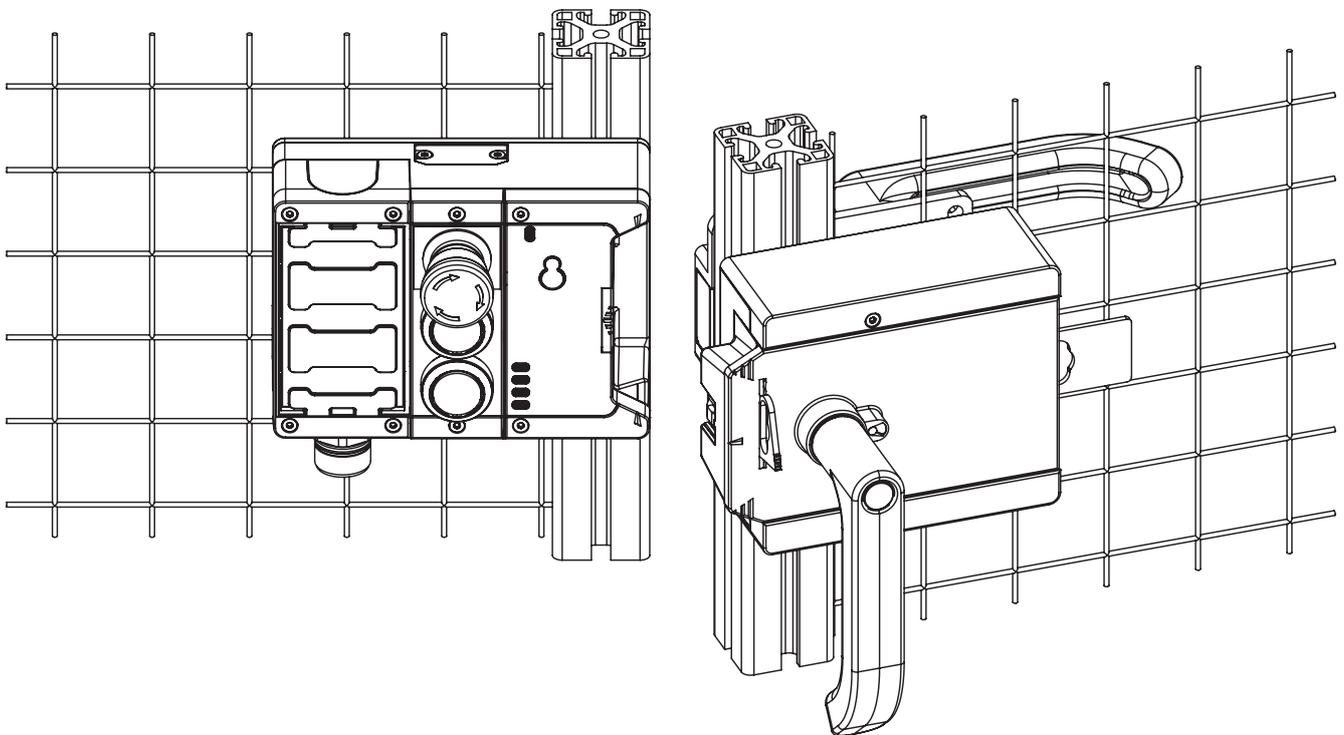


# EUCHNER

## Operating Instructions



Safety Systems  
MGB2-L1...-BR.-... / MGB2-L2...-BR.-...  
MGB2-L1...-BP.-... / MGB2-L2...-BP.-...

EN

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## 1. About this document

### 1.1. Scope

These operating instructions are valid for all MGB2-L1...-BR-... / MGB2-L2...-BR-... and MGB2-L1...-BP-... / MGB2-L2...-BP-.... These operating instructions, the document *Safety information* and any associated data sheet form the complete user information for your device.

Series	Guard locking types	System families	Product versions
MGB2	L1 (guard locking by spring force)	...-BP...	V1.1.X
		...-BR...	
	L2 (guard locking by solenoid force)	...-BP...	
		...-BR...	

#### 1.1.1. Notes on older product versions

Products with lower product versions or without a version number are not described by these operating instructions. Please contact our support team in this case.

### 1.2. 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).

### 1.3. Key to symbols

Symbol/depiction	Meaning
	This section applies to operation as MGB2-BP
	This section applies to operation as MGB2-BR
	In this section, attention must be paid to the DIP switch settings
	Printed document
	Document is available for download at <a href="http://www.euchner.com">www.euchner.com</a>
 <b>DANGER</b> <b>WARNING</b> <b>CAUTION</b>	Safety precautions <b>Danger</b> of death or severe injuries <b>Warning</b> about possible injuries <b>Caution</b> Slight injuries possible
 <b>NOTICE</b> <b>Important!</b>	<b>Notice</b> about possible device damage <b>Important</b> information
<b>Tip</b>	Useful information

## 1.4. Supplementary documents

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

Document title (document number)	Contents	
Safety information (2525460)	Basic safety information	
Operating instructions (2500233)	(this document)	
Declaration of conformity	Declaration of conformity	
Any supplementary data sheets	Item-specific information about deviations or additions	



### Important!

Always read all documents to gain a complete overview of safe installation, setup and use of the device. The documents can be downloaded from [www.euchner.com](http://www.euchner.com). For this purpose enter the doc. no. or the order number for the device in the search box.

## 2. Correct use

The system consists of at least one locking module MGB2-L1-.../MGB2-L2-... and one handle module MGB2-H...

The safety system MGB2-L-... is an interlocking device with guard locking (type 4). Devices with unicode evaluation possess a high coding level, devices with multicode evaluation possess a low coding level.

The locking module can be configured with the aid of DIP switches. Depending on the setting, the locking module behaves like a BP or BR device (see chapter 2.1. *Main differences, MGB2-BP and MGB2-BR on page 8*). In addition, the guard lock monitoring can be switched on or off. More detailed information about the possible settings is available in chapter 13.7. *Changing device configuration (using DIP switches) on page 34*.



### The following applies to active guard lock monitoring:

In combination with a movable guard and the machine control, this safety component prevents the guard from being opened while a dangerous machine function is being performed.

This means:

- Starting commands that cause a dangerous machine function must become active only when the guard is closed and locked.
- The guard locking must not be released until the dangerous machine function has ended.
- Closing and locking a guard must not cause automatic starting of a dangerous machine function. A separate start command must be issued. For exceptions, refer to EN ISO 12100 or relevant C-standards.

### The following applies to inactive guard lock monitoring:

In combination with a movable guard and the machine control, this safety component prevents dangerous machine functions from occurring while the guard is open. A stop command is triggered if the guard is opened during the dangerous machine function. With inactive guard lock monitoring, guard locking must be used only for process protection.

This means:

- Starting commands that cause a dangerous machine function must become active only when the guard is closed.
- Opening the guard triggers a stop command.
- Closing a guard must not cause automatic starting of a dangerous machine function. A separate start command must be issued. For exceptions, refer to EN ISO 12100 or relevant C-standards.

Before the device is used, a risk assessment must be performed on the machine, e.g. in accordance with the following standards:

- EN ISO 13849-1
- EN ISO 12100
- EN IEC 62061

Correct use includes observing the relevant requirements for installation and operation, particularly based on the following standards:

- EN ISO 13849-1
- EN ISO 14119
- EN IEC 60204-1

The safety system MGB2 may be combined only with the intended modules in the MGB2 system family.

On the modification of system components, EUCHNER provides no warranty for function.



Locking modules with the configuration MGB2-BR can be integrated into a BR switch chain.

Connection of several devices in a BR switch chain is permitted only using devices intended for series connection in a BR switch chain. Check the operating instructions for the related device.



**Important!**

- ▶ The user is responsible for the proper integration of the device into a safe overall system. For this purpose, the overall system must be validated, e.g. in accordance with EN ISO 13849-2.
- ▶ Correct use requires observing the permissible operating parameters (see chapter 16. *Technical data on page 50*).
- ▶ If a data sheet is included with the product, the information on the data sheet applies.

Table 1: Possible combinations for MGB2 components

Evaluation unit	Handle module	Submodules	Submodules
	MGB2-H... from V1.0.0	MSM-.P-... MSM-.N-... MSM-.K-...	MSM-.R-...
<b>MGB2...BR/BP V1.1.X</b>	●	●	-

Key to symbols	●	Combination possible
	-	Combination not possible

**2.1. Main differences, MGB2-BP and MGB2-BR**

System family	Symbol	Use
MGB2-BP		Optimized for operation in safe control systems. If series connection is not necessary, the number of terminals required can be reduced using this system family.
MGB2-BR		Linking of several guards on one shutdown path. As a consequence, several safety doors can be very simply polled using one evaluation unit or two control system inputs.

## 3. Description of the safety function

Devices from this series feature the following safety functions:

The following applies to active guard lock monitoring:



### Monitoring of guard locking and the position of the guard (interlocking device with guard locking according to EN ISO 14119)

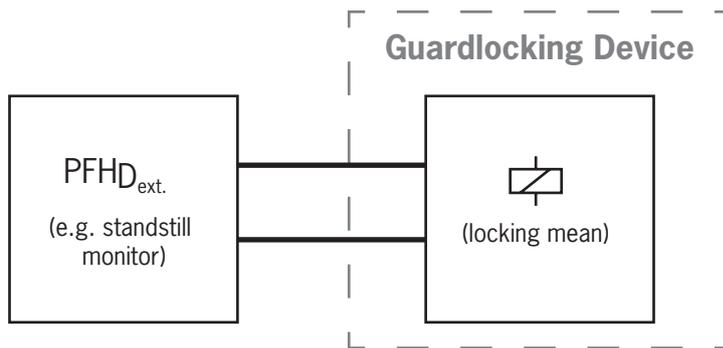
- › Safety function (see chapter 6. *Function on page 11*):
  - The safety outputs are switched off when guard locking is released (monitoring of the locking element).
 

**Important:** This applies only if guard lock monitoring is active!
  - The safety outputs are switched off when the guard is open.
  - Guard locking can be activated only when the bolt tongue is located in the locking module (prevention of inadvertent locking position (faulty closure protection)).
- › Safety characteristics: category, Performance Level, PFH<sub>D</sub> (see chapter 16. *Technical data on page 50*).

### Control of guard locking

- › Safety function  
If the device is used as guard locking for personnel protection, control of guard locking must be regarded as a safety function.

The safety level of guard locking control is determined by the device PFH<sub>D<sub>int.</sub></sub> and by the external control (e.g. PFH<sub>D<sub>ext.</sub></sub> of the standstill monitor).



- › Safety characteristics: category, Performance Level, PFH<sub>D</sub> (see chapter 16. *Technical data on page 50*).

The following applies to inactive guard lock monitoring:



### Monitoring of the guard position (interlocking device according to EN ISO 14119)

- › Safety function: the safety outputs are switched off when the guard is open (see chapter 6. *Function on page 11*).
- › Safety characteristics: category, Performance Level, PFH<sub>D</sub> (see chapter 16. *Technical data on page 50*).

The following applies to devices with emergency stop:

### Emergency stop (emergency stop device according to EN ISO 13850)

- › Safety function: emergency stop function
- › Safety characteristics: B<sub>10D</sub> value (see chapter 16. *Technical data on page 50*)

## 4. Exclusion of liability and warranty

In case of failure to comply with the conditions for correct use stated above, or if the safety regulations are not followed, or if any servicing is not performed as required, liability will be excluded and the warranty void.

## 5. General safety precautions

Safety switches fulfill personnel protection functions. Incorrect installation or tampering can lead to fatal injuries to personnel.

Check the safe function of the safeguard and, if necessary, other safety functions particularly

- › after any setup work
- › after the replacement of a system component relevant for safety
- › after an extended period without use
- › after every fault
- › after any change to the DIP switch settings

Independent of these checks, the safe function of the safeguard should be checked at suitable intervals as part of the maintenance schedule.



### WARNING

Danger to life due to improper installation or due to bypassing (tampering). Safety components fulfill a personnel protection function.

- › Safety components must not be bypassed, turned away, removed or otherwise rendered ineffective. On this topic pay attention in particular to the measures for reducing the possibility of bypassing according to EN ISO 14119:2013, section 7.
- › The switching operation is allowed to be triggered only by the intended handle module MGB2-H... that is positively fastened to the guard.
- › Prevent bypassing by means of replacement actuators (only for multicode evaluation). For this purpose, restrict access to actuators and to keys for releases, for example.
- › Mounting, electrical connection and setup only by authorized personnel possessing the following knowledge:
  - specialist knowledge in handling safety components
  - knowledge about the applicable EMC regulations
  - knowledge about the applicable regulations on operational safety and accident prevention.



### Important!

Prior to use, read the operating instructions and keep these in a safe place. Ensure the operating instructions are always available during mounting, setup and servicing. For this reason you should archive a printed copy of the operating instructions. You can download the operating instructions from [www.euchner.com](http://www.euchner.com).

## 6. Function

### 6.1. Locking module MGB2-L1/L2

Together with a handle module, the locking module makes it possible to lock movable guards. The combination also serves as a mechanical door stop at the same time.



The following switch-on condition applies to the safety outputs FO1A and FO1B (also see chapters 15.2. System status table MGB2-BR on page 45 and 15.3. System status table MGB2-BP on page 47):

DIP switch Configuration		System family	MGB2-BR		MGB2-BP	
			Active	Inactive	Active	Inactive
Condition	Guard lock monitoring					
	No fault in the device	&	TRUE	TRUE	TRUE	TRUE
	Guard closed		TRUE	TRUE	TRUE	TRUE
	Bolt tongue inserted in locking module		TRUE	TRUE	TRUE	TRUE
	Guard locking active		TRUE	irrelevant	TRUE	irrelevant
<b>In case of series connection:</b> Signal available from the upstream switch on the safety inputs FI1A and FI1B <b>In case of separate operation:</b> DC 24 V present at the safety inputs FI1A and FI1B	TRUE		TRUE	irrelevant	irrelevant	
			 FO1A and FO1B are <b>ON</b>			

The locking module detects the position of the guard and the position of the bolt tongue. The position of the guard locking is also monitored.

Guard lock monitoring can be deactivated using DIP switches (see chapter 13.7. Changing device configuration (using DIP switches) on page 34).



#### Important!

For use as guard locking for personnel protection in accordance with EN ISO 14119, guard lock monitoring must be active.

The bolt tongue in the handle module is moved into and out of the locking module by actuating the door handle.

When the bolt tongue is fully inserted into the locking module, the locking arm locks the bolt tongue in this position. Depending on version, this locking is by spring force or solenoid force.

## 6.2. Guard locking for version MGB2-L1

(guard locking actuated by spring force and released by power-ON)

**Activating guard locking:** close guard; no voltage at the solenoid.

**Releasing guard locking:** apply voltage to the solenoid.

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.



### Important!

If the guard is open when the power supply is interrupted and is then closed, guard locking is activated. This can lead to persons being locked in unintentionally.

As long as the guard locking is closed, the bolt tongue cannot be pulled out of the locking module and the guard is locked.

If voltage is applied to the guard locking solenoid, the guard locking is opened and the bolt tongue is released. The guard can be opened.

## 6.3. Guard locking for version MGB2-L2

(guard locking actuated by power-ON and released by spring force)



### Important!

Use as guard locking for personnel protection is possible only in special cases, after strict assessment of the accident risk (see EN ISO 14119:2013, section 5.7.1)!

