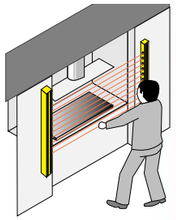
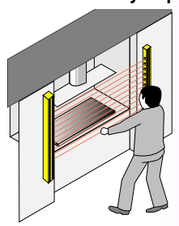
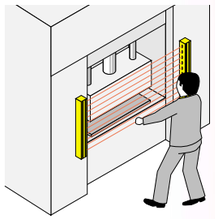
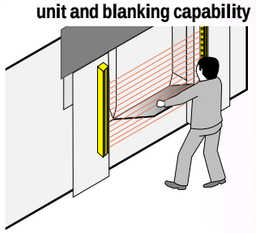
Safety Light Curtains for point-of-operation protection

TYPICAL APPLICATIONS		RESOLUTION	APPROVALS	ELECTRICAL CONNECTION / DIMENSIONS	DIMENSIONS OF THE PROTECTED AREA: SCANNING RANGE (m/ft)	DIMENSIONS OF THE PROTECTED AREA: PROTECTION HEIGHT (mm/in)	Automatic restart	Start & Restart interlock	Test input	FSD monitoring	Response time	Static outputs	Relay outputs	Self-diagnostic indicator	Output status indicator	Cross-talk reduction	Blanking/Reduced resolution	Muting	Cascading	Single/double stroke	Weld splash protection	Sealing	Voltage		
TYPE 4	**Compact Type 4 light curtain with static safety outputs** 	**Heavy industry and material conversion** • Pressing, moulding and thermoforming machines • Conveyors, handling equipment and assembly lines • Copying lathes and machining centers • Door and gate, lift and hoist technology • Stacking machines, transporting and conveyor technology • Textile, packaging machines • Vibrating sieves, sorters and milling machines	FINGER DETECTION **ø14 mm / 0.6 in** HAND DETECTION **ø30 mm / 1.2 in**	c UL us LISTED INRS CE B Approved as Type 4 per IEC/EN 61496-1/2	• DIN 43651 plugs • Brad Harrison Mini-Change® plugs • Terminal strips (cable glands) 60 mm x 42 mm / 2.36 in x 1.65 in	*FF-SYA30* 20 m/65.6 ft *FF-SYA14* 6 m/ 20 ft	*320 mm to 1760 mm/ 12.6 in to 56.7 in*	■	❑	■	❑	14 to 18 ms	■	❑	■	■	■		❑	❑	❑	❑	IP 65 NEMA 4 NEMA 13	24 Vdc	**FF-SYA14 / FF-SYA30** 	**FF-SYA**
TYPE 4	**Compact Type 4 light curtain with static safety outputs** 	**Heavy industry and material conversion** • Pressing, moulding and thermoforming machines • Electronic assembly • Copying lathes and machining centers • Textile, packaging machines	FINGER DETECTION **ø18 mm / 0.70 in** HAND DETECTION **ø30 mm / 1.2 in**	c SP us INRS CE Approved as Type 4 per IEC/EN 61496-1/2	• M12 (8 pin) connectors 55 mm x 42 mm / 2.16 in x 1.65 in	*FF-SG18 / FF-SG30* 3,5 m / 11.48 ft	*310 mm to 700 mm/ 12.21 in to 27.58 in* (*FF-SG18*); *310 mm to 1470 mm/ 12.21 in to 57.91 in* (*FF-SG30*)	■	❑		❑	15 to 21,5 ms	■	❑		■			❑	❑	❑		IP 65 NEMA 4 NEMA 13	24 Vdc	**FF-SG18 / FF-SG30** 	**FF-SG**
TYPE 4	**Harsh-duty Type 4 self-contained light curtain with relay outputs** 	**Heavy industry and material conversion** • Presses and punches for metals, plastics and leather • Deep-drawing presses, moulding presses and filter presses • Metal forming, milling and drilling machines • Spot-welding machines and fine-boring machines	FINGER DETECTION **ø22 mm / 0.86 in** HAND DETECTION **ø35 mm / 1.4 in**	c SP us BG B For ac versions only CE Approved as Type 4 per pr EN 50100 - 1/2	• Metal connectors DIN 43652 116 mm x 56 mm / 4.57 in x 2.20 in	*FF-SB12* 10 m / 32.8 ft *FF-SB14* 10 m / 32.8 ft; 24 m / 78.72 ft Long range version	*200 mm to 600 mm/ 7.88 in to 23.6 in* (*FF-SB12*); *400 mm to 1400 mm / 15.76 in to 55.16 in* (*FF-SB14*)	■	■	■	■	25 to 45 ms	2 NO 1 NC	■	■			❑	❑	❑	■ Ⓘ	IP 65 NEMA4 NEMA 13	120 Vac/ 240 Vac 24 Vdc/ 48 Vdc	**FF-SB12 / FF-SB14** 	**FF-SB**
TYPE 4	**Type 4 light curtain with separate control unit and blanking capability** 	**Heavy industry and material conversion** • Presses, metalforming, moulding, milling, thermoforming, and assembly machines • Stacking, transporting and handling equipment, conveyors and assembly lines • Copying lathes and machining centers • Door and gate, lift and hoist technology • Robotic, welding, cutting, and sealing • Textile, packaging machines • Jigging sieves, sorters and special machines	HAND DETECTION **ø31,75 mm / 1.25 in**	c SP us CE TÜV PRODUCT SERVICE Approved as Type 4 per IEC/EN 61496-1/2	• *Sensors:* connectors • *Control unit:* removable terminal strips 53,3 mm x 69,8 mm / 2.1 in x 2.75 in	7,6 m / 25 ft 15,3 m / 50 ft Long range version	*146 mm to 1822,5 mm/ 5.75 in to 71.75 in*	■	■		■	25 to 35 ms	■	2 NO 1 NC	■	■	■	❑	■	❑	■ Ⓘ	IP 65 NEMA 4	120 Vac 240 Vac 24 Vdc	**DETECTOR™ 3** 	**DETECTOR™ 3**

❑ Through external accessory Ⓘ *On specific models, with increased response time*

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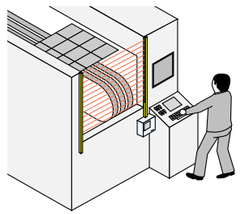
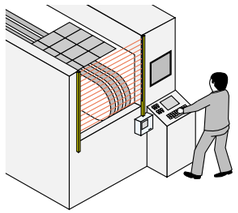
Safety Light Curtains for point-of-operation protection

	TYPICAL APPLICATIONS		RESOLUTION	APPROVALS	ELECTRICAL CONNECTION / DIMENSIONS		DIMENSIONS OF THE PROTECTED AREA: SCANNING RANGE (m/ft)	DIMENSIONS OF THE PROTECTED AREA: PROTECTION HEIGHT (mm/in)	Automatic restart	Start & Restart Interlock	Test Input	FSD monitoring	Response time	Static outputs	Relay outputs	Self-diagnostic indicator	Output status indicator	Cross-talk detection reduction	Blanking/Reduced resolution	Muting	Cascading	Single/double stroke	Weld splash protection	Sealing	Voltage		
TYPE 4	**Slim line Type 4 light curtain with separate control unit and relay outputs** 	**Light industry** • Paper cutting machines • Pick-and-place robots • Light electronic assembly machines • Goods lifts • Small carrousels	FINGER DETECTION **ø14 mm / 0.55 in** HAND DETECTION **ø30 mm / 1.18 in**	Approved as Type 4 per pr EN 50100 - 1/2	• M8 connectors ***FF-LS14*** 23 mm x 35 mm / 0.90 in x 1.38 in ***FF-LS30*** 19 mm x 12 mm / 0.74 in x 0.47 in		***3,5 m / 11.48 ft*** ***FF-LS14 / FF-LS30***	***200 mm to 750 mm / 7.88 in to 29.5 in*** ***200 mm to 1800 mm / 7.88 in to 70.9 in*** ***FF-LS14 / FF-LS30***	■	■	■	■	50 ms	2 NO 1 NC	■	■		❑	❑	❑			IP 65 NEMA 4 NEMA 13	24 Vdc and 24 Vac	**FF-LS14 / FF-LS30** 	FF-LS
TYPE 2	**Compact Type 2 light curtain with static safety outputs** 	**Heavy industry and material conversion** • Moulding and thermoforming machines • Electronic assembly • Assembly lines • Textile, packaging machines	FINGER DETECTION **ø18 mm / 0.7 in** HAND DETECTION **ø30 mm/1.2 in**	INRS Approved as Type 2 per IEC/EN 61496 - 1/2	• M12 (8 pin) connectors 55 mm x 42 mm / 2.16 in x 1.65 in		***4 m / 13.12 ft*** ***FF-SLG18/FF-SLG30***	***310 mm to 700 mm/ 12.21 in to 27.58 in*** ***310 mm to 1470 mm/ 12.21 in to 57.91 in*** ***FF-SLG18/FF-SLG30***	■	❑	■	❑	15 to 21,5 ms	■	❑	■		❑	❑	❑			IP 65 NEMA 4 NEMA 13	24 Vdc	**FF-SLG18 / FF-SLG30** 	FF-SLG

❑ Through external accessory

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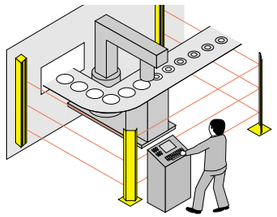
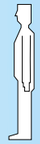
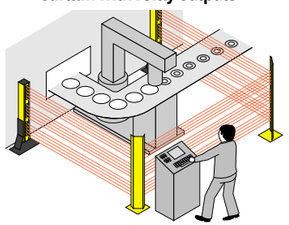
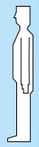
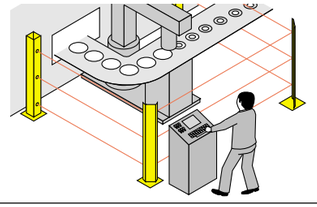
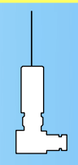
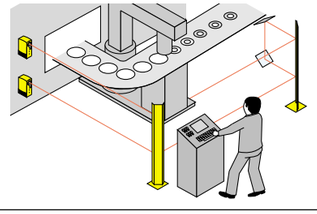
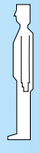
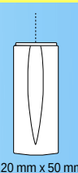
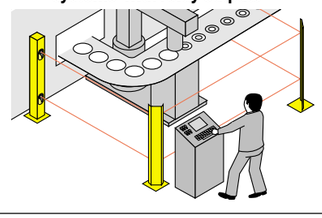
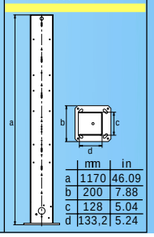
Multiple Light Beams for Access Detection to Hazardous Areas

	TYPICAL APPLICATIONS		NUMBER OF BEAMS	APPROVALS	ELECTRICAL CONNECTION / DIMENSIONS	DIMENSIONS OF THE PROTECTED AREA: SCANNING RANGE (m/ft)	DIMENSIONS OF THE PROTECTED AREA: PROTECTION HEIGHT (mm/in)	Automatic restart	Start & Restart interlock	Test input	FSD monitoring	Response time	Static outputs	Relay outputs	Self-diagnostic indicator	Output status indicator	Cross-talk detection reduction	Muting	Weld splash protection	Sealing	Voltage		
TYPE 4	**Compact Type 4 multibeam system with static safety outputs** 	**Heavy industry and material conversion** • Access detection for: - Robotic and transfer areas - Machinery centers - Palletising areas - Storage and stacking areas • Max. length of a U-shaped perimeter: 64 m / 210 ft	***2, 3 or 4 beams***  BODY DETECTION according to EN 999	c UL us LISTED; CSA C US; INRS; CE; B; Approved as Type 4 per IEC/EN 61496-1/2	• DIN 43651 plugs • Brad Harrison Mini-Change® plugs • Terminal strips (cable glands)  60 mm x 42 mm / 2.36 in x 1.65 in	***0,5 m to 80 m / 1.64 ft to 262.46 ft***	***500 mm to 900 mm / 19.7 in to 35.46 in***	■	❑	■	❑	12 ms	■	❑	■	■	■	❑	❑	IP 65 NEMA 4 NEMA 13	24 Vdc	**FF-SYA234** 	TYPE 4 FF-SYA234
TYPE 4	**Harsh-duty Type 4 self-contained light curtain with relay outputs** 	**Heavy industry and material conversion** • Access detection for: - Robotic and transfer areas - Machinery centers - Palletising areas - Storage and stacking areas • Max. length of a U-shaped perimeter: 19 m / 62.32 ft	***2, 3 or 4 beams ø235 mm / 9.25 in***  BODY DETECTION according to EN 999	CSA C US; BG; CE; Approved as Type 4 per pr EN 50100 - 1/2	• Metal connectors DIN 43652  116 mm x 56 mm / 4.57 in x 2.20 in	***3 m to 24 m / 9.84 ft to 78.72 ft***	***600 mm to 1400 mm / 23.64 in to 55.16 in***	■	■	■	■	25 to 27 ms		2 NO + 1 NC		■		❑	❑	IP 65 NEMA 4	120 Vac/ 240 Vac 24 Vdc/ 48 Vdc	**FF-SB15** 	TYPE 4 FF-SB
TYPE 4	**Type 4 modular light curtain with M18 sensors and separate control unit with relay outputs** 	**Heavy industry and material conversion** • Access protection on palletising areas • Access detection of areas containing robots or automatic machines • Detection of automatic guided vehicles • Thermoforming, agglomerating and moulding press • Max. length of a U-shaped perimeter: 27 m / 88.56 ft	***2 to 8 beams***  BODY DETECTION according to EN 999	BG; CE; Approved as Type 4 per pr EN 50100 - 1/2	• Connectors Hirschmann ELWIKA  99 mm x Ø18 mm / 3.90 in x 0.70 in	***25 m/ 82 ft*** ***33 m / 108 ft*** **Long range version**	***2 to 8 beams***	■	■	■	■	30 ms		2 NO + 1 NC		■		❑		***Sensors:*** IP 67 NEMA 6	120 Vac 230 Vac 24 to 48 Vdc	**FF-SCAN** 	TYPE 4 FF-SCAN
TYPE 4	**Compact Type 4 self-contained single beam with relay outputs** 	**Heavy industry and material conversion** • Access detection of perimeter protection around a robot zone, trip device at the entrance and the exit of a paint shop, etc. • Access detection at the rear of a press brake • Max. length of a U-shaped perimeter: 19 m / 62.32 ft	***1 beam***  BODY DETECTION according to EN 999	CSA C US; CE; INRS; B; Approved as Type 4 per pr EN 50100 - 1/2	• Metal connector DIN 43652 • Terminal strips  120 mm x 50 mm / 4.72 in x 0.02 in	***40 m / 131.2 ft*** ***75 m / 246 ft*** **Long range version**	***1 beam***	■	■	■	■	20 ms		2 NO + 1 NC	■	■	■	❑		IP 67 NEMA 6 ⓘ IP 65 NEMA 4 ②	120 Vac 230 Vac 24 Vdc	**FF-SPS4** 	TYPE 4 FF-SPS4
TYPE 4	**Harsh-duty Type 4 access detection systems with relay outputs** 	**Heavy industry and material conversion** • Access detection for perimeter protection around a robot zone, trip device at the entrance and the exit of a paint shop, etc. • Access detection at the rear of a press brake • Max. length of a U-shaped perimeter: 60 m / 196.8 ft	***2 or 3 beams***  BODY DETECTION according to EN 999	CSA C US; CE; INRS; B; Approved as Type 4 per pr EN 50100 - 1/2	• Metal connector DIN 43652 	**2-beam systems** ***0 to 20 m/ 0 to 65.6 ft*** ***5 m to 75 m / 16.4 ft to 246 ft*** **3-beam systems** ***0 to 8 m / 0 to 26.24 ft*** ***5 m to 75 m / 16.4 ft to 246 ft***	***500 mm to 800 mm / 19.7 in to 31.52 in***	■	■		■	20 ms		2 NO + 1 NC		■	■	❑		IP 65 NEMA 4		**FF-SPS4 systems** 	TYPE 4 FF-SPS4

mm	in
a 1170	46.09
b 200	7.88
c 128	5.04
d 133,2	5.24

❑ Through external accessory ⓘ *FF-SPS4❑TR❑ terminal strip version, FF-SPS4❑QR❑ Brad Harrison Minichange version* • ② *FF-SPS4❑CR❑ connector version*

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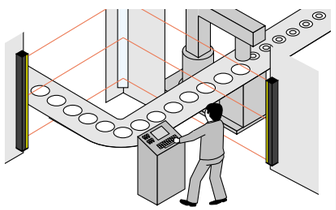
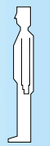
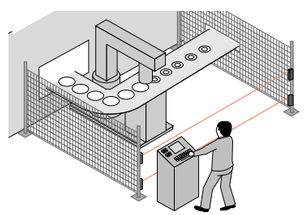
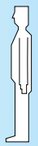
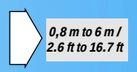
Multiple Light Beams for Access Detection into Low Risk Areas

	TYPICAL APPLICATIONS		RESOLUTION	APPROVALS	ELECTRICAL CONNECTION / DIMENSIONS	DIMENSIONS OF THE PROTECTED AREA: SCANNING RANGE (m/ft)	DIMENSIONS OF THE PROTECTED AREA: PROTECTION HEIGHT (mm/in)	Automatic restart	Start & Restart Interlock	Test input	FSD monitoring	Response time	Static outputs	Relay outputs	Self-diagnostic indicator	Output status indicator	Muting	Cascading	Sealing	Voltage	
TYPE 2	**Type 2 light curtain with integrated muting** 	**Light industry and material conversion, transportation and storage:** • Palletisers • Access detection for robotic areas • Access detection in transfer areas • Perimetric protection • Max. length of a U-shaped perimeter: 36,45 m / 119.58 ft	***2, 3, 4 beams***  BODY DETECTION **ø184 mm/7.24 in**	TÜV CE Approved as Type 2 per EN 50100 - 1/2	• M12 (5 pin, 8 pin)  35 mm x 40 mm / 1.38 in x 1.57 in	 *0,5 m to 45 m / 1.64 ft to 147.64 ft*	*500 mm to 900 mm / 19.7 in to 35.46 in*	■	■	■	■	28 to 30 ms	■		■	■	■		IP 65 NEMA 4	***Sensors:*** 24 Vdc	**FF-SLG234** 
TYPE 2	**Type 2 single beam with separate control unit and relay outputs** 	**Light industry and material conversion, transportation and storage:** • Access detection for robotic areas : • Packaging OEMs • Textile Machinery Industries • Automated industrial warehousing systems • Handling, palletising/de-palletising systems • Assembly lines	***1 to 4 beams***  BODY DETECTION **according to EN 999**	TÜV PRODUCT SERVICE CE Approved as Type 2 according to IEC/EN 61496-1/2	• M8 connector  25 mm x 15 mm / 0.98 in x 0.59 in	 *0,8 m to 6 m / 2.6 ft to 16.7 ft*	***1 to 4 beams***	■	■	■	■	28 to 30 ms		2 NO + 1 NC	■	■	❑	■		IP 65 NEMA 4	***Sensors:*** 24 Vdc	**FF-SLB** 

❑ Through external accessory

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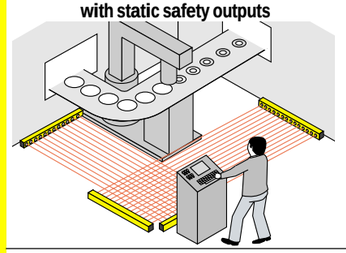
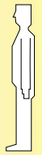
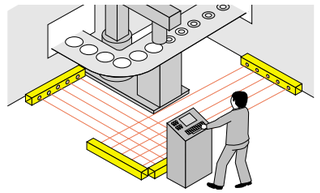
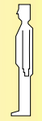
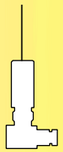
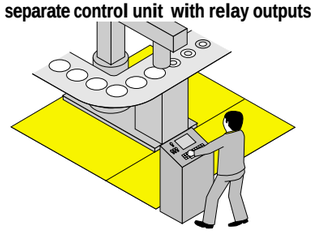
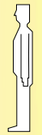
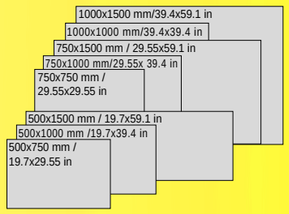
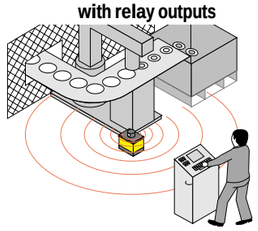
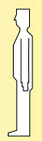
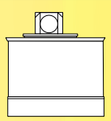
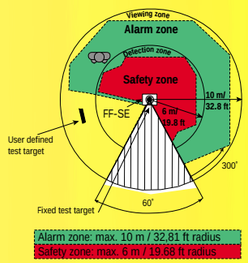
Electro-Sensitive Protective Equipment for Presence Detection in Hazardous Areas

	TYPICAL APPLICATIONS		RESOLUTION	APPROVALS	ELECTRICAL CONNECTION / DIMENSIONS	DIMENSIONS OF THE PROTECTED AREA: SCANNING RANGE (m/ft)	DIMENSIONS OF THE PROTECTED AREA: PROTECTION HEIGHT (mm/in)	Automatic restart	Start & Restart interlock	Test input	FSD monitoring	Response time	Static outputs	Relay outputs	Self-diagnostic indicator	Output status indicator	Cross-talk detection reduction	Muting	Cascading	Weld splash protection	Sealing	Voltage		
TYPE 4	**Compact Type 4 light curtain with static safety outputs** 	**Heavy industry and material conversion** • Presence detection for: - Robotic and transfer areas - Machinery centers - Palletizing areas - Storage and stacking areas	 BODY DETECTION **ø60 mm / 2.36 in**	C UL US LISTED C SP US CE INRS B Approved as Type 4 per IEC/EN 61496-1/2	• DIN 43651 plugs • Brad Harrison Mini-Change® plugs • Terminal strips (cable glands)  60 mm x 42 mm/ 2.36 in x 1.65 in	*20 m / 65.6 ft*	*320 mm to 1760 mm / 25.2 in to 63.04 in*	■	❑	■	❑	14 ms to 23 ms	■	❑	■	■	■	❑	❑	❑	IP 65 NEMA 4	24 Vdc	**FF-SYA60** 	FF-SYA
TYPE 4	**Type 4 modular light curtain with M18 sensors and separate control unit with relay outputs** 	**Heavy industry and material conversion** • Protection on palletising areas • Presence detection of areas containing robots or automatic machines • Detection of automatic guided vehicles • Thermoforming, agglomerating and moulding presses	 BODY DETECTION according to EN 999	BG CE Approved as Type 4 per pr EN 50100 - 1/2	• Connectors Hirschmann ELWIKA  99 mm x Ø18 mm/ 3.9 in x 0.7 in	*25 m / 82 ft* *33 m / 108.24 ft*	*2 to 8 beams*	■	■	■	■	30 ms	■		■		❑	■			*Sensors:* IP 67 NEMA 6	120 Vac 230 Vac 24 to 48 Vdc	**FF-SCAN** 	FF-SCAN
CAT.3 / CAT.4	**Category 3 Pressure sensitive mat and separate control unit with relay outputs** 	**Heavy industry and material conversion** • Presence sensing device for the control of dangerous areas such as robot areas, automotive transfer lines • Additional protection for optoelectronic trip devices • Suitable for cutting oils, welding splashes, shavings, etc.	 BODY DETECTION **Sensitivity ≥ 30 kg/66 lbs**	C SP US CE INRS EN 1760 *Mat* Category 3 EN 954-1 *Control unit:* Category 4 EN 954-1	• Terminal strips (cable glands) for control unit • Fiber optic cables for safety mat • Max. surface per control unit: 6 m²/64.5 ft² • Width:≤ 20 mm/0.78 in • Dimensions of the control unit: 211 x 211 x 96 mm/ 8.31 x 8.31 x 3.78 in	Standard dimensions available: 		■	❑	■	❑	25 ms	■	■	■			❑	■			*Sensor:* IP 67 *Control unit:* IP 65	120 Vac 240 Vac 24 Vdc	**FF-SM** 	FF-SM
TYPE 3	**Category 3 laser scanner with relay outputs** 	**Light industry** • Ground level trip device • Industrial robot areas • Automatically guided vehicles • For the control of large areas of any shape • Suitable for relatively clean environments	 BODY DETECTION **ø70 mm / 2.75 in**	C SP US CE UL 1998 BIA Berufsgenossenschaftliches Institut für Arbeitssicherheit Approved as Type 3 according to IEC/EN 61496-1/2	• Binder cordset (5 m/ 16.4 ft) for power and signal • Binder RS232 cordset (3 m/9.84 ft) for PC connection  172 x 176 x 107 mm/ 6.77 x 6.93 x 4.21 in			■	❑		❑	280 ms	■	■	■			❑	❑			IP 65	24 Vdc	**FF-SE** 	FF-SE

❑ Through external accessory

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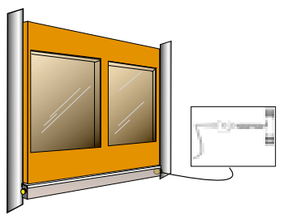
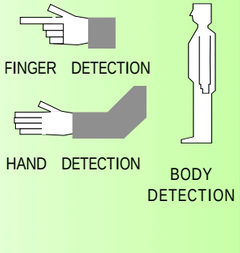
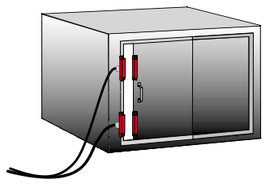
Safety Sensitive Edges

TYPICAL APPLICATIONS		DETECTION CAPABILITY	APPROVALS	ELECTRICAL CONNECTION / DIMENSIONS	DIMENSIONS OF THE PROTECTED ZONE SCANNING RANGE (m/ft)	Automatic restart	Start & Restart interlock	FSD monitoring	Response time of the control unit	Auxiliary static outputs	Relay outputs	Muting	Output status indicator	Sealing	Voltage	
CATEGORY 4	**Safety Sensitive Edges** 	• Industrial doors (sectional doors, sliding doors, etc.) - Machine guards and doors - Auto-Guided vehicle - Automatic handling systems or manipulators (robots, material feeding systems, etc.)		BG, UL, CE, Suitable for interfaces up to CATEGORY 4 per EN 954-1	Electrical Connection: 3 wires • ***Sensors***: 37 mm x 11,5 mm / 145 in x 0.45 in • ***Control unit***: 22,5 mm x 11 mm x 120 mm / 0.88 in x 0.43 in x 0.02 in	*0,4 m to 10 m / 1.31 ft to 32.8 ft*	■	■		■	32 ms	1	2 NO	❑	■	***Sensors:*** IP 68 ***Control unit:*** IP 40	24 Vdc	**FF-SD**  FF-SD

Non Contact Safety Switches

TYPICAL APPLICATIONS		DETECTION CAPABILITY	APPROVALS	ELECTRICAL CONNECTION / DIMENSIONS	FUNCTION	Automatic restart	Start & Restart interlock	Test input	FSD monitoring	Response time of the control unit	Static outputs	Relay outputs	Output status indicator	Cascading	Sealing	Voltage	
CATEGORY 3	**Safety magnetic muti-sensor system** 	• Interlocking guards for non-locked mechanical screens offering free access • Machine door or casing position detection • Guard-in-place detection, gate or access door detection • Control of mechanical screens used in addition to a safety light curtain • Meet the requirements of the following industries: Food & Beverage	Operating range: 5 mm - 7 mm / 0.20 in - 0.27 in ON, 8 mm - 12 mm / 0.32 in - 0.47 in OFF	CE, UL, Suitable for interfaces up to Category 3 per EN 954-1, TÜV NORD	Electrical Connection: 2 wires • ***FF-SNC200R2/ FF-SNC1EXT*** W: 22,5/0.88 H: 84/3.30 D: 119/4.68 • ***FF-SNC400R2/ FF-SNC400RE*** W: 75/2.95 H: 74/2.91 D: 119/4.68	• Tamper resistant keyed magnetic field actuated sensors • Multi-sensor safety control module	■	■	NA	■	15 ms	NA	2 NO + 1 NC	■	❑	***Sensors:*** IP 67 ***Control unit:*** IP 40	24 Vac/Vdc 110 Vac	**FF-SNC**  FF-SNC

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Honeywell

FF-ST2 Series

Type 2 Safety Light Curtains

DESCRIPTION

The FF-ST2 Series is designed for hazardous point-of-operation or access detection industrial machine safeguarding applications. Its enhanced output stage design provides longer cable length through M12 plugs. The Honeywell patented push-pull type OSSD outputs allow for low impedance at any time, while regular open collector type OSSD outputs have high impedance when OFF. As a result, the M12 limited wire section is no longer a constraint.

ASIC technology provides fast response times compared to the micro-processor technology commonly used for safety light curtains. The FF-ST2 light curtain response times are worst-case response times including the sensor and the output stage, and possible OSSD outputs failure modes. Fast response times contribute to shortened safety distances and reduced overall machine size.

The sturdy metal housing (including zamak end caps), and a small window that reduces exposure to the environment, allow the FF-ST2 to operate in most harsh duty applications.

Accessories include mounting kits, connectors, power supply, and relay modules.

⚠ DANGER

IMPROPER SAFETY PRODUCT USE IN THE US

- Type 2 safety light curtains as defined by IEC/EN 61496-1 and IEC/EN 61496-2 do not meet US OSHA 1910.217, US ANSI B11.1, B11.2, B11.19 and B11.20 requirements. Although Type 2 safety products are acceptable for certain applications outside the US, they are not generally acceptable in the US due to current US regulations and standards.
- In the US, Type 2 safety light curtains may be used under limited circumstances as defined by the ANSI/R15.06-1999 standard. In Canada, IEC/EN 61496-1 and IEC/EN 61496-2 are recognised as product standards, however application standards do not typically allow Type 2 light curtain use.
- Do not use Type 2 safety products in the US if the applicable standard requires a control reliable solution.
- For Risk Assessment, refer to ANSI TR3 and ANSI/R15.06-1999 for the USA and refer to the Ministry of Labour for Canada.
- Consult with local safety agencies before installing a Type 2 safety light curtain product.

Failure to comply with these instructions will result in death or serious injury.

FEATURES

- Type 2 per IEC61496-1/2, SIL2 per IEC61508
- Resolutions: 18 mm, 30 mm, 80 mm
- Protection heights: 200 mm to 1400 mm (18 mm resolution) or 200 mm to 1800 mm (30 mm and 80 mm resolutions)
- Scanning range: 0.25 m to 10 m
- Patented, unique solid state safety OSSD outputs allow longer cable length
- M12, 5 pole plugs
- ASIC technology provides fast response times
- Metal housing and reduced window size provide sturdy design
- Optimized overall size with reduced inactive zones
- Different function packages available

POTENTIAL APPLICATIONS

- Automotive plant floor industry
- Food and beverage industry
- Handling industry
- Machine tool industry
- Packaging industry
- Paper industry
- Special machines

FF-ST2 Series

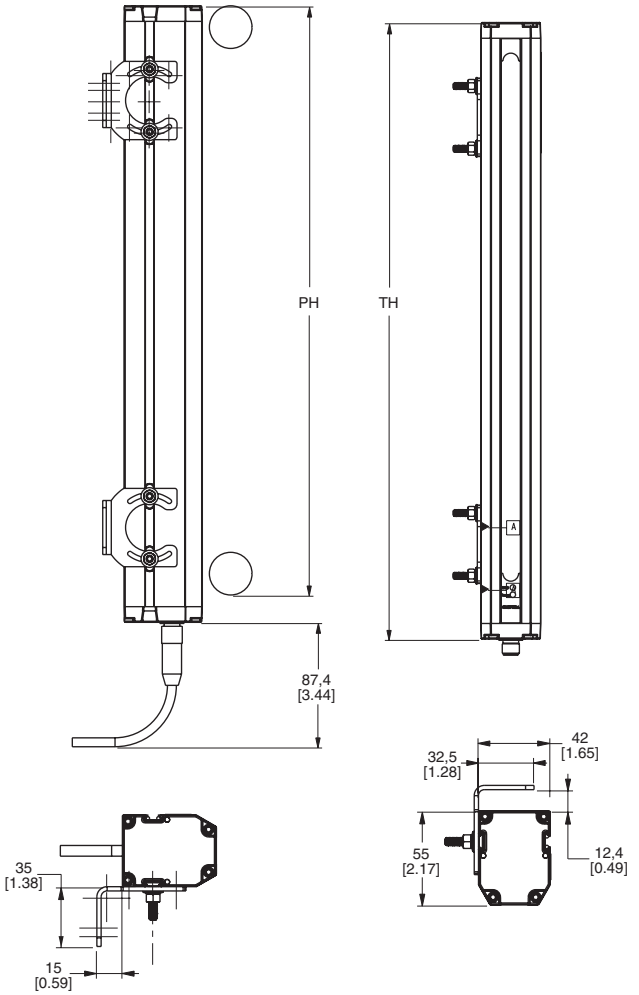
SPECIFICATIONS

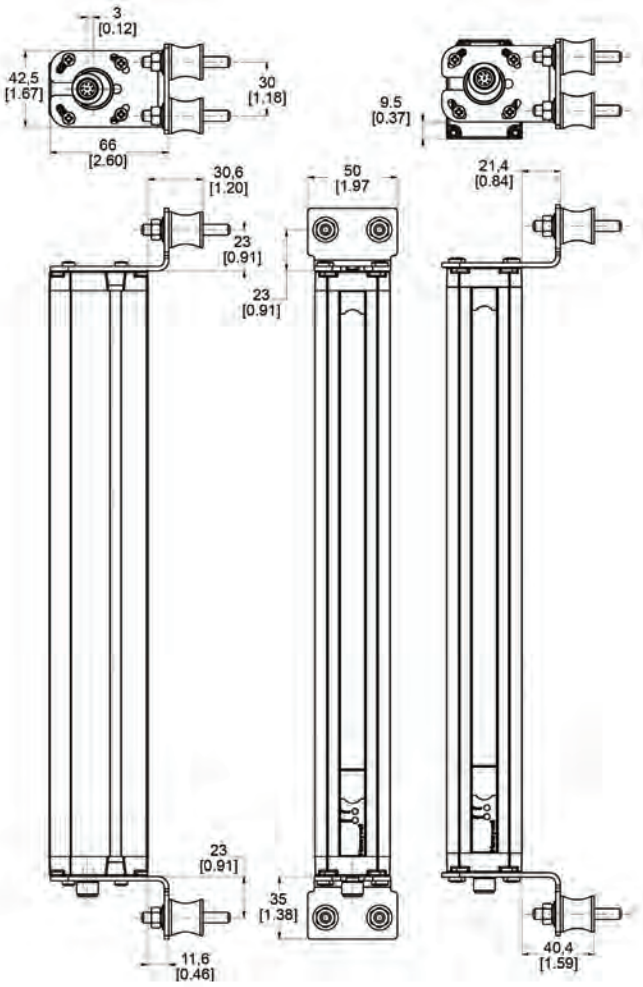
Characteristic	Parameter
Resolution (min. object detection size)	18 mm, 30 mm, 80 mm
Nominal scanning range	0.25 m to 10 m
Angle of divergence	max. ±5° above 3 m (as per IEC/EN 61496-2)
Emitting light source	infrared, pulsed, 880 nm
Supply voltage	24 Vdc (±20%) for the emitter and the receiver
Power consumption	5 W max. for the emitter, 5 W max. for the receiver
Output type	2 safety solid state outputs, push-pull/PNP type with Normally Open characteristics
Response time	see mounting dimension drawing
Switching capability	350 mA max. at 24 Vdc
Restart time after power up	>1 s (automatic mode)
Restart time after beam release	80 ms (without EDM), 150 ms (with EDM)
Leakage current	0.25 mA
Load impedance	70 Ohm min., 5 kOhm max.
Voltage drop	<2.3 Vdc
Load turn-on voltage	5 V min. on resistive loads, 7 V min. on inductive loads
Test pulse width/recurrence	2 pulses (width 200 us and 75 us), separated by 300 us, frequency from 3.3 ms to 8 ms (depending on height)
Protections	short-circuits and cross-faults, overloads (0.4 A max./0 Vdc; 0.9 A max./24 Vdc), reversed polarity, micro-cut-off 10 ms (100% voltage breakdown, 10 Hz)
Max. cable length	100 m [328.08 ft] (capacitance: 10 nF)
External contact type	relay contact, or static (solid state) PNP or static (solid state) NPN (automatic recognition - no push-pull output allowed)
Filtering time	20 ms by default, 150 ms on the EDM input
Voltage switching thresholds (high/low)	14.5 Vdc min., 4.5 Vdc (complies with IEC 61131-2, for type 2 sensors)
Input current (high/low)	20 mA; 10 mA at 24 Vdc
Max. voltage	29 Vdc
Housing material	aluminum alloy
End cap material	zamak
Window material	PMMA (Polymethyllethacrylate)

FUNCTION PACKAGES

Models	External Device Monitoring (EDM)	Automatic Restart (AUTO)	Restart Interlock (RES)
FF-ST2 Standard A	X	X	-
FF-ST2 Standard M	X	-	X

MOUNTING DIMENSIONS (For reference only: mm/[in])





FF-ST2X_ _XM2	02	03	04	05	06	07	08	09	10	12	14	16	18
Protection Height PH (mm)													
18 mm resolution	210	306	402	498	594	690	786	-	978	1170	1362	NA	NA
30 mm, 80 mm resolution	222	318	414	510	606	702	798	894	990	1182	1374	1566	1758
Total Height TH (mm)	242	338	434	530	626	722	818	914	1010	1202	1394	1586	1778
Response Time (ms)													
18 mm resolution	11	12	12.5	13	14	14.5	15.5	-	16.5	18	19.5	NA	NA
30 mm resolution	11	12	12.5	13	14	14.5	15.5	16	16.5	18	19.5	21	22
80 mm resolution	13.5	14.5	15.5	16	17	18	19	20	21	23	24.5	26.5	28.5

NA: not available

FF-ST2 Series

ORDERING INFORMATION

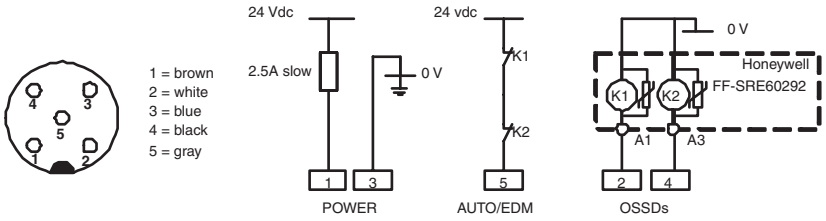
FF-ST2 Standard A

Function package — Automatic restart with external device monitoring

Connection types — M12, 5 pole on emitter and receiver

These on/off sensors are designed to be directly interfaced to the machine final switching devices (e.g. contactors), negating the need for a dedicated interface module.

RECEIVER WIRING DIAGRAM



FINGER DETECTION

Resolution 18 mm, Scanning Range 0.25 m to 10 m	
Protective Height (mm)	**Catalog Listing**
200	FF-ST2B02CM2
300	FF-ST2B03CM2
400	FF-ST2B04CM2
500	FF-ST2B05CM2
600	FF-ST2B06CM2
700	FF-ST2B07CM2
800	FF-ST2B08CM2
1000	FF-ST2B10CM2
1200	FF-ST2B12CM2
1400	FF-ST2B14CM2

HAND, LIMB OR BODY DETECTION

Resolution 30 mm, Scanning Range 0.25 m to 10 m		Resolution 80 mm, Scanning Range 0.25 m to 10 m	
Protective Height (mm)	**Catalog Listing**	**Protective Height (mm)**	**Catalog Listing**
200	FF-ST2C02CM2	200	FF-ST2C02LM2
300	FF-ST2C03CM2	300	FF-ST2C03LM2
400	FF-ST2C04CM2	400	FF-ST2C04LM2
500	FF-ST2C05CM2	500	FF-ST2C05LM2
600	FF-ST2C06CM2	600	FF-ST2C06LM2
700	FF-ST2C07CM2	700	FF-ST2C07LM2
800	FF-ST2C08CM2	800	FF-ST2C08LM2
900	FF-ST2C09CM2	900	FF-ST2C09LM2
1000	FF-ST2C10CM2	1000	FF-ST2C10LM2
1200	FF-ST2C12CM2	1200	FF-ST2C12LM2
1400	FF-ST2C14CM2	1400	FF-ST2C14LM2
1600	FF-ST2C16CM2	1600	FF-ST2C16LM2
1800	FF-ST2C18CM2	1800	FF-ST2C18LM2

ORDERING INFORMATION

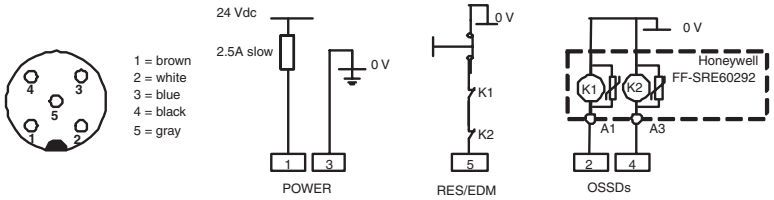
FF-ST2 Standard M

Function package — Manual restart interlock with external device monitoring

Connection types — M12, 5 pole on emitter and receiver

These on/off sensors are designed to be directly interfaced to the machine final switching devices (e.g. contactors), eliminating the need for a dedicated interface module.

RECEIVER WIRING DIAGRAM



FINGER DETECTION

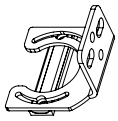
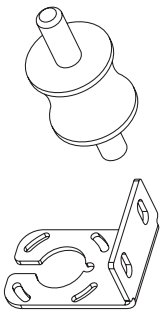
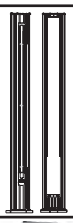
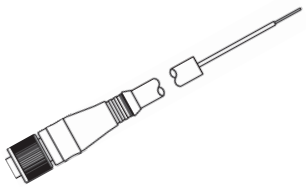
Resolution 18 mm, Scanning Range 0.25 m to 10 m	
Protective Height (mm)	**Catalog Listing**
200	FF-ST2B02BM2
300	FF-ST2B03BM2
400	FF-ST2B04BM2
500	FF-ST2B05BM2
600	FF-ST2B06BM2
700	FF-ST2B07BM2
800	FF-ST2B08BM2
1000	FF-ST2B10BM2
1200	FF-ST2B12BM2
1400	FF-ST2B14BM2

HAND, LIMB OR BODY DETECTION

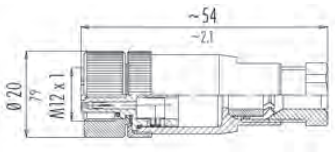
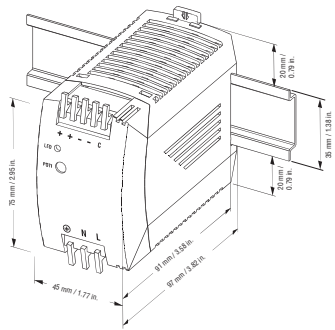
Resolution 30 mm, Scanning Range 0.25 m to 10 m		Resolution 80 mm, Scanning Range 0.25 m to 10 m	
Protective Height (mm)	**Catalog Listing**	**Protective Height (mm)**	**Catalog Listing**
200	FF-ST2C02BM2	200	FF-ST2C02KM2
300	FF-ST2C03BM2	300	FF-ST2C03KM2
400	FF-ST2C04BM2	400	FF-ST2C04KM2
500	FF-ST2C05BM2	500	FF-ST2C05KM2
600	FF-ST2C06BM2	600	FF-ST2C06KM2
700	FF-ST2C07BM2	700	FF-ST2C07KM2
800	FF-ST2C08BM2	800	FF-ST2C08KM2
900	FF-ST2C09BM2	900	FF-ST2C09KM2
1000	FF-ST2C10BM2	1000	FF-ST2C10KM2
1200	FF-ST2C12BM2	1200	FF-ST2C12KM2
1400	FF-ST2C14BM2	1400	FF-ST2C14KM2
1600	FF-ST2C16BM2	1600	FF-ST2C16KM2
1800	FF-ST2C18BM2	1800	FF-ST2C18KM2

FF-ST2 Series

ACCESSORIES

Catalog Listing	Picture	Description
FF-SGZ001001		Basic mounting kit includes two M5 dovetail shape bolts, two M5 nuts and two rip-lock washers. (These are already included in the FF-ST package.) Order two kits for a complete set to use with emitter and receiver.
FF-SXZ634189		Adjustable bracket kit includes two right angle brackets with four sets of M5 bolts, nuts and washers. Allows adjustments in azimuth directions of ±4° with front access of the adjusting screws. Order two kits for a complete set to use with emitter and receiver.
FF-SXZ634190 FF-SXZ634190-1		Kit includes two top/bottom, right angle, rotating brackets and four anti-vibration dampers (mounting hardware included). Allows adjustments in azimuth directions of ±5°. Order two kits for a complete set to use with emitter and receiver. • FF-SXZ634190: with anti-vibration dampers • FF-SXZ634190-1: without anti-vibration dampers
FF-SYZPF FF-SYZPFM11		Floor standing posts. • 1300 mm high beam post. (Order two pieces for a complete light curtain set and two FF-SYZ634178 bracket kits.) • 1170 mm high plain mirror post (25% scanning range reduction). Recommended for light curtains with a protection height of up to 1000 mm.
FF-SYZMIR102 FF-SYZMIR104 FF-SYZMIR106 FF-SYZMIR108 FF-SYZMIR110 FF-SYZMIR112 FF-SYZMIR114 FF-SYZMIR116 FF-SYZMIR118		Wall mount plain mirrors (25% scanning range reduction). Top and bottom brackets included (±45° angle adjustment). Suitable for: • FF-ST_ _ 02 _ M2 • FF-ST_ _ 03 _ M2 and FF-ST_ _ 04 _ M2 • FF-ST_ _ 05 _ M2 and FF-ST_ _ 06 _ M2 • FF-ST_ _ 07 _ M2 and FF-ST_ _ 08 _ M2 • FF-ST_ _ 09 _ M2 and FF-ST_ _ 10 _ M2 • FF-ST_ _ 12 _ M2 • FF-ST_ _ 14 _ M2 • FF-ST_ _ 16 _ M2 • FF-ST_ _ 18 _ M2
FF-SXZCAM125U02-S FF-SXZCAM125U05-S FF-SXZCAM125U05-90S FF-SXZCAM125U10-S FF-SXZCAM125U10-90S FF-SXZCAM128U02-S FF-SXZCAM128U05-S FF-SXZCAM128U05-90S FF-SXZCAM128U10-S FF-SXZCAM128U10-90S		M12 single-ended cordsets, female, 5 pin. • 2 m, straight • 5 m, straight • 5 m, right angle • 10 m, straight • 10 m, right angle M12 single-ended cordsets, female, 8 pin. • 2 m, straight • 5 m, straight • 5 m, right angle • 10 m, straight • 10 m, right angle

ACCESSORIES (continued)

Catalog Listing	Picture	Description
FF-SXZCOM125		M12 screw connector, female, straight, 5 pin
FF-SXZPWR050		ac to dc power supply (to be ordered separately as an option) • UL508 listed, UL1950, cUL/CSA-C22.2 No. 950-M90, EN/IEC 60950, EN 50178 (Class 2 rated for low power Installations) • Input voltage: 85 Vac to 264 Vac (43 Hz to 67 Hz) • Output voltage: 24 Vdc to 28 Vdc adjustable • Rated continuous load (at 60 °C [140 °F] max.): 2.1 A at 24 Vdc/ 1.8 A at 28 Vdc • Power: 50 W • Dimensions: 75 mm x 45 mm x 97 mm • DIN rail mounting • Weight: 240 g
FF-SRE60292 FF-SRE30812		Expansion relay modules for the FF-ST2 Standard A and Standard M models • 22.5 mm width, 4 NO/2 NC safety relay outputs • 90 mm width, 7 NO/1 NC safety relay outputs (See separate product data sheet for detailed information.)
FF-SRM200P2		Muting module • Connection of one or two safety devices • Modes of operation: unidirectional or bidirectional muting, mutual exclusion • Connection of two or four auxiliary muting sensors • 24 Vdc • Category 4 per EN 954-1 • Programmable max. muting time • Crossfault monitoring of inputs • Self-monitored muting lamp output • 3 NO safety relay outputs • Static outputs for output status and diagnostic information • 45 mm [1.77 in]

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

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Internet: www.honeywell.com/sensing

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FF-ST4 Series

Type 4 Safety Light Curtains

DESCRIPTION

The FF-ST4 Series is designed for hazardous point-of-operation or access detection in industrial machine safeguarding applications. Its enhanced output stage design provides longer cable length through M12 plugs. The Honeywell patented push-pull type OSSD outputs allow for low impedance at any time, while regular open collector type OSSD outputs have high impedance when OFF. As a result, the M12 limited wire section is no longer a constraint.

ASIC technology provides fast response times compared to the micro-processor technology commonly used for safety light curtains. The FF-ST4 light curtain response times are worst-case response times including the sensor and the output stage, the embedded functions processing such as blanking or muting, and possible OSSD output failure modes. Fast response times contribute to shortened safety distances and reduced overall machine size.

Some models offer flexible configuration of different mode of operations through the M12, 8 pole plug. The Honeywell patented inputs with automatic polarity recognition reduce the amount of wiring and increase the number of configurations while keeping the advantages of the pre-wired, off-the shelf M12 cord sets.

The sturdy metal housing (including zamak end caps), and a small window that reduces exposure to the environment, allow the FF-ST4 to operate in most harsh duty applications.

Accessories include mounting kits, connectors, power supply, and relay modules.

FEATURES

- Type 4 per IEC61496-1/2, SIL2 per IEC61508
- Resolutions: 14 mm, 30 mm, 80 mm
- Protection heights: 200 mm to 1400 mm (14 mm and 18 mm resolution) or 200 mm to 1800 mm (30 mm and 80 mm resolution)
- Scanning ranges: 0 m to 3.5 m (14 mm resolution) or 0.25 mm to 10 m (other resolutions)
- Patented, unique solid state safety OSSD outputs allow longer cable lengths
- Patented, automatic polarity recognition inputs provide easy, last minute configuration
- M12, 5 and 8 pole plugs
- ASIC technology provides fast response times
- Metal housing and reduced window size provide sturdy design
- Optimized overall size with reduced inactive zones
- Different function packages available
- Optional AS-i Safe field module

POTENTIAL APPLICATIONS

- Automotive plant floor industry
- Food and beverage industry
- Handling industry
- Machine tool industry
- Packaging industry
- Paper industry
- Special machines

FF-ST4 Series

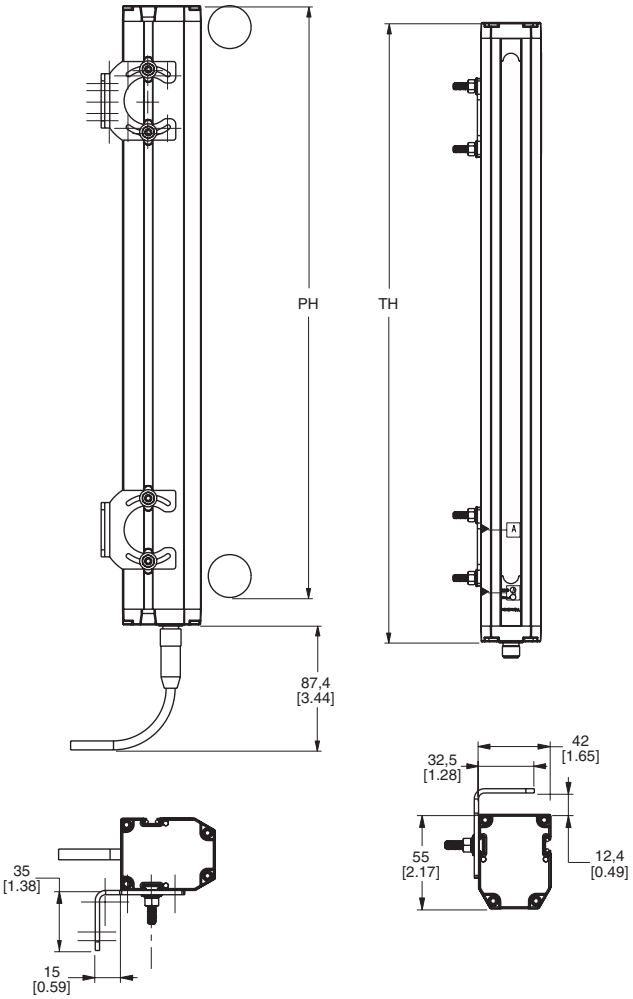
SPECIFICATIONS

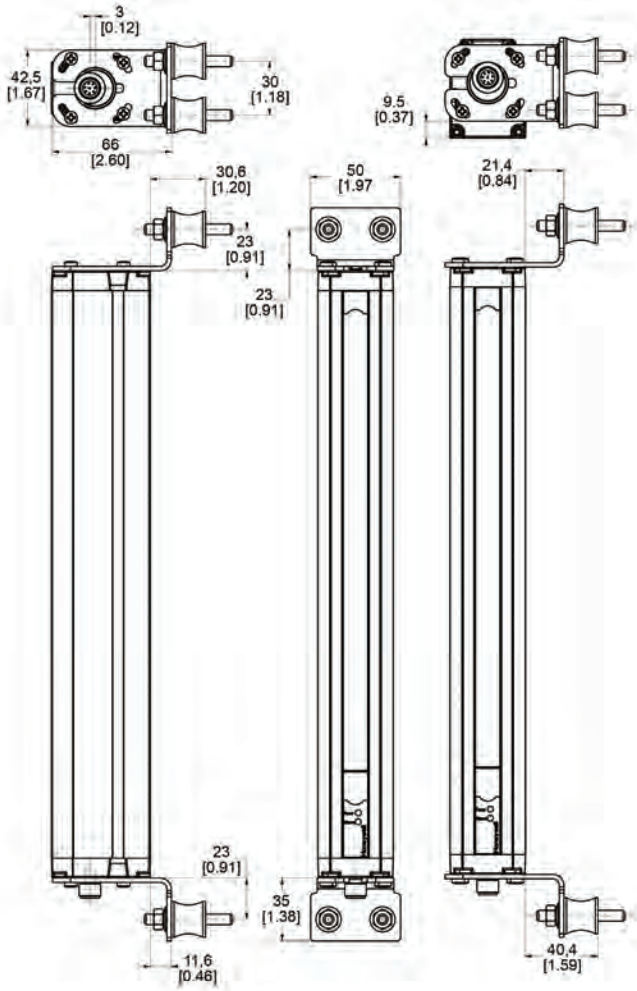
Characteristic	Parameter
Resolution (min. object detection size)	14 mm, 18 mm, 30 mm, 80 mm
Nominal scanning range	0 m to 3.5 m (for 14 mm resolution); 0.25 m to 10 m (for 18 mm, 30 mm, 80 mm resolutions)
Angle of divergence	max. ±5° above 3 m (as per IEC/EN 61496-2)
Emitting light source	infrared, pulsed, 880 nm
Supply voltage	24 Vdc (±20%) for the emitter and the receiver
Power consumption	5 W max. for the emitter, 5 W max. for the receiver
Output type	2 safety solid state outputs, push-pull/PNP type with Normally Open characteristics
Response time	see mounting dimensions drawing
Switching capability	350 mA max. at 24 Vdc
Restart time after power up	>1 s (automatic mode)
Restart time after beam release	80 ms (without EDM), 150 ms (with EDM)
Leakage current	0.25 mA
Load impedance	70 Ohm min., 5 kOhm max.
Voltage drop	<2.3 Vdc
Load turn-on voltage	5 V min. on resistive loads, 7 V min. on inductive loads
Test pulse width/recurrence	2 pulses (width 200 us and 75 us), separated by 300 us, frequency from 3.3 ms to 8 ms (depending on height)
Protections	short-circuits and cross-faults, overloads (0.4 A max./0 Vdc; 0.9 A max./24 Vdc), reversed polarity, micro-cut-off 10 ms (100% voltage breakdown, 10 Hz)
Max. cable length	100 m [328.08 ft] (capacitance: 10 nF)
External contact type	relay contact, or static (solid state) PNP or static (solid state) NPN (automatic recognition - no push-pull output allowed)
Filtering time	20 ms by default, 150 ms on the EDM input
Voltage switching thresholds (high/low)	14.5 Vdc min., 4.5 Vdc (complies with IEC 61131-2, for type 2 sensors)
Input current (high/low)	20 mA; 10 mA at 24 Vdc
Max. voltage	29 Vdc
Housing material	aluminum alloy
End cap material	zamak
Window material	PMMA (Polymethyllethacrylate)

FUNCTION PACKAGES

Model	External Device Monitoring (EDM)	Automatic Restart (AUTO)	Restart Interlock (RES)	Muting (or Bypass)	One or Two Beam Floating Blanking	AS-i Safe
FF-ST4 Basic	-	X	-	-	-	X
FF-ST4 Standard	X	X	X	-	-	-
FF-ST4 Advanced M	X	X	X	X	-	-
FF-ST4 Advanced B	X	X	X	-	X	-

MOUNTING DIMENSIONS (For reference only: mm/[in])





FF-ST4X_ _XM2	02	03	04	05	06	07	08	09	10	12	14	16	18
Protection Height PH (mm)													
14 mm resolution	206	302	398	494	590	686	782	-	974	1166	1358	NA	NA
18 mm resolution	210	306	402	498	594	690	786	-	978	1170	1362	NA	NA
30 mm, 80 mm resolution	222	318	414	510	606	702	798	894	990	1182	1374	1566	1758
Total Height TH (mm)	242	338	434	530	626	722	818	914	1010	1202	1394	1586	1778
Response Time (ms)*													
14 mm, 18 mm resolution	11	12	12.5	13	14	14.5	15.5	-	16.5	18	19.5	NA	NA
30 mm resolution	11	12	12.5	13	14	14.5	15.5	16	16.5	18	19.5	21	22
80 mm resolution	13.5	14.5	15.5	16	17	18	19	20	21	23	24.5	26.5	28.5

NA: not available

(*) without blanking

FF-ST4 Series

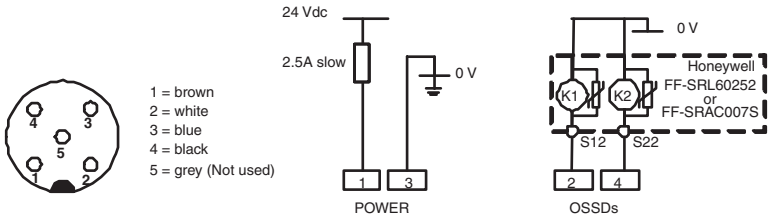
ORDERING INFORMATION

FF-ST4 Basic

Function package	Automatic restart without external device monitoring
Connection types	M12/5 pole on emitter and receiver

These on/off sensors are designed for the Honeywell FF-SRL60252 relay module or for the Honeywell FF-SRAC007S AS-i Safe field module.

RECEIVER WIRING DIAGRAM



FINGER DETECTION

Resolution 14 mm, Scanning Range 0 m to 3.5 m		Resolution 18 mm, Scanning Range 0.25 m to 10 m	
Protective Height (mm)	**Catalog Listing**	**Protective Height (mm)**	**Catalog Listing**
200	FF-ST4A02AM2	200	FF-ST4B02AM2
300	FF-ST4A03AM2	300	FF-ST4B03AM2
400	FF-ST4A04AM2	400	FF-ST4B04AM2
500	FF-ST4A05AM2	500	FF-ST4B05AM2
600	FF-ST4A06AM2	600	FF-ST4B06AM2
700	FF-ST4A07AM2	700	FF-ST4B07AM2
800	FF-ST4A08AM2	800	FF-ST4B08AM2
1000	FF-ST4A10AM2	1000	FF-ST4B10AM2
1200	FF-ST4A12AM2	1200	FF-ST4B12AM2
1400	FF-ST4A14AM2	1400	FF-ST4B14AM2

HAND, LIMB OR BODY DETECTION

Resolution 30 mm, Scanning Range 0.25 m to 10 m		Resolution 80 mm, Scanning Range 0.25 m to 10 m	
Protective Height (mm)	**Catalog Listing**	**Protective Height (mm)**	**Catalog Listing**
200	FF-ST4C02AM2	200	FF-ST4C02JM2
300	FF-ST4C03AM2	300	FF-ST4C03JM2
400	FF-ST4C04AM2	400	FF-ST4C04JM2
500	FF-ST4C05AM2	500	FF-ST4C05JM2
600	FF-ST4C06AM2	600	FF-ST4C06JM2
700	FF-ST4C07AM2	700	FF-ST4C07JM2
800	FF-ST4C08AM2	800	FF-ST4C08JM2
900	FF-ST4C09AM2	900	FF-ST4C09JM2
1000	FF-ST4C10AM2	1000	FF-ST4C10JM2
1200	FF-ST4C12AM2	1200	FF-ST4C12JM2
1400	FF-ST4C14AM2	1400	FF-ST4C14JM2
1600	FF-ST4C16AM2	1600	FF-ST4C16JM2
1800	FF-ST4C18AM2	1800	FF-ST4C18JM2

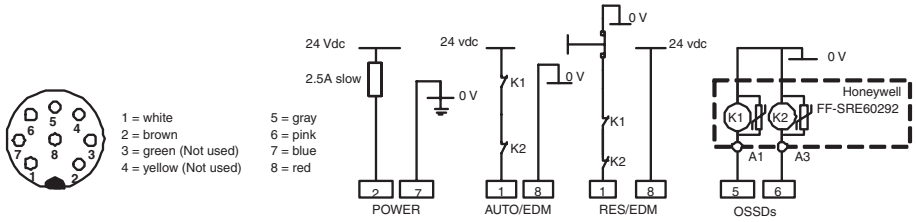
ORDERING INFORMATION

FF-ST4 Standard

Function package	Selectable automatic or manual restart interlock with external device monitoring
Connection types	M12, 5 pole on emitter and M12, 8 pole on receiver

These on/off sensors are designed to be directly interfaced to the machine final switching devices (e.g. contactors), eliminating the need for a dedicated interface module.

RECEIVER WIRING DIAGRAM



FINGER DETECTION

Resolution 14 mm, Scanning Range 0 m to 3.5 m		Resolution 18 mm, Scanning Range 0.25 m to 10 m	
Protective Height (mm)	**Catalog Listing**	**Protective Height (mm)**	**Catalog Listing**
200	FF-ST4A02DM2	200	FF-ST4B02DM2
300	FF-ST4A03DM2	300	FF-ST4B03DM2
400	FF-ST4A04DM2	400	FF-ST4B04DM2
500	FF-ST4A05DM2	500	FF-ST4B05DM2
600	FF-ST4A06DM2	600	FF-ST4B06DM2
700	FF-ST4A07DM2	700	FF-ST4B07DM2
800	FF-ST4A08DM2	800	FF-ST4B08DM2
1000	FF-ST4A10DM2	1000	FF-ST4B10DM2
1200	FF-ST4A12DM2	1200	FF-ST4B12DM2
1400	FF-ST4A14DM2	1400	FF-ST4B14DM2

HAND, LIMB OR BODY DETECTION

Resolution 30 mm, Scanning Range 0.25 m to 10 m		Resolution 80 mm, Scanning Range 0.25 m to10 m	
Protective Height (mm)	**Catalog Listing**	**Protective Height (mm)**	**Catalog Listing**
200	FF-ST4C02DM2	200	FF-ST4C02MM2
300	FF-ST4C03DM2	300	FF-ST4C03MM2
400	FF-ST4C04DM2	400	FF-ST4C04MM2
500	FF-ST4C05DM2	500	FF-ST4C05MM2
600	FF-ST4C06DM2	600	FF-ST4C06MM2
700	FF-ST4C07DM2	700	FF-ST4C07MM2
800	FF-ST4C08DM2	800	FF-ST4C08MM2
900	FF-ST4C09DM2	900	FF-ST4C09MM2
1000	FF-ST4C10DM2	1000	FF-ST4C10MM2
1200	FF-ST4C12DM2	1200	FF-ST4C12MM2
1400	FF-ST4C14DM2	1400	FF-ST4C14MM2
1600	FF-ST4C16DM2	1600	FF-ST4C16MM2
1800	FF-ST4C18DM2	1800	FF-ST4C18MM2

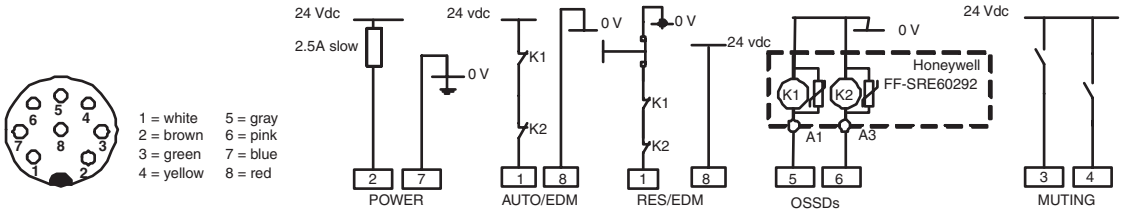
ORDERING INFORMATION **FF-ST4 Advanced M**

Function package	Selectable automatic or manual restart interlock with external device monitoring and muting
Connection types	M12, 5 pole on emitter and M12, 8 pole on receiver

Muting (or bypass) allows objects to pass through the protection field without stopping the machine. Muting is permitted when personnel are not exposed to the hazard (e.g. manual loading/unloading) or when the hazard cannot be accessed without a stop (e.g. conveyor).

NOTICE
MUTING SENSOR OUTPUT TYPE
The muting sensors can be any device with either relay outputs or soid state output. Devices with solid state push-pull outputs cannot be used.

RECEIVER WIRING DIAGRAM



FINGER DETECTION

Resolution 14 mm, Scanning Range 0 m to 3.5 m		Resolution 18 mm, Scanning Range 0.25 m to 10 m	
Protective Height (mm)	**Catalog Listing**	**Protective Height (mm)**	**Catalog Listing**
200	FF-ST4A02VM2	200	FF-ST4B02VM2
300	FF-ST4A03VM2	300	FF-ST4B03VM2
400	FF-ST4A04VM2	400	FF-ST4B04VM2
500	FF-ST4A05VM2	500	FF-ST4B05VM2
600	FF-ST4A06VM2	600	FF-ST4B06VM2
700	FF-ST4A07VM2	700	FF-ST4B07VM2
800	FF-ST4A08VM2	800	FF-ST4B08VM2
1000	FF-ST4A10VM2	1000	FF-ST4B10VM2
1200	FF-ST4A12VM2	1200	FF-ST4B12VM2
1400	FF-ST4A14VM2	1400	FF-ST4B14VM2

HAND, LIMB OR BODY DETECTION

Resolution 30 mm, Scanning Range 0.25 m to 10 m		Resolution 80 mm, Scanning Range 0.25 m to 10 m	
Protective Height (mm)	**Catalog Listing**	**Protective Height (mm)**	**Catalog Listing**
200	FF-ST4C02VM2	200	FF-ST4C02D1M2
300	FF-ST4C03VM2	300	FF-ST4C03D1M2
400	FF-ST4C04VM2	400	FF-ST4C04D1M2
500	FF-ST4C05VM2	500	FF-ST4C05D1M2
600	FF-ST4C06VM2	600	FF-ST4C06D1M2
700	FF-ST4C07VM2	700	FF-ST4C07D1M2
800	FF-ST4C08VM2	800	FF-ST4C08D1M2
900	FF-ST4C09VM2	900	FF-ST4C09D1M2
1000	FF-ST4C10VM2	1000	FF-ST4C10D1M2
1200	FF-ST4C12VM2	1200	FF-ST4C12D1M2
1400	FF-ST4C14VM2	1400	FF-ST4C14D1M2
1600	FF-ST4C16VM2	1600	FF-ST4C16D1M2
1800	FF-ST4C18VM2	1800	FF-ST4C18D1M2

ORDERING INFORMATION

FF-ST4 Advanced B

Function package	Selectable automatic or manual restart interlock with external device monitoring and selectable one or two-beam floating blanking
Connection types	M12, 5 pole on emitter and M12, 8 pole on receiver

The built-in floating blanking feature provides a means for the random inhibition of one or two light curtain beams. It is useful in applications where material or air-ejected parts randomly travel through or within the sensing field. Light beams may be disabled in an area where a fixture penetrates the light field, and stationary objects may not be allowed to protrude into the light curtain's sensing field. Any beam within the light curtain detection field may be blanked.

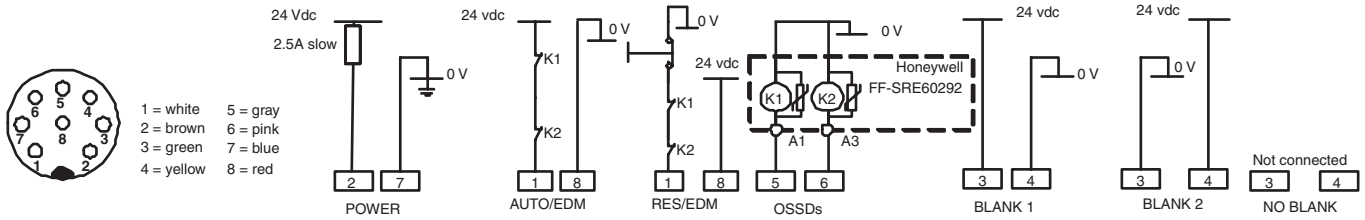
⚠ WARNING

INCORRECT SAFETY DISTANCE WHEN USING FLOATING BLANKING

- Floating blanking increases the light curtain resolution and the response time. Therefore, the safety distance between the light curtain and the hazardous area shall be increased.
- Refer to the installation manual for detailed information on resolution and calculating the safety distance.

Failure to comply with these instructions could result in death or serious injury.

RECEIVER WIRING DIAGRAM



FINGER DETECTION

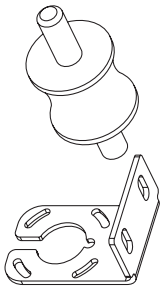
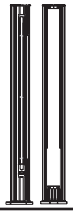
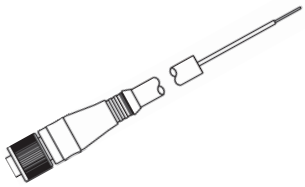
Resolution 14 mm, Scanning Range 0 m to 3.5 m		Resolution 18 mm, Scanning Range 0.25 m to 10 m	
Protective Height (mm)	**Catalog Listing**	**Protective Height (mm)**	**Catalog Listing**
200	FF-ST4A02RM2	200	FF-ST4B02RM2
300	FF-ST4A03RM2	300	FF-ST4B03RM2
400	FF-ST4A04RM2	400	FF-ST4B04RM2
500	FF-ST4A05RM2	500	FF-ST4B05RM2
600	FF-ST4A06RM2	600	FF-ST4B06RM2
700	FF-ST4A07RM2	700	FF-ST4B07RM2
800	FF-ST4A08RM2	800	FF-ST4B08RM2
1000	FF-ST4A10RM2	1000	FF-ST4B10RM2
1200	FF-ST4A12RM2	1200	FF-ST4B12RM2
1400	FF-ST4A14RM2	1400	FF-ST4B14RM2

HAND, LIMB OR BODY DETECTION

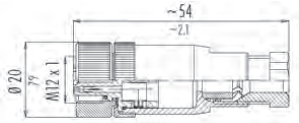
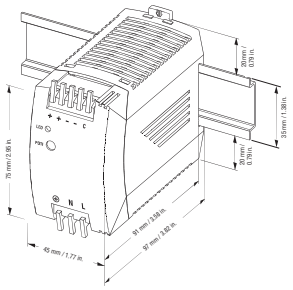
Resolution 30 mm, Scanning Range 0.25 m to 10 m		Resolution 30 mm, Scanning Range 0.25 m to 10 m	
Protective Height (mm)	**Catalog Listing**	**Protective Height (mm)**	**Catalog Listing**
200	FF-ST4C02RM2	900	FF-ST4C09RM2
300	FF-ST4C03RM2	1000	FF-ST4C10RM2
400	FF-ST4C04RM2	1200	FF-ST4C12RM2
500	FF-ST4C05RM2	1400	FF-ST4C14RM2
600	FF-ST4C06RM2	1600	FF-ST4C16RM2
700	FF-ST4C07RM2	1800	FF-ST4C18RM2
800	FF-ST4C08RM2		

FF-ST4 Series

ACCESSORIES

Catalog Listing	Picture	Description
FF-SGZ001001		Basic mounting kit includes two M5 dovetail shape bolts, two M5 nuts and two rip-lock washers. (These are already included in the FF-ST package.) Order two kits for a complete set to use with emitter and receiver.
FF-SXZ634189		Adjustable bracket kit includes two right angle brackets with four sets of M5 bolts, nuts and washers. Allows adjustments in azimuth directions of ±4° with front access of the adjusting screws. Order two kits for a complete set to use with emitter and receiver.
FF-SXZ634190 FF-SXZ634190-1		Kit includes two top/bottom, right angle, rotating brackets and four anti-vibration dampers (mounting hardware included). Allows adjustments in azimuth directions of ±5°. Order two kits for a complete set to use with emitter and receiver. • FF-SXZ634190: with anti-vibration dampers • FF-SXZ634190-1: without anti-vibration dampers
FF-SYZPF FF-SYZPFM11		Floor standing posts. • 1300 mm high beam post. (Order two pieces for a complete light curtain set and two FF-SYZ634178 bracket kits.) • 1170 mm high plain mirror post (25% scanning range reduction). Recommended for light curtains with a protection height of up to 1000 mm.
FF-SYZMIR102 FF-SYZMIR104 FF-SYZMIR106 FF-SYZMIR108 FF-SYZMIR110 FF-SYZMIR112 FF-SYZMIR114 FF-SYZMIR116 FF-SYZMIR118		Wall mount plain mirrors (25% scanning range reduction). Top and bottom brackets included (±45° angle adjustment). Suitable for: • FF-ST_ _ 02 _ M2 • FF-ST_ _ 03 _ M2 and FF-ST_ _ 04 _ M2 • FF-ST_ _ 05 _ M2 and FF-ST_ _ 06 _ M2 • FF-ST_ _ 07 _ M2 and FF-ST_ _ 08 _ M2 • FF-ST_ _ 09 _ M2 and FF-ST_ _ 10 _ M2 • FF-ST_ _ 12 _ M2 • FF-ST_ _ 14 _ M2 • FF-ST_ _ 16 _ M2 • FF-ST_ _ 18 _ M2
FF-SXZCAM125U02-S FF-SXZCAM125U05-S FF-SXZCAM125U05-90S FF-SXZCAM125U10-S FF-SXZCAM125U10-90S FF-SXZCAM128U02-S FF-SXZCAM128U05-S FF-SXZCAM128U05-90S FF-SXZCAM128U10-S FF-SXZCAM128U10-90S		M12 single-ended cordsets, female, 5 pin. • 2 m, straight • 5 m, straight • 5 m, right angle • 10 m, straight • 10 m, right angle M12 single-ended cordsets, female, 8 pin. • 2 m, straight • 5 m, straight • 5 m, right angle • 10 m, straight • 10 m, right angle

ACCESSORIES (continued)

Catalog Listing	Picture	Description
FF-SXZCOM125 FF-SXZCOM128		M12 screw connector, female, straight, 5 pin M12 screw connector, female, straight, 8 pin
FF-SXZPWR050		ac to dc power supply (ordered separately as an option). • UL508 listed, UL1950, cUL/CSA-C22.2 No. 950-M90, EN/IEC 60950, EN 50178 (Class 2 rated for low power Installations) • Input voltage: 85 Vac to 264 Vac (43 Hz to 67 Hz) • Output voltage: 24 Vdc to 28 Vdc adjustable • Rated continuous load (at 60 °C [140 °F] max.): 2.1 A at 24 Vdc/ 1.8 A at 28 Vdc • Power: 50 W • Dimensions: 75 mm x 45 mm x 97 mm • DIN rail mounting • Weight: 240 g
FF-SRL60252		Dual channel module for the FF-ST4 Basic models. • 22,5 mm width, 3 NO/1 NC internally redundant safety relay outputs (See separate product data sheet for detailed information.)
FF-SRAC007S (input module) FF-SRAC5003 (DIN rail and panel quick mount base for AS-i flat cables)		AS-i Safe input module for the FF-ST4 basic models. • Category 4 per EN954-1 and SIL3 per IEC61508 • Connection of the FF-ST4 emitter and receiver via a pair of M12 sockets • An external power supply is required to power the light curtain through the black flat cable. Order the DIN rail and panel quick mount base for AS-i flat cables: FF-SRAC5003 • Maximum cable length between light curtain and module is 10 m • 31 modules per master module • IP 67 protection rating • Dimensions: 110 mm x 45 mm x 70 mm (with the base) • Material: PA 6 (module), PBT (base) • CE approved, UL/CSA (application approval pending) • AS-i details: versions 2.11 and 3.0, profile S-0.B.E
FF-SRE60292 FF-SRE30812		Expansion relay modules for the FF-ST4 Standard A and Standard M models. • 22,5 mm width, 4 NO/2 NC safety relay outputs • 90 mm width, 7 NO/1 NC safety relay outputs (See separate product data sheet for detailed information.)
FF-SRL59022		Presence sensing device initiation module (PSDI) for the automatic machine cycle start to be used with light curtains with a resolution less than or equal to 30 m. (See separate product data sheet for detailed information.)

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

Warranty/Remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

E-mail: info.sc@honeywell.com

Internet: www.honeywell.com/sensing

Phone and Fax:

Asia Pacific	+65 6355-2828
	+65 6445-3033 Fax
Europe	+44 (0) 1698 481481
	+44 (0) 1698 481676 Fax
Latin America	+1-305-805-8188
	+1-305-883-8257 Fax
USA/Canada	+1-800-537-6945
	+1-815-235-6847
	+1-815-235-6545 Fax

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107160-3-EN FR26 GLO
March 2009

Type 4 Safety light curtain

FF-SYA Series

Compact, Universal, Smart and Full-featured

FEATURES

- Active Optoelectronic Protective Device compliant with the requirements of the IEC/EN 61496 - parts 1 and 2 European norms for Type 4 electrosensitive protective equipment
- Meets applicable parts of North American standards and regulations OSHA 1910.212 and 217; ANSI B11.1.2 and .19; ANSI RIA 15.06 for Control Reliability; CSA standards
- Self-contained with optical synchronisation
- 2 static safety outputs with short-circuit and cross-fault detection
- Selection of the infrared emission power allows cross-talk reduction
- Enhanced diagnostic information includes: a signal strength indicator, a cross-talk indicator and a failure diagnostic indicator
- Test input with selectable test input type
- Resolutions available:
  ø14 mm / 0.6 in for finger detection
  ø30 mm / 1.2 in for hand detection
  ø60 mm / 2.4 in for leg detection
- Protection height up to 1830 mm / 72 in
- Scanning range up to 20 m / 65 ft
- Electrical connection:
  - Hirschmann N6RFF type connectors,
  - Brad Harrison Mini-Change® connectors
  - Terminal strips
- Mounting brackets included allowing multiple mounting positions
- Safety relay modules for more switching capability or additional features (to be ordered separately).

TYPICAL APPLICATIONS

- Presses and punches
- Metal-forming, milling and drilling machines
- Spot-welding machines and fine-boring machines
- Pressing, moulding and thermoforming machines
- Stacking machines, transporting and conveyor technology; handling equipment and assembly lines

Approved as Type 4 per IEC/EN 61496-1/2

New design

The Honeywell FF-SYA light curtain is in compliance with IEC/EN 61496 - parts 1 and 2 standard and meets the requirements for a Type 4 Active Optoelectronic Protective Device, the highest level for safety products.

The product received an EC type test certificate from the French INRS notified body, required for safety equipment as per the 98/37/EC Machinery Directive. It meets the applicable parts of North American standards and regulations (OSHA 1910.212, OSHA 1910.217, ANSI standards including ANSI RIA 15.06 for Control Reliability and CSA Z434). Its CSA mark makes it a product usable in most parts of the world.

As soon as an object is detected inside the protection field, the FF-SYA de-energizes its two static safety outputs to signal the dangerous motion to stop. The FF-SYA is a self-contained light curtain that does not require a separate control unit for operation. Safety relay modules are available to provide higher current capability and additional functionality. This light curtain has been designed to satisfy the requirements of worldwide machine manufacturers and users: its compact size combined with its universal and smart features makes it full-featured and easy to use.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is to be referenced for each product.

Failure to comply with these instructions could result in death or serious injury.

The FF-SYA main features are:

- COMPACT SIZE

The cross section of 42 mm² x 55 mm² makes installation possible in tight spaces, especially with the help of the small brackets supplied with the light curtains. The available safety relay modules easily fit inside the machine control panel with its small width DIN rail mount housing.

- UNIVERSAL

The housing dimensions are the same for the 14 mm / 0.6 in, 30 mm / 1.2 in, 60 mm / 2.4 in resolution light curtains. The extended protected heights range from 334 mm to 1830 mm / 13.1 in to 72 in, covering industrial applications. The scanning range makes it possible to use mirrors in order to protect several sides of a machine with only one system.

- SMART

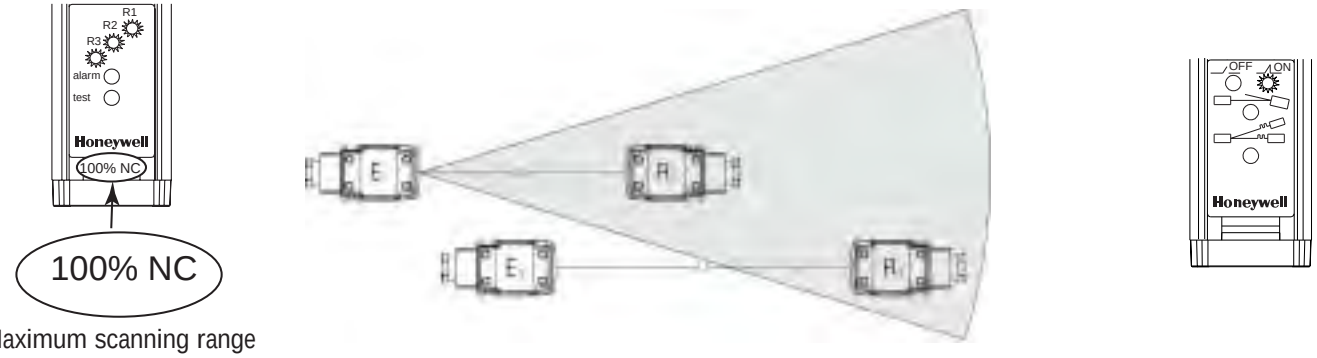
The FF-SYA is equipped with 2 static safety outputs. Compatible safety relay modules are available for a greater output current capability and manual restart functionality. An integrated cross talk reduction system allows the scanning range to be selected for the application distance. A cross-talk indicator flickers when emission from other systems is detected, indicating that a different selection of the scanning range is needed. The light curtain also has a signal strength indicator which flickers if there is a slight misalignment of the beams or front window contamination. Additional indicators provide information on the outputs status, on the selected scanning range and on failure diagnostic. Standard brackets are delivered with the light curtain to ease the order process. The housing has a T-slot mounting system to adapt brackets anywhere along the lateral sides, the rear sides or at the top and the bottom of the light curtain. Hirschmann connectors are delivered with the FF-SYA❑❑❑❑❑C2 light curtains.

- FULL FEATURED

The integrated test input can be used to test the entire safety chain. The test contact type (NO or NC characteristics) can be selected by internal configuration cards. When connected to the compatible safety relay modules, the FF-SYA provides a wide variety of advanced functions: cross-monitored relays, final switching devices monitoring for the control of external contactors or relays, choice between automatic restart or start and restart interlock as well as relay status indicators.

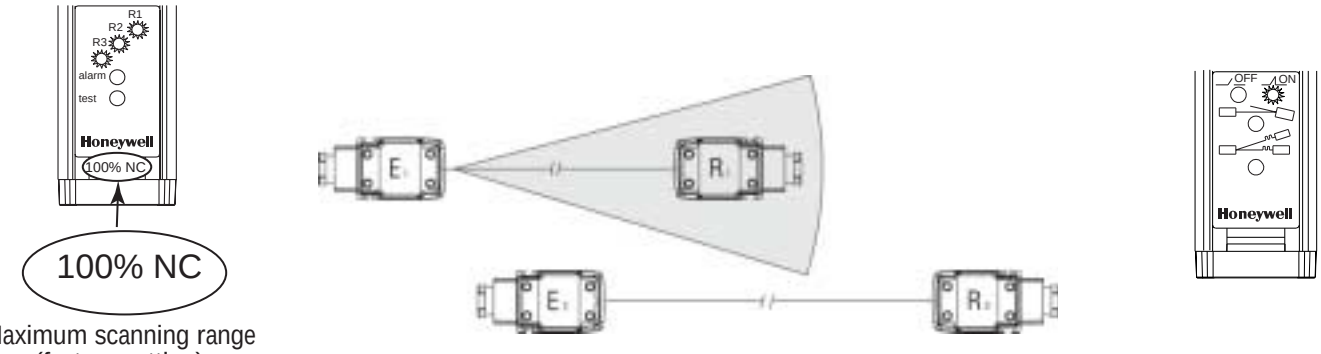
Cross-talk reduction system

The FF-SYA light curtain is based upon an infrared transmission between an emitter unit and a receiver unit. It is a requirement of the IEC/EN 61496-2 standard that if a receiver R2 receives two signals transmitted by two different emitters E1 and E2, the receiver R2 must turn to the alarm state. This happens if the receiver R2 is within the beam aperture angle and within the nominal scanning range of the second emitter E1. The cross-talk detection indicator flickers on the receiver R2 to warn the installer.



Maximum scanning range

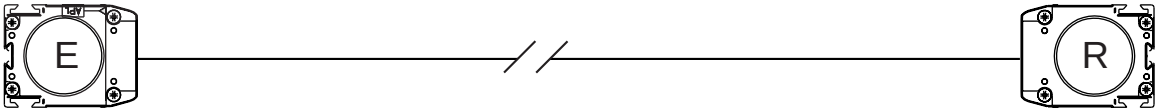
An internal configuration card is available on the emitter units for the selection of the adequate emission power. This configuration card can be used to eliminate this cross-talk phenomenon by decreasing the maximum scanning range down to minimum. The end cap can be easily removed, and there is no need to remove the unit from the machinery to select a different scanning range. Products are delivered with a maximum scanning range to ease the alignment process.



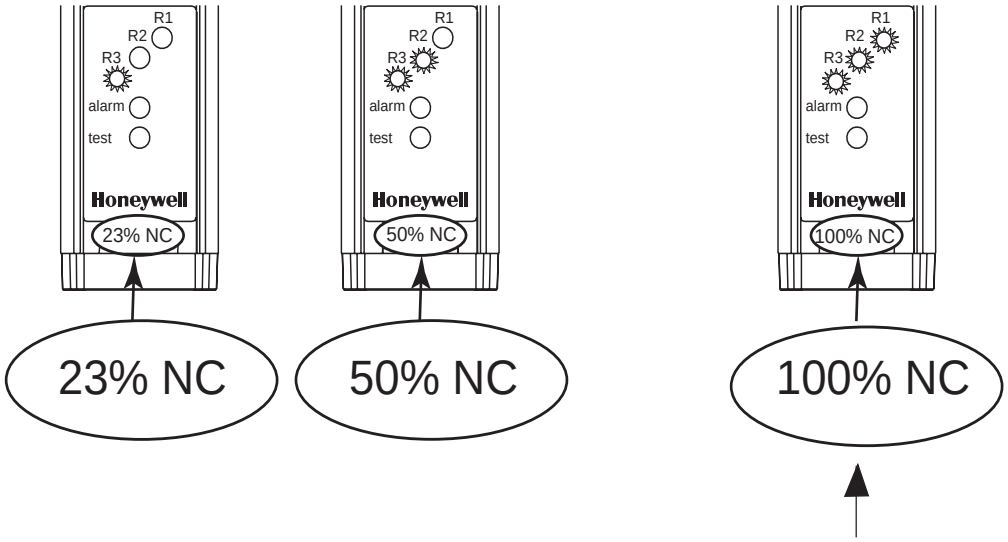
Maximum scanning range
(factory setting)

Scanning range selection

Test input type selection



	Minimum: 23 %	Medium: 50 %	Maximum: 100 %
FF-SYA14	0 m to 1,4 m / 0 ft to 4.6 ft	1 m to 3 m / 3.3 ft to 9.8 ft	2 m to 6 m / 6.6 ft to 19.7 ft
FF-SYA30 / FF-SYA60	0 m to 4,6 m / 0 ft to 15.1 ft	2 m to 10 m / 6.6 ft to 32.8 ft	5 m to 20 m / 16.4 ft to 65.6 ft



Factory setting
• for scanning range (maximum)
• for test input type (Normally closed)

Remove the end cap, in order to access to the internal configuration cards.

Emitter configuration card selection

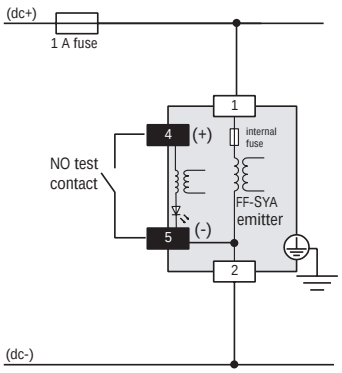
Factory setting

Card number (1)	Card code (1)	Scanning range	Test contact
#101	23 % NO	Minimum	Normally Open
#102	50 % NO	Medium	Normally Open
#103	100 % NO	Maximum	Normally Open
#104	23 % NC	Minimum	Normally Closed
#105	50 % NC	Medium	Normally Closed
#106	100 % NC	Maximum	Normally Closed

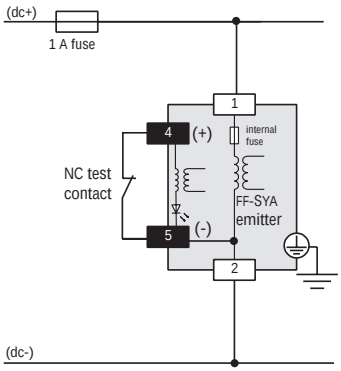
(1) Factory setting: card #106 (code «100 % NC»)

Test input type

Normally open

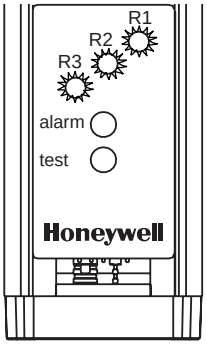


Normally closed (factory setting)



LED status indicators

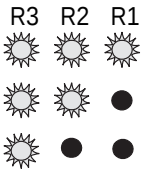
Emitter



3 scanning range indicators (yellow)

Alarm indicator (red)

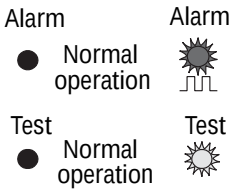
Test indicator (red)



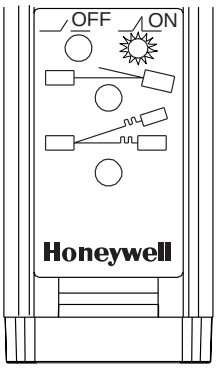
Maximum scanning range (yellow) (factory settings)

Medium scanning range (yellow)

Minimum scanning range (yellow)



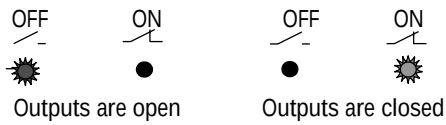
Receiver

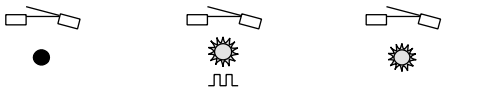


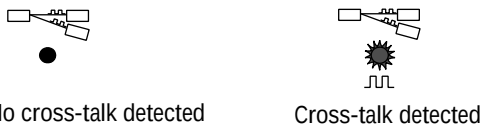
2 operation indicators (red and green)

Signal strength indicator (yellow)

Cross-talk indicator (red)

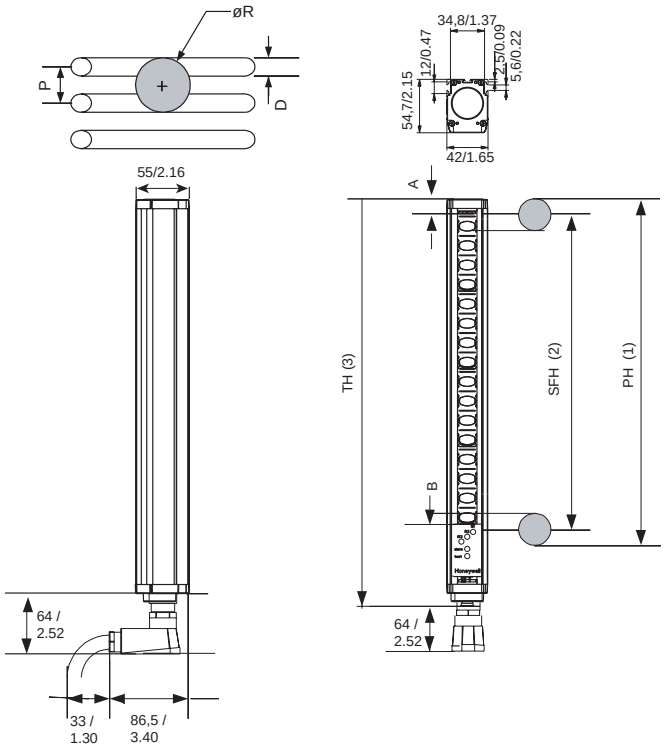




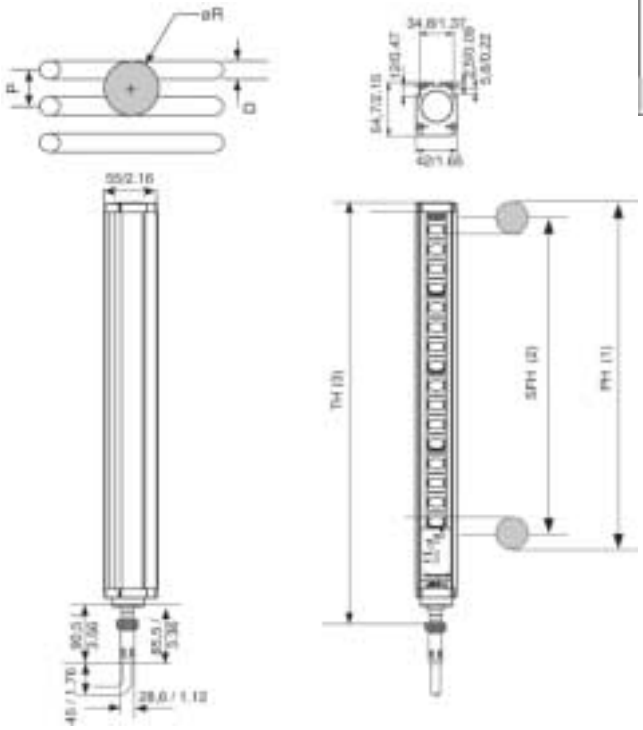


Dimensions (mm / in)

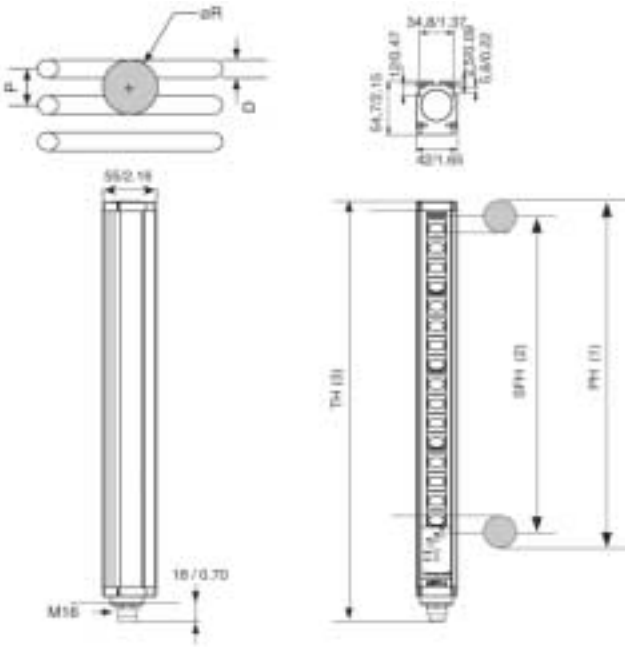
FF-SYA with Hirschmann N6RFF connectors (FF-SYA❑❑❑❑❑C2)



FF-SYA with Brad Harrison Mini-Change® connectors (FF-SYA❑❑❑❑❑Q2)



FF-SYA with terminal strips (FF-SYA❑❑❑❑❑T2)



(1) Protection Height for the minimum detected object size or resolution

(2) Sensing Field Height (full screen height)

(3) Total Height (including plugs for the FF-SYA❑❑❑❑❑C2, male receptacles for the FF-SYA❑❑❑❑❑Q2 and cable glands for the FF-SYA❑❑❑❑❑T2 versions)

Table 1

(mm / in)	**øR** (resolution)	**P** (lens pitch)	**D** (lens diameter)	**A** (inactive zone)	**B** (inactive zone)
FF-SYA14	ø 14 / 0.6	10 / 0.4	4 / 0.16	15,2 / 0.60	90,6 / 3.56
FF-SYA30	ø 30 / 1.2	20 / 0.8	10 / 0.4	22,2 / 0.87	87,6 / 3.45
FF-SYA60	ø 50 / 1.97	40 / 1.6	10 / 0.4	42,2 / 1.66	87,6 / 3.45

Type 4 safety light curtain

- **Type 4 according to the IEC/EN 61496 - parts 1 and 2 standards**
- **Control of the infrared emission source for cross-talk reduction**
- **2 static safety outputs with short-circuit and cross-fault detection**
- **Enhanced diagnostic information**

Approved as Type 4 per IEC/EN 61496-1/2

Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

Features / Type	*FF-SYA14*	*FF-SYA30*	*FF-SYA60*
Resolutions	ø 14 mm / 0.6 in	ø 30 mm / 1.2 in	ø 50 mm / 1.97 in
Protection heights	See Table 2		
Nominal scanning ranges	0 m to 6 m / 0 ft to 20 ft	0 m to 20 m / 0 ft to 65 ft	0 m to 20 m / 0 ft to 65 ft
Supply voltage	24 Vdc (± 15 %)		
Power consumption	*Emitter*: 5 W max. • *Receiver*: 7 W max. (see Table 2)		
Outputs	2 PNP safety static outputs (switching capacity: 0,35 A / 24 Vdc)		
Test input	Normally open or Normally closed (Factory setting)		
Response time	13,5 to 22,5 ms (see Table 2)		
Start time at power up	> 1 s		
Restart time after beam release	80 ms		
LED status indicators	*Emitter*: test mode, failure alarm, selected scanning range		
Test input type	*Receiver*: outputs status, optical signal margin, cross-talk detection		
Cross sectional area	W 42 mm² x D 55 mm² / W 1.65 in² x D 2.16 in²		
Emission	Infrared modulated light source (880 nm)		
Effective aperture angle	± 2°, ± 25 % (in compliance with the IEC/EN 61496 - Part 2)		
Light immunity	*Sun:* 20 000 lux • *Lamp:* 15 000 lux		
Electrical noise immunity	IEC 61000-4-4: level III / IEC 61000-4-3: level III		
Ambient temperature	*Operating temperature*: 0 °C to 55 °C / 32 °F to 131 °F		
	Storage temperature: -20 °C to 75 °C / -4 °F to 167 °F		
Vibrations	IEC/EN 61496-1: 10 to 55 Hz frequency range, 1 octave/min.sweep rate,		
	0,35 mm ± 0,05 amplitude, 20 sweeps per axis, for 3 axes		
Sealing	IP 65, NEMA 4, 13		
Material	*Housing:* aluminium alloy • *Front plate:* polymethyl metacrylate (PMMA) • *End caps:* polycarbonate		
Electrical connection	FF-SYA❑❑❑❑❑**C2**: EN 60423 plastic 7-pin right-angle plugs with crimping contacts		
	(Hirschmann N6RFF type)		
	FF-SYA❑❑❑❑❑**Q2**: 5 and 7 pole straight male receptacles		
	compatible with Brad Harrison Mini-Change® plugs (not included)		
	FF-SYA❑❑❑❑❑**T2**: terminal strip version with M16 cable glands		

Ordering information

Each listing consists of an emitter, a receiver, 2 pairs of right-angle brackets, a test rod and a pair of Hirschmann N6RFF connector (FF-SYA❑❑❑❑❑❑C2 version only)

FF-SYA❑❑ ❑❑❑ ❑2

- ***C:*** EN 60423 plastic plugs included
- ***Q:*** male receptacles compatible with Brad Harrison Mini-Change® plugs (not included)
- ***T*:** terminal strips (cable glands included)
- **Model** (see Table 2)
- **Resolutions**
  - *14:* ø 14 mm / 0.6 in
  - *30:* ø 30 mm / 1.2 in
  - *60:* ø 50 mm / 1.97 in

Table 2

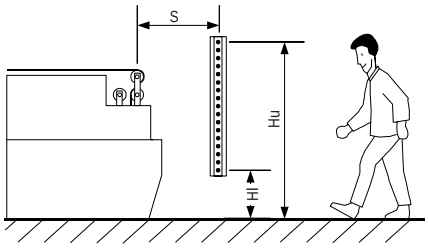
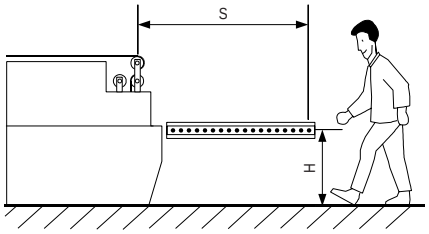
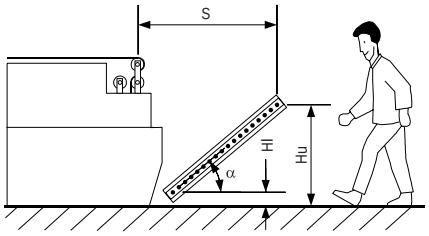
Model	***032***	***048***	***064***	***080***	***096***
Protection height (mm / in) (1)					
FF-SYA14	334 / 13.1	494 / 19.4	654 / 25.7	814 / 32.07	974 / 38.3
FF-SYA30	350 / 13.7	510 / 20.09	670 / 26.3	830 / 32.7	990 / 39
FF-SYA60	390 / 15.3	550 / 21.6	710 / 27.9	870 / 34.2	1030 / 40.5
Sensing field height (mm / in)(2)					
FF-SYA14	314 / 12.3	474 / 18.6	634 / 24.9	794 / 31.2	954 / 37.5
FF-SYA30	310 / 12.2	470 / 18.5	630 / 24.8	790 / 31.1	950 / 37.4
FF-SYA60	290 / 11.4	450 / 17.7	610 / 24.03	770 / 30.3	930 / 36.6
Total height (mm / in) (3)					
FF-SYA❑❑❑❑❑C2	483 / 19	643 / 25.3	803 / 31.6	963 / 37.9	1123 / 44.2
FF-SYA❑❑❑❑❑Q2	443 / 17.4	603 / 23.7	763 / 30	923 / 36.3	1083 / 42.6
FF-SYA❑❑❑❑❑T2	438 / 12.2	598 / 23.5	758 / 29.8	918 / 36.1	1078 / 42.4
Response time (ms)					
FF-SYA14	14	15	15,5	17,5	19,5
FF-SYA30	13,5	14	14	14,5	15
FF-SYA60	13,5	14	14	14,5	15
Weight per device (kg / lbs)	0,86 / 1.89	1,14 / 2.5	1,42 / 3.12	1,7 / 3.74	1,98 / 4.35
Power consumption (W) .	Emitter / Receiver	Emitter / Receiver	Emitter / Receiver	Emitter / Receiver	Emitter / Receiver
FF-SYA14	5 / 3.5	5 / 4	6 / 4	6 / 4.5	6 / 5
FF-SYA30	4 / 3.5	4 / 3.5	5 / 4	5 / 4	5 / 4
FF-SYA60	4 / 3.5	4 / 3.5	5 / 3.5	5 / 4	5 / 4

Table 2 (continued)

Model	***112***	***128***	***144***	***160***	***176***
Protection height (mm / in) (1)					
FF-SYA14	1134 / 44.6	1294 / 50.9	1454 / 57.2	1614 / 63.5	1774 / 69.8
FF-SYA30	1150 / 45.3	1310 / 51.6	1470 / 57.9	1630 / 64.2	1790 / 70.5
FF-SYA60	1190 / 46.8	1350 / 53.1	1510 / 59.4	1670 / 65.7	1830 / 72
Sensing field height (mm / in)(2)					
FF-SYA14	1114 / 43.8	1274 / 50.1	1434 / 56.5	1594 / 62.8	1754 / 69.1
FF-SYA30	1110 / 43.7	1270 / 50.03	1430 / 56.3	1590 / 62.6	1750 / 68.9
FF-SYA60	1090 / 42.9	1250 / 49.2	1410 / 55.1	1570 / 61.8	1730 / 68.1
Total height (mm / in) (3)					
FF-SYA❑❑❑❑❑C2	1283 / 50.5	1443 / 56.8	1603 / 63.1	1763 / 69.4	1923 / 75.7
FF-SYA❑❑❑❑❑Q2	1243 / 48.9	1403 / 55.2	1563 / 61.5	1723 / 67.8	1883 / 74.1
FF-SYA❑❑❑❑❑T2	1238 / 48.7	1398 / 55	1558 / 61.3	1718 / 67.6	1878 / 73.9
Response time (ms)					
FF-SYA14	20,5	22,5	20	21	22.5
FF-SYA30	15	15,5	16	17,5	17,5
FF-SYA60	15	15,5	16	17,5	17,5
Weight per device (kg / lbs)	2,26 / 4.97	2,54 / 4.97	2,82 / 6.20	3,10 / 6.82	3,38 / 7.43
Power consumption (W) .	Emitter/Receiver	Emitter/Receiver	Emitter/Receiver	Emitter/Receiver	Emitter/Receiver
FF-SYA14	7 / 5	7 / 5.5	7 / 7	7 / 7	7 / 7
FF-SYA30	6 / 4	6 / 4.5	6 / 4.5	6 / 4.5	6 / 4.5
FF-SYA60	6 / 4	6 / 4	6 / 4.5	6 / 4.5	6 / 4.5

Safety distances (in mm, 100 mm = 3.9 in)

❑ European EN 999 standard

	FF-SYA14	FF-SYA30	FF-SYA60
Normal approach			
	S ≥ 2000 (t1 + t2), with S ≥ 100 If S ≥ 500, then use: S ≥ 1600 (t1 + t2), with S ≥ 500	S ≥ 2000 (t1 + t2) + 128, with S ≥ 100 If S ≥ 500, then use: S ≥ 1600 (t1 + t2) + 128, with S ≥ 500	S ≥ 1600 (t1 + t2) + 850, with Hu ≥ 900 Hl ≤ 300 m
Parallel approach			
	S ≥ 1600 (t1+ t2) + (1200 - 0.4 H), with H ≤ 875 or S ≥ 1600 (t1+ t2) + 850, with 875 ≤ H ≤ 1000 with H ≥ 15 (R-50), where R is the light curtain resolution with H ≥ 150 for the FF-SYA60 light curtain		
Angled approach			
	If α ≥ 30°, then use one of the formula given for a normal approach, with Hu ≥ 900 and Hl ≤ 300 for the FF-SYA60 light curtain If α ≤ 30°, then use one of the formula given for a parallel approach, with Hu ≤ 1000 and Hl ≥ 15 (R-50), where R is the light curtain resolution (with Hl ≥ 150 for the FF-SYA60 light curtain)		

With:

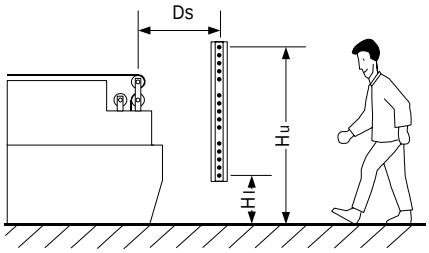
S: Minimum safety distance (in mm, 100 mm = 3.9 in)
t1: Light curtain response time (s)
t2: Machine stopping time (s)
H: Height of the detection plane above the reference floor (in mm)
Hu: Height of the uppermost beam above the reference floor (in mm)
Hl: Height of the lowest beam above the reference floor (in mm)

For more information, refer to the EN 999 European standard or comply with the requirements on safety distances given by the type C European standard if existing for the considered machine.

