

Lexium 15 LP

Servo drives

Simplified manual

30072-452-50

Retain for future use

**LXM15LD13M3/LXM15LD21M3/
LXM15LD28M3 / 200-240 V**

**LXM15LU60N4/LXM15LD10N4
LXM15LD17N4/ 208-480 V**



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Important information

WARNING

Please read these instructions carefully and examine the device in order to familiarize yourself with it prior to installation, operation or maintenance. The specific messages below can appear in the documentation or on the device. They warn of potential dangers or draw your attention to information that can clarify or simplify a procedure.



This symbol on a hazard or warning label indicates a potential risk of electrocution, which can result in bodily harm in the event of non-compliance with the accompanying instructions.



This symbol indicates a safety hazard. It warns of the potential risk of physical injury. You must observe all safety instructions accompanied by this symbol in order to avoid situations that can result in serious physical injury or even death.

DANGER

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

WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result** in death, serious injury, or equipment damage.

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result** in injury or equipment damage.

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result** in property damage.

IMPORTANT NOTE

Electrical equipment must only be serviced by qualified personnel. Schneider Electric will not accept any responsibility for consequences associated with the use of this document. This document must not be used as a training guide for beginners.

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Overview

The simplified manual only contains selected information.
The complete manual can be found at <http://www.us.telemecanique.com>.

Before you begin

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this manual before installing or operating the Lexium 15 servo drive. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with all international and national electrical code requirements with respect to grounding of all equipment.
- Many parts of this servo drive, including the printed circuit boards, operate at the line voltage. DO NOT TOUCH. Use only electrically insulated tools.
- DO NOT touch unshielded components or terminal strip screw connections with voltage present. Control and power connections may be live even if the servo motor is not rotating.
- DO NOT short across terminals PA/+ and PC/- or across the DC bus capacitors.
- The servo motor generates voltage when the shaft is rotating. Lock the shaft of the servo motor to prevent rotation before starting work on the servo drive system.
- Before working on the servo drive system:
 - Disconnect all power, including external control power that may be present.
 - Place a "DO NOT TURN ON" label on all power disconnects.
 - Lock all power disconnects in the open position.
 - Wait 5 minutes to allow the DC bus capacitors to discharge. Measure the DC bus voltage between the PC/- and PA/+ terminals to verify that the DC voltage is less than 40 V. The drive LED is not an indicator of the absence of DC bus voltage.
- Install and close all covers before applying power or starting and stopping the servo drive.

Failure to follow these instructions will result in death or equipment damage.

DANGER

UNINTENDED EQUIPMENT OPERATION

The servo drive may execute unexpected movements because of incorrect wiring, incorrect settings, incorrect data or others errors.

- Because Electromagnetic Interference may cause unpredictable responses in the system, carefully wire the servo drive in accordance with its accompanying documentation.
- Follow all wiring recommendations in this manual.
- Disable the inputs PWR (status 0) to help avoid unexpected movements before switching and configuring the servo drive system.
- Do not operate a servo drive system with unknown settings or data.
- Carry out a comprehensive commissioning test.

Failure to follow these instructions will result in death or equipment damage.

▲ WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths, and for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.¹
- Each implementation of a Lexium 15 drive controller must be individually and thoroughly tested for proper operation before being placed into service.

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

1. For additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation, and Operation of Adjustable-Speed Drive Systems."

▲ WARNING

LOSS OF CONTROL

- Set the communication error trip time to stop the drive controller in case the remote display is deactivated by an unusual event such as tripping, an operation error, or a power outage.
- Ensure that the communication error trip time is properly set before deactivating the remote keypad display.

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

▲ CAUTION

INCOMPATIBLE LINE VOLTAGE

- Before turning on and configuring the drive controller, ensure that the line voltage is compatible with the line voltage range specified on the drive controller nameplate. The drive controller can be damaged if the line voltage is not compatible.

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

To meet this product's UL requirements:

For equipment ratings, refer to the equipment's nameplate.

Use 60/75C copper wire only

Tighten the field wiring terminals to the torque specified herein

Use in a pollution degree 2 environment

Use Class I wire only (or equivalent)

Suitable for use on a circuit capable of delivering not more than 5kArms symmetrical amperes.

The Lexium 15 family of servo drives is designed to comply with UL 840 overvoltage category III. Installation of a surge arrester such as the Square D SDSA3650 on the circuit supplying power to the drive is recommended.

Steps

1 Receive product.

- Open the packaging and check the unit for transport damage.
- Check that the information on the nameplate matches that on the order form.

2 Check the mains voltage.

- Make sure that the mains voltage matches the specified voltage range of the unit.

3 Install product.

- Check that the specified installation clearances correspond to the operating conditions.
- Fasten the device in place in accordance with the EMC specifications and the recommendations included in this document.

**Steps 1 to 4
must be
performed
with the power
disconnected !**

4 Electrical installation of the unit.

- Connect the mains power, the motor and any external components (e.g. braking resistor, mains filter).
- Connect the signal lines and the controller supply voltage.

5 Basic settings

- Run the quick tuning procedure to check the drive functions.



Technical Data

RECEIVING AND PRELIMINARY INSPECTION

Before installing the Lexium 15 servo drive, read this manual and follow all precautions.

WARNING

DAMAGED PACKAGING

- If the packaging appears damaged, it can be dangerous to open it or handle it. Handle with care

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

WARNING

DAMAGED SERVO DRIVE CONTROLLER

- Do not operate or install any servo drives that appears damaged.

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

Before removing the servo drive from its packaging, verify that the carton was not damaged in shipping. Carton damage usually indicates improper handling and the potential for device damage. If any damage is found, notify the carrier and your Schneider Electric representative.

STORING AND SHIPPING

If the drive controller is not being immediately installed, store it in a clean, dry area where the ambient temperature is between - 25 ... + 70 C°. If the drive must be shipped to another location, use the original shipping carton and packaging material to protect it.

