



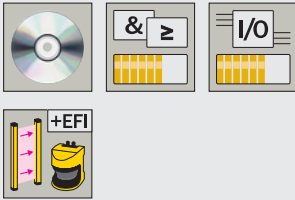
Industrial Safety Systems



Modular Safety Controller
Flexi Soft



SICK
Sensor Intelligence.



- System save in memory plug for a fast installation.
- Modular expandable (12 to 144 in/outputs)
- Intuitive software: Flexi Soft Designer
- Usage of the enhanced sensor function via EFI-interface



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Overview of technical specifications

Safety integrity level	SIL3 (IEC 61508), SILCL3 (IEC 62061)
Performance Level	PL e (EN ISO 13849)
Number of inputs	0 ... 96, depending on module combination
Number of outputs	0 ... 48, depending on module combination
Number of EFI interfaces	2
Configuration interface	RS-232
Logical functions	AND, OR, NOT, XNOR, XOR
Safety functions	Emergency stop function, machine control (e.g. PSDI), differentiation between man and material (muting), control modes and operating mode selection

Product description

Flexi Soft is a programmable and modularly expandable safety controller capable of being integrated into various networks. The main module FX3-CPU is the CPU of the entire system within which all input signals are monitored and processed via the safety logic stored in the memory plug. These signals are then used to switch outputs on the system through the FLEX BUS+ interface which connects all units to one another. The main unit has an RS-232 interface with which the Flexi Soft Designer can

upload and change system settings. The RS-232 port can be used for permanent diagnosis (i.e. PLC or HMI) as well. The main module FX3-CPU1 additionally has 2 EFI-connections on it. An input/output extension module FX3-XTIO has 8 safety inputs and 4 safety outputs. The input expansion module FX3-XTDI has 8 safety inputs.

In-system added value

Usage of enhanced sensor functions through the EFI-interface.

The EFI-interface (Enhanced Function Interface) is a two wire communication between safety sensor and controller.

- All EFI sensors connected to Flexi Soft can be accessed and programmed via the Flexi Soft's RS-232 connection.
- High quality diagnostics are available and deliver a fast and accurate course of action when availability is a priority.
- The following enhanced functions are available in combination with EFI sensor.

These functions are dependant on the type of sensor.

- Simultaneous field evaluation
- Field switching
- Decentral diagnostic information via Ethernet as if one was directly connected to the sensor.
- Evaluation from signals on Flexi Soft or attached network and safety data forwarding.

Module	Number of inputs	Number of outputs	Number of function blocks	EFI-Interface
Main unit	4 (FX3-CPU1)	-	255	2 (FX3-CPU1)
Extension unit	8	4	-	-
Input expansion unit	8	-	-	-
Relay module	-	2 (UE410-2RO) 4 (UE410-4RO)	-	-

Ordering information

Main unit¹⁾

Number of EFI interfaces	Type	Part number
-	FX3-CPU000000	1043783
2	FX3-CPU130002	1043784

¹⁾ The system plug has to be ordered separately!

Extension unit

Number of inputs	Number of outputs	Connection type	Type	Part number
8 single-channel	4 single-channel	Dual level spring clamp terminals	FX3-XTI084002	1044125

Input expansion unit

Number of inputs	Connection type	Type	Part number
8 single-channel	Dual level spring clamp terminals	FX3-XTDI80002	1044124

Relay module

Number of N/O contacts	Number of application diagnostic outputs	Connection type	Type	Part number
2	1	Plug-in terminals	UE410-2R03	6026144
		Dual level spring clamp terminals	UE410-2R04	6032677
4	2	Plug-in terminals	UE410-4R03	6026143
		Dual level spring clamp terminals	UE410-4R04	6032676

Detailed technical specifications

→ You can find more detailed data in the operating instructions. Download at www.mysick.com

