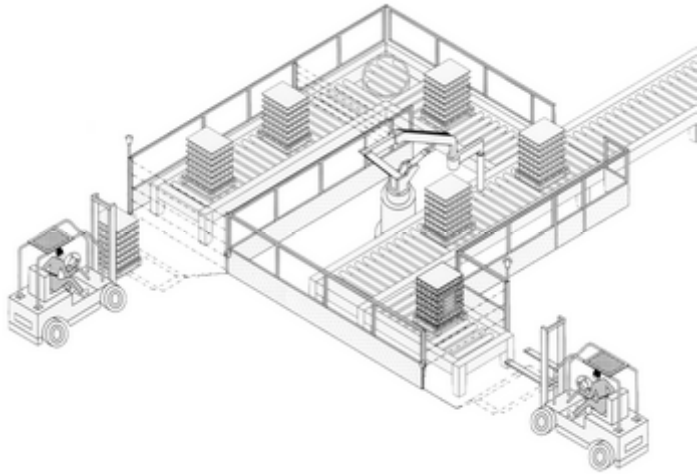
SMARTSCAN INFORMATION



8000 SERIES
PRODUCT GUIDE

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8000 Series Safety Light Curtains

Smartscan are the originators of the fully integrated ‘L’ and inverted ‘T’ shape safety light curtain to address the special safeguarding needs that arise with end-of-line packaging environments, specifically around the pallet entry and entry / exit zones, across conveyors.

The special shape of the ‘L’ and ‘T’ safety light curtains permits the incorporation of fully integrated mute sensors providing the customer with a simple, user-friendly solution.

Safeguarding pallet entry / exit zones

In most machine applications the integrated system is the ideal solution as it eliminates the need for aligning and installing additional mute sensors with all the problems such devices introduce. The mute initiating system suppresses the shut down signal from the light curtain during a pallet transfer without interruption to the machine cycle. However, should a person attempt to pass through the entry / exit area, the light curtain will instantly detect them and shut down the operation of all associated machinery.

INTRODUCTION

The Smartscan 8000 Series offers the complete solution for safeguarding end-of-line packaging machines. The unique design makes it the ideal user-friendly solution for pallet entry / exit guarding. The 8000 Series is the latest version of the original design solution and incorporates a number of additional customer driven features.

These new features include configurable cross-beam muting (1.25 – 3.5m range) and parallel-beam muting (0.5 – 3.5m range). An Integrated mute beacon option with monitoring that provides visual indication to personnel that the safety light curtain is in a muted condition and waterproof enclosures rated IP66 for harsh, wet and dusty environments.

Two, three and four beam models, for safeguarding around the perimeter of a machine are also available. These models have a scanning range of 4m – 40m.

We have also added the 8000 Plus Series to our range of guarding solutions for end-of-line packaging. The 8000 Plus offers all the control and muting functionality of the 8000 Series with the added features of multiple-beams for end-of-line packaging applications where the separation distance between the hazard and the light curtain needs to be reduced.

Please refer to the section Application Overview starting on page 7 for a detailed look at some application configurations.

APPLICATIONS OVERVIEW

The completely integrated safety solution for guarding end-of-line packaging machinery. A combination of self contained units and configurable muting patterns make the 8000 Series from Smartscan the superior choice.

Typical machine safeguarding applications include:

- Palletizers and de-palletizers
- Robotic handling systems
- Pallet strapping machines
- Stretch wrapping machinery
- Pallet inverters
- Pallet lifts
- Stackers and de-stackers
- Pallet shrink wrapping machinery
- Automated warehouses
- Automatic pallet handling machinery where conveyor access for loads is required into and out of a 'Danger Zone'

8000 Series light curtains comply with European and International Safety Standards BS EN 61496-1 and BS IEC 61496-2 Type 2. They are normally used where the risk assessment for the safety related parts of a control system, as indicated in EN62061, EN13849 (EN 954-1) determines a requirement up to and including SIL2, PL d (Category 3) control equipment.

- **EC Type Examined**
- **Safety integrity classification EN ISO 13849, PL d**
- **Simple installation and alignment**
- **0.5 to 40m scanning range (model depending)**
- **One year manufacturer's warranty**

APPLICATIONS OVERVIEW

Features

- Configurable cross beam muting (1.25 – 3.5m range) and parallel-beam muting (0.5 – 3.5m range)
- Perimeter guarding 4– 40m scanning range (model dependant)
- Configurable for both pallet in-feed and out-feed applications
- Two part safety system with fully integrated control functions
- Heavy duty enclosures rated IP66 for harsh, wet and dusty environments
- Mute enable input for increased safety integrity
- Safety output relay contacts (dual channel)
- Status output relay contact
- Safety monitored guard override facility
- Mute lamp output
- Diagnostic and status indicators
- External device monitoring (EDM)
- Integrated monitored mute beacon option
- Application specific software options
- Solutions for cold store applications
- Multi-beam solutions for closer positioning to the hazard

Safeguarding End-of-Line Packaging Machinery

The following section provides a guide to the application of 8000 Series safety light curtains when used in conjunction with end-of-line packaging machinery.

Light curtains mounted across pallet conveyors have special control features that enable pallet loads to pass through the light curtain without interruption to the machine operation but would shut-down the machine immediately should a person attempt to pass through the intangible barrier. This control function is called ***muting***, which means disabling operation of the safety light curtain output switches for a limited period while a pallet load passes through.

Obviously when light curtains are used at the pallet entry / exit zones of these machines muting the light curtain during the pallet transfer is essential if automatic operation is to be maintained.

APPLICATIONS OVERVIEW

Muting conditions for safety light barriers at pallet entry/exit zones as defined in European Standard EN 415-4 Safety of Machinery - Palletisers and de-palletisers state:

1. Muting may only occur during the period of the operating cycle when a loaded pallet obstructs access to the hazardous zone.
2. Muting shall be automatic.
3. Muting shall not be dependant upon a single electrical signal.
4. Muting signals shall not depend entirely on software signals
5. The muting signals, if they occur in an invalid combination, shall not allow muting, or they shall ensure the machine goes to lock-out.
6. The muted condition must be cancelled immediately following the passage of a pallet through the detection zone of the protective device.

Note: In some applications pallet loads can stop within the muted light curtain detection field for undefined periods of time. To ensure the light curtain does not remain in a muted condition a mute cancel timer is normally installed. If the mute period exceeds 15 minutes the light curtain control will initiate a machine shut-down.

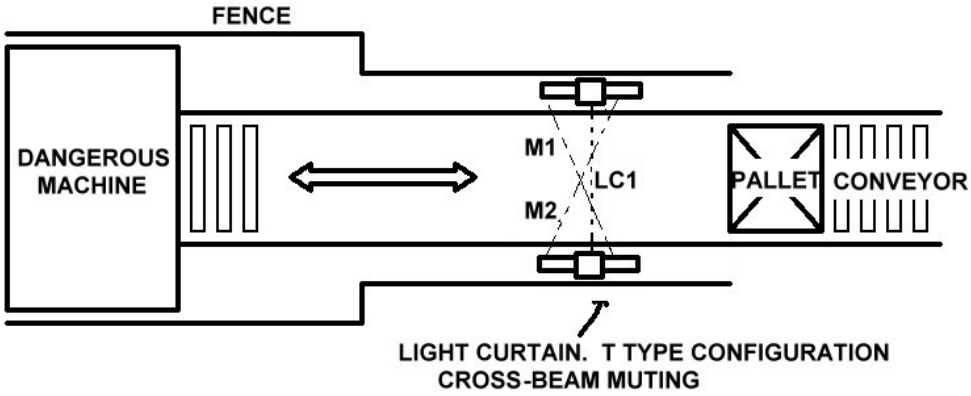
All of the above requirements as defined in the Standard are met when using a Smartscan 8000 Series light curtain with the on-board mute control system.

Signals used for muting the light curtain during a pallet transfer are normally derived from photo-electric sensors, strategically positioned to enable differentiation between a pallet load and a person. European Standard EN 415-1 recommends two specific muting configurations:
1) ***Cross-beam*** sensors. 2*)* ***Parallel-beam*** sensors operating in pre-defined and timed sequence).

The Smartscan 8000 system can be simply configured to provide both the cross-beam and parallel-beam mute configurations. Additionally the 8000 system incorporates the cross-beam / parallel beam sensors as an integral part of the light curtain. In some applications it may be more desirable to use separate sensing devices to enable them to be mounted in configurations to suit unusual applications. Smartscan provide the photo-electric sensors for these applications. They just plug-in to the *mute input* connector sockets mounted on the light curtain transmitter and receiver columns.

Cross-Beam Muting – infeed / outfeed

Figure 1



Cross-beam muting, see Figure 1, is selected for applications where the palletised loads are of regular shape and the load is almost as wide as the conveyor width.

With the cross-beam muting system it is a control system requirement that a 'conveyor run' signal be provided so as to maintain a high level of safety integrity.

If the width of the palletised load is very much less than the conveyor width or, the load is not centralised on the conveyor or, the loads are unevenly stacked the cross-beam muting configuration may not be appropriate.

Cross-beam muting provides a high integrity system which is difficult to defeat in normal operation and if possible should be used in favour of a parallel-beam muting system. However, if pallet loads are miss-shaped or, if there are large variations in profile and volume between each load the parallel beam configuration may be more appropriate.

