NEW

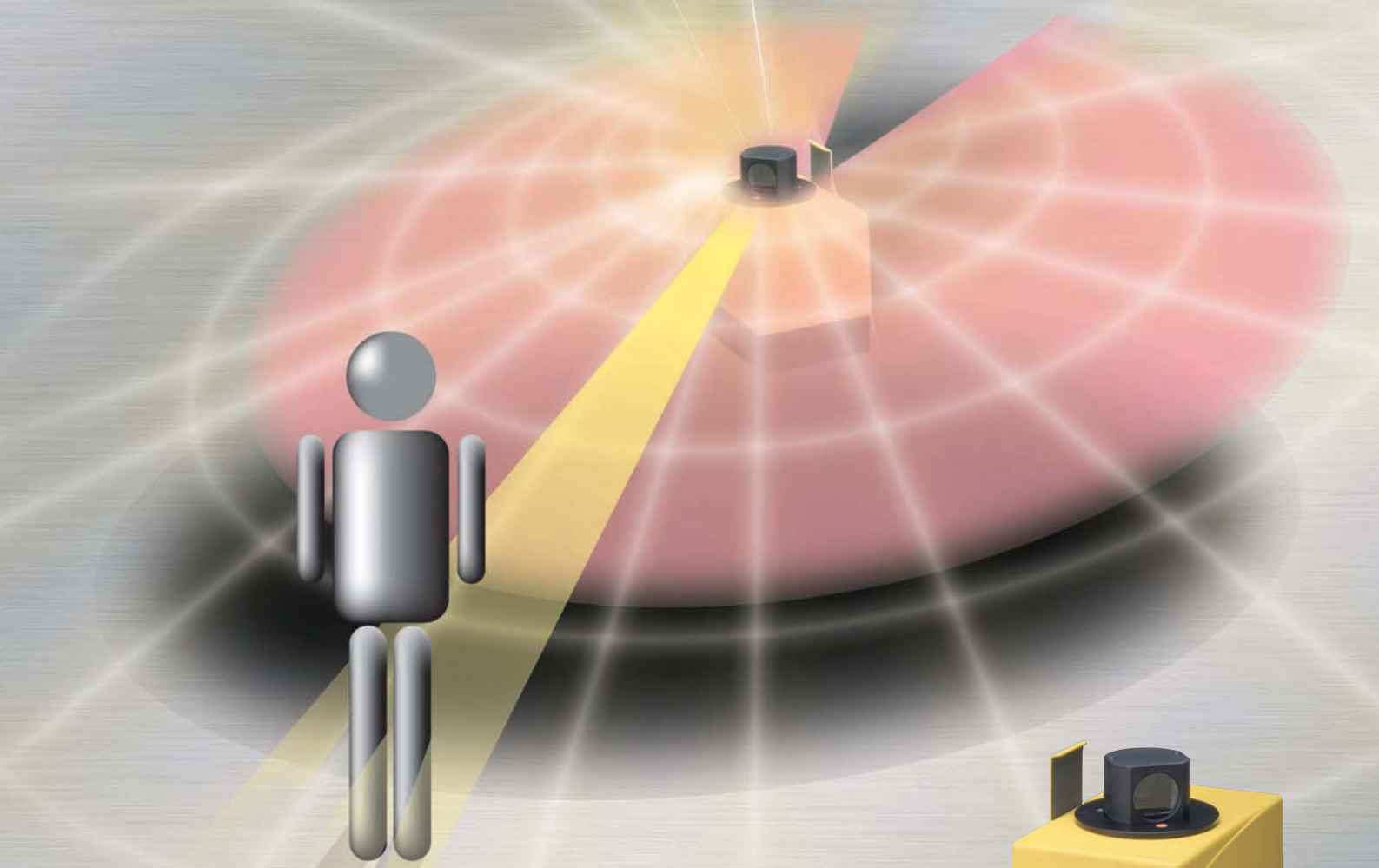
OMRON

Safety Laser Scanner

F3G-C

SAFETY OMRON

Increases Safety by Detecting Workers to Warn of Proximity to Dangerous Area



Innovation in the Solution Age

OMRON INDUSTRIAL AUTOMATION

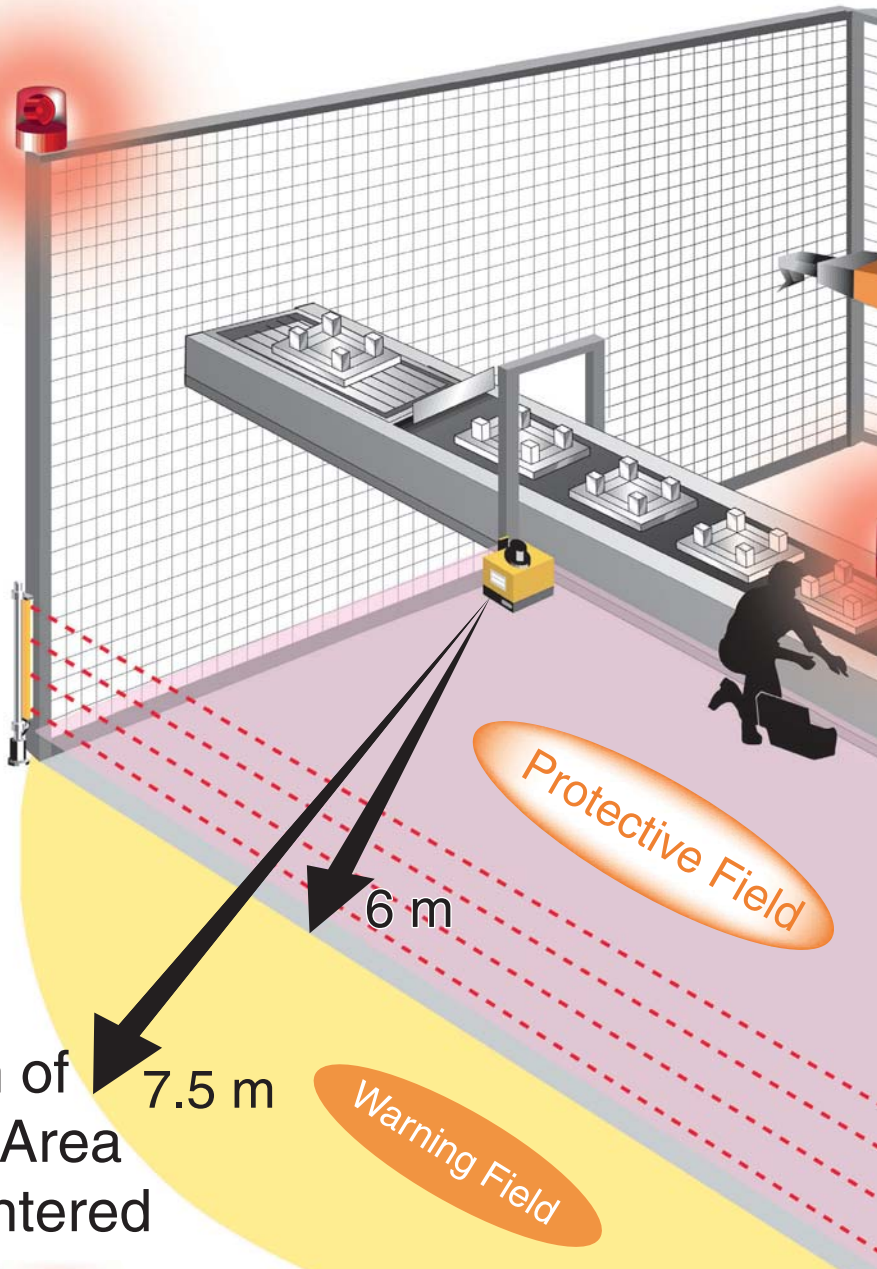
Increases Safety by Detecting Workers t

Prevents Robot from Restarting When Worker Is in Protect

Detection of Worker Prevents Unexpected Operation of Machinery

