Flexi Classic

EFFICIENT CONTROL TO THE END OF THE LINE

Safety controllers

SICK
Sensor Intelligence.

A GOOD TEAM NEEDS EXPERIENCED MANAGEMENT

Fielding a top team takes an experienced team leader and team players who are able to perfectly fulfill their role. If we apply this to safety systems, it means rational and efficient distribution of safety tasks to the high-performance individual components.

These three work in perfect harmony in a functioning system, controlling industrial machines until the end of the line.

Flexi Classic

The experienced manager

Ensures safe machine stopping through quick decision-making – whether as a central processing unit or as part of a network.

➜ Page 3–9

Flexi Loop

The flexible messenger

Quickly and reliably transmits sensor information.

➜ Page 10–11

Flexi Loop master node

The smart interpreter

Builds a bridge between the Flexi Loop and Flexi Classic.

➜ Page 12–13

Simple and to the point:
The modular and efficient Flexi Classic safety controller

In the day-to-day workings of an automated industrial environment, man and machine must be reliably protected against accidents and damage. This is ensured by protective devices such as safety sensors and safety switches. These must be controlled efficiently in order to guarantee that machines safely and immediately stop in the event of danger or a fault. This coordination needs an assertive manager. For machines with a simple to medium logic, the established Flexi Classic safety controller is the ideal solution, whether individually wired or with the safe sensor cascade Flexi Loop.

The main advantage of using the Flexi Classic is that the logic is generated without software. Users can literally adapt the configuration to their needs with a flick of the wrist, since the logic functions can simply be changed by using the rotary switch on the module. Quick and easy commissioning thus ensures maximum efficiency.

➜ www.sick.com/FlexiClassic

MANAGEMENT WITH A STRONG SUPPORTING TEAM

With the Flexi Classic, various modules can be combined in order to create tailored safety solutions. The Flexi Classic safety controller consists of a main module, extension modules, and gateways. If necessary, relay modules can be added. Communication between the units takes place via an internal bus, which also reads out diagnostics information.
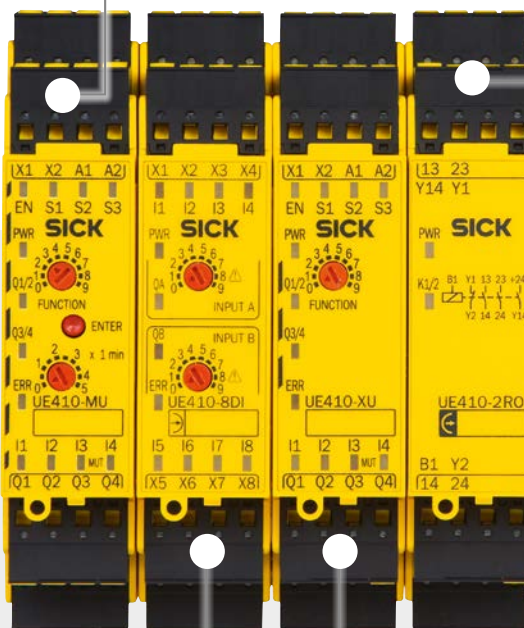
GU main module

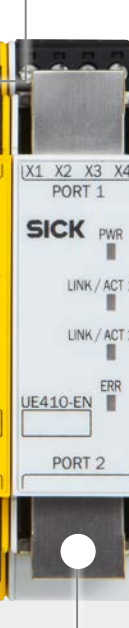For creating a global emergency stop function for a series of machines.

MU main module

The hub of the system, which saves the configuration of the application. There is also the ability to connect up to 11 expansion modules.

Relay modules

These are optional and switched via a system safety output. These modules offer additional universal relay output functions.
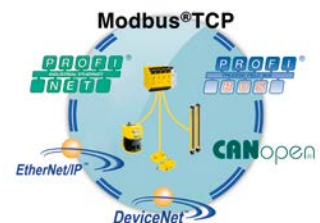

Extension modules

The extension modules provide additional inputs and outputs, and enable several sensors or actuators to be connected. The logical linking of the connected components is defined individually for each module.
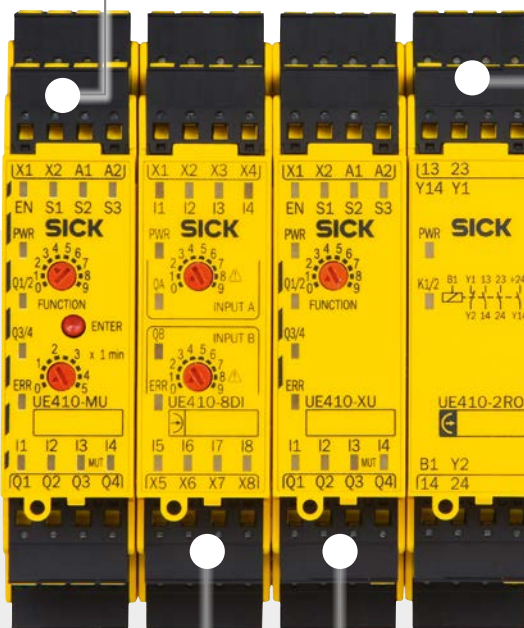
Gateways

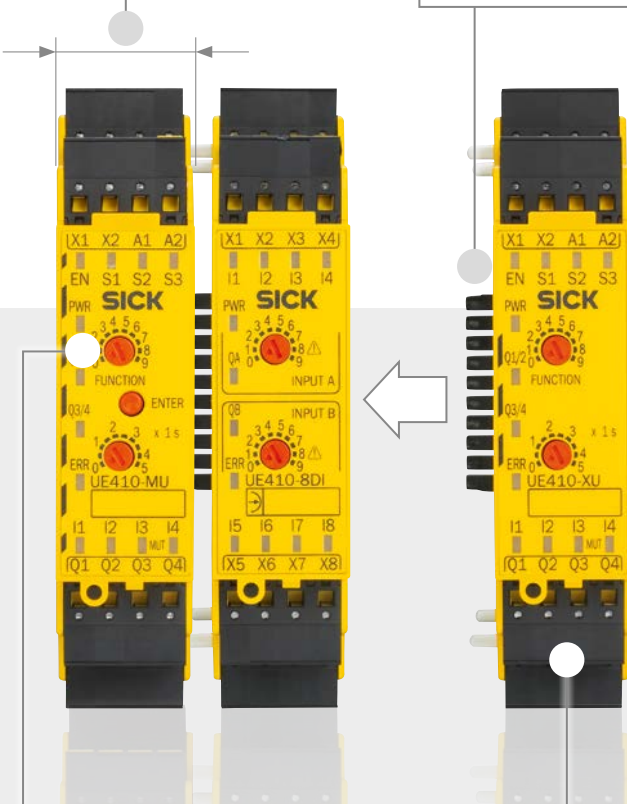For connection to any available automation control system.

