

Connection of CET4-AR to safety relay PNOZ s5



Content

| | |
|--|---|
| Guard locking power on applied – spring released according to EN ISO 14119 (open-circuit current principle)..... | 2 |
| Components/modules used..... | 2 |
| EUCHNER | 2 |
| Other | 2 |
| Functional description | 3 |
| General..... | 3 |
| Connections | 3 |
| Safety assessment | 3 |
| Principle circuit diagram..... | 4 |
| Setting of the operating mode selector switch “mode”..... | 5 |
| Automatic, manual start – without short circuit detection | 5 |
| Monitored start rising edge – without short circuit detection | 5 |
| Monitored start falling edge – without short circuit detection | 5 |
| Setting of the Reset mode for PNOZ s5..... | 6 |
| Manual Reset..... | 6 |
| Automatic Reset | 6 |
| Important note – please observe carefully!..... | 7 |

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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 locking monitoring with transponder technology

113609 / CET4-AR-CRA-CH-50X-SG-C2355-113609

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 |
|--------------------|--------------|
|--------------------|--------------|

EMERGENCY STOP safety relay

PNOZ s5 / 750 105

Functional description

General

The CET4 is a guard locking device according to EN ISO 14119 using the open-circuit current principle. The two safe outputs of the CET4 are connected to a PNOZ s5 safety relay.

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 relay PNOZ s5. 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, OV (UCM) | Control input for guard locking solenoid. Connect guard locking to 24 V DC to close. | Activated by switch S1. OV (UCM) connected to GND. 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 not used. |
| OUTD | Door monitoring output. HIGH when the actuator is within the operating distance and the CET is ready to engage guard locking (safety guard closed). | Function not used. |
| RST | Input for resetting the switch | Connected to ground; function is not used. |
| NC | Input not connected | Do not connect. |

Safety assessment

The CET4 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 PNOZ s5 achieves up to PL e according to the manufacturer's information (see the device's operating instructions for this purpose). The wiring corresponds to the circuit "Light beam device or safety switch with detection of shorts across contacts via ESPE" in the operating instructions of the PNOZ s5. Therefore, PL e in accordance with EN ISO 13849-1 can be achieved for locking mechanism position monitoring of guard locking of the CET4.

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.

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 for more information.

