

# FUNCTIONAL SAFETY CHARACTERISTICS

## Safety characteristics of Phoenix Contact safety products



Application note  
105016\_en\_07

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### 1 Aim of this document

This application note is a central data source for all safety characteristics of Phoenix Contact safety products.

It provides characteristics for:

- Machine building according to EN ISO 13849 and EN 62061
- Process automation according to IEC 61508

Phoenix Contact supports you here with the SISTEMA tool by providing you with a SISTEMA library containing all components that have already been certified according to the latest standards.

You can find the current SISTEMA library on our website under the keyword SISTEMA.

This document also contains the characteristics required to calculate safety loops in the process industry.

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Make sure you always use the latest documentation.  
It can be downloaded at [phoenixcontact.net/products](https://phoenixcontact.net/products).

This document provides additional data to the respective documentation for the products enclosed.  
The product documentation for the individual products takes priority and must be observed in each case.



Should you have any further questions, please contact the Safety service team.  
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### 3 Safety switching devices for machine building

#### 3.1 Safety relays – PSRmini



| Order No. | Short designation | EN ISO 13849-1<br>PL | EN ISO 13849-1<br>Category | EN 62061<br>SILCL | PFH <sub>D</sub><br>(1/h) | t <sub>M</sub><br>(years) | Data valid for<br>HW/FW version                           | Note                                                                                                                     |   |   |          |                                                           |
|-----------|-------------------|----------------------|----------------------------|-------------------|---------------------------|---------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|---|---|----------|-----------------------------------------------------------|
| 2904950   | PSR-MS20          | c                    | 1                          | 1                 | 1.5E-09                   | 20                        | ≥ 00/--                                                   | 8760 switching cycles per year<br>at 4 A DC13 or 5 A AC15<br>Up to PL e/SILCL 3 possible depending on the<br>application |   |   |          |                                                           |
| 2904951   | PSR-MS25          |                      |                            |                   |                           |                           | ≥ 00/--                                                   |                                                                                                                          |   |   |          |                                                           |
| 2702192   | PSR-MS21          | e                    | 4                          | 3                 | 1.0E-09                   |                           | ≥ 00/--                                                   | 8760 switching cycles per year<br>at 4 A DC13 or 5 A AC15                                                                |   |   |          |                                                           |
| 2904952   | PSR-MS30          | e                    | 4                          | 3                 | 1.5E-09                   |                           | ≥ 00/--                                                   | 8760 switching cycles per year<br>at 4 A DC13 or 5 A AC15                                                                |   |   |          |                                                           |
| 2904953   | PSR-MS35          |                      |                            |                   |                           |                           | ≥ 00/--                                                   |                                                                                                                          |   |   |          |                                                           |
| 2904954   | PSR-MS40          |                      |                            |                   |                           |                           | ≥ 00/--                                                   |                                                                                                                          |   |   |          |                                                           |
| 2904955   | PSR-MS45          |                      |                            |                   |                           |                           | ≥ 00/--                                                   |                                                                                                                          |   |   |          |                                                           |
| 2904956   | PSR-MS50          |                      |                            |                   |                           |                           | ≥ 00/--                                                   |                                                                                                                          |   |   |          |                                                           |
| 2904957   | PSR-MS55          |                      |                            |                   |                           |                           | ≥ 00/--                                                   |                                                                                                                          |   |   |          |                                                           |
| 2904958   | PSR-MS60          |                      |                            |                   |                           |                           | ≥ 00/--                                                   |                                                                                                                          |   |   |          |                                                           |
| 2700466   | PSR-MC20          | c                    | 1                          | 1                 |                           |                           | ≥ 00/--                                                   | 8760 switching cycles per year<br>at 4 A DC13 or 5 A AC15<br>Up to PL e/SILCL 3 possible depending on the<br>application |   |   |          |                                                           |
| 2700467   |                   |                      |                            |                   |                           |                           | ≥ 00/--                                                   |                                                                                                                          |   |   |          |                                                           |
| 2700498   | PSR-MC30          | e                    | 4                          | 3                 |                           |                           | ≥ 00/--                                                   | 8760 switching cycles per year<br>at 4 A DC13 or 5 A AC15                                                                |   |   |          |                                                           |
| 2700499   |                   |                      |                            |                   | ≥ 00/--                   |                           |                                                           |                                                                                                                          |   |   |          |                                                           |
| 2700524   | PSR-MC32          |                      |                            |                   | ≥ 00/--                   |                           | 8760 switching cycles per year<br>at 5 A DC13 or 5 A AC15 |                                                                                                                          |   |   |          |                                                           |
| 2700525   |                   |                      |                            |                   | ≥ 00/--                   |                           |                                                           |                                                                                                                          |   |   |          |                                                           |
| 2700540   | PSR-MC34          |                      |                            |                   | ≥ 00/--                   |                           | 8760 switching cycles per year<br>at 4 A DC13 or 5 A AC15 |                                                                                                                          |   |   |          |                                                           |
| 2700548   |                   |                      |                            |                   | ≥ 00/--                   |                           |                                                           |                                                                                                                          |   |   |          |                                                           |
| 2702411   | PSR-MC37          |                      |                            |                   | ≥ 00/--                   |                           | 8760 switching cycles per year<br>at 5 A DC13 or 5 A AC15 |                                                                                                                          |   |   |          |                                                           |
| 2702412   |                   |                      |                            |                   | ≥ 00/--                   |                           |                                                           |                                                                                                                          |   |   |          |                                                           |
| 2700569   | PSR-MC40          |                      |                            |                   | 1.5E-09                   |                           | ≥ 00/--                                                   | 8760 switching cycles per year<br>at 4 A DC13 or 5 A AC15                                                                |   |   |          |                                                           |
| 2700570   |                   |                      |                            |                   |                           |                           | ≥ 00/--                                                   |                                                                                                                          |   |   |          |                                                           |
| 2700553   | PSR-MC50          |                      |                            |                   |                           |                           | ≥ 00/--                                                   |                                                                                                                          |   |   |          |                                                           |
| 2700564   |                   |                      |                            |                   |                           |                           | ≥ 00/--                                                   |                                                                                                                          |   |   |          |                                                           |
| 2700571   | PSR-MC60          |                      |                            |                   |                           |                           | c                                                         |                                                                                                                          | 1 | 1 | 5.5E-07  | 8760 switching cycles per year<br>at 4 A DC13 or 5 A AC15 |
| 2700572   |                   |                      |                            |                   |                           |                           |                                                           |                                                                                                                          |   |   | ≥ 00/100 |                                                           |
| 2700574   | PSR-MC62          |                      |                            |                   |                           |                           | e                                                         |                                                                                                                          | 4 | 3 | 1.0E-09  | ≥ 00/100                                                  |
| 2700575   |                   |                      |                            |                   |                           |                           |                                                           |                                                                                                                          |   |   | ≥ 00/100 |                                                           |

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| Order No. | Short designation      | EN ISO 13849-1<br>PL | EN ISO 13849-1<br>Category | EN 62061<br>SILCL | PFH <sub>D</sub><br>(1/h) | t <sub>M</sub><br>(years) | Data valid for<br>HW/FW version | Note                                                                                                                     |                                                           |
|-----------|------------------------|----------------------|----------------------------|-------------------|---------------------------|---------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| 2702094   | PSR-MC70               | c                    | 1                          | 1                 | 2.5E-08                   |                           | ≥ 00/100                        | 8760 switching cycles per year<br>at 4 A DC13 or 5 A AC15<br>Up to PL e/SILCL 3 possible depending on the<br>application |                                                           |
| 2702095   |                        |                      |                            |                   |                           |                           | ≥ 00/100                        |                                                                                                                          |                                                           |
| 2702096   | PSR-MC72               | e                    | 4                          | 3                 | 1.5E-09                   | 20                        | ≥ 00/100                        | 8760 switching cycles per year<br>at 4 A DC13 or 5 A AC15                                                                |                                                           |
| 2702097   |                        |                      |                            |                   |                           |                           | ≥ 00/100                        |                                                                                                                          |                                                           |
| 2702382   | PSR-MC82 <sup>1)</sup> |                      |                            |                   | 1.0E-09                   |                           |                                 | ≥ 00/--                                                                                                                  | 8760 switching cycles per year<br>at 3 A DC13 or 3 A AC15 |
| 2702383   |                        |                      |                            |                   |                           |                           |                                 | ≥ 00/--                                                                                                                  |                                                           |

<sup>1)</sup> In conjunction with a suitable evaluating device

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## 3.2 Safety relays – PSRclassic



<sup>1)</sup> In conjunction with a suitable evaluating device

<sup>2)</sup> Delayed contacts up to PL d, category 3

| Order No. | Short designation | EN ISO 13849-1<br>PL | EN ISO 13849-1<br>Category | EN 62061<br>SILCL | PFH <sub>D</sub><br>(1/h) | t <sub>M</sub><br>(years) | Data valid for<br>HW/FW version                                          | Note                                                                                                                                 |
|-----------|-------------------|----------------------|----------------------------|-------------------|---------------------------|---------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 2963802   | PSR-ESA2-B        | c                    | 1                          | 1                 | 4.05E-10                  | 20                        | ≥ 00/--                                                                  | 8766 switching cycles per year<br>B <sub>10D</sub> = 230,000 at 3 A AC15<br>Up to PL e/SILCL 3 possible depending on the application |
| 2963954   |                   |                      |                            |                   |                           |                           | ≥ 00/--                                                                  |                                                                                                                                      |
| 2963750   | e                 | 4                    | 3                          | 5.05E-10          | ≥ 00/--                   |                           | 8766 switching cycles per year<br>B <sub>10D</sub> = 300,000 at 5 A DC13 |                                                                                                                                      |
| 2963938   |                   |                      |                            |                   | ≥ 00/--                   |                           |                                                                          |                                                                                                                                      |
| 2963763   |                   |                      |                            |                   | PSR-ESA4-B                |                           |                                                                          | ≥ 00/--                                                                                                                              |
| 2963941   |                   |                      |                            |                   |                           |                           |                                                                          | ≥ 00/--                                                                                                                              |
| 2901430   | PSR-ESAM2/3x1-B   | c                    | 1                          | 1                 | 2.42E-10                  |                           | ≥ 00/--                                                                  | 8760 switching cycles per year<br>B <sub>10D</sub> = 300,000 at 5 A DC13<br>Up to PL e/SILCL 3 possible depending on the application |
| 2901431   |                   |                      |                            |                   |                           |                           | ≥ 00/--                                                                  |                                                                                                                                      |
| 2900525   | PSR-ESAM4/2x1     | e                    | 4                          | 3                 | 5.05E-10                  |                           | ≥ 00/--                                                                  | 8766 switching cycles per year<br>B <sub>10D</sub> = 300,000 at 5 A DC13                                                             |
| 2900526   | PSR-ESAM4/3x1-B   |                      |                            |                   | ≥ 00/--                   |                           |                                                                          |                                                                                                                                      |
| 2900509   |                   |                      |                            |                   | 5.05E-10                  |                           | ≥ 00/--                                                                  |                                                                                                                                      |
| 2900510   |                   |                      |                            |                   | ≥ 00/--                   |                           |                                                                          |                                                                                                                                      |
| 2981114   | PSR-ESAM4/3x1     |                      |                            |                   | 1.26E-10                  |                           | ≥ 00/--<br>< 08/--                                                       | 8766 switching cycles per year<br>B <sub>10D</sub> = 300,000 at 5 A DC13                                                             |
|           |                   |                      |                            |                   | 8.87E-10                  |                           | ≥ 08/--                                                                  | 8766 switching cycles per year<br>B <sub>10D</sub> = 160,000 at 5 A DC13                                                             |
|           |                   |                      |                            |                   | 1.26E-10                  |                           | ≥ 00/--<br>< 08/--                                                       | 8766 switching cycles per year<br>B <sub>10D</sub> = 300,000 at 5 A DC13                                                             |
| 2981127   |                   |                      |                            |                   | 8.87E-10                  |                           | ≥ 08/--                                                                  | 8766 switching cycles per year<br>B <sub>10D</sub> = 160,000 at 5 A DC13                                                             |
|           |                   |                      |                            |                   | 5.06E-10                  |                           | ≥ 00/--                                                                  | 8766 switching cycles per year<br>B <sub>10D</sub> = 230,000 at 3 A AC15                                                             |
| 2963912   | PSR-ESAM4/8x1     |                      |                            |                   | ≥ 00/--                   |                           |                                                                          |                                                                                                                                      |
| 2963996   |                   |                      |                            |                   | ≥ 00/--                   |                           |                                                                          |                                                                                                                                      |
| 2901416   | PSR-ESAM4-B AC    |                      |                            |                   | ≥ 00/--                   |                           | 8760 switching cycles per year<br>B <sub>10D</sub> = 300,000 at 5 A DC13 |                                                                                                                                      |
| 2901417   |                   |                      |                            |                   | ≥ 00/--                   |                           |                                                                          |                                                                                                                                      |
| 2901426   |                   |                      |                            |                   | ≥ 00/--                   |                           |                                                                          |                                                                                                                                      |
| 2901427   |                   |                      |                            |                   | ≥ 00/--                   |                           |                                                                          |                                                                                                                                      |
| 2901422   |                   |                      |                            |                   | ≥ 00/--                   |                           |                                                                          |                                                                                                                                      |
| 2901425   |                   |                      |                            |                   | ≥ 00/--                   |                           |                                                                          |                                                                                                                                      |
| 2901428   |                   |                      |                            |                   | ≥ 00/--                   |                           |                                                                          |                                                                                                                                      |
| 2901429   |                   |                      |                            |                   | ≥ 00/--                   |                           |                                                                          |                                                                                                                                      |

