

# **EUCHNER**

## **Operating Instructions**

**Transponder-Coded Safety Switch with Guard Locking for Process Protection**  
**CTP-I.-AP Unicode/Multicode**

**EN**

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## 1. About this document

### 1.1. Scope

These operating instructions are valid for all CTP-I.-AP... from version V1.0.X to V1.1.X. These operating instructions, the document *Safety information* and any available data sheet form the complete user information for your device.



#### Important!

Make sure to use the operating instructions valid for your product version. Please contact the EUCHNER support team if you have any questions.

### 1.2. Target group

Design engineers and installation planners for safety systems on machines, as well as setup and servicing staff possessing special expertise in handling safety components.

### 1.3. Key to symbols

Symbol/depiction	Meaning
	Printed document
	Document is available for download at <a href="http://www.euchner.com">www.euchner.com</a>
 <b>DANGER</b> <b>WARNING</b> <b>CAUTION</b>	Safety precautions <b>Danger</b> of death or severe injuries <b>Warning</b> about possible injuries <b>Caution</b> slight injuries possible
 <b>NOTICE</b> <b>Important!</b>	<b>Notice</b> about possible device damage <b>Important</b> information
<b>Tip</b>	Useful information

### 1.4. Supplementary documents

The overall documentation for this device consists of the following documents:

Document title (document number)	Contents	
Safety information (2525460)	Basic safety information	
Operating instructions (2126290)	(this document)	
Declaration of conformity	Declaration of conformity	
Possibly enclosed data sheet	Item-specific information about deviations or additions	



#### Important!

Always read all documents to gain a complete overview of safe installation, setup and use of the device. The documents can be downloaded from [www.euchner.com](http://www.euchner.com). Simply enter the document number or the order number in the search box.

### 2. Correct use

Safety switches series CTP-I.-AP... are interlocking devices with guard locking for process protection (type 4) without safe monitoring of guard locking. Devices with unicode evaluation possess a high coding level, devices with multicode evaluation possess a low coding level.

In combination with a movable guard and the machine control, this safety component prevents dangerous machine functions from occurring while the guard is open. A stop command is triggered if the guard is opened during the dangerous machine function.

This means:

- › Starting commands that cause a dangerous machine function must become active only when the guard is closed.
- › Opening the guard triggers a stop command.
- › Closing a guard must not cause automatic starting of a dangerous machine function. A separate start command must be issued. For exceptions, refer to EN ISO 12100 or relevant C-standards.

Before the device is used, a risk assessment must be performed on the machine, e.g. in accordance with the following standards:

- › EN ISO 13849-1
- › EN ISO 12100
- › EN IEC 62061

Correct use includes observing the relevant requirements for installation and operation, particularly based on the following standards:

- › EN ISO 13849-1
- › EN ISO 14119
- › EN IEC 60204-1

The safety switch is allowed to be operated only in conjunction with the intended EUCHNER actuator and the related connection components from EUCHNER. If different actuators or other connection components are used, EUCHNER provides no warranty for safe function.




	<p><b>Important!</b></p> <ul style="list-style-type: none"> <li>› The user is responsible for the proper integration of the device into a safe overall system. For this purpose, the overall system must be validated, e.g. in accordance with EN ISO 13849-2.</li> <li>› It is only allowed to use components that are permissible in accordance with the table below.</li> </ul>
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Table 1: Possible combinations for CTP components

Safety switch	Actuator	
	A-C-H...	A-C-H...-165497
CTP-I-... Unicode/Multicode		
Key to symbols		Combination possible, guard locking for process protection
		Combination not permissible

### 3. Description of the safety function

Devices from this series feature the following safety functions:

#### Monitoring of the position of the guard (interlocking device according to EN ISO 14119)

- › Safety function (see chapter 6.8. *Switching states on page 8*):
  - The safety outputs are switched off when the guard is open (monitoring of the door position).
- › Safety characteristics: category, Performance Level, PFH<sub>D</sub> (see chapter 13. *Technical data on page 22*).

### 4. Exclusion of liability and warranty

In case of failure to comply with the conditions for correct use stated above, or if the safety regulations are not followed, or if any servicing is not performed as required, liability will be excluded and the warranty void.

### 5. General safety precautions

Safety switches fulfill personnel protection functions. Incorrect installation or tampering can lead to fatal injuries to personnel.

Check the safe function of the guard particularly

- › after any setup work
- › after the replacement of a system component
- › after an extended period without use
- › after every fault

Independent of these checks, the safe function of the guard should be checked at suitable intervals as part of the maintenance schedule.



#### **WARNING**

Danger to life due to improper installation or due to bypassing (tampering). Safety components fulfill a personnel protection function.

- › Safety components must not be bypassed, turned away, removed or otherwise rendered ineffective. On this topic pay attention in particular to the measures for reducing the possibility of bypassing according to EN ISO 14119:2013, section 7.
- › The switching operation must be triggered only by actuators designated for this purpose.
- › Prevent bypassing by means of replacement actuators (only for multicode evaluation). For this purpose, restrict access to actuators and to keys for releases, for example.
- › Mounting, electrical connection and setup only by authorized personnel possessing the following knowledge:
  - specialist knowledge in handling safety components
  - knowledge about the applicable EMC regulations
  - knowledge about the applicable regulations on operational safety and accident prevention.



#### **Important!**

Prior to use, read the operating instructions and keep these in a safe place. Ensure the operating instructions are always available during mounting, setup and servicing. For this reason you should archive a printed copy of the operating instructions. You can download the operating instructions from [www.euchner.com](http://www.euchner.com).

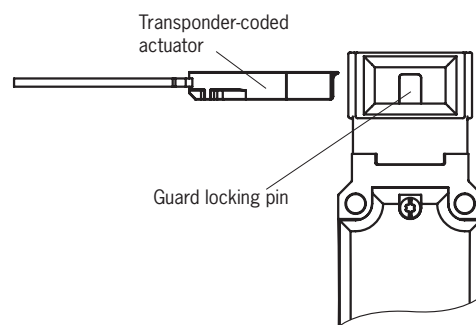
### 6. Function

The device monitors the position of movable guards.

The system consists of the following components: coded actuator (transponder) and switch.

Whether the device learns the complete actuator code (unicode) or not (multicode) depends on the respective version.

- › **Devices with unicode evaluation:** The actuator must be assigned to the safety switch by a teach-in operation so that it is detected by the system. This unambiguous assignment ensures a particularly high level of protection against tampering. The system thus possesses a high coding level.
- › **Devices with multicode evaluation:** Unlike systems with unicode evaluation, on multicode devices a specific code is not requested but instead it is only checked whether the actuator is of a type that can be detected by the system (multicode evaluation). There is no exact comparison of the actuator code with the taught-in code in the safety switch (unicode evaluation). The system possesses a low coding level.



When the guard is closed, the actuator is moved into the safety switch. When the operating distance is reached, power is supplied to the actuator by the switch and data are transferred.

If a permissible code is detected, the safety outputs are switched on.

The safety outputs and the monitoring output (OD) are switched off when the guard is opened.

In the event of a fault in the safety switch, the safety outputs are switched off and the DIA LED illuminates red. The occurrence of faults is detected at the latest on the next demand to close the safety outputs (e.g. on starting).

#### 6.1. Guard locking for process protection

To prevent that, e.g., a production process is interrupted unintentionally by opening a guard, the device has guard locking for process protection.

The position of the guard locking does not have any effect on the state of the safety outputs.

#### 6.2. Switch-on check for guard locking

This device checks whether the guard locking is actually active after control. Should this not be the case, the device switches off the safety outputs again. Important: This function does not represent guard lock monitoring in accordance with EN 14119 and is therefore not allowed to be used as guard locking for the protection of personnel.

#### 6.3. Door position monitoring output (OD)

Many versions have a door position monitoring output. The door position monitoring output is switched on as soon as the actuator is inserted into the switch head (state: guard closed and not locked). The door position monitoring output also remains switched on when guard locking is active.

#### 6.4. Diagnostic monitoring output (OI)

The diagnostic monitoring output is switched on in the event of a fault (switch-on condition as for DIA LED).

