

Lexium 62 ILM

Hardware Guide

Original instructions

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Safety Information

Important Information




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



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



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

 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.

About the Book

Document Scope

Read and understand the material contained in this manual before you work on Lexium 62 ILM drive for the first time. Take particular note of the chapter *Specific Safety Information*, page 10. Only those persons who meet the criteria described in *Qualification of Personnel*, page 15 are allowed to work with the Lexium 62 ILM components.

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

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

Follow the instructions within this manual to help:

- Reduce risks
- Reduce repair costs and downtime of the Lexium 62 ILM components.
- Increase the service life of the Lexium 62 ILM components.
- Increase reliability of the Lexium 62 ILM components.

Validity Note

This document has been updated for the release of EcoStruxure™ Machine Expert V2.0.2.

The characteristics that are described in the present document, as well as those described in the documents included in the Related Documents section below, can be found online. To access the information online, go to the Schneider Electric home page www.se.com/ww/en/download/.

The characteristics that are described in the present document should be the same as those characteristics that appear online. In line with our policy of constant improvement, we may revise content over time to improve clarity and accuracy. If you see a difference between the document and online information, use the online information as your reference.

Related Documents

Document title	Reference
EcoStruxure Machine Expert Programming Guide	EIO0000002854 (ENG) EIO0000002855 (FRE) EIO0000002856 (GER) EIO0000002857 (ITA) EIO0000002858 (SPA) EIO0000002859 (CHS)
LXM62LT00A01000 Lexium 62 DC Link Terminal, Instruction Sheet	NVE50846 (ENG)
SH3 Servo Motor - User Guide	0198441113987 (ENG)
VW3E702100000 Optional module - ILM62-iSH-DIO8 I/O module Instruction Sheet	VM08548

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:

Standard	Description
IEC 61131-2:2007	Programmable controllers, part 2: Equipment requirements and tests.
ISO 13849-1:2015	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
EN 60204-1:2006	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
ISO 14119:2013	Safety of machinery - Interlocking devices associated with guards - Principles for design and selection
ISO 13850:2015	Safety of machinery - Emergency stop - Principles for design
IEC 62061:2015	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 61784-3:2016	Industrial communication networks - Profiles - Part 3: Functional safety fieldbuses - General rules and profile definitions.
2006/42/EC	Machinery Directive
2014/30/EU	Electromagnetic Compatibility Directive
2014/35/EU	Low Voltage Directive

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

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

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

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

Specific Safety Information

Overview

This chapter contains important safety information regarding working with the Lexium 62 ILM.

Product Related Information

Overview

Health and safety risks arising from the Lexium 62 ILM have been reduced. However residual risks remain, since the Lexium 62 ILM components work with electrical voltage and electrical currents as well as initiation of movement that may be hazardous depending on your machine design.

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).

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 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.
- Connect and disconnect cables and terminals only after you have verified that the power has been removed from the system.

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

Assembly and Handling

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

⚠ DANGER**INSUFFICIENT GROUNDING**

- Use a protective ground copper conductor with at least 10 mm² (AWG 6) or two protective ground copper 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.

Hot Surfaces

The metal surfaces of the product may exceed 65 °C (149 °F) (for bare metal) 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.

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.

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

NOTE: 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 undetermined settings and data.
- Perform comprehensive commissioning tests that include verification of configuration settings and data that determine position and movement.

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

PELV Circuits

⚠ DANGER

ELECTRIC SHOCK DUE TO INADEQUATE PROTECTIVE SEPARATION

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

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

Intended Use

Installation

Install and operate this equipment in a control cabinet (enclosure) appropriately rated for its intended environment and secured by a keyed or tooled locking mechanism.

The Lexium 62 ILM and the Lexium 62 Distribution Box are intended for the 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 safety 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 ILM components, then immediately shut down the Lexium 62 ILM components and contact your Schneider Electric representative.

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.

There are no user-serviceable parts in the Lexium 62 ILM system. Do not attempt to modify the Lexium 62 ILM 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.

Environment Restrictions

The components must not be used in the following 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.

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 ISO 13849-1. 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.

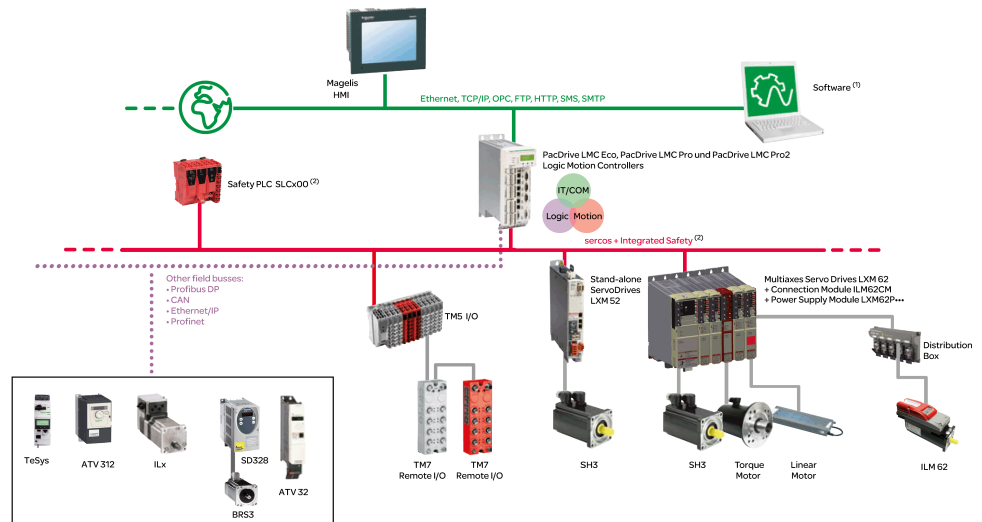
System Overview

System Overview

System Overview

The control system consists of several components, depending on its application.

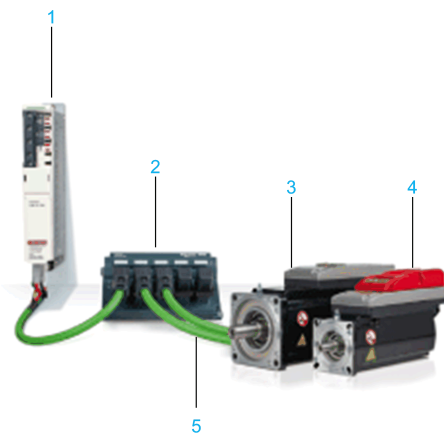
PacDrive 3 system overview:



(1) EcoStruxure Machine Expert Software

(2) Safety Logic Controller according to IEC 61508:2010 and EN ISO 13849:2015

Lexium 62 ILM system overview:



1 Lexium 62 Connection Module

2 Lexium 62 Distribution Box


3 Lexium 62 ILM Integrated Servo Drive

4 Lexium 62 ILM with Safety Module

5 Hybrid Cable

Lexium 62 Power Supply

Overview

Product	Description
	<p>The central Lexium 62 Power Supply, using a common DC bus, supplies the connected Lexium 62 servo drive(s) with the required power.</p> <p>For further information, refer to:</p> <ul style="list-style-type: none"> • <i>Installation and Maintenance</i>, page 57 • <i>Indicators of the Lexium 62 Power Supply</i>, page 88 • <i>Electrical Connections for the Lexium 62 Power Supply</i>, page 95 • <i>Mechanical and Electrical Data for the Lexium 62 Power Supply</i>, page 110

References

Product	Reference
Power supply	LXM62PD20A11000 LXM62PD84A11000

Type Code

Item	Meaning									
Product family	LXM = Lexium									
Size	62 = Lexium 62									
Type	P = Power Module									
Peak current	D84 = 84 A D20 = 20 A									
Variants	A = Power Supply Module									
Options	1 = 1 or 3 Phases x 208...480 Vac									
Hardware release	1									
Internal	0 = Serial production									
Customer	00 = Standard									
Type code (example)	LXM	62	P	D84	A	1	1	0	00	

Technical Nameplate

The technical nameplate is located laterally on housing.

Label	Meaning
LXM62PDxxxxxxx	Device type and Unicode
Input ac/dc	Input voltage and/or input current (rated- and/or peak value per input)
Output dc	Output voltage and output current (rated and/or peak value per output)
IP20	Degree of protection
Symbols	This field displays the symbols of declarations and certifications

Logistic Nameplate


The logistic nameplate is located on top of the housing.

Label	Meaning
LXM62PDxxxxxxx	Device type and Unicode
2528044067	Serial number
RS:01	Hardware revision
DOM	Date of manufacture
Symbols	This field displays the symbols of declarations and certifications

Lexium 62 Connection Module

Overview

The Lexium 62 Connection Module simplifies the wiring of the devices. With the Lexium 62 Connection Module you can connect up to 45 servo drives.

Product	Description
	<p>The Lexium 62 Connection Module supplies the Lexium 62 ILMs with DC voltage from the DC bus via a hybrid cable or a power cable (daisy chain wiring). Additionally, the Lexium 62 Connection Module provides the Inverter Enable and Sercos interface.</p> <p>For further information, refer to:</p> <ul style="list-style-type: none"> • <i>Installation and Maintenance</i>, page 57 • <i>Indicators of the Lexium 62 Connection Module</i>, page 90 • <i>Electrical Power Connection of the Lexium 62 Connection Module</i>, page 98 • <i>Mechanical and Electrical Data for the Lexium 62 Connection Module</i>, page 112

References

Product	Reference
Lexium 62 Connection Module	ILM62CMD20A000

Type Code

Item	Meaning						
Product family	ILM = Integrated Lexium Servo Module						
Size		62 = Lexium 62					
Type				CM = Connection Module			
Power (cont. DC Bus current)				D20			
Variants						A	
Internal						0 = Serial production	
Customer							00 = Standard
Type code (example)	ILM	62	CM	D20	A	0	00

Technical Nameplate

The technical nameplate is located laterally on housing.

Label	Meaning
ILM62CMxxxxxxx	Device type and Unicode
Input dc	Input voltage and/or input current (rated- and/or peak value per input)
Output ac/dc	Output voltage and output current (rated and/or peak value per output)
IP20	Degree of protection
Symbols	This field displays the symbols of declarations and certifications


Logistic Nameplate

The logistic nameplate is located on top of the housing.

Label	Meaning
ILM62xxxxxxxxxx	Device type and Unicode
2528044067	Serial number
RS:01	Hardware revision
DOM	Date of manufacture
Symbols	This field displays the symbols of declarations and certifications

Lexium 62 Distribution Box

Overview

Product	Description
	<p>The Lexium 62 Distribution Box is the link between Lexium 62 Connection Module and Lexium 62 ILM. Depending on the number of drives, 1 to 4 Lexium 62 ILMs or daisy chain lines can be connected. When operating more than four drives, expand the system by using more Lexium 62 distribution boxes.</p> <p>For further information, refer to:</p> <ul style="list-style-type: none"> • <i>Installation and Maintenance</i>, page 57 • <i>Indicators of the Lexium 62 Distribution Box</i>, page 91 • <i>Electrical Connections for the Lexium 62 Distribution Box</i>, page 102 • <i>Mechanical and Electrical Data for the Lexium 62 Distribution Box</i>, page 114

The highlights:

- 1...4 connections for Lexium 62 ILMs or daisy chain lines or further Lexium 62 distribution boxes.
- Pre-assembled hybrid cables or power cables (Daisy Chain wiring).

References

Product	Reference
Lexium 62 Distribution Box	ILM62DB4A000
Sercos bridge plug	VW3E6023

Type Code

Item	Meaning						
Product family	ILM = Integrated Lexium Servo Module						
Size	62 = Lexium 62						
Type	DB = Distribution Box						
Hybrid outputs	4						
Variants	A						
Internal	0						
Customer	0						
Type code (example)	ILM	62	DB	4	A	0	00

Technical Nameplate

The technical nameplate is located laterally on housing:

Label	Meaning
ILM62DBxxxxx	Device type and Unicode
Input dc	Input voltage and/or input current (rated- and/or peak value per input)
Output ac/dc	Output voltage and output current (rated and/or peak value per output)


Label	Meaning
IP65	Degree of protection
Symbols	This field displays the symbols of declarations and certifications

Logistic Nameplate

Label	Meaning
ILM62DBxxxxx	Device type and Unicode
2328234578	Serial number
RS:01	Hardware revision
DOM	Date of manufacture

Lexium 62 ILM Integrated Servo Drive

Overview

Product	Description
	<p>The Lexium 62 ILM combines motor, power stage, and digital servo controller for an axis in a space-saving housing. Due to its compact design with the integrated drive, it is suitable for decentralized, distributed architectures. It is available with single-turn or multi-turn encoders, and simplifies configuration with the aid of the electronic nameplate in the Lexium 62 ILM.</p> <p>For further information, refer to:</p> <ul style="list-style-type: none"> • <i>Installation and Maintenance</i>, page 57 • <i>Indicators of the Lexium 62 ILM Integrated Servo Drive</i>, page 92 • <i>Electrical Connections for the Lexium 62 ILM Integrated Servo Drive</i>, page 104 • <i>Mechanical and Electrical Data for the Lexium 62 ILM Integrated Servo Drive</i>, page 120

The Lexium 62 ILMs are available in three different flange sizes:

- ILM070 (70 mm / 2.76 in.)
- ILM100 (100 mm / 3.94 in.)
- ILM140 (140 mm / 5.51 in.)

The Lexium 62 ILMs have been derived from the Schneider Electric SH3 family of motors, and therefore share many characteristics. For instance, when it comes to mounting the motor, the Lexium 62 ILMs are equivalent.

The highlights:

- Compact design
- 3.5 times peak torque
- Integrated Sercos interface
- High-resolution single or multi-turn encoder
- Degree of protection IP65 (depending on the reference and/or options)

References

Product	Reference
Lexium 62 ILM Integrated Servo Drive	<ul style="list-style-type: none"> • ILM0701P..... • ILM0702P..... • ILM0703P..... • ILM1001P..... • ILM1002P..... • ILM1003P..... • ILM1401P..... • ILM1401M..... • ILM1402P.....

Type Code

Item	Meaning									
Product family	ILM = Integrated Lexium Servo Module									
Flange size	070 = 70 mm / 2.76 in. 100 = 100 mm / 3.94 in. 140 = 140 mm / 5.51 in.									
Number of stacks	1 = 1 Stack 2 = 2 Stacks 3 = 3 Stacks									
Winding type	P = Standard M = Optimized in terms of torque (available only with ILM1401)									
Shaft, page 129	0 = Smooth shaft, without shaft seal 1 = Parallel key, without shaft seal 2 = Smooth shaft, with shaft seal, IP65 3 = Parallel key, with shaft seal, IP65									
Encoder, page 129	1 = Absolute single-turn 128 SinCos periods per revolution 2 = Absolute multi-turn 128 SinCos periods per revolution									
Holding brake, page 131	A = Without holding brake F = With holding brake									
Variants	0									
Internal	0 = Standard production									
Customer	00 = Standard									
Type code (example)	ILM	070	1	P	0	1	A	0	0	00

Technical/Logistic Nameplate


Label	Meaning
ILMxxxxxxxxxxx	Device type, see type code
SN	Serial number
Input 1	Rated voltage and rated current of the power supply
Input 2	Rated voltage and rated current of the electronics
Type rating	Degree of protection of the housing in accordance with NEMA 250 and UL 50.

Label	Meaning
HW	Hardware version
SW	Software version
IPxx	Degree of protection
Th-Cl	Insulation material class of the motor
M0	Standstill torque
Mmax	Peak torque
nN	Nominal speed of rotation
DOM	Date of manufacture
Symbols	This field displays the symbols of declarations and certifications.

Lexium 62 ILM Digital I/O Module

Overview

Option Module for Lexium 62 ILM Integrated Servo Drive: ILM62-iSH-DIO8 I/O module.

Product	Description
	Lexium 62 ILM Digital I/O Module with 8 digital inputs or outputs. For further information, refer to the chapter <i>Lexium ILM 62 Digital I/O Module</i> , page 137.

Reference

Product	Reference
Digital I/O Module	VW3E702100000

Type Code

Item	Meaning
Product family	VW3 = Integrated Lexium
Size	E = PacDrive 3
Type	7 = Option Modules
Drawing reference	021 = I/O Option Module for Lexium 62 ILM
Internal	00000
Type code (example)	VW3 E 7 021 00000

Technical/Logistic Nameplate Description

Label	Meaning
ILM62-iSH-DIO8 I/O module	Device type and Unicode
VW3E702100000	Commercial reference
2910229412	Serial number

Label	Meaning
DOM	Date of manufacture
HW	Hardware version
FW	Firmware version

Lexium 62 ILM Safety Module

Overview

Option module for Lexium 62 ILM integrated servo drive.

Product	Description
	<p>Lexium 62 ILM Safety Module manages the safety-related motion functions via Sercos bus.</p> <ul style="list-style-type: none"> • Safe Torque off (STO) • Safe Stop 1 (SS1) • Safe Operating Stop (SOS) • Safe Stop 2 (SS2) • Safe Maximum Speed (SMS) • Safely-Limited Speed (SLS) • Safe Direction Indication (SDI) <p>For further information, refer to the chapter <i>Lexium 62 ILM Safety Module</i>, page 146.</p>

Reference

Product	Reference
Safety Module	VW3E702200000

Type Code

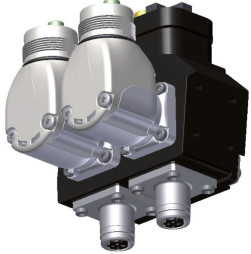
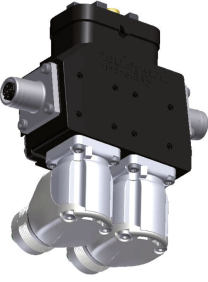

Item	Meaning
Product family	VW3 = Integrated Lexium
Size	E = PacDrive 3
Type	7 = Option Modules
Drawing reference	022 = Safety Option Module for Lexium 62 ILM
Internal	00000
Type code (example)	VW3 E 7 022 00000

Technical/Logistic Nameplate Description

Label	Meaning
Lexium 62 ILM safety option module	Device type and Unicode
VW3E702200000	Commercial reference
2910171253	Serial number
DOM	Date of manufacture
HW	Hardware version
FW	Firmware version

ILM Daisy Chain Connector Box

Overview

Product	Description
<p>Type A</p>  <p>ILM62DCA000</p>	<p>The ILM Daisy Chain Connector Box is mounted on a Lexium 62 ILM in order to enable a daisy chain wiring.</p> <p>The Lexium 62 ILMs can be either connected to the Lexium 62 Distribution Box or directly to a Lexium 62 Connection Module. Refer to <i>Wiring from the Lexium 62 Connection Module in a Daisy Chain Topology</i>, page 69.</p> <p>When connecting to a Lexium 62 Distribution Box, a larger number of drives can be connected.</p> <p>Power (DC bus voltage/24 V/Inverter Enable signals) and Sercos signals are distributed via separate cables. Each Lexium 62 ILM must be extended by a Daisy Chain Connector Box (refer to <i>Mounting</i>, page 62). If only one Lexium 62 Distribution Box is used, then up to four daisy chain lines can be connected to it. If several Lexium 62 distribution boxes are used, then from the first Lexium 62 Distribution Box up to and including the second last Lexium 62 Distribution Box up to three daisy chain lines can be connected. The last Lexium 62 Distribution Box can then have up to four daisy chain lines connected. A daisy chain line can consist of up to nine Lexium 62 ILMs.</p>
<p>Type B</p>  <p>ILM62DCB000</p>	
<p>Type C</p>  <p>ILM62DCC000</p>	

For further information, refer to:

- *Electrical Connections for the ILM Daisy Chain Connector Box*, page 105
- *Mechanical and Electrical Data for the ILM Daisy Chain Connector Box*, page 116

The connection between the Lexium 62 ILMs is established as follows (refer to *Wiring from the Lexium 62 Connection Module in a daisy chain topology*, page 69):

- Power cable for power distribution (DC bus voltage/24V/Inverter Enable signals) with an M23 connector
- Sercos cable for distribution of the Sercos signals via M12 connector

Reference

Product	Reference
ILM Daisy Chain Connector Box	<ul style="list-style-type: none"> • ILM62DCA000 • ILM62DCB000 • ILM62DCC000

Type Code

Item	Meaning					
Product family	ILM = Integrated Lexium Servo Module					
Size	62 = Integrated Lexium 62					
Type	DC = Daisy Chain Connector Box					
Series	<p>A = Power at back, Sercos at bottom (ILM070, ILM100, ILM140)</p> <p>B = Power at bottom, Sercos at left and right (ILM070)</p> <p>C = Power at bottom, Sercos at left and right (ILM100)</p> <p>Z = Protection cap for the last M23 connector</p>					
Internal	0 = Serial production					
Customer	00 = Standard					
Type code (example)	ILM	62	DC	A	0	00

Engineering

Electromagnetic Compatibility, EMC

Electromagnetic Compatibility, EMC

Electromagnetic Disturbances of Signals and Devices

This product meets the EMC requirements according to the standard IEC 61800-3 if the measures described in this manual are implemented during installation.

Signal interference can cause unexpected responses of the drive and of other equipment in the vicinity of the drive.

⚠ WARNING

SIGNAL AND EQUIPMENT INTERFERENCE

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

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

⚠ 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.

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.

Layout Control Cabinet (Enclosure)

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:

EMC measures	Objective
Use galvanized or chromium-plated sub plates, bond metallic parts across large surface areas, remove paint layer from contact surfaces.	Good conductivity by surface area contact.
Ground control cabinet (enclosure), door, and sub plates by using grounding strips or grounding cables with a cross-section of 10 mm ² (AWG 6).	Reduce emission.
Supplement switch devices such as contactors, relays, or magnetic valves with interference suppression combinations or spark suppressor elements (for example, diodes, varistors, RC elements).	Reduces mutual interference.
Fit power and control components separately.	Reduces mutual interference.

Shielded Cables

EMC measures	Objective
Connect large surface areas of cable shields, use cable clamps and ground straps.	Reduce emission.
Ground shields of digital signal wires at both ends by connecting them to a large surface area or via conductive 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 Installation

EMC measures	Objective
Do not route fieldbus cables and signal wires in a single cable duct together with lines with DC and AC voltages of more than 60 V. (Fieldbus cables, signal lines, and analog lines may be in the same cable duct) Recommendation: Use separate cable ducts at least 20 cm (7.84 in) apart.	Reduces mutual interference.
Keep cables as short as possible. Do not install unnecessary cable loops, use short cables from the central grounding point in the control cabinet to the external ground connection.	Reduces capacitive and inductive interference.
Use equipotential bonding conductors (stranded wire of equal potential at all grounding locations connected to an equipotential grounding plane) in the following cases: wide-area installations, different voltage supplies, and installation across several buildings.	Reduces current in the cable shield, reduces emissions.
Use stranded wire potential equalization conductor.	Discharging of high frequency interference currents.
If motor and machine are not connected in a conducting fashion, for example, due to an insulated flange or a connection not across a full surface, the motor must be grounded via a grounding cable with a minimum 4 mm ² (AWG 11) cross-section or a grounding strip with a length as short as possible.	Reduce emissions, increase interference resistance.
Use twisted pair for 24 Vdc signals.	Reduce interference action on signal cables, reduce emissions.

Power Supply

EMC measures	Objective
Operate product on mains with grounded neutral point.	Enables effectiveness of mains filter.
Use surge arrester if there is a risk of overvoltage.	Reduces the risk of damage caused by overvoltage.

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 reactor (choke)	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, for example, within an enclosed control cabinet complete with 15 dB attenuation of the interferences emitted	Improvement of the EMC limit values.

Control Cabinet Planning

Degree of Protection (IP)

Overview

Install components such that a degree of protection corresponding to the actual operational environment is set up.

For more information on the degree of protection of the component, refer to *Ambient Conditions*, page 109.

The following ambient conditions may damage the components:

- Oil
- Moisture
- Electromagnetic interference
- Ambient temperature
- Metal dust deposits

⚠ WARNING
<p>UNINTENDED EQUIPMENT OPERATION</p> <ul style="list-style-type: none"> • Observe and conform to ambient temperatures, storage temperatures and transport temperatures of the individual components as specified 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. <p>Failure to follow these instructions can result in death, serious injury, or equipment damage.</p>

Mechanical and Climatic Environmental Conditions in the Control Cabinet

Overview

Step	Action
1	Observe the climatic and mechanical ambient conditions. For more information on the general climatic and mechanical environmental conditions according to IEC 60721, refer to <i>Ambient Conditions</i> , page 109.
2	Verify the technical data of the device whether the permitted deviations (for example, higher shock load or higher temperature) are specified.

Using Cooling Units

Installing a Cooling Unit

How to proceed when installing a cooling unit:

Step	Action
1	Position the cooling units so that no condensate drips out of the cooling unit onto electronic components or is sprayed by the cooling air flow.
2	Provide specially designed control cabinets for cooling units on the top of the control cabinet.
3	Design the control cabinet so that the cooling unit fan cannot spray any accumulated condensate onto the electronic components when it restarts after a pause.
4	When using cooling units, use only well-sealed control cabinets so that warm, humid outside air, which causes condensation, does not enter the cabinet.
5	When operating control cabinets with open doors during commissioning or maintenance, ensure that the electronic components are at no time cooler than the air in the control cabinet after the doors are shut, in order to avoid any condensation.
6	Continue to operate the cooling unit even when the system is switched off, so that the temperature of the air in the control cabinet and the air in the electronic components remains the same.
7	Set cooling unit to a fixed temperature of 40 °C (104 °F) or lower.
8	For cooling units with temperature monitoring, set the temperature limit to 40 °C (104 °F) so that the internal temperature of the control cabinet does not fall below the external air temperature.

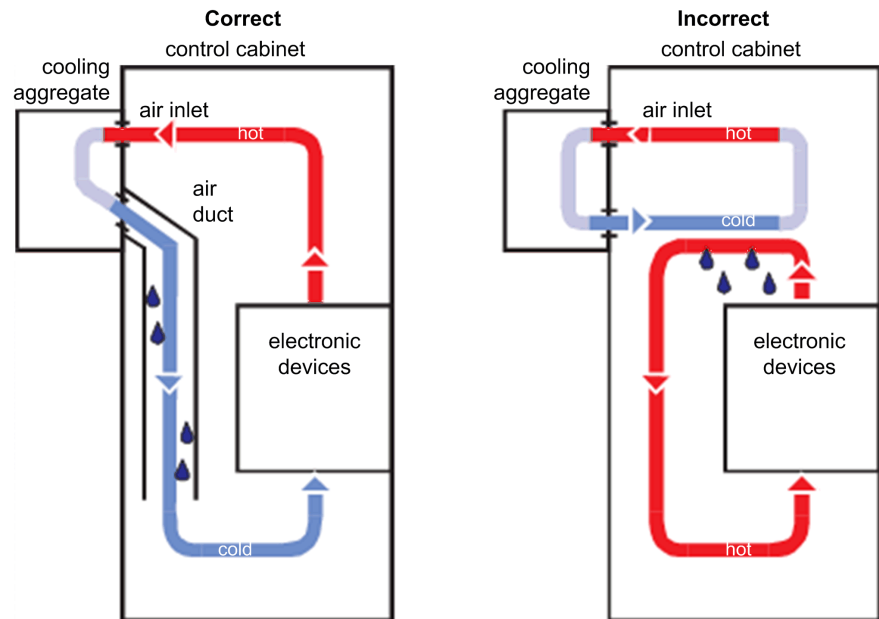
⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Follow the installation instructions such that the condensation from the cooling unit can not enter electrical equipment.

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

Installing a cooling unit



Information about Wiring

General Information about Wiring

Overview

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

For further information, refer to *Cable Characteristics*, page 32.

Use an appropriate torque indication or screwdriver for tightening connections.

Observe and implement 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, equipotential 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 connection terminals when under power.
7. Ensure that all ground connections have sufficient surface area continuity.
8. Do not interchange motor phases.
9. Do not interchange encoder connections.
10. 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 type refer to *Cable Characteristics*, page 32.
11. Do not interchange the emergency stop circuits. This has to be observed especially when two different safety-related circuits are used for axis A and axis B of the Lexium 62 Double Drive.

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.

⚠ DANGER

INCORRECT OR UNAVAILABLE GROUNDING

Remove paint across a large surface at the installation points before installing the devices (bare metal connection).

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

Cable Characteristics

Overview

Cable characteristics of the hybrid cable:

Property	Value
Hybrid cable voltage isolation	1000 V
Maximum continuous current	<ul style="list-style-type: none"> • DC Bus: 20 A • 24 Vdc: 20 A
Temperature range	-40...+80 °C / -40...+176 °F
Cable diameter	14.8 ± 0.3 mm (0.58 ± 0.012 in.)
Bending radius	Five x diameter (fixed routing) 10 x diameter (mobile, 5 million bending cycles)
Sheath	PUR, oil resistant, halogen-free

The hybrid cable (daisy chain wiring) is drag chain capable.

Cable characteristics of the power cable (daisy chain wiring):

Property	Value
Voltage isolation	1000 V
Maximum continuous current	<ul style="list-style-type: none"> • DC Bus: 20 A • 24 Vdc: 20 A
Temperature range	-40...+80 °C / -40...+176 °F (fixed routing) -25...+80 °C / -13...+176 °F (mobile)
Cable diameter	11.7 ± 0.3 mm (0.45 ± 0.012 in.)
Bending radius	5 x diameter (fixed routing) 10 x diameter (mobile, 5 million bending cycles)
Sheath	PUR, oil resistant, halogen-free, flame-retardant

The power cable (daisy chain wiring) is drag chain capable.

Cable characteristics of the Sercos cable (daisy chain wiring):

Property	Value
Voltage isolation	300 V
Temperature range	-20...+60 °C / -4...+140 °F
Cable diameter	6.7 ± 0.2 mm (0.26 ± 0.008 in.)
Bending radius	5 x diameter (fixed routing) 10 x diameter (mobile, 5 million bending cycles)

Property	Value
Sheath	PUR, halogen-free, flame-retardant
Cable type and shielding	CAT6 with S/FTP (Sercos III)

ESD Protection Measures

General

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

NOTICE
<p>ELECTROSTATIC DISCHARGE</p> <ul style="list-style-type: none"> • Do not touch any of the electrical connections or components. • Touch circuit boards only on the edges. • Take the necessary protective measures against electrostatic discharges. <p>Failure to follow these instructions can result in equipment damage.</p>

Conditions for UL / CSA Compliant Use

General

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

- Install the “open type equipment” Lexium 62 ILM system at a maximum surrounding air temperature of 40 °C / 55 °C with derating.
- Only connect the power supply to a mains supply with a maximum short circuit current of 22 kA or, alternatively, take appropriate measures according to UL508A SB4 in the supply circuit of the control cabinet to limit the short circuit current to 22 kA maximum. This does not apply to operation in accordance with CSA 22.2 No. 14. Here, it is only permissible to operate the device for a maximum short circuit current of 5 kA.
- Use devices only in connection with a Lexium 62 Power Supply.
- To protect the power supply, use a class J fuse according to UL248 with a maximum fuse rating of 60 A / 600 Vac.
- Only use hybrid connection cable approved by Schneider Electric and comply with the requirements of NFPA 79.

Short-Circuit Current Rating (SCCR)

Only connect the Lexium 62 Drive System to a mains supply network not exceeding the non-operational case of SCCR (Short Circuit Current Rating) from following table, or take appropriate measures according to UL 508 A SB4 in the supply (feeder) circuit of the control cabinet to limit the short circuit current to a value below the least SCCR of those devices you are using from the following table.

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 invalid condition has been interrupted. To reduce the risk of fire or electric shock, current-carrying parts and other components of the controller must 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**FIRE, ELECTRIC SHOCK OR ARC FLASH**

Examine and replace if necessary any current-carrying parts or other motor control components in the case of mains- or branch-circuit protection activation.

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

According to CSA 22.2 No.14, only a short circuit current rating of 5 kA is permissible.

NOTE: Line reactors according to UL 508 A (SB 4.2.1 Exception No. 1) are not required to have a short-circuit current rating (SCCR).

Notes on Wiring

- For the wiring of the Lexium 62 Power Supply, use at least 60 °C (140 °F) / 75 °C (167 °F) copper conductors.
- Choose the cross-section according to the load of the system and selected overload protection in your application.

Consider the applicable cross section for the terminal blocks according to following tables:

For Lexium 62 Power Supply

Connection	Torque [Nm] / [lbf in]	Connection cross section [mm ²] / [AWG] ⁽¹⁾
CN1	2.5 / 22	N/A
CN5	N/A	0.5...16 / 20...6
CN6	N/A	0.75...16 / 18...6
CN7	N/A	0.2...6 / 24...10
CN4	N/A	0.5...1.5 / 20...16

(1) 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.

DC Bus Coupling

When using the DC bus connection on **CN7** of the Lexium 62 Power Supply, ensure that the current is limited to 35 A via this connection with an appropriate fuse or circuit breaker.

Fusing the Mains Connection**General**

This data is only valid for fusing the mains connection of each Lexium 62 Power Supply module:

- Protect the power supply against any short-circuit and overload using appropriate measures.
- Set the overload protection depending on the permanent current of the device:
 - Lexium 62 Power Supply (LXM62PD84A11000) maximum of 40 A (3-phase),
 - Lexium 62 Power Supply (LXM62PD20A11000) maximum of 10 A (3-phase).

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 system 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. In any and all cases, determine the source of the opening of the branch-circuit protection before re-applying power to the system.

⚠ DANGER

FIRE, ELECTRIC SHOCK OR ARC FLASH

Examine and replace if necessary any current-carrying parts or other motor control components in the case of mains- or branch-circuit protection activation.

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

Allowable Combinations

Combine mains contactor and motor protection switch for protection of a Lexium 62 Power Supply as follows:

Mains current	DC bus current (with mains lines reactor)	Connection type	Protection Lexium 62 Power Supply (LXM62PD20A11000)	Protection Lexium 62 Power Supply (LXM62PD84A11000)
16 A	≤ 8 A	1-phase	Circuit breaker iC60N, characteristic C, 16 A	–
20 A	≤10 A	1-phase	Circuit breaker iC60N, characteristic C, 20 A	–
9.5 A	≤ 10 A	3-phase	TeSys Model U LUB12 with LUCA12BL (set the tripping level of the TeSys modules to the mains current)	–
12 A	≤ 12.5 A	3-phase	–	TeSys Model U LUB12 with LUCA12BL (set the tripping level of the TeSys modules to the mains current)
18 A	≤19 A	3-phase	–	TeSys Model U LUB32 with LUCA18BL (set the tripping level of the TeSys modules to the mains current)
32 A	≤ 33.5 A	3-phase	–	TeSys Model U LUB32 with LUCA32BL (set the tripping level of the TeSys modules to the mains current)
40 A	≤ 42 A	3-phase	–	Mains contactor LC1D40ABD motor protection switch GV3P40

Limit the external 24 Vdc supply to the Lexium 62 Power Supply module with adequate means to 50 A.

