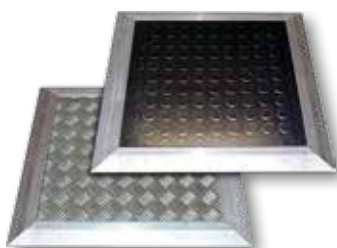
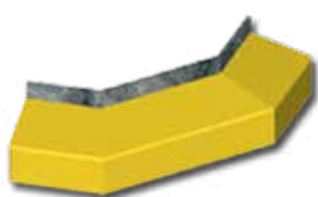




GREIN

GENERAL CATALOGUE 2018



OUR APPLICATIONS



OUR COMPANY

GREIN S.R.L. is a company founded on 1965 to sell electronic products for industrial application. On 1970 has opened a laboratory to enhance customer service and in 1978 has began to design, manufacture opto-electronic devices for safe-guarding applications. In addition to safety barriers GREIN produce a wide range of products that find applications on the same field. They are ribbon switches-edges-mats-bumpers that are employed to protect the operators from the risk of dangerous machinery. GREIN has become a leading name in machine safeguarding in Italy and in all the industrialized countries of the world. To ensure the quality of the various stages of product development and marketing, **GREIN** has an ISO 9001:2015 quality system. Safety barriers are certified by **TUV INTERCERT** certification body. The edges, mats and bumpers have been tested and validated by the **PRIMA RICERCA E SVILUPPO** (the Italian authority for the validation of safety products).



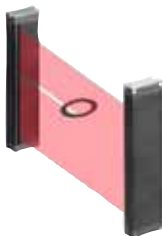
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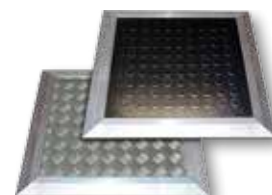
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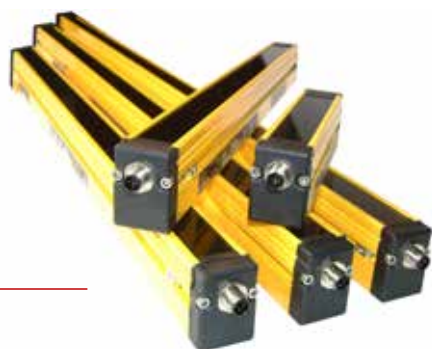
EFESTO4 AND KEEPER SAFETY LIGHT CURTAINS

OVERVIEW

The **EFESTO4** and **KEEPER** light curtains are optoelectronic systems with multi beams (ESPE) type 4 for the protection of body to prevent accidents on the machine on dangerous plants in accordance with International safety standards.

EFESTO4 and **KEEPER** are formed of an emitter and a receiver unit synchronized through a optic link. The safety outputs are solid state with the possibility to convert them into outputs relays using the optional modules. Are available interconnect modules to interface directly with the barrier without going through the electrical cabinet.

The wide range of model permit the employ on every field of industrial automation supplying the protection of the fingers, hand, arm, body, for the movement on dangerous area.



COMPLIANCE

2006/42/EC

2014/30/EC

EN 61496-1/2

EN 13849-1/2

EN 62061

EN 61508

EN 61000

Machinery Directive

Electromagnetic compatibility Directive

Safety of machinery - Electro-sensitive protective equipment

Safety of machinery - Safety-related parts of control systems

Safety of machinery - Functional safety

Functional safety of electrical/electronic/programmable electronic

Electromagnetic compatibility

EFESTO4 APPLICATIONS

- Punch, brake, stamping presses.
- Die cutter.
- Robotic area.
- Assembly lines.
- Machinery for wood and ceramic.
- Automatic warehouse.



KEEPER APPLICATIONS

- Robotic area.
- Assembly lines.
- Automatic warehouse.
- Palletizer machinery.
- Way for automatic AGV vehicle.



TEST FUNCTION

This function is present on the emitter unit. This signal simulates the interruption of the beams to check the safety chain.

BARGRAPH

The three LEDs provide indications on the beams alignment. This simplifies the alignment of the light curtain, particularly in case of difficult installations, for example with the use with mirrors or on long range. To each indicator is associated a percentage of beams aligned.

MASTER-SLAVE FUNCTION

Where the safety distance is particularly long (for example using large presses) it is necessary that nobody can enter in the dangerous area at the restart of the machine. This problem can be solved by installing the angled version light curtain, which consists of a vertical unit (MASTER) and an horizontal unit (SLAVE) used to stop behind protection.

MUTING FUNCTION

The muting function generates a temporary suspension of the protective function of the barrier in order to ensure the normal passage of the material through the protected area. If the MUTING function is active, the interruption of the beams doesn't disable the OSSDs outputs. The muting function is activated through the activation of two sensors within 2 sec of each other.

Any others conditions applied to the sensors don't activate the MUTING function. If for any reason, the muting doesn't activate, the interruption of the beams will determine the block of the machine. In this case the cycle can be restarted using the **GUARD-OVERRIDE** command.

BLANKING FUNCTION

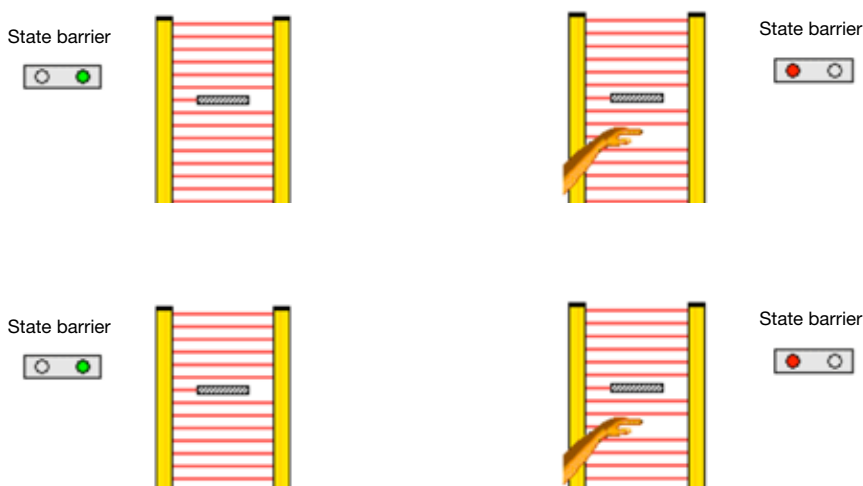
This function allow to inhibit 1, 2 or 3 beams. Their interruptions will not turn OFF the OSSDs. The blanking function is useful in applications where the working materials cross the protected area, and the interruption of the beams shall not stop the machine. The configuration is realized using 3 wires on the connector of the receiver.

Blanking without object presence obligation:

This function allows to insert inside the dangerous zone an object without turn OFF the OSSDs.

Blanking with object presence obligation:

This function allows to mantain inside the dangerous zone an object without turn OFF the OSSDs.



TECHNICAL CHARACTERISTICS

Type (EN 61496-1)	Typo 4
SIL (EN 61508)	SIL 3
SILCL (EN 62061)	SILCL 3
PL (EN ISO 13849-1)	PL e
Synchronization TX/RX	Optical
Power Supply	24Vdc ±10%
Resolution	14, 20, 30, 40, 55, 65, 125, 135, 306, 315 mm
Maximum range (depending from the resolution)	6, 15, 30, 60 m
Protected area	from 200 mm to 3000 mm
Response time	from 5 to 30 ms depending to numbers of beams
OSSD output	2 PNP-500 mA short circuit and overload protected
Signaling output	2 PNP-500 mA short circuit and overload protected
Maximum connection length	100 m
Enclosure dimension	36X50 mm yellow RAL 1021
Protection degree	IP65
Relative umidity	5 - 95 %
Working temperature	0 - 65 °C

All model have the following features:

- TX with M12 4 poles connector and test input function.
- Bargraph with 3 led for alignment and signaling.
- Automatic reset.

Furthermore, the following functions can be added:

Model	Function available							RX Connectors		
	RM	EDM	BLNK	MUTE-E	MUTE	O-S	M-F	M12 5P	M12 8P	M23-17P
EF- a								•		
EF- b	•	•							•	
EF- c			•						•	
EF- d	•	•	•			•		•	•	
EF- e	•	•			•			•	•	
EF- f1	•	•		•	•	•				•
EF- f2	•	•		•	•		•			•

LEGEND

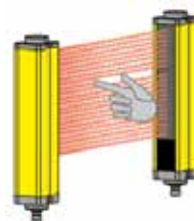
RM	Manual reset
EDM	External Device Monitoring
BLNK	Blanking
MUTE-E	Input for muting enable
MUTE	Input of 2 external sensors + guard override + signaling lamp
O-S	Output signaling the status of the safety outputs
M-F	Output signaling the status of interrupted barrier during the muting state.
M12-5P	Connector M12 - 5 Poles - male
M12-8P	Connector M12 - 8 Poles - male
M23-17P	Connector M23 - 17 Poles - male
M23-17 P	Connettore M23 - 17 poli - maschio per il ricevitore

EFESTO4

IDENTIFICATION CODE

		EF - a	450	B	-	J
Model	see table pag 9					
Sensitive height	see table pag 10-15					
Optical code	see table pag 10-15					
Master / Slave *	optional	M = master S = slave				
Additional indicator	optional	J = end cap LED D = display slave				

* Only for Master / Slave configuration

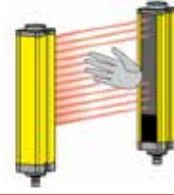


FINGER DETECTION

Resolution 14mm Range 0,5 .. 6m Optical code "A"									
Model	N° Beams	Protected height PH (mm)	Sensitive height SH (mm)	Barrier height H (mm)	Weight TX+RX (kg)	Response time (ms)	Response time blanking (ms)	MTTFd (years)	PL
EF -x - 0240 A	24	254	234	316	1,3	6	7.5	100	e
EF -x - 0360 A	36	374	354	436	1,7	11	15	100	e
EF -x - 0480 A	48	494	474	556	2,1	11	15	100	e
EF -x - 0600 A	60	614	594	676	2,5	11	15	100	e
EF -x - 0700 A	72	734	714	796	3,0	16	22.5	84,06	e
EF -x - 0850 A	84	854	834	916	3,4	16	22.5	76,09	e
EF -x - 0950 A	96	974	954	1036	3,8	16	22.5	69,51	e
EF -x - 1100 A	108	1094	1074	1156	4,2	16	22.5	63,97	e
EF -x - 1200 A	120	1214	1194	1276	4,7	21	30	59,25	e
EF -x - 1300 A	132	1334	1314	1396	5,1	21	30	55,18	e
EF -x - 1400 A	144	1454	1434	1516	5,5	21	30	51,63	e
EF -x - 1500 A	156	1574	1554	1636	5,9	26	37.5	48,51	e
EF -x - 1700 A	168	1694	1674	1756	6,4	26	37.5	45,75	e
EF -x - 1800 A	180	1814	1794	1876	6,8	26	37.5	43,28	e
EF -x - 1900 A	192	1934	1914	1996	7,2	31	45	41,07	e
EF -x - 2000 A	204	2054	2034	2116	7,6	31	45	39,07	e
EF -x - 2200 A	216	2174	2154	2236	8,1	31	45	38,53	e
EF -x - 2300 A	228	2294	2274	2356	8,5	31	45	35,61	e



HAND DETECTION



Resolution 20mm Range 2 .. 15m Optical code "AL"

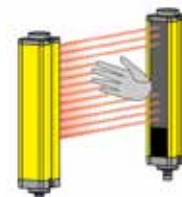
Model	N° Beams	Protected height PH (mm)	Sensitive height SH (mm)	Barrier height H (mm)	Weight TX+RX (Kg)	Response time (ms)	Response time blanking (ms)	MTTFd (years)	PL
EF -x - 0240 AL	24	260	240	316	1,3	6	7.5	100	e
EF -x - 0360 AL	36	380	360	436	1,7	11	15	100	e
EF -x - 0480 AL	48	500	480	556	2,1	11	15	100	e
EF -x - 0600 AL	60	620	600	676	2,5	11	15	100	e
EF -x - 0700 AL	72	740	720	796	3,0	16	22.5	84,06	e
EF -x - 0850 AL	84	860	840	916	3,4	16	22.5	76,09	e
EF -x - 0950 AL	96	980	960	1036	3,8	16	22.5	69,51	e
EF -x - 1100 AL	108	1100	1080	1156	4,2	16	22.5	63,97	e
EF -x - 1200 AL	120	1220	1200	1276	4,7	21	30	59,25	e
EF -x - 1300 AL	132	1340	1320	1396	5,1	21	30	55,18	e
EF -x - 1400 AL	144	1460	1440	1516	5,5	21	30	51,63	e
EF -x - 1500 AL	156	1580	1560	1636	5,9	26	37.5	48,51	e
EF -x - 1700 AL	168	1700	1680	1756	6,4	26	37.5	45,75	e
EF -x - 1800 AL	180	1820	1800	1876	6,8	26	37.5	43,28	e
EF -x - 1900 AL	192	1940	1920	1996	7,2	31	45	41,07	e
EF -x - 2000 AL	204	2060	2040	2116	7,6	31	45	39,07	e
EF -x - 2200 AL	216	2180	2160	2236	8,1	31	45	38,53	e
EF -x - 2300 AL	228	2300	2280	2356	8,5	31	45	35,61	e