#### 6.5. Guard lock monitoring output (OL)

The guard lock monitoring output is switched on when guard locking is active.

## 6.6. Guard locking on version CTP-I1

(guard locking actuated by spring force and released by power-ON)

**Activating guard locking:** close guard; no voltage at the solenoid.

**Releasing guard locking:** apply voltage to the solenoid.

The spring-operated guard locking functions in accordance with the closed-circuit current principle. If the voltage is interrupted at the solenoid, the guard locking remains active and the guard cannot be opened directly.



### Important!

If the guard is open when the power supply is interrupted and is then closed, guard locking is activated. This can lead to persons being locked in unintentionally.

The actuator cannot be pulled out of the switch and the guard is locked as long as the guard locking pin is extended.

If voltage is applied to the guard locking solenoid, the guard locking pin is retracted and the actuator is released. The guard can be opened.

## 6.7. Guard locking on version CTP-I2

(guard locking actuated by power-ON and released by spring force)

**Activating guard locking:** apply voltage to the solenoid.

**Releasing guard locking:** disconnect voltage from the solenoid.

The magnetically actuated guard locking operates in accordance with the open-circuit current principle. If the voltage is interrupted at the solenoid, the guard locking is released and the guard can be opened directly!

The guard can be opened as long as no voltage is applied to the guard locking solenoid.

If the voltage is applied to the guard locking solenoid, the guard locking pin is held in the extended position and the guard is locked.

## 6.8. Switching states

The detailed switching states for your switch can be found in the system status table. All safety outputs, monitoring outputs and display LEDs are described there.

	Guard closed and locked	Guard closed and not locked	Guard open
Voltage at guard locking solenoid CTP-I1	off	on	(irrelevant)
Voltage at guard locking solenoid CTP-I2	on	off	(irrelevant)
Safety outputs F01A and F01B	on	on	off
Guard lock monitoring output OL	on	off	off
Door position monitoring output OD	on	on	off



### 7. Manual release



#### Important!

No further release functions can be retrofitted on Extended variants with control elements in position 1 (S1) and position 2 (S2).

Some situations require the guard locking to be released manually (e.g. malfunctions or an emergency). A function test should be performed after release.

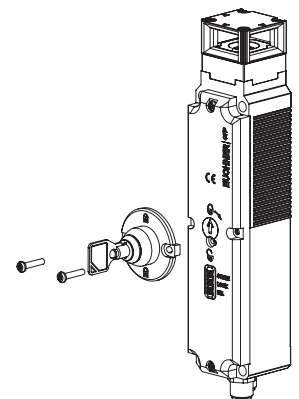
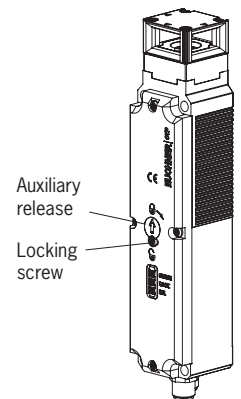
Further information on this topic can be found in the standard EN ISO 14119:2013, section 5.7.5.1. The device can feature the following release functions:

#### 7.1. Auxiliary release and auxiliary key release



#### Important!


- › The actuator must not be under tensile stress during manual release.
- › After use, reset the auxiliary release and screw in and seal the locking screw (with sealing lacquer, for example).
- › The auxiliary key release must not be used to lock the switch during servicing to prevent activation of guard locking, for example.
- › Loss of the release function due to mounting errors or damage during mounting.
- › Check the release function every time after mounting.
- › Observe the notes on any enclosed data sheets.
- › To prevent tampering, the auxiliary release must be sealed with sealing lacquer, for example, before the switch is set up.



In the event of malfunctions, the guard locking can be released with the auxiliary release or the auxiliary key release irrespective of the state of the solenoid.

The monitoring output OL is switched off; OD can assume an undefined state. Open the guard and close it again after resetting the auxiliary release or auxiliary key release. The device will then operate normally again.

##### 7.1.1. Actuating auxiliary release

1. Unscrew locking screw.
  2. Using a screwdriver, turn the auxiliary release to  in the direction of the arrow.
- ➔ Guard locking is released.

##### 7.1.2. Actuating auxiliary key release

On devices with auxiliary key release (can be retrofitted), simply turn the key to release. Function as for auxiliary release. For mounting, see the auxiliary key release supplement.

## 7.2. Emergency release

This permits opening of a locked guard from outside the danger area without tools. For mounting, see the mounting supplement.



### Important!

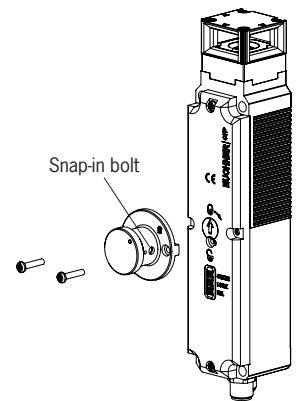
- › It must be possible to operate the emergency release manually from outside the protected area without tools.
- › The emergency release must possess a marking indicating that it may be used only in an emergency.
- › The actuator must not be under tensile stress during manual release.
- › The emergency release must be sealed or the misuse of the release function must be prevented in the control system.
- › The release function meets all other requirements from EN ISO 14119.
- › The emergency release meets the requirements of Category B according to EN ISO 13849-1:2015.
- › Loss of the release function due to mounting errors or damage during mounting.
- › Check the release function every time after mounting.
- › Observe the notes on any enclosed data sheets.

### 7.2.1. Actuating emergency release

- › Turn the emergency release clockwise until it clicks into place.
- ➔ Guard locking is released.

To reset, press the snap-in bolt inward using a small screwdriver or similar tool and turn the emergency release back.

The monitoring output OL is switched off; OD can assume an undefined state. Open the guard and close it again after resetting the emergency release. The device will then operate normally again.



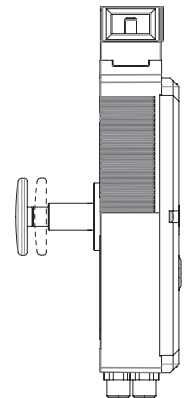
## 7.3. Escape release (optional)

This permits opening of a locked guard from the danger area without tools (see chapter 13.3. Dimension drawing for safety switch CTP... on page 25).



### Important!

- › It must be possible to actuate the escape release manually from inside the protected area without tools.
- › It must not be possible to reach the escape release from the outside.
- › The actuator must not be under tensile stress during manual release.
- › The escape release meets the requirements of Category B according to EN ISO 13849-1:2015.



### 7.3.1. Actuating escape release

- › Press the red release knob to the end stop.
- ➔ Guard locking is released.

Pull the knob out again to reset.

The monitoring output OL is switched off; OD can assume an undefined state. Open the guard and close it again after resetting the escape release. The device will then operate normally again.

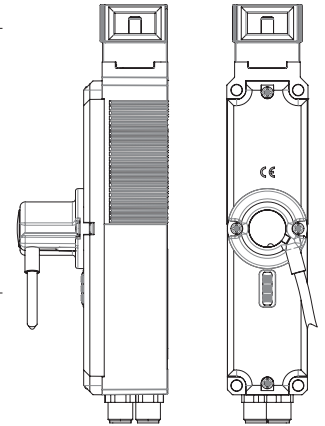
### 7.4. Wire front release (bowden)

Release via a pull wire. Depending on the type of attachment, the wire front release can be used as a front release or escape release.



#### Important!

- › The wire front release meets the requirements of Category B according to EN ISO 13849-1:2015.
- › The correct function depends on the laying of the pull wire and the attachment of the pull handle, and this is the responsibility of the plant manufacturer.
- › The actuator must not be under tensile stress during manual release.



#### 7.4.1. Laying wire front release



#### Important!

- › Loss of the release function due to mounting errors, damage or wear.
- › Check the release function every time after mounting.
- › When routing the wire front release, ensure that it operates smoothly.
- › Observe the min. bending radius (100 mm) and minimize the number of bends.
- › The switch is not allowed to be opened.
- › Observe the notes on the enclosed data sheets.

## 8. Changing the approach direction

The approach direction needs to be changed only if the switch is to be approached from the rear.

