

FF-ST2 Series

Type 2 Safety Light Curtains for Industrial Machine Safeguarding



Features

- Type 2 per IEC61496-1/2, SIL2 per IEC61508
- Resolutions: 18, 30 or 80 mm
- Protection heights: 200...1400 mm (18 mm resolution) or 200...1800 mm (30 and 80 mm resolutions)
- Scanning ranges: 0.25...10 m
- Longer cable length achieved through patented unique solid state safety OSSD outputs
- M12 / 5 pole plugs
- Fast response times achieved through Asic technology
- Sturdy design through metal housing and reduced window size
- Optimized overall size with reduced inactive zones
- Function packages:

Models	External Device monitoring (EDM)	Automatic restart (AUTO)	Restart interlock (RES)
FF-ST2 Standard A	✓	✓	-
FF-ST2 Standard M	✓	-	✓

The FF-ST2 Series is designed for hazardous point-of-operation or access detection industrial machine safeguarding applications.

Its enhanced output stage design grants 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 more a constraint.

The Asic technology used grants 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 shorten safety distances and reduce machine overall size.

The FF-ST2 is designed for harsh duty applications thanks to a sturdy metal housing (including zamak end caps) and thanks to a small window size for a reduced exposure to the environment.

Applications

- Automotive plant floor industry
- Food & beverage industry
- Handling industry
- Machine tool industry
- Packaging industry
- Paper industry
- Special machine

WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalog) 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.

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.

FF-ST2 Series, Type 2 safety light curtains

- **Sturdy design**
- **Longer cable length**
- **Fast response times**
- **M12 / 5 pole plugs**

Specifications

OPERATING CHARACTERISTICS

Resolution (min. object detection size, mm)	18, 30, 80
Nominal scanning range (m)	0.25...10
Angle of divergence	max. $\pm 5^\circ$ above 3 m (as per IEC/EN 61496-2)
Emitting light source	infrared, pulsed, 880 nm

ELECTRICAL CHARACTERISTICS

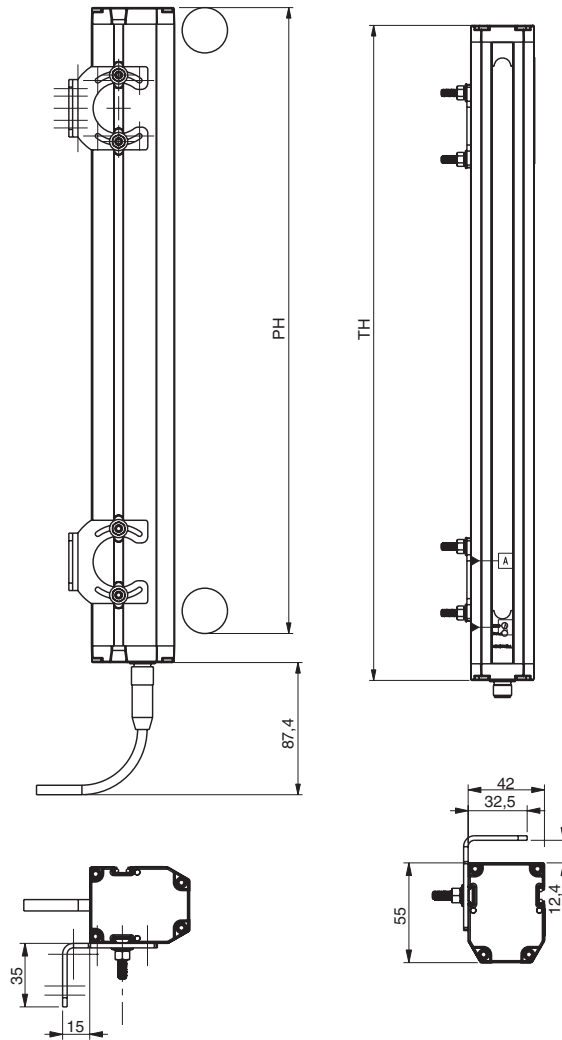
Power supply

Supply voltage	24 Vdc ($\pm 20\%$) for the emitter and the receiver
Power consumption	5 W max. for the emitter, 5 W max. for the receiver

Safety outputs (OSSD)

Output type	2 safety solid state outputs, push-pull / PNP type with Normally Open characteristics
Response time	see dimension drawing
Switching capability	350 mA max. at 24 Vdc
Restart time after power up	> 1s (automatic mode)
Restart time after beam release	80 ms (without EDM), 150 ms (with EDM)
Leakage current	0.25 mA
Loads impedance	70 Ω min. / 5 k Ω max.
Voltage drop	< 2.3 Vdc
Loads turn-on voltage	5 V min. on resistive loads / 7 V min. on inductive loads
Test pulse width / recurrence	2 pulses (width 200 μ s and 75 μ s), separated by 300 μ s, 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)
Inputs	
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 (comply with IEC 61131-2, for type 2 sensors)
Input current (high/low)	20 mA / 10 mA at 24 Vdc
Max. voltage	29 Vdc

Dimensions



Housing: aluminium alloy

End caps: zamak

Window: PMMA (Polymethylmethacrylate)

FF-ST2X□□XM2	02	03	04	05	06	07	08	09	10	12	14	16	18
Protection heights PH (mm)													
18 mm resolution	210	306	402	498	594	690	786	882	978	1170	1362	NA	NA
30 & 80 mm resolution	222	318	414	510	606	702	798	894	990	1182	1374	1566	1758
Total heights TH (mm)	242	338	434	530	626	722	818	914	1010	1202	1394	1586	1778
Response times (ms)													
18 mm resolution	11	12	12.5	13	14	14.5	15.5	16	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

