

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

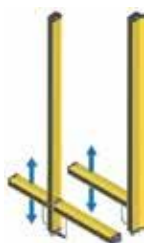
The muting function generates a temporary suspension of the protective function of the barrier in order to ensure the normal passage of the material through the protected area. If the MUTING function is active, the interruption of the beams doesn't disable the OSSDs outputs. The muting function is activated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

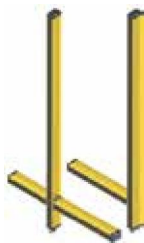
INTERNAL MUTING FUNCTION

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



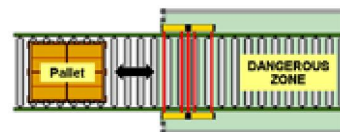
TPF, TXF, LPF, LXF Series



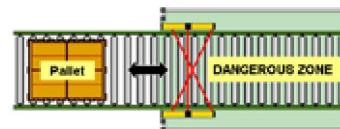
TPi, TXi, LPi, LXi Series



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 $\pm 10\%$
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	•	•			•			•

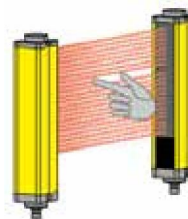
LEGEND

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

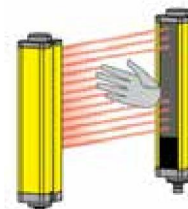
KEEPER

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	-
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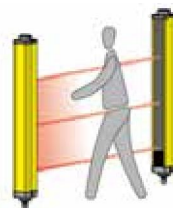
Model see tables pag 17

