Hardware Guide

(Original Instructions)

Lexium 62 ILD

12.2016

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Schneider Electric

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

Contents

1 Safety Information

Important Information

NOTICE 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.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury.

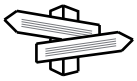
NOTICE

NOTICE 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.

The following symbols and designators are used in this document:

Symbol/Character	Meaning
	**Information Symbol:** After this symbol, you will find important information and useful tips on using the components.
	**Marker:** After this symbol, you will find references for further information.
▪	**Prerequisite symbol:** This symbol indicates a prerequisite you have to fulfill before you start to implement an instruction.
✕	**Problem symbol:** This symbol is followed by a description of the problem and an instruction how to solve the problem.
►	**Activity symbol:** After this symbol, you will find an instruction. Follow the instructions in sequence from top to bottom.
✓	**Result symbol:** The text after this symbol contains the result of an action.
(1), **(2)**, **(3)**	**Image numbers** in the text always refer to the image numbers in the **referenced** figure.
	**Orientation aid:** Information serving as an orientation aid regarding the section's contents follows this symbol.
bold	If the descriptive text contains **keywords**, such as parameters, they are highlighted in bold.
`lBuffSelect`	**Program code** is written using a different font.

2 About this manual

2.1 Introduction

Read and understand the material contained in this manual before you work on Lexium 62 ILD for the first time. Take particular note of the safety information (see 3 Product Related Information). As described in section 3.3, only those persons who meet the "Qualification of Personnel (see 3.3 Qualification of Personnel)" are allowed to work with the Lexium 62 components.

A copy of this manual must be available for personnel who work with the Lexium 62 ILD.

This manual is to help you use the capabilities of the Lexium 62 ILD safely and properly.

Lexium 62 ILD is part of the Lexium 62 drive system. For information on further Lexium 62 components, refer to the Lexium 62 ILM Hardware Guide and the Lexium 62 Hardware Guide.

Follow the instructions within this manual to help:

- reduce risks
- reduce repair costs and downtime of the Lexium 62 components
- increase the service life of the Lexium 62 components,
- increase reliability of the Lexium 62 components.

Terminology Derived from Standards

The technical terms, terminology, symbols and the corresponding descriptions in this manual, 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:

EN 61131-2:2007	Programmable controllers, part 2: Equipment requirements and tests.
ISO 13849-1:2008	Safety of machinery: Safety-related parts of control systems. General principles for design.
EN 61496-1:2013	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
IEC/EN 60204-1:2006	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
EN 1088:2008 ISO 14119:2013	Safety of machinery - Interlocking devices associated with guards - Principles for design and selection
ISO 13850:2006	Safety of machinery - Emergency stop - Principles for design
IEC/EN 62061:2005	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 61784-3:2008	Digital data communication for measurement and control: Functional safety field buses.
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:

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.

3 Product Related Information

This section contains important safety information regarding working with the Lexium 62 drive system. The Lexium 62 ILD, part of the Lexium 62 drive system, conforms to recognized technical safety regulations.

3.1 Residual Risks

Hazards arising from the Lexium 62 ILD have been reduced. However, residual risks remain since the Lexium 62 components work with electrical voltage and electrical currents while controlling the motors that produce machine movements.

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

3.1.1 Electrical parts

⚠ 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.
- Place a "Do Not Turn On" or equivalent hazard label on all power switches and lock them in the non-energized position.
- Wait 15 minutes to allow the residual energy of the DC bus capacitors to discharge.
- Measure the voltage on the DC bus with a properly rated voltage sensing device and verify that the voltage is less than 42.4 Vdc.
- Do not assume that the DC bus is voltage-free when the DC bus LED is off.
- Block the motor shaft to prevent rotation prior to performing any type of work on the drive system.
- Do not create a short-circuit across the DC bus terminals or the DC bus capacitors.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the unit.
- Use only the specified voltage when operating this equipment and any associated products.

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

⚠ DANGER

ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Operate electrical components only with a connected protective ground (earth) cable.
- After the installation, verify the secure connection of the protective ground (earth) cable to all electrical devices to ensure that connection complies with the connection diagram.
- Before enabling the device, safely cover the live components to prevent contact.
- Do not touch the electrical connection points of the components when the module is energized.
- Provide protection against indirect contact (EN 50178).
- Connect and disconnect cables and terminals only after you have verified that the power has been removed from the system.
- Insulate the unused conductors on both ends of the motor cable.

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

3.1.2 Assembly and handling

This product has a touch current greater than 3.5 mA. If the protective ground connection is interrupted, a hazardous touch current may flow if the housing is touched.

⚠ DANGER

INSUFFICIENT GROUNDING

- Use a protective ground conductor with at least 10 mm^2 (AWG 6) or two protective ground conductors with the same or larger cross section of the conductors supplying the power terminals.
- Verify compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of all equipment.

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

⚠ 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 appropriate protective clothing (for example, protective goggles, protective boots, protective gloves).

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

3.1.3 Hot surfaces

The metal surfaces of the product may exceed 85 °C (185 °F) 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.

3.1.4 Magnetic and electromagnetic fields

Conductors and motors can generate strong local electrical and magnetic fields. This can cause interference in sensitive devices.

⚠ WARNING

ELECTROMAGNETIC FIELDS

- Keep persons with electronic medical implants, such as pacemakers, away from the motor and the conductors.
- Do not place electromagnetically sensitive devices in the vicinity of the motor or of the conductors.

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

3.1.5 Hazardous movements

There can be different sources of hazardous movements:

- No, or incorrect, homing of the drive
- Wiring or cabling errors
- Errors in the application program
- Component errors
- Error in the measured value and signal transmitter

Provide for personal safety by primary equipment monitoring or measures. Do not rely only on the internal monitoring of the drive components. Adapt the monitoring or other arrangements and measures to the specific conditions of the installation in accordance with a risk and error 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 them.
- Do not make any modifications that can degrade, incapacitate, or in any way invalidate protection devices.
- Before accessing the drives or entering the zone of operation, bring the drives and the motors they control to a stop.
- 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 drive 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 electronics and their feed lines, and perform, if necessary, an EMC validation of the system.

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

Drive systems may perform unanticipated movements because of incorrect wiring, incorrect settings, incorrect data or other errors.

⚠ WARNING

UNINTENDED MOVEMENT OR MACHINE OPERATION

- Carefully install the wiring in accordance with the EMC requirements.
- Do not operate the product with unknown 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.

3.1.6 PELV circuits

All signal and control voltages must be designed as PELV (Protective Extra Low Voltage) circuits. In particular, this implies protective measures against direct and indirect contact with hazardous voltage by:

- Ensuring that the voltage with respect to PE remains below 30 Vdc.
- An implemented separation in the system/machine between the low and system voltages.

Connect GND / 0 V to PE (Protective Earth/ground) at least at one point in the control cabinet.

Separate high and low voltage wiring and respect the standard IEC 61800-5-1, Adjustable speed electrical power drive systems - safety requirements.

⚠ DANGER

ELECTRIC SHOCK BY 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.

3.2 Proper use

The Lexium 62 Power Supply and the Lexium 62 Connection Module 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. The Lexium 62 ILD and the Lexium 62 Distribution Box are intended for installation in a machine.

Provide for protective measures

Before installing the device, provide for 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.

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

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Ensure that a risk assessment 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.

If circumstances occur that affect the safety or cause changes to the operating behavior of the Lexium 62 component, then immediately shut down the Lexium 62 component and contact Schneider Electric.

Use original-equipment only

Use only the accessories and mounting parts specified in the documentation and no third-party devices or components that have not been expressly approved by Schneider Electric. With the exception of replaceable, internal fuses in some Lexium 62 components, there are no user-serviceable parts in the Lexium 62 component system. Do not attempt to modify the Lexium 62 component in any way. Refer to Schneider Electric for all repairs and replacements.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Only use software and hardware components approved by Schneider Electric for use with this equipment.
- Do not attempt to service this equipment outside of authorized Schneider Electric service centers.
- 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.

The components must not be used in the following environments:

Incompatible environments

- In hazardous (explosive) atmospheres
- In mobile, movable or floating systems
- In life support systems
- In domestic appliances
- underground

This equipment has been designed to operate outside of any hazardous location. Only install this equipment 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.

3.3 Qualification of Personnel

Target audience for this manual

Electrical 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.

Qualified person

A qualified person is one who has skills and knowledge related to the construction and operation of 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 parameterization, 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 drive system.

Designated safety functions

Qualified personnel that work with designated safety functions must be trained according to the complexity of the machines and the requirements of the EN ISO 13849-1:2008. The training has to include the production process and the relation between the designated safety function and the machine.

Qualification guidelines are available in the following publication: Safety, Competency and Commitment: Competency Guidelines for Safety-Related System Practitioners. IEEE Publications, ISBN 0 85296 787 X, 1999.

4 System overview

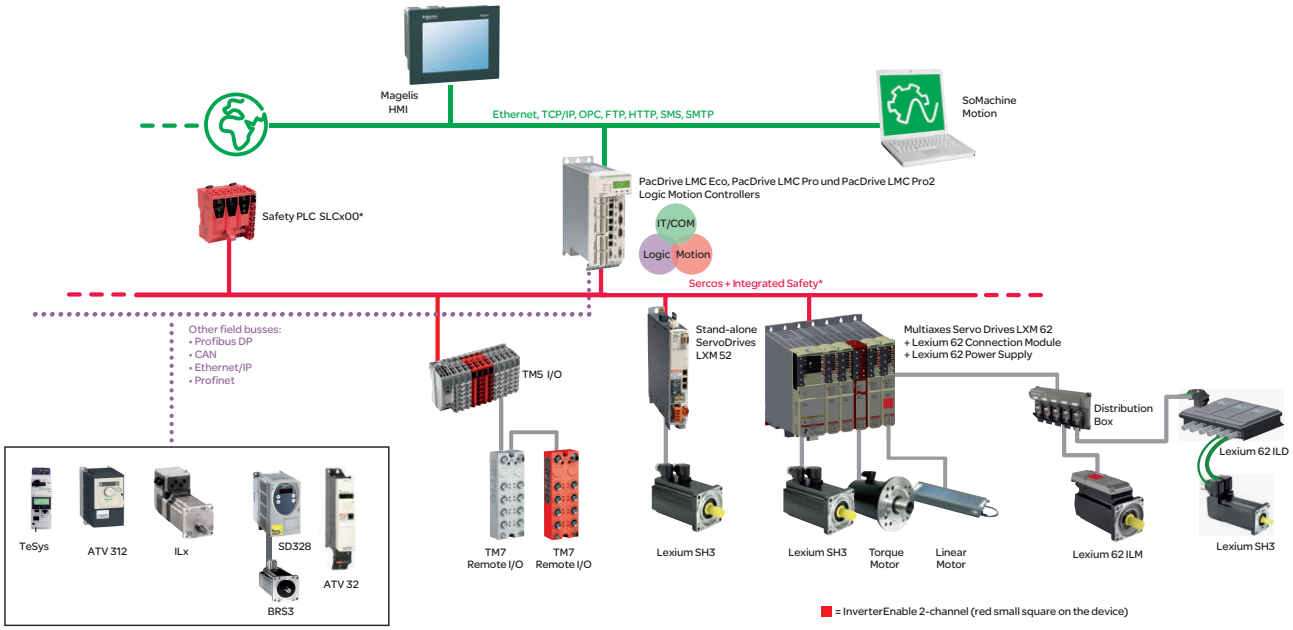


Figure 4-1: PacDrive 3 System overview

**Safety Logic Controller* according to IEC 61508:2010 and EN ISO 13849:2008

4.1 Logic Motion Controller

The LMC (Logic Motion Controller), with a VxWorks real-time operating system, centrally implements the Logic Controller and motion functions. An LMC synchronizes, coordinates and creates the motion functions of a machine for a maximum of:

- 0 Sercos servo drives for the controller PacDrive LMC100
- 4 Sercos servo drives for the controller PacDrive LMC101
- 6 Sercos servo drives for the controller PacDrive LMC106
- 8 Sercos servo drives for the controller PacDrive LMC201
- 12 Sercos servo drives for the controller PacDrive LMC212
- 16 Sercos servo drives for the controller PacDrive LMC216
- 8 Sercos servo drives for the controller PacDrive LMC300
- 16 Sercos servo drives for the controller PacDrive LMC400
- 16 Sercos servo drives for the controller PacDrive LMC402
- 99 Sercos servo drives for the controller PacDrive LMC600
- 130 Sercos servo drives for the controller PacDrive LMC802

4.2 Lexium 62 drive system

The Lexium 62 ILD is part of the Lexium 62 drive system and is designed for the operation of servo drives in a multi-axis system.

The power electronic components of the Lexium 62 ILD are fitted inside the control cabinet.

The central Lexium 62 Power Supply, using a common DC bus, supplies the connected Lexium 62 ILD drive servo converters with the power required.

The Lexium 62 Connection Module supplies the Lexium 62 ILD with DC voltage from the DC bus via a hybrid cable. Additionally, the Lexium 62 Connection Module provides the Inverter Enable and Sercos interface.

4.2.1 Lexium 62 Distribution Box

The Lexium 62 Distribution Box is the link between Lexium 62 Connection Module and Lexium 62 ILD. Depending on the number of drives, 1 to 4 Lexium 62 ILD can be connected. When operating more than 4 drives, expand the system by using more Lexium 62 distribution boxes.

The highlights

- 1...4 connections for Lexium 62 ILD or further Lexium 62 Distribution Boxes
- pre-assembled hybrid cables
- easy to expand

4.2.2 Lexium 62 ILD

The Lexium 62 ILD is a detached servo drive that can be integrated in the Lexium 62 ILM structure.

It is used for motors which do not provide integrated drive electronics.

In this case, the Lexium 62 ILD controls the connected motor.

The Lexium 62 ILD can be connected to the SH3 motors SH30551 up to maximum SH31402 (refer to the SH3 Servo motor, Motor Manual), but only in accordance with the specified rated current (see 8.3 Mechanical and electrical data) of the Lexium 62 ILD.
For usage of other motors (including special motors), contact your Schneider Electric representative.

The Lexium 62 ILD is connected to the Connection Module via a Distribution Box (see 4.2.1 Lexium 62 Distribution Box).

Up to four Lexium 62 ILD modules can be connected to a Lexium 62 Distribution Box.

Up to 45 axis can be connected to a Lexium 62 Connection Module.

Refer to Wiring of Lexium 62 ILD (see 7.1.3 Wiring from Lexium 62 Connection Module to Lexium 62 ILD).

There are four references of the Lexium 62 ILD module:

- Lexium 62 ILD Single Drive, 5 A continuous current per axis (ILM62DDD24A••••)
- Lexium 62 ILD Single Drive, 6 A continuous current per axis for cold plate with passive / active cooling (ILM62DDD24C••••)
- Lexium 62 ILD Triple Drive, 2.7A continuous current per axis (ILM62DDD24B••••)
- Lexium 62 ILD Triple Drive, 6 A continuous current per axis for cold plate with passive / active cooling (ILM62DDD24D••••)

Lexium 62 ILD Single Drive

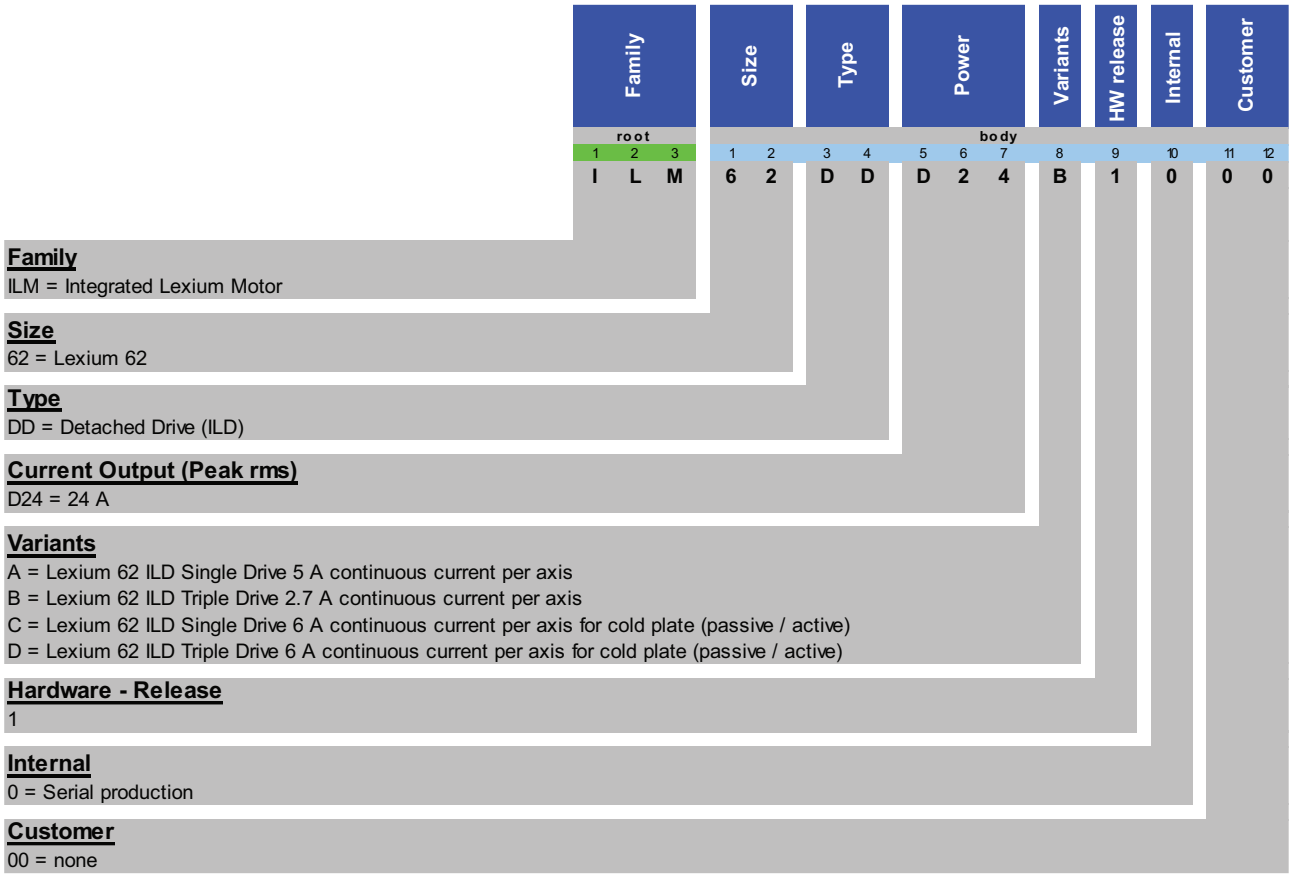
- Connected to a Lexium 62 Distribution Box by a hybrid cable.
- 1 drive electronics.
- 1 axis can be controlled.
- Connected to the motor by a motor cable and an encoder cable from 1 m up to 5 m.

Lexium 62 ILD Triple Drive

- Connected to a Lexium 62 Distribution Box by a hybrid cable.
- 3 drive electronics.
- 3 axes can be controlled.
- Connected to the motor by a motor cable and an encoder cable from 1 m up to 5 m.

