

Simplified manual  
Retain for future use

# LXM05A USA

AC servo drive



a company of  
**Schneider**  
Electric



**Telemecanique**

# 1 Simplified Manual LXM05A USA

## ⚠ DANGER

### ELECTRIC SHOCK, FIRE OR EXPLOSION

- Only qualified personnel who are familiar with and understand the contents of this manual are authorised to work on and with this drive system.
- Before working on the drive system:
  - Switch off power to all terminals.
  - Place a sign "DO NOT SWITCH ON" on the switch and lock to prevent switching on.
  - **Wait 6 minutes** (for discharge of DC bus capacitors).
  - Measure voltage at DC bus and check for <45V as described below. (The DC bus LED is not a safe indication for absence of the DC bus voltage). **Do not short across the bus capacitors.**
- The system manufacturer is responsible for compliance with all applicable regulations relevant to grounding the drive system.
- Many components, including printed wiring boards, operate at mains voltage. Do not short-circuit DC bus or touch unshielded components or screws of the terminals with voltage present.
- Install all covers and close the housing doors before applying power.
- The motor generates voltage when the shaft is rotated. Lock the shaft of the motor to prevent rotation before starting work on the drive system.

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

The bus voltage can exceed 1000 Vdc. Use appropriately rated measuring equipment when performing this procedure. To measure the bus capacitor voltage:

1. Measure the DC bus voltage between the PA (+) and PC (–) terminals to verify that the DC voltage is less than 45 Vdc. Refer to the page 1.6 of this manual for the power terminal locations. **It may take up to 15 minutes for the DC bus voltage to discharge.**
2. If the bus capacitors are not fully discharged, contact your local Schneider Electric representative—do not service or operate the drive controller.

## 1.1 Overview

The simplified manual only contains selected information.

The complete instructions can be found at <http://www.telemecanique.com>

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### **▲ WARNING**

#### **UNINTENDED EQUIPMENT OPERATION**

Drives may execute unexpected movements because of incorrect wiring, incorrect settings, incorrect data or other errors.

Malfunctions (EMC) may cause unpredictable responses in the system.

- Install the wiring carefully in accordance with the EMC requirements.
- Disable the inputs  $\overline{PWRR\_A}$  and  $\overline{PWRR\_B}$  (status 0) to prevent unexpected movements before switching on and configuring the drive system.
- Do not operate a drive system with unknown settings or data.
- Carry out a comprehensive commissioning test.

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

## 1.2 Steps

### • 1 Receive product

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

### • 2 Check mains voltage

- Make sure that the mains voltage corresponds with the permissible voltage range of the device

### • 3 Install product

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

### • 4 Electrical installation of the product

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

### • 5 Basic settings

- "First Setup" (FSU menu)

### • 6 Start

- Conduct jog to check the drive function

Steps 1 to 4  
must be carried  
out with the  
power disconnected



## 1.3 Mechanical installation

### ⚠ DANGER

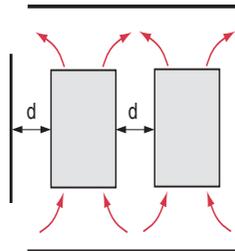
#### ELECTRIC SHOCK

Conductive foreign bodies in the product or serious damage can cause voltage spread.

- Do not use damaged products.
- Prevent foreign bodies such as chips, screws or wire clippings from entering the product.
- Do not use products that contain foreign bodies.

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

#### Installation spacing; ventilation



When selecting the position of the device in the switching cabinet, note the following instructions:

- Adequate cooling of the device must be ensured by complying with the minimum installation distances. Prevent heat accumulation.
- The device must not be installed close to heat sources or mounted on flammable materials.
- The warm airflow from other devices and components must not heat the air used for cooling the device.

Temperature	Distance <sup>1)</sup>	Measures without protective foil <sup>2)</sup>	Measures with protective foil in place
0 °C ... +40 °C (32 °F ... 104 °F)	d > 50 mm (d > 1.97 in.)	None	None
	d < 50 mm (d < 1.97 in.)	None	d > 10 mm (d > 0.39 in.)
+40 °C ... +50 °C (104 °F ... 122 °F)	d > 50 mm (d > 1.97 in.)	None	Reduce nominal current and continuous current <sup>3)</sup>
	d < 50 mm (d < 1.97 in.)	Reduce nominal current and continuous current <sup>3)</sup>	Operation not possible

1) Distance in front of the device: 10 mm (0.39 in.), above: 50 mm (1.97 in.), below: 200 mm (7.87 in.)

2) Recommendation: remove protective foil on completion of the installation

3) by 2.2 % per °C above 40 °C (by 1.22 % per °F above 104 °F)

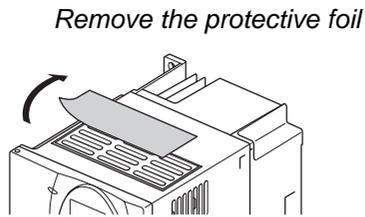
#### Installing the device



*Painted surfaces have an insulating effect. Remove the paint from the attachment points over a wide area (bright metal) before attaching the device to a painted mounting plate.*

- Note the layout of the components, see also 1.5 “Electromagnetic compatibility, EMC”
- ▶ Install the device in a vertical position ( $\pm 10^\circ$ ). This is particularly important for cooling the device.  
Attach the EMC plate included in the scope of supply at the bottom of the device, or use alternative base elements (comb bars, shield clamps, busbars).
- ▶ Attach the plate with safety instructions included with the device in a visible position on the front panel as specified by the national regulations.