APPLICATIONS OVERVIEW

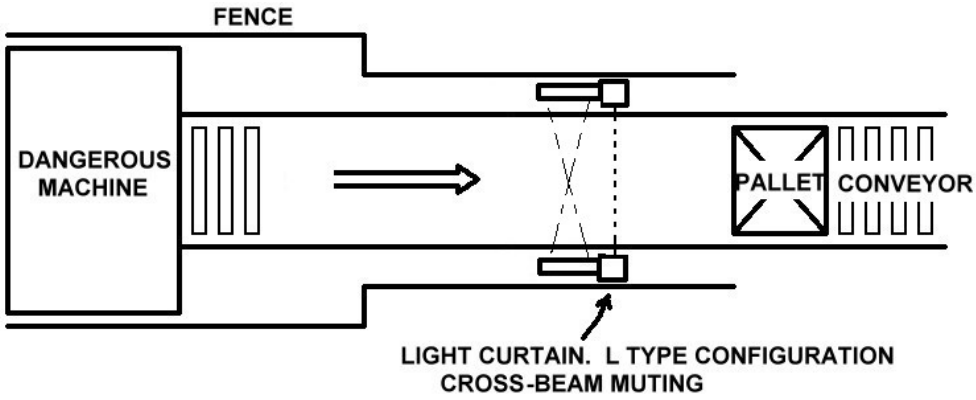
All 8000 Series light curtains can very simply be configured for cross-beam muting. The system shown in Fig. 1 can be used for safeguarding both in-feed and out-feed zones, or, zones where products are required to pass in either direction through the light curtain. Select an 8000 Series light curtain with a detection height to suit the specific application plus, a bolt-on, fully integrated mute sensor kit type (083-001).

The mute sensors (M1 and M2) inside the muting module are positioned approximately 420mm apart, the beams crossing diagonally through the light curtain (LC1) as shown. To maintain the correct sequence of operation of the safety system it is a requirement that both mute initiating beams will be interrupted together, by the pallet load, prior to it entering the detection field of the light curtain. In order to meet this criteria it can be seen from Fig. 1 that the pallet load must have a certain width in respect to the distance apart between the light curtain transmitter and receiver units. Also the load must pass centrally down the conveyor.

In some applications there may be a requirement to position mute sensors in a wider cross-beam configuration than that offered from the sensors inside the mute module. In such cases mute sensors for mounting externally can be provided. Smartscan's polarised, retro-reflective infra-red sensors type 083-004 come complete with 1.5m cable and a plug that connects directly into the Smartscan 8000 Series light curtain receiver column. Two sensors are required for correct operation of the cross-beam muting function.

Cross-Beam Muting – out-feed zones only

Figure 2



Cross-beam muting (out-feed only system), see Figure 2, is selected for applications where a safety light curtain is required to prevent personnel access into a machine at an out-feed zone – where the palletised load passes from the danger area into the safe area. On no account should a cross-beam muting, out-feed zone system be used for safeguarding an in-feed zone.

With the cross-beam muting system it is a control system requirement that a 'conveyor run' signal be provided, so as to maintain a high level of safety integrity.

The cross-beam muting, out-feed zone system has a high level of safety integrity as the muting beams (M1 and M2) are positioned inside the danger area and out of reach from interference by personnel. If a pallet stops in a position blocking the mute beams with mute enable connected the light curtain will stay in a mute condition for 15 minutes.

APPLICATIONS OVERVIEW

All 8000 Series light curtain can very simply be configured for cross-beam muting. The system shown in Fig. 2 can be used only for safeguarding outfeed zones. Select an 8000 Series light curtain with a detection height to suit the specific application plus a bolt-on, fully integrated mute sensor kit type (083-002).

The mute sensors (M1 and M2) inside the muting module are positioned approximately 210mm apart, the beams cross as shown. To maintain the correct sequence of operation of the safety system it is a requirement that both mute initiating beams be interrupted by the pallet load prior to it entering the detection field of the light curtain. When the trailing edge of the pallet load 'clears' the mute beams it has approximately 2.5 seconds to 'clear' the sensing field of the light curtain. If this time is exceeded the safety system will trip.

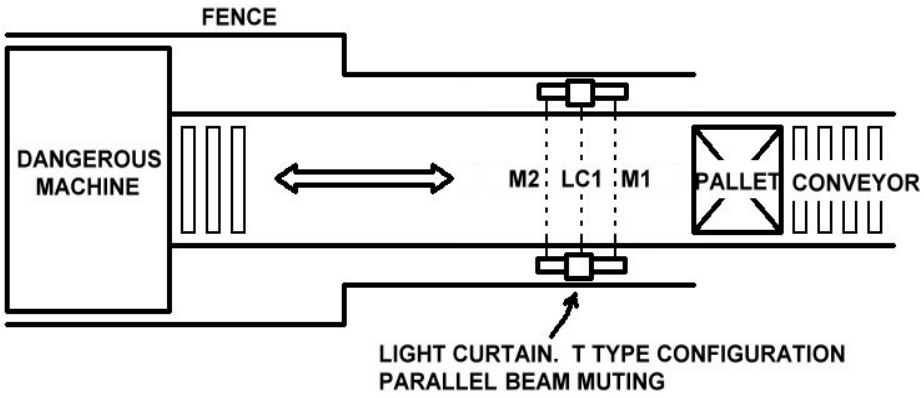
In some applications there may be a requirement to position mute sensors in a wider cross-beam configuration than that offered from the sensors inside the mute module. In such cases mute sensors for mounting externally can be provided. The polarised retro-reflective infra-red sensors come complete with 1.5m cable and a plug that connects directly into the receiver column of the Smartscan 8000 Series light curtain. Two polarised retro-reflective sensors, type (083-004) are required for correct operation of the cross-beam muting function.

Sometimes palletised loads can be very much less in width than the conveyor width. Also, the load may not be centralised on the conveyor or, the loads are unevenly stacked. They may be miss-shaped or, there may be large variations between each load, in both profile and volume. In such cases the cross-beam muting configuration may not be appropriate and parallel beam muting should be considered.

All 8000 Series light curtains can very simply be configured for parallel beam muting. The system can be used for safeguarding both in-feed and out-feed zones or zones where products are required to pass in either direction through the light curtain.

Parallel Beam Muting

Figure 3



For parallel-beam muting applications, see Figure 3, select an 8000 Series light curtain with a detection height to suit the specific project, plus an integrated mute sensor module, type (083-001).

The mute sensors inside the muting module are positioned approximately 420mm apart, mute sensor (M1) at one side of the main light curtain (LC1) and mute sensor (M2) at the other side of the light curtain as shown. To maintain the correct sequence of operation of the safety system the product or, palletised load passing through the light curtain should have a length greater than the distance between the two mute sensors (M1 and M2). For loads with a dimension less than the factory-set distance between mute beams it will be necessary to open the module housing and re-position the beams to suit the smaller product dimension.

With the parallel-beam muting system it is a control system requirement that a ‘conveyor run’ signal be provided, so as to maintain a high level of safety integrity.

To enable correct operation of the safety system it is essential that the pre-programmed operating sequence be maintained. For a palletised load travelling towards the machine the correct sequence is as follows:

1. Conveyor run signal applied – ON
2. Pallet load interrupts mute sensor (M1) – conveyor run ON
3. Pallet load interrupts mute sensor (M1) and then the light curtain, (LC1) – conveyor run ON
4. Pallet load interrupts mute sensor (M1), light curtain (LC1) and mute sensor (M2) – conveyor run ON

5. Pallet load clear of mute sensor (M1), while still interrupting (LC1) and (M2) – conveyor run ON
6. Pallet load clear of mute sensor (M1) and light curtain (LC1), while still interrupting mute sensor (M2) – conveyor run ON
7. Pallet load clear of mute sensor (M1), light curtain (LC1) and mute sensor (M2) – conveyor run OFF

A time limit of 0.2 to 7 seconds is applied between each beam 'interruption' until all three beams are blocked (Steps 2-4). At this point a 15 minute timer is activated. Providing (Step 5) is initiated within the timed period then the system programme will be satisfied. Between (Steps 5-7) the 0.2 to 7 second timer between each beam 'clearance' is re-instated. If the sequence of operation as described is not maintained throughout the entire pallet transfer the safety system will trip.

The safety control system will allow pallet loads to stop in the mute sensors detection field. The 0.2 to 7 second timer used in the programmed sequence during pallet transfer will be put on 'hold' during periods when the conveyor stops. For example; the maximum time allowed between step 2 and step 3 would be seven seconds. However, should the conveyor stop during the 7 second period the timer will be put on 'hold' until the conveyor re-starts. As the conveyor re-starts the timer is automatically removed from the 'hold' condition and continues counting the 7 second period.

Parallel-beam muting is usually selected for applications where there are large dimensional variations in both length and width between pallet loads.

Short Separation Distance Applications

The 8000 Plus Series has been introduced for end-of-line packaging applications where the separation distance (S) between the hazard and the safety light curtain is greatly reduced. These may include applications for guarding the in-feed and out-feed conveyor access to dangerous machines like pallet stretch wrappers, pallet shrink wrappers, de-stackers, de-palletisers and robotic handling systems. The 8000 Plus range offers 30mm and 40mm ODC options.

As the market for end-of-line packaging machinery has evolved end-users are fitting larger machinery into smaller production areas to keep costs down creating applications where the separation distance between the hazard and the protective device needs to be reduced.

