

Selection table for safety switches TX with guard locking and guard lock monitoring

Release feature, front

HE

Mechanical release on the front

Release feature, rear

FE

Escape release on the rear

Connection

M

Thread M20x1.5 for cable glands

NPT½"

Thread ½" for cable glands

BH10

Plug connector 9-pin + PE

SR11

Plug connector 11-pin + PE

BH12

Plug connector 11-pin + PE

RC18

Plug connector 18-pin + PE

M12

Plug connector 5-pin

Switching element

Four contacts

2 NC ⊖ / 1 NO + 1 NC or

2 NC ⊖ / 1 NO + 1 NO or

2 NC ⊖ + 2 NC ⊖

Manual release

HE

FE

Connection

M

NPT½"

BH10

SR11

BH12

RC18

M12

Switching element

four contacts

Version

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Safety switch TX with guard locking and guard lock monitoring



- ▶ Mechanical release on the front
- ▶ With door monitoring contact
- ▶ Plug connector optional



Approach direction

Horizontal and vertical
Can be adjusted in 90° steps

Mechanical release

Is used for releasing the guard locking with the aid of a tool. The mechanical release must be sealed to prevent tampering (for example with sealing lacquer).

Solenoid operating voltage

- AC/DC 24 V +10%, -15%
- AC 110 V +10%, -15%
- AC 230 V +10%, -15%

LED function display

The switch has a function display (2 LEDs, red and green). The LED voltage is same as the solenoid operating voltage.

Guard locking types

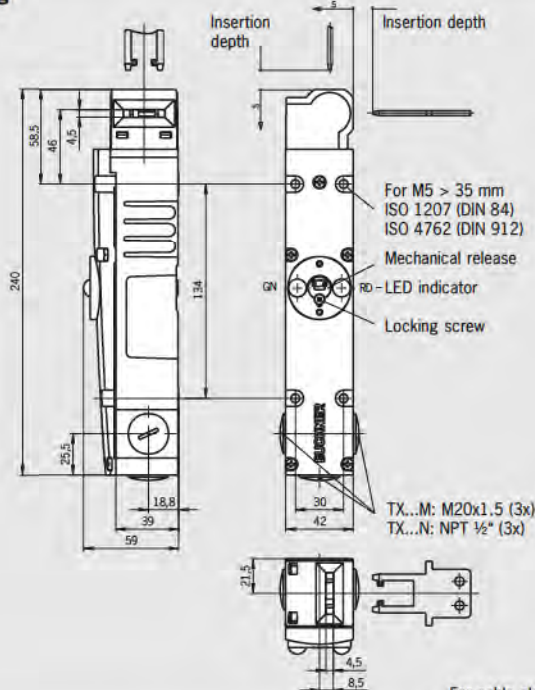
- TX1** Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.
- TX2** Open-circuit current principle, guard locking by applying voltage to the solenoid. Release by spring force.

Switching elements (see also page 14)

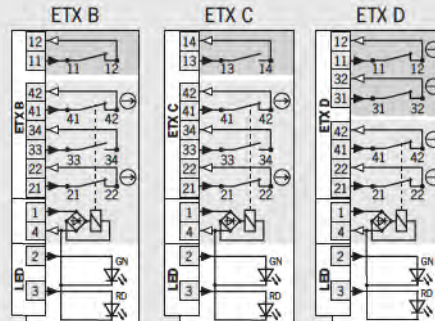
- ETX B** Slow-action switching element
2 NC ⊖ / 1 NO + 1 NC (door monit. contact)
- ETX C** Slow-action switching element
2 NC ⊖ / 1 NO + 1 NO (door monit. contact)
- ETX D** Slow-action switching element
2 NC ⊖ + 2 NC ⊖ (door monit. contacts)

Cable entry M20 x 1.5 / cable entry NPT 1/2"