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| Order No. | Short designation               | EN ISO 13849-1<br>PL | EN ISO 13849-1<br>Category | EN 62061<br>SILCL | PFH <sub>D</sub><br>(1/h) | t <sub>M</sub><br>(years) | Data valid for<br>HW/FW version | Note                                                                                                                                 |
|-----------|---------------------------------|----------------------|----------------------------|-------------------|---------------------------|---------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 2981800   | PSR-ESD-30                      | e                    | 4                          | 3                 | 1.80E-09                  | 20                        | ≥ 00/--                         | 8766 switching cycles per year<br>B <sub>10D</sub> = 400,000 at 3 A AC15 DC13                                                        |
| 2981813   |                                 |                      |                            |                   | ≥ 00/--                   |                           |                                 |                                                                                                                                      |
| 2981428   | PSR-ESD-300 <sup>2)</sup>       |                      |                            |                   | 1.89E-09                  |                           | ≥ 00/--                         | 8766 switching cycles per year<br>B <sub>10D</sub> = 230,000 at 3 A AC15                                                             |
| 2981431   |                                 |                      |                            |                   | ≥ 00/--                   |                           |                                 |                                                                                                                                      |
| 2981125   | PSR-ESD-T <sup>2)</sup>         |                      |                            |                   | 1.67E-09                  |                           | ≥ 00/--                         |                                                                                                                                      |
| 2981198   |                                 |                      |                            |                   | ≥ 00/--                   |                           |                                 |                                                                                                                                      |
| 2981059   | PSR-ESL4-B                      |                      |                            |                   | 5.56E-10                  |                           | ≥ 00/--                         |                                                                                                                                      |
| 2981062   |                                 |                      |                            |                   | ≥ 00/--                   |                           |                                 |                                                                                                                                      |
| 2963718   | PSR-ESM4                        |                      |                            |                   | 5.05E-10                  |                           | ≥ 00/--                         | 8766 switching cycles per year<br>B <sub>10D</sub> = 300,000 at 5 A DC13                                                             |
| 2963705   |                                 |                      |                            |                   |                           |                           | ≥ 00/--                         |                                                                                                                                      |
| 2963776   | PSR-ESM4-B                      |                      |                            |                   |                           |                           | ≥ 00/--                         |                                                                                                                                      |
| 2963925   |                                 |                      |                            |                   |                           |                           | ≥ 00/--                         |                                                                                                                                      |
| 2981020   | PSR-ESP4                        | c                    | 1                          | 1                 | 9.93E-11                  |                           | ≥ 00/--                         | 8766 switching cycles per year<br>B <sub>10D</sub> = 160,000 at 5 A AC15<br>Up to PL e/SILCL 3 possible depending on the application |
| 2981017   |                                 |                      |                            |                   |                           |                           | ≥ 00/--                         |                                                                                                                                      |
| 2981978   | PSR-FSP/1x1 <sup>1)</sup>       | e                    | 4                          | 3                 | 2.02E-11                  |                           | ≥ 00/--                         | 8766 switching cycles per year<br>B <sub>10D</sub> = 1,000,000 at 5 A DC13                                                           |
| 2981981   |                                 |                      |                            |                   | ≥ 00/--                   |                           |                                 |                                                                                                                                      |
| 2986960   | PSR-FSP/2x1 <sup>1)</sup>       |                      |                            |                   | 2.02E-11                  |                           | ≥ 00/--                         |                                                                                                                                      |
| 2986957   |                                 |                      |                            |                   | ≥ 00/--                   |                           |                                 |                                                                                                                                      |
| 2963721   | PSR-THC4                        |                      |                            |                   | 1.21E-09                  |                           | ≥ 00/--                         | 8766 switching cycles per year<br>B <sub>10D</sub> = 300,000 at 5 A DC13                                                             |
| 2963983   |                                 |                      |                            |                   | ≥ 00/--                   |                           |                                 |                                                                                                                                      |
| 2963734   | PSR-URM4/5x1 <sup>1)</sup>      |                      |                            |                   | 1.47E-09                  |                           | ≥ 00/--                         | 8766 switching cycles per year<br>B <sub>10D</sub> = 230,000 at 3 A AC15                                                             |
| 2964005   |                                 |                      |                            |                   | ≥ 00/--                   |                           |                                 |                                                                                                                                      |
| 2981033   | PSR-URM4/5x1-B <sup>1)</sup>    |                      |                            |                   | 1.02E-10                  |                           | ≥ 00/--                         |                                                                                                                                      |
| 2981046   |                                 |                      |                            |                   | ≥ 00/--                   |                           |                                 |                                                                                                                                      |
| 2903583   | PSR-URML4                       |                      |                            |                   | 5.56E-10                  |                           | ≥ 00/--                         | 8766 switching cycles per year<br>B <sub>10D</sub> = 300,000 at 5 A DC13                                                             |
| 2903584   |                                 |                      |                            |                   | ≥ 00/--                   |                           |                                 |                                                                                                                                      |
| 2702924   | PSR-URM4 42-230UC <sup>1)</sup> |                      |                            |                   | 1.00E-09                  |                           | ≥ 00/--                         | 8766 switching cycles per year<br>B <sub>10D</sub> = 200,000 at 5 A AC15                                                             |
| 2702925   |                                 |                      |                            |                   |                           |                           | ≥ 00/--                         |                                                                                                                                      |

<sup>1)</sup> In conjunction with a suitable evaluating device

<sup>2)</sup> Delayed contacts up to PL d, category 3

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## 3.3 Modular safety relay system – PSRmodular



| Order No. | Short designation         | EN ISO 13849-1 PL | EN ISO 13849-1 Category | EN 62061 SILCL | PFH <sub>D</sub> (1/h) | t <sub>M</sub> (years) | Data valid for HW/FW version | Note                                                                                                                                                    |
|-----------|---------------------------|-------------------|-------------------------|----------------|------------------------|------------------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2981486   | PSR-SDC4                  | e                 | 4                       |                | 2.53E-10               |                        | ≥ 00/--                      | 8766 switching cycles per year<br>B <sub>10D</sub> = 300,000 at 5 A DC13                                                                                |
| 2981499   |                           |                   |                         |                |                        |                        | ≥ 00/--                      |                                                                                                                                                         |
| 2981703   | PSR-URD3/T2 <sup>1)</sup> | d                 | 3                       | 3              | 1.35E-09               | 20                     | ≥ 00/--                      | 8766 switching cycles per year<br>B <sub>10D</sub> = 300,000 at 5 A DC13                                                                                |
| 2981729   |                           |                   |                         |                |                        |                        | ≥ 00/--                      |                                                                                                                                                         |
| 2981732   | PSR-URD3/3 <sup>1)</sup>  |                   |                         |                |                        |                        | ≥ 00/--                      |                                                                                                                                                         |
| 2981745   |                           |                   |                         |                |                        |                        | ≥ 00/--                      |                                                                                                                                                         |
| 2981512   | PSR-URD3/30 <sup>1)</sup> |                   |                         |                |                        |                        | ≥ 00/--                      |                                                                                                                                                         |
| 2981525   |                           |                   |                         |                |                        |                        | ≥ 00/--                      |                                                                                                                                                         |
| 2981677   | PSR-URM4/B <sup>1)</sup>  | e                 | 4                       |                | 9.70E-11               |                        | ≥ 00/--                      |                                                                                                                                                         |
| 2981680   |                           |                   |                         |                |                        |                        | ≥ 00/--                      |                                                                                                                                                         |
| 2981936   | PSR-SIM4                  | -                 | -                       | -              | -                      | -                      | ≥ 00/--                      | Due to the series connection of safety door switches, the possible diagnostic coverage is reduced as are the maximum achievable safety classifications. |
| 2981949   |                           |                   |                         |                |                        |                        | ≥ 00/--                      |                                                                                                                                                         |
| 2981871   | PSR-SACB-4/4-L-5,0PUR-SD  | -                 | -                       | -              | -                      | -                      | ≥ 00/--                      |                                                                                                                                                         |
| 2981884   |                           |                   |                         |                |                        |                        | ≥ 00/--                      |                                                                                                                                                         |

<sup>1)</sup> In conjunction with a suitable evaluating device

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## 3.4 Multifunctional safety relays – PSRmultifunction



| Order No. | Short designation | EN ISO 13849-1<br>PL | EN ISO 13849-1<br>Category | EN 62061<br>SILCL | PFH <sub>D</sub><br>(1/h) | t <sub>M</sub><br>(years) | Data valid for<br>HW/FW version | Note                                                                                 |
|-----------|-------------------|----------------------|----------------------------|-------------------|---------------------------|---------------------------|---------------------------------|--------------------------------------------------------------------------------------|
| 2902725   | PSR-MXF1          | e                    | 4                          | 3                 | 1.93E-10                  | 20                        | ≥ 00/--                         | 8766 switching cycles per year<br>B <sub>10D</sub> = 780,000 at 5 A DC13 or 3 A AC15 |
| 2902726   |                   |                      |                            |                   |                           |                           | ≥ 00/--                         |                                                                                      |
| 2903253   |                   |                      |                            |                   |                           |                           | ≥ 00/--                         |                                                                                      |
| 2903254   | PSR-MXF2          |                      |                            |                   |                           |                           | ≥ 00/--                         |                                                                                      |
| 2903255   |                   |                      |                            |                   |                           |                           | ≥ 00/--                         |                                                                                      |
| 2903256   |                   |                      |                            |                   |                           |                           | ≥ 00/--                         |                                                                                      |
| 2903257   | PSR-MXF3          |                      |                            |                   |                           |                           | ≥ 00/--                         |                                                                                      |
| 2903258   |                   |                      |                            |                   |                           |                           | ≥ 00/--                         |                                                                                      |
| 2903259   |                   |                      |                            |                   |                           |                           | ≥ 00/--                         |                                                                                      |
| 2903260   | PSR-MXF4          |                      |                            |                   |                           |                           | ≥ 00/--                         |                                                                                      |
| 2903261   |                   |                      |                            |                   |                           |                           | ≥ 00/--                         |                                                                                      |
| 2903262   |                   |                      |                            |                   |                           |                           | ≥ 00/--                         |                                                                                      |

#### 4 Zero-speed and over-speed safety relays – PSRmotion



| Order No. | Short designation | EN ISO 13849-1<br>PL | EN ISO 13849-1<br>Category | EN 62061<br>SILCL | PFH <sub>D</sub><br>(1/h) | t <sub>M</sub><br>(years) | Data valid for<br>HW/FW version | Note                                                       |
|-----------|-------------------|----------------------|----------------------------|-------------------|---------------------------|---------------------------|---------------------------------|------------------------------------------------------------|
| 2702355   | PSR-MM25          | e                    | 3                          | 3                 | 5.79E-08                  | 20                        | ≥ 00/100                        | 17520 switching cycles per year<br>at 4 A DC13 or 5 A AC15 |
| 2702356   |                   |                      |                            |                   |                           |                           | ≥ 00/100                        |                                                            |
| 2981538   | PSR-RSM4          | e                    | 4                          | 3                 | 7.90E-09                  |                           | ≥ 00/--                         | In conjunction with suitable sensor systems.               |
| 2981541   |                   |                      |                            |                   |                           |                           | ≥ 00/--                         |                                                            |