Figure 4

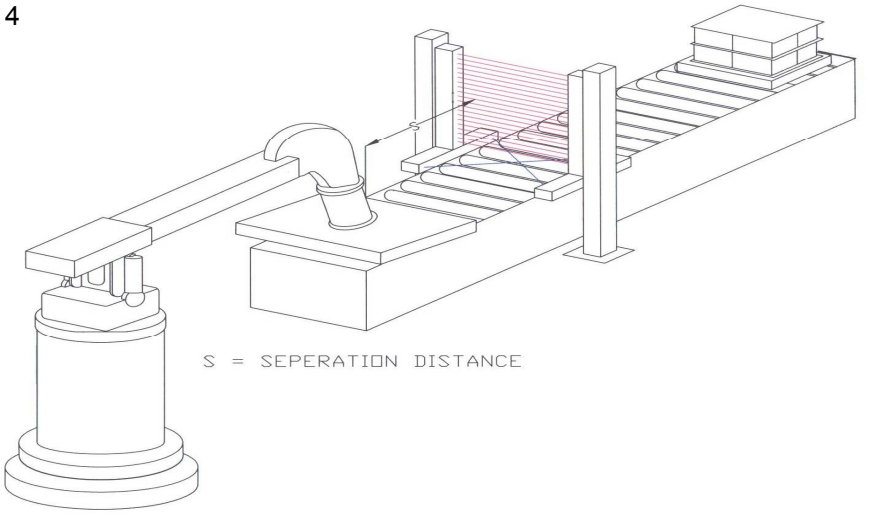


Figure 4 above provides an example of how the Smartscan 8000 Plus Series might be used to provide both the integrated muting for easy and safe passage of pallet loads into and out of the danger zone and multiple beams allowing the separation distance between the light curtain and the danger point to be shorter than for the standard 8000 Series 2, 3, and 4 beam body detection light curtain. The example below shows the improvement in the difference in separation distance by using the 8000 Plus Series in comparison to a standard 3 beam 8000 Series.

Safety light curtain option	**Response time of the machine / safety system**	**Separation distance (S) in mm**
8000 Series - 3 beam system	190ms	1154
8000 Plus Series - multi-beam system	190ms	500

APPLICATIONS OVERVIEW

The 8000 Plus retains all the excellent control and muting functionality of the original 8000 Series, including individual mute modules for product exit, or entry/exit which bolt directly onto the main light curtain and link to it with a cable and connectors. Additional features of these systems are selectable cross or parallel beam muting patterns for standard or variable pallet loads, dual channel relay outputs, two part safety system, integrated monitored mute beacon and IP66 for harsh environments.

Mute Indication

In some machinery applications it may be desirable to provide visual indication to personnel that the safety light curtain is in a muted condition. To satisfy this requirement Smartscan have introduced a high reliability mute beacon, employing bright light emitting diodes as the light source.

The beacon can be supplied for direct integration onto the light curtain receiver column, or as a separate self-contained unit for mounting remotely. In order to meet the European requirements for monitoring the mute indicator a special monitor module can be provided. The mute beacon monitor module is factory fitted inside the receiver column of an 8000 Series light curtain.

Model 083-502 with Integrated Mute Beacon

Smartscan Remote Mounting Stackable Beacons

The module continuously monitors the electrical current from the beacon LED's. Should one or both groups of beacon LED's fail to illuminate the drop in power will be detected by the monitor module, forcing the light curtain into a lockout condition, thus stopping the potentially dangerous machine.

Zone Control Systems

Complex packaging machine systems often comprise a number of potentially hazardous machines linked together by a common conveyor system. Light curtains are often used for safeguarding the large open areas across the conveyors between each machine system, to protect personnel from injury should they walk along the conveyor from one machine zone to the next.

Safety zone control may be very simple or it can be very complex in applications that require multiple zone isolation systems.

Figure 5

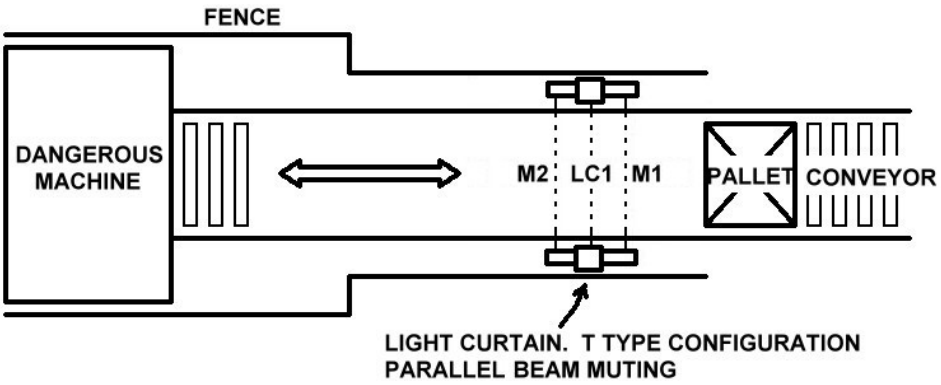
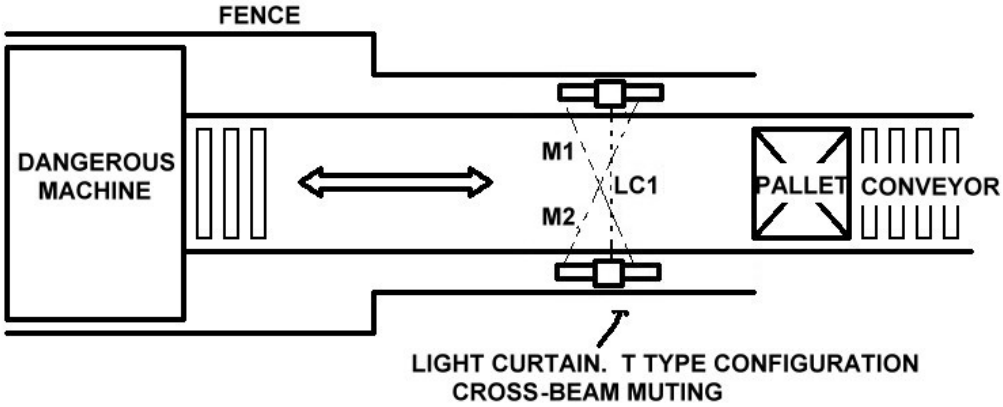


Figure 6



Figures 5 and 6 above show a zone control system in its simplest form. One machine connected to a common conveyor system. The conveyor feeds pallet loads into and out of the potentially dangerous packaging machine. Light curtain LC1 mounted across the conveyor is connected to the machinery electrical control system. Should a person attempt to walk along the conveyor, through the light curtain's detection field, then the light curtain's safety output contacts will de-activate, in-turn stopping all hazardous movement of the machine.

The light curtains shown in Figure 5 use a parallel-beam muting system and in Figure 6 a cross-beam muting system. In both cases the muting system will allow products to pass freely into and out from the danger area but instantaneously shut-down all machinery motion should a person attempt to gain access into the danger zone.

Figure 7 shows a similar application but employs a light curtain with an OUTFEED ONLY cross-beam muting system.

Figure 7

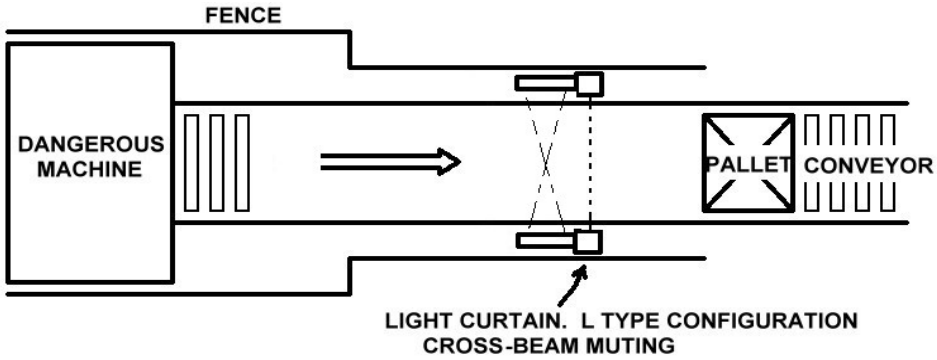


Figure 8 and 9 show palletised loads passing through a single, in-line packaging machine. In these cases light curtains at both in-feed and out-feed areas are required.

Figure 8 shows a T type cross-beam muting light curtain (LC2) at the in-feed and an 'L' type OUTFEED ONLY cross-beam muting light curtain (LC1) at the out-feed.

