



Switching devices

EsGate, ESD and ESR



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

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

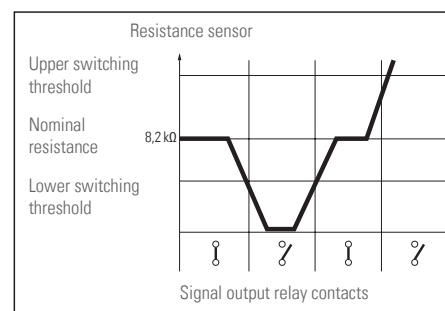
PL and cat. according to EN ISO 13849-1	Design Protection Class	Sensor inputs	Safety outputs	Voltage [V]	Application	Bircher designation	Page
PLe, cat. 3	IP 20	2	2	24	Gate	EsGate 3	4
PLd, cat. 2	IP 20	2	2	24	Gate	EsGate 2	4
PLe, cat. 3	IP 20	2	2 (in series)	230/115/24	Gate/Machine	ESD3	5/6
PLe, cat. 3	IP 30	2	2 (in series)	24	Gate/Machine	ESR31C	7
PLe, cat. 3	IP 30	2	2 (in series)	230/115/24	Gate/Machine	ESR32	7

Function and conformity

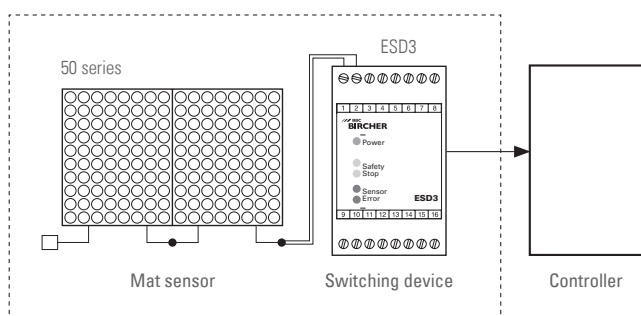
Sensors with a terminating resistor of 8.2 kΩ are connected and monitored for a change of the quiescent current.

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.

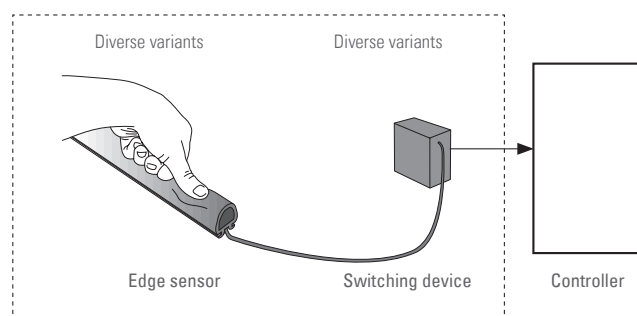


A) Type-tested safety mat according to MRL 2006/42/EG, EN ISO 13856-1 and EN ISO 13849-1*



- Safety mat systems connection:
Maximum total area of the sensor 5 m²
- The sensors are connected in series
- All of the systems are connected at a resistance of 8.2 kΩ

