

# EUCHNER

## Operating Instructions

Interlocking/Locking Modules  
**MGB2-I..MLI-... / MGB2-L..-MLI-... (Modular)**

EN

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## 1. About this document

### 1.1. Scope

These operating instructions are valid for all Interlocking/Locking Modules MGB2-I..-MLI... / MGB2-L..-MLI... (Modular). These operating instructions, the document *Safety information*, the operating instructions for the bus module MBM and any associated data sheet form the complete user information for your device.

Series	Guard locking types	System families	Product versions
MGB2	I (without guard locking)	...-MLI... (operation on a bus module MBM)	up to V1.5.X
	L1 (guard locking by spring force)		up to V1.5.X
	L2 (guard locking by solenoid force)		up to V1.5.X





#### 1.1.1. Notes on other product versions

Make sure to use the operating instructions valid for your product version. Please contact our Service department if you have any questions.

### 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) and bus systems.

### 1.3. Key to symbols

Symbol/depiction	Meaning
	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 interlocking/locking mod- ules MGB2-L..-MLI (2500234)	(this document)	
Declaration of conformity	Declaration of conformity	
Operating instructions bus modules MBM..-MLI (2500235)	Configuration manual for the connection to the bus and data evaluation in MLI systems	
Any associated data sheets	Article-specific information with deviations or additions to the operating instructions as well as data sheets for submodules	



#### **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 Modular devices described here can be operated only with a suitable bus module MBM-...-MLI-....

### The following applies to the MGB2-I...:

Along with the bus module MBM, the system consists of at least one interlocking module MGB2-I... and one handle module MGB2-H...

The safety system MGB2-I... is an interlocking device without guard locking (type 4). Devices with unicode evaluation possess a high coding level, devices with multicode evaluation possess a low coding level.

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.

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.

### The following applies to the MGB2-L...:

Along with the bus module MBM, the system consists of at least one locking module MGB2-L... 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.

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:

- Release of the guard locking by the control system triggers a stop command.
- 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.

### For MGB2-I.. /MGB2-L..

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
- EN IEC 62061

The safety system MGB2..MLI... is only allowed to be combined with suitable MLI modules (see *Table 1: Combination options for modules with MLI technology*).

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

The customer is responsible for the safe overall function, especially for the safe integration into an overall system.



**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 18. *Technical data on page 36*).
- If a data sheet is included with the product, the information on the data sheet applies.

Table 1: Combination options for modules with MLI technology

Bus module	Base units	Handle module	Submodules	Submodules	Submodules
		MGB2-H... from V1.0.X	MSM.-P... MSM.-R... MSM.-N...	MSM.-E...	MSM.-K...
MBM...-MLI from V1.0.X	Interlocking/locking module MGB2-I..MLI/MGB2-L..MLI up to V1.5.X	●	●	-	-
	Expansion module MCM...-MLI	-	●	●	-

<b>Key to symbols</b>	●	Combination possible
	-	Combination not possible

## 3. Description of the safety function



### Important!

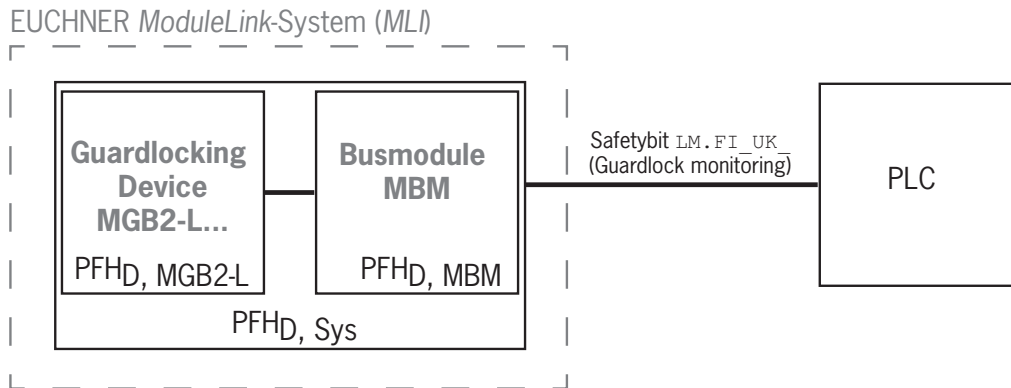
You will find detailed instructions on the determination of reliability values in the operating instructions for your bus module.

Devices from this series feature the following safety functions:

### The following applies to the MGB2-L...:

#### 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 10*):
  - When guard locking is released, safety bit  $LM.I_{UK}$  ( $\bar{ÜK}$ ) = 0 (monitoring of the locking element).
  - If the guard is open, safety bit  $LM.I_{SK}$  ( $\bar{SK}$ ) = 0 (monitoring of the position of the guard).
  - Guard locking can be activated only when the bolt tongue is located in the locking module (prevention of inadvertent locking position (faulty closure protection)).

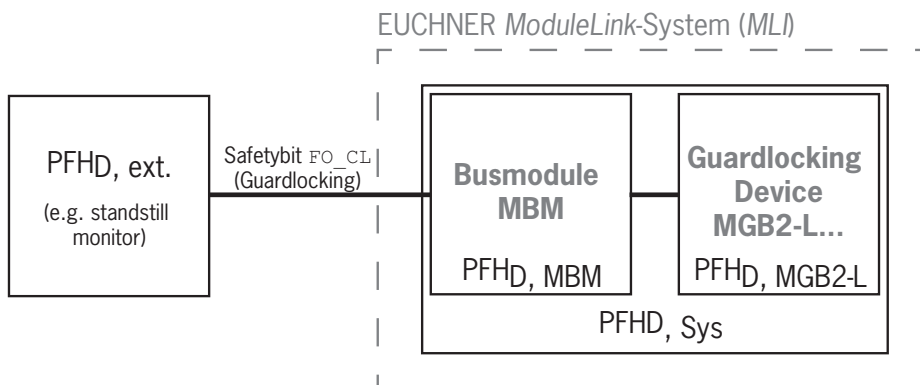


- ▶ Safety characteristics:
  - category, Performance Level,  $PFHD$
  - (reliability values according to EN 13849-1, see 18. *Technical data*).

#### Control of guard locking (safety bit $FO_{CL}$ ; applies only to guard locking devices according to the closed-circuit current principle)

- ▶ 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 system  $PFHD_{sys}$  and by the external control (e.g. safe PLC).

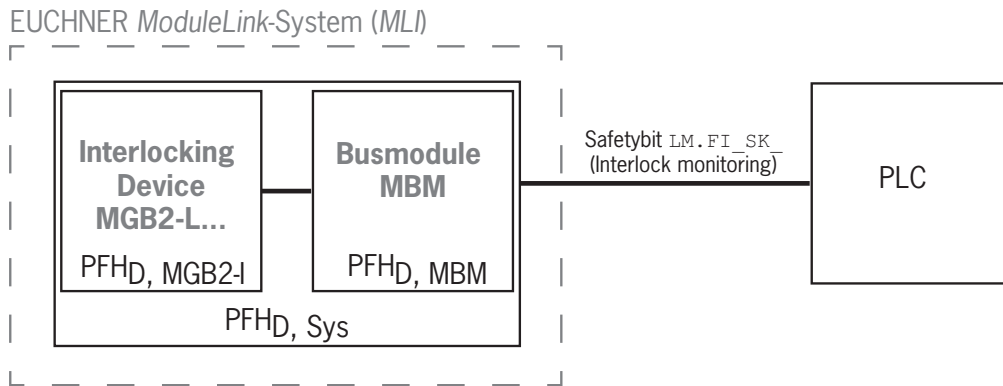


- ▶ Safety characteristics of bus module MBM and locking module MGB2-L:
  - category, Performance Level,  $PFHD$
  - (reliability values according to EN 13849-1, see 18. *Technical data*).

The following applies to MGB2-I... (or a correspondingly configured MGB2-L...):

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

- › Safety function: When the guard is open, safety bit  $LM.I\_SK$  (SK) = 0. (See chapter 6. *Function on page 10.*)



- › Safety characteristics:  
category, Performance Level, PFHD  
(reliability values according to EN 13849-1, see 18. *Technical data.*)

**Evaluation of submodules with safety function**

If you use submodules MSM with safety function in the interlocking/locking module, please observe the description of the safety functions in the operating instructions for your bus module MBM and in any data sheet for your submodule MSM.



## 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 perform 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. Interlocking module MGB2-I... (or a correspondingly configured MGB2-L2)

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

The following switch-on conditions apply to safety bit `LM.FI_SK` (SK):

- Guard closed
- Bolt tongue inserted into the interlocking module

See also chapter 16.2. *System indications during setup, teach-in and normal operation on page 34* and the operating instructions for bus module MBM.

The interlocking module detects the position of the guard and the position of the bolt tongue. The bolt tongue in the handle module is moved into and out of the interlocking module by actuating the door handle.

### 6.2. Locking module MGB2-L...

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. There are various configurations for the control of the guard locking (see section 6.3. *Control of guard locking MGB2-L1 and MGB2-L2*). The following descriptions in 6.2.1 and 6.2.2 describe the function of the guard locking with the factory setting.



#### Important!

To operate the device as guard locking for personnel protection according to EN ISO 14119, the safety bit `LM.FI_UK` (ÜK) must be evaluated.

The following switch-on conditions apply to the safety bit `LM.FI_UK` (ÜK):

- Guard closed
- Bolt tongue inserted into the locking module
- Guard locking in locking position (guard lock monitoring)

See also chapter 16.2. *System indications during setup, teach-in and normal operation on page 34* and the operating instructions for bus module MBM.

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

If the bolt tongue is fully inserted into the locking module, the guard locking can lock the bolt tongue in this position. Depending on version, this locking is by spring force or solenoid force.

#### 6.2.1. Guard locking for version MGB2-L1

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

**Guard locking:** Close guard; no voltage at the solenoid  
(with factory setting: safety bit `LM.FO_CL` = 0.)

**Releasing guard locking:** Apply voltage to the solenoid (with factory setting: safety bit `LM.FO_CL` = 1).

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.

