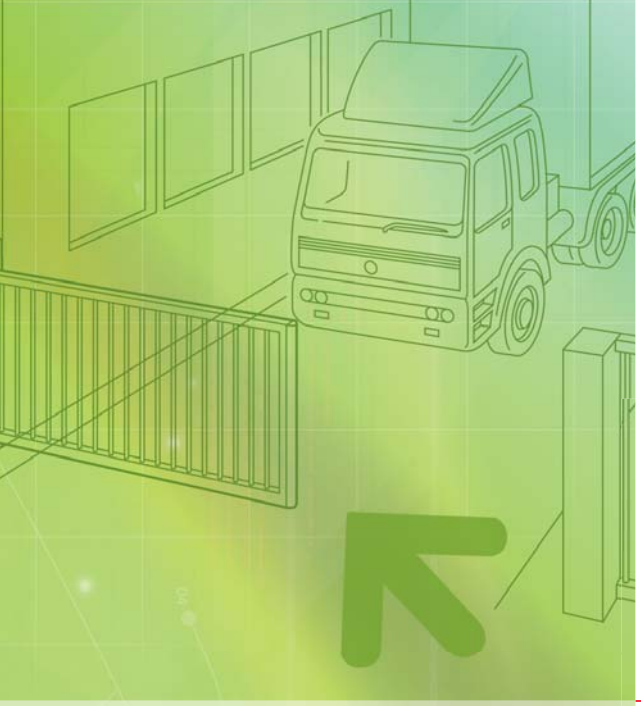
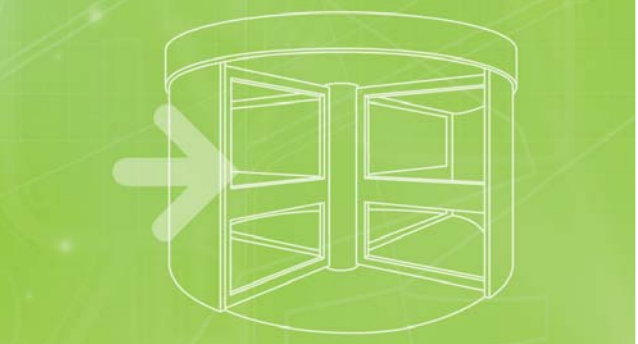
BIRCHER
Reglomat



sensing the future

Switching devices

ESD, ESR, ESA, ESP and EsGate



Simple, flexible, safe

- **Easy installation**
- **Can be configured for an extremely wide range of applications**
- **High level of safety thanks to tried-and-tested technology**

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Switching devices

Overview

The available switching devices monitor the connected contact mats/ safety edges for activation and circuit integrity. The status of the connected sensors can be read off a clear LED/LCD display. The user-friendly devices have easy programming and start up.

Switching devices selection table

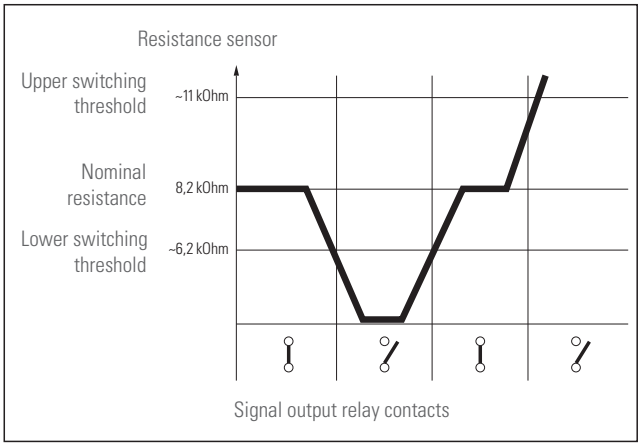
PL and cat. according to EN ISO 13849-1	Design Protection Class	Sensor inputs	Safety outputs	Voltage [V]	Application	Bircher designation	Page
PLe, cat. 3	IP 30	2	2	24/100–240	Gate	EsGate 3	5
PLd, cat. 2	IP 30	2	2	24/100–240	Gate	EsGate 2	5
PLe, cat. 3	IP 30	2	2 (in series)	230/115/24	Gate / Machine	ESD 3	6/7
PLe, cat. 3	IP 30	2	1	24	Gate / Machine	ESR 31C	8
PLe, cat. 3	IP 30	2	1	230/115/24	Gate / Machine	ESR 32	8
PLd, cat. 2	IP 30	2	1	24	Gate / Machine	ESR 25	9
PLd, cat. 2	IP 30	2	2	24	Gate / Machine	ESR 26	9
PLd, cat. 2	IP 65	1	1	230/24	Gate / Machine	ESA/ESP	10/11
PLc, cat. 1	IP 30	2	1	230/24	Gate / Machine	ESR 11	8
PLc, cat. 1	IP 30	2	2	230/24	Gate / Machine	ESR 12	8

Function

Sensors with a terminating resistor of 8.2 kOhm are connected and monitored for a change of the quiescent current.

