Single-beam Photoelectric Safety Switches and Multiple Light Beam Safety Devices

SICK leads the way in sensor technologies. With the decision for a safety solution from SICK, you are not just selecting uncompromising state-of-the-art technology. You acquire much more: Quality that covers the whole process from consultation through commissioning to after-sales service.
We have been developing industrial sensors for our customers for more than five decades. The result: A steady stream of increasingly good solutions — independent, innovative and always ahead. We are familiar with many industries, but nevertheless take a cross-sector approach. This results in system solutions which fulfil all requirements. Wherever technical developments take you — SICK has a suitable solution. This is what we call “Sensor Intelligence”. And you?

**SICK | SINGLE-BEAM PHOTOELECTRIC SAFETY SWITCHES AND MULTIPLE LIGHT BEAM SAFETY DEVICES**

Mature technologies should be as simple as possible. SICK stands for standardised integration in all automation environments: from the relay through safe controls to the field bus. Problem-free due to uniform CDS user interface for all programmable SICK safety products.

Intelligent solutions must be consistent from planning to implementation. For this reason, our service is tailored to the whole machine life cycle right from the start. We place the emphasis on more: Accredited services, support during planning, commissioning, maintenance and training.

We study and shape technical developments in many sectors. Know-how is therefore our capital which we are happy to share with you. By means of our application support, you can benefit from our wealth of experience, without this support you would have to build up this know-how.
Sensor Intelligence for the industries of the world. Where photoelectric safety switches are used.

Worldwide leadership.
Ensuring the highest safety standards while accelerating process sequences — that’s what SICK safety sensors are about. As a worldwide, independent and leading manufacturer we develop intelligent sensor solutions for you which are tailored exactly to your specific requirements. In all areas of mechanical engineering.

Problem-free and safe.
In the ever faster and complex logistics and transport systems nothing must interfere with the perfectly matched material flows. Here, Sensor Intelligence ensures that all things are in the right place at the right time. Whether large or small items — each part is processed smoothly from the warehouse via production up to delivery. SICK safety sensors are always involved.

- Protecting people
- Increasing system productivity
- Reducing costs
- Increasing availability
- Reducing time to market
The more intelligent the technology, the safer the processes. That’s why SICK Sensor Intelligence provides safety in many sectors around the world. Regardless of what is produced: Where people and machines interface state-of-the-art safety solutions from SICK are required.

Automatically precise.

In many industrial sectors an increasing number of tasks is performed by robots. They work accurately, reliably and tirelessly. So that nothing gets in your way SICK Sensor Intelligence secures your workplace. The best for all involved: The robots can work efficiently and without hindrance and people are not endangered.

Efficiently planned.

In the worldwide race for increased efficiency and optimised processes SICK has been one of the market leaders for decades. Ever more complex safety systems ensure fewer downtimes and better machine utilisation across the world. Intelligent safety sensors not only serve to protect people and machines, they also facilitate efficient processes.

Faster switching.

Although packaging machines and plants perform most of the work, it is nevertheless often essential to access hazardous areas to perform maintenance work. People must not be exposed to danger and the process must not be interrupted for longer than necessary. SICK sensor solutions help: They switch off plants safely as soon as the process is interrupted and switch them on again when the interruption is over. Sensor Intelligence as it should be.
SICK multiple light beam safety devices: Complete safety tailored to your exact requirements.
The newest generation of M4000 multiple light beam safety devices from SICK offers you high investment security through functions which are tailored exactly to your requirements. Three versions with different SICK interfaces keep all your options open. In this way, you only pay for what you really need.

M4000 Advanced + UE403
Access protection with muting

M4000 Standard
Access protection

M4000 Area
Area protection

Interface to the different system worlds
- Safety relays
  UE10 series
- Safety controller
  UE100 series
- Safety bus modules
  UE1000 series
M4000 Advanced is functional and technologically the top device of the product family. As a type 4 multiple light beam safety device to IEC 61496 it ensures the highest application requirements with respect to access protection for machines and plants. In conjunction with the SICK UE403 switching amplifier this results in a remote muting solution with many benefits to the user.

