PRODUCT INFORMATION

FLEXI SOFT

THE MODULAR SAFETY CONTROLLER THAT CLEVERLY INCORPORATES ADVANTAGES

Safety controllers

SICK
Sensor Intelligence.

FLEXI SOFT: THE NEW FACE OF SAFETY – ESPECIALLY FOR CONTROLLERS

Since 2008, Flexi Soft has been one of the best-selling safety controllers in the area of industrial safety. It is conveniently and freely programmable with software, easy to use, and it can be expanded in a variety of ways with modular additions. What makes Flexi Soft more clever is also where you stand to benefit: compact and equipped with a network connection, Flexi Soft is the optimal solution for many machines. It has already proved itself on the market more than 50,000 times – and in the broadest range of applications. Flexible in the service of industry. Soft on the company budget.

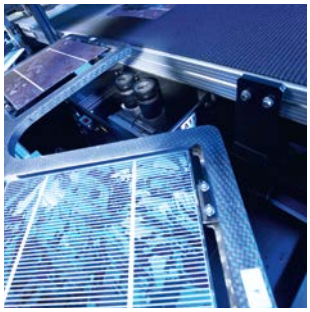
Today's Flexi Soft is smarter than ever before thanks to technology such as Flexi Line, a cost-optimized solution for practically unlimited networking between modular machines. Or Flexi Loop, a way to cascade switches and sensors that is first and foremost safe, and that also supports diagnostics. And it is just as safe to say that design engineers around the world are excited by this solution.

Safety for every industry:

Flexi Soft is a safe bet not only for a large number of systems and machines, but also for various industries. Why is that? Because Flexi Soft is an intelligent solution that networks modular machines. For instance, the masterful technical innovation is ideal for protecting hazardous points around presses and laser cutting equipment in mechanical engineering plants. It can also watch over machines with various doors and flaps in the packaging and electronics industries. Decentralized safety paths that require minimal wiring costs also stand to benefit from Flexi Soft. And, last but not least, it is impossible to imagine networking the overlapping safety functions of modular machines – and their integration into standardized system controllers – without Flexi Soft.

In many industries, Flexi Soft is the best proof that safety does not have to conflict with overall plant efficiency.

- A compact safety solution for the entire system: Flexi Soft is a modular safety controller that grows in line with the increasing complexity of the application
- Safe and especially straightforward networking without any addressing: the smart solution for realizing modular machine concepts
- Optimized production: a smaller machine footprint and safe human–machine interaction minimize downtime



Electronics and solar

Logistics

Machine building

Packaging

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Contents

www.sick.com/flexisoft

FLEXI SOFT: MORE INTELLIGENCE IN TECHNOLOGY ...

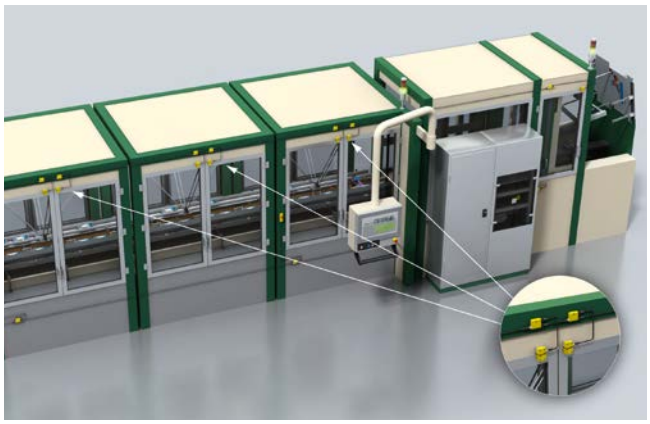
Intelligent advantages secure a modular portfolio. Flexi Soft offers scalable safety:

What are the components of a reliable, flexible safety controller that can also be configured individually? In principle, there is only one component: Flexi Soft. After all, Flexi Soft contains all the components needed by modern safety systems. And, put simply, modular is smarter.

- Main modules with or without safe networking
- Expansion modules ‘Standard’ and ‘Safety’
- Gateways into all common bus systems
- Motion Control modules

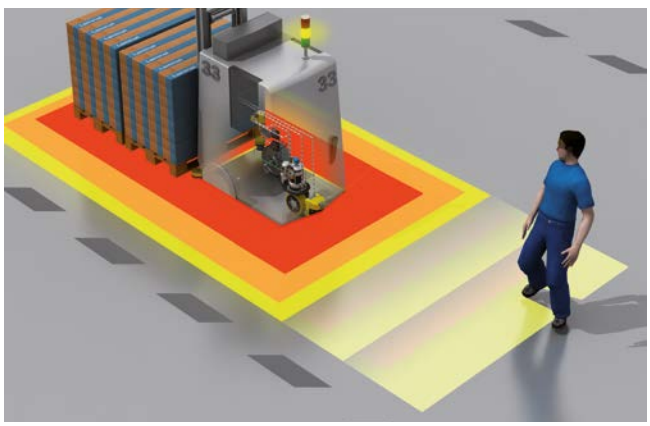
A cleverer way to go online! Flexi Line networks modular machines without limits:

- The ideal application for machines: safe networking of safety controllers across a wide area without any addressing
- Cost-effective integration: rapid project planning and commissioning with no additional hardware
- Effective communication and quick responses thanks to optimized data transfer
- A flexible solution that allows any type of modular machine concept



A smarter way to connect in series! Flexi Loop saves costs with sensor cascades that communicate:

- Flexi Loop is the answer when it comes to cascading safety switches and sensors within a machine in a way that both reduces cost and supports diagnostics (in accordance with Performance Level e)
- Compatible with sensors from all manufacturers
- Transmission of detailed diagnostic information
- Includes integrated standard input and output as well as a sensor power supply
- A perfect solution for packaging machines and production systems in the electronics and solar components industries



Independent thinkers monitor drives safely. Drive Monitor keeps an eye on everything:

- Perfect integration of safety applications with drive technology
- Greater flexibility: independent from the drive system used
- Open to all common motor feedback systems and encoders
- Additional benefits include reduced downtime thanks to numerous drive safety functions

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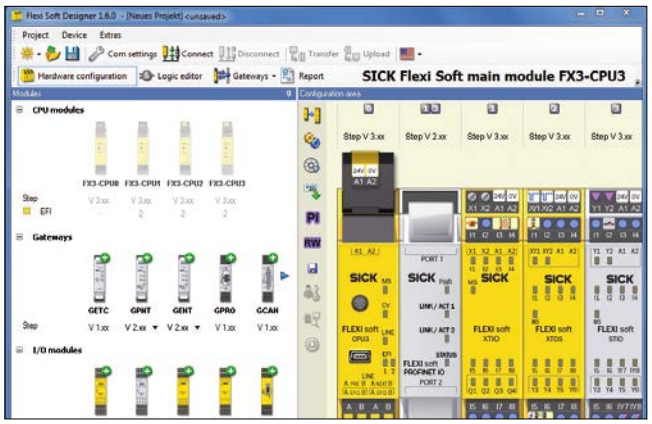
... AND MORE SOPHISTICATION IN PRACTICE

Modular expansion is the new growth:

Thanks to its modular hardware platform, the controller can grow module by module as a given task evolves. This means that Flexi Soft can be perfectly adapted to different applications, saving effort and unnecessary, expensive inputs.

- Optimal granularity avoids unnecessary inputs and outputs
- Integration with up to two gateways and twelve expansion modules
- Connection for as many as 296 safety sensors via Flexi Loop
- Ability to network up to 32 safety controllers



10 Minutes to Green with Flexi Soft Designer – free download:

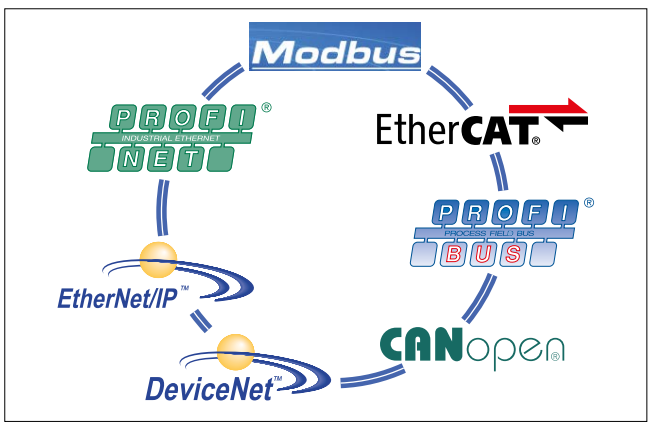
Extremely straightforward creation of configurations using software in just three steps: hardware configuration, logic creation, and transfer and verification.

- Intuitive user interface: simple drag-and-drop logic creation and integrated simulation mode
- Large number of logic blocks for each Flexi Soft station in addition to a range of application-specific function blocks
- Comprehensive, multilingual reporting in a single file together with detailed wiring assistance

Advanced sensor functions with EFI:

The enhanced function interface (EFI) specific to SICK devices enables safe communication with electro-sensitive protective devices. EFI also provides a continuous diagnostic capability. The advanced sensor functions include:

- Simultaneous evaluation of protective fields
- Switching between protective fields
- Operating mode changeover
- Analysis of diagnostic signals



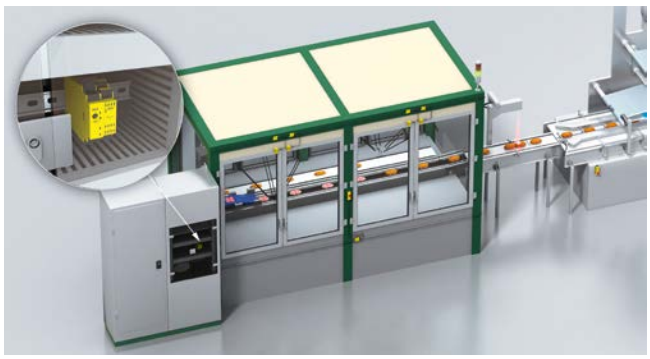
Direct integration:

- Flexi Soft gateways support the simple connection of Flexi Soft to all common automation systems
- Rapid troubleshooting with easy access to error and status information for all Flexi Soft modules, including EFI devices
- Remote diagnostics via TCP/IP gateways reduces service call-outs and system downtime
- Up to two different gateways can be used for each Flexi Soft station

A CLEVERER SYSTEM:
SAFE IS SAFE IS SAFE IS SAFE

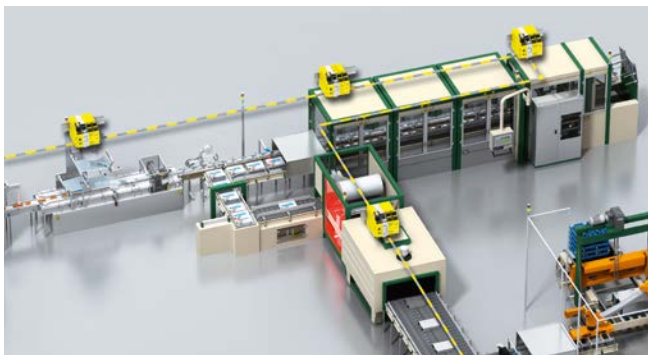
Flexi Soft

Safety controllers don’t have to be complicated (p. 4)