Dimension drawing



Wiring diagrams Actuator inserted and locked



- ☐ Solenoid monitoring
- ☐ Door monitoring

For switching functions see technical data on page 172

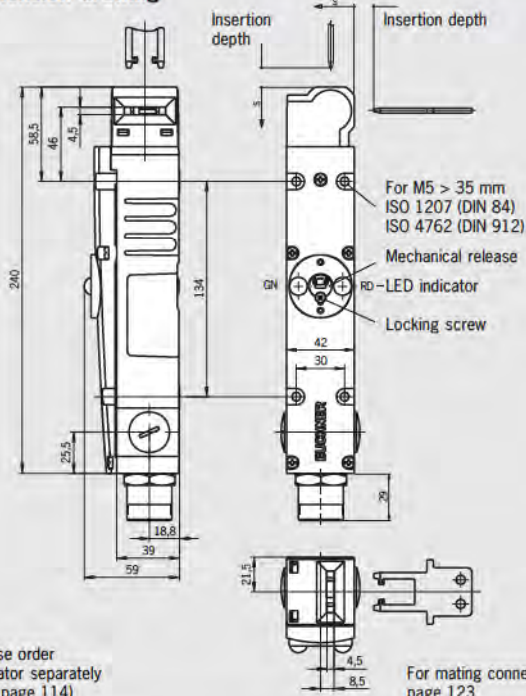
Ordering table

Series	Connection	Guard locking	Switching element	Solenoid operating voltage		
				AC/DC 24 V	AC 110 V	AC 230 V
TX	M Cable entry 3 x M20 x 1.5	1 Mechanical	ETX B 2 NC ⊖ / 1 NO + 1 NC	082 921 TX1B-A024M	085 383 TX1B-A110M	085 385 TX1B-A230M
			ETX C 2 NC ⊖ / 1 NO + 1 NO	082 922 TX1C-A024M	085 384 TX1C-A110M	085 386 TX1C-A230M
			ETX D 2 NC ⊖ + 2 NC ⊖	095 025 TX1D-A024MC2081	-	-
		2 Electrical	ETX B 2 NC ⊖ / 1 NO + 1 NC	082 927 TX2B-A024M	085 387 TX2B-A110M	085 389 TX2B-A230M
			ETX C 2 NC ⊖ / 1 NO + 1 NO	082 928 TX2C-A024M	085 388 TX2C-A110M	085 390 TX2C-A230M
			ETX D 2 NC ⊖ + 2 NC ⊖	095 026 TX2D-A024MC2081	-	-
	N Cable entry 3 x NPT 1/2"	1 Mechanical	ETX B 2 NC ⊖ / 1 NO + 1 NC	082 944 TX1B-A024N	085 382 TX1B-A110N	On request
			ETX C 2 NC ⊖ / 1 NO + 1 NO	082 945 TX1C-A024N	On request	On request
			ETX D 2 NC ⊖ + 2 NC ⊖	082 946 TX1D-A024N	On request	On request
		2 Electrical	ETX B 2 NC ⊖ / 1 NO + 1 NC	082 946 TX2B-A024N	On request	On request
			ETX C 2 NC ⊖ / 1 NO + 1 NO	082 947 TX2C-A024N	On request	On request
			ETX D 2 NC ⊖ + 2 NC ⊖	-	-	-



Plug connector BH10 9-pin + PE

Dimension drawing



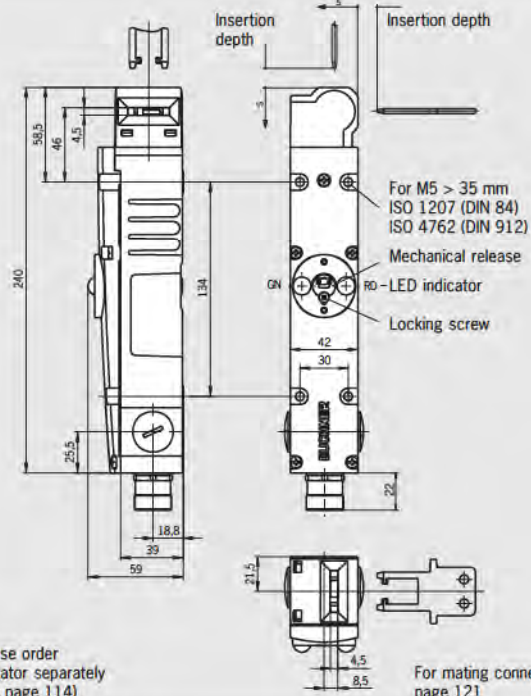
Please order
actuator separately
(see page 114)

For mating connectors see
page 123



Plug connector RC18 18-pin + PE

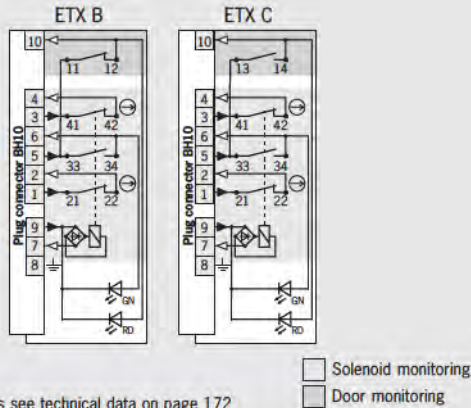
Dimension drawing



Please order
actuator separately
(see page 114)

