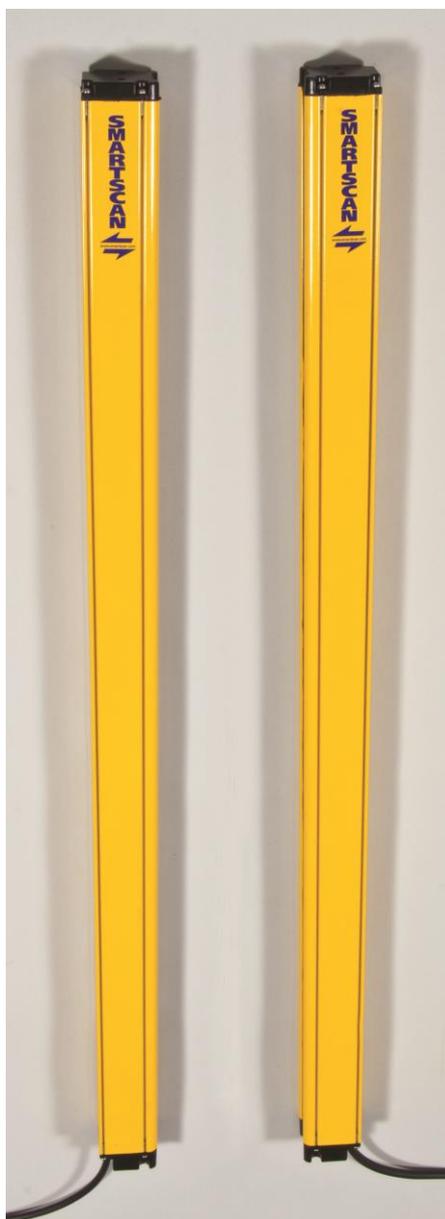


# SMARTSCAN INFORMATION

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## **SL2 (012) SERIES SAFETY LIGHT CURTAINS HANDBOOK**

Smartscan Ltd, Pywell Road, CORBY, NN17 5XJ, UK, Tel: +44 (0) 1536 401313,  
Fax: +44 (0) 1536 268954, Email: [sales@smartscan.co.uk](mailto:sales@smartscan.co.uk), [www.smartscan.co.uk](http://www.smartscan.co.uk)

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Further detailed documents relating to the Smartscan SL2 (012) series of Light curtains can be found on our Website:

**[www.smartscan.co.uk](http://www.smartscan.co.uk)**

The logo features the word "SMARTSCAN" in a bold, sans-serif font. The letters are white with a subtle drop shadow, making them stand out against the background. The logo is centered horizontally and is partially overlaid by several thin, light gray lines that intersect at various angles, creating a dynamic, geometric pattern around the text.



## INTRODUCTION

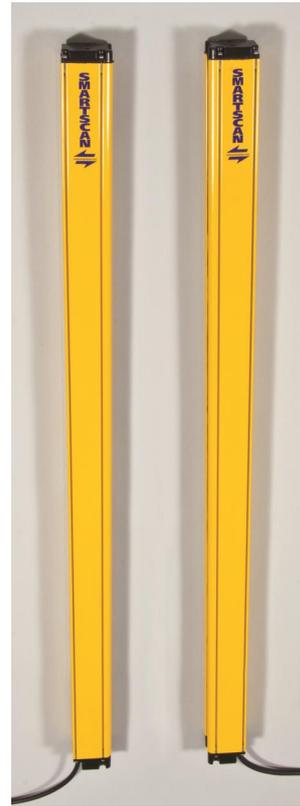
### SL2 Safety Light Curtains

The SL2 (012) series is a Type 2 safety light curtain with a PL d, SIL 2 control rating making it suitable for a wide range of machine guarding applications.

The units are housed in slim-line aluminium, 30 x 37mm profile, finished in yellow polyester powder coating. The housing is IP65 rated and includes mounting brackets as standard. Connection cables for the transmitter head and receiver head include options for 5m, 10m and 20m lengths.