Flexi Line

Safety controller networking without addressing (p. 8)



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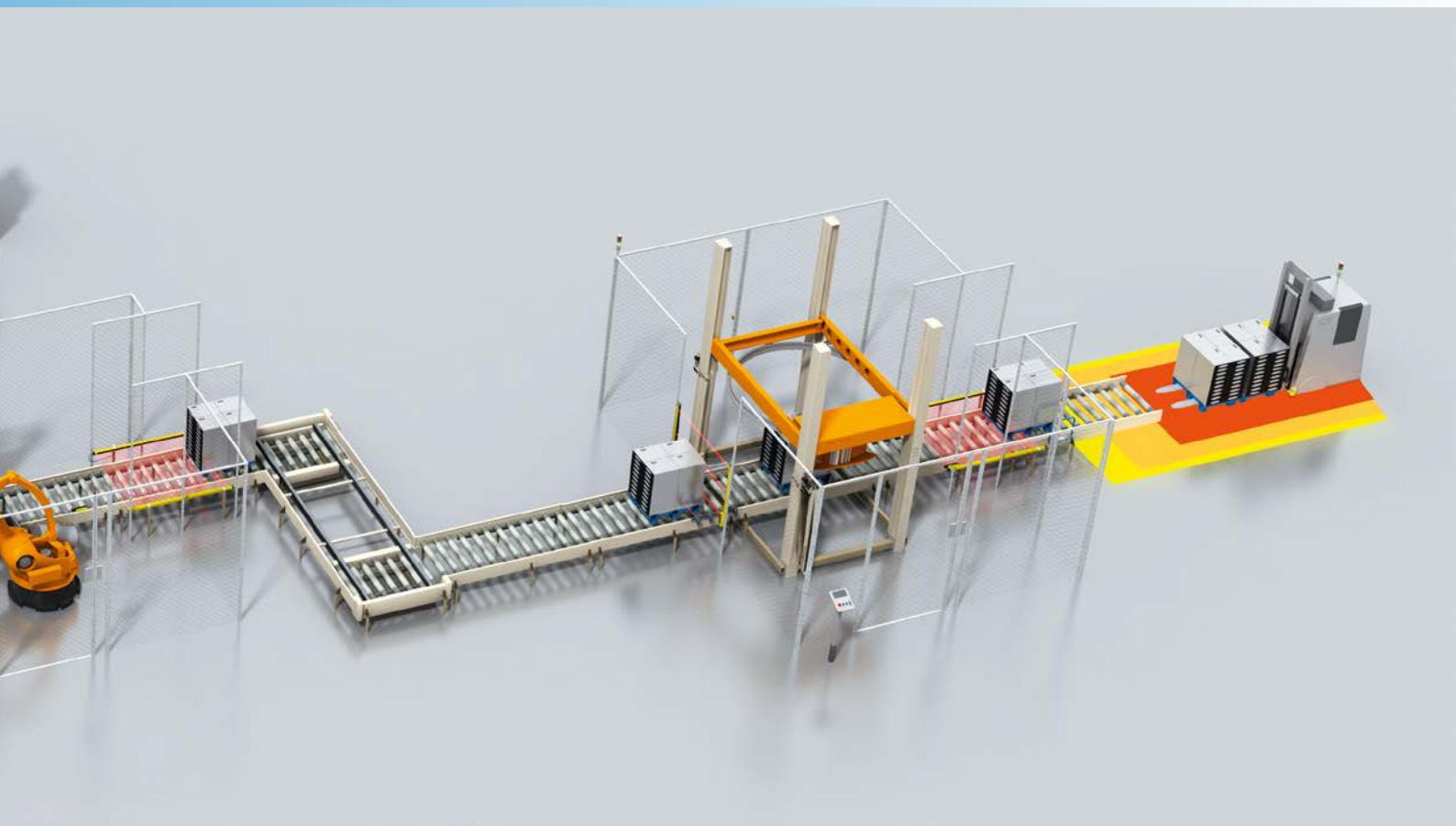
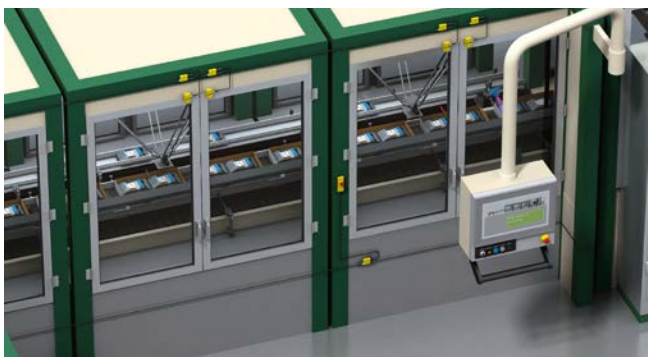


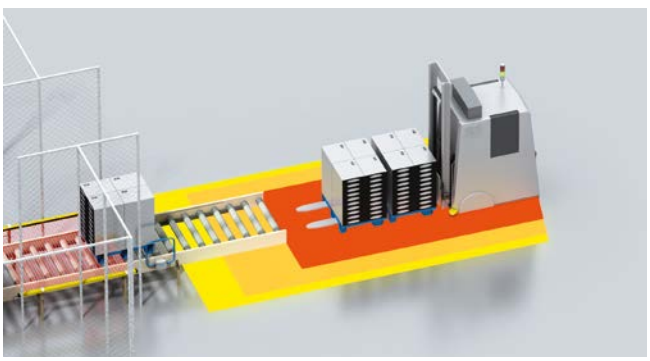
Flexi Loop

Safe sensor cascades with convenient diagnostics (p. 10)



Drive Monitor

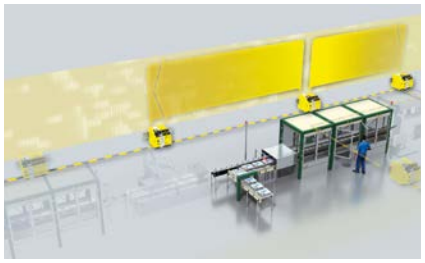
Safe drive monitoring (p. 12)



FLEXI LINE: NETWORKS MACHINES AND COMBINES FLEXIBILITY WITH EFFICIENCY

Flexi Line offers the flexibility demanded by modern machine concepts. By networking up to 32 Flexi Soft stations, it is possible to map modular machine structures in a consistent and efficient way – even at a distance of up to 1,000 meters between two Flexi Soft stations.

Configuration is quick and easy: the process image – with a data width of up to 96 bit – needs to be defined only once for the entire system. Information is either shared with neighbouring stations only or transmitted to the entire system. This division makes communication more efficient and shortens response times. Another important advantage is that the communication works without addressing using “neighbourhood detection”.



Local vs. global – shorter response times thanks to information sharing:

- Global information is compiled for the entire system
- Each station sends local information to its respective neighbours
- A communication concept that offers maximum efficiency

Quick vs. thorough – simple configuration with Flexi Soft Designer:

- The process image can be configured quickly and smoothly
- Online diagnostics with a clear summary
- Detailed diagnostic information available at a click
- Simulation and data recorder, allowing shorter commissioning times

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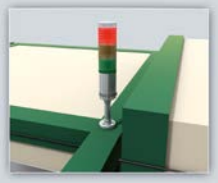
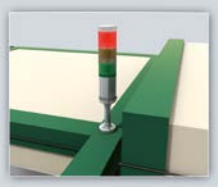
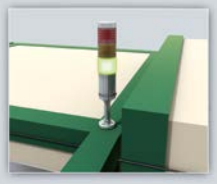


1. Change



2. Teach-in



3. Done

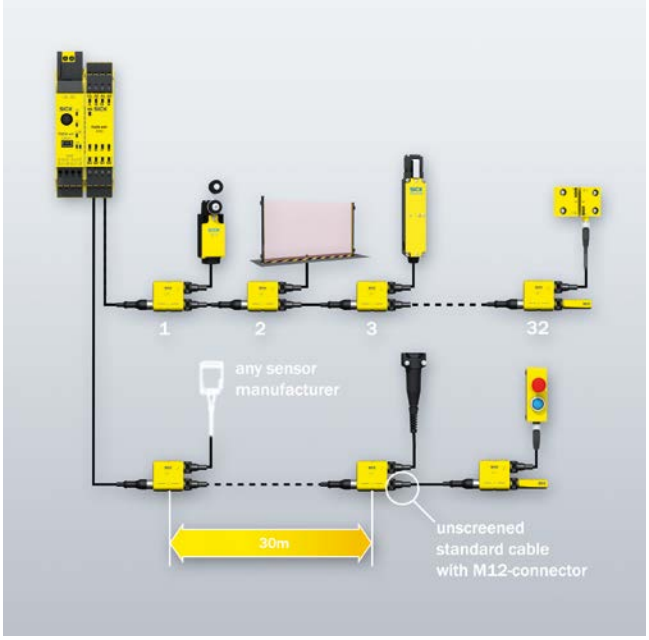
Smart vs. quick – no addressing, but with brains:

- A topology without (re) addressing: configuration of the station layout is performed by a teach-in switch
- Replacement and maintenance is straightforward and expanding machines is child's play: re-addressing is not necessary when changing the order of stations or expanding the system with additional stations
- Complete flexibility for modular machine concepts

FLEXI LOOP: SMART SENSOR CASCADES WITHOUT CASCADING COSTS

Flexi Loop meets the demand for a cost-effective way to cascade safety switches and sensors within a machine while also supporting diagnostics.

Flexi Loop makes it possible to cascade up to 32 safety sensors while maintaining the highest level of safety . Regardless of the manufacturer, any combination of safety switches and safety sensors with OSSD outputs can be used. Such a system set-up also guarantees the continuous diagnosis of all door switches, emergency stop push-buttons and sensors. Used in connection with Flexi Soft, the entire safety application can be tailored to meet the customer's needs – cost-effective, personalized and efficient.



