Safety door handle system ICS...-B30 with Safety sensor
The application for the safety door handle system with individually coded safety sensor, model ICS, is the monitoring of hinged guard devices. These should ensure that work on and with the machine or system can only be carried out when the guard device is closed.

**Safety ensured – but escape route remains open**

The barrier fencing of working areas provides safety by keeping the operating personnel away from potentially hazardous machine movements. But there are also cases in which fencing can give rise to panic instead of safety: when persons, e.g. installation personnel, are located within the hazard area and the guard door is unintentionally closed by someone else. For these cases, Schmersal has developed a simple, but effective solution - the actuator with an "emergency handle".

This expression appropriately describes the escape route function of the actuator.

**Application**

The safety door-handle system is especially suitable for hinged guard devices. The guard device can be opened and closed from outside via a rotating movement of the door handle. The actuating handle latches in the closed position.

**Escape route function**

The ICS-B30 actuator can be supplied with an emergency handle for opening the guard device. The guard device can be opened from within the hazard area by operating the emergency handle. It is not possible to close the guard device from inside. The ICS-B30 actuator can be supplied with a SZ 415 lockout tag against unintentional closure of the guard device, e.g. during installation work on systems where visibility is restricted. Mounting plates are supplied for simple fitting to fencing.
Principle of operation

The ICS safety sensor operates according to the identification principle in conjunction with its individually coded ICS-B30 actuator. In the inserted position the ICS-B30 actuator latches and the enabling signal to the safety circuit only occurs in this position. The evaluation of the safety code in the safety sensor takes place on two channels. Both channels provide mutual monitoring of each other. Each channel has an output with two output transistors.

Through this monitoring of the outputs, a connection between the output and the supply is detected and switch-on is prevented. A ground connection and a low voltage on an output lead to both outputs switching off.

The evaluation device is typically a safety PLC or a safety door monitor. This device usually provides the voltage supply for the safety sensor and its two outputs. The supply for the outputs can include clock signals for checking the connection leads for breakage and short circuit.

Function

The enabling signal to the safety circuit is only issued when the ICS-B30 actuator is located within the safety sensor and is latched. The two green indicators (CH1 + CH2) on the ICS safety sensor then light. The hysteresis range can be discerned by the flickering of the red indicator (ERR) with the green indicators continuing to light (the outputs in this case remain switched on and exhibit typical hysteresis behaviour). After this hysteresis range is left, the two green indicators go out and the red indicator lights.

From the status of the light emitting diodes, information about the status of the ICS (damped/undamped) and about possible fault situations can be derived. Some possible combinations are shown below:

<table>
<thead>
<tr>
<th>Switching condition</th>
<th>LED CH1 (green)</th>
<th>LED CH2 (green)</th>
<th>LED ERR (red)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal operation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor damped</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Sensor undamped</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>Hysteresis range</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>Fault condition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CH1 defective</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>CH2 defective</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>Short circuit CH1*</td>
<td>flashes</td>
<td>flashes</td>
<td>ON</td>
</tr>
<tr>
<td>Short circuit CH2*</td>
<td>flashes</td>
<td>flashes</td>
<td>ON</td>
</tr>
</tbody>
</table>

* with respect to supply voltage (L+ or L-)

This block diagram shows the basic configuration of the ICS with its two-channel structure.
Safety door handle system -B30 with individually coded safety sensor
Series ICS... ST1-B30-05

Features
- Metallic enclosure with individually coded ICS safety sensor
- Control Category 3 or 4
- ICS-B30 actuator including mounting plate for simple fitting
- Shearing force 67,000 N
- Side offset ± 5 mm
- Door handle latches in closed position
- ST1 plug version
- Emergency handle including mounting plate for simple fitting
- Lockout tag against unintentional closure available (not included)

Note
Contacts shown with actuator inserted and in voltage-free state.