Proceed as follows:

1. Remove the screws from the safety switch
2. Set the required direction
3. Tighten the screws with a torque of 1.2 Nm

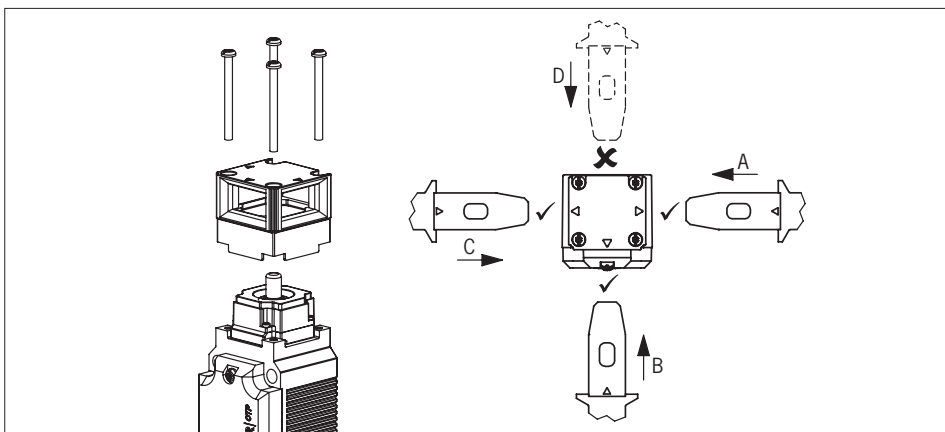


Fig. 1: Changing the approach direction

## 9. Mounting



### CAUTION

Safety switches must not be bypassed (bridging of contacts), turned away, removed or otherwise rendered ineffective.

- › Observe EN ISO 14119:2013, section 7, for information about reducing the possibilities for bypassing an interlocking device.



### NOTICE

Risk of damage to equipment and malfunctions as a result of incorrect installation.

- › Safety switches and actuators must not be used as an end stop.
- › Observe EN ISO 14119:2013, sections 5.2 and 5.3, for information about mounting the safety switch and the actuator.  
The following guidelines must be observed:
  - Mounting with screws of property class 8.8 or higher.
  - The minimum screw diameter for CTP devices is 4 mm.
  - Secure the fixing material against loosening (e.g. by means of medium-strength positive screw locking).
- › Protect the switch head against damage, as well as penetrating foreign objects such as swarf, sand and blasting shot, etc.
- › Observe the min. door radii (see chapter 13.4.1. *Dimension drawing for actuator CTP-... on page 27*).
- › Observe the tightening torque for mounting the switch (max.1.4 Nm).
- › To prevent tampering, the auxiliary release must be sealed with sealing lacquer, for example, before the switch is set up.



### CAUTION

Device damage or malfunctions caused by material changes due to the environment.

- › In accordance with section 6.3 of EN ISO 14119:2014, the environmental influences (e.g. direct UV radiation or corrosion) must be checked before a guard locking device is used.
- › Contact EUCHNER if you have any questions about environmental influences or about use in aggressive environments.

A clearance of 12 mm must be maintained around the actuator head (see Fig. 2).

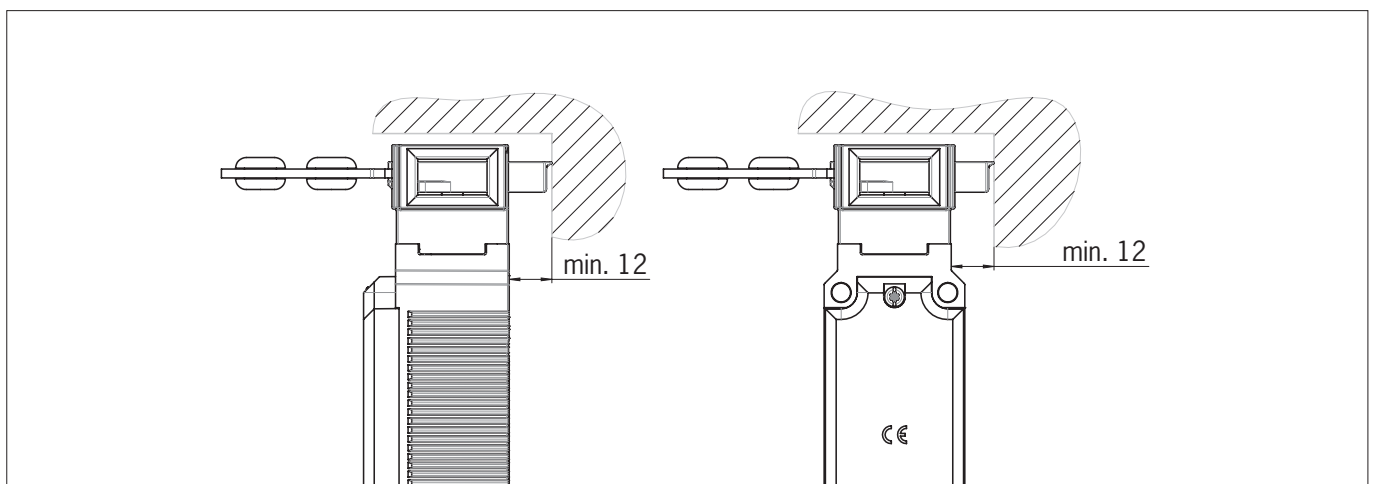


Fig. 2: Actuator head clearance

### 10. Electrical connection

	<p><b>WARNING</b></p> <p>In the event of a fault, loss of the safety function due to incorrect connection.</p> <ul style="list-style-type: none"> <li>› To ensure safety, both safety outputs (FO1A and FO1B) must always be evaluated.</li> <li>› Monitoring outputs must not be used as safety outputs.</li> <li>› Lay the connecting cables with protection to prevent the risk of short circuits.</li> </ul>
	<p><b>CAUTION</b></p> <p>Risk of damage to equipment or malfunctions as a result of incorrect connection.</p> <ul style="list-style-type: none"> <li>› In devices with IMP/IMM inputs, the power supply for the evaluation electronics is separate from the power supply for the guard locking solenoid.</li> <li>› The device generates its own test pulses on the output lines FO1A/FO1B. A downstream control system must tolerate these test pulses, which may have a length of up to 0.35 ms. Depending on the inertia of the downstream device (control system, relay, etc.), this can lead to short switching processes.</li> <li>› The inputs on an evaluation unit connected must be positive-switching, as the two outputs on the safety switch deliver a level of +24 V in the switched-on state.</li> <li>› All the electrical connections must either be isolated from the mains supply by a safety transformer according to IEC 61558-2-6 with limited output voltage in the event of a fault, or by other equivalent insulation measures (PELV).</li> <li>› All electrical outputs must have an adequate protective circuit for inductive loads. The outputs must be protected with a free-wheeling diode for this purpose. Varistors and RC interference suppression units must not be used.</li> <li>› Power devices which are a powerful source of interference must be installed in a separate location away from the input and output circuits for signal processing. The cable routing for safety circuits should be as far away as possible from the cables of the power circuits.</li> <li>› To avoid EMC interference, the physical environmental and operating conditions at the installation site of the device must comply with the requirements according to the standard EN 60204-1.</li> <li>› Pay attention to any interference fields from devices such as frequency converters or induction heating systems. Observe the EMC instructions in the manuals from the respective manufacturer.</li> </ul>
	<p><b>Important!</b></p> <p>If the device does not appear to function when operating voltage is applied (e.g. green STATE LED does not flash), the safety switch must be returned unopened to the manufacturer.</p>

#### 10.1. Notes about

	<p><b>Important!</b></p> <ul style="list-style-type: none"> <li>› This device is intended to be used with a Class 2 power source in accordance with UL1310. As an alternative an LV/C (Limited Voltage/Current) power source with the following properties can be used: This device shall be used with a suitable isolating source in conjunction with a fuse in accordance with UL248. The fuse shall be rated max. 3.3 A and be installed in the max. 30 V DC power supply to the device in order to limit the available current to comply with the UL requirements. Please note possibly lower connection ratings for your device (refer to the technical data).</li> <li>› For use and application as per the requirements of UL <sup>1)</sup> a connecting cable listed under the UL category code CYJV/7 must be used.</li> </ul> <p><small>1) Note on the scope of the UL approval: the devices have been tested as per the requirements of UL508 and CSA/C22.2 no. 14 (protection against electric shock and fire).</small></p>
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## 10.2. Safety in case of faults

- › The operating voltage UB and the solenoid voltage IMP are reverse polarity protected.
- › The safety outputs F01A/F01B are short circuit-proof.
- › A short circuit between F01A and F01B is detected by the switch.
- › A short circuit in the cable can be excluded by laying the cable with protection.