Main unit

General data

Type	Main unit FX3-CPU000000	Main unit FX3-CPU130002
Safety related parameters		
Safety integrity level	SIL3 (IEC 61508), SILCL3 (IEC 62061)	
Category	Category 4 (EN ISO 13849)	
Performance Level	PL e (EN ISO 13849)	
PFHd (probability of a dangerous failure/hour)	1,08 x 10 ⁻⁹	1,69 x 10 ⁻⁹
TM (Mission Time)	20 a	
Ambient operating temperature	-25 °C ... +55 °C	
Storage temperature	-40 °C ... +70 °C	
Air humidity from ... to	10 % ... 95 %, non-dewing	
Climate conditions according to	EN 61131-2 (55 °C operating temperature, 95 % rel. humidity)	
Vibration resistance	5 Hz ... 500 Hz	
Vibration resistance (checked to)	EN 61131-2	
Enclosure rating	EN/IEC 60529	
Clamps	IP 40	
Housing	IP 20	
Electromagnetic compatibility (EMC)	EN 61131-2 (zone B), EN 61000-6-2, EN 55011 (class A)	
Protection class	III	
System connection	Plug	
Connection type EFI connection	-	Dual level spring clamp terminals
Connection conductor cross-section	Single wire or fine wire: 1 x 0.14 mm ² ... 2.5 mm ² or 2 x 0.14 mm ² ... 0.75 mm ² / fine wire with ferrule (EN 46288): 1 x 0.25 mm ² ... 2.5 mm ² or 2 x 0.25 mm ² ... 0.5 mm ²	
Dimensions (W x H x D)	22.5 mm x 93.7 mm x 120.8 mm	
Weight	100 g	110 g

Electrical data

Type	FX3-CPU000000	FX3-CPU130002
Supply voltage	24 V DC (16.8 V DC ... 30 V DC)	
Type of supply voltage	PELV or SELV (the current of the power supply which powers the Main Module must be limited to 4 A. Either through the power supply itself or a fuse.)	
Power consumption	2.5 W	
Short-circuit protection	4 A gG	
Switch-on time	Min. 18 s	
Number of EFI interfaces	-	2
Configuration interface	RS-232 Internal bus (FLEX BUS+)	

Functional data

Type	FX3-CPU000000	FX3-CPU130002
Operating mode selector switch		✓
Reset/restart	Manual, automatic, configurable	
External device monitoring		✓
Emergency stop switch		✓
Number of function blocks	255	
Logical functions	AND, OR, NOT, XNOR, XOR	
Safety functions	Emergency stop function, machine control (e.g. PSDI), differentiation between man and material (muting), control modes and operating mode selection	
Applications-specific logical functions	Emergency stop, Two-hand control, Muting, Presses, Operating mode switch	
Additional sensor functions available when using EFI communications	-	✓
Muting		✓

Extension unit

General data

Safety related parameters		
	Safety integrity level	SIL3 (IEC 61508), SILCL3 (IEC 62061)
	Category	Category 4 (EN ISO 13849)
	Performance Level	PL e (EN ISO 13849)
	PFHd (probability of a dangerous failure/hour)	$7,1 \times 10^{-9}$
	TM (Mission Time)	20 a
Ambient operating temperature		-25 °C ... +55 °C
Storage temperature		-40 °C ... +70 °C
Air humidity from ... to		10 % ... 95 %, non-dewing
Climate conditions according to		EN 61131-2 (55 °C operating temperature, 95 % rel. humidity)
Vibration resistance		5 Hz ... 500 Hz
Vibration resistance (checked to)		EN 61131-2
Enclosure rating		EN/IEC 60529
	Clamps	IP 40
	Housing	IP 20
Electromagnetic compatibility (EMC)		EN 61131-2 (zone B), EN 61000-6-2, EN 55011 (class A)
Protection class		III
System connection		Cable gland
Connection type		Dual level spring clamp terminals
Connection conductor cross-section		Single wire or fine wire: 1 x 0.14 mm ² ... 2.5 mm ² or 2 x 0.14 mm ² ... 0.75 mm ² / fine wire with ferrule (EN 46288): 1 x 0.25 mm ² ... 2.5 mm ² or 2 x 0.25 mm ² ... 0.5 mm ²
Dimensions (W x H x D)		22.5 mm x 93.7 mm x 120.8 mm
Weight		180 g