Single phase power supply voltage : 200...240 V 50/60 HZ

Servo drive (output)					Line supply (input)				Lexium 15 LP
Nominal current In	Max. transient current for 2 s I _{max}	Peak transient current	Nominal output power	Power loss	Max. line current		Apparent power	Primary fuse	References
					at 200 V	at 240 V			
A _{rms}	A _{rms}	A _{pk}	kW	W	A	A	kVA	A	
3	9	13	0.9	35	7.7	7.6	1.1	10 class CC	LXM15LD13M3
4	9	13	1.2	60	10.1	9.9	2.4	15 class CC	LXM15LD21M3
4	9	13	1.2	90	10.4	10.1	4	15 class CC	LXM15LD28M3

Three phase power supply voltage : 200...240 V 50/60 HZ

Servo drive (output)					Line supply (input)				Lexium 15 LP
Nominal current In	Max. transient current for 2 s I _{max}	Peak transient current	Nominal output power	Power loss	Max. line current		Apparent power	Primary fuse	References
					at 200 V	at 240 V			
A _{rms}	A _{rms}	A _{pk}	kW	W	A	A	kVA	A	
3	9	13	1	35	4.7	4.6	1.1	6 class CC	LXM15LD13M3
6	15	21	2.1	60	8.8	8.6	2.4	10 class CC	LXM15LD21M3
10	20	28	3.4	90	14	13.7	4	15 class CC	LXM15LD28M3

Three phase power supply voltage : 208...480 V 50/60 HZ

Servo drive (output)					Line supply (input)				Lexium 15 LP
Nominal current In	Max. transient current for 2 s I _{max}	Peak transient current	Nominal output power	Power loss	Max. line current		Apparent power	Primary fuse	References
					at 208 V	at 480 V			
A _{rms}	A _{rms}	A _{pk}	kW	W	A	A	kVA	A	
1.5	4.5	6	1.1	40	2.8	2.5	1.2	6 class CC	LXM15LU60N4
3	7.5	10	2.1	60	3.9	4.5	2.5	6 class CC	LXM15LD10N4
6	12	17	4.3	90	6.9	8.2	5	10 class CC	LXM15LD17N4

Mechanical Installation

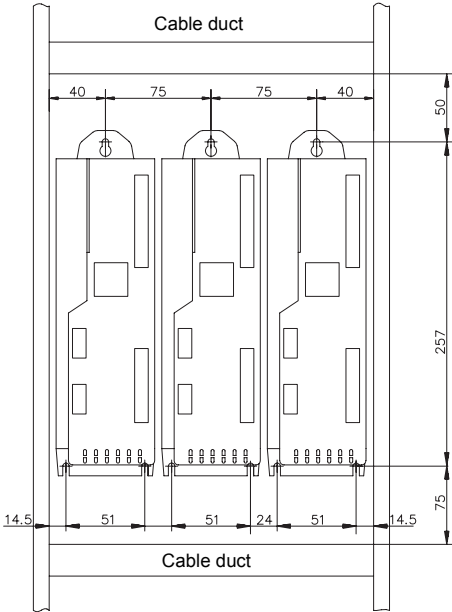
Install the servo drive vertically at $\pm 10^\circ$.

Do not place it close to heating elements.

Leave sufficient free space to ensure that the air required for cooling purposes can circulate from the bottom to the top of the unit. (see figure below).

Servo drive mounting

The following diagrams show depth dimensions and mounting area requirements for the Lexium 15 LP servo drive. You will need a 4 mm Allen key and material is 3 x M5 hexagon socket screws to DIN 912.



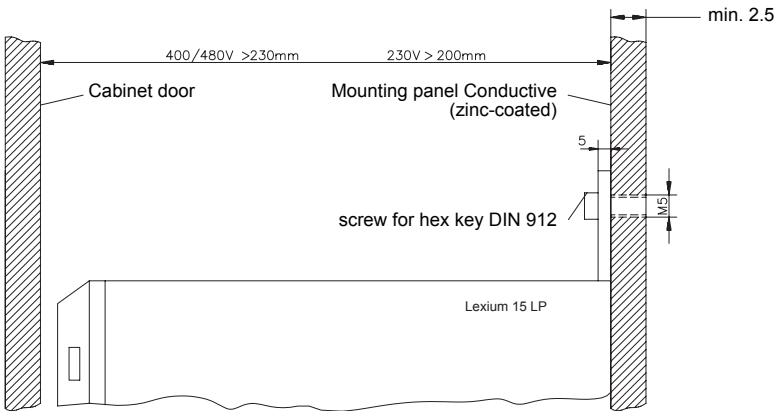
Note: All dimensions are given in millimeters
1 inch = 25.4 mm