## 10.3. Fuse protection for power supply

The power supply must be provided with fuse protection depending on the number of switches and the current required for the outputs. The following rules apply:

### Max. current consumption $I_{max}$

$$I_{max} = I_{UB} + I_{F01A+F01B} + I_{OL} + I_{OD}$$

$$I_{UB} = \text{Switch operating current (40 mA)}$$

$$I_{OL}/I_{OD} = \text{Load current of monitoring outputs (max. 50 mA per monitoring output)}$$

$$I_{F01A+F01B} = \text{Load current of safety outputs F01A + F01B (2 x max. 150 mA)}$$

## 10.4. Requirements for connecting cables



### CAUTION

Risk of damage to equipment or malfunctions as a result of incorrect connecting cables.

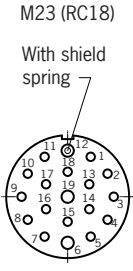
- › Use connection components and connecting cables from EUCHNER.
- › If other connection components are used, the requirements in the following table apply. EUCHNER provides no warranty for safe function in case of failure to comply with these requirements.

Observe the following requirements with respect to the connecting cables:

Parameter	Value				Unit
	M12/8-pin	M12/5-pin		M23/19-pin	
Recommended cable type	LIYY 8 x 0.25	LIYY 5 x 0.25	LIYY 5 x 0.34	LI9Y11Y 16 x 0.5 + 3 x 1.0	mm <sup>2</sup>
Cable	8 x 0.25	5 x 0.25	5 x 0.34	16 x 0.5      3 x 1.0	mm <sup>2</sup>
Cable resistance R max.	60				Ω/km
Inductance L max.	0.65				mH/km
Capacitance C max.	120				nF/km

### 10.5. Connector assignment of safety switch CTP-...-AP-...-SH-... with plug connector M23 (RC18)

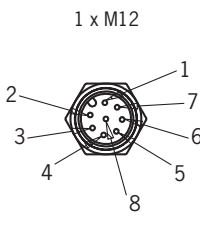
Wiring diagram B

Plug connector (view of connection side)	Pin	Designation	Function	Conductor coloring of connecting cable <sup>1)</sup>
 <p>M23 (RC18) With shield spring</p>	1	IMP	Solenoid operating voltage, 24 V DC	VT
	2	-	n.c.	RD
	3	-	n.c.	GY
	4	F01A	Safety output, channel A	RD/BU
	5	F01B	Safety output, channel B	GN
	6	UB	Electronics operating voltage, 24 V DC	BU
	7	RST	Reset input	GY/PK
	8	OD	Door position monitoring output	GN/WH
	9	OI	Diagnostic monitoring output	YE/WH
	10	OL	Guard lock monitoring output	GY/WH
	11	-	n.c.	BK
	12	FE	Functional earth (must be connected to meet the EMC requirements)	GN/YE
	13	-	n.c.	PK
	14	-	n.c.	BN/GY
	15	-	n.c.	BN/YE
	16	-	n.c.	BN/GN
	17	-	n.c.	WH
	18	IMM	Solenoid operating voltage, 0 V DC	YE
	19	OVUB	Electronics operating voltage, 0 V DC	BN

1) Only for standard EUCHNER connecting cable

### 10.6. Connector assignment of safety switch CTP-...-AP-...-SA-... with plug connector M12, 8-pin

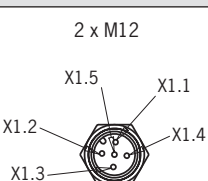
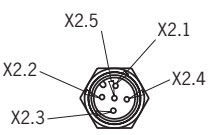
Wiring diagram C

Plug connector (view of connection side)	Pin	Designation	Function	Conductor coloring of connecting cable <sup>1)</sup>
 <p>1 x M12</p>	1	IMP	Solenoid operating voltage, 24 V DC	WH
	2	UB	Electronics operating voltage, 24 V DC	BN
	3	F01A	Safety output, channel A	GN
	4	F01B	Safety output, channel B	YE
	5	OI	Diagnostic monitoring output	GY
	6	OD	Door position monitoring output	PK
	7	OL	Guard lock monitoring output	BU
	8	0 V	Electronics and solenoid operating voltage, 0 V DC	RD

1) Only for standard EUCHNER connecting cable

### 10.7. Connector assignment of safety switch CTP-...-AP-...-SII-... with plug connectors 2 x M12, 5-pin

Wiring diagram D

Plug connector (view of connection side)	Pin	Designation	Function	Conductor coloring of connecting cable <sup>1)</sup>
 <p>2 x M12 X1.1, X1.2, X1.3, X1.4, X1.5</p>	X 1.1	UB	Electronics operating voltage, 24 V DC	BN
	X 1.2	FO1A	Safety output, channel A	WH
	X 1.3	OVUB	Electronics operating voltage, 0 V DC	BU
	X 1.4	FO1B	Safety output, channel B	BK
	X 1.5	-	n.c.	GY
 <p>X2.1, X2.2, X2.3, X2.4, X2.5</p>	X 2.1	-	n.c.	BN
	X 2.2	-	n.c.	WH
	X 2.3	IMM	Solenoid operating voltage, 0 V DC	BU
	X 2.4	IMP	Solenoid operating voltage, 24 V DC	BK
	X 2.5	-	n.c.	GY

1) Only for standard EUCHNER connecting cable

### 10.8. Connection of CTP-AP

Connect the device as shown in Fig. 3. The monitoring outputs can be routed to a control system.

**The following applies to devices with RST input:** The switches can be reset using the RST input. To do this, a voltage of 24 V is applied to the RST input for at least 3 s. The RST input must be connected to 0 V if it is not used.



**WARNING**

In the event of a fault, loss of the safety function due to incorrect connection.  
 ▶ To ensure safety, both safety outputs (FO1A and FO1B) must always be evaluated.



**Important!**

▶ The example shows only an excerpt that is relevant for connection of the CTP system. The example illustrated here does not show complete system planning. The user is responsible for safe integration into the overall system. Detailed application examples can be found at [www.euchner.com](http://www.euchner.com). Simply enter the order number of your switch in the search box. You will find all available connection examples for the device in *Downloads*.