Safety distances (in inches, 1 in = 25,4 mm)

❑ US ANSI / OSHA standard

Normal approach



Ds ≥ 63 (Ts+Tc+Tr) + 0,94	**Ds ≥ 63 (Ts+Tc+Tr)+ 3,08**	**Ds ≥ 63 (Ts+Tc+Tr) + 7,10**

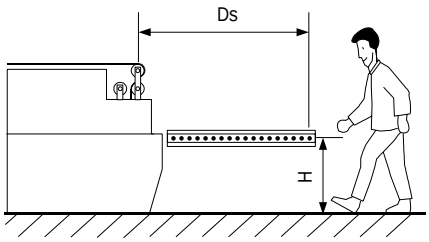
If Hi ≤ 12 and Hu > 48 (Typical for Reach Thru).

Ds ≥ 63 (Ts+Tc+Tr) + 48	**Ds ≥ 63 (Ts+Tc+Tr)+ 48**	**Ds ≥ 63 (Ts+Tc+Tr) + 48**

If Hi ≤ 12 and 36 ≤ Hu ≤ 48 (Typical for Reach Over)

If Hi > 12, supplemental safeguarding may be required to detect crawling underneath.

Parallel approach

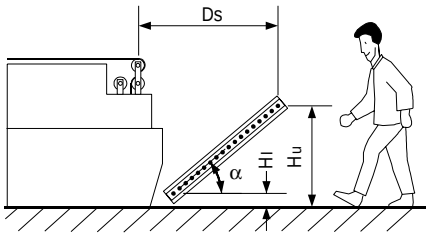


Ds ≥ 63 (Ts + Tc + Tr) + 48

Allowable field heights (for FF-SYA14 and FF-SYA30): 0 ≤ H ≤ 39	Allowable field heights (for FF-SYA60): 5,5 ≤ H ≤ 39

If H > 12, supplemental safeguarding may be required to detect crawling underneath.

Angled approach



If $\alpha \geq 30°$, then use the normal approach formula.

If $\alpha < 30°$, then use the parallel approach formula.

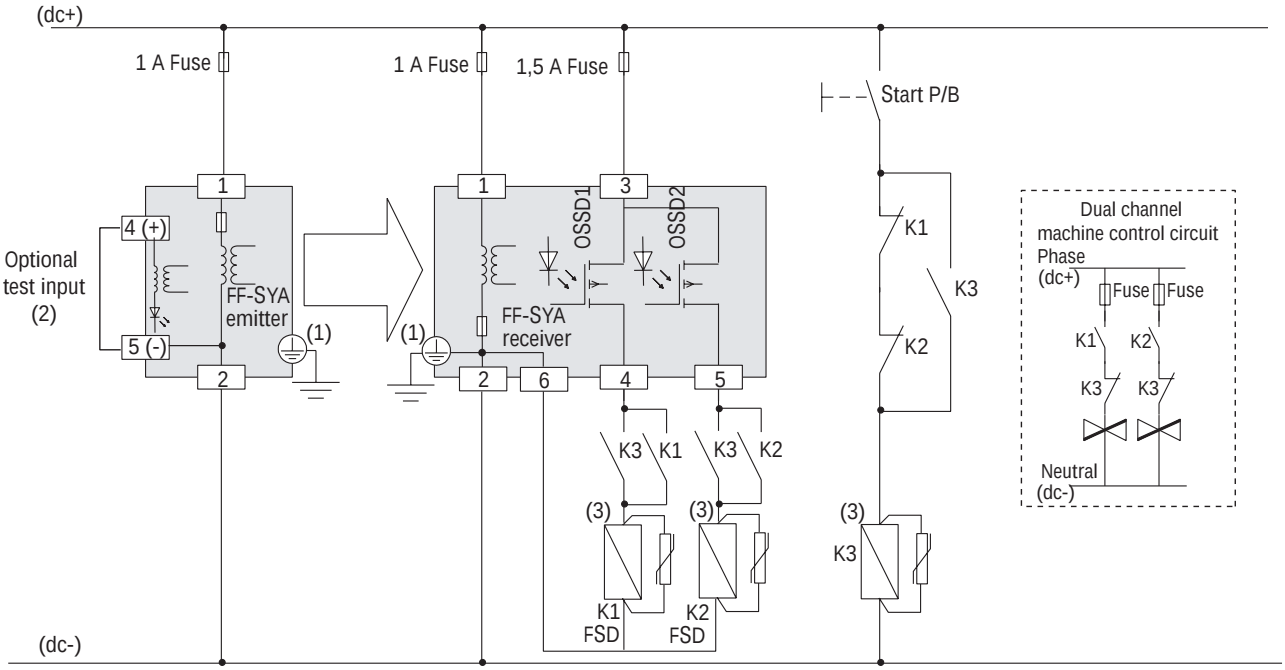
Ds = K (Ts + Tc + Tr) + Dpf

Where:

Ds: Minimum safety distance (in inches, 1 in = 25,4 mm)
K: Approach speed (in/s)
Ts: Worst case stopping time of the machine (s)
Tc: Worst case response of the machine's control (s)
Tr: Response time of the safety devices (light curtain plus its interface - meaning the response time including the mechanical relay outputs in s)
Dpf: Depth penetration factor (in)
Hu: Height of the uppermost beam above the reference floor (in)
Hl: Height of the lowest beam above the reference floor (in). For normal approach, assumption is that Hl is not greater than 12 in unless the application prevents access even with Hl at a distance greater than 12 in).

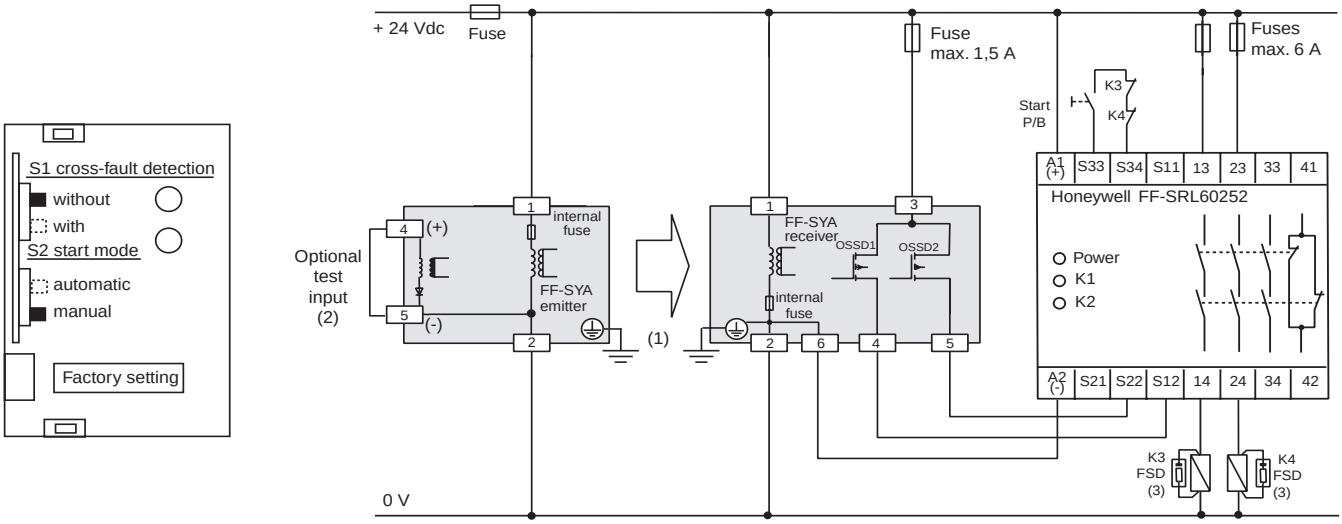
For more information, refer to the US regulations and standards (OSHA 29 CFR 1910.212 and 1910.217, ANSI B11.1, B11.2, B11.19 and ANSI RIA R15.06).

Wiring diagram using external safety relays with guided contacts



Wiring diagram using the FF-SRL60252

Example: the FF-SRL60252 safety control module is set in the manual mode, without cross-fault monitoring by the module, with FSD monitoring.



NOTICE

IMPROPER USE OF FF-SYA CURTAIN

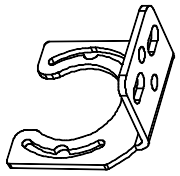
The cross-monitoring of the FF-SYA static outputs is based upon a self-checking principle which guarantees the detection of an output short-circuit and the detection of a short-circuit between the outputs (cross-fault detection). The FF-SRL60252 interface control module is primarily designed to be interfaced with Honeywell static safety outputs devices.

Compatibility of the FF-SYA with any other emergency stop safety control module is not guaranteed.

(1) Use pin 3 for the FF-SYA❑❑❑❑❑Q2E emitter and pin 7 for the FF-SYA❑❑❑❑❑Q2R receiver
(2) Optional test input jumpered when unused
(3) Install arc suppressors (31 Vdc varistors, customer supplied)
OSSD1 and OSSD2: Output Signal Switching Devices (static safety outputs)
FSD: Final Switching Devices (external safety relays with guided contacts)
Start P/B: normally open contact of a start push-button (customer supplied)

Accessories

New

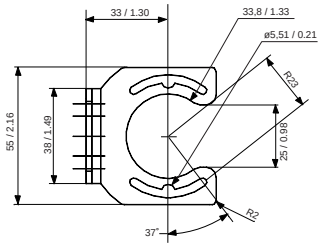


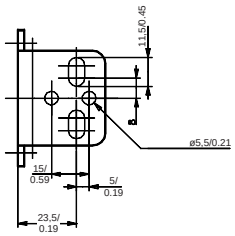
FF-SYZ634178

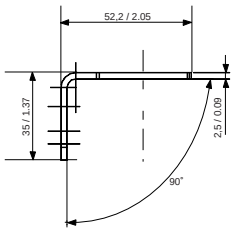
Kit of 2 right angle mounting brackets with screws, bolts, nuts and washers to mount one emitter or one receiver unit.
Possible mounting positions:

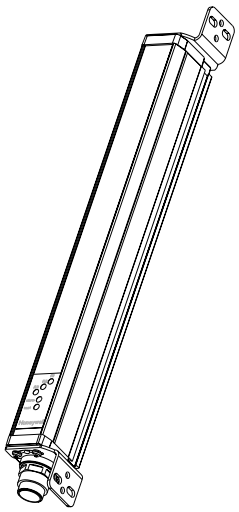
1. At the top and the bottom of the FF-SYA (allowing adjustments in azimuth directions of ±10°).
2. At one of the two lateral dovetail slots (allowing adjustments in vertical directions along the slot)
3. At the rear dovetail slot (allowing adjustments in vertical directions along the slot)

Order 2 kits for a complete set of emitter and receiver
(**already included in the FF-SYA package**).

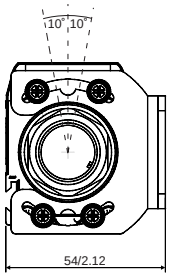


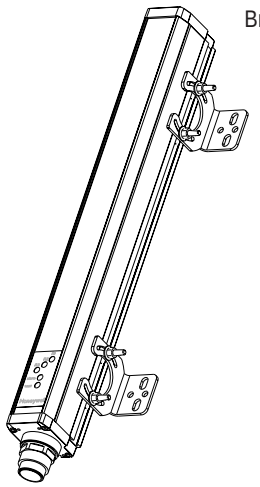




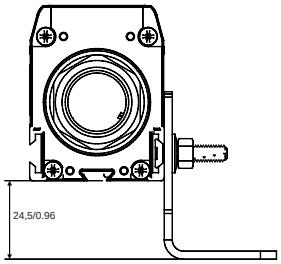


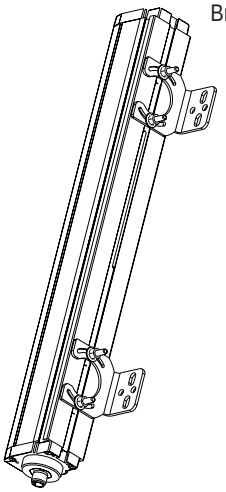
Bracket mounting at the top and the bottom



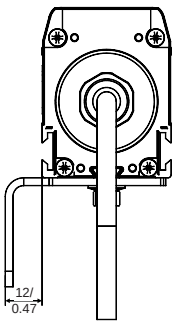


Bracket mounting at the lateral dovetail slots

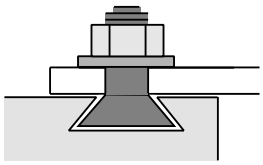


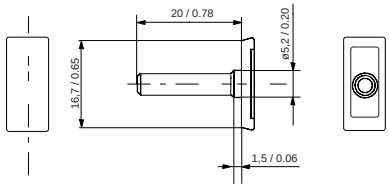


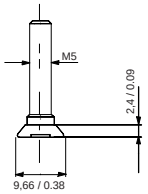
Bracket mounting at the rear dovetail slots

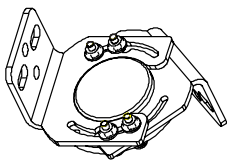


M5 dovetail shape bolt









FF-SYZ634179

Kit of 2 adjustable mounting brackets (FF-SYZ634178 type) with rotating plate, screws, bolts, nuts, and washers to mount one emitter or one receiver unit. To be mounted together with the FF-SYZ634178 brackets delivered with the FF-SYA package.

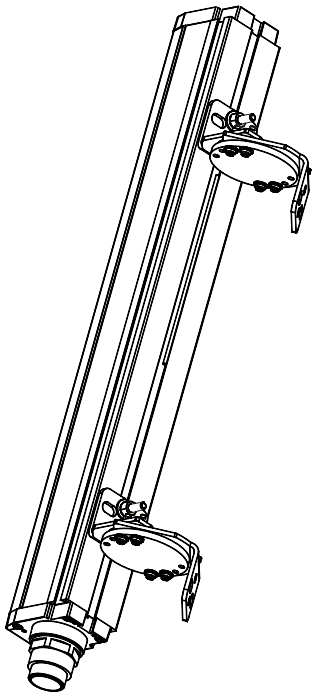
Possible mounting position is:

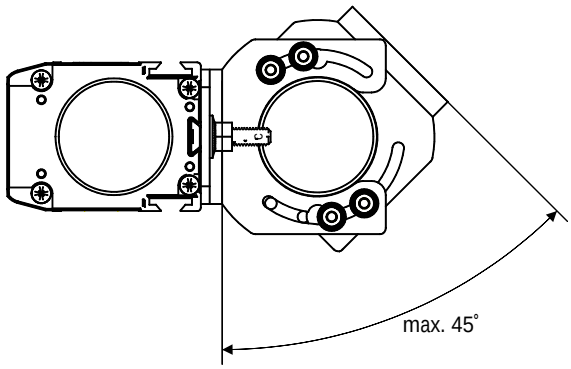
- at the rear dovetail slot
  (allowing adjustments in vertical directions along the slot an in azimuth directions of max. ± 45°)

Order 2 kits for a complete set of emitter and receiver.

Refer to the section FF-SYZ634178 for the detailed dimensions of the brackets.

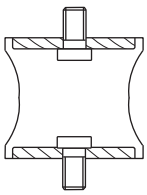
(to be ordered separately as an option)





FF-SYZAD

Kit of 4 antivibration dampers. To be mounted together with the existing mounting brackets. Order 2 kits for a complete set of emitter and receiver.



NOTICE

PROTECTION AGAINST HIGH VIBRATIONS

In case of high vibrations, 3 pairs of brackets must be used for light curtain systems with protection heights, greater or equal to 1000 mm / 39.4 in. You may also use our antivibration damper kit FF-SYZAD.

(The additional bracket kit and the antivibration damper kit must be ordered separately).

Plugs kits

FF-SYZ172113 (for FF-SYA❑❑❑❑❑C2 light curtains)
Kit of 2 EN 60423 plastic 7-pin right-angle plugs with crimping contacts (Hirschmann, N6RFF type). Order 1 kit for a complete set emitter and receiver.
Already included in the FF-SYA package.

FF-SYZ172159 (for FF-SYA❑❑❑❑❑C2 light curtains)
Kit of 2 EN 60423 plastic 7-pin straight plugs with crimping contacts (Hirschmann, N6REF type). Order 1 kit for a complete set emitter and receiver.
To be ordered separately as an option.

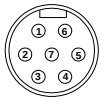
FF-SBZ1721136 (for FF-SYA❑❑❑❑❑C2 light curtains)
Kit of 1 EN 60423 plastic 7-pin right-angle connector with screw contact terminals (Hirschmann, N6RFFS11 type). Order 2 kits for a complete set of emitter and receiver.
To be ordered separately as an option.

Face view

Colour code leadwires
1-White
2-Red
3-Green
4-Orange
5-Black

FF-41308 (for FF-SYA❑❑❑❑❑Q2E emitters)
One 5-pole female straight Brad Harrison Mini-Change® plug 3,66 m /12 ft cable length. Order one plug for the emitter.
To be ordered separately when using the FF-SYA❑❑❑❑Q2 light curtains.

FF-41322 (for FF-SYA❑❑❑❑❑Q2E emitters)
One 5-pole female straight Brad Harrison Mini-Change® plug, 6,10 m / 20 ft cable length. Order one plug for the emitter.
To be ordered separately when using the FF-SYA❑❑❑❑Q2 light curtains.



Face view

Colour code leadwires
1-White/Black
2-Black
3-White
4-Red
5-Orange
6-Blue
7-Green

FF-42803 (for FF-SYA❑❑❑❑❑Q2R receivers)
One 7-pole female straight Brad Harrison Mini-Change® plug, 3,66 m /12 ft cable length. Order one plug for the receiver.
To be ordered separately when using the FF-SYA❑❑❑❑Q2 light curtains.

FF-42821 (for FF-SYA❑❑❑❑❑Q2R receivers)
One 7-pole female straight Brad Harrison Mini-Change® plug, 6,10 m / 20 ft cable length. Order one plug for the receiver.
To be ordered separately when using the FF-SYA❑❑❑❑Q2 light curtains.

Test rods

FF-SYZROD14
Test rod for ø14 mm / 0.6 in resolution safety light curtains
(already included in the FF-SYA package).

FF-SBZROD30
Test rod for ø30 mm / 1.2 in resolution safety light curtains
(already included in the FF-SYA package).

Safety control modules

New

FF-SRL60252

Dual channel relay module for safety light curtains with static safety outputs

(to be ordered separately as an option).

- Compatible with safety light curtains with static outputs only
- 24 Vdc
- Category 4 per EN 954-1
- Selectable start mode and FSD monitoring
- 3 NO, 1 NC internally redundant safety relay outputs
- 22,5 mm / 0.89 in width

New

FF-SRL59022

Multi-safety device control module with Presence Sensing Device Initiation (PSDI)

(to be ordered separately as an option)

- Accept up to three safety devices working in a guard-only mode or a single safety light curtain working in a single stroke/dual stroke mode
- 24 Vdc
- Category 4 per EN 954-1
- Manual start mode and FSD monitoring
- Cross-fault monitoring of inputs
- 3 NO safety relay outputs
- Static outputs for relay output status and diagnostic information
- 45 mm / 1.77 in

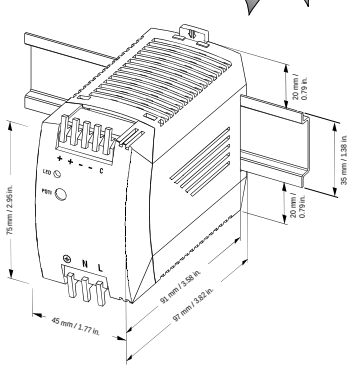
New

FF-SRM200P2

Muting module

(to be ordered separately as an option)

- Connection of 1 or 2 safety devices
- Modes of operation: unidirectional or bidirectional muting, mutual exclusion
- Connection of 2 or 4 auxiliary muting sensors
- 24 Vdc
- Category 4 per EN 954-1
- Manual start mode, FSD monitoring
- Programmable max. muting time
- Cross-fault monitoring of inputs
- Self monitored muting lamp output
- 3 NO safety relay outputs
- Static outputs for output status and diagnostic information
- 45 mm / 1.77 in



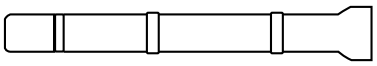
New

FF-SXZPWR050

Ac to dc power supply

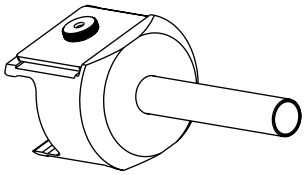
(to be ordered separately as an option)

- Approvals: UL508 listed, UL1950, cUL/CSA-C22.2 No.950-M90, EN/IEC 60950, EN 50178 (Class 2 Rated for low power installations)
- Input voltage: 85-264 Vac (43-67 Hz)
- Output voltage: 24-28 Vdc adjustable
- Rated continuous load (at 60 °C/140 °F max.): 2,1 A @ 24 Vdc / 1,8A @ 28 Vdc
- Power: 50 W
- Dimensions 75 mm x 45 mm x 97 mm / 2.95 in x 1.77 in x 3.82 in
- DIN rail mounting
- Weight: 240 g / 0.52 lbs



FF-SPZLASER

The laser pen FF-SPZLASER is a self-contained and compact laser device designed to ease infrared beam alignments. Its class II conforms to the EN 60825 European standard and the US 21 CFR 1040 American standard.



FF-SYZ604795

Mechanical adapter for the FF-SPZLASER laser pen to be used with the FF-SYA Series light curtain.

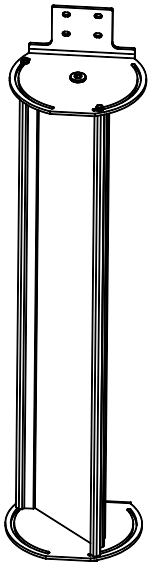
New

FF-SXZSHL

IP67 enclosure for FF-SYA light curtains

Enclosures	Light curtains
FF-SXZSHL048☐	FF-SYA☐☐032 and 048
FF-SXZSHL096☐	FF-SYA☐☐064 through 096
FF-SXZSHL128☐	FF-SYA☐☐112 and 128
FF-SXZSHLKIT	Brackets and cable gland kit (order one kit per enclosure)

☐: "P" for polycarbonate, "G" for glass



New

FF-SYZMIR❑❑❑ Deflection mirror

To be ordered separately as an option

Deflection mirror for light curtain models

Features:	
Deflection mirror with 10 % scanning range reduction (FF-SYZMIR0❑❑)	
Deflection mirror with 25 % scanning range reduction (FF-SYZMIR1❑❑)	
Quick mounting and easy mirror adjustment	
Mounting brackets included (top / bottom mounting)	
Adjustment of mirror in azimuth direction of +/-45°	
Housing compatible with FF-SBSMIR Series	
Material	Aluminium alloy housing
Finish	Gold colour anodisation
Ordering guide:	
FF-SYZMIR❑04	FF-SY❑❑032 and FF-SY❑❑048
FF-SYZMIR❑06	FF-SY❑❑064
FF-SYZMIR❑08	FF-SY❑❑080
FF-SYZMIR❑10	FF-SY❑❑096
FF-SYZMIR❑12	FF-SY❑❑112 and FF-SY❑❑128
FF-SYZMIR❑14	FF-SY❑❑144
FF-SYZMIR❑16	FF-SY❑❑160

FF-SYZPF

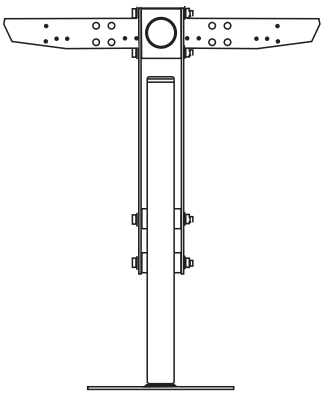
Fixed post for FF-SYA light curtain

Floorstanding post for the installation of the following FF-SYA light curtains:
Light curtain models: FF-SYA❑❑032, FF-SYA❑❑048, FF-SYA❑❑080, FF-SYA❑❑096
Multibeam models: FF-SYA02500, FF-SYA03400, FF-SYA04300
To be ordered separately as an option.

FF-SYZPFM

Fixed post with plain mirror (10 % or 25 % reduction of scanning range)

Floorstanding post with 1 plain mirror (FF-SYZPFM01,10 % of loss)
Floorstanding post with 1 plain mirror (FF-SYZPFM11, 25 % of loss)
Suitable for light curtain models: FF-SYA❑❑032, FF-SYA❑❑048, FF-SYA❑❑080, FF-SYA❑❑096
To be ordered separately as an option.



FF-SYZPA

Adjustable floor standing post

- Mounting of FF-SYA, FF-SB14 and FF-SLC light curtains
- Compatible with all protection heights
- Horizontal, diagonal and vertical adjustment of light curtains possible
- Quick mounting and easy light curtain adjustment
- 360° rotation of light curtain possible
- Fine adjustment of light curtains in azimuth direction of ±11° ensures an easy alignment
- 700 mm / 27.58 in corner protection for light curtain included
- Base plate can be mounted independently
- Finish: RAL 1021 yellow paint

To be ordered separately as an option.

Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance,current specifications, pricing or name of the nearest Authorised Distributor, contact a nearby sales office or:

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Safety multibeam system for access detection

FF-SYA234 Series

Compact, Universal, Smart and Full-featured

FEATURES

- Active Optoelectronic Protective Device compliant with the requirements of the IEC/EN 61496 - parts 1 and 2 European norms for Type 4 electrosensitive protective equipment
- Meets applicable parts of North American standards and regulations OSHA 1910.212 and 217; ANSI B11.1.2 and .19; ANSI RIA 15.06 for Control Reliability; CSA standards
- Self-contained with optical synchronisation
- 2 static safety outputs with short-circuit and cross-fault detection
- Selection of the infrared emission power allows cross-talk reduction
- Enhanced diagnostic information includes: a signal strength indicator, a cross-talk indicator and a failure diagnostic indicator
- Test input with selectable test input type
- Two, three and four beam versions for access and beam detection
- Scanning range up to 80 m / 262.4 ft
- Electrical connection:
  - Hirschmann N6RFF type connectors,
  - Brad Harrison Mini-Change® connectors
  - Terminal strips
- Mounting brackets included allowing multiple mounting positions
- Safety relay modules for more switching capability or additional features (to be ordered separately).

TYPICAL APPLICATIONS

- Access detection to robot areas
- Stacking machines, transporting and conveyor technology
- Handling equipment and assembly lines

Approved as Type 4 per IEC/EN 61496-1/2

New design

The Honeywell FF-SYA234 multibeam system is in compliance with IEC/EN 61496 - parts 1 and 2 standard and meets the requirements for a Type 4 Active Optoelectronic Protective Device, the highest level for safety products.

The product received an EC type test certificate from the French INRS notified body, required for safety equipment as per the 98/37/EC Machinery Directive. It meets the applicable parts of North American standards and regulations (OSHA 1910.212, OSHA 1910.217, ANSI standards including ANSI RIA 15.06 for Control Reliability and CSA Z434). Its CSA mark makes it a product usable in most parts of the world.

As soon as a person is detected inside the protection field, the FF-SYA de-energizes its two static safety outputs to signal the dangerous motion to stop. The FF-SYA is a self-contained light curtain that does not require a separate control unit for operation. Safety relay modules are available to provide higher current capability and additional functionality. This light curtain has been designed to satisfy the requirements of worldwide machine manufacturers and users: its compact size combined with its universal and smart features makes it full-featured and easy to use.

The long scanning distance ensures that most perimeter guarding applications are covered. The optional FF-SYZPF floor mounting posts with individual mirrors can be used to protect several sides of a machine with only one system.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is to be referenced for each product.

Failure to comply with these instructions could result in death or serious injury.

The FF-SYA main features are:

- COMPACT SIZE

The cross section of 42 mm² x 55 mm² makes installation possible in tight spaces, especially with the help of the small brackets supplied with the light curtains. The available safety relay modules easily fit inside the machine control panel with its small width DIN rail mount housing.

- UNIVERSAL

The housing dimensions are the same for the whole FF-SYA series. The scanning range makes it possible to use mirrors in order to protect several sides of a machine with only one system.

- SMART

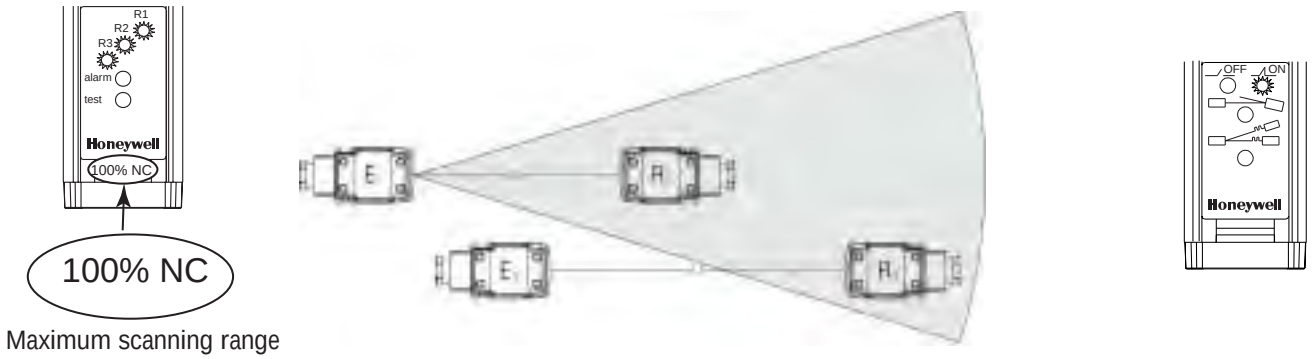
The FF-SYA is equipped with 2 static safety outputs. Compatible safety relay modules are available for a greater output current capability and manual restart functionality. An integrated cross talk reduction system allows the scanning range to be selected for the application distance. A cross talk indicator flickers when emission from other systems is detected, indicating that a different selection of the scanning range is needed. The light curtain also has a signal strength indicator which flickers if there is a slight misalignment of the beams or front window contamination. Additional indicators provide information on the outputs status, on the selected scanning range and on failure diagnostic. Standard brackets are delivered with the light curtain to ease the order process. The housing has a T-slot mounting system to adapt brackets anywhere along the lateral sides, the rear sides or at the top and the bottom of the light curtain. Hirschmann connectors are delivered with the FF-SYA❑❑❑❑❑C2 light curtains.

- FULL FEATURED

The integrated test input can be used to test the entire safety chain. The test contact type (NO or NC characteristics) can be selected by internal configuration cards. When connected to the compatible safety relay modules, the FF-SYA provides a wide variety of advanced functions: cross-monitored relays, final switching devices monitoring for the control of external contactors or relays, choice between automatic restart or start and restart interlock as well as relay status indicators.

Cross-talk reduction system

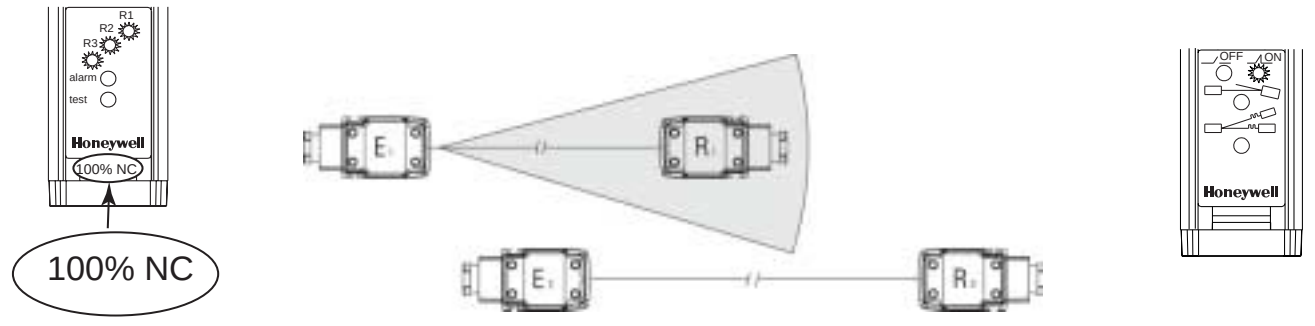
The FF-SYA light curtain is based upon an infrared transmission between an emitter unit and a receiver unit. It is a requirement of the IEC/EN 61496-2 standard that if a receiver R2 receives two signals transmitted by two different emitters E1 and E2, the receiver R2 must turn to the alarm state. This happens if the receiver R2 is within the beam aperture angle and within the nominal scanning range of the second emitter E1. The cross-talk detection indicator flickers on the receiver R2 to warn the installer.



Maximum scanning range

An internal configuration card is available on the emitter units for the selection of the adequate emission power. This configuration card can be used to eliminate this cross-talk phenomenon by decreasing the maximum scanning range down to minimum. The end cap can be easily removed, and there is no need to remove the unit from the machinery to select a different scanning range. Products are delivered with a maximum scanning range to ease the alignment process.

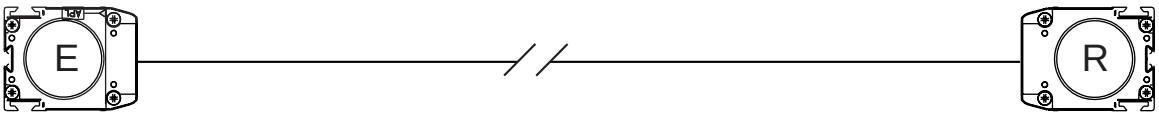
LED status indicators



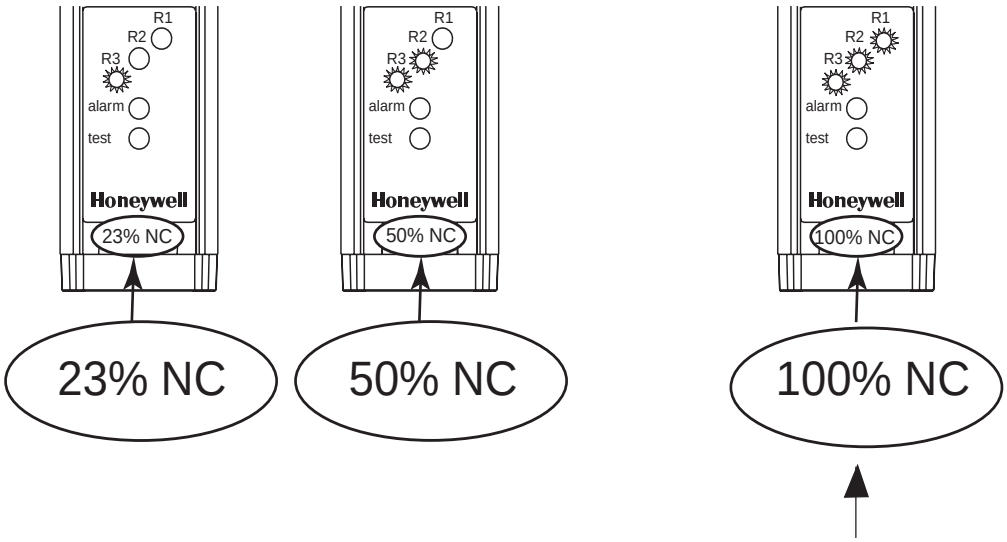
Maximum scanning range
(factory setting)

Scanning range selection

Test input type selection



	Minimum: 23 %	Medium: 50 %	Maximum: 100 %
FF-SYA02 / FF-SYA03 / FF-SYA04 - standard range (-3)	0 m to 7 m / 0 ft to 23.0 ft	4 m to 15 m / 13.1 ft to 49.2 ft	10 m to 30 m / 32.8 ft to 98.4 ft
FF-SYA02 / FF-SYA03 / FF-SYA04 - long range (-8)	5 m to 18 m / 16.4 ft to 59.1 ft	15 m to 40 m / 49.2 ft to 131.2 ft	35 m to 80 m/ 114.8 ft to 262.5 ft



Factory setting
- for scanning range (maximum)
- for test input type (Normally closed)

Remove the end cap, in order to access to the internal configuration cards.

Emitter configuration card selection

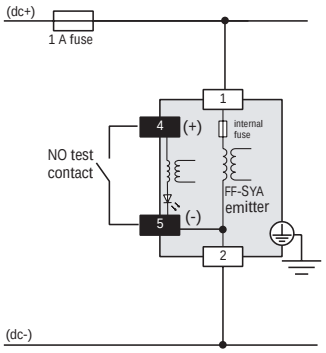
Factory setting

Card number (1)	Card code (1)	Scanning range	Test contact
#101	23 % NO	Minimum	Normally Open
#102	50 % NO	Medium	Normally Open
#103	100 % NO	Maximum	Normally Open
#104	23 % NC	Minimum	Normally Closed
#105	50 % NC	Medium	Normally Closed
#106	100 % NC	Maximum	Normally Closed

(1) Factory setting: card #106 (code «100 % NC»)

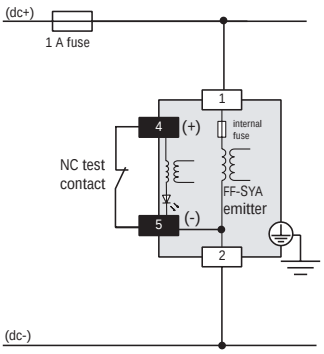
Test input type

Normally open



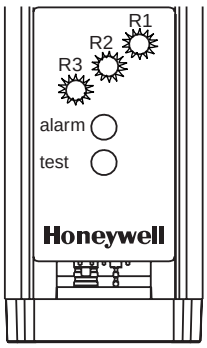
Normally closed

(factory setting)



LED status indicators

Emitter



3 scanning range indicators (yellow)

Alarm indicator (red)

Test indicator (red)

R3 R2 R1

Maximum scanning range (yellow) (factory setting)

Medium scanning range (yellow)

Minimum scanning range (yellow)

Alarm

Normal operation

Alarm

Device failure

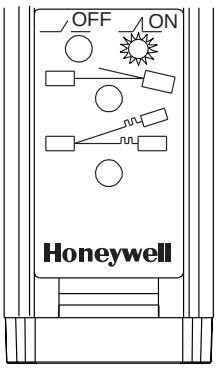
Test

Normal operation

Test

Device in test mode

Receiver



2 operation indicators (red and green)

Signal strength indicator (yellow)

Cross-talk indicator (red)

OFF ON

Outputs are open

OFF ON

Outputs are closed

Perfect beam alignment

Slight beam misalignment

Total beam misalignment

No cross-talk detected

Cross-talk detected

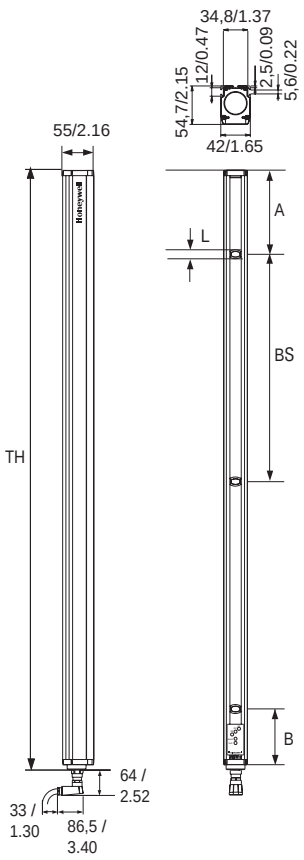
Light OFF

Light ON

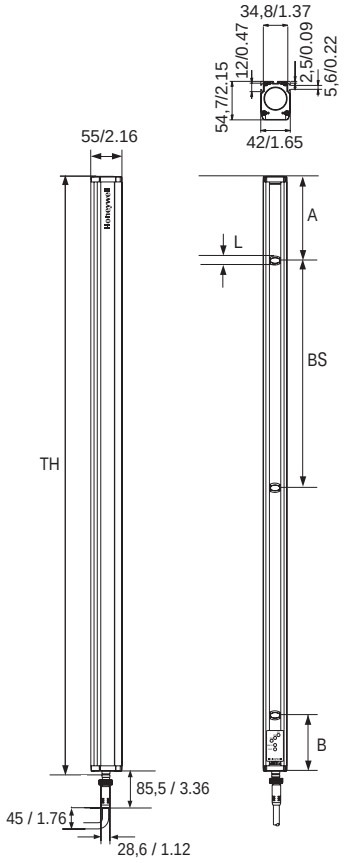
Flickering light

Dimensions (mm / in)

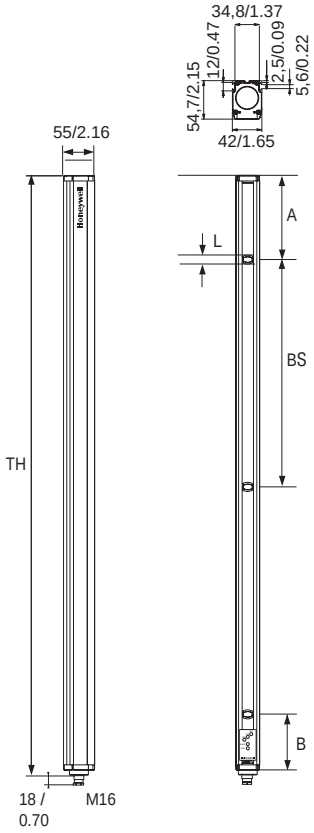
FF-SYA with Hirschmann N6RFF connectors (FF-SYA❑❑❑❑❑C2-3 (-8))



FF-SYA with Brad Harrison Mini-Change® connectors (FF-SYA❑❑❑❑❑Q2-3 (-8))



FF-SYA with terminal strips (FF-SYA❑❑❑❑❑T2-3 (-8))



Reference	Number of beams N	Beam Spacing BS	Total Height TH	A	B	Weight per device
		mm / in	mm / in	mm / in	mm / in	kg / lbs
FF-SYA02500C2-3 (-8)	2	500/ 19.70	803 / 31.63	149 / 5.87	87 / 3.42	1,42 / 3.12
FF-SYA02500Q2-3 (-8)	2	500 / 19.70	763 / 30.06	149 / 5.87	87 / 3.42	1,42 / 3.12
FF-SYA02500T2-3 (-8)	2	500 / 19.70	758 / 29.8	149 / 5.87	87 / 3.42	1,42 / 3.12
FF-SYA03400C2-3 (-8)	3	400 / 15.76	1123 / 44.24	169 / 6.65	87 / 3.42	1,98 / 4.35
FF-SYA03400Q2-3 (-8)	3	400 / 15.76	1083 / 42.67	169 / 6.65	87 / 3.42	1,98 / 4.35
FF-SYA03400T2-3 (-8)	3	400 / 15.76	1078 / 42.4	169 / 6.65	87 / 3.42	1,98 / 4.35
FF-SYA04300C2-3 (-8)	4	300 / 11.82	1123 / 44.24	69 / 2.72	87 / 3.42	1,98 / 4.35
FF-SYA04300Q2-3 (-8)	4	300 / 11.82	1083 / 42.67	69 / 2.72	87 / 3.42	1,98 / 4.35
FF-SYA04300T2-3 (-8)	4	300 / 11.82	1078 / 42.4	69 / 2.72	87 / 3.42	1,98 / 4.35

TH: Total Height (including plugs for the FF-SYA❑❑❑❑❑C2, male receptacles only for the FF-SYA❑❑❑❑❑Q2 and cable glands for the FF-SYA❑❑❑❑❑T2 versions)

Safety multibeam system for access detection

- **Type 4 according to the IEC/EN 61496 - parts 1 and 2 standards**
- **Two, three and four beam systems for access and body detection**
- **Beam spacing per EN 999 and ANSI/RIA/R15.06-1999 (see notice below)**
- **Enhanced diagnostic information**

Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

Features / Type	*FF-SYA02500*	*FF-SYA03400*	*FF-SYA04300*
Number of beams	2	3	4
Beam spacing	500 mm / 19.7 in	400 mm / 15.76 in	300 mm / 11.82 in
Nominal scanning ranges	Standard range (-3): 0 m to 30 m / 0 ft to 98.42 ft		
	Long range (-8): 5 m to 80 m / 16.4 ft to 262.4 ft		
Supply voltage	24 Vdc (± 15 %)		
Power consumption	*Emitter*: 5 W max. • *Receiver*: 7 W max.		
Outputs	2 PNP safety static outputs (switching capacity: 0,35 A / 24 Vdc)		
Test input	Normally open or Normally closed (Factory setting)		
Response time	22 ms		
LED status indicators	*Emitter*: test mode, failure alarm, selected scanning range		
	Receiver: outputs status, optical signal margin, cross-talk detection		
Cross sectional area	W 42 mm² x D 55 mm² / W 1.65 in² x D 2.16 in²		
Emission	Infrared modulated light source (880 nm)		
Effective aperture angle	± 2°, ± 25 % (in compliance with the IEC/EN 61496 - Part 2)		
Light immunity	*Sun:* 20 000 lux • *Lamp:* 15 000 lux		
Electrical noise immunity	IEC 61000-4-4: level III / IEC 61000-4-3: level III		
Ambient temperature	*Operating temperature*: 0 °C to 55 °C / 32 °F to 131 °F		
	Storage temperature: -20 °C to 75 °C / -4 °F to 167 °F		
Vibrations	IEC/EN 61496-1: 10 to 55 Hz frequency range, 1 octave/min.sweep rate,		
	0,35 mm ± 0,05 amplitude, 20 sweeps per axis, for 3 axes		
Sealing	IP 65, NEMA 4, 13		
Material	*Housing:* aluminium alloy • *Front plate:* polymethyl metacrylate (PMMA) • *End caps:* polycarbonate		
Electrical connection	FF-SYA❑❑❑❑❑**C2**: EN 60423 plastic 7-pin right-angle plugs with crimping contacts		
	(Hirschmann N6RFF type)		
	FF-SYA❑❑❑❑❑**Q2**: 5 and 7 pole straight male receptacles compatible with Brad Harrison		
	Mini-Change® plugs (not included)		
	FF-SYA❑❑❑❑❑**T2**: terminal strip version with M16 cable glands		

Ordering information

Each listing consists of an emitter, a receiver, 2 pairs of right-angle brackets, a test rod and a pair of Hirschmann N6RFF connector (FF-SYA❑❑❑❑❑❑C2 version only)

FF-SYA❑❑❑❑❑❑2-❑

- ***3: standard range**:* 0 m to 30 m / 0 ft to 98.42 ft
- ***8: long range***: 5 m to 80 m / 16.4 ft to 262.45 ft

- ***C**:* EN 60423 Hirschmann N6RFF plastic plugs (included)
- ***Q**:* male receptacles compatible with Brad Harrison Mini-Change® plugs (not included)
- ***T*:** terminal strips (cable glands included)

Model	Number of beams	Beam spacing mm / in
02500	2	500 / 19.70
03400	3	400 / 15.76
04300	4	300 / 11.82

NOTICE

NON COMPLIANCE TO ANSI/RIA 15.6-1999 WITH FF-SYA02500

Only the three beam (FF-SYA03400 Series) and the four beam versions (FF-SYA04300 series) are in compliance with the beam heights, specified in the US Standard ANSI/RIA R15.06-1999 (Industrial Robots and Robot Systems - Safety Requirements). The two beam version (FF-SYA02500 Series) does NOT comply with ANSI/RIA R15.06 and may require additional protection.

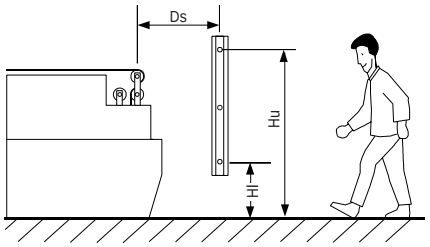
Refer to applicable standards. In the absence of an applicable standard, ANSI B11.19 and ANSI R15.06 may be used as reference for the USA, as well as EN 999 (or the relevant Type C machine standard) for Europe.

■ Safety distances

European EN 999 standard (in mm, 100 mm = 3.9 in)

Normal approach

FF-SYA234



$S \geq 1600 (t1 + t2) + 850$

Reference	Number of beams (N)	Beam heights above the reference floor	
		mm	in
FF-SYA02500❑2	2	400 / 900	15.7 / 35.4
FF-SYA03400❑2	3	300 / 700 / 1100	11.8 / 27.6 / 43.3
FF-SYA04300❑2	4	300 / 600 / 900 / 1200	11.8 / 23.6 / 35.4 / 47.2

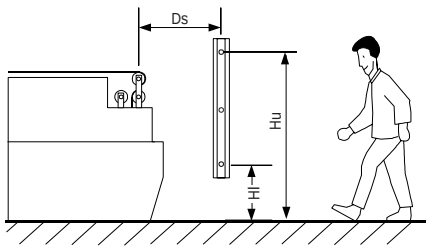
Where
S: Minimum safety distance (in mm, 100 mm = 3.9 in)
t1: Light curtain response time (s)
t2: Machine stopping time (s)
Hu: Height of the uppermost beam above the reference floor (mm)
Hl: Height of the lowest beam above the reference floor (mm)

For more information, refer to the EN 999 European standard or comply with the requirements on safety distances given by the type C European standard if existing for the considered machine.

USA ANSI/RIA 15.06 requirements (in inches, 1 in = 25,4 mm)

Normal approach

FF-SYA234



Ds = 63 (Ts + Tc + Tr) + Dpf

Reference	Number of beams (N)	Beam heights above the reference floor	Dpf
FF-SYA02500❑2	2	1st beam at 300 mm / 12 in max.(Hl) (1) Top beam at 900 mm / 36 in min. (Hu)(1)	1,2 m / 48 in (Reach over)
FF-SYA03400❑2	3	1st beam at 300 mm / 12 in max. (Hl) Top beam at 900 / 36 in min. (Hu)	1,2 m / 48 in (Reach over)
FF-SYA04300❑2	4	1st beam at 300 mm / 12 in (Hl) Top beam at 1200 mm / 48 in (Hu)	0,9 m / 36 in (Reach thru)

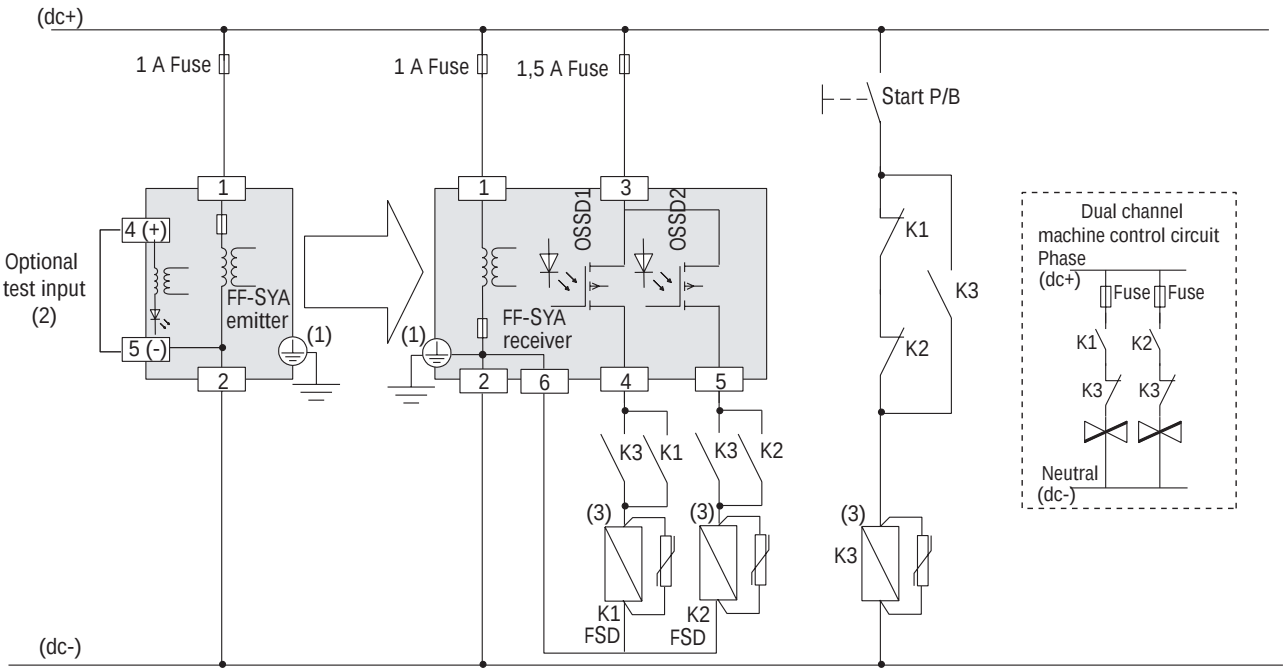
(1) Additional safeguard(s) is (are) required, when using the FF-SYA02500❑2 two beam systems, as beam heights do not fully comply to ANSI/RIA 15.06 requirements.

Ds = K (Ts + Tc + Tr) + Dpf

Where
Ds: Minimum safety distance (in inches, 1 in = 25,4 mm)
K: Approach speed
Ts: Worst case stopping time of the machine (s)
Tc: Worst case response of the machine's control (s)
Tr: Response time of the safety devices (light curtain plus its interface – meaning the response time including the mechanical relay outputs in s)
Dpf: Depth penetration factor (in)
Hu: Height of the uppermost beam above the reference floor (in)
Hl: Height of the lowest beam above the reference floor (in). For Normal approach, assumption is that Hl is not greater than 12 in unless the application prevents access even with Hl at a distance greater than 12 in.

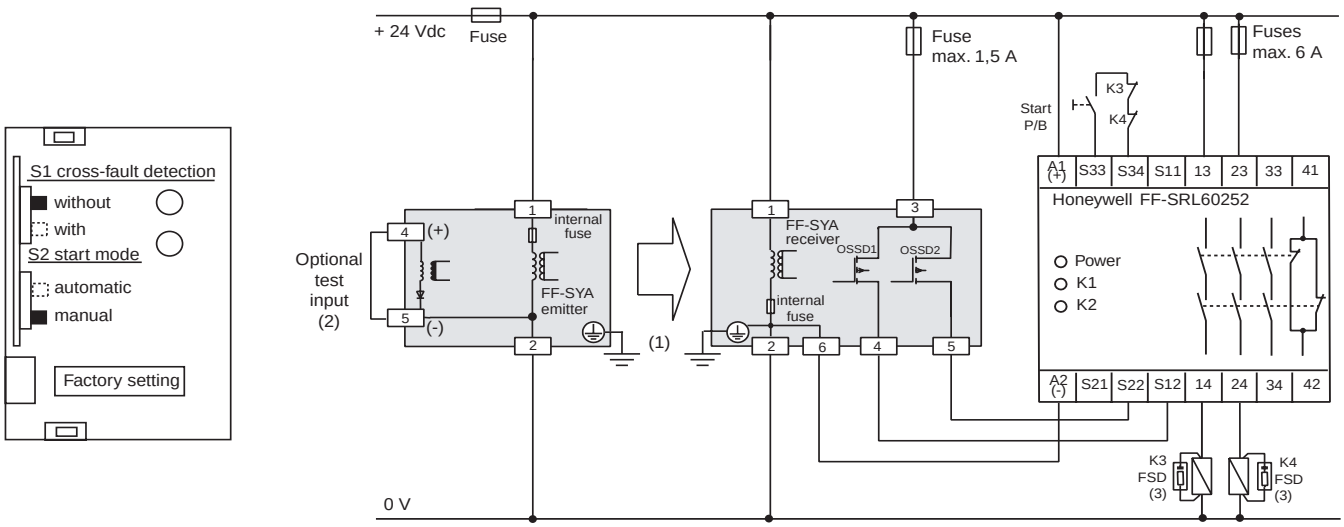
For more information, refer to the US regulations and standards (OSHA 29 CFR 1919.212 and 1910.217, ANSI B11.1, B11.2, B11.19 and ANSI RIA R15.06).

Wiring diagram using external safety relays with guided contacts



Wiring diagram using the FF-SRL60252

Example: the FF-SRL60252 safety control module is set in the manual mode, without cross-fault monitoring by the module, with FSD monitoring.



NOTICE

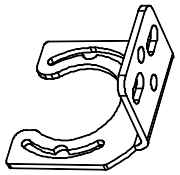
IMPROPER USE OF FF-SYA CURTAIN

The cross-monitoring of the FF-SYA static outputs is based upon a self-checking principle which guarantees the detection of an output short-circuit and the detection of a short-circuit between the outputs (cross-fault detection). The FF-SRL60252 interface control module is primarily designed to be interfaced with Honeywell static safety outputs devices.

Compatibility of the FF-SYA with any other emergency stop safety control module is not guaranteed.

(1) Use pin 3 for the FF-SYA❑❑❑❑❑Q2E emitter and pin 7 for the FF-SYA❑❑❑❑❑Q2R receiver
(2) Optional test input jumpered when unused
(3) Install arc suppressors (31 Vdc varistors, customer supplied)
OSSD1 and OSSD2: Output Signal Switching Devices (static safety outputs)
FSD: Final Switching Devices (external safety relays with guided contacts)
Start P/B: normally open contact of a start push-button (customer supplied)

Accessories

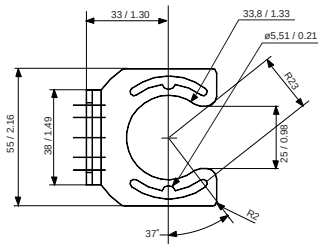


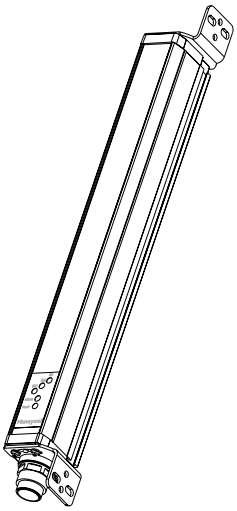
FF-SYZ634178

Kit of 2 right angle mounting brackets with screws, bolts, nuts and washers to mount one emitter or one receiver unit.
Possible mounting positions:

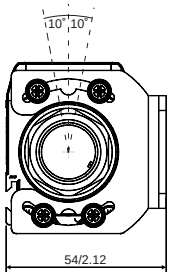
1. At the top and the bottom of the FF-SYA (allowing adjustments in azimuth directions of ±10°).
2. At one of the two lateral dovetail slots (allowing adjustments in vertical directions along the slot)
3. At the rear dovetail slot (allowing adjustments in vertical directions along the slot)

Order 2 kits for a complete set of emitter and receiver
(**already included in the FF-SYA package**).

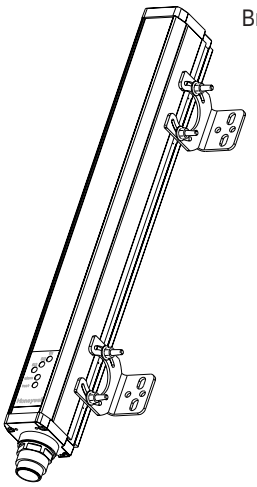


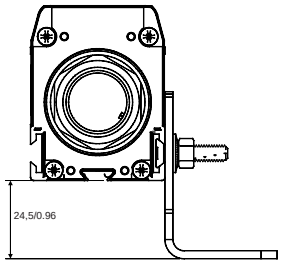


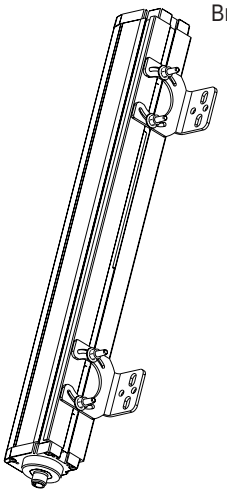
Bracket mounting at the top and the bottom



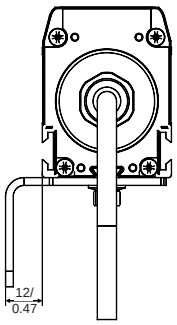
Bracket mounting at the lateral dovetail slots



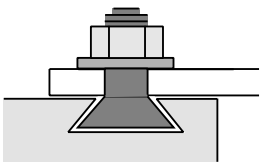


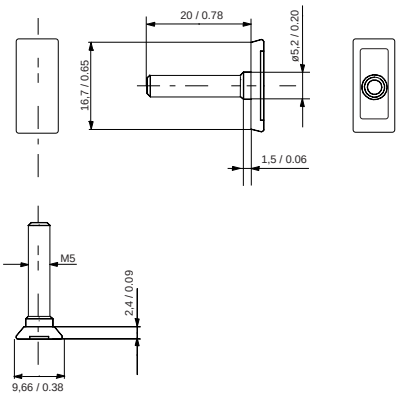


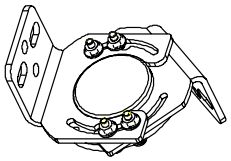
Bracket mounting at the rear dovetail slots



M5 dovetail shape bolt







FF-SYZ634179

Kit of 2 adjustable mounting brackets (FF-SYZ634178 type) with rotating plate, screws, bolts, nuts, and washers to mount one emitter or one receiver unit. To be mounted together with the FF-SYZ634178 brackets delivered with the FF-SYA package.

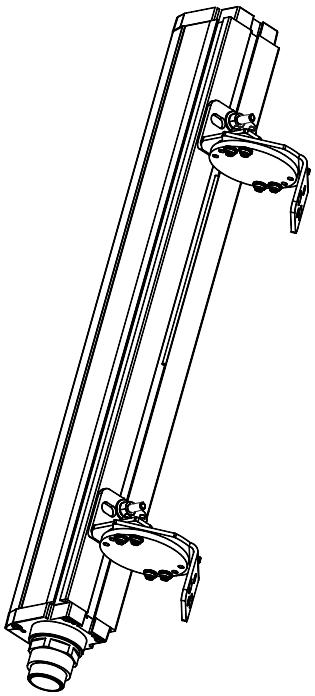
Possible mounting position is:

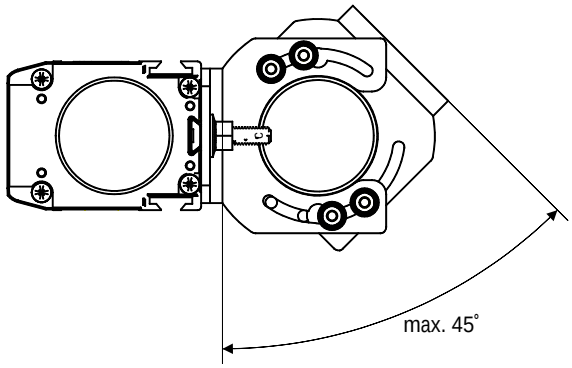
- at the rear dovetail slot
  (allowing adjustments in vertical directions along the slot and in azimuth directions of max. ± 45°)

Order 2 kits for a complete set of emitter and receiver.

Refer to the section FF-SYZ634178 for the detailed dimensions of the brackets.

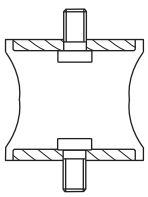
(to be ordered separately as an option)





FF-SYZAD

Kit of 4 antivibration dampers. To be mounted together with the existing mounting brackets. Order 2 kits for a complete set of emitter and receiver.



NOTICE

PROTECTION AGAINST HIGH VIBRATIONS

In case of high vibrations, 3 pairs of brackets must be used for light curtain systems with protection heights, greater or equal to 1000 mm / 39.4 in. You may also use our antivibration damper kit FF-SYZAD.

(The additional bracket kit and the antivibration damper kit must be ordered separately).

Plugs kits

FF-SYZ172113 (for FF-SYA❑❑❑❑❑C2 light curtains)
Kit of 2 EN 60423 plastic 7-pin right-angle plugs with crimping contacts (Hirschmann, N6RFF type). Order 1 kit for a complete set emitter and receiver.
Already included in the FF-SYA package.

FF-SYZ172159 (for FF-SYA❑❑❑❑❑C2 light curtains)
Kit of 2 EN 60423 plastic 7-pin straight plugs with crimping contacts (Hirschmann, N6REF type). Order 1 kit for a complete set emitter and receiver.
To be ordered separately as an option.

New

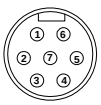
FF-SBZ1721136 (for FF-SYA❑❑❑❑❑C2 light curtains)
Kit of 1 EN 60423 plastic 7-pin right-angle connector with screw contact terminals (Hirschmann, N6RFFS11 type). Order 2 kits for a complete set of emitter and receiver.
To be ordered separately as an option.

Face view

Colour code leadwires
1-White
2-Red
3-Green
4-Orange
5-Black

FF-41308 (for FF-SYA❑❑❑❑❑Q2E emitters)
One 5-pole female straight Brad Harrison Mini-Change® plug 3,66 m /12 ft cable length. Order one plug for the emitter.
To be ordered separately when using the FF-SYA❑❑❑❑Q2 light curtains.

FF-41322 (for FF-SYA❑❑❑❑❑Q2E emitters)
One 5-pole female straight Brad Harrison Mini-Change® plug, 6,10 m / 20 ft cable length. Order one plug for the emitter.
To be ordered separately when using the FF-SYA❑❑❑❑Q2 light curtains.



Face view

Colour code leadwires
1-White/Black
2-Black
3-White
4-Red
5-Orange
6-Blue
7-Green

FF-42803 (for FF-SYA❑❑❑❑❑Q2R receivers)
One 7-pole female straight Brad Harrison Mini-Change® plug, 3,66 m /12 ft cable length. Order one plug for the receiver.
To be ordered separately when using the FF-SYA❑❑❑❑Q2 light curtains.

FF-42821 (for FF-SYA❑❑❑❑❑Q2R receivers)
One 7-pole female straight Brad Harrison Mini-Change® plug, 6,10 m / 20 ft cable length. Order one plug for the receiver.
To be ordered separately when using the FF-SYA❑❑❑❑Q2 light curtains.

FF-SYZROD14
Test rod for ø14 mm / 0.6 in resolution safety light curtains
(already included in the FF-SYA package).

FF-SBZROD30
Test rod for ø30 mm / 1.2 in resolution safety light curtains
(already included in the FF-SYA package).

Safety control modules

New

FF-SRL60252

Dual channel relay module for safety light curtains with static safety outputs
(to be ordered separately as an option).

- Compatible with safety light curtains with static outputs only
- 24 Vdc
- Category 4 per EN 954-1
- Selectable start mode and FSD monitoring
- 3 NO, 1 NC internally redundant safety relay outputs
- 22,5 mm / 0.89 in width

New

FF-SRL59022

Multi-safety device control module with Presence Sensing Device Initiation (PSDI)
(to be ordered separately as an option)

- Accept up to three safety devices working in a guard-only mode or a single safety light curtain working in a single stroke/dual stroke mode
- 24 Vdc
- Category 4 per EN 954-1
- Manual start mode and FSD monitoring
- Cross-fault monitoring of inputs
- 3 NO safety relay outputs
- Static outputs for relay output status and diagnostic information
- 45 mm / 1.77 in

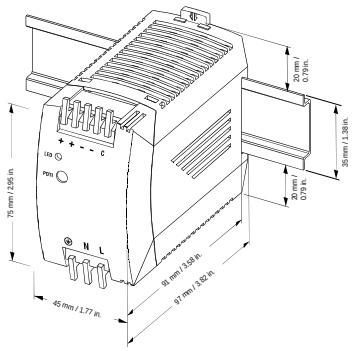
New

FF-SRM200P2

Muting module
(to be ordered separately as an option)

- Connection of 1 or 2 safety devices
- Modes of operation: unidirectional or bidirectional muting, mutual exclusion
- Connection of 2 or 4 auxiliary muting sensors
- 24 Vdc
- Category 4 per EN 954-1
- Manual start mode, FSD monitoring
- Programmable max. muting time
- Cross-fault monitoring of inputs
- Self monitored muting lamp output
- 3 NO safety relay outputs
- Static outputs for output status and diagnostic information
- 45 mm / 1.77 in

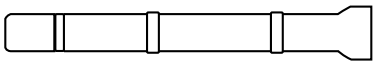
New



FF-SXZPWR050

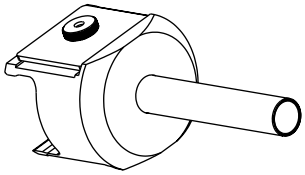
Ac to dc power supply
(to be ordered separately as an option)

- Approvals: UL508 listed, UL1950, cUL/CSA-C22.2 No.950-M90, EN/IEC 60950, EN 50178 (Class 2 Rated for low power installations)
- Input voltage: 85-264 Vac (43-67 Hz)
- Output voltage: 24-28 Vdc adjustable
- Rated continuous load (at 60 °C/140 °F max.): 2,1 A @ 24 Vdc / 1,8A @ 28 Vdc
- Power: 50 W
- Dimensions 75 mm x 45 mm x 97 mm / 2.95 in x 1.77 in x 3.82 in
- DIN rail mounting
- Weight: 240 g / 0.52 lbs



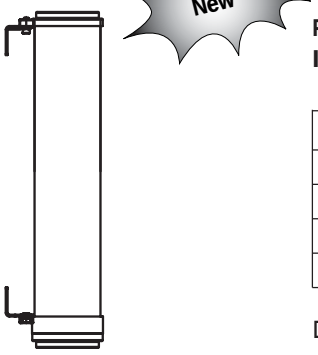
FF-SPZLASER

The laser pen FF-SPZLASER is a self-contained and compact laser device designed to ease infrared beam alignments. Its class II conforms to the EN 60825 European standard and the US 21 CFR 1040 American standard.



FF-SYZ604795

Mechanical adapter for the FF-SPZLASER laser pen to be used with the FF-SYA Series light curtain.



FF-SXZSHL

IP67 enclosure for FF-SYA light curtains

Enclosures	Light curtains
FF-SXZSHL048☐	FF-SYA☐☐032 and 048
FF-SXZSHL096☐	FF-SYA☐☐064 through 096
FF-SXZSHL128☐	FF-SYA☐☐112 and 128
FF-SXZSHLKIT	Brackets and cable gland kit (order one kit per enclosure)

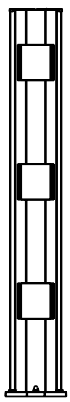
☐: "P" for polycarbonate, "G" for glass

FF-SYZPF

Fixed post for FF-SYA light curtain

Floorstanding post for the installation of the following FF-SYA light curtains:
Light curtain models: FF-SYA❑❑032, FF-SYA❑❑048, FF-SYA❑❑080, FF-SYA❑❑096
Multibeam models: FF-SYA02500, FF-SYA03400, FF-SYA04300
(To be ordered separately as an option).

Front covers are available for additional protection of the FF-SYA234 beam access detection systems:
FF-SYZ630184-2: Front cover for 2 beams
FF-SYZ630184-3: Front cover for 3 beams
FF-SYZ630184-4: Front cover for 4 beams
(To be ordered separately as an option).



FF-SYZPF❑❑

Fixed post with 2, 3 or 4 individual mirrors (10 % or 25 % reduction of scanning range) (to be ordered separately as an option)

	Floorstanding post with 2 individual mirrors
FF-SYZPF02	with 10 % of loss
FF-SYZPF12	with 25 % of loss
	Suitable for FF-SYA02500 multibeam system
	Floorstanding post with 3 individual mirrors
FF-SYZPF03	with 10 % of loss
FF-SYZPF13	with 25 % of loss
	Suitable for FF-SYA03400 multibeam system
	Floorstanding post with 4 individual mirrors
FF-SYZPF04	with 10 % of loss
FF-SYZPF14	with 25 % of loss
	Suitable for FF-SYA04300 multibeam system

Note: The FF-SYZPF❑❑ fixed posts with individual mirrors are already delivered with the FF-SYZ630184-❑ front covers.

Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance,current specifications, pricing or name of the nearest Authorised Distributor, contact a nearby sales office or:

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Type 4 Safety light curtain

FF-SYB Series

Compact, Universal, Smart and Full-featured

FEATURES

- 1- or 2-beam floating blanking
- Manual or automatic restart
- External Device Monitoring (EDM)
- 2 or 4 inputs for muting signals
- Manual muting override
- Input for serial connection of an auxiliary safety device
- Unique patented configuration cards for quick set-up and easy replacement
- Self-contained with optical synchronisation
- 2 static (solid state) safety outputs with short-circuit and cross-fault detection
- Muting lamp/diagnosis output or static (solid state) non safety output for signalling
- Selection of the infrared emission power allows cross-talk reduction
- Enhanced diagnostic information includes the following indication: signal strength, cross-talk, muting, blanking, restart and failure diagnostic
- Test input with selectable test input type
- Resolutions available:
  ø14 mm / 0.6 in for finger detection
  ø30 mm / 1.2 in for hand detection
  ø50 mm / 1.97 in for leg detection
- Protection height up to 1830 mm / 72 in
- Scanning range up to 20 m / 65 ft
- M12 connectors
- Mounting brackets included allowing multiple mounting positions
- Safety relay modules for more switching capability (to be ordered separately).

TYPICAL APPLICATIONS

- Presses and punches
- Metal-forming, milling and drilling machines
- Spot-welding machines and fine-boring machines
- Pressing, moulding and thermoforming machines
- Stacking machines, transporting and conveyor technology; handling equipment and assembly lines
- Palletizing industry

INRS

Approved as
Type 4
per IEC/EN 61496-1/2

The Honeywell FF-SYB light curtain is in compliance with IEC/EN 61496 - parts 1 and 2 standard and meets the requirements for a Type 4 Active Optoelectronic Protective Device, the highest level for safety products.

The product received an EC type test certificate from the French INRS notified body, required for safety equipment as per the 98/37/EC Machinery Directive. It meets the applicable parts of North American standards and regulations (OSHA 1910.212, OSHA 1910.217, ANSI standards including ANSI RIA 15.06 for Control Reliability and CSA Z434). The CSA marking makes it a product usable in most parts of the world.

As soon as an object is detected inside the protection field, the FF-SYB de-energizes its two static (solid state) safety outputs to signal the dangerous motion to stop. The FF-SYB is a self-contained light curtain that does not require a separate control unit for operation.

Functions such as floating blanking, muting, external device monitoring, manual restart and serial connection make it a comprehensive product and eliminate the need for additional control modules.

These built-in features, combined with the small size of the housing, help users reduce overall cost by saving space and installation time.

A unique patented configuration card system allows the user to set up the correct operating mode when swapping units, by simplifying and reducing the number of operations.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is to be referenced for each product.

Failure to comply with these instructions could result in death or serious injury.

❑ External Device Monitoring (EDM)

The FF-SYB is fitted with an EDM input which allows users to check the correct state of the final switching devices (relays or contactors with positively guided contacts). After each intrusion into the protection field, the FF-SYB will check that the EDM input loop is closed before switching the outputs back to ON. If the FF-SYB operates in automatic restart mode, it will restart immediately if the EDM loop is closed. If the FF-SYB operates in manual restart mode, it will restart when the restart push-button is pressed and if the EDM loop is closed. If the EDM loop remains open (meaning that the external device has a malfunction) the FF-SYB will keep its outputs open and will not restart.

❑ Manual restart

The FF-SYB can be used in automatic or manual restart mode. In automatic mode, the outputs will switch back to ON after an interruption of the protection field, as soon as the field becomes clear again. In manual restart mode, the FF-SYB will not switch back its outputs to ON until a manual restart push-button is pressed and released. The push-button must be a normally open type button. The manual restart will not switch the OSSDs back to ON in case of light curtain lock out (internal failure, optical interference, etc.) or when the protection field is still interrupted.

❑ Auxiliary output

An additional non safety output is available to either mimic the safety output status (solid state Normally Closed signalling output) or signal muting sequences and provide diagnostic information (mode selection depending).

❑ Muting function

The FF-SYB is fitted with a built-in muting function. Muting is the ability to temporarily inhibit the outputs of a light curtain under certain conditions.

Sensors are connected to the light curtain through the main connector. An optional junction box is available to perform the electrical connections close to the location of the muting sensors.

Muting sensors are used to discriminate authorised materials from people. The muting sensors must be able to detect the passing material (pallets, vehicles, etc.) according to the material's length and speed.

Figure 1 shows an FF-SYB placed on a conveyor, with the corresponding muting sensors. The muting activation sensors temporarily inhibit the FF-SYB light curtain as soon as they detect the object. The outputs of these sensors are connected to the muting inputs of the FF-SYB receiver. Muting sensors must be successively actuated for a correct muting sequence to start.

Whenever one of the two muting sensors is released, the muting sequence stops. In case of an incorrect muting sequence, a temporary manual muting (override) procedure may be performed to clear the FF-SYB light curtain detection field and revert back to normal operation.

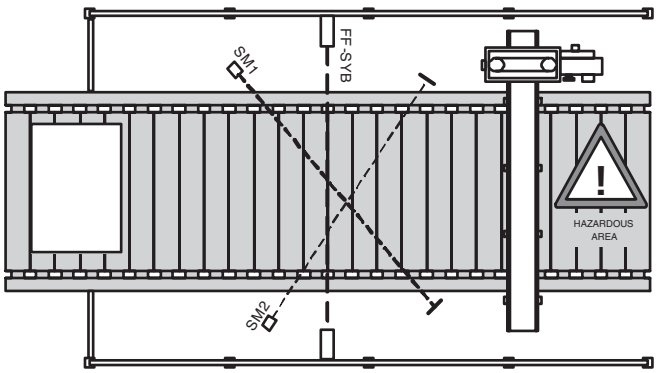
Suitable optoelectronic, mechanical, proximity sensors, etc. can be used as muting sensors.

Inputs for muting sensors accept sensors with relay or static (solid state) outputs (NPN or PNP). 2-wire sensors are also accepted.

A muting lamp output is available on the FF-SYB receiver to drive an external muting indicator that should be installed in a suitable location on the machine.

The following are some configuration examples when using the muting function:

Figure 1 *- Bi-directional application with two optoelectronic sensors*



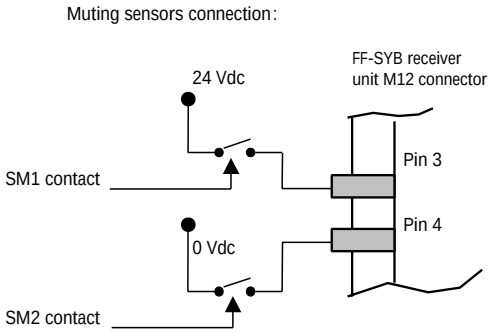
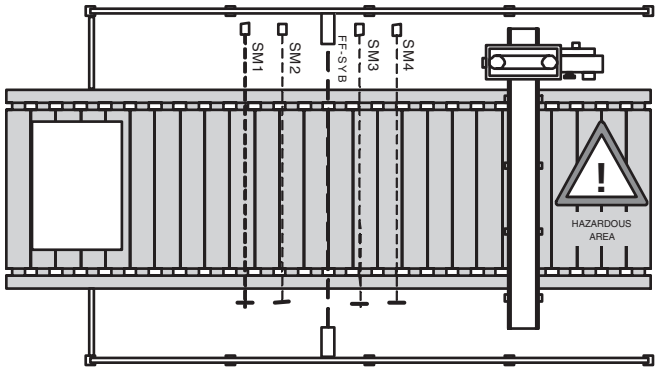


Figure 2 *- Bi-directional application with four photoelectric sensors*

2 sensors can be wired in parallel on each of the 2 muting inputs of the light curtain, creating a 4 sensor bi-directional muting.



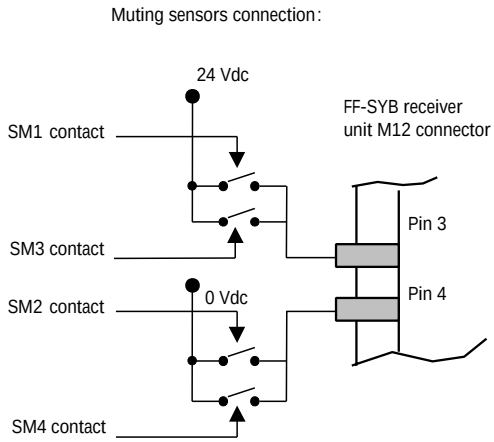
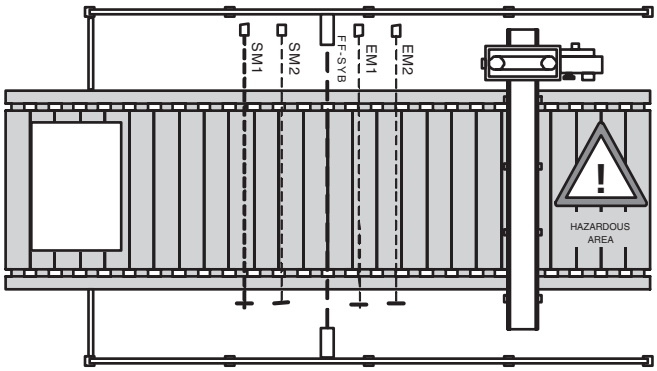
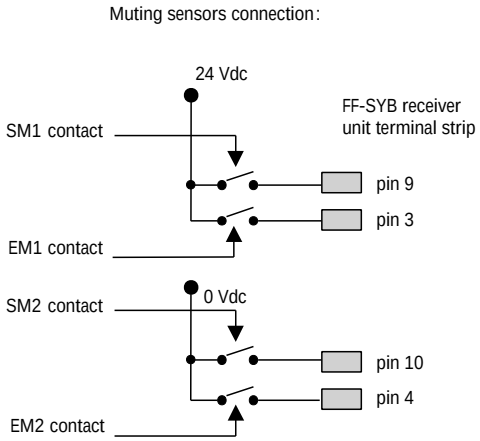


Figure 3 *- Uni-directional application with four optoelectronic sensors*



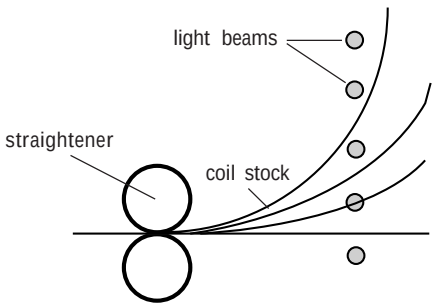


Note: this mode of operation requires direct connections to the receiver internal terminal strip. A M20 cable gland is delivered with the package. Male M23 cordsets are available on option (see "Accessories" section).

❑ Floating blanking function

The FF-SYB is fitted with a selectable floating blanking function which allows users to inhibit 1 or 2 beams anywhere within the protection field, except the bottom beam which is used for synchronisation. If 2 beam floating blanking is selected, the interruption of 1 or 2 beams will not lead to the opening of the outputs. The 2 beams can be adjacent or not. It is useful in those applications where material or air ejected parts randomly travel through or within the sensing field. You can also disable light beams in an area where a fixture penetrates the light field, and you can permit stationary objects to protrude into the light curtain's sensing field.

Figure 4



When using floating blanking, the resolution of the light curtain is altered according to the following table:

Model	Resolution without floating/ blanking	Resolution with 1-beam floating blanking	Resolution with 2-beam floating blanking
FF-SYB14	14 mm / 0.55 in	24 mm / 0.94 in	34 mm / 1.33 in
FF-SYB30	30 mm / 1.18 in	50 mm / 1.97 in	70 mm / 2.75 in
FF-SYB50	50 mm / 1.97 in	90 mm / 3.54 in	130 mm / 5.12 in

The maximum size of an undetected object is also affected by floating blanking:

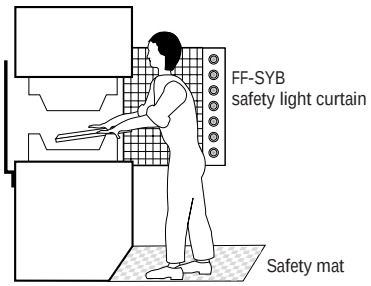
Model	Maximum size of undetected object with 1-beam floating blanking	Maximum size of undetected object with 2-beam floating blanking
FF-SYB14	6 mm / 0.23 in	16 mm / 0.63 in
FF-SYB30	10 mm / 0.39 in	30 mm / 1.18 in
FF-SYB50	30 mm / 1.18 in	70 mm / 2.75 in

❑ Serial connection

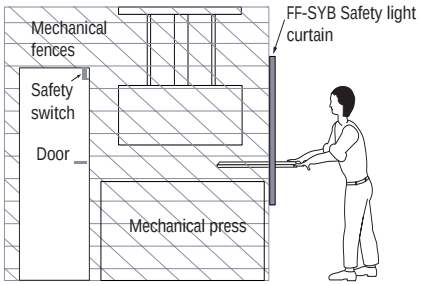
The FF-SYB safety light curtain allows the connection of another safety device with dual outputs through 2 inputs on the receiver unit. The auxiliary safety device can be an electromechanical safety switch or any other safety device with either relay outputs or solid state outputs (for safety reasons, reversed polarity on these two inputs is mandatory, therefore connection of a second FF-SYB light curtain is not possible through these two inputs). Connection is done through the main connector. An optional junction box is available to perform the electrical connections close to the light curtain.

Figure 5

a) Serial connection of an FF-SYB safety light curtain with a safety mat



b) Serial connection of an FF-SYB safety light curtain with a safety gate switch.

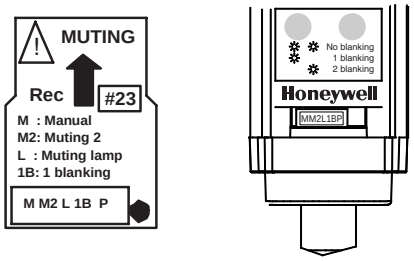


Note: This mode may be combined with the bi-directional muting mode. This combination of modes requires direct connection to the receiver internal terminal strip. A M20 cable gland is delivered with the package. Male M23 cordsets are available on option (see "Accessories" section).

❑ Configuration cards

The FF-SYB emitter and receiver are set up by the use of configuration cards, similar to the SIM cards used on mobile phones (see figure below). This simple and elegant method eliminates the use of jumpers or dip switches. No computer is required: settings are done on site, using one of the small configuration cards. If the user needs to use a different configuration from the factory settings, he just needs to select the configuration card which corresponds to the desired settings and install it behind the bottom cap of the emitter or receiver. The selected settings are written on the configuration card and are visible through the transparent front window.

Figure 6

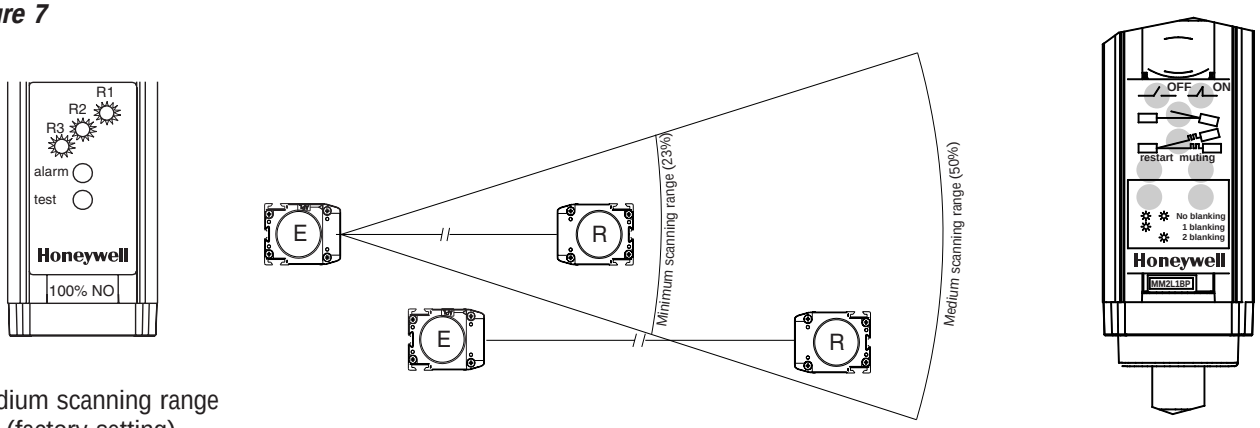


If the FF-SYB needs to be exchanged, the configuration card can be installed in another FF-SYB allowing transfer of settings in a few minutes.

❑ Cross-talk reduction system

The FF-SYB light curtain is based upon an infrared transmission between an emitter unit and a receiver unit. It is a requirement of the IEC/EN 61496-2 standard that if a receiver R2 receives two signals transmitted by two different emitters E1 and E2, the receiver R2 must turn to the alarm state. This happens if the receiver R2 is within the beam aperture angle and within the nominal scanning range of the second emitter E1. The cross-talk detection indicator flickers on the receiver R2 to warn the installer.

Figure 7

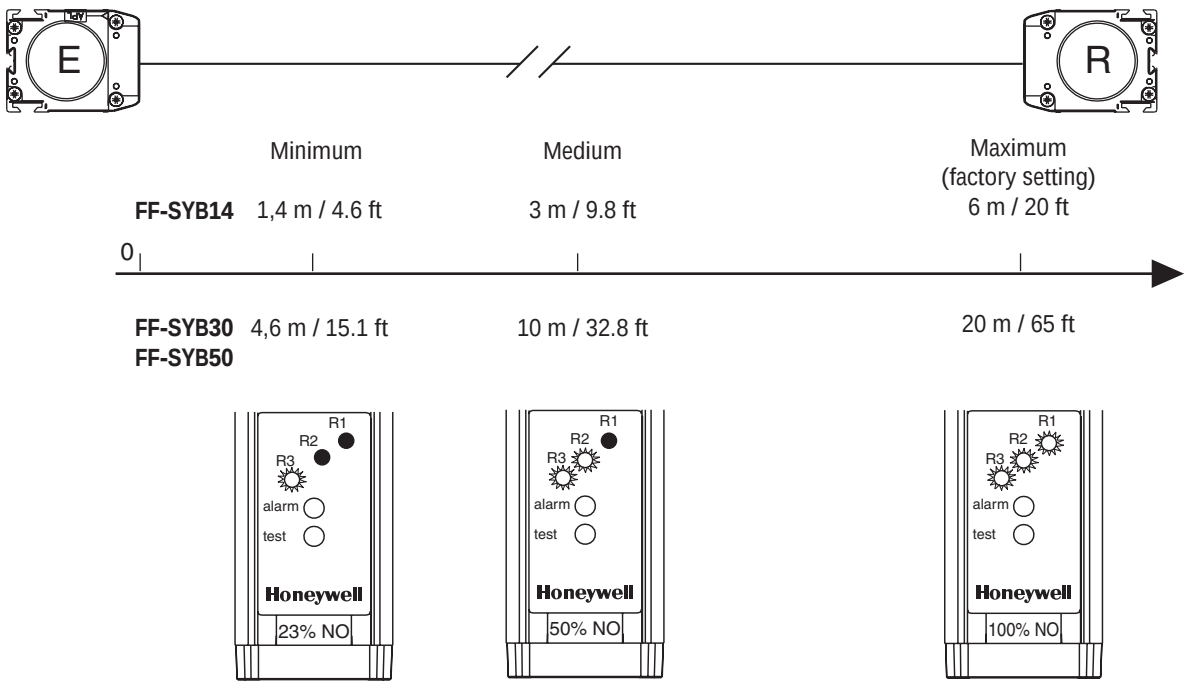


Medium scanning range
(factory setting)

A configuration card is used on the emitter unit for the selection of the adequate emission power. This configuration card can be used to eliminate this cross-talk phenomenon by decreasing the scanning range. The end cap can be easily removed to select a different scanning range. Products are delivered with a medium scanning range (middle position) to minimize cross-talk upon installation.

❑ Selectable scanning ranges

Figure 8



❑ Test input type

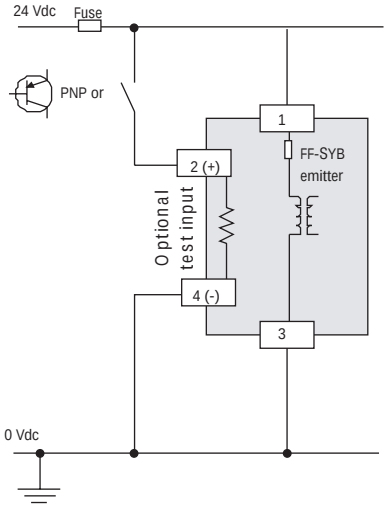
Figure 9

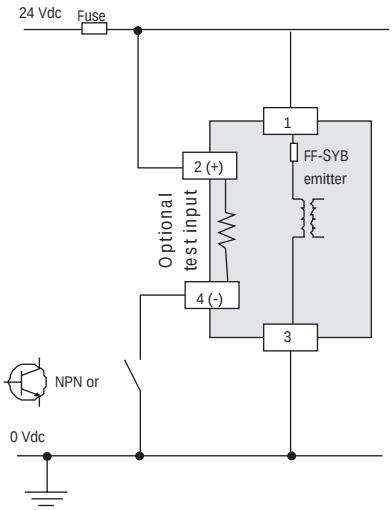
Voltage free contact

(PNP static (solid state) output and NPN static (solid state) output also connectable)

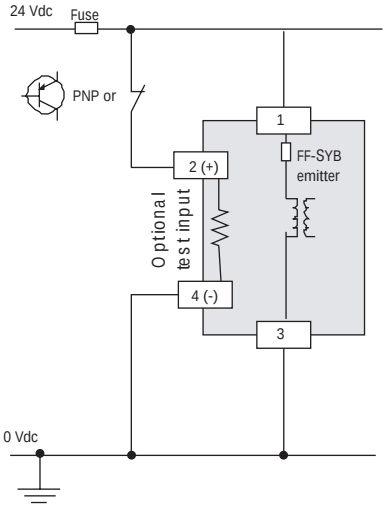
Normally open

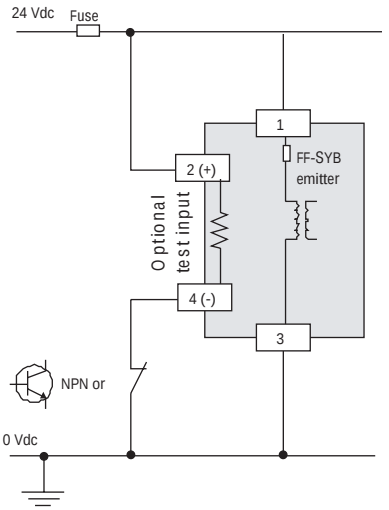
(factory setting)





Normally closed





Type 4 safety light curtain

- **Type 4 according to the IEC/EN 61496 - parts 1 and 2 standards**
- **Built-in muting, floating blanking, inputs for serial connection of an auxiliary device, manual restart and EDM**
- **Control of the infrared emission source for cross-talk reduction**
- **Enhanced diagnostic information**

Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

Features	Type	*FF-SYB14*	*FF-SYB30*	*FF-SYB50*
	Nominal scanning range	0 m to 6 m / 0 ft to 20 ft	0 m to 20 m / 0 ft to 65 ft	0 m to 20 m / 0 ft to 65 ft
	Object detection size (see chapter "Floating blanking function")	14 mm / 0.55 in	30 mm / 1.18 in	50 mm / 1.97 in
	Angle of divergence	±2°, ±25 %		
	Emitting light source (immunity)	Infrared, pulsed, 880 nm (*Sunlight:* 20 000 Lux • *Lamplight:* 15 000 Lux)		
	Supply voltage and power consumption	24 Vdc (±20 %); 5 W max. for the emitter, 5 W max. for the receiver		
Safety outputs (OSSDs)	**Output type**	2 safety static (solid state) outputs (PNP with NO characteristics) with permanent short-circuit and cross-fault detections		
	Switching capability	350 mA max. at 24 Vdc		
	Response time (beam interruption)	22 ms (28 ms for model numbers FF-SYB14128 to FF-SYB14176)		
	Response time (Auxiliary Safety Device engaged)	28 ms		
	Maximum cable length	100 m / 328 ft (100 nF capacitance)		
	Restart time after power up (after beam actuation)	> 1 s (80 ms - without EDM, 150 ms - with EDM)		
	Loads impedance	70 Ω min. / 5 kΩ max.		
	Voltage drop	< 2 Vdc		
	Loads turn-on voltage	5 V min. on resistive loads / 7 V min. on inductive loads		
	Protections	Short-circuits and cross-faults, overloads, reversed polarity, micro-cut-off (10 ms, 100 % voltage drop, 10 Hz)		
NC signalling or muting lamp/diagnosis output				
	Output type	1 PNP non safety output, NC (signalling contact) or NO (muting/diagnostic indication)		
	Switching capability	100 mA max. at 24 Vdc		
	Protections	Overloads, reversed polarity, micro-cut-off (10 ms, 100 % voltage drop, 10 Hz)		
Test input (emitter) (1)	**Input type**	Floating input with selectable NO/NC test logic		
	External contact type	Relay contact, or static (solid state) PNP or static (solid state) NPN (must be activated for at least 20 ms)		
	Test loop current (resistance)	13 mA typical (750 Ω max.)		
	Protections	3000 Vdc galvanic insulation, reversed polarity, micro-cut-off (14 ms)		
Restart / EDM input (1)	**External contact type**	Relay contact (must be activated for at least 150 ms and less than 3 s)		
	Max. voltage	29 Vdc		
Muting or serial connection inputs (1)				
	External contact type	Relay contact, or static (solid state) PNP or static (solid state) NPN (automatic recognition)		
	Maximum cable length	100 m / 328 ft (no limitation in capacitance)		
Environmental/physical characteristics				
	Temperature range	*Operating:* 0 °C to 55° C/32° F to 131 °F (95% relative humidity) • *Storage:* -20° C to 75 °C/-4° F to 167° F		
	Sealing	NEMA 4, 13 and IP 65		
	Vibrations	IEC/EN 61496-1: 10 to 55 Hz frequency range, 1 octave/min. sweep rate, 0,35 mm ±0,05 amplitude, 20 sweeps per axis, for 3 axes		
	Shocks	IEC/EN 61496-1: 15 G - 11 ms - 3 per axis, for 3 axes		
	Bumps	IEC/EN 61496-1: 10 G - 16 ms - 1000 per axis, for 3 axes		
	Product dimension	Width: 42 mm (1.65 in); depth: 55 mm (2.16 in); height (2)		
	Connection	*Emitter:* M12/5 pole male receptacle • *Receiver:* M12/8 pole male receptacle or terminal strip with M20 cable gland (see Figure 10 to determine possible modes of operation for each receiver termination type)		
	Material	*Housing:* aluminium alloy and (conductive) polycarbonate (end caps) • *Front plate:* polymethylmethacrylate (PMMA)		

Ordering information

Each listing consists of an M12 emitter, an M12 receiver, 2 pairs of right-angle brackets, an end cover equipped with a cable gland, a test rod and a set of configuration cards.

