


EUCHNER

Operating Instructions

Transponder-Coded Safety Switch With Guard Locking
CTP-LBI-AP Unicode/Multicode

EN

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1. About this document







1.1. Scope

These operating instructions are valid for all CTP-LBI-AP... from version V1.0.0. These operating instructions, the document "Safety information and maintenance" and any enclosed data sheet form the complete user information for your device.

1.2. Target group





Design engineers and installation planners for safety devices 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 www.euchner.com |
|  | Document on CD |
|  | This section is applicable only if the memory card is used |
|  DANGER WARNING CAUTION | Safety precautions Danger of death or severe injuries Warning about possible injuries Caution slight injuries possible |
|  NOTICE Important! | Notice about possible device damage Important information |
| Tip | Useful information |

1.4. Supplementary documents

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

| Document title (document number) | Contents | |
|---|--|---|
| Safety Information and Maintenance CTP (2138087) | Basic information for safe setup and service |  |
| Operating Instructions (2136918) | (this document) |  |
| 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 . For this purpose enter the doc. no. in the search box. | |

2. Correct use

Safety switches series CTP-L-... are interlocking devices with guard locking (type 4). The device complies with the requirements according to EN IEC 60947-5-3. 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 the guard from being opened while a dangerous machine function is being performed.

This means:

- › Starting commands that cause a dangerous machine function must become active only when the guard is closed and locked.
- › The guard locking device must not be unlocked until the dangerous machine function has ended.
- › Closing and locking 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.

Devices from this series are also suitable for process protection.

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, Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design
- › EN ISO 12100, Safety of machinery – General principles for design – Risk assessment and risk reduction
- › IEC 62061, Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems

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

- › EN ISO 13849-1, Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design
- › EN ISO 14119, Safety of machinery – Interlocking devices associated with guards – Principles for design and selection
- › EN 60204-1, Safety of machinery – Electrical equipment of machines – Part 1: General requirements

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



Important!

- › 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.
- › It is only allowed to use components that are permissible in accordance with the table below.

Table 1: Possible combinations for CTP components

| Safety switch | Actuator | |
|---------------------------|----------|----------------------|
| | A-C-H... | |
| CTP-... Unicode/Multicode | ● | |
| Key to symbols | ● | Combination possible |

3. Description of the safety function

Devices from this series feature the following safety functions:

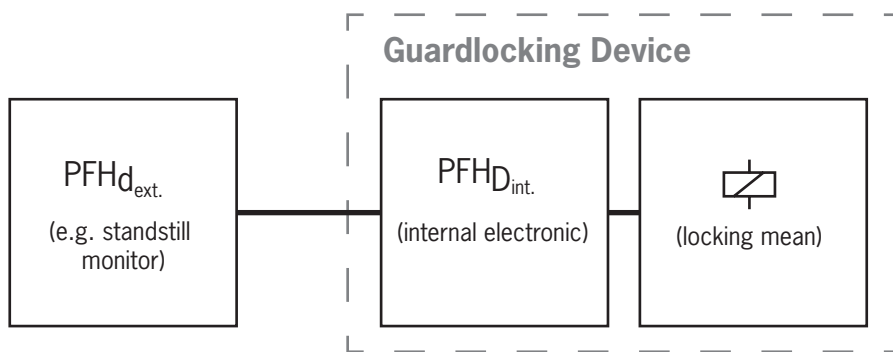
Monitoring of guard locking and the position of the guard (interlocking device with guard locking according to EN ISO 14119)

- Safety function (see chapter 6.6. *Switching states on page 9*):
 - The safety outputs are switched off when guard locking is released (monitoring of the locking device).
 - The safety outputs are switched off when the guard is open (monitoring of the door position).
 - Guard locking can be activated only when the actuator is located in the switch head (failsafe locking mechanism).
- Safety characteristics: category, Performance Level, PFH_D (see chapter 13. *Technical data on page 23*).

Activation of guard locking

If the device is used as guard locking for personnel protection, the control of the guard locking must be regarded as a safety function.

The safety level for the control of the guard locking is determined by the device PFH_{D_{int.}} and by the external control (e.g. PFH_{D_{ext.}} of the standstill monitor), but cannot be higher than PL_b.



Safety characteristics: category, Performance Level, PFH_D (see chapter 13. *Technical data on page 23*).

4. Exclusion of liability and warranty

In case of failure to comply with the conditions for correct use stated above, or if the safety instructions 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 perform 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 occupational 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. EUCHNER cannot provide any warranty in relation to the readability of the CD for the storage period required. For this reason you should archive a printed copy of the operating instructions. You can download the operating instructions from www.euchner.com.

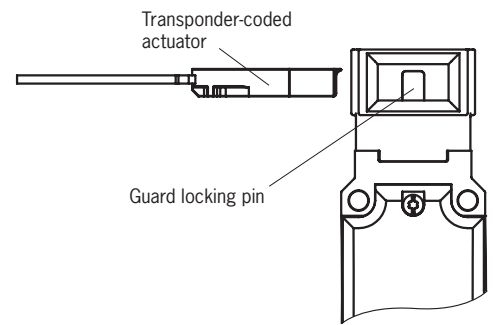
6. Function

The device permits the locking 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 unique code detection, 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 detection). There is no exact comparison of the actuator code with the taught-in code in the safety switch (unique code detection). The system possesses a low coding level.



When the guard is closed, the actuator is moved into the safety switch. When the switch-on 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 (OL) are switched off when the guard is unlocked.


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).

The switch has, in addition to the mechanical/electromagnetic guard locking, fixing for the guard locking pin. The guard locking pin is held in its current position if the operating voltage is not present. The guard locking pin can be moved only by applying the operating voltage.

If the guard locking pin is extended and the guard is still open when the power supply is interrupted, the guard locking pin will be pushed down and held in this position the next time the door is closed.

In case of interruption of the power supply (operating voltage) for the switch or if the machine is switched off for servicing, for example, the guard locking pin is held in its last position. As a result the safety door is either permanently locked or it can be closed and opened as often as required without the guard locking pin locking.

6.1. Guard locking monitoring

All versions feature two safe outputs for monitoring guard locking. The safety outputs  (FO1A and FO1B) are switched off when guard locking is released.

