SAFETY LIGHT CURTAINS

DESCRIPTION:
Idem’s Safety Light Curtains for finger and hand protection offer the user maximum accessibility to a machine or production line by removing or complementing the requirement for mechanical guarding.

Manufacturing processes that require operator access to the dangerous area can be performed quickly and with the minimum of interruption to production flow. Machines of all sizes are well suited to guarding by light curtains since the high level of throughput requires the minimum of interruption when inserting and removing product.

Fork lift truck access to conveyor lines is also an ideal application allowing fast and efficient access whilst maintaining a high level of safety integrity.

OPERATING PRINCIPLE:
Idem’s SLC-F, SLC-H Safety Light Curtains have been designed to ensure protection of operators working in hazardous areas.

They operate with infrared beams that are evenly spaced at specific intervals.

- SLC-F (finger protection) beams spaced 14mm min. sensing.
- SLC-H (hand protection) beams spaced 30mm min. sensing.

When the beam detects a finger or hand entering the defined hazardous area, the protective equipment immediately stops the machine with a 14ms response, or renders it harmless.

A high reliability is achieved by implementing a fail-safe system: The devices are Type 4 and PLe/Cat4 to ISO13849-1.

Internal failure immediately deactivates the output signals as does any intrusion into the protective field.

DESIGN FEATURES:
- Non muting function to increase productivity and safety.
- PNP or NPN selection by DIP switch.
- Smart click connectors (voltage out are from connectors).
- Advanced muting function automatically detects when a work space does not pass.
- Sensing surface fully protected due to the design feature of narrowing and recessing the exposed area.
- Fast response time of 14ms for all models regardless of number of beam channels or the number of units connected in series.

POSITIONING OF SAFETY LIGHT CURTAINS:
The Safety Distance is the minimum distance that must be maintained between the safety sensor and the hazardous part of the machine in order to stop the machine before someone or something reaches it.

A full risk assessment should always be carried out prior to installing a safety light curtain.

The Safety Distance S can be calculated using the equation method provided by the standard EN999 (ISO14120).

Vertical Curtain: \[ S = (K \times T) + 8 \times (R-14) \]

- \( S \) is the minimum safety distance in mm from the hazardous part of the machine to the detection point of the safety sensor.
- \( K \) is the approach speed of the body or parts of the body in mm/s. (2000mm/s for calculated value of \( S \leq 501 \text{mm} \) or 1600mm/s for \( S > 500 \text{mm} \)).
- \( T \) is the overall stopping performance in seconds, sum of safety sensor response time and machine response time.
- \( R \) is the resolution of the SLC (safety light curtain) (mm).
Safety Light Curtains

FEATURES:

ROBUST AND COMPACT HOUSING:
Idem’s SLC-F and SLC-H Safety Light Curtains are all equipped with a robust housing that can be used in harsh environments and withstand shocks caused by sudden human contact or a dropped tool. A scratch resistant material is used for the optical surface to prevent any unexpected machine stops.

SLIM HOUSING:
The housing structure is significantly improved to enhance resistance against shock and vibration and to reduce the thickness of the thinnest part of the housing material from 3mm to 2.5mm.

HARSH ENVIRONMENTS:
With an increased resistance to torsion the risk of optical axis misalignment due to external forces such as vibration or aging is reduced significantly. With an IP67 rating IDEM’s Safety Light Curtains are suitable for use in areas that are subject to water.

INCREASED PRODUCTIVITY AND SAFETY (Muting Function):
IDEM’s Safety Light Curtains provide an advanced Muting function that detects the zone where work pieces pass or the position of a machine or robot and disable beams of the detected part. This increases both safety and productivity. By adding the smart muting actuator this provides stable operation even for the production lines where errors occur due to vibration caused by the passing work piece.

AUTO-CONFIGURATION OF MUTING ZONE (Dynamic Muting):
When work pieces with various heights are conveyed on the same line, partial muting is automatically performed based on the height of the work piece. This advanced muting function can automatically perform normal detection at the zone where a work piece does not pass. The only beams interrupted by the work piece are kept muted and other beams are released from the muting state three seconds after the work piece passes through the safety light curtain. Muting is disabled after the work-piece has passed. Monitors human entry into the zone where a work piece does not pass (see picture opposite). Keeps only the zone muted where the work piece passes through.