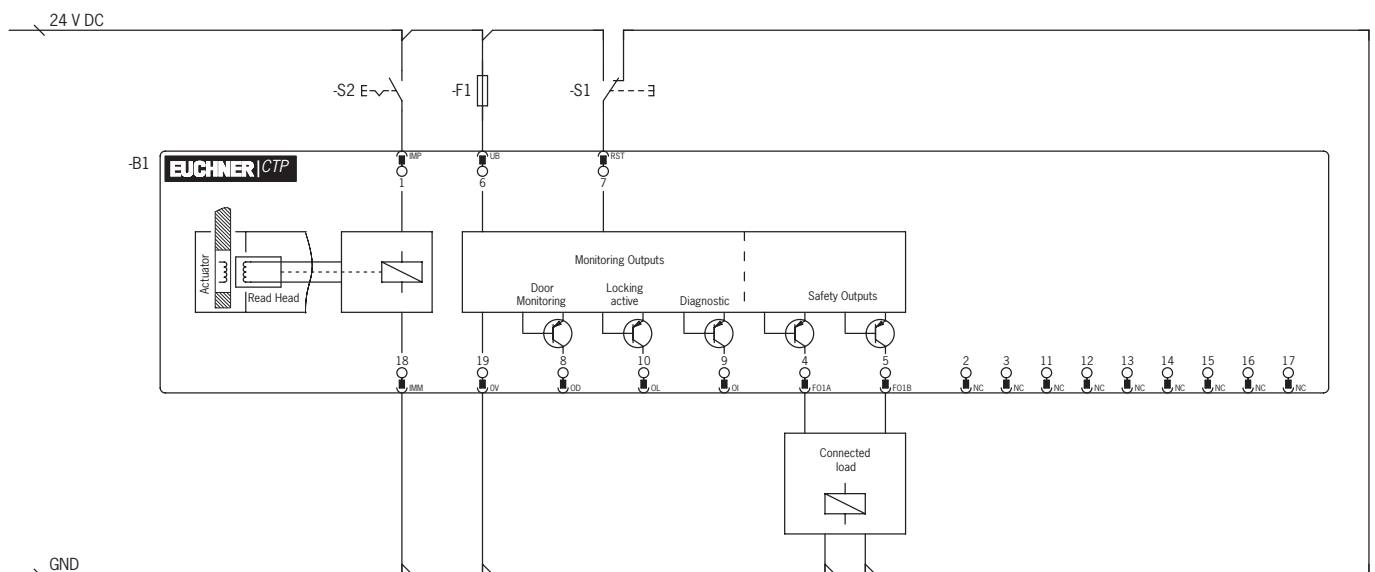


Fig. 3: Connection example, version with plug connector M23



### 10.9. Notes on operation with safe control systems

Observe the following guidelines for connection to safe control systems:

- › Use a common power supply for the control system and the connected safety switches.
- › The device tolerates voltage interruptions on UB of up to 5 ms. Tap the supply voltage directly from the power supply unit. If the power supply is connected to a terminal of a safe control system, this output must provide sufficient electrical current.
- › The safety outputs (FO1A and FO1B) can be connected to the safe inputs of a control system. Prerequisite: the input must be suitable for pulsed safety signals (OSSD signals, e.g. from light grids). The control system must tolerate test pulses on the input signals. This normally can be set up by parameter assignment in the control system. Observe the notes of the control system manufacturer. For the pulse duration of your safety switch, refer to chapter 13. *Technical data on page 22.*
- › The following applies to single-channel control of guard locking:  
The guard locking (IMM) and the control system must have the same ground.
- › For dual-channel control of the solenoid voltage by safe outputs of a control system, the following points must be observed (see also Fig. 4 on page 17):
  - If possible, switch off the pulsing of the outputs in the control system.
  - Clock pulses up to a length of max. 5 ms are tolerated.

A detailed example of connecting and setting the parameters of the control system is available for many devices at [www.euchner.com](http://www.euchner.com), in the area *Downloads/Applications/CTP*. The features of the respective device are dealt with there in greater detail.

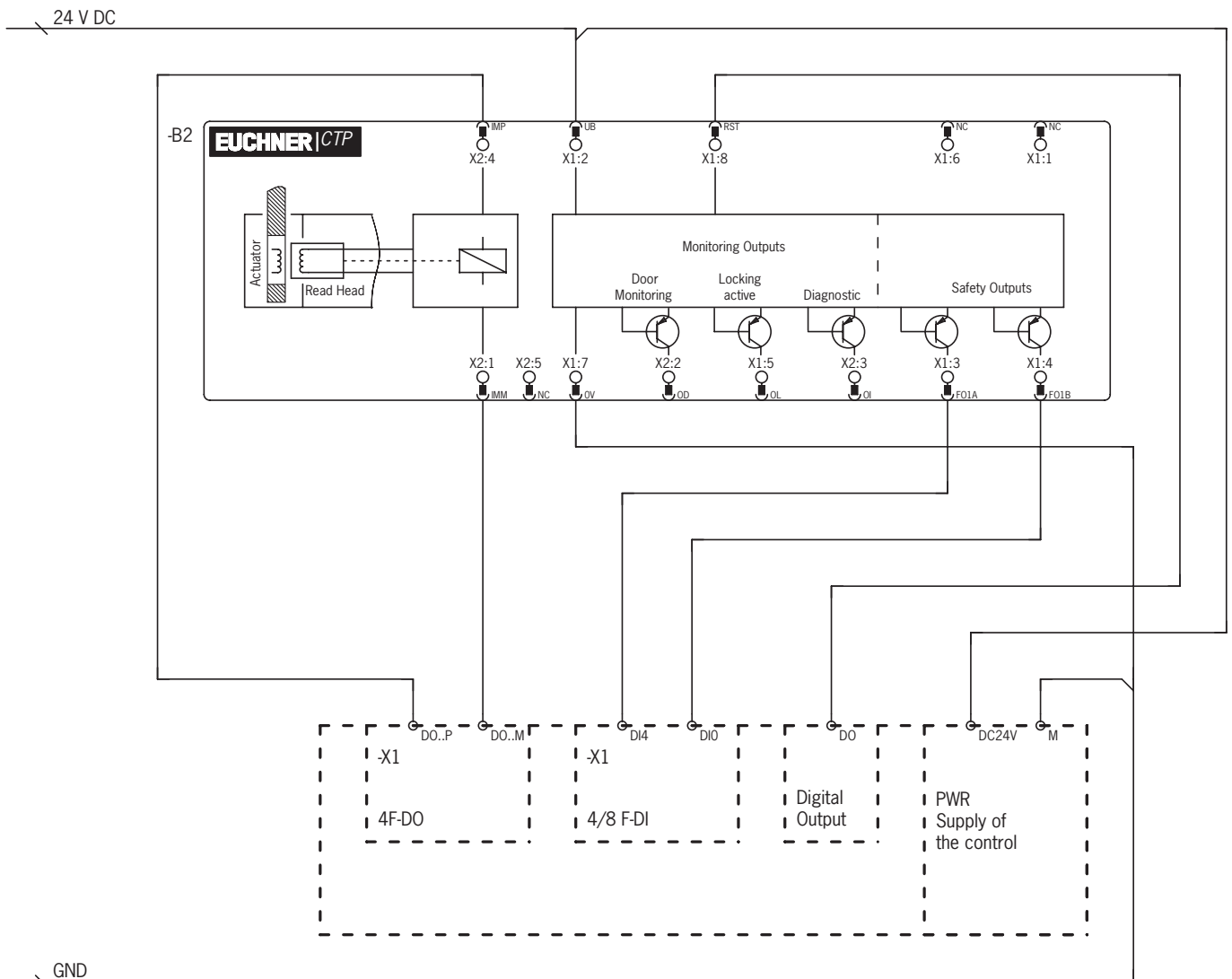


Fig. 4: Connection example for the connection to ET200

## 10.10. Connection of guard locking control

### 10.10.1. Guard locking control for variants with IMM connection

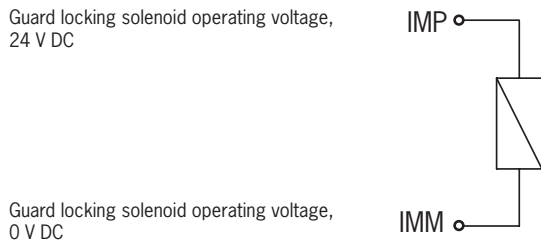


Fig. 5: Connection example with IMM connection

### 10.10.2. Guard locking control for variants without IMM connection

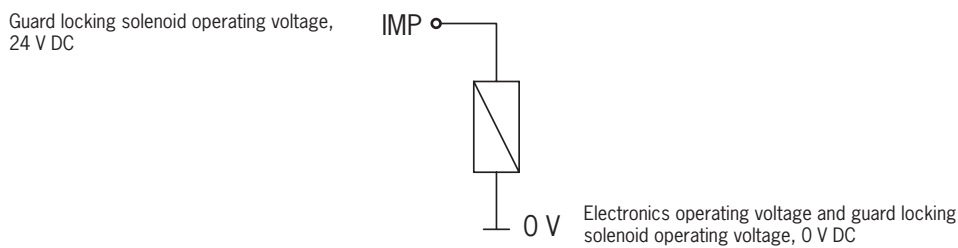


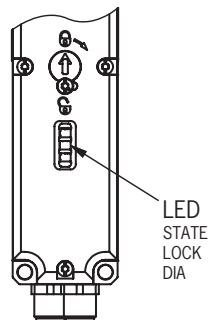
Fig. 6: Connection example without IMM connection

## 11. Setup

### 11.1. LED displays

You will find a detailed description of the signal functions in chapter 12. *System status table on page 21.*

LED	Color
STATE	green
LOCK	yellow
DIA	red



### 11.2. Teaching-in actuator (only for unicode evaluation)

The actuator must be allocated to the safety switch using a teach-in function before the system forms a functional unit.