In addition to the safety bit `LM.FO_CL`, the non-safe bit `LM.O_CL` can be used to control guard locking. Refer to the table in chapter 6.3. *Control of guard locking MGB2-L1 and MGB2-L2* for the exact configuration.

### 6.2.2. Guard locking for version MGB2-L2

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



#### Important!

- › Guard locking devices according to the open-circuit current principle are not intended for protecting personnel.
- › 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)!
- › Guard locking will be released during power-up or if communication is lost.

**Guard locking:** Apply voltage to the solenoid (with factory setting: safety bit  $LM.FO\_CL = 0$ ).

**Releasing guard locking:** Disconnect voltage from the solenoid (with factory setting: safety bit  $LM.FO\_CL = 1$ ).

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.

In addition to the safety bit  $LM.FO\_CL$ , the non-safe bit  $LM.O\_CL$  can be used to control guard locking. Refer to the table in chapter 6.3. *Control of guard locking MGB2-L1 and MGB2-L2* for the exact configuration.

### 6.3. Control of guard locking MGB2-L1 and MGB2-L2

By changing the parameters in the configuration tool for your control system, you can set which bit combinations are to be used to control the guard locking. You will find an overview of the parameters in the operating instructions for the bus module MBM.

On the use of the guard locking for personnel protection, as standard the guard locking must be controlled from the safe control area.

On use as guard locking for process protection, the guard locking can also be controlled exclusively using a non-safe bit.

The following table shows the possible configurations.

Type of locking module	Use of the control bits for guard locking				Application
	Configuration 1 (factory setting)	Configuration 2	Configuration 3	Configuration 4	
MGB2-L1	$LM.FO\_CL$	$LM.FO\_CL + LM.O\_CL$	-	-	Guard locking for personnel protection.
MGB2-L2	$LM.FO\_CL$	$LM.FO\_CL + LM.O\_CL$	-	-	Guard locking for personnel protection. Important: pay attention to section 6.2.2.
	-	-	$LM.O\_CL$	-	Interlocking with guard locking for process protection.
	-	-	-	Control is not configured in the parameters	Interlocking. Only position monitoring of the guard. No locking function.

## 7. System overview

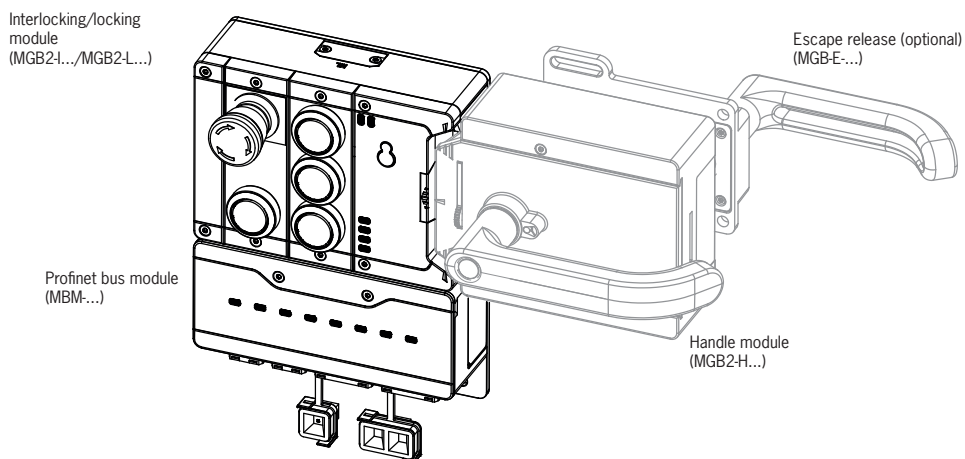
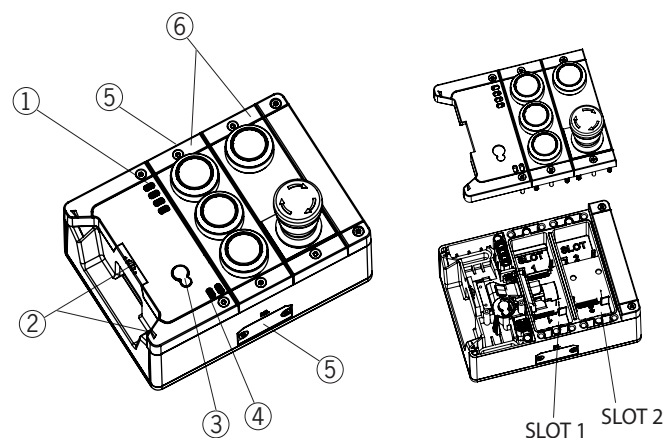


Fig. 1: Components at a glance

### 7.1. Interlocking/locking module MGB2-I..-/MGB2-L..



**Key:**

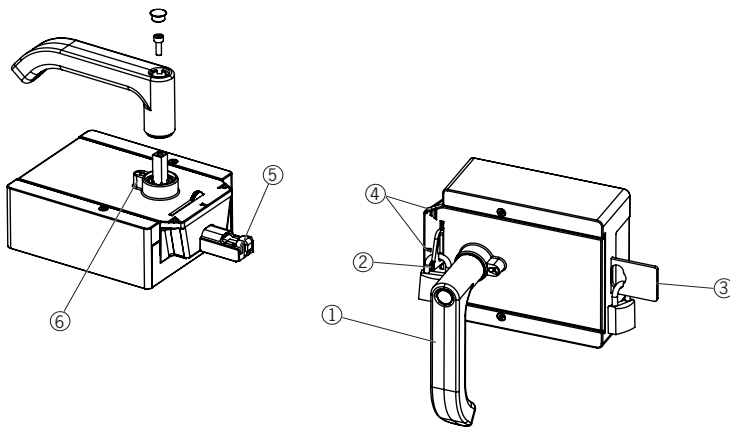
- ① Module function LED indicators
- ② Auxiliary marking for correct alignment in relation to the handle module
- ③ Auxiliary release (optional, only on version with guard locking)
- ④ LED indicator for submodule in SLOT 1 and SLOT 2
- ⑤ Top and bottom connections for the connection between modules
- ⑥ Submodules in SLOT 1 and SLOT 2 (configuration example)

**Notice:**

Depending on version, no submodules or different submodules may be inserted. See associated data sheet.

Fig. 2: Interlocking/locking module MGB2-I..-/MGB2-L..