In addition SL2 series safety light curtains have the following control functions, manual reset, automatic reset and External Device Monitoring (EDM) for monitoring an external switching device e.g. contactors.

Status indicators are located on the Receiver (Rx) head of the SL2 series providing clear condition status information. It also includes a 7 segment display located on the Transmitter (Tx) head for diagnostic information e.g. EDM connection lost.



### SL2 series

The SL2 has 38 standard models in the range.

Detection heights vary from 150mm up to 2400mm. SL2 safety light curtains detect objects of 30mm and 40mm and are therefore suitable for 'hand' detection. Two, three and four beam torso detection models, for safeguarding around the perimeter of a machine are also available. The operating range is from 0.5 – 15m (model dependent).

We also have a range of safety relay units that can be used with the SL2 series where there is a requirement for safety relay outputs. Our MFU and RY4 series products both provide safety relay output options for the SL2 series. They also offer additional control functions such electronic status outputs and an option for connecting two safety light curtains into the one safety relay.

## INTRODUCTION

### **Typical machine safeguarding applications include:**

- ❑ Packaging machines
- ❑ Process machinery
- ❑ Electronic component assembly lines
- ❑ Automated warehouses
- ❑ Printing machines
- ❑ Transfer lines

SL2 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 the control system, as indicated in EN 62061, EN13849, determines a requirement up to and including SIL 2, PL d control equipment.

### **Features**

- ❑ Slim-line enclosures
- ❑ EC Type Examined
- ❑ Manual and Automatic Reset modes
- ❑ External Device Monitoring (EDM)
- ❑ Type 2 device with SIL 2, PL d control rating
- ❑ Simple installation and alignment
- ❑ Diagnostic and alignment indicators
- ❑ Dual channel, fail-safe electronic outputs (control reliable)
- ❑ Two part system
- ❑ IP65 rating for factory environments
- ❑ One year manufacturer's warranty
- ❑ Flexible mounting options

## SPECIFICATION

### SL2 (012) Light Curtains

Number of beams	2 – 96	
Object detection	30mm, 40mm and Perimeter guarding systems	
Detection zone	150mm to 2400mm	
Range	0.5 – 15m (model dependent)	
Light type	Infra-Red 880nm	
Response time	20ms	
Operating temperature	0°C to +50°C	
Light curtain enclosure	IP65, (H x W x D) H x 30 x 37mm	
Status indicators	RX	Green LED on = OSSDs on Yellow LED = EDM on Red LED on = OSSDs off Yellow LED on = Infrared beams aligned
	TX	7 segment display for status and diagnostics
Power supply requirement	24V DC $\pm$ 10%, 1.5A regulated	
Current consumption	500mA + (OSSD current consumption)	
Light curtain connection	M12 - Transmitter head 4 way pin Receiver head 9 way pin - IP65	
Finish	Aluminium chromate treated, Polyester powder coated (yellow)	
Safety Classification	BS EN 61496-1 Type 2 BS IEC 61496-2 Type 2 EN ISO 13849 PL d EN 62061 - SIL 2	
Warranty	One Year	

#### OUTPUTS

Safety Outputs OSSD1 & OSSD2	2 x electronic switches, each rated at 24V DC, 500mA
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#### INPUTS

Reset Manual/Automatic Selectable	Manual Reset – Switch N/O contact to 24V DC Automatic Reset – 'on' (L+) 24V DC
Safety Monitoring (EDM)	Manual Reset – Yellow wire 'on' = 24V DC Automatic Reset – Green wire 'on' = 24V DC

