

## Connection of CES-AR to safety relay ESM-BA..1



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## Interlocking device according to EN ISO 14119

**Safety function** Interlocking device according to EN ISO 14119

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

## Components/modules used

### **EUCHNER**

<b>Description</b>	<b>Order no./ item designation</b>
Safety switches with transponder technology	098582 / CES-AR-C01-EH-SA
	098941 / CES-AR-C01-AH-SA
	098942 / CES-AR-C01-CH-SA
	105745 / CES-AR-CR2-CH-SA-105745
	105746 / CES-AR-CR2-AH-SA-105746
	105747 / CES-AR-CL2-CH-SA-105747
	105748 / CES-AR-CL2-AH-SA-105748
	105750 / CES-AR-CR2-CH-SG-105750
	105751 / CES-AR-CR2-AH-SG-105751
	105752 / CES-AR-CL2-CH-SG-105752
	105753 / CES-AR-CL2-AH-SG-105753
	110939 / CES-AR-CR2-CH-SA-110939
	110940 / CES-AR-CL2-CH-SA-110940
	112711 / CES-AR-CR2-CH-SG-112711
	112712 / CES-AR-CL2-CH-SG-112712
	112928 / CES-AR-CR2-CH-SA-112928
	112929 / CES-AR-CL2-CH-SA-112929
	115792 / CES-AR-CR2-CH-SA-115792
	115793 / CES-AR-CL2-CH-SA-115793
	Safety relay (base module)
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](http://www.EUCHNER.de). Simply enter the order number into the search field.

## Functional description

### General

The CES-AR is part of an interlocking device in accordance with EN ISO 14119. The two safe outputs of the last CES-AR are connected to a ESM-BA..1 safety relay.

### Connections

Designation	Function	Use in this example
OA, OB	Safety outputs. HIGH when the safeguarding device is closed and the actuator is in operating distance.	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 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.
OUT	Monitoring output. HIGH when outputs OA and OB are switched on (safety guard closed).	Function is not used.
RST	Input for resetting the switch	Connected to ground; function is not used.

## Safety assessment

The CES-AR features complete monitoring for faults in the safety-relevant parts and in the connected cables (clock pulses at outputs OA and OB). The safety evaluation units 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 CES), the wiring corresponds to PL e. Therefore, PL e in accordance with EN ISO 13849-1 can be achieved for position monitoring of a safety guard and for interlocking (preventing the operation of a machine element under certain conditions).

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 (shown with ESM-BA301)**

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

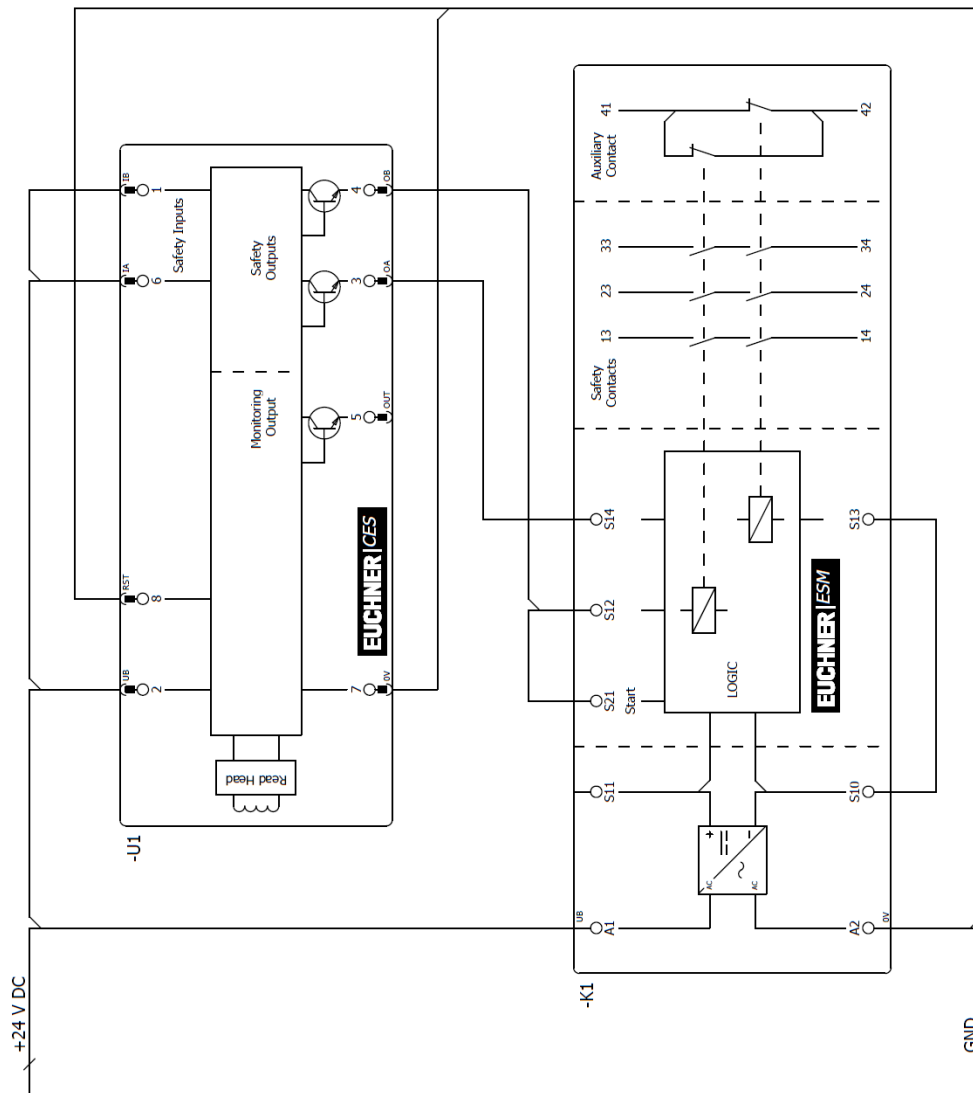
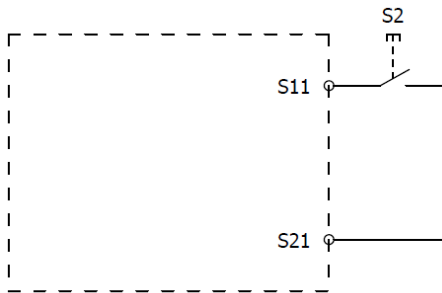


Figure 1

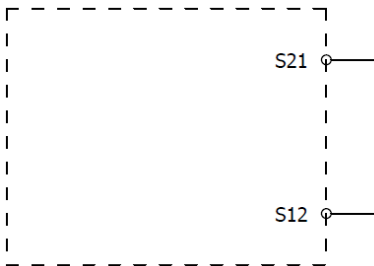
## Setting of the Start behavior for ESM-BA..1

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