### Technical details

- **Housing profile with 3 mounting grooves and swivel-mount end caps**

### Specific benefit

- Maximum mounting flexibility for the system
- No preferred position for sender or receiver

- **End cap with integrated LED**

### Specific benefit

- The device status can be viewed from 360°: OSSD on; OSSD off; Muting
- Reduced wiring outlay for external indicator lamps

- **Integrated laser alignment aid in each beam**

### Specific benefit

- An aid which is always available and permits optimal alignment
- Especially helpful when deflector mirrors are used
- Optimal alignment results in increased plant availability and highest productivity
- Reduced servicing

- **LED/7-segment display and SICK CDS configuration**

### Specific benefit

- Clear diagnostics and status information
- Simple configuration over SICK CDS interface for optimal adaptation of configuration to application
- Maximum plant availability, highest productivity

- **SDL interface and UE403 connection for remote muting solution (IP 65)**

### Specific benefit

- One universal interface, via which all peripheral technologies can be incorporated: from the relay through safe control to the safe bus
- Reduced stockkeeping through fewer variants
M4000 Advanced multiple light beam safety device and UE403: The link for remote muting.

Convincing advantages of remote muting with M4000 Advanced and UE403:
- Local processing of signals: fewer cables, lower installation outlay, more space in the control cabinet
- Supply voltage for connected muting sensors directly from UE403
- Local IP 65 connection makes additional control cabinet unnecessary
- Standardised M12 connection method reduces stockkeeping
- Configuration memory: Since no reconfiguration is required when photoelectric switches are replaced, downtimes are reduced

Basic functions of UE403:
- Connection of 2 to 4 muting sensors, external muting lamp, reset and override control switch, conveyor belt stop signal
- Concurrence monitoring
- Monitoring of the total muting time
- Sensor gap monitoring
- Sensor test
- Partial blanking
- End of muting by ESPE
- Integrated override

Technical details
Universal mounting options
RS 232 interface and configuration memory
M12 connection method with LED status indications and labelling field

Specific benefit
- Flexible mounting of UE403 to M4000 or other plant section
- Remote muting solution with safe on site signal processing
- The cable outlet direction can be varied. This reduces the mechanical strain on the connections and results in fewer faults, increased plant availability and higher productivity
- Selectable access to configuration and diagnostics over M4000 or UE403
- Reconfiguration not required after replacement of M4000 or UE403
- Reduced downtimes, increased plant availability, higher productivity
- Reduced stockkeeping costs
- Unambiguous on site diagnostics
- Individual labelling
- Optimised diagnostics for commissioning and reduced downtimes in the event of a fault

Entry/Exit (muting) with M4000 Advanced + UE403
Even the basic configuration of M4000 Standard offers comprehensive functions for reliable protection of machines and plants. Additional functions are available, if required. You get exactly what you require — and only pay for what you need.

**Technical details**

- **Housing profile with 3 mounting grooves and swivel-mount end caps.**

- **End cap with integrated LED**

- **Integrated laser alignment aid in each beam**

- **Configuration buttons**

- **LED/7-segment display**

- **Separate connection: Reset**

- **Integrated interface: AS-Interface Safety at Work**

**Specific benefit**

- Maximum mounting flexibility for the system
- No preferred position for sender or receiver

- The device status can be viewed from 360° OSSD on; OSSD off; Muting
- Reduced wiring outlay for external indicator lamps

- An aid which is always available and permits optimal alignment
- Especially helpful when deflector mirrors are used
- Optimal alignment results in increased plant availability and highest productivity
- Reduced servicing

- Fast commissioning through menu-driven setting of basic functions directly on device without additional tools or aids
- Maximum availability and productivity through clear diagnostics and status information

- Low wiring outlay through direct connection of reset button

- Integration of M4000 into safe bus systems: Directly or over SICK UE1000 interfaces

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**Basic functions:**

- Restart interlock
- External device monitoring
- Beam coding
- Application diagnostic output (ADO)
- Scanning range up to 70 m
Two different product variants are used depending on the requirement. M4000 has a sender and receiver variant for larger scanning ranges. For shorter scanning ranges only one active and one passive M4000 component are required.

