SAFETY

SF2-PRESENCE CONTROL SERIES

The **SAFEasy™** light curtains of the **SF2** series, according to the IEC 61496-1 and IEC 61496-2 standards, are very suitable for presence detection of operators exposed to risks.

Different models are available with nine standard heights ranging from 300 to 1500 mm, with 50 or 90 mm resolution and an operating distance reaching 15 m. The emitter and receiver units are optically synchronised and contain all the control circuits, test input and two safety outputs inside the housing.

The connection with the machine stopping circuits are guaranteed by unshielded M12 4-pole connectors for the emitter and M12 5-pole connectors for the receiver.

The **SAFEasy™** light curtains of the SF2 series have also integrated the test function, automatically activated every 0.5 seconds, without stopping the machine's working cycle.

A wide range of industrial applications, requiring operator safety, can be solved by the **SAFEasy™** light curtains, thanks to the extremely compact dimensions (31x32 mm), easy installation and excellent performances.

Type 2

HIGHLIGHTS

- Integrated light curtains for PRESENCE CONTROL PROTECTION
- 50 and 90 mm resolution and operating distance up to 15 m
- 31 x 32 mm compact profile
- Versions with automatic or manual RESTART

APPLICATIONS

- Automatic machines;
- Packaging, material handling and storage machines;
- Textile, wood-working and ceramic machines;
- Automatic and semi-automatic assembling lines;
- Automatic warehouses.

Presence control is obtained positioning horizontally the safety light curtain. This installation allows to continuously control the presence of an obstacle inside a specific area. This is a particularly useful solution when dangerous area, not visible from the machine control points, has to be protected.
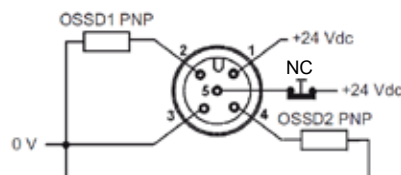
DIMENSIONS

L_2

L_1

53.3

14.9

M12x1

mm

32

31
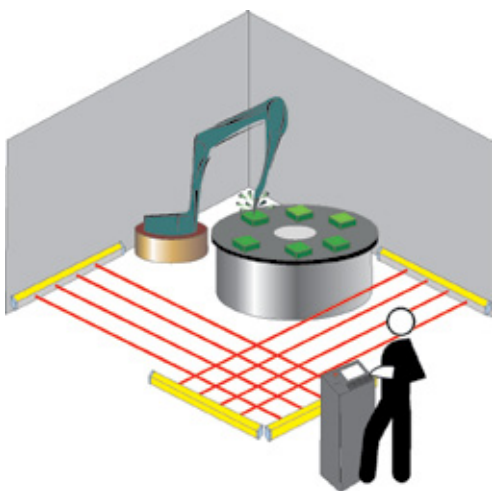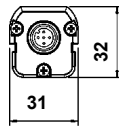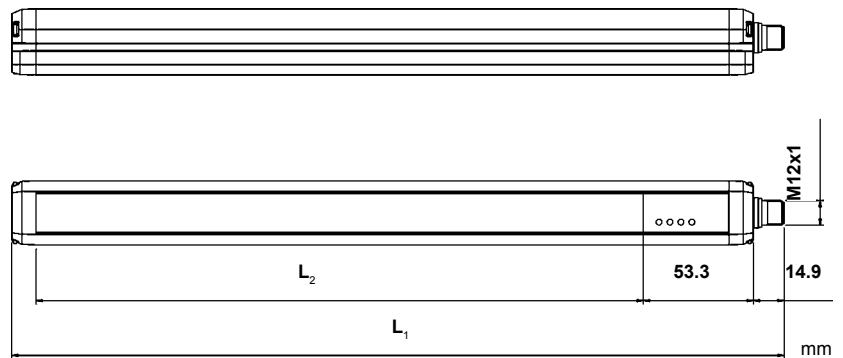
CONTROLLED HEIGHT (mm)	L_1	L_2
300	294	374
450	521	441
600	668	588
750	815	735
900	962	882
1050	1109	1029
1200	1256	1176
1350	1403	1323
1500	1550	1470

CONNECTIONS

RX: M12 5 POLE CONNECTOR

OSSD1 PNP
+24 Vdc
NC
+24 Vdc
OSSD2 PNP
0 V

1 = brown = +24 Vdc

2 = white = OSSD1

3 = blue = 0 V

4 = black = OSSD2

5 = grey = TEST *

*= automatic RESTART (X version) TEST/RESET function
= manual RESTART (Y version) TEST/RESTART/RESET function