Electrical data

Supply voltage	24 V DC (16.8 V DC ... 30 V DC)
Type of supply voltage	PELV or SELV (the current of the power supply which powers the Main Module must be limited to 4 A. Either through the power supply itself or a fuse.)
Power consumption	3 W ¹⁾
Short-circuit protection	4 A gG
Input circuit (I1 - I8)	
Number of inputs	8 single-channel
Input voltage HIGH	13 V ... 30 V
Input voltage LOW	-5 V DC ... 5 V DC
Input current HIGH	3 mA (2.4 mA ... 3.8 mA)
Input current LOW	-2.5 mA ... 2.1 mA
Control outputs (X1, X2)	
Number of outputs	2
Type of output	PNP semiconductors, short-circuit protected, cross-circuit monitored
Output voltage	16 V DC ... 30 V DC
Output current	120 mA ²⁾
Test pulse width	1 ms ... 100 ms, configurable
Test pulse rate	1 Hz ... 25 Hz, configurable
Load capacity (test puls width)	1 µF, 0.5 µF (4 ms, 1 ms)
Cable resistance	Max. 100 Ohm
Safety outputs (Q1, Q2, Q3, Q4)	
Number of outputs	4
Type of output	PNP semiconductors, short-circuit protected, cross-circuit monitored
Output voltage	15.6 V DC ... 30 V DC
Output current	2 A
Test pulse width	Max. 650 µs
Test pulse rate	0.8 Hz
Load capacity	Max. 0.5 µF
Cable length	100 m (1.5 mm ²)
Fast shut-off time	9 ms
Configuration interface	Internal bus (FLEX BUS+)

¹⁾ Via FLEX BUS+ without current on X1 ... X8

²⁾ On each Test Pulse Output(X1 or X2) Thereby 8 testable sensor cascades per module with 30 mA per cascade are possible. The total current which a Flexi Soft system can supply is limited to 1.28 A. This means that, for example, the test pulse outputs supplying 32 sensors with 30 mA inputs each and an additional 64 inputs on FX3-XTIO or FX3-XTDI modules.

Functional data

Operating mode selector switch	✓
Emergency stop switch	✓
Fast shut-off	✓

Input expansion unit

General data

Safety related parameters		
Safety integrity level		SIL3 (IEC 61508), SILCL3 (IEC 62061)
Category		Category 4 (EN ISO 13849)
Performance Level		PL e (EN ISO 13849)
PFHd (probability of a dangerous failure/hour)		$5,68 \times 10^{-9}$
TM (Mission Time)		20 a
Ambient operating temperature		-25 °C ... +55 °C
Storage temperature		-40 °C ... +70 °C
Air humidity from ... to		10 % ... 95 %, non-dewing
Climate conditions according to		EN 61131-2 (55 °C operating temperature, 95 % rel. humidity)
Vibration resistance		5 Hz ... 500 Hz
Vibration resistance (checked to)		EN 61131-2
Enclosure rating		EN/IEC 60529
	Clamps	IP 40
	Housing	IP 20
Electromagnetic compatibility (EMC)		EN 61131-2 (zone B), EN 61000-6-2, EN 55011 (class A)
Protection class		III
System connection		Cable gland
Connection type		Dual level spring clamp terminals
Connection conductor cross-section		Single wire or fine wire: 1 x 0.14 mm ² ... 2.5 mm ² or 2 x 0.14 mm ² ... 0.75 mm ² / fine wire with ferrule (EN 46288): 1 x 0.25 mm ² ... 2.5 mm ² or 2 x 0.25 mm ² ... 0.5 mm ²
Dimensions (W x H x D)		22.5 mm x 93.7 mm x 120.8 mm
Weight		150 g

