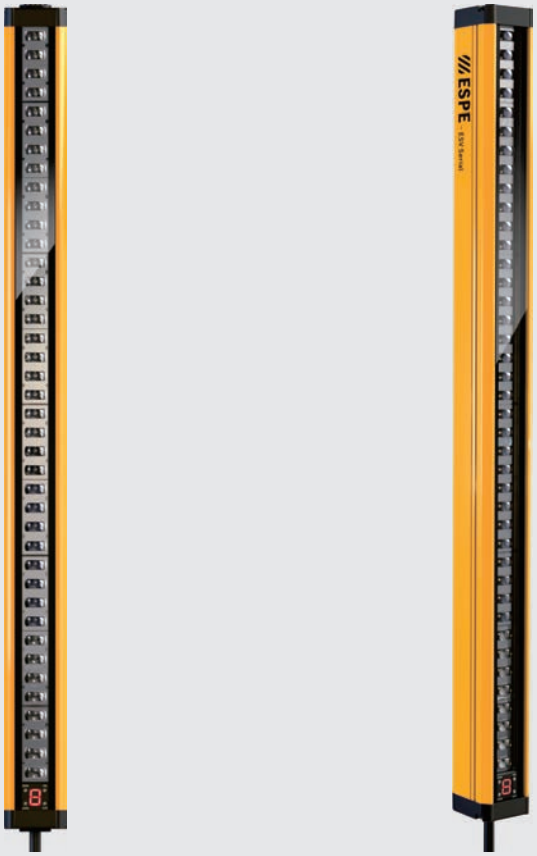
ESV Series

Type 4 Safety Light Curtain



Product Introduction

ESV series meet safety standard of IEC61496 (Type 4). High safety performance for internal self-diagnosis function and small aperture angle. Optional wire-syn and optical-syn design is suitable for various application. EDM & reset function ensure multiple safety connection with equipment. Cover fixed installation and slider installation is easier to mount on equipment.

Product Feature

- Meet IEC61496 (Type 4) and ISO13849.1 (Cat.4/PLe) safety standard;
- High safety level: Self-diagnosis design and periodic dual cross-diagnosis design;
- Wire-syn or optical syn for option;
- Redundancy with self-diagnosis: Dual-loop redundant output design ensure each loop with self-diagnosis pulse, and in time self-diagnosis when overcurrent, power short-circuit or output short-circuit;
- EDM: Dynamically monitor signals of external device (relay, contacts etc,) connected with light curtain to prevent any loss of safety protection due to adhesion failure of external relays;
- Reset: Light curtain has optional interlock reset for selecting automatic reset and manual reset;
- Small optical aperture angle: 2.5° optical angle for high safety performance;
- Various installation: End cap installation or slider installation for different installation.

