



TR4 Direct Transponder Safety Switches

Non-contact safety switches with high level of prevention against tampering

Non-contact safety switches with high level of prevention against tampering



CE **cUL** **us**

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Product description

The TR4 Direct transponder safety switch is used in applications where a high level of prevention against tampering is essential. It works with an integrated evaluation unit for sensor signals and can be connected directly to a safety controller. The safety switch is only released if a valid actuator is located within the TR4 Direct's response range. With the multicoded version, any valid multicoded

actuator may be located within the response range. In contrast, the unique coded version will only identify the taught-in individually coded actuator with the matching code that is located within the response range. The TR4 Direct enables up to 30 safety switches, all with LED status indicators, to be connected. This makes electrical installation and servicing simple and convenient.

At a glance

- Response range of up to 25 mm
- Sensor and actuator up to enclosure rating IP 69K
- Multicoded and unique coded sensors
- Up to performance level PL e (EN ISO 13849)
- Two OSSD safety outputs for direct connection of sensors to a single safety controller
- Safe series connection of up to 30 sensors possible
- LED status indicator
- Boundary area indication and magnetic retaining force (both optional)

Your benefits

- High level of prevention against tampering due to individually coded actuator (depending on type)
- High level of machine availability due to high tolerances for door misalignment and boundary area indication
- High level of machine reliability due to resistance to shocks and vibrations
- Cascadability of up to 30 sensors saves costs
- Just one safety switch in conjunction with a suitable safety module makes it possible to solve applications up to PL e and Cat. 4 (EN ISO 13849)
- Long service life due to durable and low-maintenance design
- Fast diagnostics via LED status indicator
- The devices are easy to clean, making them suitable for contaminated areas or environments with strict hygiene standards

→ www.mysick.com/en/TR4_Direct

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

Detailed technical data

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

Design: cylindrical

System part	Sensor & actuator
Housing diameter (sensor/actuator)	M18/M18 / M18/M30 (depending on type)
Coding	Multicoded / unique coded (depending on type)
Safety-related parameters	
Safety integrity level	SIL3 (IEC 61508)
Category	Category 4 (EN ISO 13849)
Performance level	PL e (EN ISO 13849)
Electrical life	10 x 10 ⁶ switching cycles
PFHd (mean probability of a dangerous failure per hour)	1.119 x 10 ⁻⁹ (EN ISO 13849)
T _M (mission time)	20 years (EN ISO 13849)
Classification in compliance with IEC/EN 60947-5-3	PDF-M
Classification according to cULus	Class 2
Housing material	Valox® DR48
Enclosure rating	NEMA 3, NEMA 4X, NEMA 12, NEMA 13, IP 69K
Ambient operating temperature from ... to	-10 °C ... +55 °C
Protection class	III
Shock resistance	30 g, 11 ms (EN 60068-2-27)
Vibration resistance	10 Hz ... 55 Hz, 3.5 mm (IEC 60068-2-6)
Supply voltage V _s	24 V DC (20.4 V DC ... 26.4 V DC)
Output current	≤ 200 mA
Power consumption	50 mA
Connection type	Cable with plug, M12, 8-pin / cable (depending on type)
Cable length	0.2 m / 3 m / 10 m (depending on type)
Connecting cable length	≤ 200 m
Type of output	Semiconductor (OSSD)
Number of safe outputs	2
Response time	60 ms ¹⁾
Enable time	360 ms ²⁾
Risk time	60 s ³⁾
Switch-on time	2.5 s ⁴⁾
Power indication	✓
Error indication	✓
Status display	✓
Safe switch on distance S _{ao}	15 mm / 25 mm (depending on type)
Safe switch off distance S _{ar}	25 mm / 35 mm (depending on type)

¹⁾ In a cascade each downstream safety switch increases the response time of the system. Other response times see operating instructions.

²⁾ Response time on approach to the enable zone.

³⁾ Error detection time for external errors (e.g., short-circuit or cross-circuit of the OSSDs). Observe detailed information in the operating instructions!

⁴⁾ After application of the supply voltage to the safety switch.