4.3 Type code

4.3.1 Lexium 62 ILD



Family
ILM = Integrated Lexium Motor

Size
62 = Lexium 62

Type
DD = Detached Drive (ILD)

Current Output (Peak rms)
D24 = 24 A

Variants
A = Lexium 62 ILD Single Drive 5 A continuous current per axis
B = Lexium 62 ILD Triple Drive 2.7 A continuous current per axis
C = Lexium 62 ILD Single Drive 6 A continuous current per axis for cold plate (passive / active)
D = Lexium 62 ILD Triple Drive 6 A continuous current per axis for cold plate (passive / active)

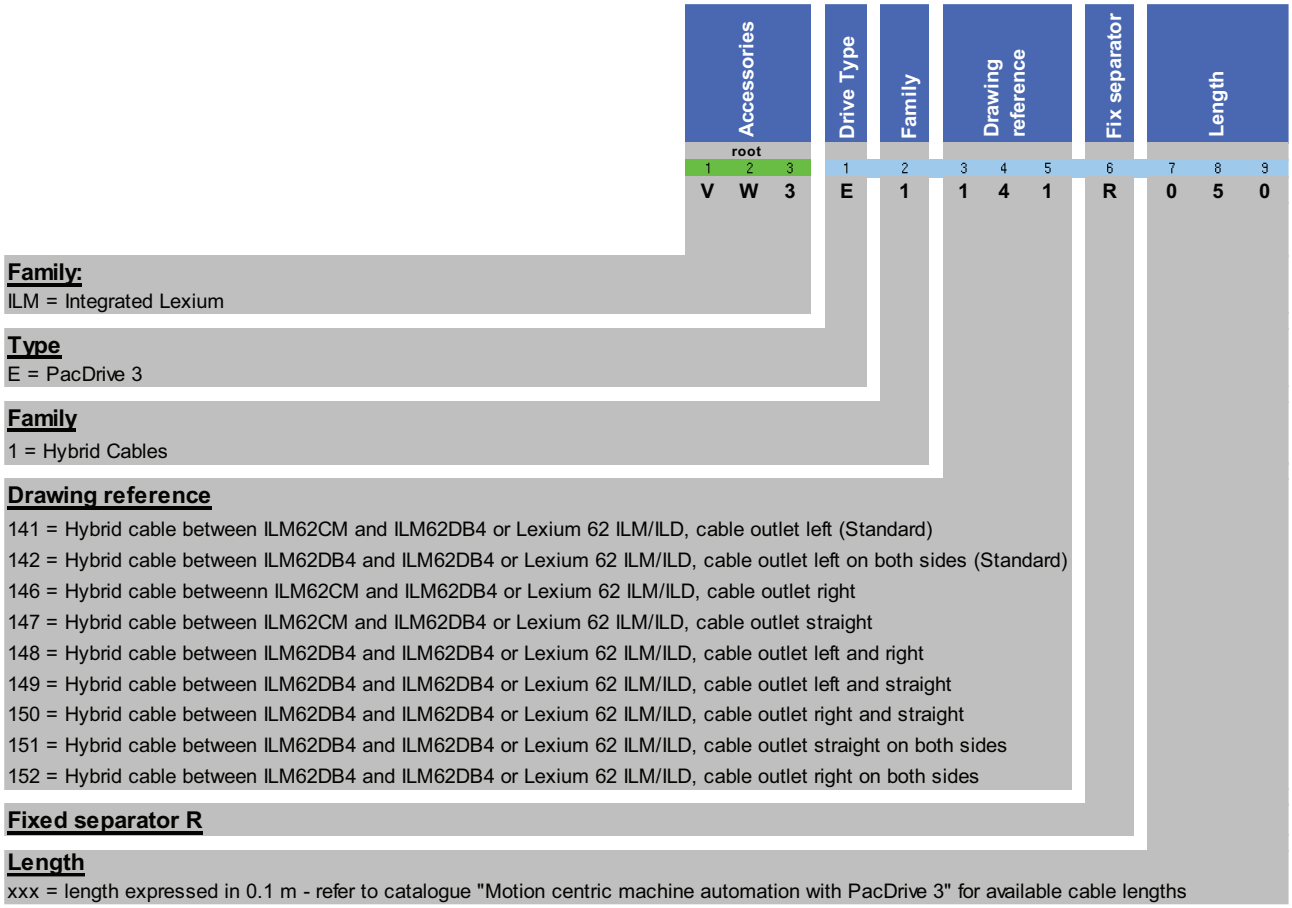
Hardware - Release
1

Internal
0 = Serial production

Customer
00 = none

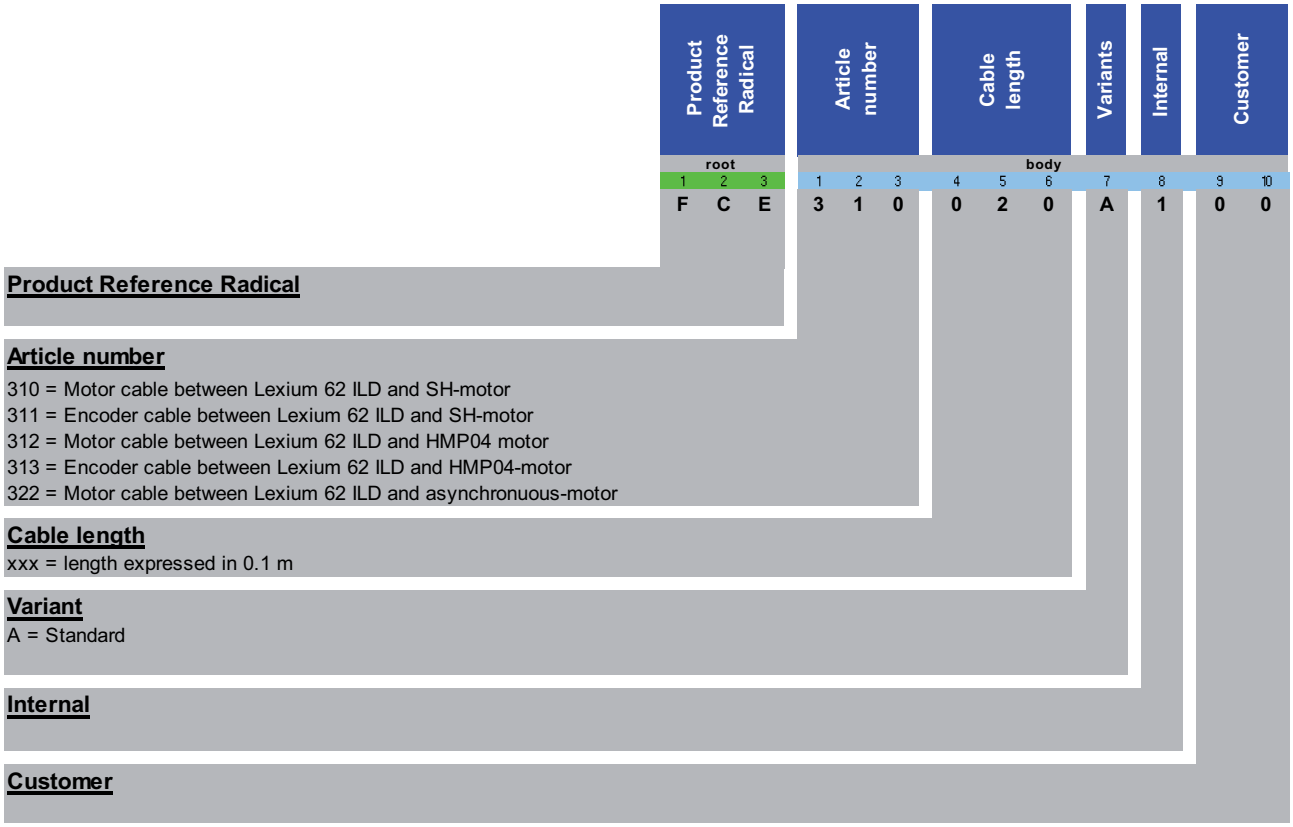
4.3.2 Lexium 62 ILD Accessories

This shows the hybrid cables for connection between Lexium 62 Connection Module and Lexium 62 Distribution Box and Lexium 62 ILM or Lexium 62 ILD.



For information on the availability of additional cable variants, contact your Schneider Electric representative.

This shows the motor and encoder cables for connection between Lexium 62 ILD and each motor.



Product Reference Radical

Article number

310 = Motor cable between Lexium 62 ILD and SH-motor
311 = Encoder cable between Lexium 62 ILD and SH-motor
312 = Motor cable between Lexium 62 ILD and HMP04 motor
313 = Encoder cable between Lexium 62 ILD and HMP04-motor
322 = Motor cable between Lexium 62 ILD and asynchronuous-motor

Cable length

xxx = length expressed in 0.1 m

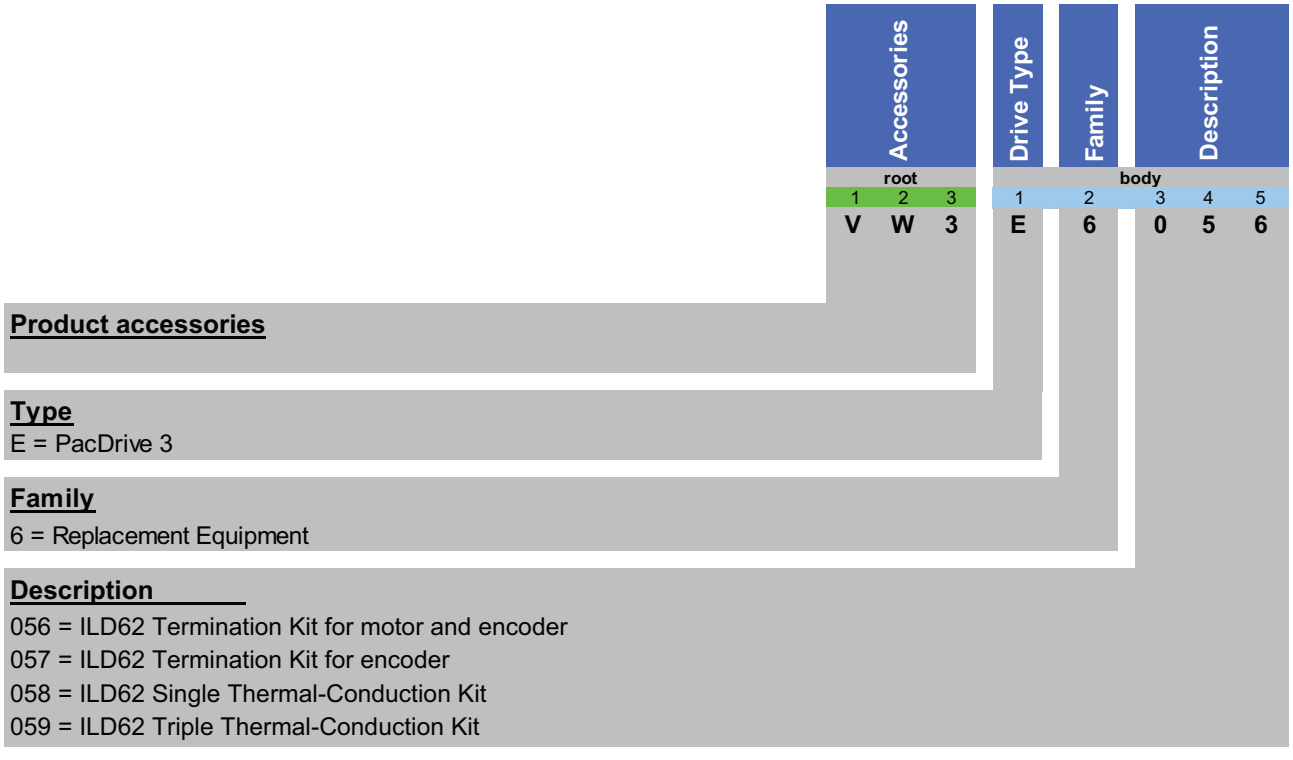
Variant

A = Standard

Internal

Customer

This shows the Termination Kits and the Thermal-Conduction Kit for the Lexium 62 ILD.



Product accessories

Type

E = PacDrive 3

Family

6 = Replacement Equipment

Description

056 = ILD62 Termination Kit for motor and encoder
057 = ILD62 Termination Kit for encoder
058 = ILD62 Single Thermal-Conduction Kit
059 = ILD62 Triple Thermal-Conduction Kit

4.4 Nameplate descriptions

Technical nameplate Lexium 62 ILD

Label	Meaning
ILM62DDxxxxxxx	Device type and Unicode
Input d.c.	Input voltage and -current (rated- and peak value per input)
Output 3~a.c.	Output current (rated- and peak value per output (= per axis))
IP65	Degree of protection
Symbols	This field displays the symbols of declarations and certifications

Table 4-1: Explanation of the technical nameplate Lexium 62 ILD

Logistical nameplate Lexium 62 ILD

Label	Meaning
ILM62DDxxxxxxx	Device type and Unicode
2528225836	Serial number
RS:01	Hardware revision status
DOM	Date of manufacture

Table 4-2: Explanation of the logistical nameplate Lexium 62 ILD

5 Indicators and control elements

5.1 Displays at the Lexium 62 ILD

The display at the Lexium 62 ILD consists of four multi-color LEDs that are used to display the status information.

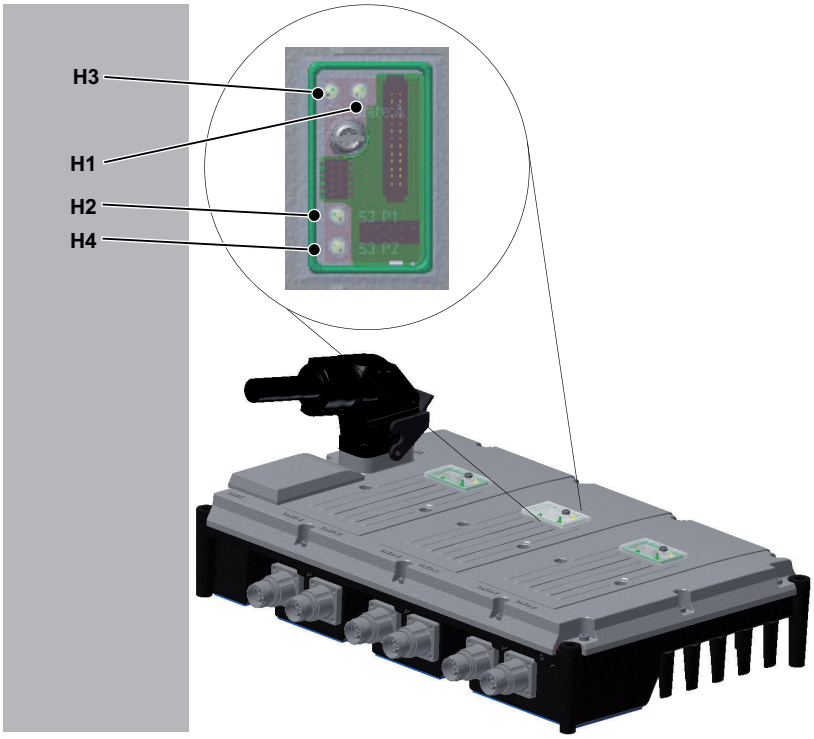


Figure 5-1: Diagnostic LEDs of the Lexium 62 ILD per axis

H1	State LED
H2	Port 1 LED
H3	S3 (Sercos III) LED
H4	Port 2 LED

5.1.1 State LED

Color	State	Meaning	Instructions/information for the user
	OFF	Device is not energized or is otherwise inoperable.	► If the 24V LED is off, replace the device.
	Flashing (2 Hz, 250 ms) (green)	Initialization of the device (firmware boot process, compatibility check of the hardware, updating the firmware)	► Waiting until initialization is complete.
	Flashing slowly (2 Hz, 40 ms) (green)	Identification of the device	► If necessary, identify the device via SoMachine Motion as defined by the controller configuration.
	ON (green)	Device has been initialized and waits for the configuration.	► Configure device as active. ► Configure device as inactive. ► Configure device for the execution of motions.
	ON (red)	A non-recoverable error has been detected requiring user intervention: • Watchdog • Firmware • Checksum • Internal error detected	► Power OFF/ON (Power Reset) ► If this condition persists, replace the device.
	Flashing slowly (2 Hz, 250 ms) (red)	A general error has been detected.	► The configuration shows the detected error ► Error detected in the Logic Builder menu **[Online]** – **[Reset diagnostic messages of controller]**. ► Otherwise restart device.

Table 5-1: State LED

5.1.2 Port LEDs

Color	State	Meaning
	OFF	no cable connected
(orange)	ON	Cable connected, no Sercos communication
(green)	ON	Cable connected, active Sercos communication

Table 5-2: Port LEDs

5.1.3 S3 (Sercos III) LED

Color	State	Meaning	Instructions/information for the user
	off	The device is not energized or is otherwise inoperable, or there is no communication due to an interrupted or separated connection.	Sercos boot-up or hot swap
(green)	On	Active Sercos connection without an error detected in the CP4.	-
(green)	Flashing (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 causes:** • Line topology or • Sercos loop break	**Workaround:** ► Close ring. **Reset condition:** ► Acknowledge error detected in the Logic Builder menu [Online] – [Reset diagnostic message of controller]. ► Switch from CP0 to CP1 alternatively. **Note:** If during phase CP1 a line topology or ring break was detected (device in loopback mode), the LED condition does not change.
(red)	On	Sercos diagnostic class 1 (DC1) an error has been detected on port 1 and/or 2. There is no Sercos communication possible anymore on the ports.	**Reset condition:** ► Acknowledge error detected in the Logic Builder menu [Online] – [Reset diagnostic message of controller].
(red)	Flashing (2 Hz, 250 ms)	Communication error at port 1 and/or port 2 has been detected. **possible causes:** • Improper functioning of the telegram • CRC error detected	**Reset condition:** ► The configuration shows the detected error ► Acknowledge error detected in the Logic Builder menu [Online] – [Reset diagnostic message of controller].
(orange)	On	The device is in a communications phase CP0 up to and including CP3 or HP0 up to and including HP2. Sercos telegrams are received.	-
(orange)	Flashing (4 Hz, 125 ms)	Device identification	-

Table 5-3: S3 (Sercos III) LED

6 Planning

6.1 Electromagnetic Compatibility, EMC

This product meets the EMC requirements in accordance with the standard IEC 61800-3:2004, provided that the EMC measures described in this manual are complied with during installation.

⚠ WARNING

ELECTROMAGNETIC DISTURBANCES OF SIGNALS AND DEVICES

Use proper EMC shielding techniques to help prevent unintended device operation in accordance with the standard IEC 61800-3:2004.

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.

The prerequisite for compliance with the specified limit values is an EMC compatible layout. Depending on the application, the following measures can improve the EMC-dependent values:

Shielded cables

EMC measures	Objective
Place cable shields on the surface, use cable clamps, and grounding strips.	Reduce emission.
Ground shields of digital signal cables on both sides across large surface areas or through conducting connector housings.	Reduce interference action on signal cables, reduce emissions.
Ground shield of analog signal cables directly on the device (signal input), insulate the shield at the other cable end or ground the same through a capacitor, such as 10 nF.	Reduce grounding loops by low frequency interferences.

Cable routing

EMC measures	Objective
Do not route fieldbus cables and signal cables together with cabling for direct and alternating voltages above 60 V in the same cable duct (fieldbus cables can be routed together with signal cables and analog cables in the same duct). Electromagnetic immunity will improve by routing cables in separated cable ducts with a distance of at least 20 cm (7.84 in).	Reduces mutual interference
Keep the cables as short as possible. Do not install any unnecessary cable loops, short cable routing from a central grounding point in the control cabinet to the external grounding connection.	Reduce capacitive and inductive interference couplings.

EMC measures	Objective
Insert a potential equalization for: • large surface installation • different voltage infeeds • networking across buildings	Reduce current on cable shield, reduce emissions.
Use fine wire potential equalization conductor.	Discharging of high frequency interference currents.
If motor and machine are not connected in a conducting fashion, e.g. due to an insulated flange or a connection not across a full surface, the motor must be grounded via a grounding cable > 10 mm^2 (AWG 6) or a grounding strip.	Reduce emissions, increase interference resistance.
Use twisted pair for 24 Vdc signals.	Reduce interference action on signal cables, reduce emissions.

Voltage supply

EMC measures	Objective
Operate product on mains with a grounded neutral.	Enable the effect of the integrated mains filter.
Protection circuit if there is a risk of overvoltage.	Reduce risk of damage due to overvoltages.

Motor and encoder cables

From an EMC perspective, motor supply cables and encoder cables are particularly important. Only use pre-configured cables, or cables with the prescribed properties, and comply with the following EMC measures.

EMC measures	Objective
Do not install switching elements in motor cables or encoder cables.	Reduces interference.
Route motor cable with a distance of at least 20 cm (7.84in.) to the signal cables or insert shield plates between the motor supply cable and the signal cable.	Reduces mutual interference
For cabling that approaches the maximum cable distance specification (75 m / 246 ft), use potential equalization cables.	Reduce current on cable shield.
Route motor supply cables and encoder cables without any separation point. [1)]	Reduces emission.
[1)] If a cable must be cut through for installation purposes, the cables must be connected at the point of separation by using screen connections and metal housing.	

Additional measures for improving the EMC

Depending on the respective application, the following measures may lead to an EMC compatible layout:

EMC measures	Objective
Upstream connection of mains line reactors (chokes)	Reduction of the harmonic network oscillations, extension of the service life of the product.
Upstream connection of external mains filters	Improvement of the EMC limit values.
Special EMC-appropriate layout, e.g. within an enclosed control cabinet complete with 15 dB attenuation of the interferences emitted	Improvement of the EMC limit values.

6.2 Information about wiring

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

For further information (see 6.2.1 Cable characteristics).

- Use a suitable torque indication or screwdriver for tightening connections (see 8.4 Electrical connections).

For information on the tightening torques and cable cross-sections (see 8.4 Electrical connections).

Observe the following points when wiring:

1. Observe the minimum cross-sections of the cables necessary for the load carrying capacity of the equipment being connected.
2. Verify the integrity of cable shields to ensure continuity to ground.
3. Ensure that there is a proper connection to ground for all interconnected equipment.
4. Ensure connection of the motors to the machine ground.
5. Eliminate any ground loops.
6. Do not disconnect cable connections terminals when under power.
7. Ensure that all ground connections have sufficient surface area continuity.
8. Connect the hybrid or power cable connections and the Sercos cable connections to the Lexium 62 Connection Module according to the connection diagram of the machine manufacturer.

For information on the different cable types (see 4.3 Type code).

9. Do not interchange the EMERGENCY STOP circuits. This has to be observed especially when different safety circuits (functions) are used for the different axes of the Lexium 62 ILD Triple Drive.

Example:

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 (see item 5.).

⚠ DANGER

INCORRECT OR UNAVAILABLE GROUNDING

At the installation points, remove paint across a large surface before installing the devices (bare metal connection).

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

6.2.1 Cable characteristics

For further information on the cable characteristics of the hybrid cable, see the Lexium 62 ILM Hardware Guide.

Property	Value
Voltage isolation	1000 V
Temperature range	-40 ... +80 °C / -40 ... +176 °F (fixed routing) -20 ... +60 °C / -4 ... +140 °F (mobile)
Cable diameter	11.0 mm ± 0.3 mm (0.43 in. ± 0.012 in.)
Minimum bending radius	10 x diameter (mobile, 10 million bending cycles with ≥ 12 x diameter)
Sheath	PUR, oil resistant, halogen-free, flame-retardant
Motor cable is suitable for use with drag chains.	

Table 6-1: Cable characteristics of the motor cable (Lexium 62 ILD)

Reference	Description
FCE310xxxA200	Motor cable to SH motor
FCE312xxxA200	Motor cable to HMP04 motor
FCE322xxxA200	Motor cable to asynchronous motor
xxx * 10 cm = cable length (for example: 010 * 10 cm = 100 cm = 1 m Available lengths: 1.0 m, 1.5 m, 2.0 m, 2.5 m ... 5.0 m	

Table 6-2: References of the motor cable (Lexium 62 ILD)

Property	Value
Voltage isolation	300 V
Temperature range	-40 ... +80 °C / -40 ... +176 °F
Cable diameter	6.8 mm ± 0.2 mm (0.27 in. ± 0.008 in.)
Minimum bending radius	5 x diameter (fixed routing) 10 x diameter (mobile , 10 million bending cycles)
Sheath	PUR, flame retardant
Encoder cable is suitable for use with drag chains.	

