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

Version

- **Standard** – One actuating head made of metal
- **TW** – *TWIN*, 2 actuating heads made of metal
- **BI** – *BiState*, with additional safety function

Release feature

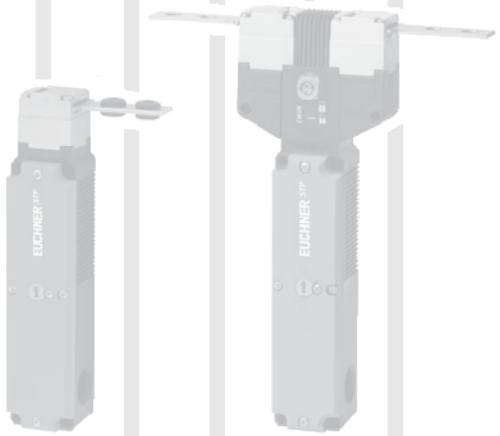
- **HE** – Mechanical release on the front
- **FE** – Escape release on the rear side

Door monitoring

- **STP3/4** – With door monitoring contact
- **STP1/2** – Without door monitoring contact

Connection

- **M** – Thread M20x1.5 for cable glands
- **SR11** – Plug connector; 11-pin+PE



Version			Release feature		Door monitoring		Connection		Page
Standard	TW	BI	HE	FE	STP3/4	STP1/2	M	SR11	
●			●		●		●	●	56 - 57
●			●			●	●		58
●			●	●	●		●		59
		●	●		●			●	60
	●		●		●		●		61

Safety switch STP with guard locking and guard lock monitoring

- **Actuating head made of metal**
- **Mechanical release on the front**
- **With door monitoring contact**

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 is sealed with sealing lacquer to prevent tampering.

Solenoid operating voltage

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

LED function display (optional)

A function display (2 LEDs, red and green) is available for the following voltage ranges:

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

Guard locking types

STP3 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the interlocking solenoid.

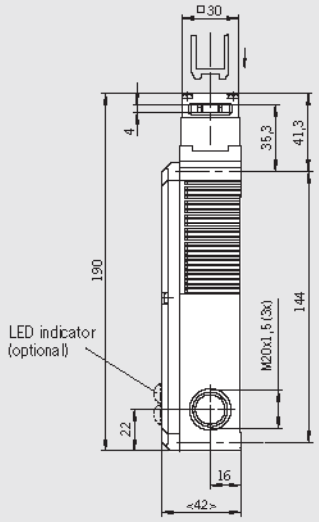
STP4 Open-circuit current principle, guard locking by applying voltage to the interlocking solenoid. Release by spring force.

Switching elements

- **537** Slow-action switching element
  1 NC ⊖ + 1 NC (door monitoring contact)
- **2131** Slow-action switching element
  2 NC ⊖ + 1 NO + 1 NC (door monit. contact)
- **4121** Slow-action switching element
  2 NC ⊖ + 1 NC/1 NO (door monit. contact)
- **4131** Slow-action switching element
  2 NC ⊖ + 1 NO + 1 NO (door monit. contact)
- **4141** Slow-action switching element
  2 NC ⊖ + 2NC ⊖ (door monit. contacts)

Cable entry M20 x 1.5

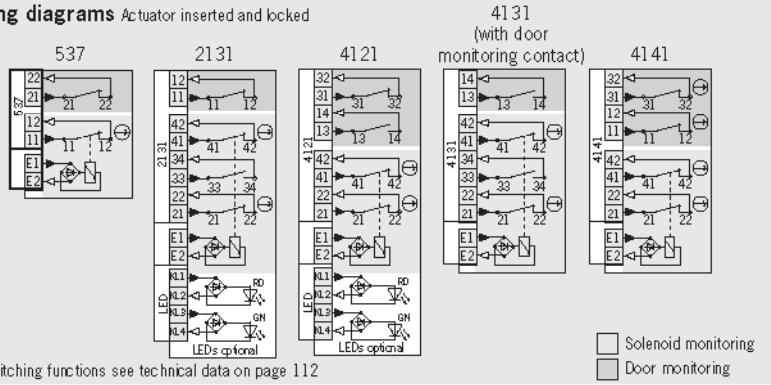
Dimension drawing



Please order actuator separately (see pages 80-82)

