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

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

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

- Functions:
  - Sensor 1: 8kΩ
  - Sensor 2: 8kΩ
  - Test Input
  - Function and safety check
  - Voltage supply
  - Safety Output 1
  - Safety Output 2
  - Status Output

### Block diagram EsGate 3, PLe, cat. 3

- Functions:
  - Sensor 1: 8kΩ
  - Sensor 2: 8kΩ
  - Function and safety check
  - Voltage supply
  - Safety Output 1
  - Safety Output 2
  - Status Output

### Dimensional drawing

#### Specific technical data

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating voltage</strong></td>
<td>24 V AC ±15%, 50/60 Hz 24 V DC ±15%</td>
</tr>
<tr>
<td><strong>Power consumption</strong></td>
<td>Max. 3 W</td>
</tr>
<tr>
<td><strong>Response time</strong></td>
<td>&lt; 20 ms</td>
</tr>
<tr>
<td><strong>EsGate 2 (PL d / Cat 2)</strong></td>
<td>Semiconductor relay 24 V AC/DC, max. 50 mA, $R_{\text{On}}$: approx. 30 Ω, short-circuit proof</td>
</tr>
<tr>
<td><strong>Safety outputs</strong></td>
<td>Semiconductor relay 24 V AC/DC, max. 50 mA, $R_{\text{On}}$: approx. 30 Ω, short-circuit proof</td>
</tr>
<tr>
<td><strong>Status relay</strong></td>
<td>24 V AC/DC ±15% 2 mA not activated = normal operation, activated = test</td>
</tr>
<tr>
<td><strong>Test input</strong></td>
<td>24 V AC/DC ±15% 2 mA not activated = normal operation, activated = test</td>
</tr>
<tr>
<td><strong>EsGate 3 (PL e / Cat 3)</strong></td>
<td>Semiconductor relay 24 V DC, 0.5 mA DC up to 50 mA DC, $R_{\text{On}}$: approx. 60 Ω, short-circuit proof</td>
</tr>
<tr>
<td><strong>Safety outputs</strong></td>
<td>Semiconductor relay 24 V AC/DC, max. 50 mA, $R_{\text{On}}$: approx. 30 Ω, short-circuit proof</td>
</tr>
<tr>
<td><strong>Status relay</strong></td>
<td>Semiconductor relay 24 V AC/DC, max. 50 mA, $R_{\text{On}}$: approx. 30 Ω, short-circuit proof</td>
</tr>
</tbody>
</table>
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:

<table>
<thead>
<tr>
<th>Version</th>
<th>Inputs</th>
<th>Safety relay</th>
<th>Reset</th>
<th>Status relay</th>
<th>Voltage variants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>M</td>
<td>SM</td>
</tr>
<tr>
<td>03</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>04</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>05</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>06</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>08</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>09</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

Status relay function

<table>
<thead>
<tr>
<th>Contacts</th>
<th>Type</th>
<th>De-energised</th>
<th>Sensor not actuated</th>
<th>Sensor actuated (LED yellow)</th>
<th>Fault (LED red)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety contacts</td>
<td>all types</td>
<td>O</td>
<td>X</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fault contact, SM</td>
<td>ESD3-03, -05</td>
<td>0</td>
<td>X</td>
<td>X</td>
<td>0</td>
</tr>
<tr>
<td>Signalling contact, M</td>
<td>ESD3-04, -06</td>
<td>0</td>
<td>X</td>
<td>O</td>
<td>0</td>
</tr>
<tr>
<td>Signalling contact, D</td>
<td>ESD3-08, -09</td>
<td>X</td>
<td>0</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

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

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 |
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption</td>
</tr>
</tbody>
</table>
| 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                                                 | 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

** 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 | 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 60947-4-1 | AC-15: 230 V/2 A/460 VA, ca. 150’000 cycles  
|                     | DC-13: 24 V/2 A/48 W, ca. 80’000 cycles  
| Usage category in acc. with EN 60947-5-1 |  
| 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  

**Block diagram ESR 31C / ESR 32**

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

**Specific technical data**

- 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
## Ordering information

<table>
<thead>
<tr>
<th>Article no.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>210978</td>
<td>ESD3 -03-230VAC</td>
</tr>
<tr>
<td>210979</td>
<td>ESD3 -03-24VACDC</td>
</tr>
<tr>
<td>210984</td>
<td>ESD3 -04-230VAC</td>
</tr>
<tr>
<td>210983</td>
<td>ESD3 -04-115VAC</td>
</tr>
<tr>
<td>210985</td>
<td>ESD3 -04-24VACDC</td>
</tr>
<tr>
<td>210988</td>
<td>ESD3 -05-24VACDC</td>
</tr>
<tr>
<td>210994</td>
<td>ESD3 -06-24VACDC</td>
</tr>
<tr>
<td>210997</td>
<td>ESD3 -08-24VACDC</td>
</tr>
<tr>
<td>211000</td>
<td>ESD3 -09-24VACDC</td>
</tr>
<tr>
<td>263911</td>
<td>EsGate 2 24VACDC</td>
</tr>
<tr>
<td>263913</td>
<td>EsGate 3 24VACDC</td>
</tr>
<tr>
<td>211897</td>
<td>ESR31C -24VDC</td>
</tr>
<tr>
<td>211922</td>
<td>ESR32 -24VDC</td>
</tr>
<tr>
<td>211903</td>
<td>ESR32 -115VAC</td>
</tr>
<tr>
<td>211909</td>
<td>ESR32 -230VAC</td>
</tr>
<tr>
<td>209745</td>
<td>11-pin plug-in base</td>
</tr>
</tbody>
</table>

## 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)

### General electrical data
- **Frequency range**: 50/60 Hz
- **Duty cycle**: 100% ED S1
- **Displays ESD3, ESR3**: Green
- **Operation**
  - Safety shutdown: Green
  - Fault (interruption): Red
- **Displays EsGate**: 3-color LED / LCD
- **Operation**
  - Safety shutdown: Orange
  - Fault (interruption): Red
- **LCD**: Additional information

### Ambient conditions
- **Protection class switching device**: EsGate, ESD3, ESR3
- **EsGate**: IP20, IP30
- **ESD3, ESR3**: IP40, IP50
- **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.