Table 6-3: Cable characteristics of the encoder cable (style 20233, Lexium 62 ILD)

Reference	Description
FCE311xxxA200	Encoder cable to SH motor
FCE313xxxA200	Encoder cable to HMP04 motor
xxx * 10 cm = cable length (for example: 010 * 10 cm = 100 cm = 1 m Available lengths: 1.0 m, 1.5 m, 2.0 m, 2.5 m ... 5.0 m	

Table 6-4: References of the encoder cable (Lexium 62 ILD)

Observe the following points when using hybrid, motor and encoder cables:

- Do not exceed the maximum number of bending cycles of the cable.
- Observe the installing instructions and the maintenance cycles of this manual.

6.2.2 ESD protection measures

- Observe the following instructions to help avoid damages due to electrostatic discharge:

NOTICE
ELECTROSTATIC DISCHARGE • Do not touch any of the electrical connections or components. • Prevent electrostatic charges, for example, by wearing appropriate clothing. • If you must touch circuit boards, do so only on the edges. • Move the circuit boards as little as possible. • Remove existing static charge by touching a grounded, metallic surface. **Failure to follow these instructions can result in equipment damage.**

6.2.3 Conditions for UL / CSA compliant use

General

If you use the Lexium 62 ILD in accordance with UL or CSA standards, you must additionally meet, aside from the installation requirements stated in the present document, the following conditions:

- Use devices only in combination with a Lexium 62 Power Supply and Lexium 62 Connection Module on a solidly grounded wye source only (480Y/277 V).
- To protect the Lexium 62 Power Supply, use a class J fuse according to UL 248 with a maximum fuse rating of 60 A / 600 Vac.
- Lexium 62 ILD incorporates internal motor overload protection with a tripping current of 110 % of the rated motor current in accordance with UL/CSA applicable standards.
- For use in NFPA 79 applications only.

Only connect the Lexium 62 ILD to a mains supply with a maximum short circuit current (SCCR) of 50 kA or worst case SCCR of connected Lexium 62 Drive System. Alternatively, take appropriate measures according to UL 508A SB4 in the supply (feeder) circuit of the control cabinet to limit the short circuit current to a value at or below 50 kA or the worst case of the Lexium 62 Drive System.

ILM62DDD24C•••• and ILM62DDD24D•••• are UL recognized components and conditions must be met. For more information, consult the product characteristic contained in the present document. If you have any questions, consult www.schneider-electric.com or your local Schneider Electric representative.

NOTE: According to UL/CSA, the output current is limited to 5 A. Therefore you must select motors that respect this limitation.

For further information about conformal use of the Lexium 62 Drive System, see Lexium 62 Hardware Guide and Lexium 62 ILM Hardware Guide.

Notes on Wiring

For wiring of the Lexium 62 ILD only use hybrid / power cables for Lexium 62 ILM family approved by Schneider Electric. These cables are tested according to the requirements for polymeric enclosures and covered by the certification of Lexium 62 ILM family.

- Use only motor cables approved by Schneider Electric and comply with the requirements of NFPA 79.

NOTE: Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes.

6.2.4 Fusing the mains connection

For further information on the fusing of the mains connection, see the Lexium 62 Hardware Guide.

NOTE: The opening of the branch-circuit protective device (fuses in the case of UL conformance, or any circuit breaker) may be an indication that an abnormal condition has been interrupted. To reduce the risk of fire or electric shock, current-carrying parts and other components of the controller should be examined and replaced if damaged. If burnout of the current element of an overload relay occurs, the complete overload relay must be replaced.

⚠ DANGER

ELECTRIC SHOCK, FIRE OR ARC FLASH

- Immediately replace any electric components that appear to be damaged or otherwise compromised.
- Immediately replace overload relays that have had their current element destroyed.

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

6.2.5 Mains contactor

For further information on the use of a mains contactor, see the Lexium 62 Hardware Guide.

6.2.6 Mains filter

For further information on the use of a mains contactor, see the Lexium 62 ILM Hardware Guide.

6.2.7 Mains line reactor (choke)

For further information on the use of mains line reactor (choke), see the Lexium 62 Hardware Guide.

6.2.8 Touch current

If the touch current is too high for the respective application, use an isolating transformer on the mains supply.

For specifications on the touch current of the Lexium 62 Power Supply, see the Lexium 62 Hardware Guide.

6.2.9 Residual current operated protective device

This product has a touch current greater than 3.5 mA. If the protective ground connection is interrupted, a hazardous touch current may flow if the housing is touched.

⚠ DANGER

INSUFFICIENT GROUNDING

- Use a protective ground conductor with at least 10 mm^2 (AWG 6) or two protective ground conductors with the same or larger cross section of the conductors supplying the power terminals.
- Verify compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of all equipment.

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

For further information on residual current protective devices, see the Lexium 62 Hardware Guide.

6.3 Functional safety

6.3.1 Process minimizing risks associated with the machine

The goal of designing machines safely is to protect people. The risk associated with machines with electrically controlled drives comes chiefly from moving machine parts and 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 EN ISO 12100 or EN 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 safety interlocks where personnel and/or equipment hazards exist.
- 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 EN ISO 13849-1 Safety of machinery - Safety-related parts of control systems - Part 1: General principles 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 EN 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 EN 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:

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.schneider-electric.com.

6.3.2 Designated safety function

Functional Description

With the Inverter Enable function (IE), you can bring drives to a defined safe stop. This Inverter Enable function relates to the components

- Lexium 62 Connection Module
- Lexium 62 Distribution Box
- Lexium 62 ILD

In the sense of the relevant standards, the requirements of the stop category 0 (Safe Torque Off, STO) and stop category 1 (Safe Stop 1, SS1) can be met. Both categories lead to a torque-free motor while SS1 takes this state after a predefined time. As a result of the hazard and risk analysis, it may be necessary to choose an additional brake as a safety-related option (e.g., for hanging loads).

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Make certain that no hazards can arise for persons or material during the coast down period of the axis/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 safety interlocks where personnel and/or equipment hazards exist.

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

Designated safety function Safe Torque Off (STO)

The Inverter Enable function relates to Lexium 62 Connection Module, Lexium 62 Distribution Box and Lexium 62 ILD, hereinafter referred to as "Lexium 62 drive system".

The function is selected via a signal(pair) at the input of the Lexium 62 Connection Module (2), which is forwarded to all drives (7) of the Lexium 62 Connection Module network. The supply voltage (AC) needs not be interrupted (see figure below).

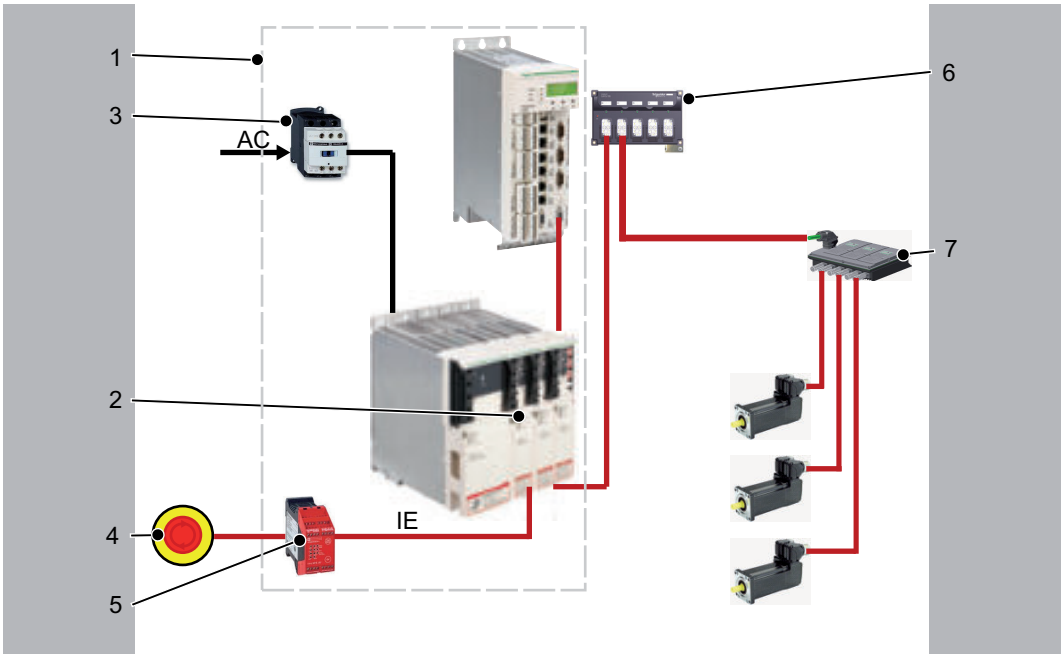


Figure 6-1: Lexium 62 drive system with emergency stop

1	control cabinet
2	Lexium 62 Connection Module
3	Contactor
4	Emergency stop switch
5	Safety switching device (e.g. Preventa XPS AV)
6	Lexium 62 Distribution Box
7	Lexium 62 ILD

Operating principle The Inverter Enable function switches off the motor torque. It is sufficient to set a logical zero at the function input. There is no need to interrupt the power supply. Standstill, however, is not monitored.

Defined Safe state Inverter Enable is synonymous with "Safe Torque Off (STO)" according to IEC/EN 61800-5-2. This torque-free state is automatically entered when errors are detected and is therefore the defined safe state of the drive.

Mode of operation The Lexium 62 connection modules have an Inverter Enable input that is used to signal all the Lexium 62 ILDs. By setting this input to logical one, all connected Lexium 62 ILDs are enabled. If this input is set to a logical zero, the Lexium 62 ILM connection module signals all connected Lexium 62 ILDs to interrupt the power stage to their respective motors. This Inverter Enable input has a redundant design (DC voltage from which the Lexium 62 Connection Module generates AC voltage which is fed to the hybrid cable or power cable (in case of daisy chain wiring)). The interruption of one of the two channels also results in a deactivation of the power stage. When the power supply is interrupted, the power stage becomes de-energized, and a diagnostic mes-

sage is generated and made available to the LMC. The motor can no longer generate torque.

You can use the Inverter Enable function to implement the control function "Stopping in case of emergency" (IEC/EN 60204-1) for stop categories 0 and 1. Use an appropriate external safety circuit to prevent the unintended restart of the drive after removal of the power stage, as required in the machine directive.

Stop category 0

In stop category 0 (Safe Torque Off), the drive coasts to a stop (provided there are no external forces operating to the contrary). The STO safety-related function is intended to help prevent an unintended start-up, not stop a motor, 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, torque, friction, etc.), and additional measures such as mechanical brakes may be necessary to help prevent any hazard from materializing. 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)

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Make certain that no hazards can arise for persons or material during the coast down period of the axis/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 safety interlocks where personnel and/or equipment hazards exist.

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

Stop category 1

For stops of category 1 (Safe Stop 1, SS1) you can request a controlled stop via the PacDrive 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 "Inverter Enable" input. This has to be implemented by means of an external safety-related switching device with safety-related delay (see application proposal).

Independent of the safety function, the detectable errors not affecting the safety function are recognized by the controller, thus avoiding the drive from starting by switching off the mains contactor. Contactor K2 prevents the mains contactor from being switched on.

Execute muting

To execute muting proceed as follows:

► To execute muting, determine the muting reaction time for switching off, that is, without the Inverter Enable function, within the application.

Should a response time be required because of the risk assessment of the machine, the total response time of the machine has to be taken into account. That is to say, the components related to the safety functions from the sensor to the drive shaft or the driven mechanics have to be considered. The determined reaction time must correspond to the results of the hazard and risk analysis.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Verify that the maximum response time corresponds to your risk analysis.
- Be sure that your risk analysis includes an evaluation for the maximum response time.
- Validate the overall function with regard to the maximum response time and thoroughly test the application.

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

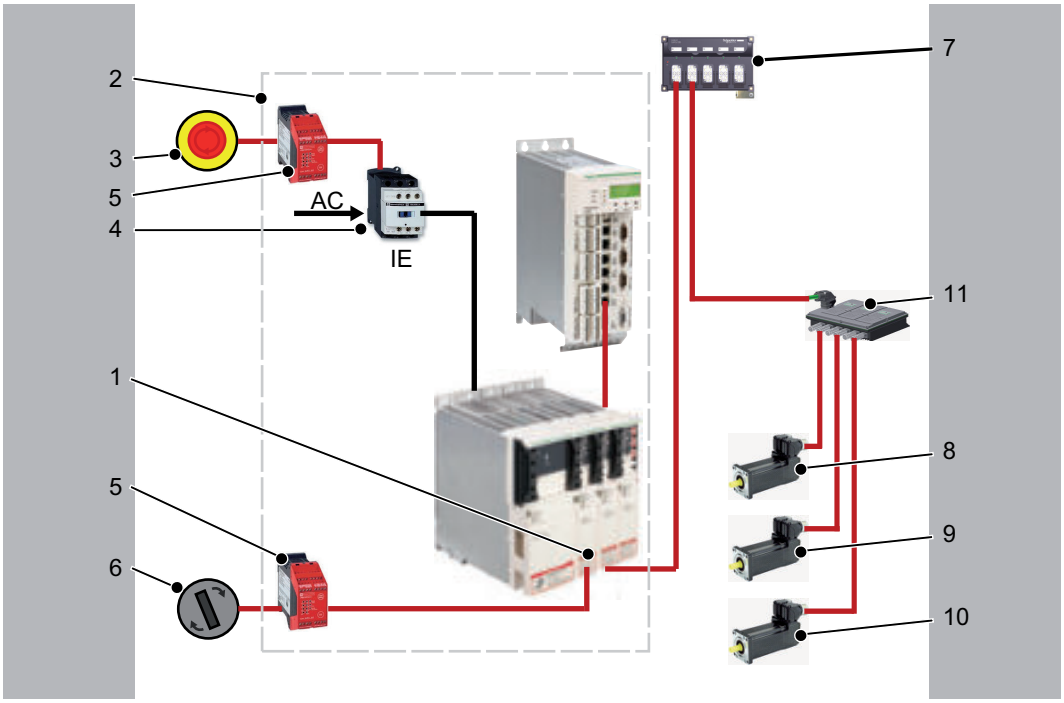
Proceed as follows to deactivate the Inverter Enable function:

- ▶ You can deactivate the Inverter Enable function by using the optional module DIS1. (see 6.3.3.1 Perform muting with the optional module DIS1)
  - ✓ The defined safe state can only be achieved if the power is removed from the power supply (see 6.3.3 Setup, installation and maintenance).
- ▶ In order to use the DIS1 optional module, you must define the configuration with the parameter `InverterEnableConfig` of the Lexium 62 ILD in the motion controller configuration.

If the software configuration does not match the physical configuration of the Lexium 62 ILD, then the diagnostic message 8978 "InverterEnableConfig invalid" with "Ext. diagnostic = x(HW)!=y(Cfg)" is presented. The drive is disabled as long as the configuration is incorrect. The error can only be acknowledged if the set `InverterEnableConfig` corresponds to the physical configuration. The deactivation of the Inverter Enable function can be used to divide the drives on a Lexium 62 Connection Module in two groups if it is technically not possible to use two Lexium 62 Connection Module for the two groups in the existing machine.

The axes without Inverter Enable function become torque-free via the mains contactor and come to a stop.

If only some of the motors (8-10) connected to a Lexium 62 ILD Triple Drive (11) are to be put in the defined safe state, this can be achieved by software parametrisation. Note, that the Lexium 62 ILD Triple Drive will appear as three single Lexium 62 ILM in the software parameterization, where the respective configuration parameters have to be set appropriately (see above). Each of these 3 Lexium 62 ILM has the serial number of the Lexium 62 ILD Triple Drive, but extended with additional "-C", "-D" and "-E" to indicate the 3 axes of the Lexium 62 ILD Triple Drive. This can be of interest, for example, for maintenance procedures (6). If an optional module DIS1 (9) is set, then the Inverter Enable signal will be ignored. To implement the emergency stop, the supply voltage on the Lexium 62 Power Supply must be interrupted; see illustration below.



1	Lexium 62 Connection Module
2	control cabinet
3	Emergency stop switch
4	Contactor
5	Safety switching device (e.g. Preventa XPS AV)
6	Switch: Operating mode (normal/maintenance)
7	Lexium 62 Distribution Box
8	Motor connected to Lexium 62 ILD Triple Drive with DIS1
9	Motor connected to Lexium 62 ILD Triple Drive without DIS1
10	Motor connected to Lexium 62 ILD Triple Drive without DIS1
11	Lexium 62 ILD Triple Drive with DIS1 on motor (8) and without DIS1 on motors (9) and (10)

Table 6-5: Implementation of "Emergency stop" combining hard-wired control of supply power with the Inverter Enable function.

ILD	Maintenance	Emergency stop	Parameter InverterEnableConfig
Lexium 62 ILD with DIS1 (8)	-	Torque-free motor	Off/0
Lexium 62 ILD without DIS1 (9) and (10)	Torque-free motor	Torque-free motor	Standard/1

Validity of the safety case

The safety case for the designated safety function of the Lexium 62 ILD is identified and defined by the standards listed in chapter "Safety standards" (see 6.3.9 Safety standards). The safety case for the designated safety function of the Lexium 62 drive system applies to the following hardware codes, which can be found examining the appropriate software object in SoMachine Motion (see SoMachine Motion, Programming Guide):

Unicode	Hardware code:
Lexium 62 ILD Single Drive (ILM62DDD24A••••, ILM62DDD24C••••)	xxxxxxxxx1xx
Lexium 62 ILD Triple Drive (ILM62DDD24B••••, ILM62DDD24D••••)	xxxxxxxxx1xx

For questions on this, contact your Schneider Electric representative.

Interface and control

The Inverter Enable function is operated via the switching thresholds of the Inverter Enable-input of the Lexium 62 connection module.

Technical data and information on the electrical connections of the Lexium 62 connection module can be found in the Lexium 62 ILM Hardware Guide.

6.3.3 Setup, installation and maintenance

Prevent possible unintended operation and avoid overvoltage

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

⚠ DANGER

ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Install Lexium 62 Connection Module in a control cabinet or housing with a minimum IP54 rating.
- Comply with the clearances and creepage distances according to EN 50178.
- Lexium 62 drive system must only be operated with 24 Vdc power supplies certified according to IEC/EN 60950 or EN 50178.

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

These power supply units do not deliver an overvoltage over 120 Vdc for more than 120ms or no permanent overvoltage over 60 Vdc.

- ► Only operate the drive system 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

UNINTENTIONAL RESTART OF THE MOTOR

- Ensure that a restart of the motor 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 (see 6.3.4 Application proposals for hardware-based safety functions).

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

To avoid that the system is in a continuous defined safe state, proceed as follows:

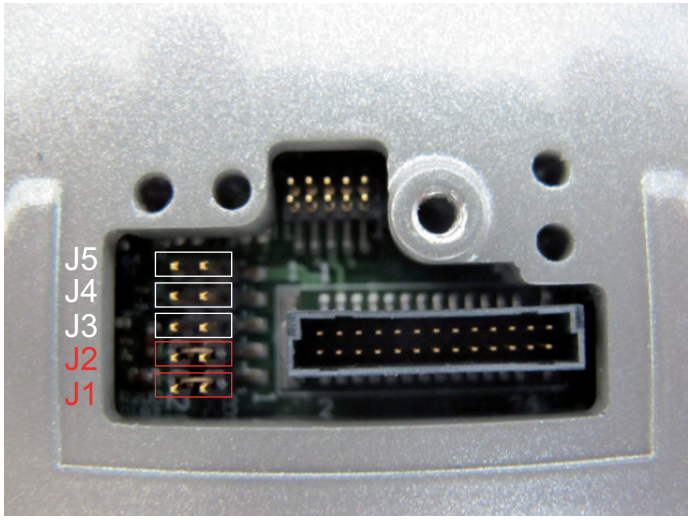
- ► Observe the specified maximum configuration (number of devices, network structure and cable length), or else a voltage drop of the Inverter Enable signal will occur over the cable length and therefore the system will be in the defined safe state continuously.
- ► Connect per Lexium 62 Connection Module a maximum of 45 axes (3 axes per Lexium 62 ILD Triple Drive).

For further information on the dimensions of the maximum system extension for wiring in line structure or tree structure, see the Lexium 62 ILM Hardware Guide.