Protection using M4000 Area

Multiple side access protection: M4000 sender/receiver
M4000 and mirror columns create an “optical fence” which permits safe access to the machine from all sides.
- For large scanning ranges up to 70 m
- Integrated laser alignment
- Mirror columns

Single-side access protection: M4000 A/P and M4000 Passive
Physical barriers block lateral access while M4000 secures access from only one side.
- With 2 or 4 beams
- For scanning ranges up to 7.5/4.5 m
- Cost savings and reduced wiring outlay since the passive M4000 unit does not require an electrical connection

Classical area protection with M4000 Area
Large areas in front of machines are protected horizontally. M4000 Area is an alternative when the scanning ranges of other area protection systems, e.g. laser scanners, are not powerful enough.
- 60 or 80 mm resolution possible
- Scanning ranges up to 70 m

Point-of-operation guarding with M4000 Area
- e.g. at an output conveyor in the automobile industry or for press protection
Single-beam photoelectric safety switches: Compact solutions for individual safety systems.
Single-beam photoelectric safety switches already offer effective solutions for many requirements: Whether on robots or processing machines or in palletiser systems, high-bay warehouses or transfer lines. With SICK Sensor Intelligence we will develop a tailor-made solution for you which suits your exact requirements.

The highlights of the SICK single-beam photoelectric safety switches
- Type 2 and 4 according to IEC 61496
- High IP 67 enclosure rating
- Extreme applications such as heat (+60 °C) or cold (–40 °C)
- Different scanning ranges
- Simple machine integration through small, compact type of construction which protects the sensor against damage

The right solution for different applications:
- Wide range of sensor products with different types of construction, sizes and materials
- A single photoelectric switch for safety and automation tasks: Double benefit reduces stock-keeping costs
- Convincing with respect to price and performance

Type 2 according to IEC 61496
WS/WE, VS/VE

Type 4 according to IEC 61496
L4000

Type 4 according to IEC 61496
WSU/WEU

Door monitoring using L4000
Access protection variants.

Each machine and plant requires its own safety sensors. Some basic variants can be distinguished which can be implemented with single-beam photoelectric safety switches and multiple light beam safety devices or with safety light curtains from SICK.

Multiple side access protection
To facilitate optimal operation a press must be accessible from different sides, for example. Electro-sensitive protection on three sides with the M4000 multiple light beam safety device and two deflector mirror columns is advisable in this case. If the light beam is interrupted, the machine stops immediately. This provides reliable protection at low cost.

Single-side access protection
Here, the insertion station of an automatic robot must be entered frequently from one side to insert or remove parts. The M4000 multiple light beam safety device protects the access. A door or protection grid would seriously obstruct the workflow. The electro-sensitive protective equipment makes the work easier and increases productivity.

Alternately active two-side access protection
The rack station of a robot cell must be protected against access from both sides. So that the robot can continue working when changing racks or if a person enters, the protective C4000 safety light curtain must be bridged. The M4000 multiple light beam safety device with deflector mirror therefore handles the access protection behind the rack station. If the beams of these multiple light beam safety devices are interrupted, the robot is shut down. In this way, the devices are alternately active.
Pattern recognition or muting for access protection systems: Safe differentiation between persons and materials.

Entry/Exit sensors are used wherever material is to be automatically transported into the working area of a machine or system and, at the same time, access by people must be excluded. Depending on the application, pattern recognition or muting offer the ideal solution for safety and maximum availability.

M4000 Advanced multiple light beam safety device + UE403
This sensor combination together with other muting sensors is used especially in handling and warehousing systems to differentiate between persons and materials. This system is used if the transported items or transport aids do not have a unique pattern or are too large.

C4000 Entry/Exit safety light curtain
C4000 can identify up to five objects up to a size of 150 mm in automobile body shell manufacture: In this case the feet of the skid. Persons in the hazardous area generate a different pattern and cause immediate shutdown.