**Activating guard locking:** apply voltage to the solenoid.

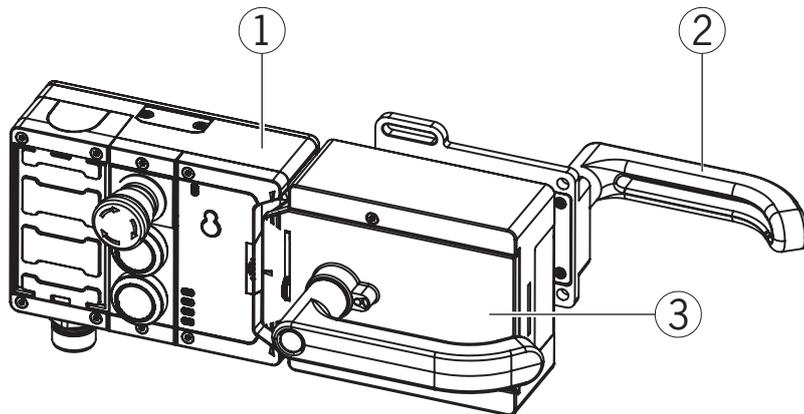
**Releasing guard locking:** disconnect voltage from the solenoid.

The magnetically actuated guard locking operates in accordance with the open-circuit current principle. If the voltage is interrupted at the solenoid, the guard locking is released and the guard can be opened directly!

The guard can be opened as long as no voltage is applied to the guard locking solenoid.

If voltage is present at the guard locking solenoid, the guard locking is held in the closed position and the guard is locked.

## 7. System overview

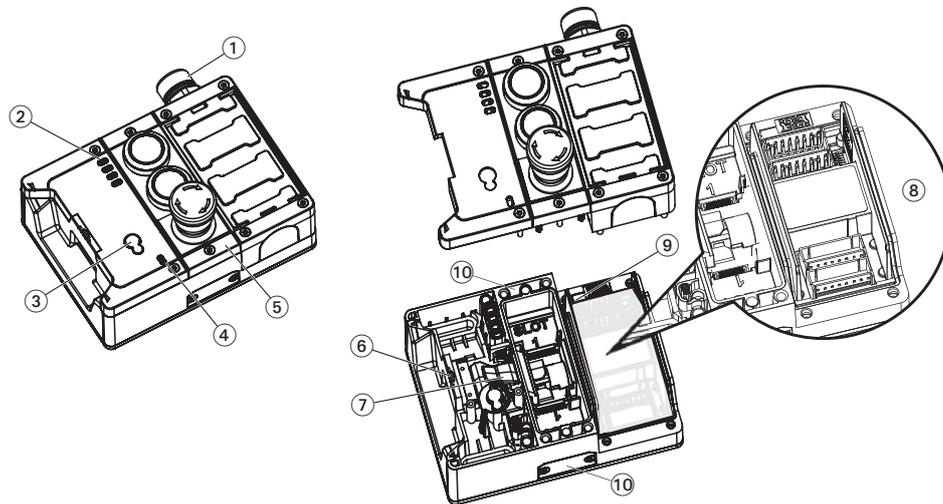


**Key:**

- ① Interlocking/locking module (MGB2-L.../ MGB2-L...)
- ② Escape release, optional (MGB-E-...)
- ③ Handle module (MGB2-H...)

Fig. 1: Overall system

### 7.1. Locking module MGB2-L-...



**Key:**

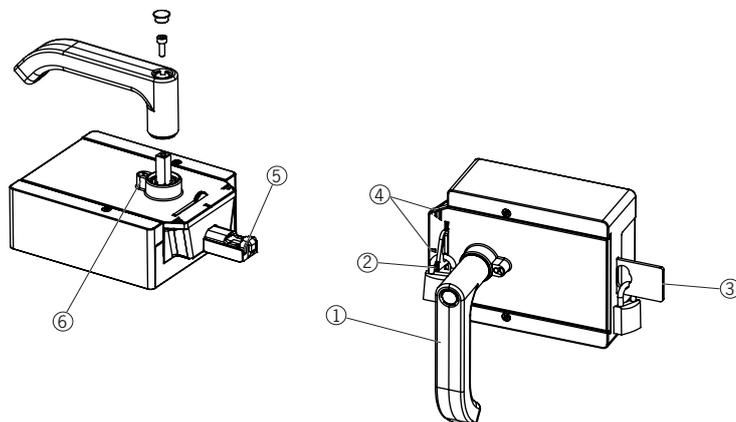
- ① Depending on version: cable entry M20x1.5 or plug connector X7
- ② Module function LED indicators
- ③ Auxiliary release (optional, only on version with guard locking)
- ④ LED indicator for submodule in SLOT 1
- ⑤ Submodule in SLOT 1 (configuration example)
- ⑥ Auxiliary marking for correct alignment in relation to the handle module
- ⑦ Locking arm
- ⑧ Terminals (X1 - X4)
- ⑨ Internal reset
- ⑩ Cover, terminals X5 and X6

**Notice:**

Depending on version, additional controls and indicators may be integrated into the cover and a mounting plate can be included. See associated data sheet.

Fig. 2: Locking module MGB2-L-...

### 7.2. Handle module MGB2-H-...

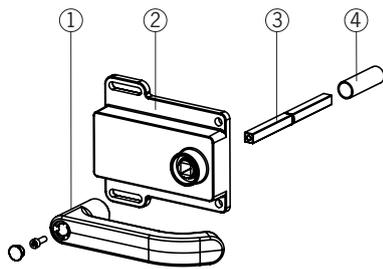


**Key:**

- ① Door handle
- ② Fold-out lockout mechanism
- ③ Automatically extending lockout mechanism (optional)
- ④ Auxiliary markings for max. permissible mounting distance
- ⑤ Bolt tongue
- ⑥ Locking bolt for handle adjustment

Fig. 3: Handle module MGB2-H-...

### 7.3. Escape release MGB-E... (optional)

**Key:**

- ① Door handle
- ② Housing
- ③ Actuation axis 8 x 8 mm  
(different lengths available)
- ④ Protective sleeve

**Notice:**

Depending on version, a mounting plate can be included.  
See associated data sheet.

Fig. 4: Escape release MGB-E...

## 7.4. Dimension drawing

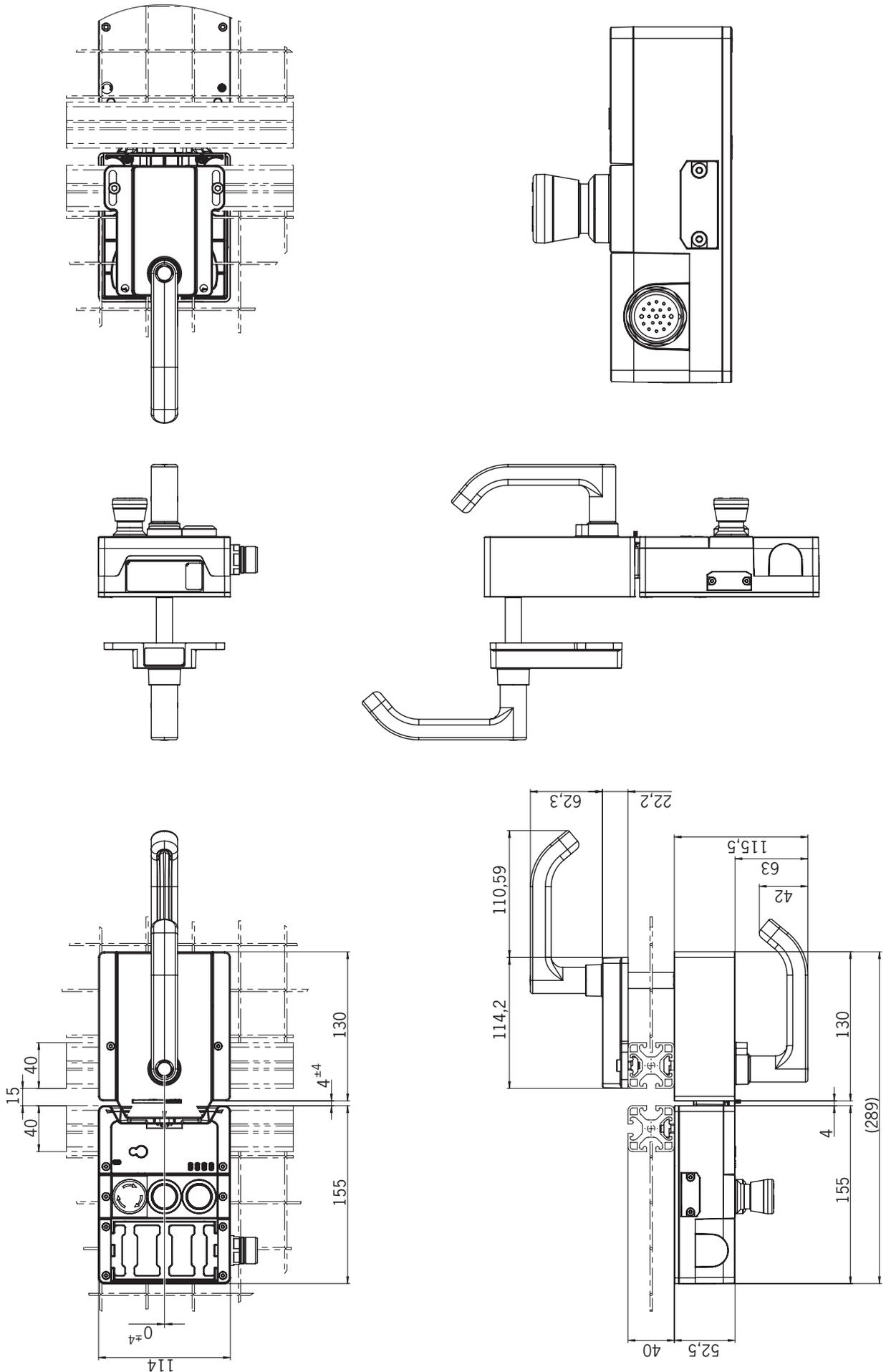


Fig. 5: Dimension drawing for MGB2 mounted, without optional mounting plates

7.4.1. Drilling pattern, overall system

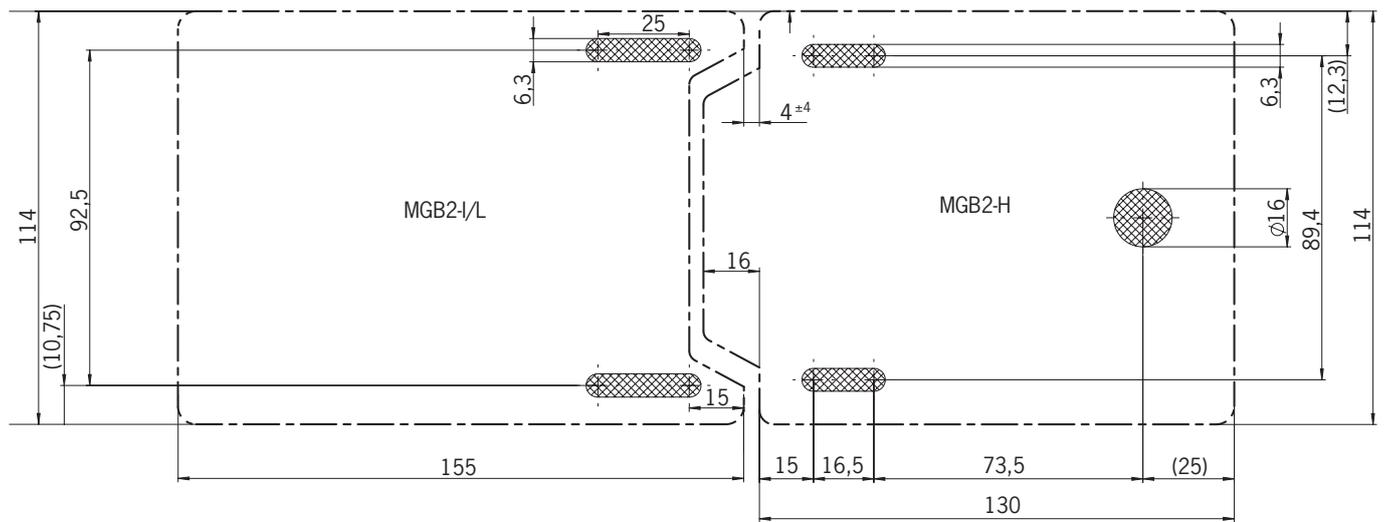


Fig. 6: Drilling pattern, overall system

## 8. Manual release

Some situations require the guard locking to be released manually (e.g. malfunctions or an emergency). A function test should be performed after release.

More information on this topic can be found in the standard EN ISO 14119:2013, section 5.7.5.1. The device can feature the following release functions:

### 8.1. Auxiliary release and auxiliary key release (can be retrofitted)

In the event of malfunctions, the guard locking can be released with the auxiliary release irrespective of the state of the solenoid.

The safety outputs  are switched off when the auxiliary release is actuated. Use the safety outputs  to generate a stop command.

The monitoring output OL is switched off; OD/OT indicates the current state of the guard. Open the guard and close it again after resetting the auxiliary release. The device will then operate normally again.

#### 8.1.1. Actuating auxiliary release

1. Remove seal label or make a hole.
  2. Undo locking screw.
  3. Using a screwdriver, turn the auxiliary release to  in the direction of the arrow.
- ➔ Guard locking is released.

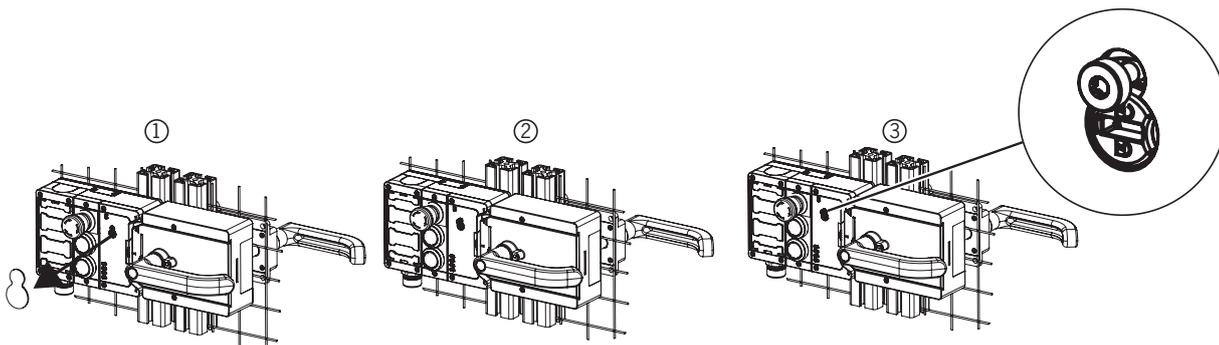


Fig. 7: Auxiliary release

-  When release monitoring is active, the system enters into a latching fault when the auxiliary release is actuated. See *System status table, signal sequence incorrect* status (DIA red, Lock flashes 1 time).
- ▶ The system might not enter into a latching fault if the auxiliary release is actuated very slowly.



#### Important!

- ▶ The auxiliary release must be reset at the control system level, e.g. by means of a plausibility check (status of the safety outputs does not match the guard locking control signal). See EN ISO 14119:2013, sec. 5.7.5.4.
- ▶ The auxiliary release is not a safety function.
- ▶ The machine manufacturer must select and use a suitable release (escape release, emergency release, etc.) for a specific application. A hazard assessment is required for this purpose. It may be necessary to take specifications from a product standard into account.
- ▶ The correct function must be checked at regular intervals.
- ▶ Loss of the release function due to mounting errors or damage during mounting. Check the release function every time after mounting.
- ▶ Observe the notes on any associated data sheets.