## 5 Safe coupling relays – PSRclassic



### 5.1 High demand – safety characteristic data

| Order No. | Short designation     | EN ISO 13849-1<br>PL | EN ISO 13849-1<br>Category | EN 62061<br>SILCL | PFH <sub>D</sub><br>(1/h)                                                  | t <sub>M</sub><br>(years) | Data valid for<br>HW/FW version | Note                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------|-----------------------|----------------------|----------------------------|-------------------|----------------------------------------------------------------------------|---------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2963747   | PSR-24UC/URM/5X1/2X2  | c                    | 1                          | 1                 | 1.00E-07 <sup>1)</sup>                                                     | 20                        | ≥ 11/--                         | <b>1)</b> 3 A AC15; 8760 switching cycles/year;<br>5 % of the overall SIL<br><b>2)</b> 3 A DC13; 8760 switching cycles/year;<br>5 % of the overall SIL<br><b>3)</b> 6 A AC1; 8760 switching cycles/year;<br>5 % of the overall SIL<br><b>4)</b> 3 A AC15; 8760 switching cycles/year;<br>10 % of the overall SIL<br><b>5)</b> 3 A DC13; 8760 switching cycles/year;<br>10 % of the overall SIL<br><b>6)</b> 6 A AC1; 8760 switching cycles/year;<br>10 % of the overall SIL |
| 2963970   |                       |                      |                            |                   | 1.35E-07 <sup>2)</sup><br>1.56E-07 <sup>3)</sup>                           |                           | ≥ 09/--                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2981444   |                       |                      |                            |                   | 6.00E-07 <sup>4)</sup>                                                     |                           | ≥ 04/--                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2981457   | PSR-24UC/URM/4X1/2X2  | c                    | 1                          | 1                 | 6.00E-07 <sup>5)</sup><br>2.40E-07 <sup>6)</sup>                           |                           | ≥ 04/--                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2981839   |                       |                      |                            |                   | 4.00E-07 <sup>1)</sup>                                                     |                           | ≥ 06/--                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2981842   | PSR-24UC/URM/3X1/3X2  | c                    | 1                          | 1                 | 4.00E-07 <sup>2)</sup><br>2.40E-07 <sup>3)</sup>                           |                           | ≥ 06/--                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2981952   |                       |                      |                            |                   | 1.00E-07 <sup>1)</sup>                                                     |                           | ≥ 04/--                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2981965   | PSR-24UC/URM/5X1/1X2  | c                    | 1                          | 1                 | 1.35E-07 <sup>2)</sup><br>1.56E-07 <sup>3)</sup>                           |                           | ≥ 04/--                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2981402   |                       |                      |                            |                   | 1.00E-07 <sup>1)</sup>                                                     |                           | ≥ 08/--                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2981415   | PSR-120UC/URM/5X1/2X2 | c                    | 1                          | 1                 | 1.35E-07 <sup>2)</sup><br>1.56E-07 <sup>3)</sup>                           |                           | ≥ 08/--                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2981363   |                       |                      |                            |                   | 6.67E-07 <sup>4)</sup><br>3.33E-07 <sup>5)</sup><br>2.00E-07 <sup>6)</sup> |                           | ≥ 03/--                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2981376   | PSR-120UC/URM/2X21    | c                    | 1                          | 1                 | 6.67E-07 <sup>4)</sup><br>3.33E-07 <sup>5)</sup><br>2.00E-07 <sup>6)</sup> |                           | ≥ 03/--                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

## FUNCTIONAL SAFETY CHARACTERISTICS

## 5.2 Low demand – safety characteristic data

| Order No. | Short designation     | Device type | HFT | IEC 61508 SIL | PFD <sub>avg</sub> (1/h) | T <sub>1max</sub> (years) | t <sub>M</sub> (years) | Data valid for HW/FW version | Note |
|-----------|-----------------------|-------------|-----|---------------|--------------------------|---------------------------|------------------------|------------------------------|------|
| 2963747   | PSR-24UC/URM/5X1/2X2  | A           | 0   | 1             | 4.05E-03                 | 4.6                       | 20                     | ≥ 11/--                      | -    |
| 2963970   |                       |             |     |               |                          |                           |                        | ≥ 09/--                      | -    |
| 2981444   | PSR-24UC/URM/4X1/2X2  | A           | 0   | 1             | 4.05E-03                 | 4.6                       |                        | ≥ 04/--                      | -    |
| 2981457   |                       |             |     |               |                          |                           |                        | ≥ 04/--                      | -    |
| 2981839   | PSR-24UC/URM/3X1/3X2  | A           | 0   | 1             | 4.05E-03                 | 4.6                       |                        | ≥ 06/--                      | -    |
| 2981842   |                       |             |     |               |                          |                           |                        | ≥ 06/--                      | -    |
| 2981952   | PSR-24UC/URM/5X1/1X2  | A           | 0   | 1             | 4.05E-03                 | 4.6                       |                        | ≥ 04/--                      | -    |
| 2981965   |                       |             |     |               |                          |                           |                        | ≥ 04/--                      | -    |
| 2981402   | PSR-120UC/URM/5X1/2X2 | A           | 0   | 1             | 4.05E-03                 | 4.6                       |                        | ≥ 08/--                      | -    |
| 2981415   |                       |             |     |               |                          |                           |                        | ≥ 08/--                      | -    |
| 2981363   | PSR-24UC/URM/2X21     | A           | 0   | 1             | 4.05E-03                 | 4.6                       |                        | ≥ 03/--                      | -    |
| 2981376   | PSR-120UC/URM/2X21    | A           | 0   | 1             | 4.05E-03                 | 4.6                       |                        | ≥ 03/--                      | -    |

## 6 Configurable safety modules – PSRtrisafe



### 6.1 High demand – safety characteristic data

| Order No.          | Short designation | Parameterization | EN ISO 13849-1<br>PL | EN ISO 13849-1<br>Category | EN 62061<br>SILCL | PFH <sub>D</sub><br>(1/h) | t <sub>M</sub><br>(years) | Data valid for<br>HW/FW version | Note                                           |
|--------------------|-------------------|------------------|----------------------|----------------------------|-------------------|---------------------------|---------------------------|---------------------------------|------------------------------------------------|
| 2986229<br>2986232 | PSR-TRISAFE-S     | 1CH              | d                    | 2                          | 2                 | 16.1E-09                  | 20                        | ≥ 10/1636                       | -                                              |
|                    |                   | 2CH              | e                    | 4                          | 3                 |                           |                           |                                 | -                                              |
| 2986012<br>2986025 | PSR-TRISAFE-M     | 1CH              | d                    | 2                          | 2                 | 17.1E-09                  |                           | ≥ 10/2033                       | -                                              |
|                    |                   | 2CH              | e                    | 4                          | 3                 |                           |                           |                                 | -                                              |
| 2986038<br>2986041 | PSR-TS-SDI8-SDIO4 | 1CH              | d                    | 2                          | 2                 | 3.94E-09                  |                           | ≥ 10/1021                       | -                                              |
|                    |                   | 2CH              | e                    | 4                          | 3                 |                           |                           |                                 | -                                              |
| 2986096<br>2986106 | PSR-TS-SDOR4      | 1CH              | c                    | 1                          | 1                 | 3.67E-07                  |                           | ≥ 03/1002                       | 4 A DC13; 8760 switching cycles/year           |
|                    |                   |                  |                      |                            |                   | 5.5E-07                   |                           |                                 | 5 A AC15; 8760 switching cycles/year           |
|                    |                   |                  |                      |                            |                   | 1.41E-07                  |                           |                                 | 5 A DC13; 8760 switching cycles/year           |
|                    |                   |                  |                      |                            |                   | 1.0E-07                   |                           | ≤ 02/1002                       | 3 A AC15; 8760 switching cycles/year           |
|                    |                   | 2CH              | e                    | 4                          | 3                 | 7.3E-10                   |                           | ≥ 03/1002                       | 4 A DC13; 5 A AC15; 8760 switching cycles/year |
|                    |                   |                  |                      |                            |                   | 7.3E-10                   |                           | ≤ 02/1002                       | 5 A DC13; 3 A AC15; 8760 switching cycles/year |

## FUNCTIONAL SAFETY CHARACTERISTICS

## 6.1.1 High demand – alternative illustration as 1oo1 structure

| Order No.          | Short designation | Parameterization | Device type | HFT | SIL | SFF (%) | $\lambda_{SD}$ (FIT) | $\lambda_{SU}$ (FIT) | $\lambda_{DD}$ (FIT) | $\lambda_{DU}$ (FIT) | $\lambda_{Total}$ (FIT) | MTBF (years) <sup>1)</sup> | PFH <sub>D</sub> (1/h) | T <sub>1max</sub> (years) | t <sub>M</sub> (years) | Data valid for HW/FW version | Note         |
|--------------------|-------------------|------------------|-------------|-----|-----|---------|----------------------|----------------------|----------------------|----------------------|-------------------------|----------------------------|------------------------|---------------------------|------------------------|------------------------------|--------------|
| 2986229<br>2986232 | PSR-TRISAFE-S     | 1CH              | B           | 0   | 2   | 99.81   | 0                    | 1282                 | 459                  | 3.39                 | 1745                    | 64.78                      | 3.39E-09               | 20                        | 20                     | ≥ 10/1636                    | -            |
|                    |                   | 2CH              |             |     | 3   |         |                      |                      |                      |                      |                         |                            |                        |                           |                        |                              |              |
| 2986012<br>2986025 | PSR-TRISAFE-M     | 1CH              | B           | 0   | 2   | 99.88   | 0                    | 1253                 | 317                  | 1.91                 | 1572                    | 71.91                      | 1.91E-09               | 20                        | 20                     | ≥ 10/2033                    | -            |
|                    |                   | 2CH              |             |     | 3   |         |                      |                      |                      |                      |                         |                            |                        |                           |                        |                              |              |
| 2986038<br>2986041 | PSR-TS-SDI8-SDIO4 | 1CH              | B           | 0   | 2   | 99.88   | 0                    | 1253                 | 317                  | 1.91                 | 1572                    | 71.91                      | 1.91E-09               | 20                        | 20                     | ≥ 10/1021                    | 2)           |
|                    |                   | 2CH              |             |     | 3   |         |                      |                      |                      |                      |                         |                            |                        |                           |                        |                              |              |
| 2986096<br>2986106 | PSR-TS-SDOR4      | 1CH              | -           | 0   | 1   | 83.79   | 873                  | 990                  | 33                   | 367                  | 2263                    | 49.94                      | 3.67E-07               | 20                        | 20                     | ≥ 03/1002                    | 4 A<br>DC13  |
|                    |                   |                  |             |     |     | 93.88   | 873                  | 1259                 | 33                   | 141                  | 2305                    | 49.02                      | 1.41E-07               |                           |                        | ≤ 02/1002                    | 5 A<br>DC13; |
|                    |                   | 2CH              |             |     | 3   | 99.99   | 910                  | 2681                 | 23.75                | 0.17                 | 3615                    | 31.26                      | 1.72E-10               |                           |                        | ≥ 03/1002                    | 4 A<br>DC13  |
|                    |                   |                  |             |     |     | 99.99   | 910                  | 1781                 | 21.51                | 0.13                 | 2712                    | 41.67                      | 1.27E-10               |                           |                        | ≤ 02/1002                    | 5 A<br>DC13; |

<sup>1)</sup> Includes faults that are not part of the safety function. MTTR was set to 8 hours.

<sup>2)</sup> Values calculated for configuring up to 8 inputs and up to 4 outputs.

## 6.2 Low demand – safety characteristic data

| Order No.          | Short designation | Parameterization | Device type | HFT | IEC 61508 SIL | PFD <sub>avg</sub> (1/h) | T <sub>1max</sub> (years) | t <sub>M</sub> (years) | Data valid for HW/FW version | Note |
|--------------------|-------------------|------------------|-------------|-----|---------------|--------------------------|---------------------------|------------------------|------------------------------|------|
| 2986229<br>2986232 | PSR-TRISAFE-S     | 1CH              | B           | 0   | 2             | 2.99E-04                 | 20                        | 20                     | ≥ 10/1636                    | -    |
|                    |                   | 2CH              |             | 1   | 3             |                          |                           |                        | -                            |      |
| 2986012<br>2986025 | PSR-TRISAFE-M     | 1CH              |             | 0   | 2             |                          |                           |                        | ≥ 10/2033                    | -    |
|                    |                   | 2CH              |             | 1   | 3             |                          |                           |                        | -                            |      |
| 2986038<br>2986041 | PSR-TS-SDI8-SDIO4 | 1CH              | B           | 0   | 2             | 2.1E-04                  | 20                        |                        | ≥ 10/1021                    | -    |
|                    |                   | 2CH              |             | 1   | 3             |                          |                           |                        | -                            |      |
| 2986096<br>2986106 | PSR-TS-SDOR4      | 1CH              | -           | 0   | 1             | 4.35E-03                 | 5                         |                        | ≥ 03/1002                    | -    |
|                    |                   |                  |             |     |               |                          | ≤ 02/1002                 |                        | -                            |      |
|                    |                   | 2CH              |             | 1   | 3             | 1.18E-04                 | 5                         |                        | ≥ 03/1002                    | -    |
|                    |                   |                  |             |     |               |                          |                           |                        | ≤ 02/1002                    | -    |