Resolution 30mm Range 0,5 .. 15m Optical code "B"

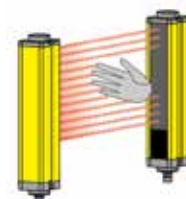
Model	N° Beams	Protected height PH (mm)	Sensitive height SH (mm)	Barrier height H (mm)	Weight TX+RX (Kg)	Response time (ms)	Response time blanking (ms)	MTTFd (years)	PL
EF -x - 0150 B	6	174	126	272	0,8	6	7.5	100	e
EF -x - 0210 B *	8	222	174	272	0,9	6	7.5	100	e
EF -x - 0240 B *	9	246	198	296	1,0	6	7.5	100	e
EF -x - 0300 B	12	318	270	368	1,2	6	7.5	100	e
EF -x - 0360 B *	14	366	318	416	1,3	6	7.5	100	e
EF -x - 0390 B *	15	390	342	440	1,4	6	7.5	100	e
EF -x - 0450 B	18	462	414	512	1,6	6	7.5	100	e
EF -x - 0540 B *	21	534	486	584	1,8	6	7.5	100	e
EF -x - 0600 B	24	606	558	656	2,0	6	7.5	100	e
EF -x - 0680 B *	27	678	630	728	2,4	11	15	100	e
EF -x - 0750 B	30	750	702	800	2,4	11	15	100	e
EF -x - 0820 B *	33	822	774	872	2,6	11	15	100	e
EF -x - 0900 B	36	894	846	944	2,8	11	15	100	e
EF -x - 0970 B *	39	966	918	1016	3,0	11	15	100	e
EF -x - 1050 B	42	1038	990	1088	3,2	11	15	100	e
EF -x - 1100 B *	45	1110	1062	1160	3,4	11	15	100	e
EF -x - 1200 B	48	1182	1134	1232	3,6	11	15	100	e
EF -x - 1250 B *	51	1254	1206	1304	3,8	11	15	100	e
EF -x - 1350 B	54	1326	1278	1376	4,0	11	15	100	e
EF -x - 1400 B *	57	1398	1350	1448	4,2	11	15	100	e
EF -x - 1500 B	60	1470	1422	1520	4,4	11	15	100	e
EF -x - 1650 B	66	1614	1566	1664	4,8	11	15	100	e
EF -x - 1800 B	72	1758	1710	1808	5,2	16	22.5	100	e
EF -x - 1950 B	78	1902	1854	1952	5,6	16	22.5	100	e
EF -x - 2100 B	84	2046	1998	2096	6,0	16	22.5	100	e
EF -x - 2200 B	90	2190	2142	2240	6,4	16	22.5	100	e
EF -x - 2300 B	96	2334	2286	2384	6,8	16	22.5	100	e
EF -x - 2450 B	102	2478	2430	2528	7,2	16	22.5	100	e
EF -x - 2650 B	108	2622	2574	2672	7,6	16	22.5	99,18	e
EF -x - 2750 B	114	2776	2718	2816	8,0	21	30	97,15	e
EF -x - 2900 B	120	2910	2862	2960	8,4	21	30	95,21	e
EF -x - 3000 B	126	3054	3006	3104	8,8	21	30	93,35	e

* Models shown may not implement the blanking function.

HAND DETECTION



Resolution 40mm Range 6 .. 30m Optical code "BL"									
Model	N° Beams	Protected height PH (mm)	Sensitive height SH (mm)	Barrier height H (mm)	Weight Tx + Rx (Kg)	Response time (ms)	Response time blanking (ms)	MTTFd (years)	PL
EF -x - 0150 BL	6	185	135	272	0,8	6	7.5	100	e
EF -x - 0210 BL *	8	233	183	272	0,9	6	7.5	100	e
EF -x - 0240 BL *	9	257	207	296	1,0	6	7.5	100	e
EF -x - 0300 BL	12	329	279	368	1,2	6	7.5	100	e
EF -x - 0360 BL *	14	377	327	416	1,3	6	7.5	100	e
EF -x - 0390 BL *	15	401	351	440	1,4	6	7.5	100	e
EF -x - 0450 BL	18	473	423	512	1,6	6	7.5	100	e
EF -x - 0540 BL *	21	545	495	584	1,8	6	7.5	100	e
EF -x - 0600 BL	24	617	567	656	2,0	6	7.5	100	e
EF -x - 0680 BL *	27	689	639	728	2,4	11	15	100	e
EF -x - 0750 BL	30	761	711	800	2,4	11	15	100	e
EF -x - 0820 BL *	33	833	783	872	2,6	11	15	100	e
EF -x - 0900 BL	36	905	855	944	2,8	11	15	100	e
EF -x - 0970 BL *	39	977	927	1016	3,0	11	15	100	e
EF -x - 1050 BL	42	1049	999	1088	3,2	11	15	100	e
EF -x - 1100 BL *	45	1121	1071	1160	3,4	11	15	100	e
EF -x - 1200 BL	48	1193	1143	1232	3,6	11	15	100	e
EF -x - 1250 BL *	51	1265	1215	1304	3,8	11	15	100	e
EF -x - 1350 BL	54	1337	1287	1376	4,0	11	15	100	e
EF -x - 1400 BL *	57	1409	1359	1448	4,2	11	15	100	e
EF -x - 1500 BL	60	1481	1431	1520	4,4	11	15	100	e
EF -x - 1650 BL	66	1625	1575	1664	4,8	11	15	100	e
EF -x - 1800 BL	72	1769	1719	1808	5,2	16	22.5	100	e
EF -x - 1950 BL	78	1913	1863	1952	5,6	16	22.5	100	e
EF -x - 2100 BL	84	2057	2007	2096	6,0	16	22.5	100	e
EF -x - 2200 BL	90	2201	2151	2240	6,4	16	22.5	100	e
EF -x - 2300 BL	96	2345	2295	2384	6,8	16	22.5	100	e
EF -x - 2450 BL	102	2489	2439	2528	7,2	16	22.5	100	e
EF -x - 2650 BL	108	2633	2583	2672	7,6	16	22.5	99,18	e
EF -x - 2750 BL	114	2777	2727	2816	8,0	21	30	97,15	e
EF -x - 2900 BL	120	2921	2871	2960	8,4	21	30	95,21	e
EF -x - 3000 BL	126	3065	3015	3104	8,8	21	30	93,35	e



HAND DETECTION

Resolution 55mm Range 0,5 .. 15m Optical code "C"								
Model	N° Beams	Protected height PH (mm)	Sensitive height SH (mm)	Barrier height H (mm)	Weight Tx + Rx (Kg)	Response time (ms)	Response time blanking (ms)	MTTFd (years)
EF -x - 0150 C	3	200	102	272	0,8	6	7.5	100
EF -x - 0250 C	5	296	198	296	1,1	6	7.5	100
EF -x - 0300 C	6	344	246	368	1,2	6	7.5	100
EF -x - 0400 C	8	440	342	440	1,5	6	7.5	100
EF -x - 0450 C	9	488	390	512	1,6	6	7.5	100
EF -x - 0600 C	12	632	534	656	2,0	6	7.5	100
EF -x - 0750 C	15	776	678	800	2,4	6	7.5	100
EF -x - 0900 C	18	920	822	944	2,8	6	7.5	100
EF -x - 1050 C	21	1064	966	1088	3,2	6	7.5	100
EF -x - 1200 C	24	1208	1110	1232	3,6	6	7.5	100
EF -x - 1350 C	27	1352	1254	1376	4,0	11	15	100
EF -x - 1500 C	30	1496	1398	1520	4,4	11	15	100
EF -x - 1650 C	33	1640	1542	1664	4,8	11	15	100
EF -x - 1800 C	36	1784	1686	1808	5,2	11	15	100
EF -x - 1950 C	39	1928	1830	1952	5,6	11	15	100
EF -x - 2100 C	42	2072	1974	2096	6,0	11	15	100
EF -x - 2200 C	45	2216	2118	2240	6,4	11	15	100
EF -x - 2300 C	48	2360	2262	2384	6,8	11	15	100
EF -x - 2450 C	51	2504	2406	2528	7,2	11	15	100
EF -x - 2650 C	54	2648	2550	2672	7,6	11	15	100
EF -x - 2750 C	57	2792	2694	2816	8,0	11	15	100
EF -x - 2900 C	60	2936	2838	2960	8,4	11	15	100
EF -x - 3000 C	63	3080	2982	3104	8,8	11	15	100



EFESTO4



BODY DETECTION

Resolution 60mm Range 6 .. 30m Optical code "CL"									
Model	N° Beams	Protected height PH (mm)	Sensitive height SH (mm)	Barrier height H (mm)	Weight TX+RX (Kg)	Response time (ms)	Response time blanking (ms)	MTTFd (years)	PL
EF -x - 0150 CL	3	211	111	272	0,8	6	7.5	100	e
EF -x - 0250 CL	5	307	207	296	1,1	6	7.5	100	e
EF -x - 0300 CL	6	355	255	368	1,2	6	7.5	100	e
EF -x - 0400 CL	8	451	351	440	1,5	6	7.5	100	e
EF -x - 0450 CL	9	499	399	512	1,6	6	7.5	100	e
EF -x - 0600 CL	12	643	543	656	2,0	6	7.5	100	e
EF -x - 0750 CL	15	787	687	800	2,4	6	7.5	100	e
EF -x - 0900 CL	18	931	831	944	2,8	6	7.5	100	e
EF -x - 1050 CL	21	1075	975	1088	3,2	6	7.5	100	e
EF -x - 1200 CL	24	1219	1119	1232	3,6	6	7.5	100	e
EF -x - 1350 CL	27	1363	1263	1376	4,0	11	15	100	e
EF -x - 1500 CL	30	1507	1407	1520	4,4	11	15	100	e
EF -x - 1650 CL	33	1651	1551	1664	4,8	11	15	100	e
EF -x - 1800 CL	36	1795	1695	1808	5,2	11	15	100	e
EF -x - 1950 CL	39	1939	1839	1952	5,6	11	15	100	e
EF -x - 2100 CL	42	2083	1983	2096	6,0	11	15	100	e
EF -x - 2200 CL	45	2227	2127	2240	6,4	11	15	100	e
EF -x - 2300 CL	48	2371	2271	2384	6,8	11	15	100	e
EF -x - 2450 CL	51	2515	2415	2528	7,2	11	15	100	e
EF -x - 2650 CL	54	2659	2559	2672	7,6	11	15	100	e
EF -x - 2750 CL	57	2803	2703	2816	8,0	11	15	100	e
EF -x - 2900 CL	60	2947	2847	2960	8,4	11	15	100	e
EF -x - 3000 CL	63	3091	2991	3104	8,8	11	15	100	e



ACCESS CONTROL DETECTION

Resolution 125 mm Range 0,5 .. 15 m Optical code "D"									
Model	N° Beams	Sensitive height SH (mm)	Barrier height H (mm)	Weight TX+RX (Kg)	Response time (ms)	Response time blanking (ms)	MTTFd (years)	PL	
EF - x - 350 D	4	366	465	1,6	6	7.5	100	e	
EF - x - 600 D	6	606	705	2,8	6	7.5	100	e	
EF - x - 850 D	8	846	945	3,2	6	7.5	100	e	
EF - x - 1050 D	10	1086	1185	4,2	6	7.5	100	e	
EF - x - 1350 D	12	1326	1425	4,8	6	7.5	100	e	
EF - x - 1550 D	14	1566	1665	5,4	6	7.5	100	e	
EF - x - 1800 D	16	1806	1905	6,0	6	7.5	100	e	
EF - x - 2050 D	18	2046	2145	6,6	6	7.5	100	e	
EF - x - 2250 D	20	2286	2385	7,2	6	7.5	100	e	
EF - x - 2550 D	22	2526	2625	7,8	6	7.5	100	e	
EF - x - 2750 D	24	2766	2865	8,4	6	7.5	100	e	
EF - x - 3050 D	26	3006	3105	9,0	11	15	100	e	



