



FX3-MOC100000

Safe EFI-pro System

SAFETY SYSTEMS

SICK
Sensor Intelligence.



Ordering information

Motion Control module

Description	Type	Part no.
Safe speed monitoring and safe position monitoring	FX3-MOC100000	1057833

Other models and accessories → www.sick.com/Safe_EFI-pro_System



Detailed technical data

Features

Module	Motion Control module
Configuration method	Via software (Flexi Soft Designer) Safe EFI-pro System: Safety Designer

Safety-related parameters

For axes with two encoders (any combination of sine-cosine, TTL, HTL 24 V, MTL 12 V, RS-422, SSI)

Safety integrity level	SIL3 (IEC 61508) SILCL3 (EN 62061)
Category	Category 4 (EN ISO 13849)
Performance level	PL e (EN ISO 13849)
PFH_D (mean probability of a dangerous failure per hour)	$5.0 \cdot 10^{-9}$
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_M (mission time)	20 years (EN ISO 13849)

For axes with one sine-cosine encoder and sin/cos analog voltage monitoring activated

Safety integrity level	SIL2 (IEC 61508) SILCL2 (EN 62061)
Category	Category 3 (EN ISO 13849)
Performance level	PL d (EN ISO 13849)
PFH_D (mean probability of a dangerous failure per hour)	$6.0 \cdot 10^{-9}$
Minimum movement for error detection	≥ 1 Sin/Cos period, At least 1 x within 24 h
T_M (mission time)	20 years (EN ISO 13849)

Functions

Drive safety functions	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) Safe cam (SCA) Safely-limited position (SLP)
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Interfaces

Encoder interface	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®
Connection type	Male connector, Micro D-Sub, 15-pin
Data interface	Internal bus (FLEXBUS+)

Electrical data

Protection class	III (EN 61140)
Voltage supply	Via FLEXBUS+
Internal power consumption	$\leq 2.5 \text{ W}^{1)}$
A/B incremental encoder, TTL, 2 outputs	
Differential input voltage HIGH	5 V (2 V ... 5.3 V) ²⁾
Differential input voltage LOW	0 V (–0.3 V ... 0.8 V) ²⁾
Input voltage	–5 V ... 10 V ³⁾
Input frequency	$\leq 300 \text{ kHz}$
Input resistance	$\geq 35 \text{ k}\Omega$
A/B incremental encoder, TTL, 2 pairs of outputs	
Differential input voltage HIGH	5 V (1.2 V ... 5.6 V) ²⁾
Differential input voltage LOW	–5 V (–5.6 V ... –1.2 V) ²⁾
Input voltage	–5 V ... 10 V ³⁾
Input frequency	$\leq 300 \text{ kHz}$
Input resistance	$\geq 35 \text{ k}\Omega$
A/B incremental encoder, HTL 12 V, 2 outputs	
Differential input voltage HIGH	12 V (6.5 V ... 15 V) ²⁾
Differential input voltage LOW	0 V (–1 V ... 2.5 V) ²⁾
Input voltage	–5 V ... 20 V ³⁾
Input frequency	$\leq 300 \text{ kHz}$
Input resistance	$\geq 35 \text{ k}\Omega$
A/B incremental encoder, HTL 12 V, 2 pairs of outputs	
Differential input voltage HIGH	12 V (4 V ... 15 V) ²⁾

¹⁾ Via FLEXBUS+, without streams at analog inputs.

²⁾ Voltage between ENC_x_y+ and ENC_x_y–.

³⁾ Voltage between ENC_x_y+ and ENC_OV and between ENC_x_y– and ENC_OV.

⁴⁾ Peak to peak voltage between ENC_x_y+ and ENC_x_y–.