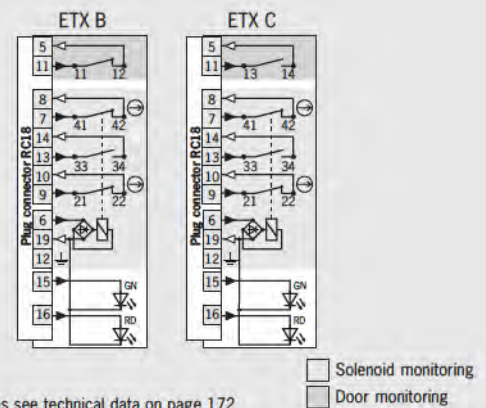
For mating connectors see
page 121

Wiring diagrams Actuator inserted and locked



For switching functions see technical data on page 172

☐ Solenoid monitoring
☐ Door monitoring



For switching functions see technical data on page 172

☐ Solenoid monitoring
☐ Door monitoring

Ordering table

Series	Connection	Guard locking	Switching element	Solenoid operating voltage		
				AC/DC 24 V	AC 110 V	AC 230 V
TX	Plug connector BH10	1 Mechanical	ETX B 2 NC $\ominus$ / 1 NO + 1 NC	085 380 TX1B-A024BH10	On request	On request
		2 Electrical	ETX B 2 NC $\ominus$ / 1 NO + 1 NC	085 381 TX2B-A024BH10	On request	On request
	Plug connector RC18	1 Mechanical	ETX B 2 NC $\ominus$ / 1 NO + 1 NC	082 933 TX1B-A024RC18	-	-
			ETX C 2 NC $\ominus$ / 1 NO + 1 NO	082 934 TX1C-A024RC18	-	-
		2 Electrical	ETX B 2 NC $\ominus$ / 1 NO + 1 NC	082 939 TX2B-A024RC18	-	-
			ETX C 2 NC $\ominus$ / 1 NO + 1 NO	082 940 TX2C-A024RC18	-	-

Safety switch TX with guard locking and guard lock monitoring



- Mechanical release on the front
- Release under load possible
- With door monitoring contact
- Plug connector optional



Approach direction

Horizontal and vertical
Can be adjusted in 90° steps

Mechanical release

Is used for releasing the guard locking with the aid of a tool. The mechanical release must be sealed to prevent tampering (for example with sealing lacquer).

Solenoid operating voltage

- AC/DC 24 V +10%, -15%
- AC 110 V +10%, -15%
- AC 230 V +10%, -15%

LED function display

The switch has a function display (2 LEDs, red and green). The LED voltage is same as the solenoid operating voltage.

Guard locking types

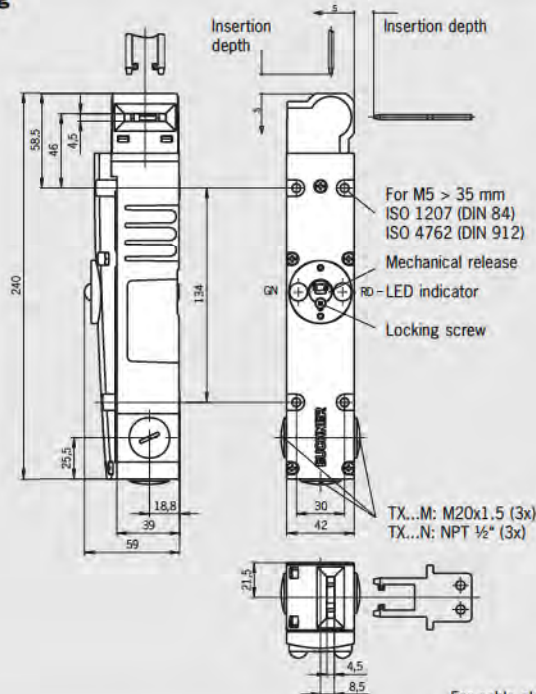
TX3 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid. Release under load possible.

Switching elements (see also page 14)

- ETX B Slow-action switching element
2 NC $\ominus$ / 1 NO + 1 NC
(door monitoring contact)
- ETX C Slow-action switching element
2 NC $\ominus$ / 1 NO + 1 NO
(door monitoring contact)

Cable entry M20 x 1.5 / cable entry NPT 1/2"

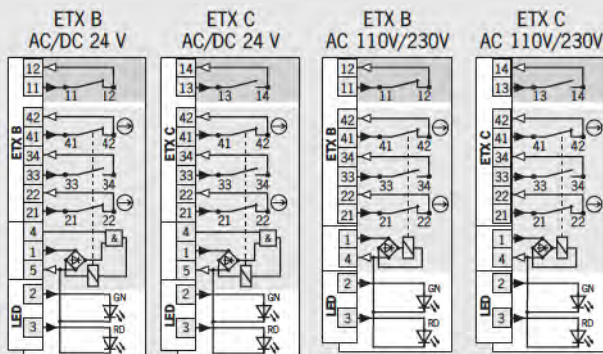
Dimension drawing



Please order
actuator separately
(see page 114)

For cable glands see page 124

Wiring diagrams Actuator inserted and locked



- ☐ Solenoid monitoring
- ☐ Door monitoring

For switching functions see technical data on page 172

Ordering table

Series	Connection	Guard locking	Switching element	Solenoid operating voltage		
				AC/DC 24 V	AC 110 V	AC 230 V
TX	M Cable entry 3 x M20 x 1.5	3 Mechanical	ETX B 2 NC $\ominus$ / 1 NO + 1 NC	082 952 TX3B-A024M	082 988 TX3B-A110M	On request
			ETX C 2 NC $\ominus$ / 1 NO + 1 NO	082 953 TX3C-A024M	082 989 TX3C-A110M	On request
	N Cable entry 3 x NPT 1/2"	3 Mechanical	ETX B 2 NC $\ominus$ / 1 NO + 1 NC	082 997 TX3B-A024N	On request	On request
			ETX C 2 NC $\ominus$ / 1 NO + 1 NO	082 998 TX3C-A024N	On request	On request