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

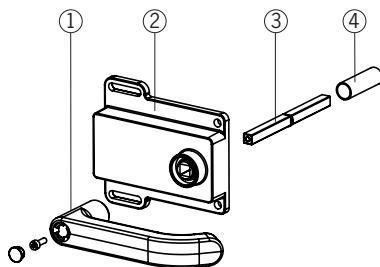


**Key:**

- 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

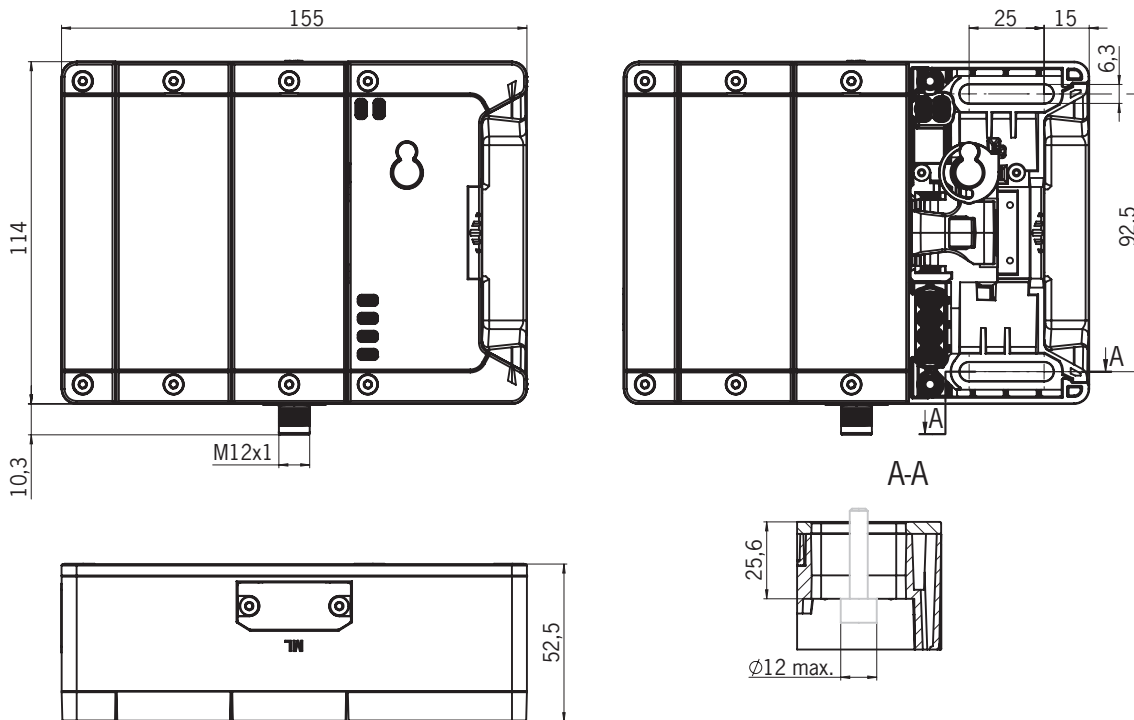
**Notice:**

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

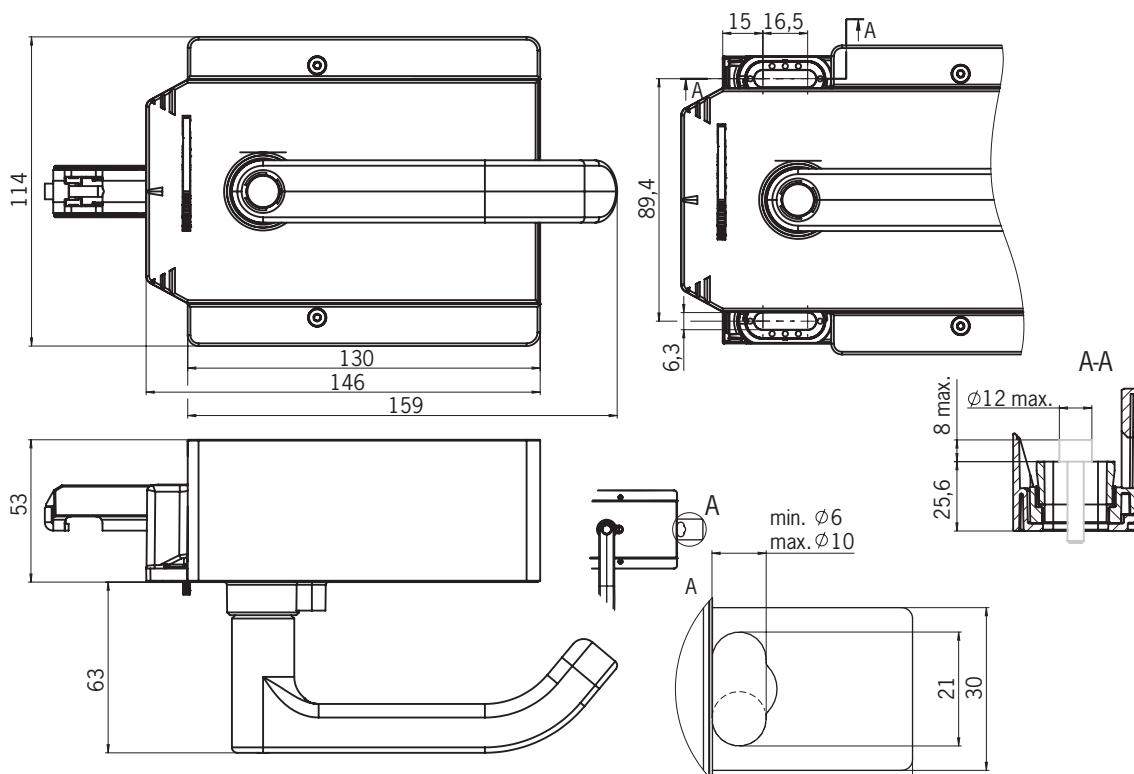
Fig. 4: Escape release MGB-E-...

## 7.4. Dimension drawings

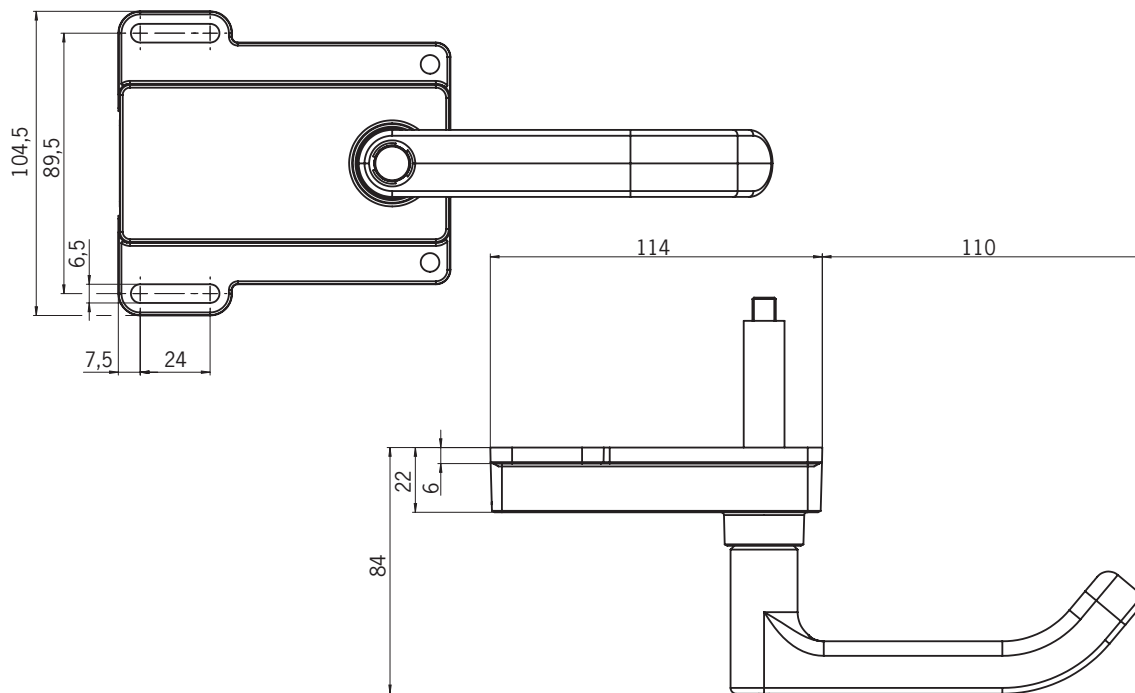
### 7.4.1. Interlocking/locking module MGB2-I.../MGB2-L...



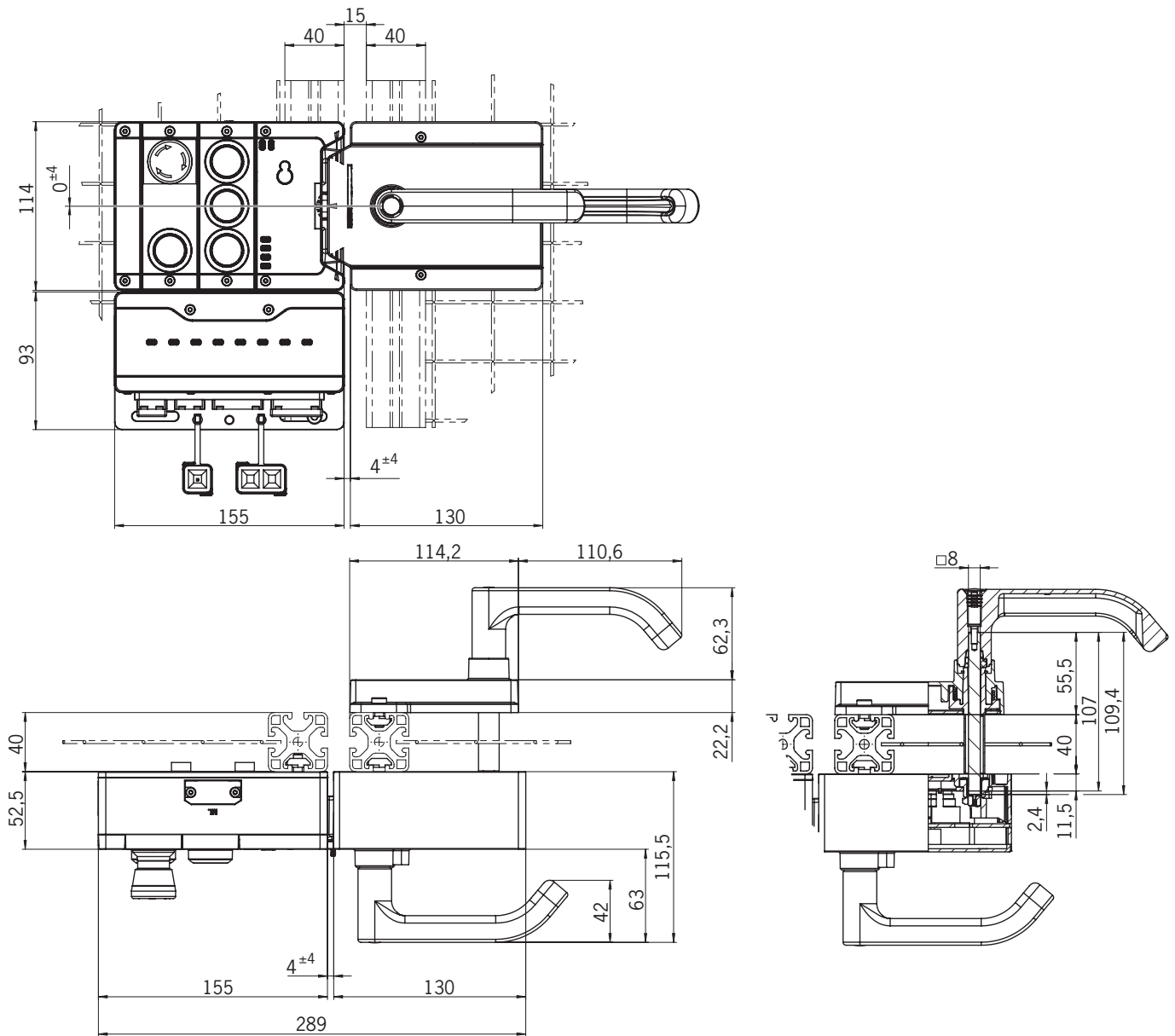
### 7.4.2. Handle module MGB2-H...



