

# Lexium™ MC12 multi carrier

## Hardware Guide

Original instructions

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The information provided in this document contains general descriptions, technical characteristics and/or recommendations related to products/solutions.

This document is not intended as a substitute for a detailed study or operational and site-specific development or schematic plan. It is not to be used for determining suitability or reliability of the products/solutions for specific user applications. It is the duty of any such user to perform or have any professional expert of its choice (integrator, specifier or the like) perform the appropriate and comprehensive risk analysis, evaluation and testing of the products/solutions with respect to the relevant specific application or use thereof.

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# Safety Information

## Important Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

 <b>DANGER</b>
<b>DANGER</b> indicates a hazardous situation which, if not avoided, <b>will result in</b> death or serious injury.
 <b>WARNING</b>
<b>WARNING</b> indicates a hazardous situation which, if not avoided, <b>could result in</b> death or serious injury.
 <b>CAUTION</b>
<b>CAUTION</b> indicates a hazardous situation which, if not avoided, <b>could result in</b> minor or moderate injury.
<b>NOTICE</b>
<b>NOTICE</b> is used to address practices not related to physical injury.

## Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

## Before You Begin

Do not use this product on machinery lacking effective point-of-operation guarding. Lack of effective point-of-operation guarding on a machine can result in serious injury to the operator of that machine.

**⚠ WARNING****UNGUARDED EQUIPMENT**

- Do not use this software and related automation equipment on equipment which does not have point-of-operation protection.
- Do not reach into machinery during operation.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

This automation equipment and related software is used to control a variety of industrial processes. The type or model of automation equipment suitable for each application will vary depending on factors such as the control function required, degree of protection required, production methods, unusual conditions, government regulations, etc. In some applications, more than one processor may be required, as when backup redundancy is needed.

Only you, the user, machine builder or system integrator can be aware of all the conditions and factors present during setup, operation, and maintenance of the machine and, therefore, can determine the automation equipment and the related safeties and interlocks which can be properly used. When selecting automation and control equipment and related software for a particular application, you should refer to the applicable local and national standards and regulations. The National Safety Council's Accident Prevention Manual (nationally recognized in the United States of America) also provides much useful information.

In some applications, such as packaging machinery, additional operator protection such as point-of-operation guarding must be provided. This is necessary if the operator's hands and other parts of the body are free to enter the pinch points or other hazardous areas and serious injury can occur. Software products alone cannot protect an operator from injury. For this reason the software cannot be substituted for or take the place of point-of-operation protection.

Ensure that appropriate safeties and mechanical/electrical interlocks related to point-of-operation protection have been installed and are operational before placing the equipment into service. All interlocks and safeties related to point-of-operation protection must be coordinated with the related automation equipment and software programming.

**NOTE:** Coordination of safeties and mechanical/electrical interlocks for point-of-operation protection is outside the scope of the Function Block Library, System User Guide, or other implementation referenced in this documentation.

## Start-up and Test

Before using electrical control and automation equipment for regular operation after installation, the system should be given a start-up test by qualified personnel to verify correct operation of the equipment. It is important that arrangements for such a check are made and that enough time is allowed to perform complete and satisfactory testing.

**⚠ WARNING****EQUIPMENT OPERATION HAZARD**

- Verify that all installation and set up procedures have been completed.
- Before operational tests are performed, remove all blocks or other temporary holding means used for shipment from all component devices.
- Remove tools, meters, and debris from equipment.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

Follow all start-up tests recommended in the equipment documentation. Store all equipment documentation for future references.

**Software testing must be done in both simulated and real environments.**

Verify that the completed system is free from all short circuits and temporary grounds that are not installed according to local regulations (according to the National Electrical Code in the U.S.A, for instance). If high-potential voltage testing is necessary, follow recommendations in equipment documentation to prevent accidental equipment damage.

Before energizing equipment:

- Remove tools, meters, and debris from equipment.
- Close the equipment enclosure door.
- Remove all temporary grounds from incoming power lines.
- Perform all start-up tests recommended by the manufacturer.

## Operation and Adjustments

The following precautions are from the NEMA Standards Publication ICS 7.1-1995:

(In case of divergence or contradiction between any translation and the English original, the original text in the English language will prevail.)

- Regardless of the care exercised in the design and manufacture of equipment or in the selection and ratings of components, there are hazards that can be encountered if such equipment is improperly operated.
- It is sometimes possible to misadjust the equipment and thus produce unsatisfactory or unsafe operation. Always use the manufacturer's instructions as a guide for functional adjustments. Personnel who have access to these adjustments should be familiar with the equipment manufacturer's instructions and the machinery used with the electrical equipment.
- Only those operational adjustments required by the operator should be accessible to the operator. Access to other controls should be restricted to prevent unauthorized changes in operating characteristics.

# About the Document

## Document Scope

This manual provides information on the Lexium™ MC12 multi carrier.

## Validity Note

This document has been updated for the release of EcoStruxure Machine Expert V2.3.

The characteristics of the products described in this document are intended to match the characteristics that are available on [www.se.com](http://www.se.com). As part of our corporate strategy for constant improvement, we may revise the content over time to enhance clarity and accuracy. If you see a difference between the characteristics in this document and the characteristics on [www.se.com](http://www.se.com), consider [www.se.com](http://www.se.com) to contain the latest information.

## Product Related Information

The equipment described herein must be used in accordance with the application-specific risk analysis that you are to perform along with verification of all applicable standards. Pay attention in conforming to any safety information, different electrical requirements, and normative standards that would apply to your application of the information contained in the present manual and the manuals for associated equipment.

### **DANGER**

#### **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to this equipment.
- Use only the specified voltage when operating this equipment and any associated equipment.

**Failure to follow these instructions will result in death or serious injury.**

## ▲ WARNING

### UNINTENDED EQUIPMENT OPERATION

- Use appropriate protective devices (functional safety devices) in compliance with local and national standards.
- Ensure that a risk assessment is conducted and respected according to EN/ISO 12100 during the design of your machine.
- Install and operate the device only in the intended environment.
- The equipment must be wired and fused in compliance with local and national regulatory requirements for the rated current and voltage of the particular equipment.
- Do not disassemble, repair, or modify this equipment.
- Do not connect wires to unused terminals and/or terminals indicated as "No Connection (N.C.)".

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## ▲ WARNING

### UNINTENDED EQUIPMENT OPERATION

- Perform a hazard and risk analysis to determine the appropriate safety integrity level, and any other safety requirements, for your specific application based on all the applicable standards.
- Ensure that the hazard and risk analysis is conducted and respected according to EN/ISO 12100 during the design of your machine.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## ▲ WARNING

### LOSS OF CONTROL

- Perform a Failure Mode and Effects Analysis (FMEA), or equivalent risk analysis, of your application, and apply preventive and detective controls before implementation.
- Provide a fallback state for undesired control events or sequences.
- Provide separate or redundant control paths wherever required.
- Supply appropriate parameters, particularly for limits.
- Review the implications of transmission delays and take actions to mitigate them.
- Review the implications of communication link interruptions and take actions to mitigate them.
- Provide independent paths for control functions (for example, emergency stop, over-limit conditions, and error conditions) according to your risk assessment, and applicable codes and regulations.
- Apply local accident prevention and safety regulations and guidelines.<sup>1</sup>
- Test each implementation of a system for proper operation before placing it into service.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

<sup>1</sup> For additional information, refer to NEMA ICS 1.1 (latest edition), *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* and to NEMA ICS 7.1 (latest edition), *Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems* or their equivalent governing your particular location.

## General Cybersecurity Information

In recent years, the growing number of networked machines and production plants has seen a corresponding increase in the potential for cyber threats, such as unauthorized access, data breaches, and operational disruptions. You must, therefore, consider all possible cybersecurity measures to help protect assets and systems against such threats.

To help keep your Schneider Electric products secure and protected, it is in your best interest to implement the cybersecurity best practices as described in the Cybersecurity Best Practices document.

Schneider Electric provides additional information and assistance:

- Subscribe to the Schneider Electric security newsletter.
- Visit the Cybersecurity Support Portal web page to:
  - Find Security Notifications.
  - Report vulnerabilities and incidents.
- Visit the Schneider Electric Cybersecurity and Data Protection Posture web page to:
  - Access the cybersecurity posture.
  - Learn more about cybersecurity in the cybersecurity academy.
  - Explore the cybersecurity services from Schneider Electric.

## Product Related Cybersecurity Information

Refer to Cybersecurity Guidelines for EcoStruxure Machine Expert, Modicon and PacDrive Controllers and Associated Equipment User Guide

## Environmental Data

For product compliance and environmental information, refer to the Schneider Electric Environmental Data Program.

## Available Languages of the Document

The document is available in these languages:

- English (EIO0000004637)
- German (EIO0000004638)

## Related Documents

Title of documentation	Reference number
Cybersecurity Best Practices	CS-Best-Practices-2019-340
Cybersecurity Guidelines for EcoStruxure Machine Expert, Modicon and PacDrive Controllers and Associated Equipment User Guide	EIO0000004242
Lexium™ MC12 long stator motor segments, Instruction sheet	JYT81313
Lexium™ MC guide rails, Instruction sheet	JYT8147601

Title of documentation	Reference number
Lexium™ MC12 carriers, Instruction sheet	JYT81509
ABLU3A48200 Universal Power Supply, Instruction Sheet	GEX92132
Lexium™ MC connection module, Instruction sheet	JYT9053801
LXMMCABR120S100 Braking Resistor, Instruction sheet	GEX2324201
PacDrive Logic Motion Controller, LMC Pro/ Pro2, Hardware Guide	EIO0000001503 (ENG) EIO0000001504 (GER)
EcoStruxure Automation Expert - Motion / EcoStruxure Machine Expert, Multicarrier Library Guide	EIO0000004641 (ENG) EIO0000004642 (GER)
EcoStruxure Automation Expert - Motion / EcoStruxure Machine Expert, MulticarrierStation Library Guide	EIO0000004643 (ENG) EIO0000004644 (GER)
Lexium™ MC multi carrier Configuration Guide	EIO0000004647 (ENG) EIO0000004648 (GER)
Lexium™ MC multi carrier Example Guide	EIO0000004218 (ENG)
EcoStruxure Automation Expert - Motion, EcoStruxure Machine Expert Programming Guide	EIO0000002854 (ENG); EIO0000002855 (FRE); EIO0000002856 (GER); EIO0000002858 (SPA); EIO0000002857 (ITA); EIO0000002859 (CHS)

To find documents online, visit the Schneider Electric download center ([www.se.com/ww/en/download/](http://www.se.com/ww/en/download/)).

## Information on Non-Inclusive or Insensitive Terminology

As a responsible, inclusive company, Schneider Electric is constantly updating its communications and products that contain non-inclusive or insensitive terminology. However, despite these efforts, our content may still contain terms that are deemed inappropriate by some customers.

## Terminology Derived from Standards

The technical terms, terminology, symbols and the corresponding descriptions in the information contained herein, or that appear in or on the products themselves, are generally derived from the terms or definitions of international standards.

In the area of functional safety systems, drives and general automation, this may include, but is not limited to, terms such as *safety*, *safety function*, *safe state*, *fault*, *fault reset*, *malfunction*, *failure*, *error*, *error message*, *dangerous*, etc.

Among others, these standards include:

Standard	Description
IEC 61131-2:2007	Programmable controllers, part 2: Equipment requirements and tests.
ISO 13849-1:2023	Safety of machinery: Safety related parts of control systems. General principles for design.

Standard	Description
EN 61496-1:2020	Safety of machinery: Electro-sensitive protective equipment. Part 1: General requirements and tests.
ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN 60204-1:2006	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
ISO 14119:2013	Safety of machinery - Interlocking devices associated with guards - Principles for design and selection
ISO 13850:2015	Safety of machinery - Emergency stop - Principles for design
IEC 62061:2021	Safety of machinery - Functional safety of safety-related electrical, electronic, and electronic programmable control systems
IEC 61508-1:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems: General requirements.
IEC 61508-2:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems: Requirements for electrical/electronic/programmable electronic safety-related systems.
IEC 61508-3:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems: Software requirements.
IEC 61784-3:2021	Industrial communication networks - Profiles - Part 3: Functional safety fieldbuses - General rules and profile definitions.
2006/42/EC	Machinery Directive
2014/30/EU	Electromagnetic Compatibility Directive
2014/35/EU	Low Voltage Directive

In addition, terms used in the present document may tangentially be used as they are derived from other standards such as:

Standard	Description
IEC 60034 series	Rotating electrical machines
IEC 61800 series	Adjustable speed electrical power drive systems
IEC 61158 series	Digital data communications for measurement and control – Fieldbus for use in industrial control systems

Finally, the term *zone of operation* may be used in conjunction with the description of specific hazards, and is defined as it is for a *hazard zone* or *danger zone* in the *Machinery Directive (2006/42/EC)* and *ISO 12100:2010*.

**NOTE:** The aforementioned standards may or may not apply to the specific products cited in the present documentation. For more information concerning the individual standards applicable to the products described herein, see the characteristics tables for those product references.

## Dual Dimensions

Dimensions are indicated in metric system and U.S. customary units system. The U.S. dimensions are given in parentheses, for example 8.4 mm (0.33 in).

**NOTE:** The given values in parentheses are rounded and for reference only.

# Specific Safety Information

## Proper Use

### Overview

This section contains information regarding the operation of the Lexium™ MC12 multi carrier. Personnel working with the system must be qualified (*Qualification of Personnel, page 18*), and read and observe this information. The system was built in compliance with the recognized technical safety regulations.

### Installation

The Lexium™ MC12 multi carrier is a partly completed machine according to Machinery Directive 2006/42/EC, and is intended to be integrated into another machine or assembled with other components to build up a machine or system.

## Provide for Protective Measures

Before installing the Lexium™ MC12 multi carrier, provide appropriate protective devices in compliance with local and national standards. Do not commission components without appropriate protective devices. After installation, commissioning, or repair, test the protective devices used.

Other standards are applicable as guideline for a Lexium™ MC12 multi carrier integration into the machine such as (non exhaustive list):

- EN ISO 12100
- EN 60204-1
- EN ISO 13849-1

Perform a risk evaluation concerning the specific use before operating the system and take appropriate security measures.

<b>▲ WARNING</b>
<b>UNINTENDED EQUIPMENT OPERATION</b>
Ensure that a risk assessment is conducted and respected according to EN/ISO 12100 during the design of your machine.
<b>Failure to follow these instructions can result in death, serious injury, or equipment damage.</b>

## Applied Standard

The system is compliant with the requirements from the EMC Directive and conformity has been verified in accordance with the following standard:

- IEC 61800-3

## Use Original Equipment Only

Use only the accessories and mounting parts specified in the documentation and only third-party devices or components that have been expressly approved by Schneider Electric. Only modify the system in the manner intended and described

in this documentation, and other documentation concerning any other associated equipment.

## ⚠ WARNING

### UNINTENDED EQUIPMENT OPERATION

- Only use software and hardware components approved by Schneider Electric for use with the system.
- Update your application program every time you change the physical hardware configuration.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## Misuse

The system is not suitable for the manipulation of living organisms or explosive materials.

## Incompatible Environments

The components must not be used in the following environments:

- Hazardous (explosive) atmospheres
- Mobile, movable, or floating systems
- Life support systems
- Domestic appliances
- Underground
- Highly saline environments
- Nuclear power plants
- Environments with increased radioactive radiation
- High-hygienic areas
- Oily surroundings
- Vacuum

The system has been designed to operate outside of any hazardous location. Only install the system in zones known to be free of a hazardous atmosphere.

## ⚠ DANGER

### POTENTIAL FOR EXPLOSION

Install and use this equipment in non-hazardous locations only.

**Failure to follow these instructions will result in death or serious injury.**

## Installation and Operating Conditions

Only use the components in accordance with the installation and operating conditions described in this documentation. The operating conditions at the installation location must be inspected and maintained in accordance with the required technical data (performance data and ambient conditions). Commissioning is prohibited until the usable machine or system in which the Lexium™ MC12 multi carrier is installed is in accordance to the applicable local regulations and standards.

## Compatibility with Foreign Substances

The equipment has been tested for compatibility with foreign substances according to the latest knowledge. However, it is impossible to follow up on all further developments of all substances such as lubricants, cleaning agents, or solvents. Therefore, you must perform a compatibility test before using new substances.

Schneider Electric provides samples of the different materials used for the Lexium™ MC12 multi carrier.

For the material samples (Material test kit 1), refer to Lexium™ MC accessories, page 33.

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## Qualification of Personnel

### Target Audience for This Manual

This documentation is intended for teams of users having the following knowledge:

- Advanced knowledge in mechanical engineering
- Advanced knowledge in electrical engineering
- Requisite skills required to be considered a qualified person
- Automation system engineering
- Training and the knowledge of how the Lexium™ MC12 multi carrier, its installation and operation, as well as the construction of the machine/ application for which it is integrated

### Qualified Person

Electrical and mechanical equipment must be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material. A qualified person is one who has skills and knowledge related to the construction and operation of mechanical and electrical equipment and the installation, and has received safety training to recognize and avoid the hazards involved.

The qualified personnel must be able to detect possible hazards that may arise from parametrization, changing parameter values and generally from mechanical, electrical, or electronic equipment. The qualified personnel must be familiar with the standards, provisions, and regulations for the prevention of industrial accidents, which they must observe when working on the system.

# Residual Risks

## Overview

Risks arising from the Lexium™ MC12 multi carrier have been reduced. However a residual risk remains since the equipment is moved and operated with electrical voltage and electrical currents.

If activities involve residual risks, a safety message is made at the appropriate points. This includes potential hazards that may arise, their possible consequences, and describes preventive measures to avoid the hazards.

## Electrical Parts

To operate the Lexium™ MC12 multi carrier described herein, you must connect the system to the control cabinet and the controller. As a system, there are residual risks that you must consider in your risk analysis of your application.

<b>⚠️⚠️ DANGER</b>
<b>ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH</b>
<ul style="list-style-type: none"><li>• Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.</li><li>• Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.</li><li>• Operate electrical components only with a connected protective ground (earth) cable.</li><li>• Verify the secure connection of the protective ground (earth) cable to all electrical devices to ensure that connection complies with the connection diagram.</li><li>• Do not touch the electrical connection points of the components when the module is energized.</li><li>• Provide protection against indirect contact (EN 50178).</li><li>• Insulate any unused conductors on both ends of the power cable.</li></ul>
<b>Failure to follow these instructions will result in death or serious injury.</b>

## Emergency Stop

The carriers are not equipped with a holding brake. In a de-energized state, carriers can move unintendedly when forces are applied to them (for example, gravity).

<b>⚠️ WARNING</b>
<b>ENTRAPMENT BY CARRIERS</b>
<ul style="list-style-type: none"><li>• Provide means for ensuring that the segments can be put into a de-energized state within reach of the zone of operation.</li><li>• Make available those means to allow one person to manually move the carriers.</li></ul>
<b>Failure to follow these instructions can result in death, serious injury, or equipment damage.</b>

After the segments have been put into a de-energized state, it may take a moment for the carriers to come to a standstill. Carriers that are in a vertical movement can run downward according to the force of gravity.

## ⚠ WARNING

### MOVING PARTS OF THE EQUIPMENT

Ensure that putting the segments into a de-energized state poses no subsequent risks in the zone of operation.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

**NOTE:** Provide separation devices for all infeed energies. It must be possible to secure the separation devices in de-energized position, for example, by locking.

## Electromagnetic Fields

- Lexium™ MC12 carriers and Lexium™ MC12 long stator motor segments generate strong local electro-magnetic fields.
- The carriers have strong drive magnets and can attract metal objects that are in their proximity.
- A carrier can move suddenly and fast due to magnetic attraction.

## ⚠ WARNING

### STRONG MAGNETIC FIELDS

- Keep persons with medical implants (for example, pacemakers or metal implants) or metallic body jewelry away from the carriers and segments with a minimum distance of 30 cm (11.9 in).
- Always leave the protective cover of the drive magnets in place for all exposed or uninstalled carriers.
- Do not put your hands or fingers between the carriers and segments.
- Do not place metallic tools in the vicinity of the carriers and segments.
- Do not place electromagnetically sensitive devices near the carriers and segments.
- Do not place credit cards or electronic/magnetic media in the vicinity of the carriers and segments.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

#### Protective cover of the drive magnets of carriers:

**NOTE:** Exposed or uninstalled carriers must have the protective cover of the drive magnets installed at all times. The cover is only removed at the time of carrier installation.

#### Protective packaging of carriers during transport:

The carriers must be transported in their associated protective packaging, which helps to reduce the effects of the strong drive magnets.

**NOTE:** Inductive sensors, such as proximity sensors, do not function properly if they are mounted near the segment coils. You must verify whether the sensors are working properly, especially when segment coils are active.

## Assembly and Handling

### ⚠ WARNING

#### CRUSHING, SHEARING, CUTTING AND HITTING DURING HANDLING

- Observe the general construction and safety regulations for handling and assembly.
- Use appropriate mounting and transport equipment and use appropriate tools.
- Prevent clamping and crushing by taking appropriate precautions.
- Cover edges and angles to protect against cutting damage.
- Wear suitable protective clothing (for example, protective goggles, protective boots, protective gloves).

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## Motion in the System

Parts of the Lexium™ MC12 multi carrier can move at high speeds. In such cases, the payload weight and additionally installed tools contribute to the total kinetic energy.

Motion sequences can occur when operating with the system allowing operational staff to make misjudgments. For safety considerations (according to EN ISO 13849-1), see [Functional Safety, page 50](#) and ensure that necessary protective measures are implemented.

The safety standards and directives for the respective country where the system is in use define which protective measures are appropriate. Additionally, the system engineer who is responsible for the integration of the system must evaluate which measures have to be taken.

**NOTE:** The configuration of the system, the carrier velocity, as well as the additional payload have an effect on the total energy, which can potentially be a source of damage and injury. At excessive speed, extreme acceleration and heavy load, the carriers can leave the track or the products can detach from the carrier.

## ⚠ WARNING

### CRUSHING, SHEARING, CUTTING AND IMPACT INJURY

- The equipment must be operated only within an enclosure.
- Open or enter the enclosure for cleaning and maintenance purposes only.
- Design the enclosure to safely deactivate the equipment as soon as a person enters the zone of operation of the system.
- Design the enclosure to withstand and to resist ejected parts from escaping the zone of operation.
- All barriers, protective doors, contact mats, light barriers, and other protective equipment, must be configured correctly and enabled whenever the equipment is under power.
- Define the clearance distance to the zone of operation so that operational staff do not have access to, nor can be enclosed in the zone of operation.
- Design the enclosure to account for the maximum possible travel paths of the equipment, including the maximum path until the hardware safety system limits as well as the additional run-on paths in case of a power interruption.
- Avoid excessive speed and extreme acceleration of the carriers by thoroughly testing your system taking into account the anticipated mass of the payload at the configured maximum speeds and accelerations.
- Verify that the distance between the mass center of gravity and the drive magnets is as small as possible.
- Take into account the impact of the centrifugal force in curves and the weight force in horizontal orientation of the track.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

In the event of a power supply interruption, the Lexium™ MC12 multi carrier deviates from the specified movement. Further, in case of an emergency stop request, the same may be true if the stop is uncontrolled.

## ⚠ WARNING

### DEVIATION FROM THE SPECIFIED MOVEMENT

- Ensure to take into account in your functional safety risk analysis the effect of a power interruption.
- Use, in the case of a powered stop such as an emergency stop, a synchronous stop on the path to avoid collisions.
- Take into account the extension of the run-on path of associated equipment, such as robots, in your functional safety risk analysis.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## Hot Surfaces

The metal surfaces of the system may exceed 70 °C (158 °F) when subjected to heavy loads and/or high performance during operation.

### **▲ WARNING**

#### **HOT SURFACES**

- Avoid unprotected contact with hot surfaces.
- Do not allow flammable or heat-sensitive parts in the immediate vicinity of hot surfaces.
- Verify that the heat dissipation is sufficient by performing a test run under maximum load conditions.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## Hazardous Movements

There can be different sources of hazardous movements:

- Wiring or cabling errors
- Errors in the application program
- Component errors
- Errors in the measured values and signal transmitters

**NOTE:** Provide for personal safety by primary equipment monitoring or measures. Do not rely only on the internal monitoring of the system components. Adapt the monitoring or other arrangements and measures to the specific conditions of the installation in accordance with a hazard and risk analysis.

**⚠ DANGER****UNAVAILABLE OR INADEQUATE PROTECTION DEVICE(S)**

- Prevent entry to a zone of operation with, for example, protective fencing, mesh guards, protective coverings, or light barriers.
- Dimension the protective devices properly and do not remove or modify them.
- Do not make any modifications that can degrade, incapacitate, or in any way invalidate protection devices.
- Bring the equipment to a stop before accessing the system or entering the zone of operation.
- Protect existing workstations and operating terminals against unauthorized operation.
- Position emergency stop switches so that they are easily accessible and can be reached quickly.
- Validate the functionality of emergency stop equipment before start-up and during maintenance periods.
- Prevent unintentional start-up by disconnecting the power connection of the equipment using the emergency stop circuit or using an appropriate lock-out tag-out sequence.
- Validate the system and installation before the initial start-up.
- Avoid operating high-frequency, remote control, and radio devices close to the system and their feed lines.
- Perform, if necessary, a special electromagnetic compatibility (EMC) verification of the system.

**Failure to follow these instructions will result in death or serious injury.**

The Lexium™ MC12 multi carrier may perform unanticipated movements because of incorrect wiring, incorrect settings, incorrect data, or other errors. The encoder magnets of the carriers can be affected by external magnetic fields.

**⚠ WARNING****UNINTENDED MOVEMENT OR CARRIER OPERATION**

- Carefully install the wiring in accordance with EMC standards.
- Ensure that there are no external magnetic fields present in the areas of position sensing for the carriers.
- Do not operate the equipment with undetermined settings and data.
- Perform comprehensive commissioning tests that include verification of configuration settings and data that determine position and movement.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## Noise Protection

The noise level of the Lexium™ MC12 multi carrier depends on the basic cycle and the payload, as well as on further application-specific accessory parts. If noise emissions reach a value greater than those defined by locally applicable regulations, wear hearing protection.

**▲ CAUTION****NOISE EMISSIONS**

- Wear hearing protection in accordance with the locally applicable regulations.
- Attach a sign on the equipment if the noise emissions reach an excessive value.

**Failure to follow these instructions can result in injury or equipment damage.**

**NOTE:** Attach the following symbol where it can easily be seen.

**Emissions**

During operation, a small amount of lubricant can leak. The leakage of small amounts of lubricants at the Lexium™ MC12 multi carrier is not an indication of a damaged system. However, excessive lubricant emissions may be an indication of a damaged carrier.

**NOTICE****INOPERABLE EQUIPMENT INDICATED BY CARRIER LUBRICANT EMISSIONS**

- Verify the mechanics before according to the defined maintenance schedule.
- Shut down the mechanics immediately if excessive lubricant emissions appear on or around the equipment or the objects being transported.

**Failure to follow these instructions can result in equipment damage.**

**Heavy and/or Falling Parts**

If you plan to assemble the Lexium™ MC12 multi carrier track outside of your machine, equip the mounting plate with suitable transport devices to be able to lift the mounted track into your machine.

**▲ WARNING****HEAVY AND/OR FALLING PARTS**

- Use a suitable crane or other suitable lifting gear for mounting the system.
- Use the necessary personal protective equipment (for example, protective shoes, protective glasses and protective gloves).
- Mount the system so that it cannot come loose (use of securing screws with appropriate tightening torque), especially in cases of fast acceleration or continuous vibration.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## Attachments or Modifications

You must design tools suitable for your application and install the tools on the Lexium™ MC12 carriers to transport your products within your track. In doing so, ensure that the movement is not restricted and/or that no motion errors can result from the modifications. Attachments and rebuilds must not influence the operation of the protective devices in any way and all EMERGENCY STOP buttons must be accessible and operational at all times.

### **▲ WARNING**

#### **UNINTENDED MACHINE OPERATION**

- Do not drill into or modify the delivered components.
- Do not modify the cable set.
- Do not modify the housing.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

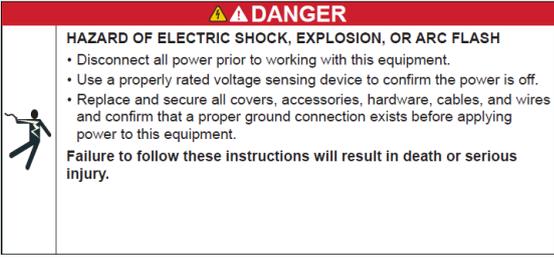
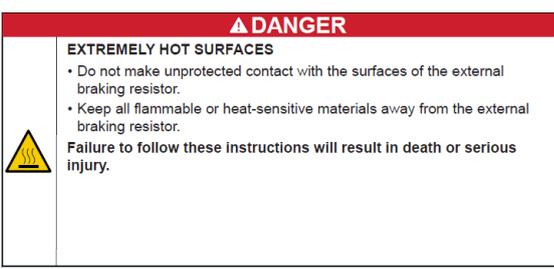
# Hazard Message Labels on the Components of the Lexium™ MC12 multi carrier

## Overview

The following hazard message labels are affixed to the components of the Lexium™ MC12 multi carrier to warn of potential hazards or to call attention to information.

## Hazard Message Labels on Components

The following table provides an overview of the hazard message labels on the components of the Lexium™ MC12 multi carrier:

Hazard Message Label	Lexium™ MC12 carrier and cover	Lexium™ MC connection module	Access door / trim / near operating handle / cover latch of the machine
	—	X	—
	—	—	X
For important safety information, refer to Electrical Parts, page 19.			
	—	—	X
For important safety information, refer to Hot Surfaces, page 23.			
	X	—	—
For important safety information, refer to Electromagnetic Fields, page 20.			
	—	X	—
For important safety information, refer to Hot Surfaces, page 23.			

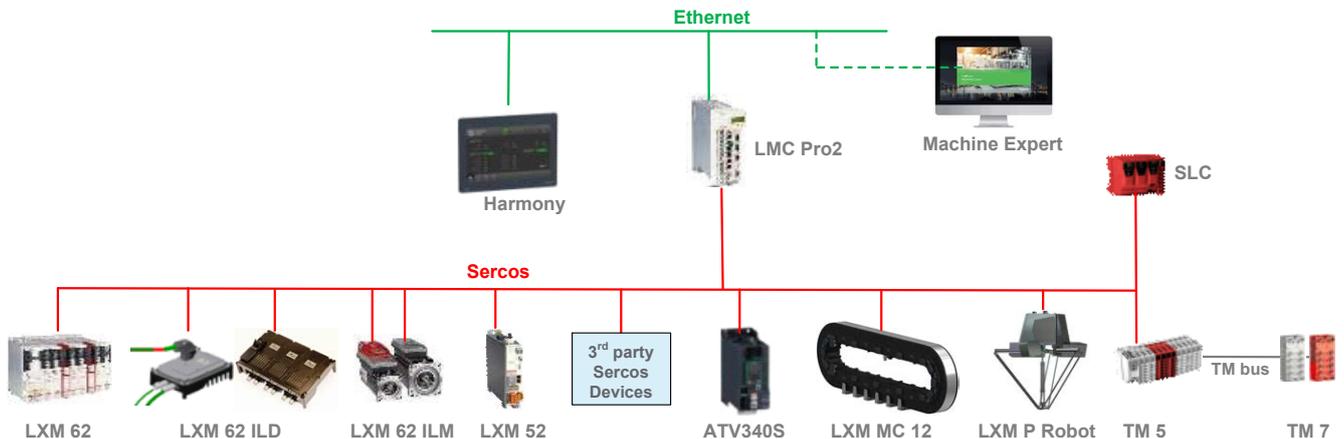
Hazard Message Label	Lexium™ MC12 carrier and cover	Lexium™ MC connection module	Access door / trim / near operating handle / cover latch of the machine
<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;"><b>⚠ WARNING</b></p> <p><b>STRONG MAGNETIC FIELDS</b></p> <ul style="list-style-type: none"> <li>• Keep persons with medical implants away from the carriers and segments with a minimum distance of 30 cm (11.9 in).</li> <li>• Do not put your hands or fingers between the carriers and segments.</li> <li>• Do not place metallic tools in the vicinity of the carriers and segments.</li> <li>• Do not place electromagnetically sensitive devices near the carriers and segments.</li> </ul> <p><b>Failure to follow these instructions can result in death, serious injury, or equipment damage.</b></p> </div>	—	—	X
<p>For important safety information, refer to Electromagnetic Fields, page 20.</p>			
<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;"><b>⚠ WARNING</b></p> <p><b>CRUSHING, SHEARING, CUTTING AND IMPACT INJURY</b></p> <ul style="list-style-type: none"> <li>• The equipment must be operated only within an enclosure.</li> <li>• Open or enter the enclosure for cleaning and maintenance purposes only.</li> <li>• Do not open or enter the enclosure during equipment operation.</li> </ul> <p><b>Failure to follow these instructions can result in death, serious injury, or equipment damage.</b></p> </div>	—	—	X
<p>For important safety information, refer to Assembly and Handling, page 21.</p>			
<div style="border: 1px solid black; padding: 5px;">  <p><b>Read instruction manual</b></p> </div>	X	—	—
<p>Read this hardware guide carefully, and become familiar with the system before trying to install, operate, service, or maintain it.</p>			
<p>X = Present on the component — = Not present on the component</p>			

# System Overview

## System Architecture

### Overview

The control system consists of several components, depending on your application. The following figure presents an example of a control system.



For more information about the several components, refer to the corresponding documentation at [www.se.com/en/download/](http://www.se.com/en/download/).

## Product Overview

### General Description of the Lexium™ MC12 multi carrier

#### Components Overview

The Lexium™ MC12 multi carrier is a transport system to be used in machines. It uses linear motion technology to move products individually through the machine.

Carriers are moved on a configurable track consisting of arc and straight segments. Process steps can be decoupled and run at different velocities.

Machines can be adapted to different products and product patterns on the fly.

The transport system is built from a combination of the following components:

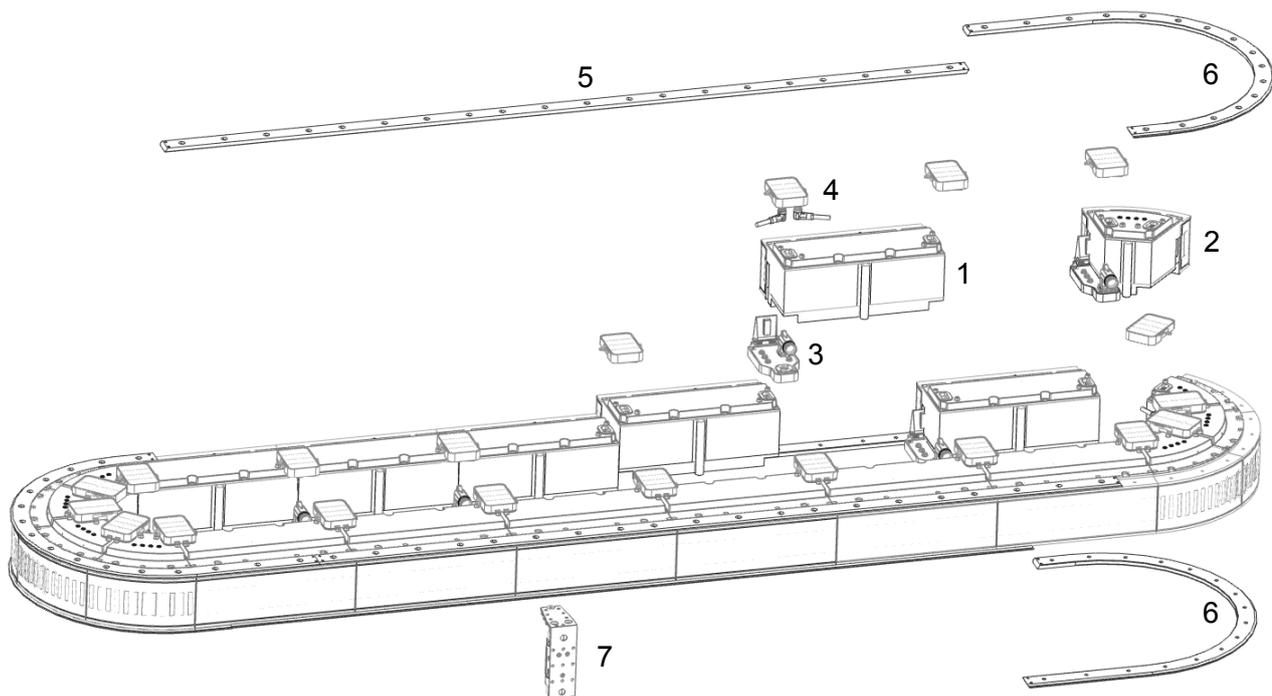
- Lexium™ MC12 long stator motor segments
  - Lexium™ MC12 long stator motor segment straight
  - Lexium™ MC12 long stator motor segment arc
- Lexium™ MC interconnects
  - Lexium™ MC power interconnect
  - Lexium™ MC communication interconnect
- Lexium™ MC guide rails
  - Lexium™ MC guide rail straight
  - Lexium™ MC guide rail arc
- Lexium™ MC12 carriers
- Lexium™ MC accessories

**NOTE:** For the number of Lexium™ MC12 long stator motor segments and Lexium™ MC12 carriers that can be used in one Lexium™ MC12 multi carrier, refer to System Planning, page 44.

To run and to control the Lexium™ MC12 multi carrier you need:

- One or more power supply/Lexium™ MC connection module combinations (depending on your system layout). The power supplies and the connection modules are installed in a control cabinet.
- One or more Lexium™ MC power cables, Sercos cables, SFO cables (for the Safe Force Off function).
- A PacDrive LMC Pro2 Motion Controller.
- EcoStruxure™ Machine Expert V2.0.3 or later.

The components of the Lexium™ MC12 multi carrier can be combined to many different layouts. The following figure presents the elements of a closed track.



- 1 Lexium™ MC12 long stator motor segment straight
- 2 Lexium™ MC12 long stator motor segment arc
- 3 Lexium™ MC power interconnect
- 4 Lexium™ MC communication interconnect
- 5 Lexium™ MC guide rail straight
- 6 Lexium™ MC guide rail arc
- 7 Lexium™ MC12 carrier

**NOTE:** For greater payloads, there is also a Lexium™ MC12 Heavy-Duty guide system. It is described in Lexium™ MC12 Heavy-Duty Guide System, page 179.

## Lexium™ MC12 long stator motor segment straight

Presentation	Segment	Reference	Description
	Straight 300 mm (11.81 in)	LXMMC12MS06S100	Long stator motor segment (straight) with integrated drive electronics 300 mm (11.81 in), IP65
		LXMMC12MS06S10L	Long stator motor segment (straight) for automated lubrication, with integrated drive electronics 300 mm (11.81 in), IP65

For information on references, also refer to chapter Type Code, page 35.

## Lexium™ MC12 long stator motor segment arc

Presentation	Segment	Reference	Description
	Arc 45°	LXMMC12MA02S100	Long stator motor segment (arc) with integrated drive electronics 45° arc, IP65, 100 N peak force (for carrier LXMMC12CA51S100)

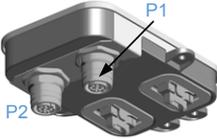
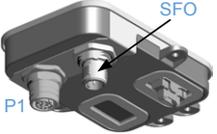
For information on references, also refer to chapter Type Code, page 35.

## Lexium™ MC power interconnects / Power disconnect

Presentation	Power interconnect	Reference	Description
	Power interconnect (plain)	LXMMCBPA001S100	Power interconnect between segments (1 piece)
		LXMMCBPA00XS100	Power interconnect between segments (10 pieces)
 <p>Same appearance as: Power interconnect (plain)</p>	Power disconnect	LXMMCBPAB01S100	Power disconnect between segments  The power disconnect is used to separate the DC bus between segments if you want to realize multiple power groups.
	Power interconnect with power connector (infeed)	LXMMCBPAP01S100	Power interconnect between segments with power infeed connector

For information on references, also refer to chapter Type Code, page 35.

## Lexium™ MC communication interconnects

Presentation	Communication interconnect	Reference	Description
	Communication interconnect (plain)	LXMMBCA001S100 LXMMBCA00XS100	Communication interconnect between segments (1 piece)  Communication interconnect between segments (10 pieces)
	Communication interconnect (Sercos)	LXMMBCAS01S100	Communication interconnect between segments with two additional Sercos connectors: Sercos port P1 (infeed) and Sercos port P2 (outfeed)
	Communication interconnect (SFO)	LXMMBCAF01S100	Communication interconnect between segments with one additional SFO connector (SFO = Safe Force Off)
	Communication interconnect open track (Sercos + SFO)	LXMMCBDAF1S100	Communication interconnect at the beginning of an open track with one additional Sercos connector (Sercos port P1 (infeed)) and one SFO connector
	Communication interconnect open track (Sercos)	LXMMCBDA01S100	Communication interconnect at the end of an open track with one additional Sercos connector (Sercos port P2 (outfeed))

For information on references, also refer to chapter Type Code, page 35.

## Lexium™ MC guide rail straight/Lexium™ MC guide rail arc

### Lexium™ MC guide rail straight

Presentation	Guide Rail	Reference	Description
Example 901.2 mm (35.48 in):  	Set of straights	-	Straight top and bottom guide rail as a set in the length of:
		LXMMCRS0A06S100	300.4 mm (11.83 in) = 1 unit length (ul)
		LXMMCRS0A06S10L	300.4 mm (11.83 in) = 1 ul; for automated lubrication
		LXMMCRS0A12S100	600.8 mm (23.65 in) = 2 ul
		LXMMCRS0A18S100	901.2 mm (35.48 in) = 3 ul
		LXMMCRS0A24S100	1201.6 mm (47.31 in) = 4 ul
LXMMCRS0A30S100	1502 mm (59.13 in) = 5 ul		
-	Set of straights 150.2 mm (5.91 in) end of open track with arcs	LXMMCRSEA03S100	Straight top and bottom guide rail as a set, 150.2 mm (5.91 in) straight for open track with arcs

Lexium™ MC guide rail arc

Presentation	Guide Rail	Reference	Description
	Set of 45° arcs	LXMMCRABA62S100	Arc top and bottom guide rails 45° as a set, 1/4 ul length (ul) straight at one end and 3/4 ul straight at the other end
	Set of 90° arcs	LXMMCRABA64S100	Arc top and bottom guide rails 90° as a set, 1/4 ul straight at one end and 3/4 ul straight at the other end
	Set of 135° arcs	LXMMCRABA66S100	Arc top and bottom guide rails 135° as a set, 1/4 ul straight at one end and 3/4 ul straight at the other end
	Set of 180° arcs	LXMMCRABA68S100	Arc top and bottom guide rails 180° as a set, 1/4 ul straight at one end and 3/4 ul straight at the other end
	Set of 360° arcs	LXMMCRA0A00S100	Arc top and bottom guide rails 360° as a set

For information on references, also refer to chapter Type Code, page 35.

Lexium™ MC12 carrier

Presentation	Carrier	Reference	Description
	Carrier	LXMMC12CA51S100 LXMMC12CA5XS100	Carrier, 50 mm (1.97 in) length (1 piece) Carrier, 50 mm (1.97 in) length (10 pieces)

For information on references, also refer to chapter Type Code, page 35.

Lexium™ MC accessories

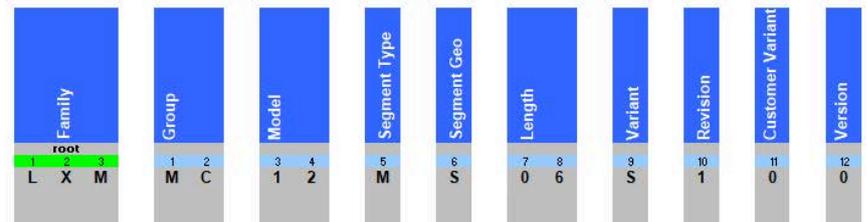
Presentation	Accessory	Reference	Description
	Universal Power Supply	ABLU3A48200	Regulated Power Supply, 380...500V AC, 48V, 20A, 3 phases, Universal
	Lexium™ MC connection module	LXMMCACMD02S100	Connection module 20 A continuous power to connect track to power supply

Presentation	Accessory	Reference	Description
–	Lexium™ MC connection module connector kit	LXMMCACMCS1S100	Set of connectors for the connection module (CN1...CN4)
	External Braking Resistor	LXMMCABR120S100	External Braking Resistor with 2.0 m (6.56 ft) cable
–	Lexium™ MC power cable	-	Power cable from Lexium™ MC connection module to power connector (infeed):
		LXMMCAPC020S100	2.0 m (6.56 ft)
		LXMMCAPC040S100	4.0 m (13.12 ft)
		LXMMCAPC060S100	6.0 m (19.68 ft)
		LXMMCAPC080S100	8.0 m (26.25 ft)
		LXMMCAPC100S100	10.0 m (32.8 ft)
		LXMMCAPC120S100	12.0 m (39.37 ft)
		LXMMCAPC140S100	14.0 m (45.93 ft)
		LXMMCAPC160S100	16.0 m (52.49 ft)
		LXMMCAPC180S100	18.0 m (59.05 ft)
	LXMMCAPC200S100	20.0 m (65.61 ft)	
–	Sercos cable	-	Sercos cable with connectors RJ45 and M12 (angled)
		VW3E3065R030	3.0 m (9.84 ft)
		VW3E3065R050	5.0 m (16.4 ft)
		VW3E3065R100	10.0 m (32.8 ft)
–	SFO cable	-	SFO cable to communication interconnect with M12 connector (angled) and open cable end with wire ferrules
		XZCP1241L2SE	2.0 m (6.56 ft)
		XZCP1241L5SE	5.0 m (16.41 ft)
		XZCP1241L10SE	10.0 m (32.80 ft)
		XZCP1241L15SE	15.0 m (49.21 ft)
		XZCP1241L20SE	20.0 m (65.61 ft)
–	Lexium™ MC encoder magnet	LXMMCAMGEALS100	Package of encoder magnets for carrier (50 pieces)
–	Lexium™ MC motion magnet	LXMMCAMGMALS100	Package of motion magnets for carrier (50 pieces)
–	Lexium™ MC carrier handling tool	LXMMCACT0A1S100	Handling tool to put carrier on track or to remove carrier from track
–	Lexium™ MC roller replacement set	LXMMCARS0AXS100	Roller set for carrier, containing 10 x 4 rollers, 10 x 2 lubrication pads and required screws
–	Set of hard stops	LXMMCAHS001S00	Set of hard stops to stop carriers at the ends of an open track
–	Single-hand lubrication gun	VW33MAP22	Single-hand high pressure oil gun to fill the lubrication reservoirs
–	Material test kit 1	LXMMCAMK001S100	Material test kit 1: Material samples for resistance tests

For information on references, also refer to chapter Type Code, page 35.

# Type Code

## Lexium™ MC12 long stator motor segments



**Product family**  
LXM

**Product Group**  
MC = Multicarrier

**Model**  
Peak Force / 10N  
12 = 120N Peakforce

**Segment**  
M = Standard Segment

**Segment Geometry**  
S = Straight  
A = Arc

**Length**  
for straight segments length given in n\*50mm, e.g 06 = 300mm  
for curved segments angle is given in n\*22,5°, e.g 02 = 45°

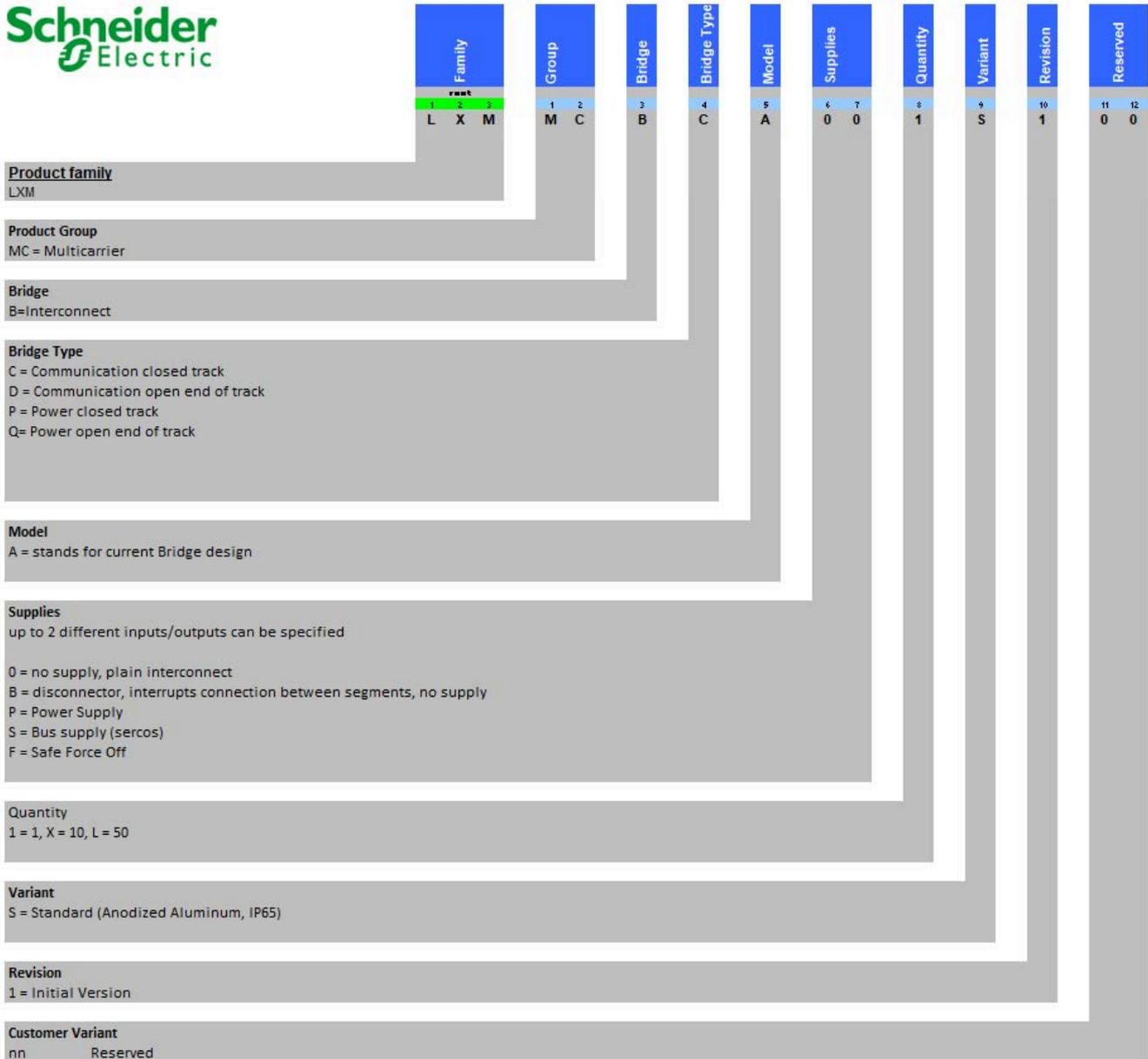
**Variant**  
S = Standard (Anodized Aluminum, IP65)

**Revision**  
1 = Initial Version

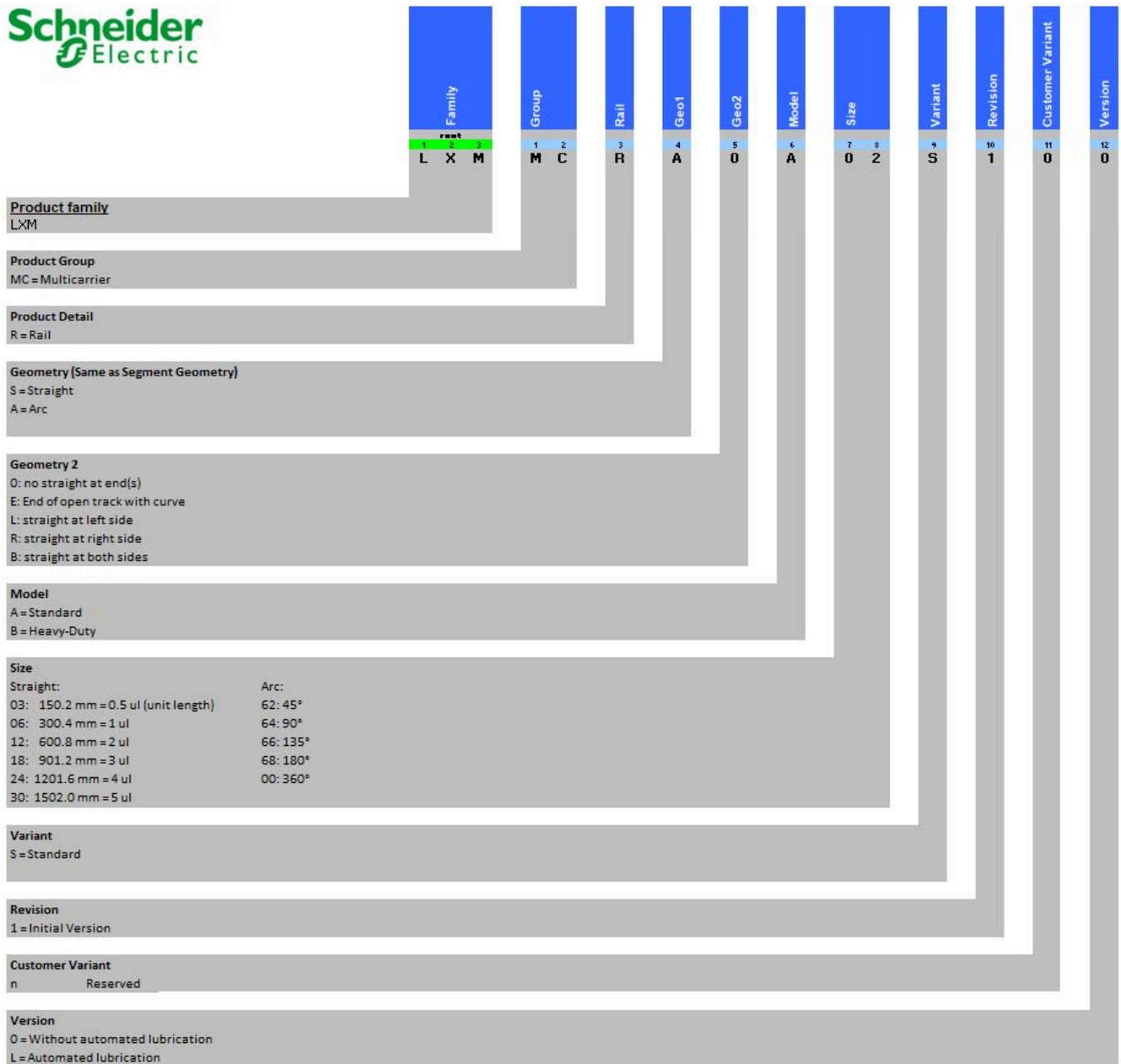
**Customer Variant**  
n Reserved

**Version**  
0 = Without automated lubrication  
L = Automated lubrication

# Lexium™ MC interconnects

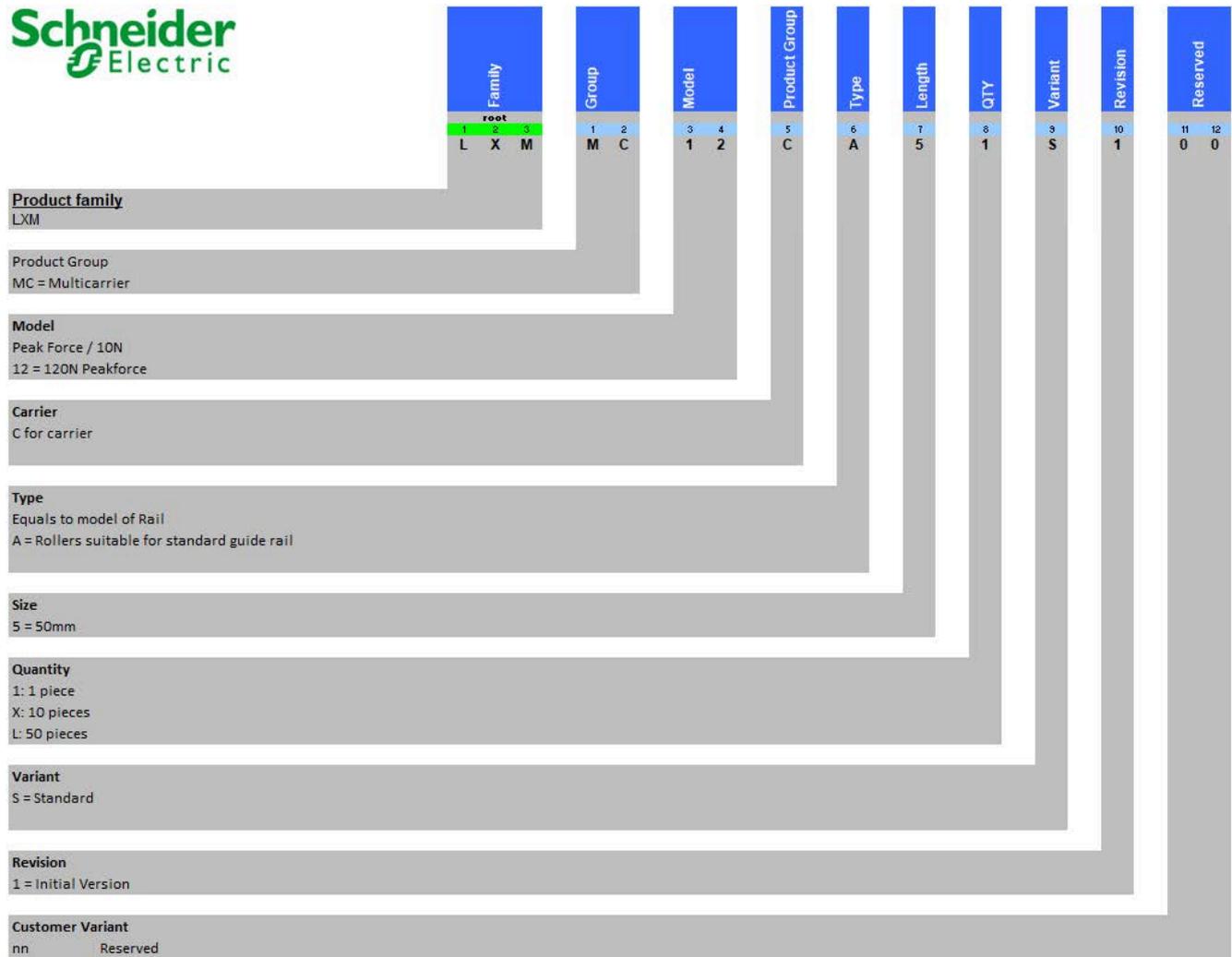


# Lexium™ MC guide rails



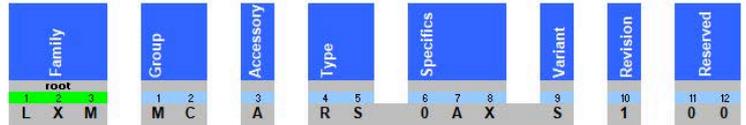
For a description of the Heavy-Duty references, refer to Lexium™ MC12 Heavy-Duty Guide Rail, page 182.

