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Connection of CET3-AP to Beckhoff CX1030/CX1010 (EL-module)

Content

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

Safety function	Guard locking for personal protection according to EN ISO 14119
Reliability figures according to EN ISO 13849	Category 4, PL e

Components/modules used

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Description	Order no./item designation
Safety switches with guard locking and guard lock monitoring with transponder technology	111346 / CET3-AP-CRA-AH-50X-SI-111346 113141 / CET3-AP-CRA-AH-50X-SI-C2354-113141 114073 / CET3-AP-CRA-AH-50F-SI-114073 114223 / CET3-AP-CRA-AH-50X-SI-C2333-114223 114504 / CET3-AP-CRA-AH-50F-SI-C2354-114504 114516 / CET3-AP-CRA-AH-50F-SI-C2333-114516 114626 / CET3-AP-CRA-AH-50F-SI-C2357-114626

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
CX1030 CPU	CX1030 / CX1010
Power supply + I/O Interface (E-Bus)	CX1100
TwinSAFE Logic module	EL6900
TwinSAFE Input module	EL1904
TwinSAFE Output module	EL2904

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Functional description

General

The CET3 is a guard locking device according to EN ISO 14119 using the closed-circuit current principle. In this example, the guard locking is controlled by a safe output of an EL2094 from a Beckhoff control system. The two safe outputs of the CET3 are connected to a safe input of an EL1904.

Connections

Designation	Function	Use in this example
OA, OB	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.
+UCM, 0V (UCM)	Control input for guard locking solenoid. Connect guard locking to 24 V DC to open.	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.

Safety assessment

The CET3 features complete monitoring for faults in the safety-relevant parts and in the connected cables (clock pulses at outputs OA and OB). 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.

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.

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Principle circuit diagram

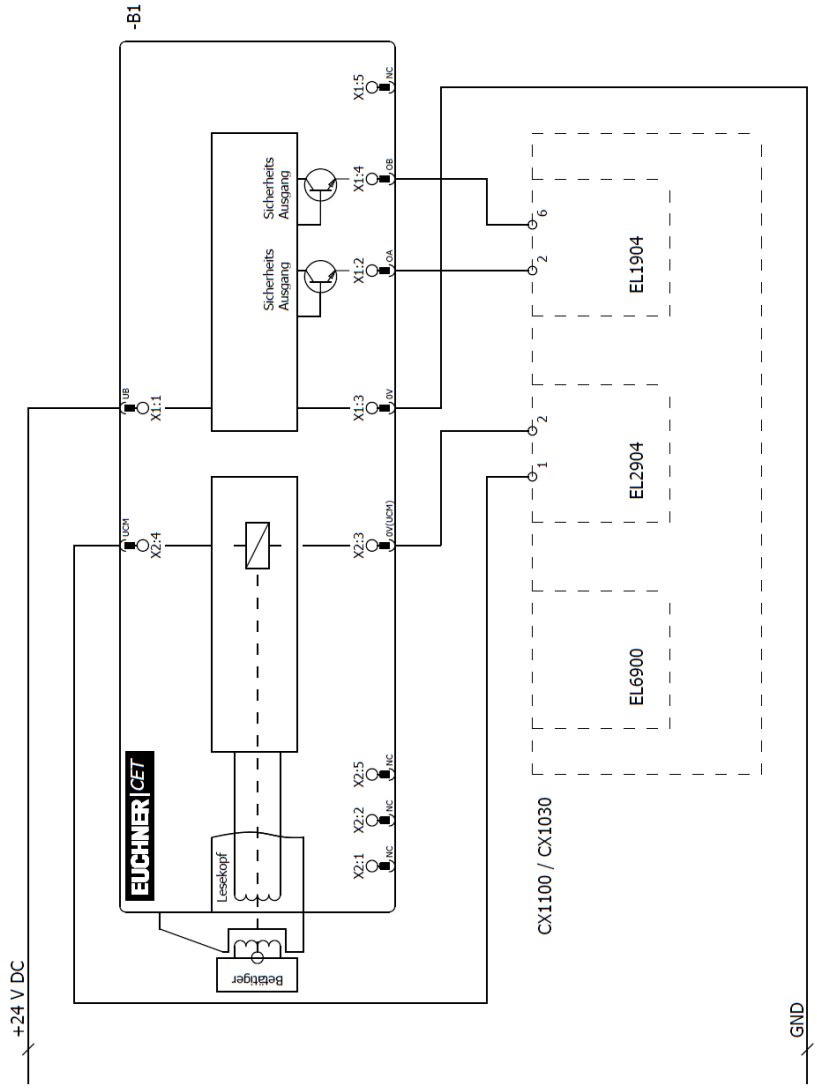

Figure 1

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Parameter assignment in the control system