Type 4 Safety Light Curtain

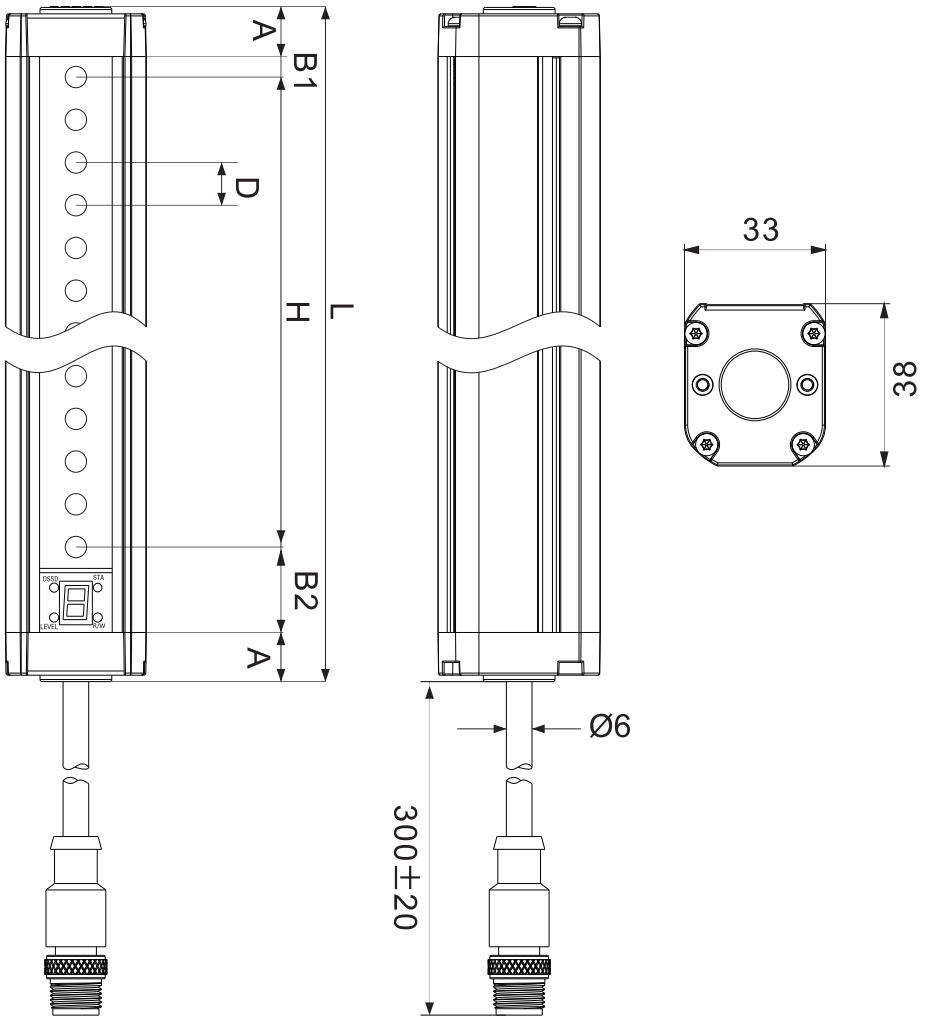
Product Parameter

Safety Standard	Type 4(IEC 61496-1/-2)Cat. 4,PL e(ISO 13849-1)
Power Supply	DC24V±20%
Capacity	<7W
Beam Space	10mm, 20mm
Resolution	15mm, 25mm
Beams	10mm: 16, 20,...148
	20mm: 8, 10,...74
Protective Height	Protection height=(N-1)*beam space, (N is beams)
Light Wavelength	940nm infrared light
Response Time	⩽2 x (Nx0.1+0.3) ms (N is beams)
Safety Output (OSSD)	PNP or NPN Load current⩽500mA (Temperature exceed 40°C⩽400 mA), residual voltages1V (any voltage drop caused by cable extension is excepted,), voltage leakages0.1mA.
Protective Circuit	Overvoltage protection, power supply reverse protection and overcurrent protection.
Sensing Distance	0.1~3m
Against Optical Interference	10000 Lux (angle>2.5°)
Sensing Method	Thru-beam
Synchronization	Optical-syn
Enclosure Material	Aluminum alloy
Enclosure Protection Rate	IP65
Sectional Size	33*38mm
Vibration Resistance	Frequency 10Hz-55Hz, amplitude 0.35±0.05mm, 20 times each X, Y and Z direction.
Ambient Operating Temperature	-10℃~55℃(no freezing)
Storage Temperature	-30℃~70℃(no freezing)
Ambient Operating Humidity	When temperature 20℃, the humidity max. 85%
T (Operation time)	20 years (ISO 13849-1)

Model Selection (e.g.: ESV1620NEL1-3)

Product Series	Beams	Beam Space	Output	Function	Bracket		Sensing Distance
ESV	16	20	N	E	L1	–	3
	08,10, 12.....	10mm 20mm	N: NPN*2 P: PNP*2	No mark: No EDM, automatic reset E: With EDM, automatic reset R: No EDM, manual reset A: With EDM, manual reset	L1: L1 side mounting Q2: end cover mounting		3:0.1~3m

Product Size



A: Up & bottom cover
B1: Up blind area
B2: Bottom blind area
D: Beam space
H: Protection height
L: Total Height

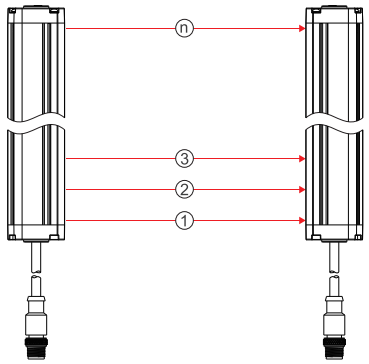
A is 11.5mm
When D=10mm, B1=5mm, B2=20mm
When D=20mm, B1=15mm, B2=20mm