A pleasant series of benefits:

- Cascading a combination of safety switches and safety sensors with OSSD outputs minimizes wiring and the number of safety controller inputs, thus saving money
- Easy to upgrade on existing machines
- Straightforward calculation of the performance level saves time because the Flexi Loop cascade monitors each sensor individually
- User-friendly with quick and easy configuration
- Can be used over long distances
- Minimal system downtime thanks to detailed diagnostics (which switch was activated and why?)
- Seamless integration and communication with higher-level controllers
- Integrated standard inputs and outputs for connecting interlocks, signal lamps and push-buttons
- Sensor power supply included

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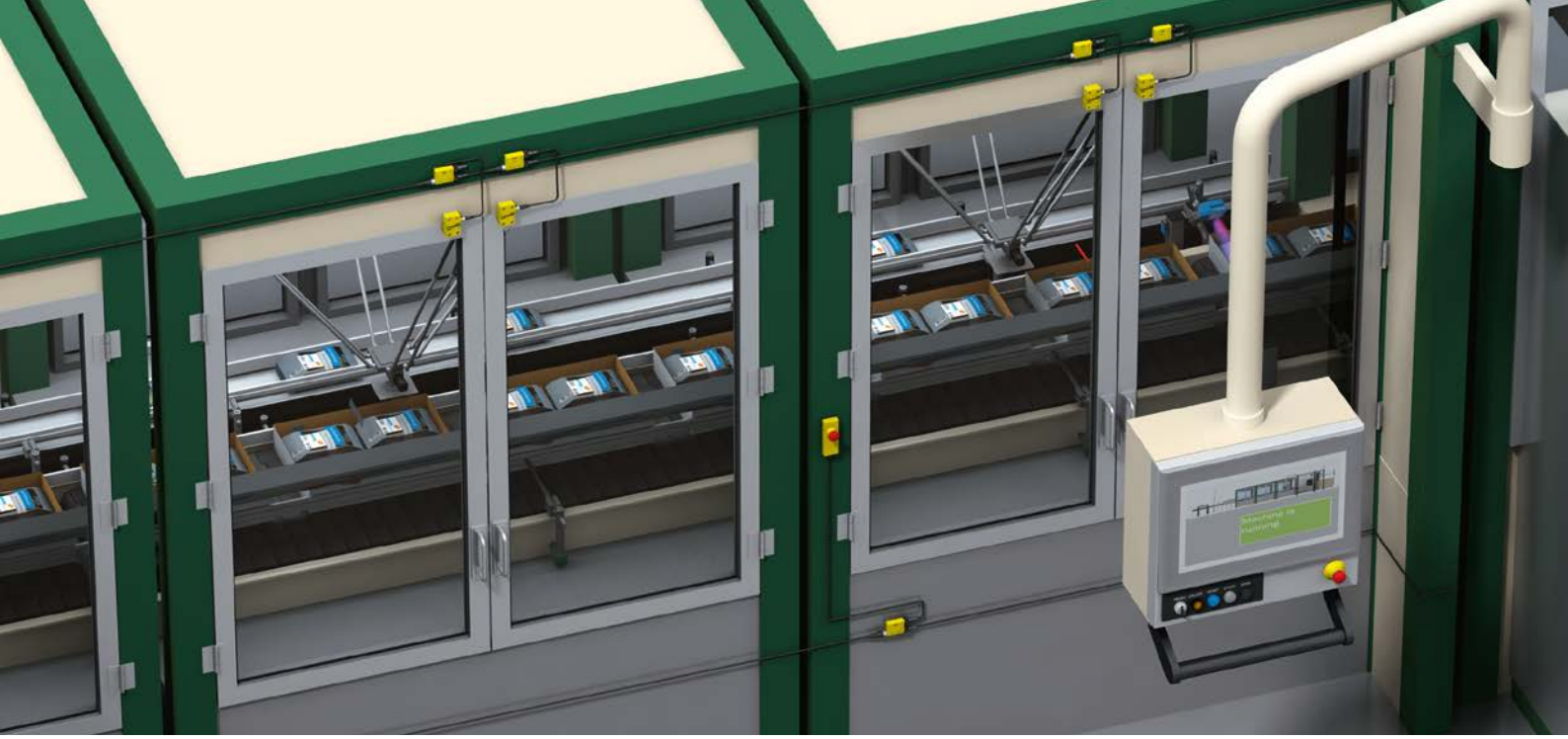
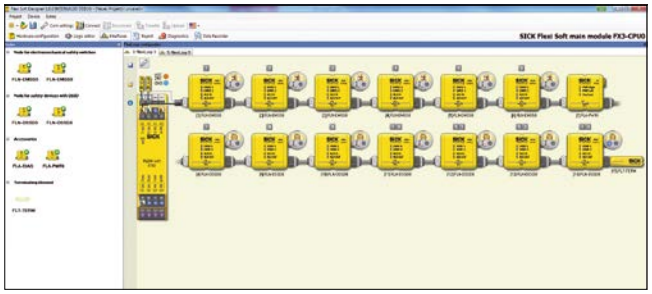




Seamless integration with Flexi Soft Designer:

The Flexi Loop software implementation in the intuitive configuration software Flexi Soft Designer follows the configuration procedure step by step to ensure a safe machine:

- Drag-and-drop hardware configuration
- Powerful, clearly structured logic editor with certified, ready-made function blocks
- Simulation mode for testing the overall application
- Complete multilingual documentation at the push of a button, including a wiring diagram and parts list

Diagnostics that thinks in detail:

- Detailed information: which safety sensor has been switched and why (normal operation vs. sensor error)?
- Monitoring of the complete safety cascade
- All information can be implemented in the software logic or processed there
- Furthermore, information can be passed to gateways and made available in all common fieldbuses for integration into standard automation systems
- Information can be visualized using human–machine interfaces, thus reducing downtime

DRIVE MONITOR: CLEVERER MONITORING FOR GREATER EFFICIENCY

The Flexi Soft Drive Monitor from SICK lends itself to an impressive range of applications and is remarkably smart.

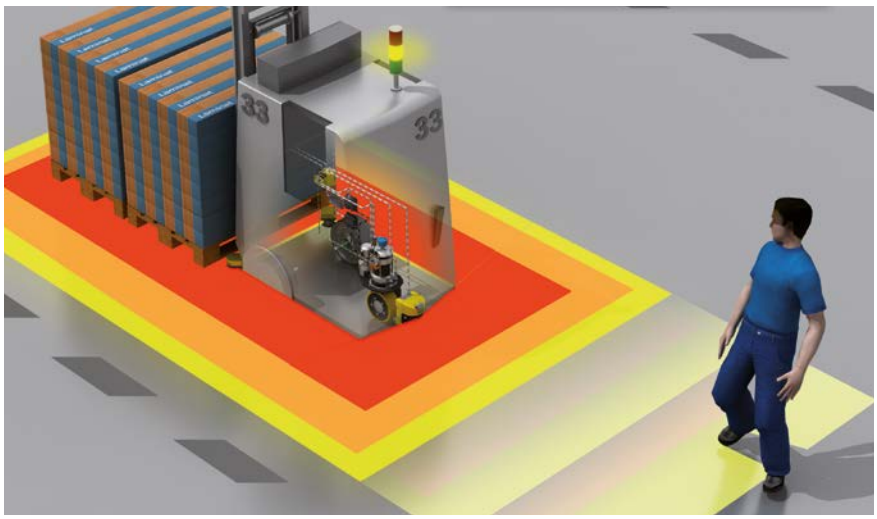
Your benefits at a glance:

- In collaboration with the Flexi Soft safety controller, it controls the movements of machine tools, multi-axis systems and mobile applications instead of disabling them
- Thanks to standstill detection, it allows swift intervention and the replacement of components in machinery that are fitted by hand
- It shortens changeover and setup times, allowing work at a reduced speed – and with reduced risk
- It offers scalable solutions, from simple machines to complex multi-axis applications
- It uses existing motor feedback systems, reducing your wiring requirements and the number of components
- Greater flexibility thanks to independence from the drive system in use as well as a large number of drive safety functions

Conclusion:

The Flexi Soft Drive Monitor offers levels of intelligence and versatility that cement the position of SICK as a full-service provider of safety solutions. The best part is that it is nevertheless simple to use and flexible thanks to an excellent software tool. Moreover, it is independent from the drive system – and open to all common motor feedback systems and encoders.

Mobile applications in sight:



The ideal solution for automated guided systems where people are able to stand in hazardous areas. Working in cooperation with safety laser scanners from SICK, the Flexi Soft Drive Monitor opens up new possibilities:

- Optimization of the monitoring of protective fields
- Monitoring speed and brake ramp

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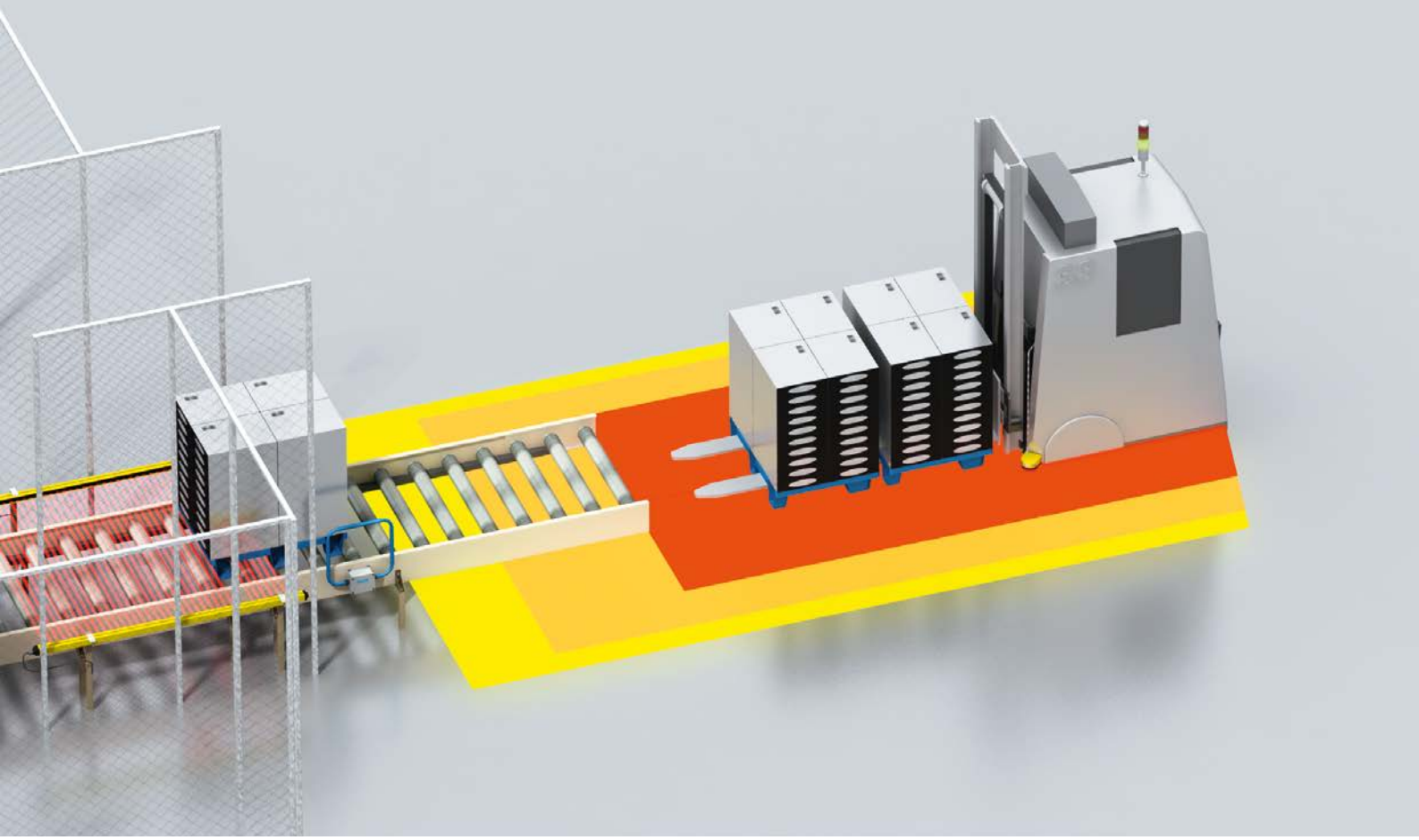
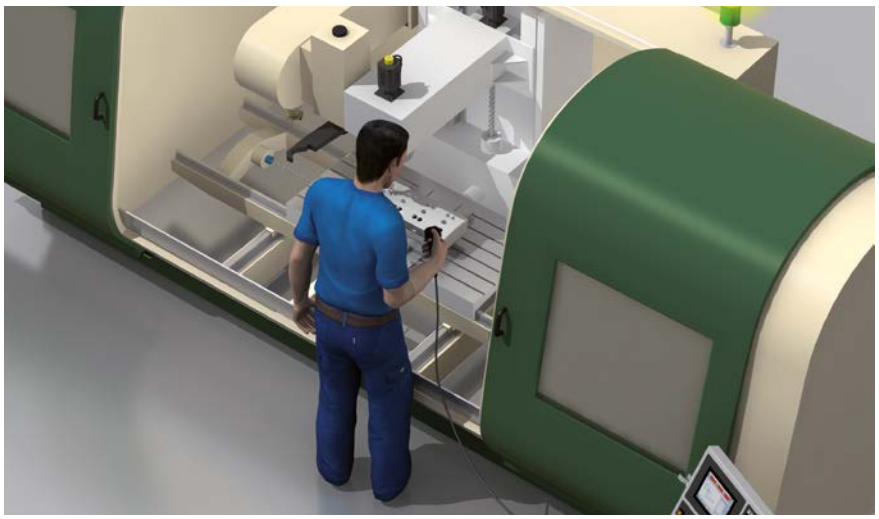