Mains Contactor

General

The selection of the mains contactor must be in accordance with the protection requirements of the mains line.

Mains Filter

Overview

The products described in the present document meet the EMC requirements in accordance with the standard IEC/EN 61800-3, if the EMC measures described in this manual are complied with during the installation. The values are based on the reference application specified in the manual. Refer to *Electromagnetic Compatibility, EMC*, page 27.

The connected cable length and the number of connected motors has no significant influence on the grid-bound emitted interference. Thus, no external mains filter is required when only the Lexium 62 ILM related components are used.

In the case of a mixed system using the Lexium 62 Servo Drives combined with the Lexium 62 ILM components, the selection of the external mains filter depends on the devices installed in the control cabinet and the motor supply cables. The hybrid cable or power cable (with daisy chain wiring) of the Lexium 62 ILM is not considered as motor supply cables.

NOTE: For additional information on mains filtering, contact your Schneider Electric representative.

Mains Line Reactor (Choke)

Overview

A mains line reactor (choke) is required for the application. A mains line reactor is necessary to reduce the harmonics of the mains current. The mains line reactor must have at least 4% voltage drop at rated load.

With UL/CSA Certification

Mains line reactor with UL / CSA certification:

- Schneider Electric: VPM05D100000 for architectures up to 10 A
- Schneider Electric: VPM05D250000 for architectures up to 25 A
- Schneider Electric: VPM05D500000 for architectures up to 50 A
- Schneider Electric: VW3A4551 for architectures up to 4 A
- Schneider Electric: VW3A4552 for architectures up to 10 A
- Schneider Electric: VW3A4553 for architectures up to 16 A
- Schneider Electric: VW3A4554 for architectures up to 30 A
- Schneider Electric: VW3A4555 for architectures up to 60 A

A shielded version of the connection cables is not required.

NOTE: Verify that the rated current of the mains line reactor is above preset overload protection of the protective device.

Correlation Between Mains Current and DC Bus Current (3-Phase Operation)

The mains current is approximately the same as the DC bus current and corresponds to the current of the mains line reactor. For the design of the mains line reactor, use a dimensioning of the mains current of 100% to 110% of the DC bus current.

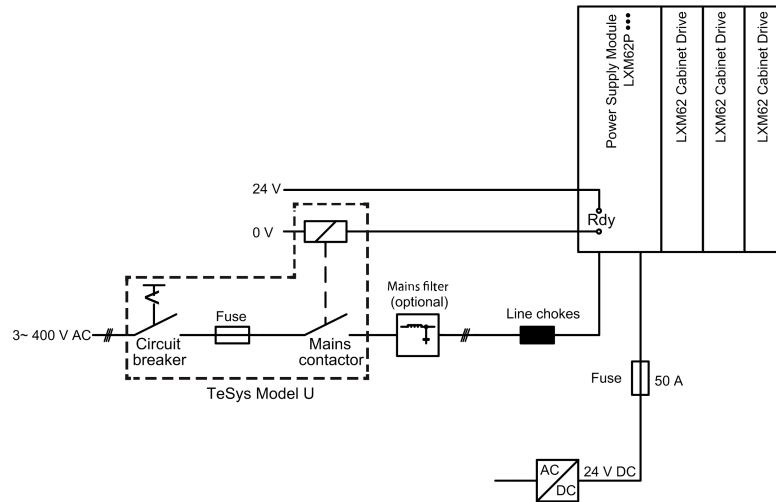
Mains Line Reactor and External Mains Filter

If a mains line reactor and an external mains line reactor are required, the mains line reactor and external mains filter must be arranged according to the following illustrations for EMC reasons.

Connection of the Lexium 62 Power Supply

Overview

Connection of a Lexium 62 Power Supply



NOTE: The 24 Vdc supply input current must be limited to 50 A, which can be realized by a 50 A fuse as shown above. In particular, a 50 A fuse is mandatory if a passive 24 Vdc power supply is used.

For further information, refer to *Fusing the Mains Connection*, page 34.

Leakage (Touch) Current

Overview

Application	Per Lexium 62 Connection Module	Per Lexium 62 Distribution Box	Per Lexium 62 Power Supply
Typical (400 V, 50 Hz)	< 9 mA	< 18 mA	≤ 141 mA

NOTE: If the leakage (touch) current is too high for the respective application, use an isolating transformer on the mains supply.

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

⚠ DANGER

INSUFFICIENT GROUNDING

- Use a protective ground copper conductor with at least 10 mm² (AWG 6) or two protective ground copper 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.

Residual Current Operated Protective Device

Using Residual Current Protective Devices

When using a residual current protective device in combination with the Lexium 62 Drive System, certain conditions and restrictions must be considered. As a dc

current component in the ground conductor may result from insulation damage or direct contact, residual current circuit-breakers of type A or AC may not be triggered and therefore must not be used. Moreover, during system power-up and also in normal operation the Lexium 62 Drive System can generate a significant leakage (touch) current, page 37 which may lead to unintended triggering of a residual current protective device.

Consequently, observe the following when using residual current protective devices in combination with the Lexium 62 Drive System:

- Only use universal current sensitive residual current circuit-breaker of type B.
- Use residual current protective devices with a latent time to prevent unintended triggering at system power-up.
- Consider the leakage (touch) current of the Lexium 62 Drive System in normal operation when selecting the triggering threshold of the residual current protective device.
- If no residual current protective device or only a device with a high current threshold can be installed, appropriate other measures must be applied to provide protection against electrical shock and fire hazard

Functional Safety

Process Minimizing Risks Associated with the Machine

General

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

▲ WARNING

NON-CONFORMANCE TO SAFETY FUNCTION REQUIREMENTS

- Specify the requirements and/or measures to be implemented in the risk analysis you perform.
- Verify that your safety-related application complies to applicable safety regulations and standards.
- Make certain that appropriate procedures and measures (according to applicable sector standards) have been established to help avoid hazardous situations when operating the machine.
- Use appropriate 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 ISO 13849-1 Safety of machinery - Safety-related parts of control systems - Part 1: General principle for design describes an iterative process for the selection and design of safety-related parts of controllers to reduce the risk to the machine to a reasonable degree:

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

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

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

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

Additional information is available on www.se.com.

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 ILM Integrated Servo Drive

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 (for example, for hanging loads).

With the optionally available Lexium 62 ILM Safety Module it is also possible to realize the extended safety functions such as Safety Limited Speed (SLS) in connection with the SLC100/200 FS and the associated software EcoStruxure Machine Expert - Safety.

⚠ 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.

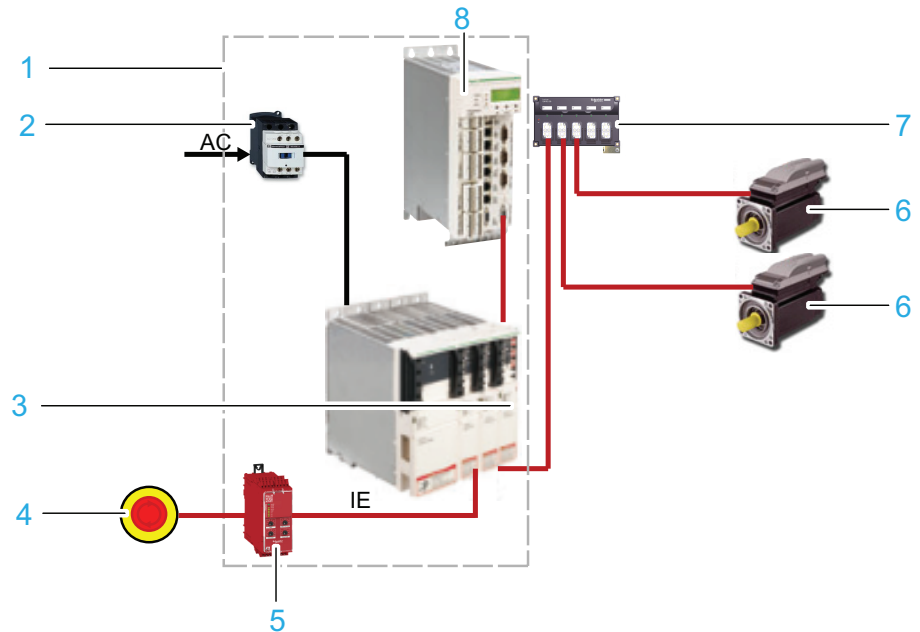
Failure to follow these instructions can result in death, serious injury, or equipment damage.

Designated Safety Function Safe Torque Off (STO)

The Inverter Enable function relates to Lexium 62 Connection Module, Lexium 62 Distribution Box and Lexium 62 ILM, 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) does not need to be interrupted.

The graphic shows the Lexium 62 Drive System with an emergency stop:



- 1 Control cabinet
- 2 Contactor
- 3 Lexium 62 Connection Module
- 4 Emergency stop switch
- 5 Safety-related switching device (for example Harmony XPSUAT1)
- 6 Lexium 62 ILM Integrated Servo Drive
- 7 Lexium 62 Distribution Box
- 8 Logic Motion Controller

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 61800-5-2:2016. 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 safety-related circuit with Inverter Enable was developed to minimize wear on the mains contactor. When the stop or the emergency stop button is activated, the mains contactor is not switched off. The defined safe stop is achieved by removing the "InverterEnable" for the optocouple in the power stage. Thus, the PWM signals cannot control the power stage so that a startup of the drives is prevented (pulse pattern lock).

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

Stop Category 0

In stop category 0 (Safe Torque Off, STO), 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, and so on), 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*, page 38).

▲ 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 Logic Motion Controller (LMC). The controlled stop by the 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 using an external safety-related switching device with safety-related delay (see *Application Proposal*, page 50).

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, 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 disable the Inverter Enable function:

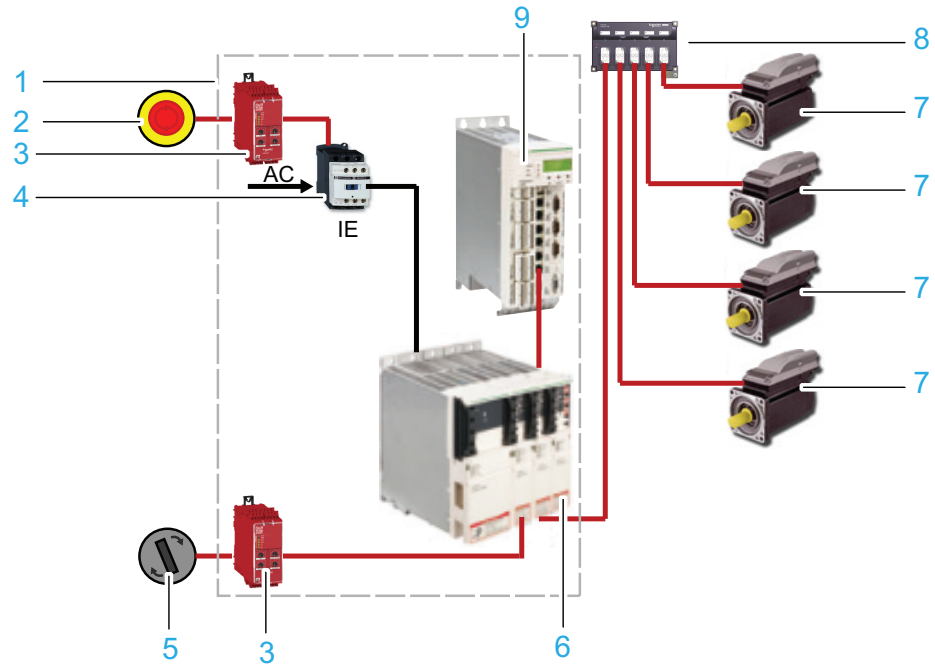
Step	Action
1	You can deactivate the Inverter Enable function by using the optional module DIS1, page 47. Result: The defined safe state can only be achieved if the power is removed from the power supply.
2	In order to use the optional module DIS1, you must define the configuration with the parameter <i>InverterEnableConfig</i> of the Lexium 62 ILM in the motion controller configuration.

If the software configuration does not match the physical configuration of the Lexium 62 ILM, then the diagnostic message **8978 InverterEnableConfig invalid** with **Ext. diagnostic = x(HW)!=y(Cfg)** is triggered. The drive is disabled as long as the configuration is incorrect. The detected 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 drives attached to a Lexium 62 Connection Module are to be put in the defined safe state, this can be achieved by the configuration of the drives. This can be of interest, for example, for maintenance procedures. If an optional module DIS1 is set, then the Inverter Enable signal is ignored.

To implement the emergency stop, the supply voltage on the Lexium 62 Power Supply must be interrupted:



- 1 Control cabinet
- 2 Emergency stop switch
- 3 Safety-related switching device (for example Harmony XPSUAT1)
- 4 Contactor
- 5 Switch: Operating mode (normal/maintenance)
- 6 Lexium 62 Connection Module
- 7 Lexium 62 ILM Integrated Servo Drive
- 8 Lexium 62 Distribution Box
- 9 Logic Motion Controller

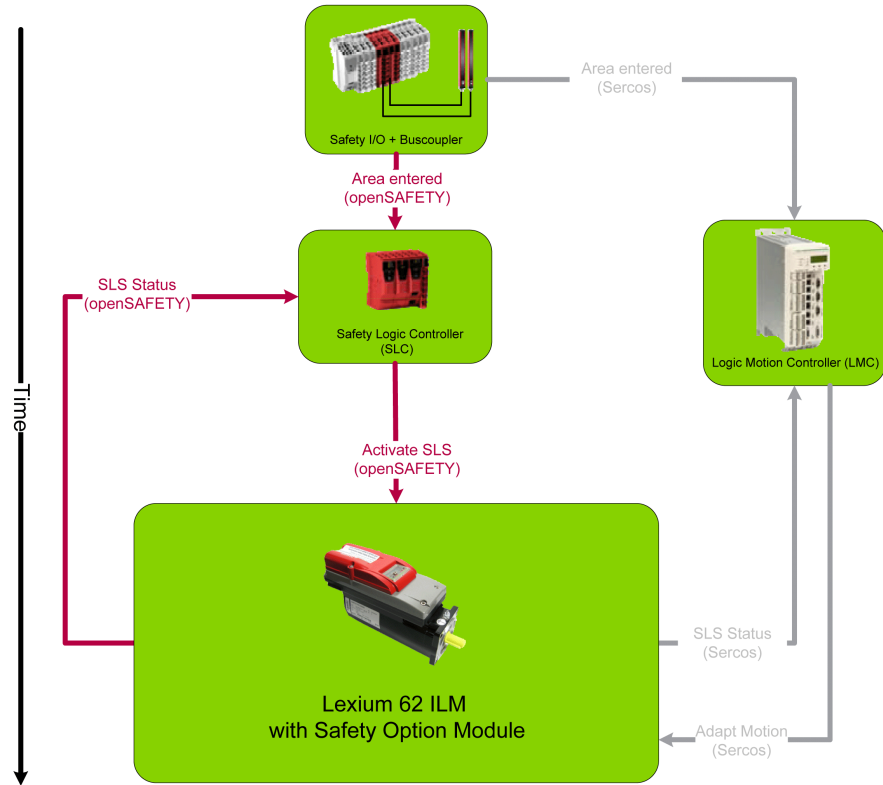
Extended Safety-Related Functions - Operating Principle

The safety concept is based upon the general consideration that the required safety-related travel movement is performed by the controller and the drive. The safety system monitors the correct execution of the motion, and if it is not respected the safety system initiates the required fall-back level (for example the defined safe state).

An example for Safe Limited Speed (SLS) is as follows:

A light curtain is connected to a safety-related digital input. As soon as a person enters the protected zone passing the light curtain, a corresponding information is transmitted to the Safety Logic Controller (SLC) and the LMC via the Sercos bus. After that the LMC initiates an adequate travel movement, for example by using decelerating and then moving slowly. After an adjustable delay time this slow movement is monitored by Lexium 62 ILM Safety Module. Upon exceeding an adjustable threshold value (for example, high velocity), the required fall-back level is entered, for example, the defined safe state.

Application of safety-related function SLS:



Extended Safety-Related Functions - Inverter Enable via Hardware Input

The Lexium 62 ILM Safety Module has been primarily developed to realize the extended safety functions, however, it still can be accessed using the usual hardware input for the Inverter Enable of the Lexium 62 Drive System. If only this is to be used, the device still needs to be configured and parameterized by using the software. If it is hardwired, the **Safe Torque Off (STO)** function can be triggered via this input or the Sercos bus. The Lexium 62 ILM Safety Module can be configured to ignore the hardware input. In this case, the Safe Torque Off (STO) function can only be activated upon a request over the Sercos bus. Otherwise, if the hardware input is not ignored then both requests (hardware input and Sercos bus) are verified and the Safe Torque Off (STO) function is triggered if one or both requests are active. The default configuration is not to ignore the hardware input.

Extended Safety-Related Functions - Defined Safe State

The defined safe state of the device is characterized by the following features:

- The drive is torque-free, which is equivalent to **Safe Torque Off (STO)** according to IEC 61800-5-2.
- There is no safety-related communication from the drive via the Sercos bus.

This state is automatically entered when errors are detected.

Validity of the Safety Case

The safety case for the Inverter Enable function of the Lexium 62 ILM is identified and defined by the standards listed in *Safety Standards*, page 54. The safety case for the designated safety function of the Lexium 62 ILM system applies to the following hardware codes, which can be found examining the appropriate software object in EcoStruxure Machine Expert (see EcoStruxure Machine Expert, Programming Guide):

Unicode	Hardware code
ILM 070/xx	xxxxxxxx1xx, xxxxxxxx2xx
ILM 100/xx	xxxxxxxx1xx, xxxxxxxx2xx
ILM140/xx	xxxxxxxx1xx, xxxxxxxx2xx
DIS1	1
ILM62CM	xxxxxx1xx, xxxxxx2xx
ILM62DB	xxxxxx1xx

Device	Hardware code
VW3E702200000	011A1110

For questions on this, contact your Schneider Electric representative.

Interface and Control

The Inverter Enable function is operated via the switching thresholds of the InverterEnable-input (IE_p1/IE_p2 at Pin1/Pin2, IE_n1/IE_n2 at Pin3/Pin4) of the Lexium 62 Connection Module.

- Maximum downtime: 500 μ s at $U_{IEX} > 20$ V with dynamic control
- Maximum test pulse ratio: 1 Hz
- STO active: -3 V $\leq U_{IE} \leq 5$ V
- Power stage active: 15 V $\leq U_{IE} \leq 30$ V

For information on the technical data and electrical connections, refer to the chapter *Technical Data*, page 109.

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 IP 54 rating.
- Comply with the clearances and creepage distances according to EN 50178.
- Lexium 62 ILM Integrated Servo Drive must only be operated with 24 Vdc power supplies certified according to EN 60950 or EN 50178.

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

NOTE: These power supply units do not deliver an overvoltage over 120 Vdc for more than 120 ms 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
<p>UNINTENTIONAL RESTART OF THE MOTOR</p> <ul style="list-style-type: none"> • 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. <p>Failure to follow these instructions will result in death or serious injury.</p>

Encoder Connection When Using Extended Safety-Related Functions

Lexium 62 ILM Safety Module enables the use of extended, position-dependent and/or velocity-dependent safety-related functions.

⚠ DANGER
<p>INOPERABLE SAFETY FUNCTION</p> <ul style="list-style-type: none"> • 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 Lexium 62 ILMs. <p>Failure to follow these instructions will result in death or serious injury.</p>

For more information on the dimensions of the maximum system extension for *Wiring in line structure or tree structure or daisy chain structure*, page 69.

Perform Muting with the Optional Modules DIS1

Overview

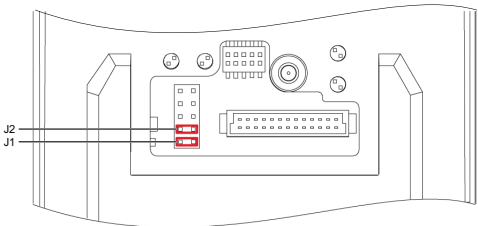
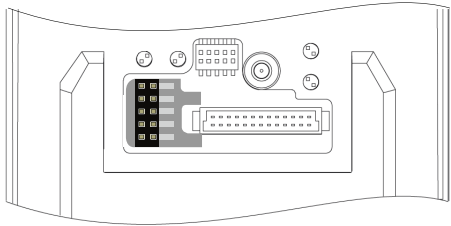
Implementation of Emergency stops combining hardwired control of supply power with the Inverter Enable function:

Lexium 62 ILM	Maintenance	Emergency stop	Parameter <i>InverterEnableConfig</i>
Lexium 62 ILM without DIS1	Torque-free motor	Torque-free motor	Standard/1
Lexium 62 ILM with DIS1	–	Torque-free motor	Off/0

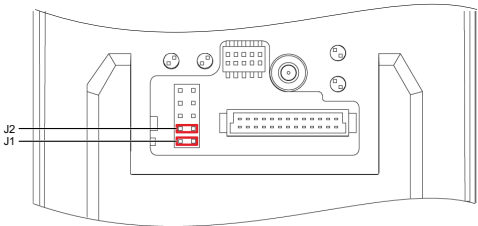
How to Install the Optional Modules DIS1

You cannot use the option modules DIS1 and Lexium 62 ILM Safety Module together.

Step	Action
1	Remove power to the Lexium 62 Power Supply during the installation of the optional module DIS1.
2	Remove the transparent cover plate on the motor.

Step	Action
3	<p>Remove the jumpers J1 and J2:</p> 
4	<p>Connect the optional module DIS1 by inserting it into the contact pin, as shown in the following graphic:</p> 
5	<p>Replace the transparent cover plate on the motor and secure it.</p>

How to Disassemble the Optional Module DIS1

Step	Action
1	<p>Remove power to the Lexium 62 Power Supply during the installation of the optional module DIS1.</p>
2	<p>Remove the transparent cover plate on the motor.</p>
3	<p>Remove the optional module DIS1.</p>
4	<p>Reconnect the jumpers J1 and J2.</p> 
5	<p>Replace the transparent cover plate on the motor and secure it.</p>

Application Proposals for Hardware-Based Safety Functions

How to Implement the Safe Stop Category 1 (SS1)

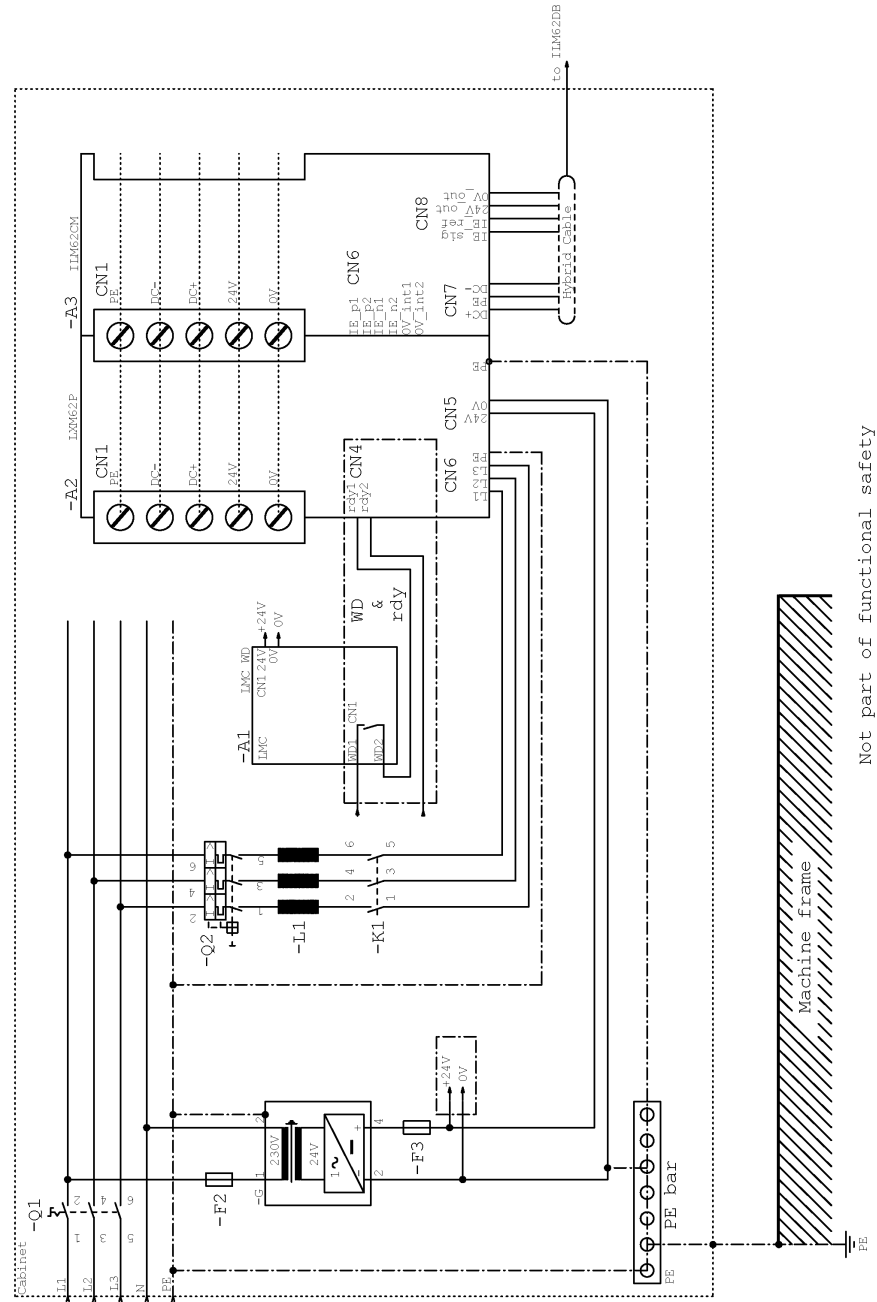
Refer to the schematic EL-1122-05-xx: Inverter Enable circuit Lexium 62 Connection Module / Lexium 62 ILM using the Logic Motion Controller LMC•00C with safety switch device for an emergency stop circuit.

NOTE:

- 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.

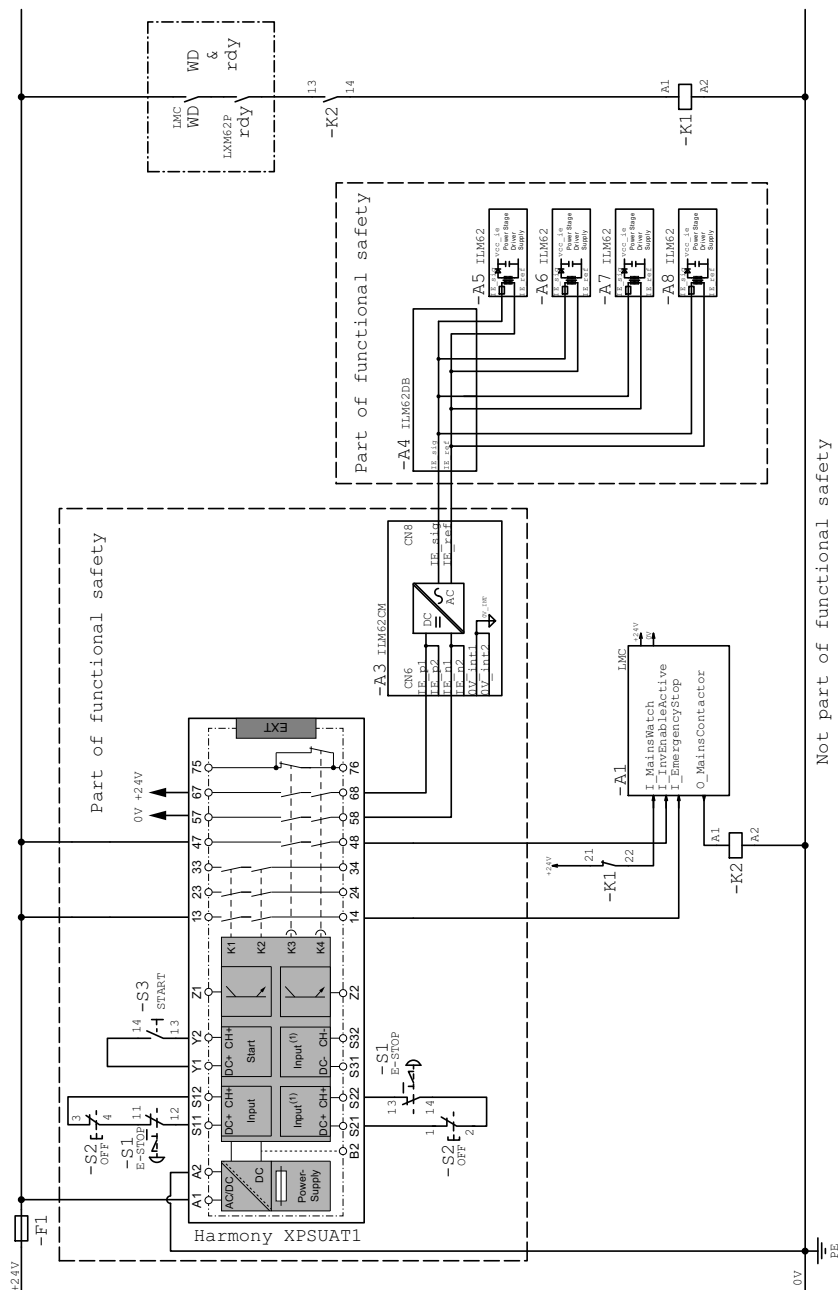
NOTE: The mains contactor in the circuit suggestion EL-1122-05-xx is not necessary for functional safety purposes. It is, however, used in the application proposal for the device protection of the Lexium 62 Power Supply or the components connected to it.

EL-1122-05-xx Sheet 1:



Not part of functional safety

EL-1122-05-xx Sheet 2:



Application Proposals for Software-Based Safety Functions

How to Use the Inverter Enable via Hardware or Extended Safety Functions

Proceed as follows to use the Inverter Enable via hardware or extended safety functions using the Lexium 62 ILM Safety Module:

Step	Action
1	Perform the assembly for Lexium 62 ILM Safety Module.
2	Configure the safety-related network.
3	Adjust the parameters, in particular the prioritization of Inverter Enable via hardware and STO via the bus.
4	Program the EcoStruxure Machine Expert - Safety application.

NOTE: Observe the information on the parameters and the EcoStruxure Machine Expert - Safety in the EcoStruxure Machine Expert online help.

Further information on the parameters and the EcoStruxure Machine Expert - Safety Software can be found in the EcoStruxure Machine Expert online help.

Commissioning

General

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

NOTE: When using the extended safety functions, the Lexium 62 ILM Safety Module must be configured, parameterized, and programmed according to the EcoStruxure Machine Expert online help and the EcoStruxure Machine Expert - Safety online help.

Best Practices

General

At machine start-up, the connected drives are usually hidden from sight of the machine operator and cannot be monitored directly.

⚠ WARNING
<p>UNSUPERVISED MACHINE START-UP</p> <p>Only start the machine if there are no persons within the zone of operation of moving machine components.</p> <p>Failure to follow these instructions can result in death, serious injury, or equipment damage.</p>

Verify Connections

Step	Action
1	Verify all terminals, connectors, and other connections on all system components for correct and firm fit.
2	Only use robust connectors and secure fixings.
3	Verify the protective earth ground (24 Vdc PELV (Protective Extra Low Voltage) supply).
4	Verify the wiring of the safety function to the axes to avoid an interchange of the <code>ie_sig</code> and <code>ie_ref</code> inputs as well as the 24 V supply.
5	Use coded connectors (refer to chapter <i>Information about Wiring</i> , page 31) and perform a commissioning test (refer to chapter <i>Commissioning</i> , page 51).
6	Use only appropriate transport packaging to forward or return individual devices.

⚠ DANGER**ELECTRIC SHOCK DUE TO INADEQUATE PROTECTIVE SEPARATION**

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

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

External Forces

The defined safe state of the 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, and so on), 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**⚠ 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.

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.

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

Maintenance**General**

The Inverter Enable function has been designed for a defined lifetime that does not require to verify the safety-related function, nor any specific maintenance requirements. After this lifetime, page 54 has elapsed, a statement about the

Inverter Enable function cannot be made due to the aging of the component. If you want to ensure the functional safety after this period, you need to replace the device that includes the safety function.

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

The following applies for Lexium 62 ILM Safety Module.

In addition to the LED state, data of the Safety Logger is also available in the EcoStruxure Machine Expert Logic Builder. These are provided for information only and must not be used for safety-related diagnostics.

For information about initial start-up and maintenance, refer to the chapter *Installation and Maintenance*, page 57.

Physical Environment

General

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 ambient temperatures, storage temperatures and transport temperatures of the individual components as specified 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 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 ILM and the Lexium 62 Distribution Box are intended for installation in a machine.