Ensuring safety is based on the principle that machinery will not start when a worker is present in the robot's operating zone or in the area around the machinery. A Safety Light Curtain or Door Switch detect when a worker enters the dangerous area, but once this zone is entered, the worker's presence cannot be monitored.

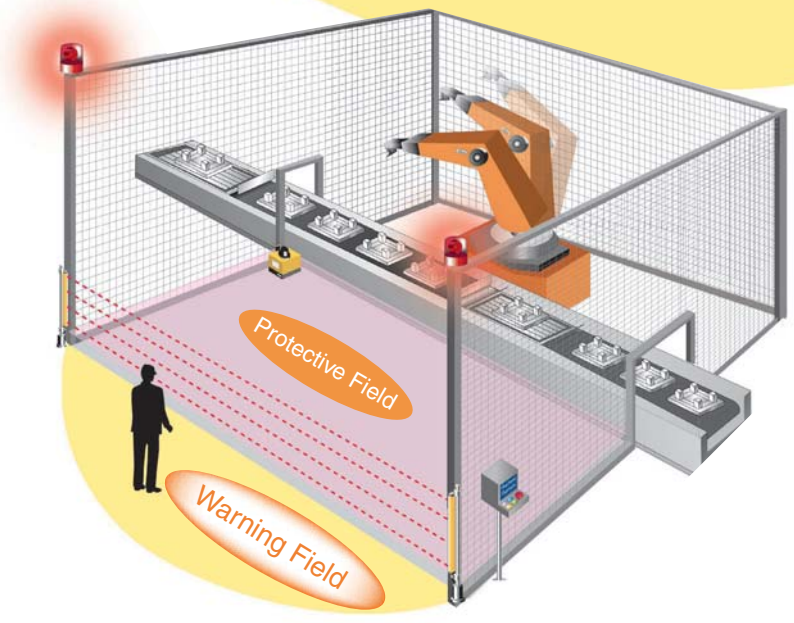
The F3G-C Safety Laser Scanner uses a laser beam to scan across a two-dimensional plane for the presence of workers in the designated area, acting as a reflective safety area sensor.