#### 8.1.2. Actuating auxiliary key release

On devices with auxiliary key release (can be retrofitted), simply turn the key to release. Function as for auxiliary release. For mounting, see the auxiliary key release supplement.

## 8.2. Emergency release (can be retrofitted)

This permits opening of a locked guard from outside the danger zone without tools. For mounting, see the mounting supplement.



### Important!

- › It must be possible to operate the emergency release manually from outside the protected area without tools.
- › The emergency release must possess a marking indicating that it may be used only in an emergency.
- › The actuator must not be under tensile stress during manual release.
- › The release function meets all other requirements from EN ISO 14119.
- › The emergency release meets the requirements of Category B according to EN ISO 13849-1:2015.
- › Loss of the release function due to mounting errors or damage during mounting.
- › Check the release function every time after mounting.
- › Observe the notes on any associated data sheets.

### 8.2.1. Actuating emergency release

› Turn the emergency release clockwise until it clicks into place.

➔ Guard locking is released.

To reset, press the snap-in bolt inward using a small screwdriver or similar tool and turn the emergency release back.

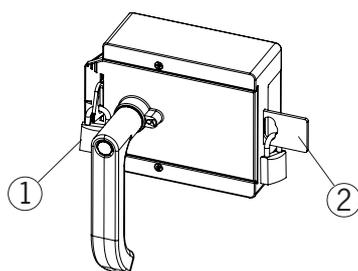
The safety outputs  are switched off when the emergency release is actuated. Use the safety outputs  to generate a stop command.

The monitoring output OL is switched off; OD/OT indicates the current state of the guard. Open the guard and close it again after resetting the emergency release. The device will then operate normally again.

## 8.3. Lockout mechanism

If the lockout mechanism is pivoted out, the bolt tongue cannot be extended. The lockout mechanism can be secured with padlocks (see Fig. 8). This is intended to prevent people from being locked in unintentionally. The lockout mechanism does not fulfill any safety function.

➔ To pivot out, press the grooved part (possible only with bolt tongue retracted).



### Key:

- ① Fold-out lockout mechanism  
Padlock  $\varnothing$  min. 2 mm,  $\varnothing$  max. 10 mm
- ② Automatically extending lockout mechanism (optional)  
Padlock  $\varnothing$  min. 6 mm,  $\varnothing$  max. 10 mm

### Notice:

You can fit up to 3 locks  $\varnothing$  8 mm per lockout mechanism.

Fig. 8: Lockout mechanism secured with padlock

## 8.4. Escape release (optional)

The escape release is used to open a locked guard from the inside without tools.



When release monitoring is active, the system enters into a latching fault when the escape release is actuated. See *System status table*, *signal sequence incorrect* status (DIA red, Lock flashes 1 time). The system might not enter into a latching fault if the escape release is actuated very slowly.



### Important!

- › It must be possible to actuate the escape release manually from inside the protected area without tools.
- › It must not be possible to reach the escape release from the outside.
- › The bolt tongue must not be under tensile stress during manual release.
- › The escape release meets the requirements of Category B according to EN ISO 13849-1:2015.
- › The correct function must be checked at regular intervals.
- › Observe the notes on any associated data sheets.

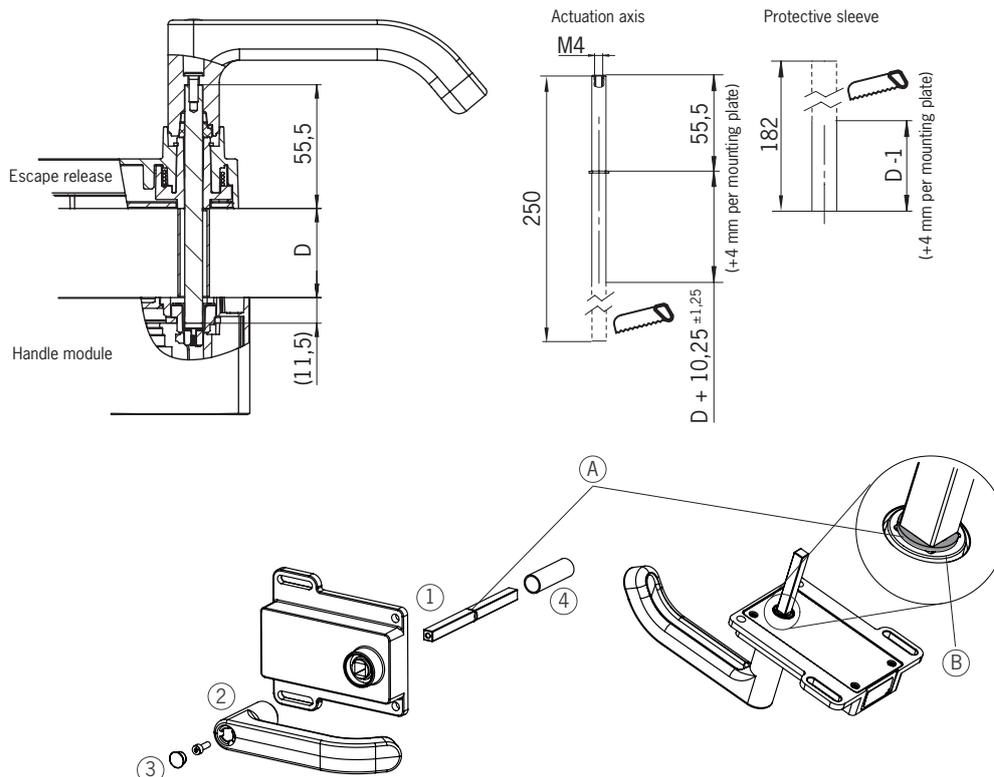
- › Fit escape release such that operation, inspection and service are possible.
- › The actuation axis for the escape release must be inserted min. 9 mm into the handle module. Note the information on the different profile widths in chapter 8.4.1. *Preparing escape release on page 20.*
- › Adjust escape release axis at right angles to the handle module. See *Fig. 10.*

### 8.4.1. Preparing escape release

**Notice:** Various escape releases with different axis lengths are available, as well as mounting plates and door handles/door knobs. You will find further information at [www.euchner.com](http://www.euchner.com).

Profile width <b>D</b>	Length required for actuation axis		Which EUCHNER parts are required?	Necessary work steps
	Without mounting plates	With mounting plates (4 mm each)		
<b>D</b>	<b>D+9</b>	<b>D+17</b>		
30 mm	39 mm	47 mm	Standard escape release with 107 mm axis (order no. 100465)	Shorten to required length
40 mm	49 mm	57 mm	Standard escape release with 107 mm axis (order no. 100465) If necessary, extended actuation axis (order no. 106761)	<i>Without mounting plates:</i> none <i>With mounting plates:</i> Use extended actuation axis and protective sleeve and shorten to required length
45 mm	54 mm	62 mm	Standard escape release with 107 mm axis (order no. 100465) <b>and</b> extended actuation axis (order no. 106761)	Use extended actuation axis and protective sleeve and shorten to required length
50 mm	59 mm	67 mm	Standard escape release with 107 mm axis (order no. 100465) <b>and</b> extended actuation axis (order no. 106761)	Use extended actuation axis and protective sleeve and shorten to required length

Example without mounting plates:



- ① Insert actuation axis. The snap ring **A** must be in contact with the escape release **B**.
- ② Fit door handle
- ③ Tighten fixing screw with 2 Nm and push in cap.
- ④ Fit protective sleeve

Fig. 9: Preparing escape release

## 9. Mounting



### WARNING

Mounting must be performed only by authorized personnel.



### NOTICE

Risk of damage to equipment and malfunctions as a result of incorrect installation. Observe EN ISO 14119:2013, sections 5.2 and 5.3, for information about mounting the safety switch and the actuator.

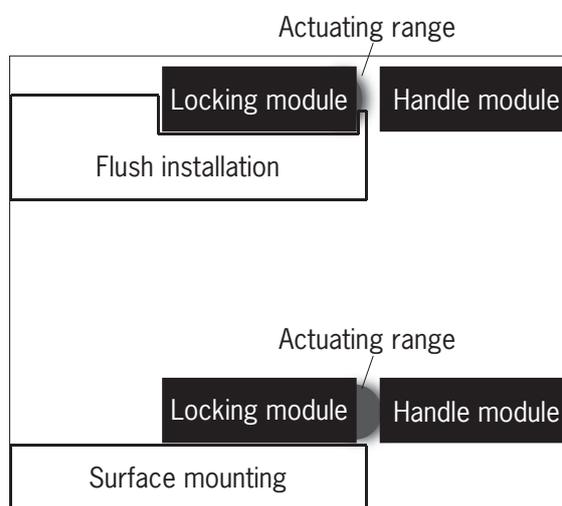
With two-leaf hinged doors, one of the two door leaves must also be latched mechanically.

Use a rod latch (Item) or a double-door lock (Bosch Rexroth) for this purpose, for example.



### Important!

› In case of flush installation, the operating distances change as a function of the installation depth and the guard material.



### Tip!

› You will find an animation on the mounting process at [www.euchner.com](http://www.euchner.com).  
› The pushbuttons and indicators can be customized using replaceable color covers and labels.

For mounting steps, see Fig. 10 and Fig. 13 to Fig. 22.

Attach system such that operation of the auxiliary release as well as inspection and service are possible.

The locking screw must be screwed back in and sealed after mounting and after every use of the auxiliary release. (Seal labels order no. 155853.) Tightening torque 0.5 Nm.

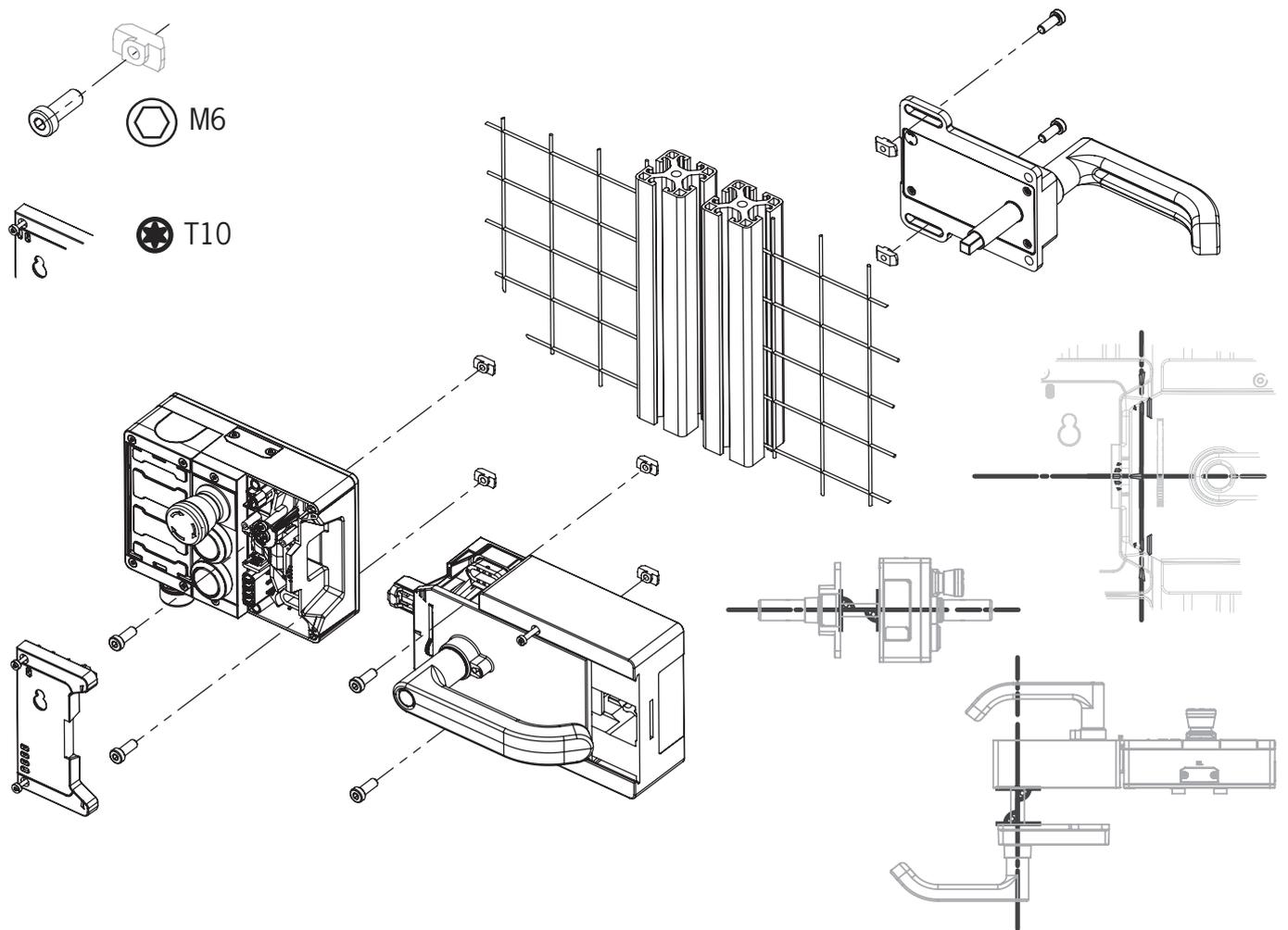


Fig. 10: Installation example for door hinged on the right (general view)

## 9.1. Replacing modules



### CAUTION

Risk of damage to equipment or malfunction as a result of uncontrolled machine stop.

- › The communication within the system is interrupted by the replacement of a module. If a process is running, this situation can result in an uncontrolled stop and damage to the installation or the product. Before replacement, make sure the installation is in a suitable operating status.

An interlocking/locking module with the BP configuration can be replaced only in combination with an overall system restart. On the disconnection of the module connection, the system enters into a fault state. The related module and all downstream modules remain inactive until the overall system is restarted (fault state).

Interlocking/locking modules with the configuration BR are hot pluggable. It is therefore not necessary to restart the overall system.

## 9.2. Mounting submodules



### CAUTION

Risk of damage to equipment or malfunction as a result of incorrect connection or a configuration change.

- › Only submodules of connection types P, K and N can be used. Check the compatibility before installation. For information on the related connection type of a submodule, refer to the sticker on the rear side of the submodule or the associated data sheet for the related submodule.
- › Pay attention to the alignment of the submodule. See marking (a) in *Fig. 11: Mounting submodule*. Submodules can also be installed rotated by 180°. The marking (a) always indicates the first position to be equipped. This is the emergency stop S1 position in the example below.
- › Make sure the pins on the submodule slide straight into the guide. Tighten the cover screws to 0.5 Nm.
- › If you use a submodule, pay attention to the correct alignment of the modules in relation to the labeling fields on the connection module. Incorrect assignments can cause serious malfunctions in your installation.
- › Make sure no foreign bodies, e.g. swarf or wires, enter the open submodule slots. These can cause short circuits or contact problems.
- › Avoid touching the contacts on the underside of the submodule. Risk of ESD damage and contact problems due to soiling.
- › Unused submodule slots must be fitted with a cover (e.g. order number 126372).

