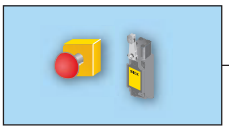
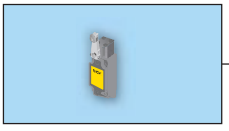
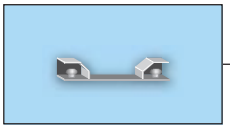
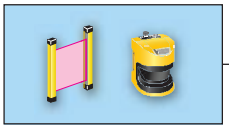
Safety relays

Selection table

Main applications	Mode	Features	Enable current contacts / Signaling current contacts	Product	Page
	Single-channel input	Stop cat. 0	2/1	**UE23-2MF**	N-3
			3/1	**UE23-3MF**	N-7
	Dual-channel input	Stop cat. 0	2/1	**UE43-2MF**	N-17
			3/1	**UE43-3MF**	N-22
		Stop cat. 1	3/0	**UE45-3S1xD33** 1 output up to 3 s off-delay	N-40
			3/0	**UE45-3S1xD330** 1 output up to 30 s off-delay	N-40
	Dual-channel input	Stop cat. 0	3/1	**UE43-3AR**	N-27
			4/0	**UE43-4AR**	N-31
	Dual-channel input	Stop cat. 0	3/0	**UE44-3SLxD33** 1 output up to 3 s on-delay	N-35
			3/0	**UE44-3SLxD330** 1 output up to 30 s on-delay	N-35
	Dual-channel input	Stop cat. 0	2/1	**UE42-2HD**	N-12
	Dual-channel input	Stop cat. 0	3/1	**UE10-3OS** [1]	N-63
			2/0	**UE10-2FG** [1] **UE12-2FG** [1]	N-57
	Dual-channel input	Stop cat. 0	2/1	**UE48-2OS**	N-46
			3/0	**UE48-3OS**	N-52

[1] Contact expansion module for main units

N

8010889/2010-07-30
Subject to change without notice

Applications								Technical specifications				Type of unit			
Emergency stop pushbutton	Safety switch	Two-hand controls Type III C	Pressure sensitive mats (in 4-wire technology)	Opto-electronic protective devices	Monitoring of simultaneous activation(s)	Manual reset (monitored)	Automatic reset	Category according to EN ISO 13849	Number of enable current paths/ signaling current paths	Input circuit (number of channels)	Housing width (mm)	Main unit	Expansion unit	Product	Page
✔	✔	–	–	–	–	✔	✔	4 [1]	2 / 1	1	22.5	✔	–	UE23-2MF	N-3
✔	✔	–	–	–	–	✔	✔	4 [1]	3 / 1	1	22.5	✔	–	UE23-3MF	N-7
–	✔	✔	–	–	0.5	–	✔	4	2 / 1	2	22.5	✔	–	UE42-2HD	N-12
✔	✔	–	–	–	–	✔	✔	4	2 / 1	1 or 2	22.5	✔	–	UE43-2MF	N-17
✔	✔	–	–	–	–	✔	✔	4	3 / 1	1 or 2	45.0	✔	–	UE43-3MF	N-22
–	✔	–	–	–	–	–	✔	4	3 / 1	1 or 2	22.5	✔	–	UE43-3AR	N-27
–	✔	–	–	–	–	–	✔	4	4 / 0	1 or 2	22.5	✔	–	UE43-4AR	N-31
✔	✔	–	–	–	–	✔	✔	4 [2] / 3 [3]	3 [4] / 0	1 or 2	22.5	✔	–	UE44-3SL	N-35
✔	✔	–	–	–	–	✔	✔	4 [2] / 3 [3]	3 [5] / 0	1 or 2	22.5	✔	–	UE45-3S1	N-40
✔	✔	–	✔	✔	–	✔	✔	4	2 / 1	1 or 2	22.5	✔	–	UE48-2OS	N-46
✔	✔	–	✔	✔	–	✔	✔	4	3 / 0	1 or 2	22.5	✔	–	UE48-3OS	N-52
–	–	–	–	✔	–	–	–	4 [6]	2 / 0	1 or 2	17.8	–	✔	UE10-2FG / UE12-2FG	N-57
–	–	–	–	✔	–	–	–	4 [6]	3 / 1	1 or 2	22.5	–	✔	UE10-3OS	N-63
–	–	–	–	–	–	–	–	4 [6]	4 / 2	–	22.5	–	✔	UE10-4XT	N-69
–	–	–	–	–	–	–	–	4 [6]	4 / 2 [7]	–	22.5	–	✔	UE11-4DX	N-74

[1] Maximum category 2, performance level d in the application

[2] For contacts 13/14, 23/24

[3] For time contacts 37/38

[4] One normally open contact on-delayed

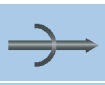
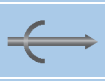
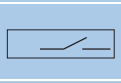
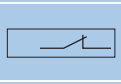
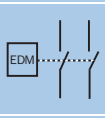
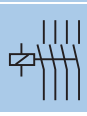
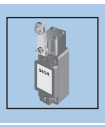
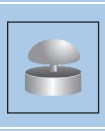
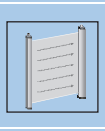
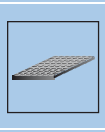
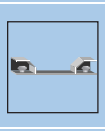
[5] One normally open contact off-delayed

[6] If the feedback current path Y1 - Y2 (external device monitoring) is monitored using an appropriate main unit

[7] Off-delayed

N

Symbols

Function		Off-delay
		On-delay
		Normally open contacts
		Normally closed contacts
		External device monitoring
		Contact expansion
Reset		Automatic reset
		Manual reset (monitored)
Applications		Safety switch
		Emergency stop
		Safety laser scanner
		Safety light curtain
		Pressure sensitive mat
		Two-hand controls
		Safety locking device, mechanically locked

N

Technical data overview

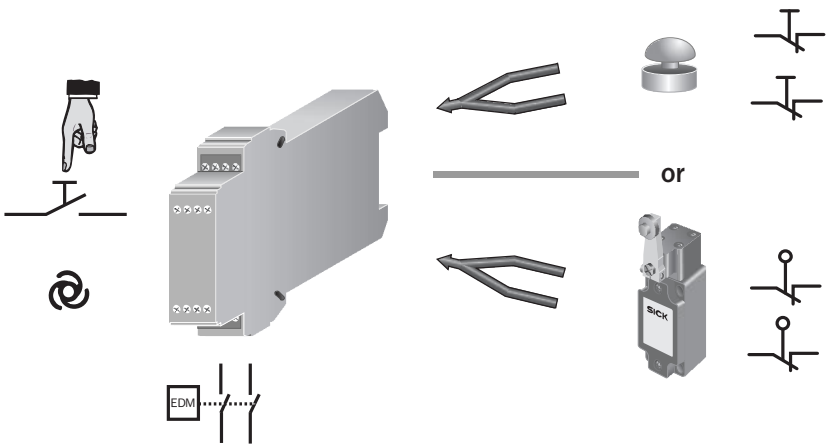
Category	Category 4 (EN ISO 13849) [1]
Performance level	PL e (EN ISO 13849) [1]
Number of enable current contacts	2
Number of signaling current contacts	1
Input circuit	Single-channel
Housing width	22.5 mm

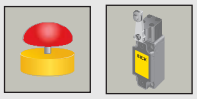
[1] Maximum category 2, performance level d, safety integrity level SIL2, SILCL2 in the application

Product description

- 2 LEDs:
  - Supply voltage
  - Relays K1, K2
- Manual reset
- Automatic reset
- Additional outputs available with the contact expansion modules
  - UE10-4XT
  - UE11-4DX
- External device monitoring (EDM)
- Screw-type terminals

Applications





- For emergency stop pushbuttons
- For safety switches

2

1

Ordering information

- Connection type: Screw-type terminals

Supply voltage	Type	Part no.
230 V AC	UE23-2MF2A3	6026148
115 V AC	UE23-2MF2A4	6026147
24 V DC	UE23-2MF2D3	6026146

N

Further information	Page
→ Technical specifications	N-4
→ Internal circuitry	N-6
→ Dimensional drawings	N-6
→ Systematic safety	A-0
→ Services	B-0

Technical specifications

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

General system data

Type	UE23-2MF2A3	UE23-2MF2A4	UE23-2MF2D3
Protection class	II, safe isolation (EN 50178)		
Safety related parameters			
Safety integrity level	SIL3 (IEC 61508), SILCL3 (IEC 62061) [1]		
Category	Category 4 (EN ISO 13849) [1]		
Performance level	PL e (EN ISO 13849) [1]		
B_{10d} parameter	1.26×10^6 switching cycles (AC-15, 230 V, I = 1.5 A), 5.9×10^6 switching cycles (AC-15, 230 V, I = 0.75 A), 4.35×10^5 switching cycles (DC-13, 24 V, I = 2.5 A), 1×10^7 switching cycles (DC-13, 24 V, I = 0.63 A)		
PFHd (mean probability of a dangerous failure per hour)	3.0×10^{-8} (EN ISO 13849)		
T_M (Mission Time)	14 years (EN ISO 13849)		
Stop category	0 (EN 60204)		
Supply voltage	A1, A2		
	230 V AC (196 V AC ... 253 V AC)	115 V AC (98 V AC ... 132 V AC)	24 V DC (20.4 V DC ... 26.4 V DC)
Power consumption	2.7 VA		1.6 W
Residual ripple	2.4 V_{pp} [2]		
Nominal frequency	50 Hz ... 60 Hz		–

[1] Maximum category 2, performance level d, safety integrity level SIL2, SILCL2 in the application

[2] In DC operation, within the limits of V_S

Control voltage Y1 - Y2 - Y3

Type	UE23-2MF2A3	UE23-2MF2A4	UE23-2MF2D3
Control voltage	Max. 40 V DC		
Control current	Max. 200 mA		
Fuse	PTC resistor		
Reset time			
Manual	Max. 70 ms (Y3)		
Automatic	Max. 600 ms (Y2)		
Galvanized decoupling	✔		–

N

Electrical output circuits 13 - 14, 23 - 24, 31 - 32

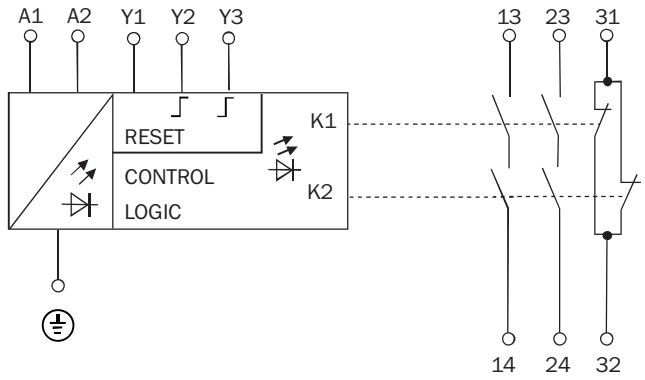
Type	UE23-2MF2A3	UE23-2MF2A4	UE23-2MF2D3
Response time	30 ms ... 80 ms [1]		
Number of enable current (N/O) contacts	2, relevant for safety		
Number of signaling current (N/C) contacts	1, not safety-relevant		
Contact type	Positively driven		
Contact material	Silver alloy, gold flashed		
Switching voltage			
	10 V AC ... 230 V AC		
	10 V DC ... 30 V DC		
Switching current			
	10 mA ... 6 A		
Total current	12 A		
Usage category	AC-15/DC-13		
Rated operating current (voltage)	4 A (230 V AC) 360 switching cycles/h 3 A (230 V AC) 3600 switching cycles/h 4 A (24 V DC) 360 switching cycles/h 2.5 A (24 V DC) 3600 switching cycles/h		
Maximum switching frequency	3600/h		
Mechanical life (relay contacts)	1 x 10^7 switching cycles		
Electrical life (relay contacts)	2 x 10^6 switching cycles		

[1] K1/K2

Operating data

Type	UE23-2MF2A3	UE23-2MF2A4	UE23-2MF2D3
Rated impulse withstand voltage U_{imp}	4 kV		
Overvoltage category	III		
Contamination rating			
External	3		
Internal	2		
Standard	EN 50178		
Rated insulation voltage U_i	300 V AC		
Test voltage	2 kV (50 Hz) EN 60439-1		
Enclosure rating			
Clamps	IP 20		
Housing	IP 40		
Interference emission	DIN EN 61000-6-4		
Interference resistance	EN 61000-6-2		
Ambient operating temperature	–25 °C ... +55 °C		
Storage temperature	–25 °C ... +75 °C		
Connection type	Screw-type terminals		
Conductor cross-section			
Single wire (2x, same cross-section)	0.14 mm² ... 0.75 mm²		
Single wire (1x)	0.14 mm² ... 2.5 mm²		
Fine wire with ferrules (2x, same cross-section)	0.25 mm² ... 0.5 mm²		
Fine wire with ferrules (1x)	0.25 mm² ... 2.5 mm²		
Dimensions (W x H x D)	22.5 mm x 123 mm x 93.5 mm		
Weight	0.27 kg		

Internal circuitry



Function

The connected emergency stop pushbuttons or safety switches are controlled by the supply voltage.

After applying the supply voltage (LED SUPPLY illuminates), the normally open contacts remain in the open state. If the connected sensor is not activated (i.e., the input circuits are closed), then the normally open contacts close immediately in automatic reset (LED “K1, K2“ illuminates). In the case of manual reset, this only occurs after pressing the reset button.

External device monitoring (EDM)

The unit can take over the function of external device monitoring. The contactor monitoring system monitors the external relays through their normally closed contacts.

Manual reset

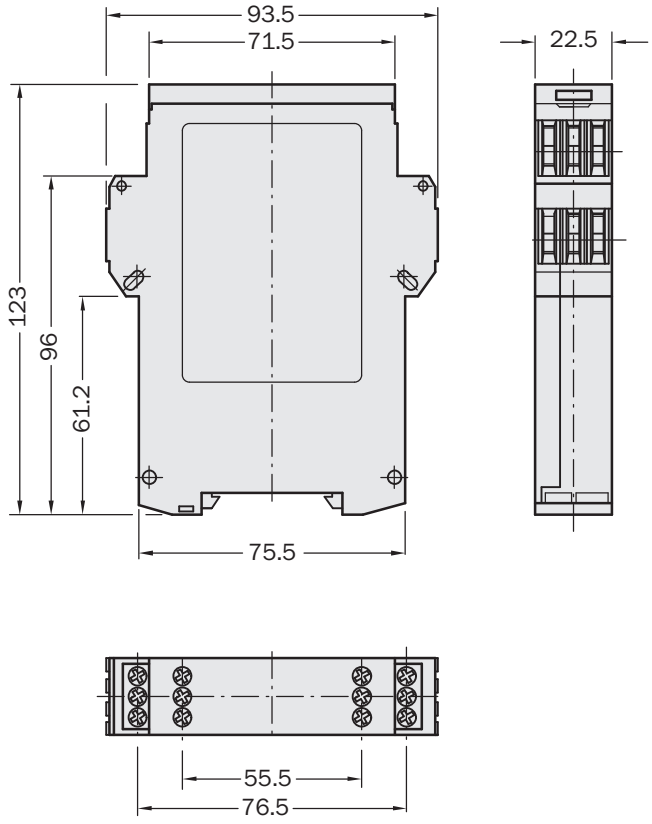
For manual resetting, a pushbutton must be connected to terminals Y1 and Y3. This reset is monitored.

Automatic reset

For automatic resetting, Y1 - Y2 must be linked.

Dimensional drawings

Screw-type terminals



Dimensions in mm

Technical data overview

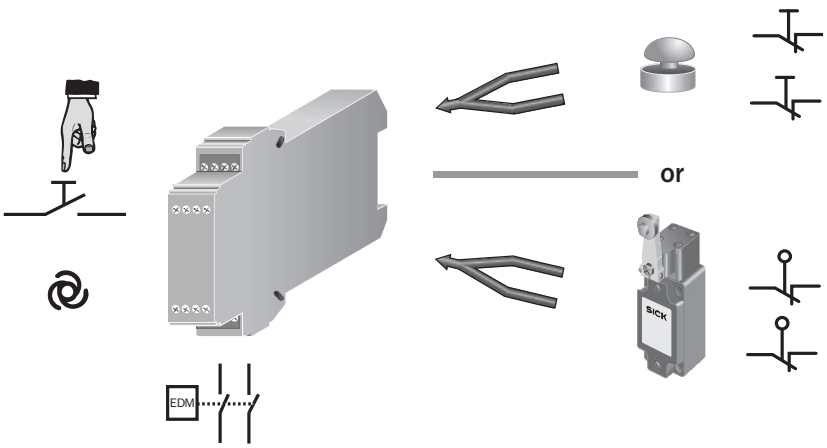
Category	Category 4 (EN ISO 13849) [1]
Performance level	PL e (EN ISO 13849) [1]
Number of enable current contacts	3
Number of signaling current contacts	1
Input circuit	Single-channel
Housing width	22.5 mm

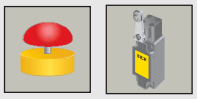
[1] Maximum category 2, performance level d, safety integrity level SIL2, SILCL2 in the application

Product description

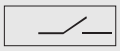
- 2 LEDs:
  - Supply voltage
  - Relay K1, K2
- Manual reset
- Automatic reset
- Additional outputs available with the contact expansion modules
  - UE10-4XT
  - UE11-4DX
- External device monitoring (EDM)
- Screw-type or plug-in terminals

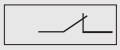
Applications





- For emergency stop pushbuttons
- For safety switches

3 

1 

Ordering information

Connection type	Supply voltage	Type	Part no.
Screw-type terminals	230 V AC	UE23-3MF2A3	6034597
	115 V AC	UE23-3MF2A4	6034596
	24 V DC	UE23-3MF2D2	6034595
Plug-in terminals	230 V AC	UE23-3MF3A3	6034600
	115 V AC	UE23-3MF3A4	6034599
	24 V DC	UE23-3MF3D2	6034598

N

Further information	Page
→ Technical specifications	N-8
→ Internal circuitry	N-10
→ Dimensional drawings	N-11
→ Systematic safety	A-0
→ Services	B-0

Technical specifications

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

General system data

Type	UE23-3MF2A3	UE23-3MF2A4	UE23-3MF2D2	UE23-3MF3A3	UE23-3MF3A4	UE23-3MF3D2
Safety related parameters						
Safety integrity level	SIL3 (IEC 61508), SILCL3 (IEC 62061) [1]					
Category	Category 4 (EN ISO 13849) [1]					
Performance level	PL e (EN ISO 13849) [1]					
B_{10d} parameter	3×10^5 switching cycles (AC-15, 230 V, I = 5 A), 2×10^6 switching cycles (DC-15, 230 V, I = 2 A), 7×10^6 switching cycles (DC-13, 24 V, I = 1 A)					
PFHd (mean probability of a dangerous failure per hour)	3.0×10^{-8} (EN ISO 13849)					
T_M (Mission Time)	20 years (EN ISO 13849)					
Stop category	0 (EN 60204)					
Voltage supply	A1, A2					
	–		PELV (Output circuit > 25 V AC / 60 V DC)	–		PELV (Output circuit > 25 V AC / 60 V DC)
	–		PELV or SELV (Output circuit < 25 V AC / 60 V DC)	–		PELV or SELV (Output circuit < 25 V AC / 60 V DC)
Supply voltage	A1, A2					
	230 V AC (196 V AC ... 253 V AC)	115 V AC (98 V AC ... 132 V AC)	24 V DC (20.4 V DC ... 26.4 V DC)	230 V AC (196 V AC ... 253 V AC)	115 V AC (98 V AC ... 132 V AC)	24 V DC (20.4 V DC ... 26.4 V DC)
Power consumption	3.4 VA		3.9 VA, 1.9 W	3.4 VA		3.9 VA, 1.9 W
Residual ripple	2.4 V_{pp} [2]					
Nominal frequency	50 Hz ... 60 Hz		–	50 Hz ... 60 Hz		–
Opening time	Min. 200 ms					

[1] Maximum category 2, performance level d, safety integrity level SIL2, SILCL2 in the application

[2] In DC operation, within the limits of V_S

Control voltage Y1 - Y2 - Y3

Type	UE23-3MF2A3	UE23-3MF2A4	UE23-3MF2D2	UE23-3MF3A3	UE23-3MF3A4	UE23-3MF3D2
Control voltage	Max. 40 V DC					
Control current	Max. 90 mA					
Short-circuit current	> 1500 mA, Y1					
Fuse	8 A gG, with tripping characteristics B or C					
Reset time						
Manual	Max. 300 ms (Y3)		Max. 60 ms (Y3)	Max. 300 ms (Y3)		Max. 60 ms (Y3)
Automatic	Max. 600 ms (Y2)					
Galvanized decoupling	✔		–	✔		–
Switch-on time	Max. 300 ms		Max. 60 ms	Max. 300 ms		Max. 60 ms
Reset time	Max. 300 ms		Max. 60 ms	Max. 300 ms		Max. 60 ms
Activation time of reset button	60 ms					
Cable resistance	≤ 70 Ohm					

Electrical output circuits 13 - 14, 23 - 24, 31 - 32

Type	UE23-3MF2A3	UE23-3MF2A4	UE23-3MF2D2	UE23-3MF3A3	UE23-3MF3A4	UE23-3MF3D2
Response time	Max. 80 ms [1]					
Number of enable current (N/O) contacts	3, relevant for safety					
Number of signaling current (N/C) contacts	1, not safety-relevant					
Contact type	Positively driven					
Contact material	Silver alloy, gold flashed					
Switching voltage	5 V AC ... 300 V AC 5 V DC ... 250 V DC					
Switching current	10 mA ... 8 A					
Usage category	AC-15/DC-13					
Rated operating current (voltage)	5 A (230 V AC) 360 switching cycles/h 5 A (24 V DC) 3600 switching cycles/h					
Maximum switching frequency	3600/h					
Mechanical life (relay contacts)	1 x 10^7 switching cycles					
Electrical life (relay contacts)	1 x 10^6 switching cycles					

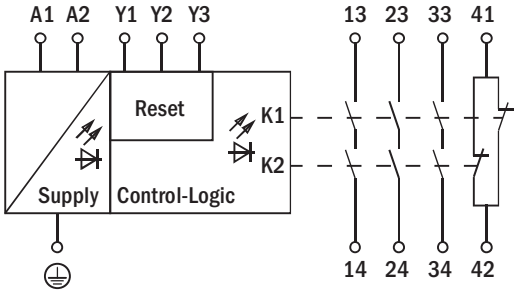
[1] K1/K2

N

Operating data

Type	UE23-3MF2A3	UE23-3MF2A4	UE23-3MF2D2	UE23-3MF3A3	UE23-3MF3A4	UE23-3MF3D2
Rated impulse withstand voltage U_{imp}	4 kV					
Overvoltage category	III					
Contamination rating						
External	3					
Internal	2					
Standard	EN 50178					
Rated insulation voltage U_i	300 V AC					
Test voltage	2 kV (50 Hz) EN 60439-1					
Enclosure rating						
Clamps	IP 20					
Housing	IP 40					
Interference emission	DIN EN 61000-6-4					
Interference resistance	EN 61000-6-2					
Ambient operating temperature	–25 °C ... +55 °C					
Storage temperature	–25 °C ... +75 °C					
Connection type	Screw-type terminals			Plug-in terminals		
Conductor cross-section						
Single wire (2x, same cross-section)	0.14 mm² ... 0.75 mm²					
Single wire (1x)	0.14 mm² ... 2.5 mm²					
Fine wire with ferrules (2x, same cross-section)	0.25 mm² ... 0.5 mm²					
Fine wire with ferrules (1x)	0.25 mm² ... 2.5 mm²					
Dimensions (W x H x D)	22.5 mm x 123 mm x 93.5 mm					
Weight	0.27 kg					

Internal circuitry



N

Function

The connected emergency stop pushbuttons or safety switches are controlled by the supply voltage.

After applying the supply voltage (LED SUPPLY illuminates), the normally open contacts remain in the open state. If the connected sensor is not activated (i.e., the input circuits are closed), then the normally open contacts close immediately in automatic reset (LED “K1, K2“ illuminates). In the case of manual reset, this only occurs after pressing the reset button.

External device monitoring (EDM)

The unit can take over the function of external device monitoring. The contactor monitoring system monitors the external relays through their normally closed contacts.

Manual reset

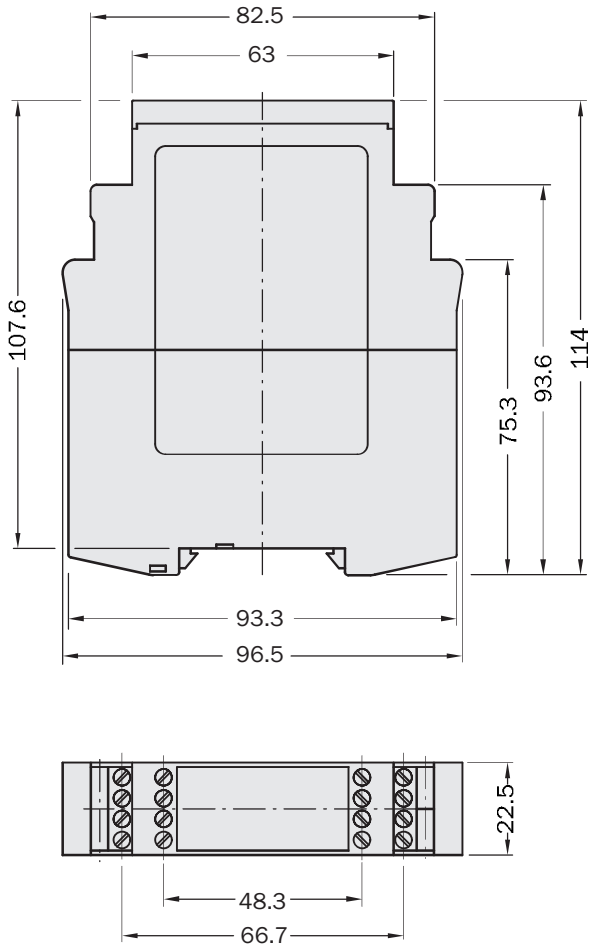
For manual resetting, a pushbutton must be connected to terminals Y1 and Y3. This reset is monitored.

Automatic reset

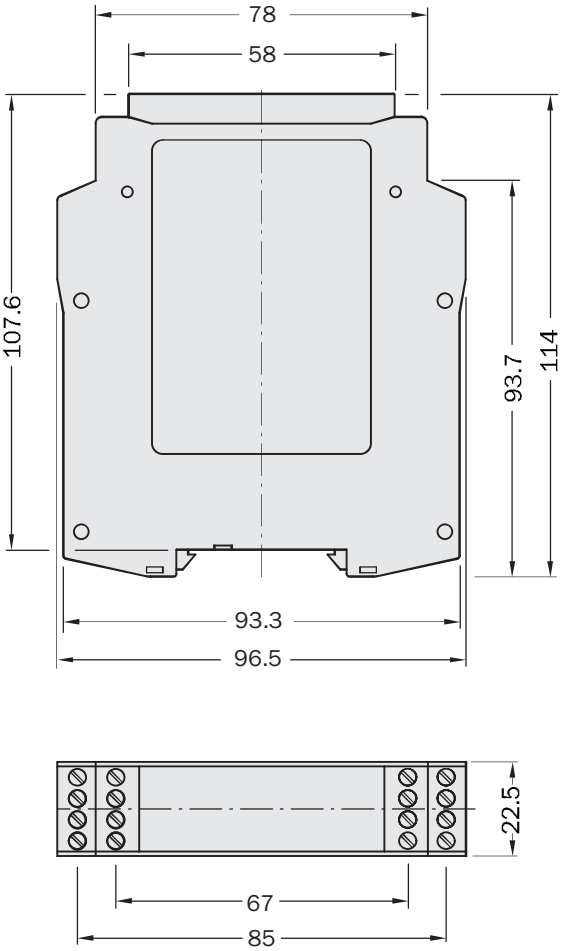
For automatic resetting, Y1 - Y2 must be linked.

Dimensional drawings

Screw-type terminals

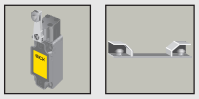


Plug-in terminals



Dimensions in mm

N



- For two-hand controls Type III C in accordance with EN 574
- For safety switches

2

1

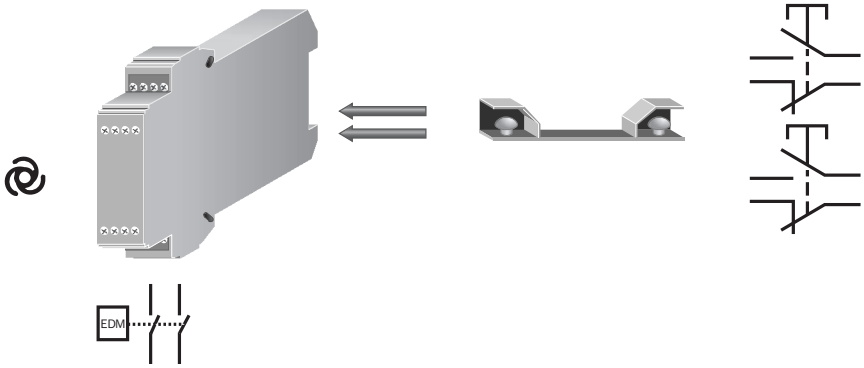
Technical data overview

Category	Category 4 (EN ISO 13849)
Performance level	PL e (EN ISO 13849)
Two-hand control systems	Type III C (EN 574)
Number of enable current contacts	2
Number of signaling current contacts	1
Input circuit	Single- or dual-channel
Housing width	22.5 mm

Product description

- 3 LEDs:
  - Supply voltage
  - Relays K1 and K2
- Automatic start
- Additional outputs available with the UE10-4XT contact expansion module
- External device monitoring (EDM)
- Screw-type terminals or plug-in terminals

Applications



Ordering information

Connection type	Type	Part no.
Screw-type terminals	UE42-2HD2D2	6024878
Plug-in terminals	UE42-2HD3D2	6024881

N

Further information	Page
→ Internal circuitry	N-15
→ Dimensional drawings	N-15
→ Connection diagrams	N-16
→ Systematic safety	A-0
→ Services	B-0

Technical specifications

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

General system data

Type	UE42-2HD2D2	UE42-2HD3D2
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)	
B_{10d} parameter	1.26×10^6 switching cycles (AC-15, 230 V, I = 1.5 A), 5.9×10^6 switching cycles (AC-15, 230 V, I = 0.75 A), 4.35×10^5 switching cycles (DC-13, 24 V, I = 2.5 A), 1×10^7 switching cycles (DC-13, 24 V, I = 0.63 A)	
PFHd (mean probability of a dangerous failure per hour)	3.0×10^{-8} (EN ISO 13849)	
T_M (Mission Time)	20 years (EN ISO 13849)	
Voltage supply	A1, A2 PELV (Output circuit > 25 V AC / 60 V DC) PELV or SELV (Output circuit < 25 V AC / 60 V DC)	
Supply voltage	A1, A2 24 V AC (20.4 V AC ... 26.4 V AC) 24 V DC (20.4 V DC ... 26.4 V DC)	
Power consumption	2.7 VA, 1.5 W	
Residual ripple	2.4 V_{pp} [1]	
Nominal frequency	50 Hz ... 60 Hz [2]	

[1] In DC operation, within the limits of V_S

[2] In AC operation

Control voltage Y11, Y21

Type	UE42-2HD2D2	UE42-2HD3D2
Control voltage	24 V DC	
Control current	60 mA	
Short-circuit current	1000 mA, between Y11 and A2	
Fuse	PTC resistor	
Galvanized decoupling	– (between A1, A2 and Y11, Y21)	

Input circuits Y12, Y14, Y22, Y23

Type	UE42-2HD2D2	UE42-2HD3D2
Switch-on time	250 ms [1]	
Input current	60 mA	
Reset time	Max. 40 ms	
Activation time tolerance between the two start buttons	500 ms	
Switch-off time	Min. 250 ms	
Cable resistance	< 70 Ohm	

[1] After applying the supply voltage

N

Electrical output circuits 13 - 14, 23 - 24, 31 - 32

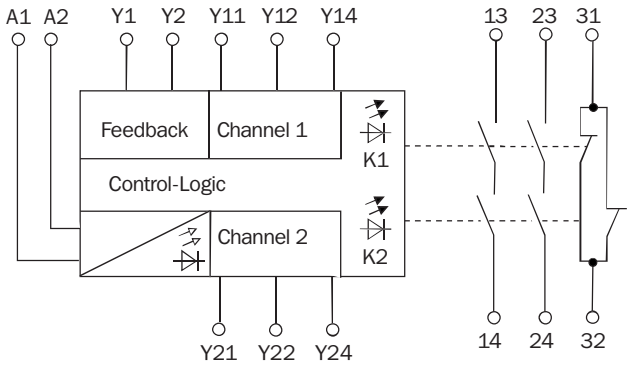
Type	UE42-2HD2D2	UE42-2HD3D2
Response time	50 ms	
Number of enable current (N/O) contacts	2, relevant for safety	
Number of signaling current (N/C) contacts	1, not safety-relevant	
Contact type	Positively driven	
Contact material	Silver alloy, gold flashed	
Switching voltage	10 V AC ... 230 V AC 10 V DC ... 30 V DC	
Switching current	10 mA ... 6 A	
Total current	12 A	
Usage category	AC-15/DC-13	
Rated operating current (voltage)	4 A (230 V AC) 360 switching cycles/h 3 A (230 V AC) 3600 switching cycles/h 4 A (24 V DC) 360 switching cycles/h 2.5 A (24 V DC) 3600 switching cycles/h	
Maximum switching frequency	3600/h	
Mechanical life (relay contacts)	1×10^7 switching cycles	
Electrical life (relay contacts)	2×10^6 switching cycles	

Operating data

Type	UE42-2HD2D2	UE42-2HD3D2
Rated impulse withstand voltage U_{imp}	4 kV	
Overvoltage category	III	
Contamination rating		
External	3	
Internal	2	
Standard	EN 50178	
Rated insulation voltage U_i	300 V AC	
Test voltage	2 kV (50 Hz) EN 60439-1	
Enclosure rating		
Clamps	IP 20	
Housing	IP 40	
Interference emission	EN 60947-1 02/99	
Interference resistance	EN 60947-1 02/99	
Ambient operating temperature	–25 °C ... +55 °C	
Storage temperature	–25 °C ... +75 °C	
Connection type	Screw-type terminals	Plug-in terminals
Conductor cross-section		
Single wire (2x, same cross-section)	0.14 mm² ... 0.75 mm²	
Single wire (1x)	0.14 mm² ... 2.5 mm²	
Fine wire with ferrules (2x, same cross-section)	0.25 mm² ... 0.5 mm²	
Fine wire with ferrules (1x)	0.25 mm² ... 2.5 mm²	
Dimensions (W x H x D)	22.5 mm x 114 mm x 96.5 mm	
Weight	0.2 kg	

N

Internal circuitry



Function

The UE42-2HD unit corresponds to EN 574 Type III C. To release the outputs, the two inputs (e.g., two-hand pushbuttons) must be actuated within 0.5 sec.

After applying the supply voltage to terminals A1 - A2, the LED SUPPLY illuminates to indicate that electrical power is present. Pressing the two-hand pushbuttons S1 and S2 at the same time (see connection diagrams) closes the two normally open contacts. Releasing one of the buttons will cause the circuits to open.

A renewed attempt to initiate starting is only possible if both start buttons are set to their nominal start position (for two-hand pushbuttons units: if both have been released) and the normally closed contact is closed.

External device monitoring (EDM)

The UE42-2HD can take over the function of external device monitoring. The normally closed contacts of the external relays are switched in series and connected to terminals Y1 - Y2.

Automatic start

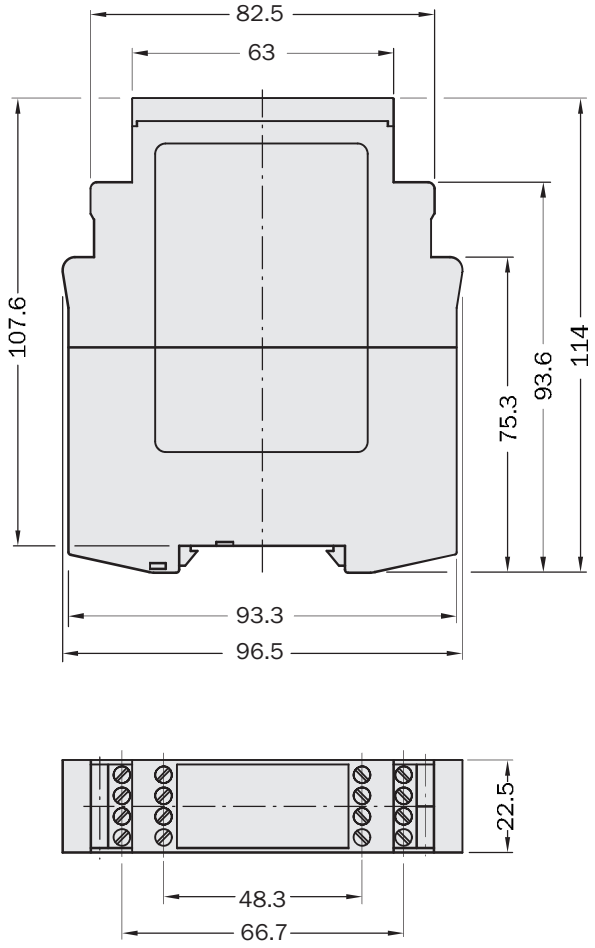
The UE42-2HD has an automatic start facility.

Monitoring of simultaneous activation

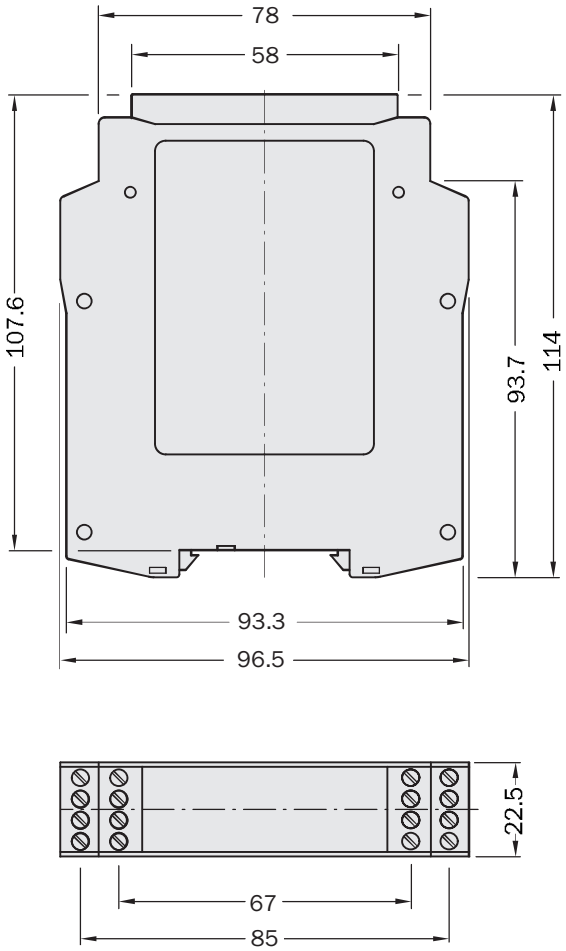
The pressing of the start buttons at the same time is monitored. Only when both start buttons are activated within 0.5 sec do normally open contacts close and the normally closed contact opens.