Warning Indicators Warn of Approach to Dangerous Area If the Warning Field Is Entered

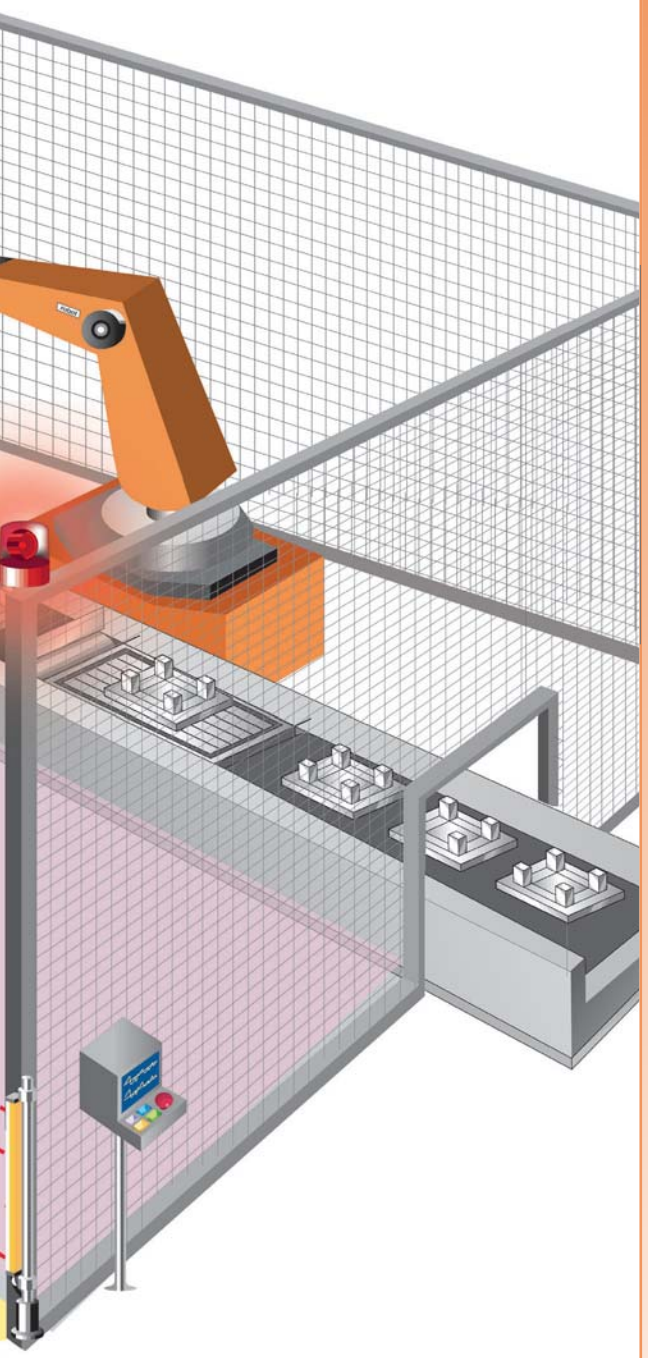
Proximity Alarm Prevents Stopping Machinery Inadvertently

In addition to setting a protective field to prevent the operation of machinery, a warning field can also be set in which the detection of a worker approaching the machinery triggers an alarm. Entering or leaving the warning field is connected to warning indicators and sirens that alert the worker, thereby protecting against the unintentionally stopping machinery by approaching the source of danger.



o Warn of Proximity to Dangerous Area

tive Field



International Safety Standards

The Safety Laser Scanner Meets International Safety Standards

1 A Type 3 Sensor Conforming to IEC, EN, JIS, and UL Standards

Conforms to the international standards IEC 61496-1, EN standard 61496-1, and JIS standard B9704-1, which are essential for safety area sensors. As a Type 3 Sensor, it also satisfies the requirements for category 3 safety measures.