6.2. Door monitoring output (OD)

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

6.3. Diagnostics output (OI)

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

6.4. Guard locking monitoring output (OL)

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

6.5. Guard locking on version CTP-LBI

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

Activating guard locking: close guard; no voltage at control input IMP

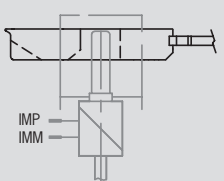
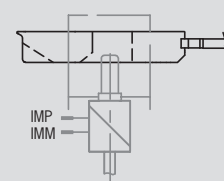
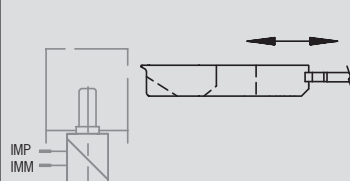

Releasing guard locking: apply voltage to control input IMP.

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.



If the guard is opened when the power supply is interrupted and is then closed, the guard locking pin will be pushed down and held in this position. This prevents people from being locked in unintentionally.

6.6. 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 |
|--|---|--|---|
| |  |  |  |
| Control input IMP | off | on | (irrelevant) |
| Safety outputs F01A and F01B  | on | off | off |
| Guard locking monitoring output OL | on | off | off |
| Door monitoring output OD | on | on | off |

7. Manual release

| | |
|---|---|
|  | <p>Important!</p> <p>No further release functions can be retrofitted on Extended variants with controls in position 1 (S1) and position 2 (S2).</p> |
|  | <p>Important!</p> <ul style="list-style-type: none"> › All release functions engage when the device is electrically isolated. › Guard locking remains released when the release function is reset. |

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

More 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


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

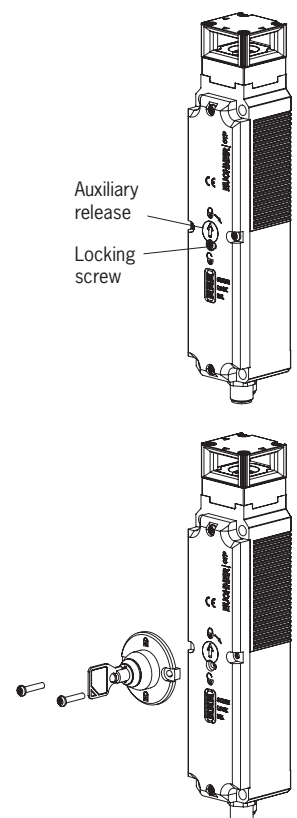
The safety outputs  are switched off when the auxiliary release is actuated. Use the safety outputs  to generate a stop command.

The monitoring output OL is switched off; OD can assume an undefined state. Open the guard and close it again after re-setting the auxiliary 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.

| | |
|---|--|
|  | <p>Important!</p> <ul style="list-style-type: none"> › 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 (e.g. with sealing lacquer). › 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. › After manual unlocking, the solenoid must be energized briefly to re-establish the defined state. › Please observe the notes on any enclosed data sheets. |
|---|--|



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 unlocking

Permits opening of a locked guard from outside the danger zone without tools. For mounting, see the mounting supplement.



Important!

- › It must be possible to operate the emergency unlocking manually from outside the protected area without tools.
- › The emergency unlocking 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 unlocking must be sealed or the misuse of the release function must be prevented in the control system.
- › The unlocking function meets all other requirements from EN ISO 14119.
- › The emergency unlocking 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.
- › Please observe the notes on any enclosed data sheets.

7.2.1. Actuating emergency unlocking

› Turn emergency unlocking clockwise until it clicks into place.

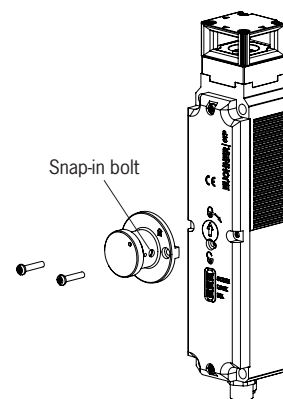
➔ Guard locking is released.

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

The safety outputs \overline{S} are switched off when the emergency unlocking is actuated. Use the safety outputs \overline{S} to generate a stop command.

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

After manual unlocking, the solenoid must be energized briefly to re-establish the defined state.



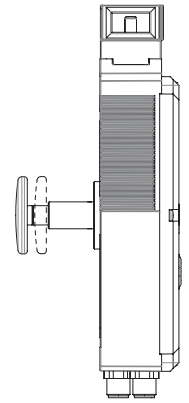
7.3. Escape release (optional)

Permits opening of a locked guard from the danger zone without tools (see chapter 13.3. *Dimension drawing for safety switch CTP... on page 26*).



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 safety outputs  are switched off when the escape release is actuated. Use the safety outputs  to generate a stop command.

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

After manual unlocking, the solenoid must be energized briefly to re-establish the defined state.

7.4. Wire front release

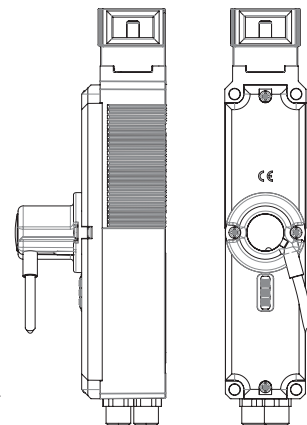
Release via a pull wire. Depending on the type of attachment, the wire front release can be used as emergency unlocking or escape release.

The following applies to non-latching wire front releases.

If the release is to be used as emergency unlocking, one of the following measures must be taken (see EN ISO 14119:2013, section 5.7.5.3):

- › Install the release so that it can be reset only with the aid of a tool.
- › Alternatively, the reset can be undertaken at the control system level. E.g. by means of a plausibility check (status of the safety outputs does not match the guard locking activation signal).

The emergency-unlocking specifications in chapter 7.2 on Page 11 apply irrespective of this information.