Design: rectangular

System part	Sensor & actuator
Dimensions	25 mm x 88 mm x 20 mm
Coding	Multicoded / unique coded (depending on type)
Safety-related parameters	
Safety integrity level	SIL3 (IEC 61508)
Category	Category 4 (EN ISO 13849)
Performance level	PL e (EN ISO 13849)
Electrical life	10 x 10 ⁶ switching cycles
PFHd (mean probability of a dangerous failure per hour)	1.119 x 10 ⁻⁹ (EN ISO 13849)
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Connecting cable length	≤ 200 m
Type of output	Semiconductor (OSSD)
Number of safe outputs	2
Response time	60 ms ¹⁾
Enable time	360 ms ²⁾
Risk time	60 s ³⁾
Switch-on time	2.5 s ⁴⁾
Power indication	✓
Error indication	✓
Status display	✓
Boundary area indication	- / ✓ (depending on type)
Magnetic retaining force	- / ✓ (depending on type)
Safe switch on distance S _{ao}	15 mm
Safe switch off distance S _{ar}	35 mm

¹⁾ In a cascade each downstream safety switch increases the response time of the system. Other response times see operating instructions.

²⁾ Response time on approach to the enable zone.

³⁾ Error detection time for external errors (e.g., short-circuit or cross-circuit of the OSSDs). Observe detailed information in the operating instructions!

⁴⁾ After application of the supply voltage to the safety switch.

Ordering information

- **Design:** cylindrical
- **System part:** sensor & actuator

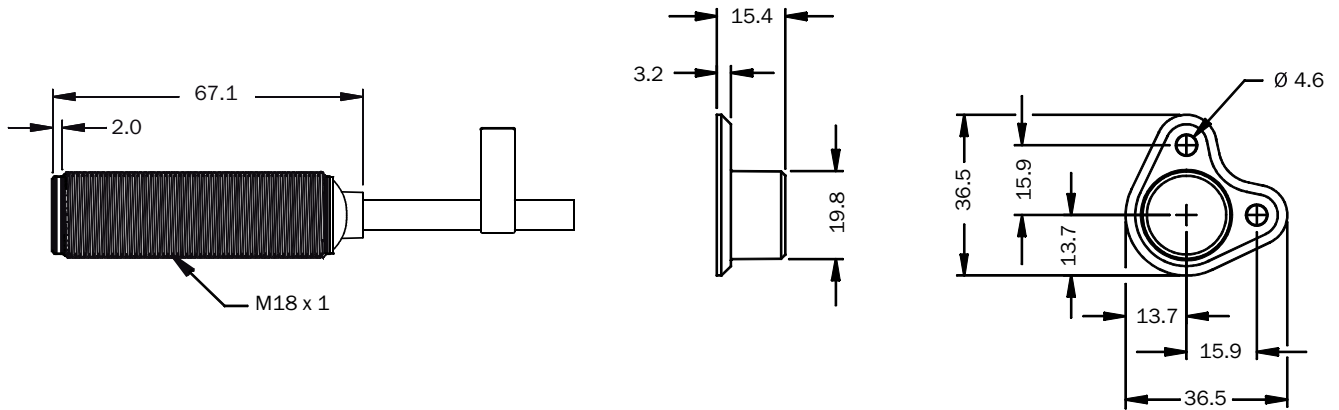
Housing diameter (sensor/ actuator)	Safe switch on distance S_{ao}	Safe switch off distance S_{ar}	Coding	Connection type	Cable length	Model name	Part no.
M18 / M18	15 mm	25 mm	Multicoded	Cable with plug, M12, 8-pin	0.2 m	TR4-SAM01C	6034588
				Cable	3 m	TR4-SAM03P	6034586
					10 m	TR4-SAM10P	6034587
			Unique coded	Cable with plug, M12, 8-pin	0.2 m	TR4-SAU01C	6022319
				Cable	3 m	TR4-SAU03P	6022317
					10 m	TR4-SAU10P	6022318
M18 / M30	25 mm	35 mm	Multicoded	Cable with plug, M12, 8-pin	0.2 m	TR4-SBM01C	6035190
				Cable	3 m	TR4-SBM03P	6025090
					10 m	TR4-SBM10P	6035189
			Unique coded	Cable with plug, M12, 8-pin	0.2 m	TR4-SBU01C	6044628
				Cable	3 m	TR4-SBU03P	6044626
					10 m	TR4-SBU10P	6044627