For cable glands see page 89

Wiring diagrams Actuator inserted and locked



For switching functions see technical data on page 112

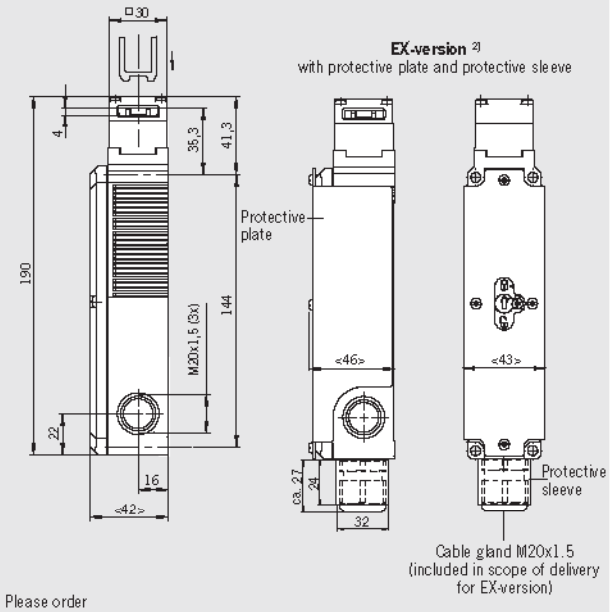
Ordering table

Series	Connection	Guard locking	Switching element	Version	Solenoid operating voltage AC/DC 24 V	AC 110 V	AC 230 V
STP	M Cable entry 3 x M20x1.5	3 Mechanical	**2131** 2 NC ⊖ + 1 NO + 1 NC		**091 493** STP3A-2131A024M	**099 326** STP3A-2131A110M	On request
				024L LED display AC/DC 24 V	**091 748** STP3A-2131A024L024M	On request	On request
			4121 2 NC ⊖ + 1 NC/1 NO		**096 890** STP3A-4121A024M	On request	**094 792** STP3A-4121A230M
			4131 2 NC ⊖ + 1 NO + 1 NO		**091 776** STP3A-4131A024M	On request	On request
			4141 2 NC ⊖ + 2 NC		**099 272** STP3A-4141A024M	On request	On request
		4 Electrical	**537** 1 NC ⊖ + 1 NC		**092 259** STP4A-537A024M	On request	On request
			2131 2 NC ⊖ + 1 NO + 1 NC		**091 494** STP4A-2131A024M	**097 754** STP4A-2131A110M	On request
				024L LED display AC/DC 24 V	**091 749** STP4A-2131A024L024M	On request	On request
			4121 2 NC ⊖ + 1 NC/1 NO		**093 159** STP4A-4121A024M	**094 793** STP4A-4121A110M	**094 794** STP4A-4121A230M
				024L LED display AC/DC 24 V	**100 026** STP4A-4121A024L024M		
			4131 2 NC ⊖ + 1 NO + 1 NO		**093 158** STP4A-4131A024M	On request	On request
			4141 2 NC ⊖ + 2 NC ⊖		**099 314** STP4A-4141A024M	On request	On request

1) With cable entry M, DC 24 V / AC 110 V

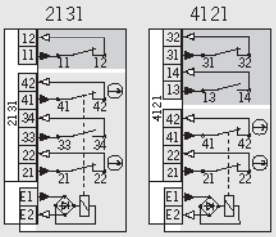
Cable entry M20 x 1.5

Dimension drawing



Please order actuator separately (see pages 80-82)