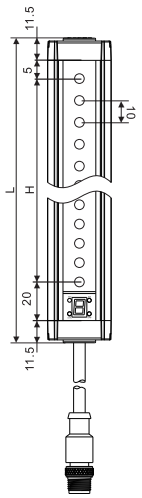
H=(Beams-1)*beam space
L=A+B1+B2+H

Type 4 Safety Light Curtain

ESV Model Selection Table

- Beam space 10mm, resolution 15mm

Picture	Beams (n)	Response Time (ms)	Protection Height (mm)	Total Height (mm)	Model (NPN)	Model (PNP)
	16	6.4	150	198	ESV1610N	ESV1610P
	20	7.2	190	238	ESV2010N	ESV2010P
	24	8	230	278	ESV2410N	ESV2410P
	28	8.8	270	318	ESV2810N	ESV2810P
	32	9.6	310	358	ESV3210N	ESV3210P
	36	10.4	350	398	ESV3610N	ESV3610P
	40	11.2	390	438	ESV4010N	ESV4010P
	44	12	430	478	ESV4410N	ESV4410P
	48	12.8	470	518	ESV4810N	ESV4810P
	52	13.6	510	558	ESV5210N	ESV5210P
	56	14.4	550	598	ESV5610N	ESV5610P
	60	15.2	590	638	ESV6010N	ESV6010P
	64	16	630	678	ESV6410N	ESV6410P
	68	16.8	670	718	ESV6810N	ESV6810P
	72	17.6	710	758	ESV7210N	ESV7210P
	76	18.4	750	798	ESV7610N	ESV7610P
	80	19.2	790	838	ESV8010N	ESV8010P
	84	20	830	878	ESV8410N	ESV8410P
	88	20.8	870	918	ESV8810N	ESV8810P
	92	21.6	910	958	ESV9210N	ESV9210P
	96	22.4	950	998	ESV9610N	ESV9610P
	100	23.2	990	1038	ESV10010N	ESV10010P
	104	24	1030	1078	ESV10410N	ESV10410P
	108	24.8	1070	1118	ESV10810N	ESV10810P
	112	25.6	1110	1158	ESV11210N	ESV11210P
	116	26.4	1150	1198	ESV11610N	ESV11610P
	120	27.2	1190	1238	ESV12010N	ESV12010P
	124	28	1230	1278	ESV12410N	ESV12410P
	128	28.8	1270	1318	ESV12810N	ESV12810P
	132	29.6	1310	1358	ESV13210N	ESV13210P
	136	30.4	1350	1398	ESV13610N	ESV13610P
	.....	.....	.....	.....	.....	.....
	148	32.8	1470	1518	ESV14810N	ESV14810P



Front View

Top View

H is protection height=(beams-1)*beam space

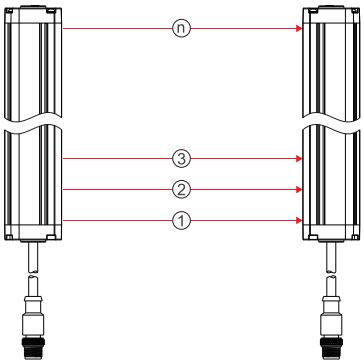
L is total height=end covers+ up & bottom blind area + protection height

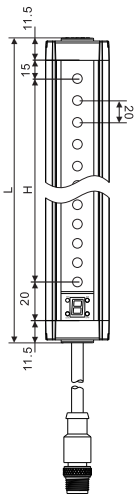
Remark: Besides above model, other curtains can be customized.

ESV Model Selection Table

- Beam space 20mm, resolution 25mm

Picture	Beams (n)	Response Time (ms)	Protection Height (mm)	Total Height (mm)	Model (NPN)	Model (PNP)
	8	4.8	140	198	ESV0820N	ESV0820P
	10	5.2	180	238	ESV1020N	ESV1020P
	12	5.6	220	278	ESV1220N	ESV1220P
	14	6	260	318	ESV1420N	ESV1420P
	16	6.4	300	358	ESV1620N	ESV1620P
	18	6.8	340	398	ESV1820N	ESV1820P
	20	7.2	380	438	ESV2020N	ESV2020P
	22	7.6	420	478	ESV2220N	ESV2220P
	24	8	460	518	ESV2420N	ESV2420P
	26	8.4	500	558	ESV2620N	ESV2620P
	28	8.8	540	598	ESV2820N	ESV2820P
	30	9.2	580	638	ESV3020N	ESV3020P
	32	9.6	620	678	ESV3220N	ESV3220P
	34	10	660	718	ESV3420N	ESV3420P
	36	10.4	700	758	ESV3620N	ESV3620P
	38	10.8	740	798	ESV3820N	ESV3820P
	40	11.2	780	838	ESV4020N	ESV4020P
	42	11.6	820	878	ESV4220N	ESV4220P
	44	12	860	918	ESV4420N	ESV4420P
	46	12.4	900	958	ESV4620N	ESV4620P
	48	12.8	940	998	ESV4820N	ESV4820P
	50	13.2	980	1038	ESV5020N	ESV5020P
	52	13.6	1020	1078	ESV5220N	ESV5220P
	54	14	1060	1118	ESV5420N	ESV5420P
	56	14.4	1100	1158	ESV5620N	ESV5620P
	58	14.8	1140	1198	ESV5820N	ESV5820P
	60	15.2	1180	1238	ESV6020N	ESV6020P
	62	15.6	1220	1278	ESV6220N	ESV6220P
	64	16	1260	1318	ESV6420N	ESV6420P
	66	16.4	1300	1358	ESV6620N	ESV6620P
	68	16.8	1340	1398	ESV6820N	ESV6820P
	.....	.....	.....	.....	.....	.....
	74	18	1460	1518	ESV7420N	ESV7420P





Front View

Top View

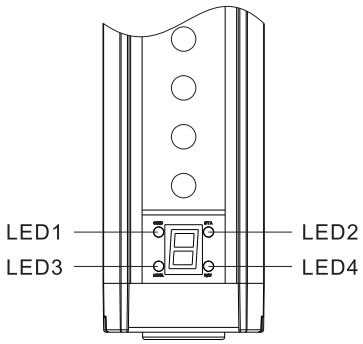
H is protection height=(beams-1)*beam space

L is total height=end covers+ up & bottom blind area + protection height

Remark: Besides above model, other curtains can be customized.

