EUCHNER

Operating Instructions

Interlocking/Locking Modules

MGB2-I..-MLI-... / MGB2-L..-MLI-... (Modular)

EN

from V1.00.0

Contents

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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 and maintenance”, the operating instructions for the bus module MBM and any enclosed 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)	from V1.00.0
	L1 (guard locking by spring force)		from V1.00.0
	L2 (guard locking by solenoid force)		from V1.00.0

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 devices 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 (PLC) and bus systems.

1.3. Key to symbols

Symbol/depiction	Meaning
	Printed document
	Document is available for download at www.euchner.com
	Document on CD
 **DANGER WARNING CAUTION**	Safety precautions **Danger** of death or severe injuries **Warning** about possible injuries **Caution** Slight injuries possible
 **NOTICE Important!**	**Notice** about possible device damage **Important** information
Tip	Useful information

1.4. Supplementary documents

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

Document title (document number)	Contents	
Operating Instructions Interlocking/Locking Modules MGB2-L..-MLI (2500234)	(this document)	
Safety Information and Maintenance (2500232)	Information sheet with important safety information	
Operating Instructions Bus Modules MBM-..-MLI (2500235)	Configuration manual for the connection to the bus and data evaluation in MLI systems	
Possibly enclosed 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. For this purpose enter the doc. no. in the search box.

2. Correct use

The modular devices described here can only be operated with a suitable bus module MBM-...-MLI-....

For the MGB2-I... the following applies:

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.

For the MGB2-L... the following applies:

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:

- The unlocking 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 device must not be unlocked 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, Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design
- EN ISO 12100, Safety of machinery – General principles for design – Risk assessment and risk reduction
- EN IEC 62061, Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems.

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

- EN ISO 13849-1, Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design
- EN ISO 14119, Safety of machinery – Interlocking devices associated with guards – Principles for design and selection
- EN IEC 60204-1, Safety of machinery – Electrical equipment of machines – Part 1: General requirements.
- EN IEC 62061, Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems.

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 V1.00.0	MSM-.-P-... MSM-.-R-... MSM-.-N-...	MSM-.-E-...	MSM-.-K-...
MBM-...-MLI from V1.00.0	Interlocking/locking module MGB2-I..-MLI/MGB2-L..-MLI from V1.00.0	●	●	-	-
	Extension module MCM-...-MLI	-	●	●	-

Key to symbols		
	●	Combination possible
	-	Combination not possible

3. Description of the safety function

Important!

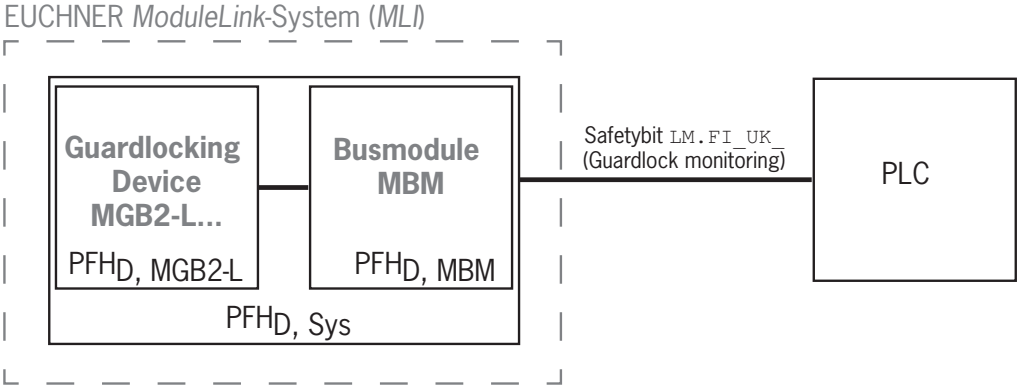
You will find detailed instructions on the determination of reliability values in the operating instructions for your bus module.

Devices from this series feature the following safety functions:

For the MGB2-L... the following applies:

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*):
  - If the guard locking is unlocked, safety bit `LM.I_UK` (ÜK) = 0 (monitoring of the locking element).
  - If the guard is open, safety bit `LM.I_SK` (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 (failsafe locking mechanism).

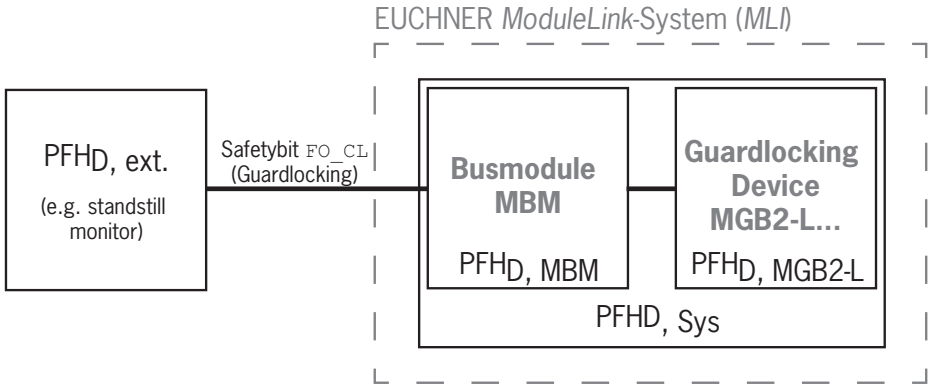


- Safety characteristics:
  Category, Performance Level, PFH_D
  (reliability values according to EN 13849-1 see *18. Technical data*).

Control of guard locking (safety bit `FO_CL`)

- 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 $PFH_{D\ sys.}$ and by the external control (e.g. safe PLC).



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

For MGB2-I... (or a correspondingly configured MGB2-L...) the following applies:

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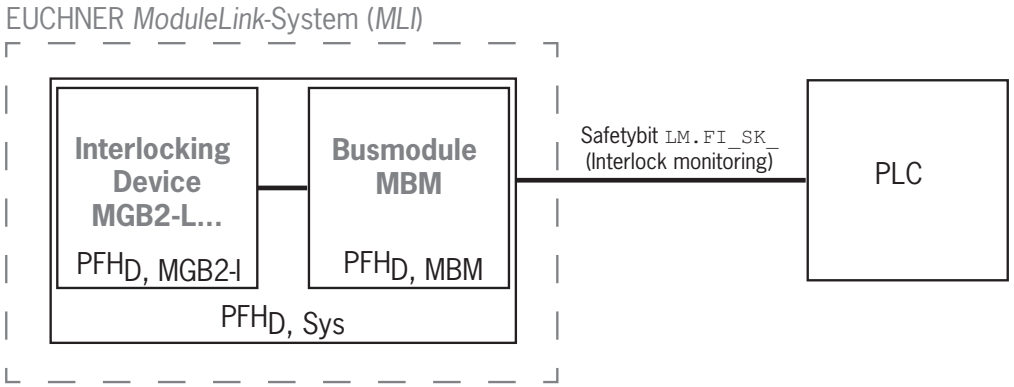
Monitoring of the guard position
(interlocking device according to EN ISO 14119)

- Safety function: If the guard is open the safety bit `LM.I_SK` (SK) = 0. (See chapter *6. Function on page 10*).



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

4. Exclusion of liability and warranty

In case of failure to comply with the conditions for correct use stated above, or if the safety instructions 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 guard and, if necessary, other safety functions particularly

- after any setup work
- each time after replacement of a component relevant to 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 guard 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 occupational 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.

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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 in 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 in the locking module
- Guard locking in locking position (guard locking 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 the 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 bolt tongue is released. The guard can be opened.

6.2.2. 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)!

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 locked position and the guard is locked.

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 using a non-safe bit.

The following table shows the possible configurations.

Type of locking module	Use of the control bit 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. The device is configured like an MGB2-I1.
	-	-	-	Control is not configured in the parameters	Interlocking. Only position monitoring of the guard. No locking function.

