

**Safety relays****SIRIUS 3TK28 Safety Relays****With relay enabling circuits****Selection and ordering data**

| Type                                                                         | Basic units<br>3TK2820                                        | 3TK2821                                                       | 3TK2822                                                       | 3TK2823                                                       | 3TK2824                                                       | 3TK2825                                                       |
|------------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|
| <b>Sensors</b>                                                               |                                                               |                                                               |                                                               |                                                               |                                                               |                                                               |
| • Inputs                                                                     | 1                                                             | 1                                                             | 1                                                             | 1                                                             | 1                                                             | 1                                                             |
| • Electronic                                                                 | --                                                            | --                                                            | --                                                            | --                                                            | --                                                            | --                                                            |
| • With contacts                                                              | ✓                                                             | ✓                                                             | ✓ <sup>1)</sup>                                               | ✓                                                             | ✓                                                             | ✓                                                             |
| • Magnetically operated switch (Reed contacts)                               | ✓ <sup>2)</sup>                                               | --                                                            | --                                                            | --                                                            | --                                                            | --                                                            |
| <b>Safety mats</b>                                                           | --                                                            | --                                                            | --                                                            | --                                                            | --                                                            | --                                                            |
| <b>Start</b>                                                                 |                                                               |                                                               |                                                               |                                                               |                                                               |                                                               |
| • Auto                                                                       | ✓                                                             | ✓                                                             | ✓                                                             | --                                                            | ✓                                                             | ✓                                                             |
| • Monitored                                                                  | ✓                                                             | ✓                                                             | --                                                            | ✓                                                             | ✓                                                             | ✓                                                             |
| <b>Cascading input<br/>24 V DC</b>                                           | --                                                            | --                                                            | --                                                            | --                                                            | --                                                            | --                                                            |
| <b>Key-operated switch</b>                                                   | --                                                            | --                                                            | --                                                            | --                                                            | --                                                            | --                                                            |
| <b>Enabling circuit,<br/>floating</b>                                        |                                                               |                                                               |                                                               |                                                               |                                                               |                                                               |
| • Stop category 0                                                            | 3 NO                                                          | 3 NO                                                          | 2 NO                                                          | 2 NO                                                          | 2 NO                                                          | 3 NO                                                          |
| • Stop category 1                                                            | --                                                            | --                                                            | --                                                            | --                                                            | --                                                            | --                                                            |
| <b>Enabling circuit,<br/>electronic</b>                                      |                                                               |                                                               |                                                               |                                                               |                                                               |                                                               |
| • Stop category 0                                                            | --                                                            | --                                                            | --                                                            | --                                                            | --                                                            | --                                                            |
| • Stop category 1                                                            | --                                                            | --                                                            | --                                                            | --                                                            | --                                                            | --                                                            |
| <b>Signaling outputs</b>                                                     |                                                               |                                                               |                                                               |                                                               |                                                               |                                                               |
| • Floating                                                                   | 1 NC                                                          | 1 NC                                                          | --                                                            | --                                                            | --                                                            | 2 NC                                                          |
| • Electronic                                                                 | --                                                            | --                                                            | --                                                            | --                                                            | --                                                            | --                                                            |
| <b>Standards</b>                                                             | IEC 60204-1,<br>EN ISO 12100,<br>EN ISO 13849-1,<br>IEC 61508 | IEC 60204-1,<br>EN ISO 12100,<br>EN ISO 13849-1,<br>IEC 61508 | IEC 60204-1,<br>EN ISO 12100,<br>EN ISO 13849-1,<br>IEC 61508 | IEC 60204-1,<br>EN ISO 12100,<br>EN ISO 13849-1,<br>IEC 61508 | IEC 60204-1,<br>EN ISO 12100,<br>EN ISO 13849-1,<br>IEC 61508 | IEC 60204-1,<br>EN ISO 12100,<br>EN ISO 13849-1,<br>IEC 61508 |
| <b>Test certificates</b>                                                     | TÜV, UL, CSA                                                  | BG, SUVA,<br>UL, CSA                                          | BG, SUVA,<br>UL, CSA                                          | BG, SUVA,<br>UL, CSA                                          | BG, SUVA,<br>UL, CSA                                          | BG, SUVA,<br>UL, CSA                                          |
| <b>SIL level max.<br/>according to IEC 61508</b>                             | 3                                                             | 1                                                             | 3                                                             | 3                                                             | 1                                                             | 3                                                             |
| <b>Performance level PL<br/>according to<br/>EN ISO 13849-1</b>              | e                                                             | c                                                             | e                                                             | e                                                             | c                                                             | e                                                             |
| <b>Probability of a<br/>dangerous failure per<br/>hour (PFH<sub>d</sub>)</b> | 9.38 x 10 <sup>-10</sup> 1/h                                  | 1.1 x 10 <sup>-9</sup> 1/h                                    | 1.3 x 10 <sup>-9</sup> 1/h                                    | 1.3 x 10 <sup>-9</sup> 1/h                                    | 8.7 x 10 <sup>-10</sup> 1/h                                   | 1.5 x 10 <sup>-9</sup> 1/h                                    |
| <b>Rated control supply<br/>voltage</b>                                      |                                                               |                                                               |                                                               |                                                               |                                                               |                                                               |
| • 24 V DC                                                                    | --                                                            | --                                                            | --                                                            | --                                                            | ✓                                                             | ✓                                                             |
| • 24 V AC/DC                                                                 | ✓                                                             | ✓                                                             | ✓                                                             | ✓                                                             | ✓                                                             | --                                                            |
| • 24 V AC                                                                    | --                                                            | --                                                            | --                                                            | --                                                            | --                                                            | ✓                                                             |
| • 115 V AC                                                                   | ✓                                                             | --                                                            | --                                                            | --                                                            | ✓                                                             | ✓                                                             |
| • 230 V AC                                                                   | ✓                                                             | --                                                            | --                                                            | --                                                            | ✓                                                             | ✓                                                             |
| • 24 ... 240 V AC/DC                                                         | --                                                            | --                                                            | --                                                            | --                                                            | --                                                            | --                                                            |