Wiring diagrams Actuator inserted and locked

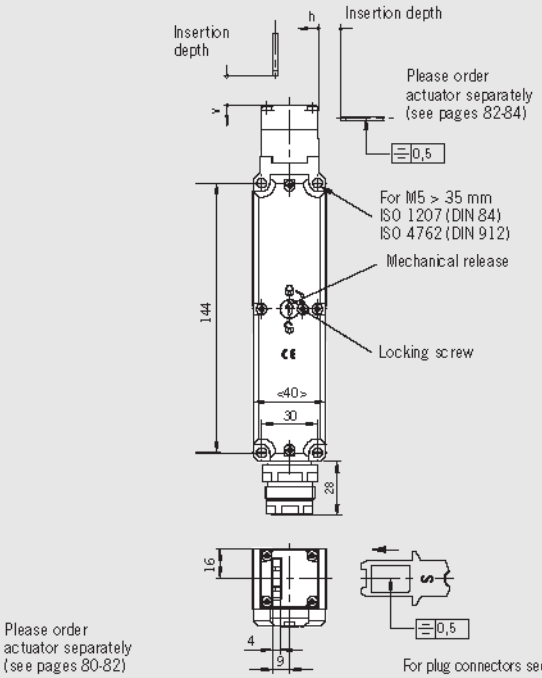


Solenoid monitoring
Door monitoring

For switching functions see technical data on page 112

Plug connector SR11

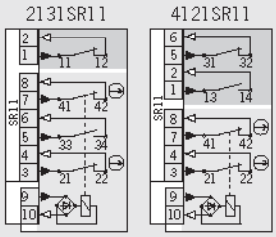
11-pin + PE



Please order actuator separately (see pages 80-82)

For plug connectors see page 86

Wiring diagrams Actuator inserted and locked



Solenoid monitoring
Door monitoring

For switching functions see technical data on page 112

Ordering table

Series	Connection	Guard locking	Switching element	Version	Solenoid operating voltage		
					AC/DC 24 V	AC 110 V	AC 230 V
STP	M Cable entry 3 x M20x1.5	3 Mechanical	2131 2 NC ⊖ + 1 NO + 1 NC	ATEX Incl. cable gland	093 794 2) STP3A-2131A024M-EX	On request	On request
			4121 2 NC ⊖ + 1 NC/1 NO	ATEX Incl. cable gland	097 626 2) STP3A-4121A024M-EX	On request	On request
		4 Electrical	2131 2 NC ⊖ + 1 NO + 1 NC	ATEX Incl. cable gland	093 795 2) STP4A-2131A024M-EX	On request	On request
	SR11 Plug connector	3 Mechanical	4121 2 NC ⊖ + 1 NC/1 NO		096 318 STP3A-4121A024SR11	-	-
		4 Electrical	2131 2 NC ⊖ + 1 NO + 1 NC		097 565 STP4A-2131A024SR11	-	-
			4121 2 NC ⊖ + 1 NC/1 NO		099 301 STP4A-4121A024SR11	-	-

1) With cable entry M, DC 24 V/AC 110 V 2) ⟨Ex⟩ II 3 G Ex nC IIC T4 / ⟨Ex⟩ 3 D Ex tD A22 T110°C X

For safety precautions see page 136
For technical data see page 99

Safety switch STP with guard locking and guard lock monitoring

- **Actuating head made of metal**
- **Mechanical release on the front**
- **Without door monitoring contact**

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 is sealed with sealing lacquer to prevent tampering.