TX: M12 4 POLE CONNECTOR

NOT USED
+24 Vdc
0 V
NOT USED
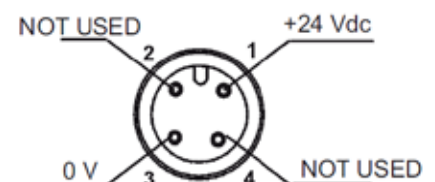
1 = brown = +24 Vdc

2 = white = Not used

3 = blue = 0 V

4 = black = Not used

TECHNICAL DATA

Power supply (Vdd):	24 Vdc ± 20% (SELV / PELV)
Consumption:	50 mA max. / 1 W (emitter)
	90 mA max. / 2.5 W (receiver without load)
Light emission:	infrared LED 880 nm
Optic diameter:	Ø 18 mm
Number of controlled beams:	refer to table 1
Optic interaxis:	37,5 mm (SF2-50); 74 mm (SF2-90)
Resolution:	50 / 90 mm
Controlled height:	refer to table 2
Operating distance:	0.2 ... 15 m
Receiver inputs:	external switches for Test and Restart
Receiver indicators:	2 yellow ALIGNMENT LEDs
	red BREAK LED
	green SAFE LED
Emitter indicators:	yellow WORKING UNIT CHECK LED
	green POWER ON LED
Output type:	2 PNP
	short-circuit protection: max.1.4 A at 55°C
	min. 1.2 A at 0 °C
Output current (for all loads):	500 mA max. per output
Output voltage ON min.:	Vdd - 1 V
Output voltage OFF max.:	0.2 V
Leakage current:	0.65 mA
Capacitive load (pure):	100 nF max.
Resistive load (pure):	60 Ω min.
Response time:	refer to table 3
Receiver connection:	M12 5-pole connector
Emitter connection:	M12 4-pole connector
Safety category:	type 2
Electrical protection:	class 1
Mechanical protection:	IP65 (EN 60529)
	IP67 (connector part)
Housing material:	painted aluminium
Cap end material:	PBT
Lens material:	PMMA
Cable length:	50 m max * (at 100nF capacitive load and Vdd=24V)
	M12 conductors (according to EN 50044, EN 60947-5-2)
	poles Ø = 32x0.1mm, external Ø = 0.5mm
Weight:	1 Kg. max. / m of total height
Operating temperature:	0 ... +55 °C
Storage temperature:	-25 ... +70 °C
Reference standards:	EN 954-1, IEC 61496-1, IEC 61496-2

* = if a longer cable has to be used, please verify that the same specifications are respected

TABLES

Model	SF2-50	SF2-90
SF2 height 300	9	5
SF2 height 450	13	7
SF2 height 600	17	9
SF2 height 750	21	11
SF2 height 900	25	13
SF2 height 1050	29	15
SF2 height 1200	33	17
SF2 height 1350	37	19
SF2 height 1500	41	21

Table 1: NUMBER OF CONTROLLED BEAMS

Model	SF2
SF2 height 300	334
SF2 height 450	481
SF2 height 600	628
SF2 height 750	775
SF2 height 900	922
SF2 height 1050	1069
SF2 height 1200	1216
SF2 height 1350	1363
SF2 height 1500	1510

Table 2: CONTROLLED HEIGHT (mm)

Model	SF2
SF2 height 300	15
SF2 height 450	16
SF2 height 600	17
SF2 height 750	18
SF2 height 900	19
SF2 height 1050	20
SF2 height 1200	22
SF2 height 1350	23
SF2 height 1500	24

Table 3: RESPONSE TIME (ms)

RELIABILITY DATA

PL (Ref. EN ISO 13849-1)	d
CAT (Ref. EN 954-1)	2
SIL (Ref. EN IEC 61508)	2
SIL CL (Ref. EN IEC 62061)	2
PFHD – Probability of Danger Failure (1/h)	2,34E-08
T1 – Life Time (Years)	20
MTTFD - Mean Time to Danger Failure (Years)	302
DC – Diagnostic Coverage (%)	93,80%
SFF – Safe Failure Fraction (%)	96,06%
HFT – Hardware Fault Tolerance	0