*Attach plate with safety instructions*



Remove the protective foil only after completion of all installation work. The protective foil must be removed if required by the thermal conditions.

Removing the foil reduces the enclosure rating from IP40 to IP20. The drive must be protected from falling dust and debris.

The drive is suitable for use in a pollution degree 2 environment. Do not install the drive in locations subject to higher levels of pollution.

## 1.4 Electrical installation

### **▲ WARNING**

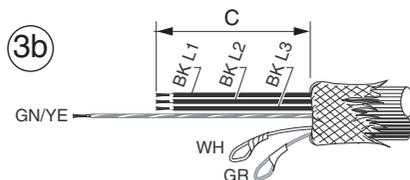
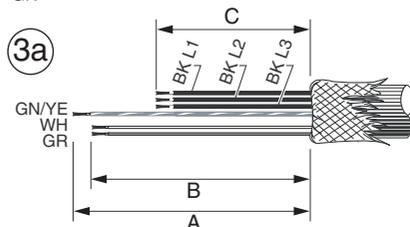
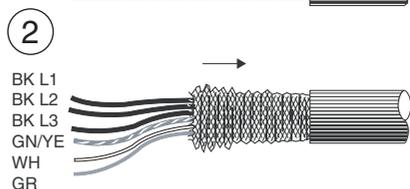
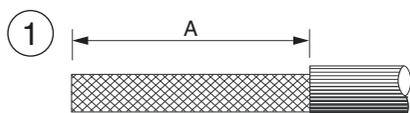
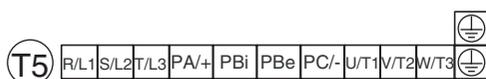
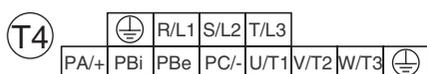
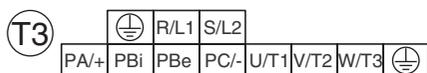
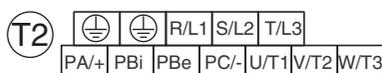
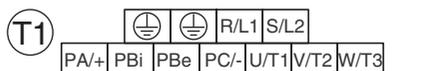
#### **LOSS OF CONTROL**

- 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. \*
- Each implementation of LXM05\* 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 damaged.**

\* 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.

## Layout of power connections



Connections	Description
PE	Ground connection (protective ground)
R/L1, S/L2/N	Mains connection, 1~
R/L1, S/L2, T/L3	Mains connection, 3~
PA/+, PC/-	DC bus + voltage, DC bus - voltage
PBi, PBe	Braking resistor internal or external
U/T1, V/T2, W/T3	Motor connections

### Wiring diagram for device type

### Preparing the motor cable [mm](in.)

		Dimension A	Dimension B	Dimension C
LXM05•D10F1	(T1)	130 (5.12)	120 (4.72)	75 (2.95)
LXM05•D10M2	(T1)	130 (5.12)	120 (4.72)	75 (2.95)
LXM05•D10M3X	(T2)	130 (5.12)	120 (4.72)	75 (2.95)
LXM05•D14N4	(T4)	130 (5.12)	120 (4.72)	85 (3.35)
LXM05•D17F1	(T3)	130 (5.12)	120 (4.72)	85 (3.35)
LXM05•D17M2	(T3)	130 (5.12)	120 (4.72)	85 (3.35)
LXM05•D17M3X	(T4)	130 (5.12)	120 (4.72)	85 (3.35)
LXM05•D22N4	(T4)	130 (5.12)	120 (4.72)	90 (3.54)
LXM05•D28F1	(T3)	130 (5.12)	120 (4.72)	90 (3.54)
LXM05•D28M2	(T3)	130 (5.12)	120 (4.72)	90 (3.54)
LXM05•D34N4	(T4)	130 (5.12)	120 (4.72)	90 (3.54)
LXM05•D42M3X	(T4)	130 (5.12)	120 (4.72)	90 (3.54)
LXM05•D57N4	(T5)	130 (5.12)	120 (4.72)	90 (3.54)

### Preparing the motor cable

- ▶ (1) Strip the motor cable to length **A**, see table.
- ▶ (2) Slide the shield braiding back over the cable sheath. During mounting it must be spread over the EMC plate.
- ▶ (3) Shortening cables: motor cables (BK) to length **C**, protective conductor remains length **A**.  
(3a) For motors with holding brake: brakes cables to length **B**  
(3b) Without holding brake: insulate brake cables individually.

Use fork-type cable lugs or wire end ferrules. The braided wire must fill the ferrule over its complete length.