# Lexium™ MC12 carrier



For a description of the Heavy-Duty references, refer to Lexium™ MC12 Heavy-Duty Carrier, page 181.

# Lexium™ MC accessories



**Product family**  
LXM

**Product Group**  
MC = Multicarrier

**Accessory**  
A = Accessory

Accessory Type	Specifics	Variant
LU: Lubricant	xxx quantity / ml	S
PC: Power Cable	xxx: length / 10cm	S
BR: Braking Resistor	120 (Type 1, 2m cable length)	S
RS: Roller Set	Oxy: 0 Roller Type, x: type of rail see rails-model for coding, y qty: 1=1, X=10, L=50	
MG: Magnet	xAy: x: Type of Magnet: E=Encoder, M = Motion, Variant = A, y qty: 1=1, X=10, L=50	
CT: Carrier Drop Tool	0A1: 0 is not used, A variant of drop tool, 1 quantity	
CM: Connection Module 20A	D02	S
CM: Connection Module Connector Kit	CS1	S
MK: Material Kit	001	

**Revision**  
1 = Initial Version

**Customer Variant**  
nn Reserved

# Type Plate

## Components with Type Plates

The following components of the Lexium™ MC12 multi carrier are equipped with a type plate:

- Lexium™ MC connection module
- Lexium™ MC12 long stator motor segments
  - Lexium™ MC12 long stator motor segment straight
  - Lexium™ MC12 long stator motor segment arc
- Lexium™ MC interconnects
  - Lexium™ MC power interconnect
  - Lexium™ MC communication interconnect
- Lexium™ MC guide rails (The rails have only laser marking with reduced information).
  - Lexium™ MC guide rail straight
  - Lexium™ MC guide rail arc
- Lexium™ MC12 carriers

## Description of the Type Plate

Depending on the component, the type plates provide the following information:

Type plate information	Description	Example
	When scanning the QR code, the following information is provided: <ul style="list-style-type: none"> <li>• Product name / type code</li> <li>• Serial number</li> <li>• Date of manufacture (DOM)</li> <li>• Hardware revision</li> </ul>	—
Product name / type code	For detailed information about the meaning of the particular digits, refer to Type Code, page 35.	Lexium LXMMC12MS06S100
Description	Component description	Long stator motor, straight, 300mm
Technical data	Depends on the component.	For example, voltage, current, standstill force, peak force, and so on.
Production data	<ul style="list-style-type: none"> <li>• Serial number</li> <li>• Date of manufacture (DOM)</li> <li>• Hardware revision</li> <li>• Data matrix code</li> <li>• Country of origin</li> </ul>	<ul style="list-style-type: none"> <li>• SN: PPHYWWXXXXX</li> <li>• PP-YYYY-WW</li> <li>• HW rev.: 00</li> <li>• #000000</li> <li>• Made in Germany</li> </ul>
 Multiple rated equipment, see instruction manual.	Read the hardware guide carefully, and become familiar with the system before installing, operating, servicing, or maintaining it.	—
	WEEE mark (Waste Electrical or Electronic Equipment )	—
	RoHS mark (Restriction of Hazardous Substances Directive)	—
IPxx	Degree of protection (Ingress Protection)	—

Type plate information	Description	Example
Certification Area	For example, TÜV mark (Technischer Überwachungsverein, Technical Inspection Association)	—
	UKCA mark (UK Conformity Assessed)	—
	CE mark (standards for products sold within the European Economic Area EEA)	—
	Schneider Electric logo	—

# Engineering

## Electromagnetic Compatibility, EMC

### Electromagnetic Disturbances of Signals and Devices

This product meets the EMC requirements according to the standard IEC 61800-3 emission category C2 if generally accepted practices to limit electromagnetic interference are implemented during installation.

As this product does not meet the EMC requirements according to the standard IEC 61800-3 emission category C1, signal and equipment interference can cause unexpected responses of other equipment in the vicinity of this equipment.

#### **⚠ WARNING**

##### **SIGNAL AND EQUIPMENT INTERFERENCE**

- Install the wiring in accordance with the EMC requirements described in the present document.
- Verify compliance with the EMC requirements described in the present document.
- Verify compliance with all EMC regulations and requirements applicable in the country in which the product is to be operated and with all EMC regulations and requirements applicable at the installation site.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

These types of devices are not intended to be used on a low-voltage public network which supplies domestic premises. Radio frequency interference is expected if used in such a network.

#### **⚠ WARNING**

##### **RADIO INTERFERENCE**

Do not use these products in domestic electrical networks.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## Hardware Compatibility

Reference	Description
XPSUAT	Safety Module (Harmony XPS Universal product range)
XPSMCMRO0004G	Safety Relay Output Module (Modicon MCM product range)
TM5SDM4DTRFS	Safety Discrete I/O Module (Modicon TM5/TM7 Modular I/O System product range in conjunction with a Safety Logic Controller (SLC))

# System Planning

## Overview

Specify the following when planning the Lexium™ MC12 multi carrier:

- Identify a track geometry fitting to your machine layout and process. Also refer to [Track Orientation](#), page 45.
- Define a number of Lexium™ MC12 carriers to start with. Refer to [System Limits](#), page 45.
- Use the **Multicarrier Configuration** editor to configure the track, process stations, tools and products. Refer to **Multicarrier Configuration** Editor and **EcoStruxure Machine Expert Twin**, page 47.
- Develop, verify and optimize your application and track geometry with the embedded emulation (**EcoStruxure Machine Expert Twin**). Refer to **Multicarrier Configuration** Editor and **EcoStruxure Machine Expert Twin**, page 47.
- Verify that the application is within system limits. Refer to [System Limits](#), page 45.
- Specify associate equipment that is compatible with the strong magnetic fields of the equipment, such as capacitive sensors.
- Derive the number of power supplies and place the power infeed interconnects at the track.
- Dimension the braking resistors and define the feed points for the power and communication connections on the track. Refer to [Dimensioning the Braking Resistor and the Interconnects](#), page 46.
- Design the mounting plate of your track. Refer to [Mounting Plate](#), page 46.
- Include in your design an appropriate enclosure for the equipment and, according to your risk analysis, the appropriate safety-related devices and measures.
- Design tools suitable for your application and install the tools on the Lexium™ MC12 carriers to transport your products within your track.
- Include in your design and application a device (for example, a sensor) for identifying the carrier type and the type of tool mounted on the carrier to help prevent collisions.

## System Limits

### Track:

- Maximum track length: 40 m (131.2 ft)  
For longer systems, contact your local Schneider Electric service representative.
- Maximum number of Lexium™ MC12 long stator motor segments per track: 136
- Maximum number of Lexium™ MC12 carriers per track: 200  
For a larger number of carriers, contact your local Schneider Electric service representative.
- Maximum number of Lexium™ MC12 carriers per Lexium™ MC12 long stator motor segment straight: 6
- Maximum number of Lexium™ MC12 carriers per Lexium™ MC12 long stator motor segment arc: 4
- Total mass (carrier with tool and product):  $\leq 3$  kg (6.61 lb)
- Maximum acceleration at 1 kg (2.2 lbs):  $120 \text{ m/s}^2$  (394 ft/s<sup>2</sup>)
- Maximum velocity: 4 m/s (13.1 ft/s)

Also refer to General Technical Data, page 75.

### Power supply:

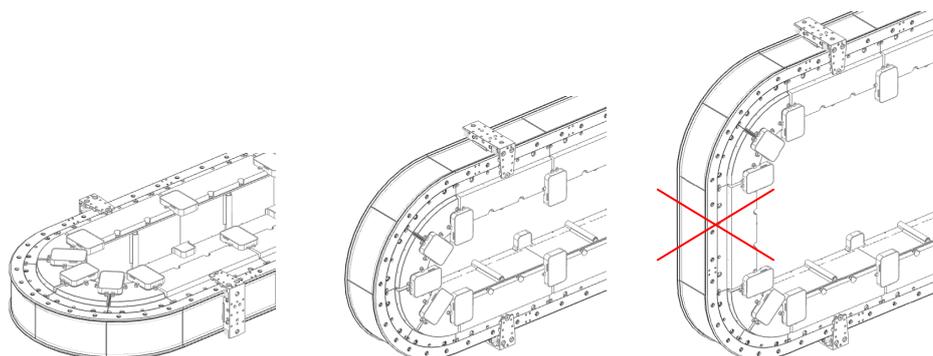
- The power supplies feed the Lexium™ MC12 multi carrier track. For each power supply, you must place a Lexium™ MC connection module between the power supply output and the Lexium™ MC12 multi carrier track.
- Up to a maximum of three power supply/Lexium™ MC connection module combinations can be used in parallel. If more than three power supplies are required, the track must be divided into power groups that are powered separately. For how to define power groups, refer to the different power interconnects (Lexium™ MC power interconnects / Power disconnect, page 31).
- The universal power supply ABLU3A48200 is designed to handle the back feed voltage (braking voltage) from the Lexium™ MC12 multi carrier track during the braking phase. Refer to Connecting a Braking Resistor (CN2), page 137.
- The Lexium™ MC12 multi carrier requires the power supply to be dimensioned based on the number of segments, segment groups, carriers, load and other relevant parameters.

Each power supply/Lexium™ MC connection module combination must not exceed 24 segments.

Refer to Power Supply, page 126.

## Track Orientation

The track orientation can be horizontal, or vertical. Straight segments are only permitted in horizontal orientation, as illustrated:



## **⚠ WARNING**

### **UNINTENDED EQUIPMENT OPERATION**

Do not use straight segments vertically.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## **Physical Coordinate System of the Track**

The physical coordinate system of the track relates to the position of the Sercos infeed. The easiest solution is to put the Sercos infeed at the beginning of a straight segment (seen in clockwise direction).

## **Mounting Plate**

The mounting plate must be prepared before installing the track. Refer to Mounting Plate, page 82.

## **Tools for the Carriers**

You must install tools on the Lexium™ MC12 carriers to transport your products within your track.

Refer to Mounting the Tools on the Lexium™ MC12 carrier, page 114 and Dimensions and Drilling Templates, page 209.

## **Dimensioning the Power Supply**

The required power and the number of power supplies must be calculated depending on the desired performance characteristics of your track.

You can feed the DC bus at different points of the track. For example, feed at points where a high electrical load due to deceleration and acceleration is to be expected.

For dimensioning the power supply, contact your local Schneider Electric service representative.

## **Dimensioning the Braking Resistor and the Interconnects**

The required braking resistor must be calculated depending on the desired braking capability and characteristics of your track. In addition, the number of Lexium™ MC power interconnects and Lexium™ MC communication interconnects and their optimized feed points on the track can be calculated.

Contact your local Schneider Electric service representative for these calculations.

## **Libraries and Example Project**

Two libraries are provided to program your Lexium™ MC12 multi carrier application:

- Multicarrier library  
For controlling the Lexium™ MC12 multi carrier and moving the individual carriers.  
For more information, refer to the Multicarrier Library Guide.
  - MulticarrierStation library  
For controlling the handling of carriers within individual stations and between the stations.  
For more information, refer to the MulticarrierStation Library Guide.
- In addition, creating a new project using the example project can simplify your work (**File > New Project > From Example > Multicarrier Example**). For more information, refer to the Lexium™ MC multi carrier Example Guide (see Lexium™ MC multi carrier Example Guide).

## Multicarrier Configuration Editor and EcoStruxure Machine Expert Twin

### Multicarrier Configuration

The **Multicarrier Configuration** editor is provided by Schneider Electric as a part of EcoStruxure Automation Expert - Motion and EcoStruxure Machine Expert.

It is used to configure a Lexium™ MC multi carrier from scratch or to modify an existing configuration. As a result, the **Multicarrier Configuration** editor adapts the device configuration in EcoStruxure Automation Expert - Motion / EcoStruxure Machine Expert, and generates or modifies code in the application.

You can use the **Multicarrier Configuration** editor to layout tracks in single-track or multi-track mode by adding and parameterizing the following components:

- Straight and curved segments (pre-defined type, length, topological address, start position, end position)
- Stations (name, waiting position, process position)
- Carrier instances (number, carrier compounds)
- Carrier compounds (name, description, properties)
- Tools (name, description, properties)
- Products (name, description, properties)

You can display the tracks and their components in simplified graphical representations.

For more information on the **Multicarrier Configuration** editor, refer to the Lexium™ MC multi carrier Configuration Guide (see Lexium™ MC multi carrier Configuration Guide).

### EcoStruxure Machine Expert Twin

The EcoStruxure Automation Expert - Motion / EcoStruxure Machine Expert installation includes the installation files of EcoStruxure Machine Expert Twin. EcoStruxure Machine Expert Twin can be used with the EcoStruxure Automation Expert - Motion or EcoStruxure Machine Expert license.

**NOTE:** EcoStruxure Machine Expert Twin can also be installed as a standalone version from the Schneider Electric Software Installer by clicking **Install new software** and selecting the product EcoStruxure Machine Expert Twin. In this case, a separate license is required.

A viewer of **EcoStruxure Machine Expert Twin** is embedded in the **Multicarrier Configuration** editor. With this, you can display a single track or a scene with multiple tracks as a 3-D emulation and see your application running virtually (by usage of a controller but without real mechanics).

This helps you to analyze your application behavior and to optimize your track design.

**NOTE:** Only one emulation can be active at a time.



# Information about Wiring

## Overview

Use only Schneider Electric approved devices in your application, and especially Schneider Electric pre-fabricated cables, wherever and whenever possible.

For further information, refer to *Technical Data for Cables*, page 80.

Use an appropriate torque indication or screwdriver for tightening connections.

Observe and implement the following points when wiring:

1. Use 60/75 °C (140/167 °F) copper conductors only.
2. Observe the minimum and maximum cross-sections of the cables necessary for the load carrying capacity of the equipment being connected.
3. Verify the integrity of cable shields to ensure continuity to ground.
4. Ensure that there is a proper, equipotential connection to ground for all interconnected equipment. The equipotential connection for the segments is implemented via the power cable.
5. Do not disconnect cable connection terminals when under power.
6. Ensure that all ground connections have sufficient surface area continuity.
7. Do not interchange DC+ and DC- conductors in the cable between the Lexium™ MC connection module and the Lexium™ MC12 multi carrier track.
8. Do not connect the DC bus directly to the power supply. Always connect the DC bus to the Lexium™ MC connection module.
9. Do not interchange the emergency stop circuits. This has to be observed especially when two different safety-related circuits are used.

If, for example, two parallel conductors are shown as coming from one point, you may not run just one conductor and then branch it off at a later point. If it is wired this way, induction loops (interference emitters and antennas) as well as interfering potential shifts may occur.

An incorrect wiring may result in damage of components.

### **⚠ CAUTION**

#### **DAMAGE OF COMPONENTS DUE TO INCORRECT WIRING**

Ensure and verify the correct wiring of power supplies, connection modules and segments.

**Failure to follow these instructions can result in injury or equipment damage.**

# Functional Safety

## Process Minimizing Risks Associated with the Machine

### Overview

The goal of designing machines safely is to protect people. The risk associated with machines with electrically controlled components comes chiefly from moving machine parts and the electricity itself.

Only you, the user, machine builder, or system integrator can be aware of all the conditions and factors realized in the design of your application for the machine. Therefore, only you can determine the automation equipment and the related safeties and interlocks which can be properly used, and validate such usage.

### Hazard and Risk Analysis

Based on the system configuration and utilization, a hazard and risk analysis must be carried out for the system (for example, according to ISO 12100 or ISO 13849-1). The results of this analysis must be considered when designing the machine, and subsequently applying safety-related equipment and safety-related functions. The results of your analysis may deviate from any application examples contained in the present or related documentation. For example, additional safety components may be required. In principle, the results from the hazard and risk analysis have priority.

#### **⚠ WARNING**

##### **NON-CONFORMANCE TO SAFETY FUNCTION REQUIREMENTS**

- Specify the requirements and/or measures to be implemented in the risk analysis you perform.
- Verify that your safety-related application complies to applicable safety regulations and standards.
- Make certain that appropriate procedures and measures (according to applicable sector standards) have been established to help avoid hazardous situations when operating the machine.
- Use appropriate protective devices (functional safety devices) in compliance with local and national standards.
- Validate the overall safety-related function and thoroughly test the application.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

The ISO 13849-1 *Safety of machinery - Safety-related parts of control systems - Part 1: General principle for design* describes an iterative process for the selection and design of safety-related parts of controllers to reduce the risk to the machine to a reasonable degree.

To perform risk assessment and risk minimization according to ISO 12100, proceed as follows:

1. Defining the boundary of the machine.
2. Identifying risks associated with the machine.
3. Assessing risks.
4. Evaluating risks.
5. Minimizing risks by:
  - Intrinsically safe design
  - Protective devices
  - User information (see ISO 12100)
6. Designing safety-related controller parts (SRP/CS, Safety-Related Parts of the Control System) in an interactive process.

To design the safety-related controller parts in an interactive process, proceed as follows:

Step	Action
1	Identify necessary safety functions that are executed via SRP/CS (Safety-Related Parts of the Control System).
2	Determine required properties for each safety function.
3	Determine the required performance level $PL_r$ .
4	Identify safety-related parts executing the safety function.
5	Determine the performance level PL of the afore-mentioned safety-related parts.
6	Verify the performance level PL for the safety function ( $PL \geq PL_r$ ).
7	Verify if all requirements have been met (validation).

Additional information is available on [www.se.com](http://www.se.com).

## Safe Force Off (SFO) Function

### Functional Description

With the SFO (Safe Force Off) function, you can set the segments to a defined safe state. In the defined safe state, the segment will not generate any force to carriers through its magnetic field.

This SFO (Safe Force Off) function relates to the components:

- Lexium™ MC connection modules
- Lexium™ MC12 long stator motor segments
- Lexium™ MC12 carriers
- Lexium™ MC communication interconnects

In the sense of the relevant standards (IEC 60204-1), the requirements of the stop category 0 (SFO) and stop category 1 (Safe Stop 1, SS1) can be met. Both categories lead to a force-free segment while SS1 takes this state after a predefined time.

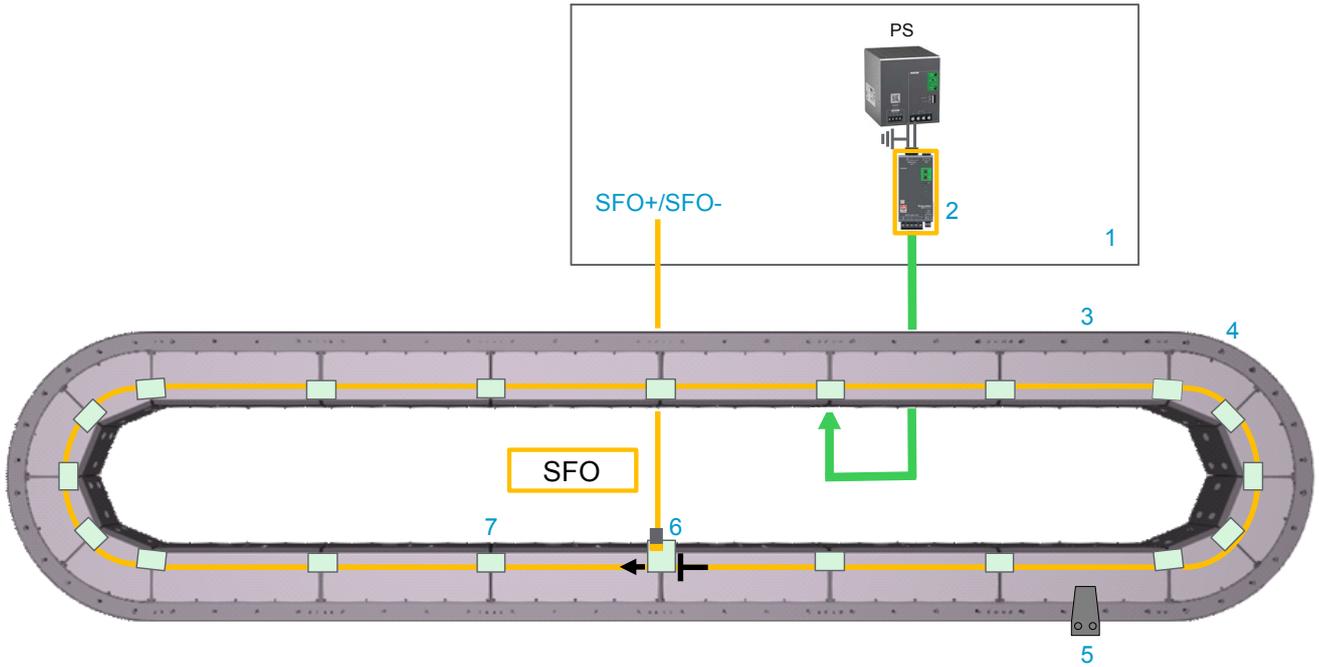
### **⚠ WARNING**

#### **UNINTENDED EQUIPMENT OPERATION**

- Make certain that no hazards can arise for persons or material during the coast down period of the carriers/machine.
- Do not enter the zone of operation during the coast down period.
- Ensure that no other persons can access the zone of operation during the coast down period.
- Use appropriate protective devices (functional safety devices) in compliance with local and national standards.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

**View of the Lexium™ MC12 multi carrier track from above**



Element	Description
1	Control cabinet
2	The Lexium™ MC connection module is connected to the track via the Lexium™ MC power cable and the Lexium™ MC power interconnect from below. Refer to graphic below.  Also refer to chapter Product Overview\Lexium MC Connection Module, page 33.
3	Lexium™ MC12 long stator motor segment straight, refer to chapter Product Overview\Lexium™ MC12 long stator motor segment straight, page 31.
4	Lexium™ MC12 long stator motor segment arc, refer to chapter Product Overview\Lexium™ MC12 long stator motor segment arc, page 31.
5	Lexium™ MC12 carrier, refer to Product Overview\Lexium™ MC12 carrier, page 33.
6	Lexium™ MC communication interconnect with SFO connector, refer to Product Overview\Lexium™ MC communication interconnects, page 32.
7	Lexium™ MC communication interconnect, refer to Product Overview\Lexium™ MC communication interconnects, page 32.

**Operating Principle**

The SFO signal is used to set the segments to a defined safe state. In the defined safe state, the segment will not generate any force to carriers through its magnetic field.

There is no need to interrupt the power supply. Standstill, however, is not monitored.

**Scope of Operation (Designated Safety Function)**

The SFO (Safe Force Off) function relates to the Lexium™ MC connection modules, Lexium™ MC power interconnects, Lexium™ MC12 long stator motor segments, Lexium™ MC12 carriers, and Lexium™ MC communication interconnects hereinafter referred to as Lexium™ MC12 multi carrier.

The function is activated/deactivated via a signal (pair) which is feed in via a Lexium™ MC communication interconnect with SFO connector at a freely

selectable Lexium™ MC12 long stator motor segment straight or Lexium™ MC12 long stator motor segment arc. The signal is forwarded with the Lexium™ MC communication interconnects to all segments belonging to the same SFO group.

The supply voltage (48 Vdc DC bus) does not need to be interrupted.

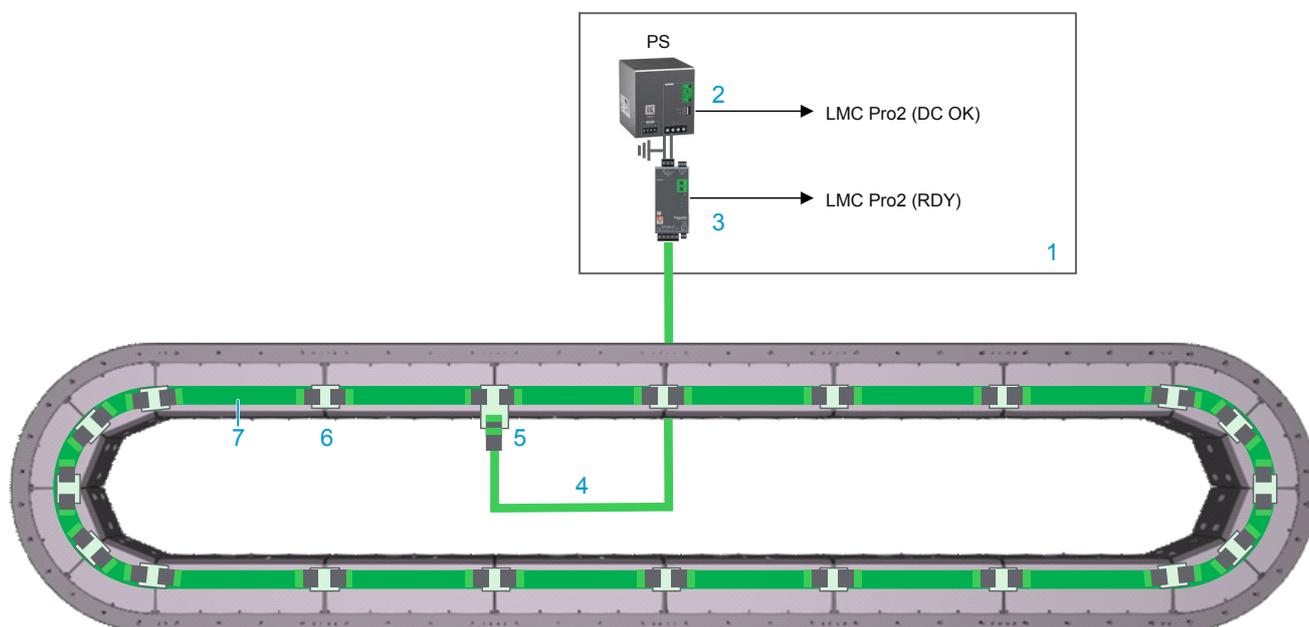
#### Lexium™ MC connection module

- The Lexium™ MC connection module (3) helps protect the Lexium™ MC12 multi carrier track against overvoltage.
- The Lexium™ MC connection module (3) supplies the Lexium™ MC12 multi carrier track with power (DC bus)

The Lexium™ MC power cable (4) is connected to the Lexium™ MC power interconnect (5) at the bottom of a segment.

- The DC bus (7) (up to 60 A) in the Lexium™ MC12 multi carrier track is distributed from segment to segment via the Lexium™ MC power interconnects (6).

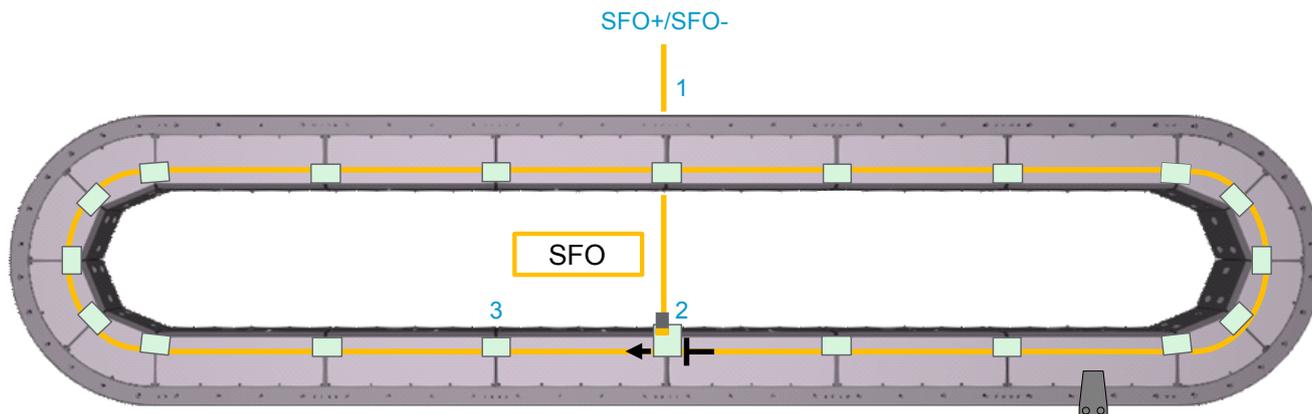
View of the Lexium™ MC12 multi carrier track from below



Element	Description
1	Control cabinet
2	Power supply
3	Lexium™ MC connection module
4	Lexium™ MC power cable with socket connector
5	Lexium™ MC power interconnect with plug connector
6	Lexium™ MC power interconnect without connector
7	Internal DC bus connection

## SFO (Safe Force Off)

View of the Lexium™ MC12 multi carrier track from above



- The SFO (Safe Force Off) signal is used to set the segments to a de-energized state. This means that the coils in the segments no longer exert an electromagnetic force on the carriers.
- The SFO signal is transmitted via an SFO cable (1). This cable is connected with a Lexium™ MC communication interconnect (2) with SFO connector at the top of a segment.
- The SFO signal is distributed from segment to segment via the Lexium™ MC communication interconnects (3).
- Several SFO groups can be set up for different sections of the track. An SFO group always starts at the Lexium™ MC communication interconnect with SFO connector and extends clockwise to the next Lexium™ MC12 long stator motor segment via the Lexium™ MC communication interconnect.
- Each segment must be provided with an SFO signal. Either with an SFO cable or via the Lexium™ MC communication interconnect from the segment before.

Also refer to [Connecting SFO \(Safe Force Off\) to the Track](#), page 150.

## Defined Safe State

In the defined safe state, the segment will not generate any force to carriers through its magnetic field. This de-energized state is also automatically entered when errors are detected in the safety-related circuit.

## Mode of Operation

When the stop or the emergency stop button is activated, the defined safe state is requested. This is achieved by inhibiting the PWM signals to the power stage of the segments. This means that the coils in the segments no longer exert an electromagnetic force on the carriers. The PWM signals cannot control the power stage so that a startup of the Lexium™ MC12 multi carrier is prevented (pulse pattern lock).

You can use the SFO (Safe Force Off) function to implement the control function “Stopping in case of emergency” (IEC 60204-1) for stop category 0 and stop category 1. Use an appropriate external safety-related circuit to prevent the unintended restart of the Lexium™ MC12 multi carrier after a stop, as required in the machine directive.

## Stop Category 0

In stop category 0 (SFO), the carriers coast to a stop (provided there are no external forces operating to the contrary). The SFO safety-related function is

intended to help prevent an unintended start-up, and therefore corresponds to an unassisted stop in accordance with IEC 60204-1.

In circumstances where external influences are present, the coast down time depends on physical properties of the components used (such as weight, velocity, friction, and so on). That is to say, if this means a hazard to your personnel or equipment, you must take appropriate measures (refer to [Hazard and Risk Analysis](#), page 50).

## ⚠ WARNING

### UNINTENDED EQUIPMENT OPERATION

- Make certain that no hazards can arise for persons or material during the coast down period of the carriers/machine.
- Do not enter the zone of operation during the coast down period.
- Ensure that no other persons can access the zone of operation during the coast down period.
- Use appropriate protective devices (functional safety devices) in compliance with local and national standards.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

Also refer to [Track Orientation](#), page 45.

## Stop Category 1

For stops of category 1 (Safe Stop 1, SS1) you can request a controlled stop via the PacDrive Logic Motion Controller (LMC). The controlled stop by the PacDrive LMC is not safety-relevant, nor monitored, and does not perform as defined in the case of a power outage or if an error is detected. The final switch off in the defined safe state is accomplished by switching off the SFO (Safe Force Off) input. This has to be implemented by using an external safety-related switching device with safety-related delay.

## Coast Down Time of Carriers

Your track may have sections with and without the Safe Force Off (SFO) function. For example:

- The segments of your track belong to different SFO groups with the SFO function.
- Some segments of your track belong to an SFO group with the SFO function and other segments belong to an SFO group without the SFO function.

Refer to [Examples SFO/Non-SFO Groups](#), page 57.

You must be aware that de-energizing a segment (SFO function) does not lead to an immediate standstill of the carriers, but that the carriers require a certain coast down time.

The coast down time of carriers depends on physical properties of the components used (such as weight, velocity, friction, and so on). This means that after activating the SFO function for one segment (segment group), a carrier can still roll into another segment.

For open tracks, this means that a carrier can still roll to the end of the track after activating the SFO function and strike the hard stop of the track.

**NOTE:** If coast down time means a hazard to your personnel or equipment, you must take appropriate measures (refer to [Hazard and Risk Analysis](#), page 50).

## ⚠ WARNING

### UNINTENDED EQUIPMENT OPERATION

- Make certain that no hazards can arise for persons or material during the coast down period of the carriers/machine.
- Do not enter the zone of operation during the coast down period.
- Ensure that no other persons can access the zone of operation during the coast down period.
- Use appropriate protective devices (functional safety devices) in compliance with local and national standards.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

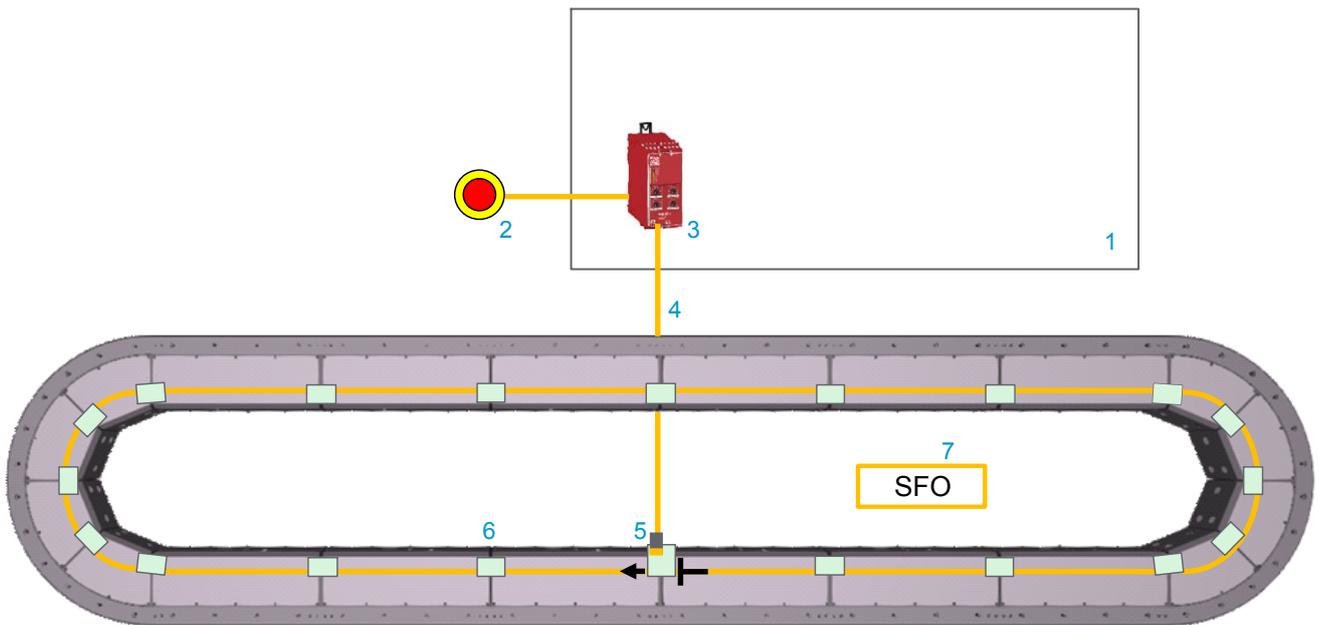
Also refer to Open Track, page 89.

## Examples SFO/Non-SFO Groups

### Views of the Lexium™ MC12 multi carrier track from above

Example: All segments of a closed track belong to one SFO group with the SFO function. This means that all segments of your track are de-energized at once.

Before entering the SFO group area, you must wait until all carriers have coasted down. Also refer to Coast Down Time of Carriers, page 56.

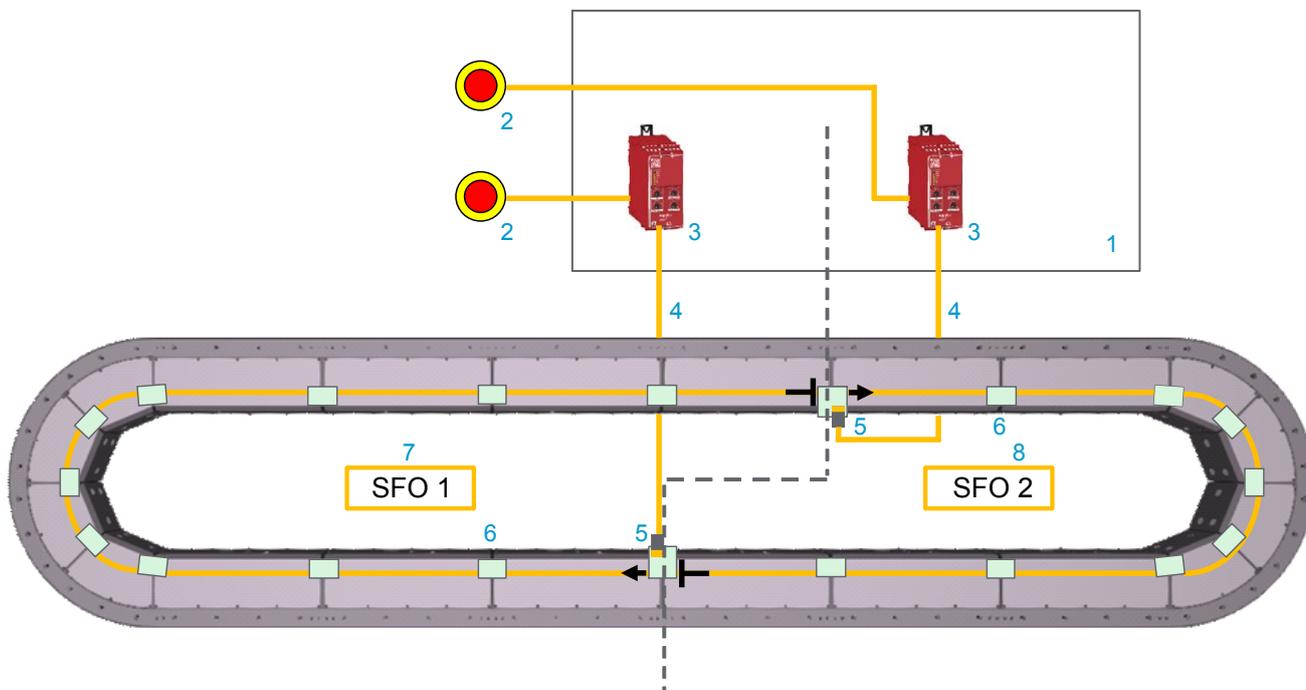


Element	Description
1	Control cabinet
2	Emergency stop switch
3	Safety-related switching device (for example, Harmony XPSUAT Safety Module)
4	SFO cable
5	Lexium™ MC communication interconnect with SFO connector
6	Lexium™ MC communication interconnect
7	SFO group

Also refer to Connecting SFO (Safe Force Off) to the Track, page 150.

Example: The segments of a closed track belong to two different SFO groups with the SFO function. This means that the segments of SFO group 1 and SFO group 2 can be de-energized independently of each other. If you de-energize SFO group 1, you must be aware that the carriers of the SFO group 2 can still roll into SFO group 1 and vice versa.

Before entering the SFO group 1 area, you must wait until all carriers have coasted down and you must take appropriate measures that no carriers from SFO group 2 can roll into SFO group 1. Also refer to Coast Down Time of Carriers, page 56.



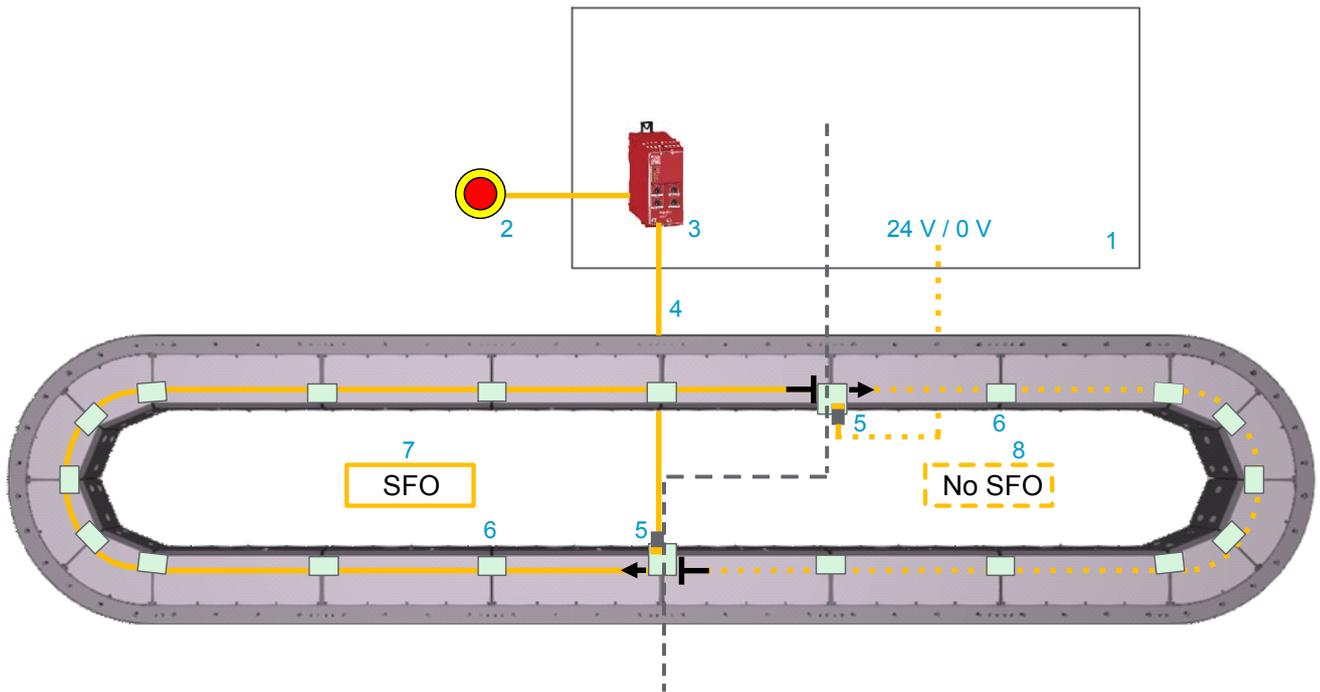
Element	Description
1	Control cabinet
2	Emergency stop switch
3	Safety-related switching device (for example, Harmony XPSUAT Safety Module)
4	SFO cable
5	Lexium™ MC communication interconnect with SFO connector
6	Lexium™ MC communication interconnect
7	SFO group 1
8	SFO group 2

Also refer to Connecting SFO (Safe Force Off) to the Track, page 150.

Example: Some segments of a closed track belong to an SFO group with the SFO function and other segments belong to an SFO group without the SFO function. This means that the segments of the SFO group with the SFO function can be de-energized and the segments of the SFO group without the SFO function can not be de-energized.

If you de-energize the SFO group with the SFO function, you must be aware that the carriers of the group without the SFO function can roll into the SFO group with the SFO function and vice versa.

Before entering the SFO group area, you must wait until all carriers have coasted down and you must take appropriate measures that no carriers from the group with no SFO can roll into the SFO group. Also refer to Coast Down Time of Carriers, page 56.



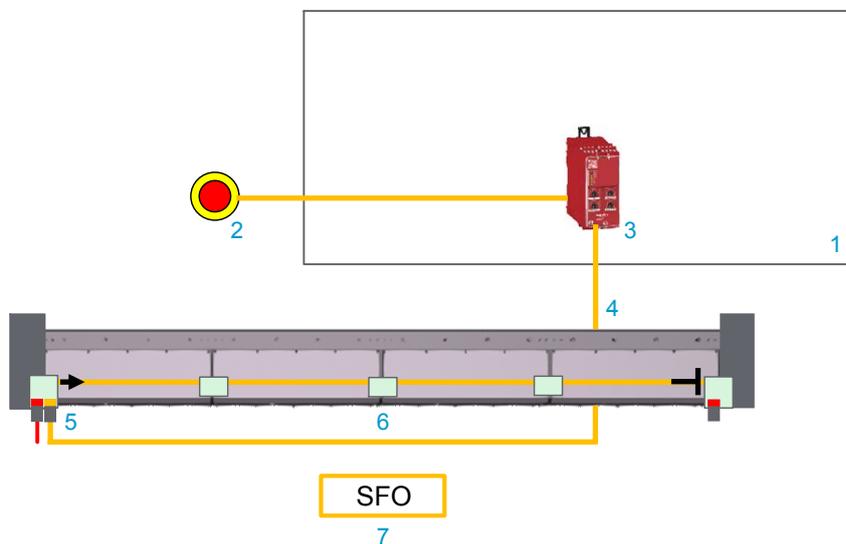
Element	Description
1	Control cabinet
2	Emergency stop switch
3	Safety-related switching device (for example, Harmony XPSUAT Safety Module)
4	SFO cable
5	Lexium™ MC communication interconnect with SFO connector
6	Lexium™ MC communication interconnect
7	SFO group
8	Non-SFO group

Also refer to Connecting SFO (Safe Force Off) to the Track, page 150.

Example: All segments of an open track belong to one SFO group with the SFO function. This means that all segments of your track are de-energized at once.

If you de-energize the SFO group, you must be aware that the carriers can still roll to the end of the track and strike the hard stop of the track.

Before entering the SFO group area, you must wait until all carriers have coasted down. Also refer to Coast Down Time of Carriers, page 56.



Element	Description
1	Control cabinet
2	Emergency stop switch
3	Safety-related switching device (for example, Harmony XPSUAT Safety Module)
4	SFO cable
5	Lexium™ MC communication interconnect with SFO connector
6	Lexium™ MC communication interconnect
7	SFO group

Also refer to Open Track, page 89.

Also refer to Connecting SFO (Safe Force Off) to the Track, page 150.

## Not Using the Safe Force Off (SFO) Function

If you have a group of segments in your track that should not use the SFO function, you must supply 24 Vdc to this group permanently. To do this, install a Lexium™ MC communication interconnect with SFO connector to the first segment of this group and supply SFOin+ (24 Vdc) and SFOin- (0 Vdc). This puts the segments of this group in an energized state and allows them to apply electromagnetic force to the Lexium™ MC12 carriers.

If the transition of carriers from a section of the track that does not use the SFO function to a section of the track with SFO function poses a hazard to your personnel or equipment, you must take appropriate measures (refer to Hazard and Risk Analysis, page 50).

## ▲ WARNING

### UNINTENDED EQUIPMENT OPERATION

- Make certain that no hazards can arise for persons or material during the coast down period of the carriers/machine.
- Do not enter the zone of operation during the coast down period.
- Ensure that no other persons can access the zone of operation during the coast down period.
- Use appropriate protective devices (functional safety devices) in compliance with local and national standards.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## Validity of the Safety Case

The safety case for the SFO (Safe Force Off) function of the Lexium™ MC12 multi carrier is identified and defined by the standards listed in *Safety Standards*, page 67. The safety case for the designated safety function of the Lexium™ MC12 multi carrier applies to the following product versions, which can be found examining the appropriate software object in EcoStruxure Automation Expert - Motion or EcoStruxure Machine Expert (see EcoStruxure Automation Expert - Motion, EcoStruxure Machine Expert Programming Guide):

Component	References	Product version
Lexium™ MC connection module	LXMMCACMD02S100	02, 03, 04
Lexium™ MC12 long stator motor segment straight	LXMMC12MS06S100	02, 03, 04,05,06
Lexium™ MC12 long stator motor segment straight for automated lubrication	LXMMC12MS06S10L	06
Lexium™ MC12 long stator motor segment arc	LXMMC12MA02S100	02, 03, 04,05,06
Lexium™ MC communication interconnect plain	LXMMBCA001S100	02, 03, 04
Lexium™ MC communication interconnect with two Sercos connectors	LXMMBCAS01S100	02, 03, 04
Lexium™ MC communication interconnect with one SFO connector	LXMMBCAF01S100	02, 03, 04
Lexium™ MC communication interconnect for open track with one Sercos and one SFO connector	LXMMCBDASF1S100	02, 03, 04
Lexium™ MC communication interconnect for open track with one Sercos connector	LXMMCBDAS01S100	02, 03, 04
Also refer to Product Overview, page 29.		

For additional information, contact your Schneider Electric service representative.

## Interface and Control

The SFO (Safe Force Off) function is operated via the difference between the two input signals SFOin+ (24 Vdc) and SFOin- (0 Vdc).

For information on the technical data and electrical connections, refer to the chapter Technical Data for Safe Force Off (SFO), page 76.

## Setup, Installation and Maintenance

### Prevent Possible Unintended Operation and Avoid Overvoltage

The following measures avoid overvoltage and help prevent possible unintended equipment operation through conductive pollution or parts falling into the device:

#### **⚠ DANGER**

##### **ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Install the Lexium™ MC connection module in a control cabinet or housing with a minimum IP 54 rating and secured by a key or tool mechanism.
- Comply with the clearances and creepage distances according to EN 50178.
- The Lexium™ MC12 multi carrier must only be operated with 24 Vdc (SFO) / 48 Vdc (DC bus) power supplies certified according to IEC 62368-1.

**Failure to follow these instructions will result in death or serious injury.**

Only operate the Lexium™ MC12 multi carrier with approved, specified cables, accessories and replacement equipment by Schneider Electric.

#### **⚠ DANGER**

##### **ELECTRIC SHOCK OR ARC FLASH**

Do not use non-Schneider Electric approved cables, accessories or any type of replacement equipment.

**Failure to follow these instructions will result in death or serious injury.**

### Avoid Unintentional Restart

The unintentional restart of the equipment must be avoided by appropriate means, depending on your particular application.

#### **⚠ DANGER**

##### **ELECTRIC SHOCK OR ARC FLASH**

- Ensure that a restart of the system is not possible after a return of power or the tripping of a functional safety device unless preceded by a deliberate enable signal from the system.
- Ensure that the enable signal meets the specified safety criteria.

**Failure to follow these instructions will result in death or serious injury.**

# Commissioning

## Overview

Step	Action
1	Verify the installation. For more information, refer to <i>Verifying the Installation</i> , page 155.
2	Verify that a hazard and risk analysis has been performed. Refer to <i>Hazard and Risk Analysis</i> , page 50.
3	Carry out a functional test of the Safe Force Off (SFO) function for all segments that need the safety-related function.
4	Especially verify the correct application of the segments without the Safe Force Off (SFO) function.
5	Verify the interaction between track sections with and without the SFO function. Refer to <i>Coast Down Time of Carriers</i> , page 56
6	Complete installation in accordance with the EMC regulations.
7	Afterwards, commission the Lexium™ MC12 multi carrier.

## Best Practices

### Overview

When the machine is commissioned, the connected segments are usually hidden from sight of the machine operator and cannot be monitored directly.

#### **⚠ WARNING**

##### **UNSUPERVISED MACHINE START-UP**

Only start the machine if there are no persons within the zone of operation of moving machine components.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

### Verify Connections

Step	Action
1	Verify all terminals, connectors, and other connections on all system components for correct and firm fit.
2	Only use robust connectors and secure fixings.
3	Verify the protective earth ground (PELV, Protective Extra Low Voltage) of the power supplies (24 Vdc SFO / 48 Vdc DC bus).
4	Verify the wiring of the DC bus (48 Vdc) from the Lexium™ MC connection module to the track. Only use the pre-assembled cable provided by Schneider Electric. Refer to Technical Data for Cables, page 80.
5	Verify the wiring of the safety function to the segments to avoid an interchange of the SFO+ and SFO– inputs. Only use the pre-assembled cable provided by Schneider Electric. Refer to Technical Data for Cables, page 80.
6	Use coded connectors (refer to chapter Connecting SFO (Safe Force Off) to the Track, page 150) and perform a commissioning test (refer to chapter Commissioning, page 63).
7	Use only appropriate transport packaging to forward or return individual system components.

#### **⚠ DANGER**

##### **ELECTRIC SHOCK DUE TO INADEQUATE PROTECTIVE SEPARATION**

Only connect devices, electrical components, or lines to the signal voltage connectors of these products that feature a sufficient, protective separation from the connected circuits in accordance with the standards (IEC 61800-5-1: Adjustable speed electrical power drive systems - safety requirements).

**Failure to follow these instructions will result in death or serious injury.**

### External Forces

The defined safe state of the Lexium™ MC12 multi carrier is achieved when the segments are set to a de-energized state. This means that the coils in the segments no longer exert an electromagnetic force on the carriers.