## 7.4.3. Escape release MGB-E-...

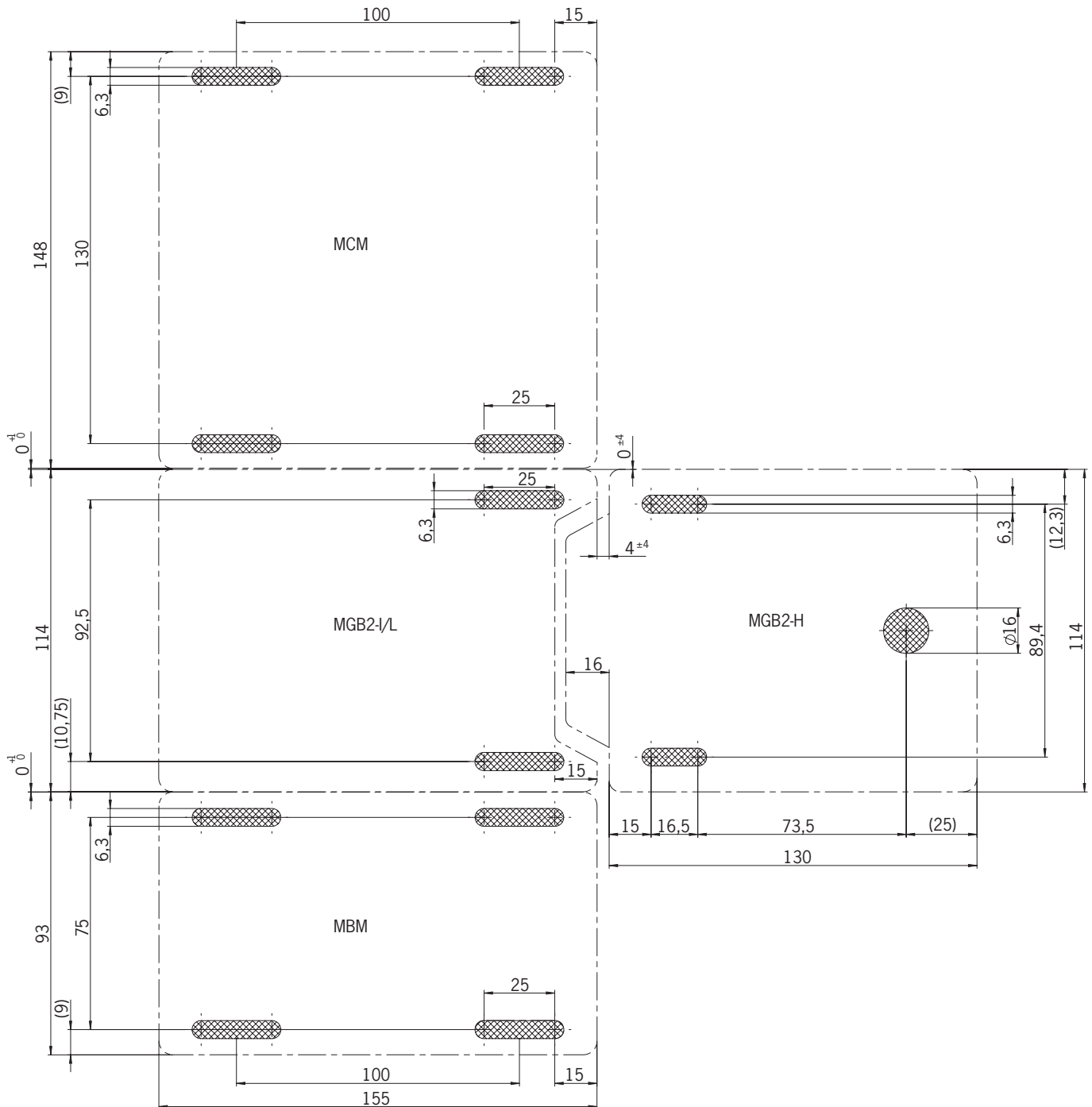


7.4.4. Assembly of MGB2-L, MGB2-H and MGB-E (example on profile 40x40)

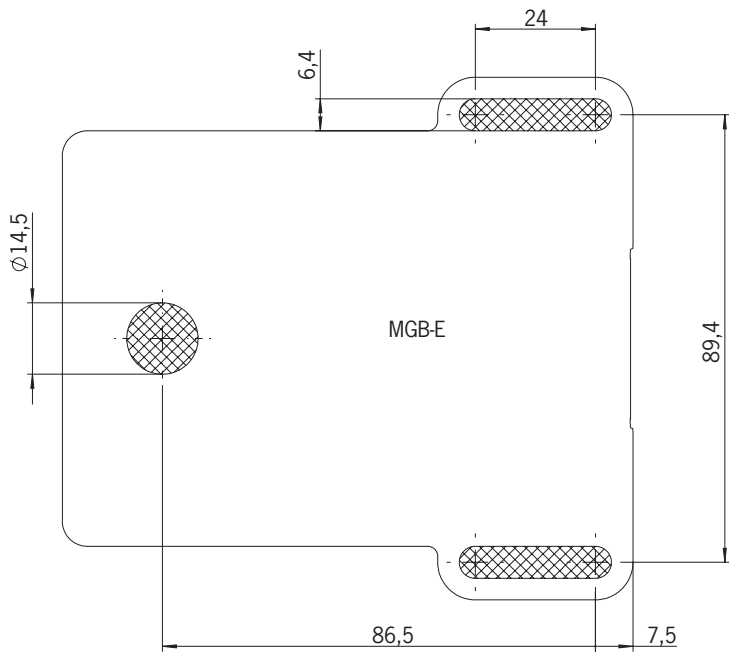




## 7.4.5. Drilling pattern, complete system with bus module MBM and optional expansion module MCM



**7.4.6. Drilling pattern, escape release MGB-E**



## 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

In the event of servicing, the guard locking can be released with the auxiliary release irrespective of the state of the solenoid (see Fig. 5).

<b>i</b>	<p><b>Important!</b></p> <ul style="list-style-type: none"> <li>› Given corresponding parameter configuration, the system enters into a latching fault if the auxiliary release is actuated. See <i>System status table</i>, <i>signal sequence incorrect</i> status (DIA red, Lock flashes 1 time). For information on setting the related parameter, see section 19.2. <i>Fault on actuating the escape release on page 38</i>.</li> </ul>
<b>i</b>	<p><b>Important!</b></p> <ul style="list-style-type: none"> <li>› The auxiliary release is not a safety function.</li> <li>› 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.</li> <li>› The correct function must be checked at regular intervals.</li> <li>› Loss of the release function due to mounting errors or damage during mounting. Check the release function every time after mounting.</li> <li>› Observe the notes on any associated data sheets.</li> </ul>

The locking screw must be screwed in and sealed again after every use of the auxiliary release (original set of seal labels, order no. 155853). Tightening torque 0.5 Nm.

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.

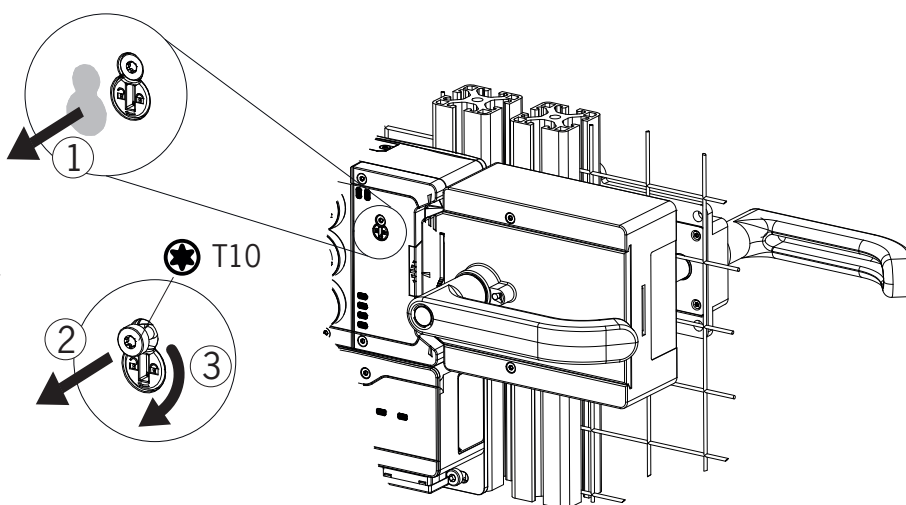


Fig. 5: Auxiliary release

### 8.2. 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. 6). 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).

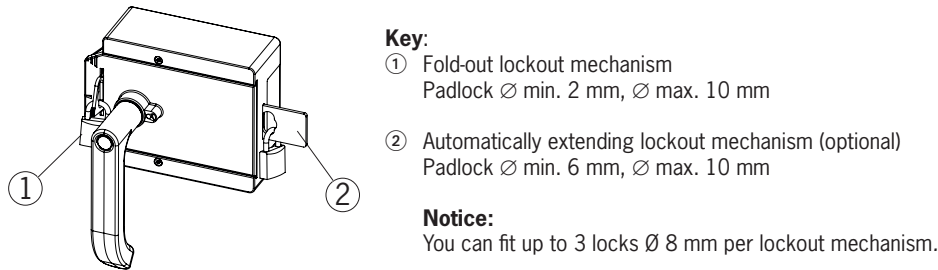


Fig. 6: Lockout mechanism secured with padlock

### 8.3. Escape release (optional)

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

Depending on the parameters set in your configuration environment, the system may enter into a latching fault if the escape release is actuated (see 19.2. *Fault on actuating the escape release on page 38*).



#### Important!

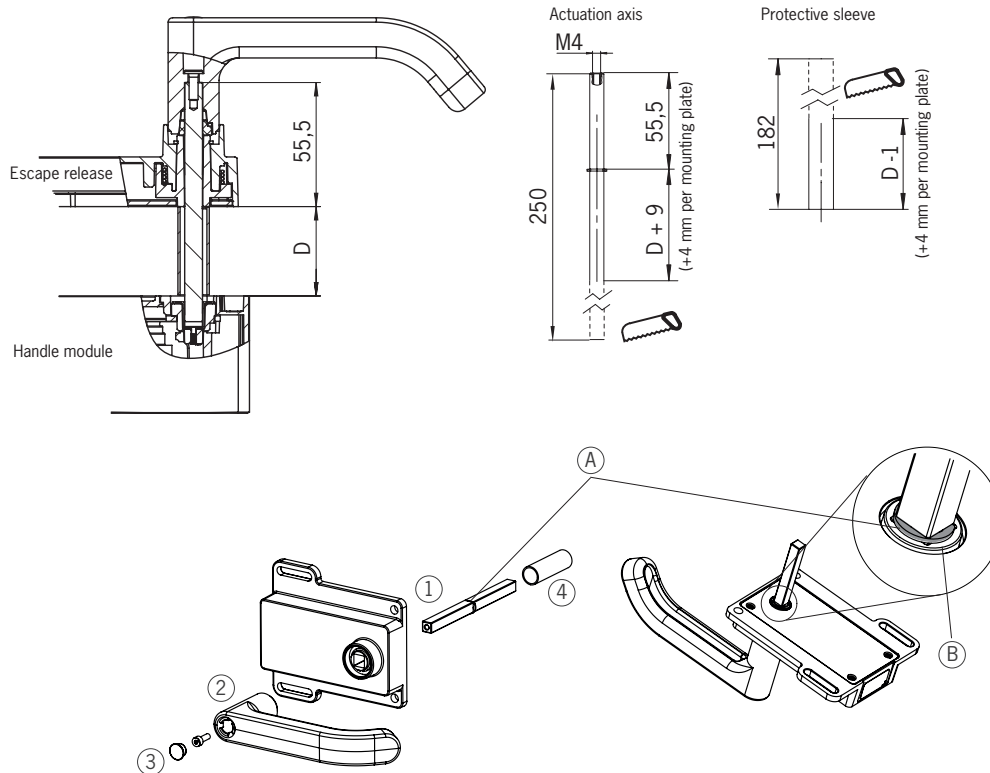
- › It must be possible to actuate the escape release manually from inside the protected area without tools.
- › It must not be possible to reach the escape release from the outside.
- › The bolt tongue must not be under tensile stress during manual release.
- › The escape release meets the requirements 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 8.3.1. *Preparing escape release on page 21*.
- › Adjust escape release axis at right angles to the handle module. See Fig. 8.

