

Safety Cat. 4, Finger/Hand/Body Detection Safety Light Curtains

SFL / SFLA Series

INSTRUCTION MANUAL

DRW190661AC

Autonics

Thank you for choosing our Autonics product.

Read and understand the instruction manual and manual thoroughly before using the product.

For your safety, read and follow the below safety considerations before using.

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.

Keep this instruction manual in a place where you can find easily.

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Follow Autonics website for the latest information.

Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

⚠ Warning Failure to follow instructions may result in serious injury or death.

- Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)**
Failure to follow this instruction may result in personal injury, economic loss or fire.
- Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**
Failure to follow this instruction may result in explosion or fire.
- Do not connect, repair, inspect, or replace the unit while connected to a power source.**
Failure to follow this instruction may cause malfunction or danger due to the safety-related function that does not operate properly. For more information, please refer to laws, regulations and standards in the country or region.
- Do not disassemble or modify the unit.**
Failure to follow this instruction may result in personal injury or fire. In addition, the manufacturer does not guarantee the performance and functionality.
- After 3 seconds of power input, use a machine or mechanical system.**
Failure to follow this instruction may cause malfunction or danger due to the safety-related function that does not operate properly.
- Responsible person for use is an operator who:**
 - is fully knowledgeable about the installation, settings, use and maintenance of the product.
 - is familiar with the requirements of laws, regulations and standards in the country or region where the product is installed and used. Responsible person for use has an obligation to educate the requirements to machine users. Machine users are persons who have been fully trained by the responsible person for use and can operate the machine correctly. When any error occurs during the operation of the machine control system, they have a responsibility to report it to the responsible person for use immediately.If an unqualified person operates the product, it may result in personal injury, economic loss or fire.
- Qualified personnel shall carry out installation, configuration and combination with the machine control system.**
If an unqualified person carries out installation, configuration and combination with the machine control system, it may cause malfunction or result in accidents due to undetected human body.
- Make sure that only the responsible person uses the keys or tools for accessing and setting the light curtains.**
Failure to follow this instruction may cause malfunction or result in accidents.
- When the machine is not operating after installation, check that functions and settings of the product operate correctly as you intended.**
Failure to follow this instruction may result in personal injury due to undetected human body.
- Always make sure that the safety distance between the light curtain and the hazardous part (hazardous zone or hazardous source) of the machine.**
The machine may not stop before an operator reaches the hazardous zone so that it may result in personal injury.
For more information on the safety distance, please refer to laws, regulations and standards in the country or region.
- To access the hazardous part (hazardous zone or hazardous source) of the machine, you shall install the light curtain as human body passes through the detection zone. If the hazardous part of the machine is accessible beyond the detection zone, install additional guards. In addition, when working in the hazardous zone, make sure that a part of human body is within the detection zone.**
If the installation does not detect the human body, it may result in personal injury.
- Do not arrange or use the light curtain as a reflective or retroreflective type with reflector.**
If the installation does not detect the human body, it may result in personal injury.
- Do not use the light curtain to detect flying objects toward the detection zone.**
If there is a risk, take additional safety measures, such as installing an additional safety guard.
- The auxiliary output (AUX) is non-safety output, therefore, do not use it for safety purposes.**
Failure to follow this instruction may result in serious injury because the safety cannot be guaranteed.