### 1.4.1 Motor phase connections

**⚠ DANGER**

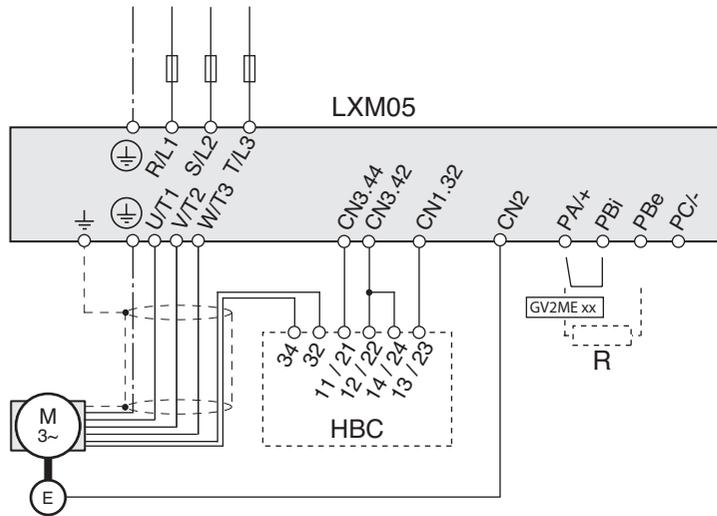
**ELECTRIC SHOCK**

High voltages at the motor connection may occur unexpectedly.

- The motor generates voltage when the shaft is rotated. Lock the motor shaft to prevent rotation before starting work on the drive system.
- AC voltages may jump over unused wires in the motor cable. Isolate unused wires at both ends of the motor cable.
- The system manufacturer is responsible for compliance with all applicable regulations relevant to grounding the drive system. Extend the ground through the motor cable with an additional ground at the motor housing.

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

**Wiring diagram for motor cable and holding brake controller HBC**



**Connection Description Colour**

Motor cables		
LXM05••: U	Motor phase	(BK_L1)
LXM05••: V	Motor phase	(BK_L2)
LXM05••: W	Motor phase	(BK_L3)
PE	Protective conductor	(GN/YE)
HBC: 32 <sup>1)</sup>	brake +	(WH)
HBC: 34 <sup>1)</sup>	brake -	(GR)

1) If the holding brake option is used

**NOTE:** Tighten terminals to the torque limits given in the table section 1.11.

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.
- See the table below for selection of the recommended GV2MExx protective devices.

**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/+.

Resistor	Rating Watts	Resistance Ohms	Model	Recommended Setting	Min/Max
VW3 A7 601 Rxx	400	10	GV2ME 10	6.32	4/6.3
VW3 A7 602 Rxx	100	27	GV2ME 07	1.92	1.6/2.5
VW3 A7 603 Rxx	200	27	GV2ME 08	2.72	2.5/4
VW3 A7 604 Rxx	400	27	GV2ME 08	3.85	2.5/4
VW3 A7 605 Rxx	100	72	GV2ME 06	1.18	1/1.6
VW3 A7 606 Rxx	200	72	GV2ME 06	1.67	1/1.6
VW3 A7 607 Rxx	400	72	GV2ME 07	2.36	1.6/2.5

## 1.4.2 Mains connection

### **⚠ DANGER**

#### **HAZARDOUS VOLTAGE - INADEQUATE GROUNDING**

This drive system has an increased leakage current > 3.5mA.

- Use a protective conductor at least 10 mm<sup>2</sup> (AWG 8) or two protective conductors with the cross section of the conductor for the power supply of the power terminals. Observe the local regulations for grounding.

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

### **⚠ WARNING**

#### **DIRECT CURRENT IN GROUND CONNECTION**

If a residual current device (RCD) is installed, general conditions must be observed.

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

### **⚠ WARNING**

#### **INADEQUATE OVERCURRENT PROTECTION**

- Use the external fuses specified in "Technical Data".
- Do not connect the product to a power supply in which the short-circuit capacity exceeds the maximum short-circuit current approved in "Technical Data".

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

### **CAUTION**

#### **DESTRUCTION BY INCORRECT MAINS VOLTAGE**

The incorrect mains voltage may destroy the product.

- Before switching on and configuring the product, make sure that the type is approved for the mains voltage.

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

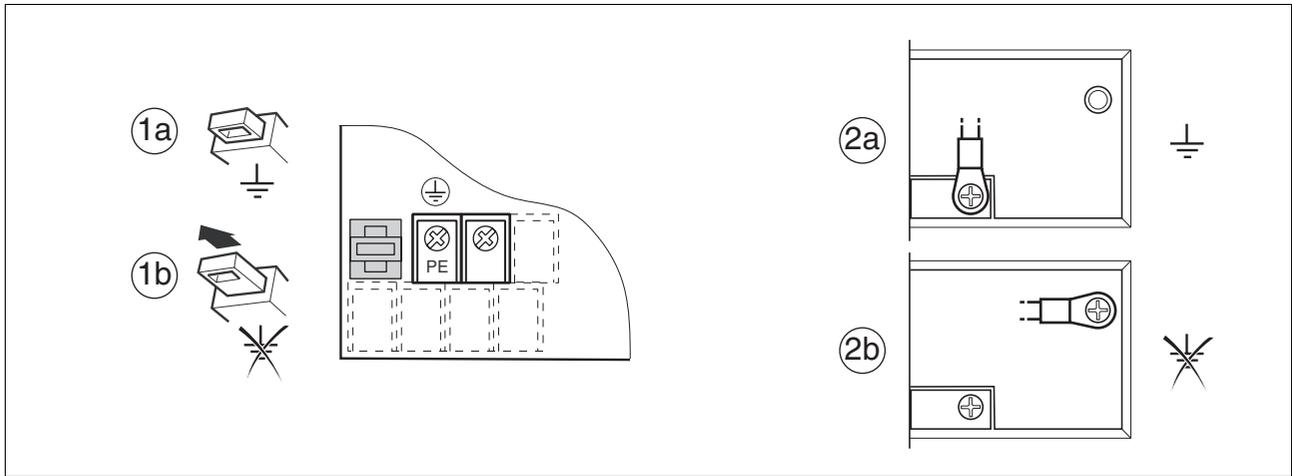
*Connect power amplifier supply voltage*

