PRODUCT INFORMATION

Drive Monitor FX3-MOC:

FLEXIBLE, HIGH-PERFORMANCE DRIVE MONITORING

Safety controllers

SICK
Sensor Intelligence.

GREATER SAFETY AND EFFICIENCY WITH MOTION CONTROL

Higher Efficiency thanks to Safer Monitoring

SICK's Safety product for Motion Control allows you to safely monitor the machine's movement, providing safe interaction between machine and operator. Motion Control offers solutions for this task. Using the term Motion Control, SICK has expanded the portfolio of safe control solutions by safe drive monitoring.

Your benefits:

- New machine concepts with safe interaction between operator and machine
- Safer movement monitoring instead of system stops
- High machine availability
- Increased efficiency and productivity

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Motion Control

Machine Construction

Motion Control solutions are suitable for access monitoring using standstill detection and reduced speed monitoring in maintenance mode. They can, for example, be used on grinding and polishing machines. Applications include complex multi-axis machines.

Electronics and Solar Industry

Motion Control solutions are used to monitor end-of-line and wafer production handling machines. Safe reduced speed monitoring enables you to manually intervene in machines and processes without having to stop them. Production waste can be kept to a minimum.

Logistics

On automated guided systems, Motion Control solutions enable intelligent speed and direction monitoring as well as stop function monitoring. They are also used as superordinate logic controllers for protective fields covered by safety laser scanners.

Automobile Industry

Motion Control solutions are used in machines and transport systems to monitor movement direction and system stops. The “marriage” of the car body and chassis in car factories is an example of this kind of application, with the car body and the brackets held in position while the connection is made.

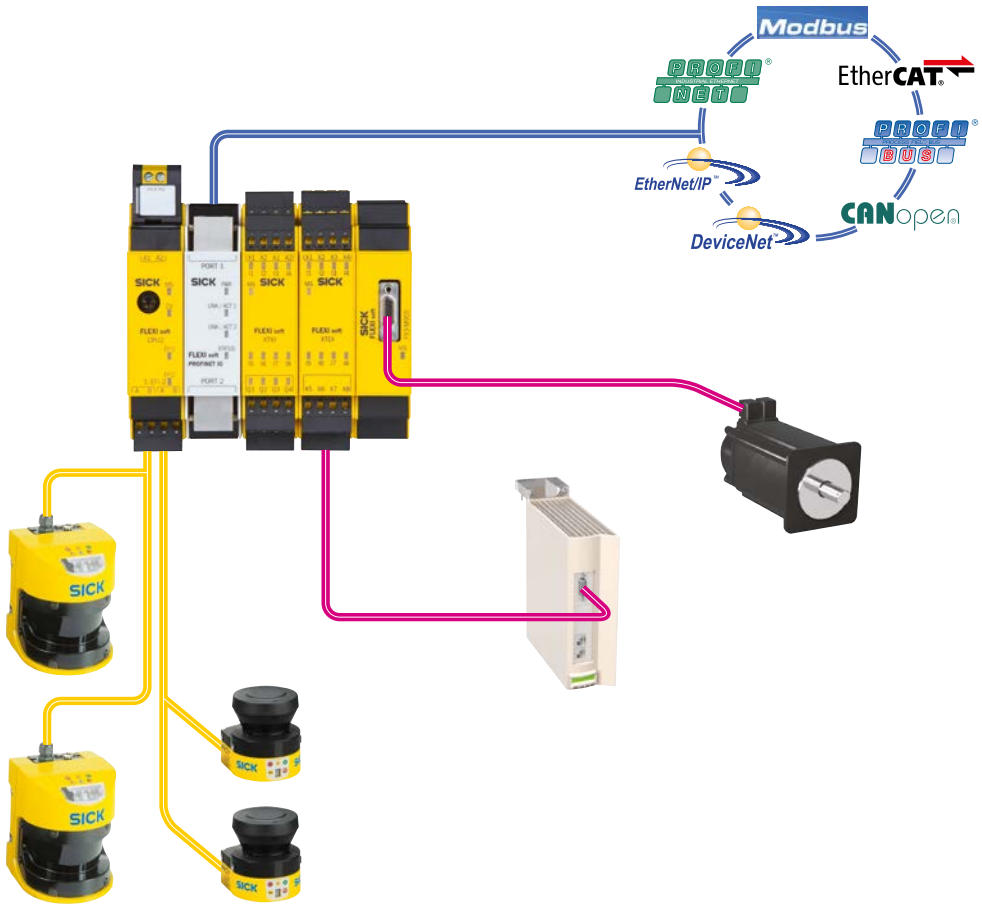
DRIVE MONITOR FX3-MOC FLEXIBLE FUNCTIONS ENSURE GREATER EFFICIENCY

With its powerful Motion Control logic system, the Drive Monitor FX3-MOC is well equipped for demanding safety drive applications. It is a snap on module for use with the Flexi Soft safety controller. Simple programming and configuration is ensured by the Flexi Soft Designer software. The Drive Monitor FX3-MOC can share diagnostic information with other PLC's via gateways and keeps cabling to a minimum.