If external forces act upon the carriers, they will not necessarily maintain their position. In any case, the carriers will coast to an unassisted stop. This coast down time depends on physical properties of the components used (such as weight, torque, friction, and so on), and additional measures such as mechanical brakes may be necessary to help prevent any hazard from materializing. If the defined safe state is inappropriate for your application where external forces may move

the carriers as determined by your risk assessment, implement other external safety-related measures.

## **▲ WARNING**

### **UNINTENDED EQUIPMENT OPERATION**

- Make certain that no hazards can arise for persons or material during the coast down period of the carriers/machine.
- Do not enter the zone of operation during the coast down period.
- Ensure that no other persons can access the zone of operation during the coast down period.
- Use appropriate protective devices (functional safety devices) in compliance with local and national standards.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## Maintenance

### Overview

The SFO (Safe Force Off) function has been designed for a defined lifetime that does not require to verify the safety-related function, nor any specific maintenance requirements. For the defined lifetime, refer to *Safety Standards*, page 67.

After this lifetime has elapsed, a statement about the SFO function cannot be made due to the aging of the component. If you want to ensure the functional safety after this period, you need to replace the device that includes the safety function.

**NOTE:** Subject the product to a complete function test after replacement.

## Physical Environment

### Overview

The system is not protected against physical or chemical sources of damage by any design features, such as:

- Toxic
- Explosive
- Corrosive
- Highly reactive
- Inflammable types

The system has been designed to operate outside of any hazardous location. Only install the system in zones known to be free of a hazardous atmosphere.

### **⚠ DANGER**

#### **POTENTIAL FOR EXPLOSION**

Install and use this equipment in non-hazardous locations only.

**Failure to follow these instructions will result in death or serious injury.**

### **⚠ WARNING**

#### **UNINTENDED EQUIPMENT OPERATION**

- Observe and conform to ambient temperatures, storage temperatures and transport temperatures of the individual components as specified in the hardware guide.
- Prevent the formation of moisture during the storage and transport of individual components.
- Conform to the vibration and shock requirements specified in the hardware guide when operating, storing and transporting system components.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

The power supplies and the Lexium™ MC connection modules must only be installed in an electrical equipment enclosure (for example, in a control cabinet). The electrical equipment enclosure must be lockable by using a key or tool.

## Safety Standards

### Overview

The SFO safety-related function has been designed and tested for functional safety according to the following standards

- IEC 61508:2010
- IEC 61800-5-2:2016
- EN ISO 13849-1:2015
- IEC 62061:2021

An independent assessment was performed by TÜV Nord.

According to the above listed standards, the figures for the devices for using the SFO (Safe Force Off) function are as follows:

Standard characteristics	Lexium™ MC connection module	Lexium™ MC communication interconnect with SFO connector	Lexium™ MC12 long stator motor segment straight/Lexium™ MC12 long stator motor segment straight for automated lubrication/Lexium™ MC12 long stator motor segment arc (including communication interconnects between segments)
SFF (IEC 61508)* Safe Failure Fraction	100 %	100 %	99 %
HFT (IEC 61508) Hardware Fault Tolerance	1	1	1
Type (IEC 61508)	A	A	A
SIL (IEC 61508, IEC 6206) Safety Integrity Level Safety Integrity Level Claim Limit	3	3	3
PFH (IEC 61508)* Probability of Dangerous Failures per Hour	0	0	$2.9 \cdot 10^{-10}/h$
PL (cat) (ISO 13849-1) Performance Level (Category)	e (4)	e (4)	e (4)
MTTFd (ISO 13849-1)* Mean Time to Dangerous Failure	–	–	4000 years
DC (ISO 13849-1)* Diagnostic Coverage	–	–	99 %
Lifetime	20 years	20 years	20 years
Maximum reaction time between the request and execution of the designated safety function	10 ms	10 ms	10 ms
Maximum reaction time before the detection of safety-related errors	10 ms	10 ms	10 ms
<p><b>NOTE:</b> The values specified are rounded individually and are therefore not a result of a conversion by for example, PFH in MTTFd or the comparative tables from ISO13849-1.</p> <p>* In case you have multiple segments in your SFO function, apply the appropriate estimations from IEC 61508, IEC 62061 and ISO 13849 to estimate the reliability of the SFO function.</p>			

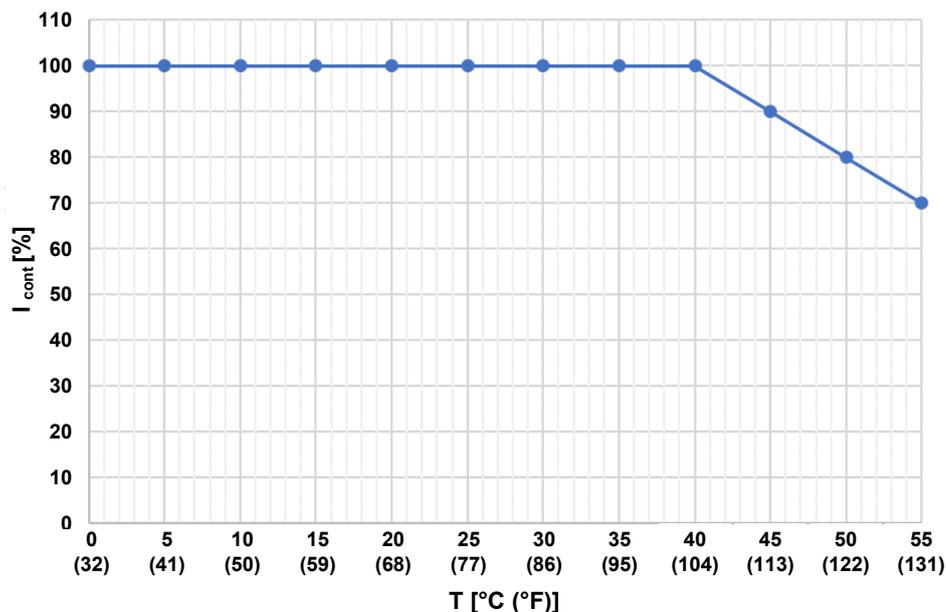
# Special Conditions

## Increased Ambient Temperature

Due to increased ambient temperature, the available continuous output current and the continuous coil current is reduced.

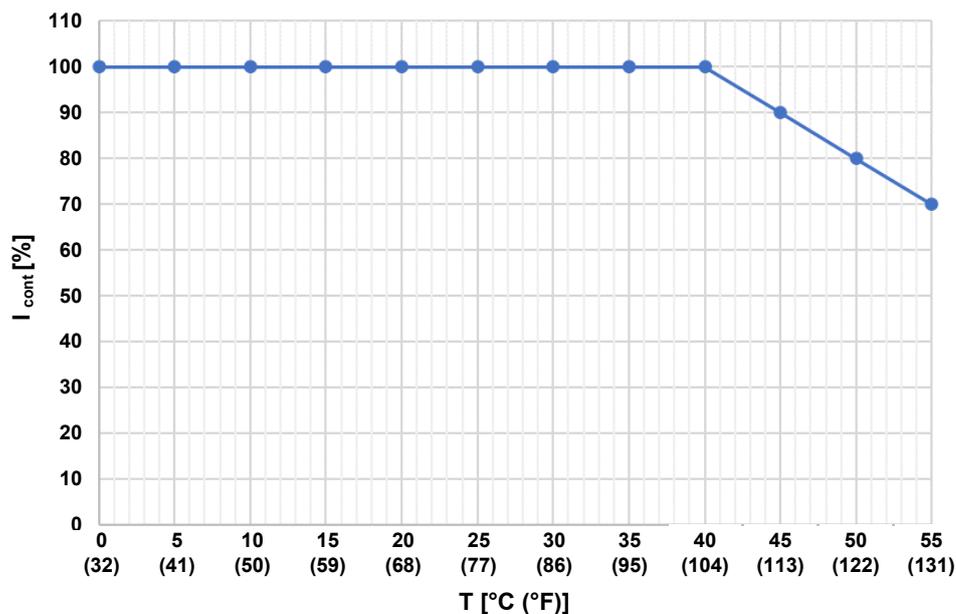
### Cabinet devices (connection modules)

Continuous output current  $I_{cont}$  [%] reduction at increased ambient temperature T [°C (°F)]



### Field devices (track, segments, coils)

Continuous coil current  $I_{cont}$  [%] reduction at increased ambient temperature T [°C (°F)]

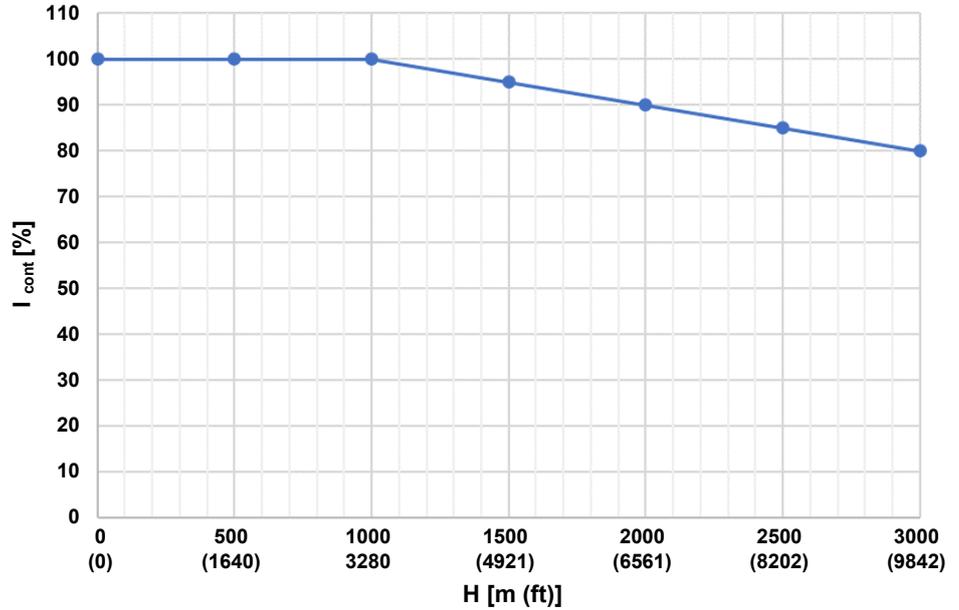


## Increased Installation Altitude

Due to the lower air pressure at higher altitudes, the cooling effect is reduced. Therefore, the continuous current of the segments / coils and the DC bus output current of the connection module must be reduced by 1% per 100 m (328 ft) starting from an installation altitude of 1000 m (3281 ft).

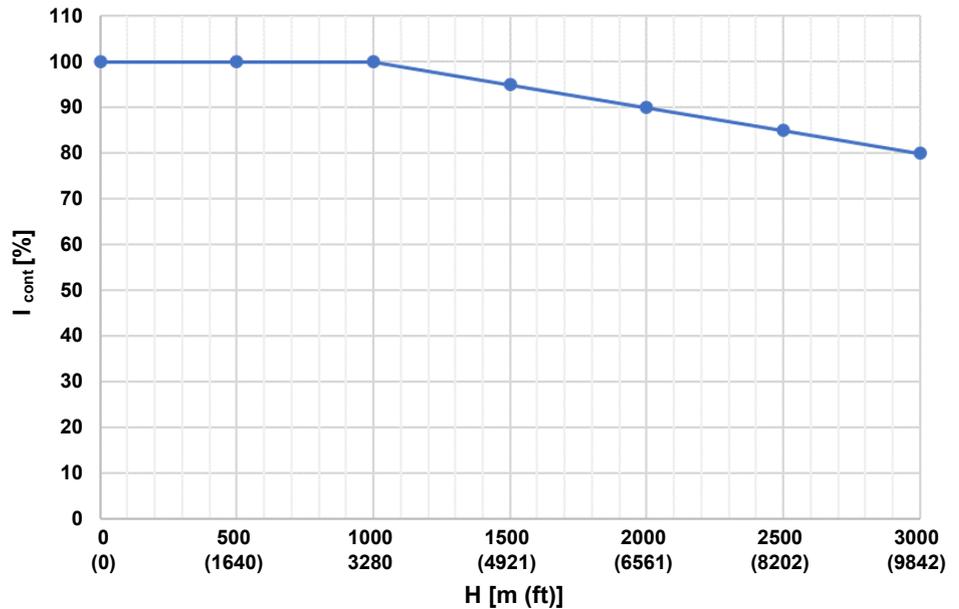
### Cabinet devices (connection modules)

Continuous output current  $I_{cont}$  [%] reduction at increased installation height  $H$  [m (ft)]



### Field devices (track, segments, coils)

Continuous coil current  $I_{cont}$  [%] reduction at increased installation height  $H$  [m (ft)]



# Technical Data

## General Installation Conditions for the System

### Overview

Parameter	Value
EMC Classification for emission IEC 61800-3	C2 (emission)
EMC Classification for immunity IEC 61800-3	Second environment (immunity)
Pollution degree IEC 61800-5-1	2 <sup>1)2)</sup>
Overvoltage category IEC 61800-5-1	III
Protective Class IEC 61800-5-1	I
Supply system / Earthing conditions IEC 61800-2 and IEC 61800-5-1	TN-S May be provided by use of an upstream isolating transformer with earthed star point, voltage range and further installation requirements in accordance with the installation manual of the power supply, page 80.
Mounting height IEC 61800-2 and IEC 61800-5-1	0...2000 m (0...6561 ft) without power de-rating 2000...3000 m (6561...9842 ft) with power de-rating <sup>3)</sup>
<p><b>1)</b> For cabinet devices: The devices must be protected against conductive contamination. For example, by installing them in a cabinet with degree of protection greater than or equal to IP54 in accordance with IEC 60529. Assuming that conductive contamination can be excluded at the installation site, a cabinet with a lower degree of protection is permissible.</p> <p><b>2)</b> Install the Lexium™ MC12 multi carrier transport system only in a pollution degree 2 environment.</p> <p><b>3)</b> For more information, refer to the de-rating information in Special Conditions, page 68.</p>	

# Ambient Conditions

## Ambient Conditions Field Devices

### Operation

Procedure	Parameter	Unit	Value
<b>Environmental characteristics</b>	Based on class 3K3 according to IEC 60721-3-3: 2002		
	Ambient temperature	°C (°F)	+5...+40 (+41...+104)/ +55 (131) with power derating <sup>(1)</sup>
	Relative humidity	%	5...85
	Air pressure	kPa	70...106
	Heat radiation	–	Prohibited
	Condensation	–	Prohibited
	Precipitation	–	Prohibited
	Water from sources other than rain	–	Allowed according to IP65.
Formation of ice	–	Prohibited	
<b>Mechanical conditions</b>	Class 3M4 according to IEC 60721-3-3: 2002		
	Displacement amplitude	mm / frequency range Hz	3.0 / 2-9
	Acceleration amplitude	m/s <sup>2</sup> / frequency range Hz	10 / 9-200
	Shock response spectrum type I	peak acceleration m/s <sup>2</sup>	100
<b>(1)</b> For more information, refer to the de-rating information in Special Conditions, page 68.			

## Transport

Procedure	Parameter	Unit	Value
<b>Environmental characteristics</b>	Based on class 2K4 according to IEC 60721-3-2:1997		
	Ambient temperature	°C (°F)	-40...+70 (-40...+158)
	Relative humidity	%	5...95
	Air pressure	kPa	70...106
	Condensation	–	Prohibited
	Precipitation	–	Prohibited (1)
	Water from sources other than rain	–	Prohibited (1)
	Formation of ice	–	Prohibited (1)
<b>Mechanical conditions</b>	Based on class 2M2 according to IEC 60721-3-2:1997		
	Displacement amplitude	mm/ frequency range Hz	3.5 / 2...9
	Acceleration amplitude	m/s <sup>2</sup> /frequency range Hz	10 / 9...200
	Shock response spectrum type I	m/s <sup>2</sup>	100
	Shock response spectrum type II	m/s <sup>2</sup>	300
<b>(1)</b> Based on the product packaging			

For detailed information about storage conditions, refer to [Transport and Storage](#), page 84.

## Long-term Storage in Transport Packaging

Procedure	Parameter	Unit	Value
<b>Environmental characteristics</b>	Based on class 1K2 according to IEC 60721-3-1:1997		
	Ambient temperature	°C (°F)	+5...+40 (+41...+104)
	Relative humidity	%	5...85
	Air pressure	kPa	70...106
	Condensation	–	Prohibited
	Precipitation	–	Prohibited
	Water from sources other than rain	–	Prohibited
	Formation of ice	–	Prohibited
<b>Mechanical conditions</b>	Based on class 1M2 according to IEC 60721-3-1:1997		
	Static load	kPa	5

# Ambient Conditions Cabinet Devices

## Operation

Procedure	Parameter	Unit	Value
<b>Environmental characteristics</b>	Based on class 3K3 according to IEC 60721-3-3: 2002		
	Ambient temperature	°C (°F)	+5...+40 (+41...+104)/ +55 (131) with power derating <sup>(1)</sup>
	Relative humidity	%	5...85
	Air pressure	kPa	70...106
	Heat radiation	–	Prohibited
	Condensation	–	Prohibited
	Precipitation	–	Prohibited
	Water from sources other than rain	–	Prohibited
Formation of ice	–	Prohibited	
<b>Mechanical conditions</b>	Based on class 3M4 according to IEC 60721-3-3: 2002		
	Displacement amplitude	mm / frequency range Hz	3.0 / 2...9
	Acceleration amplitude	m/s <sup>2</sup> / frequency range Hz	10 / 9...200
	Shock response spectrum type I	peak acceleration m/s <sup>2</sup>	100
<b>(1)</b> For more information, refer to the de-rating information in Special Conditions, page 68.			

## Transport

Procedure	Parameter	Unit	Value
<b>Environmental characteristics</b>	Based on class 2K4 according to IEC 60721-3-2:1997		
	Ambient temperature	°C (°F)	-40...+70 (-40...+158)
	Relative humidity	%	5...95
	Air pressure	kPa	70...106
	Condensation	–	Prohibited
	Precipitation	–	Prohibited (1)
	Water from sources other than rain	–	Prohibited (1)
<b>Mechanical conditions</b>	Based on class 2M2 according to IEC 60721-3-2:1997		
	Displacement amplitude	mm/ frequency range Hz	3.5 / 2...9
	Acceleration amplitude	m/s <sup>2</sup> /frequency range Hz	10 / 9...200
	Shock response spectrum type I	m/s <sup>2</sup>	100
	Shock response spectrum type II	m/s <sup>2</sup>	300
<b>(1)</b> Based on the product packaging			

For detailed information about storage conditions, refer to [Transport and Storage](#), page 84.

## Long-term Storage in Transport Packaging

Procedure	Parameter	Unit	Value
<b>Environmental characteristics</b>	Based on class 1K2 according to IEC 60721-3-1:1997		
	Ambient temperature	°C (°F)	+5...+40 (+41...+104)
	Relative humidity	%	5...85
	Air pressure	kPa	70...106
	Condensation	–	Prohibited
	Precipitation	–	Prohibited
	Water from sources other than rain	–	Prohibited
<b>Mechanical conditions</b>	Based on class 1M2 according to IEC 60721-3-1:1997		
	Static load	kPa	5

# Mechanical and Electrical Data

## General Technical Data

Designation	Unit	Value	Description
Peak force (straight segment)	N (lbf)	120 (27)	Force for acceleration and deceleration of carrier and load (10 % derating at the transition between segments)
Peak force (arc segment)	N (lbf)	100 (22.48)	
Total mass	kg (lb)	≤ 3 (6.61)	Carrier with tool and payload
Carrier nominal mass	kg (lb)	0.79 (1.74)	<b>NOTE:</b> For the calculation of the carrier acceleration, add a virtual mass of 96 grams (0.21 lb) due to the rotative inertia of the four carrier rollers.
Maximum acceleration at a total mass of 1 kg (2.2 lbs)	m/s <sup>2</sup> (ft/s <sup>2</sup> )	120 (394)	-
Maximum speed (straight segment)	m/s (ft/s)	4 (13.1)	-
Repetitive accuracy (+/-)	mm (in)	< 0.03 (0.0012) straight	Single carrier to the same, single position multiple times
		< 0.05 (0.002) arc	
Absolute accuracy (+/-)	mm (in)	< 0.25 (0.01) straight	Single carrier to positions within one segment
		< 0.35 (0.014) arc	
Carrier size (L x H)	mm (in)	50 x 147 (1.97 x 5.79)	Carrier
Length (straight segment)	mm (in)	299.8 (11.8)	-
Radius (arc segment)	mm (in)	256 (10.1)	Outer radius of the segment
Degree of protection (field devices)	IP	65	-
Degree of protection (cabinet devices)	IP	20	-
Cleanroom ISO class	—	6	According to DIN EN ISO 14644-14
Maximum number of carriers per track	#	200	Could be more, depending on the Sercos bandwidth and load.  For a larger number of carriers, contact your local Schneider Electric service representative.
Maximum number of carriers per segment (straight segment)	#	6	-
Maximum number of carriers per segment (arc segment)	#	4	-
Minimum carrier pitch	mm (in)	Length of carrier	-
Maximum track length	m (ft)	40 (131.2)	For longer systems, contact your local Schneider Electric service representative.
Track orientation	-	horizontal and vertical	For vertical orientation, only arc segments are allowed. Also refer to Track Orientation, page 45.
Safety function	-	Hardwired SFO (Safe Force Off)	-

## Technical Data for Safe Force Off (SFO)

Designation	Unit	Value
Maximum current consumption per segment	mA	15
Maximum potential difference between SFO- and PE (protective ground/earth)	Vdc	15
Input characteristics per segment:		
• SFO active (power stage off) voltage:	Vdc	$-3 \leq U_{SFO} \leq 5$
• Power stage active (SFO inactive) voltage:	Vdc	$15 \leq U_{SFO} \leq 30$
• Average current consumption (SFO active)	mA	$5 \leq I_{SFO} \leq 15$
• Maximum in-rush current consumption (SFO active)	mA	450
• Maximum dynamic test pulse duration	$\mu$ s	500
• Maximum dynamic test pulse frequency	Hz	20
• Maximum input capacitance – Lexium™ MC communication interconnect with SFO (Safe Force Off) connector	nF	16.5
• Maximum input capacitance per segment	nF	1.2
Input characteristics per SFO group (line connection)		
• Maximum number of inline segments:	–	68
• For more than 15 inline segments:	–	–
◦ Power stage active (SFO inactive) voltage (at cable length 2 m (6.56 ft))	• Vdc	• $20 \leq U_{SFO} \leq 30$
◦ Power stage active (SFO inactive) voltage (at cable length 20 m (65.62 ft))	• Vdc	• $22.5 \leq U_{SFO} \leq 30$

## Technical Data for Lexium™ MC12 long stator motor segments

Lexium™ MC12 long stator motor segment straight and Lexium™ MC12 long stator motor segments straight for automated lubrication

Designation	Unit	Value	Description
Peak force	N (lbf)	120 (27)	50 mm (1.97 in) carrier length
Standstill force	N (lbf)	30 (6.74)	50 mm (1.97 in) carrier length
Force constant	N (lbf)	12 (2.7)	A carrier current of 1 A leads to a force of 12 N (2.7 lbf).
Rated voltage	Vdc	48	-
Rated current	A	10	-
Mass	kg (lb)	7.9 (17.42)	-
Length	mm (in)	299.8 (11.8)	-
Width	mm (in)	162.6 (6.4)	-
Height	mm (in)	136 (5.35)	-

For more information, refer to the de-rating information in Special Conditions, page 68.

Lexium™ MC12 long stator motor segment arc

Designation	Unit	Value	Description
Peak force	N (lbf)	100 (22.48)	50 mm (1.97 in) carrier length
Standstill force	N (lbf)	30 (6.74)	50 mm (1.97 in) carrier length
Force constant	N (lbf)	10 (2.25)	A carrier current of 1 A leads to a force of 10 N (2.25 lbf).
Rated voltage	Vdc	48	-
Rated current	A	10	-
Mass	kg (lb)	4.5 (9.92)	-
Radius	mm (in)	256 (10.1)	Outer radius of segment
Width	mm (in)	194.1 (7.64)	-
Height	mm (in)	136 (5.35)	-
Arc angle	°	45	-

For more information, refer to the de-rating information in Special Conditions, page 68.

## Technical Data for Lexium™ MC interconnects

Lexium™ MC communication interconnect with connector

Designation	Unit	Value	Description
Voltage	Vdc	24	-
Current	A	2	Maximum current consumption SFO
Mass	kg (lb)	0.1 (0.22)	-
Length	mm (in)	77.5 (3.05)	-
Width	mm (in)	56.5 (2.22)	-
Height	mm (in)	22.65 (0.89)	-

Lexium™ MC communication interconnect without connector

Designation	Unit	Value	Description
Mass	kg (lb)	0.05 (0.11)	-
Length	mm (in)	46 (1.81)	-
Width	mm (in)	56.5 (2.22)	-
Height	mm (in)	22.65 (0.89)	-

Lexium™ MC power interconnect with connector

Designation	Unit	Value	Description
Voltage	Vdc	48	Rated DC bus voltage
Current	A	20	Rated current connector
DC bus current	A	60	Rated current common DC bus
Mass	kg (lb)	0.6 (1.32)	-
Length	mm (in)	173 (6.81)	-
Width	mm (in)	75 (2.95)	-
Height	mm (in)	82.2 (3.24)	-

Lexium™ MC power interconnect without connector

Designation	Unit	Value	Description
Mass	kg (lb)	0.4 (0.88)	-
Length	mm (in)	119.1 (4.69)	-
Width	mm (in)	75 (2.95)	-
Height	mm (in)	82.2 (3.24)	-

## Technical Data for Lexium™ MC guide rails

Lexium™ MC guide rail straight and Lexium™ MC guide rail straight for automated lubrication

Designation	Unit	Value	Description
Mass	kg (lb)	2.06 (4.54)	Mass per meter
Length	mm (in)	- 150.2 (5.91) 300.4 (11.83) 600.8 (23.65) 901.2 (35.48) 1201.6 (47.31) 1502 (59.13)	Corresponds to the length of: 0.5 straight segment 1 straight segment 2 straight segments 3 straight segments 4 straight segments 5 straight segments
Width	mm (in)	35 (1.38)	-
Height	mm (in)	8 (0.31)	-

Lexium™ MC guide rail arc

Designation	Unit	Value	Description
Mass	kg (lb)	2.06 (4.54)	Mass per meter
Width	mm (in)	35 (1.38)	-
Height	mm (in)	8 (0.31)	-
Arc angle	°	45 90 135 180 360	Guide rails arc end in a short straight at both sides. 1/4 ul (unit length) straight at one end and 3/4 ul straight at the other end. 1 ul = 300.4 mm (11.83 in).  This does not apply to the 360° arc.

**NOTE:** For a description of the Heavy-Duty references, refer to Technical Data for Heavy-Duty Guide Rail, page 185.

## Technical Data for Lexium™ MC12 carriers

Lexium™ MC12 carrier

Designation	Unit	Value	Description
Peak force	N (lbf)	120 (27)	Peak force for straight segments
Standstill force	N (lbf)	30 (6.74)	-
Maximum velocity	m/s (ft/s)	4 (13.1)	-
Mass	kg (lb)	0.79 (1.74)	<b>NOTE:</b> For the calculation of the carrier acceleration, add a virtual mass of 96 grams (0.21 lb) due to the rotative inertia of the four carrier rollers.
Width	mm (in)	91.6 (3.61)	-
Length	mm (in)	50 (1.97)	-
Height	mm (in)	145.1 (5.71)	-
Payload	kg (lb)	2.21 (4.87)	-

**NOTE:** For a description of the Heavy-Duty references, refer to Technical Data for Heavy-Duty Carrier, page 185.

## Technical Data for Lexium™ MC connection modules

Lexium™ MC connection module

Designation	Unit	Value	Description
Input voltage	Vdc	48	Rated input voltage
Input current	A	20	Rated input current
Output voltage	Vdc	48	Rated output voltage
Output current	A	20	Rated output current
Ready relay output voltage	Vac/Vdc	30	-
Ready relay output current	A	1	Resistive load
Mass	kg (lb)	0.725 (1.6)	-
Length	mm (in)	117 (4.6)	-
Width	mm (in)	63 (2.48)	-
Height	mm (in)	123.6 (4.87)	-

For de-rating refer to Special Conditions, page 68.

## Technical Data for Lexium™ MC braking resistor

### Lexium™ MC braking resistor

Designation	Unit	Value	Description
Resistance value	Ohm	3	-
Continuous power	W	100	-
Peak energy	J	4000	At 60 Vdc
Cable	m (ft)	2 (6.56)	-
Mass	kg (lb)	0.78 (1.72)	-

## Technical Data for Power Supply

The ABLU3A48200 universal power supply is designed and tested for the use with the Lexium™ MC12 multi carrier.

The power supply has the following characteristics:

Designation	Unit	Value	Description
Input – output separation	-	PELV	-
Adjustable output voltage	Vdc	48 – 56	-
Continuous output current	A	20	Electronically protected against overload, short circuit and no-load
Short term output current	A	30	For a maximum of 5 seconds
Parallel use	-	Up to 3 power supplies	-
Back-Feeding loads	Vdc	≤ 63	-
DC OK	Vdc	24, relay output	Potential-free

## Technical Data for Cables

### Lexium™ MC power cable

Designation	Unit	Value	Description
Voltage isolation	V	1000	-
Rated voltage	Vdc	48	-
Maximum continuous current	A	20	-
Temperature range	°C (°F)	-40...+80 (-40...+176 (fixed routing) -25...+80 (-13...+176 (mobile)	-
Cable diameter	mm (in)	10.3 ± 0.4 (0.41 ± 0.016)	-
Bending radius	-	5 x diameter (fixed routing)	-
Sheath	-	PUR, oil resistant, halogen-free, flame-retardant	-

**Sercos cable**

Designation	Unit	Value	Description
Voltage isolation	V	300	-
Temperature range	°C (°F)	-20...+60 (-4...+140)	-
Cable diameter	mm (in)	6.7 ± 0.2 (0.26 ± 0.008)	-
Bending radius	-	5 x diameter (fixed routing) 10 x diameter (flexing, 5 million bending cycles)	-
Sheath	-	PUR, oil resistant, halogen-free, flame-retardant	-
Cable type and shielding	-	CAT6 with S/FTP (Sercos)	-

**SFO cable**

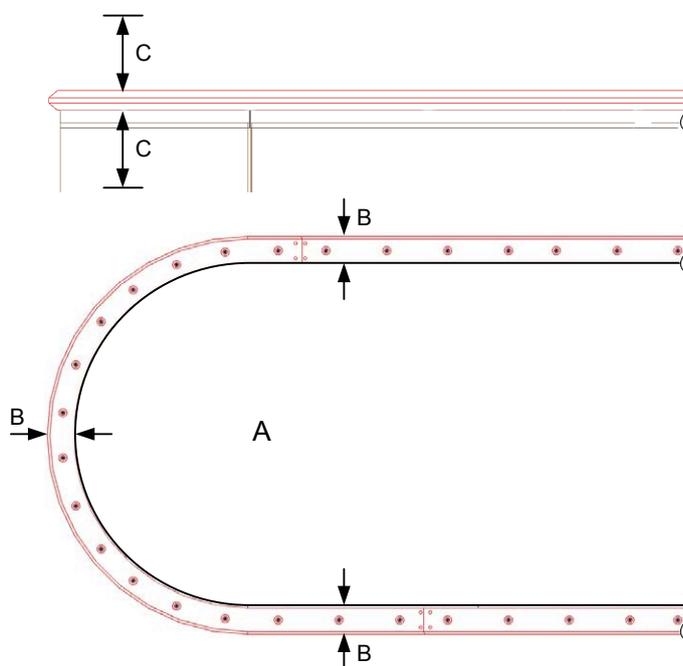
Designation	Unit	Value	Description
Voltage isolation	Vac	250	-
	Vdc	300	
Rated voltage	Vdc	24	-
Maximum continuous current	A	4	-
Temperature range	°C (°F)	-40...+80 (-40...+176) fixed	-
		-5...80 (23...176 ) flexing	
Cable outer diameter	mm (in)	5.2 mm (0.20)	-
Sheath	-	PUR, oil resistant, halogen-free, flame-retardant	-

# Mounting Plate

## Overview

The following prerequisites must be met by the mounting plate:

- The mounting plate must be flat, level and clean. The flatness of the mounting plate must be at least 0.4 mm/m (0.0048 in/ft).
- The mounting plate must support the weight of the fully assembled system.
- Have the mounting plate made of aluminum with a thickness of at least 15 mm (0.59 in) to help to ensure a sufficient heat dissipation. This also requires a good thermal connection between the segments and the mounting plate.  
If you use other material you must verify to reach a sufficient heat dissipation.
- To help to install the guide rails:
  - The size of the mounting plate (**A**) must be about 70 mm (2.76 in) (= 2 x **B**) smaller than the shape of your system layout.
  - A working space (**C**) of about 100 mm (3.94 in) must be available above and below the rails.



- The mounting plate must be provided with all necessary holes and threads. The drilling templates of the components are part of this documentation. Refer to *Dimensions and Drilling Templates*, page 209.

You can download the CAD files of the individual components from the Schneider Electric homepage.

**NOTE:** For a large system, use a frame with several mounting plates installed.

Do not move/lift the pre-assembled Lexium™ MC12 multi carrier if it is not installed on a mounting plate.

If you plan to assemble the Lexium™ MC12 multi carrier track outside of your machine, equip the mounting plate with suitable transport devices to be able to lift the mounted track into your machine.

## **▲ WARNING**

### **HEAVY AND/OR FALLING PARTS**

- Use a suitable crane or other suitable lifting gear for mounting the system.
- Use the necessary personal protective equipment (for example, protective shoes, protective glasses and protective gloves).
- Mount the system so that it cannot come loose (use of securing screws with appropriate tightening torque), especially in cases of fast acceleration or continuous vibration.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## **Service Life**

### **Overview**

The service life of the Lexium™ MC12 multi carrier is a function of the mean forces and torques that act in the system.

For detailed information about the service life of the system, refer to [Maintenance Plan](#), page 159.

# Transport and Unpacking

## Transport and Storage

### Transport Conditions

The components of the Lexium™ MC12 multi carrier must be handled with care. Shocks and impacts may damage the components. Damage may lead to reduced running accuracy, reduced service life, or to an inoperable Lexium™ MC12 multi carrier.

The components of the system are transported in cardboard boxes. The respective box dimensions vary according to the dimensions of the components and the order quantity.

For detailed information about transport conditions, refer to *Ambient Conditions*, page 71.

### Storage

The components of the Lexium™ MC12 multi carrier can be stored inside the packaging or unpacked. In both cases, ensure that they are stored in a sheltered and dry place. Avoid humidity which can have corrosive effects on the components.

**NOTE:** When stored, the components of the Lexium™ MC12 multi carrier need to be on a level surface.

For detailed information about storage conditions, refer to *Ambient Conditions*, page 71.

## Transporting and Storing the Lexium™ MC guide rails

Lexium™ MC guide rails can bend if handled improperly and may then no longer be usable.

### **NOTICE**

#### **INOPERABLE EQUIPMENT**

Do not bend or otherwise distort the guide rails.

**Failure to follow these instructions can result in equipment damage.**

## Transporting the Lexium™ MC12 carriers

The carriers must be transported in their associated protective packaging, which helps to reduce the effects of the strong drive magnets.

**NOTE:** Exposed or uninstalled carriers must have the protective cover of the drive magnets installed at all times. The cover is only removed at the time of carrier installation.

- Carriers have strong local magnetic fields. Refer to *Transporting the Lexium™ MC12 carriers*, page 84.
- The carriers have strong drive magnets and can attract metal objects that are in their proximity.
- A carrier can move suddenly and fast due to magnetic attraction.

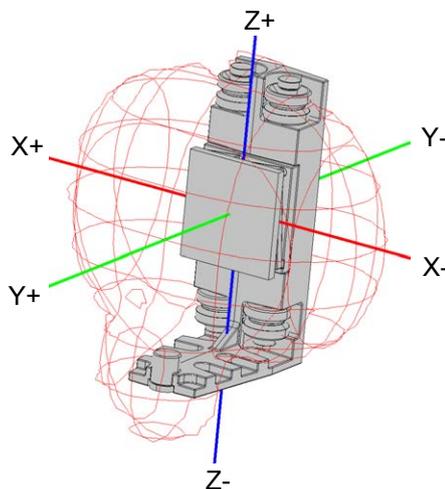
## ▲ WARNING

### STRONG MAGNETIC FIELDS

- Keep persons with medical implants (for example, pacemakers or metal implants) or metallic body jewelry away from the carriers and segments with a minimum distance of 30 cm (11.9 in).
- Always leave the protective cover of the drive magnets in place for all exposed or uninstalled carriers.
- Do not put your hands or fingers between the carriers and segments.
- Do not place metallic tools in the vicinity of the carriers and segments.
- Do not place electromagnetically sensitive devices near the carriers and segments.
- Do not place credit cards or electronic/magnetic media in the vicinity of the carriers and segments.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

The graphic shows the magnetic field of a carrier with a protective cover for the drive magnets.



**NOTE:** To avoid interferences with implanted devices, keep at least the following minimum distances from the carrier (with the protective cover in place) to achieve a flux density of less than 0.5 mT (milli-Tesla) according to DIRECTIVE 2013/35/EU.

Dimension	+	-
X	85 mm (3.35 in)	85 mm (3.35 in)
Y	70 mm (2.76 in)	25 mm (0.99 in)
Z	75 mm (2.96 in)	105 mm (4.14 in)

**NOTE:** If you remove the protective cover, the distance to be kept to all carrier and segment surfaces increases to 300 mm (11.9 in).

The carrier has two magnets which, together with the magnetic fields in the segments, move the carrier on the track. These two magnets are glued onto the carrier. A shock to the carrier can cause the glued-on magnets to flake off and the magnets can splinter.

In addition, the carrier has an encoder magnet. This can be demagnetized by improper handling, for example, if the magnets of another carrier come too close.

## **▲ WARNING**

### **INOPERABLE EQUIPMENT**

- Do not drop the carrier.
- Do not strike the carrier.
- Keep a minimum distance of 50 mm (1.97 in) between the encoder magnet and other magnets.
- Ensure to fill the lubrication reservoirs of the carriers before first use.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

For information on filling the lubrication reservoirs refer to Filling the Lubrication Reservoirs, page 175.

# Unpacking

## Overview

Before you start to unpack and position the components of the Lexium™ MC12 multi carrier, pay special attention to the accident prevention regulations and the safety regulations.

<b>▲ WARNING</b>
<p><b>CRUSHING, SHEARING, CUTTING AND HITTING DURING HANDLING</b></p> <ul style="list-style-type: none"> <li>• Observe the general construction and safety regulations for handling and assembly.</li> <li>• Use appropriate mounting and transport equipment and use appropriate tools.</li> <li>• Prevent clamping and crushing by taking appropriate precautions.</li> <li>• Cover edges and angles to protect against cutting damage.</li> <li>• Wear suitable protective clothing (for example, protective goggles, protective boots, protective gloves).</li> </ul> <p><b>Failure to follow these instructions can result in death, serious injury, or equipment damage.</b></p>

## Unpacking

Step	Action
1	Transport the components of the Lexium™ MC12 multi carrier in its packaging as close as possible to the installation site.
2	Open the cardboard box with appropriate tools.
3	Verify the components of the Lexium™ MC12 multi carrier for transport damage.
4	<b>NOTE:</b> Also refer to Transporting the Lexium™ MC12 carriers, page 84.

**NOTE:** In case of any transport damage, contact your local Schneider Electric service representative.

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# Mechanical Installation

## Information About Installation

### Overview

Proceed with care during the following steps in order to help to prevent the following points:

- Injuries and material damage
- Incorrect installation and programming of components
- Incorrect operation of components
- Use of non-authorized cables or modified components

For further Information, refer to Specific Safety Information, page 15.

**NOTE:** For additional information specific to the Heavy-Duty system, refer to Mechanical Installation, page 186.

### Accessibility for Servicing

When mounting the Lexium™ MC12 multi carrier, consider that some components may have to be accessed for servicing. Allow for such accessibility in your mechanical design.

## Mounting the Lexium™ MC12 multi carrier

### Prerequisites

The following prerequisites must be met to mount your Lexium™ MC12 multi carrier:

- The layout of your Lexium™ MC12 multi carrier is defined.
- It is specified where the Lexium™ MC power cables, the Sercos cable, and SFO cables will be connected.
- All components to build the requested system layout are available.
- All components have the same temperature (for the storage temperature range, refer to *Ambient Conditions*, page 71).
- The mounting plate for your system is prepared. Refer to chapter *Mounting Plate*, page 82.

#### **▲ WARNING**

##### **HEAVY AND/OR FALLING PARTS**

- Use a suitable crane or other suitable lifting gear for mounting the system.
- Use the necessary personal protective equipment (for example, protective shoes, protective glasses and protective gloves).
- Mount the system so that it cannot come loose (use of securing screws with appropriate tightening torque), especially in cases of fast acceleration or continuous vibration.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

### Open Track

With an open track, the carriers could leave the track at the ends. Therefore, mechanical hard stops must be mounted at both ends of an open track.

#### **▲ WARNING**

##### **UNINTENDED EQUIPMENT OPERATION**

Mount mechanical hard stops at both ends of an open track.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

Refer to *Mounting the Hard Stops*, page 106.

## Mounting the Lexium™ MC12 multi carrier Track

The components of the Lexium™ MC12 multi carrier must be handled with care. Refer to *Transport and Storage*, page 84.

Lexium™ MC guide rails can bend if handled improperly and may then no longer be usable.

## **NOTICE**

### **INOPERABLE EQUIPMENT**

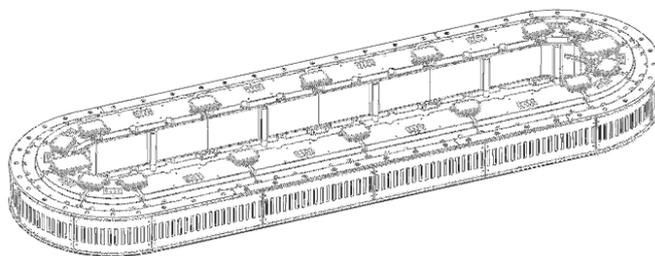
Do not bend or otherwise distort the guide rails.

**Failure to follow these instructions can result in equipment damage.**

## **Horizontal Mounting of the Track without Automated Lubrication**

This chapter presents the horizontal mounting for the segments and guide rails without automated lubrication. For the automated lubrication track, refer to Horizontal Mounting of the Track with Automated Lubrication, page 96.

### **General Information**

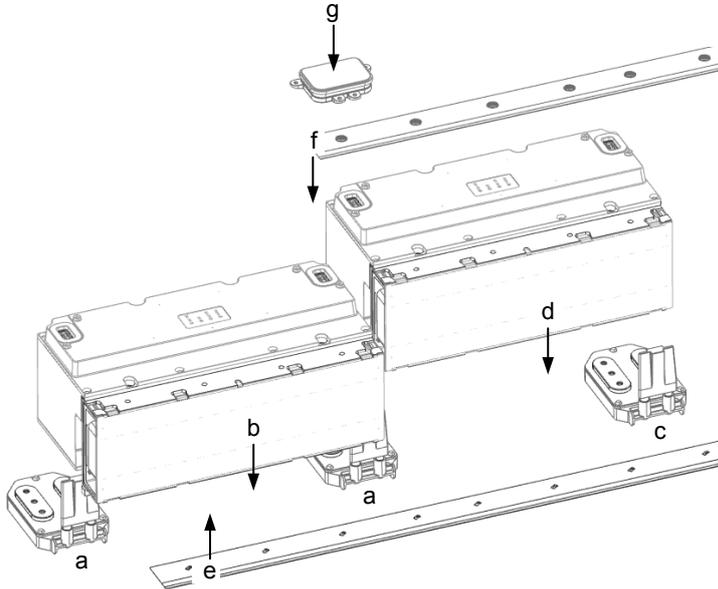
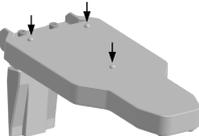


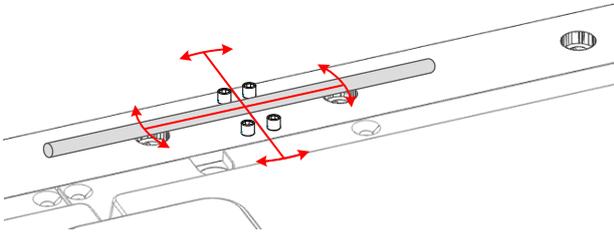
When mounting the system, apply a tightening torque of:

- 7.2 Nm (63.7 lbf-in) for rails
- 10.1 Nm (89.4 lbf-in) for segments

## Mounting

The steps for mounting the system are described in the following table:

Step	Action
1	<p>Place two Lexium™ MC power interconnects (a) at a distance of one segment length at the intended location on the mounting plate.</p>  <p>To achieve the correct distance between the interconnects, insert the three semi-circular positioning knobs on the bottom of the interconnects into the corresponding holes in the mounting plate.</p>  <p><b>NOTE:</b> If a power interconnect is used to supply your system with power from the control cabinet, use the respective reference of the Lexium™ MC power interconnects / Power disconnecter, page 31.</p>
2	<p>Insert a segment (b) from above into the two interconnects. Make sure that the segment is not tilted during insertion. The alignment aid and the oval fitting of the power interconnects help you to join the segments in a straight alignment.</p> <p>Fasten the segment loosely with three screws (M6x120 class 8.8 ISO 4762) to the mounting plate so that it will stay in place but can still be shifted a little.</p>
3	<p>Place the next Lexium™ MC interconnect (c) at a distance of one segment length at the intended location on the mounting plate.</p> <p>To achieve the correct distance between the interconnects, insert the three semi-circular positioning knobs on the bottom of the interconnect into the corresponding holes in the mounting plate.</p> <p>Insert a segment (d) from above into the two interconnects. Make sure that the segment is not tilted during insertion. The alignment aid and the oval fitting of the power interconnects help you to join the segments in a straight alignment.</p> <p>Fasten the segment loosely with three screws.</p>
4	<p>Proceed in the same way, using straight and arc segments to build your system layout.</p> <p>With an open track, proceed as described under <i>Hard Stops\Horizontal Mounting</i>.</p>
5	<p>When all the segments are in place, install the bottom Lexium™ MC guide rails (e), starting at an arc segment or at an open end of the track. The rails are mounted offset to the segments by design.</p>
6	<p>Position a Lexium™ MC guide rail (e) under the segments and loosely fasten the rail with M6x16 class 8.8 DIN 7984 screws.</p> <p><b>NOTE:</b> Make sure that the holes in the rails are aligned with the holes in the segments.</p>

Step	Action
7	<p>Align the next rail. Make sure that the rails fit tightly together at the transition points.</p> <p>Use M5x8 (ISO 4026) set screws to fine-tune the rail alignment. Unscrew the set screws approximately halfway out of the rail to avoid contact with the support surface for the rails. To install the rails, slide a suitable mounting tool between the screws (in or across the rail direction) and carefully push them into place.</p> <p><b>NOTE:</b> Avoid scratching the surface of the rails.</p>  <p>After aligning the rails, screw the set screws back into the rails.</p>
8	Tighten the two screws at the left and the right side of the transition of both bottom rails at the segment with a torque of 7.2 Nm (63.7 lbf-in).
9	Proceed in the same way with the subsequent bottom rails until all bottom rails are installed.
10	Repeat steps 5 - 9 for the corresponding top rails (f).
11	<p>If you need to adjust the height of a rail at the transition of two rails, unfasten the screws closest to the transition, adjust the two set screws (M5x8 ISO 4026) and fasten the rail again by tightening the first and the last fastening screws with 7.2 Nm (63.7 lbf-in).</p> <p><b>NOTE:</b> Before adjusting the height of the rails, apply medium-strength thread locking adhesive to the M5x8 set screws to prevent them from coming loose during machine operation.</p> <p><b>NOTE:</b> Make sure that the height of the rails is accurately aligned to ensure smooth guidance of the carrier. The sound of the carrier, while manually pushing over the transition of two rails, is a good indicator of the alignment quality of the rails. There should be almost no sound.</p>
12	Repeat step 11 for all bottom and top rails.
13	Hand tighten the M5 set screws that were not used when adjusting the height of the rails (step 12). Make sure that they are screwed in completely.
14	Tighten the rest of the guide rail screws with the a torque of 7.2 Nm (63.7 lbf-in).
15	After you installed the rails, tighten the screws of the Lexium™ MC12 long stator motor segments with a torque of 10.1 Nm (89.4 lbf-in).
16	<p>Insert the Lexium™ MC communication interconnects (g) from top between the segments. Attach the communication interconnect with its four M3x8 ISO 14583 screws with a torque of 0.6 Nm (5.31 lbf-in).</p> <p><b>NOTE:</b> If a communication interconnect is used to connect the system to the Sercos bus and/or a Safe Force Off (SFO) control device, refer to the Lexium™ MC communication interconnects, page 32.</p>
17	<p>Use the Lexium™ MC power cables, the Sercos cable, and the SFO cables to connect your Lexium™ MC12 multi carrier with the control cabinet.</p> <p>For details, refer to chapter Electrical Installation, page 124.</p> <p><b>Result:</b> The Lexium™ MC12 multi carrier track is installed and ready for verification.</p> <p>Also refer to Verifying the Installation, page 155.</p>

**NOTE:** If you mounted the Lexium™ MC12 multi carrier track outside of your machine, disconnect the track from the control cabinet (power, Sercos, and SFO), equip the mounting plate with the suitable transport devices, and lift the Lexium™ MC12 multi carrier track into your machine, and then re-connect it to the control cabinet.

**⚠ ⚠ DANGER****HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

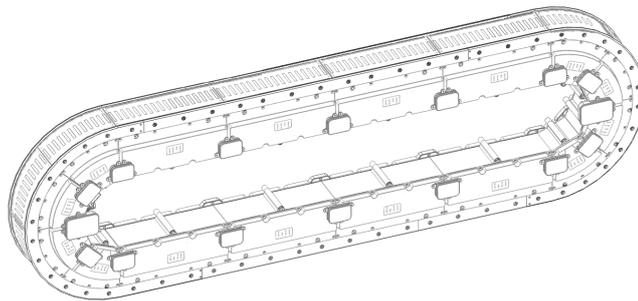
- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to this equipment.
- Use only the specified voltage when operating this equipment and any associated equipment.

**Failure to follow these instructions will result in death or serious injury.**

## Vertical Mounting of the Track without Automated Lubrication

This chapter presents the vertical mounting for the segments and guide rails without automated lubrication. For the automated lubrication track, refer to Vertical Mounting of the Track with Automated Lubrication, page 101.

### General Information

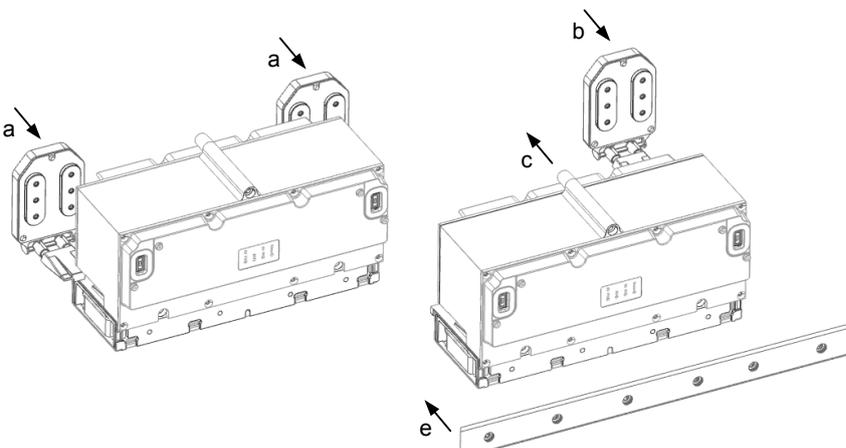
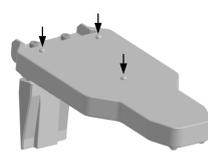
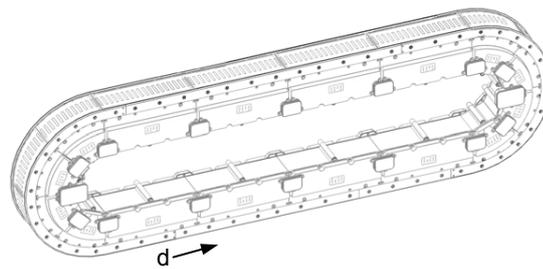


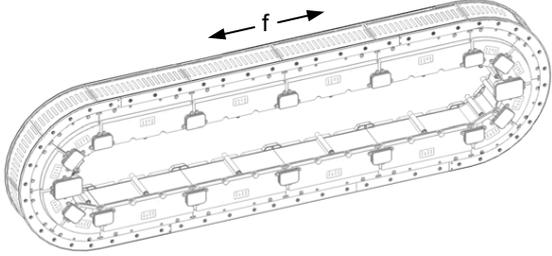
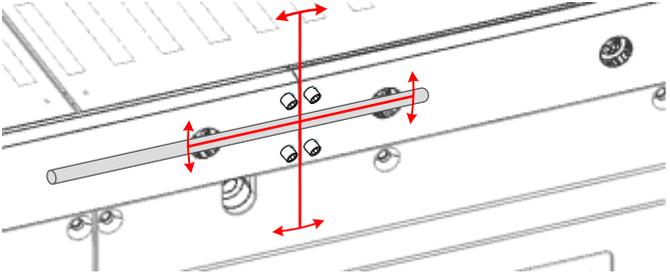
When mounting the system, apply a tightening torque of:

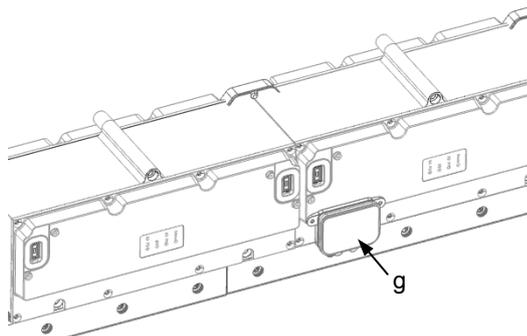
- 7.2 Nm (63.7 lbf-in) for rails
- 10.1 Nm (89.4 lbf-in) for segments

## Mounting

The steps for mounting the system are described in the following table:

Step	Action
1	<p>Insert two Lexium™ MC power interconnects (a) into a segment sideways. Make sure that the power interconnects are not tilted during insertion.</p> <p><b>NOTE:</b> If a power interconnect is used to supply your system with power from the control cabinet, use the respective reference of the Lexium™ MC power interconnects / Power disconnecter, page 31.</p> 
2	<p>Fasten the segment loosely with three screws (M6x120 class 8.8 ISO 4762) to the mounting plate so that it will stay in place but can still be shifted a little.</p> <p>To achieve the correct distance between the interconnects, insert the three semi-circular positioning knobs on the bottom of the interconnects into the corresponding holes in the mounting plate.</p> 
3	<p>Insert one Lexium™ MC interconnect (b) into another segment.</p>
4	<p>Insert the segment (c) sideways into the power interconnect of the already mounted segment.</p> <p><b>NOTE:</b> It is a good practice to start with the lower left straight segment (d).</p> 
5	<p>Fasten the segment loosely with three screws to the mounting plate so that it will stay in place but can still be shifted a little.</p>
6	<p>Proceed in the same way, using straight and arc segments to build your system layout.</p> <p>With an open track, proceed as described under <a href="#">Hard Stops\Vertical Mounting</a>.</p>
7	<p>When all the segments are in place, tighten the screws of the segments with a torque of 10.1 Nm (89.4 lbf-in).</p>

Step	Action
8	<p>When all segments are in place and screwed tight, install the top Lexium™ MC guide rails (e), starting in the middle of your track (f) or, in case of an open track, at an open end of the track. The rails are mounted offset to the segments by design.</p> 
9	<p>Position a Lexium™ MC guide rail (e) on the segments and loosely fasten the rail with M6x16 class 8.8 DIN 7984 screws.</p> <p><b>NOTE:</b> Make sure that the holes in the rails are aligned with the holes in the segments.</p>
10	<p>Proceed in the same way with the subsequent top rails until all top rails are installed.</p>
11	<p>Repeat steps 9 - 10 for the corresponding bottom rails.</p> <p><b>Result:</b> The top rails and the bottom rails are in place.</p>
12	<p>Start aligning all straight top rails from the middle of the track. (f).</p>
13	<p>Align rails at the middle segment. Make sure that the rails fit tightly together at the transition points.</p> <p>Use M5x8 (ISO 4026) set screws to fine-tune the rail alignment. Unscrew the set screws approximately halfway out of the rail to avoid contact with the support surface for the rails. To install the rails, slide a suitable mounting tool between the screws (in or across the rail direction) and carefully push them into place.</p> <p><b>NOTE:</b> Avoid scratching the surface of the rails.</p>  <p>After aligning the rails, screw the set screws back into the rails.</p>
14	<p>If you need to adjust the height of a rail at the transition of two rails, unfasten the screws closest to the transition, adjust the two set screws (M5x8 ISO 4026) and fasten the rail again by tightening the first and the last fastening screws with 7.2 Nm (63.7 lbf-in).</p> <p><b>NOTE:</b> Before adjusting the height of the rails, apply medium-strength thread locking adhesive to the M5x8 set screws to prevent them from coming loose during machine operation.</p> <p><b>NOTE:</b> Make sure that the height of the rails is accurately aligned to ensure smooth guidance of the carrier. The sound of the carrier, while manually pushing over the transition of two rails, is a good indicator of the alignment quality of the rails. There should be almost no sound.</p>
15	<p>Hand tighten the M5 set screws that were not used when adjusting the height of the rails (step 14). Make sure that they are screwed in completely.</p>
16	<p>Proceed in the same way with the subsequent straight top rails until all straight top rails are aligned.</p>
17	<p>Proceed in the same way with the straight bottom rails.</p>
18	<p>After aligning the straight rails, align the arc rails in the same way.</p>
19	<p>After aligning all rails, tighten the remaining fastening screws of all rails with a torque of 7.2 Nm (63.7 lbf-in).</p>

Step	Action
20	<p>Insert the Lexium™ MC communication interconnects (g) sideways between the segments. Attach the communication interconnect with its four M3x8 ISO 14583 screws with a torque of 0.6 Nm (5.31 lbf-in).</p>  <p><b>NOTE:</b> If a communication interconnect is used to connect the system to the Sercos bus and/or a Safe Force Off (SFO) control device, refer to the Lexium™ MC communication interconnects, page 32.</p>
21	<p>Use the Lexium™ MC power cables, the Sercos cable, and the SFO cables to connect your Lexium™ MC12 multi carrier with the control cabinet.</p> <p>For details, refer to chapter Electrical Installation, page 124.</p> <p><b>Result:</b> The Lexium™ MC12 multi carrier track is installed and ready for verification.</p> <p>Also refer to Verifying the Installation, page 155.</p>

**NOTE:** If you mounted the Lexium™ MC12 multi carrier track outside of your machine, disconnect the track from the control cabinet (power, Sercos, and SFO), equip the mounting plate with the suitable transport devices, and lift the Lexium™ MC12 multi carrier track into your machine, and then re-connect it to the control cabinet.