## SL2 SERIES MODEL RANGE

### SL2 series 30mm ODC Capability Range 0.5m to 6m

Model number	Number of beams	Detection height (K) mm	Overall length (L) mm	Fixing Centres (CTR) mm
1-012-301	6	150	270	240
1-012-302	12	300	420	390
1-012-303	18	450	570	540
1-012-304	24	600	720	690
1-012-305	30	750	870	840
1-012-306	36	900	1020	990
1-012-307	42	1050	1170	1140
1-012-308	48	1200	1320	1290
1-012-309	54	1350	1470	1440
1-012-310	60	1500	1620	1590
1-012-311	66	1650	1770	1740
1-012-312	72	1800	1920	1890
1-012-313	78	1950	2070	2040
1-012-314	84	2100	2220	2190
1-012-315	90	2250	2370	2340
1-012-316	96	2400	2520	2490

## SL2 SERIES MODEL RANGE

### Light Curtains 40mm Detection Capability Range 3m to 15m

Model number	Number of beams	Detection height (K) mm	Overall length (M) mm	Fixing Centres (CTR) mm
1-012-401	6	150	270	240
1-012-402	12	300	420	390
1-012-403	18	450	570	540
1-012-404	24	600	720	690
1-012-405	30	750	870	840
1-012-406	36	900	1020	990
1-012-407	42	1050	1170	1140
1-012-408	48	1200	1320	1290
1-012-409	54	1350	1470	1440
1-012-410	60	1500	1620	1590
1-012-411	66	1650	1770	1740
1-012-412	72	1800	1920	1890
1-012-413	78	1950	2070	2040
1-012-414	84	2100	2220	2190
1-012-415	90	2250	2370	2340
1-012-416	96	2400	2520	2490

## SL2 SERIES MODEL RANGE

### Light Curtains      Perimeter Guarding      Range 0.5m to 6m

Model number	Number of beams	Detection Zone	Overall length (L) mm	Fixing Centres (CTR) mm
1-012-605	Two x 6 beam clusters	600mm	745	715
1-012-606	Three x 6 beam clusters	900mm	1045	1015
1-012-607	Three x 6 beam clusters	1200mm	1345	1315

### Light Curtains      Perimeter Guarding      Range 3 to 15m

Model Number	Number of beams	Detection Zone	Overall length (L) mm	Fixing Centres (CTR) mm
1-012-612	Two x 6 beam clusters	600mm	745	715
1-012-613	Three x 6 beam clusters	900mm	1045	1015
1-012-614	Three x 6 beam clusters	1200mm	1345	1315

## Cables

### Transmitter Head

Model Number	Description	Length m
100-140	Transmitter head connection cable	5m
100-142	Transmitter head connection cable	10m
100-144	Transmitter head connection cable	15m

### Receiver Head

Model Number	Description	Length m
100-141	Receiver head connection cable	5m
100-143	Receiver head connection cable	10m
100-145	Receiver head connection cable	15m

**Relay Output**



Smartscan SL2 Series light curtains incorporate two fail-safe, electronic output switches. If there is a requirement for relay output switching we provide a range of safety relay output products to suit your particular requirement. A choice can be made from either the Multifunction Safety Units (MFU) or the RY4 series.

Multifunction Safety Units (MFU)

The MFU Type **011-160** provides inputs for the emergency stop function but it also has two further sets of inputs for connecting up to two light curtains. The monitored output switching contacts are rated at 250V AC, 2A with two additional electronic outputs for status indication etc. Other features include selectable auto/manual reset modes, external device monitoring (EDM) and LED indicators for all input and output channels.

MFU Type **011-151** further enhances the Smartscan range of multifunction safety units. The unit incorporates a light curtain muting facility, designed specifically for those systems that require the light curtain detection zone to be inhibited, or muted, during specific periods of a machine's operating cycle. Muting allows access through the light curtain for the passage of material or for a person to load and unload parts through the light curtain during safe periods without interrupting the machines operating cycle.

MFU Type 011-151 provides a dual channel safety monitored input for automatically muting the light curtain during safe periods of machine operation. Mute signals are often derived from the machine control system or from external sensors or switches. It also provides dual inputs for a safety light curtain and a two channel emergency stop system.

