No danger to any person can be caused.



Pallet Safe Series: Controls

Safety Relay Outputs (OSSD's) – These two safety outputs respond to interruption of the light curtain (unless muted). 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 110V, 2A. LED indicators located in the receiver column illuminate when the OSSD's are ON (green) or OFF (red).

OSSD1 (Safety Output 1): **ORANGE** wire & **PINK** wire:

OSSD2 (Safety Output 2): **TURQUOISE** wire & **GRAY** wire.

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.

Status Relay Output – The status output is a voltage free NON-SAFETY contact that is ON (closed) when the safety relays are ON (closed) and OFF (open) when the safety relays are OFF (Open). The status contact has a maximum switching 110V, 1A. A yellow LED in the receiver column illuminates when the status output signal is OFF.

Status Output: **BROWN/WHITE** wire & **BLACK/WHITE** wire

Mute Output - Some machines require a mute signal to indicate that the light curtain is muted. To monitor the mute status of the light curtain the **VIOLET** wire (cable B) must receive 24V DC. This electronic output is rated 24VDC@100mA. A yellow LED in the receiver column illuminates when the mute output is ON.

Note: - Do not connect mute output (Violet wire) directly to +24vdc it will damage the light curtain system

Mute Inputs (mute 1, mute 2). When both inputs are active ON within 2 seconds of each other, the light curtain will mute, e.g. the guard output switches will not respond to an interruption of the light curtain. There are also mute LED indicators located in the receiver column that extinguish when the mute signals are applied. If the mute inputs do not agree within 2 seconds of each other the system will trip. The blue indicator lamp located on the transmitter column will turn ON solid. **Straight Light Curtains ONLY**

Mute 1: **YELLOW** wire to 0V DC. } External mutes Mute 1 & Mute 2 are only
Mute 2: **WHITE** wire to 0V DC. } available in straight light curtains

Mute enable input – This signal must be applied for muting to occur. It may be used as a 3rd 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. A red LED in the receiver column illuminates when the mute enable signal is applied.

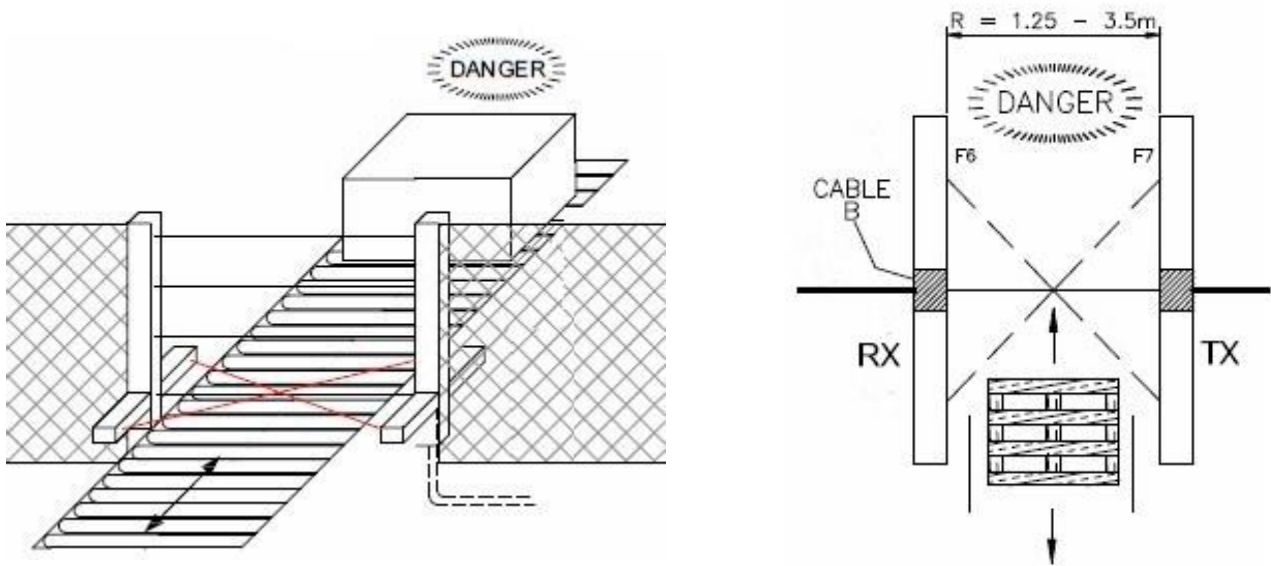
Mute Enable: Connect **RED/WHITE** wire to 0V DC.