Stationary applications in focus:



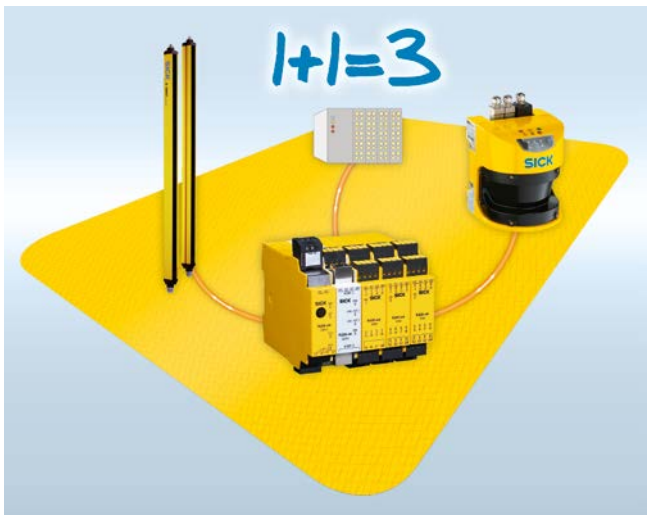
Intelligent solutions for machines where physical measures are in place to keep the operator away from the hazardous point, for example machine housing, a hood or a movable guard. Here, the Flexi Soft Drive Monitor offers many advantages for production:

- Access protection with standstill detection allows rapid intervention
- Maintenance and service mode with reduced speed settings to shorten changeover and setup times

TOWARDS AN EFFICIENT FUTURE OR: A SAFE FUTURE UNDER CONTROL

With safety solutions from SICK, you can create efficiency today and in the future. Safety devices should not hamper the productivity of your systems and machines. Before releasing new innovations, SICK therefore carries out elaborate studies and customer surveys.

In addition to advancements in technology, their experience and requests represent a major part of our requirements. This is how highly sought-after products such as our safety laser scanners and the Flexi Soft modular safety controller came into being.



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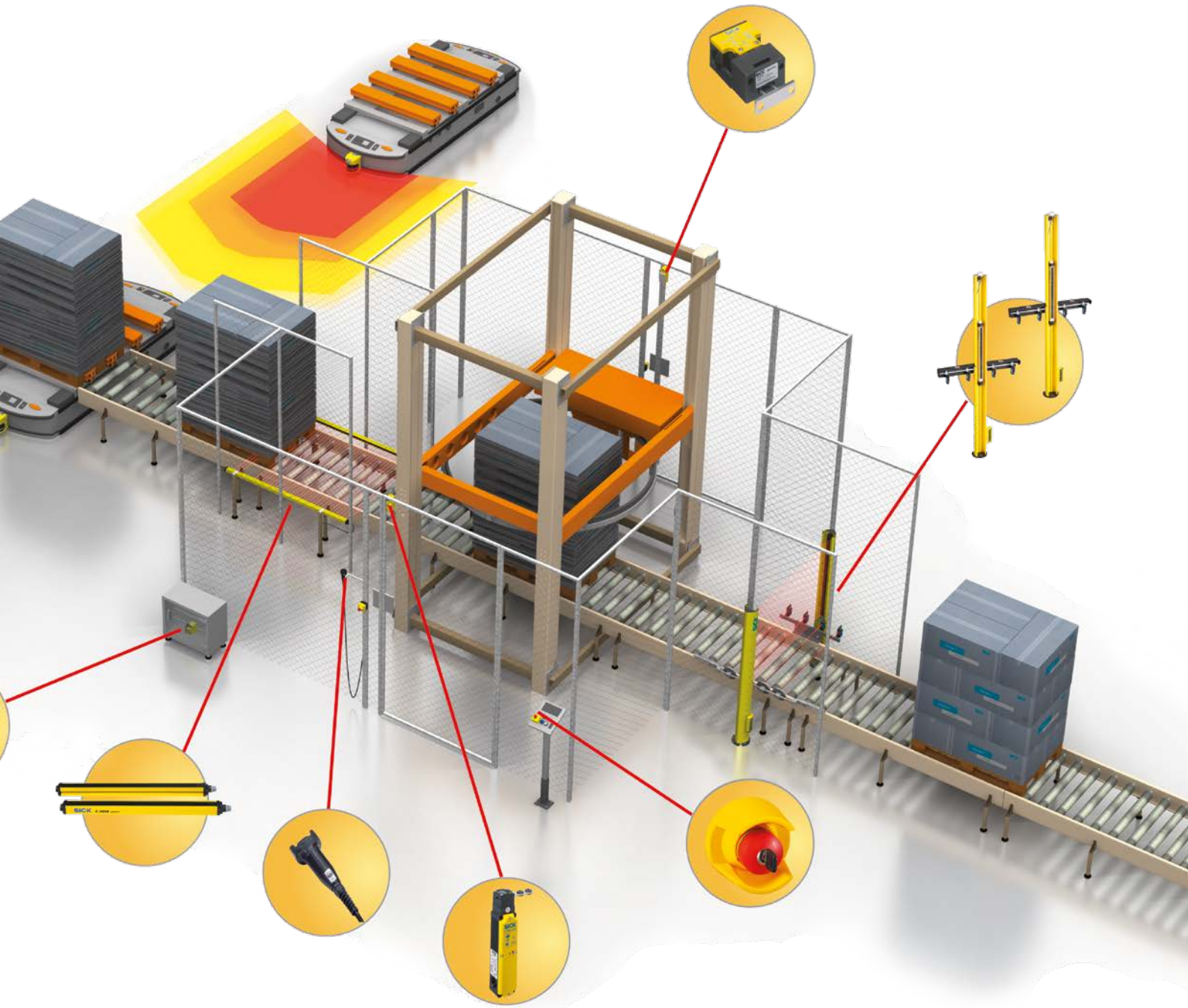

WHEN BEING SMART IS NOT SMART ENOUGH – safetyPLUS® complete solutions:

Under the name safetyPLUS®, SICK offers complete solutions for industrial automation – from development to service:

- Application-oriented features and trend-setting products to increase system efficiency
- Observance of current international standards to support your business worldwide
- Services, from the implementation of your concept to regular maintenance
- Safety engineering tools
- An all-round package for the safety processes affecting your machines and equipment

THE SOFTWARE-PROGRAMMABLE SAFETY CONTROLLER

Product description

Modular and intuitive configuration: the Flexi Soft safety controller from SICK. The Flexi Soft concept offers a whole range of main modules, expansion modules, Motion Control modules, and gateways that can be used to create a customized, efficient solution for your safety application. It is the ideal choice for safeguarding against hazardous points in presses and laser cutting systems used in machine building applications. It is also an efficient tool in the packaging industry, which uses machines with a large number of doors and flaps that require protective measures. In applications like these, Flexi Soft keeps the amount of wiring used to a minimum. Flexi Soft also makes it possible to network overlapping safety functions in modular machines – and integrate these into the standardized system controllers. The license-free Flexi Soft Designer configuration software offers intuitive programming, rapid commissioning, and continuous monitoring. The entire configuration can be documented in multiple languages with just one click.

At a glance

- Expansion modules, Motion Control modules, and gateways for all common fieldbuses
- Configuration data stored in the system plug
- Safe networking of up to 32 Flexi Soft stations
- Integration of sensor cascade
- Multi-language, license-free configuration software: exceptionally simple operation, plausibility check, simulation mode, wiring diagram, parts list, documentation, and data recorder

Your benefits

- Scalable for an efficient and cost-optimized safety application solution
- Cost savings: Flexi Soft offers a modular structure that is in line with your requirements, and thus offers an ideal level of granularity
- Intuitive configuration software featuring comprehensive functions enables continuous monitoring of the configuration
- Rapid verification of the safety application: The configuration software provides documentation and a wiring diagram
- Safety logic is easy to create thanks to ready-made, TÜV-certified function blocks
- The main module's diagnostics interfaces and the configuration storage facility in the system plug enable rapid commissioning, component replacement, and troubleshooting, resulting in minimum downtimes

Additional information

→ www.mysick.com/en/Flexi_Soft

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

General data

System construction	Modular
System plug	1
Main module	1
Gateways	0 ... 2
Expansion modules	0 ... 12 [1]
Relay modules	0 ... 8 [2]
Module interconnection	Internal bus (FLEXBUS+)
Configuration method	Via software
Configuration software	Flexi Soft Designer
Fieldbus/industrial network	CANopen, EtherCAT, EtherNet/IP, MODBUS TCP, PROFIBUS DP, PROFINET, DeviceNet
Type of fieldbus integration	Via gateway

[1] Each Motion Control module connected reduces the possible number of other expansion modules by two.

[2] Up to 8 UE410-2RO relay output modules and/or 4 UE410-4RO relay output modules (meaning a max. of 16 safe relay outputs).

Main modules

Safety-related parameters

	FX3-CPU0	FX3-CPU1	FX3-CPU2	FX3-CPU3
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)	1.07×10^{-9} (EN ISO 13849)	1.69×10^{-9} (EN ISO 13849)		1.69×10^{-9} (EN ISO 13849) 0.4×10^{-9} (EN ISO 13849) [1]
T_M (mission time)	20 years (EN ISO 13849)			

[1] Applies for a main module FX3-CPU3 that is used exclusively for routing information via Flexi Line.