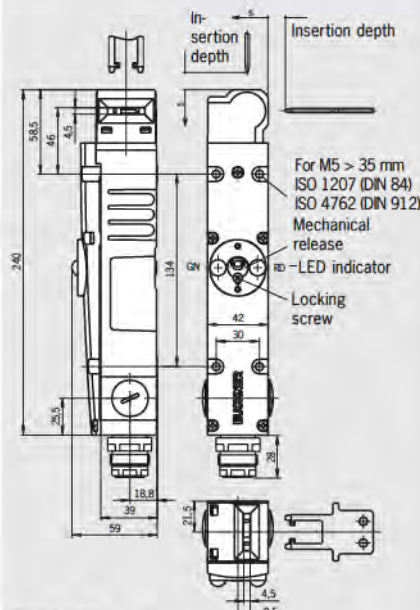


Plug connector SR11 11-pin + PE

Plug connector BH12 11-pin + PE

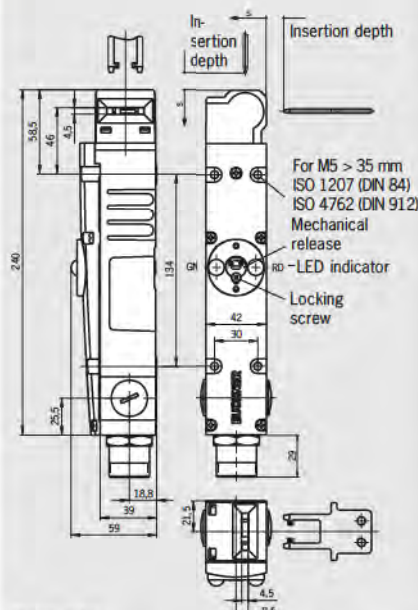
Plug connector RC18 18-pin + PE

Dimension drawing



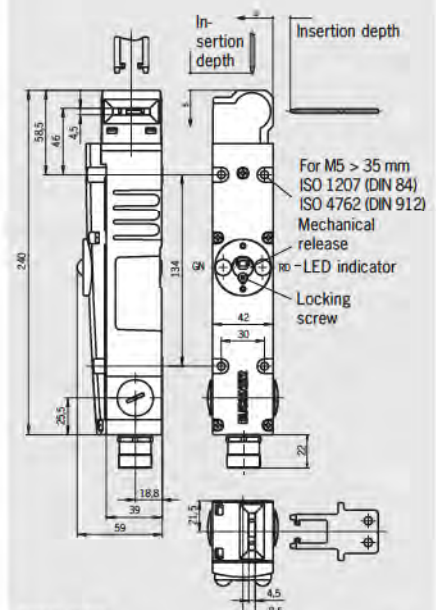
Please order
actuator separately
(see page 114)

For mating connectors see
page 120



Please order
actuator separately
(see page 114)

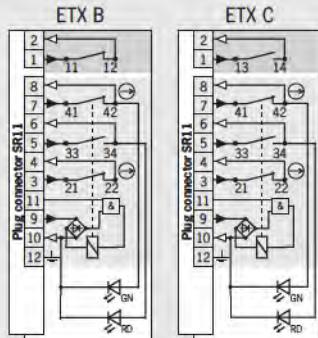
For mating connectors see
page 123



Please order
actuator separately
(see page 114)

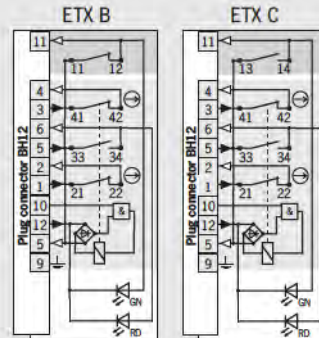
For mating connectors see
page 121

Wiring diagrams Actuator inserted and locked



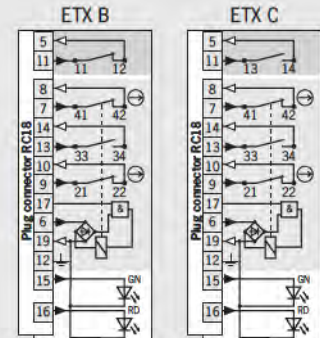
For switching functions see
technical data see page 172