2 Conforms to EC Machinery Directive

Type 3 ESPE (Electro-Sensitive Protective Equipment) EC-type Examination Certificate, which is based on the Machinery Directive from the EU-notified body BIA, enabling using the Safety Laser Scanner with European machinery and equipment.

UL listing for US and Canadian safety standards

Can be used in equipment designed according to OSHA regulations and ANSI/RIA standards.

UL CE JIS B9704-1 EN61496-1 Type 3

Third Party Assessment Body UL listing for US and Canadian safety standards has been obtained for the Safety Laser Scanner. The Scanner can be used in equipment designed according to the US OSHA (Occupational Safety and Health Administration) regulations (29 CFR 1910. 212). The Scanner also satisfies the requirements of the ANSI/RIA R15.6-1999 safety standard for industrial robots in the US, enabling applications in US and Canadian equipment.

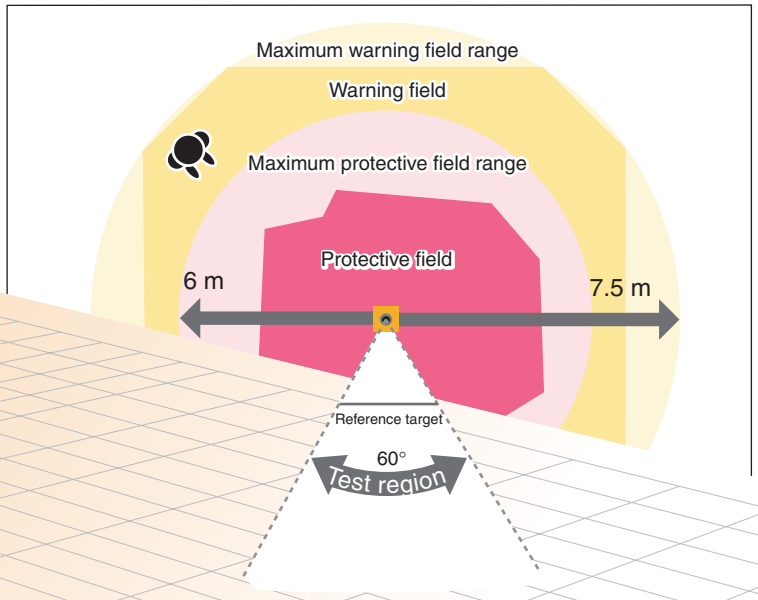
Added safety

Wider Scan Area

Wider Scan Area

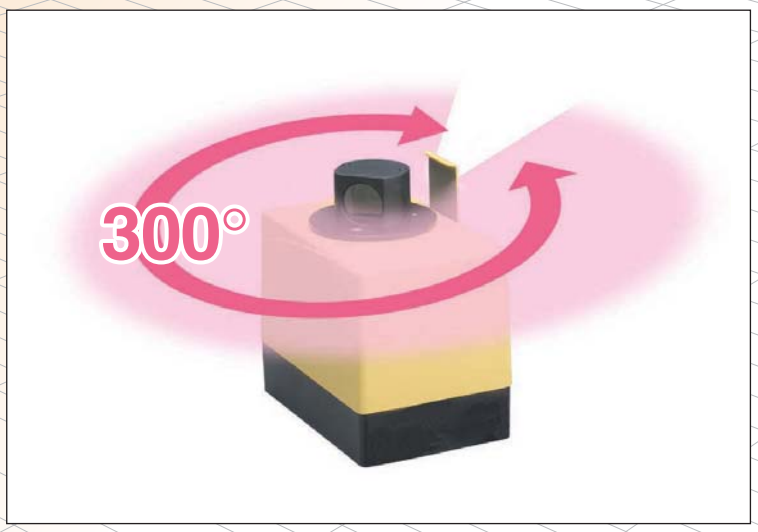
Sensing Range

Long-range sensing is provided up to a 6-m radius for the Protective Field and a 7.5-m radius for the Warning Field.
The zone dimensions and shape settings are defined by the user with the software provided with the Sensor.



Scanning Angle

Generally, safety laser scanners have a scanning angle of 180° to 190°, but the F3G-C can sense movement within a 300° range.
For example, normally two scanners would be required to monitor two surfaces of a large machine, but only one F3G-C Scanner is required if it is installed at the corner of the machine.