FF-SYB❑❑ ❑❑❑ M2

- **Model** (see Table 2 page 9)
- **Resolutions**
  - *14:* ø 14 mm / 0.6 in
  - *30:* ø 30 mm / 1.2 in
  - *50:* ø 50 mm / 1.97 in

Notes:

(1) Voltage switching (high/low): ≥ 11 Vdc min. (I > 6 mA) / ≤ 5 Vdc (I > 2 mA);
Input current (high/low): 20 mA / 10 mA at 24 Vdc.
In compliance with the IEC 61131-2 requirements for type 2 sensors.

(2) Refer to emitter and receiver dimensions / weights.

Figure 10 *- Possible modes of operation and corresponding receiver termination type and connection box*

Card (1)	Restart mode	Blanking (2)	Auxiliary Safety Device	Muting (3)	Auxiliary output (4)	Receiver termination (5)
#01	Manual				NC signal	M12 plug
#02	Manual	1-beam			NC signal	M12 plug
#03	Manual	2-beam			NC signal	M12 plug
#04	Automatic				NC signal	M12 plug
#05	Automatic	1-beam			NC signal	M12 plug
#06	Automatic	2-beam			NC signal	M12 plug
#07	Automatic		yes		NC signal	M12 plug
#08	Automatic	1-beam	yes		NC signal	M12 plug
#09	Automatic	2-beam	yes		NC signal	M12 plug
#10	Manual		yes		NC signal	M12 plug
#11	Automatic			2 inputs (6)	NC signal	M12 plug
#12	Automatic			2 inputs (6)	Muting lamp	M12 plug
#13	Automatic			4 inputs (6)	NC signal	Terminal strip
#14	Automatic			4 inputs (6)	Muting lamp	Terminal strip
#15	Automatic		yes	2 inputs	NC signal	Terminal strip
#16	Automatic		yes	2 inputs	Muting lamp	Terminal strip
#17	Manual			2 inputs (6)	NC signal	M12 plug
#18	Manual			2 inputs (6)	Muting lamp	M12 plug
#19	Manual			4 inputs (6)	NC signal	Terminal strip
#20	Manual			4 inputs (6)	Muting lamp	Terminal strip
#21	Manual		yes	2 inputs	NC signal	Terminal strip
#22	Manual		yes	2 inputs	Muting lamp	Terminal strip
#23	Manual	1-beam		2 inputs (6)	Muting lamp	M12 plug
#24	Manual	2-beam		2 inputs (6)	Muting lamp	M12 plug
#25	Manual	1-beam		4 inputs (6)	Muting lamp	Terminal strip
#26	Manual	2-beam		4 inputs (6)	Muting lamp	Terminal strip
#27	Manual	1-beam	yes	2 inputs	Muting lamp	Terminal strip
#28	Manual	2-beam	yes	2 inputs	Muting lamp	Terminal strip

(1) Factory setting: card #04

(2) Floating blanking

	1-beam		2-beam	
Model	**Resolution**	**Undetected object size**	**Resolution**	**Undetected object size**
FF-SYB14	24 mm / 0.94 in	6 mm / 0.23 in	34 mm / 1.33 in	16 mm / 0.63 in
FF-SYB30	50 mm / 1.97 in	10 mm / 0.39 in	70 mm / 2.75 in	30 mm / 1.18 in
FF-SYB50	90 mm / 3.54 in	30 mm / 1.18 in	130 mm / 5.12 in	70 mm / 2.75 in

(3) Muting: either 2 inputs available for the connection of 2 or 4 muting sensors to perform a bi-directional muting function (see page 2 and 3), or 4 inputs available for the connection of 4 sensors to perform a uni-directional muting function (see page 3).

(4) Auxiliary output: either a normally closed signalling output of a muting and diagnosis lamp output (see page 2).

(5) Receiver termination: some modes require direct connections to the internal receiver terminal strip. The M20 cable gland (delivered with the package) allows the use of a male M23 cordset.

(6) Connection boxes are available for the interconnection of all sensors and actuators (see "Accessories" section).

Table 2

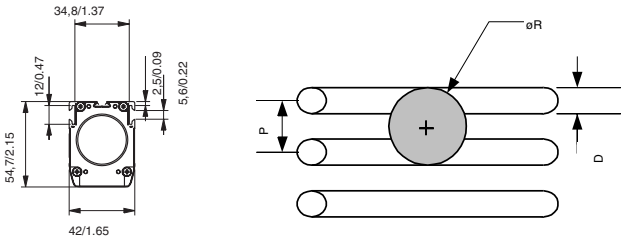
Model	***032***	***048***	***064***	***080***	***096***
Protection height (mm / in) (1)					
FF-SYB14	334 / 13.1	494 / 19.4	654 / 25.7	814 / 32.07	974 / 38.3
FF-SYB30	350 / 13.7	510 / 20.09	670 / 26.3	830 / 32.7	990 / 39
FF-SYB50	370 / 14.6	530 / 20.9	690 / 27.2	850 / 33.5	1010 / 39.8
Sensing field height (mm / in)(2)					
FF-SYB14	314 / 12.3	474 / 18.6	634 / 24.9	794 / 31.2	954 / 37.5
FF-SYB30	310 / 12.2	470 / 18.5	630 / 24.8	790 / 31.1	950 / 37.4
FF-SYB50	290 / 11.4	450 / 17.7	610 / 24.03	770 / 30.3	930 / 36.6
Total height (mm / in) (3)					
M12 emitter or receiver	424 / 16.7	584 / 23	744 / 29.3	904 / 35.6	1064 / 41.9
Cable gland receiver only	438 / 12.2	598 / 23.5	758 / 29.8	918 / 36.1	1078 / 42.4
Weight per device (kg / lbs)	0,86 / 1.89	1,14 / 2.5	1,42 / 3.12	1,7 / 3.74	1,98 / 4.35

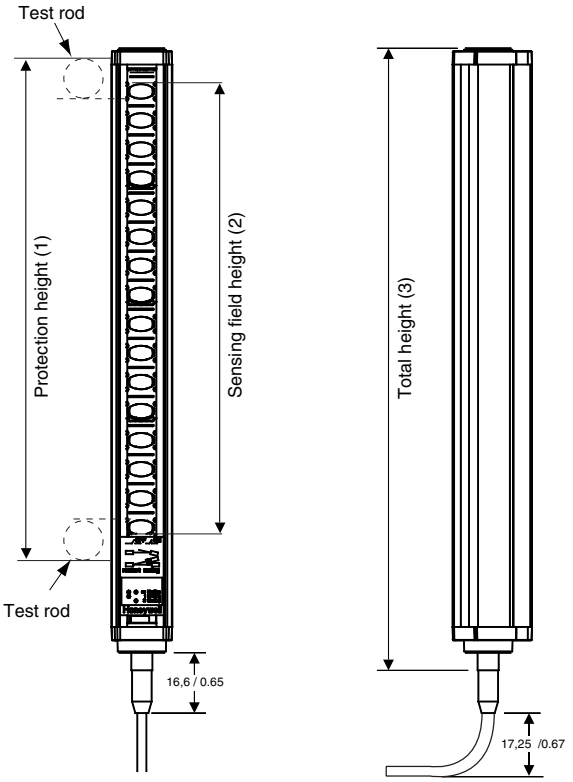
Table 2 (continued)

Model	***112***	***128***	***144***	***160***	***176***
Protection height (mm / in) (1)					
FF-SYB14	1134 / 44.6	1294 / 50.9	1454 / 57.2	1614 / 63.5	1774 / 69.8
FF-SYB30	1150 / 45.3	1310 / 51.6	1470 / 57.9	1630 / 64.2	1790 / 70.5
FF-SYB50	1170 / 46.0	1330 / 52.4	1490 / 58.7	1650 / 65.0	1810 / 71.2
Sensing field height (mm / in)(2)					
FF-SYB14	1114 / 43.8	1274 / 50.1	1434 / 56.5	1594 / 62.8	1754 / 69.1
FF-SYB30	1110 / 43.7	1270 / 50.03	1430 / 56.3	1590 / 62.6	1750 / 68.9
FF-SYB50	1090 / 42.9	1250 / 49.2	1410 / 55.1	1570 / 61.8	1730 / 68.1
Total height (mm / in) (3)					
M12 emitter or receiver	1224 / 48.2	1384 / 54.5	1544 / 60.8	1704 / 67.1	1864 / 73.4
Cable gland receiver only	1238 / 48.7	1398 / 55	1558 / 61.3	1718 / 67.6	1878 / 73.9
Weight per device (kg / lbs)	2,26 / 4.97	2,54 / 4.97	2,82 / 6.20	3,10 / 6.82	3,38 / 7.43

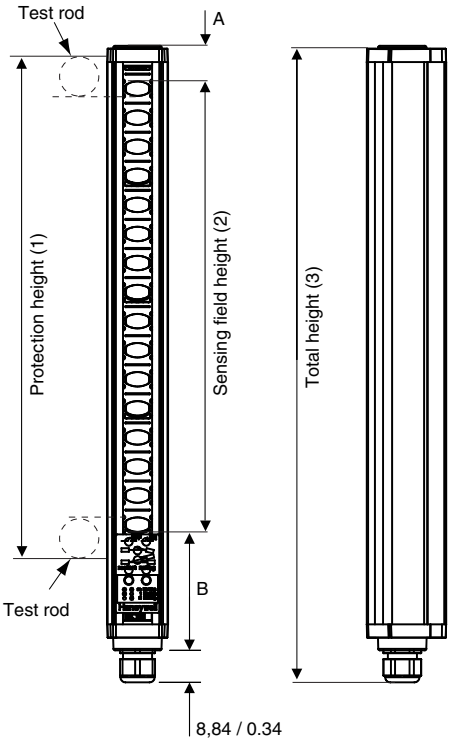
Figure 11 *- Dimensions in mm / in*

M12 emitter or receiver





Cable gland receiver



(1) Protection Height for the minimum detected object size or resolution

(2) Sensing Field Height (full screen height)

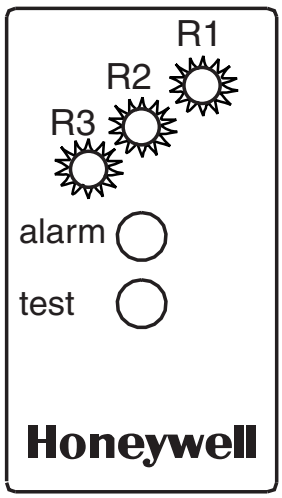
(3) Total Height (including male receptacles or cable gland)

Table 1

(mm / in)	**øR** (resolution)	**P** (lens pitch)	**D** (lens diameter)	**A** (inactive zone)	**B** (inactive zone)
FF-SYB14	ø 14 / 0.6	10 / 0.4	4 / 0.16	15,2 / 0.60	90,6 / 3.56
FF-SYB30	ø 30 / 1.2	20 / 0.8	10 / 0.4	22,2 / 0.87	87,6 / 3.45
FF-SYB50	ø 50 / 1.97	40 / 1.57	10 / 0.39	42.2 / 1.66	87,6 / 3.45

❑ **LED status indicators**

Figure 12 - *Emitter*

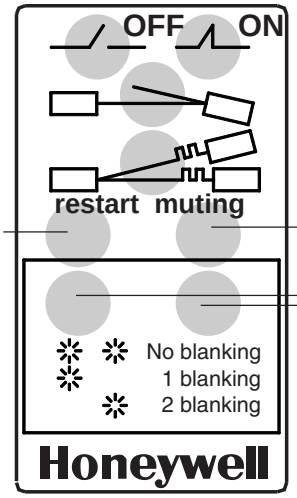


3 scanning range indicators R1, R2, R3 (yellow)

Alarm indicator (red)

Test indicator (red)

Figure 13 - *Receiver*



2 operation indicators (red and green)

Signal strength indicator (orange)

Cross-talk indicator (red)

Restart indicator (yellow)

Muting indicator (orange)

2 blanking indicators (yellow)

❑ Wiring

Figure 14 - *Recommended wiring diagram for a 2-sensor muting application with automatic restart and Temporary Manual Muting (TMM) (see Figure 1)*

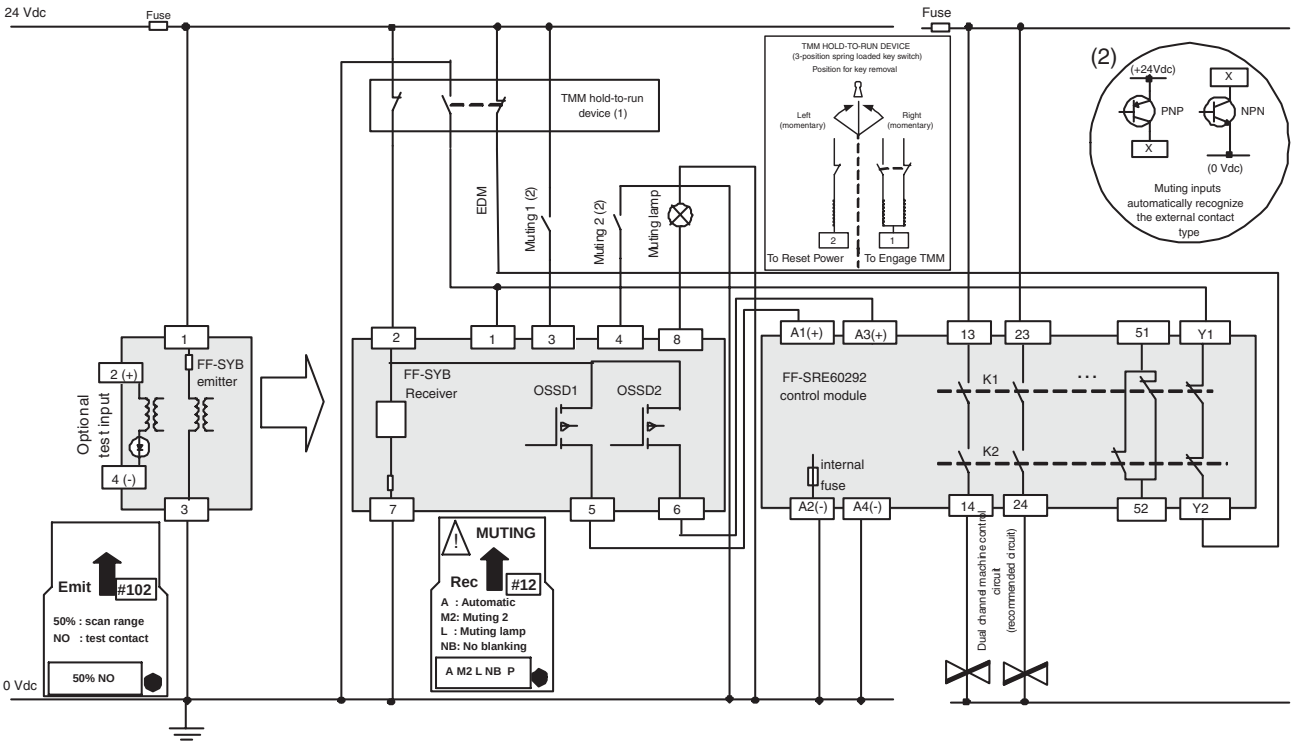
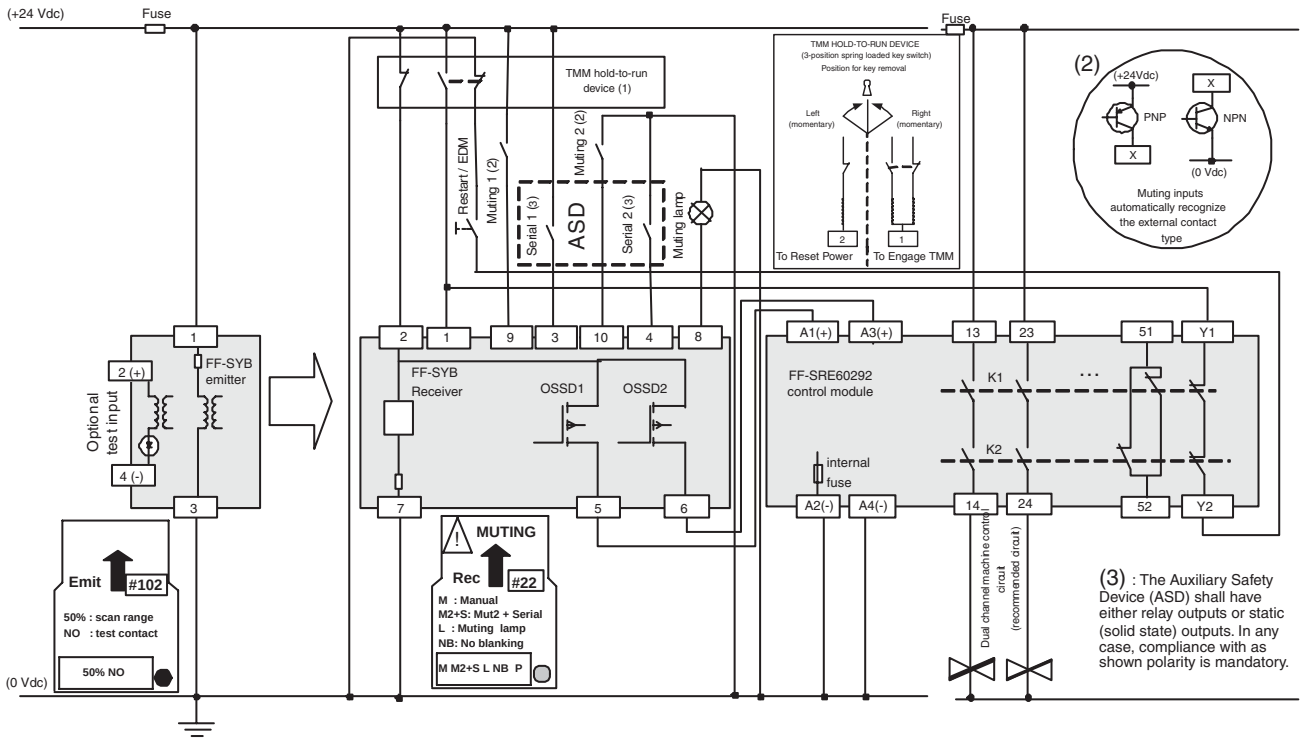
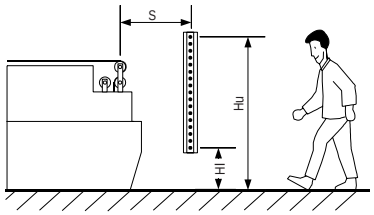
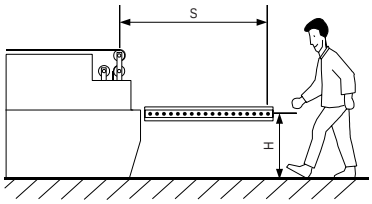
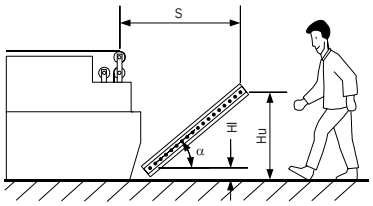


Figure 15 - *Recommended wiring diagram for a 2-sensor muting application with an auxiliary safety device, manual restart and Temporary Manual Muting (TMM)*



❑ **European EN 999 standard**

All distances/heights in mm (100 mm = 3.9 in)

LIGHT CURTAIN MODEL	FF-SYB14 FF-SYB30 without floating/blanking	FF-SYB30 with 1- or 2 beam floating blanking FF-SYB50 with or without blanking
Normal approach  	**S** ≥ **2000 (t1+t2) + 8 (R-14)** with S ≥ 100 if S ≥ 500, then use: **S** ≥ **1600 (t1+t2) + 8 (R - 14)** **with S** ≥ **500**	**S** ≥ **1600 (t1+t2) + 850** with Hu ≥ 900 mm Hl ≤ 300 mm
Parallel approach  	**S** ≥ **1600 (t1+t2)+(1200 - 0.4H)**, with H ≤ 875 Or **S** ≥ **1600 (t1+t2)+850**, with 875 ≤ H ≤ 1000 with H ≥ 15 (R-50): H ≥ 300 mm for the FF-SYB30 with 2-beam floating blanking. H ≥ 600 mm for the FF-SYB50 with 1-beam floating blanking FF-SYB50 with 2-beam floating blanking not allowed in parallel approach.	
Angled approach  	if α ≥ 30°, then use the normal approach formula, with Hu ≥ 900 mm and Hl ≤ 300 mm if α ≤ 30°, then use the parallel approach formula, with Hu ≤ 1000 mm and Hl ≥ 15 (R-50) where R is the light curtain resolution Hi ≥ 300 mm for the FF-SYB30 with 2-beam floating blanking Hi ≥ 600 mm for the FF-SYB50 with 1-beam floating blanking FF-SYB50 with 2-beam floating blanking not allowed in angled approach.	

t1: light curtain response time (s)
t2: machine stopping time (s)
R: light curtain resolution

For more information, refer to the EN 999 European standard or comply with the requirements on safety distances given by the type C European standard if existing for the considered machine.

❑ **USA's OSHA/ANSI/RIA standards**

All distances/heights in inches (1 in = 25,4 mm)

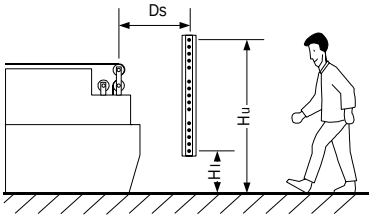
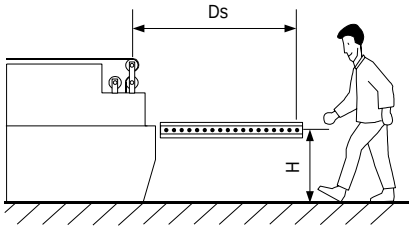
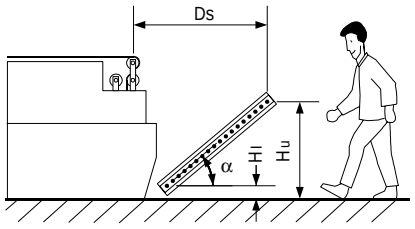
LIGHT CURTAIN MODEL	FF-SYB14, FF-SYB30, FF-SYB50 with or without floating blanking
Normal approach  	**Ds ≥ 63 (Ts+Tc+Tr) + Dpf** If R ≤ 2,5, Dpf = 3.4 x (R – 0.275), (see table below) If Hi ≤ 12 and Hu ≥ 48 (Typical for Reach Thru), Dpf = 36 If Hi ≤ 12 and 36 ≤ Hu ≤ 48 (Typical for Reach Over), Dpf = 48 If Hi > 12, supplemental safeguarding may be required to detect crawling underneath.
Parallel approach  	**Ds ≥ 63 x (Ts + Tc + Tr) +48** **H ≥ 15 x (R-2)** *If H > 12, supplemental safeguarding may be required to detect crawling underneath.
Angled approach  	If α < 30°, then use the normal approach formula If α < 30°, then use the parallel approach formula

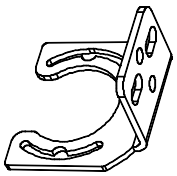
Table for H*	No blanking	1-beam	2-beam
FF-SYB14	0 < H ≤ 39	0 < H ≤ 39	0 < H ≤ 39
FF-SYB30	0 < H ≤ 39	0 < H ≤ 39	11.3 < H ≤ 39
FF-SYB50	0 < H ≤ 39	23.1 < H ≤ 39	Not allowed

Ts: worst case stopping time of the machine (s)
Tc: worst case response time of the machine controls (s)
Tr: response time of the safety devices (s)
Dpf: Depth penetration factor (in.)
R: light curtain resolution

Table for Dpf	No blanking	1-beam	2-beam
FF-SYB14	0.935	2.261	3.587
FF-SYB30	3.077	5.763	-
FF-SYB50	5.763	-	-

For more information, refer to the ANSI/RIA 15.06 American standard.

❑ Accessories

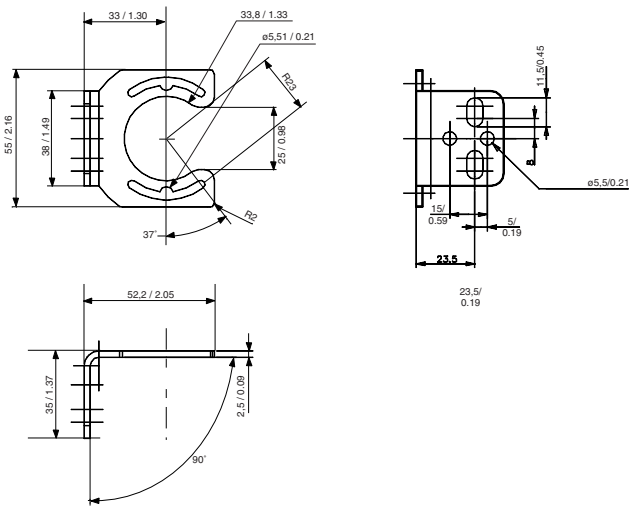


FF-SYZ634178

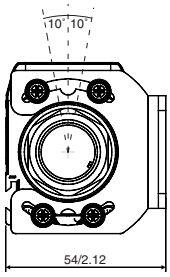
Kit of 2 right angle mounting brackets with screws, bolts, nuts and washers to mount one emitter or one receiver unit.
Possible mounting positions:

1. At the top and the bottom of the FF-SYB (allowing adjustments in azimuth directions of ±10°).
2. At one of the two lateral dovetail slots (allowing adjustments in vertical directions along the slot)
3. At the rear dovetail slot (allowing adjustments in vertical directions along the slot)

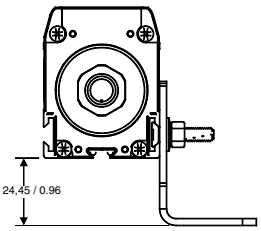
Order 2 kits for a complete set of emitter and receiver.
(already included in the FF-SYB package)

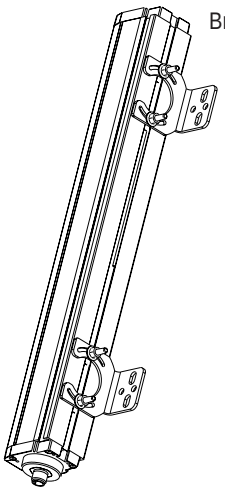


Bracket mounting at the top and the bottom

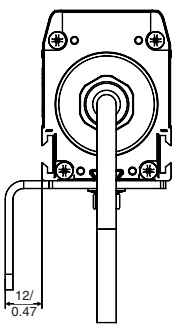


Bracket mounting at the lateral dovetail slots

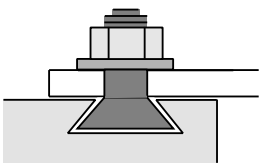


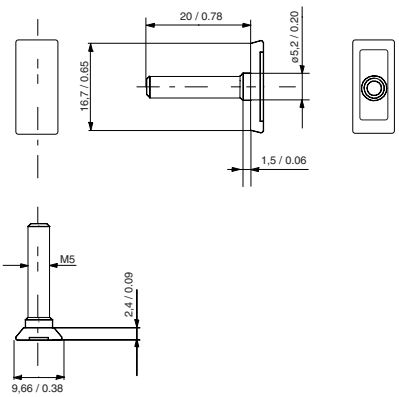


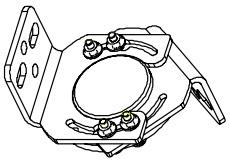
Bracket mounting at the rear dovetail slots



M5 dovetail shape bolt







FF-SYZ634179

Kit of 2 adjustable mounting brackets with rotating plate, screws, bolts, nuts, and washers to mount one emitter or one receiver unit.

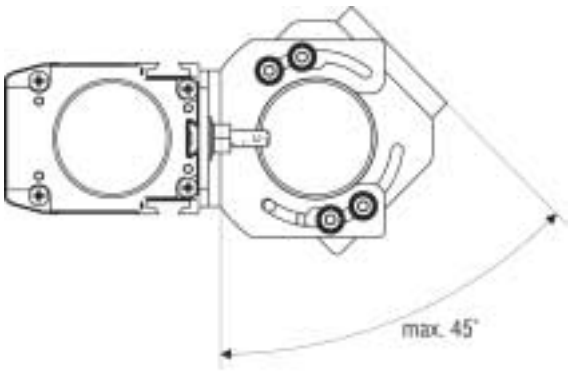
Possible mounting position is:

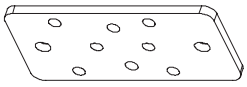
- at the rear dovetail slot
  (allowing adjustments in vertical directions along the slot an in azimuth directions of max. ± 45°)

Order 2 kits for a complete set of emitter and receiver.

Refer to the section FF-SYZ634178 for the detailed dimensions of the brackets.

(to be ordered separately as an option, to be mounted together with the FF-SYZ634178 brackets delivered with the FF-SYB package)





(x 2)

FF-SYZAD

Anti-vibration kit

Kit of 2 straight brackets and 4 anti-vibration dampers (mounting hardware included) - to substitute for the FF-SYZ634178 brackets delivered with the FF-SYB package.

(x 4)

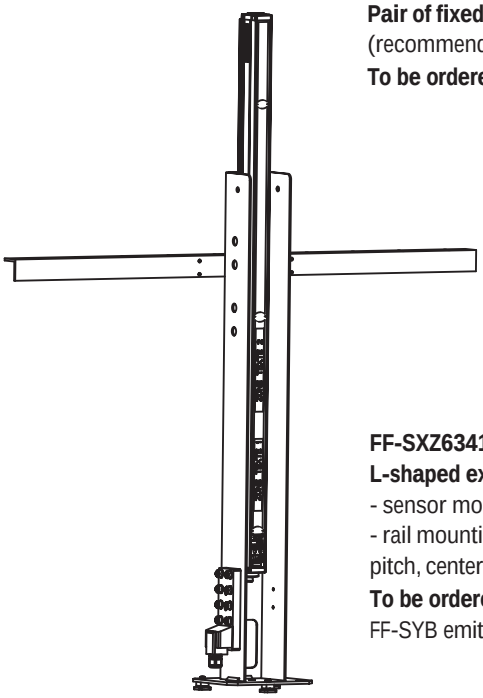
NOTICE

PROTECTION AGAINST HIGH VIBRATION

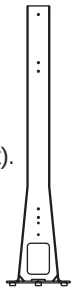
In case of high vibrations, order:

- 2 sets of FF-SYZAD kit for light curtain systems with protection height below 1000 mm/ 39.4 in.
- 3 sets of FF-SYZAD kit for light curtain systems with protection height greater or equal to 1000 mm/39.4 in, but less than 1850 mm/72.8in.
- 4 sets of FF-SYZAD kit for light curtain systems with protection height greater than 1850 mm/72.8 in.

Mechanical fixture for muting application

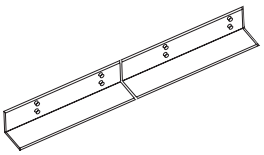


FF-SXZ630170
Pair of fixed posts for FF-SYB light curtain
(recommended when mechanical protection of the light curtain is NOT required)
To be ordered separately as an option (order 1 piece for a complete FF-SYB emitter/receiver set).



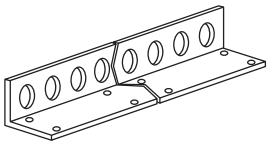
FF-SXZ634186
L-shaped extrusion 40 mm x 40 mm / 1.57 in x 1.57 in, 1 m / 3.28 ft long
- sensor mounting: ø5.5 mm / ø1/46 in fixing holes, 100 mm / 3.94 in pitch
- rail mounting: 3 pairs of ø5.5 mm / ø1/46 in fixing holes, 100 mm / 3.94 in pitch, centered

To be ordered separately as an option (order 2 pieces for a complete FF-SYB emitter/receiver set).



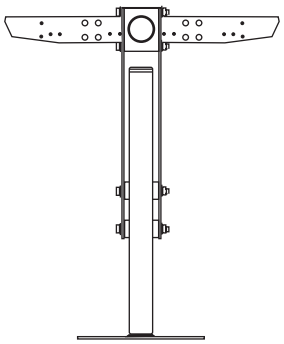
FF-MPZS6018
Muting sensor mounting rails
- sensor mounting: ø18 mm / ø0.71 in mounting holes, 30 mm / 1.18 in distance between centers
- rail mounting: ø5 mm / ø1/5 in fixing holes, 100 mm / 3.94 in pitch

To be ordered separately as an option (order 2 pieces for a complete FF-SYB emitter/receiver set).



FF-SYZPF
Fixed post for FF-SYB light curtain
(recommended when the mechanical protection of the light curtain is required)
Floorstanding post for the installation of the following FF-SYB light curtains:
Light curtain models: FF-SYB032❑❑, FF-SYB048❑❑, FF-SYB080❑❑, FF-SYB096❑❑
Multibeam models: FF-SYB02500, FF-SYB03400, FF-SYB04300
To be ordered separately as an option (order 2 pieces for a complete FF-SYB emitter/receiver set).

Front covers are available for additional protection of the FF-SYB234 beam access detection systems:
FF-SYZ630184-2: Front cover for 2 beams
FF-SYZ630184-3: Front cover for 3 beams
FF-SYZ630184-4: Front cover for 4 beams
To be ordered separately as an option.

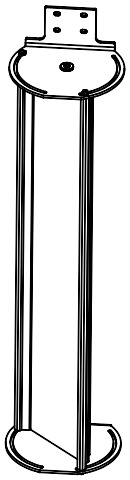


FF-SYZPA

Adjustable floor standing post

- Compatible with all protection heights
- Horizontal, diagonal and vertical adjustment of light curtains possible
- Quick mounting and easy light curtain adjustment
- 360° rotation of light curtain possible
- Fine adjustment of light curtains in azimuth direction of ±11° ensures an easy alignment
- 700 mm / 27.58 in corner protection for light curtain included
- Base plate can be mounted independently
- Finish: RAL 1021 yellow paint

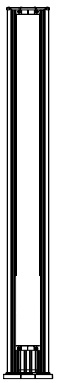
To be ordered separately as an option.



FF-SYZMIR❑❑❑ Deflection mirror

To be ordered separately as an option

Features:	
Deflection mirror with 10 % scanning range reduction (FF-SYZMIR004 through 18)	
Deflection mirror with 25 % scanning range reduction (FF-SYZMIR104 through 18)	
Food and Beverage industry: stainless steel deflection mirrors with 45 % scanning range reduction (FF-SYZMIR204 through 14)	
Quick mounting and easy mirror adjustment	
Mounting brackets included (top / bottom mounting)	
Adjustment of mirror in azimuth direction of ±45°	
Material	Aluminium alloy housing
Finish	Gold colour anodisation
Ordering guide:	
FF-SYZMIR❑04	FF-SY❑❑032 and FF-SY❑❑048
FF-SYZMIR❑06	FF-SY❑❑064
FF-SYZMIR❑08	FF-SY❑❑080
FF-SYZMIR❑10	FF-SY❑❑096
FF-SYZMIR❑12	FF-SY❑❑112 and FF-SY❑❑128
FF-SYZMIR❑14	FF-SY❑❑144
FF-SYZMIR❑16	FF-SY❑❑160
FF-SYZMIR❑18	FF-SY❑❑176



FF-SYZPFM

Fixed post with plain mirror (10 % or 25 % reduction of scanning range)

Floorstanding post with 1 plain mirror (FF-SYZPFM01,10 % of loss)

Floorstanding post with 1 plain mirror (FF-SYZPFM11, 25 % of loss)

Suitable for light curtain models: FF-SYB032❑❑, FF-SYB048❑❑, FF-SYB080❑❑, FF-SYB096❑❑

To be ordered separately as an option.

FF-SXZSHL

IP67 enclosure for FF-SYB light curtains

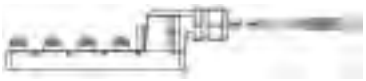
Enclosures	**Light curtains**
FF-SXZSHL048☐	FF-SYB☐☐032 and 048
FF-SXZSHL096☐	FF-SYB☐☐064 through 096
FF-SXZSHL128☐	FF-SYB☐☐112 and 128
FF-SXZSHLKIT	Brackets and cable gland kit (order one kit per enclosure)

☐: "P" for polycarbonate, "G" for glass

M12 connection boxes

For the connection of muting sensors, restart and TMM switches and muting lamp to the light curtain

FF-SXZBOX8M12T
IP67 junction box, field-attachable home run cable, M12 8-port configuration.



FF-SXZBOX8M12L02
IP67 junction box, field-attachable home run cable, M12 8-port configuration, prewired with a 2 m/6.56 ft M12 8-pin cordset.

Cordsets

M12/5 pole

1: brown
2: white
3: blue
4: black
5: green/yellow

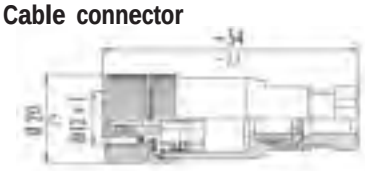
M12 single-ended cordset, female / 5-pin straight for the FF-SYB emitter
FF-SXZCAM125U02 2 m / 6.56 ft length
FF-SXZCAM125U05 5 m / 16.40 ft length
FF-SXZCAM125U10 10 m / 32.8 ft length
Equivalent to the 805000A09M... Micro-change® Series from Brad Harrison
(see vendor catalog for color code)

M12/8 pole

1: white
2: brown
3: green
4: yellow
5: grey
6: pink
7: blue
8: red

M12 single-ended cordset, female / 8-pin straight for the FF-SYB receiver
FF-SXZCAM128U02 2 m / 6.56 ft length
FF-SXZCAM128U05 5 m / 16.40 ft length
FF-SXZCAM128U10 10 m / 32.8 ft length
Equivalent to the 808000P02M... Micro-change® Series from Brad Harrison
(see vendor catalog for color code)

Cable connector



FF-SXZCOM125 - M12 screw connector, female / 5 pin straight for the FF-SYB emitter
FF-SXZCOM128 - M12 screw connector, female / 8 pin straight for the FF-SYB receiver

Safety control modules

FF-SRE60292
Slim line expansion module
- 24 Vdc
- Safety interface up to Category 4 per EN 954-1
- 4 NO/2 NC safety relay outputs
- 22,5 mm / 0.88 in width

(to be ordered separately as an option).

FF-SRE30812
Expansion module
- 24 Vdc, 115 Vac or 230 Vac
- Safety interface up to Category 4 per EN 954-1
- 7 NO/1 NC internally redundant safety relay outputs
- 90 mm / 3.54 in width

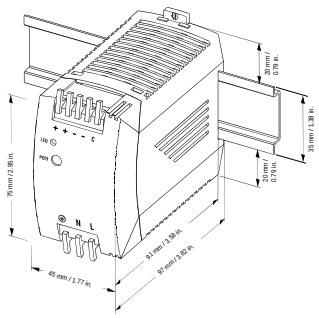
(to be ordered separately as an option).

Safety control modules

FF-SRM200P2
Mutual exclusion module
(to be ordered separately as an option)
- typical applications: loading/unloading chamber on machining centers or conveyors, crossing of conveyor lines, moving conveyors or AGVs
- connection of 2 safety devices
- 24 Vdc
- Category 4 per EN 954-1
- manual start mode, FSD monitoring
- crossfault monitoring of inputs
- 3 NO safety relay outputs
- static outputs for output status and diagnostic information
- 45 mm / 1.77 in

FF-SRL59022
Presence Sensing Device Initiation (PSDI)
(to be ordered separately as an option).
- to be used with FF-SYB14 or FF-SYB30 only
- accept a single safety light curtain working in a single stroke/dual stroke mode
- 24 Vdc
- Category 4 per EN 954-1
- manual start mode and FSD monitoring
- cross-fault monitoring of inputs
- 3 NO safety relay outputs
- static outputs for relay output status and diagnostic information
- 45 mm / 1.77 in

ac to dc power supply



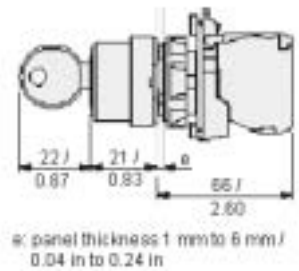
FF-SXZPWR050
ac to dc power supply
(to be ordered separately as an option)
- Approvals: UL508 listed, UL1950, cUL/CSA-C22.2 No.950-M90, EN/IEC 60950, EN 50178 (Class 2 Rated for low power installations)
- Input voltage: 85-264 Vac (43-67 Hz)
- Output voltage: 24-28 Vdc adjustable
- Rated continuous load (at 60 °C/140 °F max.): 2,1 A @ 24 Vdc / 1,8A @ 28 Vdc
- Power: 50 W
- Dimensions 75 mm x 45 mm x 97 mm / 2.95 in x 1.77 in x 3.82 in
- DIN rail mounting
- Weight: 240 g / 0.52 lbs

Muting lamp

(not contractual)

FF-SXZMLED
Beacon supplied with fixing plate for vertical surface and a LEDs bulb (Telemecanique XVB Series type). To be used as the muting/diagnostic lamp.

3 position spring loaded key switch



(not contractual)

FF-SXZTMM
ø 22 mm 3-position spring loaded key switch with a Normally Closed contact on the left position and two complementary (Normally Closed and Normally Open) contacts on the right position (Telemecanique ZB5 Series type, fixing collar with screw clamp contact blocks, key # 455).
To be used as the TMM hold-to-run device.

Configuration cards

FF-SYZ101085R
Set of 28 configuration cards for FF-SYB receiver

FF-SYZ101092E
Set of 6 configuration cards for FF-SYB emitter

Installation manuals

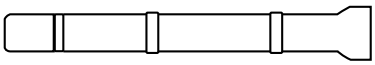
FF-PK107120-EN	One FF-SYB English installation manual
FF-PK107120-DE	One FF-SYB German installation manual
FF-PK107120-FR	One FF-SYB French installation manual
FF-PK107120-IT	One FF-SYB Italian installation manual
FF-PK107120-SP	One FF-SYB Spanish installation manual

NOTICE
By default, products will be shipped with the installation manual in the language of the country of delivery when available or in English. If any other language is required, it must be ordered separately.

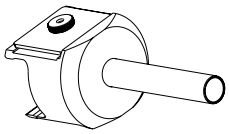
Test rods

FF-SYZROD14
Test rod for ø14 mm / 0.6 in resolution safety light curtains
(already included in the FF-SYB package).

FF-SBZROD30
Test rod for ø30 mm / 1.2 in resolution safety light curtains
(already included in the FF-SYB package).



FF-SPZLASER
The laser pen FF-SPZLASER is a self-contained and compact laser device designed to ease infrared beam alignments. Its class II conforms to the EN 60825 European standard and the US 21 CFR 1040 American standard.
To be ordered separately as an option.



FF-SYZ604795
Mechanical adapter for the FF-SPZLASER laser pen to be used with the FF-SYB Series light curtain.
To be ordered separately as an option.

Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. **The foregoing is Buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance,current specifications, pricing or name of the nearest Authorised Distributor, contact a nearby sales office or:

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www.honeywell.com/sensing

Type 4 Safety light curtain

FF-SYB234 Series

Compact, Universal, Smart and Full-featured

FEATURES

- 1- or 2-beam floating blanking
- Manual or automatic restart
- External Device Monitoring (EDM)
- 2 or 4 inputs for muting signals
- Manual muting override
- Input for serial connection of an auxiliary safety device
- Unique patented configuration cards for quick set up and easy replacement
- Self-contained with optical synchronisation
- 2 static (solid state) safety outputs with short-circuit and cross-fault detection
- Muting lamp/diagnosis output or static (solid state) non safety output for signalling
- Selection of the infrared emission power allows cross-talk reduction
- Enhanced diagnostic information includes the following indication: signal strength, cross-talk, muting, blanking, restart and failure diagnostic
- Test input with selectable test input type
- Two, three and four beam versions for access and beam detection
- Scanning range up to 80 m / 262.4 ft
- M12 connectors
- Mounting brackets included allowing multiple mounting positions
- Safety relay modules for more switching capability (to be ordered separately).

TYPICAL APPLICATIONS

- Access detection to robot areas
- Stacking machines, transporting and conveyor technology
- Handling equipment and assembly lines
- Palletizing industry

INRS

Approved as
Type 4
per IEC/EN 61496-1/2

The Honeywell FF-SYB light curtain is in compliance with IEC/EN 61496 - parts 1 and 2 standard and meets the requirements for a Type 4 Active Optoelectronic Protective Device, the highest level for safety products.

The product received an EC type test certificate from the French INRS notified body, required for safety equipment as per the 98/37/EC Machinery Directive. It meets the applicable parts of North American standards and regulations (OSHA 1910.212, OSHA 1910.217, ANSI standards including ANSI RIA 15.06 for Control Reliability and CSA Z434). Its CSA mark makes it a product usable in most parts of the world.

As soon as an object is detected inside the protection field, the FF-SYB de-energizes its two static (solid state) safety outputs to signal the dangerous motion to stop. The FF-SYB is a self-contained light curtain that does not require a separate control unit for operation.

Functions such as floating blanking, muting, external device monitoring, manual restart and serial connection make it a comprehensive product and eliminate the need for additional control modules.

These built-in features, combined with the small size of the housing, help users reducing overall cost by saving space and installation time.

A unique patented configuration card system allows the user to set up the correct operating mode when swapping units, by simplifying and reducing the number of operations.

The long scanning distance ensures that most perimeter guarding applications are covered. The optional FF-SYZPF floor mounting posts with individual mirrors can be used to protect several sides of a machine with only one system.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is to be referenced for each product.

Failure to comply with these instructions could result in death or serious injury.

❑ External Device Monitoring (EDM)

The FF-SYB is fitted with an EDM input which allows users to check the correct state of the final switching devices (relays or contactors with positively guided contacts). After each intrusion into the protection field, the FF-SYB will check that the EDM input loop is closed before switching the outputs back to ON. If the FF-SYB operates in automatic restart mode, it will restart immediately if the EDM loop is closed. If the FF-SYB operates in manual restart mode, it will restart when the restart push-button is pressed and if the EDM loop is closed. If the EDM loop remains open (meaning that the external device has a malfunction) the FF-SYB will keep its outputs open and will not restart.

❑ Manual restart

The FF-SYB can be used in automatic or manual restart mode. In automatic mode, the outputs will switch back to ON after an interruption of the protection field, as soon as the field becomes clear again. In manual restart mode, the FF-SYB will not switch back its outputs to ON until a manual restart push-button is pressed and released. The push-button must be a normally open type button. The manual restart will not switch the OSSDs back to ON in case of light curtain lock out (internal failure, optical interference, etc.) or when the protection field is still interrupted.

❑ Auxiliary output

An additional non safety output is available to either mimic the safety output status (solid state Normally Closed signalling output) or signal muting sequences and provide diagnostic information (mode selection depending).

❑ Muting function

The FF-SYB is fitted with a built-in muting function. Muting is the ability to temporarily inhibit the outputs of a light curtain under certain conditions. Sensors are connected to the light curtain through the main connector. An optional junction box is available to perform the electrical connections close to the location of the muting sensors.

Muting sensors are used to discriminate authorised materials from people. The muting sensors must be able to detect the passing material (pallets, vehicles, etc.) according to the material's length and speed.

Figure 1 shows an FF-SYB placed on a conveyor, with the corresponding muting sensors.

The muting activation sensors temporarily inhibit the FF-SYB light curtain as soon as they detect the object. The outputs of these sensors are connected to the muting inputs of the FF-SYB receiver. Muting sensors must be successively actuated for a correct muting sequence to start.

Whenever one of the two muting sensors is made free again, the muting sequence stops. In case of an incorrect muting sequence, a temporary manual muting (override) procedure may be performed to clear the FF-SYB light curtain detection field and revert back to normal operation.

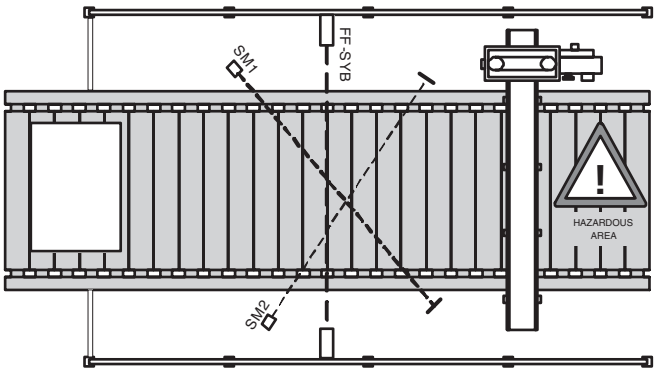
Suitable optoelectronic, mechanical, proximity sensors, etc. can be used as muting sensors.

Inputs for muting sensors accept sensors with relay or static (solid state) outputs, NPN or PNP. 2-wire sensors are also accepted.

A muting lamp output is available on the FF-SYB receiver to drive an external muting indicator that should be installed in a suitable location on the machine.

The following are some configuration examples when using the muting function:

Figure 1 *- Bi-directional application with two optoelectronic sensors*



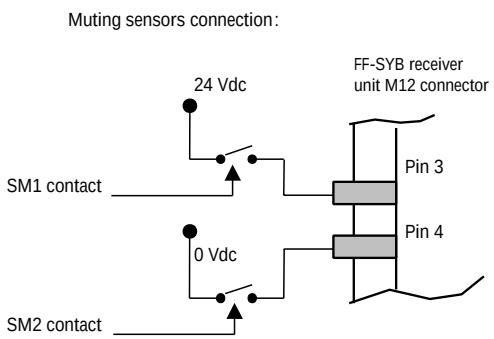
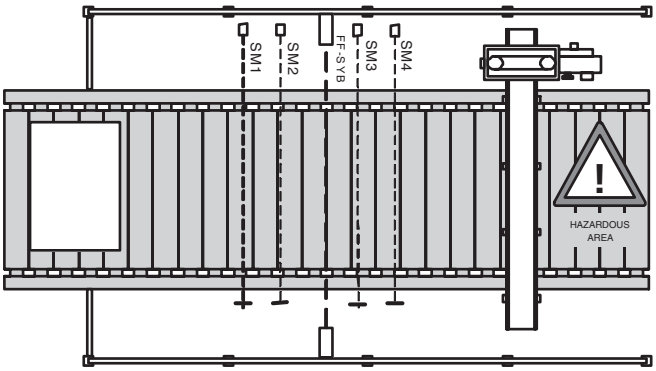


Figure 2 *- Bi-directional application with four photoelectric sensors*

2 sensors can be wired in parallel on each of the 2 muting inputs of the light curtain, creating a 4 sensor bi-directional muting.



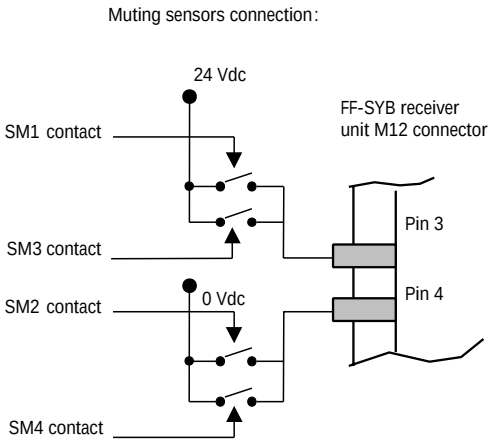
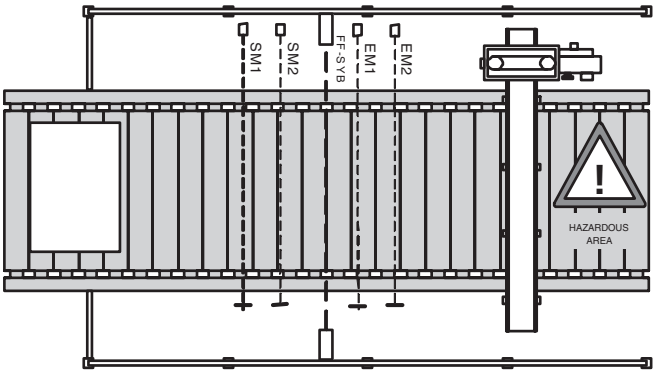
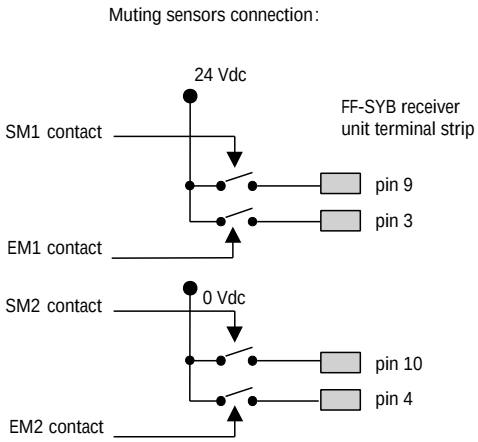


Figure 3 *- Uni-directional application with four optoelectronic sensors*



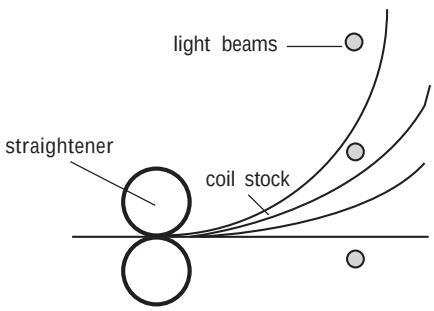


Note: this mode of operation requires direct connections to the receiver internal terminal strip. A M20 cable gland is delivered with the package. Male M23 cordsets are available on option (see "Accessories" section).

❑ Floating blanking function

With the exception of the 2-beam FF-SYB02, the FF-SYB234 systems are fitted with a selectable floating blanking function which allows users to inhibit 1 or 2 beams* anywhere within the protection field, except the bottom beam which is used for synchronisation. If 2 beam floating blanking is selected, the interruption of 1 or 2 beams will not lead to the opening of the outputs. The 2 beams can be adjacent or not. It is useful in those applications where material or air ejected parts randomly travel through or within the sensing field. You can also disable light beams in an area where a fixture penetrates the light field, and you can permit stationary objects to protrude into the light curtain's sensing field.

Figure 4



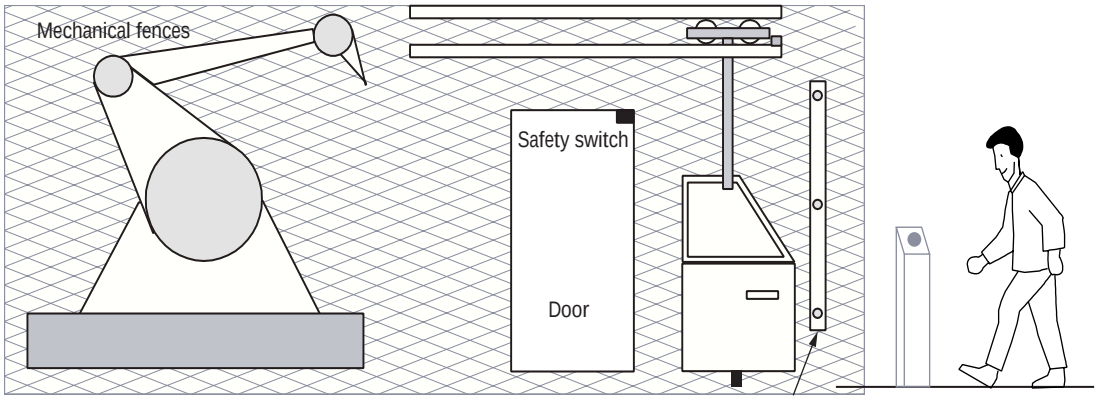
(*): 1 beam only for the 3-beam FF-SYB03 model, 1 or 2 beam for the 4-beam FF-SYB04 model.

❑ Serial connection

The FF-SYB safety light curtain allows the connection of another safety device with dual outputs through 2 inputs on the receiver unit. The auxiliary safety device can be an electromechanical safety switch or any other safety device with either relay outputs or solid state outputs (for safety reasons, reversed polarity on these two inputs is mandatory, therefore connection of a second FF-SYB light curtain is not possible through these two inputs). Connection is done through the main connector. An optional junction box is available to perform the electrical connections close to the light curtain.

Figure 5

Serial connection of an FF-SYB safety light curtain with a safety gate switch.

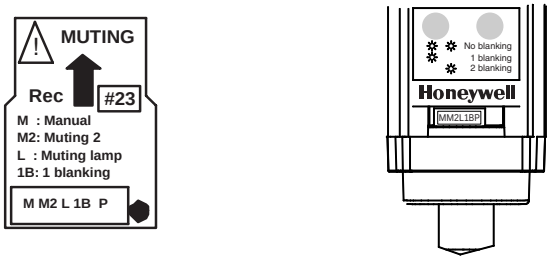


Note: This mode may be combined with the bi-directional muting mode. This combination of modes requires direct connection to the receiver internal terminal strip. A M20 cable gland is delivered with the package. Male M23 cordsets are available on option (see "Accessories" section).

❑ Configuration cards

The FF-SYB emitter and receiver are setup in the required configuration through the use of configuration cards, similar to the SIM cards used on mobile phones (see figure below). This simple and elegant method eliminates the use of jumpers or dip switches. No computer is required: settings are done on site, using one of the small configuration cards. If the user needs to use a different configuration from the factory settings, he just needs to select the configuration card which corresponds to the desired settings and install it behind the bottom cap of the emitter or receiver. The selected settings are written on the configuration card and are visible through the transparent front window.

Figure 6

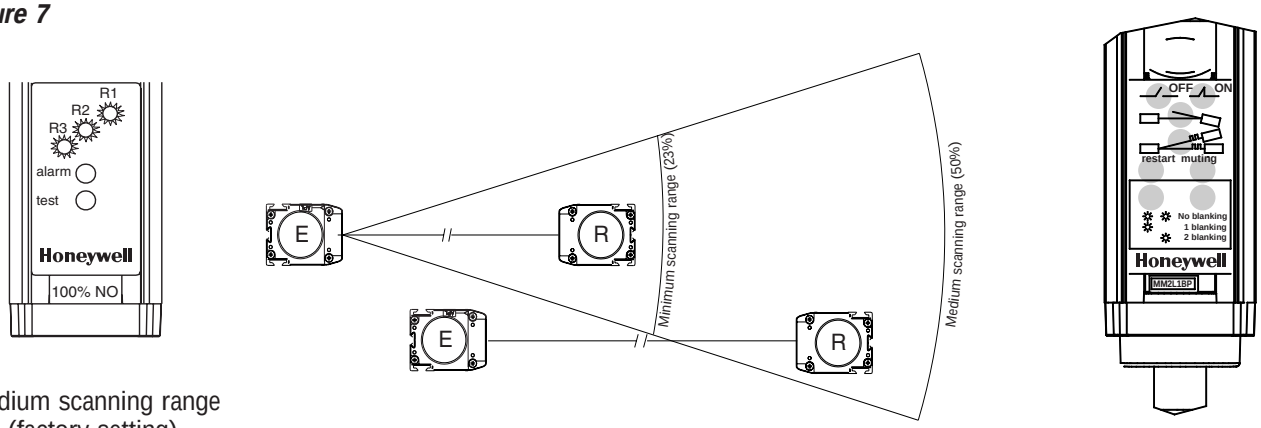


If the FF-SYB needs to be exchanged, the configuration card can be installed in another FF-SYB allowing transfer of settings in a few minutes.

❑ Cross-talk reduction system

The FF-SYB light curtain is based upon an infrared transmission between an emitter unit and a receiver unit. It is a requirement of the IEC/EN 61496-2 standard that if a receiver R2 receives two signals transmitted by two different emitters E1 and E2, the receiver R2 must turn to the alarm state. This happens if the receiver R2 is within the beam aperture angle and within the nominal scanning range of the second emitter E1. The cross-talk detection indicator flickers on the receiver R2 to warn the installer.

Figure 7

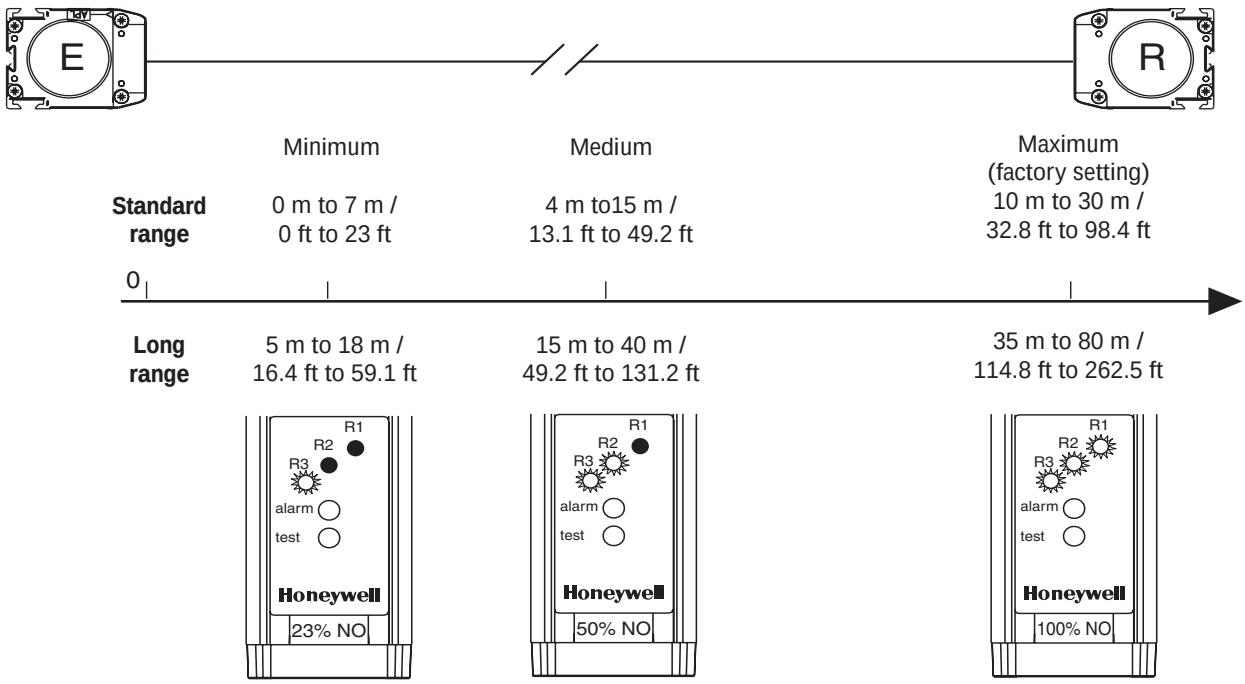


Medium scanning range (factory setting)

A configuration card is used on the emitter unit for the selection of the adequate emission power. This configuration card can be used to eliminate this cross-talk phenomenon by decreasing the scanning range. The end cap can be easily removed to select a different scanning range. Products are delivered with a medium scanning range (middle position) to minimize cross-talk upon installation.

❑ Selectable scanning ranges

Figure 8



❑ Test input type

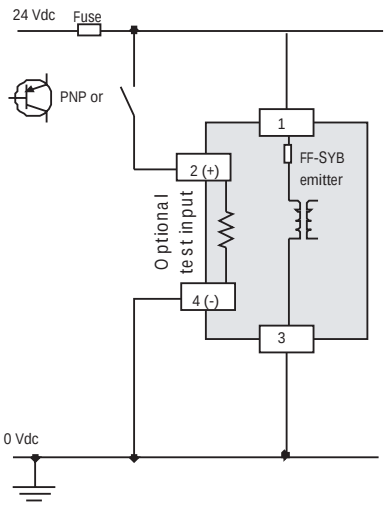
Figure 9

Voltage free contact

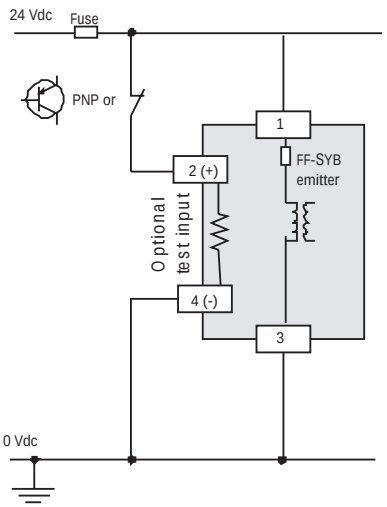
(PNP static (solid state) output and NPN static (solid state) output also connectable)

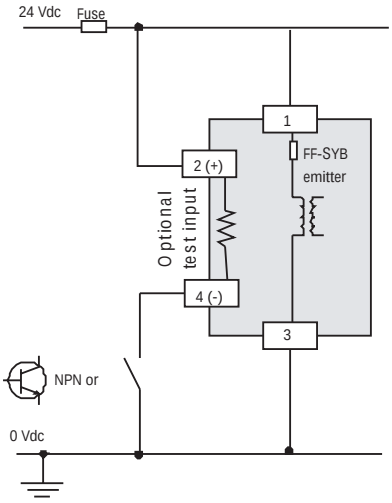
Normally open

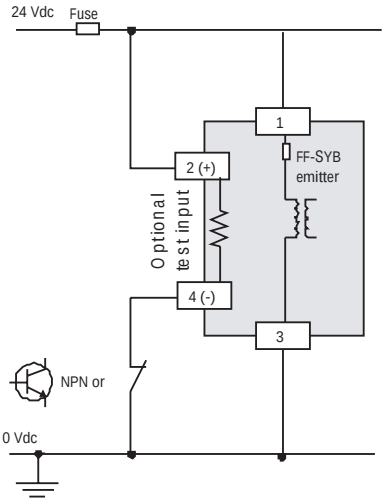
(factory setting)



Normally closed







Type 4 safety light curtain

- **Type 4 according to the IEC/EN 61496 - parts 1 and 2 standards**
- **Built-in muting, floating blanking, inputs for serial connection of an auxiliary device, manual restart and EDM**
- **Control of the infrared emission source for cross-talk reduction**
- **Enhanced diagnostic information**

Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

Features	Type	*FF-SYB02500*	*FF-SYB03400*	*FF-SYB04300*
	Number of beams	2	3	4
	Beam spacing	500 mm / 19.7 in	400 mm / 15.76 in	300 mm / 11.82 in
	Nominal scanning range	*Standard range*: 0 to 30 m/0 to 98.4 ft • *Long range*: 5 to 80 m/16.4 to 262.5 ft		
	Angle of divergence	±2°, ±25 %		
	Emitting light source (immunity)	Infrared, pulsed, 880 nm (*Sunlight:* 20 000 Lux • *Lamplight:* 15 000 Lux)		
	Supply voltage and power consumption	24 Vdc (±20 %); 5 W max. for the emitter, 5 W max. for the receiver		
Safety outputs (OSSDs)	**Output type**	2 safety static (solid state) outputs (PNP with NO characteristics) with permanent short-circuit and cross-fault detections		
	Switching capability	350 mA max. at 24 Vdc		
	Response time	22 ms (beam interruption), 28 ms (Auxilary Safety Device engaged)		
	Maximum cable length	100 m / 328 ft (100 nF capacitance)		
	Restart time after power up (after beam actuation)	> 1 s (80 ms without EDM, 150 ms with EDM)		
	Loads impedance	70 Ω min. / 5 kΩ max.		
	Voltage drop	< 2 Vdc		
	Loads turn-on voltage	5 V min. on resistive loads / 7 V min. on inductive loads		
	Protections	Short-circuits and cross-faults, overloads, reversed polarity, micro-cut-off (10 ms, 100% voltage drop, 10 Hz)		
NC signalling or muting lamp/diagnosis output				
	Output type	1 PNP non safety output, NC (signalling contact) or NO (muting/diagnostic indication)		
	Switching capability	100 mA max. at 24 Vdc		
	Protections	Overloads, reversed polarity, micro-cut-off (10 ms, 100% voltage drop, 10 Hz)		
Test input (emitter) (1)	**Input type**	Floating input with selectable NO/NC test logic		
	External contact type	Relay contact, or static (solid state) PNP or static (solid state) NPN (must be activated for at least 20 ms)		
	Test loop current (resistance)	13 mA typical (750 Ω max.)		
	Protections	3000 Vdc galvanic insulation, reversed polarity, micro-cut-off (14 ms)		
Restart / EDM input (1)	**External contact type**	Relay contact (must be activated for at least 150 ms, and less than 3 s)		
	Max. voltage	29 Vdc		
Muting or serial connection inputs (1)				
	External contact type	Relay contact, or static (solid state) PNP or static (solid state) NPN (automatic recognition)		
	Maximum cable length	100 m / 328 ft (no limitation in capacitance)		
Environmental/physical characteristics				
	Temperature range	*Operating:* 0 °C to 55 °C/32 °F to 131 °F (95% relative humidity) • *Storage:* -20 °C to 75 °C/-4 °F to 167 °F		
	Sealing	NEMA 4, 13 and IP 65		
	Vibrations	IEC/EN 61496-1: 10 to 55 Hz frequency range, 1 octave/min. sweep rate, 0,35 mm ±0,05 amplitude, 20 sweeps per axis, for 3 axes		
	Shocks	IEC/EN 61496-1: 15 G - 11 ms - 3 per axis, for 3 axes		
	Bumps	IEC/EN 61496-1: 10 G - 16 ms - 1000 per axis, for 3 axes		
	Product dimension and weight	Width: 42 mm (1.65 in); depth: 55 mm (2.16 in); height (2)		
	Connection	*Emitter:* M12/5 pole male receptacle • *Receiver:* M12/8 pole male receptacle or terminal strip with M20 cable gland (see Figure 10 to determine possible modes of operation for each receiver termination type)		
	Material	*Housing:* aluminium alloy and (conductive) polycarbonate (end caps) • *Front plate:* polymethylmethacrylate (PMMA)		

Ordering information

Each listing consists of an emitter, a receiver, 2 pairs of right-angle brackets, an end cover equipped with a cable gland and a set of configurations card.

FF-SYB❑❑❑❑❑M2 - ❑

- 3: standard range (30 m max.)
- 8: long range (80 m max.)

Model	Number of beams	Beam spacing mm/in
02500	2	500 / 19.70
03400	3	400 / 15.76
04300	4	300 / 11.82

Notes:

(1) Voltage switching (high/low): ≥ 11 Vdc min. (I > 6 mA) / ≤ 5 Vdc (I > 2 mA);
Input current (high/low): 20 mA / 10 mA at 24 Vdc.
In compliance with the IEC 61131-2 requirements for type 2 sensors.

(2) Refer to emitter and receiver dimensions / weights.

NOTICE

NON COMPLIANCE TO ANSI/RIA 15.06-1999 WITH FF-SYB02500

- Only the three beam (FF-SYB03400 Series) and the four beam versions (FF-SYB04300 Series) are in compliance with the beam heights, specified in the US Standard ANSI/RIA R15.06-1999 (Industrial Robots and Robot Systems - Safety Requirements). The two beam version (FF-SYB02500 Series) does NOT comply with ANSI/RIA R15.06 and may require additional protection.
- Refer to applicable standards. In the absence of an applicable standard, ANSI B11.19 and ANSI R15.06 may be used as reference for the USA, as well as EN 999 (or the relevant European Type C machine standard) for Europe.
- Verify compliance with ANSI/RIA R15.06 and possibly implement additional protection when floating blanking is used on the 4-beam FF-SYB234 system.

Figure 10 *- Possible modes of operation and corresponding receiver termination type and connexion box*

Card (1)	Restart mode	Blanking (2)	Auxiliary Safety Device	Muting (3)	Auxiliary output (4)	Receiver termination (5)
#01	Manual				NC signal	M12 plug
#02	Manual	1-beam			NC signal	M12 plug
#03	Manual	2-beam			NC signal	M12 plug
#04	Automatic				NC signal	M12 plug
#05	Automatic	1-beam			NC signal	M12 plug
#06	Automatic	2-beam			NC signal	M12 plug
#07	Automatic		yes		NC signal	M12 plug
#08	Automatic	1-beam	yes		NC signal	M12 plug
#09	Automatic	2-beam	yes		NC signal	M12 plug
#10	Manual		yes		NC signal	M12 plug
#11	Automatic			2 inputs(6)	NC signal	M12 plug
#12	Automatic			2 inputs(6)	Muting lamp	M12 plug
#13	Automatic			4 inputs(6)	NC signal	Terminal strip
#14	Automatic			4 inputs(6)	Muting lamp	Terminal strip
#15	Automatic		yes	2 inputs	NC signal	Terminal strip
#16	Automatic		yes	2 inputs	Muting lamp	Terminal strip
#17	Manual			2 inputs(6)	NC signal	M12 plug
#18	Manual			2 inputs(6)	Muting lamp	M12 plug
#19	Manual			4 inputs(6)	NC signal	Terminal strip
#20	Manual			4 inputs(6)	Muting lamp	Terminal strip
#21	Manual		yes	2 inputs	NC signal	Terminal strip
#22	Manual		yes	2 inputs	Muting lamp	Terminal strip
#23	Manual	1-beam		2 inputs(6)	Muting lamp	M12 plug
#24	Manual	2-beam		2 inputs(6)	Muting lamp	M12 plug
#25	Manual	1-beam		4 inputs(6)	Muting lamp	Terminal strip
#26	Manual	2-beam		4 inputs(6)	Muting lamp	Terminal strip
#27	Manual	1-beam	yes	2 inputs	Muting lamp	Terminal strip
#28	Manual	2-beam	yes	2 inputs	Muting lamp	Terminal strip

(1) Factory setting: card #04

(2)

	Floating blanking
FF-SYB02	Not available
FF-SYB03	1-beam only
FF-SYB04	1 or 2 beam

(3) Muting: either 2 inputs available for the connection of 2 or 4 muting sensors to perform a bi-directional muting function (see page 2 and 3), or 4 inputs available for the connection of 4 sensors to perform a uni-directional muting function (see page 3).

(4) Auxiliary output: either a normally closed signalling output of a muting and diagnosis lamp output (see page 2).

(5) Receiver termination: some modes require direct connections to the internal receiver terminal strip. The M20 cable gland (delivered with the package) allows the use of a male M23 cordset.

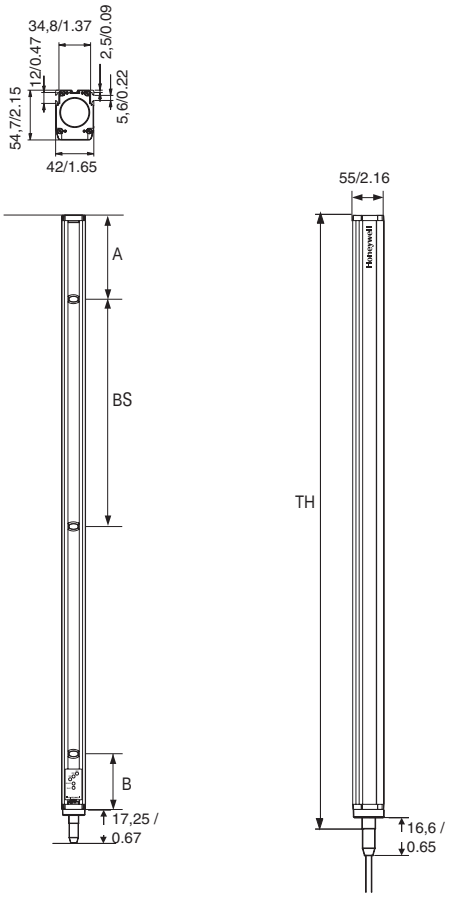
(6) Connection boxes are available for the interconnection of all sensors and actuators (see "Accessories" section).

Table 2

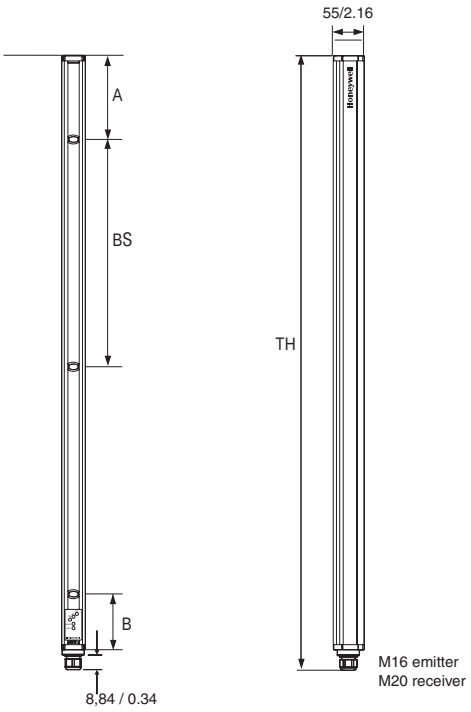
Reference	Number of beams	Beam spacing BS	Total height TH (cable gland version)	A	B	Weight per device
		mm / in	mm / in	mm / in	mm / in	kg / lbs
FF-SYB02500	2	500 / 19.70	744 / 29.3 (758 / 29.8)	149 / 5.87	87 / 3.42	1,42 / 3.12
FF-SYB03400	3	400 / 15.76	1064 / 41.9 (1078 / 42.4)	169 / 6.65	87 / 3.42	1,98 / 4.35
FF-SYB04300	4	300 / 11.82	1064 / 41.9 (1078 / 42.4)	69 / 2.72	87 / 3.42	1,98 / 4.35

Figure 11 *- Dimensions in mm / in*

3 beam version with M12 connector (emitter or receiver)



3 beam version with terminal strip (receiver only)



❑ LED status indicators

Figure 12 - *Emitter*

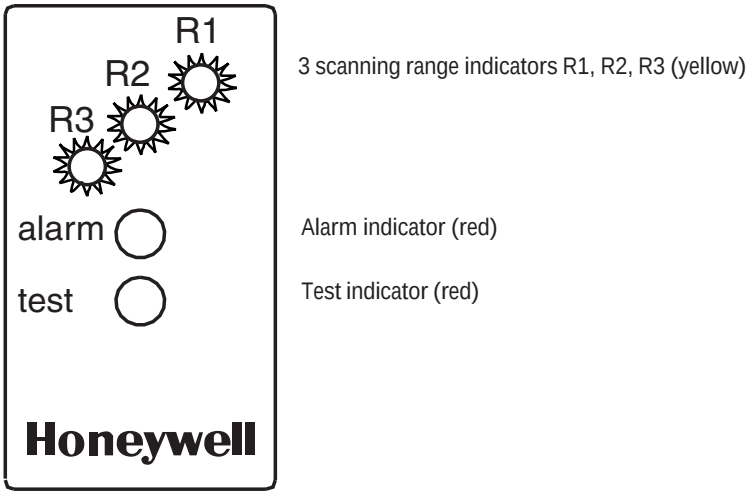
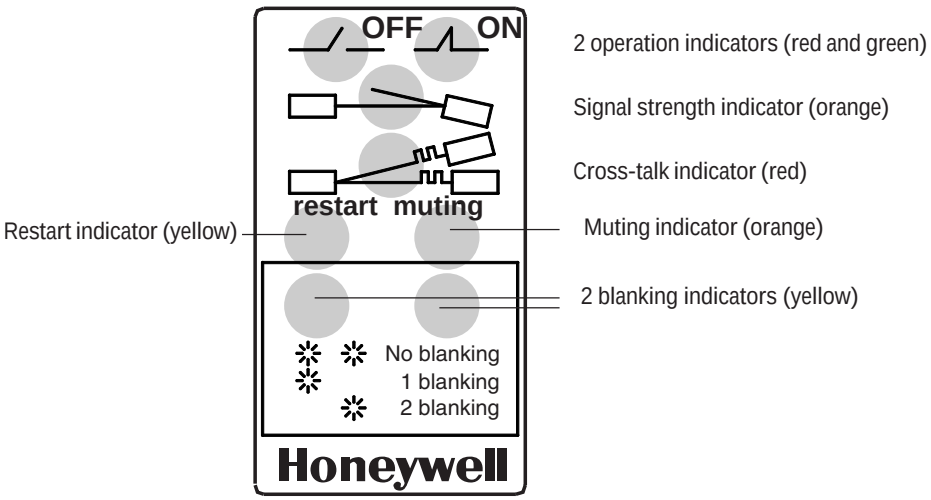


Figure 13 - *Receiver*



❑ Wiring

Figure 14 - *Recommended wiring diagram for a 2-sensor muting application with automatic restart and Temporary Manual Muting (TMM) (see Figure 1)*

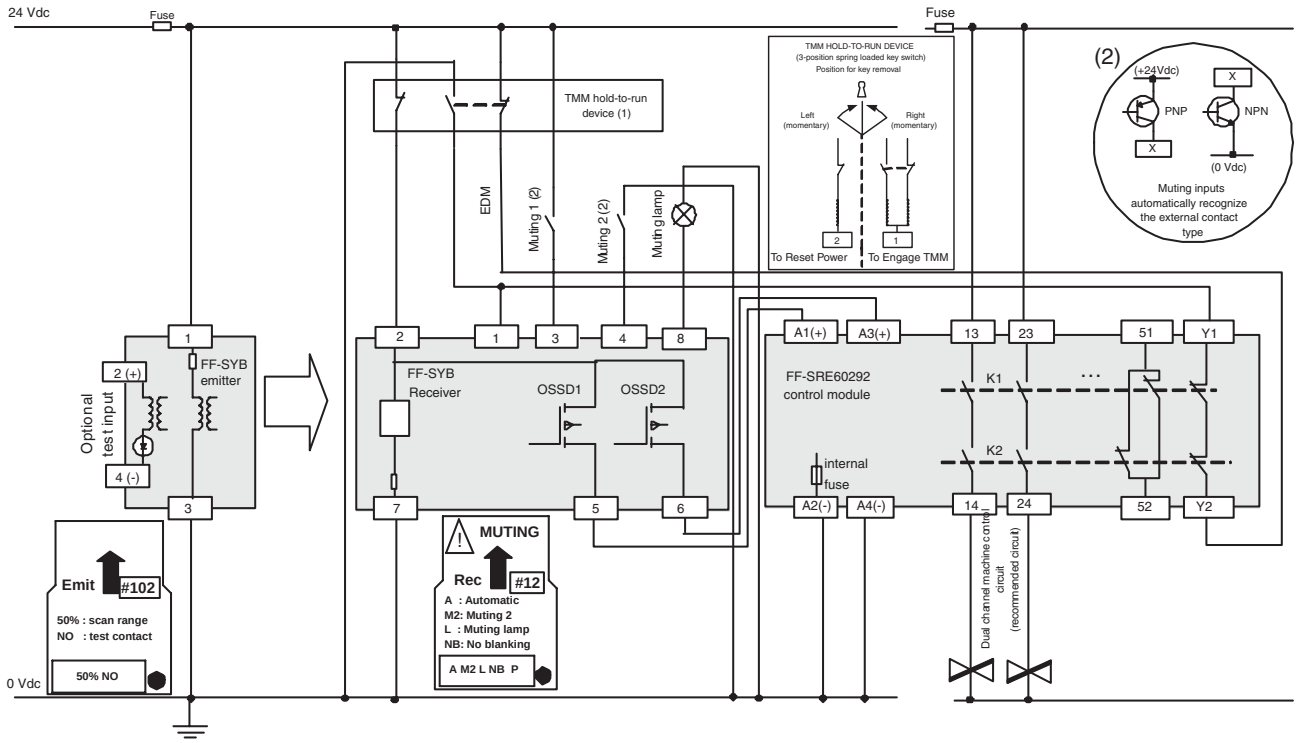
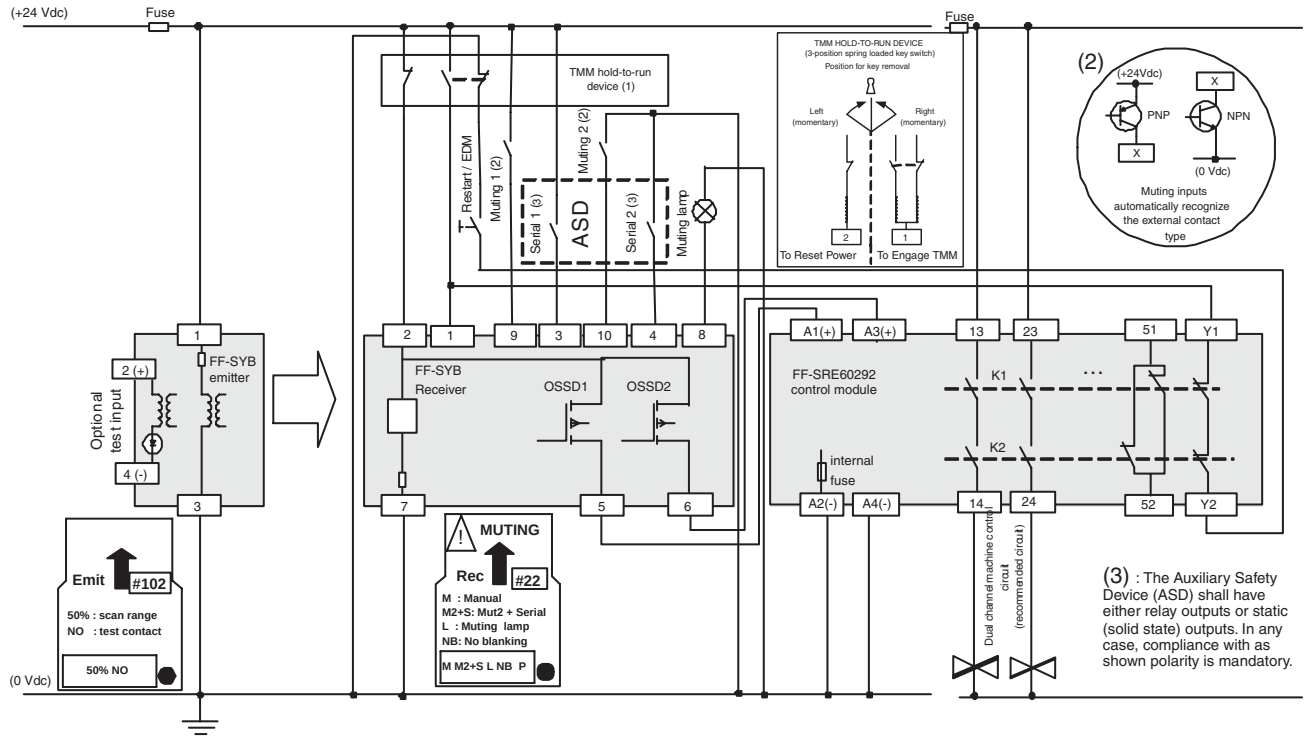


Figure 15 - *Recommended wiring diagram for a 2-sensor muting application with an auxiliary safety device, manual restart and Temporary Manual Muting (TMM)*



⚠ WARNING

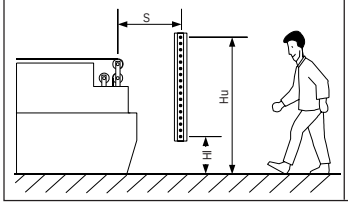
INCREASED SAFETY DISTANCE DUE TO FLOATING BLANKING

Modify the safety distance between the light curtain and the hazardous area according to the instructions in this chapter.

Failure to comply with these instructions could result in death or serious injury.

❑ European EN 999 standard

All distances/heights in mm (100 mm = 3.9 in)

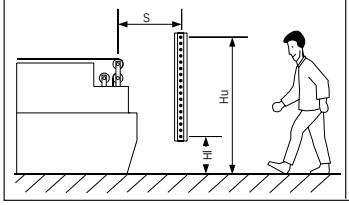
FF-SYB234 Multibeam System	FF-SYB02500	FF-SYB03400	FF-SYB04300
Number of beams	2	3	4
Beam spacing	500	400	300
Recommended beam heights above the reference plane per EN 999	Hi = 400 (lowest beam) Hu = 900 (uppermost beam)	Hi = 300 (lowest beam) 700 (intermediate beam) Hu = 1100 (uppermost beam)	Hi = 300 (lowest beam) 600 (intermediate beam) 900 (intermediate beam) Hu = 1200 (uppermost beam)
Normal approach 	**S ≥ 1600 (t1 + t2) + 850**		

t1: light curtain response time (s)
t2: machine stopping time (s)

For more information, refer to the EN 999 European standard or comply with the requirements on safety distances given by the type C European standard if existing for the considered machine.

❑ USA's OSHA/ANSI/RIA standards

All distances/heights in inches (1 in = 25,4 mm)

FF-SYB234 Multibeam System	FF-SYB03400	FF-SYB04300
Number of beams	3	4
Beam spacing	15.76	11.82
Beam heights above the reference plane	11.82 27.58 43.34	11.82 23.64 35.46 47.28
Normal approach 	**Ds ≥ 63 (Ts + Tc + Tr) + Dpf** **If Hi < 12 and 36 ≤ Hu ≤ 48 then Dpf = 48 (Reach Over)** **If Hi ≤ 12 and Hu > 48 then Dpf = 36 (Reach Thru)** If Hi > 12, supplemental safeguarding may be required to detect crawling underneath.	

Ts: worst case stopping time of the machine (s)
Tc: worst case response time of the machine
Tr: response time of the safety devices (s)
Dpf: Depth penetration factor (in.)

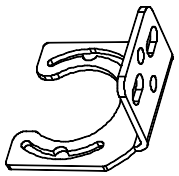
NOTICE

NON COMPLIANCE TO ANSI/RIA 15.06-1999 WITH FF-SYB02500

- Only the three beam (FF-SYB03400 Series) and the four beam versions (FF-SYB04300 Series) are in compliance with the beam heights, specified in the US Standard ANSI/RIA R15.06-1999 (Industrial Robots and Robot Systems - Safety Requirements). The two beam version (FF-SYB02500 Series) does NOT comply with ANSI/RIA R15.06 and may require additional protection.
- Refer to applicable standards. In the absence of an applicable standard, ANSI B11.19 and ANSI R15.06 may be used as reference for the USA, as well as EN 999 (or the relevant European Type C machine standard) for Europe.
- Verify compliance with ANSI/RIA R15.06 and possibly implement additional protection when floating blanking is used on the 3-beam or 4-beam FF-SYB234 system.

For more information, refer to the ANSI/RIA 15.06 American standard.

❑ Accessories

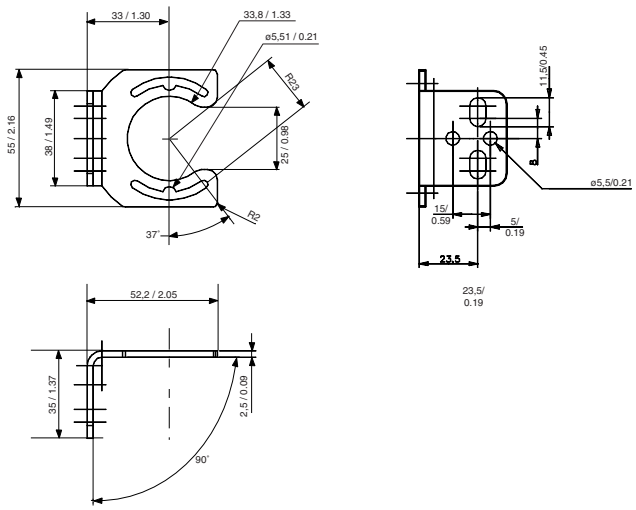


FF-SYZ634178

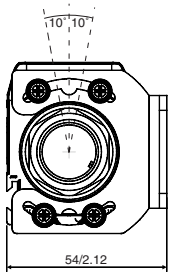
Kit of 2 right angle mounting brackets with screws, bolts, nuts and washers to mount one emitter or one receiver unit.
Possible mounting positions:

1. At the top and the bottom of the FF-SYB (allowing adjustments in azimuth directions of ±10°).
2. At one of the two lateral dovetail slots (allowing adjustments in vertical directions along the slot)
3. At the rear dovetail slot (allowing adjustments in vertical directions along the slot)

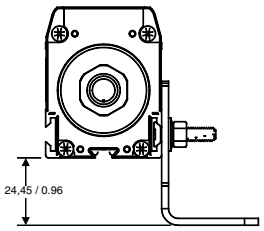
Order 2 kits for a complete set of emitter and receiver
(**already included in the FF-SYB package**).

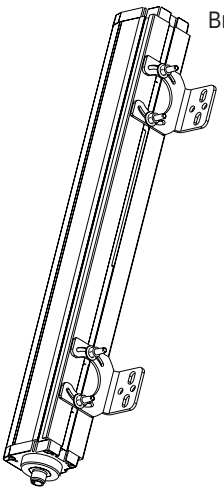


Bracket mounting at the top and the bottom

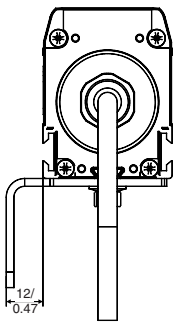


Bracket mounting at the lateral dovetail slots

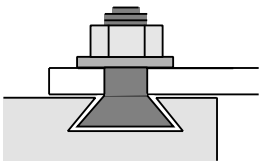


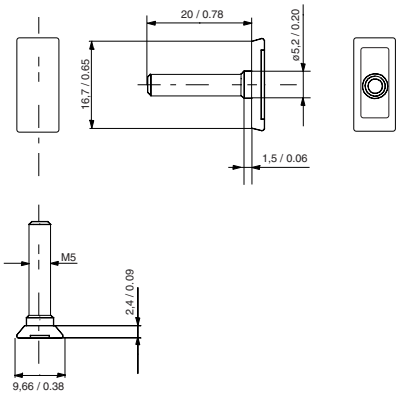


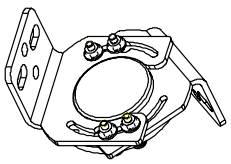
Bracket mounting at the rear dovetail slots



M5 dovetail shape bolt







FF-SYZ634179

Kit of 2 adjustable mounting brackets with rotating plate, screws, bolts, nuts, and washers to mount one emitter or one receiver unit.

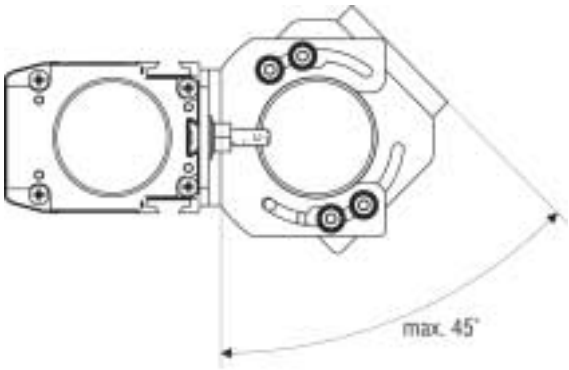
Possible mounting position is:

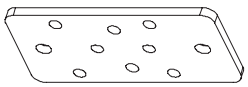
- at the rear dovetail slot
  (allowing adjustments in vertical directions along the slot an in azimuth directions of max. ± 45°)

Order 2 kits for a complete set of emitter and receiver.

Refer to the section FF-SYZ634178 for the detailed dimensions of the brackets.

(to be ordered separately as an option, to be mounted together with the FF-SYZ634178 brackets delivered with the FF-SYB package)





(x 2)

FF-SYZAD

Anti-vibration kit

Kit of 2 straight brackets and 4 anti-vibration dampers (mounting hardware included) - to substitute for the FF-SYZ634178 brackets delivered with the FF-SYB package.

(x 4)

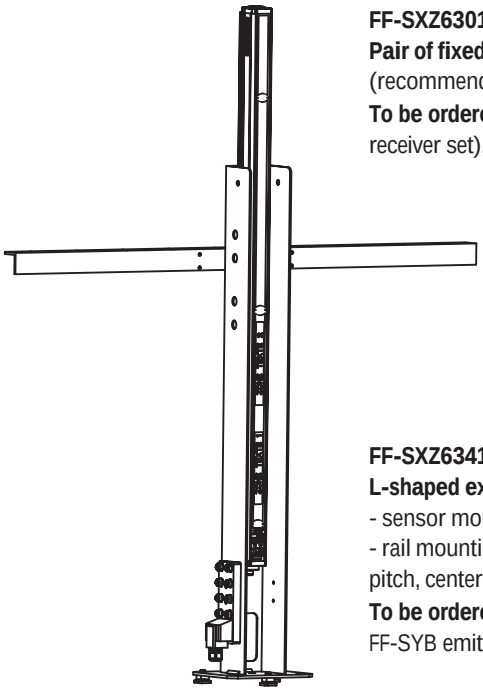
NOTICE

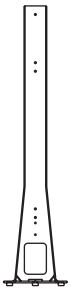
PROTECTION AGAINST HIGH VIBRATION

In case of high vibration, order:

- 2 sets of FF-SYZAD kit for light curtain systems with protection height below 1000 mm/ 39.4 in.
- 3 sets of FF-SYZAD kit for light curtain systems with protection height greater or equal to 1000 mm/39.4 in, but less than 1850 mm/72.8in.
- 4 sets of FF-SYZAD kit for light curtain systems with protection height greater than 1850 mm/72.8 in.

Mechanical fixture for muting application

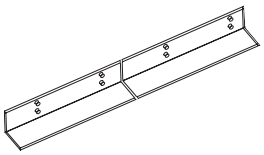




FF-SXZ630170
Pair of fixed posts for FF-SYB light curtain
(recommended when mechanical protection of the light curtain is NOT required)
To be ordered separately as an option (order 1 piece for a complete FF-SYB emitter/receiver set).

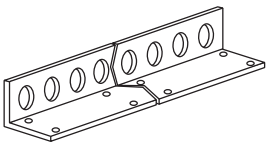
FF-SXZ634186
L-shaped extrusion 40 mm x 40 mm / 1.57 in x 1.57 in, 1 m / 3.28 ft long
- sensor mounting: ø5.5 mm / ø1/46 in fixing holes, 100 mm / 3.94 in pitch
- rail mounting: 3 pairs of ø5.5 mm / ø1/46 in fixing holes, 100 mm / 3.94 in pitch, centered

To be ordered separately as an option (order 2 pieces for a complete FF-SYB emitter/receiver set).



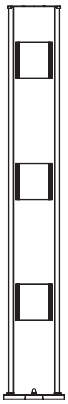
FF-MPZS6018
Muting sensor mounting rails
- sensor mounting: ø18 mm / ø0.71 in mounting holes, 30 mm / 1.18 in distance between centers
- rail mounting: ø5 mm / ø1/5 in fixing holes, 100 mm / 3.94 in pitch

To be ordered separately as an option (order 2 pieces for a complete FF-SYB emitter/receiver set).



FF-SYZPF
Fixed post for FF-SYB light curtain
(recommended when mechanical protection of the light curtain is required)
Floorstanding post for the installation of the following FF-SYB light curtains:
Light curtain models: FF-SYB032❑❑, FF-SYB048❑❑, FF-SYB080❑❑, FF-SYB096❑❑
Multibeam models: FF-SYB02500, FF-SYB03400, FF-SYB04300
To be ordered separately as an option (order 2 pieces for a complete FF-SYB emitter/receiver set).

Front covers are available for additional protection of the FF-SYB234 beam access detection systems:
FF-SYZ630184-2: Front cover for 2 beams
FF-SYZ630184-3: Front cover for 3 beams
FF-SYZ630184-4: Front cover for 4 beams
To be ordered separately as an option.



Part Listings (*)	Description
FF-SYZPF02 **FF-SYZPF12**	Floorstanding post with 2 individual mirrors for use with the FF-SYB02500 multibeam system (*)
FF-SYZPF03 **FF-SYZPF13**	Floorstanding post with 3 individual mirrors for use with the FF-SYB03400 multibeam system (*)
FF-SYZPF04 **FF-SYZPF14**	Floorstanding post with 4 individual mirrors for use with the FF-SYB04300 multibeam system (*)

(*) FF-SYZPF0❑: 10 % loss per mirror
FF-SYZPF1❑: 25 % loss per mirror
(to be ordered separately as an option)

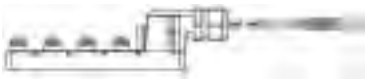
Front covers are available for additional protection of the FF-SYB234 beam access detection systems:
FF-SYZ630184-2: Front cover for 2 beams
FF-SYZ630184-3: Front cover for 3 beams
FF-SYZ630184-4: Front cover for 4 beams
To be ordered separately as an option.