☐ Solenoid monitoring
☐ Door monitoring



For switching functions see
technical data see page 172

☐ Solenoid monitoring
☐ Door monitoring



For switching functions see
technical data see page 172

☐ Solenoid monitoring
☐ Door monitoring

Ordering table

Series	Connection	Guard locking	Switching element	Solenoid operating voltage		
				AC/DC 24 V	AC 110 V	AC 230 V
TX	Plug connector SR11	3 Mechanical	ETX B 2 NC $\ominus$ / 1 NO + 1 NC	On request	-	-
			ETX C 2 NC $\ominus$ / 1 NO + 1 NO	085 396 TX3C-A024SR11	-	-
	Plug connector BH12	3 Mechanical	ETX B 2 NC $\ominus$ / 1 NO + 1 NC	082 999 TX3B-A024BH12	On request	On request
			ETX C 2 NC $\ominus$ / 1 NO + 1 NO	083 000 TX3C-A024BH12	On request	On request
	Plug connector RC18	3 Mechanical	ETX B 2 NC $\ominus$ / 1 NO + 1 NC	082 964 TX3B-A024RC18	-	-
			ETX C 2 NC $\ominus$ / 1 NO + 1 NO	082 965 TX3C-A024RC18	-	-

1) With cable entry M or NPT 1/2", AC/DC 24 V



Safety switch TX with guard locking and guard lock monitoring

- ▶ **Escape release on the rear**
- ▶ **Release under load possible (only TX3 version)**
- ▶ **With door monitoring contact**
- ▶ **Plug connector optional**



Approach direction



Horizontal and vertical
Can be adjusted in 90° steps

Escape release

Is used for the manual release of the guard locking from within the danger area without tools. With identification of On/Off position.

Solenoid operating voltage

AC/DC	24 V	+10%, -15%
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LED function display

The switch has a function display (2 LEDs, red and green). The LED voltage is same as the solenoid operating voltage.

Guard locking types

TX1 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.

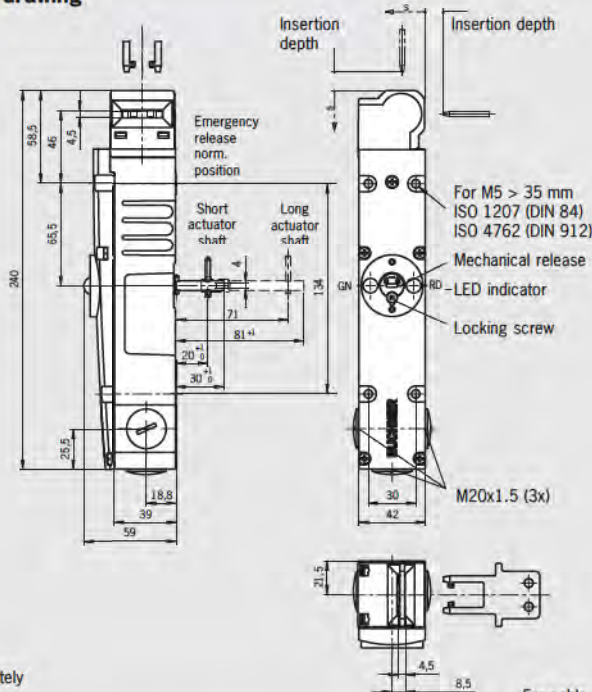
TX3 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid. Release under load possible.

Switching elements (see also page 14)

- **ETX B** Slow-action switching element
2 NC $\ominus$ / 1 NO + 1 NC (door monit. contact)
- **ETX C** Slow-action switching element
2 NC $\ominus$ / 1 NO + 1 NO (door monit. contact)
- **ETX D** Slow-action switching element
2 NC $\ominus$ + 2 NC $\ominus$ (door monit. contacts)

Cable entry M20 x 1.5

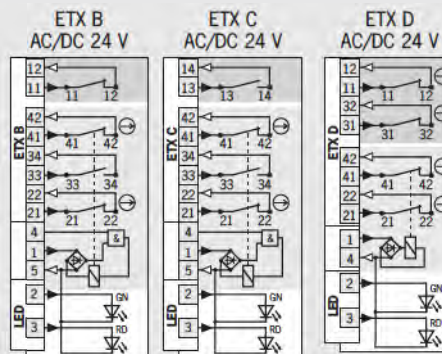
Dimension drawing



Please order
actuator separately
(see page 114)