Whenever one or multiple sensors are activated, the total resistance falls towards zero Ohm. In the process, the resistance dropping below the defined switching threshold the switching state of the outputs changes and the yellow or orange status LED lights up.

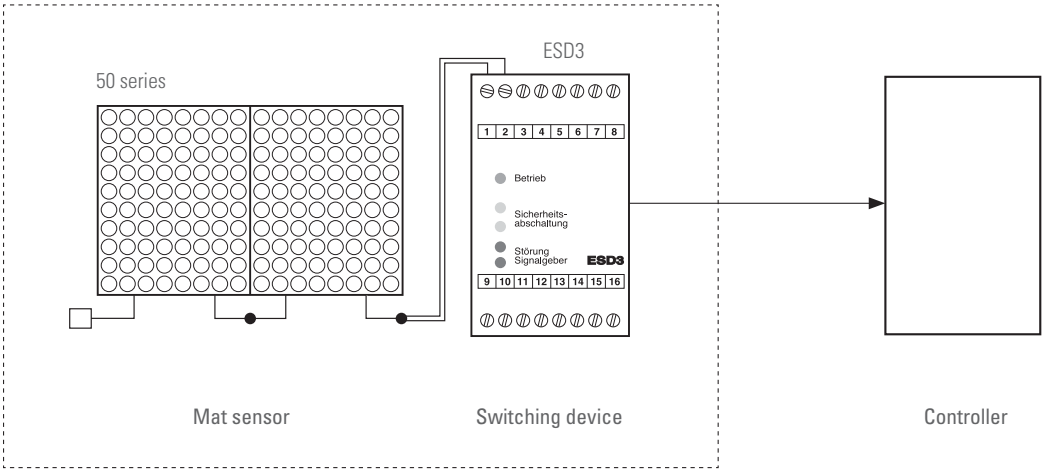
If the sensor circuit is interrupted, the total resistance increases to infinity. In the process, the resistance rising above the defined switching threshold the switching state of the outputs changes and the red status LED lights up.



Switching devices

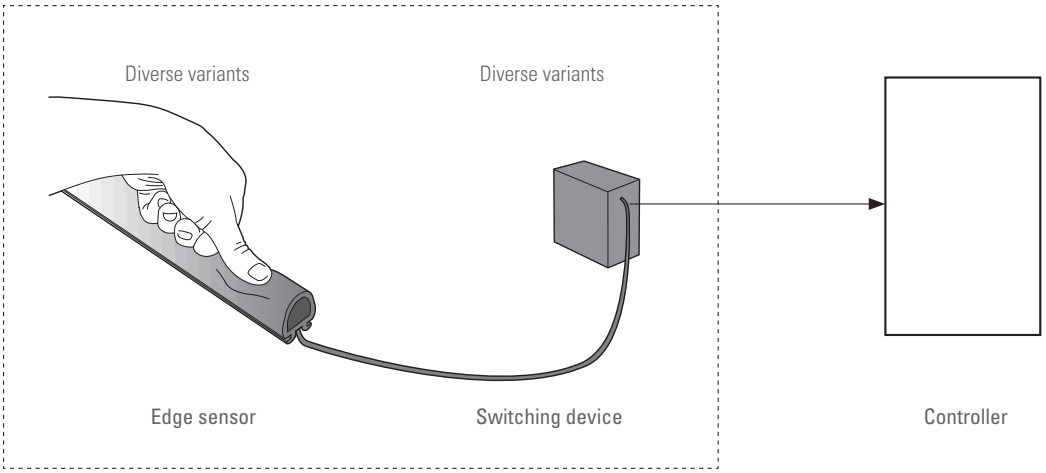
Approvals: Schematic design

A) Type-tested safety mat according to MRL 2006/42/EG, EN ISO 13856-1 and EN ISO 13849-1*



- Safety mat systems connection:
  Maximum total area of the sensor 5 m^2
- The sensors are connected in series
- All of the systems are connected at a resistance of 8.2 kOhm

B) Type-tested safety edge according to MRL 2006/42/EG, EN ISO 13856-2 and EN ISO 13849-1*



- Safety edge systems connection:
  Maximum total length of the sensor 25 m
- The sensors are connected in series (ENT-R contact strips max. 4 pieces in series)
- All of the systems are connected at a resistance of 8.2 kOhm

* The switching devices are type tested as a system in combination with Bircher Reglomat safety mats or safety edges.