SELECTION:
Idem’s Safety Light Curtain range is perfectly suited for where finger and hand protection is required close to the hazardous area (point of operation).

Depending on the application, a resolution of either 14 mm (finger protection) or 30 mm (hand protection) is available. Thanks to their type 4, Cat 4, PLe safety level, Idem’s devices can be used on equipment requiring high protection reliability and this includes, but is not limited to, the following applications such as machine tools, robots, hydraulic presses, automated stock management, weaving looms, etc.
Safety Light Curtains  
**Type:** SLC-F Finger (14mm)

**FEATURES:**
- Resolution: 14mm
- Protective height: 160mm to 1040mm
- Type 4 according to IEC61496-1 and -2
- Operating range: 0.3m to 10m
- Category 4, PLe according to EN/ISO13849-1
- Ingress protection IP67

**ORDERING INFORMATION:**

<table>
<thead>
<tr>
<th>SALES NUMBER</th>
<th>NUMBER OF BEAMS</th>
<th>PROTECTIVE HEIGHT (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLC-F-160</td>
<td>15</td>
<td>160</td>
</tr>
<tr>
<td>SLC-F-240</td>
<td>23</td>
<td>240</td>
</tr>
<tr>
<td>SLC-F-400</td>
<td>39</td>
<td>400</td>
</tr>
<tr>
<td>SLC-F-560</td>
<td>55</td>
<td>560</td>
</tr>
<tr>
<td>SLC-F-800</td>
<td>79</td>
<td>800</td>
</tr>
<tr>
<td>SLC-F-1040</td>
<td>103</td>
<td>1040</td>
</tr>
</tbody>
</table>

**Technical Specifications:**

### Performance:
- Object Resolution (Detection Capability): 14mm diameter
- Beam Gap: 10mm
- Protective Height: 160mm to 1040mm (6.3 inch to 41 inch)
- Operating Range: 300mm to 10.0m (1ft to 32.8ft)

### Electrical:
- Power Supply Voltage (Vs): SELV/PELV 24 VDC±20% (ripple p-p 10% maximum)
- Supply Outputs (OSSD): Two PNP or NPN transistor outputs (PNP or NPN is selectable by DIP Switch.) Load current of 300 mA max.,
- Output Operation Mode - Safety Output: Light-ON (Safety output is enabled when the receiver receives an emitting signal.)
- Over-voltage Category (IEC 60664-1): II
- Protective Circuit: Output short protection, Power supply reverse polarity protection
- Insulation Resistance: 20 MOhms or higher (500 VDC megger)
- Dielectric Strength: 1,000 VAC, 50/60 Hz (1 min)

### Functional:
- Test Function: Self-test (at power-on, and during operation). External test (light emission stop function by test input)
- Safety Related Functions: Interlock, External device monitoring (EDM) Pre-reset, Fixed blanking/Floating blanking Reduced resolution, Muting/Override, Scan code selection, PNP/NPN selection, Response time adjustment

### Environmental:
- Ambient Temperature: Operating: -10 to 55°C (14 to 131°F) (non-icing) Storage: -25 to 70°C (-13 to 158°F)
- Ambient Humidity: Operating: 35% to 85% (non-condensing) Storage: 35% to 95%
- Ambient Illuminance: Incandescent lamp: 3,000 lx max. on receiver surface, Sunlight: 10,000 lx max. on receiver surface
- Degree of Protection (IEC 60529): IP65 and IP67
- Vibration Resistance (IEC 61496-1): 10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps for all 3 axes
- Shock Resistance (IEC 61496-1): 100 m/s², 1000 shocks for all 3 axes
- Pollution Degree (IEC 60064-4): Pollution Degree 3

### Material:
- Housing: AluminumCap: PBT Front window: PMMA Cable: Oil resistant PVC Mounting Bracket: ZDC2 FE plate: SUS

### Conformity:
- Type of ESPE (IEC 61496-1): Type 4
- PFHd: < 9.9 × 10⁻⁸ (IEC 61508)
- Proof test interval TM: Every 20 years (IEC 61508)
- SFF: 99% (IEC 61508)
- HFT: 1 (IEC 61508)
- Classification: Type B (IEC 61508-2)
Safety Light Curtains  Type: SLC-H Hand (30mm)