FF-SXZSHL
IP67 enclosure for FF-SYB light curtains

Enclosures	Light curtains
FF-SXZSHL096☐	FF-SYB234
FF-SXZSHLKIT	Brackets and cable gland kit (order 1 kit per enclosure)

☐: "P" for polycarbonate, "G" for glass

M12 connection boxes



For the connection of muting sensors, restart and TMM switches and muting lamp to the light curtain

FF-SXZBOX8M12T
IP67 junction box, field-attachable home run cable, M12 8-port configuration.

FF-SXZBOX8M12L02
IP67 junction box, field-attachable home run cable, M12 8-port configuration, prewired with a 2 m/6.56 ft M12 8-pin cordset.

Cordsets

M12/5 pole

1: brown
2: white
3: blue
4: black
5: green/yellow

M12 single-ended cordset, female / 5-pin straight for the FF-SYB emitter

FF-SXZCAM125U02 2 m / 6.56 ft length
FF-SXZCAM125U05 5 m / 16.40 ft length
FF-SXZCAM125U10 10 m / 32.8 ft length

Equivalent to the 805000A09M... Micro-change® Series from Brad Harrison (see vendor catalog for color code)

M12/8 pole

1: white
2: brown
3: green
4: yellow
5: grey
6: pink
7: blue
8: red

M12 single-ended cordset, female / 8-pin straight for the FF-SYB receiver

FF-SXZCAM128U02 2 m / 6.56 ft length
FF-SXZCAM128U05 5 m / 16.40 ft length
FF-SXZCAM128U10 10 m / 32.8 ft length

Equivalent to the 808000P02M... Micro-change® Series from Brad Harrison (see vendor catalog for color code)

Cable connector

FF-SXZCOM125 - M12 screw connector, female / 5 pin straight for the FF-SYB emitter
FF-SXZCOM128 - M12 screw connector, female / 8 pin straight for the FF-SYB receiver

Safety control modules

FF-SRE60292
Slim line expansion module
- 24 Vdc
- Safety interface up to Category 4 per EN 954-1
- 4 NO/2 NC safety relay outputs
- 22,5 mm / 0.88 in width

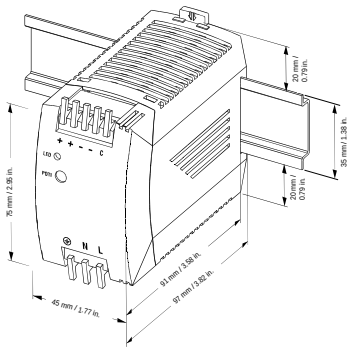
(to be ordered separately as an option).

FF-SRE30812
Expansion module
- 24 Vdc, 115 Vac or 230 Vac
- Safety interface up to Category 4 per EN 954-1
- 7 NO/1 NC internally redundant safety relay outputs
- 90 mm / 3.54 in width

(to be ordered separately as an option).

FF-SRM200P2
Mutual exclusion module
(to be ordered separately as an option)
- typical applications: loading/unloading chamber on machining centers or conveyors, crossing of conveyor lines, moving conveyors or AGVs
- connection of 2 safety devices
- 24 Vdc
- Category 4 per EN 954-1
- manual start mode, FSD monitoring
- crossfault monitoring of inputs
- 3 NO safety relay outputs
- static outputs for output status and diagnostic information
- 45 mm / 1.77 in

ac to dc power supply



FF-SXZPWR050

ac to dc power supply

(to be ordered separately as an option)

- Approvals: UL508 listed, UL1950, cUL/CSA-C22.2 No.950-M90, EN/IEC 60950, EN 50178 (Class 2 Rated for low power installations)
- Input voltage: 85-264 Vac (43-67 Hz)
- Output voltage: 24-28 Vdc adjustable
- Rated continuous load (at 60 °C/140 °F max.): 2,1 A @ 24 Vdc / 1,8A @ 28 Vdc
- Power: 50 W
- Dimensions 75 mm x 45 mm x 97 mm / 2.95 in x 1.77 in x 3.82 in
- DIN rail mounting
- Weight: 240 g / 0.52 lbs

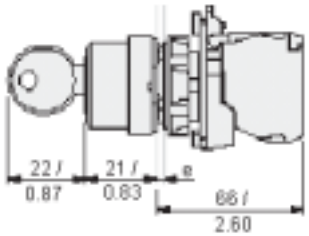
Muting lamp

(not contractual)

FF-SXZMLED

Beacon supplied with fixing plate for vertical surface and a LEDs bulb (Telemecanique XVB Series type). To be used as the muting/diagnostic lamp.

3 position spring loaded key switch



(not contractual)

FF-SXZTMM

ø 22 mm 3-position spring loaded key switch with a Normally Closed contact on the left position and two complementary (Normally Closed and Normally Open) contacts on the right position (Telemecanique ZB5 Series type, fixing collar with screw clamp contact blocks, key # 455).

To be used as the TMM hold-to-run device.

Configuration cards

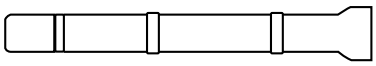
FF-SYZ101085R
Set of 28 configuration cards for FF-SYB receiver

FF-SYZ101092E
Set of 6 configuration cards for FF-SYB emitter

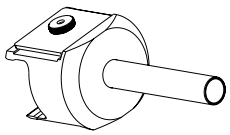
Installation manuals

FF-PK107120-EN	One FF-SYB English installation manual
FF-PK107120-DE	One FF-SYB German installation manual
FF-PK107120-FR	One FF-SYB French installation manual
FF-PK107120-IT	One FF-SYB Italian installation manual
FF-PK107120-SP	One FF-SYB Spanish installation manual

NOTICE
By default, products will be shipped with the installation manual in the language of the country of delivery when available or in English. If any other language is required, it must be ordered separately.



FF-SPZLASER
The laser pen FF-SPZLASER is a self-contained and compact laser device designed to ease infrared beam alignments. Its class II conforms to the EN 60825 European standard and the US 21 CFR 1040 American standard.
To be ordered separately as an option.



FF-SYZ604795
Mechanical adapter for the FF-SPZLASER laser pen to be used with the FF-SYB Series light curtain.
To be ordered separately as an option.

Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. **The foregoing is Buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance,current specifications, pricing or name of the nearest Authorised Distributor, contact a nearby sales office or:

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107125-20-EN FR26 GLO 405 Printed in France

www.honeywell.com/sensing

Safety 2-beam system for access detection

FF-SYB234 Series

with passive deflecting mirrors

FEATURES

- Manual or automatic restart
- External Device Monitoring (EDM)
- 2 or 4 inputs for muting signals
- Manual muting override
- Input for serial connection of an auxiliary safety device
- Unique patented configuration cards for quick set up and easy replacement
- Self-contained with optical synchronisation
- 2 static (solid state) safety outputs with short-circuit and cross-fault detection
- Muting lamp/diagnosis output or static (solid state) non safety output for signalling
- Model with integrated muting lamp
- Enhanced diagnostic information includes the following indication: cross-talk, muting, restart and failure diagnostic
- Scanning range up to 7 m / 22.9 ft
- M12 connector
- Mounting brackets included allowing multiple mounting positions
- Safety relay modules for more switching capability (to be ordered separately).

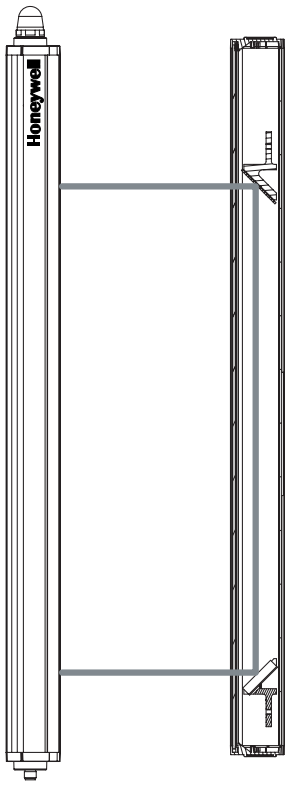
TYPICAL APPLICATIONS

- Access detection to robot areas
- Stacking machines, transporting and conveyor technology
- Handling equipment and assembly lines
- Palletizing industry

C US (pending)

INRS

Approved as Type 4 per IEC/EN 61496-1/2



New

New

The Honeywell FF-SYB light curtain is in compliance with IEC/EN 61496 - parts 1 and 2 standard and meets the requirements for a Type 4 Active Optoelectronic Protective Device, the highest level for safety products.

The product received an EC type test certificate from the French INRS notified body, required for safety equipment as per the 98/37/EC Machinery Directive. It meets the applicable parts of North American standards and regulations (OSHA 1910.212, OSHA 1910.217, ANSI standards including ANSI RIA 15.06 for Control Reliability and CSA Z434). Its CSA mark makes it a product usable in most parts of the world.

As soon as an object is detected inside the protection field, the FF-SYB de-energizes its two static (solid state) safety outputs to signal the dangerous motion to stop. The FF-SYB is a self-contained light curtain that does not require a separate control unit for operation.

Functions such as muting, external device monitoring, manual restart and serial connection make it a comprehensive product and eliminate the need for additional control modules.

These built-in features, combined with the small size of the housing, help users reducing overall cost by saving space and installation time.

A unique patented configuration card system allows the user to set up the correct operating mode when swapping units, by simplifying and reducing the number of operations.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is to be referenced for each product.

Failure to comply with these instructions could result in death or serious injury.

❑ External Device Monitoring (EDM)

The FF-SYB is fitted with an EDM input which allows users to check the correct state of the final switching devices (relays or contactors with positively guided contacts). After each intrusion into the protection field, the FF-SYB will check that the EDM input loop is closed before switching the outputs back to ON. If the FF-SYB operates in automatic restart mode, it will restart immediately if the EDM loop is closed. If the FF-SYB operates in manual restart mode, it will restart when the restart push-button is pressed and if the EDM loop is closed. If the EDM loop remains open (meaning that the external device has a malfunction) the FF-SYB will keep its outputs open and will not restart.

❑ Manual restart

The FF-SYB can be used in automatic or manual restart mode. In automatic mode, the outputs will switch back to ON after an interruption of the protection field, as soon as the field becomes clear again. In manual restart mode, the FF-SYB will not switch back its outputs to ON until a manual restart push-button is pressed and released. The push-button must be a normally open type button. The manual restart will not switch the OSSDs back to ON in case of light curtain lock out (internal failure, optical interference, etc.) or when the protection field is still interrupted.

❑ Auxiliary output

An additional non safety output is available to either mimic the safety output status (solid state Normally Closed signalling output) or signal muting sequences and provide diagnostic information (mode selection depending).

❑ Muting function

The FF-SYB is fitted with a built-in muting function. Muting is the ability to temporarily inhibit the outputs of a light curtain under certain conditions. Sensors are connected to the light curtain through the main connector. An optional junction box is available to perform the electrical connections close to the location of the muting sensors.

Muting sensors are used to discriminate authorised materials from people. The muting sensors must be able to detect the passing material (pallets, vehicles, etc.) according to the material's length and speed.

Figure 1 shows an FF-SYB placed on a conveyor, with the corresponding muting sensors.

The muting activation sensors temporarily inhibit the FF-SYB light curtain as soon as they detect the object. The outputs of these sensors are connected to the muting inputs of the FF-SYB active unit. Muting sensors must be successively actuated for a correct muting sequence to start.

Whenever one of the two muting sensors is made free again, the muting sequence stops. In case of an incorrect muting sequence, a temporary manual muting (override) procedure may be performed to clear the FF-SYB light curtain detection field and revert back to normal operation.

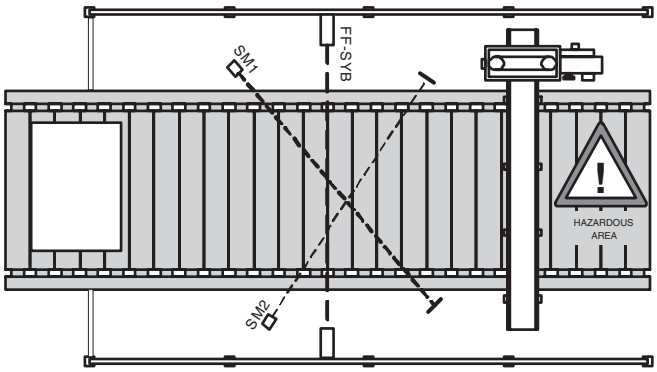
Suitable optoelectronic, mechanical, proximity sensors, etc. can be used as muting sensors.

Inputs for muting sensors accept sensors with relay or static (solid state) outputs, NPN or PNP. 2-wire sensors are also accepted.

A muting lamp output is available on the FF-SYB active unit to drive an external muting indicator that should be installed in a suitable location on the machine. A specific model integrates the muting lamp, reducing time spent on wiring.

The following are some configuration examples when using the muting function:

Figure 1 *- Bi-directional application with two optoelectronic sensors*



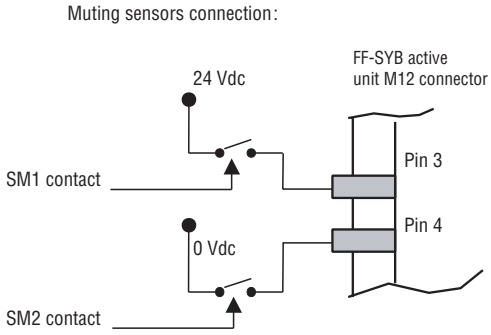
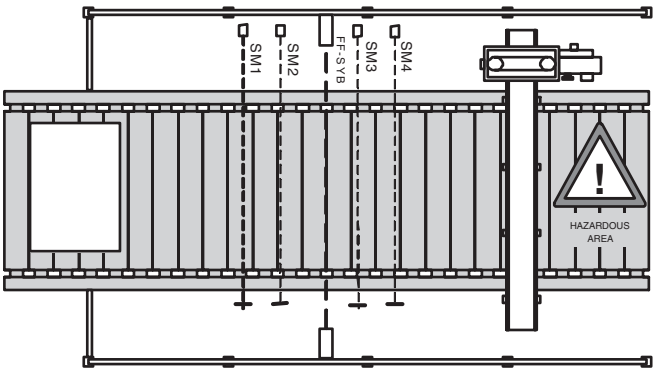


Figure 2 *- Bi-directional application with four photoelectric sensors*

2 sensors can be wired in parallel on each of the 2 muting inputs of the light curtain, creating a 4 sensor bi-directional muting.



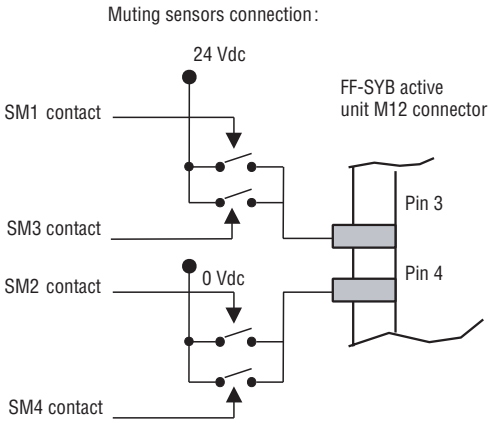
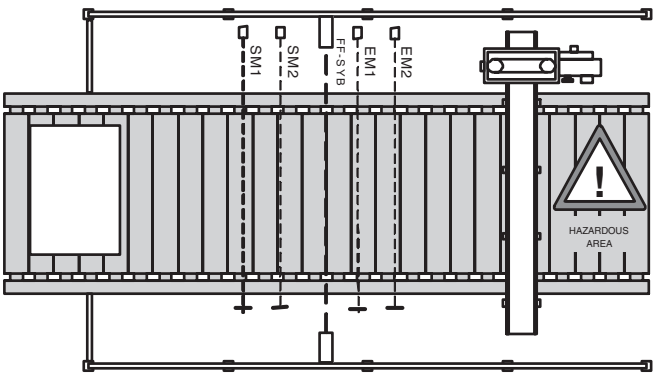
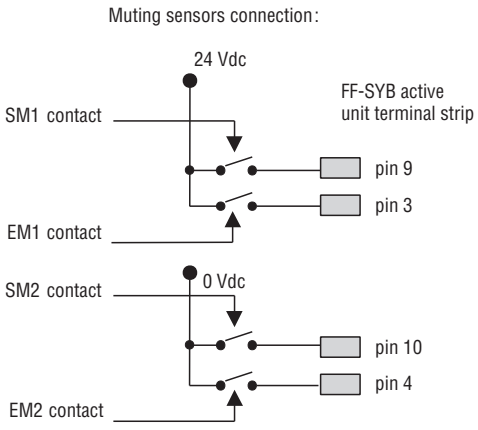


Figure 3 *- Uni-directional application with four optoelectronic sensors*





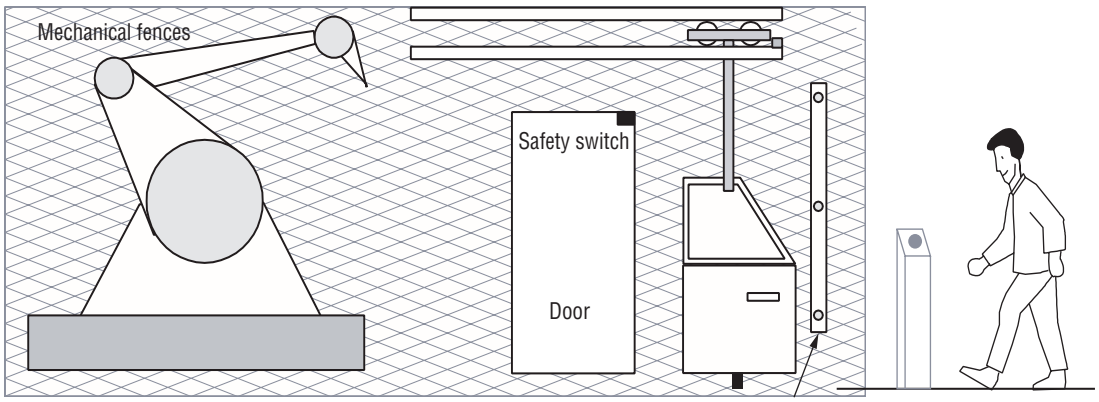
Note: this mode of operation requires direct connections to the active unit internal terminal strip. A M20 cable gland is available as an option.

❑ Serial connection

The FF-SYB safety light curtain allows the connection of another safety device with dual outputs through 2 inputs on the active unit. The auxiliary safety device can be an electromechanical safety switch or any other safety device with either relay outputs or solid state outputs (for safety reasons, reversed polarity on these two inputs is mandatory, therefore connection of a second FF-SYB light curtain is not possible through these two inputs). Connection is done through the main connector. An optional junction box is available to perform the electrical connections close to the light curtain.

Figure 4

Serial connection of an FF-SYB safety light curtain with a safety gate switch.

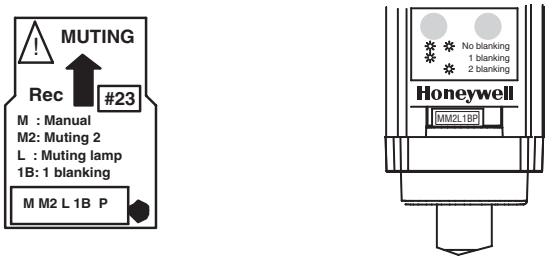


Note: This mode may be combined with the bi-directional muting mode. This combination of modes requires direct connection to the active unit internal terminal strip. A M20 cable gland is available as an option.

❑ Configuration cards

The FF-SYB active unit is setup in the required configuration through the use of a configuration card, similar to the SIM cards used on mobile phones (see figure below). This simple and elegant method eliminates the use of jumpers or dip switches. No computer is required: settings are done on site, using one of the small configuration cards. If the user needs to use a different configuration from the factory settings, he just needs to select the configuration card which corresponds to the desired settings and install it behind the bottom cap of the active unit. The selected settings are written on the configuration card and are visible through the transparent front window.

Figure 5



If the FF-SYB needs to be exchanged, the configuration card can be installed in another FF-SYB allowing transfer of settings in a few minutes.

Type 4 safety light curtain

- **Type 4 according to the IEC/EN 61496 - parts 1 and 2 standards**
- **Built-in muting, inputs for serial connection of an auxiliary device, manual restart and EDM**
- **Enhanced diagnostic information**

C US (pending) CE INRS

Approved as Type 4 per IEC/EN 61496-1/2

Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

Features	
Number of beams	2
Beam spacing	500 mm / 19.7 in
Nominal scanning range	0 to 7 m / 0 to 22.9 ft
Angle of divergence	max. ±2,5°
Emitting light source (immunity)	Infrared, pulsed, 880 nm (*Sunlight:* 20 000 Lux • *Lamplight:* 15 000 Lux)
Supply voltage and power consumption	24 Vdc (±20 %); 5,2 W max.
Safety outputs (OSSDs)	
Output type	2 safety static (solid state) outputs (PNP with NO characteristics)
	with permanent short-circuit and cross-fault detections
Switching capability	350 mA max. at 24 Vdc
Response time	22 ms (beam interruption), 28 ms (Auxilary Safety Device engaged)
Maximum cable length	100 m / 328 ft (100 nF capacitance)
Restart time after power up (after beam actuation)	> 1 s (80 ms without EDM, 150 ms with EDM)
Loads impedance	70 Ω min. / 5 kΩ max.
Voltage drop	< 2 Vdc
Loads turn-on voltage	5 V min. on resistive loads / 7 V min. on inductive loads
Protections	Short-circuits and cross-faults, overloads, reversed polarity, micro-cut-off
	(10 ms, 100% voltage drop, 10 Hz)
NC signalling or muting lamp/diagnosis output	
Output type	1 PNP non safety output, NC (signalling contact) or NO (muting/diagnostic indication)
Switching capability	100 mA max. at 24 Vdc (50 mA for models integrating the muting lamp)
Protections	Overloads, reversed polarity, micro-cut-off (10 ms, 100% voltage drop, 10 Hz)
Restart / EDM input (1)	
External contact type	Relay contact (must be activated for at least 150 ms, and less than 3 s)
Max. voltage	29 Vdc
Muting or serial connection inputs (1)	
External contact type	Relay contact, or static (solid state) PNP or static (solid state) NPN (automatic recognition)
Maximum cable length	100 m / 328 ft (no limitation in capacitance)
Environmental/physical characteristics	
Temperature range	*Operating:* 0 °C to 55 °C/32 °F to 131 °F (95% relative humidity) •
	Storage: -20 °C to 75 °C/-4 °F to 167 °F
Sealing	NEMA 4, 13 and IP 65
Vibrations	IEC/EN 61496-1: 10 to 55 Hz frequency range, 1 octave/min. sweep rate,
	0,35 mm ±0,05 amplitude, 20 sweeps per axis, for 3 axes
Shocks	IEC/EN 61496-1: 15 G - 11 ms - 3 per axis, for 3 axes
Bumps	IEC/EN 61496-1: 10 G - 16 ms - 1000 per axis, for 3 axes
Product dimension and weight	Width: 42 mm (1.65 in); depth: 55 mm (2.16 in); height : see Figure 7
Connection	*Active unit:* M12/8 pole male receptacle or terminal strip with M20 cable gland on option
	(see Figure 6 to determine possible modes of operation for each termination type)
Material	*Housing:* aluminium alloy and (conductive) polycarbonate (end caps) •
	Front plate: polymethylmethacrylate (PMMA)

Ordering information

Each listing consists of an active unit and a passive unit with mounting kit. Configuration cards and cordsets are available separately.

FF-SYB02500 M2-Z ❑
- blank: no muting lamp
- ML: with muting lamp

Notes:
(1) Voltage switching (high/low): ≥ 11 Vdc min. (I > 6 mA) / ≤ 5 Vdc (I > 2 mA);
Input current (high/low): 20 mA / 10 mA at 24 Vdc.
In compliance with the IEC 61131-2 requirements for type 2 sensors.

NOTICE

NON COMPLIANCE TO ANSI/RIA 15.06-1999 WITH FF-SYB02500

- This two beam version does NOT comply with ANSI/RIA R15.06 and may require additional protection.
- Refer to applicable standards. In the absence of an applicable standard, ANSI B11.19 and ANSI R15.06 may be used as reference for the USA, as well as EN 999 (or the relevant European Type C machine standard) for Europe.

Figure 6 *- Possible modes of operation and corresponding termination type*

Card (1)	Restart mode	Blanking	Auxiliary Safety Device	Muting (2)	Auxiliary output (3)	Termination (4)
#01	Manual				NC signal	M12 plug
#04	Automatic				NC signal	M12 plug
#07	Automatic		yes		NC signal	M12 plug
#10	Manual		yes		NC signal	M12 plug
#11	Automatic			2 inputs	NC signal	M12 plug
#12	Automatic			2 inputs	Muting lamp	M12 plug
#13	Automatic			4 inputs	NC signal	Terminal strip
#14	Automatic			4 inputs	Muting lamp	Terminal strip
#15	Automatic		yes	2 inputs	NC signal	Terminal strip
#16	Automatic		yes	2 inputs	Muting lamp	Terminal strip
#17	Manual			2 inputs	NC signal	M12 plug
#18	Manual			2 inputs	Muting lamp	M12 plug
#19	Manual			4 inputs	NC signal	Terminal strip
#20	Manual			4 inputs	Muting lamp	Terminal strip
#21	Manual		yes	2 inputs	NC signal	Terminal strip
#22	Manual		yes	2 inputs	Muting lamp	Terminal strip

(1) Factory setting: card #18. For other modes of operation, the configuration cards must be ordered separately (see Accessories section).

(2) Muting: either 2 inputs available for the connection of 2 or 4 muting sensors to perform a bi-directional muting function (see page 2 and 3), or 4 inputs available for the connection of 4 sensors to perform a uni-directional muting function (see page 3). Connection boxes are available for the interconnection of all sensors and actuators (see "Accessories" section).

(3) Auxiliary output: either a normally closed signalling output or a muting and diagnosis lamp output (see page 2).

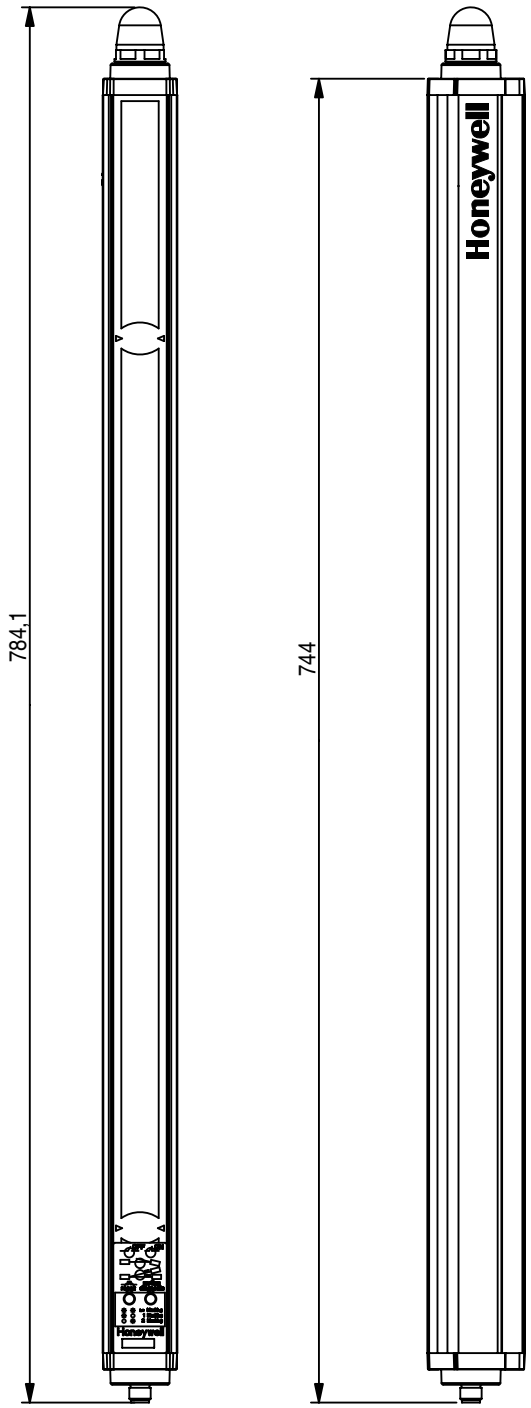
(4) Termination: some modes require direct connections to the internal active unit terminal strip. A M20 cable gland (available as an option) allows the use of a male M23 cordset (customer supplied).

Table 2

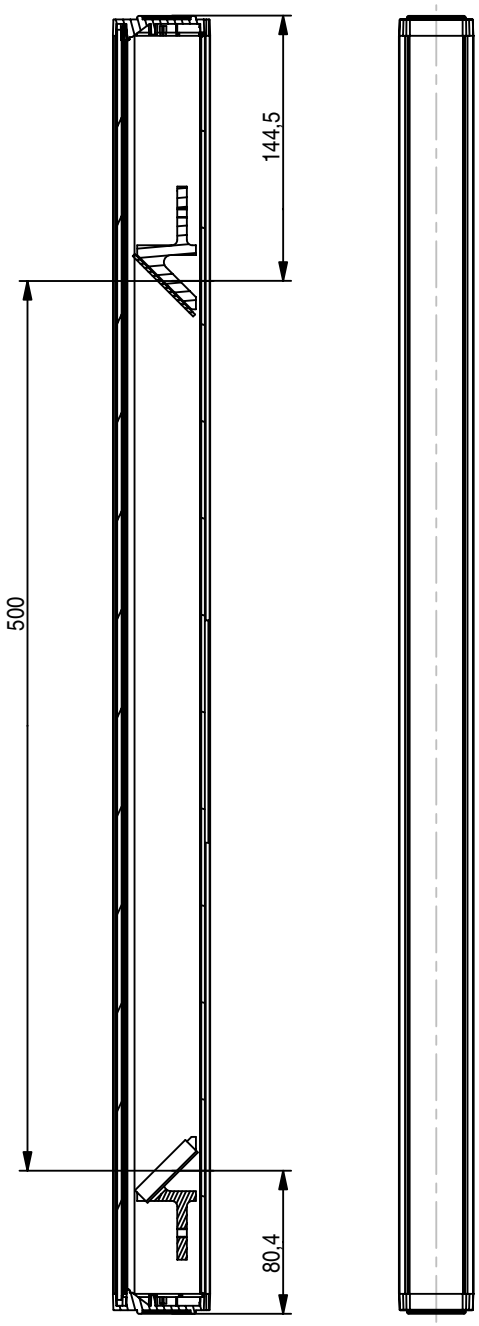
Number of beams	Beam spacing BS	Total height TH (cable gland version)	A	B	Weight per device
	mm / in	mm / in	mm / in	mm / in	kg / lbs
2	500 / 19.70	744 / 29.3 (758 / 29.8)	149 / 5.87	87 / 3.42	1,42 / 3.12

Figure 7 *- Dimensions in mm / in*

Active unit (with optional muting lamp)

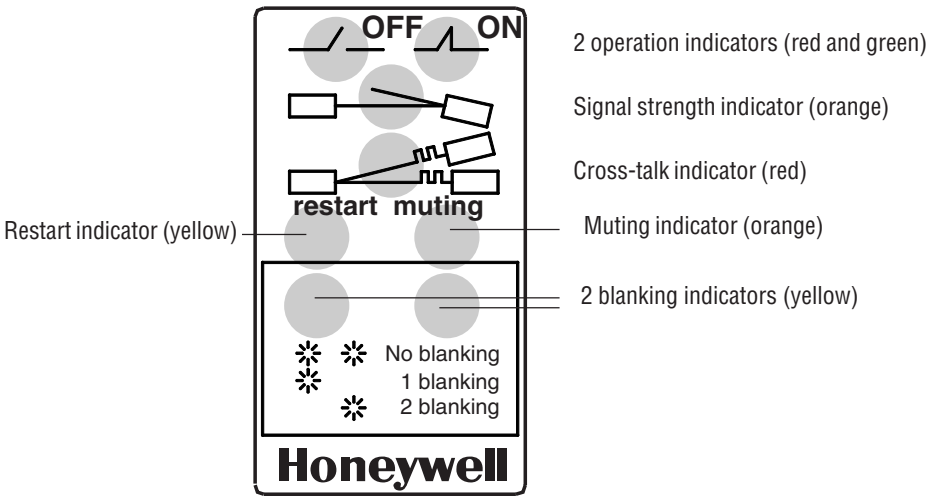


Passive unit



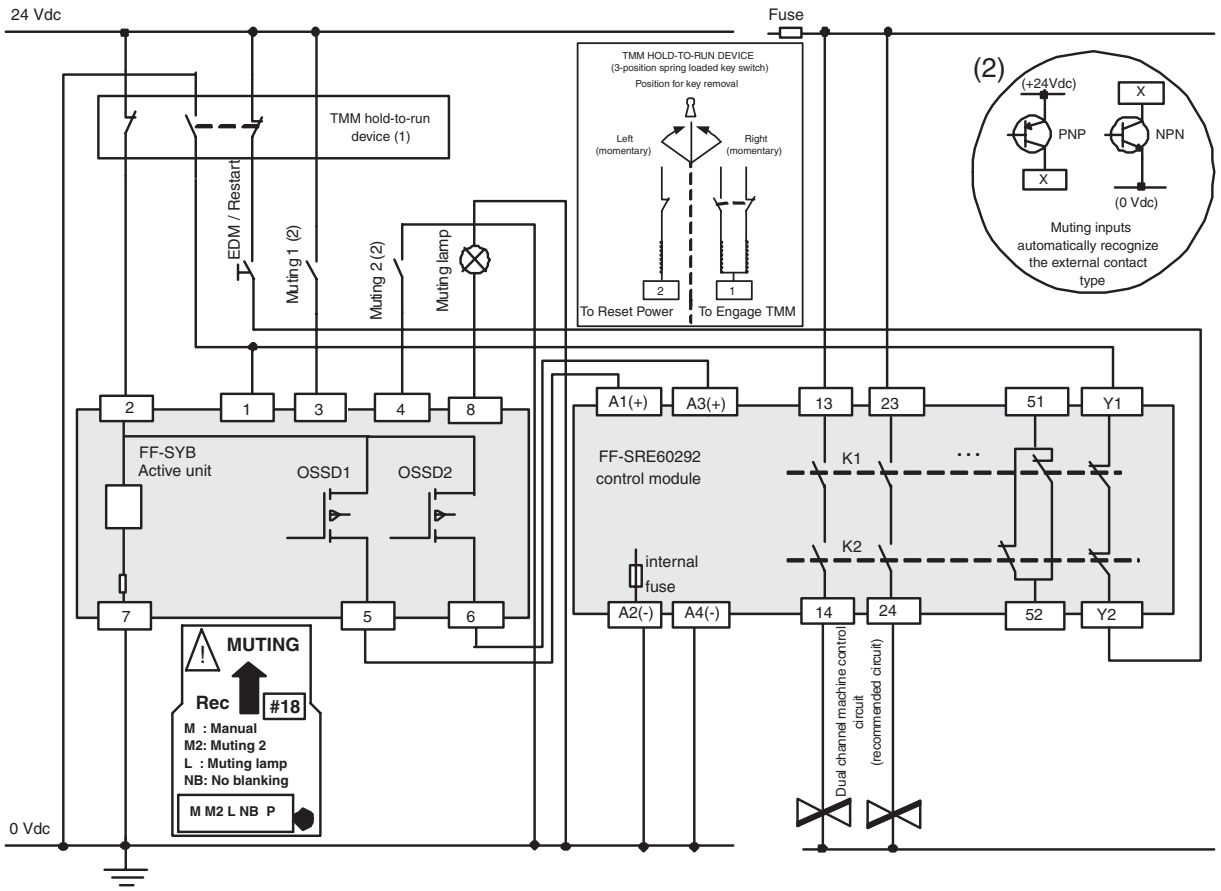
❑ LED status indicators

Figure 8 - *Active unit*



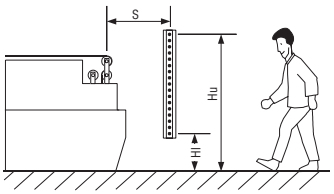
❑ Wiring

Figure 9 - *Recommended wiring diagram for a 2-sensor muting application with manual restart and Temporary Manual Muting (TMM) (see Figure 1)*



❑ European EN 999 standard

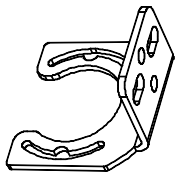
All distances/heights in mm (100 mm = 3.9 in)

Number of beams	2
Beam spacing	500
Recommended beam heights above the reference plane per EN 999	Hi = 400 (lowest beam) Hu = 900 (uppermost beam)
Normal approach 	**S ≥ 1600 (t1 + t2) + 850**

t1: light curtain response time (s)
t2: machine stopping time (s)

For more information, refer to the EN 999 European standard or comply with the requirements on safety distances given by the type C European standard if existing for the considered machine.

❑ Accessories



FF-SYZ634178

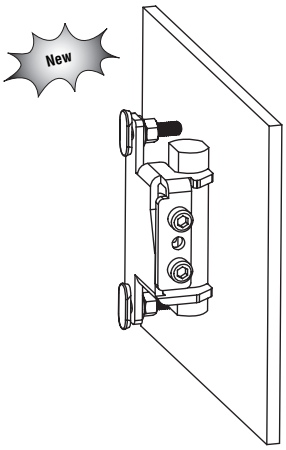
Kit of 2 right angle mounting brackets with screws, bolts, nuts and washers to mount one passive unit or one active unit.

Possible mounting positions:

1. At the top and the bottom of the FF-SYB (allowing adjustments in azimuth directions of ±10°).
2. At one of the two lateral dovetail slots (allowing adjustments in vertical directions along the slot)
3. At the rear dovetail slot (allowing adjustments in vertical directions along the slot)

Order 2 kits for a complete set of passive and active unit.

(**already included in the FF-SYB package**).



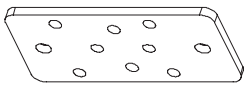
FF-SXZ634188

Kit of 2 adjustable mounting brackets to mount one passive or one active unit, using one of the 2 lateral dovetail slots of the light curtain.

Allows adjustments in azimuth directions of ±5° with front access of the 2 adjusting screws.

Order 2 kits for a complete set of passive and active unit.

(to be ordered separately as an option)



(x 2)

FF-SYZAD

Anti-vibration kit

Kit of 2 straight brackets and 4 anti-vibration dampers (mounting hardware included) - to substitute for the FF-SYZ634178 brackets.

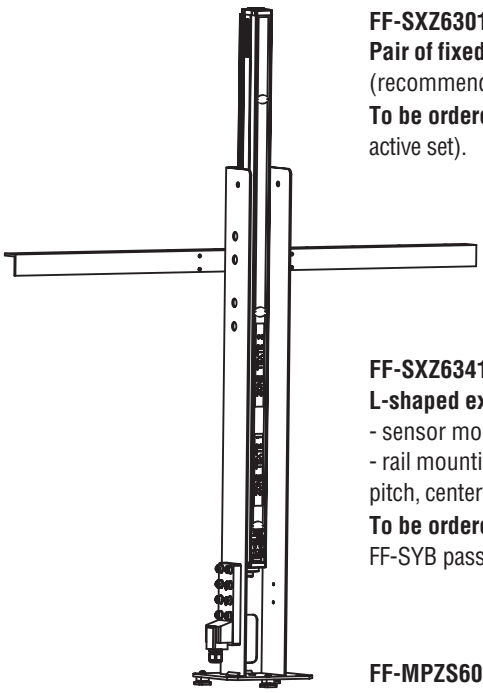
(x 4)

NOTICE

PROTECTION AGAINST HIGH VIBRATION

In case of high vibration, order 2 sets of FF-SYZAD for a complete set of passive and active units.

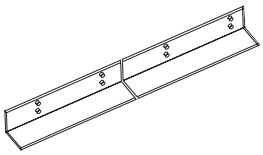
Mechanical fixture for muting application



FF-SXZ630170
Pair of fixed posts for FF-SYB light curtain
(recommended when mechanical protection of the light curtain is NOT required)
To be ordered separately as an option (order 1 piece for a complete FF-SYB passive / active set).

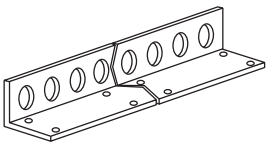
FF-SXZ634186
L-shaped extrusion 40 mm x 40 mm / 1.57 in x 1.57 in, 1 m / 3.28 ft long
- sensor mounting: ø5.5 mm / ø1/46 in fixing holes, 100 mm / 3.94 in pitch
- rail mounting: 3 pairs of ø5.5 mm / ø1/46 in fixing holes, 100 mm / 3.94 in pitch, centered

To be ordered separately as an option (order 2 pieces for a complete FF-SYB passive / active set).



FF-MPZS6018
Muting sensor mounting rails
- sensor mounting: ø18 mm / ø0.71 in mounting holes, 30 mm / 1.18 in distance between centers
- rail mounting: ø5 mm / ø1/5 in fixing holes, 100 mm / 3.94 in pitch

To be ordered separately as an option (order 2 pieces for a complete FF-SYB passive / active set).



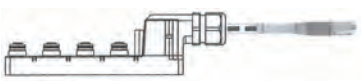
FF-SYZPF
Fixed post for FF-SYB light curtain
(recommended when mechanical protection of the light curtain is required)
To be ordered separately as an option (order 2 pieces for a complete FF-SYB passive / active set).

A front cover is available for additional protection:
FF-SYZ630184-2: Front cover for 2 beams
To be ordered separately as an option.

M12 connection boxes

For the connection of muting sensors, restart and TMM switches and muting lamp to the light curtain

FF-SXZBOX8M12T
IP67 junction box, field-attachable home run cable, M12 8-port configuration.



FF-SXZBOX8M12L02
IP67 junction box, field-attachable home run cable, M12 8-port configuration, prewired with a 2 m/6.56 ft M12 8-pin cordset (for bi-directional muting only).

Cordsets

M12/8 pole

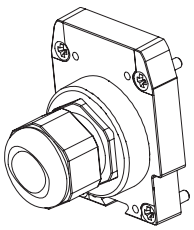
1: white
2: brown
3: green
4: yellow
5: grey
6: pink
7: blue
8: red

M12 single-ended cordset, female / 8-pin straight for the FF-SYB active unit

FF-SXZCAM128U02-S 2 m / 6.56 ft length
FF-SXZCAM128U05-S 5 m / 16.40 ft length
FF-SXZCAM128U10-S 10 m / 32.8 ft length

Equivalent to the 808000P02M... Micro-change® Series from Brad Harrison (see vendor catalog for color code)

M20 cable gland

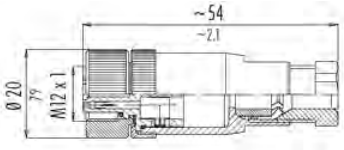


FF-SYZBR015T

Receiver endcap with M20 cable gland.

To be ordered separately as an option (see figure 6).

Cable connector



FF-SXZCOM128

M12 screw connector, female / 8 pin straight for the FF-SYB active unit

Safety control modules

FF-SRE60292

Slim line expansion module
- 24 Vdc
- Safety interface up to Category 4 per EN 954-1
- 4 NO/2 NC safety relay outputs
- 22,5 mm / 0.88 in width

(to be ordered separately as an option).

FF-SRE30812

Expansion module
- 24 Vdc, 115 Vac or 230 Vac
- Safety interface up to Category 4 per EN 954-1
- 7 NO/1 NC internally redundant safety relay outputs
- 90 mm / 3.54 in width

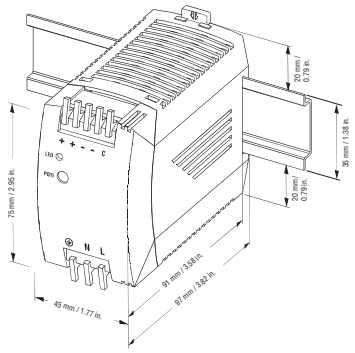
(to be ordered separately as an option).

FF-SRM200P2

Mutual exclusion module

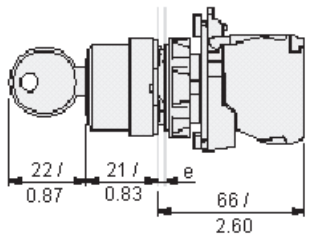
(to be ordered separately as an option)
- typical applications: loading/unloading chamber on machining centers or conveyors, crossing of conveyor lines, moving conveyors or AGVs
- connection of 2 safety devices
- 24 Vdc
- Category 4 per EN 954-1
- manual start mode, FSD monitoring
- crossfault monitoring of inputs
- 3 NO safety relay outputs
- static outputs for output status and diagnostic information
- 45 mm / 1.77 in

ac to dc power supply



FF-SXZPWR050
ac to dc power supply
(to be ordered separately as an option)
- Approvals: UL508 listed, UL1950, cUL/CSA-C22.2 No.950-M90, EN/IEC 60950, EN 50178 (Class 2 Rated for low power installations)
- Input voltage: 85-264 Vac (43-67 Hz)
- Output voltage: 24-28 Vdc adjustable
- Rated continuous load (at 60 °C/140 °F max.): 2,1 A @ 24 Vdc / 1,8A @ 28 Vdc
- Power: 50 W
- Dimensions 75 mm x 45 mm x 97 mm / 2.95 in x 1.77 in x 3.82 in
- DIN rail mounting
- Weight: 240 g / 0.52 lbs

3 position spring loaded key switch



e: panel thickness 1 mm to 6 mm / 0.04 in to 0.24 in

(not contractual)

FF-SXZTMM
ø 22 mm 3-position spring loaded key switch with a Normally Closed contact on the left position and two complementary (Normally Closed and Normally Open) contacts on the right position (Telemecanique ZB5 Series type, fixing collar with screw clamp contact blocks, key # 455).
To be used as the TMM hold-to-run device.

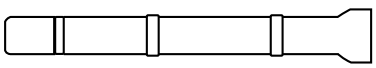
Configuration cards

FF-SYZ101085R
Set of 28 configuration cards for FF-SYB active unit.

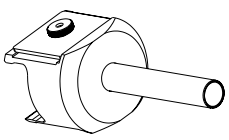
Installation manuals

FF-PK107120-EN	One FF-SYB English installation manual
FF-PK107120-DE	One FF-SYB German installation manual
FF-PK107120-FR	One FF-SYB French installation manual
FF-PK107120-IT	One FF-SYB Italian installation manual
FF-PK107120-SP	One FF-SYB Spanish installation manual

NOTICE
By default, products will be shipped with the installation manual in the language of the country of delivery when available or in English. If any other language is required, it must be ordered separately.



FF-SPZLASER
The laser pen FF-SPZLASER is a self-contained and compact laser device designed to ease infrared beam alignments. Its class II conforms to the EN 60825 European standard and the US 21 CFR 1040 American standard.
To be ordered separately as an option.



FF-SYZ604795
Mechanical adapter for the FF-SPZLASER laser pen to be used with the FF-SYB Series light curtain.
To be ordered separately as an option.

Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. **The foregoing is Buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance,current specifications, pricing or name of the nearest Authorised Distributor, contact a nearby sales office or:

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Type 4 self-contained light curtain

FF-SB Series

For the protection of operators in Industry

FEATURES

- Meets applicable parts of US OSHA 29CFR 1910.217, 1910.212 and ANSI B11.1, B11.2, B11.19 1990 and RIA 15.06 regulations for Control Reliability
- Through scan active optoelectronic protective equipment
- No-touch safety light curtain with permanent self-checking in compliance with the requirements of the IEC/EN 61496 - Parts 1 and 2 for Type 4 equipment
- No electrical connection necessary between emitter and receiver
- Self-contained and light-weight equipment with the following functions available to the user:
  . Automatic restart (after each operation)
  . Start interlock (at power up)
  . Restart interlock (after each operation)
  Furthermore, in order to monitor the final switching devices (FSDs: relays, contactors, parts of the machine safety related control system) a test input and an FSD monitoring input are provided
- 2 guided-contact safety relay outputs

TYPICAL APPLICATIONS

- Presses and punches for metals, plastics and leather
- Deep-drawing presses, moulding presses and filter presses
- Pressing, moulding and thermoforming machines
- Metal-forming, milling and drilling machines
- Conveyors, handling equipment and assembly lines
- Spot-welding machines and fine-boring machines
- Copying lathes and machining centres
- Door and gate, lift and hoist technology
- Stacking machines, transporting and conveyor technology
- Textile, packaging machines
- Jigging sieves, sorters and milling machines
- For all machines quoted in Annex IV of the Machinery Directive 98/37/EC

FF-SB14E/R❑❑K-❑-2 ONLY

Approved as Type 4 per pr EN 50100 - 1/2

The FF-SB multibeam industrial safety light curtain is an electrosensitive protective equipment designed to protect operators of power driven machinery.

The design of this device complies with the requirements of the European Directives and Standards as well as with the North American regulations. The German BG (E+ MIII) notified body granted the EC type examination certificate according to the essential requirements of the Machinery Directive 98/37/EC and according to the IEC/EN 61496-1/2 standards for the design and construction of Type 4 electrosensitive protective equipment. The Canadian cCSAus gave an approval to this device which meets applicable part of US ANSI B11.1, B11.2, and B11.19, RIA 15.06 and OSHA 29 CFR 1910 217 and 1910.212 regulations for Control Reliability.

Entry into the protection field is detected extremely reliably by the interruption of a single infrared beam. Each interruption or malfunction causes both an alarm and the disabling of the output relays. The high reliability of the equipment results from the permanent self-checking of the electronic switching circuit.

The invisible infrared beams have a high intensity and range up to 24 m / 78.73 ft. The SB Series emitter is optically synchronized with the receiver by a special beam transmitted from the receiver to the emitter (this is a “reverse” beam). **No interconnecting cables are required between emitter and receiver.** Installation time is greatly reduced. The FF-SB offers very high resistance to electrical interference and ambient light. LED indicators on the emitter and the receiver provide information about the reception of the synchronizing beam, protection field status (clear or interrupted), receiver signal strength and test input. The robust, compact housing is made of aluminium alloy with longitudinal T-shaped fixing grooves and three different brackets for rigid or swivel installation, thus simplifying mounting and adjustment.

⚠ WARNING

MISUSE OF DOCUMENTATION

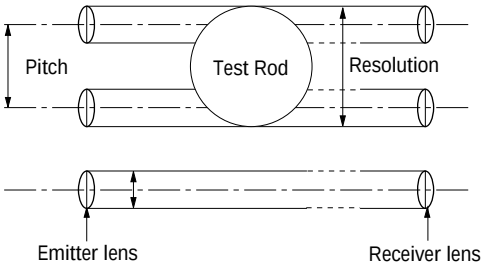
- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

Design and operation

The FF-SB industrial safety light curtain forms a grid of parallel infrared beams, which are activated in succession in a multiplexed process, with a high scanning frequency. A beam from the receiver to the emitter provides quartz accurate synchronization.

The nominal protection heights result from the number of beams and the lens pitch. The resolution or minimum detection size is independent of the scanning distance or the environment.

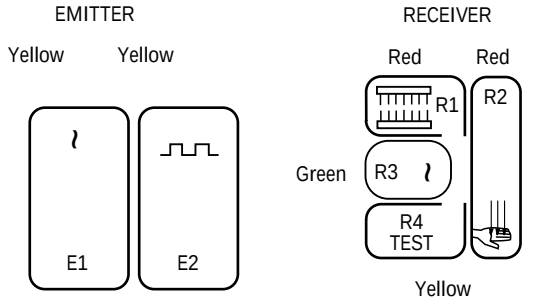


LED Status indicators

The emitter and receiver are fitted with LED status indicators. On the emitter, a yellow LED (E1) signals power on. The second yellow LED (E2) provides information on the synchronisation beam reception.

The receiver has a red contamination indicator R1, which under normal conditions does not light up and which flickers if the receiving level is too low and permanently lights up if no signal is received.

The bright red LED R2 illuminates if the protection field is entered, the green LED R3 if the protection field is clear. In addition, a signalling output is provided. This signal (optocoupler) is ON when the protection field is clear. This NPN output is capable of sinking a current up to 20 mA dc max. under 30 Vdc max. The yellow LED R4 illuminates during a test by means of a fault simulation on the test input of the device. The yellow LED R4 flickers when a restart of the system is necessary.

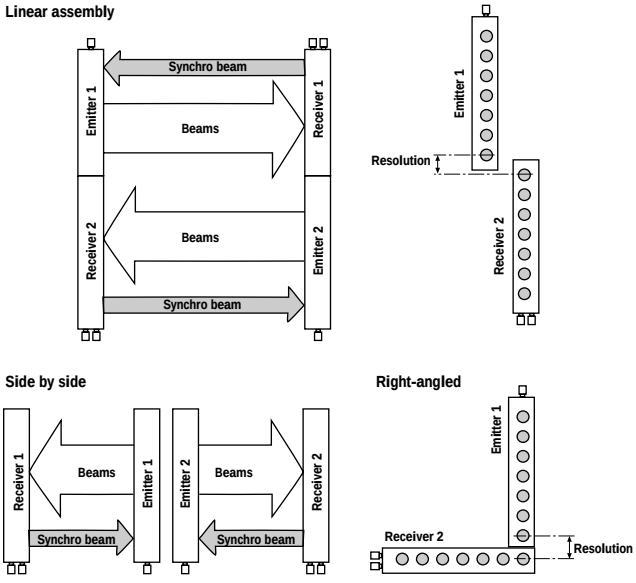


Mounting possibilities

Higher protection field heights can be achieved by means of adjacent rows or more safety light curtains. To prevent mutual interference between devices, the adjacent equipment should be operated in the reverse direction, as shown below. To avoid the less favourable resolution of 60 mm / 2.36 in between neighbouring protection fields, in the linear assembly, it is recommended to use the displaced mounting arrangement shown below with a continuous resolution. In a side by side assembly, the equipment should also be operated in the reverse direction.

In some applications, the right-angled mounting arrangement shown below offers the best solution.

For special applications, an arrangement with one or two deflection mirrors is possible (scanning distance is decreased by approximately 10% per added mirror).



Protection around presses

European regulations apply to the use of photoelectric barriers, grids and curtains with power-operated presses for metal processing. Some specific EN standards classified C type are available:

- EN 692 for mechanical presses
- pr EN 693 for hydraulic presses, press brakes, pneumatic presses, punches for metal, metal forming machines.

These C standards specify a specific formula in order to calculate the minimum installation distance between the safety light curtain and the dangerous zone (refer to C standard for calculation).

These guidelines state that safety light curtains should only be used as safety equipment and if the protection field is entered, the operation of the machinery is immediately interrupted. “Immediate interruption” means that any dangerous movement must stop before the operator can reach the dangerous zone on the basis of the speed of his movement.

The self-checking of the photoelectric barrier is essential. If a malfunction occurs in the safety equipment, dangerous movement of the machine must be automatically interrupted.

It should not be possible to resume machine operation until the malfunction has been rectified.

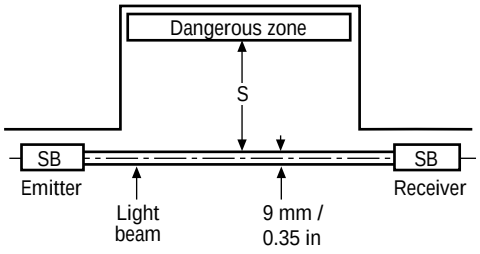
The safety light curtain should only allow the start of a dangerous movement if it is seen to be functioning correctly and if a reset push-button has been reactivated (start interlock). It is for this reason that it is important to refer to EN 954-1 for the design of the electrical interface between the safety barrier and the elements which stop the machine. The stopping time of the machine, the safety distance S and the speed of movement K are the decisive factors in order to ensure the conformity of the installation.

In all cases, the conformity of the installation must be ensured by local organisations and official safety specialists.

Notes

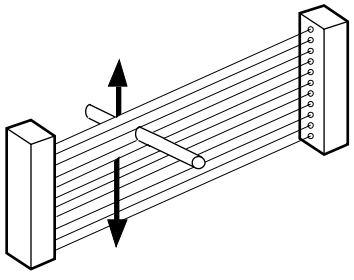
- If the tool can be changed (for instance in a press), calculate the distance “S” for the largest tool.
- It is very important that it must be impossible for the operator to remain undetected between the safety light curtain and the dangerous zone. In addition, the operator should not be able to reach the dangerous zone from above, below or laterally without being detected.

The safety light curtain should be protected against shocks, moving equipment, oil, dust, etc. by positioning it near walls and rigidly fixed on metal bars.



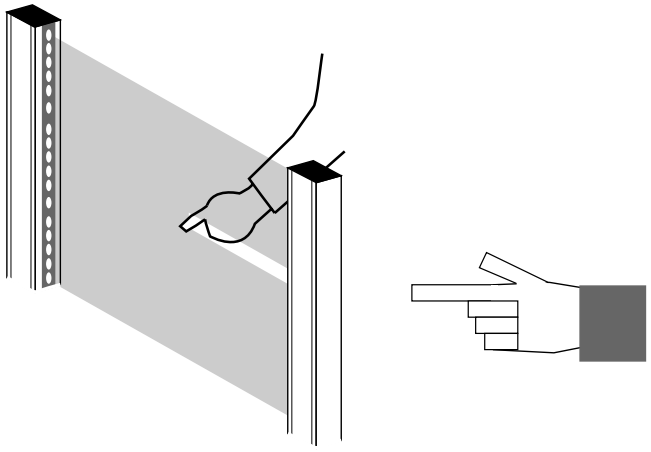
Functional testing

The response of a safety light curtain over the whole protection height should be regularly tested using a test rod with a diameter equal to the safety light curtain resolution. Each time the power-operated machinery is switched on, it should be verified whether an immediate shutdown occurs when any beam is interrupted by an opaque object.

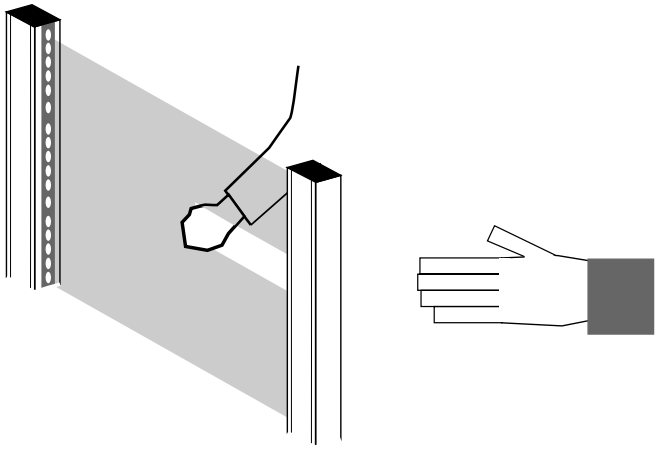


Test rod

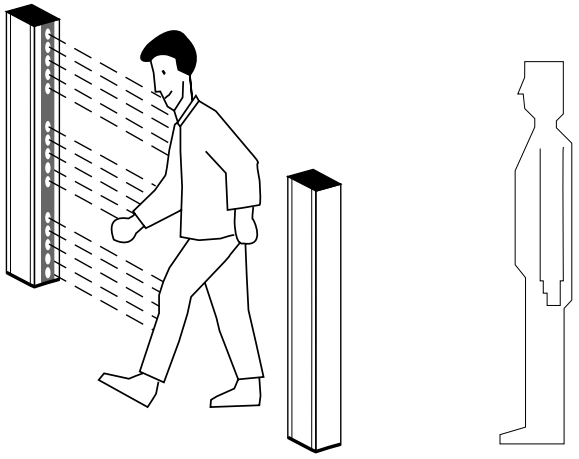
FF-SB12 Finger detection



FF-SB14 Hand / Limb detection

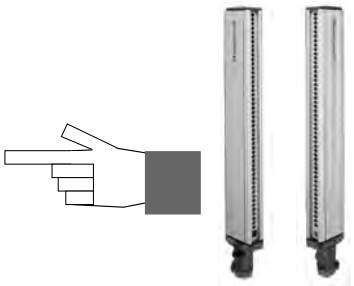


FF-SB15 Body detection



FF-SB12

- **Type 4 according to IEC/EN 61496 - 1 / 2 Standards**
- **Meets applicable parts of ANSI/RIA/OSHA regulations for Control Reliability**
- **ø22 mm / 0.86 in detection capability**
- **Scanning distance up to 10 m / 32.8 ft**



Approved as Type 4 per pr EN 50100 - 1/2

Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

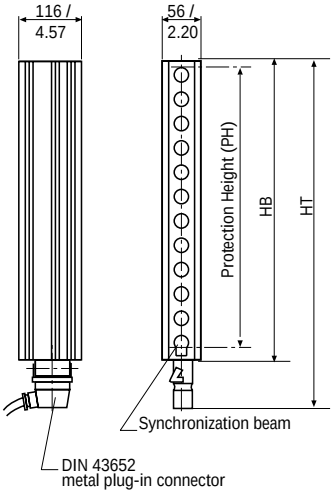
Specifications			
Supply voltage	120/240 Vac (+10%, - 20%) 48 to 62 Hz(1)	24 to 48 Vdc(2) ±15%
Power consumption	8 VA (120/240 Vac), 8 W (24 to 48 Vdc)	
Switching capacity	2 A/250 Vac, 2 safety relays with guided contacts (50 mA min.)	
Material	*Profile*: aluminium alloy yellow painted according to RAL 1021	
	Front face: polycarbonate	
Housing size	56 mm / 2.20 in width, 116 mm / 4.57 in depth, height according to protection height	
Emission	Modulated Light Source, infrared LED (880 nm)	
Scanning frequency	9,6 kHz	
Resolution	ø22 mm / 0.86 in min. target size	
Alignment tolerance	± 2° for emitter and receiver	
Ambient temperature	0 °C to 55 °C / 32 °F to 131 °F	
Sealing	IP 65 / NEMA 4 and 13	
Noise immunity	According to IEC 801-4: level IV (120/240 Vac), level III (24 to 48 Vdc)	
	according to IEC 801-3: level III	
Resistance to ambient light	*Sun*: 20 000 Lux • *Lamp*: 15 000 Lux	
Output indication	LEDs display on unit front face	
Scanning distance	*Standard:* 0 m to 10 m / 0 ft to 32.8 ft	
Electrical connection (connectors delivered with the equipment)	Metal connectors DIN 43652	

Ordering information (Emitter/Receiver)
FF-SB12E/R❑❑❑-S2

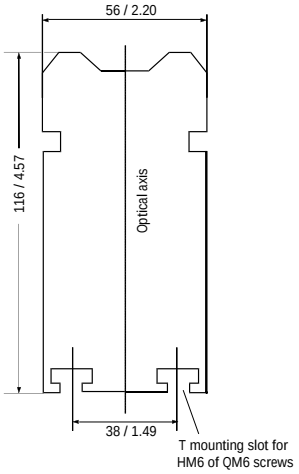
Power supply:
E: 120 Vac (for 200 mm / 7.87 in)
G: 240 Vac (for 200 mm / 7.87 in)
K: 120/240 Vac (Automatic selection)
4: 24 to 48 Vdc (2)

Protection Height (PH) (mm/in):
02: 212,7 / 8.38
04: 415,9 / 16.38
06: 619,1 / 24.39

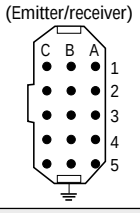
The emitter and the receiver have the same dimensions

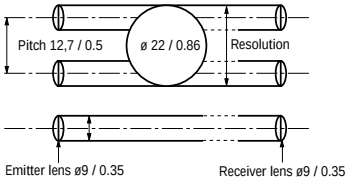


Cross section of the barrier



Metal Connector DIN 43652

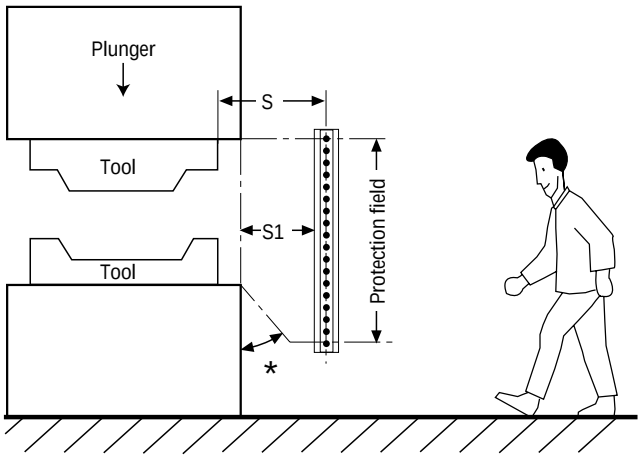




Notes:
(1) - 120 Vac or 240 Vac for the 200 mm / 7.87 in model.
(2) - The dc version is featured with a galvanic insulation (dc to dc converter) that provides immunity to external disturbances; this is essential to guarantee the safety integrity of the equipment**. Not available on 200 mm / 7.87 in models.**

Model		*02*	*04*	*06*
Protection Height	PH	212,7 / 8.38	415,9 / 16.38	619,1 / 24.39
Barrier Height	HB	274,6 / 10.81	477,8 / 18.82	681 / 26.83
Total Height (including connectors)	HT	369 / 14.53	569 / 22.41	769 / 30.29
Number of beams		17	33	49
Response time (10^{-3} s)	t1	25	27	29
Mass per device	kg/lbs	2,8 / 6.17	4 / 8.82	5,2 / 11.46

Safety distances



Note: Due to the FF-SB12 resolution, most of the time this equipment will be used in applications where the direction of approach is normal to the detection plane.

* Positioning of the unit should be made to prevent people from reaching the dangerous zone from the bottom or top of the unit (also refer to installation consideration page 75).

The safety distance between the protection field and the dangerous zone should be large enough to ensure that if the protection field is entered, the dangerous zone cannot be reached before the hazardous movement is interrupted. To determine the safety distance in an application, use the following formula:

- **Normal Approach**

Europe (EN 999)

S ≥ 2000 (t1 + t2) + 64 (mm), with S ≥ 100 mm
(or S ≥ 78.8 (t1+t2) + 2.5 (in), with S ≥ 3.9 in)

If the result of this calculation is greater or equal to 500 mm, then use the following formula:

S ≥ 1600 (t1 + t2) + 64 (mm), with S ≥ 500 mm
(or S ≥ 63 (t1+t2) + 2.5 (in), with S ≥ 19.7 in)

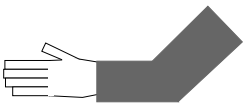
US (OSHA 29 CFR 1910.217, ANSI B11.19 1990)

Ds ≥ 63 (t1 + t2) + 2.01 in Ds = S

Ds: minimum safety distance (mm / in)
t1: response time of the light curtain (s)
t2: Stopping time of the equipment guarded by the light curtain, including all mechanical, electromechanical and electronic parts (s)

FF-SB14

- **Type 4 according to IEC/EN 61496 - 1 / 2**
- **Meets applicable parts of ANSI/RIA/OSHA regulations for Control Reliability**
- **ø35 mm / 1.38 in detection capability**
- **Scanning range up to 24 m / 78.72 ft**



Approved as Type 4 per pr EN 50100 - 1/2

FF-SB14E/R❑❑K-❑-2 ONLY

Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

Specifications			
Supply voltage	120/240 Vac (+10%, -20%) 48 to 62 Hz	24 to 48 Vdc(1) ±15%
Power consumption	8 VA per unit	8 W per unit
Switching capacity	2 A/250 Vac, 2 safety relays with guided contacts (50 mA min.)	
Material	*Housing*: Aluminium alloy yellow painted according to RAL 1021	
	Front face: polycarbonate (filtered versions: shock and welding splash extra resistant)	
Housing size	56 mm / 2.20 in width, 116 mm / 4.57 in depth, height according to protection height	
Emission	Modulated Light Source, infrared (880 nm)	
Scanning frequency	9,6 kHz	
Resolution	ø35 mm / 1.38 in min. target size	
Alignment tolerance	±2° for emitter and receiver	
Ambient temperature	0 °C to 55 °C / 32 °F to 131 °F	
Sealing	IP 65 / NEMA 4 or 13	
Noise immunity	According to IEC 801-4: level IV (120/240 Vac), level III (24 to 48 Vdc)	
	According to IEC 801-3: level III	
Resistance to ambient light	*Sun*: 20 000 Lux / *Lamp*: 15 000 Lux	
Output indication	LEDs display on unit front face	
Scanning distance	*Standard:* 0 m to 10 m / 0 ft to 32.8 ft • *Long range:* 3 m to 24 m / 9.84 ft to 78.72 ft(2)	
	Filter: 0 m to 6 m / 0 ft to 19.7 ft	
Electrical connection (connectors delivered with the equipment)	Metal connector DIN 43652	

Ordering information (Emitter/Receiver)

FF-SB14E/R❑❑❑-S❑

- **Scanning range:**
  2: 10 m / 32.8 ft *(standard)*
  2L: 24 m / 78.72 ft *(Long range(2))*
  2F: 6 m / 19.7 ft (Filtered version for welding applications)
- **Connectors:** Metal DIN 43652
- **Power Supply:**
  K: 120/240 Vac (automatic selection)
  4: 24 to 48 Vdc (1)

Protection Height (PH) (mm/in):

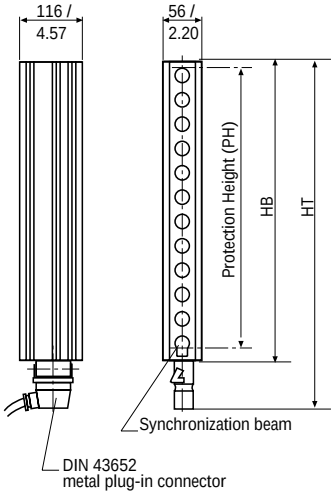
04: 417 / 16.42	*10:* 1024 / 40.34
06: 620 / 24.42	*12:* 1230 / 48.46
08: 824 / 32.46	*14:* 1434 / 56.49

Notes:

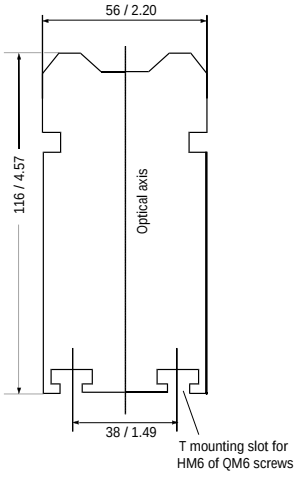
(1) - The 24 to 48 Vdc version is featured with a galvanic insulation (dc to dc converter) that provides the immunity to external disturbances; this is essential to guarantee the safety integrity of the equipment.

(2) - The safety light curtain, although always operational with scanning distances less than 3 m / 9.84 ft, does not fully comply with certain requirements of the IEC/EN 61496 - 2 standard at distances between 0 and 3 m / 0 to 9.84 ft. In this case, the version *0 to 10 m / 0 to 32.8 ft* should be used.

The emitter and the receiver have the same dimensions

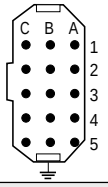


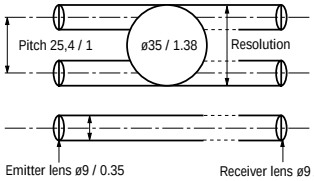
Cross section of the barrier



Metal Connector DIN 43652

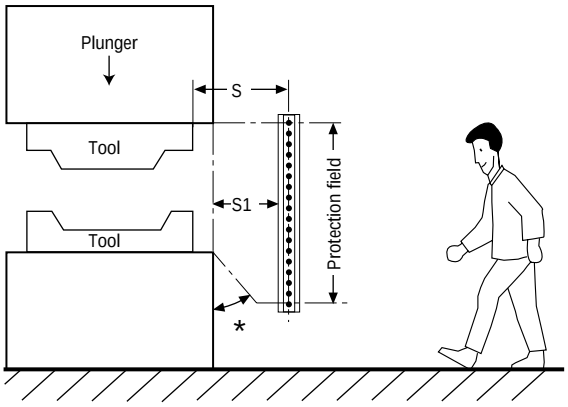
(Emitter/receiver)



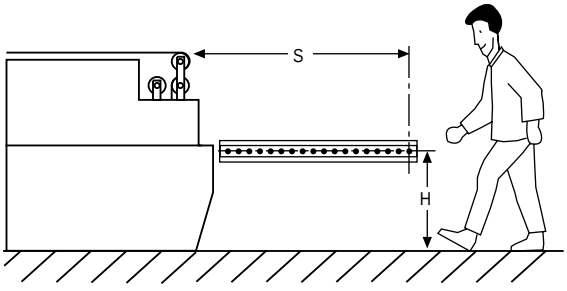


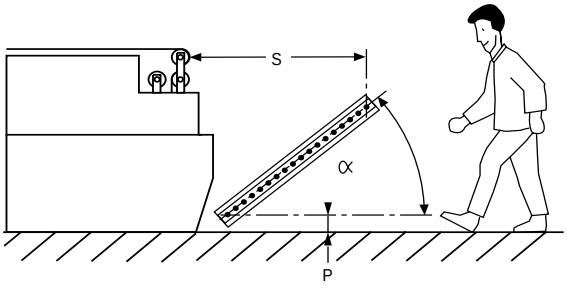
Model		*04*	*06*	*08*	*10*	*12*	*14*
Protection Height	PH	417 / 16.42	620 / 24.42	824 / 32.46	1024 / 40.34	1230 / 48.46	1434 / 56.49
Barrier Height	HB	488 / 19.22	688 / 27.10	888 / 34.98	1088 / 42.86	1288 / 50.74	1488 / 58.62
Total Height (including connectors)	HT	569 / 22.41	769 / 30.29	969 / 38.17	1169 / 46.05	1369 / 53.93	1569 / 61.81
Number of beams		17	25	33	41	49	57
Response time (10^{-3} s)	t1	25	26	27	28	29	30
Mass per device	(kg/lbs)	4 / 8.8	5,2 / 11.4	6,4 / 14.1	7,5 / 16.5	8,6 / 18.9	9,8 / 21.6

Safety distances



* Positioning of the unit should be made to prevent people from reaching the dangerous zone from the bottom or top of the unit (also refer to installation consideration page 75).





The safety distance between the protection field and the dangerous zone should be large enough to ensure that if the protection field is entered, the dangerous zone cannot be reached before the hazardous movement is interrupted. To determine the safety distance in an application, use the following formula:

- **Normal Approach**

Europe (EN 999)

S ≥ 2000 (t1 + t2) + 168 (mm), with S ≥ 100 mm
(or S ≥ 78.8 (t1+t2) + 6.6 (in), with S ≥ 3.9 in)

If the result of this calculation is greater or equal to 500 mm, then use the following formula:

S ≥ 1600 (t1 + t2) + 168 (mm), with S ≥ 500 mm
(or S ≥ 63 (t1+t2) + 6.6 (in), with S ≥ 19.7 in)

US (OSHA 29 CFR 1910.217, ANSI B11.19 1990)

Ds ≥ 63 (t1 + t2) + 3.75 in Ds = S

- **Parallel approach**

Europe (EN 999)

S ≥ 1600 (t1 + t2) + 1200-0.4H (mm)
where (1200-0.4 H) ≥ 850 mm
(or S ≥ 63 (t1+t2) + 47.3-0.4H (in)
where (47.3-0.4 H) ≥ 33.5 in)

If H is greater than 300 mm / 11.82 in, the risk of access from below must be taken into account. For this barrier, the minimum height allowed is H min. = 0 mm and the maximum height allowed is H max. = 1 000 mm / 39.4 in.

- **Angled approach**

Europe (EN 999)

30° < α < 90°

If the angle is greater than 30°, the approach should be considered as normal, and one of the above-mentioned formulas should be used.

0° < α ≤ 30°

If the angle is less than or equal to 30°, the approach should be considered as parallel, and one of the above-mentioned formulas should be used. In this case the minimum height allowed is P min. = 0 mm and the max. height allowed is H = 1 000 mm / 39.4 in max. However, if P > 300 mm / 11.82 in, the risk of inadvertent access from below must be taken into account.

S: Minimum safety distance (mm / in)

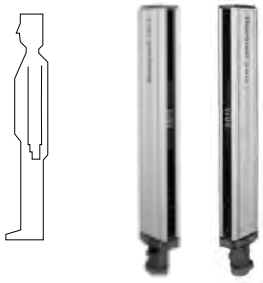
t1: Response time of the light curtain (s)

t2: Stopping time of the equipment guarded by the light curtain, including all mechanical, electromechanical and electronic parts (s)

H: Height of the detection zone above the floor (mm / in)

FF-SB15

- **Type 4 according to IEC/EN 61496 - 1 / 2**
- **Meets applicable parts of ANSI/RIA/OSHA regulations for Control Reliability**
- **ø235 mm / 9.25 in detection capability**
- **Scanning range up to 24 m / 78.72 ft**



Approved as Type 4 per pr EN 50100 - 1/2

Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

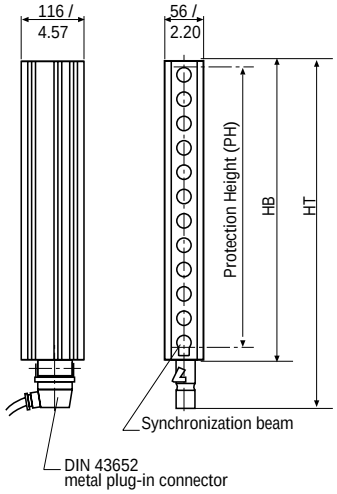
Specifications			
Supply voltage	120/240 Vac +10% -20%, 48 to 62 Hz	24 to 48 Vdc(1) ±15%
Power consumption	8 VA per unit	8 W per unit
Switching capacity	2 A/250 Vac, 2 safety relays with guided contacts (50 mA min.)	
Material	*Housing*: aluminium alloy yellow painted according to RAL 1021	
	Front face: polycarbonate	
Housing size	56 mm / 2.20 in width, 116 mm / 4.57 in depth, height according to protection height	
Emission	Modulated Light Source, infrared LED (880 nm)	
Scanning frequency	9,6 kHz	
Resolution	ø235 mm / 9.25 in minimum target size	
Alignment tolerance	± 2° for emitter and receiver	
Ambient temperature	0 °C to 55 °C / 32 °F to 131 °F	
Sealing	IP 65 / NEMA 4 or 13	
Noise immunity	According to IEC 801-4: level IV (120/240 Vac), level III (24 to 48 Vdc)	
	according to IEC 801-3: level III	
Resistance to ambient light	*Sun*: 20 000 Lux • *Lamp*: 15 000 Lux	
Output indication	LEDs display on unit front face	
Scanning distance	3 m to 24 m / 9.84 ft to 78.72 ft	
Electrical connection	Metal connectors DIN 43652	
(connectors delivered with the equipment)		

Ordering information (Emitter/Receiver)
FF-SB15E/R❑❑❑-S2

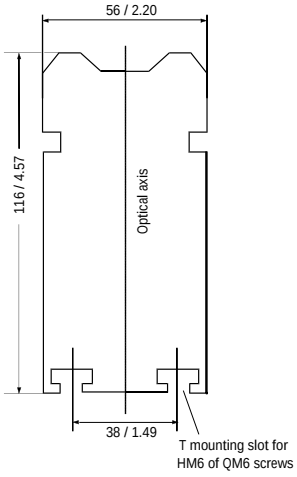
Power supply:
K: 120/240 Vac (Automatic selection)
4: 24 to 48 Vdc (1)

Number of beam sets (PH: mm/in):
06: 2 sets of beams (620 / 24.42)
10: 3 sets of beams (1027 / 40.46)
14: 4 sets of beams (1434 / 56.49)

The emitter and the receiver have the same dimensions

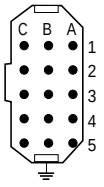


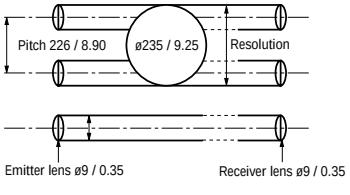
Cross section of the barrier



Metal Connector DIN 43652

(Emitter/receiver)

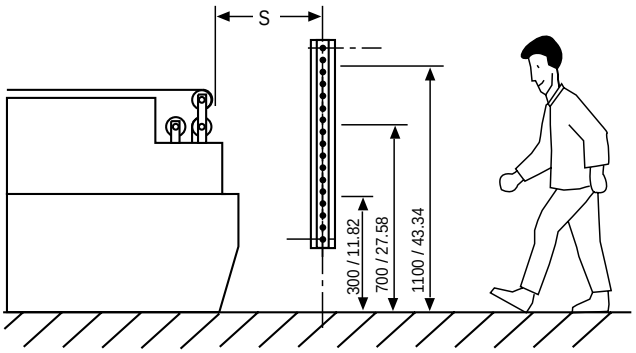




Model		*06*	*10*	*14*
Protection Height	PH	620 / 24.42	1027 / 40.46	1434 / 56.49
Barrier Height	HB	688 / 27.10	1088 / 42.86	1488 / 58.62
Total Height (including connectors)	HT	769 / 30.29	1169 / 46.05	1598 / 62.96
Number of beams		2	3	4
Response time (10^{-3} s)	t1	25	26	27
Mass per device	kg/lbs	5,2 / 11.4	7,5 / 16.5	9,8 / 21.6

Note:
(1) - The 24 to 48 Vdc version is featured with a galvanic insulation (dc to dc converter) that provides the immunity to external disturbances; this is essential to guarantee the safety integrity of the equipment.

Safety distances



Models	Beam height mm	Beam height in
FF-SB15E/R06❑-S2	400 / 900	15.76 / 35.46
FF-SB15E/R10❑-S2	300 / 700 / 1100	11.82 / 27.58 / 43.34
FF-SB15E/R14❑-S2	300 / 700 / 1100 / 1500	11.82 / 27.58 / 43.34 / 59.1

The safety distance between the protection field and the dangerous zone should be large enough to ensure that if the protection field is entered, the dangerous zone cannot be reached before the hazardous movement is interrupted. To determine the safety distance in an application, use the following formula:

- **Normal Approach**

  Europe (EN 999)

  S ≥ 1600 (t1 + t2) + 850 (mm)
  (or S ≥ 63 (t1 + t2) + 33.5 (in))

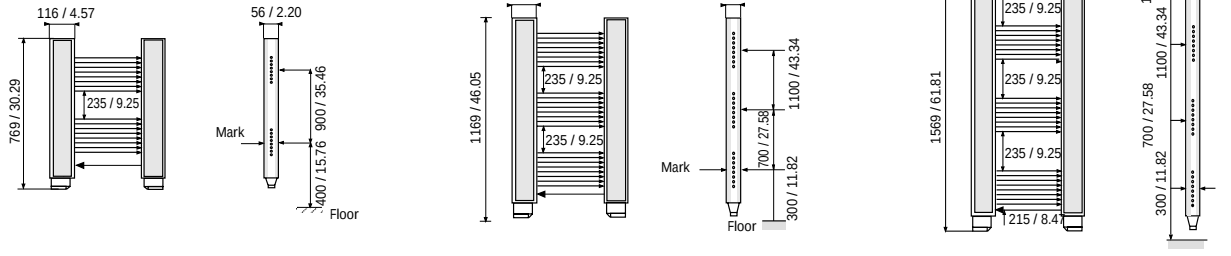
S: Minimum safety distance (mm / in)

t1: Response time of the light curtain (s)

t2: Stopping time of the equipment guarded by the light curtain, including all mechanical, electromechanical and electronic parts (s)

Mounting: The barrier has a mark on its front plate on the connector side. This mark should be positioned as follows:

Figure 1

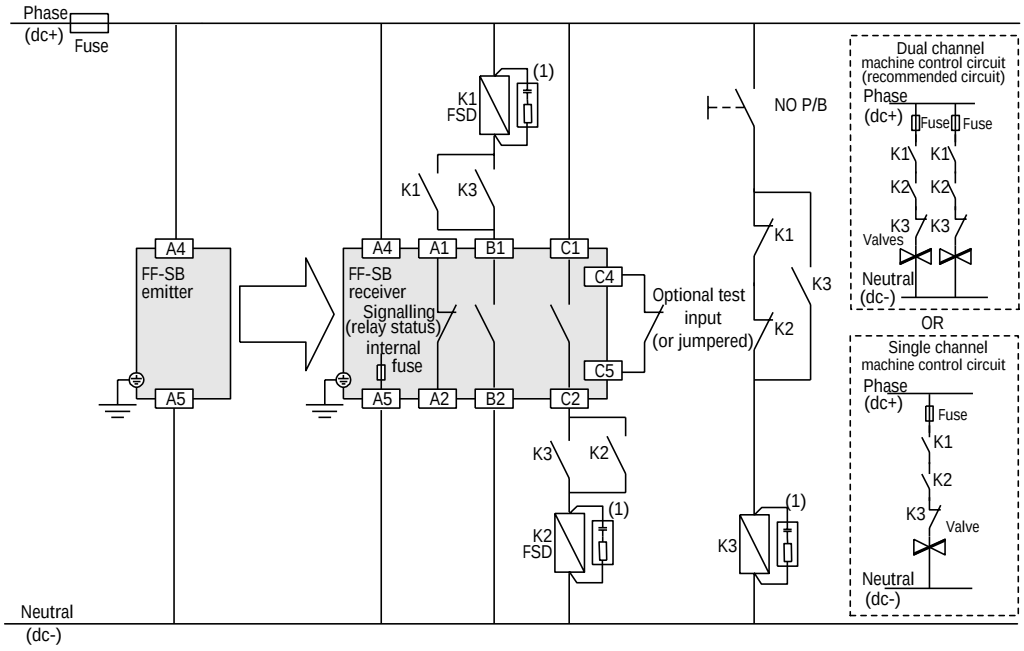


FF-SB15E/R06❑-S2 **FF-SB15E/R10❑-S2** **FF-SB15E/R14❑-S2**

Connection diagrams (Please refer to EN 954 for electrical interface).
(Possible use of Honeywell safety control module to replace K1, K2 and K3 external safety relays and simplify / ease wiring).

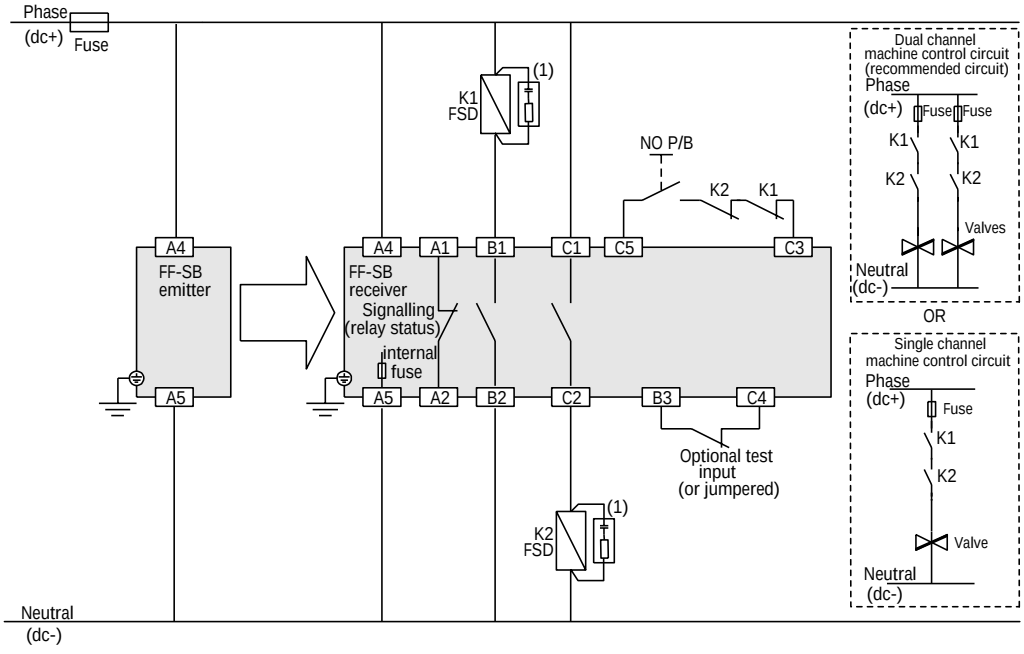
FF-SB12E/R02 ❑ -S2 models (These models provide 2 NO output contacts only)

Figure 1



Other FF-SB models (with exception of the 200 mm / 7.87 in, these models provide 2 NO and 1 NC safety output contacts).

Figure 2

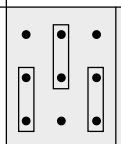
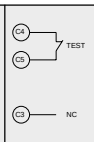
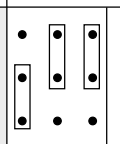
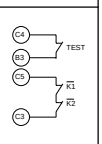
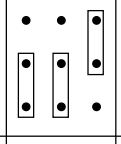
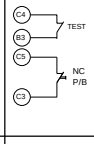
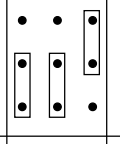
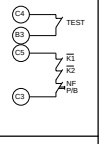
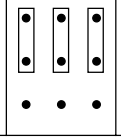
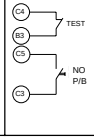
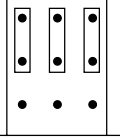
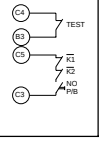


(1): RC (220 Ω + 0.22 µF) for ac interfaces, varistors for dc interfaces; NO P/B: normally open contact of a push-button; FSD: Final Switching Device

Important

The shutdown of the machine should not be carried out by a programmable controller, but by the power supply. The NC contacts can be used for signalling to the programmable controller. For more information, please refer to the installation and maintenance manual.

Selection of the restart mode

RESTART	WITHOUT FSD(1) MONITORING		WITH FSD(1) MONITORING	
AUTOMATIC				
START INTERLOCK				
START & RESTART INTERLOCK				

This equipment is able to operate in any of the following restart modes:

- Automatic: Automatic restart after power up or after any beam interruption.
- Start Interlock: Manual restart after power up and automatic restart after any beam interruption.
- Start & Restart Interlock: Manual restart after power up and after any beam interruption.

The equipment is delivered in the Automatic mode without FSD(1) monitoring. Any other mode can be selected by changing the internal jumper links position. These jumper links are located on the receiver power supply board. The following instructions must be followed to select one of 3 restart modes:

NC: Not Connected.

NC P/B: NC contact of a push-button

NO P/B: NO contact of a push-button.

(1) FSD: Final Switching Device (refer to the connection diagram).

Position of jumper links on delivery

Spare parts

- **Special front plate** (recommended for the FF-SB14 Series only in welding applications)

FF-SBZFL40 ❑❑ 1 shock-proof optical filter (improves immunity to light interference. High temperature resistant. Reduces scanning ranges by 40%). For receiver filter version units only. Nominal protected height (ex.: FF-SBZFL4006 to be fixed on a FF-SB14R06... receiver)

FF-SBZFL00 ❑❑ 1 shock-proof transparent front plate (high temperature resistant). Nominal protected height (ex.: FF-SBZFL0006 to be fixed on a FF-SB14E06... emitter)

- **DIN 43652 connecting plugs** (parts supplied with the equipment)

FF-SBZ1721137	Female supply plug for emitter
FF-SBZ1721202	Female supply and signal plug for receiver

- **Accessories**

FF-SBZ0130010	Assortment of Torx screws for end covers and internal circuits
FF-SBZ172115	Kit of 100 female crimping contacts for DIN 43652 metal connector
FF-SBZ666144	Kit of reducer and cable glands for metal connectors of a complete set FF-SB14E/❑❑❑-S2 ❑

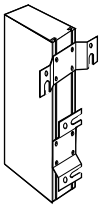
- **Tools**

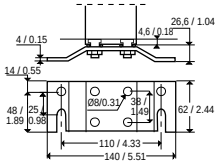
FF-SBZROD22	Ø22 mm / 0.86 in test rod for FF-SB12 series
FF-SBZROD35	Ø35 mm / 1.38 in test rod for FF-SB14 series
FF-SBZ0140010	Torx screw driver ACX 20
FF-SBZCRIMP	Crimping tool for DIN 43652 metal connectors
FF-SBZREMOV	Removal tool for DIN 43652 metal connectors

FF-SB accessories

Mounting brackets (brackets are not supplied with light curtains and need to be ordered separately).

FF-SBZS5000 (1)



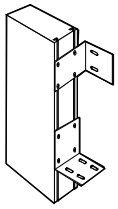


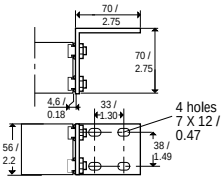
Kit of 2 brackets with anti-vibration inserts

The brackets can be assembled transversally or longitudinally (4 possible positions).

Application: Recommended for vertical or horizontal mountings.

FF-SBZS6000 (1)



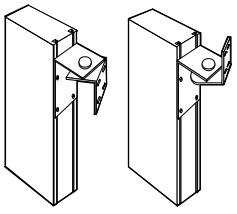


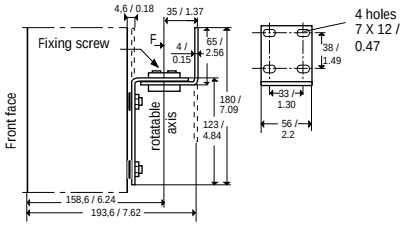
Kit of 2 right angle brackets with anti-vibration inserts

The corner plate can be fitted in 4 different positions at 90° to each other.

Application: Recommended for vertical or horizontal mountings.

FF-SBZS7000 (1)





Kit of 2 rotatable brackets with anti-vibration inserts

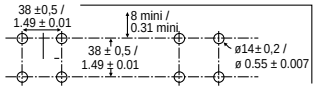
The bracket may be reversed.

These brackets are strongly recommended for precise optical alignment at max. range.

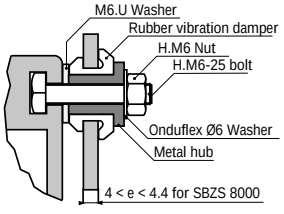
Application: Recommended for vertical mounting only.

FF-SBZS8000 (1)

Drilling gauge



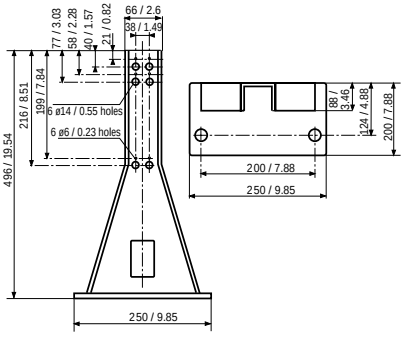
Detail



Kit of accessories for direct mounting

All installations must use this kit (8 bolts, 8 nuts, 16 washers, 8 anti-vibration dampers, 8 metal hubs).

FF-SBZS9010 (1)



Floor mounting column for FF-SB15

Floor mounting column for FF-SB15E/R❑❑-S2 only.
(black epoxy painting)

06 or 10

(1) Order 2 kits for a complete set (emitter and receiver)

SAFETY SENSITIVE EDGES

FF-SD Series

FEATURES

- Sensor based on an optoelectronic technology
- Meets the EN 1760-2 standard for Pressure Sensitive Protective Devices
- Permanent self-checking electronics designed in compliance with Category 4 per the EN 954-1 standard
- Protection lengths: from 0.4 to 10 m / 1.31 ft to 32.8 ft
- High resistance to environmental influences
- Robust against mechanical damage
- Sensors sealing: IP68
- Automatic gain control to adjust system to different protection lengths
- Low actuating force and high over-travel
- Supply Voltage: 24 Vdc
- Response Time of the control unit: 32 ms
- Manual or automatic restart
- LED status indicator
- Slim line 22.5 mm / 0.88 in width control unit

Suitable for interfaces up to CATEGORY 4 per EN 954-1

c UL us LISTED
E197638

TYPICAL APPLICATIONS

- Machine guards, doors and hoods
- Machining centers
- Presses
- Welding machines
- Packaging machines
- Lifting decks, elevating platforms
- Material handling and feeding systems, robots
- Paternoster, theatre stages
- Automatic guided vehicles (AGV)
- Industrial washing machines

The Honeywell FF-SD Safety Sensitive Edge is a pressure sensitive protective device designed in compliance with the requirements of the EN 1760 part 2 European Standard for protection of operators exposed to hazardous moving parts.

Each safety edge system is made up of an emitter and a receiver, a rubber profile mounted on an aluminum rail and a control unit. The complete system complies with Category 4 per EN 954-1 European Standard and therefore can be used in high-risk applications.

The sensors mounted inside the hollow rubber profile use a pulsed infrared light beam to achieve a dynamic monitoring concept together with the control unit. If the light beam is attenuated, the control unit de-energizes its safety output relays.

The Safety Sensitive Edges can easily be adapted to different lengths thanks to an automatic gain control system. Thus, environmental influences like vibrations, dust, or profile damage can be compensated. The Safety Sensitive Edge can protect lengths from 0,4 m to 10 m / 1.31 ft to 32.8 ft.

The industrial rubber profile provides generally good chemical or mechanical resistance. A coated version of the rubber profile is available providing good oil resistance. The rubber profile can be replaced easily and quickly. The sensors, with an IP68 sealing, can be used in harsh industrial environments.

The slim line safety control unit easily fits inside the electrical cabinet and can be installed up to 200 meters away from the Safety Sensitive Edge.

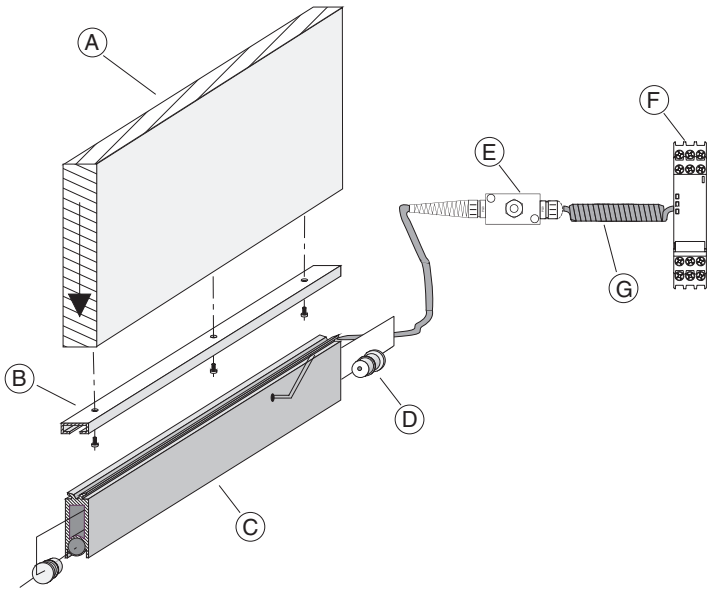
⚠ WARNING

MISUSE OF DOCUMENTATION

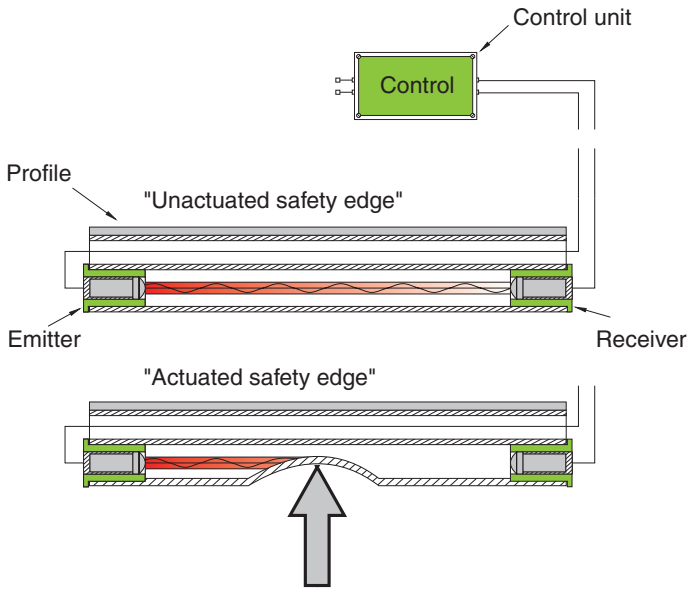
- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

Safety Sensitive Edge System



A: Moving part
B: Aluminum rail
C: Rubber Profile
D: Sensors
E: Junction Box (Optional)
F: Control Unit
G: Coil Cord (Optional)



Selection of a Safety Sensitive Edge

The Safety Sensitive Edge is used to protect people from being injured by a moving part. In order to select the right Safety Sensitive Edge system, several parameters are required:

- Which safety category according to EN 954-1 does your application require?
- What is the maximal speed of the hazardous movement?
- What is the stopping travel of the moving part after a stop signal was sent from the control unit?
- What is the maximal permissible force? (depending on the part of body to be protected, e.g. fingers, hands etc.)
- What are the expected environmental specifications of the profil? (e.g. resistance to chemicals, oils etc.)

The minimum over travel required by the safety edge is determined from the measured or given stopping travel at maximum operating speed. The EN 1760-2 standard recommends a safety factor of at least 1.2 times the minimum distance.

If the application involves extremely frequent actuation, care should be taken to choose a profile that recovers its original shape as quickly as possible. Attention must also be paid to the construction of the opposite edge.

When the stopping travel and speed are known, the force-travel diagrams of the safety edges can be used to select the safety device with the required over travel and the required operating speed.

The stopping response time of the machine may have to be improved if no safety edge with sufficient over travel is available.

Installation of the safety edge

The aluminum rail is mounted on the moving part of the machine. To fix it, drill a hole approximately every 70 mm / 2.76 in distance and fix it to the application with the use of head or countersunk head screws (diameter 3 mm to 6 mm / 0.11 in to 0.23 in). The surface should be plain and clean.