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 on 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.
- › After manual unlocking, the solenoid must be energized briefly to re-establish the defined state.
- › 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

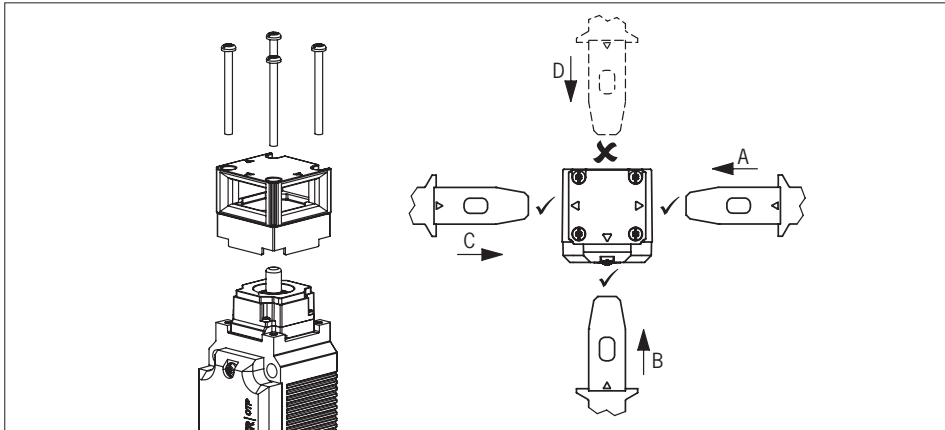


Figure 1: Changing the approach direction

9. Installation



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 fastening the safety switch and the actuator.
- › Protect the switch head against damage, as well as penetrating foreign objects such as swarf, sand and blasting shot, etc.
- › The rear side of the switch must be covered, but it must not be sealed.
- › Observe the min. door radii (see chapter 13.4.1. *Dimension drawing for actuator CTP-... on page 28*).
- › Observe the tightening torque for fastening the switch (max.1.4 Nm).

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

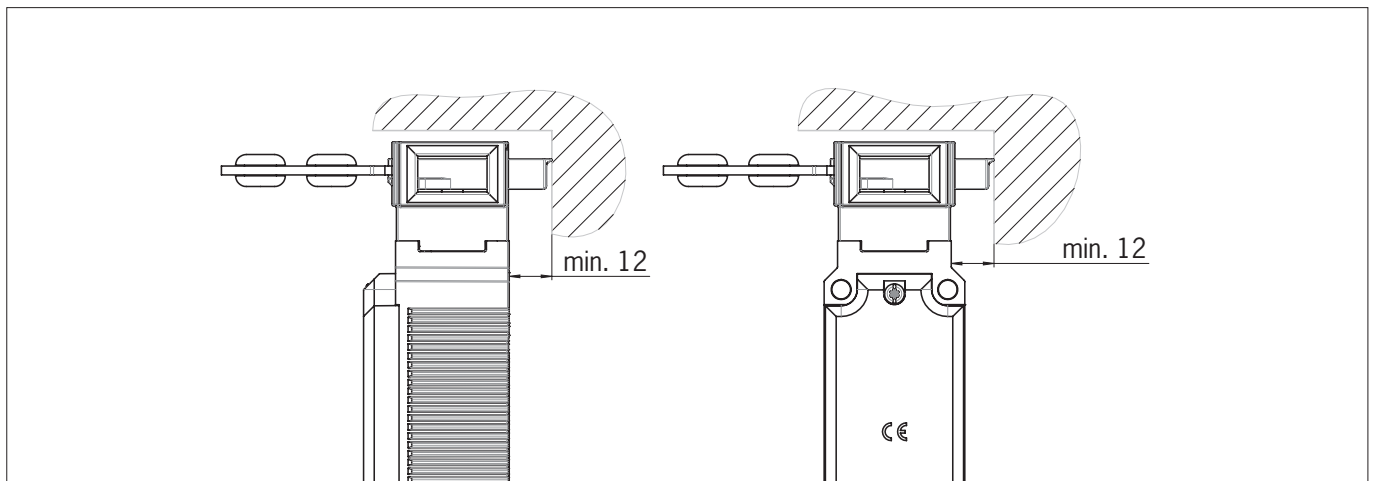





Figure 2: Actuator head clearance

10. Electrical connection

| | |
|--|---|
| | <p>WARNING</p> <p>If there is a mistake, loss of the safety function due to incorrect connection.</p> <ul style="list-style-type: none"> › To ensure safety, both safety outputs  (FO1A and FO1B) must always be evaluated. › Monitoring outputs must not be used as safety outputs. › Lay the connection cables with protection to prevent the risk of short circuits. |
| | <p>CAUTION</p> <p>Risk of damage to equipment or malfunctions as a result of incorrect connection.</p> <ul style="list-style-type: none"> › 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. › 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. › 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 isolation measures (PELV). › 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. RC interference suppression units must not be used. › 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. › 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 60204-1:2006, section 4.4.2 (EMC). <p>Please 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.</p> |
| | <p>Important!</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>Important!</p> <ul style="list-style-type: none"> › For use and operation as per the  requirements ¹⁾, a power supply with the feature “for use in class 2 circuits” must be used. Alternative solutions must comply with the following requirements: Electrically isolated power supply unit in combination with fuse as per UL248. This fuse should be designed for max. 3.3 A and should be integrated into the 30 V DC voltage section. › For use and applications as per the  requirements ¹⁾, a connection cable listed under UL category code CYJV/7, min. 24 AWG, min 80 °C, must be used. <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> |
|--|---|

10.2. Safety in case of faults

- The operating voltage UB and the control voltage IMP are reverse polarity protected.
- The safety outputs FO1A/FO1B are short circuit-proof.
- A short circuit between FO1A and FO1B 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 current required for the outputs. The following rules apply:

Max. current consumption I_{max}

$$I_{max} = I_{UB} + I_{FO1A+FO1B} + I_{OL} + I_{OD}$$

$$I_{UB} = \text{Switch operating current (max. 440 mA)}$$

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

$$I_{FO1A+FO1B} = \text{Load current of safety outputs FO1A + FO1B (2 x max. 150 mA)}$$

10.4. Requirements for connection cables



CAUTION

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

- Use connection components and connection cables from EUCHNER
- On the usage of other connection components, 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 connection cables:

For safety switches CTP-...-AP-...-SA-... with plug connector M12, 8-pin

| Parameter | Value | Unit |
|-------------------------------|-------------------------------|-----------------|
| Conductor cross-section, min. | 0.25 | mm ² |
| R max. | 80 | Ω/km |
| C max. | 120 | nF/km |
| L max. | 0.65 | mH/km |
| Recommended cable type | LIYY 8 x 0.25 mm ² | |

10.5. Pin 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 | Wire color of connection cable ¹⁾ |
|---|-----|-------------|---|--|
| 1 x M12 | 1 | IMP | Operating voltage of guard locking solenoid, 24 V DC | WH |
| | 2 | UB | Operating voltage of AP electronics, 24 V DC | BN |
| | 3 | FO1A | Safety output, channel 1 | GN |
| | 4 | FO1B | Safety output, channel 2 | YE |
| | 5 | OI | Diagnostic output | GY |
| | 6 | OD | Door monitoring output | PK |
| | 7 | OL | Guard locking monitoring output | BU |
| | 8 | 0 V UB | Operating voltage of guard locking solenoid, 0 V and operating voltage of AP electronics, 0 V | RD |

1) Only for standard EUCHNER connection cable

10.6. Connection CTP-AP

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

On devices with RST input the following applies: The switches can be reset via 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

If there is a mistake, 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. Simply enter the order number in the search box. All available connection examples for the device can be found in "Downloads."

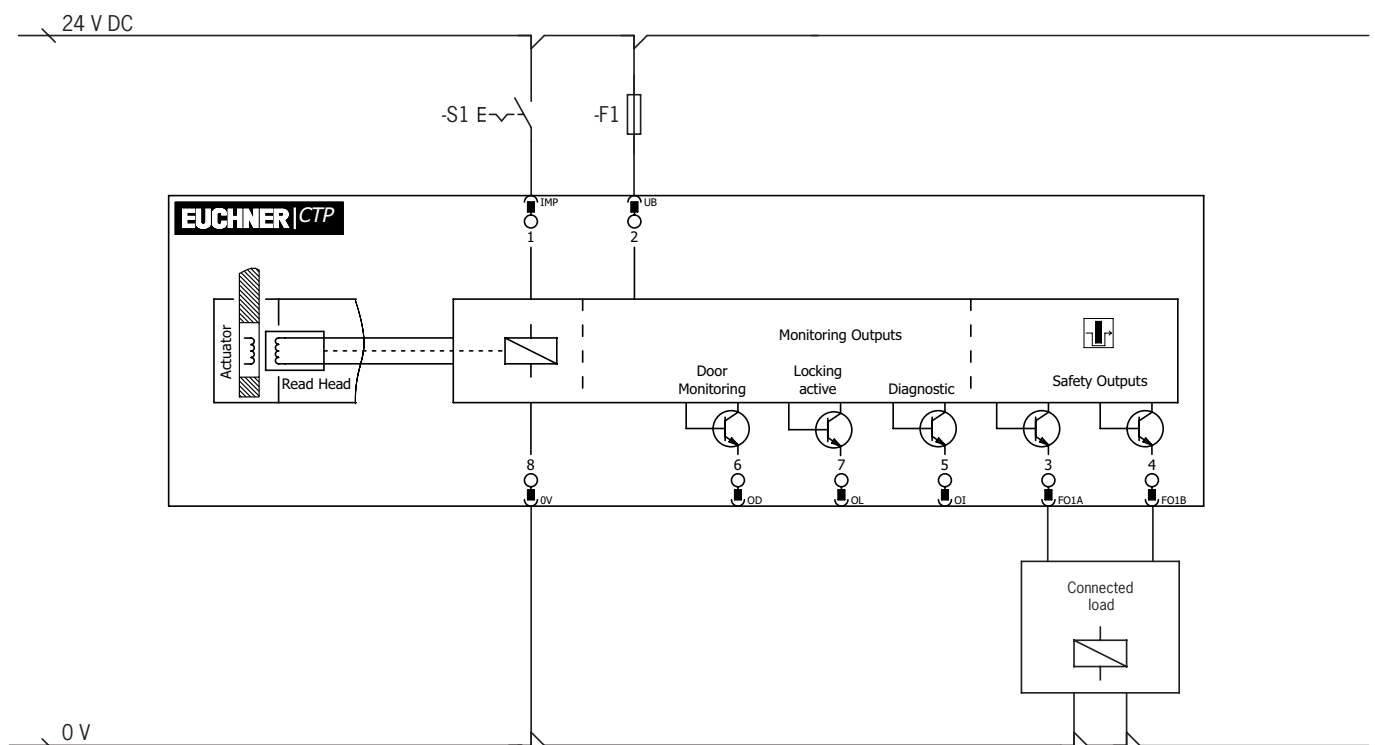



Figure 3: Connection example, version with plug connector M12

10.7. Notes on operation with safe control systems

Please observe the following requirements for connection to safe control systems:

- Use a common power supply for the control system and the connected safety switches.
- The device does not tolerate voltage interruptions at UB. Tap the supply voltage directly from the power supply unit. If the supply voltage 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, please refer to chapter 13. *Technical data on page 23.*
- 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 *Figure 4 on page 19*):
 - If possible, switch off the pulsing of the outputs in the control system.
 - 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 in Downloads » Applications » CTP. The features of the respective device are dealt with there in greater detail.