## FUNCTIONAL SAFETY CHARACTERISTICS

## 6.2.1 Low demand – alternative illustration as 1oo1 structure

| Order No.          | Short designation | Parameterization | Device type | HFT | SIL | SFF (%) | $\lambda_{SD}$ (FIT) | $\lambda_{SU}$ (FIT) | $\lambda_{DD}$ (FIT) | $\lambda_{DU}$ (FIT) | $\lambda_{Total}$ (FIT) | MTBF (years) <sup>1)</sup> | $PFD_{avg}$ <sup>2)</sup> (1/h) | $T_{1max}$ (years) | $t_M$ (years) | Data valid for HW/FW version | Note |
|--------------------|-------------------|------------------|-------------|-----|-----|---------|----------------------|----------------------|----------------------|----------------------|-------------------------|----------------------------|---------------------------------|--------------------|---------------|------------------------------|------|
| 2986229<br>2986232 | PSR-TRISAFE-S     | 1CH              | B           | 0   | 2   | 99.84   | 0                    | 1638                 | 505                  | 3.39                 | 2146                    | 64.36                      | 1.49E-05                        | 20                 | 20            | ≥ 10/1636                    | -    |
|                    |                   | 2CH              |             |     | 3   |         |                      |                      |                      |                      |                         |                            |                                 |                    |               |                              | -    |
| 2986012<br>2986025 | PSR-TRISAFE-M     | 1CH              | B           | 0   | 2   | 99.91   | 0                    | 1729                 | 349                  | 1.91                 | 2080                    | 66.41                      | 8.38E-06                        | 20                 | 20            | ≥ 10/2033                    | -    |
|                    |                   | 2CH              |             |     | 3   |         |                      |                      |                      |                      |                         |                            |                                 |                    |               |                              | -    |
| 2986038<br>2986041 | PSR-TS-SDI8-SDIO4 | 1CH              | B           | 0   | 2   | 99.91   | 0                    | 1729                 | 349                  | 1.91                 | 2080                    | 66.41                      | 8.38E-06                        | 20                 | 20            | ≥ 10/1021                    | 3)   |
|                    |                   | 2CH              |             |     | 3   |         |                      |                      |                      |                      |                         |                            |                                 |                    |               |                              | -    |
| 2986096<br>2986106 | PSR-TS-SDOR4      | 1CH              | -           | 0   | 1   | 94.26   | 873                  | 2379                 | 32                   | 200                  | 3484                    | 32.44                      | 9.69E-04                        | 5                  | 20            | ≥ 03/1002                    | -    |
|                    |                   |                  |             |     |     |         |                      |                      |                      |                      |                         |                            |                                 |                    |               | ≤ 02/1002                    | -    |
|                    |                   |                  |             |     |     |         |                      |                      |                      |                      |                         |                            |                                 |                    |               | ≥ 03/1002                    | -    |
|                    |                   | 2CH              |             |     | 3   | 99.88   | 910                  | 3700                 | 21.18                | 5.45                 | 4637                    | 24.37                      | 1.23E-04                        | 5                  |               | ≤ 02/1002                    | -    |

<sup>1)</sup> Includes faults that are not part of the safety function. MTTR was set to 8 hours.

<sup>2)</sup> For  $T_1 = 1$  year

<sup>3)</sup> Values calculated for configuring up to 8 inputs and up to 4 outputs.

## FUNCTIONAL SAFETY CHARACTERISTICS

## 7 Network safety solutions



<sup>1</sup> In conjunction with clock signals. See user documentation for the module.

<sup>2</sup> Version as per illustration 6-3 in the user manual. See table 7-3, illustration 6-3 and illustration 6-4 in the user manual.

| Order No. | Short designation |                                  | EN ISO 13849-1<br>PL | EN ISO 13849-1<br>Category | EN 62061<br>SILCL | PFH <sub>D</sub><br>(1/h) | t <sub>M</sub><br>(years) | Data valid for<br>HW/FW/FW<br>version | Note                                                                                                                                                                             |
|-----------|-------------------|----------------------------------|----------------------|----------------------------|-------------------|---------------------------|---------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2916024   | IB IL LPSDO 8     | 1CH                              | d                    | 3                          | 2                 | 1E-08                     | 20                        | ≥ 00/100/100                          | -                                                                                                                                                                                |
|           |                   | 2CH                              | e                    | 4                          | 3                 | 1E-09                     |                           | ≥ 00/100/100                          |                                                                                                                                                                                  |
| 2700606   | IB IL LPSDO 8 V2  | 1CH                              | d                    | 3                          | 2                 | 1E-08                     |                           | ≥ 00/100/100                          |                                                                                                                                                                                  |
|           |                   | 2CH                              | e                    | 4                          | 3                 | 1E-09                     |                           | ≥ 00/100/100                          |                                                                                                                                                                                  |
| 2701625   | IB IL LPSDO-8-V3  | 1CH                              | d                    | 3                          | 2                 | 1E-08                     |                           | ≥ 00/100/100                          |                                                                                                                                                                                  |
|           |                   | 2CH                              | e                    | 4                          | 3                 | 1E-09                     |                           | ≥ 01/200/100                          |                                                                                                                                                                                  |
| 2916493   | IB IL PSDO 4/4    | 1CH                              | d                    | 3                          | 2                 | 1E-08                     |                           | ≥ 01/200/100                          |                                                                                                                                                                                  |
|           |                   | 2CH                              | e                    | 4                          | 3                 | 1E-09                     |                           | ≥ 01/200/100                          |                                                                                                                                                                                  |
| 2985631   | IB IL PSDO 8      | 1CH                              | d                    | 3                          | 2                 | 1E-08                     |                           | ≥ 01/200/100                          |                                                                                                                                                                                  |
|           |                   | 2CH                              | e                    | 4                          | 3                 | 1E-09                     |                           |                                       |                                                                                                                                                                                  |
| 2985864   | IB IL PSDOR 4     | 1CH-AC15                         | c                    | 1                          | 1                 | 1E-08                     |                           | ≥ 00/200/100                          | The PFH <sub>D</sub> value is an example value here. It depends on the parameterization and wiring. You can determine the exact value with the aid of the product documentation. |
|           |                   | 1CH-DC13                         | c                    | 1                          | 1                 | 1E-08                     |                           |                                       |                                                                                                                                                                                  |
|           |                   | 2CH-AC15 version A <sup>2)</sup> | e                    | 4                          | 3                 | 1E-09                     |                           |                                       |                                                                                                                                                                                  |
|           |                   | 2CH-AC15 version B <sup>2)</sup> | e                    | 4                          | 3                 | 1E-09                     |                           |                                       |                                                                                                                                                                                  |
|           |                   | 2CH-DC13 version A <sup>2)</sup> | e                    | 4                          | 3                 | 1E-09                     |                           |                                       |                                                                                                                                                                                  |
|           |                   | 2CH-DC13 version B <sup>2)</sup> | e                    | 4                          | 3                 | 1E-09                     |                           |                                       |                                                                                                                                                                                  |
| 2985688   | IB IL PSDI 8      | 1CH                              | d                    | 3 <sup>1)</sup>            | 2                 | 1E-08                     | ≥ 00/200/-                | -                                     |                                                                                                                                                                                  |
|           |                   | 2CH                              | e                    | 4                          | 3                 | 1E-09                     | ≥ 00/200/-                |                                       |                                                                                                                                                                                  |
| 2700994   | IB IL PSDI 16     | 1CH                              | d                    | 3 <sup>1)</sup>            | 2                 | 1E-08                     | ≥ 00/200/-                |                                       |                                                                                                                                                                                  |
|           |                   | 2CH                              | e                    | 4                          | 3                 | 1E-09                     | ≥ 00/--                   |                                       |                                                                                                                                                                                  |
| 2702446   | IB IL SAFE 2-ECO  | 1CH                              | c                    | 1                          | 1                 | 1E-09                     | ≥ 00/100/-                |                                       |                                                                                                                                                                                  |
|           |                   | 2CH                              | e                    | 4                          | 3                 |                           | ≥ 00/100/-                |                                       |                                                                                                                                                                                  |
| 2701559   | AXL F PSDI8/4 1F  | 1CH                              | d                    | 3 <sup>1)</sup>            | 2                 | 1E-08                     | ≥ 00/100/-                |                                       |                                                                                                                                                                                  |
|           |                   | 2 CH                             | e                    | 4                          | 3                 | 1E-09                     | ≥ 00/100/-                |                                       |                                                                                                                                                                                  |
| 2701560   | AXL F PSDO8/3 1F  | 1CH                              | d                    | 3                          | 2                 | 1E-08                     | ≥ 01/200/-                |                                       |                                                                                                                                                                                  |
|           |                   | 2CH                              | e                    | 4                          | 3                 | 1E-09                     | ≥ 01/200/-                |                                       |                                                                                                                                                                                  |
| 2702263   | AXL F SSDI8/4 1F  | 1CH                              | d                    | 3 <sup>1)</sup>            | 2                 | 1E-08                     | ≥ 01/200/-                |                                       |                                                                                                                                                                                  |
|           |                   | 2CH                              | e                    | 4                          | 3                 | 1E-09                     | ≥ 00/100/-                |                                       |                                                                                                                                                                                  |
| 2702264   | AXL F SSDO8/3 1F  | 1CH                              | d                    | 3                          | 2                 | 1E-08                     | ≥ 00/100/-                |                                       |                                                                                                                                                                                  |
|           |                   | 2CH                              | e                    | 4                          | 3                 | 1E-09                     |                           |                                       |                                                                                                                                                                                  |
| 2702171   | AXL F LPSDO8/3 1F | 1CH                              | d                    | 3                          | 2                 | 1E-08                     | ≥ 00/100/-                |                                       |                                                                                                                                                                                  |
|           |                   | 2 CH                             | e                    | 4                          | 3                 | 1E-09                     |                           |                                       |                                                                                                                                                                                  |

## 8 Safe control technology



| Order No. | Short designation     | EN ISO 13849-1<br>PL | EN ISO 13849-1<br>Category | EN 62061<br>SILCL | PFH <sub>D</sub><br>(1/h) | t <sub>M</sub><br>(years) | Data valid for<br>HW/FW/FW version |       |        |                 | Note |
|-----------|-----------------------|----------------------|----------------------------|-------------------|---------------------------|---------------------------|------------------------------------|-------|--------|-----------------|------|
|           |                       |                      |                            |                   |                           |                           | HW                                 | FW    | FW COP | SIS FW<br>HW/FW |      |
| 2916794   | RFC 470S PN 3TX       | e                    | 4                          | 3                 | 1E-09                     | 20                        | > 01                               | > 46F | > 360Q | > 10/236        | -    |
| 2700651   | FL PN/PN SDIO-2TX/2TX |                      |                            |                   |                           |                           | > 01                               | > 100 | > 010  | -               |      |

### 8.1 Safe analog value processing

Function block library for safety-related analog value acquisition with standard I/O modules.



The following characteristics are only valid if the total MTBF of the network infrastructure components used between the controller and SAFE AI station is  $\geq 30$  years.  
If the total MTBF is  $< 30$  years, please contact Phoenix Contact.

| Order No. | Short designation | EN ISO 13849-1<br>PL | EN ISO 13849-1<br>Category | EN 62061<br>SILCL | PFH <sub>D</sub><br>(1/h)                  | t <sub>M</sub><br>(years) | Note                                                                          |
|-----------|-------------------|----------------------|----------------------------|-------------------|--------------------------------------------|---------------------------|-------------------------------------------------------------------------------|
| 2400057   | SAFE AI           | e                    | 4                          | 3                 | 2E-09 <sup>1)</sup><br>5E-09 <sup>2)</sup> | 20                        | When only using safety-related input signals in the station                   |
|           |                   | d                    | 3                          | 2                 |                                            |                           | When using safety-related and non-safety-related input signals in the station |

<sup>1)</sup> When used with the AXL F AI8 1F module (Order No. 2688064)

<sup>2)</sup> When used with the AXL F AI8 W 1F module (Order No. 2702525)

## 9 CONTACTRON hybrid motor starters



| Order No.                     | Short designation            | EN ISO 13849-1<br>PL | EN ISO 13849-1<br>Category | PFD <sub>D</sub><br>(1/h) | t <sub>M</sub><br>(years) | Note |
|-------------------------------|------------------------------|----------------------|----------------------------|---------------------------|---------------------------|------|
| 2297031                       | ELR-W3-24DC/500AC-2I         | e                    | 3                          | 2.67E-09                  | 20                        | -    |
| 2297044                       | ELR-W3-230AC/500AC-2I        |                      |                            | 6.82E-09                  |                           |      |
| 2297057                       | ELR-W3-24DC/500AC-9I         |                      |                            | 2.67E-09                  |                           |      |
| 2297060                       | ELR-W3-230AC/500AC-9I        |                      |                            | 6.82E-09                  |                           |      |
| 2900582<br>2900414<br>2900421 | ELR-H5-IES-SC-24DC/500AC...  |                      |                            | 2.67E-09                  |                           |      |
| 2903902<br>2903904<br>2903906 | ELR-H5-IES-PT-24DC/500AC...  |                      |                            | 6.82E-09                  |                           |      |
| 2900692<br>2900420<br>2900422 | ELR-H5-IES-SC-230AC/500AC... |                      |                            | 2.67E-09                  |                           |      |
| 2900559<br>2900561            | ELR-H5-ES-SC-24DC/500AC...   |                      |                            | 2.40E-09                  |                           |      |
| 2900566<br>2900567<br>2900569 | ELR-H3-IES-SC-24DC/500AC...  |                      |                            | 6.27E-09                  |                           |      |
| 2903914<br>2903916<br>2903918 | ELR-H3-IES-PT-24DC/500AC...  |                      |                            |                           |                           |      |
| 2900689<br>2900568<br>2900570 | ELR-H3-IES-SC-230AC/500AC... |                      |                            |                           |                           |      |