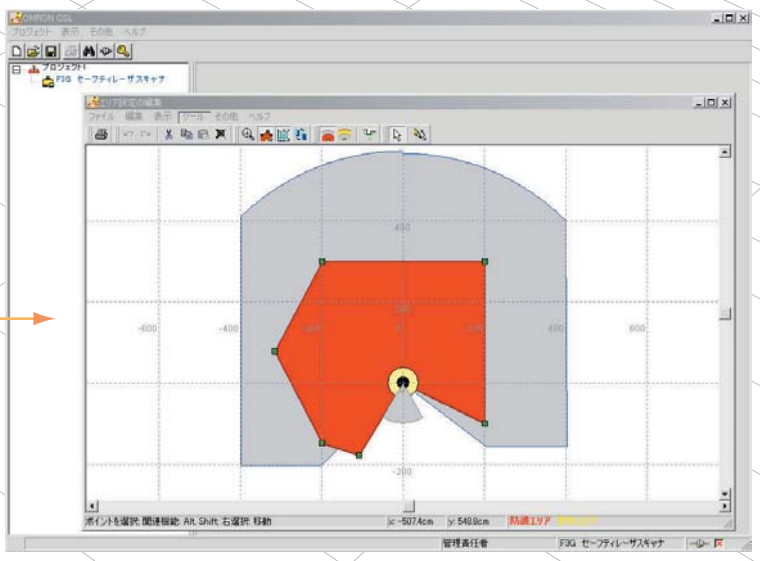


Easy Setup

Easy Setup

The Protective Field and Warning Field can be easily set up from a personal computer using the CSL Setup Software provided with the Scanner.

Settings can be protected from changes by using a password, preventing unintentional changes.



The system requirements for running CSL Setup Software are as follows:

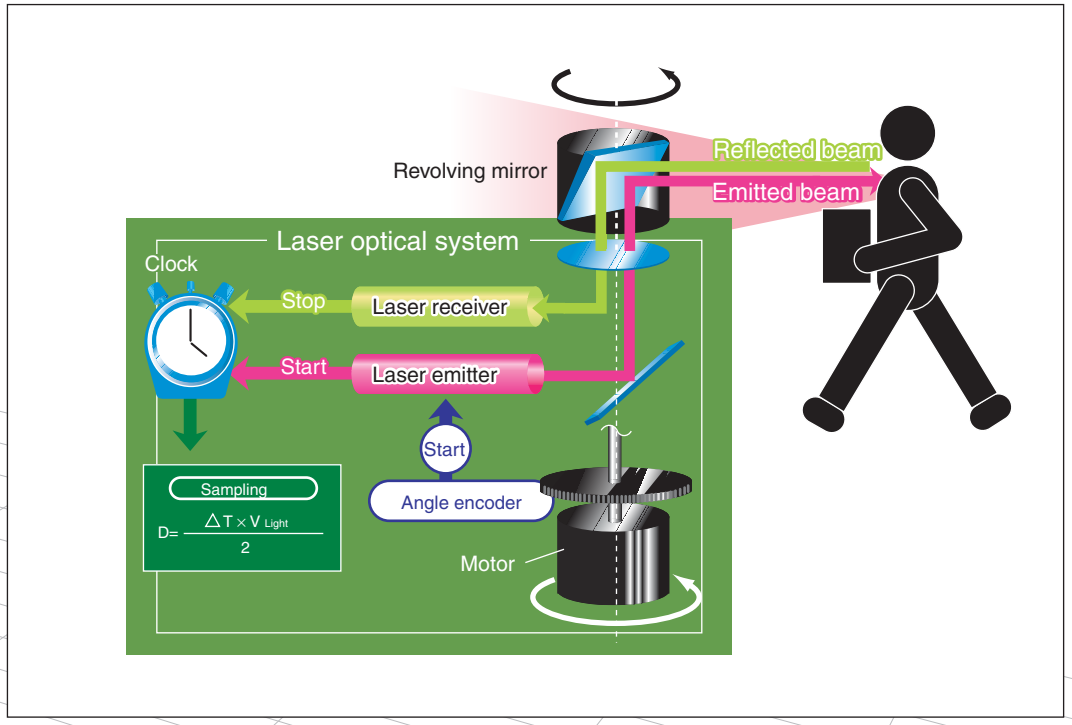
- CPU: Intel Pentium PC, 233 MHz or higher
- RAM: 64 MB or higher
- RS-232C: Serial interface*
  * The software may not function properly if a USB/RS-232C Serial Conversion Adapter is used.
- OS: Microsoft Windows 95, 98, NT 4.0, ME, 2000 Professional, or XP
- CD-ROM drive

F3G-C1R70

Principle of Operation

Principle of Operation

The F3G-C1R70 Safety Laser Scanner emits a pulse laser beam in all directions over a 360° range using a revolving mirror. The laser pulses are reflected off surrounding objects and the sensor receives reflected light through a photodiode. The distance to the object is calculated according to the time from when the laser emits the beam until the sensor receives the light. The direction of the measured beam is determined by the angle encoder. Of the total scanning range of 360°, the actual scanning angle is 300° after subtracting 60° due to reflection from the reference target.