- **Design:** rectangular
- **System part:** sensor & actuator
- **Dimensions:** 25 mm x 88 mm x 20 mm
- **safe switch on distance S_{ao} :** 15 mm
- **safe switch off distance S_{ar} :** 35 mm

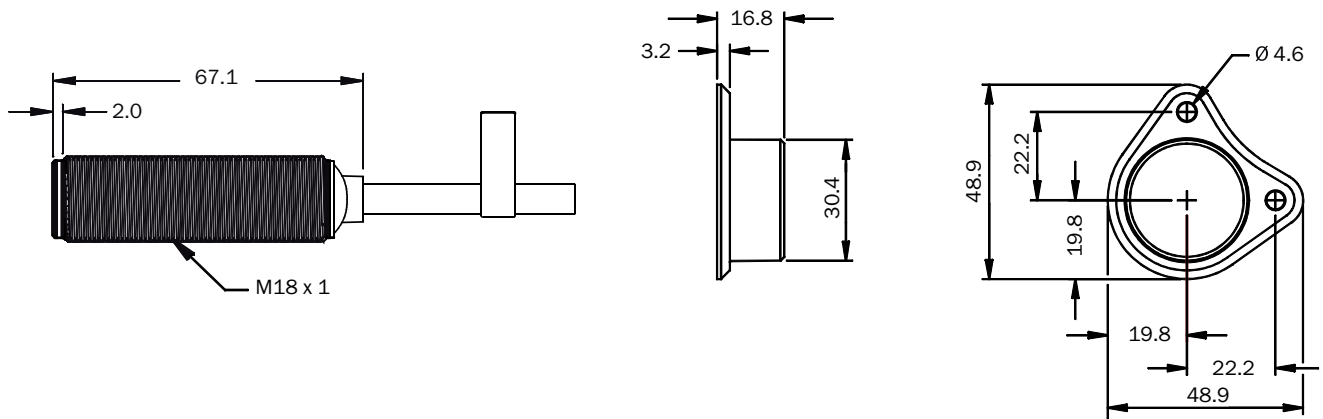
Boundary area indication	Magnetic retaining force	Coding	Connection type	Cable length	Model name	Part no.
-	-	Multicoded	Cable with plug, M12, 8-pin	0.2 m	TR4-SDM01C	6044638
			Cable	3 m	TR4-SDM03P	6044636
				10 m	TR4-SDM10P	6044637
		Unique coded	Cable with plug, M12, 8-pin	0.2 m	TR4-SDU01C	6044641
			Cable	3 m	TR4-SDU03P	6044639
				10 m	TR4-SDU10P	6044640
✓	-	Multicoded	Cable with plug, M12, 8-pin	0.2 m	TR4-SEM01C	6044644
			Cable	3 m	TR4-SEM03P	6044642
				10 m	TR4-SEM10P	6044643
		Unique coded	Cable with plug, M12, 8-pin	0.2 m	TR4-SEU01C	6044647
			Cable	3 m	TR4-SEU03P	6044645
				10 m	TR4-SEU10P	6044646
	✓	Multicoded	Cable with plug, M12, 8-pin	0.2 m	TR4-SFM01C	6044650
			Cable	3 m	TR4-SFM03P	6044648
				10 m	TR4-SFM10P	6044649
		Unique coded	Cable with plug, M12, 8-pin	0.2 m	TR4-SFU01C	6044653
			Cable	3 m	TR4-SFU03P	6044651
				10 m	TR4-SFU10P	6044652