Narrow housing

More space available in the control cabinet

Modular extension possible

Optimal granularity avoids unnecessary inputs and outputs

Rotary switch

Simple configuration without software

Plug-in terminals

Quick module replacement

Team planning in the configurator

A ➜ configurator is available free of charge for planning. Using the graphical user interface, Flexi Classic modules can be combined, and safety sensors, safety switches, and Flexi Loop nodes can be connected by simply dragging and dropping.
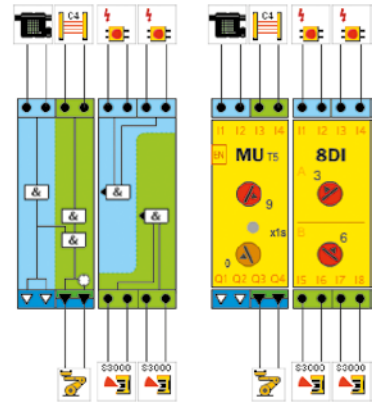
Going to the next level, the project planner can also call up practical wiring assistance. This ensures quick commissioning and means that users are provided with a quick overview, enabling straightforward maintenance and allowing checks to be performed regularly.
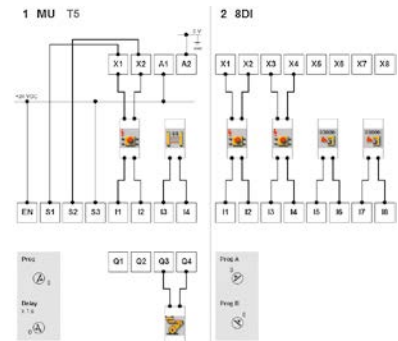
MAKING CONTACTS IS
ALL PART OF BEING A MANAGER

GLOBAL UNIT MODULE – THE GLOBAL NETWORKER

Good contacts and communication channels are at the heart of any successful cooperation. After all, to get good results, it's not just a question of what managers can do, but also who they know.

The global unit (GU) module provides the basis for a global emergency stop function. Several of these modules can be connected via a special signal, with each recognizing its "co-workers" – or rather, neighboring modules – which have been introduced by means of a teach-in process at an earlier stage. All applications which can be selected using a rotary switch on a GU module have a global emergency stop function which affects all safety outputs in the system. Put simply, this means that if an emergency stop pushbutton is actuated on a GU module, then all other safety outputs on the associated modules turn off too. To reset the global emergency stop, the reset function has to be actuated on the same GU module on which the emergency stop was triggered (local reset).

Local sensor included

Each GU module even has the option to connect a local sensor, which responds exclusively to the safety output for the respective GU module and can be reset either automatically or using the local reset function depending on the selected application.

Numerous options for expansion

In addition to gateways and Flexi Loop applications, it is also possible to connect up to 11 expansion modules to the GU module. Communication and the power supply are provided via the internal bus.
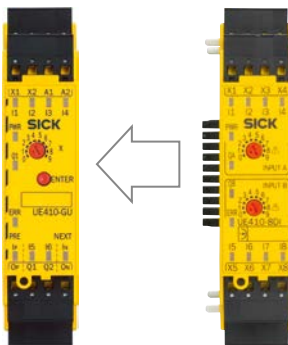
Wide range of connection options

Alongside the facility for connecting two neighboring modules and an emergency stop pushbutton, the GU module also offers inputs for a local sensor, a reset pushbutton, and an EDM signal. And last but not least, it even has an output for a reset lamp.

● Safety inputs
● Safety outputs
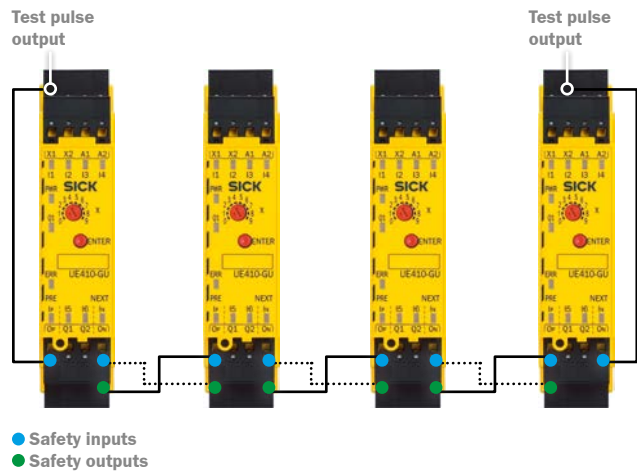
- Global emergency stop function
  – Affects all safety outputs in the system
- Connection for a local sensor
  – Can be used in addition and only affects the local safety output
- Simple commissioning and minimal cabling effort
- Certified functionality
- Increased productivity thanks to a complete diagnostics option

Protection of a stretch banding machine

The Flexi Classic safety controller protects this high-performance machine from unauthorized access. It takes all signals from the connected safety components and safely switches the machine off in the event of a dangerous situation. At the same time, servicing and maintenance via the service doors is always possible.

- Easily configurable access protection with rotary switch
- Service and maintenance functions for quick intervention when the machine is in operation

⊕ Compact solution with optimal sensor integration

Access protection through muting
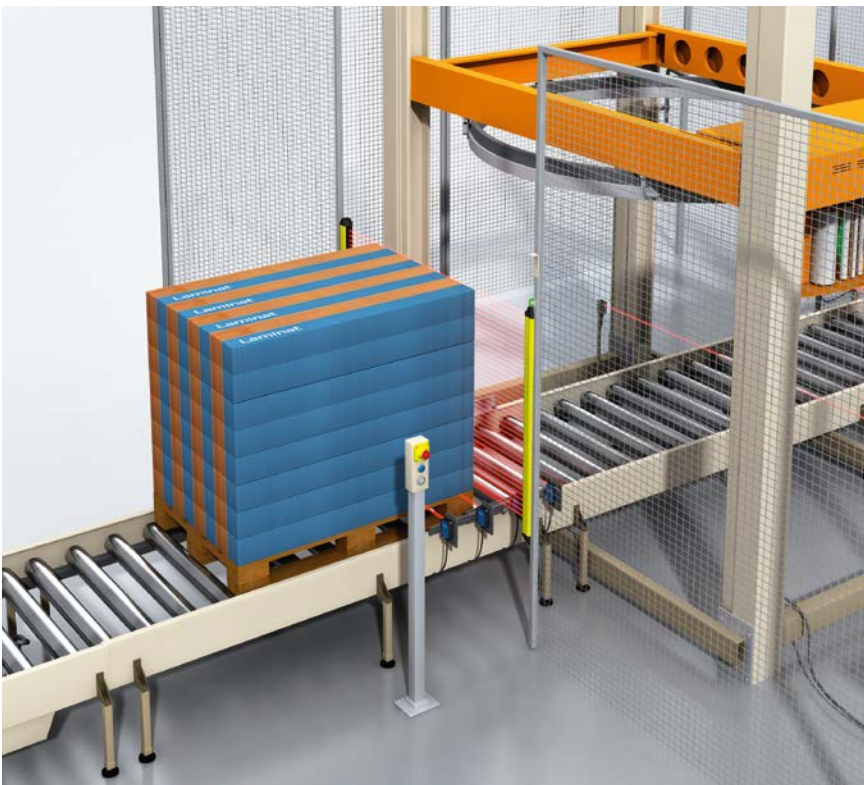
The muting function of the Flexi Classic safety controller ensures that pallet transportation runs smoothly. The muting sensors recognize the size of the object detected, and monitors the object throughput time. Using this information, the safety controller decides whether it is dealing with human or material movement, and consequently whether to automatically activate temporary muting of the safety light curtain.