Pallet Safe Series: MUTING T Style

To ensure correct operation of the safety system both mute beams must be interrupted by a loaded pallet within 2 seconds of each other and both must remain interrupted during the entire period the palletized load is transferring through the light curtain.

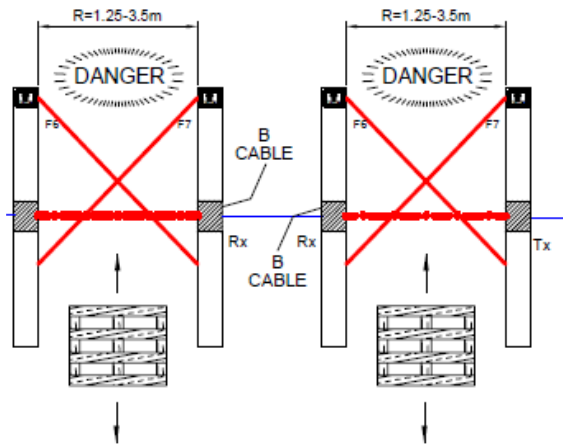
Once both cross-beams are blocked the system will remain muted until the product exits the cross beams.

The cross-beam muting configuration is suitable for scanning a range between 1.25m and 3.5m.



Type 1

Type 2



Pallet Safe Series Muting: L Style System

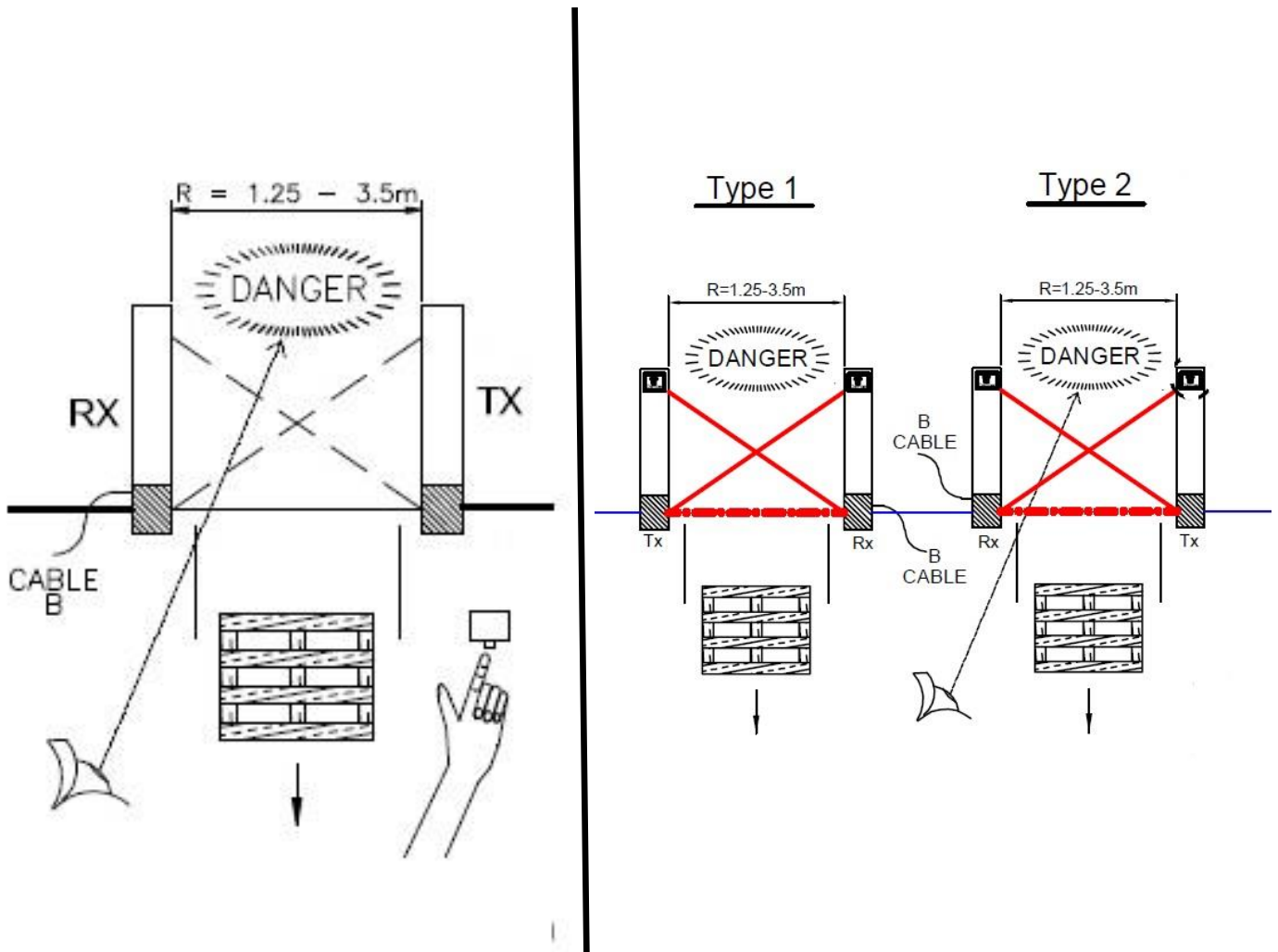
The 'L' type module must **NOT** be used at infeed zones.