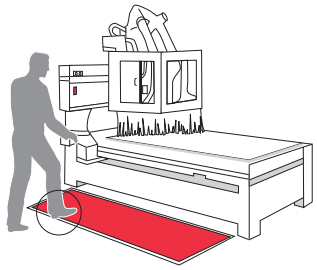
Switching devices

Applications in combination with safety mats

Situation
Machine safety

Solution
- Protection of hazardous areas in machines with safety mats combined with an ESD3 safety switching device

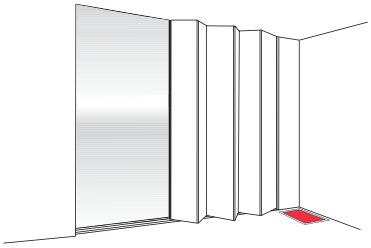
Tip
- Combination of multiple safety mats to protect larger areas



Situation
Folding door

Solution
- Protection of the door folding area with a safety mat combined with an ESD3 safety switching device

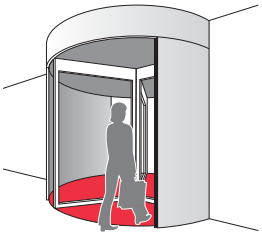
Tip
- Combination of a safety edge and an RFGate radio transmission system to protect the closing edge of the door



Situation
Revolving door

Solution
- EsGate safety switching device in combination with safety edges

Tip
- Using safety mats to protect revolving doors

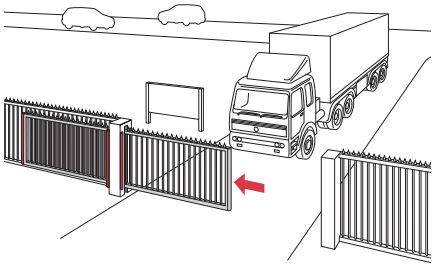


Applications in combination with safety edges

Situation
Sliding gate at site entrance

Solution
- Safety switching edge systems for the four stationary and two mobile safety edges

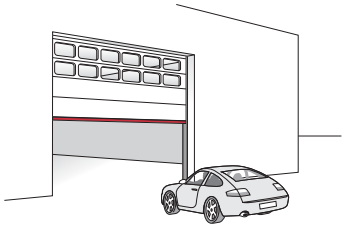
Tip
- Combine with RFGate radio transmission system for the mobile safety edge



Situation
Sectional door and gate

Solution
- Protect the closing edge with a safety edge and a safety switching device

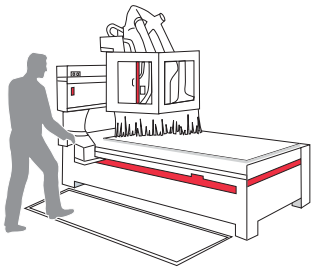
Tip
- Optimum protection because of mobile safety edges acc. to cat. 2 or cat. 3
- Herkules 2 gate radar as opening sensor. It distinguishes between vehicles and people



Situation
Milling or grinding machine with automatic protective door

Solution
- Protection of moving parts with a safety edge and a safety switching device