ACCESS CONTROL DETECTION

Resolution 135 mm Range 6 .. 30m Optical code "DL"

Model	N° Beams	Sensitive height SH (mm)	Barrier height H (mm)	Weight TX+RX (Kg)	Response time (ms)	Response time blanking (ms)	MTTFd (years)	PL
EF - x - 350 DL	4	375	465	1,6	6	7.5	100	e
EF - x - 600 DL	6	615	705	2,8	6	7.5	100	e
EF - x - 850 DL	8	855	945	3,2	6	7.5	100	e
EF - x - 1050 DL	10	1095	1185	4,2	6	7.5	100	e
EF - x - 1350 DL	12	1335	1425	4,8	6	7.5	100	e
EF - x - 1550 DL	14	1575	1665	5,4	6	7.5	100	e
EF - x - 1800 DL	16	1815	1905	6,0	6	7.5	100	e
EF - x - 2050 DL	18	2055	2145	6,6	6	7.5	100	e
EF - x - 2250 DL	20	2295	2385	7,2	6	7.5	100	e
EF - x - 2550 DL	22	2535	2625	7,8	6	7.5	100	e
EF - x - 2750 DL	24	2775	2865	8,4	6	7.5	100	e
EF - x - 3050 DL	26	3015	3105	9,0	11	15	100	e

Resolution 306 mm Range 0,5 .. 15 m Optical code "E"

Model	N° Beams	Sensitive height SH (mm)	Barrier height H (mm)	Weight TX+RX (Kg)	Response time (ms)	Response time blanking (ms)	MTTFd (years)	PL
EF - x - 300 E	2	306	457	1,5	6	7.5	100	e
EF - x - 650 E	3	606	757	1,9	6	7.5	100	e
EF - x - 900 E	4	906	1057	3,0	6	7.5	100	e
EF - x - 1200 E	5	1206	1357	4,1	6	7.5	100	e
EF - x - 1550 E	6	1506	1657	5,2	6	7.5	100	e
EF - x - 1800 E	7	1806	1957	6,3	6	7.5	100	e
EF - x - 2250 E	8	2106	2257	7,4	6	7.5	100	e
EF - x - 2400 E	9	2406	2557	8,5	6	7.5	100	e
EF - x - 2750 E	10	2706	2857	9,6	6	7.5	100	e
EF - x - 3000 E	11	3006	3157	10,7	6	7.5	100	e

Resolution 315 mm Range 6 .. 30m Optical code "EL"

Model	N° Beams	Sensitive height SH (mm)	Barrier height H (mm)	Weight TX+RX (Kg)	Response time (ms)	Response time blanking (ms)	MTTFd (years)	PL
EF - x - 300 EL	2	315	457	1,5	6	7.5	100	e
EF - x - 650 EL	3	615	757	1,9	6	7.5	100	e
EF - x - 900 EL	4	915	1057	3,0	6	7.5	100	e
EF - x - 1200 EL	5	1215	1357	4,1	6	7.5	100	e
EF - x - 1550 EL	6	1515	1657	5,2	6	7.5	100	e
EF - x - 1800 EL	7	1815	1957	6,3	6	7.5	100	e
EF - x - 2250 EL	8	2115	2257	7,4	6	7.5	100	e
EF - x - 2400 EL	9	2415	2557	8,5	6	7.5	100	e
EF - x - 2750 EL	10	2715	2857	9,6	6	7.5	100	e
EF - x - 3000 EL	11	3015	3157	10,7	6	7.5	100	e

KEEPER

TEST FUNCTION

This function is present on the emitter unit. This signal simulates the interruption of the beams to check the safety chain.

BARGRAPH

The three LEDs provide indications on the beams alignment. This simplifies the alignment of the light curtain, particularly in case of difficult installations. To each indicator is associated a percentage of beams aligned.

EXTERNAL MUTING FUNCTION

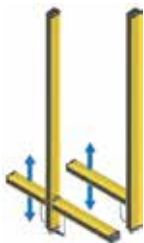
The muting function generates a temporary suspension of the protective function of the barrier in order to ensure the normal passage of the material through the protected area. If the MUTING function is active, the interruption of the beams doesn't disable the OSSDs outputs. The muting function is activated through the activation of two sensors within 2 sec of each other.

Any others conditions applied to the sensors don't activate the MUTING function. If for any reason, the muting doesn't activate, the interruption of the beams will determine the block of the machine. In this case the cycle can be restarted using the GUARD-OVERRIDE command.

INTERNAL MUTING FUNCTION

The peculiar characteristic is the presence of MUTING arms that include the sensors with fixed detection geometries. The MUTING arms, can be mobile with the possibility of vertical/angular adjustment during installation (xxM series), or fixed without adjustment (xxF series) or vertical execution with the possibility of external muting sensors connection chosen by the customer (series xxi). May be provided in the configuration T for the control of entry and exit, or L for the exit control.

TPM, TXM, LPM, LXM Series



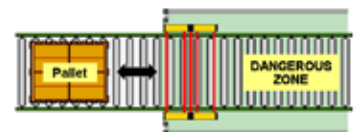
TPF, TXF, LPF, LXF Series



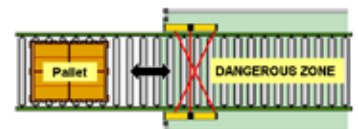
TPi, TXi, LPi, LXi Series



In the version with parallel MUTING sensors, the muting is active when the correct sequence of interruption of the beams sensors is performed. The maximum distance between TX and RX is 5m. In the T version the material being processed can interrupt the muting sensors in any direction of the movement.



In the version with crossed muting sensors, the muting is active when the beams muting sensors are interrupted simultaneous. The maximum distance between TX and RX is 2.5 m, the material being processed must interrupt the muting sensors in the central area. In the T version the material being processed can interrupt the muting sensors in any direction of the movement.



TIME FUNCTION

This function is present only KEEPER safety light curtains h and k model. This function allows the selection of the duration of MUTING. The configuration is set using two wires on the connector of the receiver and is stored at power on. There are three values of time: 1 minute, 90 minutes and 24 hour. When this time expire the muting function is stopped.

TECHNICAL CHARACTERISTICS

Type (EN 61496-1)	Typo 4
SIL (EN 61508)	SIL 3
SILCL (EN 62061)	SILCL 3
PL (EN ISO 13849-1)	PL e
Synchronization TX/RX	Optical
Power Supply	24Vdc ±10%
Resolution	14, 30, 55, 125, 306
Maximum range (depending from the resolution)	0.5 - 2.5 m across beam muting, 0.5 - 5 m parallel beam muting
Protected area	from 200 mm to 3000 mm
Response time	from 6 to 16 ms depending to numbers of beams
OSSD output	2 PNP-500 mA short circuit and overload protected
Signaling output	2 PNP-500 mA short circuit and overload protected
Maximum connection lenght	100 m
Enclousure dimension	36X50 mm yellow RAL 1021
Protection degree	IP65
Relative umidity	5 - 95 %
Working temperature	0 - 65 °C
Grado di protezione	IP65
Umidità relativa	5 - 95 %
Temperatura di funzionamento	0 - 65 °C

All model have the following features:

- TX with M12 4 poles connector and test input function.
- Bargraph with 3 led for alignment and signaling.
- Automatic and manual reset.
- External device monitoring.

Furthermore, the following functions can be added:

Model	Function available					RX Connectors		
	TIME	MUTE-E	MUTE	O-S	M-F	M12 5P	M12 8P	M23-17P
KP- e			•			•	•	
KP- f1		•	•					•
KP- f2		•	•		•			•
KP- h	•	•		•				•
KP- k	•	•			•			•

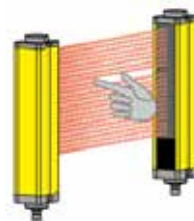
LEGEND

TIME	Selection of duration of MUTING function
MUTE	Input of 2 external sensors + guard override + signaling lamp
MUTE-E	Input for muting enable
O-S	Output signaling the status of the safety outputs
M-F	Output signaling the status of interrupted barrier during the muting state.

M12-5P	Connector M12 - 5 Poles - male
M12-8P	Connector M12 - 8 Poles - male
M23-17P	Connector M23 - 17 Poles - male

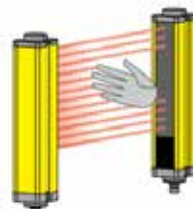
KEEPER

FINGER DETECTION



Resolution 14mm Range 0,5 - 6m Optical code "A"								
Model	N° Beams	Protect- ed height PH (mm)	Sensitive height SH (mm)	Barrier height H (mm)	Weight TX+RX (Kg)	Re- sponse time (ms)	MTTFd (years)	PL
KP - x - 240 A - yyyy	24	254	234	326	1,4	6	100	e
KP - x - 360 A - yyyy	36	374	354	446	1,8	11	100	e
KP - x - 480 A - yyyy	48	494	474	566	2,2	11	100	e
KP - x - 600 A - yyyy	60	614	594	686	2,6	11	100	e
KP - x - 700 A - yyyy	72	734	714	806	3,0	16	84,06	e
KP - x - 850 A - yyyy	84	854	834	926	3,5	16	76,09	e
KP - x - 950 A - yyyy	96	974	954	1046	3,9	16	69,51	e
KP - x - 1100 A - yyyy	108	1094	1074	1166	4,3	16	63,97	e

HAND DETECTION



Resolution 30mm Range 0,5 - 15m Optical code "B"								
Model	N° Beams	Pro- tected height PH (mm)	Sensitive height SH (mm)	Barrier height H (mm)	Weight TX+RX (Kg)	Re- sponse time (ms)	MTTFd (years)	PL
KP - x - 300 B - yyyy	12	318	270	368	1,3	6	100	e
KP - x - 450 B - yyyy	18	462	414	512	1,7	6	100	e
KP - x - 600 B - yyyy	24	606	558	656	2,1	6	100	e
KP - x - 750 B - yyyy	30	750	702	800	2,4	11	100	e
KP - x - 900 B - yyyy	36	894	846	944	2,8	11	100	e
KP - x - 1050 B - yyyy	42	1038	990	1088	3,2	11	100	e
KP - x - 1200 B - yyyy	48	1182	1134	1232	3,6	11	100	e
KP - x - 1350 B - yyyy	54	1326	1278	1376	4,1	11	100	e
KP - x - 1500 B - yyyy	60	1470	1422	1520	4,5	11	100	e
KP - x - 1650 B - yyyy	66	1614	1566	1664	4,9	11	100	e
KP - x - 1800 B - yyyy	72	1758	1710	1808	5,3	16	100	e
KP - x - 1950 B - yyyy	78	1902	1854	1952	5,7	16	100	e
KP - x - 2100 B - yyyy	84	2046	1998	2096	6,1	16	100	e
KP - x - 2200 B - yyyy	90	2190	2142	2240	6,5	16	100	e
KP - x - 2300 B - yyyy	96	2334	2286	2384	6,9	16	100	e
KP - x - 2450 B - yyyy	102	2478	2430	2528	7,3	16	100	e
KP - x - 2650 B - yyyy	108	2622	2574	2672	7,7	16	99,18	e

IDENTIFICATION CODE

Kp - a	900E	LFX1	-
Model	see tables pag 17		
Optics	see table pag 18-20		
Type of Muting	see tables pag 21		
Additional indicator	optional J = end cap LED		

BODY DETECTION



Resolution 55mm Range 0,5 - 15m Optical code "C"

Model	N° Beams	Protected height PH (mm)	Sensitive height SH (mm)	Barrier height H (mm)	Weight TX+RX (Kg)	Response time (ms)	MTTFd (years)	PL
KP - x - 300 C - yyyy	6	344	246	368	1,3	6	100	e
KP - x - 450 C - yyyy	9	488	390	512	1,7	6	100	e
KP - x - 600 C - yyyy	12	632	534	656	2,1	6	100	e
KP - x - 750 C - yyyy	15	776	678	800	2,5	6	100	e
KP - x - 900 C - yyyy	18	920	822	944	2,9	6	100	e
KP - x - 1050 C - yyyy	21	1064	966	1088	3,3	6	100	e
KP - x - 1200 C - yyyy	24	1208	1110	1232	3,7	6	100	e
KP - x - 1350 C - yyyy	27	1352	1254	1376	4,1	11	100	e
KP - x - 1500 C - yyyy	30	1496	1398	1520	4,5	11	100	e
KP - x - 1650 C - yyyy	33	1640	1542	1664	4,9	11	100	e
KP - x - 1800 C - yyyy	36	1784	1686	1808	5,3	11	100	e
KP - x - 1950 C - yyyy	39	1928	1830	1952	5,6	11	100	e
KP - x - 2100 C - yyyy	42	2072	1974	2096	6,0	11	100	e
KP - x - 2200 C - yyyy	45	2216	2118	2240	6,4	11	100	e
KP - x - 2300 C - yyyy	48	2360	2262	2384	6,9	11	100	e
KP - x - 2450 C - yyyy	51	2504	2406	2528	7,3	11	100	e
KP - x - 2650 C - yyyy	54	2648	2550	2672	7,7	11	100	e
KP - x - 2750 C - yyyy	57	2792	2694	2816	8,1	11	100	e
KP - x - 2900 C - yyyy	60	2936	2838	2960	8,5	11	100	e
KP - x - 3000 C - yyyy	63	3080	2982	3104	8,9	11	100	e