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7. System overview

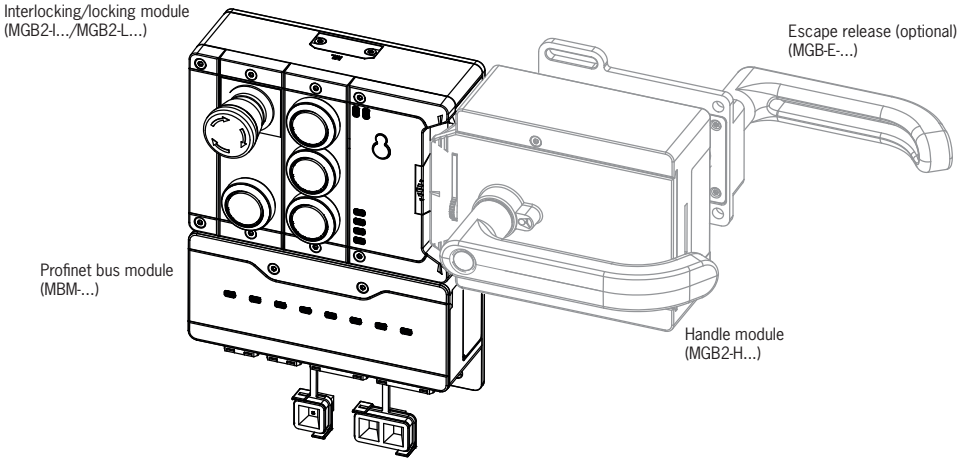
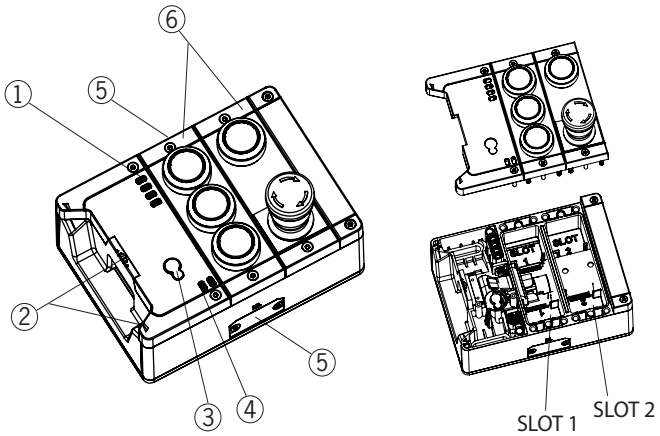


Figure 1: Components at a glance

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

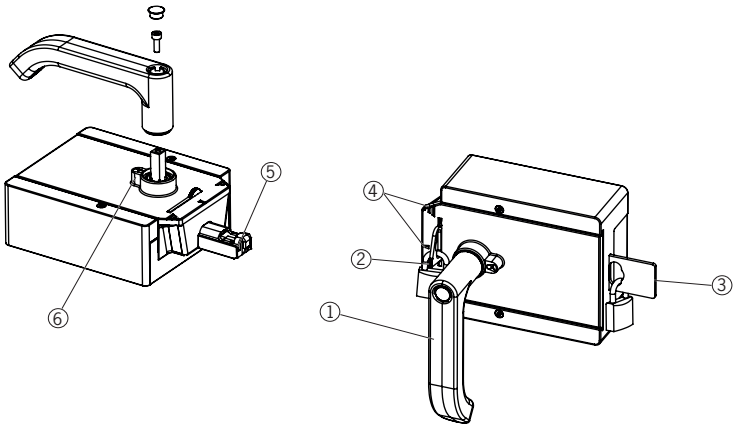


Key:
① Module function LED indicators
② Auxiliary marking for correct alignment in relation to the handle module
③ Auxiliary release (optional, only on version with guard locking)
④ LED indicator for submodule in SLOT 1 and SLOT 2
⑤ Top and bottom connection for the connection between modules
⑥ Submodules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

Notice:
Depending on version, no submodules or different submodules may be inserted. See enclosed data sheet.

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

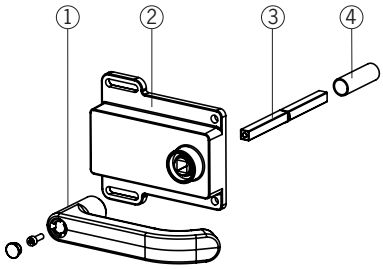
7.2. Handle module MGB2-H-...



Key:
① Door handle
② Hinged lockout mechanism
③ Automatically extending lockout mechanism (optional)
④ Auxiliary markings for max. permissible mounting distance
⑤ Bolt tongue
⑥ Latching pin for handle adjustment

Figure 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 the version, a mounting plate can be included.
See enclosed data sheet.

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

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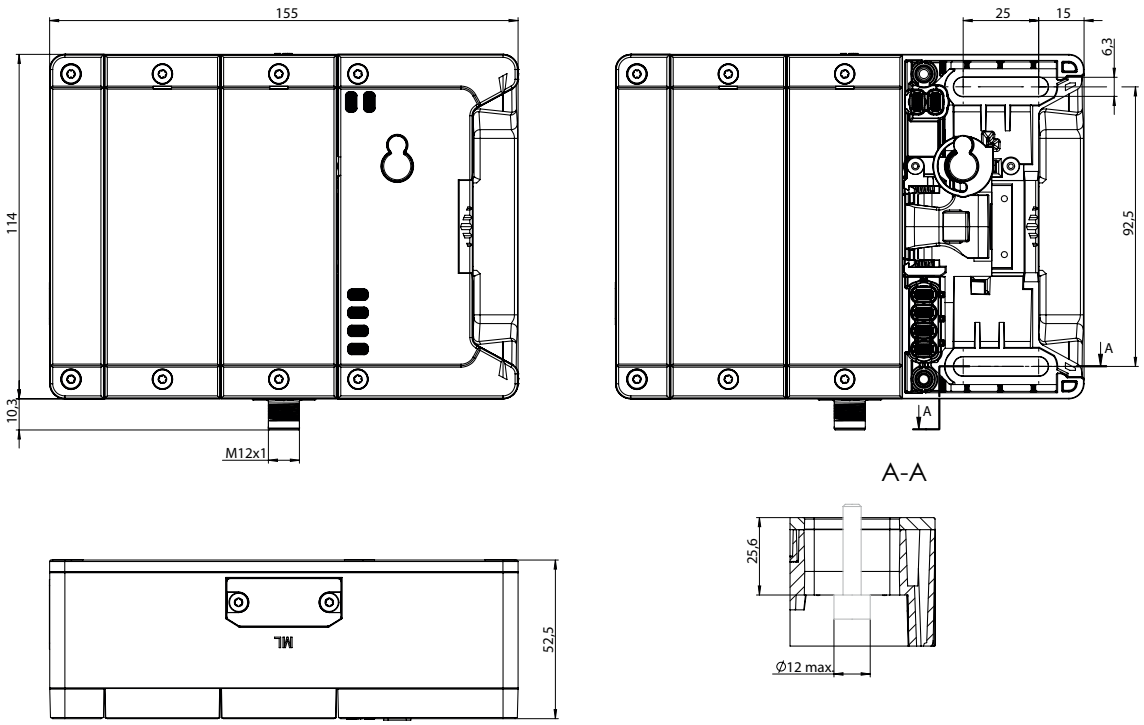
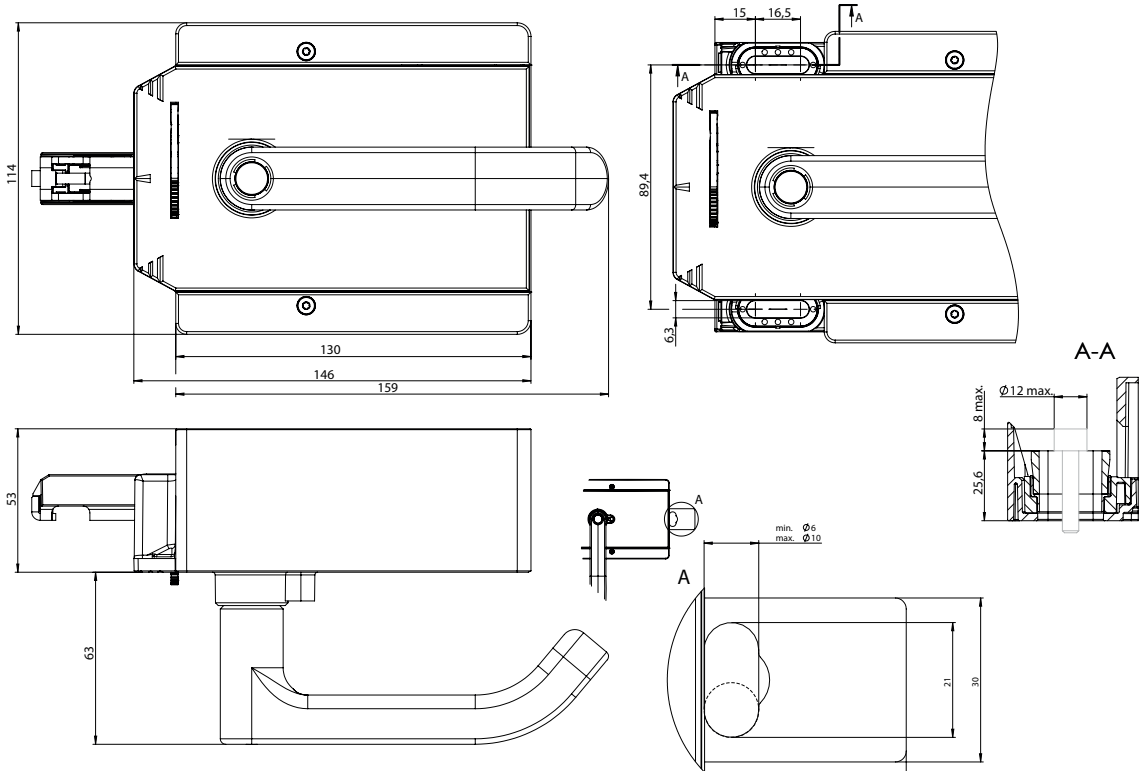
7.4. Dimension drawings