Input EL1904

Parameter	Value
Sensor test Channel 1 active	FALSE
Sensor test Channel 2 active	FALSE
Logic of Channel 1 and 2	Single channel

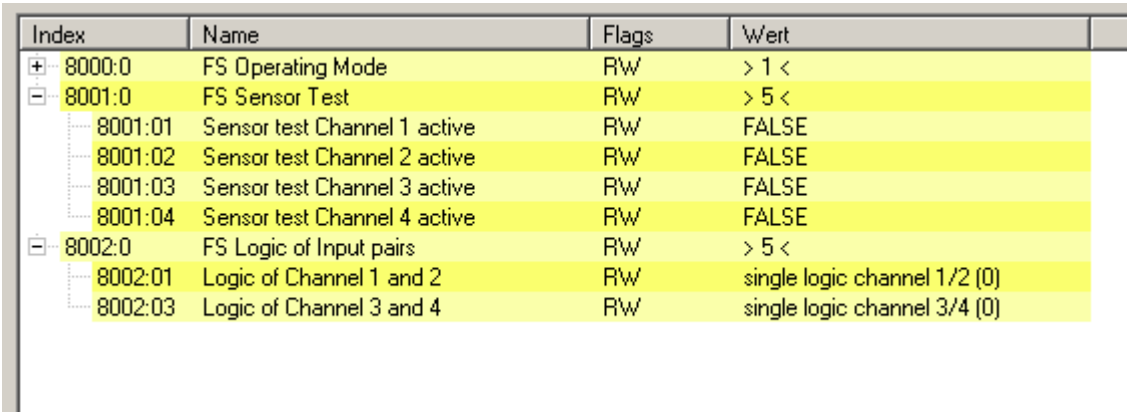

Figure 2. EL1904 parameterization

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Output EL2904

Standard outputs active	Optional
Current measurement active	Optional
Testing output active	Optional
Error acknowledge active	Optional