Electrical data

Input circuit (I1 - I8)		
Number of inputs		8 single-channel
Input voltage HIGH		13 V ... 30 V
Input voltage LOW		-5 V DC ... 5 V DC
Input current HIGH		3 mA (2.4 mA ... 3.8 mA)
Input current LOW		-2.5 mA ... 2.1 mA
Control outputs (X1 - X8)		
Number of outputs		8 ¹⁾
Type of output		PNP semiconductors, short-circuit protected, cross-circuit monitored
Output voltage		16 V DC ... 30 V DC
Output current		120 mA ²⁾
Cable resistance		Max. 100 Ohm
Configuration interface		Internal bus (FLEX BUS+)

¹⁾ With 2 test pulse generators

²⁾ On each of two test pulse generators (X1/X3/X5/X7 or X2/X4/X6/X8). Thereby 8 testable sensor cascades per Module with 30 mA per cascade are possible. The total current which a Flexi Soft System can supply is limited to 1.28 A. This means that, for example, the test pulse outputs supplying 32 sensors with 30 mA inputs each and an additional 64 inputs on FX3-XTIO or FX3-XTDI modules.

Functional data

Operating mode selector switch	✓
Emergency stop switch	✓
Safety functions	Emergency stop function, machine control (e.g. PSDI), differentiation between man and material (muting), control modes and operating mode selection

Relay module

General data

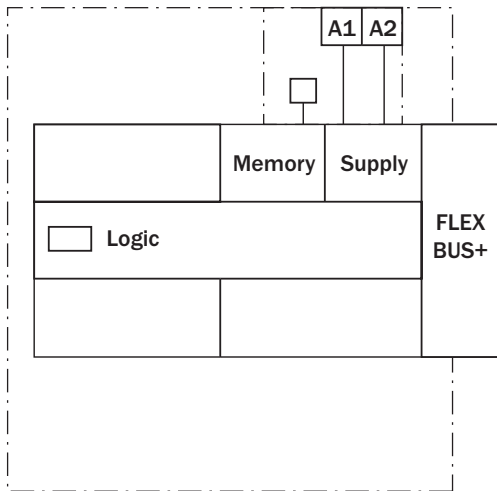
		Relay module
Safety related parameters	Safety integrity level	SIL3 (IEC 61508), SILCL3 (IEC 62061)
	Category	Category 4 (EN ISO 13849)
	Performance Level	PL e (EN ISO 13849)
	PFHd (probability of a dangerous failure/hour)	$4,0 \times 10^{-11}$
	TM (Mission Time)	20 a
Galvanised decoupling	✓ (supply circuit - output circuit and input circuit - output circuit), - (supply circuit - input circuit)	
Ambient operating temperature	-25 °C ... +55 °C	
Storage temperature	-25 °C ... +70 °C	
Air humidity from ... to	15 % ... 95 %, non-dewing	
Climate conditions according to	EN 61131-2	
Vibration resistance	5 Hz ... 500 Hz	
Vibration resistance (checked to)	EN 60068-2-64, EN 61131-2	
Enclosure rating	EN/IEC 60529	
	Clamps	IP 40
	Housing	IP 20
Electromagnetic compatibility (EMC)	Class A (EN 61131-2, EN 61000-6-2, EN 55011)	
Protection class	III	
System connection	Cable gland	
Connection type (depending on type)	Plug-in terminals / dual level spring clamp terminals	
Connection conductor cross-section	Single wire or fine wire: 1 x 0.14 mm ² ... 2.5 mm ² or 2 x 0.14 mm ² ... 0.75 mm ² / fine wire with ferrule (EN 46288): 1 x 0.25 mm ² ... 2.5 mm ² or 2 x 0.25 mm ² ... 0.5 mm ²	
Dimensions (W x H x D)	22 mm x 96.5 mm x 120.8 mm	
Weight (depending on type)	160 g / 190 g	