Dimensional drawings

Screw-type terminals



Plug-in terminals

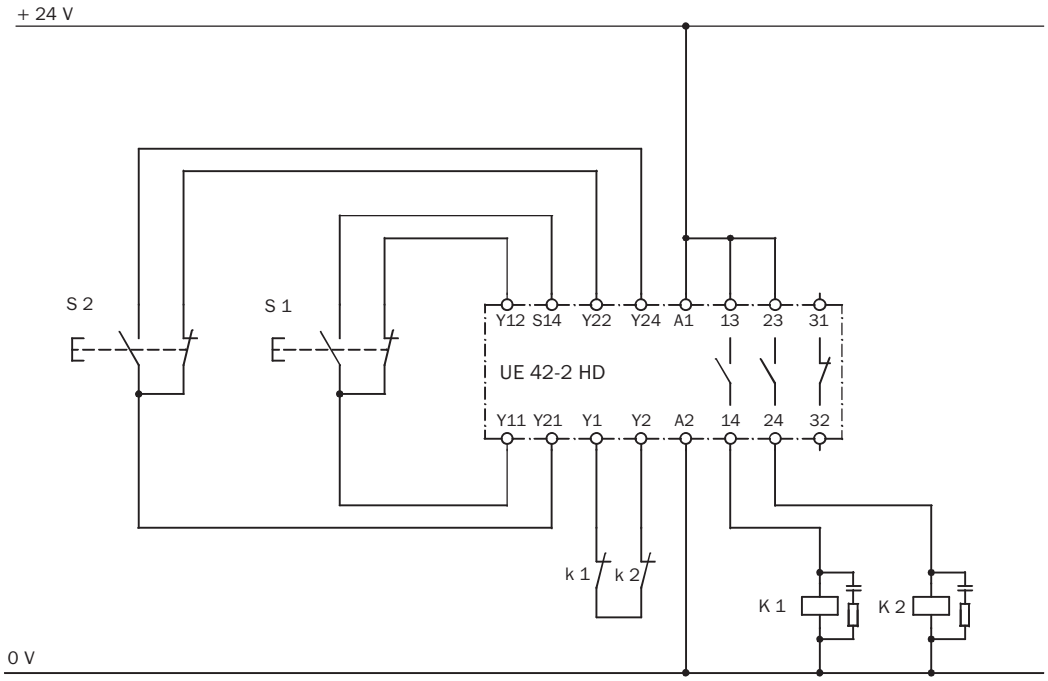


Dimensions in mm

Connection diagrams

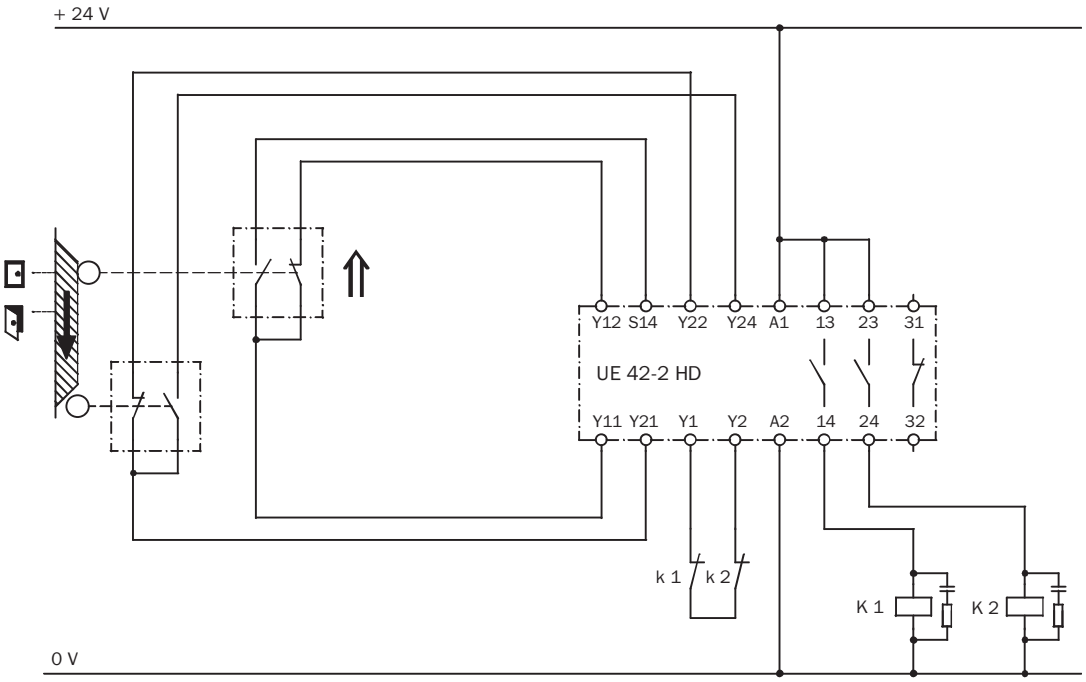
➜ You can find more connection diagrams at www.mysick.com

Two-hand control with UE42-2HD safety relay, dual-channel system



Operating mode: with automatic start and external device monitoring (EDM)

Two safety switches connected to UE42-2HD safety relay, dual-channel system



Operating mode: with automatic reset and external device monitoring (EDM)

N

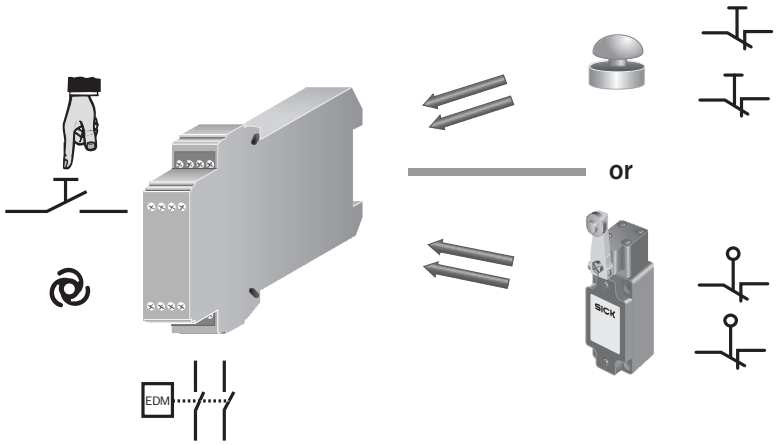
Technical data overview

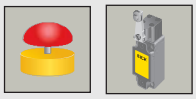
Category	Category 4 (EN ISO 13849)
Performance level	PL e (EN ISO 13849)
Number of enable current contacts	2
Number of signaling current contacts	1
Input circuit	Single- or dual-channel
Housing width	22.5 mm

Product description

- Cross-circuit detection on dual-channel wired systems
- 3 LEDs:
  - Supply voltage
  - Relay K1
  - Relay K2
- Manual reset
- Automatic reset
- Additional outputs available with the contact expansion modules
  - UE10-4XT
  - UE11-4DX
- External device monitoring (EDM)
- Screw-type terminals or plug-in terminals

Applications





- For emergency stop pushbuttons
- For safety switches

2

1

Ordering information

Connection type	Type	Part no.
Screw-type terminals	UE43-2MF2D2	6024893
Plug-in terminals	UE43-2MF3D2	6024894

Further information	Page
→ Technical specifications	N-18
→ Internal circuitry	N-20
→ Dimensional drawings	N-20
→ Connection diagrams	N-21
→ Systematic safety	A-0
→ Services	B-0

N

Technical specifications

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

General system data

Type	UE43-2MF2D2	UE43-2MF3D2
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)	
B_{10d} parameter	1.26 x 10^6 switching cycles (AC-15, 230 V, I = 1.5 A), 5.9 x 10^6 switching cycles (AC-15, 230 V, I = 0.75 A), 4.35 x 10^5 switching cycles (DC-13, 24 V, I = 2.5 A), 1 x 10^7 switching cycles (DC-13, 24 V, I = 0.63 A)	
PFHd (mean probability of a dangerous failure per hour)	3.0 x 10^{-8} (EN ISO 13849)	
T_M (Mission Time)	20 years (EN ISO 13849)	
Stop category	0 (EN 60204)	
Voltage supply	A1, A2 PELV (Output circuit > 25 V AC / 60 V DC) PELV or SELV (Output circuit < 25 V AC / 60 V DC)	
Supply voltage	A1, A2 24 V AC (20.4 V AC ... 26.4 V AC) 24 V DC (20.4 V DC ... 26.4 V DC)	
Power consumption	4.6 VA, 2.1 W	
Residual ripple	2.4 V_{pp} [1]	
Nominal frequency	50 Hz ... 60 Hz [2]	

[1] In DC operation, within the limits of V_S

[2] In AC operation

Control voltage S11, S21, S33

Type	UE43-2MF2D2	UE43-2MF3D2
Control voltage	17.4 V DC ... 22 V DC	
Control current	40 mA ... 100 mA	
Short-circuit current	2000 mA, between S33 / S11 and S21	
Fuse	PTC resistor	
Reaction time by cross connection	3 s	
Reaction time upon detection of cross connection	3 s	
Galvanized decoupling	– (between A1, A2 and S11, S21, S33)	

Input circuits S12, S22, S31, S34, S35

Type	UE43-2MF2D2	UE43-2MF3D2
Input current		
S12, S22, S31	40 mA ... 100 mA	
S34, S35	5 mA ... 50 mA	
Reset time		
Manual	Max. 40 ms	
Automatic	200 ms ... 500 ms	
Activation time of reset button	50 ms	
Cable resistance	< 35 Ohm	

Electrical output circuits 13 - 14, 23 - 24, 31 - 32

Type	UE43-2MF2D2	UE43-2MF3D2
Response time	25 ms [1]	
Opening time	40 ms	
Number of enable current (N/O) contacts	2, relevant for safety	
Number of signaling current (N/C) contacts	1, not safety-relevant	
Contact type	Positively driven	
Contact material	Silver alloy, gold flashed	
Switching voltage		
	10 V AC ... 230 V AC	
	10 V DC ... 30 V DC	
Switching current		
	10 mA ... 6 A	
Total current	12 A	
Usage category	AC-15/DC-13	
Rated operating current (voltage)	4 A (230 V AC) 360 switching cycles/h 3 A (230 V AC) 3600 switching cycles/h 4 A (24 V DC) 360 switching cycles/h 2.5 A (24 V DC) 3600 switching cycles/h	
Maximum switching frequency	3600/h	
Mechanical life (relay contacts)	1 x 10^7 switching cycles	
Electrical life (relay contacts)	1 x 10^5 switching cycles	

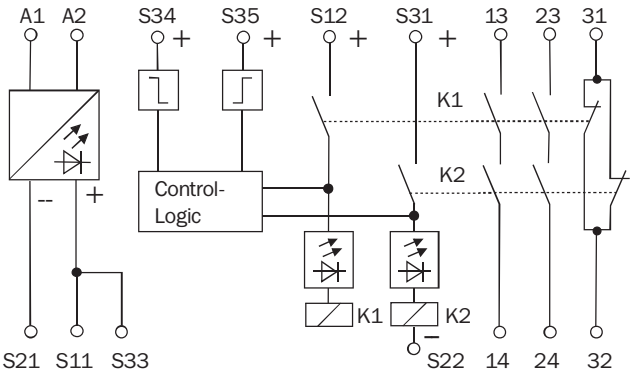
[1] K1/K2

Operating data

Type	UE43-2MF2D2	UE43-2MF3D2
Rated impulse withstand voltage U_{imp}	4 kV	
Overvoltage category	III	
Contamination rating		
External	3	
Internal	2	
Standard	EN 50178	
Rated insulation voltage U_i	300 V AC	
Test voltage	2 kV (50 Hz) EN 60439-1	
Enclosure rating		
Clamps	IP 20	
Housing	IP 40	
Interference emission	DIN EN 61000-6-4	
Interference resistance	EN 61000-6-2	
Ambient operating temperature	–25 °C ... +55 °C	
Storage temperature	–25 °C ... +75 °C	
Connection type	Screw-type terminals	Plug-in terminals
Conductor cross-section		
Single wire (2x, same cross-section)	0.14 mm² ... 0.75 mm²	
Single wire (1x)	0.14 mm² ... 2.5 mm²	
Fine wire with ferrules (2x, same cross-section)	0.25 mm² ... 0.5 mm²	
Fine wire with ferrules (1x)	0.25 mm² ... 2.5 mm²	
Dimensions (W x H x D)	22.5 mm x 114 mm x 96.5 mm	
Weight	0.2 kg	

N

Internal circuitry



Function

After applying the supply voltage (LED SUPPLY illuminates), the normally open contacts remain in the opened state. If the connected sensor is not activated (i.e., the input circuits are closed), then the normally open contacts close immediately in automatic reset (LED K1 and K2 illuminate). In the case of manual reset, this only occurs after pressing and releasing the reset button. Activation of the sensor (opening of one or both input circuits) affects the opening of the normally open outputs (LED K1 and K2 off).

External device monitoring (EDM)

The UE43-2MF unit can take over the function of external device monitoring. The contactor monitoring system monitors the external relays by means of their normally closed contacts.

Manual reset

For manual resetting, a pushbutton must be connected to terminals S33 - S34. Reset is monitored.

Automatic reset

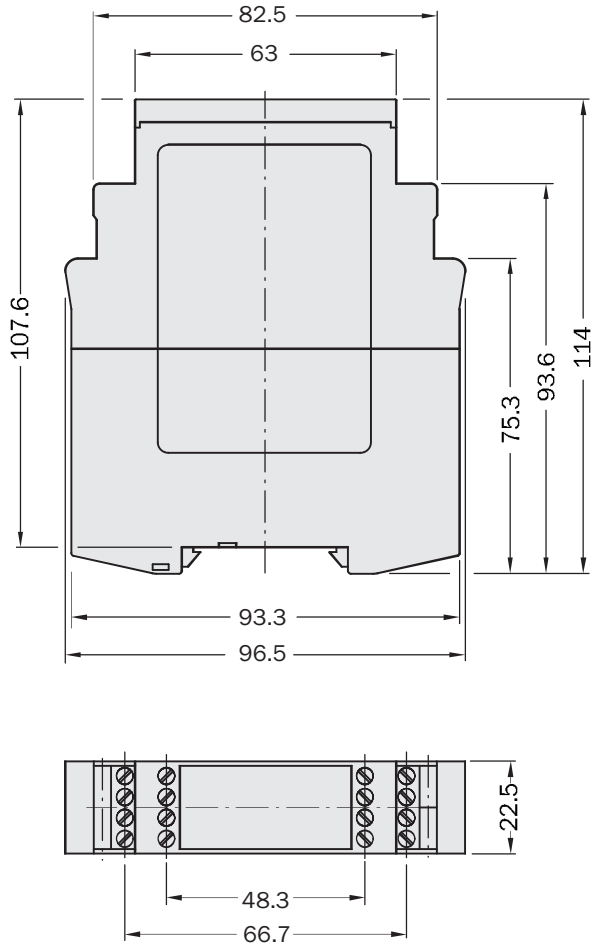
For automatic resetting, S12 - S35 must be linked.

Cross-circuit detection

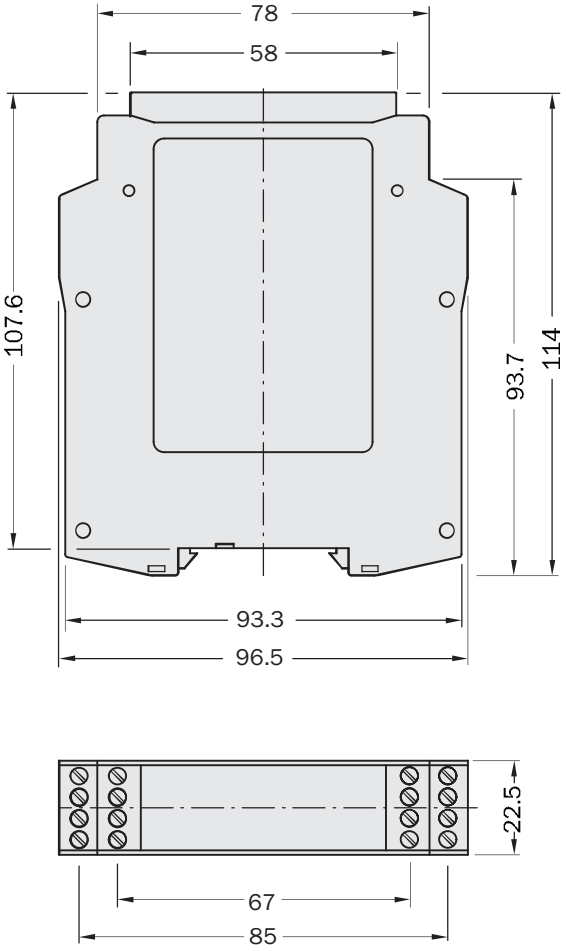
Cross-circuit is detected on dual-channel wired systems if these are wired with opposing polarity.

Dimensional drawings

Screw-type terminals



Plug-in terminals

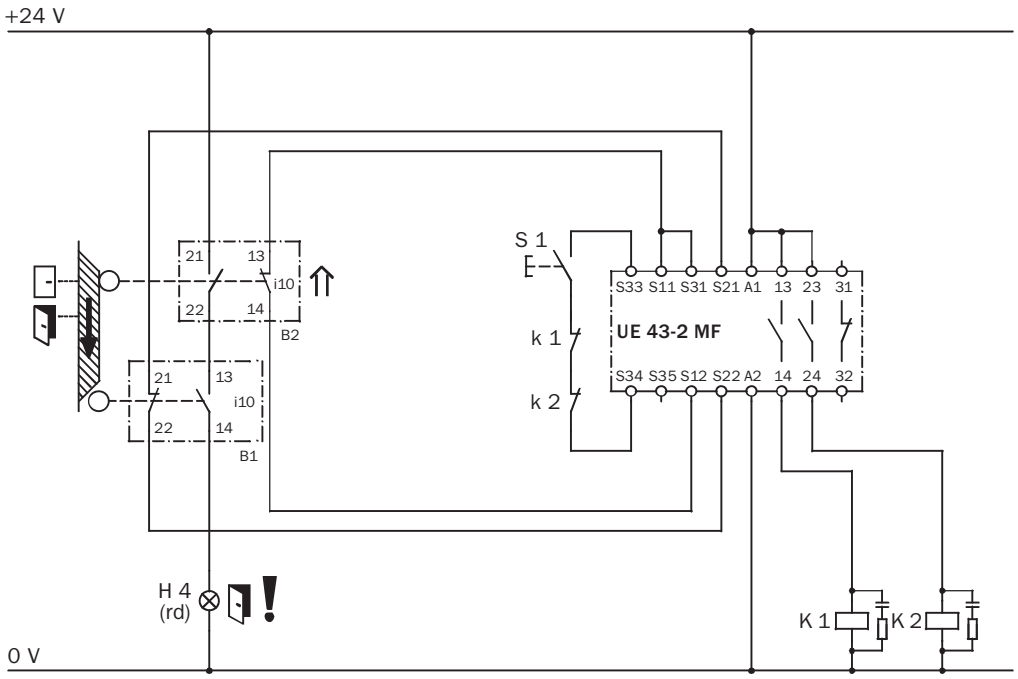


Dimensions in mm

Connection diagrams

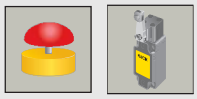
➜ You can find more connection diagrams at www.mysick.com

Two i10 safety switches to UE43-2MF safety relay, dual-channel system



Operating mode: with manual reset and external device monitoring (EDM)

N



- For emergency stop pushbuttons
- For safety switches

3

1

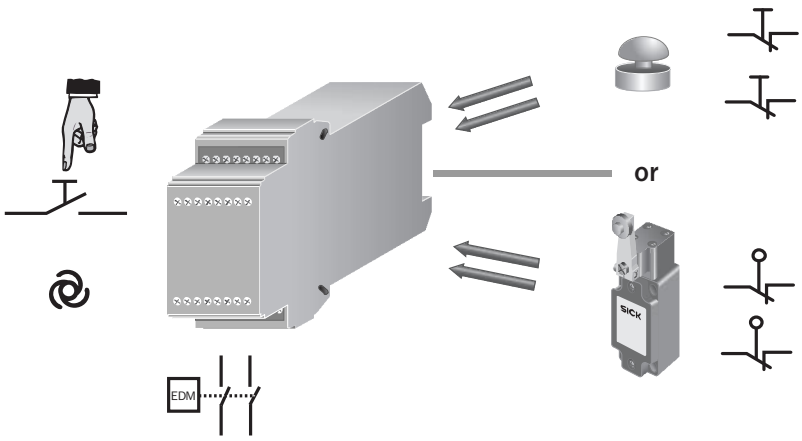
Technical data overview

Category	Category 4 (EN ISO 13849)
Performance level	PL e (EN ISO 13849)
Number of enable current contacts	3
Number of signaling current contacts	1
Input circuit	Single- or dual-channel
Housing width	45 mm

Product description

- Cross-circuit detection on dual-channel wired systems
- 3 LEDs:
  - Supply voltage
  - Relays K2 and K3
- Manual reset
- Automatic reset
- Additional outputs available with the contact expansion modules
  - UE10-4XT
  - UE11-4DX
- External device monitoring (EDM)

Applications



Ordering information

Supply voltage	Type	Part no.
24 V DC	UE43-3MF2D3	6024897
24 V AC	UE43-3MF2A0	6024898
115 V AC	UE43-3MF2A1	6024899
120 V AC	UE43-3MF2A2	6024900
230 V AC	UE43-3MF2A3	6024901

N

Further information	Page
→ Internal circuitry	N-25
→ Dimensional drawings	N-26
→ Connection diagrams	N-26
→ Systematic safety	A-0
→ Services	B-0

Technical specifications

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

General system data

Type	UE43-3MF2D3	UE43-3MF2A0	UE43-3MF2A1	UE43-3MF2A2	UE43-3MF2A3
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)				
B_{10d} parameter	1 x 10^6 switching cycles (AC-15, 230 V, I = 0.5 A), 3.5 x 10^5 switching cycles (DC-13, 24 V, I = 2 A), 1.2 x 10^6 switching cycles (DC-13, 24 V, I = 0.5 A)				
PFHd (mean probability of a dangerous failure per hour)	3.0 x 10^{-8} (EN ISO 13849)				
T_M (Mission Time)	20 years (EN ISO 13849)				
Stop category	0 (EN 60204)				
Voltage supply	A1, A2				
	PELV (Output circuit > 25 V AC / 60 V DC)	–			
	PELV or SELV (Output circuit < 25 V AC / 60 V DC)	–			
	–	Use of earth conductor terminal			
Supply voltage	A1, A2				
	24 V DC (20.4 V DC ... 26.4 V DC)	24 V AC (20.4 V AC ... 26.4 V AC)	115 V AC (97.75 V AC ... 126.5 V AC)	120 V AC (102 V AC ... 132 V AC)	230 V AC (195.5 V AC ... 253 V AC)
Power consumption	1 W	3.2 VA, 2.5 W			
Residual ripple	2.4 V_{pp} [1]				
Nominal frequency	–	50 Hz ... 60 Hz			

[1] In DC operation, within the limits of V_S

Control voltage Y11, Y21

Type	UE43-3MF2D3	UE43-3MF2A0	UE43-3MF2A1	UE43-3MF2A2	UE43-3MF2A3
Control voltage	24 V DC				
Control current	40 mA				
Short-circuit current	1000 mA, between Y11 and A2				
Fuse	PTC resistor	Short-circuit protected transformer			
Galvanized decoupling	–	✔ (between A1, A2 and Y11, Y21, PE)			

N

Input circuits Y12, Y22, Y31

Type	UE43-3MF2D3	UE43-3MF2A0	UE43-3MF2A1	UE43-3MF2A2	UE43-3MF2A3
Input current					
Y12, Y22, Y31	15 mA				
Y13, Y14	40 mA				
Reset time					
Manual	150 ms ... 250 ms, Y13				
Automatic	0.8 s (1.2 s)				
Synchronous time monitoring	500 ms				
Switch-on time	Min. 100 ms				
Cable resistance	< 70 Ohm				

Electrical output circuits 13 - 14, 23 - 24, 33 - 34, 41 - 42

Type	UE43-3MF2D3	UE43-3MF2A0	UE43-3MF2A1	UE43-3MF2A2	UE43-3MF2A3
Response time	50 ms [1]				
Number of enable current (N/O) contacts	3, relevant for safety				
Number of signaling current (N/C) contacts	1, not safety-relevant				
Contact type	Positively driven				
Contact material	Silver alloy, gold flashed				
Switching voltage					
	10 V AC ... 230 V AC				
	10 V DC ... 30 V DC				
Switching current					
	10 mA ... 6 A				
Total current	18 A				
Usage category	AC-15/DC-13				
Rated operating current (voltage)	6 A (230 V AC) 3600 switching cycles/h 6 A (24 V DC) 360 switching cycles/h 3 A (24 V DC) 3600 switching cycles/h				
Maximum switching frequency	3600/h				
Mechanical life (relay contacts)	1 x 10^7 switching cycles				
Electrical life (relay contacts)	2 x 10^6 switching cycles				

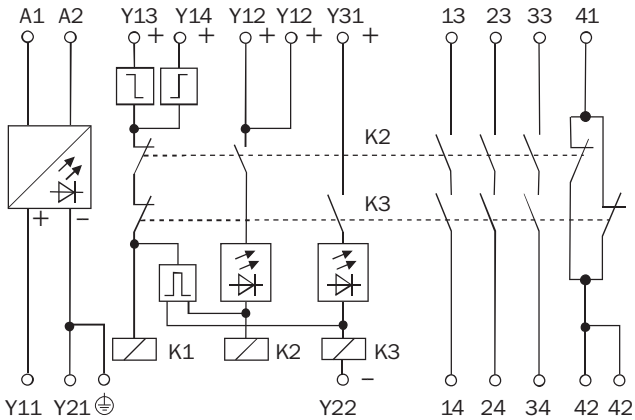
[1] K2/K3

N

Operating data

Type	UE43-3MF2D3	UE43-3MF2A0	UE43-3MF2A1	UE43-3MF2A2	UE43-3MF2A3
Rated impulse withstand voltage U_{imp}	4 kV				
Overvoltage category	III				
Contamination rating					
External	3				
Internal	2				
Standard	EN 50178				
Rated insulation voltage U_i	300 V AC				
Test voltage	2 kV (50 Hz) EN 60439-1				
Enclosure rating					
Clamps	IP 20				
Housing	IP 40				
Interference emission	DIN EN 61000-6-4				
Interference resistance	EN 61000-6-2				
Ambient operating temperature	–25 °C ... +55 °C				
Storage temperature	–25 °C ... +75 °C				
Connection type	Screw-type terminals				
Conductor cross-section					
Single wire (2x, same cross-section)	0.75 mm² ... 2.5 mm²				
Single wire (1x)	0.75 mm² ... 2.5 mm²				
Fine wire with ferrules (2x, same cross-section)	0.5 mm² ... 1.5 mm²				
Fine wire with ferrules (1x)	0.5 mm² ... 1.5 mm²				
Dimensions (W x H x D)	45 mm x 120.5 mm x 75 mm				
Weight	0.3 kg	0.36 kg			

Internal circuitry



Function

After applying the supply voltage (LED SUPPLY illuminates), the normally open contacts remain open. If the connected sensor is not activated (i.e., the input circuits are closed), the normally open contacts close immediately in automatic reset (LED K2 and K3 illuminate). In the case of manual resetting, this only occurs upon pressing and releasing the reset button.
Activation of the sensor (opening of one or both input circuits) affects the opening of the normally open contacts (LED K2 and K3 off).

External device monitoring (EDM)

The UE43-3MF unit can take over the external device monitoring. The contactor monitoring system monitors the external relays by way of their normally closed contacts.

Manual reset

For manual resetting, a pushbutton must be connected to terminals Y12 and Y13. Reset is monitored.

Automatic reset

For automatic resetting, Y12 - Y14 must be linked.

Cross-circuit detection

Cross-circuit is detected on dual-channel wired systems, if these are wired with opposing polarity.

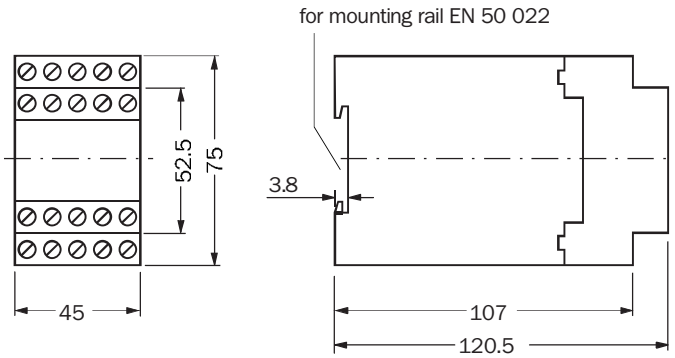
Monitoring of synchronization

Only if input 2 closes no later than 0.5 sec after input 1, do the output circuits close. If input 2 closes before input 1, the synchronization monitoring will not be affected, and the output circuits will close. This monitoring only takes place in automatic reset.

N

Dimensional drawings

Screw-type terminals

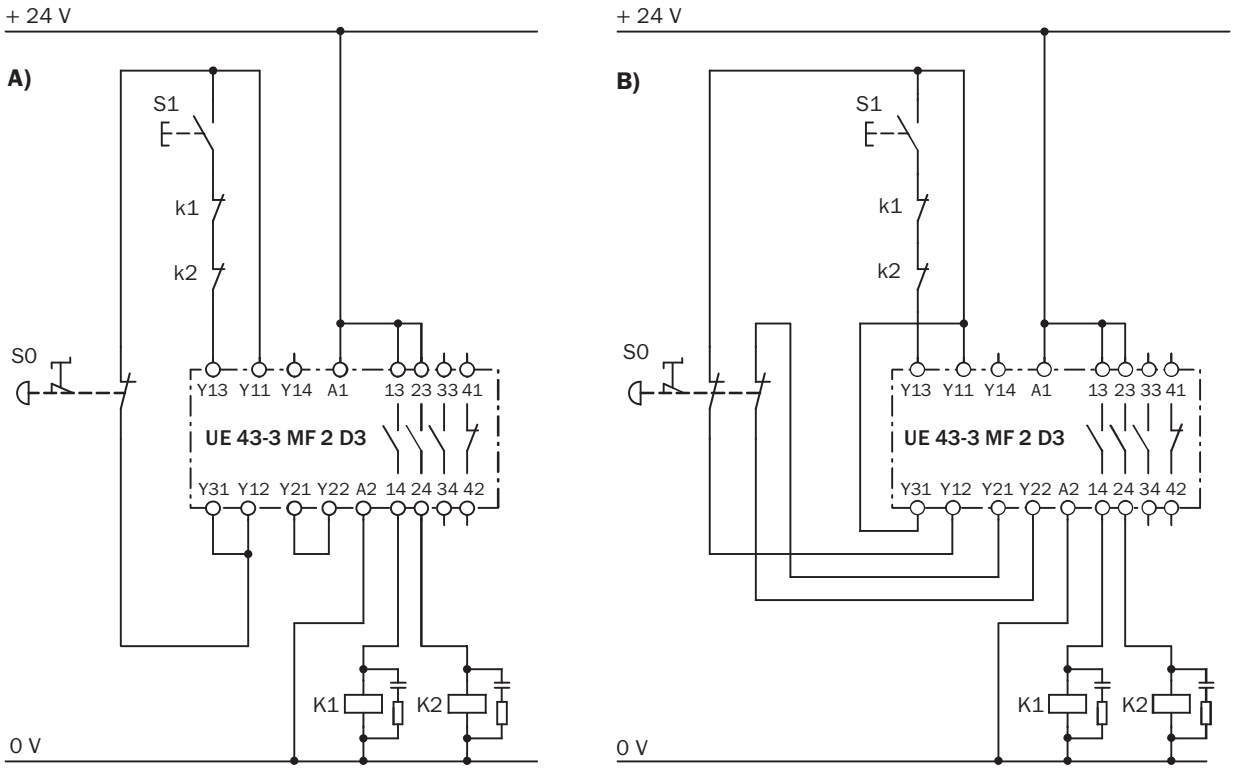


Dimensions in mm

Connection diagrams

➜ You can find more connection diagrams at www.mysick.com

Emergency stop switch connected to UE43-3MF2D3 safety relay



Operating mode: with manual reset and external device monitoring. **A)** Single-channel system, **B)** Dual-channel system

N

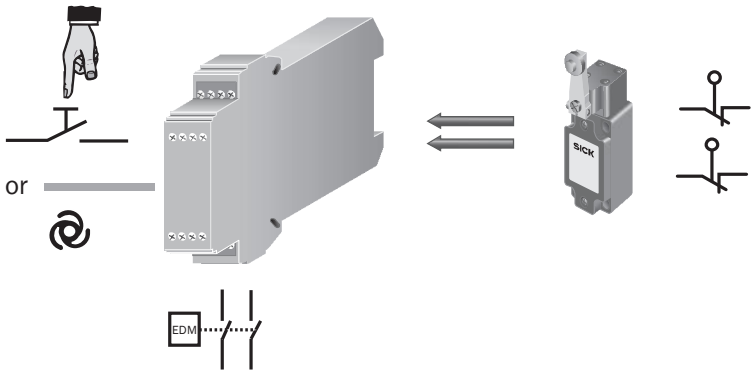
Technical data overview

Category	Category 4 (EN ISO 13849)
Performance level	PL e (EN ISO 13849)
Number of enable current contacts	3
Number of signaling current contacts	1
Input circuit	Single- or dual-channel
Housing width	22.5 mm

Product description

- Cross-circuit detection on dual-channel wired systems
- 3 LEDs:
  - Supply voltage
  - Relays K1 and K2
- Automatic reset
- Additional outputs available with the contact expansion modules
  - UE10-4XT
  - UE11-4DX
- External device monitoring (EDM)
- Screw-type terminals or plug-in terminals

Applications

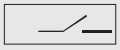


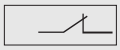
Ordering information

- Supply voltage: 24 V DC
- Reset/restart: Automatic

Connection type	Type	Part no.
Screw-type terminals	UE43-3AR2D2	6034565
Plug-in terminals	UE43-3AR3D2	6034568

- For safety switches

3 

1 

N

Further information	Page
→ Technical specifications	N-28
→ Internal circuitry	N-30
→ Dimensional drawings	N-30
→ Systematic safety	A-0
→ Services	B-0

Technical specifications

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

General system data

Type	UE43-3AR2D2	UE43-3AR3D2
Supply voltage	24 V DC	
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)	
B_{10d} parameter	3×10^5 switching cycles (AC-15, 230 V, I = 5 A), 2×10^6 switching cycles (DC-15, 230 V, I = 2 A), 7×10^6 switching cycles (DC-13, 24 V, I = 1 A)	
PFHd (mean probability of a dangerous failure per hour)	1.30×10^{-8} (EN ISO 13849)	
T_M (Mission Time)	20 years (EN ISO 13849)	
Stop category	0 (EN 60204)	
Voltage supply	A1, A2 PELV (Output circuit > 25 V AC / 60 V DC) PELV or SELV (Output circuit < 25 V AC / 60 V DC)	
Supply voltage	A1, A2 24 V DC (20.4 V DC ... 26.4 V DC)	
Power consumption	3.6 VA, 2.1 W	
Residual ripple	2.4 V_{pp} [1]	

[1] In DC operation, within the limits of V_S

Control voltage S11

Type	UE43-3AR2D2	UE43-3AR3D2
Control voltage	24 V DC (19.2 V DC ... 40 V DC)	
Control current	25 mA (max. 100 mA)	
Fuse	8 A gG, with tripping characteristics B or C	
Reset time	Max. 350 ms (S34)	
Galvanized decoupling	–	

Input circuits Y12, Y22, Y31

Type	UE43-3AR2D2	UE43-3AR3D2
Switch-on time	350 ms	
Input voltage	24 V DC (19.2 V DC ... 26.6 V DC)	
Input current S12, S52, S22, S34	25 mA, 100 mA	
Reset time	Max. 350 ms (S34)	
Switch-on time	Min. 350 ms	
Switch-off time	Min. 10 ms	
Cable resistance	< 70 Ohm	

N

Electrical output circuits 13 - 14, 23 - 24, 33 - 34, 41 - 42

Type	UE43-3AR2D2	UE43-3AR3D2
Response time	Max. 10 ms [1]	
Number of enable current (N/O) contacts	3, relevant for safety	
Number of signaling current (N/C) contacts	1, not safety-relevant	
Contact type	Positively driven	
Contact material	Silver alloy, gold flashed	
Switching voltage	5 V AC ... 300 V AC 5 V DC ... 250 V DC	
Switching current	10 mA ... 8 A	
Usage category	AC-15/DC-13	
Rated operating current (voltage)	5 A (230 V AC) 360 switching cycles/h 5 A (24 V DC) 3600 switching cycles/h	
Maximum switching frequency	3600/h	
Mechanical life (relay contacts)	1 x 10^7 switching cycles	
Electrical life (relay contacts)	1 x 10^6 switching cycles	

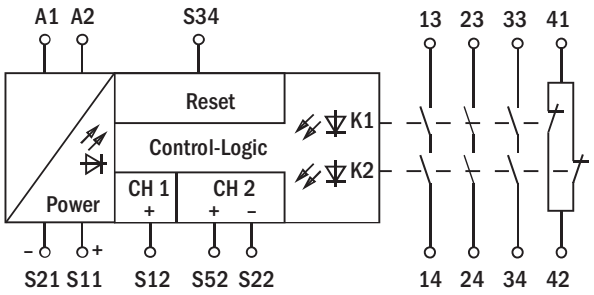
[1] K1/K2

Operating data

Type	UE43-3AR2D2	UE43-3AR3D2
Rated impulse withstand voltage U_{imp}	4 kV	
Overvoltage category	III	
Contamination rating		
External	3	
Internal	2	
Standard	EN 50178	
Rated insulation voltage U_i	300 V AC	
Test voltage	2 kV (50 Hz) EN 60439-1	
Enclosure rating		
Clamps	IP 20	
Housing	IP 40	
Interference emission	DIN EN 61000-6-4	
Interference resistance	EN 61000-6-2	
Ambient operating temperature	–25 °C ... +55 °C	
Storage temperature	–25 °C ... +75 °C	
Connection type	Screw-type terminals	Plug-in terminals
Conductor cross-section		
Single wire (2x, same cross-section)	0.14 mm² ... 0.75 mm²	
Single wire (1x)	0.14 mm² ... 2.5 mm²	
Fine wire with ferrules (2x, same cross-section)	0.25 mm² ... 0.5 mm²	
Fine wire with ferrules (1x)	0.25 mm² ... 2.5 mm²	
Dimensions (W x H x D)	22.5 mm x 114 mm x 96.5 mm	
Weight	0.21 kg	

N

Internal circuitry



Function

After applying the supply voltage (LED SUPPLY illuminates), the normally open contacts remain in the opened state. If the connected sensor is not activated (i.e., the input circuits are closed), then the normally open contacts close immediately in automatic reset (LED K1 and K2 illuminate). Activation of the sensor (opening of one or both input circuits) affects the opening of the normally open outputs (LED K1 and K2 off).

