

Connection of CTP-L2..-AR to Siemens ET 200S



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Guard locking power on applied – spring released according to EN ISO 14119 (open-circuit current principle)

Safety function Guard locking for process protection with interlocking according to EN ISO 14119

Reliability figures according to EN ISO 13849 Category 4, PL e

Components/modules used

EUCHNER

| Description | Order no./ item designation |
|--|---------------------------------------|
| Safety switches with guard locking and guard lock monitoring with transponder technology | 122814 / CTP-L2-AR-U-HA-AZ-SAB-122814 |
| | 123361 / CTP-L2-AR-MHA-AZ-SAB-123361 |

Tip: More information and downloads about the above mentioned EUCHNER products can be found at www.EUCHNER.de. Simply enter the order number into the search field.

Other

| Description | Items |
|--|--------------------|
| ET 200S, Interface module IM151-3 PN HF | 6ES7151-3BA23-0AB0 |
| SIMATIC DP, Power module PM-E | 6ES7138-4CA01-0AA0 |
| Digital electronic module 4/8 F-DI DC24V PROFI-safe | 6ES7138-4FA00-0AB0 |
| | 6ES7138-4FA03-0AB0 |
| | 6ES7138-4FA04-0AB0 |
| | 6ES7138-4FA05-0AB0 |
| Digital electronic module 4 F-DO DC24V/2A PROFI-safe; P-/M-switching | 6ES7138-4FB03-0AB0 |
| | 6ES7138-4FB04-0AB0 |
| Digital electronic module 8 DI DC24V | 6ES7131-4BF00-0AA0 |

Functional description

General

The CTP-L2 is a guard locking device according to EN ISO 14119 using the open-circuit current principle. In this example, the guard locking is controlled by a safe output from a Siemens control system. The two safe outputs of the CTP are connected to a safe input of an ET 200S.

Connections

| Designation | Function | Use in this example |
|-------------|--|---|
| FO1A, FO1B | Safety outputs. HIGH when the safety guard is closed and locked. | Switch-off of at least one of the outputs must lead to shutdown of the machine or installation via the connected control system. Important: The actual shutdown of the energy which is causing a hazard in a machine is not shown in the example and must be supplemented. |
| FI1A, FI1B | Inputs for series connection of AR devices from EUCHNER. | Connected to 24 V DC; function is not used. |
| IMP, IMM | Control input for guard locking solenoid. Connect guard locking to 24 V DC to close. | Dual-channel controlled by an F-DO output. Important: According to EN ISO 14119, it shall be ensured that the hazard caused by a machine has disappeared before the guard locking can be released. |
| OD | Door monitoring output, HIGH, when the door is closed. | Connected to a standard input of the ET 200S. |
| OL | Guard locking monitoring output, HIGH when the door is closed and locked. | Connected to a standard input of the ET 200S. |
| OI | Diagnostics monitoring output, HIGH when the device is in the fault state. | Connected to a standard input of the ET 200S. |
| RST | Input for resetting the switch | Connected to ground; function is not used. |

Safety assessment

The CTP-L2 features complete monitoring for faults in the safety-relevant parts and in the connected cables (clock pulses at outputs FO1A and FO1B). With the device's own pulsing, switch-off or non-connection of the clock signals from the control system's safe inputs does not lead to a reduction in the PL. The example achieves PL e in accordance with EN ISO 13849-1 for position monitoring of the locking mechanism of guard locking.

In exceptional cases in accordance with the risk assessment, guard locking can also be used for safety-relevant purposes. More detailed information about this can be found in EN ISO 14119. In this case, locking mechanism position monitoring of guard locking also meets the requirements of PL e.

A safety assessment for control of guard locking is not part of this example and must be supplemented for the respective machine by the design engineer in accordance with the risk assessment.