- 3-phase devices must only be connected and operated on 3-phase.
- For devices with external mains filter the mains power cable must be shielded from 200mm (7.87 in) length between the external mains filter and the device and grounded at both ends.
- Observe the UL and EMC requirements.
- Use 60/75°C copper conductors only
- The cable diameter must be sufficient to trip the fuse in the event of a short circuit. See also page 1-27.
- Tighten terminals to the torque limits given in the table in section 1.11.

For information on the use of residual current devices see the product manual.

**1.4.3 Operation in an IT mains**

An IT mains is characterised by a neutral conductor that is isolated or grounded through a high impedance . The Y-capacitors can be disabled if required on devices with integrated mains filter. Use an insulation monitor with permanent measurement that is compatible with non-linear loads such as XM200 by Merlin Gerin or equivalent.



**Devices with switch beside power terminals (1)**

**LXM05•... D1••• D2••• D3••• D4•••**

(1a): Y-capacitors of the internal filter effective (standard)

(1b): Y-capacitors of the internal filter disabled (IT mains)

**Devices with jumpers (2)**

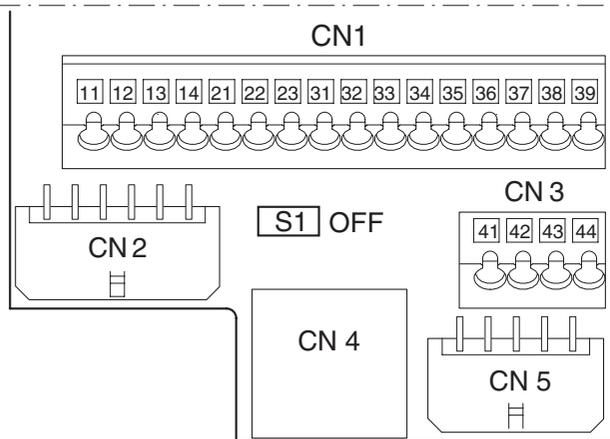
**LXM05•... D5•••**

(2a): Y-capacitors of the internal filter effective (standard)

(2b): Y-capacitors of the internal filter disabled (IT mains)

## 1.4.4 Overview of signal connections

Make sure that the cables, the wiring and the connected interfaces meet the requirements for PELV.



CN1 <sup>1)</sup>	Analogue inputs $\pm 10V$ , see page 1-12 CANopen, pin 21-23 (see product manual) Digital inputs/outputs, see page 1-12 <sup>2)</sup>
CN2	Motor encoder (Hiperface Sensor)
CN3 <sup>1)</sup>	24V controller supply voltage
CN4	PC, remote terminal, Modbus, CANopen (fieldbus: see product manual)
CN5	ESIM A/B/I (out), PULSE/DIR (in), A/B/I encoder signals (in) <sup>3)</sup>
S1	Switch for fieldbus terminating resistor

1) max. 0.75mm<sup>2</sup> (19 AWG) cable diameter, max. 2A terminal current

2) from SW Version 1.201 additional functions and changes to signal names. For more information see product manual.

3) depending on "First Setup" FSU

### 1.4.5 Connection of motor encoder (CN2)

Connect the motor encoder to CN2.

► Use the cables offered as accessories to prevent wiring errors.

### 1.4.6 Connection of controller supply voltage (24V at CN3)



*The controller power supply (+24VDC) must be connected for all operating modes.*

## ⚠ DANGER

### ELECTRIC SHOCK

The +24VDC supply voltage is connected with many accessible signals in the drive system.

- Use a power supply unit that meets the requirements for PELV (Protective Extra Low Voltage)
- Connect the negative output of the power supply unit to PE.

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

**▲ CAUTION**

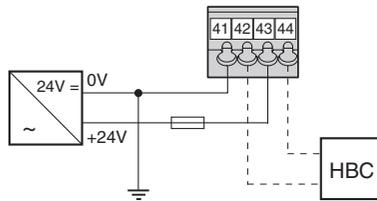
**DESTRUCTION OF SYSTEM COMPONENTS AND LOSS OF CONTROL**

Excessive currents can be created at the signal connections if the negative connection to the controller supply voltage is interrupted.

- Do not interrupt the negative connection between power supply unit and load with a fuse or switch
- Check for correct connection before switching on.
- Never connect the controller supply voltage or change its wiring while there is supply voltage present.