Tip
- Combine with contact mat systems

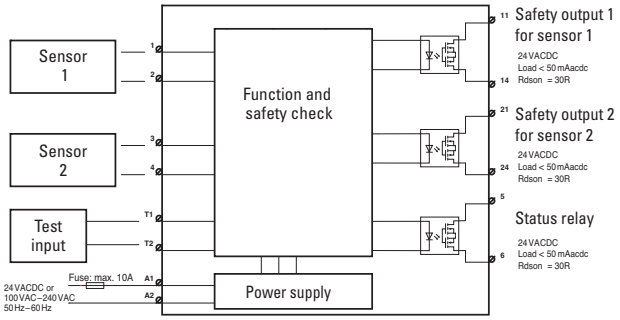


Switching devices

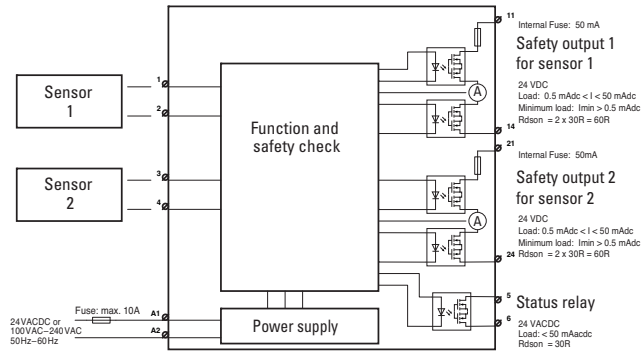
EsGate 2 / EsGate 3

- Housing, polyamide red/grey
- EsGate 2 with external test input
- EsGate 3 is self-monitoring
- Performance level d/e, cat. 2/3 acc. to EN ISO 13849-1
- Individually configurable
- Integrated resistance display
- Truly two-channel
- For DIN mounting rail
- Illuminated LCD
- EN 12978

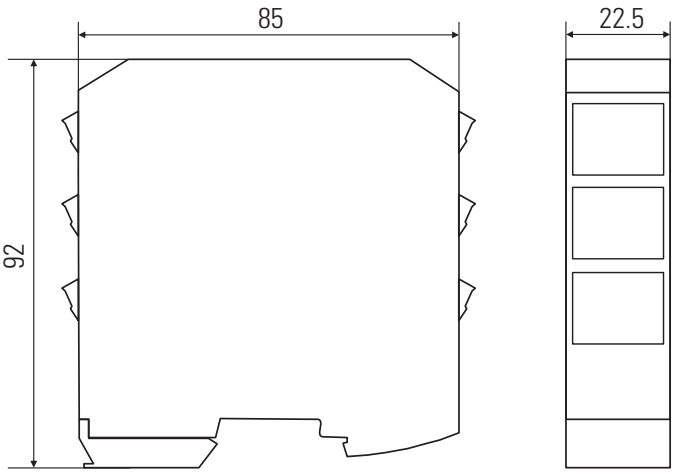
EsGate 2 block diagram



EsGate 3 block diagram



EsGate dimensional drawing



Specific technical data

Power consumption	Max. 2 VA
Response time	< 20 ms
EsGate 2 (PL d / Cat 2)	
Safety outputs	Semiconductor relay 24 V ACDC, < 50 mA, Rdson; approx. 30 Ohm
Status relay	Semiconductor relay 24 V ACDC, < 50 mA, Rdson; approx. 30 Ohm
Test input	24 V ACDC ± 15% 2 mA not activated = normal operation, activated = test
EsGate 3 (PL e / Cat 3)	
Safety outputs	Semiconductor relay 24 V DC, 0.5 mA DC up to 50 mA DC, Rdson; approx. 60 Ohm
Status relay	Semiconductor relay 24 V ACDC, < 50 mA, Rdson; approx. 60 Ohm

Switching devices

ESD3

- Housing, ABS red/black
- Performance level e, cat. 3 acc. to EN ISO 13849-1
- For safety mats acc. to EN ISO 13856-1/ for safety edges acc. to EN ISO 13856-2
- Auto-, external reset
- Redundant signal evaluation
- Positively driven relays
- Installation on DIN mounting rail

ESD3 variants

The ESD3 variants are distinguished firstly by their reset function and secondly by the configuration of the status relay contact. This can be implemented off-load both as open and closed. It is not a safety contact, but is exclusively used for transmitting information. It is not monitored for failure and must never be used for safety shutdown in any form whatsoever. Different voltage supply variants are available depending on the type:

Version	Inputs	Safety relay	Reset		Status relay			Voltage variants		
	2	Disconnected	Auto.	External	M	SM	D	230 VAC	115 VAC	24 VACDC
03	x	x	x			x		x		x
04	x	x	x		x			x	x	x
05	x	x		x		x				x
06	x	x		x	x					x
08	x	x	x				x			x
09	x	x		x			x			x

