EUCHNER
More than safety.

Connection of CET3-AR to Safety Relay ESM-BA..1

Content

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

EUCHNER

Description	**Order no./item designation**
Safety switches with guard locking and guard locking monitoring with transponder technology	110114 / CET3-AR-CRA-CH-50X-SG-C2290-110114 110905 / CET3-AR-CRA-CH-50F-SG-C2290-110905 110906 / CET3-AR-CRA-CH-50X-SG-110906 110907 / CET3-AR-CRA-CH-50F-SG-110907 112840 / CET3-AR-CRA-CH-50X-SG-C2368-112840 112841 / CET3-AR-CRA-CH-50F-SG-C2368-112841 112842 / CET3-AR-CRA-CH-50F-SG-C2368-112842 112843 / CET3-AR-CRA-CH-50F-SG-C2368-112843
Safety relay (base module)	085610 / ESM-BA201 085613 / ESM-BA301 097224 / ESM-BA701 097225 / ESM-BA701P 097226 / ESM-BA201P 097230 / ESM-BA301P

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.

Functional description

General

The CET3 is a guard locking device according to EN ISO 14119 using the closed-circuit current principle. The two safe outputs of the CET3 are connected to an ESM-BA..1 safety evaluation module.

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 leads to a direct switch-off of the safety contacts (13 – 14, 23 – 24, ...) of the safety evaluation module ESM-BA..1. 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.
IA, IB	Inputs for series connection of AR devices from EUCHNER	Connected to 24 V DC; function is not used.
+UCM, 0V (UCM)	Control input for guard locking solenoid. Connect guard locking to 24 V DC to open.	Activated by switch S1. 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.
OUT	Monitoring output. HIGH when outputs OA and OB are switched on (safety guard closed and locked).	Function is not used
OUTD	Door monitoring output. HIGH when the actuator is within the operating distance and the CET is ready for controlling guard locking (safety guard closed).	Function is not used
LED1	Input for controlling the installed red LED.	Function is not used.
RST	Input for resetting the switch	Connected to ground; function is not used.

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). The safety relay ESM-BA..1. achieve PL e, depending on the number of annual switching cycles and the load of the enable paths (see the device's operating instructions for this purpose). The wiring corresponds to the circuit "Two-channel emergency stop with pnp-outputs/OSSD-outputs with short circuit monitoring" in the operating instructions of the ESM-BA..1. In combination with a safety sensor that detects a short circuit for the connected cables (here CET3), the wiring corresponds to PL e. Therefore, PL e in accordance with EN ISO 13849-1 can be achieved for locking mechanism position monitoring of guard locking of the CET3.

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.

Important: Switch-off of the energy and any necessary monitoring energy switch-off (feedback loop) of the hazard are not part of this document and must be added in accordance with the risk assessment for the machine. In this example, the safety evaluation unit without feedback loop and without start button is used. Please refer to the operating instructions of the safety evaluation unit used for more information.

Principle circuit diagram (shown with ESM-BA301)