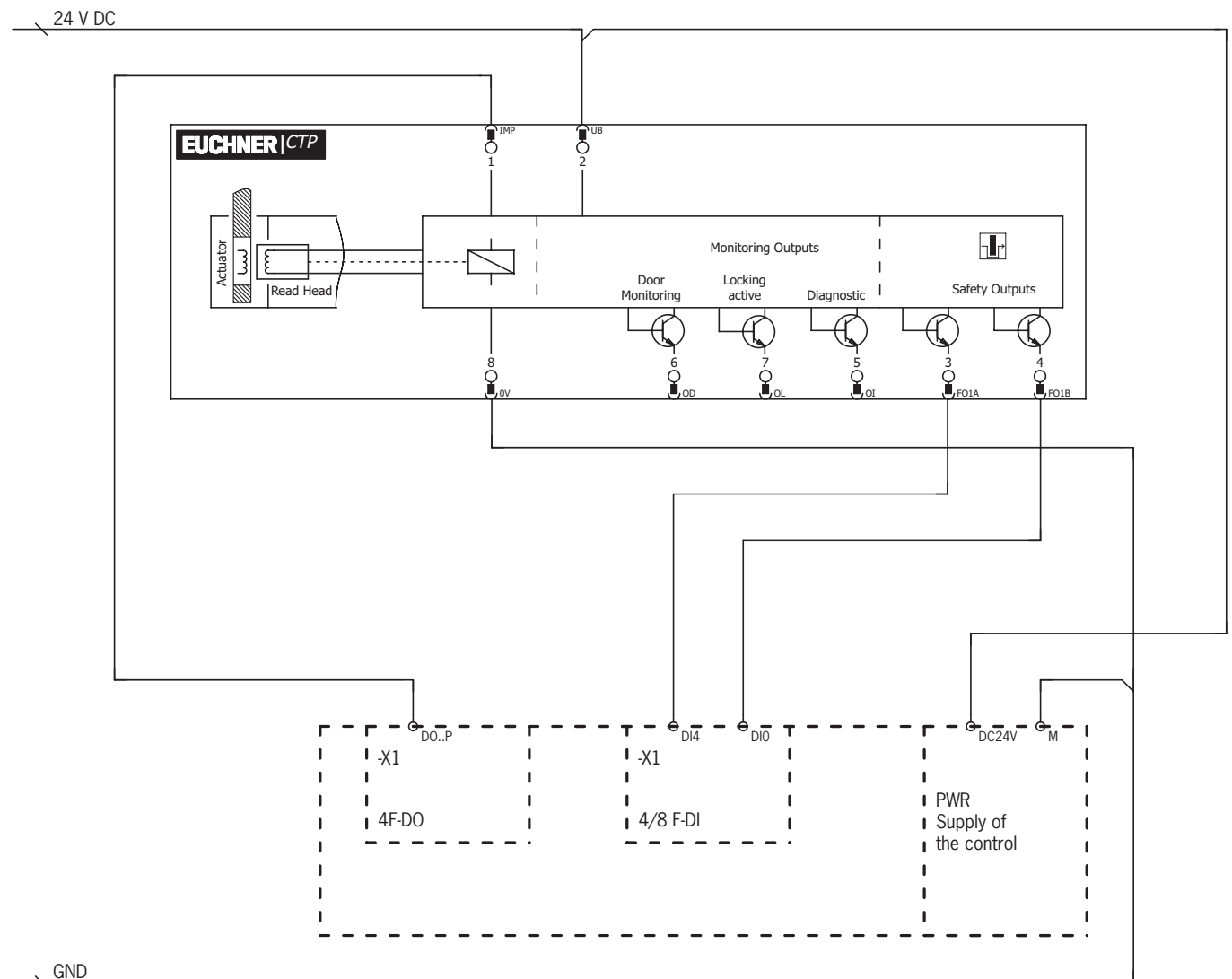


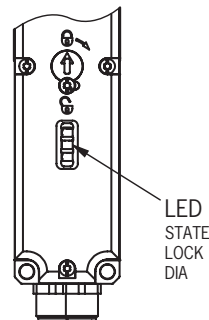
Figure 4: Connection example for the connection to ET200

11. Setup

11.1. LED displays

You will find a detailed description of the signal functions in chapter 12. *System status table on page 22.*

| LED | Color |
|-------|--------|
| STATE | green |
| LOCK | yellow |
| DIA | red |



11.2. Teach-in function for 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 fully 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 circuits and on large installations.



Important!

- ▶ The teach-in operation may be performed only if the device does not have any internal errors.
- ▶ Devices in the condition as supplied remain in teach-in standby state until you 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 previous actuator if teach-in is carried out for a new actuator. Teach-in is not possible again immediately for this actuator if a new teach-in operation is carried out. The disabled code is released 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 when in the teach-in standby state, this state is ended immediately and the switch changes to normal state.
- ▶ The actuator to be taught in is not activated if it is within the operating distance for less than 30 s.

11.2.1. Actuator teach-in

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 on the green State LED (see chapter 12. *System status table on page 22*).

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 functional check.

- › Before carrying out the functional check, make sure that there are no persons in the danger zone.
- › Observe the applicable 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 unlocking or escape release), the correct function of the release must be checked as well.





















11.3.2. Electrical function test






After installation and any fault, the safety function 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. Guard locking by solenoid force: 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. Enable operation in the control system.
 - ➔ It must not be possible to deactivate guard locking as long as operation is enabled.
4. Disable operation in the control system and deactivate guard locking.
 - ➔ The guard must remain locked until there is no longer any risk of injury.
 - ➔ It must not be possible to start the machine as long as the guard locking is deactivated.

Repeat steps 2 - 4 for each guard.

12. System status table

| Operating mode | Actuator/door position | Safety outputs FO1A and FO1B  | Guard locking monitoring output OL | Door monitoring output OD | LED indicator Output | | LOCK (yellow) | State |
|--------------------------------------|------------------------|--|------------------------------------|---------------------------|---|---|---|--|
| | | | | | STATE (green) | D/A (red) and diagnostics output OI | | |
| Normal operation | closed | on | on | on |  | ○ |  | Normal operation, door closed and locked |
| | closed | off | off | on |  1 x inverse | ○ | ○ | Normal operation, door closed and not locked |
| | open | off | off | off |  1 x | ○ | ○ | Normal operation, door open |
| 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 the teach-in operation (only unicode) Actuator removed from the operating distance 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 error |

| | | |
|----------------|---|--|
| Key to symbols | ○ | LED not illuminated |
| |  | LED illuminated |
| |  10 Hz (8 s) | LED flashes for 8 s at 10 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. Please 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-LBI-AP