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

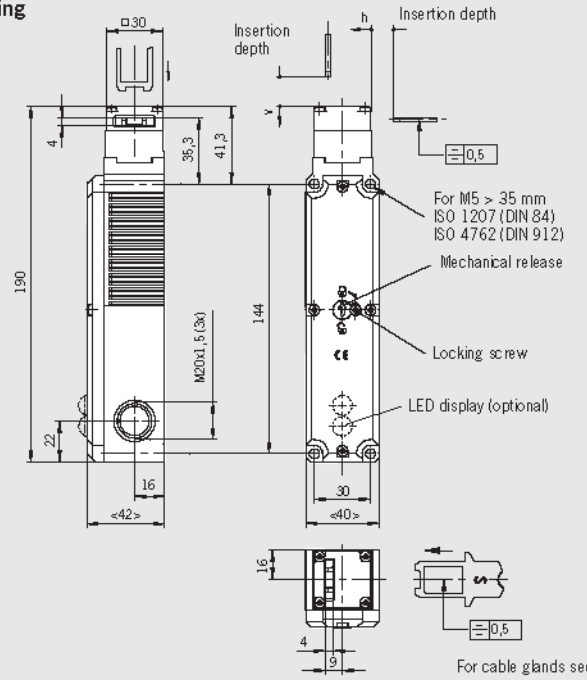
LED function display (optional)
A function display (2 LEDs, red and green) is available for the following voltage ranges:
- AC/DC 24 V +10%, -15%

Guard locking types
STP1 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the interlocking solenoid.
STP2 Open-circuit current principle, guard locking by applying voltage to the interlocking solenoid. Release by spring force.

Switching elements
- **528** Slow-action switching element 1 NC ⊖ + 1 NO
- **538** Slow-action switching element 2 NC ⊖
- **4131** Slow-action switching element 2 NC ⊖ + 2 NO

Cable entry M20 x 1.5

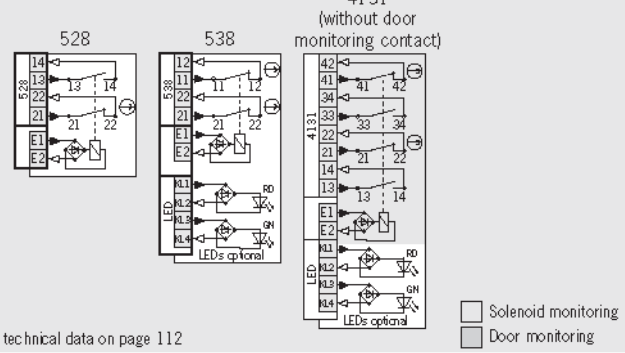
Dimension drawing



Please order actuator separately (see pages 80-82)

For cable glands see page 89

Wiring diagrams Actuator inserted and locked



For switching functions see technical data on page 112

Ordering table

Series	Connection	Guard locking	Switching element	Version	Solenoid operating voltage AC/DC 24 V	AC 110 V	AC 230 V
STP	M Cable entry 3 x M20 x 1.5	1 Mechanical	528 1 NC ⊖ + 1 NO		092 266 STP1A-528A024M	On request	On request
			538 2 NC ⊖		092 258 STP1A-538A024M	On request	On request
				024L LED display AC/DC 24 V with pre-assembled insertion funnel	092 489 STP1D-538A024L024M	On request	On request
			4131 2 NC ⊖ + 2 NO		091 491 STP1A-4131A024M	On request	On request
				024L LED display AC/DC 24 V	091 746 STP1A-4131A024L024M	On request	On request
		2 Electrical	538 2 NC ⊖		092 260 STP2A-538A024M	On request	On request
				024L LED display AC/DC 24 V	092 490 STP2A-538A024L024M	On request	On request
			4131 2 NC ⊖ + 2 NO		091 492 STP2A-4131A024M	On request	On request
				024L LED display AC/DC 24 V	091 747 STP2A-4131A024L024M	On request	On request

Safety switch STP with guard locking and guard lock monitoring

- **Escape release on the rear side**
- **With door monitoring contact**
- **Increased horizontal overtravel**