FEATURES:
- Resolution: 30mm
- Protective height: 270mm to 1710mm
- Type 4 according to IEC61496-1 and -2
- Operating range: 0.3m to 20m
- Category 4, PLe according to EN/ISO13849-1
- Ingress protection IP67

ORDERING INFORMATION:

<table>
<thead>
<tr>
<th>SALES NUMBER</th>
<th>NUMBER OF BEAMS</th>
<th>PROTECTIVE HEIGHT (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLC-H-270</td>
<td>12</td>
<td>270</td>
</tr>
<tr>
<td>SLC-H-430</td>
<td>20</td>
<td>430</td>
</tr>
<tr>
<td>SLC-H-750</td>
<td>36</td>
<td>750</td>
</tr>
<tr>
<td>SLC-H-1070</td>
<td>52</td>
<td>1070</td>
</tr>
<tr>
<td>SLC-H-1470</td>
<td>72</td>
<td>1470</td>
</tr>
<tr>
<td>SLC-H-1710</td>
<td>84</td>
<td>1710</td>
</tr>
</tbody>
</table>

NOTE: Comes complete with SENDER, RECEIVER and STANDARD FIXING BRACKETS.

<table>
<thead>
<tr>
<th>SALES NUMBER</th>
<th>NUMBER OF BRACKETS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLC-SB-2</td>
<td>2</td>
</tr>
</tbody>
</table>

STANDARD BRACKETS (Supplied)
- Side mounting and backside mounting possible.
- Pack of two brackets included in the SLC-F package

<table>
<thead>
<tr>
<th>SALES NUMBER</th>
<th>NUMBER OF BRACKETS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLC-AB-2</td>
<td>2</td>
</tr>
</tbody>
</table>

ADJUSTABLE BRACKETS (Optional extra)
- Angle adjustment range is ±15°.
- Side mounting and backside mounting possible.

TECHNICAL SPECIFICATIONS:

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**SLC-F SAFETY LIGHT CURTAINS**  
**TECHNICAL DATA**

**Performance:**
- Object Resolution (Detection Capability) 30mm diameter
- Beam Gap 20mm
- Protective Height 270mm to 1710mm (10.5 inch to 68 inch)
- Operating Range 300mm to 20.0m (1ft to 65ft)

**Electrical:**
- Power Supply Voltage (Vs) SELV/PELV 24 VDC±20% (ripple p-p 10% maximum)
- Supply Outputs (OSSD) Two PNP or NPN transistor outputs (PNP or NPN is selectable by DIP Switch.)
- Output Operation Mode - Safety Output Light-ON (Safety output is enabled when the receiver receives an emitting signal.)
- Over-voltage Category (IEC 60664-1) II
- Protective Circuit Output short protection, Power supply reverse polarity protection
- Insulation Resistance 20 MOhms or higher (500 VDC megger)
- Dielectric Strength 1,000 VAC, 50/60 Hz (1 min)

**Functional:**
- Test Function Self-test (at power-on, and during operation). External test (light emission stop function by test input)
- Safety Related Functions Interlock External device monitoring (EDM) Pre-reset Fixedblanking/Floating blanking Reduced resolution Muting/Override Scan code selection PNP/NPN selection Response time adjustment

**Environmental:**
- Ambient Temperature Operating: -10 to 55°C (14 to 131°F) (non-icing)  
  Storage: -25 to 70°C (-13 to 158°F)
- Ambient Humidity Operating: 35% to 85% (non-condensing)  
  Storage: 35% to 95%
- Ambient Illuminance Incandescent lamp: 3,000 Ix max. on receiver surface  
  Sunlight: 10,000 Ix max. on receiver surface
- Degree of Protection (IEC 60529) IP65 and IP67
- Vibration Resistance (IEC 61496-1) 10 to 55 Hz, Multiple amplitude of 0.7 mm, 20 sweeps for all 3 axes
- Shock Resistance (IEC 61496-1) 100 m/s², 1000 shocks for all 3 axes
- Pollution Degree (IEC 60664-1) Pollution Degree 3

**Material:**
- Housing: Aluminum Cap: PBT Front window: PMMA Cable: Oil resistant PVC Mounting Bracket: ZDC2 FE plate: SUS