Dimensional drawings

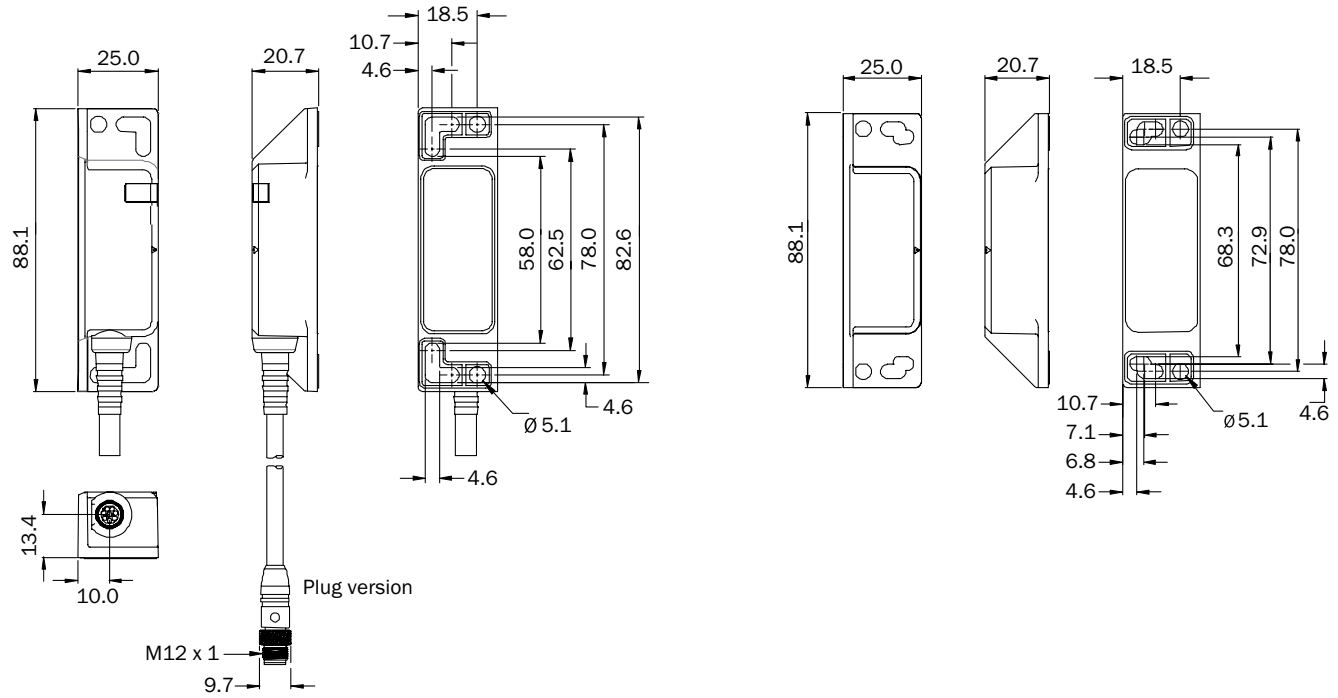
Design: cylindrical
housing diameter (sensor/actuator): M18 / M18



Design: cylindrical
housing diameter (sensor/actuator): M18 / M30

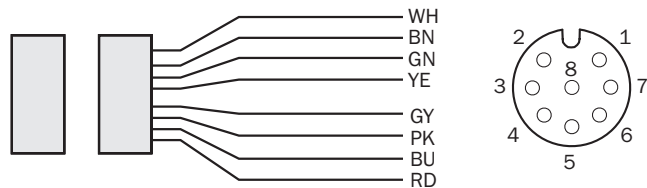


Design: rectangular



All dimensions in mm

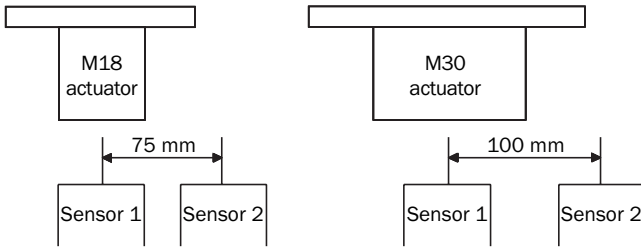
Connection diagram



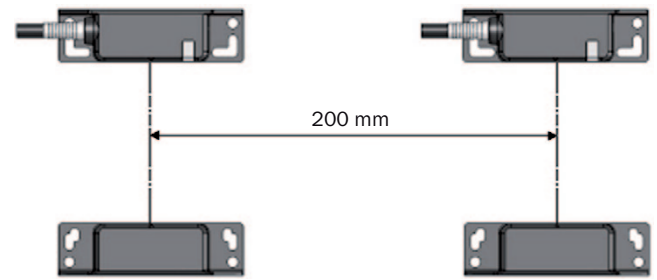
Pin	Wire color	Designation	Description
1	White	Out Aux	Aux output (not safe)
2	Brown	+ 24 V DC	Voltage supply 24 V DC
3	Green	N. c.	Not connected
4	Yellow	In B	Enable input for channel B
5	Gray	Out A	Safety output A
6	Pink	Out B	Safety output B
7	Blue	0 V	Voltage supply 0 V DC
8	Red	In A	Enable input for channel A