<table>
<thead>
<tr>
<th>Contacts/ Switch travel</th>
<th>Door hinged to right with emergency handle</th>
<th>1 NC/ 1 NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 3</td>
<td>ICS3 ST1-B30-05</td>
<td></td>
</tr>
<tr>
<td>Category 4</td>
<td>ICS4 ST1-B30-05</td>
<td></td>
</tr>
</tbody>
</table>

ICS3 ...: x = 165; Y = 189
ICS4 ...: x = 223; Y = 247
Safety door handle system -B30 with individually coded safety sensor
Series ICS... ST1-B30-06

Door hinged to the left with emergency handle

Features
- Metallic enclosure with individually coded ICS safety sensor
- Control Category 3 or 4
- ICS-B30 actuator including mounting plate for simple fitting
- Shearing force 67,000 N
- Side offset ± 5 mm
- Door handle latches in closed position
- ST1 plug version
- Emergency handle including mounting plate for simple fitting
- Lockout tag against unintentional closure available (not included)

Note
Contacts shown with actuator inserted and in voltage-free state.

Contacts/ Switch travel
Door hinged to the left with emergency handle 1 NC/ L1→A1
                                      1 NC  L2→A2

Category 3  ICS3 ST1-B30-06
Category 4  ICS4 ST1-B30-06
Safety door handle system -B30 with individually coded safety sensor
Series ICS... ST1-B30-07

Door hinged to the right without emergency handle

Features
- Metallic enclosure with individually coded ICS safety sensor
- Control Category 3 or 4
- ICS-B30 actuator including mounting plate for simple fitting
- Shearing force 67,000 N
- Side offset ± 5 mm
- Door handle latches in closed position
- ST1 plug version
- Lockout tag against unintentional closure available (not included)

Contacts/ Switch travel
Door hinged to the right without emergency handle 1 NC/ 1 NC

<table>
<thead>
<tr>
<th>Contacts</th>
<th>Switch travel</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICS3</td>
<td>L1 - - A1</td>
</tr>
<tr>
<td>ICS4</td>
<td>L2 - - A2</td>
</tr>
</tbody>
</table>

Category 3  ICS3 ST1-B30-07
Category 4  ICS4 ST1-B30-07

Note
Contacts shown with actuator inserted and in voltage-free state.
Safety door handle system -B30 with individually coded safety sensor
Series ICS... ST1-B30-08

Features

- Metallic enclosure with individually coded ICS safety sensor
- Control Category 3 or 4
- ICS-B30 actuator including mounting plate for simple fitting
- Shearing force 67,000 N
- Side offset ± 5 mm
- Door handle latches in closed position
- ST1 plug version
- Lockout tag against unintentional closure available (not included)

Note

Contacts shown with actuator inserted and in voltage-free state.

<table>
<thead>
<tr>
<th>Contacts/ Switch travel</th>
<th>Category 3</th>
<th>Category 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door hinged to the left</td>
<td>1 NC/</td>
<td>1 NC</td>
</tr>
<tr>
<td>without emergency handle</td>
<td>ICS3 ST1-B30-08</td>
<td>ICS4 ST1-B30-08</td>
</tr>
</tbody>
</table>

ICS3 ...: x = 165; Y = 189
ICS4 ...: x = 223; Y = 247
Safety door handle system -B30 with individually coded safety sensor

Accessories

Mounting plate MP ICS-B30

- Mounting plate for the ICS-B30 actuator
- Aluminium
- Plate thickness 15 mm
- With ICS-B30 actuator factory-fitted
- Included in supplied items

Mounting plate MP TG-02

- Mounting plate for the emergency handle
- For simple fitting of the AZ/AZM 415-B30 emergency handle
- Plate thickness 5 mm
- With emergency handle factory-fitted
- Included in supplied items

ICS Cover

- For covering the plug on the enclosure
- Not included in supplied items
**Safety door handle system -B30 with individually coded safety sensor**

**Accessories**

### Lockout tag SZ 415-1/-2
- For protection against unintentional closure, e.g. during installation work
- For systems where visibility is restricted
- Prevents operation of the switch
- Suitable for mounting inside and outside of hazard area
- SZ 415-1: for AZ/AZM 415-B30-06, AZ/AZM 415-B30-08
- SZ 415-2: for AZ/AZM 415-B30-05, AZ/AZM 415-B30-07
- Version SZ 415-1 is shown, version SZ 415-2 has mirror-image design
- Not included in supplied items

### Connector plug ICS4 ST1
- Straight mating connector
- 6-pole
- Can be wired as required
- Wire cross-section: 6 x 0.75 mm²
- Not included in supplied items