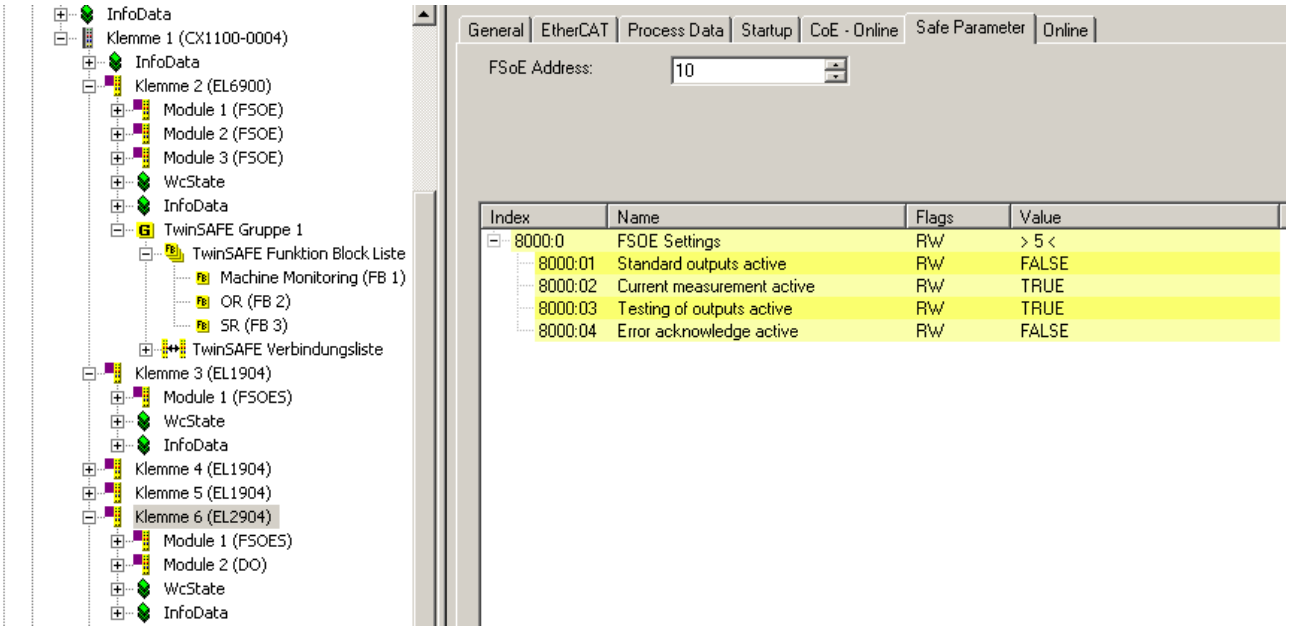

Figure 3. EL2904 parameterization

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Application example

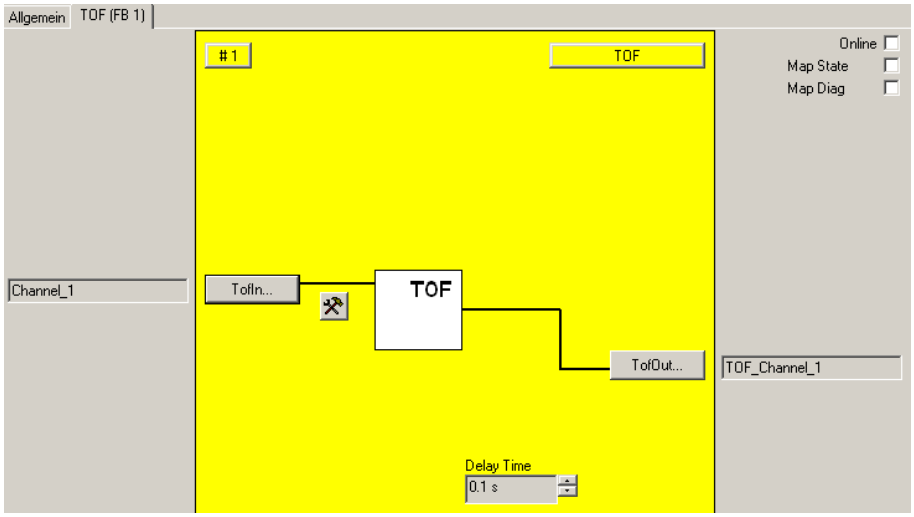

Figure 4. FB-TOF for Channel 1 to filter the test pulses

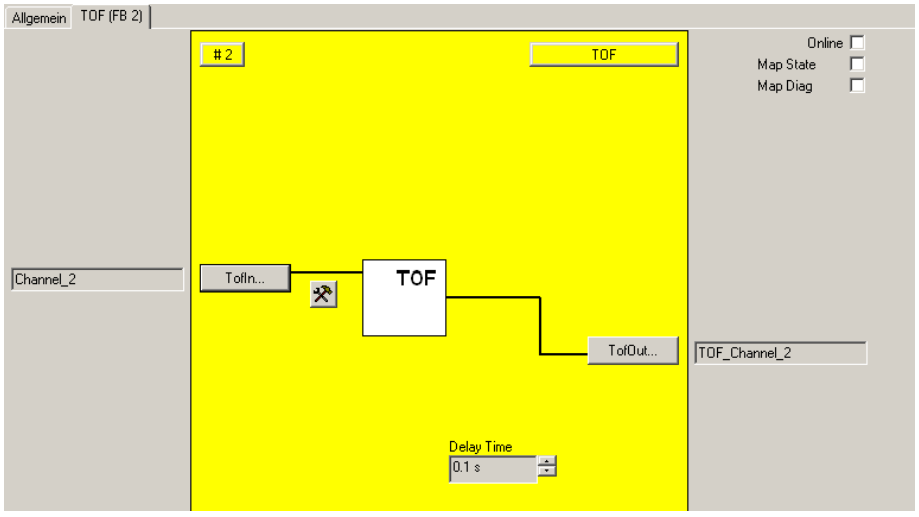

Figure 5. FB-TOF for Channel 2 to filter the test pulses