Figure 8

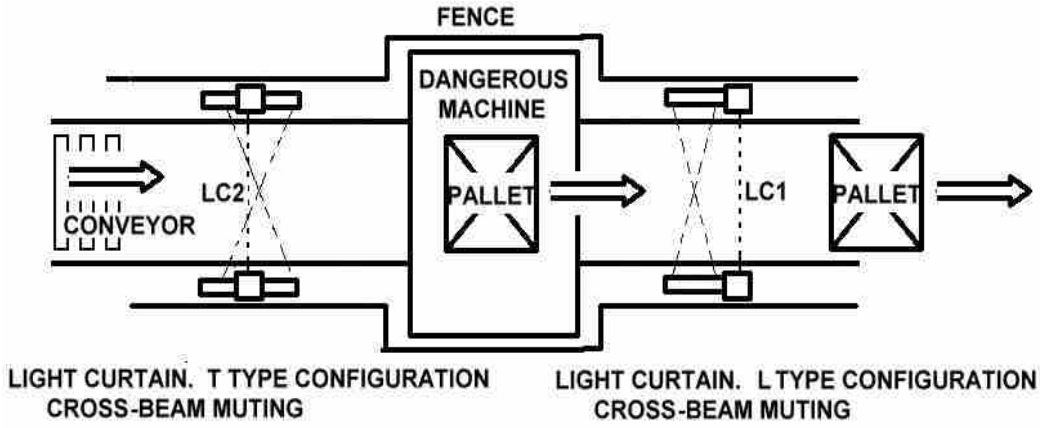
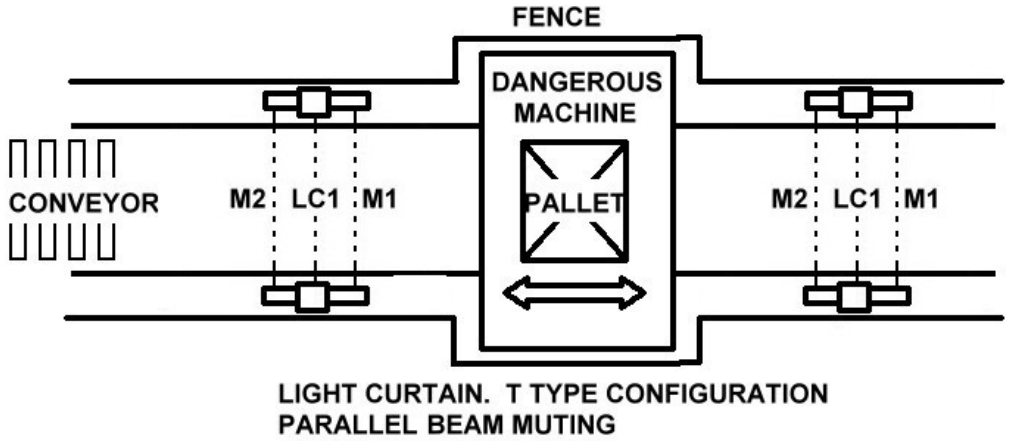


Figure 9 shows an alternative muting configuration with T type, parallel-beam muting light curtains at both the in-feed and out-feed areas. In this application the pallet load may travel in either direction.

Figure 9

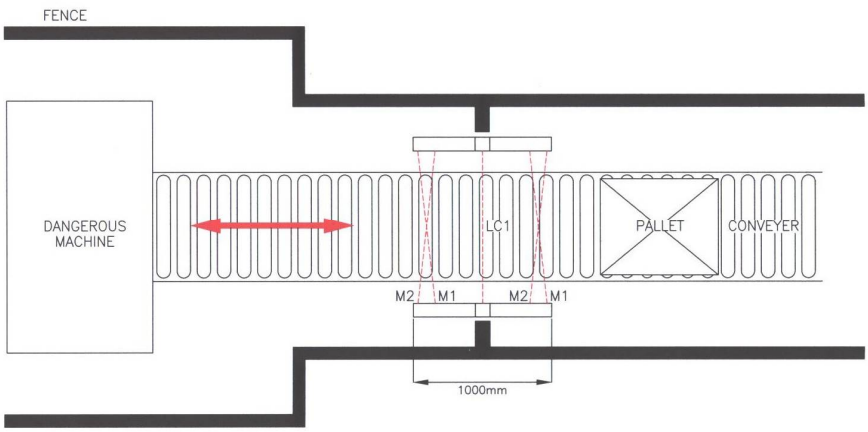


Smartscan's 'Extended T' Mute Module

The Extended 'T' mute module has been specifically designed to eliminate any likelihood of intermittent tripping of the safety system that can occur with conventional systems when a pallet load is transferring through a light curtain. Problems normally associated with non-centralised and non-symmetrical pallet loads, overhang of top and interlayer sheets, loose overhanging top flaps, trailing stretch wrap film can be addressed with this system.

The 'Extended T' eliminates all these problems by using additional mute sensors and special microchips to provide the software necessary to maintain a reliable high integrity safety system.

Figure 10



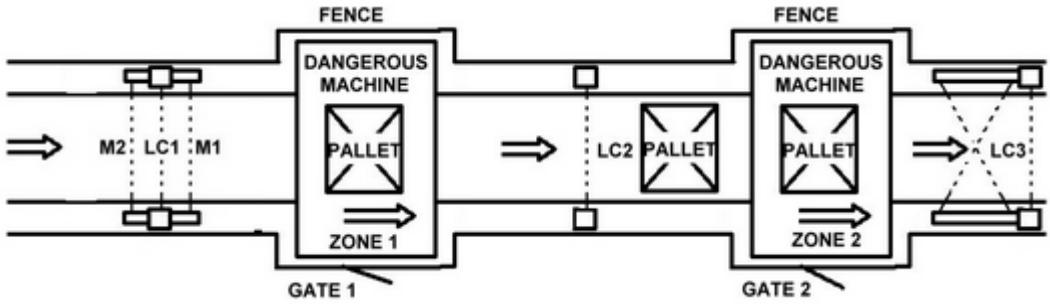
As shown in Figure 10 the Extended 'T' uses four muting sensors, two sensors in cross configuration outside of the light curtain and two sensors in similar configuration inside the light curtain as shown in the drawing. As a pallet load passes along the conveyor and into the first cross-beam mute sensors and providing the third mute input e.g. conveyor run signal is ON, then the light curtain will be muted, thus allowing a loaded pallet to enter the light curtain detection field without interruption to the operating cycle.

The pallet load continues along the conveyor it enters the inner cross beam mute sensors. Providing the outer mute sensors, the light curtain and inner mute sensors are all interrupted then the pallet load will continue along the conveyor. As the pallet load continues it will leave the detection zone of the outer mute sensors and then leave the light curtain and finally the inner mute sensors are cleared thereby satisfying the transfer sequence of the Smartscan safety control system. To maintain a high level of safety integrity the transfer time is monitored. When the pallet load enters the outer mute sensors a timer starts in the control system. From interruption of the outer sensors fifteen minutes is allowed for the pallet load to pass into the detection zone of the light curtain and a further fifteen minutes to interrupt inner, light curtain and outer mute beams. If these times are exceeded the safety control system will trip, thus stopping all associated machine movement. From a trip condition or trip/block condition the safety system would require a manual reset/override from a push button or key switch (activate).

To maintain an uninterrupted transfer sequence it can be seen that the palletised load must be longer than the distance between the outer mute sensors cross-point and inner mute sensors cross-point. This would normally mean that the load would need a minimum length of 800mm. However, the distance between the outer and inner mute beams can be adjusted to reduce the factory-preset distance if necessary.

Figure 11 shows a more complex zone control system. Two machines are linked together by a common conveyor system. The conveyor feeds pallet loads into and out of each potentially dangerous machine. The machinery system is surrounded by fixed fences with electrically interlocked gates giving personnel access to the machine in zone 1 and the machine in zone 2. Safety light curtains safeguard the conveyor feed areas.

Figure 11



The electrical safety output contacts of light curtain (LC1) are connected to the 'STOP' circuits of the machine shown in zone 1. The safety output contacts of light curtain (LC2) are connected to the 'STOP' circuits of the machines in zone 1 and zone 2. The electrical safety output contacts of light curtain (LC3) are connected to the 'STOP' circuits of the machine shown in zone 2.

The light curtain (LC1), at the in-feed to zone 1, uses a parallel-beam muting system with the light curtain (LC3) at the out-feed from zone 2 providing an OUTFEED ONLY cross-beam muting system.

The light curtain (LC2) positioned between zone 1 and zone 2 utilises control signals from the access gates and additional output signals from light curtains (LC1 and LC3) for muting and un-muting the light curtain. With both access gates closed and locked and light curtains LC1 and LC3 both active then (LC2) will be in a muted condition, allowing products to flow freely through the machine complex, but would instantaneously shut down all machinery motion should a person attempt to gain access into the danger zones.

If either of the access gates to zone 1 or zone 2 are opened then light curtain (LC2) will activate (turn-on). Similarly, if either light curtains (LC1 or LC3) become tripped then again (LC2) will become active. Interruption of the light curtain (LC2) will stop all machinery operation in both zones.

The system described offers total safeguarding at both zones while allowing the flexibility of safe access to personnel into one of the zones while allowing continuous operation of the machinery in the other zone. For example, an operator needs to enter zone 2 to remove a damaged package on the pallet. He gains access to the area via the interlocked gate at zone 2. Unlocking the gate will automatically stop the machine in zone 2 and activates light curtain (LC2). He can now enter zone 2 in complete safety even while the machine in zone 1 is operating. Should he attempt to pass into zone 1, through light curtain (LC2), then the machinery in zone 1 will stop.

Figures 12 and 13 show an application where fork lift trucks are used to place and remove palletised loads from the in-feed or out-feed conveyor of a potentially dangerous machine. The application shows light curtains operating in conjunction with a control system and strategically positioned under-floor inductive loops, that enable continuous but safe operation of the machinery even during periods when a fork lift truck is loading or unloading the pallet loads in close proximity.