**Conformity:**
- Type of ESPE (IEC 61496-1) Type 4
- Performance Level (PL) Safety Category Type 4: PL e/Category 4 (EN ISO 13849-1:2008)
- PFHd < 9.9 x 10^-6 (IEC 61508)
- Proof test interval TM Every 20 years (IEC 61508)
- SFF 99% (IEC 61508)
- HFT 1 (IEC 61508)
- Classification Type B (IEC 61508-2)
Safety Light Curtains  Type: SLC-F and SLC-H

CONNECTIONS (Basic Wiring Diagrams):

STANDALONE SLC-F or SLC-H using PNP OUTPUTS:

[DIP Switch settings]
Receiver:
- Manual Reset Mode
- EDM enabled
- PNP output

Emitter:
- 24 V Active

[1] Power Supply
+24 VDC

0 VDC

S1: Test Switch
S2: Lockout/Interlock Reset Switch
KM1, KM2: Safety relay with forcibly guided contacts
M: 3-phase motor
*1. Also used as EDM input line.

STANDARD MUTING MODE/EXIT-ONLY MUTING MODE WITH TWO MUTING SENSORS USING PNP OUTPUTS

[DIP Switch settings]
Receiver:
- Auto Reset Mode
- EDM disabled
- PNP output

Emitter:
- 24 V Active

S1: Test Switch
S2: Lockout/Interlock Reset Switch, Override Switch or Override Cancel Switch
M: Muting lamp
A1, B1: Muting sensor

Power Supply
+24 VDC
0 VDC

Reflector

Mutin Sensor (PNP output)
Safety Light Curtains  Type: SLC-F and SLC-H

DIMENSIONS:
MOUNTED WITH STANDARD FIXED BRACKETS (supplied in pack) BACKSIDE MOUNTING:

DIMENSIONS FOR SLC-H SERIES

<table>
<thead>
<tr>
<th>Dimension</th>
<th>SLC-H SERIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimension A</td>
<td>C1 + 18</td>
</tr>
<tr>
<td>Dimension C1</td>
<td>Protective Height (See pp221)</td>
</tr>
<tr>
<td>Dimension D</td>
<td>C1 - 50</td>
</tr>
<tr>
<td>Dimension P</td>
<td>20</td>
</tr>
</tbody>
</table>

DIMENSIONS FOR SLC-F SERIES

<table>
<thead>
<tr>
<th>Dimension</th>
<th>SLC-F SERIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimension A</td>
<td>C2 + 48</td>
</tr>
<tr>
<td>Dimension C2</td>
<td>Protective Height (See p220)</td>
</tr>
<tr>
<td>Dimension D</td>
<td>C1 - 20</td>
</tr>
<tr>
<td>Dimension P</td>
<td>10</td>
</tr>
</tbody>
</table>

STANDARD FIXED BRACKET DIMENSIONS (Supplied)