Principle circuit diagram

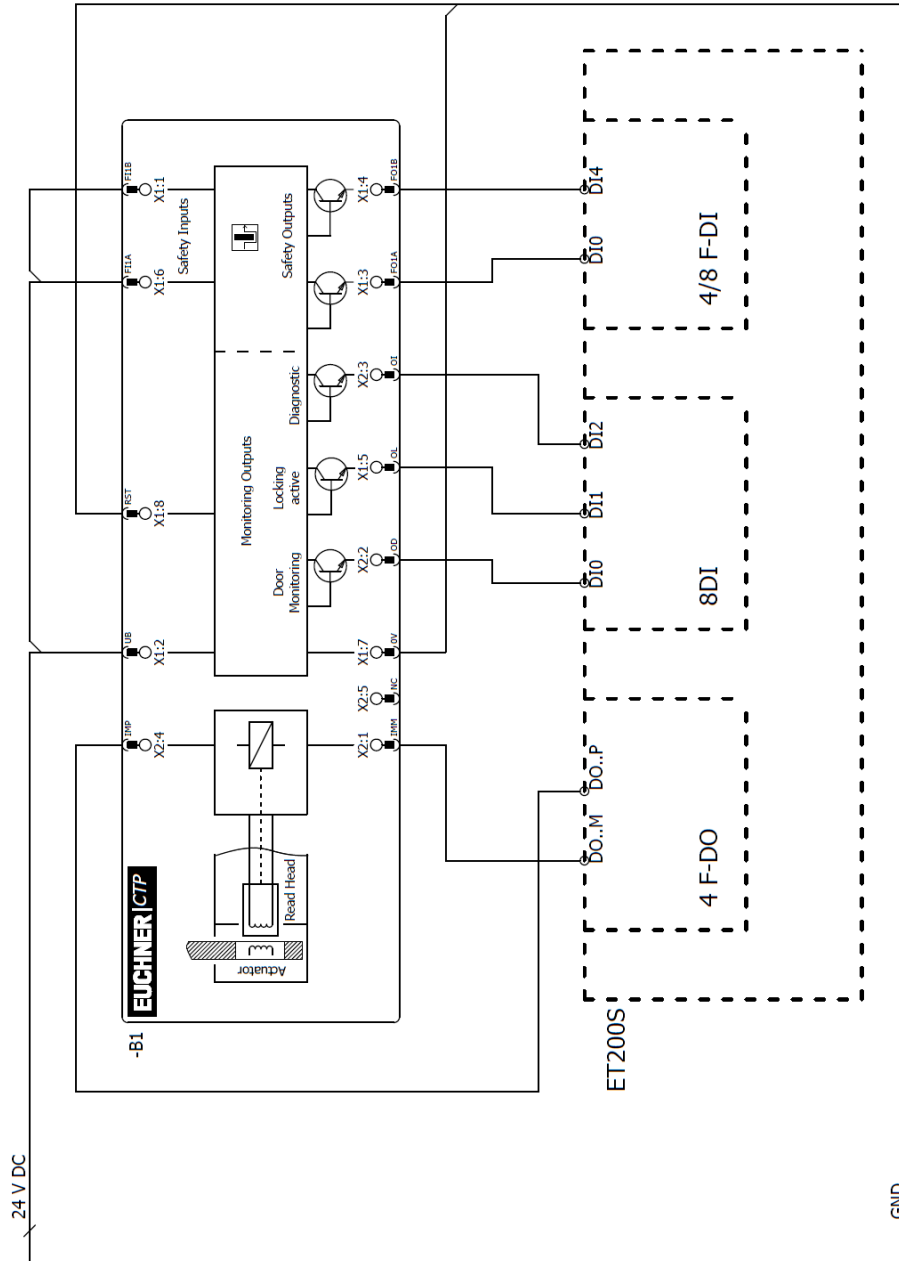


Figure 1

Parameter assignment in the control system

Output 4 F-DO

This parameter assignment applies only for the following assemblies:

- 6ES7138-4FB03-0AB0
- 6ES7138-4FB04-0AB0

| Parameter | Value |
|-------------------------------|---|
| F-Parameter | Corresponding to the use in Profibus/Profinet |
| Behavior after channel faults | Optional |
| Read-back time | 1 (ms) |
| Diagnostics: wire break | Optional |

