EUCHNER

Application

**Connection of CTM-LBI-BR-.. to Siemens ET 200SP
from V1.0.0**

Contents

1. About this document

1.1. Version

Version	Date	Change/addition	Chapter
01-06/20	6/5/2020	Prepared	All

1.2. Scope

This document describes the connection of the CTM-LBI-BR-.. to the decentralized peripheral Siemens SIMATIC ET 200SP.

1.3. Target group

Design engineers and installation planners for safety systems on machines, as well as setup and servicing staff possessing special expertise in handling safety components as well as expertise in the installation, setup, programming and diagnostics of programmable logic controllers (PLCs) and bus systems.

1.4. Supplementary documents

The overall documentation for this application consists of the following documents:

Document title (document number)	Contents	
Operating instructions (2525462)	Operating instructions transponder-coded safety switch with guard locking CTM-LBI-BR unicode	www
Safety information (2525460)	Basic safety information	
Possibly enclosed data sheets	Item-specific information about deviations or additions	

1.5. Notice

This application is based on the CTM-LBI-BR-.. operating instructions and the operating instructions for SIEMENS SIMATIC ET 200SP. Please refer to the operating instructions for technical details and other information.

EN

2. Components/modules used

2.1. EUCHNER

Description	Order number / item number
Safety switches with guard locking and guard lock monitoring with transponder technology	161638 / CTM-LBI-BR-U-AZ-SA-161638
	161496 / CTM-LBI-BR-U-ZZ-SA-P-161496
	161639 / CTM-LBI-BR-U-AZ-SA-161639
	161640 / CTM-LBI-BR-U-ZZ-SA-P-161640

Tip: More information and downloads about the aforementioned EUCHNER products can be found at www.euchner.com. Simply enter the order number in the search box.

2.2. Others

Description	Order number / item number
SIMATIC S7-1215 FC DC/DC/DC	6ES7 215-1AF40-0XB0
SIMATIC ET200 SP, interface module	6ES7 155-6AU00-0BN0
SIMATIC ET200 SP, F-DI electronics module	6ES7 136-6BA00-0CA0
SIMATIC ET200 SP, digital output module	6ES7 132 6BF00-0CA0

2.3. Software

Description	Version
Totally Integrated Automation Portal	Version V16
STEP 7 Professional	Version V16
STEP 7 Safety	Version V16

3. Functional description

3.1. CTM-LBI-BR-..

The CTM-LBI-BR-.. is an interlocking device with guard locking according to EN ISO 14119. The safety outputs are switched off when guard locking is released (monitoring of the locking element).

The spring-operated guard locking functions in accordance with the closed-circuit current principle. If the voltage is interrupted at the solenoid, the guard locking remains active and the guard cannot be opened directly.

If the guard is open when the power supply is interrupted and is then closed, guard locking remains released. This prevents people from being locked in unintentionally.

Guard locking according to EN ISO 14119 actuated by spring force – released by power-ON (closed-circuit current principle)	
Safety function	Guard locking for personnel protection according to EN ISO 14119
Reliability values according to EN ISO 13849	Category 4, PL e

In this example, the two safe outputs (FO1A and FO1B) on the CTM-LBI-BR-.. are connected to a safe input on the ET 200SP.

4. Safety assessment

The CTM-LBI-BR-.. features complete monitoring for faults in the safety-relevant parts and in the cables connected (short circuit monitoring by means of pulsed signals on the outputs FO1A and FO1B).

The example achieves PL e in accordance with EN ISO 13849-1 for position monitoring of the locking element of the guard locking device.

	Important!
ⓘ	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.

EN

5. Overview of the connections

5.1. Connection of the CTM-LBI-BR-..

Pin	Designation	Function	Use in this example
1	FI1B	Enable input for channel B	Connection to power supply 24 V DC for use as a separate device.
2	UB	Operating voltage, 24 V DC	Connection to power supply 24 V DC
3	FO1A	Safety output channel A	Connection to fail-safe input assembly: F-DI0 and F-DI4. Switching off at least one of the outputs must lead to the shutdown of the machine or installation via the connected control system.
4	FO1B	Safety output channel B	Important: The actual shutdown of the energy causing a hazard in a machine is not shown in the example and must be added.
5	OD/C	Door monitoring output / communication	Connection to input assembly: DI..x.
6	FI1A	Enable input for channel A	Connection to power supply 24 V DC for use as a separate device.
7	0 V	Operating voltage, 0 V DC	Connection to power supply 0 V DC
8	IMP	Control input of guard locking solenoid	Connection to output assembly: DQ..x Important: According to EN ISO 14119, it must be ensured that the hazard posed by a machine is no longer present before the guard locking can be opened.