Safety Standards

Overview

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

- IEC 61508:2010
- IEC 61800-5-2:2016
- EN ISO 13849-1:2015
- IEC 62061:2005

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 Connection Module	Lexium 62 ILM	Lexium 62 ILM with installed Lexium 62 ILM Safety Module ¹
SFF (IEC 61508) Safe failure fraction	99%	99.9%	99%
HFT (IEC 61508) Hardware Fault Tolerance	1	1	1
Type (IEC 61508)	A	A	B
SIL (IEC 61508) Safety Integrity Level SILCL (IEC 62061) Safety Integrity Level claim limit	3	3	3
PFH (IEC 61508) Probability of Dangerous Failures per Hour	$1.3 \cdot 10^{-9}/h$	$0.08 \cdot 10^{-9}/h$	$1.6 \cdot 10^{-9}/h$
PL (cat) (EN ISO 13849-1) Performance Level (Category)	e (4)	e (4)	e(4)
MTTFd (EN ISO 13849-1) Mean Time to Dangerous Failure	881 years	14487 years	320 years
DC (EN ISO 13849-1) Diagnostic Coverage	99%	99%	99%
Lifetime	20 years	20 years	20 years
Maximum reaction time between the request and execution of the designated safety function	5 ms	5 ms	10 ms
Maximum reaction time before the detection of safety-related errors	5 ms	5 ms	10 ms

Standard characteristics	Lexium 62 Connection Module	Lexium 62 ILM	Lexium 62 ILM with installed Lexium 62 ILM Safety Module ¹
Maximum reaction time between exceeding the threshold values of extended safety functions and the initiation of substitute reactions	Not applicable	Not applicable	10 ms
<p>¹Lexium 62 Distribution Box: The elimination from consideration of certain errors within the safety-related parts of the control system, known as Fault Exclusion within various IEC, ISO, NFPA and ANSI standards, has been applied because clearances and creepage standards have been respected in the product. The plug-in connectors have been included in the PFH figures of Lexium 62 Connection Module and Lexium 62 ILM.</p> <p>NOTE: The values specified are rounded individually and are therefore not a result of a conversion by for example, PFH in MTTFd or the comparative tables from EN ISO 13849-1:2015.</p>			

Standard characteristics - Lexium 62 ILM Safety Module

Standard characteristics	Lexium 62 ILM Safety Module
	MTTFd (EN ISO 13849-1) Mean Time to Dangerous Failure [years]
Use of SLS (Safely Limited Speed (SLS)) etc.	–
... with Sick Stegmann encoder SKM36	250
... with Sick Stegmann encoder SKS36	250

Special Conditions

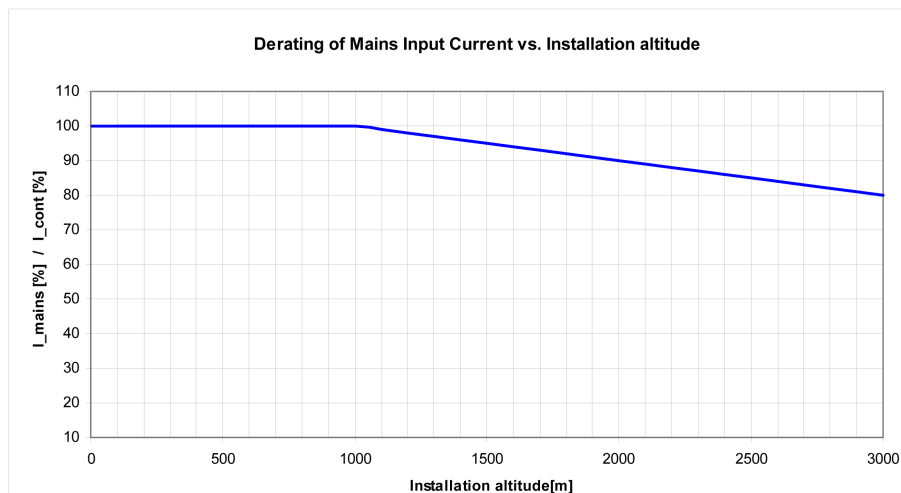
Low Air Pressure

Description

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

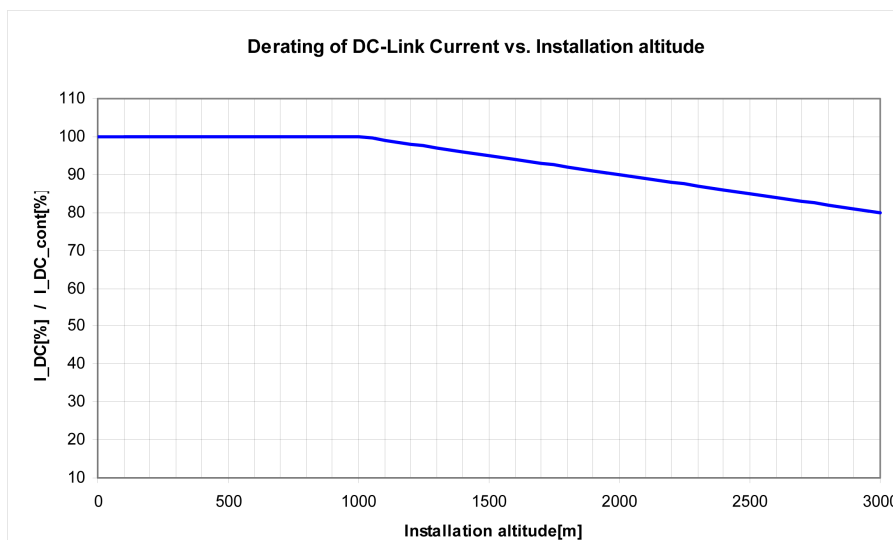
Low Air Pressure - Lexium 62 Power Supply

Power reduction at increased installation altitude (Lexium 62 Power Supply):



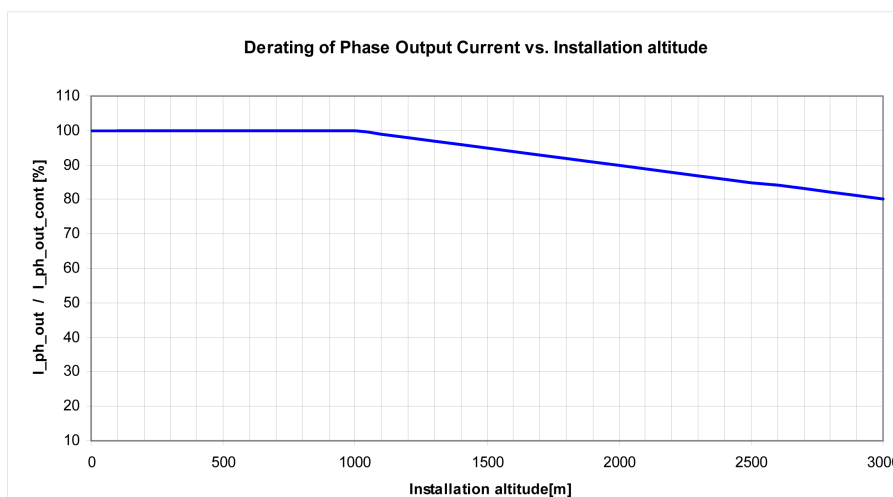
Low Air Pressure - Lexium 62 Connection Module

Power reduction at increased installation altitude (Lexium 62 Connection Module):



Low Air Pressure - Lexium 62 ILM

Power reduction at increased installation altitude (Lexium 62 ILM at 8 kHz clock frequency of power stage):



NOTE: 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.

Installation and Maintenance

Prerequisites for Installation and Maintenance

Prerequisites for Maintenance and Installation

General Information

Proceed with care during the following steps in order to help to avoid 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
<p>INCORRECT INSTALLATION</p> <p>Ensure a correct installation and maintenance of the system according to this manual.</p> <p>Failure to follow these instructions can result in death, serious injury, or equipment damage.</p>

The Lexium 62 ILMs (drive/motor combination) have been derived from the Schneider Electric SH3 family of motors, and therefore share many characteristics. However, when it comes to mounting the motor, the Lexium 62 ILMs are equivalent to the SH3 motors. Refer to the *SH3 - Servo motor, User Guide* (see SH3 Servo Motor, User Guide) for details of installing the Lexium 62 ILMs.

The correspondence between the Lexium 62 ILMs and the SH3 motors are as follows:

Lexium 62 ILM	SH3 motor
ILM070	SH3070
ILM100	SH3100
ILM140	SH3140

Commissioning

Prerequisites for Commissioning

Prerequisites

⚠ 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 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.
- Connect and disconnect cables and terminals only after you have verified that the power has been removed from the system.

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

Preparing Commissioning

Prerequisite

Verify safety-related circuits for proper function, if applicable.

ESD Protection

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

NOTICE	
ELECTROSTATIC DISCHARGE	
<ul style="list-style-type: none"> • Do not touch any of the electrical connections or components. • Touch circuit boards only on the edges. • Take the necessary protective measures against electrostatic discharges. 	
Failure to follow these instructions can result in equipment damage.	

Unpacking

How to unpack the device:

Step	Action
1	Remove packaging
2	Dispose of the packaging material in accordance with the relevant local regulations.

Verifying

How to verify the device:

Step	Action
1	Verify that the delivery is complete based on the delivery slip.
2	Closely inspect the device for any signs of damage.
3	Verify the data with the help of the nameplates.
4	Observe requirements for the installation location.
5	Observe requirements for the degree of protection and the EMC rules.
6	In addition to the following instructions, also note the information in the chapter <i>Engineering</i> , page 27.
7	Install the Lexium 62 ILM component.

⚠ WARNING	
UNINTENDED EQUIPMENT OPERATION	
<ul style="list-style-type: none"> • 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.	

Grinding the Holding Brake

Overview

NOTE: Regrind the holding brake if a motor was stored for over 2 years before mounting.

How to Disassemble the Motor

Step	Action
1	Observe the <i>Prerequisites for Replacing Components and Cables</i> , page 78 and the special measures for <i>Replacement of the Lexium 62 ILM</i> , page 84.
2	Set main switch to OFF position to free system of voltage.
3	Prevent main switch from being switched back on.
4	Disconnect the connection cables on the motor.
5	Loosen the screw connections on the motor. Result: The motor is removed from the machine and disconnected from the electrical supply lines.

How to Regrind the Holding Brake

NOTE: The motor must not be installed in machine and the holding brake must be engaged.

⚠ WARNING
UNINTENDED AXIS MOVEMENTS
Only grind the holding brake when the removed motor is disconnected from the electrical supply lines.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

Step	Action
1	Verify the holding torque of the holding brake, page 131 using a torque wrench.
2	Compare the value to the specified holding torque of the holding brake upon delivery.
3	If the holding torque of the holding brake considerably differs from the specified values, manually rotate the motor shaft by 25 rotations in both directions.
4	Repeat the process. If you cannot restore the original holding torque after repeating the process 3 times, contact your Schneider Electric representative.

Preparing the Control Cabinet

Overview

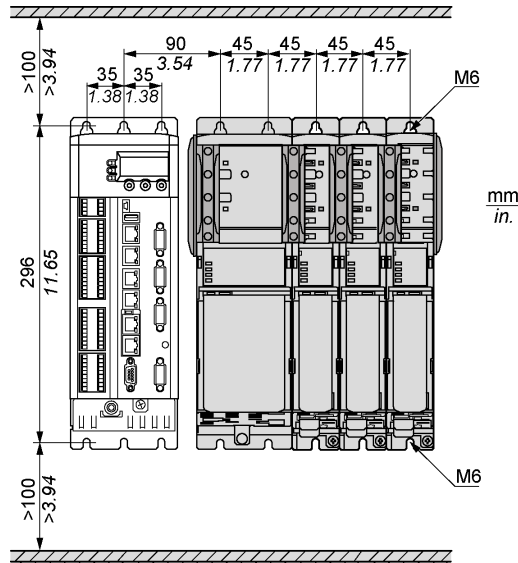
⚠ DANGER
INCORRECT OR UNAVAILABLE GROUNDING
Remove paint across a large surface at the installation points before installing the devices (bare metal connection).
Failure to follow these instructions will result in death or serious injury.

Step	Action
1	If necessary to maintain and respect the maximum ambient operating temperature, install additional fan in the control cabinet.
2	Do not block the fan air inlet of the product.
3	Drill mounting holes in the control cabinet in the 45 mm (1.77 in) mounting-grid pattern (±0.2 mm / ±0.01 in).
4	Observe tolerances as well as distances to the cable channels and adjacent Lexium 62 servo drives or other heat producing equipment.

Required Distances

Keep a distance of at least 100 mm (3.94 in) above and below the devices.

Required distances in the control cabinet for the Logic Motion Controller, Lexium 62 Power Supply, Lexium 62 Connection Module:

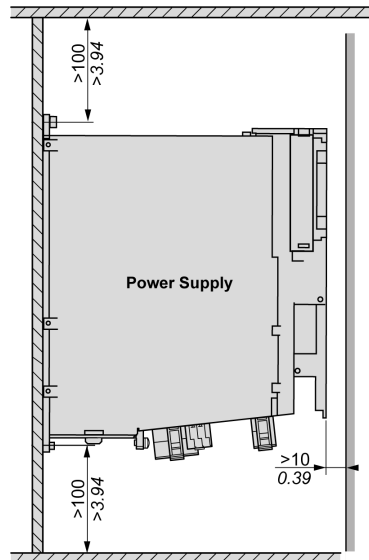


NOTE: For the shield plates (external shield connections), additional holes are required.

Required Distances in the Control Cabinet for the Power Supply

Keep a distance of at least 100 mm (3.94 in) above and below the devices.

Required distances in the control cabinet for the Lexium 62 Power Supply:

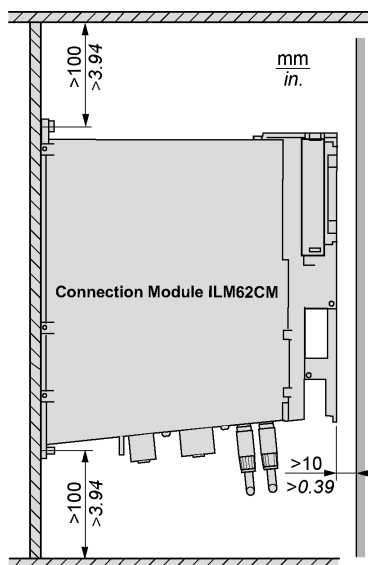


Do not lay any cables or cable channels over the servo amplifiers or braking resistor modules.

Required Distances in the Control Cabinet for the Lexium 62 Connection Module

Keep a distance of at least 100 mm (3.94 in) above and below the devices.

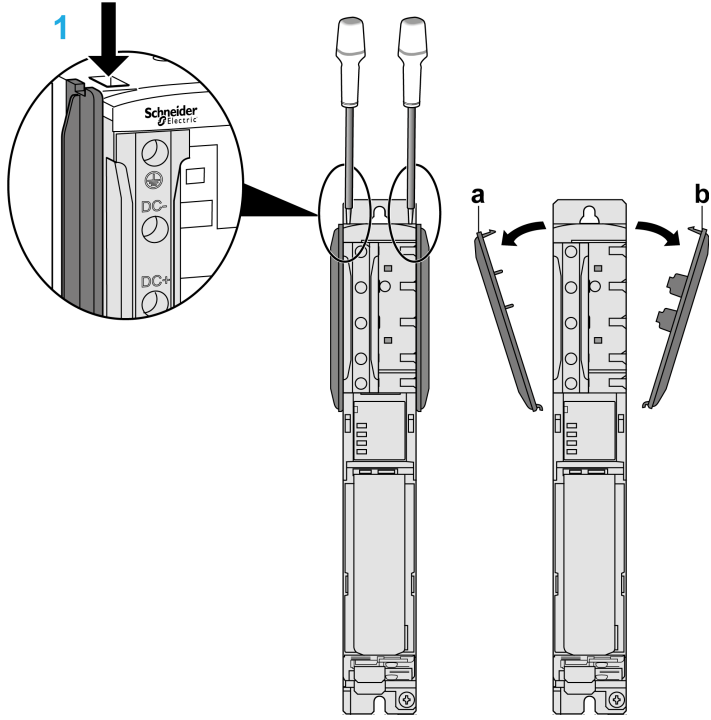
Required distances in the control cabinet for the Lexium 62 Connection Module:



Do not lay any cables or cable channels over the servo amplifiers or braking resistor modules.

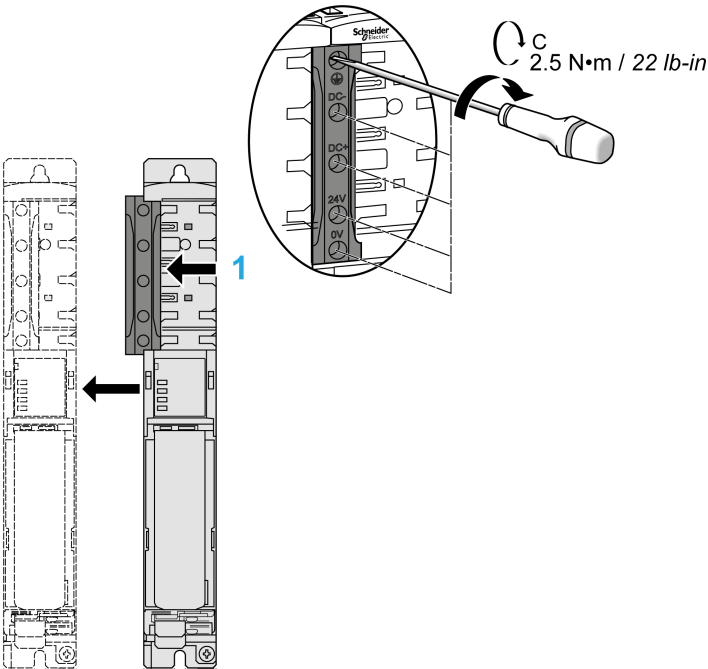
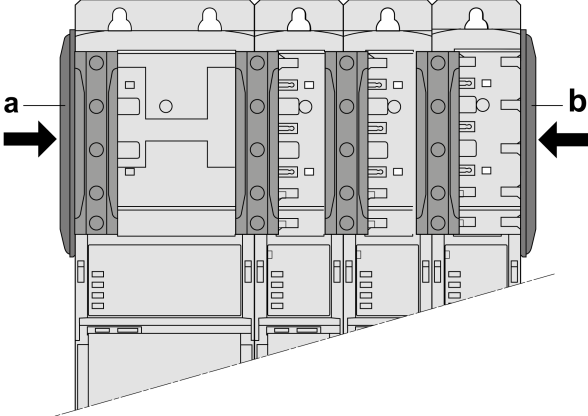
Mounting

How to Mount the Lexium 62 Power Supply and the Lexium 62 Connection Module

Step	Action
1	Remove the terminal covers on the module sides (Lexium 62 Power Supply and Lexium 62 Connection Module) on which the modules are connected with each other.
2	For this purpose, press the screwdriver in the opening (1) (blade width: 5.5...8 mm (0.22...0.31 in)) on the top side of the module to loosen the terminal cover. 
3	Then remove the terminal covers (a, b) toward the outside.
4	Screw the pan-head screws M6 (socket head cap screws) into the prepared mounting holes.
5	Keep a distance of 10 mm (0.39 in) between the screw head and the mounting plate.

Step	Action
6	Hook in device and verify the vertical mounting arrangement.
7	Place the Lexium 62 Power Supply and Lexium 62 Connection Module in the following order from left to right according to the current carrying capacity: <ol style="list-style-type: none"> 1. Lexium 62 Power Supply 2. Lexium 62 Connection Module <p>NOTE: By doing this, the load on the DC bus- and 24 V-supply at the wiring bus is reduced.</p>
8	Tighten the mounting screws (torque: 4.6 Nm (41 lbf in)).

How to Assemble the Modules

Step	Action
1	Verify whether the slide on the Bus Bar Module can be moved easily. If not, loosen the screws securing the slide to the Bus Bar Module.
2	Connect devices via the slide of the Bus Bar Module (1). 
3	Tighten the screws of the Bus Bar Module (torque: 2.5 Nm / 22 lbf in).
4	Mount the terminal covers left TOP (a) and right TOP (b) on the outside of the Bus Bar Module combination. For important safety information, follow the instructions in the first safety message after this table. <p>Terminal covers on the outside of the Bus Bar Module combination</p> 

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

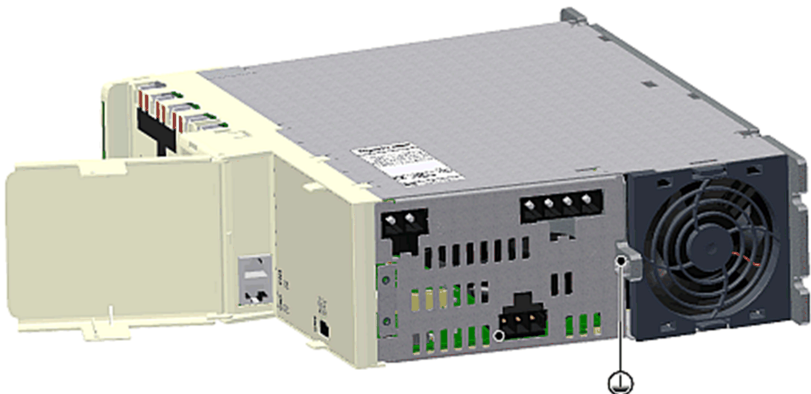
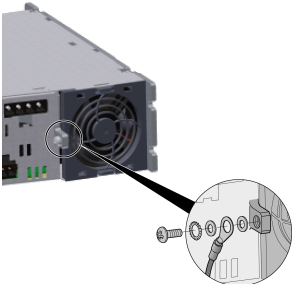
⚠ DANGER

ELECTRIC SHOCK CAUSED BY HIGH LEAKAGE (TOUCH) VOLTAGE

- Attach the terminal covers on the extremities of the *Bus Bar Module combination*, page 62.
- Apply power to the device only if the terminal covers have been attached to the extremities of the Bus Bar Module combination.

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

How to Ground the Lexium 62 Power Supply

Step	Action
1	 <p>Connect the additional protective earth ground conductor with the ring cable lug and the M5 screw to the heat sink of the power supply (tightening torque: 3.5 Nm (31 lbf in)).</p>
2	 <p>Follow the assembly based on the heat sink:</p> <ul style="list-style-type: none"> • Washer • Ring cable lug • Washer • Lock washer • Screw
3	<p>Connect the plug-in connector CN5 24 V supply to the power supply.</p> <p>NOTE: See important hazard message after the table.</p>
4	<p>Connect the plug-in connector CN6 AC supply to the power supply.</p>
5	<p>Connect the Sercos cable CN2 (CN3) to the power supply.</p>

⚠ DANGER

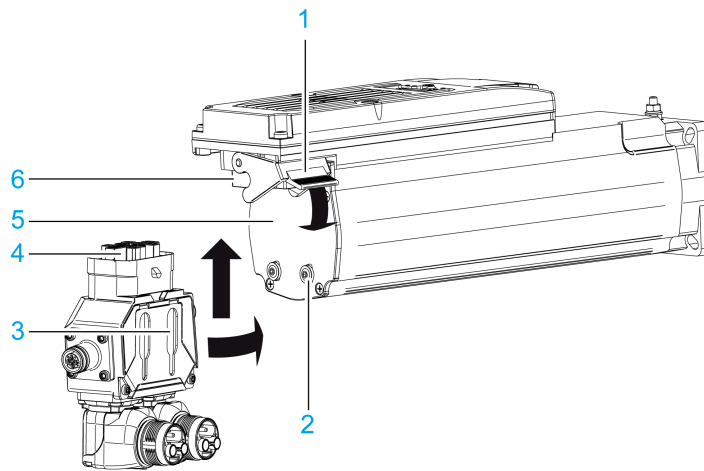
INSUFFICIENT GROUNDING

- Use a protective ground copper conductor with at least 10 mm² (AWG 6) or two protective ground copper 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.

How to Mount the Daisy Chain Connector Box on the Lexium 62 ILM

The graphic shows the installation of the Daisy Chain Connector Box on the Lexium 62 ILM.



Step	Action
1	Place the Daisy Chain Connector Box flush onto the rear side of the Lexium 62 ILM so that the two guide lugs (5) are inserted in the two guide slots (6). Result: The Daisy Chain Connector Box lies flush on the rear side of the Lexium 62 ILM (3).
2	While the Daisy Chain Connector Box is lying flush on the rear side of the Lexium 62 ILM (3), push it upwards as far as it goes. Result: The hybrid plug connector (4) is inserted as far as it goes into the hybrid socket connector (2) of the Lexium 62 ILM.
3	Close the locking latch (1).

NOTICE

BROKEN TABS ON THE LOCKING LATCH

Only close the locking latch (1) when the hybrid plug connector (4) is fully seated into the hybrid socket connector (2) and the Daisy Chain Connector Box lies flush on the rear side of the Lexium 62 ILM (3).

Failure to follow these instructions can result in equipment damage.

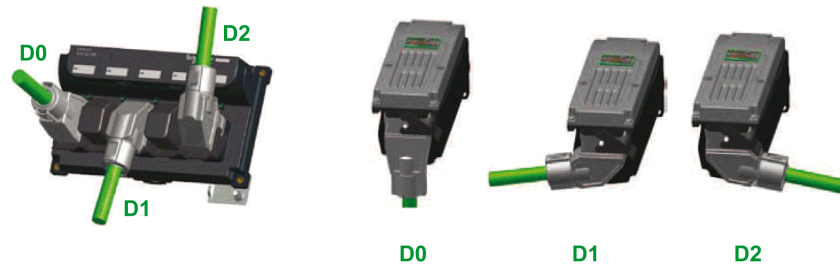
Wiring the Lexium 62 Connection Module in Linear or Tree Topologies

Presentation

The wiring of Lexium 62 Connection Module, Lexium 62 Distribution Box, and Lexium 62 ILM in linear or tree topologies is supported by hybrid cables.

The hybrid cable variants suitable for linear or tree topologies are listed in the type code Lexium 62 ILM accessories.

The hybrid connector variants presented in the following graphic are suitable for wiring in linear or tree topologies.



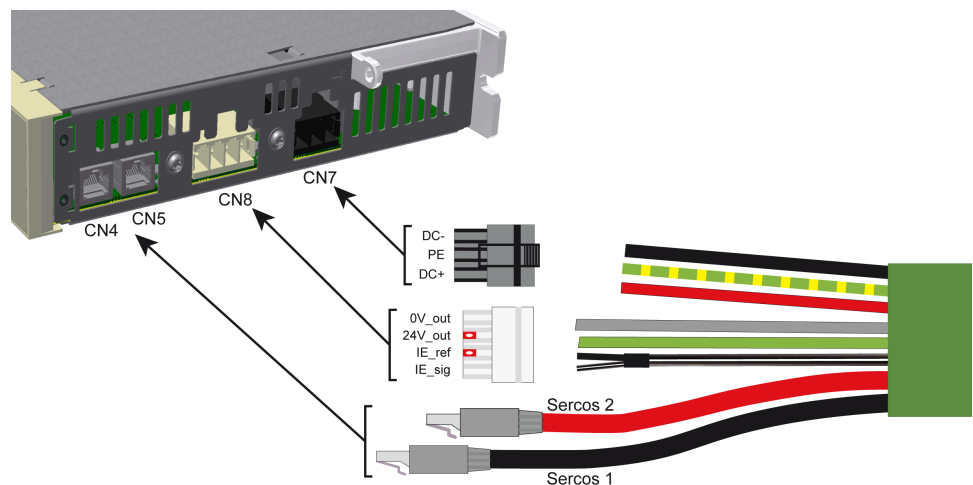
D0 Straight connection

D1 Connection at the bottom (Lexium 62 Distribution Box) or on the left (Lexium 62 ILM).

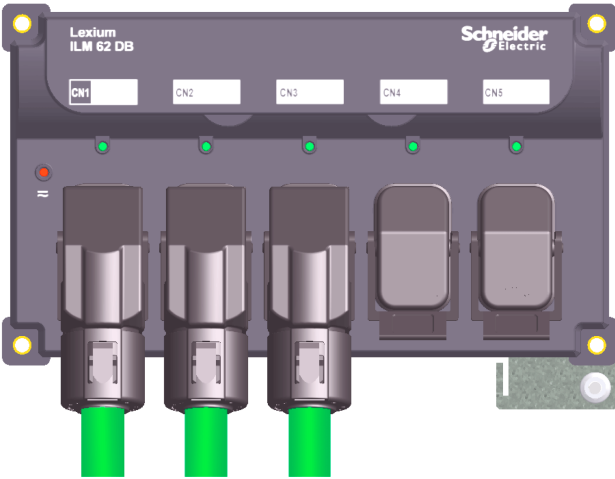
D2 Connection on the top (Lexium 62 Distribution Box) or on the right (Lexium 62 ILM).

How to Wire the Modules

For an overview of the different connections, refer to the *Electrical Power Connections*, page 95.



Step	Action
1	Connect connections CN4 , CN5 , CN7 , and CN8 (Sercos, DC bus voltage, 24 V, Inverter Enable) at the Lexium 62 Connection Module with the Lexium 62 Distribution Box by using the pre-assembled hybrid cable.
2	Remove protective cover from hybrid cables.

Step	Action
3	<p>Connect up to four Lexium 62 ILMs at the Lexium 62 Distribution Box using hybrid cables. Engage the respective mounting bracket at both connection sides.</p> 
4	<p>Provide unused hybrid connection sockets with strapping plugs.</p> <p>NOTE:</p> <ul style="list-style-type: none"> The strapping plugs are not included in the scope of delivery of Lexium 62 ILM and must be ordered separately (Commercial reference: VW3E6023). Strapping plugs close the Sercos loop, while helping to ensure the integrity of 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.

Topological Addressing of the Lexium 62 ILMs

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

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

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

The topological address for **CN2**, **CN3**, **CN4**, and **CN5** (Lexium 62 Distribution Box) depends on the assignment of Sercos 1/Sercos 2 to **CN4/CN5** (Lexium 62 Connection Module).

Depending on the selected identification (address) mode in the EcoStruxure Machine Expert 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.

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

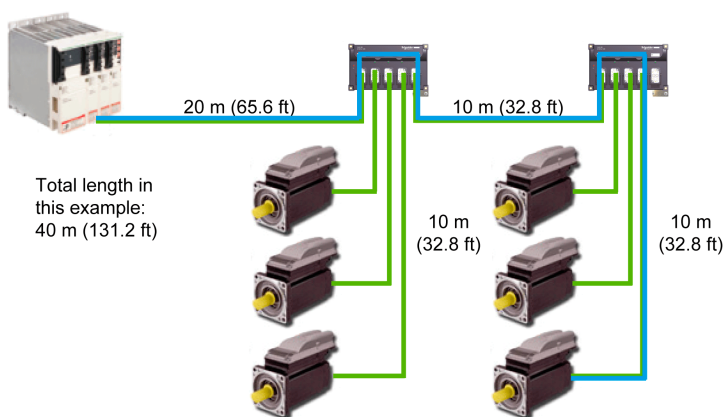
- Maximum cable length of 20 m (65.2 ft) from Lexium 62 Connection Module to Lexium 62 Distribution Box.
- Maximum cable length of 10 m (32.8 ft) from Lexium 62 Distribution Box to another Lexium 62 Distribution Box.
- Maximum cable length of 10 m (32.8 ft) from Lexium 62 Distribution Box to Lexium 62 ILM.
- Sum of all cable lengths maximum 200 m (656 ft).
- Maximum distance of 50 m (164 ft) between 2 active Sercos slaves. In the example below, the critical measure is the return from the last Sercos slave (Lexium 62 ILM) to the Lexium 62 Power Supply via the connection module.
- Lexium 62 Connection Module and Lexium 62 Distribution Box are not active Sercos slaves. Both the Lexium 62 Connection Module and the Lexium 62 Distribution Box are passive, pass-through devices.

Examples for the Pathways in Linear Topology and Tree Topology

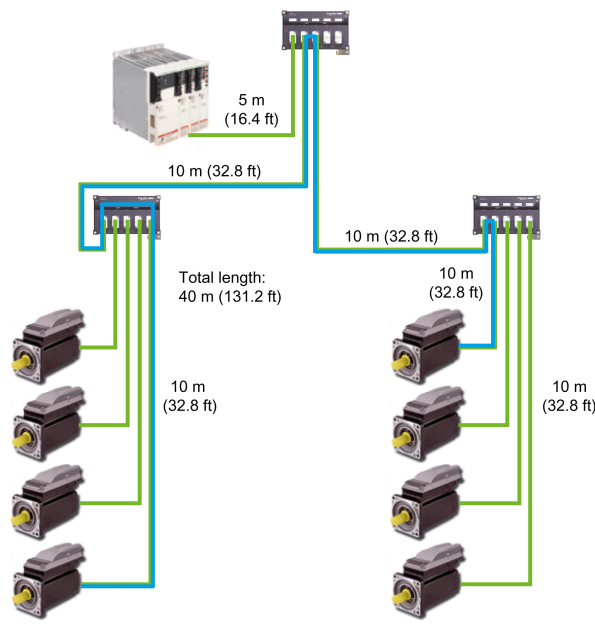
NOTE: Contact Schneider Electric in order to create a detailed system layout for the respective available topology.

The following two examples illustrate the longest path between 2 active Sercos slaves for which a maximum length of 50 m (164 ft) is permissible. This critical distance is marked in blue.

In the following example of a linear topology, the longest path is between the Lexium 62 Power Supply and the last Lexium 62 ILM:



In this example of a tree topology, the longest path is between two Lexium 62 ILMs and not between the Lexium 62 Power Supply and the last Lexium 62 ILM. In this topology, the critical path is the forward, incoming signal as opposed to the former example where the critical path was the return path.



The graphic shows a connection overview of Lexium 62 ILM



1 Ground connection

2 Hybrid connector

NOTE: According to IEC/EN 60204-1, the correct grounding of the motor has to be verified on the installed machine on location in all cases.

Wiring from the Lexium 62 Connection Module in a Daisy Chain Topology

Overview

Wiring of Lexium 62 Connection Module, Lexium 62 Distribution Box, Lexium 62 ILM in daisy chain topology is supported by a Daisy Chain Connector Box mounted on the Lexium 62 ILM along with power and Sercos cables.

The power and Sercos cable variants suitable for daisy chain topologies are listed in the type code, page 26 figure Lexium 62 ILM accessories.

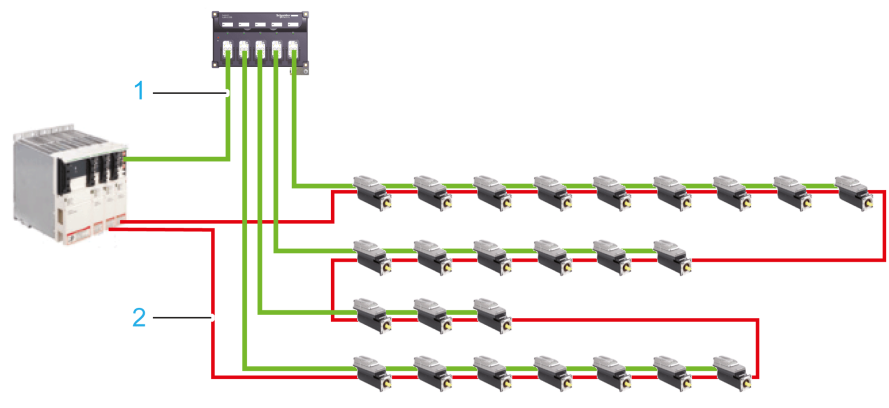
The graphic shows a power connector suitable for a daisy chain wiring



D1 Connection at the bottom (Lexium 62 Distribution Box)

With daisy chain structure, the power (DC bus voltage/24 V/Inverter Enable signals) and Sercos signals are distributed via separate cables.