Electrical data

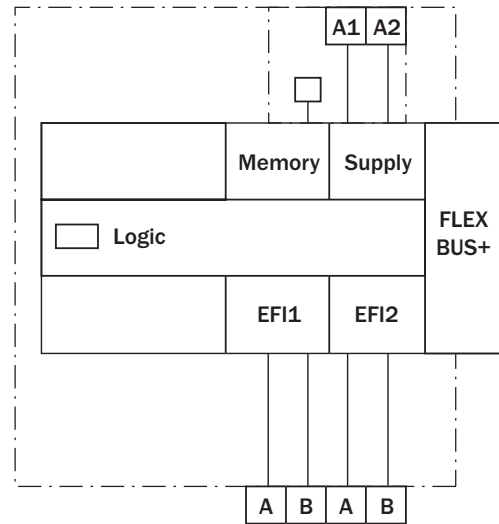
Type	UE410-2R03	UE410-2R04	UE410-4R03	UE410-4R04
Supply voltage	24 V DC (19.2 V DC ... 30 V DC)			
Type of supply voltage	PELV (electrical output circuit on UE410-4R0/UE410-2R0 > 25 V AC/60 V DC), PELV or SELV (electrical output circuit on UE410-4R0/UE410-2R0 < 25 V AC/60 V DC)			
Power consumption	1 W		2 W	
Short-circuit protection	6A gG (per circuit)			
Safety contacts switch-off circuits K1/K2 (13/14 and 23/24)				
Number of N/O contacts	2		4	
Number of application diagnostic outputs	1		2	
Type of output	Potential free, positively-driven			
Switching voltage	230 V DC/230 V DC (5 V DC ... 275 V DC) 250 V AC (5 V AC ... 275 V AC)			
Output current	6 A			
Total current	12 A			
Contact material	AgSnO2			
Surface treatment	Au (1µm)			
Usage category	AC-15/DC-13			
Rated operating current (voltage)	3 A (250 V AC), 3 A (24 V DC)			
Response time	< 30 ms			