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

**Connection of controller supply voltage to CN3 (24V)**



Pin	Signal	Description	I/O
41	0VDC	Reference potential for 24V voltage	I
42	0VDC	Reference potential for 24V voltage	O
43	+24VDC	24V controller supply voltage	I
44	+24VDC	24V controller supply voltage	O

### 1.4.7 Connection of A/B signals, pulse/direction or encoder emulation (ESIM) (CN5)

The CN5 connection can also process reference values as A/B/I encoder signals or pulse direction signals for the electronic gear operating mode as input signal or output encoder simulation signals (ESIM). All inputs are designed for 5V push-pull signals only.

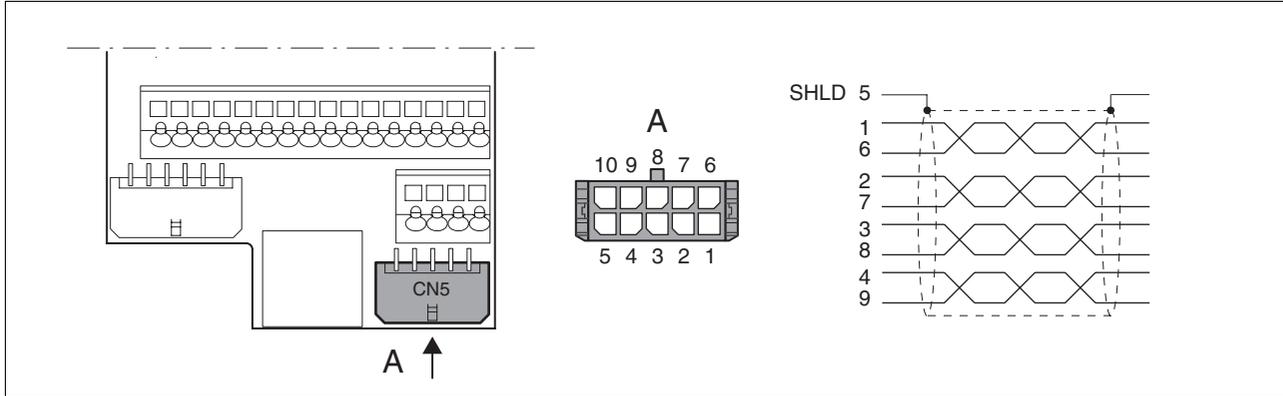


Figure 1.1 Wiring diagram CN5

#### Cable assignment and meaning

Pin	Colour 1)	A/B/I signal	Meaning of A/B/I	PULSE signal	Meaning of PULSE	ESIM signal	Meaning of ESIM
1	white	ENC_A	Encoder signal channel A	PULSE	Motor step "Pulse"	ESIM_A	Channel A
6	brown	$\overline{\text{ENC\_A}}$	Channel A, inverted	$\overline{\text{PULSE}}$	Motor step "Pulse", inverted	$\overline{\text{ESIM\_A}}$	Channel A, inverted
2	green	ENC_B	Encoder signal channel B	DIR	direction of rotation "DIR"	ESIM_B	Channel B
7	yellow	$\overline{\text{ENC\_B}}$	Channel B, inverted	$\overline{\text{DIR}}$	direction of rotation "Dir", inverted	$\overline{\text{ESIM\_B}}$	Channel B, inverted
3	grey	ENC_I	Channel index pulse	ENABLE/LI7 2)	Enable signal	ESIM_I	Index pulse
8	pink	$\overline{\text{ENC\_I}}$	Channel index pulse, inverted	$\overline{\text{ENABLE/LI7}} 2)$	Enable signal, inverted	$\overline{\text{ESIM\_I}}$	index pulse, inverted
4	red	$\overline{\text{ACTIVE2\_OUT}} / \overline{\text{LO3\_OUT}} 2)$	Drive ready	$\overline{\text{ACTIVE2\_OUT}} / \overline{\text{LO3\_OUT}} 2)$	Drive ready	$\overline{\text{ACTIVE2\_OUT}} / \overline{\text{LO3\_OUT}} 2)$	Drive ready
9	blue	POS_0V	Reference potential	POS_0V	Reference potential	POS_0V	Reference potential
5		Shield		Shield		Shield	
10		nc	not connected	nc	not connected	nc	not connected

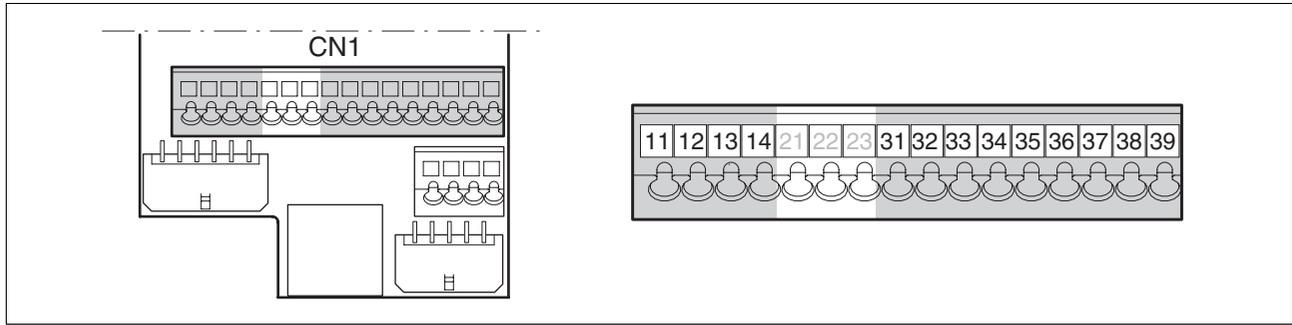
1) Information on colour refers to the cables available as accessories.

