BBC BIRCHER

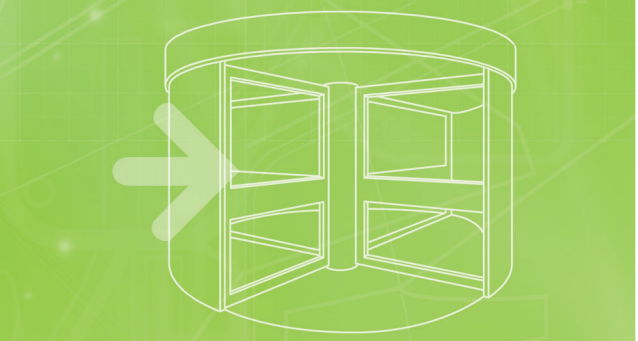
Smart Access





Switching devices

EsMatix 3, 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**

bircher.com

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

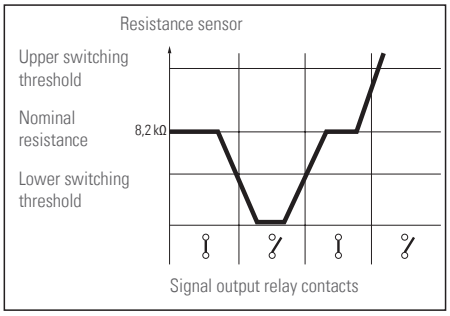
PL and cat. according to EN ISO 13849-1	Design Protection Class	Sensor inputs	Safety outputs	Voltage [V]	Application	Bircher designation	Page
PLe, cat. 3	IP20	2	2 (in series)	24	Gate/Machine	EsMatix 3	4
PLe, cat. 3	IP20	2	2 (in series)	230/115/24	Gate/Machine	ESD3	5/6
PLe, cat. 3	IP30	2	2 (in series)	24	Gate/Machine	ESR31C	7
PLe, cat. 3	IP30	2	2 (in series)	230/115/24	Gate/Machine	ESR32	7

Function and conformity

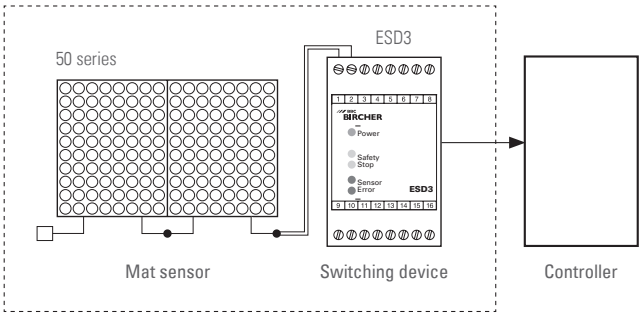
Sensors with a terminating resistor of 8.2 kΩ are connected and monitored for a change of the quiescent current.

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 increasesto 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.

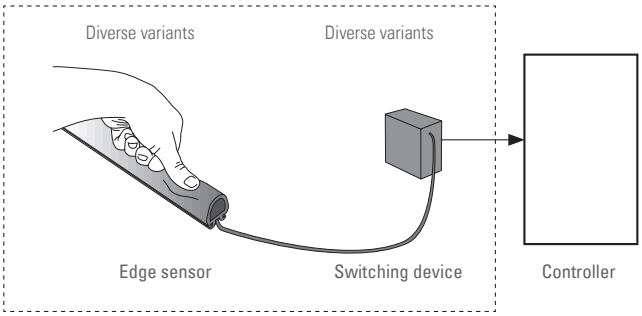


A) Type-tested safety mat according to MRL 2006/42/EG, EN ISO 13856-1 and EN ISO 13849-1*



- 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.

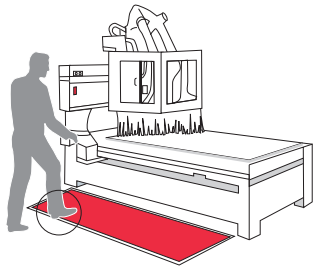
Switching devices

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

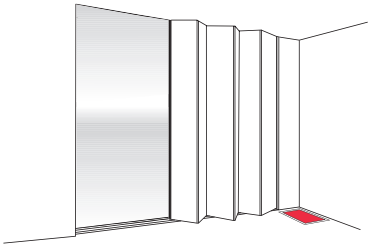
Tip
- Combination of multiple safety mats to protect larger areas