Figure 12

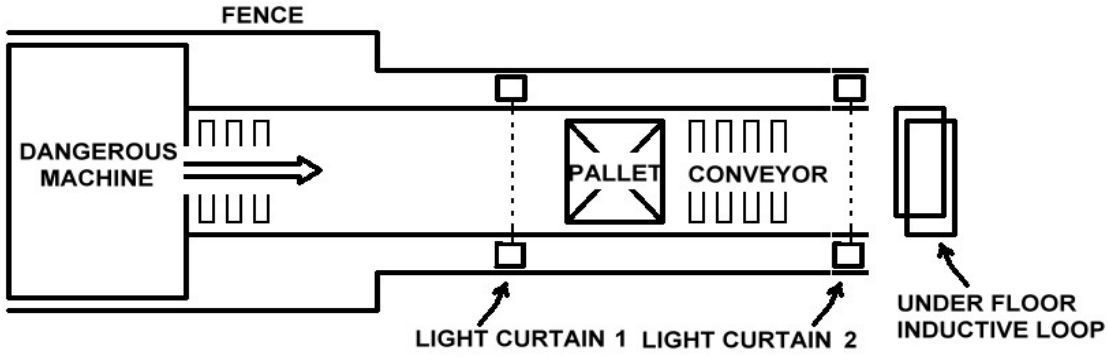


Figure 12 shows a hazardous machine surrounded by fixed fences. The open area across the conveyor is safeguarded with two light curtains that operate in a specific sequence.

When light curtain 2 is active, or ON then light curtain 1 is muted e.g. the electrical outputs from light curtain 1 do not respond to an interruption of its detection field. When light curtain 2 is muted then light curtain 1 is automatically switched ON. Light curtain 2 is automatically muted with signals derived from the under-floor inductive loops. These signals 'mute' light curtain 2 when the metal mass of the fork lift truck is positioned above the loops. When the fork lift truck moves away from the loops the muting signals are removed and light curtain 2 once again becomes active at the same time deactivating or muting light curtain 1. It can be seen that there is always one of the light curtains in an active, ON condition, thus preventing personnel access to the machinery at all times but, still allowing continuous machine operation.

Figure 13 shows another packaging machine application using control functionality similar to the system previously described. However, in this case two fork lift truck load / unload stations are installed, each safeguarded with a light curtain and an inductive loop control muting system.

Figure 13

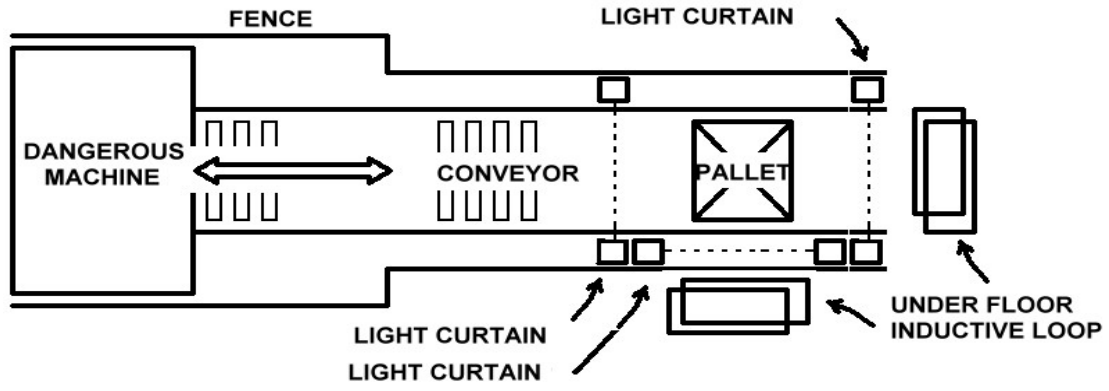
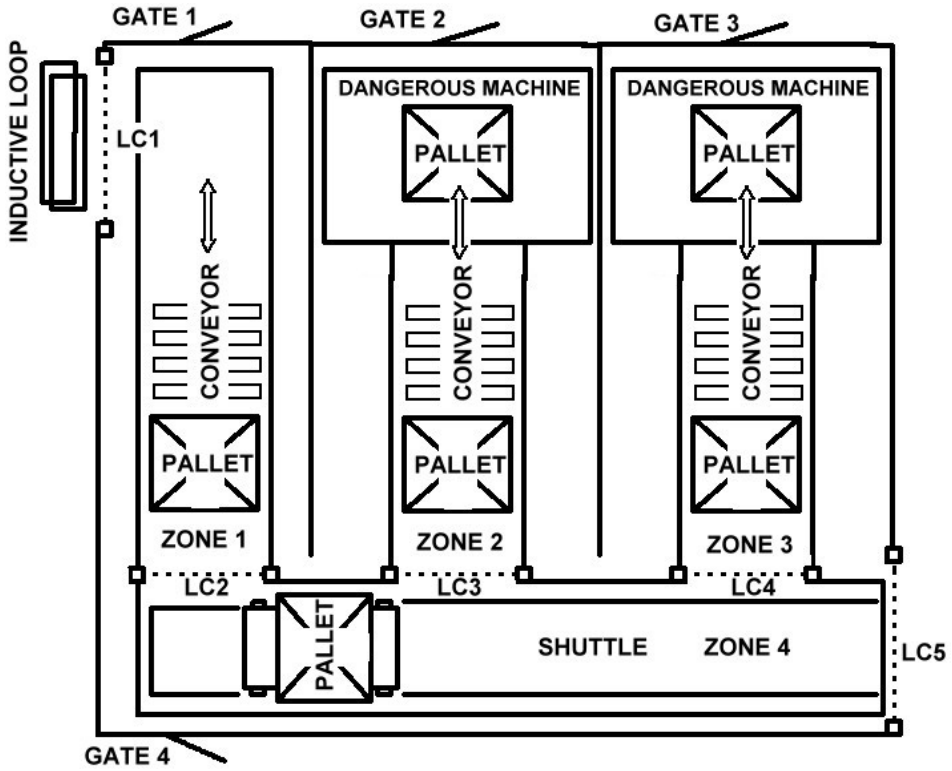


Figure 14 shows a rather more complex safety control system where the machinery is separated into four specific safe zones, however the system uses much of the safety control functionality for the applications previously described in this section.

Figure 14



The application pictures included are for illustrating end-of-line packaging examples and not for specific product representation.

SPECIFICATION

8000 Series Light Curtains

Number of beams	1 - 4
Detection height	500, 600, 900 and 1200mm
Range	Perimeter 0.5 – 40m (Model dependant) Parallel-beam muting 0.5 – 3.5m Cross-beam muting 1.25 – 3.5 m
Light type	IR 880nm
Response time	40ms
Operating temperature	0°C to +50°C
Light curtain enclosure	IP66
Power supply	24V DC 2A ±10%
Current consumption	250mA
Light curtain connection	Circular, bayonet locking IP68
Finish	Aluminium chromate treated, yellow polyester powder coated
Classification	BS EN 61496-1 Type 2 BS IEC 61496-2 Type 2 EN 62061 - SIL 2, EN ISO 13849 - PL d
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 switching contact rated at 110V 1A
Mute Output	Electronic output. MUTE ON = 0V
Status Indication	Status & condition LED's on Light Curtain

INPUTS	
Safety Monitoring (EDM)	ON = +24V DC
Activate	Combined restart and override. ON = +24V DC
Muting M1 and M2	Two circular IP68 bayonet locking connectors. One for each independent muting channel
Mute Enable	3rd mute channel ON = +24V DC
Mode select	Cross-beam mute. ON = 0V DC Parallel-beam mute. ON = +24V DC

amtri veritas Type Examined

amtri veritas
Certificate Number: AV EC 2027

CELESTICA
Certificate Number: MCK/01/046

NOTIFIED BODY No: AV EC 2027 APPROVED

BSI Report Numbers: 288/4268608 288/4260461

FM27829

8000 Range of Light Curtains

Model Number	Number of Beams and beam spacing (mm)	Detection height (mm)	Overall length (M) mm	Weight (TX + RX) Kg
083-501	1 @ 500	500	572	0.7

Range 0.5 – 4 metres

Model Number	Number of Beams and beam spacing (mm)	Detection height (mm)	Overall length (M) mm	Weight (TX + RX) Kg
083-502	2 @ 500	500	572	2.0
083-602	2 @ 600	600	672	2.5
083-903	3 @ 450	900	972	3.5
083-1204	4 @ 400	1200	1272	4.5

Range 0.5 – 5metres

'T' mute module (Suitable for entry and exit applications)

Model number	Number of beams	Overall length (M) mm	Weight (TX + RX) Kg
083-001	2	500	1.8

Range: Cross-beam muting 1.25 – 3.5 m
Parallel-beam muting 0.5 – 3.5m

'L' mute module (Suitable for exit applications only)

Model number	Number of beams	Overall length (M) mm	Weight (TX + RX) Kg
083-002	2	325	1.2

Range
Cross-beam muting 1 – 2.5m

8000 Range of Light Curtains for Perimeter Guarding

Model number	Number of beams and beam spacing (mm)	Detection height (mm)	Overall length (M) mm	Weight (TX + RX) Kg
085-502	2 @ 500	500	572	2.0
085-602	2 @ 600	600	672	2.5
085-903	3 @ 450	900	972	3.5
085-1204	4 @ 400	1200	1272	4.5

Range 4 - 40m

Application Specific Software

Application specific software is available, please contact your local Distributor or Smartscan Ltd for advice and pricing.

