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Connection of MGB-L1..-AR to a safety relay MSR127TP

Content

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

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

Components/modules used

EUCHNER

Description	Order no./item designation Set	Order no./item designation Evaluation Units
Safety system MGB, Guard locking with guard locking monitoring	105782 / MGB-L1H-AR-R-105782 105784 / MGB-L1HE-AR-R-105784 116232 / MGB-L1HE-ARA-R-116232 116233 / MGB-L1HE-ARA-L-116233	104302 / MGB-L1-AR-AA1A1-M-104302

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
Safety relay	MSR127TP / 440R-N23132

Functional description

General

The MGB-L1 is a guard locking device according to EN 14119 using the closed-circuit current principle. The two safe outputs of the MGB-L1 are connected to a MSR127TP safety relay.

In this example, an MGB with the version 2.0.0 or newer is used in the configuration “system family AP”. Please note that the circuit must be changed if older MGB versions are used.

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 leads to a direct switch-off of the safety contacts (13 – 14, 23 – 24, …) of the safety relay MSR127TP. 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.	Not connected. In this example function is not used. Important: DIP switches 1 and 2 in the MGB must be set to ON position. It is essential to observe the MGB operating instructions for this purpose.
IMP (up to V.2.2.2) IMP1 (from V3.0.0)	Control input for guard locking solenoid. Connect guard locking to 24 V DC to open.	Activated by switch S1. Important: According to EN 14119, it shall be ensured that the hazard caused by a machine has disappeared before the guard locking can be released.
IMP2 (from V3.0.0)	Control input for guard locking solenoid, when dual channel control of the solenoid is used. Connect guard locking to 24 V DC to open.	Function is not used. Important: IMP1 and IMP2 are connected with a jumper. In this example has to remain plugged.
OD	Door monitoring output, HIGH, when the door is closed.	Function is not used.
OT	Bolt tongue monitoring output, HIGH when the door is closed and the bolt tongue is inserted in the locking module.	Function is not used.
OL	Guard locking monitoring output, HIGH when the door is closed and locked.	Function is not used.
OI	Diagnostics monitoring output, HIGH when the device is in the fault state.	Function is not used.
RST	Input for resetting the switch	Connected to ground; function is not used.

Safety assessment

The MGB-L1 features complete monitoring for faults in the safety-relevant parts and in the connected cables (clock pulses at outputs FO1A and FO1B). The safety relay MSR127TP achieve up to PL e according to the manufacturer's information (see the device's operating instructions for this purpose). The wiring is similar to the circuit "Light Curtain, Monitored Manual Reset, Monitored Output" in the operating instructions of the MSR127TP. As found in the operation manual of the MSR127TP, when connected to light curtains, the light curtain must perform cross fault detection (here MGB-L1), then, 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 MGB-L1.

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 with start button is used. Please refer to the operating instructions of the safety evaluation unit used for more information.

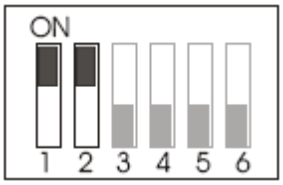
Device configuration for MGB

The device can be configured using DIP switches. To change the device settings, please refer to the operating instructions for the MGB.

Tip: The operation manual can be found at www.EUCHNER.de. Simply enter the order number into the search field.

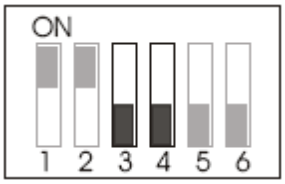
DIP switches – Setting system family AP

Switches 1 and 2 must be set to ON position.



DIP switches – Setting guard lock monitoring activated

Switches 3 and 4 must be set to OFF position (normally the factory setting).



Principle circuit diagram

In the example Manual Reset of the MSR127TP is used.

