



# FX3-MOC100010

Flexi Soft

SAFETY CONTROLLERS

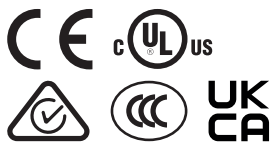
**SICK**  
Sensor Intelligence.



Ordering information

| Type          | part no. |
|---------------|----------|
| FX3-MOC100010 | 1112300  |

Other models and accessories → [www.sick.com/Flexi\\_Soft](http://www.sick.com/Flexi_Soft)



Detailed technical data

Features

|                      |                                                                                          |
|----------------------|------------------------------------------------------------------------------------------|
| Module               | Motion Control module                                                                    |
| Configuration method | Via software (Flexi Soft Designer, Safe EFI-pro System: Safety Designer)                 |
| Specialty            | Protective coating for more challenging ambient conditions (e.g., resistance to sulfur). |

Safety-related parameters

|                                                                                                          |                                                                                                                             |
|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>For axes with two encoders (any combination of sine-cosine, TTL, HTL 24 V, MTL 12 V, RS-422, SSI)</b> |                                                                                                                             |
| Safety integrity level                                                                                   | SIL 3 (IEC 61508)                                                                                                           |
| Category                                                                                                 | Category 4 (EN ISO 13849)                                                                                                   |
| Performance level                                                                                        | PL e (EN ISO 13849)                                                                                                         |
| PFH <sub>D</sub> (mean probability of a dangerous failure per hour)                                      | 5.0 * 10 <sup>-9</sup>                                                                                                      |
| Minimum movement for error detection                                                                     | ≥ Selected tolerance limit of the function block used for cross check, e.g., position cross check, At least 1 x within 24 h |
| T <sub>M</sub> (mission time)                                                                            | 20 years (EN ISO 13849)                                                                                                     |
| <b>For axes with one sine-cosine encoder and sin/cos analog voltage monitoring activated</b>             |                                                                                                                             |
| Safety integrity level                                                                                   | SIL 2 (IEC 61508)                                                                                                           |
| Category                                                                                                 | Category 3 (EN ISO 13849)                                                                                                   |
| Performance level                                                                                        | PL d (EN ISO 13849)                                                                                                         |
| PFH <sub>D</sub> (mean probability of a dangerous failure per hour)                                      | 6.0 * 10 <sup>-9</sup>                                                                                                      |
| Minimum movement for error detection                                                                     | ≥ 1 Sin/Cos period, At least 1 x within 24 h                                                                                |
| T <sub>M</sub> (mission time)                                                                            | 20 years (EN ISO 13849)                                                                                                     |

## Functions

|                               |                                                                                                                                                                                                                                         |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Drive safety functions</b> | Safe stop 1 (SS1)<br>Safe stop 2 (SS2)<br>Safe operating stop (SOS)<br>Safe speed monitoring (SSM)<br>Safely-limited speed (SLS)<br>Safe direction (SDI)<br>Safe brake control (SBC)<br>Safe cam (SCA)<br>Safely-limited position (SLP) |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Interfaces

|                          |                                                                                                                                                                                  |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Encoder interface</b> | A/B incremental encoder, TTL<br>A/B incremental encoder, HTL 12 V or 24 V<br>A/B incremental encoder, RS-422<br>Sin/cos encoder<br>SSI encoder (master / listener)<br>HIPERFACE® |
| <b>Connection type</b>   | Male connector, Micro D-Sub, 15-pin                                                                                                                                              |
| <b>Data interface</b>    | Internal bus (FLEXBUS+)                                                                                                                                                          |