The monitored safety output relay switches are rated at 250V AC, 2A, for connection to a power-switching device or directly to a machines final control element. Two electronic outputs are provided one for guard status indication and the other to indicate a 'mute on' condition. Both are for direct connection to a PLC or indicator lamps etc.

## ACCESSORIES

Other features include external device monitoring (EDM) and LED indicators on all inputs and outputs.

MFU Type **011-155** has been designed specifically for entry/exit applications where the light curtain is positioned across a conveyor. The control module provides two safety monitored inputs for signals that automatically mute the associated light curtain during safe periods of the machine operation. Mute signals are usually derived from external PE sensors, limit switches or the machine control system.

For additional integrity a third mute input channel (mute enable) is provided. This input is often connected to a 'conveyor run' signal to enable a mute condition, **ONLY** when the associated conveyor is 'running'. The 011-155 also provides dual inputs for a safety light curtain and a 'guard override function'. The override facility enables the light curtain's safety output relays to be negated for a short period. This facility is essential in the packaging industry for light curtains that are positioned across conveyors that prevent access to personnel but allowing pallet loads to pass through.

The monitored safety output relay switches are rated at 250V AC, 2A, for connection to a power-switching device or directly to a machines final control element.

Electronic outputs are provided, one for guard status indication and the other for mute indication. The MFU also includes external device monitoring (EDM) and visual indicators on all inputs and outputs.

## ACCESSORIES

### R<sub>Y</sub>4 series

The Smartscan R<sub>Y</sub>4 series provides dedicated relay output switching options that may be used with the SL2 series safety light curtain.

The units when used in conjunction with the SL2 series are suitable for all applications where the control system is rated as, EN ISO 13849 – 1 PL d, EN 62061 SIL 2.

Model number	Description
020-005	R <sub>Y</sub> 4A Safety Relay for SL2 series 2 N/O & 1 N/C
020-010	R <sub>Y</sub> 4B Safety Relay for SL2 series 3 N/O & 1 N/C
020-015	R <sub>Y</sub> 4C Safety Relay for SL2 series 3 N/O & 1 N/C RJ45 Connection

**R<sub>Y</sub>4A** – The R<sub>Y</sub>4A provides a simple low cost safety relay output option for the SL2 series.

2 normally open safety relay contacts rated at 250V AC, 6A and 1 normally closed auxiliary (non-safety) contact rated at 250V AC, 6A. SL2 series functions mirrored include, auto/manual reset, EDM, and status.



**R<sub>Y</sub>4B** – Additional contacts offer a more versatile safety relay option when integrating into more complex applications.

3 normally open safety relay contacts rated at 250V AC, 6A, and 1 normally closed auxiliary (non-safety) relay contact rated at 250V AC, 6A. SL2 series functions mirrored include, auto/manual reset, EDM, and status.



**R<sub>Y</sub>4C** – Combines RJ45 cable connection for simple plug and play connection of the SL2 series safety light curtain with additional contacts for a versatile safety relay option when integrating into more complex applications.

3 normally open safety relay contacts rated at 250V AC, 6A, and 1 normally closed auxiliary (non-safety) relay contact rated at 250V AC, 6A. SL2 series functions mirrored include, auto/manual reset, EDM and status



## ACCESSORIES

### Reset Station

The reset station provides the user with a guard reset function and guard status indication.

The unit is mounted in a robust enclosure with a bright LED lamp and 6mm screw size mounting brackets top and bottom. Each unit comes with an integrated 10m connection cable for interface via a multifunction safety relay unit (MFU), 011-160, 011-151, 011-155 or RY4 series relays, RY4A, RY4B and RY4C.



Model number	Description
012-302	1000 Series push button reset station with trip indication

## ACCESSORIES

### Power Supplies



If a suitable stabilised 24V DC power supply is not available the following units are recommended.