### 8.3.1. Preparing escape release

Profile width	Required length Actuation axis		Which EUCHNER parts are required?	Necessary work steps
	Without mounting plates	With mounting plates (4 mm each)		
D	D+9	D+17		
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. 7: Preparing escape release

## 9. Mounting



### IMPORTANT

- › Mounting must be performed only by authorized personnel.
- › Depending on the substrate material, the detection range for the acquisition of the door position may vary.
- › During mounting, pay attention to correct alignment. Use the alignment aids on the housing for the interlocking/locking module and on the housing for the handle module (see Fig. 8).

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.

For mounting steps, see Fig. 8 and Fig. 10 to Fig. 15.

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

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

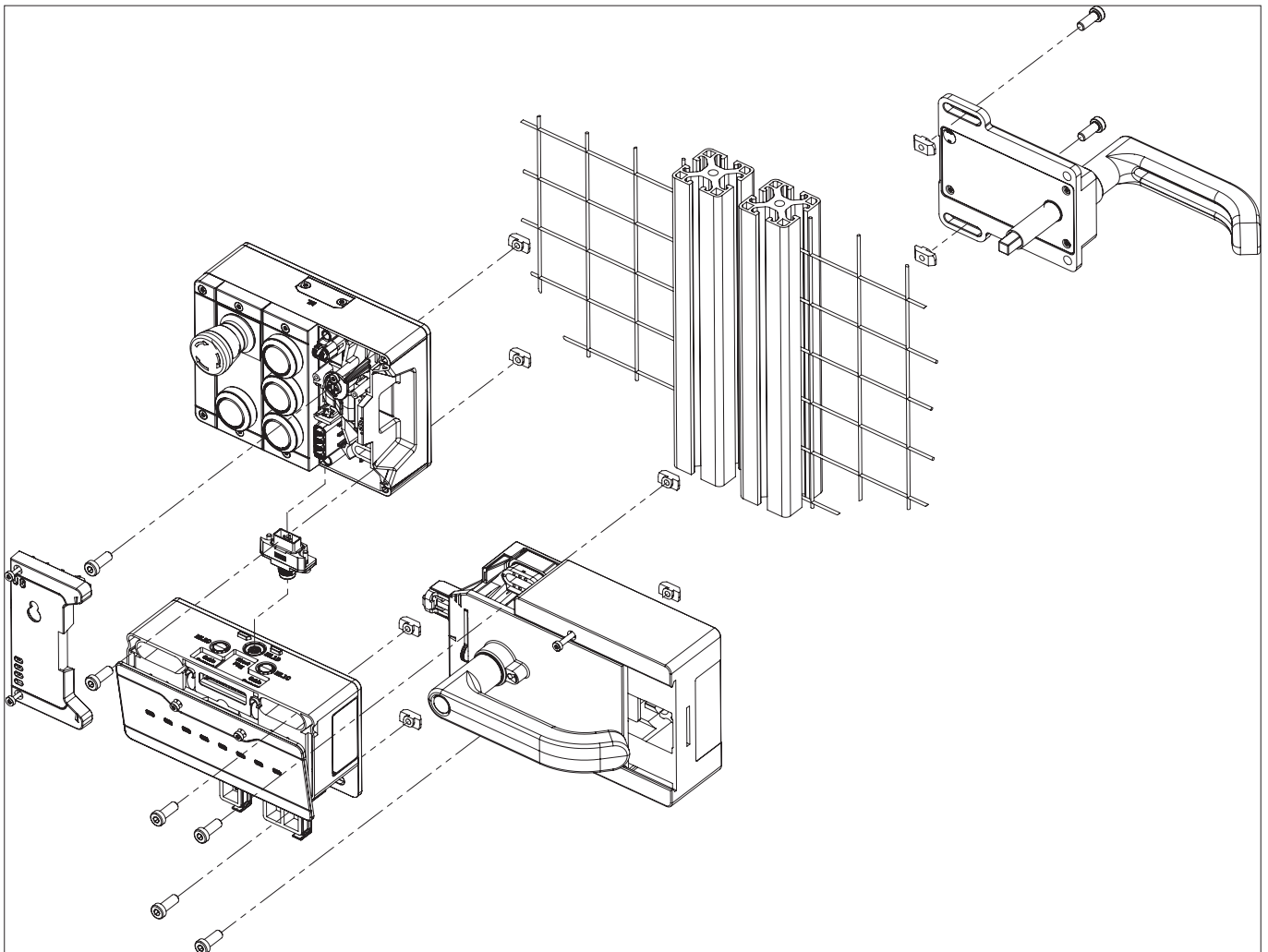


Fig. 8: Installation example for door hinged on the right (general view)

## 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, and the safe bits are reset. 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.

Modules (e.g. locking module or expansion module) can be replaced only in combination with a restart of the overall system. 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).

## 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, R 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. 9: *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.
- › On using a submodule with labeling fields, pay attention to the correct alignment of the modules in relation to the labeling fields. 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 (order number 126372).

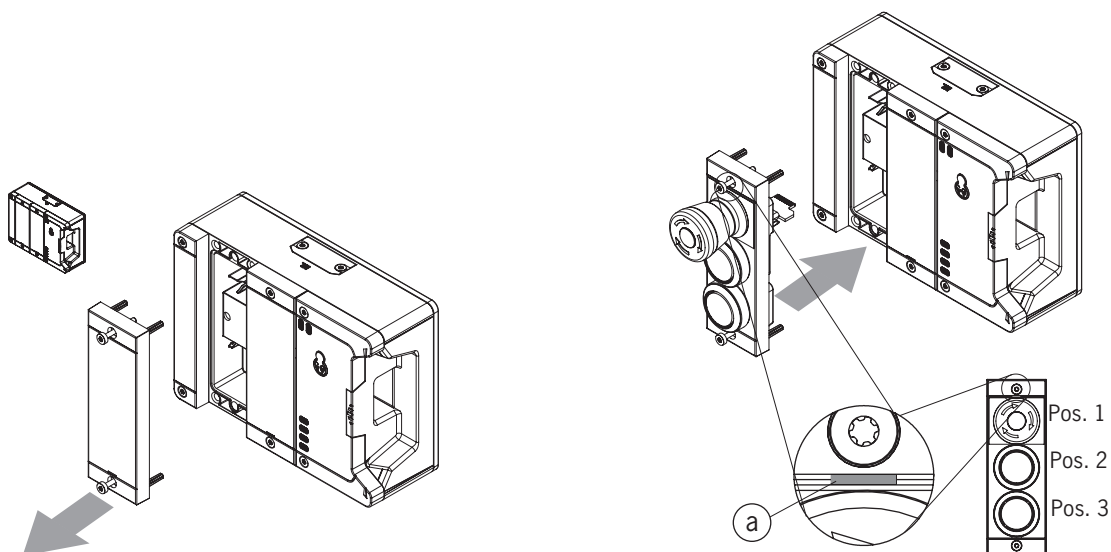


Fig. 9: Mounting submodule

### 9.3. Replacing submodules



#### 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 submodule, and the safe bits are reset. 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.



#### NOTICE

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

The replacement of submodules MSM with the same function during operation is also possible (pay attention to safety note above). As soon as the system detects a correct submodule, the submodule is ready for operation. For replacement of submodules with a different function, see chapter 9.3.2. *Replacing submodule with a submodule with a different function (changing configuration)*. The system reacts as follows on a replacement:

1. If the submodule MSM is removed, the SLOT LED illuminates red, interrupted by 1x green flash. In addition, the SF LED on the bus module MBM illuminates red.
2. If the submodule MSM contains a safety function, the related bit on the bus is cleared as soon as the submodule has been removed.
3. If an identical submodule is inserted with the same alignment, the fault display goes out and the bit is transmitted on the bus again to suit the actual situation.

#### 9.3.1. Replacing faulty submodule



#### Important!

If alignment detection is active, the system checks the alignment of the newly inserted submodule and compares it to the submodule inserted last. The alignment of the previous submodule must be retained in this situation because otherwise the configuration of the device will change. If a configuration change is required, pay attention to the sequence in 9.3.2. *Replacing submodule with a submodule with a different function (changing configuration)*. You will find information on switching on and off the alignment detection in the operating instructions for your bus module MBM.

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

The system saves the last configuration of your system.

The configuration changes if

- You replace a submodule with a submodule with a different function or
- You fit the same submodule rotated by 180°.

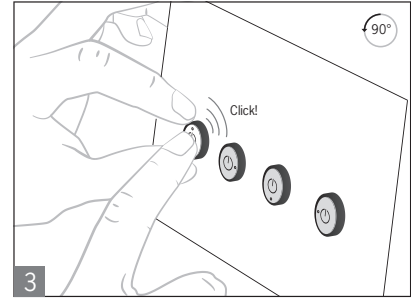
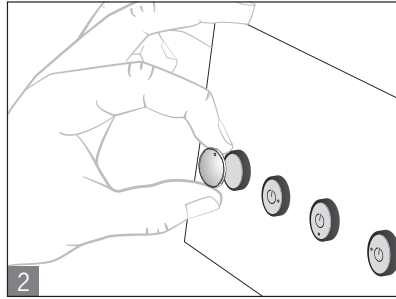
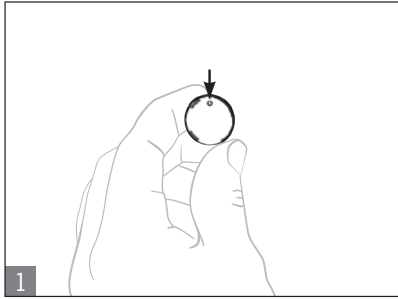
Adapt the configuration in the configuration software for your control system.