External device monitoring (EDM)

The UE43-3AR unit can take over the function of external device monitoring. The contactor monitoring system monitors the external relays by means of their normally closed contacts.
Connecting the EDM contacts between S11 and S34 replaces the wire link.

Automatic reset

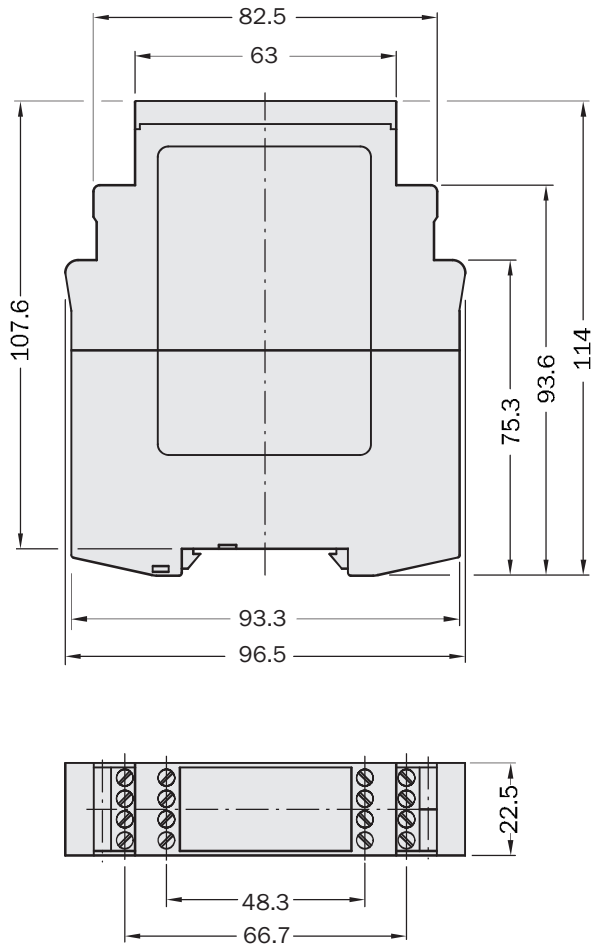
For automatic resetting, S11 - S34 must be linked.

Cross-circuit detection

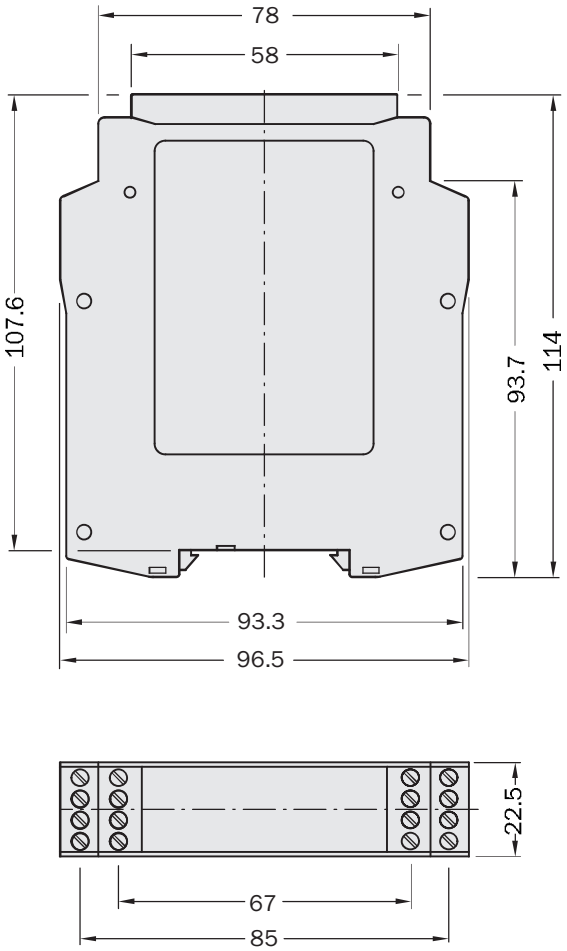
Cross-circuit is detected on dual-channel wired systems, if these are wired with opposing polarity.

Dimensional drawings

Screw-type terminals



Plug-in terminals



Dimensions in mm

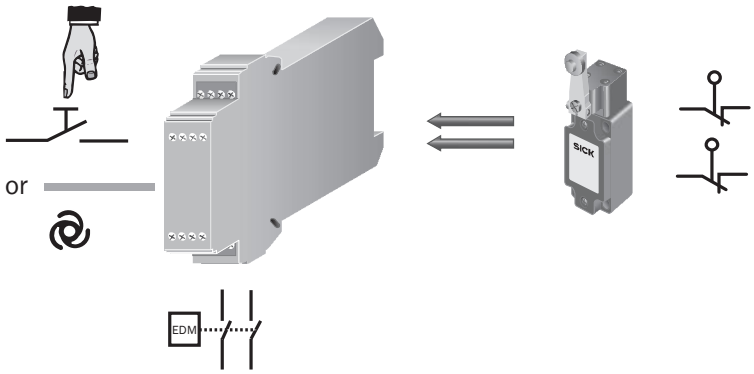
Technical data overview

Category	Category 4 (EN ISO 13849)
Performance level	PL e (EN ISO 13849)
Number of enable current contacts	4
Number of signaling current contacts	0
Input circuit	Single- or dual-channel
Housing width	22.5 mm

Product description

- Cross-circuit detection on dual-channel wired systems
- 3 LEDs:
  - Supply voltage
  - Relays K1 and K2
- Automatic reset
- Additional outputs available with the contact expansion modules
  - UE10-4XT
  - UE11-4DX
- External device monitoring (EDM)
- Screw-type terminals or plug-in terminals

Applications

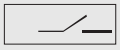


Ordering information

- Supply voltage: 24 V DC
- Reset/restart: Automatic

Connection type	Type	Part no.
Screw-type terminals	UE43-4AR2D2	6034772
Plug-in terminals	UE43-4AR3D2	6034775

- For safety switches

4 

Further information	Page
→ Technical specifications	N-32
→ Internal circuitry	N-34
→ Dimensional drawings	N-34
→ Systematic safety	A-0
→ Services	B-0

N

Technical specifications

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

General system data

Type	UE43-4AR2D2	UE43-4AR3D2
Supply voltage	24 V DC	
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)	
B_{10d} parameter	3×10^5 switching cycles (AC-15, 230 V, I = 5 A), 2×10^6 switching cycles (DC-15, 230 V, I = 2 A), 7×10^6 switching cycles (DC-13, 24 V, I = 1 A)	
PFHd (mean probability of a dangerous failure per hour)	1.30×10^{-8} (EN ISO 13849)	
T_M (Mission Time)	20 years (EN ISO 13849)	
Stop category	0 (EN 60204)	
Voltage supply	A1, A2 PELV (Output circuit > 25 V AC / 60 V DC) PELV or SELV (Output circuit < 25 V AC / 60 V DC)	
Supply voltage	A1, A2 24 V DC (20.4 V DC ... 26.4 V DC)	
Power consumption	3.6 VA, 2.1 W	
Residual ripple	2.4 V_{pp} [1]	

[1] In DC operation, within the limits of V_S

Control voltage S11

Type	UE43-4AR2D2	UE43-4AR3D2
Control voltage	24 V DC (19.2 V DC ... 40 V DC)	
Control current	25 mA (max. 100 mA)	
Fuse	8 A gG, with tripping characteristics B or C	
Reset time	Max. 350 ms (S34)	
Galvanized decoupling	–	

Input circuits Y12, Y22, Y31

Type	UE43-4AR2D2	UE43-4AR3D2
Switch-on time	350 ms	
Input voltage	24 V DC (19.2 V DC ... 26.6 V DC)	
Input current S12, S52, S22, S34	25 mA, 100 mA	
Reset time	Max. 350 ms (S34)	
Switch-on time	Min. 350 ms	
Switch-off time	Min. 10 ms	
Cable resistance	< 70 Ohm	

N

Electrical output circuits 13 - 14, 23 - 24, 33 - 34, 43 - 44

Type	UE43-4AR2D2	UE43-4AR3D2
Response time	Max. 10 ms [1]	
Number of enable current (N/O) contacts	4, relevant for safety	
Number of signaling current (N/C) contacts	0	
Contact type	Positively driven	
Contact material	Silver alloy, gold flashed	
Switching voltage	5 V AC ... 300 V AC 5 V DC ... 250 V DC	
Switching current	10 mA ... 8 A	
Usage category	AC-15/DC-13	
Rated operating current (voltage)	5 A (230 V AC) 360 switching cycles/h 5 A (24 V DC) 3600 switching cycles/h	
Maximum switching frequency	3600/h	
Mechanical life (relay contacts)	1 x 10^7 switching cycles	
Electrical life (relay contacts)	1 x 10^6 switching cycles	

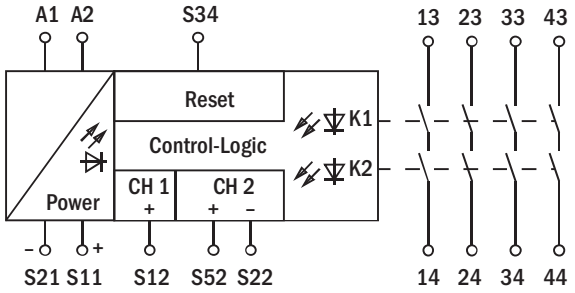
[1] K1/K2

Operating data

Type	UE43-4AR2D2	UE43-4AR3D2
Rated impulse withstand voltage U_{imp}	4 kV	
Overvoltage category	III	
Contamination rating		
External	3	
Internal	2	
Standard	EN 50178	
Rated insulation voltage U_i	300 V AC	
Test voltage	2 kV (50 Hz) EN 60439-1	
Enclosure rating		
Clamps	IP 20	
Housing	IP 40	
Interference emission	DIN EN 61000-6-4	
Interference resistance	EN 61000-6-2	
Ambient operating temperature	–25 °C ... +55 °C	
Storage temperature	–25 °C ... +75 °C	
Connection type	Screw-type terminals	Plug-in terminals
Conductor cross-section		
Single wire (2x, same cross-section)	0.14 mm² ... 0.75 mm²	
Single wire (1x)	0.14 mm² ... 2.5 mm²	
Fine wire with ferrules (2x, same cross-section)	0.25 mm² ... 0.5 mm²	
Fine wire with ferrules (1x)	0.25 mm² ... 2.5 mm²	
Dimensions (W x H x D)	22.5 mm x 114 mm x 96.5 mm	
Weight	0.21 kg	

N

Internal circuitry



Function

After applying the supply voltage (LED SUPPLY illuminates), the normally open contacts remain open. If the connected sensor is not activated or the protective field of the connected electro-sensitive protective equipment (ESPE) is not broken (i.e., the input circuits are closed), then the normally open contacts close immediately in automatic reset (LED K1 and K2 illuminate). The activation of the sensor or incursion into the protective field of the non-contact safety device (open state of one of the two input circuits) affects the opening of the normally open contacts (LED K1 and K2 off).

External device monitoring (EDM)

The UE43-4AR unit can take over external device monitoring. The contactor monitoring system monitors the external relays by way of their normally closed contacts. Connecting the EDM contacts between S11 and S34 replaces the wire link.

Automatic reset

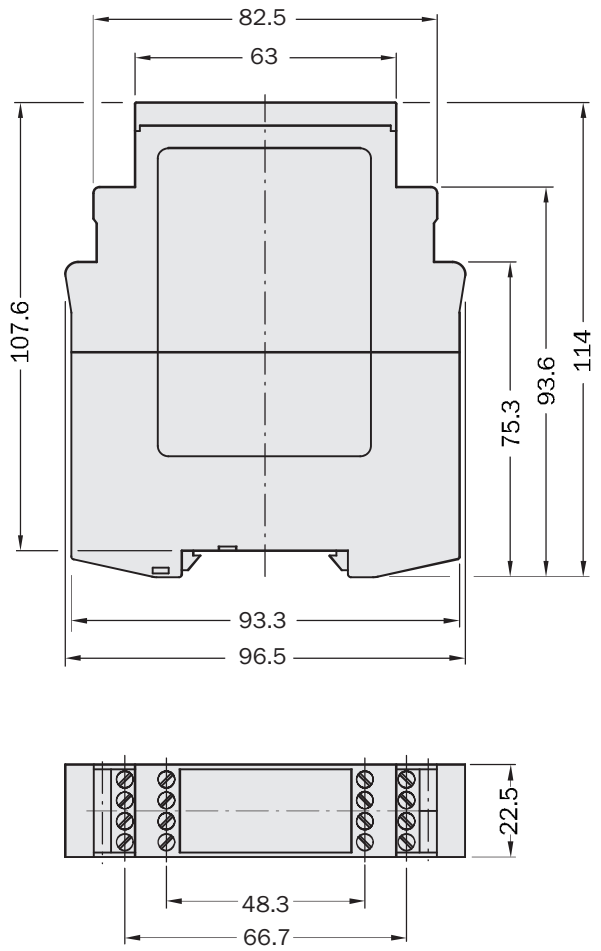
S11 - S34 must be linked.

Cross-circuit detection

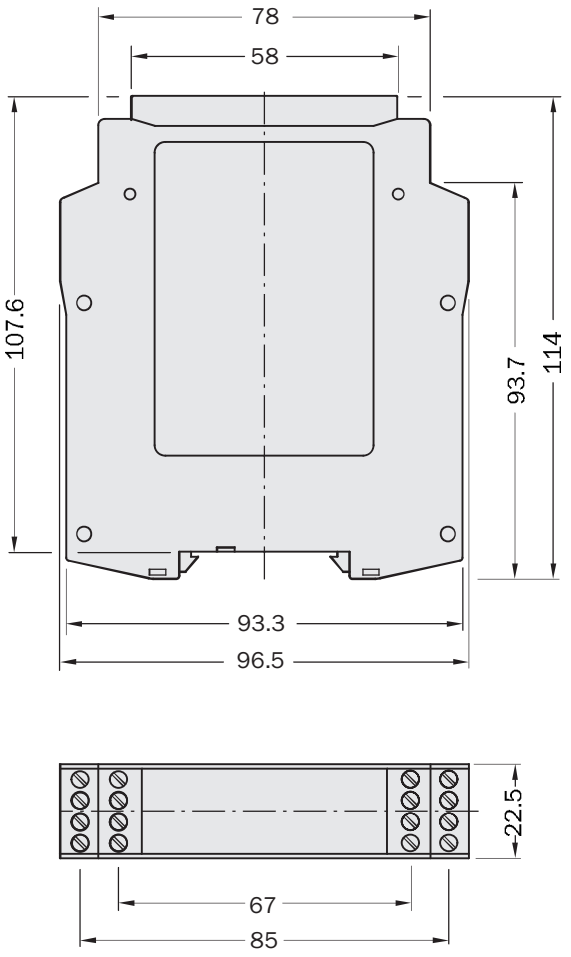
Cross-circuit is detected on dual-channel wired systems, if these are wired with opposing polarity.

Dimensional drawings

Screw-type terminals



Plug-in terminals



Dimensions in mm

Technical data overview

Category	Category 4 (EN ISO 13849) [1], Category 3 (EN ISO 13849) [2]
Performance level	PL e (EN ISO 13849) [1], PL d (EN ISO 13849) [2]
Number of enable current contacts	2
Number of signaling current contacts	0
Number of on-delayed contacts	1
Input circuit	Single- or dual-channel
Housing width	22.5 mm

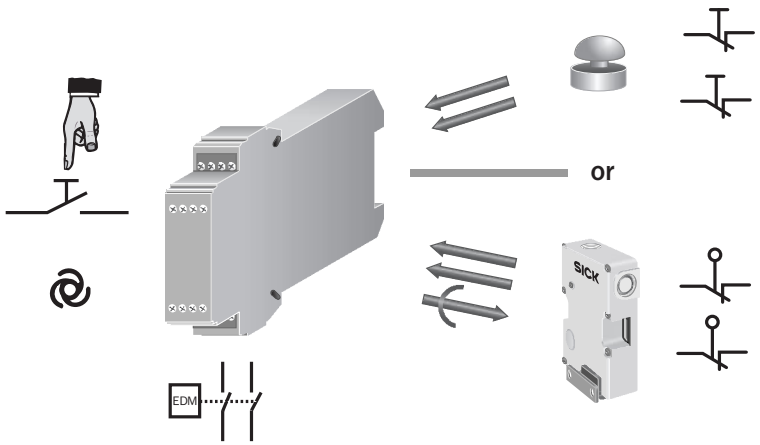
[1] For contacts 13/14, 23/24

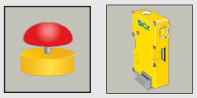
[2] For time contacts 37/38

Product description

- Cross-circuit detection on dual-channel wired systems
- Outputs:
  - 2 normally open contacts
  - 1 normally open contact with on-delay, adjustable from 0.15 ... 3 sec or 1.5 ... 30 sec
- 3 LEDs:
  - Supply voltage
  - Relays K1/K2 (without delay) and relays K3/K4 (off-delayed)
- Manual reset
- Automatic reset
- Additional outputs available with the contact expansion modules
  - UE10-4XT
  - UE11-4DX
- External device monitoring (EDM)
- Screw-type terminals or plug-in terminals

Applications





- For emergency stop pushbuttons
- For safety switches
- For safety switches with mechanical locking

2

1

Ordering information

Connection type	On-delay time	Type	Part no.
Screw-type terminals	0.15 s ... 3 s	UE44-3SL2D33	6024907
	1.5 s ... 30 s	UE44-3SL2D330	6024909
Plug-in terminals	0.15 s ... 3 s	UE44-3SL3D33	6024908
	1.5 s ... 30 s	UE44-3SL3D330	6024910

N

Further information	Page
→ Technical specifications	N-36
→ Internal circuitry	N-38
→ Dimensional drawings	N-38
→ Connection diagrams	N-39
→ Systematic safety	A-0
→ Services	B-0

Technical specifications

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

General system data

Type	UE44-3SL2D33	UE44-3SL2D330	UE44-3SL3D33	UE44-3SL3D330
Safety related parameters				
Safety integrity level	SILCL3 (IEC 62061) [1], SILCL2 (IEC 62061) [2]			
Category	Category 4 (EN ISO 13849) [1], category 3 (EN ISO 13849) [2]			
Performance level	PL e (EN ISO 13849) [1], PL d (EN ISO 13849) [2]			
B_{10d} parameter	4×10^5 switching cycles (with maximum load)			
PFHd (mean probability of a dangerous failure per hour)	3.0×10^{-8} (EN ISO 13849) [1], 2.0×10^{-8} (EN ISO 13849) [2]			
T_M (Mission Time)	5 years (EN ISO 13849)			
Stop category	0 (EN 60204)			
Voltage supply	A1, A2 PELV (Output circuit > 25 V AC / 60 V DC) PELV or SELV (Output circuit < 25 V AC / 60 V DC)			
Supply voltage	A1, A2 24 V DC (20.4 V DC ... 26.4 V DC)			
Power consumption	1.8 W			
Residual ripple	2.4 V_{pp} [3]			

[1] For contacts 13/14, 23/24

[2] For time contacts 37/38

[3] In DC operation, within the limits of V_S

Control voltage S11, S21, S33

Type	UE44-3SL2D33	UE44-3SL2D330	UE44-3SL3D33	UE44-3SL3D330
Control voltage	22 V DC			
Control current	60 mA			
Short-circuit current	2200 mA, between S11 and A2			
Fuse	PTC resistor			
Reaction time by cross connection	2 s			
Galvanized decoupling	– (between A1, A2 and Y11, Y21, PE)			

Input circuits S12, S31, S34, S35

Type	UE44-3SL2D33	UE44-3SL2D330	UE44-3SL3D33	UE44-3SL3D330
Input current				
S12, S31	25 mA ... 100 mA			
S34, S35	40 mA ... 50 mA			
Reset time				
Manual	Max. 30 ms (S34)			
Automatic	Max. 750 ms (S35)			
Activation time of reset button	250 ms			
Synchronous time monitoring	500 ms			
Cable resistance	< 85 Ohm			

N

Electrical output circuits 13 - 14, 23 - 24, 37 - 38

Type	UE44-3SL2D33	UE44-3SL2D330	UE44-3SL3D33	UE44-3SL3D330
Response time	25 ms [1]			
On-delay time	0.15 s ... 3 s	1.5 s ... 30 s	0.15 s ... 3 s	1.5 s ... 30 s
Number of enable current (N/O) contacts	2, category 4			
Number of on-delayed N/O contacts	1, category 3			
Contact type	Positively driven			
Contact material	Silver alloy, gold flashed			
Switching voltage	10 V AC ... 230 V AC 10 V DC ... 30 V DC			
Switching current	10 mA ... 6 A			
Total current	12 A			
Usage category	AC-15/DC-13			
Rated operating current (voltage)	4 A (230 V AC) 3600 switching cycles/h 5 A (24 V DC) 360 switching cycles/h 3 A (24 V DC) 3600 switching cycles/h			
Maximum switching frequency	3600/h			
Mechanical life (relay contacts)	5 x 10^6 switching cycles			
Electrical life (relay contacts)	2 x 10^6 switching cycles			

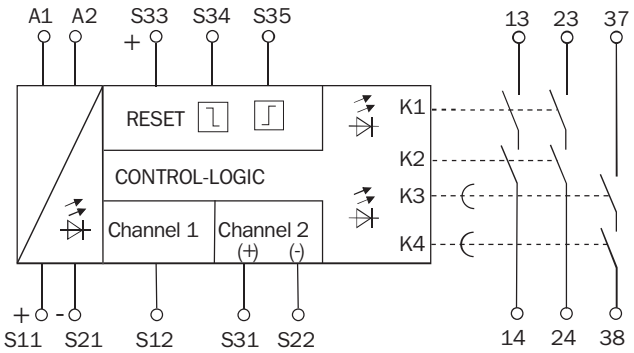
[1] K1/K2

Operating data

Type	UE44-3SL2D33	UE44-3SL2D330	UE44-3SL3D33	UE44-3SL3D330
Rated impulse withstand voltage U_{imp}	4 kV			
Overvoltage category	III			
Contamination rating				
External	3			
Internal	2			
Standard	EN 50178			
Rated insulation voltage U_i	300 V AC			
Test voltage	2 kV (50 Hz) EN 60439-1			
Enclosure rating				
Clamps	IP 20			
Housing	IP 40			
Interference emission	EN 60947-1 02/99			
Interference resistance	EN 60947-1 02/99			
Ambient operating temperature	–25 °C ... +55 °C			
Storage temperature	–25 °C ... +75 °C			
Connection type	Screw-type terminals		Plug-in terminals	
Conductor cross-section				
Single wire (2x, same cross-section)	0.14 mm² ... 0.75 mm²			
Single wire (1x)	0.14 mm² ... 2.5 mm²			
Fine wire with ferrules (2x, same cross-section)	0.25 mm² ... 0.5 mm²			
Fine wire with ferrules (1x)	0.25 mm² ... 2.5 mm²			
Dimensions (W x H x D)	22.5 mm x 114 mm x 96.5 mm			
Weight	0.2 kg			

N

Internal circuitry



Function

After applying the supply voltage (LED SUPPLY illuminates), the normally open contacts (13 - 14 / 23 - 24) remain open. After completion of the on-delay set on the relay, the delay circuit (37 - 38) closes, and the LED K3/K4 illuminates. If the connected sensor is not activated (i.e., the input circuits are closed), the normally open contacts (13 - 14 / 23 - 24) close immediately during automatic reset, the LED K1/K2 illuminates, and the delay circuit (37 - 38) opens (LED K3/K4 off). In the case of manual reset, this only occurs after pressing and releasing the reset button.

The activation of the sensor (opening of one or both input circuits) affects the opening of both normally open contacts (13 - 14 / 23 - 24), with LEDs K1/K2 being off, and a time delayed closing of the third circuit (37 - 38), with LED K3/K4 illuminating.

External device monitoring (EDM)

The unit can take over external device monitoring. The contactor monitoring system monitors the external relays by way of their normally closed contacts.

Manual reset

For manual resetting, a pushbutton is to be connected between 24 V DC supply and terminal S34. This reset is monitored. For applications with mechanical locking safety switches, only channel 2 must be closed during manual reset.

Automatic reset

For automatic resetting, S12 - S35 must be linked. For applications with mechanical locking safety switches, only channel 1 must be closed during automatic reset.

Cross-circuit detection

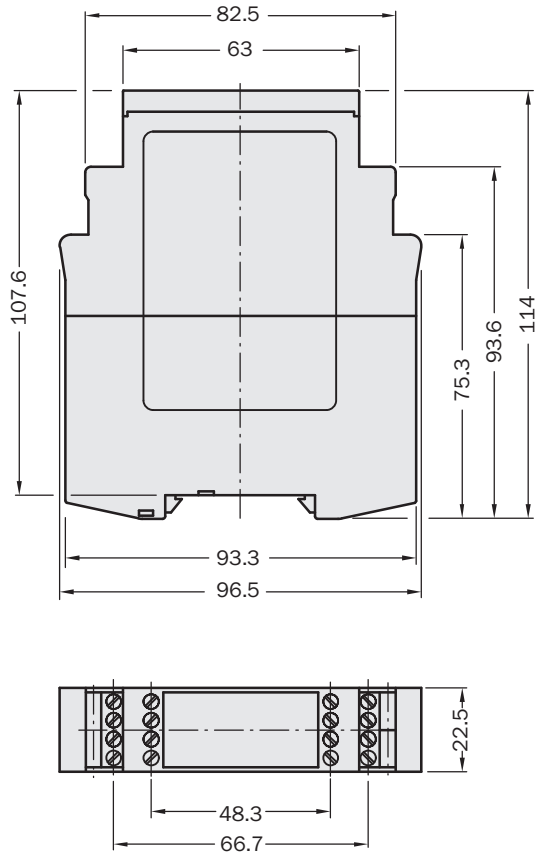
Cross-circuit is detected on dual-channel wired systems, if these are wired with opposing polarity.

Monitoring of synchronization

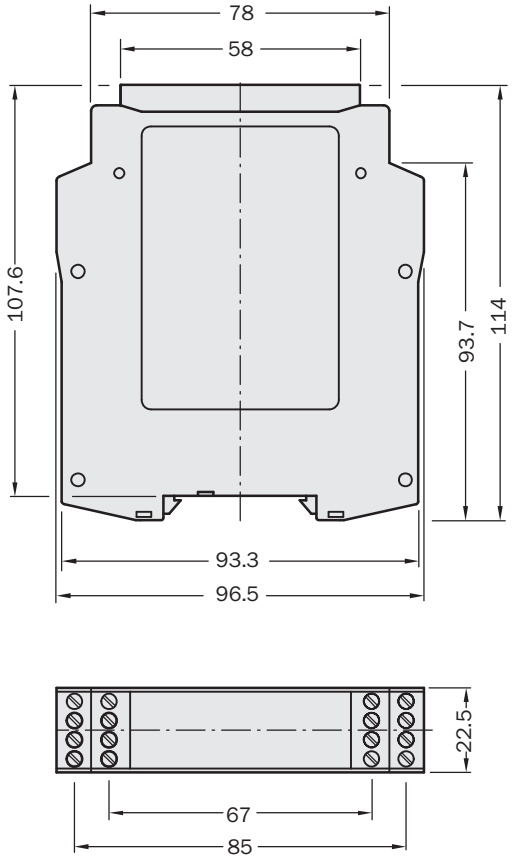
Only if input 2 closes no later than 0.5 sec after input 1, do the output circuits close. If input 2 closes before input 1, the synchronization monitoring will not be affected, and the output circuits will close. This monitoring only takes place in automatic reset.

Dimensional drawings

Screw-type terminals



Plug-in terminals



Dimensions in mm

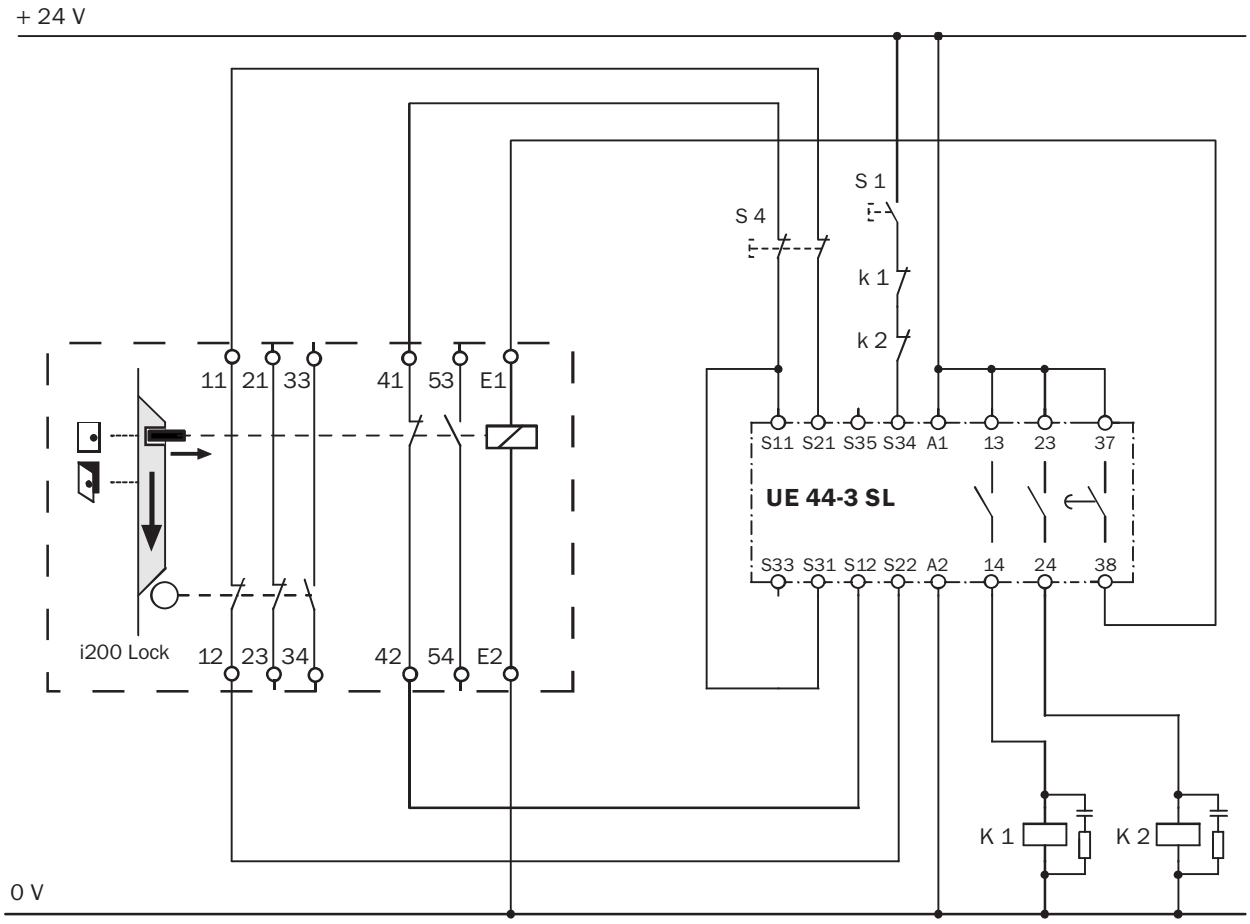
N

8010889/2010-07-30
Subject to change without notice

Connection diagrams

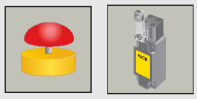
➜ You can find more connection diagrams at www.mysick.com

i200 Lock safety locking device connected to UE44-3SL safety relay

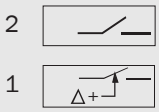


Operating mode: with manual reset and external device monitoring (EDM)

N



- For emergency stop pushbuttons
- For safety switches



Technical data overview

Category	Category 4 (EN ISO 13849) [1], Category 3 (EN ISO 13849) [2]
Performance level	PL e (EN ISO 13849) [1], PL d (EN ISO 13849) [2]
Number of enable current contacts	2
Number of signaling current contacts	0
Number of off-delayed contacts	1
Input circuit	Single- or dual-channel
Housing width	22.5 mm

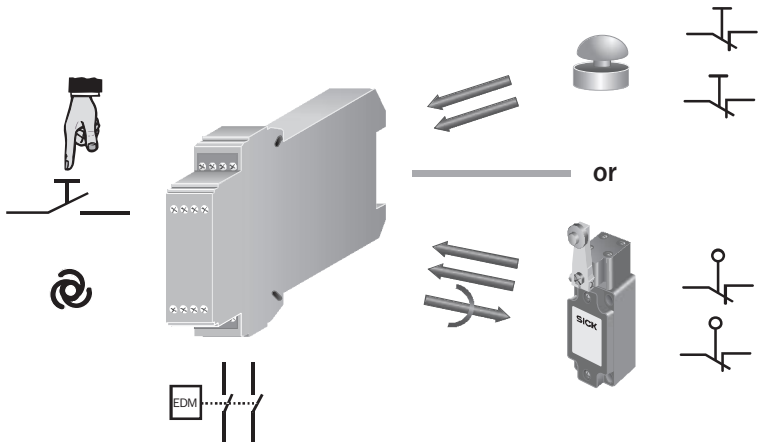
[1] For contacts 13/14, 23/24

[2] For time contacts 37/38

Product description

- Cross-circuit detection on dual-channel wired systems
- Outputs:
  - 2 normally open contacts
  - 1 normally open contact with off-delay, adjustable from 0.15 ... 3 sec or 1.5 ... 30 sec
- 3 LEDs:
  - Supply voltage
  - Relays K1/K2 (without delay) and relays K3/K4 (off-delayed)
- Manual reset
- Automatic reset
- Additional outputs available with the contact expansion modules
  - UE10-4XT
  - UE11-4DX
- External device monitoring (EDM)
- Screw-type terminals or plug-in terminals

Applications



Ordering information

Connection type	Off-delay time	Type	Part no.
Screw-type terminals	0.15 s ... 3 s	UE45-3S12D33	6024911
	1.5 s ... 30 s	UE45-3S12D330	6024913
Plug-in terminals	0.15 s ... 3 s	UE45-3S13D33	6024912
	1.5 s ... 30 s	UE45-3S13D330	6024914

N

Further information	Page
→ Internal circuitry	N-43
→ Dimensional drawings	N-44
→ Connection diagrams	N-45
→ Systematic safety	A-0
→ Services	B-0

Technical specifications

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

General system data

Type	UE45-3S12D33	UE45-3S12D330	UE45-3S13D33	UE45-3S13D330
Safety related parameters				
Safety integrity level	SILCL3 (IEC 62061) [1], SILCL2 (IEC 62061) [2]			
Category	Category 4 (EN ISO 13849) [1], category 3 (EN ISO 13849) [2]			
Performance level	PL e (EN ISO 13849) [1], PL d (EN ISO 13849) [2]			
B_{10d} parameter	4×10^5 switching cycles (with maximum load)			
PFHd (mean probability of a dangerous failure per hour)	3.0×10^{-8} (EN ISO 13849) [1], 2.0×10^{-8} (EN ISO 13849) [2]			
T_M (Mission Time)	20 years (EN ISO 13849)			
Stop category	1, 0 (EN 60204)			
Voltage supply	A1, A2 PELV (Output circuit > 25 V AC / 60 V DC) PELV or SELV (Output circuit < 25 V AC / 60 V DC)			
Supply voltage	A1, A2 24 V DC (20.4 V DC ... 26.4 V DC)			
Power consumption	2.6 W			
Residual ripple	2.4 V_{pp} [3]			

[1] For contacts 13/14, 23/24

[2] For time contacts 37/38

[3] In DC operation, within the limits of V_S

Control voltage S11, S21, S33

Type	UE45-3S12D33	UE45-3S12D330	UE45-3S13D33	UE45-3S13D330
Control voltage	24 V DC			
Control current	60 mA			
Short-circuit current	2200 mA, between S11 and A2			
Fuse	PTC resistor			
Reaction time by cross connection	2 s			
Galvanized decoupling	– (between A1, A2 and S11, S21)			

Input circuits S12, S31, S34, S35

Type	UE45-3S12D33	UE45-3S12D330	UE45-3S13D33	UE45-3S13D330
Input current				
S12, S31	25 mA ... 100 mA			
S34, S35	40 mA ... 50 mA			
Reset time				
Manual	Max. 30 ms (S34)			
Automatic	Max. 600 ms (S35)			
Activation time of reset button	200 ms			
Synchronous time monitoring	500 ms			
Cable resistance	< 85 Ohm			

N

Electrical output circuits 13 - 14, 23 - 24, 37 - 38

Type	UE45-3S12D33	UE45-3S12D330	UE45-3S13D33	UE45-3S13D330
Response time	25 ms [1]			
Off-delay time	0.15 s ... 3 s	1.5 s ... 30 s	0.15 s ... 3 s	1.5 s ... 30 s
Number of enable current (N/O) contacts	2, category 4			
Number of off-delayed N/O contacts	1, category 3			
Contact type	Positively driven			
Contact material	Silver alloy, gold flashed			
Switching voltage	10 V AC ... 230 V AC 10 V DC ... 30 V DC			
Switching current	10 mA ... 6 A			
Total current	12 A			
Usage category	AC-15/DC-13			
Rated operating current (voltage)	4 A (230 V AC) 3600 switching cycles/h 5 A (24 V DC) 360 switching cycles/h 3 A (24 V DC) 3600 switching cycles/h			
Maximum switching frequency	3600/h			
Mechanical life (relay contacts)	5 x 10^6 switching cycles			
Electrical life (relay contacts)	2 x 10^6 switching cycles			

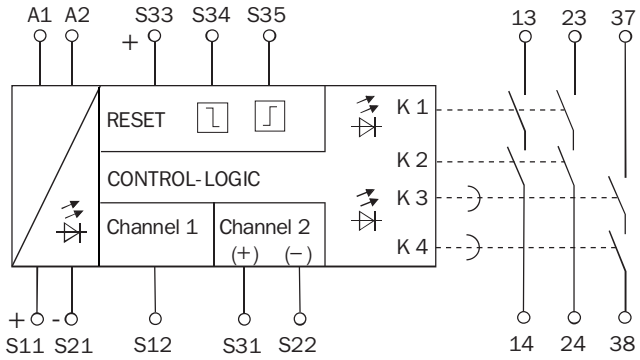
[1] K1/K2

Operating data

Type	UE45-3S12D33	UE45-3S12D330	UE45-3S13D33	UE45-3S13D330
Rated impulse withstand voltage U_{imp}	4 kV			
Overvoltage category	III			
Contamination rating				
External	3			
Internal	2			
Standard	EN 50178			
Rated insulation voltage U_i	300 V AC			
Test voltage	2 kV (50 Hz) EN 60439-1			
Enclosure rating				
Clamps	IP 20			
Housing	IP 40			
Interference emission	EN 60947-1 02/99			
Interference resistance	EN 60947-1 02/99			
Ambient operating temperature	–25 °C ... +55 °C			
Storage temperature	–25 °C ... +75 °C			
Connection type	Screw-type terminals		Plug-in terminals	
Conductor cross-section				
Single wire (2x, same cross-section)	0.14 mm² ... 0.75 mm²			
Single wire (1x)	0.14 mm² ... 2.5 mm²			
Fine wire with ferrules (2x, same cross-section)	0.25 mm² ... 0.5 mm²			
Fine wire with ferrules (1x)	0.25 mm² ... 2.5 mm²			
Dimensions (W x H x D)	22.5 mm x 114 mm x 96.5 mm			
Weight	0.2 kg			

N

Internal circuitry



Function

After applying the supply voltage (LED SUPPLY illuminates), the normally open contacts remain open. If the connected sensor is not activated (i.e., the input circuits are closed), the normally open contacts close immediately during automatic resettin; LED K1/K2 and K3/K4 illuminate. In the case of manual resetting, this only occurs after pressing and releasing the reset button. The activation of the sensor (opening of one or both input circuits) affects the opening of both normally open contacts (13 - 14 / 23 - 24) immediately, and a time delayed opening of the third circuit (37 - 38), with LED K1/K2 immediately going off and K3/K4 going off later.