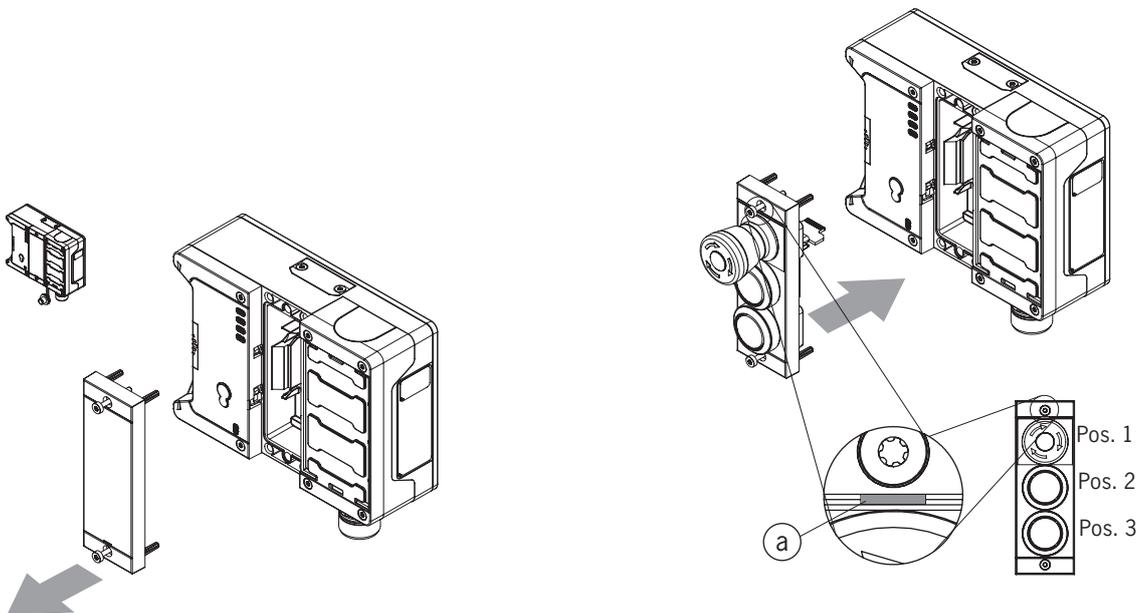


Fig. 11: Mounting submodule

### 9.3. Replacing submodules

**CAUTION**

▸ The communication between submodule and locking module is interrupted by the replacement of a submodule. The submodule ceases to function. The function of the locking module, e.g. the safety outputs FO1A/FO1B, is not affected. If a process is running, the removal/replacement of a submodule can result in an uncontrolled stop and damage to the installation or the product. Before replacement, make sure the installation is in a suitable operating status.

**NOTICE**

Pay attention to the information on the replacement of a submodule in the operating instructions for the related module. Correct function must be tested after replacement before the system enters normal operation again.

The replacement of submodules MSM while in operation is also possible (pay attention to safety note above). As soon as the system detects a compatible submodule, the submodule is ready for operation.

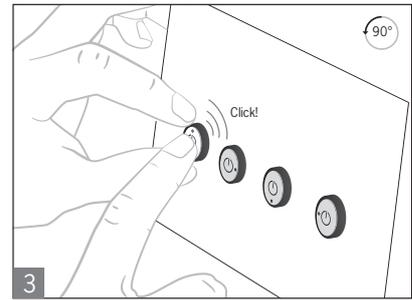
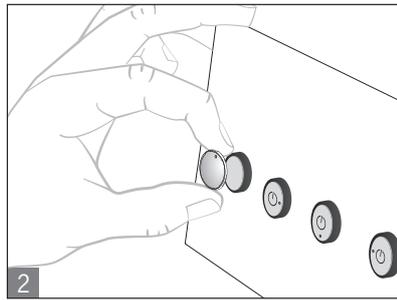
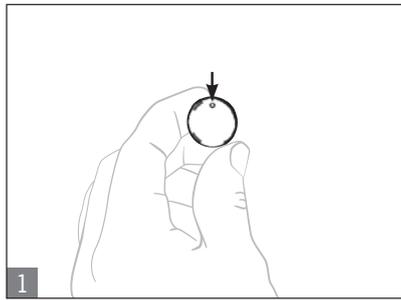
If an incompatible submodule is installed, the Slot 1 LED illuminates red.

#### 9.3.1. Replacing submodule with a submodule with a different function (changing configuration)

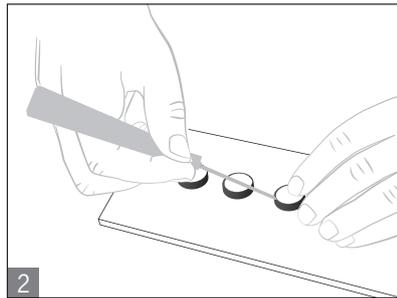
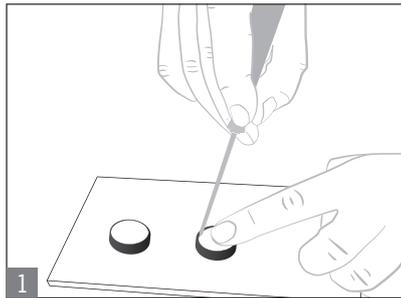
The use of a different submodule will change the function and as a result the terminal assignment (see data sheet for the submodule). Take into account the changes in your wiring and control system.

## 9.3.2. Fitting and removing lenses and labels for controls and indicators

### Fitting



### Removing



## 9.4. Changing direction of connection



### CAUTION

Risk of damage to equipment or malfunction as a result of uncontrolled machine stop.

- ▶ The direction of connection can be changed by removing the covers and mounting rotated by 180°.
- ▶ The communication within the system is interrupted if the internal wiring is changed. If a process is running, this situation can result in an uncontrolled stop and damage to the installation or the product. Before replacement, make sure the installation is in a suitable operating status.

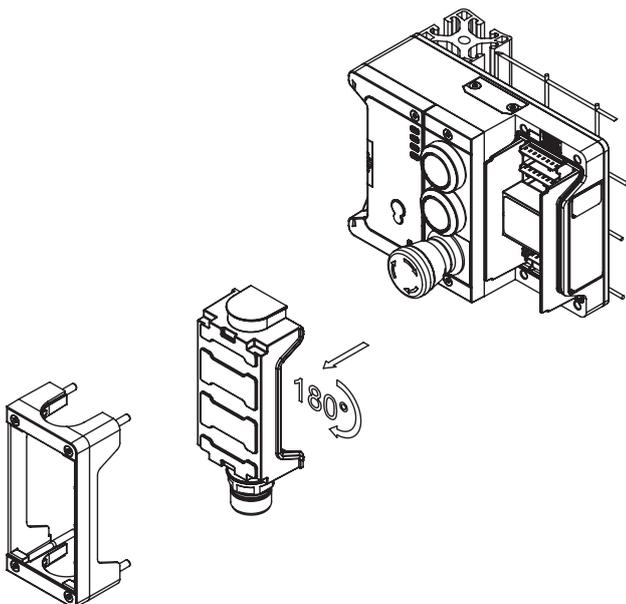


Fig. 12: Changing direction of connection

## 10. Changing the door hinge position

### 10.1. Changing the interlocking/locking module to a different door hinge position

To change the interlocking/locking module for doors with a different door hinge position, the module only needs to be rotated by 180°. Submodules installed in the module can also be rotated by 180° (see section 9.1. *Replacing modules on page 23*).

### 10.2. Changing the actuating direction of the handle module

(here: from right to left)



#### Important!

It is possible to make this change only when the bolt tongue is not extended and an escape release is not yet mounted.

In the delivery state, the handle module is set either for doors hinged on the right or for doors hinged on the left.

Based on the example of a handle module for doors hinged on the right this means:

- The guard opens by pressing down the door handle.
- The system is mounted the other way up for doors hinged on the left. In other words, the guard opens by pressing up the door handle (see Fig. 13). For this reason the actuating direction of the door handle must be changed (see Fig. 13 to Fig. 22).

(Similarly on handle modules for doors hinged on the left)