Then the new configuration must be taught-in by restarting the bus module MBM. You will find further information in the operating instructions for your bus module MBM.

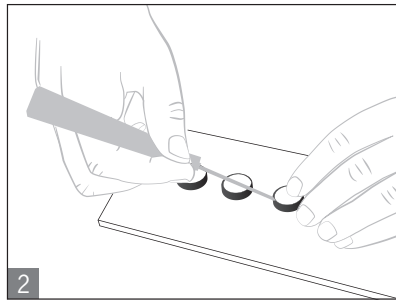
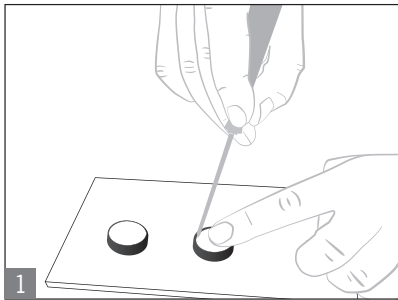


## 9.3.3. Fitting and removing lenses and labels for controls and indicators

### Fitting



### Removing



## 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!**

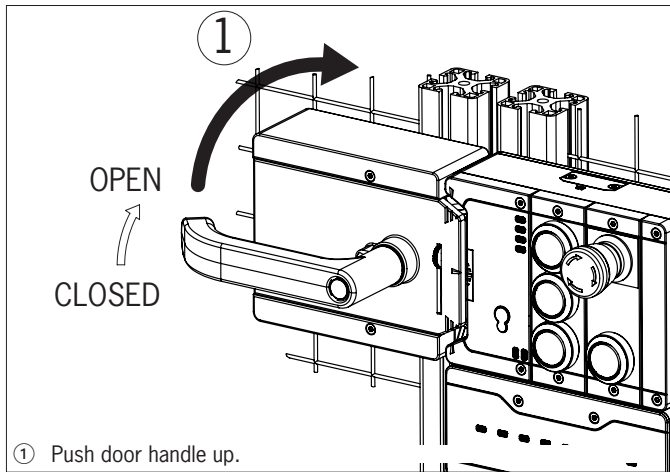
It is possible to make this change only when the bolt tongue is not extended and an escape release is not yet mounted.

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:

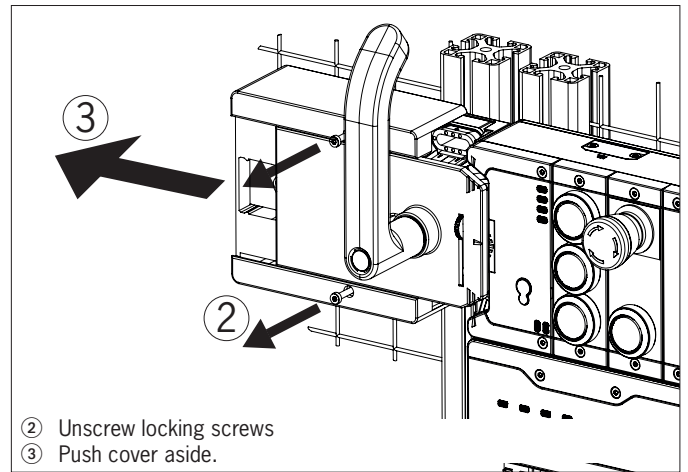
- › The guard opens by pressing down the door handle.
- › The system is mounted the other way up for doors hinged on the left. In other words, the guard opens by pressing up the door handle (see *Fig. 10*). For this reason the actuating direction of the door handle must be changed (see *Fig. 10* to *Fig. 15*).

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



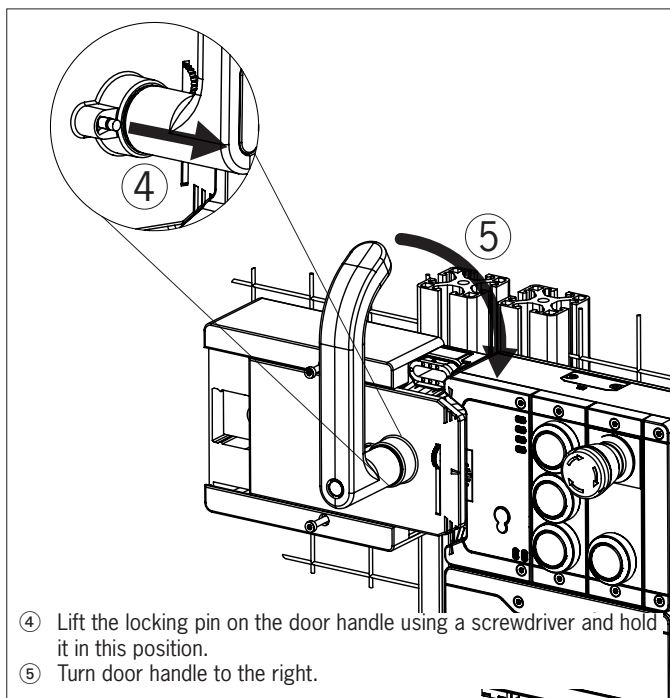
① Push door handle up.

Fig. 10: Changing actuating direction, step ①



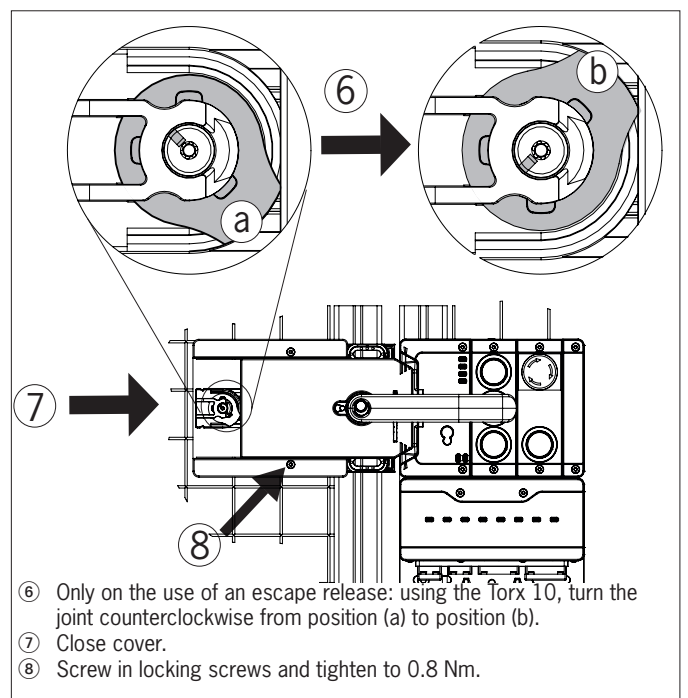
② Unscrew locking screws  
③ Push cover aside.

Fig. 11: Changing actuating direction, steps ② and ③



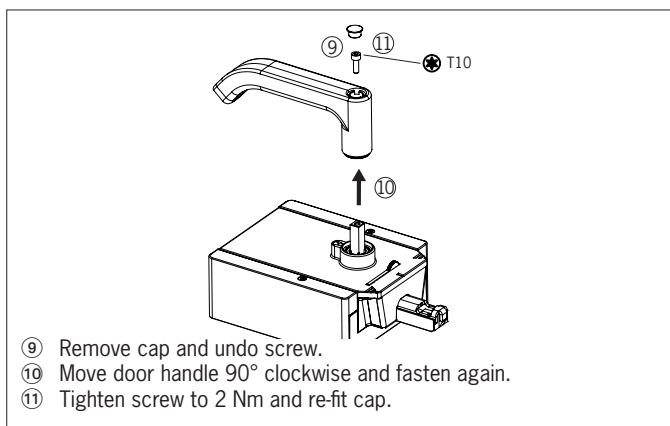
④ Lift the locking pin on the door handle using a screwdriver and hold it in this position.  
⑤ Turn door handle to the right.

Fig. 12: Changing actuating direction, steps ④ and ⑤



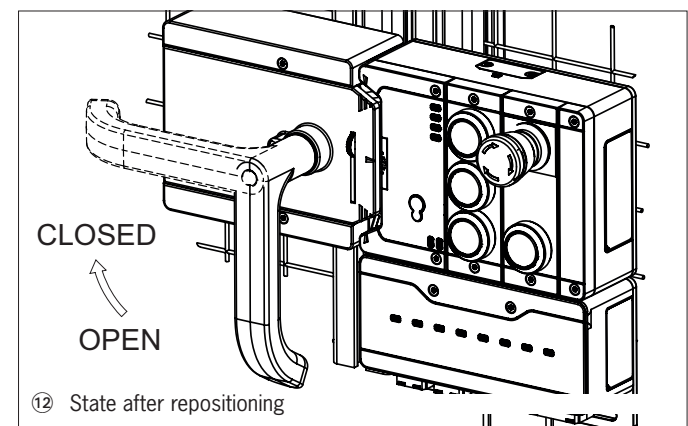
⑥ Only on the use of an escape release: using the Torx 10, turn the joint counterclockwise from position (a) to position (b).  
⑦ Close cover.  
⑧ Screw in locking screws and tighten to 0.8 Nm.

Fig. 13: Changing actuating direction, steps ⑥ to ⑧



⑨ Remove cap and undo screw.  
⑩ Move door handle 90° clockwise and fasten again.  
⑪ Tighten screw to 2 Nm and re-fit cap.