### Connector plug ICS3 ST1
- Straight mating connector
- 8-pole
- M12 Euro-plug
- Length of lead 5 m
- Not included in supplied items
### Safety door handle system -B30 with individually coded safety sensor

#### Technical Data

<table>
<thead>
<tr>
<th></th>
<th>ICS 3 ST1-B30..</th>
<th>ICS 4 ST1-B30..</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulations:</td>
<td>IEC/EN 60947-5-3 PDF/M</td>
<td>4 accord. to EN 954-1</td>
</tr>
<tr>
<td>Control Category:</td>
<td>3 accord. to EN 954-1</td>
<td>4 accord. to EN 954-1</td>
</tr>
<tr>
<td>Enclosure:</td>
<td>Metal enclosure</td>
<td></td>
</tr>
<tr>
<td>Type of protection:</td>
<td>IP 65</td>
<td>IP 67</td>
</tr>
<tr>
<td>Protective insulation:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection class:</td>
<td>Protection Class II accord. to IEC 60947-1</td>
<td></td>
</tr>
<tr>
<td>Type of connection:</td>
<td>Connector plug, 8-pole, Euro-plug, M12</td>
<td>Connector plug, 6-pole, M23 x 1 (Conninvers RC)</td>
</tr>
<tr>
<td>Operating principle:</td>
<td>Transponder</td>
<td></td>
</tr>
<tr>
<td>Switching distance, hysteresis:</td>
<td>13 ± 5 mm, &lt; 15%</td>
<td></td>
</tr>
<tr>
<td>Switch status indicators:</td>
<td>LED 2 x identification (gn); 1 x fault (rd)</td>
<td></td>
</tr>
<tr>
<td>Input voltage $U_{L1,L2}$:</td>
<td>12 ... 24 ... 30 VDC</td>
<td>12 ... 24 ... 30 VDC,</td>
</tr>
<tr>
<td></td>
<td>Clock: Low pulse &lt; 100 µs</td>
<td>Clock: Pulse: 1 ... 5 ms; space: 1...5 ms</td>
</tr>
<tr>
<td>Output voltage $U_{A1,A2}$:</td>
<td>Typ. $&lt; U_{L1,L2} - 1.75 V$ (100 mA)</td>
<td>$U_{L1,L2} - 5 V &lt; U_{A1,A2} &lt; U_{L1,L2} - 1 V$</td>
</tr>
<tr>
<td>Output current:</td>
<td>&lt; 400 mA per output</td>
<td></td>
</tr>
<tr>
<td>Outputs:</td>
<td>2 semiconductor outputs, current sourcing</td>
<td></td>
</tr>
<tr>
<td>Response time:</td>
<td>&gt; 80 ms, typ. 120 ms</td>
<td>&gt; 150 ms, typ. 185 ms</td>
</tr>
<tr>
<td>Decay time:</td>
<td>&lt; 50 ms, typ. 10 ms</td>
<td>&gt; 75 ms, typ. 100 ms</td>
</tr>
<tr>
<td>Max. perm. lead length:</td>
<td>300 m</td>
<td></td>
</tr>
<tr>
<td>Operating voltage $U_{L+}$:</td>
<td>15 ... 24 ... 30 VDC</td>
<td></td>
</tr>
<tr>
<td>Operating current $I_e$:</td>
<td>&lt; 90 mA</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature:</td>
<td>–30 °C ... + 60 °C</td>
<td></td>
</tr>
<tr>
<td>Shock resistance:</td>
<td>30 g / 11 ms</td>
<td></td>
</tr>
<tr>
<td>Vibration resistance:</td>
<td>10 ... 55 Hz, amplitude 1 mm</td>
<td></td>
</tr>
</tbody>
</table>

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Safety door handle system -B30 with individually coded safety sensor

Circuit example

- Description: • Safeguarding a guard door
- Safety circuit: • Two-channel
- Input circuit: • Control Category 3 accord. to EN 954-1

Features

Description: • Safeguarding a guard door
Safety circuit: • Two-channel
Input circuit: • Control Category 3 accord. to EN 954-1

Product selection

Safety door handle system: ICS Series
Safety monitoring modules: Protect Series

Note: The circuit example is shown for the guard device closed and in the voltage-free state.

Info: You will find further safety monitoring modules and technical details in the catalogue "Safety relay modules Protect SRB’s"