Mounting

Minimum distance to neighboring sensors, cylindrical design

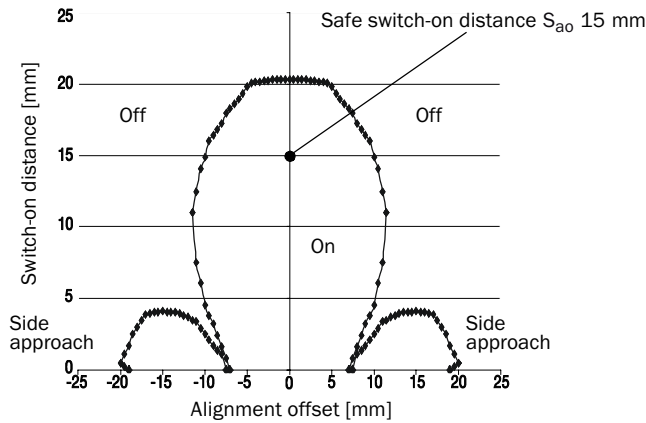


Minimum distance to neighboring sensors, rectangular design



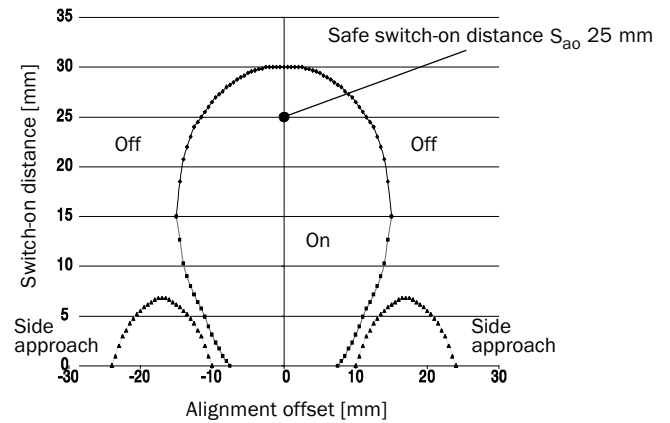
Response range

Design: cylindrical housing diameter (sensor/actuator): M18 / M18



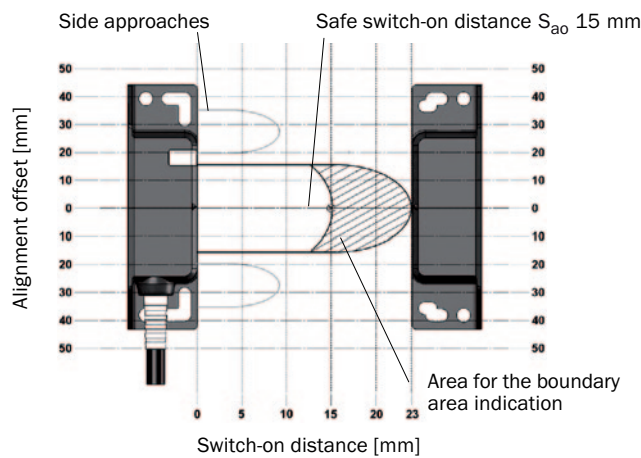
If the actuator moves laterally in relation to the surface of the sensor, a minimum distance of 4 mm must be maintained. This distance will prevent premature triggering due to the side approach areas.

Design: cylindrical housing diameter (sensor/actuator): M18 / M30



If the actuator moves laterally in relation to the surface of the sensor, a minimum distance of 7 mm must be maintained. This distance will prevent premature triggering due to the side approach areas.