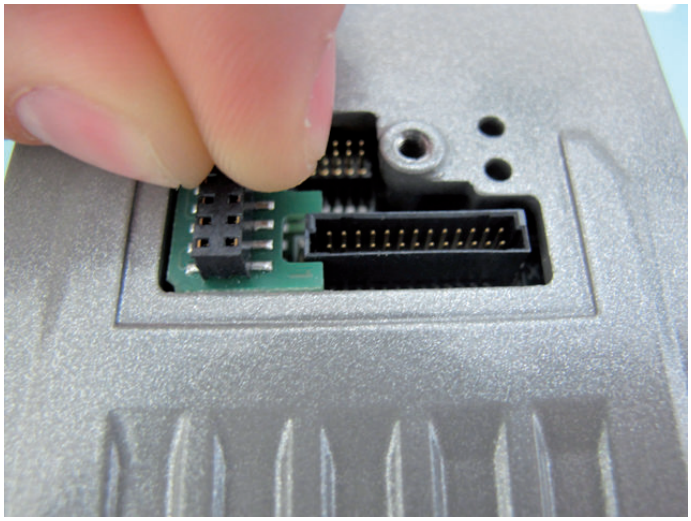
Perform muting with the optional module DIS1

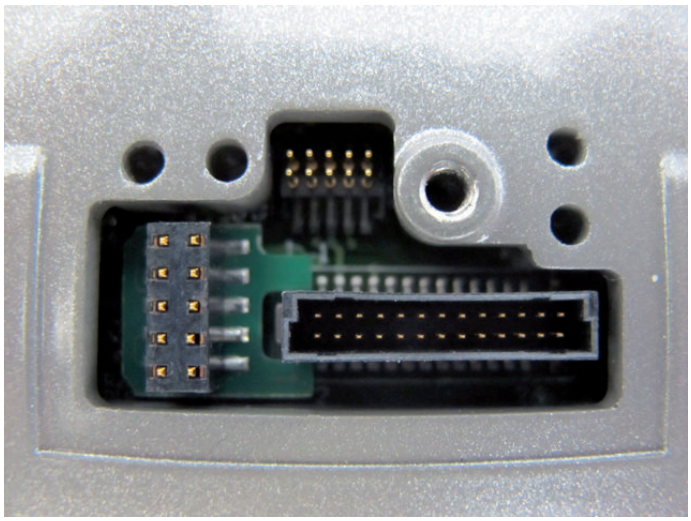
How to install the optional module DIS1:

- Remove power to the Lexium 62 power supply during the installation of the DIS1 module.
- Remove the transparent cover plate on the motor.
- Remove plugged in jumpers J1 and J2 (see figure).



- Connect the optional module DIS1 by inserting it into the contact pins, as shown in the following figure.

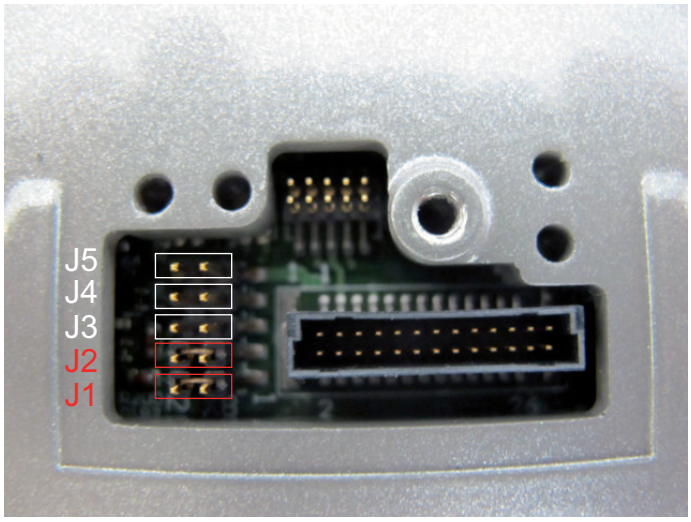




- Replace the transparent cover plate on the motor and secure it.

How to disassemble the optional module DIS1:

- Remove power to the Lexium 62 power supply during the installation of the DIS1 module.
- Remove the transparent cover plate on the motor.
- Remove the optional module DIS1.
- Re-connect the jumpers J1 and J2 (see figure).



- Replace the transparent cover plate on the motor and secure it.

6.3.4 Application proposals for hardware-based safety functions

To implement the safe stop of category 1 (SS1):

- Refer to the schematic EL-1122-05-xx: Inverter Enable circuit Lexium 62 Connection Module/ Lexium 62 ILD using the PacDrive LMC Pro / PacDrive LMC Pro2 with safety switch device for an emergency stop circuit

Notes on application proposals

General

- All application proposals provide for a protected Inverter Enable-wiring (control cabinet IP54) from the safety-related switch device to the Lexium 62 Connection Module, as wiring issues need to be ruled out.
- Protection against automatic restart must be provided by the external safety-related switch device.

Notes on EL-1122-05-xx

The mains contactor in this circuit suggestion is not necessary for functional safety purposes. It is, however, used in the application proposal for the device protection of the Lexium 62 Power Supply or the components connected to it.

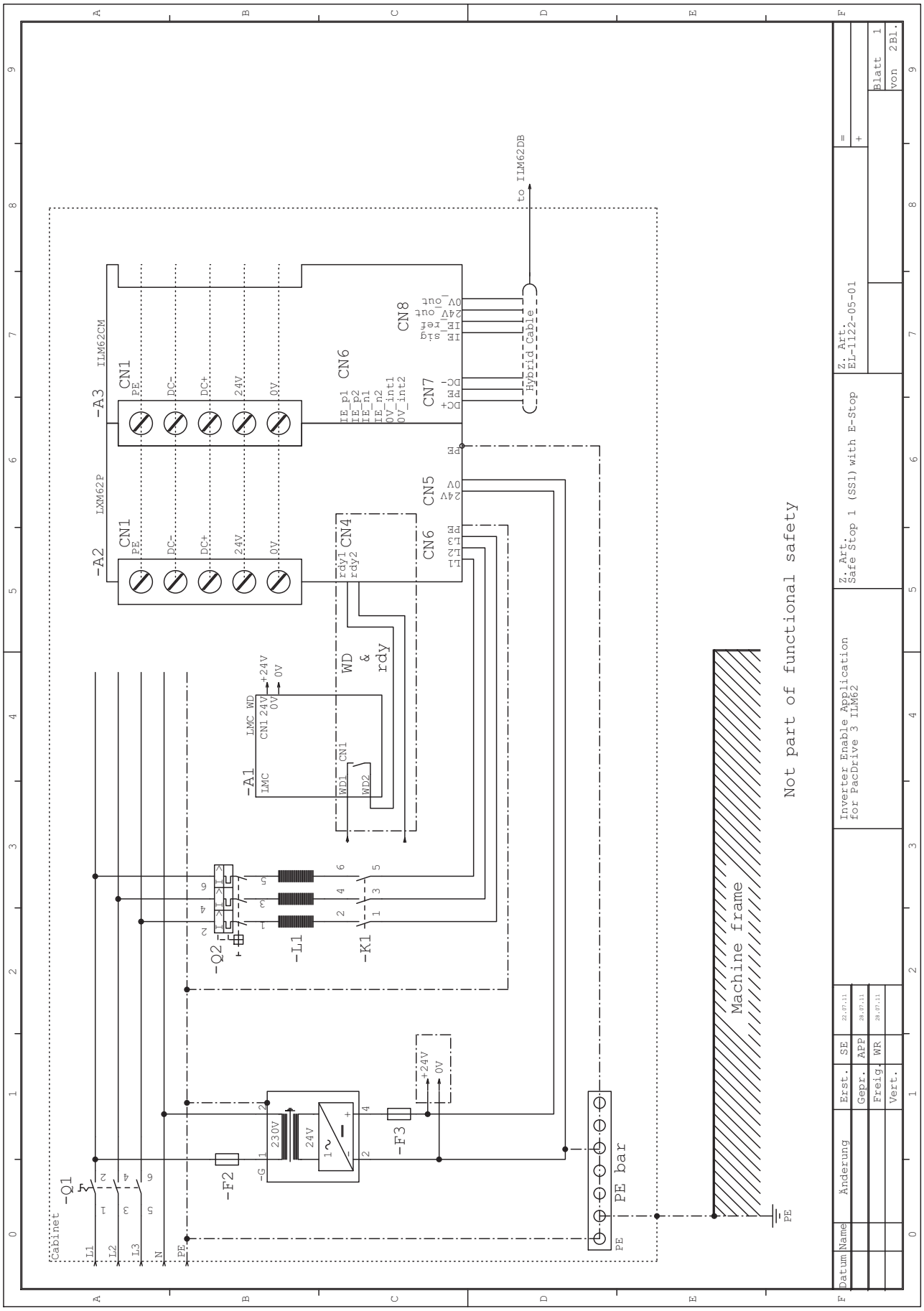


Figure 6-2: EL-1122-05-xx Sheet 1

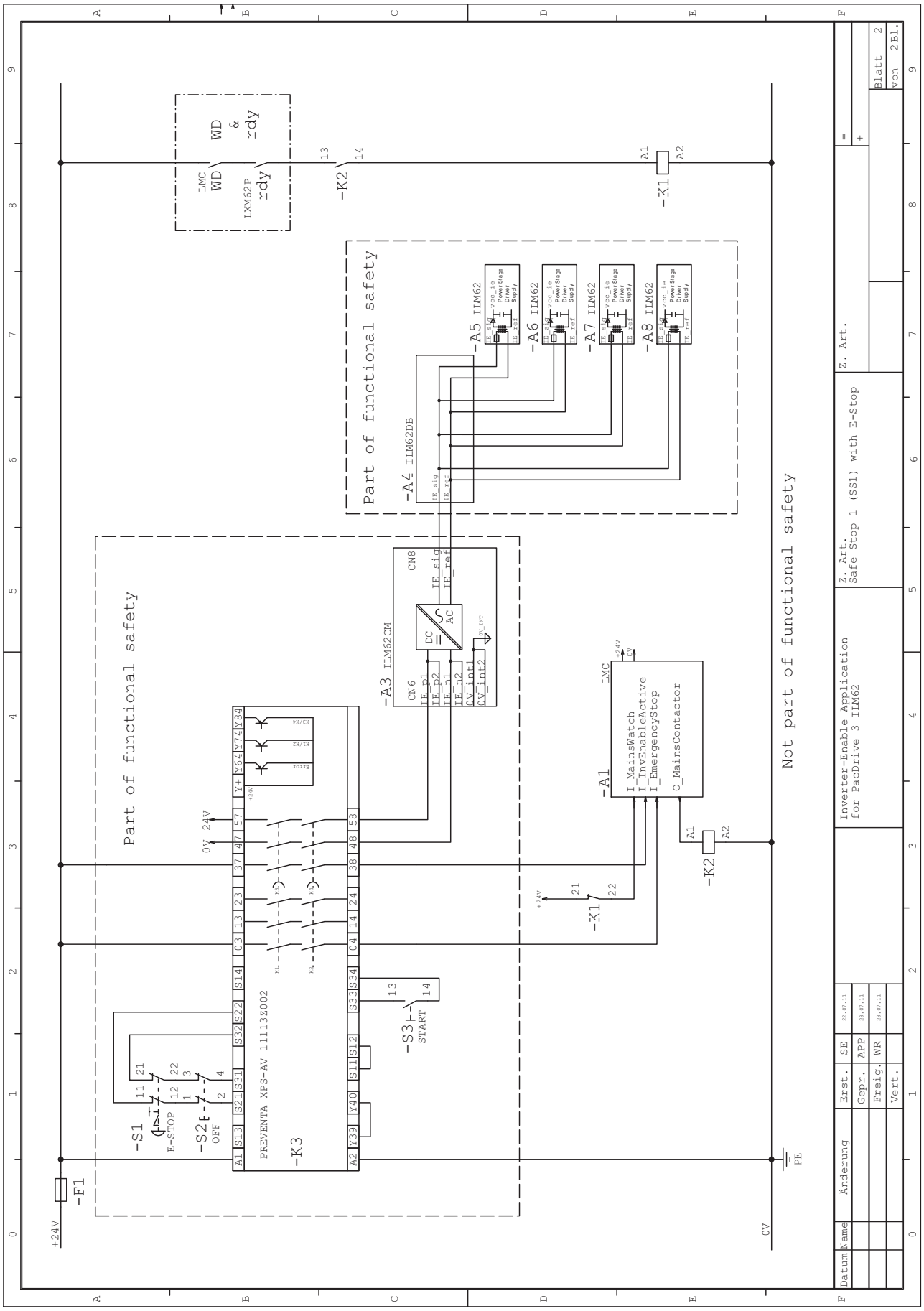


Figure 6-3: EL-1122-05-xx Sheet 2

6.3.5 Commissioning

- Carry out a functional test of the STO function for all drives that need the safety function.
- Especially verify the correct application of the axes without Inverter Enable function.
- Complete installation in accordance with the EMC regulations and further specifications in the device operating manuals.
- Afterwards commission the drive systems.

6.3.6 Best Practices

At machine start-up, the connected drives 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

- Verify all terminals, connectors and other connections on all system components for correct and firm fit.
- Only use robust connectors and secure fixings.
- Verify the protective ground (earth) 24Vdc PELV supply.
- Verify the wiring of the safety function to the axes to avoid an interchange of the IE_sig and IE_ref inputs as well as the 24V supply.
- Use coded connectors (see 6.2 Information about wiring) and perform a commissioning test (see 7.1 Commissioning).

⚠ DANGER

ELECTRIC SHOCK BY 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.

- Use only suitable transport packaging to forward or return individual devices.

External forces

The defined safe state of the motor is the torque-free output shaft. If external forces act upon the output shaft, it will not necessarily maintain its position. In any case, the motor will coast to an unassisted stop. This coast down time depends on physical properties of the components used (such as weight, torque, friction, etc.), and additional measures such as mechanical brakes may be necessary to help prevent any hazard from materializing. If the torque-free defined safe state is inappropriate for your application where external forces may move the output shaft 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 axis/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 safety interlocks where personnel and/or equipment hazards exist.

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

Hanging and pulling loads

- If the suspension of hanging / pulling loads is a safety objective for the machine, then you can only achieve this objective by using an appropriate external brake as a safety-related measure.

⚠ WARNING

UNINTENDED AXIS MOVEMENT

- Do not use the internal holding brake as a safety-related measure.
- Only use certified external brakes as safety-related measures.

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

The device does not provide its own safety-related output to connect an external safety brake to use as a safety-related measure.

6.3.7 Maintenance

The safety function has been designed for a defined lifetime that does not require specific maintenance or verification. After this lifetime a statement about the safety 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.

Subject the product to a complete function test after replacement.

See the "Installation and Maintenance" of this operating instruction chapter for information about initial start-up and maintenance.

6.3.8 Physical environment

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

- toxic,
- explosive,
- corrosive,
- highly reactive, or
- inflammable types.

This equipment has been designed to operate outside of any hazardous location. Only install this equipment 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 the ambient, storage and transport temperatures of the individual components indicated in the operating manuals of the components.
- Prevent the formation of moisture during the operation, storage and transport of individual components.
- Conform to the vibration and shock requirements specified in the operating manuals for the components when operating, storing and transporting system components.

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

The Lexium 62 ILD is intended for installation in a machine.

6.3.9 Safety standards

The designated safety functions have been designed and tested for functional safety according to the following standards:

- IEC 61800-5-2:2016
- ISO 13849-1:2015
- ISO 13849-2:2012
- IEC 62061:2005 + A1:2012 + A2:2015

An independent assessment was performed by TÜV NORD.

According to the above listed standards, the figures for the devices for using the Inverter Enable function are as follows:

Standard characteristics	Lexium 62 ILD[1)]
SFF (IEC 61508) Safe Failure Fraction	99.9%
HFT (IEC 61508) Hardware Fault Tolerance	1
Type (IEC 61508)	A
SIL (IEC 61508) Safety Integrity Level SILCL (IEC 62061) Safety Integrity Level claim limit	3
PFH (IEC 61508) Probability of Dangerous Failures per Hour	$0.08*10^{-9}$/h
PL (cat) (EN ISO 13849-1) Performance Level (Category)	e (4)
MTTFd (EN ISO 13849-1) Mean Time to Dangerous Failure	14487 years
DC (EN ISO 13849-1) Diagnostic Coverage	99%
Lifetime	20 years
Maximum reaction time between the request and execution of the designated safety function	5 ms
Maximum reaction time before the detection of safety-related errors	5 ms
Note: The values specified are rounded individually and are therefore not a result of a conversion by e.g. PFH in MTTFd or the comparative tables from EN ISO 13849-1:2008. [1)] The values in this column are valid per 1 safety function realized by a Lexium 62 ILD. A Lexium 62 ILD Single Drive can realize 1 safety function. A Lexium 62 ILD Triple Drive can realize up to 3 safety functions.	

Table 6-6: Standard characteristics

6.4 Special Conditions

6.4.1 Low air pressure

If the installation altitude exceeds the specified rated installation altitude, the performance of the entire system is reduced.

Lexium 62 Power Supply

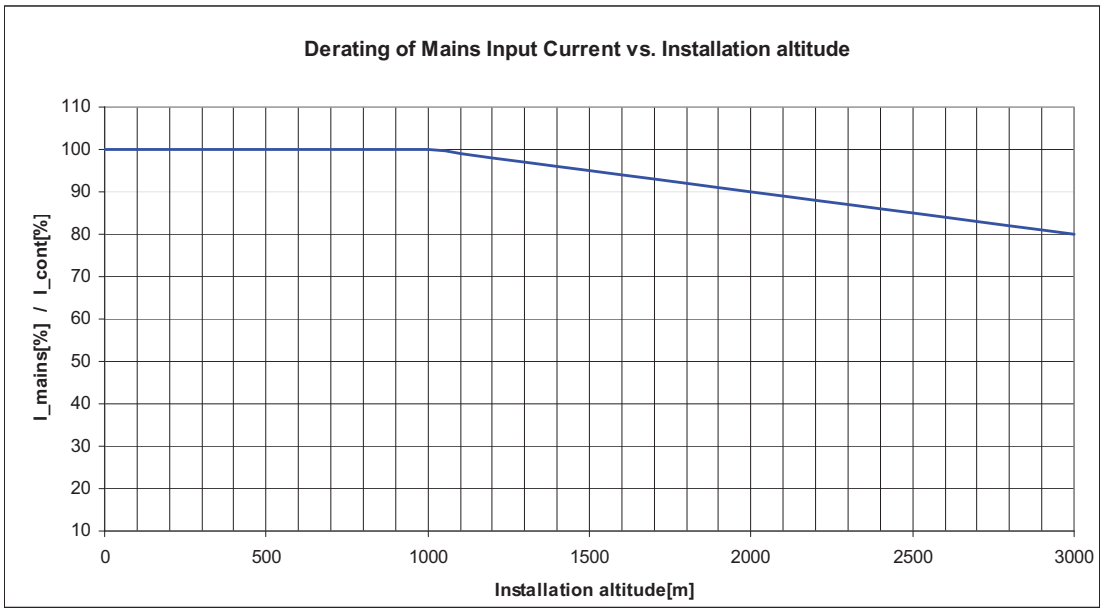


Figure 6-4: Power reduction at increased installation altitude (Lexium 62 power supply)

Lexium 62 Connection Module

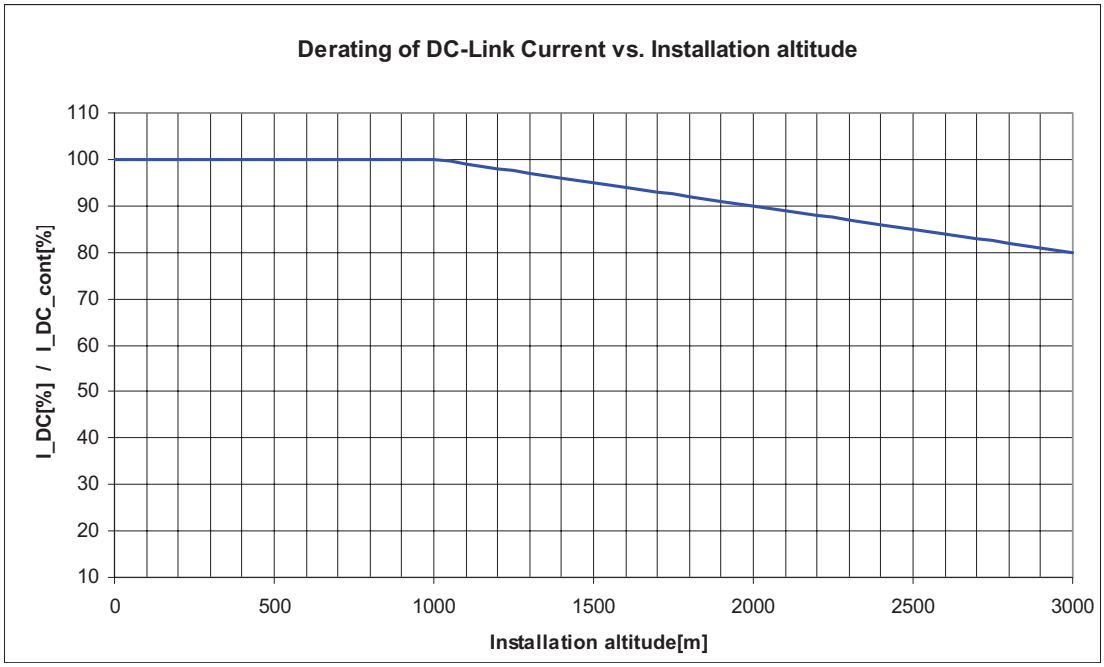


Figure 6-5: Power reduction at increased installation altitude (Lexium 62 connection module)

Lexium 62 ILD

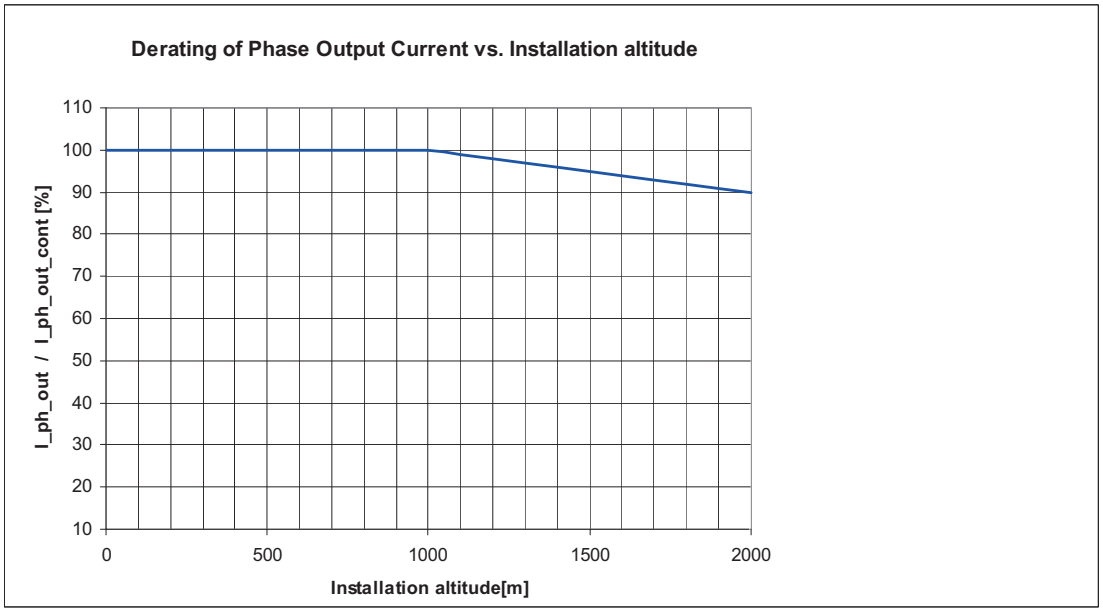


Figure 6-6: Power reduction at increased installation height (Lexium 62 ILD at 8 kHz clock frequency of power stage)

Multiply the values with the nominal current at 40°C / 104°F in order to calculate the maximum current value, depending on the required installation altitude.