## ⚡⚠ DANGER

### HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to this equipment.
- Use only the specified voltage when operating this equipment and any associated equipment.

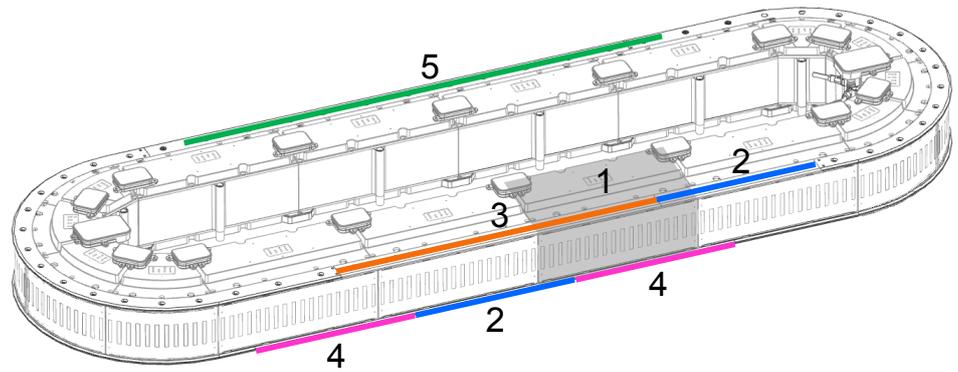
**Failure to follow these instructions will result in death or serious injury.**

## Horizontal Mounting of the Track with Automated Lubrication

### General Information

For a Lexium™ MC12 multi carrier track with automated lubrication, you need at minimum one Lexium™ MC12 long stator motor segment straight for automated lubrication (marked **1** in the example graphic below) and two corresponding guide rails for automated lubrication (marked **2** in the example graphic below).

**NOTE:** Do not use a lubrication segment immediately before or after a curve. Consequently, for using automated lubrication on a closed Lexium™ MC12 multi carrier track, you need at least three straight segments in a row.



Element	Color code	Description	References
1	Grey	Lexium™ MC12 long stator motor segment straight for automated lubrication	LXMMC12MS06-S10L
2	Blue	Lexium™ MC guide rail straight for automated lubrication (1 unit length (ul)) with lubricant opening	LXMMCRS0A06-S10L
3	Orange	Lexium™ MC guide rail straight (2 ul)	LXMMCRS0A12-S100
4	Pink	Lexium™ MC guide rail straight (1 ul)	LXMMCRS0A06-S100
5	Green	Lexium™ MC guide rail straight (3 ul)	LXMMCRS0A18-S100

Also refer to Product Overview, page 29.

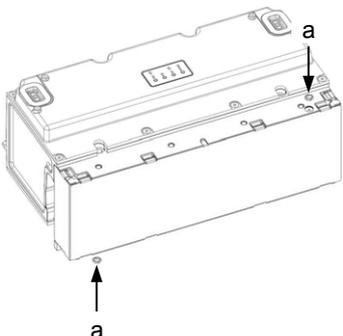
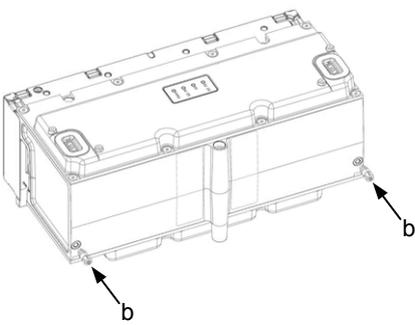
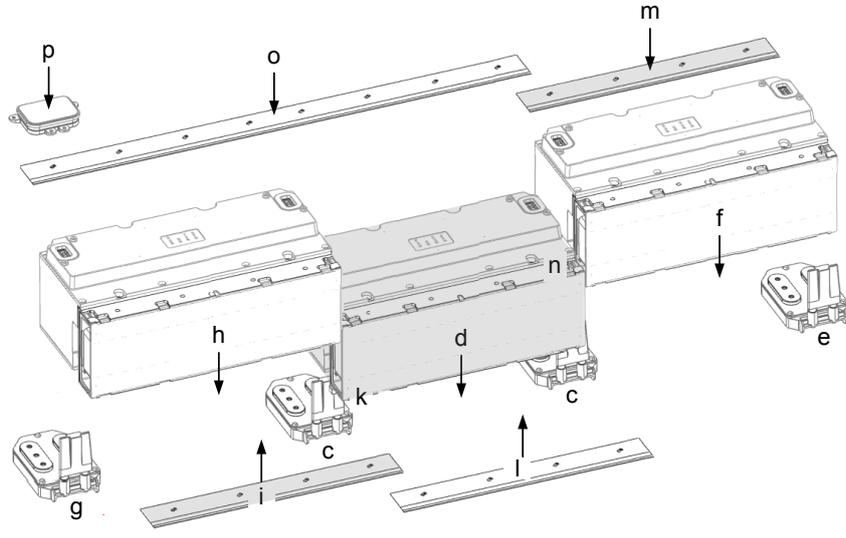
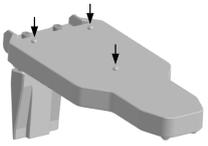
For more information on the automated lubrication system, refer to *Automated Lubrication*, page 176.

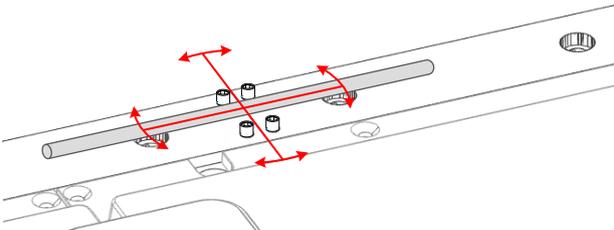
When mounting the system, apply a tightening torque of:

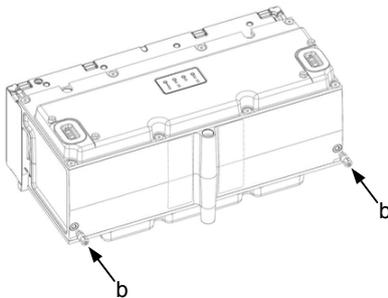
- 7.2 Nm (63.7 lbf-in) for rails
- 10.1 Nm (89.4 lbf-in) for segments
- 1.5 Nm (13.3 lbf-in) for lubrication connectors

## Mounting

The steps for mounting the system are described in the following table:

Step	Action
1	<p>To prepare the Lexium™ MC12 long stator motor segment straight for automated lubrication:</p> <p>First, insert the two O-rings (a) into the appropriate cavities at the top and the bottom of the segment.</p> <p><b>NOTE:</b> Verify the correct positioning of the O-rings, which are used to seal the bottom and top guide rails for automated lubrication.</p>  <p>Then, screw in the two threaded connectors (b) into the appropriate openings at the rear side of the segment. Tighten the connectors with a torque of 1.5 Nm (13.3 lbf-in).</p> 
2	<p>Place two Lexium™ MC power interconnects (c) at a distance of one segment length at the intended location on the mounting plate.</p>  <p>To achieve the correct distance between the interconnects, insert the three semi-circular positioning knobs on the bottom of the interconnects into the corresponding holes in the mounting plate.</p>  <p><b>NOTE:</b> If a power interconnect is used to supply your system with power from the control cabinet, use the respective reference of the Lexium™ MC power interconnects / Power disconnecter, page 31.</p>

Step	Action
3	<p>Insert the Lexium™ MC12 long stator motor segment straight for automated lubrication (d) from above into the two interconnects. Make sure that the segment is not tilted during insertion. The alignment aid and the oval fitting of the power interconnects help you to join the segments in a straight alignment.</p> <p><b>NOTE:</b> The first straight position before and after a curve is not allowed for installing a lubrication segment.</p> <p>Fasten the segment loosely with three screws (M6x120 class 8.8 ISO 4762) to the mounting plate so that it will stay in place but can still be shifted a little.</p>
4	<p>Place the next Lexium™ MC interconnect (e) at a distance of one segment length at the intended location on the mounting plate.</p> <p>To achieve the correct distance between the interconnects, insert the three semi-circular positioning knobs on the bottom of the interconnect into the corresponding holes in the mounting plate.</p> <p>Insert a Lexium™ MC12 long stator motor segment straight (f) from above into the two interconnects. Make sure that the segment is not tilted during insertion. The alignment aid and the oval fitting of the power interconnects help you to join the segments in a straight alignment.</p> <p>Fasten the segment loosely with three screws.</p>
5	<p>Place the next Lexium™ MC interconnect (g) at a distance of one segment length at the intended location on the mounting plate.</p> <p>Insert a Lexium™ MC12 long stator motor segment straight (h) from above into the two interconnects. Make sure that the segment is not tilted during insertion. The alignment aid and the oval fitting of the power interconnects help you to join the segments in a straight alignment.</p> <p>Fasten the segment loosely with three screws.</p>
6	<p>Proceed in the same way, using straight and arc segments to build your system layout.</p> <p>With an open track, proceed as described under Hard Stops\Horizontal Mounting.</p> <p><b>NOTE:</b> For tracks with automated lubrication, make sure to install sufficient lubrication segments (and the corresponding lubrication guide rails), depending on the length of the track (refer to Lubrication System Requirements, page 177).</p>
7	<p>When all the segments are in place, install the bottom guide rails, starting with the Lexium™ MC guide rail for automated lubrication (i).</p> <p>Position the lubrication rail offset under the part of the lubrication segment (d) with the bottom lubricant opening (k) and loosely fasten the rail with M6x16 class 8.8 DIN 7984 screws.</p> <p><b>NOTE:</b> Make sure that the sealing O-rings are correctly positioned when mounting the rail.</p> <p><b>NOTE:</b> The rails are mounted offset to the segments by design.</p> <p><b>NOTE:</b> Make sure that the holes in the rails are aligned with the holes in the segments.</p>
8	<p>Align the next non-automated lubrication rail (l). Make sure that the rails fit tightly together at the transition points.</p> <p>Use M5x8 (ISO 4026) set screws to fine-tune the rail alignment. Unscrew the set screws approximately halfway out of the rail to avoid contact with the support surface for the rails. To install the rails, slide a suitable mounting tool between the screws (in or across the rail direction) and carefully push them into place.</p> <p><b>NOTE:</b> Avoid scratching the surface of the rails.</p>  <p>After aligning the rails, screw the set screws back into the rails.</p>
9	<p>Tighten the two screws at the left and the right side of the transition of both bottom rails at the segment with a torque of 7.2 Nm (63.7 lbf-in).</p>
10	<p>Proceed in the same way with the subsequent bottom rails until all bottom rails are installed.</p>

Step	Action
11	<p>Repeat steps 7 - 10 for the corresponding top rails, starting with the Lexium™ MC guide rail for automated lubrication (m) and continue with a Lexium™ MC guide rail (o) with double length (2 ul), in this example.</p> <p><b>NOTE:</b> Make sure that the guide rail for automated lubrication is installed offset on the part of the lubrication segment (d) with the top lubricant opening (n).</p>
12	<p>If you need to adjust the height of a rail at the transition of two rails, unfasten the screws closest to the transition, adjust the two set screws (M5x8 ISO 4026) and fasten the rail again by tightening the first and the last fastening screws with 7.2 Nm (63.7 lbf-in).</p> <p><b>NOTE:</b> Before adjusting the height of the rails, apply medium-strength thread locking adhesive to the M5x8 set screws to prevent them from coming loose during machine operation.</p> <p><b>NOTE:</b> Make sure that the height of the rails is accurately aligned to ensure smooth guidance of the carrier. The sound of the carrier, while manually pushing over the transition of two rails, is a good indicator of the alignment quality of the rails. There should be almost no sound.</p>
13	Repeat step 12 for all bottom and top rails.
14	Hand tighten the M5 set screws that were not used when adjusting the height of the rails (step 12). Make sure that they are screwed in completely.
15	Tighten the rest of the guide rail screws with the a torque of 7.2 Nm (63.7 lbf-in).
16	After you installed the rails, tighten the screws of the Lexium™ MC12 long stator motor segments with a torque of 10.1 Nm (89.4 lbf-in).
17	<p>Insert the Lexium™ MC communication interconnects (p) from top between the segments. Attach the communication interconnect with its four M3x8 ISO 14583 screws with a torque of 0.6 Nm (5.31 lbf-in).</p> <p><b>NOTE:</b> If a communication interconnect is used to connect the system to the Sercos bus and/or a Safe Force Off (SFO) control device, refer to the Lexium™ MC communication interconnects, page 32.</p>
18	<p>Use the Lexium™ MC power cables, the Sercos cable, and the SFO cables to connect your Lexium™ MC12 multi carrier with the control cabinet.</p> <p>For details, refer to chapter Electrical Installation, page 124.</p>
19	<p>Connect the lubricant lines to the lubrication connectors (b) at the rear side of the segment. Tighten the union nuts with a torque of 1.5 Nm (13.3 lbf-in).</p>  <p><b>Result:</b> The Lexium™ MC12 multi carrier track is installed and ready for verification.</p> <p>Also refer to Verifying the Installation, page 155.</p>

**NOTE:** If you mounted the Lexium™ MC12 multi carrier track outside of your machine, disconnect the track from the control cabinet (power, Sercos, and SFO), equip the mounting plate with the suitable transport devices, and lift the Lexium™ MC12 multi carrier track into your machine, and then re-connect it to the control cabinet.

**⚠ ⚠ DANGER****HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to this equipment.
- Use only the specified voltage when operating this equipment and any associated equipment.

**Failure to follow these instructions will result in death or serious injury.**

## Vertical Mounting of the Track with Automated Lubrication

### General Information

For a Lexium™ MC12 multi carrier track with automated lubrication, you need at minimum one Lexium™ MC12 long stator motor segment straight for automated lubrication (marked **1** in the Horizontal Mounting of the Track with Automated Lubrication, page 96 example graphic) and two corresponding guide rails for automated lubrication (marked **2** in the Horizontal Mounting of the Track with Automated Lubrication, page 96 example graphic).

**NOTE:** Do not use a lubrication segment immediately before or after a curve. Consequently, For using automated lubrication on a closed Lexium™ MC12 multi carrier track, you need at least three straight segments in a row.

You find an example for a track installation with automated lubrication in Horizontal Mounting of the Track with Automated Lubrication, page 96.

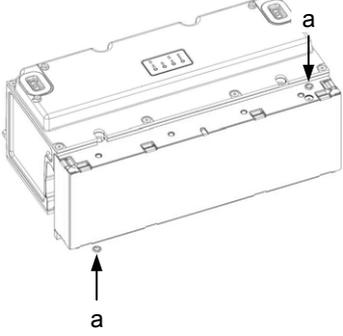
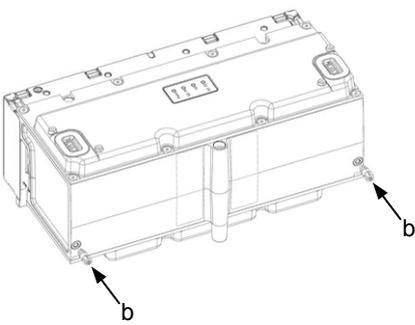
For more information on the automated lubrication system, refer to Automated Lubrication, page 176.

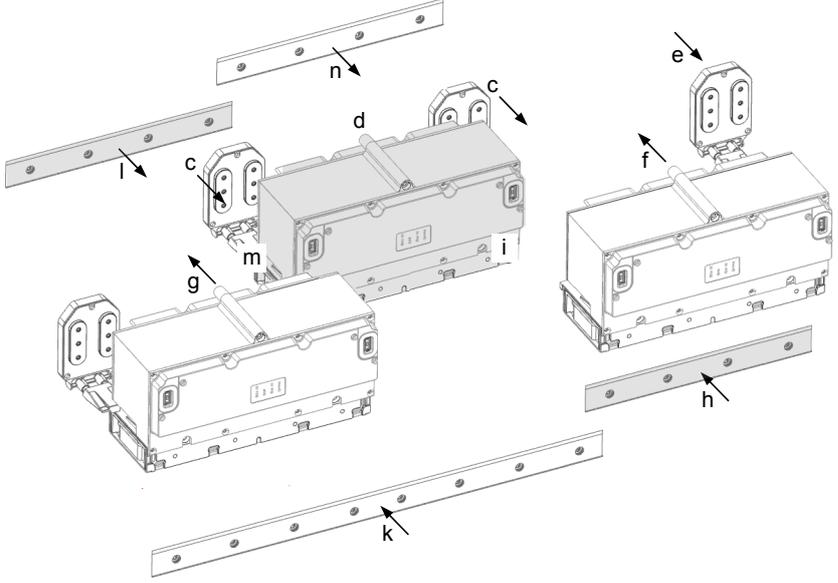
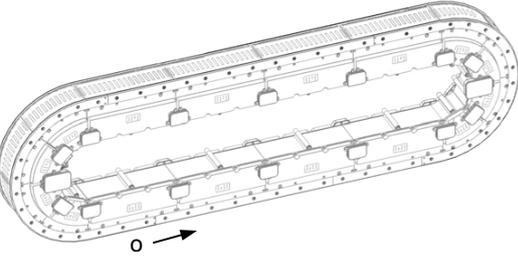
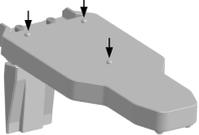
When mounting the system, apply a tightening torque of:

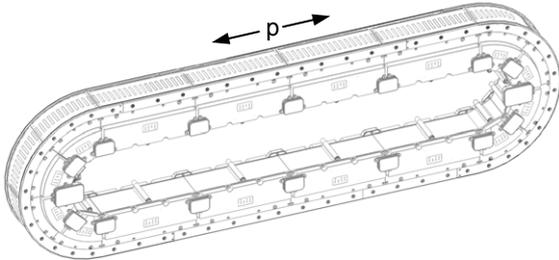
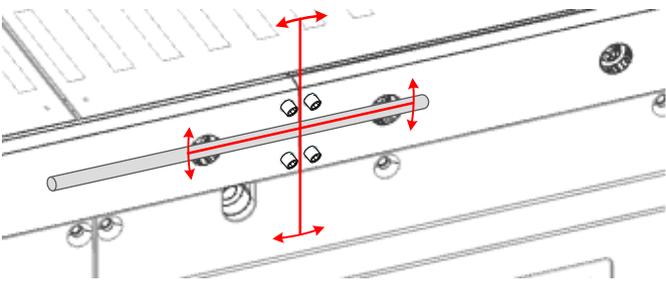
- 7.2 Nm (63.7 lbf-in) for rails
- 10.1 Nm (89.4 lbf-in) for segments
- 1.5 Nm (13.3 lbf-in) for lubrication connectors

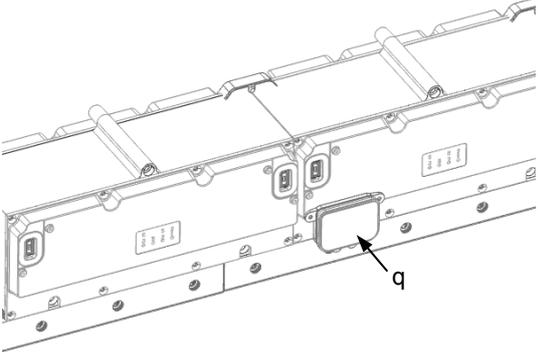
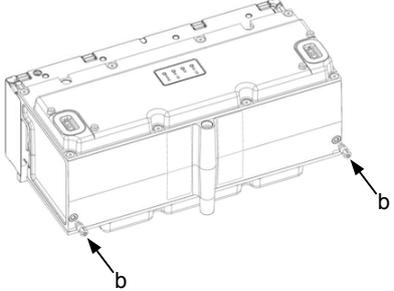
### Mounting

The steps for mounting the system are described in the following table:

Step	Action
1	<p data-bbox="582 174 1340 224">To prepare the Lexium™ MC12 long stator motor segment straight for automated lubrication:</p> <p data-bbox="582 241 1433 291">First, insert the two O-rings (a) into the appropriate cavities at the top and the bottom of the segment.</p> <p data-bbox="625 302 1433 351"><b>NOTE:</b> Verify the correct positioning of the O-rings, which are used to seal the bottom and top guide rails for automated lubrication.</p>  <p data-bbox="582 728 1412 777">Then, screw in the two threaded connectors (b) into the appropriate openings at the rear side of the segment. Tighten the connectors with a torque of 1.5 Nm (13.3 lbf-in).</p> 

Step	Action
2	<p>Insert two Lexium™ MC power interconnects (c) sideways into a Lexium™ MC12 long stator motor segment straight for automated lubrication (d). Make sure that the power interconnects are not tilted during insertion.</p>  <p><b>NOTE:</b> Refer to the reference of the Lexium™ MC power interconnects / Power disconnecter, page 31.</p> <p><b>NOTE:</b> It is a good practice to start with the lower left straight segment (o).</p> 
3	<p>Fasten the lubrication segment loosely with three screws (M6x120 class 8.8 ISO 4762) to the mounting plate so that it will stay in place but can still be shifted a little.</p> <p>To achieve the correct distance between the interconnects, insert the three semi-circular positioning knobs on the bottom of the interconnects into the corresponding holes in the mounting plate.</p> 
4	<p>Insert one Lexium™ MC interconnect (e) into the Lexium™ MC12 long stator motor segment straight (f).</p>
5	<p>Insert the segment (f) sideways into the power interconnect of the already mounted lubrication segment (d).</p>
6	<p>Fasten the segment loosely with three screws to the mounting plate so that it will stay in place but can still be shifted a little.</p>
7	<p>Insert another Lexium™ MC12 long stator motor segment straight (g) sideways into the power interconnect of the already mounted lubrication segment (d).</p>
8	<p>Fasten the segment loosely with three screws to the mounting plate so that it will stay in place but can still be shifted a little.</p>

Step	Action
9	<p>Proceed in the same way, using straight and arc segments to build your system layout.</p> <p>With an open track, proceed as described under <b>Hard Stops\Vertical Mounting</b>.</p> <p><b>NOTE:</b> For tracks with automated lubrication, make sure to install sufficient lubrication segments (and the corresponding lubrication rails), depending on the length of the track (refer to <b>Lubrication System Requirements</b>, page 177).</p>
10	<p>When all the segments are in place, tighten the screws of the segments with a torque of 10.1 Nm (89.4 lbf-in).</p>
11	<p>When all segments are in place and screwed tight, install the top Lexium™ MC guide rails, starting in the middle of your track (<b>p</b>) or, in case of an open track, at an open end of the track.</p> 
12	<p>Position a Lexium™ MC guide rail for automated lubrication (<b>h</b>) offset on the part of the lubrication segment (<b>d</b>) with the top lubricant opening (<b>i</b>) and loosely fasten the rail with M6x16 class 8.8 DIN 7984 screws.</p> <p><b>NOTE:</b> Make sure that the sealing O-rings are correctly positioned when mounting the rail.</p> <p><b>NOTE:</b> The rails are mounted offset to the segments by design.</p> <p><b>NOTE:</b> Make sure that the holes in the rails are aligned with the holes in the segments.</p>
13	<p>Proceed in the same way with the subsequent top rails (<b>k</b>) until all top rails are installed.</p>
14	<p>Repeat steps 12 - 13 for the corresponding bottom rails, starting with the Lexium™ MC guide rail for automated lubrication (<b>l</b>) under the part of the lubrication segment with the bottom lubricant opening (<b>m</b>) and continuing with a bottom Lexium™ MC guide rail (<b>n</b>).</p> <p><b>Result:</b> The top rails and the bottom rails are in place.</p>
15	<p>Start aligning all straight top rails from the middle of the track (<b>p</b>).</p>
16	<p>Align rails at the middle segment. Make sure that the rails fit tightly together at the transition points.</p> <p>Use M5x8 (ISO 4026) set screws to fine-tune the rail alignment. Unscrew the set screws approximately halfway out of the rail to avoid contact with the support surface for the rails. To install the rails, slide a suitable mounting tool between the screws (in or across the rail direction) and carefully push them into place.</p> <p><b>NOTE:</b> Avoid scratching the surface of the rails.</p>  <p>After aligning the rails, screw the set screws back into the rails.</p>
17	<p>If you need to adjust the height of a rail at the transition of two rails, unfasten the screws closest to the transition, adjust the two set screws (M5x8 ISO 4026) and fasten the rail again by tightening the first and the last fastening screws with 7.2 Nm (63.7 lbf-in).</p> <p><b>NOTE:</b> Before adjusting the height of the rails, apply medium-strength thread locking adhesive to the M5x8 set screws to prevent them from coming loose during machine operation.</p> <p><b>NOTE:</b> Make sure that the height of the rails is accurately aligned to ensure smooth guidance of the carrier. The sound of the carrier, while manually pushing over the transition of two rails, is a good indicator of the alignment quality of the rails. There should be almost no sound.</p>

Step	Action
18	Hand tighten the M5 set screws that were not used when adjusting the height of the rails (previous step). Make sure that they are screwed in completely.
19	Proceed in the same way with the subsequent straight top rails until all straight top rails are aligned.
20	Proceed in the same way with the straight bottom rails.
21	After aligning the straight rails, align the arc rails in the same way.
22	After aligning all rails, tighten the remaining fastening screws of all rails with a torque of 7.2 Nm (63.7 lbf-in).
23	<p>Insert the Lexium™ MC communication Lexium™ MC communication interconnects (q) sideways between the segments. Attach the communication interconnect with its four M3x8 ISO 14583 screws with a torque of 0.6 Nm (5.31 lbf-in).</p>  <p><b>NOTE:</b> If a communication interconnect is used to connect the system to the Sercos bus and/or a Safe Force Off (SFO) control device, refer to the Lexium™ MC communication interconnects, page 32.</p>
24	<p>Use the Lexium™ MC power cables, the Sercos cable, and the SFO cables to connect your Lexium™ MC12 multi carrier with the control cabinet.</p> <p>For details, refer to chapter Electrical Installation, page 124.</p>
25	<p>Connect the lubricant lines to the lubrication connectors (b) at the rear side of the segment. Tighten the union nuts with a torque of 1.5 Nm (13.3 lbf-in).</p>  <p><b>Result:</b> The Lexium™ MC12 multi carrier track is installed and ready for verification.</p> <p>Also refer to Verifying the Installation, page 155.</p>

**NOTE:** If you mounted the Lexium™ MC12 multi carrier track outside of your machine, disconnect the track from the control cabinet (power, Sercos, and SFO), equip the mounting plate with the suitable transport devices, and lift the Lexium™ MC12 multi carrier track into your machine, and then re-connect it to the control cabinet.

**⚡⚠ DANGER****HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to this equipment.
- Use only the specified voltage when operating this equipment and any associated equipment.

**Failure to follow these instructions will result in death or serious injury.**

## Mounting the Hard Stops

### General Information

With an open track, the carriers could leave the track at the ends. Therefore, mechanical hard stops must be mounted at both ends of an open track.

**⚠ WARNING****UNINTENDED EQUIPMENT OPERATION**

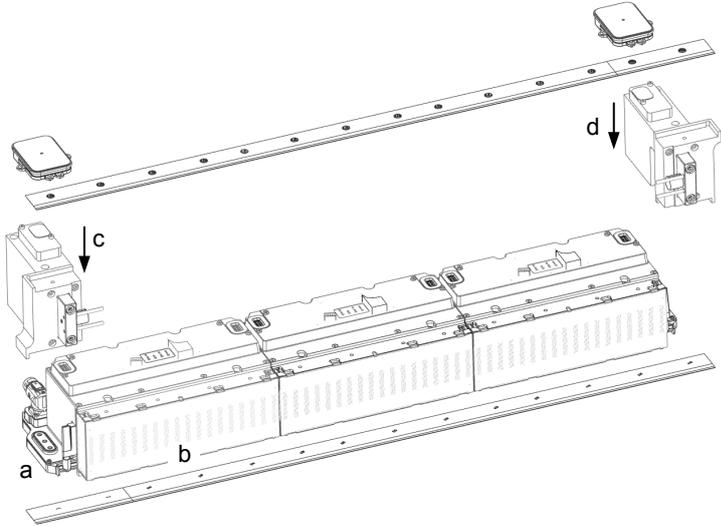
Mount mechanical hard stops at both ends of an open track.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

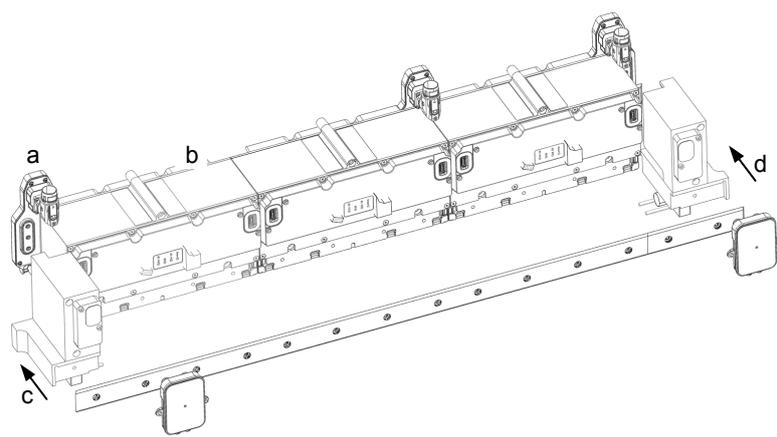
### Mounting

Mounting of the hard stops is carried out similarly to the mounting of the track (Mounting the Lexium™ MC12 multi carrier, page 89).

### Horizontal Mounting

Step	Action
1	<p>After mounting the power interconnects (a) and the segments (b), insert a left hard stop (c) from above into the left power interconnect and a right hard stop (d) into the right power interconnect.</p> 
2	<p>Fasten the hard stops loosely with two screws (M6x120 class 8.8 ISO 4762) to the mounting plate so that they stay in place but can still be shifted a little.</p>
3	<p>Then proceed with the installation of the guide rails as described in Horizontal Mounting of the Track without Automated Lubrication, page 90 or Horizontal Mounting of the Track with Automated Lubrication, page 96.</p> <p><b>NOTE:</b> Additionally, for the guide rail mounting procedures specific to the Heavy-Duty system, refer to Mounting a Lexium™ MC12 Heavy-Duty Guide Rail without Automated Lubrication, page 188 and Mounting a Lexium™ MC12 Heavy-Duty Guide Rail with Automated Lubrication, page 190.</p>

### Vertical Mounting

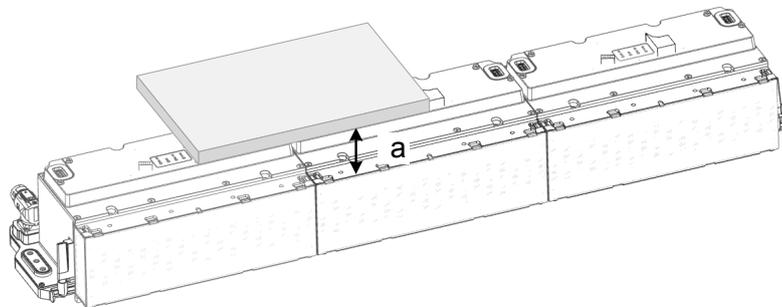
Step	Action
1	<p>After mounting the power interconnects (a) and the segments (b), insert a left hard stop (c) from above into the left power interconnect and a right hard stop (d) into the right power interconnect.</p> 
2	<p>Fasten the hard stops loosely with two screws (M6x120 class 8.8 ISO 4762) to the mounting plate so that they stay in place but can still be shifted a little.</p>
3	<p>Then proceed with the installation of the guide rails as described in Vertical Mounting of the Track without Automated Lubrication, page 93 or Vertical Mounting of the Track with Automated Lubrication, page 101.</p> <p><b>NOTE:</b> Additionally, for the guide rail mounting procedures specific to the Heavy-Duty system, refer to Mounting a Lexium™ MC12 Heavy-Duty Guide Rail without Automated Lubrication, page 188 and Mounting a Lexium™ MC12 Heavy-Duty Guide Rail with Automated Lubrication, page 190.</p>



# Unmounting a Segment With Little Free Space Above It

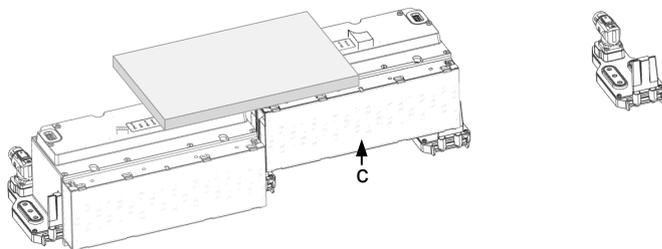
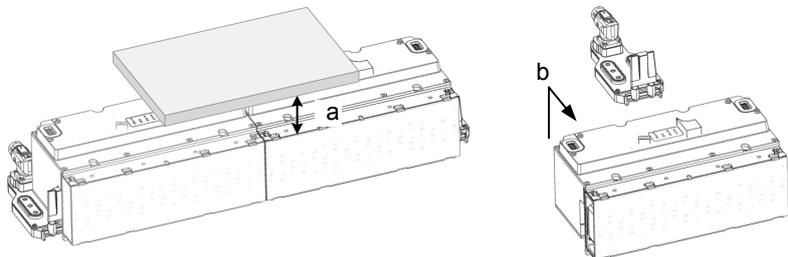
## Overview

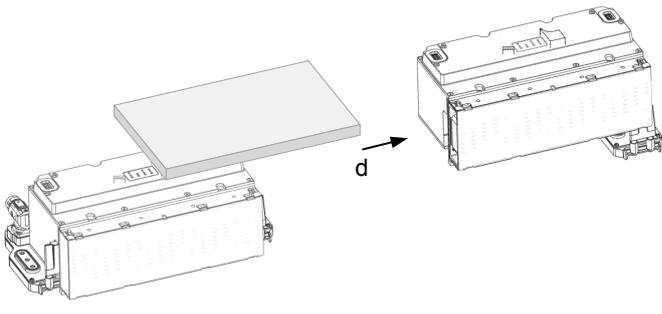
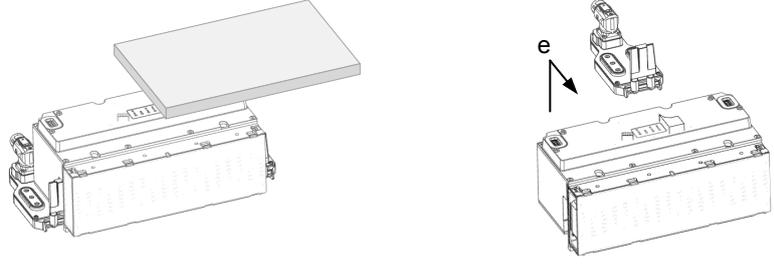
If there is less than 70 mm (2.75 inches) of free space (a) above a segment you want to unmount, for example, because there is a machine part there, you must first unmount a neighboring segment.



## Unmounting the Segment

Step	Action
1	Unscrew and remove a neighboring segment (b).
2	Unscrew the segment you want to unmount.
3	Ensure there is about 40 mm (1,57 in) of space at the top, then lift the segment (c) upwards out of the power connection.



Step	Action
4	<p data-bbox="576 174 1444 235">Move the segment sideways (<b>d</b>) to the position where you previously removed the first segment.</p> 
5	<p data-bbox="576 600 1444 638">You can now remove (<b>e</b>) the segment.</p> 

# Mounting a Lexium™ MC12 carrier

## Overview

**NOTE:** Exposed or uninstalled carriers must have the protective cover of the drive magnets installed at all times. The cover is only removed at the time of carrier installation.

- Carriers have strong local magnetic fields. Refer to *Transporting the Lexium™ MC12 carriers*, page 84.
- The carriers have strong drive magnets and can attract metal objects that are in their proximity.
- A carrier can move suddenly and fast due to magnetic attraction.

### ⚠ WARNING

#### STRONG MAGNETIC FIELDS

- Keep persons with medical implants (for example, pacemakers or metal implants) or metallic body jewelry away from the carriers and segments with a minimum distance of 30 cm (11.9 in).
- Always leave the protective cover of the drive magnets in place for all exposed or uninstalled carriers.
- Do not put your hands or fingers between the carriers and segments.
- Do not place metallic tools in the vicinity of the carriers and segments.
- Do not place electromagnetically sensitive devices near the carriers and segments.
- Do not place credit cards or electronic/magnetic media in the vicinity of the carriers and segments.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

The carrier has two magnets which, together with the magnetic fields in the segments, move the carrier on the track. These two magnets are glued onto the carrier. A shock to the carrier can cause the glued-on magnets to flake off and the magnets can splinter.

In addition, the carrier has an encoder magnet. This can be demagnetized by improper handling, for example, if the magnets of another carrier come too close.

### ⚠ WARNING

#### INOPERABLE EQUIPMENT

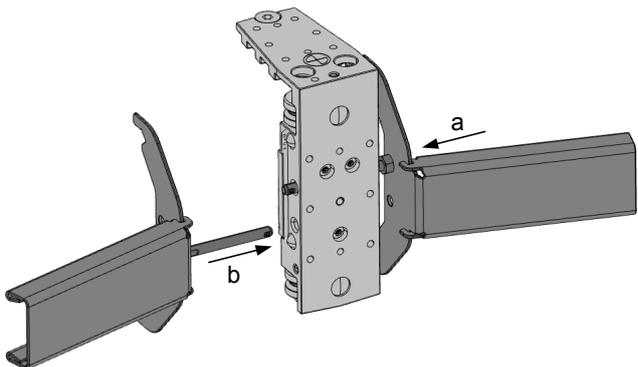
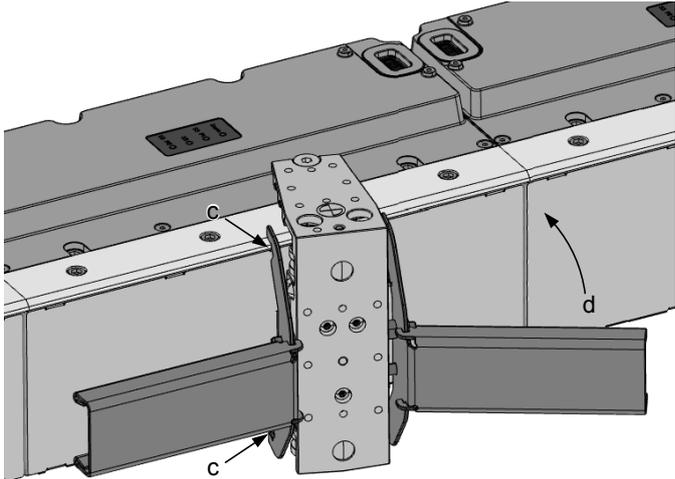
- Do not drop the carrier.
- Do not strike the carrier.
- Keep a minimum distance of 50 mm (1.97 in) between the encoder magnet and other magnets.
- Ensure to fill the lubrication reservoirs of the carriers before first use.

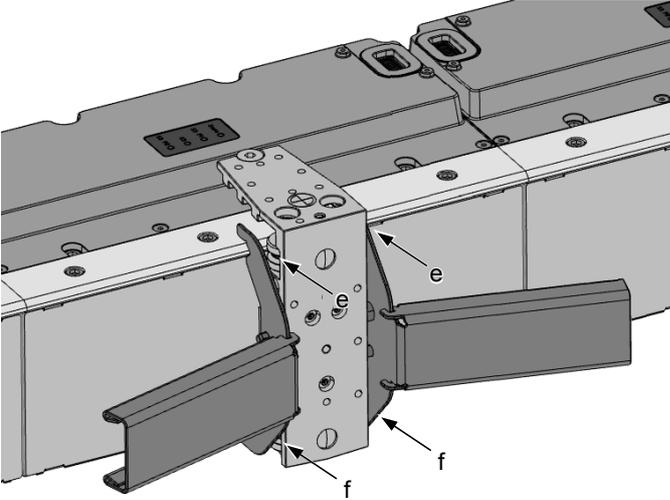
**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

For information on filling the lubrication reservoirs refer to *Filling the Lubrication Reservoirs*, page 175.

## Mounting

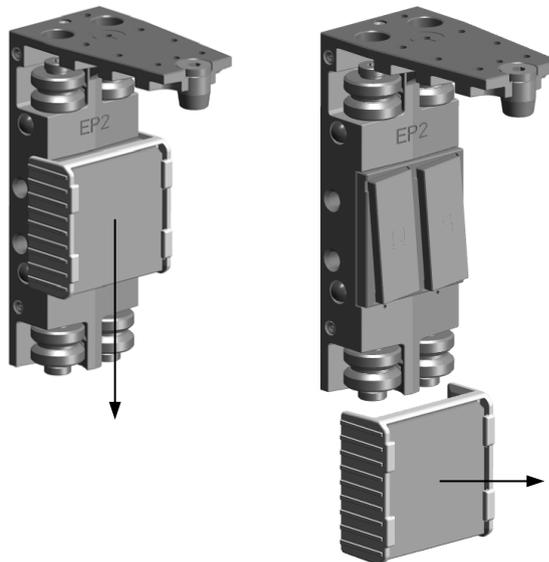
**NOTE:** Exposed or uninstalled carriers must have the protective cover of the drive magnets installed at all times. The cover is only removed at the time of carrier installation.

Step	Action
1	Install the protective cover of the drive magnets by sliding it onto the magnets if it is not already installed.
2	Fill the lubrication reservoirs of the carriers before first use. Refer to <i>Filling the Lubrication Reservoirs</i> , page 175.
3	<p>Attach the Lexium™ MC carrier handling tool to the carrier.</p>  <p><b>NOTE:</b> The Lexium™ MC carrier handling tool consists of two identical parts. Push the guide bolt (a) of the first part of the Lexium™ MC carrier handling tool from the right through the carrier. Push the guide bolt (b) of the second part of the Lexium™ MC carrier handling tool from the left through the carrier.</p> <p><b>NOTE:</b> The right and the left part of the Lexium™ MC carrier handling tool are secured by circlips at the upper end of the guide bolts.</p>
4	Remove the protective cover of the drive magnets by sliding it from the magnets. For more details, refer to <b>Removing the Protective Cover of the Drive Magnets</b> , page 113.
5	<p>Place the upper and lower guide grooves (c) of the Lexium™ MC carrier handling tool on the upper and lower rails.</p> 

Step	Action
6	<p>Swivel the Lexium™ MC carrier handling tool with the carrier towards the segment until the carrier is magnetically attracted to the segment (d).</p> <p><b>Result:</b> The two upper rollers (e) and the two lower rollers (f) of the carrier are positioned on the rails. The carrier can be moved manually along the rails.</p> 
7	Disassemble the Lexium™ MC carrier handling tool from the Lexium™ MC12 carrier.

## Removing the Protective Cover of the Drive Magnets

Remove the protective cover of the drive magnets by sliding it from the magnets.



# Mounting the Tools on the Lexium™ MC12 carrier

## Overview

You must design tools suitable for your application and install the tools on the Lexium™ MC12 carriers to transport your products within your track.

- Your products must be held properly by the tools so that the products do not move on the carriers or slide down from the carriers during the acceleration and deceleration movements.
- Distribute the load of the products and tools symmetrically on the Lexium™ MC12 carriers to allow maximum acceleration/deceleration and velocity of the Lexium™ MC12 carriers.

**NOTE:** Exposed or uninstalled carriers must have the protective cover of the drive magnets installed at all times. The cover is only removed at the time of carrier installation.

- Carriers have strong local magnetic fields. Refer to *Transporting the Lexium™ MC12 carriers*, page 84.
- The carriers have strong drive magnets and can attract metal objects that are in their proximity.
- A carrier can move suddenly and fast due to magnetic attraction.
- Use a device such as a sensor to identify the carrier and the type of tool mounted on the carrier to help prevent collisions.

### **▲ WARNING**

#### **STRONG MAGNETIC FIELDS**

- Keep persons with medical implants (for example, pacemakers or metal implants) or metallic body jewelry away from the carriers and segments with a minimum distance of 30 cm (11.9 in).
- Always leave the protective cover of the drive magnets in place for all exposed or uninstalled carriers.
- Do not put your hands or fingers between the carriers and segments.
- Do not place metallic tools in the vicinity of the carriers and segments.
- Do not place electromagnetically sensitive devices near the carriers and segments.
- Do not place credit cards or electronic/magnetic media in the vicinity of the carriers and segments.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

The carrier has two magnets which, together with the magnetic fields in the segments, move the carrier on the track. These two magnets are glued onto the carrier. A shock to the carrier can cause the glued-on magnets to flake off and the magnets can splinter.

In addition, the carrier has an encoder magnet. This can be demagnetized by improper handling, for example, if the magnets of another carrier come too close.

## ▲ WARNING

### INOPERABLE EQUIPMENT

- Do not drop the carrier.
- Do not strike the carrier.
- Keep a minimum distance of 50 mm (1.97 in) between the encoder magnet and other magnets.
- Ensure to fill the lubrication reservoirs of the carriers before first use.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

For information on filling the lubrication reservoirs refer to Filling the Lubrication Reservoirs, page 175.

## Mounting Options

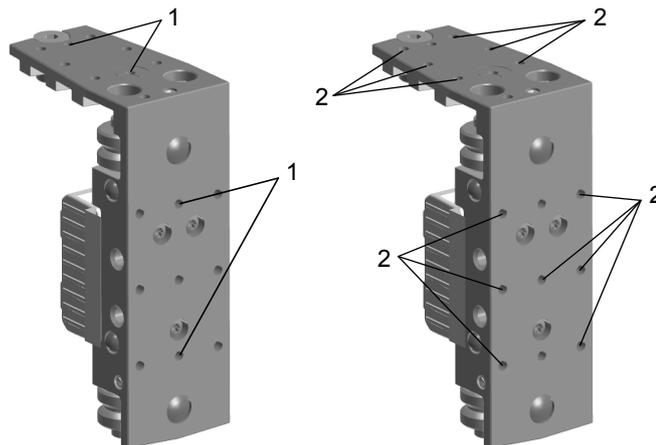
1. A Lexium™ MC12 carrier provides two fitting holes (4 mm, +0.015...+0.005 mm / 0.1575 in, +0.00059...+0.000197 in) on the short angle arm of the carrier and two fitting holes on the long angle arm of the carrier.

Use these fitting holes (1) to align your tool with the carrier.

2. The Lexium™ MC12 carrier provides six M5 threaded holes (hole depth 10 mm/0.39 in) on the short angle arm of the carrier and seven M5 threaded holes (hole depth 10 mm/0.39 in) on the long angle arm of the carrier.

Use these threaded holes (2) to fix your tool on the carrier.

Tighten the fixing screws. Maximum tightening torque is 5.9 Nm (52.2 lbf-in).



# Mounting/Unmounting the Lexium™ MC connection module

## Overview

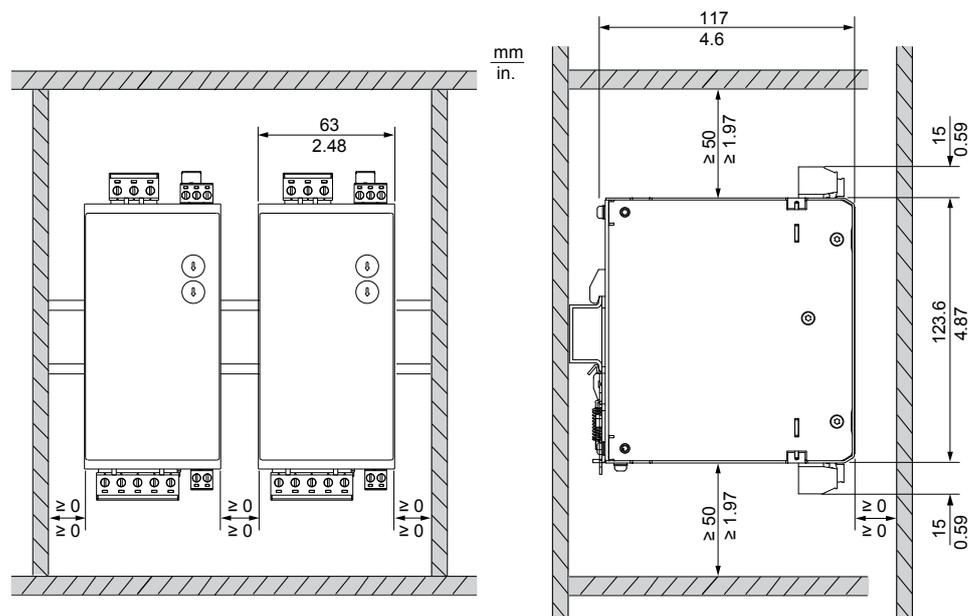
The Lexium™ MC connection module must be installed in a control cabinet with degree of protection greater or equal to IP54.

## Preparing the Control Cabinet

Step	Action
1	If necessary to maintain and respect the maximum ambient operating temperature, install an additional fan in the control cabinet.
2	Do not block the fan air inlet of the product.
3	Observe tolerances as well as distances to the cable channels and adjacent braking resistors or other heat producing equipment.

## Required Distances

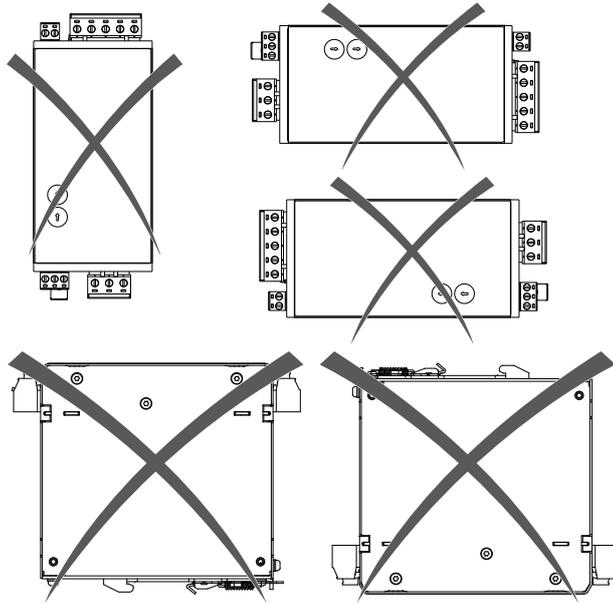
Keep a distance of at least 50 mm (1.97 in) above and below the Lexium™ MC connection module.



**NOTE:** Do not lay any cables or cable channels over the Lexium™ MC connection module.

## Not Allowed Mounting Positions

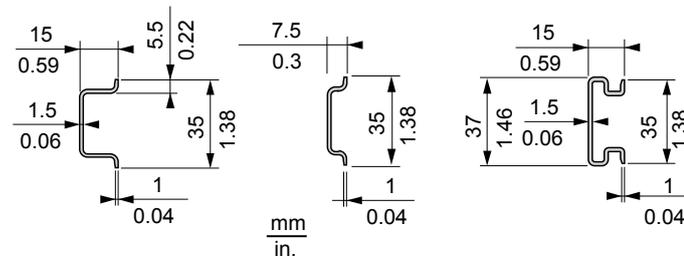
Do not mount the Lexium™ MC connection module in any of the following mounting positions:



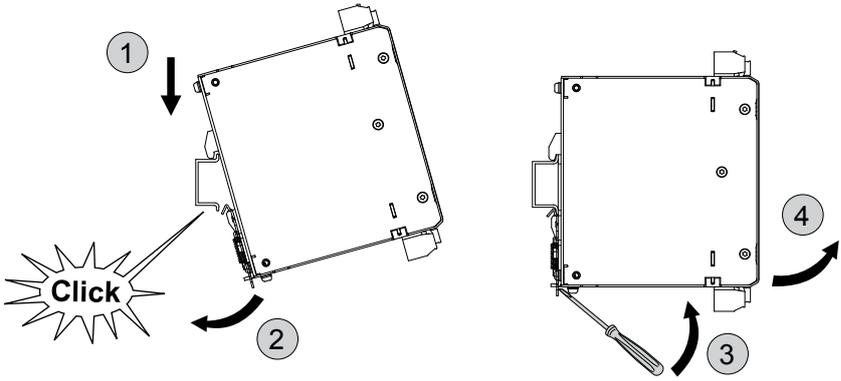
## DIN Rails

The Lexium™ MC connection module can be mounted on various DIN rails. The DIN rails are not included in the scope of delivery of the Lexium™ MC connection module.

DIN rail examples:



## Mounting/Unmounting the Lexium™ MC connection module

Step	Action
1	<p>Place the upper guide groove of the Lexium™ MC connection module on the DIN rail.</p> 
2	<p>Swivel the Lexium™ MC connection module towards the DIN rail until the lower guide groove engages.</p>
3	<p>To remove the Lexium™ MC connection module from the DIN rail, insert a screwdriver into the hole in the bottom locking tab and swivel the screwdriver to the Lexium™ MC connection module.</p> <p><b>Result:</b> The Lexium™ MC connection module is mechanically unlocked.</p>
4	<p>Swing the Lexium™ MC connection module up and remove it from the DIN rail.</p>

# Mounting the External Braking Resistor

## Preparing the Control Cabinet

During operation, the surface temperature of the external braking resistor may exceed 250 °C (482 °F).