2) for additional information on the assignment of digital inputs (LI) or digital outputs (LO) see product manual.

### 1.4.8 Connection of inputs/outputs with local control mode (CN1)

*Connecting analogue inputs* ▶ The shield must be connected to the ground potential over a wide area (EMC plate).

*Connecting digital inputs/outputs* ▶ With the fieldbus control mode pins 33-35 have different functions, see product manual. Some digital inputs (LI) and outputs (LO) can be assigned with other functions, see product manual.



Pin	Signal	Description	I/O
11	ANA1+	±10V, e.g. for current reference value or speed reference value	I analogue
12	ANA1-	Reference potential for ANA1+, pin 11	I analogue
13	ANA2+	±10V, e.g. for current limiting or speed limiting	I analogue
14	ANA2-	Reference potential for ANA2+, pin 13	I analogue
31	NO_FAULT_OUT/ LO1_OUT <sup>1)</sup>	Output for error detection	O digital, 24V <sup>2)</sup>
32	BRAKE_OUT/ LO2_OUT	Control signal for HBC (0: motor without current, 1: motor with current)	O digital, 24V <sup>2)</sup>
1) for additional information on the assignment of digital inputs (LI) or digital outputs (LO) see product manual.			
33	LI1 <sup>1)</sup>	Digital input 1, assignment see product manual	I digital 24V
34	FAULT_RESET/LI2	Fault reset	I digital 24V <sup>2)</sup>
35	ENABLE	Enable power amplifier	I digital 24V <sup>2)</sup>
36	HALT/LI4	"HALT" function, interruption of movement / continue without error	I digital 24V <sup>2)</sup>
37	PWRR_B	Safety function channel B	I digital 24V
38	PWRR_A	Safety function channel A	I digital 24V
1) for additional information on the assignment of digital inputs (LI) or digital outputs (LO) see product manual. 2) Signal logic (logic type) can be specified via "First Setup", see Seite 13			
39	24VDC	if a safety function is not required, jumper pin 37, 38 and 39	O 24 V

### 1.4.9 Logic type

This product can switch the 24V inputs and outputs as follows (drL - / , oL t). Exception: the safety signals  $\overline{PWRR\_A}$  and  $\overline{PWRR\_B}$  are always logic type "Source".

Logic type	active status
"Source"	output sends current current flows to the input
"Sink"	output absorbs current current flows from the input

**⚠ WARNING**

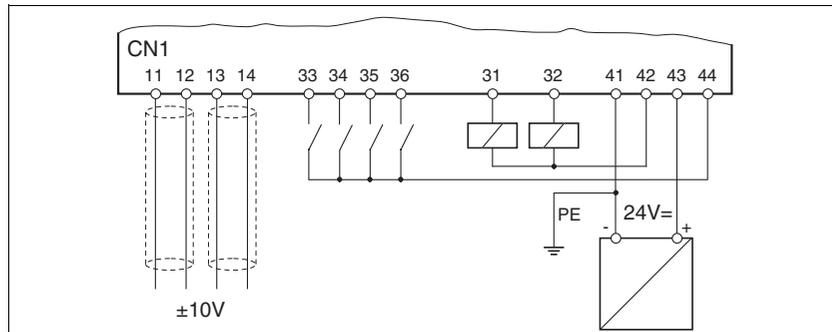
**UNMONITORED OPERATION**

When using the "Sink" setting logic type the ground fault of a signal is detected as an On status.

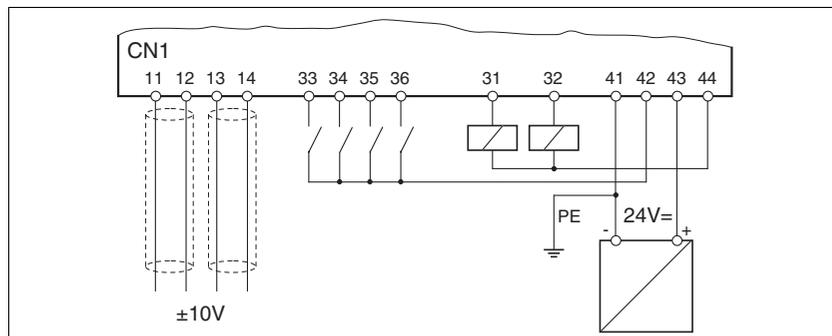
- Use great care with wiring to prevent the possibility of an ground fault.

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

Logic type "Source"



Logic type "Sink"



### 1.4.10 Minimum terminal assignment of inputs with local control mode

Pin	Signal	Description	I/O
35	ENABLE	Enable power amplifier	I digital 24V
36	$\overline{\text{HALT}}$ <sup>1)</sup> / $\overline{\text{LI4}}$ <sup>2)</sup>	"HALT" function, interruption of movement / continue without error	I digital 24V
37	$\overline{\text{PWRR\_B}}$ <sup>3)</sup>	Safety function channel B, see product manual for more information	I digital 24V
38	$\overline{\text{PWRR\_A}}$ <sup>3)</sup>	Safety function channel A, see product manual for more information	I digital 24V

- 1) if the  $\overline{\text{HALT}}$  signal is not required, the input must be wired according to the logic type
- 2) if the LI4 input is not configured as  $\overline{\text{HALT}}$ , it is not necessary to wire this input
- 3) if the safety function is not required, these inputs must be wired with +24V

#### Connection of safety function

**⚠ WARNING**

**LOSS OF SAFETY FUNCTION**

Incorrect usage may cause a safety hazard by loss of the safety function.