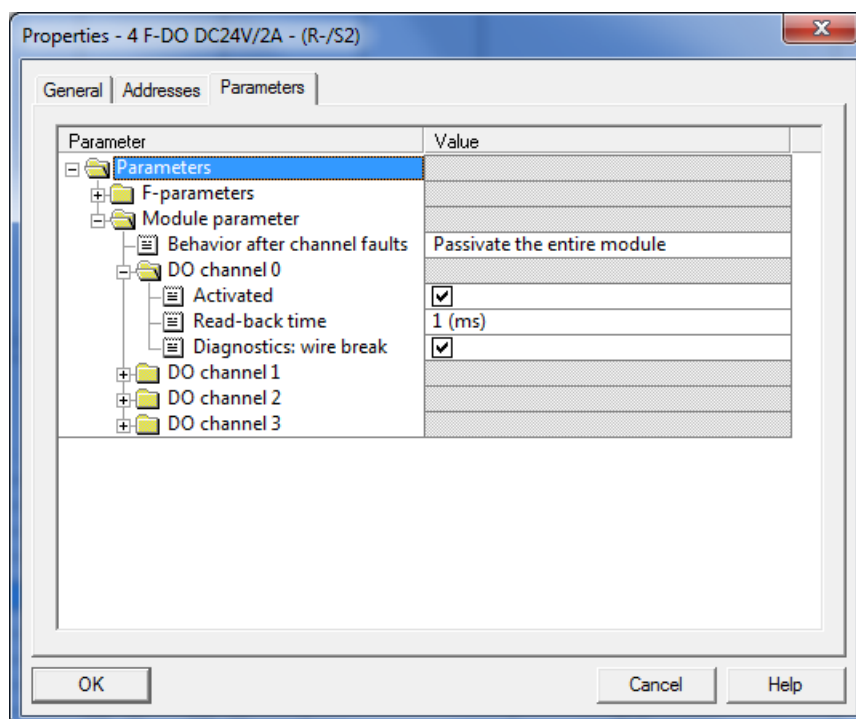


Figure 2

Input 4/8 F-DI

This parameter assignment applies only for the following assemblies:

- 6ES7138-4FA03-0AB0
- 6ES7138-4FA04-0AB0
- 6ES7138-4FA05-0AB0

| Parameter | Value |
|--------------------------------|---|
| F-Parameter | Corresponding to the use in Profibus/Profinet |
| Input delay | 3 (ms) or longer |
| Short-circuit test | Cyclic |
| Behavior after channel faults | Optional |
| Sensor supply | External |
| Evaluation of the sensors | 1oo2 evaluation |
| Type of sensor interconnection | 2 channel equivalent |
| Other parameters | Optional |

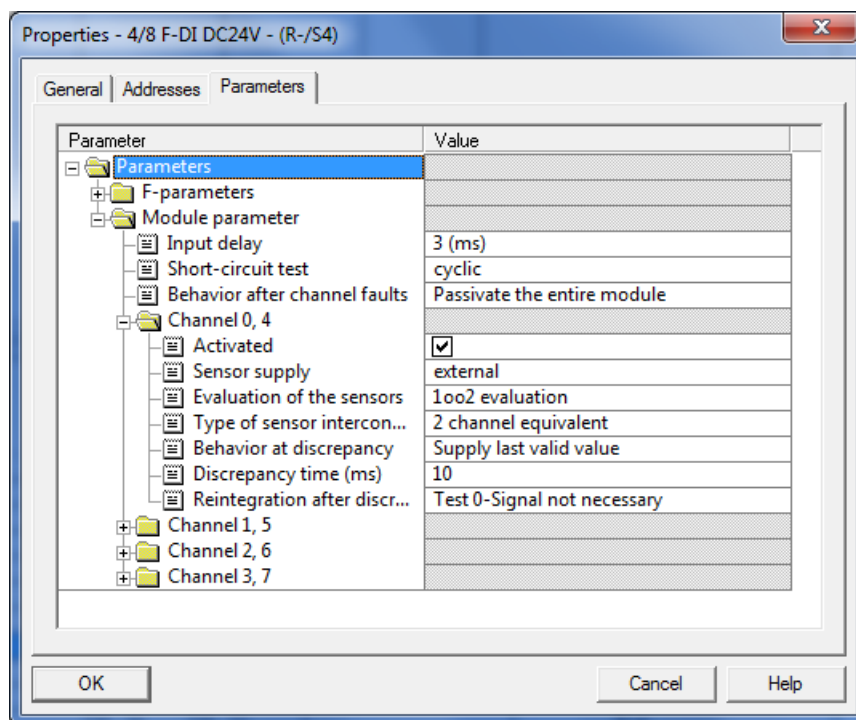


Figure 3

Input 4/8 F-DI (continued)

This parameter assignment applies only for the following assemblies:

- 6ES7138-4FA00-0AB0

| Parameter | Value |
|--------------------------------|---|
| F-Parameter | Corresponding to the use in Profibus/Profinet |
| Input delay | 3 (ms) or longer |
| Short-circuit test | Lock |
| Behavior after channel faults | Optional |
| Evaluation of the sensors | 1oo2 evaluation |
| Type of sensor interconnection | 2 channel equivalent |
| Other parameters | Optional |