The graphic shows an example of a net topology in a daisy chain structure with four daisy chain lines:

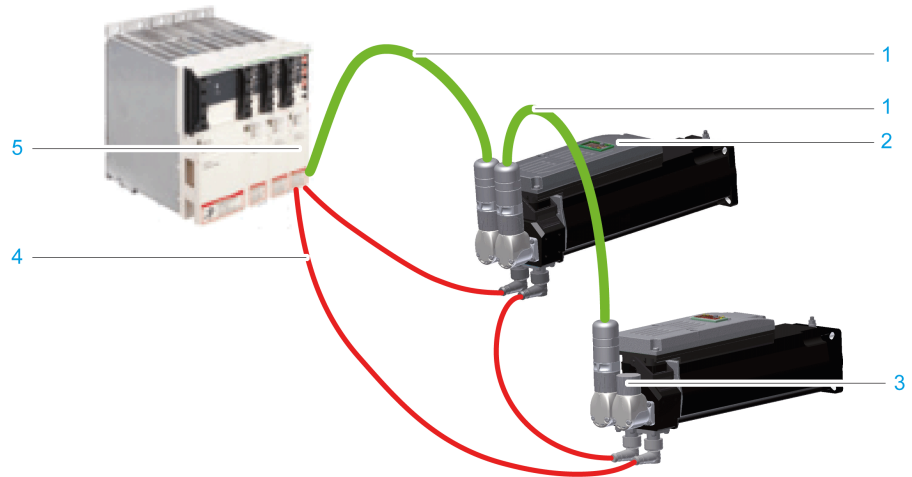


1 Power cable (green)

2 Sercos cable (red)

Each Lexium 62 ILM must be extended for daisy chain wiring by a Daisy Chain Connector Box. For this purpose, the Daisy Chain Connector Box is mounted, page 65 onto the Lexium 62 ILM and the wiring of the Lexium 62 ILMs is carried out via M12 / M23 connectors of the Daisy Chain Connector Box.

The graphic shows an example for a daisy chain wiring with one daisy chain line (connected directly to the Lexium 62 Connection Module):



1 Power cable (green)

2 Lexium 62 ILM

3 At the last Lexium 62 ILM of the daisy chain line, the open power socket connector M23 (CN2/CN3) of the Daisy Chain Connector Box has to be tightly closed with a protection cap ILM62DCZ000.

4 Sercos cable (red)

5 Lexium 62 Connection Module

⚠ WARNING

LOSS OF IP65 RATING

- Assemble the M23 cable connector correctly to the daisy-chain connector box to properly seal the connection and meet the IP65 protection class requirements.
- Tightly seal off open power socket connectors CN2/CN3 with an ILM62DCZ000 protection cap on the last drive of the daisy chain.
- Use only cables and accessory parts from Schneider Electric.

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

How to Wire the Modules

For an overview of the different connections, refer to the *Electrical Power Connections*, page 95

Depending on the selected identification (address) mode in the EcoStruxure Machine Expert Logic Builder, an interchanged connection of the Sercos cables can lead to unintended machine operation.

⚠ WARNING
<p>UNINTENDED MACHINE OPERATION</p> <ul style="list-style-type: none"> 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. Ensure that the Sercos cables are connected to the Sercos socket connectors of the Daisy Chain Connector Box according to the requirements of the application, its configuration, and applicable standards. <p>Failure to follow these instructions can result in death, serious injury, or equipment damage.</p>

Step	Action		
1	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-right: 1px solid black; padding: 5px;"> By using one (or several) Lexium 62 Distribution Box: Connect the connections CN7, CN8 (power cable: DC bus voltage, 24 V, Inverter Enable) at the Lexium 62 Connection Module with the (first) Lexium 62 Distribution Box by using the pre-assembled power cable. </td> <td style="width: 50%; padding: 5px;"> Without Lexium 62 Distribution Box: Connect the connections CN7, CN8 (power cable: DC bus voltage, 24 V, Inverter Enable) at the Lexium 62 Connection Module with the (first) Lexium 62 ILM by using the pre-assembled power cable. </td> </tr> </table>	By using one (or several) Lexium 62 Distribution Box: Connect the connections CN7, CN8 (power cable: DC bus voltage, 24 V, Inverter Enable) at the Lexium 62 Connection Module with the (first) Lexium 62 Distribution Box by using the pre-assembled power cable.	Without Lexium 62 Distribution Box: Connect the connections CN7, CN8 (power cable: DC bus voltage, 24 V, Inverter Enable) at the Lexium 62 Connection Module with the (first) Lexium 62 ILM by using the pre-assembled power cable.
By using one (or several) Lexium 62 Distribution Box: Connect the connections CN7, CN8 (power cable: DC bus voltage, 24 V, Inverter Enable) at the Lexium 62 Connection Module with the (first) Lexium 62 Distribution Box by using the pre-assembled power cable.	Without Lexium 62 Distribution Box: Connect the connections CN7, CN8 (power cable: DC bus voltage, 24 V, Inverter Enable) at the Lexium 62 Connection Module with the (first) Lexium 62 ILM by using the pre-assembled power cable.		
2	Secure the M23 connector to the Daisy Chain Connector Box by twisting the connector collar.		
3	Connect up to 9 Lexium 62 ILMs per daisy chain line by using power cables.		
4	Connect up to four daisy chain lines with a maximum of 9 Lexium 62 ILMs to a Lexium 62 Distribution Box by using power cables.		
5	Engage the locking mechanism to the Lexium 62 Distribution Box connection side.		
6	Connect the connections CN4, CN5 of the Lexium 62 Connection Module with the Sercos socket connectors of the Daisy Chain Connector Box to the Lexium 62 ILM by using a pre-assembled Sercos cable.		
7	Connect the Lexium 62 ILMs to the Sercos socket connectors of the Daisy Chain Connector Box by using a pre-assembled Sercos cable.		
8	Tightly close the open power socket M23 (CN2/CN3) of the Lexium 62 ILM with a protection cap ILM62DCZ000 on every daisy chain line on the last Daisy Chain Connector Box.		

⚠ WARNING
<p>LOSS OF IP65 RATING</p> <ul style="list-style-type: none"> Assemble the M23 cable connector correctly to the daisy-chain connector box to properly seal the connection and meet the IP65 protection class requirements. Tightly seal off open power socket connectors CN2/CN3 with an ILM62DCZ000 protection cap on the last drive of the daisy chain. Use only cables and accessory parts from Schneider Electric. <p>Failure to follow these instructions can result in death, serious injury, or equipment damage.</p>

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 another Lexium 62 Distribution Box.
- Maximum cable length of 10 m (32.8 ft) from Lexium 62 Distribution Box or Lexium 62 Connection Module to the first Lexium 62 ILM of the daisy chain line.
- A maximum of 9 Lexium 62 ILMs can be connected per daisy chain line and a maximum cable length of 10 m (32.8 ft) between the first and the last Lexium 62 ILM of the daisy chain line.
- Sum of all cable lengths maximum 200 m (656 ft).
- Maximum distance of 50 m (164 ft) between 2 active Sercos slaves.

- Lexium 62 Connection Module and Lexium 62 Distribution Box are not active Sercos slaves. Both the Lexium 62 Connection Module and the Lexium 62 Distribution Box are passive, pass-through devices.

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

NOTICE
INCORRECT VOLTAGE / CURRENT Only use topologies approved by Schneider Electric. Failure to follow these instructions can result in equipment damage.

NOTE: According to IEC/EN 60204-1, the correct grounding of the motor has to be verified on the installed machine on location in all cases.

Maintenance, Repair, Cleaning, Replacement Equipment Inventory

Prerequisites for Maintenance, Repair, and Cleaning

Introduction

Observe the following instructions before carrying out maintenance on the Lexium 62 Drive System.

De-Energize the System

⚠ DANGER
ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH <ul style="list-style-type: none">• 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 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:

Step	Action
1	Set main switch to OFF position, or otherwise disconnect all power to the system.
2	Prevent main switch from being switched back on.
3	In the case of any drives, servos or other equipment with high capacity capacitors, wait at least 15 minutes after removing power (switching off) to allow the DC bus capacitors to discharge.
4	Verify whether the DC-BUS LED indicator has turned off on all components located in the axis group.
5	Verify with an appropriate measuring instrument that the voltages between DC+ to PE (Protective Earth/ground), DC- to PE and DC+ to DC- are all less than 42 Vdc.

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 indicator, refer to *Bus Bar Module LED Indicators*, page 90.

Fuse Replacement Lexium 62 Connection Module

Overview

If there is a loss of power from the Lexium 62 Connection Module while there is power at the power supply, you may need to replace the internal fuses.

The Lexium 62 Drive System indicates such a condition by the following:

- DC bus LED at the Lexium 62 Power Supply is on.
- DC bus LED at the Lexium 62 Connection Module is off.

NOTE: Before attempting to replace the fuses, determine the source of over-current or short circuit and remedy the issue.

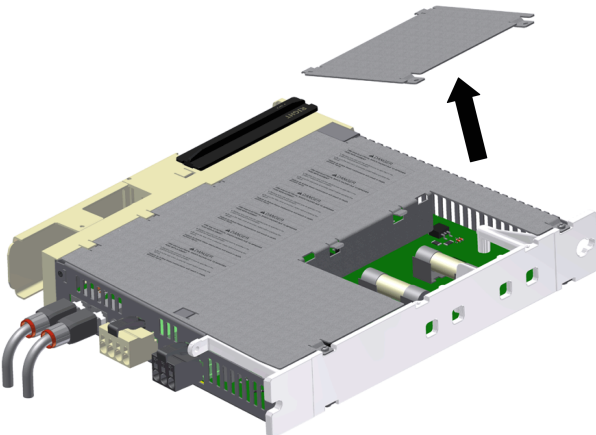
The Lexium 62 Connection Module needs to be disconnected and removed to replace the internal fuses.

DANGER

ELECTRIC SHOCK CAUSED BY HIGH TOUCH VOLTAGE

- Before working on the product, make sure that it is de-energized.
- After disconnection, do not touch connector CN6 mains connection on the Lexium 62 Power Supply module as it still carries hazardous voltages for approximately one second.
- Only operate the Lexium 62 Power Supply and the Lexium 62 Connection Module in a control cabinet that cannot be opened without the help of tools.

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

Step	Action
1	Dismount Lexium 62 Connection Module, refer to <i>Replacing components and cables</i> , page 78.
2	Open the maintenance flap. 
3	On the back side of the housing, remove both fuses from the holding device using a screwdriver and replace them by new fuses of the same type (Commercial reference VW3E6024).

⚠ DANGER

FIRE AND ELECTRICAL SHOCK DUE TO IMPROPER FUSE REPLACEMENT

- Replace fuse only by a fuse of identical type as specified in the product documentation.
- Be sure that the fuse cover is securely closed before operating the device.

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

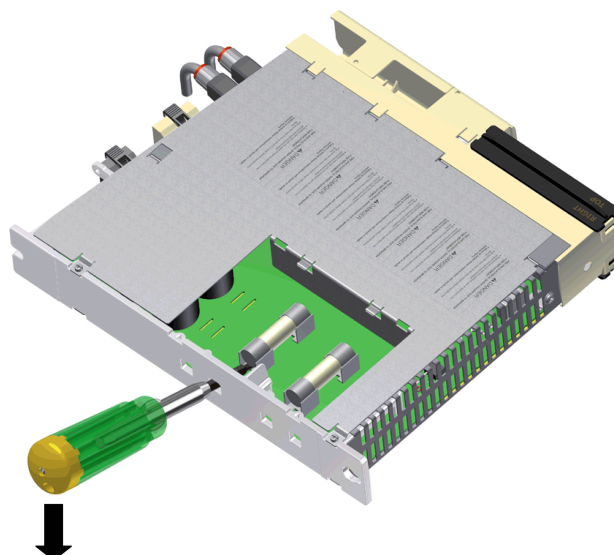
Instructions for ESD Protection

NOTICE

ELECTROSTATIC DISCHARGE

- Do not touch any of the electrical connections or components.
- Touch circuit boards only on the edges.
- Take the necessary protective measures against electrostatic discharges.

Failure to follow these instructions can result in equipment damage.



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

Step	Action
1	Close maintenance flap and mount, page 62 the Lexium 62 Connection Module.
2	Restart the system, page 63.

NOTE:

- If after remedying the source of over-current or short circuit and fuse replacement, the Lexium 62 Connection Module still is not ready for operation or returns to a no power condition again after recommissioning, contact your Schneider Electric representative.
- With exception of internal fuses in the Lexium 62 Connection Module, there are no other user-serviceable parts within the Lexium 62 components. Either replace the component or contact your Schneider Electric representative.

⚠ 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.

Machine Repair

Presentation

With exception of internal fuses in the Lexium 62 Connection Module, page 74, there are no other user-serviceable parts within the Lexium 62 ILM components. Either replace the entire drive or contact your Schneider Electric representative.

▲ 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.

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. Do not modify the equipment.

In case machine repair includes the replacement of the drive components, observe the following instructions for ESD protection in order to avoid any damage due to electrostatic discharge:

NOTICE

ELECTROSTATIC DISCHARGE

- Do not touch any of the electrical connections or components.
- Touch circuit boards only on the edges.
- Take the necessary protective measures against electrostatic discharges.

Failure to follow these instructions can result in equipment damage.

Cleaning

Cleaning the Lexium 62 ILM Integrated Servo Drive

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 chloride-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 component, refer to *Technical Data*, page 109.

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

Replacement Equipment Inventory

Presentation

Keep a stock of the most important components to help assure that your machine is functioning and ready for operation.

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

Indicate the following information on the replacement equipment order:

- Item name: for example ILM0701P01A0000
- Hardware code: for example, RS02
- Software (firmware) version: for example SW: 0.24.21

For example, there is a hardware enhancement between revision RS01 and RS02 in the braking resistors such that absorption has been increased. Therefore, if a RS02 power supply is replaced by a RS01 power supply, this could lead to equipment damage.

NOTICE

INCREASED PULSE ENERGY ABSORPTION CAPACITY OF THE LEXIUM 62 POWER SUPPLY MODULE

Only replace Lexium 62 power supply module with the same or greater hardware revision.

Failure to follow these instructions can result in equipment damage.

This information can be found on the logistic nameplate.

For more information concerning the replacement of components, refer to *Replacing Components and Cables*, page 78.

Replacing Components and Cables

Prerequisites for Replacing Components and Cables

De-Energize the 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 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:

Step	Action
1	Set main switch to OFF position, or otherwise disconnect all power to the system.
2	Prevent main switch from being switched back on.
3	In the case of any drives, servos or other equipment with high capacity capacitors, wait at least 15 minutes after removing power (switching off) to allow the DC bus capacitors to discharge.
4	Verify whether the DC-BUS LED indicator has turned off on all components located in the axis group.
5	Verify with an appropriate measuring instrument that the voltages between DC+ to PE (Protective Earth/ground), DC- to PE and DC+ to DC- are all less than 42 Vdc.

⚠ 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 indicator, refer to *Displays at the Lexium 62 Connection Module*, page 90.

Other Prerequisites

⚠ 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.
- Connect and disconnect cables and terminals only after you have verified that the power has been removed from the system.

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

With exception of internal fuses in the Lexium 62 Connection Module, there are no other user-serviceable parts within the Lexium 62 ILM components. Either replace the entire device or contact your Schneider Electric representative.

⚠ 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.

ESD Protection

Refer to *ESD Protection Measures*, page 33.

Replacement of the Lexium 62 Connection Module

Overview

Before beginning the replacement of specific components, read thoroughly the section *Replacing Components and Cables*, page 78 for important safety information and general instructions.

How to Replace the Lexium 62 Connection Module

⚠ 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 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

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.

Step	Action
1	Disconnect all connection cables on the Lexium 62 Connection Module. NOTE: Ensure that the cables clearly indicate their connections before disconnecting.
2	Loosen the screwed connections on the wiring bus (CN1) of the component that shall be replaced.
3	If present, loosen the screwed connections of the adjacent device on the right-hand side.
4	Push both slides (CN1) to the center of the device.
5	Loosen the screw connections of the device mounting brackets on the top and bottom side.

Step	Action
6	Remove the Lexium 62 Connection Module and replace it.
7	Install the new Lexium 62 Connection Module and tighten the screwed connections on the top and bottom side.
8	Verify whether a terminal cover is attached to the wiring bus (CN1) at the end of a row. For important safety information, follow the instructions in the safety messages after this table.
9	Connect the Lexium 62 component according to the circuit diagram of the machine. For important safety information, follow the instructions in the safety messages after this table.
10	After replacing a Lexium 62 Connection Module, proceed as by the first commissioning, page 58.

⚠ DANGER

ELECTRIC SHOCK CAUSED BY HIGH LEAKAGE (TOUCH) VOLTAGE

- Attach the terminal covers on the extremities of the *Bus Bar Module combination*, page 62.
- Apply power to the device only if the terminal covers have been attached to the extremities of the Bus Bar Module combination.

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

⚠ DANGER

INCORRECT ASSIGNMENT OF CABLES

Verify that the assignment of the cables conforms to their previous connector assignments.

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

Depending on the selected identification mode in the EcoStruxure Machine Expert Logic Builder, an interchanged connection of the connection Sercos or the Sercos cables can lead to an unintended operation of the machine.

⚠ 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.

⚠ CAUTION

FALLING HEAVY OBJECT

Do not fully remove the screw connections of the device mounting suspension and prevent the device from falling out and down.

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

Replacement of the Lexium 62 Distribution Box

Overview

Before beginning the replacement of specific components, read thoroughly the section *Replacing Components and Cables*, page 78 for important safety information and general instructions.

How to Replace the Lexium 62 Distribution Box

NOTICE

CONNECTOR WEAR

Do not connect / disconnect the hybrid cables more than 20 times.

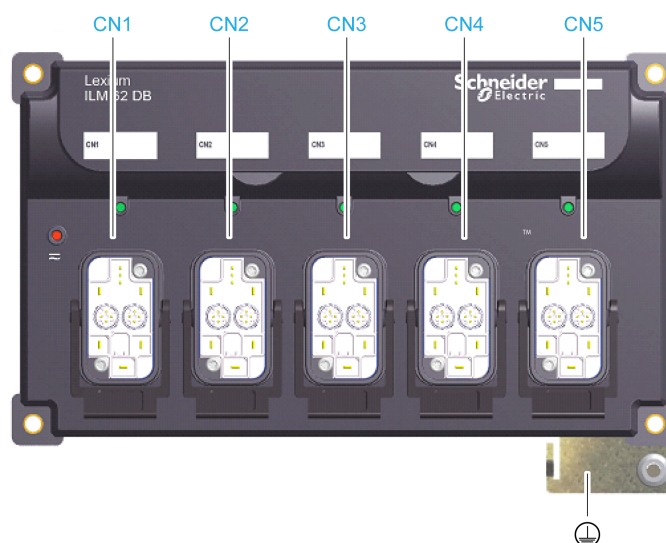
Failure to follow these instructions can result in equipment damage.

NOTICE

ELECTROSTATIC DISCHARGE

- Do not touch any of the electrical connections or components.
- Touch circuit boards only on the edges.
- Take the necessary protective measures against electrostatic discharges.

Failure to follow these instructions can result in equipment damage.



Step	Action
1	After opening the connector locking mechanism of the Lexium 62 Distribution Box, disconnect the hybrid or power cable connector (cable connection from the Lexium 62 Connection Module). NOTE: Ensure that the cables clearly indicate their connections before disconnecting.
2	Disconnect the hybrid or power cable connectors of all connected motors.
3	Likewise, remove any strapping plugs that may be connected in the same manner, and retain them to replace on the new distribution module.
4	Dismount protective ground (earth) cable from the lower-right-corner metal bracket connection of the Lexium 62 Distribution Box.
5	Replace the Lexium 62 Distribution Box as a whole.
6	Attach connectors of the hybrid or power cable connectors of all motors to be connected.
7	In addition, replace any strapping plugs to their respective connections.

Step	Action
8	Secure the connectors by using the connector locking mechanism of the Lexium 62 Distribution Box.
9	Attach the hybrid or power cable connector (from the Lexium 62 Connection Module) and secure it by using the connector locking mechanism.
10	Mount ground (earth) cable to the lower-right-corner metal bracket connection of the Lexium 62 Distribution Box.

Removing the Lexium 62 Connection Module Hybrid or Power Cables

Disconnect the pre-assembled hybrid or power cable connector for the connection between Lexium 62 Connection Module and Lexium 62 Distribution Box as follows:

Step	Action
1	Open the connector locking mechanism of the Lexium 62 Distribution Box.
2	Detach the hybrid or power cable connector to its connection at the Lexium 62 Distribution Box.
3	Disconnect the cables at connectors CN4-5 (in the case of the hybrid cable), CN6 , CN7 , and CN8 at the Lexium 62 Connection Module.

Removing the Lexium 62 ILM Hybrid or Power Cables

Disconnect the pre-assembled hybrid or power cable connector for the connection between Lexium 62 ILM and Lexium 62 Distribution Box as follows:

Step	Action
1	Detach hybrid or power cable connector to the Lexium 62 ILM: <ul style="list-style-type: none"> In the case of the hybrid cable, open the connector locking mechanism and disconnect the hybrid cable connector. In the case of the power cable connector, loosen the retaining sleeve of the M23 connector and unbuckle the connector from the daisy-chain connector box.
2	Open the connector locking mechanism and detach the hybrid or power cable connector from its connection at the Lexium 62 Distribution Box.

Installing the Lexium 62 Connection Module Hybrid or Power Cables

Connect the pre-assembled hybrid or power cable connector for the connection between Lexium 62 Connection Module and Lexium 62 Distribution Box as follows:

Step	Action
1	Remove protective cover on the hybrid or power cables connector(s).
2	Attach the hybrid or power cable connector to its connection at the Lexium 62 Distribution Box.
3	Secure the connector by using the connector locking mechanism of the Lexium 62 Distribution Box.
4	Perform connections CN4-5 (in the case of the hybrid cable), CN6 , CN7 , and CN8 at the Lexium 62 Connection Module according to the connection overview, page 98.

Depending on the selected identification (address) mode in the EcoStruxure Machine Expert Logic Builder, an interchanged connection of the Sercos 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.

Installing the Lexium 62 ILM Hybrid or Power Cables

Connect the pre-assembled hybrid or power cable connector for the connection between Lexium 62 ILM and Lexium 62 Distribution Box as follows:

Step	Action
1	Remove protective cover on the hybrid or power cables connector(s).
2	Attach hybrid or power cable connector to the Lexium 62 ILM: <ul style="list-style-type: none"> In the case of the hybrid cable, connect it directly to the Lexium 62 ILM integrated drive and secure it by using the connector locking mechanism. In the case of the power cable connector, connect the cable to the daisy chain connector box mounted on the Lexium 62 ILM via the M23 connector. Be sure to lock the M23 connector by twisting the connection sleeve to ensure a proper IP65 rated seal.
3	Attach the hybrid or power cable connector to its connection at the Lexium 62 Distribution Box and secure it by using the connector locking mechanism of the Lexium 62 Distribution Box.

⚠ WARNING**LOSS OF IP65 RATING**

- Assemble the M23 cable connector correctly to the daisy-chain connector box to properly seal the connection and meet the IP65 protection class requirements.
- Tightly seal off open power socket connectors CN2/CN3 with an ILM62DCZ000 protection cap on the last drive of the daisy chain.
- Use only cables and accessory parts from Schneider Electric.

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

Replacement of the Lexium 62 ILM Integrated Servo Drive**Overview**

Before beginning the replacement of specific components, read thoroughly the section *Replacing Components and Cables*, page 78 for important safety information and general instructions.

How to Replace the Lexium 62 ILM

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

⚠ 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 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.

⚠ WARNING

HEAVY, FALLING COMPONENTS

- Use 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.

NOTICE

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 equipment damage.

The Lexium 62 ILM is composed of an integrated drive/motor combination, and is considered as one, inseparable component. When replacing the Lexium 62 ILM, the entire drive/motor combination must be replaced.

NOTICE

IMPROPER REPLACEMENT OR OPENING OF THE COMPONENTS

- Do not open the components to replace or modify the sub-components and put them into operation.
- If deemed necessary, replace the entire drive/motor combination.
- 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.

Disconnect all connection cables on the Lexium 62 ILM.

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

The replacement of the Lexium 62 ILM 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 recalibrated.

▲ 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.

There are sensitive precision parts involved in the proper functioning of the Lexium 62 ILM. Therefore, care must be taken during the replacement of the component to avoid damage and disfunction.

NOTICE

MECHANICAL FORCE TO THE ENCODER SYSTEM

- Prevent impacts on the motor shaft when removing and attaching couplings to the motor shaft, as this could damage the encoder.
- Use appropriate tools, such as an extractor.
- Avoid mechanical damage to the coating of the motor housing.

Failure to follow these instructions can result in equipment damage.

NOTICE

CONNECTOR WEAR

Do not connect / disconnect the hybrid cables more than 20 times.

Failure to follow these instructions can result in equipment damage.

Before attempting to replace the Lexium 62 ILM, refer to *Mounting*, page 62.

Step	Action
1	Replace the drive according to your machine application requirements, or the specifications of the original machine manufacturer.
2	Reconnect the protective earth ground cable and tighten it with a 2.8 Nm (24.8 lbf in) torque.

The graphic shows a connection overview of Lexium 62 ILM:



1 Protective earth ground connection

2 Hybrid connector

How to Replace the Cables for Line Structure and Tree Structure

Step	Action
1	Disconnect / attach the protective ground (earth) cable and hybrid connector from/ to the Lexium 62 ILM.
2	Disconnect / attach the hybrid connector from/to the Lexium 62 Distribution Box.

How to Replace the Cables for Daisy Chain Structure

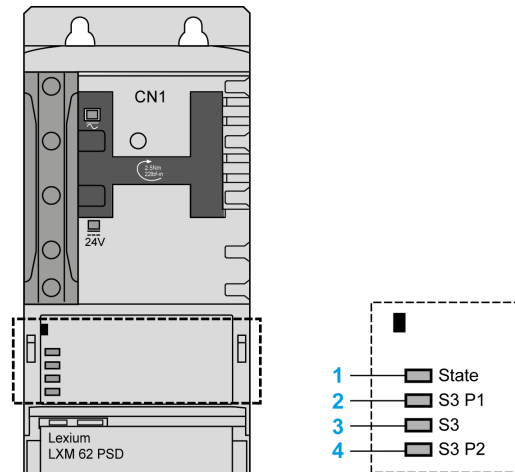
Step	Action
1	Disconnect / attach the protective ground (earth) cable from/to Lexium 62 ILM and disconnect / attach power cable as well as Sercos cables from/to the Daisy Chain Connector Box which is installed on the Lexium 62 ILM.
2	Disconnect / attach the power cable from/to Lexium 62 Distribution Box.

Indicators and Control Elements

Indicators of the Lexium 62 Power Supply

Overview

The display of the Lexium 62 Power Supply consists of four LED indicators that are used to display status information.



1 State LED indicator

2 S3 P1 LED indicator for the status of port 1 of the Sercos III communication

3 S3 LED indicator for the Sercos III communication

4 S3 P2 LED indicator for the status of port 2 of the Sercos III communication

Reset Button

Press the reset button to reset and restart the Lexium 62 Power Supply.

State LED Indicator

LED indicator color / status	Description	Instructions / information for the user
Off	Device is not energized or is otherwise inoperable.	<ul style="list-style-type: none"> • Verify the power supply. • Replace device.
Flashing green (4 Hz, 125 ms)	Initialization of the device (firmware boot process, compatibility verification of the hardware, updating the firmware)	<ul style="list-style-type: none"> • Wait until initialization is complete.
Flashing slowly green (2 Hz, 250 ms)	Identification of the device	<ul style="list-style-type: none"> • If necessary, identify the device via EcoStruxure Machine Expert as defined by the controller configuration.
Steady green	Device has been initialized and waits for the configuration.	<ul style="list-style-type: none"> • Configure device as active. • Configure device as inactive. • Configure device for the execution of motions.

LED indicator color / status	Description	Instructions / information for the user
Steady red	A non-recoverable error has been detected requiring user intervention: <ul style="list-style-type: none"> • Watchdog • Firmware • Checksum • Internal error detected 	<ul style="list-style-type: none"> • Cycle power (power reset) • If this condition persists, replace the device.
Flashing slowly red (2 Hz, 250 ms)	A general error has been detected.	<ul style="list-style-type: none"> • The devices tree in EcoStruxure Machine Expert displays the error detected. • Reset error detected in the EcoStruxure Machine Expert Logic Builder menu Online > Reset diagnostic messages of controller. • Otherwise restart device.

S3 Ports 1 and 2 LED Indicator

LED indicator color / status	Description
Off	No cable connected
Steady orange	Cable connected, no Sercos communication
Steady green	Cable connected, active Sercos communication

S3 LED Indicator

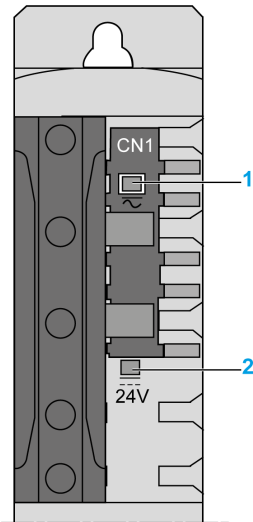
LED indicator color / status	Description	Instructions / information for the user
Off	The device is not energized or is otherwise inoperable, or there is no communication due to an interrupted or separated connection.	Start Sercos boot up or verify the Sercos cable and connections.
Steady green	Active Sercos connection without an error detected in the CP4.	–
Flashing green (4 Hz, 125 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: <ul style="list-style-type: none"> • Line topology or • Sercos loop break 	Workaround: <ul style="list-style-type: none"> • Close ring. Reset condition: <ul style="list-style-type: none"> • Acknowledge the detected error in the EcoStruxure Machine Expert Logic Builder menu Online > Reset diagnostic messages 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 indicator condition does not change.
Steady red	Sercos diagnostic class 1 (DC1) error has been detected on port 1 and/or port 2.	Reset condition: <ul style="list-style-type: none"> • Acknowledge the detected error in the EcoStruxure Machine Expert Logic Builder menu Online > Reset diagnostic messages of controller.
Flashing red / green (4 Hz, 125 ms)	Communication error has been detected. Possible causes: <ul style="list-style-type: none"> • Improper functioning of the telegram • CRC error detected 	Reset condition: <ul style="list-style-type: none"> • The configuration shows which error has been detected. • Acknowledge the detected error in the EcoStruxure Machine Expert Logic Builder menu Online > Reset diagnostic messages of controller.
Steady orange	The device is in a communications phase CP0 up to and including CP3 or HP0 up to and including HP2. Sercos telegrams are received.	–
Flashing orange (4 Hz, 125 ms)	Device identification	NOTE: The identified device is also displayed by the axis state LED indicator on the drive.

Indicators of the Lexium 62 Connection Module

Overview

The display of the Lexium 62 Connection Module consists of two LEDs that indicate the state of the DC voltage supply or the 24 V voltage supply via the Bus Bar Module.

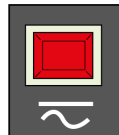
The graphic shows the diagnostic LEDs of the Lexium 62 Connection Module:



1 DC Bus LED Indicator

2 24 V LED Indicator

DC Bus LED Indicator



LED indicator color / status	Description	Information
Off	DC bus supply inactive	–
Steady red	DC bus supply active	DC bus voltage ≥ 42 Vdc

The DC Bus LED indicator is not an indicator for the absence of DC bus voltage.

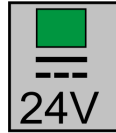
⚠ DANGER

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.

24V LED Indicator

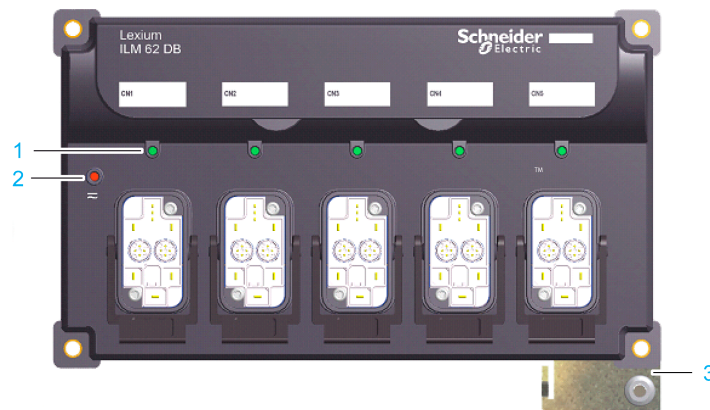


LED indicator color / status	Description
Off	24 Vdc logic supply inactive
Steady green	24 Vdc logic supply active

Indicators of the Lexium 62 Distribution Box

Overview

The graphic shows the display and operating elements of the LEDs of the Lexium 62 Distribution Box:



- 1 Hybrid connection LED Indicator
- 2 DC bus LED Indicator
- 3 Protective ground (earth)

Hybrid Connection LED Indicator

LED indicator color / status	Description	Information
Off	Hybrid connection not connected.	–
Steady green	Hybrid plug connector connected.	Applies for hybrid cable or power cable (daisy chain wiring).

DC Bus LED Indicator



LED indicator color / status	Description	Information
Off	DC bus supply inactive	–
Steady red	DC bus supply active	DC bus voltage ≥ 42 Vdc

The DC Bus LED indicator is not an indicator for the absence of DC bus voltage.

⚠ 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.

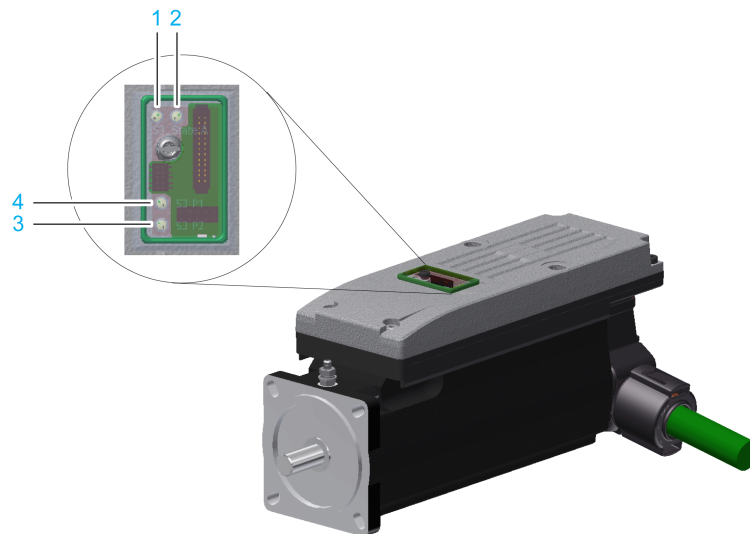
Failure to follow these instructions will result in death or serious injury.