- Observe the requirements for the safety function.

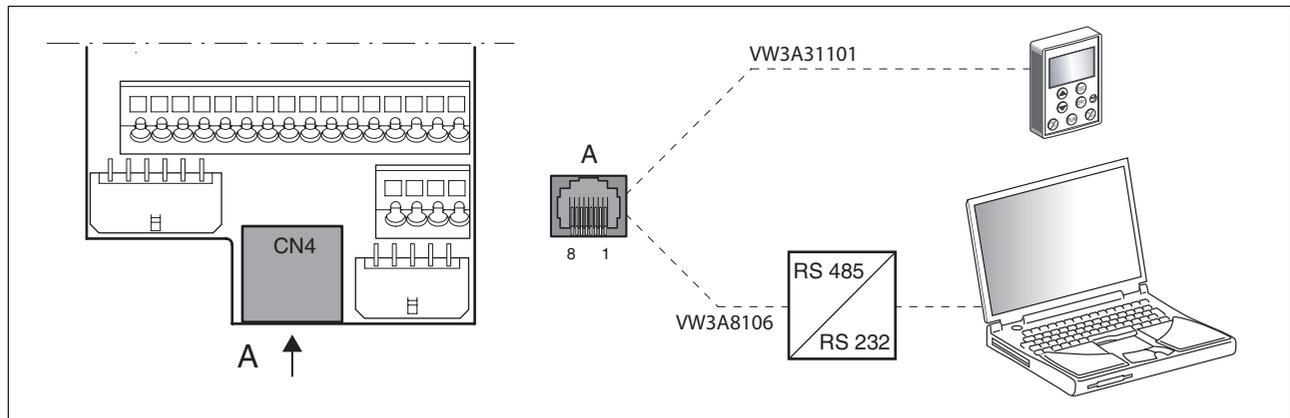
**Failure to follow these instructions can result in death, serious injury or equipment damage.**

For more information see the product manual.

### 1.4.11 Connection to PC or remote terminal (CN4)

*Function of the control terminal* The remote terminal with LCD display and keyboard is available as an option. It can be connected directly to CN4 with the included RJ-45 cable.

*PC connection* A converter from RS485 to RS232 is required for the PC (commissioning software). It is available with cables as an option.



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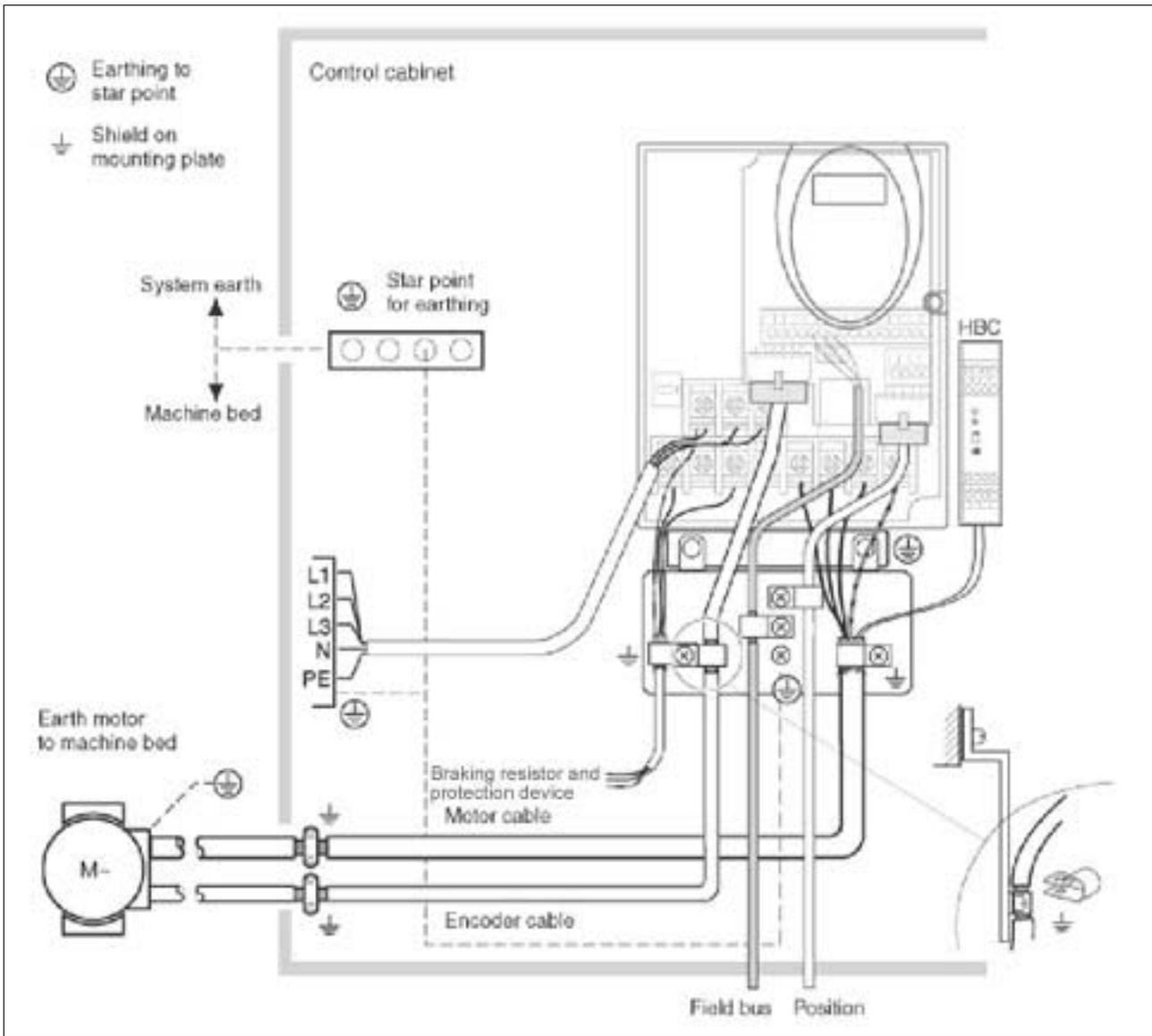
## 1.5 Electromagnetic compatibility, EMC