Table 1:   Terminal assignment and contact description, CTM-LBI-BR-..
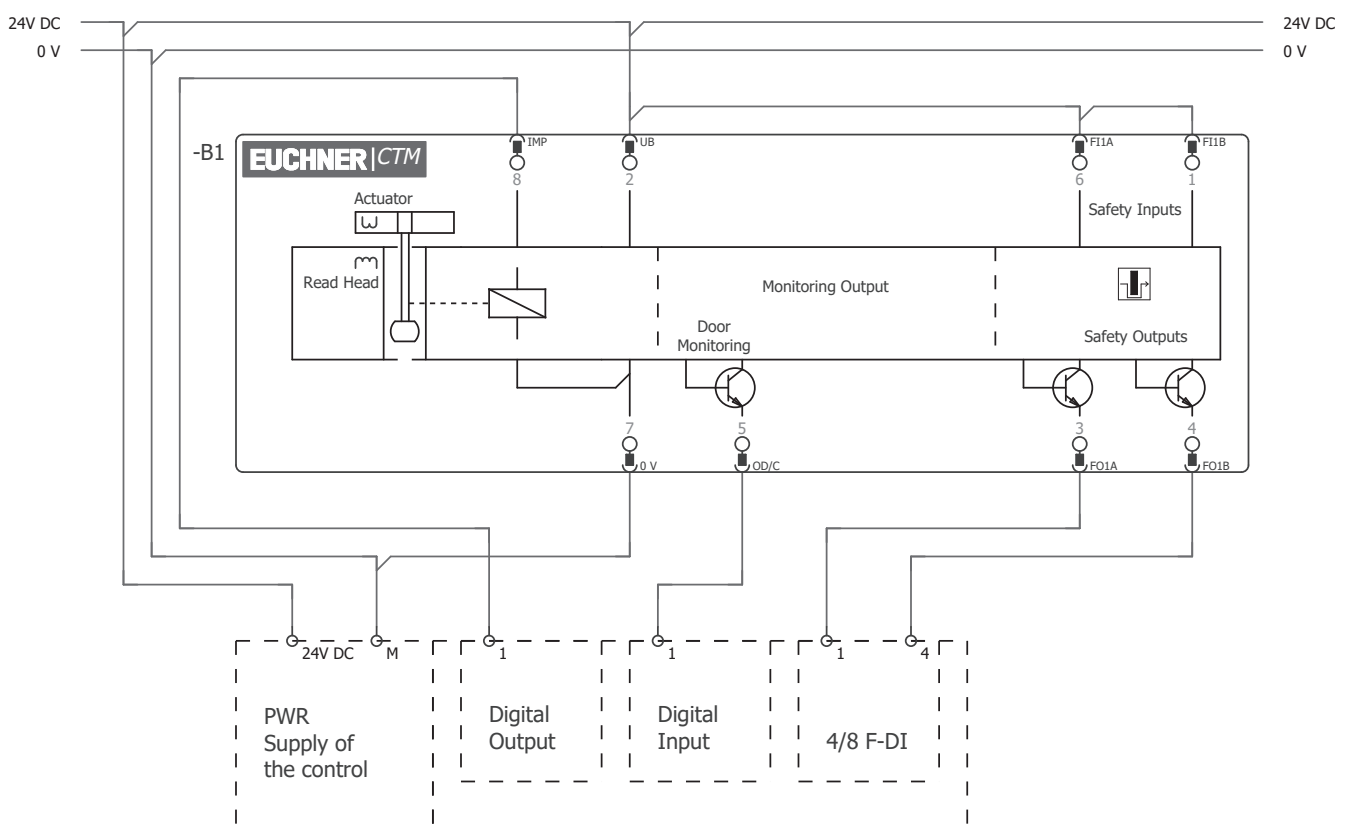
6. Basic circuit diagram

6.1. CTM-LBI-BR-..

Figure 1:   Basic circuit diagram, CTM-LBI-BR-..

7. Parameter assignment in the control system

> ### Notice
>
> The F parameters for the input module and the output module must be configured to suit the application in PROFINET

7.1. Input F-DI 8x24VDC HF

| Parameter name (English)	Parameter name (German)	Value
Channel 0, 4		
Sensor evaluation	Auswertung der Geber	1oo2 evaluation, equivalent
Discrepancy behavior	Diskrepanzverhalten	Supply value 0 or as required
Discrepancy time	Diskrepanzzeit	10 ms
Reintegration after discrepancy error	Wiedereingliederung nach Diskrepanzfehler	Test 0 signal not necessary or as required
Channel 0		
Activated	Aktiviert	☑
Sensor supply	Geberversorgung	External sensor supply
Input delay	Eingangsverzögerung	1.6 ms or longer
Channel 4		
Activated	Aktiviert	☑
Sensor supply	Geberversorgung	External sensor supply
Input delay	Eingangsverzögerung	1.6 ms or longer