Principle circuit diagram

In example Automatic Reset of the PNOZ s5 is used

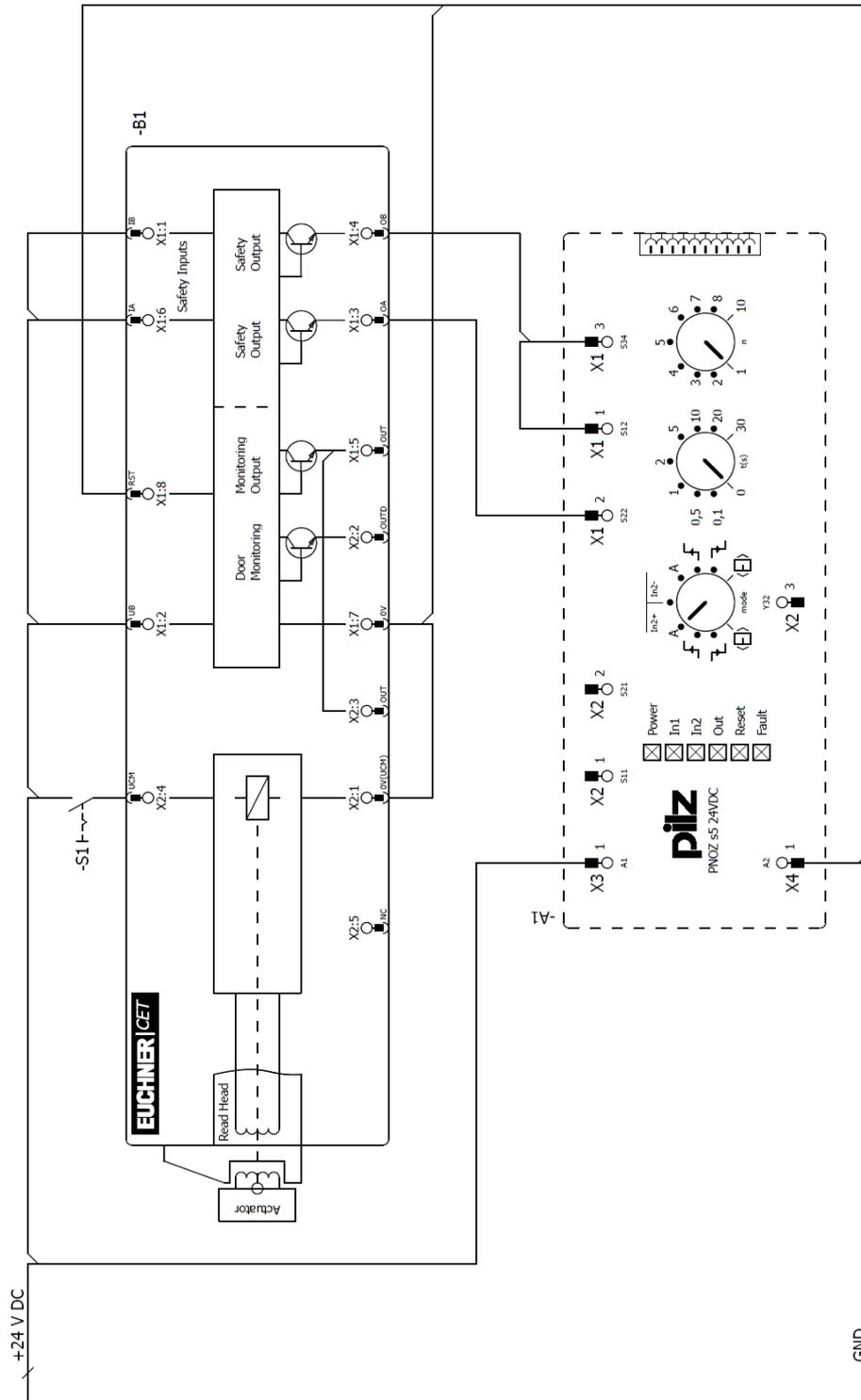
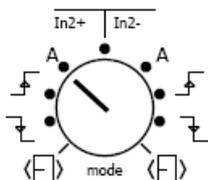


Figure 1

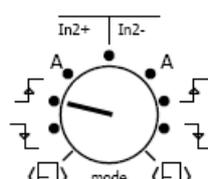
Setting of the operating mode selector switch “mode”

Only with the following settings does the safety relay PNOZ s5 operate correctly with a CET4-AR.

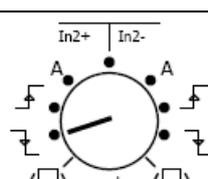
Automatic, manual start – without short circuit detection

| | |
|---------------------------------------|---|
| Operating mode selector switch “mode” | Automatic, manual start |
| Without short circuit detection |  |

Monitored start rising edge – without short circuit detection

| | |
|---------------------------------------|--|
| Operating mode selector switch “mode” | Monitored start, rising edge |
| Without short circuit detection |  |

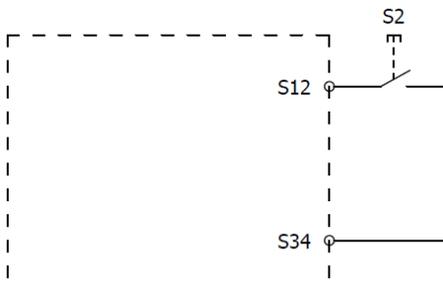
Monitored start falling edge – without short circuit detection

| | |
|---------------------------------------|---|
| Operating mode selector switch “mode” | Monitored start falling edge |
| Without short circuit detection |  |

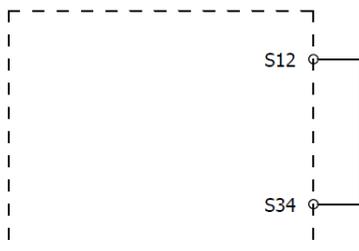
Setting of the Reset mode for PNOZ s5

Only with the following settings does the safety relay PNOZ s5 operate correctly with a CET4-AR.

Manual Reset



Automatic Reset



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.