To ensure correct operation of the safety system both mute beams must be interrupted by a loaded pallet within 2 seconds of each other and both must remain interrupted during the entire period the palletized load is transferring through the light curtain.

Once both cross-beams are blocked the system will remain muted until the cross beams are cleared.

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. A timer is incorporated within the safety control system that allows a period of 2 seconds between the pallet load 'clearing' the mute sensors and 'clearing' the light curtain. If the 2 second period is exceeded the safety system will trip.

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

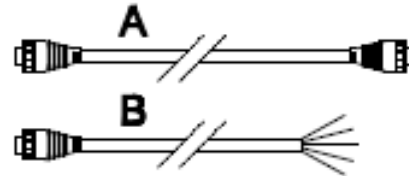
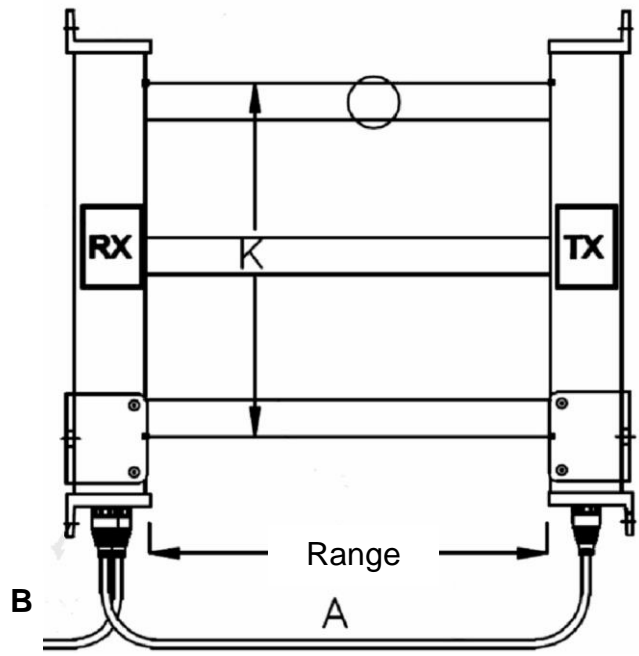
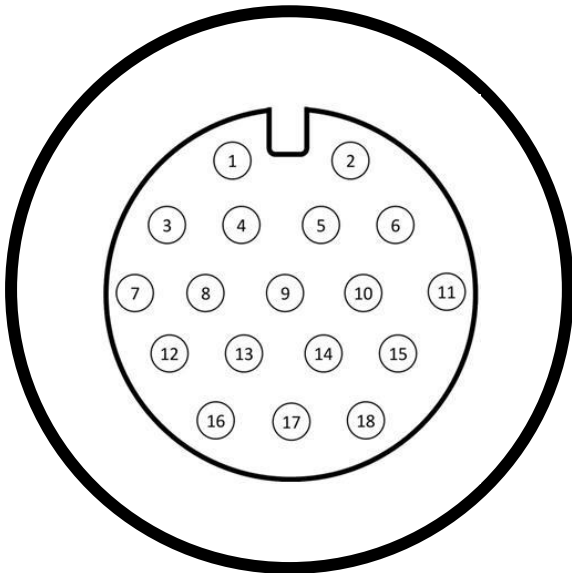


Pallet Safe Series: Physical Set-up

“A” Cable - Connects the transmitter (Tx) column to the receiver (Rx) column

“B” Cable - This cable connects the light curtain to the user equipment e.g. control panel. At one end it has an 18 pin connector enabling it to be plugged into the receiver (Rx) and the other end has open (un-terminated) wires to connect to the control panel.