▲ CAUTION

CONTAMINATION AND OVERHEATING

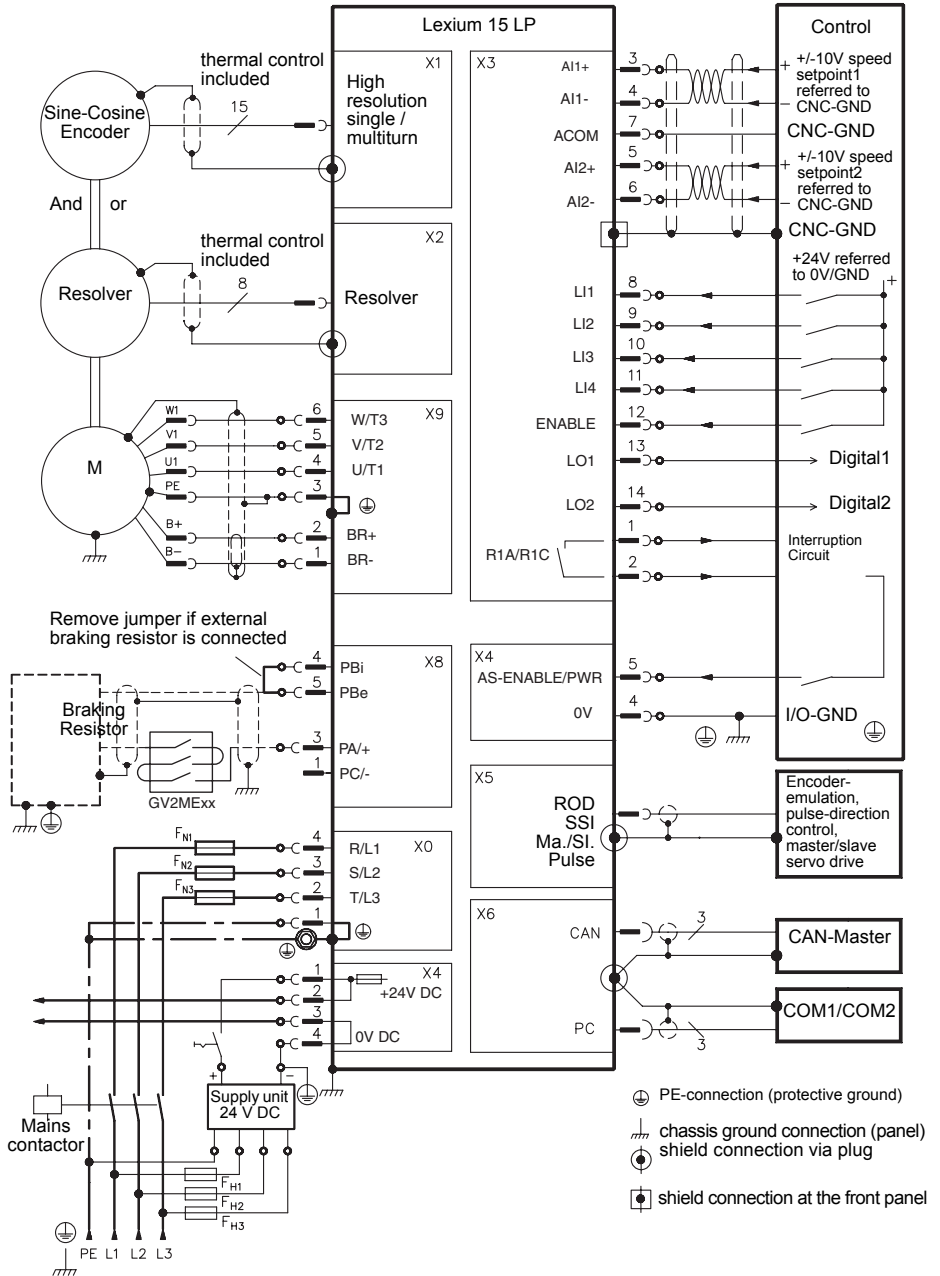
- Ensure the Lexium 15 LP servo drive is mounted within a closed control cabinet.
- The site must be free from conductive or corrosive materials.
- Maintain the required spacing indicated in the drawing to the left. The spacings must be maintained both above, below and between the servo drives.

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



Wiring overview

The following diagram shows the different connections for the Lexium 15 LP



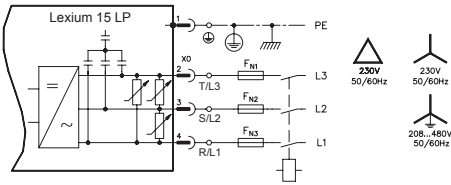
Electrical Installation

Mains connection

The following diagrams show the connections for the AC power supply input to the Lexium 15 LP servo drive. For fusing please refer to section **Technical Data**.

Three phase

The three phase power supply EMC filter is integrated.



⚠ CAUTION

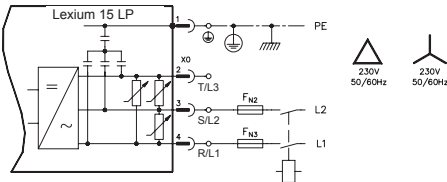
RISK OF EQUIPMENT DAMAGE

Always use an isolating transformer for 400...480 V networks which are asymmetrically grounded or not grounded.

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

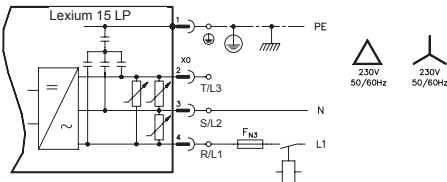
Single phase without neutral

The following diagram shows the connection for a single phase without neutral power supply.



Single phase with neutral

The following diagram shows the connection for a single phase with neutral power supply.



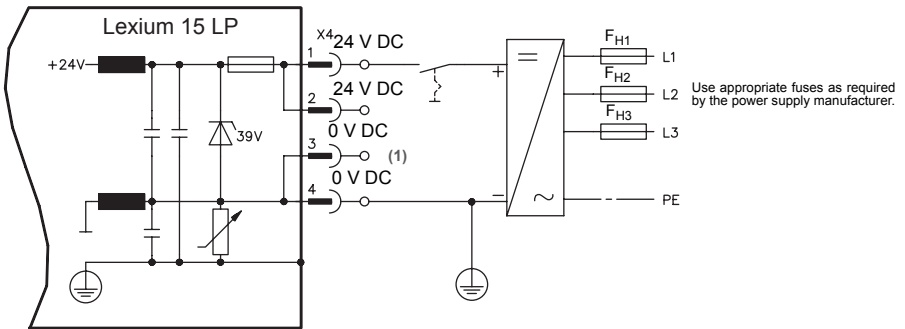
Connection of the controller supply voltage

The table below describes the 24 V DC external control power supply specifications

Model	Servo motor brake present	External control power supply input	Value
LXM15LD13M3 LXM15LU60N4	No	Voltage	20-30 V
		Current	1 A
	Yes	Voltage	24 V DC -0 % +15 %
		Current	2.5
LXM15LD21M3 LXM15LD28M3 LXM15LD10N4 LXM15LD17N4	Yes	Voltage	24 V DC -0 % +15 %
		Current	2.5

The external control 24 V DC power supply has to be electrically isolated, e.g. via an isolating transformer. An EMC filter for the 24 V DC external control power supply is integrated.

