



# Safety Light Curtains

## Type 2 SG2 Series (Basic & Extended Models)

Hand Protection



Presence Protection



- Integrated light curtain for Hand Protection or Presence Control
- Operating distance up to 19m
- Controlled heights from 150 to 1800mm
- Compact 32 x 37mm profile
- Sturdy profile and rotating brackets
- Test/Restart, Auto/Manual Restart, EDM, Anti-interference
- User interface with display
- Alignment function

The SG2 Type 2 series offers two models, the SG2 basic and the SG2 extended. Available functions include Test/Restart, EDM and Anti-interference. With very fast response times, the SG2 series can be installed right next to a hazardous area improving productivity. The rotating mounting brackets make installation and the alignment of the emitting and receiving units easy, even at long distances and in applications that use mirrors.

## Type 4 SG4 Series

Finger Protection



Hand Protection



- Integrated light curtain for Finger Protection or Hand Protection
- Operating distance up to 6m for Finger Protection series & 19m for Hand Protection series
- Controlled heights from 150 to 1800mm
- Compact 32 x 37mm profile
- Sturdy profile and rotating brackets
- Test/Restart, Auto/Manual Restart, EDM
- User interface with display
- Alignment function

With mounting brackets that rotate, no connection necessary between emitter and receiver, and configuration that can be accomplished without external control units or supplementary cables, the SG4 Type 4 light curtains are one of the best available on the market today. In addition, the light curtains can be aligned using the 7 segment display on either the emitter or receiver.





## Applications

The SG safety light curtain family provides solutions for automation where access to hazardous areas must be controlled. In particular, safety curtains can be used to stop machine movement in the following industries.

- Automated manufacturing

### SG2 Series

#### Milling Machine



**Situation:** Protect operator hand's from injury from moving parts.

**Solution:** The machine's movement stops immediately even if only one of the safety light curtain beams is interrupted.

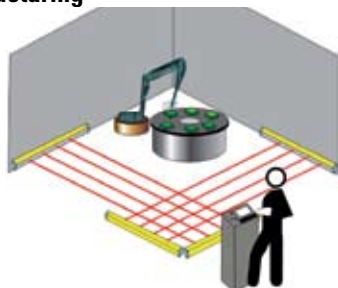
#### Machine Restart Prevention



**Situation:** Avoid accidental machine restart when an operator is performing maintenance.

**Solution:** A safety light curtain can stop a machine when the operator enters a hazardous area. A manual restart is then necessary to restart the production cycle. Horizontal light curtains are positioned and actually connected to the restart of the main light curtain in the areas where the operator may not be visible when doing maintenance.

#### Robotic Manufacturing



**Situation:** Protect operator from being hit or crushed by a robotic arm's movement.

**Solution:** The robot stops when the operator enters a hazardous area and interrupts the optic grid, usually placed on the floor.

### SG4 Series

#### Operating Point Protection on a Drilling Machine



**Situation:** An operator positions a part before machining and removes it when done and must be protected from injury while working.

**Solution:** When the operator's hand interrupts the light beam, the SG4 series of safety light curtains stop the machine's movement because the light curtain can be installed directly on the machine near the hazard.

#### Paper Cutting Machines



**Situation:** These machines typically cut paper to a specific size for newspapers or special applications and the operator needs to be protected against injury from the cutter blades.

**Solution:** Installed directly on the machine near the hazardous area, the SG4 series of safety light curtains stop the machine when the operator's hand interrupts the light beam.

#### Machine Press



**Situation:** Protect operator from either being pinned between the top and bottom portions of a machine press, or struck by the machined part while it is moving.

**Solution:** If even one beam of the SG4 series safety light curtain is interrupted by an operator's hand or finger, while the press is moving, the mobile tool bar will stop.