- Direction detection, sensor gap monitoring, conveyor stop and sequence monitoring via muting
- Connection to superordinate controller with the corresponding gateways

⊕ Enables safe differentiation between man and material

Safe monitoring of machines that take up a large area

Together with the Flexi Loop safe sensor cascade, the Flexi Classic safety controller can protect large machines in a cost-efficient and smart manner. This combination truly reaches its full potential in cases where there are many doors, emergency stop pushbuttons, and tactile and electro-sensitive protective devices, but where very few, and sometimes very long, cut-off paths are in place. Individual monitoring of each safety switch or safety sensor within the Flexi Loop cascade means that there is no impact on the performance level of the whole application, despite the safe cascading.

- During commissioning, the Flexi Loop offers the possibility, even before connection of the safety controller, to check the wiring centrally. The LEDs on the Flexi Loop master node display the status of each individual node in the sensor cascade. This allows any errors to be detected and resolved early on.
- During operation, the transfer of diagnostics information results in rapid localization of the triggering machine stop

➕ Highly efficient and low-cost sensor integration without software

MESSAGES NEED A MESSENGER

FLEXI LOOP – THE FLEXIBLE MESSENGER

These days, no-one can afford to exchange information at snail-mail pace.
What is needed are flexible and swift couriers who take messages from
point A to point B without a hitch.

For safe cascading, the information must be transmitted from
the safety sensors and safety switches to the safety control-
ler. The Flexi Loop performs extremely well in its role as the
messenger.

- Cascading of up to 32 different safety switches and safety
  sensors with semiconductor outputs monitored
- Compatible with sensors from all manufacturers
- In compliance with most stringent safety standards (up to
  Performance Level PL e)
- Transmission of diagnostics information without avoiding the
  danger posed by error masking

- Integrated standard input and output as well as power
  supply to sensors
- Saves costs thanks to minimized wiring work
- Easy upgrading of existing machines
- Simple calculation of the performance levels saves time
  since the Flexi Loop node monitors each sensor individually
- Integration and communication with superordinate safety
  controller
- Ability to be used over long distances increases application
  flexibility

Plug and play

Make use of the time that you save

The process of commissioning a machine with the Flexi Loop and SICK safety sensors and safety switches is quick, easy, and efficient.

Plug and play when connecting the sensors and when wiring the nodes. Industry-standard cables with M12 connectivity leave plenty of time to spare.

Individual node diagnostics

Flexi Loop points you in the right direction

The individual Flexi Loop nodes not only test themselves, they also indicate to the machine operator which direction they need to go in whenever a fault arises.

If an LED is constantly illuminated green, this means that the machine is running smoothly. If an LED is flashing, this means there is a fault at the following Flexi Loop node. At this node, the LED will be illuminated red.
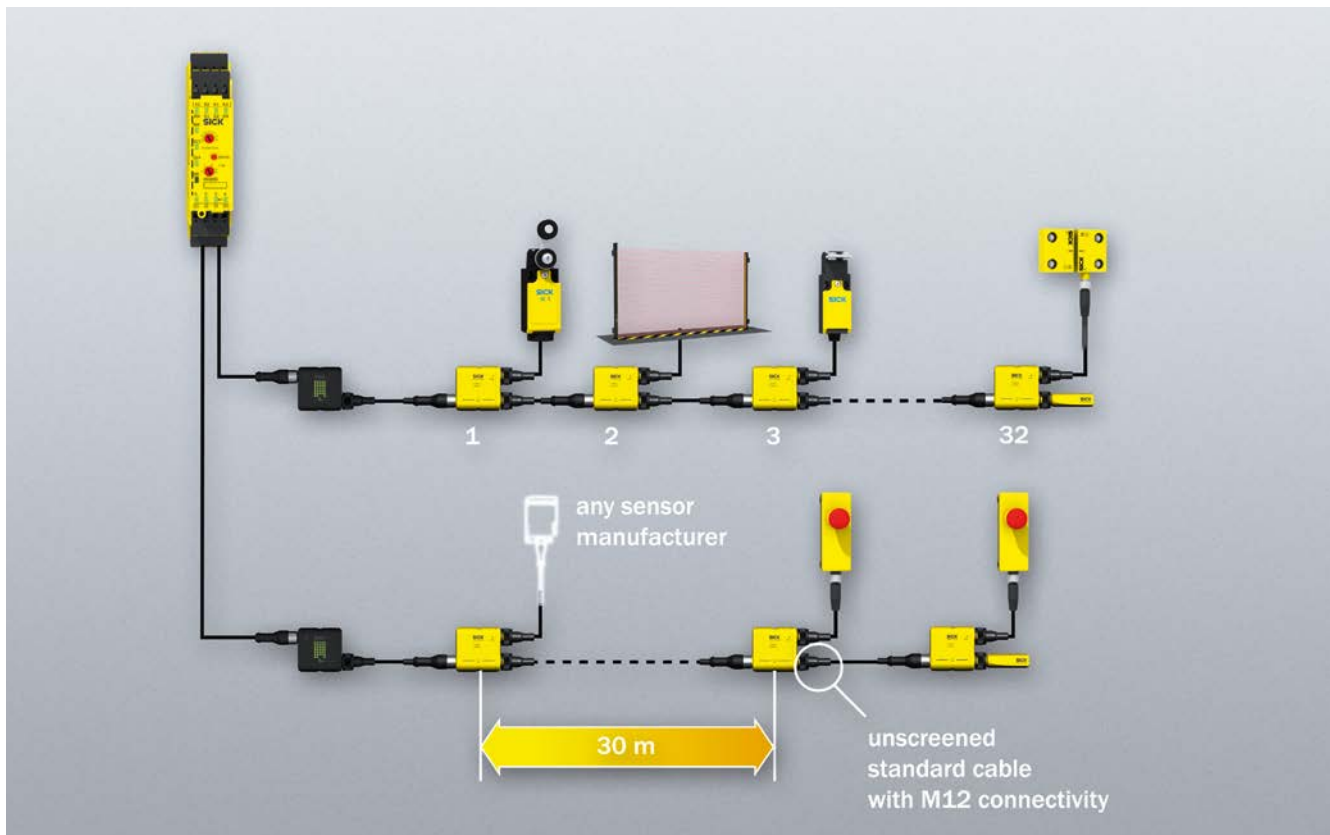
Cascading of up to 32 safety sensors with the Flexi Loop.