Model number	Description
112-027	Power supply Input 100 – 240V AC Output 24V DC, 2.5A
112-029	Power supply Input 85 - 264V AC Output 24V DC, 4.5A

#### 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	47-63 HZ
Inrush current	Cold start, 24A, 115V & 50A, 230V
Output voltage/current rating	24CV DC 2.5 amp
Operating temperature	0°C to 50°C
Storage temperature	-10°C to +70°C
Connection	5P/9.5mm pitch terminal
Enclosure	160x98x38mm Din rail mounting
Weight	0.5 Kg

## ACCESSORIES

Specification 112-029

Type	Switch mode
Input Voltage	100 – 240V AC
Input frequency	50-60HZ
Inrush current	
Output voltage/current rating	24V DC, 4.5A
Operating temperature	0°C to 50°C
Storage temperature	-10°C to +70°C
Connection	7P
Enclosure	200x98x38mm Din rail mounting
Weight	0.61 Kg

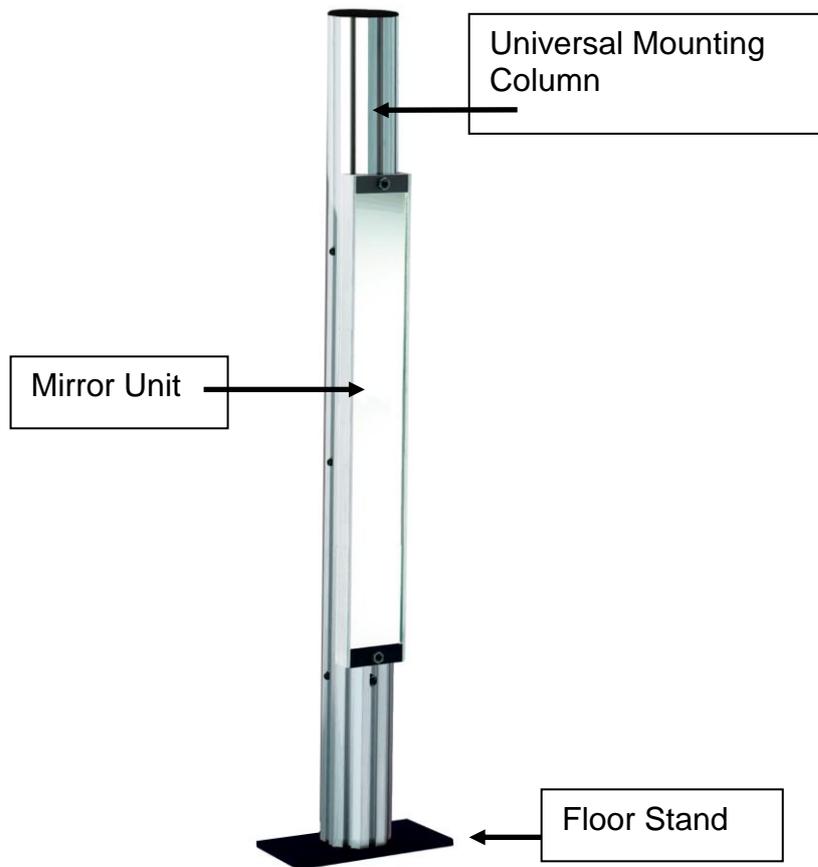
## ACCESSORIES

### 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.

Range of the light curtain	Maximum range through 1 mirror	Maximum range through 2 mirrors
0.5m - 6m	4m	3m
3m - 15m	11m	8m

## ACCESSORIES

### Mirror Units

#### Mirrors

Model number	Description
044-252	600mm x 110mm wide mirror unit
044-279	700mm x 110mm wide mirror unit
044-274	800mm x 110mm wide mirror unit
044-249	900mm x 110mm wide mirror unit
044-243	1000mm x 110mm wide mirror unit
044-298	1100mm x 110mm wide mirror unit
044-250	1200mm x 110mm wide mirror unit
044-253	1400mm x 110mm wide mirror unit
044-297	1500mm x 110mm wide mirror unit
044-254	1600mm x 110mm wide mirror unit
044-269	1800mm 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.