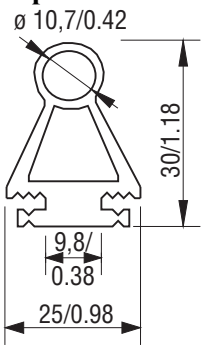
The maximum length of the aluminum rail is 2,5 m / 8.2 ft. For lengths over 2,5 m / 8.2 ft, several units with standard size have to be mounted. Care must be taken that neither misalignment nor bends occur (do not exceed 30°).
Slide or clip the sensor profile into the rail. If the safety sensitive edge is mounted vertically, the profile has to be fixed to avoid slipping off the aluminum rail.

The sensors can be wired to the control unit directly or through the junction box. The coil cord is used when the door's motion can damage the cable. A special version of the sensors offering polyester coated cables for better flexibility can also be used for this type of application.

Ordering Information

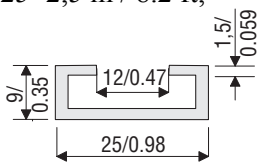
Rubber profiles and aluminum rails

FF-SDZP□2530□□
30 mm x 25 mm rubber profile

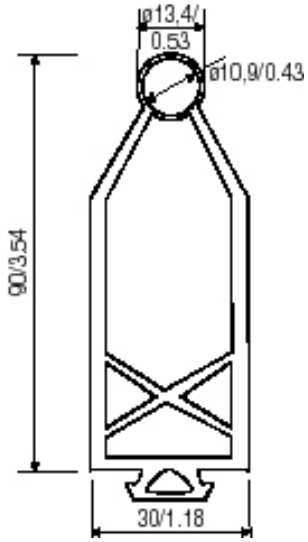


FF-SDZRA2509□□
25 mm aluminum rail

Available lengths: □□
01=1 m, 3.28 ft
25=2,5 m / 8.2 ft,

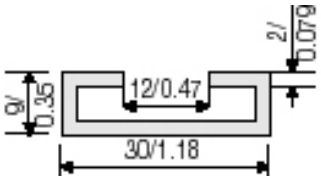


FF-SDZP□3090□□
90 mm x 30 mm rubber profile



FF-SDZRA3009□□
30 mm aluminum rail

Available lengths: □□
01=1 m,/ 3.28 ft
25=2,75 m / 9.0 ft,



Profile versions:
FF-SDZP□2530□□
FF-SDZP□3090□□

R = standard profile
C = special coated profile (good oil resistance)

Available lengths:
FF-SDZP□2530□□
FF-SDZP□3090□□

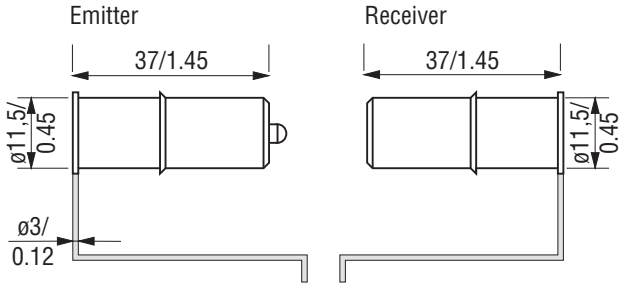
01=1 m / 3.28 ft.
25=2.5 m / 8.2 ft.
05= 5 m / 16.4 ft.
10=10 m / 32.8 ft.
00= 25 m / 82.02 ft.

FF-SDER11A2
Safety Sensors with standard cable

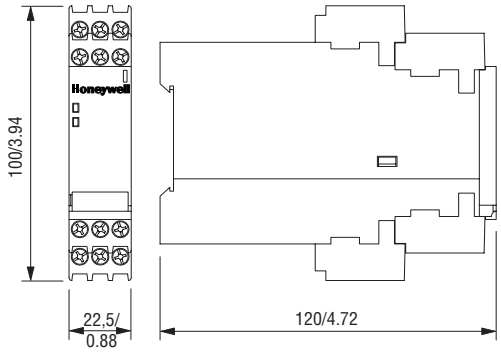
The FF-SDER11A2 version is recommended when the sensor cable is not in movement.

FF-SDER11B2
Safety sensor with special flexible cable

The FF-SDER11B2 version has polyester coated wires inside the sensor cable for better flexibility, and is recommended in applications where the sensor cable is in movement.

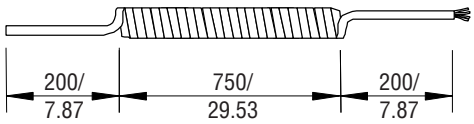


FF-SDC100R2
Safety Control Unit



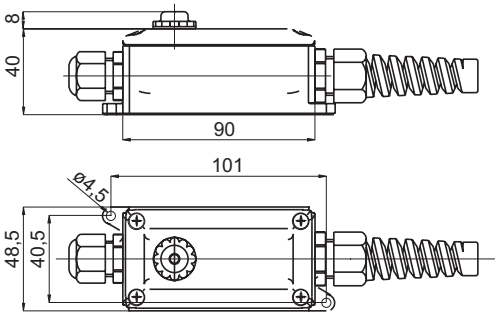
Accessories (optional)

FF-SDZCOILA
Coil cord



The coil cord is used as a flexible connection between the junction box mounted on the moving part and the control unit. The maximum cable extension is 3 meters.

FF-SDZJUNCA
Junction Box



The junction box is used for the cable connection between emitter / receiver and the control unit (sealing: IP 65).

FF-SD

- **Pressure sensitive protective device in compliance with the requirements of the EN 1760-2 standard**
- **Safety Sensitive Edge in compliance with the requirements of the EN 954-1 for Category 4 equipment**

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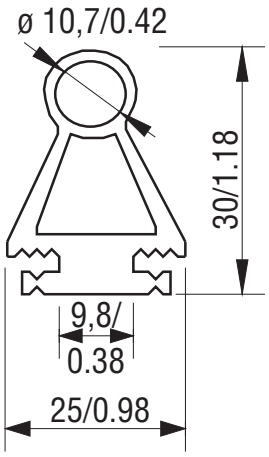
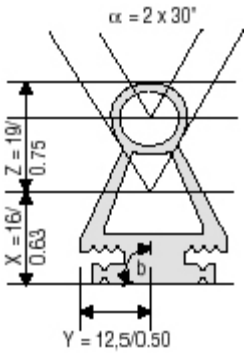
Suitable for interfaces up to CATEGORY 4 per EN 954-1

TECHNICAL SPECIFICATIONS

CONTROL UNIT SPECIFICATIONS	FF-SDC100R2 control unit	
Power supply	24 Vdc -10 %, +20 %	
Power consumption	< 4 W	
Response Time	32 ms	
Safety outputs	2 NO safety relay contacts	
Auxiliary outputs	1 NPN static non-safety output (NO characteristics)	
Start modes	Manual or automatic	
Max. operating voltage	250 Vac/dc	
Max. operating current	4 A resistive load	
Mechanical lifetime	3 Million operations	
Safety Category	Category 4 according to EN 954-1	
Operating Temperature	+5 °C to +55 °C / +41 °F to +131 °F	
Sealing	terminal strips: IP 20, housing: IP 40	
Weight	0,2 kg / 0.44 lbs	
PHOTOELECTRIC SENSORS SPECIFICATIONS	**FF-SDER11□2 SENSORS**	
Material	Polyethylene	
Scanning range	From 0,4 m to 10 m / 1.31 ft to 32.8 ft	
Emission	IR light : 950 nm	
Voltage	12 Vdc (supplied by the control unit)	
Operating Temperature	-20 °C to +75 °C / -4 °F to +167 °F	
Sealing	IP 68	
Length of the sensor cables	Emitter: 10,5 m / 34.44 ft – Receiver: 3 m / 9.84 ft	
Max. cable length	200 m	
Standard cable of FF-SDER11A2 sensors	Polyurethane / polyvinylchloride, 3 x 0,15 mm² oil proof, cold resistant, notch proof cable	
GENERAL RUBBER PROFILE SPECIFICATIONS	**FF-SDZPR Series Standard profiles**	**FF-SDZPC Series Special coated profiles**
Material (Chemical marking)	Ethylen-Propylen-Ter-Polymer EPDM (APTK)	
Operating Temperature	5 °C to 55 °C / 41 °F to 131 °F	
Storage temperature:	-25 °C to +60 °C / -13 °F to 140 °F	
Rebound elasticity at 20 °C / 68 °F	good	
Resistance against permanent deformation	good	
Sealing level	IP 67	
Operating speed	max.: 100 mm/s	
General weatherproofness	excellent	
Ozone resistance	excellent	
Oil resistance	poor	good
Fuel resistance	poor	good
Chemical solvent resistance	poor to satisfying	good
General resistance against acids	good	

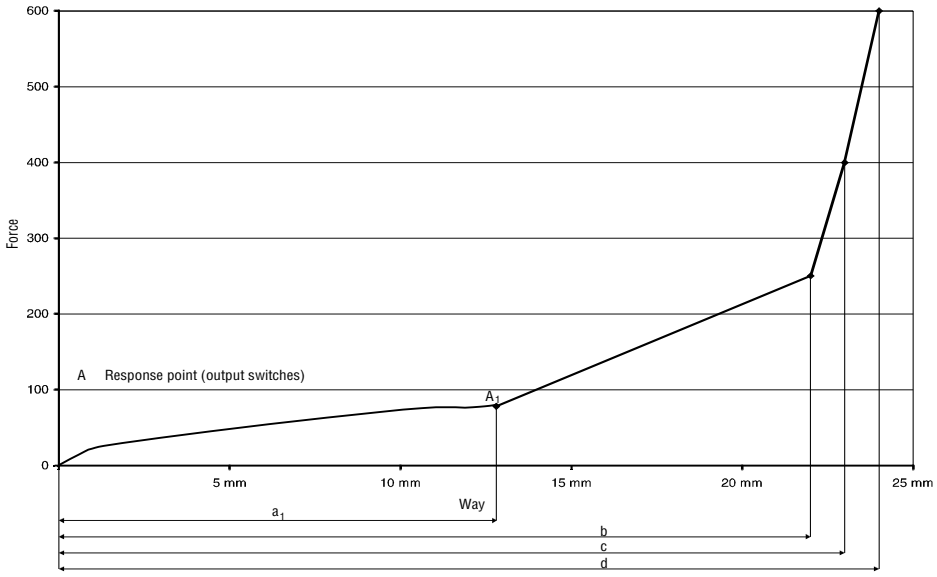
SPECIFICATIONS OF THE FF-SDZP□2530□□ RUBBER PROFILE

Technical specifications		Dimensions in mm / in	Effective sensing surface
Hardness	60 Shore A		
Height	30 mm		
Width	25 mm		
Finger detection	yes		
Weight	0,3 kg / m		
No-detection zone on the profile edges due to the inserted sensors	2 x 35 mm		
Operating speed	Max. 100 mm / s		
Force	Max 500 N applied over the total effective sensing edge surface		
Temperature range	5 °C to 55 °C / 41 °F to 131 °F		
Sealing level	IP 67		

The no-detection zone of 2 x 35 mm must de clearly indicated on the rubber profile.

The highest total actuating force applied over the effective sensing surface should be less than 500 N.

Force travel relation



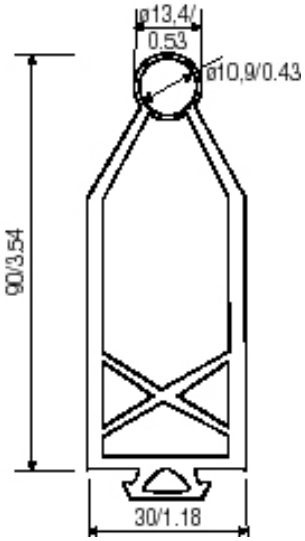
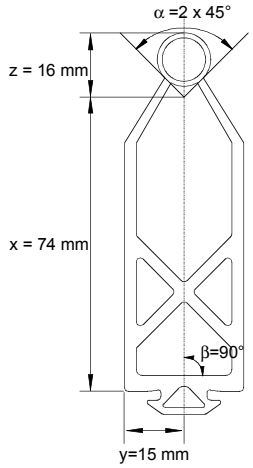
Measuring parameters:
- Temperature: T = 23 °C
- Install position: B (per EN 1760-2)
- Measuring point: C3 (per EN 1760-2)
- Speed : 100 mm/s (from 0 to point A)
  10 mm/s (starting from point A)

Actuation travel: 8 mm

Over travel = Total Travel – Pre-Travel

	Travel	Force
a1= pre travel	13 mm / 0.50 in	80 N
b = total travel at 250 N	22 mm / 0.87 in	250 N
c = total travel at 400 N	23 mm / 0.9 in	400 N
d = total travel at 600 N	24 mm / 0.94 in	600 N

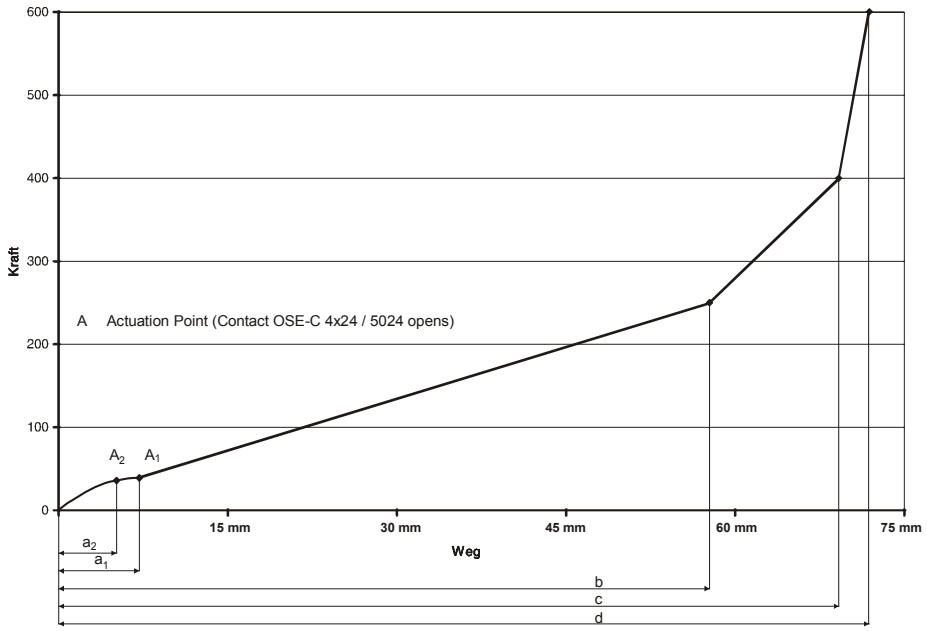
SPECIFICATIONS OF THE FF-SDZP□3090□□ RUBBER PROFILE

Specific profile data		Dimensions in mm / in	Effective sensing surface
Hardness	60 Shore A		
Height	90 mm		
Width	30 mm		
Finger detection	yes		
Weight	0,9 kg / m		
No-detection zone of on the profile edges due to the inserted sensors	2 x 25 mm		
Operating speed	Max. 100 mm / s		
Force	Max 400 N applied over the total effective sensing edge surface		
Temperature range	5 °C to 55 °C/ 41 °F to 131 °F		
Sealing level	IP 67		

The no-detection zone of 2 x 25mm must de clearly indicated on the rubber profile.

The highest total actuating force applied over the effective sensing surface should be less than 400 N.

Force travel relation



Measuring parameters:

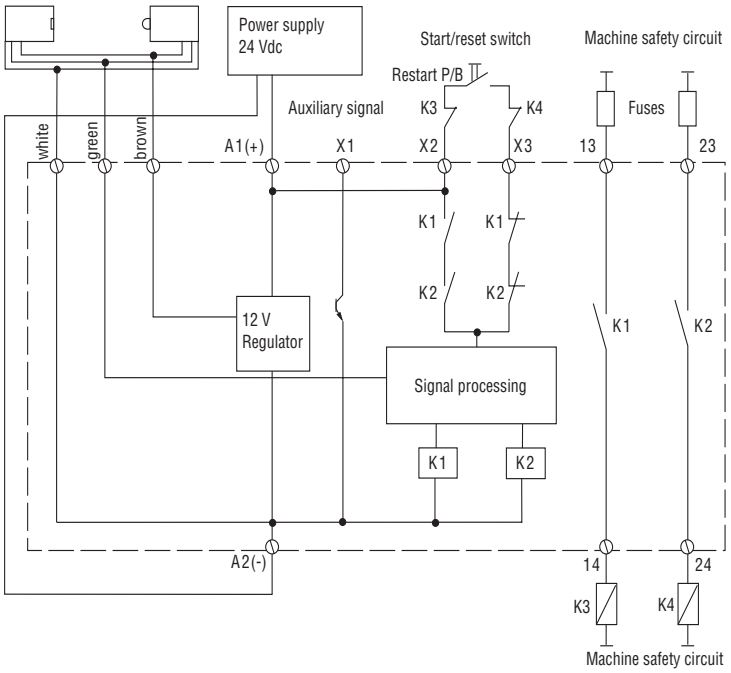
- Temperature: T = 23 °C
- Install position: B (per EN 1760-2)
- Measuring point: C3 (per EN 1760-2)
- Speed : 100 mm/s (from 0 to point A)
  10 mm/s (starting from A)

Over Travel = Total travel – Pre Travel

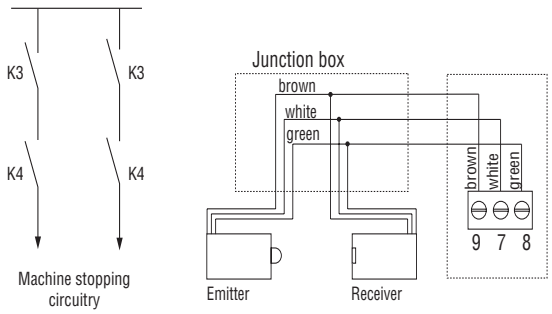
	Travel	Force
a1/2= pre-travel	8.8 mm	40.5 N
b = working travel at 250 N	58.4 mm	250 N
c = working travel at 400 N	70.4 mm	400 N
d = total travel at 600 N	72.8 mm	600 N

Electrical connection

Connection to the FF-SDC100R2 control unit



Connection using the FF-SDZJUNCA junction box



The safety control unit FF-SDC100R2 hash a DIN-rail mount housing:

- Connect the power supply to terminals A1(+) and A2 (-).
- Connect the start / reset circuit:
    - **Manual start:** connect a normally open start/reset push-button in series with the normally closed contacts of external contactors K3 and K4 (when used) between X2 and X3.
    - **Automatic start:** connect a jumper between X2 and X3 or connect the normally closed contacts of external contactors K3 and K4 (when used) in series.
- Connect the emitter and receiver sensors as follows: connect the brown, white, green emitter and receiver wires to the brown, white, green terminals of the control unit.
- Connect the safety outputs : connect the normally open contacts 13/14 and 23/24 into the machine safety circuit.
- Use the auxiliary signal output X1 (NPN open collector) for signaling purpose.

Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, as its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance,current specifications, pricing or name of the nearest Authorised Distributor, contact a nearby sales office or:

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www.honeywell.com/sensing/safety
107096-20-EN FR26 GLO 0906 Printed in France

Category 3 Safety laser scanner

FF-SE Series

Two zone programmable area control

FEATURES

- No touch detection system in compliance with the requirements of IEC/EN 61496 part 1 and pr EN 61496 part 3 for Type 3 equipments
- Meets applicable parts of ANSI B11.19-1990 standard and OSHA 1910.212 regulations for Control Reliability
- Objects and people protection
- Surveillance area size up to 262 m^2 / 2820 ft^2
- Class 1 infrared Laser beam, invisible and harmless to the eye
- Easy to install: a single device, a single cable
- Detection of a unique inner failure per EN 954-1
- Fast and accurate configuration of the surveillance areas around the dangerous zone with a computer and user friendly software
- The shape of the protection zones fits any environment (Teach-in option for zone definition)
- Scanning angle: up to 300°
- Free rotating head, making it a self-cleaning optical system
- Permanent self-checking of the beam status with fixed test target
- External user defined test target possibility to ensure correct positioning of the laser during machine operation
- Response time: 0.280 s
- Surveillance range: 10 m / 32.8 ft
- Detection range: 6 m / 19.7 ft
- Resolution: 70 mm / 2.8 in at 6 m / 19.7 ft

TYPICAL APPLICATIONS

- Horizontal detection (like a sensitive mat) of people or objects
- Anti-collision system for AGVs

BIA
Berufsgenossenschaftliches Institut für Arbeitssicherheit

C US
(Pending)

Approved as
Type 3
per IEC/EN 61496-1

The FF-SE laser scanner from Honeywell is a revolutionary product in the world of industrial safety. This device combines radar and laser principles to scan pre-defined zones around dangerous machinery or moving vehicles. In case of intrusion in these zones, output relays are immediately opened, eliminating the danger.

An infrared class 1 laser beam strikes a mirror rotating at 8 Hz, allowing it to sweep a 300° area. Any object with a minimum reflectivity of 1,8% (black target) will be detected in a 6 m / 19.7 ft radius. Two safety levels may be set through two zones that can have any shape:

- "alarm zone", in a 10 m / 32.8 ft radius around the FF-SE
- "safety zone" in a 6 m / 19.7 ft radius

These two zones are defined using the software (ordered separately), running on a computer connected to the FF-SE, which allows the areas to be protected to be displayed on the screen. The two zones correspond to two independent outputs, allowing multiple applications:

- the alarm zone can be used to trigger an acoustic or light signal when a person approaches, which indicates that there is a close danger, allowing the intruder to withdraw without stopping the machine.
- the safety zone is used to trigger the immediate stopping of the machinery (2 safety NO contacts).

Restart is automatic after clearing the zone. Use additional safety control module if manual restart is needed.

This system is unique because of its small resolution (0,5° in angle) and its excellent precision, while covering a wide area (262 m^2 / 2820 ft^2). The FF-SE has been designed in agreement with the pr EN 61496-3 that will soon be brought into effect for this new kind of detecting device.

External and internal surveillance systems make it a Type 3 optoelectronic protective system. Its self-cleaning optical head and its good immunity to pollution guarantee a superior reliability.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

FF-SE

- **Objects and people protection**
- **Scanning angle up to 300°**
- **Surveillance up to 262 m² / 2820 ft²**

BIA
Berufsgenossenschaftliches Institut für Arbeitssicherheit

C US (Pending)

Approved as Type 3 per IEC/EN 61496-1

Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

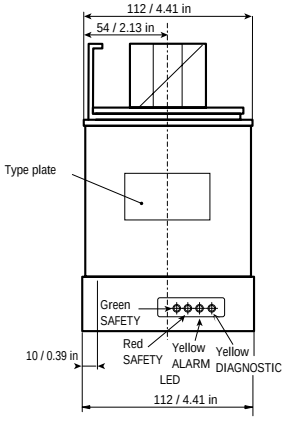
Features	
Power supply	24 Vdc, ± 15%
Consumption	0,75 A at 24 Vdc, rush at startup: 2 A during 100 ms
Measure and detection angle	300°
Detection distance	Black target (1,8%): 6 m /19.7 ft
Outputs	3 relay outputs, free of potential: 2 A / 48 V
Head spinning frequency	8 Hz, ± 5%
Status display	*Green:* safety zone free • *Red*: safety zone occupied • *Yellow:* alarm zone occupied - Diagnostic
Emitting source	Infrared laser LED, 905 nm, ± 30 nm
Beam divergence	0,9°
Interface	RS 232, V.24, 19200 Baud
Safety class	*Sensor:* Type 3 according to IEC/EN 61496-1(1) • *Laser*: Class 1(2) according to IEC 825-1
Protection class	IP 65 (NEMA 4, 13)
Operating temperature	0 °C to 50 °C / 32 °F to 122 °F
Storage temperature	-20 °C to 70 °C / -4 °F to 158 °F
Shock and vibration resistance	According to IEC 68
Material	*Casing*: Aluminium • *Connector*: Steel
Colour	Yellow paint RAL 1021

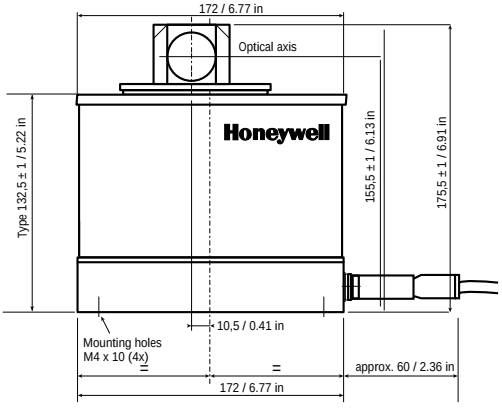
Ordering information

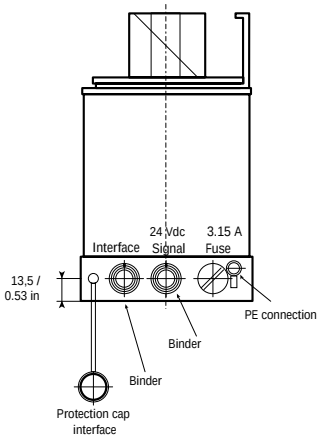
FF-SEDGE6G2-1 Sensor kit (Sensor + power cable)
and
FF-SEZ6SOFT2 Software kit (Diskette + PC cable)

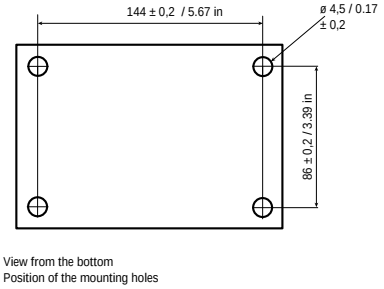
Accessories:

FF-SEZ6BRAC3 Mounting bracket
FF-SEZ6PLAT Mounting plate
FF-SEZ6POST Post supporting the bracket







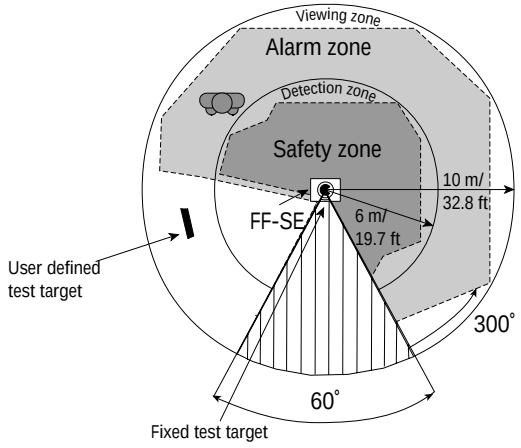


Remarks
(1) Category 3 per EN 954-1.

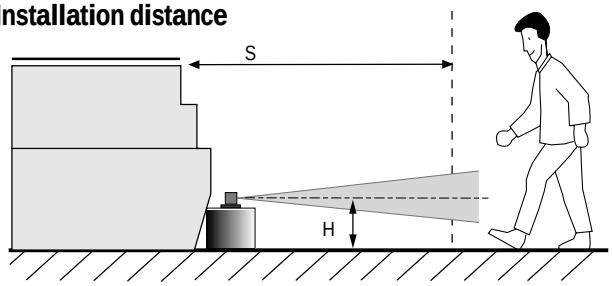
(2) No special limitation of use in the USA or in Europe.

Infrared beam radius		At 6 m / 19.7 ft: 100 mm / 3.9 in • At 10 m / 32.8 ft: 170 mm / 6.7 in
Beam Increment		0,5°
Response time	t1	280 ms (including relays)
Device weight		3 kg / 6.61 lbs

Tolerance and detection distances



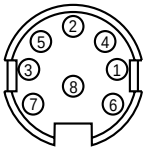
Installation distance



$$S \geq V (t_1 + t_2) + (L - 0.4\ H) + E$$

Where:

- *S: Distance (mm / in)*
- *t1: Response time of the FF-SE (See technical specifications)*
- *t2: Stopping time of the machine (s); i.e. the time interval necessary to stop the machine, after the protection device has emitted the stop signal*
- *L: 1200 mm / 47.28 in*
- *H: Height of the beam from the ground, 300 ≤ H ≤ 1000 mm / 11.82 ≤ H ≤ 39.4 in*
- *V: Penetration velocity (mm / s or in / s) (V = 1600 mm / s in Europe) V = 63 in / s in USA*
- *E: Maximum Error in measurement (see technical specifications)*



Pin number	Signal	Function
1	24 V	Power 24 Vdc supply
2	GND24	Ground 0 Vdc supply
3 SAFETY 2.1	DETEC2	Safety 2 relay output
4 SAFETY 2.2	DETEC2	Safety 2 relay output
5 SAFETY 1.1	DETEC1	Safety 1 relay output
6 SAFETY 1.2	DETEC1	Safety 1 relay output
7 ALARM1		ALARM relay output
8 ALARM2		ALARM relay output
SHIELD	PE	Protection earth

The protection zone is made up of 600 beams. Each beam receives a signal corresponding to a distance measured using the light time of flight principle, whatever the reflectivity of the target. If this signal goes below a user defined threshold during the surveillance, it means that an object is present in the protection area. Consequently, the corresponding relay is opened.

The surveillance area includes an alarm zone and a safety zone, that are user-defined. Both may have an irregular shape which corresponds to the environment.

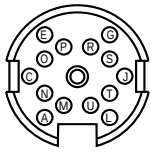
Applications: a greater flexibility

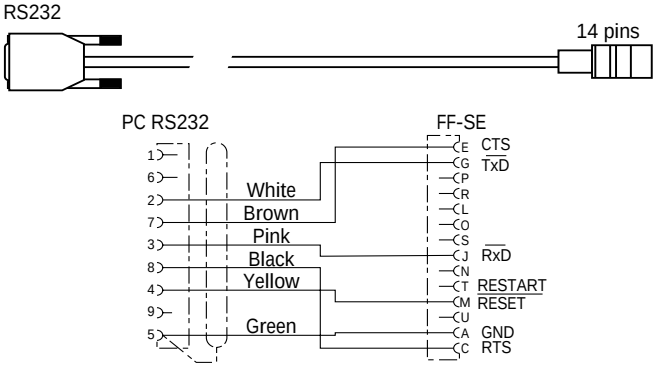
The FF-SE being an optoelectronic detecting device, it has a no touch detection and therefore brings more flexibility on site. Its principle of diffuse reflection simplifies the installation, compared to the traditional emitter/receiver pair of light curtains. The protection zones do not need any additional fixture (wall, fence, door...) since the FF-SE covers a 300° angle and adapts to existing obstacles. Installation costs are reduced to a minimum and the working position is easily accessible since the protection is a no-touch type.

In case of a change in the machine or production floor layout, the FF-SE can adapt very quickly by a re-configuration. The FF-SE is not linked to any particular set up or machine: it is exchangeable just by programming.

Compared to a usual safety device (light curtain, safety mat, door...), the FF-SE includes two protection zones which is a great asset: the alarm zone, used as an early warning zone, allows a signal to an intruder that he is close to a dangerous zone and that his movement is about to stop the machine. There is still time for the individual to change direction and avoid a stoppage of the equipment that can be costly if it occurs often. By avoiding unnecessary stoppage, the FF-SE increases the production lines productivity without decreasing the safety: it protects just what is needed.

Computer connection





Software

The Honeywell software kit allows the protection zones to be easily programmed into the sensor. This software runs under any PC (286 or more), under MS DOS. The FF-SE is linked to the PC through the serial port (RS232 format) and a cable supplied with the software kit. The custom zone definition can be achieved through 3 different methods that can be combined:

- with the mouse, by clicking on end points forming the limit of the protection field;
- with the keyboard, by plotting points with the cursor keys;
- with a text editor in which the end points are defined by their coordinates;

Defining the protection zones is easy since obstacles are displayed on the screen: they are seen in real time.

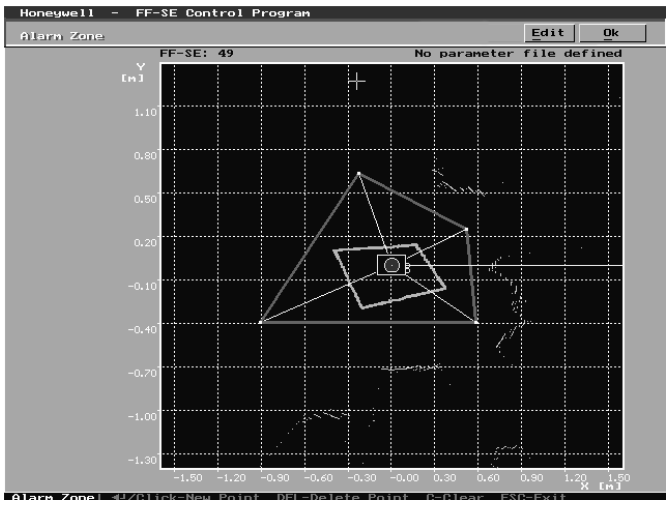
Using a PC also allows to store several configurations on a disk, that can be retrieved in a few seconds into the sensor. One can therefore define different shapes according to different situations and transmit them into the sensor whenever needed.
Once the settings are downloaded into the sensor, it is a standalone device that will keep all zone definitions and parameters in a permanent memory, even if the power is cut. Access to this memory and to zone definition is protected by a password. The program also has other features: real time profile measurement, sensor simulation to get familiar with it, surveillance of the zones with intrusion time display.

Self-check

A fixed test target is mounted on top of the housing to ensure the beam self-check: this takes away 60° off the scanning angle to perform various checks: contamination of the lens, accuracy of the distance measurements, status of the beam...

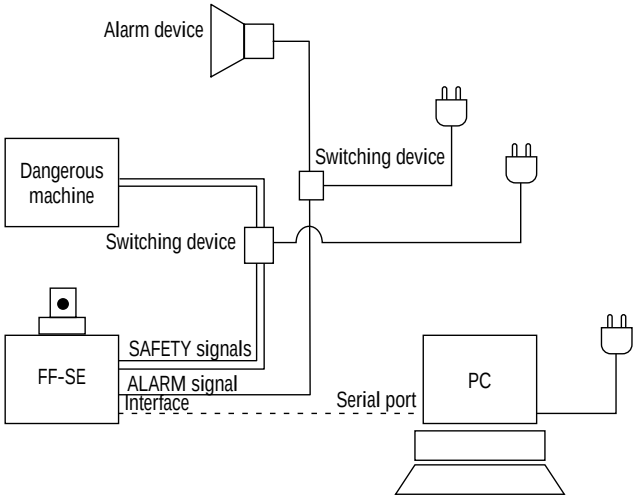
An external test target possibility ensures the correct positioning of the sensor and guarantees the safety if its position is changed since the definition of the zones depend on the position of the sensor. The rotating head is self-cleaning and therefore is much less sensitive to pollution as other fixed-window devices. The internal angular coder is controlled by a “surveillance circuitry”, as are the relays.

Graphic screen

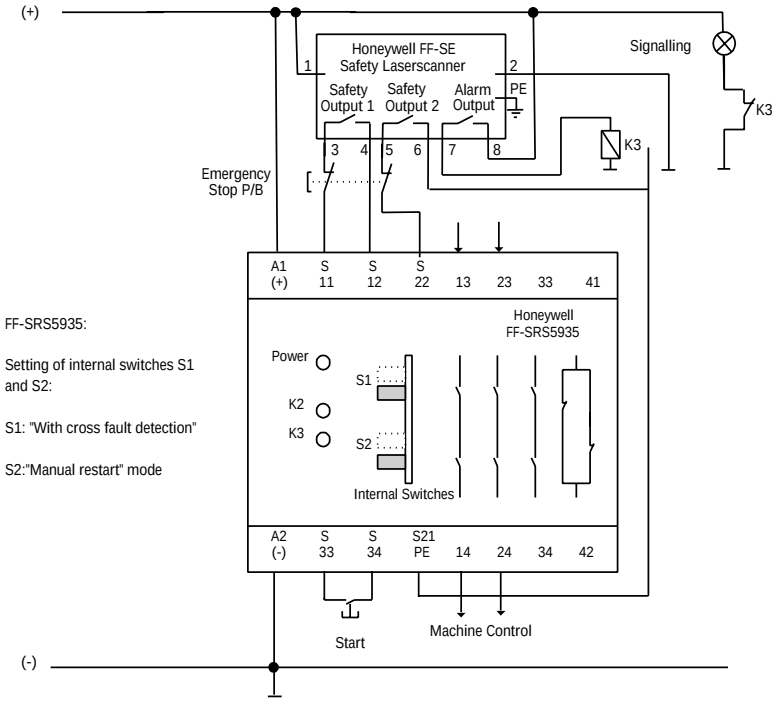


Defining the zones with the editor

Example of electrical connection



Connection diagram



Installation

The FF-SE can be installed in various configurations. It does not need any receiver nor separated reflector. When mounted horizontally, it replaces light curtains or safety mats by offering a better coverage and an increased flexibility. Its small size allows installations in most of existing sites. The laser beam is an invisible Class 1 laser, therefore it is not harmful and does not disturb workers. A unique connector links the sensor to the power supply and the devices connected to the 3 output relays (alarm, safe 1 and safe 2), making connections with the sensor very easy.

For AGVs

Weight and speed of AGVs in industrial environments can represent a certain danger for the workforce. The FF-SE can be installed on these AGVs to ensure people safety: due to its long range, it can stop the AGV before the obstacle, even if its speed is high.

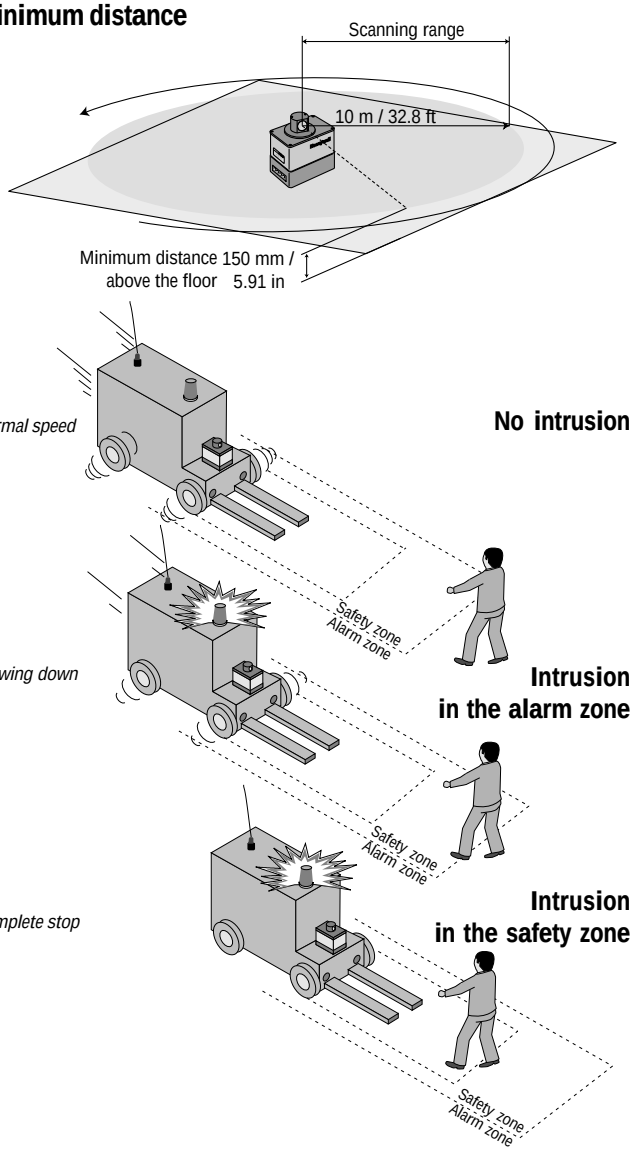
The two distinct zones can be used in an elegant way:

The alarm zone, with its 10 m / 32.8 ft range, acts as a slowing down system: if something is detected in the zone, the AGV will slow down and emit a warning signal to make the way free again.

The safety zone, with its 6 m / 19.7 ft range, acts as an emergency stop: the AGV will immediately be stopped when an object is detected in this zone.

Knowing the AGV stopping distance and the response time of the safety chain, it is possible to calculate the limits of these zones optimally.

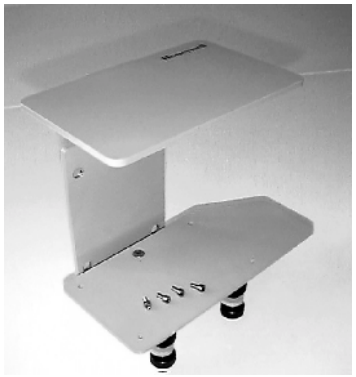
Minimum distance



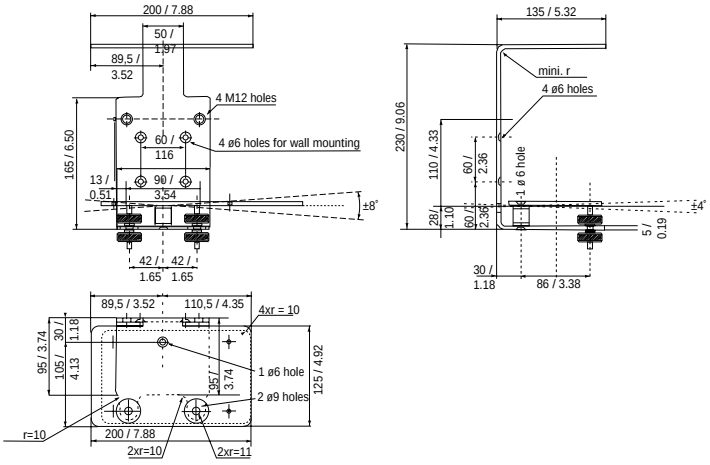
FF-SE

Accessories

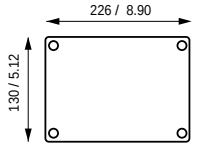
- **FF-SEZ6BRAC3 Mounting bracket:** It reinforces the protection in installations where the sensor could be reached by humans or vehicles. It allows head up or down mounting. The bracket can be mounted on a vertical surface from behind thanks to 4 M6 holes. There are 2 adjustable screws that allow an adjustment of the scanning plane (±8°) in X, ± 4° in Y, so as to allow an accurate placement of the beam, especially in multiple device configurations.



Dimensions in millimeter/inches

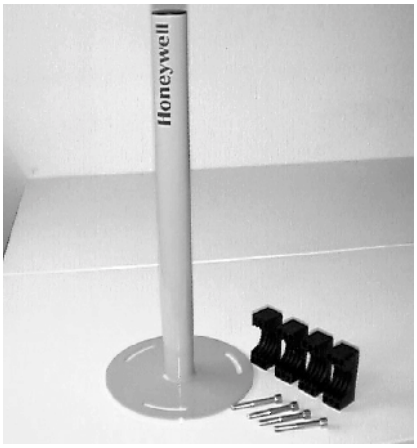


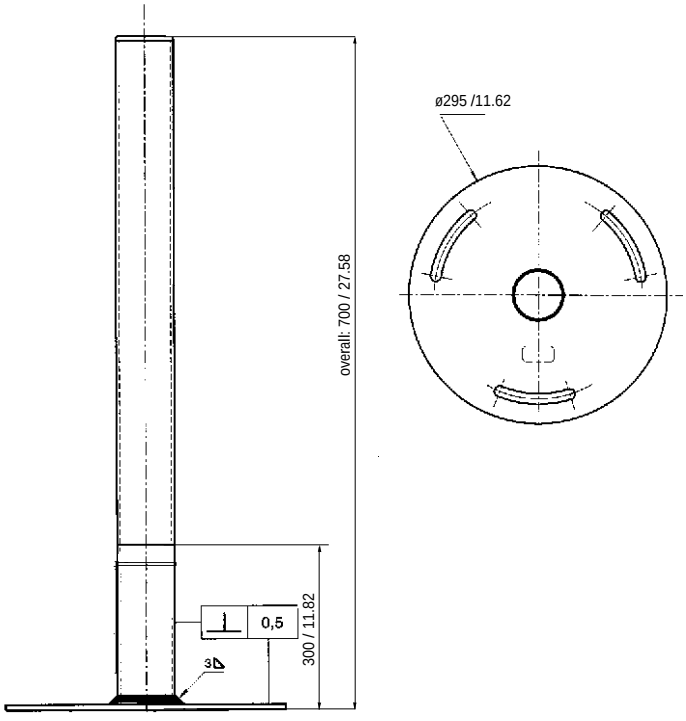
- **FF-SEZ6PLAT Mounting plate:** Mounting plate to mount the scanner on horizontal ground.



- **FF-SEZ6POST:**

  This post is designed to support the mounting bracket FF-SEZ6BRAC3. This allows an adjustment of the scanning plane height. The scanning plane can be adjusted from 300 mm up to 700 mm / 11.82 in to 27.58 in. The bracket can also be rotated around the post. A collar holds the bracket to the post and slides on the post. The bracket can be mounted up or down, so that the laser scanner head is either up or down.





- **FF-SEZ6SOFT2:** The Honeywell software kit allows sensor programming and setup. It is supplied with a manual explaining how to use it and an RS232 cable for PC connection.

Safety light curtain

FF-SG Series

Compact and cost-effective unit

FEATURES

- Active Optoelectronic Protective Device compliant with the requirements of the IEC/EN 61496-1 and IEC/EN 61496-2 European norms for Type 4 electrosensitive protective equipment
- Meets applicable parts of North American standards and regulations OSHA 1910.212 and 217; ANSI B11.1 series; ANSI RIA 15.06 and CSA
- **Self-contained unit. No electrical connection necessary between emitter and receiver**
- **2 safety static outputs with short-circuit and cross-fault detection**
- Integrated dc to dc converter as per the IEC/EN 61496 Standard
- Resolutions available:
  ø18 mm / 0.7 in for finger detection
  ø30 mm / 1.2 in for hand detection
- Protection height up to 1470 mm / 58 in
- Scanning range up to 3,5 m / 11.48 ft
- Electrical connection: M12 (8 pin) connectors
- Compact size: only 42 mm^2 x 55 mm^2 / 1.65 in^2 x 2.16 in^2 cross sectional area
- Optional interface control module for more switching capabilities and additional features

TYPICAL APPLICATIONS

- Presses and punches
- Woodworking machines
- Electronic assembly
- Textile machines
- Pressing, moulding and thermoforming machines

Approved as
Type 4
per IEC/EN 61496-1/2

The Honeywell FF-SG is a self-contained light curtain that does not require a separate control unit for operation. As soon as an object is detected inside the protection field, the FF-SG opens its two safety static outputs to generate an emergency stop condition that is used to remove dangerous machine motion when properly interfaced with the machine stopping circuitry. When connected to the FF-SRL60252 optional interface control module, the FF-SG provides a wide variety of advanced functions: cross-monitored relays, final switching devices monitoring for the control of external contactors or relays, choice between automatic restart or start and restart interlock as well as relay status indicators.

The FF-SG is designed in compliance with IEC/EN 61496-1 and IEC/EN 61496-2 standards and meets the requirements for a Type 4 Active Optoelectronic Protective Device, the safest level for safety products.

The product received an EC type test certificate from the French INRS notified body, required in Europe for safety equipment as per the 98/37/EC Machinery Directive. It meets the applicable parts of North American standards and regulations (OSHA, ANSI and CSA) for light curtains and control reliability and bears the cCSAus listing mark, making it a product usable in all parts of the world.

The cross section of 42 mm^2 x 55 mm^2 / 1.65 in^2 x 2.16 in^2 makes installation possible in tight spaces, especially with the help of the included mounting hardware. Indicators provide information on the output status and failure diagnostics. The housing has a dovetail slot mounting system to adapt brackets anywhere along the housing. The optional FF-SRL60252 interface control module easily fit inside the machine control panel with its DIN rail mount housing.

The FF-SG does not need a galvanic insulated power supply since it includes its own means of galvanic insulation (dc/dc converter). Compliance with the installation requirements of the IEC/EN 61496-1 standard is therefore built in the design.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is to be referenced for each product.

Failure to comply with these instructions could result in death or serious injury.

Honeywell

Safety light curtain

FF-SG Series

Compact and cost-effective unit

(picture not contractual)

FEATURES

- Active Optoelectronic Protective Device compliant with the requirements of the IEC/EN 61496-1 and IEC/EN 61496-2 European norms for Type 4 electrosensitive protective equipment
- Meets applicable parts of North American standards and regulations OSHA 1910.212 and 217; ANSI B11.1 series; ANSI RIA 15.06 and CSA
- **Self-contained unit. No electrical connection necessary between emitter and receiver**
- **2 safety static outputs with short-circuit and cross-fault detection**
- Resolutions available:
  ø18 mm / 0.7 in for finger detection
  ø30 mm / 1.2 in for hand detection
- Protection height up to 1758 mm / 69.2 in
- Scanning range up to 6 m / 19.7 ft
- Electrical connection: M12 (8 pin) connectors
- Compact size: only 42 mm^2 x 55 mm^2 / 1.65 in^2 x 2.16 in^2 cross sectional area
- Optional interface control module for more switching capabilities and additional features

TYPICAL APPLICATIONS

- Presses and punches
- Woodworking machines
- Electronic assembly
- Textile machines
- Pressing, moulding and thermoforming machines

The Honeywell FF-SG is a self-contained light curtain that does not require a separate control unit for operation. As soon as an object is detected inside the protection field, the FF-SG opens its two safety static outputs to generate an emergency stop condition that is used to remove dangerous machine motion when properly interfaced with the machine stopping circuitry. When connected to the FF-SRL60252 optional interface control module, the FF-SG provides a wide variety of advanced functions: cross-monitored relays, final switching devices monitoring for the control of external contactors or relays, choice between automatic restart or start and restart interlock as well as relay status indicators.

The FF-SG is designed in compliance with IEC/EN 61496-1 and IEC/EN 61496-2 standards and meets the requirements for a Type 4 Active Optoelectronic Protective Device, the safest level for safety products.

The product received an EC type test certificate from the French INRS notified body, required in Europe for safety equipment as per the 98/37/EC Machinery Directive. It meets the applicable parts of North American standards and regulations (OSHA, ANSI and CSA) for light curtains and control reliability and bears the $_{C}CSA_{US}$ listing mark, making it a product usable in all parts of the world.

The cross section of 42 mm^2 x 55 mm^2 / 1.65 in^2 x 2.16 in^2 makes installation possible in tight spaces, especially with the help of the included mounting hardware. Indicators provide information on the output status and failure diagnostics. The housing has a dovetail slot mounting system to adapt brackets anywhere along the housing. The optional FF-SRL60252 interface control module easily fit inside the machine control panel with its DIN rail mount housing.

Approved as
Type 4
per IEC/EN 61496-1/2

⚠ WARNING

MISUSE OF DOCUMENTATION

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Failure to comply with these instructions could result in death or serious injury.

Compact and cost-effective unit FF-SG

- **Type 4 according to the IEC/EN 61496-1 and IEC/EN 61496-2 standards**
- **Control reliable per OSHA 29 CFR 1910.217 definition**
- **2 safety static outputs with short-circuit and cross-fault detection**

Approved as Type 4 per IEC/EN 61496-1/2

Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

Features / Type	FF-SG18	FF-SG30
Resolutions	ø 18 mm / 0.7 in	ø 30 mm / 1.2 in
Protection heights	See Table 1	
Nominal scanning ranges	0,3 m to 6 m / 1 ft to 19.67 ft	
Supply voltage	24 Vdc (±15 %)	
Power consumption	*Emitter:* 5 W max. • *Receiver*: 5 W max. (see Table 1)	
Outputs	2 safety static outputs (switching capacity: 0,3 A / 24 Vdc)	
Maximum cable length	100 m / 328 ft	
Response time	15 ms to 21,5 ms (see Table 1)	
LED status indicators	*Emitter:* failure alarm, power	
	Receiver: outputs status, beam status	
Cross sectional area	W 42 mm² x D 55 mm² / W 1.65 in² x D 2.16 in²	
	(see Table 1 for complete housing dimensions)	
Emission	Infrared modulated light source (925 nm)	
Effective aperture angle	±2°, ±25 % (in compliance with the IEC/EN 61496-2)	
Light immunity	*Sun:* 20 000 lux • *Lamp:* 15 000 lux	
Electrical noise immunity	IEC 61000-4-4: level III / IEC 61000-4-3: level III	
Ambient temperature	*Operating temperature:* 0 °C to 55 °C / 32 °F to 131 °F	
	Storage temperature: -20 °C to 75 °C / -4 °F to 167 °F	
Vibrations	IEC/EN 61496-1: 10 to 55 Hz frequency range, 1 octave/min. sweep rate, 0,35 mm	
	±0,05 amplitude, 20 sweeps per axis, for 3 axes	
Sealing	IP 65, NEMA 4, 13	
Material	*Housing:* aluminium alloy • *Front plate:* polymethyl methacrylate (PMMA)	
	End caps: polycarbonate	
Electrical connection	M12 8 pole connectors	

Ordering information

Each listing consists of an emitter, a receiver, two pairs of brackets and a test rod.

FF-SG ❑❑ ❑❑❑ AM2-L

Model (see Table 1)

Resolutions
18: ø 18 mm / 0.7 in
30: ø 30 mm / 1.2 in

(1) Protection Height for the minimum detected object size or resolution
(2) Sensing Field Height (full screen height)
(3) Total Height

Dimensions
(mm / in)

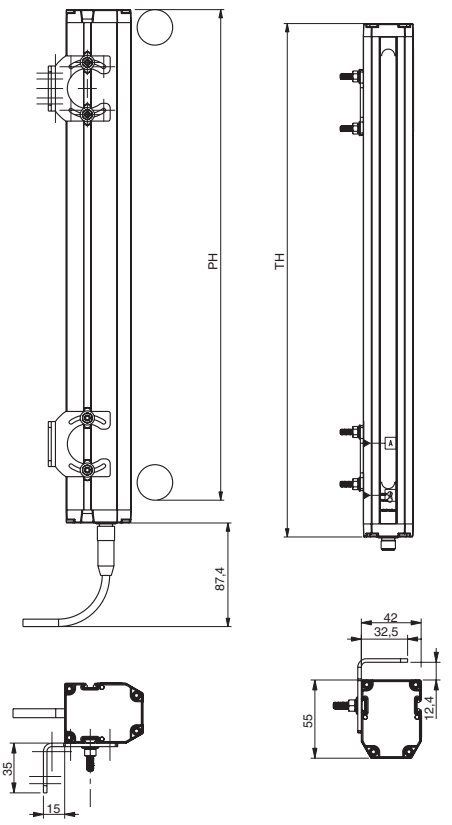
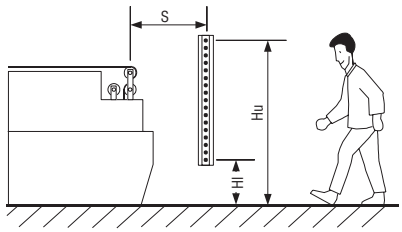
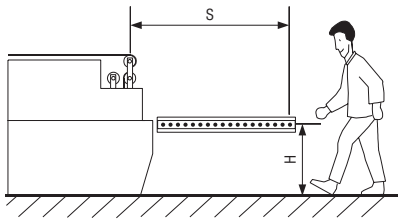
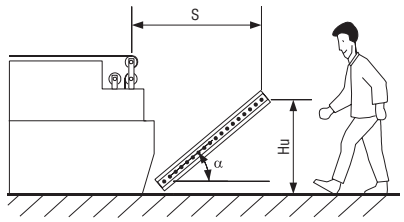


Table 1

Model	*031*	*050*	*070*	*089*	*109*	*128*	*147*
Protection height (mm)							
FF-SG18	306	498	690	NA	NA	NA	NA
FF-SG30	318	510	702	894	1086	1278	1470
Total height (mm)							
	338	530	722	914	1106	1298	1490
Response time (ms)							
FF-SG18	15	15	15	15,5	17,5	19,5	NA
FF-SG30	15	15	15	15,5	17,5	19,5	21,5

Safety distances

European EN 999 standard (in mm, 100 mm = 3.9 in)	***FF-SG18***	***FF-SG30***
Normal approach		
	S ≥ 2000 (t1 + t2) + 32, with S ≥ 100 If S ≥ 500, then use: S ≥ 1600 (t1 + t2) + 32, with S ≥ 500	S ≥ 2000 (t1 + t2) + 128, with S ≥ 100 If S ≥ 500, then use: S ≥ 1600 (t1 + t2) + 128, with S ≥ 500
Parallel approach		
	S ≥ 1600 (t1+ t2) + (1200 - 0.4 H), with H ≤ 875 or S ≥ 1600 (t1+ t2) + 850, with 875 ≤ H ≤ 1000	
Angled approach		
	If α ≥ 30°, then use one of the formula given for a normal approach. If α ≤ 30°, then use one of the formula given for a parallel approach, with Hu ≤ 1000.	

Where:

S: Minimum safety distance (mm, 100 mm = 3.9 in)

t1: Light curtain response time (s)

t2: Machine stopping time (s)

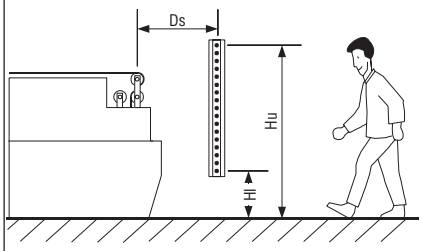
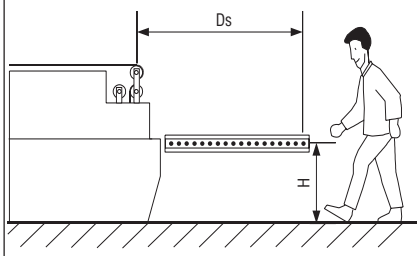
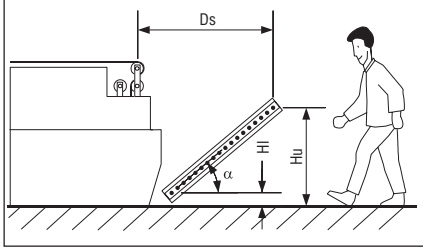
H: Height of the detection plane above the reference floor (in mm, 100 mm = 3.9 in)

Hu: Height of the uppermost beam above the reference floor (in mm, 100 mm = 3.9 in)

Hl: Height of the lowest beam above the reference floor (in mm, 100 mm = 3.9 in)

For more information, refer to the EN 999 European standard or comply with the requirements on safety distances given by the type C European standard (if existing or available) for the considered machine.

Safety distances per USA OSHA/ANSI requirements (in inches, 1 in = 25,4 mm)

Ds = K x (Ts + TC + Tr) + Dpf	***FF-SG18:*** 0.7 in resolution (min. object sensitivity)	***FF-SG30:*** 1.2 in resolution (min. object sensitivity).
Normal approach		
	**Ds = 63 x (Ts + Tc + Tr) + 1.48 in**	**Ds = 63 x (Ts + Tc + Tr) + 3.08 in**
	Note: If Hu is less than 48", then Dpf = 48" (reach over).	
Parallel approach		
	**Ds = 63 x (Ts + Tc + Tr) + 48**	
Angled approach		
	If $\alpha \geq 30°$ then use a normal approach formula. If $\alpha \leq 30°$ then use a parallel approach formula.	

Where

Ds: Minimum safety distance

K: Approach speed (called "hand speed") = 63 in / s

Ts: Worst case stopping time of the machine (s)

Tc: Worst case response of the machine's control (s)

Tr: Response time of the safety devices (light curtain plus its interface – meaning the response time including the mechanical relay outputs in seconds)

Dpf: Depth penetration factor (in)

H: Height of the detection plane above the reference floor (in)

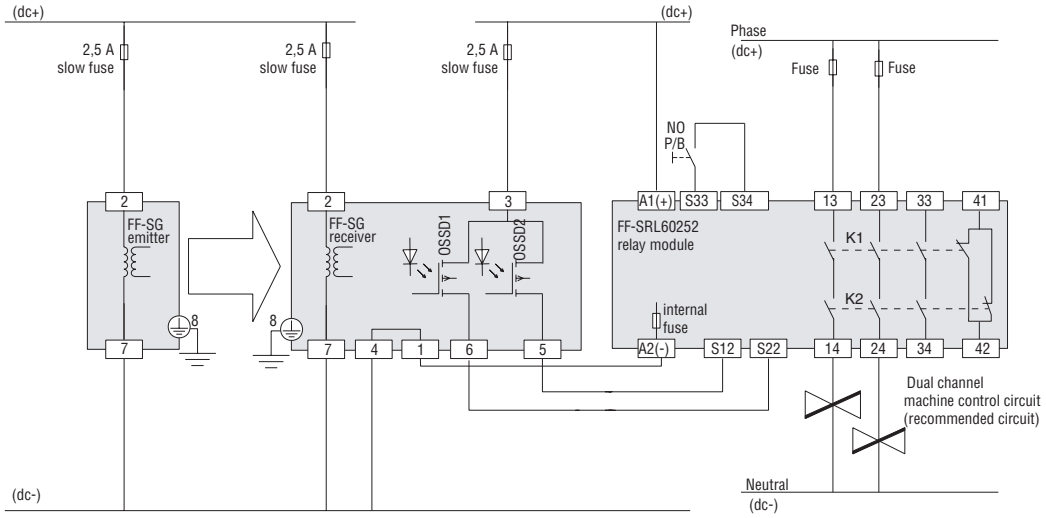
Hu: Height of the uppermost beam above the reference floor (in)

Hl: Height of the lowest beam above the reference floor (in). For Normal approach, assumption is that Hl is not greater than 12 in unless the application prevents access even with Hl at a distance greater than 12 in)

For more information, refer to the US regulations and standards (OSHA 29 CFR 1910.212 and 1910.217, ANSI B11.1, B11.2, B11.19, B11.20 and R15.06).

Wiring diagram (using the FF-SRL60252 safety control module)

The FF-SRL60252 interface control module is set in the Manual restart mode without FSD monitoring:



OSSD1 and OSSD2: Output Signal Switching Devices (light curtain safety contacts)
N.O. P/B: normally open contact of a push-button

NOTICE

Improper use of the FF-SG light curtain

The cross-monitoring of the FF-SG static outputs is based upon a self-checking principle which guarantees the detection of an output short-circuit and the detection of a short-circuit between the outputs (cross-fault detection). The FF-SRL60252 interface control module is designed to be interfaced with Honeywell safety static outputs devices.

Compatibility of the FF-SG with any other emergency stop safety control module is not guaranteed.

Accessories

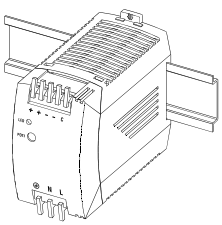
Safety control modules

FF-SRL60252
Dual channel relay module for safety light curtains with static safety outputs
(to be ordered separately as an option)
- compatible with safety light curtains with static outputs only
- 24 Vdc
- Category 4 per EN 954-1
- Selectable start mode and FSD monitoring
- 3 NO, 1 NC internally redundant safety relay outputs
- 22,5 mm / 0.89 in width

FF-SRM200P2
Muting module
(to be ordered separately as an option)
- connection of 1 or 2 safety devices
- modes of operation: unidirectional or bidirectional muting, mutual exclusion
- connection of 2 or 4 auxiliary muting sensors
- 24 Vdc
- category 4 per EN 954-1
- manual start mode, FSD monitoring
- programmable max. muting time
- crossfault monitoring of inputs
- self monitored muting lamp output
- 3 NO safety relay outputs
- static outputs for output status and diagnostic information
- 45 mm / 1.77 in

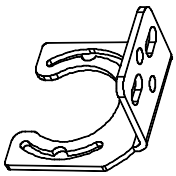
FF-SRL59022
Multi-safety device control module with Presence Sensing Device Initiation (PSDI)
(to be ordered separately as an option)
- accept up to three safety devices working in a guard-only mode or a single safety light curtain working in a single stroke/dual stroke mode
- 24 Vdc
- category 4 per EN 954-1
- manual start mode and FSD monitoring
- cross-fault monitoring of inputs
- 3 NO safety relay outputs
- static outputs for relay output status and diagnostic information
- 45 mm / 1.77 in

ac to dc power supply



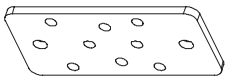
FF-SXZPWR050
ac to dc power supply
Input voltage: 85 to 264 Vac
Output voltage: 24 to 28 Vdc / 2,1 A to 1,8 A
Dimensions: 97 mm x 75 mm x 45 mm / 3.82 in x 2.95 in x 1.77 in
Mounting: DIN rail
Approvals: UL508 listed, UL1950, cUL/CSA-C22.2, EN/IEC 60950, EN 50178
(to be ordered separately as an option).

Mounting bracket kit



FF-SXZ634178
Right angle bracket kit (delivered with the FF-SG)
includes two right angle brackets with four sets of M5 bolts, nuts and washers.

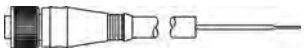
Anti-vibration kit



FF-SYZAD
Kit of 2 straight brackets and 4 anti-vibration dampers (mounting hardware included) - to substitute for the FF-SYZ634178 brackets delivered with the FF-SG package.

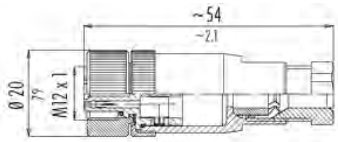
NOTICE
PROTECTION AGAINST HIGH VIBRATION
In case of high vibrations, order:
- 2 sets of FF-SYZAD kit for light curtain systems with protection height below 1000 mm / 39.4 in.
- 3 sets of FF-SYZAD kit for light curtain systems with protection height greater or equal to 1000 mm / 39.4 in.

M12 single-ended cordsets, female, 8-pin



Catalogue listing	Description
FF-SXZCAM128U02-S	2 m length, straight
FF-SXZCAM128U05-S	5 m length, straight
FF-SXZCAM128U05-90S	5 m length, right angle
FF-SXZCAM128U10-S	10 m length, straight
FF-SXZCAM128U10-90S	10 m length, right angle

M12 screw connector, female, straight



FF-SXZCOM128
8 pin

Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during that period of coverage, Honeywell will repair or replace without charge those items if finds defective. The foregoing is the Buyer's sole remedy and **is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application personally, through our literature and the Honeywell Website, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and service

Honeywell serves its customers through a world-wide network of sales offices and distributors. For application assistance, current specifications, pricing or the name of the nearest distributor, contact a nearby sales office or call:

Telephone

Argentina	54 11 4383 7012
Australia	613 9420 5555
Brazil	55 11 865 2055
China	86 21 623 70 237
Czeck Republic	420 602 364 696
Denmark	45 20 60 75 05
Finland	358 9 3480 101
France	33 (0)1 60 19 82 68
Germany	49 69 80 64 559
India	91 22 641 0897
Japan	81 3 67 6730 7208
Korea	822 799 6114 5
Malaysia	037 958 4988
Mexico	52 5 259 19 66
Netherlands	31 20 5656 911
New Zealand	64 9 623 5050
Poland	48 22 606 09 00
Romania	40 1 211 0076
Singapore	656 355 2828
Slovak Republic	421 7 5824 7403
South Africa (Republic of)	27 11 805 1201
South Korea	82 2 799 6167
Sweden	46 8 775 55 00
Switzerland	41 1 855 24 40
United Kingdom	44 1698 481 000
United States	1 800 537 6945
Thailand	662 693 3099

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107061-30-EN FR26 GLO 407 Printed in France
April 2007

107061-26-EN FR26 GLO 306 Printed in France

Compact and cost-effective unit FF-SG

- **Type 4 according to the IEC/EN 61496-1 and IEC/EN 61496-2 standards**
- **Control reliable per OSHA 29 CFR 1910.217 definition**
- **2 safety static outputs with short-circuit and cross-fault detection**

Approved as Type 4 per IEC/EN 61496-1/2

Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

Features / Type	FF-SG18	FF-SG30
Resolutions	ø 18 mm / 0.7 in	ø 30 mm / 1.2 in
Protection heights	See Table 2	
Nominal scanning ranges	0,3 m to 3,5 m / 1 ft to 11.48 ft	
Supply voltage	24 Vdc (±15 %)	
Power consumption	*Emitter:* 4 W max. • *Receiver*: 3 W max. (see Table 2)	
Outputs	2 safety static outputs (switching capacity: 0,3 A / 24 Vdc)	
Response time	15 ms	15 ms to 21,5 ms (see Table 2)
LED status indicators	*Emitter:* failure alarm, power	
	Receiver: outputs status	
Cross sectional area	W 42 mm² x D 55 mm² / W 1.65 in² x D 2.16 in²	
	(see Tables 1 and 2 for complete housing dimensions)	
Emission	Infrared modulated light source (925 nm)	
Effective aperture angle	±2° , ±25 % (in compliance with the IEC/EN 61496-2)	
Light immunity	*Sun:* 20 000 lux • *Lamp:* 15 000 lux	
Electrical noise immunity	IEC 61000-4-4: level III / IEC 61000-4-3: level III	
Ambient temperature	*Operating temperature:* 0 °C to 55 °C / 32 °F to 131 °F	
	Storage temperature: -20 °C to 75 °C / -4 °F to 167 °F	
Vibrations	IEC/EN 61496-1: 10 to 55 Hz frequency range, 1 octave/min.sweep rate, 0,35 mm	
	±0,05 amplitude, 20 sweeps per axis, for 3 axes	
Sealing	IP 65, NEMA 4, 13	
Material	*Housing:* aluminium alloy • *Front plate:* polymethyl methacrylate (PMMA)	
	End caps: polycarbonate	
Electrical connection	M12 8 pole connectors	

Ordering information

Each listing consists of an emitter, a receiver, 2 pairs of mounting pins, 4 M5 dovetail shape bolts, 4 M5 nuts and 4 rip-lock washers and a test rod.

FF-SG ❑❑ ❑❑❑ AM2

Model (see Table 2)

Resolutions
18: ø 18 mm / 0.7 in
30: ø 30 mm / 1.2 in

(1) Protection Height for the minimum detected object size or resolution
(2) Sensing Field Height (full screen height)
(3) Total Height

Dimensions
(mm / in)

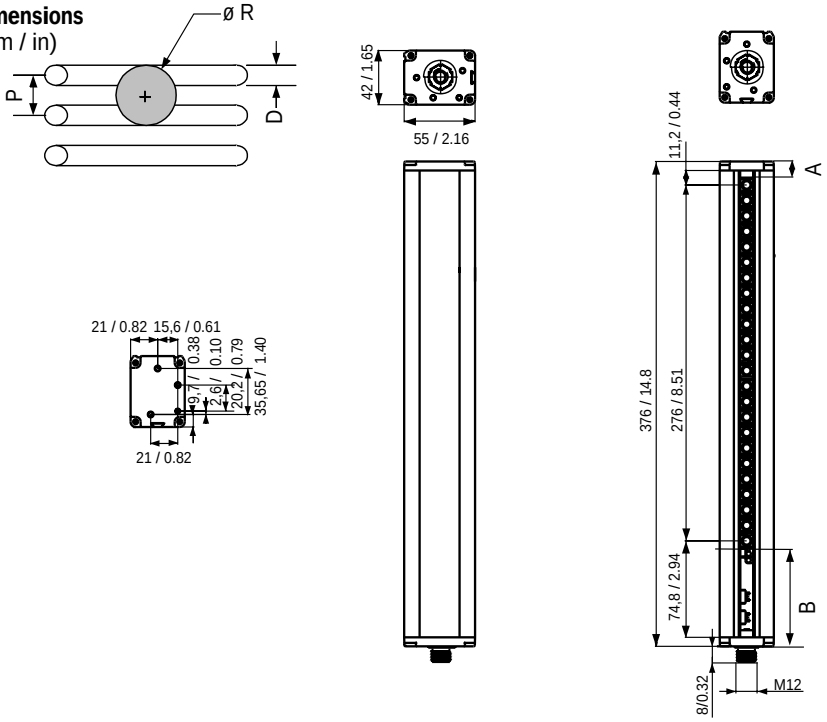


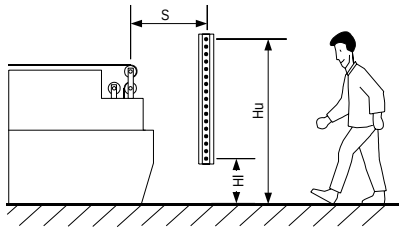
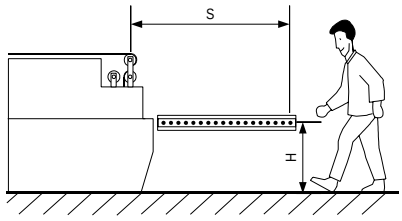
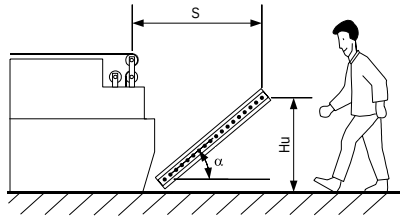
Table 1 (mm / in)

	øR (resolution)	**P** (lens pitch)	**D** (lens diameter)	**A** (inactive zone)	**B** (inactive zone)
FF-SG18	ø 18 / 0.7	12 / 0.47	6 / 0.23	15,2 / 0.60	78,8 / 3.10
FF-SG30	ø 30 / 1.2	24 / 0.94	6 / 0.23	27,2 / 1.07	78,8 / 3.10

Table 2

Model	*031*		*050*		*070*		*089*		*109*		*128*		*147*	
Protection height (mm / in) (1)														
FF-SG18	**306 / 12.05**		**498 / 19.62**		**690 / 27.18**		-		-		-		-	
FF-SG30	**318 / 12.52**		**510 / 20.09**		**702 / 27.65**		**894 / 35.22**		**1086 / 42.78**		**1278 / 50.35**		**1470 / 57.91**	
Sensing field height (mm / in) (2)														
FF-SG18	**282 / 11.11**		**474 / 18.6**		**666 / 26.24**		-		-		-		-	
FF-SG30	**270 / 10.63**		**462 / 18.2**		**654 / 25.76**		**846 / 33.33**		**1038 / 40.89**		**1230 / 48.46**		**1422 / 56.02**	
Total height (mm / in) (3)														
FF-SG18	376 / 14.8		568 / 22.36		760 / 29.92		-		-		-		-	
FF-SG30	376 / 14.8		568 / 22.36		760 / 29.92		952 / 37.48		1144 / 45.03		1336 / 52.6		1528 / 60.15	
Response time (ms)														
FF-SG18	15		15		15		-		-		-		-	
FF-SG30	15		15		15		15,5		17,5		19,5		21,5	
	Em.	**Rec.**	**Em.**	**Rec.**	**Em.**	**Rec.**	**Em.**	**Rec.**	**Em.**	**Rec.**	**Em.**	**Rec.**	**Em.**	**Rec.**
Weight per device (kg / lbs)	1,1/2.4	1,2/2.6	1,5/3.3	1,6/3.5	1,8/3.9	1,9/4.2	2,2/4.8	2,3/5	2,5/5.5	2,6/5.7	2,9/6.3	3/6.6	3,2/7	3,3/7.2
Power consumption (W) *FF-SG18*	4	3	4	3	4	3	-	-	-	-	-	-	-	-
(Emitter/receiver) *FF-SG30*	4	3	4	3	4	3	4	3	4	3	4	3	4	3

Safety distances

European EN 999 standard (in mm, 100 mm = 3.9 in)	***FF-SG18***	***FF-SG30***
Normal approach		
	S ≥ 2000 (t1 + t2) + 32, with S ≥ 100 If S ≥ 500, then use: S ≥ 1600 (t1 + t2) + 32, with S ≥ 500	S ≥ 2000 (t1 + t2) + 128, with S ≥ 100 If S ≥ 500, then use: S ≥ 1600 (t1 + t2) + 128, with S ≥ 500
Parallel approach		
	S ≥ 1600 (t1+ t2) + (1200 - 0.4 H), with H ≤ 875 or S ≥ 1600 (t1+ t2) + 850, with 875 ≤ H ≤ 1000	
Angled approach		
	If α ≥ 30°, then use one of the formula given for a normal approach. If α ≤ 30°, then use one of the formula given for a parallel approach, with Hu ≤ 1000.	

Where:

S: Minimum safety distance (mm, 100 mm = 3.9 in)

t1: Light curtain response time (s)

t2: Machine stopping time (s)

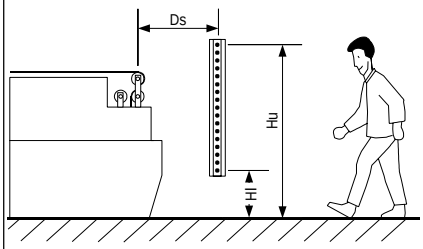
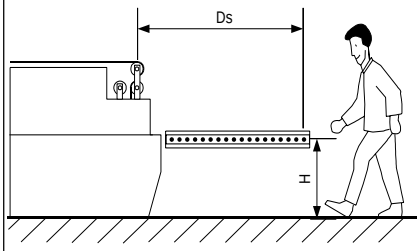
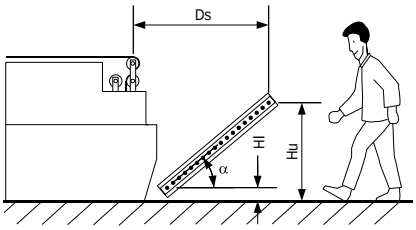
H: Height of the detection plane above the reference floor (in mm, 100 mm = 3.9 in)

Hu: Height of the uppermost beam above the reference floor (in mm, 100 mm = 3.9 in)

Hl: Height of the lowest beam above the reference floor (in mm, 100 mm = 3.9 in)

For more information, refer to the EN 999 European standard or comply with the requirements on safety distances given by the type C European standard (if existing or available) for the considered machine.

Safety distances per USA OSHA/ANSI requirements (in inches, 1 in = 25,4 mm)

Ds = K x (Ts + TC + Tr) + Dpf	***FF-SG18:*** 0.7 in resolution (min. object sensitivity)	***FF-SG30:*** 1.2 in resolution (min. object sensitivity).
Normal approach		
	**Ds = 63 x (Ts + Tc + Tr) + 1.48 in**	**Ds = 63 x (Ts + Tc + Tr) + 3.08 in**
	Note: If Hu is less than 48", then Dpf = 48" (reach over).	
Parallel approach		
	**Ds = 63 x (Ts + Tc + Tr) + 48**	
Angled approach		
	If $\alpha \geq 30°$ then use a normal approach formula. If $\alpha \leq 30°$ then use a parallel approach formula.	

Where

Ds: Minimum safety distance

K: Approach speed (called "hand speed") = 63 in / s

Ts: Worst case stopping time of the machine (s)

Tc: Worst case response of the machine's control (s)

Tr: Response time of the safety devices (light curtain plus its interface - meaning the response time including the mechanical relay outputs in seconds)

Dpf: Depth penetration factor (in)

H: Height of the detection plane above the reference floor (in)

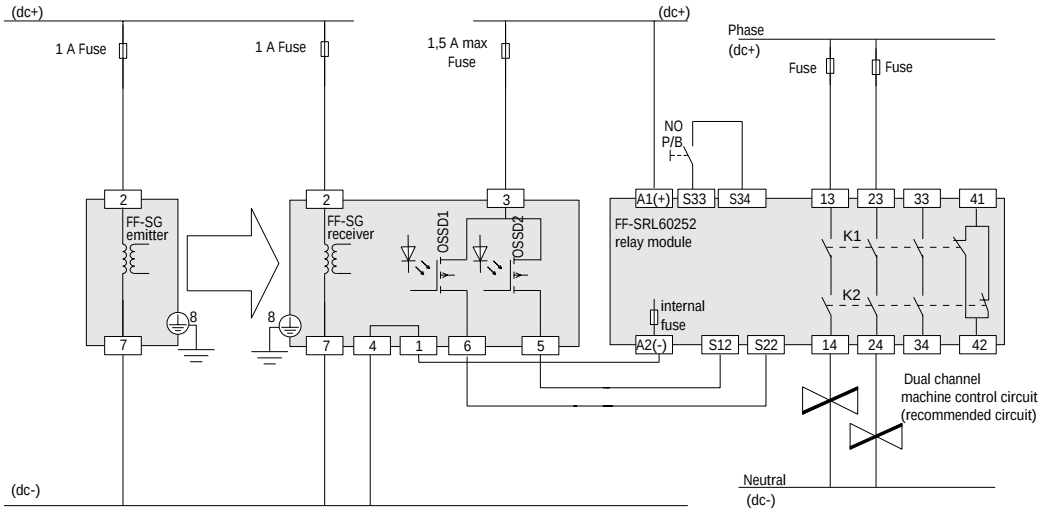
Hu: Height of the uppermost beam above the reference floor (in)

Hl: Height of the lowest beam above the reference floor (in). For Normal approach, assumption is that Hl is not greater than 12 in unless the application prevents access even with Hl at a distance greater than 12 in)

For more information, refer to the US regulations and standards (OSHA 29 CFR 1910.212 and 1910.217, ANSI B11.1, B11.2, B11.19, B11.20 and R15.06).

Wiring diagram (using the FF-SRL60252 safety control module)

The FF-SRL60252 interface control module is set in the Manual restart mode without FSD monitoring:



OSSD1 and OSSD2: Output Signal Switching Devices (light curtain safety contacts)
N.O. P/B: normally open contact of a push-button

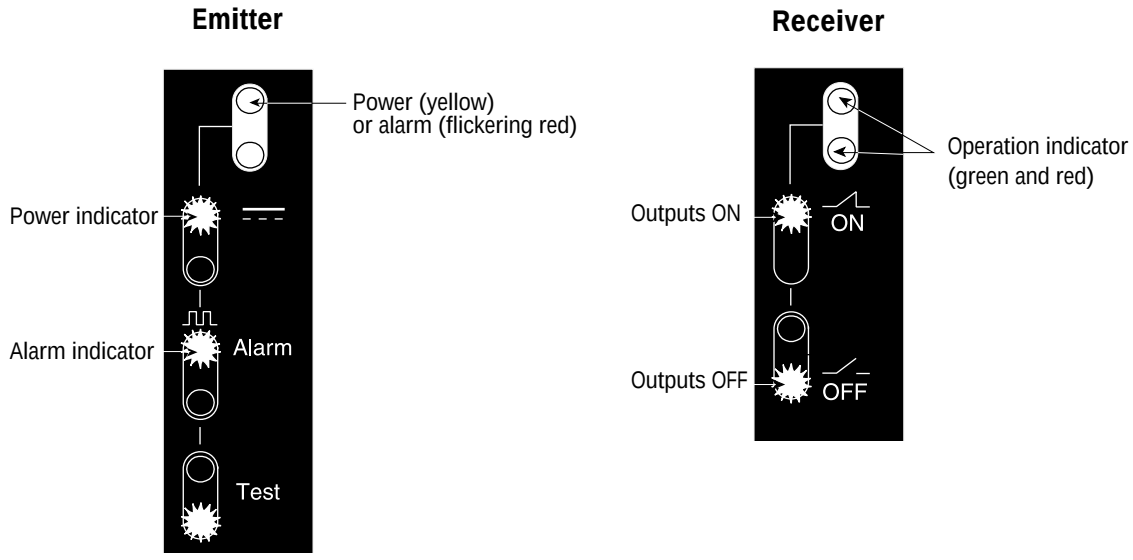
NOTICE

Improper use of the FF-SG light curtain

The cross-monitoring of the FF-SG static outputs is based upon a self-checking principle which guarantees the detection of an output short-circuit and the detection of a short-circuit between the outputs (cross-fault detection). The FF-SRL60252 interface control module is designed to be interfaced with Honeywell safety static outputs devices.

Compatibility of the FF-SG with any other emergency stop safety control module is not guaranteed.

LED status indicators



Accessories

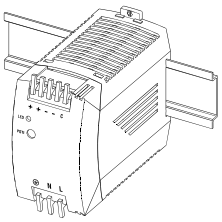
Safety control modules

FF-SRL60252
Dual channel relay module for safety light curtains with static safety outputs
(to be ordered separately as an option)
- compatible with safety light curtains with static outputs only
- 24 Vdc
- Category 4 per EN 954-1
- Selectable start mode and FSD monitoring
- 3 NO, 1 NC internally redundant safety relay outputs
- 22,5 mm / 0.89 in width

FF-SRM200P2
Muting module
(to be ordered separately as an option)
- connection of 1 or 2 safety devices
- modes of operation: unidirectional or bidirectional muting, mutual exclusion
- connection of 2 or 4 auxiliary muting sensors
- 24 Vdc
- category 4 per EN 954-1
- manual start mode, FSD monitoring
- programmable max. muting time
- crossfault monitoring of inputs
- self monitored muting lamp output
- 3 NO safety relay outputs
- static outputs for output status and diagnostic information
- 45 mm / 1.77 in

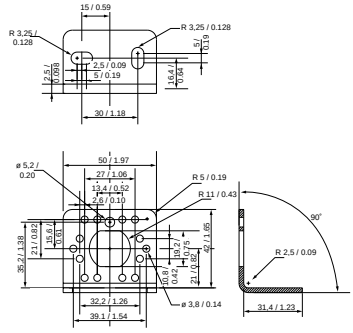
FF-SRL59022
Multi-safety device control module with Presence Sensing Device Initiation (PSDI)
(to be ordered separately as an option)
- accept up to three safety devices working in a guard-only mode or a single safety light curtain working in a single stroke/dual stroke mode
- 24 Vdc
- category 4 per EN 954-1
- manual start mode and FSD monitoring
- cross-fault monitoring of inputs
- 3 NO safety relay outputs
- static outputs for relay output status and diagnostic information
- 45 mm / 1.77 in

ac to dc power supply



FF-SXZPWR050
ac to dc power supply
Input voltage: 85 to 264 Vac
Output voltage: 24 to 28 Vdc / 2,1 A to 1,8 A
Dimensions: 97 mm x 75 mm x 45 mm / 3.82 in x 2.95 in x 1.77 in
Mounting: DIN rail
Approvals: UL508 listed, UL1950, cUL/CSA-C22.2, EN/IEC 60950, EN 50178
(to be ordered separately as an option).

Right-angle bracket kit



FF-SGZ001002

One kit includes 2 brackets and 8 M3,5 x 8 screws. Order one bracket kit per emitter or receiver element, 2 kits for an emitter/receiver system. The 8 screws are used if the bracket is fixed on the top and bottom caps of the FF-SG.

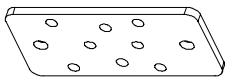
(to be ordered separately as an option).

NOTICE

PROTECTION AGAINST HIGH VIBRATION

In case of high vibration, 3 pairs of brackets must be used for light curtain systems with protection heights greater or equal to 1000 mm / 39.4 in (an additional bracket kit must be ordered).

Anti-vibration kit



(x 2)

(x 4)

FF-SYZAD

Kit of 2 straight brackets and 4 anti-vibration dampers (mounting hardware included).

NOTICE

PROTECTION AGAINST HIGH VIBRATION

In case of high vibrations, order:

- 2 sets of FF-SYZAD kit for light curtain systems with protection height below 1000 mm / 39.4 in.
- 3 sets of FF-SYZAD kit for light curtain systems with protection height greater or equal to 1000 mm / 39.4 in, but less than 1470 mm / 57.91 in.

Cordsets

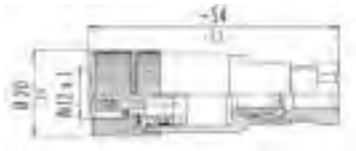
Lumberg single keyway M12, female straight **(to be ordered separately).**

Order 2 cordsets for emitter + receiver.

Emitter (FF-SG❑❑❑❑❑AM2E) or receiver (FF-SG❑❑❑❑❑AM2R)

Catalogue listing	Description
FF-SXZCAM128U02	2 m / 6.56 ft length
FF-SXZCAM128U05	5 m / 16.40 ft length
FF-SXZCAM128U10	10 m / 32.80 ft length

Cable connector



FF-SXZCOM128

Binder single keyway M12 female screw type straight connector. 8 set screws M2,5. Gold platedcontacts. Pin configuration according to IEC 61076-2-101.

Deflection mirror

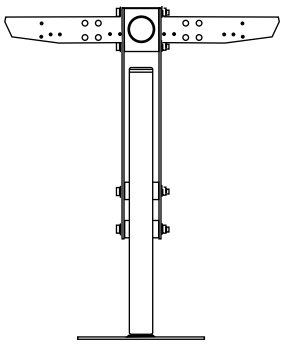
FF-SYZMIR❑❑❑
To be ordered separately as an option

Features:	
Deflection mirror with 10 % scanning range reduction (FF-SYZMIR0❑❑)	
Deflection mirror with 25 % scanning range reduction (FF-SYZMIR1❑❑)	
Quick mounting and easy mirror adjustment	
Mounting brackets included (top / bottom mounting)	
Adjustment of mirror in azimuth direction of ±45°	
Housing compatible with FF-SBSMIR Series	
Material	Aluminium alloy housing
Finish	Gold colour anodisation
Ordering guide:	
FF-SYZMIR❑04	FF-SG❑❑031
FF-SYZMIR❑06	FF-SG❑❑050
FF-SYZMIR❑08	FF-SG❑❑070
FF-SYZMIR❑10	FF-SG❑❑089
FF-SYZMIR❑12	FF-SG❑❑109
FF-SYZMIR❑14	FF-SG❑❑128 and FF-SG❑❑147

Floorstanding post

FF-SYZPF
To be ordered separately as an option
Floorstanding post for the installation of the following FF-SG light curtains:
FF-SG❑❑031 to FF-SG❑❑109.

Adjustable floorstanding post



FF-SYZPA
To be ordered separately as an option
- horizontal, diagonal and vertical adjustment of light curtains possible
- quick mounting and easy light curtain adjustment
- 360° rotation of light curtain possible
- fine adjustment of light curtains in azimuth direction of ±11° ensures an easy alignment
- 700 mm / 27.58 in corner protection for light curtain included
- base plate can be mounted independently
- finish: RAL 1021 yellow paint.

Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance,current specifications, pricing or name of the nearest Authorised Distributor, contact a nearby sales office or:

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107061-25-EN FR26 GLO 304 Printed in France

Type 4 miniature light curtain, 30 mm / 1.18 in resolution

FF-LS30 Series

Designed for the protection of operators work stations

FEATURES

- Meets applicable parts of US OSHA 29 CFR 1910.217, 1910.212 and ANSI B11.1, B11.2, B11.19 1990 and RIA 15.06 regulations for Control Reliability
- EC type examination certificate granted by the TÜV
- Designed in compliance with the IEC/EN 61496 - parts 1 & 2 for Type 4 Electrosensitive Protective Equipment (permanent self-checking equipment)
- Through-scan small profile sensing unit with separate control unit
- Minimum object detection capability: ø30 mm / 1.18 in suitable for hands detection
- Scanning range: from 0,2 m up to 3,5 m/ 0.65 ft to 11.48 ft
- Protection heights: from 236 mm up to 1804 mm / 9.29 in up to 71.07 in
- Global response time: less than 50 ms
- Power supply voltage: 24 Vac/dc
- Outputs: 2 guided contacts safety relays
- Test input
- Automatic restart or start & restart interlock
- Sealing: IP 65 (sensing units and control unit)
- Immunity to ambient light: 50 000 Lux max.

TYPICAL APPLICATIONS

- Paper-cutting machines
- Pick-and-place robots
- Light electronic assemblying machines
- Good lifts
- Small carousels

TÜV HANNOVER SACHSEN-ANHALT

CE

C SP® US

Approved as Type 4 per pr EN 50100 - 1/2

The FF-LS equipment is an infrared multibeam device designed to protect operators working on dangerous machines. The FF-LS equipment features are ideal for the protection of work stations on small machines such as paper-cutting machines or pick-and-place robots.

The permanent self-checking electronic process is based upon a microprocessor technology and meets the requirement of the IEC/EN 61496- parts 1 & 2 European standards for Type 4 electrosensitive protective equipment.

It has been examined by the TÜV who granted the EC type examination certificate.

The equipment consist of a pair of sensing units connected to a separate control unit via a RS-485 connection.

Each sensing unit is made of a row of emitting circuits alternating with receiving circuits. These circuits are housed in an extremely small aluminium extruded profile: the cross section is only 12 mm x 19,7 mm / 0.47 in x 0.77 in.

The two sensors are matched to each other by individual coding to reduce risk of cross talk with other light curtains and to improve immunity to welding splashes.

The control unit supplies the sensing units, controls the correct operation of the scanning circuits and transmits the resulting commands to the machine control circuitry through its two relay outputs.

The equipment can operate according to two different mode: the automatic mode, the start & restart interlock mode.

In addition, the control unit is featured with a test input to trigger the output relays switching and thus check the correct operation of the final switching devices whenever needed. In case of failure, the control unit provides optical and acoustic signals to ease failure diagnostic.

⚠ WARNING

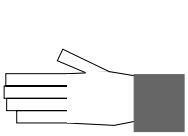
MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

FF-LS30

- **Type 4 according to IEC/EN 61496 - parts 1& 2**
- **ø30 mm / 1.18 in object detection capability**
- **Reduced dimensions (12 mm x 19,7 mm / 0.47 in x 0.77 in cross section)**



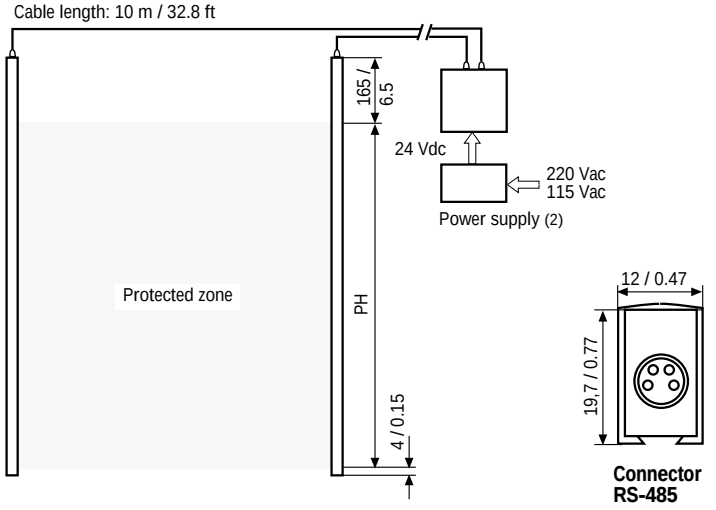
Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

Specifications	
Supply voltage	22 to 30 Vdc or 18 to 25 Vac
Current consumption	< 300mA
Output switching capacity	Main out 1 & out 2: 4 A/250 Vac/Lamp: 4 A/42 V
Material	*Sensor*: Aluminium profile / *Control unit*: Polycarbonate
Housing Size	*Sensors*: 12 mm x 19,7 mm x PH mm / 0.47 in x 0.77 in x PH in
	Control unit: 60 mm x 160 mm x 240 mm / 2.36 in x 6.30 in x 9.45 in
Emission	Modulated infrared light (880 mm)
Resolution	ø 30 mm / 1.18 in
Alignment tolerance	According to IEC/EN 61496 - 2 standard
Operating temperature	0 °C to 55° C / 32 °F to 131° F
Sealing	*Sensors and control unit*: IP 65
Electromagnetic immunity	According to IEC 801-4: level IV/According to IEC 801-3 level III
Light immunity	50 000 Lux
Status indicators	Lamps to be connected to outputs available on control units
Range	0,2 m to 3,5 m / 0.65 ft to 11.48 ft
Electrical wiring (delivered with the unit)	*Sensors*: RS-485 cable / Pre-wired connectors (10 m / 32.8 ft)
	Control unit: Screw terminal

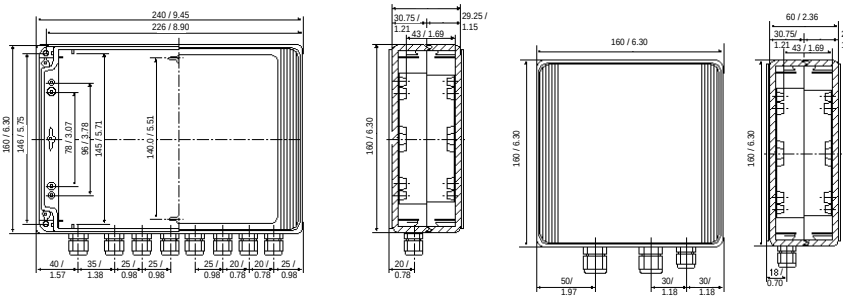
Ordering information (1)
FF-LS❑❑28❑❑❑❑2

Number of beams	Model	Protection height (PH) (mm / in)
08	*0236*	236 / 09.29
16	*0460*	460 / 18.12
24	*0684*	684 / 26.94
32	*0908*	908 / 35.77
40	*1132*	1132 / 44.60
48	*1356*	1356 / 53.42
56	*1580*	1580 / 62.25
64	*1804*	1804 / 71.07

Sensors A and B have the same dimensions.



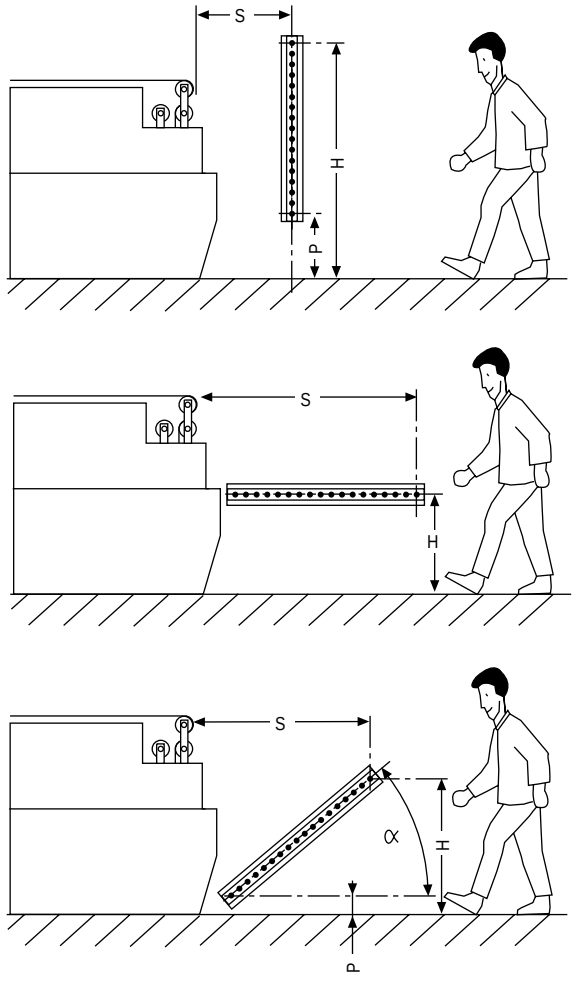
Control unit (4 mounting M4 holes) **Power supplies** (2)



Notes:
(1) Each reference corresponds to the delivery of a complete set: A/B sensors, control unit, 2 RS-485 cables (pre-wired 10 m / 32.8 ft), brackets, 8 cable glands and a ø30 mm / 1.18 in test rod.
(2) Power supply: The use of one of these supplies brings the galvanic isolation which is necessary for the system to be in compliance with IEC/EN 61496-1 standard.
FF-LSZUS0605 (230 Vac / 24 Vdc)
FF-LSZUS0606 (115 Vac / 24 Vdc)
These power supplies must be ordered separately.
(3) Control unit and sensors.

Nominal Protection Height mm / in	PH	236 / 9.29	460 / 18.12	684 / 26.94	908 / 35.77	1132 / 44.60	1356 / 53.42	1580 / 62.25	1804 / 71.07
Number of beams		8	16	24	32	40	48	56	64
Response time	t1	< 50 ms	< 50 ms	< 50 ms	< 50 ms	< 50 ms	< 50 ms	< 50 ms	< 50 ms
Weight of the device (3)	kg /lbs	1,75 / 3.85	1,86 / 4.1	1,97 / 4.34	2,08 / 4.58	2,19 / 4.82	2,30 / 5.07	2,41 / 5.31	2,52 / 5.55

Safety distance



S: *Minimum safety distance (mm / in)*

t1: Response time of the light curtain (s)

t2: Stopping time of the equipment guarded by the light curtain, including all mechanical, electromechanical and electronic parts (s)

H: Height of the detection zone above the floor (mm / in)

The safety distance between the protection field and the dangerous zone should be large enough to ensure that if the protection field is entered, the dangerous zone cannot be reached before the hazardous movement is arrested. For the safety distance, the following formula applies:

• Normal approach

Europe (EN 999)

S ≥ 2000 (t1 + t2) + 128 (mm), with S ≥ 100 mm
(or S ≥ 78.8 t1 + t2) + 5 (in), with S ≥ 3.9 in

If the result of this calculation is greater or equal to 500 mm / 19.7 in, then use the following formula:

S ≥ 1600 (t1 + t2+ 128 (mm), with S ≥ 500 mm
(or S ≥ 63 (t1 + t2) + 5 (in), with S ≥ 19.7 in

US (OSHA 29 CFR 1910.217, ANSI B11.19 1990

Ds ≥ 63 (t1 + t2) + 3.08 (in) Ds = S

• Parallel approach

Europe (EN 999)

S ≥ 1600 (t1 + t2) + (1200-0.5H) (mm)
where (1200-0.4H) ≥ 850 mm
(or S ≥ 63 (t1+t2) + 47.3 - 0.4H0 (in)
where (47.3 - 0.4) ≥ 33.5 in)

If H is greater than 300 mm / 11.82 in, the risk of access from below must be taken into account. For this barrier, the minimum height allowed is H min. = 0 mm and the maximum height allowed is H max. = 1 000 mm / 39.4 in.