- The lamp output (Lamp) is non-safety output, therefore, do not use it for safety purposes.**
Failure to follow this instruction may result in serious injury because the safety cannot be guaranteed.
- Only qualified personnel shall use the PC setting tool (atLightCurtain) to configure functions of light curtain and manage the changed settings.**
If an unqualified person tries to change settings of function via the PC setting tool, it may cause malfunction or result in personal injury due to undetected human body.
- After setting or changing the function of light curtain via the PC setting tool, check that light curtain operates as you intended.**
Failure to follow this instruction may result in personal injury.
- When installation, if you have changed the configuration of light curtain (replacement of light curtain, change the number of beams, change the number of series connection, etc.), set the function of the light curtain via the PC setting tool again.**
Failure to follow this instruction may result in personal injury due to unintended settings.
- If the (master) receiver has been replaced, send the setting information of PC setting tool to the replaced receiver gain.**
Failure to follow this instruction may result in personal injury due to unintended settings.
- Install the devices for releasing Interlock condition (e.g. switch) in a location where the entire hazardous zone can be seen or the devices cannot be handled within the hazardous zone.**
- When restarting the machine in interlock condition, make sure that no operators are in the hazardous zone.**
Failure to follow this instruction may result in personal injury due to undetected human body.
- Follow the requirements described in this manual for the muting devices and installation method to use muting function.**
For more information, please refer to laws, regulations and standards in the country or region. Failure to follow these requirements, the functions and performance are not guaranteed. It may result in personal injury.
- Install the muting devices in a location that can be changed by only qualified and responsible person for use.**
Change the installation location under the supervision of responsible person for use.
- The muting function temporarily stops the safety related functions of light curtain.**
If the function is activated, take additional safety measures for the safety of the machine control system.
- When the muting function is activated, make sure that no operator is in the hazardous zone.**
Take additional safety measures to prevent the human body from entering the hazardous zone.
- When you need to inform that the muting function is activating, install the indicators with any forms (e.g. alarm lamp) where it can be seen from all sites.**
For more information, please refer to laws, regulations and standards in the country or region.
- Qualified and responsible person for use should conduct the risk assessment on the time related to the muting function, set the time correctly according to the conditions described in this manual. In particular, set the muting timeout (T2) to a finite value in the PC setting tool.**
Failure to follow this instruction may cause the function failure of safety related and result in personal injury or fire.
- When you use the auto scan for muting zone via PC setting tool, the OSSD output may temporarily go to ON state due to the operation of line or facilities for scan and measurement. Therefore, safety measures in workplace shall be implemented.**
If there is a risk, take additional safety measures, such as installing an additional safety guard.
- The installation environment and timing chart shown in the PC setting tool are examples for your understanding. Make sure that the qualified and responsible person for use check the light curtain operates in the actually installed site as intended.**
Failure to follow this instruction may result in personal injury due to undetected human body.
- Follow the requirements described in this manual for the devices and installation method to use the override function.**
For more information, please refer to laws, regulations and standards in the country or region. Failure to follow these requirements, the functions and performance are not guaranteed. It may result in personal injury.
- Connect the override switch to reset input to use the override function.**
Failure to release the override condition with the override switch may result in personal injury.
- The override function temporarily stops the safety related functions of light curtain. Therefore, safety measures in workplace shall be implemented.**
If the function is activated, take additional safety measures for the safety of the machine control system.
- When the override function is activated, make sure that no operator is in the hazardous zone.**
Take additional safety measures to prevent the human body from entering the hazardous zone.
- When you need to inform that the override function is activating, install the indicators with any forms (e.g. alarm lamp) where it can be seen from all sites.**
For more information, please refer to laws, regulations and standards in the country or region.
- Qualified and responsible person for use should conduct the risk assessment on the time related to the override function, set the time correctly according to the conditions described in this manual. In particular, set the override timeout to a finite value in the PC setting tool.**
Failure to follow this instruction may cause the function failure of safety related and result in personal injury or fire.
- After setting the fixed blanking function, check that it operates as intended.**
Failure to follow this instruction may result in personal injury due to undetected human body.
- If the tolerance is set for the fixed blanking function, the detection capability will be larger.**
Calculate the safety distance suitable for the minimum detection capability to secure minimum safety distance.
- If you use the fixed blanking function, conduct additional safety measures to prevent a part of human body from entering the hazardous zone passing by beams for the blanking zone.**
- After setting the floating blanking function, check that it operates as intended.**
Failure to follow this instruction may result in personal injury due to undetected human body.
- If the tolerance is set for the floating blanking function, the detection capability will be larger.**
Calculate the safety distance suitable for the minimum detection capability to secure minimum safety distance.