Indicators of the Lexium 62 ILM Integrated Servo Drive

Overview

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

Diagnostic LEDs of the Lexium 62 ILM:



- 1 S3 LED Indicator
- 2 State LED Indicator
- 3 Port 2 LED Indicator
- 4 Port 1 LED Indicator

S3 (Sercos III) LED Indicator

LED indicator color / status	Description	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.	Start Sercos boot up or verify the Sercos cable and connections.
Steady green	Active Sercos connection without an error detected in the CP4.	–
Flashing green (2 Hz, 250 ms)	The device is in loopback mode. Loopback describes the situation in which the Sercos telegrams have to be sent back on the same port on which they were received. Possible causes: <ul style="list-style-type: none"> Line topology or Sercos loop break 	Workaround: <ul style="list-style-type: none"> Close ring. Reset condition: <ul style="list-style-type: none"> Acknowledge the detected error in the EcoStruxure Machine Expert Logic Builder menu Online > Reset diagnostic messages 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 indicator condition does not change.
Steady red	Sercos diagnostic class 1 (DC1) an error has been detected on port 1 and/or port 2. No Sercos communication possible on the ports.	Reset condition: <ul style="list-style-type: none"> Acknowledge the detected error in the EcoStruxure Machine Expert Logic Builder menu Online > Reset diagnostic messages of controller.
Flashing red / green (2 Hz, 250 ms)	Communication error has been detected. Possible causes: <ul style="list-style-type: none"> Improper functioning of the telegram CRC error detected 	Reset condition: <ul style="list-style-type: none"> The configuration shows which error has been detected. Acknowledge the detected error in the EcoStruxure Machine Expert Logic Builder menu Online > Reset diagnostic messages of controller.
Steady orange	The device is in a communications phase CP0 up to and including CP3 or HP0 up to and including HP2. Sercos telegrams are received.	–
Flashing orange (4 Hz, 125 ms)	Device identification	–

State LED Indicator

LED indicator color / status	Description	Instructions / information for the user
Off	Device is not energized or is otherwise inoperable.	<ul style="list-style-type: none"> Verify the power supply. Replace device.
Flashing green (2 Hz, 250 ms)	Initialization of the device (firmware restart process, compatibility verification of the hardware, updating the firmware)	<ul style="list-style-type: none"> Wait until initialization is complete.
Flashing slowly green (2 Hz, 40 ms)	Identification of the device	<ul style="list-style-type: none"> If necessary, identify the device via EcoStruxure Machine Expert as defined by the controller configuration.
Steady green	Device has been initialized and waits for the configuration.	<ul style="list-style-type: none"> Configure device as active. Configure device as inactive. Configure device for the execution of motions.
Steady red	A non-recoverable error has been detected requiring user intervention: <ul style="list-style-type: none"> Watchdog Firmware Checksum Internal error detected 	<ul style="list-style-type: none"> Cycle power (power reset) If this condition persists, replace the device.
Flashing slowly red (2 Hz, 250 ms)	A general error has been detected.	<ul style="list-style-type: none"> The devices tree in EcoStruxure Machine Expert displays the error detected . Reset error detected in the EcoStruxure Machine Expert Logic Builder menu Online > Reset diagnostic messages of controller. Otherwise restart device.

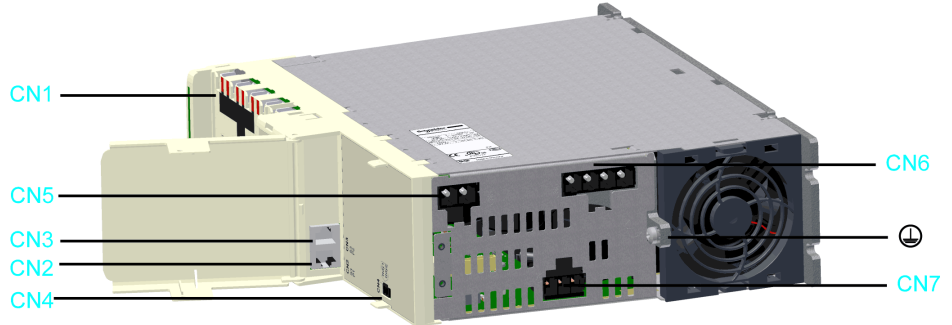
Port 1 and 2 LED Indicators


LED indicator color / status	Description
Off	No cable connected
Steady orange	Cable connected, no Sercos communication
Steady green	Cable connected, active Sercos communication

Electrical Power Connections

Electrical Connections for the Lexium 62 Power Supply

Overview

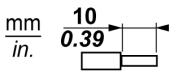


Connector	Description	Connection cross-section [mm ²] / [AWG]	Tightening torque [Nm] / [lbf in]
CN1, page 96	Bus Bar Module	–	2.5 / 22.14
CN2/CN3, page 96	Sercos communication	–	–
CN4, page 97	Ready relay output	0.2...1.5 / 24...16 ⁽¹⁾	–
CN5, page 97	24 Vdc	0.5...16 / 20...6 ⁽¹⁾	–
CN6, page 97	Mains connection	0.75...16 / 18...6 ⁽¹⁾	–
CN7, page 98	DC bus output	0.2...6 / 24...10 ⁽¹⁾	–
	Protective ground (earth)	10 / 6	3.5 / 30.98
<p>⁽¹⁾ Gauge required for UL conformance. For further information on this, refer to <i>Conditions for UL Compliant Use</i>, page 33.</p>			

Removable Spring-Clamping Terminal Block Wiring

The details in the following table apply for the wiring on the removable spring-clamping terminal block of the **CN4** connection.

Overview of the connection cross-sections for the removable spring-clamping terminal block **CN4** Ready Relay output

	Rigid wire	Flexible wire	Flexible wire with a wire end sleeve without a plastic sleeve	Flexible wire with a wire end sleeve and plastic sleeve
mm ²	0.2...1.5	0.2...1.5	0.25...1.5	0.25...0.75
AWG	24...16	24...16	23...16	23...16

The details in the following table apply for the wiring on the removable spring-clamping terminal block of the **CN5, CN6 and CN7** connection.

Overview of the connection cross-sections for the removable spring-clamping terminal block **CN5, CN6 and CN7** mains connection.

	Rigid wire	Flexible wire	Flexible wire with a wire end sleeve⁽¹⁾ without a plastic sleeve	Flexible wire with a wire end sleeve⁽¹⁾ and plastic sleeve
mm ²	0.75...16	0.75...16	0.75...16	0.75...10
AWG	18...6	18...6	18...6	18...8
(1) Use crimping tools CRIMPFOX 10 S (for wire cross sections 0.75..10 mm ² , AWG 18..8) and CRIMPFOX 16 S (for wire cross-sections 10...16 mm ² , AWG 8..6) from Phoenix Contact.				

CN1 - Bus Bar Module

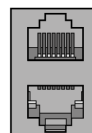
The DC bus voltage and the 24 Vdc control voltage are distributed and the protective conductor is connected via the Bus Bar Module.



Pin	Designation	Description
1		Protective ground (earth)
2	DC-	DC bus voltage -
3	DC+	DC bus voltage +
4	24 V	Supply voltage +
5	0 V	Supply voltage -

CN2/CN3 - Sercos

The Sercos connection is used for the communication between the controller and the Lexium 62 Power Supply.

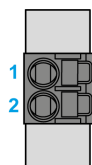


Pin	Designation	Description
1.1	Eth0_Tx+	Positive transmission signal
1.2	Eth0_Tx-	Negative transmission signal
1.3	Eth0_Rx+	Positive receiver signal
1.4	N.C.	Reserved
1.5	N.C.	Reserved
1.6	Eth0_Rx-	Negative receiver signal

Pin	Designation	Description
1.7	N.C.	Reserved
1.8	N.C.	Reserved
2.1	Eth1_Tx+	Positive transmission signal
2.2	Eth1_Tx-	Negative transmission signal
2.3	Eth1_Rx+	Positive receiver signal
2.4	N.C.	Reserved
2.5	N.C.	Reserved
2.6	Eth1_Rx-	Negative receiver signal
2.7	N.C.	Reserved
2.8	N.C.	Reserved

CN4 - Ready Relay Output

Following initialization of the Lexium 62 Power Supply, the Ready output is activated.



Pin	Designation	Description	Note
1	RDY1	Indicates that the power supply is operational.	Potential-free contact
2	RDY2		

CN5 - 24 V

The 24 V input supplies the internal logic assemblies as well as the holding brakes of the axis group, connected to the axis modules.

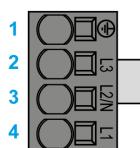



Pin	Designation	Description
1	0 V	Internal supply voltage
2	24 V	

The insulation-stripped length of the wires of the 24 V input connector is 18 mm (0.71 in.).

CN6 - Mains Connection

The Power Supply is supplied with voltage via the power connection.

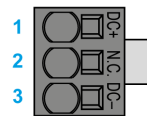


Pin	Designation	Description
1		Protective ground (earth)
2	L3	External conductor L3
3	L2/N	External conductor L2/N
4	L1	External conductor L1

The insulation-stripped length of the wires of the AC infeed connectors is 18 mm (0.71 in.).

CN7 - DC Bus Output

The DC bus output can be used for an external braking resistor module.

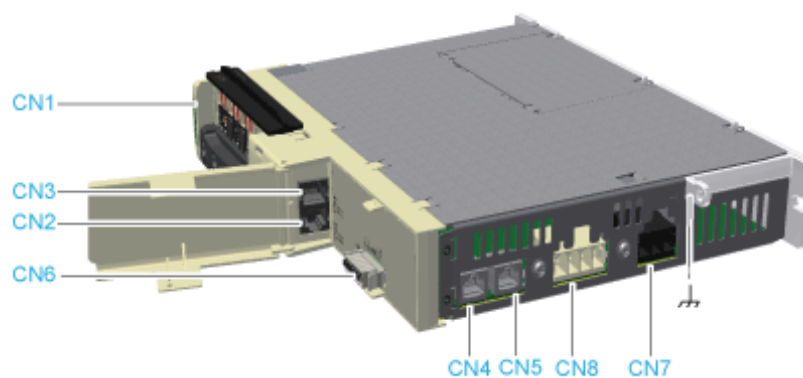


Pin	Designation	Description
1	DC+	DC bus voltage +
2	N.C.	Reserved
3	DC-	DC bus voltage -


The insulation-stripped length of the wires of the DC bus connector is 15 mm (0.59 in.).

Electrical Connections for the Lexium 62 Connection Module

Overview




Connector	Description	Connection cross-section [mm ²] / [AWG]	Tightening torque [Nm] / [lbf in]
CN1, page 99	Bus Bar Module	–	2.5 / 22.14
CN2/CN3, page 99	Sercos communication	–	–
CN4, page 100	Sercos communication	–	–
CN5, page 100	Sercos communication	–	–

Connector	Description	Connection cross-section [mm ²] / [AWG]	Tightening torque [Nm] / [lbf in]
CN6, page 100	Inverter Enable 24 V	0.5...16 / 20...6	–
CN7, page 101	DC bus output	0.2...6 / 24...10	–
CN8, page 101	Inverter Enable signal output / 24 V output	0.2...6 / 24...10	–
	Protective ground (earth)	10 (cable lug) / 6	3.5 / 30.98

CN1 - Bus Bar Module

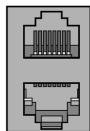
The DC bus voltage and the 24 Vdc control voltage are distributed and the protective conductor is connected via the Bus Bar Module.



Pin	Designation	Description
1		Protective ground (earth)
2	DC-	DC bus voltage -
3	DC+	DC bus voltage +
4	24 V	Supply voltage +
5	0 V	Supply voltage -

CN2/CN3 - Sercos

The Sercos connection is used for the communication between the controller, the Lexium 62 Power Supply and the Lexium 62 Connection Module.

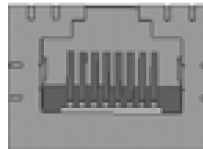


Pin	Designation	Description
1.1	Eth0_Tx+	Positive transmission signal
1.2	Eth0_Tx-	Negative transmission signal
1.3	Eth0_Rx+	Positive receiver signal
1.4	N.C.	–
1.5	N.C.	–
1.6	Eth0_Rx-	Negative receiver signal

Pin	Designation	Description
1.7	N.C.	–
1.8	N.C.	–
2.1	Eth1_Tx+	Positive transmission signal
2.2	Eth1_Tx-	Negative transmission signal
2.3	Eth1_Rx+	Positive receiver signal
2.4	N.C.	–
2.5	N.C.	–
2.6	Eth1_Rx-	Negative receiver signal
2.7	N.C.	–
2.8	N.C.	–

CN4/CN5 - Sercos

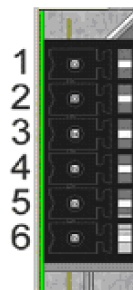
The Sercos connection is used for communication between Lexium 62 Connection Module and Lexium 62 ILM.



Pin	Designation	Description
1	Eth0_Tx+	Positive transmission signal
2	Eth0_Tx-	Negative transmission signal
3	Eth0_Rx+	Positive receiver signal
4	N.C.	–
5	N.C.	–
6	Eth0_Rx-	Negative receiver signal
7	N.C.	–
8	N.C.	–

CN6 - Inverter Enable Power Supply 24 V

The Inverter Enable voltage connection supplies the Inverter Enable output.



Pin	Designation	Description
1	IE_p1	Supply voltage 24 V for Inverter Enable
2	IE_p2	Supply voltage 24 V for Inverter Enable
3	IE_n1	Supply voltage 0 V for Inverter Enable
4	IE_n2	Supply voltage 0 V for Inverter Enable

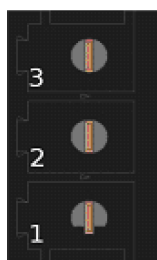
Pin	Designation	Description
5	0V_int1	Control voltage 0 V
6	0V_int2	Control voltage 0 V

NOTE: The maximum current carrying capacity must be respected:

Maximum consumption per Lexium 62 Connection Module: 2 A with 45 Lexium 62 ILM Integrated servo drives.

CN7 - DC Bus Output

The DC bus output is connected to the Lexium 62 Distribution Box via the hybrid cable or power cable (daisy chain wiring), or is directly connected to an Lexium 62 ILM and supplies the Lexium 62 ILM with the required power.

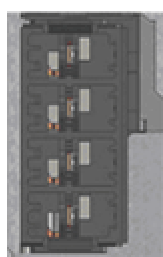


Pin	Designation	Description	Color of cable core
1	DC+	DC bus voltage +	red
2	PE	Protective ground (earth)	green/yellow
3	DC-	DC bus voltage -	black

The insulation-stripped length of the wires of the DC bus connector is 15 mm (0.59 in.).

CN8 - Inverter Enable Output

The Inverter Enable signal switches off the motor torque to obtain the defined safe state.

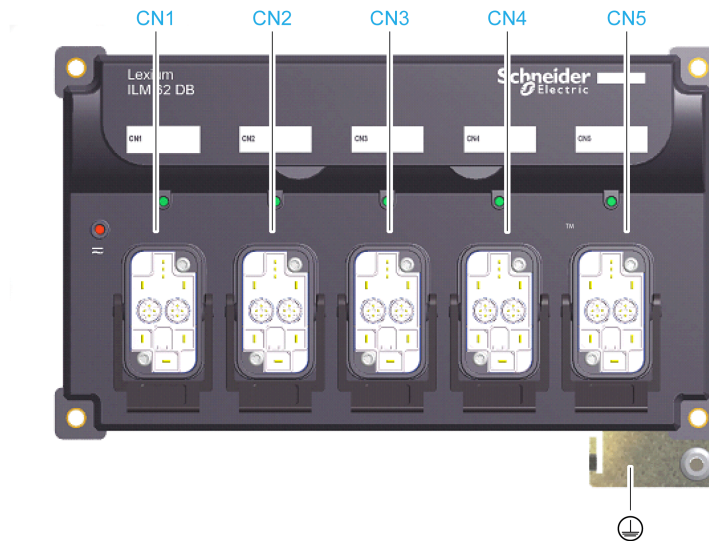



Pin	Designation	Description	Color of cable core
1	IE_sig	IE signal 1	white (core)
2	IE_ref	IE signal 2	white (shield)
3	24V_out	Control voltage 24 V	green
4	0V_out	Control voltage 0 V	gray

The insulation-stripped length of the wires of the 24 V input connector is 15 mm (0.59 in.).

Electrical Connections for the Lexium 62 Distribution Box

Overview



Connector	Description
CN1, page 102	Input (Lexium 62 Connection Module or Lexium 62 Distribution Box)
CN2, page 102	Output (Lexium 62 Distribution Box or Lexium 62 ILM)
CN3, page 102	Output (Lexium 62 Distribution Box or Lexium 62 ILM)
CN4, page 102	Output (Lexium 62 Distribution Box or Lexium 62 ILM)
CN5, page 102	Output (Lexium 62 Distribution Box or Lexium 62 ILM)
	Protective ground (earth) Connection cross-section 2.5 / 13 [mm ²]/[AWG] Tightening torque 3.5 / 30.98 [Nm] / [lbf in]

CN1...CN5 - Hybrid Socket Connector



Pin	Designation	Description
1	IE_sig	IE signal 1
2	IE_ref	IE signal 2
3	Hybrid cable or power cable detection	Hybrid cable or power cable detection (daisy chain wiring)
4	Hybrid cable or power cable detection	Hybrid cable or power cable detection (daisy chain wiring)

Pin	Designation	Description
5	n.c.	-
6	0 V	Control voltage 0 V
7	24 V	Control voltage 24 V
8.1	Rx+	Sercos port 1 - Input (not assigned for daisy chain wiring)
8.2	Tx-	Sercos port 1 - Output (not assigned in the case of daisy chain wiring)
8.3	Rx-	Sercos port 1 - Input (not assigned for daisy chain wiring)
8.4	Tx+	Sercos port 1 - Output (not assigned in the case of daisy chain wiring)
9.1	Rx+	Sercos port 2 - Input (not assigned for daisy chain wiring)
9.2	Tx-	Sercos port 2 - Output (not assigned in the case of daisy chain wiring)
9.3	Rx-	Sercos port 2 - Input (not assigned for daisy chain wiring)
9.4	Tx+	Sercos port 2 - Output (not assigned in the case of daisy chain wiring)
10	DC-	DC bus voltage -
11	Shield	Shielded connector
12	DC+	DC bus voltage +
13	PE	Protective ground (earth)

NOTE: Provide unused hybrid connection sockets with strapping plugs.

- The strapping plugs are not included in the scope of delivery of Lexium 62 ILM and must be ordered separately (Commercial Reference: VW3E6023).
- Strapping plugs close the Sercos loop while ensuring the integrity of the IP65 degree of protection.

Depending on the selected identification (address) mode in the EcoStruxure Machine Expert Logic Builder, an interchanged connection of the Sercos 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.

Electrical Connections for the Lexium 62 ILM Integrated Servo Drive

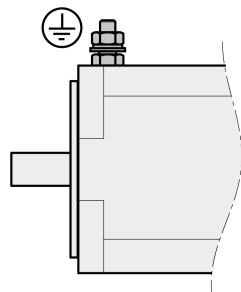
Overview



Connection	Description	Connection cross section [mm ²] / [AWG]	Tightening torque [Nm] / [lbf in]
1	Ground connection	2.5 / 13 ¹⁾ 4.0 / 11 ²⁾	1.8 / 15.9
2	Hybrid connector	- / -	- / -

1) With mechanical protection
2) Without mechanical protection

Protective Ground Conductor Connection



Ground the motor via a grounding screw if grounding via the flange and the protective ground conductor of the motor cable is not sufficient. Use parts with suitable corrosion protection. Note the required tightening torque and the property class of the grounding screw.

Hybrid Connector



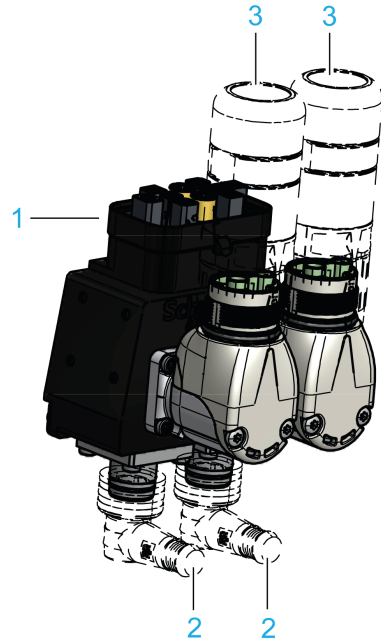
Pin	Designation	Description
1	IE_sig	IE signal 1
2	IE_ref	IE signal 2
3	Brake	Braking signal
4	n.c.	-
5	n.c.	-
6	0 V	Control voltage 0 V
7	24 V	Control voltage 24 V
8.1	Rx+	Sercos port 1 - Input (not assigned for daisy chain wiring)
8.2	Tx-	Sercos port 1 - Output (not assigned in the case of daisy chain wiring)
8.3	Rx-	Sercos port 1 - Input (not assigned for daisy chain wiring)
8.4	Tx+	Sercos port 1 - Output (not assigned in the case of daisy chain wiring)
9.1	Rx+	Sercos port 2 - Input (not assigned for daisy chain wiring)
9.2	Tx-	Sercos port 2 - Output (not assigned in the case of daisy chain wiring)
9.3	Rx-	Sercos port 2 - Input (not assigned for daisy chain wiring)
9.4	Tx+	Sercos port 2 - Output (not assigned in the case of daisy chain wiring)
10	DC-	DC bus voltage -
11	Shield	Shielded connector
12	DC+	DC bus voltage +
13	PE	Protective ground (earth)

Electrical Connections for the ILM Daisy Chain Connector Box

Overview

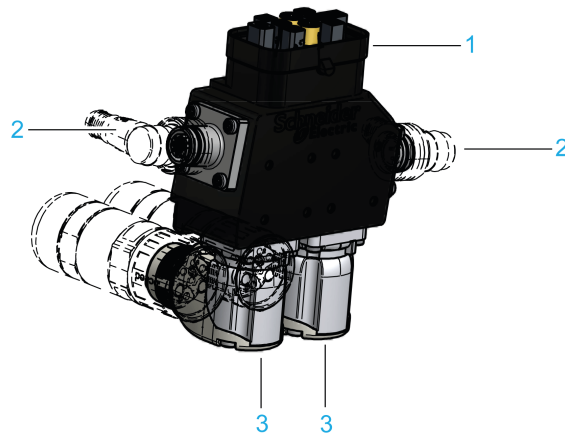
Usage of Daisy Chain Connector Box enables wiring of Lexium 62 ILMs in daisy chain structure. This requires that each Lexium 62 ILM must be extended by a Daisy Chain Connector Box. Per daisy chain line, up to 9 Lexium 62 ILMs can be connected to one another via their respective Daisy Chain Connector Box. Power (DC bus voltage/24 V/ Inverter Enable signals) and signals are distributed from one to the next via separate cables (power cable and signal cable).

Plug and socket connectors of the Daisy Chain Connector Box type A:



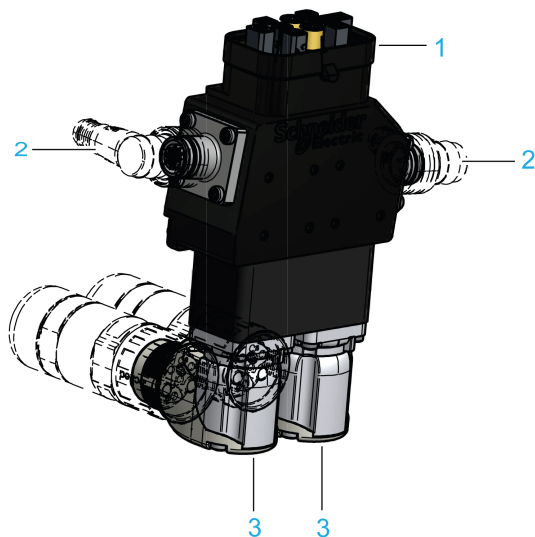
Conne- ction	Connector	Description
1	CN1, page 107	Hybrid plug connector
2	CN4/CN5, page 108	Sercos socket connectors M12
3	CN2/CN3, page 108	Power socket connectors M23

Plug and socket connectors of the Daisy Chain Connector Box type B:



Conne- ction	Connector	Description
1	CN1, page 107	Hybrid plug connector
2	CN4/CN5, page 108	Sercos socket connectors M12
3	CN2/CN3, page 108	Power socket connectors M23

Plug and socket connectors of the Daisy Chain Connector Box type C:



Conne- ction	Connector	Description
1	CN1, page 107	Hybrid plug connector
2	CN4/CN5, page 108	Sercos socket connectors M12
3	CN2/CN3, page 108	Power socket connectors M23

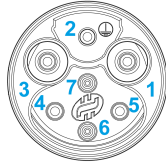
Hybrid Plug Connector (CN1)



Pin	Designation	Description
1	IE_sig	IE signal 1
2	IE_ref	IE signal 2
3	Brake	Braking signal
4	N.C.	–
5	N.C.	–
6	0 V	Control voltage 0 V
7	24 V	Control voltage 24 V
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

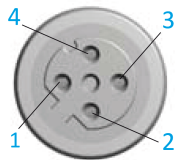
Pin	Designation	Description
9.3	Rx-	Sercos port 2 - input
9.4	Tx+	Sercos port 2 - output
10	DC-	DC bus voltage -
11	n.c.	–
12	DC+	DC bus voltage +
13	PE	Protective earth ground (earth)

Power Socket Connector M23 (CN2/CN3) of Daisy Chain Connector Box:



Pin	Designation	Description
1	DC +	DC bus voltage +
2	PE	Protective ground conductor
3	DC-	DC bus voltage -
4	24 V	Control voltage 24 V
5	0 V	Control voltage 0 V
6	IE_sig	IE signal 1
7	IE_ref	IE signal 2

Sercos Socket Connector M12 (CN4/CN5) of Daisy Chain Connector Box:



Pin	Designation	Description
1	Eth_Tx+	Positive transceiver signal
2	Eth_Rx+	Positive receiver signal
3	Eth_Tx-	Negative transceiver signal
4	Eth_Rx-	Negative receiver signal

Technical Data

Standards and Regulations

Overview

Standards and regulations

CE	EC Low Voltage Directive 2006/95/EC
	<ul style="list-style-type: none"> IEC/EN 61800-5-1
UL	EC EMC Directive 2004/108/EC
	<ul style="list-style-type: none"> IEC/EN 61800-3
UL	UL 508C: Power Conversion Equipment
CSA	Industrial Control Equipment
	<ul style="list-style-type: none"> CSA-C22.2 No. 14

Standards and regulations - functional safety

Functional safety	EN ISO 13849-1, PL e
	IEC/EN 62061, SIL 3
	IEC/EN 61508, SIL 3

Ambient Conditions

Installation Altitude

The installation altitude is defined as height above sea level.

Installation altitude without power reduction	<1000 m (<3281 ft.)
Installation altitude while complying with all of the following conditions: <ul style="list-style-type: none"> 55 °C (131 °F) maximum ambient temperature Reduction of the continuous power by 1 % per 100 m (328 ft.) above 1000 m (3281 ft.) 	1000...2000 m (3281...6562 ft.)
Installation altitude above sea level when complying with all of the following conditions: <ul style="list-style-type: none"> 40 °C (104 °F) maximum ambient temperature Reduction of the continuous power by 1 % per 100 m (328 ft.) above 1000 m (3281 ft.) Overvoltages of the supplying grid limited to an overvoltage category III according to IEC 60664-1/IEC 61800-5-1 	2000...3000 m (6562...9843 ft.)

Installation Location and Connection

For operation, the Lexium 62 Power Supply and the Lexium 62 Connection Module must be mounted in a closed control cabinet. The devices must only be operated with fixed connections.

Degree of Protection When Using the Safety Function

Ensure that no conductive pollution can deposit in the product (pollution degree 2). Conductive pollution can cause the safety function to be ineffective.

Mechanical and Electrical Data for the Lexium 62 Power Supply

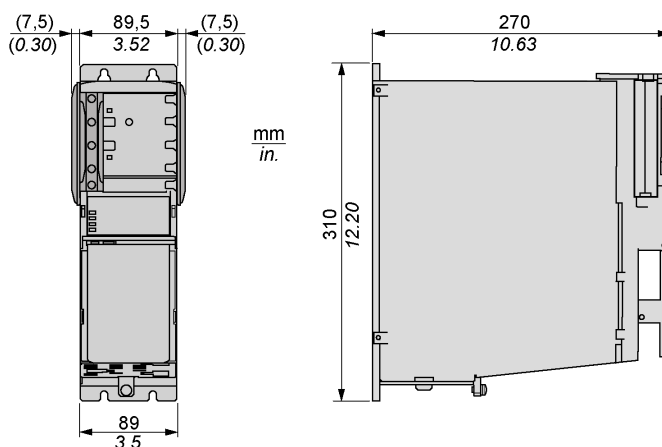
Technical Data for the Lexium 62 Power Supply

Designation	Parameter	Value		
Reference		LXM62PD84A11000	LXM62PD20A11000	
Power supply	Rated supply voltage 3_{AC}	Minimum 380 Vac (-10%) / Nominal 400 Vac / Maximum 480 Vac (+10%)		
		Minimum 208 Vac (-10%) / Nominal 230 Vac / Maximum 360 Vac (+10%)		
	Adjust the parameter <i>MainsVoltageMode</i> of the power supply according to the nominal supply voltage.			
	Rated supply voltage 1_{AC}	Minimum 208 Vac (-10%) / Nominal 230 Vac / Maximum 270 Vac (+10%)		
	Rated supply current	Maximum 40 A	Maximum 10 A	
	Supply frequency	48...63 Hz		
Logic supply	Control voltage	24 Vdc (-20%...+25%)		
	Control current	-		
	Maximum current entry	50 A (no overload permissible)		
	Maximum current consumption	1.2 A		
DC circuit	DC bus voltage	270...700 Vdc		
	DC bus capacitance	1.36 mF		
	Overvoltage	860 Vdc		
	Rated current (I_{NC})	21 A with 1_{AC} infeed	10 A with 1_{AC} infeed	
		42 A with 3_{AC} infeed	10 A with 3_{AC} infeed	
	Peak current 1 s (I_{SC})	42 A with 1_{AC} infeed	20 A with 1_{AC} infeed	
		84 A with 3_{AC} infeed	20 A with 3_{AC} infeed	
	Rated power	22.1 kW at 3 Vac ~ 400 Vac	5.2 kW at 3 Vac ~ 400 Vac	
		26.6 kW at 3 Vac ~ 480 Vac	6.2 kW at 3 Vac ~ 480 Vac	
	Peak power	44.2 kW at 3 Vac ~ 400 Vac	10.4 kW at 3 Vac ~ 400 Vac	
		53.2 kW at 3 Vac ~ 480 Vac	12.5 kW at 3 Vac ~ 480 Vac	
		$U_{Bleeder ON}$	830 Vdc	
		$U_{Bleeder OFF}$	810 Vdc	
	DC bus unloading time	Maximum 15 minutes		
Internal braking resistor	Resistance	15 Ω		
	Continuous power	400 W		
	Peak power	46 kW		
	Pulse energy (periodic duty, 120 s)	4000 Ws (HW Rev. 01) 20000 Ws (HW Rev. 02)		
Interface	Sercos	Integrated		
Power loss	Electronics power supply	15 W		
	Power stage	3 W/A (maximum 126 W at 42 A)		
	Braking resistor (internal)	400 W		

Designation	Parameter	Value	
Reference		LXM62PD84A11000	LXM62PD20A11000
Outputs	Relay outputs	Ready relay, up to 6 A (maximum) for 1 s at 150 Vac and 1.5 A (cont.)	
		Ready relay, up to 6 A (maximum) for 1 s at 48 Vdc and 1.5 A (cont.)	
Radio interference level	–	C3 (C2 with additional filter measures)	
Protective class	Class	1 (IEC 61800-5-1)	
Supported Supply Earthing Systems (IEC 60364-1)	TN with grounded neutral point corner-earthed	Not supported	
	TT systems		
	IT systems		
System Voltage (IEC 61800-5-1)	-	Max. 300 Vac	
Overvoltage category	–	III (IEC 61800-5-1)	
Degree of protection housing	IP20 with plug-in connectors	IEC/EN 60721-3-3	
Pollution degree	–	2 (IEC 61800-5-1)	
Weight	Weight (with packaging)	6.3 kg / 7.4 kg (13.9 lbs / 16.3 lbs)	

NOTE: Due to the higher pulse energy of the braking resistor in hardware revision RS 02, the precharge of the system may be delayed up to 50 seconds, depending on the load state or the estimated worst-case load state of the braking resistor. In particular, this longer delay time can be noticed in situations where the load of the braking resistor is undefined to the system (for example after turning on the 24 V supply of the device or after a forced discharge of the DC Bus).

Dimensions - Lexium 62 Power Supply



Mechanical and Electrical Data for the Lexium 62 Connection Module

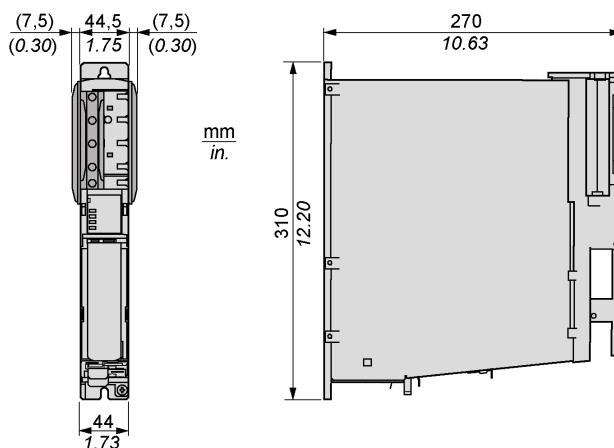
Technical Data for the Lexium 62 Connection Module

Designation	Parameter	Value
Electronics power supply (CN1)	Control voltage	DC +24 V -20% / +25%
	Input current	20 A
Power supply (CN1)	DC bus voltage	DC 250...700 V
	Input current	20 A rated current
	DC bus capacity	220 µF
	Discharge time	5 minutes (maximum)
	Overvoltage	860 Vdc
Output DC bus (CN7)	DC bus voltage	DC 250...700 V
	Output current	20 A rated current
	Peak current 1 s (I _{sc})	40 A
Inverter Enable power supply (CN6)	Control voltage	DC +24 V -20% / +25%
	Control current	1.5 A
Inverter Enable output signal (CN8)	IE voltage	AC 40 V rms
	IE current	AC 2 A rms
	IE signal frequency	100 kHz
Interfaces	Sercos	Integrated
Cooling	–	Natural convection
Degree of protection	–	IP20
Pollution degree	–	2 (IEC/EN 61800-5-1)
Protective class	Class	1 (IEC/EN 61800-5-1)
Overvoltage category	Class	III (IEC/EN 61800-5-1)
Radio interference level	Class	C3 (IEC/EN 61800-3)
Weight	Weight (with packaging)	3 kg (4 kg) / 6.6 lbs (8.8 lbs)

Ambient Conditions for the Lexium 62 Connection Module

Procedure	Parameter	Value	Basis
Operation	Class 3K3		IEC/EN 60721-3-3
	Ambient temperature	+5 °C...+55 °C / +41 °F...+131 °F	
	Relative humidity	5%... 85%	
	• Condensation	No	
	• Icing	No	
	• Other water	No	
	Class 3M4		
	Vibration	10 m/s ²	
Shock	100 m/s ²		
Transport	Class 2K3		IEC/EN 60721-3-2
	Ambient temperature	-25 °C...+70 °C / -13 °F...+158 °F	
	Relative humidity	5%... 95%	
	• Condensation	No	
	• Icing	No	
	• Other water	No	
	Class 2M2		
	Vibration	15 m/s ²	
Shock	300 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	
	Relative humidity	5%...95%	
	• Condensation	No	
	• Other water	No	

Dimensions - Lexium 62 Connection Module



For mounting holes diameter and required distances in the control cabinet, refer to *Preparing the Control Cabinet*, page 60.