During a teach-in operation, the safety outputs are switched off, i.e. the system is in the safe state.

The teach-in operation is automatic. The number of possible teach-in operations is unlimited.



#### Tip!

Prior to switching on, close the guard on which the actuator to be taught-in is installed. The teach-in operation starts immediately after switching on. This feature simplifies above all teach-in with series connections and on large installations.



#### Important!

- › The teach-in operation can be performed only if the device does not have any internal fault.
- › Devices in the condition as supplied remain in teach-in standby state until they have successfully taught-in the first actuator. Once taught-in, switches remain in the teach-in standby state for approx. 3 min. after each switch-on.
- › The safety switch disables the code of the preceding device if teach-in is carried out for a new actuator. Teach-in is not possible again immediately for this device if a new teach-in operation is carried out. The disabled code is enabled again in the safety switch only after a third code has been taught-in.
- › The safety switch can be operated only with the last actuator taught-in.
- › If the switch detects the actuator that was most recently taught-in when in the teach-in standby state, this state is ended immediately and the switch changes to normal operation.
- › The actuator to be taught-in is not activated if it is within the actuating range for less than 30 s.

#### 1. Establish teach-in standby:

- Devices in the condition as supplied: unlimited teach-in standby after switching on
- Switch already taught-in: teach-in standby is available for approx. 3 min. after switching on

➔ Teach-in standby indication, STATE LED flashes 3x repeatedly.

#### 2. Insert the actuator during teach-in standby.

➔ The automatic teach-in operation starts (duration approx. 30 s).

During the teach-in operation the STATE LED flashes (approx. 1 Hz).

Alternate flashing of the STATE and DIA LEDs acknowledges the successful teach-in operation.

Teach-in errors are indicated by the illumination of the red DIA LED and a flashing code of the green STATE LED (see chapter 12. *System status table on page 21.*)

3. Switch off operating voltage UB (min. 3 s).
  - ➔ The code of the actuator that was just taught-in is activated in the safety switch.
4. Switch on operating voltage UB.
  - ➔ The device operates normally.

### 11.3. Functional check



#### WARNING

- Danger of fatal injury as a result of faults in installation and the functional check.
- › Before carrying out the functional check, make sure that there are no persons in the danger area.
  - › Observe the valid accident prevention regulations.

#### 11.3.1. Mechanical function test

The actuator must slide easily into the actuating head. Close the guard several times to check the function. For devices with mechanical release (emergency release or escape release), the correct function of the release must be checked as well.

#### 11.3.2. Electrical function test



#### NOTICE

This function test applies if the process is allowed to run only with process protection guard locking active. The procedure may vary depending on the application.

After installation and any fault, the safety function and the guard locking for process protection must be fully checked. Proceed as follows:

1. Switch on operating voltage.
  - ➔ The machine must not start automatically.
  - ➔ The safety switch carries out a self-test. The green STATE LED then flashes at regular intervals.
2. Close all guards. Activate guard locking.
  - ➔ The machine must not start automatically. It must not be possible to open the guard.
  - ➔ The green STATE LED and the yellow LOCK LED are illuminated continuously.
3. Deactivate guard locking and enable operation in the control system.
4. Open the guard.
  - ➔ The machine must switch off and it must not be possible to start it as long as the guard is open.

Repeat steps 2 - 4 for each guard.

### 12. System status table

Operating mode	Actuator/door position	Safety outputs F01A and F01B	Guard lock monitoring output OL	Door position monitoring output OD	LED indicator Output			State
					STATE (green)	D/A (red) and diagnostic monitoring output OI	LOCK (yellow)	
Normal operation	closed	on	on	on		○		Normal operation, door closed and locked
	closed	on	off	on		○	○	Normal operation, door closed and <b>not</b> locked
	open	off	off	off	1 x	○	○	Normal operation, door open. On the version with switch-on check for the guard locking (see chapter 6.2, <i>Switch-on check for guard locking on page 7</i> ), this state is also indicated if the guard locking is not yet active 1 s after control (malfunction).
Teach-in operation (only unicode)	open	off	off	off	3 x	○	○	Device in teach-in standby
	closed	off	X	on	1 Hz	○	○	Teach-in operation
	X	off	X	X			○	Positive acknowledgment after completion of teach-in operation
Fault display	X	off	X	X	1 x		○	Fault in teach-in operation (only unicode). Actuator removed from the actuating range prior to the end of the teach-in operation or faulty actuator detected.
	X	off	off	off	2 x		○	Input error Test pulses on the safety outputs cannot be read due to asynchronous tests pulses on UB.
	X	off	off	off	3 x		○	Read error (e.g. actuator faulty)
	X	off	off	off	4 x		○	Output error (e.g. short circuit, loss of switching ability)
	X	off	X	X	5 x		○	Disabled actuator detected
	X	off	off	off	○		X	Internal fault

Key to symbols	○			LED not illuminated
				LED illuminated
	1 Hz			LED flashes at 1 Hz
	3 x			LED flashes three times, and this is then repeated
				LEDs flash alternately
	X			Any state

After the cause has been remedied, faults can generally be reset by opening and closing the guard. If the fault is still displayed afterward, use the reset function or briefly interrupt the power supply. Contact the manufacturer if the fault could not be reset after restarting.



#### Important!

If you do not find the displayed device status in the system status table, this indicates an internal device fault. In this case, you should contact the manufacturer.

## 13. Technical data



### NOTICE

If a data sheet is included with the product, the information on the data sheet applies.

### 13.1. Technical data for safety switch CTP-AP

Parameter	Value			Unit
	min.	typ.	max.	
<b>General</b>				
Material - Switch head - Switch housing	Die-cast zinc Reinforced thermoplastic			
Installation position	Any			
Degree of protection	with plug connector M12	IP67/IP69/IP69K		
	with plug connector M23	IP67 (screwed tight with the related mating connector)		
Safety class	III			
Degree of contamination	3			
Mechanical life	1 x 10 <sup>6</sup> operating cycles			
Ambient temperature at UB = 24 V	-20	-	+55	°C
Actuator approach speed, max.	20			m/min.
Actuating/extraction/retention force at 20 °C	10/20/20			N
Locking force F <sub>max</sub> <sup>1)</sup>	3,900			N
Locking force F <sub>Zh</sub> <sup>1)</sup> acc. to EN ISO 14119	F <sub>Zh</sub> = F <sub>max</sub> /1.3 = 3,000			N
Weight	Approx. 0.42			kg
Connection (depending on version)	2 plug connectors M12, 5- and 8-pin / 1 plug connector RC18, 19-pin / 1 plug connector M12, 8-pin			
Operating voltage UB (reverse polarity protected, regulated, residual ripple < 5%)	24 ± 15% (PELV)			V DC
Current consumption I <sub>UB</sub>	40			mA
The following applies to the approval acc. to UL	Operation only with UL Class 2 power supply or equivalent measures			
Switching load acc. to UL	DC 24 V, class 2			
External fuse (operating voltage UB) <sup>2)</sup>	0.25	-	8	A
External fuse (solenoid operating voltage IMP) <sup>2)</sup>	0.5	-	8	A
Rated insulation voltage U <sub>i</sub>	-	50	-	V
Rated impulse withstand voltage U <sub>imp</sub>	-	0.5	-	kV
Rated conditional short-circuit current	100			A
Shock and vibration resistance	Acc. to EN 60947-5-3			
EMC protection requirements	Acc. to EN 60947-5-3			
Ready delay	-	-	1	s
Risk time	-	-	260	ms
Turn-on time	-	-	400	ms
Discrepancy time	-	-	10	ms
Test pulse duration	0.35			ms
Frequency band	120 ... 130			kHz
<b>Safety outputs F01A/F01B</b> Semiconductor outputs, p-switching, short circuit-proof				
- Output voltage U <sub>F01A</sub> /U <sub>F01B</sub> <sup>3)</sup>				
HIGH U <sub>F01A</sub> /U <sub>F01B</sub>	UB - 1.5	-	UB	V DC
LOW U <sub>F01A</sub> /U <sub>F01B</sub>	0	-	1	
Switching current per safety output	1	-	150	mA
Utilization category acc. to EN 60947-5-2	DC-13 24V 150 mA Caution: outputs must be protected with a free-wheeling diode in case of inductive loads			
Switching frequency <sup>4)</sup>	0.5			Hz