C4000 Palletizer Advanced/Standard safety light curtain
C4000 Palletizer has been developed especially for the palletisers/depalletisers of the packaging industry. The Advanced variant recognizes 2 to 5 objects up to a size of 240 mm. In this example the pallet feet. The Standard variant recognizes the transported object if it is at least 500 mm large.

C4000 Advanced safety light curtain: diagonal mounting
The special requirements of the printing and paper industry have resulted in this mounting variant. It recognizes a closed geometrical shape up to a size of 1500 mm: the paper coils, for example. Lateral scanning in the shade must be avoided.
Access protection with muting: Safety and productivity in the automobile industry.

SICK muting solutions are the first choice where transport systems operate continuously such as during final assembly in the automobile industry. SICK solutions guarantee smooth operation without downtimes while ensuring the highest safety standards for personnel.

Muting before engine assembly
Engine blocks are moved to the robot cell on transport aids. To guarantee continuous material flow a 3-beam M4000 Advanced and UE403 switching amplifier is used to implement a remote muting function. This ensures safety and maximum availability. To ensure a valid muting condition is not reset by elapsing time monitoring, the time monitoring can be stopped using the belt stop function and a belt stop signal. The sensors and ESPE are monitored for changes when the conveyor belt stops. If there is no change, the station proceeds automatically after stopping. If the sensors or ESPE detect a change the system is not restarted automatically. The station must then be specifically enabled with the integrated override function.

Flexible fieldbus integration
Through the UE1000 bus modules the M4000 multiple light beam safety devices are compatible with different fieldbus systems such as Profibus and DeviceNet. In addition, M4000 Advanced can be consistently diagnosed with the SDL interface.

Technical details
- Remote on site wiring of sensors and control switches
- Integrated status indicator lamps: 360°, Red/green/yellow
- Belt stop function
- Configuration memory
- Monitoring of the total muting time
- Integrated override

Specific benefit
- Simpler installation
- Reduced downtimes
- Increased plant availability

Classical muting solutions for body shell manufacture: Multiple light beam safety device with muting function, muting sensors, muting lamp and hinged flaps.

The SICK alternative to muting: C4000 Entry/Exit
In body shell manufacture, the muting alternative C4000 Entry/Exit with pattern recognition is already widely used for many applications.
Access protection with muting: More safety for handling and warehousing systems.

The extremely safe remote muting solutions with M4000 are ideal for systems where goods have to be moved all the time and where flexible responses to changing requirements are needed. These solutions offer many different functions which can be tailored to the individual machine! This keeps all the material flows moving.

Muting with partial blanking
Automatic material handling to and from the hazardous area is performed with a ground transport system. Access to the hazardous area is protected with a M4000 Advanced 3-beam multiple light beam safety device (mounted into columns) and a UE403 switching amplifier for muting. Four optical scanners serve as muting sensors and detect the transported objects.

Technical details
• 3-beam M4000 Advanced multiple light beam safety device
• Remote muting function in conjunction with UE403 switching amplifier, reset and override control switch
• Integrated override
• Partial blanking: Specified beams of the protective device remain constantly active

Specific benefit
• Simpler installation
• Low-cost solution
• Increased safety
• Increased plant availability

Uninterrupted safety
A higher level of safety can be achieved if the system operates with partial blanking. When the muting sensors are activated only the lower two beams of M4000 are blanked. The upper beam remains active and causes a shutdown if interrupted. The use of an additional single-beam photoelectric safety switch is not necessary. The station can be enabled with the integrated override function!

Protection for an exit from the hazardous area
The type 4 multiple light beam safety device with remote muting recognises the automated guided system.

Protection for an automatic container inlet of a filling station with M2000 and LE20 Muting.
Efficient access protection:
Fewer interruptions in the packaging industry.

In addition to the single-beam photoelectric safety switches and multiple light beam safety devices, the C4000 Palletizer light curtains can be used to protect palletisers/depalletisers, winders and stretchers in the packaging industry. In this way, SICK offers an even wider range of intelligent protection systems for automatic material handling.