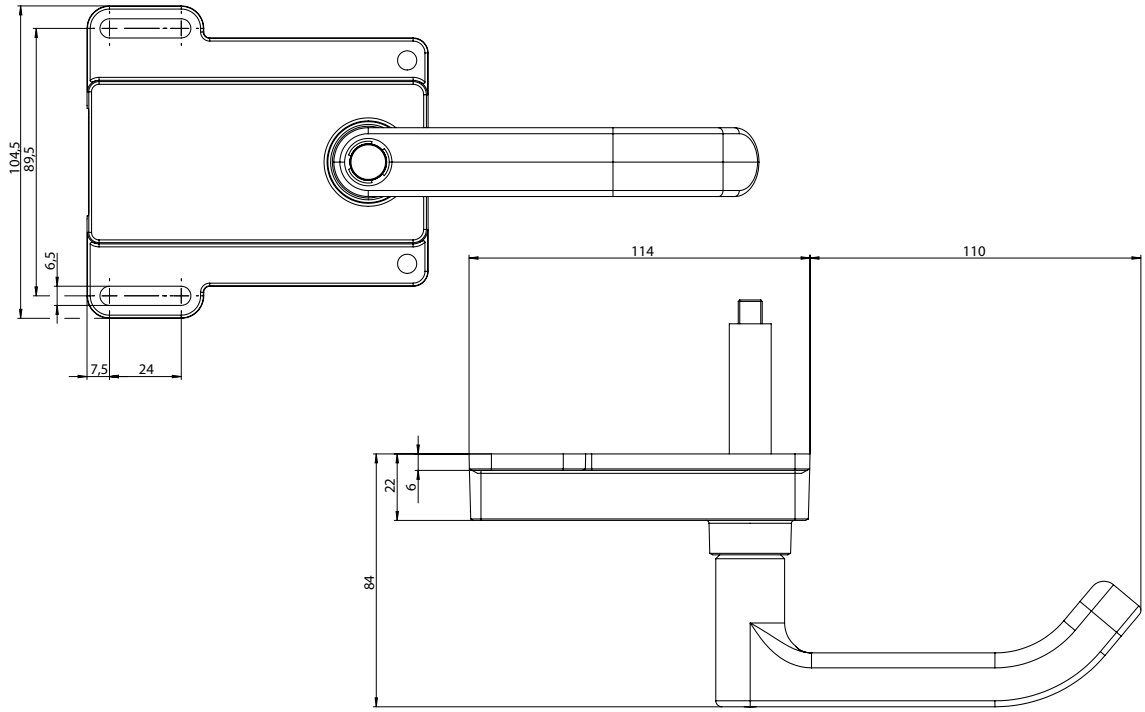
7.4.1. Interlocking/locking module MGB2-I.../MGB2-L...



7.4.2. Handle module MGB2-H...



7.4.3. Escape release MGB-E-...



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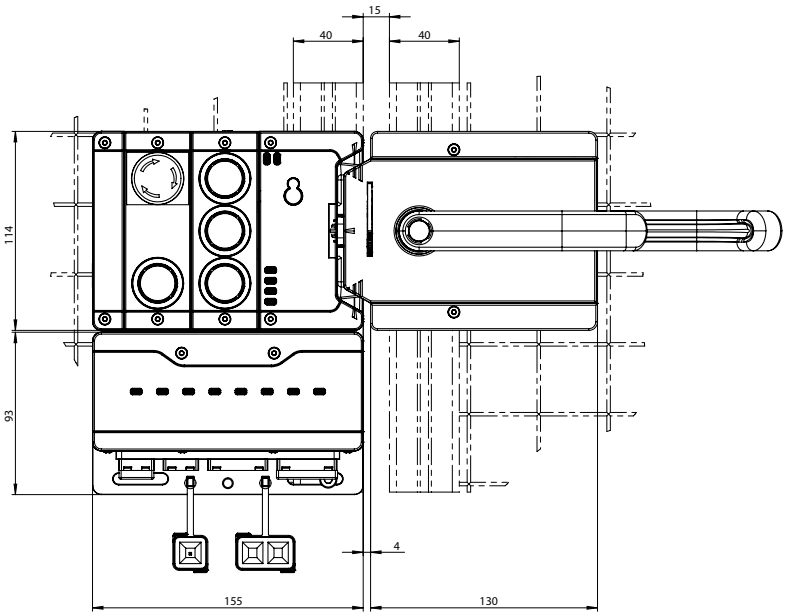
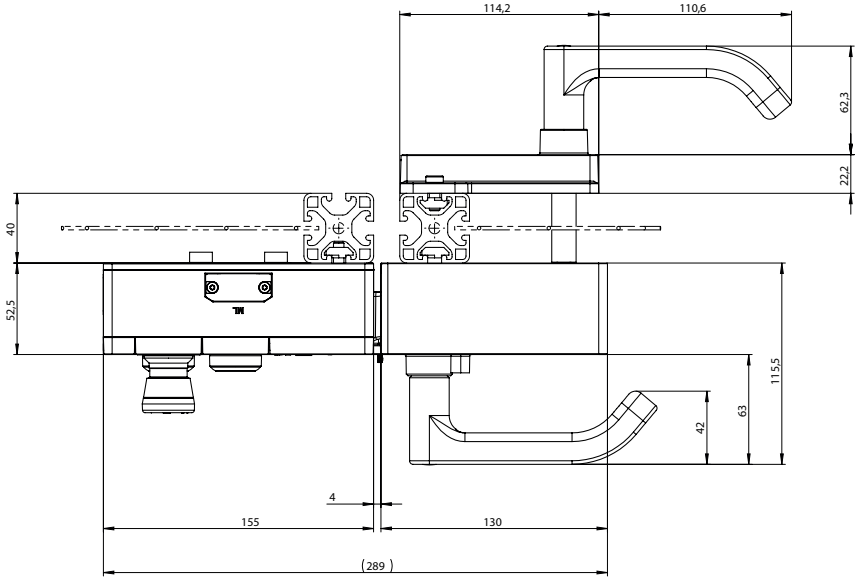
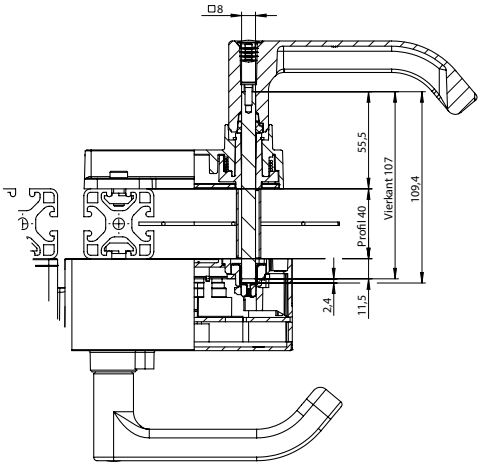
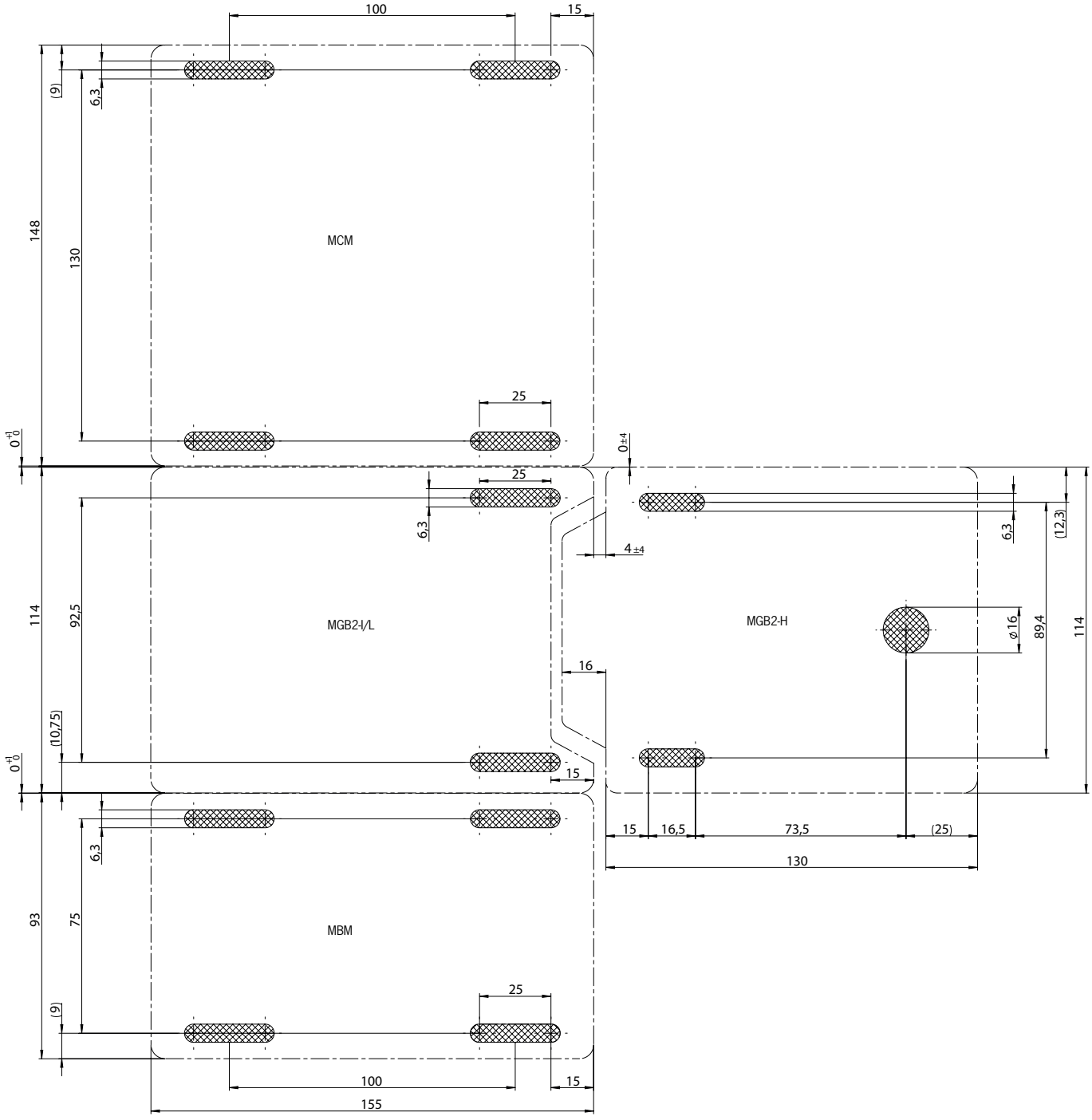
7.4.4. Assembly of MGB2-L, MGB2-H and MGB-E (example on profile 40x40)