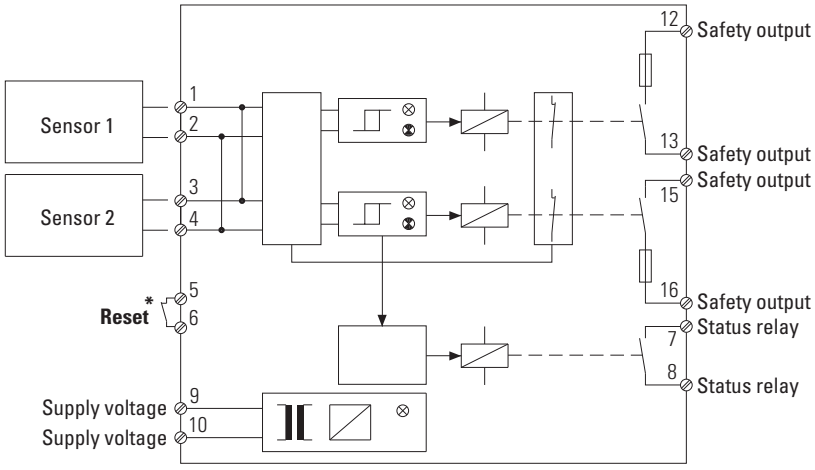
Status relay function

Contacts	Type	De-energised	Sensor not actuated	Sensor actuated (LED yellow)	Fault (LED red)
Safety contacts	all types	0	X	0	0
Fault contact, SM	ESD3-03,-05	0	X	X	0
Signalling contact, M	ESD3-04,-06	0	X	0	0
Signalling contact, D	ESD3-08,-09	X	0	X	X

Key:
0 = contact open
X = contact closed

Switching devices

Block diagram and terminal assignment

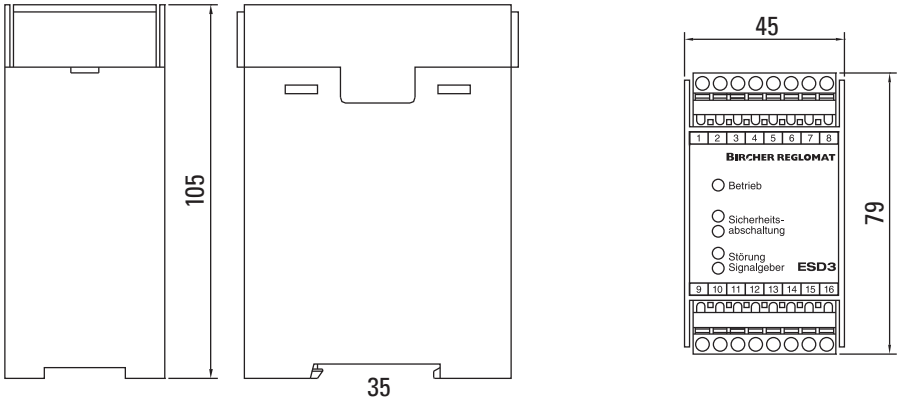


*Versions with automatic reset have this function integrated in the circuit

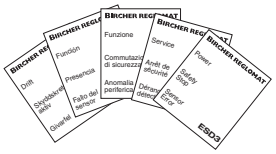
Terminals

- Type: 2 x 8-pin, pluggable
- 2 parallel sensor inputs

Dimensional drawing



Stick-on labels in the following languages: en, fr, it, es, sv



Technical data

Power consumption	Max. 5 VA
Safety outputs	
Usage category in acc. with EN 60947-4-1	AC- 1: 250 V/2 A/500 VA approx. 300'000 cycles DC-1: 24 V/2 A/48 W approx. 700'000 cycles
Usage category in acc. with EN 60947-5-1	AC- 15: 250 V/2 A / 500 VA approx. 130'000 cycles DC-13: 24 V/2 A/48 W approx. 70'000 cycles
Internal contact fuse	2 A slow blowing
Mechanical service life	20 million cycles
Status relay	
Switching capacity	24 VDC / 1 A, resistive load; 30 VAC / 1 A, resistive load
Response time	< 50 ms

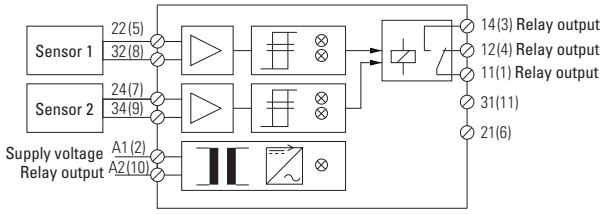
For further technical data, please see last page