**⚠ DANGER**

**EXTREMELY HOT SURFACES**

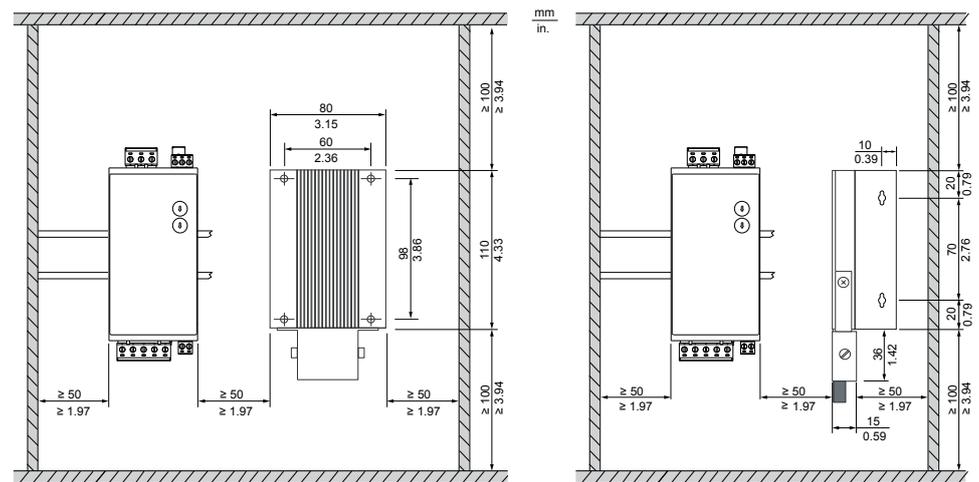
- Do not make unprotected contact with the surfaces of the external braking resistor.
- Keep all flammable or heat-sensitive materials away from the external braking resistor.
- Verify that the heat dissipation is sufficient by performing a test run under maximum load conditions.

**Failure to follow these instructions will result in death or serious injury.**

Step	Action
1	If necessary to maintain and respect the maximum ambient operating temperature, install an additional fan in the control cabinet.
2	Do not block the fan air inlet of the product.
3	Observe tolerances as well as distances to the cable channels and adjacent braking resistors or other heat producing equipment.

## Required Distances

- Keep a distance of at least 100 mm (3.94 in) above and below the external braking resistor.
- Keep a distance of at least 50 mm (1.97 in) to the right and left of the external braking resistor.



**NOTE:** Do not lay any cables or cable channels over the external braking resistor.



# Indicators

## Indicators of the Segments

### Overview

The Lexium™ MC12 long stator motor segments are equipped with four LED indicators on the top:

	<b>State:</b> Segment state
	<b>S3 P1:</b> Port status Sercos bus
	<b>S3:</b> Network status Sercos bus
	<b>S3 P2:</b> Port status Sercos bus

## State LED Indicator

The **State** LED indicates the internal state of the segment.

LED indicator color / status	Flashing pattern (3 seconds)	Description	Instructions / information for the user
Off	–	Device is not energized or is otherwise inoperable.	<ul style="list-style-type: none"> <li>Verify the power supply.</li> <li>Replace device.</li> </ul>
Steady orange		Segment boot phase	Boot and initialization phase of the segment
Flashing green (4 Hz, 125 ms)		Segment update state	Firmware update file transfer or internal firmware update process.
Flashing slowly orange (1 Hz, 500 ms)		SFO not supplied with 24 Vdc, power stage not prepared.	–
Flashing slowly green (1 Hz, 500 ms)		SFO supplied with 24 Vdc, power stage not prepared.	–
Orange for 875 ms, off for 125 ms		SFO not supplied with 24 Vdc, power stage prepared.	–
Green for 875 ms, off for 125 ms		SFO supplied with 24 Vdc, power stage prepared.	–
Steady green		Power stage active	–
Flashing red (4 Hz, 125 ms)		A general error has been detected.	<ul style="list-style-type: none"> <li>The <b>Devices</b> tree in EcoStruxure Automation Expert - Motion / EcoStruxure Machine Expert displays the error detected.</li> <li>Acknowledge the detected error in the EcoStruxure Automation Expert - Motion / EcoStruxure Machine Expert menu <b>Online &gt; Reset diagnostic messages of controller</b>.</li> <li>Otherwise restart device.</li> </ul>
Steady red		A non-recoverable error has been detected requiring user intervention: <ul style="list-style-type: none"> <li>Watchdog</li> <li>Firmware</li> <li>Checksum</li> <li>Internal error detected</li> </ul>	<ul style="list-style-type: none"> <li>Cycle power (power reset)</li> <li>If this condition persists, contact your local Schneider Electric service representative.</li> </ul>

## S3 P1 and S3 P2 LED Indicators

The **S3 P1** and **S3 P2** LEDs indicate the status of both Sercos ports.

LED indicator color / status	Flashing pattern (3 seconds)	Description	Instructions / information for the user
Off	–	Possible causes: <ul style="list-style-type: none"> <li>No cable connected</li> <li>The device is not energized</li> </ul>	<ul style="list-style-type: none"> <li>Connect the cable.</li> <li>Verify the power supply.</li> </ul>
Steady orange		Cable connected, no Sercos communication	–
Steady green		Cable connected, active Sercos communication	–

## S3 LED Indicator

The **S3** LED indicates the network status of the Sercos bus.

LED indicator color / status	Flashing pattern (3 seconds)	Description	Instructions / information for the user
Off	–	Possible causes: <ul style="list-style-type: none"> <li>The device is not energized or is otherwise inoperable, or</li> <li>there is no communication due to an interrupted or separated connection.</li> </ul>	<ul style="list-style-type: none"> <li>Verify the power supply.</li> <li>Sercos boot-up</li> </ul>
Steady green		Active Sercos connection without an error detected in the CP4.	–
Flashing green (2 Hz, 250 ms)		The device is in loopback mode.  Loopback describes the situation in which the Sercos telegrams have to be sent back on the same port on which they were received.  Possible cause: Sercos loop break	Workaround: <ul style="list-style-type: none"> <li>Close ring.</li> </ul> Reset condition: <ul style="list-style-type: none"> <li>Acknowledge the detected error in the EcoStruxure Automation Expert - Motion / EcoStruxure Machine Expert menu <b>Online &gt; Reset diagnostic messages of controller</b>.</li> <li>Switch from CP0 to CP1 alternatively.</li> </ul> <p><b>NOTE:</b> If during phase CP1 a line topology or ring break was detected (device in loopback mode), the LED indicator condition does not change.</p>
Steady red		Sercos diagnostic class 1 (C1D) error has been detected on port 1 and/or port 2.	Reset condition: <ul style="list-style-type: none"> <li>Acknowledge the detected error in the EcoStruxure Automation Expert - Motion / EcoStruxure Machine Expert menu <b>Online &gt; Reset diagnostic messages of controller</b>.</li> </ul>
Flashing red / green (2 Hz, 250 ms)		Communication error has been detected.  Possible causes: <ul style="list-style-type: none"> <li>Improper functioning of the telegram</li> <li>CRC error detected</li> </ul>	Reset condition: <ul style="list-style-type: none"> <li>The configuration shows which error has been detected.</li> <li>Acknowledge the detected error in the EcoStruxure Automation Expert - Motion / EcoStruxure Machine Expert menu <b>Online &gt; Reset diagnostic messages of controller</b>.</li> </ul>
Orange		The device is in a communications phase CP0 up to and including CP3 or HP0 up to and including HP2. Sercos telegrams are received.	See table below for the individual CP indications.
Flashing orange (2 Hz, 250 ms)		Device identification	–

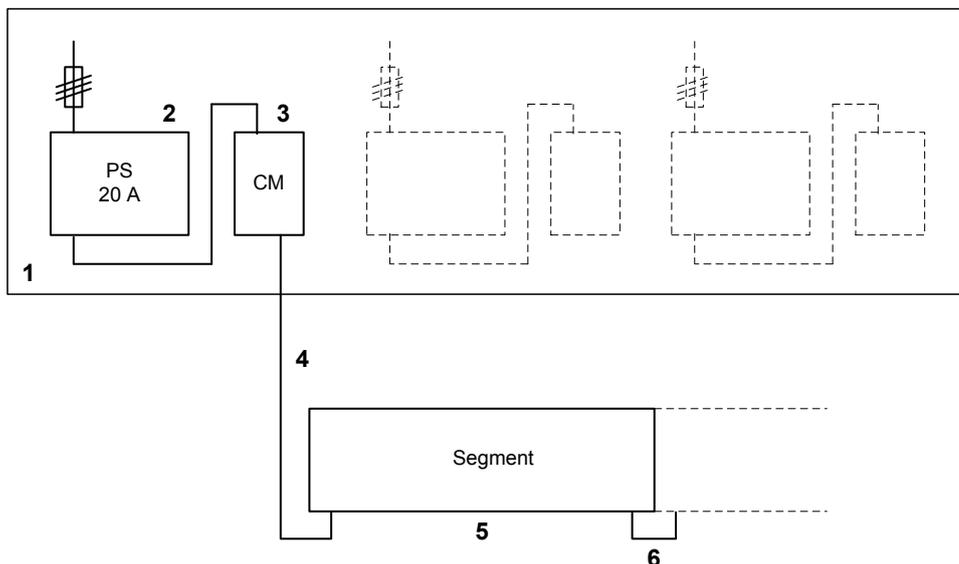
**NOTE:** The communication phase information is available as follows while in orange state:

LED indicator color / status	Flashing pattern (3 seconds)	Description	Instructions / information for the user
Steady orange		Communication phase is CP0	–
One brief green flash followed by steady orange		Communication phase is CP1	–
Two brief green flashes followed by steady orange		Communication phase is CP2	–
Three brief green flashes followed by steady orange		Communication phase is CP3	–

# Electrical Installation

## Information About Power Supply/Connection Module

### Overview



- The power supply (2) and the Lexium™ MC connection module (3) are installed in a cabinet (1).
- The power supplies feed the Lexium™ MC12 multi carrier track. For each power supply, you must place a Lexium™ MC connection module between the power supply output and the Lexium™ MC12 multi carrier track.

Up to a maximum of three power supply/Lexium™ MC connection module combinations can be used in parallel. If more than three power supplies are required, the track must be divided into power groups that are powered separately. For how to define power groups, refer to the different power interconnects (Lexium™ MC power interconnects / Power disconnect, page 31).

The universal power supply ABLU3A48200 is designed to handle the back feed voltage (braking voltage) from the Lexium™ MC12 multi carrier track during the braking phase. Refer to *Connecting a Braking Resistor (CN2)*, page 137.

- The Lexium™ MC12 multi carrier track (5) is connected to the Lexium™ MC connection module with a pre-assembled cable (4).

**NOTE:** If you have to remove a connector from the cable, for example, to lead the cable through a cable bushing, make sure to reconnect the wires of the cable correctly to the connector afterwards. Observe the requirements for the degree of protection and the EMC regulations.

Refer to cable wiring diagram *Pinout and Cable Diagram*, page 143.

**NOTE:** The front covers of the segments are not connected to the PE (protective ground/earth). The electrical safety requirements are fulfilled by appropriate insulation measures (protective separation).

- The Lexium™ MC connection module supplies the Lexium™ MC12 multi carrier track with power (DC bus).

The Lexium™ MC connection module limits the DC bus voltage to <60 Vdc, conforming to Functional Safety rules. Refer to *Scope of Operation (Designated Safety Function)*, page 53.

- You can feed the DC bus at different points of the track. For example, feed at points where a high electrical load due to deceleration and acceleration is to be expected.

- The DC bus (up to 60 A) inside the Lexium™ MC12 multi carrier track is distributed from segment to segment via the Lexium™ MC power interconnects (6).
- The Lexium™ MC12 multi carrier requires the power supply to be dimensioned based on the number of segments, segment groups, carriers, load and other relevant parameters.

Each power supply/Lexium™ MC connection module combination must not exceed 24 segments.

For how to dimension the power supplies, refer to System Planning, page 44.

## **⚠ CAUTION**

### **INOPERABLE EQUIPMENT**

- Do not connect the DC bus of the Lexium™ MC12 multi carrier track directly to the power supply.
- Always connect the DC bus through the Lexium™ MC connection module.

**Failure to follow these instructions can result in injury or equipment damage.**

Also refer to Technical Data for Power Supply, page 80 and Technical Data for Lexium™ MC connection modules, page 79.

For a controlled movement of the carriers on a track, the required hardware preconditions must be fulfilled. This includes the correct state of the DC bus (DC ok) and SFO (Safe Force Off) signals of segments and enabled logical devices (track, segments, carriers). You must monitor the required hardware preconditions in your application and implement adequate reactions for a controlled behavior of the devices.

## **⚠ WARNING**

### **UNINTENDED EQUIPMENT OPERATION**

- Monitor electrical I/O signals from peripheral devices like power supplies and connection modules in your application.
- Permanently monitor the state of the track, the segments and the carriers in your application.
- Trigger a controlled reaction of your application when deviations from the monitored preconditions are detected.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

# Power Supply

## Overview

- The power supplies feed the Lexium™ MC12 multi carrier track. For each power supply, you must place a Lexium™ MC connection module between the power supply output and the Lexium™ MC12 multi carrier track.

Up to a maximum of three power supply/Lexium™ MC connection module combinations can be used in parallel. If more than three power supplies are required, the track must be divided into power groups that are powered separately. For how to define power groups, refer to the different power interconnects (Lexium™ MC power interconnects / Power disconnect, page 31).

The universal power supply ABLU3A48200 is designed to handle the back feed voltage (braking voltage) from the Lexium™ MC12 multi carrier track during the braking phase. Refer to Connecting a Braking Resistor (CN2), page 137.

- For how to dimension the power supplies, refer to System Planning, page 44.

### **⚠ CAUTION**

#### **INOPERABLE EQUIPMENT**

- Do not connect the DC bus of the Lexium™ MC12 multi carrier track directly to the power supply.
- Always connect the DC bus through the Lexium™ MC connection module.

**Failure to follow these instructions can result in injury or equipment damage.**

**NOTE:** Only use power supplies that are approved for use by Schneider Electric. Refer to Technical Data for Power Supply, page 80.

Also refer to Technical Data for Power Supply, page 80 and Information About Power Supply/Connection Module, page 124.

## Status LEDs/Switches/Potentiometer

The universal power supply ABLU3A48200 provides a status LED, switches, and a potentiometer. (Also refer to Technical Data for Power Supply, page 80).

Component	Description
LED <b>DC OK</b> (output status LED)	Steady on (green): The adjusted output voltage is available. Flashing (green): The power supply is in power boost or overload. Steady on (red): The power supply is in overtemperature. Flashing (red): The power supply has detected an overvoltage. Flashing (green/red): The power supply is in shut down mode.
Switch ( <b>Parallel / Single</b> )	Set to <b>Parallel</b> when the power supplies are connected in parallel to increase the output power. <b>NOTE:</b> If you use several power supplies in parallel, the output voltage of all power supplies must be set to the same value (default value = 48 Vdc).
Switch ( <b>Manual / Auto</b> )	Set to <b>Auto</b> for automatic return to rated power supply operation once the overload has been corrected.
Potentiometer ( <b>48 V...56 V</b> )	Output voltage (48 Vdc = nominal value for the Lexium™ MC12 multi carrier)

For a detailed description, refer to the ABLU3A48200 Universal Power Supply, Instruction Sheet.

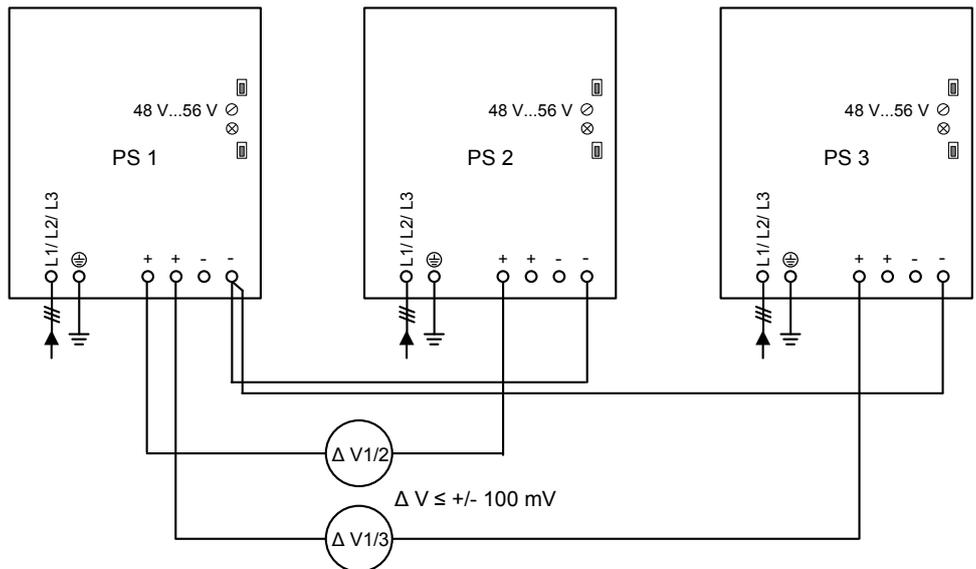
## Voltage Adjustment for Parallel Operation of Power Supplies

If only one power supply per power group is used, the switch at the power supply has to be set to **Single**.

For two or three power supplies in parallel, the switches at the power supplies have to be set to **Parallel**.

If you use several power supplies in parallel, the output voltage of all power supplies must be adjusted to the same value ( $\leq \pm 100$  mV). It is important to maintain an even load.

The following diagram shows a circuit for adjusting the output voltages of several power supplies.



Proceed in the following way:

Step	Action
1	Connect the power supplies to the mains. <b>L1, L2, L3, PE</b> (protective ground/earth).
2	Connect the negative output voltage terminal of power supply 1 to the negative output voltage terminals of the power supplies 2 and 3 for the purposes of calibrating the voltage of the supplies.
3	Power on the parallel power supplies. <b>NOTE:</b> The power supplies connected in parallel must be powered on at the same time. Use one contactor or power on the mains.
4	Measure the voltage difference between the positive output voltage terminal of the power supply 1 and the positive output voltage terminal of the power supply 2 and adjust the output voltage of power supply 2 to the same voltage as that of power supply 1 (the measured voltage difference must be less than +/- 100 mV). Use the potentiometer <b>48 V...56 V</b> to adjust the voltage.
5	Measure the voltage difference between the positive output voltage terminal of the power supply 1 and the positive output voltage terminal of the power supply 3 and adjust the output voltage of power supply 3 to the same voltage as that of power supply 1 (the measured voltage difference must be less than +/- 100 mV).
6	Power off the parallel power supplies.
7	Remove the connections of the negative output voltage terminal of power supply 1 to the negative output voltage terminals of power supplies 2 and 3.
8	For further steps, refer to <i>Connecting the Power Supply to the Lexium™ MC connection module</i> , page 131.

To ensure an equal load on the power supplies connected in parallel, the power cables in the same power group must have the same length.

## **NOTICE**

### **INOPERABLE EQUIPMENT**

Use the same length of power cables to the connection modules when using parallel power supplies.

**Failure to follow these instructions can result in equipment damage.**

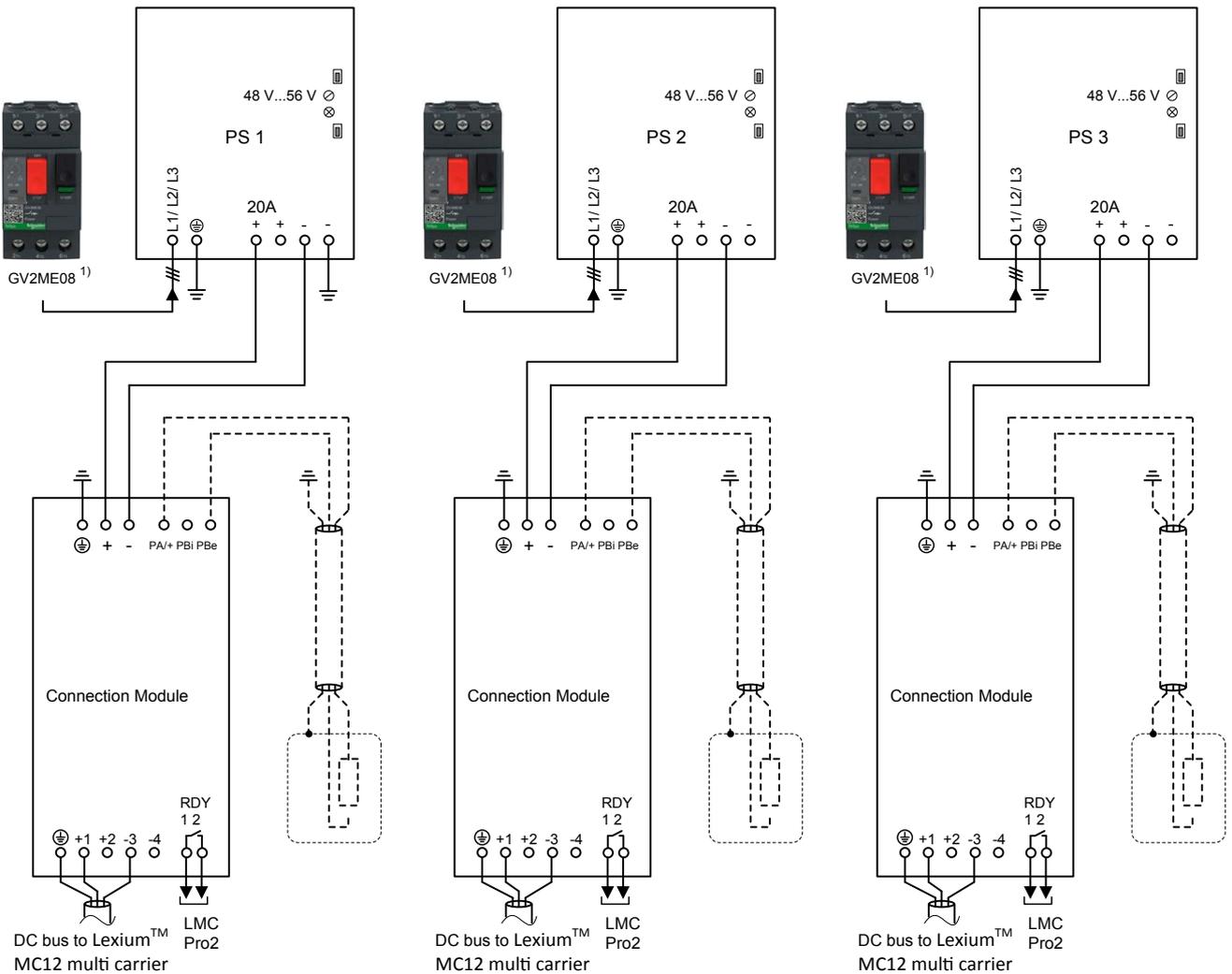
## Wiring Power Groups (Example)

The following must be observed when installing power groups:

- The output voltage of all power supplies must be adjusted to the same value.
- The switches at the power supplies must be set to **Parallel**.

Refer to section Voltage Adjustment for Parallel Operation of Power Supplies, page 127.

The DC bus of the power supplies is connected in parallel by the power interconnects on the Lexium™ MC12 multi carrier track.



1) GV2ME08 is an example. Refer to the documentation of the power supply for protection devices.

## Fusing the Mains Connection

- Depending on the power supplies you use, you must install appropriate fuses and circuit breakers for the power supplies.
- Do not short circuit or overload the power supplies.
- If you use two or three power supplies in parallel, set the respective switch at the power supplies to **Parallel** and adjust the output voltage of the power supplies to an identical value.
- Connect the **DC OK** relay contact to the PacDrive LMC Pro2 Motion Controller for diagnostic purposes.
- If application requirements or your risk analysis dictates, ensure that the PacDrive LMC Pro2 Motion Controller can de-energize the power supplies in case of an error detected in the Lexium™ MC12 multi carrier track or the Lexium™ MC connection module.

**NOTE:** The power supplies, the mains connection of the power supplies and their fusing are not part of the Schneider Electric scope of delivery. Installation, fusing, and so on, must be in accordance with the specifications of the power supply manufacturer. Also refer to *Technical Data for Power Supply*, page 80.

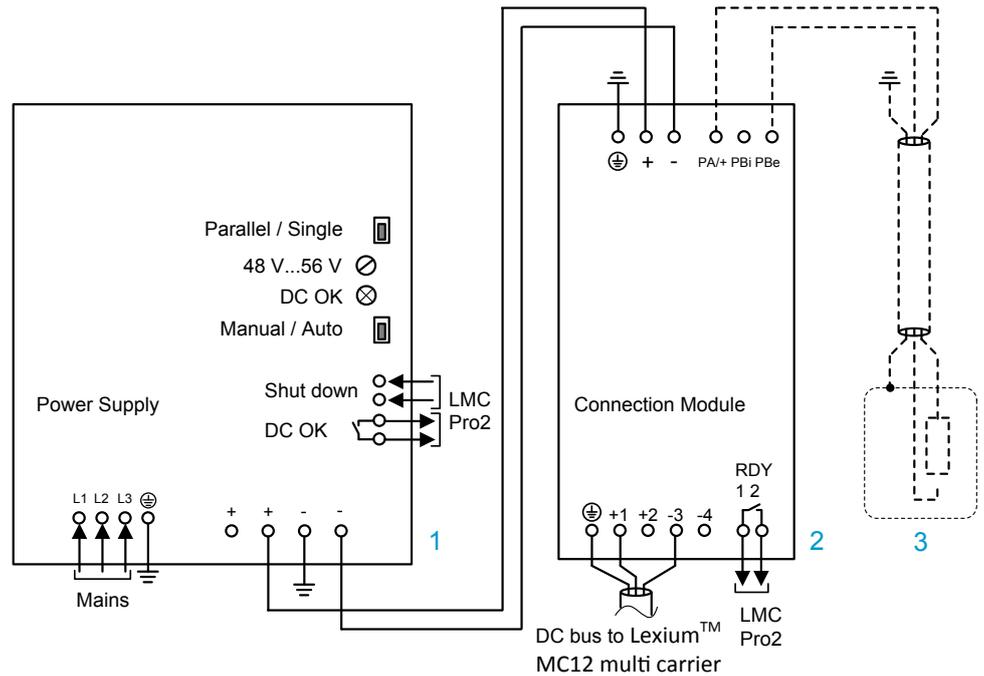
### **DANGER**

#### **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to this equipment.
- Use only the specified voltage when operating this equipment and any associated equipment.

**Failure to follow these instructions will result in death or serious injury.**

# Connecting the Power Supply to the Lexium™ MC connection module



1 Power supply (refer to Technical Data for Power Supply, page 80)

2 Lexium™ MC connection module

3 Optional external braking resistor with over temperature switch (optional) and heat sink

**NOTE:** To use the internal braking resistor, jumper PA/+ to PBi.

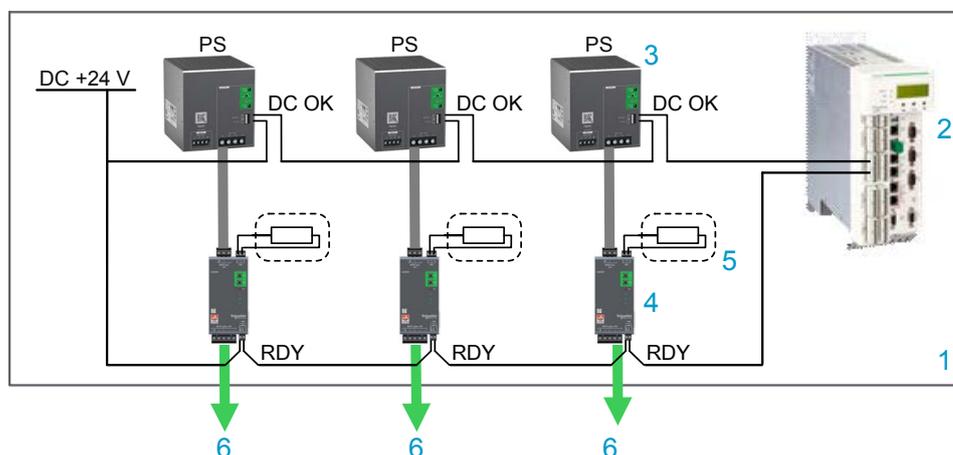
Step	Action
1	Remove power from the supply voltages. Respect the safety instructions concerning electrical installation.
2	Verify that no voltages are present.
3	Set the switch <b>Parallel / Single</b> to the required position (refer to Status LEDs/Switches/Potentiometer, page 126)
4	Set the potentiometer: <b>48 V...56 V</b> to 48 Vdc (default output value for the Lexium™ MC12 multi carrier) <b>NOTE:</b> If you use several power supplies in parallel, the output voltage of all power supplies must be set to the same value (48 Vdc). Refer to Voltage Adjustment for Parallel Operation of Power Supplies, page 127.
5	Connect the <b>PE</b> (protective ground/earth) terminal of the Lexium™ MC connection module to the <b>PE</b> (protective ground/earth) of the cabinet.
6	Connect one negative output voltage terminal of the power supply to the <b>PE</b> (protective ground/earth) of the cabinet. <b>NOTE:</b> For each group of power supplies (up to three) only the negative output voltage terminal of power supply 1 is connected to the <b>PE</b> (protective ground/earth) of the cabinet.
7	Connect the positive output voltage terminal of the power supply to the positive output voltage terminal of the Lexium™ MC connection module.
8	Connect one negative output voltage terminal of the power supply to the negative output voltage terminal of the Lexium™ MC connection module.
9	Connect the <b>DC OK</b> relay contact of the power supply to the PacDrive LMC Pro2 Motion Controller for diagnostic purposes. Refer to Wiring Example (DC OK + RDY), page 132.
10	Connect the <b>Shut down</b> digital input of the power supply to the PacDrive LMC Pro2 Motion Controller so that the PacDrive LMC Pro2 Motion Controller can de-energize the power supply in case of an error detected in the Lexium™ MC12 multi carrier or the Lexium™ MC connection module. Refer to Wiring Example (Shut Down), page 133.

## Monitoring of Lexium™ MC12 multi carrier Components

- The PacDrive LMC Pro2 Motion Controller receives status and diagnostic information from the segments and carriers via the Sercos bus.
- To monitor the status of the power supplies, connection modules and the external braking resistors, you can connect the respective signal contacts to the inputs of the PacDrive LMC Pro2 Motion Controller. Refer to Wiring Example (DC OK + RDY), page 132.
  - Power supplies: **DC OK**
  - Connection modules: **RDY**
  - Braking resistor: Over temperature switch (optional)
- In the event of a detected error on the output voltage, the power supplies can be de-energized via the **Shut down** input or, alternatively, the power supplies can be powered off on the input side via a contactor. Refer to Wiring Example (Shut Down), page 133.

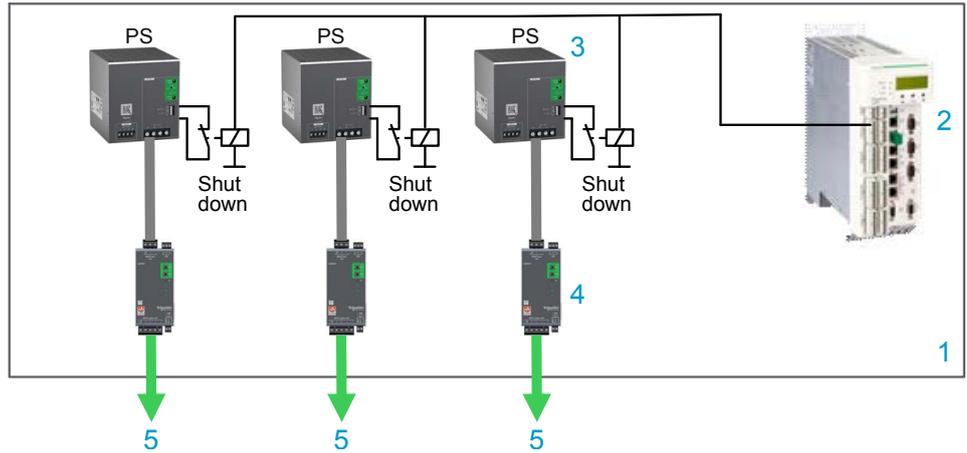
Also refer to Coast Down Time of Carriers, page 56.

### Wiring Example (DC OK + RDY)



Element	Description
1	Control cabinet
2	PacDrive LMC Pro2 Motion Controller
3	Power supply with <b>DC OK</b> relay contact
4	Lexium™ MC connection module with <b>RDY</b> relay Normally Open (NO) output
5	External braking resistor with over temperature switch (optional)
6	DC bus to the Lexium™ MC12 multi carrier track

## Wiring Example (Shut Down)



Element	Description
1	Control cabinet
2	PacDrive LMC Pro2 Motion Controller
3	Power supply with <b>Shut down</b> digital input <b>NOTE:</b> This input must not be controlled directly with a 24 Vdc signal. It must be controlled via a potential-free contact.
4	Lexium™ MC connection module
5	DC bus to the Lexium™ MC12 multi carrier track

# Lexium™ MC connection module

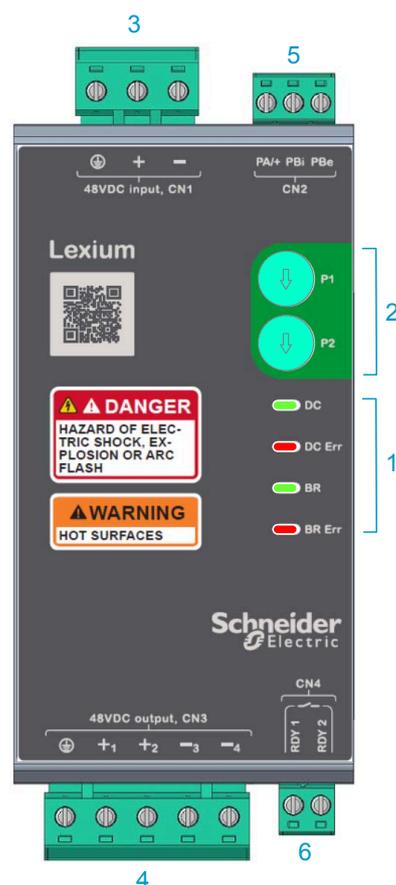
## Overview

- The power supplies feed the Lexium™ MC12 multi carrier track. For each power supply, you must place a Lexium™ MC connection module between the power supply output and the Lexium™ MC12 multi carrier track.
- Up to a maximum of three power supply/Lexium™ MC connection module combinations can be used in parallel. If more than three power supplies are required, the track must be divided into power groups that are powered separately. For how to define power groups, refer to the different power interconnects (Lexium™ MC power interconnects / Power disconnecter, page 31).
- The Lexium™ MC connection module supplies the Lexium™ MC12 multi carrier track with power (DC bus).

The Lexium™ MC connection module limits the DC bus voltage to <60 Vdc, conforming to Functional Safety rules. Refer to Scope of Operation (Designated Safety Function), page 53.

Also refer to:

- Technical Data for Lexium™ MC connection modules, page 79
- Information About Power Supply/Connection Module, page 124
- Connecting the Connection Module to the Track, page 141



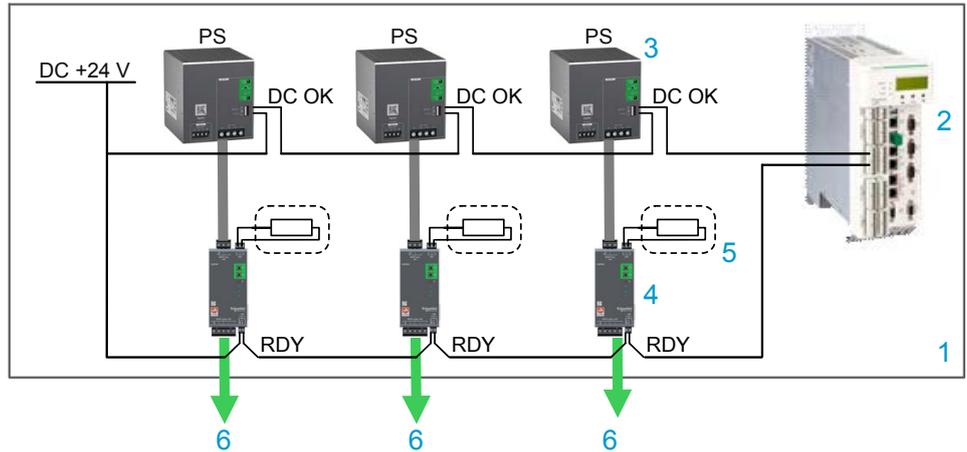
Element	Description
1	Status LEDs (DC, DC Err, BR, BR Err). Refer to Status LEDs, page 136.
2	Rotary switches (P1, P2) for the braking resistors and voltage level. Refer to Switches, page 136.
3	CN1: 48 Vdc input from power supply (PE connection, +, -)

Element	Description
4	<b>CN3:</b> 48 Vdc output to the Lexium™ MC12 multi carrier track ( <b>PE</b> connection, <b>+1, +2, -3, -4</b> )
5	<b>CN2:</b> Connection for braking resistor ( <b>PA/+</b> , <b>PBi</b> , <b>PBe</b> ) Also refer to Connecting a Braking Resistor (CN2), page 137.
6	<b>CN4:</b> Ready relay, Normally Open (NO) output ( <b>RDY 1, RDY 2</b> ). Connect this relay output to the PacDrive LMC Pro2 Motion Controller for diagnostic purposes. Refer to Wiring Example (RDY), page 135.

## Connectors

Connector	Description	Wire cross section [mm <sup>2</sup> (AWG)]	Stripped wire length [mm (in)]	Tightening torque [Nm (lbf-in)]	Screw driver style [mm (in)]
<b>CN1</b>	48 Vdc input from power supply	4.0 (12)	7 (0.28)	0.5 (4.5)	Slotted, 3.5 (0.14)
<b>CN3</b>	48 Vdc output to the Lexium™ MC12 multi carrier track				
<b>CN2</b>	Connection for braking resistor ( <b>PA/+</b> , <b>PBi</b> , <b>PBe</b> ) The connection module is delivered with a jumper between <b>PA/+</b> and <b>PBi</b> . This means that the internal braking resistor is used by default.	1.0 - 2.5 (18 - 14)			
<b>CN4</b>	Ready relay, Normally Open (NO) output ( <b>RDY 1, RDY 2</b> )	0.25 - 2.5 (24 - 14)			

## Wiring Example (RDY)



Element	Description
1	Control cabinet
2	PacDrive LMC Pro2 Motion Controller
3	Power supply
4	Lexium™ MC connection module with <b>RDY</b> relay Normally Open (NO) output
5	External braking resistor (optional)
6	DC bus to the Lexium™ MC12 multi carrier track

## Status LEDs

Refer to connection module above.

Name	Color	Description	On	Slow flashing 2 Hz <sup>(1)</sup>	Fast flashing 4 Hz <sup>(1)</sup>
DC	Green	DC bus status	Steady on: Input supply OK, 40.8...60 Vdc	Undervoltage	Overvoltage
DC Err	Red	General error detected	Steady on: Track could not be charged	Undervoltage during operation detected, stored	Incorrect setting of switches
BR	Green	Braking resistor activated	On for $\geq 500$ ms: Braking resistor is activated	–	– <sup>(2)</sup>
BR Err	Red	Braking resistor overload / short circuit	Steady on: Braking resistor short circuit	Braking resistor connection supervision <sup>(3)</sup>	Braking resistor overload (I <sup>2t</sup> )

(1) Switch off input voltage to acknowledge an error state:

- Wait until input voltage  $< 7$  Vdc or
- Wait  $\geq 30$  s

(2) Invalid voltage selection on the Lexium™ MC connection module.

(3) Braking resistor connection supervision:

- Internal braking resistor selected, but not connected
- External braking resistor selected, but internal braking resistor connected
- Internal transistor for braking error detected

## Switches

Use the rotary switches (**P1**, **P2**) to set the parameters for the braking resistors. Refer to connection module above.

In the delivery state, both switches are set to the value zero.

Modifying the switch positions of P1 / P2 during operation may result in high temperatures and damage of the connection module and the braking resistor after the next power cycle of the module.

### WARNING

#### UNINTENDED EQUIPMENT OPERATION

Do not put the connection module into service before the settings of the switches are established and verified.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

P1 (type)	Braking resistor type	P_Braking resistor [W]	R_Braking resistor [ $\Omega$ ]	Pulse energy capacity [J]
0	Internal (default)	10	1.56	60
2	External	50 <sup>1)</sup>	3.0	4000
4	External	100	3.0	4000
6	External	100 <sup>1)</sup>	1.5 <sup>2)</sup>	8000
8	External	200	1.5 <sup>2)</sup>	8000
1, 3, 5, 7, 9... E	Not allowed. An error is indicated.	–	–	–
F	Not allowed (special mode)	–	–	–

P\_Braking = Continuous power value  
R\_Braking = Resistance value

<sup>1)</sup> In this switch position, the continuous power is reduced to 50%, resulting in a lower surface temperature.  
<sup>2)</sup> Two external 3  $\Omega$  braking resistors in parallel for higher peak and continuous power.

For the external braking resistor (LXMMCABR120S100), also refer to Technical Data for Lexium™ MC braking resistor, page 80.

P2 (level)	Braking resistor voltage	V_BR0 [V]	V_BR1 [V]
0	Increasing with load (default)	52	56
1	Increasing with load	54	58
2	Increasing with load	56	60
3	Constant	54	54
4	Constant	56	56
5	Constant	58	58
6	Constant	60	60
7...E	Not allowed. An error is indicated.	–	–
F	Not allowed. Braking resistor will be permanently off.	–	–

Dynamic load-dependent switch-on threshold for the braking resistor:  
**V\_BR0** = Switch-on threshold value when the braking resistor is not yet loaded  
**V\_BR1** = Switch-on threshold value when the braking resistor is fully loaded at its power limit

## Connecting a Braking Resistor (CN2)

**NOTE:** The required braking resistor must be calculated depending on the desired braking capability and characteristics of your application. Refer to Dimensioning the Braking Resistor and the Interconnects, page 46. For setting the parameters for the braking resistor, refer to Switches, page 136.

An insufficiently rated braking resistor can cause overvoltage on the DC bus. Overvoltage on the DC bus causes the power stage to be disabled. The system is no longer actively decelerated.

## ⚠ WARNING

### UNINTENDED EQUIPMENT OPERATION

- Verify that the braking resistor has a sufficient rating by performing a test run under maximum load conditions.
- Verify that the parameter settings for the braking resistor are correct.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

During operation, the surface temperature of the housing of the Lexium™ MC connection module may exceed 70 °C (158 °F).

## ⚠ WARNING

### HOT SURFACES

- Avoid unprotected contact with hot surfaces.
- Do not allow flammable or heat-sensitive parts in the immediate vicinity of hot surfaces.
- Verify that the heat dissipation is sufficient by performing a test run under maximum load conditions.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

### Internal braking resistor

A braking resistor is integrated in the Lexium™ MC connection module to absorb braking energy. The Lexium™ MC connection module is shipped with the internal braking resistor (10 W, continuous power) active (jumper between **PA/+** and **PBi**).

## External Braking Resistor

An external braking resistor is required for applications in which the internal resistor is not able to absorb the braking energy.

Remove the jumper between **PA/+** and **PBi** and connect the external braking resistor between **PA/+** and **PBe**. Refer to Technical Data for Lexium™ MC braking resistor, page 80.

**NOTE:** Make sure to set switch **P1** to the correct values of the external braking resistor. Refer to *Switches*, page 136. The continuous power must be set to a value less or equal to the continuous power of the external braking resistor (depending on mounting: free air or on heat sink).

During operation, the surface temperature of the external braking resistor may exceed 250 °C (482 °F).

## ⚠ DANGER

### EXTREMELY HOT SURFACES

- Do not make unprotected contact with the surfaces of the external braking resistor.
- Keep all flammable or heat-sensitive materials away from the external braking resistor.
- Verify that the heat dissipation is sufficient by performing a test run under maximum load conditions.

**Failure to follow these instructions will result in death or serious injury.**

### Connecting an external braking resistor

⚡ ⚠ **DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to this equipment.
- Use only the specified voltage when operating this equipment and any associated equipment.

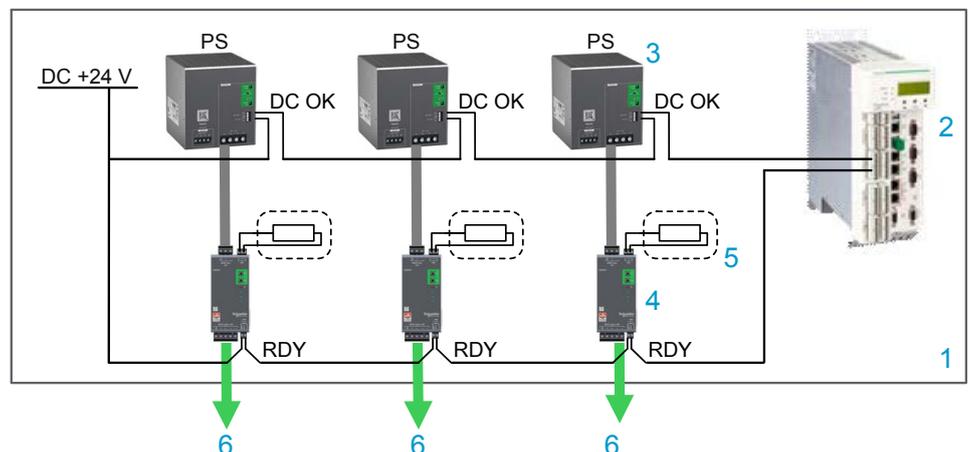
**Failure to follow these instructions will result in death or serious injury.**

Step	Action
1	Remove power from the supply voltages. Respect the safety instructions concerning electrical installation.
2	Verify that no voltages are present.
3	Remove the jumper between <b>PA/+</b> and <b>PBi</b> and connect the external braking resistor between <b>PA/+</b> and <b>PBe</b> to the Lexium™ MC connection module.
4	If the braking resistor is equipped with an over temperature switch, it can be connected to the PacDrive LMC Pro2 Motion Controller for diagnostic purposes and to de-energize the power supply in case of overheat. Refer to Wiring Example (Connecting an External Braking Resistor), page 139 and Wiring Example (Shut Down), page 133.
5	Use the switches <b>P1</b> and <b>P2</b> of the Lexium™ MC connection module to set the braking resistor type and the braking resistor voltage level. Refer to Switches, page 136.

## Monitoring of the Braking Resistor

The braking resistor (internal or external) is monitored by the Lexium™ MC connection module. In case of overload and short circuit, the connection module signals a detected error (**BR Err**, refer to Status LEDs, page 136) and opens the **RDY** relay.

## Wiring Example (Connecting an External Braking Resistor)



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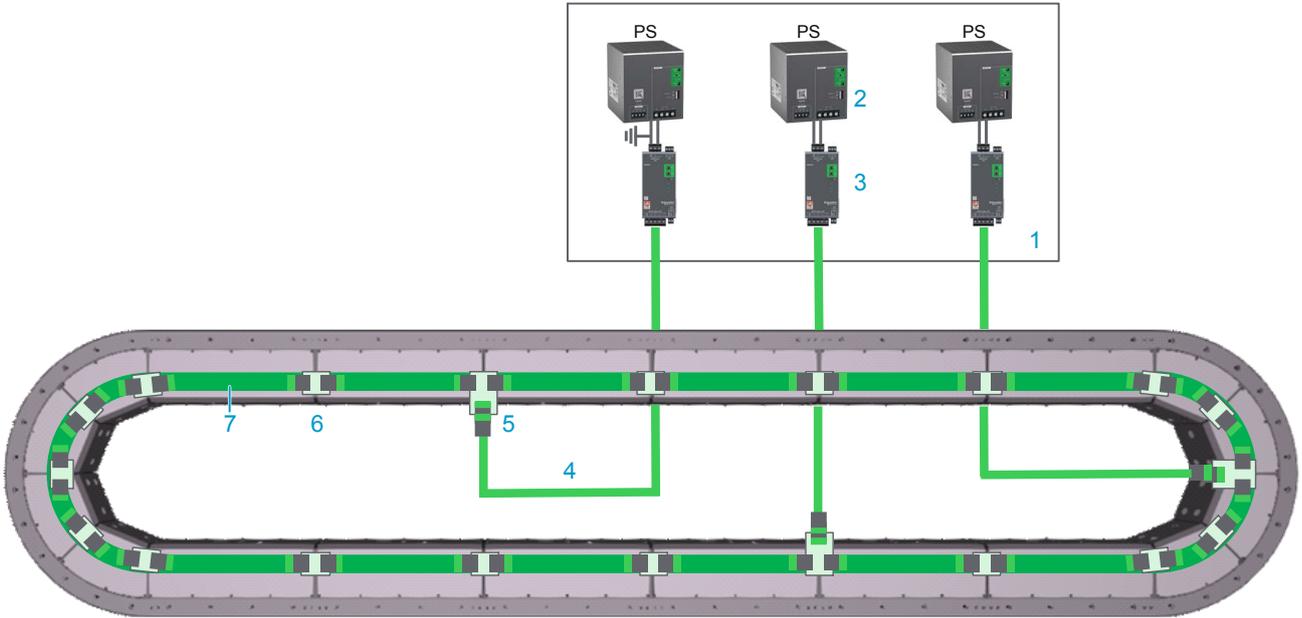
<b>Element</b>	<b>Description</b>
1	Control cabinet
2	PacDrive LMC Pro2 Motion Controller
3	Power supply
4	Lexium™ MC connection module
5	External braking resistor (optional)
6	DC bus to the Lexium™ MC12 multi carrier track

# Connecting the Connection Module to the Track

## Wiring Example

Also refer to Additional Wiring Examples, page 144.

### Closed track



Element	Description
1	Control cabinet
2	Power supply
3	Lexium™ MC connection module
4	Lexium™ MC power cable with socket connector
5	Lexium™ MC power interconnect with plug connector
6	Lexium™ MC power interconnect without connector
7	Internal DC bus connection

## Description

- The Lexium™ MC12 multi carrier track is connected to the Lexium™ MC connection module with pre-assembled cables.
  - NOTE:** The front covers of the segments are not connected to the PE (protective ground/earth). The electrical safety requirements are fulfilled by appropriate insulation measures (protective separation).
- The Lexium™ MC connection module supplies the Lexium™ MC12 multi carrier track with power (DC bus).
  - The Lexium™ MC connection module limits the DC bus voltage to <60 Vdc, conforming to Functional Safety rules. Refer to Scope of Operation (Designated Safety Function), page 53.
- The DC bus (up to 60 A) in the Lexium™ MC12 multi carrier track is distributed from segment to segment via the Lexium™ MC power interconnects.

- The Lexium™ MC12 multi carrier requires the power supply to be dimensioned based on the number of segments, segment groups, carriers, load and other relevant parameters.

Each power supply/Lexium™ MC connection module combination must not exceed 24 segments.

Also refer to Information About Power Supply/Connection Module, page 124.

## Connecting the Lexium™ MC connection module to the Lexium™ MC12 multi carrier Track

The following describes the connection from the Lexium™ MC connection module to the Lexium™ MC12 multi carrier track (refer to Wiring Example, page 141):

Step	Action
1	Connect the Lexium™ MC power cable to the Lexium™ MC connection module CN3 (3) in the wiring example above.
2	Connect the Lexium™ MC power cable (4) to the Lexium™ MC power interconnect (5) at the bottom of a segment. Verify that connector of the cable is fixed with its four M3x12 screws to the Lexium™ MC power interconnect, with a torque of 1.2 Nm (10.62 lbf-in).

# Pinout and Cable Diagram

## Pinout

Pre-assembled Lexium™ MC power cable. Refer to Type Code, page 35.

Only operate the Lexium™ MC12 multi carrier with approved, specified cables, accessories and replacement equipment by Schneider Electric.

**⚠ DANGER**

**ELECTRIC SHOCK OR ARC FLASH**

Do not use non-Schneider Electric approved cables, accessories or any type of replacement equipment.

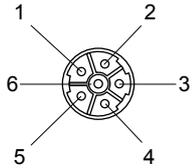
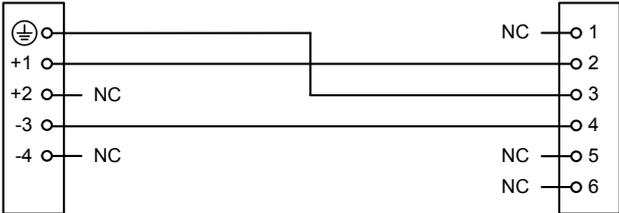
**Failure to follow these instructions will result in death or serious injury.**

**⚠⚠ DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to this equipment.
- Use only the specified voltage when operating this equipment and any associated equipment.

**Failure to follow these instructions will result in death or serious injury.**

Connector at the Lexium™ MC connection module (CN3)	Pin from CN3	Description	Pin from M23 connector	Connector (M23, plug) at the Lexium™ MC12 multi carrier track
	⊕	Protective ground (earth)	3	
	+1	48 Vdc DC bus voltage +	2	
	+2	Not connected	1	
	-3	48 Vdc DC bus voltage -	4	
	-4	Not connected	5	
		Not connected	6	
<p><b>Cable diagram</b></p> <p>Shield connected to housing on connector side.</p> 				

**NOTE:** If you have to remove a connector from the cable, for example, to lead the cable through a cable bushing, make sure to reconnect the wires of the cable correctly to the connector afterwards. Observe the requirements for the degree of protection and the EMC regulations.

## ⚠ WARNING

### UNINTENDED EQUIPMENT OPERATION

Do not connect wires to unused terminals and/or terminals indicated as “No Connection (N.C.)”.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

An incorrect wiring may result in damage of components.

## ⚠ CAUTION

### DAMAGE OF COMPONENTS DUE TO INCORRECT WIRING

Ensure and verify the correct wiring of power supplies, connection modules and segments.

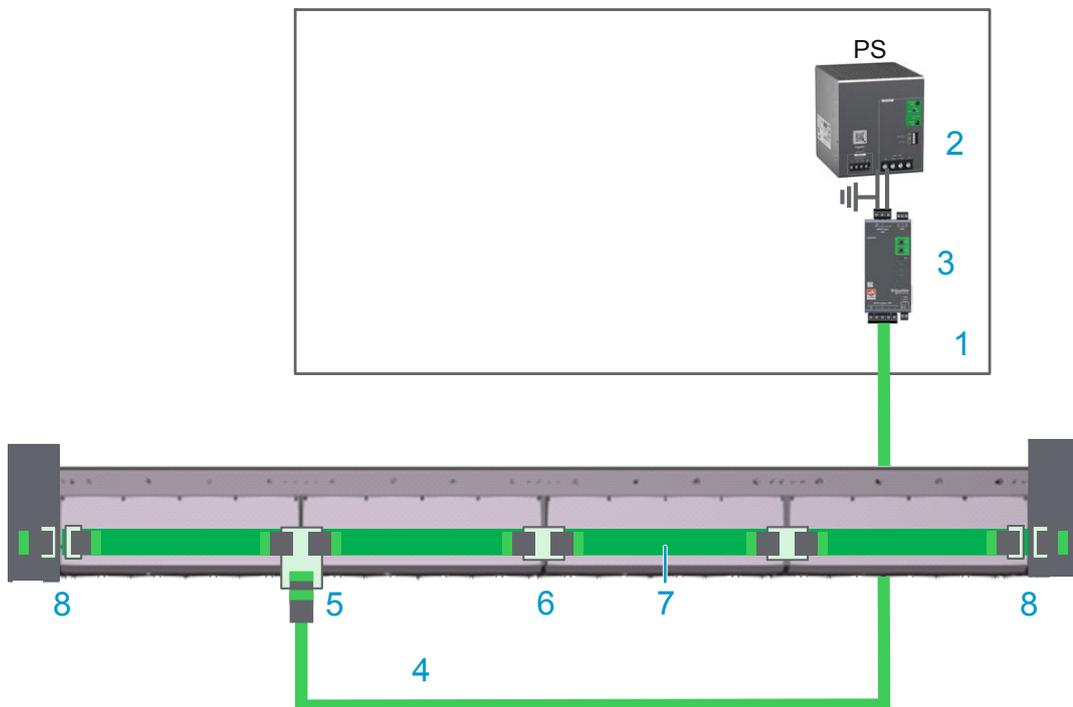
**Failure to follow these instructions can result in injury or equipment damage.**

## Additional Wiring Examples

### Open track

With an open track, you need a power disconnecter (8) at each end of your track.