The Motion Control logic system contains a wide range of user-friendly modules.

Your benefits:

- Ideal integration into the safety application
- Independence from the drive system means greater flexibility
- Convenient engineering and convenient documentation
- Easy and fast diagnostic options
- All-inclusive safety application solution



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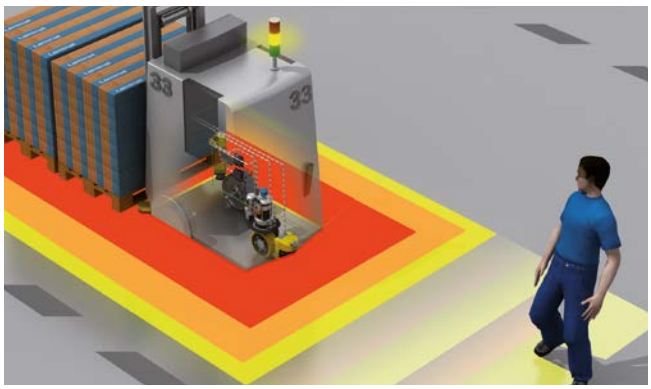
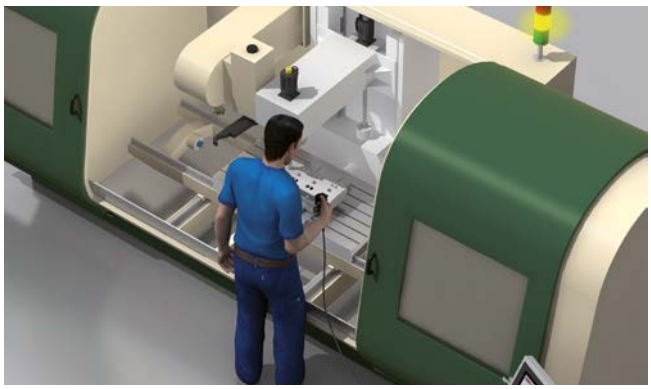
Monitoring Automated Guided Systems

Encoders are centrally connected to the Drive Monitor FX3-MOC and thus enable speed and brake ramp monitoring. This monitoring optimizes protective fields, ensuring more effective use of the available space.



Monitoring Multi-Axis Machines

The Drive Monitor FX3-MOC allows intervention once it has detected a machine's downtime status. Components and tools can then be quickly replaced in machines secured by a door, cover, or similar safety device. The speed monitor ensures safer and more efficient operation in maintenance mode.



FLEXIBLE, HIGH-PERFORMANCE DRIVE MONITORING

Product description

Providing protection from hazardous movements in addition to creating more efficient and flexible machine designs: SICK's Drive Monitor FX3-MOC is the ideal expansion module for the Flexi Soft safety controller for use in drive monitoring. Monitoring can be performed using functions such as speed and direction monitoring and the execution of stop functions in accordance with IEC 61800-5-2. All commonly used encoder interfaces are supported. The Drive Monitor FX3-MOC has programmable logic with special drive modules. It can be integrated via all common fieldbuses into a higher-level controller in combination with the Flexi Soft safety controller. It is possible to import predefined applications, thus greatly simplifying the engineering of standard safety applications. Integration into the Flexi Soft safety controller provides important solutions for tool machine, robotic, and mobile applications.

At a glance

- 7 drive safety functions: SS1, SS2, SOS, SSM, SLS, SDI, and SBC
- For all common encoder interfaces
- Programmable logic
- Monitoring of up to 10 speed levels and 4 brake ramps
- Possible to monitor multiple axes

Your benefits

- Integration into a Flexi Soft system with one software tool and one project file allows quick project planning and commissioning
- Easy logic development using predefined, modifiable, freely configurable applications
- Maximum level of integration into higher-level controllers via all common fieldbus systems using gateways
- Documentation of the entire safety application simplifies machine acceptance and validation
- Monitoring movements instead of shutting down increases machine productivity
- Flexibility due to a wide range of drive safety functions

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Additional information

→ www.mysick.com/en/Drive_Monitor_FX3-MOC

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.