7 Installation and maintenance

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

⚠ WARNING

INCORRECT INSTALLATION

Ensure the correct installation and maintenance of the system according to the instructions contained in the present document and other supporting documents.

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

7.1 Commissioning

⚠ 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.
- Place a "Do Not Turn On" or equivalent hazard label on all power switches and lock them in the non-energized position.
- Wait 15 minutes to allow the residual energy of the DC bus capacitors to discharge.
- Measure the voltage on the DC bus with a properly rated voltage sensing device and verify that the voltage is less than 42.4 Vdc.
- Do not assume that the DC bus is voltage-free when the DC bus LED is off.
- Block the motor shaft to prevent rotation prior to performing any type of work on the drive system.
- Do not create a short-circuit across the DC bus terminals or the DC bus capacitors.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the unit.
- Use only the specified voltage when operating this equipment and any associated products.

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

⚠ DANGER

ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Operate electrical components only with a connected protective ground (earth) cable.
- After the installation, verify the secure connection of the protective ground (earth) cable to all electrical devices to ensure that connection complies with the connection diagram.
- Before enabling the device, safely cover the live components to prevent contact.
- Do not touch the electrical connection points of the components when the module is energized.
- Provide protection against indirect contact (EN 50178).
- Connect and disconnect cables and terminals only after you have verified that the power has been removed from the system.
- Insulate the unused conductors on both ends of the motor cable.

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

ESD protection

► Observe the following instructions to help avoid damages due to electrostatic discharge:

NOTICE

ELECTROSTATIC DISCHARGE

- Do not touch any of the electrical connections or components.
- Prevent electrostatic charges, for example, by wearing appropriate clothing.
- If you must touch circuit boards, do so only on the edges.
- Move the circuit boards as little as possible.
- Remove existing static charge by touching a grounded, metallic surface.

Failure to follow these instructions can result in equipment damage.

7.1.1 Preparing commissioning

Unpacking

How to unpack the device:

- ▶ Remove packaging.
- ▶ Dispose of the packaging material in accordance with the relevant local regulations.

Verifying

How to verify the device:

- ▶ Verify that the delivery is complete on the basis of the delivery slip.
- ▶ Closely inspect the device for any signs of damage.

⚠ WARNING

UNINTENTED EQUIPMENT OPERATION

- Do not mount or commission damaged drive systems.
- Do not modify the drive systems.
- Send back inoperative devices.

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

- ▶ Verify the data with the help of the nameplates.
- ▶ Observe requirements for the installation location.
- ▶ Observe requirements for the degree of protection and the EMC rules.
- ▶ In addition to the following instructions, also note the information in the chapter "Planning".
- ▶ Then install Lexium 62 ILD component.

7.1.2 Mechanical mounting

Lexium 62 ILD

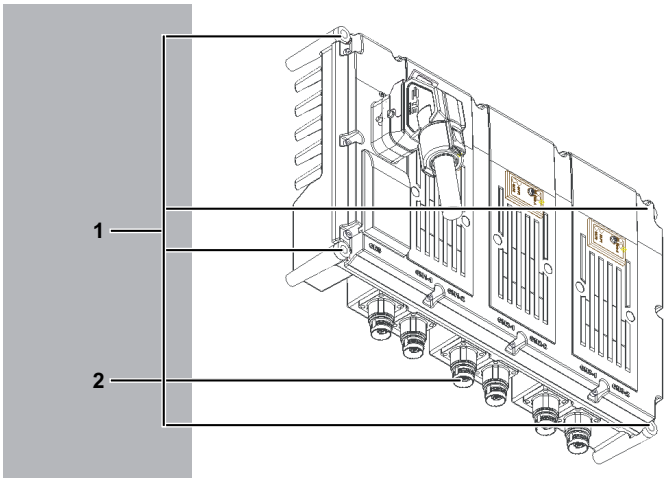
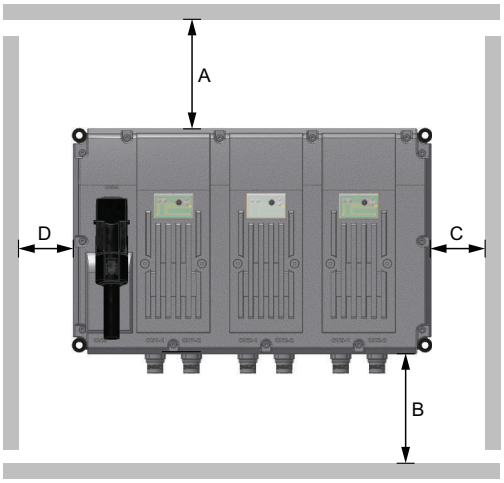


Figure 7-1: Installation of Lexium 62 ILD

- Prepare an appropriate place for mounting the Lexium 62 ILD.
- Keep distances to other devices or machine components as indicated in the graphic below.
- Position the Lexium 62 ILD according to one of the mounting orientations for Lexium 62 ILD.
- Mount the Lexium 62 ILD using the 4 mounting holes (1).



A	> 100 mm (3.94 in.)
B	> 100 mm (3.94 in.)
C	> 50 mm (1.97 in.)
D	> 50 mm (1.97 in.)

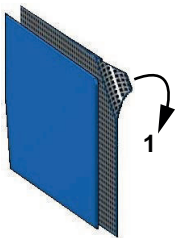
Lexium 62 ILD for cold plate (passive / active cooling, ILM62DDD24C•••• / ILM62DDD24D••••)

To enhance the performance characteristics of the Lexium 62 ILD, you can mount the module on a cold plate.

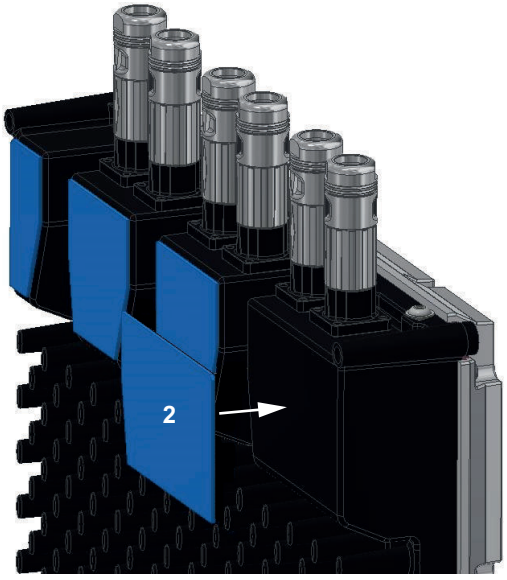
Mounting the Lexium 62 ILD on a cold plate (cooling surface) supports cooling by heat convection and dissipation.

Before mounting the Lexium 62 ILD on a cold plate, attach **Gap Pads** (delivered with the Lexium 62 ILD) to the rear side of the drive:

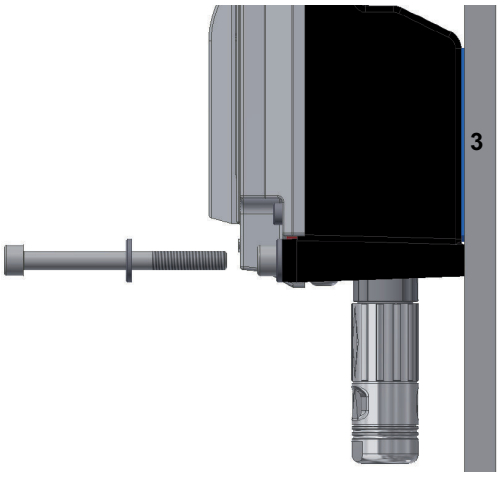
- Verify that the metal surfaces where the **Gap Pads** should be attached are greaseless and dust-free.
- Remove the first protective foil from the **Gap Pad** (1).



- Attach the pre-cut **Gap Pad** precisely to the metal surface of the drive (2) using slight contact pressure.
  The **Gap Pad** has the same shape as the metal surfaces where the **Gap Pads** are to be attached.
  NOTE: Avoid creases and blisters.



- Repeat the process for the other **Gap Pads**.
- Remove the second protective foil from each **Gap Pad**.
- Mount the Lexium 62 ILD to the cold plate (3) using the 4 mounting holes. Refer to the mounting instructions contained in the present document.



- Use a tightening torque according to the following table so that the **Gap Pads** create sufficient thermal contact with the cold plate.

NOTE: Use a **Gap Pad** only once.

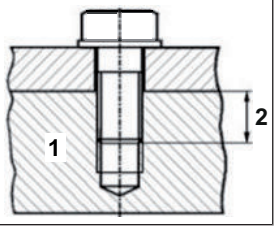
Parameter	Material (1)		Graphic
	Aluminum	Steel	
Torque for screw M6 (steel) • Strength class 8.8 • Overall coefficient of friction μ=0.14	9.0 Nm (79.7 lbf in.)	9.0 Nm (79.7 lbf in.)	
Minimum engagement depth (2)	10 mm (0.39 in.)	6 mm (0.24 in.)	

Table 7-1: Tightening torque

Reference	Description
VW3E6058	Single Thermal-Conduction Kit Provides 2 pre-cut, self-adhesive **Gap Pads**.
VW3E6059	Triple Thermal-Conduction Kit Provides 4 pre-cut, self-adhesive **Gap Pads**.

Cold plate (active cooling)

For applications requiring a maxium current greater than 4.4 A (for the Lexium 62 ILD Triple Drive) or 6 A without temperature derating (for the Lexium 62 ILD Single Drive), you must install the Lexium 62 ILD on an active cold plate.

If you use cold plates with water cooling, observe the following:

⚠ WARNING

INSUFFICIENT OR EXCESSIVE COOLING

- Only operate the Lexium 62 ILD for cold plate with a properly working water cooling system for applications requiring more than 4.4 A at 400 V (for the Lexium 62 ILD Triple Drive) or 6 A at 400 V without temperature derating (for the Lexium 62 ILD Single Drive) .
- Size the water cooling system in such a way that no condensation can form on the Lexium 62 ILD.
- Install a monitoring system for the water cooling system that disables the power stage when the water cooling system is not operating properly if necessary.

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

NOTE: UL/CSA compliance requires that drive current be limited to 5 A.

Mounting orientations for Lexium 62 ILD

Vertical installation - reference installation position

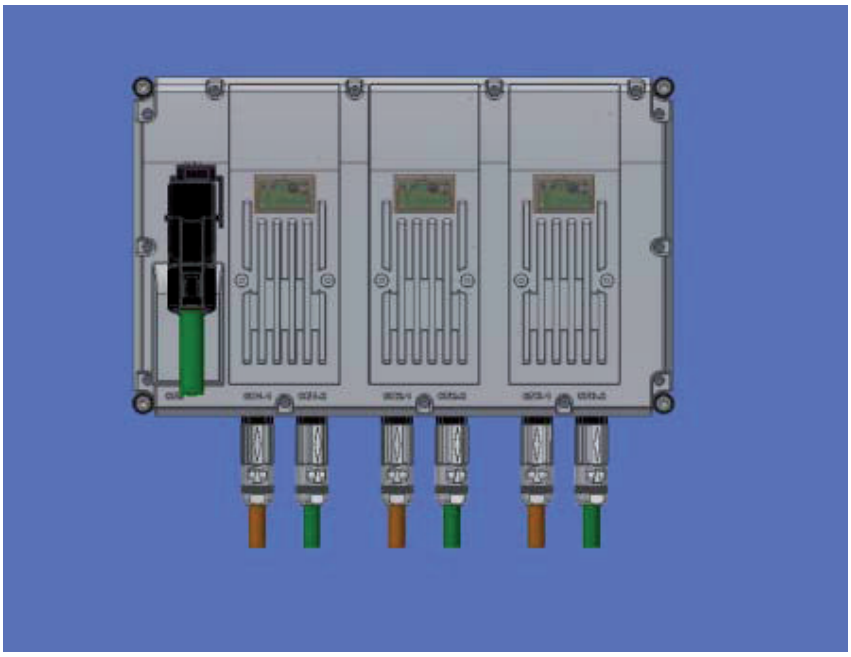


Figure 7-2: Lexium 62 ILD mounting orientation vertical - cable leaving at bottom side

Vertical installation - installation position +90°

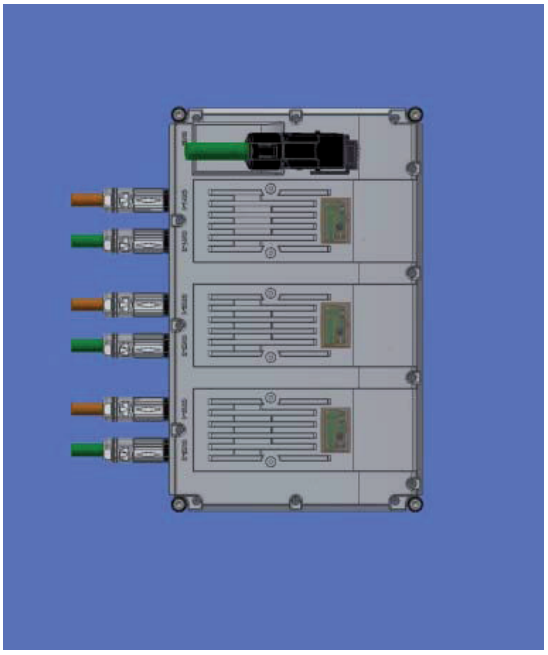


Figure 7-3: Lexium 62 ILD mounting orientation vertical - cable leaving at left side

Vertical installation - installation position -90°

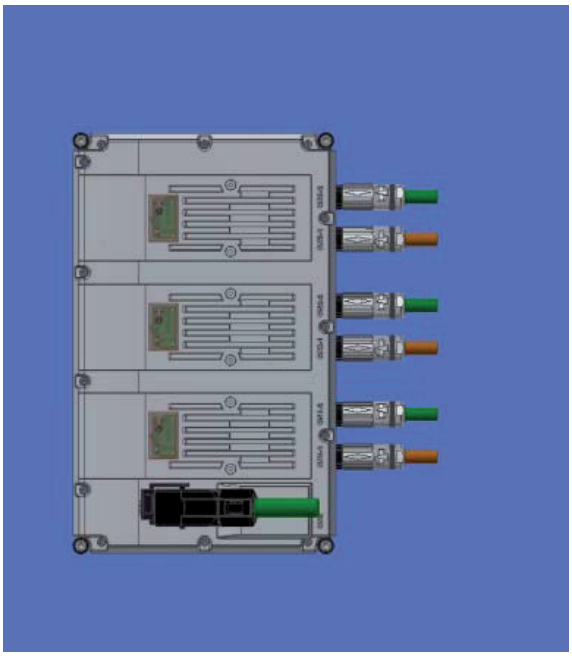


Figure 7-4: Lexium 62 ILD mounting orientation vertical - cable leaving at right side

Horizontal installation

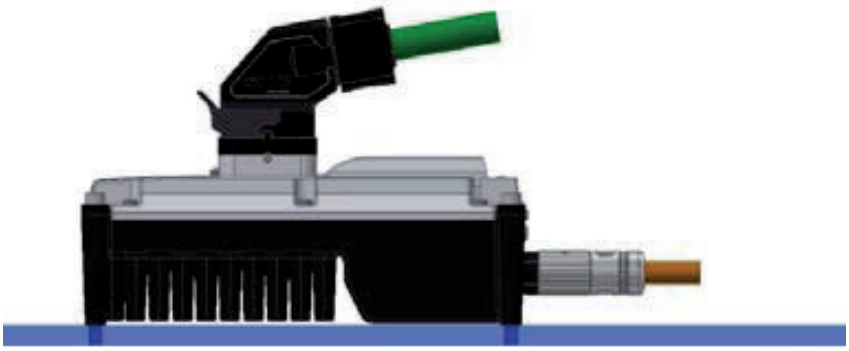


Figure 7-5: Lexium 62 ILD mounting orientation horizontal

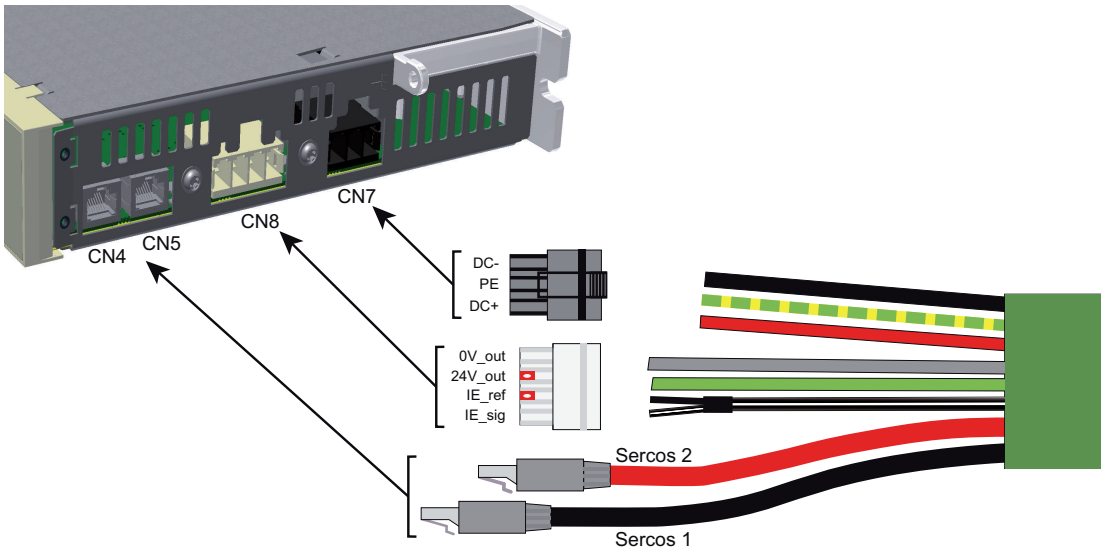
7.1.3 Wiring from Lexium 62 Connection Module to Lexium 62 ILD

The wiring of Lexium 62 Connection Module, Lexium 62 Distribution Box, and Lexium 62 ILD is supported by hybrid cables.

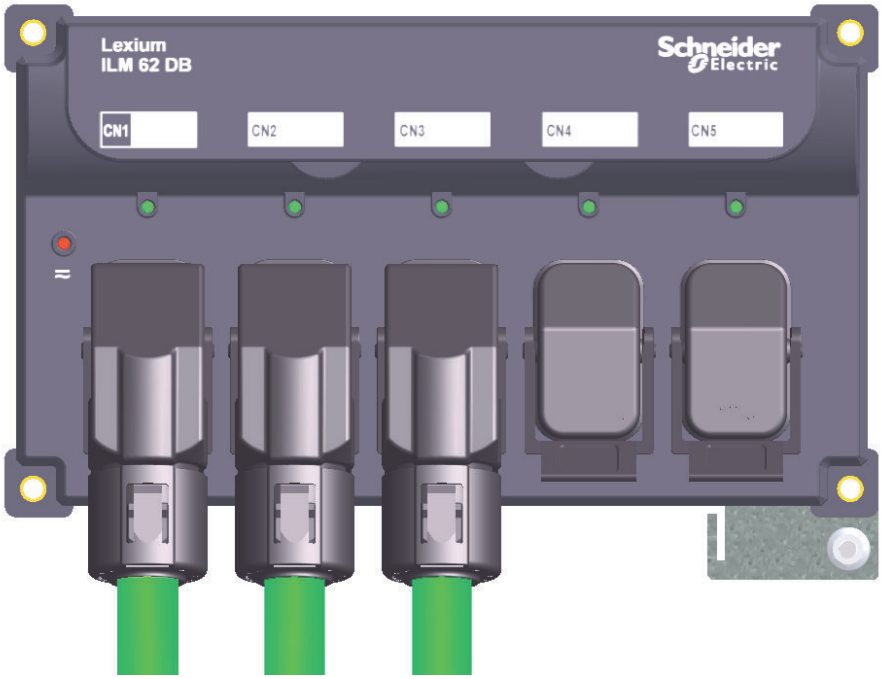
The suitable hybrid cable variants are listed in the type code figure ILD62 accessories (see 4.3.2 Lexium 62 ILD Accessories).

This is how you wire the modules:

- For an overview of the different connections, refer to the chapter Electrical Connections (see 8.4 Electrical connections).
- ► Connect connections **CN4, CN5, CN7 and CN8** (Sercos, DC bus voltage, 24V, Inverter Enable) at the Lexium 62 Connection Module with the Lexium 62 Distribution Box by means of the pre-assembled hybrid cable.