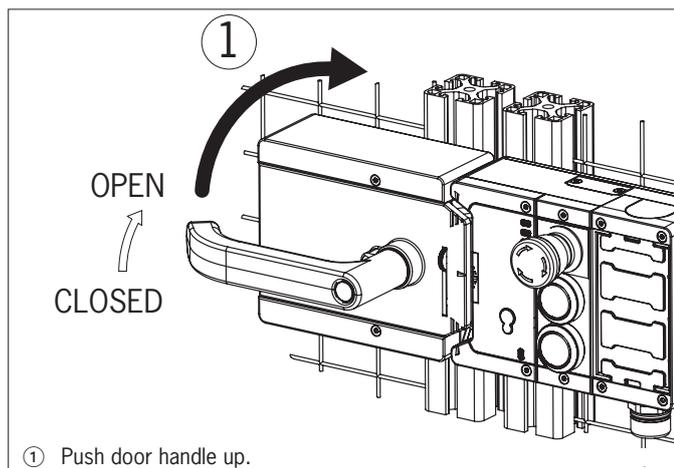


Fig. 13: Changing actuating direction, step ①

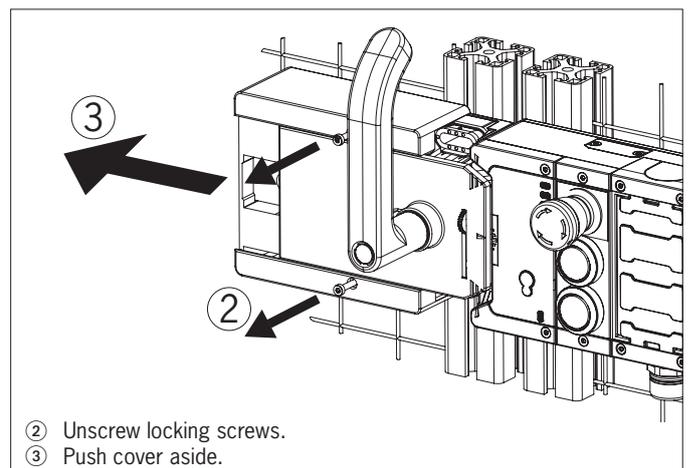


Fig. 14: Changing actuating direction, steps ② and ③

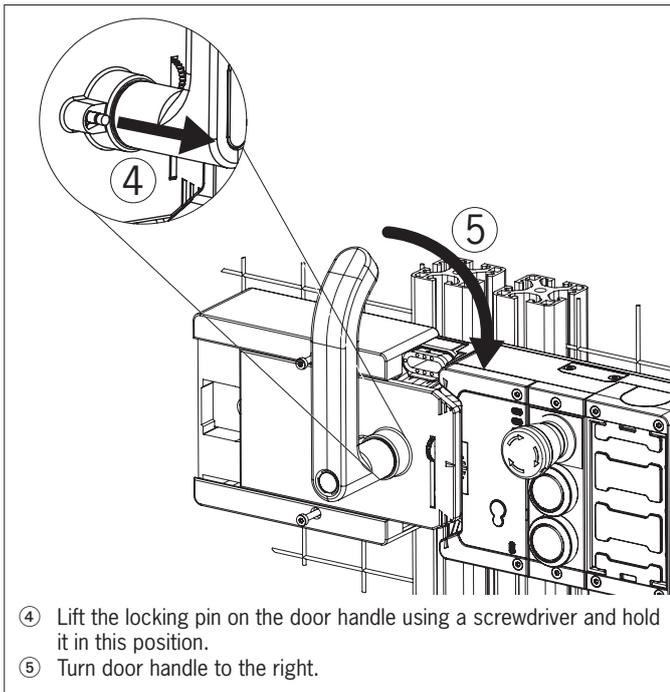


Fig. 15: Changing actuating direction, steps ④ and ⑤

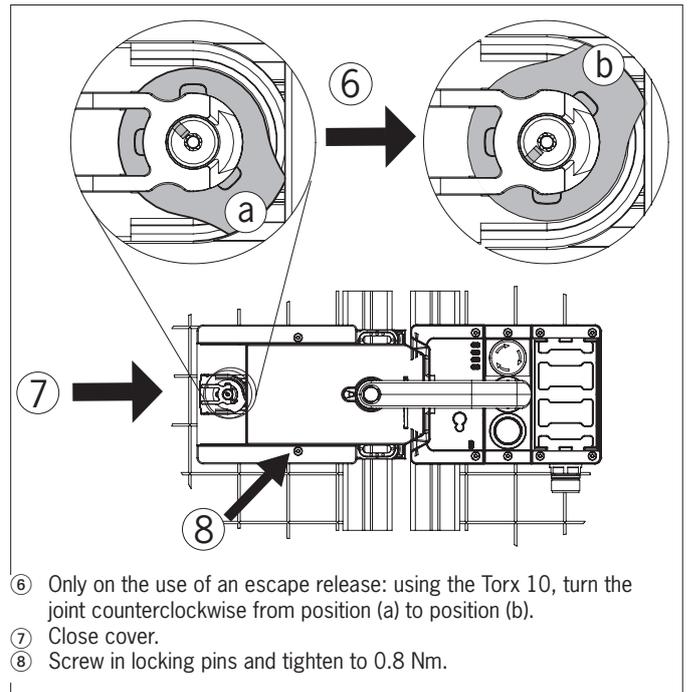


Fig. 16: Changing actuating direction, steps ⑥ to ⑧

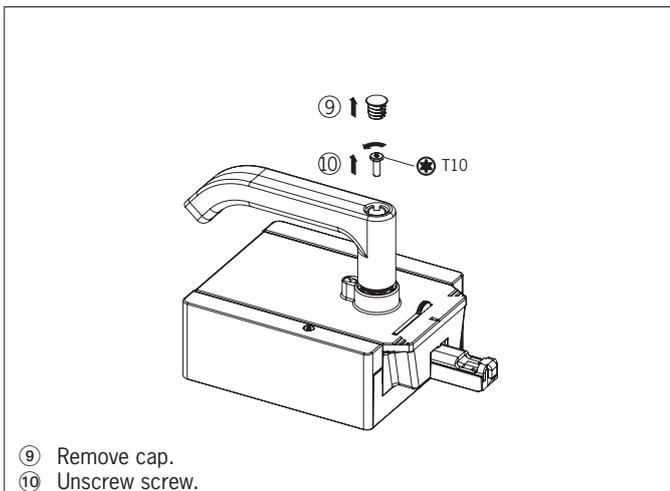


Fig. 17: Changing actuating duration, steps ⑨ and ⑩

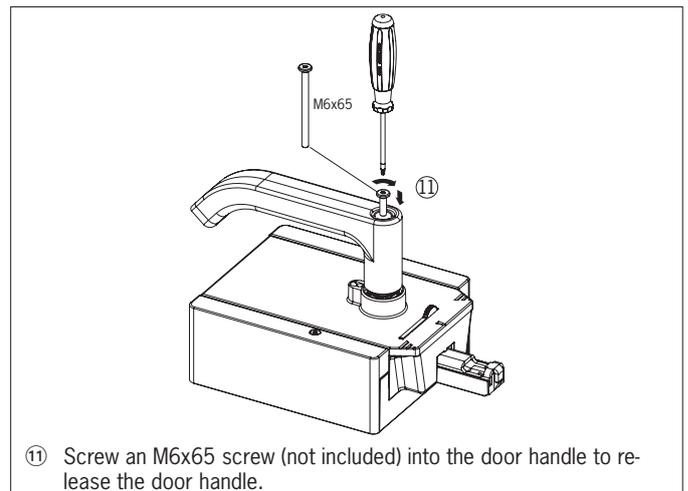


Fig. 18: Changing actuating duration, step ⑪

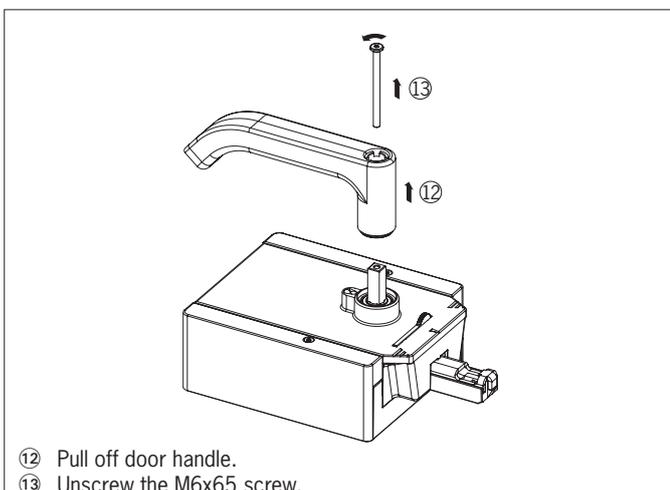


Fig. 19: Changing actuating duration, steps ⑫ and ⑬

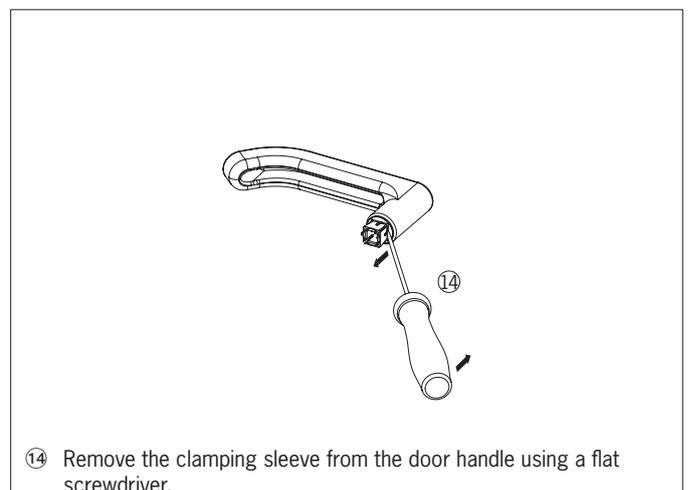


Fig. 20: Changing actuating duration, step ⑭

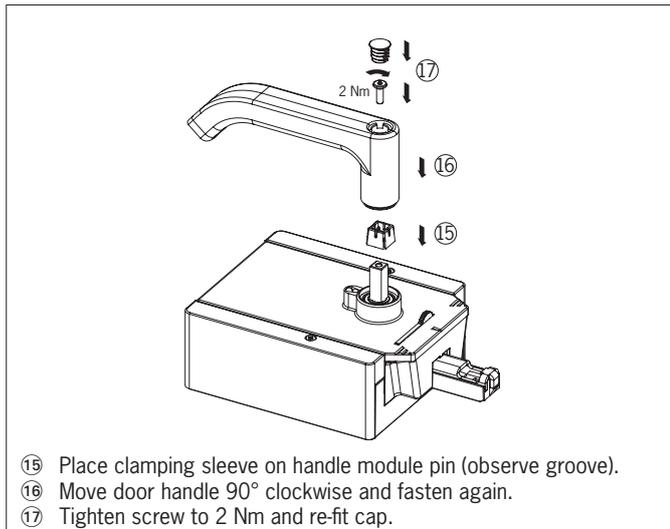


Fig. 21: Changing actuating duration, steps 15 to 17

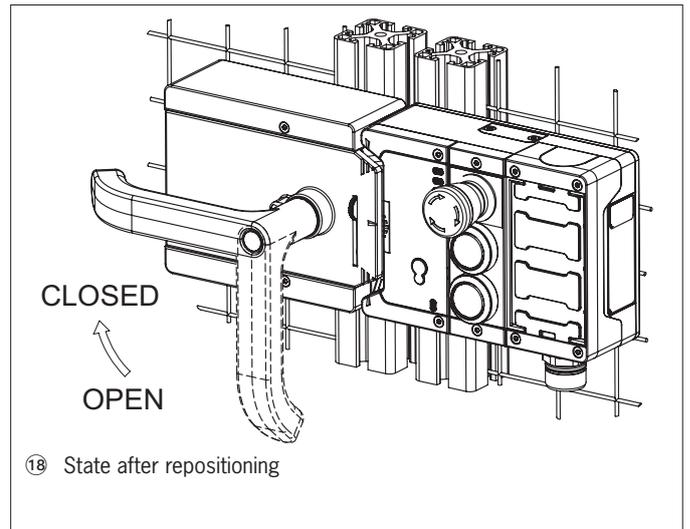


Fig. 22: Changing actuating direction, final state

## 11. Protection against environmental effects

A lasting and correct safety function requires that the system must be protected against foreign bodies such as swarf, sand, blasting shot, etc., which can become lodged in the housing.

Pay attention to the following measures:

- Seal unused connections using the covers provided.
- Make sure the housing covers are correctly sealed and the cover screws are tightened to the necessary tightening torque.
- Cover the device during painting work.

## 12. Controls and indicators

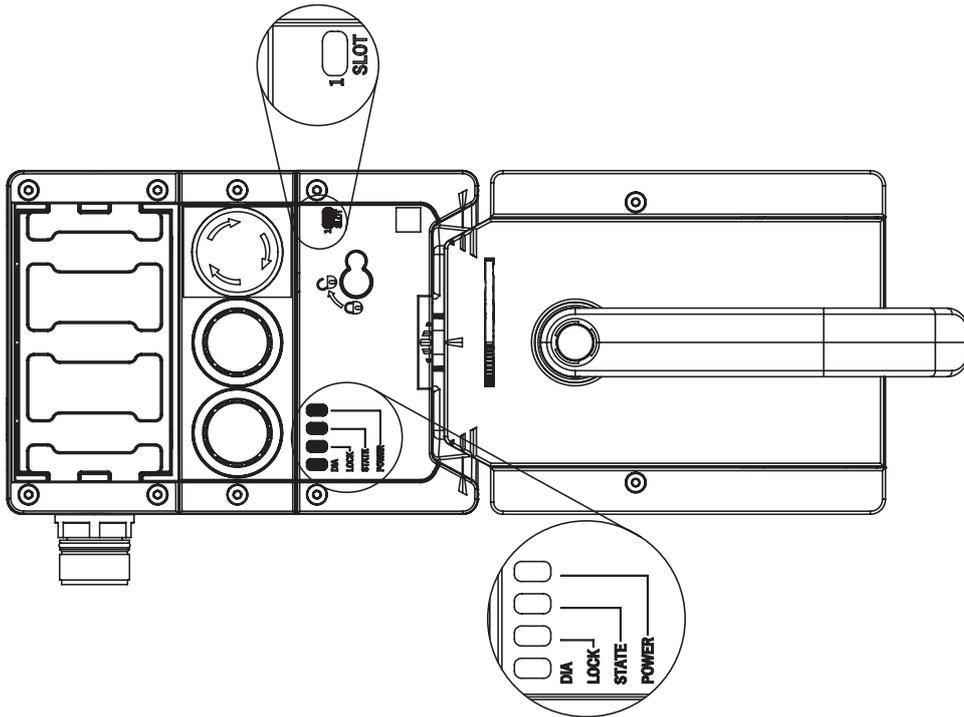


Fig. 23: Indicators and control elements

LED	Description
POWER	Illuminates if power supply correct Color: green
STATE	Indicates the device state Color: green
LOCK	Indicates the state of the guard locking Color: yellow
DIA	Indicates errors Color: red
SLOT 1	Indicates the status of the submodule Color: red/green

## 13. Electrical connection



### WARNING

In the event of a fault, loss of the safety function due to incorrect connection.

- › To ensure safety, both safety outputs (FO1A and FO1B) must always be evaluated.
- › The monitoring outputs must not be used as safety outputs.
- › Lay the connecting cables with protection to prevent the risk of short circuits.



### CAUTION

Risk of damage to equipment or malfunctions as a result of incorrect connection.

- › The inputs on a connected evaluation unit must be positive switching, as the two outputs on the safety switch deliver a level of +24 V in the switched-on state.
- › All the electrical connections must either be isolated from the mains supply by a safety transformer according to EN IEC 61558-2-6 with limited output voltage in the event of a fault, or by other equivalent insulation measures.
- › All electrical outputs must have an adequate protective circuit for inductive loads. The outputs must be protected with a free-wheeling diode for this purpose. RC interference suppression units must not be used.
- › Power devices which are a powerful source of interference must be installed in a separate location away from the input and output circuits for signal processing. The cable routing for safety circuits should be as far away as possible from the cables of the power circuits.
- › To prevent EMC problems, it is imperative you follow the chapter 13.6. *Notes on cable laying on page 33*. Follow EMC notes on devices in the immediate vicinity of the MGB2 system and its cables.
- › In order to avoid EMC interference, the physical environmental and operating conditions at the installation site of the device must comply with the requirements according to the standard DIN EN 60204-1:2006, section 4.4.2 (EMC).



### Important!

- › If the device does not appear to function when the operating voltage is applied (e.g. green Power LED does not illuminate), the safety switch must be returned to the manufacturer.
- › To ensure the stated degree of protection is achieved, the cover screws must be tightened to a tightening torque of 1 Nm.
- › Tighten screw for the cover for the auxiliary release to 0.5 Nm.

## 13.1. Using submodules

Each interlocking/locking module can contain one submodule. For an exact description of the individual submodules as well as information on compatibility, refer to the associated data sheet for the related submodule.



### Important!

- ▶ Only submodules of connection types P, K and N may be installed in the modules described here. For information on the related connection type of a submodule, refer to the sticker on the rear side of the submodule or the associated data sheet for the related submodule.
- ▶ On using a submodule, pay attention to the correct alignment of the module in relation to the labeling fields on the connection submodule. Incorrect assignments can cause serious malfunctions in your installation.
- ▶ Unused submodule slots must be fitted with a cover (e.g. order number 126372).
- ▶ Avoid touching the contacts on the underside of the submodule. Risk of ESD damage and contact problems due to soiling.

## 13.2. Notes about



### Important!

- ▶ This device is intended to be used with a Class 2 power source in accordance with UL1310 <sup>1)</sup>. As an alternative an LV/C (Limited Voltage/Current) power source with the following properties can be used:
  - This device shall be used with a suitable isolating source in conjunction with a fuse in accordance with UL248. The fuse shall be rated max. 3.3 A and be installed in the max. 30 V DC power supply to the device in order to limit the available current to comply with the UL requirements. Please note possibly lower connection ratings for your device (refer to the technical data).

1) Note on the scope of the UL approval: only for applications as per NFPA 79 (Industrial Machinery). The devices have been tested as per the requirements of UL508 (protection against electric shock and fire).

## 13.3. Safety in case of faults

- ▶ The operating voltage UB is reverse polarity protected.
- ▶ The safety outputs FO1A/FO1B are short circuit-proof.
- ▶ A short circuit between FI1A and FI1B or FO1A and FO1B is detected by the device.
- ▶ A short circuit in the cable can be excluded by laying the cable with protection.

### 13.4. Fuse protection for power supply

The power supply must be provided with fuse protection depending on the number of devices and the current required for the outputs. The following rules apply:

**Max. current consumption of an individual device  $I_{max}$**

$$I_{max} = I_{UB} + I_{IMP} + I_{F01A+F01B}$$

$$I_{UB} = \text{Device operating current (80 mA) + monitoring outputs (4 x max. 50 mA) + control elements}$$

$$I_{F01A+F01B} = \text{Load current of safety outputs F01A + F01B (2 x max. 150 mA)}$$

$$I_{IMP} = \text{Solenoid (max. 375 mA)}$$



**Max. current consumption of a switch chain  $\Sigma I_{max}$  with star wiring**

$$\Sigma I_{max} = I_{F01A+F01B} + n \times I_{UB} + n \times \text{monitoring outputs} + n \times I_{IMP}$$

$n$  = Number of connected devices

**Assignment of the currents to the fuse circuits**

Current	Fuse circuit F1	Fuse circuit F2
$I_{UB}$	80 mA $I_{OD,OT,OL,OI} = (4 \times \text{max. } 50 \text{ mA})$ $I_{\text{control elements}} = \text{max. } 10 \text{ mA}$ (per control element) $I_{\text{indicators}} = \text{max. } 5 \text{ mA}$ (per indicator)	
$I_{F01A+F01B}$	(2 x max. 150 mA)	
$I_{IMP}$		$I_{\text{solenoid}} = 375 \text{ mA}$

### 13.5. Requirements for connecting cables



**CAUTION**

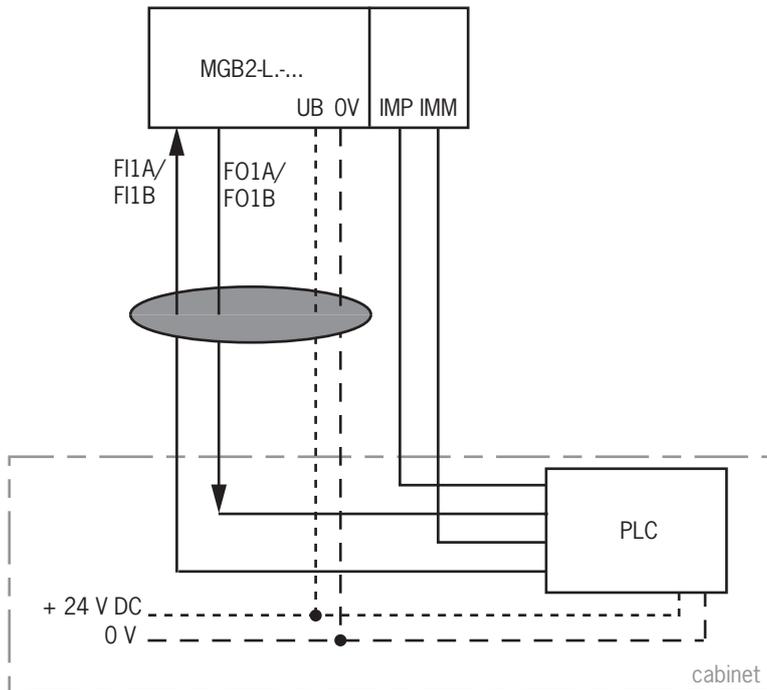
Risk of damage to equipment or malfunctions as a result of incorrect connecting cables.  
 ▶ On the use of other connection components, the requirements in the following table apply. EUCHNER provides no warranty for safe function in case of failure to comply with these requirements.

Observe the following requirements with respect to the connecting cables:

Parameter	Value	Unit
Conductor cross-section, min.	0.25	mm <sup>2</sup>
R max.	60	Ω/km
C max.	120	nF/km
L max.	0.65	mH/km

## 13.6. Notes on cable laying

Lay all MGB2 connecting cables in a common cable harness.



**Important:** lay cables in a common harness  
Alternatively, IMM/IMP can also be laid in the common harness.

Fig. 24: Stipulated cable laying

### 13.7. Changing device configuration (using DIP switches)



**Tip!**

You will find an animation on device configuration at [www.euchner.com](http://www.euchner.com).