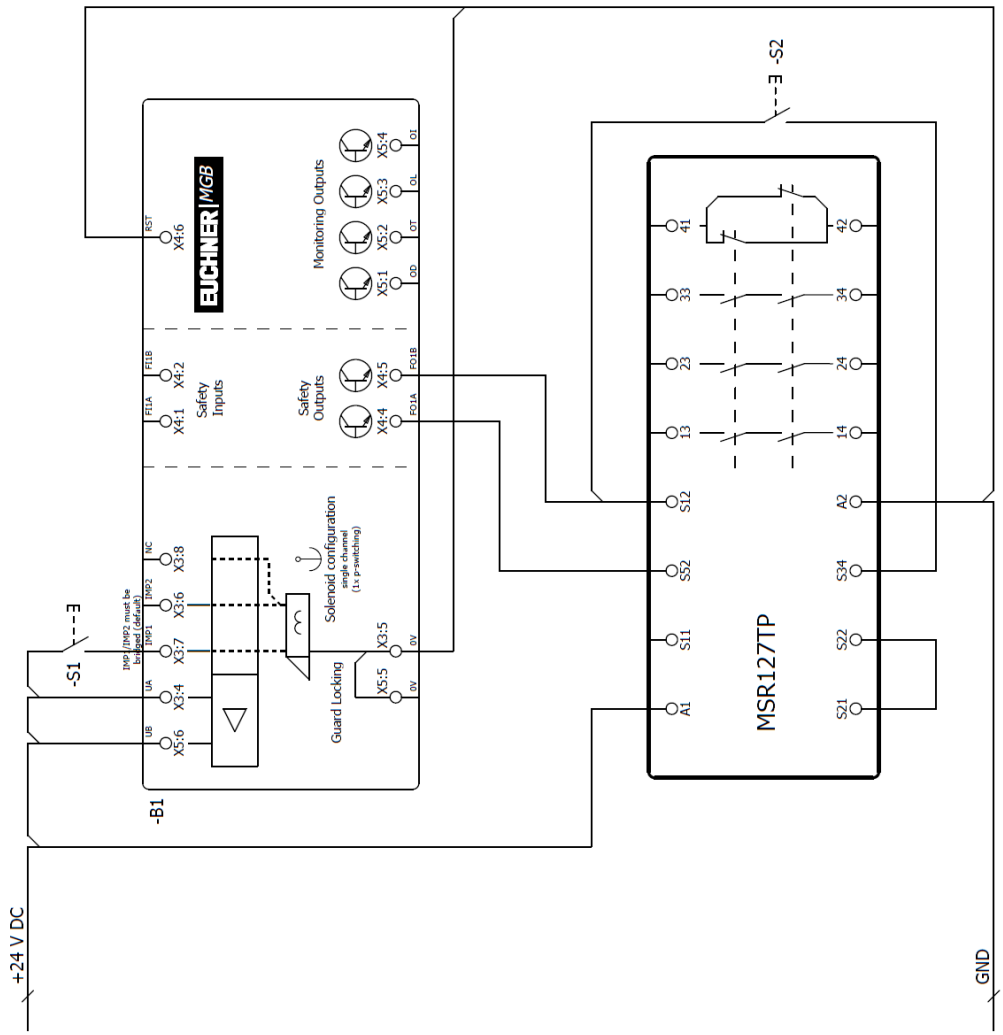
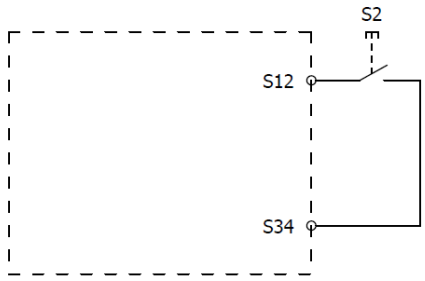


Figure 1

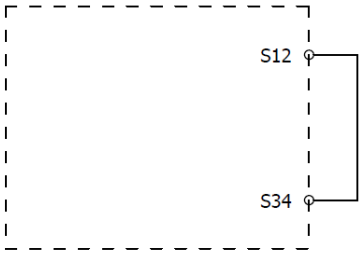
Settings of the Reset for MSR127TP

Only with the following settings does the Safety Relay MSR127TP operate correctly with a MGB-L1.

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 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.