Optics see tablse pag 18-20

Type of Muting see tables pag 21

Additional indicator optional J = end cap LED

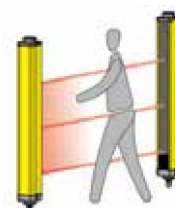
BODY DETECTION



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





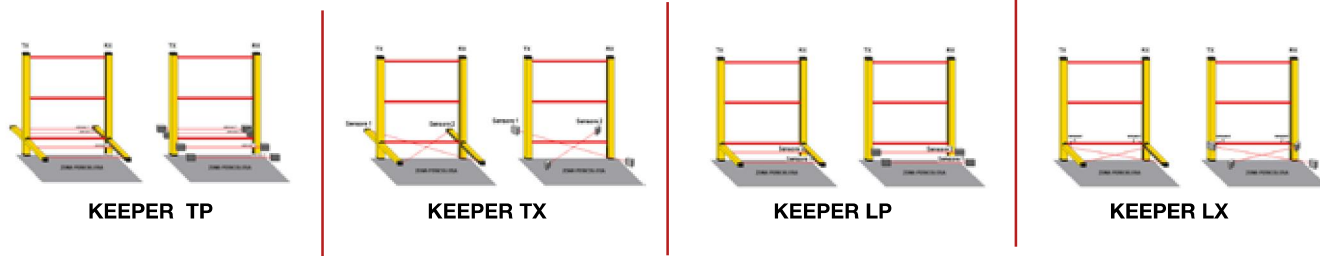
ACCESS CONTROL DETECTION

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



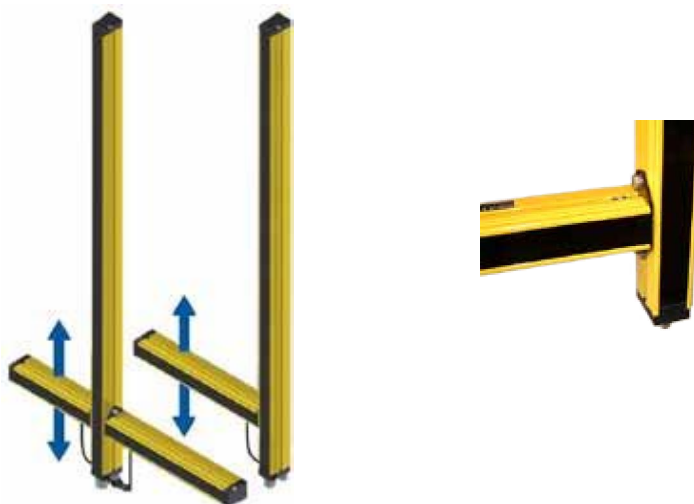
MODEL WITH MUTING ARMS



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

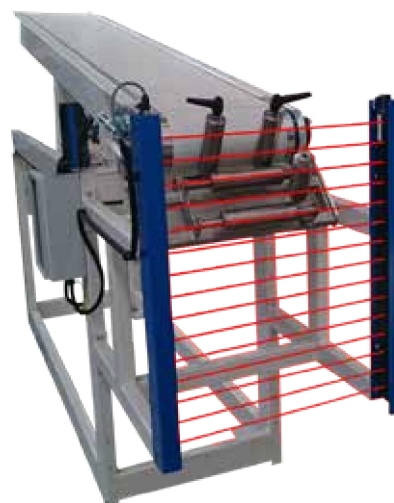
Power supply	24Vdc $\pm$ 20%
Current supply	300 mA
Resolution	3- 6-12, 14-26, 12, 26, 50, 55 mm
Maximum range (depending from the resolution)	4, 5, 10 m