Type 4 Safety Light Curtain

Indicator Light



Light off

Light on

Light blink

No display on digital tube

Digital tube LED blink

Power-on startup process status:

Emitter/receiver indicator during power-on						
Status	LED1	LED2	LED3	LED4	Digital Tube	Lasting Time
Status 1	Red/Green	Green red ON	Blue	Yellow	8.	Lasting 1.5s
Status 2	Red/Green (2Hz)	Red green 2Hz	2Hz	2Hz	E.	Lasting 1s
Status 3	Red/Green (2Hz)	Red green 2Hz	2Hz	2Hz	6. 2Hz	Configuring status, re-start after configuring

Note: 1. After the light curtain is powered on, the configuration display sequence of the host computer is: State 1->State 2-> Normal working state.

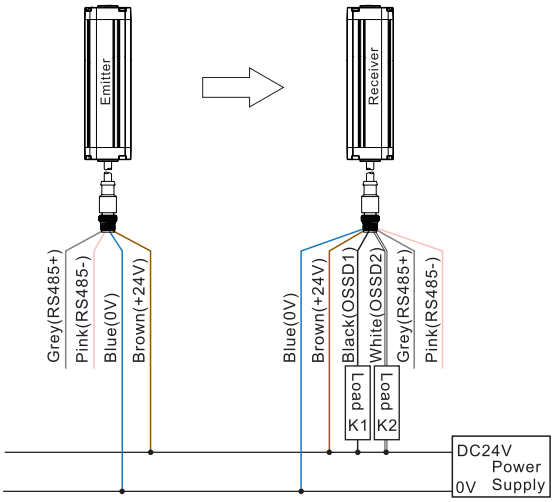
2. If the light curtain detects a configuration before entering the normal working state, it will jump to and continue in state 3. After the configuration, the light curtains need to be restarted and then started according to the normal startup process.

Emitter working state description					
LED1	LED2	LED3	LED4	Digital Tube	Description
●	●	○	○	8.	Normal working
●	●	○	○	8.	Overvoltage or undervoltage, please check power supply
●	2Hz	○	○	8.	Internal failure, repair or replace
○	○	○	○	8→8.	Internal failure, repair or replace
○	○	○	○	8.	Internal failure, repair or replace
○	○	○	○	8→8.	Internal failure, repair or replace
○	○	○	○	8→8.	Internal failure, repair or replace
○	○	○	○	8→8.	Internal failure, repair or replace
○	○	○	○	8.	Internal failure, repair or replace
○	○	○	○	8→8.	Internal failure, repair or replace
○	○	○	○	8→8.	Internal failure, repair or replace
○	○	○	○	8→8.	Internal failure, repair or replace
○	○	○	○	8→8.	Internal failure, repair or replace
○	○	○	○	8.	Internal failure, repair or replace

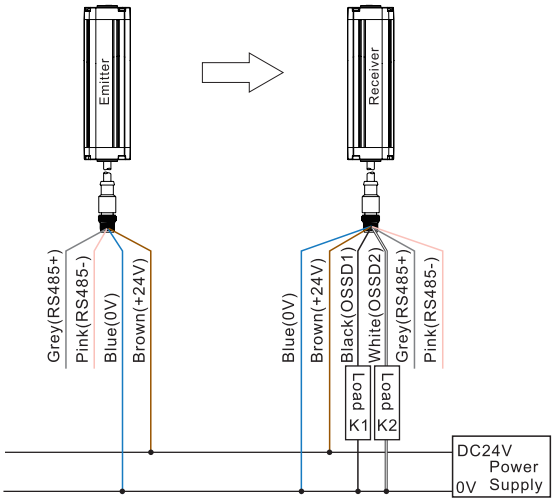
Receiver working state description					
LED1	LED2	LED3	LED4	Digital Tube	Description
○	●	○	●	8 1Hz	Waiting wire-syn signal
○	●	○	●	8 1Hz	Waiting optical-syn signal
●	●	●	○	8.	Well alignment, with output
●	●	○	○	8.	Beam blocked, no signal
○	●	●	☀ 1Hz	8	Waiting for reset signal
○	●	○	○	8.	Input power failure
○	●	○	○	8.	Wire-syn failure and abnormal RS485 signal.
○	●	○	○	8.	Reset input error (when the reset function is enabled)
○	○	○	○	8→8.	OSSD1 short-circuit
○	○	○	○	8→8.	OSSD2 short-circuit
○	○	○	○	8→8.	OSSD1 and OSSD2 short-circuit
○	○	○	○	8→8.	OSSD1 overload
○	○	○	○	8→8.	OSSD2 over load
○	○	○	○	8→8.	Auxiliary output overload
○	○	○	○	0→8.	Abnormal voltage at OSSD1
○	○	○	○	0→8.	Abnormal voltage OSSD2
○	●	○	○	8.	EDM error
○	☀ 1Hz	○	○	8.	Internal failure, repair or replace
○	○	○	○	8→8.	Internal failure, repair or replace
○	○	○	○	8.	Internal failure, repair or replace
○	○	○	○	8→8.	Internal failure, repair or replace
○	○	○	○	8→8.	Internal failure, repair or replace
○	○	○	○	8→8.	Internal failure, repair or replace
○	○	○	○	8→8.	Internal failure, repair or replace
○	○	○	○	8→8.	Internal failure, repair or replace
○	○	○	○	8→8.	Internal failure, repair or replace
○	○	○	○	8.	Internal failure, repair or replace
○	○	○	○	8.	Internal failure, repair or replace
○	○	○	○	8.→8.	Internal failure, repair or replace
○	○	○	○	8.→8.	Internal failure, repair or replace
○	○	○	○	8.→8.	Internal failure, repair or replace
○	○	○	○	8→8.	Internal failure, repair or replace
○	○	○	○	8→8.	Internal failure, repair or replace
○	○	○	○	8→8.	Internal failure, repair or replace
○	○	○	○	8→8.	Internal failure, repair or replace