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



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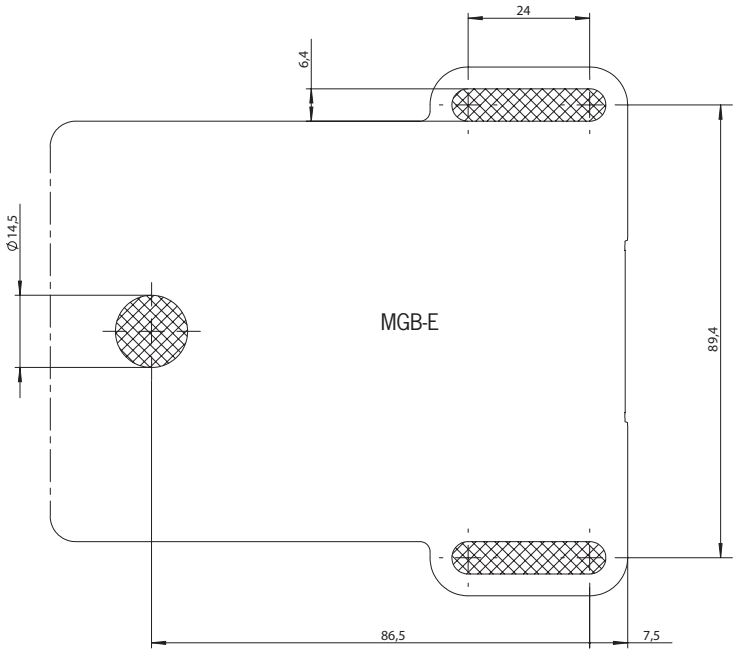
7.4.6. Drilling pattern escape release MGB-E



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 service, the guard locking can be released with the auxiliary release irrespective of the state of the solenoid (see *Figure 5*).

Important!

- Given corresponding parameter configuration, the system enters into a latching fault if the auxiliary release is actuated. See *System status table, signal sequence incorrect* status (DIA red, Lock flashes 1 time). For information on setting the related parameter, see section *19.2. Fault on actuating the escape release on page 38*.

Important!

- The auxiliary release is not a safety function.
- The machine manufacturer must select and use a suitable release (escape release, emergency unlocking, etc.) for a specific application. A risk 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.
- Please observe the notes on any enclosed data sheets.

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.

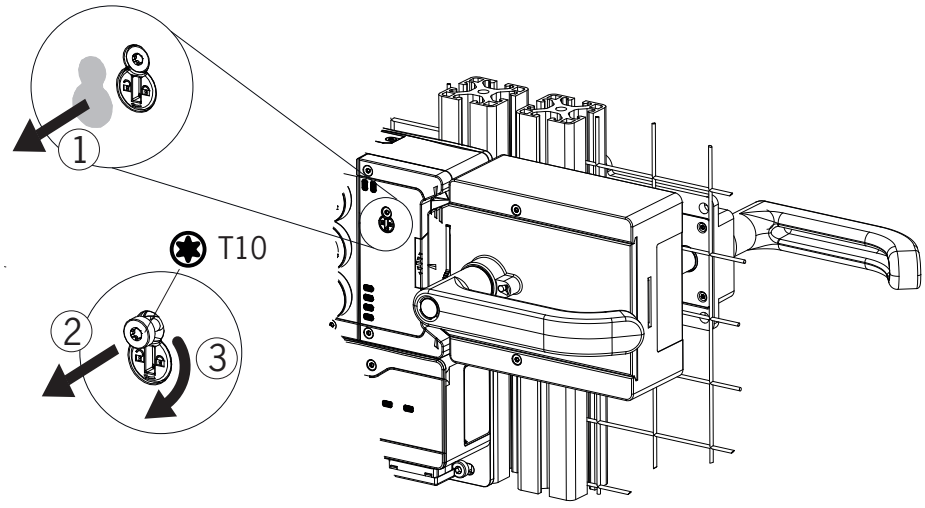


Figure 5: Auxiliary release

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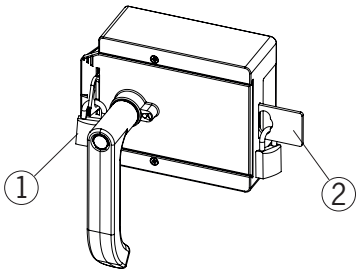
8.2. Lockout mechanism

If the lockout mechanism is pivoted out, the bolt tongue cannot be extended. The lockout mechanism can be secured with padlocks (see *Figure 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).



Key:
① Hinged lockout mechanism
Padlock ∅ min. 2 mm, ∅ max. 10 mm

② Automatically extending lockout mechanism (optional)
Padlock ∅ min. 6 mm, ∅ max. 10 mm

Notice:
You can fit a maximum of 3 locks Ø 8 mm per lockout mechanism.

Figure 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*).

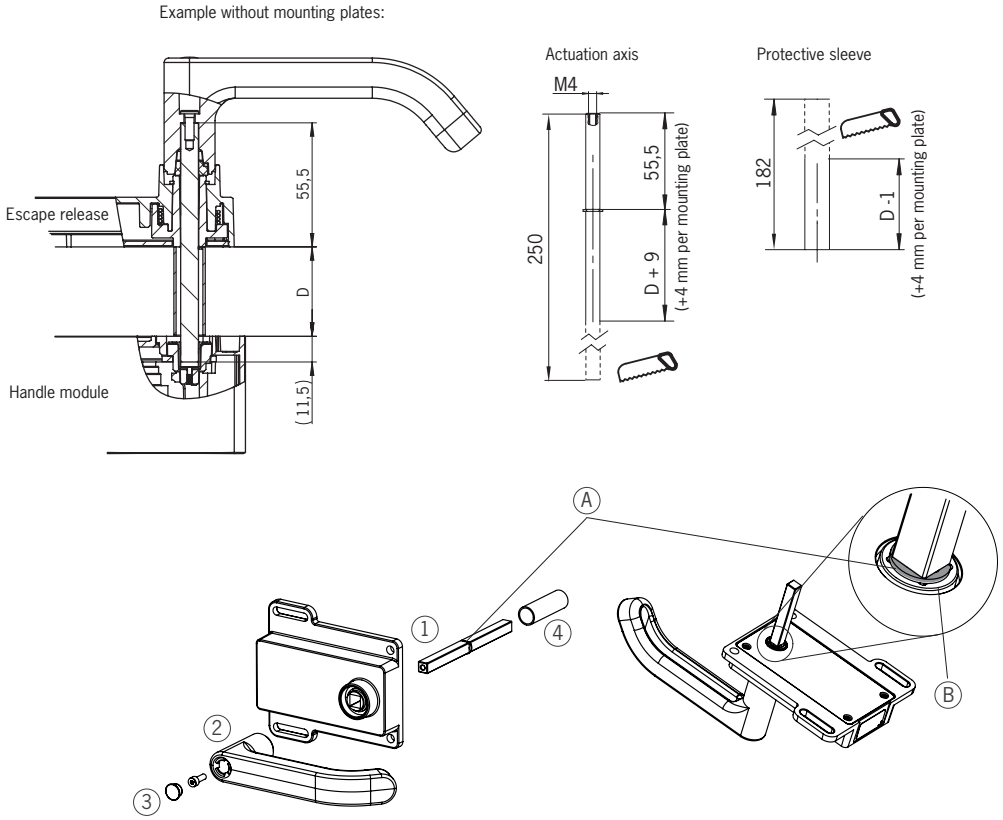
Important!

- 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.
- Please observe the notes on any enclosed data sheets.

- Fit escape release such that operation, inspection and maintenance 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 the chapter *8.3.1. Preparing escape release on page 21*.
- Align escape release axis at right angles to the handle module. See *Figure 8*.

8.3.1. Preparing escape release

Profile width	Length required for 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)	*Without mounting plates:* None *With mounting plates:* 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) **and** 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) **and** extended actuation axis (order no. 106761)	Use extended actuation axis and protective sleeve and shorten to required length



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 to 2 Nm and press in cap.
④ Fit protective sleeve.