External device monitoring (EDM)

The unit can take over external device monitoring. The contactor monitoring system monitors the external relays by way of their normally closed contacts.

Manual reset

For manual resetting, a pushbutton must be connected to terminals S33 - S34. This reset is monitored.

Automatic reset

For automatic resetting, S33 - S35 must be linked.

Cross-circuit detection

Cross-circuit is detected on dual-channel wired systems, if these are wired with opposing polarity.

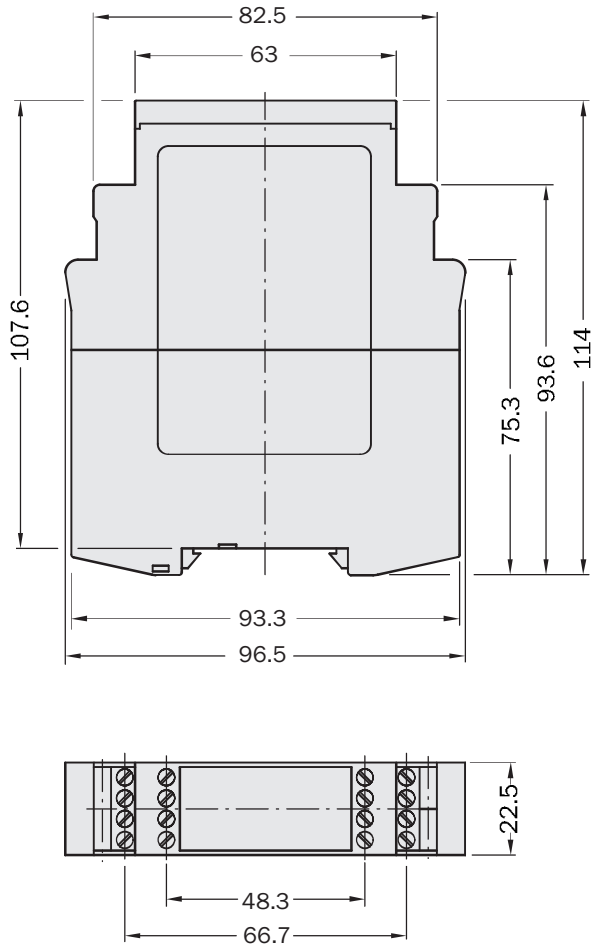
Monitoring of synchronization

Only if input 2 closes no later than 0.5 sec after input 1, do the output circuits close. If input 2 closes before input 1, the synchronization monitoring will not be affected, and the output circuits will close. This monitoring only takes place in automatic reset.

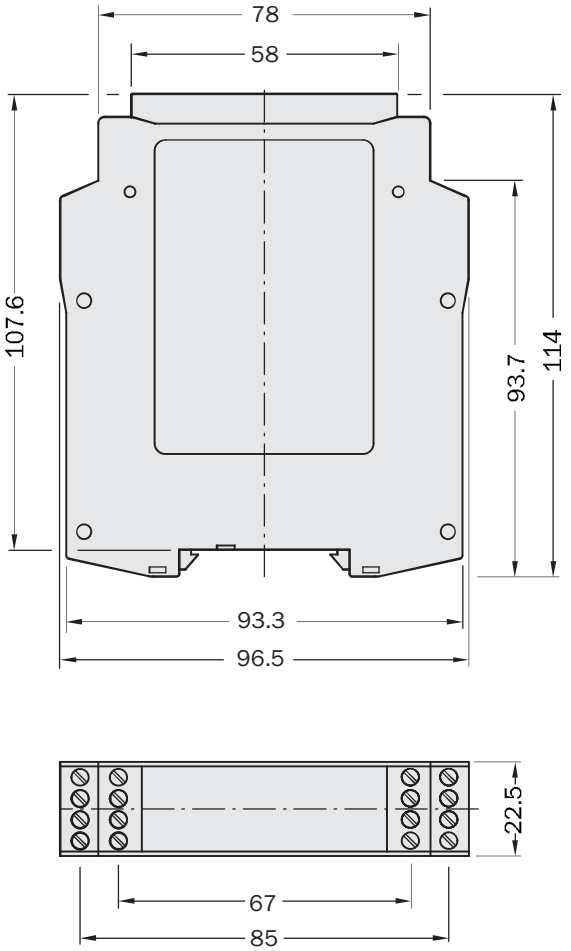
N

Dimensional drawings

Screw-type terminals



Plug-in terminals



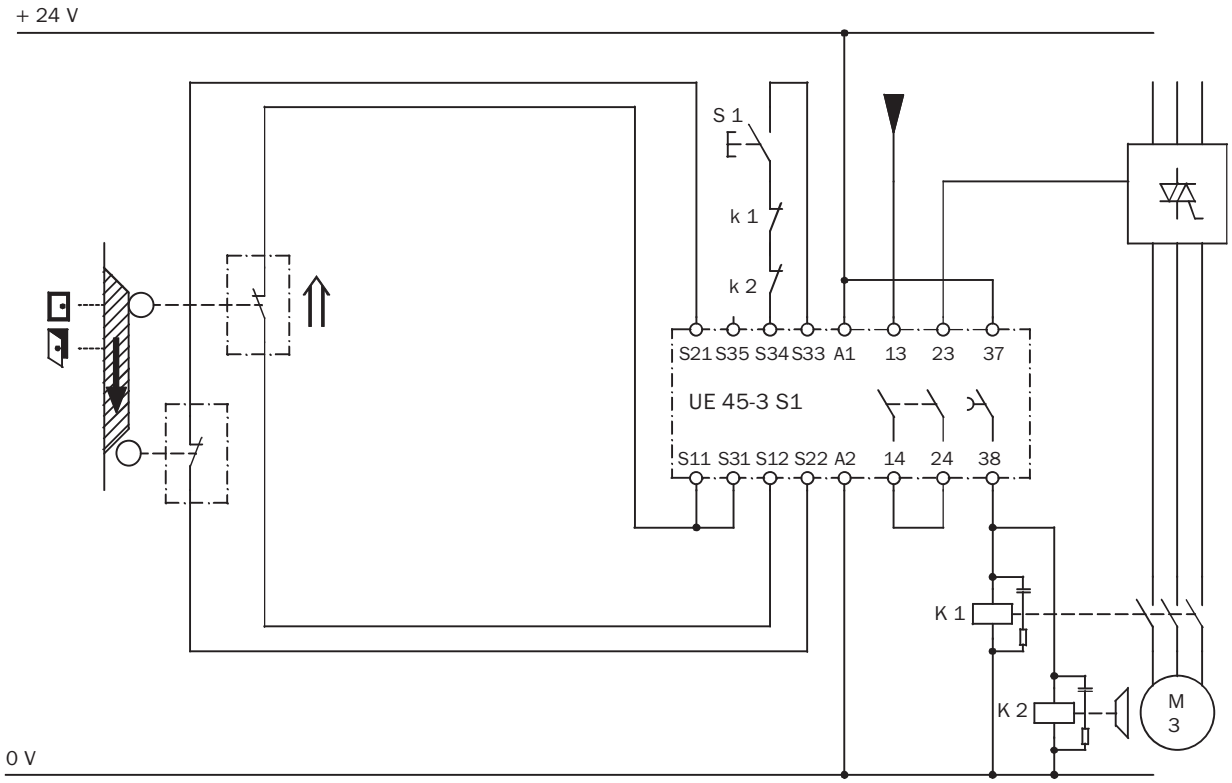
Dimensions in mm

N

Connection diagrams

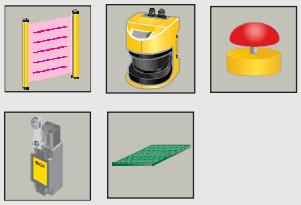
➜ You can find more connection diagrams at www.mysick.com

Two safety switches connected to UE45-3S1 safety relay



Operating mode: with manual reset and external device monitoring (EDM)

N



- For emergency stop pushbuttons
- For safety switches
- For safety laser scanners
- For safety light curtains
- For non-contact safety switches
- For pressure sensitive mats in accordance with EN 1760 using 4-wire technology

2

1

Technical data overview

Category	Category 4 (EN ISO 13849)
Performance level	PL e (EN ISO 13849)
Number of enable current contacts	2
Number of signaling current contacts	1
Input circuit	Single- or dual-channel
Housing width	22.5 mm

Product description

- Cross-circuit detection on dual-channel wired systems
- 3 LEDs:
  - Supply voltage
  - Relays K1 and K2
- Manual reset
- Automatic reset
- Additional outputs with the contact expansion modules
  - UE10-4XT
  - UE11-4DX
- External device monitoring (EDM)
- Screw-type terminals or removable terminals

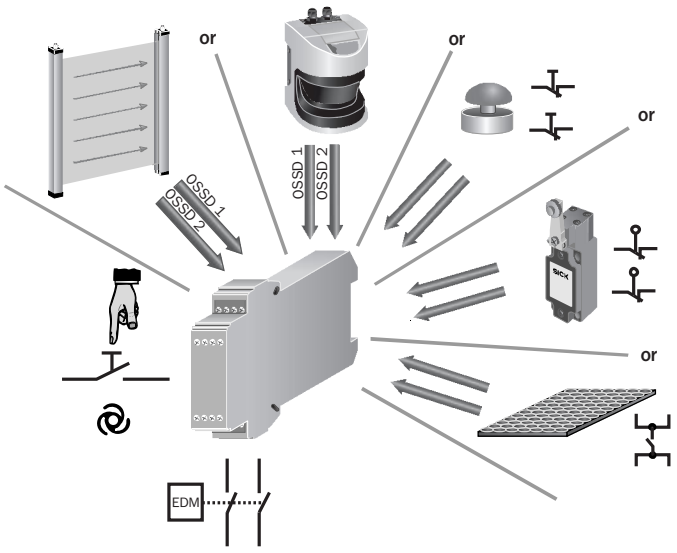
In-system added value

Devices employing monitored semiconductor outputs (OSSD), such as:

- C2000
- M2000
- C4000
- S3000
- M4000
- T4000 Direct

→ For more combinations, see annex

Applications



Ordering information

Connection type	Type	Part no.
Screw-type terminals	UE48-20S2D2	6024915
Plug-in terminals	UE48-20S3D2	6024916

N

Technical specifications

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

General system data

Type	UE48-20S2D2	UE48-20S3D2
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)	
B_{10d} parameter	1.26×10^6 switching cycles (AC-15, 230 V, I = 1.5 A), 5.9×10^6 switching cycles (AC-15, 230 V, I = 0.75 A), 4.35×10^5 switching cycles (DC-13, 24 V, I = 2.5 A), 1×10^7 switching cycles (DC-13, 24 V, I = 0.63 A)	
PFHd (mean probability of a dangerous failure per hour)	3.0×10^{-8} (EN ISO 13849)	
T_M (Mission Time)	20 years (EN ISO 13849)	
Stop category	0 (EN 60204)	
Voltage supply	A1, A2 PELV (Output circuit > 25 V AC / 60 V DC) PELV or SELV (Output circuit < 25 V AC / 60 V DC)	
Supply voltage	A1, A2 24 V AC (20.4 V AC ... 26.4 V AC) 24 V DC (20.4 V DC ... 26.4 V DC)	
Power consumption	4.6 VA, 2.1 W	
Residual ripple	2.4 V_{pp} [1]	
Nominal frequency	50 Hz ... 60 Hz [2]	

[1] In DC operation, within the limits of V_S

[2] In AC operation

Control voltage S11, S21, S33

Type	UE48-20S2D2	UE48-20S3D2
Control voltage	17.4 V DC ... 22 V DC	
Control current	40 mA ... 100 mA	
Short-circuit current	300 mA, between S33 / S11 and S21	
Fuse	Electronic fuse	
Reaction time by cross connection	50 ms	
Reaction time upon detection of cross connection	50 ms	
Galvanized decoupling	– (between A1, A2 and S11, S21, S33)	

N

Input circuits S12, S22, S31, S34, S35

Type	UE48-20S2D2	UE48-20S3D2
Input voltage		
HIGH	17.4 V DC ... 26.4 V DC	
LOW	–3 V DC ... 5 V DC	
Input current		
S12, S22, S31	40 mA ... 100 mA	
S34, S35	5 mA ... 50 mA	
Reset time		
Manual	Max. 40 ms (S34)	
Automatic	Max. 80 ms (S12, S35)	
Activation time of reset button	50 ms	
Switch-off time	Min. 7 ms	
Test pulse width	Max. 1000 µs	
Test pulse rate	10 Hz	
Cable resistance	< 35 Ohm	

Electrical output circuits 13 - 14, 23 - 24, 31 - 32, 33 - 34

Type	UE48-20S2D2	UE48-20S3D2
Response time	25 ms [1]	
Opening time	70 ms ... 130 ms	
Number of enable current (N/O) contacts	2, relevant for safety	
Number of signaling current (N/C) contacts	1, not safety-relevant	
Contact type	Positively driven	
Contact material	Silver alloy, gold flashed	
Switching voltage		
	10 V AC ... 230 V AC	
	10 V DC ... 30 V DC	
Switching current		
	10 mA ... 6 A	
Total current	12 A	
Usage category	AC-15/DC-13	
Rated operating current (voltage)	4 A (230 V AC) 360 switching cycles/h 3 A (230 V AC) 3600 switching cycles/h 4 A (24 V DC) 360 switching cycles/h 2.5 A (24 V DC) 3600 switching cycles/h	
Maximum switching frequency	3600/h	
Mechanical life (relay contacts)	1×10^7 switching cycles	
Electrical life (relay contacts)	2×10^6 switching cycles	

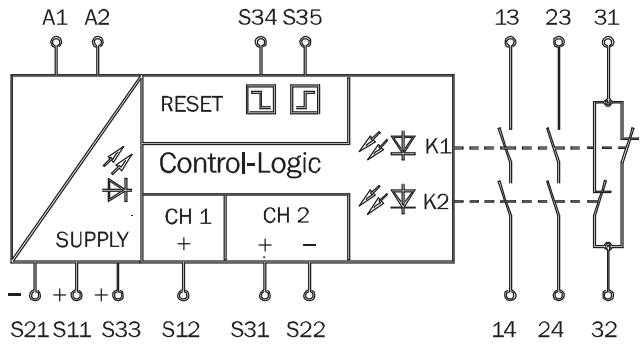
[1] K1/K2

Operating data

Type	UE48-20S2D2	UE48-20S3D2
Rated impulse withstand voltage U_{imp}	4 kV	
Overvoltage category	III	
Contamination rating		
External	3	
Internal	2	
Standard	EN 50178	
Rated insulation voltage U_i	300 V AC	
Test voltage	2 kV (50 Hz) EN 60439-1	
Enclosure rating		
Clamps	IP 20	
Housing	IP 40	
Interference emission	DIN EN 61000-6-4	
Interference resistance	EN 61000-6-2	
Ambient operating temperature	–25 °C ... +55 °C	
Storage temperature	–25 °C ... +75 °C	
Connection type	Screw-type terminals	Plug-in terminals
Conductor cross-section		
Single wire (2x, same cross-section)	0.14 mm² ... 0.75 mm²	
Single wire (1x)	0.14 mm² ... 2.5 mm²	
Fine wire with ferrules (2x, same cross-section)	0.25 mm² ... 0.5 mm²	
Fine wire with ferrules (1x)	0.25 mm² ... 2.5 mm²	
Dimensions (W x H x D)	22.5 mm x 114 mm x 96.5 mm	
Weight	0.2 kg	

N

Internal circuitry



Function

After applying the supply voltage (LED SUPPLY illuminates), the normally open contacts remain open. If the connected sensor is not activated or the protective field of the connected electro-sensitive protective equipment (ESPE) is not broken (i.e., the input circuits are closed), then the normally open contacts close immediately in automatic reset; LEDs K1 and K2 illuminate. In the case of manual resetting, this only occurs after pressing and releasing the reset button. The activation of the sensor or incursion into the protective field of the non-contact safety device (open state of one of the two input circuits) affects the opening of the normally open contacts (LED K1 and K2 off).

External device monitoring (EDM)

The unit can take over external device monitoring. The contactor monitoring system monitors the external relays by way of their normally closed contacts.

Manual reset

For manual resetting, a pushbutton must be connected to terminals S33 - S34. This reset is monitored.

Automatic reset

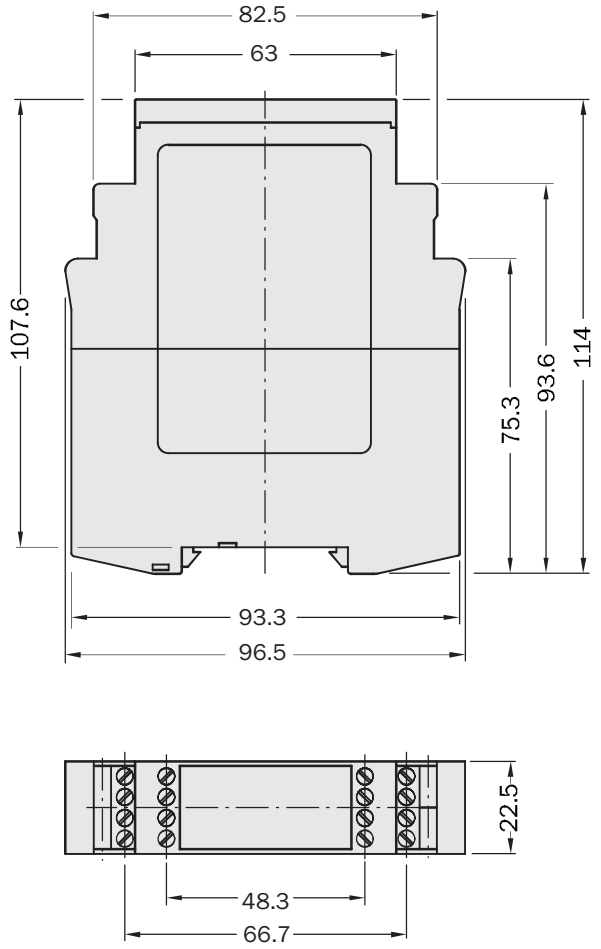
For ESPE's: S33 - S35 must be linked; for applications with potential free contacts on the input circuit, S12 - S35 must be linked.

Cross-circuit detection

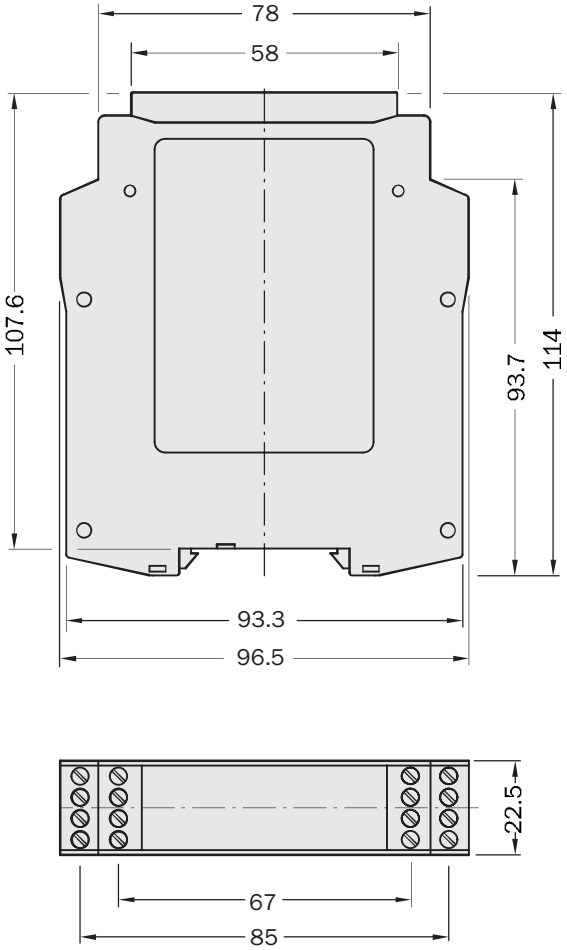
Cross-circuit is detected on dual-channel wired systems, if these are wired with opposing polarity.

Dimensional drawings

Screw-type terminals



Plug-in terminals

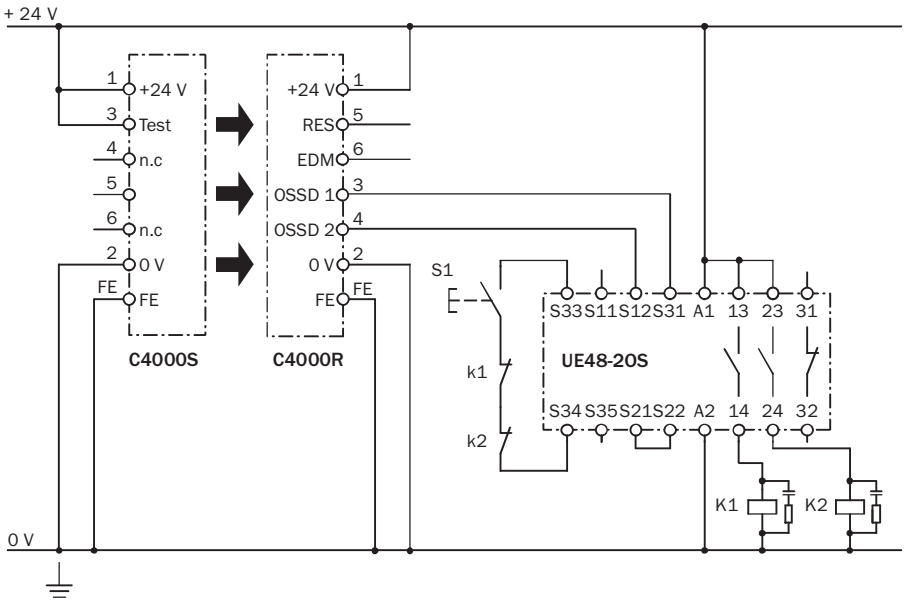


Dimensions in mm

Connection diagrams

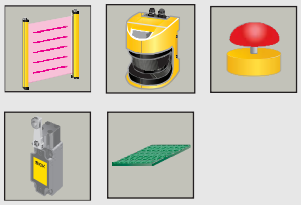
➜ You can find more connection diagrams at www.mysick.com

C4000 Basic safety light curtain connected to UE48-20S safety relay

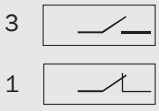


Operating mode: with manual reset and external device monitoring (EDM)

N



- For emergency stop pushbuttons
- For safety switches
- For safety laser scanners
- For safety light curtains
- For non-contact safety switches
- For pressure sensitive mats in accordance with EN 1760 using 4-wire technology



Technical data overview

Category	Category 4 (EN ISO 13849)
Performance level	PL e (EN ISO 13849)
Number of enable current contacts	3
Number of signaling current contacts	0
Input circuit	Single- or dual-channel
Housing width	22.5 mm

Product description

- Cross-circuit detection on dual-channel wired systems
- 3 LEDs:
  - Supply voltage
  - Relays K1 and K2
- Manual reset
- Automatic reset
- Additional outputs available with the contact expansion modules
  - UE10-4XT
  - UE11-4DX
- External device monitoring (EDM)
- Screw-type terminals or removable terminals

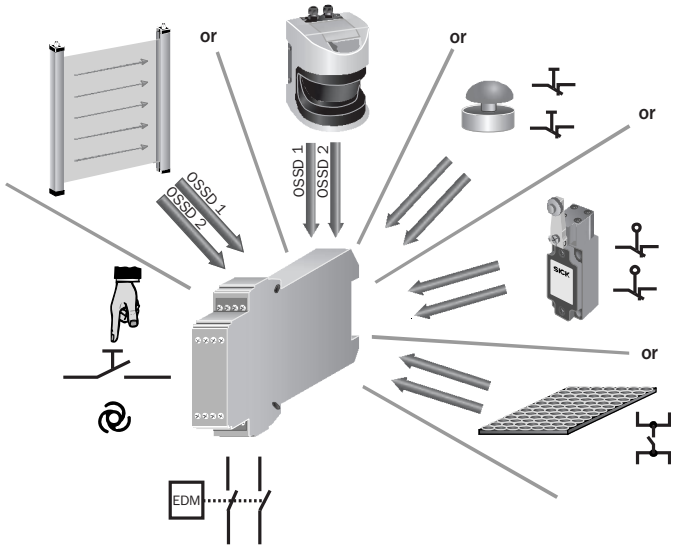
In-system added value

Devices employing monitored semiconductor outputs (OSSD), such as:

- C2000
- M2000
- C4000
- S3000
- M4000
- T4000 Direct

➜ For more combinations, see annex

Applications



Ordering information

Connection type	Type	Part no.
Screw-type terminals	UE48-30S2D2	6025089
Plug-in terminals	UE48-30S3D2	6025097

N

Further information	Page
➜ Internal circuitry	N-55
➜ Dimensional drawings	N-56
➜ Systematic safety	A-0
➜ Services	B-0

Technical specifications

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

General system data

Type	UE48-3OS2D2	UE48-3OS3D2
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)	
B_{10d} parameter	1.26×10^6 switching cycles (AC-15, 230 V, I = 1.5 A), 5.9×10^6 switching cycles (AC-15, 230 V, I = 0.75 A), 4.35×10^5 switching cycles (DC-13, 24 V, I = 2.5 A), 1×10^7 switching cycles (DC-13, 24 V, I = 0.63 A)	
PFHd (mean probability of a dangerous failure per hour)	3.0×10^{-8} (EN ISO 13849)	
T_M (Mission Time)	20 years (EN ISO 13849)	
Stop category	0 (EN 60204)	
Voltage supply	A1, A2 PELV (Output circuit > 25 V AC / 60 V DC) PELV or SELV (Output circuit < 25 V AC / 60 V DC)	
Supply voltage	A1, A2 24 V AC (20.4 V AC ... 26.4 V AC) 24 V DC (20.4 V DC ... 26.4 V DC)	
Power consumption	4.6 VA, 2.1 W	
Residual ripple	2.4 V_{pp} [1]	
Nominal frequency	50 Hz ... 60 Hz [2]	

[1] In DC operation, within the limits of V_S

[2] In AC operation

Control voltage S11, S21

Type	UE48-3OS2D2	UE48-3OS3D2
Control voltage	17.4 V DC ... 22 V DC	
Control current	40 mA ... 100 mA	
Short-circuit current	300 mA, between S33 / S11 and S21	
Fuse	Electronic fuse	
Reaction time by cross connection	50 ms	
Reaction time upon detection of cross connection	50 ms	
Galvanized decoupling	– (between A1, A2 and S11, S21, S33)	

N

Input circuits S12, S22, S31, S34, S35

Type	UE48-30S2D2	UE48-30S3D2
Input voltage		
HIGH	17.4 V DC ... 26.4 V DC	
LOW	–3 V DC ... 5 V DC	
Input current		
S12, S22, S31	40 mA ... 100 mA	
S34, S35	5 mA ... 50 mA	
Reset time		
Manual	Max. 40 ms (S34)	
Automatic	Max. 80 ms (S12, S35)	
Activation time of reset button	50 ms	
Switch-off time	Min. 7 ms	
Test pulse width	Max. 1000 µs	
Test pulse rate	10 Hz	
Cable resistance	35 Ohm	

Electrical output circuits 13 - 14, 23 - 24, 33 - 34

Type	UE48-30S2D2	UE48-30S3D2
Response time	25 ms [1]	
Opening time	70 ms ... 130 ms	
Number of enable current (N/O) contacts	3, relevant for safety	
Contact type	Positively driven	
Contact material	Silver alloy, gold flashed	
Switching voltage		
	10 V AC ... 230 V AC	
	10 V DC ... 30 V DC	
Switching current		
	10 mA ... 6 A	
Total current	12 A	
Usage category	AC-15/DC-13	
Rated operating current (voltage)	4 A (230 V AC) 360 switching cycles/h 3 A (230 V AC) 3600 switching cycles/h 4 A (24 V DC) 360 switching cycles/h 2.5 A (24 V DC) 3600 switching cycles/h	
Maximum switching frequency	3600/h	
Mechanical life (relay contacts)	1×10^7 switching cycles	
Electrical life (relay contacts)	2×10^6 switching cycles	

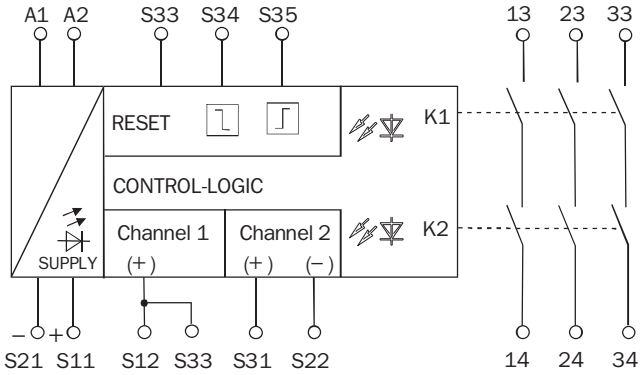
[1] K1/K2

N

Operating data

Type	UE48-30S2D2	UE48-30S3D2
Rated impulse withstand voltage U_{imp}	4 kV	
Overvoltage category	III	
Contamination rating		
External	3	
Internal	2	
Standard	EN 50178	
Rated insulation voltage U_i	300 V AC	
Test voltage	2 kV (50 Hz) EN 60439-1	
Enclosure rating		
Clamps	IP 20	
Housing	IP 40	
Interference emission	DIN EN 61000-6-4	
Interference resistance	EN 61000-6-2	
Ambient operating temperature	–25 °C ... +55 °C	
Storage temperature	–25 °C ... +75 °C	
Connection type	Screw-type terminals	Plug-in terminals
Conductor cross-section		
Single wire (2x, same cross-section)	0.14 mm² ... 0.75 mm²	
Single wire (1x)	0.14 mm² ... 2.5 mm²	
Fine wire with ferrules (2x, same cross-section)	0.25 mm² ... 0.5 mm²	
Fine wire with ferrules (1x)	0.25 mm² ... 2.5 mm²	
Dimensions (W x H x D)	22.5 mm x 114 mm x 96.5 mm	
Weight	0.2 kg	

Internal circuitry



Function

After applying the supply voltage (LED SUPPLY illuminates), the normally open contacts remain open. If the connected sensor is not activated or the protective field of the connected electro-sensitive protective equipment (ESPE) is not broken (i.e., the input circuits are closed), then the normally open contacts close immediately in automatic reset; LEDs K1 and K2 illuminate. In the case of manual resetting, this only occurs after pressing and releasing the reset button. The activation of the sensor or incursion into the protective field of the non-contact safety device (open state of one of the two input circuits) affects the opening of the normally open contacts (LED K1 and K2 off).

External device monitoring (EDM)

The unit can take over external device monitoring. The contactor monitoring system monitors the external relays by way of their normally closed contacts.

Manual reset

For manual resetting, a pushbutton must be connected to terminals S33 - S34. This reset is monitored.

Automatic reset

For ESPE's: S33 - S35 must be linked; for applications with potential free contacts on the input circuit, S12 - S35 must be linked.

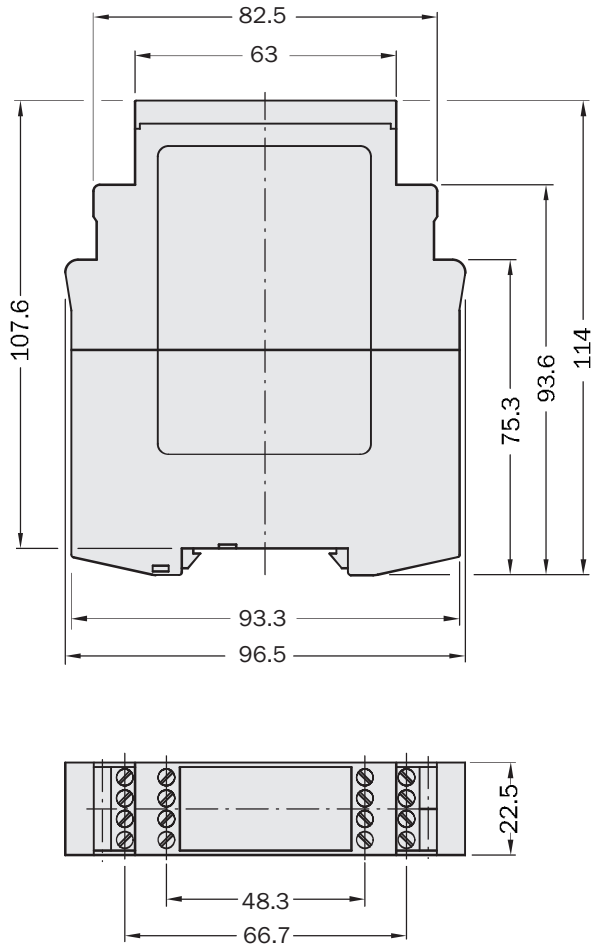
Cross-circuit detection

Cross-circuit is detected on dual-channel wired systems, if these are wired with opposing polarity.