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%

Guard locking types

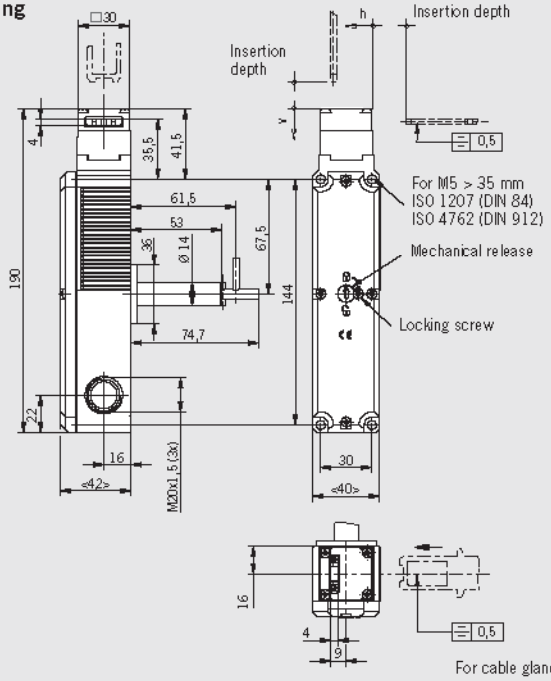
STP3 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the interlocking solenoid.

Switching elements

- **4121** Slow-action switching element
  2 NC ⊖ + 1 NC / 1 NO
  (door monitoring contact)

Cable entry M20 x 1.5

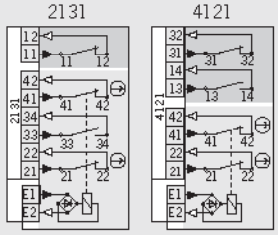
Dimension drawing



Please order actuator separately (see pages 80-82)

For cable glands see page 89

Wiring diagrams Actuator inserted and locked



Solenoid monitoring
Door monitoring

For switching functions see technical data on page 112

Ordering table

Series	Connection	Guard locking	Switching element	Version	Solenoid operating voltage AC/DC 24 V
STP	**M** Cable entry **3 x M20 x 1.5**	**3** Mechanical	**2131** 2 NC ⊖ + 1 NO + 1NC	**C1993** Long actuator shaft	**102 267** STP3A-2131A024MC1993
			4121 2 NC ⊖ + 1 NC/1 NO	**C1993** Long actuator shaft	**096 885** STP3A-4121A024MC1993

For safety precautions see page 136
For technical data see page 99

Safety switch STP-BI with guard locking and guard lock monitoring

- **Actuating head made of metal**
- **Mechanical release on the front**
- **Additional safety function**
- **With door monitoring contact**

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 is sealed with sealing lacquer to prevent tampering.

Safety function
The STP-BI additionally features a safety function that prevents

- persons unintentionally locking themselves inside if the safety guard is open in the event of a power failure or when the machine is switched off
- the activated guard locking being deactivated in the event of a power failure.

Solenoid operating voltage

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

Guard locking types

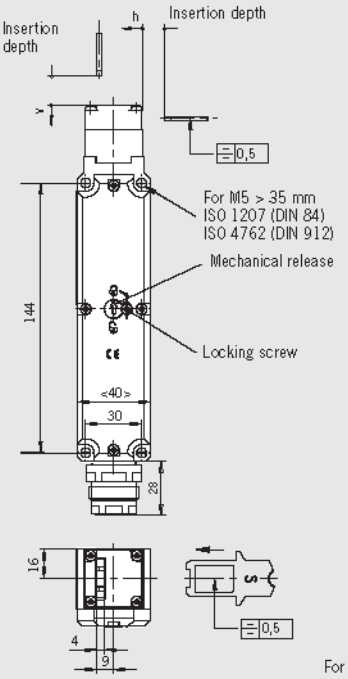
STP3 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the interlocking solenoid.