Figure 7: Preparing escape release

EN

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 *Figure 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 *Figure 8* and *Figure 10* to *Figure 15*.

Attach system such that operation of the auxiliary release as well as inspection and maintenance 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.

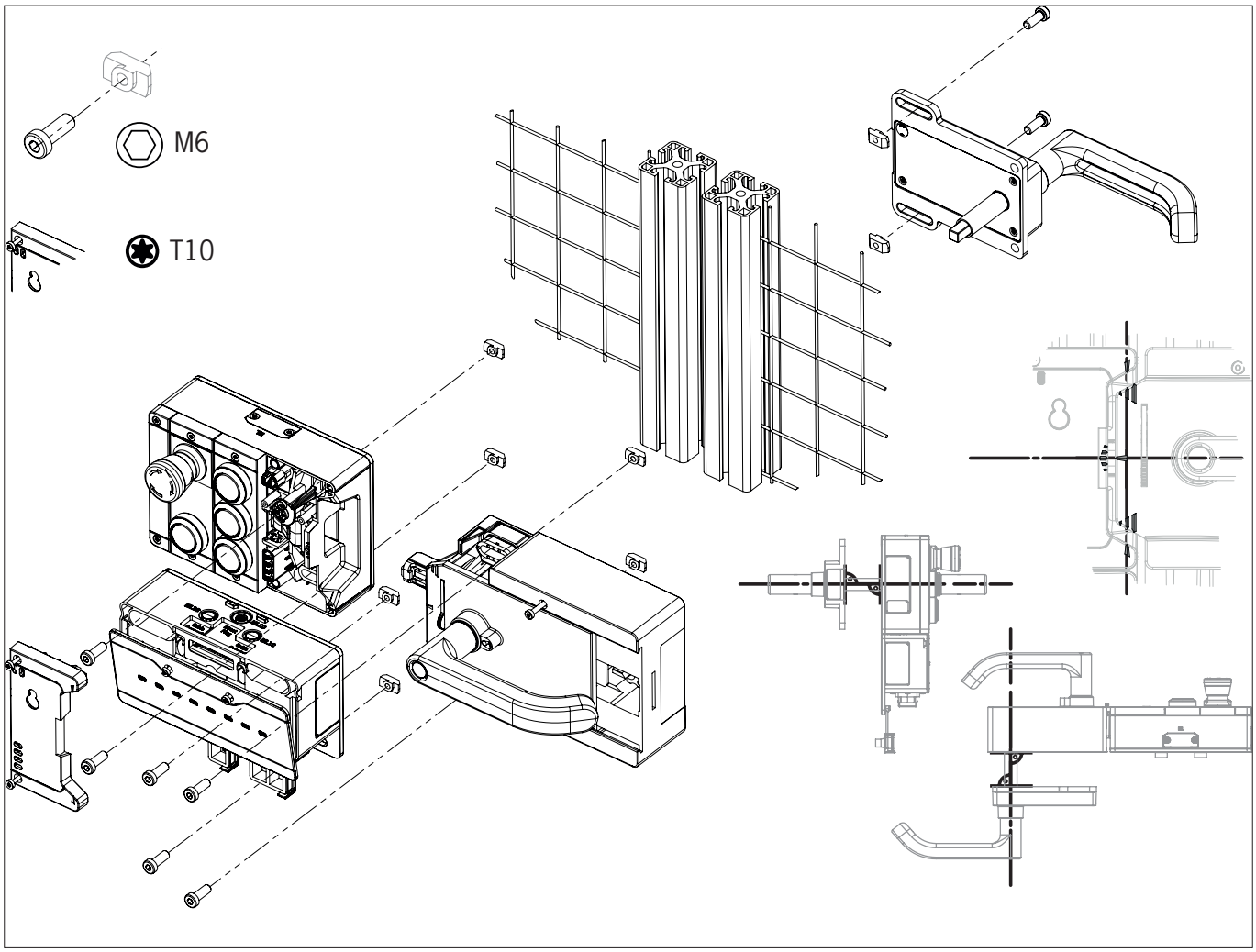


Figure 8: Installation example for door hinged on the right (general view)

9.1. Replacing modules

CAUTION

Risk of damage to equipment or malfunctions 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.

It is only possible to replace modules (e.g. locking module or extension module) 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 malfunctions as a result of incorrect connection or a configuration change.

- It is only possible to use submodules of connection types P, R and N. Check the compatibility before installation. For the related connection type of a submodule, please refer to the sticker on the rear of the submodule or the data sheet for the related submodule. This is included with each submodule.
- Pay attention to the alignment of the submodule. See marking (a) in *Figure 9: Mounting submodule*. Submodules can also be installed rotated by 180°. The marking (a) always indicates the first installation position. In the example, the emergency stop S1 is underneath.
- 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. chips or wire enter the open slots on the submodule. 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).

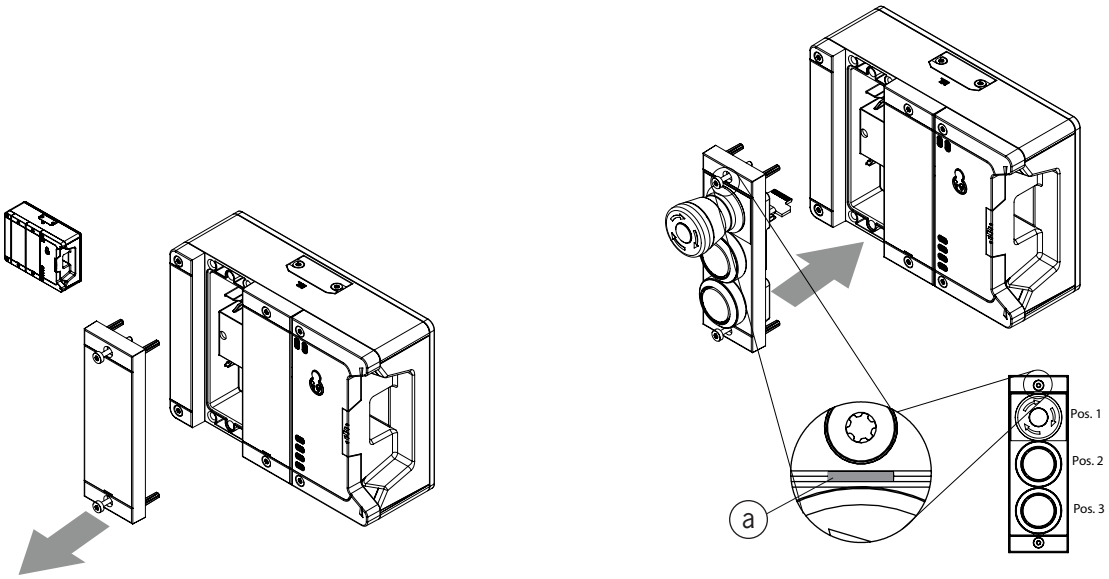


Figure 9: Mounting submodule

EN

9.3. Replacing submodules

CAUTION

Risk of damage to equipment or malfunctions 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 while in operation is also possible (pay attention to safety instruction above). As soon as the system detects a correct submodule, the submodule is ready for operation. 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 submodules

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

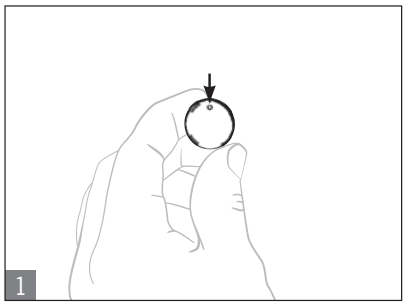
- You replace a submodule with a submodule with a different function or
- You fit the same submodule rotated by 180°.

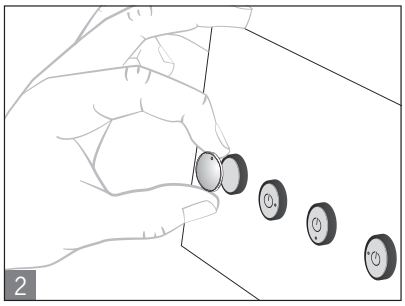
Adapt the configuration in the configuration software for your control system.

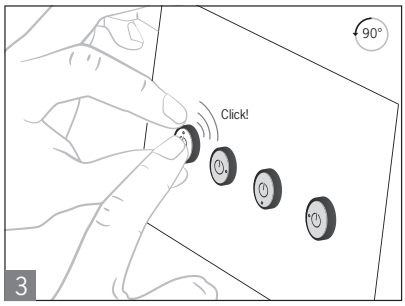
Then the new configuration must be taught-in by restarting the bus module MBM. You will find further information in the operating instructions for your bus module MBM.