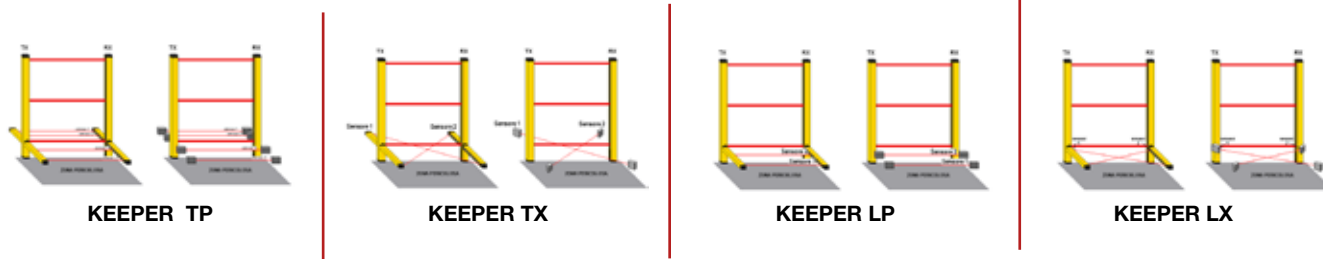
ACCESS CONTROL DETECTION

Resolution 125 mm Range 0,5 - 15 m Optical code "D"							
Model	N° Beams	Sensitive height SH (mm)	Barrier height H (mm)	Weight TX+RX (Kg)	Re-sponse time (ms)	MTTFd (years)	PL
KP - x - 350 D - yyyy	4	366	465	1,6	6	100	e
KP - x - 600 D - yyyy	6	606	705	2,8	6	100	e
KP - x - 850 D - yyyy	8	846	945	3,2	6	100	e
KP - x - 1050 D - yyyy	10	1086	1185	4,2	6	100	e
KP - x - 1350 D - yyyy	12	1326	1425	4,8	6	100	e
KP - x - 1550 D - yyyy	14	1566	1665	5,4	6	100	e
KP - x - 1800 D - yyyy	16	1806	1905	6,0	6	100	e
KP - x - 2050 D - yyyy	18	2046	2145	6,6	6	100	e
KP - x - 2250 D - yyyy	20	2286	2385	7,2	6	100	e
KP - x - 2550 D - yyyy	22	2526	2625	7,8	6	100	e
KP - x - 2750 D - yyyy	24	2766	2865	8,4	6	100	e
KP - x - 3050 D - yyyy	26	3006	3105	9,0	11	100	e

Resolution 306 mm Range 0,5 - 15 m Optical code "E"							
Model	N° Beams	Sensitive height SH (mm)	Barrier height H (mm)	Weight TX+RX (Kg)	Response time (ms)	MTTFd (years)	PL
KP - x - 300 E - yyyy	2	306	457	1,5	6	100	e
KP - x - 650 E - yyyy	3	606	757	1,9	6	100	e
KP - x - 900 E - yyyy	4	906	1057	3,0	6	100	e
KP - x - 1200 E - yyyy	5	1206	1357	4,1	6	100	e
KP - x - 1550 E - yyyy	6	1506	1657	5,2	6	100	e
KP - x - 1800 E - yyyy	7	1806	1957	6,3	6	100	e
KP - x - 2250 E - yyyy	8	2106	2257	7,4	6	100	e
KP - x - 2400 E - yyyy	9	2406	2557	8,5	6	100	e
KP - x - 2750 E - yyyy	10	2706	2857	9,6	6	100	e
KP - x - 3000 E - yyyy	11	3006	3157	10,7	6	100	e



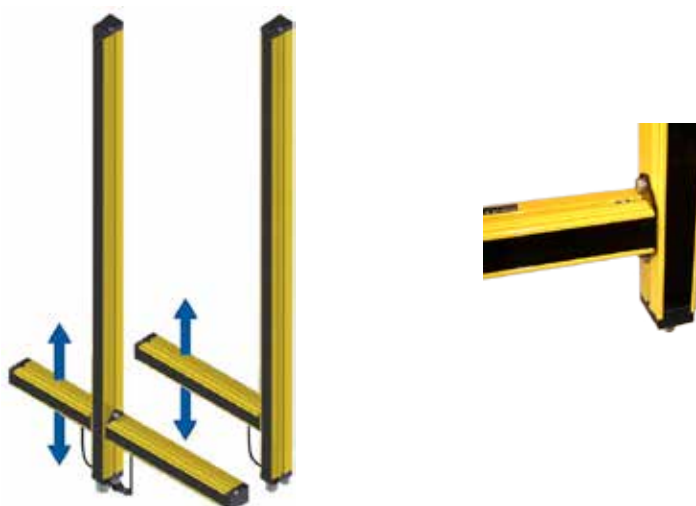
MODEL WITH MUTING ARMS



MODEL Muting	Mobile arms
LPM1	2 mobile sensors with parallel beams and receiver right
LPM2	2 mobile sensors with parallel beams and receiver left
LXM1	2 mobile sensors with crossed beams and receiver right
LXM2	2 mobile sensors with crossed beams and receiver left
TXM1	2 mobile sensors with crossed beams and receiver right
TXM2	2 mobile sensors with crossed beams and receiver left
TPM3	4 mobile sensors with parallel beams
MODEL Muting	Fixed arms
LPF1	2 fixed sensors with parallel beams and receiver right
LPF2	2 fixed sensors with parallel beams and receiver left
LXF1	2 fixed sensors with crossed beams and receiver right
LXF2	2 fixed sensors with crossed beams and receiver left
TXF1	2 fixed sensors with crossed beams and receiver right
TXF2	2 fixed sensors with crossed beams and receiver left
TPF3	4 fixed sensors with parallel beams
MODEL Muting	External muting sensors
TPI3	4 external sensors with parallel beams
TXI3	2 external sensors with crossed beams
LPI3	2 external sensors with parallel beams
LXI3	2 external sensors with crossed beams

NOTE

Receiver right and left are referred to the position of the receiver observing the area protected from outside.



LIGHT CURTAINS FOR AUTOMATION

OVERVIEW

These are devices for industrial and civil applications requiring the detection, measurement and recognition of variously shaped objects.

The NI series are realized to detect object starting from 0,9mm diameter. Due to the principle of operation, is very effective the detection of flat sheet of small thickness of any kind of material. The detection is not dependent from material type and colour. Are so suitable to detect plastic, metal, wood, and in many cases glass and other transparent materials. There are two output. If there is a +24V the light curtains beams are busy, otherwise if the beams are free the output is 0V.

The NS series are systems formed by a transmitter and a receiver that produces a zone of parallel beams to detect the presence, the form and the position of an object and communicate it to the control system. Different outputs and communication systems are available. The version with analog output provides a voltage or current variation (0-10 V or 4-20 mA. The version with RS485 serial interface Mod-Bus protocol, and give the indication of the status of every beam. Especially used in painting plants, lapping and where is important to know the location, size and holes in the workpiece.

NS APPLICATIONS

- Dimensional measurement of objects.
- Process control.
- Level control.
- Measuring for packaging systems.

NI APPLICATIONS

- Shape detection for painting plants and similar.
- Dimensional detection
- Automatic packaging plants
- Loop control

COMPLIANCE

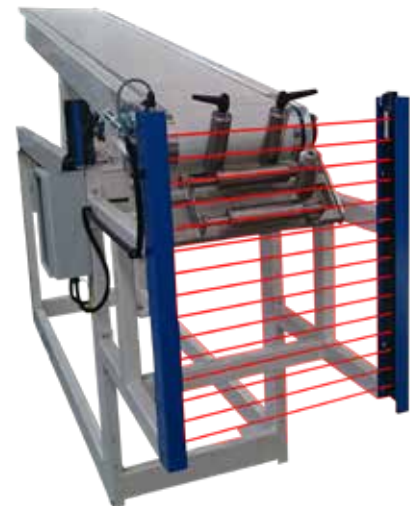
2006/42/EC	Machinery Directive
2014/30/EC	Electromagnetic compatibility Directive.
IEC 60947-5-2	Low-voltage switchgear and controlgear - Part 5-2: Control circuit devices and switching elements Proximity switches.
EN 61000	Electromagnetic compatibility.

NS TECHNICAL CHARACTERISTICS

Power supply	24Vdc \pm 20%
Current supply	300 mA
Resolution	3- 6-12, 14-26, 12, 26, 50, 55 mm
Maximum range (depending from the resolution)	4, 5, 10 m
Detection height	From 80 mm to 2900 mm
Response time	From 1 to 17ms
Output	0-10V, 4-20mA, RS 485 MODBUS RTU
Enclousure dimension	20X40 mm
IP protection	IP65

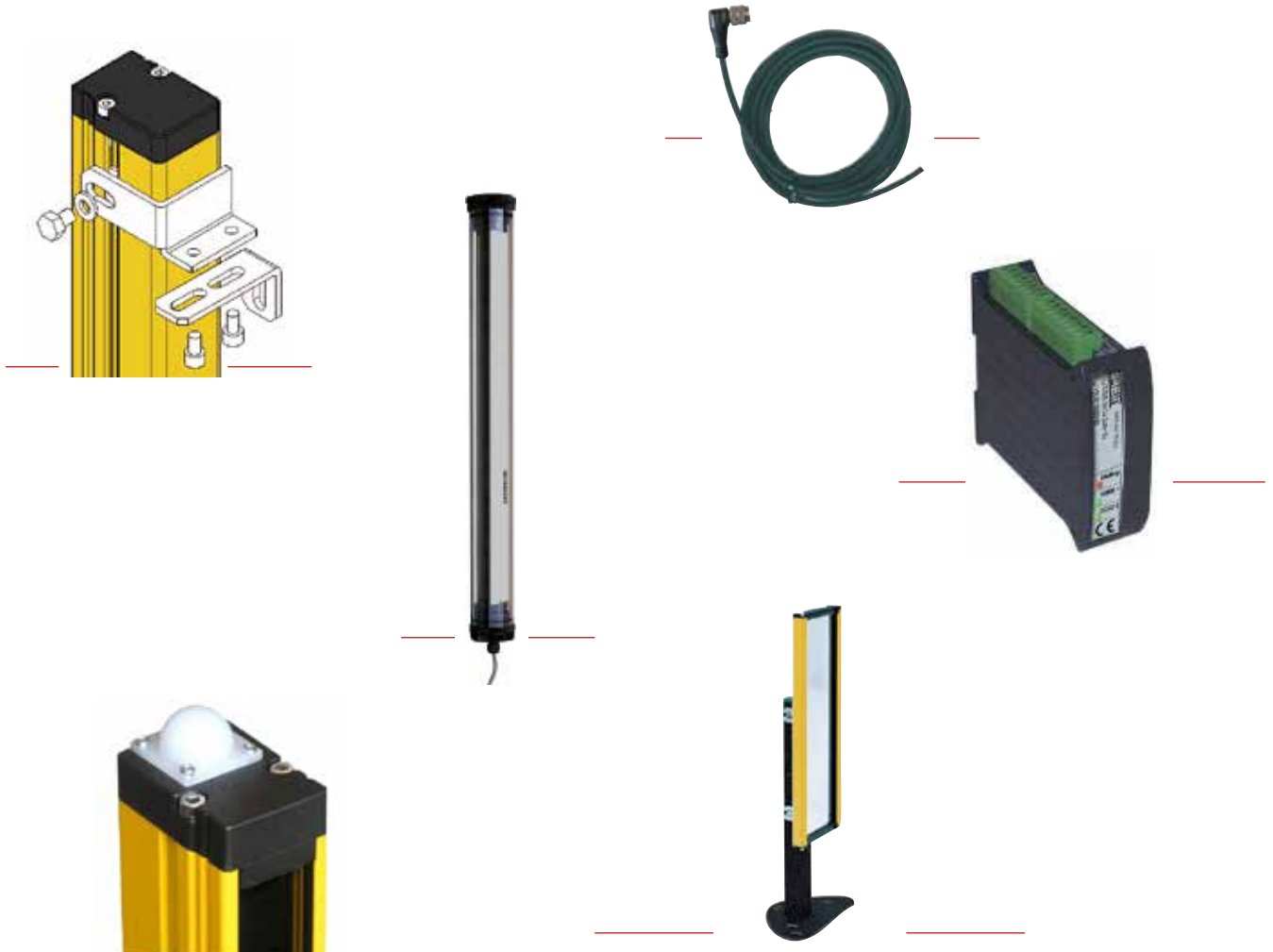
NI TECHNICAL CHARACTERISTICS

Power supply	24Vdc \pm 20%
Current supply	300 mA
Resolution	0.9, 2, 4, 8, 12, 25 mm
Maximum range (depending from the resolution)	From 500 to 8000
Detection height	From 35 mm to 3000 mm
Response time	From 0.4 to 30ms
Output	Dark ON + Dark OFF NPN + PNP 100 mA
Enclousure dimension	20X40 mm
IP protection	IP65



For more details see
www.grein.it

ACCESSORIES



This category includes a series of components to meet various other market requirements .