For cable glands see page 124

Wiring diagrams



☐ Solenoid monitoring
☐ Door monitoring

For switching functions see technical data on page 172

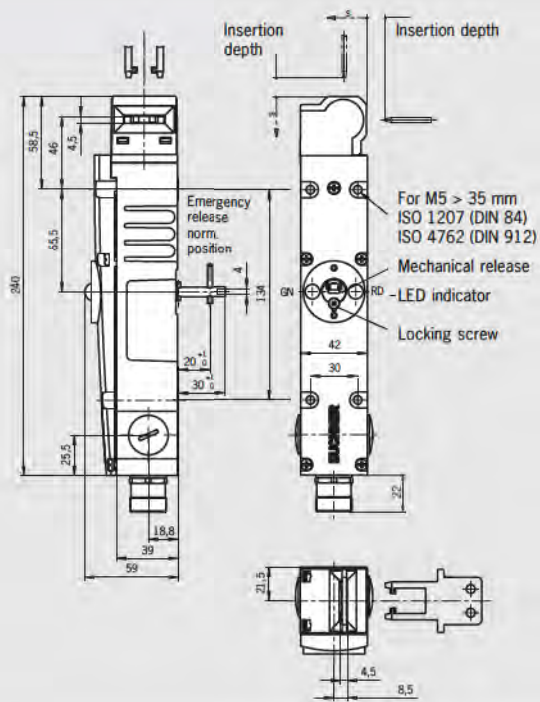
Ordering table

Series	Connection	Guard locking	Switching element	Version	Solenoid operating voltage
					AC/DC 24 V
TX	M Cable entry 3 x M20 x 1.5	1 Mechanical	ETX C 2 NC ⊖ / 1 NO + 1 NO	C2161 Long actuator shaft	099 489 TX1C-A024MC2161
			ETX D 2 NC ⊖ + 2 NC ⊖	C1991 Short actuator shaft	096 173 TX1D-A024MC1991
		3 Mechanical	ETX B 2 NC ⊖ / 1 NO + 1 NC	C1991 Short actuator shaft	085 391 TX3B-A024MC1991
			ETX C 2 NC ⊖ / 1 NO + 1 NO	C1991 Short actuator shaft	093 118 TX3C-A024MC1991
				C2161 Long actuator shaft	098 946 TX3C-A024MC2161



Plug connector RC18
18-pin + PE

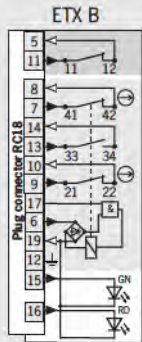
Dimension drawing



Please order actuator separately (see page 114)

For mating connectors see page 121

Wiring diagrams Actuator inserted and locked



For switching functions see technical data on page 172

- ☐ Solenoid monitoring
- ☐ Door monitoring

Ordering table

Series	Connection	Guard locking	Switching element	Version	Solenoid operating voltage
					AC/DC 24 V
TX	Plug connector RC18	3 Mechanical	ETX B 2 NC 1 NO + 1 NC	C1991 Short actuator shaft	093 559 TX3B-A024RC18C1991

Safety switch TX with guard locking and guard lock monitoring



- ▶ Mechanical release on the front
- ▶ With door monitoring contact
- ▶ Separate plug connector for solenoid monitoring and door monitoring with solenoid operating voltage
- ▶ For direct connection to PROFIsafe inputs/outputs



Approach direction



Horizontal and vertical
Can be adjusted in 90° steps

Mechanical release

Is used for releasing the guard locking with the aid of a tool. The mechanical release must be sealed to prevent tampering (for example with sealing lacquer).

Solenoid operating voltage

- ▶ AC/DC 24 V +10%, -15%
- ▶ AC 110 V +10%, -15%
- ▶ AC 230 V +10%, -15%

LED function display

The switch has a function display (2 LEDs, red and green). The LED voltage is same as the solenoid operating voltage.

Guard locking types

- TX1** Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.
- TX2** Open-circuit current principle, guard locking by applying voltage to the solenoid. Release by spring force.

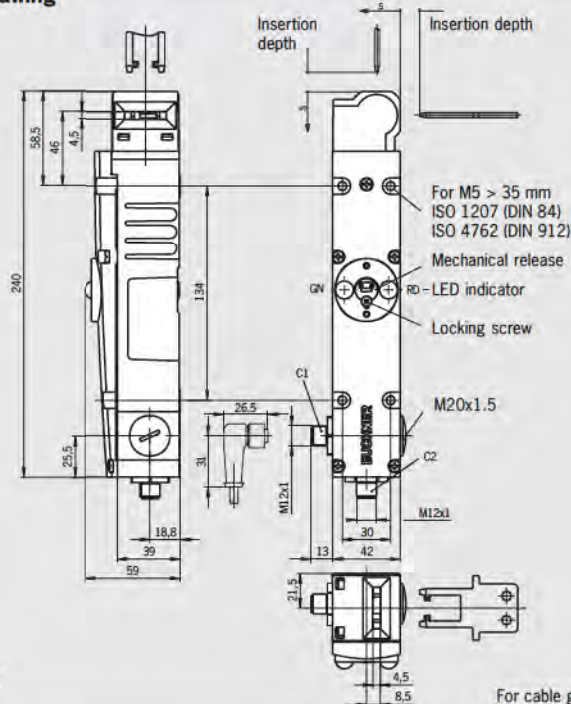
Switching elements (see also page 14)

- ▶ **ETX B** Slow-action switching element
2 NC ⊖ / 1 NO + 1 NC
(door monitoring contact)

Plug connector M12

2 plug connectors, 5-pin

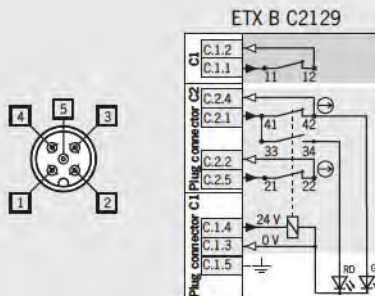
Dimension drawing



Please order
actuator separately
(see page 114)

For cable glands see page 124

Wiring diagrams Actuator inserted and locked



- ☐ Solenoid monitoring
- ☐ Door monitoring

For switching functions see technical data on page 172

Ordering table

Series	Connection	Guard locking	Switching element	Version	Solenoid operating voltage
					AC/DC 24 V
TX	Plug connector 2 x M12	1 Mechanical	ETX B 2 NC ⊖ / 1 NO + 1 NC	C2129	097 623 TX1B-A024MC2129

Safety switch TX... with guard locking and guard lock monitoring



The technical data on switches, switching elements and guard locking apply to all connections. Further technical data are given for the connection selected.