- If you use the floating blanking function, conduct additional safety measures to prevent a part of human body from entering the hazardous zone passing by beams for the blanking zone.**
- If you use the auto scan function for the fixed and floating blanking zone via the PC setting tool, the OSSD output temporarily goes to the OFF state.**
Please note that the operating status of the light curtain may be changed.
- If you use the reduced resolution function, the detection capability will be larger.**
Calculate the safety distance suitable for the minimum detection capability to secure minimum safety distance.
- Only qualified and responsible person for use shall use the factory reset via the PC setting tool. Also, check the safety distance and the operation of the light curtain again.**
Failure to follow this instruction may result in personal injury due to undetected human body.
- Check 'Connections' before wiring. And make sure that there are no safety problems.**
Failure to follow this instruction may result in fire.
- When using PNP output, be sure to connect the load between the OSSD output wire and 0V. Do not short the OSSD output wires to +24V.**
Incorrect wiring or shut down of the power supply is dangerous because the OSSD output is always in ON state.
- When using NPN output, be sure to connect the load between the OSSD output wire and +24V. Do not short the OSSD output wires to 0V.**
Incorrect wiring or shut down of the power supply is dangerous because the OSSD output is always in ON state.
- Use only the two OSSD output wires in this product to construct safety systems, and do not use output signals (e.g. auxiliary output) other than the OSSD output for safety purposes.**
When you use only one OSSD output or use other output signal as a safety output, the machine cannot be stopped in the event of a malfunction and result in personal injury due to the safety related function failure.
- When wiring, all input/output wires with double insulation or reinforced insulation should be used between the circuits.**
Failure to follow this instruction may result in fire.
- Do not install all input/output wires in the same piping with high voltage wire and power line.**
Failure to follow this instruction may cause malfunction or dangerous due to the safety related function do not operate properly.
- Use a separate power supply for the load and the product, and do not exceed the specified ratings.**
Failure to follow this instruction may result in damage or malfunction of the product.

⚠ Caution Failure to follow instructions may result in injury or product damage.

- Use the product within the rated specifications.**
Failure to follow this instruction may result in fire or product damage.
- Use a dry cloth to clean the unit, and do not use water or organic solvent.**
Failure to follow this instruction may result in fire.
- Use the cable within the rated length and do not modify, change, and extend the cable.**
If the cable is longer, it may cause malfunction or dangerous due to the safety related function do not operate properly.
- To use the light curtain in "PSDI mode", configure the appropriate control circuit between the light curtain and the machine according to the requirements of laws, regulations and standards in the country or region.**
- Do not use the product outdoors.**
Failure to follow this instruction may result in damage and malfunction of the product.
- Keep the product away from metal chip, dust, and wire residue which flow into the unit.**
Failure to follow this instruction may result in personal injury due to the malfunction of the light curtain.
- Be sure for responsible person for use to change the password of PC setting tool to prevent the setting change by the machine users (or operator). Securely manage your password and avoid forgetting the password.**
Failure to follow this instruction may result in personal injury due to the malfunction of the light curtain.
- You must conduct regular inspections and maintenance procedures according to the items listed on the "Check and Maintenance" within six months.**
Failure to follow this instruction may result in personal injury due to the malfunction of the light curtain.
- Check the installation status, normal operation, breakage, modification, and manipulation in the situations shown below, and conduct the weekly inspection.**
 - When starting the safety system for the first time
 - When replacing the accessories of the safety system
 - When the safety system has not been operated for a long timeFailure to follow this instruction may result in personal injury because the safety-related function may not work properly due to the malfunction of the product.

Cautions for Installation

For more information, see the "SFL/SFLA User Manual."

- Install the unit correctly with the usage environment, location, and the designated specifications. Install the light curtain that complies with the following details.
 - Part(s) of the human body passes through the detection zone to the hazards of the machine.
 - Install an additional guard if part(s) of the human body access to hazards of the machine without passing through the detection zone.
 - If an operator works in the hazardous part of the machine, be sure to install the light curtain to detect part(s) of the human body.
- You must set the safety distance of the light curtain.
Failure to this instruction, the machine cannot be stopped before reaching the hazardous part, and it may result in personal injury.
The safety distance calculation may differ from laws, regulations, and standards. Therefore, be sure to use the appropriate formula which abides by the rules of the country.
- Install the emitter and the receiver face to each other and adjust the top and bottom beam of the light curtain to meet the centerline. Also, the switch settings of the emitter and the receiver must be the same.
- Use a bracket suitable for the mounting method.
The type and number of brackets differ depending on the length of the light curtain.