The following diagram shows the required wiring for the 24 V DC external control power supply terminal



CAUTION

SERVO DRIVE CONTROLLER DAMAGE

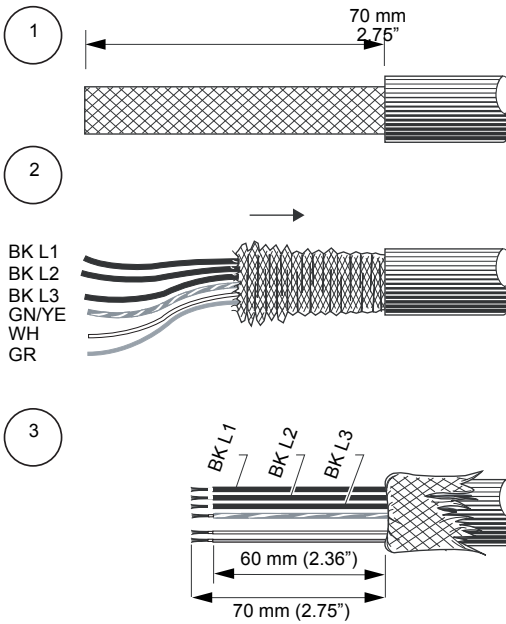
- A fuse must be used between the terminal of the power supply and the +24V DC input (X4-1 and 2) pins.
- The power supply may serve several devices in an installation, but in no event may the fuse serving a Lexium drive exceed 10A.

Failure to follow these instructions can result in equipment damage.

Motor phase connection

Preparing the motor cable

The following diagram and associated table explain how to prepare the motor cable



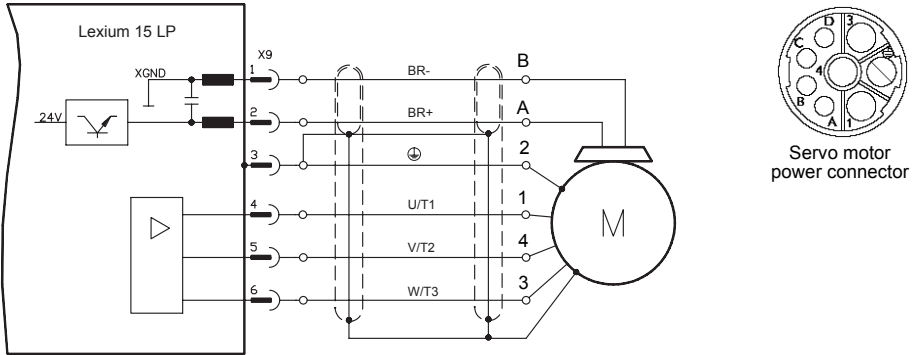
Step	Action
1	Strip the motor cable to 70 mm (2.75")
2	Slide the shield braiding back over the cable sheath. During mounting it must be spread over the EMC plate.
3	Strip each segment cable to 10 mm

Servo motor cable	Description	Color
U/T1	Motor phase	BK L1
V/T2	Motor phase	BK L2
W/T3	Motor phase	BK L3
⊥	Protective conductor	Green/Yellow
BR+	Brake +	White
BR-	Brake -	Gray

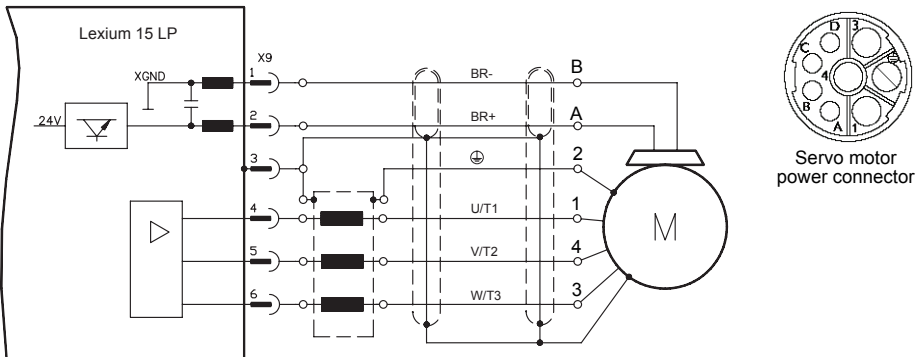
Wiring diagram

The following diagrams show the connections between a BDH or BSH servo motor and the Lexium 15 LP servo drive. When the interface cable length exceeds 25 m, a servo motor choke must be installed as shown and at a distance of one meter or less from the servo drive.

Connection between servo motor and servo drive when interface cable length is 25 m or less:



Connection between servo motor and servo drive when interface cable length exceeds 25 m:



If a servo motor power cable is used that includes cores for brake control, the brake control cores must be separately shielded. Ground the shielding at both ends.

⚠ DANGER

UNINTENTIONAL EQUIPMENT OPERATION

- The servo motor output cable must be properly grounded using the provided shielding clamp.

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

Connection of Optional Braking Resistor

For many applications, the internal braking resistor will be adequate. Consult Schneider Motion engineering for information and recommendations if an external braking resistor is required. There is a risk that the resistor will overheat and eject hot gasses under severe overload conditions caused by a shorted brake control transistor or equivalent. It is required that a protective device (a fuse, an overload trip mechanism or equivalent) be installed to protect the drive and the resistor in the case of an overload

⚠ DANGER

FIRE HAZARD

- Connect the resistor to a protective device such as a Telemecanique GV2MExx circuit protector.
- Place the circuit protector between the resistor and the PA/+ terminal of the controller. The three contacts on the GV2ME must be wired in series.
- Consult Schneider Motion engineering for selection of the appropriate GV2MExx protective devices and the recommended settings.
- If fuses are used, two must be installed, one each resistor connection. Fuses must be rated for direct current (DC) application at the highest DC Link Voltage.