• Angled approach

Europe (EN 999)

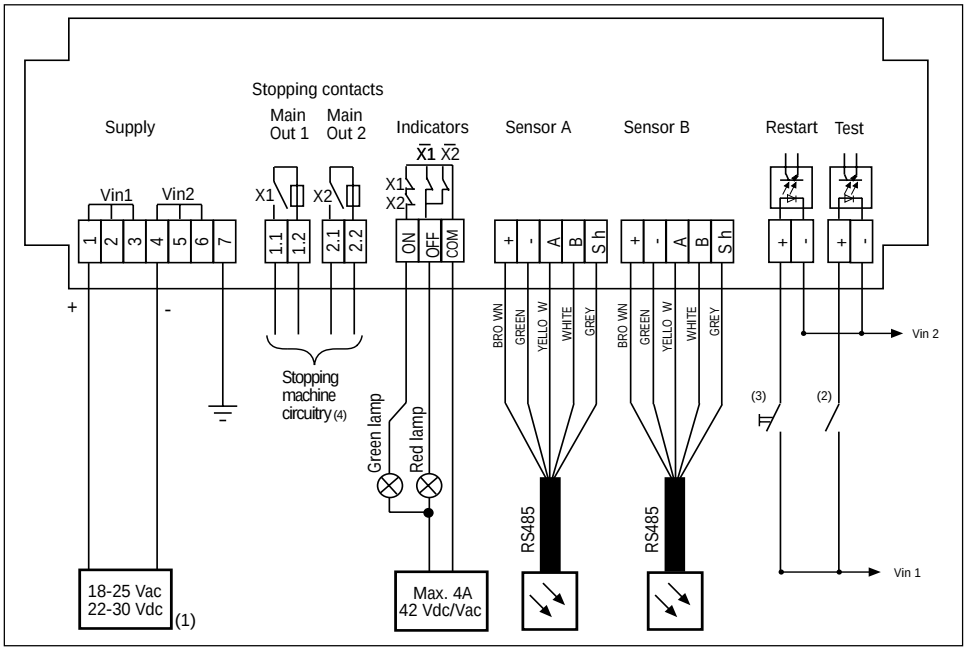
30° < α < 90°

If the angle is greater than 30°, the approach should be considered as normal, and one of the above-mentioned formulas should be used.

0° < α ≤ 30°

If the angle is less than or equal to 30°, the approach should be considered as parallel and one of the above-mentioned formulas should be used. In this case the minimum height allowed is P min. = 0 mm and the max. height allowed is H = 1 000 mm / 39.4 in max. However, if P > 300 mm / 11.82 in, the risk of inadvertent access from below must be taken into account.

Connection diagram



(1) - Supply (to be ordered separately): The use of one of these supplies brings the galvanic isolation which is necessary to the system for a use conform to IEC/EN 61496 - 1 standard.

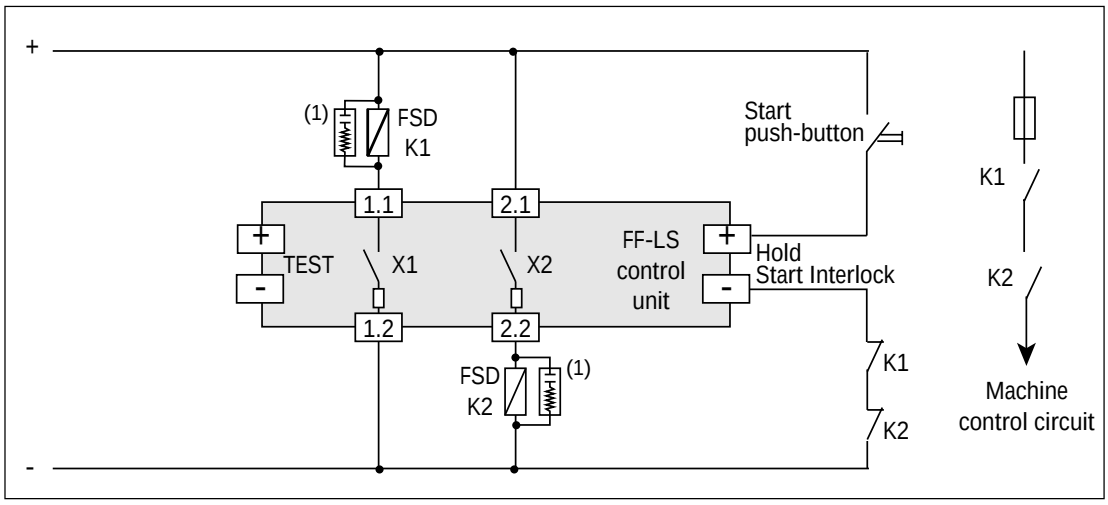
FF-LSZUS0605 (230 Vac / 24 Vdc),
FF-LSZUS0606 (115 Vac / 24 Vdc)

(2) - Test duration: The contact must be closed during 100 ms as a minimum.

(3) - The push-button must remain closed during 200 ms at least. It takes 500 ms for the system to restart after releasing the push-button.

(4) - If additional contacts are needed or if the switching capacity must be increased, use the connection diagram given or an example.

Connection diagram example: Start/Restart interlock/Final Switching Device (FSD) monitoring (please refer to EN 954 for electrical interface)



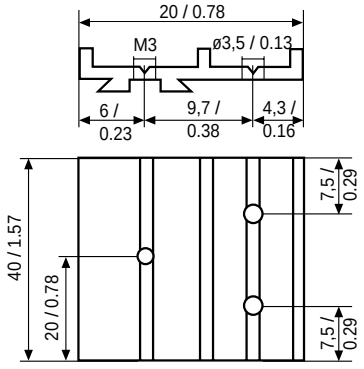
(1) RC (220 Ω + 22 µF) for ac interface (or varistors for dc interfaces) increases the life of contacts and improves electrical noise immunity.

Accessories

FF-LSZKA0611: Connecting cable

One 10 m / 32.8 ft RS485 prewired cable for the connection of one sensing unit to the control unit.

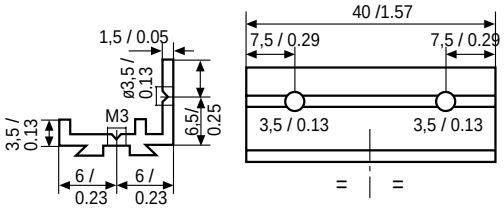
FF-LSZMS660



Straight bracket

Kit of 2 straight brackets for an installation parallel to the sliding rail.

FF-LSZMS690

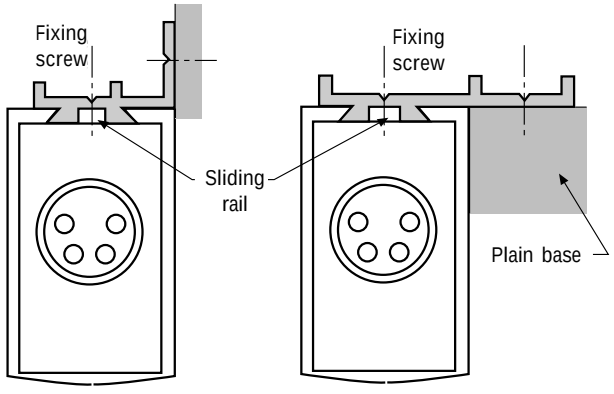


Right-angle bracket

Kit of 2 right-angle brackets for an installation perpendicular to the sliding rail.

Note: All FF-LS equipment is delivered with both types of brackets. The number of brackets available allows to fix one bracket every 500 mm / 19.7 in along the profile.

Examples



Example of installation

For a correct installation, brackets must be fixed on a plain base in order to avoid profile deformation.

Type 4 miniature light curtain, 14 mm/0.55 in resolution

FF-LS14 Series

Designed for the protection of operators work stations

FEATURES

- Meets applicable parts of US OSHA 29CFR 1910.217, 1910.212 and ANSI B11.1, B11.2, B11.19 1990 and RIA 15.06 regulations for Control reliability
- EC type examination certificate granted by the TÜV
- Designed in compliance with the IEC/EN 61496 - parts 1 & 2 for Type 4 Electrosensitive Protective Equipment (permanent self-checking equipment)
- Through-scan small profile sensing units with separate control unit
- Minimum object detection capability: ø14 mm / 0.55 in suitable for fingers detection
- Scanning range from 0,2 m up to 3,5 m / 0.65 ft up to 11.48 ft.
- Protection heights: from 196 mm up to 744 mm / 7.72 in up to 29.31 in
- Global response time: less than 50 ms
- Power supply voltage: 24 Vac/dc
- Outputs: 2 guided contacts safety relays
- Test input
- Automatic restart or start & restart interlock
- Sealing: IP 65 (sensing units and control unit)
- Immunity to ambient light: 50 000 Lux max.

TYPICAL APPLICATIONS

- Paper-cutting machines
- Pick-and-place robots
- Light electronic assemblying machines
- Textile machines
- Leather presses
- Matching centres

TÜV HANNOVER SACHSEN-ANHALT

CE

C SP® US

Approved as Type 4 per pr EN 50100 - 1/2

The FF-LS14 equipment is an ultra-compact infrared multibeam device designed to protect operators working on dangerous machines. The FF-LS14 equipment features are ideal for the protection of work stations where space is critical such as paper-cutting machines or pick-and-place robots. Thanks to a small resolution, it will spring into action even if a finger gets too close: any intrusion will lead to the immediate stoppage of the moving part of the machine.

Each sensing unit is made up of a row of emitting circuits alternating with receiving circuits. These circuits are housed in an extremely small aluminium extruded profile: the cross section is only 23 mm x 35 mm / 0.90 in x 1.38 in, the smallest available on the market in its class. These ultra-compact dimensions, backed by in-line connectors, allow the FF-LS14 to be mounted on small machines or in other applications where light curtains were previously too large. Its small resolution - the smallest on the market - allows the closest installation to the dangerous area, thanks to no additional safety distance in the safety distance calculation formula (EN 999).

The permanent self-checking electronic process is based on a microprocessor technology and meets the requirements of the IEC/EN 61496 - parts 1 & 2 European standards for Type 4 electrosensitive protective equipment. It has been granted the EC type examination certificate by the TÜV.

The equipment consists of a pair of identical length sensing units, a separate control unit and a pair of RS-485 connection cables. It is supplied with mounting brackets, a test rod and cable glands for the terminal strip connections.

The two sensors are matched to each other by individual coding to reduce risk of cross talk with other light curtains and to improve immunity to welding splashes.

The control unit supplies the sensing units, controls the correct operation of the scanning circuits and transmits the resulting commands to the machine control circuitry through its two relay outputs.

The equipment can operate according to two different modes selected with an internal selector: the automatic mode or the start & restart interlock mode.

In addition, the control unit is featured with a test input to trigger the output relays switching and thus check the correct operation of the final switching devices whenever needed.

In case of failure, the control unit provides an acoustic signal and 6 different optical signals to ease failure diagnostic.

⚠ WARNING

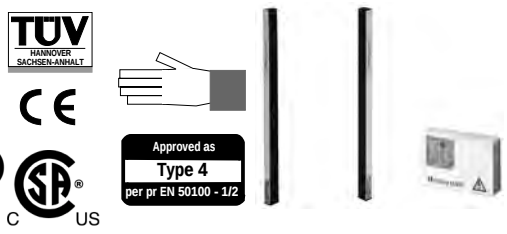
MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

FF-LS14

- **Type 4 according to IEC/EN 61496 - parts 1& 2**
- **ø14 mm / 0.55 in object detection capability**
- **Reduced dimensions (23 mm x 35 mm / 0.90 in x 1.38 in cross section)**



Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

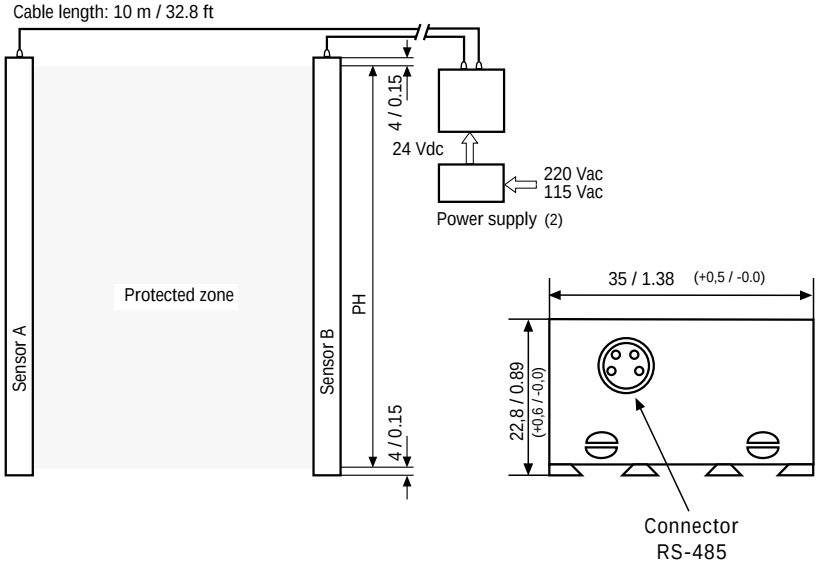
Specifications	
Supply voltage	22 to 30 Vdc or 18 to 25 Vac
Current consumption	< 300 mA
Output switching capacity	*Main out 1 & out 2*: 4 A/250 Vac / *Lamp*: 4 A/42 V
Material	*Sensors*: Aluminium profile • *Control unit*: Polycarbonate
Housing Size	*Sensors:* 23 mm x 35 mm x PH mm / 0.90 in x 1.38 in x PH in
	Control unit: 50 mm x 160 mm x 240 mm / 2.36 in x 6.30 in x 9.45 in
Emission	Modulated infrared light (880 mm)
Resolution	ø14 mm / 0.55 in
Alignment tolerance	According to IEC/EN 61496 - 2 standard
Operating temperature	0 °C to 55 °C / 32 °F to 131 °F
Sealing	*Sensors and control unit*: IP 65
Electromagnetic immunity	According to IEC 801-4: level IV/According to IEC 801-3 level III
Light immunity	50,000 Lux
Status indicators	Lamps to be connected to outputs available on control units
Range	0,2 m to 3,5 m / 0.65 ft to 11.48 ft
Electrical wiring (delivered with the unit)	*Sensors*: RS-485 cable/Pre-wired connectors (10 m / 32.8 ft)
	Control unit: Screw terminal

Ordering information (1)

FF-LS❑❑14❑❑❑2

Number of beams	Model	Protection height (PH) (mm / in)
16	*196*	196 / 7.72
32	*378*	378 / 14.89
48	*561*	561 / 22.10
64	*744*	744 / 29.31

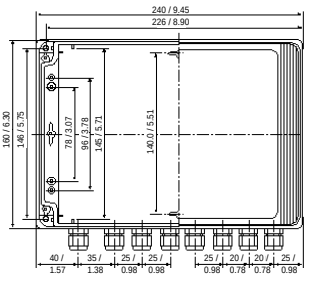
Sensors A and B have the same dimensions.



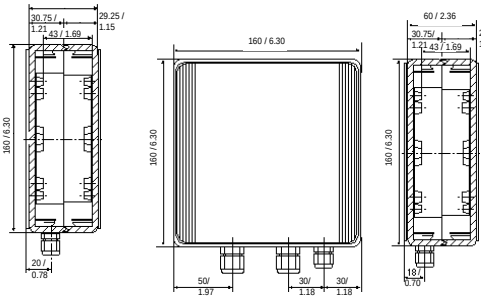
Notes:

(1) Each reference corresponds to the delivery of a complete set: A/B sensors, control unit, 2 RS-485 cables (pre-wired 10 m / 32.8 in), brackets,
8 cable glands and a ø14 mm / 0.55 in test rod.
(2) Power supply: The use of one of these supplies brings the galvanic isolation which is necessary for the system to be in compliance with IEC/EN 61496-1 standard.
FF-LSZUS0605 (230 Vac / 24 Vdc)
FF-LSZUS0606 (115 Vac / 24 Vdc)
These power supplies must be ordered separately.
(3) Control unit and sensors.

Control unit (4 mounting M4 holes)

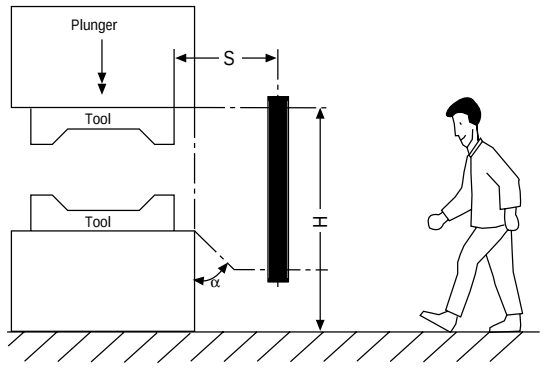


Power supplies (2)



Nominal Protection Height	mm / in	PH	196 / 7.72	378 / 14.89	561 / 22.10	744 / 29.31
Number of beams			16	32	48	64
Response time		t1	< 50 ms	< 50 ms	< 50 ms	< 50 ms
Weight of the device (3)		kg / lbs	1,85 / 4.07	2,06 / 4.53	2,26 / 4.97	2,48 / 5.45

Safety distance



S: Minimum safety distance (mm / in)

t1: Response time of the light curtain (s)

t2: Stopping time of the equipment guarded by the light curtain, including all mechanical, electromechanical and electronic parts. (s)

H: Height of the detection zone above the floor (mm / in)

The safety distance between the protection field and the dangerous zone should be large enough to ensure that if the protection field is entered, the dangerous zone cannot be reached before the hazardous movement is arrested. For the safety distance, the following formula applies:

- **Normal Approach**

Europe (EN 999)

S ≥ 2000 (t1 + t2) (mm), with S ≥ 100 mm
(or S ≥ 78.8 (t1 + t2), with S ≥ 3.9 in

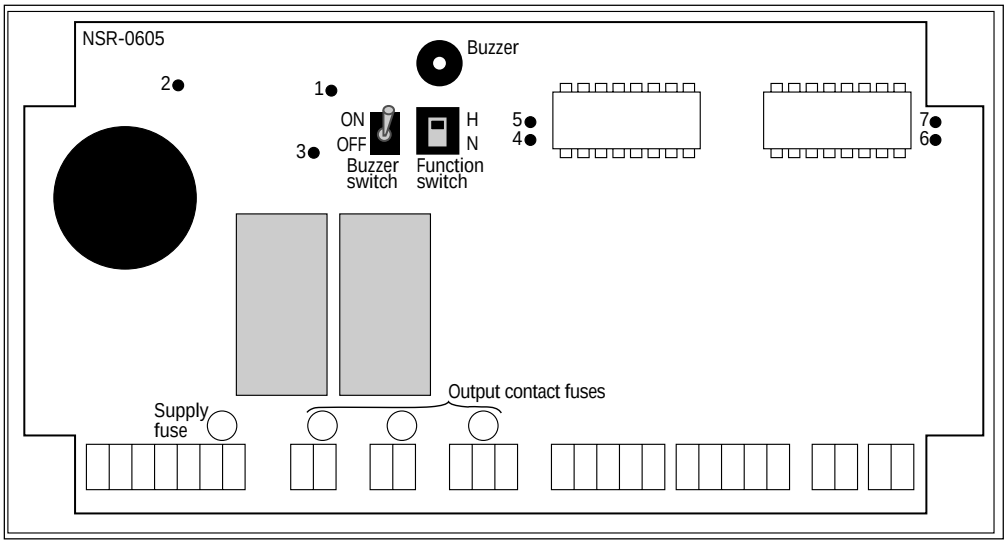
If the result of this calculation is greater or equal to 500 mm/ 19.7 in, then use the following formula:

S ≥ 1600 (t1+ t2) (mm), with S ≥ 500 mm
(or S ≥ 63 (t1 + t2) (in), with S ≥ 19.7 in

US (OSHA 29 CFR 1910.217, ANSI B11.19 1990

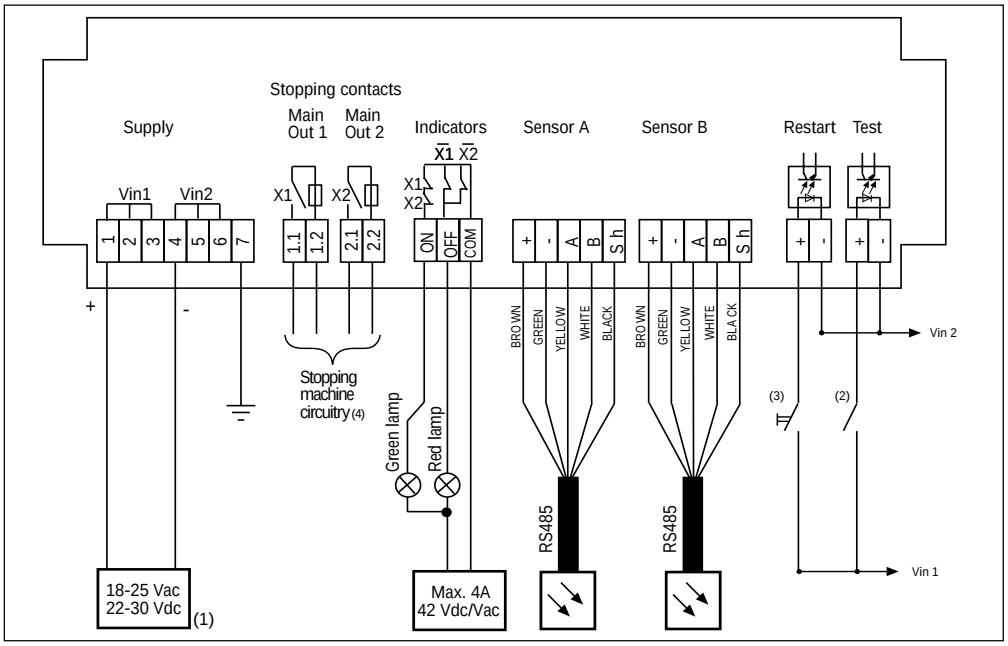
Ds ≥ (t1 + t2) + 0.9315 (in) Ds = S

Optical and acoustic signals of the control unit



As shown in the figure here below, there are 7 LEDs on the control unit. The green LEDs 1, 2 and 3 are constantly alight when the supply voltage is present. The system condition is indicated by the yellow LEDs 4 and 6, the red LEDs 5 and 7 and an acoustic signal. This signal can be switched on or off by the buzzer switch on the PC-board.

Connection diagram



(1) - Supply (to be ordered separately): The use of one of these supplies brings the galvanic isolation which is necessary to the system for a use conform to IEC/EN 61496 - 1 standard.

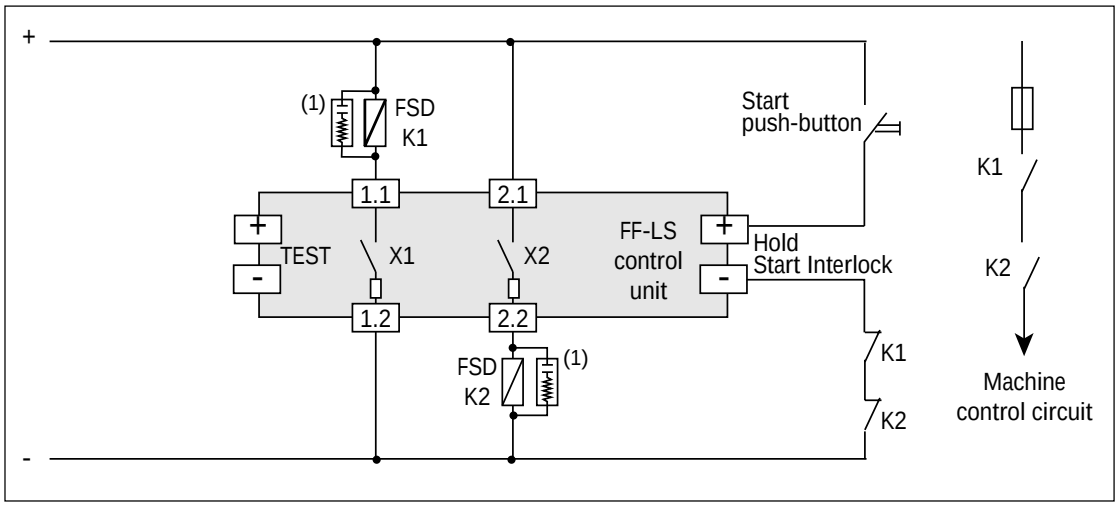
FF-LSZUS0605 (230 Vac / 24 Vdc),
FF-LSZUS0606 (115 Vac / 24 Vdc)

(2) - Test duration: The contact must be closed during 100 ms as a minimum.

(3) - The push-button must remain closed during 200 ms at least. It takes 500 ms for the system to restart after releasing the push-button.

(4) - If additional contacts are needed or if the switching capacity must be increased, use the connection diagram given or an example.

Connection diagram example: Start/Restart interlock/Final Switching Device (FSD) monitoring
(please refer to EN 954 for electrical interface)



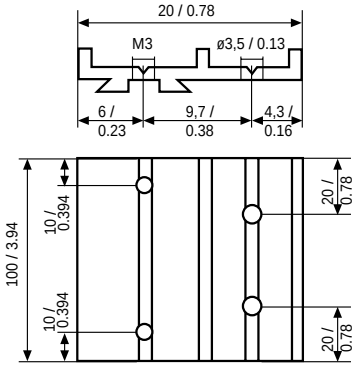
(1) RC (220 Ω + 22 µF) for ac interface (or varistors for dc interfaces) increases the life of contacts and improves electrical noise immunity.

Accessories

FF-LSZKA0611: Connecting cable

One 10 m / 32.8 ft RS485 prewired cable for the connection of one sensing unit to the control unit.

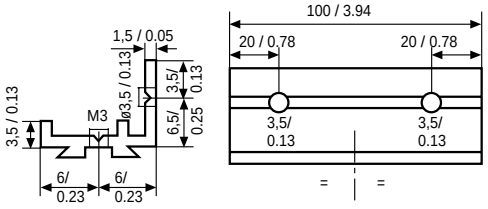
FF-LSZMS720



Straight bracket

Kit of 2 straight brackets for an installation parallel to the sliding rail.

FF-LSZMS730

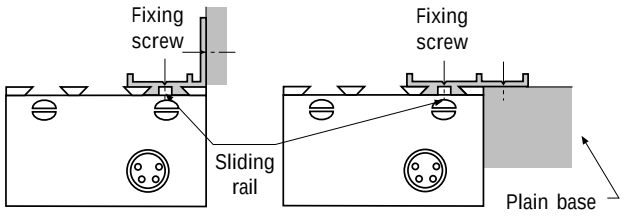


Right-angle bracket

Kit of 2 right-angle brackets for an installation perpendicular to the sliding rail.

Note: All FF-LS equipment is delivered with both types of brackets. The number of brackets available allows to fix one bracket every 500 mm / 19.7 in along the profile.

Examples



Example of Installation

For a correct installation, brackets must be fixed on a plain base in order to avoid profile deformation.

Type 2 light curtain with separate control unit

FF-SLC Series

For the protection of operators in Industry

FEATURES

- Through scan detection system with separate control unit for ease of connection to the machine controls
- Safeguarding function based on a periodic performance test in compliance with Type 2 defined by the norm IEC/EN 61496 - parts 1 & 2 (Safety of machinery - Electrosensitive protective systems)
- Output: 2 guided contact safety relays
- Operating temperature: 0 to 55°C/32 to 131°F
- Resolution: ø35, ø55, ø184 mm/ ø1.38, ø2.16, ø7.24 in
- Response time < 0.032 sec
- Supply voltage: 24 Vdc
- Protection height of 230 to 1600 mm/9.06 to 63.04 in

APPLICATIONS

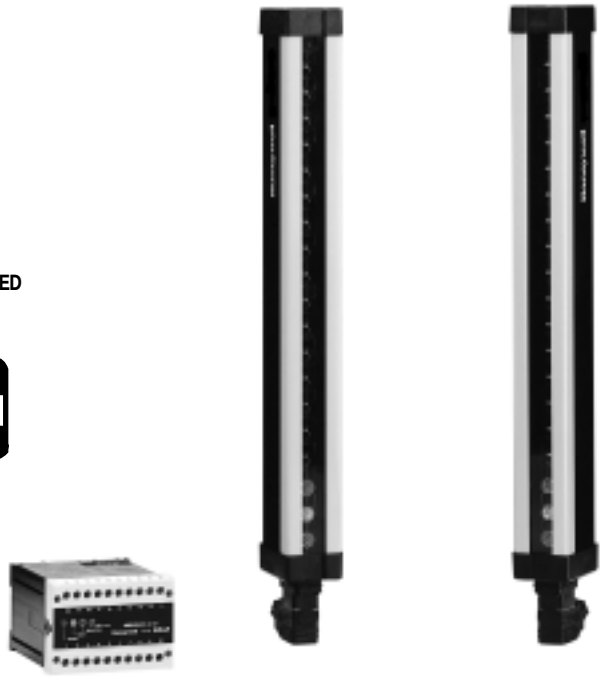
- Packaging and wrapping devices
- Automated warehouses
- Protection of working zone instead of sensitive mats
- Machinery for merchandise handling such as palletizing and self-organisers
- Automated assembly lines

TÜV PRODUCT SERVICE

CE

c UL US LISTED

Approved as Type 2 per EN 50100 - 1/2



FF-SLC

The FF-SLC curtain is a no-touch safety device designed to protect operators of dangerous machinery. The safety light curtain detects any opaque object which interrupts the protected zone, the result being immediate arrest of the moving parts of the machine. The FF-SLC series is an excellent alternative to traditional mechanical barriers, providing many benefits such as unobstructed working area, improved productivity, simple installation and maintenance.

The FF-SLC curtain is a multibeam photoelectric barrier made up of an emitter, a receiver and a separate control unit. The three units are combined to provide a Type 2 fail-safe system, the safeguarding function of which is based upon a periodic performance test, as defined by the norm IEC/EN 61496 - parts 1 & 2. The performance test is initiated by the machine and the control unit is provided with a test input that guarantees a safe connection between emitter and receiver and the machinery control circuit. Via a specific feedback monitor, the control unit is preset to check the reaction times and the electrical connections of the external contactors used in the machine control circuitry.

The control unit is equipped with a self-diagnostic output giving information on the internal relays status.

⚠ WARNING

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- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

If the feedback monitor is set, this output can also give some information on the external relays status.

Both the emitter and the receiver are built in a modular design. This design permits rapid and simple maintenance of barrier from 230 up to 1600 mm / 9.06 to 63.04 in detection heights. Three different object detection capabilities are available:

- FF-SLC35 versions with a 35 mm /1.38 in object detection capability, ideal for detecting the hands of the operator.
- FF-SLC55 versions with a 55 mm / 2.16 in object detection capability for arms, legs or the whole body detection.
- FF-SLC18 versions with a 184 mm / 7.24 in object detection capability for the whole body detection.

With a scanning range of up to 12 m / 39.4 ft, the FF-SLC barrier can be used for most industrial applications.

Due to its specific mechanical concept combined with micro-electronics technology, the modular system minimises the size, making it possible to install the system in confined spaces.

The control unit is powered on 24 Vdc. The control unit box (IP 40) can be integrated into the machine control panel at a distance from the barrier of up to 100 m / 328 ft. This control unit is designed for rapid mounting on an Omega rail (EN 50 022). Moreover, the separate control unit makes first level maintenance easier for the customer: it is not necessary to dismantle the receiver to change relays for instance.

The emitter and receiver are optically synchronised, and can be easily mounted using the right-angle brackets which are provided with the system.

The ±4° opening angle of the beams complies with IEC/EN 61496 - 2, enabling simple alignment between emitter and receiver.

LED indicators displayed on the front panel of the emitter, receiver and control units, indicate the status of the system, aiding optical alignment and failure diagnoses.

Design and operation

IEC/EN 61496 requires that a Type 2 electrosensitive protective device maintains its protective function, if an emergency-stop signal is generated after detection of the failure of the protective device due to the cyclic performance test.

The control unit of the FF-SLC barrier is set with a test signal input which allows the machine to generate a periodic test (before each machine cycle for instance). At power up and after any interruption of the detection field, the test command is systematically activated when the safety system is reset. Only a positive response to the test enables the start function, energising the output relays. When a test gives a negative response the output relays de-energise. The control unit remains permanently de-energised until the fault condition is removed (it is not possible to reset the safety system). Reset is activated by external control conditions. Both emitter and receiver columns have integral self-check circuits to control the emission and reception of the infrared light scan. Any failure is immediately detected within the scanning time.

The control unit checks the correct function of the output circuitry of the receiver column, the reaction time of the two internal relays, the electrical connections of the test/start command and the connections with auxiliary external relays (checking the reaction time via the feedback monitor).

The self-diagnostic output provides information on failures of the control unit. When the system detects a drop in synchronisation between the two internal relays A and B, the self-diagnostic output switches off. If the feedback connection is set, a drop in synchronisation between the outer relays K1 and K2 can also be detected. After each switching of the self-diagnostic output, the following should be carried out:

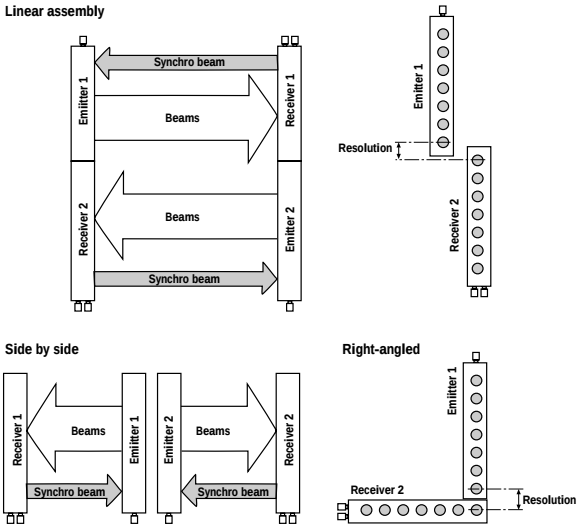
- Switch off the power.
- Remove the failure cause.
- Switch on the power.
- Reset the system (test command).

Installation precautions

The FF-SLC curtain should be protected against moving equipment, oil, dust, etc. The emitter and receiver columns should be rigidly mounted on the same plane.

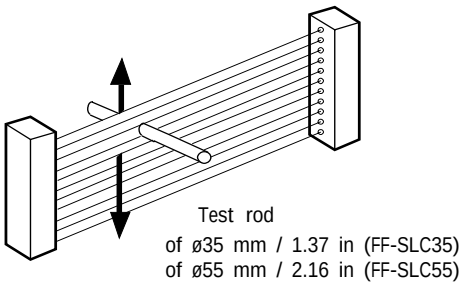
The control unit should be installed in an IP 54 enclosure. Protection heights above 1600 mm / 63.04 in can be achieved by means of adjacent rows of two or more photoelectric barriers. To prevent mutual interference between the devices, the adjacent devices should be operated in the opposite direction, as shown in the diagram below. To avoid the less favorable resolution of 70 mm / 2.75 in between adjacent protection fields, it is recommended to use the displaced mounting arrangement shown on the right of the diagram following, with a continuous resolution of 35 mm / 1.38 in or 55 mm / 2.16 in In a side-by-side assembly, the barriers should also be operated in the opposite direction.

In some applications, the right-angled mounting arrangement shown below offers the best solution. For perimetric protection, an arrangement with one, two, or three mirrors is possible.

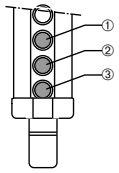
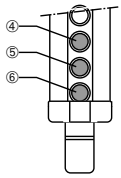
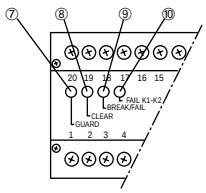


Functional test

The response of the photoelectric safety curtain over the whole protection height should be regularly tested using a ø35 mm / 1.38 in test rod for the FF-SLC35 and a ø55 mm / 2.16 in test rod for the FF-SLC55. Each time the machinery is powered up, an immediate shutdown of the machine should occur when any of the beams are interrupted by an opaque object.



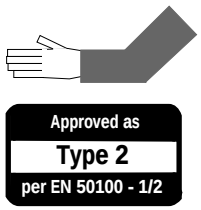
LED status indicators

UNIT	LED Nr	COLOUR	STATE	INDICATIONS
Emitter 	①	Green	On	Reception of the synchronisation beam
	②	Yellow	On	Misalignment of the synchronisation beam
	③	Red	Flickering	Failure on the emitter unit(1)
Receiver 	④	Green	On	Protection field is clear/NO outputs are closed
	⑤	Yellow	On	Protection field is clear/NO outputs are open
	⑥	Red	On	Protection field is entered/NO outputs are open
			On	Failure on the receiver unit(1)
Control unit 	⑦ (Guard)	Green	On	Protection field is clear/NO outputs are closed
	⑧ (Clear)	Yellow	On	Protection field is clear/NO outputs are open
	⑨ (Break/Fail)	Red	On	Protection field is entered/NO outputs are open
			Flickering	Failure on the control unit
	⑩ (Fail K1-K2)	Red	Flickering	Failure on the external relays K1 & K2(2)

(1) The red LED and the yellow LED flicker alternately - (2) The 2 red LED flicker simultaneously.

FF-SLC35

- **Type 2 according to IEC/EN 61496 - parts 1 & 2**
- **ø35 mm / 1.38 in object detection capability**
- **Scanning range up to 12 m / 39.4 ft**



Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

Specifications	
Supply voltage	24 Vdc ± 20 %
Output	2 safety relays with guided contacts (2 A / 125 Vac): 2 NO contacts and 1 NC contact
Resolution	ø35 mm / 1.37 in
Alignment tolerance	±4° for both emitter and receiver, in compliance with norm IEC/EN 61496 - 2
Temperatures	Operating: 0 to 55° C / 32 to 131° F • Storage: -20 to 70° C / -4 to 158° F
Resistance to ambient light	> 50 000 Lux
Sealing	Emitter and receiver: IP 65 / Control unit: IP 40
Electrical noise immunity according to	Norm IEC 801-4 Level IV
Mechanical mounting	Right-angle brackets
	Control unit: Rail mounting in accordance with EN 50 022-35
Dimensions of control unit	100 mm / 3.94 in x 73 mm / 2.87 in x 118 mm / 4.64 in
Weight of control unit	500 g / 1.1 lb
Lens diameter	ø12 mm / 0.47 in
Scanning range	0 to 12 m / 0 to 39.4 ft
Electrical connections	Emitter and receiver: 7-pin plastic plugs type GO 610WF,Nr 932 484-100 (Hirschmann)
	Control unit: Plugable terminal blocks / Max. connection length: 100 m/328 ft
	Cable specifications: ø0.5 to 1 mm² (max. allowable line resistance: 4Ω)

Ordering information
FF-SLC35❑❑2

Protection height (PH) mm/in

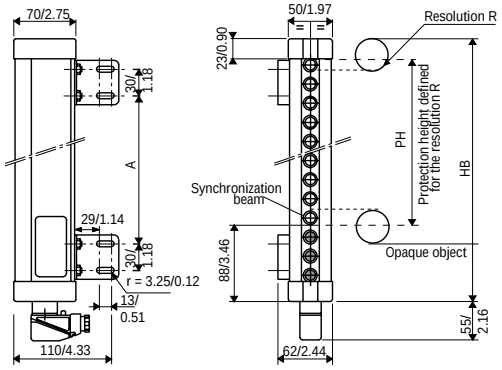
02:	230 / 9.06
04:	400 /15.76
06:	570 / 22.45
07:	745 / 29.35
09:	915 / 36.05
11:	1 090 / 42.94
13:	1 260 / 49.64
14:	1 435 / 56.53
16:	1 605 / 63.23

Control units

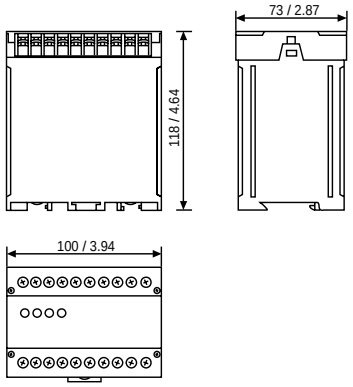
FF-SLU100R2 (Normal control unit)
or
FF-SLM200R2 (with muting function)

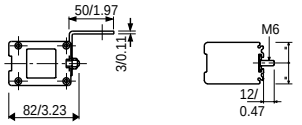
Note
Each barrier consists of an emitter and a receiver, and is delivered with 4 brackets and 2 connectors (cable is not provided). **For a complete set be sure to order the control unit**. In case of significant vibrations, order separately 2 kits of vibration dampers.

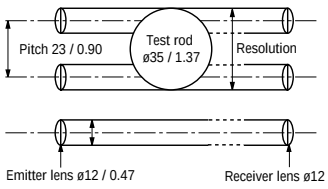
The emitter and the receiver have the same dimensions



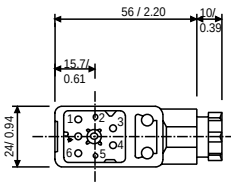
Control unit







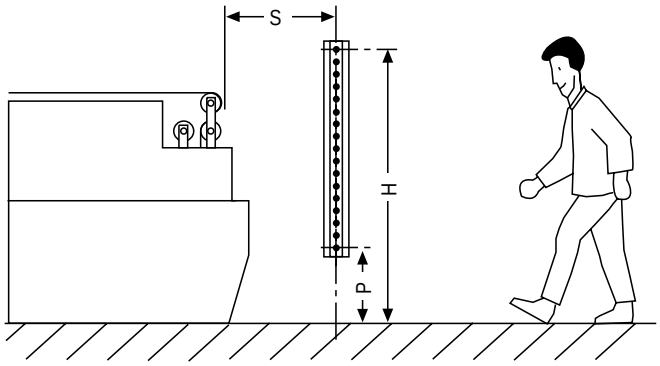
Plastic Connector
GO 610WF (7 pins) no. 932 484-100 Hirschmann

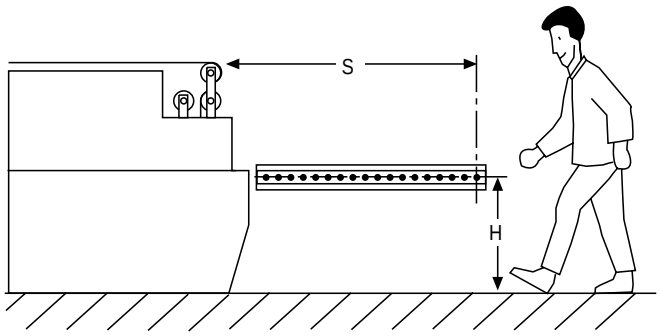


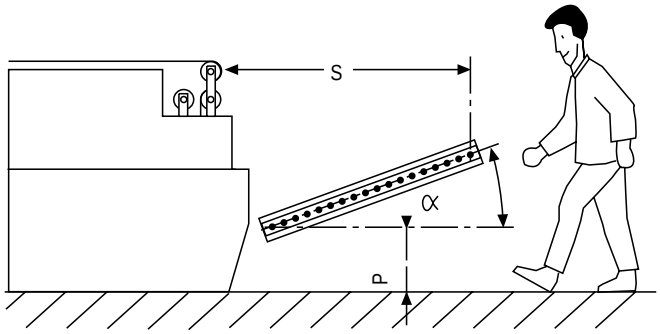
Protection height	mm / in	PH	230/9.06	400/15.76	570/22.45	745/29.35	915/36.05	1090/42.94	1260/49.64	1435/56.53	1605/63.23
Height of the barrier	mm / in	HB	300/11.82	470/18.51	645/25.41	815/32.11	990/39	1160/45.70	1335/52.59	1505/59.29	1675/65.99
Dimensions height	mm / in	HT	355/13.98	525/20.68	700/27.58	870/34.27	1045/41.17	1215/47.87	1390/54.76	1560/61.46	1730/68.16
Number of beams			9	17	25	33	41	49	57	65	73
Response time (with control unit, See Note) t1		(ms)	28	29	29	30	30	30	31	32	32
Weight		kg / lbs	2.5/5.5	3.7/8.15	4.8/10.58	6/13.22	7.4/16.31	8.6/18.95	9.7/21.38	10.8/23.8	12.5/27.55
Power consumption		W	14.3	15.6	17	18.4	19.8	21.1	22.5	23.9	25.3
Mounting brackets pitch	mm / in	A max.	165/6.5	340/13.39	510/20.09	685/26.98	855/33.68	1030/40.58	1200/47.28	1370/53.97	1540/60.67
		A mini.	20/0.78								

Note: (with SLU100R2 or SLM200R2 control unit)

Safety distances







The safety distance between the protection field and the dangerous zone should be large enough to ensure that if the protection field is entered, the dangerous zone cannot be reached before the hazardous movement has ended or is interrupted. For the safety distance S, the EN 999 European project norm defines the following formula:

Normal approach

Europe

S ≥ 2000 (t1+t2) + 168 mm , S ≥ 100 mm
(or S ≥ 78.74 (t1+t2) + 6.61 in, S ≥ 3.9 in)

This formula applies for all safety distances of S up to and including 500 mm/19.7 in. If S is found to be greater than 500 mm/19.7 in. using the above-mentioned formula, then the distance may be reduced using the following formula:

S ≥ 1600 (t1+t2) + 168 mm , S ≥ 500 mm
(or S ≥ 63.04 (t1+t2) + 6.61 in, S ≥ 19.7 in)

US (OSHA 29 CFR 1910.217, ANSI B11.19 1990)

Ds ≥ 63 (t1 + t2) + 3.75 in Ds = S

Parallel approach

S ≥ 1600 (t1+t2) + 850 mm with 875 < H ≤ 1 000 mm
(or S ≥ 63.04 (t1+t2) + 33.5 in with 875 < H ≤ 19.7 in)

or

S ≥ 1600 (t1+t2) + (1 200 - 0.4H) mm with 0 < H ≤ 875 mm
(or S ≥ 63.04 (t1+t2) + (47.3 - 0.4H) in with 0 < H ≤ 34.47 in)

The height H should be a maximum of H max. = 1 000 mm/39.4 in from the ground and the lowest allowable height of the device H min. = 0 from the ground. However, if the installation height H is greater than 300 mm/11.82 in, there is a risk of inadvertent undetected access beneath the curtain, and this must be taken into account in the risk assessment.

t1: Response time of the barrier and control unit (sec)
t2: Stopping time of the machine (sec)
H: Height of the plane of detection (mm/in)

Angled approach

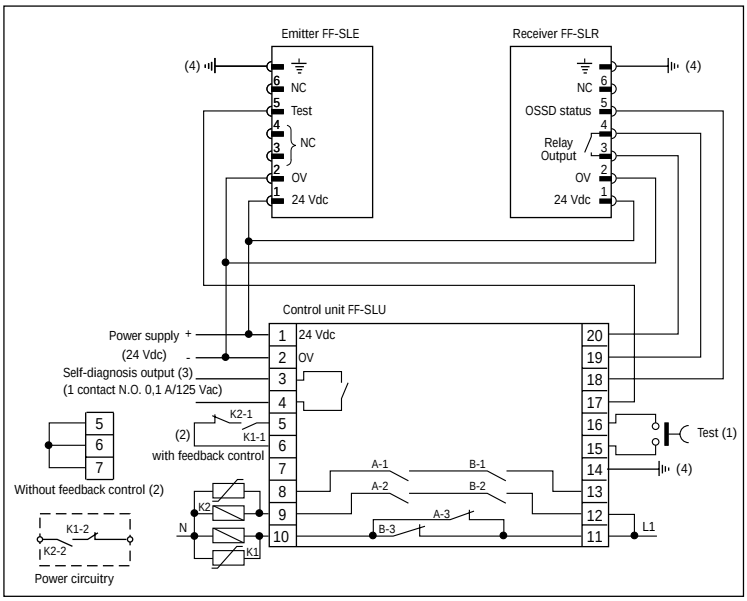
30° < α < 90°

If the angle is greater than 30°, the approach should be considered as normal, and one of the above-mentioned formulas should be used.

0° < α ≤ 30°

If the angle is less than or equal to 30°, the approach should be considered as parallel, and one of the above-mentioned formulas should be used. In this case the min. height allowed is P min. = 0 and the max. height allowed is H max. = 1 000 mm/39.4 in. However, if P > 300 mm/11.82 in, the risk of inadvertent access from below must be taken into account.

Connection diagram



(1) Test input: The safeguarding function of the system relies on the use of this input. This input enables the cyclic activation of the test and the reset of the system after each power on or intrusion in the detection field (the contact should be maintained during 10 msec/test duration: 150 msec).

(2) Feedback control: The setting of this feedback control allows the monitoring of the external relays K1 and K2. In case of failure of one relay, the control unit remains in a stop condition until the failure cause is remoted.

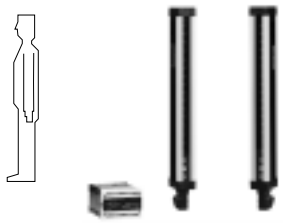
(3) Self-diagnosis output: This output provides an alarm signal when a drop of synchronism is detected between the two inner relays A and B (if the feedback connection is set, the alarm signal is also provided in case of drop of synchronism between the two external relays K1 and K2).

(4) All the ground terminals must be connected to the same potential.

FF-SLC55

- **Type 2 according to IEC/EN 61496 - parts 1 & 2**
- **ø55 mm / 2.16 in object detection capability**
- **Scanning range up to 12 m / 39.4 ft**

Approved as **Type 2** per EN 50100 - 1/2



Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

Specifications	
Supply voltage	24 Vdc ± 20 %
Output	2 safety relays with guided contacts (2 A / 125 Vac): 2 NO contacts and 1 NC contact
Resolution	ø55 mm / ø2.16 in
Alignment tolerance	±4° for both emitter and receiver, in compliance with norm IEC/EN 61496 - 2
Temperatures	Operating: 0 to 55° C / 32 to 131° F • Storage: -20 to 70° C / -4 to 158° F
Resistance to ambient light	> 50 000 Lux
Sealing	Emitter and receiver: IP 65 / Control unit: IP 40
Electrical noise immunity according to	Norm IEC 801-4 Level IV
Mechanical mounting	Right-angle brackets
	Control unit: Rail mounting in accordance with EN 50 022-35
Dimensions of control unit	100 mm / 3.94 in x 73 mm / 2.87 in x 118 mm/ 4.64 in
Weight of control unit	500 g / 1.1 lb
Lens diameter	ø12 mm / 0.47 in
Scanning range	0 to 12 m / 0 to 39.36 ft
Electrical connections	Emitter and receiver: 7-pin plastic plugs type GO 610WF, Nb 932 484-100 (Hirschmann)
	Control unit: Plugable terminal blocks / Max. connection length: 100 m / 328 ft
	Cable specifications: ø0.5 to 1 mm² (max. allowable line resistance: 4 Ω)

Ordering information

FF-SLC55❑❑2

Protection height (PH)	mm/in
04:	440/17.33
06:	610/24.03
08:	785/30.92
09:	955/37.62
11:	1130/44.52
13:	1300/51.22
15:	1475/58.11
16:	1645/64.81

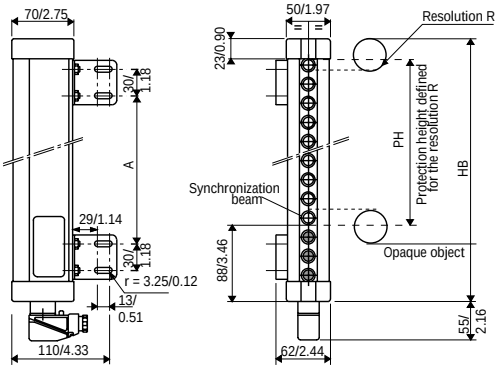
Control units

FF-SLU100R2 (Normal control unit)
or
FF-SLM200R2 (with muting function)

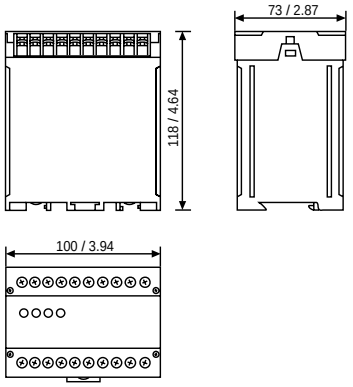
Note

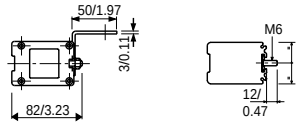
Each barrier consists of an emitter and a receiver, and is delivered with 4 brackets and 2 connectors (cable is not provided). **For a complete set be sure to order the control unit**. In case of significant vibrations, order separately 2 kits of vibration dampers.

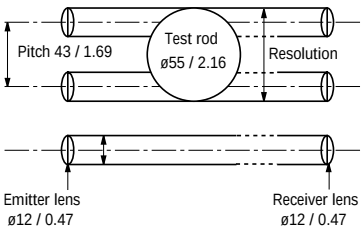
The emitter and the receiver have the same dimensions



Control unit

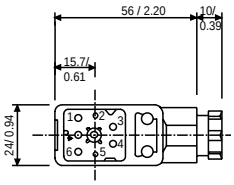






Plastic Connector

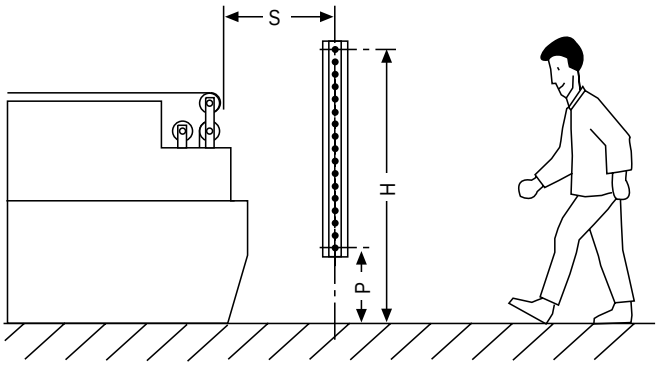
GO 610WF (7 pins) no. 932 484-100 Hirschmann

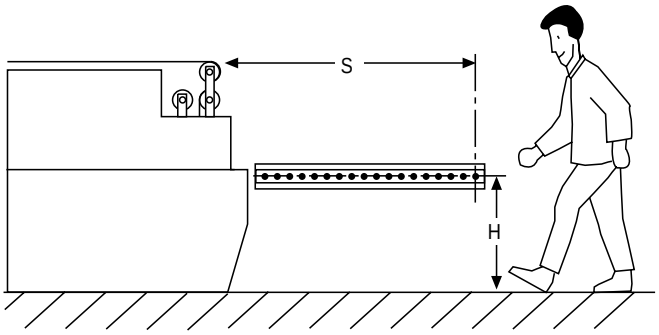


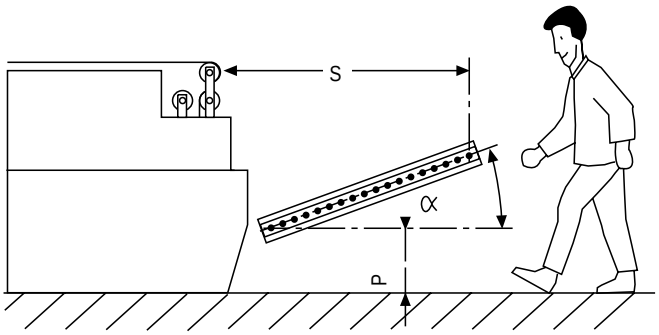
Protection height	mm / in	PH	440 / 17.33	610 / 24.03	785 / 30.92	955 / 37.62	1130 / 44.52	1300 / 51.22	1475 / 58.11	1645 / 64.81
Height of the barrier	mm / in	HB	470 / 18.51	645 / 25.41	815 / 32.11	990 / 39	1160 / 45.70	1335 / 52.59	1505 / 59.29	1675 / 65.99
Dimensions height	mm / in	HT	525 / 20.68	700 / 27.58	870 / 34.27	1045 / 41.17	1215 / 47.87	1390 / 54.76	1560 / 61.46	1560 / 61.46
Number of beams			9	13	17	21	25	29	33	37
Response time (with control unit, See Note) t1		(ms)	28	28	29	29	29	30	30	30
Weight		kg / lbs	3.7 / 8.14	4.8 / 10.56	6 / 13.2	7.4 / 16.28	8.6 / 18.92	9.7 / 21.34	10.8 / 23.76	12.5 / 27.5
Power consumption		W	14.3	15	15.6	16.3	17	17.7	18.4	19.3
Mounting brackets pitch	mm / in	A max.	340 / 13.4	510 / 20.10	685 / 27	855 / 33.68	1030 / 40.58	1200 / 47.28	1370 / 54	1375 / 54.17
		A mini.	20 / 0.78							

Note: (with SLU100R2 or SLM200R2 control unit)

Safety distances







The safety distance between the protection field and the dangerous zone should be large enough to ensure that if the protection field is entered, the dangerous zone cannot be reached before the hazardous movement has ended or is interrupted. For the safety distance S, EN 999 defines the following formula:

Normal approach

$S \geq 1600\ (t1+t2) + 850$ mm
(or $S \geq 63.04\ (t1+t2) + 33.49$ in)

The risk of inadvertent access should be taken into account during the risk assessment stage, but in all cases, the height H of the uppermost beam should be greater or equal to 900 mm/35.46 in, and the height P of the lowest beam should be lower or equal to 300 mm/11.82 in.

Parallel approach

$S \geq 1600\ (t1+t2) + 850$ mm with $875 < H \leq 1\ 000$ mm
(or $S \geq 63.04\ (t1+t2) + 47.28$ with $875 < H \leq 1\ 000$)
or
$S \geq 1600\ (t1+t2) + (1200 - 0.4H)$ in. with $0 < H \leq 875$ mm
(or $S \geq 63.04\ (t1+t2) + (47.28 - 0.4H)$ in with $0 < H \leq 34.47$ in)

The height H should be a maximum of H max. = 1 000 mm/39.4 in from the ground and the lowest allowable height of the device H min. = 75 mm/2.95 in from the ground. However, if the installation height H is greater than 300 mm/11.82 in there is a risk of inadvertent undetected access beneath the curtain, and this must be taken into account in the risk assessment.

t1: Response time of the barrier and control unit (sec)
t2: Stopping time of the machine (sec)
H: Height of the plane of detection (mm / in)

Angled approach

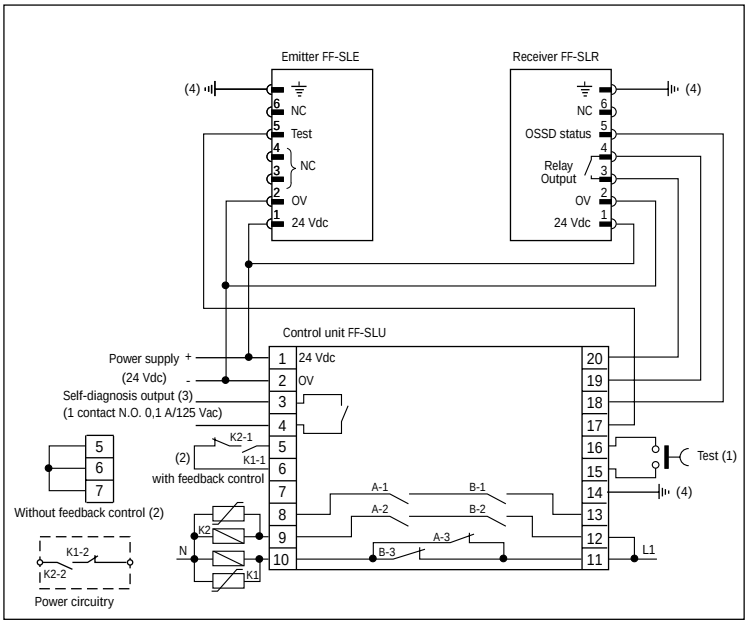
$30° < \alpha < 90°$

If the angle is greater than 30°, the approach should be considered as normal, and one of the above-mentioned formulas should be used.

$0° < \alpha \leq 30°$

If the angle is less than or equal to 30°, the approach should be considered as parallel, and one of the above-mentioned formulas should be used. In this case the min. height allowed is P min. = 75 mm /2.95 in and the max. height allowed is H max. = 1 000 mm/39.4 in. However, if P > 300 mm/11.82 in, the risk of inadvertent access from below must be taken into account.

Connection diagram



(1) Test input: The safeguarding function of the system relies on the use of this input. This input enables the cyclic activation of the test and the reset of the system after each power on or intrusion in the detection field (the contact should be maintained during 10 msec/test duration: 150 msec).

(2) Feedback control: The setting of this feedback control allows the monitoring of the external relays K1 and K2. In case of failure of one relay, the control unit remains in a stop condition until the failure cause is remoted.

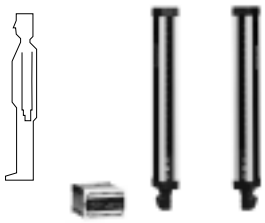
(3) Self-diagnosis output: This output provides an alarm signal when a drop of synchronism is detected between the two inner relays A and B (if the feedback connection is set, the alarm signal is also provided in case of drop of synchronism between the two external relays K1 and K2).

(4) All the ground terminals must be connected to the same potential.

FF-SLC18

- **Type 2 according to IEC/EN 61496 - parts 1 & 2**
- **ø184 mm / 7.24 in object detection capability**
- **Scanning range up to 12 m / 39.4 ft**

Approved as Type 2 per EN 50100 - 1/2



Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

Specifications	
Supply voltage	24 Vdc ± 20 %
Output	2 safety relays with guided contacts (2 A / 125 Vac) : 2 NO contacts and 1 NC contact
Resolution	ø184 mm / 7.24 in
Alignment tolerance	±4° for both emitter and receiver, in compliance with norm IEC/EN 61496 -2
Temperatures	Operating: 0 to 55° C / 32 to 131° F • Storage: -20 to 70° C / -4 to 158° F
Resistance to ambient light	> 50 000 Lux
Sealing	Emitter and receiver: IP 65 / Control unit: IP 40
Electrical noise immunity according to	Norm IEC 801-4 Level IV
Mechanical mounting	Right-angle brackets
	Control unit: Rail mounting in accordance with EN 50 022-35
Dimensions of control unit	100 mm / 3.94 in x 73 mm / 2.87 in x 118 mm / 4.64 in
Weight of control unit	500 g / 1.1 lb
Lens diameter	ø12 mm / 0.47 in
Scanning range	0 to 12 m / 0 to 39.4 ft
Electrical connections	Emitter and receiver: 7-pin plastic plugs type GO 610WF,Nb 932 484-100 (Hirschmann)
	Control unit: Plugable terminal blocks / Max. connection length: 100 m / 328 ft
	Cable specifications: ø0.5 to 1 mm² (max. allowable line resistance: 4 Ω)

Ordering information
FF-SLC18❑❑2

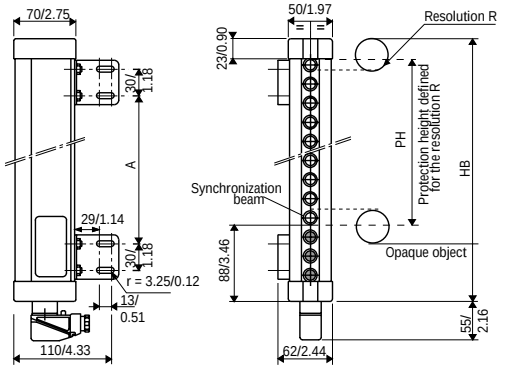
Protection height (PH) mm/in
04: 355/13.98
06: 525/20.68
07: 700/27.58
09: 870/34.27
11: 1045/41.17
13: 1215/47.87
14: 1390/54.76

Control units

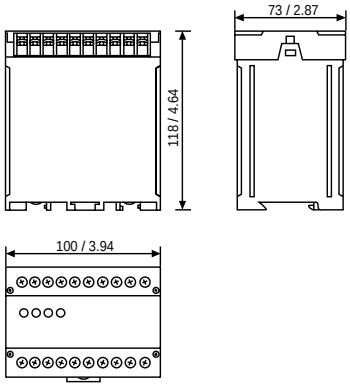
FF-SLU100R2 (Normal control unit)
or
FF-SLM200R2 (with muting function)

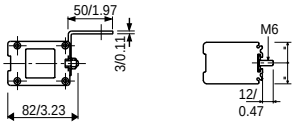
Note
Each barrier consists of an emitter and a receiver, and is delivered with 4 brackets and 2 connectors (cable is not provided). **For a complete set be sure to order the control unit**. In case of significant vibrations, order separately 2 kits of vibration dampers.

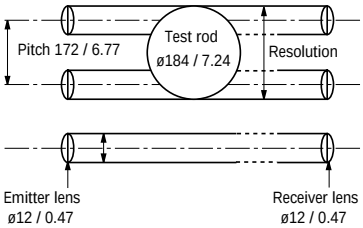
The emitter and the receiver have the same dimensions



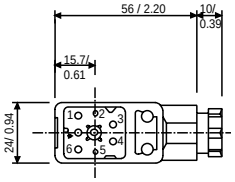
Control unit







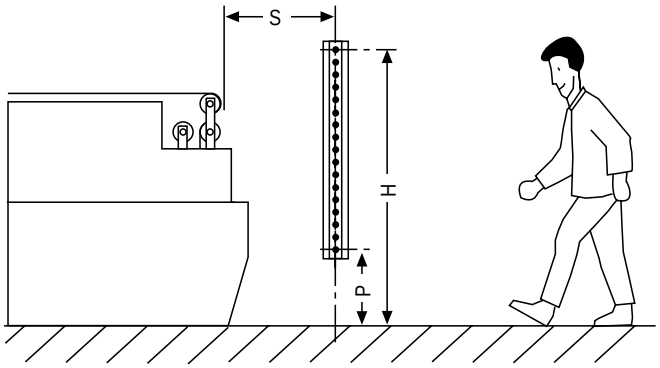
Plastic Connector
GO 610WF (7 pins) no. 932 484-100 Hirschmann



Protection height	mm / in	PH	355 / 13.98	525 / 20.68	700 / 27.58	870 / 34.27	1045 / 41.17	1215 / 47.87	1390 / 54.76
Height of the barrier	mm / in	HB	470 / 18.51	645 / 25.41	815 / 32.11	990 / 39	1160 / 45.70	1335 / 52.59	1505 / 59.29
Dimensions height	mm / in	HT	525 / 20.68	700 / 27.58	870 / 34.27	1045 / 41.17	1215 / 47.87	1390 / 54.76	1560 / 61.46
Number of beams			3	4	5	6	7	8	9
Response time (with control unit, See Note) t1		(ms)	28	28	29	29	29	30	30
Weight		kg / lbs	3.7 / 8.15	4.8 / 10.58	6 / 13.22	7.4 / 16.31	8.6 / 18.95	9.7 / 21.38	10.8 / 23.80
Power consumption		W	15.6	17	18.4	19.8	21.1	22.5	23.9
Mounting brackets pitch	mm / in	A max.	420 / 16.54	590 / 23.24	765 / 30.14	935 / 36.83	1110 / 43.73	1218 / 47.98	1450 / 57.13
		A mini.	20 / 0.78						

Note: (with SLU100R2 or SLM200R2 control unit)

Safety distances



The safety distance between the protection field and the dangerous zone should be large enough to ensure that if the protection field is entered, the dangerous zone cannot be reached before the hazardous movement has ended or is interrupted. For the safety distance S, EN 999 defines the following formula:

Normal approach

S ≥ 1600 (t1+t2) + (850 mm)

(or S ≥ 63.04 (t1+t2) + (33.5 in))

t1: Response time of the barrier and control unit

t2: Stopping time of the machine (sec)

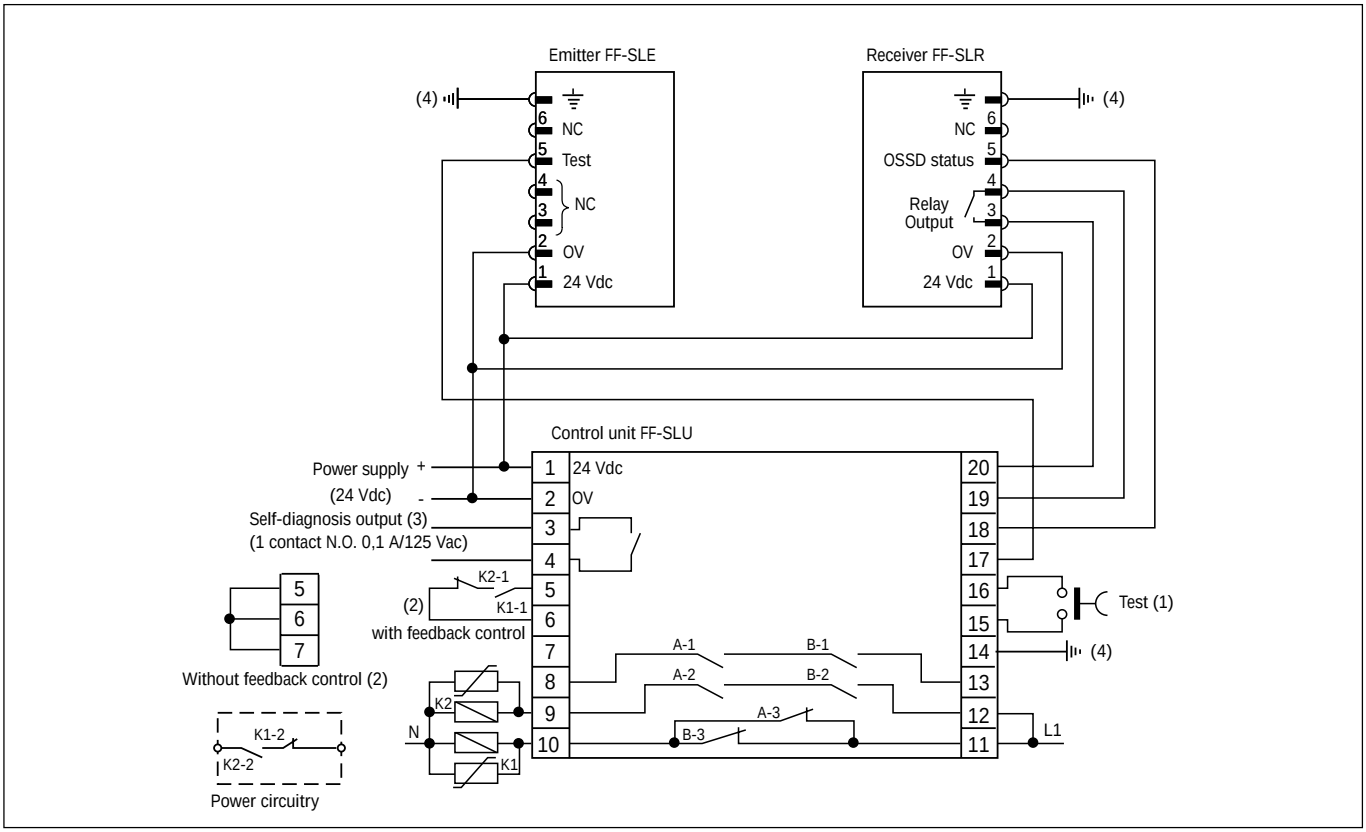
Recommendations:

Models	***Beam Heights***	
	P (mm/in)	H (mm/in)
FF-SLC18042(1)	578 / 22.77	922 / 36.32
FF-SLC18062(2)	400 / 15.76	916 / 36.09
FF-SLC18072	300 / 11.82	988 / 38.92
FF-SLC18092	300 / 11.82	1 160 / 45.70
FF-SLC18112	300 / 11.82	1 332 / 52.48
FF-SLC18132	200 / 7.88	1 404 / 55.31
FF-SLC18142	200 / 7.88	1 576 / 62.09

(1) This equipment may be installed at a height similar to the one mentioned in the EN 999 for single safety beams.

(2) This risk of inadvertent access beneath the light curtain must be taken into account during the risk assessment stop.

Connection diagram



(1) Test input: The safeguarding function of the system relies on the use of this input. This input enables the cyclic activation of the test and the reset of the system after each power on or intrusion in the detection field (the contact should be maintained during 10 msec/test duration: 150 msec).

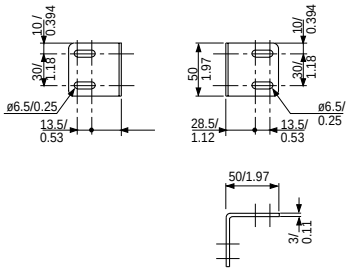
(2) Feedback control: The setting of this feedback control allows the monitoring of the external relays K1 and K2. In case of failure of one relay, the control unit remains in a stop condition until the failure cause is remoted.

(3) Self-diagnosis output: This output provides an alarm signal when a drop of synchronism is detected between the two inner relays A and B (if the feedback connection is set, the alarm signal is also provided in case of a drop of synchronism between the two external relays K1 and K2).

(4) All the ground terminals must be connected to the same potential.

FF-SLC accessories (Brackets/connectors are provided with light curtains)

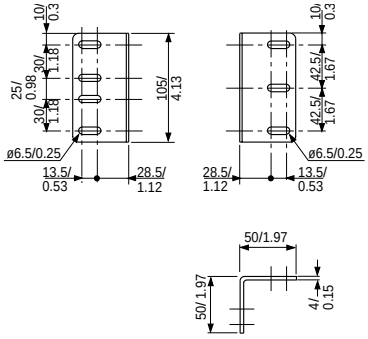
7200037



Single mounting bracket (HP < 1 000 mm / 39.4 in)

Mounting bracket for one mounting pin, supplied with screws and nuts (order 2 brackets per emitter or receiver with a protection height lower than 1 000 mm / 39.4 in).

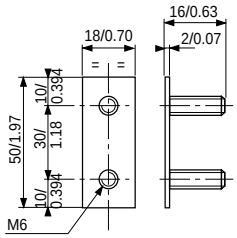
7200081



Double mounting bracket (HP ≥ 1 000 mm / 39.4 in)

Mounting bracket for two mounting pins, supplied with screws and nuts (order 2 brackets per emitter or receiver with a protection height greater or equal to 1 000 mm / 39.4 in).

7200038



Mounting pin

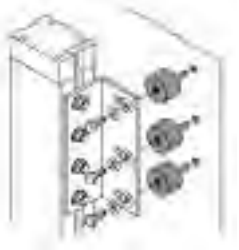
Mounting pin (order one mounting pin for the 7200037 bracket and 2 mounting pins for the 7200081 bracket).

1200084

Kit of 4 anti-vibration dampers

In case of significant vibrations, use one kit of 4 anti-vibration dampers for two 7200037 brackets (supplied with screws and nuts)

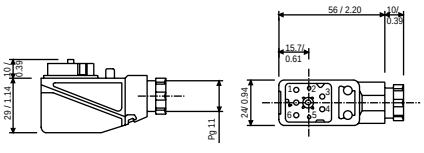
1200085



Kit of 6 anti-vibration dampers

In case of very significant vibrations, use one kit of 6 anti-vibration dampers for two 7200081 brackets (supplied with screws and nuts).

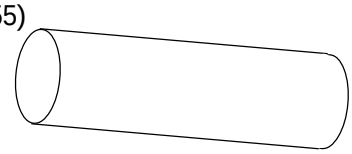
7200062



Plastic connector

Mobile female supply plug for emitter and receiver, Hirschmann 7 pin GO 610WF, no. 932 484-100 (order one plug per emitter and receiver).

8010587 (Ø35)
8010588 (Ø55)



Test rods

Test rods of ø35 mm / 1.37 in for FF-SLC35 barrier and ø55 mm/2.16 in for FF-SLC55 barrier.

Type 2 safety light curtain

FF-SLG Series

Compact and cost-effective unit

FEATURES

- Active Optoelectronic Protective Device compliant with the requirements of the IEC/EN 61496-1 and IEC/EN 61496-2 European norms for Type 2 electrosensitive protective equipment
- **Self-contained unit. No electrical connection necessary between emitter and receiver**
- **2 safety static outputs with short-circuit and cross-fault detection**
- Resolutions available:
  ø18 mm / 0.7 in for finger detection
  ø30 mm / 1.2 in for hand detection
- Protection height up to 1470 mm / 58 in
- Scanning range up to 3,5 m / 11.48 ft
- Electrical connection: M12 8 pole connectors
- Compact size: only 42 mm² x 55 mm² / 1.65 in² x 2.16 in² cross sectional area
- Optional interface control module for more switching capability and additional features

TYPICAL APPLICATIONS

- Woodworking machines
- Electronic assembly
- Textile machines

INRS

Approved as
Type 2
per IEC/EN 61496-1/2

C US

The Honeywell FF-SLG is a self-contained light curtain that does not require a separate control unit for operation. As soon as an object is detected inside the protection field, the FF-SLG opens its two safety static outputs to generate an emergency stop condition that is used to remove dangerous machine motion when properly interfaced with the machine stopping circuitry. When connected to the FF-SRL60252 optional interface control module, the FF-SLG provides a wide variety of advanced functions: cross-monitored relays, final switching devices monitoring for the control of external contactors or relays, choice between automatic restart or start and restart interlock as well as relay status indicators.

The FF-SLG is designed in compliance with IEC/EN 61496-1 and IEC/EN 61496-2 standards and meets the requirements for a Type 2 Active Optoelectronic Protective Device. It can be used on low to medium danger machines.

The product received an EC type test certificate from the French INRS notified body, required for safety equipment as per the 98/37/EC Machinery Directive.

The cross section of 42 mm x 55 mm / 1.65 in x 2.16 in makes installation possible in tight spaces, especially with the help of the T-shape bolts supplied with the light curtains. Indicators provide information on the output status and on failure diagnostic. Optional right angle brackets allow for bottom and top mounting. The optional FF-SRL60252 interface control module easily fits inside the machine control panel with its 22,5 mm / 0.89 in width DIN rail mount housing.

A test input on the emitter allows for a cyclical test of the system, as per the requirements of IEC/EN 61496-1 and IEC/EN 61496-2.

⚠ DANGER

IMPROPER SAFETY PRODUCT USE IN THE US

- Type 2 safety light curtains as defined by IEC/EN 61496-1 and IEC/EN 61496-2 **do not meet** US OSHA 1910.217, US ANSI B11.1, B11.2, B11.19 and B11.20 requirements. Although Type 2 safety products are acceptable for certain applications outside the US, they are not generally acceptable in the US due to current US regulations and standards.
- In the US, Type 2 safety light curtains may be used under limited circumstances as defined by the ANSI/R15.06-1999 standard. In Canada, IEC/EN 61496-1 and IEC/EN 61496-2 are recognised as product standards, however application standards do not typically allow Type 2 light curtain use.
- Do not use Type 2 safety products in the US if the applicable standard requires a control reliable solution. For Risk Assessment, refer to ANSI TR3 and ANSI/R15.06-1999 for the USA and the Ministry of Labour for Canada.
- Consult with local safety agencies before installing a Type 2 safety light curtain product.

Failure to comply with these instructions will result in death or serious injury.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is to be referenced for each product.

Failure to comply with these instructions could result in death or serious injury.

Type 2 compact and cost-effective unit FF-SLG

- **Type 2 according to the IEC/EN 61496-1 and IEC/EN 61496-2 standards**
- **2 safety static outputs with short-circuit and cross-fault detection**

Approved as Type 2 per IEC/EN 61496-1/2

Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

Features / Type	FF-SLG18	FF-SLG30
Resolutions	ø 18 mm / 0.7 in	ø 30 mm / 1.2 in
Protection heights	See Table 2	
Nominal scanning ranges	0,3 m to 3,5 m / 1 ft to 11.48 ft	
Supply voltage	24 Vdc (±15 %)	
Power consumption	*Emitter:* 4 W max. • *Receiver*: 3 W max. (see Table 2)	
Outputs	2 safety static outputs (switching capacity: 0,3 A / 24 Vdc)	
Maximum cable length	25 m / 82 ft when conected on the relevant Honeywell control module	
Test input	Voltage free (normally closed contact)	
Response time	15 ms	15 ms to 21,5 ms (see Table 2)
LED status indicators	*Emitter:* failure alarm / power, test	
	Receiver: outputs status	
Cross sectional area	W 42 mm² x D 55 mm² / W 1.65 in² x D 2.16 in²	
	(see Tables 1 and 2 for complete housing dimensions)	
Emission	Infrared modulated light source (925 nm)	
Effective aperture angle	±4°, ±25 % (in compliance with the IEC/EN 61496-2)	
Light immunity	*Sun:* 20 000 lux • *Lamp:* 15 000 lux	
Electrical noise immunity	IEC 61000-4-4: level III / IEC 61000-4-3: level III	
Ambient temperature	*Operating temperature:* 0 °C to 55 °C / 32 °F to 131 °F	
	Storage temperature: -20 °C to 75 °C / -4 °F to 167 °F	
Vibrations	IEC/EN 61496-1: 10 to 55 Hz frequency range, 1 octave/min.sweep rate, 0,35 mm	
	±0,05 amplitude, 20 sweeps per axis, for 3 axes	
Sealing	IP 65, NEMA 4, 13	
Material	*Housing:* black anodised aluminium alloy • *Front plate:* polymethyl methacrylate (PMMA)	
	End caps: polycarbonate	
Electrical connection	M12 8 pole connectors	

Ordering information

Each listing consists of an emitter, a receiver, 2 pairs of mounting pins, 4 M5 dovetail shape bolts, 4 M5 nuts and 4 rip-lock washers, and a test rod.

FF-SLG ❑❑ ❑❑❑ BM2

Model (see Table 2)

Resolutions
18: ø 18 mm / 0.7 in
30: ø 30 mm / 1.2 in

(1) Protection Height for the minimum detected object size or resolution
(2) Sensing Field Height (full screen height)
(3) Total Height

Dimensions
(mm / in)

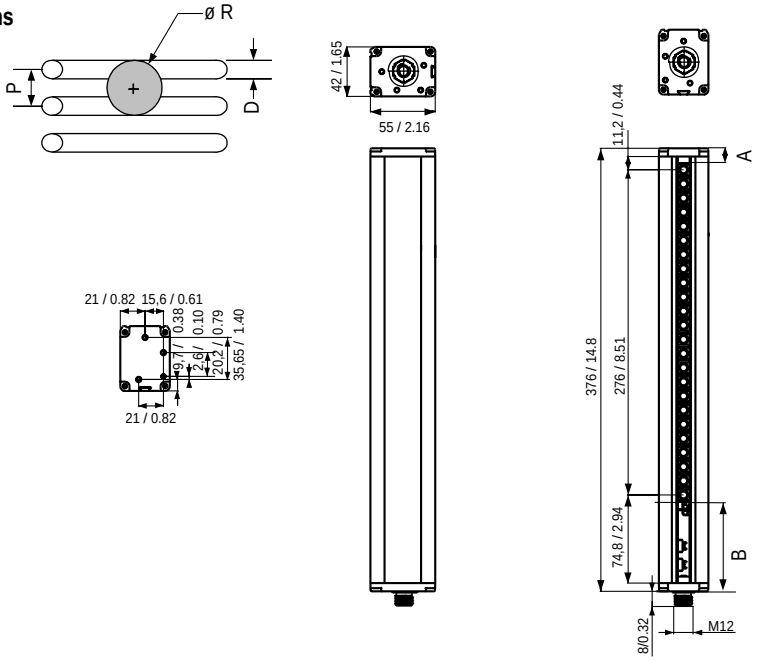
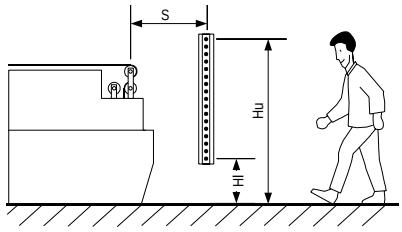
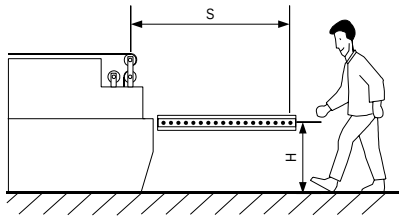
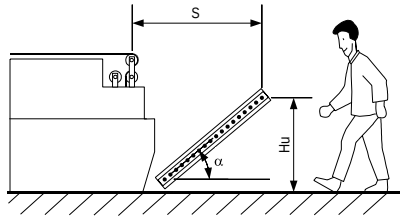


Table 1 (mm / in)	øR (resolution)	P (lens pitch)	D (lens diameter)	A (inactive zone)	B (inactive zone)
FF-SLG18	ø 18 / 0.7	12 / 0.47	6 / 0.23	15,2 / 0.60	78,8 / 3.10
FF-SLG30	ø 30 / 1.2	24 / 0.94	6 / 0.23	27,2 / 1.07	78,8 / 3.10

Table 2

Model	*031*		*050*		*070*		*089*		*109*		*128*		*147*	
Protection height (mm / in) (1)														
FF-SLG18	**306 / 12.05**		**498 / 19.62**		**690 / 27.18**		-		-		-		-	
FF-SLG30	**318 / 12.52**		**510 / 20.09**		**702 / 27.65**		**894 / 35.22**		**1086 / 42.78**		**1278 / 50.35**		**1470 / 57.91**	
Sensing field height (mm/in)(2)														
FF-SLG18	**282 / 11.11**		**474 / 18.6**		**666 / 26.24**		-		-		-		-	
FF-SLG30	**270 / 10.63**		**462 / 18.2**		**654 / 25.76**		**846 / 33.33**		**1038 / 40.89**		**1230 / 48.46**		**1422 / 56.02**	
Total height (mm / in) (3)														
FF-SLG18	376 / 14.8		568 / 22.36		760 / 29.92		-		-		-		-	
FF-SLG30	376 / 14.8		568 / 22.36		760 / 29.92		952 / 37.48		1144 / 45.03		1336 / 52.6		1528 / 60.15	
Response time (ms)														
FF-SLG18	15		15		15		-		-		-		-	
FF-SLG30	15		15		15		15,5		17,5		19,5		21,5	
	Em.	**Rec.**	**Em.**	**Rec.**	**Em.**	**Rec.**	**Em.**	**Rec.**	**Em.**	**Rec.**	**Em.**	**Rec.**	**Em.**	**Rec.**
Weight per device (kg / lbs)	1,1/2.4	1,2/2.6	1,5/3.3	1,6/3.5	1,8/3.9	1,9/4.2	2,2/4.8	2,3/5	2,5/5.5	2,6/5.7	2,9/6.3	3/6.6	3,2/7	3,3/7.2
Power consumption (W) *FF-SLG18*	4	3	4	3	4	3	-	-	-	-	-	-	-	-
(Emitter/receiver) *FF-SLG30*	4	3	4	3	4	3	4	3	4	3	4	3	4	3

Safety distances (North American information not provided due to limited applicability)

European EN 999 standard (in mm, 100 mm = 3.9 in)	***FF-SLG18***	***FF-SLG30***
Normal approach		
	S ≥ 2000 (t1 + t2) + 32, with S ≥ 100 If S ≥ 500, then use: S ≥ 1600 (t1 + t2) + 32, with S ≥ 500	S ≥ 2000 (t1 + t2) + 128, with S ≥ 100 If S ≥ 500, then use: S ≥ 1600 (t1 + t2) + 128, with S ≥ 500
Parallel approach		
	S ≥ 1600 (t1+ t2) + (1200 - 0.4 H), with H ≤ 875 or S ≥ 1600 (t1+ t2) + 850, with 875 ≤ H ≤ 1000	
Angled approach		
	If α ≥ 30°, then use one of the formula given for a normal approach. If α ≤ 30°, then use one of the formula given for a parallel approach, with Hu ≤ 1000.	

Where:

S: Minimum safety distance (mm, 100 mm = 3.9 in)

t1: Light curtain response time (s)

t2: Machine stopping time (s)

H: Height of the detection plane above the reference floor (in mm, 100 mm = 3.9 in)

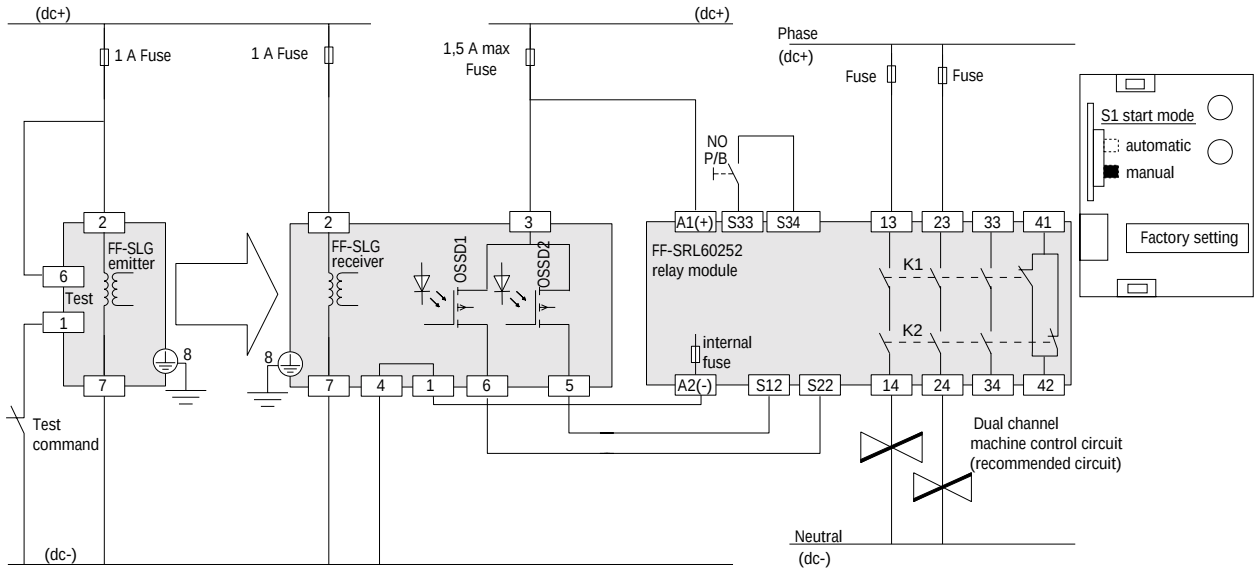
Hu: Height of the uppermost beam above the reference floor (in mm, 100 mm = 3.9 in)

Hl: Height of the lowest beam above the reference floor (in mm, 100 mm = 3.9 in)

For more information, refer to the EN 999 European standard or comply with the requirements on safety distances given by the type C European standard (if existing or available) for the considered machine.

Wiring diagram (using the FF-SRL60252 safety control module)

The FF-SRL60252 interface control module is set in the Manual restart mode:



OSSD1 and OSSD2: Output Signal Switching Devices (light curtain safety contacts)
N.O. P/B: normally open contact of a push-button

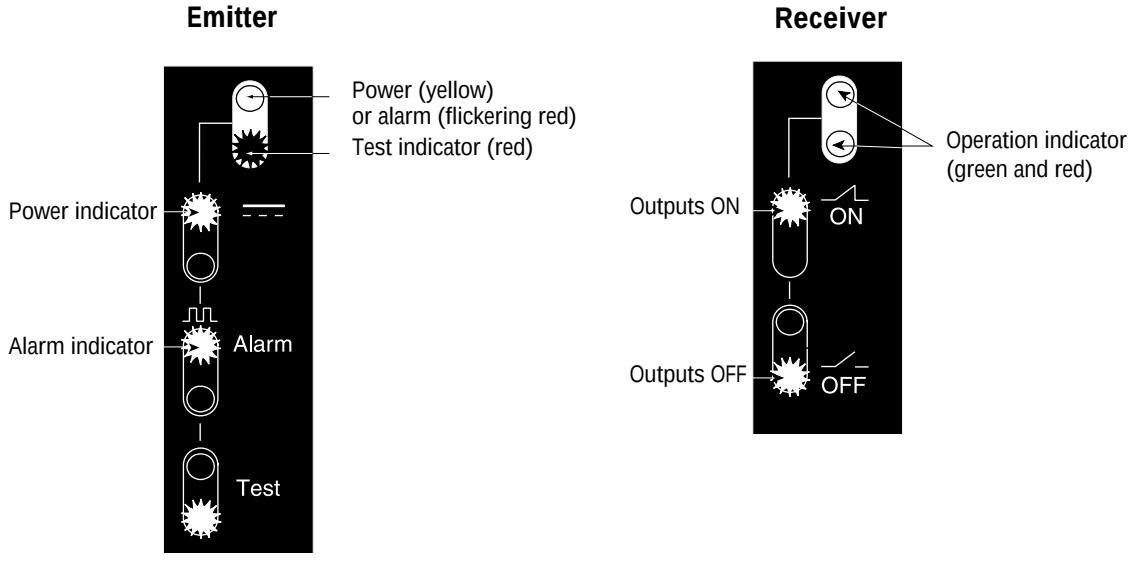
NOTICE

Improper use of the FF-SLG light curtain

The cross-monitoring of the FF-SLG static outputs is based upon a self-checking principle which guarantees the detection of an output short-circuit and the detection of a short-circuit between the outputs (cross-fault detection). The FF-SRL60252 interface control module is primarily designed to be interfaced with Honeywell safety static outputs devices.

Compatibility of the FF-SLG with any other emergency stop safety control module is not guaranteed.

LED status indicators



Accessories

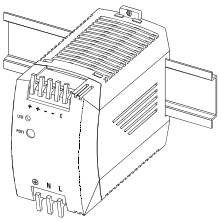
Safety control modules

FF-SRL60252
Dual channel relay module for safety light curtains with static safety outputs
(to be ordered separately as an option)
- compatible with safety light curtains with static outputs only
- 24 Vdc
- Category 4 per EN 954-1
- Selectable start mode and FSD monitoring
- 3 NO, 1 NC internally redundant safety relay outputs
- 22,5 mm / 0.89 in width

FF-SRM200P2
Muting module
(to be ordered separately as an option)
- connection of 1 or 2 safety devices
- modes of operation: unidirectional or bidirectional muting, mutual exclusion
- connection of 2 or 4 auxiliary muting sensors
- 24 Vdc
- category 4 per EN 954-1
- manual start mode, FSD monitoring
- programmable max. muting time
- crossfault monitoring of inputs
- self monitored muting lamp output
- 3 NO safety relay outputs
- static outputs for output status and diagnostic information
- 45 mm / 1.77 in

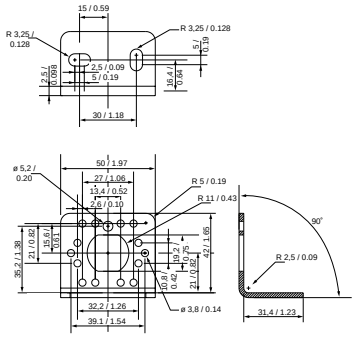
FF-SRL59022
Multi-safety device control module with Presence Sensing Device Initiation (PSDI)
- accept up to three safety devices working in a guard-only mode or a single safety light curtain working in a single stroke/dual stroke mode
- 24 Vdc
- category 4 per EN 954-1
- manual start mode and FSD monitoring
- cross-fault monitoring of inputs
- 3 NO safety relay outputs
- static outputs for relay output status and diagnostic information
- 45 mm / 1.77 in

ac to dc power supply



FF-SXZPWR050
ac to dc power supply
Input voltage: 85 to 264 Vac
Output voltage: 24 to 28 Vdc / 2,1 A to 1,8 A
Dimensions: 97 mm x 75 mm x 45 mm / 3.82 in x 2.95 in x 1.77 in
Mounting: DIN rail
Approvals: UL508 listed, UL1950, cUL/CSA-C22.2, EN/IEC 60950, EN 50178
(to be ordered separately as an option).

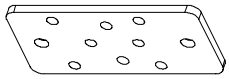
Right-angle bracket kit



FF-SGZ001002
One kit includes 2 brackets and 8 M3,5 x 8 screws. Order one bracket kit per emitter or receiver element, 2 kits for an emitter/receiver system. The 8 screws are used if the bracket is fixed on the top and bottom caps of the FF-SLG.
(to be ordered separately as an option).

NOTICE
PROTECTION AGAINST HIGH VIBRATION
In case of high vibration, 3 pairs of brackets must be used for light curtain systems with protection heights greater or equal to 1000 mm / 39.4 in (an additional bracket kit must be ordered).

Anti-vibration kit



(x 2)

(x 4)

FF-SYZAD
Kit of 2 straight brackets and 4 anti-vibration dampers (mounting hardware included).

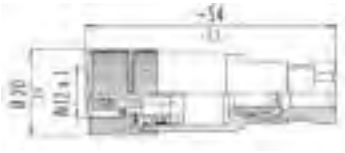
NOTICE
PROTECTION AGAINST HIGH VIBRATION
In case of high vibrations, order:
- 2 sets of FF-SYZAD kit for light curtain systems with protection height below 1000 mm / 39.4 in.
- 3 sets of FF-SYZAD kit for light curtain systems with protection height greater or equal to 1000 mm / 39.4 in, but less than 1470 mm / 57.91 in.

Cordsets

Lumberg single keyway M12, female straight **(to be ordered separately)**
Order 2 cordsets for emitter + receiver.
Emitter (FF-SLG❑❑❑❑❑BM2E) or receiver (FF-SLG❑❑❑❑❑BM2R)

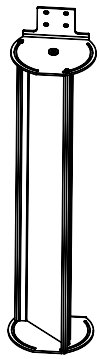
Catalogue listing	Description
FF-SXZCAM128U02	2 m / 6.56 ft length
FF-SXZCAM128U05	5 m / 16.40 ft length
FF-SXZCAM128U10	10 m / 32.80 ft length

Cable connector



FF-SXZCOM128
Binder single keyway M12 female screw type straight connector. 8 set screws M2,5. Gold plated contacts. Pin configuration according to IEC 61076-2-101.

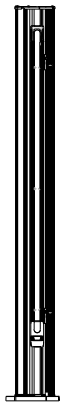
Deflection mirror



FF-SYZMIR❑❑❑
To be ordered separately as an option

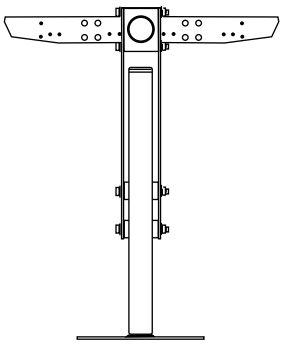
Features:	
Deflection mirror with 10 % scanning range reduction (FF-SYZMIR0❑❑)	
Deflection mirror with 25 % scanning range reduction (FF-SYZMIR1❑❑)	
Quick mounting and easy mirror adjustment	
Mounting brackets included (top / bottom mounting)	
Adjustment of mirror in azimuth direction of ±45°	
Housing compatible with FF-SBSMIR Series	
Material	Aluminium alloy housing
Finish	Gold colour anodisation
Ordering guide:	
FF-SYZMIR❑04	FF-SLG❑❑031
FF-SYZMIR❑06	FF-SLG❑❑050
FF-SYZMIR❑08	FF-SLG❑❑070
FF-SYZMIR❑10	FF-SLG❑❑089
FF-SYZMIR❑12	FF-SLG❑❑109
FF-SYZMIR❑14	FF-SLG❑❑128 and FF-SLG❑❑147

Floorstanding post



FF-SYZPF
To be ordered separately as an option
Floorstanding post for the installation of the following FF-SLG light curtains:
FF-SLG❑❑031 to FF-SLG❑❑109.

Adjustable floorstanding post



FF-SYZPA
To be ordered separately as an option
- horizontal, diagonal and vertical adjustment of light curtains possible
- quick mounting and easy light curtain adjustment
- 360° rotation of light curtain possible
- fine adjustment of light curtains in azimuth direction of ±11° ensures an easy alignment
- 700 mm / 27.58 in corner protection for light curtain included
- base plate can be mounted independently
- finish: RAL 1021 yellow paint.

Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance,current specifications, pricing or name of the nearest Authorised Distributor, contact a nearby sales office or:

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Type 4 modular light curtain with separate control unit

Designed to enhance application flexibility

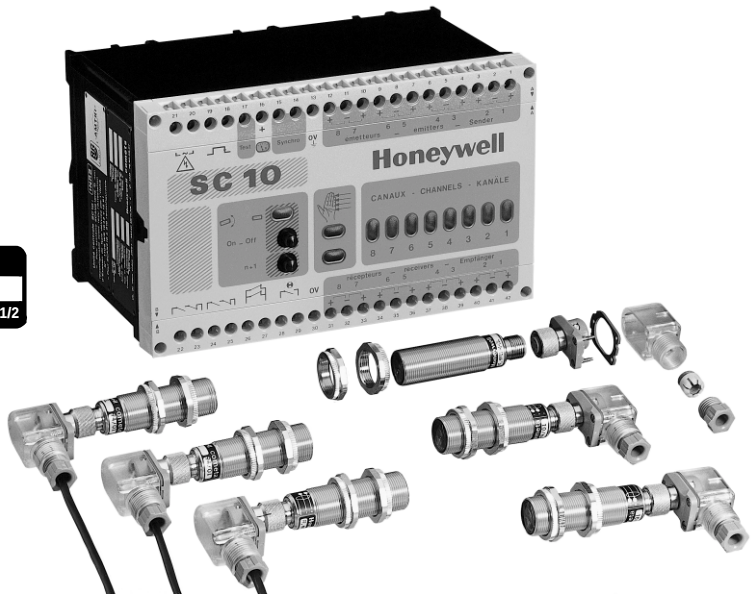
FEATURES

- Meets applicable parts of US OSHA 29CFR 1910.212 and RIA 15.06 regulations for Control Reliability
- Through scan detection system
- Complete system, ready for installation (amplifier, sensors, plug and cable)
- Safety amplifier with permanent self-checking, Type 4 according to IEC/EN 61496 - parts 1 & 2
- EC type examination certificate delivered by the German BG E+MIII
- Can drive from 2 to 8 multiplexed photoelectric beams
- Two guided contact output relays
- Resolution: ø40 mm to 400 mm / 1.57 in to 15.76 in in compliance with EC regulations (EN 999 standard)
- Built-in individual beam alignment aid
- Restart modes available:
  - · automatic restart
  - · start and restart interlock after power on and any beam interruption; in this mode the FSD monitoring facility is available
- Test input for FSD monitoring

TYPICAL APPLICATIONS

- Access protection on palletising areas
- Access control of areas containing robots or automatic machines
- Detection of automatic guided vehicles
- Ejection control
- Tool control
- Reliability of the detection information
- Thermoforming, agglomerating and moulding presses
- Door control

Approved as
Type 4
per pr EN 50100 - 1/2



The FF-SCAN system uses an invisible, modulated infrared curtain. Due to its flexibility, it offers a customised solution for the protection of personnel working on dangerous machinery.

The system contains a positive-safety self-checking amplifier, M18 photoelectric sensors, connectors and one or two rolls of cable (1 shielded pair). Optional accessories are available (mounting brackets, deflection mirrors, multibeam post) to make the installation easy.

The sensors used to analyse an access area operate in through scan mode. The distance separating emitters and receivers can be as high as 33 m / 108.24 ft. Receivers are fitted with a line impedance adaptor allowing cabling connections of up to 50 m / 164 ft.

The amplifier drives from 2 to 8 sensors, that can provide a resolution of 40 mm to 400 mm / 1.57 in to 15.76 in (see sensors installation).