- acrylic protection to render watertight barriers (IP 67).
- mirrors and floor posts for perimeter protection.
- connection cables from 3 to 20 m.
- brackets for installation of the curtains.
- interface modules for transforming solid state into safety power relay outputs.

ACRYLIC PROTECTION

To render barriers watertight (IP 67) for protection against the water jets; suitable for spray washing of machine. Only EF-a, EF-b, EF-c EFESTO4 safety light curtains model can be used with acrylic protection.

IDENTIFICATION CODES

IDENTIFICATION CODES ACRYLIC PROTECTION		
Model	Light Curtain Model	Code
VET-1	from 0150 to 0300	D-01
VET-2	from 0350 to 0600	D-02
VET-3	from 0650 to 0900	D-03
VET-4	from 0950 to 1250	D-04
VET-5	from 1300 to 1500	D-05
VET-6	from 1550 to 1950	D-06
BRACKET IDENTIFICATION CODE		
Model	Description	Code
VET-70/60	Kit complet with 4 brackets	D-10



HEATED ACRYLIC PROTECTION

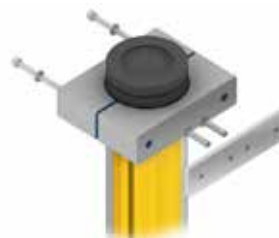
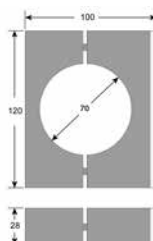
Problems with barrier operation may occur in winter at low temperatures (ice or frost). This is remedied by fitting two elements (24 V DC/AC) to the sides of the tube with adhesive to produce enough heat (thermostat control) to eliminate the external film of moisture and ensure system operation down to -15° C. The output cable is formed by 6 wires: 4 for the barrier and 2 for resistance. Only EF-a, EF-b, EF-c EFESTO4 safety light curtains model can be used with acrylic protection.

IDENTIFICATION CODES HEATED ACRYLIC PROTECTION		
Model	Light Curtain Model	Code
VET-1	from 0150 to 0300	DR-01
VET-2	from 0350 to 0600	DR-02
VET-3	from 0650 to 0900	DR-03
VET-4	from 0950 to 1250	DR-04
VET-5	from 1300 to 1500	DR-05
VET-6	from 1550 to 1950	DR-06
BRACKET IDENTIFICATION CODE		
Model	Description	Code
VET-70/60	Kit including with 4 brackets	DR-10

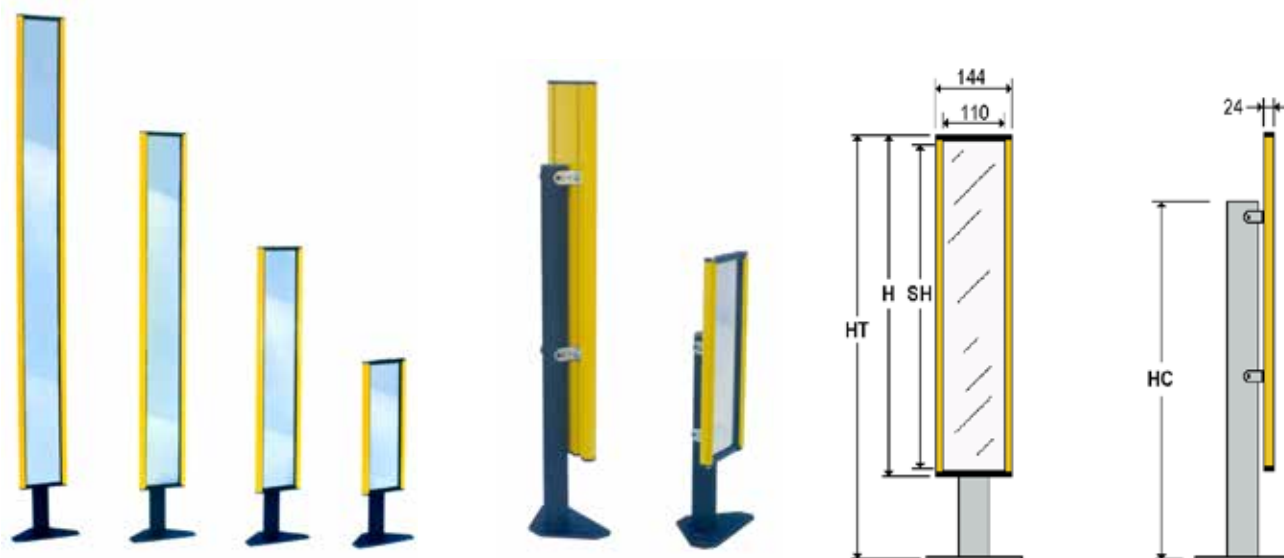
BRACKETS

The dimensions of the barriers are reported from page 10 to 15 adding 90 mm due to the thickness of the caps plus 25 mm of cable gland.

VET - 70/60

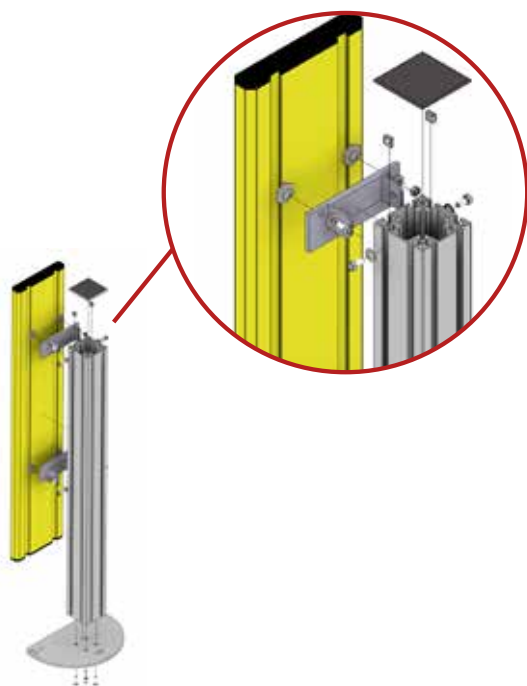


MIRRORS



MIRRORS TABLE

MODEL	SH mm	H mm	HC mm	HT min : max	Code
WAB 501	370	390	385	400 : 570	D-50
WAB 502	690	710	705	720 : 1050	D-51
WAB 503	1010	1030	1025	1040 : 1530	D-52
WAB 504	1330	1350	1345	1360 : 2010	D-53
WAB 505	1650	1670	1345	1680 : 2320	D-54
WAB 506	1810	1830	1345	1840 : 2480	D-55
WAB 507	1970	1990	1345	2000 : 2640	D-56



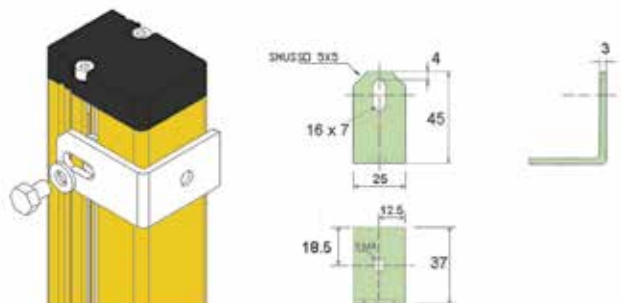
FLOOR POST TABLE

MODEL	HC (mm)	Code
SCFS-3022	385	D-61
SCFS-3023	705	D-62
SCFS-3024	1025	D-63

BRACKETS

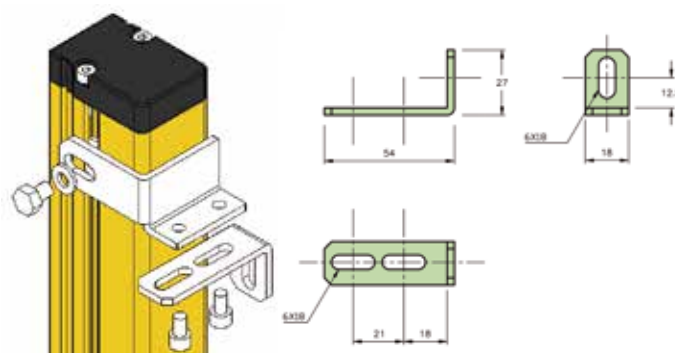
Bracket model STGM

Simple L bracket for easy adjustment of the curtain .The special nut inside the aluminium profile allows the barrier height to be easily adjusted .



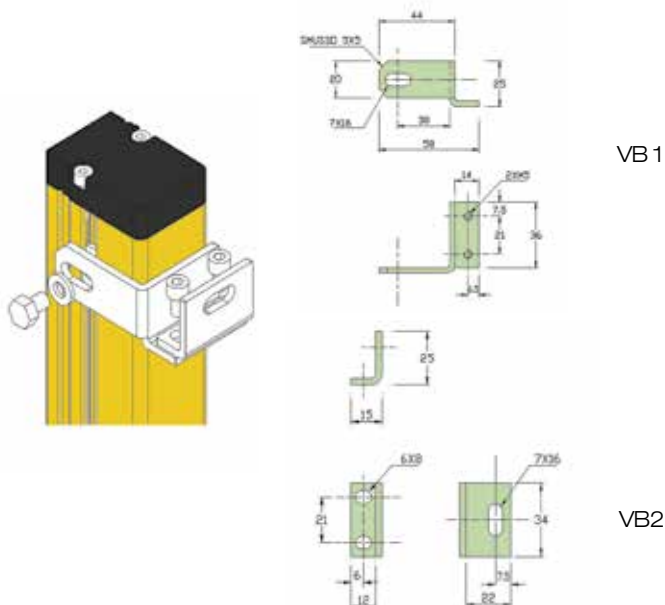
Bracket model STDL

Double "L" bracket for lateral fixing of the barrier with angular and lateral regulation .



Bracket model STVB

Compact bracket comprising two parts - VB1 and VB2 – allowing installation in confined space and easy adjustment on three axes.



Cross section of aluminium profile

Along the profile there is a channel in which threaded elements for fixing the brackets can slide .If they have to be removed to put them in the channel on the opposite side, remove the black cap of the barrier without a connector by removing the two anchor screws .



INTERFACE MODULES

The interface module contains all the main functions required for the remotely management of EFESTO4/KEEPER barriers. It constitutes a point of support as interface between barrier and the machine. The use of key switches, designed to increase the safety level of the light curtain in order to ensure that the restart could be done only by authorized and qualified person.



- REL011 Module at DIN connection.
- REL012 Module at DIN connection with driver lamp for MUTING



REL 021 B Module with reset key and output state lamp for EF-b.



REL 021 D Module with reset key and output state lamp for EF-d.



REL 022 E Module with reset key, guard override key, output state lamp and muting lamp for EF-e, KP-e.



REL 022 F Module with reset key, guard override key, output state lamp and muting lamp for EF-f, KP-f1, KP-f2, KP h and KP k.

SIGNALING LAMP

The optional lamp integrated inside the upper end cap of the barrier, provides information on the status of the OSSD and the MUTING function. The MUTING lamp function is provided for the “e, f1, f2” versions. In the following table there are relationships between the state of the lamp and the active functions of the barrier.