Detection height	From 80 mm to 2900 mm
Response time	From 1 to 17ms
Output	0-10V, 4-20mA, RS 485 MODBUS RTU
Enclosure dimension	20X40 mm
IP protection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

NI TECHNICAL CHARACTERISTICS

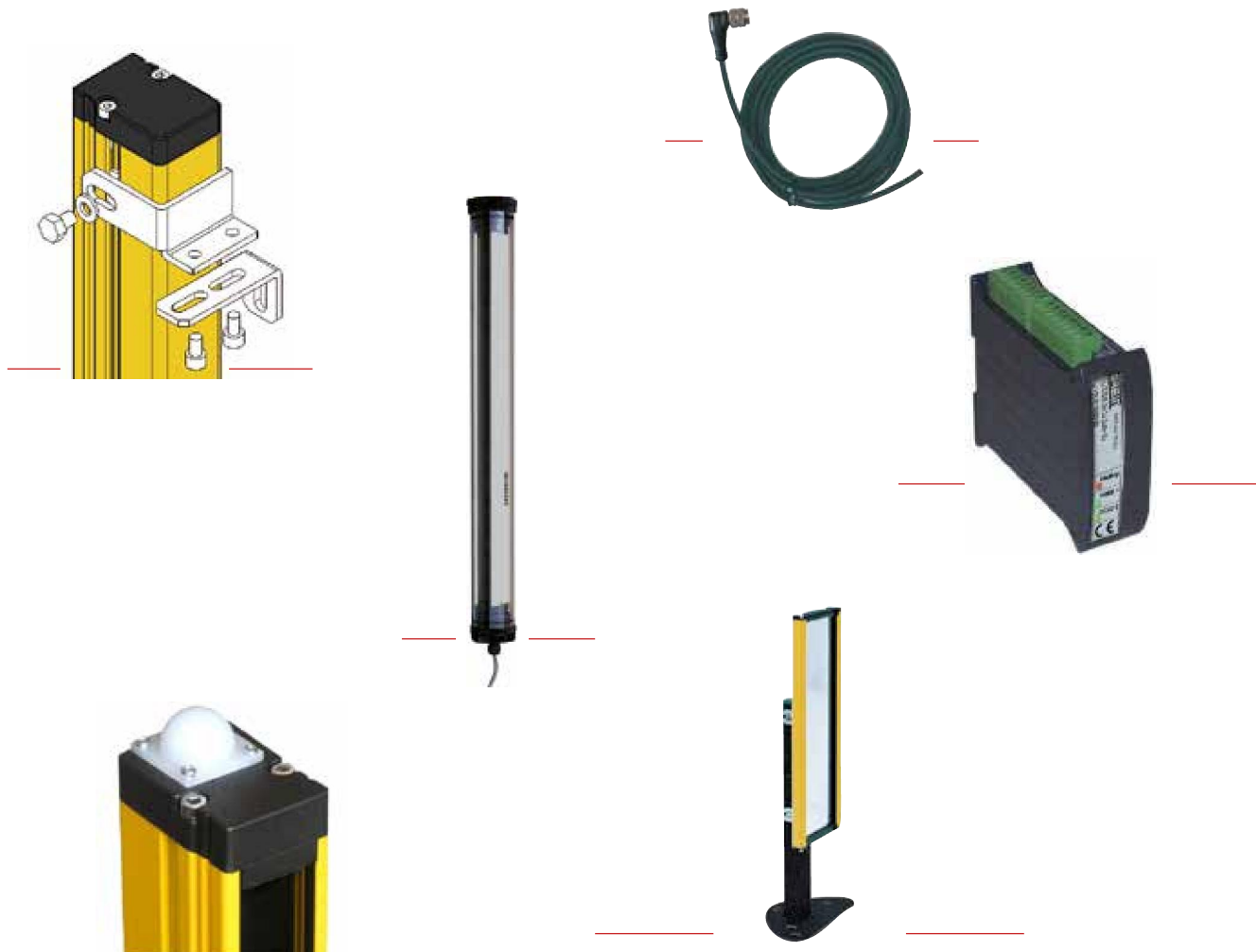
Power supply	24Vdc $\pm$ 20%
Current supply	300 mA
Resolution	0.9, 2, 4, 8, 12, 25 mm
Maximum range (depending from the resolution)	From 500 to 8000
Detection height	From 35 mm to 3000 mm
Response time	From 0.4 to 30ms
Output	Dark ON + Dark OFF NPN + PNP 100 mA
Enclosure dimension	20X40 mm
IP protection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