A built-in individual beam alignment aid provides visual information, which helps optimise optical adjustments when installing sensors. This alignment aid is helpful for any protection and any scanning ranges up to 33 m / 108.24 ft. Accessories are designed to ease sensors installation and a laser pen designed for alignment purposes can be used for perimetric protections involving one or several mirrors.

The dynamic electronic processing and the permanent self-checking of circuits provide a high level of intrinsic safety. The start and restart interlock allows reliable access control of dangerous areas surrounded by the infrared beam. The use of a test input facility provides a reliable control of the electrical interface which connects the FF-SCAN to the machine control circuits.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

Sensors installation

The safety distance between the protection field and the dangerous zone should be large enough to ensure that if the protection field is entered, the dangerous zone cannot be reached before the hazardous movement is ended or interrupted. The safety distance "S" (or D) is calculated according to the following formula:

$$S \geq K\,(t1 + t2) + C$$

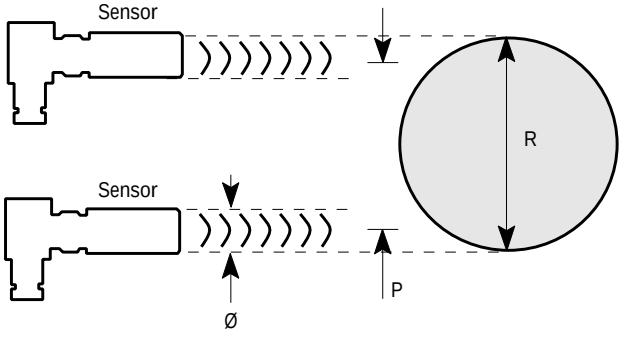
S: Minimum safety distance (mm / in)
K: Approach speed of the operator (mm / s)
t1: Response time of the photoelectric curtain (30 ms)
t2: Stopping time of the machine (ms)
C: Additional guarding space depending on the curtain sensitivity (mm / in)

Resolution of the photoelectric curtain

Parameter C depends on the maximum resolution of the photoelectric curtain. This resolution is determined by the sensing width of two adjacent beams as follows:

$$R = P + Ø$$

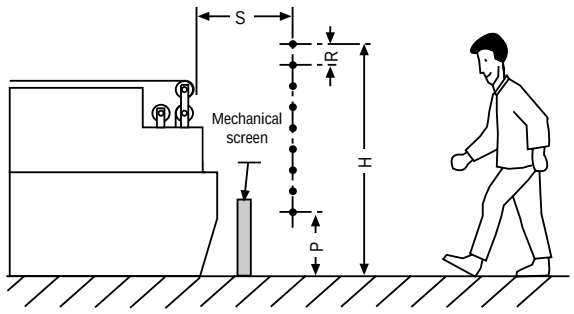
R: Maximum resolution of the curtain (mm / in)
P: Maximum distance separating the centers of two adjacent sensors (mm / in)
Ø: Lens diameter (15 mm / 0.59 in)



Values of K and C parameters according to the European EN 999 standard

The approach speed "K" depends upon the position of the curtain, and the guarding space "C" depends upon the resolution of the curtain.

Normal approach



Safety curtain with a resolution greater than ø40 mm / 1.57 in and less than ø 70 mm / 2.75 in

Protective devices with such a resolution are considered by the EN 999 European project norm to be sets of multiple independent beams. They will not detect intrusion of the hands, and therefore shall only be used where the risk assessment indicates that detection of intrusion of the hands is inappropriate. When the resolution of the FF-SCAN system is set between ø40 mm / 1.57 in and ø70 mm / 2.75 in, the sensing field will detect arms, legs or the whole body of the operator.

In that case, the minimum allowable safety distance "S" from the dangerous zone to the vertical detection plane shall be calculated using the following formula:

$$S \geq 1600\,(t1 + t2) + 850 \text{ (mm)}$$
$$\text{(or } S \geq 63\,(t1 + t2) + 33.5 \text{ (in))}$$

S: Minimum safety distance (mm / in)
t2: Stopping time of the machine (s)
t1: 30 ms (response time of the FF-SCAN curtain)

The risk of inadvertent access shall be taken into account during the risk assessment stage, and if it is the case, the height "H" of the uppermost beam shall be greater or equal to 900 mm / 35.46 in, and the height "P" of the lowest beam shall be lower or equal to 300 mm / 11.82 in.

Where the photoelectric safety curtain may not offer sufficient protection, additional safety devices or further photoelectric controls are required in order to prevent the operator from entering the dangerous zone without being detected, and from staying between the dangerous zone and the photoelectric safety grid.

Multiple individual beam devices (resolution > 70 mm / 2.75 in)

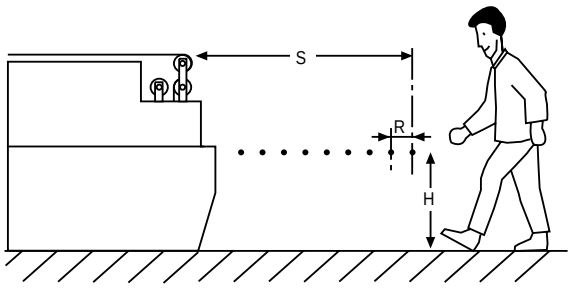
When the resolution of the photoelectric safety curtain is greater than 70 mm / 2.75 in, the EN 999 project norm recommends the number of beams and their heights above the floor as follows:

Note

Number of beams	Heights	
	mm	in
2	400 / 900	15.76 / 35.46
3	300 / 700 / 1100	11.82 / 27.58 / 43.34
4	300 / 600 / 900 / 1200	11.82 / 23.64 / 35.46 / 47.28

Multiple individual beam devices may not necessarily detect intrusion of the body or parts of the body towards the dangerous zone. If it is the case, additional safety devices are required.

Parallel approach



The minimum safety distance “S” from the dangerous zone to the outer beam is dependent on the part of the body detected, which sets the height “H” of the curtain above the floor and the resolution “R” of the curtain. This safety distance shall be calculated using the following formula:

S ≥ 1600 (t1 + t2) + 1200 -0.4H (mm)
where (1200 - 0.4 H) ≥ 850 mm

(or S ≥ 63 (t1 + t2) + 47.3 -0.4H (in)
where (47.3 - 0.4 H) ≥ 33.5 in)

t1: 30 ms (response time of the FF-SCAN curtain)
t2: Stopping time of the machine (s)
H: Height (mm / in) of the curtain above the floor
R: Resolution of the curtain (mm / in)

Note
The height “H” shall be a maximum of 1000 mm / 39.4 in. However if the installation height “H” is greater than 300 mm / 11.82 in, there is a risk of inadvertent undetected access beneath the curtain and this must be taken into account in the risk assessment.

The height “H” of the detection plane above the floor is related to the maximum allowable resolution “R” of the curtain.

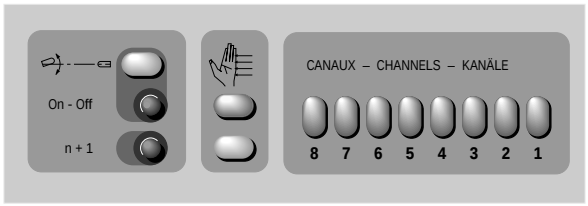
H = 15 (R - 50)

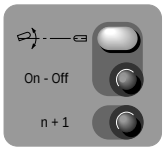
H: Height (mm / in) of the curtain
R: Resolution of the curtain (in mm)

In this way, where the height “H” of the curtain is known or fixed, a maximum allowable resolution can be calculated according to the above mentioned formula:

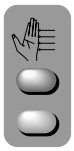
R = H/15 + 50

The above mentioned mountings are given as possible mountings. For any other kind of mounting, or for more information, please refer to EN 999 or get in touch with us.

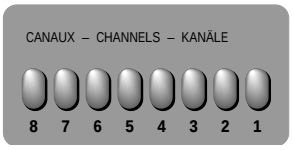




Tuning indicator
Tuning push-button
Channel selector



Power and output status indicator **(de-energized relays)**
Power and output indicator **(energized relays)**

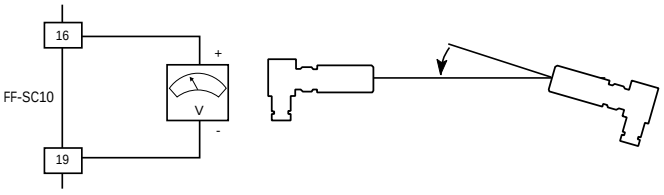


Channel indicators:
Beam status during normal operation.
Selected beam during adjustment

Light indicators located on the front panel of the FF-SC10

Sensors alignment procedure

- Connect a voltmeter between terminals 16 and 19 of the FF-SC10 amplifier (scale: 20 Vdc).
- Select the tuning mode with the “On - Off” push-button.
- Select channel number 1 with the “n + 1” push-button (the first channel indicator must light up).
- Adjust the mechanical position of the sensors connected on the first channel until the voltage reaches a maximum on the voltmeter.

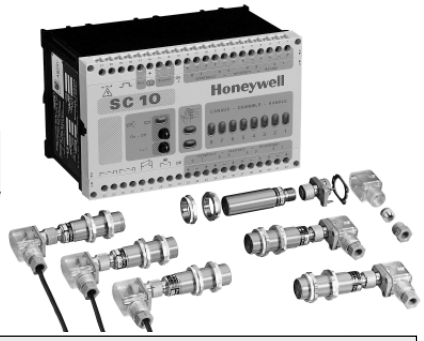


- Repeat these operations for each channel and go back to the normal mode of operation.

FF-SCAN

- **Type 4 according to IEC/EN 61496 - parts 1 & 2**
- **Meets applicable parts of OSHA and RIA regulations for Control Reliability**
- **Modular photoelectric safety curtain**
- **Scanning range up to 33 m / 108 ft**

Approved as Type 4 per pr EN 50100 - 1/2



Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

Specifications			
Supply voltage	120/240 Vac, +10% -20 %, 48 to 62 Hz	24 to 48 Vdc(1) ±15 %
Power consumption	20 VA	15 W
Switching capacity	2 A/250 Vac, 2 safety relays with guided contacts (50 mA min.)	
Material	*Sensors*: Aluminium alloy housing and glass lens • *Amplifier*: polycarbonate housing	
Response time	0.03 s (Output switching frequency = 10 Hz)	
Housing size	*Sensors*: M18 x 99 mm (with connectors) • *Amplifier*: 20 mm x 128,5 mm x 120 mm	
	(Ω rail mounting according EN 50 022)	
	Sensors: M18 x 3.90 in (with connectors) • *Amplifier*: 0.78 in x 5.06 in x 4.72 in	
	(Ω rail mounting according EN 50 022)	
Emission	Modulated Light Source, infrared LED (875 nm)	
Resolution	From ø40 mm to ø400 mm / 1.57 in to 15.76 in (in compliance with EN 999)	
Alignment tolerance	±2° for emitters and receivers	
Ambient temperature	0 °C to 55 °C / 32 °F to 131 °F	
Sealing	*Sensors*: IP 67 / (NEMA 6) • *Amplifier*: IP 20 (need to be installed in an IP 54 enclosure)	
Electrical noise immunity	IEC 801-4: level III	
Resistance to ambient light	*Sun*: 20 000 Lux • *Lamp*: 15 000 Lux	
Indications	LED displays on unit front panel and signalling contacts (output and beams status)	
Scanning distance	*Standard*: 0 m to 25 m / 0 ft to 82 ft • *Long range*: 15 m to 33 m / 49.2 ft to 108.2 ft	
Electrical connections	*Sensors*: Plastic plug-in connectors (Type Hirschmann ELWIKA 4012)	
	Amplifier: 2 plug-in terminal strips	

Ordering information(2)

FF-SCAN❑18❑-❑

- **Nominal scanning range:**
  - *Blank:* 0 m to 25 m / 0 ft to 82 ft (standard)
  - *L*: 15 m to 33 m / 49.2 ft to 108.2 ft (lg range)
- **Supply voltage:**
  - *E:* 120 Vac
  - *G*: 240 Vac
  - *4:* 24 to 48 Vdc(1)
- **Number of beams:** 2 to 8 (3)

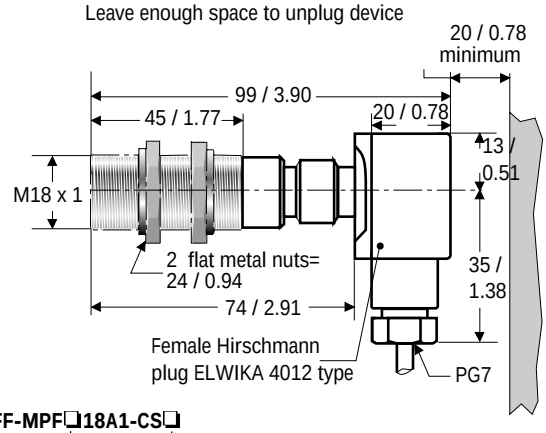
Note

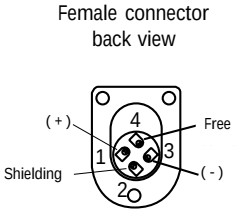
(1) - Dc versions are featured with a galvanic insulation (dc to dc converter) that provides the immunity to external disturbances; this is essential to guarantee the safety integrity of the equipment.
(2) - A complete set includes: a number of sensors, relevant connectors and cable, the FF-SC10 amplifier.
(3) - For 2 to 4 beams: cable length is 100 m / 328 ft
For 5 to 8 beams: cable length is 200 m / 656 ft

The 2 beam programming must be done by the manufacturer and cannot be modified by the user.

Sensor FF-MPF with connector FF-MPFCONN

Leave enough space to unplug device

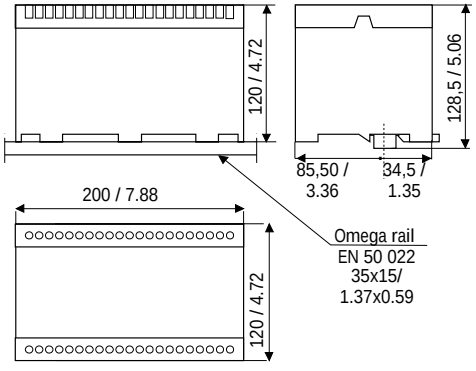




FF-MPF❑18A1-CS❑

- **Scanning range:**
  - ***Blank***: 0 m to 25 m / O ft to 82 ft (standard)
  - ***L***: 15 m to 33 m / 49.2 ft to 108.2 ft (long range)
- ***E***: Emitter
- ***R***: Receiver

Control unit (amplifier FF-SC10)

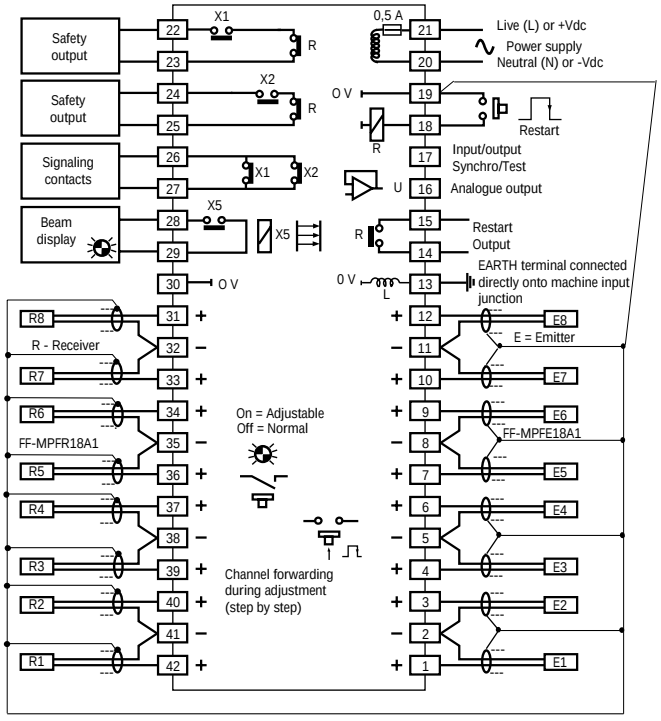


FF-SC10M08❑

- **Supply voltage:**
  - ***E***: 120 Vac
  - ***G***: 240 Vac
  - ***4***: 24 Vdc to 48 Vdc (1)

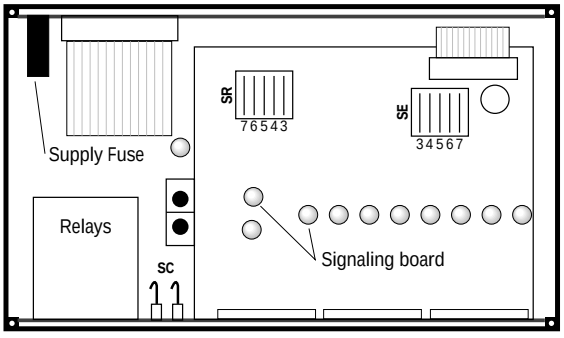
Connection diagram

FF-SC10
Amplifier



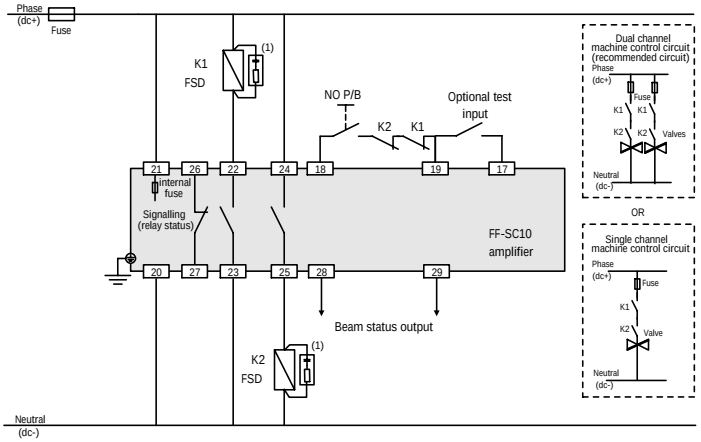
Notice: Other devices should not be connected to internally generated supply. Vdc versions are protected against reversed polarity due to a rectifier.

Locating the configuration devices

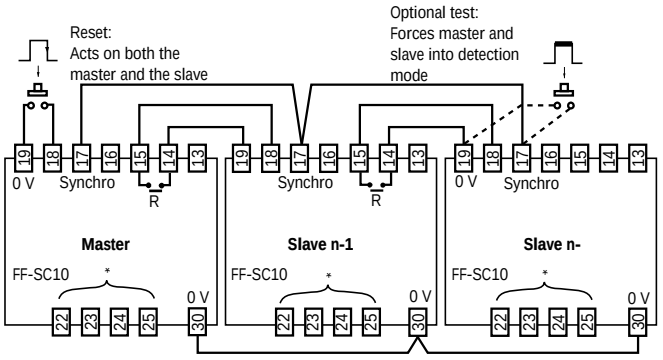


Position "0": Open

Position "1": Closed



Multiple amplifier connection



SR and SE switches positions:

Number of channels	Number of beams used	Position SR 7	6	5	4	3	Position SE 3	4	5	6	7
3	1 to 3	1	1	1	1	1	0	0	0	0	0
4	1 to 4	1	1	1	1	0	1	0	0	0	0
5	1 to 5	1	1	1	0	0	1	1	0	0	0
6	1 to 6	1	1	0	0	0	1	1	1	0	0
7	1 to 7	1	0	0	0	0	1	1	1	1	0
8	1 to 8	0	0	0	0	0	1	1	1	1	1

The 2 beam programming must be done by the manufacturer and cannot be modified by the user.

Restart mode:

SC in position 1 - 1: Automatic mode

SC in position 0 - 0: Start and restart mode

Connection diagram
(please refer to EN 954 for electrical interface)

Example with start and restart interlock / FSD monitoring.

NO P/B: normally open contact of a push-button;
FSD: Final Switching Device.(1): RC (220 Ω + 0.22 µF) for ac interfaces, or varistors for dc interfaces.

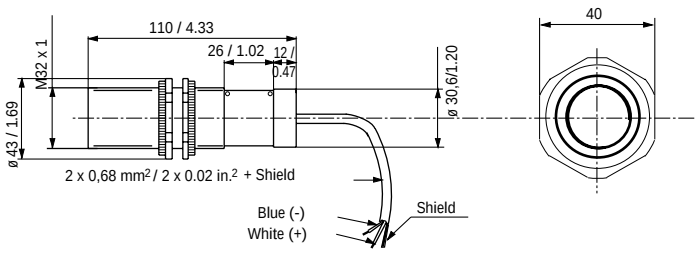
FF-SCAN

FF-SCAN accessories

Explosion-proof photoelectric sensor

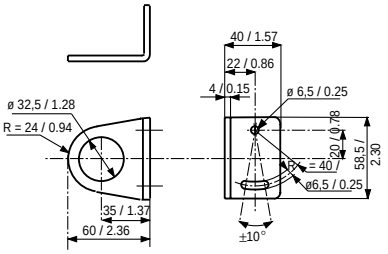
FF-MPFE/R32EX-❑

(emitter and receiver) — Cable length 2 m, 3 m, 5 m,10 m / 6.56 ft, 9.84 ft, 16.4 ft, 32.8 ft



FF-MPZS32EX

Mounting bracket with adjustment of ± 10°

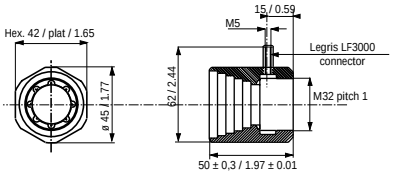


Order 2 mountings FF-MPZS32XP for one beam.

FF-MPZT32EX

Protective hood

Connection on compressed air:
P = 0.3 Bar approximately

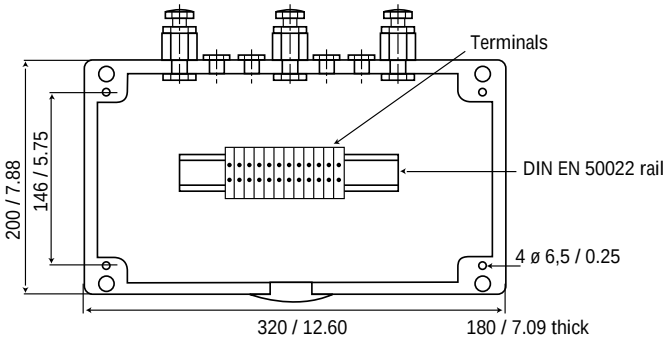


Order 2 hoods FF-MPZT32EX for one beam to keep dust/paint away from sensor lens.

Sensor

- Infrared through-scan detection
- Certified by the L.C.I.E. no. 91C6094.
- In accordance with CENELEC European standard EN 50014 and EN 50018.
- Group EEX “d” II CT6.
- Detection up to 15 m / 49.2 ft with the FF-SC10 amplifier.
- Max. response time: 30 ms
- Diameter of glass lens: ø12 mm / 0.47 in
- Sealing: IP 67 / NEMA 6.
- Aperture angle: ± 2°
- Operating temperature: 0 °C to 55 °C / 32 °F to 131 °F
- Material of the protective covering: Nickel-plated brass
- Explosion-proof cord extension: FF-MP1750EX (100 m / 328 ft of shielded cable, to be ordered separately)

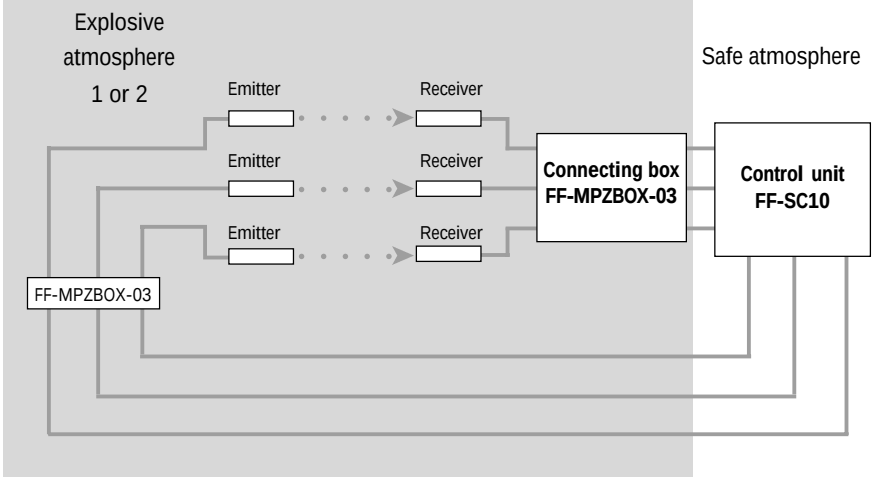
FF-MPZBOX-03



Connecting box

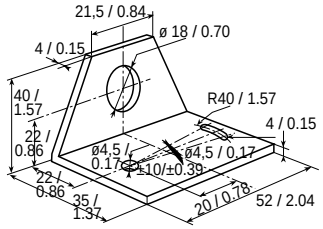
Box for the connection of 3 sensors max.

Application



FF-SCAN

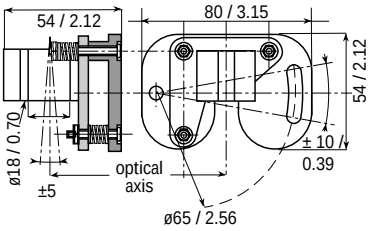
FF-MPZS1018



Basic bracket

- Suitable for detection distances up to 6 m / 19.7 ft
- Sturdy construction from 4 mm / 0.16 in aluminium alloy
- Black anodized finish
- Adjustable (± 10° azimuth)
- Mounting with 4 mm / 0.16 in screws

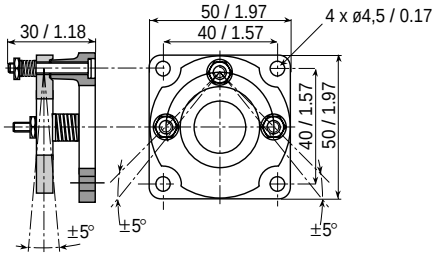
FF-MPZS2018



Adjustable sensor mounting bracket (parallel to optical axis)

- Suitable for detection distances up to 33 m / 108.3 ft
- Sturdy construction from 4 mm / 0.16 in aluminium
- Black anodized finish
- Adjustment springs
- Easy adjustment (± 5°: site / ± 10°: azimuth)
- Mounting with 4 mm / 0.16 in screws

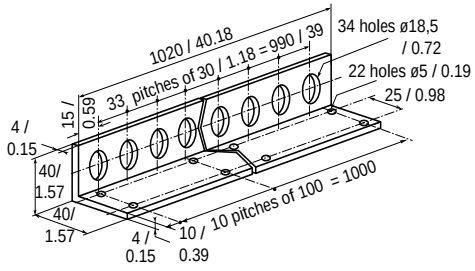
FF-MPZS3018



Adjustable sensor mounting bracket (perpendicular to optical axis)

- Suitable for detection distances up to 33 m / 108.3 ft
- Sturdy construction from 4 mm / 0.16 in aluminium
- Black anodized finish
- Adjustment springs
- Easy adjustment (± 5°: site / ± 10°: azimuth)
- Mounting with 4 mm / 0.16 in screws

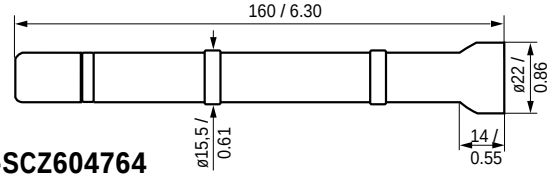
FF-MPZS6018



Sensor mounting rail

- Suitable for detection distances up to 33 m / 108.3 ft
- Sturdy construction from 4 mm / 0.16 in aluminium
- L-shaped extrusion 40 mm x 40 mm / 1.57 in x 1.57 in, 1 m / 3.28 ft long
- 18 mm / 0.70 in diameter sensor mounting holes, 30 mm / 1.18 in distance between centers
- Can be easily cut to any desired length
- Mounting with 5 mm / 0.19 in screws

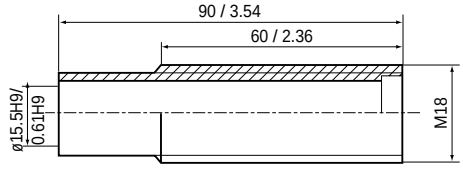
FF-SPZLASER



Laser pen

The laser pen FF-SPZLASER is a self-contained and compact laser device designed to ease infrared beam alignments. Its IIa class conforms to the EN 60825 European standard and the US 21 CFR 1040 American standard.

FF-SCZ604764



Mechanical adapter M18x90

To be used with the laser pen (to be installed on the FF-MPZS4018 brackets).

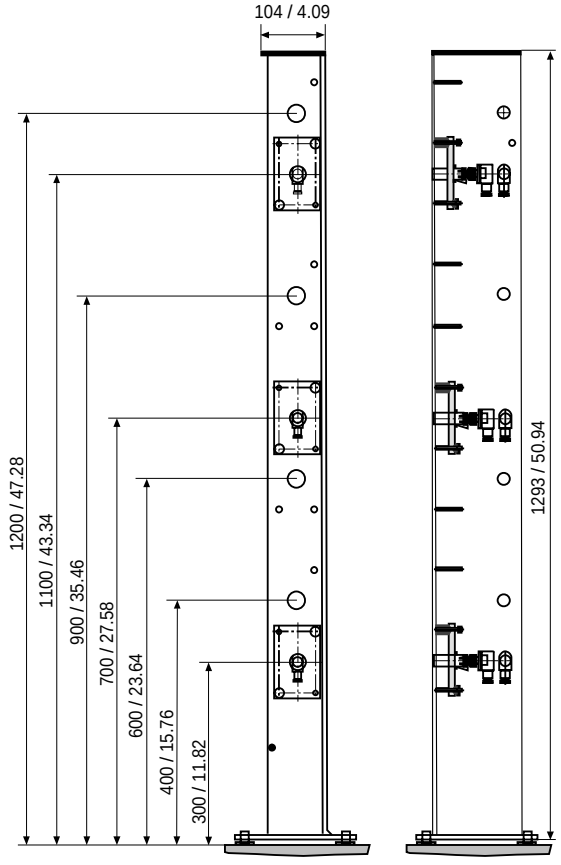
FF-MP175090 and FF-MP1750EX

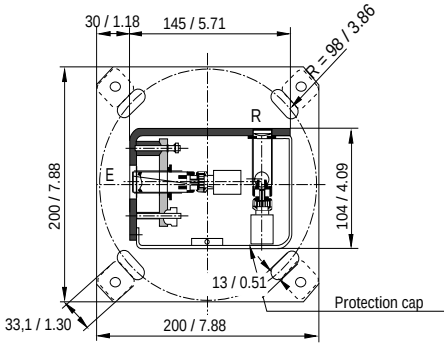
Shielded cable

FF-MP175090 100 m / 328 ft shielded cable (2 x 0,22 mm² / AWG32).

FF-MP1750EX 100 m / 328 ft shielded cable (2 x 0,68 mm² / AWG24) for explosive atmospheres.

FF-SCZS1218





Multibeam safety column for access control

- Floor mounting column for the FF-SCAN M18 sensor
- Mounting positions for sensors in compliance with European norm requirements for 2, 3, or 4 safety beams (EN 999)
- Optical alignment:
  Vertical and angular column position easily adjusted
  Separate mounting brackets FF-MPZS4018 for optimum adjustment of the emitters
- Emitters and receivers can be mounted together for fully closed areas
- Finish: RAL 1021 yellow paint
- Weight: 21 kg / 46.2 lbs

European norm (EN 999) specifies beam heights as follows:

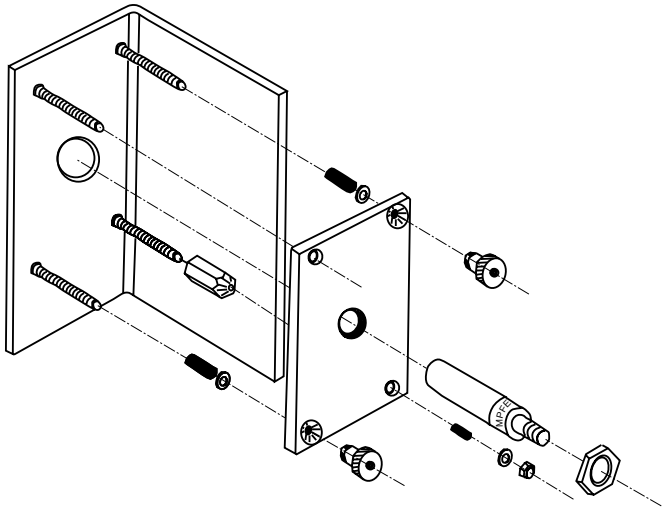
Number of beams	Heights	
	mm	in
2	400 / 900	15.76 / 35.46
3	300 / 700 / 1100	11.82 / 27.58 / 43.34
4	300 / 600 / 900 / 1200	11.82 / 23.64 / 35.46 / 47.28

Typical applications

Access control for dangerous zones: robotic areas, automatic machinery, transporting and conveyor systems, punching and shearing machines, etc.

The FF-SCZS1218 safety column provides a full area trip protection when used with FF-SCZO...MIR deflection mirrors and the FF-SCAN modular safety curtain.

FF-MPZS4018



Bracket for FF-MPF emitter

The FF-MPZS4018 brackets allow optimum adjustments. They must be ordered separately and are not supplied with the FF-SCZS1218 column.

Order one bracket per emitter.

For alignment operation, the FF-SPZLASER laser pen can be installed on the emitter bracket with the FF-SCZ604764 mechanical adapter.

Type 4 self-contained single beam

FF-SPS4 Series

For access control

FEATURES

- Meets applicable parts of US OSHA 1910.212, ANSI B11.19 and RIA 15.06 for Control Reliability
- Active optoelectronic protective equipment, Type 4 according to the norm IEC/EN 61496 - parts 1 & 2
- **Protection against mutual interference by selection of the emission frequency**
- Through scan device with permanent self-checking ensuring the highest level of safety
- Power supplies: 120 Vac, 240 Vac and 24 Vdc
- Response time: 0.020 s
- Scanning range:
  0,5 m to 40 m / 1.6 ft to 131.2 ft *(standard)*
  0,5 m to 20 m / 1.6 ft to 65.6 ft *(lens heating)*
  30 m to 75 m / 98.4 ft to 246 ft *(long range)*
- Beam aperture angle: ± 2° in compliance with the norm IEC/EN 61496 - 2
- Connection: terminal strips or connectors
- Outputs: 2 safety relays with guided contacts
- Sealing: IP 67 / NEMA 6 (terminal) or IP 65 / NEMA 4 (connector)
- Available restart modes:
  - automatic restart
  - start interlock (at power up only)
  - start & restart interlock (at power up and after any beam interruption)
- Final Switching Devices monitoring input
- Test input
- Numerous LED status indicators
- Accessories: individual and adjustable beam deflection mirror, floor mounting deflection mirrors for 2, 3 or 4 beams
- Alignment aid kit: compact and self-contained laser pen, signal margin LED indicator

TYPICAL APPLICATIONS

Access control: perimetric protection around a robot zone, trip device at the entrance and the exit of a paint shop, etc.

INRS

CE

C SP US

B

Approved as
Type 4
per pr EN 50100 - 1/2

The FF-SPS4 Active Optoelectronic Protective Device is a single through scan infrared beam designed to detect the body of an operator on approach to a dangerous zone.

The interruption of the beam de-energizes the output contacts which in turn de-energizes the machine stop circuitry.

The emission source is modulated infrared which makes the operation almost completely independent of ambient light conditions. Moreover, the device is equipped with an emission frequency selector to avoid possible mutual interference between sets.

The processing is a permanent dynamic self-checking principle meeting the requirements of the norm IEC/EN 61496 - parts 1 & 2 for Type 4 Electrosensitive Protective Equipment. Any internal failure will be immediately detected and disable the output relays.

The Canadian cCSA$_{us}$ gave an approval to this device which meets applicable parts of US ANSI, RIA 15.06 standards and OSHA 29 CFR and 1910.212 regulations for Control Reliability.

The FF-SPS4 is preset with the start and restart interlock mode on delivery. The start and restart interlock guarantees that the equipment remains in alarm at power up or after an interruption of the beam. The operator must press a push-button to restart the protective equipment. However, an automatic restart can be easily programmed by internal switches.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

The receiver unit is equipped with 2 safety relays with guided contacts which can be directly used to stop the dangerous movement. However, most of the time, additional relaying (or Final Switching Devices) between the equipment outputs and the machine circuitry is necessary. For this reason, the FF-SPS4 has a Final Switching Device monitoring input to negate the use of a self-checking relay module. A test input is also available. The use of the test input sets the equipment in an alarm condition. When used in conjunction with the monitoring input, the test input facility provides the ability to regularly check the correct operation of interface relays.

A lens heating system is available on some models to prevent condensation where conditions of use may require such an equipment. These models can operate down to -25 °C / -13 °F ambient temperature.

LED indicators provide useful visual information on the equipment status during installation and operation. They ease beam adjustment and warn the operator about a lens contamination or misalignment before an unexpected emergency stop signal is generated.

The equipment is delivered with a pair of standard adjustable brackets for ease of installation. The use of deflection mirrors is a cost effective solution for designing multiple separate beam trip devices or perimetric protections around a dangerous area.

A laser pen is available as an accessory. It helps a single person adjust rapidly and easily the infrared beams even if deflection mirrors are used.

The device features the highest level of safety and can be used for a wide range of dangerous machines.

Multiple separate beams

Multiple separate beams are often used to detect the intrusion of the whole body rather than parts of the body.

The installation of a multiple separate beam arrangement has to be carried out in such a way that access to the dangerous moving parts is impossible without breaking the beams.

The EN 999 European standard gives the following formula for the calculation of the minimum safety distance between the dangerous zone and the detection plane. Compliance to this formula will ensure reliable detection of an operator and stop the dangerous motion before the operator reaches the danger:

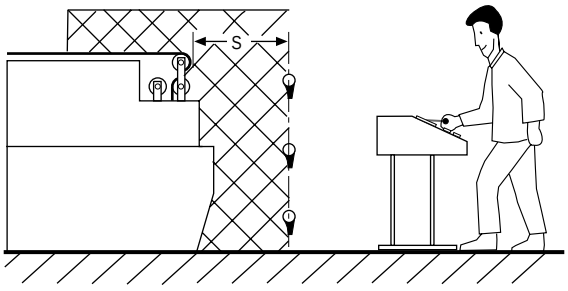
S ≥ 1600 (t1 + t2) + 850 (mm)
(or Ds ≥ 63 (t1 + t2) + 33.5 (in) Ds = S)

S: Minimum safety distance (mm / in)
t1: Response time of the FF-SPS4 equipment (0.02 s)
t2: Response time of the machine (s), i.e. time required to stop the machine or remove the risk after receiving the output signal from the protective equipment

Recommended beam heights

EN 999 recommends the following heights which have been found to be the most practical in application for multiple separate beams.

Number of beams	Beam heights above the reference floor	
	mm	in
2	400 / 900	15.7 / 35.4
3	300 / 700 / 1100	11.8 / 27.6 / 43.3
4	300 / 600 / 900 / 1200	11.8 / 23.6 / 35.4 / 47.2



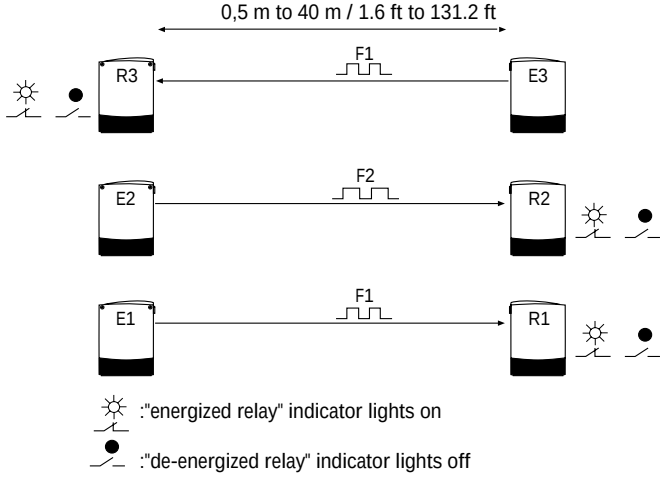
The number of beams to be used needs to be defined according to the risk assessment and to the importance for the machine operator to pass undetected. Particularly, during risk assessment, methods of defeating the safety equipment shall be taken into account before selecting the correct configuration.

Protection against mutual interference

When more than one FF-SPS4 is used, mutual interference may occur between sets.

To avoid these undesirable disturbances, the device is equipped with internal switches designed to select the emission frequency F1 or F2 of the infrared modulated light. The position of these switches can be changed to avoid mutual interference between two systems.

In some cases, mutual interference can be cancelled by using two different emission frequencies and by reversing the transmission direction of the through scan beams. This would be the case for a three beam trip device for instance:



FF-SPS4

Status indicators

Emitter

Power on indicator
● power off ☼ power on

TEST Test mode indicator
● normal ☼ alarm

Emission frequency indicator
☼ F1 ● F2

Receiver

Signal margin (ms)
● ms ≥ 2 threshold ☼ ms < 0.5 threshold ☼ 0.5 ≤ ms < 2 threshold

RESET reset mode indicator
● Automatic ☼ Manual ☼ Press the push-button

Energized relay indicator
● NO contacts: OFF state ☼ NO contacts: ON state

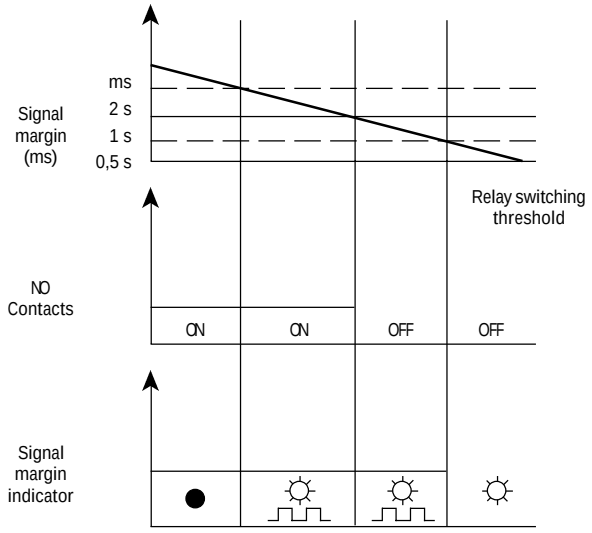
De-energizer relay indicator
● NO contacts: ON state ☼ NO contacts: OFF state

Emission frequency indicator
● F2 ☼ F1

● Light Off ☼ Light On ☼ Flickering light

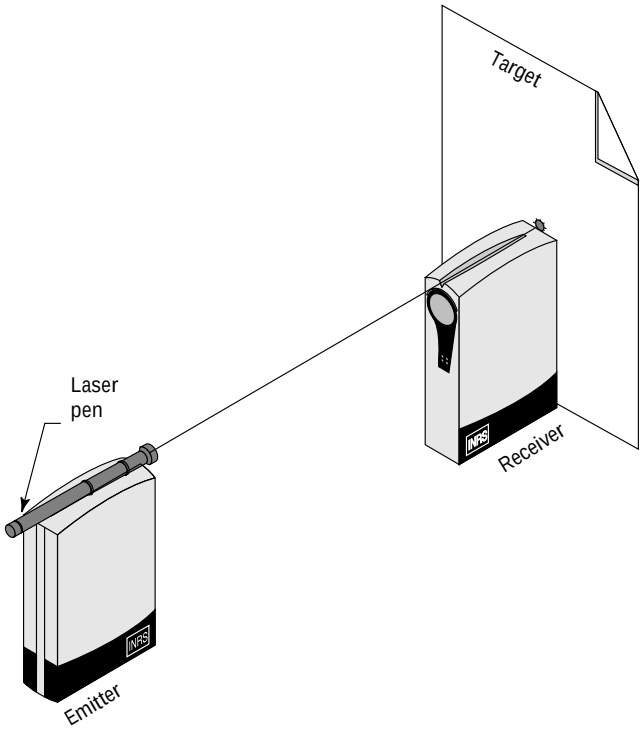
Operating diagram

(Output status/Reception signal)



Laser alignment procedure

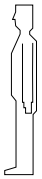
The use of the FF-SPZLASER pen is recommended to perform easy and fast beam alignment, particularly if the scanning distance is greater than 10 m / 32.8 ft. The FF-SPS4 equipment housing is designed to support the laser pen without any additional mechanical adapter. A location notch found on the top of the housing is designed to support the laser pen which should be used in conjunction with a target (such as a white sheet of paper) as shown below. However, in the absence of the laser pen, the notch can be used as a “backsight notch” to ease alignment operations.



FF-SPS4

FF-SPS4

- **Type 4 according to IEC/EN 61496 - parts 1 & 2**
- **Scanning range up to 75 m / 246 ft without adjustment**
- **ø35 mm / 1.4 in detection capability**
- **Meets applicable parts of US OSHA, ANSI and RIA for Control Reliability**



Approved as Type 4 per pr EN 50100 - 1/2

INRS

C US

Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

Specifications		
	Power supply voltage	120 Vac or 240 Vac (+10%, -20%) 24 Vdc, ±15%(1)
	Power consumption	*Standard*: 8 • *Long range*: E = 4 VA / 3 W, R = 6 VA / 5 W • *Lens heating*: E = 7 VA, R = 9 VA
	Output switching capacity	2 A/250 Vac, 2 safety relays with guided contacts (10 mA min.)
	Material	*Housing*: Aluminium alloy, yellow painted according to RAL 1021 (polyurethane)
		Front face: polycarbonate
	Dimensions	*Terminal*: 187 mm x 120 mm x 50 mm / 7.4 in x 4.7 in x 2 in
		Connector: 277 mm x 120 mm x 50 mm / 10.9 in x 4.7 in x 2 in
		Lens emitter: ø35 mm / 1.4 in • *Lens receiver*: ø35 mm / 1.4 in
	Emission	Modulated infrared (880 nm), 2 selectable emission frequencies (50 Hz and 40 Hz)
	Power supply frequency	48 to 62 Hz (for the power supplies 120 Vac or 240 Vac)
	Resolution	ø35 mm / 1.4 in
	Alignment tolerance	± 2° in compliance with IEC/EN 61496 - 2 requirements
	Ambient temperature	*Standard*: 0 °C to 55 °C / 32 °F to 131 °F • *Lens heating*: -25 °C to 55 °C / -13 °F to 131°F
	Sealing	*Terminal*: IP 67 or NEMA 6 • *Connector*: IP 65 or NEMA 4 and 13
	Noise immunity	*Electrical*: IEC 801-4, level IV • *Electromagnetic*: IEC 801-3, level IV
	Immunity to ambient light	*Sun*: 20 000 Lux • *Lamp*: 15 000 Lux
	Status indicator	LEDs display on unit front face
	Scanning range	*Standard*: 0,5 m to 40 m / 1.6 ft to 131.2 ft • *Lens heating*: 0,5 m to 20 m /1.6 ft to 65.6 ft •
		Long range: 30 m to 75 m / 98.4 ft to 246 ft
	Electrical connection	Connecting terminals: snap-in clips or DIN 43652 connector model

Ordering information (Emitter/Receiver) (2)

FF-SPS4 ❑ ❑ R ❑

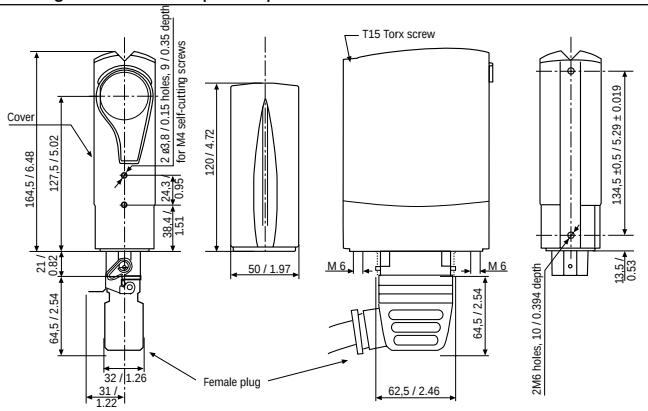
- **Power supply voltage:**
  - *E:* 120 Vac
  - *G:* 240 Vac
  - *2:* 24 Vdc (1)
- **With test input**
- **Electrical wiring:**
  - *T:* Terminal strip (snap-in-clip)
  - *C:* DIN 43652 connector
- **Scanning range:**
  - *4*: 0,5 m to 40 m / 1.6 ft to 131.2 ft (standard model)
  - *2*: 0,5 m to 20 m / 1.6 ft to 65.6 ft (lens heating model, available with terminal strip and Vac supply only)
  - *7*: 30 m to 75 m / 98.4 ft to 246 ft (long range)

Note

(1) - Dc versions are featured with a galvanic insulation (dc to dc converter) that provides immunity to external disturbances; this is essential to guarantee the safety integrity of the equipment.

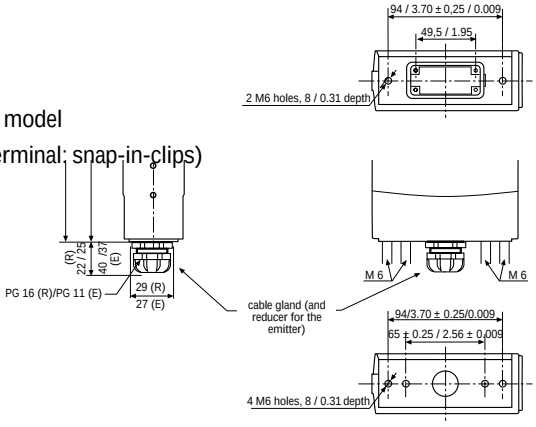
(2) - The equipment is delivered with two standard brackets and two separate plugs (for the FF-SPS4❑C❑❑ models) or two cable glands and one reducer (for the FF-SPS4❑T❑❑ models).

DIN 43652 connector model



Terminal strip model

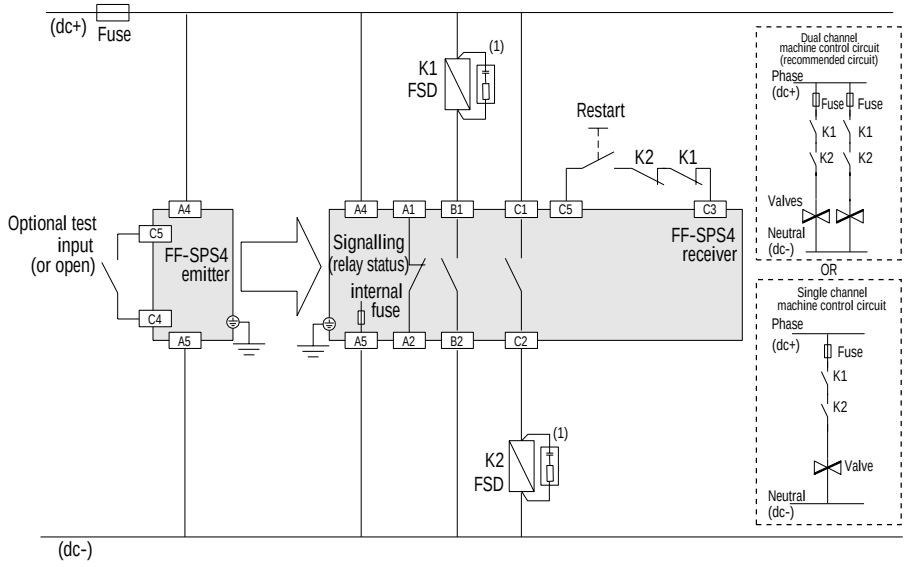
(connecting terminal; snap-in-clips)



		Emitter	Receiver
Response time (10^{-3} s)	t1	20	
Mass per device	kg / lbs	1,15 / 2.5	1,35 / 3

Connection diagram

The FF-SPS4 can be easily connected to the machine control circuitry due to the FSD monitoring and start and restart interlock facilities:



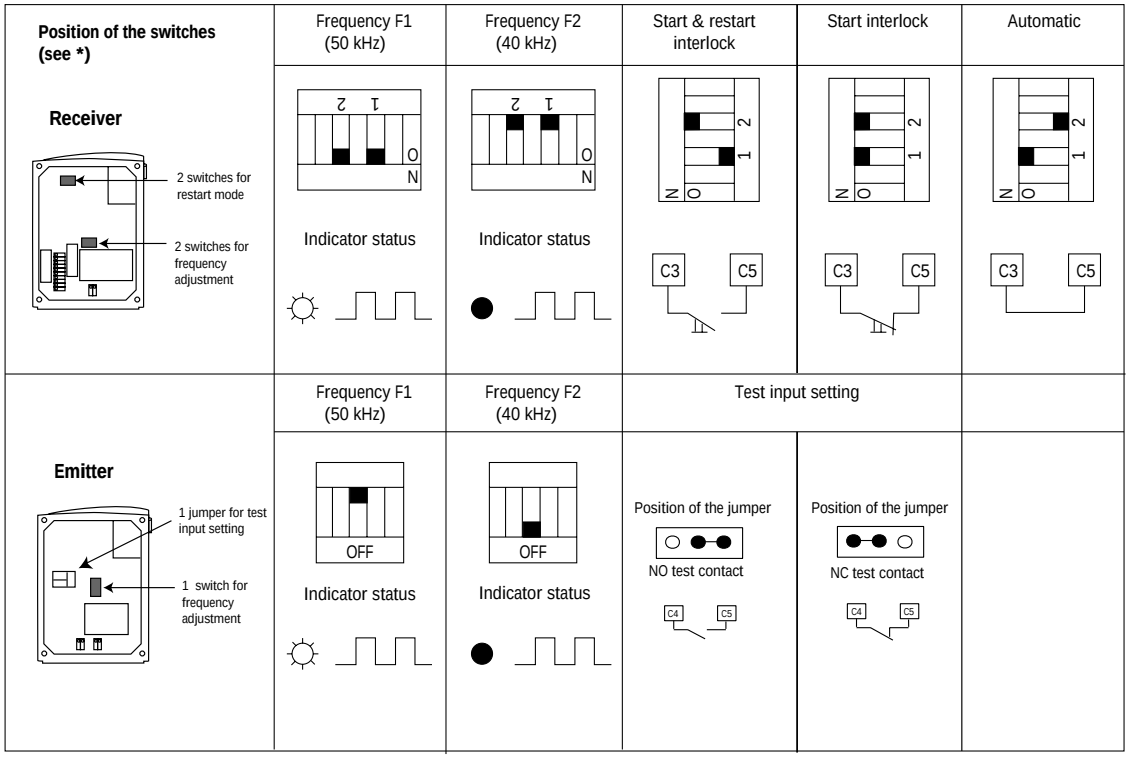
(1) RC (220 Ω + 0.22 μF) for ac interfaces or varistors for dc interfaces.

FSD: Final Switching Device.

Frequency switches and restart mode selectors

The position of the emission frequency switches must be changed on both the emitter and the receiver units otherwise the system remains permanently in alarm.

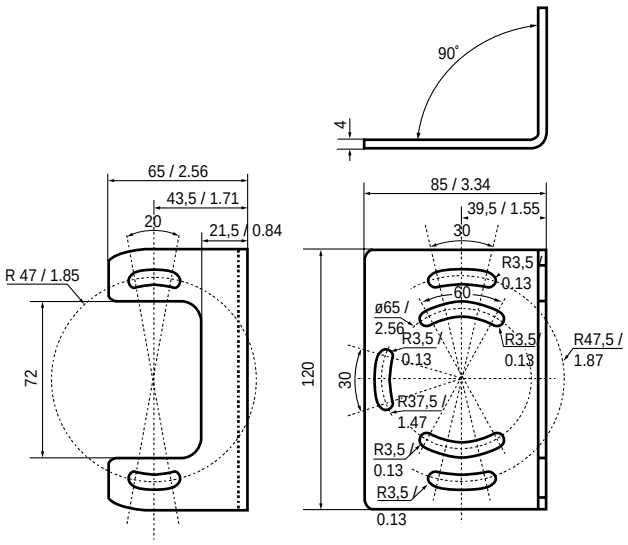
It is recommended to use the start and restart interlock facility when using the equipment as a trip device to control access to a dangerous zone. The restart push-button should be installed outside the dangerous zone. However, if the application does not require this facility, it can be removed using the following indications:



*Factory settings: the equipment is preset on the emission frequency F1 (50 kHz), Start & Restart interlock and a NO test contacts.

Accessories FF-SPS4

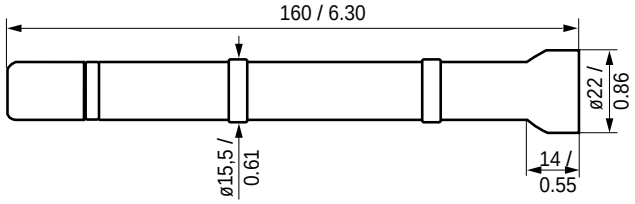
FF-SPZSPX001



Mounting bracket (already included in the FF-SPS4 package)

Mounting bracket for fixing a unit onto a wall (tool: Allen key no. 5).

FF-SPZLASER



Laser pen

The laser pen FF-SPZLASER is a self-contained and compact laser device designed to ease infrared beam alignments. Its IIa class conforms to the EN 60825 European standard and the US 21 CFR 1040 American standard.

Laser	Red visible light diode
Classification	Class II
Optical power	Max. 1 mW
Wavelength	635 nm
Beam diameter.	4 mm / 0.15 in
Beam spread	Less than 0,7 mrad
Supply	2 AAA batteries (1,5 V)
Endurance time	Typically 20 hours continuous
Lifetime	MTBF greater than 10 000 hours
Material	Aluminium
Weight	Approx. 80 gr / 0.17 lb (2.8 oz)

Tools

FF-SPZSCREW

Torx T15 screwdriver for FF-SPS4 cover.

FF-SBZCRIMP

Crimping tool for female contacts (for connector version).

FF-SBZREMOV

Removal tool for female contacts (for connector version).

Access control systems

FF-SPS4 Series

MAIN FEATURES

- Meets applicable parts of US OSHA 1910.212, ANSI B11.19 and RIA 15.06 for Control Reliability
- 2 or 3-beam electrosensitive protective devices designed in compliance with the IEC 61496-1/2 standard for Type 4 protective equipment
- Easy and quick installation
- Beam height in compliance with the EN 999 European standard
- Different models available with scanning ranges from 8 m to 75 m / 26.24 ft to 246 ft
- Supply voltages: 24 Vdc, 120 Vac, 240 Vac
- Selectable restart modes (automatic or manual restart)
- Final Switching Devices monitoring loop
- Mutual interference immunity
- Wiring: terminal strips, connectors or 10 m / 32.8 ft cable
- Laser pen for beam alignment

TYPICAL APPLICATIONS

Access control: perimetric protection around a robot zone, trip device at the entrance and the exit of a paint shop, etc.

INRS

C US

Approved as
Type 4
per pr EN 50100 - 1/2

The FF-SPS4 access control systems are protective equipment designed for the control of dangerous zones in Industry. The intrusion of a person inside the zone is detected by the interruption of one or several infrared beams permanently self-checked by an electronic circuitry which outputs an alarm signal toward the machine control circuitry. The opening of the output contacts due to the detection immediately stops the dangerous movement.

These systems offer different solutions which fit any need. Each system consists of two columns which support one or several FF-SPS4 single safety beams and 45° deflection mirrors for some of them. The nominal scanning distance of the beam allows to cover distances from 8 m to 75 m / 26.24 ft to 246 ft with or without mirrors, offering a cost effective solution. The installation of beams and mirrors is done on delivery to shorten time spent on setting up the system. The mechanics of both column and mirrors is designed to fulfill the requirements of the optics, and eases beam alignment adjustment. Moreover, a laser pen can be used to adjust beam alignment quickly.

The integrated functions simplify the electrical interfacing of the machine control circuits while saving cost: the restart input and the final switching device monitoring loop reduce the number of components used in the interface with two relays (with guided contacts). Prewired models are also available and add flexibility to the application.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

2-beam access control systems

- **Scanning ranges: 0 m to 20 m / 0 ft to 65.6 ft, 5 m to 75 m / 16.4 ft to 246 ft(1)**
- **Terminal strips or connector option**
- **Meets applicable parts of US OSHA, ANSI and RIA for Control Reliability, and IEC/EN 61496 - parts 1 & 2 requirements for Type 4 protective equipment**

Approved as Type 4 per pr EN 50100 - 1/2

Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

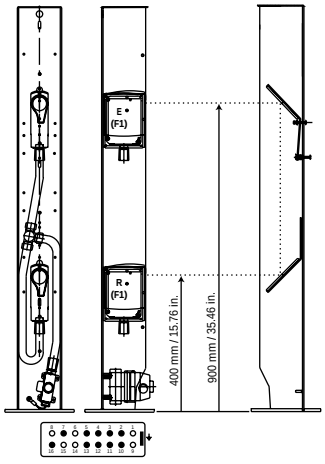
Features	Range		
	Beam heights	400 mm and 900 mm / 15.76 in and 35.4 in	
	Supply voltages	120 Vac (+10 %, -20 %), 240 Vac (+10%, -20%), 24 Vdc (±15%) (2)	
	Consumption	10 VA or 8 W per system	20 VA or 16 W per system
	Outputs	*Contacts*: 2 NO + 1 NC • *Switching capacity*: 2 A/250 Vac (10 mA min.)	
	Response time	0.02 s	
	Inputs	Manual or automatic restart / FSD monitoring loop (3)	
	Material	*Column*: steel (4 mm / 0.15 in thickness), yellow painted according to RAL 1021 (epoxy)	
	Dimensions	1170 mm x 133 mm x 128 mm / 46.09 in x 5.24 in x 5.04 in	
		Base plate: 200 mm x 200 mm / 7.88 in x 7.88 in	
	Emission	Modulated infrared LED (880 nm), 2 emission frequencies: 40 kHz or 50 kHz	
	Effective aperture angle	≤ 1,6°	≤ 2,5°
	Ambient temperature	0 °C to 55 °C / 32 °F to 131 °F	
	Sealing	*FF-SPS4 single beam*: IP 67 or NEMA 6 • *Connector*: IP 65 / *Prewired*: IP 54	
	Electrical immunity	IEC 801-4 (level IV), IEC 801-3 (level III)	
	Optical immunity	*Sun*: 20 000 Lux • *Lamp*: 15 000 Lux	
	Indicators	Front panel LEDs	
	Connecting terminals	Terminal strips located on each FF-SPS4 units connectors located at the bottom of each column	Connectors located at the bottom of each column

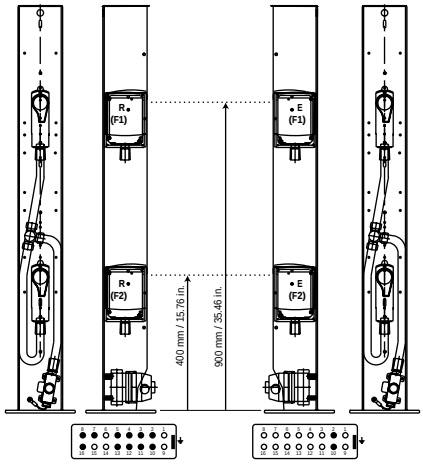
Tools (refer to the accessories section)

FF-SPZLASER
Laser pen for beam alignment

FF-SCZ604764
Mechanical adapter for laser pen

For safety distances see Type 4 self-contained single beam section





Notes

(1) This system does not fully comply with certain requirement of the IEC 61496-2 standard for distances below 5 m / 16.4 ft. If necessary, use models with a smaller nominal scanning range.
(2) The 24 Vdc models are featured with a galvanic insulation (dc/dc converter) that provides the immunity to external disturbances: this is essential to guarantee the safety integrity of the equipment (per IEC 61496-1 standard)
(3) Final Switching Devices
(4) Order each of the two listings for a complete system. Each column is delivered with a protective cover (refer to the accessories section).

Ordering information (4)

FF-SPS4ERX❑-❑

Connection
blank: individual terminal strips
1: intermediary connector

Supply voltage
E: 120 Vac
G: 240 Vac
2: 24 Vdc (2)

FF-SPZ12MIR

Ordering information (4)

FF-SPS4❑❑X❑-1

Supply voltage
E: 120 Vac
G: 240 Vac
2: 24 Vdc (2)

Columns (4)
EE: emitting column
RR: receiving column

3-beam access control systems

- **Scanning ranges 0 m to 8 m / 0 ft to 26.24 ft, 5 m to 75 m / 16.4 ft to 246 ft**
- **Terminal strips or connector option**
- **Meets applicable parts of US OSHA, ANSI and RIA for Control Reliability, and IEC/EN 61496 - parts 1 & 2 requirements for Type 4 protective equipment**

Approved as Type 4 per pr EN 50100 - 1/2

Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

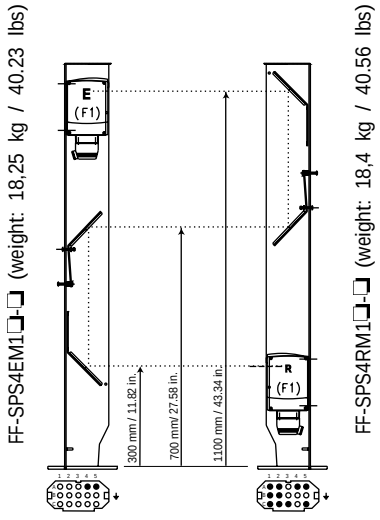
Features	Range		
	Range	0 m to 8 m / 0 ft to 26.24 ft	5 m to 75 m / 16.4 ft to 246 ft
	Beam heights	300 mm, 700 mm and 1100 mm / 11.82 in , 27.58 in and 43.34 in	
	Supply voltages	120 Vac (+10 %, -20 %), 240 Vac (+10%, -20%), 24 Vdc (±15%) (1)	
	Consumption	10 VA or 8 W per system	30 VA or 24 W per system
	Outputs	Contacts: 2 NO + 1 NC / switching capacity : 2 A/250 Vac (10 mA min.)	
	Response time	0.02 s	
	Inputs	Manual or automatic restart / FSD monitoring loop (2)	
	Material	*Column*: steel (4 mm / 0.15 in thickness), yellow painted according to RAL 1021 (epoxy)	
	Dimensions	1170 mm x 133 mm x 128 mm / 46.09 in x 5.24 in x 5.04 in, *base plate:* 200 mm x 200 mm / 7.88 in x 7.88 in	
	Emission	Modulated infrared LED (880 nm), 2 emission frequencies: 40 kHz or 50 kHz	
	Effective aperture angle	≤ 1,6°	≤ 2,5°
	Ambient temperature	0 °C to 55 °C / 32 °F to 131 °F	
	Sealing	*FF-SPS4 single beam*: IP 67 or NEMA 6 • *Connector*: IP 65 / *Prewired*: IP 54	
	Electrical immunity	IEC 801-4 (level IV), IEC 801-3 (level III)	
	Optical immunity	*Sun*: 20 000 Lux • *Lamp*:15 Lux	
	Indicators	Front panel LED's	
	Connecting terminals	Terminal strips located on each FF-SPS4 unit Connectors located on each FF-SPS4 unit	Connectors located at the bottom of each column

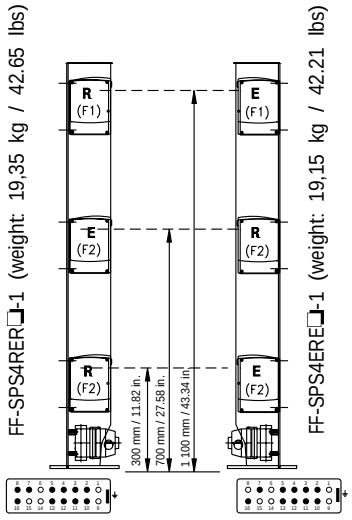
Tools (refer to the accessories section)

FF-SPZLASER
Laser pen for beam alignment

FF-SCZ604764
Mechanical adapter for laser pen

For safety distances see Type 4 self-contained single beam section





Ordering information (3)

FF-SPS4❑M1❑-❑

- **Connection**
  blank: individual terminal strips
  2: individual connector
- **Supply voltage**
  E: 120 Vac
  G: 240 Vac
  2: 24 Vdc (1)
- **Columns** (3)
  E: emitting column
  R: receiving column

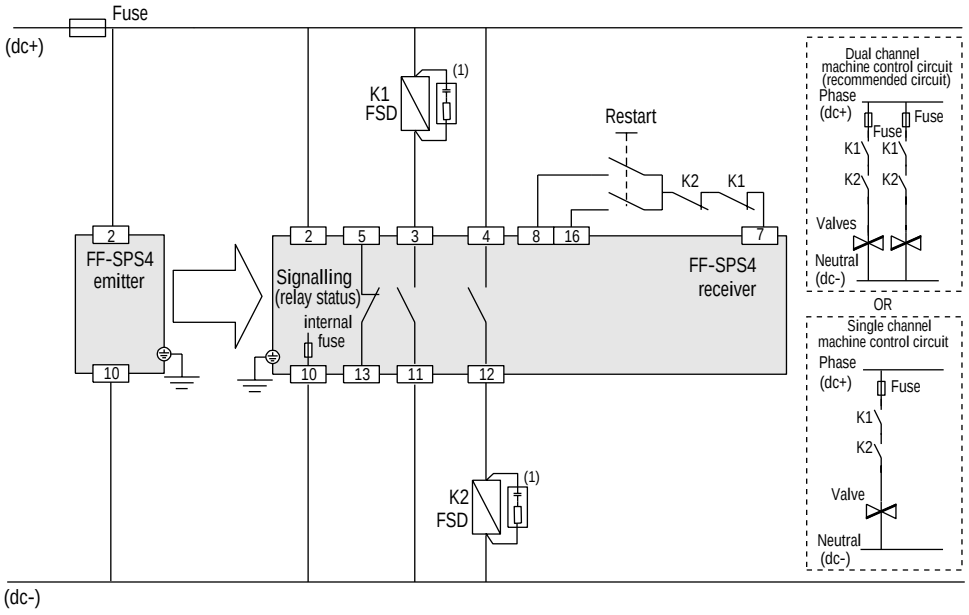
Ordering information (3)

FF-SPS4❑❑❑❑-1

- **Supply voltage**
  E: 120 Vac
  G: 240 Vac
  2: 24 Vdc (2)
- **Columns** (3)
  RER: emitting and receiving column
  ERE: emitting and receiving column

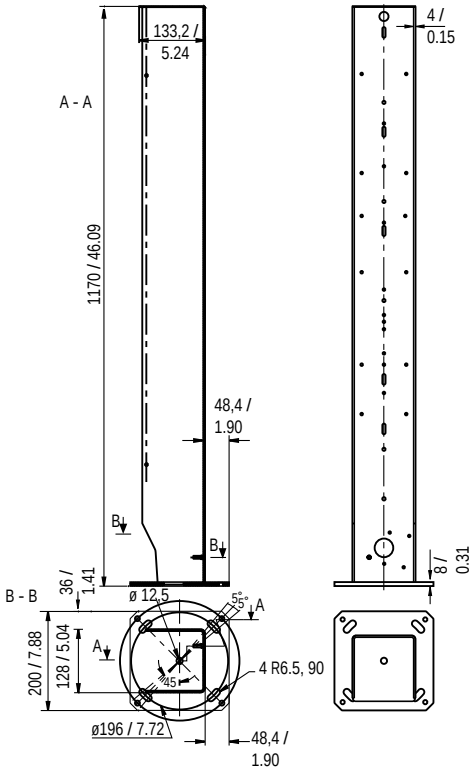
Notes

(1) The 24 Vdc models are featured with a galvanic insulation (dc/dc converter) that provides the immunity to external disturbances: this is essential to guarantee the safety integrity of the equipment (per IEC 61496-1 standard)
(2) Final Switching Devices
(3) Order each of the two listings for a complete system. Each column is delivered with a protective cover (refer to the accessories section).



(1): RC (200 Ω + 0.22 μF) for ac interfaces, or varistors for dc interfaces.

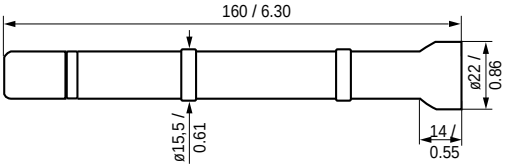
Dimensions (in mm / in)



- **Tools (to be ordered separately)**

FF-SPZLASER

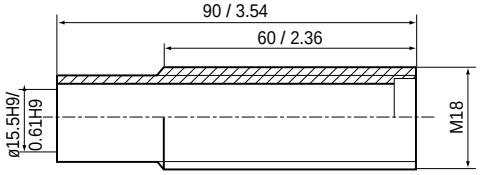
The laser pen FF-SPZLASER is a self-contained and compact laser device designed to ease infrared beam alignments; its II class conforms to the EN 60825 European standard and the US 21 CFR 1040 American standard.



FF-SCZ604764

Mechanical adapter M18 x 90.

To be used for the installation of the laser pen on the columns.



Safety Products

Detector™ 3 Series

Safety Light Curtain Detector™ 3
Blanking capability: fixed and floating

FEATURES

- Meets applicable parts of US OSHA 29CFR 1910.212, 1910.217 and ANSI B11.1, B11.2, B11.19, B11.20 and R15.06
- Independent testing and certification by Canadian Standards (NRTL/C) per CSA 22.2-0.8 and 22.2-14
- Safety outputs: two relays with force-guided contacts
- Floating blanking (1 beam)
- Fixed blanking capability using optional external blanking windows (up to 5 contiguous beams)
- Easy to install and mount
- Adaptable and versatile controller - one or two emitter/receiver pairs can share the same controller

APPLICATIONS

- Area guarding
- Automated assembly
- Automatic sand blasters
- Component insertion
- Die casting machines
- Encapsulated machines
- Filter presses
- Hydraulic presses
- Injection molding
- Load/unload stations
- Packaging/converting
- Robotic systems
- Special machine guarding
- Weld lines

C US

Honeywell's Detector™3 safety light curtain is a compact, state-of-the-art, 3-box light curtain system used to protect personnel from hazardous equipment. It provides dependable personnel protection without the interference of mechanical guards. The light curtain produces an array of invisible infrared light beams between an emitter and a receiver. If a person or object interrupts the detection field, the Detector™3 controller activates its output relays, sending a stop signal.

Detector™3 complies with OSHA 29CFR 1910.212 "General Machine Guarding" and 1910.217 "Mechanical Power Presses", ANSI B11.1 "Mechanical Power Presses", B11.2 "Hydraulic Power Presses", B11.19 "Performance Criteria for Safeguarding"; B11.20 "Manufacturing Systems/Cells"; and R15.06 "Industrial Robots and Robot Systems".

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Safety Products

Safety Light Curtain Detector™ 3

C US

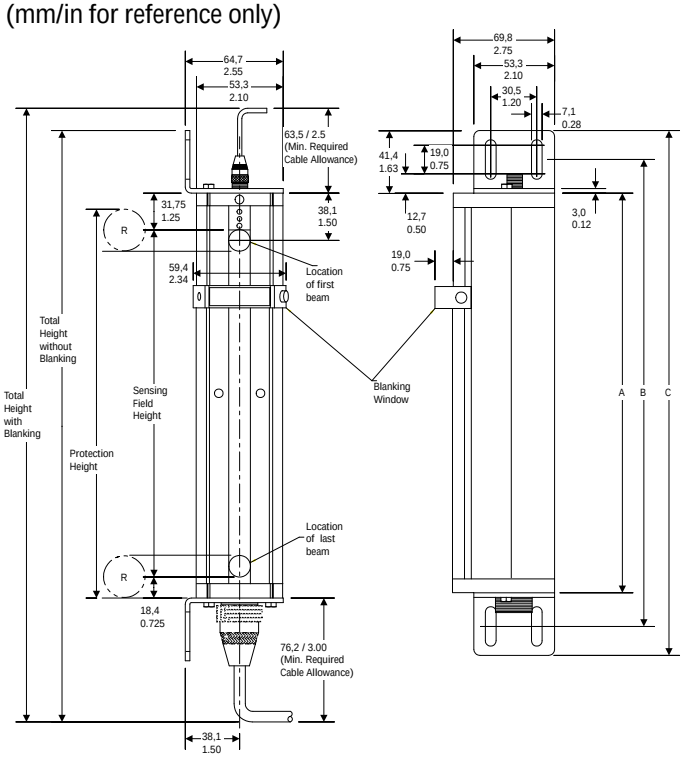
- **Blanking capability: fixed and floating**

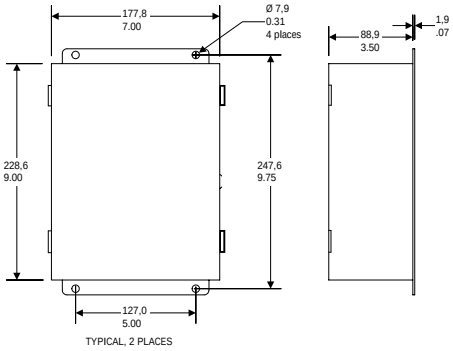
Dimensions in inches / millimeters, feet / meters , weights in lbs / kg

Specifications	**General**	
	Protection heights (in/mm)	184 to 1860 mm / 7.25 to 73.25 in - See Table 1
	Scanning range (ft/m)	*Standard*: 0 to 7,6 m / 0 to 25 ft
		Extended: 0 to 15,3 m / 0 to 50 ft
	Resolution (min. object sensitivity)	31,75 mm / 1.25 in - See Table 2
	Effective aperture angle	± 3.5° for emitter and receiver
	Emission	Pulsed infrared light (880 nm)
	Blanking/Floating	*Fixed*: external blanking window required (for first beam, master blanking window
		required; for each additional beam, 1 slave blanking window is required, up to 4 slaves)
		Floating: 1 beam floating capability standard via switch inside the controller
	Response time	30 ms to 40 ms - See Table 1
		75 ms max. - for the weld controllers
Outputs		2 stop relays with force-guided contacts; plus 1 auxiliary relay
		and 4 solid state indicator outputs
	Switching capacity	4 A/240 Vac or DC resistive; selectable NO or NC contact available with all outputs relays
	Indicator outputs	4 open collector NPN, opto-isolated
		70 Vdc/2 mA maximum when "ON"
Inputs		
	Supply voltage	24 Vdc +10%, -20%; 120/240 Vac ± 10% selectable 50/60 Hz
	Power consumption	27 VA maximum, 27 watts maximum
	Emitter/Receiver sets	2 sets (any height) can be connected to same control box
	FSDs/MPCEs Monitoring input	Dry contacts rated 20 mA when contacts are closed and 20 Vdc when open;
	Selectable restart interlock	Closure to ground. Max. on voltage 20 V/2 mA when "ON"
(reset required after detection field interruption)		
	Selectable start interlock	Closure to ground. Max. on voltage 20 V/2 mA when "ON"
(reset required at power up)		
Indicators		*Emitter*: Amber (Power ON)
		Receiver: Green (unobstructed), Red (obstructed), and flashing amber (floating enabled)
		Control box: Green (unobstructed/output relays energized), Red (stop signaled/output
		relays de-energized), Yellow (reset required), flashing amber (floating enabled)
Material		
	Emitter and receiver Housing	Extruded aluminium 0.12 in/3 mm wall minimum
	End caps	Black nylon, glass reinforced
	Window	Polymethyl methacrylate (PMMA)
	Control box (dimensions)	14 gauge (0.075 in / 1.9 mm) welded steel with keylock included:
		enclosure 17,8 x 22,9 x 8,9 cm / 7 x 9 x 3.5 in
	Cables (dimensions)	1,5; 4,6; 9,1; 15,2 and 30,5 m / 5, 15, 30, 50 and 100 ft / with connector on one end
Environmental		
	Emitter, Receiver Sealing	NEMA 4 / IP 65
	Control Box Sealing	(See Order Guide)
	Cable Sealing	NEMA 4 / IP 65 connector; oil-resistant PVC cable
	Operating temperature	0 to 50° C / 32° to 122° F
	Humidity	30 - 95% relative humidity, non condensing
	Vibration	10 g, 0.03 inch displacement, 10-150 Hz frequency (3 axes):
	Shock testing	50 g, 11 ms pulse per MIL-STD-810 C, Method 516, Procedure 1 (applies to all 3 axes)
Weight	**Emitter or receiver**	0,64 to 5,17 kg / From 1.4 to 11.3 lbs - See Table 1
	Control box	4 kg / 9 lbs

❍ Mounting dimensions

(mm/in for reference only)





❍ Table 1: Safety light curtain characteristics

Dimensions in mm/in, weights in kg/lbs, response times in ms

Model	*06*	*12*	*18*	*24*	*30*	*36*	*42*	*48*	*60*	*72*
Protection height (mm/in) (1)	184,2 7.25	336,6 13.25	489 19.25	641,4 25.25	793,8 31.25	946,2 37.25	1098,6 43.25	1251 49.25	1555,8 61.25	1860,6 73.25
Sensing field height (mm/in)	146,1 5.75	298,5 11.75	450,9 17.75	603,3 23.75	755,7 29.75	908,1 35.75	1060,5 41.75	47.75 1212,9	1517,7 59.75	1822,5 71.75
Total height without blanking (in/mm) (2)	314,3 12.38	466,7 18.38	619,1 24.38	771,5 30.38	923,9 36.38	1076,3 42.38	1228,7 48.38	1381,1 54.38	66.38 1685,9	1990,7 78.38
Total height with blanking (mm/min (3)	336,6 13.25	489 19.25	641,4 25.25	793,8 31.25	946,2 37.25	1076,3 43.25	1251 49.25	1403,4 55.25	1708,2 67.25	2013 79.25
Response time with stand. controller (ms)	30	30	30	30	35	35	35	35	40	40
Response time with weld controller (ms)	75	75	75	75	75	75	75	75	75	75
Weight per device (kg / lbs)	0,64 1.4	1,05 2.3	1,46 3.2	1,87 4.1	2,29 5	2,7 5.9	3,11 6.8	3,52 7.7	4,34 9.5	5,17 11.3
A	196,9 7.75	349,3 13.75	501,7 19.75	654,1 25.75	806,5 31.75	958,9 37.75	1111,3 43.75	1263,7 49.75	1568,5 61.75	1873,3 73.75
B	241,3 9.50	393,7 15.50	546,1 21.50	698,5 27.50	850,9 33.50	1003,3 39.50	1155,7 45.50	1308,1 51.50	1612,9 63.50	1917,7 75.50
C	279,4 11.00	431,8 17.00	584,2 23.00	736,6 29.00	889 35.00	1041,4 41.00	1193,8 47.00	1346,2 53.00	1651 65.00	1955,8 77.00

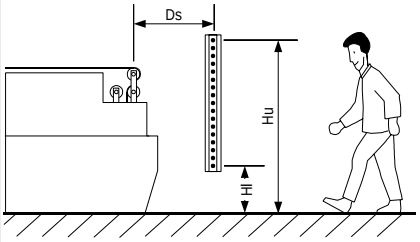
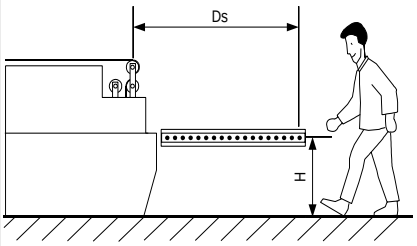
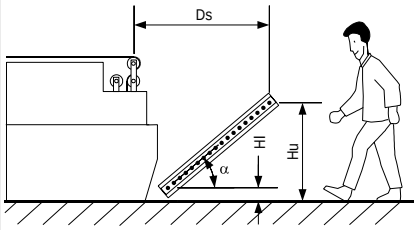
(1) Protection height for the min. object sensitivity or resolution
(2) Total height including bracket and connector
(3) Total height including connectors when a blanking window is used

❍ Table 2: Safety light curtain blanking characteristics

	Without blanking		1 beam blanking		2 beam blanking		3 beam blanking		4 beam blanking		5 beam blanking	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
Resolution R*	31,75	1.25	50,80	2	69,85	2.75	88,90	3.50	107,95	4.25	127	5
Beam spacing	19,05	0.75	19,05	0.75	19,05	0.75	19,05	0,75	19,05	0.75	19,05	0.75
Beam diameter	12.70	0.50	12,70	0.50	12,70	0.50	12,70	0.50	12,70	0.50	12,70	0.50

***Minimum object sensitivity

❍ Safety distances per USA's OSHA/ANSI requirements (in inches, 1 in = 25.4 mm)

Ds = K x (Ts + Tc + Tr) + Dpf	**Without blanking** 1.25 in resolution (Minimum object sensitivity)	**1-beam blanking*** 2 in resolution Minimum object sensitivity
Normal approach		
	**Ds = 63 x (Ts + Tc + Tr) + 3.3** **Note**: If Hu is less than 48", then Dpf = 48" (reach over).	**Ds = 63 x (Ts + Tc + Tr) + 5.9 for 1 beam blanked (2.0" resolution)** **Note**: If more than one contiguous beam is blanked, the resolution (minimum object sensitivity) becomes greater than 2.5", then : - Dpf = 36" if Hu is greater or equal to 48" (reach through) or, - Dpf = 48" if Hu is less than 48" (reach over).
Parallel approach		
	**Ds = 63 x (Ts + Tc + Tr) + 48**	**Ds = 63 x (Ts + Tc + Tr) + 48** **Note**: H is to be not greater than 39 inches. if the blanked area is not entirely obstructed, H is not to be less than : - 7" for 2 contiguous blanked beams (2.75" resolution) or, - 15" for 3 contiguous blanked beams (3.5" resolution) or, - 30" for 4 contiguous blanked beams (4.25" resolution) or, - 39" for 5 contiguous blanked beams (5" resolution).
Angled approach		
	If $\alpha \geq 30°$ then use a normal approach formula. If $\alpha \leq 30°$ then use a parallel approach formula.	

Where:

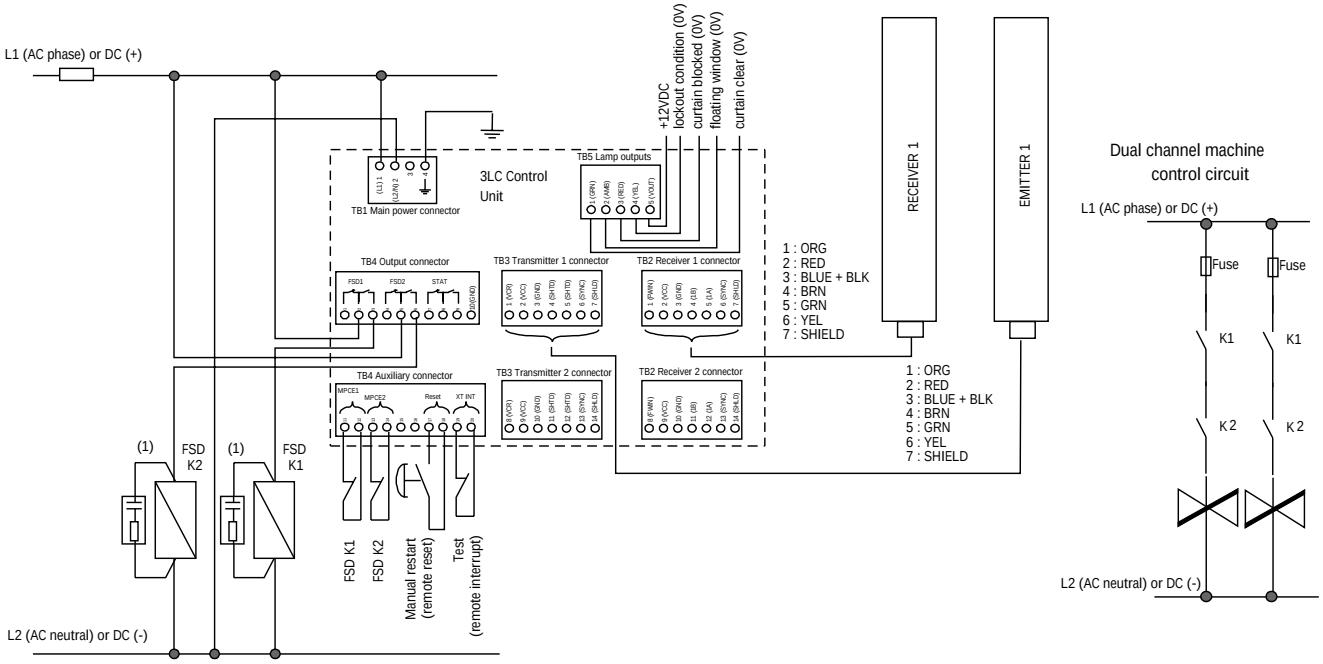
Ds	Minimum safety distance
K	Approach speed (called "hand speed") = 63 in/sec
Ts	Worst case stopping time of the machine (seconds)
Tc	Worst case response of the machine's control (seconds)
Tr	Response time of the safety devices (light curtain plus its interface – meaning the response time including the mechanical relay outputs in seconds)
Dpf	Depth penetration factor (inches)
H	height of the detection plane above the reference floor (inches)
Hu	height of the uppermost beam above the reference floor (inches)
Hl	height of the lowest beam above the reference floor (inches). For Normal approach, assumption is that Hl is not greater than 12 inches unless the application prevents access even with Hl at a distance greater than 12 inches)

(*) Floating or fixed blanking windows affect safety distance

USA's OSHA and ANSI safety distance formulas state that if the resolution (minimum object sensitivity) increases, the safety distance must also increase. If the blanked area is not completely physically obstructed, use of blanking windows requires moving the light curtain farther back from the hazardous area. The rule for increasing the safety distance is to add 2.6 in. to the safety distance for one beam blanked if the blanked area is not obstructed physically. If two or more contiguous beams are blanked then the Depth penetration factor (Dpf) is at least 36" when Hu is greater or equal to 48" (personnel are detected while reaching through the light curtain field). However Dpf is at least 48" if the Hu is less than 48" (personnel are detected reaching over the light curtain field). The light curtain must be sized and installed such that a stop would be signaled and the hazard cease prior to a person accessing the hazard. If the blanked area is entirely blocked by a fixture, the safety distance remains unchanged. Blanking two beams or more can create a large unprotected area through the light curtain. If this passageway is not completely filled by a fixture, personnel would be subject to a dangerous working environment.

For more information, refer to the US regulations and standards (OSHA 29 CFR 1910.212 and 1910.217, ANSI B11.1, B11.2, B11.19, B11.20 and R15.06).

❍ **Wiring diagram example using external relaying and manual restart (remote reset)**



(1) RC (220 Ω + 0.22 mF) for ac interfaces, varistors (31 Vdc) for dc interfaces

For other configurations and capabilities, see the product installation manual.

Detector safety light curtain

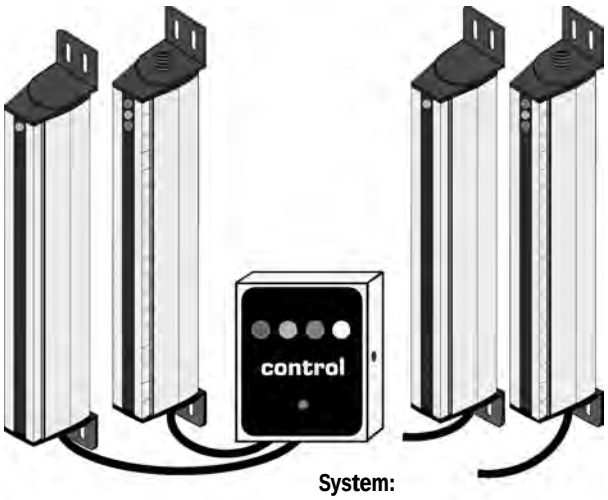
Detector™3 provides excellent protection. Once properly installed, Detector does not require additional adjustment, and no maintenance is required.

Detector™3's controller is both adaptable and versatile. One or two emitter/receiver pairs can use the same controller. The controller contains a power supply, light curtain logic, relays outputs, and configuration switches. These switches are used to configure the system: one or two sets of emitter/receiver pairs and other options.

After installation, access to the controller interior is not necessary. To secure the installation and configuration, close and lock the controller.

For added security and to comply with supervisory control requirements, the controller is equipped with a keyed reset switch. To reset, turn the keyed reset switch to the right (clockwise).

❍ Ordering a system



System:
1 or 2 emitter / receiver pairs,
2 or 4 cables and control box

1. Select the appropriate control box.
2. Determine the protected height requirements.
3. Select the appropriate emitter/receiver pair to match the application requirements.
4. Select the appropriate cable length(s) to match the installation requirements.

❍ Control box order guide

Catalog Listing	Description
3LC-B	NEMA 2 and IP 52 enclosure, 120/240 Vac (selectable)
3LC-BW	NEMA 2 and IP 52 enclosure with 75 ms response for welding applications, 120/240 Vac (selectable)
3LC-B24	NEMA 2 and IP 52 enclosure, 24 Vdc
3LC-B4	NEMA 4 and IP 65 enclosure with 120/240 Vac (selectable)

Note: cable glands are not included (customer supplied)

❍ Emitter/receiver pair order guide

Standard Range - up to 25 ft (7.6 m) scanning range		
Catalog Listing	Protection Height	
	(mm)	(in)
3LC06	184,2	7.25
3LC12	336,6	13.25
3LC18	489	19.25
3LC24	641,4	25.25
3LC30	793,8	31.25
3LC36	946,2	37.25
3LC42	1098,6	43.25
3LC48	1251	49.25
3LC60	1555,8	61.25
3LC72	1860,6	73.25

Extended Range - up to 50 ft (15.3 m) scanning range		
Catalog Listing	Protection Height	
	(mm)	(in)
3LC06X	184,2	7.25
3LC12X	336,6	13.25
3LC18X	489	19.25
3LC24X	641,4	25.25
3LC30X	793,8	31.25
3LC36X	946,2	37.25
3LC42X	1098,6	43.25
3LC48X	1251	49.25
3LC60X	1555,8	61.25
3LC72X	1860,6	73.25

❍ Cables* order guide

Catalog Listing	Description	
	(m)	(ft)
3LC-C05	1,52	5
3LC-C15	4,57	15
3LC-C30	9,14	30
3LC-C50	15,24	50
3LC-C100	30,48	100

*Order two cables for a complete emitter and receiver pair.

❍ Blanking window* order guide

Catalog Listing	Description
3DBWM-24	Master, 0,61 m / 24 in cable length
3DBWM-48	Master, 1,22 m / 48 in cable length
3DBWM-72	Master, 1,83 m / 72 in cable length
3DBW-S	Slave for any size
*Order 1 master and up to 4 slaves	

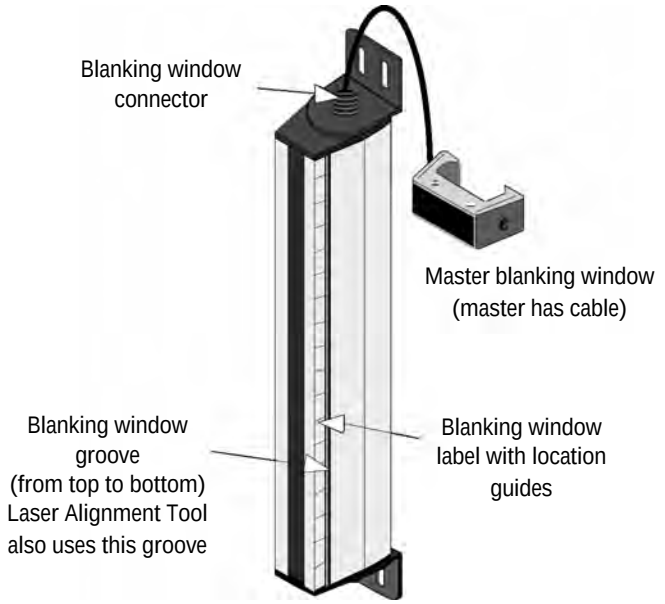
Maximum of five beams may be blanked; this does not include the floating blanking window.

Fixed blanking windows can be used with floating blanking window.

Master fixed blanking windows have cables that connect to the top of the receiver.

Slave fixed blanking windows look like a master window, but have no cable.

Slave fixed blanking windows snap on top of Master – no jumpers are required.



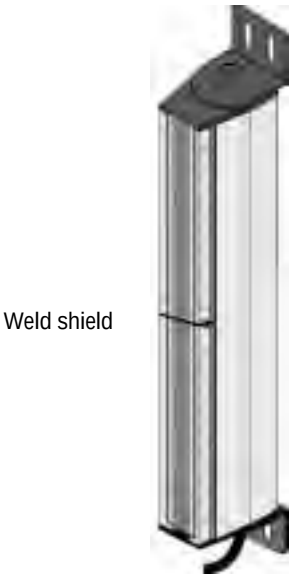
❍ Weld shield kits** order guide

Catalog Listing	Protection Heights	
	(mm)	(in)
3WS06	184,2	7.25
3WS12	336,6	13.25
3WS18	489	19.25
3WS24	641,4	25.25
3WS30	793,8	31.25
3WS36	946,2	37.25
3WS42	1098,6	43.25
3WS48	1251	49.25
3WS60	1555,8	61.25
3WS72	1860,6	73.25
**Weld shield kit; 1 clear acrylic (plastic) shield with mechanical clips that attach to blanking window grooves		

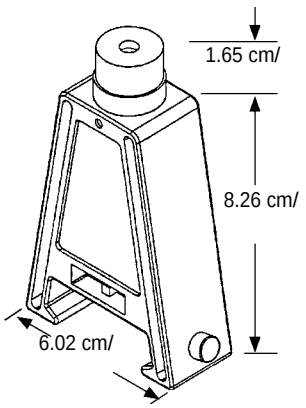
❍ Other accessories order guide

Catalog Listing	Description
3LC-LAT	Laser alignment tool, 3V lithium battery, 20-hour life

❍ Weld shields (external)



❍ Laser alignment tool



Safety Light Curtain Detector ™ 3

Detector™ 3 Series

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

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While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

For application assistance, current specifications, or name of the nearest Authorized Distributor, contact a nearby sales office. Or call:

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Freeport, Illinois 61032

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004723-2-EN IL50 GLO 0500 Printed in USA

Safety Mat

based on a fiber optic technology

FF-SM Series

FEATURES

- Meets applicable parts of US ANSI B11.19.1990, ANSI/RIA 15.06-1992 standards, OSHA 1910.212, 1910.217 regulations and European EN 1760-1 standard for Pressure Sensitive Protective Devices
- Permanent self-checking electronic designed in compliance with the requirements of the EN 954-1 standard for **Category 4 Electrosensitive Protective Devices**
- Sensor based on a fiber optic technology for a positive light operating mode and designed in compliance with the requirements of the EN 954 - 1 standard for Category 3 protective devices
- Standard sizes in mm (and ft): 500x750 (1.64x2.46), 500x1000 (1.64x3.28), 500x1500 (1.64x4.92), 750x750 (2.46x2.46), 750x1000 (2.46x3.28), 750x1500 (2.46x4.92), 1000x1000 (3.28x3.28), 1000x1500 (3.28x4.92)
- Several safety mats can be connected in series
- Number of operations > 10 million
- Shock and overload resistance
- Sensor: IP 67 / NEMA 6 control unit: IP 65 / NEMA 4
- Highly resistant to chemical agent and oils
- Supply voltage: 120 Vac, 240 Vac & 24 Vdc
- Response time: 0.025 sec
- Test input
- LED status indicators

APPLICATIONS

- Presence sensing device for the control of dangerous areas such as robot areas, automotive transfer lines
- Additional protection for optoelectronic trip devices

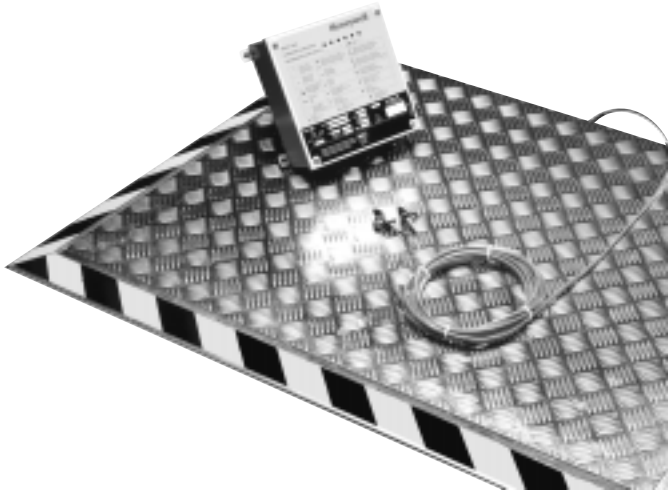
INRS

CE

NRTL/C

Category 3 EN 954-1
Mat

Category 4 EN 954-1
Control unit



The FF-SM safety mat is a pressure sensitive protective device designed in compliance with the requirements of the EN 1760 - part 1 European standard for the detection of operators inside a dangerous zone. The sensor uses an infrared modulated light source spread by a fiber optic cable and operates in the light operated mode for a positive safety: the presence of a load greater than the 30 kg / 66.14 lbs detection capability causes a bending of the fiber optic cable on the whole of the sensing surface. The loss in signal resulting from this bending de-energizes the output relays of the control unit and stops the dangerous movement of the machine. The fiber optic technology is totally immune to electromagnetic disturbances and it allows longer connections than electrical wires. Several safety mats can be connected in series and monitored by one single control unit.

The sensor is designed in compliance with the requirements of the EN 954 - 1 European standard for Category 3 Pressure Sensitive Protective Devices. A load distributor forms part of the sensor mechanics and protects the sensing surface from damage caused by the falling of heavy objects (such as a 5 kg / 11 lbs steel sphere being dropped from a 1 m / 3.3 ft height). Due to the mechanical structure of the sensor, the safety mat is resistant to occasional overloads caused by fork lift trucks, and features an exceptional life expectancy when used in normal conditions.

The available industrial coatings provide excellent chemical resistance and sealing Sensor: IP 67 / NEMA 6, and control unit: IP 65 / NEMA 4.

(1) Note: The 30 kg / 66.14 lbs sensitivity is suitable for adult detection only (15 kg / 33.07 lbs is the sensitivity for children detection).

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

The control unit complies with the requirements of the EN 954-1 European Standard for Category 4 safety related parts of control systems and is based on a permanent self-checking principle.