Switch			
		Value	Unit
Housing material		Die-cast alloy, cathodically dipped	
Mechanical life		$> 1 \times 10^6$ operating cycles	
Ambient temperature		- 20 ... + 80	°C
Weight		approx. 0.8	kg
Max. approach speed		20	m/min
Actuating force		35	N
Extraction force		35	N
Retention force		20	N
Locking force, max.		1700	N
Locking force F_{Zh} in accordance with test principles GS-ET-19		1300	N
Insertion depth	Standard actuators	Overtravel actuator	
Required insertion depths s_{min}	32	32	mm
Maximum insertion depth s_{max}	33	40	mm
Actuator travel (in the locked state)	6	13	mm

Switching element			
		Value	Unit
Switching principle		Slow-action switching element	
Switching elements	ETX B	ETX C	ETX D
with 4 switching elements	2 NC + 1 NO + 1 NC	2 NC + 1 NO + 1 NO	2 NC + 2 NC
Switching current, min., at 24 V DC		1	mA
Switching voltage, min., at 10 mA		12	V
Contact material		Silver alloy, gold flashed	

Guard locking			
		Value	Unit
Solenoid operating voltage	AC/DC 24 V +10/-15%	AC 110 V +10/-15%	AC 230 V +10/-15%
Connection		Reverse polarity protected, integrated bridge rectifier	
Duty cycle ED		100	%
Power consumption		8	W

Connection, cable entry M20 x 1.5			
		Value	Unit
Connection		Screw terminal	
Version		M20 x 1.5	
Conductor cross-section max.		0.34 ... 1.5 mm ²	
Degree of protection according to IEC 60529		IP 67	
Rated insulation voltage U_i		250	V AC/DC
Rated impulse withstand voltage U_{imp}		2.5	kV
Conventional thermal current I_{th}		4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category to IEC 60947-5-1	AC15	le 4 A Ue 230 V	
	DC13	le 4 A Ue 24 V	

Connection, cable entry NPT 1/2"



Parameter		Value	Unit
Connection		Screw terminal	
Version		NPT 1/2"	
Conductor cross-section max.		0.34 ... 1.5 mm ²	
Degree of protection according to IEC 60529		IP 67	
Rated insulation voltage U _i		250	V AC/DC
Rated impulse withstand voltage U _{imp}		2.5	kV
Conventional thermal current I _{th}		4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category to IEC 60947-5-1	AC15	I _e 4 A U _e 230 V	
	DC13	I _e 4 A U _e 24 V	

Connection, plug connector (M12)



Parameter		Value	Unit
Connection		Plug connector	
Version		M12 (4-pin+ PE), adjustable male socket (max. 270°) for elbow connector	
Degree of protection according to IEC 60529		IP 65 ¹⁾	
Rated insulation voltage U _i		30	V AC/DC
Conventional thermal current I _{th}		4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category to IEC 60947-5-1	AC-15	I _e 4 A U _e 30 V	
	DC-13	I _e 4 A U _e 24 V	

1) Screwed tight with the related plug connector

Connection, plug connector BH10



Parameter		Value	Unit
Connection		Plug connector	
Version		9-pin + PE	
Degree of protection according to IEC 60529		IP 65 ¹⁾	
Rated insulation voltage U _i		50	V AC/DC
Rated impulse withstand voltage U _{imp}		2.5	kV
Conventional thermal current I _{th}		4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category to IEC 60947-5-1	AC-15	I _e 4 A U _e 24 V	
	DC-13	I _e 4 A U _e 24 V	

1) Screwed tight with the related plug connector

Connection, plug connector BH12



Parameter		Value	Unit
Connection		Plug connector	
Version		11-pin + PE	
Degree of protection according to IEC 60529		IP 65 ¹⁾	
Rated insulation voltage U _i		50	V AC/DC
Rated impulse withstand voltage U _{imp}		2.5	kV
Conventional thermal current I _{th}		4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category to IEC 60947-5-1	AC-15	I _e 4 A U _e 24 V	
	DC-13	I _e 4 A U _e 24 V	

1) Screwed tight with the related plug connector

Connection, plug connector SR11



Parameter		Value	Unit
Connection		Plug connector	
Version		11-pin + PE	
Degree of protection according to IEC 60529		IP 65 ¹⁾	
Rated insulation voltage U _i		50	V AC/DC
Rated impulse withstand voltage U _{imp}		1.5	kV
Conventional thermal current I _{th}		4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category to IEC 60947-5-1	AC-15	I _e 4 A U _e 50 V	
	DC-13	I _e 4 A U _e 24 V	