FLEXI LOOP MEETS FLEXI CLASSIC –
RENDEZVOUS IN A LITTLE BLACK DRESS
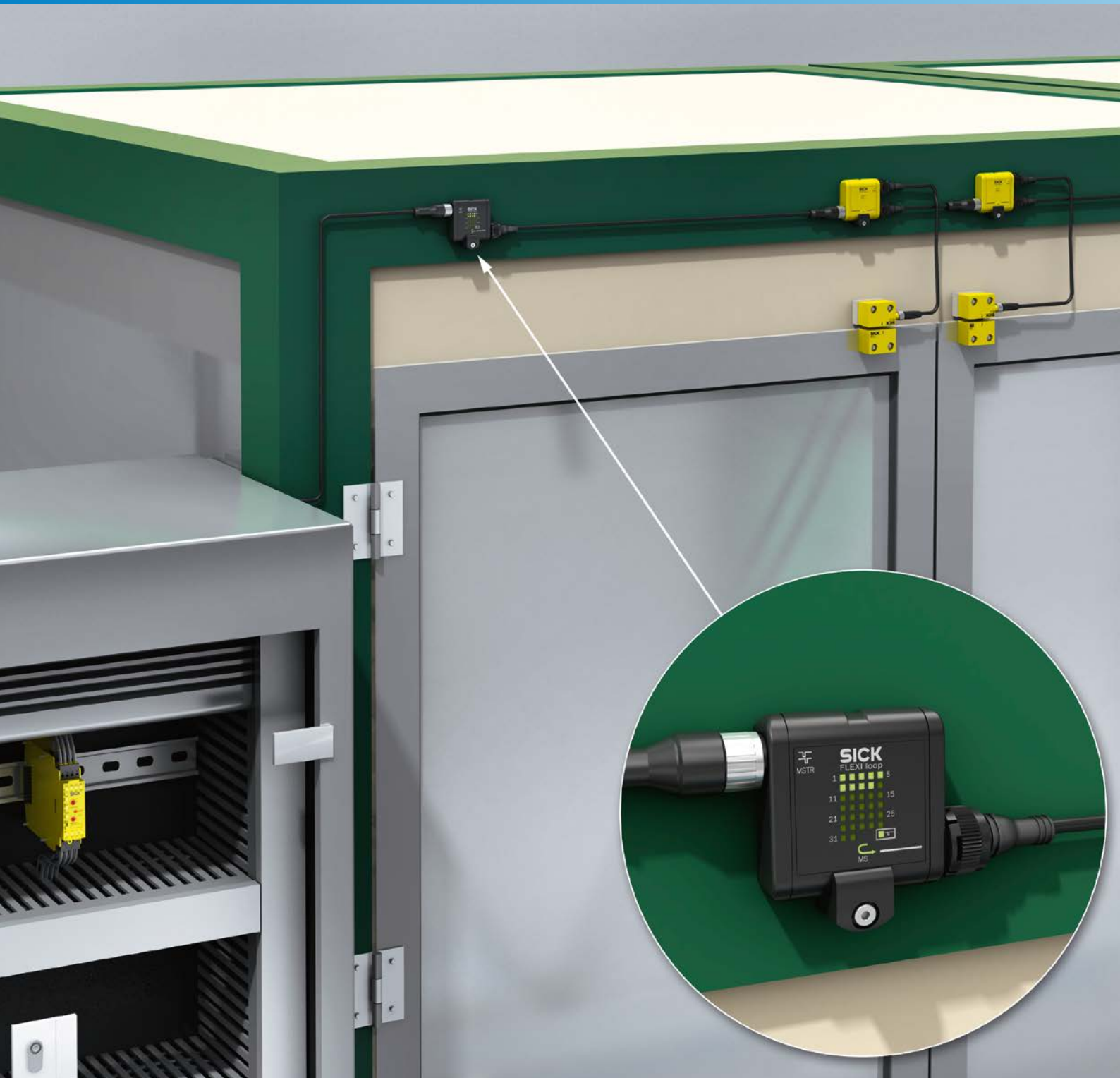
FLEXI LOOP MASTER NODE – THE SMART INTERPRETER

When the Flexi Loop and Flexi Classic meet, there is initially radio silence, because they do not speak the same language. Fortunately, the Flexi Loop master node speaks both their languages, and can therefore act as an interpreter. It is available in two models: the basic version (MSTR1) and the version with an additional IO-Link interface (MSTR2).

Two operating modes plus IO-Link connection

Commissioning

If the Flexi Classic is not active or connected, the Flexi Loop master node performs the loop communication. All integrated components in the cascade can be tested to see if they are ready for operation. In this mode, however, the master node does not determine any safety information.

Safe mode

Before the Flexi Loop master node can function in safe mode, it must learn how many Flexi Loop nodes are connected to the cascade by way of a simple teaching procedure. This is done using a single test signal from the Flexi Classic. After that, it transmits relevant safety information from the cascade, and sends the corresponding safety signals back to the safety

controller. This information can include dynamic faults such as the discrepancy errors or static errors such as sensor status, cross-circuit, line rupture, or incorrect node count.

IO-Link for even more efficiency

The IO-Link interface allows a live connection to be made with the process control system, which also controls the standard inputs and outputs of the Flexi Loop nodes. The advantage here is that the types of Flexi Loop nodes (EMSS or OSSD, 5-pin or 8-pin) can be recognized and confirmed, even without a teaching procedure. The configuration of the Flexi Loop master node can also be adjusted in this way.

EFFICIENT AND EASY-TO-USE SAFETY CONTROLLER

Product description

The Flexi Classic modular safety controller allows easy logic setting without any software. This enables the user to adapt the configuration to the application requirements. Logic functions are configured using rotary DIP switches. These switches are located directly on the modules, enabling quick and easy commissioning. Communication between the individual modules is achieved via an internal bus, providing users interface information about the diagnostics of the safety system.

The product portfolio include gateways, which have no influence on the adjusted logic and are used for connection to a higher-level, non-safe control. The gateways collect and forward the information of the system, ensuring quick diagnostics. The Flexi Classic also has a Flexi Classic Configurator tool for configuration planning. Special modules for muting complete this product family, which provides efficient solutions for a whole host of applications.

At a glance

- Rotary DIP switch for easy adjustment
- Modularly expandable
- Direct wiring for all types of sensors
- Logic functions: AND, OR, Muting, Bypass, Reset, EDM

- Integration into all common fieldbuses
- Integration of the safe sensor cascade Flexi Loop
- Special muting modules are able to meet all the requirements of a demanding muting application

Your benefits

- Optimal scalability prevents extra inputs and outputs, reducing hardware
- Configuration via rotary DIP switch simplifies logic configuration
- The Flexi Classic Configurator tool offers easy logic configuration and wiring help

- Complete diagnostics of the system reduces downtime
- Its compact design makes it possible to save space in the control cabinet
- Significantly reduced wiring compared with conventional safety solutions. Wiring with Flexi Loop is even easier.

CE

Additional information

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.

Detailed technical data

General data

System construction	Modular
Main module	1
Expansion modules	0 ... 11
Relay modules	0 ... 8 [1]
Gateway	0 ... 1
Module interconnection	Internal bus (FLEXBUS)
Configuration method	Via rotary switch
Display elements	LEDs
Fieldbus, industrial network	CANopen, DeviceNet, EtherNet/IP, Modbus TCP, PROFIBUS DP, PROFINET
Type of fieldbus integration	Gateway

[1] 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

Safety integrity level	SIL3 (IEC 61508) SILCL3 (EN 62061)
Category	Category 4 (EN ISO 13849)
Performance level	PL e (EN ISO 13849)
PFHd (mean probability of a dangerous failure per hour)	2.5×10^{-9} (EN ISO 13849)
T_M (mission time)	20 years (EN ISO 13849)

Functions

	UE410-MU	UE410-MM	UE410-GU
Restart interlock	Manual / automatic (configurable)		
External device monitoring (EDM)	✔		
AND operation	✔	–	✔
OR operation	✔	–	–
Bypass	✔	–	–
Differentiation between man and material (muting)	✔		
Override	–	✔	–
Concurrence monitoring	–	✔	–
Monitoring of total muting time	–	✔	–
Sensor gap monitoring	–	✔	–
End of muting by ESPE	–	✔	–
Global emergency stop	–		✔