Mechanical and Electrical Data for the Lexium 62 Distribution Box

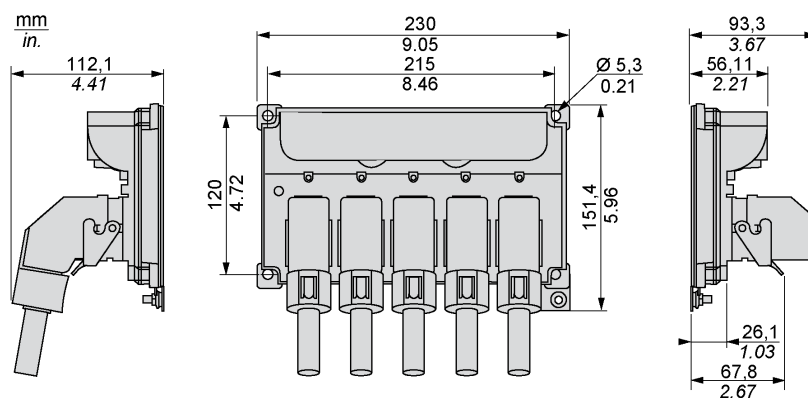
Technical Data for the Lexium 62 Distribution Box

Designation	Parameter	Value
DC power supply (CN1 - CN5)	DC bus voltage	DC 250 V...700 V
	Rated current	20 A
	DC capacity	100 µF
Electronics power supply (CN1 - CN5)	Control voltage / current	DC 24 V (-20%...+25%) / maximum 20 A
	Control voltage capacity	1000 µF
Inverter Enable (CN1 - CN5)	IE voltage	AC 40 V rms
	IE current	AC 2 A rms
	IE signal frequency	100 kHz
Ethernet Sercos (CN1 - CN5)	Data rate	100 Mbit/s
Cooling	–	Natural convection
Degree of protection	–	IP65
Pollution degree	–	2 (IEC/EN 61800-5-1)
Protective class	Class	1 (IEC/EN 61800-5-1)
Overvoltage category	Class	III (IEC/EN 61800-5-1:2016), T2 (DIN VDE 0110)
Radio interference level	Class	C3 (IEC/EN 61800-3)
Material	–	Polycarbonate [Lexan 940 A]
Weight	–	0.85 kg (1.8 lbs)

Ambient Conditions for Lexium 62 Distribution Box

Procedure	Parameter	Value	Basis
Operation	Class 3K3		IEC/EN 60721-3-3
	Ambient temperature	+5 °C...+55 °C/ +41 °F...+131 °F	
	Relative humidity	5%...85%	
	• Condensation	No	
	• Icing	No	
	• Other water	No	
	Class 3M7		
	Vibration	30 m/s ²	
Shock	250 m/s ²		
Transport	Class 2K3		IEC/EN 60721-3-2
	Ambient temperature	-25 °C...+70 °C / -13 °F...+158 °F	
	Relative humidity	5%...95%	
	• Condensation	No	
	• Icing	No	
	• Other water	No	
	Class 2M2		
	Vibration	10 m/s ²	
Shock	300 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	
	Relative humidity	5%...85%	
	• Condensation	No	
	• Icing	No	
	• Other water	No	

Dimensions - Lexium 62 Distribution Box



For mounting holes diameter and required distances in the control cabinet, refer to *Preparing the Control Cabinet*, page 60.

Mechanical and Electrical Data for the ILM Daisy Chain Connector Box

Technical Data for the ILM Daisy Chain Connector Box:

Designation	Parameter	Value
DC power supply (CN1, CN2/CN3)	DC bus voltage	DC 250 V...700 V
	Rated current	20 A
Electronics power supply (CN1, CN2/CN3)	Control voltage / -current	DC 24 V (-20%...+25%) / maximum 20 A
Inverter Enable (CN1, CN2/CN3)	IE voltage	AC 40 V rms
	IE current	AC 2 A rms
	IE signal frequency	100 kHz
Ethernet Sercos (CN4/CN5)	Data rate	100 Mbit/s
Cooling	–	Natural convection
Degree of protection	–	IP65
Pollution degree	–	2(IEC/EN 61800-5-1)
Protective class	Class	1 (IEC/EN 61800-5-1)
Overvoltage category	Class	III (IEC/EN 61800-5-1:2016), T2 (DIN VDE 0110)
Radio interference level	Class	C3 (IEC/EN 61800-3)
Material	–	Polybutylene terephthalate (PBT) with 30% fiberglass [Pocan B 4235]
Connect / Disconnect	Cycles	Maximum 20

NOTICE

CONNECTOR WEAR

Do not connect / disconnect the hybrid cables more than 20 times.

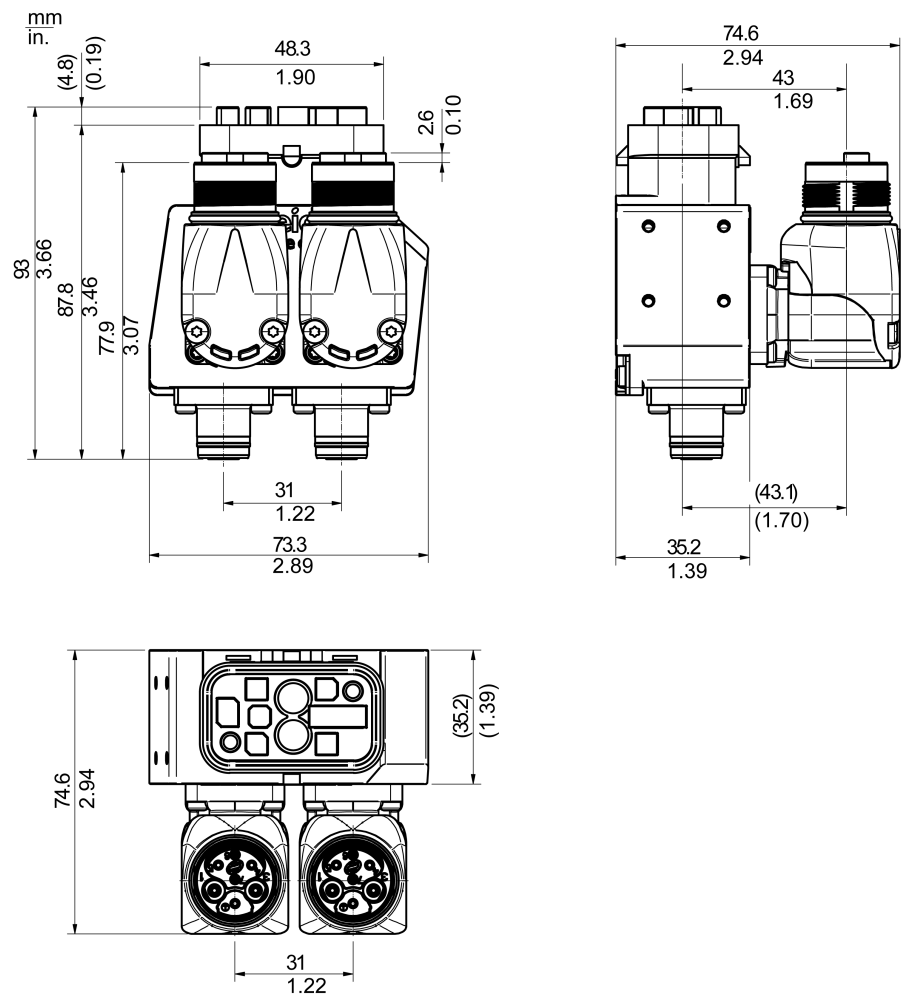
Failure to follow these instructions can result in equipment damage.

Ambient Conditions for the Daisy Chain Connector Box

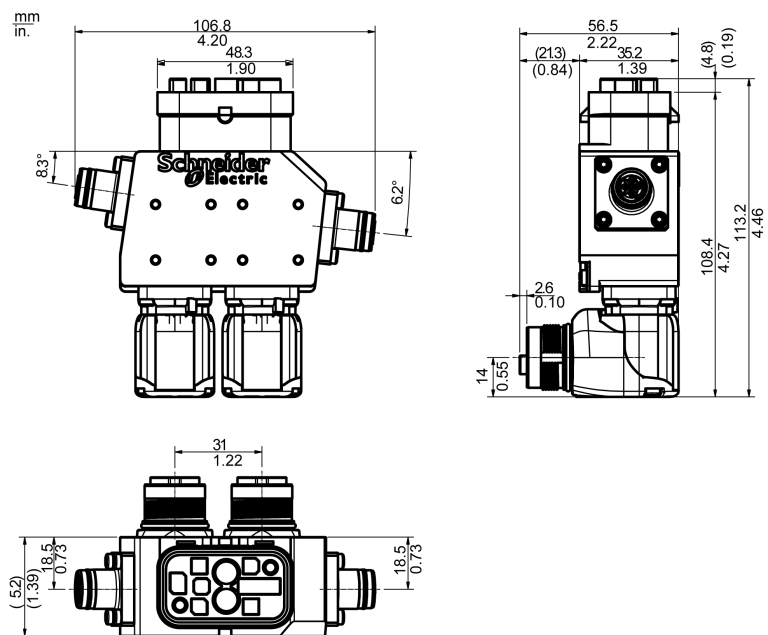
Procedure	Parameter	Value	Basis
Operation	Class 3K4		IEC/EN 60721-3-3
	Ambient temperature	-20 °C...+60 °C / -4 °F...+140 °F	
	Relative humidity	5%...95%	
	• Condensation	No	
	• Icing	No	
	• Other water	No	
	Class 3M7		
	Vibration	30 m/s ²	
	Shock	250 m/s ²	
Transport	Class 2K2		IEC/EN 60721-3-2
	Ambient temperature	-25 °C...+70 °C / -13 °F...+158 °F	
	Relative humidity	maximum 75%	
	• Condensation	No	
	• Icing	No	
	• Other water	No	
	Class 2M2		
	Vibration	15 m/s ²	
	Shock	300 m/s ²	
Long-term storage in transport packaging	Class 1K2		IEC/EN 60721-3-1
	Ambient temperature	-25 °C...+55 °C / -13 °F...+131 °F	
	Relative humidity	5%... 85%	
	• Condensation	No	
	• Icing	No	
	• Other water	No	

Dimensions - ILM Daisy Chain Connector Box

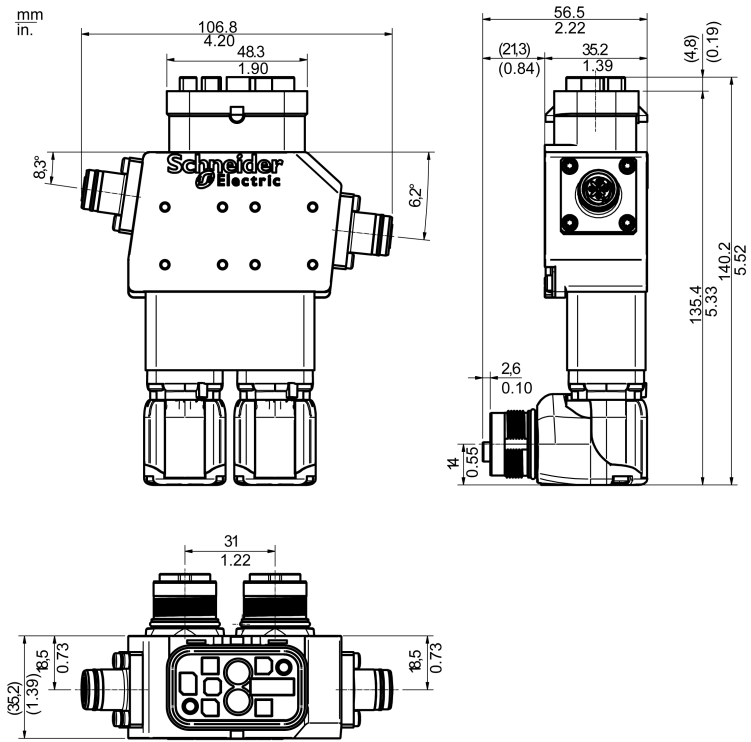
Dimensions - Daisy Chain Connector Box type A:



Dimensions - Daisy Chain Connector Box type B:



Dimensions - Daisy Chain Connector Box type C:



Mechanical and Electrical Data for the Lexium 62 ILM Integrated Servo Drive

Technical Data for the Lexium 62 ILM

Designation	Parameter	Value		
Power Supply	DC bus voltage	250...700 Vdc		
	DC bus capacity	700 nF		
	DC bus current	Motor type		
		ILM0701P	0.6 A DC	
		ILM0702P	0.9 A DC	
		ILM0703P	1.2 A DC	
		ILM1001P	1.2 A DC	
		ILM1002P	1.7 A DC	
		ILM1003P	2.0 A DC	
		ILM1401P	2.7 A DC	
		ILM1402P	2.4 A DC	
	ILM1401M	3.7 A DC		
	Without brake			
	Control voltage			
	Hardware code: xxxxxx1xxxx	DC +18.5...+31 V		
	Hardware code: xxxxxx2xxxx	DC +18.5...+31 V		
Current consumption	240 mA (maximum)			
With brake				
Control voltage	DC +21.6... +25.4 V			
Hardware code: xxxxxx1xxxx	DC +20.5... +30 V			
Hardware code: xxxxxx2xxxx				
Power Supply	Current consumption	Motor type	Continuous operation	While releasing the brake
		ILM0701P	360 mA	500 mA
		ILM0702P	360 mA	530 mA
		ILM0703P	360 mA	530 mA
		ILM1001P	450 mA	740 mA
		ILM1002P	450 mA	740 mA
		ILM1003P	500 mA	820 mA
		ILM1401P	560 mA	700 mA
		ILM1402P	600 mA	890 mA
ILM1401M	560 mA	700 mA		
Cooling	–	Natural convection		
Degree of protection	Controller	IP65		
	Motor	For information on the degree of protection of the motor refer to the corresponding Mechanical and Electrical Data of the Lexium 62 ILM Integrated Servo Motor.		
Pollution degree	–	2 (IEC/EN 61800-5-1)		
Protective class	Class	1 (IEC/EN 61800-5-1)		
Overvoltage category	Class	III (IEC/EN 61800-5-1), T2 (DIN VDE 0110)		
Overload protection	–	Yes. See <i>Overload Protection</i> , page 121		
Radio interference level	Class	C3 (IEC/EN 61800-3)		

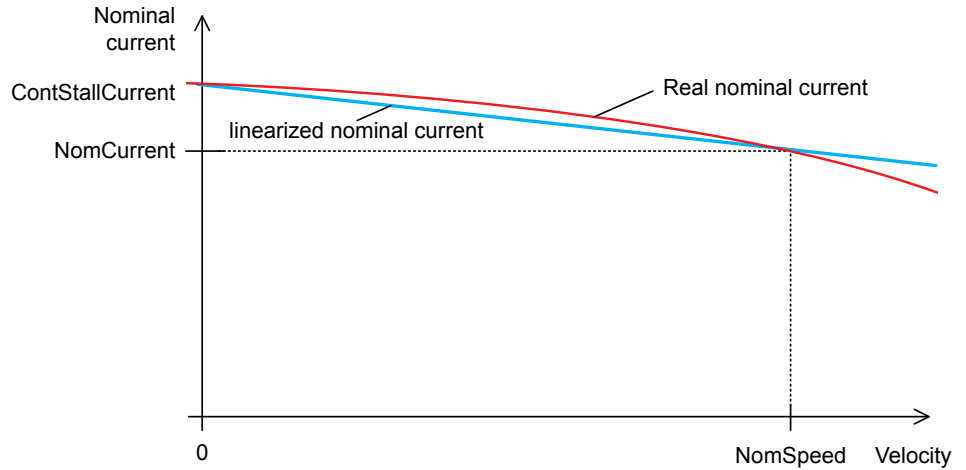
Designation	Parameter	Value
Insulation material class	–	F
Motor coating	–	Powder coating based on epoxy resin
Lubricant (according to FDA standard for servo motors)	–	Klübersynth UH1 64-62 food safe gearbox grease

Overload Protection

The motor overload supervision observes an exceeding nominal current of the motor to prevent the motor from thermal overload.

The height of the nominal current depends on the velocity of the motor. At standstill the nominal current is defined by the parameter *ContStallCurrent* and at nominal velocity (*NomSpeed*) by the parameter *NomCurrent*. The three parameters are stored in the motor type plate.

Over the residual velocity range, the calculated height of the nominal current deviates linear (shown as linearized nominal current).



The real nominal current is a curve (red) that lies above the linearized nominal current (blue) for almost the whole velocity range. It helps preventing overheating of the motor.

The overload is calculated in a range from 0% to 200%. At 80% the message **8125 Motor load high** and at 100% the message **8100 Motor overload** is triggered that leads to a stop of the motor.

When the drive is energized, the integral starts with 79% to cover the case that the motor is already heated, but without triggering a message.

Ambient Conditions for the Lexium 62 ILM

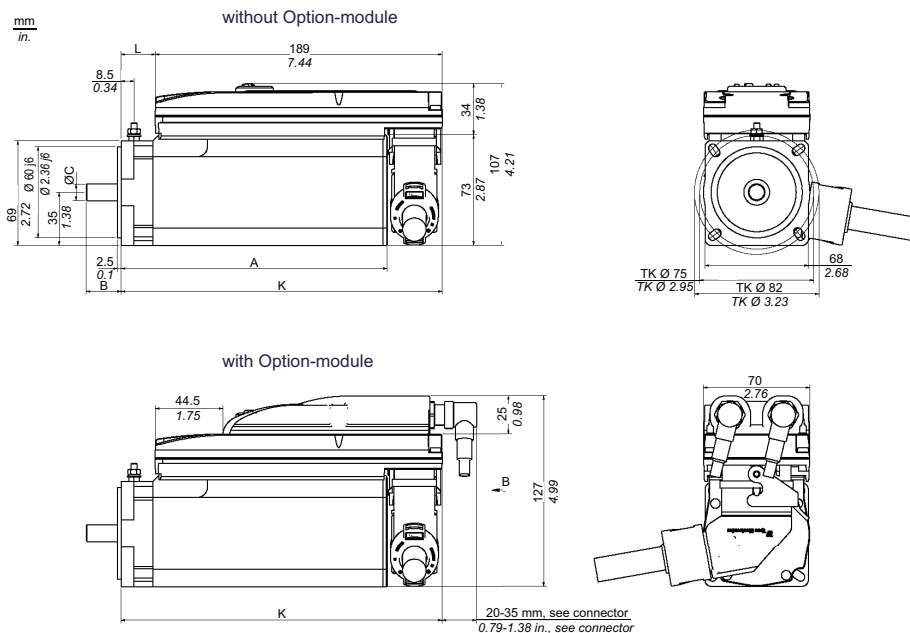
Procedure	Parameter	Value	Basis
Operation	Class 3K3		IEC/EN 60721-3-3
	Ambient temperature	+5 °C...+40 °C/ +41 °F...+104 °F	
	Relative humidity	5%...85%	
	Class 3M7		
	Vibration	30 m/s ² (all directions in space)	
	Shock	250 m/s ²	
Transport	Class 2K3		IEC/EN 60721-3-2
	Ambient temperature	-25 °C...+70 °C/ -13 °F...+158 °F	
	Relative humidity	5%...95%	
	• Condensation	No	
	• Icing	No	
	• Other water_ PCILMLM	No	
	Class 2M1		
	Vibration	15 m/s ²	
	Shock	100 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	
	Relative humidity	10%...100%	
	• Condensation	No	
	• Icing	No	
	• Other water	No	

Mechanical and Electrical Data for the ILM070 Servo Motor

Technical Data for ILM070

Designation	Parameter	Abbreviation [unit]	ILM0701P	ILM0702P	ILM0703P
General data	Standstill torque	M_0 [Nm]	1.1	1.7	2.2
	Peak torque	M_{max} [Nm]	3.5	7.6	8.7
	Rated motor speed	n_N [RPM]	6000	6000	6000
	Rated torque	M_N [Nm]	0.5	1.15	1.15
	Rated power	P_N [kW]	0.31	0.72	0.72
Electrical data	Number of pole pairs	p	3	3	3
	Motor winding switch	–	Y	Y	Y
	Torque constant (120 °C)	k_T [Nm/A _{rms}]	0.71	0.68	0.73
	Winding resistance Ph-Ph (20 °C)	$R_{U-V, 20}$ [Ω]	10.40	4.20	2.70
	Winding resistance Ph-0 (120 °C)	R_{120} [Ω]	7.23	2.92	1.88
	Winding inductance Ph-Ph	L_{U-V} [mH]	38.8	19.0	13.0
	Winding inductance Ph-0	L [mH]	19.4	9.5	6.5
	Voltage constant Ph-Ph ⁽¹⁾	k_E [V _{rms}]	46	48	49
	Standstill current	I_0 [A _{rms}]	1.55	2.5	2.7
	Rated current	I_N [A _{rms}]	0.60	1.5	1.5
	Peak current 23 s (I _{sc})	I_{max} [A _{rms}]	5.7	11.8	12.0
Protective class	Class	-	1 (IEC/EN 61800-5-1)		
Mechanical data (with brake)	Moment of inertia of the rotor	J_M [kgcm ²]	0.25 (0.35)	0.41 (0.51)	0.58 (0.88)
Thermal data	Thermal time constant	T_{th} [min]	35	38	51
	Response threshold temperature sensor	T_{TK} [°C]	100	100	100
Brake data	Holding brake	–	optional	optional	optional
Weight (with brake)	–	m [kg]	2.7 (3.0)	3.4 (3.7)	4.2 (4.7)
(1) : RMS value at 1000 rpm and 20°C (68°F)					

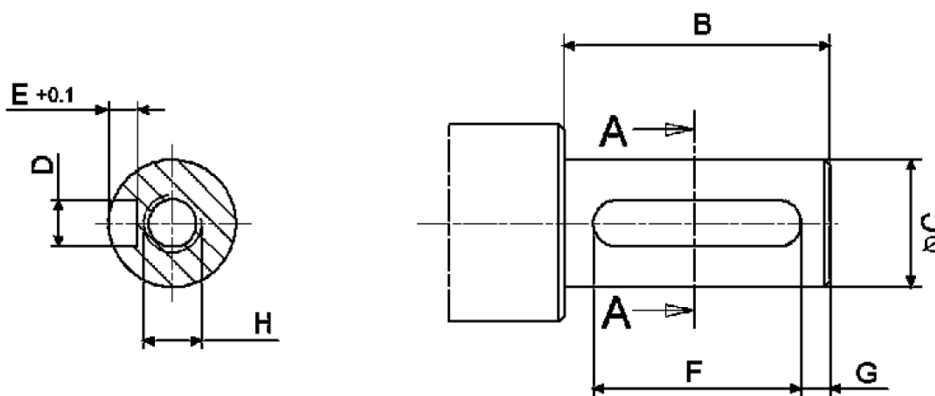
Dimensions - ILM070



NOTE: The ILM series 070 uses different shaft diameters. The shaft diameter for the ILM0703P is 14 mm/0.55 in.

Dimensions	ILM0701P [mm]/[in]	ILM0702P [mm]/[in]	ILM0703P [mm]/[in]
A (with brake)	175 (182) / 6.89 (7.17)	189 (215) / 7.44 (8.46)	222 (256) / 8.74 (10.08)
B	23 / 0.91	23 / 0.91	30 / 1.18
C	11 k6 / 0.43 k6	11 k6 / 0.43 k6	14 k6 / 0.55 k6
K (with brake)	212 (219) / 8.35 (8.62)	226 (252) / 8.90 (9.92)	259 (293) / 10.20 (11.54)
L (with brake)	25 (31) / 0.98 (1.22)	38 (64) / 1.50 (2.52)	71 (105) / 2.80 (4.13)

Dimensions - Feather Key



Dimensions	ILM0701P / ILM0702P [mm] / [in]	ILM0703P [mm] / [in]
B	23 / 0.91	30 / 1.18
C	11 k6 / 0.43 k6	14 k6 / 0.55 k6
D	4 N9 / 0.16 N9	5 N9 / 0.20 N9
E	2.5 / 0.10	3 / 0.12
F	18 / 0.71	20 / 0.78
G	2.5 / 0.10	5 / 0.20

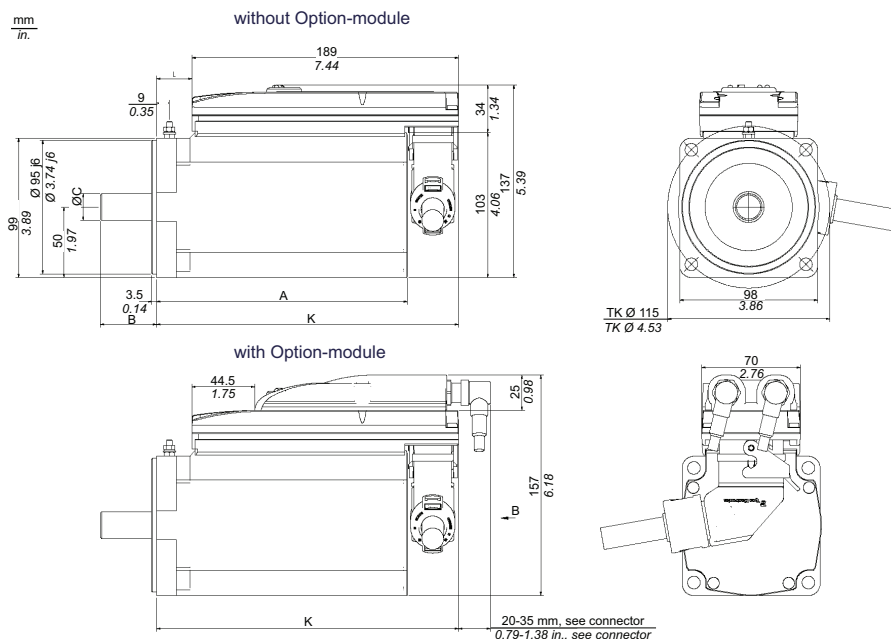
Dimensions	ILM0701P / ILM0702P	ILM0703P
	[mm] / [in]	[mm] / [in]
H	DIN 332-D M4	DIN 332-D M5
Feather key (N9)	DIN 6885-A4x4x18	DIN 6885-A5x5x20

Mechanical and Electrical Data for the ILM100 Servo Motor

Technical Data for ILM100

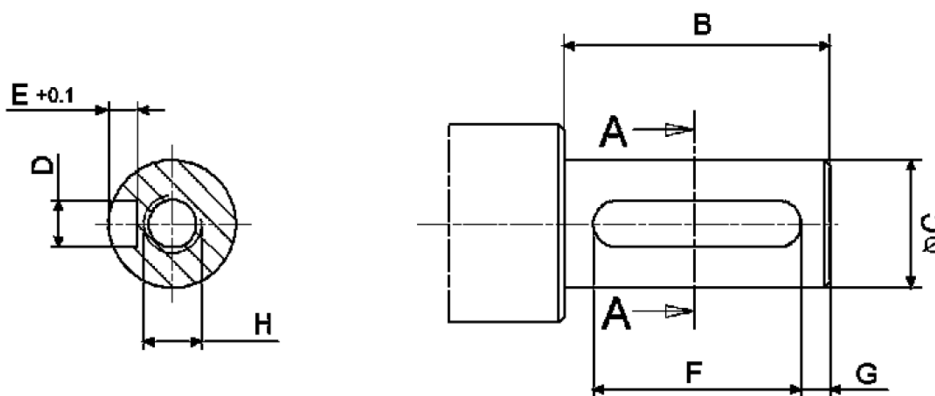
Category	Parameter	Abbreviation [unit]	ILM1001P	ILM1002P	ILM1003P
General data	Standstill torque	M_0 [Nm]	2.5	4.4	5.8
	Peak torque	M_{max} [Nm]	9.6	18.3	28.3
	Rated motor speed	n_N [RPM]	3000	3000	3000
	Rated torque	M_N [Nm]	1.9	2.9	3.5
	Rated power	P_N [kW]	0.6	0.91	1.10
Electrical data	Number of pole pairs	p	4	4	4
	Motor winding switch		Y	Y	Y
	Torque constant (120 °C)	k_T [Nm/A _{rms}]	1.39	1.52	1.61
	Winding resistance Ph-Ph (20 °C)	$R_{U-V, 20}$ [Ω]	9.80	4.12	2.60
	Winding resistance Ph-0 (120 °C)	R_{120} [Ω]	6.82	2.86	1.81
	Winding inductance Ph-Ph	L_{U-V} [mH]	45.70	21.80	15.60
	Winding inductance Ph-0	L [mH]	22.85	10.90	7.80
	Voltage constant Ph-Ph ⁽¹⁾	k_E [V _{rms}]	90	100	103
	Standstill current	I_0 [A _{rms}]	1.80	2.90	3.60
	Rated current	I_N [A _{rms}]	1.40	2.00	2.40
	Peak current 23 s (I _{sc})	I_{max} [A _{rms}]	7.40	13.10	21.20
Protective class	Class	-	1 (IEC/EN 61800-5-1)		
Mechanical data (with brake)	Moment of inertia of the rotor	J_M [kgcm ²]	1.40	2.31	3.22
			(2.10)	(3.01)	(3.92)
Thermal data	Thermal time constant	T_{th} [min]	44	48	56
	Response threshold temperature sensor	T_{TK} [°C]	100	100	100
Brake data	Holding brake	-	optional	optional	optional
Weight (with brake)	-	m [kg]	4.9 (5.7)	6.4 (7.2)	8.1 (8.9)
(1) : RMS value at 1000 rpm and 20°C (68°F)					

Dimensions - ILM100



Dimensions	ILM1001P [mm]/[in]	ILM1002P [mm]/[in]	ILM1003P [mm]/[in]
A (with brake)	178 (207) / 7.01 (8.15)	212 (243) / 8.35 (9.57)	248 (279) / 9.76 (10.98)
B	40 / 1.57	40 / 1.57	40 / 1.57
C	19 k6 / 0.75 k6	19 k6 / 0.75 k6	19 k6 / 0.75 k6
K (with brake)	215 (243) / 8.46 (9.57)	249 (280) / 9.80 (11.02)	285 (315) / 11.22 (12.40)
L (with brake)	27 (55) / 1.06 (2.17)	61 (92) / 2.40 (3.62)	97 (127) / 3.82 (5)

Dimensions - Feather Key



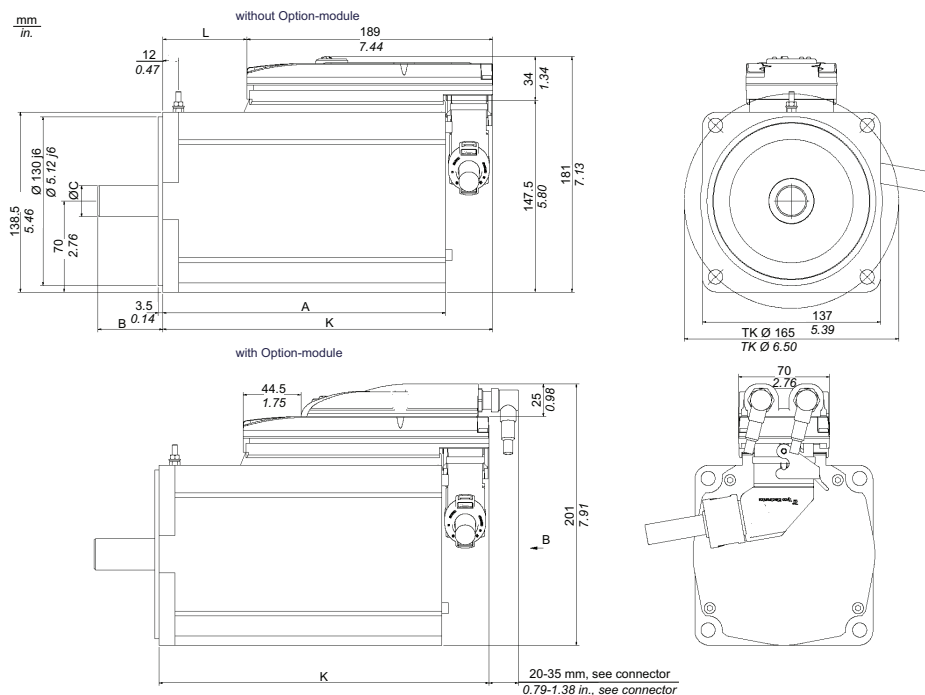
Dimensions	ILM1001P / ILM1002P / ILM1003P [mm] / [in]
B	40 / 1.57
C	19 k6 / 0.75 k6
D	6 N9 / 0.24 N9
E	3.5 / 0.14
F	30.01.2018
G	5 / 0.20
H	DIN 332-D M6
Feather key (N9)	DIN 6885-A6x6x30

Mechanical and Electrical Data for the ILM140 Servo Motor

Technical Data for the ILM140

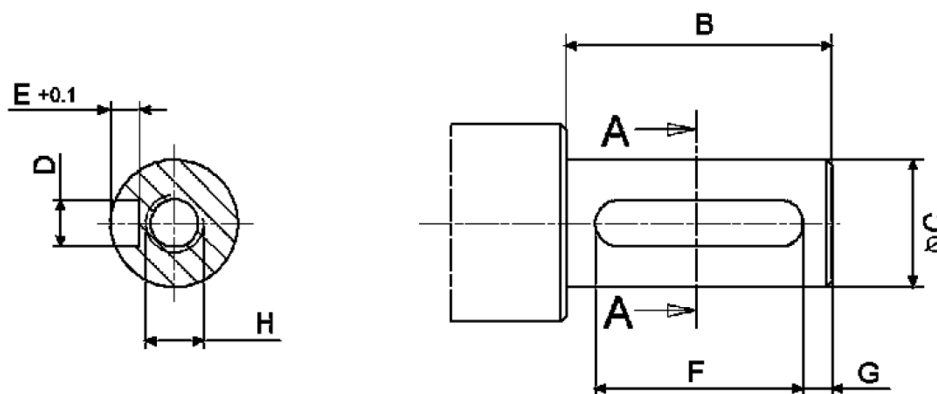
Designation	Parameter	Abbreviation [unit]	ILM1401P	ILM1401M	ILM1402P
General data	Standstill torque	M_0 [Nm]	7.5	8.5	12.5
	Peak torque	M_{max} [Nm]	27.0	27.0	55.0
	Rated motor speed	n_N [RPM]	3000	1500	2000
	Rated torque	M_N [Nm]	4.6	8.3	9.1
	Rated power	P_N [kW]	1.45	1.30	1.91
Electrical data	Number of pole pairs	p	5	5	5
	Motor winding switch	–	Y	Y	Y
	Torque constant (120 °C)	k_T [Nm/A _{rms}]	1.60	2.65	2.60
	Winding resistance Ph-Ph (20 °C)	$R_{U-V, 20}$ [Ω]	1.81	4.58	1.90
	Winding resistance Ph-0 (120 °C)	R_{120} [Ω]	1.26	3.18	1.32
	Winding inductance Ph-Ph	L_{U-V} [mH]	19.10	50.0	22.0
	Winding inductance Ph-0	L [mH]	9.55	25.0	11.0
	Voltage constant Ph-Ph ⁽¹⁾	k_E [V _{rms}]	108	175	173
	Standstill current	I_0 [A _{rms}]	4.70	3.20	4.8
	Rated current	I_N [A _{rms}]	2.90	3.15	3.7
	Peak current 23 s (I_{SC})	I_{max} [A _{rms}]	18.8	14.6	24.0
	Protective class	Class	–	1 (IEC/EN 61800-5-1)	
Mechanical data (with brake)	Moment of inertia of the rotor	J_M [kgcm ²]	7.41	7.41	12.68
Thermal data	Thermal time constant	T_{th} [min]	64	64	74
	Response threshold temperature sensor	T_{TK} [°C]	100	100	100
Brake data	Holding brake	–	optional	optional	optional
Weight (with brake)	–	m [kg]	12.5 (13.8)	12.5 (13.8)	17.2 (18.5)
(1) : RMS value at 1000 rpm and 20°C (68°F)					

Dimensions - ILM140



Dimensions	ILM1401P [mm]/[in]	ILM1401M [mm]/[in]	ILM1402P [mm]/[in]
A (with brake)	218 (256) / 8.58 (10.08)	218 (256) / 8.58 (10.08)	273 (311) / 10.75 (12.24)
B	50 / 1.97	50 / 1.97	50 / 1.97
C	24 k6 / 0.94 k6	24 k6 / 0.94 k6	24 k6 / 0.94 k6
K (with brake)	254 (292) / 10 (11.50)	254 (292) / 10 (11.50)	309 (347) / 12.17 (13.66)
L (with brake)	67 (105) / 2.64 (4.13)	67 (105) / 2.64 (4.13)	122 (160) / 4.80 (6.30)

Dimensions - Feather Key



Dimensions	ILM1401P / ILM1401M / ILM1402P [mm] / [in]
B	50 / 1.97
C	24 k6 / 0.94 k6
D	8 N9 / 0.31 N9
E	4.5 / 0.18
F	40 / 1.57
G	5 / 0.20

Dimensions	ILM1401P / ILM1401M / ILM1402P [mm] / [in]
H	DIN 332-D M8
Feather key (N9)	DIN 6885-A8x7x40

Encoder

Technical Data for the Encoder SinCos (SKS36) Singleturn

Parameter	Value	Units
Number of revolutions	1	–
Number of sine/cosine periods	128	Per revolution
Absolute measuring range	1	Revolution
Error limits of the digital absolute value	± 5.3	Angular minutes
Error limits when evaluating the 128 signals (integral nonlinearity)	± 1.3	Angular minutes
Signal shape	Sinusoidal	–

Technical Data for the Encoder SinCos (SKM36) Multiturn

Parameter	Value	Units
Number of revolutions	4096	–
Number of sine/cosine periods	128	Per revolution
Absolute measuring range	1	Revolution
Error limits of the digital absolute value	± 5.3	Angular minutes
Error limits when evaluating the 128 signals (integral nonlinearity)	± 1.3	Angular minutes
Signal shape	Sinusoidal	–

Motor Shaft and Bearings

Design of the Shaft End

Smooth shaft end (standard)	With a non-positive connection, torque transmission must be achieved only by surface pressure to help ensure power transmission without backlash.
Shaft end with round-ended feather key according to DIN 6885	Shaft connections with feather keys are positive. The feather key seating can wear under continuous strain with changing torques and frequent changes of direction, causing backlash as the increased wear causes play between the key and its seating. As a result, rotational quality is reduced due to backlash. Further increasing wear can lead to the feather key breaking and damage to the shaft.