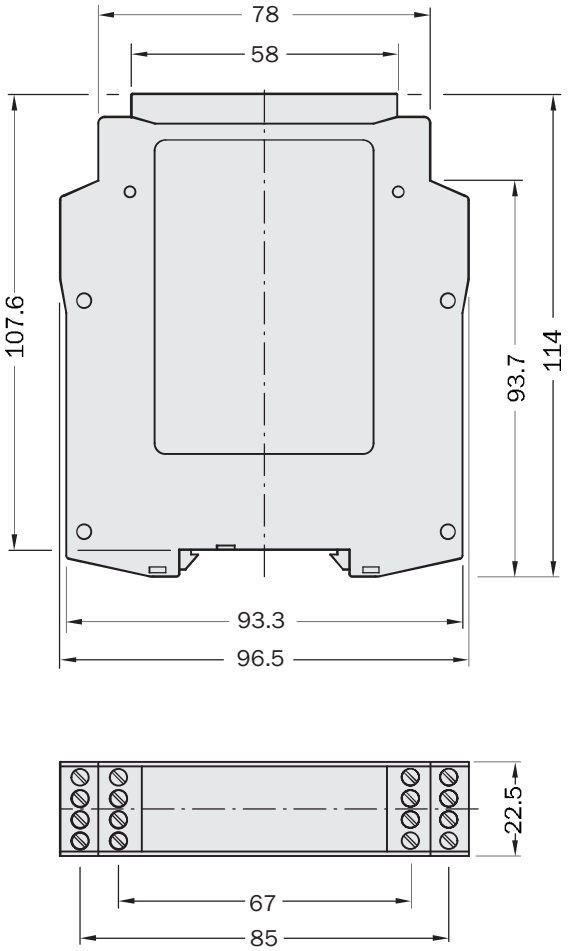
N

Dimensional drawings

Screw-type terminals



Plug-in terminals



Dimensions in mm

N

Technical data overview

Category	Category 4 (EN ISO 13849) [1]
Performance level	PL e (EN ISO 13849) [1]
Number of enable current contacts	2
Number of signaling current contacts	0
Input circuit	Single- or dual-channel
Housing width	17.8 mm

[1] If the feedback current path Y1 - Y2 (external device monitoring) is monitored using an appropriate main unit

Product description

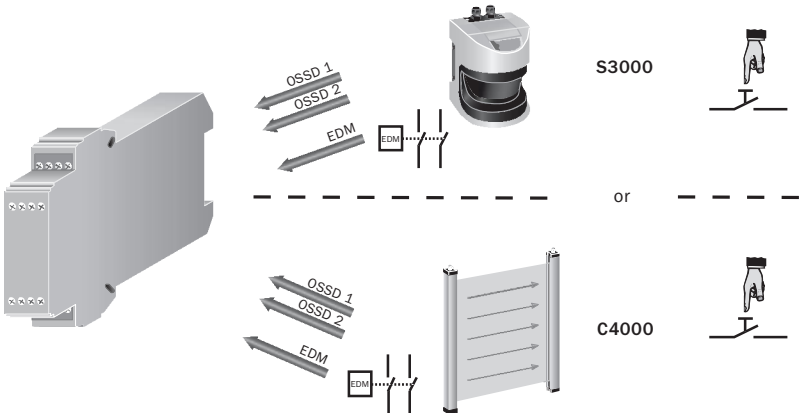
- NC contact for external device monitoring (EDM)
- 2 LEDs:
  - Relay K1
  - Relay K2
- Additional outputs available with the supplied cascading jumper (UE12-2FG only)
- Available with screw-type or plug-in terminals

In-system added value

- Contact expansion module for electro-sensitive protective equipment (ESPE) with monitored semiconductor outputs, integral external device monitoring (EDM) and restart interlock, such as:
  - C4000
  - C/M2000
  - M4000
  - S3000
- Contact expansion module for safety systems with monitored semiconductor outputs, integral external device monitoring and restart interlock, such as:
  - Flexi Classic
  - Flexi Soft

→ For more combinations, see annex

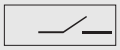
Applications



Ordering information

Connection type	Type	Part no.
Screw-type terminals	UE10-2FG2D0	1043915
Plug-in terminals	UE10-2FG3D0	1043916
Screw-type terminals	UE12-2FG2D0	1043917
Plug-in terminals	UE12-2FG3D0	1043918

- For safety laser scanners
- For safety light curtains

2 

Further information	Page
→ Technical specifications	N-58
→ Internal circuitry	N-59
→ Dimensional drawings	N-60
→ Connection diagrams	N-60
→ Systematic safety	A-0
→ Services	B-0

N

Technical specifications

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

General system data

Type	UE10-2FG2D0	UE10-2FG3D0	UE12-2FG2D0	UE12-2FG3D0
Safety related parameters				
Safety integrity level	SIL3 (IEC 61508) [1], SILCL3 (IEC 62061) [1]			
Category	Category 4 (EN ISO 13849) [1]			
Performance level	PL e (EN ISO 13849) [1]			
B_{10d} parameter	1×10^5 switching cycles (AC-15, 230 V, I = 2 A), 2.5×10^5 switching cycles (AC-15, 230 V, I = 1 A), 5.4×10^5 switching cycles (DC-13, 24 V, I = 0.5 A), 1×10^7 switching cycles (DC-13, 24 V, I ≤ 2 A)			
PFHd (mean probability of a dangerous failure per hour)	1.05×10^{-9} (EN ISO 13849)		1.58×10^{-9} (EN ISO 13849)	
T_M (Mission Time)	20 years (EN ISO 13849)			
Voltage supply	B1/A2, B2/A2 PELV (Output circuit > 25 V AC / 60 V DC) PELV or SELV (Output circuit < 25 V AC / 60 V DC)			
Residual ripple	2.4 V_{pp} [2]			

[1] If the feedback current path Y1 - Y2 (external device monitoring) is monitored using an appropriate main unit

[2] In DC operation, within the limits of V_S

Input circuits B1, B2

Type	UE10-2FG2D0	UE10-2FG3D0	UE12-2FG2D0	UE12-2FG3D0
Switch-on time	30 ms			
Input voltage	24 V DC (16.8 V DC ... 27.6 V DC)			
Input current	500 mA			
Reset time	Max. 30 ms			
Switch-on time	Min. 30 ms			
Switch-off time	Min. 10 ms			
Test pulse width	Max. 1 ms			

Electrical output circuits 13 - 14, 23 - 24, Y1 - Y2

Type	UE10-2FG2D0	UE10-2FG3D0	UE12-2FG2D0	UE12-2FG3D0
Response time	Max. 10 ms			
Number of enable current (N/O) contacts	2, relevant for safety			
Number of contactor monitoring (N/C) contacts	1, external device monitoring			
Contact type	Positively driven			
Contact material	Silver alloy, gold flashed			
Switching voltage				
Enable current contact	10 V AC ... 250 V AC			
Contactor monitoring contact	0.1 V AC/DC ... 60 V AC/DC			
Switching current				
Enable current contact	10 mA ... 6 A			
Contactor monitoring contact	1 mA ... 300 mA			
Switching power	1500 VA, 200 W			
Usage category	AC-15/DC-13			
Rated operating current (voltage)	3 A (230 V AC) 4 A (24 V DC)			
Mechanical life (relay contacts)	1×10^7 switching cycles			
Electrical life (relay contacts)	1×10^5 switching cycles			

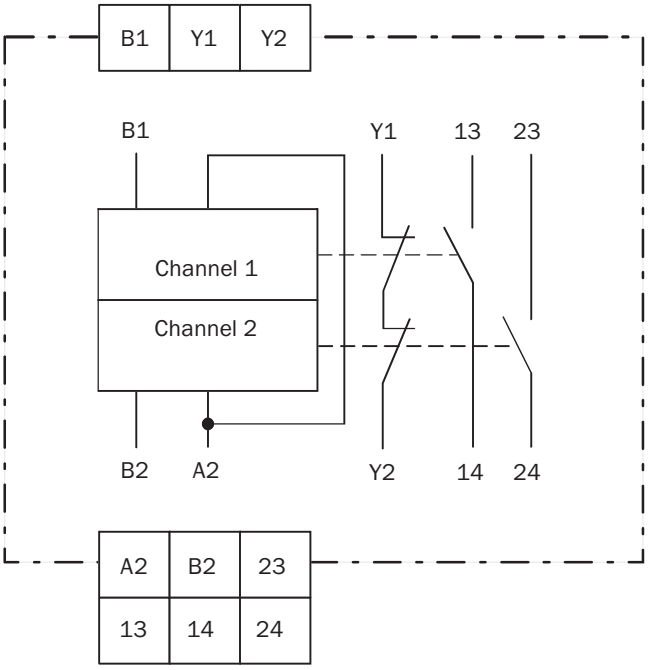
N

Operating data

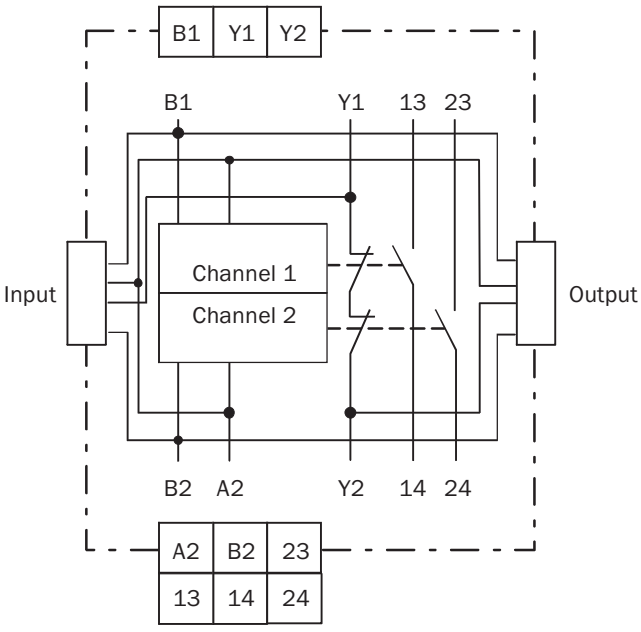
Type	UE10-2FG2D0	UE10-2FG3D0	UE12-2FG2D0	UE12-2FG3D0
Rated impulse withstand voltage U_{imp}	4 kV			
Overvoltage category	II			
Rated insulation voltage U_i	300 V AC			
Test voltage	1.2 kV			
Enclosure rating				
Clamps	IP 20			
Housing	IP 40			
Ambient operating temperature	0 °C ... +55 °C			
Storage temperature	–25 °C ... +75 °C			
Connection type	Screw-type terminals	Plug-in terminals	Screw-type terminals	Plug-in terminals
Conductor cross-section				
Single wire (2x, same cross-section)	0.2 mm² ... 1 mm²			
Single wire (1x)	0.2 mm² ... 4 mm²	0.2 mm² ... 2.5 mm²	0.2 mm² ... 4 mm²	0.2 mm² ... 2.5 mm²
Fine wire with ferrules (2x, same cross-section)	0.2 mm² ... 0.5 mm²	0.2 mm² ... 1.5 mm²	0.2 mm² ... 0.5 mm²	0.2 mm² ... 1.5 mm²
Fine wire with ferrules (1x)	0.2 mm² ... 2.5 mm²			
Dimensions (W x H x D)	17.8 mm x 89.8 mm x 70.8 mm	17.8 mm x 105.5 mm x 70.8 mm	17.8 mm x 89.8 mm x 70.8 mm	17.8 mm x 105.5 mm x 70.8 mm
Weight	91 g			

Internal circuitry

UE10-2FG



UE12-2FG



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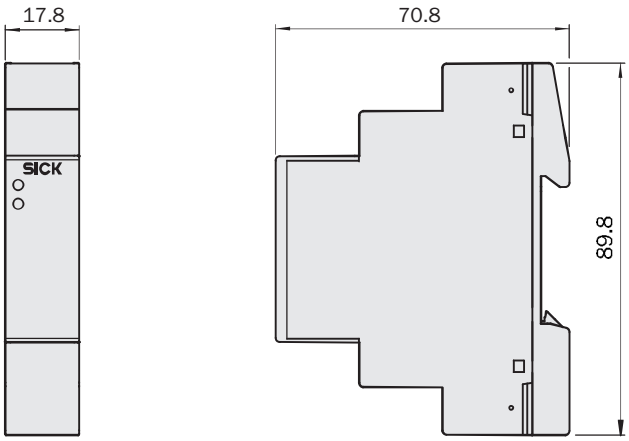
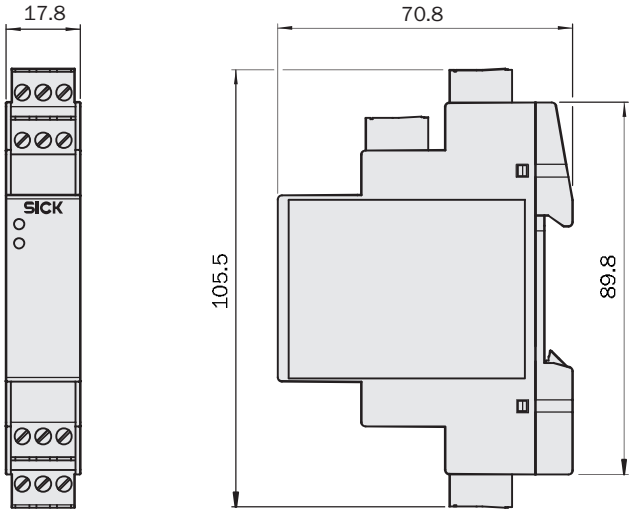
Dimensional drawings

Screw-type terminals



Plug-in terminals

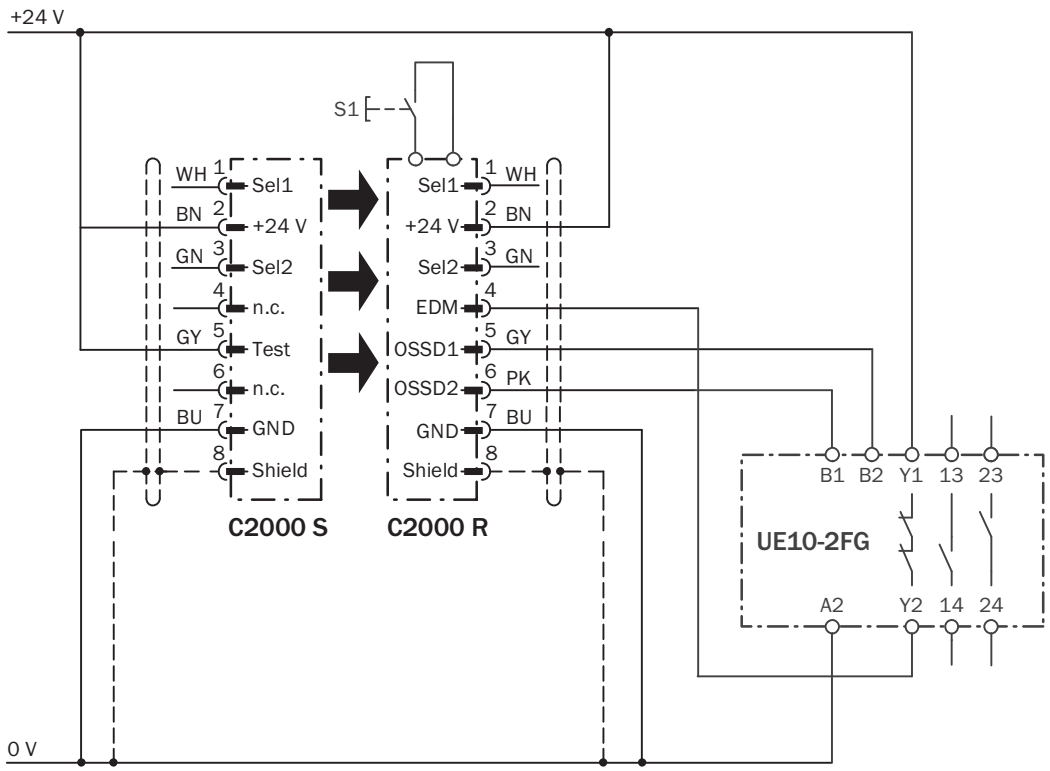


Dimensions in mm

Connection diagrams

➜ You can find more connection diagrams at www.mysick.com

C2000 RES/EDM safety light curtain connected to UE10-2FG safety relay



Operating mode: with manual reset and external device monitoring

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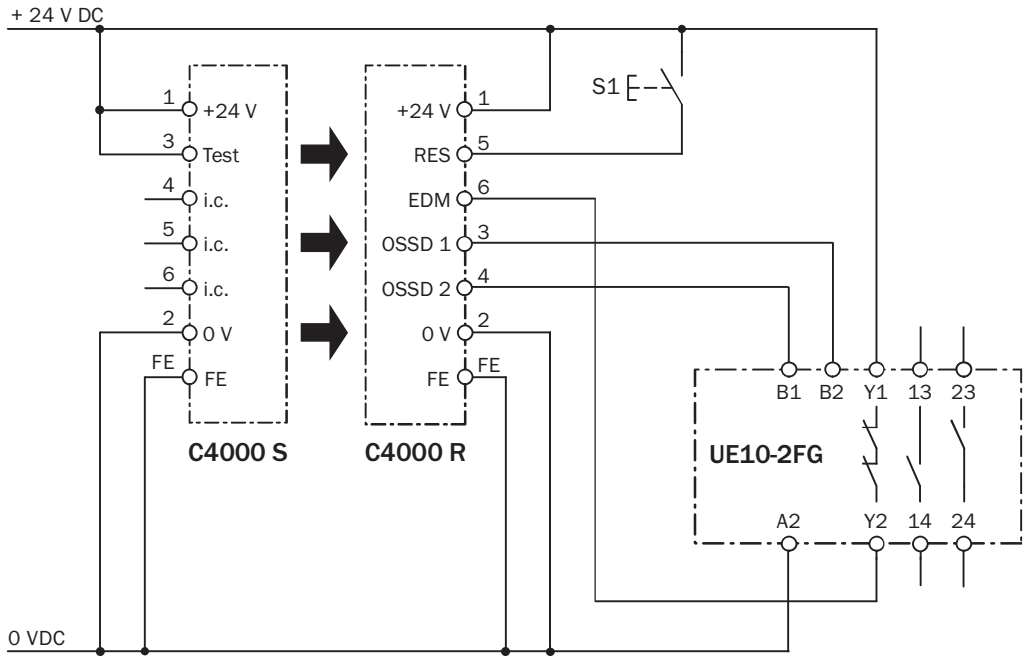
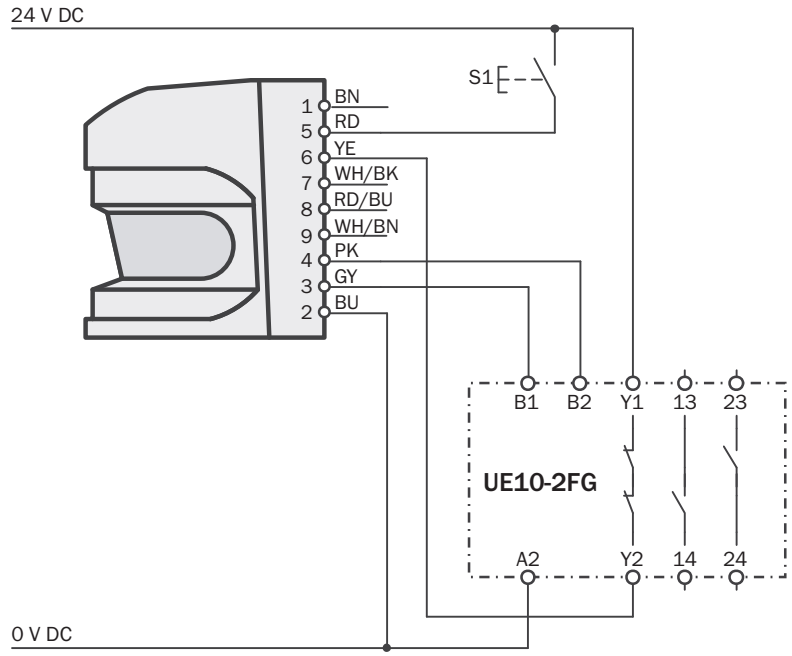
C4000 Standard/Advanced safety light curtain connected to UE10-2FG safety relay



Operating mode: with manual reset and external device monitoring

S3000 Standard safety laser scanner connected to UE10-2FG safety relay



Operating mode: with manual reset and external device monitoring

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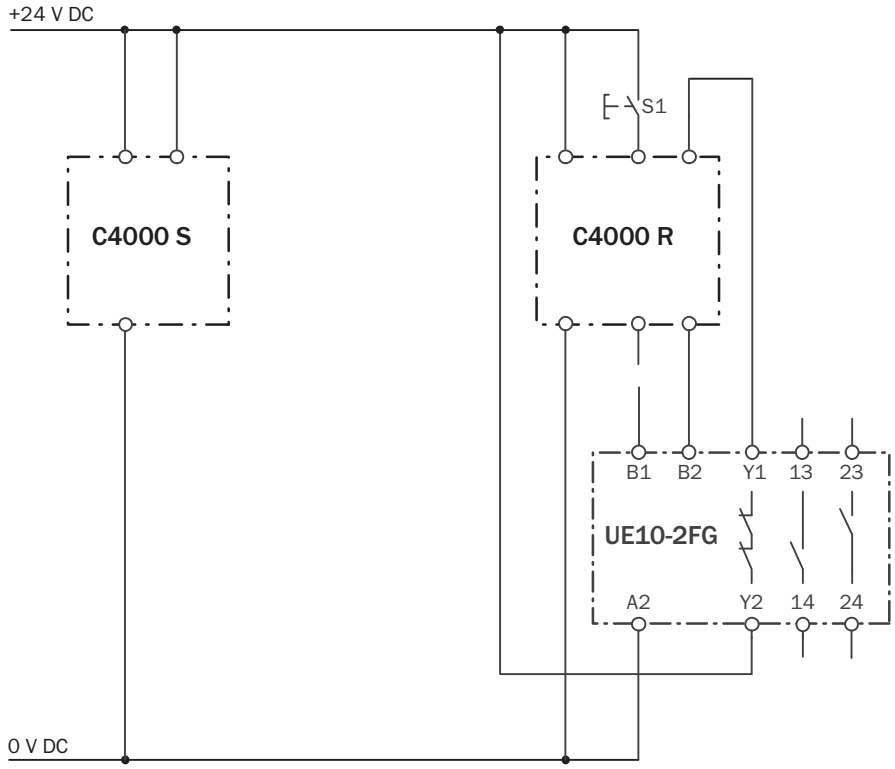
C4000 Micro safety light curtain connected to UE10-2FG safety relay



Operating mode: with manual reset and external device monitoring

N

Technical data overview

Category	Category 4 (EN ISO 13849) [1]
Performance level	PL e (EN ISO 13849) [1]
Number of enable current contacts	3
Number of signaling current contacts	1
Input circuit	Single- or dual-channel
Housing width	22.5 mm

[1] If the feedback current path Y1 - Y2 (external device monitoring) is monitored using an appropriate main unit

Product description

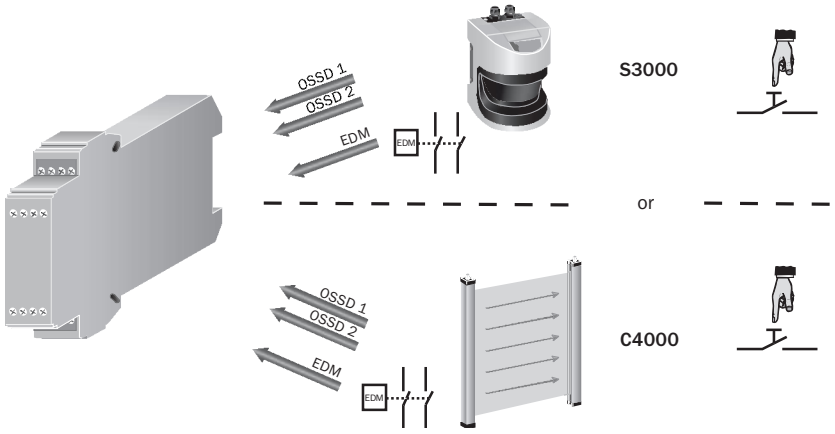
- NC contact for external device monitoring (EDM)
- 2 LEDs:
  - Relay K1
  - Relay K2
- Additional outputs available with the contact expansion modules
  - UE10-4XT
  - UE11-4DX
- Available with screw-type or plug-in terminals

In-system added value

- Contact expansion module for electro-sensitive protective equipment (ESPE) with monitored semiconductor outputs, integral external device monitoring (EDM) and restart interlock, such as:
  - C2000, C4000
  - M2000, M4000
  - S3000
- Contact expansion module for safety systems with monitored semiconductor outputs, integral external device monitoring and restart interlock, such as:
  - Flexi Classic
  - Flexi Soft

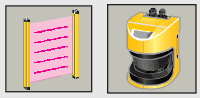
→ For more combinations, see annex

Applications



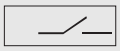
Ordering information

Connection type	Type	Part no.
Screw-type terminals	UE10-3OS2D0	6024917
Plug-in terminals	UE10-3OS3D0	6024918



- For safety laser scanners
- For safety light curtains

3



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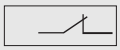

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Further information	Page
→ Technical specifications	N-64
→ Internal circuitry	N-66
→ Dimensional drawings	N-66
→ Connection diagrams	N-67
→ Systematic safety	A-0
→ Services	B-0

Technical specifications

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

General system data

Type	UE10-3OS2DO	UE10-3OS3DO
Safety related parameters		
Safety integrity level	SIL3 (IEC 61508) [1], SILCL3 (IEC 62061) [1]	
Category	Category 4 (EN ISO 13849) [1]	
Performance level	PL e (EN ISO 13849) [1]	
B_{10d} parameter	1.26 x 10^6 switching cycles (AC-15, 230 V, I = 1.5 A), 5.9 x 10^6 switching cycles (AC-15, 230 V, I = 0.75 A), 4.35 x 10^5 switching cycles (DC-13, 24 V, I = 2.5 A), 1 x 10^7 switching cycles (DC-13, 24 V, I = 0.63 A)	
PFHd (mean probability of a dangerous failure per hour)	3.0 x 10^{-8} (EN ISO 13849)	
T_M (Mission Time)	20 years (EN ISO 13849)	
Voltage supply	B1 - B4 PELV (Output circuit > 25 V AC / 60 V DC) PELV or SELV (Output circuit < 25 V AC / 60 V DC)	

[1] If the feedback current path Y1 - Y2 (external device monitoring) is monitored using an appropriate main unit

Input circuits B1 - B4

Type	UE10-3OS2DO	UE10-3OS3DO
Switch-on time	Max. 40 ms	
Input voltage	24 V DC (15 V DC ... 30 V DC)	
Input current	500 mA	

Electrical output circuits 13 - 14, 23 - 24, 33 - 34, 41 - 42, Y1 - Y2

Type	UE10-3OS2DO	UE10-3OS3DO
Response time	20 ms [1]	
Number of enable current (N/O) contacts	3, relevant for safety	
Number of signaling current (N/C) contacts	1, not safety-relevant	
Number of contactor monitoring (N/C) contacts	1, external device monitoring	
Contact type	Positively driven	
Contact material	Silver alloy, gold flashed	
Switching voltage		
Enable current contact	10 V AC ... 230 V AC	
Signaling current contact	10 V DC ... 30 V DC	
Contactor monitoring contact	10 V DC ... 24 V DC	
Switching current		
Enable current contact	10 mA ... 6 A	
Signaling current contact	10 mA ... 2 A	
Contactor monitoring contact	10 mA ... 0.1 A	
Total current	12 A	
Usage category	AC-15/DC-13	
Rated operating current (voltage)	4 A (230 V AC) 360 switching cycles/h 3 A (230 V AC) 3600 switching cycles/h 4 A (24 V DC) 360 switching cycles/h 2.5 A (24 V DC) 3600 switching cycles/h	
Maximum switching frequency	3600/h	
Mechanical life (relay contacts)	1 x 10^7 switching cycles	
Electrical life (relay contacts)	2 x 10^6 switching cycles	

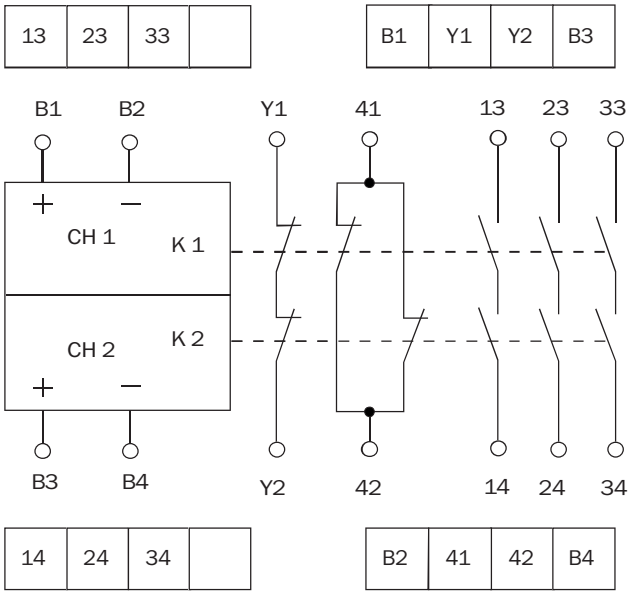
[1] K1/K2

Operating data

Type	UE10-3OS2DO	UE10-3OS3DO
Rated impulse withstand voltage U_{imp}	4 kV	
Overvoltage category	III	
Contamination rating		
External	3	
Internal	2	
Standard	EN 50178	
Rated insulation voltage U_i	300 V AC	
Test voltage	2 kV (50 Hz) EN 60439-1	
Enclosure rating		
Clamps	IP 20	
Housing	IP 40	
Interference emission	DIN EN 61000-6-4	
Interference resistance	EN 61000-6-2	
Ambient operating temperature	–25 °C ... +55 °C	
Storage temperature	–25 °C ... +75 °C	
Connection type	Screw-type terminals	Plug-in terminals
Conductor cross-section		
Single wire (2x, same cross-section)	0.15 mm² ... 0.75 mm²	
Single wire (1x)	0.14 mm² ... 2.5 mm²	
Fine wire with ferrules (2x, same cross-section)	0.25 mm² ... 0.5 mm²	
Fine wire with ferrules (1x)	0.25 mm² ... 2.5 mm²	
Dimensions (W x H x D)	22.5 mm x 114 mm x 96.5 mm	
Weight	0.2 kg	

N

Internal circuitry



Function

If the semiconductor outputs of the installed safety device (e.g., C4000, S3000) are energized, then the safety output contacts will close.

When at least one of the semiconductor outputs of the safety device becomes de-energized, then the output contacts revert back to open circuit status.

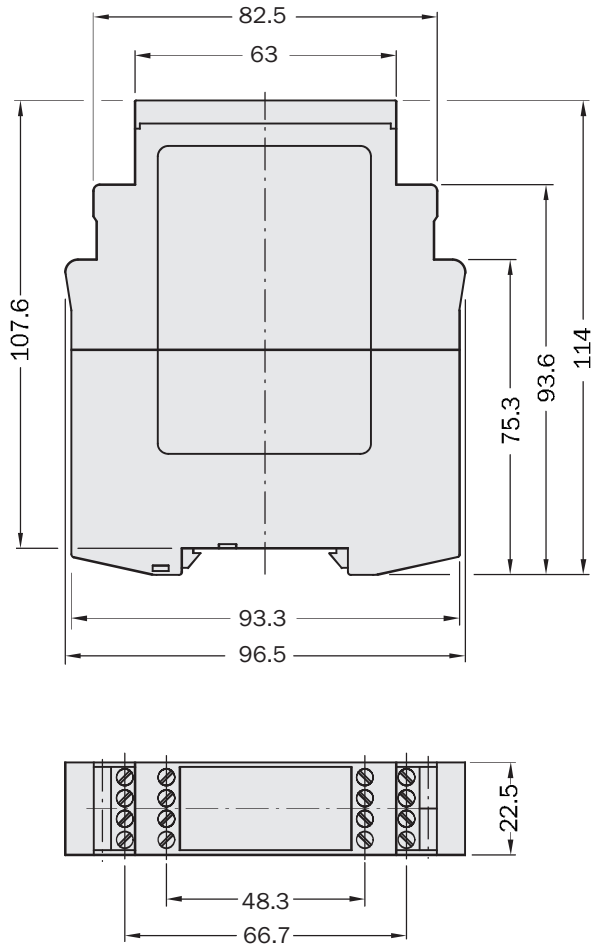
If restart interlock is needed, then this is achieved in the safety device, for example with a C4000 or S3000.

External device monitoring (EDM)

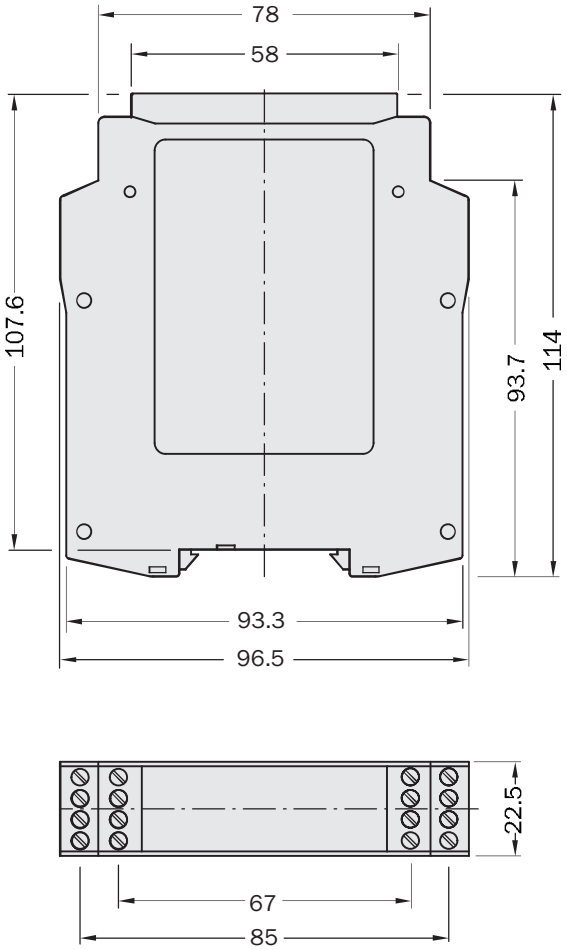
Category 3 or 4, which determines the performance level according to EN ISO 13849, requires monitoring of contactors for the detection of failures. This is provided in the connected protective device, for example in the C4000 or S3000. The normally closed contact (Y1 -Y2) in the UE10-3OS unit is a part of this contactor monitoring system.

Dimensional drawings

Screw-type terminals



Plug-in terminals

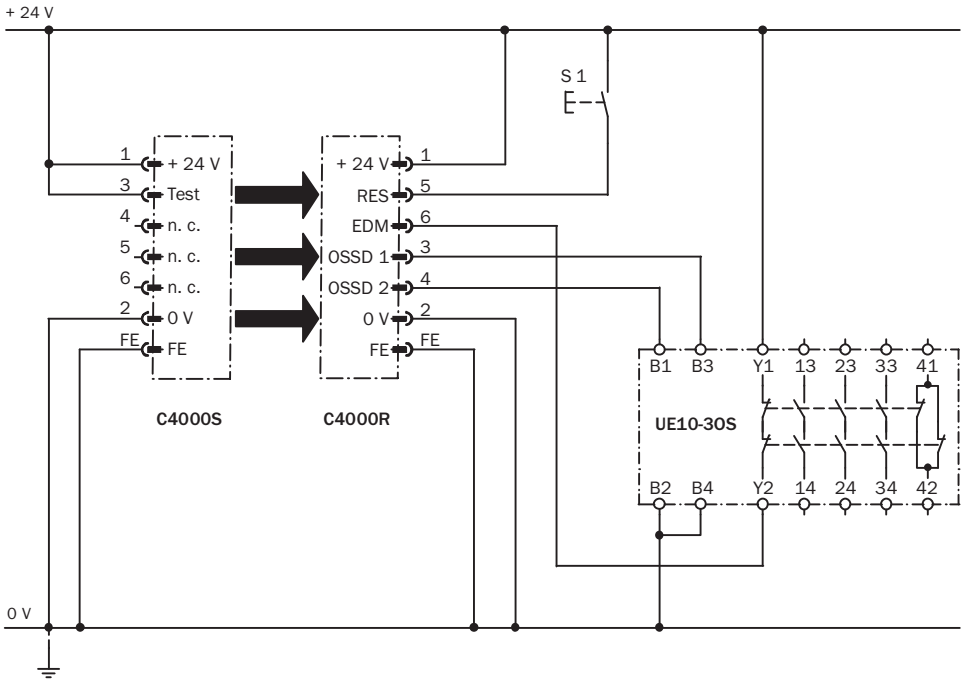


Dimensions in mm

Connection diagrams

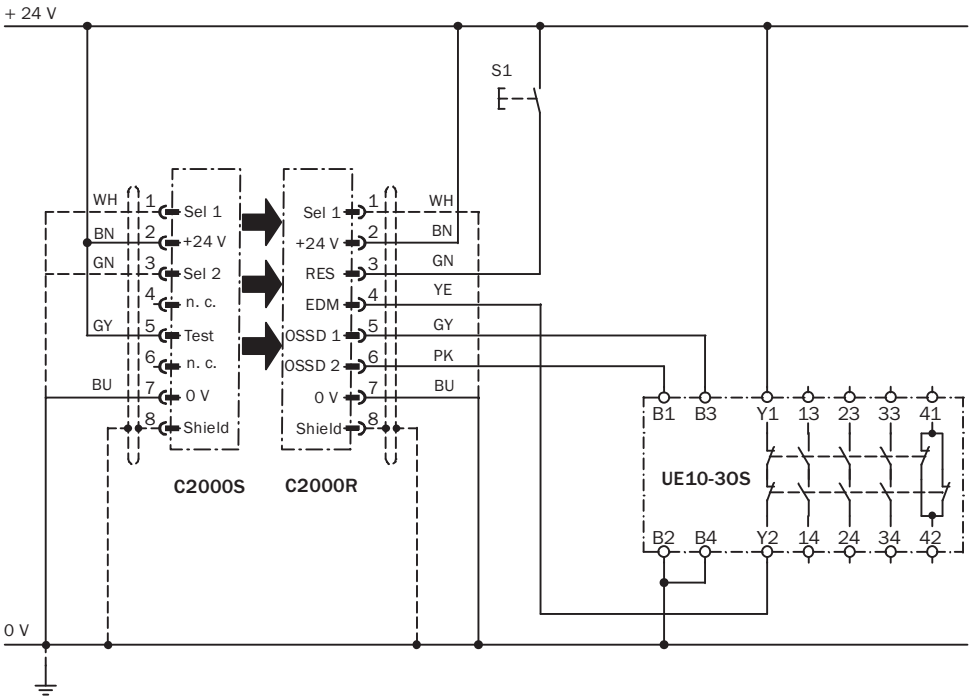
➜ You can find more connection diagrams at www.mysick.com

C4000 Standard/Advanced safety light curtain connected to UE10-3OS safety relay



Operating mode: with manual reset and external device monitoring

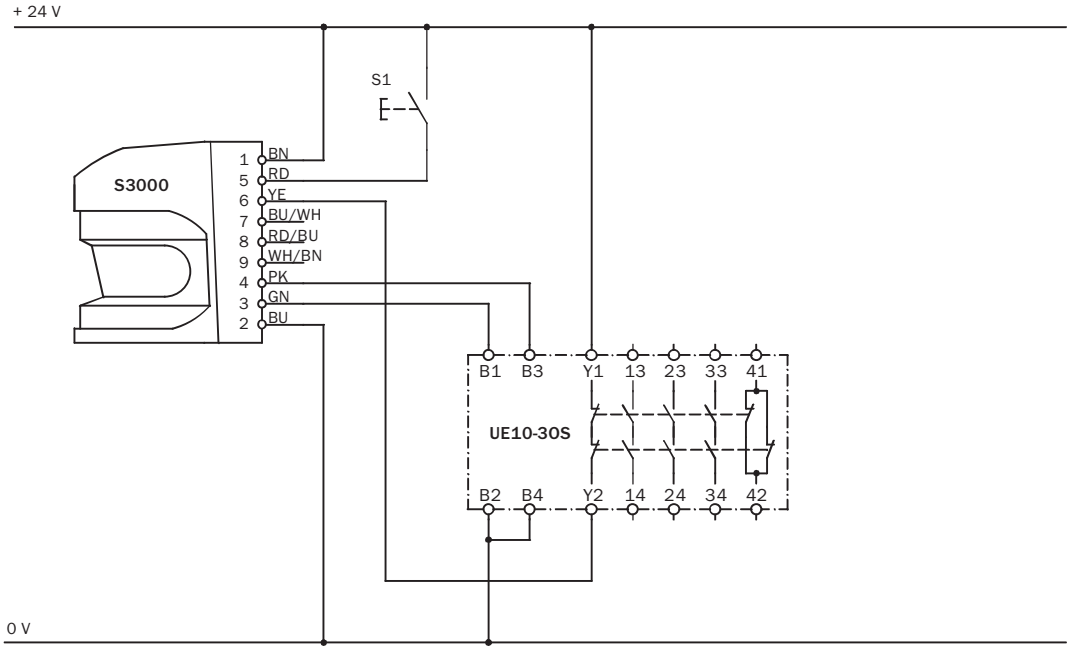
C2000 RES/EDM safety light curtain connected to UE10-3OS safety relay



Operating mode: with manual reset and external device monitoring

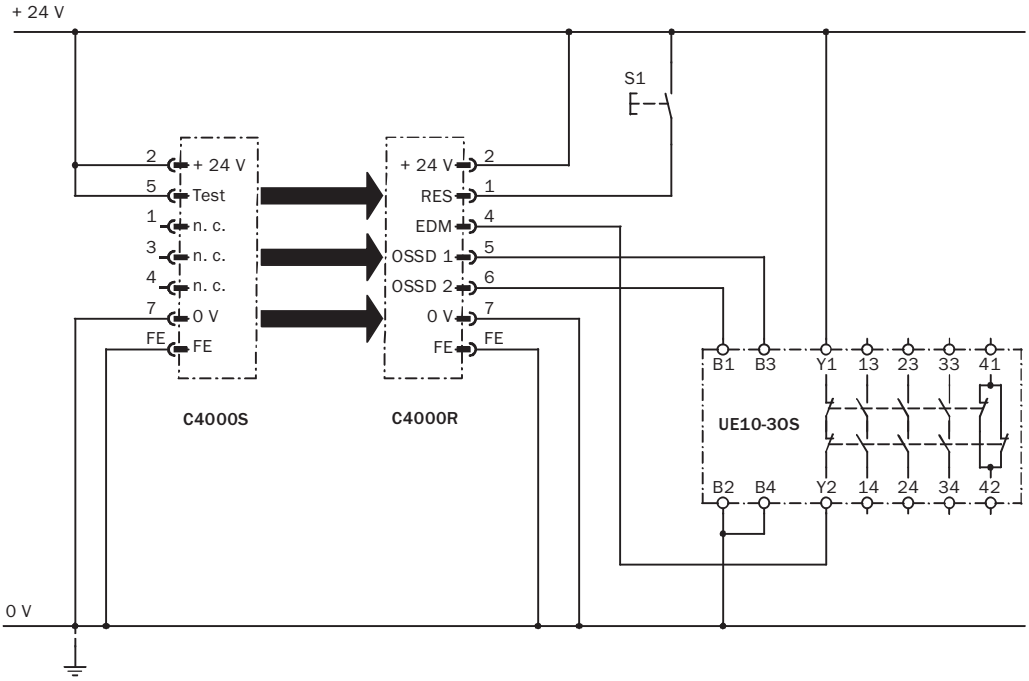
N

S3000 Standard safety laser scanner connected to UE10-3OS safety relay



Operating mode: with manual reset and external device monitoring

C4000 Micro safety light curtain connected to UE10-3OS safety relay



Operating mode: with manual reset and external device monitoring

N

Technical data overview

Category	Category 4 (EN ISO 13849) [1]
Performance level	PL d (EN ISO 13849) [1]
Number of enable current contacts	4
Number of signaling current contacts	2
Housing width	22.5 mm