**Note:** Maximum mirror length available is 1800mm.

#### Column & Floor Stand

Model number	Description
044-256	1.1m aluminium universal mounting column
044-257	1.3m aluminium universal mounting column
044-273	1.4m aluminium universal mounting column
044-258	1.6m aluminium universal mounting column
044-247	1.8m aluminium universal mounting column
130-112	Floor stand

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

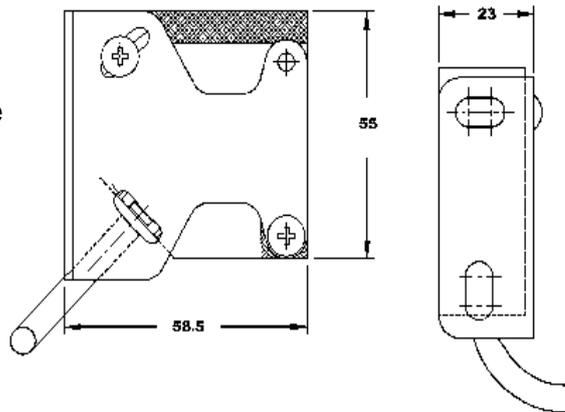
## ACCESSORIES

### Mute signalling photocell Type 109-016

The polarised retro-reflective photocell can be used in conjunction with MFU 011-151 and MFU 155 to provide the mute initiating signals to terminals B3 and B4 of the MFU.



A safety light curtain with mute control function is often used in the packaging industry. In conjunction with a SL2 Series light curtain and an MFU 011-155 two photocells are positioned to scan across a conveyor to detect loaded pallets prior to the load interrupting the light curtain. The photocell must be positioned to detect the load during the entire time the load is passing through the light curtain.



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

Each photocell comes complete with mounting bracket and retro-reflective mirror.

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

Sensing Distance	4m
Transmitter Diode	Infra-red
Sensing Adjustment	None
Protection Rating	IP65
Operating Voltage	12-240V dc, 24-240V ac - 50/60Hz
Output	Relay
Current Consumption	2VA max
Response Time	15ms
Enclosure	Intensive ABS
Cable	1.5m length
Operating Temp	-20°C to +60°C
Humidity	35% to 85%
Weight	285g

## ACCESSORIES

### Mute Signalling Photocell Type 109-006

The through-beam infra-red photocell can be used in conjunction with MFU 011-151 and 011-155 to provide the mute initiating signals to terminals B3 and B4 of the MFU.

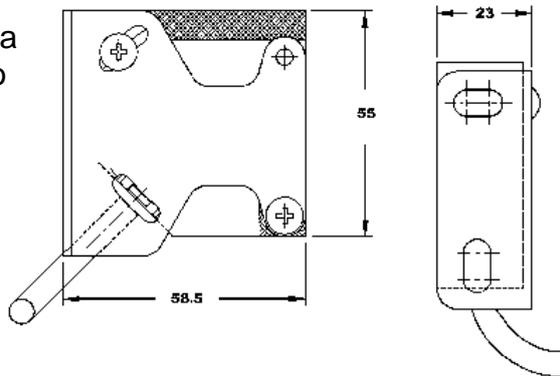


A safety light curtain with mute control function is often used in the packaging industry. In conjunction with a SL2 Series light curtain and an MFU 011-151 and 011-155 two photocells are positioned to scan across a conveyor, to detect loaded pallets prior to the load interrupting the light curtain. The photocells are positioned to scan across a conveyor, to detect loaded pallets prior to the load interrupting the light curtain.



Type 109-006 photocells have a maximum sensing range of 10 metres.

Each transmitter and receiver comes complete with a 1.5m cable.