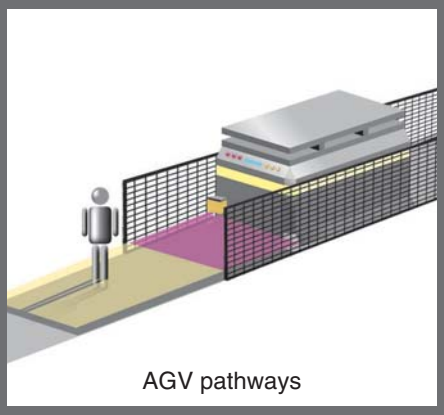
Laser Safety Considerations

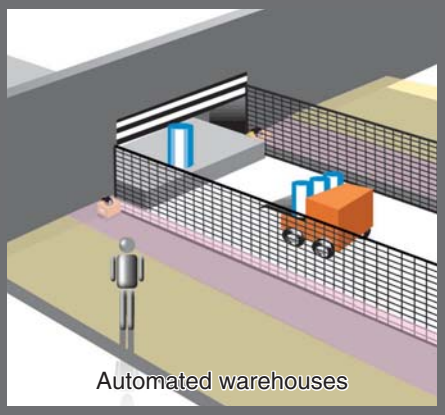
Safety Consideration for Laser

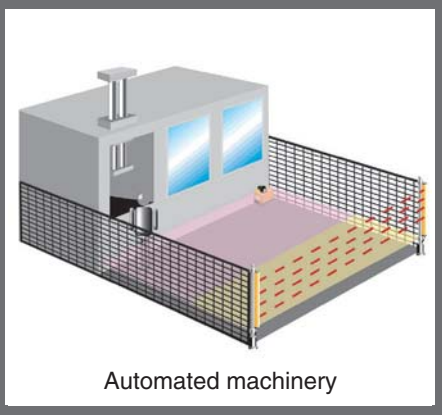
The laser diode that emits the laser beam is a Class 1 laser, which is the lowest laser strength category. (JIS C 6802, EN 60825-1 (IEC 825-1), FDA (21 CFR 1040. 10))