## Specifications

|                             | SG2 - Hand Series   |  | SG2 - Presence Control Series   |             | SG4 - Finger Series   |  | SG4 - Hand Series   |           |  |
|-----------------------------|---|--|---|-------------|---|--|---|-----------|--|
|                             | Type 2 Safety Category  |  |   |             | Type 4 Safety Category  |  |   |           |  |
|                             |  |  |  |             |  |  |  |           |  |
| Electrical                  | Power supply (Vdd)  | 24V DC ± 20%   |   |             |   | 24V DC ± 20%   |   |           |  |
|                             | Consumption (TX):   | 2.5W max   |   |             |   | 2.5W max   |   |           |  |
|                             | Consumption (RX):   | 3.5W max (without load)  |   |             |   | 4W max (without load)  |   |           |  |
|                             | OSSD outputs:   | 2 PNP (push-pull)  |   |             |   | 2 PNP (push-pull)  |   |           |  |
|                             | Short-circuit protection:   | 1.4A max   |   |             |   | 1.4A max   |   |           |  |
|                             | Output current:   | 0.5A max on each output  |   |             |   | 0.5A max on each output  |   |           |  |
|                             | Output voltage – ON status:   | Vdd-1V min   |   |             |   | Vdd-1 V  |   |           |  |
|                             | Output voltage – OFF status:  | 0.2V max   |   |             |   | 0.2V max   |   |           |  |
|                             | Leakage current:  | < 1mA  |   |             |   | < 1mA  |   |           |  |
|                             | Capacitive load:  | 2.2 uF @ 24V DC max*   |   |             |   | 2.2 uF @ 24V DC*   |   |           |  |
|                             | Optical   | Controlled height:   | 150 - 1800mm  |             | 300 - 1800mm  |  | 150 - 1800mm  |           |  |
| Auxiliary functions:        |   | Test/Reset, Auto/Manual Restart (extended), EDM (extended)                               |   |             |   | Test/Reset, Auto/Manual Restart, EDM   |   |           |  |
| Electrical protection:      |   | Class I / Class III  |   |             |   | Class I / Class III  |   |           |  |
| Connections:                |   | M12: Emitter 4 pole, Receiver 5 pole (basic), 8 pole (extended)                          |   |             |   | M12: Emitter 4-pole, Receiver 8-pole   |   |           |  |
| Cable length (for powering) |   | 50m. max *   |   |             |   | 50m. max *   |   |           |  |
| Light emission:             |   | Infrared LED (950nm)   |   |             |   | Infrared LED (950nm)   |   |           |  |
| Resolution:                 |   | 30mm   |   | 50mm / 90mm |   | 14mm   |   | 30 mm     |  |
| Operating distance:         |   | 0.2m-19m (basic) or selectable 0.2m-9m / 0.2-19m (extended)                              |   |             |   | 0.2 - 6m   |   | 0.2 - 19m |  |
| Aperture angle (EAA):       |   | ±5°  |   |             |   | ±2.5°  |   |           |  |
| Ambient light rejection:    |   | IEC 61496-2  |   |             |   | IEC 61496-2  |   |           |  |
| Mechanical & Environmental  |   | Operating temperature:   | 0 - 55°C  |             |   |  | 0 - 55°C  |           |  |
|                             | Storage temperature:  | -25 to +70°C   |   |             |   | -25 to +70°C   |   |           |  |
|                             | Temperature class:  | T6   |   |             |   | T6   |   |           |  |
|                             | Humidity:   | 15 - 95% (no condensation)   |   |             |   | 15 - 95% (no condensation)   |   |           |  |
|                             | Mechanical protection:  | IP65 (EN 60529)  |   |             |   | IP65 (EN 60529)  |   |           |  |
|                             | Vibrations:   | 0.35mm amplitude, 10 - 55 Hz frequency<br>20 sweep per axis, 1 octave/min (EN 60068-2-6) |   |             |   | 0.35mm amplitude, 10 - 55 Hz frequency<br>20 sweep per axis, 1 octave/min (EN 60068-2-6) |   |           |  |
|                             | Shock resistance:   | 16ms (10g) 1.000 shock per axis, (EN 60068-2-29)   |   |             |   | 16ms (10g) 1.000 shock per axis, (EN 60068-2-29)   |   |           |  |
|                             | Housing material:   | Painted aluminium (yellow RAL 1003)  |   |             |   | Painted aluminium (yellow RAL 1003)  |   |           |  |
| Protective shield material: | PMMA  |  |   |             | PMMA  |  |   |           |  |

\*If a longer cable is needed, please verify that the capacitive load specifications are followed.