## FUNCTIONAL SAFETY CHARACTERISTICS

| Order No.                                                      | Short designation   | EN ISO 13849-1<br>PL | EN ISO 13849-1<br>Category | PFH <sub>D</sub><br>(1/h) | t <sub>M</sub><br>(years) | Note |
|----------------------------------------------------------------|---------------------|----------------------|----------------------------|---------------------------|---------------------------|------|
| 2905151<br>2905138<br>2905152<br>2905139<br>2905153<br>2905140 | ELR H5-IES...-IFS   | e                    | 3                          | 0.1E-09                   | 20                        | -    |
| 2905154<br>2905141<br>2905155<br>2905142<br>2905156<br>2905143 | ELR H3-IES...-IFS   |                      |                            |                           |                           |      |
| 2903933<br>2903934<br>2903935                                  | ELR H5-IES...SWD... |                      |                            | 0.1E-09                   |                           |      |
| 2903936<br>2903937<br>2903938                                  | ELR H3-IES...SWD... |                      |                            |                           |                           |      |
| 2908669<br>2908670                                             | ELR H5-IES...-IOL   |                      |                            |                           |                           |      |
| 2908671<br>2908672                                             | ELR H3-IES...-IOL   |                      |                            |                           |                           |      |

## FUNCTIONAL SAFETY CHARACTERISTICS

## 10 Safety relay modules for the process industry

## 10.1 Safe coupling relays – PSRmini



Alternative illustration as 1oo1 structure

| Order No.          | Short designation | Demand              | Device type | HFT | SIL | SFF (%) | $\lambda_{SD}$ (FIT) | $\lambda_{SU}$ (FIT) | $\lambda_{DD}$ (FIT) | $\lambda_{DU}$ (FIT) | $\lambda_{Total}$ (FIT) | MTBF (years) <sup>1)</sup> | $PFD_{avg}$ <sup>2)</sup> (1/h) | $PFH_D$ (1/h) | $T_{1max}$ (years) | $t_M$ (years) | Data valid for HW/FW version |
|--------------------|-------------------|---------------------|-------------|-----|-----|---------|----------------------|----------------------|----------------------|----------------------|-------------------------|----------------------------|---------------------------------|---------------|--------------------|---------------|------------------------------|
| 2700356            | PSR-PS20          | High <sup>3)</sup>  | A           | 0   | 3   | 99.98   | 989.32               | 148.96               | 52.58                | 0.20                 | 1191.06                 | 80.63                      | -                               | 1.95E-10      | 20                 | 20            | ≥ 00/--                      |
|                    |                   | Low                 |             |     |     | 99.66   | 0                    | 1579                 | 0                    | 5.392                | 1584                    | 63                         | 2.36E-05                        | -             | 6                  |               |                              |
| 2702524            | PSR-PS22          | High <sup>4)</sup>  |             |     |     | 99.996  | 0                    | 2857.88              | 5.45                 | 0.11                 | 2863.44                 | 29.18                      | -                               | 1.10E-10      | 20                 |               | ≥ 00/--                      |
|                    |                   | Low <sup>4)5)</sup> |             |     |     | 99.839  | 0                    | 2639.18              | 0                    | 4.26                 | 2643.44                 | 30.94                      | 1.87E-05                        | -             | 6                  |               |                              |
|                    |                   | High <sup>6)</sup>  |             |     |     | 99.961  | 0                    | 2855.45              | 6.86                 | 1.12                 | 2863.44                 | 29.18                      | -                               | 1.12E-09      | 20                 |               |                              |
|                    |                   | Low <sup>6)</sup>   |             |     |     | 99.907  | 0                    | 2634.25              | 6.74                 | 2.45                 | 2643.44                 | 30.94                      | 7.08E-05                        | -             | 3.8                |               |                              |
| 2700357            | PSR-PS21          | High <sup>3)</sup>  |             |     | 2   | 99.18   | 494.66               | 79.10                | 494.66               | 8.80                 | 1077.22                 | 91.65                      | -                               | 8.80E-09      | 20                 | 20            | ≥ 00/--                      |
|                    |                   | Low                 |             |     |     | 81.20   | 0                    | 794.1                | 0                    | 183.8                | 977.9                   | 99                         | 8.06E-04                        | -             | 1.6                |               |                              |
| 2700398            | PSR-PS40          | High                |             |     | 3   | 99.99   | 989.32               | 460.91               | 51.90                | 0.10                 | 1502.24                 | 64.01                      | -                               | 1.04E-10      | 20                 | 20            | ≥ 00/--                      |
|                    |                   | Low                 |             |     |     | 99.72   | 0                    | 1891                 | 0                    | 5.236                | 1896                    | 52                         | 2.29E-05                        | -             | 6                  |               |                              |
| 2700577<br>2700578 | PSR-PC20          | High <sup>3)</sup>  |             |     |     | 99.98   | 989.32               | 230.38               | 52.58                | 0.20                 | 1272.48                 | 76.43                      | -                               | 1.95E-10      | 20                 |               | ≥ 00/--                      |
|                    |                   | Low                 |             |     |     | 99.68   | 0                    | 1660                 | 0                    | 5.392                | 1666                    | 60                         | 2.36E-05                        | -             | 6                  |               | ≥ 00/--                      |
| 2700581<br>2700582 | PSR-PC32          | High <sup>3)</sup>  |             |     |     | 99.99   | 0                    | 3135.22              | 62.35                | 1                    | 3198.57                 | 22.44                      | -                               | 1.00E-09      | 20                 |               | ≥ 00/--                      |
|                    |                   | Low                 |             |     |     | 99.85   | 0                    | 3577.81              | 0                    | 5.5                  | 3583.32                 | 22.51                      | 2.41E-05                        | -             | 6                  |               | ≥ 00/--                      |
| 2700588<br>2700589 | PSR-PC40          | High                |             |     |     | 99.99   | 989.32               | 397.43               | 51.90                | 0.10                 | 1438.75                 | 64.98                      | -                               | 1.04E-10      | 20                 |               | ≥ 00/--                      |
|                    |                   | Low                 |             |     |     | 99.71   | 0                    | 1798                 | 0                    | 5.236                | 1803                    | 54                         | 2.29E-05                        | -             | 6                  |               | ≥ 00/--                      |
| 2904664<br>2904665 | PSR-PC50          | Low                 |             |     |     | 99.60   | 4.27                 | 849                  | 4.21                 | 3.40                 | 860.88                  | 110.5                      | 1.49E-05                        | -             | 10                 |               | ≥ 00/--<br>≥ 00/--           |
| 2702522<br>2702523 | PSR-PC51          | Low                 |             |     |     | 99.68   | 0                    | 1831.13              | 3.66                 | 5.72                 | 1840.51                 | 66.98                      | 2.5E-05                         | -             | 6                  |               | ≥ 00/--<br>≥ 00/--           |

<sup>1)</sup> Includes faults that are not part of the safety function. MTTR was set to 8 hours.<sup>2)</sup> For  $T_1 = 1$  year<sup>3)</sup> Only in conjunction with a suitable evaluating device.<sup>4)</sup> Diagnostics / Proof test: Readback via N/C contact 22<sup>5)</sup> Diagnostics / Proof test: Error message about the diagnostic LEDs<sup>6)</sup> Diagnostics / Proof test: Error acknowledgment via A1 to DO

## FUNCTIONAL SAFETY CHARACTERISTICS

## 10.2 Safe coupling relays – PSRclassic



Alternative illustration as 1oo1 structure

| Order No. | Short designation | Demand             | Device type | HFT | SIL             | SFF (%) | $\lambda_{SD}$ (FIT) | $\lambda_{SU}$ (FIT) | $\lambda_{DD}$ (FIT) | $\lambda_{DU}$ (FIT) | $\lambda_{Total}$ (FIT) | MTBF (years) <sup>1</sup> | $PFD_{avg}$ <sup>2</sup> (1/h) | $PFH_D$ (1/h) | $T_{1max}$ (years) | $t_M$ (years) | Data valid for HW/FW version |  |
|-----------|-------------------|--------------------|-------------|-----|-----------------|---------|----------------------|----------------------|----------------------|----------------------|-------------------------|---------------------------|--------------------------------|---------------|--------------------|---------------|------------------------------|--|
| 2981978   | PSR-FSP           | High <sup>5)</sup> | A           | 0   | 3               | 99.99   | 198                  | 62.7                 | 3.66                 | 0.02                 | 264.38                  | 319                       | -                              | 2.02E-11      | 20                 | 20            | ≥ 00/--                      |  |
| 2981981   |                   | Low <sup>3)</sup>  |             |     |                 | 99.77   | 0                    | 909.7                | 0                    | 2.09                 | 911.79                  | 113                       | 9.15E-06                       | -             | 12                 |               | ≥ 00/--                      |  |
| 2981020   | PSR-ESP4          | High               |             |     | 1 <sup>4)</sup> | 99.99   | 949                  | 58.3                 | 44.5                 | 0.093                | 1052                    | 106.9                     | -                              | 9.93E-11      | 20                 |               | ≥ 00/--                      |  |
| 2981017   |                   | Low <sup>3)</sup>  |             |     |                 | 99.56   | 0                    | 849                  | 0                    | 3.68                 | 853                     | 132.3                     | 1.61E-05                       | -             | 9                  |               | ≥ 00/--                      |  |
| 2986960   | PSR-FSP/2x1       | High <sup>5)</sup> |             |     | 3               | 99.99   | 198                  | 63.9                 | 3.66                 | 0.02                 | 264.38                  | 342                       | -                              | 2.02E-11      | 20                 |               | ≥ 00/--                      |  |
| 2986957   |                   | Low <sup>3)</sup>  |             |     |                 | 99.76   | 0                    | 1026.9               | 0                    | 2.42                 | 1029.32                 | 104                       | 1.06E-05                       | -             | 5                  |               | ≥ 00/--                      |  |
| 2986575   | PSR-FSP2/2x1      | High <sup>5)</sup> |             |     | 2               | 99.61   | 99                   | 55.7                 | 99                   | 1                    | 254.7                   | 361                       | -                              | 1E-09         | 20                 |               | ≥ 00/--                      |  |
| 2986588   |                   | Low <sup>3)</sup>  |             |     |                 | 81.97   | 0                    | 455                  | 0                    | 100                  | 555                     | 185                       | 4.38E-04                       | -             | 2.25               |               | ≥ 00/--                      |  |
| 2901416   | PSR-ESAM4-B AC    | High               |             |     | 3               | 99.99   | 660                  | 1298                 | 26.7                 | 0.359                | 1985                    | 50.9                      | -                              | 3.60E-10      | 20                 |               | ≥ 00/--                      |  |
| 2901417   |                   |                    |             |     |                 |         |                      |                      |                      |                      |                         |                           |                                |               |                    |               |                              |  |
| 2901426   |                   | Low                |             |     |                 |         |                      |                      |                      |                      |                         |                           |                                |               |                    |               |                              |  |
| 2901427   |                   |                    |             |     |                 |         |                      |                      |                      |                      |                         |                           |                                |               |                    |               |                              |  |
| 2901422   |                   |                    |             |     |                 |         |                      |                      |                      |                      |                         |                           |                                |               |                    |               |                              |  |
| 2901425   |                   |                    |             |     |                 |         |                      |                      |                      |                      |                         |                           |                                |               |                    |               |                              |  |
| 2901428   |                   |                    |             |     |                 |         |                      |                      |                      |                      |                         |                           |                                |               |                    |               |                              |  |
| 2901429   |                   |                    |             |     |                 |         |                      |                      |                      |                      |                         |                           |                                |               |                    |               |                              |  |

<sup>1</sup> Includes faults that are not part of the safety function. MTTR was set to 8 hours.<sup>2</sup> For  $T_1 = 1$  year<sup>3</sup> Calculated assuming an average ambient temperature of 40°C. At higher ambient temperatures, a safety factor of 1.8 should be applied to the failure rates.<sup>4</sup> Up to SIL 3 possible depending on the application.<sup>5</sup> Only in conjunction with a suitable evaluating device.

## 11 Signal conditioners



### 11.1 Analog IN / Analog OUT



For additional operating modes, please refer to the corresponding data sheet for the relevant product at [phoenixcontact.net/products](http://phoenixcontact.net/products).