| Parameter | Value | | | Unit |
|---|---|-----------|---------------------------------|-------|
| | min. | typ. | max. | |
| General | | | | |
| Material | Die-cast zinc Reinforced thermoplastic | | | |
| - Switch head | | | | |
| - Switch housing | | | | |
| Installation position | Any | | | |
| Degree of protection ¹⁾ | IP 67/IP 69/IP 69K | | | |
| | with plug connector M12 | | | |
| | with plug connector M23 | IP 67 | | |
| | (screwed tight with the related mating connector) | | | |
| Safety class according to EN IEC 61558 | III | | | |
| Degree of contamination | 3 | | | |
| Mechanical life | 1 x 10 ⁶ 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 | 8/10/5 | | | N |
| Locking force F _{max} ²⁾ | 3900 | | | N |
| Locking force F _{Zh} ²⁾ according to EN ISO 14119 | F _{Zh} = F _{max} /1.3 = 3,000 | | | N |
| Weight | Approx. 0.42 | | | kg |
| Connection type (depending on version) | 2 plug connectors M12, 5- and 8-pin 1 plug connector RC18, 19-pin (as yet no UL approval) 1 plug connector M12, 8-pin | | | |
| Operating voltage UB (reverse polarity protected, regulated, residual ripple < 5 %) | 24 ± 15% (PELV) | | | V DC |
| Current consumption I _{UB} | 40 mA at IMP = 24 V, 440 mA at IMP = 0 V | | | mA |
| For the approval according to UL the following applies | Operation only with UL class 2 power supply, or equivalent measures | | | |
| Switching load according to UL | DC 24 V, class 2 | | | |
| External fuse (operating voltage UB) ³⁾ | 0.25 | - | 8 | A |
| External fuse (solenoid operating voltage IMP) ³⁾ | 0.5 | - | 8 | A |
| Rated insulation voltage U _i | - | - | 50 | V |
| Rated impulse withstand voltage U _{imp} | - | - | 0.5 | kV |
| Rated conditional short-circuit current | 100 | | | A |
| Resilience to vibration | Acc. to EN 60947-5-3 | | | |
| EMC protection requirements | Acc. to EN 60947-5-3 | | | |
| Ready delay | - | - | 1 | s |
| Risk time | - | - | 260 | ms |
| Switch-on time | - | - | 400 | ms |
| Discrepancy time | - | - | 10 | ms |
| Test-pulse duration | 0.35 | | | ms |
| Frequency band | 120 ... 130 | | | kHz |
| Safety outputs FO1A/FO1B Semiconductor outputs, p-switching, short circuit-proof | | | | |
| - Output voltage U _{FO1A} /U _{FO1B} ⁴⁾ | | | | |
| HIGH U _{FO1A} /U _{FO1B} | UB - 1.5 | - | UB | V DC |
| LOW U _{FO1A} /U _{FO1B} | 0 | - | 1 | |
| Switching current per safety output | 1 | - | 150 | mA |
| Utilization category acc. to EN 60947-5-2 | DC-13 24 V 150 mA | | | |
| | Caution: outputs must be protected with a free-wheeling diode in case of inductive loads | | | |
| Switching frequency ⁵⁾ | 0.5 | | | Hz |
| Monitoring outputs OL, OI, OD p-switching, short circuit-proof | | | | |
| Output voltage | 0.8 x UB | - | UB | V DC |
| Max. load | - | - | 50 | mA |
| Solenoid | | | | |
| Solenoid operating voltage IMP (reverse polarity protected, regulated, residual ripple < 5 %) | HIGH | 15 ... 24 | | V DC |
| | LOW | 0 ... 5 | | |
| Solenoid current consumption I _{IMP} | 20 | | | mA |
| Power consumption | 1.7 | | | W |
| Duty cycle | 100 | | | % |
| Reliability values acc. to EN ISO 13849-1 | | | | |
| | Guard locking monitoring | | Control of guard locking | |
| Category | 4 | | B | |
| Performance Level (PL) | e | | b | |
| PFD ₀ | 4.1 x 10 ⁻⁹ /h | | 2.1 x 10 ⁻⁹ /h | |
| Mission time | 20 | | 20 | |
| | | | years | |

1) In order to achieve the specified degree of protection, the rear side of the switch must be covered but must not be sealed.

2) Dependent on the actuator used.

3) Trip characteristic medium slow-blow.

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

5) Corresponds to the actuation frequency.

13.1.1. Typical system times

Please refer to the technical data for the exact values.

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

Switch-on time of safety outputs: The max. reaction time t_{on} is the time from the moment when the guard is locked to the moment when the safety outputs switch on.

Risk time according to EN 60947-5-3: If an actuator moves outside the operating distance, the safety outputs $\overline{F01}$ (F01A and F01B) are switched off after the risk time at the latest.

Discrepancy time: The safety outputs $\overline{F01}$ (F01A and F01B) 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 $\overline{F01}$ (F01A and F01B). 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, please 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.

6723 Lyons Street
East Syracuse, NY 13057

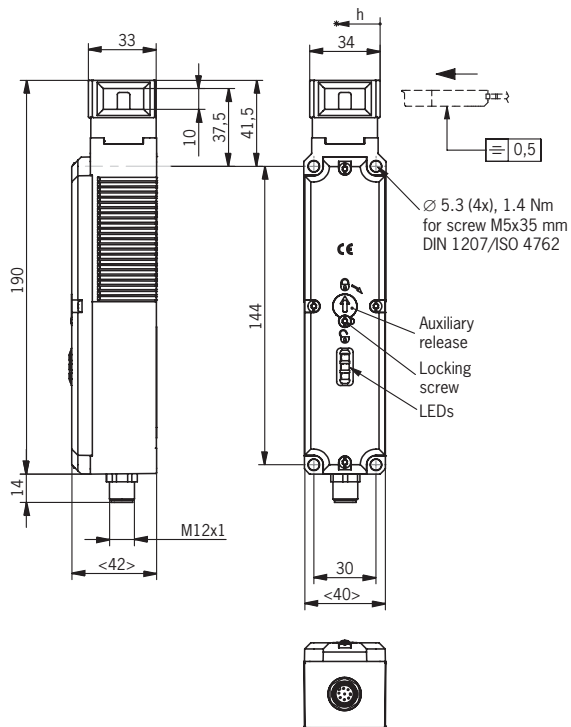
+1 315 701-0315

+1 315 701-0319

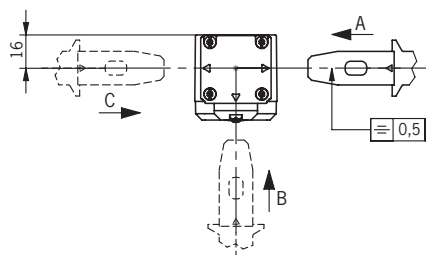
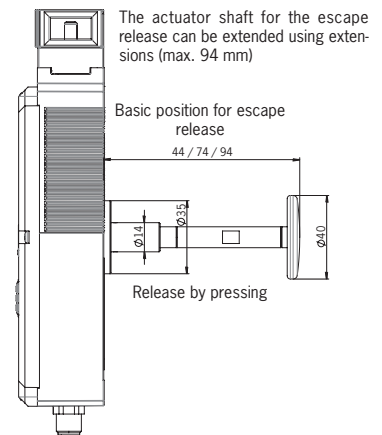
info(at)euchner-usa.com