NOTICE

ADVERSE ROTATIONAL QUALITY

Regularly inspect feather key shaft ends for wear and possible damage in applications that have frequent changes in torque and direction.

Failure to follow these instructions can result in equipment damage.

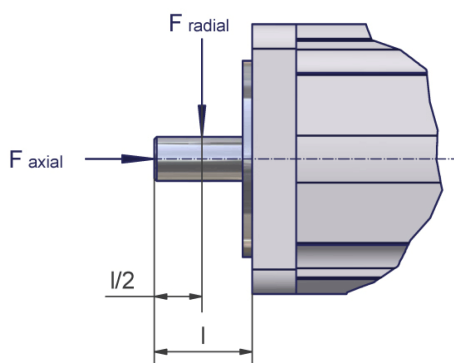
Bearing

The back side bearing is designed as a fixed bearing and the bearing on shaft output side as a floating bearing.

Permissible Shaft Load

The life of drives might be limited by the bearing life. You cannot replace the bearing, as the measuring systems integrated in the drive must then be reinitialized.

The graphic shows the definition of shaft load:



The table shows the permissible radial force F_{radial} [N]:

Motor	1000 RPM	2000 RPM	3000 RPM	4000 RPM	5000 RPM	6000 RPM
ILM0701P	660	520	460	410	380	360
ILM0702P	710	560	490	450	410	390
ILM0703P	730	580	510	460	430	400
ILM1001P	900	720	630	-	-	-
ILM1002P	990	790	690	-	-	-
ILM1003P	1050	830	730	-	-	-
ILM1401M	2210	1760	-	-	-	-
ILM1401P	2210	1760	1530	-	-	-
ILM1402P	2430	1930	-	-	-	-

Basis for calculation:

The permissible axial force F_{axial} [N] is calculated according to:

$$F_{axial} = 0.2 \times F_{radial}$$

- Nominal bearing life $L_{10h} = 20,000$ h for a shaft without feather key nut (for operating hours at a 10% detected failure probability)
- Ambient temperature = 40 °C / 104 °F (approximately 100 °C / 212 °F storage temperature)
- Peak torque = 10% duty cycle
- Nominal torque = 100% duty cycle

Holding Brake

Overview

The holding brake in the motor has the task of holding the motor position when the power stage is disabled. The holding brake is not a safety function and not a service brake.

▲ WARNING
<p>UNINTENDED EQUIPMENT OPERATION</p> <ul style="list-style-type: none"> • Verify that movements without braking effect cannot cause injuries or equipment damage. • Verify the function of the holding brake at regular intervals. • Do not use the holding brake as a service brake. • Do not use the holding brake for safety-related purposes. <p>Failure to follow these instructions can result in death, serious injury, or equipment damage.</p>

Releasing the holding brake can cause an unintended movement, for example, lowering of the load in the case of vertical axes.

▲ WARNING
<p>UNINTENDED MOVEMENT</p> <ul style="list-style-type: none"> • Take appropriate measures to avoid damage caused by falling or lowering loads or other unintended movements. • Verify that there are no persons or obstacles in the zone of operation when performing a test of the holding brake. <p>Failure to follow these instructions can result in death, serious injury, or equipment damage.</p>

Applying the holding brake while the motor is running causes excessive wear and loss of the braking force.

▲ WARNING
<p>LOSS OF BRAKING FORCE DUE TO WEAR OR HIGH TEMPERATURE</p> <ul style="list-style-type: none"> • Do not use the holding brake as a service brake. • Do not exceed the maximum number of brake applications and the kinetic energy during braking of moving loads. <p>Failure to follow these instructions can result in death, serious injury, or equipment damage.</p>

The times mentioned in the following apply when switching in the direct current circuit, when the motor is warm, and at the rated voltage. The disconnection time is the period from switching on the current to the dying out of the torque to 10% of the rated torque of the brake. The coupling time counts as the period from when the current is switched off to the attainment of the rated torque.

Technical Data of the Holding Brakes

Technical data of the holding brake of the ILM070:

Parameter	ILM070 1 P	ILM070 2 P	ILM070 3 P	Unit
Static holding torque at 120 °C	3.0	3.0	3.0	Nm
Coupling time	10	10	10	ms

Parameter	ILM070 1 P	ILM070 2 P	ILM070 3 P	Unit
Disconnection time	80	80	80	ms
Mass	0.28	0.28	0.28	kg
Moment of inertia	0.11	0.11	0.11	kgcm ²

Technical data of the holding brake of the ILM100:

Parameter	ILM100 1 P	ILM100 2 P	ILM100 3 P	Unit
Static holding torque at 120 °C	5.5	5.5	9.0	Nm
Coupling time	30	30	25	ms
Disconnection time	70	70	90	ms
Mass	0.46	0.46	0.65	kg
Moment of inertia	0.49	0.49	0.78	kgcm ²

Technical data of the holding brake of the ILM140:

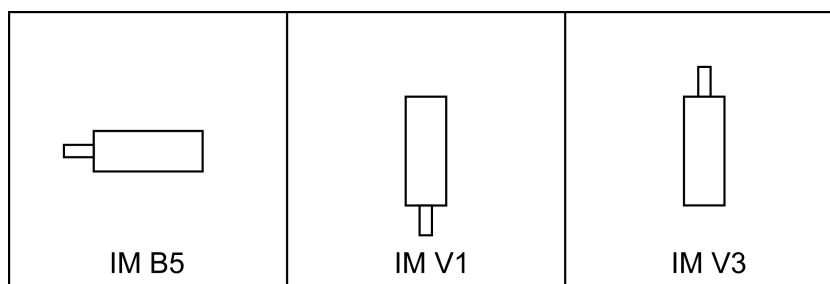
Parameter	ILM140 1 M	ILM140 1 P	ILM140 2 P	Unit
Static holding torque at 120 °C	18.0	18.0	23.0	Nm
Coupling time	50	50	60	ms
Disconnection time	100	100	100	ms
Mass	1.06	1.06	1.29	kg
Moment of inertia	1.5	1.5	2.55	kgcm ²

Mounting Arrangement and Degree of Protection

Overview

The drive degree of protection depends on the reference of the drive. In some cases, the degree of protection requires particular mounting arrangements and addition options. The mounting flange for all drive types is designed in such a way that the installation type is possible according to the types of construction IM B5, IM V1, and IM V3 (mounting flange with through hole).

The following mounting positions are defined and permissible as per IEC 60034-7:



NOTICE

MOUNTING POSITION AND PENETRATING LIQUIDS

Prevent liquids from remaining on the motor shaft over an extended period of time when mounting the motor in the mounting position IM V3.

Failure to follow these instructions can result in equipment damage.

NOTE: It also cannot be ruled out that liquids penetrate the motor housing along the motor shaft even if a shaft sealing ring has been installed.

The table shows the degree of protection of the Lexium 62 ILM servo motor:

Motor part	Mounting position (conforming to DIN 42 950)	Degree of protection (according to IEC/EN 60529) WITHOUT shaft sealing ring	Degree of protection (according to IEC/EN 60529) WITH shaft sealing ring
Shaft	IM V3	IP 50	IP 65
	IM B5, IM V1	IP 54	
Surface / connections	IM B5, IM V1, IM V3	IP 65	IP 65

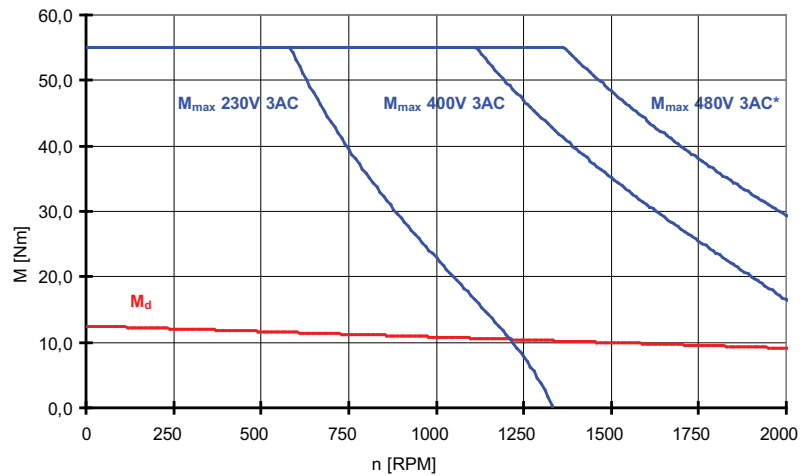
Torque / Speed Characteristic Curves

Overview

The torque-speed characteristic curve represents the following characteristics:

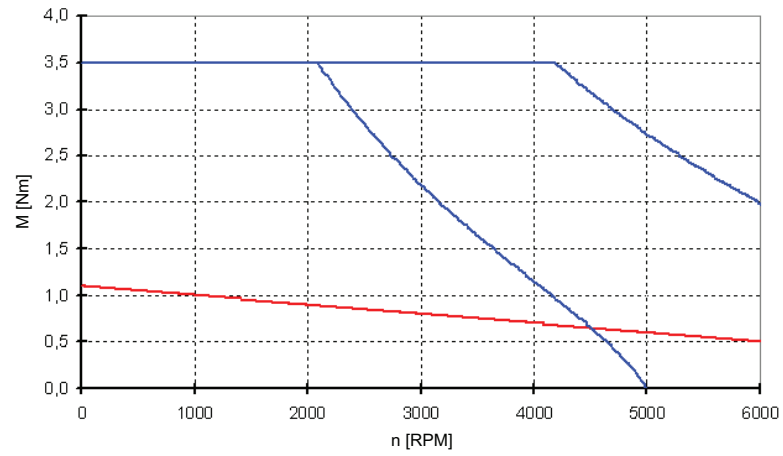
- The permissible permanent torque (operating type S 1)
- The peak torque with mains voltage = 3 x 230 Vac
- The peak torque with mains voltage = 3 x 400 Vac
- The peak torque with mains voltage = 3 x 480 Vac (for ILM140•• only)

Example of a torque-speed characteristic curve (ILM140•• only):

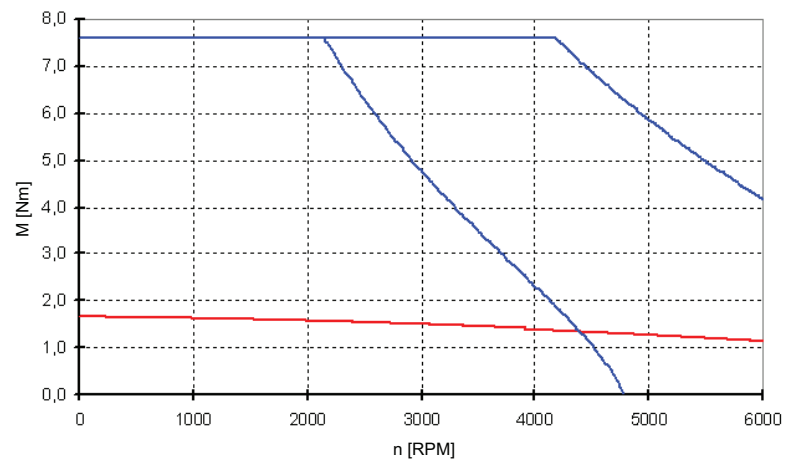


The characteristic curves refer to an ambient temperature of 40 °C / 104 °F and a maximum winding temperature of 120 °C / 248 °F.

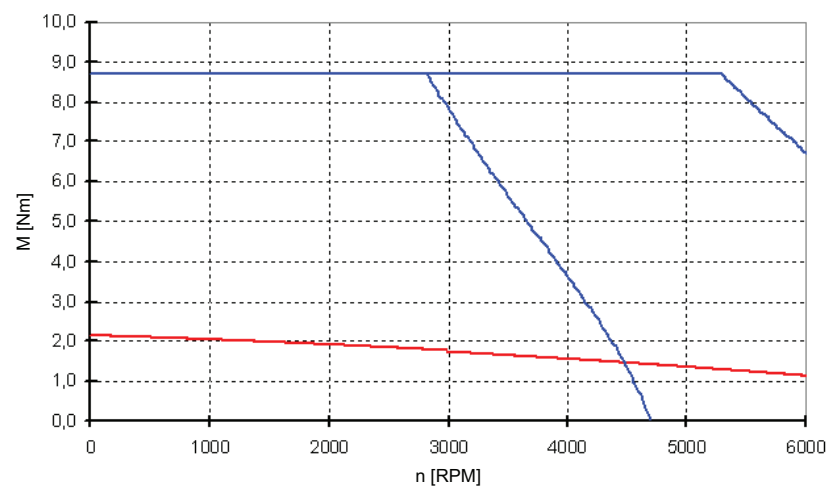
Torque-speed characteristic curve ILM0701P:



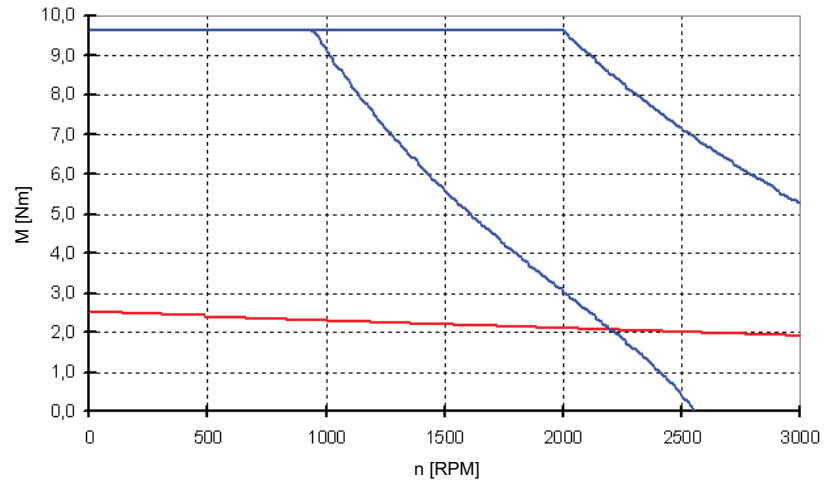
Torque-speed characteristic curve ILM0702P:



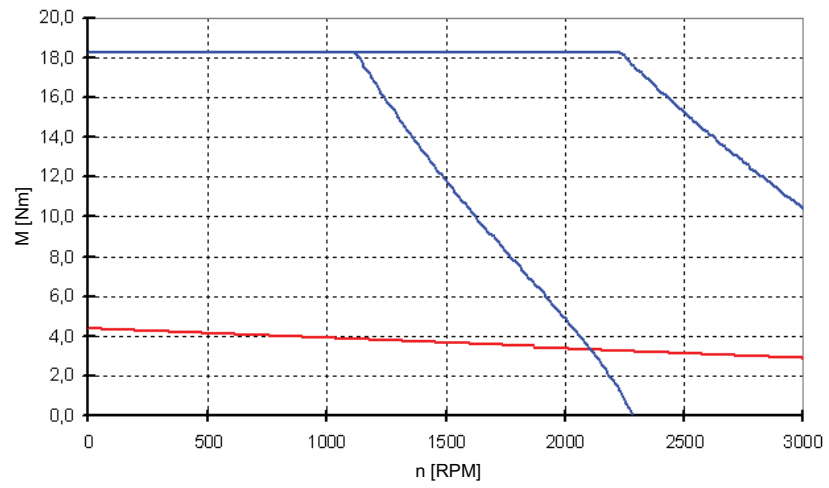
Torque-speed characteristic curve ILM0703P:



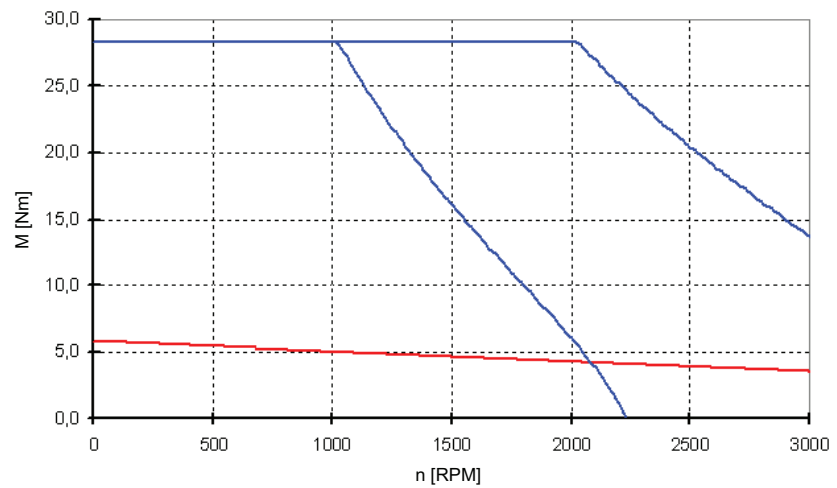
Torque-speed characteristic curve ILM1001P:



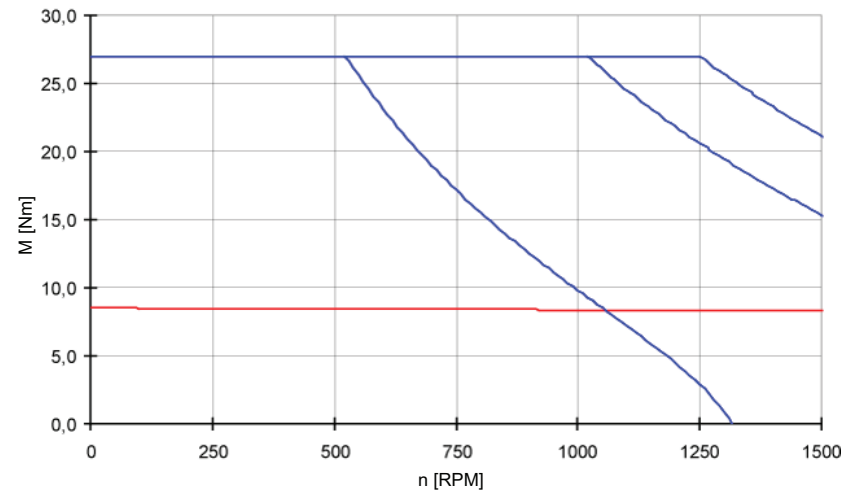
Torque-speed characteristic curve ILM1002P:



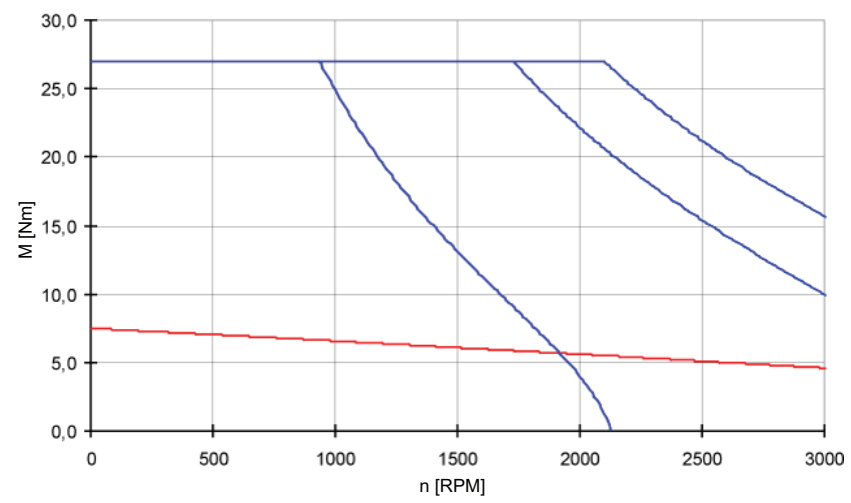
Torque-speed characteristic curve ILM1003P:



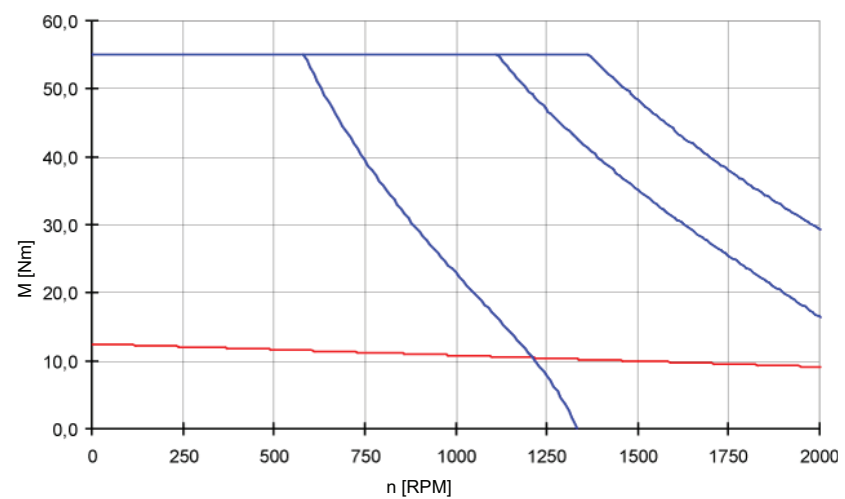
Torque-speed characteristic curve ILM1401M:



Torque-speed characteristic curve ILM1401P:



Torque-speed characteristic curve ILM1402P:

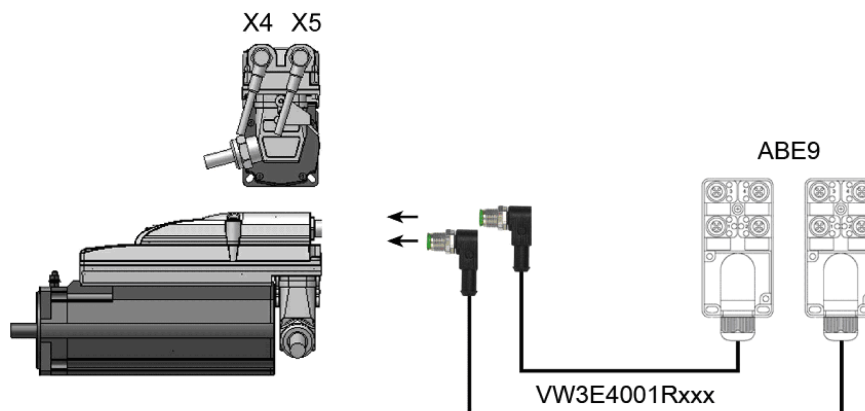


Lexium 62 ILM Digital I/O Module

Lexium 62 ILM Digital I/O Module - Description

Overview

Connecting the ABE9 splitter box to the Lexium 62 ILM Digital I/O Module:



Features:

- 8 bidirectional floating inputs/outputs (configurable in the controller configuration).
- Connection via two M12 connectors (8-pin), each with 4 inputs/outputs.
- Floating internal power supply of outputs up to 0.1 A total current for 8 inputs/outputs.
- Maximum 2 A total output current via 8 outputs when using external supply voltage.
- 0.5 A output current maximum per output when using external supply.
- Short-circuit detection and open-circuit detection on outputs.
- Two inputs with special functions (touch probe, counter).

Lexium 62 ILM Digital I/O Module - Technical Data

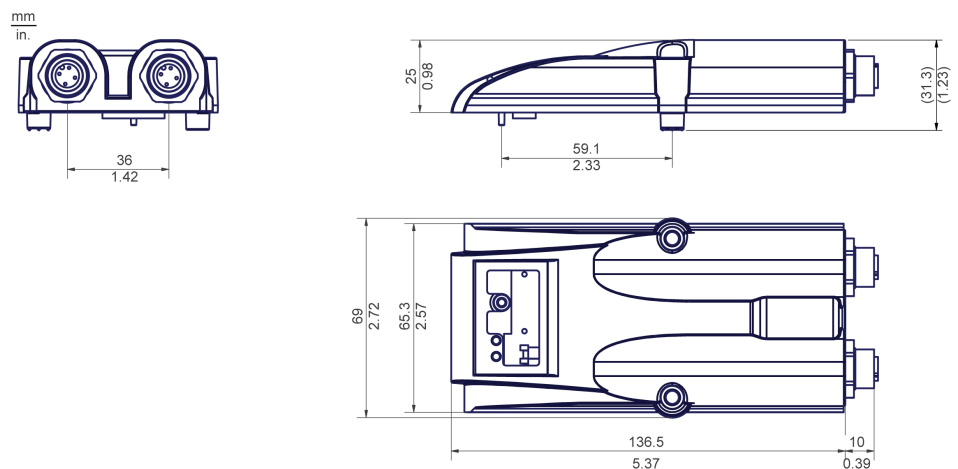
Parameter Table

Parameter	Value
Internal/External control voltage UL	DC 24 V (-15% / +20%)
Internal control current	<ul style="list-style-type: none"> • When using internal I/O supply: maximum 300 mA • When using external I/O supply: maximum 80 mA
External current	Maximum 2 A
Overvoltage category	III
Weight	0.22 kg (0.49 lb)
Degree of radio interference	C3 (IEC/EN 61800-3)
Inputs / Outputs	
Inputs/Outputs	8 configurable as inputs or outputs: <ul style="list-style-type: none"> • Inputs IEC61131-2 Type1 • Outputs IEC61131-2
Galvanic isolation	500 V DC isolated against PE

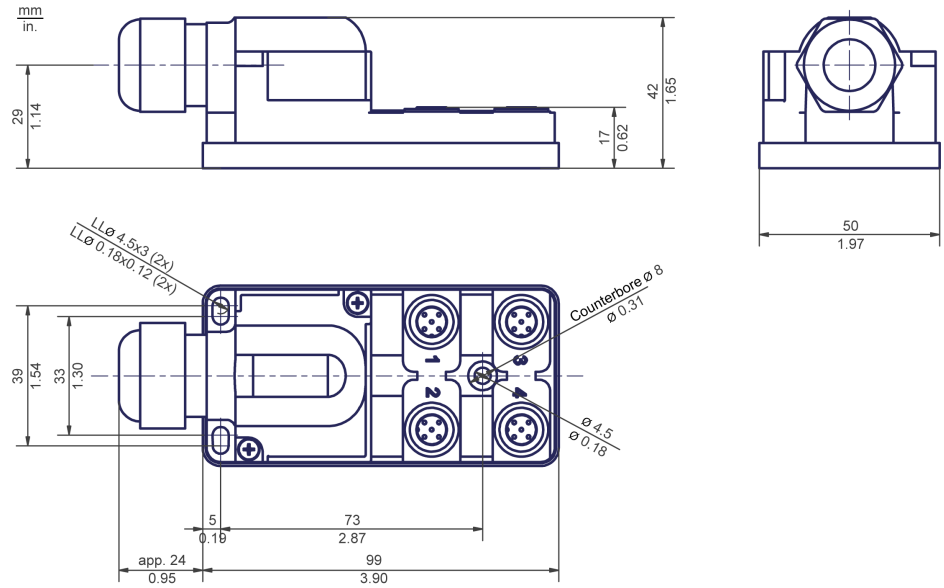
Parameter	Value
Ports configurable as digital inputs	
Voltage in U_{IN} L/0 range	-3...5 Vdc
Voltage in U_{IN} H/1 range	15...30 Vdc
Input current	$I_{IN} = 2 \text{ mA}$ at $U_{IN} = 15 \text{ Vdc}$
Protected against reverse polarity	Yes
Input filter	1 ms or 5 ms, configurable
Ports configurable as digital outputs	
Output voltage	$(+U_L - 3 \text{ V}) < U_{OUT} < +U_L$
Rated current per output	$I_e = 500 \text{ mA}$
Overall module current across all 8 in-/outputs	When using internal I/O supply: 0.1 A
	When using external I/O supply: 2.0 A
Maximum inrush current	$I_{e\max} > 2 \text{ A}$ for 1 s
Touch current with zero signal	$< 0.4 \text{ mA}$
Transmission time	100 μs
Short-circuit protections	Yes
Supply output (L / 0)	24 Vdc (-15...+20%) / 2 A
Ambient conditions	
Degree of protection	IP 65 (with connected cables or caps)
Operational temperature	+5...+40 °C (+41...+104 °F)
Storage temperature	-25...+55 °C (-13...+131 °F)
Transport temperature	-25...+70 °C (-13...+158 °F)
Temperature Fluctuation	$t_{\max} = 30 \text{ K/h}$
Operational humidity	5 %...85 % rel.
Storage humidity	5 %...95 % rel.
Transport humidity	5 %...95 % rel.

Dimensions

Dimensions Lexium 62 ILM digital I/O module:

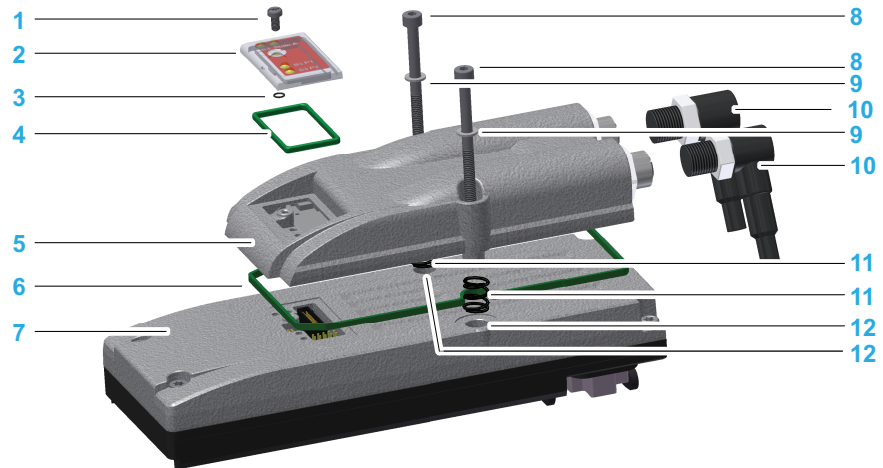


Dimensions of the ABE9 splitter box:



Lexium 62 ILM Digital I/O Module - Installation

Overview



- 1 Torx M3x6 screw
- 2 Protective cover
- 3 Insulating washer, 2.5 x 0.6 mm (0.1 x 0.02 in.)
- 4 Protective cover gasket
- 5 Lexium 62 ILM digital I/O module
- 6 Sealing ring for the Lexium 62 ILM digital I/O module
- 7 Lexium 62 ILM Integrated Servo Drive
- 8 Hexagon socket screw M4x50
- 9 Serrated lock washers M4
- 10 M12 connectors (X4, X5)
- 11 Pressure springs with inner diameter 5 mm (0.20 in) / outer diameter 8 mm (0.31 in) / height 8 mm (0.31 in)
- 12 Mounting holes of the Lexium 62 ILM

Before beginning the replacement of specific components, read thoroughly the section *Replacing Components and Cables*, page 78 for important safety information and general instructions.