Reliable and capable of learning
The self-teaching, dynamic blanking function reliably differentiates between goods and persons. To do this, it uses the pattern of the pallet feet or the closed shape of an object, for example.

Saves costs
Increases freedom. C4000 Palletizer makes monitored barriers and access doors unnecessary.

System and user advantages:
- Low acquisition costs as only a single pair of sensors is required
- Simple: Fast commissioning without programming
- Self-teaching pattern recognition system
- Safe: The whole access area is permanently protected
- Recognition of different package sizes
- Pallet-independent: Different pallets are tolerated.
- Permanent parking allowed: C4000 Palletizer allows objects to be permanently left in the protective field. No time limit
- High availability through intelligent functions

Conventional muting solutions:
Multiple light beam safety devices in use
Alternatively, conventional muting solutions can be used if pattern recognition cannot be implemented.

Safely wound:
Stretch winder with type 4 multiple light beam safety device (active/passive system) with remote muting.

Safely packaged:
Packaging robots with one type 2 multiple light beam safety device each with muting.
Access protection for machine tool and robotics.

In places where there are moving robots and where strong forces are applied people must keep their distance during operation. The SICK M4000 multiple light beam safety devices are perfectly suited to reliably protect these workplaces and even increase productivity by doing so.

Access protection for a robot welding system
The 4-beam M4000 multiple light beam safety devices ensure that people cannot enter the area of the robot arm while the machine is in operation.

Due to the short distance the low-cost active/passive variant in device columns could be used here. Your advantages:
- Only the active module requires an electrical connection. The columns are placed on the floor which makes assembly simple and flexible.

System and user advantages:
- Low installation outlay through complete solutions with mirror and device columns
- The “safety zone” can be easily extended if the plant is expanded which is a clear advantage compared to physical safety barriers
Safety in cold climates.

Safety must be ensured at all times even under extreme conditions. The single-beam photoelectric switches show their strengths under difficult environmental conditions such as rain, fog, frost or snow. They are especially compact and rugged and some versions are equipped with integrated heaters. With IP 67 enclosure rating they operate under almost all climatic conditions. Reliable.

In dirt and dust.

In harsh industrial environments sensors have to fulfil difficult requirements such as vibrations, dust, dirt and other extreme conditions. SICK photoelectric safety switches have been designed with these conditions in mind and offer robust and low-cost solutions.

System and user advantages:
- Sufficient scanning range reserves
- Large beam cross-sections for high availability
- Integrated heaters and IP 67 enclosure ratings permit outdoor use

In dirty and dusty environments sensors have to meet difficult requirements such as vibrations, dust, dirt and other extreme conditions. SICK photoelectric safety switches have been designed with these conditions in mind and offer robust and low-cost solutions.

System and user advantages:
- High availability despite dirt, dust and vibration through sufficient scanning range reserves and large beam cross-sections

The type 2 single-beam photoelectric safety switch even protects rotary tables in cold stores with arctic climates of -27 °C against unauthorised access.

M2000 access protection system used for a stone setting machine.

Two-side access protection system with M2000 and mirror column.
The clever and simple way to safe solutions.

Safety does not have to be complicated.

Clever solutions are often quite simple. An example: Automated guided systems are equipped with single-beam photoelectric safety switches. While the S3000 laser scanner protects the forward and backward movements VS/VE18 monitors the sides.

Lateral thinking.

Seven doors of a packaging machine are protected with a single L400 photoelectric safety switch. The evaluation is performed by the UE401 safety evaluation device.

System and user advantages

- Small type of construction for simple machine integration
- Replacement for contact strips: Electro-sensitive protective equipment will last longer than any mechanical solution and is therefore cheaper

System and user advantages

- Small type of construction for simple machine integration
- Long service life
- Replacement for safety interlocks: Cost savings since electro-sensitive protective equipment will last longer than any mechanical solution

Safety sensors can also be used for large installations: Large-scale automated guided system for aircraft components protected by S3000 and VS/VE 18.
Intelligent, opto-electronic protective devices can be used for vertical and horizontal hazardous point, area and access protection. The devices can differentiate between people and material, if required. And they can do this without disrupting workflows. For maximum profitability and safety.