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

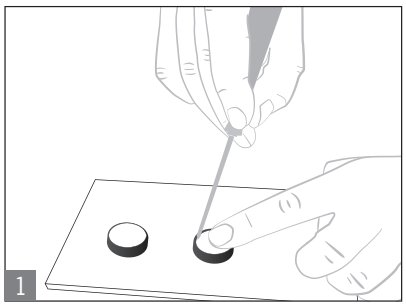
Fitting

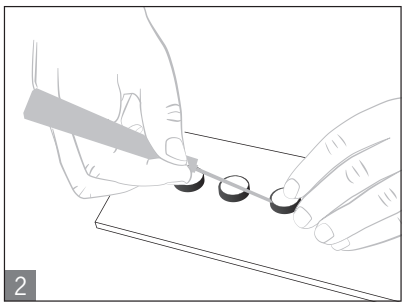






Removing





Lens

EN

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 actuating direction of the handle module

(Here: from right to left)

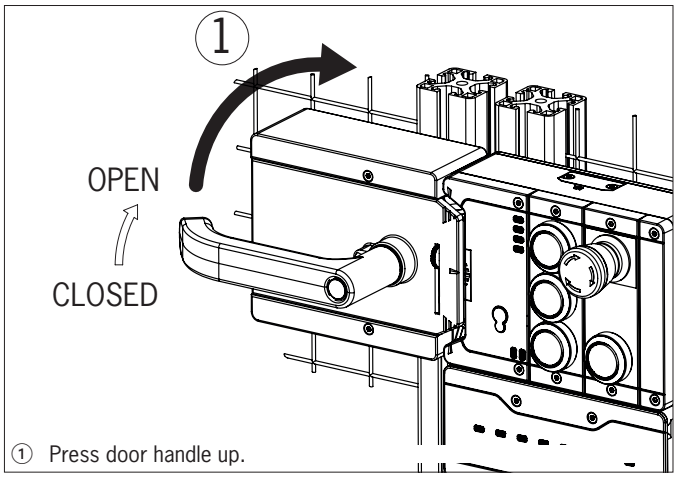
ⓘ	**Important!** It is possible to make this change only when the bolt tongue is not extended and an escape release is not yet mounted.

As supplied, 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:

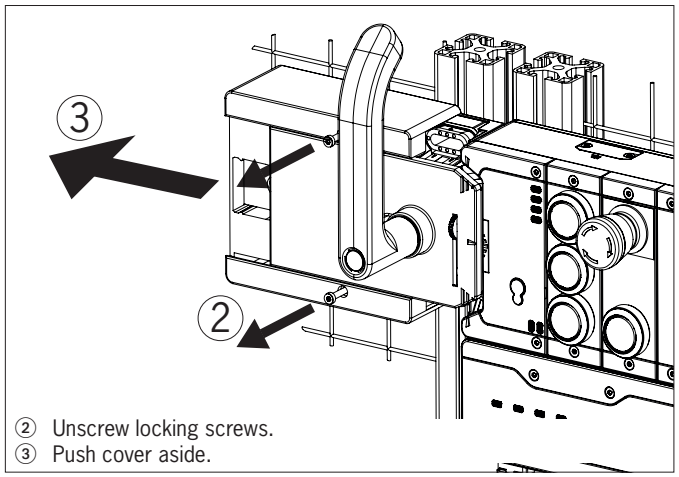
- The guard opens by pressing down the door handle.
- The system is mounted the other way up for doors hinged on the left. In other words, the guard opens by pressing up the door handle (see *Figure 10*). For this reason the actuating direction of the door handle must be changed (see *Figure 10* to *Figure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

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



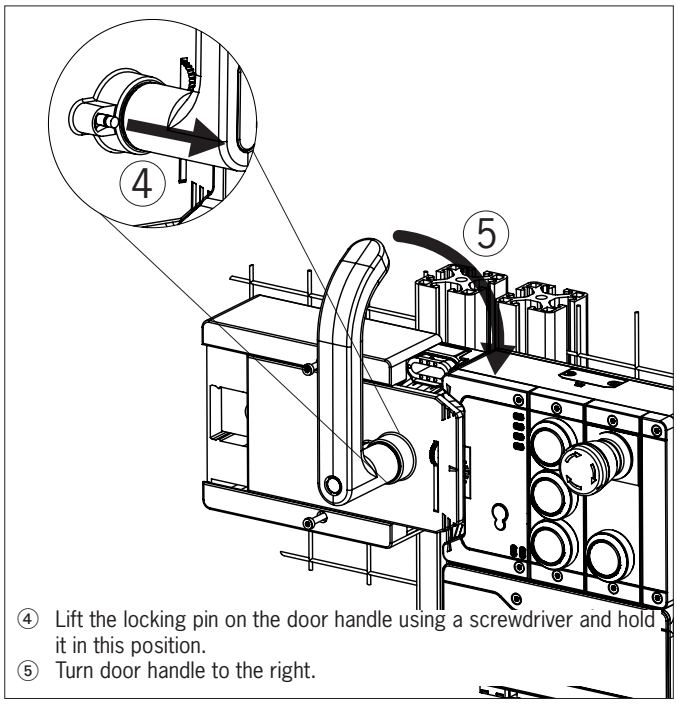
① Press door handle up.

Figure 10: Changing actuating direction, step ①



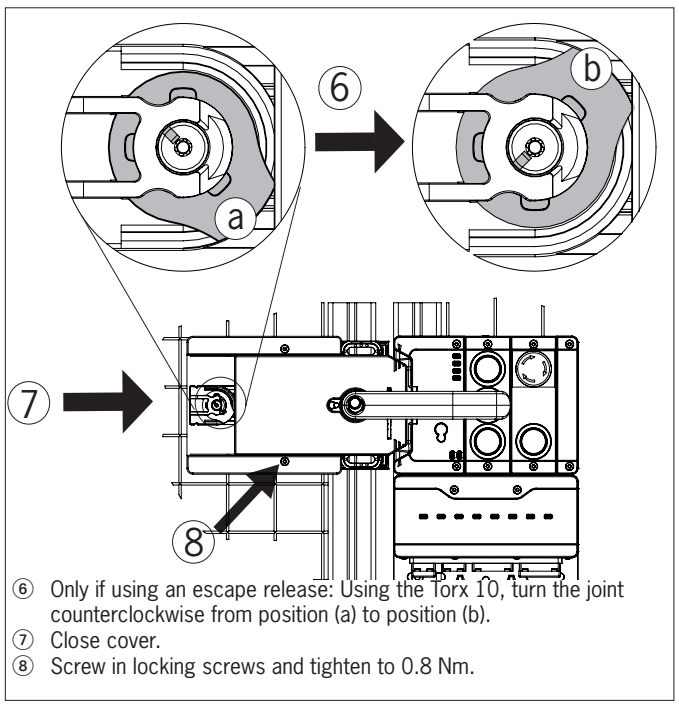
② Unscrew locking screws.
③ Push cover aside.

Figure 11: Changing actuating direction, steps ② and ③



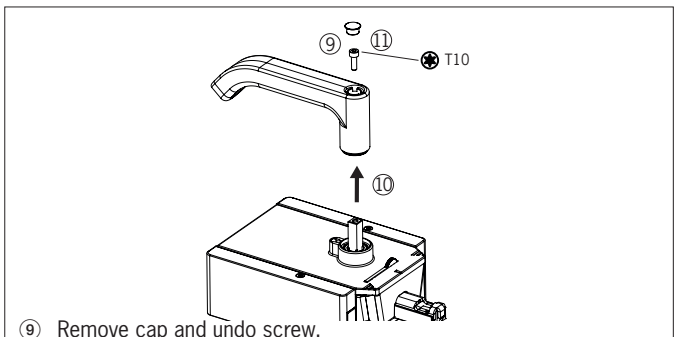
④ Lift the locking pin on the door handle using a screwdriver and hold it in this position.
⑤ Turn door handle to the right.

Figure 12: Changing actuating direction, steps ④ and ⑤



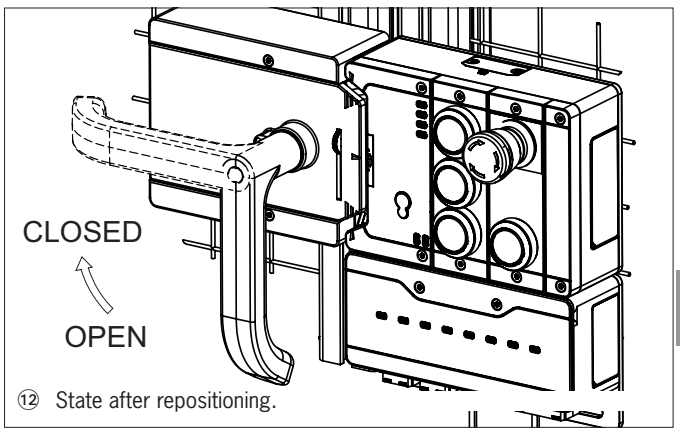
⑥ Only if using an escape release: Using the Torx 10, turn the joint counterclockwise from position (a) to position (b).
⑦ Close cover.
⑧ Screw in locking screws and tighten to 0.8 Nm.

Figure 13: Changing actuating direction, steps ⑥ to ⑧



⑨ Remove cap and undo screw.
⑩ Reposition the door handle by 90° in clockwise direction and fasten it again.
⑪ Tighten screw to 2 Nm and re-fit cap.

Figure 14: Changing actuating direction, steps ⑨ and ⑪



⑫ State after repositioning.