- ► Remove protective cover from hybrid cables.
- ► Connect up to four Lexium 62 ILD at the Lexium 62 Distribution Box using hybrid cables. Engage the respective locking latch at both connection sides.



- ▶ Provide unused hybrid connection sockets with strapping plugs.

The strapping plugs are not included in the scope of delivery of Lexium 62 ILD and must be ordered separately (order number: VW3E6023).

Strapping plugs close the Sercos loop, serve as protection against hazardous voltage and ensure the IP65 degree of protection.

⚠ WARNING

LOSS OF IP65 RATING

Use strapping plugs VW3E6023 in unused hybrid connection sockets.

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

The following table is an example of the topological addressing of the Lexium 62 ILD, depending on the Sercos connection and assuming the Lexium 62 Connection Module is connected to connector CN1 with a hybrid cable.

Sercos lines within the Hybrid cable	Connection Lexium 62 Connection Module	Topological address of the Lexium 62 ILD connected to the Lexium 62 Distribution Box			
		CN2	CN3	CN4	CN5
Sercos 1 (black) Sercos 2 (red)	CN4 CN5	4	3	2	1
Sercos 1 (black) Sercos 2 (red)	CN5 CN4	1	2	3	4

Table 7-2: The topological address for CN2, CN3, CN4 and CN5 (Lexium 62 Distribution Box) depends of the assignment of Sercos 1/Sercos 2 to CN4/CN5 (Lexium 62 Connection Module)

Depending on the selected identification (address) mode in the SoMachine Motion Logic Builder, an interchanged connection of the Sercos 1/Sercos 2 connectors can lead to unintended machine operation.

⚠ WARNING

UNINTENDED MACHINE OPERATION

Ensure that the Sercos cables are connected to the Sercos connections CN4/CN5 of the Lexium 62 Connection Module according to the requirements of the application, its configuration and applicable standards.

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

- ▶ Connect the Lexium 62 ILD with the motor by means of the pre-assembled power cable and the pre-assembled encoder cable.
  Therefore place the plug connector onto the socket and turn the plug connector 90 degrees clockwise.
  For an overview of the different connections, refer to the chapter Electrical Connections (see 8.4.1 Lexium 62 ILD).

⚠ DANGER

ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Install the termination plug (VW3E6056 Termination Kit) on all open motor connections CN1-1 / CN2-1 / CN3-1.
- Verify that the termination plug is properly seated and sealed.

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

⚠ WARNING

LOSS OF IP65 RATING

- Install the termination plug (VW3E6056 Termination Kit) on all open motor connections CN1-1 / CN2-1 / CN3-1.
- Install the sealing cap (VW3E6056 Termination Kit) on all open encoder connections CN1-2 / CN2-2 / CN3-2.
- Verify that the termination plug(s) and sealing cap(s) are properly seated and sealed.
- Use only cables and accessory parts from Schneider Electric.

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

NOTE: You can order the sealing cap (VW3E6057) separately from the Termination Kit (VW3E6056).

The following boundary conditions must be observed for the system layout:

- Maximum cable length of 20 m (65.2 ft) from Lexium 62 Connection Module to Lexium 62 Distribution Box.
- Maximum cable length of 10 m (32.8 ft) from Lexium 62 Distribution Box to Lexium 62 ILD.
- Maximum cable length of 5 m (16.4 ft) from Lexium 62 ILD to motor.
- Sum of all cable lengths maximum 200 m (656 ft).

- Maximum distance of 50 m (164 ft) between 2 active Sercos slaves e.g. way back in the Sercos loop from Lexium 62 ILD to Lexium 62 Power Supply.
- Lexium 62 Connection Module and Lexium 62 Distribution Box are no active Sercos slaves.

Contact your Schneider Electric representative in order to create a detailed system layout for the respective available topology.

In the following example the longest path is between two Lexium 62 ILDs.

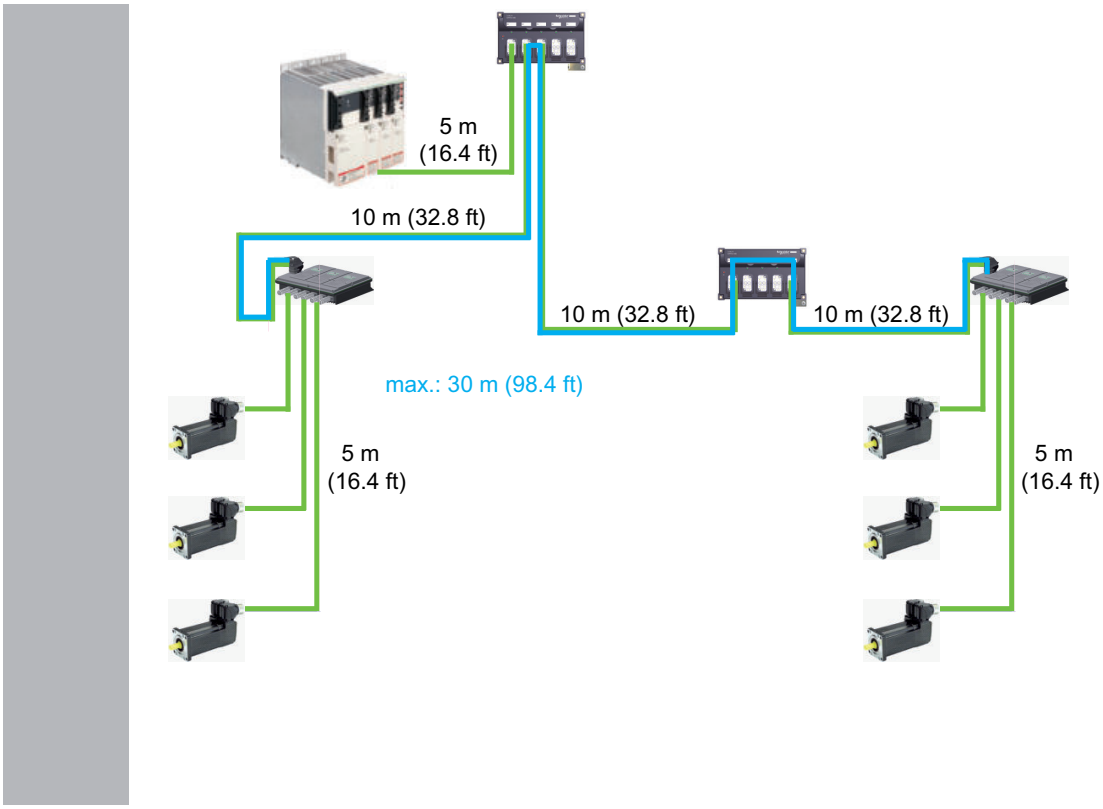


Figure 7-6: Example longest path

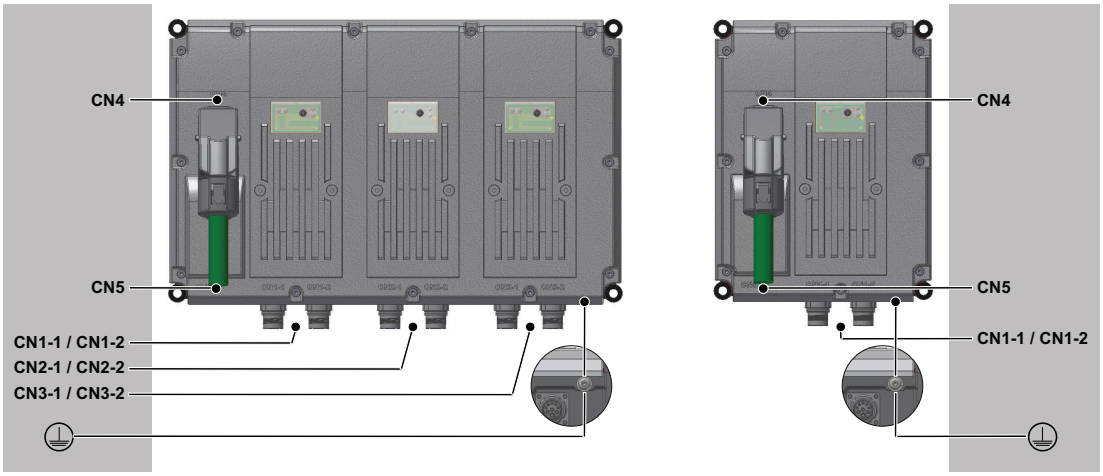


Figure 7-7: Connection overview Lexium 62 ILD Triple / Single Drive

Connection	Meaning
CN1-1 **CN2-1** **CN3-1**	Motor cable
CN1-2 **CN2-2** **CN3-2**	Encoder cable
CN4	Lexium 62 Distribution Box (hybrid cable)
CN5	Reserved
⏚	Protective ground (earth)

According to IEC/EN 60204-1, the correct grounding of the Lexium 62 ILD has to be verified on the completely installed machine on location in all cases.

The following table is an example of the topological addressing of the Lexium 62 ILD, depending on the Sercos connection and assuming the Lexium 62 Connection Module is connected to connector CN4 with a hybrid cable.

Sercos lines within the Hybrid cable	Connection Lexium 62 Connection Module	Topological address of the Lexium 62 ILD connected to the Lexium 62 Distribution Box		
		CN1-1 / CN1-2 Axis 1	CN2-1 / CN2-2 Axis 2	CN3-1 / CN3-2 Axis 3
Sercos 1 (black) Sercos 2 (red)	CN4 CN5	3	2	1
Sercos 1 (black) Sercos 2 (red)	CN5 CN4	1	2	3

Table 7-3: The topological address for CN1-1 / CN1-2 (axis 1), CN2-1 / CN2-2 (axis 2) and CN3-1 / CN3-2 (axis 3) (Lexium 62 ILD) depends of the assignment of Sercos 1/Sercos 2 to CN4/CN5 (Lexium 62 Connection Module)

Depending on the selected identification (address) mode in the SoMachine Motion Logic Builder, an interchanged connection of the Sercos 1/Sercos 2 connectors can lead to unintended machine operation.

⚠ WARNING

UNINTENDED MACHINE OPERATION

Ensure that the Sercos cables are connected to the Sercos connections CN4/CN5 of the Lexium 62 Connection Module according to the requirements of the application, its configuration and applicable standards.

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

7.2 Maintenance, repair, cleaning

► Observe the following instructions before carrying out maintenance on Lexium 62 drive system:

⚠ 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.
- Place a "Do Not Turn On" or equivalent hazard label on all power switches and lock them in the non-energized position.
- Wait 15 minutes to allow the residual energy of the DC bus capacitors to discharge.
- Measure the voltage on the DC bus with a properly rated voltage sensing device and verify that the voltage is less than 42.4 Vdc.
- Do not assume that the DC bus is voltage-free when the DC bus LED is off.
- Block the motor shaft to prevent rotation prior to performing any type of work on the drive system.
- Do not create a short-circuit across the DC bus terminals or the DC bus capacitors.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the unit.
- Use only the specified voltage when operating this equipment and any associated products.

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

How to de-energize the system:

► Set main switch to "OFF Position", or otherwise disconnect all power to the system.
► Prevent main switch from being switched back on.
► Wait 15 minutes after removing power (switching off) to allow the DC bus capacitors to discharge.
► After the DC-BUS LED has turned off on all components located in the axis group, measure whether any residual voltage is present on the DC bus.
► Verify DC+ to PE (Protective Earth/ground) and DC- to PE with an appropriate measuring instrument to make sure it is de-energized before working on the device.

⚠ DANGER

ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Verify with a correctly calibrated measuring instrument that the DC bus is de-energized (less than 42.4 Vdc) before replacing, maintaining or cleaning machine components.

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

7.2.1 Machine repair

With exception of internal fuses in the Lexium 62 connection modules, there are no other user-serviceable parts within the Lexium 62 components. Either replace the en-

tire device or contact the Schneider Electric Customer Service (for contact addresses, refer to the Appendix (see 9.1 Contact addresses)).

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Only use software and hardware components approved by Schneider Electric for use with this equipment.
- Do not attempt to service this equipment outside of authorized Schneider Electric service centers.
- 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.

► Observe the following instructions to help avoid damages due to electrostatic discharge:

NOTICE

ELECTROSTATIC DISCHARGE

- Do not touch any of the electrical connections or components.
- Prevent electrostatic charges, for example, by wearing appropriate clothing.
- If you must touch circuit boards, do so only on the edges.
- Move the circuit boards as little as possible.
- Remove existing static charge by touching a grounded, metallic surface.

Failure to follow these instructions can result in equipment damage.

7.2.2 Cleaning

If you find it necessary to clean the Lexium 62 ILD, care must be taken with cleaning products as some active agents may have deleterious effects on plastics and stainless steel welds.

NOTICE

CORROSION CAUSED BY CLEANING AGENTS

- Before using a cleaning agent, carry out a compatibility test in relation to the cleaning agent and the component affected.
- Do not use alkaline detergent.
- Do not use any chlorid-containing cleaning agents.
- Do not use any sulphuric acid containing detergent.

Failure to follow these instructions can result in equipment damage.

For more information on the material properties of your components (see 8.3 Mechanical and electrical data).

The standard cooling method of the motor is by natural convection. Therefore, keep the motor surfaces free from dirt.

7.3 Replacement equipment inventory

Keep a stock of the most important components to make certain your machine is functioning and ready for operation.

Replace devices with the same hardware configuration to help ensure compatibility.

Indicate the following information on the replacement equipment order:

Item name:	for example, ILM62DDD24••••
Hardware code:	for example, RS02
Software (firmware) version:	for example, SW: 0.24.21

This information can be found on the logistic nameplate (see 4.4 Nameplate descriptions).

For more information concerning the replacement of components, refer to chapter Replacing Lexium 62 components and cables (see 7.4 Replacing Lexium 62 components and cables).

7.4 Replacing Lexium 62 components and cables

⚠ 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.
- Place a "Do Not Turn On" or equivalent hazard label on all power switches and lock them in the non-energized position.
- Wait 15 minutes to allow the residual energy of the DC bus capacitors to discharge.
- Measure the voltage on the DC bus with a properly rated voltage sensing device and verify that the voltage is less than 42.4 Vdc.
- Do not assume that the DC bus is voltage-free when the DC bus LED is off.
- Block the motor shaft to prevent rotation prior to performing any type of work on the drive system.
- Do not create a short-circuit across the DC bus terminals or the DC bus capacitors.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the unit.
- Use only the specified voltage when operating this equipment and any associated products.

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

⚠ DANGER

ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Operate electrical components only with a connected protective ground (earth) cable.
- After the installation, verify the secure connection of the protective ground (earth) cable to all electrical devices to ensure that connection complies with the connection diagram.
- Before enabling the device, safely cover the live components to prevent contact.
- Do not touch the electrical connection points of the components when the module is energized.
- Provide protection against indirect contact (EN 50178).
- Connect and disconnect cables and terminals only after you have verified that the power has been removed from the system.
- Insulate the unused conductors on both ends of the motor cable.

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

With exception of internal fuses in the Lexium 62 connection modules, there are no other user-serviceable parts within the Lexium 62 components. Either replace the entire device or contact the Schneider Electric Customer Service (for contact addresses, refer to the Appendix (see 9.1 Contact addresses)).

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Only use software and hardware components approved by Schneider Electric for use with this equipment.
- Do not attempt to service this equipment outside of authorized Schneider Electric service centers.
- 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.

⚠ WARNING

IMPROPER REPLACEMENT OR OPENING OF THE COMPONENT HOUSING

- Do not open the housing of the components for commissioning, replacement or any other reason whatsoever unless otherwise instructed in the specific product documentation of the component.
- Observe and respect the instructions and specifications in the product documentation and that of the machine manufacturer when replacing the device.
- Replace inoperable components as a whole.

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

To replace components and cables, read thoroughly the instructions contained in the beginning of the present chapter, Installation and Maintenance.

ESD protection

► Observe the following instructions to help avoid damages due to electrostatic discharge:

NOTICE

ELECTROSTATIC DISCHARGE

- Do not touch any of the electrical connections or components.
- Prevent electrostatic charges, for example, by wearing appropriate clothing.
- If you must touch circuit boards, do so only on the edges.
- Move the circuit boards as little as possible.
- Remove existing static charge by touching a grounded, metallic surface.

Failure to follow these instructions can result in equipment damage.

How to de-energize the system:

- ► Set main switch to "OFF Position", or otherwise disconnect all power to the system.
- ► Prevent main switch from being switched back on.
- ► Wait 15 minutes after removing power (switching off) to allow the DC bus capacitors to discharge.
- ► After the DC-BUS LED has turned off on all components located in the axis group, measure whether any residual voltage is present on the DC bus.
- ► Verify DC+ to PE (Protective Earth/ground) and DC- to PE with an appropriate measuring instrument to make sure it is de-energized before working on the device.

⚠ DANGER

ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Verify with a correctly calibrated measuring instrument that the DC bus is de-energized (less than 42.4 Vdc) before replacing, maintaining or cleaning machine components.

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

For more information on the DC bus LED, see the Lexium 62 ILM Hardware Guide.

⚠ DANGER

INOPERABLE SAFETY FUNCTION

Test the proper functioning of the safety functions after every device replacement and every change of the wiring.

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

7.4.1 Replacement of devices and cables of Lexium 62 ILD

How to replace the Lexium 62 ILD:

⚠ 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.
- Place a "Do Not Turn On" or equivalent hazard label on all power switches and lock them in the non-energized position.
- Wait 15 minutes to allow the residual energy of the DC bus capacitors to discharge.
- Measure the voltage on the DC bus with a properly rated voltage sensing device and verify that the voltage is less than 42.4 Vdc.
- Do not assume that the DC bus is voltage-free when the DC bus LED is off.
- Block the motor shaft to prevent rotation prior to performing any type of work on the drive system.
- Do not create a short-circuit across the DC bus terminals or the DC bus capacitors.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the unit.
- Use only the specified voltage when operating this equipment and any associated products.

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

The metal surfaces of the product may exceed 85 °C (185 °F) 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.

The Lexium 62 ILD is very heavy relative to its size. While replacing the component, its great mass can cause injuries and/or damage.

⚠ WARNING

HEAVY, FALLING COMPONENTS

- Use a a suitable crane or other suitable lifting gear for mounting the component if this is required by the weight of the component.
- Use the necessary personal protective equipment (for example, protective shoes, protective glasses and protective gloves).
- Mount the component 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.

Pay attention to the ESD protection measures, to avoid damages caused by electrostatic discharge.

⚠ CAUTION

ELECTROSTATIC DISCHARGE

- Use the original or similar packaging to send back components.
- Components must be packaged in ESD packaging/film.

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

NOTICE

IMPROPER REPLACEMENT OR OPENING OF THE COMPONENTS

- Do not open the components to put it into operation or replace it.
- In addition to the information and instructions found in this present document, you must observe the information and instructions of the original machine builder.

Failure to follow these instructions can result in equipment damage.

The replacement of the Lexium 62 ILD may have an impact on positioning or other parameters relative to the machine application. For example, the application may employ techniques, such as indirect distance measuring, that may be lost as a result of the component replacement, and may therefore need to be re-calibrated.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Be sure to consult the documentation of the original machine builder before attempting to replace the component.

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

Before attempting to replace the Lexium 62 ILD, refer to the mounting information in section Installation and maintenance (see 7 Installation and maintenance).

For an overview of the different connections, refer to the chapter Electrical Connections.

NOTE: Be sure that the cables clearly indicate their connections before disconnecting.

► Unplug plug connector of the hybrid connector (cable connection to the Lexium 62 Distribution Box at CN4). Before this, loosen the locking latch.

- ► Loosen plug connectors of motor cables and encoder cables of all connected motors (CN1-1 / CN1-2 to CN3-1 / CN3-2).
  Therefore turn the fast lock mechanism of the plug connector 90 degrees counter clockwise.
- ► Dismount ground (earth) cable of shielding of the Lexium 62 ILD.
- ► Replace Lexium 62 ILD as a whole.
- ► Attach connectors of motor cables and encoder cables of all connected motors (CN1-1 / CN1-2 to CN3-1 / CN3-2). Therefore place the plug connector onto the socket and turn the plug connector 90 degrees clockwise.
- ► Attach plug connector of the hybrid connector (cable connection to the Lexium 62 Distribution Box at CN4) and lock the locking latch.
- ► Mount ground (earth) cable of shielding of the Lexium 62 ILD and tighten it with a 3.5 Nm (30.98 lbf in) torque.

⚠ DANGER

ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Install the termination plug (VW3E6056 Termination Kit) on all open motor connections CN1-1 / CN2-1 / CN3-1.
- Verify that the termination plug is properly seated and sealed.

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

⚠ WARNING

LOSS OF IP65 RATING

- Install the termination plug (VW3E6056 Termination Kit) on all open motor connections CN1-1 / CN2-1 / CN3-1.
- Install the sealing cap (VW3E6056 Termination Kit) on all open encoder connections CN1-2 / CN2-2 / CN3-2.
- Verify that the termination plug(s) and sealing cap(s) are properly seated and sealed.
- Use only cables and accessory parts from Schneider Electric.

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

NOTE: You can order the sealing cap (VW3E6057) separately from the Termination Kit (VW3E6056).