Design: rectangular

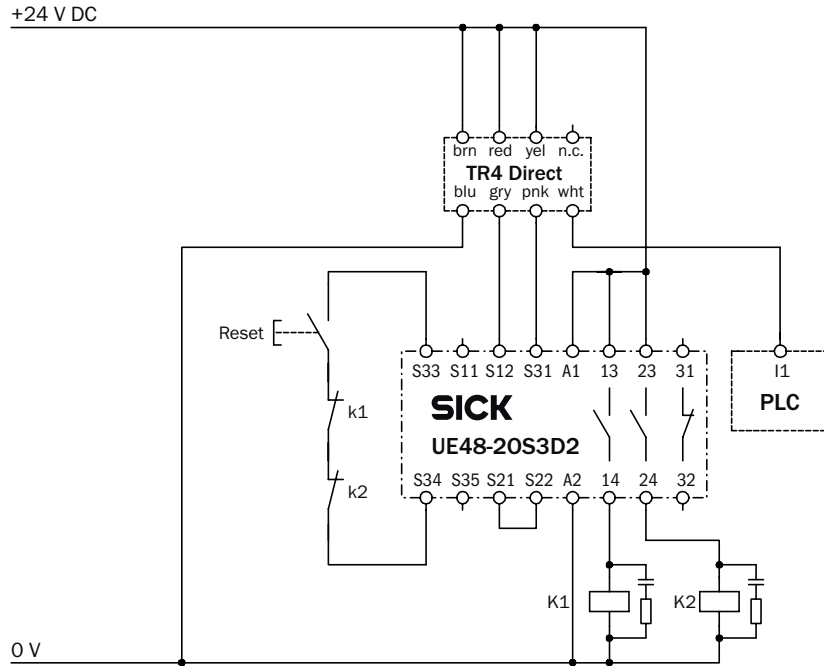


If the actuator moves laterally in relation to the surface of the sensor, a minimum distance of 9 mm must be maintained. This distance will prevent premature triggering due to the side approach areas.