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 kΩ

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

Switching devices

Applications in combination with safety mats

Situation

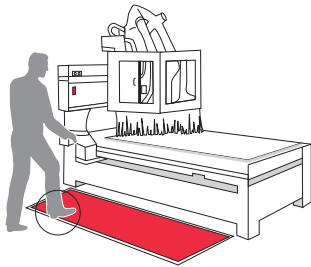
Machine safety

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

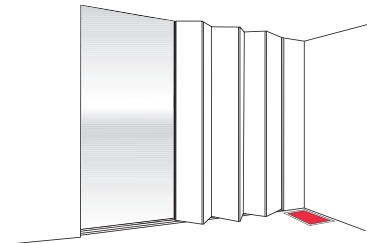
Folding door

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

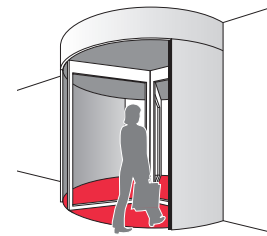
Revolving door

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

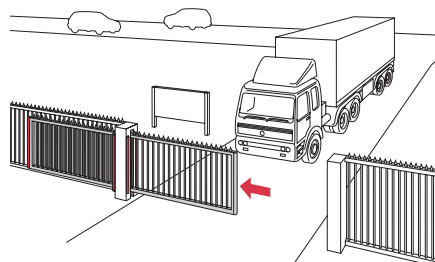
Sliding gate at site entrance

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

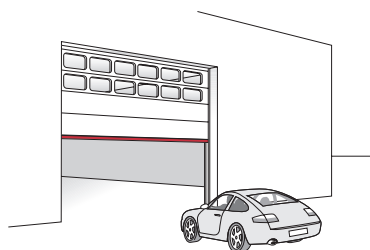
Sectional door and gate

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

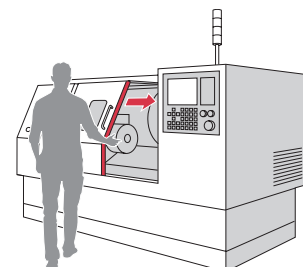
Milling or grinding machine with automatic protective door

Solution

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

Tip

- Combine with contact mat systems



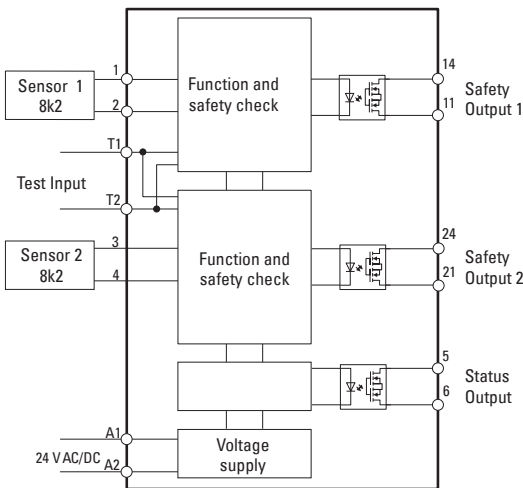
Switching devices



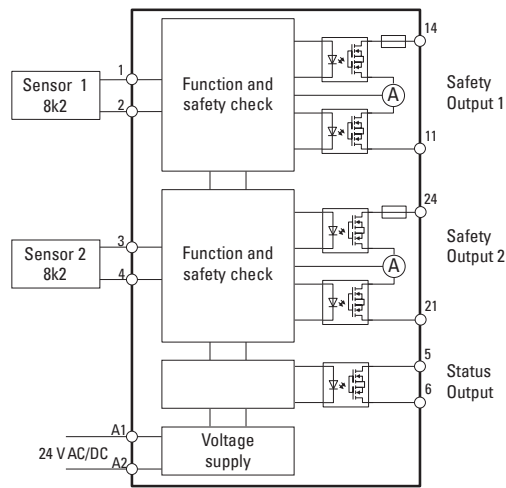
EsGate 2 / EsGate 3

- 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
- For safety edges acc. to EN ISO 13856-2
- Individually configurable
- Integrated resistance display
- Truly two-channel
- For DIN mounting rail
- Illuminated LCD
- EN 12978