LIGHT CURTAIN STATE	LAMP COLOR
OSSD OFF	RED
OSSD ON	GREEN
ACTIVE MUTING	YELLOW



EFESTO4, KEEPER CONNECTIONS CABLES

Code	Description	
E-84-05	Cable M12 4 poles straight shielded female 5m for TX	
E-84-10	Cable M12 4 poles straight shielded female 10m for TX	
E-84-15	Cable M12 4 poles straight shielded female 15m for TX	
E-84-20	Cable M12 4 poles straight shielded female 20m for TX	
E-84-25	Cable M12 4 poles straight shielded female 25m for TX	
E-84-30	Cable M12 4 poles straight shielded female 30m for TX	
E-84S-05	Cable M12 4 poles angled shielded female 5m for TX	
E-85-05	Cable M12 5 poles straight shielded female 5m for RX a / d / e	
E-85-10	Cable M12 5 poles straight shielded female 10m for RX a / d / e	
E-85-15	Cable M12 5 poles straight shielded female 15m for RX a / d / e	
E-85-20	Cable M12 5 poles straight shielded female 20m for RX a / d / e	
E-85-25	Cable M12 5 poles straight shielded female 25m for RX a / d / e	
E-85-30	Cable M12 5 poles straight shielded female 30m for RX a / d / e	
E-85S-05	Cable M12 5 poles angled shielded female 5m for RX a / d / e	
E-88-05	Cable M12 8 poles straight shielded female 5m for RX b / c / d / e	
E-88-10	Cable M12 8 poles straight shielded female 10m for RX b / c / d / e	
E-88-15	Cable M12 8 poles straight shielded female 15m for RX b / c / d / e	
E-88-20	Cable M12 8 poles straight shielded female 20m for RX b / c / d / e	
E-88-25	Cable M12 8 poles straight shielded female 25m for RX b / c / d / e	
E-88-30	Cable M12 8 poles straight shielded female 30m for RX b / c / d / e	
E-88S-05	Cable M12 8 poles angled shielded female 5m for RX b / c / d / e	
E-88S-10	Cable M12 8 poles angled shielded female 10m for RX b / c / d / e	
E-817-05	Cable M23 17 poles straight shielded female 5m for RX f	
E-94-05	Cable M12 4 poles straight shielded 2 female 5m for TX-Rel 021/ 022	
E-95-05	Cable M12 5 poles straight shielded 2 female 5m for RX-Rel 021/ 022	
E-98-05	Cable M12 8 poles straight shielded 2 female 5m for RX-Rel 021/ 022	
E-94-10	Cable M12 4 poles straight shielded 2 female 10m for TX-Rel 021/ 022	
E-95-10	Cable M12 5 poles straight shielded 2 female 10m for RX-Rel 021/ 022	
E-98-10	Cable M12 8 poles straight shielded 2 female 10m for RX-Rel 021/ 022	
E-917-10	Cable M23 17 poles straight shielded 2 female 10m per RX f -Rel 021/ 022	
E-84-D	Female screw connector M12 4 poles straight	 
E-85-D	Female screw connector M12 5 poles straight	
E-88-D	Female screw connector M12 8 poles straight	
E-84-S	Female screw connector M12 4 poles angled	
E-85-S	Female screw connector M12 5 poles angled	
E-88-S	Female screw connector M12 8 poles angled	
E-85-Y	Cable with M12 5 poles female connector + 2 M12 4 poles female connector for external muting sensors	
E-88-Y	Cable with M12 8 poles connector + 2 M12 5 poles female connector for external muting sensors	

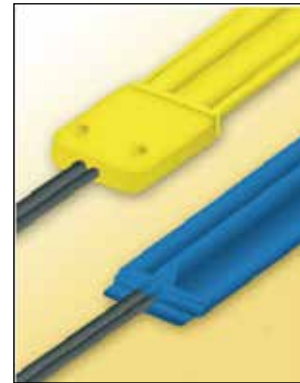
RIBBON SWITCHES

OVERVIEW

The ribbon switches are made of a special PVC sheath within which is housed the sensor (NO contact) which provides an electrical signal when any external crushing action is exerted on the ribbon switch. A profile of aluminum complete the device for its fitting to the machine. The connection with control unit are with two wire for non safety application, two wire with internal resistor or four wire for safety application. They are also available in do-it-yourself kits for self made fabrication and installation. The ribbon switches are compliant with **EN 13856-2**. The ribbon switch in combination with PS3 control module can reach the **CAT 3 - PL "e"** how indicated in the ISO 13849-1 standard.

APPLICATIONS

- Switches of emergency on every type of machine
- Control on conveyors
- Entry signallings for doors opening
- Drive chronometers trigger for swimming pools



COMPLIANCE

2006/42/EC	Machinery Directive
2014/30/EC	Electromagnetic compatibility Directive.
EN 13856-2	Safety of machinery - Pressure-sensitive protective devices - Part 2: General principles for design and testing of pressure - sensitive edges and pressure-sensitive bars.



TECHNICAL CHARACTERISTICS

ELECTRICAL CHARACTERISTICS FOR ALL RIBBON SWITCHES	
Power supply max	32Vdc
Current max	1A
Dielectric resistance	1000 Vdc
Electrical resistance	0.6 ohm al metro
Working temperature	-15 + 65 °C
Degree protection	IP65
Number of operation	3.000.000
Weight	
MECHANICAL CHARACTERISTICS	
Actuating force	2N (0.2Kg)
Bend radius	10mm
Aluminium profile	Type 404
Terminals	Type D
Applications	Lower profile for tight spaces or to prevent accidental actuation.
Actuating force	5N (0.5Kg)
Bend radius	15mm
Aluminium profile	Type 406
Terminals	Type C
Applications	General purpose switch for industrial, medical, and transportation applications.

IDENTIFICATION CODE

		Model	lengths	cables	output side	L cavi	scaling	aluminium channel
Ribbon blue color	102-A							
Ribbon yellow color	202-L							
To specify in mm								
4 wires fail safe	F							
2 wires fail safe with R=8,2KOhm	R							
2 wires no safety	S							
Only one side	O							
From two sides	E							
From final sides (with R=8,2KOhm)	X							
500 mm	1							
2000 mm	2							
On request	3							
Sealing with connector	C							
Sealing with connector	D							
Sealing with welding	LD							
Aluminium channel type 404-406	Y							
No channel	N							

Note: The ribbon switch with internal resistor has two wire.

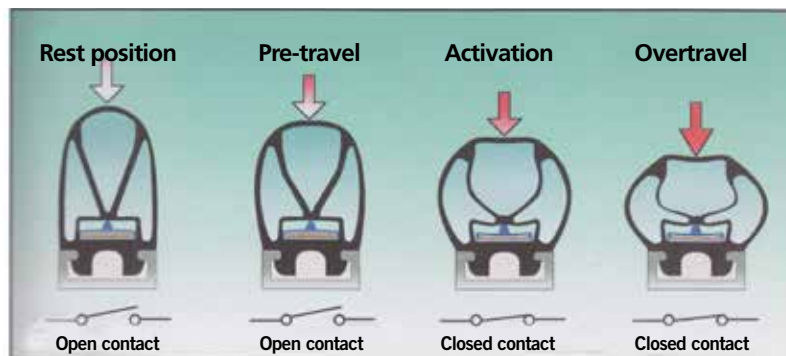
SAFETY EDGES

OVERVIEW

The safety edges are made in a durable material within which is housed the sensor (NO contact) which provides an electrical signal when any external pressure action is exerted on the ribbon switch. A profile of aluminum complete the device for its attachment to the machine. They are in a range of different profiles and sensitivities to suit various applications, perimeter protection, angular protection and other. The edges can be supply by special design of the customer. The housing material is EPDM or NBR. The connection with control unit are with two wire for non safety application, two wire with internal resistor or four wire for safety application. They are also available in do-it-yourself kits for field fabrication and installation. The safety edges are compliant with **EN 13856-2**. The edges in combination with PS3 control module can reach the **CAT 3 - PL "e"** how indicated in the ISO 13849-1 standard.

To choose the right bump switch for the application required, consider the following three characteristics which define performance:

- Application, finger detection or other part of body detection.
- Activation force before closing of the internal contact.
- Internal contact activation after activation force.
- Overtravel distance after the contact closure



APPLICATIONS

- Switches of emergency on every type of machine
- Doors and industrial gates
- Entry signalings for doors opening
- Personnel lifts
- Automatic store
- Conveyor systems
- Robotic areas

COMPLIANCE

2006/42/EC Machinery Directive

2014/30/EC Electromagnetic compatibility Directive.

EN 13856-2 Safety of machinery -- Pressure-sensitive protective devices -- Part 2: General principles for design and testing of pressure-sensitive edges and pressure-sensitive bars.

EN 12978 Industrial, commercial and garage doors and gates - Safety devices for power operated doors and gates - Requirements and test methods.

TECHNICALS CHARACTERISTICS

ELECTRICAL/MECHANICAL CHARACTERISTICS FOR ALL SAFETY EDGES	
Max voltage	32Vdc
Max current	1A
Dielectric resistance	1000 Vdc
Electrical Resistance	0.6 ohm / m
Material hardness	70 Shore
Internal contact	Normal open
Operating temperature	-15 + 65°C @ 10mm/s, 0 +65°C @ 100mm/s
Protection degree	IP56 o IP65
Number of operations	3.000.000
Cable material	PVC other on request
Sensor mounting orientations	A, B - EN13852-2
Max length	60 m
Dead zone at the end	25 mm
Max length cable	250 m copper 0.35mm ²
Max cable length between edges	Equal to max length of the single edge

CHEMICAL COMPATIBILITY - EPDM SAFETY EDGES

SUBSTANCE	EFFECT (note 1)	CONTACT (note 2)
Alcohol	no effect	permanent
Water	no effect	permanent
Hydrocarbons	extreme	avoid
Dilutes base	few	some
Dilutes acid	few	some
Vegetable oils	severe	very brief
Oxidizing acids	extreme	avoid
Not oxidizing acids	few	some

CHEMICAL COMPATIBILITY - NBR SAFETY EDGES

SUBSTANCE	EFFECT (note 1)	CONTACT (note 2)
Alcohol	no effect	permanent
Water	no effect	permanent
Hydrocarbons	extreme	avoid
Dilutes base	few	some
Dilutes acid	few	some
Vegetable oils	severe	very brief
Oxidizing acids	extreme	avoid
Not oxidizing acids	few	some

Note1 Effects that are found on the surface after contact with substance.

Note 2 Type of contact between edge and substance. This list is only a guideline. The customer, in critical applications, should test the edge with the substance.



Theater stage and auditorium



Medical equipment



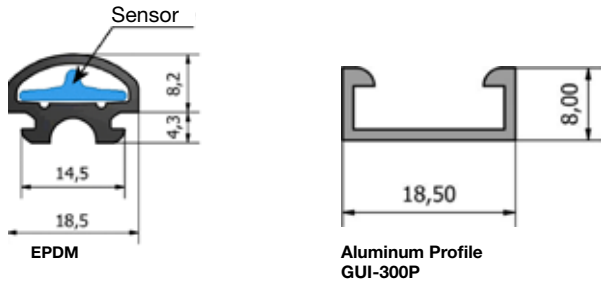
Factory automation



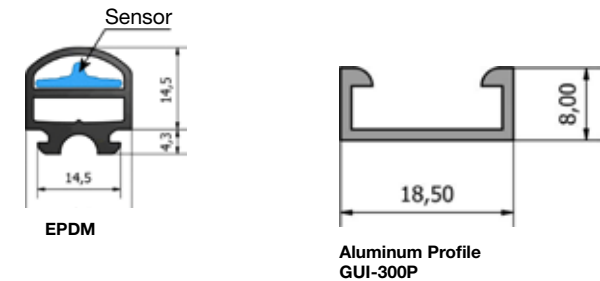
Transportation and disabled accessibility

SAFETY EDGES

EDGE GR-306



EDGE GR-316



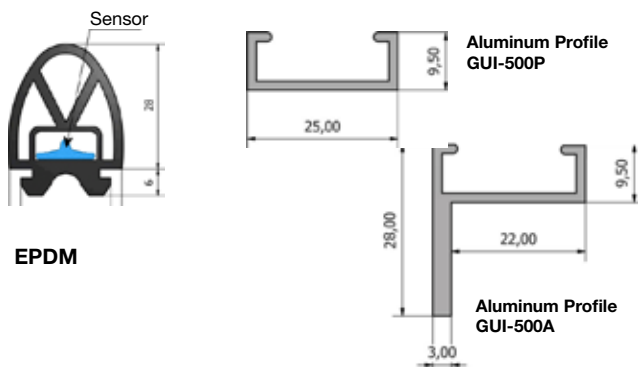
MECHANICAL CHARACTERISTICS

DESCRIPTION	Speed 10 mm/s
Pre-travel	1.5 mm
Working travel 250N	3.4 mm
Working travel 400N	4.1 mm
Working travel 600N	4.8 mm
Overtravel 250N	1.9 mm
Overtravel 400N	2.6 mm
Overtravel 600N	3.3 mm
Actuating force test rod 20mm	16 N (1.6Kg) @20°C
Actuating force test rod 80mm	56 N (5.6Kg) @20°C
Weight	0.3 Kg/m
Applications	Suitable for fingers detection
Effective sensing angle	20°