In the example Automatic Start of the ESM-BA301 is used

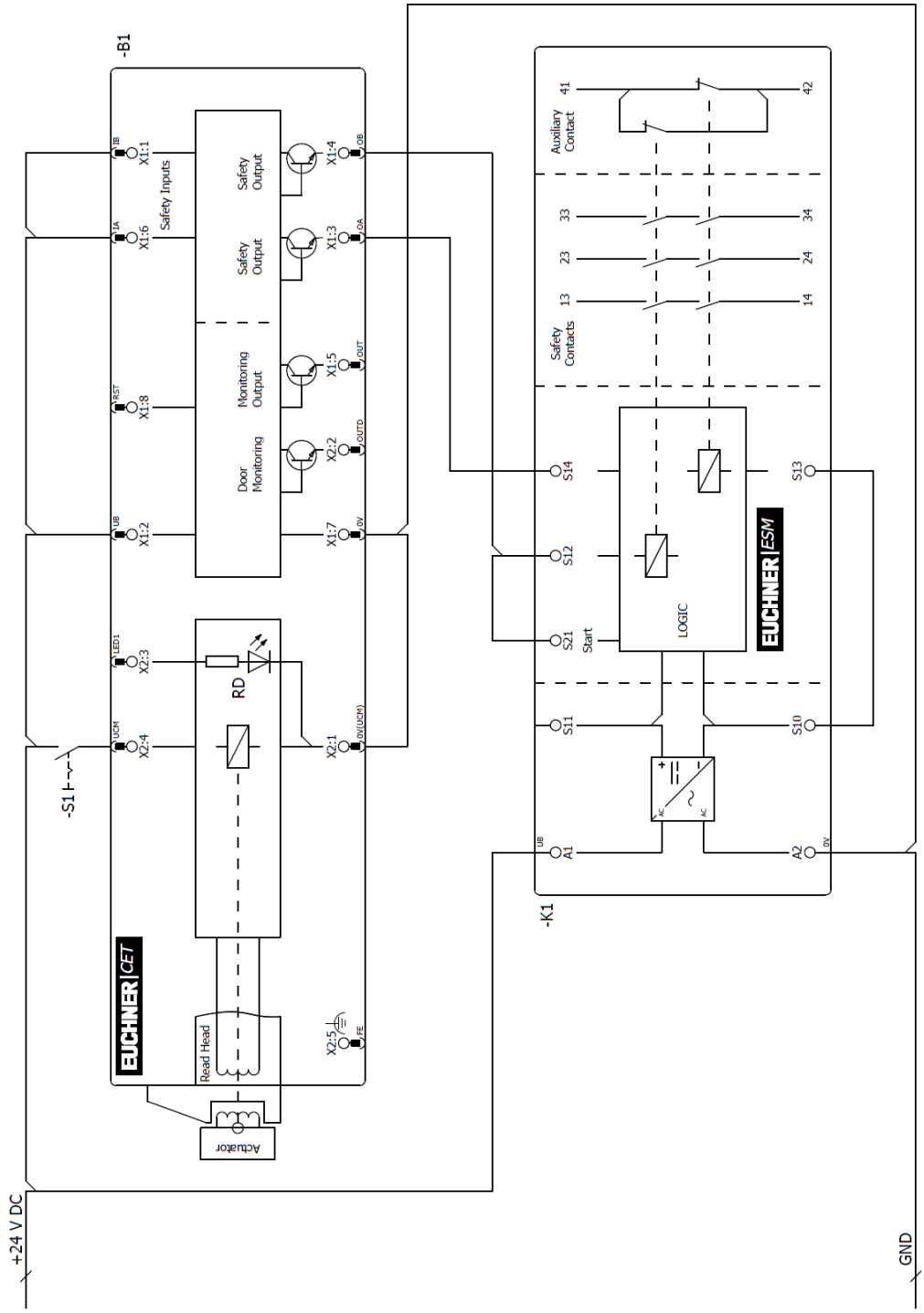
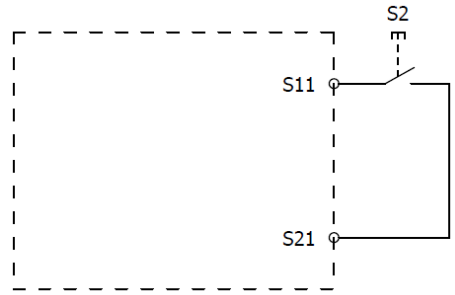


Figure 1

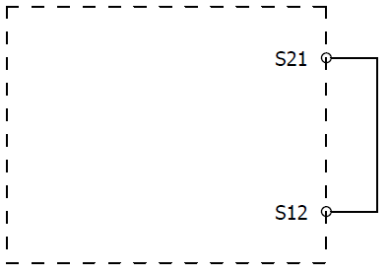
Setting of the Start behavior for ESM-BA..1

Only with the following settings does the safety relay ESM-BA..1 operates correctly with a CET3-AR.

Manual Start



Automatic Start



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.