Alternative illustration as 1001 structure

| Order No. | Short designation           | Demand   | Device type | Operating mode | SIL | SFF (%) | $\lambda_{SD}$ (FIT) | $\lambda_{SU}$ (FIT) | $\lambda_{DD}$ (FIT) | $\lambda_{DU}$ (FIT) | MTBF (years) | $PFD_{avg}^1$ (1/h) | $PFH_D$ (1/h) | DC (%) |
|-----------|-----------------------------|----------|-------------|----------------|-----|---------|----------------------|----------------------|----------------------|----------------------|--------------|---------------------|---------------|--------|
| 2811284   | MACX MCR-UI-UI(-SP)(-NC)    | Low/High | A           | 2              | 2   | 83.50   | 0                    | 317.3                | 0                    | 62.9                 | 259          | 2.76E-04            | 6.29E-08      | 0.00   |
| 2811572   |                             |          |             | 3              | 2   | 83.00   | 0                    | 318.2                | 0                    | 62.1                 | 259          | 2.83E-04            | 6.46E-08      | 0.00   |
| 2811446   |                             |          |             | 3              | 2   | 83.00   | 0                    | 318.2                | 0                    | 62.1                 | 259          | 2.83E-04            | 6.46E-08      | 0.00   |
| 2811556   |                             |          |             | 3              | 2   | 83.00   | 0                    | 318.2                | 0                    | 62.1                 | 259          | 2.83E-04            | 6.46E-08      | 0.00   |
| 2811459   | MACX MCR-UI-UI-UP(-SP)(-NC) | Low/High | A           | 2              | 2   | 86.10   | 0                    | 369.8                | 0                    | 59.5                 | 228          | 2.61E-04            | 5.95E-08      | 0.00   |
| 2811585   |                             |          |             | 3              | 2   | 82.80   | 0                    | 353.7                | 0                    | 69.7                 | 228          | 3.19E-04            | 7.27E-08      | 0.00   |
| 2811297   |                             |          |             | 3              | 2   | 82.80   | 0                    | 353.7                | 0                    | 69.7                 | 228          | 3.19E-04            | 7.27E-08      | 0.00   |
| 2811569   |                             |          |             | 3              | 2   | 82.80   | 0                    | 353.7                | 0                    | 69.7                 | 228          | 3.19E-04            | 7.27E-08      | 0.00   |
| 2865955   | MACX MCR-SL-RPSSI-I(-SP)    | Low/High | A           | 4              | 2   | 91.2    | 0                    | 245                  | 332                  | 55.4                 | 161          | 2.46E-04            | 5.54E-08      | 85.7   |
| 2924207   | MACX MCR-SL-RPSSI-I-UP(-SP) | Low/High | A           | 4              | 2   | 90.5    | 0                    | 558                  | 0                    | 58.3                 | 183          | 2.53E-04            | 5.83E-08      | 0.00   |
| 2865968   |                             |          |             | 4              | 2   | 90.5    | 0                    | 558                  | 0                    | 58.3                 | 183          | 2.53E-04            | 5.83E-08      | 0.00   |
| 2924210   |                             |          |             | 4              | 2   | 90.5    | 0                    | 558                  | 0                    | 58.3                 | 183          | 2.53E-04            | 5.83E-08      | 0.00   |
| 2924825   | MACX MCR-RPSSI-2I(-SP)      | Low/High | A           | 4              | 2   | 85.5    | 0                    | 145.5                | 224.1                | 62.3                 | 197          | 2.73E-04            | 6.23E-08      | 78.3   |
| 2924838   |                             |          |             | 4              | 2   | 85.5    | 0                    | 145.5                | 224.1                | 62.3                 | 197          | 2.73E-04            | 6.23E-08      | 78.3   |
| 2865971   | MACX MCR-SL-IDSI-I(-SP)     | Low/High | A           | 4              | 2   | 94.7    | 0                    | 496.5                | 0                    | 27.9                 | 204          | 1.22E-04            | 2.79E-08      | 0.00   |
| 2924223   |                             |          |             | 4              | 2   | 94.7    | 0                    | 496.5                | 0                    | 27.9                 | 204          | 1.22E-04            | 2.79E-08      | 0.00   |
| 2904089   | MACX MCR-SL-RPSS-2I-2I(-SP) | Low/High | A           | 4              | 2   | 87.6    | 0                    | 195                  | 198                  | 55.3                 | 254          | 2.48E-04            | 5.53E-08      | 78.1   |
| 2904090   |                             |          |             | 4              | 2   | 87.6    | 0                    | 195                  | 198                  | 55.3                 | 254          | 2.48E-04            | 5.53E-08      | 78.1   |

<sup>1</sup> For  $T_1 = 1$  year

<sup>2</sup> Input isolator  $I \approx I$  (4 ... 20 mA)

<sup>3</sup> Output isolator  $I \approx I$  (4 ... 20 mA)

<sup>4</sup> Repeater power supply

## FUNCTIONAL SAFETY CHARACTERISTICS

## 11.2 Temperature



For additional operating modes, please refer to the corresponding data sheet for the relevant product at [phoenixcontact.net/products](http://phoenixcontact.net/products).

Alternative illustration as 1001 structure

| Order No. | Short designation         | Demand   | Device type | Operating mode | SIL | SFF (%) | $\lambda_{SD}$ (FIT) | $\lambda_{SU}$ (FIT) | $\lambda_{DD}$ (FIT) | $\lambda_{DU}$ (FIT) | MTBF (years) | $PFD_{avg}^1$ (1/h) | $PFH_b$ (1/h) | DC (%) |
|-----------|---------------------------|----------|-------------|----------------|-----|---------|----------------------|----------------------|----------------------|----------------------|--------------|---------------------|---------------|--------|
| 2811394   | MACX MCR-T-UI-UP(-SP)(-C) | Low/High | B           | 2              | 2   | 94.00   | 0                    | 0                    | 805                  | 43                   | 97           | 2.95E-04            | 4.30E-08      | 94.00  |
| 2811860   |                           | Low/High |             | 3              | 2   | 93.00   | 0                    | 0                    | 789                  | 56                   | 97           | 3.75E-04            | 5.60E-08      | 93.00  |
| 2811873   |                           |          |             |                |     |         |                      |                      |                      |                      |              |                     |               |        |
| 2811970   |                           |          |             |                |     |         |                      |                      |                      |                      |              |                     |               |        |
| 2811378   | MACX MCR-T-UIREL-UP(-SP)  | Low/High | B           | 4              | 2   | 94.00   | 0                    | 234                  | 543                  | 43                   | 85           | 2.88E-04            | 4.30E-08      | 92.00  |
| 2811828   |                           |          |             |                |     |         |                      |                      |                      |                      |              |                     |               |        |

<sup>1</sup> For  $T_1 = 1$  year

<sup>2</sup> Pt 100 3-conductor, output 4 ... 20 mA

<sup>3</sup> Voltage input mV, output 4 ... 20 mA

<sup>4</sup> Pt 100 3-conductor, output relay

## FUNCTIONAL SAFETY CHARACTERISTICS

## 11.3 Digital IN



For additional operating modes, please refer to the corresponding data sheet for the relevant product at [phoenixcontact.net/products](http://phoenixcontact.net/products).

Alternative illustration as 1oo1 structure

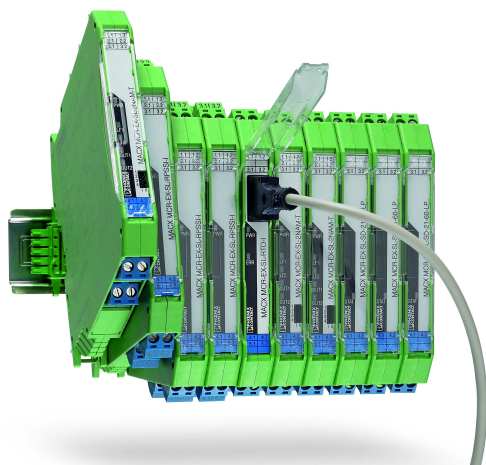
| Order No. | Short designation          | Demand | Device type | Operating mode | SIL | SFF (%) | $\lambda_{SD}$ (FIT) | $\lambda_{SU}$ (FIT) | $\lambda_{DD}$ (FIT) | $\lambda_{DU}$ (FIT) | MTBF (years) | $PFD_{avg}^1$ (1/h) | $PFH_D$ (1/h) | DC (%) |
|-----------|----------------------------|--------|-------------|----------------|-----|---------|----------------------|----------------------|----------------------|----------------------|--------------|---------------------|---------------|--------|
| 2865997   | MACX MCR-SL-NAM-R(-SP)     | Low    | A           | <sup>2</sup>   | 2   | 78.9    | 6                    | 242                  | 7                    | 60                   | 304          | 2.90E-04            | -             | 10.0   |
| 2924252   |                            |        |             | <sup>3</sup>   | 2   | 78.0    | 1                    | 249                  | 6                    | 64                   | 304          | 3.08E-04            | -             | 8.0    |
| 2865010   | MACX MCR-SL-NAM-2RO(-SP)   | Low    | A           | <sup>2</sup>   | 2   | 79.4    | 6                    | 244                  | 7                    | 57                   | 223          | 2.83E-04            | -             | 10.0   |
| 2924265   |                            |        |             | <sup>3</sup>   | 2   | 78.0    | 1                    | 251                  | 6                    | 64                   | 223          | 3.09E-04            | -             | 8.0    |
| 2865049   | MACX MCR-SL-2NAM-RO(-SP)   | Low    | A           | <sup>2</sup>   | 2   | 78.3    | 6                    | 249                  | 7                    | 64                   | 204          | 3.09E-04            | -             | 9.0    |
| 2924294   |                            |        |             | <sup>3</sup>   | 2   | 78.3    | 1                    | 248                  | 6                    | 62                   | 204          | 3.01E-04            | -             | 8.0    |
| 2865052   | MACX MCR-SL-2NAM-R-UP(-SP) | Low    | A           | <sup>2</sup>   | 2   | 86.6    | 6                    | 403                  | 0                    | 63                   | 226          | 3.01E-04            | -             | 0.0    |
| 2924304   |                            |        |             | <sup>3</sup>   | 2   | 86.4    | 0                    | 413                  | 0                    | 65                   | 226          | 3.10E-04            | -             | 0.0    |
| 2865023   | MACX MCR-SL-NAM-2T(-SP)    | Low    | A           | <sup>2</sup>   | 2   | 83.0    | 11                   | 203                  | 2                    | 43                   | 336          | 1.88E-04            | -             | 0.0    |
| 2924278   |                            |        |             | <sup>3</sup>   | 2   | 85.0    | 1                    | 201                  | 6                    | 35                   | 336          | 1.53E-04            | -             | 0.0    |
| 2865036   | MACX MCR-SL-2NAM-T(-SP)    | Low    | A           | <sup>2</sup>   | 2   | 81.0    | 12                   | 251                  | 15                   | 64                   | 269          | 2.80E-04            | -             | 0.0    |
| 2924281   |                            |        |             | <sup>3</sup>   | 2   | 81.0    | 2                    | 262                  | 12                   | 64                   | 269          | 2.80E-04            | -             | 0.0    |

<sup>1</sup> For  $T_1 = 1$  year

<sup>2</sup> Non-inverted output (N)

<sup>3</sup> Inverted output (I)

## 12 Ex i signal conditioners



### 12.1 Analog IN / Analog OUT



For additional operating modes, please refer to the corresponding data sheet for the relevant product at [phoenixcontact.net/products](http://phoenixcontact.net/products).

Alternative illustration as 1001 structure

| Order No. | Short designation              | Demand   | Device type | Operating mode | SIL | SFF (%) | $\lambda_{SD}$ (FIT) | $\lambda_{SU}$ (FIT) | $\lambda_{DD}$ (FIT) | $\lambda_{DU}$ (FIT) | MTBF (years) | $PFD_{avg}^1$ (1/h) | $PFH_D$ (1/h) | DC (%) |
|-----------|--------------------------------|----------|-------------|----------------|-----|---------|----------------------|----------------------|----------------------|----------------------|--------------|---------------------|---------------|--------|
| 2865340   | MACX MCR-EX-SL-RPSSI-I(-SP)    | Low/High | A           | 2              | 2   | 91.0    | 0                    | 247                  | 333.3                | 56.7                 | 161          | 2.52E-04            | 5.67E-08      | 85.4   |
| 2924016   |                                |          |             | 2              | 2   | 90.5    | 0                    | 558.0                | 0                    | 58.3                 | 183          | 2.53E-04            | 5.83E-08      | 0.0    |
| 2865793   | MACX MCR-EX-SL-RPSSI-I-UP(-SP) | Low/High | A           | 2              | 2   | 85.5    | 0                    | 145.5                | 224.1                | 62.3                 | 197          | 2.73E-04            | 6.23E-08      | 78.3   |
| 2924029   |                                |          |             | 2              | 2   | 94.7    | 0                    | 496.5                | 0                    | 27.9                 | 204          | 1.22E-04            | 2.79E-08      | 0.0    |
| 2865366   | MACX MCR-EX-SL-RPSSI-2I(-SP)   | Low/High | A           | 2              | 3   | 92.3    | 0                    | 316.0                | 345                  | 55.3                 | 159          | 2.52E-04            | 5.53E-08      | 86.2   |
| 2924236   |                                |          |             | 2              | 3   | 92.3    | 0                    | 316.0                | 345                  | 55.3                 | 159          | 2.52E-04            | 5.53E-08      | 86.2   |
| 2865405   | MACX MCR-EX-SL-IDSI-I(-SP)     | Low/High | A           | 3              | 2   | 94.7    | 0                    | 496.5                | 0                    | 27.9                 | 204          | 1.22E-04            | 2.79E-08      | 0.0    |
| 2924032   |                                |          |             | 3              | 2   | 94.7    | 0                    | 496.5                | 0                    | 27.9                 | 204          | 1.22E-04            | 2.79E-08      | 0.0    |
| 2865382   | MACX MCR-EX-SL-RPSS-2I-2I(-SP) | Low/High | A           | 2              | 3   | 92.3    | 0                    | 316.0                | 345                  | 55.3                 | 159          | 2.52E-04            | 5.53E-08      | 86.2   |
| 2924676   |                                |          |             | 2              | 3   | 92.3    | 0                    | 316.0                | 345                  | 55.3                 | 159          | 2.52E-04            | 5.53E-08      | 86.2   |

<sup>1</sup> For  $T_1 = 1$  year

<sup>2</sup> Repeater power supply

<sup>3</sup> Output isolator  $I \hat{=} I$  (4 ... 20 mA)

## FUNCTIONAL SAFETY CHARACTERISTICS

## 12.2 Temperature



For additional operating modes, please refer to the corresponding data sheet for the relevant product at [phoenixcontact.net/products](http://phoenixcontact.net/products).