Application

Application Examples


AGV pathways


Automated warehouses


Automated machinery

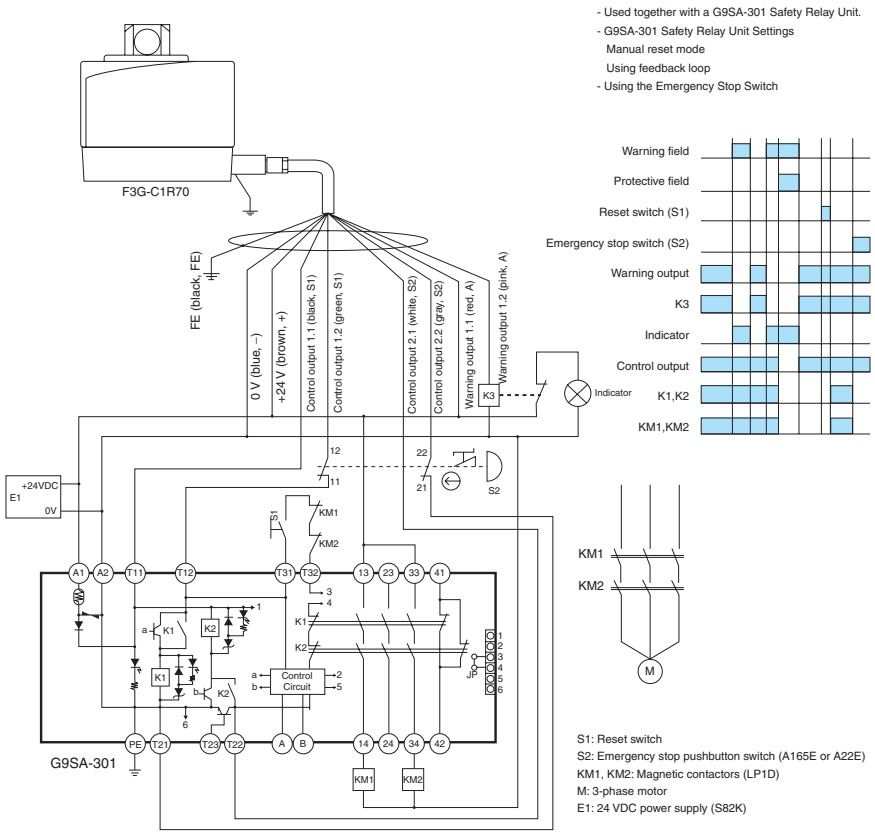
List of Models

Appearance	Product name	Model	Remarks
	Sensor	F3G-C1R70	Includes setup software CD.
	Power supply cable	F39-JG5A	One cable required for each Sensor.
	Communications cable	F39-JG5R	Required for setup only.
	Mounting Bracket (sold separately)	F39-LG1	Includes the following items. Main bracket: 1 Side bracket (left): 1 Side bracket (right): 1 M8 Allen-head bolts: 4 M8 plain washers: 4

Ratings and Performance

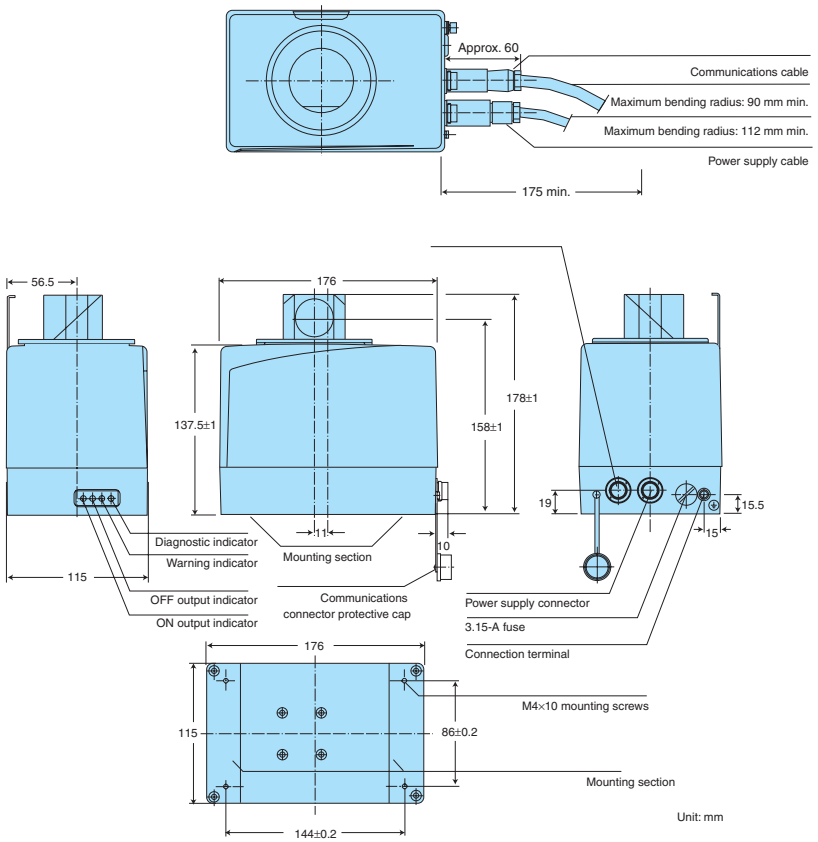
Item \ Model		F3G-C1R70
Safety category		Conforms to Type 3 ESPE EN/IEC 61496-1
Sensing range (includes safety supplement)		Protective field: 0 to 6 m Warning field: 0 to 7.5 m
Scanning angle		300°
Detection capability		Non-transparent, 70 mm in diameter (reflective rate of 1.8% min.)
Response time		280 ms max.
Reactivation time		200 to 5,000 ms (adjustable)
Supply voltage		24 VDC ±25% (ripple: 5 V p-p max, except for voltage drop due to cable extension)
Power consumption		24 W
Light source		Infrared Laser Diode (wavelength: 905 nm)
Laser protection class		Laser class 1 product conforms to the following standards: EN 60825-1, IEC 825-1, JIS C 6802, and 21 CFR 1040.10
Control output (output signal switching device)		Relay output: SPST-NO contact × 2 outputs, 30 V, 2 A (cosϕ=1) max. Switch life expectancy: 2,000,000 operations
Warning output (non-safety output)		Relay output: SPST-NO contact, 30 V, 2 A (cosϕ=1) max. Switch life expectancy: 2,000,000 operations
Protection		Control circuit: 3.15-A fuse (medium slow blow) Output: 2-A self-resetting fuse
Connection method		Power supply, output: 8-pin round connector (manufactured by Binder, 423 Series) Computer connection: 14-pin round connector (manufactured by Binder, 423 Series)
Communications method with computer		RS-232C
Ambient temperature		Operating: 0 to 50 °C; Storage: –20 to 70 °C
Ambient humidity		Operating/storage: 5% to 95% (with no condensation)
Vibration resistance (malfunction)		10 to 55 Hz with a 0.7-mm double amplitude, 20 sweeps each in X, Y, and Z directions
Shock resistance (malfunction)		100 m/s^2, 1,000 times each in X, Y, and Z directions
Degree of protection		IP65 (IEC 60529)
Cable (sold separately)	Power supply, output	0.5 mm^2, 8-wire, mesh shield; maximum extension length: 20 m; allowable bending radius: 90 mm
	Connection to computer	Maximum extension length: 5 m; allowable bending radius: 112 mm
Materials		Case: Aluminum; Optical surface, display: Glass
Weight		Sensor only: Approximately 3.0 kg; In packaging: Approximately 4.4 kg
Accessories		Instruction manual, CSL Setup Software (CD-ROM), and mounting screws (four, M4×10)