✓ Available

-- Not available

<sup>1)</sup> The ON button is not monitored.<sup>2)</sup> Only magnetically operated switches with a current carrying capacity of at least 250 mA.<sup>3)</sup> Depending on the hazard assessment, additional measures may be necessary in the sensor circuit (e.g. protected laying).

# Safety relays

## SIRIUS 3TK28 Safety Relays

### With relay enabling circuits

| Type                                                                 | Basic units              |                          |                                                      |                          |                          |                          | Two-hand control units                                       | Expansion units <sup>2)</sup>                        |
|----------------------------------------------------------------------|--------------------------|--------------------------|------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------------------------------------------|------------------------------------------------------|
|                                                                      | 3TK2826                  |                          |                                                      |                          | 3TK2827                  | 3TK2828                  | 3TK2834                                                      | 3TK2830                                              |
|                                                                      | 24 V DC                  | Wide voltage range       | 24 V DC $t_v$                                        | Wide voltage range $t_v$ | $t_v$                    | $t_v$                    |                                                              |                                                      |
| <b>Sensors</b>                                                       |                          |                          |                                                      |                          |                          |                          |                                                              |                                                      |
| • Inputs                                                             | 1                        | 1                        | 1                                                    | 1                        | 1                        | 1                        | 1                                                            | --                                                   |
| • Electronic                                                         | ✓                        | --                       | ✓                                                    | --                       | --                       | --                       | --                                                           | --                                                   |
| • With contacts                                                      | ✓                        | ✓                        | ✓                                                    | ✓                        | ✓                        | ✓                        | ✓                                                            | --                                                   |
| • Magnetically operated switch (Reed contacts)                       | ✓                        | ✓                        | ✓                                                    | ✓                        | --                       | --                       | --                                                           | --                                                   |
| <b>Safety mats</b>                                                   | ✓                        | ✓                        | ✓                                                    | ✓                        | --                       | --                       | --                                                           | --                                                   |
| <b>Start</b>                                                         |                          |                          |                                                      |                          |                          |                          |                                                              |                                                      |
| • Auto                                                               | ✓                        | ✓                        | ✓                                                    | ✓                        | --                       | ✓                        | --                                                           | --                                                   |
| • Monitored                                                          | ✓                        | ✓                        | ✓                                                    | ✓                        | ✓                        | --                       | --                                                           | --                                                   |
| <b>Cascading input 24 V DC</b>                                       | ✓                        | ✓                        | ✓                                                    | ✓                        | --                       | --                       | --                                                           | --                                                   |
| <b>Key-operated switch</b>                                           | --                       | --                       | --                                                   | --                       | --                       | --                       | --                                                           | --                                                   |
| <b>Enabling circuit, floating</b>                                    |                          |                          |                                                      |                          |                          |                          |                                                              |                                                      |
| • Stop category 0                                                    | 4 NO                     | 4 NO                     | 2 NO                                                 | 2 NO                     | 2 NO                     | 2 NO                     | 2 NO                                                         | 4 NO                                                 |
| • Stop category 1                                                    | --                       | --                       | 2 NO                                                 | 2 NO                     | 2 NO                     | 2 NO                     | --                                                           | --                                                   |
| <b>Enabling circuit, electronic</b>                                  |                          |                          |                                                      |                          |                          |                          |                                                              |                                                      |