Switching elements

- **2131** Slow-action switching element
  2 NC ⊖ + 1 NO + 1 NC (door monit. contact)

Plug connector SR11
11-pin + PE

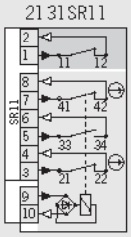
Dimension drawing



Please order actuator separately (see pages 80-82)

For plug connectors see page 86

Wiring diagrams Actuator inserted and locked



☐ Solenoid monitoring
☐ Door monitoring

For switching functions see technical data on page 113

Ordering table

Series	Connection	Guard locking	Switching element	Version	Solenoid operating voltage AC/DC 24 V
STP-BI	SR11 Plug connector	3 Mechanical	2131 2 NC ⊖ + 1 NO + 1 NC		100 105 STP-BI-3A-2131A024SR11

Sicherheitsschalter STP-TW mit Zuhaltung und Zuhaltungsüberwachung

- **Zwei Betätigungsköpfe aus Metall**
- **Gleichzeitige Überwachung von zwei Schutztüren**
- **Hilfsentriegelung an der Frontseite**
- **Schlüsselhilfsentriegelung optional**
- **Mit Türmeldekontakt**

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 is sealed with sealing lacquer to prevent tampering.

Mechanical key release
If the switch has a mechanical key release, the drive's safety circuit can be opened and retained in this position. In this way unintentional starting of the system can be prevented.
The lock function setting is indicated in the window.
Two keys are included.

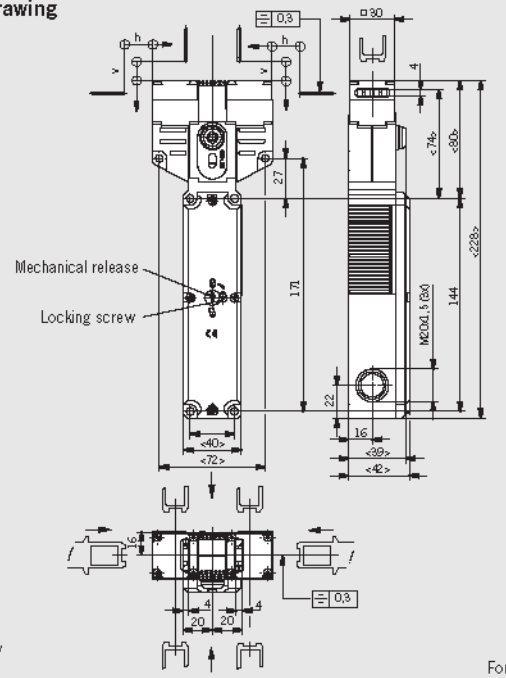
Solenoid operating voltage
- AC/DC 24 V +10%, -15%

Guard locking types
STP3 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the interlocking solenoid.
STP4 Open-circuit current principle, guard locking by applying voltage to the interlocking solenoid. Release by spring force.

Switching elements
- **2131** Slow-action switching element
  2 NC ⊖ + 1 NO + 1 NC (door monit. contact)

Cable entry M20 x 1.5

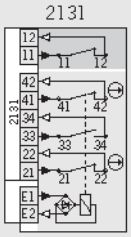
Dimension drawing



Please order actuator separately (see pages 80-82)

For cable glands see page 89

Wiring diagrams Actuator inserted and locked



Solenoid monitoring
Door monitoring

For switching functions see technical data on page 115

Ordering table

Series	Connection	Guard locking	Switching element	Version	Solenoid operating voltage AC/DC 24 V
STP-TW	M Cable entry M20x1,5	3 Mechanical	2131 2 Ö ⊖ + 1 S + 1 Ö		099 973 STP-TW-3A-2131AC024M
				with mechanical key release (identical locking)	098 827 STP-TW-3A-2131AC024M-S1
		4 Electrical	2131 2 Ö ⊖ + 1 S + 1 Ö		100 849 STP-TW-4A-2131AC024M
				with mechanical key release (identical locking)	100 850 STP-TW-4A-2131AC024M-S1

For safety precautions see page 136
For technical data see page 99

Safety switch STP.../STP-BI 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