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

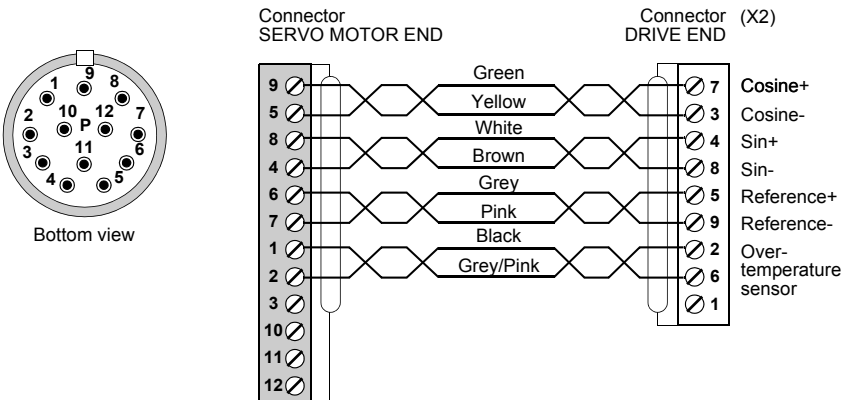
Installing an Optional Braking Resistor

Connecting external braking resistor:

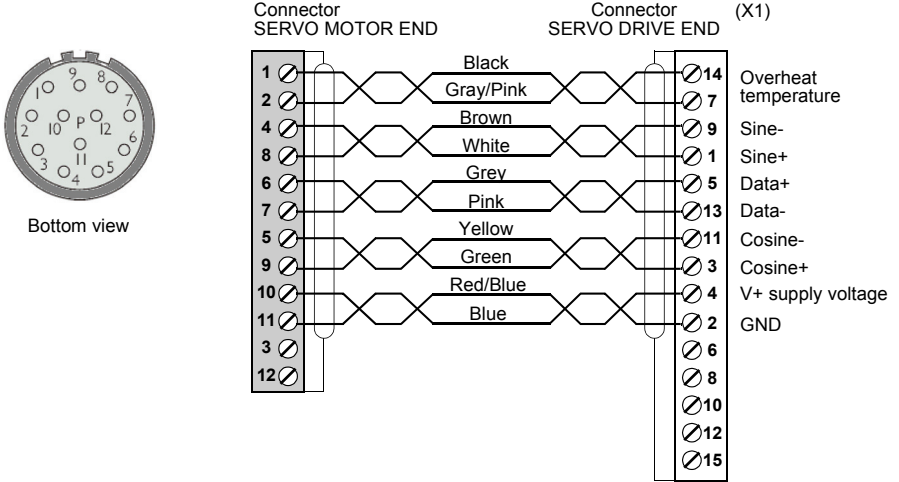
- Remove jumper between PA/+ and PBi. Otherwise the internal braking resistor may be destroyed during operation.
- Connect external braking resistor to PA/+ and PBe, with the protective device between the resistor and PA/+.
- Program the drive parameters PBALRES and PBALMAX to the appropriate values. PBALMAX must be less than or equal to the rated power dissipation of the resistor.

Connection of motor sensor

BDH servo motor resolver connection



Servo motor encoder connection

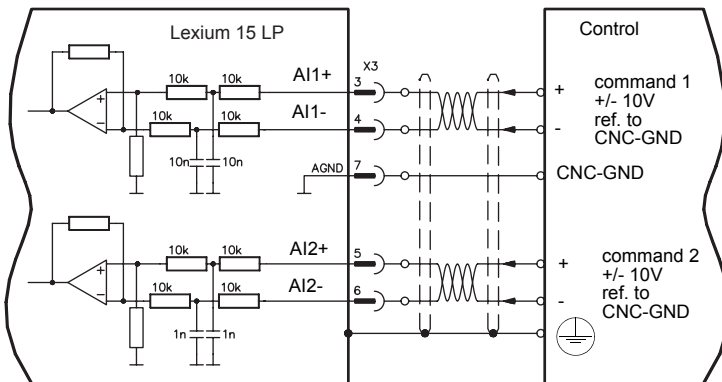


Connection of A/B signals, pulse direction or encoder emulation (X5 connector)

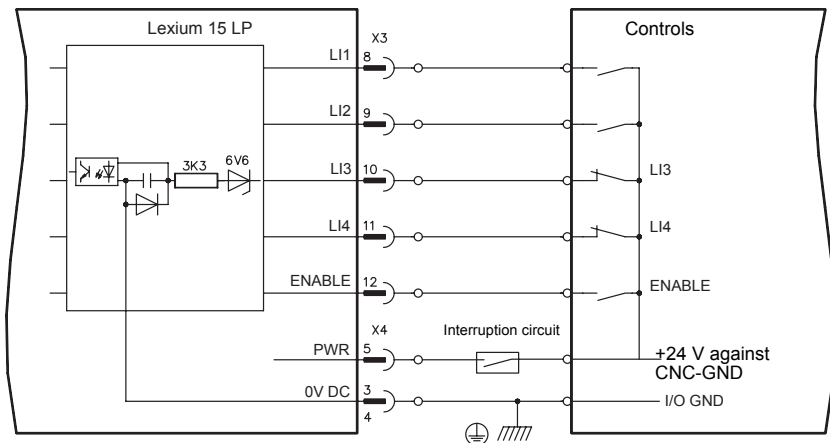
For connecting these signals please refer to the complete manual on the included CD.