Functions

	FX3-CPU0	FX3-CPU1	FX3-CPU2	FX3-CPU3
Restart interlock	Manual / automatic (configurable)			
External device monitoring (EDM)	✔			
Differentiation between man and material (muting)	✔			
Safe SICK device communication via EFI/SDL	–	✔		
Safe networking				
Flexi Link	–	✔		
Flexi Line	–			✔
Automatic Configuration Recovery (ACR)	–		✔	

Interfaces

	FX3-CPU0	FX3-CPU1	FX3-CPU2	FX3-CPU3
System connection	System plug FX3-MPL000001		System plug FX3-MPL100001	
Connection type				
System plug	Screw-type terminals			
EFI connection	–	Spring terminals		
Flexi Line connection	–			Spring terminals
Number of EFI interfaces	0	2		
Configuration and diagnostics interface	RS-232			RS-232, USB

Electrical data

Protection class	III (EN 61140)
Type of voltage supply	PELV or SELV [1]
Supply voltage V_s	24 V DC (16.8 V DC ... 30 V DC)
Internal power consumption	≤ 2.5 W
Overvoltage category	II (EN 61131-2)
Switch-on time	≤ 18 s

[1] The current of the power supply that powers the main unit must be limited to a maximum of 4 A, either through the power supply itself or a fuse.

Mechanical data

	FX3-CPU0	FX3-CPU1	FX3-CPU2	FX3-CPU3
Dimensions (W x H x D)	22.5 mm x 96.5 mm x 120.6 mm			
Weight	111 g (± 5 %)	119 g (± 5 %)		133 g (± 5 %)

Ambient data

Enclosure rating	
Terminals	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
Climate conditions according to	EN 61131-2 (55 °C ambient operating temperature, 95% rel. humidity)
Electromagnetic compatibility (EMC)	Class A (EN 61000-6-2, EN 55011)
Vibration resistance	1 g, 5 Hz ... 150 Hz (EN 60068-2-6) 3 g 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)

Gateways

Interfaces

	FX0-GENT	FX0-GMOD	FX0-GPNT	FX0-GETC	FX0-GPRO	FX0-GCAN	FX0-GDEV
Fieldbus/industrial network	EtherNet/IP	MODBUS TCP	PROFINET	EtherCAT	PROFIBUS DP	CANopen	DeviceNet
Type of fieldbus integration	Integrated device						
Integrated Ethernet switch	3-port layer-2 managed switch with Auto-MDI-X for automatic detection of crossed Ethernet cable			–			
Connection type	2 x female connector, RJ-45				1 x female connector, D-Sub, 9-pin	1 x female connector, Open Style, 5-pin	
Baud rate	–				≤ 12 MBaud	–	
Data transmission rate	10 Mbit/s (10Base-T) 100 Mbit/s (100Base-TX) (autosensing)				≤ 12,000 kbit/s [1]	≤ 1,000 kbit/s [1]	≤ 500 kbit/s [1]

[1] Depending on cable length.

Electrical data

	FX0-GENT	FX0-GMOD	FX0-GPNT	FX0-GETC	FX0-GPRO	FX0-GCAN	FX0-GDEV
Protection class	III (EN 61140)						
Voltage supply	Via FLEXBUS+						
Internal power consumption	≤ 2.4 W [1]			≤ 3 W [1]	≤ 1.6 W [1]		

[1] Via FLEXBUS+.

Mechanical data

	FX0-GENT	FX0-GMOD	FX0-GPNT	FX0-GETC	FX0-GPRO	FX0-GCAN	FX0-GDEV
Dimensions (W x H x D)	22.5 mm x 96.5 mm x 120.6 mm				22.5 mm x 96.5 mm x 131 mm		
Weight	125 g (± 10 %)			150 g (± 10 %)			

Ambient data

Enclosure rating	
Terminals	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
Climate conditions according to	EN 61131-2 (55 °C ambient operating temperature, 95% rel. humidity)
Electromagnetic compatibility (EMC)	Class A (EN 61000-6-2, EN 55011)
Vibration resistance	5 g, 10 Hz ... 500 Hz (EN 60068-2-6)
Shock resistance	
Continuous shock	10 g, 16 ms (EN 60068-2-27)
Single shock	30 g, 11 ms (EN 60068-2-27)

Expansion modules – I/O modules

Safety-related parameters

	FX3-XTIO	FX3-XTDI	FX3-XTDS	FX0-STIO
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)	4.8×10^{-9} (EN ISO 13849) [1] 0.9×10^{-9} (EN ISO 13849) [2]	0.4×10^{-9} (EN ISO 13849)		–
T_M (mission time)	20 years (EN ISO 13849)			

[1] For single channel outputs.
[2] For dual channel outputs.

Functions

	FX3-XTIO	FX3-XTDI	FX3-XTDS	FX0-STIO
Flexi Loop-compatible	✔			–
Fast shut-off	✔	–		
Fast shut-off time	8 ms	–		

Interfaces

	FX3-XTIO	FX3-XTDI	FX3-XTDS	FX0-STIO
Number of safety inputs	8 (I1 – I8)			0
Number of non-safe inputs	0			6-8 (I1 – I6, IY7, IY8) [1]
Number of test signal outputs	2 (X1, X2)	8 (X1 – X8)	2 (XY1, XY2)	0
Number of safe outputs	4 (Q1 – Q4)	0		
Number of non-safe outputs	0		4-6 (XY1, XY2, Y3 – Y6) [2]	6-8 (Y1 – Y6, IY7, IY8) [1]
Connection type	Spring terminals			

[1] The FX0-STIO has 6 non-safe standard inputs and outputs. In addition the connections IY7 and IY8 can be used both as a standard input and as a standard output.
[2] In addition the test outputs XY1 and XY2 can be used as further standard outputs.

Electrical data

Operating data

	FX3-XTIO	FX3-XTDI	FX3-XTDS	FX0-STIO
Protection class	III (EN 61140)			
Voltage supply				
Internal logic	Via FLEXBUS+			
Test signal outputs	Via FLEXBUS+			–
Safe outputs	Via A1, A2	–		
Non-safe outputs	–		Via A1, A2	
Internal power consumption	≤ 2.2 W [1]	≤ 2 W [1]	≤ 1.5 W [1]	≤ 1.5 W [2]

[1] Via FLEXBUS+, without current on test signal outputs.
[2] Via FLEXBUS+.

Power supply terminals

	FX3-XTIO	FX3-XTDI	FX3-XTDS	FX0-STIO
Terminals	A1, A2	–	A1, A2	
Type of input voltage	PELV or SELV [1]	–	PELV or SELV [1]	
Input voltage	24 V DC (16.8 V DC ... 30 V DC)	–	24 V DC (16.8 V DC ... 30 V DC)	
Input current	≤ 4 A	–	≤ 4 A	

[1] The current of the power supply that powers the module must be limited to a maximum of 4 A, either through the power supply itself or a fuse.

Safe inputs

	FX3-XTIO	FX3-XTDI	FX3-XTDS	FX0-STIO
Terminals	I1 – I8			–
Input voltage				
HIGH	13 V DC ... 30 V DC			–
LOW	–5 V DC ... 5 V DC			–
Input current				
HIGH	2.4 mA ... 3.8 mA			–
LOW	–2.5 mA ... 2.1 mA			–

Non-safe inputs

	FX3-XTIO	FX3-XTDI	FX3-XTDS	FX0-STIO
Terminals	–			I1 – I6, IY7, IY8
Input voltage				
HIGH	–			13 V DC ... 30 V DC
LOW	–			–5 V DC ... 5 V DC
Input current				
HIGH	–			2.4 mA ... 3.8 mA
LOW	–			–2.5 mA ... 2.1 mA

Test signal outputs

	FX3-XTIO	FX3-XTDI	FX3-XTDS	FX0-STIO
Terminals	X1, X2	X1 – X8	XY1, XY2	–
Type of output	PNP semiconductors, short-circuit protected			–
Test signal generators	2 (X1, X2)	2 (X1/X3/X5/X7, X2/X4/X6/X8)	2 (XY1, XY2)	–
Output voltage HIGH	15 V DC ... 30 V DC			–
Output current	≤ 120 mA [1]			–
	40 ms ... 1,000 ms (configurable)			–
Pulse duration	1 ms ... 100 ms (configurable)			–

[1] At each of the two test signal generators. This means that a maximum of 8 testable sensor cascades per module with max. 30 mA each are possible.

Safe outputs

	FX3-XTIO	FX3-XTDI	FX3-XTDS	FX0-STIO
Terminals	Q1 – Q4	–		
Type of output	PNP semiconductors, short-circuit protected, cross-circuit monitoring (configurable)	–		
Output voltage HIGH	16 V DC ... 30 V DC	–		
Output current	≤ 2 A	–		
Load capacity	≤ 0.5 µF	–		

Non-safe outputs

	FX3-XTIO	FX3-XTDI	FX3-XTDS	FX0-STIO
Terminals	–		XY1, XY2, Y3 – Y6	Y1 – Y6, IY7, IY8
Type of output	–		PNP semiconductors, short-circuit protected	
Output voltage HIGH	–		16 V DC ... 30 V DC	
Output current				
XY1, XY2	–		≤ 120 mA	–
Y3 – Y6	–		≤ 500 mA	–
Y1 – Y6	–			≤ 500 mA
IY7, IY8	–			≤ 500 mA

Mechanical data

	FX3-XTIO	FX3-XTDI	FX3-XTDS	FX0-STIO
Dimensions (W x H x D)	22.5 mm x 96.5 mm x 120.6 mm			
Weight	164 g (± 5 %)	139 g (± 5 %)		

Ambient data

Enclosure rating	
Terminals	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
Climate conditions according to	EN 61131-2 (55 °C ambient operating temperature, 95% rel. humidity)
Electromagnetic compatibility (EMC)	Class A (EN 61000-6-2, EN 55011)
Vibration resistance	1 g, 5 Hz ... 150 Hz (EN 60068-2-6) 3 g 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)

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Expansion modules – Motion Control modules

Find detailed technical data on page 36.

Safe sensor cascade Flexi Loop

Find detailed technical data on page 30.

Relay modules

Safety-related parameters

Safety integrity level	SIL3 (IEC 61508) SILCL3 (EN 62061)
Category	Category 4 (EN ISO 13849-1)
Performance level	PL e (EN ISO 13849-1)

Interfaces

	UE410-2RO4	UE410-4RO4	UE10-2FG3	UE12-2FG3
Number of control inputs	1 (B1)	2 (B1, B2)	1 (B1, B2)	
Number of enable current contacts	2 (13/14, 23/24)	4 (13/14, 23/24, 33/34, 43/44)	2 (13/14, 23/24)	
Number of signalling current contacts	1 (Y14)	2 (Y14, Y24)	0	
Number of contactor monitoring contacts	1 (Y1/Y2)	2 (Y1/Y2, Y3/Y4)	1 (Y1/Y2)	
Connection type	Spring terminals		Plug-in screw-type terminals	

Electrical data

Operating data

	UE410-2RO4	UE410-4RO4	UE10-2FG3	UE12-2FG3
Voltage supply	Via FLEXBUS+		Via B1, B2	
Internal power consumption	≤ 1.6 W	≤ 3.2 W	≤ 2 W	
Overvoltage category	II (EN 61131-2)			

Switching inputs

	UE410-2RO4	UE410-4RO4	UE10-2FG3	UE12-2FG3
Terminals	B1	B1, B2		
Input voltage ON	24 V DC (18 V DC ... 30 V DC)		24 V DC (16.8 V DC ... 27.6 V DC)	

Enable current contacts

	UE410-2RO4	UE410-4RO4	UE10-2FG3	UE12-2FG3
Terminals	13/14, 23/24	13/14, 23/24, 33/34, 43/44	13/14, 23/24	
Type of output	Potential-free NO contacts, positively guided			
Switching voltage	5 V AC/DC ... 253 V AC/DC		10 V AC/DC ... 250 V AC/DC	
Switching current	10 mA ... 6 A			