[1] If the feedback current path Y1 - Y2 (external device monitoring) is monitored using an appropriate main unit

Product description

- The UE10-4XT contact expansion module provides:
  - Additional output contacts in a main unit
  - NC contact for external device monitoring (EDM)
- 2 LEDs for relays K1 and K2
- Screw-type or plug-in terminals

In-system added value

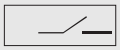
Applicable with UE10 – UE48 main units

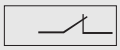
➜ Fo more combinations, see annex

Ordering information

Connection type	Type	Part no.
Screw-type terminals	UE10-4XT2D2	6024919
Plug-in terminals	UE10-4XT3D2	6024920

- Contact expansion module
- External device monitoring (EDM) within the main unit

4 

2 

N

Further information	Page
➜ Technical specifications	N-70
➜ Internal circuitry	N-72
➜ Dimensional drawings	N-73
➜ Systematic safety	A-0
➜ Services	B-0

Technical specifications

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

General system data

Type	UE10-4XT2D2	UE10-4XT3D2
Safety related parameters		
Safety integrity level	SIL3 (IEC 61508), SILCL3 (IEC 62061) [1]	
Category	Category 4 (EN ISO 13849) [1]	
Performance level	PL d (EN ISO 13849) [1]	
B_{10d} parameter	1×10^6 switching cycles (AC-15, 230 V, I = 0.5 A), 3.5×10^5 switching cycles (DC-13, 24 V, I = 2 A), 1.2×10^6 switching cycles (DC-13, 24 V, I = 0.5 A)	
PFHd (mean probability of a dangerous failure per hour)	2.0×10^{-7} (EN ISO 13849)	
T_M (Mission Time)	4 years (EN ISO 13849)	
Voltage supply	A1, A2 PELV (Output circuit > 25 V AC / 60 V DC) PELV or SELV (Output circuit < 25 V AC / 60 V DC)	
Supply voltage	A1, A2 24 V DC (20.4 V DC ... 26.4 V DC)	
Power consumption	2.7 VA, 1.5 W	
Residual ripple	2.4 V_{pp} [2]	
Nominal frequency	50 Hz ... 60 Hz [3]	

[1] If the feedback current path Y1 - Y2 (external device monitoring) is monitored using an appropriate main unit

[2] In DC operation, within the limits of V_S

[3] In AC operation

Electrical output circuits 13 - 14, 23 - 24, 33 - 34, 43 - 44, 51 - 52, 61 - 62, Y1 - Y2

Type	UE10-4XT2D2	UE10-4XT3D2
Response time	40 ms [1]	
Number of enable current (N/O) contacts	4, relevant for safety	
Number of signaling current (N/C) contacts	2, not safety-relevant	
Number of contactor monitoring (N/C) contacts	1, external device monitoring	
Contact type	Positively driven	
Contact material	Silver alloy, gold flashed	
Switching voltage		
Enable current contact	10 V AC ... 230 V AC 10 V DC ... 30 V DC	
Contactor monitoring contact	10 V DC ... 24 V DC	
Switching current		
Enable current contact	10 mA ... 6 A	
Signaling current contact	10 mA ... 2 A	
Contactor monitoring contact	10 mA ... 0.1 A	
Total current	12 A	
Usage category	AC-15/DC-13	
Rated operating current (voltage)	6 A (230 V AC) 360 switching cycles/h 6 A (24 V DC) 360 switching cycles/h 3 A (24 V DC) 3600 switching cycles/h	
Maximum switching frequency	3600/h	
Mechanical life (relay contacts)	1×10^7 switching cycles	
Electrical life (relay contacts)	2×10^6 switching cycles	

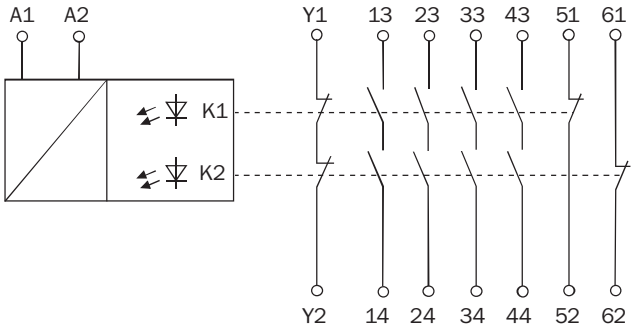
[1] K1/K2

N

Operating data

Type	UE10-4XT2D2	UE10-4XT3D2
Rated impulse withstand voltage U_{imp}	4 kV	
Overvoltage category	III	
Contamination rating		
External	3	
Internal	2	
Standard	EN 50178	
Rated insulation voltage U_i	300 V AC	
Test voltage	2 kV (50 Hz) EN 60439-1	
Enclosure rating		
Clamps	IP 20	
Housing	IP 40	
Interference emission	EN 60947-1 02/99	
Interference resistance	EN 60947-1 02/99	
Ambient operating temperature	–25 °C ... +55 °C	
Storage temperature	–25 °C ... +75 °C	
Connection type	Screw-type terminals	Plug-in terminals
Conductor cross-section		
Single wire (2x, same cross-section)	0.14 mm² ... 0.75 mm²	
Single wire (1x)	0.14 mm² ... 2.5 mm²	
Fine wire with ferrules (2x, same cross-section)	0.25 mm² ... 0.5 mm²	
Fine wire with ferrules (1x)	0.25 mm² ... 2.5 mm²	
Dimensions (W x H x D)	22.5 mm x 114 mm x 96.5 mm	
Weight	0.2 kg	

Internal circuitry



Function

The supply voltage of the contact expansion module is linked to the main unit's output contact.

Upon applying the supply voltage to terminals A1 and A2, relays K1 and K2 are energized (the LEDs for both relays illuminate): The 4 output contacts close and the two normally closed contacts and the EDM (feedback) circuit switch to open circuit status.

When the output contacts of the standard unit open (e.g,. by activation of the emergency stop), the relays K1 and K2 de-energize: The normally open contacts open and the two normally closed contacts close.

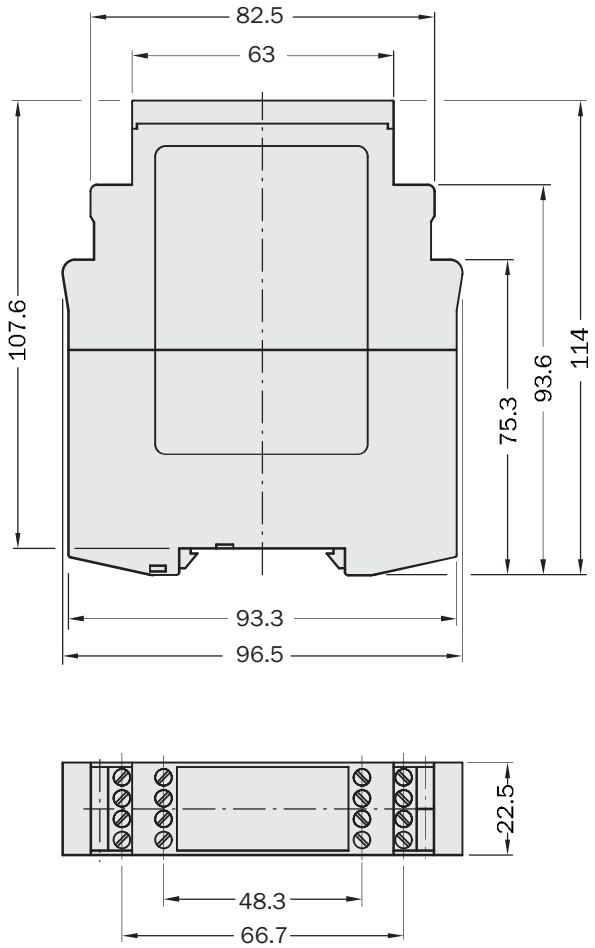
External device monitoring (EDM)

If external device monitoring is implemented in the connected main unit, then the normally closed contacts (Y1 - Y2) prevent the main unit from resetting when K1 and/or K2 do not de-energize.

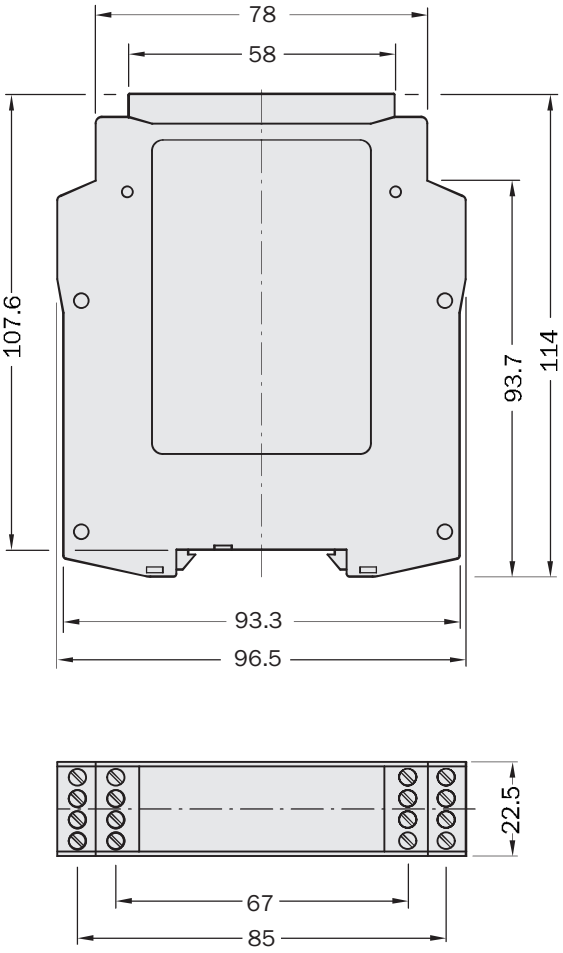
N

Dimensional drawings

Screw-type terminals



Plug-in terminals



Dimensions in mm

N

- Contact expansion module
- External device monitoring (EDM) within the main unit

4

2

Technical data overview

Category	Category 4 (EN ISO 13849) [1]
Performance level	PL d (EN ISO 13849) [1]
Number of enable current contacts	4
Number of delayed deactivation signaling current contacts	2
Housing width	22.5 mm

[1] If the feedback current path Y1 - Y2 (external device monitoring) is monitored using an appropriate main unit

Product description

- The UE11-4DX contact expansion module provides:
  - Additional output contacts in a main unit
  - Off-delayed outputs (0.5, 1, 2, 3 s, depending on model)
  - NC contact for external device monitoring (EDM)
- 2 LEDs for relays K1 and K2
- Screw-type or plug-in terminals

In-system added value

- Applicable with UE10 – UE48 main units

→ For more combinations, see annex

Ordering information

Connection type	Off-delay time	Type	Part no.
Screw-type terminals	0.5 s	UE11-4DX2D30.5	6024921
	1 s	UE11-4DX2D31	6024922
	2 s	UE11-4DX2D32	6024923
	3 s	UE11-4DX2D33	6024924
Plug-in terminals	0.5 s	UE11-4DX3D30.5	6024925
	1 s	UE11-4DX3D31	6024926
	2 s	UE11-4DX3D32	6024927
	3 s	UE11-4DX3D33	6024928

N

Further information	Page
→ Internal circuitry	N-78
→ Dimensional drawings	N-79
→ Systematic safety	A-0
→ Services	B-0

Technical specifications

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

General system data

Type	UE11-4DX2D30.5	UE11-4DX2D31	UE11-4DX2D32	UE11-4DX2D33	UE11-4DX3D30.5	UE11-4DX3D31	UE11-4DX3D32	UE11-4DX3D33
Safety related parameters								
Safety integrity level	SIL3 (IEC 61508), SILCL3 (IEC 62061) [1]							
Category	Category 4 (EN ISO 13849) [1]							
Performance level	PL d (EN ISO 13849) [1]							
B_{10d} parameter	1×10^6 switching cycles (AC-15, 230 V, I = 0.5 A), 3×10^5 switching cycles (DC-13, 24 V, I = 2 A), 1.2×10^6 switching cycles (DC-13, 24 V, I = 0.5 A)							
PFHd (mean probability of a dangerous failure per hour)	2.0×10^{-7} (EN ISO 13849)							
T_M (Mission Time)	4 years (EN ISO 13849)							
Voltage supply	A1, A2 PELV (Output circuit > 25 V AC / 60 V DC) PELV or SELV (Output circuit < 25 V AC / 60 V DC)							
Supply voltage	A1, A2 24 V DC (20.4 V ... 26.4 V)							
Power consumption	2 W							
Residual ripple	2.4 V_{pp} [2]							
Switch-on time	75 ms							

[1] If the feedback current path Y1 - Y2 (external device monitoring) is monitored using an appropriate main unit

[2] In DC operation, within the limits of V_S

N

Electrical output circuits 17 - 18, 27 - 28, 37 - 38, 47 - 48, 55 - 56, 65 - 66, Y1 - Y2

Type	UE11-4DX2D30.5	UE11-4DX2D31	UE11-4DX2D32	UE11-4DX2D33	UE11-4DX3D30.5	UE11-4DX3D31	UE11-4DX3D32	UE11-4DX3D33
Off-delay time	0.5 s	1 s	2 s	3 s	0.5 s	1 s	2 s	3 s
Number of enable current (N/O) contacts	4, relevant for safety							
Number of signaling current (N/C) contacts	2, not safety-relevant							
Number of contactor monitoring (N/C) contacts	1, external device monitoring							
Contact type	Positively driven							
Contact material	Silver alloy, gold flashed							
Switching voltage								
Enable current contact	10 V AC ... 230 V AC 10 V DC ... 30 V DC							
Contactor monitoring contact	10 V DC ... 24 V DC							
Switching current								
Enable current contact	10 mA ... 6 A							
Signaling current contact	10 mA ... 2 A							
Contactor monitoring contact	10 mA ... 0.1 A							
Total current	12 A							
Usage category	AC-15/DC-13							
Rated operating current (voltage)	6 A (230 V AC) 3600 switching cycles/h 6 A (24 V DC) 360 switching cycles/h 3 A (24 V DC) 3600 switching cycles/h							
Maximum switching frequency	3600/h							
Mechanical life (relay contacts)	1×10^7 switching cycles							
Electrical life (relay contacts)	2×10^6 switching cycles							

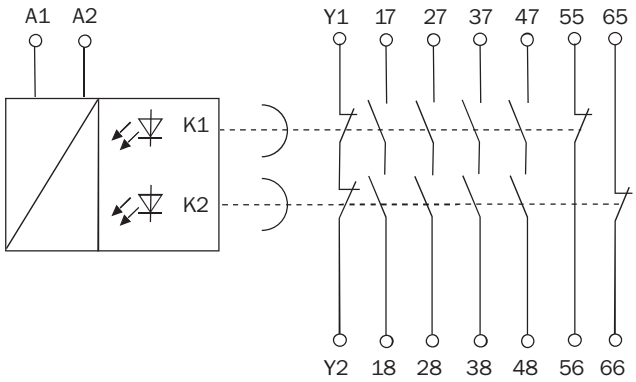
N

Operating data

Type	UE11-4DX2D30.5	UE11-4DX2D31	UE11-4DX2D32	UE11-4DX2D33	UE11-4DX3D30.5	UE11-4DX3D31	UE11-4DX3D32	UE11-4DX3D33
Rated impulse withstand voltage U_{imp}	4 kV							
Overvoltage category	III							
Contamination rating								
External	3							
Internal	2							
Standard	EN 50178							
Rated insulation voltage U_i	300 V AC							
Test voltage	2 kV (50 Hz) EN 60439-1							
Enclosure rating								
Clamps	IP 20							
Housing	IP 40							
Interference emission	EN 60947-1 02/99							
Interference resistance	EN 60947-1 02/99							
Ambient operating temperature	–25 °C ... +55 °C							
Storage temperature	–25 °C ... +75 °C							
Connection type	Screw-type terminals				Plug-in terminals			
Conductor cross-section								
Single wire (2x, same cross-section)	0.14 mm² ... 0.75 mm²							
Single wire (1x)	0.14 mm² ... 2.5 mm²							
Fine wire with ferrules (2x, same cross-section)	0.25 mm² ... 0.5 mm²							
Fine wire with ferrules (1x)	0.25 mm² ... 2.5 mm²							
Dimensions (W x H x D)	22.5 mm x 114 mm x 96.5 mm							
Weight	0.2 kg							

N

Internal circuitry



Function

The supply voltage of the contact expansion module is triggered by the standard unit's output contact.

Upon applying the supply voltage to terminals A1 and A2, relays K1 and K2 are energized (the LEDs for both relays illuminate):

The 4 output contacts close and the two normally closed contacts and the EDM (feedback) circuit switch to open circuit status.

When the output contacts of the standard unit open (e.g., by activation of the emergency stop switch), the relays K1 and K2 de-energize after a unit specific delay. These fixed switch-off delay times of 0.5 s, 1 s, 2 s and 3 s are according to the type. This is achieved by means of capacitors to ensure that the off-delay runs its full duration, even during power supply failures. Only after the delay period has expired do the relays K1 and K2 return to their neutral rest position. With the combination of UE11-4DX (with off-delayed) and a standard unit, stop category 1 (EN 418) can be realized.

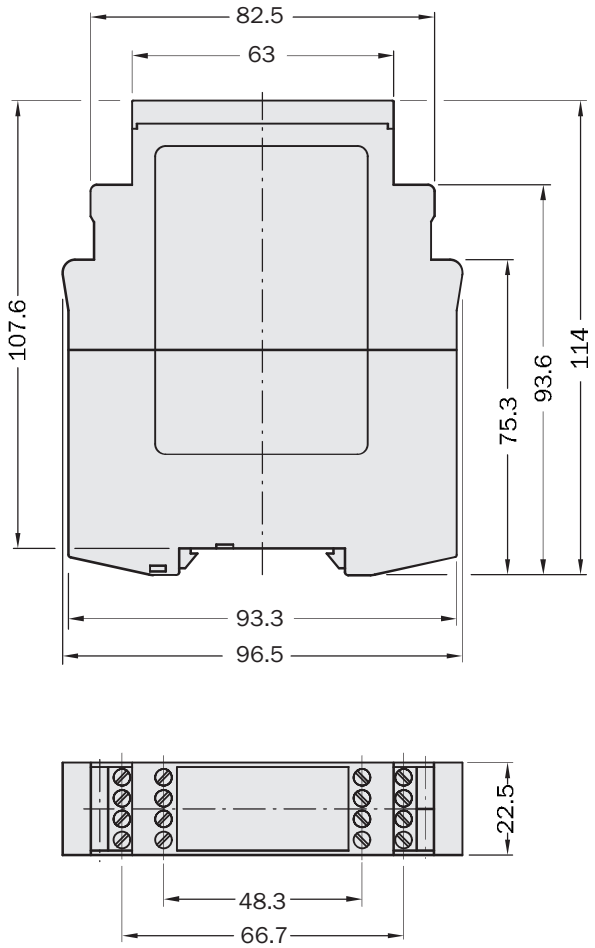
External device monitoring (EDM)

If external device monitoring is implemented in the upstream installed standard unit, then the normally closed contacts (Y1 - Y2) prevent the standard unit from resetting, when K1 and/or K2 do not de-energize.

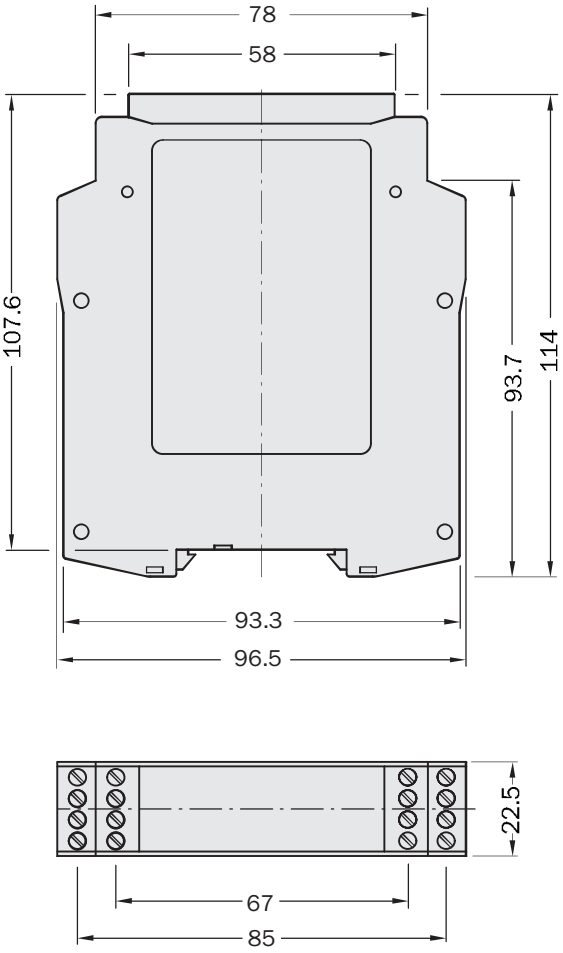
N

Dimensional drawings

Screw-type terminals



Plug-in terminals



Dimensions in mm

N

Safety controllers

Technical overview and applications

Flexi Classic and Flexi Soft safety controllers are both modular and expandable units, which prevents unnecessary inputs and outputs. Using SICK's configuration tools, the planning engineer has the ability to quickly select sensors and actuators by dragging and dropping specific symbols into our easy-to-use software. This results in a complete connection diagram with trouble-free electrical installation. Both the Flexi Classic and Flexi Soft can be optimally integrated with all safety sensors. Gateways for all leading networks (e.g., PROFINET IO, PROFIBUS-DP, CANopen®, Modbus TCP, Ethernet (TCP/IP)) are available. This helps minimize downtimes significantly.

Impressively easy: Flexi Classic

- Function setting via rotary switch
- Easy configuration through certified programs (4 function blocks)
- Significant advantages over relays:
  - Less space required
  - Reduced wiring effort
  - Shorter response times
- Complete diagnostics through LED indicators on the modules results in less downtime

Intuitive software, modular hardware: Flexi Soft

- Intuitive configuration software with 38 certified function blocks
- Safe networking of up to 4 Flexi Soft stations without additional hardware (Flexi Link technology)
- Immediate verification of the safety function using the simulation mode
- Quick commissioning through configuration memory in the system plug

Flexi Classic Configurator: Just a few clicks to reach your goal

The Flexi Classic configurator is an immense help in preparing a Flexi system. You can place modules side by side; adding sensors and actuators using the drag and drop feature. Plus, the view of the internal logic makes design quick and easy. The programs produced can be set on the device using a screwdriver.

➜ Project Flexi Classic system: www.sens-control.com

Flexi Soft Designer: Powerful logic to quickly create a project

From the easy-to-place modules and elements, to the logic simulation and the wiring, the Flexi Soft Designer is an intuitive tool throughout the configuration process. With 38 available logic blocks and the option to export/import application parts, it is easy to control safety-related functions.

➜ Project Flexi Soft system: www.sens-control.com

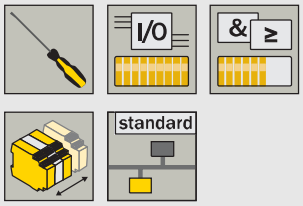
Application		Description	Number of inputs	Number of outputs	Minimum system width	Number of selectable function blocks	Functions: Configuration via screwdriver	Functions: Software-based	Functions: Safe device communication via EFI [2]	Functions: Linking of up to 4 stations	Product	Page
standard		**Modular safety controller**	4 ... 100 [1]	4 ... 52 [1]	1 module (22.5 mm)	4 [3]	✔	–	–	–	Flexi Classic	0-2
		**Modular safety controller**	4 ... 96 [1]	4 ... 48 [1]	2 modules (45 mm)	38 [4]	–	✔	✔	✔	Flexi Soft	0-25

[1] Depending on module combination

[2] Enhanced Function Interface (EFI), communication interface to SICK safety sensors; further information ➜ page A-8

[3] AND/OR/Bypass/Muting

[4] Consisting of the following groups: Standard Boolean, start/edge, delays, counter and fast shut-off, EDM/output modules, muting/presses



- Optimal integration of SICK safety devices
- Significant reduction in the control cabinet width
- Easy program selection using rotary switches (no software required)
- Significant reduction in the wiring effort
- Relay module
- PROFIBUS-DP, DeviceNet, CANopen, Modbus TCP, Ethernet (TCP/IP), EtherNet/IP and PROFINET IO integration

Further information	Page
➜ Technical specifications	0-5
➜ Internal circuitry	0-18
➜ Dimensional drawings	0-20
➜ Connection diagrams	0-21
➜ Accessories	0-24
➜ Systematic safety	A-0
➜ Services	B-0

0

Technical data overview

Number of inputs	4 ... 100, depending on module combination
Number of outputs	4 ... 52, depending on module combination
Fieldbus (depending on type)	CANopen®, DeviceNet, Ethernet (TCP/IP), EtherNet/IP, Modbus TCP, PROFIBUS-DP, PROFINET IO
Program selection	Adjustable by means of rotary switch
Logical functions (depending on type)	Muting, Override / OR, AND, BYPASS
Number of muting sensors (depending on type)	2 ... 4

Product description

The Flexi Classic series uses a safety control concept that enables different units and modules to be connected together based on the application requirements.
The plug-in style units enable communication between the individual units over an internal bus.
The connected sensors and the function are defined using rotary switches on the related units; except for the relay modules and the fieldbus modules, which are used for integration in a higher level controller without a safety function. These modules are output units and have no affect on the logic set or the function of the upstream units.

The Flexi Classic series comprises the following units:

- UE410-MU (main unit)
- UE410-XU (extension unit)
- UE410-8DI (input expansion unit)
- UE410-MM (muting main unit)
- UE410-XM (muting extension unit)
- UE410-MDI (muting expansion unit)
- UE410-2RO/-4RO (relay module)
- UE410-PRO/UE410-DEV/UE410-CAN/UE410-EN (gateway PROFIBUS-DP, DeviceNet, CANopen, Modbus TCP, Ethernet (TCP/IP), EtherNet/IP and PROFINET IO)

In-system added value

A Flexi Classic system always comprises a main unit (UE410-MU) or muting main unit (UE410-MM) and, as required, additional extension units and an appropriate gateway.

Module	Number of inputs	Number of outputs	Delay time (adjustable at outputs Q3/Q4)	Functions	Fieldbus	Number of application diagnostic outputs
Main unit	4	4	0 ... 300 s (depending on type)	AND, OR, BYPASS	–	–
Extension unit	4	4			–	–
Input expansion unit	4 dual-channel	–	–		–	–
Muting main unit	6	4	–	Muting	–	–
Muting extension unit	6	4	–		–	–
Muting input expansion unit	3	–	–	Muting, Belt stop, Override	–	–
Relay module[1]	–	2/4 relay outputs	–	–	–	1/2
Gateway	–	–	–	Diagnostics [2]	✔[3]	–

[1] UE10-2FG/UE12-2FG safety relays may be used as an alternative (cf. N-57).
[2] Via standard network
[3] PROFIBUS-DP, DeviceNet, CANopen®, Modbus TCP, Ethernet (TCP/IP), EtherNet/IP, PROFINET IO

➜ Configuring Flexi Classic modules: www.sens-control.com

Ordering information

Main unit

- Number of inputs: 2 dual-channel or 4 single-channel
- Number of outputs: 2 dual-channel or 4 single-channel

Delay time (outputs Q3/Q4)	Connection type	Type	Part no.
–	Plug-in terminals	UE410-MU3T0	6035242
	Dual-level spring clamp terminals	UE410-MU4T0	6035243
0 s ... 5 s	Plug-in terminals	UE410-MU3T5	6026136
	Dual-level spring clamp terminals	UE410-MU4T5	6032669
0 s ... 50 s	Plug-in terminals	UE410-MU3T50	6026137
	Dual-level spring clamp terminals	UE410-MU4T50	6032670
0 s ... 300 s	Plug-in terminals	UE410-MU3T300	6026138
	Dual-level spring clamp terminals	UE410-MU4T300	6032671

Extension unit

- Number of inputs: 2 dual-channel or 4 single-channel
- Number of outputs: 2 dual-channel or 4 single-channel

Delay time (outputs Q3/Q4)	Connection type	Type	Part no.
–	Plug-in terminals	UE410-XU3T0	6035244
	Dual-level spring clamp terminals	UE410-XU4T0	6035245
0 s ... 5 s	Plug-in terminals	UE410-XU3T5	6032470
	Dual-level spring clamp terminals	UE410-XU4T5	6032672
0 s ... 50 s	Plug-in terminals	UE410-XU3T50	6032471
	Dual-level spring clamp terminals	UE410-XU4T50	6032673
0 s ... 300 s	Plug-in terminals	UE410-XU3T300	6032472
	Dual-level spring clamp terminals	UE410-XU4T300	6032674

Input expansion unit

- Number of inputs: 4 dual-channel or 8 single-channel

Connection type	Type	Part no.
Plug-in terminals	UE410-8DI3	6026139
Dual-level spring clamp terminals	UE410-8DI4	6032675

Muting main unit

- Number of inputs: 1 dual-channel and 4 single-channel
- Number of outputs: 1 dual-channel and 2 single-channel
- Muting: ✔
- Number of muting sensors: 2 ... 4

Connection type	Type	Part no.
Plug-in terminals	UE410-MM3	6034482
Dual-level spring clamp terminals	UE410-MM4	6034645

Muting extension unit

- Number of inputs: 1 dual-channel and 4 single-channel
- Number of outputs: 1 dual-channel and 2 single-channel
- Muting: ✔
- Number of muting sensors: 2 ... 4

Connection type	Type	Part no.
Plug-in terminals	UE410-XM3	6034483
Dual-level spring clamp terminals	UE410-XM4	6034646

Muting input expansion unit

- Number of inputs: 3 single-channel
- Muting: ✔

Connection type	Type	Part no.
Plug-in terminals	UE410-MDI3	6034484
Dual-level spring clamp terminals	UE410-MDI4	6034647

Relay module

Number of N/O contacts	Number of application diagnostic outputs	Connection type	Type	Part no.
2	1	Plug-in terminals	UE410-2RO3 [1)]	6026144
		Dual-level spring clamp terminals	UE410-2RO4 [1)]	6032677
4	2	Plug-in terminals	UE410-4RO3 [1)]	6026143
		Dual-level spring clamp terminals	UE410-4RO4 [1)]	6032676

[1)] Alternatively UE10-2FG/UE12-2FG safety relays may be used (cf. (N-57)).

Gateway

Connection type	Fieldbus	Type	Part no.
Plug-in terminals	PROFIBUS-DP	UE410-PRO3	6028407
Dual-level spring clamp terminals		UE410-PRO4	6032678
Plug-in terminals	DeviceNet	UE410-DEV3	6032469
Dual-level spring clamp terminals		UE410-DEV4	6032679
Plug-in terminals	CANopen®	UE410-CAN3	6033111
Dual-level spring clamp terminals		UE410-CAN4	6033112
Screw-terminal connector	Ethernet (TCP/IP), EtherNet/IP	UE410-EN1	1042964
	Ethernet (TCP/IP), Modbus TCP	UE410-EN3	1042193
	PROFINET IO	UE410-EN4	1044078

Technical specifications

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

Main unit

General data

Type	UE410-MU3T0	UE410-MU4T0	UE410-MU3T5	UE410-MU4T5	UE410-MU3T50	UE410-MU4T50	UE410-MU3T300	UE410-MU4T300
Safety related parameters								
Safety integrity level	SIL3 (IEC 61508)							
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} [1], 6.0×10^{-9} [2] (EN ISO 13849)							
T_M (Mission Time)	20 years (EN ISO 13849)							
Ambient operating temperature	–25 °C ... +55 °C							
Storage temperature	–25 °C ... +70 °C							
Air humidity from ... to	15 % ... 95 %, non-condensing							
Climate conditions according to	EN 61131-2							
Vibration resistance	5 Hz ... 500 Hz							
Vibration resistance (checked to)	EN 60068-2-6, EN 61131-2							
Enclosure rating	EN/IEC 60529							
Clamps	IP 40							
Housing	IP 20							
Electromagnetic compatibility (EMC)	Class A (EN 61000, EN 55011)							
Protection class	III							
System connection	Cable gland							
Connection type	Plug-in terminals	Dual-level spring clamp terminals	Plug-in terminals	Dual-level spring clamp terminals	Plug-in terminals	Dual-level spring clamp terminals	Plug-in terminals	Dual-level spring clamp terminals
Connection conductor cross-section	Single-wire or fine-wire conductor: 1 x 0.14 mm² ... 2.5 mm² or 2 x 0.14 mm² ... 0.75 mm² / fine-wire with terminal crimp according to EN 46288: 1 x 0.25 mm² ... 2.5 mm² or 2 x 0.25 mm² ... 0.5 mm²							
Dimensions (W x H x D)	29 mm x 96.5 mm x 120.8 mm							
Weight	180 g							

[1] Dual-channel outputs

[2] Single-channel outputs

Electrical data

Type	UE410-MU3T0	UE410-MU4T0	UE410-MU3T5	UE410-MU4T5	UE410-MU3T50	UE410-MU4T50	UE410-MU3T300	UE410-MU4T300
Supply voltage	24 V DC (19.2 V DC ... 30 V DC)							
Type of supply voltage	PELV (electrical output circuit on UE410-4RO/UE410-2RO > 25 V AC/60 V DC) PELV or SELV (electrical output circuit on UE410-4RO/UE410-2RO < 25 V AC/60 V DC)							
Power consumption	3 W							
Switch-on time	Max. 60 s							
Short-circuit protection	4 A gG (with tripping characteristics B or C)							
Input circuit (I1 - I4, EN, S1 - S3)								
Number of inputs	2 dual-channel or 4 single-channel							
Input voltage HIGH	13 V DC ... 30 V DC							
Input voltage LOW	–5 V DC ... 5 V DC							
Input current HIGH	2.4 mA ... 3.8 mA							
Input current LOW	–2.5 mA ... 2.1 mA							
Switch-on time	Min. 70 ms							
Synchronous time monitoring	1500 ms (at program 2) 500 ms (at program 4 and 5)							
Number of muting sensors	0, 2							
Muting time to operate	Max. 61 ms, at program 3 [1]							
Tolerated muting sensor signal interrupt	Max. 100 ms, at program 3 [2]							
Switch-on time ENTER button	3 s [3]							
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	Max. 120 mA							
Test pulse width	40 ms (at program 1, 2, 4, 5, 6 and 9 on X1 and X2, at program 3.2 on X1) 52 ms (at program 3.2 on X2)							
Test pulse rate	5 Hz							
Load capacity (test pulse width)	1000 nF (40 ms)							
Safety outputs (Q1, Q2, Q3, Q4)								
Number of outputs	4							
Type of output	PNP semiconductors, short-circuit protected, cross-circuit monitored							
Output voltage	18 V DC ... 30 V DC							
Output current	Max. 2 A							
Test pulse width	700 µs							
Test pulse rate	12.5 Hz ... 32 Hz							
Load capacity	1000 nF							
Cable length	100 m (1.5 mm²)							
Response time	13 ms ... 79 ms [4]							
Delay time (outputs Q3/Q4)	–		0 s ... 5 s, adjustable		0 s ... 50 s, adjustable		0 s ... 300 s, adjustable	

[1] Time between valid muting condition and active muting
[2] One muting input may be LOW for this time
[3] Upon applying the supply voltage
[4] Depending on the selected program and the connected sensors

Functional data

Type	UE410-MU3T0	UE410-MU4T0	UE410-MU3T5	UE410-MU4T5	UE410-MU3T50	UE410-MU4T50	UE410-MU3T300	UE410-MU4T300
Reset/restart	Manual, automatic/configurable							
External device monitoring	✔							
Emergency stop switch	✔							
Logical functions	OR, AND, BYPASS, Muting							
Muting	✔							

Extension unit

General data

Type	UE410-XU3T0	UE410-XU4T0	UE410-XU3T5	UE410-XU4T5	UE410-XU3T50	UE410-XU4T50	UE410-XU3T300	UE410-XU4T300
Safety related parameters								
Safety integrity level	SIL3 (IEC 61508)							
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} [1], 6.0×10^{-9} [2] (EN ISO 13849)							
T_M (Mission Time)	20 years (EN ISO 13849)							
Ambient operating temperature	–25 °C ... +55 °C							
Storage temperature	–25 °C ... +70 °C							
Air humidity from ... to	15 % ... 95 %, non-condensing							
Climate conditions according to	EN 61131-2							
Vibration resistance	5 Hz ... 500 Hz							
Vibration resistance (checked to)	EN 60068-2-6, EN 61131-2							
Enclosure rating	EN/IEC 60529							
Clamps	IP 40							
Housing	IP 20							
Electromagnetic compatibility (EMC)	Class A (EN 61000, EN 55011)							
Protection class	III							
System connection	Cable gland							
Connection type	Plug-in terminals	Dual-level spring clamp terminals	Plug-in terminals	Dual-level spring clamp terminals	Plug-in terminals	Dual-level spring clamp terminals	Plug-in terminals	Dual-level spring clamp terminals
Connection conductor cross-section	Single-wire or fine-wire conductor: 1 x 0.14 mm² ... 2.5 mm² or 2 x 0.14 mm² ... 0.75 mm² / fine-wire with terminal crimp according to EN 46288: 1 x 0.25 mm² ... 2.5 mm² or 2 x 0.25 mm² ... 0.5 mm²							
Dimensions (W x H x D)	22.5 mm x 96.5 mm x 120.8 mm							
Weight	180 g							

[1] Dual-channel outputs

[2] Single-channel outputs

Electrical data

Type	UE410-XU3T0	UE410-XU4T0	UE410-XU3T5	UE410-XU4T5	UE410-XU3T50	UE410-XU4T50	UE410-XU3T300	UE410-XU4T300
Supply voltage	24 V DC (19.2 V DC ... 30 V DC)							
Type of supply voltage	PELV (electrical output circuit on UE410-4RO/UE410-2RO > 25 V AC/60 V DC) PELV or SELV (electrical output circuit on UE410-4RO/UE410-2RO < 25 V AC/60 V DC)							
Power consumption	3 W							
Switch-on time	Max. 60 s							
Short-circuit protection	4 A gG (with tripping characteristics B or C)							
Input circuit (I1 - I4, EN, S1 - S3)								
Number of inputs	2 dual-channel or 4 single-channel							
Input voltage HIGH	13 V DC ... 30 V DC							
Input voltage LOW	–5 V DC ... 5 V DC							
Input current HIGH	2.4 mA ... 3.8 mA							
Input current LOW	–2.5 mA ... 2.1 mA							
Switch-on time	Min. 70 ms							
Synchronous time monitoring	1500 ms (at program 2) 500 ms (at program 4 and 5)							
Number of muting sensors	0, 2							
Muting time to operate	Max. 61 ms, at program 3 [1]							
Tolerated muting sensor signal interrupt	Max. 100 ms, at program 3 [2]							
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	Max. 120 mA							
Test pulse width	40 ms (at program 1, 2, 4, 5, 6 and 9 on X1 and X2, at program 3.2 on X1) 52 ms (at program 3.2 on X2)							
Test pulse rate	5 Hz							
Load capacity (test pulse width)	1000 nF (40 ms)							
Safety outputs (Q1, Q2, Q3, Q4)								
Number of outputs	4							
Type of output	PNP semiconductors, short-circuit protected, cross-circuit monitored							
Output voltage	18 V DC ... 30 V DC							
Output current	Max. 2 A							
Test pulse width	700 µs							
Test pulse rate	12.5 Hz ... 32 Hz							
Load capacity	1000 nF							
Cable length	100 m (1.5 mm²)							
Response time	13 ms ... 79 ms [3]							
Delay time (outputs Q3/Q4)	–		0 s ... 5 s, adjustable		0 s ... 50 s, adjustable		0 s ... 300 s, adjustable	