Connection of inputs/outputs with local control mode

Analog inputs (X3)



Digital control inputs(X3/X4)



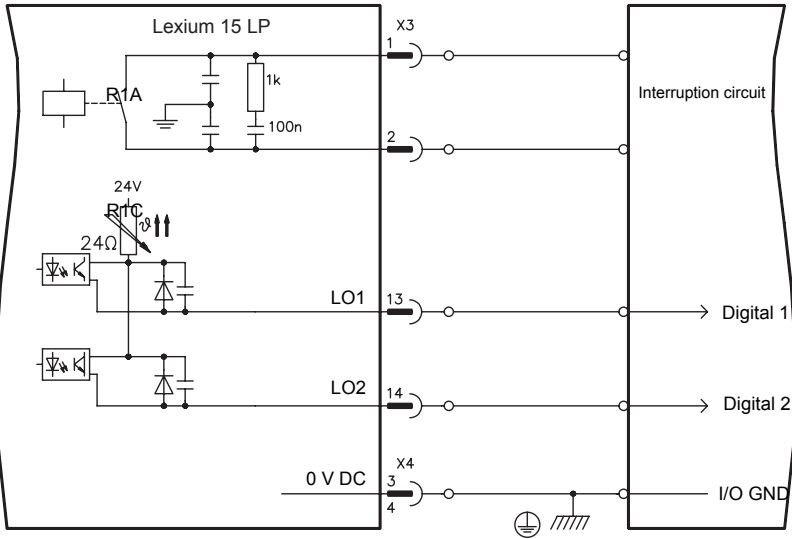
⚠ DANGER

UNINTENDED EQUIPMENT OPERATION

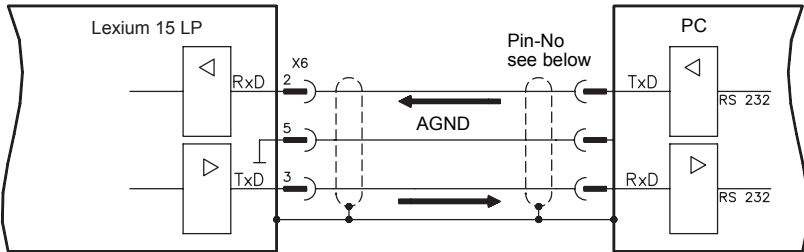
The power removal function input (PWR) must be properly wired using an interruption circuit per EN 954-1 and in accordance with the Lexium 15 LP Installation Manual.

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

Digital control outputs(X3)



Connection to a PC



Serial communications specifications table

The following table lists the serial communications specifications.

SERIAL I/O	
Data bits	Eight
Stop bits	One
Parity	None
Baud rate	9600

Wiring recommendations

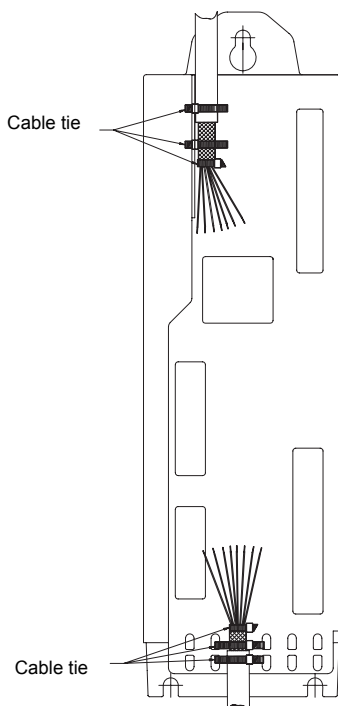
Connecting cable shields to the front panel

The following procedure and associated diagram describe how to connect cable shields to the front panel of the Lexium 15 LP servo drive:

Step	Action
1	Remove a length of the cable's outer covering and braided shield sufficient to expose the required length of wires.
2	Secure the exposed wires with a cable tie.
3	Remove approximately 30 mm of the cable's outer covering while ensuring the braided shield is not damaged during the process.
4	At the front panel of the servo drive, insert a cable tie into a slot in the shielding rail.
5	Use the previously inserted cable tie to secure the exposed braided shield of the cable firmly against the shielding rail.

Cable shield connection diagram

The following diagram shows the cable shield connections at the front of the Lexium 15 LP servo drive.



Remove the outside shroud of the cable and the shielded braid on the desired core length. Secure the cores with a cable tie.

Remove the outside shroud of the line on a length from, for instance, 30 mm without damaging the shielding braid.

Pull a cable tie by the slot in the shielding rail on the front panel of the servo drive.

Press the shielding of the cable firmly against the front panel with the cable tie

Note: For motor power output connection, use the shielding clamp provided in the package to ground the cable shielding.

"First setup" procedure

Overview

The following procedure and associated information verifies operation of the system without creating a hazard to personnel or jeopardizing the equipment. This procedure presumes the servo drive has been configured with UniLink software in OpMode 1 as a speed controller with analog input command. An exact description of all parameters and the possibilities for optimizing the control loop characteristics can be found in the Lexium 15 LP programming manual.

Note: Default parameters for BDH or BSH servo motor series are loaded into your servo drive at the factory and contain valid values for the current and speed controllers. A database for the servo motor parameters is stored in the servo drive. During commissioning, you must select the data set for the connected servo motor and store it in the servo drive. For most applications, these settings will provide good servo loop efficiency. For a description of all parameters and servo motor tuning, see the UniLink online help.

WARNING

IMPROPER WIRING PRACTICES

- Follow the wiring practices described in this document in addition to those already required by the National Electrical Code and local electrical codes.
- Do not apply input line voltage to the output terminals.
- Check the power connections before energizing the drive controller.
- If replacing another drive controller, verify that all wiring connections to the Lexium 15 servo drive comply with all wiring instructions in this manual.

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

WARNING

UNINTENDED EQUIPMENT OPERATION

When the servo drive is operated for the first time, there is a high risk of unexpected motion because of possible wirings faults or unsuitable parameters.

- If possible, run the first test movement without coupled loads.
 - Make sure that a functioning button for EMERGENCY STOP is within reach.
 - Also anticipate a movement in the incorrect direction or oscillation of the servo drive.
 - Keep test area clear of all personnel and equipment.
- Make sure that the system is free and ready for the motion before starting the function.