SPECIFICATION

8000 Plus Series Light Curtains

Number of beams	2 – 48
Object detection	30mm, 40mm plus 2, 3 & 4 beam perimeter systems
Detection height	330 - 1240mm
Range	Perimeter 0.5 – 10m (Model dependant) Parallel-beam muting 0.5 – 3.5m Cross-beam muting 1.25 – 3.5m
Light type	IR 880nm
Response time	40ms
Operating temperature	0°C to +50°C
Light curtain enclosure	IP66
Power supply	24V DC 2A ±10%
Current consumption	750mA
Light curtain connection	Circular, bayonet locking IP68
Finish	Aluminium chromate treated, yellow polyester powder coated
Classification	BS EN 61496-1 Type 2 BS IEC 61496-2 Type 2 EN62061 - SIL 2, EN ISO 13849 - PL d
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 switching contact rated at 110V 1A
Mute Output	Relay output. MUTE ON = 0V
Status Indication	Status & condition LED's on Light Curtain

INPUTS	
Safety Monitoring (EDM)	ON = +24V DC
Activate	Combined restart and override. ON = +24V DC
Muting M1 and M2	Two circular IP68 bayonet locking connectors. One for each independent muting channel
Mute Enable	3rd mute channel ON = +24V DC
Mode select	Cross-beam mute. ON = 0V Parallel-beam mute. ON = +24VDC

Safenet Type Examined
Registration No. 1674

Safenet
Certificate Number: 519040609

CELESTICA
Certificate Number: MCK/01/046

BSI Report Numbers:
288/4268608
288/4260461

FM27829

8000 Plus Range of Light Curtains

Model number	Number of beams	Detection zone (K) mm	Overall length (M) mm	Weight (TX + RX) Kg
089E412	12	330	400	3.6
089E518	18	480	550	5.0
089E724	24	630	700	6.3
089E1036	36	930	1000	9.0
089E1348	48	1230	1300	11.7

Range 0.5 – 5m

Model number	Number of beams	Detection zone (K) mm	Overall length (M) mm	Weight (TX + RX) Kg
1089E412	12	340	400	3.6
1089E518	18	490	550	5.0
1089E724	24	640	700	6.3
1089E1036	36	940	1000	9.0
1089E1348	48	1240	1300	11.7

Range 4 – 10m

‘T’ mute module (Suitable for entry and exit applications)

Model number	Number of beams	Overall length (M) mm	Weight (TX + RX) Kg
083-001	2	500	1.8

Range Cross-beam muting 1.25 - 3.5m
Parallel-beam muting 0.5 - 3.5m

‘L’ mute module (Suitable for exit applications only)

Model number	Number of beams	Overall length (M) mm	Weight (TX + RX) Kg
083-002	2	325	1.2

Range
Cross-beam muting 1.0 - 3.5m

8000 Plus Range of Light Curtains for Perimeter Guarding

Model number	Number of beams	Detection height (mm)	Overall length (M) mm	Weight (TX + RX) Kg
089E502	2 @ 550	630	700	7.3
089E1003	3 @ 450	980	1050	9.0
089E1204	4 @ 400	1280	1350	10.6

Range 0.5 – 5m

Model number	Number of beams	Detection height (mm)	Overall length (M) mm	Weight (TX + RX) Kg
1089E502	2 @ 550	640	700	7.3
1089E1003	3 @ 450	990	1050	9.0
1089E1204	4 @ 400	1290	1350	10.6

Range 4 – 10m

Application Specific Software

Application specific software is available please contact your local Distributor or Smartscan for advice and pricing.

CABLES

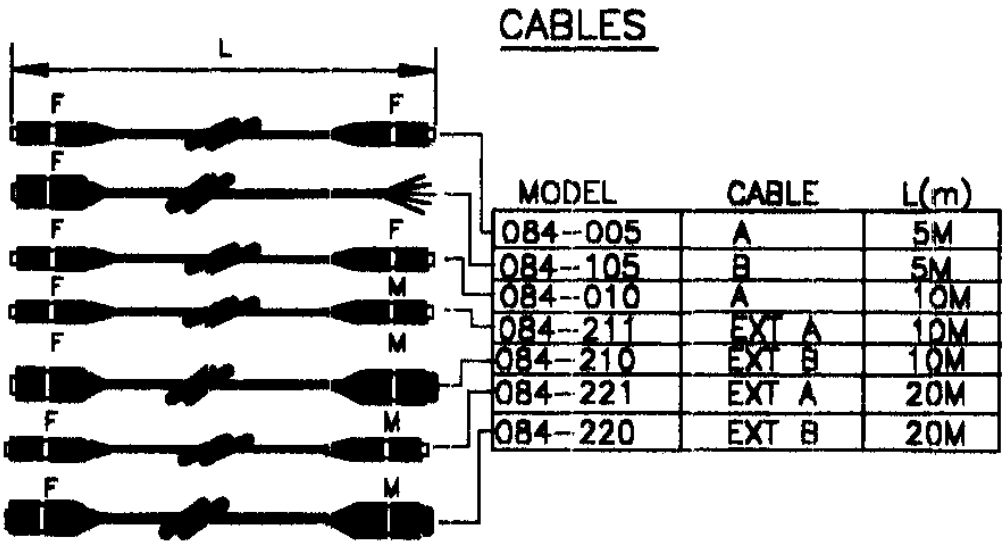
Model number	Description	Overall length (L) m
084 - 005	Cable A	5m
084 - 105	Cable B	5m
084 - 010	Cable A	10m
084 – 211	Extension (Cable A)	10m
084 - 210	Extension (Cable B)	10m
084 – 221	Extension (Cable A)	20m
084 – 220	Extension (Cable B)	20m

Cable A

Connects the transmitter (Tx) column to the receiver (Rx) column. It has an 8 pin circular, bayonet locking connector at each end.

Cable B

This cable connects the light curtain to the user equipment e.g. control panel. At one end it has a circular 18 pin socket enabling it to be plugged into the receiver (Rx) and the other end has open wires to connect to the control panel.



Remote Control Stations

Remote control stations offer additional flexibility to the 8000 Series system by providing control functions from a remote location including restart and guard override. Each unit comes with an integrated 5m user cable extension as standard.

- Plug-in system for ease of installation
- Trip indicators
- Push button or key activate options

083 - 301

Model Number	Description
083 – 301	Key Operated Unit (Cross-beam, 24V) – restart / override & trip indicator
083 – 302	Push Button Unit (Cross-beam, 24V) - restart / override & trip indicator
083 – 303	Key Operated Unit (110/230V AC) - restart & trip indicator
083 – 304	Push Button Unit (110/230V AC) - restart & trip indicator
083 – 305	Key Operated Unit (Parallel-beam, 24V) – restart / override & trip indicator
083 – 306	Push Button Unit (Parallel-beam, 24V) - restart / override & trip indicator

Cable Junction Unit

This unit offers connection for external mute inputs into the 8000 and 8000 Plus Series safety light curtains as well as the user cable connection back to the Receiver (Rx) unit. (Integrated cables are 600mm long.) A multi-core cable on the unit provides all the necessary interface together with muting signals to the machine control system on a single cable.

083 - 310

Model Number	Description
083 - 310	Rx Cable Junction

ACCESSORIES

Remote Mounting Stackable Beacons

A range of Stackable Beacons are available with the 8000 Series.

They are typically used where the machine application requires visual indication of control functions from a single location. The translucent plastic lenses provide all round light visibility and can be programmed to provide either flashing or a steady output. The bright LED's are supplied in a variety of colours as listed below.

Model 083-502 with Integrated Mute Beacon

Smartscan Remote Mounting Stackable Beacons

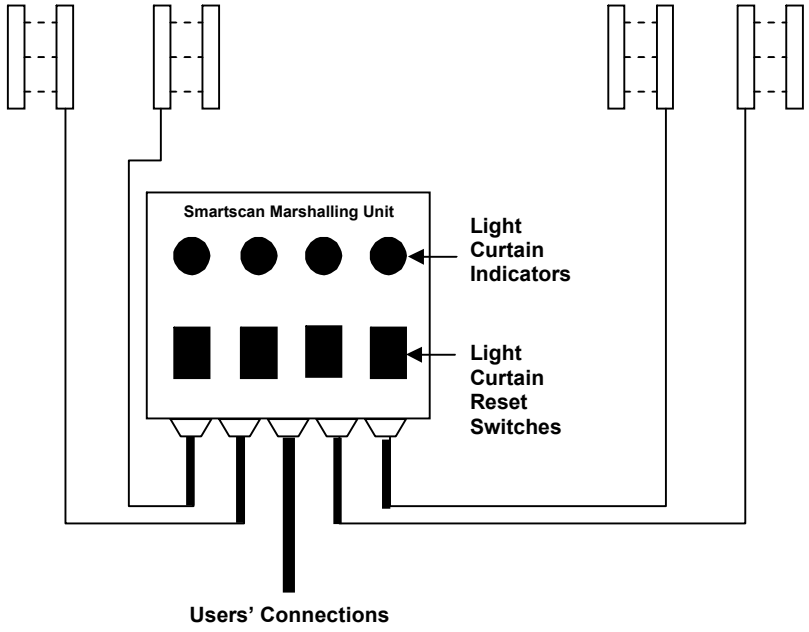
Integrated Monitored Mute Beacon

An integrated mute beacon (105 – 804) can be supplied for direct integration onto the light curtain receiver column, or as a separate self-contained unit for mounting remotely. In order to meet the European requirements for monitoring the mute indicator a special monitor module can be provided (105 – 810). The mute beacon monitor module is factory fitted inside the receiver column of an 8000 Series light curtain.