[1] Time between valid muting condition and active muting

[2] One muting input may be LOW for this time

[3] Depending on the selected program and the connected sensors

Functional data

Type	UE410-XU3T0	UE410-XU4T0	UE410-XU3T5	UE410-XU4T5	UE410-XU3T50	UE410-XU4T50	UE410-XU3T300	UE410-XU4T300
Reset/restart	Manual, automatic/configurable							
External device monitoring	✔							
Emergency stop switch	✔							
Logical functions	OR, AND, BYPASS, Muting							
Muting	✔							

Input expansion unit

General data

Type	UE410-8DI3	UE410-8DI4
Safety related parameters		
Safety integrity level	SILCL3 (IEC 62061)	
Category	Category 4 (EN ISO 13849)	
Performance level	PL e (EN ISO 13849)	
PFHd (mean probability of a dangerous failure per hour)	3.8×10^{-9} 1), 7.3×10^{-9} 2) (EN ISO 13849)	
Ambient operating temperature	–25 °C ... +55 °C	
Storage temperature	–25 °C ... +70 °C	
Air humidity from ... to	15 % ... 95 %, non-condensing	
Climate conditions according to	EN 61131-2	
Vibration resistance	5 Hz ... 500 Hz	
Vibration resistance (checked to)	EN 60068-2-6, EN 61131-2	
Enclosure rating	EN/IEC 60529	
Clamps	IP 40	
Housing	IP 20	
Electromagnetic compatibility (EMC)	Class A (EN 61000, EN 55011)	
Protection class	III	
System connection	Cable gland	
Connection type	Plug-in terminals	Dual-level spring clamp terminals
Connection conductor cross-section	Single-wire or fine-wire conductor: 1 x 0.14 mm² ... 2.5 mm² or 2 x 0.14 mm² ... 0.75 mm² / fine-wire with terminal crimp according to EN 46288: 1 x 0.25 mm² ... 2.5 mm² or 2 x 0.25 mm² ... 0.5 mm²	
Dimensions (W x H x D)	22.5 mm x 96.5 mm x 120.8 mm	
Weight	150 g	

1) Dual-channel outputs

2) Single-channel outputs

Electrical data

Type	UE410-8DI3	UE410-8DI4
Power consumption	3 W	
Input circuit (I1 - I8)		
Number of inputs	4 dual-channel or 8 single-channel	
Input voltage HIGH	13 V DC ... 30 V DC	
Input voltage LOW	–5 V ... 5 V DC	
Input current HIGH	2.4 mA ... 3.8 mA	
Input current LOW	–2.5 mA ... 2.1 mA	
Switch-on time	Min. 70 ms	
Synchronous time monitoring	1500 ms (at program 3 and 5)	

Muting main unit

General data

Type	UE410-MM3	UE410-MM4
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 (mean probability of a dangerous failure per hour)	7.9×10^{-9} (EN ISO 13849)	
T_M (Mission Time)	20 years (EN ISO 13849)	
Ambient operating temperature	–25 °C ... +55 °C	
Storage temperature	–25 °C ... +70 °C	
Air humidity from ... to	15 % ... 95 %, non-condensing	
Climate conditions according to	EN 61131-2	
Vibration resistance	5 Hz ... 500 Hz	
Vibration resistance (checked to)	EN 60068-2-6, EN 61131-2	
Enclosure rating	EN/IEC 60529	
Clamps	IP 40	
Housing	IP 20	
Electromagnetic compatibility (EMC)	Class A (EN 61000, EN 55011)	
Protection class	III	
System connection	Cable gland	
Connection type	Plug-in terminals	Dual-level spring clamp terminals
Connection conductor cross-section	Single-wire or fine-wire conductor: 1 x 0.14 mm² ... 2.5 mm² or 2 x 0.14 mm² ... 0.75 mm² / fine-wire with terminal crimp according to EN 46288: 1 x 0.25 mm² ... 2.5 mm² or 2 x 0.25 mm² ... 0.5 mm²	
Dimensions (W x H x D)	29 mm x 96.5 mm x 120.8 mm	
Weight	180 g	

Electrical data

Type	UE410-MM3	UE410-MM4
Supply voltage	24 V DC (19.2 V DC ... 30 V DC)	
Type of supply voltage	PELV (electrical output circuit on UE410-4RO/UE410-2RO > 25 V AC/60 V DC) PELV or SELV (electrical output circuit on UE410-4RO/UE410-2RO < 25 V AC/60 V DC)	
Power consumption	3 W	
Switch-on time	Max. 10 s	
Short-circuit protection	4 A gG (with tripping characteristics B or C)	
Input circuit (I1, I2, EN, S1)		
Number of inputs	1 dual-channel and 4 single-channel	
Input voltage HIGH	15 V DC ... 30 V DC	
Input voltage LOW	–5 V DC ... 5 V DC	
Input current HIGH	3 mA (2.3 mA ... 3.6 mA)	
Input current LOW	–2.5 mA ... 0.15 mA	
Switch-on time	Min. 70 ms	
Number of muting sensors	2, 4	
Muting time to operate	Max. 70 ms	
Tolerated muting sensor signal interrupt	Max. 200 ms [1]	
Total muting monitoring time	Activation and time adjustable 0.33 min ... 60 min	
Switch-on time ENTER button	3 s [2]	
Control outputs (X1)		
Number of outputs	1	
Type of output	PNP semiconductors, short-circuit protected, cross-circuit monitored	
Output voltage	18 V DC ... 30 V DC	
Output current	Max. 120 mA	
Load capacity	Max. 1000 nF	
Safety outputs (Q1, Q2)		
Number of outputs	2	
Type of output	PNP semiconductors, short-circuit protected, cross-circuit monitored	
Output voltage	18 V DC ... 30 V DC	
Output current	Max. 2 A	
Response time	< 13 ms	
Test pulse width	300 µs	
Test pulse rate	5 Hz	
Load capacity	500 nF	
Cable length	100 m (1.5 mm²)	
Response time	< 13 ms	

[1] One muting input may be LOW for this time

[2] Upon applying the supply voltage

Functional data

Type	UE410-MM3	UE410-MM4
Reset/restart	Manual, automatic/configurable	
External device monitoring	✔	
Logical functions	Muting, override	
Muting	✔	
Override	✔	
Concurrence monitoring	✔	
Monitoring total muting time	✔	
Sensor gap monitoring	✔	
End of muting by ESPE	✔	

Muting extension unit

General data

Type	UE410-XM3	UE410-XM4
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 (mean probability of a dangerous failure per hour)	7.9×10^{-9} (EN ISO 13849)	
T_M (Mission Time)	20 years (EN ISO 13849)	
Ambient operating temperature	–25 °C ... +55 °C	
Storage temperature	–25 °C ... +70 °C	
Air humidity from ... to	15 % ... 95 %, non-condensing	
Climate conditions according to	EN 61131-2	
Vibration resistance	5 Hz ... 500 Hz	
Vibration resistance (checked to)	EN 60068-2-6, EN 61131-2	
Enclosure rating	EN/IEC 60529	
Clamps	IP 40	
Housing	IP 20	
Electromagnetic compatibility (EMC)	Class A (EN 61000, EN 55011)	
Protection class	III	
System connection	Cable gland	
Connection type	Plug-in terminals	Dual-level spring clamp terminals
Connection conductor cross-section	Single-wire or fine-wire conductor: 1 x 0.14 mm² ... 2.5 mm² or 2 x 0.14 mm² ... 0.75 mm² / fine-wire with terminal crimp according to EN 46288: 1 x 0.25 mm² ... 2.5 mm² or 2 x 0.25 mm² ... 0.5 mm²	
Dimensions (W x H x D)	22.5 mm x 96.5 mm x 120.8 mm	
Weight	180 g	

Electrical data

Type	UE410-XM3	UE410-XM4
Supply voltage	24 V DC (19.2 V DC ... 30 V DC)	
Type of supply voltage	PELV (electrical output circuit on UE410-4RO/UE410-2RO > 25 V AC/60 V DC) PELV or SELV (electrical output circuit on UE410-4RO/UE410-2RO < 25 V AC/60 V DC)	
Power consumption	3 W	
Switch-on time	Max. 10 s	
Short-circuit protection	4 A gG (with tripping characteristics B or C)	
Input circuit (I1, I2, EN, S1)		
Number of inputs	1 dual-channel and 4 single-channel	
Input voltage HIGH	15 V DC ... 30 V DC	
Input voltage LOW	–5 V DC ... 5 V DC	
Input current HIGH	3 mA (2.3 mA ... 3.6 mA)	
Input current LOW	–2.5 mA ... 0.15 mA	
Switch-on time	Min. 70 ms	
Number of muting sensors	2, 4	
Muting time to operate	Max. 70 ms	
Tolerated muting sensor signal interrupt	Max. 200 ms [1]	
Total muting monitoring time	Activation and time adjustable 0.33 min ... 60 min	
Control outputs (X1)		
Number of outputs	1	
Type of output	PNP semiconductors, short-circuit protected, cross-circuit monitored	
Output voltage	18 V DC ... 30 V DC	
Output current	Max. 120 mA	
Load capacity	Max. 1000 nF	
Safety outputs (Q1, Q2)		
Number of outputs	2	
Type of output	PNP semiconductors, short-circuit protected, cross-circuit monitored	
Output voltage	18 V DC ... 30 V DC	
Output current	Max. 2 A	
Response time	< 13 ms	
Test pulse width	300 µs	
Test pulse rate	5 Hz	
Load capacity	500 nF	
Cable length	100 m (1.5 mm²)	
Response time	< 13 ms	

[1] One muting input may be LOW for this time

Functional data

Type	UE410-XM3	UE410-XM4
Reset/restart	Manual, automatic/configurable	
External device monitoring	✔	
Logical functions	Muting, override	
Muting	✔	
Override	✔	
Concurrence monitoring	✔	
Monitoring total muting time	✔	
Sensor gap monitoring	✔	
End of muting by ESPE	✔	

Muting input expansion unit

General data

Type	UE410-MDI3	UE410-MDI4
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 (mean probability of a dangerous failure per hour)	6.1 x 10^{-9} (EN ISO 13849)	
T_M (Mission Time)	20 years (EN ISO 13849)	
Ambient operating temperature	–25 °C ... +55 °C	
Storage temperature	–25 °C ... +70 °C	
Air humidity from ... to	15 % ... 95 %, non-condensing	
Climate conditions according to	EN 61131-2	
Vibration resistance	5 Hz ... 500 Hz	
Vibration resistance (checked to)	EN 60068-2-6, EN 61131-2	
Enclosure rating	EN/IEC 60529	
Clamps	IP 40	
Housing	IP 20	
Electromagnetic compatibility (EMC)	Class A (EN 61000, EN 55011)	
Protection class	III	
System connection	Cable gland	
Connection type	Plug-in terminals	Dual-level spring clamp terminals
Connection conductor cross-section	Single-wire or fine-wire conductor: 1 x 0.14 mm² ... 2.5 mm² or 2 x 0.14 mm² ... 0.75 mm² / fine-wire with terminal crimp according to EN 46288: 1 x 0.25 mm² ... 2.5 mm² or 2 x 0.25 mm² ... 0.5 mm²	
Dimensions (W x H x D)	22.5 mm x 96.5 mm x 128.8 mm	
Weight	150 g	

Electrical data

Type	UE410-MDI3	UE410-MDI4
Power consumption	1.8 W	
Input ciruit (C1, CS, OVR)		
Number of inputs	3 single-channel	
Input voltage HIGH	15 V DC ... 30 V DC	
Input voltage LOW	–5 V DC ... 5 V DC	
Input current HIGH	2.3 mA ... 3.6 mA	
Input current LOW	–2.5 mA ... 0.15 mA	
Switch-on time	Min. 50 ms	

Relay module

General data

Type	UE410-2RO3	UE410-2RO4	UE410-4RO3	UE410-4RO4
Safety related parameters				
Safety integrity level	SIL3 (IEC 61508) [1] SILCL3 (IEC 62061) [1]			
Category	Category 4 (EN ISO 13849) [1]			
Performance level	PL e (EN ISO 13849) [1]			
PFHd (mean probability of a dangerous failure per hour)	1.2×10^{-9} (EN ISO 13849) [2]			
T_M (Mission Time)	Depending on load condition and number of switching cycles			
Galvanized 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-condensing			
Climate conditions according to	EN 61131-2			
Vibration resistance	5 Hz ... 500 Hz			
Vibration resistance (checked to)	EN 60068-2-6, 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	Plug-in terminals	Dual-level spring clamp terminals	Plug-in terminals	Dual-level spring clamp terminals
Connection conductor cross-section	Single-wire or fine-wire conductor: 1 x 0.14 mm² ... 2.5 mm² or 2 x 0.14 mm² ... 0.75 mm² / fine-wire with terminal crimp according to EN 46288: 1 x 0.25 mm² ... 2.5 mm² or 2 x 0.25 mm² ... 0.5 mm²			
Dimensions (W x H x D)	22 mm x 96.5 mm x 120.8 mm			
Weight	160 g		190 g	

[1] If the feedback current path Y1 - Y2 (external device monitoring) is monitored by the Flexi system

[2] At 4 x 0.75 A (AC 15); for other conditions, see operating instructions

Electrical data

Type	UE410-2RO3	UE410-2RO4	UE410-4RO3	UE410-4RO4
Supply voltage	24 V DC (19.2 V DC ... 30 V DC)			
Type of supply voltage	PELV (electrical output circuit on UE410-4RO/UE410-2RO > 25 V AC/60 V DC) PELV or SELV (electrical output circuit on UE410-4RO/UE410-2RO < 25 V AC/60 V DC)			
Power consumption	1.6 W		3.2 W	
Short-circuit protection	6 A 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 guided			
Switching voltage	230 V DC (5 V DC ... 275 V DC) 250 V AC (5 V AC ... 275 V AC)			
Output current	Max. 6 A			
Total current	8 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			

Gateway

General data

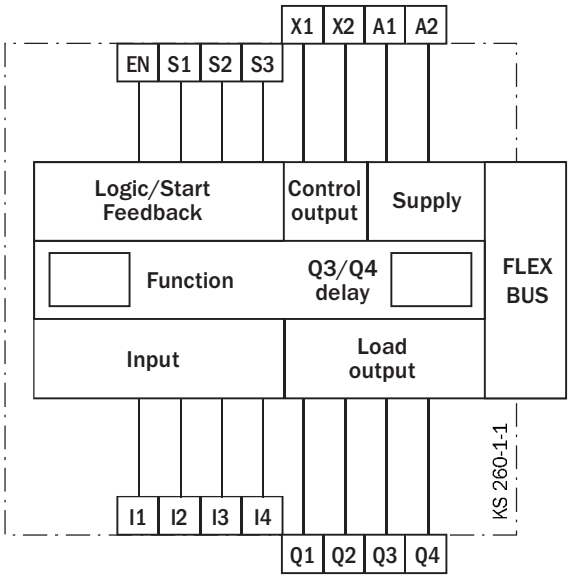
Type	UE410-PRO3	UE410-PRO4	UE410-DEV3	UE410-DEV4	UE410-CAN3	UE410-CAN4	UE410-EN1	UE410-EN3	UE410-EN4
Ambient operating temperature	–25 °C ... +55 °C								
Storage temperature	–25 °C ... +70 °C								
Air humidity from ... to	15 % ... 95 %, non-condensing								
Climate conditions according to	EN 61131-2								
Vibration resistance	5 Hz ... 500 Hz								
Vibration resistance (checked to)	EN 60068-2-6, EN 61131-2								
Enclosure rating	EN/IEC 60529								
Clamps	IP 40								
Housing	IP 20								
Electromagnetic compatibility (EMC)	Class A (EN 61000, EN 55011)								
Protection class	III								
System connection	Cable gland								
Connection conductor cross-section	Single-wire or fine-wire conductor: 1 x 0.14 mm² ... 2.5 mm² or 2 x 0.14 mm² ... 0.75 mm² / fine-wire with terminal crimp according to EN 46288: 1 x 0.25 mm² ... 2.5 mm² or 2 x 0.25 mm² ... 0.5 mm²								
Dimensions (W x H x D)	22.5 mm x 96.5 mm x 120.8 mm							22.5 mm x 96.5 mm x 114.4 mm	22.5 mm x 96.5 mm x 120.8 mm
Weight	160 g							140 g	160 g

Electrical data

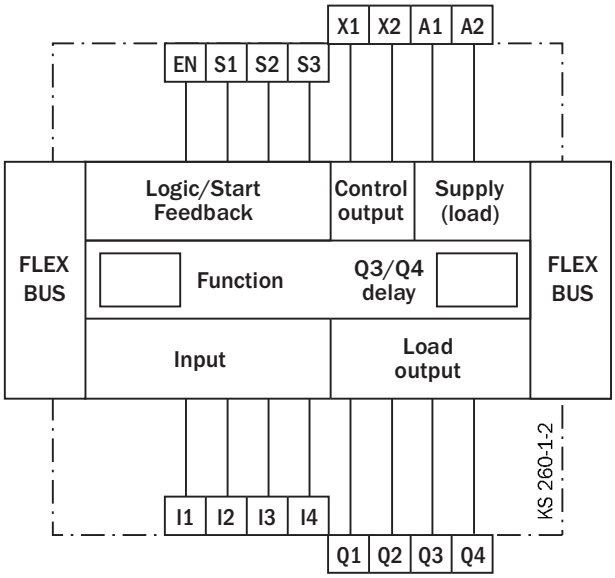
Type	UE410-PR03	UE410-PR04	UE410-DEV3	UE410-DEV4	UE410-CAN3	UE410-CAN4	UE410-EN1	UE410-EN3	UE410-EN4
Supply voltage	24 V DC (19.2 V DC ... 30 V DC)								
Power consumption	2.4 W								
Control outputs (X1 - X4)									
Number of outputs	4								
Type of output	PNP semiconductors, short-circuit protected								
Output voltage	18 V DC ... 30 V DC								
Output current	Max. 100 mA								
Load capacity	Max. 100 nF								
Configuration interface	RS-485		ISO-DIS 11898				RJ45		
Fieldbus	PROFIBUS-DP		DeviceNet		CANopen®		Ethernet (TCP/IP), Ether-Net/IP	Ethernet (TCP/IP), Modbus TCP	PROFI-NET IO
Communication behavior	V0		Group 2 Only Server				–		
Connection type	SUB-D 9-pole, female		Plug-in terminal 5-pole				Socket		
Slave address	0 ... 99		0 ... 63		0 ... 99, adjustable by means of rotary switch		–		
Transmission rate	12 MBaud		125 kbit/s, 250 kbit/s, 500 kbit/s, automatic setting		125 kbit/s, 250 kbit/s, 500 kbit/s, 800 kbit/s, 1000 kbit/s, adjustable by means of a DIP switch		–		
Cable length (transmission rate)	1200 m (9.6 kbit/s, 19.2 kbit/s, 93.75 kbit/s), 1000 m (187.5 kbit/s), 400 m (500 kbit/s), 200 m (1500 kbit/s), 100 m (12000 kbit/s)		–				Maximum 100 m per segment		
Delivery status	–						Subnet mask: 255.255.0.0, Default Gateway: 0.0.0.0, IP: 192.168.250.250		

Internal circuitry

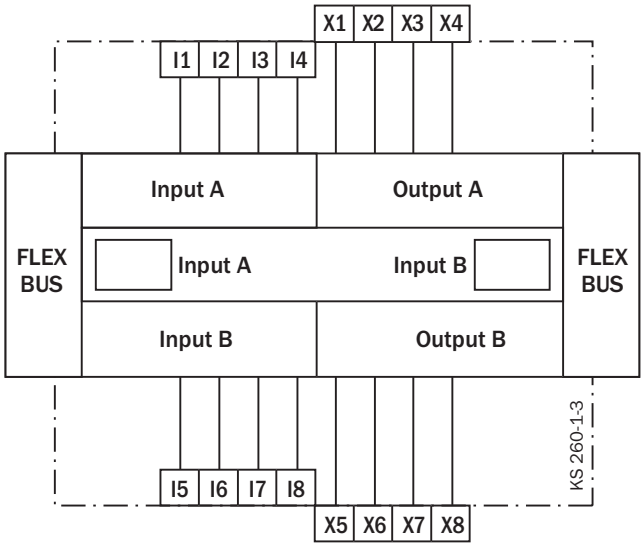
Main unit



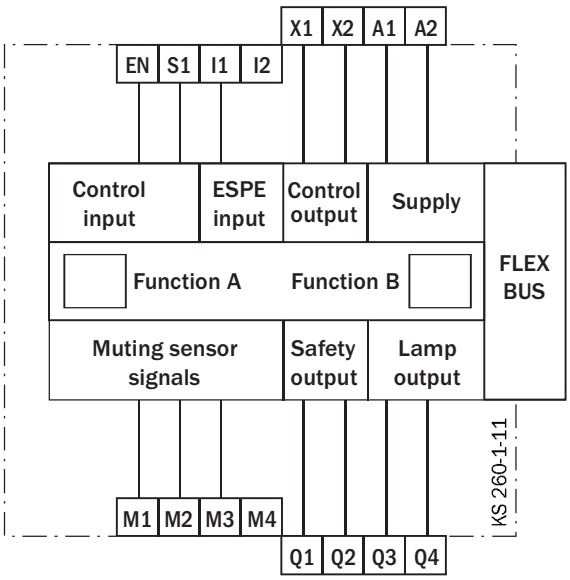
Extension unit



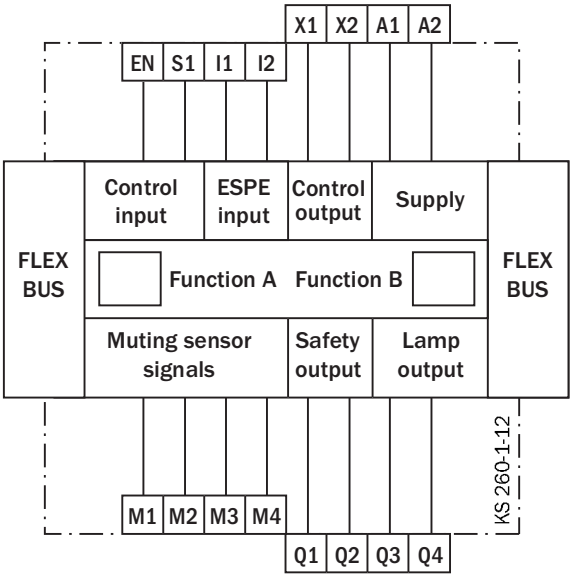
Input expansion unit



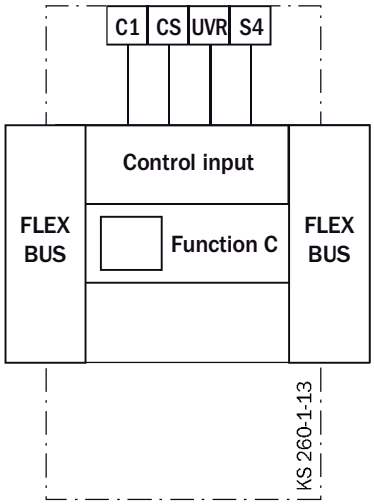
Muting main unit



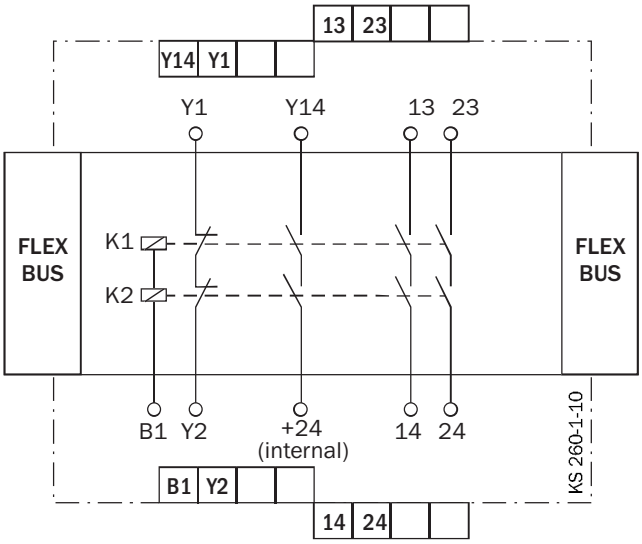
Muting extension unit



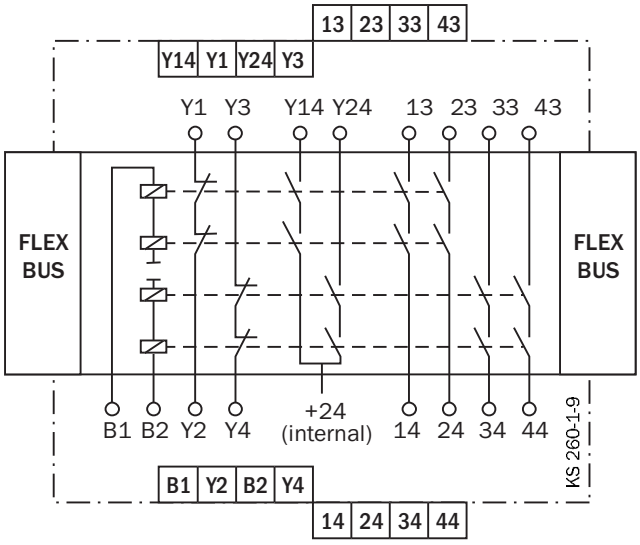
Muting input expansion unit



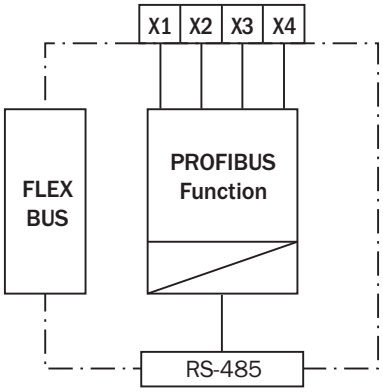
Relay module UE410-2R03, UE410-2R04



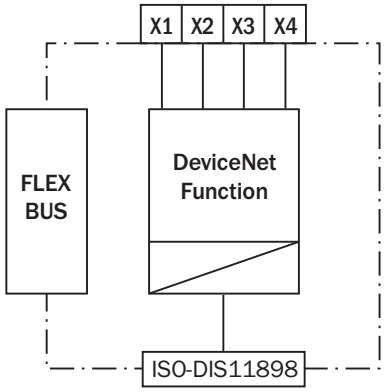
Relay module UE410-4R03, UE410-4R04



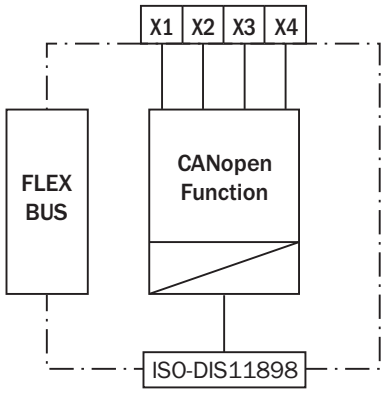
Gateway PROFIBUS-DP



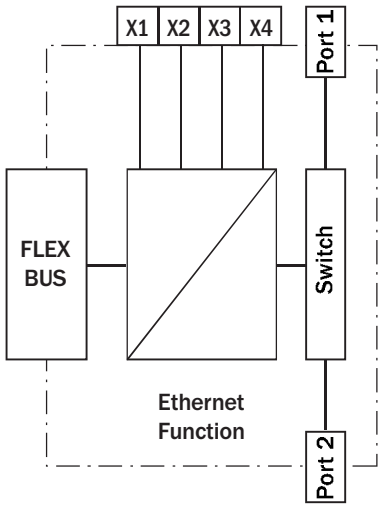
Gateway DeviceNet



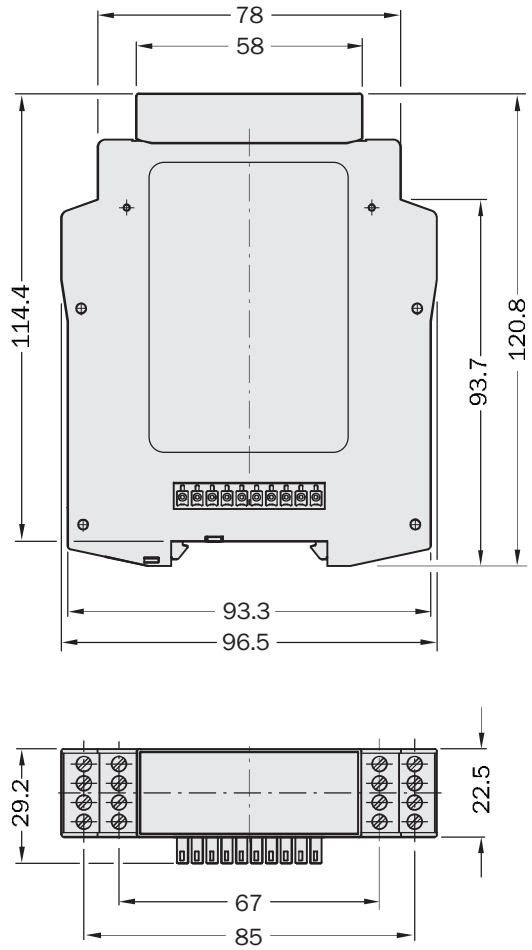
Gateway CANopen®



Gateway Ethernet (TCP/IP), EtherNet/IP, Modbus TCP, PROFINET IO



Dimensional drawings

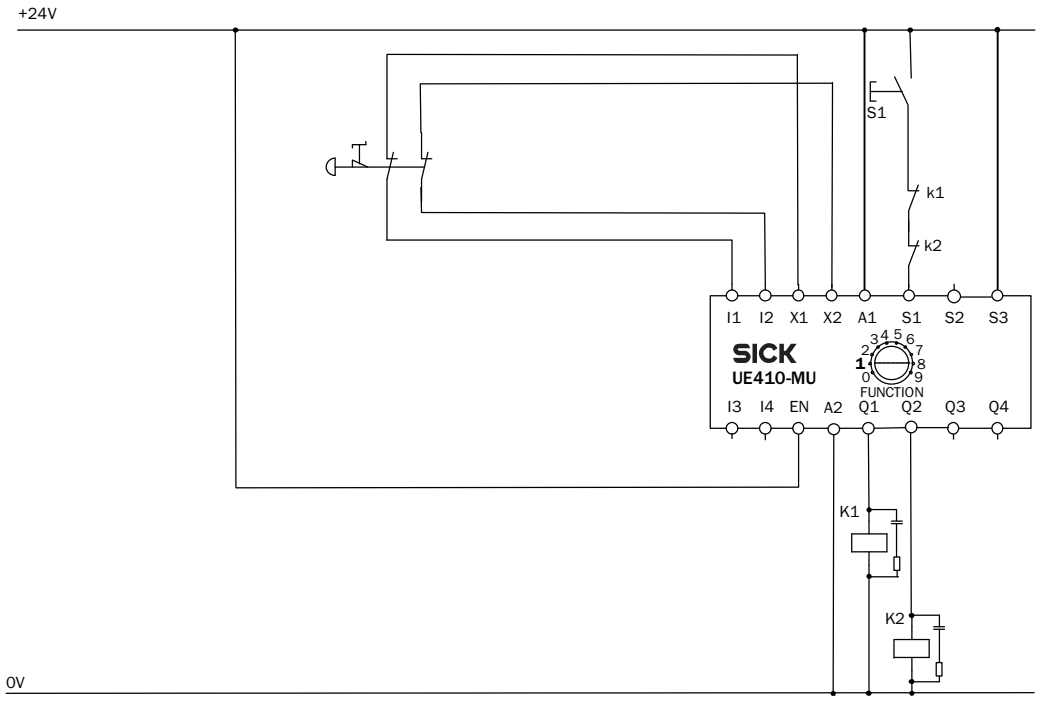


Dimensions in mm

Connection diagrams

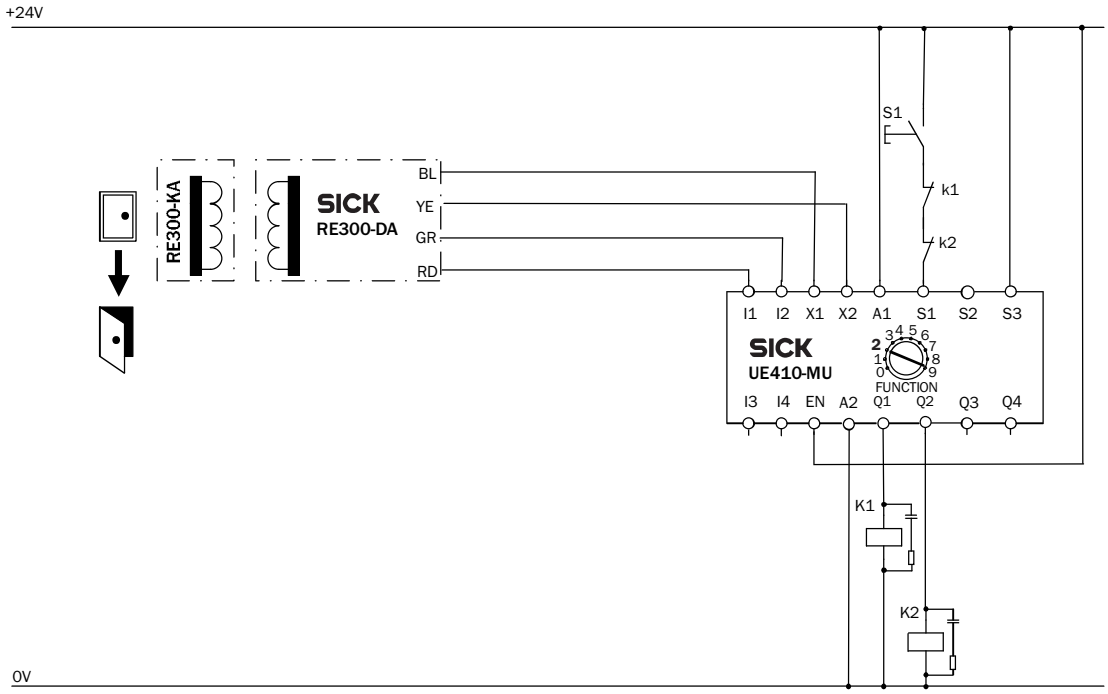
➜ You can find more connection diagrams at www.mysick.com

Emergency stop on Flexi Classic main module



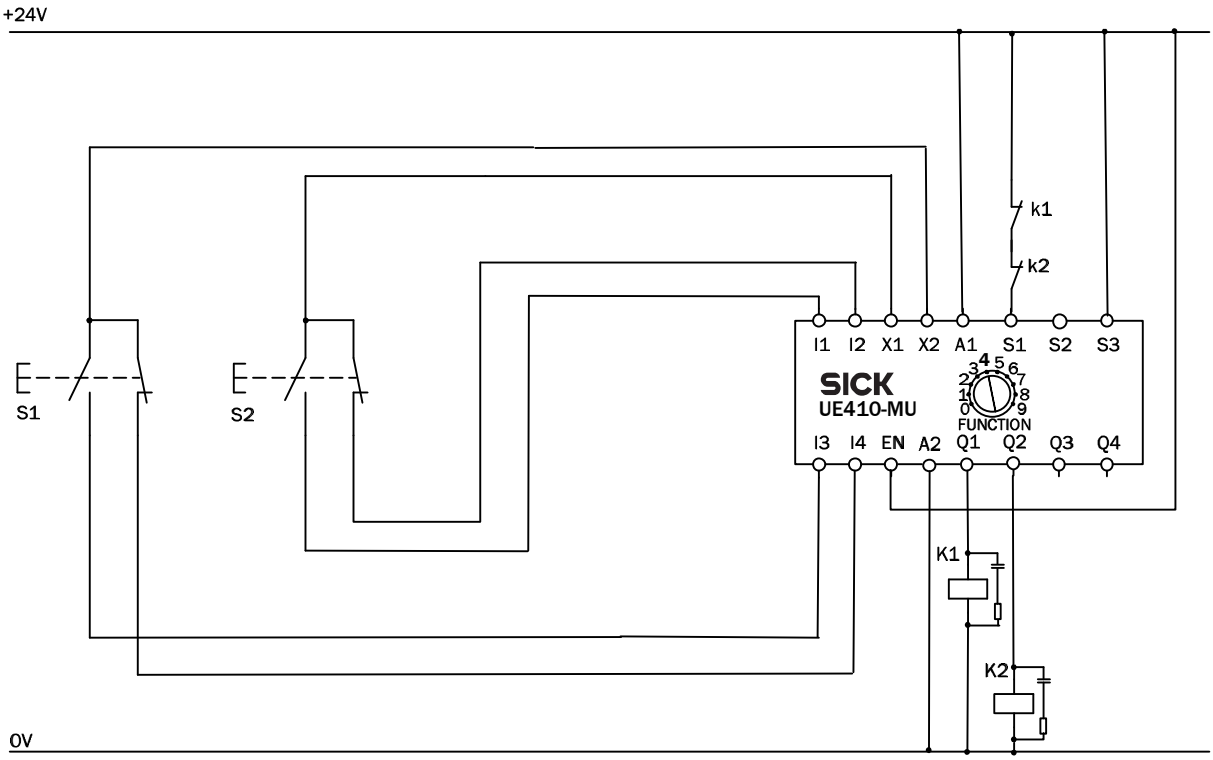
Program 1 with restart interlock and external device monitoring (EDM)