Wire Diagram

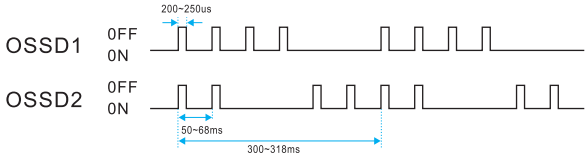
NPN (No EDM, automatic reset)



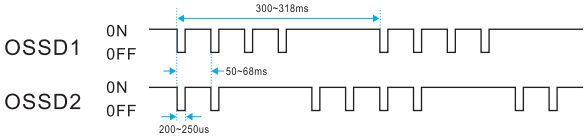
PNP (No EDM, automatic reset)



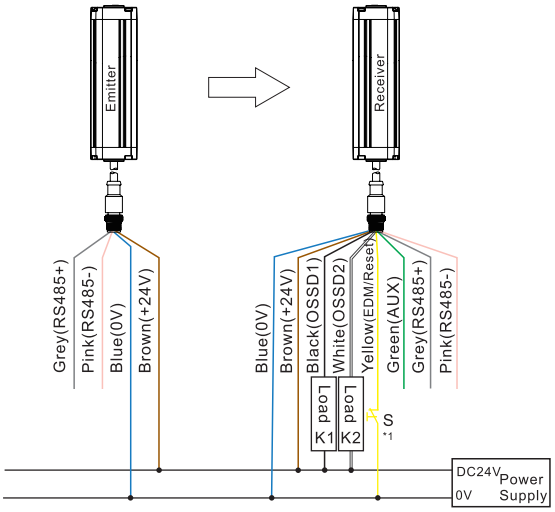
NPN output timing chart



PNP output timing chart

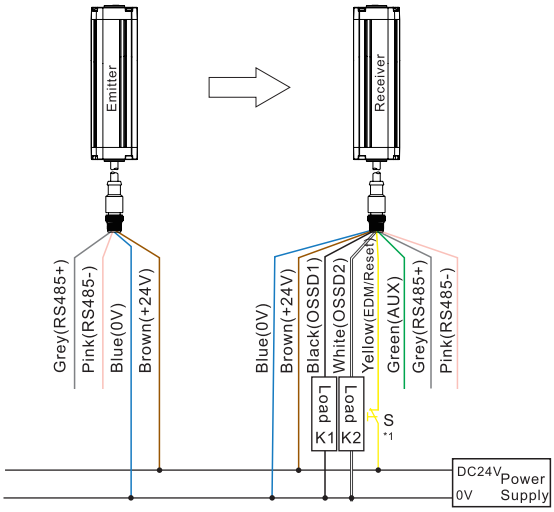


NPN (No EDM, with manual reset)



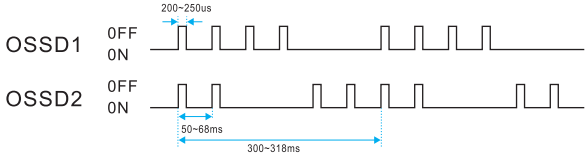
1.Reset: Once safety device triggered, reset interlock avoid machine restarting. Operator need to push restart safety device. Then machine start to work.

PNP (No EDM, with manual reset)

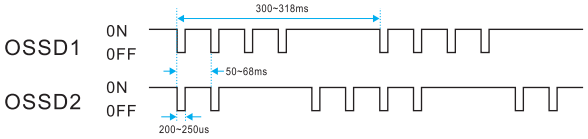


2.Reset: Once safety device triggered, reset interlock avoid machine restarting. Operator need to push restart safety device. Then machine start to work.