Model number	Description
105 - 801	High intensity LED stackable beacon kit - Red
105 - 802	High intensity LED stackable beacon kit - Orange
105 - 803	High intensity LED stackable beacon kit - Green
105 - 804	High intensity LED stackable beacon kit - Blue
105 - 810	Monitored mute beacon module

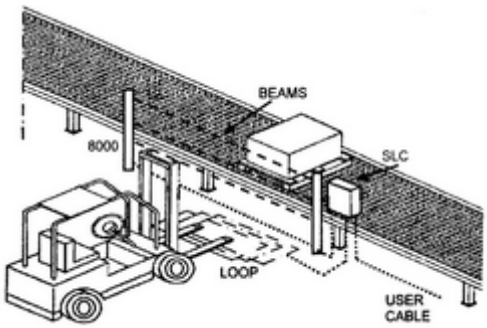
Safety System Control Units

Smartscan's Marshalling Units can be used for connecting a number of light curtains and miscellaneous devices, such as gate switches. The Marshalling Units give a number of dual channel safety inputs and outputs. In addition, panel mounted reset switches and status indicators can also be provided.



The Marshalling units can include up to 18 dual inputs and 6 dual outputs. Please contact your local Distributor or Smartscan Ltd for advice and pricing.

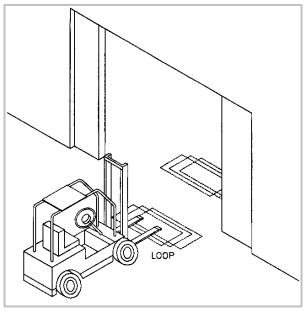
Inductive Loop Controllers



Smartscan inductive loop controllers have been designed for use in conjunction with Series 8000 and 8000 Plus entry/exit safety light curtains.

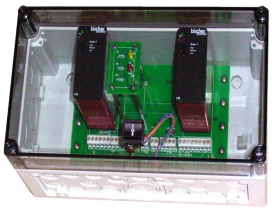
Smartscan dual loop controllers are used in a number of machine safety applications wherever the presence of fork lift trucks or other industrial vehicles needs to be detected, for example, when entering safe-guarded access ways or at pallet conveyors for loading and unloading. The system thus provides safe operation of fully automatic end-of-line packaging machines at the in-feed and out-feed zones of automated warehouses.

Loop Controller, Model SLC4, is available for Category 4 control integrity as defined in EN 954.



As a loaded pallet moves along the conveyor away from the dangerous machinery it enters the load/unload area at which point the conveyor stops. This load/unload area is safe guarded by a Smartscan light curtain that is positioned to detect personnel accessing the potentially dangerous machinery.

As the forklift truck enters the area it passes over the under floor mounted dual inductive loops which detect it's presence and provide output signals via the inductive loop controller to mute the light curtain. After inserting or unloading the loaded pallet from the conveyor, the forklift truck moves out of the area and therefore off the inductive loops. At this point the muting signals are removed and the light curtain becomes fully active again, thus providing fully automatic control of the machine and safety system.



083 - 320

Inductive Loop Controller

Model number	Description
083 - 320	SLC4 Inductive Loop Controller (CAT 4) Cross-beam

Mute Connection Cable

Model number	Description
084 – 360	5m Inductive Loop Mute Connection Cable

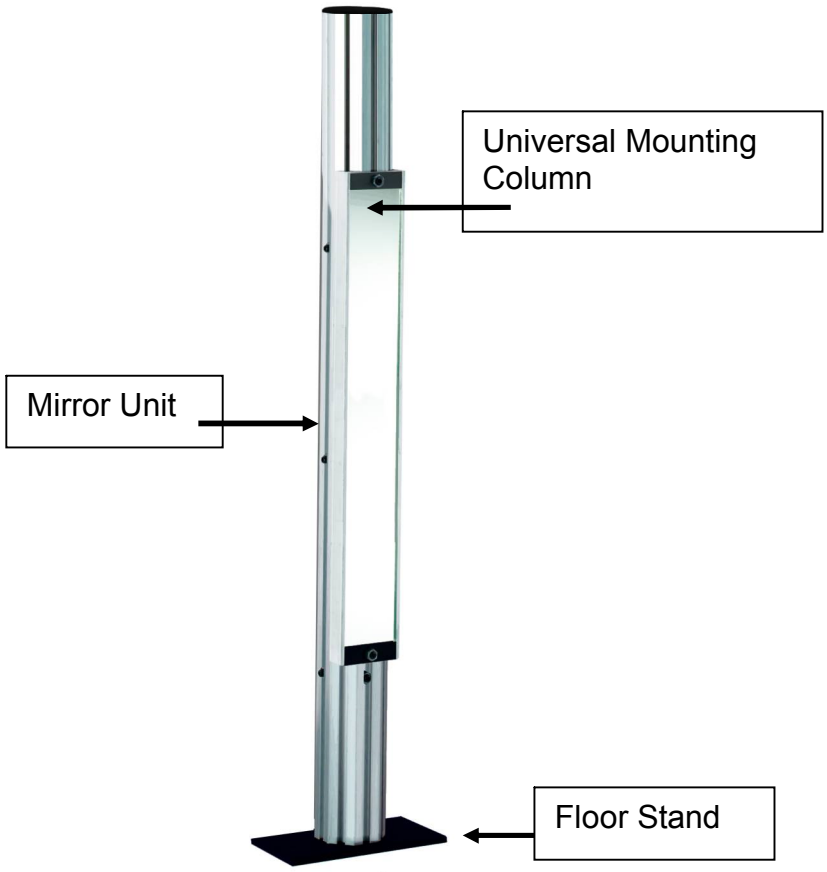
For more information refer to the section 'Application Overview'.

Mirror Units

Two or three sides of a machine can be safeguarded with a single light curtain by using mirrors to deflect the light curtain's infra-red beams.

The Smartscan mirror system provides a sturdy floor mounting kit together with an aluminium column for mounting the mirror. The mirror assembly simply slots onto the column and can be adjusted to the height required for the application.

The special mounting stand enables the mirror unit to be rotated through 360 degrees while also allowing full adjustment in all axes.



Note: Mirrors cause a reduction in optical efficiency, reducing the effective range of the light curtain. Contact Smartscan Ltd or your local Distributor for guidance.

ACCESSORIES

Maximum Range of the light curtain	Maximum range through 1 mirror	Maximum range through 2 mirrors
40m	30m	15m

Mirrors

Model number	Description
044 - 252	600mm x 110mm wide mirror unit
044 - 249	900mm x 110mm wide mirror unit
044 - 250	1200mm x 110mm wide mirror unit
044 - 253	1400mm x 110mm wide mirror unit

Note: Mirror length must be a minimum of 100mm longer than the overall length of the light curtain to be installed

Column & Floor Stand

Model number	Description
044 - 256	1.1m aluminium universal mounting column
044 - 257	1.3m aluminium universal mounting column
044 - 258	1.6m aluminium universal mounting column
044 – 247	1.8m aluminium universal mounting column
044 - 262	2.0m aluminium universal mounting column
044 - 248	Floor stand

Note: A universal mounting column and floor stand is required for each mirror unit.

ACCESSORIES

Power Supplies

If a suitable stabilised 24V DC 2.5A power supply is not available the following unit is recommended. A 24V DC 1A power supply option is also available.

Model number	Description
112-027	Power supply Input 85 - 264V AC Output 24V DC, 2.5A
112-028	Power supply Input 100 – 240V AC Output 24V DC, 1.1A

Features

- High reliability
- High efficiency, low working temp
- Built in EMI filter, low ripple noise
- Compact size, lightweight
- Short circuit, over load, over voltage protection
- Approvals: UL, TUV, CB and CE

Specification 112-027

Type	Switch mode
Input Voltage	85 - 264V AC
Input frequency	47-63HZ
Inrush current	Cold start, 24A, 115V & 50A, 230V
Output voltage/current rating	24V DC, 2.5A
Operating temperature	0°C to 50°C
Storage temperature	-10°C to +70°C
Connection	5P/9.5mm pitch terminal block
Enclosure	160x98x38mm Din rail mounting
Weight	0.5 Kg

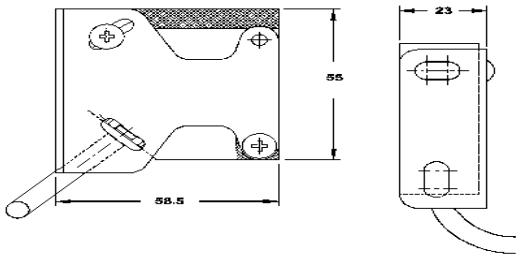
Specification 112-028

Type	Switch mode
Input Voltage	100 - 240V AC
Input frequency	50-60HZ
Inrush current	Cold start, 15A, 115V & 30A, 230V
Output voltage/current rating	24V DC, 1.1A
Operating temperature	0°C to 50°C
Storage temperature	-10°C to +70°C
Connection	5P/9.5mm pitch terminal block
Enclosure	99x97x35mm Din rail mounting
Weight	0.37 Kg

Mute Signalling Photocell Type 109-016A

The polarised retro-reflective photocell can be used in conjunction with all 8000 Series safety light curtains to provide the mute initiating signals.

The mute signalling photocells offer the user an additional muting option configuration. The mute signalling photocells plug directly into the 8000 Series safety light curtain, which uses the signal from the photocells for the mute control sequence instead of the 'L' unit (083 – 002) or 'T' unit (083 – 001). The photocells are positioned to scan across a conveyor to detect loaded pallets prior to the load interrupting the light curtain.