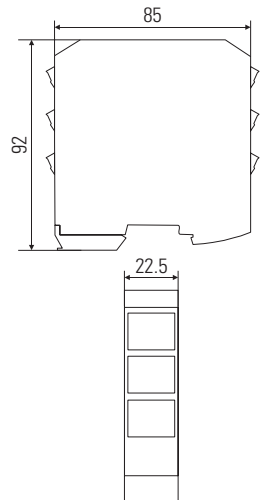
Block diagram EsGate 2, PLd, cat. 2



Block diagram EsGate 3, PLe, cat. 3



Dimensional drawing



Specific technical data

Operating voltage	24 V AC $\pm 15\%$, 50/60 Hz 24 V DC $\pm 15\%$
Power consumption	Max. 3 W
Response time	< 20 ms
EsGate 2 (PL d / Cat 2)	
Safety outputs	Semiconductor relay 24 V AC/DC, max. 50 mA, $R_{DS(on)}$: approx. 30 Ω , short-circuit proof
Status relay	Semiconductor relay 24 V AC/DC, max. 50 mA, $R_{DS(on)}$: approx. 30 Ω , short-circuit proof
Test input	24 V AC/DC $\pm 15\%$ 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, $R_{DS(on)}$: approx. 60 Ω , short-circuit proof
Status relay	Semiconductor relay 24 V AC/DC, max. 50 mA, $R_{DS(on)}$: approx. 30 Ω , short-circuit proof

Switching devices



ESD3

- Housing, ABS grey/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 V AC	115 V AC
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

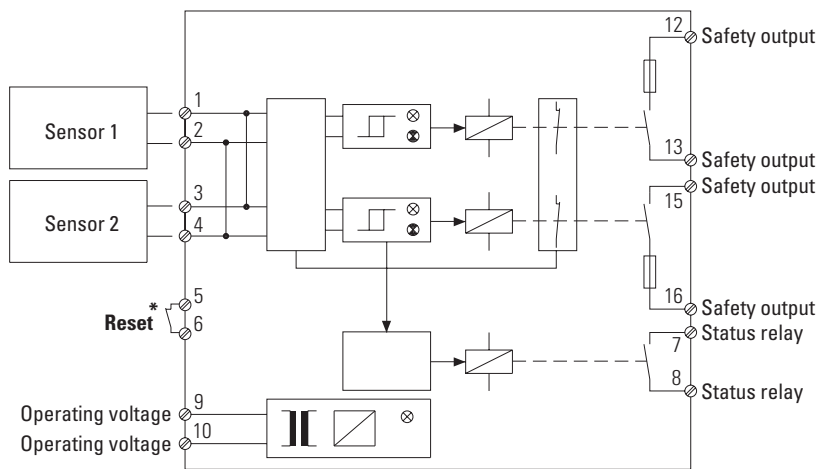
Key:

0 = contact open

X = contact closed

Switching devices

Block diagram and terminal assignment

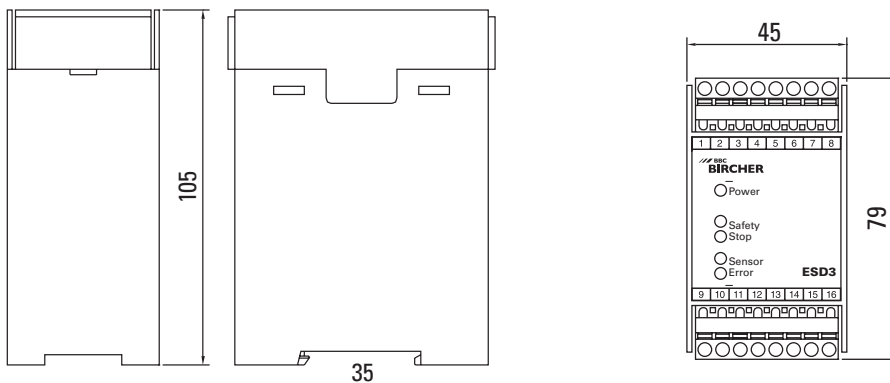


* Versions with automatic reset have this function integrated in the circuit
For versions with an external reset, a button must be connected to 5-6 as a break contact.