Signalling current contacts

	UE410-2RO4	UE410-4RO4	UE10-2FG3	UE12-2FG3
Terminals	Y14	Y14, Y24	–	
Type of output	NO contact, connected to internal 24 V DC, positively guided, current-limited		–	
Output voltage	24 V DC (16 V DC ... 30 V DC)		–	
Output current	≤ 75 mA		–	

Contactor monitoring contacts

	UE410-2RO4	UE410-4RO4	UE10-2FG3	UE12-2FG3
Terminals	Y1/Y2	Y1/Y2, Y3/Y4	Y1/Y2	
Type of output	Potential-free NC contacts, positively guided			
Switching voltage	5 V AC/DC ... 253 V AC/DC		0.1 V AC/DC ... 60 V AC/DC	
Switching current	10 mA ... 6 A		1 mA ... 300 mA	

Mechanical data

	UE410-2RO4	UE410-4RO4	UE10-2FG3	UE12-2FG3
Dimensions (W x H x D)	22.5 mm x 96.5 mm x 120.6 mm		17.8 mm x 105.5 mm x 70.8 mm	
Weight	160 g (± 5 %)	186 g (± 5 %)	91 g (± 5 %)	

Ambient data

	UE410-2RO4	UE410-4RO4	UE10-2FG3	UE12-2FG3
Enclosure rating				
Terminals	IP 20 (EN 60529)			
Housing	IP 40 (EN 60529)			
Ambient operating temperature	–25 °C ... +55 °C		0 °C ... +55 °C	
Storage temperature	–25 °C ... +70 °C		–25 °C ... +75 °C	

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Ordering information

Main modules

Number of EFI interfaces	Flexi Link	Automatic Configuration Recovery (ACR)	Flexi Line	Type	Part no.
0	–	–	–	FX3-CPU000000	1043783
2	✔	–	–	FX3-CPU130002	1043784
		✔	–	FX3-CPU230002	1058999
			✔	FX3-CPU320002	1059305

Gateways

Fieldbus/industrial network	Type	Part no.
EtherNet/IP	FX0-GENT00000	1044072
MODBUS TCP	FX0-GMOD00000	1044073
PROFINET	FX0-GPNT00000	1044074
EtherCAT	FX0-GETC00000	1051432
PROFIBUS DP	FX0-GPRO00000	1044075
CANopen	FX0-GCAN00000	1044076
DeviceNet	FX0-GDEV00000	1044077

Expansion modules – I/O modules

Flexi Loop-compatible	Number of safe inputs	Number of non-safe inputs	Number of test signal outputs	Number of safe outputs	Number of non-safe outputs	Type	Part no.
✔	8	0	2	4	0	FX3-XTIO84002	1044125
			8	0	0	FX3-XTDI80002	1044124
			2	0	4-6	FX3-XTDS84002	1061777
–	0	6-8	0	0	6-8	FX0-STIO68002	1061778

Expansion modules – Motion Control modules

Description	Type	Part no.
Flexi Soft Drive Monitor	FX3-MOC00000	1062344

Safe sensor cascade Flexi Loop

Flexi Loop node for safety sensors with dual-channel OSSD outputs

Connection type	Number of non-safe inputs	Number of non-safe outputs	Type	Part no.
Female connector M12, 5-pin	1	0	FLN-OSSD1000105	1061709
Female connector M12, 8-pin	1	1	FLN-OSSD1100108	1061710

Flexi Loop node for dual-channel equivalent electro-mechanical safety switches

Connection type	Number of non-safe inputs	Number of non-safe outputs	Type	Part no.
Female connector M12, 5-pin	0	0	FLN-EMSS0000105	1061711
Female connector M12, 8-pin	1	1	FLN-EMSS1100108	1061712

Flexi Loop power supply module

Description	Type	Part no.
The power supply module is used to connect a power supply with 24 V DC, for the electrical isolation and for overcurrent shutdown.	FLA-PWRI00001	1061715

Flexi Loop terminator module

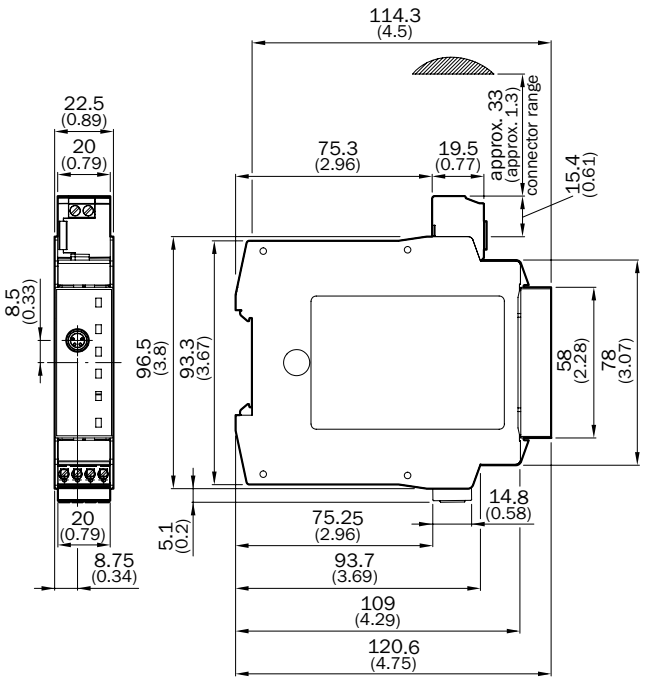
Description	Type	Part no.
The terminator is used to terminate the safe sensor cascade on the last Flexi Loop node.	FLT-TERM00001	1061716

Relay modules

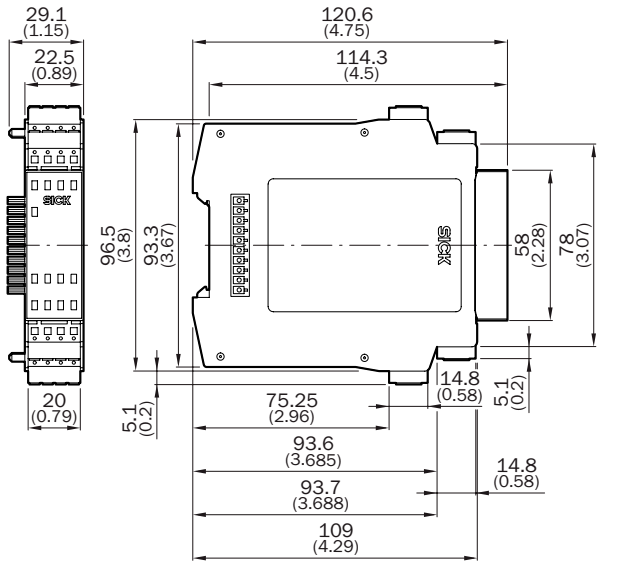
Number of enable current contacts	Number of signalling current contacts	Number of contactor monitoring contacts	Type	Part no.
2	1	1	UE410-2RO4	6032677
4	2	2	UE410-4RO4	6032676
2	0	1	UE10-2FG3D0	1043916
			UE12-2FG3D0	1043918

Dimensional drawings (Dimensions in mm (inch))

FX3-CPU0, FX3-CPU1, FX3-CPU2, FX3-CPU3



FX3-XTIO, FX3-XTDI, FX3-XTDS, FX0-STIO, UE410-2RO4, UE410-4RO4



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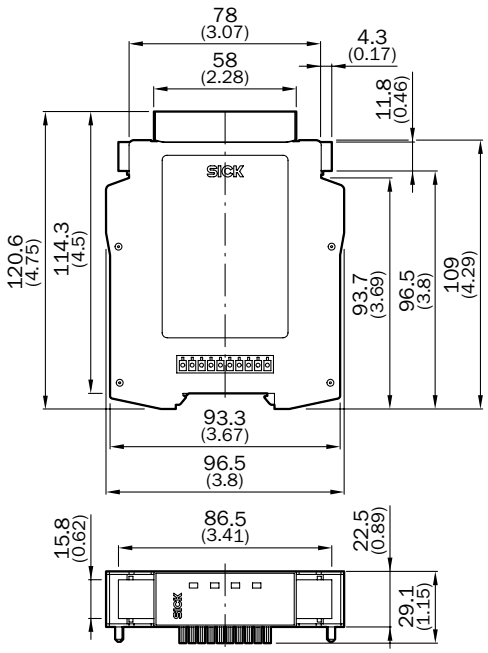
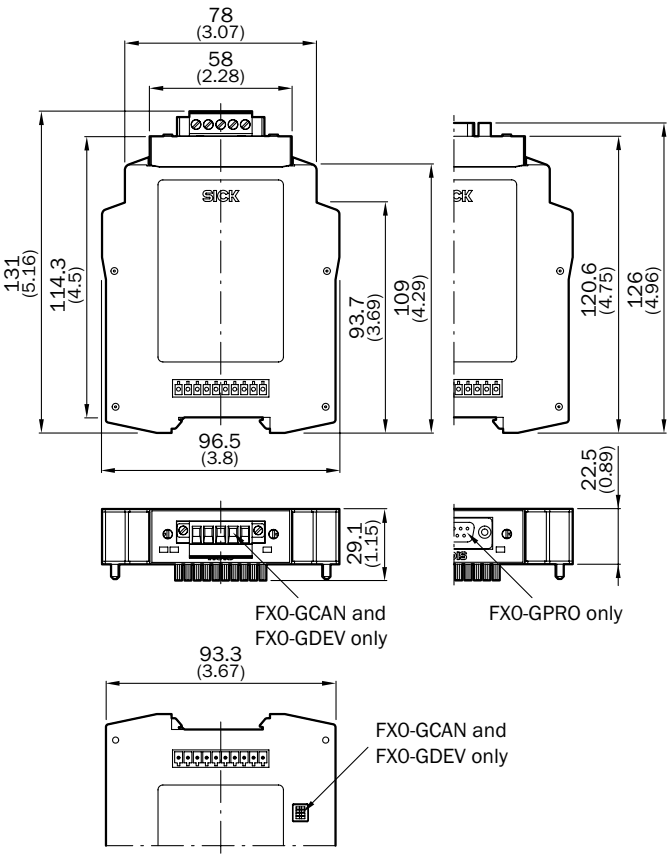
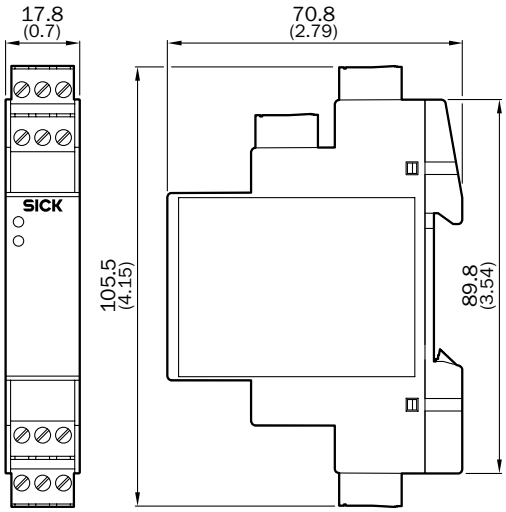
FX0-GENT, FX0-GMOD, FX0-GPNT, FX0-GETC