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Detailed technical data

Safety-related parameters

For axes with two encoders (TTL, HTL, RS-422, Sin/Cos, SSI)

Safety integrity level	SIL3 (IEC 61508) SILCL3 (EN 62061)
Category	Category 4 (EN ISO 13849-1)
Performance level	PL e (EN ISO 13849-1)
PFHd (mean probability of a dangerous failure per hour)	5.0 * 10^{-9} (EN ISO 13849)
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 × within 24 h
T_M (mission time)	20 years (EN ISO 13849)

Activated for axes with one Sin/Cos encoder and Sin/Cos voltage monitoring

Safety integrity level	SIL2 (IEC 61508) SILCL2 (EN 62061)
Category	Category 3 (EN ISO 13849-1)
Performance level	PL d (EN ISO 13849-1)
PFHd (mean probability of a dangerous failure per hour)	6.0 * 10^{-9} (EN ISO 13849)
Minimum movement for error detection	≥ 1 Sin/Cos period, at least 1 × 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)	✔
Safe speed monitoring (SSM)	✔
Safe limited speed (SLS)	✔
Safe direction of motion (SDI)	✔
Safe brake control (SBC)	✔

Interfaces

Connection type	Male connector, Micro D-Sub, 15-pin
Encoder interface	A/B incremental encoder, TTL A/B incremental encoder, HTL A/B incremental encoder, RS-422 Sin/Cos encoder SSI encoder
Data interface	Internal bus (FLEX BUS+)

Electrical data

Operating data

Protection class	III (EN 61140)
Power consumption	≤ 2.5 W [1]
Output voltage for encoder	24 V

[1] Via FLEXBUS+, without encoder voltage supply.

A/B incremental encoder, TTL, 2 outputs

Input resistance	≥ 35 kΩ
Input voltage HIGH	5 V (2 V ... 5.3 V)
Input voltage LOW	0 V (–0.3 V ... 0.8 V)
Input frequency	≤ 300 kHz

A/B incremental encoder, TTL, 2 output pairs

Input resistance	≥ 35 kΩ
Input voltage HIGH	5 V (1.2 V ... 5.6 V)
Input voltage LOW	–5 V (–5.6 V ... –1.2 V)
Input voltage common mode	–10 V ... 10 V
Input frequency	≤ 300 kHz

A/B incremental encoder, HTL 12 V, 2 outputs

Input resistance	≥ 35 kΩ
Input voltage HIGH	12 V (6.5 V ... 15 V)
Input voltage LOW	0 V (–1 V ... 2.5 V)
Input frequency	≤ 300 kHz

A/B incremental encoder, HTL 12 V, 2 output pairs

Input resistance	≥ 35 kΩ
Input voltage HIGH	12 V (4 V ... 15 V)
Input voltage LOW	–12 V (–15 V ... –4 V)
Input voltage common mode	–10 V ... 10 V
Input frequency	≤ 300 kHz

A/B incremental encoder, HTL 24 V, 2 outputs

Input resistance	≥ 35 kΩ
Input voltage HIGH	24 V (13 V ... 30 V)
Input voltage LOW	0 V (–3 V ... 5 V)
Input frequency	≤ 300 kHz

A/B incremental encoder, HTL 24 V, 2 output pairs

Input resistance	≥ 35 kΩ
Input voltage HIGH	24 V (8 V ... 30 V)
Input voltage LOW	–24 V (–30 V ... –8 V)
Input voltage common mode	–10 V ... 10 V
Input frequency	≤ 300 kHz

A/B incremental encoder, RS-422

Differential resistance	≥ 35 kΩ
Input voltage HIGH	0.2 V ... 5 V
Input voltage LOW	–5 V ... –0.2 V
Input voltage common mode	–7 V ... 7 V
Input frequency	≤ 1,000 kHz

Sin/Cos encoder

Input resistance	1 kΩ (0.9 kΩ ... 1.1 kΩ)
Differential input voltage	1 V (0.8 V ... 1.2 V)
Input voltage common mode	–10 V ... 10 V
Input frequency	≤ 120 kHz
Sin/Cos voltage monitoring, lower limit for vector length monitoring	0.5 V (0.45 V ... 0.6 V)
Sin/Cos voltage monitoring, upper limit for vector length monitoring	1.25 V (1.2 V ... 1.4 V)

SSI encoder

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
Data bits per frame	16 ... 62

