



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.

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

⚠ 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.

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

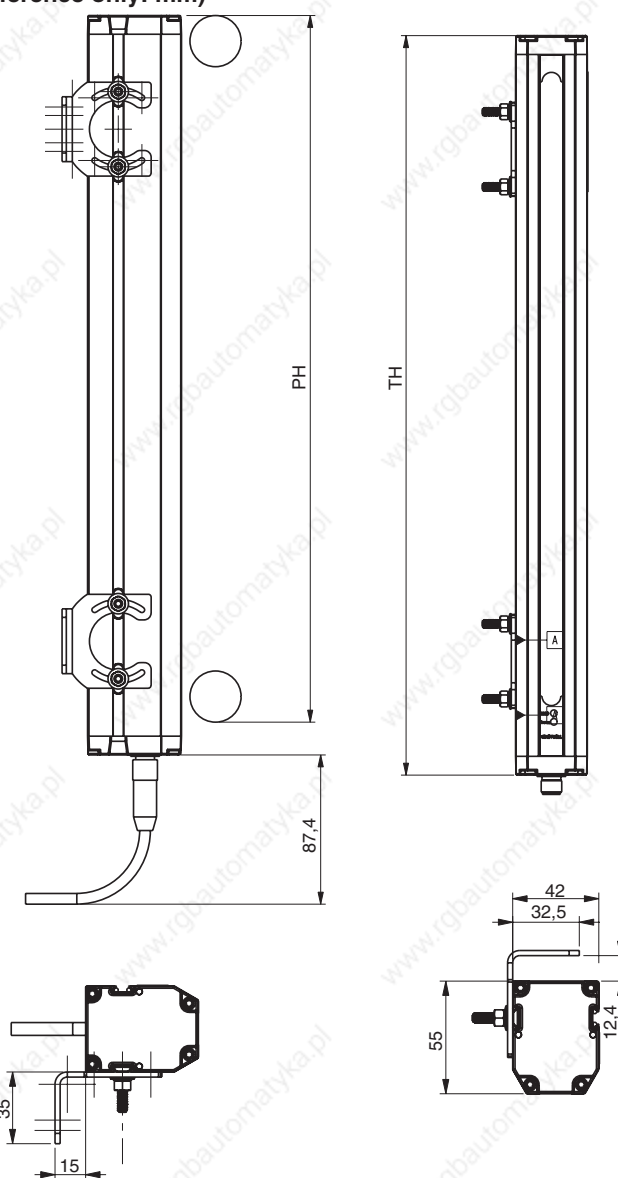
| Characteristic | Parameter |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Resolution (min. object detection size) | 18 mm, 30 mm, 80 mm |
| Nominal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

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 |

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MOUNTING DIMENSIONS (For reference only: mm)



| 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 | 882 | 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 | 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

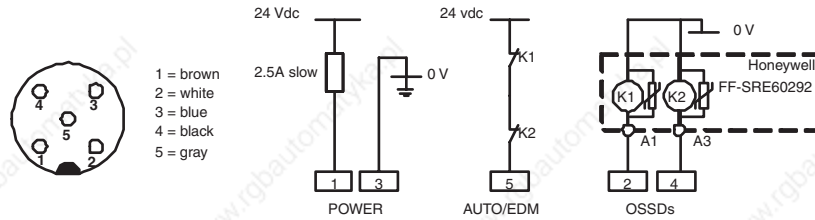
ORDERING INFORMATION

Function package Automatic restart with external device monitoring
 Connection types M12, 5 pole on emitter and receiver

FF-ST2 Standard A

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 |

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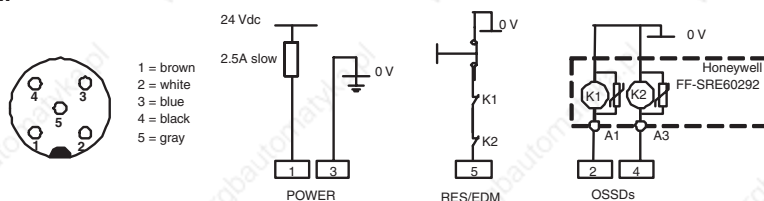
ORDERING INFORMATION