FX0-GPRO, FX0-GCAN, FX0-GDEV



UE10-2FG3, UE12-2FG3



Accessories

Plug connectors and cables

System plugs

Figure	Description	Specialty	Type	Part no.
	Storing the system configuration, without EFI-compatible devices	For FX3-CPU0 and FX3-CPU1	FX3-MPL000001	1043700
	Storing the system configuration, including EFI-compatible devices via Automatic Configuration Recovery (ACR)	For FX3-CPU2 and FX3-CPU3	FX3-MPL100001	1047162

Connecting cable (male connector-open)

Connection type head A	Connection type head B	Cable length	Type	Part no.
Connector, M8, 4-pin, angled	Open conductor heads	3 m	Connection cable	6036342

Connection cable (male-female connector)

Figure	Connection type head A	Connection type head B	Cable length	Type	Part no.
	Connector, M8, 4-pin, straight	Female connector, D-Sub, 9-pin, straight	2 m	DSL-8D04G02M025KM1	6021195
			10 m	DSL-8D04G10M025KM1	2027649

Connection cable (male connector-male connector)

Figure	Connection type head A	Connection type head B	Cable length	Type	Part no.
	Connector, M8, 4-pin, straight	Connector, USB-A, straight	2 m	DSL-8U04G02M025KM1	6034574
			10 m	DSL-8U04G10M025KM1	6034575
	Connector, USB-A, straight	Connector, Mini-USB, straight	3 m	Connection cable	6042517

Cable (open-open)

Figure	Connection type head A	Connection type head B	Items supplied	Type	Part no.
	Open conductor heads	Open conductor heads	By the meter	Flexi Link cable	6034249
				EFI connecting cable	6029448

Male connector (ready to assemble)

Figure	Connection type	Permitted cross-section	Type	Part no.
	Terminal connector, 4-pin	≤ 2.5 mm²	Screw-type terminal connector	2045891
		0.25 mm² ... 1.5 mm²	Spring terminal connector	2045890

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Adapters/distributors

Other adapters/distributors

Description	Type	Part no.
Diode module, for the connection of multiple short-circuiting switching mats (up to 4)	DM8-A4K	6026142

Power supply units/power cord connectors

Figure	Input voltage	Output voltage	Output current	Type	Part no.
	100 V AC ... 240 V AC	24 V DC	≤ 2.1 A	Power supply	7028789
			≤ 3.9 A	Power supply	7028790

Muting accessories

Figure	Description	Connection type	Cable length	Type	Part no.
 Illustration may differ	LED muting lamp, inclusive mounting kit, inclusive connection cable	Cable with connector M12	2 m	Indicator lamp	2019909
			10 m	Indicator lamp	2019910

COST-SAVING, SAFE SENSOR CASCADE WITH DIAGNOSTIC FUNCTION

Product description

The Flexi Loop can cascade up to 32 sensors while maintaining the highest performance level e. Safety switches and safety sensors with OSSD outputs can be used together regardless of the sensor manufacturer. In addition, for each sensor or switch there are detailed diagnostic information available. Integrated switching signals allow for the use of interlocks, switches and lamps. All sensors are supplied with power directly from the Flexi Loop.

Unscreened standard cables are used with M12 plugs. In total Flexi Loop guarantees the highest level of security. Cascading sensors reduces the amount of wiring and the number of safety inputs in the control cabinet. It also provides a comprehensive diagnostic check of all doors, emergency stop pushbuttons and sensors. In conjunction with the Flexi Soft and the Flexi Classic, the entire safety application is able to cost-effectively meet customer needs.

At a glance

- Ability to cascade 32 sensors with up to 30 m per segment in compliance with performance level PLe
- Compatible with sensors from all manufacturers
- Transfer of detailed diagnostic information
- Integrated standard inputs and outputs
- Power supply for sensors is included
- Connection of the sensors via unscreened standard cable with M12 plug
- IP 65 and IP 67 enclosure rating

Your benefits

- Cascading of safety switches and safety sensors with OSSD outputs minimizes the wiring effort and the inputs of the safety controller, which saves costs
- Easy retrofitting of existing machines
- Simple calculation of the performance level saves time since the Flexi Loop node monitors each sensor individually
- User-friendly due to quick and easy configuration
- Ability to be used over long distances increases application flexibility
- Detailed diagnostic information minimizes system downtime
- Seamless system integration and communication with other SICK safety controllers

Additional information

→ www.mysick.com/en/Flexi_Loop

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

Safety integrity level	SIL3 (IEC 61508) SILCL3 (EN 62061)
Category	Category 3 (EN ISO 13849-1)
Performance level	PL e (EN ISO 13849-1)
PFHd (mean probability of a dangerous failure per hour)	0.76 x 10^{-9} (EN ISO 13849)
T_M (mission time)	20 years (EN ISO 13849)

Functions

	OSSD 5-pin	OSSD 8-pin	EMSS 5-pin	EMSS 8-pin
Diagnostic and monitoring functions				
Cross-circuit	Monitoring via OSSD device		Monitoring via Flexi Loop node	
Short-circuit	Monitoring via OSSD device		Monitoring via Flexi Loop node	
Discrepancy errors	Monitoring via Flexi Loop node			
Sequence errors	Monitoring via Flexi Loop node			

Interfaces

	OSSD 5-pin	OSSD 8-pin	EMSS 5-pin	EMSS 8-pin
Connection usage				
Safety device connection	Safety sensor with dual-channel OSSD outputs		Dual-channel equivalent electro-mechanical safety switch (EMSS)	
Flexi Loop input	To connect a Flexi Loop predecessor module or to connect a Flexi Loop string with the safety controller Flexi Soft.			
Flexi Loop output	To connect a Flexi Loop successor module, or to terminate a Flexi Loop string with the Flexi Loop termination element.			
Connection type				
Safety device connection	Female connector M12, 5-pin	Female connector M12, 8-pin	Female connector M12, 5-pin	Female connector M12, 8-pin
Flexi Loop input	Connector M12, 5-pin			
Flexi Loop output	Female connector M12, 5-pin			
Number of non-safe inputs	1		0	1
Number of non-safe outputs	0	1	0	1
Power supply output for external devices	✔		–	✔

Electrical data

Operating data

	OSSD 5-pin	OSSD 8-pin	EMSS 5-pin	EMSS 8-pin
Protection class	III (EN 61140)			
Type of supply voltage	SELV			
Supply voltage V_s	24 V DC (16.8 V DC ... 30 V DC)			
Power consumption	45 mA		55 mA	

OSSD inputs

	OSSD 5-pin	OSSD 8-pin	EMSS 5-pin	EMSS 8-pin
Input voltage				
HIGH	13 V DC ... 30 V DC		–	
LOW	–5 V DC ... 5 V DC		–	
Input current				
HIGH	3.5 mA ... 6.2 mA		–	
LOW	–2.5 mA ... 2.5 mA		–	

EMSS interface

	OSSD 5-pin	OSSD 8-pin	EMSS 5-pin	EMSS 8-pin
Test period	–		40 ms	
Test pulse duration	–		12 ms	
Test pulse current via the switch contacts	–		3 mA ... 6.2 mA	

Non-safe inputs

	OSSD 5-pin	OSSD 8-pin	EMSS 5-pin	EMSS 8-pin
Switching voltage				
HIGH	13 V DC ... 30 V DC		–	13 V DC ... 30 V DC
LOW	0 V DC ... 5 V DC		–	0 V DC ... 5 V DC
Input current	≤ 6.2 mA		–	≤ 6.2 mA

Non-safe outputs

	OSSD 5-pin	OSSD 8-pin	EMSS 5-pin	EMSS 8-pin
Type of output	–	Highside driver, short-circuit protected	–	Highside driver, short-circuit protected
Output current	–	≤ 500 mA	–	≤ 500 mA

Power supply output for external devices

	OSSD 5-pin	OSSD 8-pin	EMSS 5-pin	EMSS 8-pin
Supply voltage	24 V DC (16.8 V DC ... 30 V DC)		–	24 V DC (16.8 V DC ... 30 V DC)
Output current	≤ 3.9 A	≤ 2 A	–	≤ 2 A

Mechanical data

Dimensions (W x H x D)	68.15 mm x 45 mm x 18 mm
Weight	28 g (± 5 %)

Ambient data

Enclosure rating	IP 65, IP 67 (EN 60529)
Ambient operating temperature	–25 °C ... +55 °C
Storage temperature	–25 °C ... +70 °C
Electromagnetic compatibility (EMC)	Class A (EN 61000-6-2, EN 55011)
Shock resistance	
Continuous shock	10 g, 16 ms (EN 60068-2-64)
Single shock	30 g, 11 ms (EN 60068-2-27)

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Ordering information

Flexi Loop node for safety sensors with dual-channel OSSD outputs

Connection type	Number of non-safe inputs	Number of non-safe outputs	Type	Part no.
Female connector M12, 5-pin	1	0	FLN-OSSD1000105	1061709
Female connector M12, 8-pin	1	1	FLN-OSSD1100108	1061710

Flexi Loop node for dual-channel equivalent electro-mechanical safety switches

Connection type	Number of non-safe inputs	Number of non-safe outputs	Type	Part no.
Female connector M12, 5-pin	0	0	FLN-EMSS0000105	1061711
Female connector M12, 8-pin	1	1	FLN-EMSS1100108	1061712

Flexi Loop power supply module

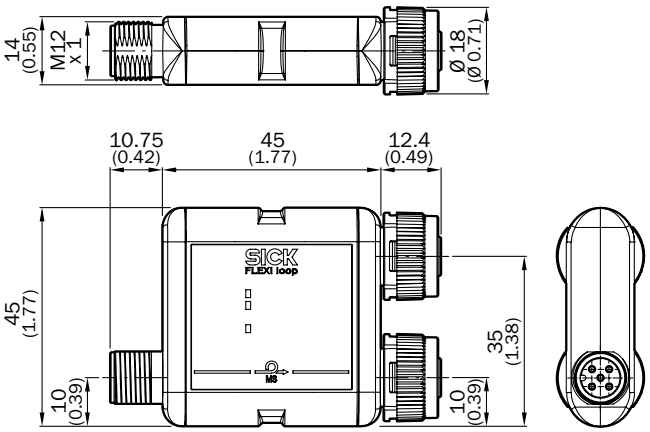
Description	Type	Part no.
The power supply module is used to connect a power supply with 24 V DC, for the electrical isolation and for overcurrent shutdown.	FLA-PWRI00001	1061715