Figure 15: Changing actuating direction, final state

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11. Protection against environmental effects

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

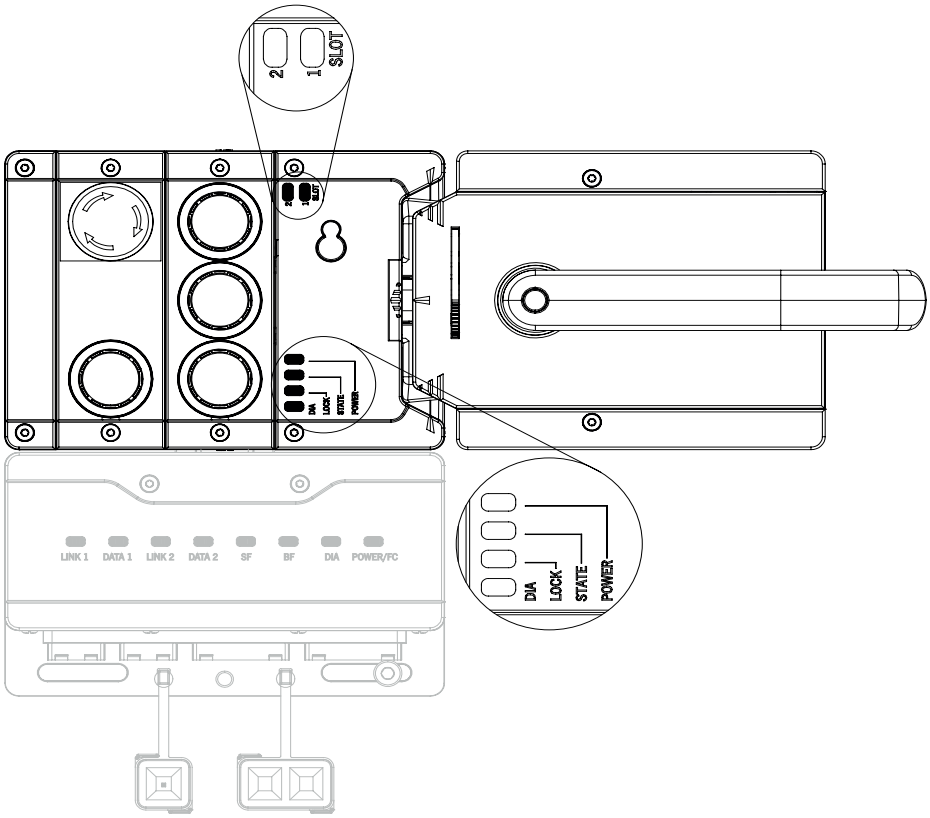

Figure 16: Indicators and controls

LED	Description
POWER	Illuminated 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 faults 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, please 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 *Figure 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 the connector's position. Only use the module connector intended to connect modules together (see table below). The maximum cable length for a line must not exceed 20 m.

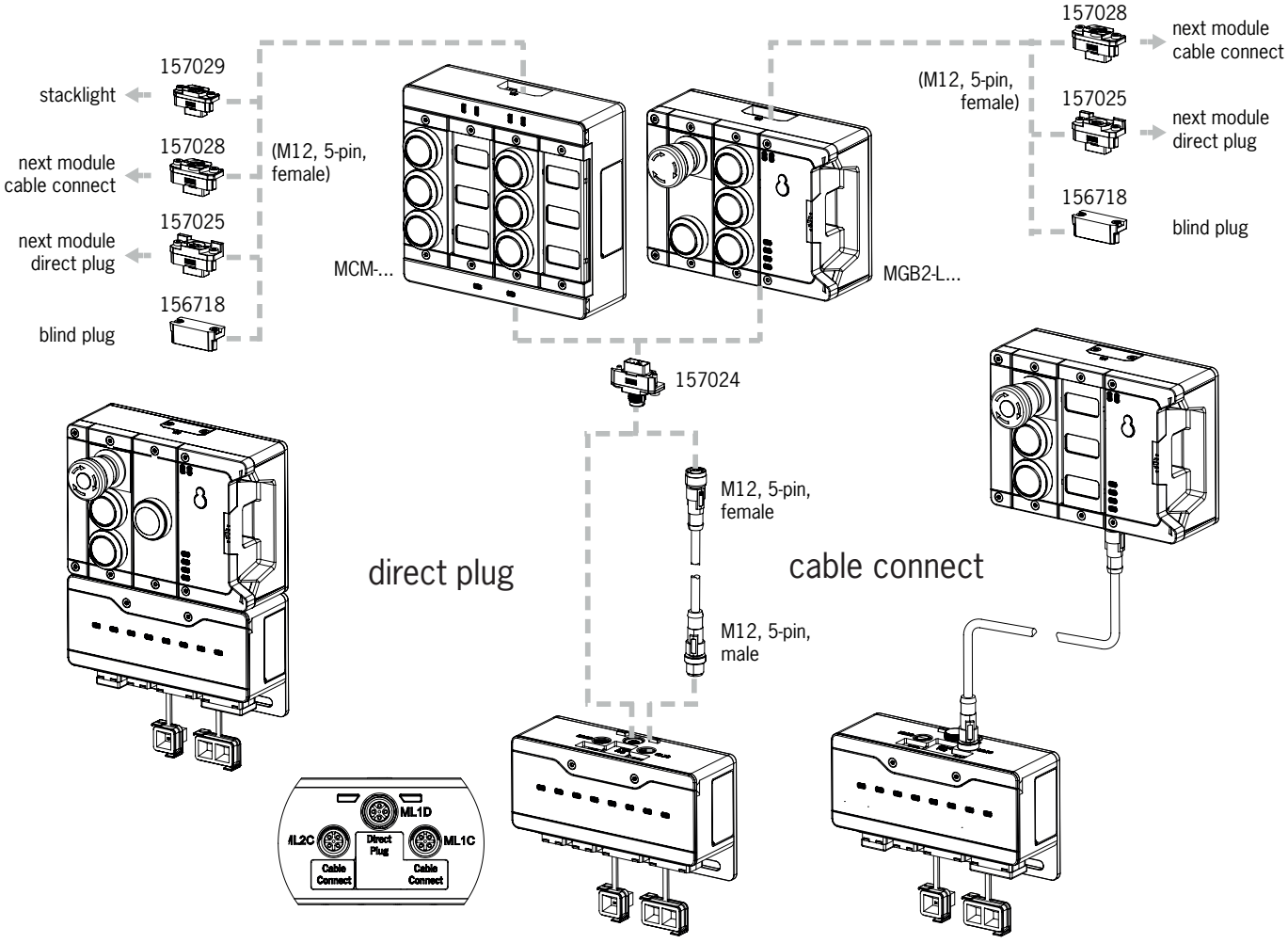

Figure 17: Connecting modules

Table 2: Overview of module connectors

Function	Order no.	Included?
Module connector M12, 5-pin, male	157024	1x
Blanking cover	156718	1x
Set with sealing caps for unused connections	156739	Yes
Module connector, 5-pin, female for the direct connection of a further module	157025	No, must be ordered separately
Module connector M12, 5-pin, female for the connection of a further module via a connecting cable	157028	
Module connector for the connection of a Stacklight	157029	
Connecting cable M12, 5-pin	See catalog or www.euchner.com	

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, please refer to the data sheet for the related submodule. This is included with each 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, please refer to the sticker on the rear of the submodule or the data sheet for the related submodule. This is included with each 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 data sheet enclosed. 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, please 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 (no safe bits are 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 handle module 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 fault is indicated after 30 s.
- The interlocking/locking module can only be operated 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 operating distance for less than 30 s, the handle module is not taught-in and the device indicates a teach-in fault.

Teaching in handle module

1. Fit handle module.
2. Close guard. Check for correct alignment and distance using the markings on the interlocking/locking module and re-adjust if necessary.
3. Insert bolt tongue in 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.

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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.
- **For the MGB2-I.. the following applies**: The green LED (State) is illuminated.
- **For the MGB2-L.. the following applies**: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, please 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, it can be acknowledged using the bit `LM.ACK_G`. The bit `LM.E_G` is reset during this process. Exception: escape release fault (see *19.2. Fault on actuating the escape release on page 38*)

Operating mode	LED indicator: POWER (gn)	STATE (gn)		Lock (ye), only MGB2-L1/-L2		DIA (rd)		Device diagnostics related fault/status bit	State
Fault display	☼	☼	1 x	○		☼		LM.E_G	Handle module teach-in fault (e.g. teach-in operation interrupted too early), configuration teach-in fault
		☼	3 x	○				LM.E_G	Handle module read fault (e.g. fault in code or code cannot be read)**
		☼	5 x	○				LM.E_G	Environment fault, disabled actuator, power supply outside the permissible range
		○		○				LM.E_G	Internal fault (e.g. component faulty, data error)*
		○		☼	1 x			LM.E_ER	Plausibility fault, signal sequence incorrect, e.g. broken bolt tongue recognized *** or after actuation of the escape release, for example*
	☼ 1 x	○		○				BM.E_MLI	MLI communication fault (indication on bus module)

Key to symbols	State
○	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

* Latching fault; use corresponding output bit `LM.ACK_G` to reset
** Non-latching fault; open guard and close it again to reset
*** Latching fault; use corresponding output bit `LM.ACK_ER` to reset, door must be open during this process (see chapter *16. System status table, module LEDs on page 33*)

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.