NPN output timing chart

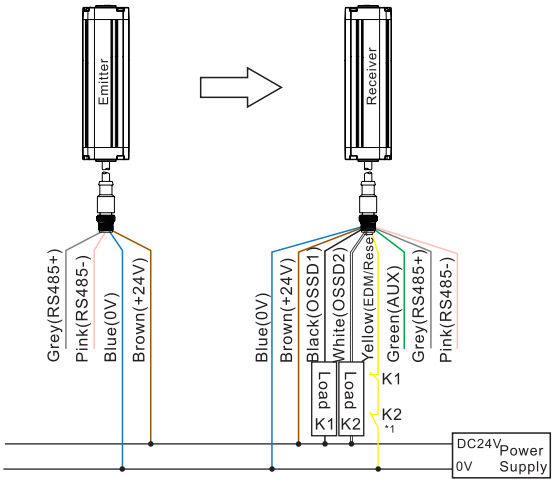


PNP output timing chart



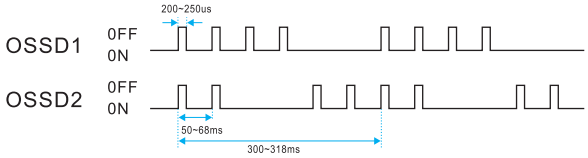
Wire Diagram

NPN (With EDM & automatic reset)

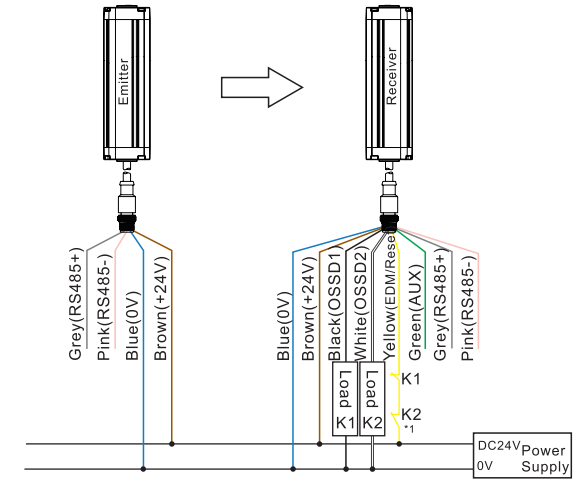


1 EDM: Monitor external device state

NPN output timing chart

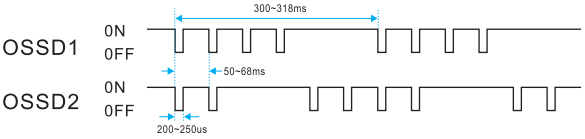


PNP (With EDM & automatic reset)

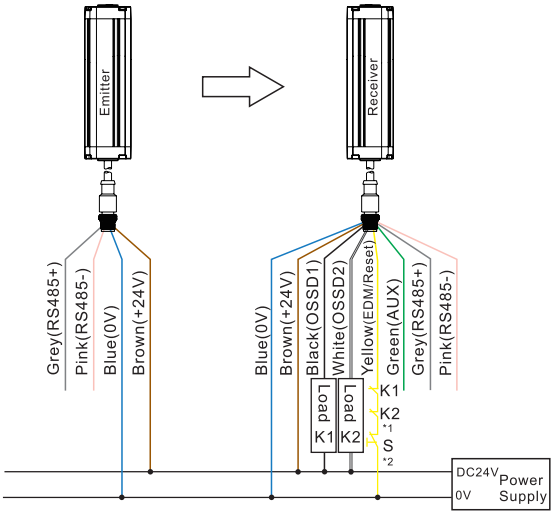


1 EDM: Monitor external device state

PNP output timing chart



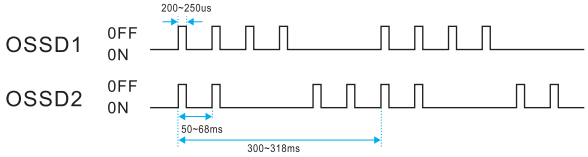
NPN (With EDM & manual reset)



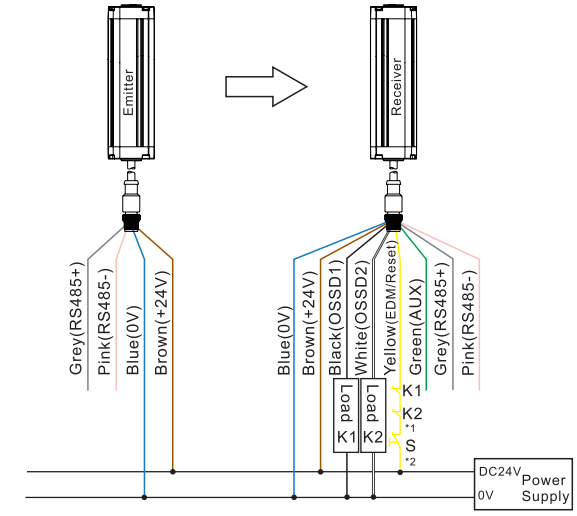
1.EDM: Monitor external device state

2.Reset: Once safety device triggered, reset interlock avoid machine restarting. Operator need to push restart safety device. Then machine start to work.