## Control Heights

| Height |
|--------|
| 150mm* |
| 300mm  |
| 450mm  |
| 600mm  |
| 750mm  |
| 900mm  |
| 1050mm |
| 1200mm |
| 1350mm |
| 1500mm |
| 1650mm |
| 1800mm |

## Number of Controlled Beams

| Height | SG2 Hand | SG2 Presence |      | SG4 Finger | SG4 Hand |
|--------|----------|--------------|------|------------|----------|
|        |          | 50mm         | 90mm |            |          |
| 150    | 8        | –            | –    | 16         | 8        |
| 300    | 16       | 9            | 5    | 32         | 16       |
| 450    | 24       | 13           | 7    | 48         | 24       |
| 600    | 32       | 17           | 9    | 64         | 32       |
| 750    | 40       | 21           | 11   | 80         | 40       |
| 900    | 48       | 25           | 13   | 96         | 48       |
| 1050   | 56       | 29           | 15   | 112        | 56       |
| 1200   | 64       | 33           | 17   | 128        | 64       |
| 1350   | 72       | 37           | 19   | 144        | 72       |
| 1500   | 80       | 41           | 21   | 160        | 80       |
| 1650   | 88       | 45           | 23   | 176        | 88       |
| 1800   | 96       | 49           | 25   | 192        | 96       |

\* Not applicable to SG2 Presence Control series.

## Response Time (ms)

| Height | SG2 Hand | SG2 Presence |      | SG4 Finger | SG4 Hand |
|--------|----------|--------------|------|------------|----------|
|        |          | 50mm         | 90mm |            |          |
| 150    | 8        | –            | –    | 11         | 9        |
| 300    | 9        | 9            | 9    | 15         | 11       |
| 450    | 11       | 10           | 10   | 18         | 13       |
| 600    | 12       | 11           | 11   | 22         | 14       |
| 750    | 14       | 12           | 12   | 25         | 16       |
| 900    | 15       | 14           | 13   | 29         | 18       |
| 1050   | 17       | 15           | 14   | 33         | 19       |
| 1200   | 18       | 16           | 15   | 36         | 21       |
| 1350   | 20       | 17           | 16   | 40         | 23       |
| 1500   | 21       | 18           | 17   | 43         | 25       |
| 1650   | 23       | 19           | 18   | 47         | 26       |
| 1800   | 24       | 20           | 19   | 50         | 28       |

## Part Numbers

| Item  | Safety Category | Protection Type   | Resolution  | Included Functions  | Part Number                          |
|---|-----------------|---|---|---|--------------------------------------|
|  | Type 2          | Hand<br><br>Type 2     |                      | Basic Model - Test/Reset  | SG2-30-□-00-X                        |
|   |                 | Presence<br><br>Type 2 |                      | Extended Model - Test/Reset, Auto/Manual Restart, EDM                             | SG2-30-□-00-E-C                      |
|   |                 |   |                      | Basic Model - Test/Reset  | SG2-50-□-00-X                        |
|   |                 |   |                      | Extended Model - Test/Reset, Auto/Manual Restart, EDM                             | SG2-50-□-00-E-C                      |
|   |                 |   |   | Basic Model - Test/Reset  | SG2-90-□-00-X                        |
|   |                 | Extended Model- Test/Reset, Auto/Manual Restart, EDM  | SG2-90-□-00-E-C   |   |                                      |
|   | Type 4          |   | Finger<br><br>Type 4 |  | Test/Reset, Auto/Manual Restart, EDM |
|   | Type 4          | Hand<br><br>Type 4     |                      | Test/Reset, Auto/Manual Restart, EDM  | SG4-30-□-00-E                        |