Ordering Information

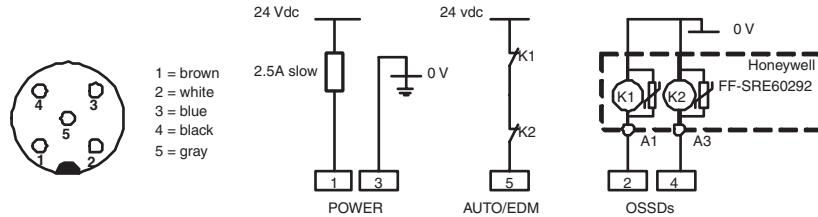
FF-ST2 Standard A

Features overview

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



Part numbers

(see accessories section for mounting kits, connectors, power supply and relay modules)

Finger detection

Resolution 18 mm, scanning range 0...10 m	
Protective height (mm)	Part number
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...10 m		Resolution 80 mm, scanning range 0...10 m	
Protective height (mm)	Part number	Protective height (mm)	Part number
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

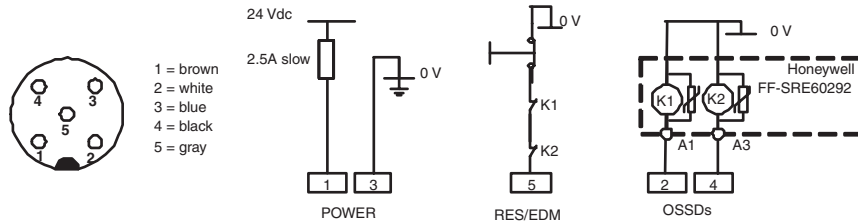
FF-ST2 Standard M

Features overview

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), negating the need for a dedicated interface module.

Receiver wiring diagram



Part numbers

(see accessories section for mounting kits, connectors, power supply and relay modules)

Finger detection

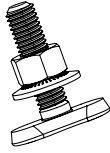
Resolution 18 mm, scanning range 0...10 m	
Protective height (mm)	Part number
200	FF-ST2B02BM2
300	FF-ST2B03BM2
400	FF-ST2B04BM2
500	FF-ST2B05BM2
600	FF-ST2B06BM2
700	FF-ST2B07BM2
800	FF-ST2B08BM2
1000	FF-ST2B10BM2
1200	FF-ST2B12BM2
1400	FF-ST2B14BM2

Hand, limb or body detection

Resolution 30 mm, scanning range 0...10 m		Resolution 80 mm, scanning range 0...10 m	
Protective height (mm)	Part number	Protective height (mm)	Part number
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

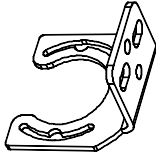
Accessories

FF-SGZ001001



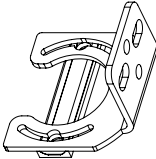
Basic mounting kit (order 2 kits for a complete set of emitter and receiver)
includes two M5 dovetail shape bolts, two M5 nuts and two rip-lock washers.
(already included in the FF-ST package)

FF-SYZ634178



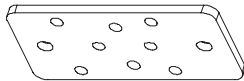
Right angle bracket kit (order 2 kits for a complete set of emitter and receiver)
includes two right angle brackets with four sets of M5 bolts, nuts and washers.

FF-SYZ634189



Adjustable bracket kit (order 2 kits for a complete set of emitter and receiver)
includes two right angle brackets with four sets of M5 bolts, nuts and washers. Allows adjustments in azimuth directions of $\pm 4^\circ$ with front access of the adjusting screws.

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-ST 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
- 3 sets of FF-SYZAD kit for light curtain systems with protection height greater or equal to 1000 mm, but less than 1800 mm.
- 4 sets of FF-SYZAD kit for light curtain systems with protection height equal to 1800 mm.

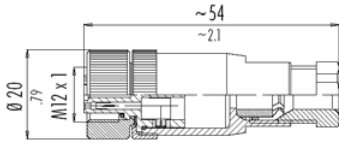
FF-SXZCAM



M12 single-ended cordsets, female, 5-pin

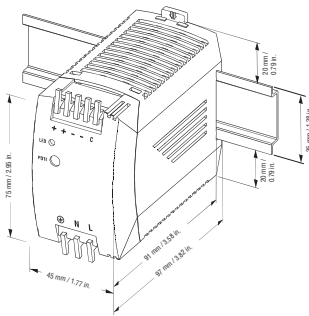
FF-SXZCAM125U02-S	2 m length, straight
FF-SXZCAM125U05-S	5 m length, straight
FF-SXZCAM125U05-90S	5 m length, right angle
FF-SXZCAM125U10-S	10 m length, straight
FF-SXZCAM125U10-90S	10 m length, right angle

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: 85-264 Vac (43-67 Hz)
- Output voltage: 24-28 Vdc adjustable
- Rated continuous load (at 60°C/140°F max.): 2.1 A @ 24 Vdc / 1.8 A @ 28 Vdc
- Power: 50 W
- Dimensions: 75 mm x 45 mm x 97 mm
- DIN rail mounting
- Weight: 240 g

FF-SRE



Expansion relay modules for the FF-ST2 Standard A and Standard M models

FF-SRE60292 22.5 mm width, 4 NO/2NC safety relay outputs

FF-SRE30812 90 mm width, 7NO/1NC safety relay outputs

See separate product data sheet for detailed information

FF-SRM200P2



Muting module

- 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

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 found 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:

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