“B” Cable Pin Out



Pallet Safe “B” Cable, Color Code

Pin	Color	Function	Signal	I/O
1	Black	-L Volts	0V DC	0VDC
2	Red	+L Volts	+24V DC	+24V DC
3	Green	SMM / EDM	SSM/ EDM Out	Input
4	White	Mute 2	Mute 2 input (Straight Only)	Input
5	Brown	Heater	+24V DC to turn ON heater	Input
6	Blue	Activate	Manual reset	Input
7	Orange	OSSD1	Safety Output 1	Output
8	Pink	OSSD1	Safety Output 1	Output
9	Gray	OSSD2	Safety Output 2	Input
10	Violet	Mute Out	Mute Output	Output
11	Yellow	Mute 1	Mute 1 input (Straight Only)	Input
12	Brown/White	Status	Status Output (non-safety)	Output
13	Orange/White	G.O.	Guard Override	Input
14	Black/White	Status	Status Output (non-safety)	Output
15	Red/ White	Mute Enable	Mute Enable	Input
16	Shield	Ground/Earth		
17	Turquoise	OSSD2	Safety Output 2	Input
18	Green/White	SMM / EDM	SMM / EDM In	Input

Pallet Safe Series: Specifications

Pallet Safe Series Light Curtains

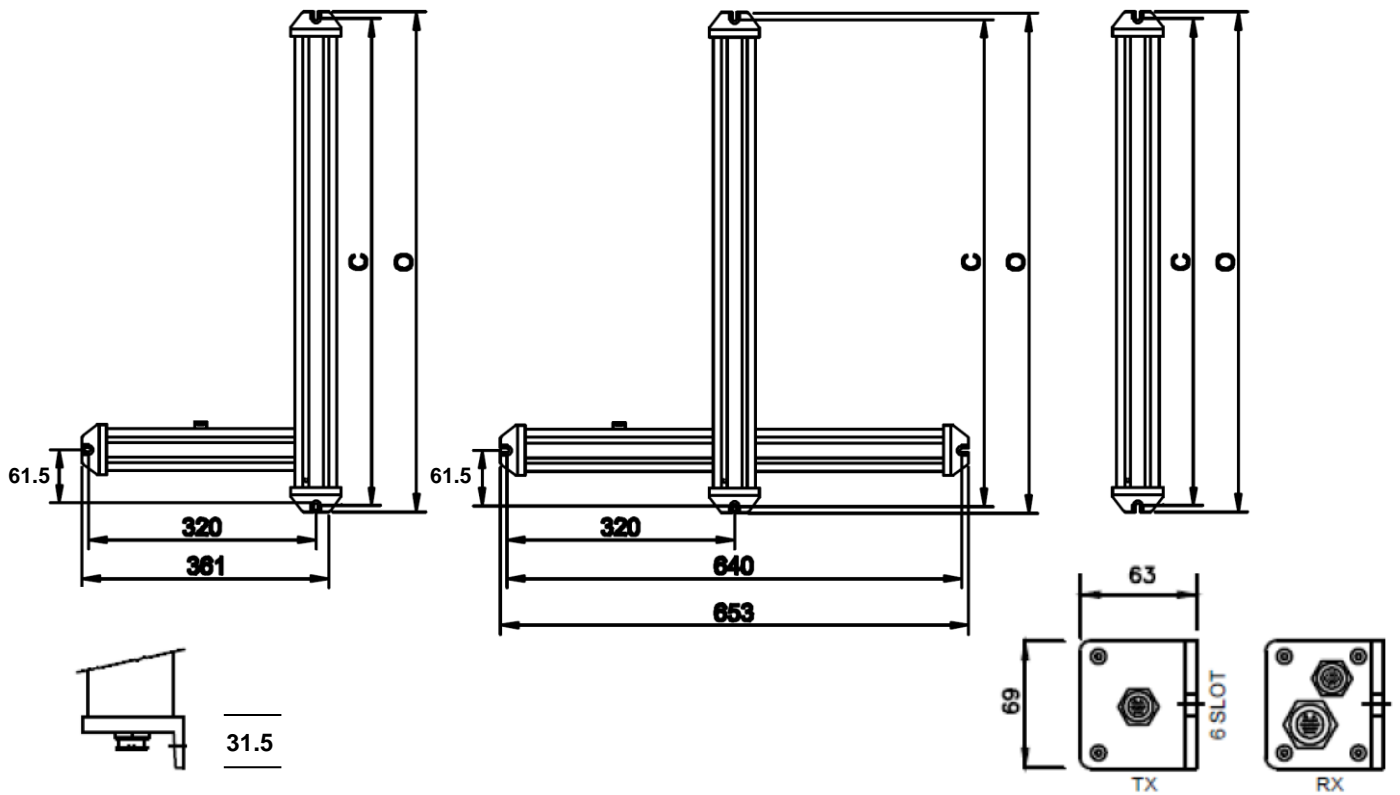
Number of beams	2 – 4
Object Detection	2, 3 & 4 beam systems
Detection height	600, 900, and 1200mm
Range	Perimeter 0.5 – 40m (model dependent) Cross-beam muting 1.25 – 3.5m
Light type	IR 880nm
Response time	40ms
Operating temperature	0°C to +50°C (Heaters: -30°C to 25°C)
Light curtain enclosure	*IP54
Power supply	24V DC 0.5A ±10%
Current consumption	250mA
Light curtain connection	18 pin Circular, bayonet locking connector
Finish	Aluminum chromate treated, yellow polyester powder coated
Classification	BS EN 61496-1 Type 2 BS IEC 61496-2 Type 2 BS EN 954-1 Category 3 IEC 62061 SIL 2 EN ISO 13849-1 PLd
Warranty	1 Year