Non-contact safety switch RE300 on Flexi Classic main module



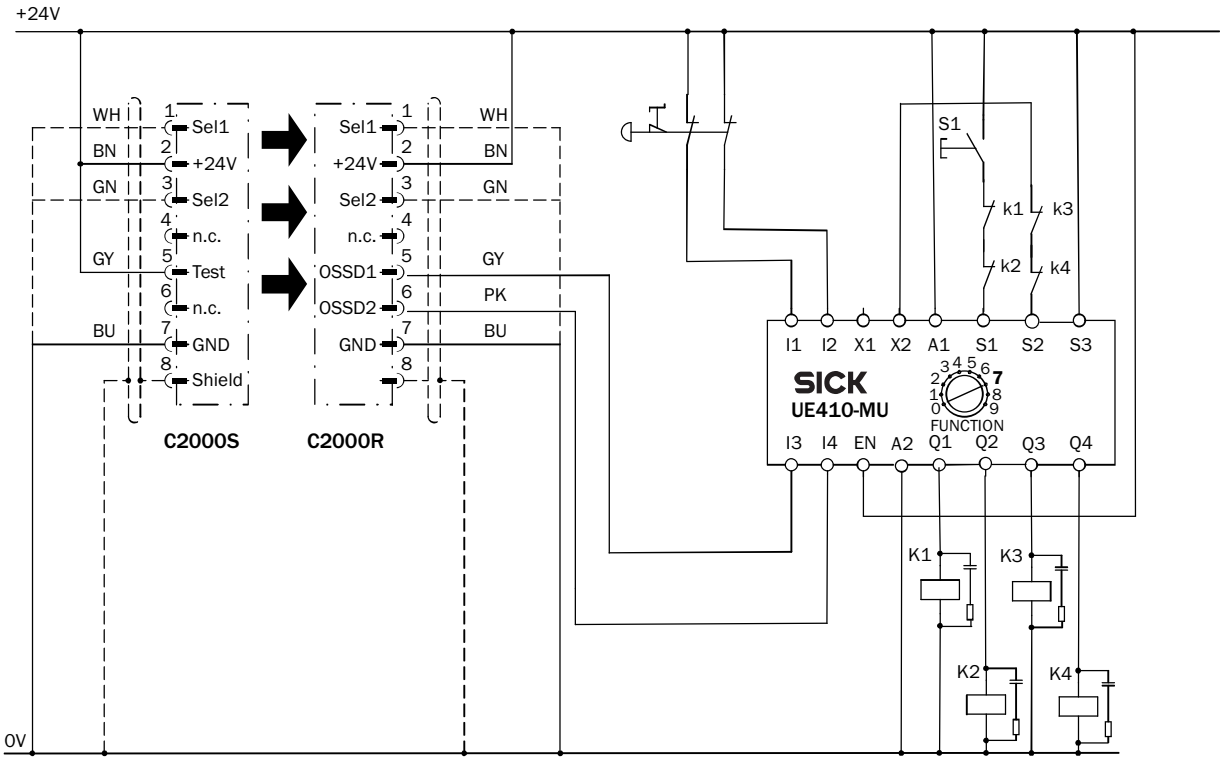
Program 2 with restart interlock and external device monitoring (EDM)

Two-hand control type III C on Flexi Classic main module



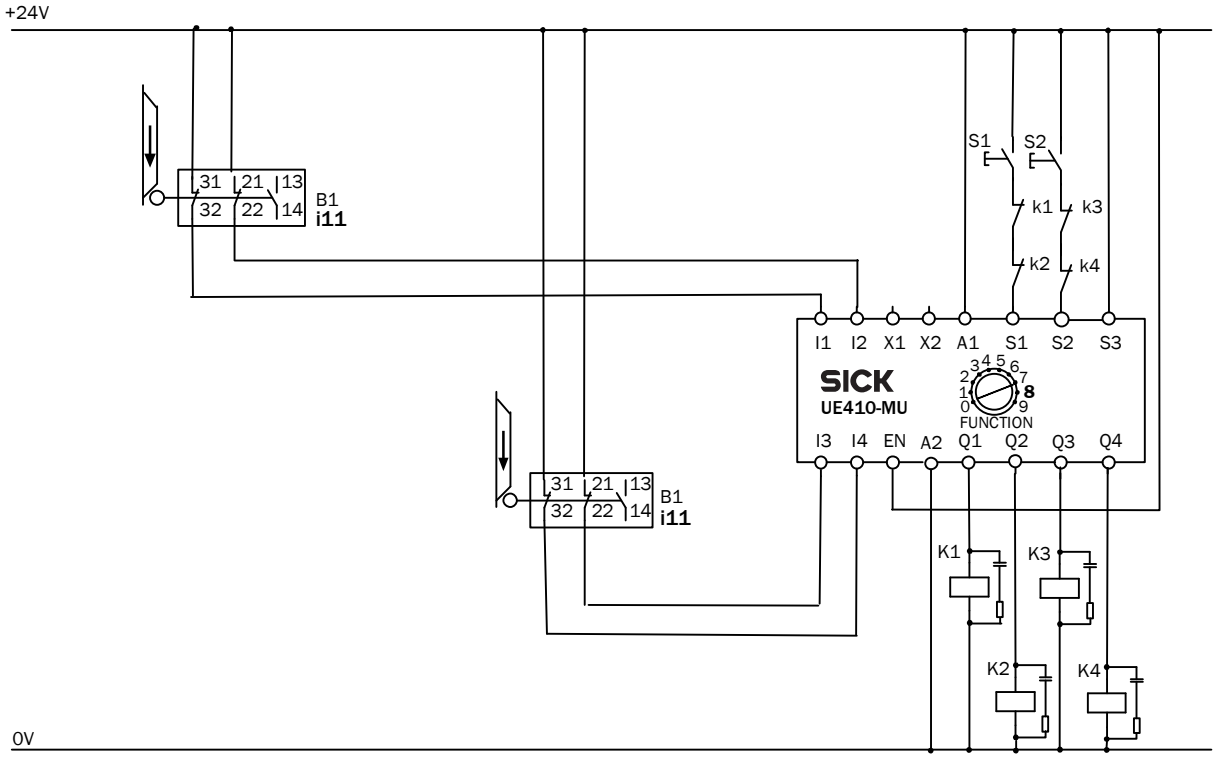
Program 4 without restart interlock and with external device monitoring (EDM)

C2000 safety light curtain and emergency stop on Flexi Classic main module



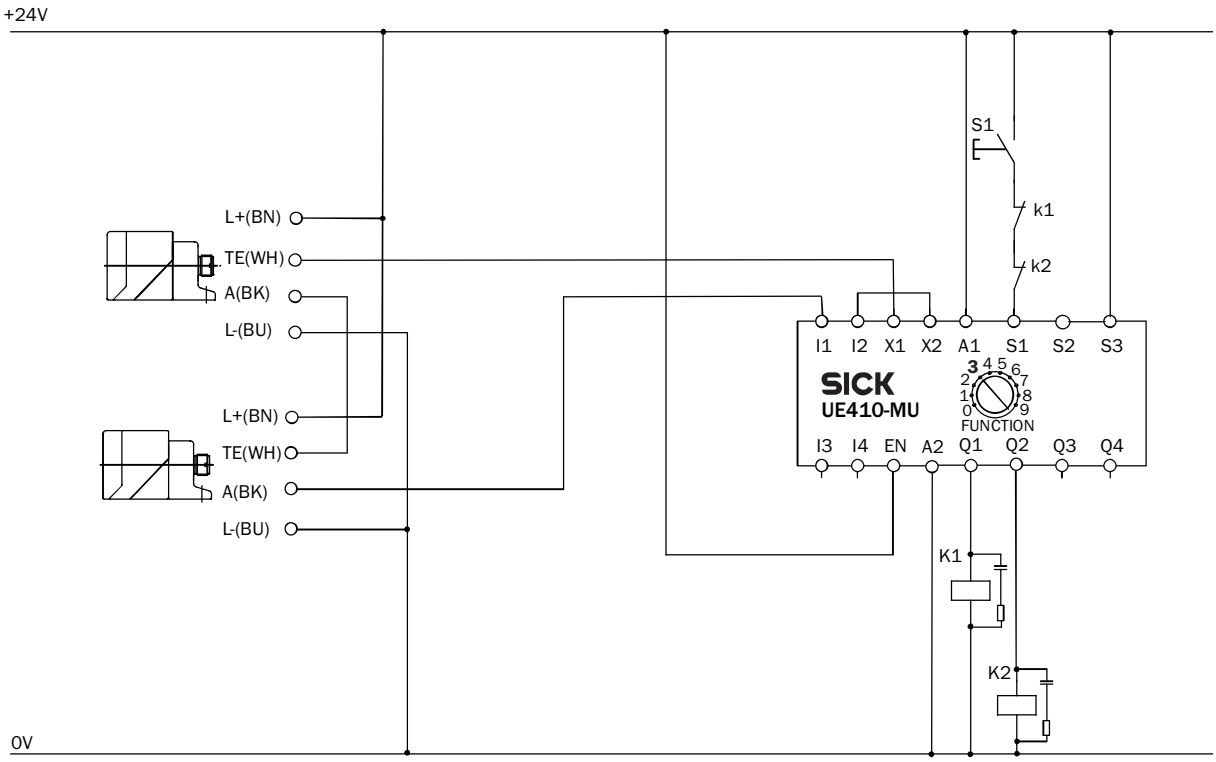
Program 7 with restart interlock and external device monitoring (EDM)

2 safety switches with separate actuator i11, 2 separate hazardous areas on Flexi Classic main module



Program 8 with restart interlock and external device monitoring (EDM)

2 IN4000 non-contact safety switches on Flexi Classic main module



Program 3.2 with restart interlock and external device monitoring (EDM)

Accessories

Power supply units

Figure	Input voltage	Output voltage	Maximum output current	Part no.
	100 V AC ... 240 V AC	24 V DC	2.1 A	7028789
			3.9 A	7028790

Muting indicator lamp

Figure	Type of muting indicator	Description	Cable length	Part no.
	LED lamp	Incl. mounting kit, and connection cable	2 m	2019909
			10 m	2019910
	Indicator lamp (bulb)	Incl. mounting kit, connection cable not included	–	2020743

Master simulator

Figure	Connection type	Fieldbus	Communication behavior	Transmission rate	Type	Part no.
	Terminals, PROFIBUS, SUB-D	PROFIBUS	V0	19.2 kBaud	PR-MSV0	6022458
					PR-MSV1	6022459

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Technical data overview

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 EFI interfaces	2
Configuration interface	RS-232
Number of outputs	0 ... 48, depending on module combination
Fieldbus (depending on type)	EtherNet/IP, Modbus TCP, PROFIBUS-DP, PROFINET IO
Logical functions	AND, OR, NOT, XNOR, XOR
Safety functions	Emergency stop function, machine control (e.g., PSDI), differentiation between man and material (muting), control functions 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. All input signals are monitored and processed via the safety logic stored in the memory plug. These signals are then used to switch system outputs through the FLEX BUS+ interface, which connects all units to one another.
Additionally, the FX3-CPU1 main unit has an RS-232 interface that enables the Flexi Soft Designer to upload and change system settings.
The RS-232 port can also be used for permanent diagnosis (i.e., PLC or HMI).
Additionally, the FX3-CPU1 main module has 2 EFI connections on it.
The FX3-XTIO input/output extension module has 8 safety inputs and 4 safety outputs.
The FX3-XTDI input expansion module has 8 safety inputs.
Through integrated Flexi Link technology, up to 4 Flexi Soft stations can be linked to one another without any gateways or additional wiring.

In-system added value

Usage of enhanced sensor functions through the Enhanced Function Interface (EFI)

EFI is a two-wire communication between safety sensor and controller.

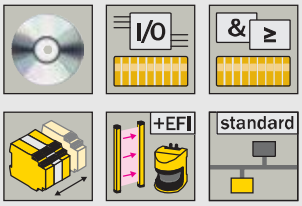
- All EFI sensors connected to the Flexi Soft can be accessed and programmed via the Flexi Soft's RS-232 connection.
- High-quality diagnostics provide fast and accurate results when availability is a priority.

The following enhanced functions are available in combination with the 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	Fieldbus
Main unit	4 EFI inputs (FX3-CPU1)	–	255	2 (FX3-CPU1)	–
Extension unit	8	4	–	–	–
Input expansion unit	8	–	–	–	–
Relay module [1]	–	2 (UE410-2RO) 4 (UE410-4RO)	–	–	–
Gateway	–	–	–	–	✔ [2]

[1] UE10-2FG/UE12-2FG safety relays may be used as an alternative (cf. N-57).
[2] PROFIBUS-DP, Modbus TCP, EtherNet/IP, PROFINET IO



System plug not included

- System save-in-memory plug for a fast installation
- Modularly expandable (12 to 144 in/outputs)
- Intuitive software: Flexi Soft Designer
- Usage of the enhanced sensor function via EFI interface
- Safe linking of up to 4 Flexi Soft safety controllers

Further information	Page
→ Ordering information	0-26
→ Technical specifications	0-27
→ Internal circuitry	0-33
→ Dimensional drawings	0-35
→ Accessories	0-37
→ Systematic safety	A-0
→ Services	B-0

0

Ordering information

Main unit

Number of EFI interfaces	Type	Part no.
–	FX3-CPU000000 [1]	1043783
2	FX3-CPU130002 [1]	1043784

[1] The system plug has to be ordered separately! (cf. 0-37)

Extension unit

Number of inputs	Number of outputs	Connection type	Type	Part no.
8 single-channel	4 single-channel	Dual-level spring clamp terminals	FX3-XTIO84002	1044125

Input expansion unit

Number of inputs	Connection type	Type	Part no.
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 no.
2	1	Plug-in terminals	UE410-2RO3 [1]	6026144
		Dual-level spring clamp terminals	UE410-2RO4 [1]	6032677
4	2	Plug-in terminals	UE410-4RO3 [1]	6026143
		Dual-level spring clamp terminals	UE410-4RO4 [1]	6032676

[1] UE10-2FG/UE12-2FG safety relays may be used as an alternative (cf. (N-57)).

Gateway

Connection type	Fieldbus	Type	Part no.
Dual-level spring clamp terminals	PROFIBUS-DP	FX0-GPRO00000	1044075
–	Modbus TCP	FX0-GMOD00000	1044073
	EtherNet/IP	FX0-GENT00000	1044072
	PROFINET IO	FX0-GPNT00000	1044074

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Technical specifications

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

Main unit

General data

Type	FX3-CPU000000	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 (mean probability of a dangerous failure per hour)	1.07×10^{-9} (EN ISO 13849)	1.69×10^{-9} (EN ISO 13849)
T_M (Mission Time)	20 years (EN ISO 13849)	
Ambient operating temperature	–25 °C ... +55 °C	
Storage temperature	–25 °C ... +70 °C	
Air humidity from ... to	10 % ... 95 %, non-condensing	
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)	Class A (EN 61000-6-2, EN 55011, EN 61131-2 (zone B))	
Protection class	III	
System connection	Plug	
Connection type EFI connection	–	Cable gland, dual-level spring clamp terminals
Connection conductor cross-section	Single-wire or fine-wire conductor: 1 x 0.14 mm² ... 2.5 mm² or 2 x 0.14 mm² ... 0.75 mm² / fine-wire with terminal crimp according to EN 46288: 1 x 0.25 mm² ... 2.5 mm² or 2 x 0.25 mm² ... 0.5 mm²	
Dimensions (W x H x D)	22.5 mm x 96.5 mm x 120.8 mm	
Weight	111 g	119 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 that powers the main module must be limited to a maximum of 4 A, either through the power supply itself or a fuse.)	
Power consumption	2.5 W	
Short-circuit protection	4 A gG (with tripping characteristics B or C)	
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 functions and operating mode selection	
Application-specific logical functions	Emergency stop, two-hand control, muting, presses, operating mode switch	
Safe device communication via EFI/SDL	–	✔
Safe networking	–	✔
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 (mean probability of a dangerous failure per hour)	9.0 x 10^{-10} 1), 4.8 x 10^{-9} 2) (EN ISO 13849)
T_M (Mission Time)	20 years (EN ISO 13849)
Ambient operating temperature	–25 °C ... +55 °C
Storage temperature	–25 °C ... +70 °C
Air humidity from ... to	10 % ... 95 %, non-condensing
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)	Class A (EN 61000-6-2, EN 55011, EN 61131-2 (zone B))
Protection class	III
System connection	Cable gland
Connection type	Dual-level spring clamp terminals
Connection conductor cross-section	Single-wire or fine-wire conductor: 1 x 0.14 mm² ... 2.5 mm² or 2 x 0.14 mm² ... 0.75 mm² / fine-wire with terminal crimp according to EN 46288: 1 x 0.25 mm² ... 2.5 mm² or 2 x 0.25 mm² ... 0.5 mm²
Dimensions (W x H x D)	22.5 mm x 96.5 mm x 120.8 mm
Weight	164 g

1) Dual-channel outputs

2) Single-channel outputs

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 that powers the main unit must be limited to a maximum of 4 A, either through the power supply itself or a fuse.)
Power consumption	3 W [1]
Short-circuit protection	4 A gG (with tripping characteristics B or C)
Input circuit (I1 - I8)	
Number of inputs	8 single-channel
Input voltage HIGH	13 V DC ... 30 V DC
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
Switch-on time	Min. 18 s
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	Max. 120 mA [2]
Test pulse width	1 ms ... 100 ms, configurable
Test pulse rate	1 Hz ... 25 Hz, configurable
Load capacity (test pulse width)	1 µF (4 ms) 0.5 µF (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	16 V DC ... 30 V DC
Output current	Max. 2 A
Maximum total current	3.2 A (55 °C) 4 A (45 °C)
Test pulse width	Max. 650 µs
Test pulse rate	0.8 Hz
Load capacity	0.5 µF
Cable length	100 m (1.5 mm²)
Fast shut-off time	8 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). A maximum of 8 testable sensor cascades per module (with max. 30 mA each) are possible. The total current of the Flexi Soft system is limited to a maximum of 1.28 A. This means that, for example, the test pulse outputs are able to supply 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 functions and operating mode selection
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 (mean probability of a dangerous failure per hour)	4.0 x 10^{-10} (EN ISO 13849)
T_M (Mission Time)	20 years (EN ISO 13849)
Ambient operating temperature	–25 °C ... +55 °C
Storage temperature	–25 °C ... +70 °C
Air humidity from ... to	10 % ... 95 %, non-condensing
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)	Class A (EN 61000-6-2, EN 55011, EN 61131-2 (zone B))
Protection class	III
System connection	Cable gland
Connection type	Dual-level spring clamp terminals
Connection conductor cross-section	Single-wire or fine-wire conductor: 1 x 0.14 mm² ... 2.5 mm² or 2 x 0.14 mm² ... 0.75 mm² / fine-wire with terminal crimp according to EN 46288: 1 x 0.25 mm² ... 2.5 mm² or 2 x 0.25 mm² ... 0.5 mm²
Dimensions (W x H x D)	22.5 mm x 96.5 mm x 120.8 mm
Weight	139 g

Electrical data

Power consumption	5 W
Input circuit (I1 - I8)	
Number of inputs	8 single-channel
Input voltage HIGH	13 V DC ... 30 V DC
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	Max. 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). A maximum of 8 testable sensor cascades per module (with max. 30 mA each) are possible. The total current of the Flexi Soft system is limited to a maximum of 1.28 A. This means that, for example, the test pulse outputs are able to supply 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 functions and operating mode selection

Relay module

General data

Type	**UE410-2RO3**	**UE410-2RO4**	**UE410-4RO3**	**UE410-4RO4**
Safety related parameters				
Safety integrity level	SIL3 (IEC 61508), SILCL3 (IEC 62061) [1]			
Category	Category 4 (EN ISO 13849) [1]			
Performance level	PL e (EN ISO 13849) [1]			
PFHd (mean probability of a dangerous failure per hour)	1.2×10^{-9} [2] (EN ISO 13849)			
T_M (Mission Time)	Depending on load condition and number of switching cycles			
Galvanized 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-condensing			
Climate conditions according to	EN 61131-2			
Vibration resistance	5 Hz ... 500 Hz			
Vibration resistance (checked to)	EN 60068-2-6, 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	Plug-in terminals	Dual-level spring clamp terminals	Plug-in terminals	Dual-level spring clamp terminals
Connection conductor cross-section	Single-wire or fine-wire conductor: 1 x 0.14 mm² ... 2.5 mm² or 2 x 0.14 mm² ... 0.75 mm² / fine-wire with terminal crimp according to EN 46288: 1 x 0.25 mm² ... 2.5 mm² or 2 x 0.25 mm² ... 0.5 mm²			
Dimensions (W x H x D)	22 mm x 96.5 mm x 120.8 mm			
Weight	160 g		190 g	

[1] If the feedback current path Y1 - Y2 (external device monitoring) is monitored by the Flexi system

[2] At 4 x 0.75 A (AC 15); for other conditions, see operating instructions

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Electrical data

Type	UE410-2RO3	UE410-2RO4	UE410-4RO3	UE410-4RO4
Supply voltage	24 V DC (19.2 V DC ... 30 V DC)			
Type of supply voltage	PELV (electrical output circuit on UE410-4RO/UE410-2RO > 25 V AC/60 V DC) PELV or SELV (electrical output circuit on UE410-4RO/UE410-2RO < 25 V AC/60 V DC)			
Power consumption	1.6 W		3.2 W	
Short-circuit protection	6 A 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 guided			
Switching voltage	230 V DC (5 V DC ... 275 V DC) 250 V AC (5 V AC ... 275 V AC)			
Output current	Max. 6 A			
Total current	8 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			

Gateway

General data

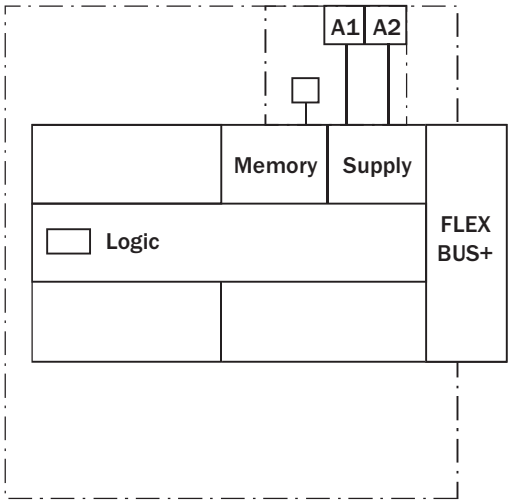
Type	FX0-GPRO00000	FX0-GMOD00000	FX0-GENT00000	FX0-GPNT00000
Ambient operating temperature	–25 °C ... +55 °C			
Storage temperature	–25 °C ... +70 °C			
Air humidity from ... to	10 % ... 95 %, non-condensing			
Climate conditions according to	EN 61131-2 (55 °C operating temperature, 95 % rel. humidity)			
Vibration resistance	5 Hz ... 150 Hz			
Vibration resistance (checked to)	EN 61131-2			
Enclosure rating	EN/IEC 60529			
Clamps	IP 40			
Housing	IP 20			
Electromagnetic compatibility (EMC)	Class A (EN 61000-6-2, EN 55011, EN 61131-2 (zone B))			
Protection class	III			
System connection	Cable gland			
Connection type	Dual-level spring clamp terminals	–		
Connection conductor cross-section	Single-wire or fine-wire conductor: 1 x 0.14 mm² ... 2.5 mm² or 2 x 0.14 mm² ... 0.75 mm² / fine-wire with terminal crimp according to EN 46288: 1 x 0.25 mm² ... 2.5 mm² or 2 x 0.25 mm² ... 0.5 mm²			
Dimensions (W x H x D)	22.5 mm x 96.5 mm x 126.5 mm	22.5 mm x 96.5 mm x 120.8 mm		
Weight	186 g			

Electrical data

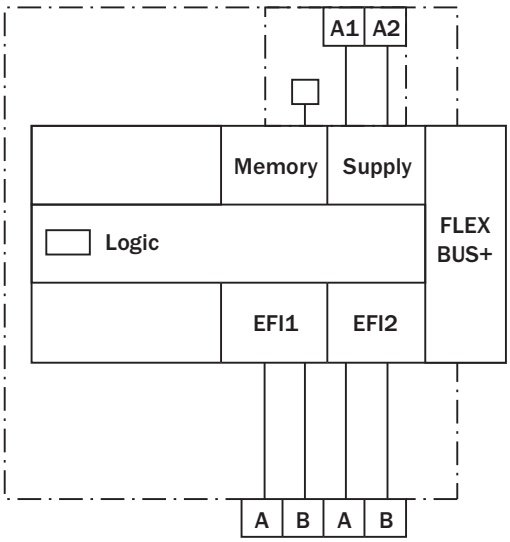
Type	FX0-GPRO000000	FX0-GMOD00000	FX0-GENT00000	FX0-GPNT00000
Supply voltage	24 V DC (19.2 V DC ... 30 V DC)			
Power consumption	2.4 W			
Configuration interface	Internal bus (FLEX BUS+)			
Fieldbus	PROFIBUS-DP	Modbus TCP	EtherNet/IP	PROFINET IO
Communication behavior	Slave	Master/slave operation	Target, Explicit Messaging Only	IO Device, Conformance Class A
Connection type	SUB-D 9-pole, female	RJ45		
Slave address	1 ... 99	–		0 ... 126
Transmission rate	12 MBaud	–		
Delivery status	–	Subnet mask: 255.255.0.0, Default Gateway: 0.0.0.0, IP: 192.168.250.250		

Internal circuitry

Main unit FX3-CPU000000



Main unit FX3-CPU130002



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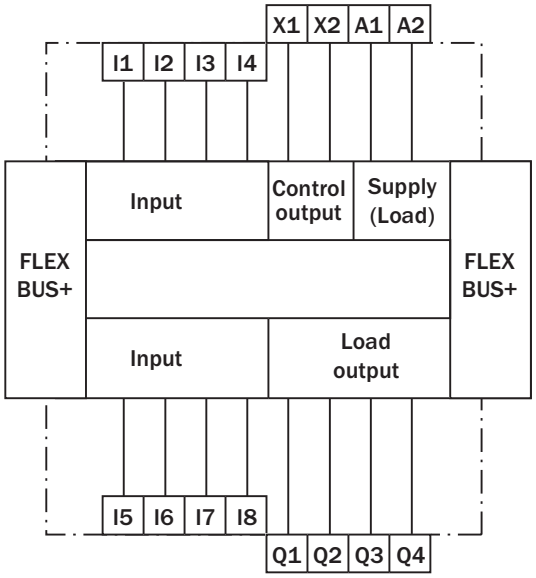
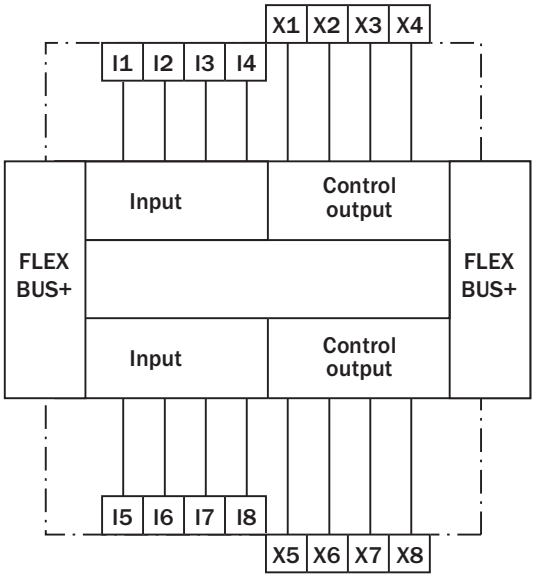
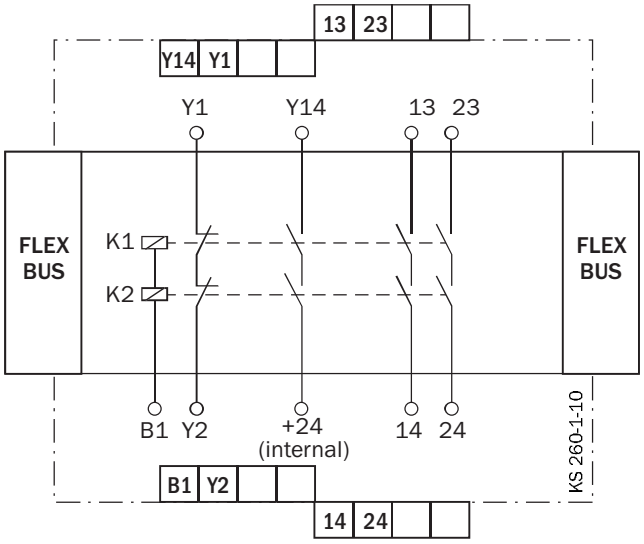
Extension unit FX3-XTIO84002



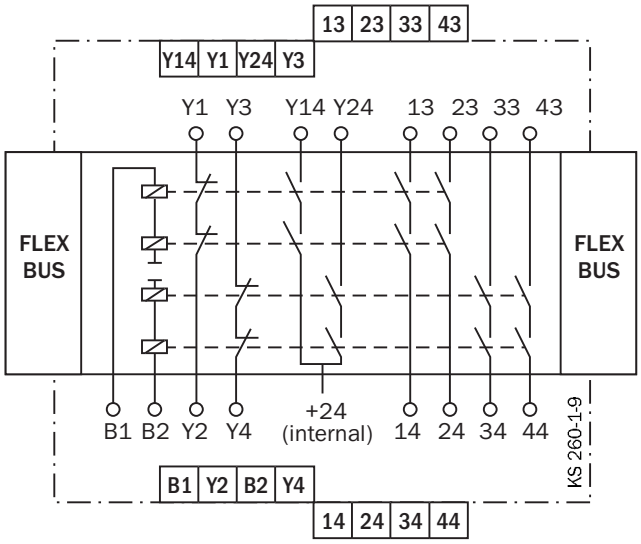
Input expansion unit FX3-XTDI80002



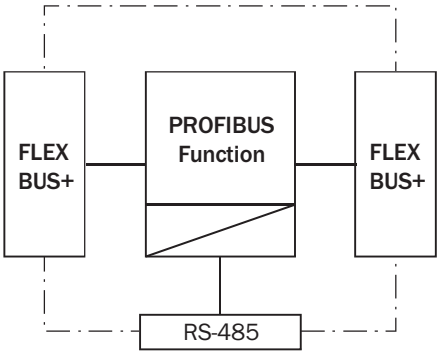
Relay module UE410-2RO3, UE410-2RO4



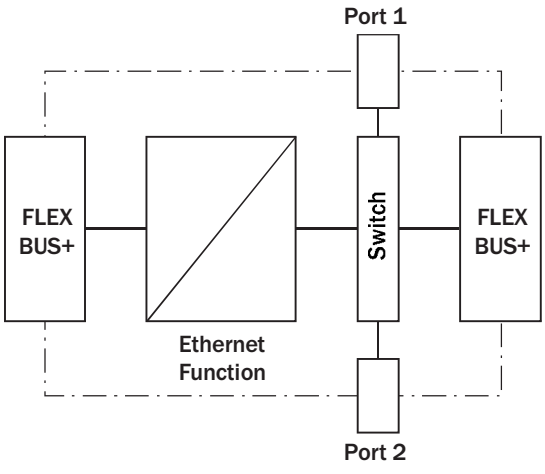
Relay module UE410-4RO3, UE410-4RO4



Gateway PROFIBUS-DP

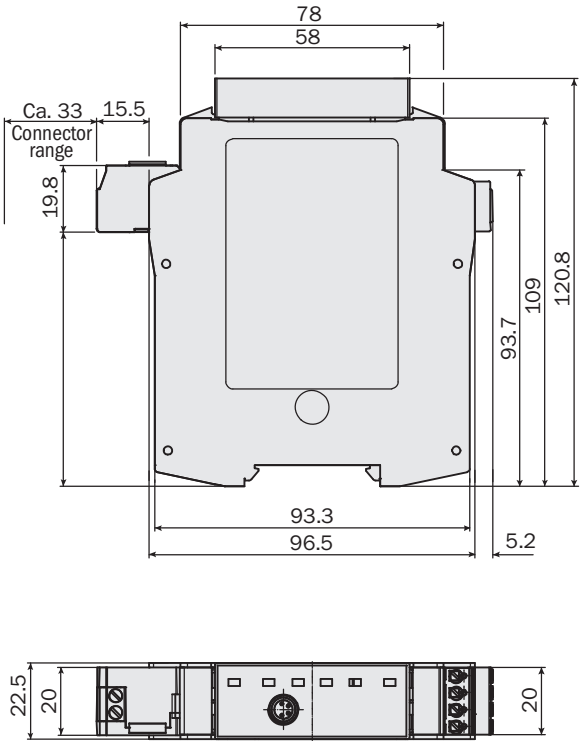


Gateway Modbus TCP, EtherNet/IP, PROFINET IO

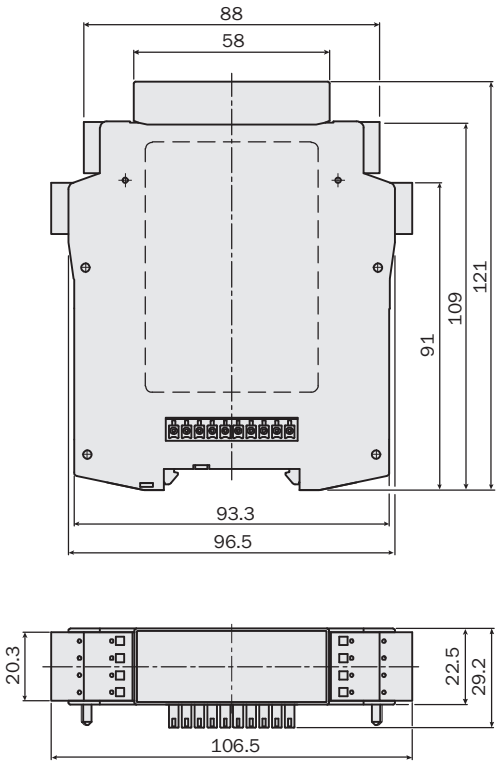


Dimensional drawings

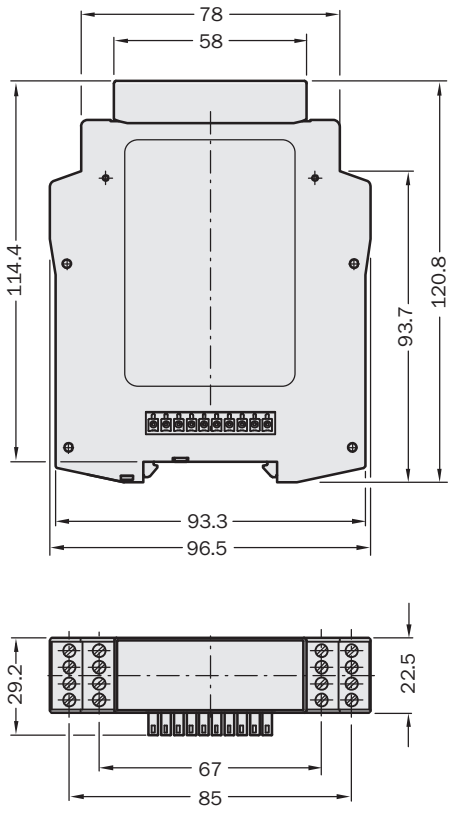
Main unit FX3-CPU000000, FX3-CPU130002



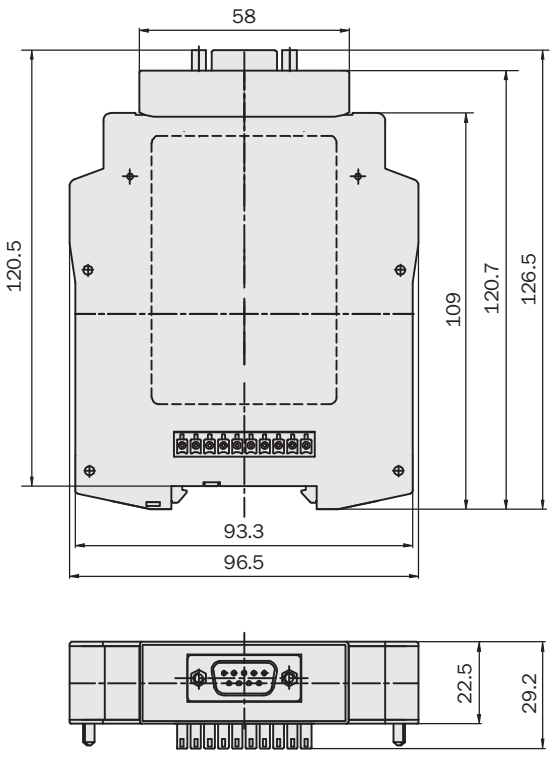
Extension unit FX3-XTIO84002
Input expansion unit FX3-XTDI80002



Relay module UE410-2RO3, UE410-2RO4, UE410-4RO3, UE410-4RO4

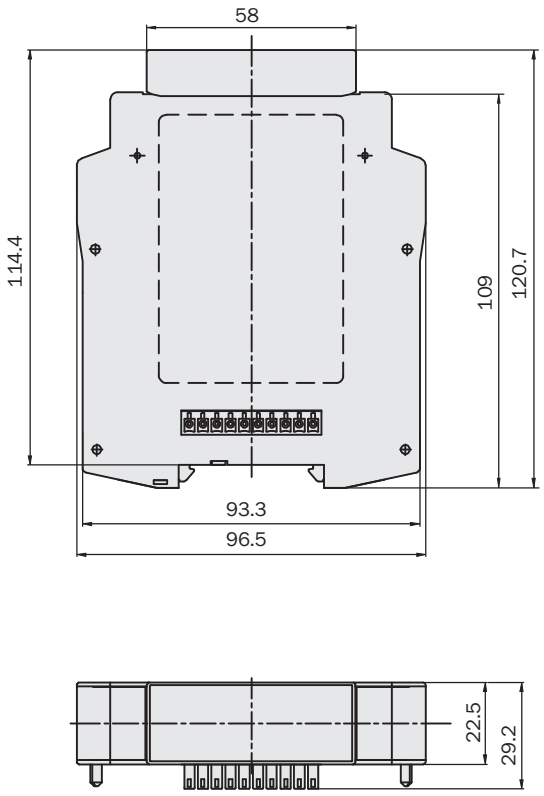


Gateway FX0-GPRO00000



Dimensions in mm

Gateway FX0-GMOD00000, FX0-GENT00000, FX0-GPNT00000



Dimensions in mm

Accessories

System plug

Integrated configuration memory	Type	Part no.
✔	FX3-MPL000001	1043700

Connecting cables

Connection type	Cable length	Type	Part no.
Stripped	By the meter	EFI connection cable	6029448

Configuration connection cables

Figure	Connection type	Cable length	Description	Type	Part no.
	–	2 m	For connecting the configuration connection to the PC	DSL-8D04G02M025KM1	6021195
	Stripped	3 m	For connecting the configuration connection of a PLC	Connection cable	6036342
	–	35 cm	–	Converter RS-232 to USB	6035396

Power supply units

Figure	Input voltage	Output voltage	Maximum output current	Part no.
	100 V AC ... 240 V AC	24 V DC	3.9 A	7028790
			2.1 A	7028789

Configuration software

Description	Type	Part no.
Flexi Soft Designer	Flexi Soft Designer	2045931

Muting indicator lamp

Figure	Type of muting indicator	Description	Cable length	Part no.
	LED lamp	Incl. mounting kit, and connection cable	10 m	2019910
			2 m	2019909

Terminal connectors

Figure	Packing unit	Type	Part no.
	4	Screw terminal connector	2045891
		Terminal plug spring	2045890