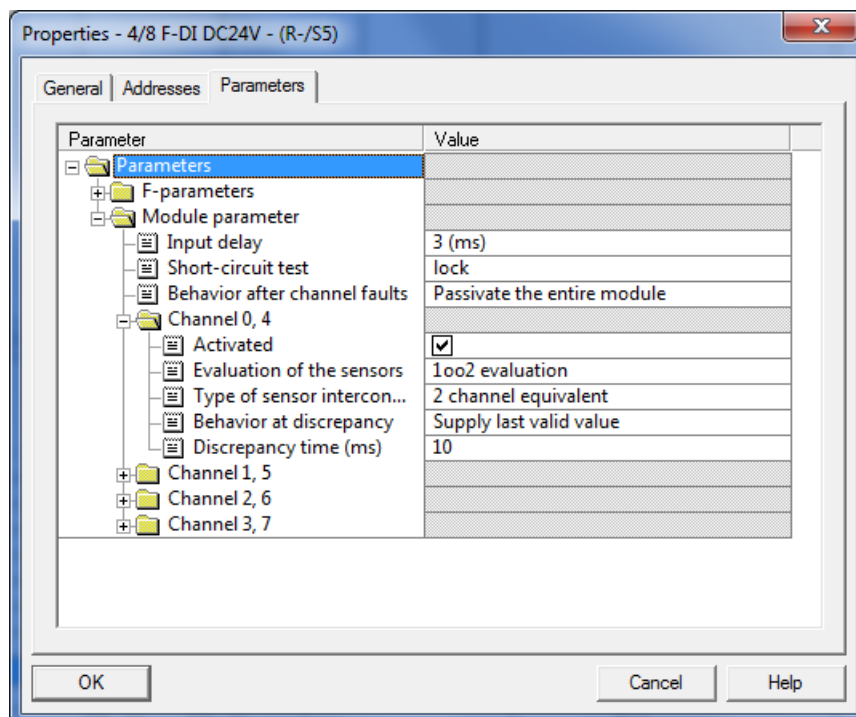


Figure 4

Important note – please observe carefully!

This document is intended for a design engineer who possesses the requisite knowledge in safety engineering and knows the applicable standards, e.g. through training for qualification as a safety engineer. Only with the appropriate qualification is it possible to integrate the introduced example into a complete safety chain.

The example represents only a part of a complete safety chain and does not fulfill any safety function on its own. In order to fulfill a safety function, the energy switch-off function for the hazard location and the software within the safety evaluation must also be considered, for example.

The introduced applications are only examples for solving certain safety tasks for protecting safety guards. The examples cannot be comprehensive due to the application-dependent and individual protection goals within a machine/installation.

If questions pertaining to this example remain open, please contact us directly.

In accordance with Machinery Directive 2006/42/EC, the design engineer of a machine or installation is obligated to perform a risk assessment and take measures to reduce the risk. When doing this, the engineer must comply with the applicable national and international standards. Standards generally represent the current state of the art. Therefore, the design engineer should continuously inform himself about changes in the standards and adapt his considerations to them. Relevant standards include EN ISO 13849 and EN 62061. This application must be regarded only as assistance for the considerations about safety measures.

The design engineer of a machine/installation is obligated to assess the safety technology himself. The examples must not be used for assessment, because only a small excerpt of a complete safety function was considered in terms of safety engineering here.

In order to be able to use the safety switch applications correctly on safety guards, it is indispensable to observe the standards EN ISO 13849-1, EN ISO 14119 and all relevant C-standards for the respective machine type. Under no circumstances does this document replace the engineer's own risk assessment, and it cannot serve as the basis for a fault assessment.

Particularly in case of a fault exclusion, it must be noted that this can be performed only by the design engineer of a machine or installation and requires a reason. A general fault exclusion is not possible. More information about fault exclusion can be found in EN ISO 13849-2.

Changes at products or within assemblies from third-party suppliers used in this example can lead to the function no longer being ensured or the safety assessment having to be adapted. In any event, the information in the operating instructions on the part of EUCHNER, as well as on the part of third-party suppliers, must be taken as the basis before this application is integrated into an overall safety function. If contradictions should arise between the operating instructions and this document, please contact us directly.

Use of brand and company names

All mentioned brand and company names are property of the respective manufacturers. The use is only for clear identification of compatible peripheral devices and environment of operation in combination with our products.