NPN output timing chart



PNP (With EDM & manual reset)



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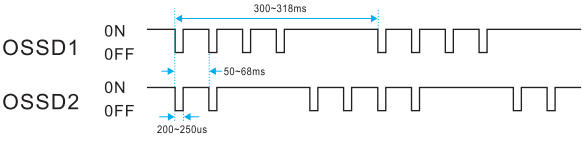
PNP output timing chart

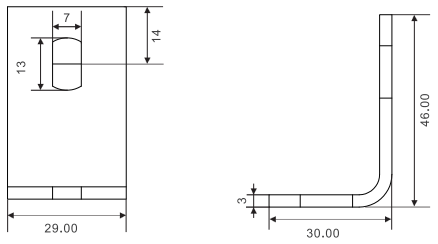
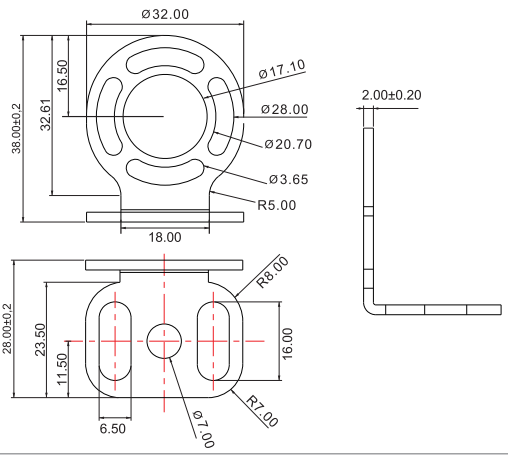