## Electronics

|                                                         |                                        |
|---------------------------------------------------------|----------------------------------------|
| <b>Protection class</b>                                 | III (EN 61140)                         |
| <b>Voltage supply</b>                                   | Via FLEXBUS+                           |
| <b>Internal power consumption</b>                       | $\leq 2.5 \text{ W}^{1)}$              |
| <b>A/B incremental encoder, TTL, 2 outputs</b>          |                                        |
| Differential input voltage HIGH                         | 5 V (2 V ... 5.3 V) <sup>2)</sup>      |
| Differential input voltage LOW                          | 0 V (–0.3 V ... 0.8 V) <sup>2)</sup>   |
| Input voltage                                           | –5 V ... 10 V <sup>3)</sup>            |
| Input frequency                                         | $\leq 300 \text{ kHz}$                 |
| Input resistance                                        | $\geq 35 \text{ k}\Omega$              |
| <b>A/B incremental encoder, TTL, 2 pairs of outputs</b> |                                        |
| Differential input voltage HIGH                         | 5 V (1.2 V ... 5.6 V) <sup>2)</sup>    |
| Differential input voltage LOW                          | –5 V (–5.6 V ... –1.2 V) <sup>2)</sup> |
| Input voltage                                           | –5 V ... 10 V <sup>3)</sup>            |
| Input frequency                                         | $\leq 300 \text{ kHz}$                 |
| Input resistance                                        | $\geq 35 \text{ k}\Omega$              |
| <b>A/B incremental encoder, HTL 12 V, 2 outputs</b>     |                                        |
| Differential input voltage HIGH                         | 12 V (6.5 V ... 15 V) <sup>2)</sup>    |
| Differential input voltage LOW                          | 0 V (–1 V ... 2.5 V) <sup>2)</sup>     |
| Input voltage                                           | –5 V ... 20 V <sup>3)</sup>            |
| Input frequency                                         | $\leq 300 \text{ kHz}$                 |
| Input resistance                                        | $\geq 35 \text{ k}\Omega$              |

<sup>1)</sup> Via FLEXBUS+, without streams at analog inputs.

<sup>2)</sup> Voltage between ENC<sub>x</sub>\_y+ and ENC<sub>x</sub>\_y–.

<sup>3)</sup> Voltage between ENC<sub>x</sub>\_y+ and ENC\_OV and between ENC<sub>x</sub>\_y– and ENC\_OV.

<sup>4)</sup> Peak to peak voltage between ENC<sub>x</sub>\_y+ and ENC<sub>x</sub>\_y–.

|                                                              |                                      |
|--------------------------------------------------------------|--------------------------------------|
| <b>A/B incremental encoder, HTL 12 V, 2 pairs of outputs</b> |                                      |
| Differential input voltage HIGH                              | 12 V (4 V ... 15 V) <sup>2)</sup>    |
| Differential input voltage LOW                               | -12 V (-15 V ... -4 V) <sup>2)</sup> |
| Input voltage                                                | -5 V ... 20 V <sup>3)</sup>          |
| Input frequency                                              | ≤ 300 kHz                            |
| Input resistance                                             | ≥ 35 kΩ                              |
| <b>A/B incremental encoder, HTL 24 V, 2 outputs</b>          |                                      |
| Differential input voltage HIGH                              | 24 V (13 V ... 30 V) <sup>2)</sup>   |
| Differential input voltage LOW                               | 0 V (-3 V ... 5 V) <sup>2)</sup>     |
| Input voltage                                                | -10 V ... 40 V <sup>3)</sup>         |
| Input frequency                                              | ≤ 300 kHz                            |
| Input resistance                                             | ≥ 35 kΩ                              |
| <b>A/B incremental encoder, HTL 24 V, 2 pairs of outputs</b> |                                      |
| Differential input voltage HIGH                              | 24 V (8 V ... 30 V) <sup>2)</sup>    |
| Differential input voltage LOW                               | -24 V (-30 V ... -8 V) <sup>2)</sup> |
| Input voltage                                                | -10 V ... 40 V <sup>3)</sup>         |
| Input frequency                                              | ≤ 300 kHz                            |
| Input resistance                                             | ≥ 35 kΩ                              |
| <b>A/B incremental encoder, RS-422</b>                       |                                      |
| Differential input voltage HIGH                              | 0.2 V ... 5 V <sup>2)</sup>          |
| Differential input voltage LOW                               | -5 V ... -0.2 V <sup>2)</sup>        |
| Input voltage                                                | -7 V ... 7 V <sup>3)</sup>           |
| Input frequency                                              | ≤ 1,000 kHz                          |
| Input resistance                                             | ≥ 35 kΩ                              |
| Differential resistance                                      | 120 Ω (100 Ω ... 150 Ω)              |
| <b>Sin/cos encoder</b>                                       |                                      |
| Differential input voltage                                   | 1 V (0.8 V ... 1.2 V) <sup>4)</sup>  |
| Input voltage                                                | 0 V ... 5 V <sup>3)</sup>            |
| Input frequency                                              | ≤ 120 kHz                            |
| Input resistance                                             | 1 kΩ (0.9 kΩ ... 1.1 kΩ)             |
| Voltage monitoring, lower limit for vector length monitoring | 0.5 V                                |
| Voltage monitoring, upper limit for vector length monitoring | 1.5 V                                |
| <b>SSI encoder (master / listener)</b>                       |                                      |
| Differential resistance                                      | 120 Ω (100 Ω ... 150 Ω)              |

<sup>1)</sup> Via FLEXBUS+, without streams at analog inputs.