Also refer to Open Track, page 89.

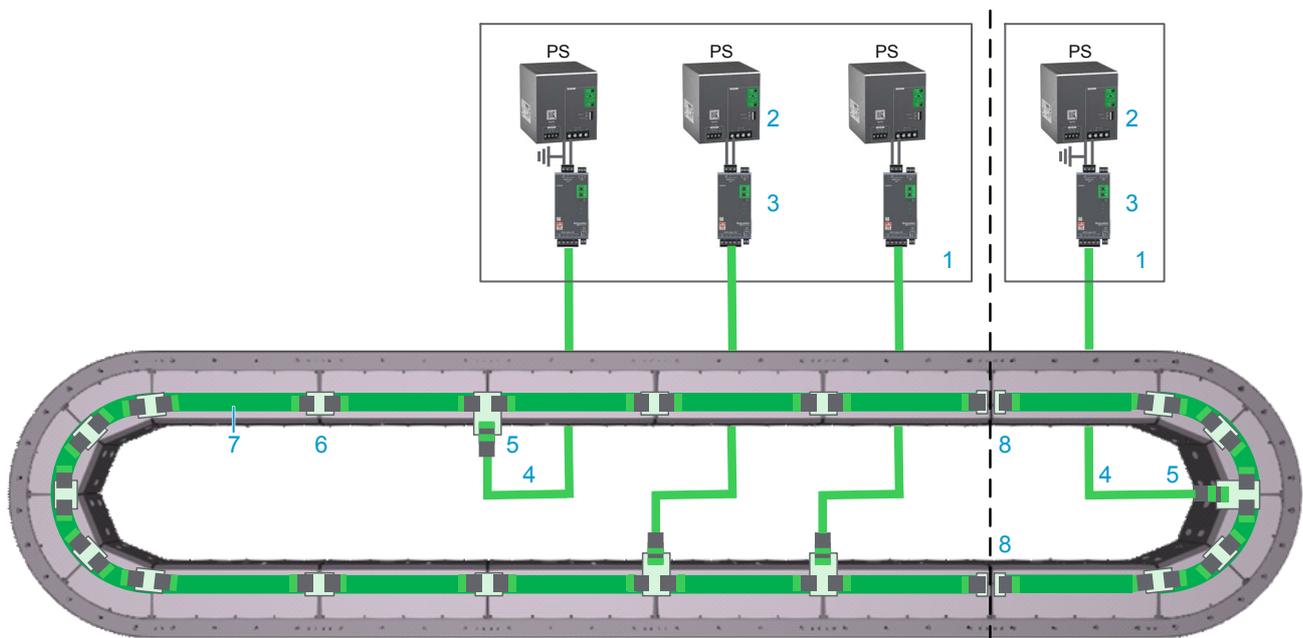


Element	Description
1	Control cabinet
2	Power supply
3	Lexium™ MC connection module
4	Lexium™ MC power cable with socket connector
5	Lexium™ MC power interconnect with plug connector

Element	Description
6	Lexium™ MC power interconnect without connector
7	Internal DC bus connection
8	Power disconnecter

**Track with two power supply groups**

With a track with two power supply groups, you need power disconnecters (8) between the two power supply groups.



Element	Description
1	Control cabinet
2	Power supply
3	Lexium™ MC connection module
4	Lexium™ MC power cable with socket connector
5	Lexium™ MC power interconnect with plug connector
6	Lexium™ MC power interconnect without connector
7	Internal DC bus connection
8	Power disconnecter

To ensure an equal load on the power supplies connected in parallel, the power cables in the same power group must have the same length.

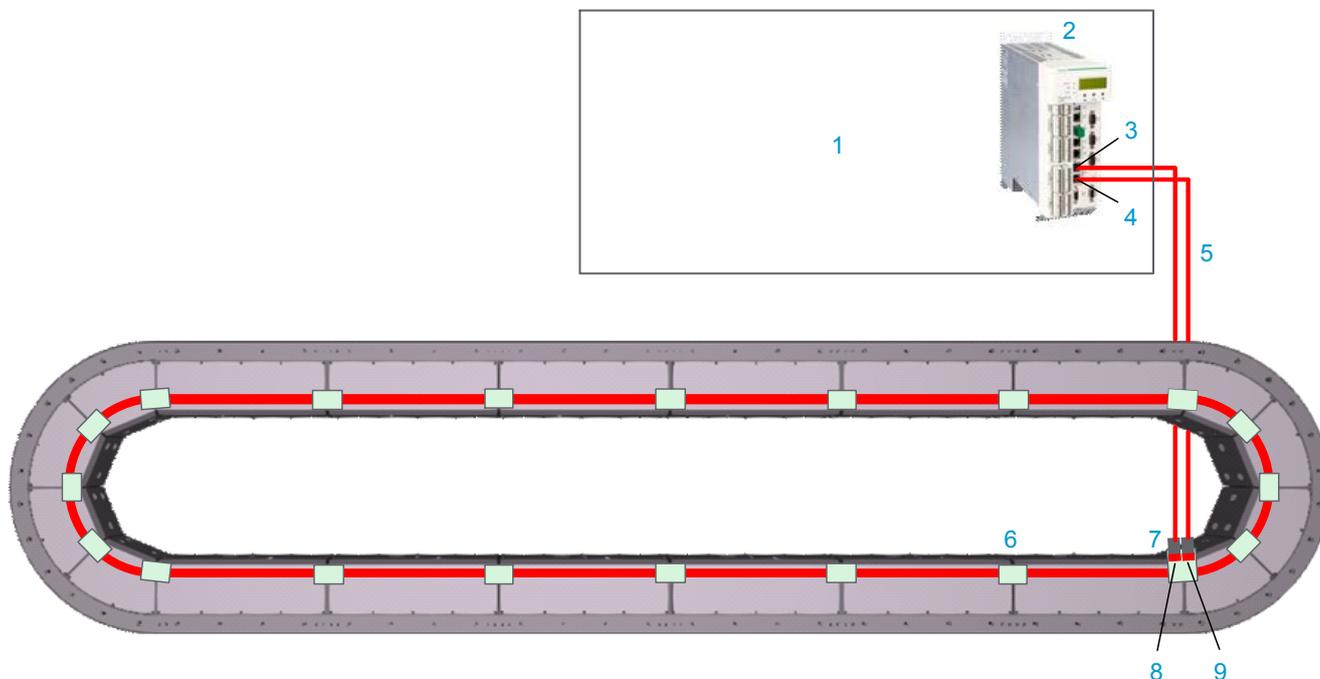
<b>NOTICE</b>
<b>INOPERABLE EQUIPMENT</b>
Use the same length of power cables to the connection modules when using parallel power supplies.
<b>Failure to follow these instructions can result in equipment damage.</b>

# Connecting the Sercos Bus to the Track

## Wiring Example

Also refer to Additional Wiring Example, page 148.

### Closed track



Element	Description
1	Control cabinet
2	LMC Pro2 Motion Controller
3	Sercos port 1 (CN12) of the controller
4	Sercos port 2 (CN13) of the controller
5	Sercos cables
6	Lexium™ MC communication interconnect
7	Lexium™ MC communication interconnect with two Sercos connectors (in/out)
8	Sercos port P1 (infeed) of a closed Lexium™ MC12 multi carrier track
9	Sercos port P2 (outfeed) of a closed Lexium™ MC12 multi carrier track

## Description

- The LMC Pro2 Motion Controller is installed in a cabinet.
- The LMC Pro2 Motion Controller is connected to the Lexium™ MC12 multi carrier track with pre-assembled cables. If you do not use pre-assembled cables, make sure not to exceed a Sercos cable length of 50 m (164 ft).
- The LMC Pro2 Motion Controller communicates with the Lexium™ MC12 multi carrier track via Sercos bus.
- The Sercos bus is distributed from segment to segment via the Lexium™ MC communication interconnects.

# Connecting the Sercos Bus to the Lexium™ MC12 multi carrier Track

The following describes the Sercos bus connection from the LMC Pro2 Motion Controller to the Lexium™ MC12 multi carrier track:

Step	Action
1	Connect the Sercos cables (5) to the LMC Pro2 Motion Controller (2).
2	Connect the Sercos cables (5) to the Lexium™ MC communication interconnect with the two Sercos connectors (7) at the top of a segment. Verify that the Lexium™ MC communication interconnect is fixed with its four M3x8 screws to the segment, with a torque of 0.6 Nm (5.31 lbf-in). The Sercos port P1 (CN12) of the controller must be connected to the Sercos port P1 of the Lexium™ MC12 multi carrier track.

## Pinout and Cable Diagram

### Pinout

Pre-assembled Sercos cable.

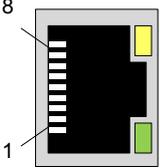
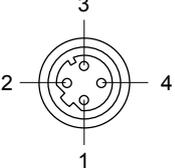
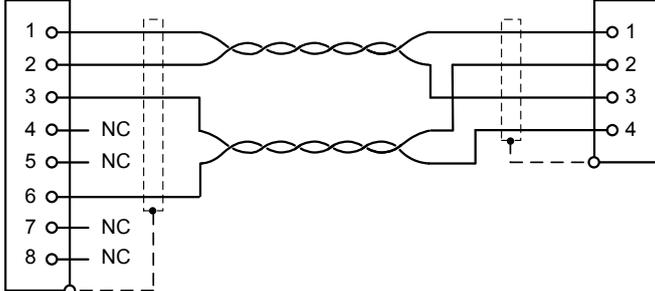
Only operate the Lexium™ MC12 multi carrier with approved, specified cables, accessories and replacement equipment by Schneider Electric.

⚠ DANGER

ELECTRIC SHOCK OR ARC FLASH

Do not use non-Schneider Electric approved cables, accessories or any type of replacement equipment.

Failure to follow these instructions will result in death or serious injury.

Connector at LMC Pro2 Motion Controller (RJ45, CN12/CN13)	Pin from CN12/ CN13	Designation	Description	Pin from M12 connector	Connector (M12, D-coded, socket) at the Lexium™ MC12 multi carrier track
	1	Tx+	Output transmit data +	1	
	2	Tx-	Output transmit data -	3	
	3	Rx+	Input receive data +	2	
	4	-	Reserved	N/A	
	5	-	Reserved	N/A	
	6	Rx-	Input receive data -	4	
	7	-	Reserved	N/A	
	8	-	Reserved	N/A	
<p><b>Cable diagram</b></p> <p>Shield connected to housing on connector side.</p> 					

**NOTE:** If you have to remove a connector from the cable, for example, to lead the cable through a cable bushing, make sure to reconnect the wires of the cable correctly to the connector afterwards. Observe the requirements for the degree of protection and the EMC regulations.

## ⚠ WARNING

### UNINTENDED EQUIPMENT OPERATION

Do not connect wires to unused terminals and/or terminals indicated as “No Connection (N.C.)”.

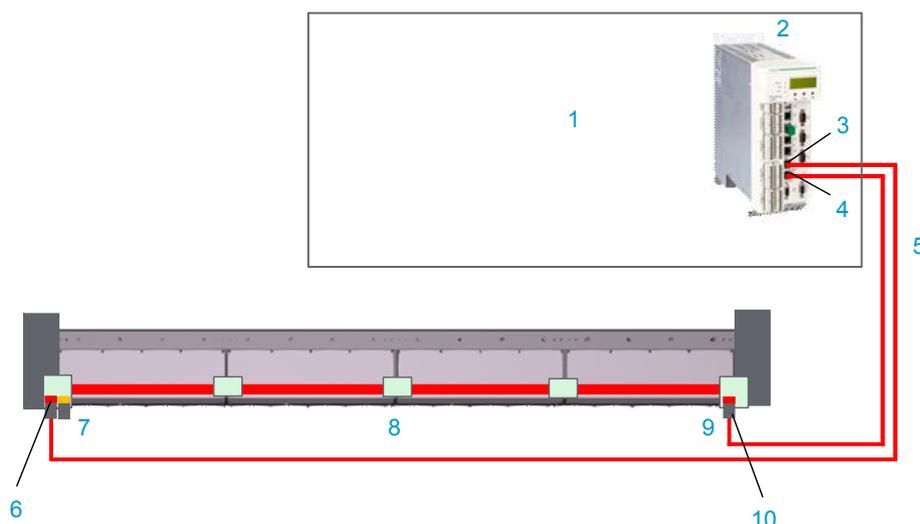
**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## Additional Wiring Example

### Open track

With an open track, you need a communication interconnect (7) at the beginning of the open track with one Sercos (and one SFO) connector and a communication interconnect (9) at the end of the open track with one Sercos connector.

Also refer to Open Track, page 89.



Element	Description
1	Control cabinet
2	LMC Pro2 Motion Controller
3	Sercos port P1 (CN12) of the controller
4	Sercos port P2 (CN13) of the controller
5	Sercos cables
6	Sercos port P1 (infeed) of an open Lexium™ MC12 multi carrier track
7	Lexium™ MC communication interconnect with one Sercos (and one SFO) connector.
8	Lexium™ MC communication interconnect
9	Lexium™ MC communication interconnect with one Sercos connector.
10	Sercos port P2 (outfeed) of an open Lexium™ MC12 multi carrier track



# Connecting SFO (Safe Force Off) to the Track

## General Information

Regardless of whether you use the SFO (Safe Force Off) function in your track or not, you must supply 24 Vdc to the track permanently. To do this, install a Lexium™ MC communication interconnect with SFO connector to the first segment of the track and supply SFOin+ (24 Vdc) and SFOin- (0 Vdc). This puts the Lexium™ MC12 long stator motor segments in an energized state and allows them to apply electromagnetic force to the Lexium™ MC12 carriers.

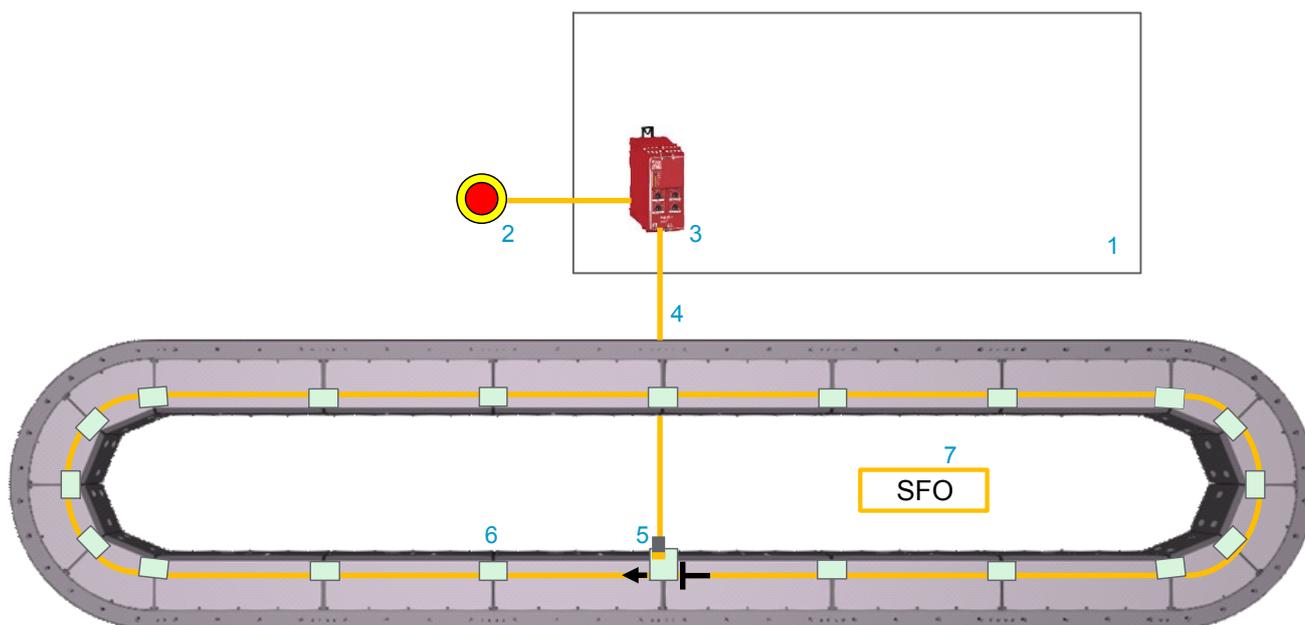
In case you use the SFO (Safe Force Off) function, the 24 Vdc must be supplied by an appropriate safety-related switching device. In case you do not use the SFO (Safe Force Off) function, the 24 Vdc can be provided by another power supply.

For more information on SFO (Safe Force Off), refer to Functional Safety, page 50.

## Wiring Example (SFO)

Also refer to Additional Wiring Examples (No SFO), page 152.

### Closed track



Element	Description
1	Control cabinet
2	Emergency stop switch
3	Safety-related switching device (for example, Harmony XPSUAT Safety Module)
4	SFO cable
5	Lexium™ MC communication interconnect with SFO (Safe Force Off) connector
6	Lexium™ MC communication interconnect
7	SFO group

## Description

You must provide at least one SFO (Safe Force Off) signal to the Lexium™ MC12 multi carrier track. Otherwise the Lexium™ MC12 long stator motor segments remain in a defined safe state and do not exert an electromagnetic force to the Lexium™ MC12 carriers.

In addition, if you wish to use the SFO safety-related function, you must use safety-related devices, for example, to integrate emergency stop switches into your system.

- The safety-related devices are installed in a cabinet. For example:
  - XPSUAT Safety Module (Harmony XPS Universal product range)
  - XPSMCMRO0004G Safety Relay Output Module (Modicon MCM product range)
  - TM5SDM4DTRFS Safety Discrete I/O Module (Modicon TM5/TM7 Modular I/O System product range in conjunction with a Safety Logic Controller (SLC))

**NOTE:** Third-party safety-related modules must be able to handle the in-rush current consumption of 450 mA per segment.

- The safety-related devices are connected to the Lexium™ MC12 multi carrier track with pre-assembled cables.

Make sure not to exceed a cable length of 20 m (65.6 ft).

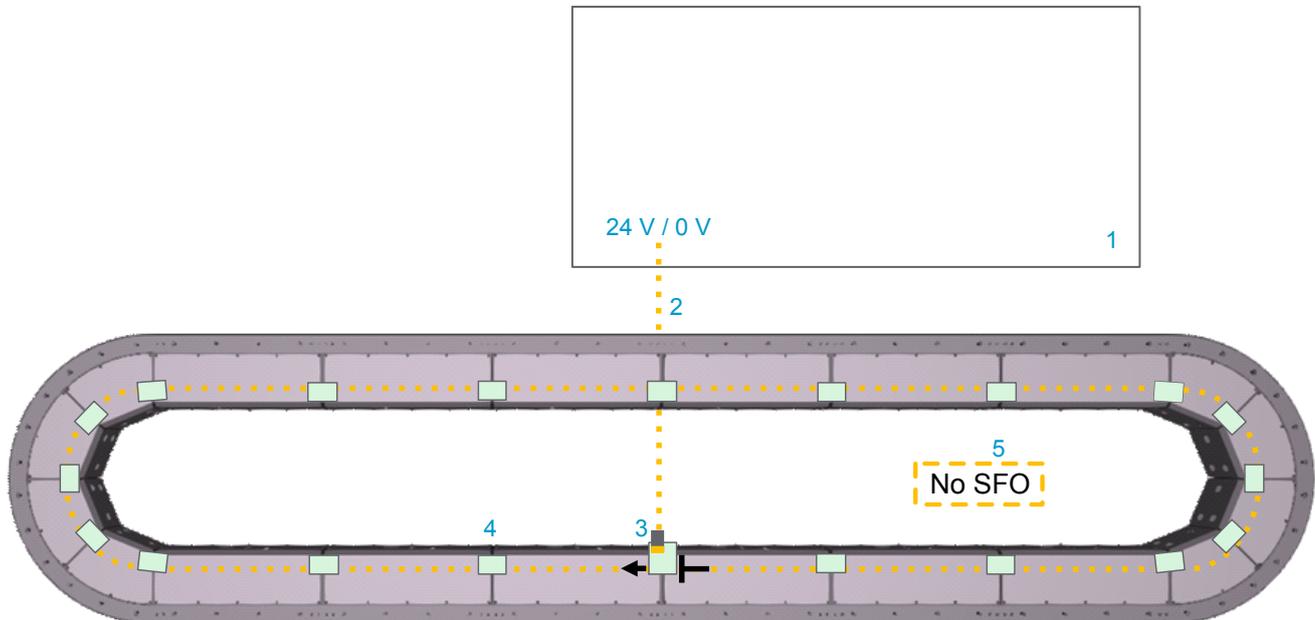
- The safety-related modules allow to perform safety-related functions, for example, to bring carriers moving on the track to a defined safe stop (SFO).
- The SFO signal is distributed from segment to segment via the Lexium™ MC communication interconnects.
- Several SFO groups can be set up for different sections of the track. An SFO group always starts at the Lexium™ MC communication interconnect with SFO connector and extends clockwise to the next Lexium™ MC12 long stator motor segment via the Lexium™ MC communication interconnect.
- Each segment must be provided with an SFO signal. Either with an SFO cable (with SFO) connector at the top of a segment) or via the Lexium™ MC communication interconnect from the segment before.
- Up to 68 segments can be controlled by one safety-related output.

## Additional Wiring Examples (No SFO)

Even if you do not use the SFO (Safe Force Off) function in your track or in a group of segments of your track, you must supply 24 Vdc to the track permanently.

### Closed track

With a closed track, you need a Lexium™ MC communication interconnect with SFO connector.

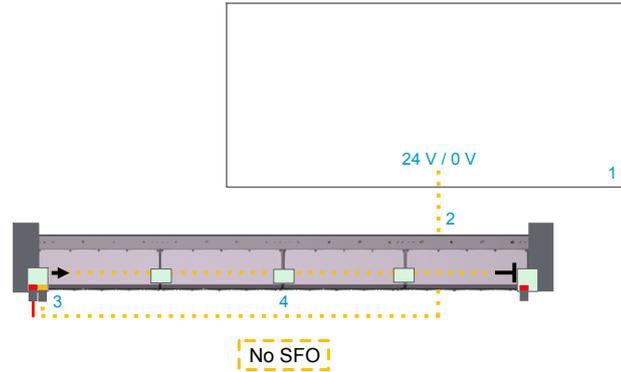


Element	Description
1	Control cabinet
2	SFO cable
3	Lexium™ MC communication interconnect with SFO (Safe Force Off) connector
4	Lexium™ MC communication interconnect
5	Non-SFO group

### Open track

With an open track, you need a Lexium™ MC communication interconnect at the beginning of the open track with one SFO connector (and one Sercos connector).

Also refer to Open Track, page 89.



Element	Description
1	Control cabinet
2	SFO cable
3	Lexium™ MC communication interconnect with SFO (Safe Force Off) connector
4	Lexium™ MC communication interconnect

## Connecting SFO (Safe Force Off) to the Lexium™ MC12 multi carrier Track

The following describes the SFO connection to the Lexium™ MC12 multi carrier track (refer to Additional Wiring Examples (No SFO), page 152):

Step	Action
1	Connect the SFO cable (2) in the wiring examples above to 24 Vdc.
2	Connect the negative output voltage terminal of the power supply to the <b>PE</b> (protective ground/earth) of the cabinet.
3	Connect the SFO cable (2) to the Lexium™ MC communication interconnect with SFO connector (3) at the top of a segment. Verify that the Lexium™ MC communication interconnect is fixed with its four M3x8 screws to the segment, with a torque of 0.6 Nm (5.31 lbf-in).

## Pinout and Cable Diagram

### Pinout

Pre-assembled SFO cable. Refer to Type Code, page 35.

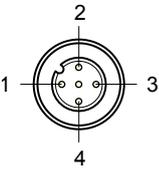
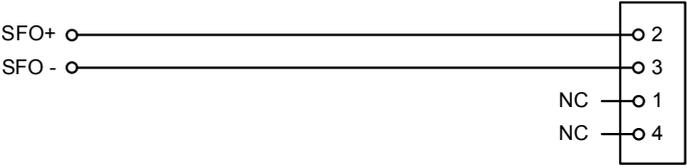
Only operate the Lexium™ MC12 multi carrier with approved, specified cables, accessories and replacement equipment by Schneider Electric.

### **⚠ DANGER**

#### **ELECTRIC SHOCK OR ARC FLASH**

Do not use non-Schneider Electric approved cables, accessories or any type of replacement equipment.

**Failure to follow these instructions will result in death or serious injury.**

Open cable end with wire end ferrules	Wire color	Designation	Description	Pin from M12 connector	Connector (M12, A-coded, plug) at the Lexium™ MC12 multi carrier track
-	Brown	Not connected	Not connected	1	
	White	SFO+	Positive SFO signal	2	
	Blue	SFO-	Negative SFO signal	3	
	Black	Not connected	Not connected	4	
<b>Cable diagram</b> 					

**NOTE:** If you have to remove a connector from the cable, for example, to lead the cable through a cable bushing, make sure to reconnect the wires of the cable correctly to the connector afterwards. Observe the requirements for the degree of protection and the EMC regulations.

### **⚠ WARNING**

#### **UNINTENDED EQUIPMENT OPERATION**

Do not connect wires to unused terminals and/or terminals indicated as "No Connection (N.C.)".

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

**NOTE:** Protected wiring, e.g., control cabinet, armored conduit, etc., is required if the safety-related module generating the SFO signal is not able to perform an error detection on the wiring. Refer to IEC 61800-5-2 and IEC 60204-1.

# Initial Start-Up

## Verifying the Installation

### Overview

Verify that the components of the Lexium™ MC12 multi carrier are installed correctly. For more information, refer to *Specific Safety Information*, page 15.

Pay special attention to:

- Properly bolted mechanical parts.
- Installation and wiring of the components of the Lexium™ MC12 multi carrier. Make sure that the mains connection, the DC bus, the Sercos bus, and the SFO (Safe Force Off) connections are wired correctly.
- Installation and connection of all cables and connectors. Make sure that the Lexium™ MC interconnects are properly inserted and secured with the associated screws.
- Wiring and settings of the Lexium™ MC connection modules (Refer to *Lexium™ MC connection module*, page 134).
  - Verify the correct wiring of the relay contacts at the connector **CN4 (RDY 1 / RDY 2)**.
  - Verify the correct wiring of the braking resistor at the connector **CN2** (jumper between **PA/+** and **PBi** for internal braking resistor. **PA/+** and **PBe** for external braking resistor).
  - Verify the correct settings of the switches **P1** and **P2** (parameters for the braking resistor).
- Wiring and settings of the power supplies (refer to *Power Supply*, page 126):
  - Verify the correct wiring of the relay contacts **DC OK** and **Shut down**.
  - Verify the correct setting of the switch **Parallel/Single**.
  - Verify the correct setting of the potentiometer **Output voltage**.
- Connection of the protective ground (earth) cables.
- Use of correct fuses.
- Isolation of the unused cable ends.
- Unobstructed movement of the carriers along the entire track.

### **DANGER**

#### **ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Operate electrical components only with a connected protective ground (earth) cable.
- Verify the secure connection of the protective ground (earth) cable to all electrical devices to ensure that connection complies with the connection diagram.
- Do not touch the electrical connection points of the components when the module is energized.
- Provide protection against indirect contact (EN 50178).
- Insulate any unused conductors on both ends of the power cable.

**Failure to follow these instructions will result in death or serious injury.**

**⚡⚠ DANGER****ELECTRIC SHOCK DUE TO LOOSE WIRING OR CABLING**

Tighten wiring or cabling connections in conformance with the torque specifications.

**Failure to follow these instructions will result in death or serious injury.**

**⚡⚠ DANGER****ELECTRIC SHOCK DUE TO IMPROPER GROUNDING**

- Ground the components of the system in accordance with local, regional and/or national standards and regulations at a single, central point.
- Verify that the components of the system are connected to the central ground.

**Failure to follow these instructions will result in death or serious injury.**

## Start-Up

### Overview

When the Lexium™ MC12 multi carrier is operated for the first time, there is a risk of unintended equipment operation caused by possible wiring errors or unsuitable parameters.

You must take care that the carriers (depending on the shape of the product, size, mass, center of mass, acceleration, deceleration, velocity) keep enough distance from each other to help prevent collisions. Verify that you have implemented a device like, for example, a sensor for identifying the carrier and the type of tool mounted on the carrier to help prevent collisions. In addition, depending on the load and center of gravity, the speed of the carriers must be reduced on arc segments to help prevent the carriers from leaving the track.

Use the related libraries to program your application. The libraries provide function blocks and interfaces to control the Lexium™ MC12 multi carrier. Refer to Libraries and Example Project, page 46.

**⚠ WARNING****UNINTENDED EQUIPMENT OPERATION**

- Verify that the carriers, tools on the carriers, and products on the carrier tools are properly fastened so it cannot come loose even in the case of fast acceleration.
- Take all necessary measures to ensure that the moving parts cannot move in an unanticipated way.
- Verify that emergency stop equipment is operational and within reach of the zone of operation.
- Verify that the system is obstacle-free and ready for the movement before starting the system.
- Run initial tests at reduced velocity.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

If the power supply is disabled unintentionally, for example as a result of power outage, errors or functions, the carriers are no longer decelerated in a controlled way.

<b>▲ WARNING</b>
<b>UNINTENDED EQUIPMENT OPERATION</b>
Verify that movements without active braking capabilities cannot cause injuries or equipment damage.
<b>Failure to follow these instructions can result in death, serious injury, or equipment damage.</b>

The metal surfaces of the system may exceed 70 °C (158 °F) when subjected to heavy loads and/or high performance during operation.

<b>▲ WARNING</b>
<b>HOT SURFACES</b>
<ul style="list-style-type: none"> <li>• Avoid unprotected contact with hot surfaces.</li> <li>• Do not allow flammable or heat-sensitive parts in the immediate vicinity of hot surfaces.</li> <li>• Verify that the heat dissipation is sufficient by performing a test run under maximum load conditions.</li> </ul>
<b>Failure to follow these instructions can result in death, serious injury, or equipment damage.</b>

**NOTE:** Perform a start-up in case of an already configured Lexium™ MC12 multi carrier when it is used under modified operating conditions. For more information, refer to Specific Safety Information, page 15.

## Commissioning Procedure

Step	Action
1	Verify the installation. For more information, refer to <i>Verifying the Installation</i> , page 155.
2	Verify that the loads conform to the appropriate specified forces and torques for components of the Lexium™ MC12 multi carrier before operating the system.
3	Perform initial tests at reduced velocity. During these tests, verify that the controller responds without any error or advisory message to the signals of the Lexium™ MC12 multi carrier.
4	Verify that the ambient conditions conform to the appropriate specified environments for the Lexium™ MC12 multi carrier. For details, refer to <i>Ambient Conditions</i> , page 71.
5	For Lexium™ MC12 multi carrier tracks with automated lubrication: Verify that the lubricant lines have been filled with lubricant so that the lubrication pump supplies sufficient lubricant through the channels in the segment to the guide rails.

**NOTE:** The maximum permissible dynamic forces decrease with increasing velocities and depend on the load and the center of gravity.

# Maintenance, Repair, and Cleaning

## Maintenance and Repair

### General Information About Maintenance, Repair, and Cleaning

#### Overview

The use and application of the information contained herein require expertise in the design and programming of automated control systems. Only you, the user, machine builder or integrator, can be aware of all the conditions and factors present during installation and setup, operation, repair, and maintenance of the machine or process.

You must also consider any applicable standards and/or regulations with respect to grounding of all equipment. Verify compliance with any safety information, different electrical requirements, and normative standards that apply to your machine or process in the use of this equipment.

#### **DANGER**

##### **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to this equipment.
- Use only the specified voltage when operating this equipment and any associated equipment.

**Failure to follow these instructions will result in death or serious injury.**

Insufficient maintenance can lead to premature wear, or even present potential safety hazards for production or maintenance operators.

#### **WARNING**

##### **UNINTENDED EQUIPMENT OPERATION**

Develop and follow a maintenance plan and associated protocols adapted to the requirements of your application and equipment.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

#### Servicing

In case of issues which cannot be resolved, contact your local Schneider Electric service representative with the following information:

- Type plate information (type, identification number, serial number, date of manufacture)
- Detailed description of the issue
- Previous and associated circumstances

# Maintenance Plan

## Overview

The data given in the maintenance schedule are indicative only. The data have to be adapted depending on the application and the environmental conditions.

For the maintenance procedures, refer to:

Cleaning, page 161

Replacing Parts, page 162

Lubrication, page 173

**NOTE:** For information specific to the Heavy-Duty system, refer to Maintenance Schedule, page 198.

## Maintenance Schedule

Perform the following maintenance tasks after delivery or long storage:

Interval <sup>(1)</sup>	Action
After delivery <sup>(2)</sup>	<ul style="list-style-type: none"> <li>Fill the lubrication reservoirs of the carriers. Refer to Lubrication, page 173.</li> </ul>
After delivery, every 1000 km (621 miles) or within the first two months of service life	<ul style="list-style-type: none"> <li>Verify the Lexium™ MC12 multi carrier by visual inspection for any damage or missing parts, especially for moving parts and parts at risk for collisions such as mounting elements.</li> </ul>
After ≥ two years of storage	<ul style="list-style-type: none"> <li>Verify the lubrication pads of the carriers and replace if necessary. Refer to Replacing Parts, page 162.</li> </ul>
<p>(1) The distances referred to are for one carrier. The performance of your system may differ.</p>	
<p>(2) Filling the lubrication reservoirs of the carriers helps to ensure an even lubrication of the carrier rollers and the rails.</p>	

Perform the following maintenance tasks within the stated intervals.

**NOTE:** The intervals in the following table are guidelines. The intervals can be adjusted depending on your application and the environmental conditions (track length, number of carriers, motion profile, temperature, and so on).

Interval <sup>(1)</sup>	Action
Every 1000 km (621 miles) of operation	<ul style="list-style-type: none"> <li>• Clean the Lexium™ MC12 multi carrier if necessary. Refer to <i>Cleaning</i>, page 161.</li> <li>• Verify that the floating bearing of the lower carrier rollers moves freely in axial direction. Clean if necessary and make the rollers run smoothly. Refer to <i>Cleaning the Carrier Rollers</i>, page 161.</li> <li>• Verify the lubrication pads of the carriers for wear and replace them if necessary. Refer to <i>Replacing Parts</i>, page 162.</li> </ul>
Every 1000 km (621 miles)... 8000 km (4970 miles) <sup>(2)</sup>	<p>Lubricate the carriers depending on the application. Refer to <i>Lubrication</i>, page 173. As examples, two test cases were conducted that required refilling the lubricant reservoirs.</p> <ul style="list-style-type: none"> <li>• Test application for 1000 km (621 miles): 1.5 m (59 in.) track length, 1 carrier, laboratory environment at 35 °C (95 °F)</li> <li>• Test application for 8000 km (4970 miles): 5.2 m (205 in.) track length, 5 carriers, laboratory environment at 25 °C (77 °F)</li> </ul>
Every 4000 km (2485 miles) of operation	<ul style="list-style-type: none"> <li>• Clean the Lexium™ MC12 multi carrier. Refer to <i>Cleaning</i>, page 161. <ul style="list-style-type: none"> <li>◦ Verify the covers of the segments and the drive magnets of the carriers for dirt and magnetic abrasion. Clean the covers and the magnets and remove the magnetic abrasion if necessary. Refer to <i>Removing Particles from the Magnets</i>, page 161.</li> <li>◦ Verify the carrier rollers for dirt and clean if necessary.</li> <li>◦ Verify the area of encoder magnets of the carriers for dirt, and clean if necessary.</li> <li>◦ Verify the rails for dirt, and clean if necessary.</li> </ul> </li> <li>• Verify the Lexium™ MC12 multi carrier by visual inspection for any damage or missing parts, especially moving parts and parts at risk for collisions such as mounting elements. <ul style="list-style-type: none"> <li>◦ Verify the drive magnets of the carriers for damage. The drive magnets cannot be replaced individually. Replace the plate with the two magnets as a whole if necessary. Refer to <i>Replacing the Drive Magnets of the Carrier</i>, page 170.</li> <li>◦ Verify the rails for wear or damage and replace them if necessary.</li> </ul> </li> </ul>
Every 20,000 km (12,427 miles) of operation	<ul style="list-style-type: none"> <li>• Verify the carrier rollers for wear and replace the carrier rollers if necessary. Refer to <i>Replacing the Rollers of a Carrier</i>, page 166.</li> </ul>
<p>(1) The distances referred to are dependent on your system and usage. More frequent usage may require more frequent lubrication applications.</p> <p>(2) Not required for Lexium™ MC12 multi carrier tracks with automated lubrication. For a track with automated lubrication, ensure a sufficient supply of lubricant to the lubricant outlets.</p>	

Perform the following maintenance tasks if your carriers have exceptional movement profiles:

Movement profile	Action
Reversing movements in which the carriers travel a distance of less than 200 mm (7.88 in).	<ul style="list-style-type: none"> <li>• If a distance of less than 200 mm (7.88 in) is travelled, perform a lubrication run after 20,000 traverse cycles or earlier.</li> </ul> <p><b>NOTE:</b> Sufficient lubrication during reversing movements can only be reached if the carriers travel a distance of at least 200 mm (7.88 in).</p>

## Cleaning

### Overview

Care must be taken with cleaning products as some active agents may have harmful effects on the materials of the Lexium™ MC12 multi carrier.

#### **NOTICE**

##### **CORROSION CAUSED BY CLEANING AGENTS**

Perform a compatibility test in relation to the cleaning agent and the component affected before using a cleaning agent.

**Failure to follow these instructions can result in equipment damage.**

Schneider Electric provides samples of the different materials used for the Lexium™ MC12 multi carrier.

For the material samples (Material test kit 1), refer to Lexium™ MC accessories, page 33.

Test kit materials:

- Aluminum die casting, anodized black or no coloring
- Stainless steel
- Plastic (PBT, Polybutylene terephthalate), injection molding
- Carbon steel, milled, surface treatment black
- Carbon steel, machined, no coloring
- Carbon steel, machined, electroless nickel
- Zinc alloy, die casting, cathodic dip painted, black
- Magnets, nickel plated
- Bumper, rubber, black

### Cleaning the Lexium™ MC12 multi carrier

The Lexium™ MC12 multi carrier must be inspected, large particles and dirt must be removed from the surface, and the system must be cleaned at regular intervals (refer to Maintenance Plan, page 159). When cleaning the Lexium™ MC12 multi carrier, note the following:

- Do not use compressed air for cleaning.
- Use only damp, soft, and lint-free cleaning cloths to wipe the surface.

**NOTE:** Depending on the operating conditions and requirements, verifying and cleaning may be necessary on a more frequent basis.

### Removing Particles from the Magnets

The drive magnets of the carriers and the electromagnets of the segments can attract ferrous particles. These impurities can impair the function of the magnets.

Remove the particles from the magnets with an adhesive tape or another suitable means.

### Cleaning the Carrier Rollers

Particularly during the first runs, there may be increased abrasion of the oxide layer of the rail surface, so that the free movement in the axial direction of the lower floating bearings of the carrier rollers is impaired by the abrasion. Verify that

the floating bearing of the lower carrier rollers moves freely in axial direction. Clean if necessary and make the rollers run smoothly. Also refer to Maintenance Schedule, page 159.

You may need to remove the lower carrier rollers for cleaning. Refer to Replacing the Rollers of a Carrier, page 166.

**NOTE:** The rails are made of hardened steel with a black oxide layer for rust protection. On the running surface of the rails, the oxide layer may partially or completely wear off due to various factors such as weight, acceleration, speed and jerk. The wear does not affect the hardened steel of the rails. For rust protection, ensure sufficient lubrication (refer to Information About Lubrication, page 173).

## Replacing Parts

### Information About Replacing Parts

#### Overview

The use and application of the information contained herein require expertise in the design and programming of automated control systems. Only you, the user, machine builder or integrator, can be aware of all the conditions and factors present during installation and setup, operation, repair, and maintenance of the machine or process.

You must also consider any applicable standards and/or regulations with respect to grounding of all equipment. Verify compliance with any safety information, different electrical requirements, and normative standards that apply to your machine or process in the use of this equipment.

#### **DANGER**

##### **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to this equipment.
- Use only the specified voltage when operating this equipment and any associated equipment.

**Failure to follow these instructions will result in death or serious injury.**

The segments and the carriers of the Lexium™ MC12 multi carrier may exceed 70 °C (158 °F) when subjected to heavy loads and/or high performance during operation.

## **▲ WARNING**

### **HOT SURFACES**

- Avoid unprotected contact with hot surfaces.
- Do not allow flammable or heat-sensitive parts in the immediate vicinity of hot surfaces.
- Verify that the heat dissipation is sufficient by performing a test run under maximum load conditions.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## Information About Replacing Parts of the Carrier

### Electromagnetic Fields

**NOTE:** Exposed or uninstalled carriers must have the protective cover of the drive magnets installed at all times. The cover is only removed at the time of carrier installation.

- Carriers have strong local magnetic fields. Refer to Transporting the Lexium™ MC12 carriers, page 84.
- The carriers have strong drive magnets and can attract metal objects that are in their proximity.
- A carrier can move suddenly and fast due to magnetic attraction.

#### **⚠ WARNING**

##### **STRONG MAGNETIC FIELDS**

- Keep persons with medical implants (for example, pacemakers or metal implants) or metallic body jewelry away from the carriers and segments with a minimum distance of 30 cm (11.9 in).
- Always leave the protective cover of the drive magnets in place for all exposed or uninstalled carriers.
- Do not put your hands or fingers between the carriers and segments.
- Do not place metallic tools in the vicinity of the carriers and segments.
- Do not place electromagnetically sensitive devices near the carriers and segments.
- Do not place credit cards or electronic/magnetic media in the vicinity of the carriers and segments.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

### Use Original Equipment Only

Use only the accessories and mounting parts specified in the documentation and only third-party devices or components that have been expressly approved by Schneider Electric.

#### **⚠ WARNING**

##### **UNINTENDED EQUIPMENT OPERATION**

Only use hardware components approved by Schneider Electric for use with the system.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## Handling the Carrier

The carrier has two magnets which, together with the magnetic fields in the segments, move the carrier on the track. These two magnets are glued onto the carrier. A shock to the carrier can cause the glued-on magnets to flake off and the magnets can splinter.

In addition, the carrier has an encoder magnet. This can be demagnetized by improper handling, for example, if the magnets of another carrier come too close.

### **▲ WARNING**

#### **INOPERABLE EQUIPMENT**

- Do not drop the carrier.
- Do not strike the carrier.
- Keep a minimum distance of 50 mm (1.97 in) between the encoder magnet and other magnets.
- Ensure to fill the lubrication reservoirs of the carriers before first use.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

For information on filling the lubrication reservoirs refer to Filling the Lubrication Reservoirs, page 175.

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## Replacing the Rollers of a Carrier

### Overview

A Lexium™ MC12 carrier has four rollers which must be replaced at the same time.

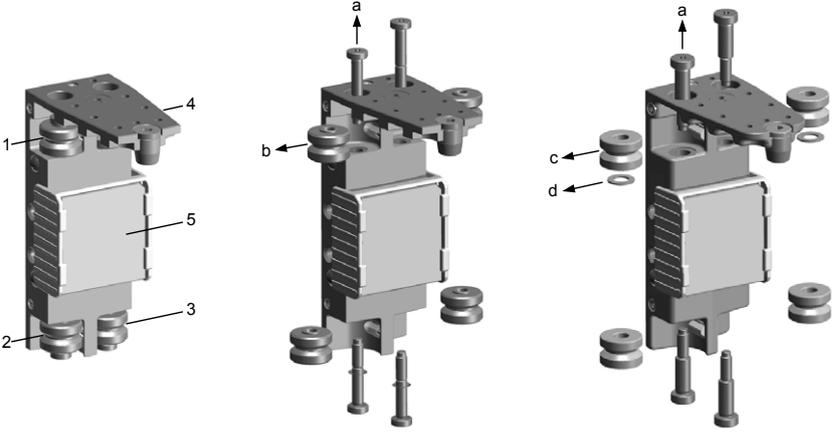
Refer to the Maintenance Plan, page 159.

**NOTE:** Also refer to Information About Replacing Parts of the Carrier, page 164.

**NOTE:** For information specific to the Heavy-Duty system, refer to Replacing the Rollers of a Lexium™ MC12 Heavy-Duty Carrier, page 202.

### Replacing the Rollers

**NOTE:** Exposed or uninstalled carriers must have the protective cover of the drive magnets installed at all times. The cover is only removed at the time of carrier installation.

Step	Action
1	<p>Install the protective cover (5) of the drive magnets by sliding it onto the magnets if it is not already installed. Refer to <b>Removing the Protective Cover of the Drive Magnets</b>, page 113.</p> <p><b>NOTE:</b> A Lexium™ MC12 carrier has four rollers (1–4) which must be replaced at the same time.</p> <p><b>NOTE:</b> The rollers are available in two versions:</p> <ul style="list-style-type: none"> <li>• Version 1: rollers with a small flange (b)</li> <li>• Version 2: rollers without a flange (c); upper rollers of type (c) require an additional washer (d)</li> </ul> 
2	Loosen and remove the screw (M6) with which the roller is fixed (a).
3	<p>Version 1: Remove the roller (b).</p> <p>Version 2: Remove the roller (c) and the corresponding washer (d).</p> <p><b>NOTE:</b> The lower rollers of type (c) are not provided with a washer (d).</p>
4	Proceed in this way for all four rollers.
5	<p>Version 1: Insert a new roller (b) to the carrier and fix the roller with a new screw.</p> <p>Version 2, upper rollers (c) with a washer (d): First, insert the washer (d) in the hole. Then fix the roller with a new screw.</p> <p>Version 2, lower rollers (c) without washer (d): Insert a new roller (c) to the carrier and fix the roller with a new screw.</p> <p><b>NOTE:</b> Make sure that the hole thread is free of any residue.</p> <p><b>NOTE:</b> Use new screws (supplied by Schneider Electric) which already have locking adhesive applied.</p>
6	Tighten the screw with a torque of 6 Nm (53.1 lbf-in).
7	Proceed in this way for all four rollers.

## Replacing the Lubrication Pads of a Carrier

### Overview

A Lexium™ MC12 carrier has two lubrication pads which must be replaced at the same time.

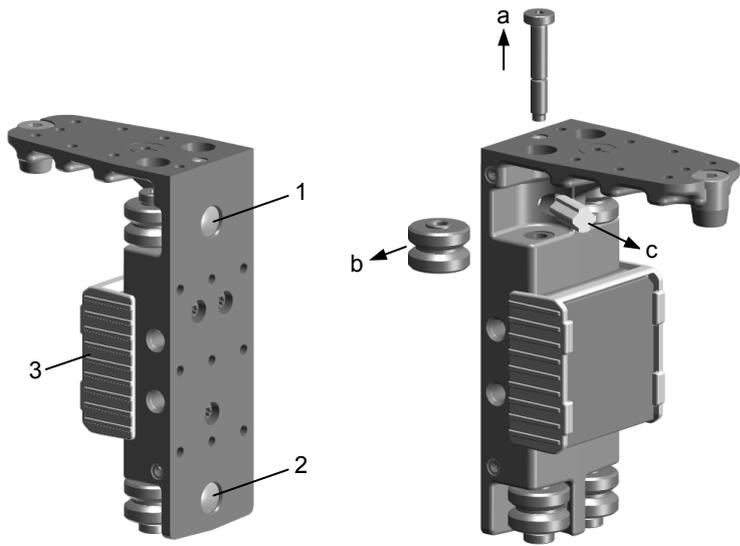
Refer to the Maintenance Plan, page 159.

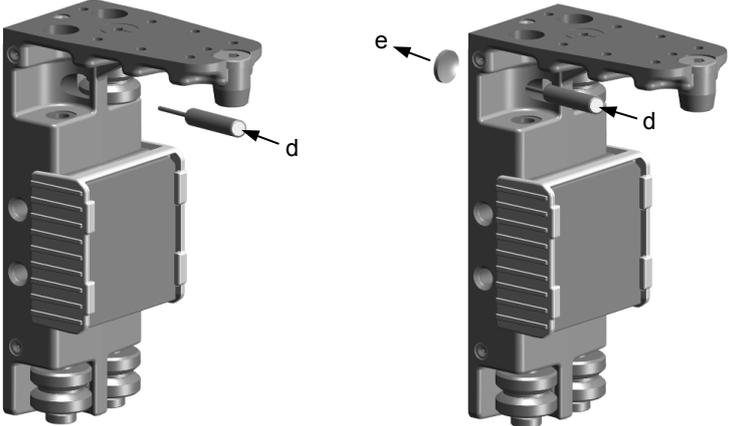
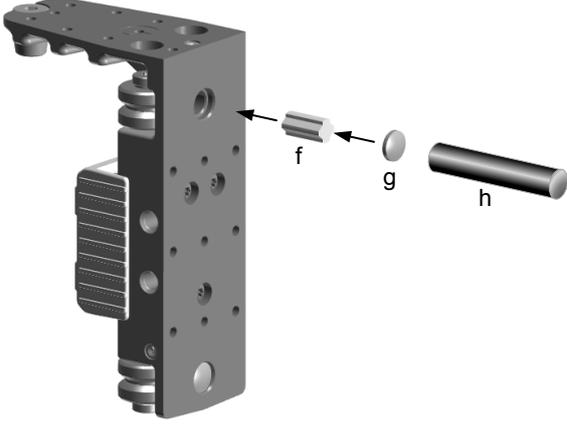
**NOTE:** Also refer to Information About Replacing Parts of the Carrier, page 164.

**NOTE:** For information specific to the Heavy-Duty system, refer to Replacing the Lubrication Pads of a Lexium™ MC12 Heavy-Duty Carrier, page 203.

### Replacing the Lubrication Pads

**NOTE:** Exposed or uninstalled carriers must have the protective cover of the drive magnets installed at all times. The cover is only removed at the time of carrier installation.

Step	Action
1	<p>Install the protective cover (3) of the drive magnets by sliding it onto the magnets if it is not already installed. Refer to <b>Removing the Protective Cover of the Drive Magnets</b>, page 113.</p> <p><b>NOTE:</b> A Lexium™ MC12 carrier has two lubrication pads (1–2) which must be replaced at the same time.</p> 
2	Loosen and remove the screw (M6) with which the roller is fixed (a).
3	Remove the roller (b).
4	<p>Use suitable tweezers to remove the lubrication pad (c).</p> <p><b>NOTE:</b> Do not reuse the removed lubrication pad.</p>

Step	Action
5	 <p data-bbox="603 660 1284 689">Use a suitable drift punch (d) to press the plug (e) out of the carrier body.</p> <p data-bbox="646 694 1013 723"><b>NOTE:</b> Do not reuse the removed plug.</p>
6	<p data-bbox="603 741 1300 770">Reinsert the roller to the carrier and fix the roller with the associated screw.</p> <p data-bbox="646 775 1436 824"><b>NOTE:</b> Make sure that the screw thread and hole thread are free of any residue and that thread locking adhesive has been applied to the screw.</p>
7	<p data-bbox="603 844 1093 873">Tighten the screw with a torque of 6 Nm (53.1 lbf-in).</p>
8	 <p data-bbox="603 1370 1428 1420">Insert a new lubrication pad (f) into the carrier and close the hole again with the plug (g). Make sure that the plug is not tilted during insertion.</p> <p data-bbox="603 1440 1236 1469">Use a suitable drift punch (h) to press the plug into the carrier body.</p> <p data-bbox="646 1473 1165 1503"><b>NOTE:</b> Saturate the pad with lubricant before insertion.</p> <p data-bbox="603 1507 933 1536">Also refer to Lubrication, page 173.</p>
9	<p data-bbox="603 1554 1021 1583">Proceed in this way for both lubrication pads.</p>

## Replacing the Drive Magnets of the Carrier

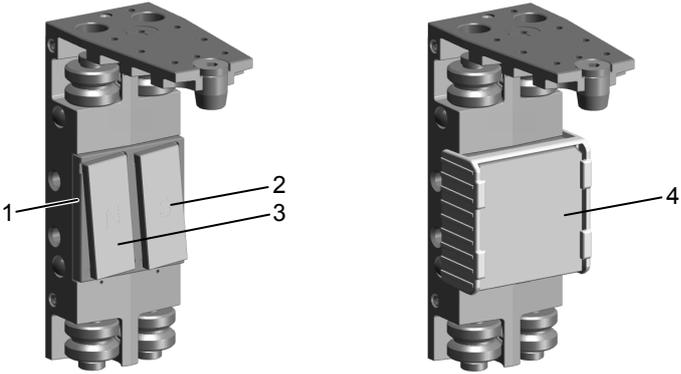
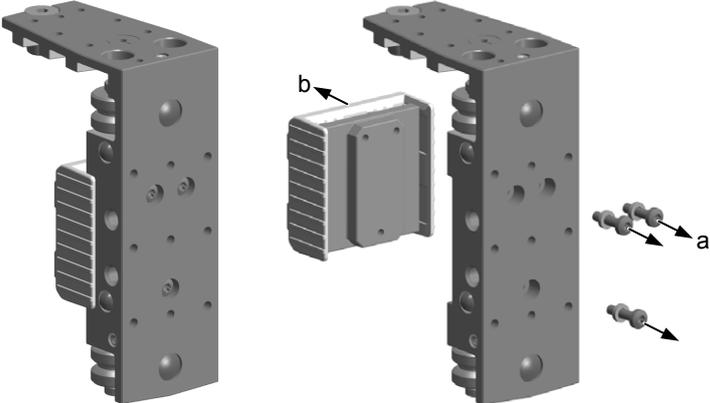
### Overview

A Lexium™ MC12 carrier has two drive magnets which are firmly mounted on a supporting plate. The drive magnets cannot be replaced individually. The supporting plate with the two magnets can only be replaced as a whole.

**NOTE:** Also refer to Information About Replacing Parts of the Carrier, page 164.

### Replacing the Drive Magnets of the Carrier

**NOTE:** Exposed or uninstalled carriers must have the protective cover of the drive magnets installed at all times. The cover is only removed at the time of carrier installation.

Step	Action
1	<p><b>NOTE:</b> A Lexium™ MC12 carrier has two drive magnets (2+3) which are firmly mounted on a supporting plate (1).</p> <p>First install the protective cover (4) of the drive magnets by sliding it onto the magnets if it is not already installed. Refer to Removing the Protective Cover of the Drive Magnets, page 113.</p> 
2	 <p>Loosen and remove the three screws (M4x16 class 8.8) (a) with which the supporting plate is fixed, and the associated washers.</p>
3	Remove the supporting plate (b) with the two drive magnets.
4	Insert a new supporting plate and fix the supporting plate with the associated screws. Make sure to add the associated washers as well.
5	Tighten the screws with a torque of 3 Nm (26.56 lbf-in).