<http://www.euchner-usa.com>

13.3. Dimension drawing for safety switch CTP...

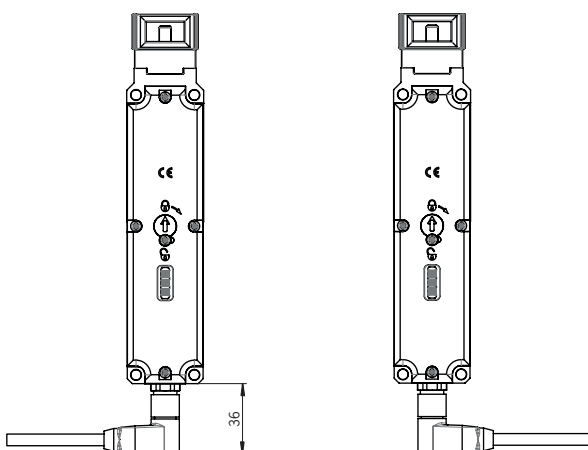


With escape release

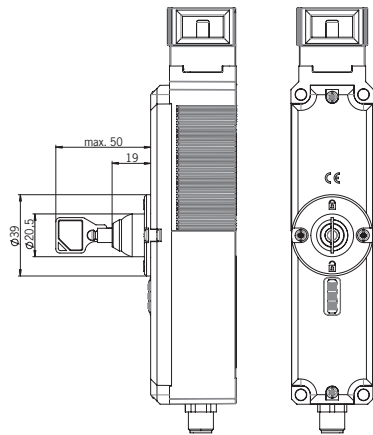


Cable exit C

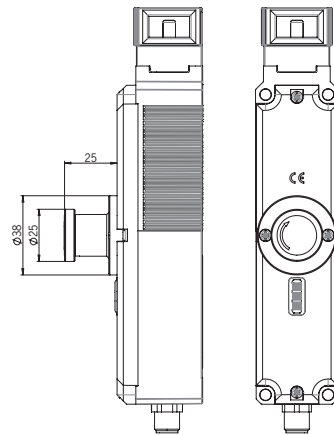
Cable exit A



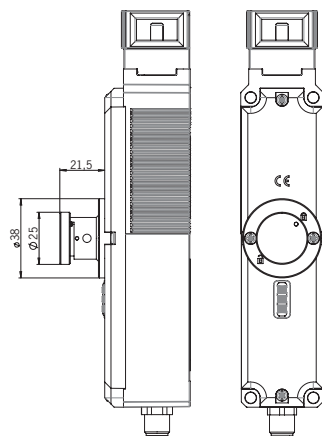
With auxiliary key release



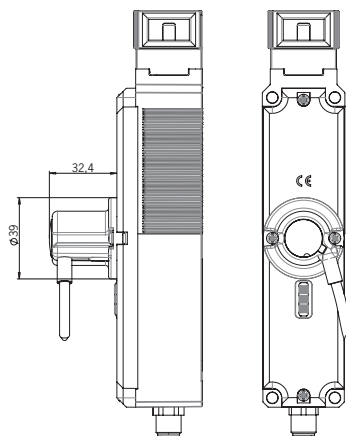
With release, automatic return



With emergency unlocking



With wire front release



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 | IP 67/IP 69/IP 69K | | | |
| Mechanical life | 1 x 10 ⁶ | | | |
| Locking force, max. - Straight actuator 126015 (red) 122666 (black) - Hinged actuator - Bent actuator | | 3900 2600 2600 1500 | | 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 | | | 122666 A-CH-G-SST-122666 |
| | | | 126015 A-CH-G-SST-126015 |

| | Dimension drawing | Min. door radius [mm] | Order no./item |
|----------------|-----------------------|-----------------------|---|
| Bent actuators | <p>bent, upward</p> | | <p>122667 A-CHW-SST-122667</p> |
| | <p>bent, downward</p> | | <p>122668 A-CHW-SST-122668</p> |

| | Dimension drawing | Min. door radius [mm] | Order no./item |
|------------------|-------------------|--|--|
| Hinged actuators | | <p>max. 28 $X \begin{smallmatrix} +4 \\ -1 \end{smallmatrix}$</p> <p>X = 53 mm (122671, 122672) X = 49 mm (122669, 122670)</p> | <p>122671 A-C-HRL-LS-122671</p> |
| | | <p>max. 28 $X \begin{smallmatrix} +4 \\ -1 \end{smallmatrix}$</p> <p>R > 200 (4) (Ø 5,5)</p> <p>16 (40)</p> | <p>122672 A-C-HRL-LS-122672</p> |
| Hinged actuators | | <p>max. 28 $X \begin{smallmatrix} +4 \\ -1 \end{smallmatrix}$</p> <p>R > 200</p> <p>16</p> <p>X = 41 mm (122673, 122674) X = 45 mm (122675, 122676)</p> | <p>122675 A-C-HR0-LS-122675</p> |
| | | <p>max. 28 $X \begin{smallmatrix} +4 \\ -1 \end{smallmatrix}$</p> <p>R > 200</p> <p>16</p> <p>X = 41 mm (122673, 122674) X = 45 mm (122675, 122676)</p> | <p>122676 A-C-HR0-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. 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 21*)
- › Check all additional functions (e.g. escape release, lockout bar, etc.)
- › Check the secure fastening of the devices and the connections
- › Check for soiling

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 service support is required, please contact:

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

Service telephone:

+49 711 7597-500

E-mail:

support@euchner.de

Internet:

www.euchner.com

17. Declaration of conformity



EUCHNER

More than safety.