Integrating intelligent safety systems into automation environments is becoming more and more important. Using Intelliface, the intelligent interface technology for safety systems, SICK provides you with an entire range of interface products that were specially developed for interfacing safety products and machines. Three different products which permit safety functions to be used in conjunction with networks are available for different degrees of machine networking. Since the interfaces are tailored to SICK safety products the integration outlay is low.
### Photoelectric safety switch

<table>
<thead>
<tr>
<th>Feature</th>
<th>M4000 ADVANCED + UE403</th>
<th>M4000 STANDARD</th>
<th>M4000 AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Features</td>
<td>Restart interlock, external device monitoring, beam coding, application diagnostic output (ADO), LED/7-segment display</td>
<td>RS 232/CDS connection, configuration buttons</td>
<td>RS 232/CDS connection</td>
</tr>
<tr>
<td></td>
<td>SDL interface, separate reset connection (optional)</td>
<td>SDL interface</td>
<td></td>
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<tr>
<td></td>
<td>Integrated laser alignment aid (optional)</td>
<td>Integrated laser alignment aid (optional)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>End cap with integrated LED (optional)</td>
<td>End cap with integrated LED (optional)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Remote muting with UE403: connection of 2 to 4 muting sensors; external muting lamp; control switch for Reset and Override; belt stop signal; concurrence monitoring; monitoring of the total muting time; sensor gap monitoring; sensor test; partial blanking; end of muting by ESPE; integrated override</td>
<td>Muting in conjunction with UE49, muting in conjunction with UE49</td>
<td></td>
</tr>
</tbody>
</table>

### Technical specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>M4000 ADVANCED + UE403</th>
<th>M4000 STANDARD</th>
<th>M4000 AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beam separation/resolution*</td>
<td>120 mm ... 600 mm</td>
<td>120 mm ... 600 mm</td>
<td>60 or 80 mm</td>
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<tr>
<td>Number of beams/length of the monitored range*</td>
<td>2 ... 12</td>
<td>2 ... 12</td>
<td>300 ... 1800 mm</td>
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<tr>
<td>Scanning range*</td>
<td>0.5 m ... 70 m</td>
<td>0.5 m ... 70 m</td>
<td>0.5 m ... 19 m/70 m</td>
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<tr>
<td></td>
<td>0.5 m ... 7.5 m</td>
<td>0.5 m ... 7.5 m</td>
<td></td>
</tr>
<tr>
<td>Type of light/light sender*</td>
<td>Infrared, 950 nm</td>
<td>Infrared, 950 nm</td>
<td>Infrared, 950 nm</td>
</tr>
<tr>
<td>Response time*, max.</td>
<td>10 ms ... 12 ms</td>
<td>10 ms ... 12 ms</td>
<td>11 ms ... 17 ms</td>
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<tr>
<td>Output signal switching devices</td>
<td>2 PNP semiconductors</td>
<td>2 PNP semiconductors</td>
<td>2 PNP semiconductors</td>
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<tr>
<td>Supply voltage</td>
<td>24 V DC</td>
<td>24 V DC</td>
<td>24 V DC</td>
</tr>
<tr>
<td>Type of connection</td>
<td>Hirschmann plug, 12-pin</td>
<td>M12 plug, 8-pin</td>
<td>Hirschmann plug, 12-pin</td>
</tr>
<tr>
<td>Housing material</td>
<td>Aluminium alloy, powder coated</td>
<td>Aluminium alloy, powder coated</td>
<td>Aluminium alloy, powder coated</td>
</tr>
<tr>
<td>Dimensions*</td>
<td>Diameter [mm] 52 x 55.5</td>
<td>Diameter [mm] 52 x 55.5</td>
<td>Diameter [mm] 52 x 55.5</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient operating temp.</td>
<td>0 °C ... +55 °C</td>
<td>0 °C ... +55 °C</td>
<td>0 °C ... +55 °C</td>
</tr>
<tr>
<td>Enclosure rating</td>
<td>IP 65</td>
<td>IP 65</td>
<td>IP 65</td>
</tr>
<tr>
<td>Approval</td>
<td>CE, cULus (in preparation)</td>
<td>CE, cULus (in preparation)</td>
<td>CE, cULus (in preparation)</td>
</tr>
</tbody>
</table>