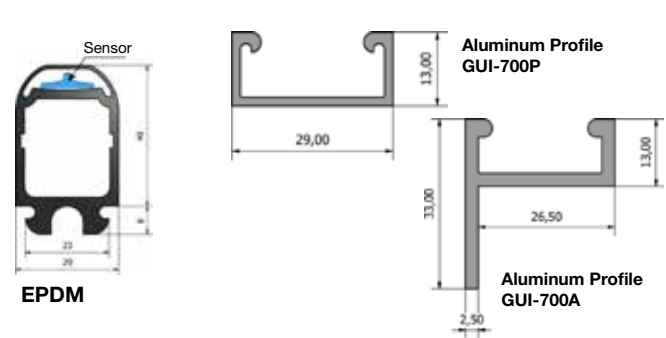
MECHANICAL CHARACTERISTICS

DESCRIPTION	Speed 10 mm/s
Pre-travel	2 mm
Working travel 250N	4.8 mm
Working travel 400N	6.0 mm
Working travel 600N	7.3 mm
Overtravel 250N	2.8 mm
Overtravel 400N	4.0 mm
Overtravel 600N	5.3 mm
Actuating force test rod 20mm	11 N (1.1Kg) @20°C
Actuating force test rod 80mm	45 N (4.5Kg) @20°C
Weight	0.35 Kg/m
Applications	Suitable for fingers detection
Effective sensing angle	70°

EDGE GR-503



EDGE GR-747



MECHANICAL CHARACTERISTICS

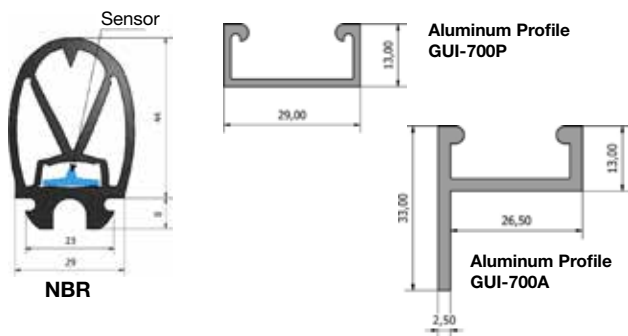
DESCRIPTION	Speed 10 mm/s
Pre-travel	6.9 mm
Working travel 250N	11.6 mm
Working travel 400N	14.3 mm
Working travel 600N	16.1 mm
Overtravel 250N	4.7 mm
Overtravel 400N	7.4 mm
Overtravel 600N	9.2 mm
Actuating force test rod 80mm	147 N (14.7 Kg) @ 20°C
Weight	0.6 Kg/m
Applications	Not Suitable for fingers detecting
Effective sensing angle	20°

MECHANICAL CHARACTERISTICS

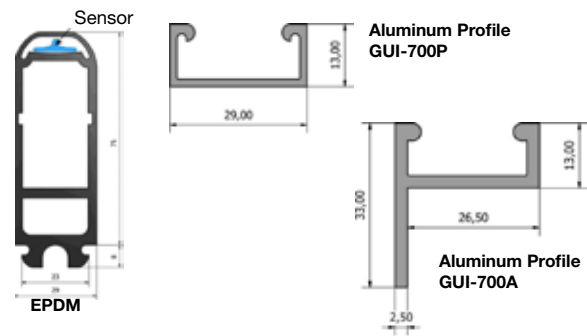
DESCRIPTION	Speed 10 mm/s
Pre-travel	1.7mm
Working travel 250N	22.4 mm
Working travel 400N	26.2 mm
Working travel 600N	28.1 mm
Overtravel 250N	20.7 mm
Overtravel 400N	24.5 mm
Overtravel 600N	26.4 mm
Actuating force test rod 20mm	11 N (1.1Kg) @ 20°C
Actuating force test rod 80mm	36 N (3.6Kg) @ 20°C
Weight	0.7 Kg/m
Applications	Suitable for fingers detection
Effective sensing angle	40°

SAFETY EDGES

EDGE GR-748



EDGE GR-757



MECHANICAL CHARACTERISTICS

DESCRIPTION	Speed 10 mm/s
Pre-travel	2.5 mm
Working travel 250N	13 mm
Working travel 400N	20 mm
Working travel 600N	24 mm
Overtravel 250N	10.5 mm
Overtravel 400N	17.5 mm
Overtravel 600N	21.5 mm
Actuating force test rod 80mm	116 N (11.6 Kg) @ 20°C
Weight	0.9 Kg/m
Applications	Not Suitable for fingers detecting
Effective sensing angle	40°

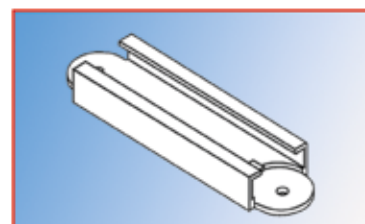
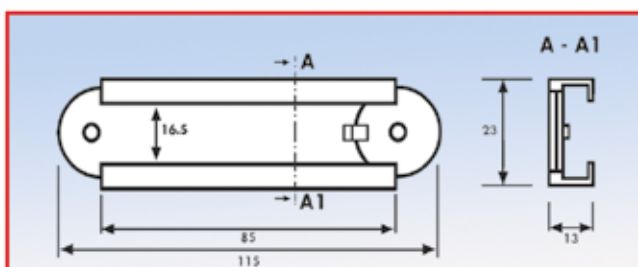
MECHANICAL CHARACTERISTICS

DESCRIPTION	Speed 10 mm/s
Pre-travel	1.3 mm
Working travel 250N	36.7 mm
Working travel 400N	44.0 mm
Working travel 600N	47.4 mm
Overtravel 250N	35.4 mm
Overtravel 400N	42.7 mm
Overtravel 600N	46.1 mm
Actuating force test rod 20mm	66 N (6.6Kg) @ 20°C
Actuating force test rod 80mm	20 N (2.0Kg) @ 20°C
Weight	1.1 Kg/m
Applicatons	Suitable for fingers detection
Effective sensing angle	20°

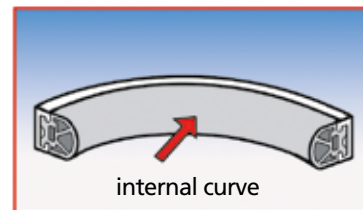
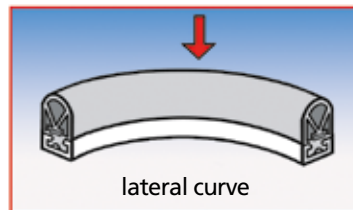
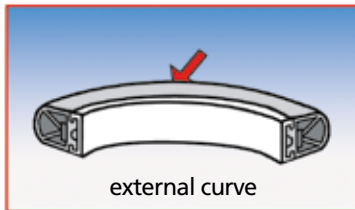
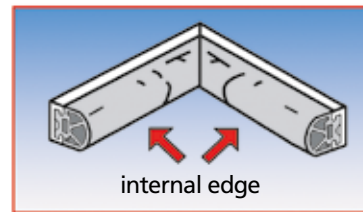
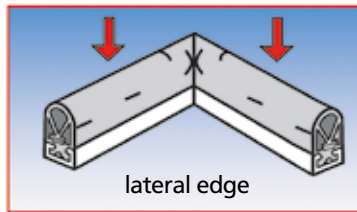
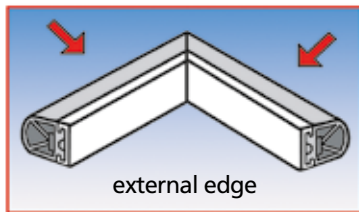
Bended EDGES

The BS-3 support is designed to solve the problem of bended edges in a very simple way irrespective of the radius required and only for GR 503 – GR 747 – GR 748. The min .radius is 1.5 m. This solution has big advantages in that the radius is not binding, so the customer can decide the bend value.

Overall dimensions of type BS3



SPECIAL EDGES

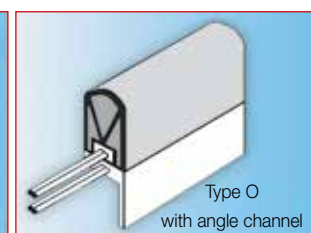
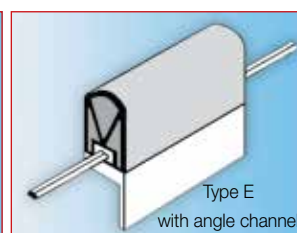
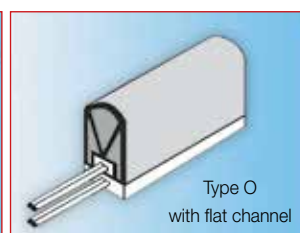
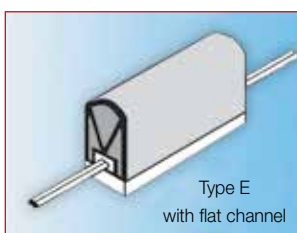


IDENTIFICATION CODE

	Model	length	type of channel	material of channel	cable	cable output	cable length	tappi fitted
GR-306 in EPDM	= 306							
GR-316 in EPDM	= 316							
GR-503 in EPDM	= 503							
GR-747 in EPDM	= 747							
GR-748 in NBR	= 748							
GR-757 in EPDM	= 757							
to specify in mm								
flat to every type	= F							
angle for GR-747-748-757	= A							
curve for GR-503-747-748-757	= C							
aluminium	= A							
PVC for curves edges	= P							
fail safe 4 wires	= F							
fail safe 2 wires (with R=8,2KOhm)	= R							
no safe 2 wires	= S							
output only one side	= O							
output on two sides	= E							
output with final resistor	= X							
500 mm	= 1							
2000 mm	= 2							
on request	= 3							
end caps for type GR-306-316-503-747-748-757	= Y							
no caps	= N							

The cap can close all edge or only sensor zone.

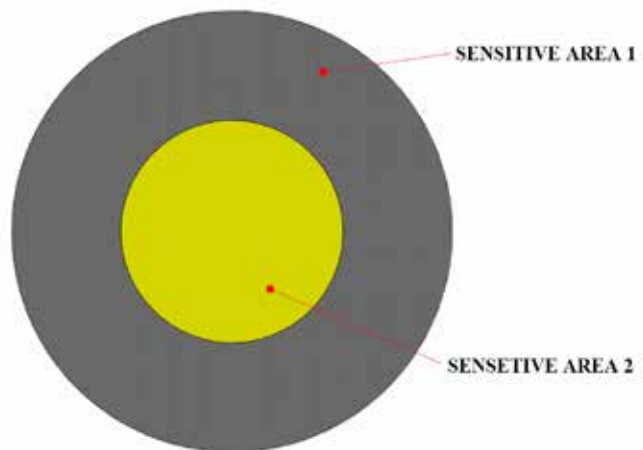
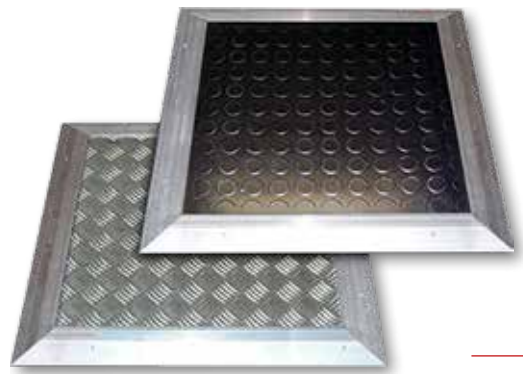
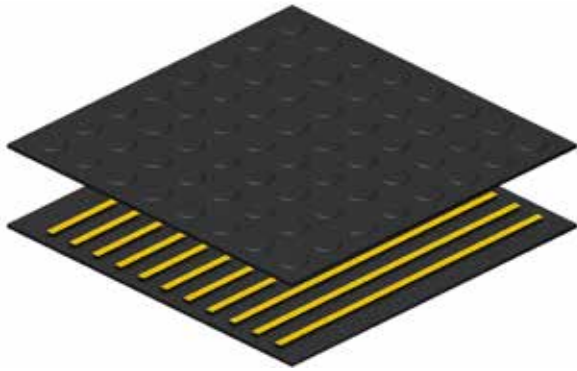
The terminal connection can be realized with M12 male or female connector.