Differential input voltage LOW	-12 V (-15 V ... -4 V) ²⁾
Input voltage	-5 V ... 20 V ³⁾
Input frequency	≤ 300 kHz
Input resistance	≥ 35 kΩ
A/B incremental encoder, HTL 24 V, 2 outputs	
Differential input voltage HIGH	24 V (13 V ... 30 V) ²⁾
Differential input voltage LOW	0 V (-3 V ... 5 V) ²⁾
Input voltage	-10 V ... 40 V ³⁾
Input frequency	≤ 300 kHz
Input resistance	≥ 35 kΩ
A/B incremental encoder, HTL 24 V, 2 pairs of outputs	
Differential input voltage HIGH	24 V (8 V ... 30 V) ²⁾
Differential input voltage LOW	-24 V (-30 V ... -8 V) ²⁾
Input voltage	-10 V ... 40 V ³⁾
Input frequency	≤ 300 kHz
Input resistance	≥ 35 kΩ
A/B incremental encoder, RS-422	
Differential input voltage HIGH	0.2 V ... 5 V ²⁾
Differential input voltage LOW	-5 V ... -0.2 V ²⁾
Input voltage	-7 V ... 7 V ³⁾
Input frequency	≤ 1,000 kHz
Input resistance	≥ 35 kΩ
Differential resistance	120 Ω (100 Ω ... 150 Ω)
Sin/cos encoder	
Differential input voltage	1 V (0.8 V ... 1.2 V) ⁴⁾
Input voltage	0 V ... 5 V ³⁾
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
SSI encoder (master / listener)	
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

¹⁾ Via FLEXBUS+, without streams at analog inputs.

²⁾ Voltage between ENC_x_y⁺ and ENC_x_y⁻.

³⁾ Voltage between ENC_x_y⁺ and ENC₀₀^V and between ENC_x_y⁻ and ENC₀₀^V.

⁴⁾ Peak to peak voltage between ENC_x_y⁺ and ENC_x_y⁻.

Position data bits per frame	16 ... 62
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- 1) Via FLEXBUS+, without streams at analog inputs.
 2) Voltage between ENCx_y+ and ENCx_y-.
 3) Voltage between ENCx_y+ and ENC_OV and between ENCx_y- and ENC_OV.
 4) Peak to peak voltage between ENCx_y+ and ENCx_y-.

Mechanical data

Dimensions (W x H x D)	22.5 mm x 96.5 mm x 126 mm
Weight	120 g

Ambient data

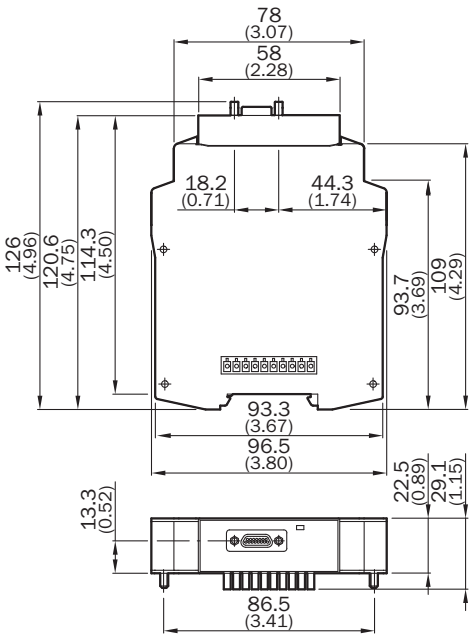
Enclosure rating	IP20 (EN 60529)
Ambient operating temperature	-25 °C ... +55 °C
Storage temperature	-25 °C ... +70 °C
Air humidity	10 % ... 95 %, Non-condensing

Classifications

ECI@ss 5.0	27243001
ECI@ss 5.1.4	27243101
ECI@ss 6.0	27243101
ECI@ss 6.2	27243101
ECI@ss 7.0	27243101
ECI@ss 8.0	27243101
ECI@ss 8.1	27243101
ECI@ss 9.0	27243101
ECI@ss 10.0	27243101
ECI@ss 11.0	27243101
ETIM 5.0	EC001449
ETIM 6.0	EC001449
ETIM 7.0	EC001449
UNSPSC 16.0901	32151705

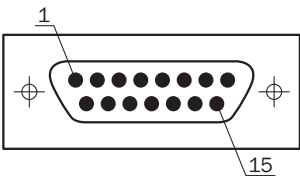
Dimensional drawing (Dimensions in mm (inch))

FX3-MOC0, FX3-MOC1



PIN assignment

FX3-MOC0, FX3-MOC1



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