Switching devices

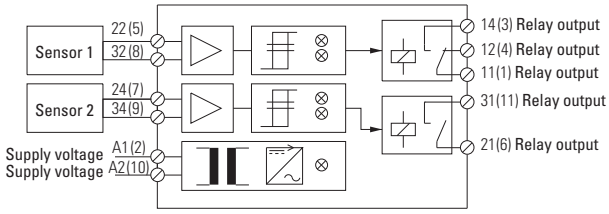
ESR 11 / ESR 12

- Bircher M3 housing, noryl red
- 11-pin connector
- Performance level c, cat. 1 acc. to EN ISO 13849-1
- Two-channel set-up
- Simple signal evaluation (for ESR 12 per channel)
- Detection of sensor faults

ESR 11 block diagram



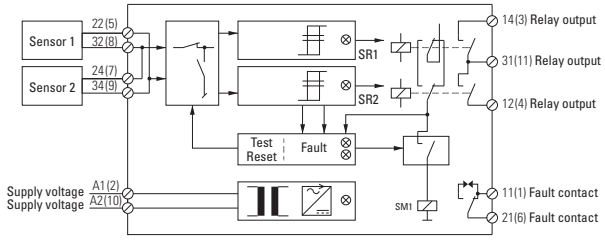
ESR 12 block diagram



ESR 31C / ESR 32

- Bircher M3 housing, noryl red
- 11-pin connector
- Performance level e, cat. 3 acc. to EN ISO 13849-1
- Double redundant signal evaluation
- Self-monitoring
- Start-up test
- Automatic or external reset

ESR 31C / ESR 32 block diagram



*Reset button on ESR 31C:
Green power LED is also the reset button

Specific technical data

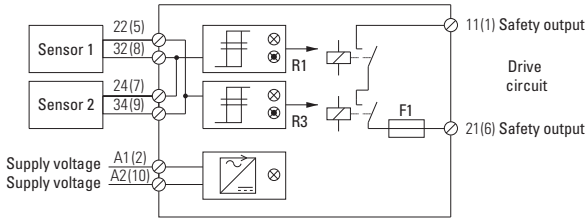
Power consumption	Max. 3 VA for ESR 11 / ESR 12; max. 5 VA for ESR 31C / ESR 32
Signal output relay **Usage category in acc. with EN 60947-4-1**	AC- 1: 250 V/2 A/500 VA approx. 300'000 cycles DC-1: 24 V/2 A/48 W approx. 700'000 cycles
Usage category in acc. with EN 60947-5-1	AC- 1: 250 V/2 A/500 VA approx. 300'000 cycles DC-1: 24 V/2 A/48 W approx. 700'000 cycles
External contact fuse	5 A sluggish for ESR 11 / ESR 12; 2 A sluggish for ESR 31C / ESR 32
Mechanical service life	20 million cycles
Response time	< 70 ms
Status relay for ESR 31C / ESR 32	30 V DC / 1A Ohmic load 1 A ind. load 30 V AC / 1A Ohmic load 0.5 A ind. load

Switching devices

ESR 25 / ESR 26

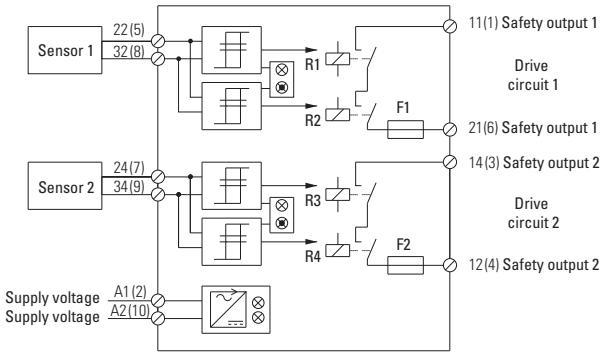
- Bircher M3 housing, noryl red
- 11-pin connector
- Performance level d, cat. 2 acc. to EN ISO 13849-1

ESR 25 block diagram



- Two parallel sensor inputs
- One safety output
- Redundant evaluation of sensor