## Replacing the Encoder Magnet of a Carrier

### Overview

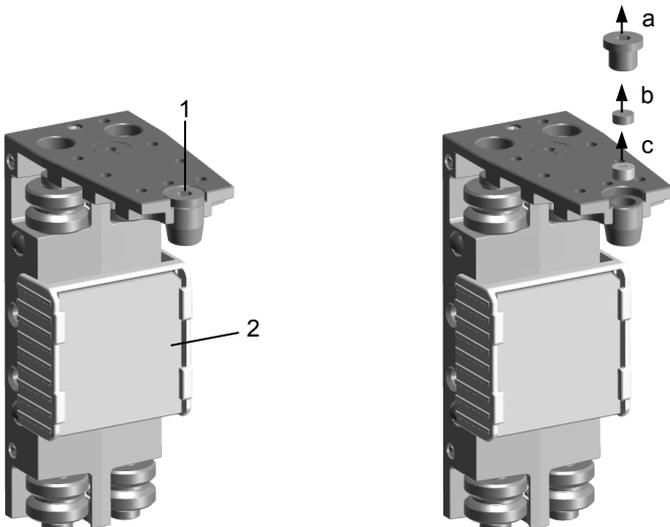
A Lexium™ MC12 carrier has a highly accurate magnet to sense the position of the carrier on the track.

Refer to the Maintenance Plan, page 159.

**NOTE:** Also refer to Information About Replacing Parts of the Carrier, page 164.

### Replacing the Encoder Magnet

**NOTE:** Exposed or uninstalled carriers must have the protective cover of the drive magnets installed at all times. The cover is only removed at the time of carrier installation.

Step	Action
1	<p>Install the protective cover (2) of the drive magnets by sliding it onto the magnets if it is not already installed. Refer to <b>Removing the Protective Cover of the Drive Magnets</b>, page 113.</p> <p>A Lexium™ MC12 carrier has a highly accurate magnet (c) to sense the position of the carrier on the track.</p> 
2	Loosen and remove the screw (a) with which the magnet is fixed. The screw has size M10x1 and class A2 (non-magnetic stainless steel).
3	Remove the plastic bumper (b).
4	Remove the encoder magnet (c).
5	<p>Insert a new encoder magnet and a plastic bumper to the carrier and fix the magnet with the associated screw.</p> <p><b>NOTE:</b> Verify that you do not tilt the magnet when inserting it and that the marked north pole on the encoder magnet is facing up.</p>
6	Tighten the screw with a torque of 10.1 Nm (89.4 lbf-in). Use screw locking adhesive to secure the screw.

# Lubrication

## Information About Lubrication

### Overview

Lubricant is consumed continuously during operation of the Lexium™ MC12 multi carrier. The lubrication reservoirs of the carriers must be filled at regular intervals (refer to Lubricating the Carrier, page 175). The rails are lubricated via the carriers. Execute a carrier lubrication run on the rails after cleaning the rails.

**NOTE:** For information specific to the Heavy-Duty system, refer to Replacing the Lubrication Pads of a Lexium™ MC12 Heavy-Duty Carrier, page 203.

**NOTE:** The carriers are shipped without lubricant in the lubrication reservoirs. The lubrication reservoirs of the carriers must be filled before first use.

**NOTE:** For a Lexium™ MC12 multi carrier track with automated lubrication, ensure a sufficient supply of lubricant to the lubricant outlets.

Incorrect lubricants may damage the carriers and the rails. Insufficient lubrication or incorrect lubricants increase wear and reduce the service life.

<b>NOTICE</b>
<b>INOPERABLE EQUIPMENT</b>
Only use the specified type and amount of lubricant.
<b>Failure to follow these instructions can result in equipment damage.</b>

For lubricating the carriers/rails you can use either:

- Klüberoil GEM 1-320 N
- An oil of your choice with similar characteristics (refer to Lubricant Specification, page 173)

If the ambient temperature is at the lower or upper limit of the permissible ambient temperature (Ambient Conditions, page 71), it is a good practice to select an oil with a higher or lower viscosity.

**NOTE:** Always wear protective clothing when working on the system. Repeated and prolonged exposure to the product can cause skin irritation, or sickness if ingested.

<b>⚠ CAUTION</b>
<b>EYE OR SKIN CONTACT WITH, OR INGESTION OF, LUBRICANTS</b>
<ul style="list-style-type: none"> <li>• In the event of contact with the eyes or the skin, consult the data sheet of the lubricant for treatment.</li> <li>• In the event of swallowing, do not provoke vomiting or administer any products orally; consult a doctor as soon as possible.</li> </ul>
<b>Failure to follow these instructions can result in injury or equipment damage.</b>

## Lubricant Specification

Characteristics	Value
Service temperature, lower limit	-5 °C (23 °F)
Service temperature, upper limit	100 °C (212 °F)
ISO viscosity grade, DIN ISO 3448, ISO VG	320

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<b>Characteristics</b>	<b>Value</b>
Kinematic viscosity, DIN EN ISO 3104 / DIN 51562-1 / ASTM D445 / ASTM D7042, 100 °C (212 °F)	approximately 25 mm <sup>2</sup> /s
Kinematic viscosity, DIN EN ISO 3104 / DIN 51562-1 / ASTM D445 / ASTM D7042, 40 °C (104 °F)	approximately 320 mm <sup>2</sup> /s

## Lubricating the Carrier

### Overview

The running surfaces of the upper two and lower two rollers of the Lexium™ MC12 carrier and the running surfaces of the rails must be lubricated.

This is done by an upper and a lower lubrication pad. The pads are supplied with lubricant by two reservoirs in the carrier. The reservoirs must be filled regularly.

Refer to the Maintenance Plan, page 159.

**NOTE:** Also refer to Information About Lubrication, page 173 and Information About Replacing Parts of the Carrier, page 164.

For how to replace the lubrication pads, refer to Replacing the Lubrication Pads of a Carrier, page 168.

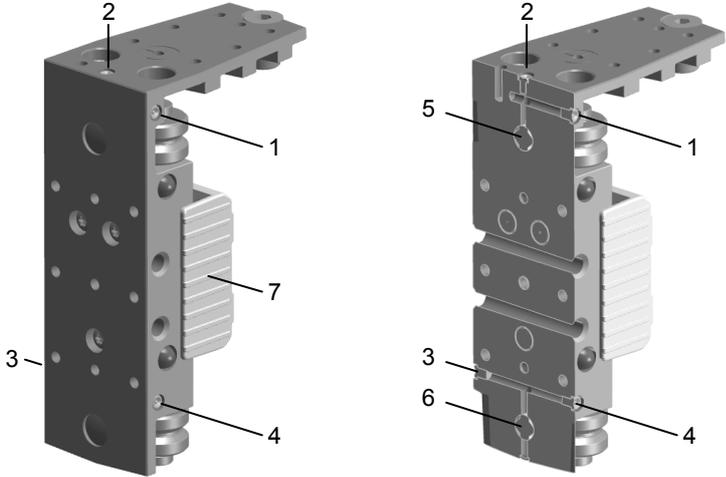
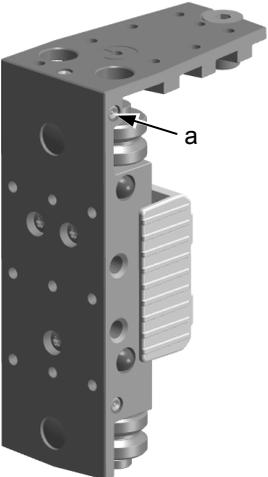
**NOTE:** For information specific to the Heavy-Duty system, refer to Replacing the Lubrication Pads of a Lexium™ MC12 Heavy-Duty Carrier, page 203.

### Filling the Lubrication Reservoirs

The lubrication reservoirs of the Lexium™ MC12 carrier must be filled before first use and refilled as necessary. This can be done both with the carrier mounted on the rail or removed from the rail.

If the lubrication nipples are covered by a tool mounted on the carrier, you must disassemble the tool.

**NOTE:** Exposed or uninstalled carriers must have the protective cover of the drive magnets installed at all times. The cover is only removed at the time of carrier installation.

Step	Action
1	<p>If removing the carrier from the track to fill the lubrication reservoirs, install the protective cover (7) of the drive magnets by sliding it onto the magnets if it is not already installed. Refer to <b>Removing the Protective Cover of the Drive Magnets</b>, page 113.</p> <p>A Lexium™ MC12 carrier has four lubrication nipples (1–4) to fill the two lubrication reservoirs. The upper lubrication reservoir (5) is filled by lubrication nipple 1 or 2, the lower lubrication reservoir (6) is filled by lubrication nipple 3 or 4.</p> 
2	 <p>Press the nozzle of a single-hand lubrication gun in a right angle against one of the lubrication nipples (a) and inject the lubricant.</p>
3	<p>Fill the lubrication reservoir with lubricant.</p> <p><b>NOTE:</b> Verify that you do not overfill the reservoirs.</p>
4	<p>Proceed in this way to fill the upper and the lower lubrication reservoirs.</p>

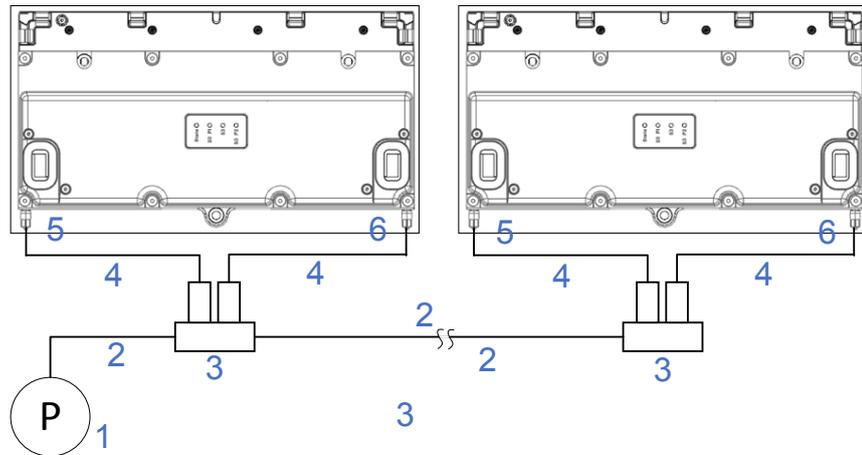
## Automated Lubrication

**NOTE:** For information specific to the Heavy-Duty system, refer to Automated Lubrication of a Heavy-Duty Track, page 207.

## Overview

On a Lexium™ MC12 multi carrier track with automated lubrication, the running surfaces of the upper two and lower two rollers of the Lexium™ MC12 carrier and

the running surfaces of the rails are lubricated with lubricant supplied by a lubrication pump (1). The lubricant is pumped through a lubricant line (2) to a distributor (3). From the distributor, the lubricant is supplied through lubricant lines (4) to the connectors (5/6) at the segments where it flows through channels inside the segments to the running surface of the lubrication rails.



Element	Description
1	Lubrication pump
2	Lubricant line from the pump to the distributor and between the distributors
3	Distributor with dosing valves
4	Lubricant lines from the distributor to the connectors
5	Connector, lubrication of the top guide rail
6	Connector, lubrication of the bottom guide rail

**NOTE:** Elements 1 through 4 are to be purchased separately. Refer to *Lubrication System Requirements* below.

**NOTE:** It is a good practice to fill the lubricant lines manually with lubricant before commissioning for helping to avoid air bubbles in the lubricant supplied to the guide rails.

For mounting the lubrication segment(s) and the corresponding top and bottom lubrication rails, refer to *Horizontal Mounting of the Track with Automated Lubrication*, page 96 and *Vertical Mounting of the Track with Automated Lubrication*, page 101. Additionally, for the procedure specific to the Heavy-Duty system, refer to *Mounting a Lexium™ MC12 Heavy-Duty Guide Rail with Automated Lubrication*, page 190.

## Lubrication System Requirements

Apart from the Lexium™ MC12 long stator motor segment straight for automated lubrication and the Lexium™ MC guide rail straight for automated lubrication, the components of the automated lubrication system (pump, distributor(s), lubricant lines) are not provided by Schneider Electric. Select the components according to your individual needs. Contact your local Schneider Electric service representative for more information.

For the automated lubrication of a Lexium™ MC12 multi carrier track, the following minimum requirements must be met:

- One lubrication point, consisting of a lubrication segment and the corresponding upper and lower lubrication rail, for every 6 meters of the track
- Lubricant: Refer to *Information About Lubrication*, page 173
- Lubrication pump: volume flow rate of 50 ml/min (0.013 gal/min)
- Distributor(s): One dosing valve per lubricant line, with a dosing volume of 0.01 cm<sup>3</sup> (0.0006 in<sup>3</sup>) per stroke

- Lubricant lines: 4 mm (0.16 in) diameter, externally calibrated

**NOTE:** The given values apply to clean environments and the ambient temperatures defined in the *Ambient Conditions*, page 71.

# Lexium™ MC12 Heavy-Duty Guide System

## System Overview

### Overview

The Lexium™ MC12 Heavy-Duty guide system is an additional offer to allow to operate the Lexium™ MC12 multi carrier system with greater payloads.

Due to different setup and dimensions of the Heavy-Duty carriers, the carriers require also a dedicated guidance with specific components like guide rails and spacers.

The Lexium™ MC12 Heavy-Duty guide system with the dedicated carriers, guide rails and spacers – detailed in this chapter – is a customized solution with some limitations compared to the standard Lexium™ MC12 guide system.

For further details on the differences to the standard Lexium™ MC12 guide system, contact your local Schneider Electric representative.

## Components Overview

The Lexium™ MC12 Heavy-Duty guide system includes the components listed below.

For information about system architecture, product overview and type plate of the Lexium™ MC12 multi carrier, refer to [System Overview](#), page 29.

## Lexium™ MC12 Heavy-Duty guide rail straight/Heavy-Duty guide rail arc

### Lexium™ MC12 Heavy-Duty guide rail straight

Presentation	Guide Rail	Reference	Description
Example 901.2 mm (35.48 in): 	Set of Heavy-Duty straights	—	Heavy-Duty straight top and standard bottom guide rail as a set in the length of:
		LXMMCRS0B06S100	300.4 mm (11.83 in) = 1 unit length (ul)
		LXMMCRS0B06S10L	300.4 mm (11.83 in) = 1 ul; for automated lubrication
		LXMMCRS0B12S100	600.8 mm (23.65 in) = 2 ul
		LXMMCRS0B18S100	901.2 mm (35.48 in) = 3 ul
		LXMMCRS0B24S100	1201.6 mm (47.31 in) = 4 ul
		LXMMCRS0B30S100	1502 mm (59.13 in) = 5 ul
—	Set of Heavy-Duty straights 150.2mm (5.91 in) end of open track with arcs	LXMMCRSEB03S100	Heavy-Duty straight top and standard bottom guide rail as a set, 150.2 mm (5.91 in) straight for open track with arcs

## Lexium™ MC12 Heavy-Duty guide rail arc

Presentation	Guide Rail	Reference	Description
	Set of 45° Heavy-Duty arcs	LXMMCRABB62S100	Heavy-Duty arc top and standard bottom guide rails 45° as a set, 1/4 unit length (ul) straight at one end and 3/4 ul straight at the other end
	Set of 90° Heavy-Duty arcs	LXMMCRABB64S100	Heavy-Duty arc top and standard bottom guide rails 90° as a set, 1/4 ul straight at one end and 3/4 ul straight at the other end
	Set of 135° Heavy-Duty arcs	LXMMCRABB66S100	Heavy-Duty arc top and standard bottom guide rails 135° as a set, 1/4 ul straight at one end and 3/4 ul straight at the other end
	Set of 180° Heavy-Duty arcs	LXMMCRABB68S100	Heavy-Duty arc top and standard bottom guide rails 180° as a set, 1/4 ul straight at one end and 3/4 ul straight at the other end
	Set of 360° Heavy-Duty arcs	LXMMCRA0B00S100	Heavy-Duty arc top and standard bottom guide rails 360° as a set

## Lexium™ MC12 Heavy-Duty spacer

Presentation	Spacer	Reference	Description
	Heavy-Duty spacer straight	LXMMCSS0B06S100	Heavy-Duty spacer straight 1 unit length (ul)
		LXMMCSS0B06S10L	Heavy-Duty spacer straight 1 ul for automated lubrication
	Heavy-Duty spacer arc	LXMMCSA0B62S100	Heavy-Duty spacer arc 45°
	Heavy-Duty spacer hard stop	LXMMCSS0B03S100	Heavy-Duty spacer for placement on the end in case of an open track

## Lexium™ MC12 Heavy-Duty carrier

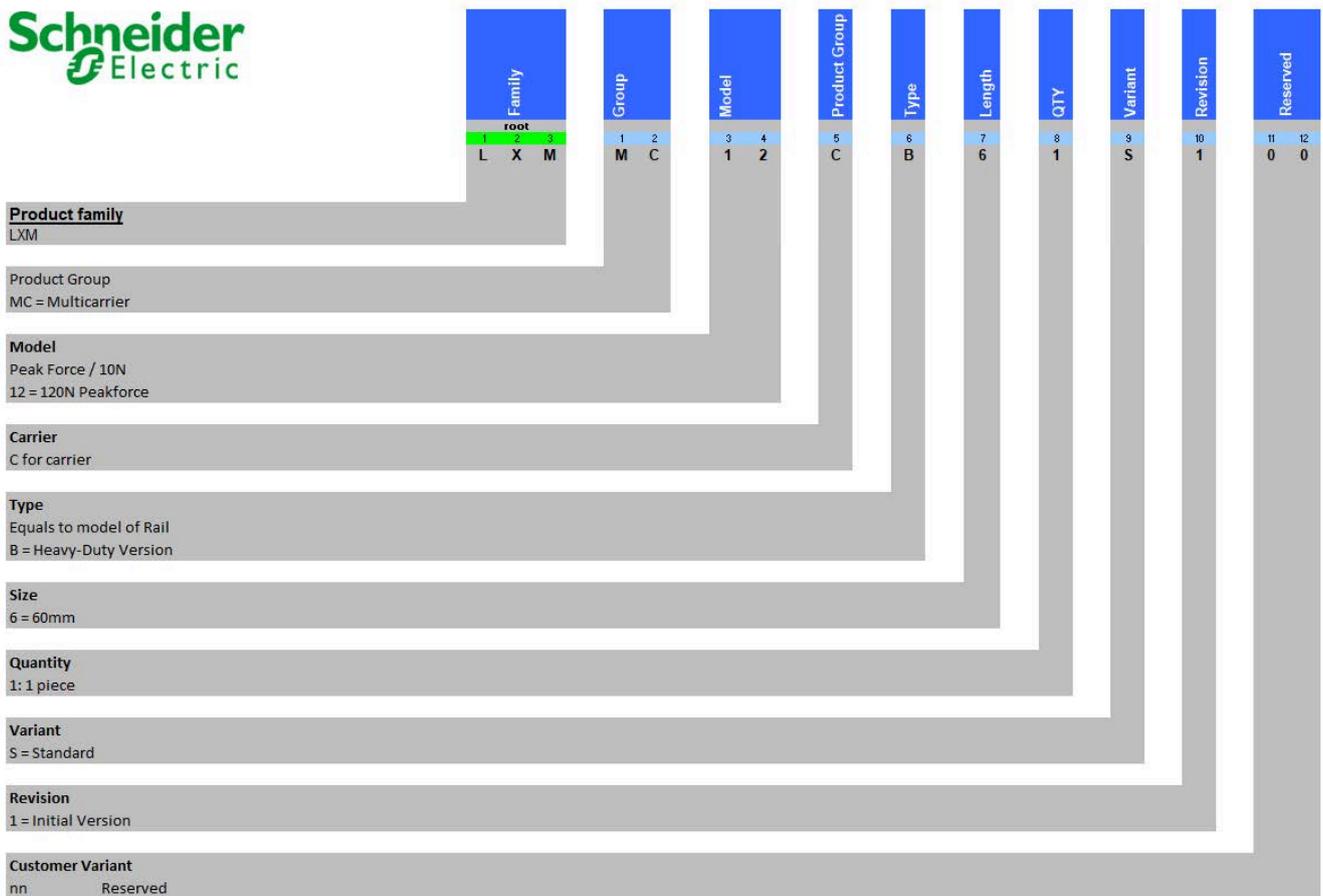
Presentation	Carrier	Reference	Description
	Heavy-Duty carrier	LXMMC12CB61S100	Heavy-Duty carrier, 59 mm (2.32 in) length (1 piece)

## Lexium™ MC12 Heavy-Duty accessories

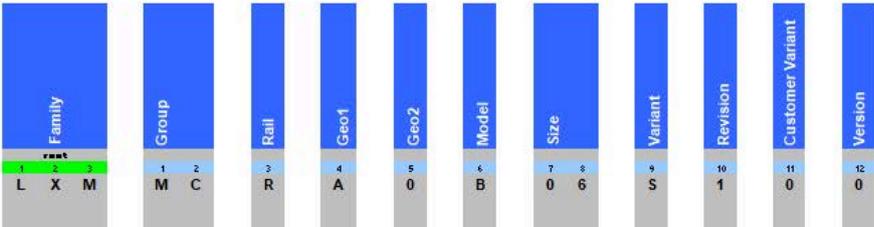
Presentation	Mounting Rail	Reference	Description
	Heavy-Duty mounting rail	LXMMCAMR0A1S100	300.4 mm (11.83 in) = 1 unit length (ul) Aluminum mounting rail to mount and dismount the carriers

## Type Code

### Lexium™ MC12 Heavy-Duty Carrier



# Lexium™ MC12 Heavy-Duty Guide Rail



**Product family**  
LXM

**Product Group**  
MC = Multicarrier

**Product Detail**  
R = Rail

**Geometry (Same as Segment Geometry)**  
S = Straight  
A = Arc

**Geometry 2**  
0: no straight at end(s)  
E: End of open track with curve  
L: straight at left side  
R: straight at right side  
B: straight at both sides

**Model**  
B = Heavy-Duty

**Size**

Straight:	Arc:
03: 150.2mm = 0.5ul (unit length)	62: 45°
06: 300.4mm = 1ul	64: 90°
12: 600.8mm = 2ul	66: 135°
18: 901.2mm = 3ul	68: 180°
24: 1201.6mm = 4ul	00: 360°
30: 1502.0mm = 5ul	

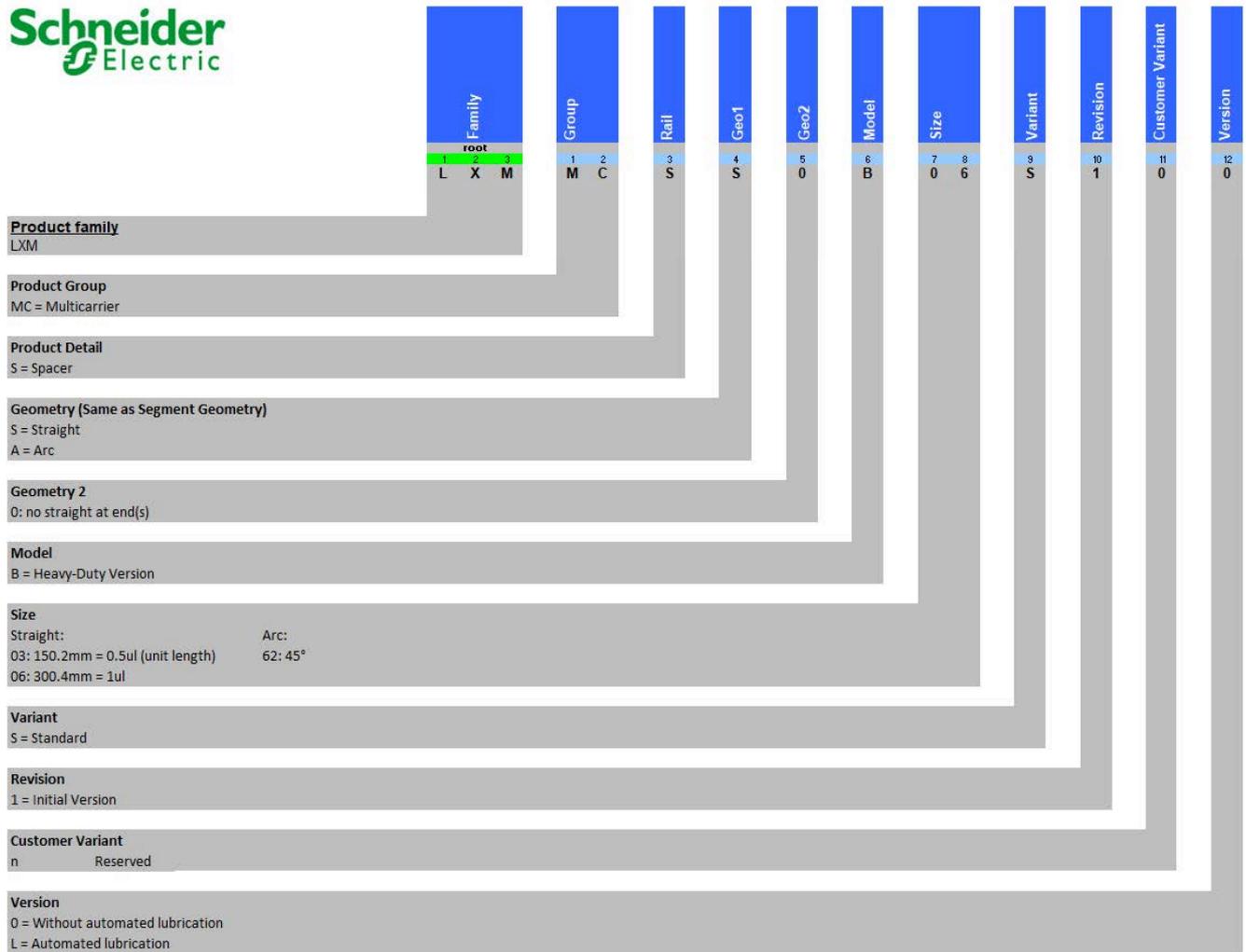
**Variant**  
S = Standard

**Revision**  
1 = Initial Version

**Customer Variant**  
n Reserved

**Version**  
0 = Without automated lubrication  
L = Automated lubrication

## Lexium™ MC12 Heavy-Duty Spacer



## Engineering

Refer to Engineering, page 42 for information about electromagnetic compatibility (EMC), hardware compatibility, system planning, and also information about the wiring, functional safety and special conditions.

## System Limits

### Track

Designation	Unit	Value
Maximum track length	m (ft)	40 (131.2) <b>NOTE:</b> For longer systems, contact your local Schneider Electric service representative.
Maximum number of Lexium™ MC12 long stator motor segments per track	-	136
Maximum number of Lexium™ MC12 Heavy-Duty carriers per track	-	200

Designation	Unit	Value
		<b>NOTE:</b> For a larger number of carriers, contact your local Schneider Electric service representative.
Maximum number of Lexium™ MC12 Heavy-Duty carriers per Lexium™ MC12 long stator motor segment straight	-	5
Maximum number of Lexium™ MC12 Heavy-Duty carriers per Lexium™ MC12 long stator motor segment arc	-	2
Total payload	kg (lbs)	10 (22.05) (See note and hazard message after this table.)
Maximum velocity	m/s (ft/s)	3 (9.84)

**NOTE:** The maximum payload in vertical orientation is 10 kg with the center of gravity in the middle of the carrier.

## ⚠ WARNING

### UNINTENDED EQUIPMENT OPERATION

- Reduce your payload accordingly when using curved, vertical tracks to take into account centrifugal forces.
- When using vertical tracks, make sure that your payload does not exceed the magnetic force that holds the lower end of the Lexium™ MC12 Heavy-Duty carrier on the track.

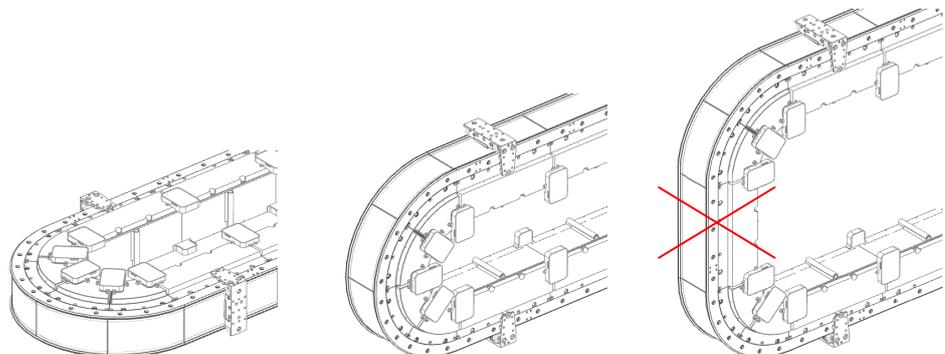
**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## Power Supply

Refer to Power Supply, page 126.

## Track Orientation

The track orientation can be horizontal, or vertical. Straight segments are only permitted in horizontal orientation, as illustrated:



**▲ WARNING****UNINTENDED EQUIPMENT OPERATION**

Do not use straight segments vertically.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## Technical Data

In this chapter, you find specific information about the Lexium™ MC12 Heavy-Duty guide system. Refer also to *Technical Data*, page 70 for information about general installation conditions for the system, ambient conditions, mechanical and electrical data, mounting plate and service life.

### Technical Data for Heavy-Duty Carrier

Designation	Unit	Value	Description
Peak force	N (lbf)	120 (27)	Peak force for straight segments
Standstill force	N (lbf)	30 (6.74)	-
Maximum velocity	m/s (ft/s)	3 (9.84)	-
Mass	kg (lb)	1.35 (2.98)	<b>NOTE:</b> For the calculation of the carrier acceleration, add a virtual mass of 144 grams (0.31 lb) due to the rotative inertia of the six carrier rollers.
Width	mm (in)	103 (4.06)	-
Length	mm (in)	59 (2.32)	-
Height	mm (in)	214 (8.43)	-
Payload	kg (lb)	10 (22.05)	Maximum payload without carrier mass

### Technical Data for Heavy-Duty Guide Rail

#### Lexium™ MC12 Heavy-Duty Guide Rail Straight

Designation	Unit	Value	Description
Mass	kg (lb)	2.6 (5.73)	Mass per meter
Length	mm (in)	-	Corresponds to the length of:
		150.2 (5.91)	0.5 straight segment
		300.4 (11.83)	1 straight segment
		600.8 (23.65)	2 straight segments
		901.2 (35.48)	3 straight segments
		1201.6 (47.31)	4 straight segments
1502 (59.13)	5 straight segments		

Designation	Unit	Value	Description
Width	mm (in)	45 (1.77)	-
Height	mm (in)	8 (0.31)	-

## Lexium™ MC12 Heavy-Duty Guide Rail Arc

Designation	Unit	Value	Description
Mass	kg (lb)	2.6 (5.73)	Mass per meter
Width	mm (in)	45 (1.77)	-
Height	mm (in)	8 (0.31)	-
Arc angle	°	45 90 135 180 360	Guide rails arc end in a short straight at both sides. $\frac{1}{4}$ ul (unit length) straight at one end and $\frac{3}{4}$ ul straight at the other end. 1 ul = 300.4 mm (11.83 in).  This does not apply to the 360° arc.

## Transport and Unpacking

Refer to [Transport and Unpacking](#), page 84 for information about transport, storage and unpacking.

## Mechanical Installation

In this chapter, you find specific information about the Lexium™ MC12 Heavy-Duty guide system. Refer also to [Mechanical Installation](#), page 88 for information about mounting the track, the segments, the tool on the carrier, the connection module and the external braking resistor.

## Mounting a Lexium™ MC12 Heavy-Duty Carrier

### Overview

The following procedures describe the mounting of a Heavy-Duty carrier.

**NOTE:** Exposed or uninstalled carriers must have the protective cover of the drive magnets installed at all times. The cover is only removed at the time of carrier installation.

- Carriers have strong local magnetic fields. Refer to [Transporting the Lexium™ MC12 carriers](#), page 84.
- The carriers have strong drive magnets and can attract metal objects that are in their proximity.
- A carrier can move suddenly and fast due to magnetic attraction.

**▲ WARNING****STRONG MAGNETIC FIELDS**

- Keep persons with medical implants (for example, pacemakers or metal implants) or metallic body jewelry away from the carriers and segments with a minimum distance of 30 cm (11.9 in).
- Always leave the protective cover of the drive magnets in place for all exposed or uninstalled carriers.
- Do not put your hands or fingers between the carriers and segments.
- Do not place metallic tools in the vicinity of the carriers and segments.
- Do not place electromagnetically sensitive devices near the carriers and segments.
- Do not place credit cards or electronic/magnetic media in the vicinity of the carriers and segments.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

The carrier has two magnets which, together with the magnetic fields in the segments, move the carrier on the track. These two magnets are glued onto the carrier. A shock to the carrier can cause the glued-on magnets to flake off and the magnets can splinter.

In addition, the carrier has an encoder magnet. This can be demagnetized by improper handling, for example, if the magnets of another carrier come too close.

**▲ WARNING****INOPERABLE EQUIPMENT**

- Do not drop the carrier.
- Do not strike the carrier.
- Keep a minimum distance of 50 mm (1.97 in) between the encoder magnet and other magnets.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## Mounting a Heavy-Duty Carrier

Before mounting, make sure that the lubrication pads are oiled. If the Heavy-Duty carriers are not oiled, relubricate the pads. For more information, refer to [Filling the Lubrication Pads](#), page 205.

Step	Action
1	When mounting the carrier, ensure that the top guide rails are open.  Dismount one curved top guide rail and replace it with a mounting rail to push the carriers on the track.
2	Uninstall the protective cover of the drive magnets by sliding it up or down. Refer to <a href="#">Removing the Protective Cover of the Drive Magnets</a> , page 113.
3	Grab the carrier with one hand at the top and with one hand at the bottom and do not place your fingers between the carrier and the segments.
4	Push the carrier with the top rollers onto the top guide rail. Make sure that the 4 rollers are properly positioned on the V-shaped guide rail.  <b>NOTE:</b> When the carrier gets near the segments, the magnetic force attracts the carrier to the track.
5	When the carrier is on the track, make sure that also the bottom rollers are on the V-shaped guide rail.
6	Verify whether the carrier can be moved by hand to be sure that the rollers are on track.

## Mounting a Lexium™ MC12 Heavy-Duty Guide Rail without Automated Lubrication

### Overview

The following procedures describe the mounting of a Heavy-Duty guide rail.

### Mounting a Heavy-Duty Guide Rail without Automated Lubrication

The components of the Lexium™ MC12 multi carrier must be handled with care. Refer to *Transport and Storage*, page 84.

Heavy-Duty guide rails can bend if handled improperly and then may become unusable.

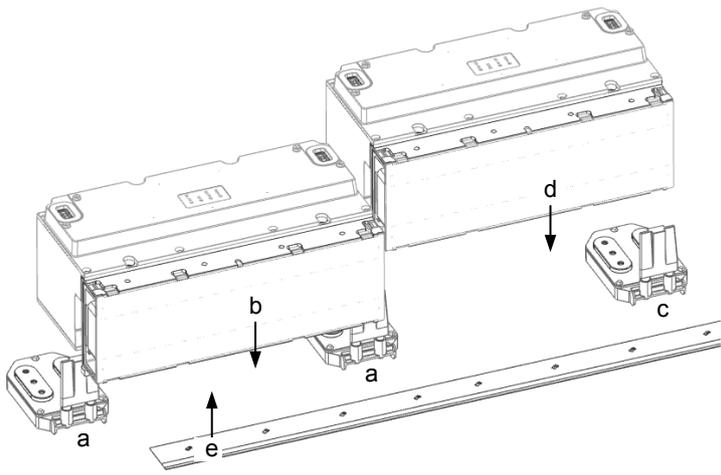
#### **NOTICE**

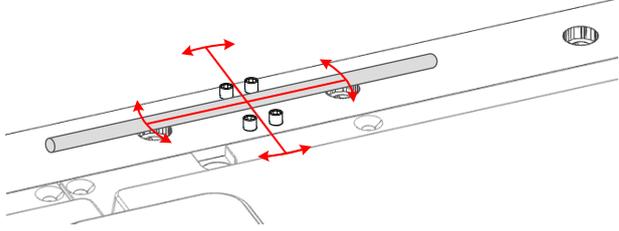
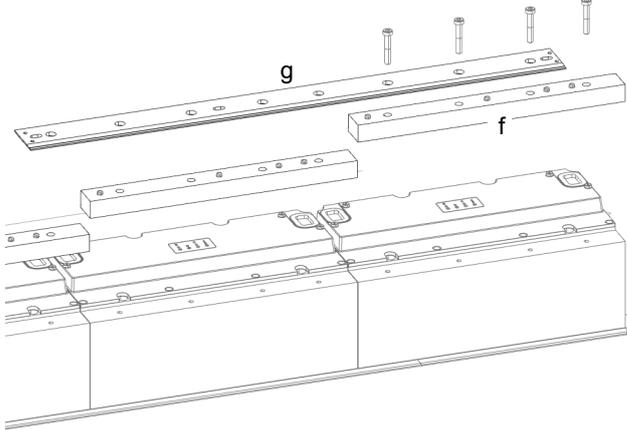
##### **INOPERABLE EQUIPMENT**

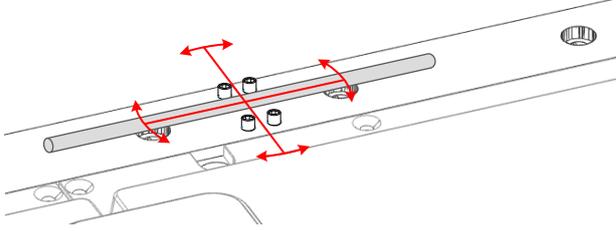
Do not bend or otherwise distort the Heavy-Duty guide rails.

**Failure to follow these instructions can result in equipment damage.**

**NOTE:** Heavy-Duty carriers cannot be mounted by snapping them on the rails. Instead, they must be slipped into position on either a top Heavy-Duty straight guide rail or the Heavy-Duty mounting rail. In a closed loop application, you must first remove one of the upper curved guide rails and replace it with a short, straight rail to slip on the carrier. If it is an open track application, you must first remove the hard stop at the end of the track to do the same. Refer to *Mounting a Lexium™ MC12 Heavy-Duty Carrier*, page 186.

Step	Action
1	<p>When the components <b>a</b>, <b>b</b>, <b>c</b> and <b>d</b> are in place (refer to <i>Mounting the Lexium™ MC12 multi carrier Track</i>, page 89), install the bottom Heavy-Duty guide rails (<b>e</b>), starting at an arc segment or at an open end of the track. The rails are mounted offset to the segments by design.</p> 
2	<p>Position a guide rail (<b>e</b>) under the segments and loosely fasten the rail with M6x16 class 8.8 DIN 7984 screws.</p> <p><b>NOTE:</b> Make sure that the holes in the rails are aligned with the holes in the segments.</p>
3	Loosely fasten the bottom rail screws at the first segment.

Step	Action
4	<p>Align the next rail. Make sure that the rails fit tightly together at the transition points.</p> <p>Use M5x8 (ISO 4026) set screws to fine-tune the rail alignment. Unscrew the set screws approximately halfway out of the rail to avoid contact with the support surface for the rails. To install the rails, slide a suitable mounting tool between the screws (in or across the rail direction) and carefully push them into place.</p> <p><b>NOTE:</b> Avoid scratching the surface of the rails.</p>  <p>After aligning the rails, screw the set screws back into the rails.</p>
5	Tighten the screws of both bottom rails at the segment where the rails meet with a torque of 10.1 Nm (89.4 lbf-in).
6	Proceed in the same way with the subsequent bottom rails until all bottom rails are installed.
7	<p>When all the bottom guide rails are installed, place the Heavy-Duty spacer (f) on the track and align the holes with those in the segments.</p> 
8	Locate the long holes of the Heavy-Duty guide rails and insert the cylindrical pins into the Heavy-Duty spacer.
9	<p>Beginning at an arc segment or an open end of the track, place the top Heavy-Duty guide (g) rail over the segments with the Heavy-Duty spacer. The rails are mounted offset from the segments by design. The long holes must fit into the cylindrical pins. The holes in the rails must match the holes in the segments.</p> <p>Make sure that the Heavy-Duty spacer is aligned with the segment stop and that the Heavy-Duty guide rail is aligned with the cylindrical pins.</p>
10	<p>Loosely attach the top rail with M6x35 class 8.8 DIN 7984 screws.</p> <p><b>NOTE:</b> The screws must go through the Heavy-Duty guide rails and the Heavy-Duty spacer.</p>
11	Tighten the top rail screws at the first segment with a torque of 10.1 Nm (89.4 lbf-in).
12	<p>Mount Heavy-Duty carriers on the track (refer to Mounting a Lexium™ MC12 Heavy-Duty Carrier, page 186).</p> <p><b>NOTE:</b> Heavy-Duty carriers must be mounted before the rails are closed.</p>

Step	Action
13	<p>Align the next rail. Make sure that the rails fit closely together at the transition points.</p> <p>Use M5x8 (ISO 4026) set screws to fine-tune the rail alignment. Unscrew the set screws approximately halfway out of the rail to avoid contact with the support surface for the rails. To install the rails, slide a suitable mounting tool between the screws (in or across the rail direction) and carefully push them into place.</p> <p><b>NOTE:</b> Avoid scratching the surface of the rails.</p>  <p>After aligning the rails, screw the set screws back into the rails.</p>
14	Tighten the screws of both top rails at the segment where the rails meet with a torque of 10.1 Nm (89.4 lbf-in).
15	Install each Heavy-Duty guide rail until all top rails are installed.
16	After you install the rails, tighten the screws of the Lexium™ MC12 long stator motor segments with a torque of 10.1 Nm (89.4 lbf-in).
17	<p>Insert the Lexium™ MC communication interconnects from top between the segments. Attach the communication interconnect with its four M3x8 ISO 14583 screws with a torque of 0.6 Nm (5.31 lbf-in).</p> <p><b>NOTE:</b> If a communication interconnect is used to connect the system to the Sercos bus and/or a Safe Force Off (SFO) control device, refer to the Lexium™ MC communication interconnects, page 32.</p>
18	<p>Use the Lexium™ MC power cables, the Sercos cable, and the SFO cables to connect your Lexium™ MC12 multi carrier with the control cabinet.</p> <p>For details, refer to Electrical Installation, page 124.</p> <p><b>Result:</b> The Lexium™ MC12 multi carrier track is installed and ready for verification.</p> <p>Refer to Verifying the Installation, page 155.</p>

## Mounting a Lexium™ MC12 Heavy-Duty Guide Rail with Automated Lubrication

### General Information on Mounting a Heavy-Duty Guide Rail

The components of the Lexium™ MC12 multi carrier must be handled with care. Refer to Transport and Storage, page 84.

Heavy-Duty guide rails can bend if handled improperly and then may become unusable.

### **NOTICE**

#### **INOPERABLE EQUIPMENT**

Do not bend or otherwise distort the Heavy-Duty guide rails.

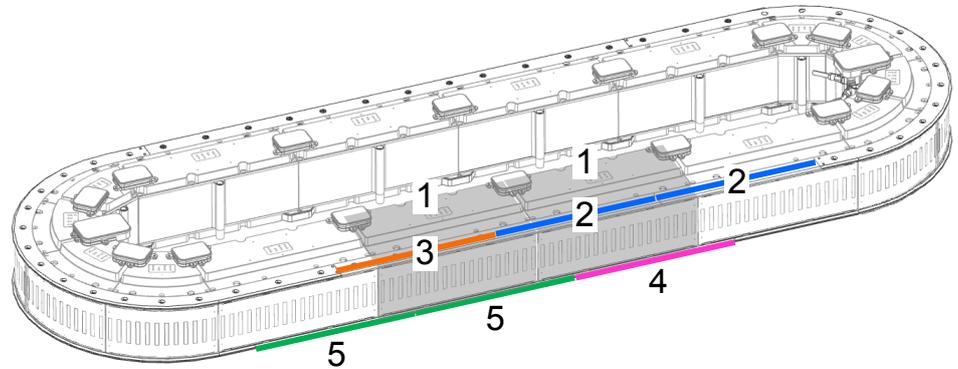
**Failure to follow these instructions can result in equipment damage.**

**NOTE:** Heavy-Duty carriers cannot be mounted by snapping them on the rails. Instead, they must be slipped into position on either a top Heavy-Duty straight guide rail or the Heavy-Duty mounting rail. In a closed loop application, you must first remove one of the upper curved guide rails and replace it with a short, straight rail to slip on the carrier. If it is an open track application, you must first remove the hard stop at the end of the track to do the same. Refer to Mounting a Lexium™ MC12 Heavy-Duty Carrier, page 186.

## General Information on Heavy-Duty Tracks with Automated Lubrication

For a Lexium™ MC12 multi carrier Heavy-Duty track with automated lubrication, you need at minimum two lubrication segments (marked 1 in the example graphic below), two Heavy-Duty lubrication spacers (top) and four Heavy-Duty lubrication guide rails (marked 2 and 5 in the example graphic below)

**NOTE:** Do not use a lubrication segment immediately before or after a curve. Consequently, For using automated lubrication on a closed Heavy-Duty track, you need at least four straight segments in a row.



Element	Color code	Description	References
1	Grey	Lexium™ MC12 long stator motor segment straight for automated lubrication with  Lexium™ MC12 Heavy-Duty spacer straight for automated lubrication (1 unit length (ul)), with lubricant opening	LXMMC12MS06S10L  LXMMCCS0B06S10L
2	Blue	Lexium™ MC12 Heavy-Duty guide rail straight for automated lubrication (1 ul), with lubricant opening, top rail	LXMMCRS0B06S10L
3	Orange	Lexium™ MC12 Heavy-Duty guide rail straight (1 ul), top rail	LXMMCRS0B06S100
4	Pink	Lexium™ MC12 Heavy-Duty guide rail straight (1 ul), bottom rail	LXMMCRS0B06S100
5	Green	Lexium™ MC12 Heavy-Duty guide rail straight for automated lubrication (1 ul), with lubricant opening, bottom rail	LXMMCRS0B06S10L
Also refer to Product Overview, page 29.			

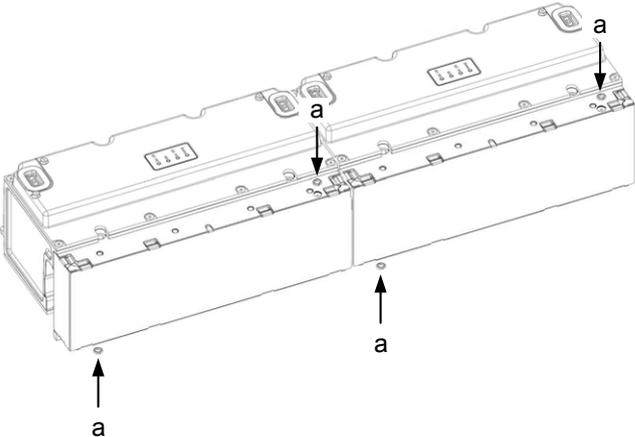
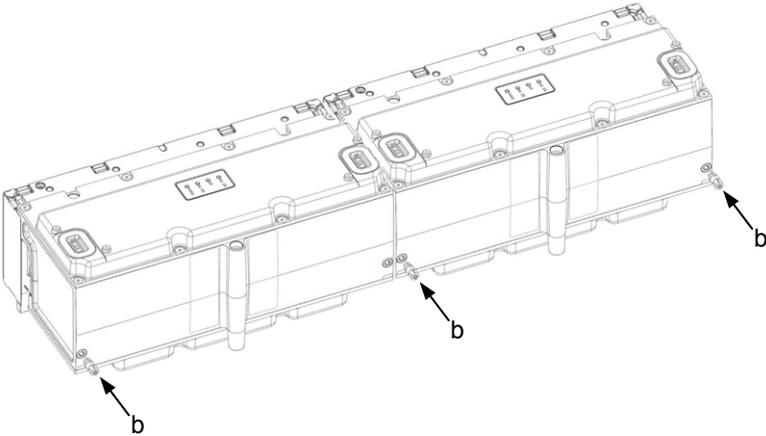
For more information on the automated lubrication system, refer to Automated Lubrication of a Heavy-Duty Track, page 207.

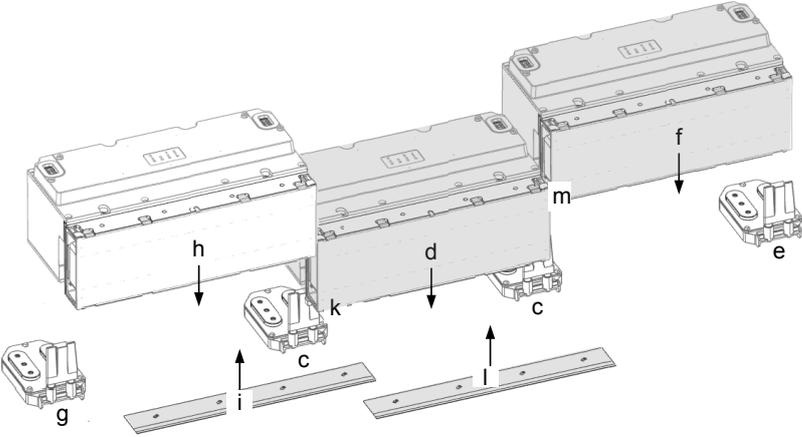
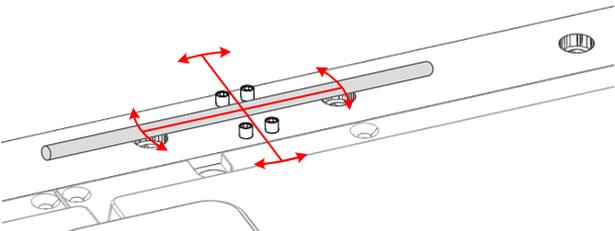
When mounting the system, apply a tightening torque of:

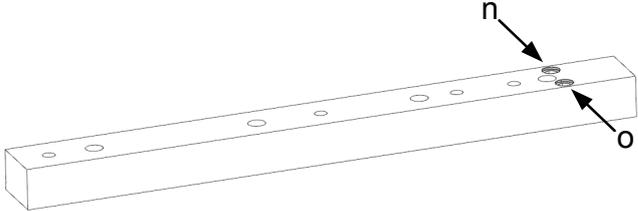
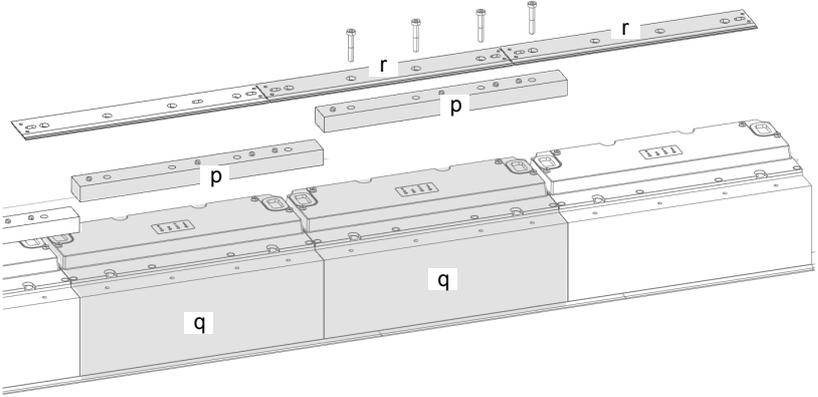
- 7.2 Nm (63.7 lbf-in) for rails
- 10.1 Nm (89.4 lbf-in) for segments
- 1.5 Nm (13.3 lbf-in) for lubrication connectors

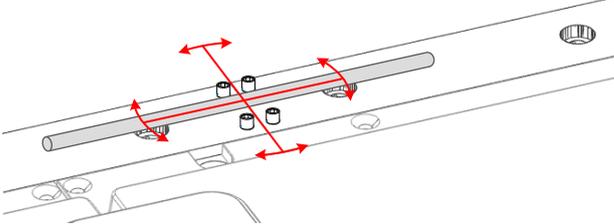
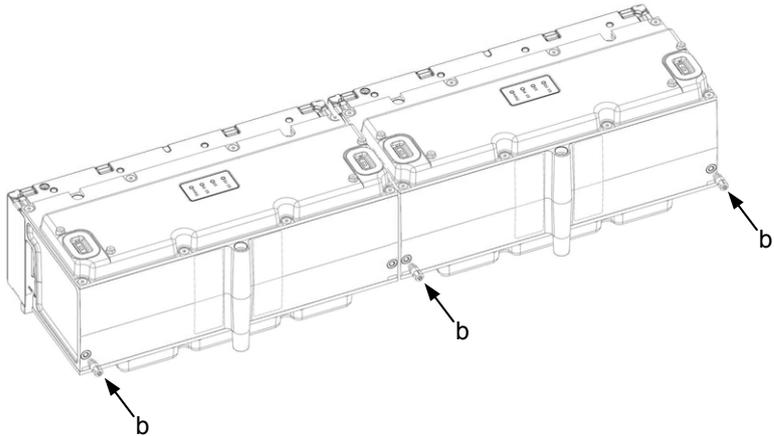
## Mounting a Heavy-Duty Guide Rail with Automated Lubrication

The following procedures describe the mounting of a Heavy-Duty guide rail with automated lubrication.

Step	Action
1	<p data-bbox="616 174 1385 224">To prepare two Lexium™ MC12 long stator motor segments straight for automated lubrication:</p> <p data-bbox="616 241 1437 291">First, insert the four O-rings (a) into the appropriate cavities at the top and the bottom of the two lubrication segments.</p> <p data-bbox="660 300 1393 349"><b>NOTE:</b> Verify the correct positioning of the O-rings, which are used to seal the bottom and top guide rails for automated lubrication.</p>  <p data-bbox="616 837 1425 887">Then, screw in three threaded connectors (b) into the appropriate openings at the rear side of the segments. Tighten the connectors with a torque of 1.5 Nm (13.3 lbf-in).</p> <p data-bbox="660 896 1425 945"><b>NOTE:</b> At the junction of the two lubrication segments, use the left opening of the right segment (see graphic below).</p> <p data-bbox="616 954 1422 1003">For more information on the components of the automated lubrication system, refer to Automated Lubrication of a Heavy-Duty Track, page 207.</p> 

Step	Action
2	<p>When the segments (<b>d</b>, <b>f</b> and <b>h</b>) and interconnects (<b>g</b>, <b>c</b> and <b>e</b>) are in place (refer to Horizontal Mounting of the Track with Automated Lubrication, page 96), install the bottom Heavy-Duty guide rails, starting with the first Heavy-Duty guide rail for automated lubrication (<b>i</b>). The rails are mounted offset to the segments by design.</p>  <p>Position the lubrication rail (<b>i</b>) offset under the lubrication segment (<b>d</b>) with the bottom lubricant opening (<b>k</b>) and loosely fasten the rail with M6x16 class 8.8 DIN 7984 screws.</p> <p><b>NOTE:</b> Make sure that the sealing O-rings are correctly positioned when mounting the rail.</p> <p><b>NOTE:</b> Make sure that the holes in the rails are aligned with the holes in the segments.</p>
3	Loosely fasten the bottom rail screws at the first segment.
4	<p>Align the next Heavy-Duty guide rail for automated lubrication (<b>l</b>) with the bottom lubricant opening (<b>m</b>). Make sure that the rails fit tightly together at the transition points.</p> <p>Use M5x8 (ISO 4026) set screws to fine-tune the rail alignment. Unscrew the set screws approximately halfway out of the rail to avoid contact with the support surface for the rails. To install the rails, slide a suitable mounting tool between the screws (in or across the rail direction) and carefully push them into place.</p> <p><b>NOTE:</b> Avoid scratching the surface of the rails.</p>  <p>After aligning the rails, screw the set screws back into the rails.</p>
5	Tighten the screws of both bottom Lexium™ MC12 Heavy-Duty guide rails straight for automated lubrication at the segment where the rails meet with a torque of 10.1 Nm (89.4 lbf-in).
6	Proceed in the same way with the subsequent standard bottom rails until all bottom rails are installed.