Fig. 14: Changing actuating direction, steps ⑨ and ⑪



⑫ State after repositioning

Fig. 15: 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

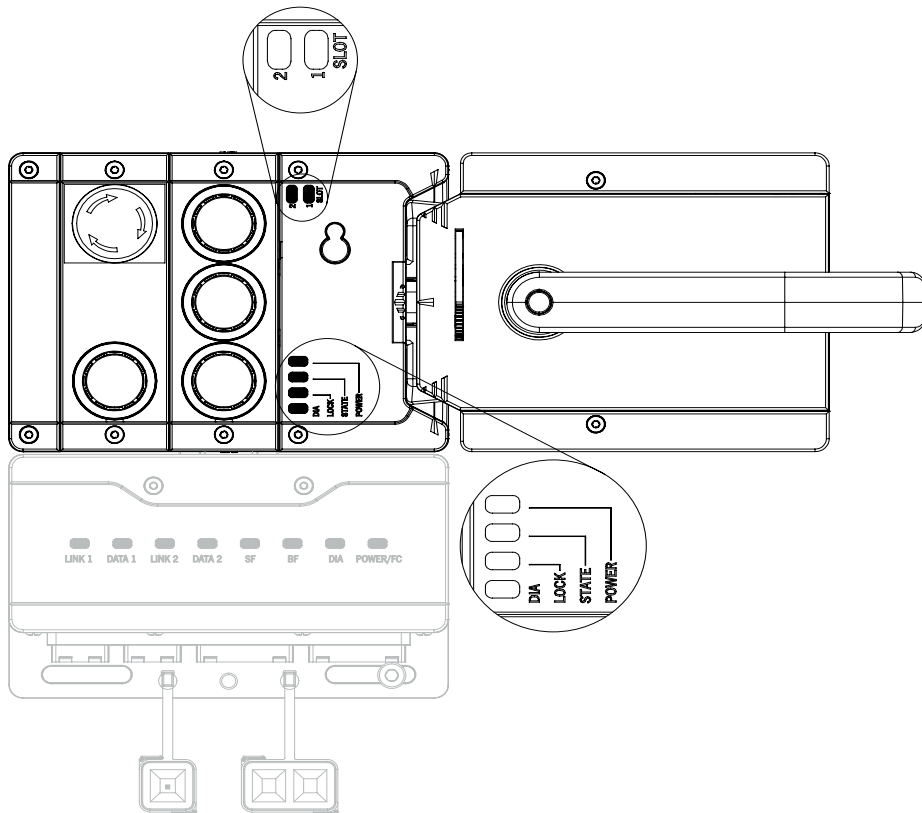


Fig. 16: Indicators and control elements

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
SLOT 2	Indicates the status of the submodule Color: red/green

## 13. Electrical connection

All devices in a line of modules draw their power from a suitable bus module MBM. The connection is only allowed to be made to a bus module MBM or an upstream module.

For detailed instructions on the connection of the overall system, refer to the operating instructions for the bus module MBM used.



### CAUTION

Risk of damage to equipment or malfunctions as a result of incorrect connection.  
 ▶ Pay attention to the instructions on correct connection in the operating instructions for the bus module MBM used.

### 13.1. Connecting modules

MGB2 Modular modules can either be connected together directly or using cables (see Fig. 17: Connecting modules).

Each module has a top and a bottom connection. You can use either the bottom or the top connection or both if the module is between two other modules.

The bottom module connector is already integrated. To use the top connection, change its position. Use only the module connector intended to connect modules together (see table below). The maximum cable length for a line must not exceed 40 m.

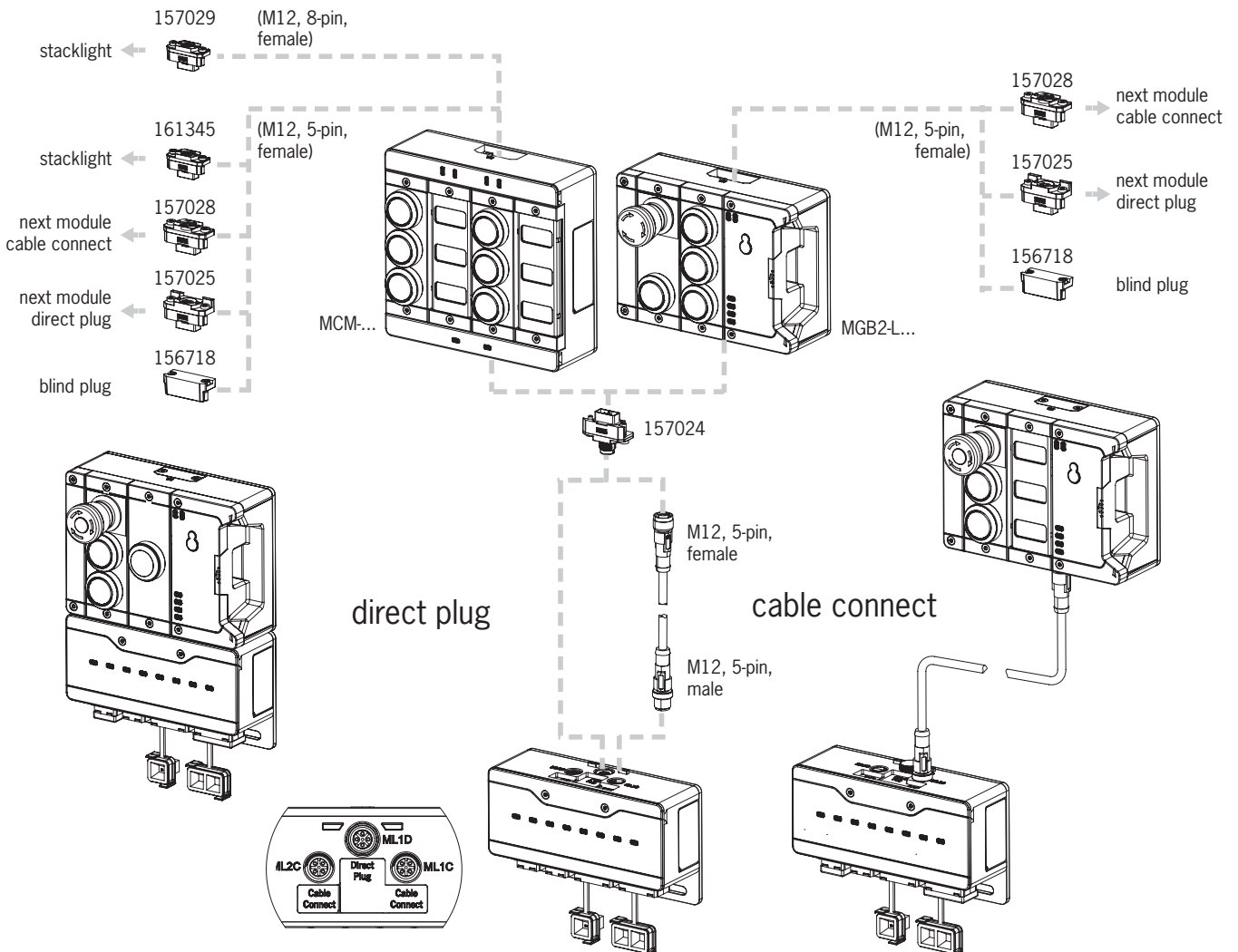


Fig. 17: Connecting modules

Table 2: Overview of module connectors

Function	Order no.	Included?
Module connector M12, 5-pin, plug	157024	1x *
Blanking cover	156718	1x *
Set with sealing caps for unused connections	156739	Yes
Module connector, 5-pin socket, for the direct connection of a further module	157025	No, must be ordered separately
Module connector M12, 5-pin socket, for the connection of a further module via a connecting cable	157028	
Module connector M12, 5-pin socket, for the connection of a stacklight	161345	
Module connector M12, 8-pin socket, for the connection of a stacklight	157029	
Connecting cable M12, 5-pin	See catalog or <a href="http://www.euchner.com">www.euchner.com</a>	
Connecting cable M12, 8-pin		

\* Not for MGB2...-Y0000-...

### 13.2. Using submodules

Each interlocking/locking module can contain up to two submodules. 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!**

- › In the modules described here it is only allowed to install submodules of connection types P, R and N. 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.
- › Only one submodule with an emergency stop is allowed to be installed per module.
- › On using a submodule with labeling fields, pay attention to the correct alignment of the modules in relation to the labeling fields. Incorrect assignments can cause serious malfunctions in your installation.
- › Unused submodule slots must be fitted with a cover (order number 126372).
- › Avoid touching the contacts on the underside of the submodule. Risk of ESD damage and contact problems due to soiling.

## 14. Data blocks for interlocking/locking module MGB2-I or MGB2-L



### Important!

You will find the exact data structure for your device on the related data sheet. You will find a detailed description of the safe and non-safe data blocks in the operating instructions for your bus module MBM.

## 15. Setup

The device is automatically in operation after powering up the bus module MBM. For detailed instructions on setup, refer to the operating instructions for your bus module MBM.

You can see the current operating status on the LEDs on the module (see 12. Controls and indicators on page 28 and 16. System status table, module LEDs on page 33). You will also find information on fault detection there.

### 15.1. 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 interlocking/locking module and handle module forms a functional unit.

During a teach-in operation, the module is in the safe state (all safe bits are not set).



### Important!

- ▶ A system that has not yet been taught-in remains in the teach-in standby state until a handle module has been taught-in. Interlocking/locking modules already taught-in remain in the teach-in standby state for 3 min after the system start.
- ▶ The interlocking/locking module disables the code for the previous handle module if a new handle module is taught-in. 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.
- ▶ If the interlocking/locking module detects a disabled or unsuitable handle module while the module is in the teach-in standby state, a teach-in error is indicated after 30 s.
- ▶ The interlocking/locking module can be operated only with the last handle module taught-in.
- ▶ If, in the teach-in standby state, the interlocking/locking module detects the handle module last taught-in, the teach-in standby state is ended immediately and the interlocking/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 and the device indicates a teach-in error.

### Teaching-in handle module

1. Fit handle module.
2. Close safety device. Check for correct alignment and distance using the markings on the interlocking/locking module and re-adjust if necessary.
3. Insert bolt tongue into the interlocking/locking module.
4. Connect interlocking/locking module to the bus module MBM. The bus module must be in operation for this purpose.
- ➔ 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. Provided this is not the case, the teach-in operation is completed after approx. 30 seconds, and the green LED (State) goes out. The new code has now been stored, and the old code is disabled. The STATE and DIA LEDs on the interlocking/locking module flash alternately if the teach-in operation was successful.
5. Restart overall system via the bus module MBM. For this purpose, disconnect the bus module from the power supply for a few seconds.

## 15.2. 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. 5 Nm).

## 15.3. Electrical function test

1. Close all guards and insert the bolt tongue into the locking module.
2. Activate guard locking.
  - › The machine must not start automatically.
  - › It must not be possible to open the guard.
  - › **The following applies to MGB2-I..:** The green LED (State) is illuminated.
  - › **The following applies to MGB2-L..:** The green LED (State) and the yellow LED (Lock) are illuminated.
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.