Table 2: Parameter settings for the inputs
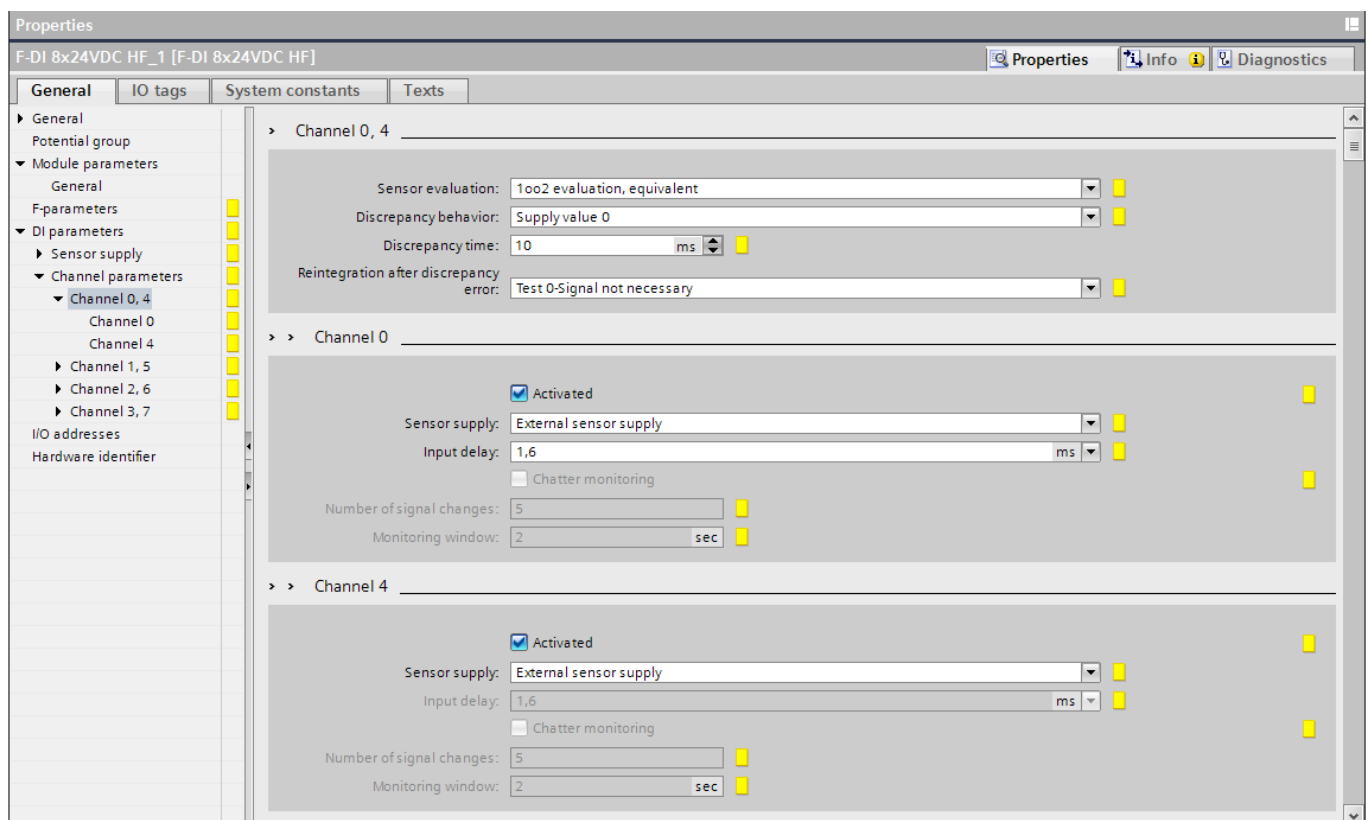
Figure 2: Parameter settings for the inputs

8. 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 example provided into a complete safety chain.

The example represents only 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 danger zone and the software must also be considered in the safety evaluation, for example.

The applications provided are only examples for solving certain safety tasks for protecting safety doors. The examples cannot be comprehensive due to the application-dependent and individual protection goals within a machine/installation.

If questions concerning this example remain open, please contact us directly.

According to the Machinery Directive 2006/42/EC, the design engineer of a machine or installation has the obligation to perform a risk assessment and take measures to reduce the risk. While doing this, the engineer must comply with the applicable national and international safety 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 for functional safety 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 has the obligation to assess the safety technology himself. The examples must not be used for an 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 doors, 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.

In particular in relation to a fault exclusion, it must be noted that a fault can be excluded only by the machine's or installation's design engineer and this action requires justification. A general fault exclusion is not possible. More information about fault exclusion can be found in EN ISO 13849-2.

Changes to 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 used 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 names and company names

All brand names and company names stated are the property of the related manufacturer. They are used only for the clear identification of compatible peripheral devices and operating environments in relation to our products.