Cautions during Use

- Follow instructions in "Cautions during Use". Otherwise, it may cause unexpected accidents.
- The power input of 24VDC≒ model is insulated and limited voltage/current or supply via power supply with SELV and Class 2.
- When supplying power with SMPS, ground the FG terminal and connect the noise suppression capacitor between 0V and FG terminal.
- When installing the light curtain, make sure that the bottom indicators of the emitter and receiver are aligned exactly.
- Install the light curtain in a place where the emitter and receiver are not affected by walls or reflecting surfaces.
- If you use the light curtain as several sets, arrange them not to interfere with each other, or install with a shading plate.
- Do not install the light curtain in place where it is exposed to intense disturbance light (such as direct sunlight, sunlight, spotlights fluorescent lights, and etc.) or reflected light from glossary surface is directly incident on the receiver. If it is difficult to install in such a place, take additional safety measures using shading plates, hoods, etc.
Failure to follow this instruction may cause malfunction or dangerous due to the safety related function do not operate properly.
- Make sure that any unused wires, when installing the product, should be insulated.
- Make sure that removable parts (including packing, end caps, product wires, covers, etc.) are properly assembled. Also, tighten the screws with specified tightening torque. Failure to follow this instruction may cause product degradation.
- Assessment of conformity to the required safety level is evaluated for the entire system. Please consult with a certified certification body regarding the assessment procedure.
- It should be done away regarded as an industrial waste. For more information, please refer to laws, regulations and standards in the country or region.
- This product may be used in the following environments.
 - Altitude max. 2000 m
 - Pollution degree 3
 - Installation Category II

Ordering Information

This is only for reference. For selecting the specific model, follow the Autonics web site.

SFL ① ② - ③

- ① **Type**
No-mark: Standard type
A: Advanced type
- ② **Detection capability**
14: Ø 14 mm, finger
20: Ø 20 mm, hand
30: Ø 30 mm, hand-body
- ③ **Number of optical axes**
Number: Number of optical axes

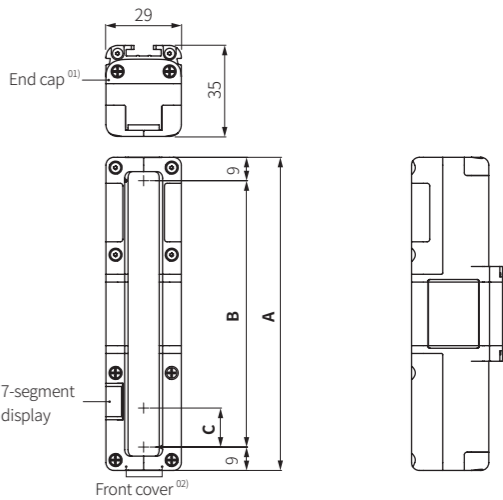
User Manual

For the detail information and instructions, please refer to user manual, and be sure to follow cautions written in the technical descriptions.

Visit our website (www.autonics.com) to download manuals.

Dimensions

- Unit: mm, For the detailed dimensions of the product, follow the Autonics web site.
- This dimension is based on the SFL(A) 14 model. The appearance varies depending on the detection capability.



01) When removing the end cap, there is the lamp output terminal (top) or the power supply terminal (bottom).
02) When removing the front cover, there is the setting switch (on the emitter and the receiver) or the PC communication port (on the receiver).

Detection capability	Models	Number of beams	A (protective height)	B (sensing height)	C (optical axis pitch)
Ø 14 mm (finger)	Standard	15 to 111	144 to 1,008	126 to 990	9
	Advanced	15 to 199	144 to 1,800	126 to 1,782	
Ø 20 mm (hand)	Standard	12 to 68	183 to 1,023	165 to 1,005	15
	Advanced	12 to 124	183 to 1,863	165 to 1,845	
Ø 30 mm (hand-body)	Standard	42 to 75	1,043 to 1,868	1,025 to 1,850	25
	Advanced	9 to 75	218 to 1,868	200 to 1,850	