ESR 26 block diagram

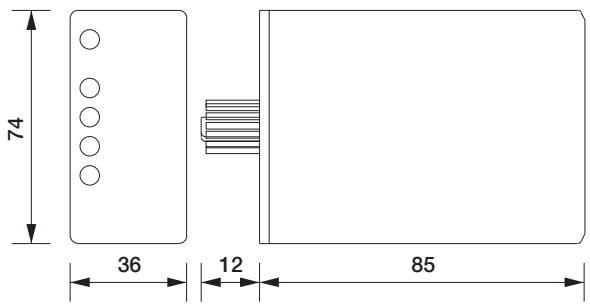


- Two separate sensor inputs
- Two separate sensor outputs
- Redundant evaluation of both channels

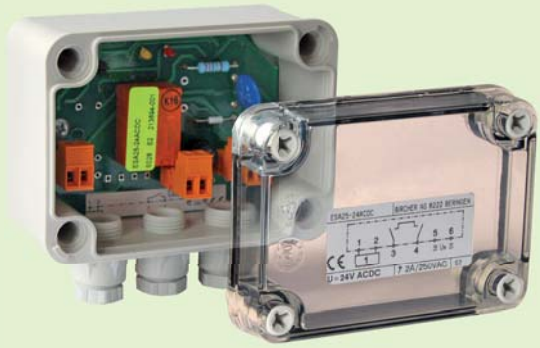
Specific technical data

Power consumption	Max. 3 VA
Signal output relay **Usage category in acc. with EN 60947-4-1**	AC-1: 250 V / 2 A / 500 VA approx. 500'000 cycles
External contact fuse	2 A slow blowing
Mechanical service life	20 million cycles
Response time	< 12 ms

Dimensional drawing for ESR 11/12/25/26/31C/32



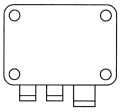
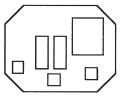
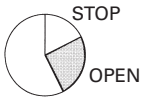
Switching devices



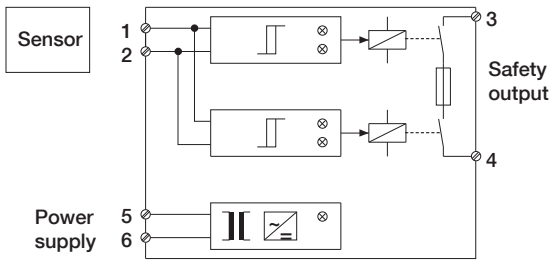
ESA 25 (A=panel mounting housing) / ESP 25 (P=Print)

- IP65 protection class (ESA 25)
- Panel mounting housing, ABS grey
- Redundant signal evaluation
- Performance level d, cat. 2 acc. to EN ISO 13849-1

ESA/ESP overview

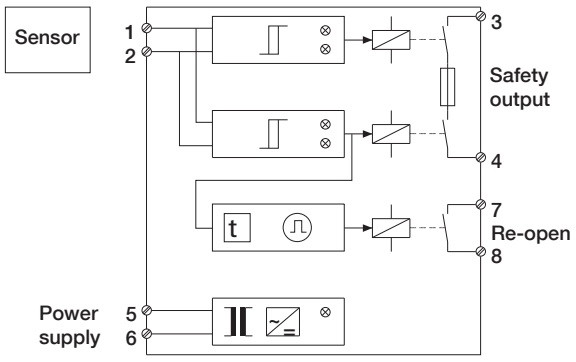
				
ESA 25	x		x	
ESAS 25	x		x	x
ESP 25		x	x	

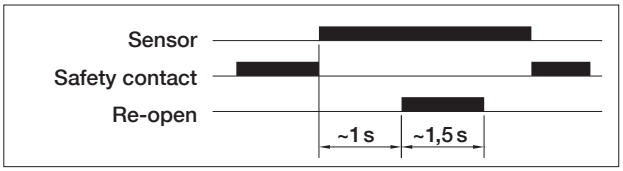
ESA 25 / ESP 25 block diagram



- Redundant evaluation of both channels
- In output, both contacts are switched in series and protected by a fuse