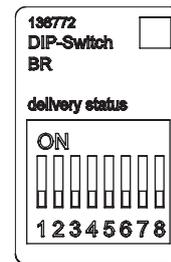
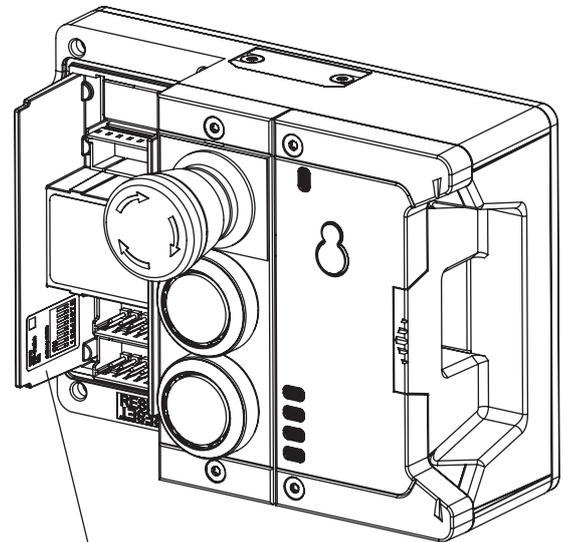
**DIP switches**

The device can be configured using the DIP switches. The following settings are possible:

- › Changing system family (BR/BP switching)
- › Deactivating guard lock monitoring
- › Activating release monitoring (possible only with active guard lock monitoring)

**Position of the switches**

Item	Description
1	DIP switch
2	Sticker with factory setting



**Function of the switches**

Switch	Function
1+4	on: device is operated as a BP system off: device is operated as a BR system
2+5	on: guard lock monitoring is deactivated off: guard lock monitoring is active (usually factory setting)
3	on: release monitoring is activated off: release monitoring is deactivated (usually factory setting)
6	n.c.
7	on: factory reset on off: factory reset off
8	on: configuration possible off: configuration inhibited (factory setting)

#### 13.7.1. Changing system family (BR/BP switching)

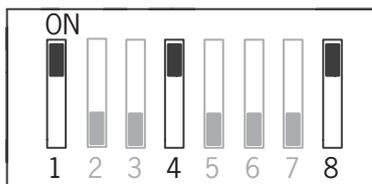


**CAUTION**

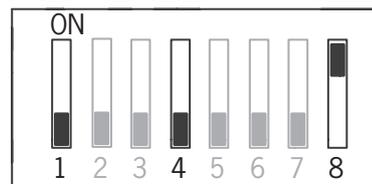
Malfunction due to incorrect configuration or incorrect connection.  
› Note that the terminal assignment also changes on changing the configuration (see chapter 13.10. Terminal assignment and contact description on page 38).

1. Switch off power supply.
2. Set DIP switches 1, 4 and 8 as shown.

For change from BR => BP



For change from BP => BR



3. Switch on power supply for 5 s.  
➔ The change is confirmed by positive acknowledgment.
4. Switch off power supply and set DIP switch 8 to OFF.  
➔ The next time the device is started, it operates in the operating mode set.

### 13.7.2. Deactivating guard lock monitoring



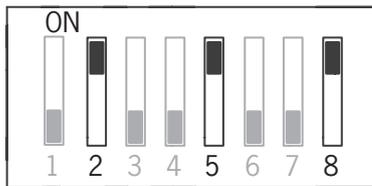
#### WARNING

Risk of injury due to inactive guard lock monitoring.

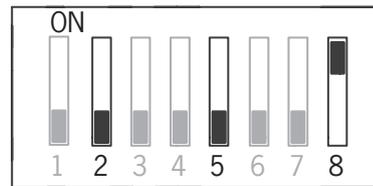
▸ With inactive guard lock monitoring, the guard locking position does not influence the safety outputs. The guard can be opened immediately. This setting is not allowed to be used in applications in which, e.g., there is a hazard due to overtraveling machine movements. With inactive guard lock monitoring, guard locking must be used only for process protection.

1. Switch off power supply.
2. Set DIP switches 2, 5 and 8 as shown.

Deactivating guard lock monitoring



Activating guard lock monitoring



3. Switch on power supply for 5 s.
  - ➔ The change is confirmed by positive acknowledgment.
4. Switch off power supply and set DIP switch 8 to OFF.
  - ➔ The next time the device is started, it operates in the operating mode set.

### 13.7.3. Activating release monitoring



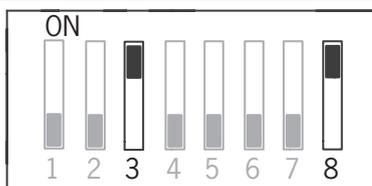
#### NOTICE

When release monitoring is active, the system enters into a latching fault when the escape release or auxiliary release is actuated.

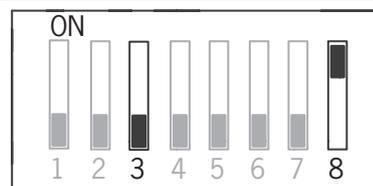
See *System status table, signal sequence incorrect status* (DIA red, Lock flashes 1 time).

1. Switch off power supply.
2. Set DIP switches 3 and 8 as shown.

Deactivating release monitoring



Activating release monitoring



3. Switch on power supply for 5 s.
  - ➔ The change is confirmed by positive acknowledgment.
4. Switch off power supply and set DIP switch 8 to OFF.
  - ➔ The next time the device is started, it operates in the operating mode set.

### 13.8. Notes on operation with control systems

Observe the following guidelines for connection to safe control systems:

#### General notes

- › Use a common power supply for the control system and the connected safety switches.
- › A pulsed power supply must not be used for UB. Tap the supply voltage directly from the power supply unit. If the power supply is connected to a terminal of a safe control system, this output must provide sufficient electrical current.
- › The safety outputs (FO1A and FO1B) can be connected to the safe inputs of a control system. Prerequisite: the input must be suitable for pulsed safety signals (OSSD signals, e.g. from light grids). The control system must tolerate test pulses on the input signals. This normally can be set up by parameter assignment in the control system. Observe the notes of the control system manufacturer. For the pulse duration of your safety switch, refer to chapter 16. *Technical data on page 50.*
- › The inputs on a connected evaluation unit must be positive switching, as the two outputs on the safety switch deliver a level of +24 V in the switched-on state.



- › Always connect inputs FI1A and FI1B directly to a power supply unit or to outputs FO1A and FO1B of another EUCHNER BR device (series connection). Pulsed signals must not be present at inputs FI1A and FI1B.

#### Guard locking control

- › Test pulses up to max. 5 ms in duration at intervals of min. 100 ms are tolerated on IMP and IMM.



#### NOTICE

Due to the fact that short circuit monitoring of the safety outputs FO1A/FO1B is performed by the device itself, the Performance Level in accordance with EN 13849 is not reduced if the control system pulsing is switched off.



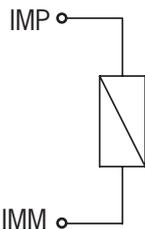
#### Tip!

A detailed example of connecting and setting the parameters of the control system is available for many devices at [www.euchner.com](http://www.euchner.com), in the area *Downloads/Applications/MGB2*. The features of the respective device are dealt with there in greater detail.

## 13.9. Connection of guard locking control

### 13.9.1. Guard locking control for devices with IMM connection

Guard locking solenoid operating voltage,  
24 V DC

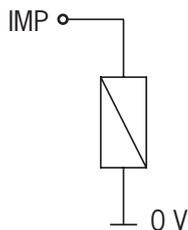


Guard locking solenoid operating voltage,  
0 V DC

Fig. 25: Connection example with IMM connection

### 13.9.2. Guard locking control for devices without IMM connection

Guard locking solenoid operating voltage,  
24 V DC



Solenoid ground connected internally to 0 V UB.

Fig. 26: Connection example without IMM connection

### 13.10. Terminal assignment and contact description

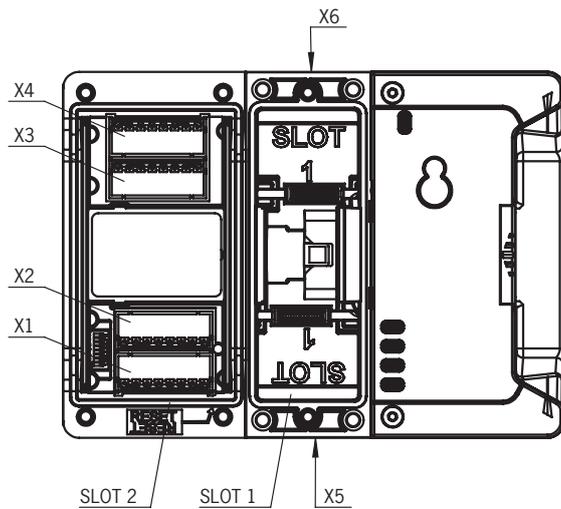


Fig. 27: Connections and LEDs

Terminal	Designation	Description
X1.1	UB	BR electronics operating voltage, 24 V DC
X1.2	F1A	Enable input for channel A If operated separately (BP), set DIP switch as per operating instructions.
X1.3	F1B	Enable input for channel B If operated separately (BP), set DIP switch as per operating instructions.
X1.4	OT/C	Bolt tongue monitoring output ON when the door is closed and the bolt tongue is inserted into the locking module. Optional: BR diagnostic output
X1.5	OD	Door monitoring output ON when the door is closed.
X1.6	OL	Guard lock monitoring output ON when the door is closed and locked. (No function on MGB2-I)
X1.7	OI	Monitoring output DIA ON when the device is in the fault state.
X1.8	F01A	Safety output, channel A ON when the door is closed and locked/interlocked. Attention: Pay attention to the DIP switch position.
X2.1	0 V UB	BR electronics operating voltage, 0 V
X2.2	S2 1.2	
X2.3	S2 2.2	
X2.4	S1 LED	See the associated data sheet for the submodule
X2.5	S2 LED	
X2.6	S3 LED	
X2.7	RST	Reset input, device is reset if 24 V DC is applied to RST for min. 3 s.
X2.8	F01B	Safety output, channel B ON when the door is closed and locked/interlocked. Attention: Pay attention to the DIP switch position.
X3.1	IMP	Guard locking solenoid operating voltage, 24 V DC
X3.2	IMM	Guard locking solenoid operating voltage, 0 V
X3.3 - X3.8		See the associated data sheet for the submodule
X4.1 - X4.8		See the associated data sheet for the submodule
X5		Connection for optional accessories; see associated data sheet
X6		Connection for optional accessories; see associated data sheet

Table 2: Terminal assignment and contact description

## 13.11. Terminal assignment, submodule with plug connector M23 (X7)



### NOTICE

The following table applies to the submodule MSM-C-K-BA-SH0-S1-160849.  
Various assembly options are possible. Refer to the data sheet of the submodule for the correct wiring for your device.

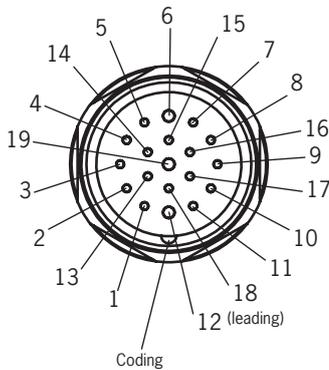


Fig. 28: View of connection side, plug connector M23 (X7)

Pin	Terminal	Designation	Description
1	X3.1	IMP	Guard locking solenoid operating voltage, 24 V DC
2	X1.2	F11A	Enable input for channel A If operated separately (BP), set DIP switch as per operating instructions.
3	X1.3	F11B	Enable input for channel B If operated separately (BP), set DIP switch as per operating instructions.
4	X1.8	F01A	Safety output, channel A ON when the door is closed and locked/interlocked. Attention: Pay attention to the DIP switch position.
5	X2.8	F01B	Safety output, channel B ON when the door is closed and locked/interlocked. Attention: Pay attention to the DIP switch position.
6	X1.1	UB	BR electronics operating voltage, 24 V DC
7	X2.7	RST	Reset input, device is reset if 24 V DC is applied to RST for min. 3 s.
8	X1.4	OT/C	Bolt tongue monitoring output ON when the door is closed and the bolt tongue is inserted into the locking module. Optional: BR diagnostic output
9	X1.7	OI	Monitoring output DIA ON when the device is in the fault state.
10	X3.3		See the associated data sheet for the submodule
11	X3.5		See the associated data sheet for the submodule
12	-	n.c.	Not used
13	X3.4		
14	X3.6		
15	X2.2		See the associated data sheet for the submodule
16	X2.5		
17	X3.7		
18	X2.6		
19	X2.1	0 V UB	BR electronics operating voltage, 0 V
	X3.2	IMM	Guard locking solenoid operating voltage, 0 V

Table 3: Terminal assignment and contact description

**13.12. Operation as separate device**

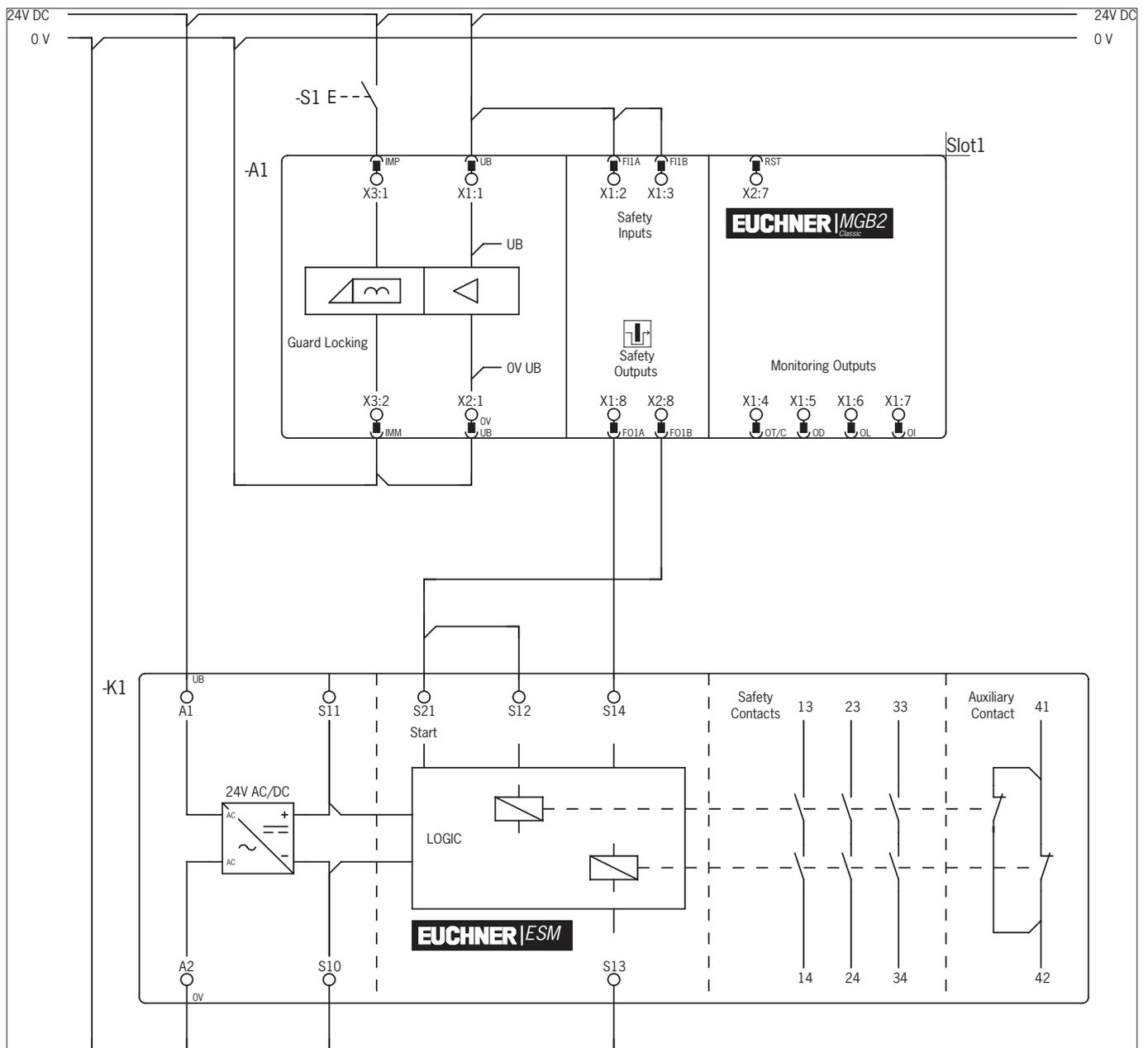


Fig. 29: Connection example for separate operation

The switches can be reset via the RST input. For this purpose, a voltage of 24 V ( $\pm$  permissible tolerances) must be applied to the input for  $t > 3$  sec. During the time when this voltage is present on the input, all LEDs and outputs (monitoring and safety outputs) are switched off. The device restarts on the falling edge of the voltage.