<sup>2)</sup> Voltage between ENC<sub>x</sub>\_y+ and ENC<sub>x</sub>\_y-.

<sup>3)</sup> Voltage between ENC<sub>x</sub>\_y+ and ENC\_OV and between ENC<sub>x</sub>\_y- and ENC\_OV.

<sup>4)</sup> Peak to peak voltage between ENC<sub>x</sub>\_y+ and ENC<sub>x</sub>\_y-.

|                                                         |                       |
|---------------------------------------------------------|-----------------------|
| Clock frequency                                         | 100 kHz ... 1,000 kHz |
| Cycle gaps between the data packages<br>(monoflop time) | ≥ 100 µs              |
| Position data bits per frame                            | 16 ... 62             |

<sup>1)</sup> Via FLEXBUS+, without streams at analog inputs.

<sup>2)</sup> Voltage between ENC<sub>x</sub>\_y+ and ENC<sub>x</sub>\_y-.

<sup>3)</sup> Voltage between ENC<sub>x</sub>\_y+ and ENC\_OV and between ENC<sub>x</sub>\_y- and ENC\_OV.

<sup>4)</sup> Peak to peak voltage between ENC<sub>x</sub>\_y+ and ENC<sub>x</sub>\_y-.

## Mechanics

|                               |                            |
|-------------------------------|----------------------------|
| <b>Dimensions (W x H x D)</b> | 22.5 mm x 96.5 mm x 126 mm |
| <b>Weight</b>                 | 120 g                      |

## Ambient data

|                                               |                                                                                                                                                           |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Enclosure rating</b>                       | IP20 (EN 60529)                                                                                                                                           |
| <b>Ambient operating temperature</b>          | -25 °C ... +55 °C                                                                                                                                         |
| <b>Storage temperature</b>                    | -25 °C ... +70 °C                                                                                                                                         |
| <b>Air humidity</b>                           | ≤ 95 %, Non-condensing                                                                                                                                    |
| <b>Single gas resistance (sulfur dioxide)</b> | 25 ppm, 21 days, 25 °C (IEC 60068-2-42 - Kc)                                                                                                              |
| <b>Mixed gas resistance</b>                   | 100 ppb - H <sub>2</sub> S<br>2000 ppb - NO <sub>2</sub><br>100 ppb - Cl <sub>2</sub><br>2,000 ppb - SO <sub>2</sub> , 21 days, 30 °C (IEC 60068-2-60 Ke) |

## Certificates

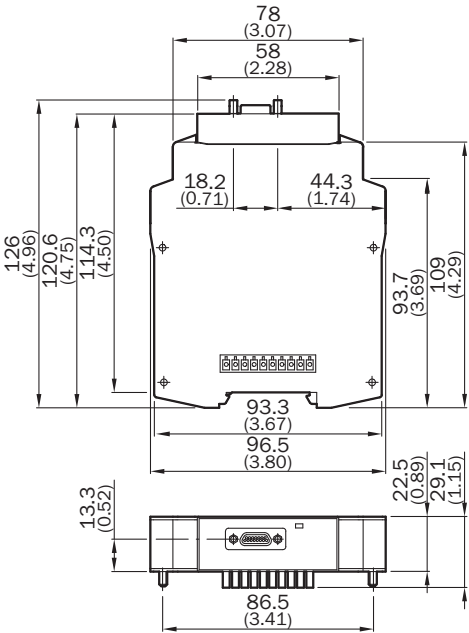
|                                                                                  |   |
|----------------------------------------------------------------------------------|---|
| <b>EU declaration of conformity</b>                                              | ✓ |
| <b>UK declaration of conformity</b>                                              | ✓ |
| <b>ACMA declaration of conformity</b>                                            | ✓ |
| <b>China RoHS</b>                                                                | ✓ |
| <b>CCC certificate</b>                                                           | ✓ |
| <b>UK-Type-Examination approval</b>                                              | ✓ |
| <b>cULus certificate</b>                                                         | ✓ |
| <b>cTUVus certificate</b>                                                        | ✓ |
| <b>EC-Type-Examination approval</b>                                              | ✓ |
| <b>Information according to Art. 3 of Data Act<br/>(Regulation EU 2023/2854)</b> | ✓ |