Mechanical data

Dimensions (W x H x D)	22.5 mm x 96.5 mm x 120.8 mm
Weight	120 g

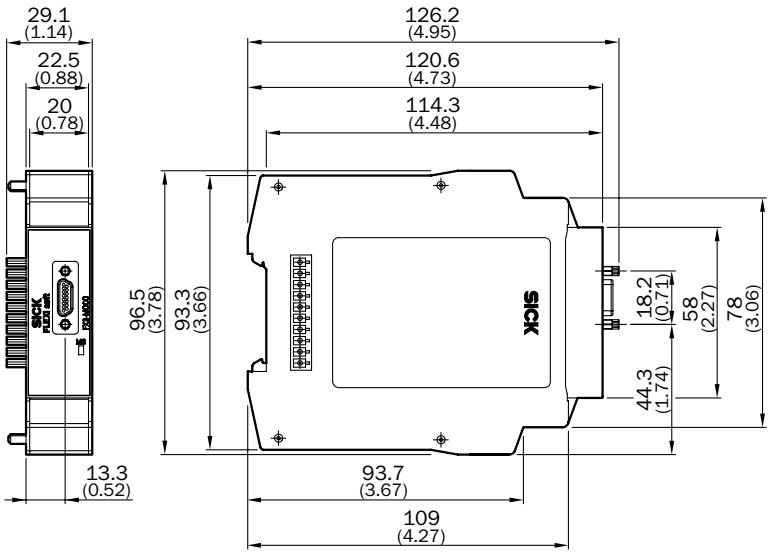
Ambient data

Enclosure rating	
Clamps	IP 20 (EN 60529)
Housing	IP 40 (EN 60529)
Ambient operating temperature	–25 °C ... +55 °C
Storage temperature	–25 °C ... +70 °C
Air humidity	10 % ... 95 %, non-condensing
Electromagnetic compatibility (EMC)	Class A (EN 61000-6-2, EN 55011)
Vibration resistance	1 g, 5 Hz ... 150 Hz (EN 60068-2-6)
	3g RMS, 10 Hz ... 500 Hz (EN 60068-2-64)
Shock resistance	
Continuous shock	10 g, 16 ms (EN 60068-2-27)
Single shock	30 g, 11 ms (EN 60068-2-27)

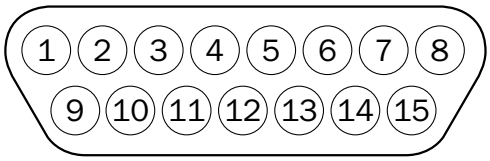
Ordering information

Description	Type	Part no.
Drive Monitor FX3-MOC	FX3-MOC00000	1062344

Dimensional drawing (Dimensions in mm (inch))



Pin assignment



Pin	Signal	Color coding
1	ENC1_A+	White
2	ENC1_B+	Gree
3	ENC1_C+	Grey
4	ENC1_24V	Blue
5	ENC2_24V	Red
6	ENC2_C+	White/green
7	ENC2_B+	Grey/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–	Purple

Accessories

Modules

Connection modules

Description	Model name	Part no.
Facility for connecting one encoder (normally used in conjunction with a motor feedback encoder). Connection to Drive Monitor FX3-MOC: Female connector, D-Sub HD, 15-pin. Connection to a second motor feedback splitter box: Female connector, D-Sub, 9-pin.	Motor feedback splitter box	2068728
Facility for connecting two encoders. Connection to Drive Monitor FX3-MOC: Female connector, D-Sub HD, 15-pin.	Dual encoder connection box	2068729

Plug connectors and cables

Connecting cable (female connector-open)

Connection type head A	Connection type head B	Cable length	Usage	Model name	Part no.
Female connector, Micro D-Sub, 15-pin, straight	Open conductor heads	2 m	For direct encoder connection	Connecting cable	2067893

Connection cable (male-female connector)

Connection type head A	Connection type head B	Cable length	Usage	Model name	Part no.
Male connector, D-Sub HD, 15-pin, straight	Female connector, Micro D-Sub, 15-pin, straight	2 m	To connect Drive Monitor FX3-MOC with motor feedback splitter box or dual encoder connection box	Connection cable	2067798
		10 m		Connection cable	2067799

Connection cable (male connector-male connector)

Connection type head A	Connection type head B	Cable length	Usage	Model name	Part no.
Male connector, D-Sub HD, 15-pin, straight	Male connector, D-Sub, 9-pin, straight	2 m	To connect two motor feedback splitter boxes with each other	Connection cable	2067800
		10 m		Connection cable	2067801

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SICK AT A GLANCE

SICK is a leading manufacturer of intelligent sensors and sensor solutions for factory, logistics, and process automation. With more than 6,000 employees and over 40 subsidiaries worldwide, we are always close our customers. 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 various 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 round out 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:

Australia, Belgium/Luxembourg, Brasil, Ceská Republika, Canada, China, Danmark, Deutschland, España, France, Great Britain, India, Israel, Italia, Japan, México, Nederland, Norge, Österreich, Polska, România, Russia, Schweiz, Singapore, Slovenija, South Africa, South Korea, Suomi, Sverige, Taiwan, Türkiye, United Arab Emirates, USA.

Please find detailed addresses and additional representatives and agencies in all major industrial nations at: www.sick.com

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