Step	Action
7	<p>Prepare the Heavy-Duty spacers for automated lubrication (LXMMCCS0B06S10L) for the top guide rail. For an appropriate lubrication of the top guide rails, you need in total two lubricant outlets – one for the outer side and one for the inner side of the guide rail. For this, you need two spacers, each with one open lubricant channel and one closed lubrication channel.</p>  <p>Prepare the Heavy-Duty spacer for lubricating the inner running surface of the top guide rail:</p> <ol style="list-style-type: none"> <li>1. Insert the O-ring into the appropriate cavity of the spacer at position (n). <b>NOTE:</b> Verify the correct positioning of the O-ring, which is used to seal the top guide rail for automated lubrication.</li> <li>2. Insert the screw with the pre-mounted O-ring into the threaded hole at position (o) to close the opening. Tighten the screw with a torque of 1 Nm (8.9 lbf-in).</li> </ol> <p>Prepare the spacer for lubricating the outer running surface of the top guide rail:</p> <ol style="list-style-type: none"> <li>1. Insert the O-ring into the appropriate cavity of the spacer at position (o). Verify the correct positioning of the O-ring, which is used to seal the top guide rail for automated lubrication.</li> <li>2. Insert the screw with the pre-mounted O-ring into the threaded hole at position (n) to close the opening. Tighten the screw with a torque of 1 Nm (8.9 lbf-in).</li> </ol> <p><b>NOTE:</b> To supply the inner and outer side of the guide rails with lubricant, make sure that the lubricant openings are in position (n) in one spacer and in position (o) in the other spacer.</p>
8	<p>When all the bottom guide rails are installed, place the Heavy-Duty spacers on the track, beginning with installing the lubrication spacers (p) onto the lubrication segments (q). Align the holes with those in the segments.</p> 
9	<p>Locate the long holes of the Heavy-Duty guide rails and insert the cylindrical pins into the Heavy-Duty spacer.</p>
10	<p>Beginning at an arc segment or an open end of the track, place the top Heavy-Duty guide rails over the segments with the Heavy-Duty spacers. The rails are mounted offset from the segments by design. The long holes must fit into the cylindrical pins. The holes in the rails must match the holes in the segments.</p> <p><b>NOTE:</b> Make sure that the two guide rails for automated lubrication (r) are installed offset on the lubrication segments (q) with the top lubricant openings.</p> <p><b>NOTE:</b> Make sure that the Heavy-Duty spacer is aligned with the segment stop and that the Heavy-Duty guide rail is aligned with the cylindrical pins.</p>
11	<p>Loosely attach the top rail with M6x35 class 8.8 DIN 7984 screws.</p> <p><b>NOTE:</b> The screws must go through the Heavy-Duty guide rails and the Heavy-Duty spacer.</p>
12	<p>Tighten the top rail screws at the first segment with a torque of 10.1 Nm (89.4 lbf-in).</p>

Step	Action
13	<p>Mount Heavy-Duty carriers on the track (refer to Mounting a Lexium™ MC12 Heavy-Duty Carrier, page 186).</p> <p><b>NOTE:</b> Heavy-Duty carriers must be mounted before the rails are closed.</p>
14	<p>Align the next rail. Make sure that the rails fit closely together at the transition points.</p> <p>Use M5x8 (ISO 4026) set screws to fine-tune the rail alignment. Unscrew the set screws approximately halfway out of the rail to avoid contact with the support surface for the rails. To install the rails, slide a suitable mounting tool between the screws (in or across the rail direction) and carefully push them into place.</p> <p><b>NOTE:</b> Avoid scratching the surface of the rails.</p>  <p>After aligning the rails, screw the set screws back into the rails.</p>
15	<p>Tighten the screws of both top rails at the segment where the rails meet with a torque of 10.1 Nm (89.4 lbf-in).</p>
16	<p>Install each Heavy-Duty guide rail until all top rails are installed.</p>
17	<p>After you install the rails, tighten the screws of the Lexium™ MC12 long stator motor segments with a torque of 10.1 Nm (89.4 lbf-in).</p>
18	<p>Insert the Lexium™ MC communication interconnects from top between the segments. Attach the communication interconnect with its four M3x8 ISO 14583 screws with a torque of 0.6 Nm (5.31 lbf-in).</p> <p><b>NOTE:</b> If a communication interconnect is used to connect the system to the Sercos bus and/or a Safe Force Off (SFO) control device, refer to the Lexium™ MC communication interconnects, page 32.</p>
19	<p>Use the Lexium™ MC power cables, the Sercos cable, and the SFO cables to connect your Lexium™ MC12 multi carrier with the control cabinet.</p> <p>For details, refer to Electrical Installation, page 124.</p>
20	<p>Connect the lubricant lines to the indicated three lubrication connectors (<b>b</b>) at the rear side of the segment. Tighten the union nuts with a torque of 1.5 Nm (13.3 lbf-in).</p> <p>For more information on the components of the automated lubrication system, refer to Automated Lubrication of a Heavy-Duty Track, page 207.</p>  <p><b>Result:</b> The Lexium™ MC12 multi carrier track is installed and ready for verification.</p> <p>Also refer to Verifying the Installation, page 155.</p>

**NOTE:** If you mounted the Lexium™ MC12 multi carrier track outside of your machine, disconnect the track from the control cabinet (power, Sercos and SFO), equip the mounting plate with the suitable transport devices, and lift the Lexium™ MC12 multi carrier track into your machine, and then re-connect it to the control cabinet.

## ⚡⚠ **DANGER**

### **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to this equipment.
- Use only the specified voltage when operating this equipment and any associated equipment.

**Failure to follow these instructions will result in death or serious injury.**

## Mounting the Tools on a Lexium™ MC12 Heavy-Duty Carrier

### Overview

You must design tools suitable for your application and install the tools on the Heavy-Duty carrier to transport your products within your track.

Observe the following guideline:

- Make sure your products are held properly by the tools so that the products do not move on the Heavy-Duty carriers or slide off from the Heavy-Duty carriers during acceleration and deceleration.
- Distribute the load of your products evenly on the Heavy-Duty carriers to operate at the maximum configured acceleration / deceleration and velocity of the Heavy-Duty carrier.
- Use a device such as a sensor to identify the Heavy-Duty carrier and the type of tool mounted on the Heavy-Duty carrier to help prevent collisions.

## ⚠ **WARNING**

### **STRONG MAGNETIC FIELDS**

- Keep persons with medical implants (for example, pacemakers or metal implants) or metallic body jewelry away from the carriers and segments with a minimum distance of 30 cm (11.9 in).
- Always leave the protective cover of the drive magnets in place for all exposed or uninstalled carriers.
- Do not put your hands or fingers between the carriers and segments.
- Do not place metallic tools in the vicinity of the carriers and segments.
- Do not place electromagnetically sensitive devices near the carriers and segments.
- Do not place credit cards or electronic/magnetic media in the vicinity of the carriers and segments.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

The Heavy-Duty carrier has two magnets which, together with the magnetic fields in the segments, move the Heavy-Duty carrier on the track. These two magnets are glued onto the Heavy-Duty carrier. A shock to the Heavy-Duty carrier can cause the glued-on magnets to flake off and the magnets can splinter.

In addition, the Heavy-Duty carrier has an encoder magnet. This can be demagnetized by improper handling, for example, if the magnets of another Heavy-Duty carrier come too close.

## ▲ WARNING

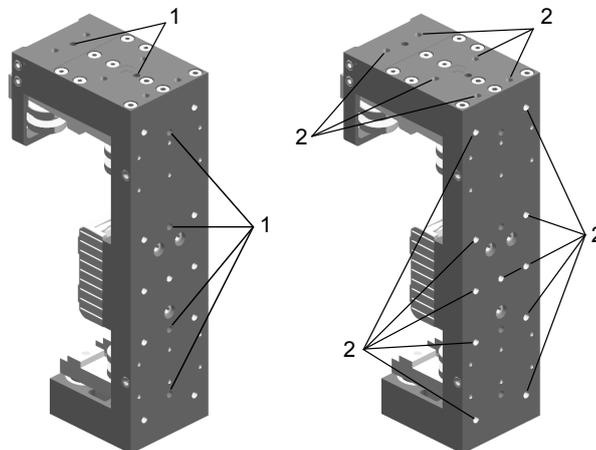
### INOPERABLE EQUIPMENT

- Do not drop the Heavy-Duty carrier.
- Do not strike the Heavy-Duty carrier.
- Keep a minimum distance of 50 mm (1.97 in) between the encoder magnet and other magnets.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## Mounting Options

1. A Lexium™ MC12 Heavy-Duty carrier provides two fitting holes (4 mm, +0.015...+0.005 mm / 0.1575 in, +0.00059...+0.000197 in) on the short angle arm of the carrier and four fitting holes on the long angle arm of the carrier.  
Use these fitting holes (1) to align your tool with the Heavy-Duty carrier.
2. A Lexium™ MC12 Heavy-Duty carrier provides six M5 threaded holes (hole depth 10 mm/0.39 in) on the short angle arm of the carrier and eleven M5 threaded holes (hole depth 10 mm/0.39 in) on the long angle arm of the carrier.  
Use these threaded holes (2) to fix your tool on the Heavy-Duty carrier.  
Tighten the fixing screws. Maximum tightening torque is 5.9 Nm (52.2 lbf-in).



## Removing the Lexium™ MC12 Heavy-Duty Carrier from the Lexium™ MC12 Heavy-Duty Guide Rail

Proceed as follows, to remove the Heavy-Duty carrier from the Heavy-Duty guide rail:

**NOTE:** Exposed or uninstalled carriers must have the protective cover of the drive magnets installed at all times. The cover is only removed at the time of carrier installation.

Step	Action
1	Make sure the top guide rails are not closed. If the track is closed, dismount one curved top guide rail and replace it with a straight guide rail.
2	Grab the carrier with one hand at the top and with one hand at the bottom and do not place your fingers between the carrier and the segments..
3	Push the carrier off the track. <b>NOTE:</b> To push the carrier off the track, you have to overcome the magnetic force.
4	When the carrier is off the track, install the protective cover on the drive magnets.

## Indicators

Refer to Indicators, page 121 for information about the LED indicators.

## Electrical Installation

Refer to Electrical Installation, page 124 for information about wiring the power supply and the Lexium™ MC connection module, and connecting the Sercos bus and SFO (Safe Force Off) to the track.

## Initial Start-Up

Refer to Initial Start-Up, page 155 for information about verifying the installation and the first start-up.

## Maintenance Plan

The data given in the maintenance schedule are indicative only. The data have to be adapted depending on the application and the environmental conditions. Refer also to Maintenance, Repair, and Cleaning, page 158 for more information.

## Maintenance Schedule

Perform the following maintenance tasks after delivery or long storage.

Interval <sup>(1)</sup>	Action
After delivery <sup>(2)</sup>	Fill the lubrication reservoirs of the carriers. Refer to Lubrication, page 205.
After delivery, every 1000 km (621 miles) or within the first two months of service life	Verify the Heavy-Duty carriers by visual inspection for any damage or missing parts, especially for moving parts and parts at risk for collisions such as mounting elements
After ≥ two years of storage	Verify the lubrication pads of the Heavy-Duty carriers and replace them if necessary. Refer to Replacing Parts, page 199.
(1) The distances referred to are for one Heavy-Duty carrier. The performance of your system may differ.	
(2) Filling the lubrication reservoirs of the carriers helps to ensure an even lubrication of the carrier rollers and the rails.	

Perform the following maintenance tasks within the stated intervals.

**NOTE:** The intervals in the following table are guidelines. The intervals can be adjusted depending on your application and the environmental conditions (track length, number of Heavy-Duty carriers, motion profile, temperature, etc.).

Interval <sup>(1)</sup>	Action
Every 1000 km (621 miles) of operation	<ul style="list-style-type: none"> <li>• Clean the Lexium™ MC12 Heavy-Duty guide system if necessary. Refer to <i>Cleaning</i>, page 161.</li> <li>• Verify that the floating bearing of the lower rollers of the Heavy-Duty carrier moves freely in axial direction. Clean if necessary and make the rollers run smoothly. Refer to <i>Cleaning the Carrier Rollers</i>, page 161.</li> <li>• Verify the lubrication pads of the Heavy-Duty carriers for wear and replace them if necessary. Refer to <i>Replacing Parts</i>, page 199.</li> </ul>
Every 1000 km (621 miles)... 8000 km (4970 miles) <sup>(2)</sup>	<p>Lubricate the Heavy-Duty carriers depending on the application. Refer to <i>Lubricating the Lexium™ MC12 Heavy-Duty Carrier</i>, page 205. As examples, two test cases were conducted that required refilling the lubricant reservoirs.</p> <ul style="list-style-type: none"> <li>• Test application for 1000 km (621 miles): 1.5 m (59 in.) track length, 1 carrier, laboratory environment at 35 °C (95 °F)</li> <li>• Test application for 8000 km (4970 miles): 5.2 m (205 in.) track length, 5 carriers, laboratory environment at 25 °C (77 °F)</li> </ul>
Every 4000 km (2485 miles) of operation	<ul style="list-style-type: none"> <li>• Clean the Lexium™ MC12 Heavy-Duty guide system if necessary. Refer to <i>Cleaning</i>, page 161.                         <ul style="list-style-type: none"> <li>◦ Verify the covers of the segments and the drive magnets of the Heavy-Duty carriers for dirt and magnetic abrasion. Clean the covers and the magnets and remove the magnetic abrasion if necessary. Refer to <i>Removing Particles from the Magnets</i>, page 161.</li> <li>◦ Verify the Heavy-Duty carrier rollers for dirt and clean if necessary.</li> <li>◦ Verify the area of encoder magnets of the Heavy-Duty carriers for dirt, and clean if necessary.</li> <li>◦ Verify the rails for dirt and clean if necessary.</li> </ul> </li> <li>• Remove the Lexium™ MC12 Heavy-Duty carriers from the guide rail, refer to <i>Removing the Lexium™ MC12 Heavy-Duty Carrier from the Lexium™ MC12 Heavy-Duty Guide Rail</i>, page 197. Verify it by visual inspection for any damage or missing parts, especially moving parts and parts at risk for collisions such as mounting elements.                         <ul style="list-style-type: none"> <li>◦ Verify the drive magnets of the Heavy-Duty carriers for damage. The drive magnets cannot be replaced individually. Replace the plate with the two magnets as a whole if necessary. Refer to <i>Replacing the Drive Magnets of the Carrier</i>, page 170.</li> <li>◦ Verify the rails for wear or damage and replace if necessary.</li> </ul> </li> <li>• Reinstall the Heavy-Duty carriers and the guide rails and mount them according to the descriptions in <i>Mechanical Installation</i>, page 186.</li> </ul>
Every 10,000 km (6214 miles) of operation	Verify the Heavy-Duty carrier rollers for wear and replace the Heavy-Duty carrier rollers if necessary. Refer to <i>Replacing Parts</i> , page 199.
(1) The distances referred to are for one Heavy-Duty carrier. The performance of your system may differ.	
(2) Not required for Lexium™ MC12 Heavy-Duty tracks with automated lubrication. For a track with automated lubrication, ensure a sufficient supply of lubricant to the lubricant outlets.	

Perform the following maintenance tasks if your Heavy-Duty carriers have exceptional movement profiles:

Movement profile	Action
Reversing movements in which the Heavy-Duty carriers travel a distance of less than 200 mm (7.88 in).	If a distance of less than 200 mm (7.88 in) is travelled, perform a lubrication run after 20,000 traverse cycles or earlier.

## Replacing Parts

In this chapter, you find specific information about the Lexium™ MC12 Heavy-Duty guide system. Refer also to *Replacing Parts*, page 162 for more information.

## Information About Replacing Parts

### Overview

The use and application of the information contained herein require expertise in the design and programming of automated control systems. Only you, the user, machine builder or integrator, can be aware of all the conditions and factors present during installation and setup, operation, repair, and maintenance of the machine or process.

You must also consider any applicable standards and/or regulations with respect to grounding of all equipment. Verify compliance with any safety information, different electrical requirements, and normative standards that apply to your machine or process in the use of this equipment.

#### **DANGER**

##### **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to this equipment.
- Use only the specified voltage when operating this equipment and any associated equipment.

**Failure to follow these instructions will result in death or serious injury.**

The segments and the carriers of the Lexium™ MC12 multi carrier may exceed 70 °C (158 °F) when subjected to heavy loads and/or high performance during operation.

#### **WARNING**

##### **HOT SURFACES**

- Avoid unprotected contact with hot surfaces.
- Do not allow flammable or heat-sensitive parts in the immediate vicinity of hot surfaces.
- Verify that the heat dissipation is sufficient by performing a test run under maximum load conditions.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## Information About Replacing Parts of the Lexium™ MC12 Heavy-Duty Carrier

### Electromagnetic Fields

**NOTE:** Exposed or uninstalled carriers must have the protective cover of the drive magnets installed at all times. The cover is only removed at the time of carrier installation.

Heavy-Duty carriers have strong magnetic fields. Refer to Transporting the Lexium™ MC12 carriers, page 84.

The Heavy-Duty carriers have strong drive magnets and can attract metal objects that are in their proximity.

A Heavy-Duty carrier can move suddenly and fast due to magnetic attraction.

## **▲ WARNING**

### **STRONG MAGNETIC FIELDS**

- Keep persons with medical implants (for example, pacemakers or metal implants) or metallic body jewelry away from the carriers and segments with a minimum distance of 30 cm (11.9 in).
- Always leave the protective cover of the drive magnets in place for all exposed or uninstalled carriers.
- Do not put your hands or fingers between the carriers and segments.
- Do not place metallic tools in the vicinity of the carriers and segments.
- Do not place electromagnetically sensitive devices near the carriers and segments.
- Do not place credit cards or electronic/magnetic media in the vicinity of the carriers and segments.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## **Use Original Equipment Only**

Use only the accessories and mounting parts specified in the documentation and only third-party devices or components that have been expressly approved by Schneider Electric.

## **▲ WARNING**

### **UNINTENDED EQUIPMENT OPERATION**

Only use hardware components approved by Schneider Electric for use with the system.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

## **Handling the Heavy-Duty Carrier**

The Heavy-Duty carrier has two magnets which, together with the magnetic fields in the segments, move the Heavy-Duty carrier on the track. These two magnets are glued onto the Heavy-Duty carrier. A shock to the Heavy-Duty carrier can cause the glued-on magnets to flake off and the magnets can splinter.

In addition, the Heavy-Duty carrier has an encoder magnet. This can be demagnetized by improper handling, for example, if the magnets of another Heavy-Duty carrier come too close.

**⚠ WARNING****INOPERABLE EQUIPMENT**

- Do not drop the carrier.
- Do not strike the carrier.
- Keep a minimum distance of 50 mm (1.97 in) between the encoder magnet and other magnets.
- For Heavy-Duty carriers, verify that the lubrication reservoirs are filled before first use.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

For information on filling the lubrication reservoirs, refer to *Lubricating the Lexium™ MC12 Heavy-Duty Carrier*, page 205.

## Replacing the Rollers of a Lexium™ MC12 Heavy-Duty Carrier

### Overview

A Heavy-Duty carrier has six rollers which must be replaced at the same time.

Refer to the *Maintenance Schedule*, page 198 and the *Information About Replacing Parts of the Lexium™ MC12 Heavy-Duty Carrier*, page 200.

### Replacing the Rollers

**NOTE:** Exposed or uninstalled carriers must have the protective cover of the drive magnets installed at all times. The cover is only removed at the time of carrier installation.

Step	Action
1	<p>Install the protective cover (7) of the drive magnets by sliding it onto the magnets if it is not already installed. Refer to <b>Removing the Protective Cover of the Drive Magnets</b>, page 113.</p> <p><b>NOTE:</b> The rollers are available in two versions:</p> <ul style="list-style-type: none"> <li>• Version 1: Upper rollers are mounted with fixed bearings (1 to 4).</li> <li>• Version 2: Lower rollers are mounted with loose bearings (5 and 6).</li> </ul>
2	<p>To replace the rollers, the rotatable arms have to be dismantled (as explained here from step 2 to 5): dismantle the encoder support (a) first.</p>

Step	Action
3	Remove the cover plate (b) at the top and the bottom of the Heavy-Duty carrier by loosening the six screws at each plate.
4	Under the cover plate (b) you can find the heads of the hex bolts (c) which hold the rotatable arms (d). Unscrew the two hex bolts (c) to dismount the rotatable arms (d).
5	The rollers (f) are mounted to the rotatable arms: loosen the nuts (e) and dismount the rollers.
6	Replace the rollers (f) on both rotatable arms.
7	Place in the wedge-lock washers under the nuts and tighten the nuts. (Upper rollers with 5 Nm (44.25 lbf-in), lower rollers with 3 Nm (26.55 lbf-in)).
8	Verify the lubrication pads of the Heavy-Duty carriers for wear and replace them if necessary. Refer to Replacing the Lubrication Pads of a Lexium™ MC12 Heavy-Duty Carrier, page 203.
9	Place the rotatable arms in position and push the hex bolts through the bearings (g) and fasten the hex bolts loosely in the threads of the rotatable arms. <b>NOTE:</b> Apply a thin layer of medium strength threadlocker on the thread of the bolt.
10	Tighten the hex bolts (c) in the threads of the rotatable arms with 5 Nm (44.3 lbf-in).
11	Repeat step 4 to 10 to replace the lower rollers.
12	Place the cover plates at the top and the bottom of the Heavy-Duty carrier and mount them with their six screws. Tighten the screws with 2.5 Nm (22.1 lbf-in).

## Replacing the Lubrication Pads of a Lexium™ MC12 Heavy-Duty Carrier

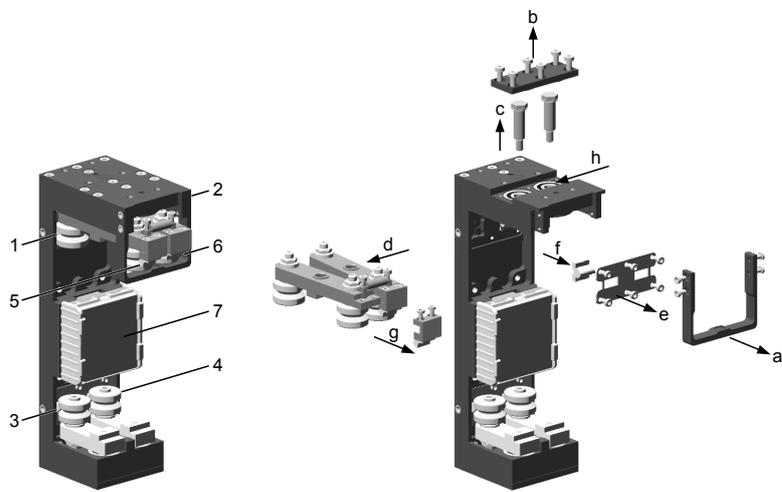
### Overview

A Heavy-Duty carrier has six lubrication pads which must be replaced at the same time.

Refer to the Maintenance Schedule, page 198 and the Information About Replacing Parts of the Lexium™ MC12 Heavy-Duty Carrier, page 200.

### Replacing the Lubrication Pads

**NOTE:** Exposed or uninstalled carriers must have the protective cover of the drive magnets installed at all times. The cover is only removed at the time of carrier installation.

Step	Action
1	<p>Install the protective cover (7) of the drive magnets by sliding it onto the magnets if it is not already installed. Refer to <b>Removing the Protective Cover of the Drive Magnets</b>, page 113.</p> <p><b>NOTE:</b> A Heavy-Duty carrier has six lubrication pads which must be replaced at the same time. Four are installed in the main body (1 to 4) and two are installed at the end of the top rotatable arms (5 and 6).</p> 
2	To replace the lubrication pads in the main body, the rotatable arms have to be dismantled (as explained here from step 2 to 5): dismantle the encoder support (a) first.
3	Remove the cover plate (b) at the top and the bottom of the Heavy-Duty carrier by loosening the six screws at each plate.
4	Under the cover plate (b) you can find the heads of the hex bolts (c) which hold the rotatable arms (d). Unscrew the two hex bolts (c) to dismantle the rotatable arms (d).
5	The lubrication pads in the main body are sitting behind the mounting plate (e). Loosen the six screws at the mounting plate and dismantle the mounting plate (e).
6	Replace the lubrication pads (f) on the mounting plate.
7	Screw the mounting plate (e) together with the lubrication pads to the main body with 1 Nm (8.9 lbf-in).
8	Place the rotatable arms in position and push the hex bolts through the bearings (h) and fasten the hex bolts loosely in the threads of the rotatable arms. <b>NOTE:</b> Apply a thin layer of medium strength threadlocker on the thread of the bolt.
9	Tighten the hex bolts (c) in the threads of the rotatable arms with 5 Nm (44.3 lbf-in).
10	For the change of the lubrication pads that are mounted at the end of the rotatable arms, loosen the two screws at each bracket (g).
11	Remove the bracket (g) together with the lubrication pad.
12	Replace the lubrication pads from the brackets.
13	Screw the brackets (g) again to the rotatable arms (d) with 1 Nm (8.9 lbf-in).
14	Repeat step 4 to 9 to replace the lubrication pads in the lower main body.
15	Place the cover plates (b) at the top and the bottom of the Heavy-Duty carrier and mount them with their six screws. Tighten the screws with 2.5 Nm (22.1 lbf-in).
16	Lubricate the Heavy-Duty carrier. Refer to <b>Lubricating the Lexium™ MC12 Heavy-Duty Carrier</b> , page 205.

# Lubrication

## Lubricating the Lexium™ MC12 Heavy-Duty Carrier

### Overview

The running surfaces of the four upper and two lower rollers of the Heavy-Duty carrier and the running surfaces of the Heavy-Duty guide rails must be lubricated. This is done by four upper and two lower lubrication pads. The Heavy-Duty carrier pads are delivered filled with lubricant and must be filled regularly.

The Heavy-Duty guide rails are lubricated via the Heavy-Duty carriers. Execute a Heavy-Duty carrier lubrication run on the Heavy-Duty guide rails after cleaning the rails.

**NOTE:** For a track with automated lubrication, ensure a sufficient supply of lubricant to the lubricant outlets.

For more information, refer to [Information About Lubrication](#), page 173.

Incorrect lubricants may damage the Heavy-Duty carriers and the Heavy-Duty guide rails. Insufficient lubrication or incorrect lubricants increase wear and reduce the service life.

### **NOTICE**

#### **INOPERABLE EQUIPMENT**

Only use the specified type and amount of lubricant.

**Failure to follow these instructions can result in equipment damage.**

**NOTE:** Always wear protective clothing when working on the system. Repeated and prolonged exposure to the product can cause skin irritation, or sickness if ingested.

### **⚠ CAUTION**

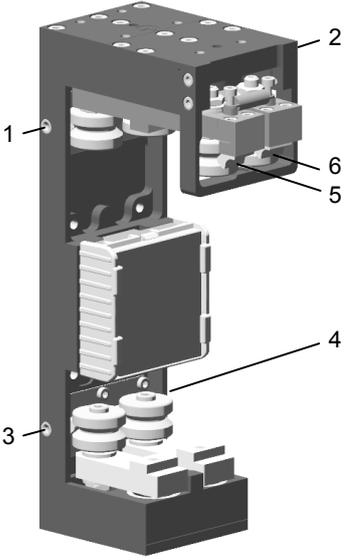
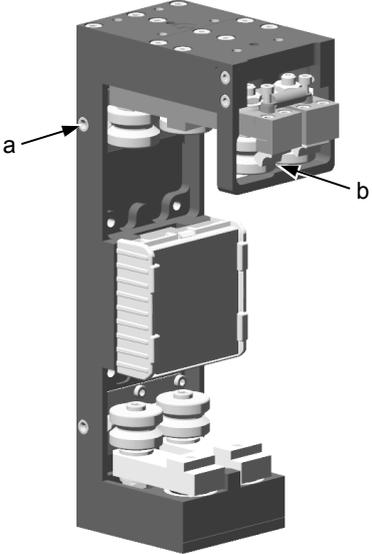
#### **EYE OR SKIN CONTACT WITH, OR INGESTION OF, LUBRICANTS**

- In the event of contact with the eyes or the skin, consult the data sheet of the lubricant for treatment.
- In the event of swallowing, do not provoke vomiting or administer any products orally; consult a doctor as soon as possible.

**Failure to follow these instructions can result in injury or equipment damage.**

## Filling the Lubrication Pads

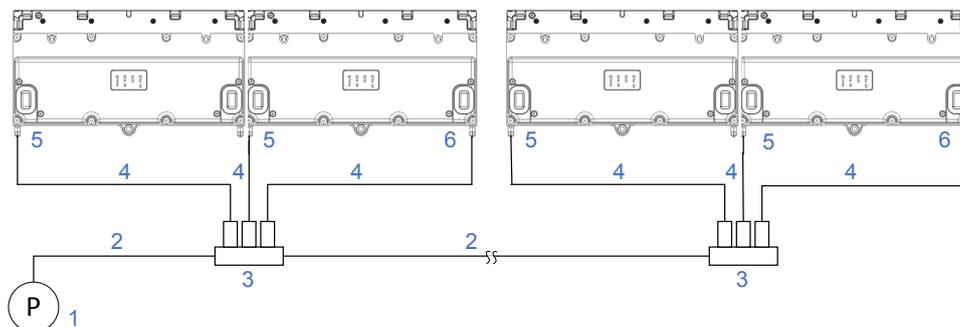
The Heavy-Duty carrier can stay on the track during lubrication.

Step	Action
1	<p>In the housing, a Heavy-Duty carrier has four lubrication nipples (1 to 4) to fill the four lubrication pads. Each lubrication pad has its own lubrication nipple.</p>  <p>Press the nozzle of a single-hand lubrication gun in a right angle against one of the lubrication nipples and inject the lubricant.</p>
2	<p>To fill the lubrication pads use one stroke of the lubrication gun.</p> <p><b>NOTE:</b> The lubrication process has to be done slowly. Use approximately one minute for the stroke to be sure that the oil has soaked up by the lubrication pad.</p> 
3	Proceed in this way to fill the two upper and the two lower lubrication pads.
4	On the rotatable upper arms, there are also lubrication pads (b). Loosen the two screws on each rotatable upper arm. Then, dismount the brackets with the lubrication pads.
5	<p>To fill the lubrication pads use one stroke of the lubrication gun directly on the pad.</p> <p><b>NOTE:</b> The lubrication process has to be done slowly. Use approximately one minute for the stroke to be sure that the oil has soaked up by the lubrication pad.</p>
6	Mount the two brackets with the lubrication pads again and insert the 4 screws. Tighten the screws with 1 Nm (8.85 lbf-in).

## Automated Lubrication of a Heavy-Duty Track

### Overview

On a Lexium™ MC12 Heavy-Duty guide system with automated lubrication, the running surfaces of the four upper and two lower rollers of the Lexium™ MC12 carrier and the running surfaces of the rails are lubricated with lubricant supplied by a lubrication pump (1). The lubricant is pumped through a lubricant line (2) to the distributors (3). From the distributors, the lubricant is supplied through lubricant lines (4) to the connectors (5/6) at the segments where it flows through channels inside the segments to the running surfaces of the lubrication rails.



Element	Description
1	Lubrication pump
2	Lubricant line from the pump to the distributors and between the distributors
3	Distributor with dosing valves
4	Lubricant lines from the distributor to the connectors
5	Connector, lubrication of the top guide rail
6	Connector, lubrication of the bottom guide rail

**NOTE:** It is a good practice to fill the lubricant lines manually with lubricant before commissioning for helping to avoid air bubbles in the lubricant supplied to the guide rails.

For mounting the Heavy-Duty lubrication segment(s), the corresponding Heavy-Duty bottom lubrication rails and the corresponding Heavy-Duty lubrication spacers and Heavy-Duty top lubrication rails, refer to *Mounting a Lexium™ MC12 Heavy-Duty Guide Rail with Automated Lubrication*, page 190.

### Lubrication System Requirements

Apart from the two Lexium™ MC12 long stator motor segments straight for automated lubrication (LXMMC12MS06S10L), the four Lexium™ MC12 Heavy-Duty guide rails straight for automated lubrication (LXMMCRS0B06S10L) and the two Lexium™ MC12 Heavy-Duty spacers straight for automated lubrication (LXMMCCS0B06S10L), the components of the automated lubrication system (pump, distributor(s), lubricant lines) are not provided by Schneider Electric. Select the components according to your individual needs.

For the automated lubrication of a Heavy-Duty Lexium™ MC12 multi carrier track, the following minimum requirements must be met:

- One lubrication point, consisting of two lubrication segments and the corresponding upper and lower lubrication rails and spacers, for every 6 meters of the track
- Lubricant: Refer to *Information About Lubrication*, page 173
- Lubrication pump: volume flow rate of 50 ml/min (0.013 gal/min)
- Distributor(s): One dosing valve per lubricant line, with a dosing volume of 0.01 cm<sup>3</sup> (0.0006 in<sup>3</sup>) per stroke

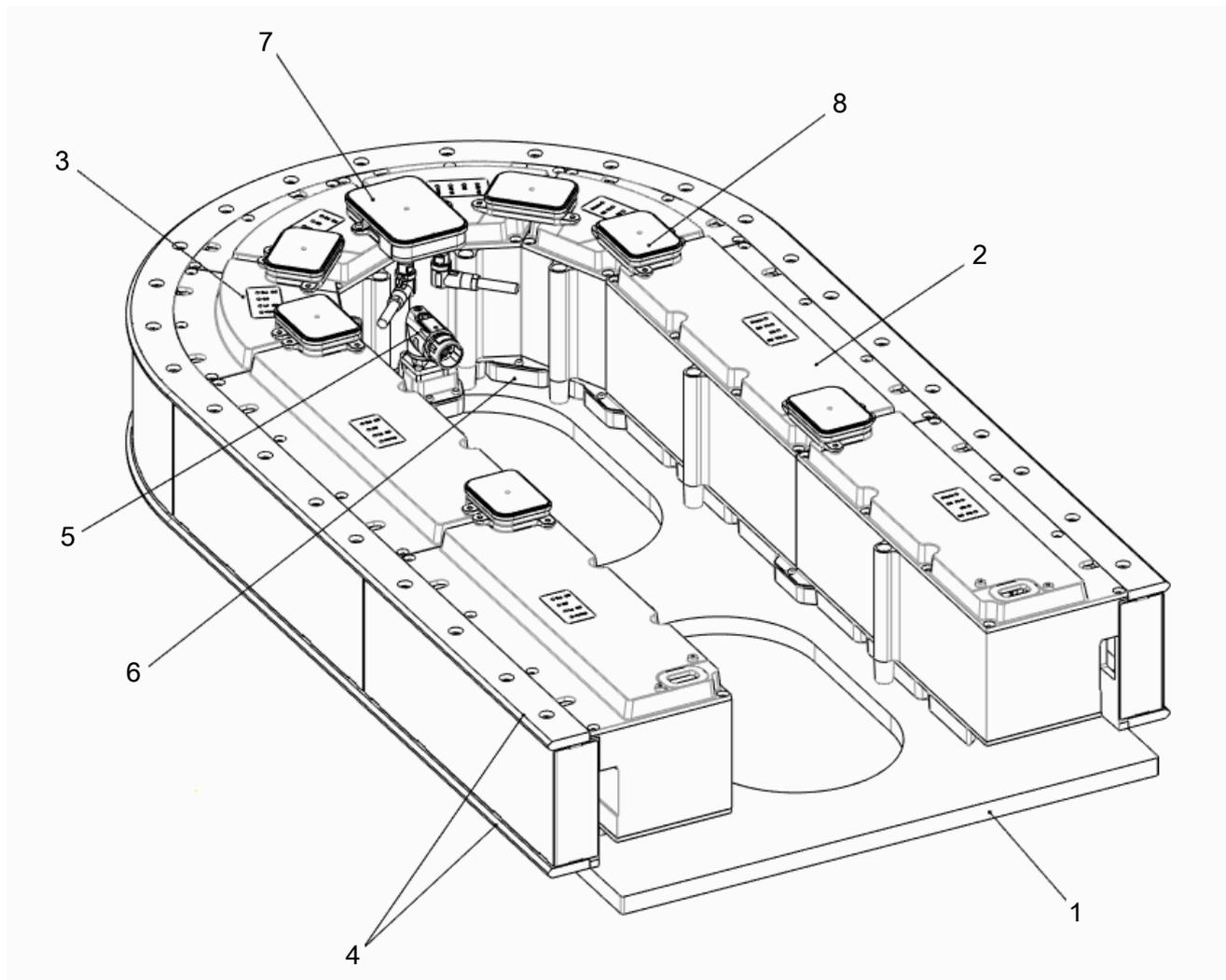
- Lubricant lines: 4 mm (0.16 in) diameter, externally calibrated

**NOTE:** The given values apply to clean environments and the ambient temperatures defined in the *Ambient Conditions*, page 71.

# Appendices

## Dimensions and Drilling Templates

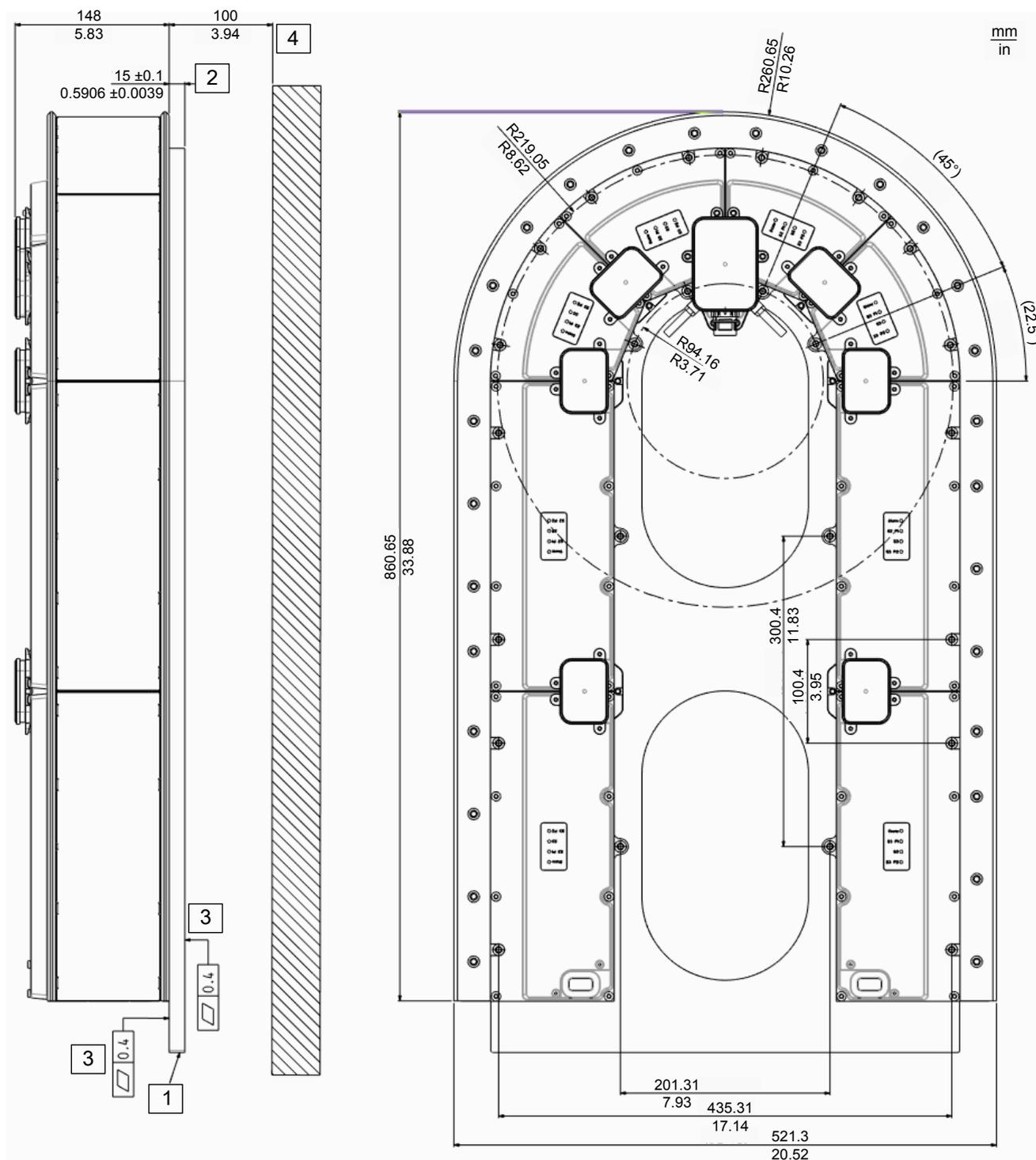
### Layout Example – Components Overview



- 1 Mounting plate
- 2 Lexium™ MC12 long stator motor segment straight
- 3 Lexium™ MC12 long stator motor segment arc
- 4 Lexium™ MC guide rails
- 5 Lexium™ MC power interconnect (with power infeed connector)
- 6 Lexium™ MC power interconnect (plain)
- 7 Lexium™ MC communication interconnect (with two Sercos connectors)
- 8 Lexium™ MC communication interconnect (plain)

## Dimensions

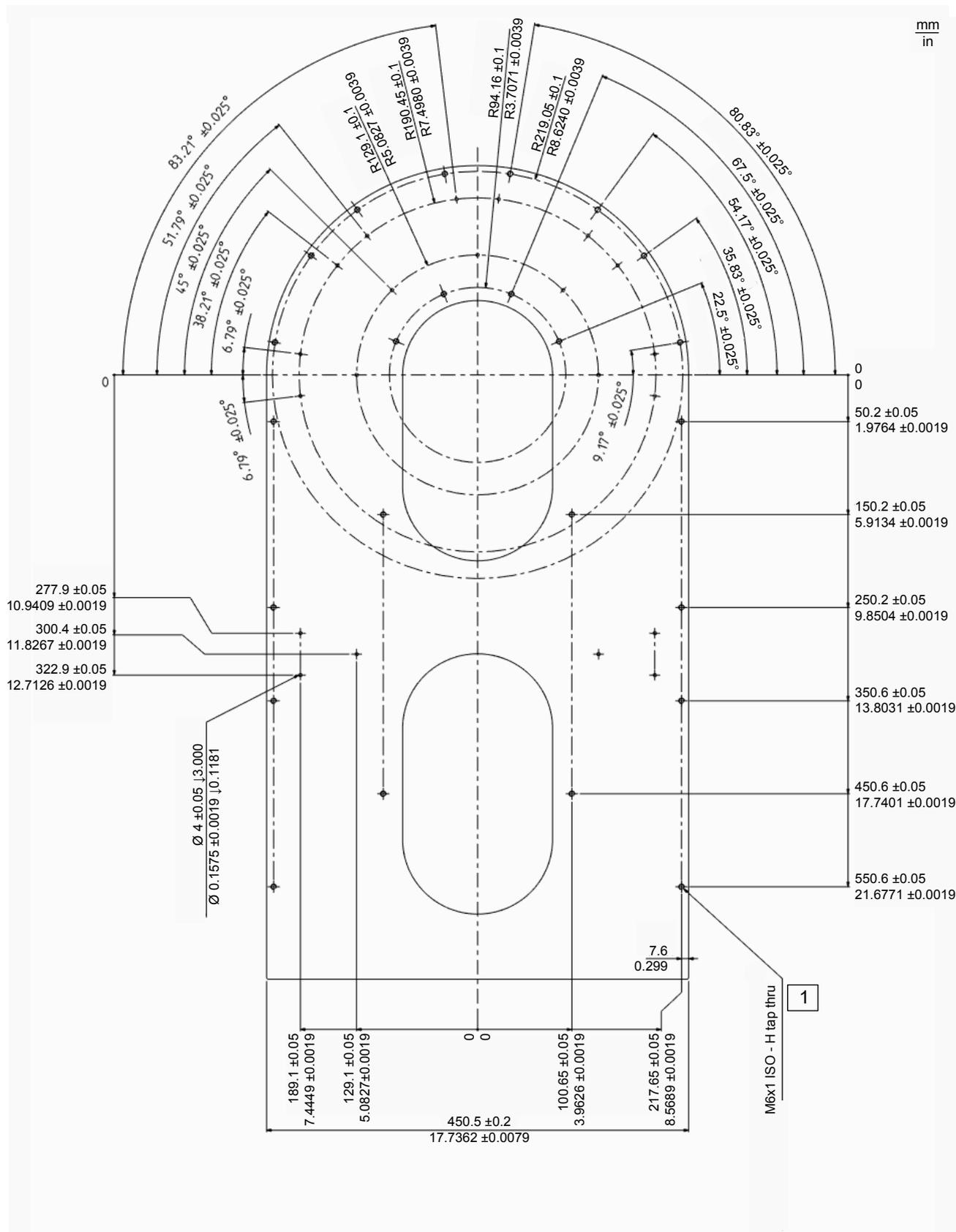
You can download the CAD files of the individual components from the Schneider Electric homepage.



- 1 Aluminum alloy Al 5754-0 H111 or an alloy with similar mechanical properties
- 2 Minimum required thickness of the mounting plate (aluminum)
- 3 Minimum required mounting plate flatness per meter
- 4 Minimum required free space below the rails

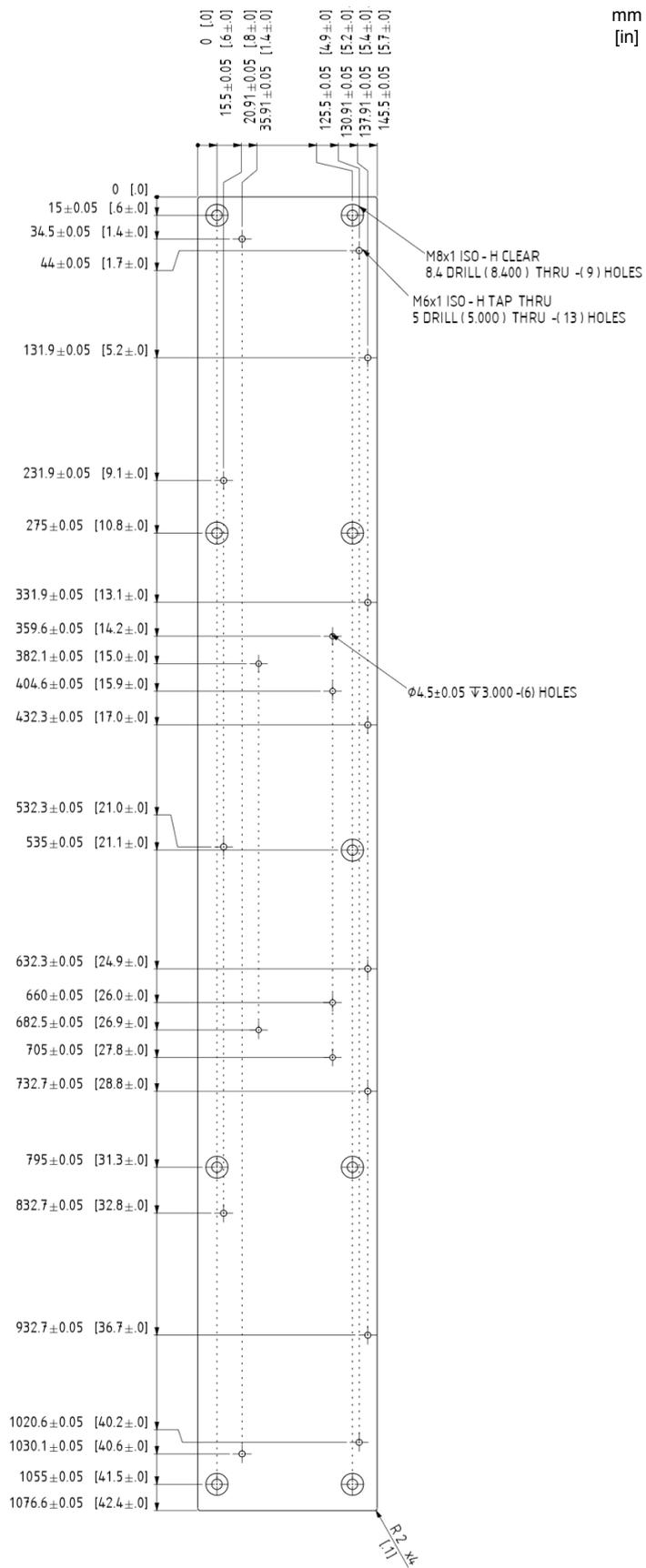
# Drilling Template – Mounting Plate – Closed Track

You can download the CAD files of the individual components from the Schneider Electric homepage.



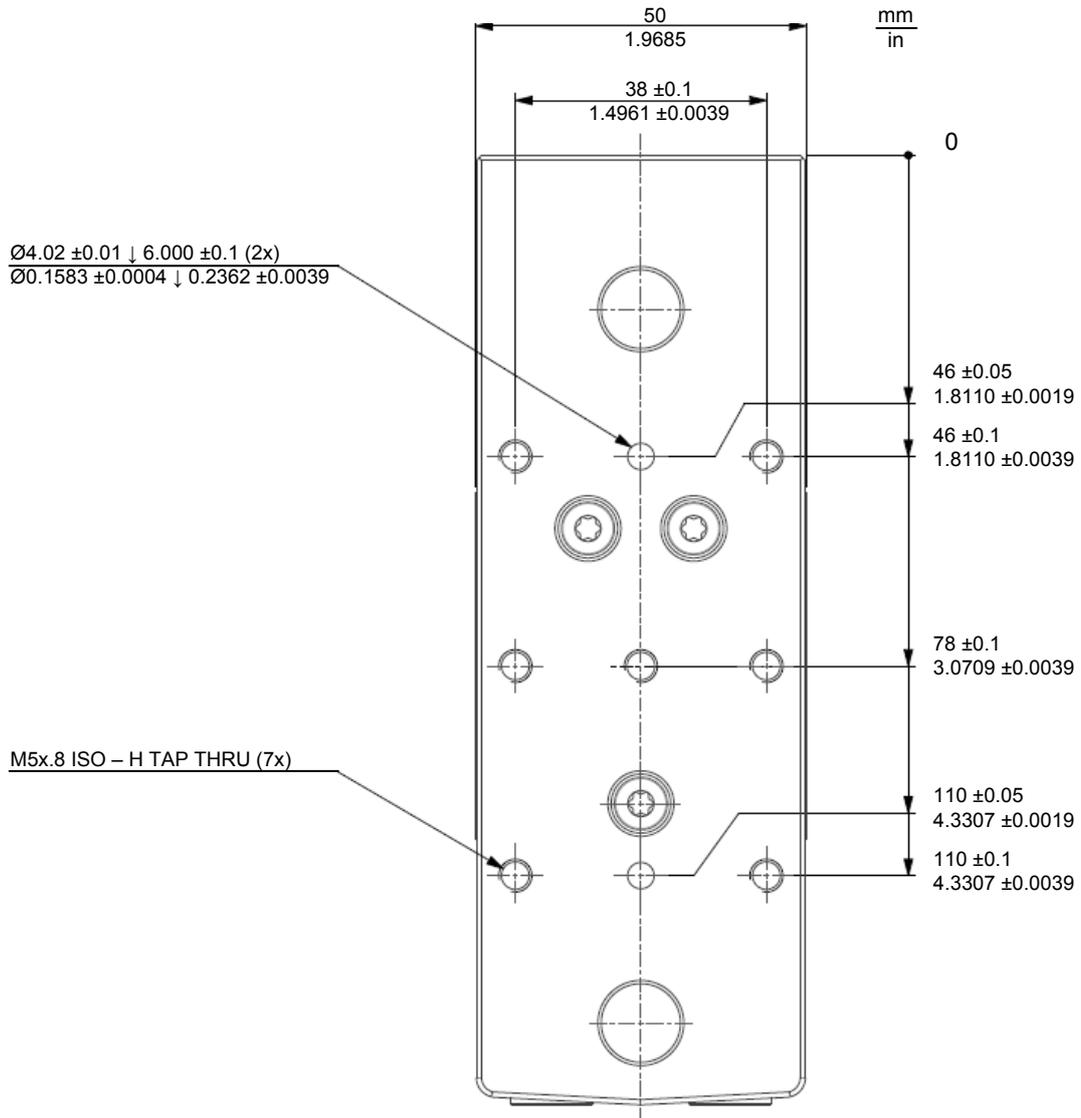
# Drilling Template – Mounting Plate – Open Track with Hard Stops

You can download the CAD files of the individual components from the Schneider Electric homepage.



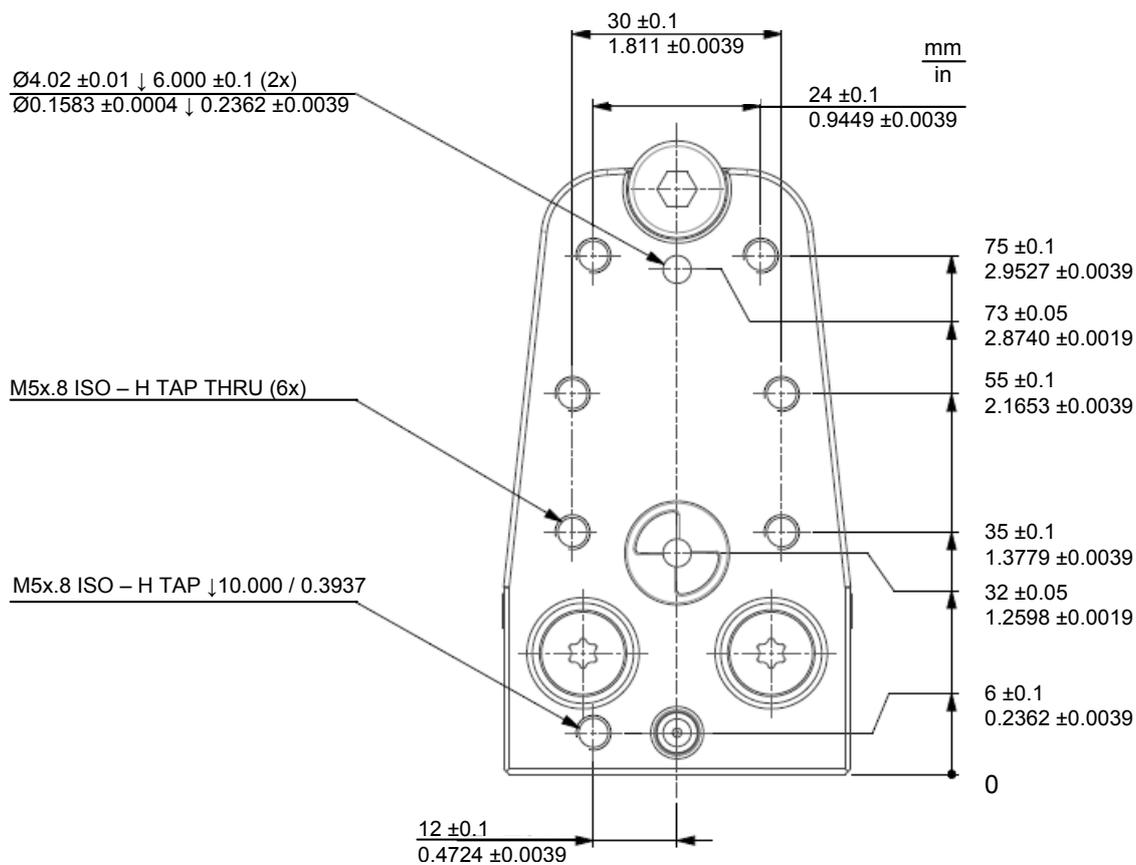
## Drilling Template – Carrier (Side view)

You can download the CAD files of the individual components from the Schneider Electric homepage.



## Drilling Template – Carrier (Top view)

You can download the CAD files of the individual components from the Schneider Electric homepage.



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