How to replace the cables

- ► Disconnect / attach the motor cable and the encoder cable from/at the motor.
- ► Disconnect / attach the motor cable and the encoder cable from/at the Lexium 62 ILD

8 Technical data

8.1 Ambient conditions

Lexium 62 ILD

Procedure	Parameter	Value	Basis
Operation	**Class 3K3**		IEC/EN 60721-3-3
	Degree of protection housing	IP 65 with plugged-in connectors	
	Ambient temperature	+5...+55 °C (+41...131 °F)	
	• Power de-rating above 40 °C (104 °F)	+40...+55 °C (+104...+131 °F) Refer to Derating for Lexium 62 ILD Drive (see 8.3.3 Derating for Lexium 62 ILD Drive).	
	Relative humidity	5% ... 85%	
	Class 3M7		
	Shock	250 m/s^2	
	Vibration	30 m/s^2	
Transport	**Class 2K3**		IEC/EN 60721-3-2
	Ambient temperature	-25 °C...+70 °C / -13 °F...+158 °F	
	Condensation	No	
	Icing	No	
	Other liquid	No	
	Relative humidity	5% ... 95%	
	Class 2M2		
	Shock	300 m/s^2	
	Vibration	15 m/s^2	
Long-term storage in transport packaging	**Class 1K4**		IEC/EN 60721-3-1
	Ambient temperature	-25 °C...+55 °C / -13 °F...+131 °F	
	Condensation	No	
	Icing	No	
	Other liquid	No	
	Relative humidity	10% ... 100%	

Table 8-1: Ambient conditions Lexium 62 ILD

8.2 Standards and regulations

CE	Low Voltage Directive 2014/35/EU • IEC/EN 61800-5-1
	EMC Directive 2014/30/EU • IEC/EN 61800-3
	Machinery Directive 2006/42/EC • EN ISO 13849-1, PL e • IEC/EN 62061, SIL 3 • IEC/EN 61800-5-2, SIL 3
cULus (ILM62DDD24A••••, ILM62DDD24B••••) **cURus** (ILM62DDD24C••••, ILM62DDD24D••••)	UL 61800-5-1 CSA C22.2 No. 274

Table 8-2: Declarations and certifications

8.3 Mechanical and electrical data

8.3.1 Lexium 62 ILD Single Drive

Category	Parameter	Value	
Product configuration	**Item name**	**Detached electronic ILM62DDD24A••••**	**Detached electronic ILM62DDD24C••••**
Power Supply	Supply voltage	250...700 V DC	
	Control voltage (without holding brake)	24 Vdc (-20 % ... +25 %)	
	max. current consumption	0.24 A	
	Control voltage (with holding brake)	24 Vdc (-10 % ... +6 %)	
	max. current consumption	1.6 A	
Motor connection (CN1-1)	Switching frequency (power stage)	8 kHz	
	Rated current at 40 °C (104 °F) (vertical)	Mounted on backplate: 5.0 A_{eff} (at 400 Vac)	For cold plate, passive cooling: 6.0 A_{eff} (at 400 Vac) For cold plate, active cooling (water cooling): 6.0 A_{eff} (at 400 Vac)
	Refer to Derating for Lexium 62 ILD Drive (see 8.3.3 Derating for Lexium 62 ILD Drive).		
	Peak current (acceleration) at 40 °C (104 °F)	24.0 A_{eff} (RMS)	
	Peak current for 100 ms (signal frequency = 0 Hz) at 40 °C (104 °F)	34.0 A	
Interfaces	Sercos	Integrated	
Encoder interface (CN1-2)	Analog encoder	SICK Hiperface	

Category	Parameter	Value	
Product configuration	**Item name**	**Detached electronic ILM62DDD24A••••**	**Detached electronic ILM62DDD24C••••**
Encoder (CN1-2)	Power supply	10 Vdc (-5...+5%), maximum 125 mA, short-circuit protection	
	Differential analog input (sine and cosine signal)	Input voltage: 0.8...1.1 V_{PP}	
		Offset: 2.5 Vdc (-10...+10%)	
		Terminating resistor: 130 Ω	
		Cutoff-frequency: 100 MHz	
	Communication	RS-485 interface	
Dimensions	Housing D x W x H	Lexium 62 ILD Single 86 mm x 169 mm x 237 mm (3.39 in. x 6.65 in. x 9.33 in.)	
Weight	Weight (without packaging)	2.45 kg (5.40 lbs)	2.45 kg (5.40 lbs)
	Weight (with packaging)	3.50 kg (7.72 lbs)	3.55 kg (7.83 lbs)
Cooling	-	Backplate, natural convection (only heat sink)	Cold plate, passive cooling Cold plate, active cooling (water cooling)
Ventilation	-	No fan	
Degree of protection	-	IP65	
Protection category	Class	I (IEC/EN 61800-5-1)	
Overvoltage category	Class	III (IEC/EN 61800-5-1)	
Pollution degree	-	2 (EN 61800-5-1)	
Radio interference level	-	C3 (IEC/EN 61800-3)	
Immunity level	-	Second environment (IEC/EN 61800-3)	
Coating	-	Powder coating based on polyester resin	
Motor brake (CN1-1)	Output voltage	Control voltage minus 0.8 Vdc	
	Output current	1.3 A (maximum)	
	Inductance	1.0 H (maximum)	
	Energy inductive load	1.2 J (maximum)	
	Overload protection	Yes	
	Short-circuit protection	Yes	
Installation altitude	-	2000 m (6561 ft)	

Table 8-3: Technical data Lexium 62 ILD

8.3.2 Lexium 62 ILD Triple Drive

Category	Parameter	Value	
Product configuration	**Item name**	**Detached electronic ILM62DDD24B••••**	**Detached electronic ILM62DDD24D••••**
Power Supply	Supply voltage	250...700 V DC	
	Control voltage (without holding brake) max. current consumption	24 Vdc (-20 % ... +25 %)	
		0.72 A	
	Control voltage (with holding brake) max. current consumption	24 Vdc (-10 % ... +6 %)	
		4.9 A	
Motor connection (per axis[1)])	Switching frequency (power stage)	8 kHz	
	Rated current at 40 °C (104 °F) (vertical)	Mounted on backplate: 2.7 A_{eff} (at 400 Vac)	For cold plate, passive cooling: 4.4 A_{eff} (at 400 Vac) For cold plate, active cooling (water cooling): 6.0 A_{eff} (at 400 Vac)
	Refer to Derating for Lexium 62 ILD Drive (see 8.3.3 Derating for Lexium 62 ILD Drive).		
	Peak current (acceleration) at 40 °C (104 °F)	24.0 A_{eff} (RMS)	
	Peak current for 100 ms (signal frequency = 0 Hz) at 40 °C (104 °F)	34.0 A	
Interfaces	Sercos	Integrated	
Encoder interface (per axis[2)])	Analog encoder	SICK Hiperface	
Encoder (per axis[2)])	Power supply	10 Vdc (-5...+5%), maximum 125 mA, short-circuit protection	
	Differential analog input (sine and cosine signal)	Input voltage: 0.8...1.1 V_{PP}	
		Offset: 2.5 Vdc (-10...+10%)	
		Terminating resistor: 130 Ω	
		Cutoff-frequency: 100 MHz	
	Communication	RS-485 interface	
Dimensions	Housing D x W x H	Lexium 62 ILD Triple 86 mm x 348 mm x 237 mm (3.39 in. x 13.7 in. x 9.33 in.)	
Weight	Weight (without packaging)	5.30 kg (11.68 lbs)	5.30 kg (11.68 lbs)
	Weight (with packaging)	6.40 kg (14.11 lbs)	6.50 kg (14.33 lbs)
Cooling	-	Backplate, natural convection (only heat sink)	Cold plate, passive cooling Cold plate, active cooling (water cooling)
Ventilation	-	No fan	
Degree of protection	-	IP65	
Protection category	Class	I (IEC/EN 61800-5-1)	
Overvoltage category	Class	III (IEC/EN 61800-5-1)	
Pollution degree	-	2 (EN 61800-5-1)	
Radio interference level	-	C3 (IEC/EN 61800-3)	
Immunity level	-	Second environment (IEC/EN 61800-3)	

Category	Parameter	Value	
Product configuration	**Item name**	**Detached electronic ILM62DDD24B••••**	**Detached electronic ILM62DDD24D••••**
Coating	-	Powder coating based on polyester resin	
Motor brake (per axis[1])	Output voltage	Control voltage minus 0.8 Vdc	
	Output current	1.3 A (maximum)	
	Inductance	1.0 H (maximum)	
	Energy inductive load	1.2 J (maximum)	
	Overload protection	Yes	
	Short-circuit protection	Yes	
Installation altitude	-	2000 m (6561 ft)	

[1] Connection CN x-1 with x = 1...3, refer to Electrical connections (see 8.4.1 Lexium 62 ILD)
[2] Connection CN x-2 with x = 1...3, refer to Electrical connections (see 8.4.1 Lexium 62 ILD)

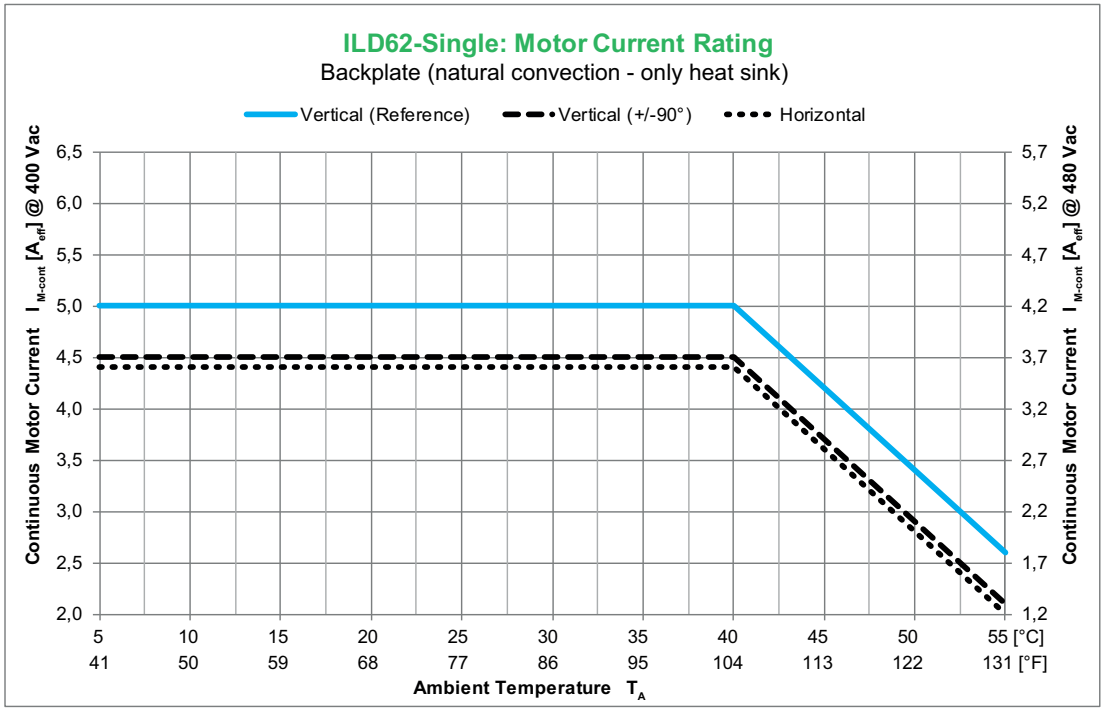
Table 8-4: Technical data Lexium 62 ILD

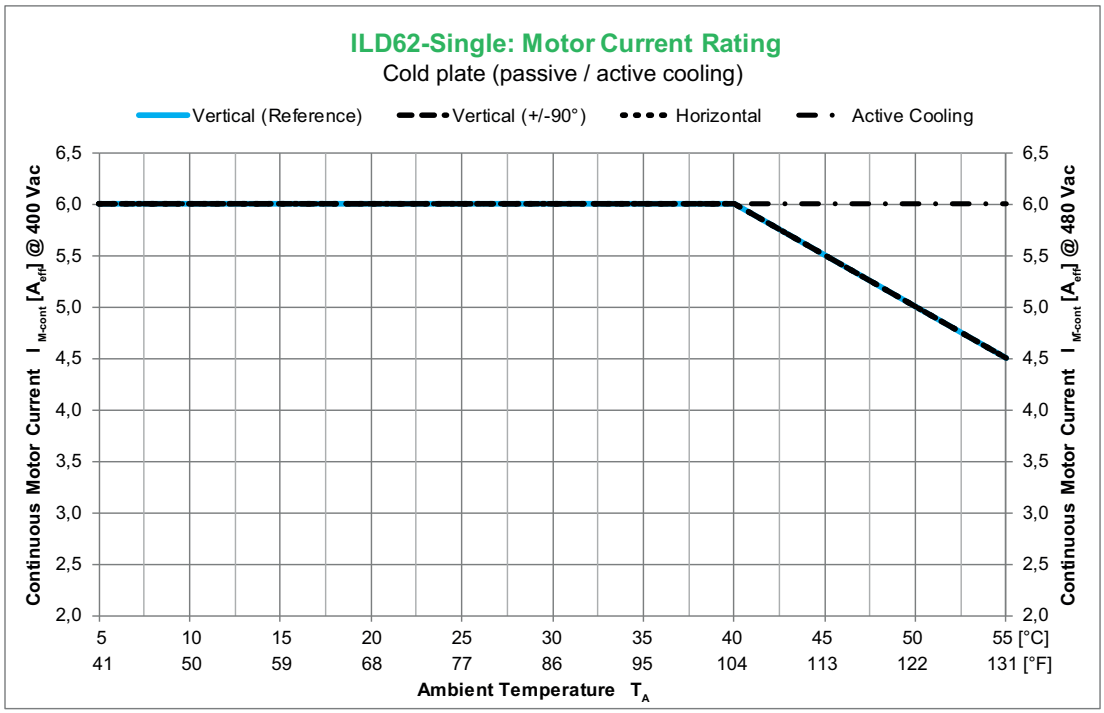
8.3.3 Derating for Lexium 62 ILD Drive

Derating for Lexium 62 ILD Single Drive

-	Backplate (natural convection - only heat sink) Variant A (ILM62DDD24A••••)	Cold plate (passive cooling) Variant C (ILM62DDD24C••••)	Cold plate (active cooling) Variant C (ILM62DDD24C••••)
Mounting surface	Backplate (no thermal conductivity)	Cold plate Material: Aluminum Size: 3 x base area of Lexium 62 ILD Single Drive Height: minimum 20 mm (0.79 in.)	Cold plate with water cooling Material: Aluminum Temperature (feed water): maximum 20 °C (68 °F) Flow rate: minimum 3.5 l / min
Thermal connection	-	**Gap Pad** (minimum 3W/mK)	**Gap Pad** (minimum 3W/mK)
Switching frequency	8 kHz	8 kHz	8 kHz
Continuous motor current (CN1-1)			
• **Rated current (8 kHz) at 40 °C (104 °F) (vertical)**	• 5.0 A_{eff} (at 400 Vac)	• 6.0 A_{eff} (at 400 Vac)	• 6.0 A_{eff} (at 400 Vac)
• **Derating mains voltage: U_{Mains} = 480 Vac**	• - 0.8 A_{eff}	• - 0.0 A_{eff}	• - 0.0 A_{eff}
• **Derating temperature at 40…55 °C (104…131 °F) (vertical)**	• - 160mA$_{eff}$/K	• - 100 mA$_{eff}$/K	• - 0 mA$_{eff}$/K
• **Derating position (+/- 90°)**	• - 0.5 A_{eff}	• - 0.0 A_{eff}	• - 0.0 A_{eff}
• **Derating position (horizontal)**	• - 0.6 A_{eff}	• - 0.0 A_{eff}	• - 0.0 A_{eff}

Derating diagrams



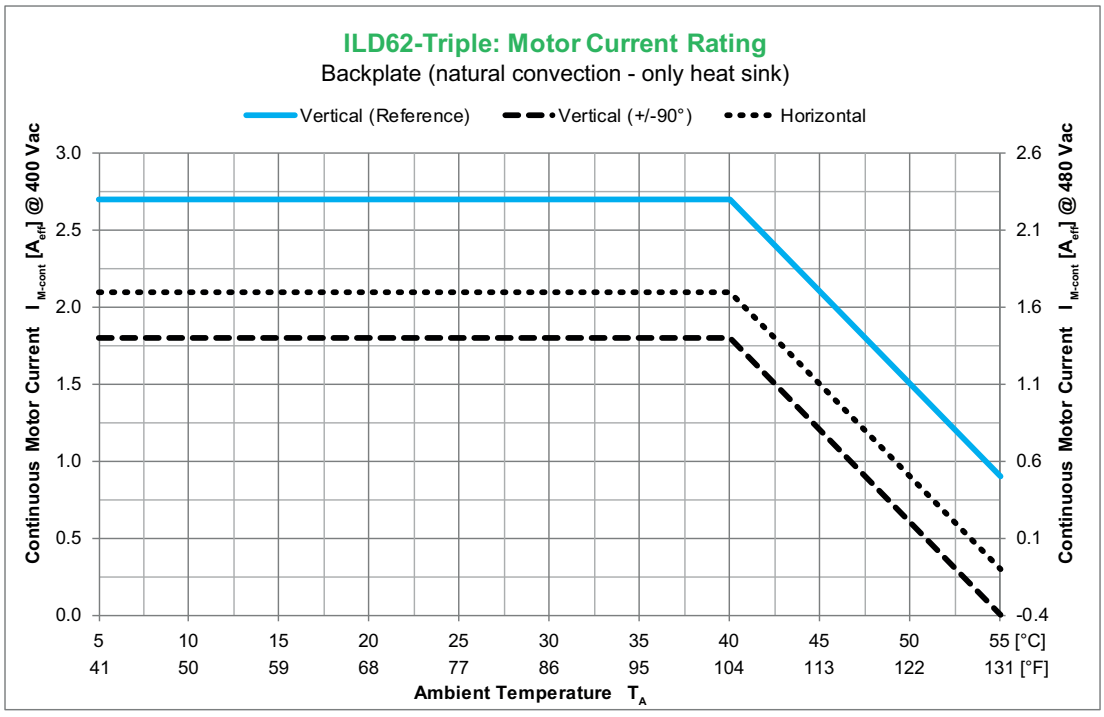


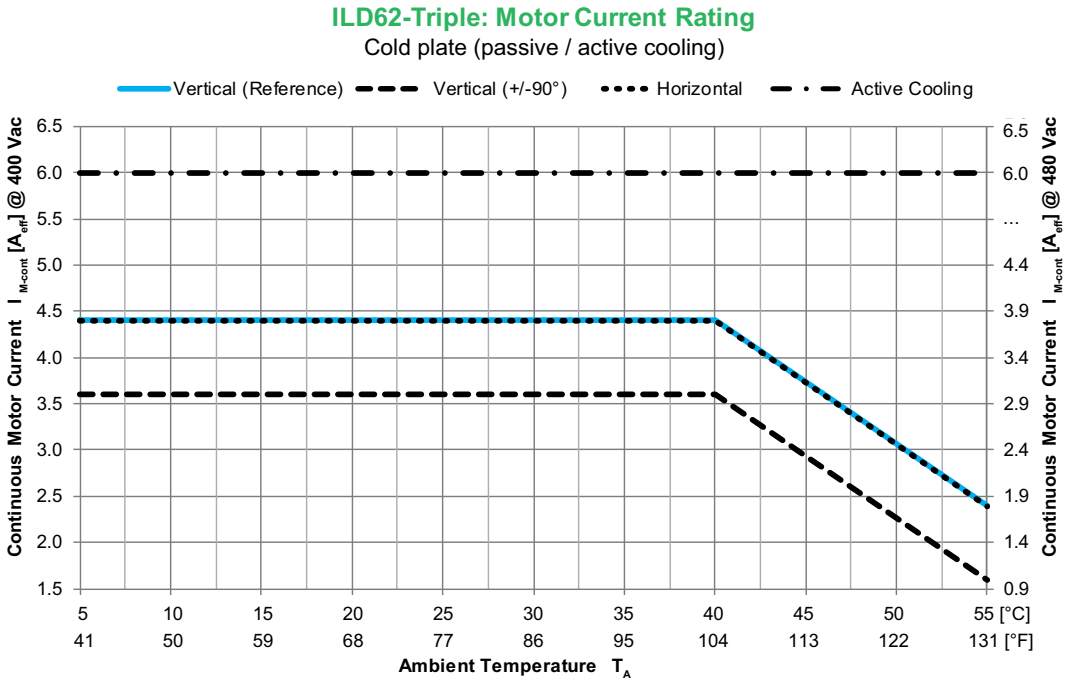
Derating for Lexium 62 ILD Triple Drive

-	Backplate (natural convection - only heat sink) Variant B (ILM62DDD24B••••)	Cold plate (passive cooling) Variant D (ILM62DDD24D••••)	Cold plate (active cooling) Variant D (ILM62DDD24D••••)
Mounting surface	Backplate (no thermal conductivity)	Cold plate Material: Aluminum Size: 3 x base area of Lexium 62 ILD Triple Drive Height: minimum 20 mm (0.79 in.)	Cold plate with water cooling Material: Aluminum Temperature (feed water): maximum 20 °C (68 °F) Flow rate: minimum 3.5 l / min
Thermal connection	-	**Gap Pad** (minimum 3W/mK)	**Gap Pad** (minimum 3W/mK)
Switching frequency	8 kHz	8 kHz	8 kHz
Continuous motor current (per axis) [1]			
• **Rated current (8 kHz) at 40 °C (104 °F) (vertical)**	• 2.7 A_{eff} (at 400 Vac)	• 4.4 A_{eff} (at 400 Vac)	• 6.0 A_{eff} (at 400 Vac)
• **Derating mains voltage: U_{Mains} = 480 Vac**	• - 0.4 A_{eff}	• - 0.6 A_{eff}	• - 0.0 A_{eff}
• **Derating temperature at 40…55 °C (104…131 °F) (vertical)**	• - 120 mA_{eff}/K	• - 135 mA_{eff}/K	• - 0 mA_{eff}/K
• **Derating position (+/- 90°)**	• - 0.9 A_{eff}	• - 0.8 A_{eff}	• - 0.0 A_{eff}
• **Derating position (horizontal)**	• - 0.6 A_{eff}	• - 0.0 A_{eff}	• - 0.0 A_{eff}