OUTPUTS	
Safety Outputs OSSD1 & OSSD2	2 X N/O fail-safe switching contacts each rated at 110 V 2A
Status Output Relay	1 x N/O non-safety switching contact rated at 110V 1A
Status Indication	Status & condition LED's on Light Curtain
Mute Output	Electronic output. MUTE ON = 0V

INPUTS	
Safety Monitoring (EDM)	Connected GREEN/ WHITE to GREEN wire
Activate	Restart ON = 0V DC
Guard Override	Override ON = 0V DC
Muting M1 and M2	Mute ON = 0V DC (Straight Only)
Mute Enable	3 rd mute channel ON = 0V DC

* For more information about IP ratings please contact Smartscan, inc.

Pallet Safe Series: Dimensions



Self-muting L Light Curtains

Range 1.25 – 3.5m

Model number	Number of beams	Detection Capability (mm)	Centers (C) mm	Overall length (O) mm	Weight (TX + RX) Kg
PS3-903APL(1 or 2)	3	440.4	958	969	4.2
PS3-1204APL(1 or 2)	4	409.9	1263	1274	5.2

Self-muting T Light Curtains

Range 1.25 – 3.5m

Model number	Number of beams	Detection Capability (mm)	Centers (C) mm	Overall length (O) mm	Weight (TX + RX) Kg
PS3-903APT(1 or 2)	3	440.4	958	969	4.7
PS3-1204APT(1 or 2)	4	409.9	1263	1274	5.7

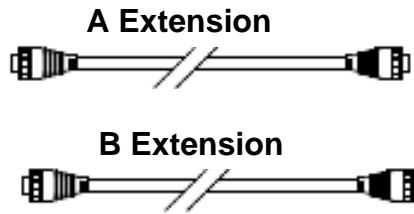
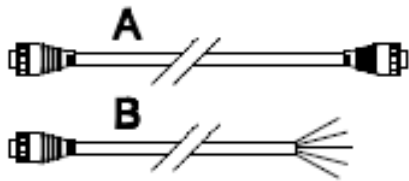
Straight Light Curtains

Range 0.5 – 15m

Model number	Number of beams	Detection Capability (mm)	Centers (C) mm TX	Centers (C) mm RX	Overall length (O) mm TX	Overall length mm RX	Weight (TX + RX) Kg
PS3-903AP	3	440.4	958	1068	969	1079	3.7
PS3-1204AP	4	409.9	1263	1373	1274	1384	4.7

Extended range straight lights available upon request.

Pallet Safe Series: Cables



Model Number	Description	Overall length (L) m
PS05	Cable A	5m
PSB05	Cable B	5m
PSAX05	Extension (Cable A)	5m
PSAX15	Extension (Cable A)	15m
PSBX10	Extension (Cable B)	10m
PSBX20	Extension (Cable B)	20m