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

Step	Action	Description																		
1	Check installation	See safety messages on previous page																		
2	Block the Enable signals	Apply 0 V DC to terminal X3/12 (Enable) and to terminal X4/5 (PWR)																		
3	Switch on 24 V DC external control power supply	Apply 24 V to terminal X4/1(+ 24 V DC), ground terminal X4/3 (0 V DC). After the initialization procedure (about 0.5 sec.) the status will be shown in the LED display.																		
4	Switch on PC, start setup software	Select the interface to which the servo drive is connected. The parameters which are stored in the SRAM of the servo drive are then transferred to the PC.																		
5	Check the displayed parameters, and correct if necessary	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">⚠ DANGER</p> <p>UNINTENDED EQUIPMENT OPERATION</p> <p>It is VERY important to check the displayed parameters and to correct them if necessary. Please refer to the Lexium 15 LP programming manual.</p> <p>Failure to follow these instructions will result in death or serious injury.</p> </div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Supply voltage</td> <td>Set to the actual electrical supply voltage.</td> </tr> <tr> <td>Rated servo motor voltage</td> <td>At least as high as the DC bus link voltage of the servo drive.</td> </tr> <tr> <td>Servo motor pole-no.</td> <td>Must match the servo motor (see servo motor manual).</td> </tr> <tr> <td>Feedback</td> <td>Must match the feedback device in the servo motor.</td> </tr> <tr> <td>IRMS</td> <td>Maximum is the servo motor standstill current I0 (on: nameplate).</td> </tr> <tr> <td>IPEAK</td> <td>Maximum is 4 x servo motor standstill current I0.</td> </tr> <tr> <td>Limit speed</td> <td>Maximum is the rated servo motor speed (on nameplate).</td> </tr> <tr> <td>Braking power</td> <td>Maximum is the permitted braking resistor dissipation.</td> </tr> <tr> <td>Station address</td> <td>Unique address (See the Lexium 15 LP programming manual).</td> </tr> </table>	Supply voltage	Set to the actual electrical supply voltage.	Rated servo motor voltage	At least as high as the DC bus link voltage of the servo drive.	Servo motor pole-no.	Must match the servo motor (see servo motor manual).	Feedback	Must match the feedback device in the servo motor.	IRMS	Maximum is the servo motor standstill current I0 (on: nameplate).	IPEAK	Maximum is 4 x servo motor standstill current I0.	Limit speed	Maximum is the rated servo motor speed (on nameplate).	Braking power	Maximum is the permitted braking resistor dissipation.	Station address	Unique address (See the Lexium 15 LP programming manual).
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Braking power	Maximum is the permitted braking resistor dissipation.																			
Station address	Unique address (See the Lexium 15 LP programming manual).																			
6	Check interlock, overrun and other safety related devices	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">⚠ DANGER</p> <p>IMPACT HAZARD</p> <p>Make sure that any unintended movement of the servo drive cannot cause any danger to personnel or machinery</p> <p>Failure to follow these instructions will result in death or serious injury.</p> </div>																		
7	Switch on supply power	Use the ON/OFF button of the contactor controls.																		
8	Apply 0 V command	Apply 0 V to terminals X3/3-4 (AI1+/AI1-) or X3/5-6 (AI2+/AI2-) respectively.																		
9	Enable	Apply 24 V DC (500 ms after switching on the supply power) to terminal X3/12 (ENABLE), servo motor stands with standstill torque M0.																		
10	Setpoint	<p>Apply a small analog setpoint (about 0.5 V is recommended) to terminals X3/3-4 (AI1+/AI1-) or X3/5-6 (AI2+/AI2-) respectively.</p> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">CAUTION</p> <p>SERVO MOTOR DAMAGE</p> <p>If the servo motor oscillates, the parameter Kp on the menu page "Speed controller" must be reduced, the servo motor may be permanently damaged!</p> <p>Failure to follow these instructions can result in equipment damage.</p> </div>																		

11	Optimization	Optimize speed, current and position controllers (see the Lexium 15 LP programming manual).
12	Set up the expansion card	See setup instructions in the corresponding manual on the CD-ROM.

Error messages

Error identification and description

Any errors that occur are displayed as coded into an error number on the front panel, in the LED display.

All error messages result in:

- the R1A/R1C contact being opened,
- the output stage of the servo drive being switched off (servo motor loses all torque), and
- the servo motor-holding brake being activated.

Number	Designation	Explanation
F01*	heat sink temperature	heat sink temperature too high limit is set by manufacturer to 80 °C
F02*	overvoltage	overvoltage in DC bus link limit depends on the electrical supply voltage
F03*	contouring error	message from the position controller
F04	feedback	cable break, short-circuit, short to ground
F05*	undervoltage	undervoltage in DC bus link limit is set by manufacturer to 100 V
F06	servo motor temperature	servo motor temperature too high or temp. sensor limit is set by manufacturer to 145 °C
F07	reserved	reserved
F08*	overspeed	servo motor, speed is too high
F09	EEPROM	checksum error
F10	flash-EPROM	checksum error
F11	brake	cable break, short-circuit, short to ground
F12	servo motor phase	servo motor phase missing (cable break or similar)
F13*	internal temperature	internal temperature too high
F14	output stage	error in the power output stage
F15	I ² t max.	I ² t maximum value exceeded
F16*	supply BTB/RTO	2 or 3 phases missing in the power supply feed
F17	A/D converter	error in the analog-digital conversion, normally caused by extreme electromagnetic interference
F18	braking	braking circuit inoperative or incorrect setting
F19*	supply phase	a phase is missing in the power supply power feed (can be switched off for 2-phase operation)
F20	slot error	hardware error on expansion card
F21	handling error	software error on the expansion card
F22	"reserved "	reserved
F23	"CAN-bus off "	severe CAN bus communication error
F24	alert	alert is displayed as an error
F25	commutation error	commutation error
F26	limit switch	homing error (machine has driven onto hardware limit switch)
F27	PWR option	operational error with PWR option (control signal for PWR option appears simultaneously with the ENABLE signal)
F28	reserved	reserved
F29	Field bus error	Field bus option card operation issue
F30	emergency timeout	timeout emergency stop
F31	reserve	reserve
F32	system error	system software not responding correctly

* = these error messages can be cleared without a reset, by using the ASCII command CLRFAULT.
If only one of these errors is present and the RESET button or the I/O RESET function is used, only the CLRFAULT command will be executed

Finding and removing causes of detected errors

The table below should be regarded as a “First-aid” box. There may be a wide variety of reasons for the detected error, depending on the conditions in your installation. In multi-axis systems, there may be further hidden causes of a detected error.