Situation
Folding door

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

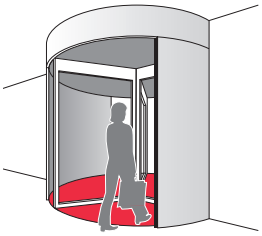
Tip
- Combination of a safety edge and an Expert-System XRF radio transmission system to protect the closing edge of the door



Situation
Revolving door

Solution
- ESD3 safety switching device in combination with safety edges

Tip
- Using safety mats to protect revolving doors

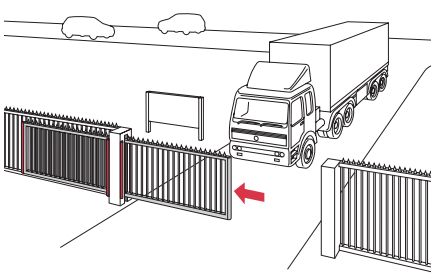


Applications in combination with safety edges

Situation
Sliding gate at site entrance

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

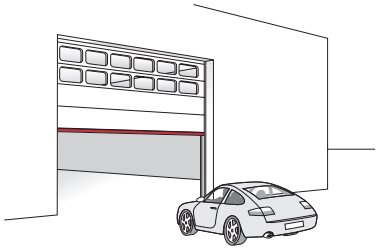
Tip
- Combine with ExpertSystem XRF radio transmission system for the mobile safety edge



Situation
Sectional door and gate

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

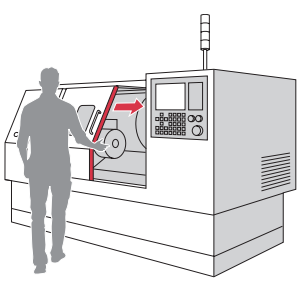
Tip
- Optimum protection because of mobile safety edges acc. to cat. 2 or cat. 3
- Herkules 2E gate radar as opening sensor. It distinguishes between vehicles and people



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



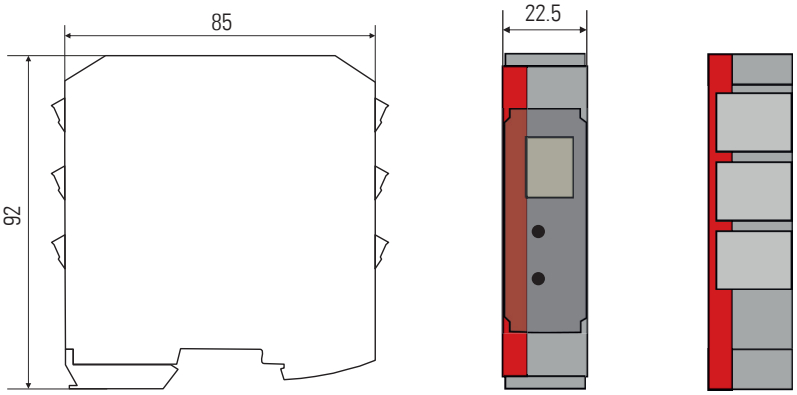
Switching devices



EsMatix 3

- Housing, polyamide red/grey
- Performance level e, cat. 3 acc. to EN ISO 13849-1
- For safety edges acc. to EN ISO 13856-2
- Auto-, external reset
- Individually configurable
- Integrated resistance display
- For DIN mounting rail
- Illuminated LCD

Dimensional drawing



Discontinued product:
This product is in the process of being discontinued and will only be available for a short time. Please contact our sales department for more information and successor products.

Specific technical data

Operating voltage	24 V DC –20% to +20% 24 V AC –20% to +10%, 50/60 Hz
Power consumption	Max. 3 W
Inputs	For 1 or 2 sensors with 8.2 kΩ termination
Reset input	24 V AC/DC, max. 3 mA@24 V, Uth > 8 V DC
Safety outputs	Solid state relays, 24 V DC, min. 0,5 mA, max. 250 mA $R_{DS(on)}$: ca. 2 Ω, internally protected by a 300 mA fuse
Status output	Solid state relays, 24 V AC/DC, max. 250 mA, $R_{DS(on)}$: ca. 2 Ω
Response time (actuation)	< 5 ms
Recovery time	< 30 ms (reset after actuation)
Start-up time	< 300 ms
External reset pulse (required)	> 100 ms
Programmable functions	
Reset (confirmation)	Automatic (automatic start) Manual (pushbutton) Manual (external)
Fall-delay time	Between 0 and 1000 ms (5 levels)
Input delay	0, 15, 30 or 45 ms
Relay status	Error signal output

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	24 V AC/DC
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