Interfaces

	UE410-MU	UE410-MM	UE410-GU
Inputs	4 safety inputs 4 switching inputs	2 safety inputs 2 switching inputs 4 muting inputs	4 safety inputs 2 switching inputs 2 inputs for the global emergency stop function
Number of muting sensors	0 / 2	2 / 4	–
Outputs	4 safety outputs 2 test outputs	2 safety outputs 2 test outputs 2 diagnostic outputs	1 safety output 2 test outputs 1 diagnostic output 2 outputs for the global emergency stop function
Delay time (outputs Q3/Q4)	0 s ... 300 s (depending on type)	–	
Connection type	Plug-in screw-type terminals / plug-in spring terminals (depending on type)		Plug-in screw-type terminals
Permitted cross-section			
Single wire or finely stranded (1x)	0.14 mm² ... 2.5 mm²		
Single wire or finely stranded (2x)	0.14 mm² ... 0.75 mm²		
Finely stranded with ferrules (1x)	0.25 mm² ... 2.5 mm²		
Finely stranded with ferrules (2x)	0.25 mm² ... 0.5 mm²		

Electrical data

	UE410-MU	UE410-MM	UE410-GU
Protection class	III (EN 61140)		
Type of voltage supply	PELV or SELV [1]		
Supply voltage V_s	24 V DC (19.2 V DC ... 30 V DC)		
Residual ripple	≤ 10 %		
Power consumption	≤ 3 W (DC)		
Switch-on time	≤ 60 s	≤ 10 s	≤ 60 s

[1] The current of the power supply that powers the main unit must be limited to a maximum of 6 A, either through the power supply itself or a fuse.

Mechanical data

Dimensions (W x H x D)	22.5 mm x 96.5 mm x 120.8 mm
Weight	180 g

Ambient data

Enclosure rating		
	Housing	IP 40 (EN 60529)
	Terminals	IP 20 (EN 60529)
Ambient operating temperature		–25 °C ... +55 °C
Storage temperature		–25 °C ... +70 °C
Air humidity		15 % ... 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 RMS, 5 Hz ... 500 Hz (EN 60068-2-64)

I/O modules

Safety-related parameters

	UE410-XU	UE410-XM	UE410-8DI	UE410-MDI
Safety integrity level	SIL3 (IEC 61508) SILCL3 (EN 62061)			
Category	Category 4 (EN ISO 13849)			
Performance level	PL e (EN ISO 13849)			
PFHd (mean probability of a dangerous failure per hour)	2.5×10^{-9} (EN ISO 13849)		3.8×10^{-9} (EN ISO 13849)	2.5×10^{-9} (EN ISO 13849)
T_M (mission time)	20 years (EN ISO 13849)			

Functions

	UE410-XU	UE410-XM	UE410-8DI	UE410-MDI
Restart interlock	Manual / automatic (configurable)		–	
External device monitoring (EDM)	✔		–	
AND operation	✔	–	✔	–
OR operation	✔	–	✔	–
Bypass	✔	–	✔	–
Differentiation between man and material (muting)	✔		–	✔
Override	–	✔	–	✔
Concurrence monitoring	–	✔	–	
Monitoring of total muting time	–	✔	–	
Sensor gap monitoring	–	✔	–	
End of muting by ESPE	–	✔	–	
Belt stop signal	–			✔
Additional muting signal	–			✔

Interfaces

	UE410-XU	UE410-XM	UE410-8DI	UE410-MDI
Inputs	4 safety inputs 4 switching inputs	2 safety inputs 2 switching inputs 4 muting inputs	8 safety inputs	3 switching inputs
Number of muting sensors	0 / 2	2 / 4	–	
Outputs	4 safety outputs 2 test outputs	2 safety outputs 2 test outputs 2 diagnostic outputs	8 test outputs	–
Delay time (outputs Q3/Q4)	0 s ... 300 s (depending on type)	–		
Connection type	Plug-in screw-type terminals / plug-in spring terminals (depending on type)			
Permitted cross-section				
Single wire or finely stranded (1x)	0.14 mm² ... 2.5 mm²			
Single wire or finely stranded (2x)	0.14 mm² ... 0.75 mm²			
Finely stranded with ferrules (1x)	0.25 mm² ... 2.5 mm²			
Finely stranded with ferrules (2x)	0.25 mm² ... 0.5 mm²			

Electrical data

	UE410-XU	UE410-XM	UE410-8DI	UE410-MDI
Protection class	III (EN 61140)			
Voltage supply	Via A1, A2		Via FLEXBUS	
Type of voltage supply	PELV or SELV [1]		–	
Supply voltage V_s	24 V DC (19.2 V DC … 30 V DC)		–	
Residual ripple	≤ 10 %		–	
Power consumption	≤ 3 W (DC)			≤ 1.8 W (DC)

[1] The current of the power supply that powers the module must be limited to a maximum of 6 A, either through the power supply itself or a fuse.

Mechanical data

	UE410-XU	UE410-XM	UE410-8DI	UE410-MDI
Dimensions (W x H x D)	22.5 mm x 96.5 mm x 120.8 mm			
Weight	180 g		150 g	

Ambient data

Enclosure rating		
	Housing	IP 40 (EN 60529)
	Terminals	IP 20 (EN 60529)
Ambient operating temperature		–25 °C … +55 °C
Storage temperature		–25 °C … +70 °C
Air humidity		15 % … 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 RMS, 5 Hz … 500 Hz (EN 60068-2-64)

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

	UE410-2RO3	UE410-2RO4	UE410-4RO3	UE410-4RO4
Number of control inputs	1 (B1)		2 (B1, B2)	
Number of enable current contacts	2 (13/14, 23/24)		4 (13/14, 23/24, 33/34, 43/44)	
Number of signalling current contacts	1 (Y14)		2 (Y14, Y24)	
Number of contactor monitoring contacts	1 (Y1/Y2)		2 (Y1/Y2, Y3/Y4)	
Connection type	Plug-in screw-type terminals	Plug-in spring terminals	Plug-in screw-type terminals	Plug-in spring terminals

Electrical data

Operating data

	UE410-2RO3	UE410-2RO4	UE410-4RO3	UE410-4RO4
Voltage supply	Via FLEXBUS			
Internal power consumption	≤ 1.6 W (DC) [1]		≤ 3.2 W (DC) [1]	
Overvoltage category	II (EN 61131-2)			

[1] Via FLEXBUS.