EU-Konformitätserklärung
EU declaration of conformity
Déclaration UE de conformité
Dichiarazione di conformità UE
Declaración UE de conformidad

Original DE
Translation EN
Traduction FR
Traduzione IT
Traducción ES

2123042-07-03/19

Die nachfolgend aufgeführten Produkte sind konform mit den Anforderungen der folgenden Richtlinien (falls zutreffend):
The beneath listed products are in conformity with the requirements of the following directives (if applicable):
Les produits mentionnés ci-dessous sont conformes aux exigences imposées par les directives suivantes (si valable)
I prodotti sotto elencati sono conformi alle direttive sotto riportate (dove applicabili):
Los productos listados a continuación son conforme a los requisitos de las siguientes directivas (si fueran aplicables):

| | | |
|------|--|--|
| I: | Maschinenrichtlinie <i>Machinery directive</i> <i>Directive Machines</i> <i>Direttiva Macchine</i> <i>Directiva de máquinas</i> | 2006/42/EG 2006/42/EC 2006/42/CE 2006/42/CE 2006/42/CE |
| II: | Funkanlagen-Richtlinie (RTTE / RED) <i>Radio equipment directive</i> <i>Directive équipement radioélectrique</i> <i>Direttiva apparecchiatura radio</i> <i>Directiva equipo radioeléctrico</i> | 2014/53/EU 2014/53/EU 2014/53/UE 2014/53/UE 2014/53/UE |
| III: | RoHS Richtlinie <i>RoHS directive</i> <i>Directive de RoHS</i> <i>Direttiva RoHS</i> <i>Directiva RoHS</i> | 2011/65/EU 2011/65/EU 2011/65/UE 2011/65/UE 2011/65/UE |

Die Schutzziele der Niederspannungsrichtlinie 2014/35/EU und EMV Richtlinie 2014/30/EU werden gemäß Artikel 3.1 der Funkanlagen-Richtlinie eingehalten.
The safety objectives of the Low-voltage directive 2014/35/EU and EMC Directive 2014/30/EU comply with article 3.1 of the Radio equipment directive.
Les objectifs de sécurité de la Directive basse tension 2014/35/UE et Directive de CEM 2014/30/UE sont conformes à l'article 3.1 de la Directive équipement radioélectrique.
Gli obiettivi di sicurezza della Direttiva bassa tensione 2014/35/UE e Direttiva CEM 2014/30/UE sono conformi a quanto riportato nell'articolo 3.1 della Direttiva apparecchiatura radio.
Los objetivos de seguridad de la Directiva de bajo voltaje 2014/35/UE y Directiva CEM 2014/30/UE cumplen con el artículo 3.1 de la Directiva equipo radioeléctrico.

Folgende Normen sind angewandt:
Following standards are used:
Les normes suivantes sont appliquées:
Vengono applicate le seguenti norme:
Se utilizan los siguientes estándares:

| | | | |
|----|------------------------------------|----|----------------------|
| a: | EN 60947-5-3:2013 | f: | EN 50581:2012 (RoHS) |
| b: | EN ISO 14119:2013 | g: | EN 50364:2010 |
| c: | EN ISO 13849-1:2015 | h: | EN 300 330 V2.1.1 |
| d: | EN 62026-2:2013 (ASI) | | |
| e: | EN 60947-5-5:1997/A1:2005/A11:2013 | | |

| Bezeichnung der Bauteile <i>Description of components</i> <i>Description des composants</i> <i>Descrizione dei componenti</i> <i>Descripción de componentes</i> | Type <i>Type</i> <i>Type</i> <i>Tipo</i> <i>Typo</i> | Richtlinie <i>Directives</i> <i>Directive</i> <i>Direttiva</i> <i>Directivas</i> | Normen <i>Standards</i> <i>Normes</i> <i>Norme</i> <i>Estándares</i> | Zertifikats-Nr. <i>No. of certificate</i> <i>Numéro du certificat</i> <i>Norme</i> <i>Número del certificado</i> |
|--|--|--|--|--|
| Sicherheitsschalter <i>Safety Switches</i> <i>Interrupteurs de sécurité</i> <i>Finecorsa di sicurezza</i> <i>Interruptores de seguridad</i> | CTP-... | I, II, III | a, b, c, f, g, h | UQS 123565, ET 18080 * |
| | CTP-..AS... | I, II, III | a, b, c, d, f, g, h | UQS 125542 |
| | CTP-LBI... | I, II, III | a, b, c, f, g, h | UQS 127798 |
| | CEM-I2-...-C40... | I, II, III | a, b, c, f, g, h | UQS 124482 |
| Sicherheitsschalter mit Not-Halt-Einrichtungen <i>Safety Switches with Emergency-Stop facilities</i> <i>Interrupteurs de sécurité avec appareillage arrêt d'urgence</i> <i>Finecorsa di sicurezza con dispositivi di arresto di emergenza</i> <i>Interruptores de seguridad con dispositivos de parada de emergencia</i> | CTP-... | I, II, III | a, b, c, e, f, g, h | UQS 123565 |
| Betätiger <i>Actuator</i> <i>Actionneur</i> <i>Azionatore</i> <i>Actuador</i> | A-C-... A-C40-... A-TI-... | I, II, III } I, II, III | a, b, c, f, g, h | UQS 123565, ET 18080 * UQS 124482 |



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* Benannte Stelle
Notified Body
Organisme notifié
Sede indicata
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0340
DGUV Test
Prüf- und Zertifizierungsstelle Elektrotechnik
Fachbereich ETEM
Gustav-Heinemann-Ufer 130
50968 Köln

Genehmigung der umfassenden Qualitätssicherung (UQS) durch die benannte Stelle 0035
Approval of the full quality assurance system by the notified body 0035
Approbation du système d'assurance qualité complet par l'organisme notifié 0035
Approvazione del sistema di garanzia di qualità totale da parte dell'organismo notificato 0035
Aprobación del sistema de aseguramiento de calidad total por parte del organismo 0035 notificado

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Germany

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