## Classifications

|                     |          |
|---------------------|----------|
| <b>ECLASS 5.0</b>   | 27243001 |
| <b>ECLASS 5.1.4</b> | 27243101 |
| <b>ECLASS 6.0</b>   | 27243101 |
| <b>ECLASS 6.2</b>   | 27243101 |
| <b>ECLASS 7.0</b>   | 27243101 |
| <b>ECLASS 8.0</b>   | 27243101 |
| <b>ECLASS 8.1</b>   | 27243101 |
| <b>ECLASS 9.0</b>   | 27243101 |
| <b>ECLASS 10.0</b>  | 27243101 |

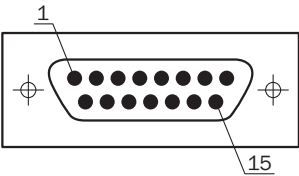
|                       |          |
|-----------------------|----------|
| <b>ECLASS 11.0</b>    | 27243101 |
| <b>ECLASS 12.0</b>    | 27243101 |
| <b>ETIM 5.0</b>       | EC001449 |
| <b>ETIM 6.0</b>       | EC001449 |
| <b>ETIM 7.0</b>       | EC001449 |
| <b>ETIM 8.0</b>       | EC001449 |
| <b>UNSPSC 16.0901</b> | 32151705 |

Dimensional drawing FX3-MOC0, FX3-MOC1



Dimensions in mm (inch)

PIN assignment FX3-MOC0, FX3-MOC1



| Pin | Signal   | Color-coded connecting cable |
|-----|----------|------------------------------|
| 1   | ENC1_A+  | White                        |
| 2   | ENC1_B+  | Green                        |
| 3   | ENC1_C+  | Gray                         |
| 4   | ENC1_24V | Blue                         |
| 5   | ENC2_24V | Red                          |
| 6   | ENC2_C+  | White-green                  |

| Pin | Signal  | Color-coded connecting cable |
|-----|---------|------------------------------|
| 7   | ENC2_B+ | Gray-pink                    |
| 8   | ENC2_A+ | Black                        |
| 9   | ENC1_A- | Brown                        |
| 10  | ENC1_B- | Yellow                       |
| 11  | ENC1_C- | Pink                         |
| 12  | ENC_0V  | White-yellow                 |
| 13  | ENC2_C- | Brown-green                  |
| 14  | ENC2_B- | Red-blue                     |
| 15  | ENC2_A- | Violet                       |

## Recommended accessories

Other models and accessories → [www.sick.com/Flexi\\_Soft](http://www.sick.com/Flexi_Soft)

|                                                                                     | Brief description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Type         | part no. |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------|
| Safety relays                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |          |
|   | <ul style="list-style-type: none"> <li><b>Applications:</b> Output expansion module for OSSDs</li> <li><b>Compatible sensor types:</b> Safety sensors with OSSDs</li> <li><b>Connection type:</b> Front connector with spring terminals</li> <li><b>Restart interlock:</b> no</li> <li><b>External device monitoring (EDM):</b> Via path</li> <li><b>Outputs:</b> 4 enabling current paths (safe), 1 feedback current path (for use as external device monitoring, not safe), 1 signaling current path (not safe)</li> <li><b>Housing width:</b> 28 mm</li> </ul> | RLY3-OSSD400 | 1099971  |
|  | <ul style="list-style-type: none"> <li><b>Applications:</b> Output expansion module for OSSDs</li> <li><b>Compatible sensor types:</b> Safety sensors with OSSDs</li> <li><b>Connection type:</b> Front connector with spring terminals</li> <li><b>Restart interlock:</b> no</li> <li><b>External device monitoring (EDM):</b> Via path</li> <li><b>Outputs:</b> 2 enabling current paths (safe), 1 feedback current path (for use as external device monitoring, not safe)</li> <li><b>Housing width:</b> 18 mm</li> </ul>                                      | RLY3-OSSD100 | 1085343  |

## SICK AT A GLANCE

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is “Sensor Intelligence.”

## WORLDWIDE PRESENCE:

Contacts and other locations –[www.sick.com](http://www.sick.com)