Terminals

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

Dimensional drawing



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



Technical data

Operating voltage according to EN 60204-1 (depending on type)	24 V AC $\pm 10\%$, 50/60 Hz 24 V DC $\pm 10\%$ 115 V AC $\pm 10\%$, 60 Hz 230 V AC $\pm 10\%$, 50 Hz
Power consumption	Max. 5 VA
Safety outputs	
Usage category in acc. with EN 60947-4-1	AC-1: 230 V/2 A/460 VA, approx. 280'000 cycles DC-1: 24 V/2 A/48 W, approx. 500'000 cycles
Usage category in acc. with EN 60947-5-1	AC-15: 230 V/2 A/460 VA, approx. 150'000 cycles DC-13: 24 V/2 A/48 W, approx. 80'000 cycles
Internal contact fuse	2 A slow blowing
Mechanical service life	10 million cycles
Status relay	
Switching capacity	24 V DC/1 A, resistive load 30 V AC/1 A, resistive load
Response time	< 50 ms

For further technical data, please see last page

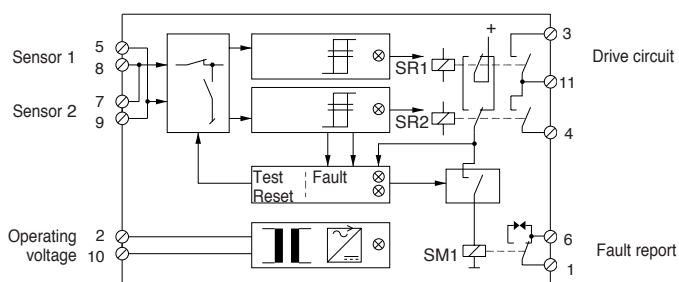
Switching devices



ESR31C / ESR32

- Bircher M3 housing, noryl red
- 11-pin connector
- 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
- Double redundant signal evaluation
- Self-monitoring
- Start-up test
- Automatic or external reset

Block diagram ESR 31C / ESR 32



Reset button on ESR31C:
Green power LED is also the reset button

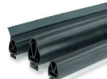


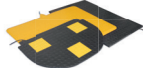
Specific technical data

Operating voltage	ESR31C-24VDC: 24 V DC $\pm 15\%$ ESR32-24VDC: 24 V DC $\pm 15\%$ ESR32-115VAC: 115 V AC $+10\%$ / -15% , 60 Hz ESR32-230VAC: 230 V AC $+10\%$ / -15% , 50 Hz
Power consumption	Max. 5 VA
Signal output relay Usage category in acc. with EN 60947-4-1	AC-1: 230 V/2 A/460 VA, approx. 280'000 cycles DC-1: 24 V/2 A/48 W, approx. 500'000 cycles
Usage category in acc. with EN 60947-5-1	AC-15: 230 V/2 A/460 VA, ca. 150'000 cycles DC-13: 24 V/2 A/48 W, ca. 80'000 cycles
External contact fuse	2 A sluggish
Mechanical service life	10 million cycles
Response time	< 70 ms
Status relay	30 VDC / 1A, resistive load 30 VAC / 1A, resistive load

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	
263913	EsGate 3 24VACDC	
211897	ESR31C -24VDC	
211922	ESR32 -24VDC	
211903	ESR32 -115VAC	
211909	ESR32 -230VAC	
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	
ExpertSystem XRF 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)
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General electrical data

Frequency range	50/60 Hz
Duty cycle	100% ED S1
Displays ESD3, ESR3	
Operation	Green
Safety shutdown	Yellow
Fault (interruption)	Red
Displays EsGate	
Operation	Green
Safety shutdown	Orange
Fault (interruption)	Red
LCD	Additional information

Ambient conditions

Protection class switching device		EsGate, ESD3 IP20
		ESR3 IP30
Operating temperature		
EsGate	-20 °C to +60 °C	
ESD3	-20 °C to +55 °C	
ESR3	-20 °C to +50 °C	
Storage temperature		
EsGate	-40 °C to +70 °C	
ESD3, ESR3	-20 °C to +80 °C	
Air humidity		
EsGate	Max. 95% relative, non-condensing	
ESD3, ESR3	Max. 80% relative, non-condensing	

Conformity & Standards

Conformity	MD 2006/42/EC
Standards	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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