Function package Manual restart interlock with external device monitoring
 Connection types M12, 5 pole on emitter and receiver

FF-ST2 Standard M

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

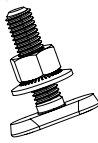
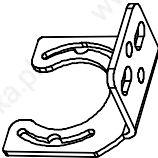
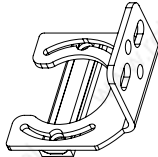
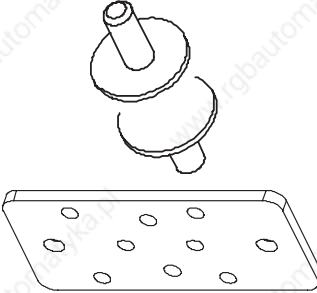
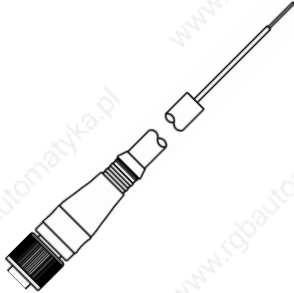
| Resolution 18 mm, Scanning Range 0.25 m to 10 m | |
|-------------------------------------------------|-----------------|
| Protective Height (mm) | Catalog Listing |
| 200 | FF-ST2B02BM2 |
| 300 | FF-ST2B03BM2 |
| 400 | FF-ST2B04BM2 |
| 500 | FF-ST2B05BM2 |
| 600 | FF-ST2B06BM2 |
| 700 | FF-ST2B07BM2 |
| 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 |

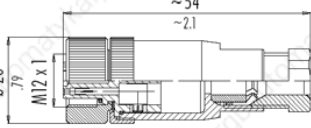
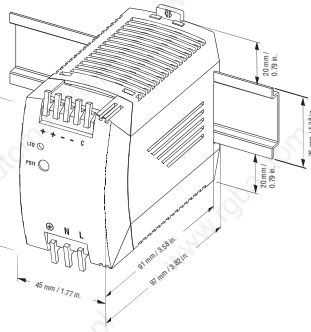


FF-ST2 Series

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-SYZ634178 |  | Right angle bracket kit includes two right angle brackets with four sets of M5 bolts, nuts and washers. Order two kits for a complete set to use with emitter and receiver. |
| FF-SYZ634189 |  | Adjustable bracket kit 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. Order two kits for a complete set to use with emitter and receiver) |
| FF-SYZAD |  | Kit includes two straight brackets and four anti-vibration dampers (mounting hardware included). In case of high vibration applications, order: <ul style="list-style-type: none"> • Two FF-SYZAD kits for light curtain systems with protection heights below 1000 mm. • Three FF-SYZAD kitS for light curtain systems with protection heights greater or equal to 1000 mm, but less than 1800 mm. • Four FF-SYZAD kits for light curtain systems with protection heights equal to 1800 mm. |
| FF-SXZCAM125U02-S FF-SXZCAM125U05-S FF-SXZCAM125U05-90S FF-SXZCAM125U10-S FF-SXZCAM125U10-90S |  | M12 single-ended cordsets, female, 5 pin 2 m, straight 5 m, straight 5 m, right angle 10 m, straight 10 m, right angle |

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ACCESSORIES (continued)

| Catalog Listing | Picture | Description |
|----------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FF-SXZCOM125 |  | M12 screw connector, female, straight, 5 pin |
| FF-SXZPWR050 |  | <p>ac to dc power supply (to be ordered separately as an option)</p> <ul style="list-style-type: none"> • 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 |  | <p>Expansion relay modules for the FF-ST2 Standard A and Standard M models</p> <ul style="list-style-type: none"> • 22.5 mm width, 4 NO/2 NC safety relay outputs • 90 mm width, 7 NO/1 NC safety relay outputs <p>(See separate product data sheet for detailed information.)</p> |
| FF-SRM200P2 |  | <p>Muting module</p> <ul style="list-style-type: none"> • 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.

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Sensing and Control

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