| • Stop category 0                                                    | --                       | --                       | --                                                   | --                       | --                       | --                       | --                                                           | --                                                   |
| • Stop category 1                                                    | --                       | --                       | --                                                   | --                       | --                       | --                       | --                                                           | --                                                   |
| <b>Signaling outputs</b>                                             |                          |                          |                                                      |                          |                          |                          |                                                              |                                                      |
| • Floating                                                           | 1 NC                     | 1 NO + 1 NC              | 2 NC                                                 | 1 NO + 2 NC              | 1 NC                     | 1 NC                     | 2 NC                                                         | --                                                   |
| • Electronic                                                         | 2                        | --                       | 2                                                    | --                       | --                       | --                       | --                                                           | --                                                   |
| <b>Standards</b>                                                     |                          |                          | IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508 |                          |                          |                          | IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508, EN 574 | IEC 60204-1, EN ISO 12100, EN ISO 13849-1, IEC 61508 |
| <b>Test certificates</b>                                             | TÜV, UL, CSA             | TÜV, UL, CSA             | TÜV, UL, CSA                                         | TÜV, UL, CSA             | BG, SUVA, UL, CSA        | BG, SUVA, UL, CSA        | BG, SUVA, UL, CSA, TÜV                                       | BG, SUVA, UL, CSA, TÜV                               |
| <b>SIL level max. according to IEC 61508</b>                         | 3                        | 3                        | 3                                                    | 3                        | 3 <sup>3)</sup>          | 3 <sup>3)</sup>          | --                                                           | As basic unit                                        |
| <b>Performance level PL according to EN ISO 13849-1</b>              | e                        | e                        | e                                                    | e                        | e <sup>3)</sup>          | e <sup>3)</sup>          | --                                                           | As basic unit                                        |
| <b>Probability of a dangerous failure per hour (PFH<sub>d</sub>)</b> | $7.8 \times 10^{-9}$ 1/h | $7.8 \times 10^{-9}$ 1/h | $7.8 \times 10^{-9}$ 1/h                             | $7.8 \times 10^{-9}$ 1/h | $2.7 \times 10^{-9}$ 1/h | $2.7 \times 10^{-9}$ 1/h | $1.4 \times 10^{-9}$ 1/h                                     | $1.2 \times 10^{-9}$ 1/h                             |
| <b>Rated control supply voltage</b>                                  |                          |                          |                                                      |                          |                          |                          |                                                              |                                                      |
| • 24 V DC                                                            | ✓                        | --                       | ✓                                                    | --                       | ✓                        | ✓                        | ✓                                                            | --                                                   |
| • 24 V AC/DC                                                         | --                       | --                       | --                                                   | --                       | --                       | --                       | --                                                           | ✓                                                    |
| • 24 V AC                                                            | --                       | --                       | --                                                   | --                       | ✓                        | ✓                        | ✓                                                            | --                                                   |
| • 115 V AC                                                           | --                       | --                       | --                                                   | --                       | ✓                        | ✓                        | ✓                                                            | ✓                                                    |
| • 230 V AC                                                           | --                       | --                       | --                                                   | --                       | ✓                        | ✓                        | ✓                                                            | ✓                                                    |
| • 24 ... 240 V AC/DC                                                 | --                       | ✓                        | --                                                   | ✓                        | --                       | --                       | --                                                           | --                                                   |
| ✓ Available                                                          |                          |                          |                                                      |                          |                          |                          |                                                              |                                                      |
| -- Not available                                                     |                          |                          |                                                      |                          |                          |                          |                                                              |                                                      |

<sup>1)</sup> Only possible for instantaneous enabling contacts, otherwise Category 3.

<sup>2)</sup> For expansion of Siemens safety products.

<sup>3)</sup> Only possible for instantaneous enabling contacts, otherwise SIL level 2 or Performance level PL d.