[1] Connection CN x-1 with x = 1...3, refer to Electrical connections (see 8.4.1 Lexium 62 ILD)

Derating diagrams



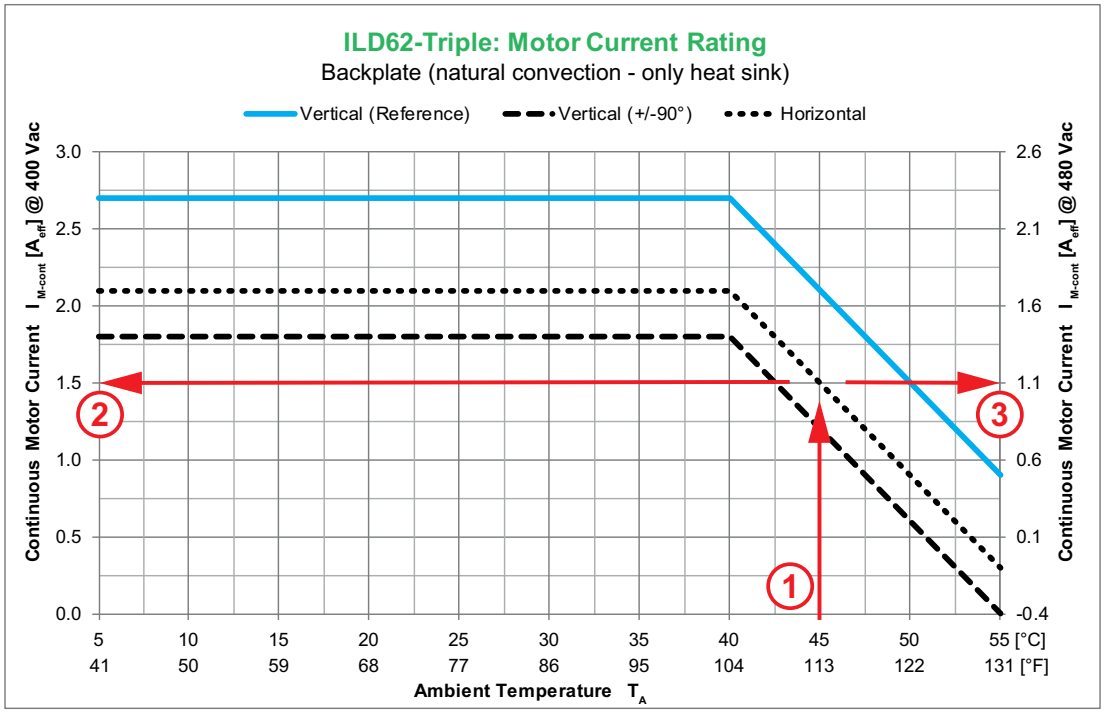


Calculation example

Calculation example for variant B (ILM62DDD24B••••), mounted on backplate, at 45 °C (113 °F), horizontal mounting position:

-	At 400 Vac	At 480 Vac
• **Rated current (8 kHz) at 40 °C (104 °F) (vertical)**	• 2.7 A_{eff} (at 400 Vac)	• 2.7 A_{eff} (at 400 Vac)
• **Derating mains voltage: U_{Mains} = 480 Vac**	• -	• - 0.4 A
• **Derating temperature at 45 °C (113 °F)**	• - 5 x 120 mA	• - 5 x 120 mA
• **Derating position (horizontal)**	• - 0.6 A	• - 0.6 A
Calculation	2.7 A - [(5x120 mA) + 0.6 A] = 2.7 A - 1.2 A = 1.5 A	2.7 A - [0.4 A + (5x120 mA) + 0.6 A] = 2.7 A - 1.6 A = 1.1 A

▪ You can also find the continous motor current in the diagram:
► Identify the intersection of the coordinate axis at 45 °C/113 °F (1) with the curve of the mounting position of the Lexium 62 ILD Triple Drive.
✓ At the y-axis on the left (2) you can find the admissible continous motor current at 400 Vac (1.5 A).
✓ At the y-axis on the right (3) you can find the admissible continous motor current at 480 Vac (1.1 A).


ILD62-Triple: Motor Current Rating
Backplate (natural convection - only heat sink)
Vertical (Reference)
Vertical (+/-90°)
Horizontal
Continuous Motor Current I M-cont [Aeff] @ 400 Vac
Continuous Motor Current I M-cont [Aeff] @ 480 Vac
3.0
2.5
2.0
1.5
1.0
0.5
0.0
2.6
2.1
1.6
1.1
0.6
0.1
-0.4
5 10 15 20 25 30 35 40 45 50 55 [°C]
41 50 59 68 77 86 95 104 113 122 131 [°F]
Ambient Temperature TA
1
2
3

8.4 Electrical connections

8.4.1 Lexium 62 ILD

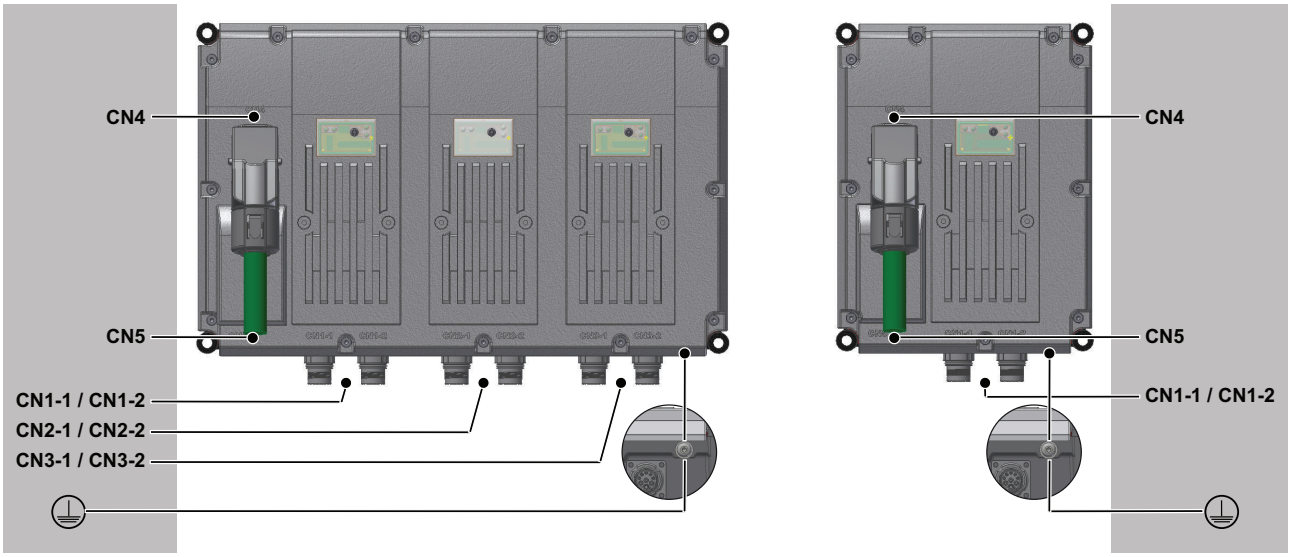


Figure 8-1: Connection overview (triple / single)

Connection	Meaning	Connection cross-section [mm²]/ [AWG]	Tightening torque [Nm] / [lbf in]
CN1-1 **CN2-1** **CN3-1**	Motor cable	- / -	- / -
CN1-2 **CN2-2** **CN3-2**	Encoder cable		
CN4	Lexium 62 Distribution Box (hybrid cable)	- / -	- / -
CN5	Reserved	- / -	- / -
⏚	Protective ground (earth)	2.5 / 13	3.5 / 30.98

Table 8-5: Connection overview Lexium 62 ILD

For pin assignment of the hybrid socket connector refer to Distribution Box ILM62DB.

CN4 - Hybrid socket connector

Pin	Designation	Description
1	IE_sig	Inverter Enable (differential signal)
2	IE_ref	
3	Hybrid cable or power cable detection	Hybrid cable or power cable detection
4	Hybrid cable or power cable detection	Hybrid cable or power cable detection
5	N.C.	Reserved
6	0V	Control voltage 0V
7	24V	Control voltage 24V
8.1	Rx+	Sercos port 1 - Input *
8.2	Tx-	Sercos port 1 - Output
8.3	Rx-	Sercos port 1 - Input
8.4	Tx+	Sercos port 1 - Output
9.1	Rx+	Sercos port 2 - Input *
9.2	Tx-	Sercos port 2 - Output
9.3	Rx-	Sercos port 2 - Input
9.4	Tx+	Sercos port 2 - Output
10	DC-	DC bus voltage -
11	Shield	Shielded connector
12	DC+	DC bus voltage +
13	PE	Protective ground (earth)
* Sercos port 1/ port 2 = Cat5e		

Table 8-6: Hybrid socket connector Lexium 62 ILD

Depending on the selected identification (address) mode in the SoMachine Motion Logic Builder, an interchanged connection of the Sercos 1/Sercos 2 connectors can lead to unintended machine operation.

⚠ WARNING

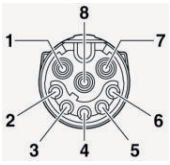
UNINTENDED MACHINE OPERATION

Ensure that the Sercos cables are connected to the Sercos connections CN4/CN5 of the Lexium 62 Connection Module according to the requirements of the application, its configuration and applicable standards.

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

Pin	Designation	Description
1	U	Motor phase
2	BR+	Holding brake
3	BR-	
4	Tmp+	Temperature sensor
5	Tmp-	
6	V	Motor phase
7	W	Motor phase
8	PE	Protective earth

Table 8-7: Motor cable connector M17 (CN1-1, CN2-1, CN3-1)



Pin	Designation	Description
1	ENC+10V	Power supply
2	SIN	Signal
3	REF SIN	Signal
4	COS	Signal
5	REF COS	Signal
6	DATA-	Signal
7	ENC 0V	Power supply
8	DATA+	Signal

Table 8-8: Encoder cable connector M17 (CN1-2, CN2-2, CN3-2)

8.5 Dimensions

8.5.1 Lexium 62 ILD

Lexium 62 ILD (single)

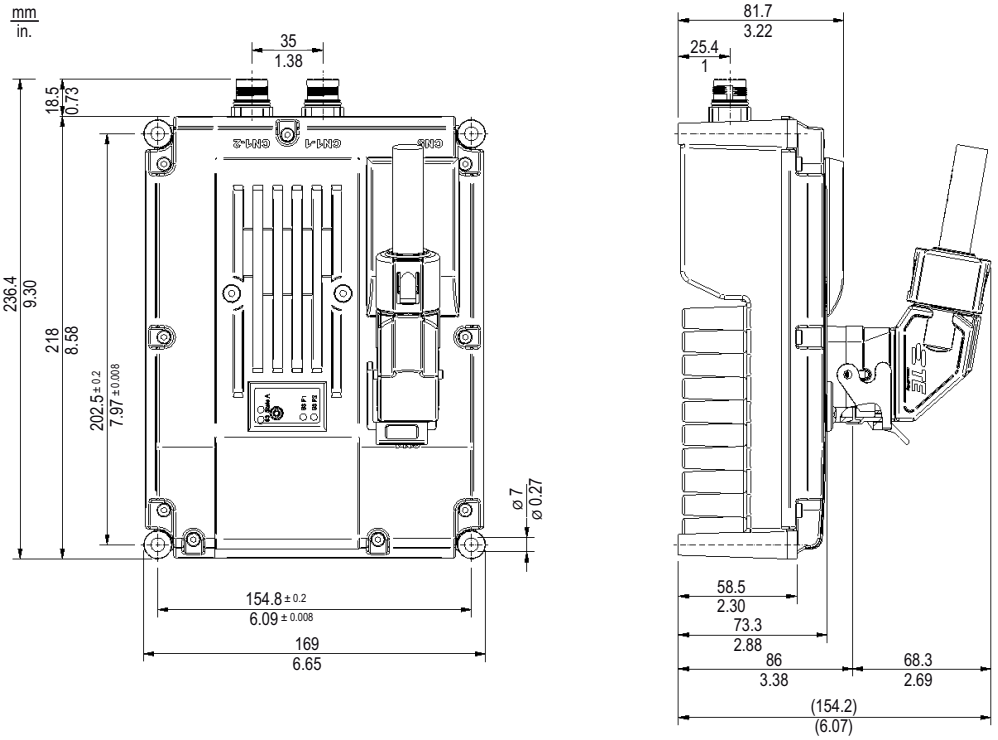


Figure 8-2: Dimensions of the Lexium 62 ILD (single)

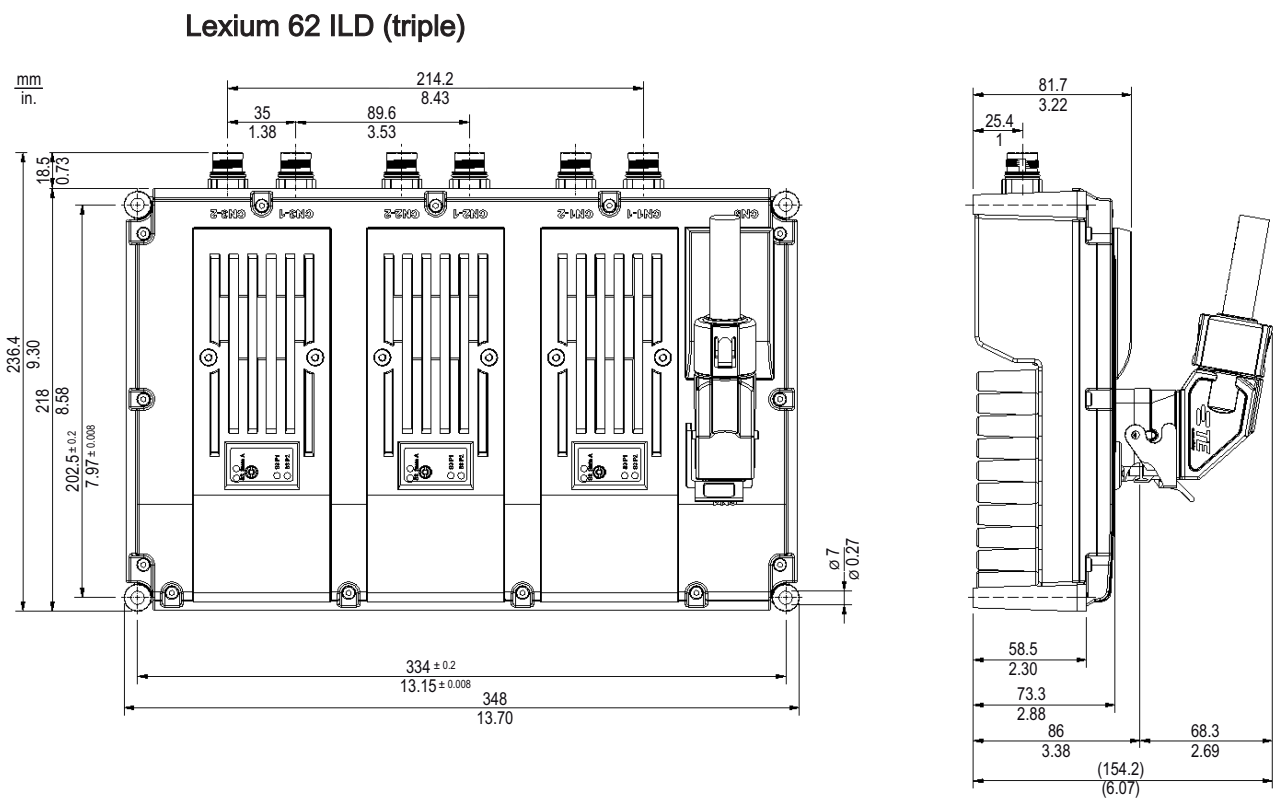


Figure 8-3: Dimensions of the Lexium 62 ILD (triple)

9 Appendix

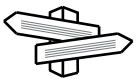
9.1 Contact addresses

Schneider Electric Automation GmbH

Schneiderplatz 1
97828 Marktheidenfeld, Germany
Phone: +49 (0) 9391 / 606 - 0
Fax: +49 (0) 9391 / 606 - 4000
Email: info-marktheidenfeld@schneider-electric.com
Internet: www.schneider-electric.com

Machine Solution Service

Schneiderplatz 1
D- 97828 Marktheidenfeld, Germany
Phone: +49 (0) 9391 / 606 - 3265
Fax: +49 (0) 9391 / 606 - 3340
Email: automation.support.de@schneider-electric.com
Internet: www.schneider-electric.com



See the homepage for additional contact addresses:
www.schneider-electric.com

9.2 Disposal

The components consist of different materials, which can be re-used and must be disposed of separately. The packaging cannot be returned to the manufacturer.

- Dispose of the packaging in accordance with the relevant national regulations.
- Dispose of the packaging at the disposal sites provided for this purpose.
- Dispose of Lexium 62 components in accordance with the applicable national regulations.

9.3 Units and conversion tables

9.3.1 Length

	in	ft	yd	m	cm	mm
in	-	/ 12	/ 36	* 0.0254	* 2.54	* 25.4
ft	* 12	-	/3	* 0.30479	* 30.479	* 304.79
yd	* 36	* 3	-	* 0.9144	* 91.44	* 914.4
m	/ 0.0254	/ 0.30479	/ 0.9144	-	*100	* 1000
cm	/ 2.54	/ 30.479	/ 91.44	/ 100	-	* 10
mm	/ 25.4	/ 304.79	/ 914.4	/ 1000	/ 10	-

9.3.2 Mass

	lb	oz	slug	0.22 kg	g
lb	-	* 16	* 0.03108095	* 0.4535924	* 453.5924
oz	/ 16	-	* $1.942559*10^{-3}$	* 0.02834952	* 28.34952
slug	/ 0.03108095	/ $1.942559*10^{-3}$	-	* 14.5939	* 14593.9
0.22 kg	/ 0.45359237	/ 0.02834952	/ 14.5939	-	* 1000
g	/ 453.59237	/ 28.34952	/ 14593.9	/ 1000	-

9.3.3 Force

	lb	oz	p	dyne	N
lb	-	* 16	* 453.55358	* 444822.2	* 4.448222
oz	/ 16	-	* 28.349524	* 27801	* 0.27801
p	/ 453.55358	/ 28.349524	-	* 980.7	* $9.807*10^{-3}$
dyne	/ 444822.2	/ 27801	/ 980.7	-	/ $100*10^{3}$
N	/ 4.448222	/ 0.27801	/ $9.807*10^{-3}$	* $100*10^{3}$	-

9.3.4 Power

	HP	W
HP	-	* 746
W	/ 746	-

9.3.5 Rotation

	min^{-1}(rpm)	rad/s	deg./s
min^{-1}(rpm)	-	* π / 30	* 6
rad/s	* 30 / π	-	* 57.295
deg./s	/ 6	/ 57.295	-

9.3.6 Torque

	lbf-in	lbf•ft	oz•in	Nm	kp•m	kp•cm	dyne•cm
lbf-in	-	/ 12	* 16	* 0.112985	* 0.011521	* 1.1521	* $1.129*10^{6}$
lbf•ft	* 12	-	* 192	* 1.355822	* 0.138255	* 13.8255	* $13.558*10^{6}$
oz•in	/ 16	/ 192	-	* $7.0616*10^{-3}$	* $720.07*10^{-6}$	* $72.007*10^{-3}$	* 70615.5
Nm	/ 0.112985	/ 1.355822	/ $7.0616*10^{-3}$	-	* 0.101972	* 10.1972	* $10*10^{6}$
kp•m	/ 0.011521	/ 0.138255	/ $720.07*10^{-6}$	/ 0.101972	-	* 100	* $98.066*10^{6}$
kp•cm	/ 1.1521	/ 13.8255	/ $72.007*10^{-3}$	/ 10.1972	/ 100	-	* $0.9806*10^{6}$
dyne•cm	/ $1.129*10^{6}$	/ $13.558*10^{6}$	/ 70615.5	/ $10*10^{6}$	/ $98.066*10^{6}$	/ $0.9806*10^{6}$	-

9.3.7 Moment of inertia

	lb•in²	lb•ft²	kg•m²	kg•cm²	kg•cm²•s²	oz•in²
lb•in²	-	/ 144	/ 3417.16	/ 0.341716	/ 335.109	* 16
lb•ft²	* 144	-	/3	*0.30479	*30.479	*304.79
kg•m²	* 3417.16	/ 0.04214	-	*0.9144	*91.44	*914.4
kg•cm²	* 0.341716	/ 421.4	/0.9144	-	*100	*1000
kg•cm²•s²	* 335.109	/ 0.429711	/91.44	/100	-	*10
oz•in²	/ 16	/ 2304	/ 54674	/ 5.46	/ 5361.74	-

9.3.8 Temperature

	°F	max	K
°F	-	(°F - 32) * 5/9	(°F - 32) * 5/9 + 273.15
max	°C * 9/5 + 32	-	°C + 273.15
K	(K - 273.15) * 9/5 + 32	K - 273.15	-

9.3.9 Conductor cross-section

AWG	1	2	3	4	5	6	7	8	9	10	11	12	13
mm²	42.4	33.6	26.7	21.2	16.8	13.3	10.5	8.4	6.6	5.3	4.2	3.3	2.6

AWG	14	15	16	17	18	19	20	21	22	23	24	25	26
mm²	2.1	1.7	1.3	1.0	0.82	0.65	0.52	0.41	0.33	0.26	0.20	0.16	0.13

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