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

Operating mode	LED indicator: POWER (gn)	LED indicator: STATE (gn)	LED indicator: Lock (ye), only MGB2-L1/-L2	LED indicator: DIA (rd)	Door position	Position of the bolt tongue	Guard locking control IM.FO_CL (depending on setting also IM.O.CL)	Device diagnostics status bit IM.I_OD	Bolt position status bit IM.I_OT	Bolt position (SK) safe input bit IM.FI_SK Status bit IM.I_SK	Guard locking status bit IM.I_OL	Guard locking status (ÜK) safe input bit IM.FI_UK Status bit IM.I_UK	State
Normal operation	☼	long OFF short ON	○	○	open	not inserted	off	off	off	off	off	off	Normal operation, door open
		long ON short OFF	○	○	closed	not inserted	off	on	off	off	off	off	Normal operation, door closed
		✳	long ON short OFF	○	closed	inserted	off	on	on	on	off	off	Normal operation, door closed, bolt tongue inserted
		✳	✳	○	closed	inserted	on	on	on	on	on	on	Normal operation, door closed and locked
		X	☼ flashing quickly	○	X	not inserted	on	off	off	off	off	off	Ready for guard locking, guard locking is active, bolt tongue not inserted
Teach-in standby (only for MGB2 unicode)		3 x	○	○	open	not inserted	off	off	off	off	off	off	Door open; unit is ready for teach-in for another handle module (only short time after power-up)
Setup (only for MGB2 unicode)		1 Hz	○	○	closed	inserted	on	on	on	off	on	off	Teach-in operation
		✳	alternately flashing STATE /DIA	✳		X	X	off	off	off	off	off	Positive acknowledgment after completion of teach-in operation
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

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: Type of submodule is correct, but 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, however the parameter for alignment detection is active. Change parameter for alignment detection and restart system.
Red ON Green flashes 3 x	Submodule 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 base unit
Red flashing (1 Hz) The DIA LED also illuminates	Fault in the safety equipment, can be reset automatically ‣ Enabling switch discrepancy fault ‣ Other input fault on the submodule	For enabling switch: release enabling switch and press again. ‣ If the problem persists: check cable and connection. ‣ If the problem persists: replace submodule. ‣ If the problem persists: replace base unit For all other submodules: replace submodule. ‣ If the problem persists: replace base unit

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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 MGB2 (interlocking/locking module, without submodules)	1.0 kg
Weight handle module	1.1 kg
Weight escape release module	0.55 kg
Ambient temperature	-25 ... +55 °C
Degree of protection	IP 65 1)
Safety class	III
Degree of contamination	3
Installation position	Any
Locking force F_{zh} acc. to GS-ET-19	2000 N
Power supply	Via bus module MBM
Connection	M12, 5-pin (EUCHNER module plug connector MLI)
Current consumption, max. 2)	500 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. (switch-off times) 3) - Monitoring of the position of the guard - Monitoring of guard locking - Activation of guard locking	See information in the operating instructions for your bus module
Reliability values acc. to EN ISO 13849-1:2005	
Category	4
Performance Level	PL e
$MTTF_d$ 4)	820 years
DC	99%
Mission time	20 years
PFH_d 4) - 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	2.62 x 10^{-9}

1) Only with correctly mounted connecting cables and submodules
2) Without submodules.
3) The risk time is the max. time between the change in the input status and the deletion of the corresponding bit in the bus protocol.
4) Fixed failure rate without consideration of faults in wearing parts.

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 only covers 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. For this purpose you must set the value in the *Fehler bei Betätigung der Fluchtentriegelung* field to ja in the *Baugruppenparameter* dialog box in the *Fehler Fluchtentriegelung* section in the configuration software for your control system. 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: The MGB2 system enters into a latching fault on the actuation of the escape release (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.FT_UK	Device diagnostics status bit LM.I_OD	LED indicator: Power (gn)	LED indicator: State (gn)	LED indicator: Lock (ye)	LED indicator: DIA (rd)	State
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
✳ 10 Hz (8 s)	LED flashes for 8 seconds at 10 Hz
✳ 3 x	LED flashes three times
X	Any state

19.3. Resetting system to factory settings

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

20. Service

If service support is required, please contact:

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

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 www.euchner.com 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 fastening of the devices and the connections
- Check for soiling

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.

EN

22. Declaration of conformity

CE

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EU-Konformitätserklärung
EU declaration of conformity
Déclaration UE de conformité
Dichiarazione di conformità UE
Declaración UE de conformidad

Original DE
Translation EN
Traduction FR
Traduzione IT
Traducción ES

2518509-01–07/18

Die nachfolgend aufgeführten Produkte sind konform mit den Anforderungen der folgenden Richtlinien (falls zutreffend):
The beneath listed products are in conformity with the requirements of the following directives (if applicable):
Les produits mentionnés ci-dessous sont conformes aux exigences imposées par les directives suivantes (si valable)
I prodotti sotto elencati sono conformi alle direttive sotto riportate (dove applicabili):
Los productos listados a continuación son conforme a los requisitos de las siguientes directivas (si fueran aplicables):

I:	Maschinenrichtlinie	2006/42/EG
	Machinery directive	*2006/42/EC*
	Directive Machines	*2006/42/CE*
	Direttiva Macchine	*2006/42/CE*
	Directiva de máquinas	*2006/42/CE*
II:	Funkanlagen-Richtlinie (RTTE / RED)	2014/53/EU
	Radio equipment directive	*2014/53/EU*
	Directive équipement radioélectrique	*2014/53/UE*
	Direttiva apparecchiatura radio	*2014/53/UE*
	Directiva equipo radioeléctrico	*2014/53/UE*
III:	RoHS Richtlinie	2011/65/EU
	RoHS directive	*2011/65/EU*
	Directive de RoHS	*2011/65/UE*
	Direttiva RoHS	*2011/65/UE*
	Directiva RoHS	*2011/65/UE*

Die Schutzziele der Niederspannungsrichtlinie 2014/35/EU und EMV Richtlinie 2014/30/EU werden gemäß Artikel 3.1 der Funkanlagen-Richtlinie eingehalten.
The safety objectives of the Low-voltage directive 2014/35/EU and EMC Directive 2014/30/EU comply with article 3.1 of the Radio equipment directive.
Les objectifs de sécurité de la Directive basse tension 2014/35/UE et Directive de CEM 2014/30/EU sont conformes à l'article 3.1 de la Directive équipement radioélectrique.
Gli obiettivi di sicurezza della Direttiva bassa tensione 2014/35/UE e Direttiva CEM 2014/30/UE sono conformi a quanto riportato nell´articolo 3.1 della Direttiva apparecchiatura radio.
Los objetivos de seguridad de la Directiva de bajo voltaje 2014/35/UE y Directiva CEM 2014/30/UE cumplen con el artículo 3.1 de la Directiva equipo radioeléctrico.

Folgende Normen sind angewandt:
Following standards are used:
Les normes suivantes sont appliquées:
Vengono applicate le seguenti norme:
Se utilizan los siguientes estándares:

a:	EN 60947-5-3:2013
b:	EN ISO 14119:2013
c:	EN ISO 13849-1:2015
d:	EN 60947-5-5:1997 + A1:2005 + A11:2013 + A2:2017
e:	EN 50364:2010
f:	EN 300 330 V2.1.1
g:	EN 50581:2012 (RoHS)

Bezeichnung der Bauteile *Description of components* *Description des composants* *Descrizione dei componenti* *Descripción de componentes*	**Type** *Type* *Type* *Tipo* *Typo*	**Richtlinie** *Directives* *Directive* *Direttiva* *Directivas*	**Normen** *Standards* *Normes* *Norme* *Estándares*	**Zertifikats-Nr.** *No. of certificate* *Numéro du certificat* *Numero del certificato* *Número del certificado*
Sicherheitsschalter *Safety Switches* *Interrupteurs de sécurité* *Finecorsa di sicurezza* *Interruptores de seguridad*	MGB2-I… MGB2-L… MGB2-H… MBM… MCM… MSM…	I, II	a, b, c, e, f, g	Z10 18 xxxxx
Sicherheitsschalter mit Not-Halt-Einrichtungen *Safety Switches with Emergency-Stop facilities* *Interrupteurs de sécurité avec appareillage arrêt d'urgence* *Finecorsa di sicurezza con dispositivi di arresto di emergenza* *Interruptores de seguridad con dispositivos de parada de emergencia*	MGB2-I… MGB2-L… MCM… MSM…	I, II	a, b, c, d , e, f, g	Z10 18 xxxxx

Benannte Stelle
Notified Body
Organisme notifié
Sede indicata
Entidad citada

NB 0123
TÜV SÜD Product Service GmbH
Ridlerstrasse 65
80339 München
Germany

CE

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Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller:
This declaration of conformity is issued under the sole responsibility of the manufacturer:
La présente déclaration de conformité est établie sous la seule responsabilité du fabricant:
La presente dichiarazione di conformità è rilasciata sotto la responsabilità esclusiva del fabbricante:
La presente declaración de conformidad se expide bajo la exclusiva responsabilidad del fabricante:

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Leinfelden, Juli 2018

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