Alternative illustration as 1oo1 structure

| Order No. | Short designation            | Demand   | Device type | Operating mode | SIL | SFF (%) | $\lambda_{SD}$ (FIT) | $\lambda_{SU}$ (FIT) | $\lambda_{DD}$ (FIT) | $\lambda_{DU}$ (FIT) | MTBF (years) | $PFD_{avg}^1$ (1/h) | $PFH_D$ (1/h) | DC (%) |
|-----------|------------------------------|----------|-------------|----------------|-----|---------|----------------------|----------------------|----------------------|----------------------|--------------|---------------------|---------------|--------|
| 2865654   | MACX MCR-EX-T-UI-UP(-SP)(-C) | Low/High | B           | 2              | 2   | 94.0    | 0                    | 0                    | 805                  | 43                   | 97           | 2.95E-04            | 4.30E-08      | 94.0   |
| 2924689   |                              | Low/High |             | 3              | 2   | 93.0    | 0                    | 0                    | 789                  | 56                   | 97           | 3.75E-04            | 5.60E-08      | 93.0   |
| 2811763   |                              | Low/High |             | 4              | 2   | 94.0    | 0                    | 234                  | 543                  | 43                   | 85           | 2.88E-04            | 4.30E-08      | 92.0   |
| 2924692   |                              | Low/High |             | 2              | 2   | 94.0    | 0                    | 234                  | 543                  | 43                   | 85           | 2.88E-04            | 4.30E-08      | 92.0   |
| 2865751   | MACX MCR-EX-T-UIREL-UP(-SP)  | Low/High | B           | 2              | 2   | 94.0    | 0                    | 234                  | 543                  | 43                   | 85           | 2.88E-04            | 4.30E-08      | 92.0   |
| 2924799   | MCR-FL-TS-LP-I-EX            | Low/High | B           | 2              | 2   | 94.0    | 0                    | 234                  | 543                  | 43                   | 85           | 2.88E-04            | 4.30E-08      | 92.0   |
| 2864587   | MCR-FL-TS-LP-I-EX            | Low/High | B           | 2              | 2   | 94.0    | 0                    | 234                  | 543                  | 43                   | 85           | 2.88E-04            | 4.30E-08      | 92.0   |
| 2864545   | MCR-HT-TS-I-EX               | Low/High | B           | 2              | 2   | 94.0    | 0                    | 234                  | 543                  | 43                   | 85           | 2.88E-04            | 4.30E-08      | 92.0   |

<sup>1</sup> For  $T_1 = 1$  year

<sup>2</sup> Pt 100 3-conductor, output 4 ... 20 mA

<sup>3</sup> Voltage input mV, output 4 ... 20 mA

<sup>4</sup> Pt 100 3-conductor, output relay

## FUNCTIONAL SAFETY CHARACTERISTICS

## 12.3 Digital IN / Digital OUT



For additional operating modes, please refer to the corresponding data sheet for the relevant product at [phoenixcontact.net/products](http://phoenixcontact.net/products).

Alternative illustration as 1oo1 structure

| Order No. | Short designation                 | Demand   | Device type | Operating mode | SIL | SFF (%) | $\lambda_{SD}$ (FIT) | $\lambda_{SU}$ (FIT) | $\lambda_{DD}$ (FIT) | $\lambda_{DU}$ (FIT) | MTBF (years) | $PFD_{avg}^1$ (1/h) | $PFH_D$ (1/h) | DC (%) |
|-----------|-----------------------------------|----------|-------------|----------------|-----|---------|----------------------|----------------------|----------------------|----------------------|--------------|---------------------|---------------|--------|
| 2865434   | MACX MCR-EX-SL-NAM-R(-SP)         | Low      | A           | <sup>2</sup>   | 2   | 78.9    | 6                    | 242                  | 7                    | 60                   | 304          | 2.90E-04            | -             | 10.0   |
| 2924045   |                                   |          |             | <sup>3</sup>   |     | 78.0    | 1                    | 249                  | 6                    | 64                   | 304          | 3.08E-04            | -             | 8.0    |
| 2865450   | MACX MCR-EX-SL-NAM-2RO(-SP)       | Low      | A           | <sup>2</sup>   | 2   | 79.4    | 6                    | 244                  | 7                    | 57                   | 223          | 2.83E-04            | -             | 10.00  |
| 2924061   |                                   |          |             | <sup>3</sup>   |     | 78.0    | 1                    | 251                  | 6                    | 64                   | 223          | 3.09E-04            | -             | 8.0    |
| 2865476   | MACX MCR-EX-SL-2NAM-RO(-SP)       | Low      | A           | <sup>2</sup>   | 2   | 78.3    | 6                    | 249                  | 7                    | 64                   | 204          | 3.09E-04            | -             | 9.0    |
| 2924087   |                                   |          |             | <sup>3</sup>   |     | 78.3    | 1                    | 248                  | 6                    | 62                   | 204          | 3.01E-04            | -             | 8.0    |
| 2865984   | MACX MCR-EX-SL-2NAM-R-UP(-SP)     | Low      | A           | <sup>2</sup>   | 2   | 86.6    | 6                    | 403                  | 0                    | 63                   | 226          | 3.01E-04            | -             | 0.0    |
| 2924249   |                                   |          |             | <sup>3</sup>   |     | 86.4    | 0                    | 413                  | 0                    | 65                   | 226          | 3.10E-04            | -             | 0.0    |
| 2865463   | MACX MCR-EX-SL-NAM-2T(-SP)        | Low      | A           | <sup>2</sup>   | 2   | 83.0    | 11                   | 203                  | 2                    | 43                   | 336          | 1.88E-04            | -             | 0.0    |
| 2924074   |                                   |          |             | <sup>3</sup>   |     | 85.0    | 1                    | 201                  | 6                    | 35                   | 336          | 1.53E-04            | -             | 0.0    |
| 2865489   | MACX MCR-EX-SL-2NAM-T(-SP)        | Low      | A           | <sup>2</sup>   | 2   | 81.0    | 12                   | 251                  | 15                   | 64                   | 269          | 2.80E-04            | -             | 0.0    |
| 2924090   |                                   |          |             | <sup>3</sup>   |     | 81.0    | 2                    | 262                  | 12                   | 64                   | 269          | 2.80E-04            | -             | 0.0    |
| 2866006   | MACX MCR-EX-SL-NAM-NAM(-SP)       | Low      | A           | <sup>2</sup>   | 2   | 84.0    | 0                    | 106                  | 72                   | 32                   | 266          | 1.74E-04            | -             | 69.0   |
| 2924883   |                                   |          |             | <sup>3</sup>   |     | 83.0    | 0                    | 108                  | 72                   | 36                   | 266          | 1.74E-04            | -             | 66.0   |
| 2905723   | MACX MCR-EX-SL-NAM-YO(-SP)        | Low      | A           | <sup>2</sup>   | 2   | 84.0    | 0                    | 106                  | 72                   | 32                   | 266          | 1.74E-04            | -             | 69.0   |
| 2905724   |                                   |          |             | <sup>3</sup>   |     | 83.0    | 0                    | 108                  | 72                   | 36                   | 266          | 1.74E-04            | -             | 66.0   |
| 2907404   | MACX MCR-EX-SL-NAM-HO(-SP)        | Low      | A           | <sup>2</sup>   | 2   | 84.0    | 0                    | 106                  | 72                   | 32                   | 266          | 1.74E-04            | -             | 69.0   |
| 2907405   |                                   |          |             | <sup>3</sup>   |     | 83.0    | 0                    | 108                  | 72                   | 36                   | 266          | 1.74E-04            | -             | 66.0   |
| 2865492   | MACX MCR-EX-SL-SD-21-25-LP(-SP)   | Low/High | A           | -              | 3   | 100.0   | 0                    | 50                   | 0                    | 0                    | 237          | 0.00E+00            | -             | 0.0    |
| 2924113   |                                   |          |             | -              |     | 100.0   | 0                    | 50                   | 0                    | 0                    | 237          | 0.00E+00            | -             | 0.0    |
| 2865764   | MACX MCR-EX-SL-SD-21-40-LP(-SP)   | Low/High | A           | -              | 3   | 100.0   | 0                    | 50                   | 0                    | 0                    | 237          | 0.00E+00            | -             | 0.0    |
| 2924139   |                                   |          |             | -              |     | 100.0   | 0                    | 50                   | 0                    | 0                    | 237          | 0.00E+00            | -             | 0.0    |
| 2865609   | MACX MCR-EX-SL-SD-24-48-LP(-SP)   | Low/High | A           | -              | 3   | 100.0   | 0                    | 50                   | 0                    | 0                    | 237          | 0.00E+00            | -             | 0.0    |
| 2924126   |                                   |          |             | -              |     | 100.0   | 0                    | 50                   | 0                    | 0                    | 237          | 0.00E+00            | -             | 0.0    |
| 2865515   | MACX MCR-EX-SL-SD-21-60-LP(-SP)   | Low/High | A           | -              | 3   | 100.0   | 0                    | 50                   | 0                    | 0                    | 237          | 0.00E+00            | -             | 0.0    |
| 2924100   |                                   |          |             | -              |     | 100.0   | 0                    | 50                   | 0                    | 0                    | 237          | 0.00E+00            | -             | 0.0    |
| 2924867   | MACX MCR-EX-SL-SD-23-48-LFD (-SP) | Low/High | A           | -              | 3   | 94.8    | 0                    | 406                  | 45.1                 | 24.6                 | 167          | 1.08E-04            | 2.46E-8       | 64.7   |
| 2924870   |                                   |          |             | -              |     | 94.8    | 0                    | 406                  | 45.1                 | 24.6                 | 167          | 1.08E-04            | 2.46E-8       | 64.7   |
| 2905669   | MACX MCR-EX-SL-SD-21-25-LFD (-SP) | Low/High | A           | -              | 3   | 94.8    | 0                    | 406                  | 45.1                 | 24.6                 | 167          | 1.08E-04            | 2.46E-8       | 64.7   |
| 2905674   |                                   |          |             | -              |     | 94.8    | 0                    | 406                  | 45.1                 | 24.6                 | 167          | 1.08E-04            | 2.46E-8       | 64.7   |
| 2906155   | MACX MCR-EX-SL-SD-24-48-LFD (-SP) | Low/High | A           | -              | 3   | 94.8    | 0                    | 406                  | 45.1                 | 24.6                 | 167          | 1.08E-04            | 2.46E-8       | 64.7   |
| 2906156   |                                   |          |             | -              |     | 94.8    | 0                    | 406                  | 45.1                 | 24.6                 | 167          | 1.08E-04            | 2.46E-8       | 64.7   |

<sup>1</sup> For  $T_1 = 1$  year

<sup>2</sup> Non-inverted output (N)

<sup>3</sup> Inverted output (I)

### 13 Explanation of terms

| Abbreviation                        | Term                                       | Explanation                                                                                                             |
|-------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>EN ISO 13849-1</b>               |                                            |                                                                                                                         |
| <b>PL</b>                           | Performance level                          | Classification of the ability of safety functions to meet a safety demand.                                              |
| <b>Category</b>                     | Category                                   | Classification of the resistance to faults according to EN ISO 13849-1.                                                 |
| <b>PFD<sub>D</sub></b>              | Probability of dangerous failure per hour  | Probability of dangerous failure per hour                                                                               |
| <b>t<sub>M</sub></b>                | Mission time                               | Duration of use                                                                                                         |
| <b>EN IEC 61508 / 61511 / 62061</b> |                                            |                                                                                                                         |
| <b>HFT</b>                          | Hardware fault tolerance                   | Ability of a function unit to continue with the execution of a demanded function despite existing faults or deviations. |
| <b>SIL</b>                          | Safety Integrity Level                     | Safety integrity level                                                                                                  |
| <b>SILCL</b>                        | Safety integrity level claim limit         | SIL claim limit (suitability)                                                                                           |
| <b>SFF</b>                          | Safe Failure Fraction                      | Fraction of safe failures                                                                                               |
| <b>λ<sub>SD</sub></b>               | Failure rate – safe detected               | Failure rate of safe detected failures                                                                                  |
| <b>λ<sub>SU</sub></b>               | Failure rate – safe undetected             | Failure rate of safe undetected failures                                                                                |
| <b>λ<sub>DD</sub></b>               | Failure rate – dangerous detected          | Failure rate of dangerous detected failures                                                                             |
| <b>λ<sub>DU</sub></b>               | Failure rate – dangerous undetected        | Failure rate of dangerous undetected failures                                                                           |
| <b>λ<sub>Total</sub></b>            | Total failure rate                         | Failure rate of all failures                                                                                            |
| <b>DC</b>                           | Diagnostic coverage                        | Diagnostic coverage                                                                                                     |
| <b>MTBF</b>                         | Mean time between failure                  | Average failure time period                                                                                             |
| <b>PFD<sub>avg</sub></b>            | Average probability of failure on demand   | Average probability of failure on demand                                                                                |
| <b>FIT</b>                          | Failure in time (in 10 <sup>9</sup> hours) | Failures per unit time (1 failure every 10 <sup>9</sup> hours)                                                          |
| <b>T<sub>1max</sub></b>             | Proof test interval                        | Repeat testing                                                                                                          |