Parameter	Value			Unit
	min.	typ.	max.	
<b>Monitoring outputs OL, OI, OD</b>		p-switching, short circuit-proof		
Output voltage	0.8 x UB	-	UB	V DC
Max. load	-	-	50	mA
<b>Solenoid</b>				
Solenoid operating voltage IMP (reverse polarity protected, regulated, residual ripple < 5%)	DC 24 V +10%/-15%			
Solenoid current consumption I <sub>IMP</sub>	400			mA
Connection rating	6			W
Duty cycle	100			%
<b>Characteristics acc. to EN ISO 13849-1</b>				
Mission time	20			years
<b>Monitoring of the guard position</b>				
Category	4			
Performance Level	PL e			
PFH <sub>D</sub>	4.1 x 10 <sup>-9</sup> /h			

1) Dependent on the actuator used.

2) Trip characteristic medium slow-blow.

3) Values at a switching current of 50 mA without taking into account the cable lengths.

4) Corresponds to the actuation frequency.

### 13.1.1. Typical system times

Refer to the technical data for the exact values.

**Ready delay:** After switch-on, the device carries out a self-test. The system is ready for operation only after this time.

**Turn-on time of safety outputs:** The max. reaction time  $t_{on}$  is the time from the moment when the guard is closed to the moment when the safety outputs switch on.

**Risk time according to EN 60947-5-3:** If an actuator moves outside the actuating range, the safety outputs (FO1A and FO1B) are switched off after the risk time at the latest.

**Discrepancy time:** The safety outputs (FO1A and FO1B) switch with a slight time offset. They have the same signal state no later than after the discrepancy time.

**Test pulses at the safety outputs:** The device generates its own test pulses on the safety outputs (FO1A and FO1B). A downstream control system must tolerate these test pulses.

This can usually be set up in the control systems by parameter assignment. If parameter assignment is not possible for your control system or if shorter test pulses are required, contact our support organization.

The test pulses are output only if the safety outputs are switched on.

## **13.2. Radio frequency approvals**

**FCC ID: 2AJ58-05**

**IC: 22052-05**



### **FCC/IC-Requirements**

This device complies with part 15 of the FCC Rules and with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

- 1) This device may not cause harmful interference, and
- 2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

### **Supplier's Declaration of Conformity 47 CFR § 2.1077 Compliance Information**

#### **Unique Identifier:**

CTP-I-AR SERIES  
CTP-I1-AR SERIES  
CTP-I2-AR SERIES  
CTP-IBI-AR SERIES  
CTP-L1-AR SERIES  
CTP-L2-AR SERIES  
CTP-LBI-AR SERIES  
CTP-I-AP SERIES  
CTP-I1-AP SERIES  
CTP-I2-AP SERIES  
CTP-IBI-AP SERIES  
CTP-L1-AP SERIES  
CTP-L2-AP SERIES  
CTP-LBI-AP SERIES

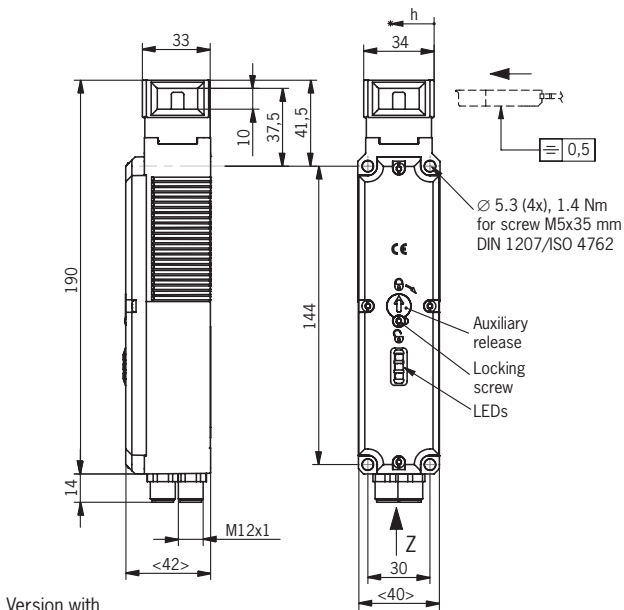
#### **Responsible Party – U.S. Contact Information**

**EUCHNER USA Inc.**  
1860 Jarvis Avenue  
Elk Grove Village, Illinois 60007  
+1 315 701-0315  
info(at)euchner-usa.com  
<http://www.euchner-usa.com>

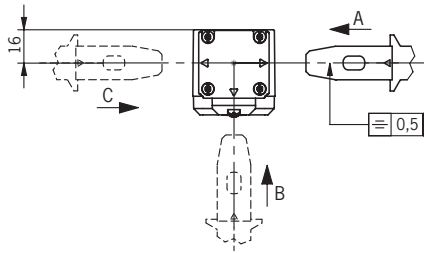
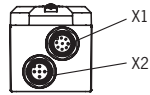
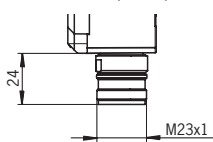


### 13.3. Dimension drawing for safety switch CTP...

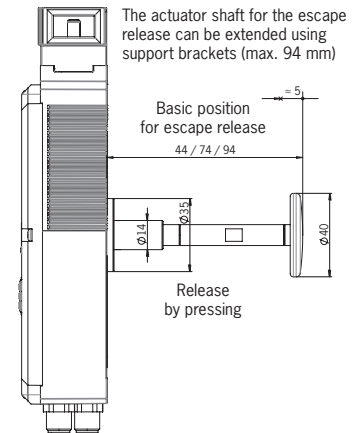
Version with plug connectors 2 x M12



Version with plug connector M23 (RC18)

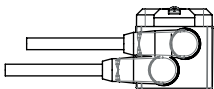


With escape release

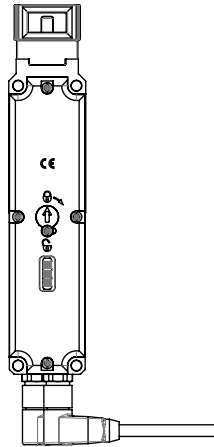
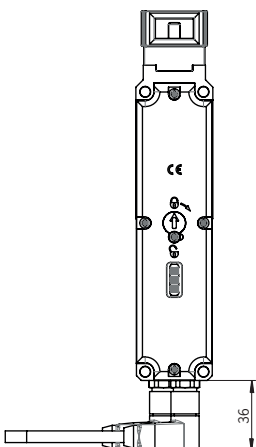
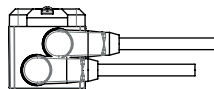


Plug connectors 2 x M12

Cable outlet C

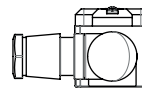


Cable outlet A

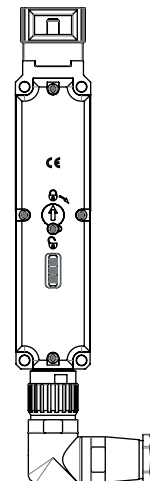
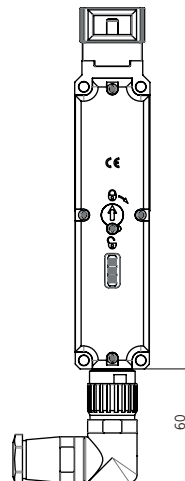
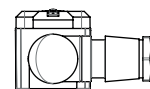