Internal circuitry

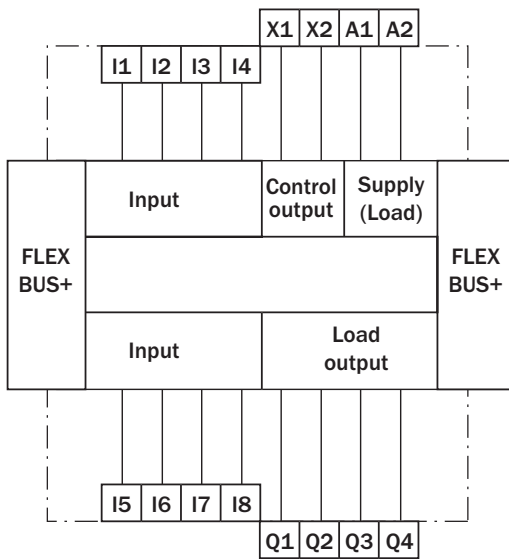
Main unit FX3-CPU000000



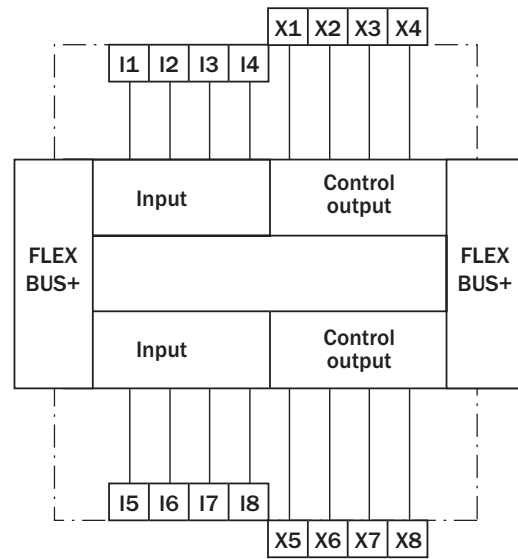
Main unit FX3-CPU130002



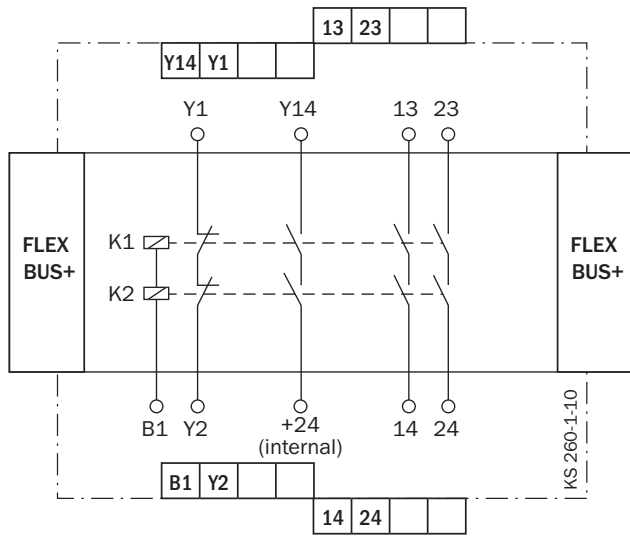
Extension unit FX3-XTI084002



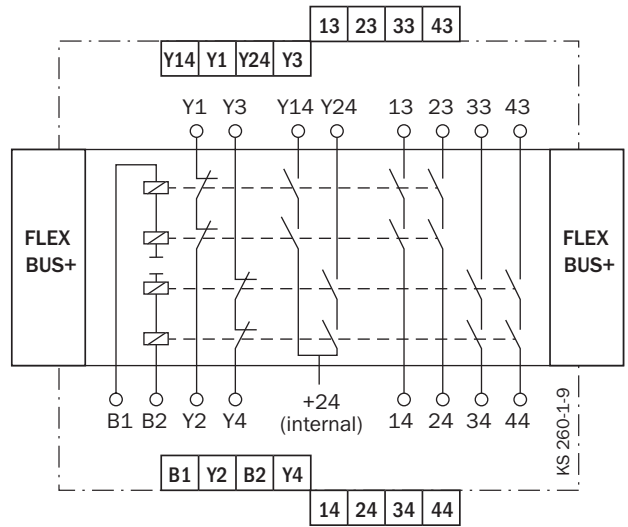
Input expansion unit FX3-XTDI80002



Relay module UE410-2R03, UE410-2R04

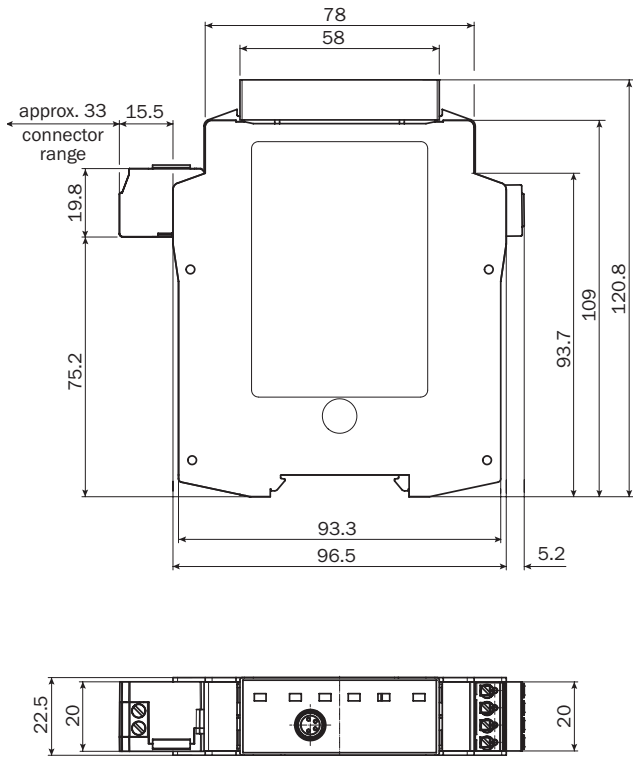


Relay module UE410-4R03, UE410-4R04

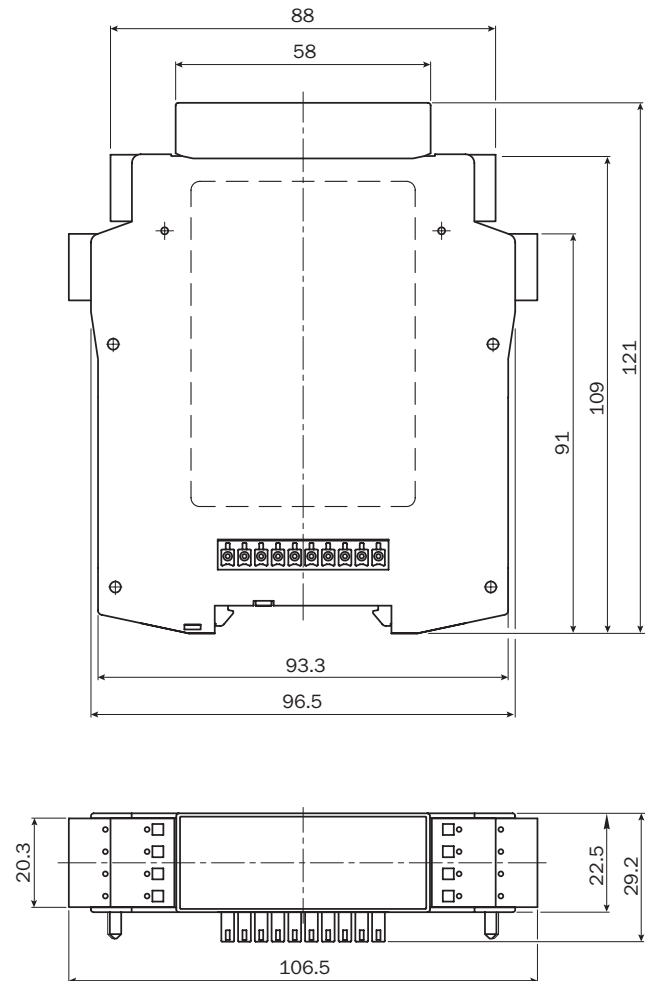


Dimensional drawings

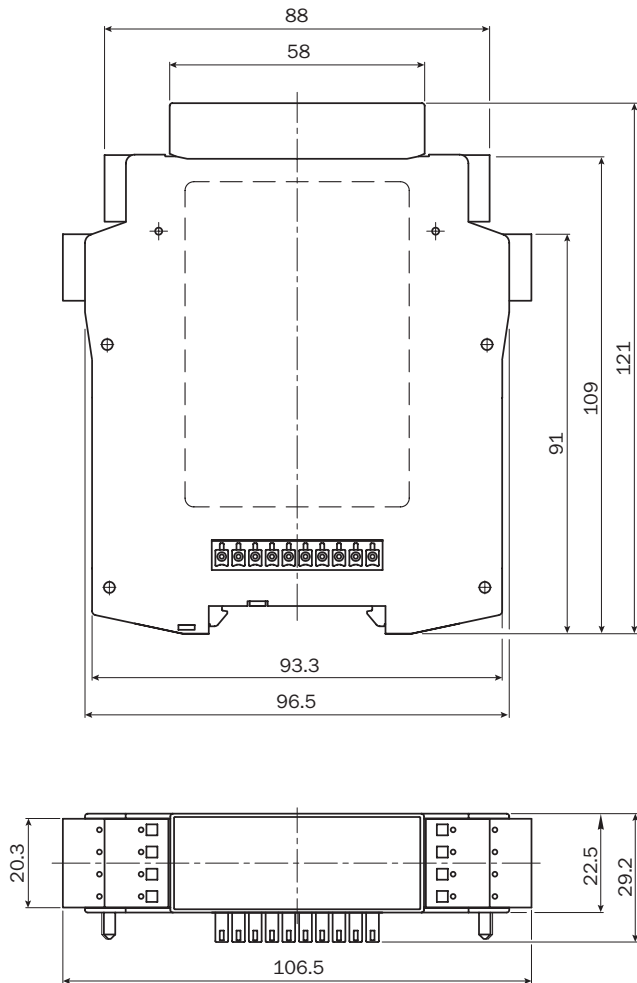
Main unit FX3-CPU000000, FX3-CPU130002



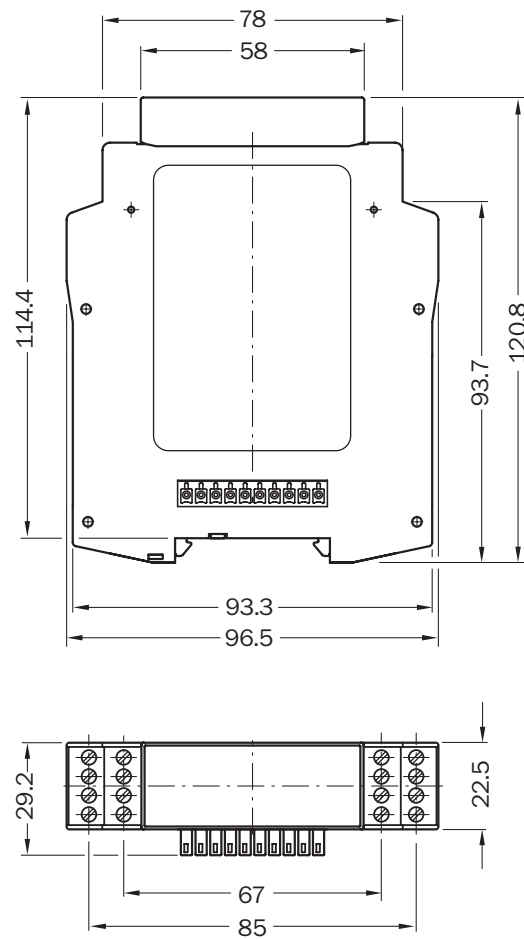
**Extension unit FX3-XTI084002
Input expansion unit FX3-XTDI80002**



Relay module UE410-2R04, UE410-4R04



Relay module UE410-2R03, UE410-4R03



Dimensions in mm

Accessories

Connection cable

Cable length	Type	Part number
50 m	EFI connection cable	6026675

Muting indicator lamp

Type of muting indicator	Cable length	Description	Remark connection cable	Type	Part number