Flexi Loop terminator module

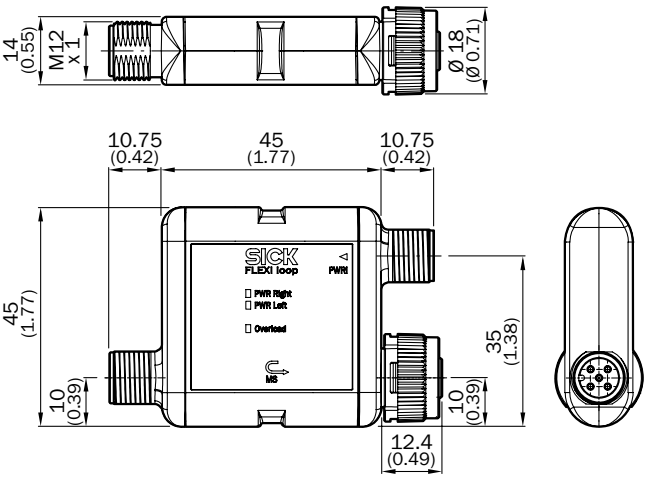
Description	Type	Part no.
The terminator is used to terminate the safe sensor cascade on the last Flexi Loop node.	FLT-TERM00001	1061716

Dimensional drawings (Dimensions in mm (inch))

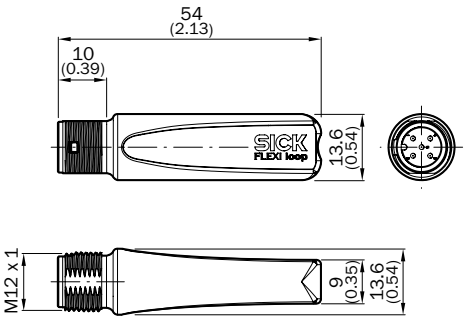
FLN-OSSD1000105, FLN-OSSD1100108,
FLN-EMSS0000105, FLN-EMSS1100108



FLA-PWRI00001



FLT-TERM00001



Accessories

Mounting brackets/plates

Mounting brackets

Figure	Description	Type	Part no.
	Flexi Loop fixing clip	C-Fix bracket	2068830

Plug connectors and cables

Connecting cable (female connector-open)

Figure	Connection type head A	Connection type head B	Cable length	Type	Part no.
	Female connector, M12, 5-pin, straight	Open conductor heads	5 m	DOL-1205-G05MC	6025907
			10 m	DOL-1205-G10MC	6025908
			15 m	DOL-1205-G15MC	6051946
			20 m	DOL-1205-G20MC	6050247
			30 m	DOL-1205-G30MC	6050248

Connecting cable (male connector-open)

Connection type head A	Connection type head B	Cable length	Type	Part no.
Connector, M12, 5-pin, straight	Open conductor heads	1 m	STL-1205-G01MC	6037741
		2 m	STL-1205-G02MC	6051951
		5 m	STL-1205-G05MC	6051952
		10 m	STL-1205-G10MC	6051953
Connector, M12, 8-pin, straight	Open conductor heads	1 m	STL-1208-G01MC	6051954
		2 m	STL-1208-G02MC	6051955
		5 m	STL-1208-G05MC	6051956
		10 m	STL-1208-G10MC	6051957

Connection cable (male-female connector)

Figure	Connection type head A	Connection type head B	Cable length	Type	Part no.
	Connector, M12, 4-pin, straight	Female connector, M12, 4-pin, straight	0.2 m	DSL-1204-G0M2C	6051998
	Connector, M12, 5-pin, straight	Female connector, M12, 5-pin, straight	0.6 m	DSL-1205-G0M6C	6025930
			1 m	DSL-1205-G01MC	6029280
			1.5 m	DSL-1205-G1M5C	6029281
			2 m	DSL-1205-G02MC	6025931
			5 m	DSL-1205-G05MC	6029282
			10 m	DSL-1205-G10MC	6038954
			15 m	DSL-1205-G15MC	6038956
			20 m	DSL-1205-G20MC	6038957
			30 m	DSL-1205-G30MC	6051945
	Connector, M12, 8-pin, straight	Female connector, M12, 8-pin, straight	0.6 m	DSL-1208-G0M6C	6044991
			1 m	DSL-1208-G01MC	6051940
			1.5 m	DSL-1208-G1M5C	6051941
			2 m	DSL-1208-G02MC	6051942
			5 m	DSL-1208-G05MC	6051943
			10 m	DSL-1208-G10MC	6051944

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Female connector (ready to assemble)

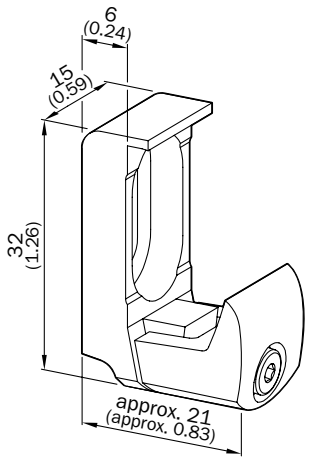
Figure	Connection type	Permitted cross-section	Permitted cable diameter	Type	Part no.
	Female connector, M12, 5-pin, straight	≤ 0.75 mm²	3 mm ... 6.5 mm	DOS-1205-G	6009719
	Female connector, M12, 8-pin, straight	≤ 0.75 mm²	3 mm ... 6.5 mm	DOS-1208-G	6028422

Male connector (ready to assemble)

Figure	Connection type	Permitted cross-section	Permitted cable diameter	Type	Part no.
	Connector, M12, 5-pin, straight	≤ 0.75 mm²	3 mm ... 6.5 mm	STE-1205-G	6022083
	Connector, M12, 8-pin, straight	≤ 0.75 mm²	3 mm ... 6.5 mm	STE-1208-G	6033269

Dimensional drawings accessories (Dimensions in mm (inch))

C-Fix bracket



FLEXIBLE, HIGH-PERFORMANCE DRIVE MONITORING

Product description

Providing protection from hazardous movements in addition to creating more efficient and flexible machine designs: SICK's Flexi Soft Drive Monitor 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 Flexi Soft Drive Monitor 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

Additional information

→ www.mysick.com/en/Flexi_Soft_Drive_Monitor

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	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 (FLEXBUS+)

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

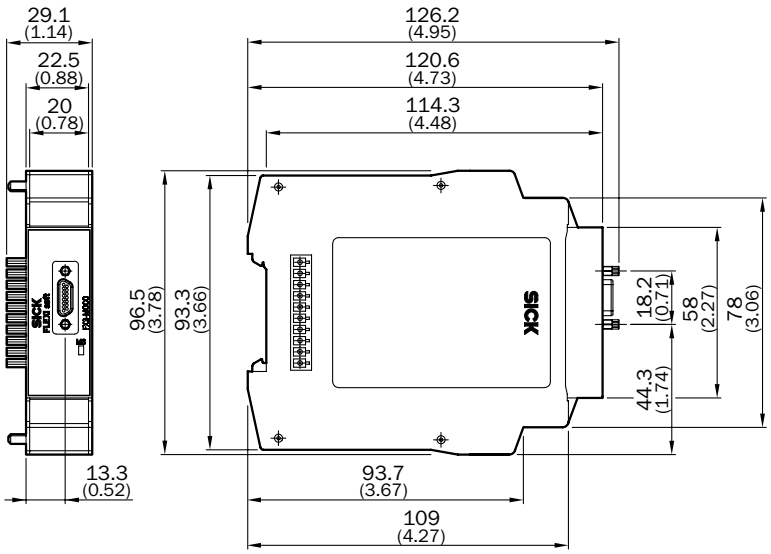
Ambient data

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)
	3 g 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)

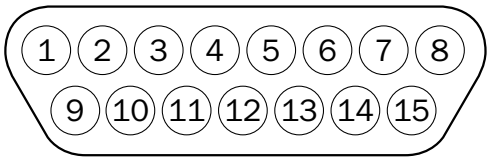
Ordering information

Description	Type	Part no.
Flexi Soft Drive Monitor	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

Figure	Description	Model name	Part no.
	Facility for connecting one encoder (normally used in conjunction with a motor feedback encoder). Connection to Flexi Soft Drive Monitor: 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 Flexi Soft Drive Monitor: 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)

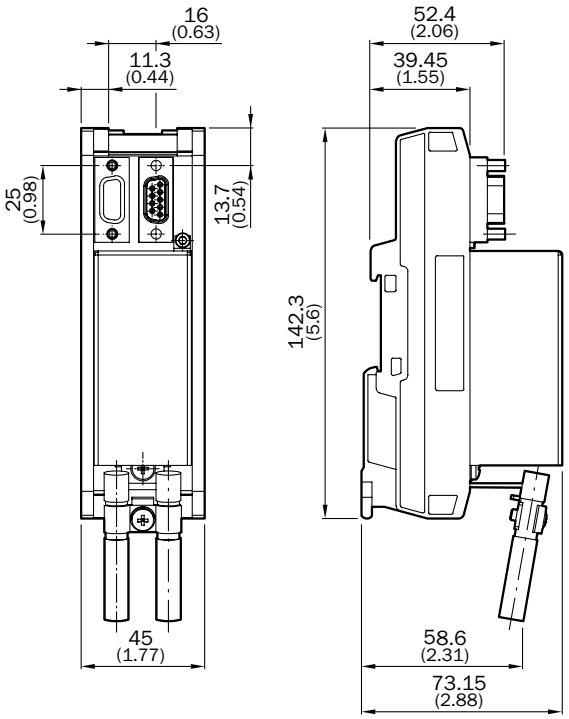
Connection type head A	Connection type head B	Cable length	Usage	Model name	Part no.
Connector, D-Sub HD, 15-pin, straight	Female connector, Micro D-Sub, 15-pin, straight	2 m	To connect Flexi Soft Drive Monitor with motor feedback splitter box or dual encoder connection box	Connection cable	2067798
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

Connection cable (male connector-male connector)

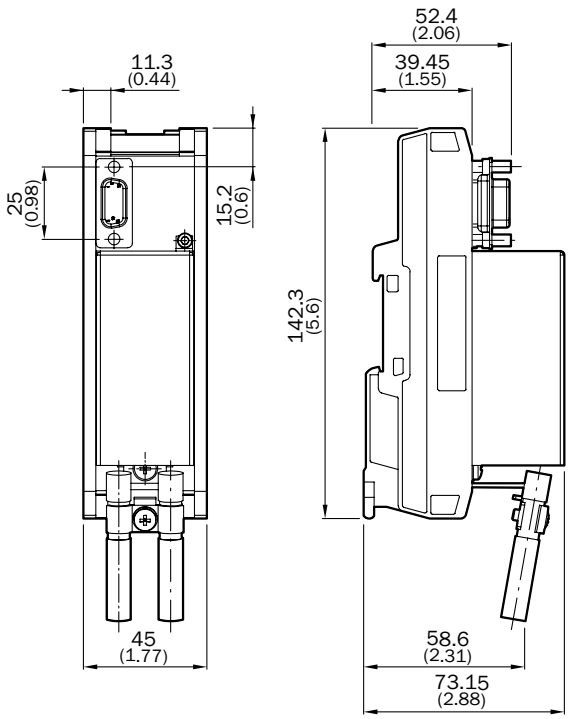
Connection type head A	Connection type head B	Cable length	Usage	Model name	Part no.
Connector, D-Sub HD, 15-pin, straight	Connector, D-Sub, 9-pin, straight	2 m	To connect two motor feedback splitter boxes with each other	Connection cable	2067800
		10 m		Connection cable	2067801

Dimensional drawings accessories (Dimensions in mm (inch))

Motor feedback splitter box



Dual encoder connection box



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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 to 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.”

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Australia, Belgium/Luxembourg, Brasil, Česká 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.

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