| Controlled Height Code |      |
|------------------------|------|
| Controlled Height      | Code |
| 150mm*                 | 015* |
| 300mm                  | 030  |
| 450mm                  | 045  |
| 600mm                  | 060  |
| 750mm                  | 075  |
| 900mm                  | 090  |
| 1050mm                 | 105  |
| 1200mm                 | 120  |
| 1350mm                 | 135  |
| 1500mm                 | 150  |
| 1650mm                 | 165  |
| 1800mm                 | 180  |

\* Not applicable to SG2 Presence Control series.

In place of □ enter the Controlled Height code. See table on the right.

## Accessories

### M12 Unshielded Axial Connector Cable, UL 2464

| Item  | # of Poles    | Used For  | Cable Length  | Part Number   |
|---|---------------|---|---------------|---------------|
|  | 4             | <br>SG4 & SG2 Emitters                 | 3m            | CS-A1-02-U-03 |
|   |               |   | 5m            | CS-A1-02-U-05 |
|   |               |   | 10m           | CS-A1-02-U-10 |
|   |               |   | 15m           | CS-A1-02-U-15 |
|   |               |   | 25m           | CS-A1-02-U-25 |
|   | 5             | <br>SG2 Basic Model Receivers          | 3m            | CS-A1-03-U-03 |
|   |               |   | 5m            | CS-A1-03-U-05 |
|   |               |   | 10m           | CS-A1-03-U-10 |
|   |               |   | 15m           | CS-A1-03-U-15 |
|   | 8             | <br>SG4 & SG2 Extended Model Receivers | 3m            | CS-A1-06-U-03 |
|   |               |   | 5m            | CS-A1-06-U-05 |
|   |               |   | 10m           | CS-A1-06-U-10 |
| 15m   |               |   | CS-A1-06-U-15 |               |
| 25m   | CS-A1-06-U-25 |   |               |               |

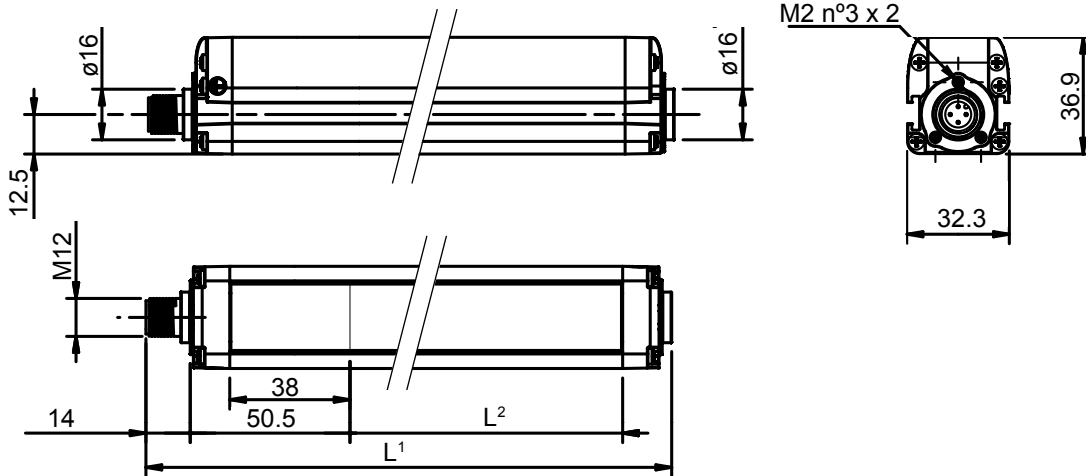
### Mounting Brackets

| Item   | Description                                      | Part Number |
|--|--|-------------|
|  | Angled mounting brackets (4 pc kit)              | ST-KSTD     |
|  | Anti-vibration supports (4 pc kit)               | ST-K4AV     |
|  | Anti-vibration supports (6 pc kit)               | ST-K6AV     |
|  | Top-Bottom rotating mounting brackets (4 pc kit) | ST-K4ROT    |