Switching inputs

	UE410-2RO3	UE410-2RO4	UE410-4RO3	UE410-4RO4
Terminals	B1		B1, B2	
Input voltage ON	24 V DC (18 V DC … 30 V DC)			

Enable current contacts

	UE410-2RO3	UE410-2RO4	UE410-4RO3	UE410-4RO4
Terminals	13/14, 23/24		13/14, 23/24, 33/34, 43/44	
Type of output	Potential-free NO contacts, positively guided			
Switching voltage	5 V AC/DC … 253 V AC/DC			
Switching current	10 mA … 6 A			

Signalling current contacts

	UE410-2RO3	UE410-2RO4	UE410-4RO3	UE410-4RO4
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

	UE410-2RO3	UE410-2RO4	UE410-4RO3	UE410-4RO4
Terminals	Y1/Y2		Y1/Y2, Y3/Y4	
Type of output	Potential-free NC contacts, positively guided			
Switching voltage	5 V AC/DC … 253 V AC/DC			
Switching current	10 mA … 6 A			

Mechanical data

	UE410-2RO3	UE410-2RO4	UE410-4RO3	UE410-4RO4
Dimensions (W x H x D)	22.5 mm x 96.5 mm x 120.8 mm			
Weight	160 g (± 5 %)		186 g (± 5 %)	

Ambient data

Enclosure rating		
	Housing	IP 40 (EN 60529)
	Terminals	IP 20 (EN 60529)
Ambient operating temperature		–25 °C … +55 °C
Storage temperature		–25 °C … +70 °C
Air humidity		15 % … 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 RMS, 5 Hz … 500 Hz (EN 60068-2-64)

Gateways

Interfaces

	UE410-EN1	UE410-EN3	UE410-EN4	UE410-PRO	UE410-CAN	UE410-DEV
Fieldbus, industrial network	EtherNet/IP	Modbus TCP	PROFINET	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	–	
Baud rate	10 Mbit/s (10Base-T) 100 Mbit/s (100Base-T) (autosensing)			12,000 kbit/s	1,000 kbit/s	500 kbit/s
Diagnostic outputs	4 (X1 – X4)					
Connection type diagnostic outputs	Plug-in screw-type terminals			Plug-in screw-type terminals / plug-in spring terminals (depending on type)		
Permitted cross-section						
Single wire or finely stranded (1x)	0.14 mm² ... 2.5 mm²					
Single wire or finely stranded (2x)	0.14 mm² ... 0.75 mm²					
Finely stranded with ferrules (1x)	0.25 mm² ... 2.5 mm²					
Finely stranded with ferrules (2x)	0.25 mm² ... 0.5 mm²					

Electrical data

	UE410-EN1	UE410-EN3	UE410-EN4	UE410-PRO	UE410-CAN	UE410-DEV
Protection class	III (EN 61140)					
Voltage supply	Via FLEXBUS					
Power consumption	≤ 2.4 W (DC)			≤ 1.6 W (DC)		

Mechanical data

Dimensions (W x H x D)	22.5 mm x 96.5 mm x 120.8 mm
Weight	160 g

Ambient data

Enclosure rating	
Housing	IP 40 (EN 60529)
Terminals	IP 20 (EN 60529)
Ambient operating temperature	–25 °C ... +55 °C
Storage temperature	–25 °C ... +70 °C
Air humidity	15 % ... 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 RMS, 5 Hz ... 500 Hz (EN 60068-2-64)

Ordering information

Main modules

Inputs	Number of muting sensors	Outputs	Delay time (outputs Q3/Q4)	Connection type	Type	Part no.
4 safety inputs 4 switching inputs	0 / 2	4 safety outputs 2 test outputs	–	Plug-in screw-type terminals	UE410-MU3T0	6035242
				Plug-in spring terminals	UE410-MU4T0	6035243
			0 s … 5 s	Plug-in screw-type terminals	UE410-MU3T5	6026136
				Plug-in spring terminals	UE410-MU4T5	6032669
			0 s … 50 s	Plug-in screw-type terminals	UE410-MU3T50	6026137
				Plug-in spring terminals	UE410-MU4T50	6032670
			0 s … 300 s	Plug-in screw-type terminals	UE410-MU3T300	6026138
				Plug-in spring terminals	UE410-MU4T300	6032671
2 safety inputs 2 switching inputs 4 muting inputs	2 / 4	2 safety outputs 2 test outputs 2 diagnostic outputs	–	Plug-in screw-type terminals	UE410-MM3	6034482
				Plug-in spring terminals	UE410-MM4	6034645
4 safety inputs 2 switching inputs 2 inputs for the global emergency stop function	–	1 safety output 2 test outputs 1 diagnostic output 2 outputs for the global emergency stop function	–	Plug-in screw-type terminals	UE410-GU3	1072177

I/O modules

| Inputs	Number of muting sensors	Outputs	Delay time (outputs Q3/Q4)	Connection type	Type	Part no.
4 safety outputs 4 switching inputs	0 / 2	4 safety outputs 2 test outputs	–	Plug-in screw-type terminals	UE410-XU3T0	6035244
				Plug-in spring terminals	UE410-XU4T0	6035245
			0 s ... 5 s	Plug-in screw-type terminals	UE410-XU3T5	6032470
				Plug-in spring terminals	UE410-XU4T5	6032672
			0 s ... 50 s	Plug-in screw-type terminals	UE410-XU3T50	6032471
				Plug-in spring terminals	UE410-XU4T50	6032673
			0 s ... 300 s	Plug-in screw-type terminals	UE410-XU3T300	6032472
				Plug-in spring terminals	UE410-XU4T300	6032674
2 safety outputs 2 switching inputs 4 muting inputs	2 / 4	2 safety outputs 2 test outputs 2 diagnostic outputs	–	Plug-in screw-type terminals	UE410-XM3	6034483
				Plug-in spring terminals	UE410-XM4	6034646
8 safety outputs	–	8 test outputs	–	Plug-in screw-type terminals	UE410-8DI3	6026139
				Plug-in spring terminals	UE410-8DI4	6032675
3 switching inputs	–	–	–	Plug-in screw-type terminals	UE410-MDI3	6034484
				Plug-in spring terminals	UE410-MDI4	6034647

Relay modules

Number of enable current contacts	Number of signalling current contacts	Number of contactor monitoring contacts	Connection type	Type	Part no.
2	1	1	Plug-in screw-type terminals	UE410-2RO3	6026144
			Plug-in spring terminals	UE410-2RO4	6032677
4	2	2	Plug-in screw-type terminals	UE410-4RO3	6026143
			Plug-in spring terminals	UE410-4RO4	6032676

Gateways

| Fieldbus, industrial network	Number of application diagnostic outputs	Connection type diagnostic outputs	Type	Part no.
EtherNet/IP	4	Plug-in screw-type terminals	UE410-EN1	1042964
Modbus TCP		Plug-in screw-type terminals	UE410-EN3	1042193
PROFINET		Plug-in screw-type terminals	UE410-EN4	1044078
PROFIBUS DP		Plug-in screw-type terminals	UE410-PRO3	6028407
		Plug-in spring terminals	UE410-PRO4	6032678
CANopen		Plug-in screw-type terminals	UE410-CAN3	6033111
		Plug-in spring terminals	UE410-CAN4	6033112
DeviceNet		Plug-in screw-type terminals	UE410-DEV3	6032469
		Plug-in spring terminals	UE410-DEV4	6032679

Dimensional drawings (Dimensions in mm (inch))