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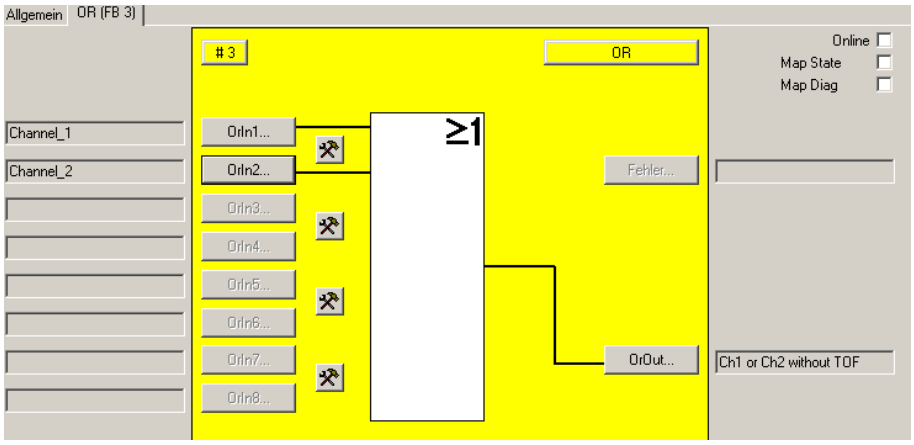

Figure 6. FB-OR for Channel 1 and 2 for real time switch off

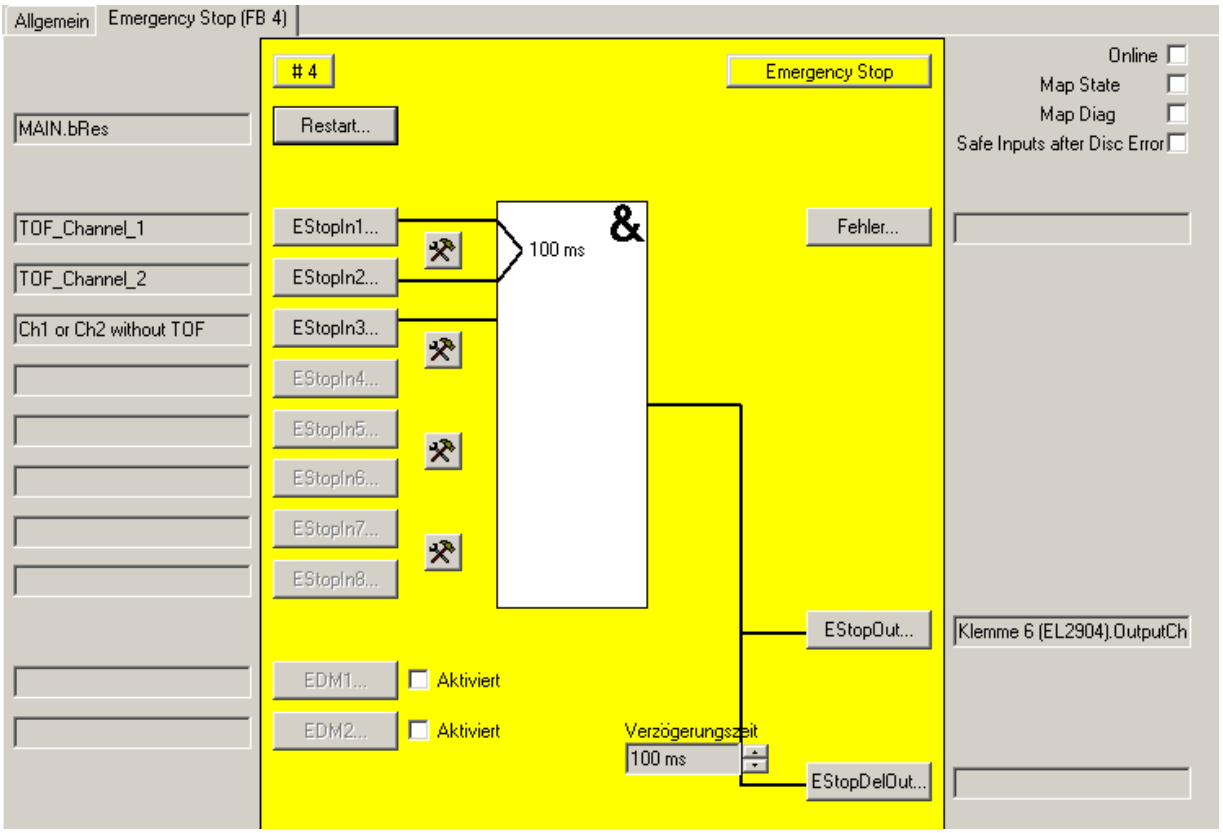

Figure 7. FB-E-Stop to avoid discrepancy error

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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.

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