* Depending on type
## SICK | SINGLE-BEAM PHOTOELECTRIC SAFETY SWITCHES AND MULTIPLE LIGHT BEAM SAFETY DEVICES

### Specifications

<table>
<thead>
<tr>
<th>M2000</th>
<th>L4000</th>
<th>WSU/WEU26</th>
<th>WS/WE 12/18/24/27</th>
<th>VS/VE18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-beam type 2</td>
<td>Single-beam type 4</td>
<td>Single-beam type 4</td>
<td>Single-beam type 2</td>
<td>Single-beam type 2</td>
</tr>
<tr>
<td>Restart interlock</td>
<td>Restart interlock</td>
<td>Rugged type of construction</td>
<td>High scanning ranges from 0 to 50 m</td>
<td></td>
</tr>
<tr>
<td>External device monitoring</td>
<td>Scanning range up to 70 m</td>
<td>Red light, infrared light variants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam coding</td>
<td>LED/7-segment display</td>
<td>Relay outputs</td>
<td>Front screen heating variants</td>
<td></td>
</tr>
<tr>
<td>LED/7-segment display</td>
<td>8 cascaded sensor pairs</td>
<td>Universal power supply (24V DC/115V AC/230V AC)</td>
<td>Temperature range -40 °C ... +60 °C</td>
<td></td>
</tr>
<tr>
<td>Self test</td>
<td>Scanning ranges 0 ... 60 m</td>
<td>Front screen heating</td>
<td>Rugged, compact types of construction</td>
<td></td>
</tr>
<tr>
<td>Cascadable</td>
<td>Temperature range from -20 °C ... +55 °C</td>
<td>Self test</td>
<td>Plastic and metal variants</td>
<td></td>
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<tr>
<td>Host/guest-compatible to C2000</td>
<td>Intelligent testing prevents mutual optical interference</td>
<td>Muting in conjunction with LE49</td>
<td>Testable type 2 photoelectric safety switches to EN 61496 in conjunction with a suitable test device, e.g. evaluation device LE20</td>
<td></td>
</tr>
<tr>
<td>Muting in conjunction with LE20</td>
<td>Muting angle variant for optimal mechanical integration</td>
<td>Field of view &lt;= +/-5°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Testable type 4 photoelectric safety switches to EN 61496 only in conjunction with safety evaluation device LE401</td>
<td>Restart interlock, external device monitoring and muting implementable with evaluation device LE20</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Dimensions

- **M2000**: 116 mm ... 500 mm
- **L4000**: 2 ... 9
- **WSU/WEU26**: 1 ... 8
- **WS/WE 12/18/24/27**: 1 ... 6 (in conjunction with LE20)
- **VS/VE18**: 0 m ... 70 m

### Performance

- **Infrared, 950 nm**: Visible red light, 660 nm
- **Infrared, 880 nm**: Visible red light, 660 nm
- **Temperature range**: –40 °C ... +60 °C
- **Self test**: 7 ms ... 8 ms
- **Relay outputs**: PNP, Q and Q (diagonal)
- **Thread diameter x L [mm]**: M18 x 98/108, M30 x 100
- **Thread diameter x L [mm]**: 49 x 15 x 41.5, 75 x 17 x 32.5
- **Thread diameter x L [mm]**: M18 x 86/98

### Environment

- **IP 65, IP 67**: IP 67
- **CE, cULus**: CE, cULus

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*SICK* | *SINGLE-BEAM PHOTOELECTRIC SAFETY SWITCHES AND MULTIPLE LIGHT BEAM SAFETY DEVICES* 25
Safety issues in plant automation are not simply dealt with by installing first class SICK sensor technology. It all starts before assembly and continues afterwards. Safety after all is a continuous process which remains relevant throughout the whole life cycle of a machine or plant.