## 14 Revision history

| Revision | Date    | Contents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00       | 12/2011 | First publication                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 01       | 01/2012 | Layout adjustments<br>PSR-SIM4 modular safety relay added<br>PSR-SACB-4/4-L-5,0PUR-SD accessory added                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 02       | 04/2012 | FL PN/PN SDIO-2TX/2TX safe PROFINET gateway added                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 03       | 01/2014 | Layout adjustments<br>Values for ESA2-B and ESAM2/3x1 corrected in "Safety relays" on page 2 and PSR-URML4, PSR-URM4 42-230UC, and PSR-MXF added<br>"Forcibly guided coupling relays" moved to page 6 in Section 3, "Safety switching devices" (previously Section 6)<br>Values for order numbers 2986229, 2986232, 2986012, 2986025, 2986038, and 298604 updated in "PSR-TRISAFE configurable safety module" on page 7 and order numbers 2986096 and 2986106 added<br>Order numbers 2700994 and 2701625 added in "Safe control technology" on page 10, PL and Cat. corrected for IL-PSDOR-4-1CH-AC15 and IL-PSDOR-4-1CH-DC13, note text for order number 2985864 reduced<br>Designation for order number 2916794 corrected in "Safe control technology" on page 10.<br>"Safe coupling relay" on page 12 renamed (previously "Process technology"), PSR-ETP/1x1 added and footnote for PSR-FSP and PSR-ETP/1x1 inserted.<br>Added "Signal conditioners" on page 13<br>"Ex i signal conditioners" on page 16 added<br>"Explanation of terms" on page 19 extended                                                                                                              |
| 04       | 03/2015 | Layout adjustments / Structure revised / Sections renamed in accordance with the designations of the product ranges<br>Column for HW/FW version inserted in tables, if relevant<br>"Safety relays – PSRmini" on page 2 inserted<br>Second data record for order number 2981114/2981127 "PSR-ESAM4/3x1" on page 4 inserted<br>"Multifunctional safety relays – PSRmultifunction" on page 7 inserted (previously included in Section 3.1 "Safety relays")<br>Data in "Configurable safety modules – PSRtrSAFE" on page 11 revised<br>Order number 2701559/270160 in "Network safety solutions" on page 14 inserted<br>Order numbers 2903902, 2903904, 2903906, 2903914, 2903916, and 2903918 in "CONTACTRON hybrid motor starters" on page 16 inserted<br>Data for "CONTACTRON hybrid motor starters" on page 16 updated<br>"Safe coupling relays – PSRmini" on page 18 inserted<br>In "Safe coupling relays – PSRclassic" on page 19 for PSR-FSP, PSR-ESP4, PSR-FSP2/2X1, PSR-ESAM4-B AC HFT changed from 1 to 0<br>Data for signal conditioners "Analog IN / Analog OUT" on page 20 updated<br>Data for Ex i signal conditioners "Analog IN / Analog OUT" on page 23 updated |
| 04_c00   | 04/2015 | Notes for TRISAFE-S, -M, and -SDI8-SDIO4 on Page 11 modified                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## FUNCTIONAL SAFETY CHARACTERISTICS

| Revision | Date    | Contents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 05       | 06/2016 | <p><b>Section 3.1 “Safety relays – PSRmini” :</b><br/>New products inserted:<br/>PSR-MS21, PSR-MC60, PSR-MC62, PSR-MC70, PSR-MC72, PSR-MC82</p> <p><b>Section 3.2 “Safety relays – PSRclassic” :</b><br/>PL/Cat./SILCL/PFH<sub>D</sub> for PSR-ESP4 modified</p> <p><b>Section 4 “Zero-speed and over-speed safety relays – PSRmotion” :</b><br/>New product inserted: PSR-MM25</p> <p><b>Section 6 “Configurable safety modules – PSRtrisafe” :</b><br/>HW/FW version column revised<br/>Note for TRISAFE-S 1CH and TRISAFE-M 1CH removed</p> <p><b>Section 7 “Network safety solutions” :</b><br/>Cat./SILCL (for 1CH-AC15 and 1CH-DC13 ) for order number 2985864 IB IL PSDO 4 adjusted<br/>Characteristics for 2CH-CAP-B for order number 2985864 IB IL PSDOR 4 removed<br/>Footnote 1 inserted<br/>New products inserted:<br/>AXL F SSDI8/4 1F, AXL F SSDO8/3 1F, AXL F LPSDO8/3 1F</p> <p><b>Section 8.1 “Safe analog value processing” inserted</b></p> <p><b>Section 9 “CONTACTRON hybrid motor starters” :</b><br/>Heading modified (previously “CONTACTRON solid-state contactors”)<br/>New products inserted:<br/>ELR H5-IES...-IFS , ELR H3-IES...-IFS , ELR H5-IES...SWD... , ELR H3-IES...SWD...</p> <p><b>Section 10.2 “Safe coupling relays – PSRclassic” :</b><br/>T<sub>1max</sub> for PSR-FSP (low demand) modified<br/>SIL for PSR-ESP4 modified and corresponding footnote inserted<br/>Footnote for low demand values for PSR-FSP, PSR-ESP4, PSR-FSP2/2x1 inserted</p> <p><b>Section 11 “Signal conditioners” :</b><br/>Order number for MACX MCR-T-UIREL-UP(-SP)(-C) corrected<br/>Order numbers removed:<br/>2811514, 2811831, 2865065, 2924317, 2865078, 2924320, 2924333, 2924346</p> <p><b>Section 12 “Ex i signal conditioners” :</b><br/>Order numbers removed:<br/>2865722, 2924809, 2865939, 2924142, 2865573, 2924168, 2865942, 2865586<br/>New products inserted:<br/>MACX MCR-EX-SL-NAM-YO(-SP), MACX MCR-EX-SL-NAM-HO(-SP), MACX MCR-EX-SL-SD-21-25-LFD(-SP), MACX MCR-EX-SL-SD-24-48-LFD(-SP)</p> |

## FUNCTIONAL SAFETY CHARACTERISTICS

| Revision | Date    | Contents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 06       | 03/2017 | <p><b>Page 1:</b><br/>Information about important product information added</p> <p><b>Section 3.1 “Safety relays – PSRmini” :</b><br/>New products added:<br/>PSR-MC32, PSR-MC37<br/>PFH<sub>D</sub> figures for PSR-MC60 and PSR-MC62 added<br/>Order numbers 2902935 and 2902936 replaced by order numbers 2702924 and 2702925</p> <p><b>Section 5 “Safe coupling relays – PSRclassic” :</b><br/>Section fully revised due to new SIL qualification of the products</p> <p><b>Section 6 “Configurable safety modules – PSRtrisafe” :</b><br/>Section fully revised, new data added, for PSR-TS-SDI8-SDIO4: PFH<sub>D</sub> figures changed, SILCL on 1CH assignment changed</p> <p><b>Section 7 “Network safety solutions” :</b><br/>New product added: IB IL SAFE 2-ECO<br/>Footnote 2 added</p> <p><b>Section 8 “Safe control technology” :</b><br/>Order number 2985563 removed</p> <p><b>Section 9 “CONTACTRON hybrid motor starters” :</b><br/>Order numbers removed:<br/>2900558, 2900688, 2900560, 2900562, 2900550, 2900552, 2900554, 2900686, 2900553, 2900555<br/>PFH<sub>D</sub> figure for ELR H3-IES...SWD... changed<br/>New products added:<br/>ELR H5-IES...-IOL and ELR H5-IES...-IOL</p> <p><b>Section 10.1 “Safe coupling relays – PSRmini” :</b><br/>New products added:<br/>PSR-PS22, PSR-PC32, PSR-PC51</p> <p><b>Section 10.2 “Safe coupling relays – PSRclassic” :</b><br/>Footnote for low demand figures for PSR-FSP/2x1 added<br/>Order numbers removed:<br/>2986711, 2986562</p> <p><b>Section 12 “Ex i signal conditioners” :</b><br/>Order numbers removed:<br/>2865502, 2924197<br/>High demand changed for order numbers 2865492 to 2906156<br/><math>\lambda_{SU}</math> and MTBF values changed for order numbers 2865492 to 2924100</p> |
| 07       | 03/2018 | <p><b>Section 5 “Safe coupling relays – PSRclassic” :</b><br/>Safety characteristic data changed (PFH<sub>D</sub> and PFD<sub>avg</sub> values)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |



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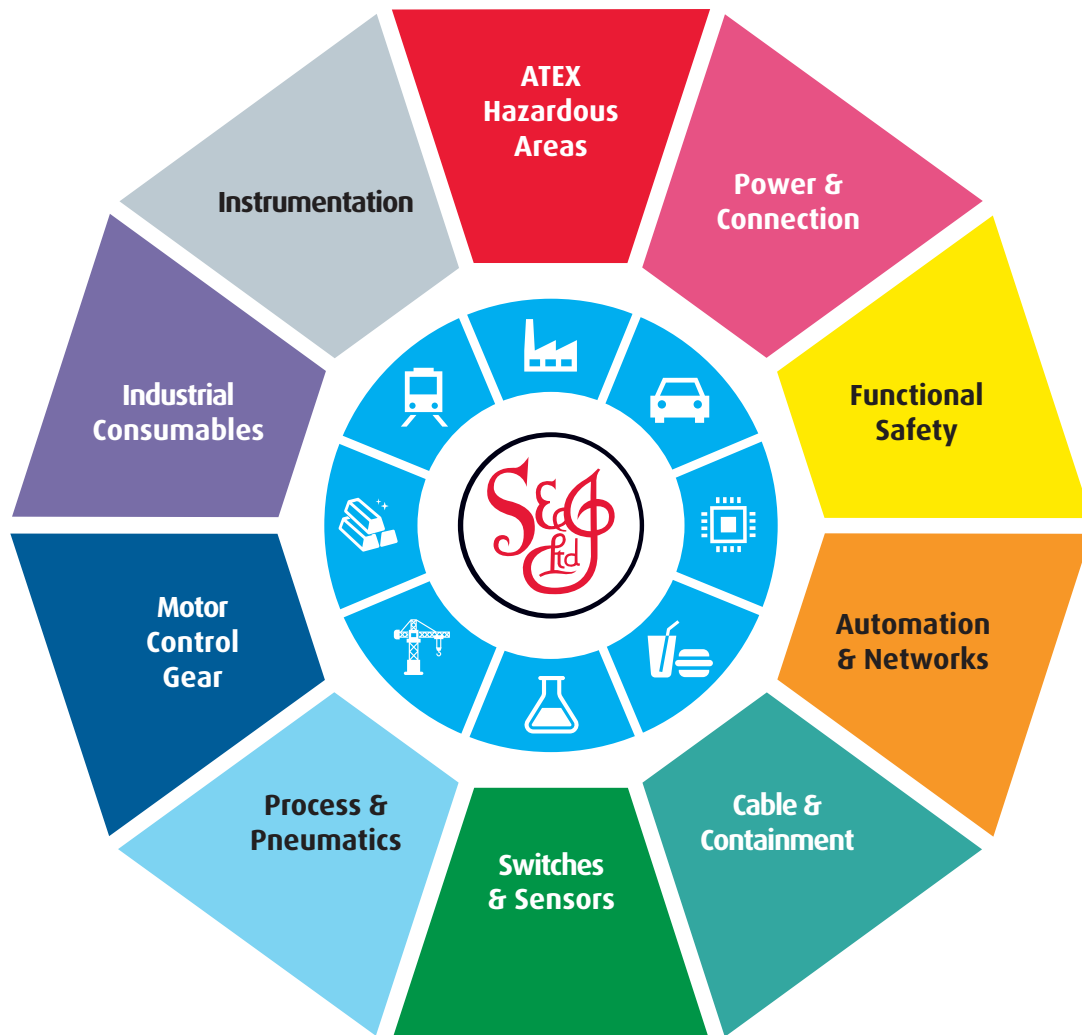
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