Model number	Description
109-006	Through-beam photocell kit

Sensing Distance	10m
Transmitter Diode	Infrared
Sensing Adjustment	None
Protection Rating	IP65
Operating Voltage	12-240V dc, 24-240V ac - 50/60Hz
Output	Relay
Current Consumption	2VA max
Response Time	15ms
Enclosure	Intensive ABS
Cable	1.5m length
Operating Temp	-20°C to +60°C
Humidity	35% to 85%
Weight	285g

## ACCESSORIES

### Mounting Stands

The Smartsan mounting stands are designed to accommodate our range of safety light curtains.

The **Adjustable Stand** (50mm x 50mm) offers the user a flexible mounting option. The stand has adjustable brackets that allow the safety light curtain to be mounted at different positions to suit a specific application.

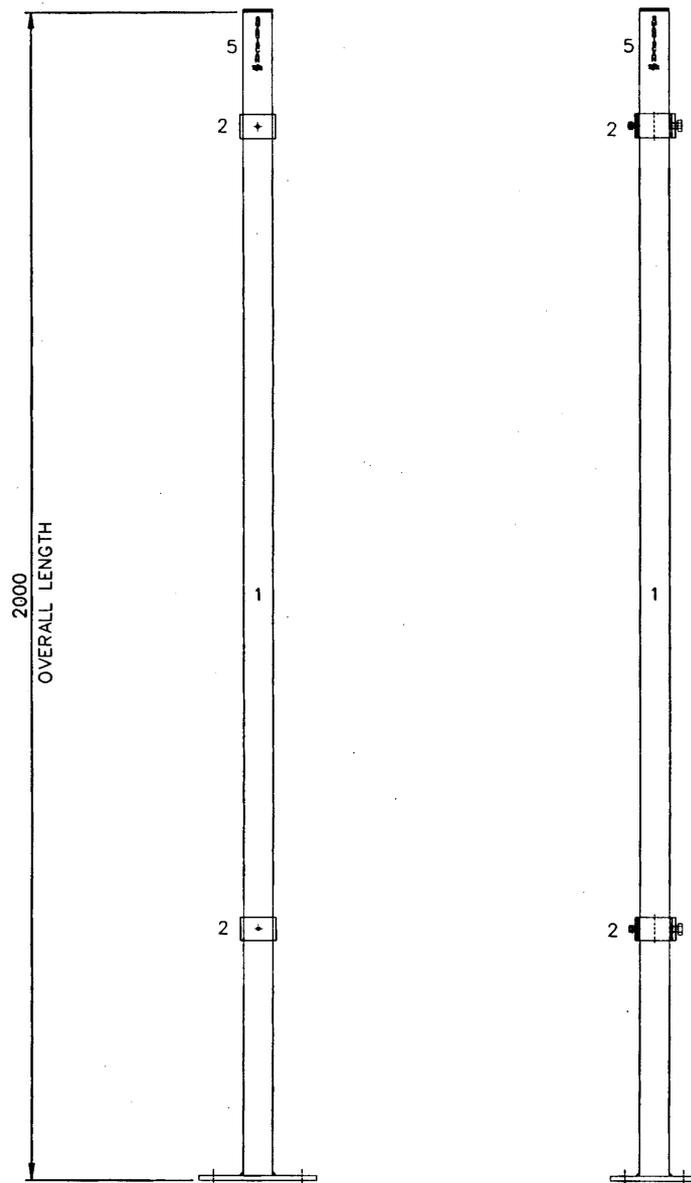
The **Channel Stand** allows the user to mount the safety light curtain inside a protective housing. This provides protection on three sides to give a more robust installation. Channel stands would typically be used where the safety light curtain is at risk of damage from fork lift truck operations, or in the case of end-of-line applications damage from falling pallet loads.

# ACCESSORIES

## Adjustable Mounting Stands

Straight stands

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



# ACCESSORIES

## Channel Mounting Stands

### Straight stands

Model number	Description	Height
126-027	Pair of channel floor stands (straight)	2m