## 15.4. Replacing a module

For instructions on replacement, refer to the operating instructions for your bus module MBM. After the replacement of an interlocking/locking module or a handle module, a teach-in operation may be necessary. See 15.1. *Teach-in operation (only for MGB2 unicode)* on page 31.













### 16. System status table, module LEDs

All diagnostic messages are listed below. The scope of the possible messages may differ depending on the type and number of modules/submodules used.

#### 16.1. System indications if there are faults (module LEDs)

If there are faults, the bit `LM.E_G` is set. After the fault has been rectified, this can be acknowledged using the bit `LM.ACK_G`. The bit `LM.E_G` is reset during this process. Exception: escape release error (see 19.2. Fault on actuating the escape release on page 38)

Operating mode	LED indicator					Device diagnostics Corresponding error/status bit	State
	POWER (gn)	STATE (gn)	Lock (ve), only MGB2-L1/-L2	DIA (rd)			
Fault display		 1 x	○			<code>LM.E_G</code>	Handle module teach-in error (e.g. teach-in operation interrupted too early), configuration teach-in error
		 3 x	○			<code>LM.E_G</code>	Handle module read error (e.g. error in code or code cannot be read) <sup>2)</sup>
		 5 x	○			<code>LM.E_G</code>	Environment error, disabled actuator, power supply outside the permissible range
		○	○			<code>LM.E_G</code>	Internal fault (e.g. component faulty, data error) <sup>1)</sup>
		○	 1 x			<code>LM.E_G</code>	Plausibility error, signal sequence incorrect, e.g. broken bolt tongue recognized <sup>2)</sup>
		○	 1 x			<code>LM.F_ER</code>	After actuation of the escape release <sup>3)</sup>
	 1 x	○	○			<code>BM.E_MLI</code>	MLI communication error (indication on bus module)
Key to symbols	○				LED not illuminated		
					LED illuminated		
	 3 x				LED flashes three times		
	X				Any state		

- 1) Latching fault; use corresponding output bit `LM.ACK_G` to reset
- 2) Non-latching fault; open guard and close it again to reset
- 3) Non-latching fault; use corresponding output bit `LM.ACK_ER` to reset

**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.

**16.2. System indications during setup, teach-in and normal operation**

State										
Guard locking status (ÜK) Safe input bit LM.FI_UK Status bit LM.I_UK	off	off	off	on	off	off	off	off	off	
Guard locking Status bit LM.I_OL	off	off	off	on	off	off	on	off	off	
Bolt position (SK) Safe input bit LM.FI_SK Status bit LM.I_SK	off	off	on	on	off	off	off	off	off	
Bolt position Status bit LM.I_OT	off	off	on	on	off	off	on	off	off	
Device diagnostics Status bit LM.I_OD	off	on	on	on	off	off	on	off	off	
<b>Guard locking control</b> LM.FO_CL (depending on setting also LM.O.CL)	off	off	off	on	on	off	on	X		
<b>Position of the bolt tongue</b>	not inserted	not inserted	inserted	inserted	not inserted	not inserted	inserted	X		
<b>Door position</b>	open	closed	closed	closed	X	open	closed			
<b>DIA (rd)</b>	○	○	○	○	○	○	○	☀		
<b>LED indicator</b> Lock (ye), only MGB2-L1/-L2	○	○	☀ long ON short OFF	☀	☀ flashing quickly	○	○	alternately flashing STATE /DIA		
<b>STATE (gn)</b>	☀ long OFF short ON	☀ long ON short OFF	☀	☀	X	☀ 3 x	☀ 1 Hz	☀		
<b>POWER (gn)</b>					☀					
<b>Operating mode</b>										
<b>Normal operation</b>										
<b>Teach-in standby</b> (only for MGB2 unicode)										
<b>Setup</b> (only for MGB2 unicode)										
	LED not illuminated									
	LED illuminated									
	LED flashes at 1 Hz									
	LED flashes three times									
	Any state									

**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.

## 17. System status table (slot LEDs)

If a fault occurs on the submodule, the bit LM.E\_SM.. is set. As soon as the fault has been corrected, it is reset automatically (non-latching fault).

Fault display SLOT1 / SLOT2 LED	Meaning	Measures
OFF	A submodule is not used or Submodule functioning without faults	-
Red ON Green flashes 1 x	Submodule missing although a submodule was included in the last configuration	Insert suitable submodule or Change configuration
Red ON Green flashes 2 x	Submodule is installed rotated by 180°	Case 1: Submodule type is correct, but submodule must be installed rotated by 180°. Case 2: If it is intended to change the configuration, the system must be restarted so that the required configuration is taught-in. Case 3: Alignment is irrelevant for this submodule, but the parameter for alignment detection is active. Change parameter for alignment detection and restart system.
Red ON Green flashes 3 x	Submodule type does not correspond to the submodule type configured last	Insert submodule of appropriate type or Change configuration
Red ON	Internal fault in the submodule	Replace submodule. ▶ If the problem persists: replace the base unit.
Red flashing (1 Hz) The DIA LED also illuminates	Faults in safety engineering, latching Other input errors on the submodule	Restart system. ▶ If the problem persists: replace the submodule. ▶ If the problem persists: replace the base unit.
Red flashing Green OFF	Enabling switch discrepancy error	Release enabling switch and press again. ▶ If the problem persists: check the cable and connection. ▶ If the problem persists: replace the submodule. ▶ If the problem persists: replace the base unit.

## 18. Technical data



### NOTICE

If a data sheet is included with the product, the information on the data sheet applies.

Parameter	Value
Housing material	Fiber glass reinforced plastic Die-cast zinc, nickel-plated, stainless steel, powder-coated sheet steel
Dimensions	See dimension drawing
Weight of MGB2 (interlocking/locking module, without submodules)	1.0 kg
Weight of handle module	1.1 kg
Weight of escape release	0.75 kg
Ambient temperature	-30 ... +55 °C <sup>1)</sup>
Degree of protection	IP65 <sup>2)</sup>
Safety class	III
Degree of contamination	3
Installation orientation	Any
Locking force $F_{zh}$ acc. to GS-ET-19	2,000 N
Power supply	Via bus module MBM
Connection	M12, 5-pin (EUCHNER module plug connector MLI)
Current consumption, max. (without submodules)	350 mA
Current consumption, max., per submodule	30 mA
Rated impulse withstand voltage $U_{imp}$	0.5 kV
Resilience to vibration and shock	Acc. to EN 60947-5-3
EMC protection requirements	Acc. to EN 61000-4 and DIN EN 61326-3-1
Risk times, max. (turn-off times) <sup>3)</sup>	See information in the operating instructions for your bus module
- Monitoring of the position of the guard	
- Monitoring of guard locking	
- Activation of guard locking	
<b>Characteristics acc. to EN ISO 13849-1<sup>4)</sup></b>	
Category	4
Performance Level	PL e
MTTF <sub>d</sub> <sup>5)</sup>	820 years
DC	99%
Mission time	20 years
PFH <sub>d</sub> <sup>6)</sup>	2.62 x 10 <sup>9</sup>
- Monitoring of guard locking and the position of the guard	
- Control of guard locking	
- Monitoring of the position of the guard	
- Evaluation of safety signals in submodules installed	

1) Different values could apply to built-in submodules; please observe the data sheets.

2) Only with correctly mounted connecting cables and submodules.

3) The risk time is the maximum time between the change in an input status and the clearing of the corresponding bit in the bus protocol.

4) Refer to the declaration of conformity for the issue date.

5) Fixed failure rate without consideration of faults in wearing parts.

6) Information regarding wearing parts without consideration of fixed failure rates in electronic components.

## 18.1. Radio frequency approvals

**FCC ID:** 2AJ58-02

**IC:** 22052-02

### 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.

## 19. Troubleshooting and assistance

You will find detailed information on diagnostics and troubleshooting in the operating instructions for your bus module MBM. The following information covers only faults related to the interlocking/locking module MGB2.

### 19.1. Resetting general faults

Proceed as follows:

1. Acknowledge fault using output bit  $LM.ACK\_G$ .
  2. Close guard if necessary and switch on guard locking.
- ➔ The system is in normal operation again.








### 19.2. Fault on actuating the escape release

This fault behavior must be configured correspondingly in the parameters. You can do this in the configuration software for your control system. In the *Module parameters* dialog, set the value for the *Fault on actuating the escape release* field in the *Escape release fault* section to *yes*. You will find information on configuration in the operating instructions for your bus module MBM.

To achieve monitoring of the locking element in category 4, PL e according to EN ISO 13849-1, internal monitoring logic is integrated into every locking module.

**Result:** Bit  $LM.F\_ER$  is set when the escape release is actuated (see 16.2. *System indications during setup, teach-in and normal operation* on page 34).

The bit  $LM.ACK\_ER$  must be set for at least 100 ms to acknowledge the fault.

Door position	Position of the bolt tongue	Guard locking	Bolt position Status bit $LM.I\_OT$	Guard locking Status bit $LM.I\_OL$	ÜK Input bit $LM.FI\_UK$	Device diagnostics status bit $LM.I\_OD$	LED indicator				State	
							Power (gn)	State (gn)	Lock (ye)	DIA (rd)		
X	X	X	off	off	off	X				1 x		Signal sequence incorrect (e.g. after actuation of the escape release)
												LED not illuminated
												LED illuminated
										3 x		LED flashes three times
							X					Any state

### 19.3. Resetting system to factory settings

For instructions on resetting to factory settings, refer to the operating instructions for your bus module MBM.

## 20. 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:**

support@euchner.de

**Internet:**

www.euchner.com

## 21. 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.

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

- › Check the safety function (see chapter 15.3. *Electrical function test on page 32*)
- › 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.

## 22. Declaration of conformity

The 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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Edition:  
2500234-06-06/23

Title:  
Operating Instructions Interlocking/Locking Modules  
MGB2-I.-MLF... / MGB2-L.-MLF... (Modular) and from V1.00.0  
(translation of the original operating instructions)  
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