Main modules
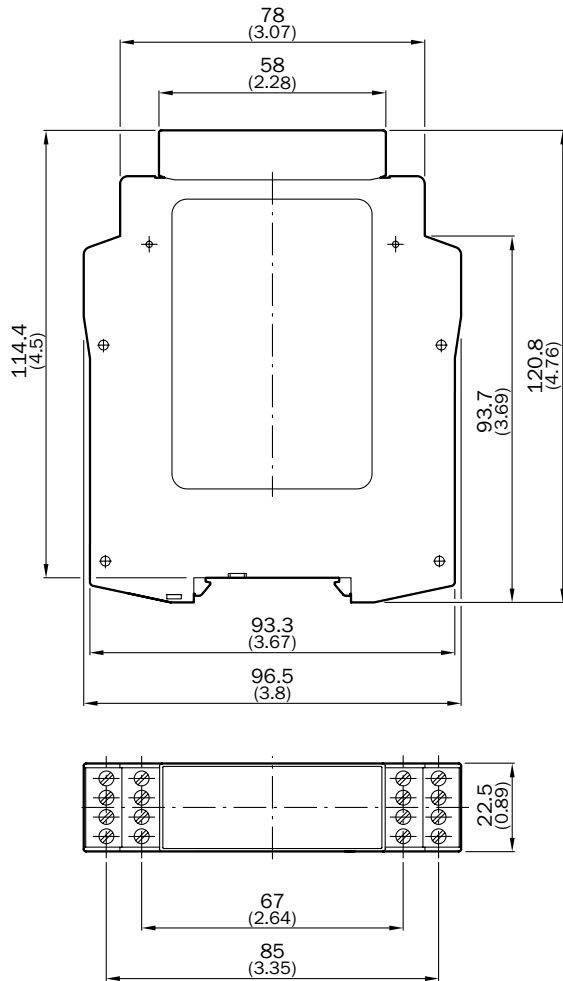
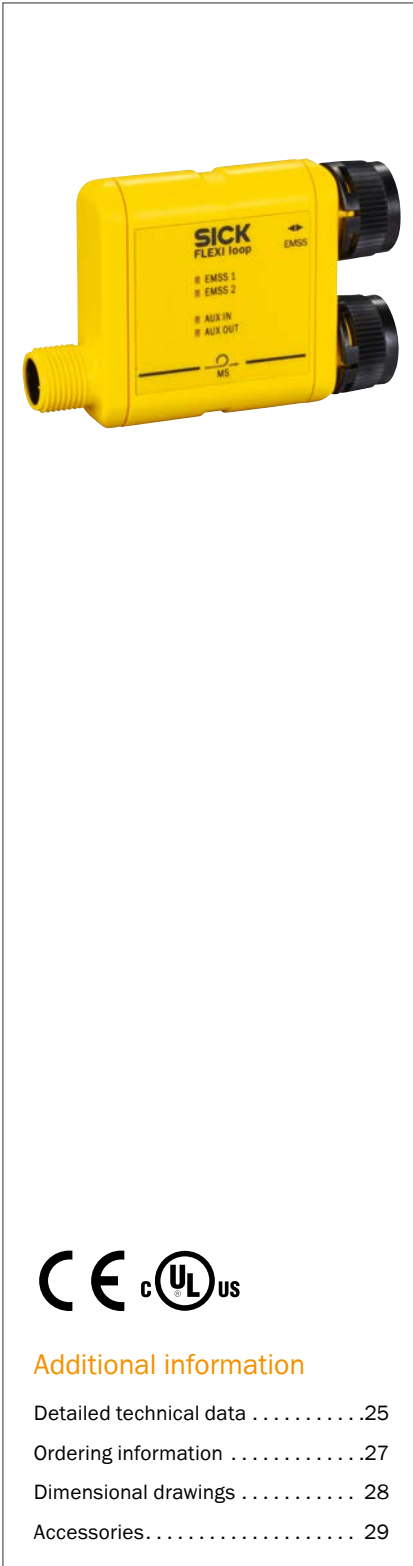### I/O modules, relay module, gateways
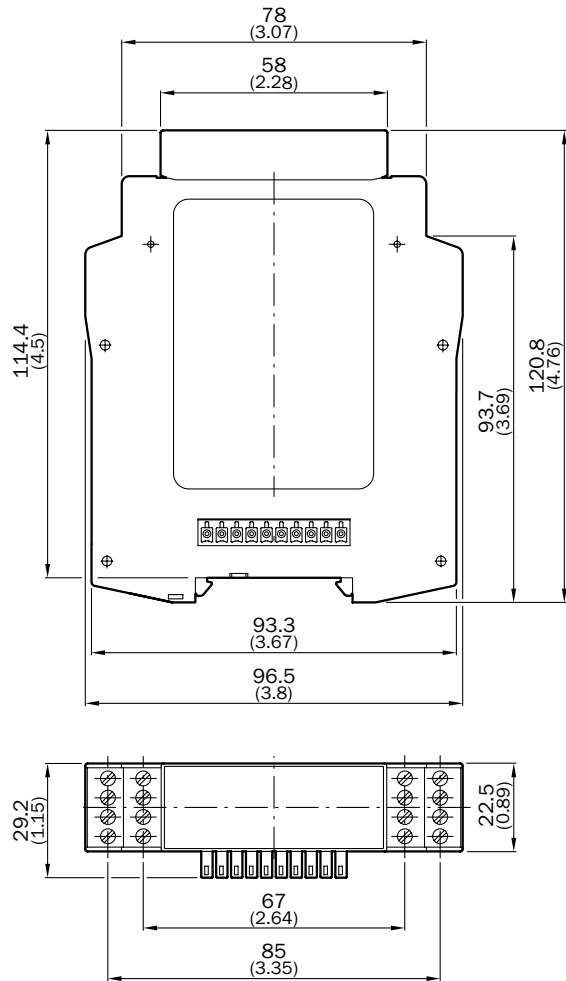
Accessories

Connection systems

Power supply units and power cord connectors

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

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 e
- Compatible with sensors from all manufacturers
- Detailed diagnostic information
- Integrated standard inputs and outputs
- Power supply for sensors is included
- Unscreened standard cable with M12 connectivity
- IP 65 and IP 67 enclosure rating
- Intelligent accessories for field diagnostics and commissioning

Your benefits

- Cascading of safety switches and safety sensors with OSSD outputs minimizes the wiring effort and the number of 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
- Detailed status information on Flexi Loop components, diagnostics accessories, and safety controller enable quick and easy field diagnostics

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.

Detailed technical data

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)
PFHd (mean probability of a dangerous failure per hour)	0.76×10^{-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
	–		40 ms	
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)

Ordering information

Flexi Loop master node for connection to Flexi Classic

Description	IO-Link	Type	Part no.
Flaxi Loop master node to connect a Flexi Loop cascade to Flexi Classic. System diagnostics during operation and during commisioning without busmaster.	–	FLA-MSTR00001	1061713
	✔	FLA-MSTR00002	1067650