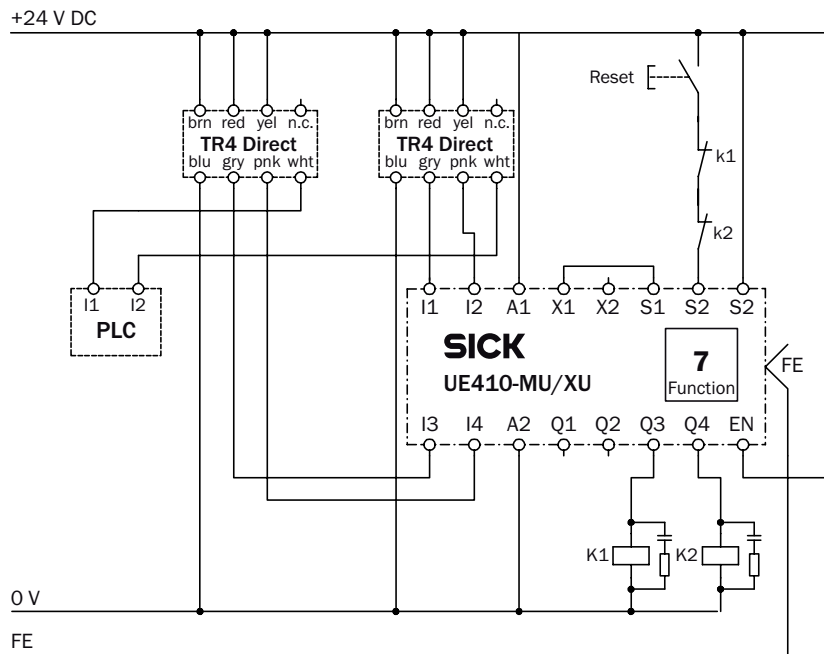
Connection diagrams

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

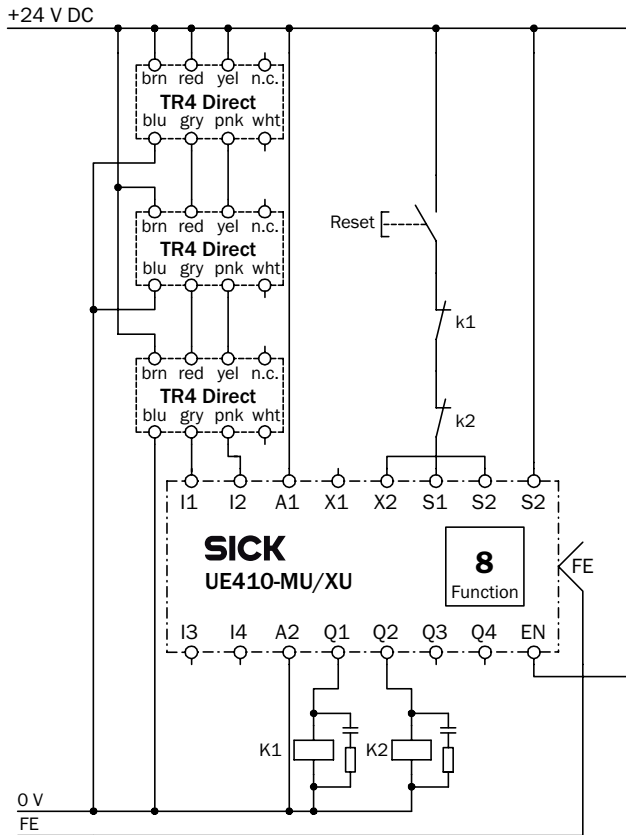
TR4 Direct transponder safety switch connected to UE48-20S safety relay



Two TR4 Direct transponder safety switches connected in parallel on a Flexi Classic safety controller




Three TR4 Direct transponder safety switches in cascade connected to a Flexi Classic safety controller




Accessories


Mounting brackets/plates

Figure	Description	Material	Model name	Part no.
	Mounting bracket, M18 thread	Steel, zinc coated	BEF-WN-M18	5308446

Terminal and alignment brackets

Figure	Description	Material	Model name	Part no.
	Clamping block for round sensors M18, without fixed stop	Plastic (PA12), glass-fiber reinforced	BEF-KH-M18	2051481



Plug connectors and cables

Figure	Size of the cable gland	Direction of cable outlet	Cable material	Cable length	Model name	Part no.
	M12, 8-pin	Straight	PVC	5 m	DOL-1208-G05MA	6020993
				10 m	DOL-1208-G10MA	6022152
				15 m	DOL-1208-G15MA	6022153
				30 m	DOL-1208-G30MA	6022242

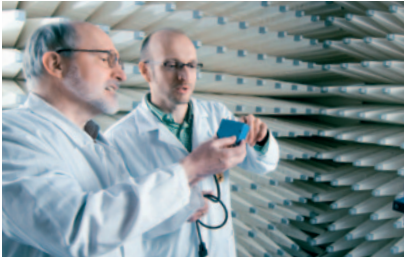
Adapters/distributors

Description	Model name	Part no.
T-junction for serial connection of TR4 Direct	TR4-AK004C	5325889
End plug for serial connection in combination with TR4-AK004C T-junction	TR4-AL002C	5325890

Actuators

Figure	Description	Model name	Part no.
	Replacement actuator for TR4-SAMxxx	TR4-RAM000	5321030
	Replacement actuator for TR4-SAUxxx	TR4-RAU000	5321031
	Replacement actuator for TR4-SBMxxx	TR4-RBM000	5321032
	Replacement actuator for TR4-SBUxxx	TR4-RBU000	5321033
	Replacement actuator for TR4-SDMxxx	TR4-RDM000	5325631
	Replacement actuator for TR4-SDUxxx	TR4-RDU000	5325632
	Replacement actuator for TR4-SEMxxx and TR4-SFMxxx	TR4-RFM000	5325633
	Replacement actuator for TR4-SEUxxx and TR4-SFUxxx	TR4-RFU000	5325634

SICK at a glance



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With a staff of more than 5,000 and over 50 subsidiaries and representations worldwide, SICK is one of the leading and most successful manufacturers of sensor technology. The power of innovation and solution competency have made SICK the global market leader. No matter what the project and industry may be, talking with an expert from SICK will provide you with an ideal basis for your plans – there is no need to settle for anything less than the best.



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- Non-contact detecting, counting, classifying, positioning and measuring of any type of object or media
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- Automatic identification with bar code and RFID readers
- Laser measurement technology for detecting the volume, position and contour of people and objects
- Complete system solutions for analysis and flow measurement of gases and liquids



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