From planning via operation to modernisation. With SICK “International Service Solutions” you profit in all phases from the international know-how of the market leader of safety products and the experience gained from different sectors and countless applications.
Safety during the whole machine life cycle.
For more safety equipment and increased efficiency.

During the whole machine life cycle
Linking safety-relevant signals with Intelliface series interface modules

Sensor Intelligence always means: Integrated safety according to plan.

Safety network controller
Fieldbus level
SDL (Safety Data Link)
Safety switches
Safety light curtains and multiple light beam safety devices
Single-beam photoelectric safety switches
Safety bus modules
Uniform configuration and diagnostics software
Safety sensors
Safety controllers
Emergency stop
Photoelectric switches
Intelliface
Safety laser scanners
Safexpert
Safety switches
Single-beam photoelectric safety switch systems
2-hand module
Safety relays
Safe design, risk assessment and documentation
Safety engineering on machines and systems
Safety switches
Safety light curtains and multiple light beam safety devices
Safexpert
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Single-beam photoelectric safety switch systems
2-hand module
Safety relays
Safe design, risk assessment and documentation
Safety engineering on machines and systems
SICK Industrial Safety Systems:
Tailored to your requirements.

- Laser scanner and safety camera system
  - S3000
  - PLS
  - PLS Short Range
  - V4000 Press Brake

- Light curtains
  - C4000 Micro
  - C4000 Basic, Basic Plus
  - C4000 Eco
  - C4000 Standard
  - C4000 Entry/Exit
  - C4000 Palletizer
  - C2000
  - LGT

- Multiple light beam devices
  - M4000 Advanced/UE403
  - M4000 Standard
  - M4000 Area
  - MSL/MSM
  - M2000

- Single-beam photoelectric switches
  - L4000 System
  - WS/WEU26/2
  - WS/WE12-2 with LE20
  - WS/WE18-3 with LE20
  - WS/WE24-2 with LE20
  - WS/WE27-2 with LE20
  - VS/VE18-2 with LE20

- Safety switches, sensors and operating devices
  - Safety position switches
  - Safety switch with separate actuator
  - Safety locking devices
  - Safety sensors
  - Safety operating devices

- Safety bus modules and network controllers
  - UE1000 series
    - UE4120, UE4150, UE4155
    - UE3212, UE4215, UE4231, UE4232
    - UE4420, UE4421, UE4450, UE4470

- Safety controllers
  - UE100 series
    - UE440
    - UE470

- Safety relays
  - UE10 series
    - UE10 to UE49

- Software
  - Safexpert

www.sick.com

- eCatalog
- Product Finder
- Application Finder
- and much more ...

www.sick.com/safetysystems
Our complete range of sensors provides answers to suit any application in the field of automation. Even under rugged ambient conditions objects are reliably detected, counted and positioned in respect of their form, location and surface finish, as well as their distances established with pin-point accuracy.

Comprehensive safeguarding of both personnel and machinery! As specialists in Sensor Technology, SICK develops and manufactures pioneering products for providing protection in hazardous zones, dangerous locations and for safeguarding access points. By providing services, which encompass all aspects of machine safety and security, SICK is setting new standards in Safety Technology.

Whether the tasks involve identification, handling, classification or volume measurement, innovative Auto Ident systems and laser measuring systems function extremely reliably, even under rapid cycle times. They conform to the latest Standards and can be simply and speedily integrated in all industrial environments and external applications.

System control, maintaining setpoints, optimising process control and monitoring the flow of materials – the instruments and services for Analysis and Process Measurement, supplied by SICK MAIHAK, are setting the standards for these applications in terms of Technology and Quality.

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Please find the detailed addresses and more representatives and agencies in all major industrial nations at www.sick.com