Plug connector M23

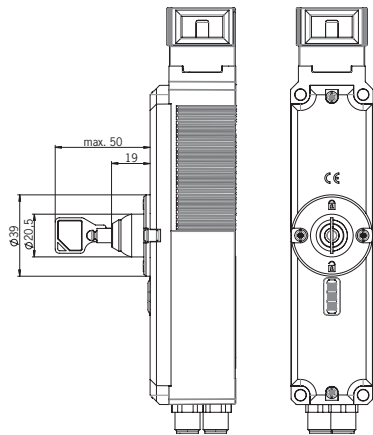
Cable outlet C



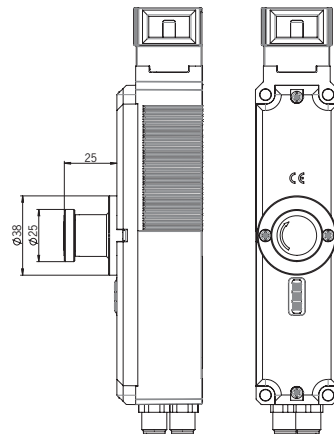
Cable outlet A



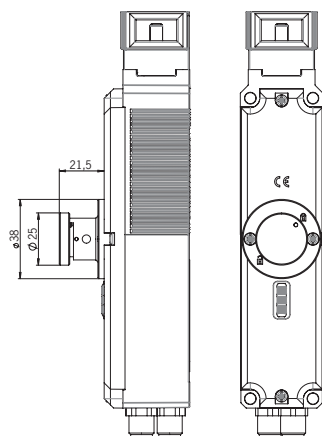
With auxiliary key release



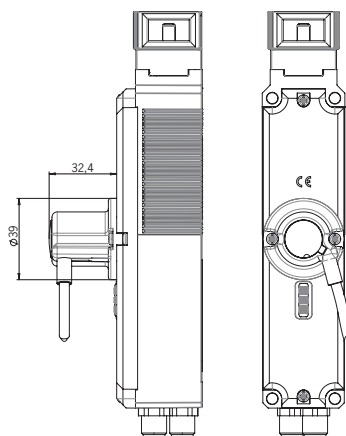
With release, automatic return



With emergency release



With wire front release (bowden)

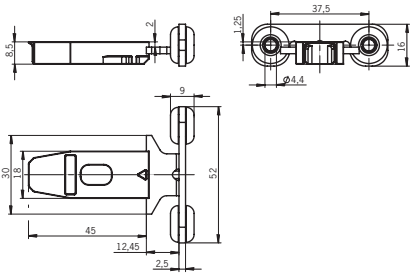
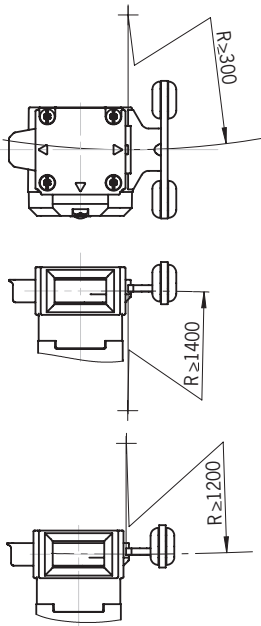
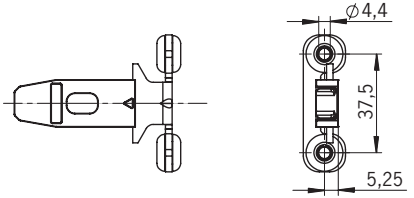
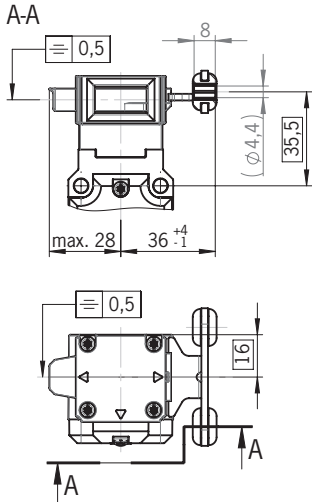


### 13.4. Technical data for actuator CTP-...

Parameter	Value			Unit
	min.	typ.	max.	
Housing material	Fiber reinforced plastic			
Weight	0.03 ... 0.06 (depending on version)			kg
Ambient temperature	-20	-	+55	°C
Degree of protection	IP67/IP69/IP69K			
Mechanical life	1 x 10 <sup>6</sup>			
Locking force F <sub>max.</sub> - Straight actuator 126015 (red) 122666 (black) - Hinged actuator - Bent actuator		3,900 2,600 2,600 1,500		N
Installation position	Any			
Power supply	Inductive via read head			

#### 13.4.1. Dimension drawing for actuator CTP-...

	Dimension drawing	Min. door radius [mm]	Order no./item
Straight actuators			<b>122666</b> A-CH-G-SST-122666
			<b>126015</b> A-CH-G-SST-126015

	Dimension drawing	Min. door radius [mm]	Order no./item
Bent actuators	 <p>Bent, upward</p>	 <p><math>R \geq 300</math></p> <p><math>R \geq 1400</math></p> <p><math>R \geq 1200</math></p>	<p><b>122667</b> A-CHW-SST-122667</p>
	 <p>Bent, downward</p>	 <p>A-A</p> <p><math>\equiv 0,5</math></p> <p>8</p> <p><math>\phi 4,4</math></p> <p>35,5</p> <p>max. 28</p> <p><math>36^{+4}_{-1}</math></p> <p>16</p> <p>A</p>	<p><b>122668</b> A-CHW-SST-122668</p>

	Dimension drawing	Min. door radius [mm]	Order no./item
Hinged actuators		<p>X = 53 mm (122671, 122672) X = 49 mm (122669, 122670)</p>	<p><b>122671</b> A-CHRL-LS-122671</p>
		<p>R &gt; 200</p>	<p><b>122672</b> A-CHRL-LS-122672</p>
Hinged actuators		<p>X = 41 mm (122673, 122674) X = 45 mm (122675, 122676)</p>	<p><b>122675</b> A-CHRO-LS-122675</p>
		<p>X = 41 mm (122673, 122674) X = 45 mm (122675, 122676)</p>	<p><b>122676</b> A-CHRU-LS-122676</p>



### Tip!

Safety screws are included with the actuator.

## 14. Ordering information and accessories



**Tip!**

Suitable accessories, e.g. cables or assembly material, can be found at [www.euchner.com](http://www.euchner.com). To order, enter the order number of your item in the search box and open the item view. Accessories that can be combined with the item are listed in *Accessories*.

## 15. Inspection and service



**WARNING**

Danger of severe injuries due to the loss of the safety function.

- › If damage or wear is found, the complete switch and actuator assembly must be replaced. Replacement of individual parts or assemblies is not permitted
- › Check the device for proper function at regular intervals and after every fault. For information about possible time intervals, refer to EN ISO 14119:2013, section 8.2.

Regular inspection of the following is necessary to ensure trouble-free long-term operation:

- › Check the switching function (see chapter 11.3. *Functional check on page 20*)
- › Check all additional functions (e.g., escape release, lockout bar, etc.)
- › Check the secure mounting of the devices and the connections
- › Check for contamination

No servicing is required. Repairs to the device are only allowed to be made by the manufacturer.



**NOTICE**

The year of manufacture is given in the laser marking at the bottom right corner. The current version number in the format (V X.X.X) can also be found on the device.

## 16. Service

If servicing is required, please contact:

EUCHNER GmbH + Co. KG  
Kohlhammerstraße 16  
70771 Leinfelden-Echterdingen  
Germany

**Service telephone:**

+49 711 7597-500

**E-mail:**

[support@euchner.de](mailto:support@euchner.de)

**Internet:**

[www.euchner.com](http://www.euchner.com)

## 17. Declaration of conformity

The product complies with the requirements according to Machinery Directive 2006/42/EC.

The EU declaration of conformity can be found at [www.euchner.com](http://www.euchner.com). Enter the order number of your device in the search box. The document is available under *Downloads*.



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www.euchner.com

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(translation of the original operating instructions)  
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