## 13.13. Information on operation in a BR switch chain

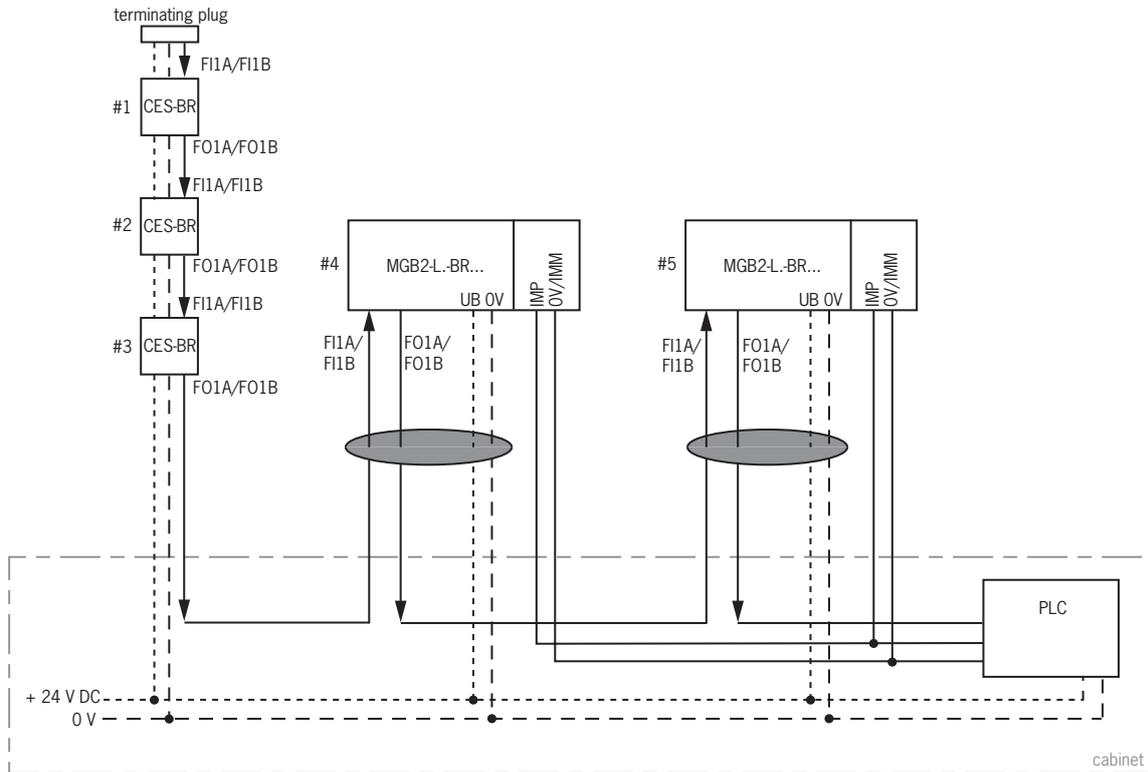


### 13.13.1. System times

The locking module has different reaction times compared to a CES-BR switch (see chapters 16. Technical data on page 50 and 16.2. Typical system times on page 52).

### 13.13.2. Wiring of a BR switch chain

To prevent earth loops, the wiring should be in a star configuration (see Fig. 30).



**Important:** lay cables in a common harness

Alternatively, OV/IMM/IMP can also be laid in the common harness.

Fig. 30: Central wiring of a BR switch chain in the control cabinet

### 13.13.3. Number of devices in switch chains

In a pure MGB2 switch chain a maximum of ten devices can be connected in series. In mixed switch chains (e.g. MGB2 together with CES-BR) the maximum number of devices is also ten.

### 13.13.4. Resetting in switch chains



#### Important!

Use the reset input (RST) for resetting in BR switch chains. All devices in the chain must be reset simultaneously. Resetting individual switches will result in faults.

## 14. Setup

### 14.1. Teach-in operation (only for MGB2 unicode)

The handle module must be assigned to the locking module using a teach-in function before the system comprising locking module and handle module forms a functional unit.

During a teach-in operation the safety outputs are switched off.

**Important!**

- › The locking module disables the code for the previous handle module if teach-in is carried out for a new handle module. Teach-in is not possible again immediately for this device if a new teach-in operation is carried out. The disabled code is deleted in the locking module only after a third code has been taught-in.
- › The locking module can be operated only with the last handle module taught-in.
- › If, in the teach-in standby state, the locking module detects the taught-in handle module, the teach-in standby state is ended immediately and the locking module changes to normal operation.
- › If the bolt tongue is in the actuating range for less than 30 s, the handle module is not taught-in.

#### Teaching-in handle module

1. Fit handle module.
2. Close safety device. Check for correct alignment and distance using the marking on the locking module and re-adjust if necessary.
3. Insert bolt tongue into the locking module.
4. Apply operating voltage to the locking module, optionally connect teach-in adapter.
  - ➔ The green LED (State) flashes quickly (approx. 5 Hz). A self-test is performed during this time (approx. 1 s in case of BP configuration and approx. 5 s in case of BR configuration). Teach-in operation starts, green LED (State) flashes slowly (approx. 1 Hz). During the teach-in operation, the locking module checks whether the handle module is a disabled handle module. If this is not the case, the teach-in operation is completed after approx. 30 seconds; the green LED (State) and the red LED (DIA) flash slowly (approx. 1 Hz). The new code has now been stored, and the old code is disabled.
5. To activate the handle module's code from the teach-in operation in the locking module, the operating voltage must then be switched off at the locking module for min. 3 seconds. As an alternative, 24 V can be applied to the input RST for at least 3 seconds.

Teach-in in a series connection works analogously. Here, the complete series connection must be restarted using the input RST.

### 14.2. Mechanical function test

It must be possible to insert the bolt tongue easily into the locking module. To check, close guard several times and actuate door handle.

If available, check function of the escape release. With active guard locking it must be possible to operate the escape release from the inside without excessive effort (approx. 40 N).

## 14.3. Electrical function test



### WARNING

On use in a switch chain with different BR devices (e.g. CES-BR), also follow the procedure for the functional check in the related operating instructions.



### With active guard lock monitoring

1. Switch on operating voltage.
    - ➔ The locking module carries out a self-test. In case of BR configuration: the green State LED flashes at 5 Hz for 5 s. The State LED then flashes at regular intervals.
  2. Close all guards and insert the bolt tongue into the locking module. In case of guard locking by solenoid force: activate guard locking.
    - ➔ The safety outputs FO1A/FO1B are ON.
    - ➔ The machine must not start automatically.
    - ➔ It must not be possible to open the guard.
    - ➔ The green State LED and the yellow Lock LED are illuminated continuously.
  3. Enable operation in the control system.
    - ➔ It must not be possible to deactivate guard locking as long as operation is enabled.
  4. Disable operation in the control system and deactivate guard locking.
    - ➔ The guard must remain locked until there is no longer any risk of injury.
    - ➔ It must not be possible to start the machine as long as guard locking is deactivated.
    - ➔ It must be possible to open the guard.
- Repeat steps 2-4 for each guard.

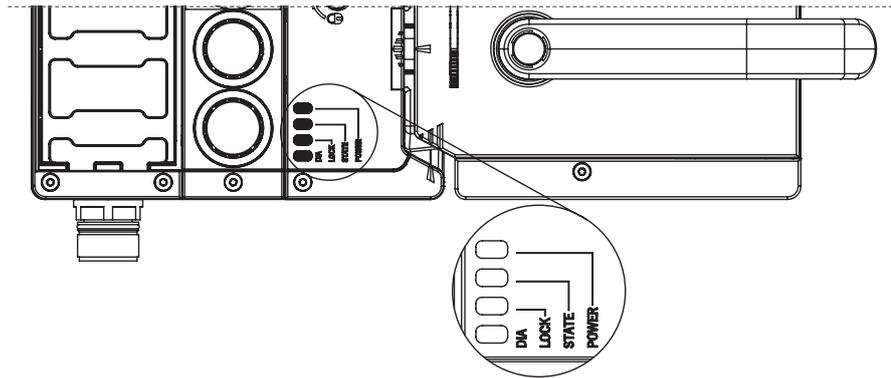
### With inactive guard lock monitoring

1. Switch on operating voltage.
    - ➔ The locking module carries out a self-test. In case of BR configuration: the green State LED flashes at 5 Hz for 5 s. The State LED then flashes at regular intervals.
  2. Close all guards and insert the bolt tongue into the locking module. As soon as the bolt tongue is inserted into the locking module, the safety outputs FO1A/FO1B are ON. This is regardless of whether the guard locking is active or not.
    - ➔ The machine must not start automatically.
    - ➔ The green State LED illuminates continuously. The yellow Lock LED is ON for a long time with a short interruption or is ON continuously (depending on the state of the guard locking).
  3. Enable operation in the control system.
  4. If necessary, deactivate guard locking and open guard.
    - ➔ The machine must switch off and it must not be possible to start it as long as the guard is open.
- Repeat steps 2-4 for each guard.

## 15. System states

### 15.1. Key to symbols

○	LED not illuminated
☀	LED illuminated
☀ 10 Hz (8 s)	LED flashes for 8 seconds at 10 Hz
☀ 3 x	LED flashes three times
X	Any state



## 15.2. System status table MGB2-BR

Operating mode	Safety inputs F11A and F11B	Door position	Position of the bolt tongue	Guard locking	Safety outputs F01A and F01B	Door monitoring output (OD)	Bolt tongue monitoring output (OT)	Guard lock monitoring output (OL)	Diagnostic monitoring output (OI)	Power (green)	LED indicator			Submodule LEDs		State
											STATE (green)	DIA (red)	Lock (yellow)	SLOT (red)	SLOT (green)	
<b>Self-test</b>	X	X	X	X	OFF	OFF	OFF	OFF	OFF	ON	5 Hz	○	○	○	○	Self-test after power-up
	X	open	not inserted	OFF	OFF	OFF	OFF	OFF	OFF	long OFF, short ON	long OFF, short ON	○	○	○	○	Normal operation, door open
	X	closed	not inserted	OFF	OFF	ON	OFF	OFF	OFF	long ON, short OFF	long ON, short OFF	○	○	○	○	Normal operation, door closed
	OFF	closed	inserted	OFF	OFF	ON	ON	OFF	OFF	long ON, short OFF	long ON, short OFF	○	○	○	○	Normal operation, door closed, bolt tongue inserted, safety inputs F11A/F11B OFF
<b>Normal operation</b>	ON	closed	inserted	OFF	OFF	ON	ON	OFF	OFF	long ON, short OFF	long ON, short OFF	○	○	○	○	<b>With active guard lock monitoring:</b> normal operation, door closed, bolt tongue inserted. Safety inputs F11A/F11B are ON. Safety outputs F01A and F01B are OFF
	ON	closed	inserted	OFF	ON	ON	ON	ON	OFF	long ON, short OFF	long ON, short OFF	○	○	○	○	<b>With inactive guard lock monitoring:</b> normal operation, door closed, bolt tongue inserted. Safety inputs F11A/F11B are ON. Safety outputs F01A and F01B are ON
	OFF	closed	inserted	ON	ON	ON	ON	ON	OFF	long ON, short OFF	long ON, short OFF	○	○	○	○	<b>Operation in a BR chain:</b> normal operation, door closed and locked. Safety outputs on the previous device OFF
	ON	closed	inserted	ON	ON	ON	ON	ON	OFF	long ON, short OFF	long ON, short OFF	○	○	○	○	<b>Operation as separate device:</b> normal operation, door closed and locked.
<b>Teach-in standby</b> (only for MGB2 unicode)	X	X	not inserted	OFF	OFF	X	OFF	OFF	OFF	3 x	○	○	○	○	○	Door open; device is ready for teach-in of another handle module (only 3 min. after power-up). If a transponder is detected, jump to the teach-in operation state. Should the teach-in operation not be successful, this state is active again after a reset.
	X	X	inserted	X	OFF	OFF	OFF	OFF	OFF	5 Hz	1x	○	○	○	○	Waiting for address assignment by master
	X	closed	inserted	X	OFF	X	X	X	OFF	1 Hz	○	○	○	○	○	Tip for teach-in operation: to prevent the interruption of teach-in operations, close door and switch on guard locking. If teach-in operation is started, it is always continued to the end. After the teach-in time has elapsed, one of these states is assumed with latching: 1. User action acknowledgment 2. Teach-in error 3. Transponder error
<b>Setup</b> (only for MGB2 unicode)	X	X	inserted	X	OFF	OFF	OFF	OFF	OFF	1 Hz	○	○	○	○	○	Positive acknowledgment after completion of teach-in operation
	X	X	inserted	X	OFF	OFF	OFF	OFF	OFF	1 Hz	○	○	○	○	○	

Operating mode	Safety inputs F11A and F11B		Door position		Position of the bolt tongue		Guard locking		Safety outputs F01A and F01B		Door monitoring output (OD)		Bolt tongue monitoring output (OT)		Guard lock monitoring output (OL)		Diagnostic monitoring output (OI)		Power (green)		LED indicator		Submodule LEDs		State			
	erroneous	normal	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	STATE (green)	DIA (red)	Lock (yellow)	SLOT (red)	SLOT (green)	Error
<b>Diagnostics</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1 x		○	○	○	Error during teach-in/configuration or invalid DIP switch setting	
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	2 x		○	○	○	F11A/F11B input error (latching) on power-up (e.g. missing test pulses, illogical switching state from previous switch)	
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	2x	long ON	○	○	○	Input error (resettable, e.g. missing test pulses, illogical switching state from previous switch during operation)	
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	3 x		○	○	○	Faulty or disabled transponder. If a transponder error is detected during teach-in, the teach-in operation is continued and the transponder error is indicated afterward	
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	3 x	long ON	○	○	○	Faulty or disabled transponder has been detected during normal operation	
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	4 x		○	○	○	Output error (latching, e.g. short circuit, loss of switching capability) or short circuit at the outputs. Short circuits, external voltage, short circuit on the output or output current too high during power-up	
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	4 x	long ON	○	○	○	Output error (resettable, e.g. short circuit, loss of switching capability) or short circuit at the outputs. Short circuits, external voltage, short circuit on the output or output current too high during operation	
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			○	○	○	Internal fault (e.g. component fault, data error)	
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		long ON	1 x	○	○	○	Signal sequence erroneous (e.g. broken bolt tongue). With active release monitoring: escape release or auxiliary release was actuated.
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	5 x	long ON	○	○	○	○	Environment error (resettable), e.g. voltage or temperature too high/too low
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			2x	○	○	○	Voltage error on the solenoid:
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			○	○	○	Internal fault in the submodule, e.g. CRC error	

After remedying the cause, use the reset function (see chapter 17. Troubleshooting and assistance on page 53) or briefly disconnect the power supply. Contact the manufacturer if the fault could not be reset after restarting.  
**Important:** if you do not find the displayed device status in the system status table, this indicates an internal device fault. In this case, you should contact the manufacturer.