Our customer service can give you further assistance with problems.

Detector Error	Possible causes	Measures to remove the cause of the detected error
F01 message: Heat sink temperature	Permissible heat sink temperature exceeded.	Improve ventilation.
F02 message: Overvoltage	Braking power is insufficient. Braking power limit was reached and the braking resistor was switched off. This causes excessive voltage in the DC bus link circuit.	Reduce the RAMP braking time. Use an external braking resistor with a higher power rating and adjust the braking power parameter.
	Supply voltage too high.	Use a supply transformer.
F04 message: Feedback Unit	Feedback connector not properly inserted.	Check connectors.
	Feedback cable is broken, crushed, or otherwise damaged.	Check cables.
	Feedback unit is damaged or incorrectly configured.	Check feedback unit and settings.
F05 message: Undervoltage	Supply voltage is not present, or too low when the servo drive is enabled.	Only ENABLE the servo drive when the electrical supply voltage has been switched on delay > 500 ms.
F06 message: Servo motor temperature	Servo motor thermostat has been activated.	Wait until servo motor has cooled down, then check for possible reasons for overheating.
	Feedback connector is loose, or a break in the feedback cable.	Tighten connector screw, or use new feedback cable.
F07 message: Aux. voltage	The aux. voltage produced by the servo drive is incorrect.	Return the servo drive to the manufacturer for servicing.
F08 message: Overspeed	Servo motor phases swapped.	Correct servo motor phase sequence.
	Feedback device set up incorrectly.	Set up correct offset angle.
F11 message: Brake	Short-circuit in the supply cable for the servo motor-holding brake.	Remove the short-circuit.
	Servo motor-holding brake is inoperative.	Replace servo motor.
	Fault in brake cable.	Check shielding of brake cable.
	No brake connected, although the brake parameter is set to WITH.	Set brake parameter to WITHOUT.
F13 message: Internal temp.	Permissible internal temperature has been exceeded.	Improve ventilation.
F14 message: Output stage detected error	Servo motor has short-circuit or earth/ground short.	Replace servo motor.
	Servo motor cable has a short-circuit or earth/ground short.	Replace cable.
	Output module is overheated.	Improve ventilation.
	Output stage is inoperative.	Return the servo drive to the manufacturer for repair.
	Short-circuit or short to ground in the external braking resistor.	Remove short-circuit / ground short.
F16 message: Mains BTB/RTO	Enable was applied, although the supply voltage was not present.	Only ENABLE the servo drive when the electrical supply voltage has been switched on.
	At least 2 supply phases are missing.	Check the electrical supply.
F17 message: A/D converter	Error in the analog-digital conversion, usually caused by EMC interference.	Reduce EMC interference check shielding and grounding.

Finding and removing detected errors

Detected error	Possible causes	Measures to remove the cause of the detected error
F25 message: Commutation error	Wrong cable used.	Check cable.
	Offset is too large.	Check resolver pole number (RESPOLES), servo motor pole number (MPOLES) and offset (MPHASE).
	Wake & shake missed.	Execute wake & shake.
F27 message: error PWR function	Power digital input AND hardware enable AND software enable are active.	Check programming and wiring of the PLC / control system.
Servo motor does not rotate	Servo drive not enabled.	Apply ENABLE signal.
	Software enable not set.	Set software enable.
	Break in setpoint cable.	Check setpoint cable.
	Servo motor phases swapped.	Correct servo motor phase sequence.
	Brake not released.	Check brake control.
	Servo drive is mechanically blocked.	Check mechanism.
	Servo motor pole no. set incorrectly.	Set servo motor pole no.
	Feedback set up incorrectly.	Set up feedback correctly.
Servo motor oscillates	Gain is too high (speed controller).	Reduce Kp (speed controller).
	Shielding in feedback cable has a break.	Replace feedback cable.
	AGND not wired up.	Join AGND to CNC-GND.
Servo drive reports following error	Irms or Ipeak set too low.	Increase Irms or Ipeak (keep within servo motor ratings!).
	Accel/decel ramp is too long.	Shorten ramp +/-.
Servo motor overheating	Irms/Ipeak is set too high.	Reduce Irms/Ipeak.
Servo drive too soft	Kp (speed controller) too low.	Increase Kp (speed controller).
	Tn (speed controller) too high.	Use servo motor default value for Tn (speed controller).
	ARLPF / ARHPF too high.	Reduce ARLPF / ARHPF.
	ARLP2 too high.	Reduce ARLP2.
Servo drive runs roughly	Kp (speed controller) too high.	Reduce Kp (speed controller).
	Tn (speed controller) too low.	Use servo motor default value for Tn (speed controller).
	ARLPF / ARHPF too low.	Increase ARLPF / ARHPF.
	ARLP2 too low.	Increase ARLP2.
Axis drifts at setpoint = 0 V	Offset not correctly adjusted for analog setpoint provision.	Adjust offset (analog I/O).
	AGND not joined to the controller-GND of the controls.	Join AGND and controller-GND.
n12 message: Servo motor default values loaded	Servo motor numbers stored in the encoder and servo drive do not match the parameters that have been set.	Default values for the servo motor have been loaded, SAVE automatically stores the servo motor number in the EEPROM.
n14 message: SinCos feedback	SinCos commutation (wake & shake) not completed.	ENABLE the servo drive.

30072-452-50

04.2008