### Laser Pointer

| Item   | Description   | Part Number |
|--|---|-------------|
|  | Laser pointer used to aide in aligning safety light curtains. | SG-LP       |

### Dimensions (mm)



### Dimension Table

| Model | L <sup>1</sup> | L <sup>2</sup> |
|-------|----------------|----------------|
| 150*  | 233.3          | 153.3          |
| 300   | 383.2          | 303.2          |
| 450   | 533.2          | 453.3          |
| 600   | 683.2          | 603.2          |
| 750   | 833.2          | 753.3          |
| 900   | 983.2          | 903.2          |
| 1050  | 1133.2         | 1053.2         |
| 1200  | 1283.3         | 1203.3         |
| 1350  | 1433.2         | 1353.2         |
| 1500  | 1583.3         | 1503.3         |
| 1650  | 1733.3         | 1653.3         |
| 1800  | 1883.3         | 1803.3         |

\* Not applicable to SG2 Presence Control series.

### Connections

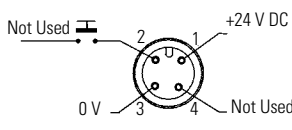
#### SG2 Basic Models

##### M12 5-Pole Connector



| Pin | Cable Color | Function   |
|-----|-------------|------------|
| 1   | brown       | +24V DC    |
| 2   | white       | OSSD1      |
| 3   | blue        | 0V         |
| 4   | black       | OSSD2      |
| 5   | gray        | TEST/RESET |

##### M12 4-Pole Connector



| Pin | Cable Color | Function |
|-----|-------------|----------|
| 1   | brown       | +24V DC  |
| 2   | white       | Not Used |
| 3   | blue        | 0V       |
| 4   | black       | Not Used |

#### SG2 Extended Models / SG4 Models

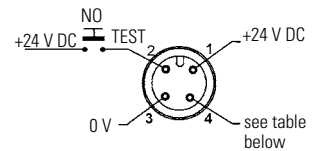
##### M12 8-Pole Connector



| Pin | Cable Color | Function               |
|-----|-------------|------------------------|
| 1   | white       | RESET*                 |
| 2   | brown       | +24 V DC               |
| 3   | green       | EDM Activation         |
| 4   | yellow      | EDM                    |
| 5   | gray        | OSSD1                  |
| 6   | pink        | OSSD2                  |
| 7   | blue        | 0 V                    |
| 8   | red         | SEL MAN / AUTO RESTART |

\*Automatic RESTART - RESET function  
Manual RESTART - RESET/RESTART function

##### M12 4-Pole Connector



| Pin | Cable Color | Function                                     |
|-----|-------------|--|
| 1   | brown       | +24V DC                                      |
| 2   | white       | TEST   |
| 3   | blue        | 0 V  |
| 4   | black       | SG2: SEL operating distance<br>SG4: Not Used |

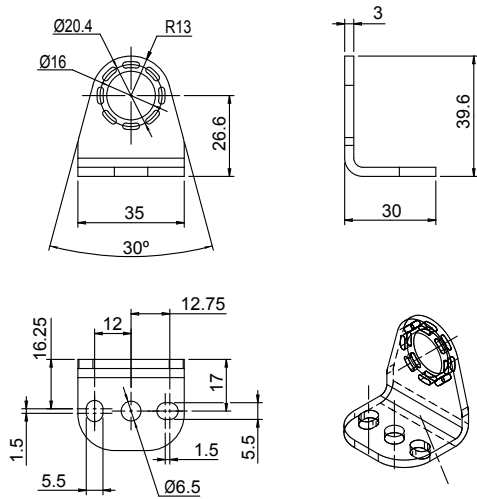
### Indicators & Settings

SG4 and SG2 light curtains are equipped with an Alignment system that shows alignment status on a visual display, making configuration quick and easy. Alignment level and any change in environment conditions (presence of dust, light disturbance, etc.) are monitored during normal operating mode. The display also gives diagnostic messages to ensure accurate and correct functioning.