## 15.3. System status table MGB2-BP

State	Submodule LEDs				LED indicator				Diagnostic monitoring output (OI)	Guard lock monitoring output (OL)	Bolt tongue monitoring output (OT)	Door monitoring output (OD)	Safety outputs FO1A and FO1B	Guard locking	Position of the bolt tongue	Door position	Operating mode
	SLOT (green)	SLOT (red)	Lock (yellow)	DIA (red)	STATE (green)	Power (green)											
Self-test after power-up	○	○	○	○	5 Hz	✱	OFF	OFF	OFF	OFF	OFF	OFF	X	X	X	Self-test	
Normal operation, door open	X	X	X		long OFF short ON	✱	OFF	OFF	OFF	OFF	OFF	OFF	OFF	not inserted	open	Normal operation	
	X	X	X		long ON short OFF	✱	OFF	OFF	OFF	OFF	OFF	OFF	OFF	not inserted	closed		
Normal operation, door closed	X	X	X		long ON short OFF	✱	OFF	OFF	OFF	OFF	OFF	OFF	OFF	inserted	closed	Normal operation	
	X	X	X		long ON short OFF	✱	OFF	OFF	OFF	OFF	OFF	OFF	OFF	inserted	closed		
With active guard lock monitoring: normal operation, door closed, bolt tongue inserted. Safety outputs FO1A and FO1B are OFF	X	X	✱		long ON short OFF	✱	OFF	OFF	OFF	OFF	OFF	OFF	OFF	inserted	closed	Teach-in standby (only for MGB2 unicode)	
With inactive guard lock monitoring: normal operation, door closed, bolt tongue inserted. Safety outputs FO1A and FO1B are ON	X	X	✱		long ON short OFF	✱	OFF	OFF	OFF	OFF	OFF	OFF	OFF	inserted	closed		
Normal operation, door closed and locked.	X	X	✱		3 x	✱	OFF	OFF	OFF	OFF	OFF	OFF	OFF	not inserted	X	Teach-in standby (only for MGB2 unicode)	
Door open; device is ready for teach-in of another handle module (only 3 min. after power-up). If a transponder is detected, jump to the teach-in operation state. Should the teach-in operation not be successful, this state is active again after a reset.	X	X	○		5 Hz	✱	OFF	OFF	OFF	OFF	OFF	OFF	X	X	X		
Waiting for address assignment by master	○	○	○	1x	5 Hz	✱	OFF	OFF	OFF	OFF	OFF	OFF	OFF	not inserted	X	Setup (only for MGB2 unicode)	
Tip for teach-in operation: to prevent the interruption of teach-in operations, close door and switch on guard locking. If teach-in operation is started, it is always continued to the end. After the teach-in time has elapsed, one of these States is assumed with latching: 1. User action acknowledgment 2. Teach-in error 3. Transponder error	X	X	○		1 Hz	✱	OFF	OFF	OFF	OFF	OFF	OFF	X	inserted	closed		
Positive acknowledgment after completion of teach-in operation	○	○	○	1 Hz	1 Hz	✱	OFF	OFF	OFF	OFF	OFF	OFF	OFF	X	X	Setup (only for MGB2 unicode)	

Operating mode	Door position	Position of the bolt tongue	Guard locking	Safety outputs F01A and F01B	Door monitoring output (OD)	Bolt tongue monitoring output (OT)	Guard lock monitoring output (OL)	Diagnostic monitoring output (OI)	LED indicator		Submodule LEDs		State
									STATE (green)	DIA (red)	Lock (yellow)	SLOT (red)	
<b>Diagnostics</b>	X	X	X	OFF	X	X	X	ON	1 x	☀	○	○	Error during teach-in/configuration or invalid DIP switch setting
	X	X	X	OFF	X	OFF	OFF	ON	3 x	☀	○	×	Faulty or disabled transponder. If a transponder error is detected during teach-in, the teach-in operation is continued and the transponder error is indicated afterward
	X	X	X	OFF	X	OFF	OFF	ON	3 x	☀	○	×	Faulty or disabled transponder has been detected during normal operation
	X	X	X	OFF	X	X	X	ON	4 x	☀	○	×	Output error (latching, e.g. short circuit, loss of switching capability) or short circuit at the outputs. Short circuits, external voltage, short circuit on the output or output current too high
	X	X	X	OFF	X	X	X	ON	4 x	☀	○	×	Output error (resettable, e.g. short circuit, loss of switching capability) or short circuit at the outputs. Short circuits, external voltage, short circuit on the output or output current too high
	X	X	X	OFF	X	X	X	ON	○	☀	○	○	Internal fault (e.g. component fault, data error)
	X	X	X	OFF	X	X	X	ON	○	☀	☀	×	Signal sequence erroneous (e.g. broken bolt tongue). With active release monitoring: escape release or auxiliary release was actuated.
	X	X	X	OFF	X	X	X	ON	5 x	☀	○	×	Environment error (latching), e.g. voltage or temperature too high/too low
	X	X	X	OFF	X	X	X	ON	5 x	☀	○	×	Environment error (resettable), e.g. voltage or temperature too high/too low
	X	X	X	X	X	X	X	ON	○	☀	☀	×	Voltage error on the solenoid:
	X	X	X	X	X	X	X	ON	×	☀	☀	☀	Internal fault in the submodule, e.g. CRC error

After remedying the cause, use the reset function (see chapter 17 Troubleshooting and assistance on page 53) or briefly disconnect the power supply. Contact the manufacturer if the fault could not be reset after restarting.  
**Important:** If you do not find the displayed device status in the system status table, this indicates an internal device fault. In this case, you should contact the manufacturer.

## 15.4. System status table (Slot LED)

A submodule error is reset automatically as soon as a compatible submodule is installed correctly.

Fault display SLOT1 LED	Meaning	Measures
OFF	A submodule is not used.	–
Red ON	An incompatible submodule has been installed.	Install compatible submodule to reset.

## 16. Technical data



### NOTICE

If a data sheet is included with the product, the information on the data sheet applies in case of discrepancies with the operating instructions.

Parameter	Value			Unit
	min.	typ.	max.	
Housing material	Fiber glass reinforced plastic Die-cast zinc, nickel-plated Stainless steel			
Dimensions	See chapter 7.4. Dimension drawing on page 15 (interlocking/locking module, without submodules)			
Weight				kg
Locking module	1.00			
Handle module	1.10			
Escape release	0.55			
Ambient temperature at UB = DC 24 V	-25 ... +55			°C
Degree of protection	IP65			
Cover not populated/populated with buttons/ indicators/selector switches/key-operated rotary switches				
Safety class	III			
Degree of contamination	3			
Installation orientation	Any			
Locking force $F_{2h}$ acc. to EN ISO 14119	2,000			N
Connection	1 cable entry M20x1.5 with 4 socket connectors or plug connectors			
Conductor cross-section (rigid/flexible) - With cable end sleeve acc. to DIN 46228/1 - With cable end sleeve with collar acc. to DIN 46228/1	0.25 ... 1.5 (AWG 23 ... AWG 16) 0.25 ... 1.5 0.25 ... 0.75			mm <sup>2</sup>
Operating voltage UB (reverse polarity protected, regulated, residual ripple < 5 %)	24 -15% / +20% (PELV)			V DC
Current consumption $I_{UB}$ (at 20.4 V incl. F11A/F11B, no load on any outputs)	80			mA
Guard locking solenoid operating voltage IMP (reverse polarity protected, regulated, residual ripple < 5%)	24 -15% / +20% (PELV)			V DC
Test pulses Guard locking solenoid operating voltage IMP	5			ms
Test-pulse interval Guard locking solenoid operating voltage IMP	100			ms
Current consumption $I_{IMP}$ - with energized guard locking solenoid	375			mA
External fuse	See chapter 13.4. Fuse protection for power supply on page 32			
<b>Safety outputs F01A/F01B</b>	<b>Semiconductor outputs, p-switching, short circuit-proof</b>			
Test pulses	< 300			µs
Test pulse interval	Min. 100			ms
Output voltage $U_{F01A} / U_{F01B}$ <sup>1)</sup> HIGH $U_{F01A} / U_{F01B}$ LOW $U_{F01A} / U_{F01B}$	UB - 3.5 V ... UB 0 ... 1			V DC
Switching current per safety output	1 ... 150			mA
Utilization category acc. to EN IEC 60947-5-2	DC-13 24 V 150 mA Caution: Outputs must be protected by a free-wheeling diode in the case of inductive loads.			
Monitoring outputs - Output voltage <sup>1)</sup> - Max. load	p-switching, short circuit-proof UB - 3.5 V ... UB Max. 50			mA
Rated insulation voltage $U_i$	75			V
Rated impulse withstand voltage $U_{imp}$	1.5			kV
Resilience to vibration	Acc. to EN IEC 60947-5-3			
Switching frequency	0.25			Hz
EMC protection requirements	Acc. to EN IEC 60947-5-3			
Ready delay (BR)	-	5	-	s
Risk time for single device	-	-	50	ms
Risk time delay per device	10			ms
Turn-on time	-	-	80	ms
Discrepancy time	-	-	10	ms

Reliability values acc. to EN ISO 13849-1	Guard lock monitoring	Control of guard locking	
Category	4	4	
Performance Level	PL e	PL e	
MTTF <sub>D</sub> 2)	750	750	years
Diagnostic Coverage DC	99	–	%
PFH <sub>D</sub>	2.95 x 10 <sup>-9</sup>	2.95 x 10 <sup>-9</sup>	
Mission time	20	20	years
Safety Integrity Level	SIL 3	SIL 3	
Mechanical life		1 x 10 <sup>6</sup>	
- In case of use as door stop, and 1 Joule impact energy		0.1 x 10 <sup>6</sup>	
B <sub>10D</sub> (emergency stop)		0.13 x 10 <sup>6</sup>	
<b>Emergency stop</b>			
Operating voltage		5 ... 30	V
Operating current		1 ... 100	mA
Breaking capacity, max.		250	mW
Power supply LED		24	V DC
<b>Controls and indicators</b>			
Operating voltage		UB	V
Operating current		1 ... 10	mA
Breaking capacity, max.		250	mW
Power supply LED		24	V DC

1) Values at a switching current of 50 mA without taking into account the cable lengths.  
2) Fixed failure rate without consideration of faults in wearing parts.

## 16.1. Radio frequency approvals

**Product description: Safety Switch**

**FCC ID: 2AJ58-03**

**IC: 22052-03**

### FCC/IC-Requirements

This device complies with part 15 of the FCC Rules and with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

- 1) This device may not cause harmful interference, and
- 2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

## 16.2. Typical system times



### Important!

The system times given are maximum values for one device.

### Ready delay:



**The following applies to BR configuration:** After switching on, the device carries out a self-test for 5 s. The system is ready for operation only after this time.



**The following applies to BP configuration:** After switching on, the device carries out a self-test for 0.5 s. The system is ready for operation only after this time.

### Turn-on time of safety outputs:



**The following applies to BR configuration:** The max. reaction time from the moment when the guard is locked to the moment when the safety outputs switch on  $T_{on}$  is 80 ms.



**The following applies to BP configuration:** The max. reaction time from the moment when the bolt tongue is inserted to the moment when the safety outputs switch on  $T_{on}$  is 80 ms.



**Simultaneity monitoring of safety inputs F1A/F1B:** If the safety inputs have different switching states for longer than 50 ms, the safety outputs FO1A/FO1B will be switched off. The device enters the fault state.

### Risk time according to EN 60947-5-3:



**The following applies to active guard lock monitoring:** If guard locking is no longer effective, the safety outputs FO1A and FO1B will be switched off after a maximum of 50 ms.

This value applies to a single switch. The risk time increases by 10 ms for each additional switch in a chain.



**The following applies to inactive guard lock monitoring:** If the bolt tongue is pulled out of the locking module, the safety outputs FO1A and FO1B will be switched off after a maximum of 50 ms.

This value applies to a single switch. The risk time increases by 10 ms for each additional switch in a chain.

**Difference time:** The safety outputs FO1A and FO1B switch with a slight time offset. They both have the ON state at the latest after a difference time of 10 ms.

## 17. Troubleshooting and assistance

Simple errors (DIA flashing) are reset by opening and closing the guard. If the error is not reset by this action, proceed as follows:

### 17.1. Resetting errors

Proceed as follows:

1. Open the guard.
2. Switch off operating voltage at the locking module for min. 3 seconds or connect 24 V to the input RST for min. 3 seconds.  
Alternatively, the internal reset (see 7. System overview on page 13) can be pressed for 3 seconds with a pointed object, e.g. small screwdriver.
  - ➔ The green LED (State) flashes quickly (approx. 5 Hz in case of BR configuration). A self-test is performed during this time (approx. 5 s in case of BR configuration). The LED then cyclically flashes three times.
3. Close guard and switch on guard locking.
  - ➔ The system is in normal operation again.

### 17.2. Troubleshooting help on the Internet

You will find a help file on troubleshooting under "Support" in the service area at [www.euchner.com](http://www.euchner.com).

### 17.3. Mounting help on the Internet

You will find an animation on the mounting process at [www.euchner.com](http://www.euchner.com).

### 17.4. Application examples

You will find application examples on connecting the device to various control systems at [www.euchner.com](http://www.euchner.com).

## 18. Service

If servicing is required, please contact:

EUCHNER GmbH + Co. KG  
Kohlhammerstraße 16  
70771 Leinfelden-Echterdingen  
Germany

**Service telephone:**

+49 711 7597-500

**E-mail:**

[info@euchner.de](mailto:info@euchner.de)

**Internet:**

[www.euchner.com](http://www.euchner.com)

## 19. Inspection and service



### WARNING

Loss of the safety function because of damage to the device.

- › In case of damage, the affected module must be replaced completely. Only accessories or spare parts that can be ordered from EUCHNER may be replaced.
- › Check the device for proper function at regular intervals and after every fault. For information about possible time intervals, refer to EN ISO 14119:2013, section 8.2.

Regular inspection of the following is necessary to ensure trouble-free long-term operation:

- › Check the switching function (see chapter 14.3. *Electrical function test on page 43*)
- › Check the secure mounting of the devices and the connections
- › Check for contamination

No servicing is required. Repairs to the device are only allowed to be made by the manufacturer.



### NOTICE

The year of manufacture can be seen in the lower right corner of the type label.

## 20. Declaration of conformity

The declaration of conformity is part of the operating instructions.

The complete EU declaration of conformity can also be found at [www.euchner.com](http://www.euchner.com). Enter the order number of your device in the search box. The document is available under *Downloads*.



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(translation of the original operating instructions)  
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