Parameter		Value		Unit
Material	Housing	Reinforced thermoplastic		
	Actuating head	Die-cast aluminum		
	Cam in actuating head	Stainless steel		
Mechanical life		1 x 10^6 operating cycles		
Ambient temperature		- 20 ... + 55		°C
Weight		approx. 0.5		kg
Max. approach speed		20		m/min
Actuating force		35		N
Extraction force (not locked)		30		N
Retention force		20		N
Locking force, max.		Approach direction		N
		From top (v)	Side (h)	
		2500	2500	
Locking force F_{Zh} in accordance with test principles GS-ET-19		Approach direction		N
		From top (v)	Side (h)	
	Straight actuator	2000	2000	
Insertion depth (minimum required travel + permissible overtravel)		Actuator *S* standard	Actuator *L* for insertion funnel	
Approach direction side (h)		24.5 + 5	28.5 + 5	mm
Approach direction from top (v)		24.5 + 5	28.5 + 5	mm

Switching element

Parameter	Value				Unit
Switching principle	Slow-action switching element				
Switching elements with 2 switching elements	**528** 1 NC ⊖ + 1 NO	**537** 1 NC ⊖ + 1NC	**538** 1 NC ⊖ + 1NC		
Switching elements with 4 switching elements	**2131** 2 NC ⊖ + 1 NO + 1 NC	**4121** 2 NC ⊖ + 1 NC + 1 NO	**4131** 2 NC ⊖ + 2 NO	**4141** 4 NC ⊖	
Switching current, min., at DC 24 V	1				mA
Switching voltage, min., at 10 mA	12				V
Contact material	Silver alloy, gold flashed				

Guard locking

Parameter	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

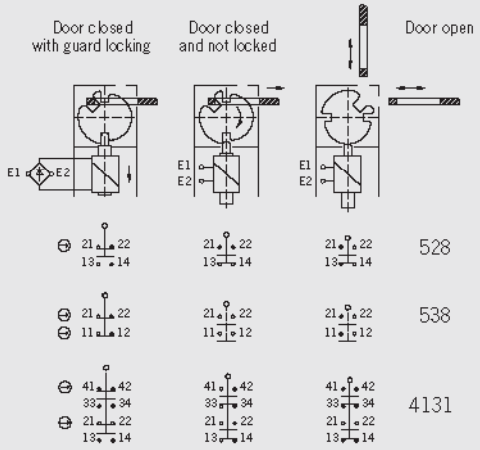
Parameter		Value	Unit
Connection		Screw terminal	
Version		M20 x 1.5	
Conductor cross-section max.		0.34 ... 1.5	mm^2
Degree of protection according to IEC 60529		IP 67	
Rated impulse withstand voltage U_{imp}		2.5	kV
Rated insulation voltage U_i		250	V AC/DC
Conventional thermal current I_{th}		4	A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

Plug connector SR11 connection

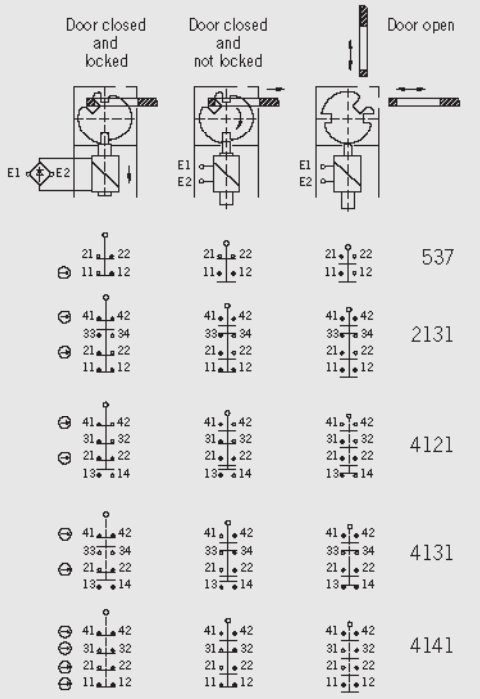
Parameter		Value	Unit
Connection		Plug connector	
Version		11-pin + PE	
Degree of protection according to IEC 60529		IP 65 1)	
Rated impulse withstand voltage U_{imp}		1.5	kV
Rated insulation voltage U_i		50	V AC/DC
Conventional thermal current I_{th}		4	A
Short circuit protection according to IEC 60269-1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