MODEL SELECTION AND ORDER INFORMATION

MODEL	DESCRIPTION	N° ORDER
SF2-50 with automatic RESTART		
SF2-50-030-PP-X	Type 2 safety light curtain h=300 mm	957081200
SF2-50-045-PP-X	Type 2 safety light curtain h=450 mm	957081210
SF2-50-060-PP-X	Type 2 safety light curtain h=600 mm	957081220
SF2-50-075-PP-X	Type 2 safety light curtain h=750 mm	957081230
SF2-50-090-PP-X	Type 2 safety light curtain h=900 mm	957081240
SF2-50-105-PP-X	Type 2 safety light curtain h=1050 mm	957081250
SF2-50-120-PP-X	Type 2 safety light curtain h=1200 mm	957081260
SF2-50-135-PP-X	Type 2 safety light curtain h=1350 mm	957081270
SF2-50-150-PP-X	Type 2 safety light curtain h=1500 mm	957081280
SF2-50 with manual RESTART		
SF2-50-030-PP-Y	Type 2 safety light curtain h=300 mm	957081380
SF2-50-045-PP-Y	Type 2 safety light curtain h=450 mm	957081390
SF2-50-060-PP-Y	Type 2 safety light curtain h=600 mm	957081400
SF2-50-075-PP-Y	Type 2 safety light curtain h=750 mm	957081410
SF2-50-090-PP-Y	Type 2 safety light curtain h=900 mm	957081420
SF2-50-105-PP-Y	Type 2 safety light curtain h=1050 mm	957081430
SF2-50-120-PP-Y	Type 2 safety light curtain h=1200 mm	957081440
SF2-50-135-PP-Y	Type 2 safety light curtain h=1350 mm	957081450
SF2-50-150-PP-Y	Type 2 safety light curtain h=1500 mm	957081460
SF2-90 with automatic RESTART		
SF2-90-030-PP-X	Type 2 safety light curtain h=300 mm	957081290
SF2-90-045-PP-X	Type 2 safety light curtain h=450 mm	957081300
SF2-90-060-PP-X	Type 2 safety light curtain h=600 mm	957081310
SF2-90-075-PP-X	Type 2 safety light curtain h=750 mm	957081320
SF2-90-090-PP-X	Type 2 safety light curtain h=900 mm	957081330
SF2-90-105-PP-X	Type 2 safety light curtain h=1050 mm	957081340
SF2-90-120-PP-X	Type 2 safety light curtain h=1200 mm	957081350
SF2-90-135-PP-X	Type 2 safety light curtain h=1350 mm	957081360
SF2-90-150-PP-X	Type 2 safety light curtain h=1500 mm	957081370
SF2-90 with manual RESTART		
SF2-90-030-PP-Y	Type 2 safety light curtain h=300 mm	957081470
SF2-90-045-PP-Y	Type 2 safety light curtain h=450 mm	957081480
SF2-90-060-PP-Y	Type 2 safety light curtain h=600 mm	957081490
SF2-90-075-PP-Y	Type 2 safety light curtain h=750 mm	957081500
SF2-90-090-PP-Y	Type 2 safety light curtain h=900 mm	957081510
SF2-90-105-PP-Y	Type 2 safety light curtain h=1050 mm	957081520
SF2-90-120-PP-Y	Type 2 safety light curtain h=1200 mm	957081530
SF2-90-135-PP-Y	Type 2 safety light curtain h=1350 mm	957081540
SF2-90-150-PP-Y	Type 2 safety light curtain h=1500 mm	957081550

ACCESSORY SELECTION AND ORDER INFORMATION

MODEL	DESCRIPTION	N° ORDER
CS-A1-03-G-03	M12 5-pole unshielded axial 3 m connector	95ACC2110
CS-A1-03-G-05	M12 5-pole unshielded axial 5 m connector	95ACC2120
CS-A1-03-G-10	M12 5-pole unshielded axial 10 m connector	95ACC2140
CS-A1-02-G-03	M12 4-pole unshielded axial 3 m connector	95A251380
CS-A1-02-G-05	M12 4-pole unshielded axial 5 m connector	95A251270
CS-A1-02-G-10	M12 4-pole unshielded axial 10 m connector	95A251390
ST-KSF2	anti-scratch fixing bracket (4 pcs)	95ACC2320
ST-KSF2STD	SF2 standard fixing bracket (12 pcs)	95ASE1020
ST-KSF2-4OR	SF2 orientable supports (4 pcs)	95ACC2580
ST-KSF2-6OR	SF2 orientable supports (6 pcs)	95ACC2590