Connection Example (Category 3) Connection with a G9SA-301 Safety Relay Unit



Dimensions

F3G-C1R70



■ Accessories (Optional)

F39-LG1
Mounting Bracket

With Side Brackets

Photo shows mounting example.

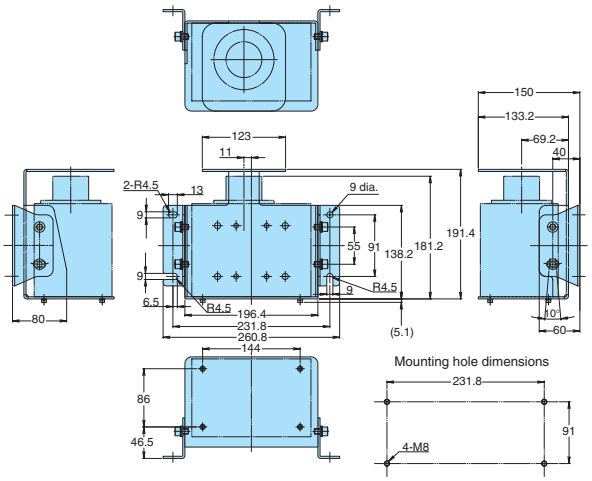
Without Side Brackets

Photo shows mounting example.

Dimensions

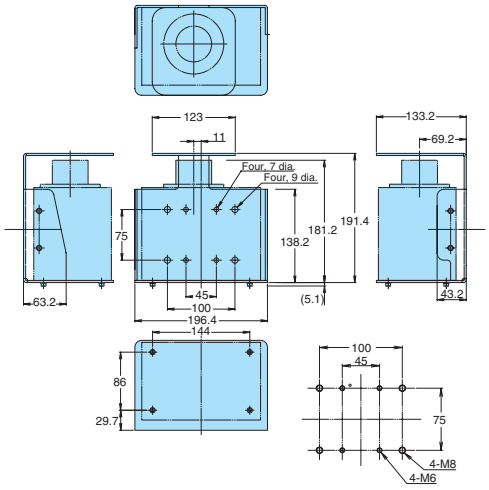
F39-LG1

With Side Brackets



Mounting hole dimensions

Without Side Brackets



WARNING!

- This catalog is provided as a guide for selecting the product. Do not use the product without first thoroughly reading and understanding the instruction manual provided with the product (Cat. No. SCHG-704), and the CSL Setup Software User's Manual (provided on the CD-ROM).
- Always have a qualified technician with appropriate training perform all of the following: Installing the F3G-C Safety Laser Scanner, setting up the designated monitoring area, and incorporating the product into the machine control system.
- The user must operate the F3G-C Safety Laser Scanner according to the performance specifications and installation environment described in the operation manuals. Perform risk assessment with all associated personnel and use the product according to the results of risk assessment.

■ Traceability

- To ensure the performance of the safety functions, the product must be inspected before use and at regular intervals according to the methods in the instruction manual provided with the product. To ensure delivery of additional information on the safe use of the product, an OMRON representative will need to confirm the installation location of the product and register the user with the product's serial number. We ask for your cooperation in the required procedures.

- The application examples in this catalog are provided for reference only. Always check the functions and safety of machinery and devices before using with the product.
- Before using the product under conditions which are not described in the manual or applying the product to nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, safety equipment, and other systems, machines, and equipment that may have a serious influence on lives and property if used improperly, consult your OMRON representative. Make sure that the ratings and performance characteristics of the product are sufficient for the systems, machines, and equipment, and be sure to provide the systems, machines, and equipment with double safety mechanisms.

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