Type 109-016A photocell has a maximum sensing range of 4 metres.

Each photocell comes complete with 1.5m cable and a 4 pin bayonet locking connector for directly connecting to Smartscan 8000 Series light curtains. A mounting bracket and retro-reflective mirror is also supplied.

Model number	Description
109-016A	Polarised retro-reflective photocell

(Each kit contains 1x photocell , 1x mounting bracket 1x reflector mirror)

Sensing Distance	4m
Transmitter Diode	Red Light
Protection Rating	IP65
Operating Voltage	12-240V dc, 50/60Hz
Output	Relay
Current Consumption	2VA max
Response Time	15ms
Enclosure	Intensive ABS
Cable	1.5m length with 4 pin circular bayonet locking connector
Operating Temp	-20°C to +60°C
Humidity	35% to 85%
Weight	145g

Mounting Stands

Designed to accommodate the Smartscan 8000 Series Straight, L and T shaped safety light curtains.

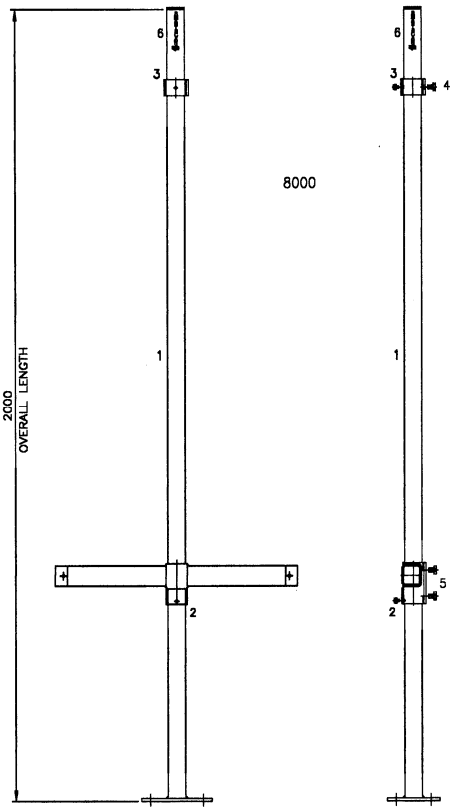
The **Adjustable Stand** (50mm x 50mm) offers the user a flexible mounting option for all your end-of-line applications. The stand has adjustable brackets that allow the safety light curtain to be mounted at different positions to suit a specific application. Brackets for mounting mute signalling photocells on the stand are also available.

The **Channel Stand** allows the user to mount the safety light curtain inside a protective housing. This provides protection on three sides to give a more robust installation. Channel stands would typically be used where the safety light curtain is at risk of damage from fork lift truck operations, or in the case of end-of-line applications damage from falling pallet loads. The stands are custom made to suit the application requirements for either the straight, L or T shaped safety light curtains. (Please contact your Distributor or Smartscan Ltd directly for further information on this product).

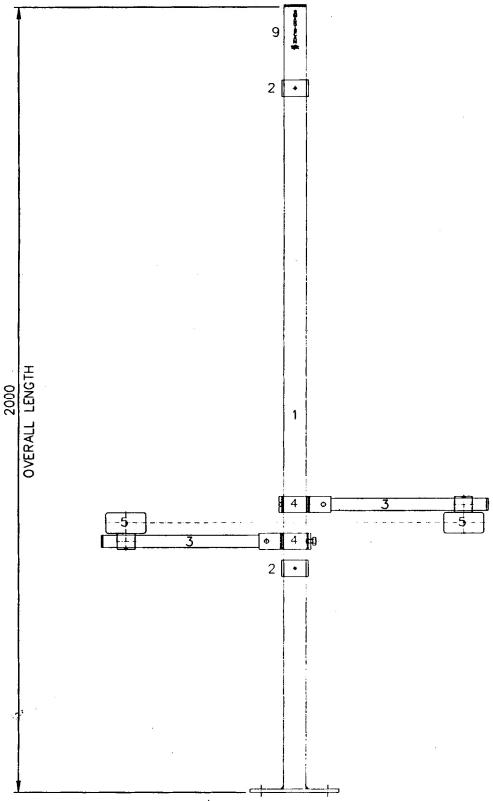
Adjustable Mounting Stands

T stands (entry / exit systems)

Model number	Description	Height
084 – 410	Pair of adjustable 8000 Series ‘T’ style stands (with complete bracket set)	2m
044 - 400	Pair of adjustable ‘T’ style stands (with external mute sensor bracket set)	2m



084 - 410

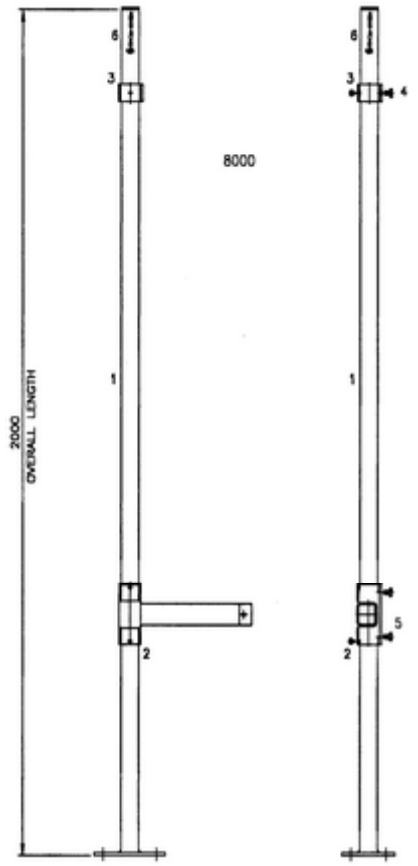


044 - 400

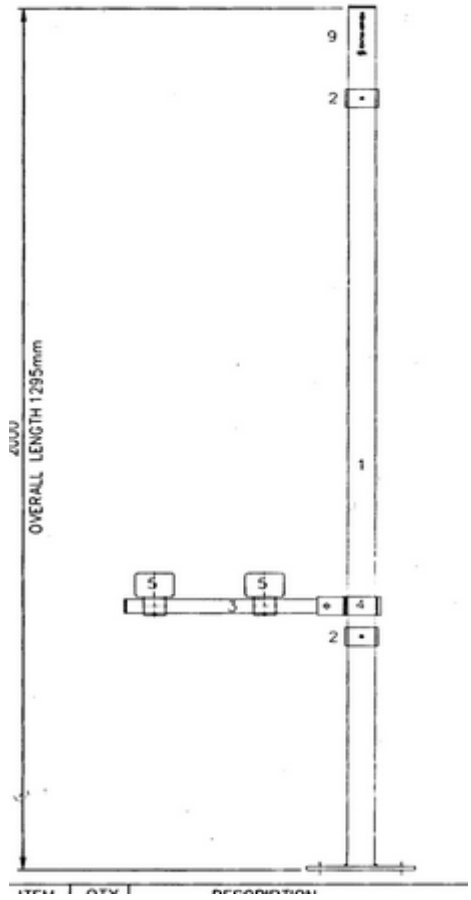
ACCESSORIES

L stands (exit systems)

Model number	Description	Height
084 – 409	Pair of adjustable 8000 Series ‘L’ style stands (with complete bracket set)	2m
044 - 412	Pair of adjustable ‘L’ style stands (with external mute sensor bracket sets)	2m



084 - 409

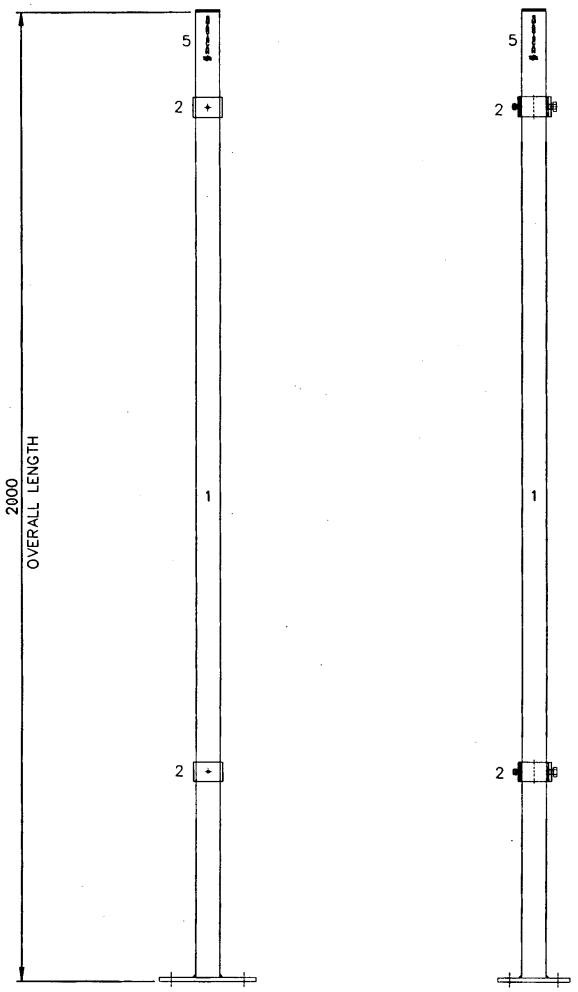


044 - 412

ACCESSORIES

Straight stands

Model number	Description	Height
044 – 408	Pair of adjustable straight stands (with complete bracket set)	2m



044 - 408