ESAS 25 block diagram

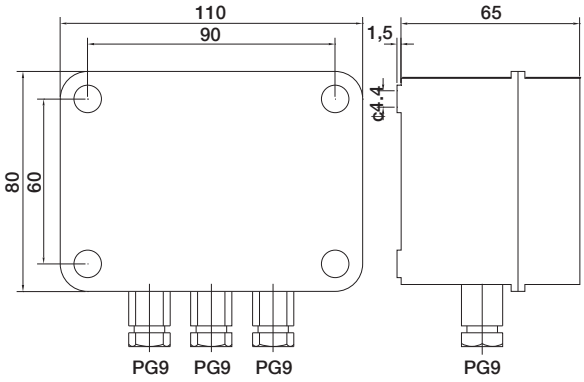




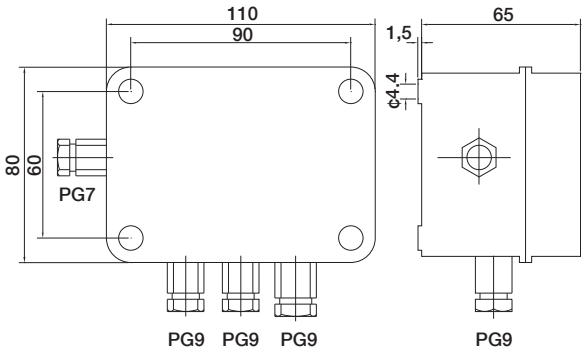
- Basic function as in ESA 25 / ESP 25
- in addition, when sensor is actuated for 1 second, the contact in the third relay closes for 1.5 seconds (re-start)

Switching devices

Dimensional drawing of panel mounting housing ESA 25



Dimensional drawing of panel mounting housing ESAS 25



Specific technical data

Power consumption	Max. 4 VA
Signal output relay **Usage category in acc. with EN 60947-4-1**	AC-1: 250 V / 2 A / 500 VA approx. 300'000 cycles DC-1: 24 V / 2 A / 48 W approx. 700'000 cycles
Internal contact fuse	2 A slow blowing
Mechanical service life	20 million cycles
Response time / drop-out time if circuit is interrupted	< 15 ms
Cable gland	For ESA 25: 4 x PG9 / for ESAS 25: 4 x PG9, 1 x PG7
Sensor input	
Input resistance	5 kOhm at 12 V (internal)
Input voltage at 8.2 kOhm	Approx. 7.5 V DC
Relay for re-start function (only ESAS)	
Switching capacity	2 A / 250 V AC
Time delay	1…1.5 sec.
Pulse duration	1.5…2 sec.

Ordering information

Article no.	Description	
210978	ESD3-03-230VAC	
210979	ESD3-03-24VACDC	
210984	ESD3-04-230VAC	
210983	ESD3-04-115VAC	
210985	ESD3-04-24VACDC	
210988	ESD3-05-24VACDC	
210994	ESD3-06-24VACDC	
210997	ESD3-08-24VACDC	
211000	ESD3-09-24VACDC	
263911	EsGate 2 24VACDC	
263912	EsGate 2.LVAC 100-240VAC	
263913	EsGate 3 24VACDC	
263914	EsGate 3.LVAC 100-240VAC	
211897	ESR31C-24VDC GB	
211922	ESR32-24VDC GB	
211903	ESR32-115VAC GB	
211909	ESR32-230VAC GB	
210865	ESA25-24VACDC	
210864	ESA25-230VAC	
210884	ESAS25-230AC	
211731	ESP25-24VACDC	
211838	ESR25-24VACDC GB	
211845	ESR26-24VACDC GB	
211777	ESR11-24VACDC GB	
211771	ESR11-230VAC GB	
211795	ESR12-24VACDC GB	
211789	ESR12-230VAC GB	
209745	11-pin plug-in base	

Supplementary products

ClickLine
Electrical safety edge
rubber profiles with click-fit foot

CoverLine
Electrical safety edge
rubber profiles for clicking in at the side

RFGate 2.1 / RFGate 2.2.A
Wireless signal transmission system for safety edges on roller and sectional gates, folding doors, sliding gates at site entrance and telescopic gates

Safety mats
Electric pushbutton for activating and deactivating machines and devices

Technical data

General mechanical data	
Weight	approx. 250 g (depending on type)
General electrical data	
Frequency range	50–60 Hz
Duty cycle	100% operating factor
Displays	
Operation	Green
Safety shutdown	Yellow
Fault (interruption)	Red
Ambient conditions	
Protection class	
Switching device	IP30, except for ESA25
Operating temperature	–20 °C to +50 °C
Storage temperature	–40 °C to +80 °C
Air humidity	Max. 80% relative (no moisture condensation allowed)
Standards	
Approvals	EN ISO 13849-1

Note
Technical details and recommendations concerning our products are based on experience and are an aid for the orientation of the user. Details stated in our brochures and data sheets do not guarantee special properties of the products. This does not apply to special product properties confirmed by us in writing or individually. Subject to technical alterations.

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