Required Tool

The following tools are required for installation:

- Hexagon socket screwdriver 3.0
- Torx TX10 screwdriver

Check delivery for completeness:

- Lexium 62 ILM digital I/O module with sealing ring
- Two hexagonal screws M4x50
- Two serrated lock washers M4
- Two pressure springs

ESD Protection

Observe the following instructions to help prevent damages due to electrostatic discharge.

NOTICE

ELECTROSTATIC DISCHARGE

- Do not touch any of the electrical connections or components.
- Touch circuit boards only on the edges.
- Take the necessary protective measures against electrostatic discharges.

Failure to follow these instructions can result in equipment damage.

Prepare Installation

Step	Action
1	Set main switch to OFF position, or otherwise remove all power to the system.
2	Prevent main switch from being switched back on.
3	Loosen the screw (1) with the screwdriver (Torx).

Step	Action
4	Remove screw (1) with insulating washer (3) and protective cap (2) and protective cap gasket (4) from Lexium 62 ILM.
5	Loosen the screws in the mounting holes (11) (M4x28) with the screwdriver (hexagon socket).
6	Remove the screws and serrated lock washers.
7	Insert the sealing ring (6) into the groove of the Lexium 62 ILM digital I/O module.

NOTICE
<p>INSUFFICIENT SHIELDING/GROUNDING/TIGHTNESS</p> <ul style="list-style-type: none"> Serrated lock washers (9) must be removed when removing screws from position (12). Align DIO8 with three fixing pins. The sealing ring of DIO8 must be completely inserted into the groove of the DIO8. Insert springs if installing on ILM070/100/140. <p>Failure to follow these instructions can result in equipment damage.</p>

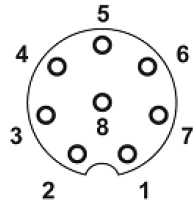
Assembly

Step	Action
1	Insert each pressure spring (11) in vertical position into the respective mounting hole (12) of the Lexium 62 ILM.
2	Place the Lexium 62 ILM Digital I/O Module on the Lexium 62 ILM.
3	Insert screws (8) (M4x50) with serrated lock washers (9) through the mounting holes of the Lexium 62 ILM Digital I/O Module, then through the aperture of the pressure springs (11), and finally into the mounting holes (12) of the Lexium 62 ILM.
4	Tighten the screws (8) temporary with 2 Nm (17.70 lbf in).
5	Tighten the screws (8) with 3 Nm (26.55 lbf in) definitively.
6	Fit protective cap (2) together with protective cover seal (4) onto the Lexium 62 ILM digital I/O module.
7	Screw the protective cap on (to 1 Nm) with the screw (1) and the insulating washer (3) by using a Torx screwdriver.

NOTICE
<p>INSUFFICIENT SHIELDING/GROUNDING/TIGHTNESS</p> <ul style="list-style-type: none"> Serrated lock washers (9) must be removed when removing screws from position (12). Align DIO8 with three fixing pins. The sealing ring of DIO8 must be completely inserted into the groove of the DIO8. Insert springs if installing on ILM070/100/140. <p>Failure to follow these instructions can result in equipment damage.</p>

Lexium 62 ILM Digital I/O Module - Electrical Connections

Electrical Connections - Lexium 62 ILM Digital I/O Module



NOTE: Maximum cable length is 30 m (98.4 ft)

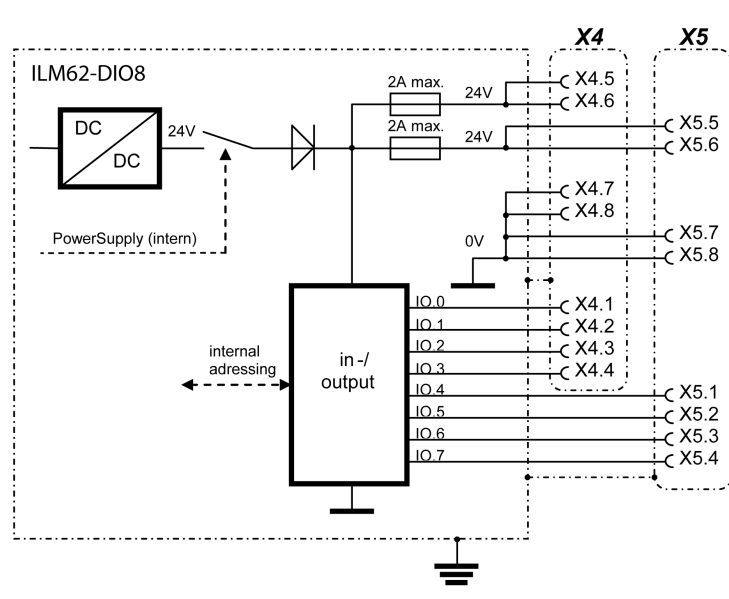
Electrical connection Lexium 62 ILM Digital I/O Module outlet X4 - inputs/outputs:

Pin	Designation	Meaning
1	IO.0	Input/output 0
2	IO.1	Input/output 1
3	IO.2	Input/output 2
4	IO.3	Input/output 3
5	24 V	Control voltage
6	24 V	Control voltage
7	0 V	Control voltage
8	0 V	Control voltage
Shield	PE	Shield

Electrical connection Lexium 62 ILM Digital I/O Module outlet X5 - inputs/outputs:

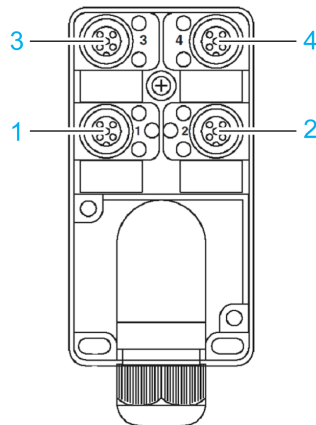
Pin	Designation	Meaning
1	IO.4	Input/output 4
2	IO.5	Input/output 5
3	IO.6	Input/output 6
4	IO.7	Input/output 7
5	24 V	Control voltage
6	24 V	Control voltage
7	0 V	Control voltage
8	0 V	Control voltage
Shield	PE	Shield

Block Diagram Lexium 62 ILM Digital I/O Module

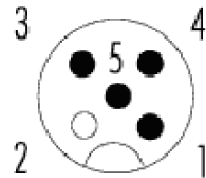


ABE9 - Splitter Box

Connection wiring diagram ABE9 splitter box:



- 1 Outlet 1
- 2 Outlet 2
- 3 Outlet 3
- 4 Outlet 4



Electrical connections for ABE9 splitter box outlet 1...4 - inputs/outputs

Pin	Designation	Meaning
1	24 V	Control voltage
2	free	Reserved
3	0 V	Control voltage

Pin	Designation	Meaning
4	IO.x	Input/output x (X4: 0 ... 3 or X5: 4 ... 7)
5	PE	Shield

The control voltage when using external I/O supply can be supplied either via the X4, X5 outlets or via the ABE9 splitter box.

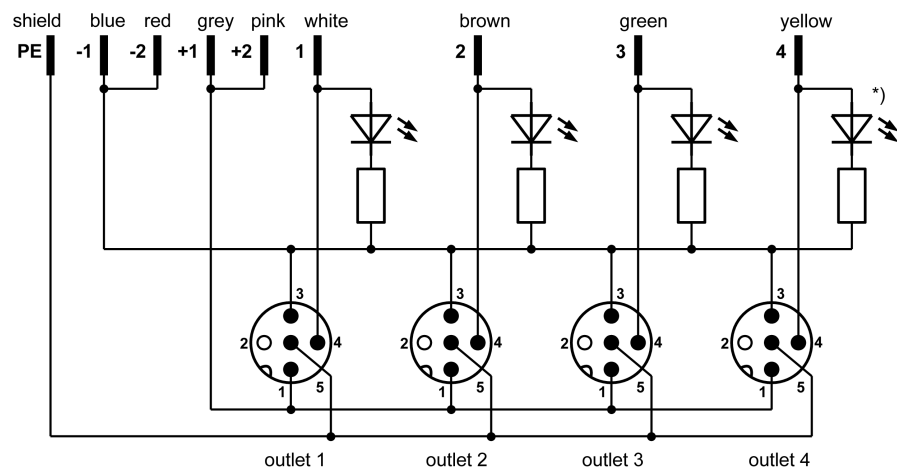
NOTICE

NO POTENTIAL ISOLATION OF THE INPUTS/OUTPUTS

Install a 2 A, slow blow fuse when using an external power supply.

Failure to follow these instructions can result in equipment damage.

Block diagram ABE9 splitter box:

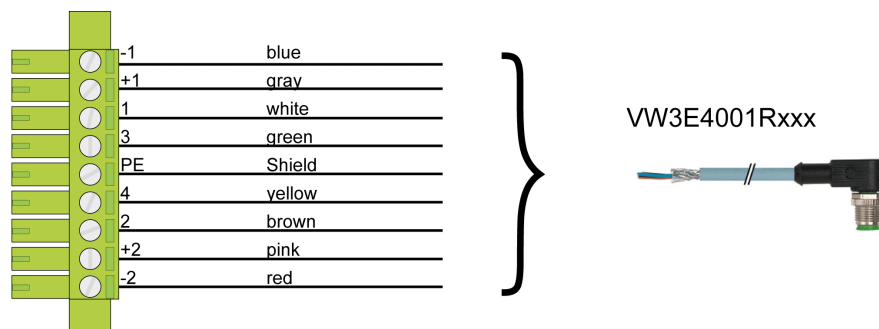


*) 2 variants available: with or without LED indicator

Lexium 62 ILM Digital I/O Module - Wiring

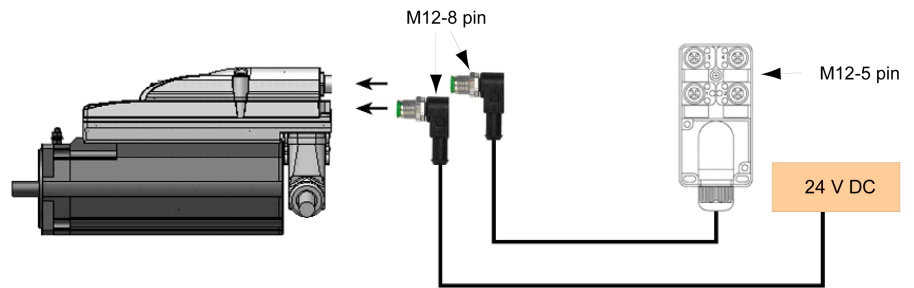
Overview

Cable configuration VW3E4001Rxxx for connection of ABE9 splitter box:

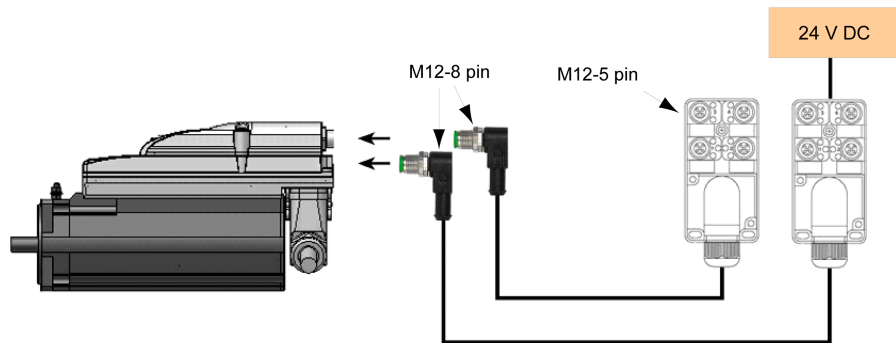


Configuration Examples

1-4 inputs/ outputs with external supply:



2-8 inputs/ outputs with external supply:



Lexium 62 ILM Safety Module

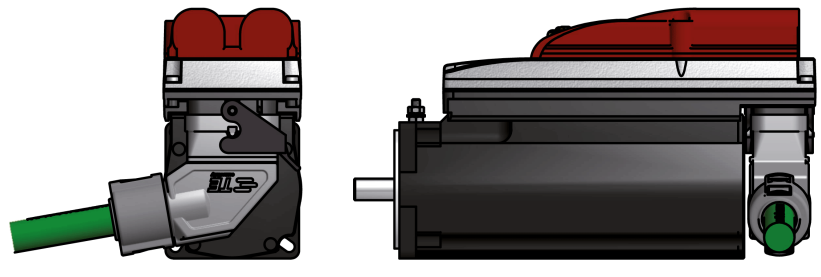
Lexium 62 ILM Safety Module - Description

Overview

Features:

- Realization of extended safety-related functions functions, page 44.

Lexium 62 ILM with installed Safety Module



Lexium 62 ILM Safety Module - Technical Data

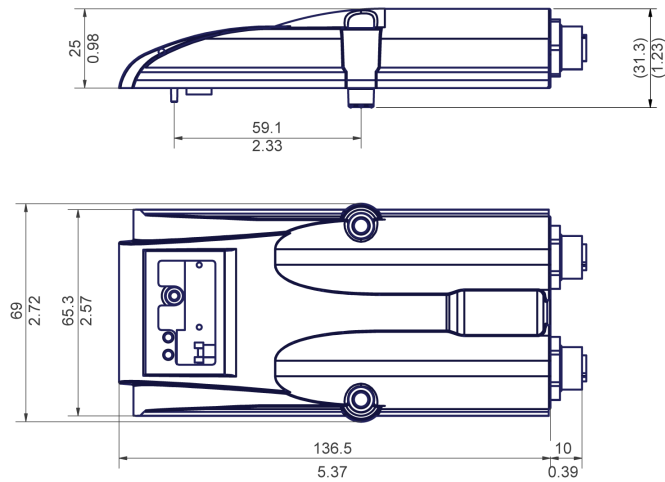
Overview

Parameter	Value
Supply	
Control voltage / control current	DC 24 V (-15% / +20%) With internal E/A supply: maximum 400 mA
Weight	0.22 kg (0.49 lb)
Ambient conditions	
Overvoltage category	III
Radio interference level	Class A EN55011 / IEC/EN 61800-3
Operation	
Degree of protection	IP 65
Ambient temperature	+5 °C to + 40 °C/ +41 + 104 °F
Condensation	No
Icing	No
Other liquid	No
Transport	
Ambient temperature	-25 + 70 °C / -13 + 158 °F, temperature variation $t_{\max} = 30 \text{ K/h}$
Condensation	No
Icing	No
Other liquid	No
Long-term storage in transport packaging	
Ambient temperature	-25 + 55 °C/ -13 + 131 °F, temperature variation $t_{\max} = 30 \text{ K/h}$
Condensation	No

Parameter	Value
Icing	No
Other liquid	No

Dimensions

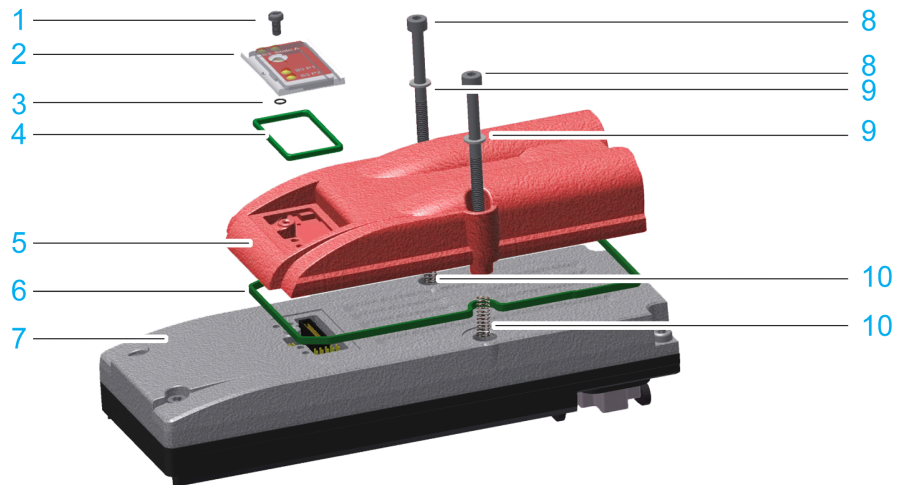
Lexium 62 ILM Safety Module dimensions:



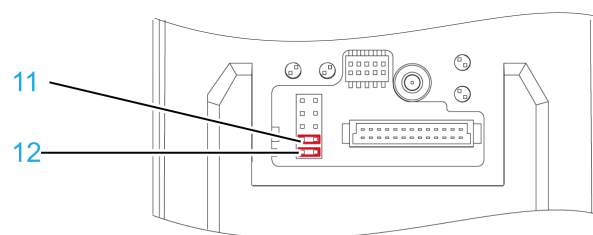
Lexium 62 ILM Safety Module - Installation

Overview

Mounting of the Lexium 62 ILM Safety Module on the Lexium 62 ILM:



- 1 Torx M3x6 screw
- 2 Protective cover
- 3 Insulating washer, 2.5 x 0.6 mm (0.1 x 0.02 in)
- 4 Protective cover gasket
- 5 Lexium 62 ILM Safety Module
- 6 Sealing ring for the Lexium 62 ILM Safety Module
- 7 Lexium 62 ILM Integrated Servo Drive
- 8 Hexagon socket screw M4x50
- 9 Serrated lock washers M4
- 10 Mounting holes of the Lexium 62 ILM; pressure springs with inner diameter 5 mm (0.20 in) / outer diameter 8 mm (0.31 in) / height 8 mm (0.31 in)



- 11 Jumper J2
- 12 Jumper J1

Before beginning the replacement of specific components, read thoroughly the section *Replacing Components and Cables*, page 78 for important safety information and general instructions.

How to Mount the Lexium 62 ILM Safety Module

Required tool:

- Hexagon socket screwdriver 3.0 with adjustable tightening torque
- Torx TX10 screwdriver with adjustable tightening torque

Check delivery for completeness:

- Lexium 62 ILM Safety Module
- 1 x sealing ring
- 2 x hexagon socket screw M4x50
- 2 x serrated lock washers M4
- 2 x pressure spring

NOTE: Hardware Compatibility

Only use the Lexium 62 ILM Safety Module when the Lexium 62 ILM has the hardware code x2x5xxxxxxx or a later hardware code.

The dates of manufacturing must be:

- ILM070xxxxxxx: as of 14/09/2015
- ILM100xxxxxxx: as of 19/08/2015
- ILM140xxxxxxx: as of 24/08/2015

ESD Protection

Observe the following instructions to help prevent damages due to electrostatic discharge.

NOTICE
<p>ELECTROSTATIC DISCHARGE</p> <ul style="list-style-type: none"> • Do not touch any of the electrical connections or components. • Touch circuit boards only on the edges. • Take the necessary protective measures against electrostatic discharges. <p>Failure to follow these instructions can result in equipment damage.</p>

Prepare Installation

⚠ DANGER
<p>DEACTIVATED SAFETY FUNCTION</p> <p>Remove the jumpers J1 and J2 before mounting the Lexium 62 ILM Safety Module, so that the Safety Module for Lexium 62 ILM is active.</p> <p>Failure to follow these instructions will result in death or serious injury.</p>

NOTICE
<p>INSUFFICIENT SHIELDING/GROUNDING/TIGHTNESS</p> <p>The serrated lock washers must be removed from their original position (10) when removing screws.</p> <p>Failure to follow these instructions can result in equipment damage.</p>

Step	Action
1	Loosen the screw (1) with the screwdriver (Torx).
2	Remove screw (1) with insulating washer (3) and protective cover (2) and protective cover gasket (4) from Lexium 62 ILM.
3	Loosen the screws in the mounting holes (10) (M4x28) with the screwdriver (hexagon socket).
4	Remove the screws and serrated lock washers.
5	Remove the jumpers J1 (12) and J2 (11) from the Lexium 62 ILM (see previous figure).

Execute Installation

Step	Action
1	Insert the sealing ring (6) into the groove of the Lexium 62 ILM Safety Module.
2	Insert each pressure spring (10) in vertical position into the respective mounting hole (10) of the Lexium 62 ILM.
3	Place the Lexium 62 ILM Safety Module on the Lexium 62 ILM.
4	Insert screws (8) (M4x50) with serrated lock washers (9) through the mounting holes of the Lexium 62 ILM Safety Module and through the aperture of the pressure springs (10) into the mounting holes (10) of the Lexium 62 ILM.
5	First turn the screw (8) clockwise with a screwdriver (hexagon socket) until screw is snug but not tightened.
6	Then tighten incrementally the screws (8) with 2 Nm (17.70 lbf in) torque.
7	Finally tighten the screws (8) to the target torque value of 3 Nm (26.55 lbf in).
8	Fit protective cover (2) together with protective cover gasket (4) onto Lexium 62 ILM Safety Module.
9	Screw the protective cover on (to 1 Nm/ 0.74 lbf) with the screw (1) and the insulating washer (3) by using a Torx screwdriver.

NOTICE

LOSS OF IP67 RATING

- Align the Lexium 62 ILM Safety Module with the three fixing pins.
- Be sure that the sealing ring of the Lexium 62 ILM Safety Module is completely inserted into the groove of the Lexium 62 ILM.

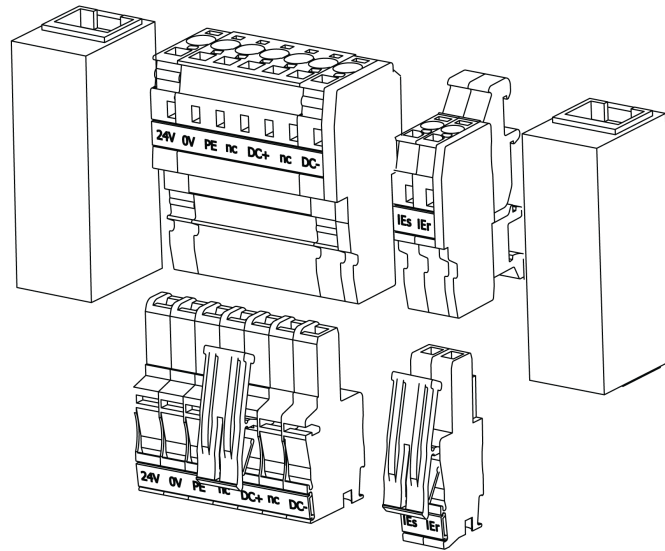
Failure to follow these instructions can result in equipment damage.

Hybrid Connector HCN-2 Adapter

Hybrid Connector HCN-2 Adapter - Description

Overview

The HCN-2 can be used to connect hybrid cables from the Lexium 62 Connection Module to the Lexium 62 Distribution Box or between two Lexium 62 Distribution Box.



Reference

Product	Reference
Hybrid Connector HCN-2 Adapter	VW3E6026

Hybrid Connector HCN-2 Adapter - Technical Data

Ambient Conditions

Ambient conditions for HCN-2:

Procedure	Parameter	Value	Basis
Operation	Class 3K3		IEC/EN 60721-3-3
	Degree of protection	IP20	
	Pollution degree	2	
	Ambient temperature	+5 °C...+ 55 °C / +41...131 °F	
	Relative humidity	5 %...85 %	
	Condensation	No	
	Formation of ice	No	
	Class 3M3		
	Vibration	10 m/s ²	
	Shock	100 m/s ²	
Transport	Class 2K3		IEC/EN 60721-3-2
	Ambient temperature	-25...+70 °C/ -13... +158 °F	
	Relative humidity	5 %...95 %	
	Condensation	No	
	Formation of ice	No	
	Class 2M2		
	Vibration	10 m/s ²	
	Shock	100 m/s ²	
Long-term storage in transport packaging	Class 1K4		IEC/EN 60721-3-1
	Ambient temperature	-25...+55 °C/ -13...+131 °F	
	Ambient temperature variations	0.5 °C/min	
	Relative humidity	10 %...100 %	
	Condensation	No	
	Formation of ice	No	

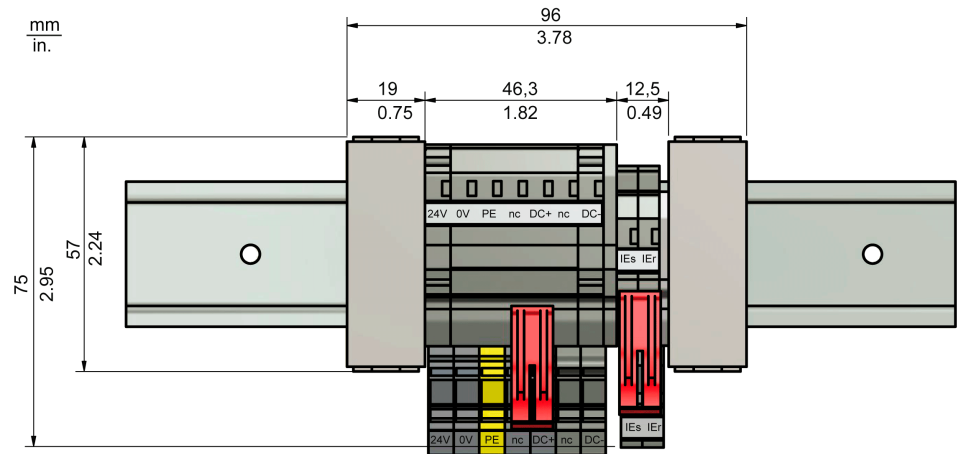
Mechanical and Electrical Data

Technical data for HCN-2

Parameters	Value
Control voltage (24 V / 0 V)	
Control voltage	24 Vdc
Permanent current	12 A
DC bus (DC+ / DC-)	
DC bus voltage	250...700 Vdc
DC bus permanent current	20 A
DC bus peak current (1s)	40 A
Inverter Enable (IEs / IEr)	
Voltage	AC 40 V rms
Current	AC 2 A rms
Signal frequency	100 kHz
Sercos	
Data rate	100 Mbit/s
Overvoltage category	III

Parameters	Value
Weight	0.125 kg (4.4 oz)
Pollution degree	2 (IEC/EN 61800-5-1)

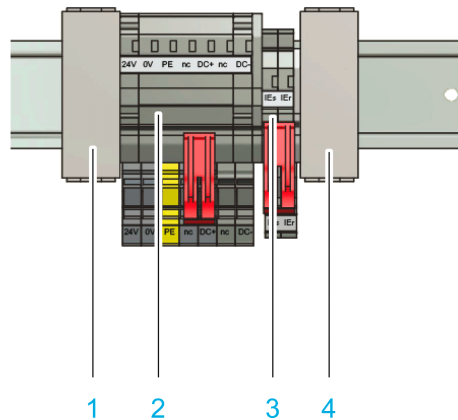
HCN-2 - Dimensions



Hybrid Connector HCN-2 Adapter- Installation

Overview

HCN-2 - Components



- 1 Sercos-continuity binder, left side
- 2 Power connector
- 3 Inverter Enable connector
- 4 Sercos-continuity binder, right side

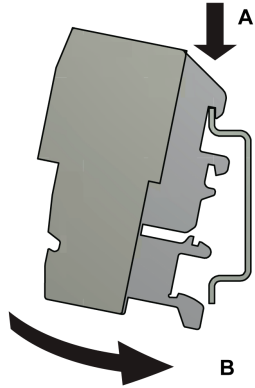
How to Mount the HCN-2:

Given the length of the individual Sercos lines, place the continuity binders with the Sercos connection lines at the outside. In this way, the Sercos connection lines are subject to even pull tension when the hybrid cables need to be bent.

▲ WARNING**INOPERABLE INVERTER ENABLE SAFETY FUNCTION**

Install the Hybrid Connector HCN-2 Adapter in a control cabinet with a degree of protection IP54 minimum.

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

Step	Action
1	Place the respective components (1) - (4) at an angle on the upper top-hat rail guide.
2	Pivot the respective components (1) - (4) completely onto the top-hat rail until the latch snaps completely into place. 

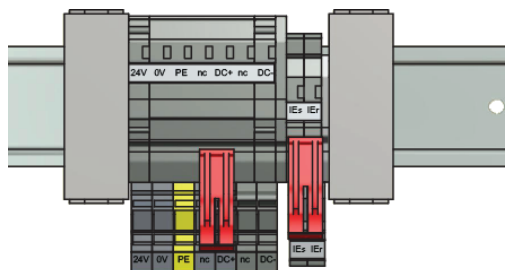
NOTICE**SHEARING FORCE AT THE SERCOS CONTINUITY BINDERS**

- Assemble a Sercos-continuity binder (1), (4) on the right and on the left side of the Hybrid Connector HCN-2 Adapter.
- Only use cables and accessories of Schneider Electric.

Failure to follow these instructions can result in equipment damage.

Hybrid Connector HCN-2 Adapter - Electrical Connections

Overview



Designation	Meaning	Color	Cross-section (mm ² / AWG)
24 V	Control voltage	green	2.5 / 13
0 V	Control voltage	grey	2.5 / 13
PE	Protective Earth	green/yellow	2.5 / 13
nc	Not connected	-	-

Designation	Meaning	Color	Cross-section (mm ² / AWG)
DC +	DC bus +	red	2.5 / 13
nc	Not connected	-	-
DC-	DC bus -	black	2.5 / 13
IEs	Inverter Enable signal 1	white	0.34 / 22
IEr	Inverter Enable signal 2	black	0.34 / 22
Sercos P1	Sercos port 1	-	-
Sercos P2	Sercos port 2	-	-

NOTE: The DIN rail is not part of the HCN-2.

NOTICE

CONNECTOR WEAR

Do not connect / disconnect the hybrid cables more than 20 times.

Failure to follow these instructions can result in equipment damage.

How to Connect the HCN-2

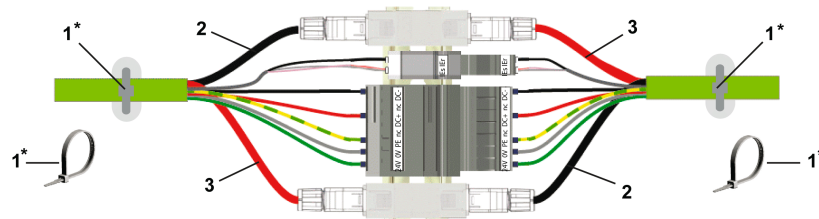
Depending on the identification mode selected in the EcoStruxure Machine Expert Logic Builder, a reversed connection of Sercos-connecting lines can lead to unintended operation of the machine.

⚠ WARNING

UNINTENDED MACHINE OPERATION

Be sure the Sercos-connecting lines have a cross-over connection that is black (2) to red (3) and red (3) to black (2).

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



1 Strain relief (not part of the delivery)

2 Sercos connection line (black)

3 Sercos connection line (red)

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK DUE TO BROKEN, LOOSE WIRES

Use a strain relief for every hybrid cable.

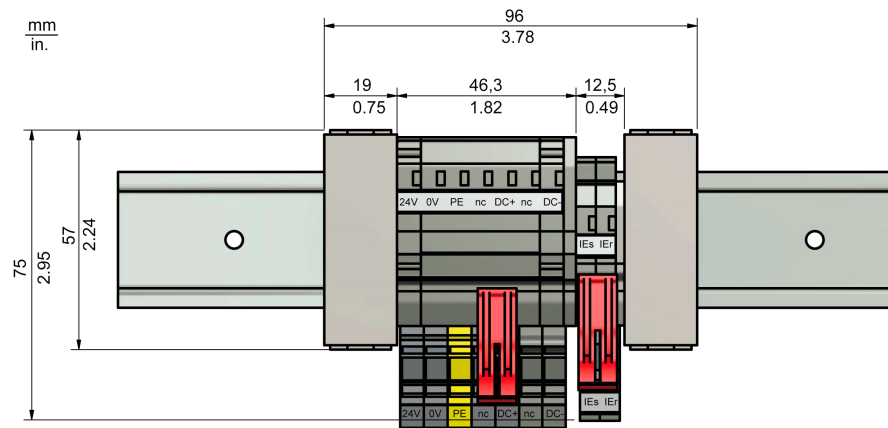
Failure to follow these instructions will result in death or serious injury.

Step	Action
1	Connect the hybrid cables of the conductors.
2	Ensure that the hybrid cables of the conductors are not subject to pull tension. This applies particularly to the IEs/IEr-conductors (Inverter Enable).
3	Connect the Sercos-connecting lines cross-over (black (2) to red (3) and red (3) to black (2)).
4	Secure the strain relief (1) for each hybrid cable in place.

Hybrid Connector HCN-2 Adapter - Dimensions

Overview

HCN-2 dimension diagram.



Appendices

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Disposal

What's in This Chapter

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Disposal

Information on the Disposal of Schneider Electric Products

NOTE: The components consist of different materials which can be recycled and must be disposed of separately.

Step	Action
1	Dispose of the packaging in accordance with the relevant national regulations.
2	Dispose of the packaging at the disposal sites provided for this purpose.
3	Dispose of Lexium 62 ILM component in accordance with the applicable national regulations.

Glossary

A

AWG:

(*American wire gauge*) The standard that specifies wire section sizes in North America.

D

DC bus:

Circuit that supplies the power stage with energy (direct voltage).

Degree of protection:

The degree of protection is a standardized specification for electrical equipment that describes the protection against the ingress of foreign objects and water (for example: IP 20).

DOM:

Date of manufacturing: The nameplate of the product shows the date of manufacture in the format DD.MM.YY or in the format DD.MM.YYYY. For example:

31.12.11 corresponds to December 31, 2011

31.12.2011 corresponds to December 31, 2011

E

EMC:

Electromagnetic compatibility

Encoder :

Sensor that converts a measured distance or angle into an electrical signal. This signal is evaluated by the drive to determine the actual position of a shaft (rotor) or a driving unit.

H

Holding brake:

The holding brake in the motor has the task of holding the motor position when the power stage is disabled. The holding brake is not a safety function and not a service brake.

L

legacy projects:

Application projects that were created with SoMachine, SoMachine Motion, or a previous version of EcoStruxure Machine Expert.

LMC:

(*Lexium motion controller*)

P

PWM:

(*pulse width modulation*) A fast output that oscillates between off and on in an adjustable duty cycle, producing a rectangular wave form (though you can adjust it to produce a square wave).

S

Sercos:

(serial real-time communications system) A digital control bus that interconnects, motion controls, drives, I/Os, sensors, and actuators for numerically controlled machines and systems. It is a standardized and open controller-to-intelligent digital device interface, designed for high-speed serial communication of standardized closed-loop real-time data.

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