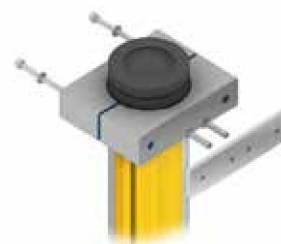
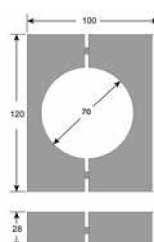
Problems with barrier operation may occur in winter at low temperatures (ice or frost) .This is remedied by fitting two elements (24 V DC/AC) to the sides of the tube with adhesive to produce enough heat (thermostat control) to eliminate the external film of moisture and ensure system operation down 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

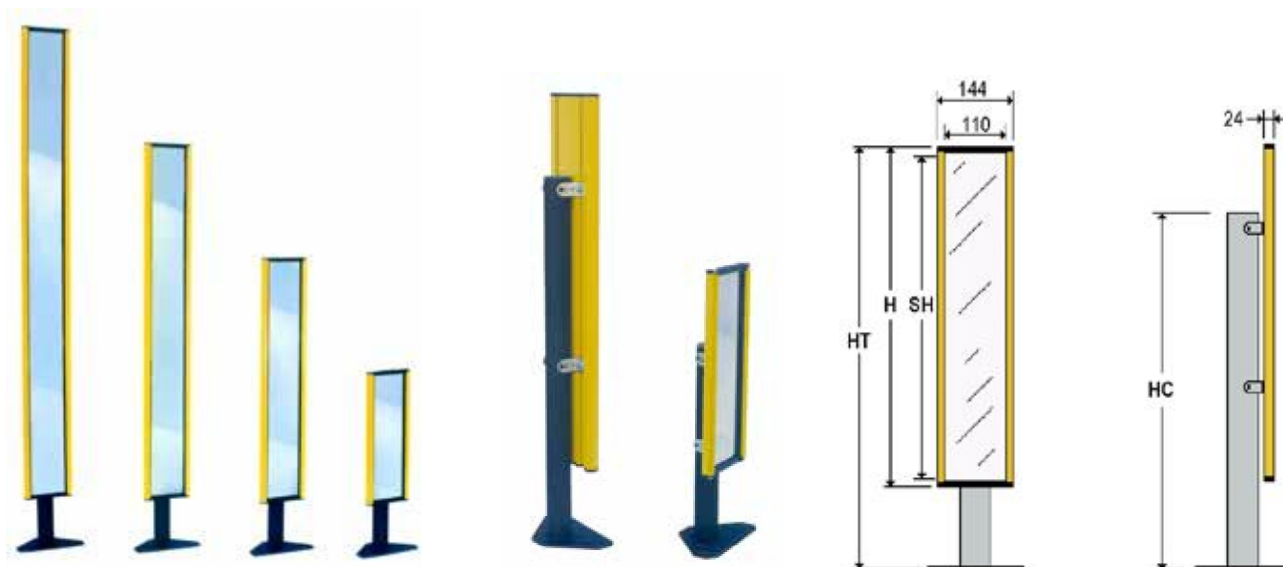
BRACKETS

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

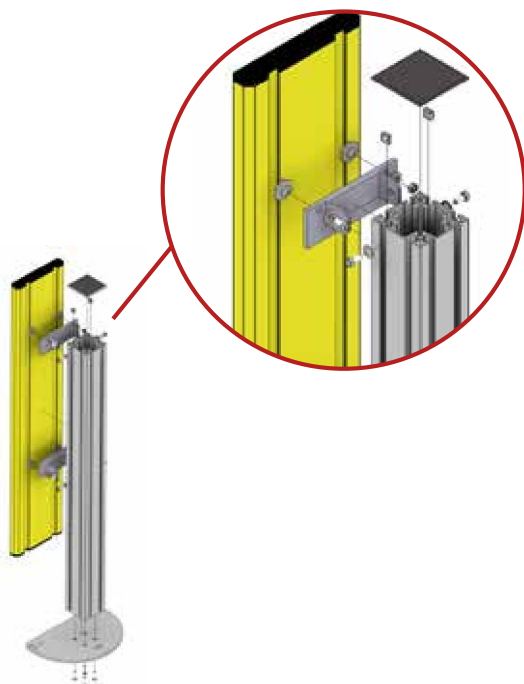


MIRRORS



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



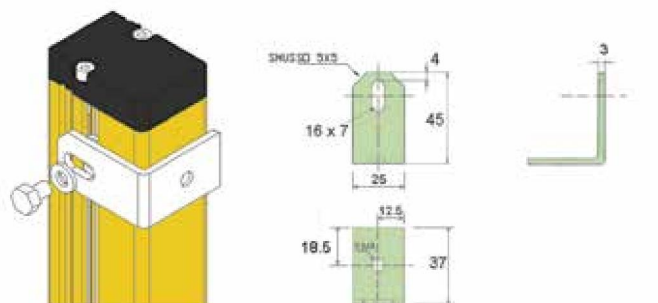
FLOOR POST TABLE

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

BRACKETS

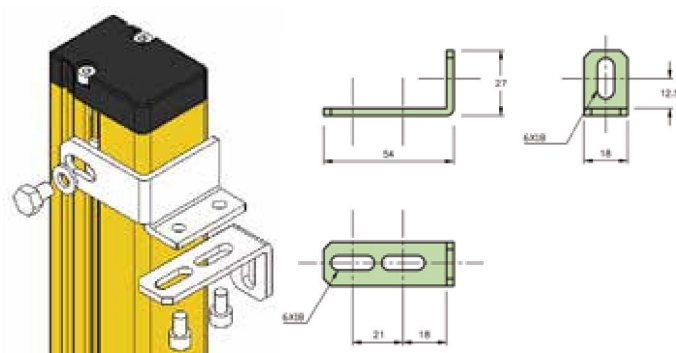
Bracket model STGM

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



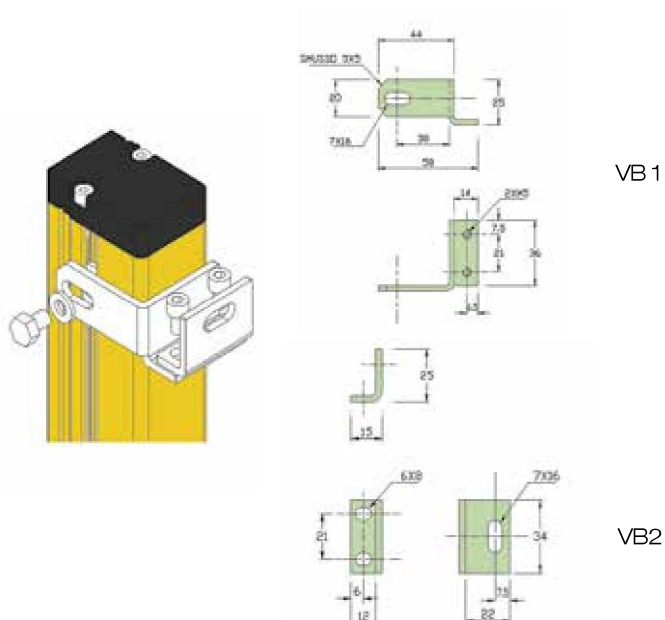
Bracket model STDL

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	