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 Y-adapters

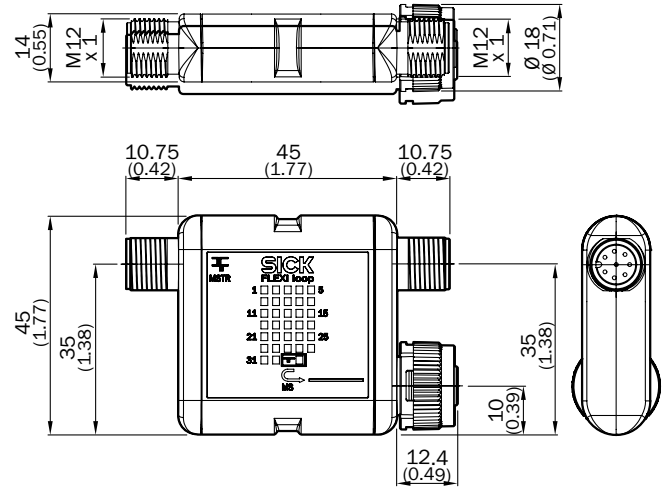| Description	Type	Part no.
The Flexi Loop Y-adapter (EMMS) splits the 8-pin connection of the FLN-EMSS1100108 in two 5-pin connections: One for dual-channel equivalent electro-mechanical safety switches and one for non-safe I/O signals.	FLA-YCON00001	2074733
The Flexi Loop Y-adapter (OSSD) splits the 8-pin connection of the FLN-OSSD1100108 in two 5-pin connections: One for safety sensors with dual-channel OSSD outputs and one for non-safe I/O signals.	FLA-YCON00002	2074734

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

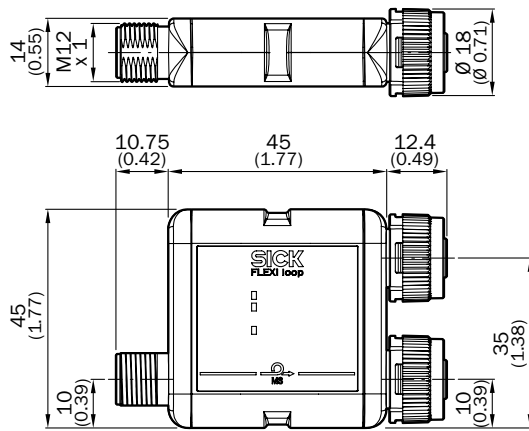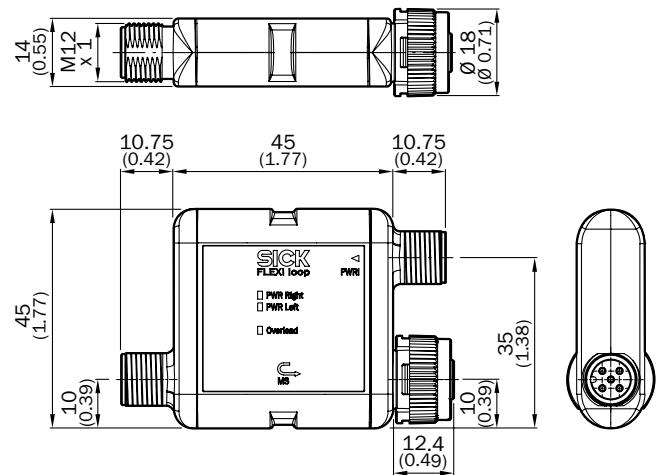## Dimensional drawings (Dimensions in mm (inch))
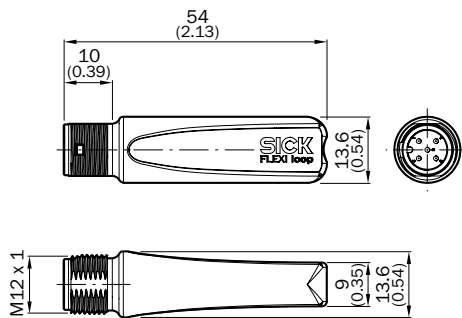
FLA-MSTR00001
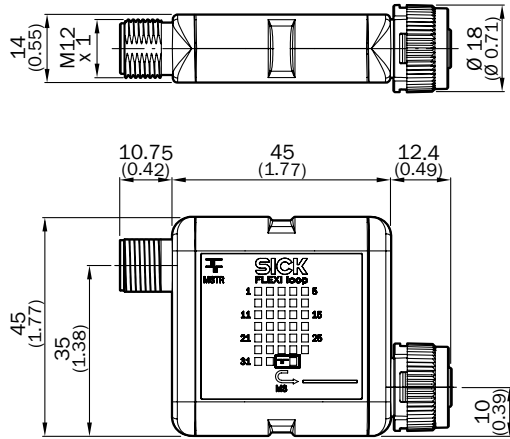
FLA-MSTR00002

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

FLA-PWRI00001

FLT-TERM00001

Accessories

Mounting systems

Mounting brackets and mounting plates

Mounting brackets

Figure	Description	Packing unit	Model name	Part no.
	Flexi Loop fixing clip	1 piece	C-Fix bracket	2068830

Dimensional drawings ➜

Connection systems

Plug connectors and cables

Connecting cables with female connector

Figure	Connection type	Conductor cross-section	Cable length	Model name	Part no.
	Female connector, M12, 5-pin, straight	Cable	0.34 mm²	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 cables with male connector

Connection type	Conductor cross-section	Cable length	Model name	Part no.
Male connector, M12, 5-pin, straight	Cable	0.34 mm²	1 m	STL-1205-G01MC	6037741
			2 m	STL-1205-G02MC	6051951
			5 m	STL-1205-G05MC	6051952
			10 m	STL-1205-G10MC	6051953
Male connector, M12, 8-pin, straight	Cable	0.25 mm²	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 cables with female connector and male connector

Figure	Connection type		Conductor cross-section	Cable length	Model name	Part no.
	Female connector, M12, 4-pin, straight	Male connector, M12, 4-pin, straight	0.34 mm²	0.2 m	DSL-1204-G0M2C	6051998
	Female connector, M12, 5-pin, straight	Male connector, M12, 5-pin, straight	0.34 mm²	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
	Female connector, M12, 8-pin, straight	Male connector, M12, 8-pin, straight	0.25 mm²	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

Female connectors (ready to assemble)

Figure	Connection type	Permitted cross-section	Permitted cable diameter	Model name	Part no.
	Female connector, M12, 5-pin, straight, screw-type terminals	≤ 0.75 mm²	4 mm … 6 mm	DOS-1205-G	6009719
	Female connector, M12, 8-pin, straight, screw-type terminals	≤ 0.5 mm²	6 mm … 8 mm	DOS-1208-G	6028422

Male connectors (ready to assemble)

Figure	Connection type	Permitted cross-section	Permitted cable diameter	Model name	Part no.
	Male connector, M12, 5-pin, straight, screw-type terminals	≤ 0.75 mm²	4 mm … 6 mm	STE-1205-G	6022083
	Male connector, M12, 8-pin, straight, screw-type terminals	≤ 0.75 mm²	3 mm … 6.5 mm	STE-1208-G	6033269

Dimensional drawings for accessories (Dimensions in mm (inch))

Mounting brackets and mounting plates

C-Fix bracket
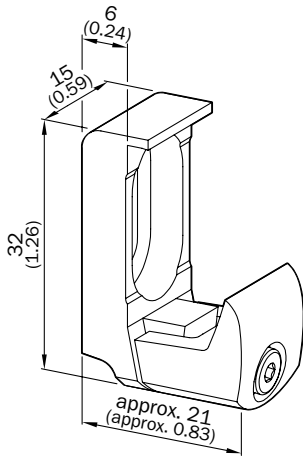
SICK AT A GLANCE

SICK is a leading manufacturer of intelligent sensors and sensor solutions for industrial applications. With more than 6,500 employees and over 50 subsidiaries and equity investments as well as numerous representative offices 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.

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