1) Screwed tight with the related plug connector (see page 86)

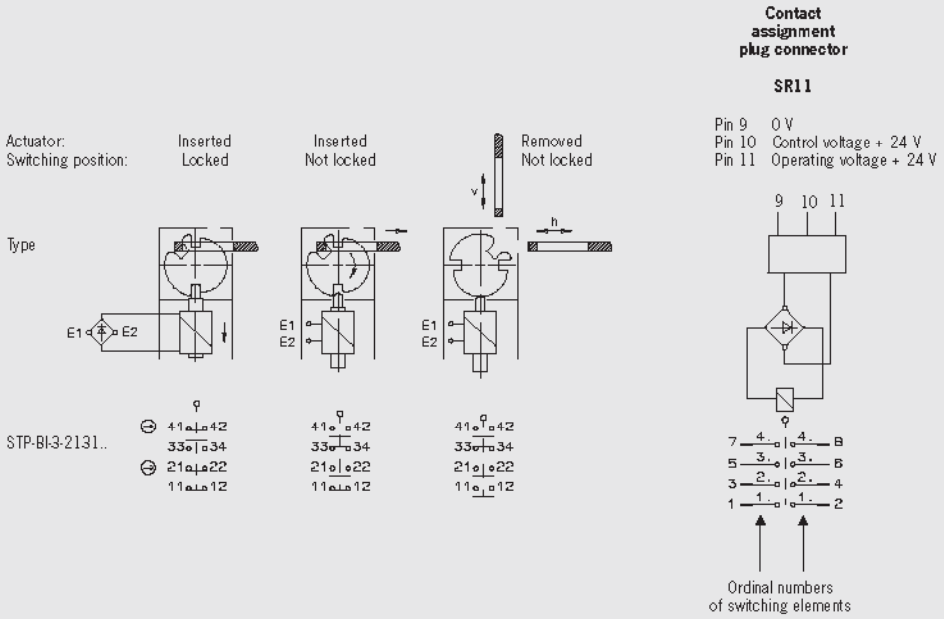
Switching functions STP1/STP2 without door monitoring contact



Switching functions STP3/STP4 with door monitoring contact



Switching functions STP-BI



Safety switch STP-TW 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

Parameter		Value		Unit
Material	Housing	Reinforced thermoplastic		
	Actuating head	Die-cast aluminum		
	Cam in actuating head	Stainless steel		
Mechanical life		1 x 10^6 operating cycles		
Ambient temperature		- 20 ... + 55		°C
Weight		approx. 0.65		kg
Max. approach speed		20		m/min
Actuating force		35		N
Extraction force (not locked)		30		N
Retention force		20		N
Locking force, max.		Approach direction		N
		From top (v)	Side (h)	
		2500	2500	
Locking force F_{zh} in accordance with test principles GS-ET-19		Approach direction		N
		From top (v)	Side (h)	
	Straight actuator	2000	2000	
Insertion depth (minimum required travel + permissible overtravel)		Actuator S standard		
Approach direction side (h)		24.5 + 5		mm
Approach direction from top (v)		24.5 + 5		mm

Switching element

Parameter	Value	Unit
Switching principle	Slow-action switching element	
Switching elements with 4 switching elements	**2131** 2 NC ⊖ + 1 NO + 1 NC	
Switching current, min., at DC 24 V	1	mA
Switching voltage, min., at 10 mA	12	V
Contact material	Silver alloy, gold flashed	

Guard locking

Parameter	Value	Unit
Solenoid operating voltage	AC/DC 24 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

Parameter		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 impulse withstand voltage U_{imp}		2.5	kV
Rated insulation voltage U_i		250	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	AC15	I_e 4 A U_e 230 V	
	DC13	I_e 4 A U_e 24 V	

Switching functions STP-TW