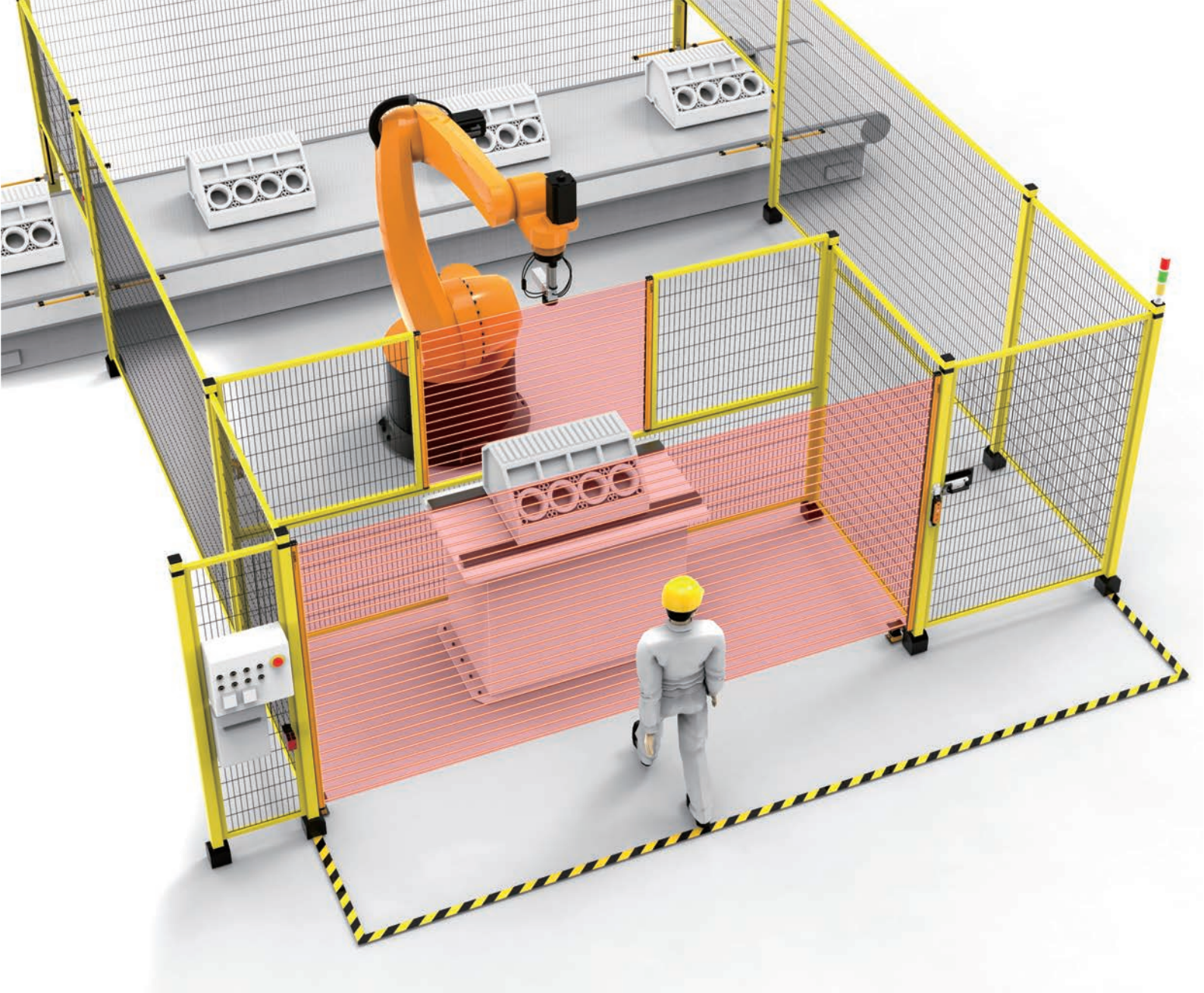
Type 4 Safety Light Curtain

Wire Specification

Barrier	Color	Wire Mark	Function
Emitter	White	NC	——
	Brown	24V DC	Positive of power
	Green	NC	——
	Yellow	NC	——
	Grey	RS485+	Configured RS485+/ Syn RS485+
	Pink	RS485-	Configured RS485-/ Syn RS485-
	Blue	0V	Negative of power
	Black	NC	——
Receiver	White	OSSD2	Safety output 2
	Brown	24V	Positive of power
	Green	AUX	Auxiliary output
	Yellow	EDM/RESET	EDM/ Reset input
	Grey	SYNC+	Configured RS485+/ Syn RS485+
	Pink	SYNC-	Configured RS485-/ Syn RS485-
	Blue	0V	Negative of power
	Black	OSSD1	Safety output 1

Option of Bracket

Picture	Name	Accessories	Size
	L1 bracket	L1 bracket (4pcs) Slider (4pcs) M6 gasket (4pcs) M6 spring washer (4pcs) M6*16 screw (4pcs) M6*8 screw (4pcs)	
	Q2 bracket	Q2 bracket (4pcs) M6 gasket (4pcs) M6 spring washer (4pcs) M6*16 screw (4pcs) M3*7 screw (4pcs)	



Certificate

Safenet Certification Services Ltd.
Ducart Suite, Castletroy Park Commercial Campus, Limerick, V94 Y6FD, Ireland
Tel: +353 61 33 2046 e-mail: office@safenetics.ie Website: www.safenetics.ie
European Notified Body 2805
EU Type Examination Certificate
This is to certify that
Shenzhen ESPE Technology Co., Ltd.
401, 501, 502 Building 2, Hongxin Industrial Park, Guanguang Road, Xinlan Community, Gunlan, Longhua, Shenzhen, Guangdong, China
Has had a range of ESV Safety Light Curtains examined with regards to the Electromagnetic Compatibility Directive 2014/30/EU.
With reference to model ESV3210P
Manufactured by:
Shenzhen ESPE Technology Co., Ltd.
401, 501, 502 Building 2, Hongxin Industrial Park, Guanguang Road, Xinlan Community, Gunlan, Longhua, Shenzhen, Guangdong, China
1. The technical construction file contains all the relevant information.
2. Having verified that the appropriate tests have been conducted, with regard to the ESV3210P representing the range.
2.1. The example has been manufactured in accordance with the technical construction file and may be used under the intended conditions.
2.2. The standards and transposed standards as the case may be, have been applied correctly.
2.3. The example has conformity with the protection requirements of Electromagnetic Compatibility Directive 2014/30/EU.
2.4. The technical file contains all the information required to include the models listed in the attached annex to this certificate.
Certificate Number: 5449080324
Date: 08/03/2024 Expiry Date: 08/03/2029
Signed for Safenet Certification Services Ltd.
Peter McNicol
Technical Manager
CE
EMC Directive
Number 2805

Safenet Certification Services Ltd.
Ducart Suite, Castletroy Park Commercial Campus, Limerick, V94 Y6FD, Ireland
Tel: +353 61 33 2046 e-mail: office@safenetics.ie Website: www.safenetics.ie
European Notified Body 2805
EC Type Examination Certificate
This is to certify that
Shenzhen ESPE Technology Co., Ltd.
401, 501, 502 Building 2, Hongxin Industrial Park, Guanguang Road, Xinlan Community, Gunlan, Longhua, Shenzhen, Guangdong, China
Has had a range of ESV Safety Light Curtains examined with regard to the Directive 2006/42/EC as amended.
In respect of the ESV3210P
Manufactured by:
Shenzhen ESPE Technology Co., Ltd.
401, 501, 502 Building 2, Hongxin Industrial Park, Guanguang Road, Xinlan Community, Gunlan, Longhua, Shenzhen, Guangdong, China
1. The technical file contains all the relevant information.
2. Having verified that the appropriate tests have been conducted
2.1. The standards and transposed standards EN IEC 61496-1:2020 and EN IEC 61496-2:2020 have been applied correctly.
2.2. The example representing series production of the item, complies with the essential health and safety requirements of the Directive 2006/42/EC as amended.
2.3. The technical file contains all the information required to include the models listed in the attached annex to this certificate.
2.4. The technical file also contains evidence of compliance with EN IEC 61496-1:2020 TYPE 4 and EN IEC 61496-2:2020 TYPE 4, and is suitable for applications regarding EN ISO 13849-1:2023 PL e.
Certificate Number: 5448080324
Date: 08/03/2024 Expiry Date: 08/03/2029
Signed for Safenet Certification Services Ltd.
Peter McNicol
Technical Manager
CE
Machinery Directive
Number 2805