



# FX3-MOC000000

Flexi Soft Drive Monitor

SAFE MOTION MONITORING AND CONTROL

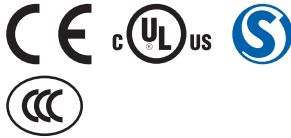
**SICK**  
Sensor Intelligence.



### Ordering information

Description	Type	Part no.
Safe speed monitoring	FX3-MOC000000	1062344

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



### Detailed technical data

#### Features

<b>Module</b>	Motion Control module
<b>Configuration method</b>	Via software (Flexi Soft Designer)

#### 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 for the function block used for the cross check, e.g. speed 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) Safe stop 2 (SS2) Safe operating stop (SOS)
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	Safe speed monitoring (SSM) Safely-limited speed (SLS) Safe direction (SDI) Safe brake control (SBC)
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**Interfaces**

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

**Electrical data**

<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	$5 \text{ V} (2 \text{ V} \dots 5.3 \text{ V})^{2)}$
Differential input voltage LOW	$0 \text{ V} (-0.3 \text{ V} \dots 0.8 \text{ V})^{2)}$
Input voltage	$-5 \text{ V} \dots 10 \text{ V}^{3)}$
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	$5 \text{ V} (1.2 \text{ V} \dots 5.6 \text{ V})^{2)}$
Differential input voltage LOW	$-5 \text{ V} (-5.6 \text{ V} \dots -1.2 \text{ V})^{2)}$
Input voltage	$-5 \text{ V} \dots 10 \text{ V}^{3)}$
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	$12 \text{ V} (6.5 \text{ V} \dots 15 \text{ V})^{2)}$
Differential input voltage LOW	$0 \text{ V} (-1 \text{ V} \dots 2.5 \text{ V})^{2)}$
Input voltage	$-5 \text{ V} \dots 20 \text{ V}^{3)}$
Input frequency	$\leq 300 \text{ kHz}$
Input resistance	$\geq 35 \text{ k}\Omega$
<b>A/B incremental encoder, HTL 12 V, 2 pairs of outputs</b>	
Differential input voltage HIGH	$12 \text{ V} (4 \text{ V} \dots 15 \text{ V})^{2)}$
Differential input voltage LOW	$-12 \text{ V} (-15 \text{ V} \dots -4 \text{ V})^{2)}$

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

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

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

<sup>4)</sup> Peak to peak voltage between ENC<sub>x</sub><sub>y</sub><sup>+</sup> and ENC<sub>x</sub><sub>y</sub><sup>-</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)
Clock frequency	100 kHz ... 1,000 kHz
Cycle gaps between the data packages (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\_0V and between ENC<sub>x</sub>\_y- and ENC\_0V.

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

### Mechanical data

<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

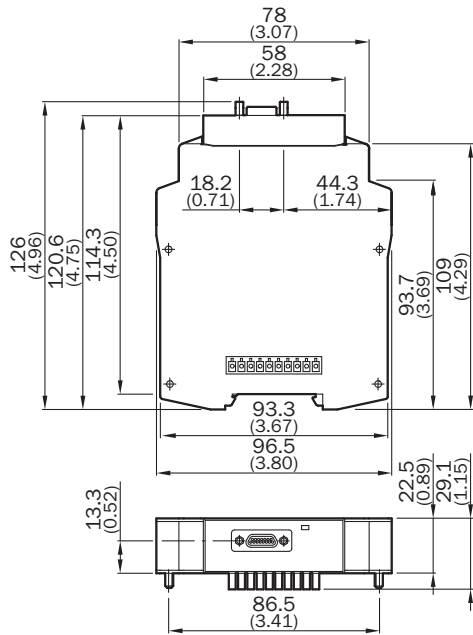
<b>Enclosure rating</b>	IP20 (EN 60529)
<b>Ambient operating temperature</b>	-25 °C ... +55 °C
<b>Storage temperature</b>	-25 °C ... +70 °C
<b>Air humidity</b>	≤ 95 %, Non-condensing

### 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

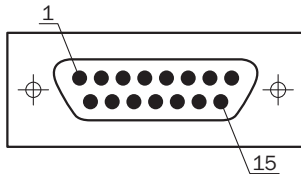
### Dimensional drawing (Dimensions in mm (inch))

FX3-MOC0, FX3-MOC1



### 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
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

Pin	Signal	Color-coded connecting cable
14	ENC2_B-	Red-blue
15	ENC2_A-	Violet

### Recommended accessories

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

	Brief description	Type	Part no.
Others			
	<ul style="list-style-type: none"> <li>• <b>Sub product family:</b> SIM1000 FX</li> <li>• <b>Product category:</b> Programmable devices</li> <li>• <b>Supported products:</b> 2D and 3D LiDAR sensors, pico- und midiCam series, incremental and absolute encoders, Image-based code readers, Fixed mount barcode scanners, RFID read/write device, displacement measurement sensors, Photoelectric sensors, Flexi Soft main module</li> <li>• <b>Processor:</b> Dual-core ARM Cortex-A9 CPU with NEON accelerator</li> <li>• <b>Toolkit:</b> SICK algorithm API</li> <li>• <b>Further functions:</b> FPGA for I/O handling</li> <li>• <b>Connections:</b> Terminal block 1-4, Ethernet, FLEXBUS+</li> <li>• <b>Enclosure rating:</b> IP20</li> </ul>	SIM1000-0POB110	1097817
Safety switching amplifier			
	<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
	<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

## 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)