EDGES APPLICATIONS



SAFETY MATS



OVERVIEW

The mats are a product of high quality encapsulated between two layers of vinyl resin with special additives in carbon to give greater abrasion resistance to ensure an IP65 sealing and high resistance to external agents such as water, oils, mineral salts, acids, dust. They are very resistant to shock, vibration and flammability as a self-extinguishing. The mats can be supplied with any shape and dimension (also circular) as requested by the customer. An aluminium edge is used to fix the mats in position on the floor. The connection with control unit are with two wire for non safety application, two wire with internal resistor or four wire for safety application. The termination of the connection cable can be with M12, M8 connector or free wires.

The mats models are:

- TO - Standard type in bubble black color in PVC
- TX - Standard type circular in bull PVC
- MO - Standard type plus aluminum protection cover
- MZ - Standard type as MO plus zinc metal sheet on the bottom

The MZ mat is used where the surface of the floor is not uniform. The TX mat is used inside circular doors of banks, shopping centers and other. The mat can be supplied with one or two sensitive areas.

The safety mats are compliant with **EN 13856-1**. The mats in combination with PS3 control module can reach the **CAT 3 - PL "e"** how indicated in the ISO 13849-1 standard.

APPLICATIONS

- Automatic store
- Conveyor systems
- Wood machinery
- Assembly line
- Mobile escalators
- Lifts
- Robotic areas
- Bank doors
- Shopping centers



COMPLIANCE

2006/42/EC	Machinery Directive
2014/30/EC	Electromagnetic compatibility Directive.
EN 13856-1	Safety of machinery -- Pressure-sensitive protective devices -- Part 1: General principles for design and testing of pressure-sensitive mats and pressure-sensitive floors
EN 12978	Industrial, commercial and garage doors and gates - Safety devices for power operated doors and gates - Requirements and test methods.

SAFETY MATS

TECHNICAL CHARACTERISTICS

SafetyLevel	PL = e with PS3-Ax unit control
Maximum dimensions of single mat	1500 X 2500 mm
Top layer	PVC black da 4 mm
Bottom layer	PVC black da 2 mm
Overall thickness	9 mm
Weight	12 Kg / m2
Actuating force with 80 mm test rod	25 Kg
Actuating force with 200 mm test rod	45 Kg
static load	60 Kg/cm2
Dead zone	30 mm perimetral
Working temperature	-10° a + 60°C
Protection rating	IP65
B10d	3 millions of operation
Response time	50 ms
Max. voltage	32 Vdc
Max. current	100 mA
Output contact	N.O. four wire or two wire
Max length connections mat/control unit	100 m, copper 0.35 mm ²

CHEMICAL COMPATIBILITY

SUBSTANCE	EFFECT (NOTE 1)	CONTACT (NOTE 2)
Alcool	Few effects	Some effects
Water	No effect	Permanent contact
Dilutes ammonia	Few effects	Some effects
Hydorcabons aliphatic/benzene	Extreme effects	Avoid contact
Dilutes acid	Few effects	Some contact
hydrochloric acid	Few effects	Some contact
Trichloroethylene	Extreme effects	Avoid contact
Ethyl	Extreme effects	Avoid contact

Note 1 - Effects that are found on the surface of the mat after contact with the substance.

Note 2 - Type of compatibility between mat and the substance.

ACCESSORIES

The mat can be supplied with this accessories.

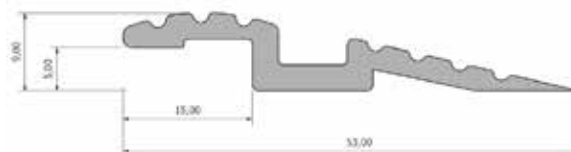
ALLUMINIUM PROFILE GUI-TP1

for mats model TO - MO



ALLUMINIUM PROFILE GUI-TP2

for mats model TO



MATS APPLICATIONS



SAFETY BUMPER

OVERVIEW

They are utilized to prevent collision of the operator against vehicles or movement machines. The bumper are able to absorb the impact and to produce a signal to stop the machine. The operating principle is very simple. With a minimum compression of the bumper, after a pre-travel, the internal contact produces the command signal for stopping the machine. After the pre-travel the bumper allows yet to compression (over-travel) that permit to cushion the impact of the person against the machinery. This sensing device utilizes a highly durable and flexible thermoplastic material which when pressed, closes the internal sensors. They are formed by a poliuretanic foam (designed under customer drawing) with ribbon switches incorporated inside. The bumper is designed for fail-safe circuit to ensure proper monitoring of the system.

The safety bumper are compliant with **EN 13856-3**. The mats in combination with PS3 control module can reach the **CAT 3 - PL "e"** how indicated in the ISO 13849-1 standard.

APPLICATIONS

- Mobile platform for airplane
- Automatic store
- Conveyor systems
- AGV
- Telescopic arms
- Robotic areas



COMPLIANCE

2006/42/EC	Machinery Directive
2014/30/EC	Electromagnetic compatibility Directive.
EN 13856-3	Safety of machinery - Pressure-sensitive protective devices - Part 3: General principles for design and testing of pressure-sensitive bumpers, plates, wires and similar devices
EN 12978	Industrial, commercial and garage doors and gates - Safety devices for power operated doors and gates - Requirements and test methods.

TECHNICAL CHARACTERISTICS

SafetyLevel	Cat 3, PL = e with PS3-Ax unit control
Working temperature	-10° a + 50°C
Protection degree	IP54
Number of operations	10000 operations
Min operative speed	10 mm/s
Max operative speed	100 mm/s
Tempo di risposta	60 ms
Max voltage	24 Vdc
Max current	100 mA
Output contact	Normaly open
Max length connections bumper/control unit	100 m, copper 0.35 mm ²

CHEMICAL COMPATIBILITY

The tests were performed on a bumper composed of coating (10% acrylic, 90% polyester) and sponge (polyurethane foam).

Product	Good	Medium	Bad
Acids and			●
Aqueous solutions	●	●	
Acetic Acid			
Bromobenzene			●
Cyclohexane	●		
Diethyl Ehter		●	
Doictyl Phthalate			●
1,4- Dioxane			●
n-Hexane		●	
Methyletylketone			●
Pyridine			●
Trichloroethylene			●
Turpentine			●
Xylene			●
Petroleum, Oils and Fuels		●	
Automatic Transmission fluid	●		
Power steering fluid	●		
Antifreeze	●		
50/50 Ethylene Glycol/water			●
Skydrol		●	

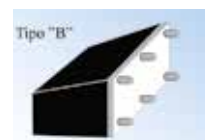
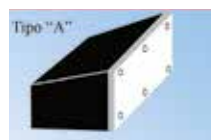
FIXING SYSTEM

The fixing plate can be supplied in the following versions.

TYPE A) Sheet with 8.5 mm fixing holes.

The number of holes depend from the length.

TYPE B) Sheet with captive screws M6, length 30mm.



CONTROL UNIT FOR RIBBON SWITCH, EDGES, MATS, BUMPERS

PS3-AX OVERVIEW



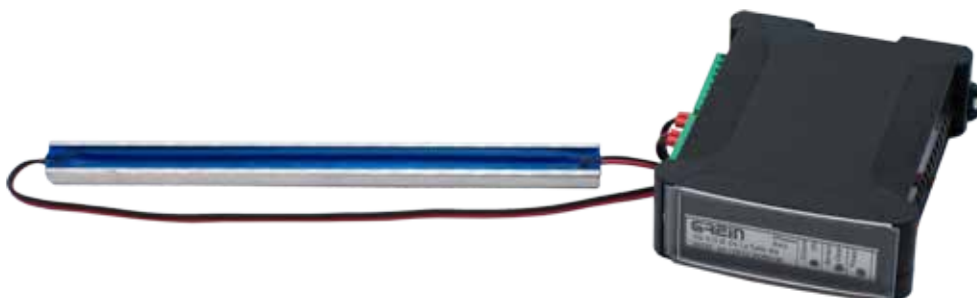
The PS3 unit control series are the controller for ribbon switches, edges, mats and bumpers provided with four wire to meet category 3, Performance Level “e” according to EN ISO 13849. The control circuit disables the internal relays when the sensor is pressed, if the conductors are cut, in case of interruption of the internal circuit of the sensor, if power failure, in case of a failure to the internal components of the safety circuit. The RESET can be automatic or manual. The PS3 control unit are provided with two safety contacts NO and one no safety NC contact. The control unit is protected against shortcircuit, overload and polarity reversal.

PS3-RS / RD OVERVIEW



The PS-3RS and PS-3RD control unit series are the controllers for ribbon switches, edges, mats and bumpers provided with two wires and 8.2 K Ω terminal resistor to meet category 2, Performance Level “d” according to EN ISO 13849. The control circuit disables the internal relays when the sensor is pressed, if the conductors are cut, in case of interruption of the internal circuit of the sensor, if power failure, in case of a failure to the internal components of the safety circuit. The RESET can be automatic or manual. The PS-3RS and RD control unit are provided with two safety contacts NO and one no safety NC contact. The control unit is protected against short circuit and overload and the power.

PS3 APPLICATIONS



CONTROL UNIT FOR RIBBON SWITCH, EDGES, MATS, BUMPERS

PS3-AX TECHNICAL CHARACTERISTICS

GENERAL	
SafetyLevel	Type 3 - PL e - Cat. 3
Power Supply	24Vcc ± 10% PELV / 24-115-230 Vca ± 10%
Max current with sensor deactivated	55 mA
Max current with sensor activated	45 mA
Max current in the sensor	100 mA
Working Temperature	-5 ÷ 60 °C
Relative umidity	5 - 95%
Protection degree	IP20-IP56
Weight	190 grams
Response Time	18 ms, restart 280 msec
Max controlled lenght for edges	60 m
Max controlled area for mats	15 m2
Max controlled edges	equal to the max length of the single edge
Max controlled mats	equal to the max area of the single mat
Max lenght connections edge/control unit	250 m with copper cable - 0.35 mm ²
SAFETY RELAY - OUTPUT CONTACT	
Contact material	AgSnO2
Working voltage	AC 230V; DC 300V
Max switching voltage	6A
Max constant current	2A
Max switching capability	1500VA
Mechanical service life	10 ⁷
Electrical service life	10 ⁵

PS3-AX IDENTIFICATION CODE

CONTROL UNIT DIN IP20		
ORDER CODE	MODEL	POWER SUPPLY
P-09	PS-3 / A1	24 Vca
P-10	PS-3 / A2	115 Vca
P-11	PS-3 / A3	230 Vca
P-12	PS-3 / A5	24 Vdc
CONTROL UNIT IP56		
ORDER CODE	MODEL	POWER SUPPLY
P-13	PS-3-56 / A1	24 Vca
P-14	PS-3-56 / A2	115 Vca
P-15	PS-3-56 / A3	230 Vca
P-16	PS-3-56 / A5	24 Vdc

PS3-RS / RD TECHNICAL CHARACTERISTICS

GENERAL	
SafetyLevel	PL d - Cat. 2
Power Supply	24Vcc ± 10% PELV / 24Vca ± 10%
Max current with sensor deactivated	55 mA
Max current with sensor activated	45 mA
Max current in the sensor	100 mA
Working Temperature	-5 ÷ 60 °C
Relative umidity	5 - 95%
Protection degree	IP20-IP56
Weight	190 grams
Response Time	9 ms, restart 400 msec
Max controlled lenght for edges	100 m
Max controlled area for mats	15 m ²
Max controlled edges	equal to the max length of the single edge
Max controlled mats	equal to the max area of the single mat
Max lenght connections mat, edge, bumper / control unit	250 m with copper cable - 0.35 mm ²
SAFETY RELAY - OUTPUT CONTACT	
Contact material	AgSnO ₂
Working voltage	AC 230V; DC 300V
Max switching voltage	6A
Max constant current	2A
Max switching capability	1500VA
Mechanical service life	10 ⁷
Electrical service life	10 ⁵

PS3-AX IDENTIFICATION CODE

CONTROL UNIT DIN IP20		
ORDER CODE	MODEL	POWER SUPPLY
P-21	PS-3RS / A1	24 Vca
P-22	PS-3RS / A5	24 Vdc
P-23	PS-3RS / 56A1	24 Vca
P-24	PS-3RS / 56A5	24 Vdc
CONTROL UNIT IP56		
ORDER CODE	MODEL	POWER SUPPLY
P-25	PS-3RD / A1	24 Vca
P-26	PS-3RD / A5	24 Vdc
P-27	PS-3RD / 56A1	24 Vca
P-28	PS-3RD / 56A5	24 Vdc

Industrial safety and control device

Safety light curtain and light curtain for automation

Safety Ribbon switches

Safety edges

Safety mats and bumper

Control units

Commercial organization

Europa

Italy

Croatia

Finland

France

Poland

Czech Republic

Rumania

Slovakia

Slovenia

Spain

Switzerland

Turkey

Hunghery

America

Brasil

Canada

Colombia

Asia

China

India



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