Material: Alloy
Safety Light Curtains  
**Type: SLC-F and SLC-H**

**INDICATOR INFORMATION:**

<table>
<thead>
<tr>
<th>Emitter</th>
<th>Name of Indicator</th>
<th>Colour</th>
<th>Illuminated</th>
<th>Blinking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test</td>
<td>TEST</td>
<td>Green</td>
<td>Long range mode is selected by DIP Switch.</td>
<td>External test is being performed.</td>
</tr>
<tr>
<td>Operating Range</td>
<td>LONG</td>
<td>Green</td>
<td>Power is ON.</td>
<td>Lockout state due to DIP Switch setting error.</td>
</tr>
<tr>
<td>Power</td>
<td>POWER</td>
<td>Green</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Lockout</td>
<td>LOCKOUT</td>
<td>Red</td>
<td>-</td>
<td>Lockout state due to error in emitter.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Receiver</th>
<th>Name of Indicator</th>
<th>Colour</th>
<th>Illuminated</th>
<th>Blinking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top-beam-state</td>
<td>TOP</td>
<td>Blue</td>
<td>The top beam is unblocked</td>
<td>Muting/Override state, or Lockout state due to Cap error or other sensor error.</td>
</tr>
<tr>
<td>NPN/NPN mode</td>
<td>NPN</td>
<td>Green</td>
<td>NPN mode is selected by DIP Switch</td>
<td>-</td>
</tr>
<tr>
<td>Response time</td>
<td>SLOW</td>
<td>Green</td>
<td>Response Time Adjustment is enabled</td>
<td>-</td>
</tr>
<tr>
<td>Sequence error</td>
<td>SEQ</td>
<td>Yellow</td>
<td>Sequence error in Muting or Pre-reset mode.</td>
<td>-</td>
</tr>
<tr>
<td>Blanking</td>
<td>BLANK</td>
<td>Green</td>
<td>Blanking, Warning Zone or Reduced Resolution is enabled.</td>
<td>Teach-in mode, or Blanking Monitoring error.</td>
</tr>
<tr>
<td>Configuration</td>
<td>CFG</td>
<td>Green</td>
<td>-</td>
<td>Teach-in mode, zone measurement being performed by Dynamic Muting, or Lockout state due to Parameter error or Cascading Configuration error.</td>
</tr>
<tr>
<td>Interlock</td>
<td>INT-LK</td>
<td>Yellow</td>
<td>Interlock state</td>
<td>Pre-reset mode.</td>
</tr>
<tr>
<td>External device monitoring</td>
<td>EDM</td>
<td>Green</td>
<td>RESET input is in ON state</td>
<td>Lockout state due to EDM error.</td>
</tr>
<tr>
<td>Internal error</td>
<td>INTERNAL</td>
<td>Red</td>
<td>-</td>
<td>Lockout state due to Internal error, or error due to abnormal power supply or noise.</td>
</tr>
<tr>
<td>Lockout</td>
<td>LOCKOUT</td>
<td>Red</td>
<td>-</td>
<td>Lockout state due to error in receiver.</td>
</tr>
<tr>
<td>Stable-state</td>
<td>STB</td>
<td>Green</td>
<td>The bottom beam is unblocked</td>
<td>Muting/Override state, or Lockout state due to DIP Switch setting error.</td>
</tr>
<tr>
<td>ON/OFF</td>
<td>ON/OFF</td>
<td>Red</td>
<td>Safety output is in OFF state.</td>
<td>Lockout state due to Off state error, or error due to abnormal power supply or noise.</td>
</tr>
<tr>
<td>Communication</td>
<td>COM</td>
<td>Green</td>
<td>Synchronization between emitter and receiver is maintained.</td>
<td>Lockout state due to Communication error, or error due to abnormal power supply or noise.</td>
</tr>
<tr>
<td>Bottom-beam-state</td>
<td>BTM</td>
<td>Blue</td>
<td>The bottom beam is unblocked</td>
<td>-</td>
</tr>
</tbody>
</table>

Accessories: Brackets, Alignment Tool, Extension Cables

**ADJUSTABLE MOUNTING BRACKET:**

**SMART MUTING ACTUATOR:**

**MUTING LAMP:**

**EXTENSION CABLES:**

<table>
<thead>
<tr>
<th>Accessory Description</th>
<th>Muting Trigger Beam</th>
<th>Sales Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart Muting Actuator - 8 beams</td>
<td>100mm</td>
<td>SLC-SMA100</td>
</tr>
<tr>
<td>Smart Muting Actuator - 20 beams</td>
<td>300mm</td>
<td>SLC-SMA300</td>
</tr>
</tbody>
</table>

**TECHNICAL DATA:**

- Rated Voltage: 60V ac/dc max.
- Rated Current: 4A max. per contact
- Electromagnetic Protection: Shielded
- Sleeve Material: PUR
- Wire Structure: 5 x 0.34mm²
- Wire Insulation: PP
- Outer Cable Diameter: 6.3mm ± 5%
- Temperature Range: -25°C to +80°C (-13°F to +175°F)
- Degree of Protection: IP67
- Certification: UL CSA

**CABLE DESCRIPTION**

<table>
<thead>
<tr>
<th>Cable Description</th>
<th>Sales Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUR Shielded M12 5-pole 3m length</td>
<td>SLC-CE3</td>
</tr>
<tr>
<td>PUR Shielded M12 5-pole 10m length</td>
<td>SLC-CE10</td>
</tr>
<tr>
<td>PUR Shielded M12 8-pole 3m length</td>
<td>SLC-CR3</td>
</tr>
<tr>
<td>PUR Shielded M12 8-pole 10m length</td>
<td>SLC-CR10</td>
</tr>
</tbody>
</table>

**NOTE:** Cables are not supplied with Safety Light Curtains