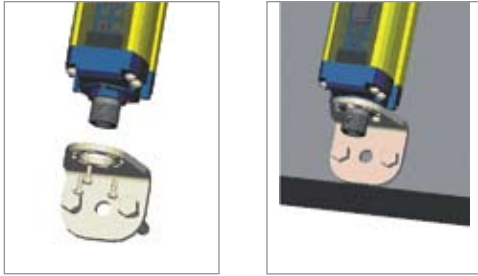


## Mounting Brackets Dimensions (mm)

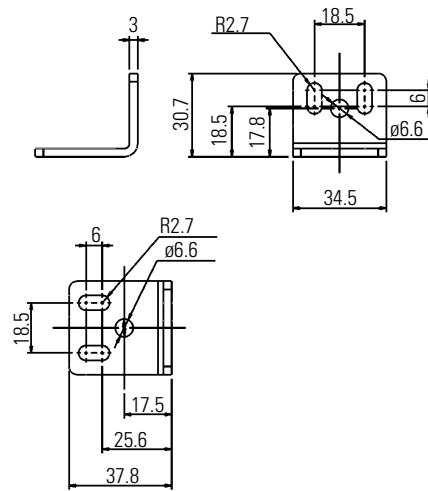
### Rotating Mounting Bracket <sup>1</sup> (ST-K4ROT)



1. Supplied with the SG2 extended models only.



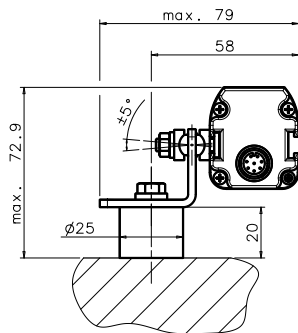
### Angled Mounting Bracket <sup>2</sup> (ST-KSTD)



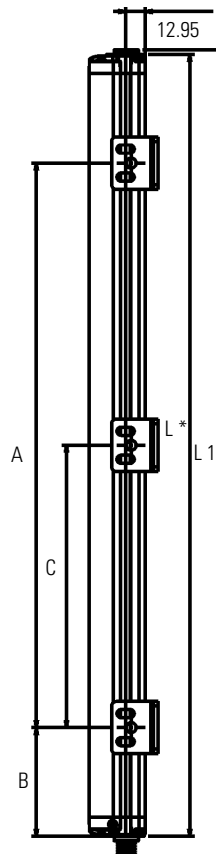
2. Supplied with SG2 standard models and all SG4 models.



### Anti-vibration Support Brackets (ST-K4AV/ST-K6AV)



### Mounting Bracket with Light Curtain (mm)



Mounting Bracket Dimension Table (mm)

| Height | L      | A    | B   | C   |
|--------|--------|------|-----|-----|
| 150*   | 216.3  | 108  | 54  | -   |
| 300    | 366.2  | 216  | 75  | -   |
| 450    | 516.3  | 316  | 100 | -   |
| 600    | 666.2  | 366  | 150 | -   |
| 750    | 816.3  | 466  | 175 | -   |
| 900    | 966.2  | 566  | 200 | -   |
| 1050   | 1116.2 | 666  | 225 | -   |
| 1200   | 1266.3 | 966  | 150 | 483 |
| 1350   | 1416.2 | 1066 | 175 | 533 |
| 1500   | 1566.3 | 1166 | 200 | 583 |
| 1650   | 1716.3 | 1266 | 225 | 633 |
| 1800   | 1866.3 | 1366 | 250 | 683 |

\* Not applicable to SG2 Presence Control series.