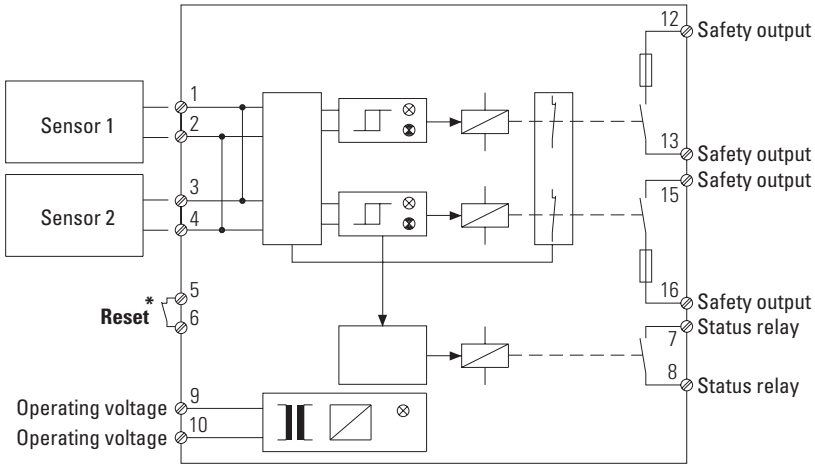
Status relay function

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

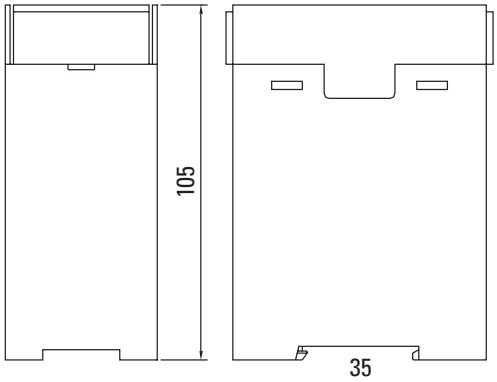


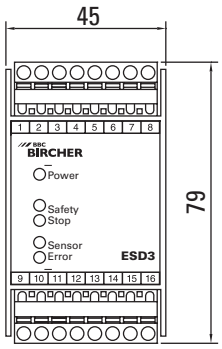
*Versions with automatic reset have this function integrated in the circuit
For versions with an external reset, a button must be connected to 5-6 as a break contact.

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 ±10%, 50/60 Hz 24 V DC ±10% 115 V AC ±10%, 60 Hz 230 V AC ±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

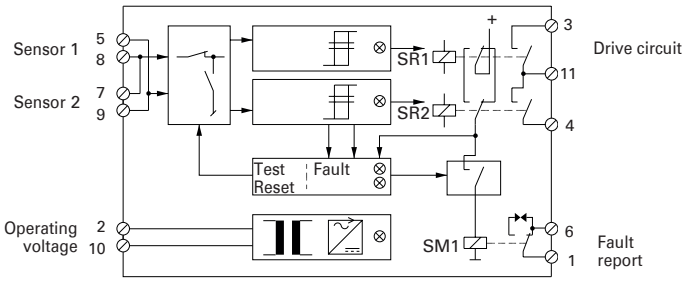
Switching devices



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

Discontinued products:
These products are in the process of being discontinued and will only be available for a short time. Please contact our sales department for more information and successor products.

Specific technical data

Operating voltage	ESR31C-24VDC: 24 V DC ±15% ESR32-24VDC: 24 V DC ±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 V DC / 1A, resistive load 30 V AC / 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	
364283	⚠	EsMatix 3 Safety switching device	
211897		ESR31C -24VDC	
211922	⚠	ESR32 -24VDC	
211903		ESR32 -115VAC	
211909		ESR32 -230VAC	
209745		11-pin plug-in base	

⚠ Discontinued products

Supplementary products

ExpertSystem XL
Modular pressure-sensitive edge system
for gate/door applications



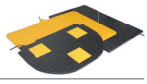
ClickLine
Electrical safety edge
rubber profiles with click-fit foot



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)
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 EsMatix 3		3-color LED / LCD
Operation		Green
Safety shutdown		Orange
Fault (interruption)		Red
LCD		Additional information
Ambient conditions		
Protection class switching device	EsMatix 3, ESD3	IP20
	ESR3	IP30
Operating temperature		
	EsMatix 3	–20 °C to +60 °C
	ESD3	–20 °C to +55 °C
	ESR3	–20 °C to +50 °C
Storage temperature		
	EsMatix 3	–40 °C to +70 °C
	ESD3, ESR3	–20 °C to +80 °C
Air humidity		
	EsMatix 3	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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