LED lamp	2 m	Incl. mounting kit	Incl. connection cable	Indicator lamp	2019909
	10 m	Incl. mounting kit	Incl. connection cable	Indicator lamp	2019910

Configuration software

Type	Part number
Flexi Soft Designer	2045931

System plug

Integrated configuration memory	Type	Part number
✓	FX3-MPL000001	1043700

Power supply units

Input voltage	Output voltage	Maximum output current	Type	Part number
100 V AC ... 240 V AC	24 V DC	2.1 A	Power supply	7028789
		3.9 A	Power supply	7028790

Terminal connector

Type	Part number
Screw-terminal connector	6030951
Spring clamp terminal connector	6034806

Configuration connection cable

Cable length	Description	Type	Part number
2 m	For connecting the configuration connection to the PC	Connection cable	6021195
3 m	For connecting the configuration connection to the PC	Connection cable	6036342
35 cm	-	Converter RS-232 to USB	6035396

SICK Industrial Safety Systems

Safety laser scanners and laser scanners

- S3000
- S300
- S200
- S100

Safety camera systems

- V4000 Press Brake
- V200 Work Station
- V300 Work Station

Safety light curtains

- C4000 Micro
- C4000 Basic Plus, Basic, Eco
- C4000 Standard/Advanced
- C4000 Entry/Exit
- C4000 Palletizer
- M4000 Advanced Curtain
- C2000
- LGT

Multiple light beam safety devices

- M4000 Standard
- M4000 Advanced
- M4000 Area
- M2000

Single-beam photoelectric safety switches

- L4000 System
- L4000: L41
- WSU/WEU26/2
- L2000: L21, L27, L28

Safety switches

- Electro-mechanical safety switches
- Non-contact safety switches
- Safety command devices

Network solutions

- UE4120, UE4150, UE4155, UE4140, UE1140
- UE4212, UE4215, UE4231, UE4232, UE4233, UE4234
- UE4420, UE4421, UE4450, UE4470
- UE4140, UE1140



SICK Industrial Safety Systems

Safety controllers

- Flexi Classic
- Flexi Soft
- UE440, UE470
- UE4427, UE4457
- UE4470

Safety relays

- UE10 to UE49

Software

- Safexpert

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