The control unit is equipped with 2 safety relays with guided contacts which can be directly used to stop the dangerous movement. However, most of the time, additional relaying (or «Final Switching Devices» - FSD) between the control unit outputs and the machine control circuitry is necessary.

For this reason, the use of an emergency stop relay module is recommended. This relay module must integrate a start and restart interlock facility for a correct installation of the safety mat as required by the EN 1760-1 European standard.

A test input is also available on the control unit. The test input is used to set the equipment in an alarm condition. It provides the ability to regularly check the correct operation of the interface relays.

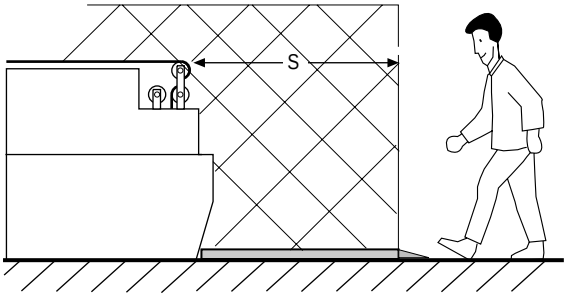
LED indicators provide useful information on the equipment status during installation and operation.

Safety Distances

The safety mat must be dimensioned and positioned so access to the dangerous zone is impossible without actuating the sensing zone. The EN 999 standard or ANSI B11.19 1990 provides a formula for calculating the minimum distance between the dangerous zone and the edge of the safety mat for ground level trip devices.

To prevent access to dangerous sides of machinery not protected by safety mats, install additional hard guarding and/or safety protection type products.

Floor Mounting safety distance formula:



Ensure hard guarding protection is installed on the rear face and on both sides.

Europe (EN 999)

S ≥ 1600 (t1 + t2) + 1200 (mm)

or S ≥ 63 (t1 + t2) + 47.3 (in)

US (ANSI B11.19 1990)

Ds ≥ 63 (t1 + t2) + C (in) S = Ds

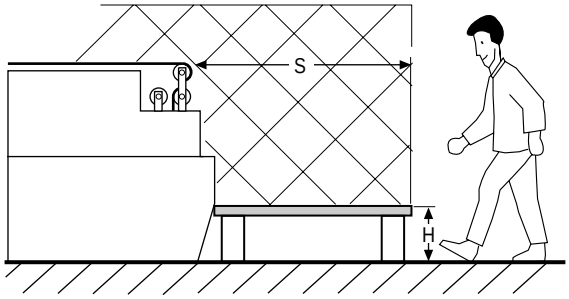
where C is an additional safety distance (see local Health and Safety Regulations for this value).

Ds: minimum safety distance (mm/in)

t1: Global response time of the safety mat (0.025 sec)

t2: Stopping time of the machine, application dependent (sec)

Step mounting safety distance formula:



Ensure hard guarding protection is installed on the rear face and on both sides.

Europe (EN 999)

S ≥ 1600 (t1 + t2) + (1200 - 0.4 H) (mm)

or Ds ≥ 63 (t1 + t2) + (47.3 - 0.4 H) (in) S = Ds

S: minimum safety distance (mm/in)

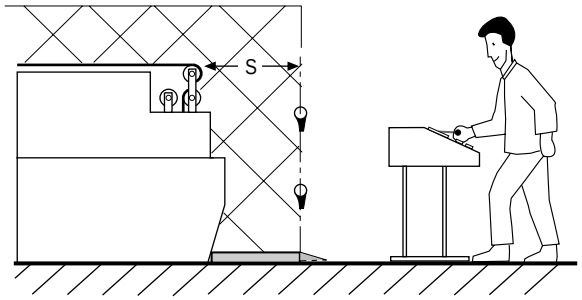
t1: global response time of the safety mat (0.025 sec)

t2: stopping time of the machine, application dependent (sec)

H: height of the platform (mm/in)

Combined protective devices

If a safety mat is used with a safety light curtain or multiple safety single beam devices, the minimum safety distance between the dangerous zone and the safety beams or the edge of the safety mat should be calculated using the following formula:



Ensure hard guarding protection is installed on the rear face and on both sides.

Europe (EN 999)

S ≥ 1600 (t1 + t2) + 850 (mm)

or S ≥ 63 (t1 + t2) + 33.5 (in)

S: minimum safety distance (mm/in)

t1: response time of the multiple safety single beam device (sec)

t2: stopping time of the machine, application dependent (sec)

LED status indicators

The 4 LED's available on the front panel have the following meaning:

Output status	Machine operation enabled	Machine operation disabled
TEST Test	Normal operation	Device in test condition
Power supply	Power off	Power on

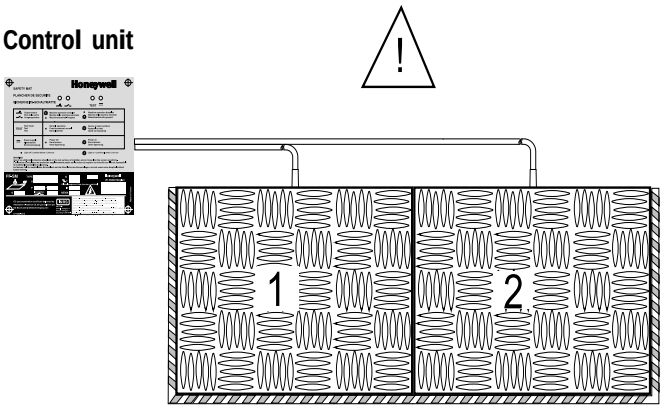
Light off — Light on

Area controlled by several safety mats run by a single control unit

The fiber optic technology allows the connection in series of up to **4 mats** to cover a larger detection zone while using a single channel control unit. The following applications can be performed:

• Protection of a single zone with several mats run by a single control unit:

Control unit

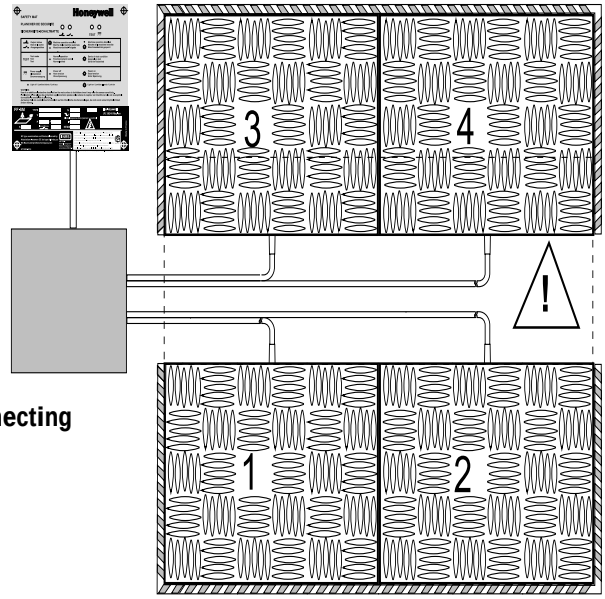


Connection in series of 2 safety mats can be done inside the control unit box.

• Protection of several zones with several mats run by a single control unit:

Control unit

Connecting box



Connection in series of more than 2 safety mats must be done inside an additional connecting box.

Resistance to chemical materials

Coatings		Aluminium sheet metal	
		Nitrile checker	
Fluids resistance	Hydrocarbons	■	■
	Aromatic solvents	▲	■
	Chlorinated solvents	▲	▲
	Aliphatic hydrocarbons	■	■
	Acetone	●	■
	Animal oils	■	■
	Vegetable oils	■	■
	Water (absorption)	■	■
	Dilute acid	▲	■
	Concentrated acid	▲	▲
	Bases	■	■

■ excellent resistance — ▲ poor resistance — ● bad resistance

FF-SM

FF-SM

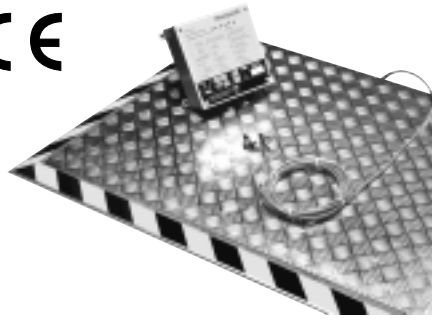
- **Pressure sensitive device in compliance with the requirements of the EN 1760-1 standard**
- **Control unit in compliance with the requirements of the EN 954-1 standard for Category 4 equipment**
- **Sensor unit based on a fiber optic technology and designed in compliance with the requirements of the EN 954-1 standard for Category 3 equipment**
- **Meets applicable parts of ANSI/RIA/OSHA regulations**

INRS

NRTL/C

Category 3 EN 954-1
Mat

Category 4 EN 954-1
Control unit



Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

Features		
	Compliance	***Europe:*** Compliance with EN 1760-1 standard
		US: ANSI B11.19.1990, ANSI/RIA 15.06-1992 standards, OSHA 1910.212, 1910.217 regulations
Sensor unit	**Category**	Category 3 according to EN 954-1 standard
	Detection sensitivity	≥ 30 kg / 66.14 lbs
	Number of operations	Tested up to 10 million with a ø80 mm / 75 kg (3.15 in / 165 lbs) stamp applied on 1 point
	Shock resistance	50 Joules (energy released by the falling of a 5 kg/11 lbs sphere dropped from 1 m / 3.28 ft)
	Overload resistance	Max. static load: 1000 N/cm² (resist to fork lift trucks)
	Quality of coating	Aluminium bulb plate: welding splash resistant (3 mm / 0.11 in thickness)
		Nitrile checker: oil resistant (5 mm / 0.2 in thickness)
	Chemical resistance	Oils / Diluted bases / Usual cleaning liquids
	Operating temperature	0 to 55°C / 32 to 131°F
	Connection to the control unit	A fiber optic cable equipped with 2 ST connectors (5 m / 16.4 ft) cable length, PVC sheath
	Connection in series	Up to 4 mats per control unit
	Sealing	IP 67 / NEMA 6
	Fixing on the reference floor	Laid on the reference floor and maintained by edges, or embedded in the reference floor
	Weight	Aluminium: 27 kg/m² / 5.5 lbs/ft² / Nitrile: 23 kg/m² / 4.6 lbs/ft²
Control unit	**Category**	Category 4 according to EN 954-1 standard
	Supply voltage	120 Vac (+ 10%, - 20%), 240 Vac (+10%, -20%), 24 Vdc (±15%)
	Frequency	50 to 60 Hz
	Power consumption	6 VA / 9 W
	Global response time	0.025 sec. (safety mat included)
	Connection	Snap-in clips for electrical wires - ST connectors for fiber optic cables
	Electrical noise immunity	according to IEC 801-4: level IV (Vac) or level III (Vdc)
		according to IEC 801-3: level III (Vac & Vdc)
	Outputs	2NO+1NC (2 safety relays with guided contacts, 2A/250 Vac, 10 mA mini.)
	Functions	Test input
	Sealing	IP 65 / NEMA 4
	Fixing	4 M5 screws
	Weight	3.6 kg / 7.93 lbs

Ordering information

• SAFETY MAT

FF-SM❑❑❑❑❑❑-❑ 0 5

Coating:
1: aluminium
2: nitrile

Dimensions:

.075050:	0750x0500	mm² /	2.46x1.64	ft²
.100050:	1000x0500	mm² /	3.28x1.64	ft²
.150050:	1500x0500	mm² /	4.92x1.64	ft²
.075075:	0750x0750	mm² /	2.46x2.46	ft²
.100075:	1000x0750	mm² /	3.28x2.46	ft²
.150075:	1500x0750	mm² /	4.92x2.46	ft²
.100100:	1000x1000	mm² /	3.28x3.28	ft²
.150100:	1500x1000	mm² /	4.92x3.28	ft²

• CONTROL UNIT

FF-SMC100T ❑

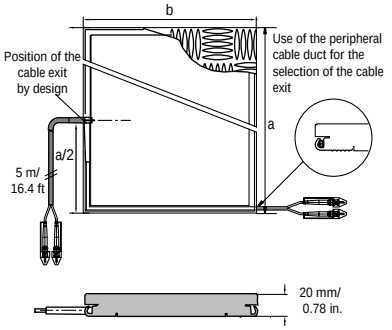
Supply voltage: E:120Vac/ G:240Vac/ 2:24Vdc

- If the control unit is installed on a flexible structure submitted to vibrations, the use of anti-vibration dampers FF-SMZ646095 is necessary.
- Secure the installation by fixing the safety mat with the recommended FF-SMZTAPE double-sided adhesive tape.

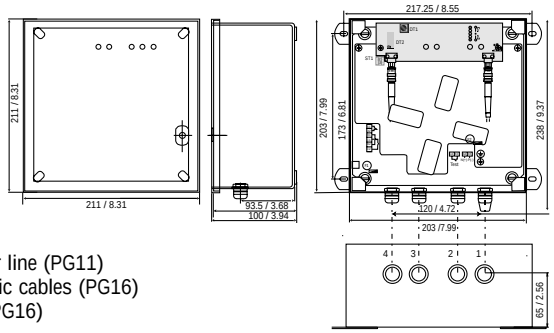
Also refer to the accessory section.

Sensor unit

References	a (mm² / ft²)	b (mm² / ft²)
FF-SM075050-❑05	750 / 2.46	500 / 1.64
FF-SM100050-❑05	1000 / 3.28	500 / 1.64
FF-SM150050-❑05	1500 / 4.92	500 / 1.64
FF-SM075075-❑05	750 / 2.46	750 / 2.46
FF-SM100075-❑05	1000 / 3.28	750 / 2.46
FF-SM150075-❑05	1500 / 4.92	750 / 2.46
FF-SM100100-❑05	1000 / 3.28	1000 / 3.28
FF-SM150100-❑05	1500 / 4.92	1000 / 3.28

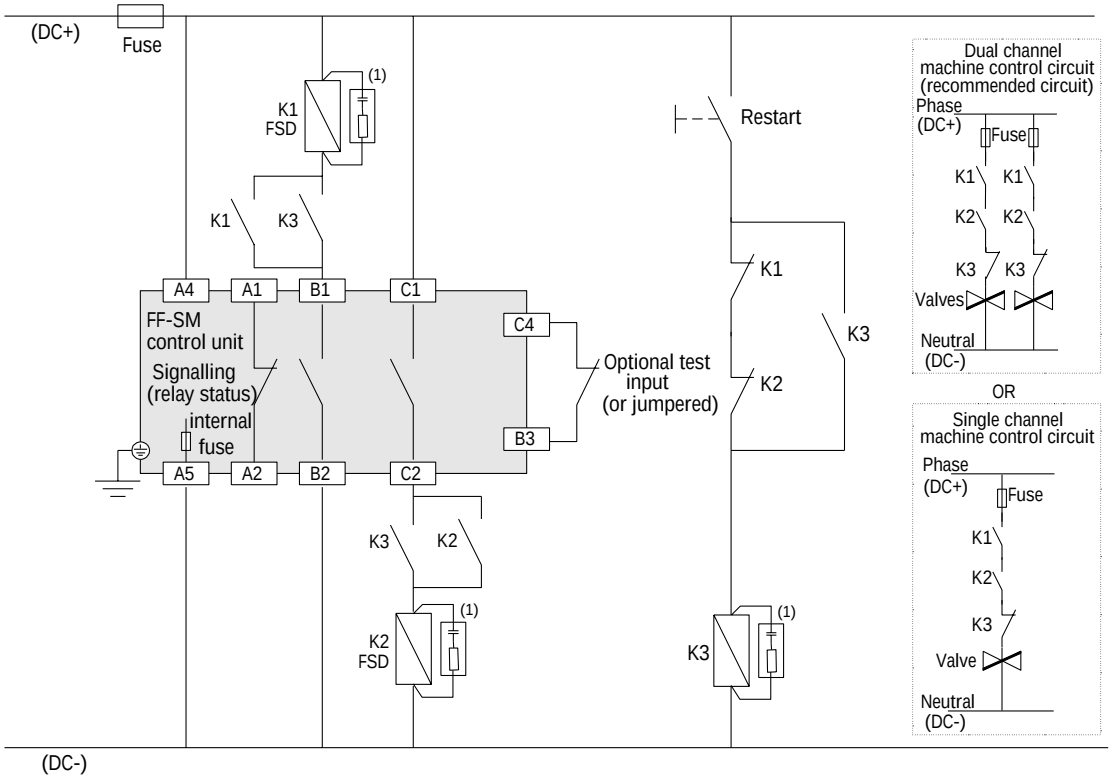


Control unit

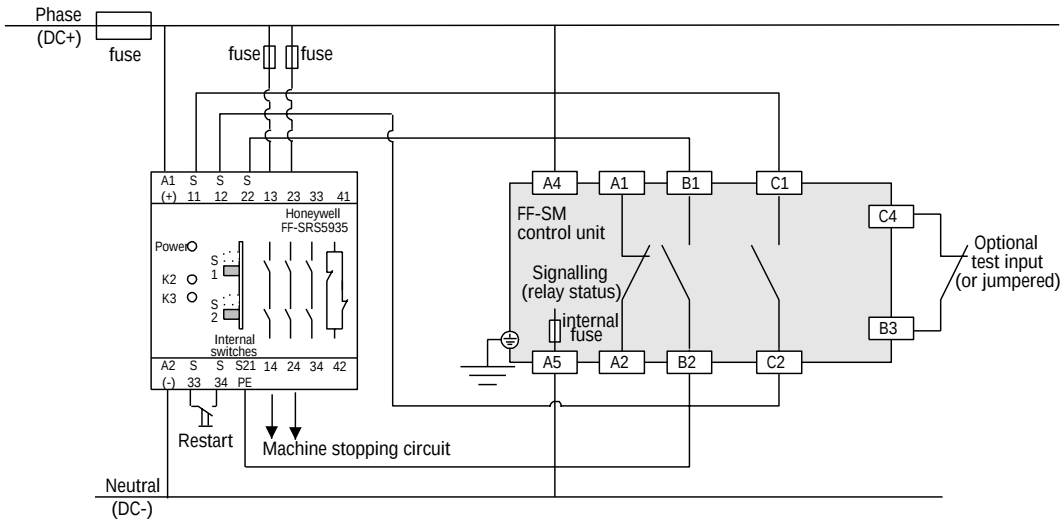


1 : Cable gland for the power line (PG11)
2 and 3 : Cable glands for fiber optic cables (PG16)
4 : Cable gland for signals (PG16)

Wiring diagram with safety relays



Wiring diagram with Honeywell safety module



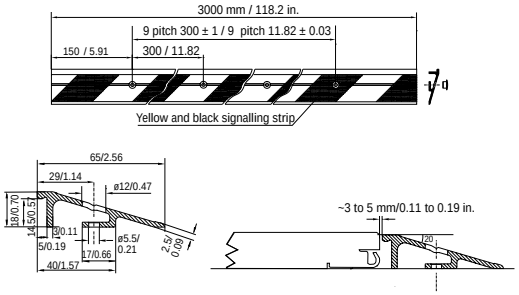
(1) RC (220 Ω + 0.22 μF) for AC interfaces or varistors for DC interfaces
FSD: Final Switching Device

Note: The start and restart interlock facility and the cross-monitored Final Switching Devices may be provided by a safety relay module from the FF-SR Series.

Accessories FF-SM

Dimensions in millimeters / inches, meters / feet

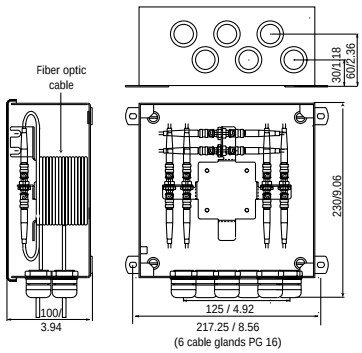
• FF-PSZS1030



Edges

If the safety mat is laid on the reference floor, then the EN 1760-1 standard makes the use of edges all around the accessible periphery of the sensing zone mandatory. They prevent people from stumbling over the safety mats and keep them in position. The edges are delivered per 3 m / 9.84 ft and must be cut to the right length according to the application.

• FF-SMZBOX:

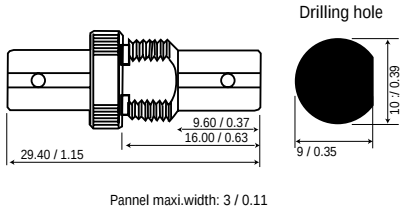


Connecting box (delivered without cable-to-cable connector)
For a reliable installation, it is recommended to use the connecting box for the connection in series of several mats. It allows the connection in series of 2 to 4 mats to the control unit via a cable extension. The connecting box is equipped with a cable drum to absorb the excess cable, it improves the IP sealing of connectors (dust proof - IP 60) and protects them from mechanical damages.

Notes:

- Connection in series of 2 safety mats can be made inside the control unit box if no cable extension is required.

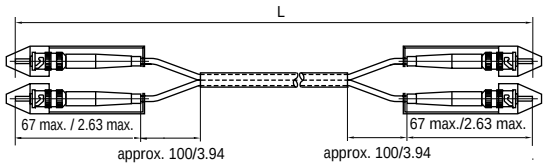
• FF-SMZ175196:



Kit of 2 cable-to-cable connectors

This kit of 2 ST cable-to-cable connectors must be used for the interconnection of optical cables. 2 cable-to-cable connectors are necessary for the connection of a mat to the control unit via a cable extension, and one cable-to-cable connector is necessary for the connection in series of 2 mats to the control unit. (Example: Order 2 kits of cable-to-cable connectors for the connection in series of 3 mats to the control unit via a cable extension).

• FF-SMZFOC❑❑:

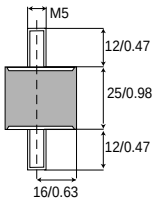


Cable extensions (delivered without cable-to-cable connector)

Each mat is pre-wired with a fiber optic cable. If the control unit is installed at a greater distance, the use of a cable extension is necessary.

Reference	*L (m / ft)*
FF-SMZF0C02	2 / 6.56
FF-SMZF0C05	5 / 16.4
FF-SMZF0C10	10 / 32.8
FF-SMZF0C20	20 / 65.6

• FF-SMZ646095



Kit of 4 antivibration dampers with 8 HM5 nuts for the control unit

• FF-SMZTAPE

Sellotape 0485 double-sided adhesive tape:
0.4 mm/0.016 in thickness and 30 m /98.36 ft length, to secure the mats installation

Safety Non Contact Switch

Based on Magnetic Coded Technology

FF-SNC Series

New*

FEATURES

- Meets applicable parts of European EN 1088 standard for Interlocking devices associated with guards
- Permanent self-checking electronic designed in compliance with the requirements of the EN 954-1 standard for **Category 3 protective Devices**
- Operating range:
  5 mm - 7 mm / 0.20 in - 0.27 in ON,
  8 mm - 12 mm / 0.32 in - 0.47 in OFF
- High resistance to environmental influences
- ABS and Stainless Steel housings sensors available
- Sensors sealing: IP 67
- Prewired or M8 plug termination
- Supply voltage: 24 Vdc/Vac ±15 %;
  110 Vac ±15 % (only available for the 4-sensor control unit)
- Response time of the control unit:
  15 ms
- Manual or automatic restart
- LED status indicator
- 2-sensor control unit: (DIN rail mount 22,5 mm / 0.89 in width)
  4-sensor control unit: (DIN rail mount 75 mm / 2.95 in width)
  5-sensor extension module: (DIN rail mount 22,5 / 0.89 in width)

TYPICAL APPLICATIONS

Interlocking guard for non locked mechanical screens offering free access (machines must achieve instant stop):

- Machine door or casting "open/closed" detection
- Guard-in-place detection, gate/access door detection
- Control of mechanical screens used in addition to a safety light curtain
- Food & Beverage, Packaging, Machine Tool, Automotive and Textile.

Suitable for interfaces up to CATEGORY 3 per EN 954-1

c UL US LISTED

TÜV NORD

*New: M8 plug model now available

The FF-SNC Honeywell safety non contact switch is a tamper resistant safety system for monitoring machine guards. The actuator being a passive component, the safety switch is the only component that needs to be wired to the control unit and cannot be defeated by regular magnet.

Each system is made up of one or several safety switches, actuators and a control unit. The Honeywell FF-SNC safety non contact switches are designed in compliance with the requirements of the EN 954-1 European Standard for Category 3 Protective Devices.

The FF-SNC is especially suited for applications where perfect door alignment can not be obtained. The FF-SNC Series can be mounted on sliding, hinged or removable machine guards. The output of the control unit is triggered as soon as the distance between the safety switch and the actuator is greater or equal to 8 mm / 0.32 in. This switching distance compensates for the machine vibration or any issue with the installation alignment.

The sensor and actuator small size makes it usable under tight space requirements.

The safety switches and the actuators provide excellent chemical and mechanical resistance. Stainless steel housing versions fulfil the requirements of the Food and Beverage industry.

The FF-SNC400 safety control unit comes in a 75 mm / 2.95 in package and can monitor up to 4 sensors.

The FF-SNC200R2 safety control unit with its 22,5 mm / 0.89 in width will easily find a place in the electrical cabinet and can monitor 2 sensors. Both control units can be placed up to 100 m / 328 ft away from the safety non contact switches. The indicators located on the front cover of both control units provide individual door status information.

The FF-SNC1EXT extension module can be added to the FF-SNC400 or FF-SNC200 control unit and allows the connection of 5 additional sensors.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is to be referenced for each product.

Failure to comply with these instructions could result in death or serious injury.

Safety Non Contact Switch FF-SNC

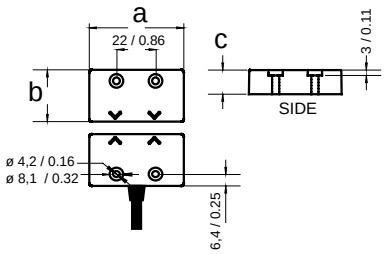
- **Complies with the requirements of the EN 954-1 for Category 3 equipment**
- **Meets applicable parts of ANSI/RIA/OSHA regulations**

Dimensions in millimeters / inches, meters / feet, weights in kg / lbs

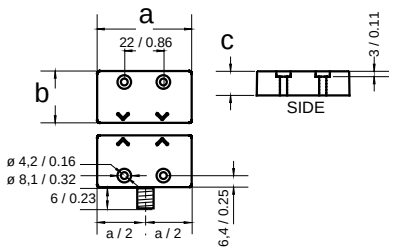
Features	
Switch	
Material	ABS (**FF-SNC1SA❑❑PA-❑)** or Stainless Steel 316 and Resin filled **(FF-SNC1SA❑❑PS)**
Sensing range	5 mm - 7 mm / 0.20 in - 0.27 in ON • 8 mm - 12 mm / 0.32 in - 0.47 in OFF
	allowable misalignment: ±4mm / ±1/6 in
Minimum gap	1 mm
Standard cable length	Prewired 3 m / 9.84 ft or 5 m/16.4 ft (ABS only) - M8 plug: 5 mm/16.4 ft (ABS only)
Temperature	*Operating:* -10 °C to +55 °C/14 °F to 131 °F • *Storage*: -20 °C to +60 °C/-4 °F to 140 °F
Connection to the control unit	Max. cable length: 100 m / 328 ft
Sealing	IP 67 prewired or M8 plug
Fixing	2 x (M4 x 20 mm) Tamper proof screws (supplied with the product)
Control unit / extension module	
Category	Category 3 according to EN 954-1
Supply voltage	24 Vdc/Vac ±15 % • 110 Vac ±15 % (FF-SNC400RE only)
Response time of the control unit	15 ms (with or without extension module)
Power consumption (including sensors)	6 VA (with or without ext. module): FF-SNC400 • 3 VA (with or without ext. module) : FF-SNC200
Temperature	*Operating :* -10 °C to + 55 °C / 14 °F to 131 °F • *Storage:* -20 °C to 60 °C / -4 °F to 140 °F
Output	2 NO + 1 NC relay contact
Output Contact Rating	*Max.*: 4 A / 230 Vac; 2 A / 24 Vdc (Res.) @Cos = 1 • *Min.*: 10 V / 10 mA
Restart	Manual or automatic
Sealing	IP 40 Housing, Terminals IP 20
Mounting	35 mm / 1.37 in DIN rail
LED indicators	FF-SNC200R2 control unit: Power, Run and 2 guard status indicators
	FF-SNC400RE control unit: 4 guard status indicators and deselect indicators
Material	Polycarbonate, red

■ Dimensions (mm/in)

Prewired

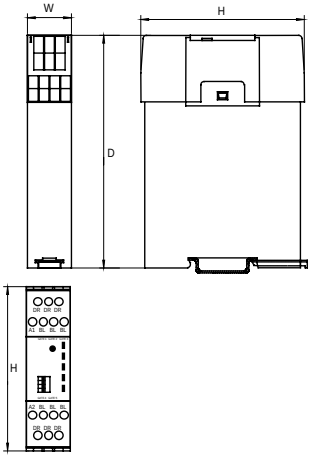


M8 plug



	a	b	c
ABS	52 / 2.04	28 / 1.10	14 / 0.55
SS316	53 / 2.8	29 / 1.14	13.5 / 0.53

M4 x 20 mmTorx screws are supplied with the switches.



	FF-SNC200R2	FF-SNC1EXT	FF-SNC400R2	FF-SNC400RE	
W	22,5 / 0.88		75 / 2.95		(mm/in)
H	84 / 3.30		74 / 2.91		
D	119 / 4.68		119 / 4.68		

Safety Distance Calculations per EN 294 European standard

The dimensions of openings correspond to the narrowest dimension of a slot opening (for openings greater than 120 mm / 4.72 in, refer to the EN 294 standard).
Safety distances *sr* for regular openings for persons of 14 years of age and above:

Part of body	Illustration	Opening size	Safety distance *sr*
			Slot
Fingertip		e ≤ 4	≥ 2
		4 < e ≤ 6	≥ 10
Finger up to knuckle joint		6 < e ≤ 8	≥ 20
		8 < e ≤ 10	≥ 80
Or		10 < e ≤ 12	≥ 100
		12 < e ≤ 20	≥ 120
hand		20 < e ≤ 30	≥ 850*
Arm up to junction with shoulder		30 < e ≤ 40	≥ 850
		40 < e ≤ 120	≥ 850

*If the length of the slot opening is ≤ 65 mm / 2.56 in, the thumb will act as a stop and the safety distance can be reduced to 200 mm / 7.88 in).

For more information on the guards installation, refer to the European standards: EN 811, EN 953, EN 294

Safety Distance Calculations per US ANSI / OSHA standard

$$Ds = K(Ts + Tc + Tr) + Dpf$$

With:

Ds = minimum safe distance between safeguarding device and hazard
K = speed constant: 1,6 m/sec (63 in/sec) minimum based on the movement being the hand/arm only and the body being stationary (a greater value may be required in specific applications and when body motion must also be considered)
Ts = worst stopping time of the machine/equipment
Tc = worst stopping time of the control system
Tr = response time of the safeguarding device including its interface (Tr for interlocked barrier may include a delay due to actuation. This delay may result in Tr being a deduct- negative value).
Dpf = the "Depth penetration factor" is the maximum travel towards the hazard if the guard can be opened a certain width or amount before a stop is signaled.

Dpf values from OSHA O-10 Table:

If the maximum width or diameter of the opening is less than or equal to (mm/in)	Dpf equals (mm/in)
6,4 / 0.25	12,7 / 0.5
9,5 / 0.375	38,1 / 1.5
12,7 / 0.5	63,5 / 2.5
15,9 / 0.625	88,9 / 3.5
19,1 / 0.75	139,7 / 5.5
22,2 / 0.875	165,1 / 6.5
31,8 / 1.25	190,5 / 7.5
38,1 / 1.5	317,5 / 12.5
47,6 / 1.875	393,7 / 15.5
54 / 2.125	444,5 / 17.5

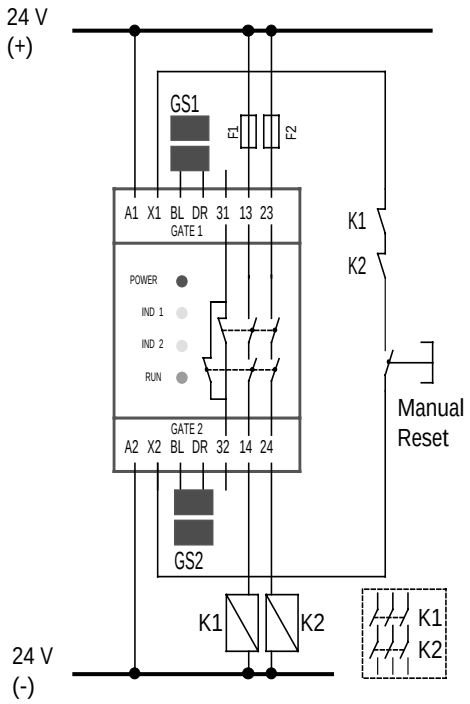
Note: Over 54 mm / 2.125 in, the Dpf equals 800 mm / 31.5 in, with a maximum allowable opening of 152,4 mm / 6 in.

Example: Dpf = 0 when the guard can be opened up to, but less than 6,4 mm / 0.25 in before issuing a stop command.
Dpf = 444,5 mm / 17.5 in if the guard can be opened 54,0 mm / 2.125 in.
At no time can the opening be greater than 152,4 mm / 6 in before issuing a stop command.

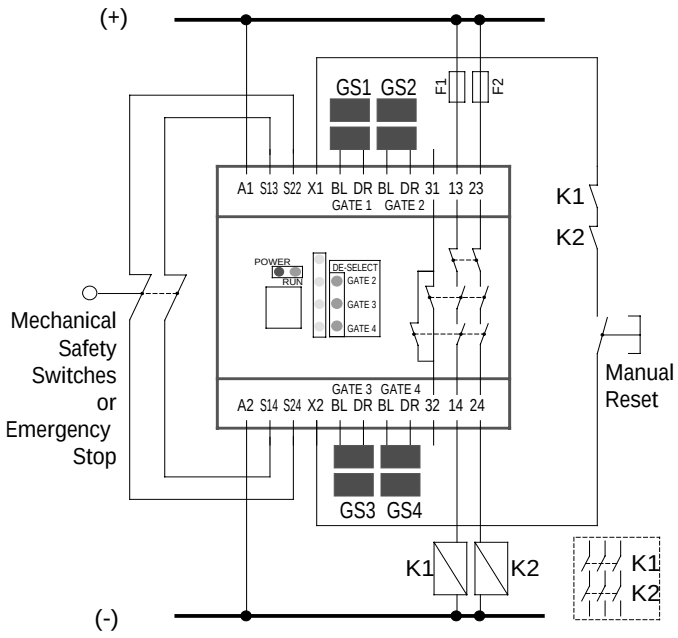
For more information, refer to the US regulations and standards (OSHA 29 CFR 1910.212 & 1910.217, ANSI B11.19 and ANSI/RIA R15.06).

■ Connection diagram:

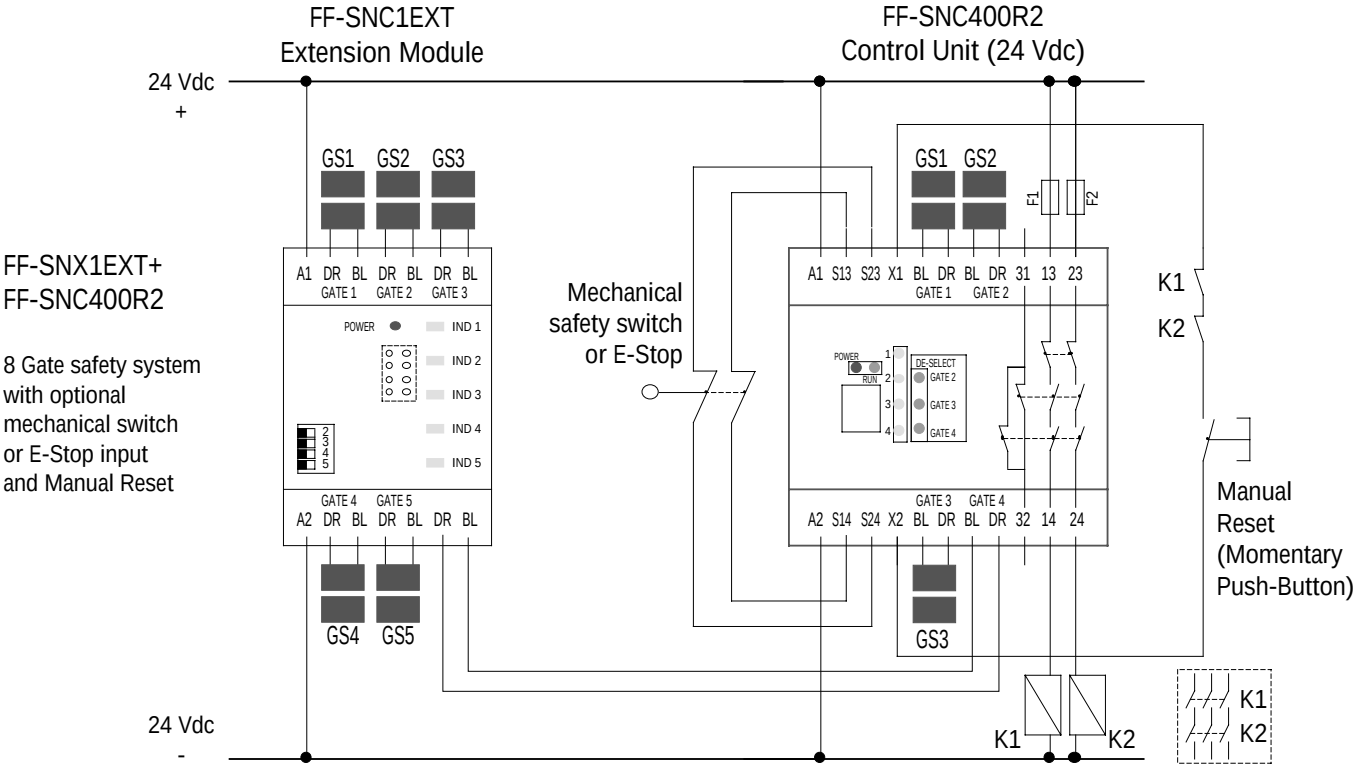
FF-SNC200R2 Control Unit
(Manual reset option)



FF-SNC400R2/FF-SNC400RE Control Unit
(Manual reset option)



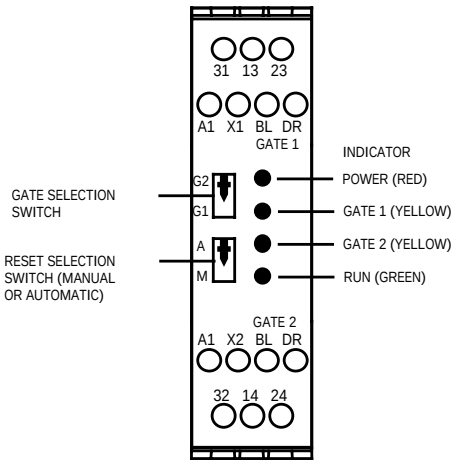
FF-SNC1EXT Extension Module
(can be used with FF-SNC400 or FF-SNC200 Series, 24 Vac/dc only)



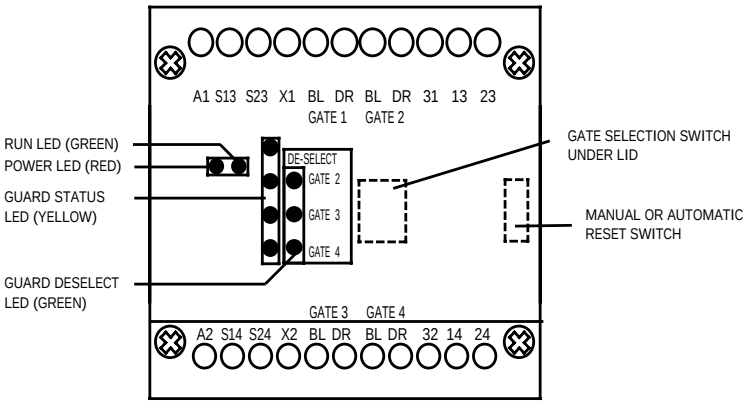
Up to 28 gates can be monitored using 6 extension modules with the FF-SNC400R2. The extension module can only be used with the 24 Vac/dc control units.

■ LED indicators:

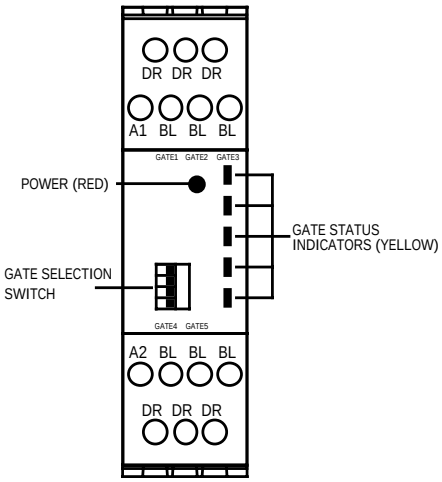
FF-SNC200R2 Control Unit



FF-SNC400R2/FF-SNC400RE Control Unit



FF-SNC1EXT Control Unit



■ Ordering information

Part number	Description	Weight
FF-SNC200R2	24 Vdc/Vac Control unit for monitoring up to 2 gates	Max. 183 g / 0.403 lb
FF-SNC400R2	24 Vdc/Vac Control unit for monitoring up to 4 gates	Max. 575 g / 1.26 lb
FF-SNC400RE	110 Vac Control unit for monitoring up to 4 gates	Max. 575 g / 1.26 lb
FF-SNC1EXT	Extension module	Max. 135 g / 0.297 lb
FF-SNC1SA03PA	Safety switch + actuator, 3 m / 9.84 ft cable, ABS housing	Max. 150 g / 0.330 lb
FF-SNC1SA05PA	Safety switch + actuator, 5 m / 16.40 ft cable, ABS housing	Max. 200 g / 0.441 lb
FF-SNC1SA03PS	Safety switch + actuator, 3 m / 9.84 ft cable, stainless steel 316 housing	Max. 250 g / 0.551 lb
FF-SNC1SA05PS	Safety switch + actuator, 5 m / 16.40 ft cable, stainless steel 316 housing	Max. 300 g / 0.662 lb
FF-SNC1SA05PA-QD	Safety switch + actuator + M8 cordset, 5 m / 16.40 ft cable, ABS housing	Max. 350 g / 0.771 lb
FF-SNC1SA05PS-QD	Safety switch + actuator + M8 cordset, 5 m / 16.40 ft cable, stainless steel 316 housing	Max. 450 g / 0.992 lb
FF-SNC1SA-050-CBL	Single core cable, 50 m/ 164 ft roll	Max. 1,5 kg / 3.307 lbs

Warranty and remedy

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application assistance, personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Sales and Service

Honeywell serves its customers through a worldwide network of sales offices and distributors. For application assistance,current specifications, pricing or name of the nearest Authorised Distributor, contact a nearby sales office or:

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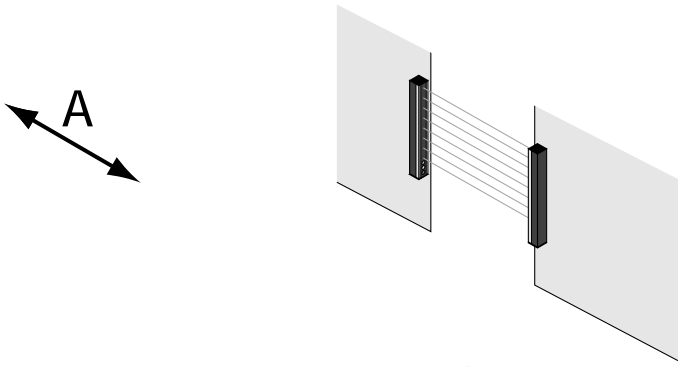
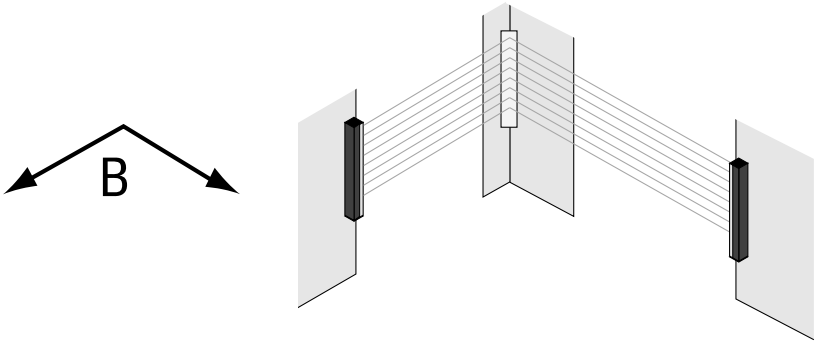
This section contains information about the Honeywell deflection mirrors which can be used with safety light curtains to perform the following perimeter protections:

Applications

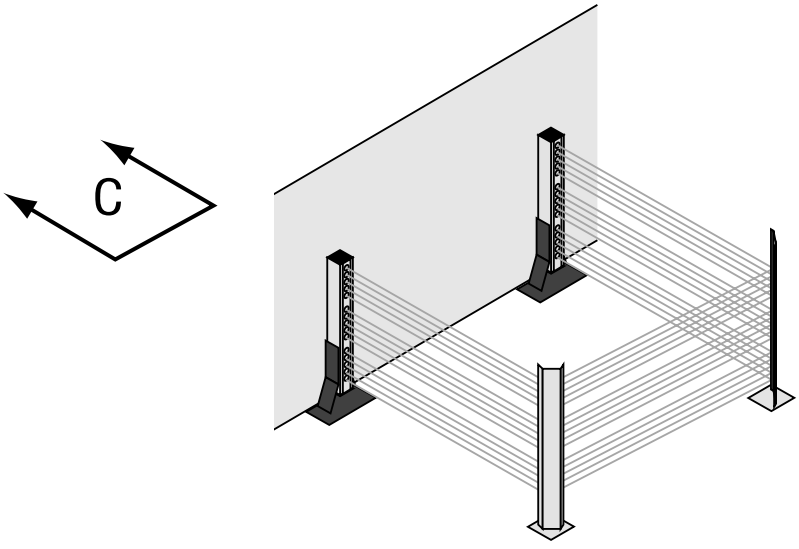
Without mirror



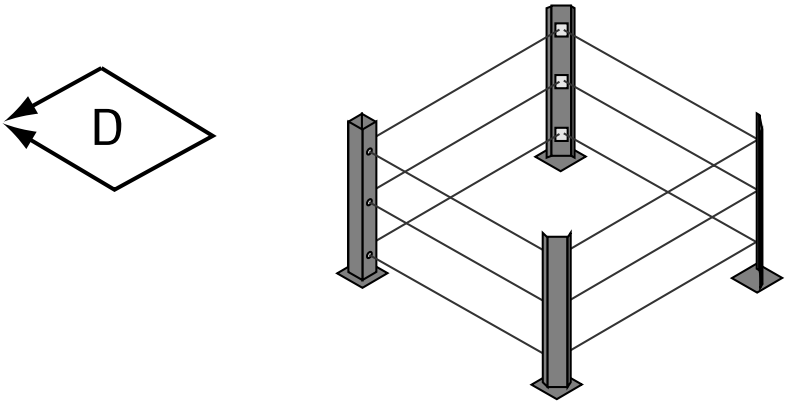
With 1 mirror



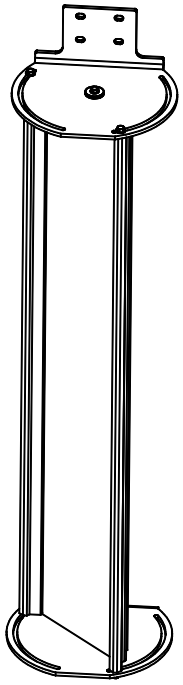
With 2 mirrors



With 3 mirrors

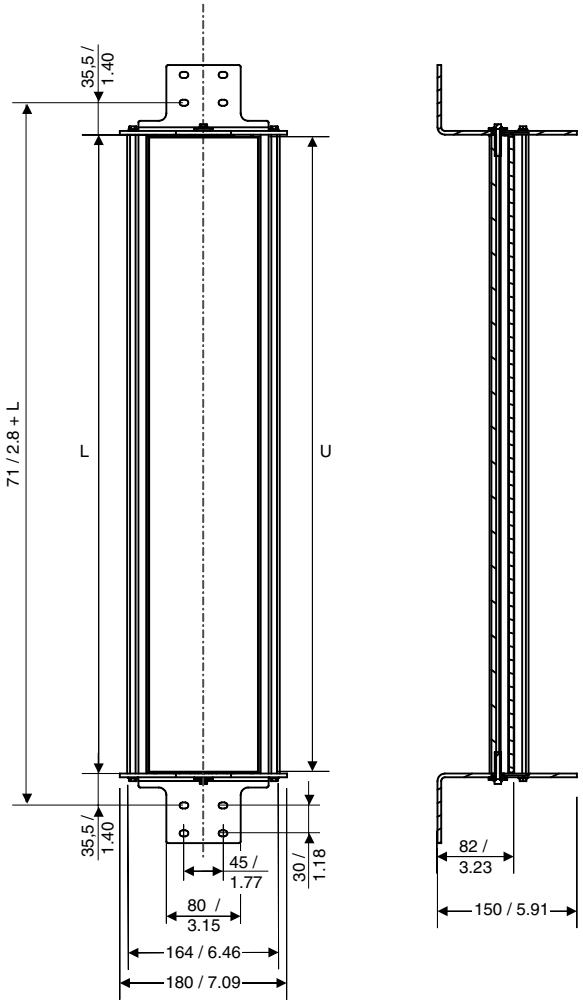


❑ Wall mounting deflection mirrors for FF-SB, FF-SY, FF-LS, FF-SG, FF-SLG, FF-SLC, Detector™3 :

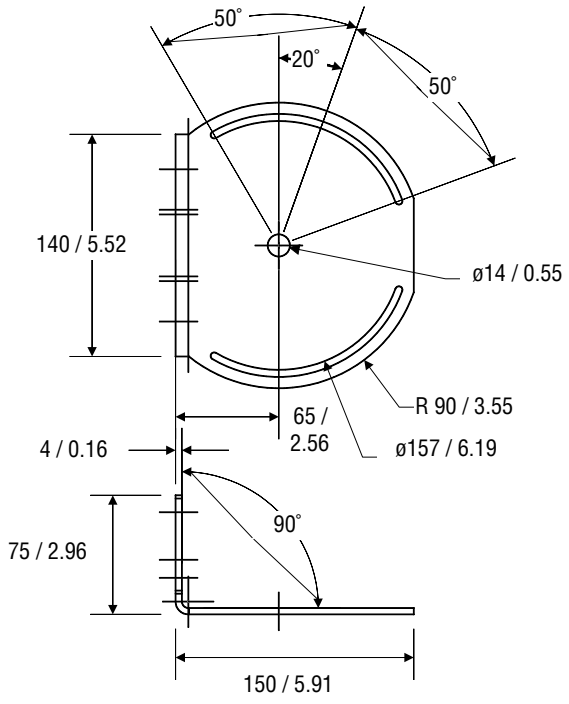


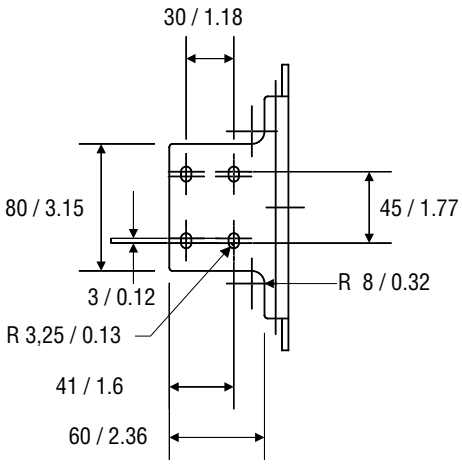
- Deflection mirrors (for arms and body detection).
- Design for perimetric protections with small resolution.
- Material: Aluminium alloy housing
  25% scanning range reduction: silver reflecting material laid on the back of an ordinary glass protected by a vernish.
  10% scanning range reduction: copper reflecting material laid on the back of a white glass protected by a vernish.
- Finish: anodized gold colour.
- Provided with 2 adjustable brackets for easy adjustment.

Dimensions mirror profile (mm/in)



Dimensions of the right-angle mounting brackets (mm/in)





Dimensions, weights and part numbers

Mirror type	Scanning range loss per mirror	Total height (mm/in) L	Reflecting surface (mm/in) U	Weight (kg/lbs)
FF-SYZMIR002 FF-SYZMIR102	10% 25%	282 / 11.1	272 / 10.7	4,4 / 9.70
FF-SYZMIR004 FF-SYZMIR104	10% 25%	485 / 19.11	475 / 17.7	6 / 13.23
FF-SYZMIR006 FF-SYZMIR106	10% 25%	688 / 27.11	678 / 26.7	7,5 / 16.53
FF-SYZMIR008 FF-SYZMIR108	10% 25%	893 / 35.18	883 / 34.8	8,9 / 19.62
FF-SYZMIR010 FF-SYZMIR110	10% 25%	1096 / 43.18	1086 / 42.8	10,5 / 23.15
FF-SYZMIR012 FF-SYZMIR112	10% 25%	1299 / 51.18	1289 / 50.8	13,6 / 29.98
FF-SYZMIR014 FF-SYZMIR114	10% 25%	1504 / 59.26	1494 / 58.9	15,2 / 33.51
FF-SYZMIR016 FF-SYZMIR116	10% 25%	1707 / 67.26	1697 / 66.9	17,1 / 37.70
FF-SYZMIR018 FF-SYZMIR118	10% 25%	1910 / 67.26	1900 / 74.9	18,8 / 41.45

Compatibility

Mirror type	Safety light curtain					
	FF-SB Series	FF-SY Series	FF-SG Series FF-SLG Series	FF-LS Series	FF-SLC Series	Detector 3™ Series
FF-SYZMIR❒02	FF-SB12E/R02-S2			FF-LS082802362 FF-LS16141962	FF-SLC35022	3LCE06
FF-SYZMIR❒04	FF-SB❑❑E/R04-S2❑	FF-SY❑❑❑032❑2	FF-SG❑❑031❑❑2 FF-SLG❑❑031❑❑2	FF-LS32143782	FF-SLC❑❑042	3LCE12
FF-SYZMIR❒06	FF-SB❑❑E/R06-S2❑	FF-SY❑❑❑048❑2	FF-SG❑❑050❑❑2 FF-SLG❑❑050❑❑2	FF-LS162804602 FF-LS48145612	FF-SLC❑❑062	3LCE18
FF-SYZMIR❒08	FF-SB❑❑E/R08-S2❑	FF-SY❑❑❑064❑2 FF-SY❑❑❑080❑2	FF-SG❑❑070❑❑2 FF-SLG❑❑070❑❑2	FF-LS242806842 FF-LS64147442	FF-SLC❑❑072 FF-SLC55082	3LCE24 3LCE30
FF-SYZMIR❒10	FF-SB❑❑E/R10-S2❑	FF-SY❑❑❑096❑2	FF-SG❑❑089❑❑2 FF-SLG❑❑089❑❑2	FF-LS322809082	FF-SLC❑❑092	3LCE36
FF-SYZMIR❒12	FF-SB❑❑E/R12-S2❑	FF-SY❑❑❑112❑2	FF-SG❑❑109❑❑2 FF-SLG❑❑109❑❑2	FF-LS402811322	FF-SLC❑❑112 FF-SLC35132 FF-SLC18132	3LCE42
FF-SYZMIR❒14	FF-SB❑❑E/R14-S2❑	FF-SY❑❑❑128❑2 FF-SY❑❑❑144❑2	FF-SG❑❑128❑❑2 FF-SLG❑❑128❑❑2 FF-SG❑❑147❑❑2 FF-SLG❑❑147❑❑2	FF-LS482813562	FF-SLC❑❑142 FF-SLC55132 FF-SLC55152	3LCE48
FF-SYZMIR❒16		FF-SY❑❑❑160❑2		FF-LS562815802	FF-SLC35162 FF-SLC55162	3LCE60
FF-SYZMIR❒18		FF-SY❑❑❑176❑2				3LCE72

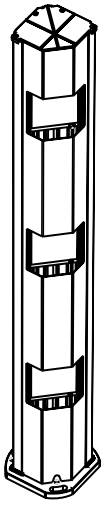
Scanning distance (in m / ft) using FF-SYZMIR1❒❒ (10 % loss per mirror)

Safety light curtain	Max. range without mirror (A)	Max. range with 1 mirror (B)	Max. range with 2 mirrors (C)	Max. range with 3 mirrors (D)
FF-SY❑14 FF-SB14 filtered	6 / 19.7	5,4 / 17.7	4,9 / 16	4,4 / 14.4
other FF-SY❑❑❑	20 / 65.6	18 / 59	16,2 / 53.1	14,6 / 47.8
FF-SG18, FF-SG30, FF-LS14, FF-LS30	3,5 / 11.5	3,2 / 10.5	2,8 / 9.2	2,6 / 8.5
FF-SLG18, FF-SLG30	4 / 13.12	3,6 / 11.8	3,2 / 10.5	2,9 / 9.51
FF-SB12, FF-SB14 standard	10 / 32.8	9 / 29.5	8,1 / 26.6	7,3 / 23.9
FF-SB14 long range, FF-SB15	24 / 78.8	21.6 / 70.9	19,4 / 63.8	17,5 / 57.4
FF-SLC35, FF-SLC55, FF-SLC18	12 / 39.4	10,8 / 35.5	9,7 / 31.9	8,7 / 28.7
Detector™ 3 standard range	7,6 / 25	6,8 / 18.7	6,2 / 20.3	5,5 / 18
Detector™ 3 long range	15,3 / 50	13,8 / 45.3	12,4 / 40.7	11,2 / 36.7

Scanning distance (in m / ft) using FF-SYZMIR1❒❒ (25 % loss per mirror)

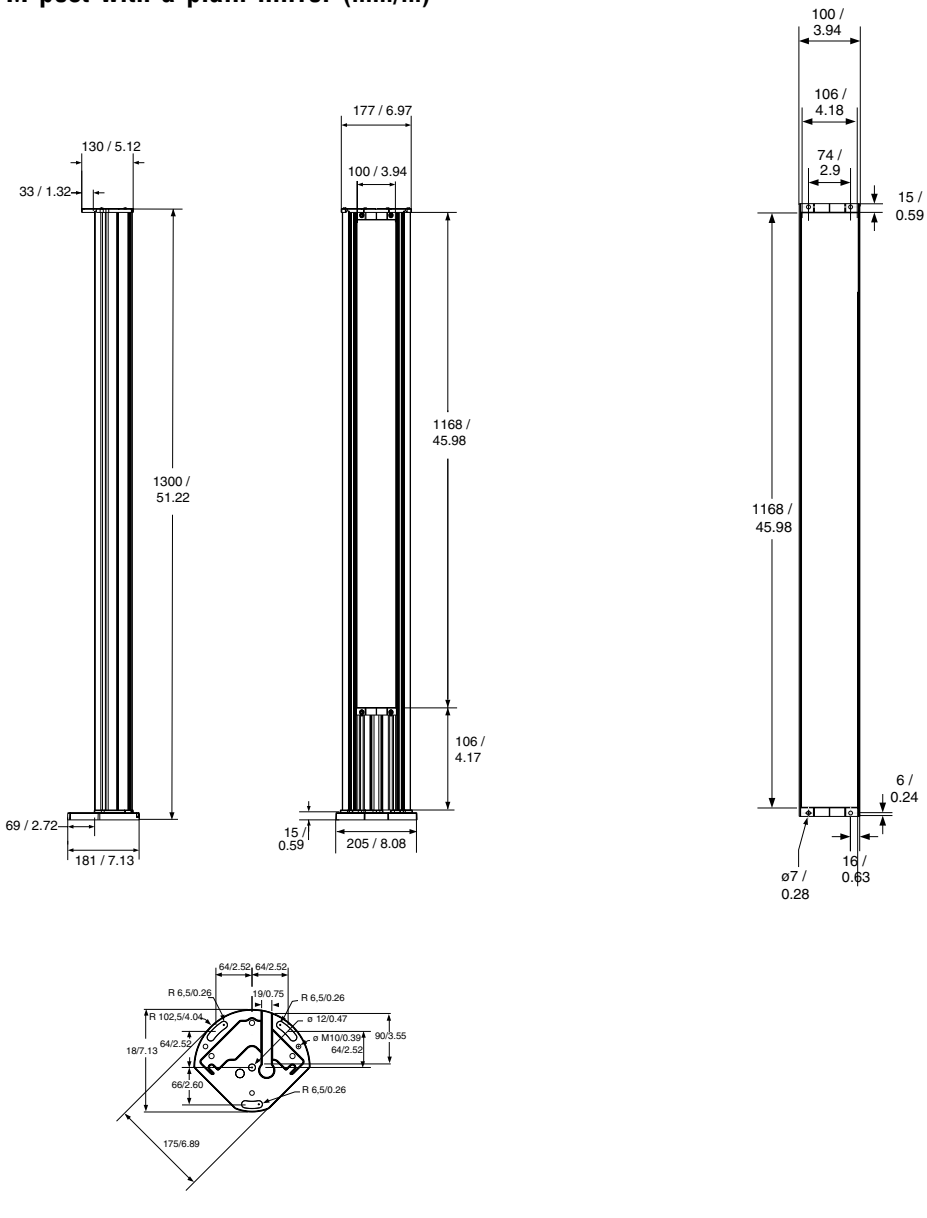
Safety light curtain	Max. range without mirror (A)	Max. range with 1 mirror (B)	Max. range with 2 mirrors (C)	Max. range with 3 mirrors (D)
FF-SY❑14 FF-SB14 filtered	6 / 19.7	4,5 / 14.8	3,4 / 11.1	2,5 / 8.3
Other FF-SY❑❑❑	20 / 65.6	15 / 49.2	11,3 / 36.9	8,4 / 27.7
FF-SG18, FF-SG30, FF-LS14, FF-LS30	3,5 / 11.5	2,6 / 8.6	2 / 6.5	1,5 / 4.8
FF-SLG18, FF-SLG30	4 / 13.12	3 / 9.8	2,3 / 7.6	1,7 / 5.6
FF-SB12, FF-SB14 standard	10 / 32.8	7,5 / 24.6	5,6 / 18.5	4,2 / 13.8
FF-SB14 long range, FF-SB15	24 / 78.8	18 / 59.1	13,5 / 44.3	10,1 / 33.2
FF-SLC35, FF-SLC55, FF-SLC18	12 / 39.4	9 / 29.5	6,8 / 22.1	5,1 / 16.6
Detector™ 3 standard range	7,6 / 25	5,7 / 18.7	4,3 / 14.1	3,2 / 10.5
Detector™ 3 long range	15,3 / 50	11,5 / 37.7	8,6 / 28.2	6,5 / 21.3

❑ Floor mounting deflection mirrors FF-SYZPF❑❑❑ for FF-SY, FF-SB, FF-SG, FF-SLG

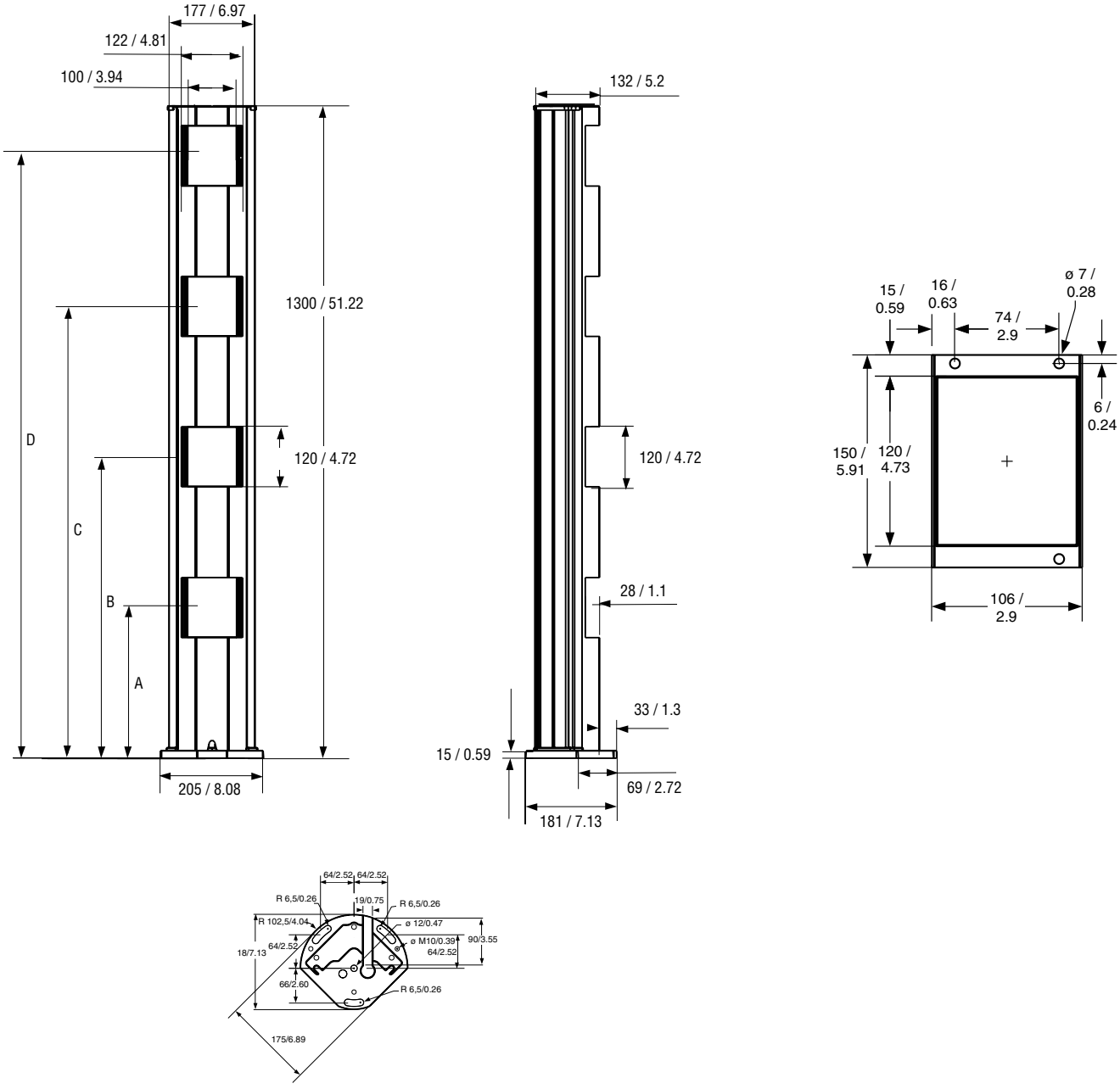


- Plain mirror or individual mirrors with mounting positions in compliance with European norm requirements for 2, 3 or 4 beams (EN 999).
- Mechanics designed for easy adjustment of vertical and angular positioning: due to its design, optical alignment of all the beams is achieved by adjusting the uppermost beam only.
- Material: Aluminium alloy housing
  10% scanning range reduction:
  25% scanning range reduction:
- Finish: RAL 1021 yellow paint

❑ FF-SYZPFM post with a plain mirror (mm/in)



❑ FF-SYZPF posts with individual mirrors



Beam heights, weights and part numbers

Part listings	Scanning range loss per mirror	Beam heights above the reference plane per EN 999 mm (A / B / C / D)	Beam heights above the reference plane per EN 999 in (A / B / C / D)	Weight (kg/lbs)
FF-SYZPF❑2 **FF-SYZPF12**	10% 25%	400 / 900	15.76 / 35.46	9,7 / 21.4
FF-SYZPF❑3 **FF-SYZPF13**	10% 25%	300 / 700 / 1100	11.82 / 27.58 / 43.34	10 / 22.1
FF-SYZPF❑4 **FF-SYZPF14**	10% 25%	300 / 600 / 900 / 1200	11.82 / 23.64 / 35.46 / 47.28	10,2 / 22.5
FF-SYZPFM01 **FF-SYZPFM11**	10% 25%	Lower beam: 106 Upper beam: 1168	Lower beam: 40.2 Upper beam: 46	11,1 / 24.4

Compatibility

	FF-SB Series	FF-SY❑ Series	FF-SG Series FF-SLG Series	FF-LS Series
FF-SYZPFM01 FF-SYZPFM11	FF-SB12E/R02 to 06 FF-SB14E/R04 to 10 FF-SB15E/R06 to 10	FF-SY❑14032 to 096 FF-SY❑30032 to 096 FF-SY❑60032 to 096 FF-SY❑02 to 04	FF-SG18031 to 070 FF-SG30031 to 109 FF-SLG18031 to 070 FF-SLG30031 to 109 FF-SLG02 to 04	FF-LS1614 to FF-LS6414 FF-LS0828 to FF-LS0832
FF-SYZPF02 FF-SYZPF12	Not applicable	FF-SY❑02	FF-SLG02	Not applicable
FF-SYZPF03 FF-SYZPF13	Not applicable	FF-SY❑03	FF-SLG03	Not applicable
FF-SYZPF04 FF-SYZPF14	Not applicable	FF-SY❑04	FF-SLG02 to 04	Not applicable

	FF-SLC Series	Detector 3™ Series	FF-SCAN Series	FF-SPS4 Series
FF-SYZPFM01 FF-SYZPFM11	FF-SLC3502 to FF-SLC3511 FF-SLC5504 to FF-SLC5509 FF-SLC1804 to FF-SLC1811	3LCE06 to 3LCE42	FF-SCAN2 to FF-SCAN8	FF-SPS4 (x2 to x4)
FF-SYZPF02 FF-SYZPF12	Not applicable	Not applicable	FF-SCAN2	FF-SPS4 (x2)
FF-SYZPF03 FF-SYZPF13	Not applicable	Not applicable	FF-SCAN3	FF-SPS4 (x3)
FF-SYZPF04 FF-SYZPF14	Not applicable	Not applicable	FF-SCAN4	FF-SPS4 (x4)

Scanning distance (in m/ft) using FF-SYZMIR0❑❑ (10% loss per mirror)

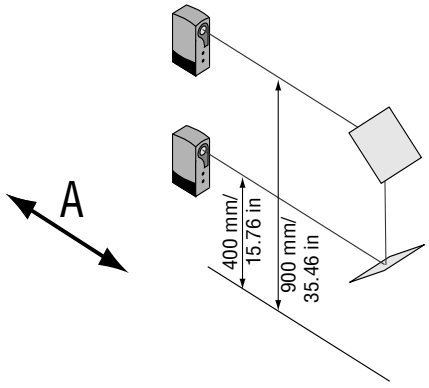
Safety light curtain	Max. range without mirror (A)	Max. range with 1 mirror (B)	Max. range with 2 mirrors (C)	Max. range with 3 mirrors (D)
FF-SY❑14 FF-SB14 filtered	6 / 19.7	5,4 / 17.7	4,9 / 16	4,4 / 14.4
Other FF-SY❑❑❑	20 / 65.6	18 / 59	16,2 / 53.1	14,6 / 47.8
FF-SG18, FF-SG30, FF-LS14, FF-LS30	3,5 / 11.5	3,2 / 10.5	2,8 / 9.2	2,6 / 8.5
FF-SLG18, FF-SLG30	4 / 13.12	3,6 / 11.8	3,2 / 10.5	2,9 / 9.51
FF-SB12, FF-SB14 standard	10 / 32.8	9 / 29.5	8,1 / 26.6	7,3 / 23.9
FF-SB14 long range FF-SB15	24 / 78.8	21,6 / 70.9	19,4 / 63.8	17,5 / 57.4
FF-SLC35, FF-SLC55 FF-SLC18	12 / 39.4	10,8 / 35.5	9,7 / 31.9	8,7 / 28.7
Detector 3™ standard range	7,6 / 25	6,8 / 22.3	6,2 / 20.3	5,5 / 18
Detector 3™ long range	15,3 / 50	13,8 / 45.3	12,4 / 40.7	11,2 / 36.7
FF-SCAN	25 / 82.1	22,5 / 73.9	20,3 / 66.5	18,2 / 59.8
FF-SCAN long range	33 / 108,3	29,7 . 97.5	26,7 / 87.7	24,1 / 79
FF-SPS4	40 / 131.3	36 / 118.2	32,4 / 106.3	29,2 / 95.7
FF-SPS4 long range	75 / 246,1	67,5 / 221.5	60,8 / 199.4	54,7 / 179.4

Scanning distance (in m/ft) using FF-SYZMIR0❑❑ (25% loss per mirror)

Safety light curtain	Max. range without mirror (A)	Max. range with 1 mirror (B)	Max. range with 2 mirrors (C)	Max. range with 3 mirrors (D)
FF-SY❑14 FF-SB14 filtered	6 / 19.7	4,5 / 14.8	3,4 / 11.1	2,5 / 8.3
Other FF-SY❑❑❑	20 / 65.6	15 / 49.2	11,3 / 36.9	8,4 / 27.7
FF-SG18, FF-SG30, FF-LS14, FF-LS30	3,5 / 11.5	2,6 / 8.6	2 / 6.5	1,5 / 4.8
FF-SLG18, FF-SLG30	4 / 13.12	3 / 9.8	2,3 / 7.6	1,7 / 5.6
FF-SB12, FF-SB14 standard	10 / 32.8	7,5 / 24.6	5,6 / 18.5	4,2 / 13.8
FF-SB14 long range FF-SB15	24 / 78.8	18 / 59.1	13,5 / 44.3	10,1 / 33.2
FF-SLC35, FF-SLC55 FF-SLC18	12 / 39.4	9 / 29.5	6,8 / 22.1	5,1 / 16.6
Detector 3™ standard range	7,6 / 25	5,7 / 18.7	4,3 / 14.1	3,2 / 10.5
Detector 3™ long range	15,3 / 50	11,5 / 37.7	8,6 / 28.2	6,5 / 21.3
FF-SCAN	25 / 82.1	18,8 / 61.6	14,1 / 46.2	10,5 / 34.7
FF-SCAN long range	33 / 108,3	24,8 / 81.3	18,6 / 61	13,9 / 45.7
FF-SPS4	40 / 131.3	30 / 98.5	22,5 / 73.9	16,9 / 55.4
FF-SPS4 long range	75 / 246,1	56,3 / 184.6	42,2 / 138.5	31,6 / 103.9

Applications

With 2 individual mirrors



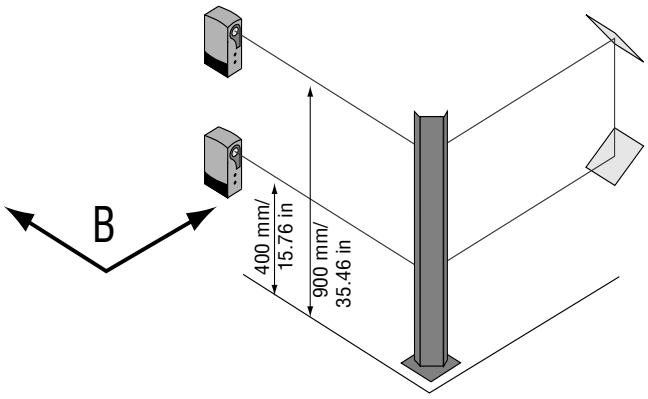
Perimeter A
Mirrors

FF-SPZ01MIR or FF-MSK2	**FF-SPS44❑❑❑**	**FF-SPS47❑❑❑**
	16 / 52.3	30,1 / 98.8
	FF-SCAN❑18	**FF-SCAN❑18❑L**
	9,9 / 32.4	13,1 / 43
FF-SPZ11MIR	**FF-SPS44❑❑❑**	**FF-SPS47❑❑❑**
	11 / 36.1	20,8 / 68.3
	FF-SCAN❑18	**FF-SCAN❑18❑L**
	6,8 / 22.2	9 / 29.6

Dimensions in m / ft

Also refer to the access detection systems FF-SPZ12MIR post.

With 1 floor mounting mirror and 2 individual mirrors



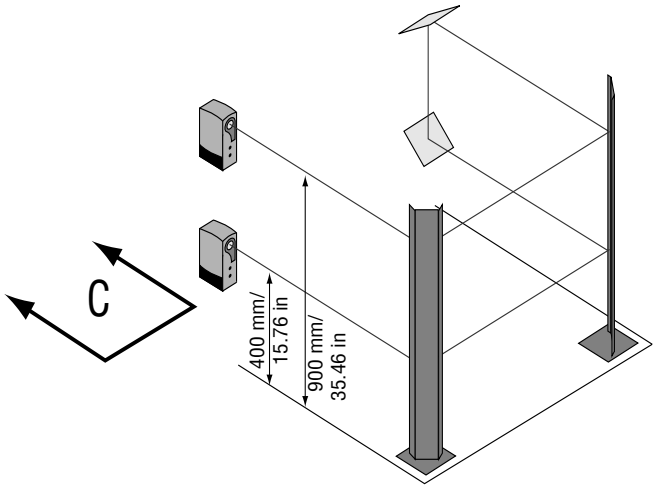
Perimeter B
Mirrors

FF-SPZ01MIR or FF-MSK2 (x2) and FF-SCZ02MIR (x1)	**FF-SPS44❑❑❑**	**FF-SPS47❑❑❑**
	12,9 / 42.2	24,4 / 79.8
	FF-SCAN❑18	**FF-SCAN❑18❑L**
	8 / 26.1	10,6 / 34.7
FF-SPZ11MIR (x2) and FF-SCZ02MIR (x1)	**FF-SPS44❑❑❑**	**FF-SPS47❑❑❑**
	8,9 / 29.1	16,8 / 55.2
	FF-SCAN❑18	**FF-SCAN❑18❑L**
	5,4 / 17.9	7,3 / 23.8

Dimensions in m / ft

Also refer to the access detection systems FF-SPZ12MIR post.

With 2 floor mounting mirrors and 2 individual mirrors



Perimeter C
Mirrors

FF-SPZ01MIR or FF-MSK2 (x2) and FF-SCZ02MIR (x2)	**FF-SPS44❑❑❑**	**FF-SPS47❑❑❑**
	10,4 / 34	19,7 / 64.5
	FF-SCAN❑18	**FF-SCAN❑18❑L**
	6,4 / 21	8,5 / 27.9
FF-SPZ11MIR (x2) and FF-SCZ02MIR (x2)	**FF-SPS44❑❑❑**	**FF-SPS47❑❑❑**
	7,1 / 23.4	13,6 / 44.6
	FF-SCAN❑18	**FF-SCAN❑18❑L**
	4,4 / 14.3	5,8 / 19.1

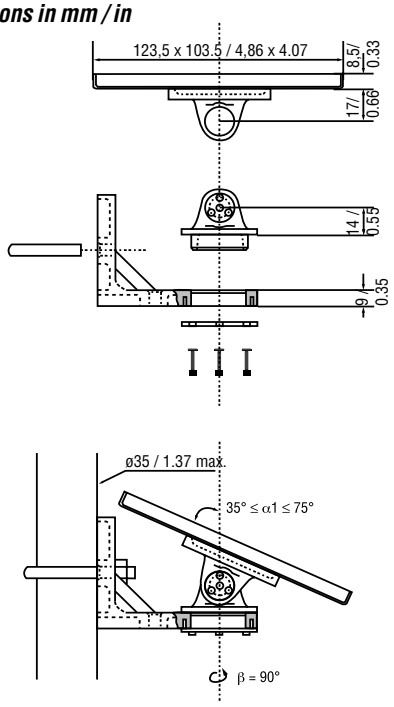
Dimensions in m / ft

Also refer to the access detection systems FF-SPZ12MIR post.

Note: The use of deflection mirrors is not recommended with the lens heating model FF-SPS42❑❑❑.

Individual and adjustable mirrors FF-SPZ❑❑MIR for FF-SCAN and FF-SPS4

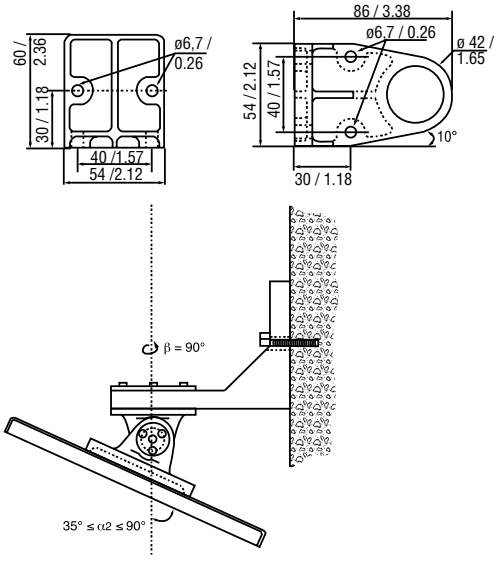
Dimensions in mm / in



Note: -35° ≤ α1 ≤ 35° if ß = 0° or 180°

The adjustable mirror is mounted on a pivoting base which can be fixed on a wall or on a ø35 mm/1.37 in. tube with a clamping ring.

Each mirror is delivered with a target drawn on an adhesive paper (the electrostatic process guarantees the cleanliness of the mirror). This target eases quick infrared beam alignment.



Note: -45° ≤ α2 ≤ 45° if ß = 0° or 180°

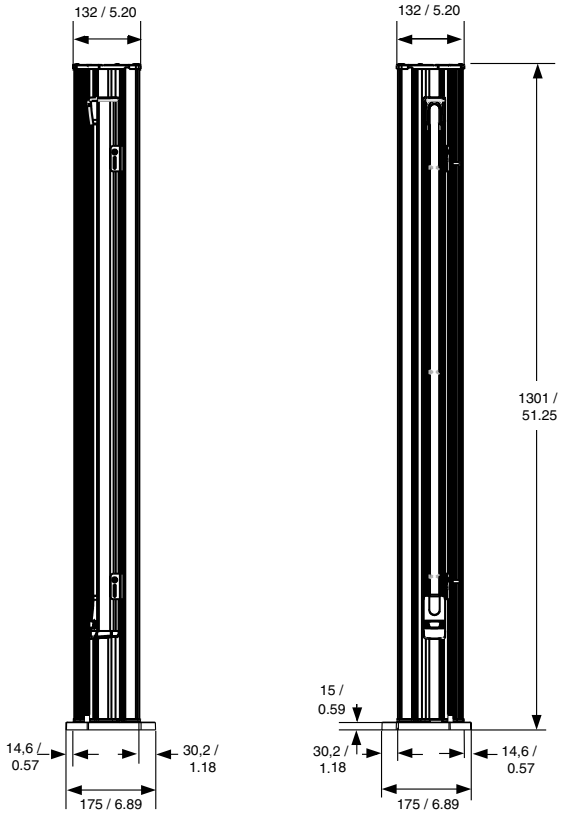
Mirror listings	Scanning range attenuations	Material
FF-SPZ01MIR	10 % per mirror	Aluminium alloy housing
FF-SPZ11MIR	25 % per mirror	Aluminium alloy housing

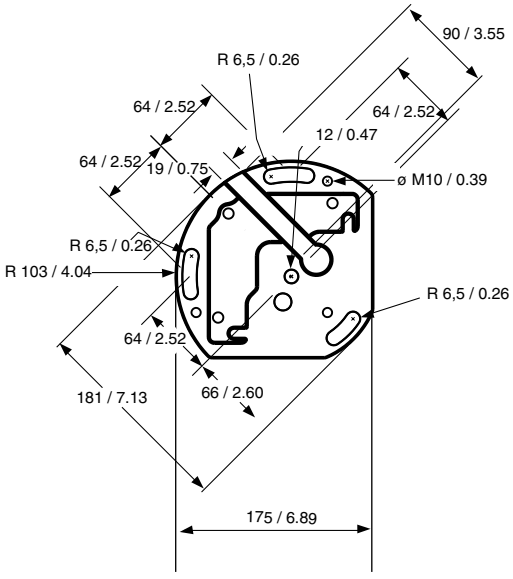
FLOOR MOUNTING POST FOR SAFETY LIGHT CURTAINS - FF-SYZPF

❑ Floor mounting post for FF-SY❑, FF-SG, FF-SLG safety light curtains

- Designed for vertical installation of a safety light curtain with protection heights of up to 1100 mm (43.30 in)
- T-slot mounting system allowing quick installation and easy height adjustment
- Material: Aluminium alloy housing
- Use of straight connectors recommended

Dimensions (mm/in)

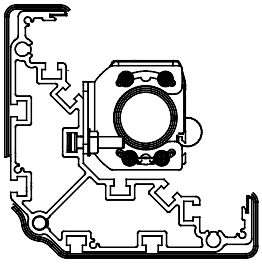
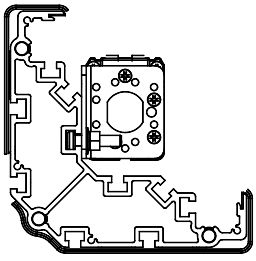
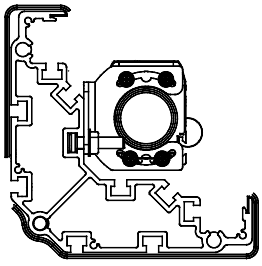
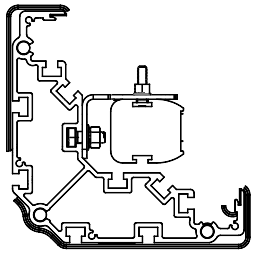




Compatibility

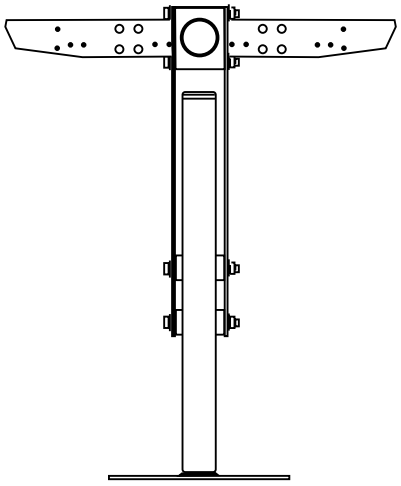
NOTICE

Use of straight connectors is necessary when installing the safety light curtain on the FF-SYZPF fixed floor mounting post (see product datasheet).

	FF-SY❑14/30/50/60 Series (finger/hand/ arm detection)	FF-SG18/30 Series FF-SLG18/30 Series (finger & hand detection)	FF-SY❑234 Series (body detection)	FF-SLG234 Series (body detection)
FF-SYZPF	FF-SYA14032 to 096 FF-SYA30032 to 096 FF-SYA60032 to 096 FF-SYA02 to 04	FF-SG18031 to 070 FF-SG30031 to 109 FF-SLG18031 to 070 FF-SLG30031 to 109	FF-SYA02 to 04	FF-SLG02 to 04
Recommended bracket kits	FF-SYZ634178 (delivered with the safety light curtain)	FF-SGZ001002 (to be ordered separately)	FF-SYZ634178 (delivered with the safety light curtain)	FF-SLGZ634178) (to be ordered separately)
Front cover	Not available	Not available	FF-SYZ630184-2 (2-beam) FF-SYZ630184-3 (3-beam) FF-SYZ630184-4 (4-beam)	FF-SYZ630184-2 (2-beam) FF-SYZ630184-3 (3-beam) FF-SYZ630184-4 (4-beam)
Mounting top view				

ADJUSTABLE FLOOR MOUNTING POST FOR FF-SB, FF-SYA, FF-SG & FF-SLG

❑ Adjustable floor standing post



- Designed for horizontal, vertical or inclined installation of a safety light curtain
- Allows quick installation and easy alignment
- 360° rotating arm with adjustments in azimuth directions (± 11°)
- Installation heights from 63,5 mm (2,5 in) up to 1100 mm (43.31 in).

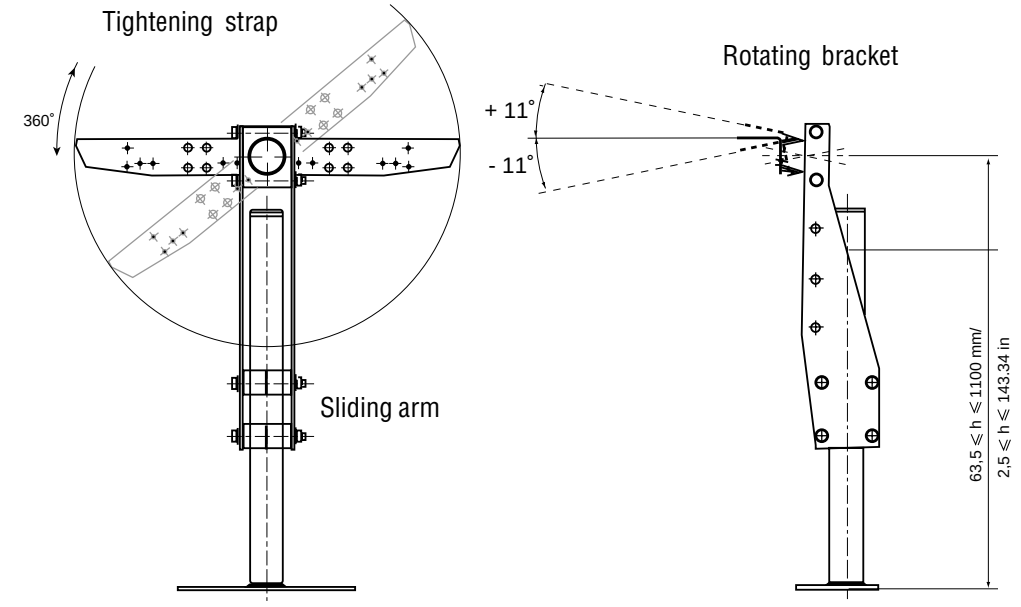
⚠ WARNING

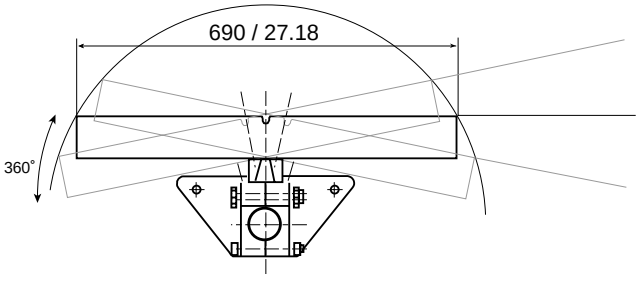
IMPROPER USE OF THE FF-SYZPA FLOOR MOUNTING POST

- Do NOT use the FF-SYZPA adjustable floor mounting post for horizontal or inclined installation of the following access detection systems: FF-SY❑234, FF-SLG234, FF-SB15.
- Prefer the FF-SYZPF fixed floor mounting post for installing vertically the FF-SY❑234 or FF-SLG234 access detection systems.

Failure to comply with these instructions could result in death or serious injury.

Dimensions (mm/in)

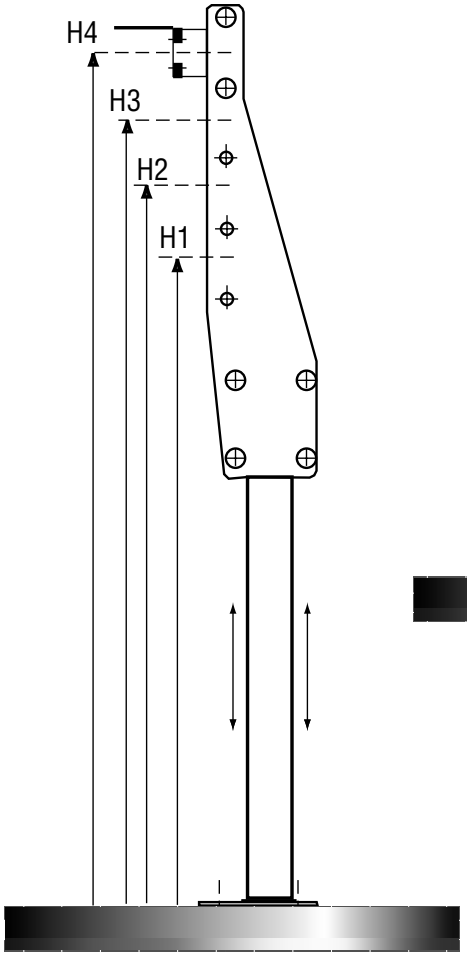




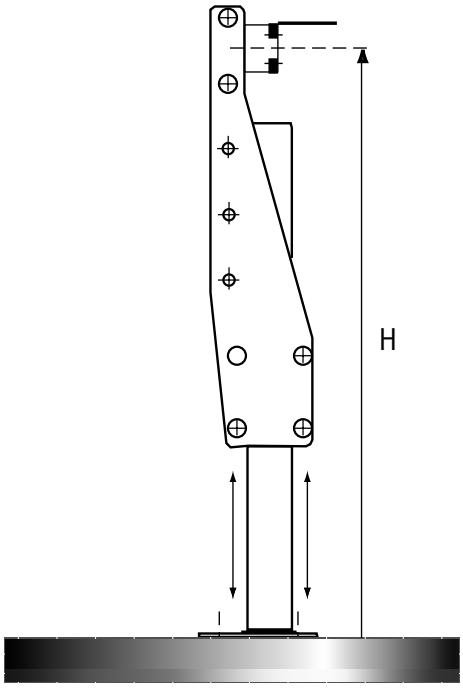
Recommended brackets

	FF-SB Series	FF-SY❑ Series	FF-SG18/30 Series FF-SLG18/30 Series	FF-SLG234 Series
Recommended bracket kits	FF-SBZS5000 (to be ordered separately)	FF-SGZ001001 (delivered with the safety light curtain)	FF-SGZ001001 (delivered with the safety light curtain)	FF-SGZ001001 (delivered with the safety light curtain)

Installation heights (mm/in)

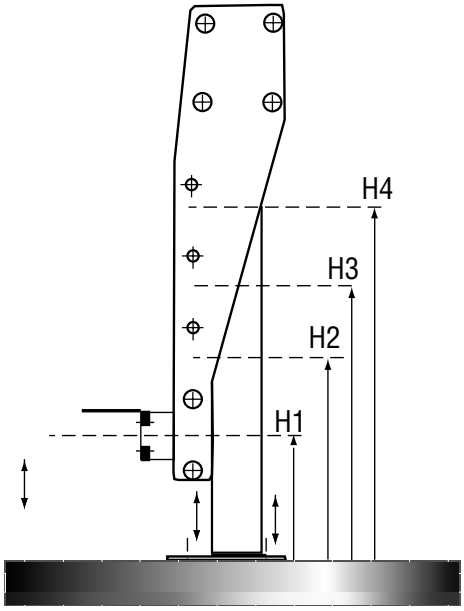


Backward/upper position



Hmin. = 770 mm (30.31 in)
Hmax. = 1100 (43.31 in)

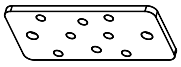
Forward/upper position



Forward/lower position

H min. / max.	Lower position	Upper position
H4	333,5 mm / 425,5 mm [13.13 in / 16.75 in]	546,5 mm / 1100 mm [21.51 in / 43.31 in]
H3	243,5 mm / 335,5 mm [9.58 in / 13.21 in]	456,5 mm / 1010 mm [17.97 in / 39.76 in]
H2	153,5 mm / 245,5 mm [6.04 in / 9.66 in]	366,5 mm / 920 mm [14.43 in / 36.22 in]
H1	63,5 mm / 155,5 mm [2.5 in / 6.12 in]	276,5 mm / 830 mm [10.88 in / 32.68 in]

FF-SYZAD
Anti-vibration kit
Kit of 2 straight brackets and 4 anti-vibration dampers (mounting hardware included) - to substitute for the standard brackets delivered with the FF-SY❑ or FF-SG❑ light curtain.


(x 2)


(x 4 - M6)


(x 4 - M5)


(x 8 - M6)


(x 4 - M5)

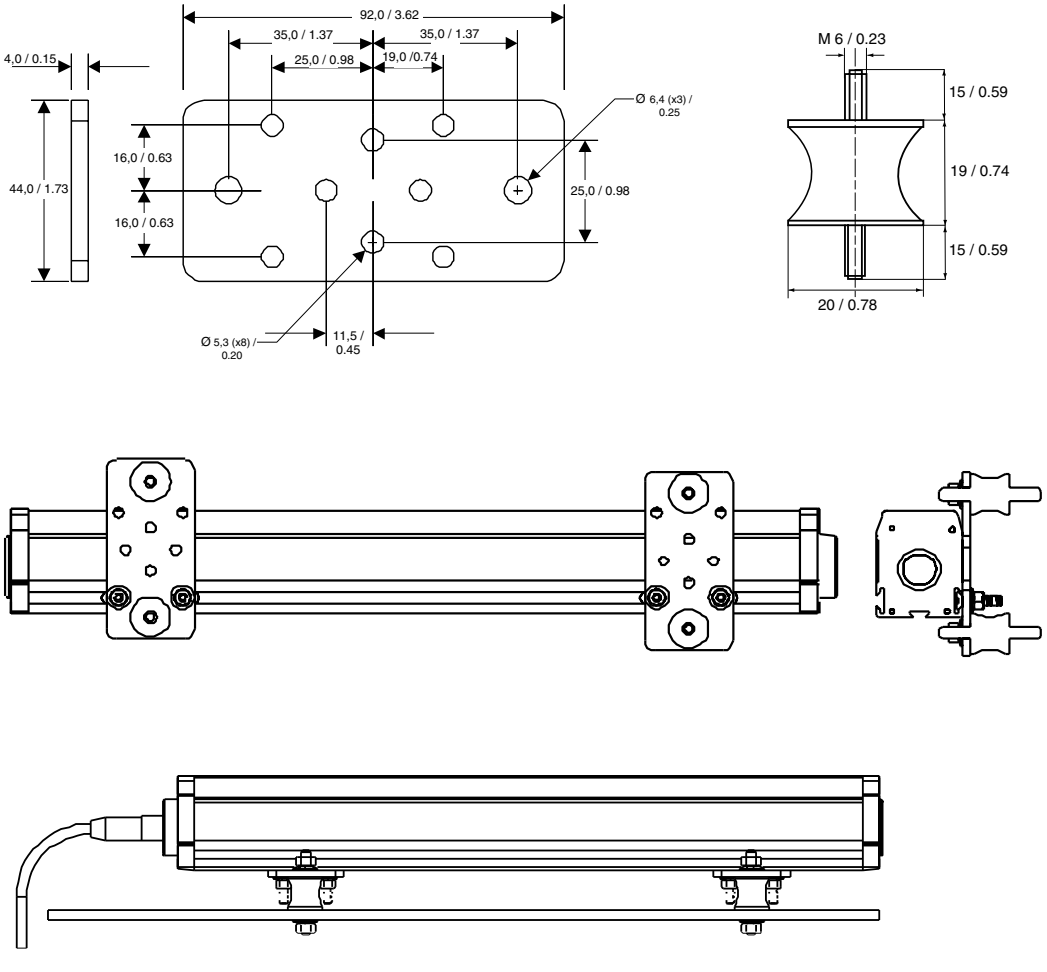

(x 8 - M6 Riplock)


(x 4 - M5 Riplock)

NOTICE

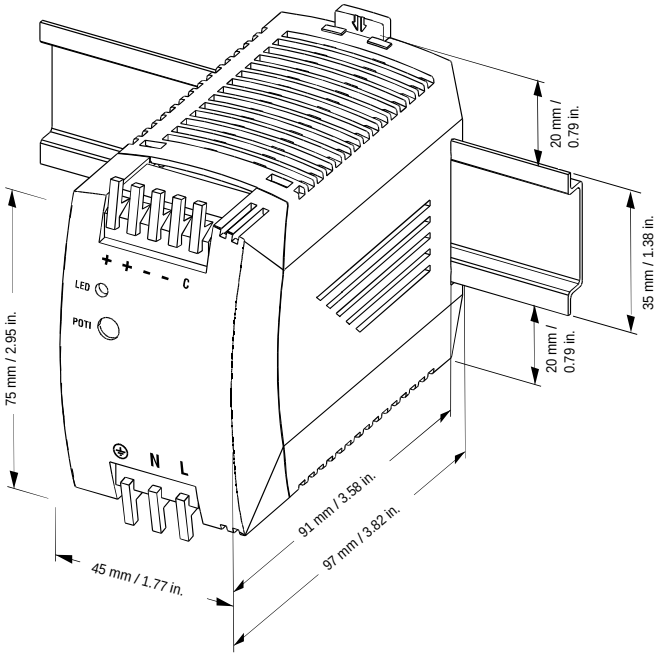
PROTECTION AGAINST HIGH VIBRATION
In case of high vibration, order:
- 2 sets of FF-SYZAD kit for light curtain systems with protection height below 1000 mm/39.4 in.
- 3 sets of FF-SYZAD kit for light curtain systems with protection height greater or equal to 1000 mm/39.4 in, but less than 1850 mm/72.8in.
- 4 sets of FF-SYZAD kit for light curtain systems with protection height greater than 1850 mm/72.8 in.

Dimensions (mm/in)



Rear mount

ac to dc power supply



FF-SXZPWR050

- Worldwide approvals: UL508 listed, UL1950, cUL/CSA-C22.2 No.950-M90), EN/IEC 60 950, EN 50178 (Class 2 Rated for low power installations).
- Input voltage: 85-264 Vac (43-67 Hz).
- Output voltage: 24-28 Vdc adjustable.
- Rated continuous load (at 60 °C/140 °F max.): 2,1 A @ 24 Vdc / 1,8A @ 28 Vdc.
- No external fuse required (the unit provides T3A internal fuse - not accessible).
- Special industrial overload design: the unit does not switch off at overload but delivers up to 1,5 time nominal current at reduced voltage.
- dc signal output and LED indicator (ON when output voltage exceeds 20 V ±4 %).
- Hold up time: >17 ms @ 100 Vac or >170 ms @ 230 Vac.
- Sealing: IP 20 (EN 60529), Protection class 1 (IEC 536).
- Operational temperature range: -10 ° to +70 °C (14 °F to 158 °F); storage temperature: -25 °C to 85°C (-13 °F to 185 °F).
- DIN rail mounting.
- Connection by spring clamp terminals with integrated lever for wire fixing (2 terminals per outputs).
- Weight: 240 g / 0.52 lbs

UL 508

UL 1950

cUL/ CSA-C22.2

89/336/EC EMC & 73/23/EC Low Voltage Directives

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as system installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

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