1) Screwed tight with the related plug connector (see page 120, 123 and 124)



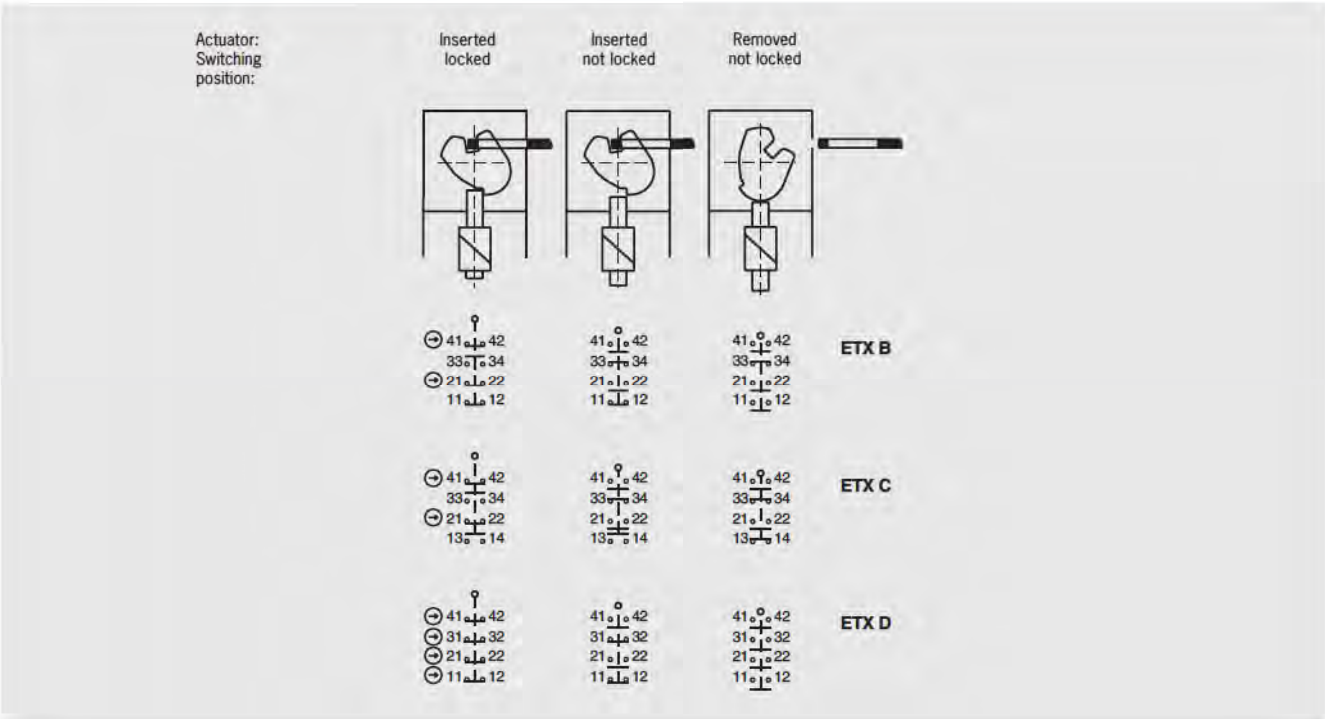
Connection, plug connector RC18



Parameter	Value	Unit
Connection	Plug connector	
Version	18-pin + PE	
Degree of protection according to IEC 60529	IP 65 ¹⁾	
Rated insulation voltage U _i	50	V AC/DC
Rated impulse withstand voltage U _{imp}	2.5	kV
Conventional thermal current I _{th}	4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)	4	A gG
Utilization category to IEC 60947-5-1	AC-15	I _e 4 A U _e 24 V
	DC-13	I _e 4 A U _e 24 V

1) Screwed tight with the related plug connector (see page 121)

Switching functions TX



Switching characteristics safety switch TX3... (mechanical guard locking)

The application of a voltage U_B/U_S when the actuator is not inserted does not produce **any** change in the state of the switching element.

Solenoid operating voltage U_B

On versions TX...110 and TX...230 release is performed using the voltage U_B .
A control voltage U_S is not necessary.

Control voltage U_S

On the version TX...24 an additional control voltage U_S is only required if U_B cannot supply the required current of 2 A for $T_{MP} = 250$ ms when the solenoid is switched on.
Otherwise, the connection terminals U_S and U_B must be bridged on the version TX...24.

Safety switch TX3... with door monitoring contact (mechanical guard locking)

			Actuator inserted		Actuator removed
			Locked	Not locked	
Switching element	ETX B				
	ETX C				
Switch version	TX3...24	Control voltage U_S	0 V	24 V	24 V or 0 V
		Operating voltage U_B	0 V	24 V	24 V or 0 V
	TX3...110 / TX3...230	Control voltage U_S	Not connected		
		Operating voltage U_B	0 V	110 V or 230 V	110 V, 230 V or 0 V