### **▲ WARNING**

#### **RADIO INTERFERENCE**

- In a domestic environment additional precautions need to be adopted to ensure proper grounding of the device.

For more information see the product manual.



## 1.6 Operation with installed HMI

### ⚠ WARNING

#### UNINTENDED EQUIPMENT ACTION

When the drive is operated for the first time there is a high risk of unexpected movement because of possible wiring errors 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 drive.
- Make sure that the system is free and ready for the movement before starting the function.

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



(1) Red LED on: voltage applied at DC bus

(2) Status display

(3) LEDs for fieldbus

- |     |  |
|-----|--|
| ESC | <ul style="list-style-type: none"> <li>• Closing a menu or parameter</li> <li>• Return from displayed to last saved value</li> </ul> |
| ENT | <ul style="list-style-type: none"> <li>• Calling a menu or parameter</li> <li>• Save the displayed value in the EEPROM</li> </ul>    |
| ▲   | <ul style="list-style-type: none"> <li>• Switch to previous menu or parameter</li> <li>• Increase the displayed value</li> </ul>     |
| ▼   | <ul style="list-style-type: none"> <li>• Switch to next menu or parameter</li> <li>• Reduce the displayed value</li> </ul>           |

## 1.6.1 HMI menu structure

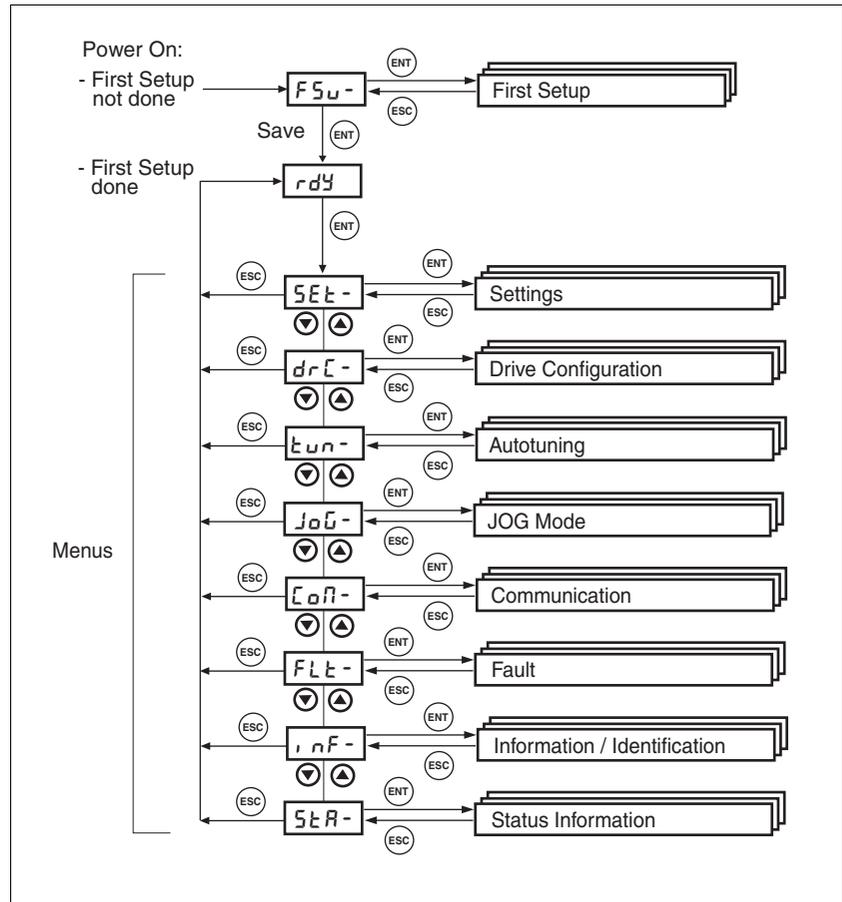
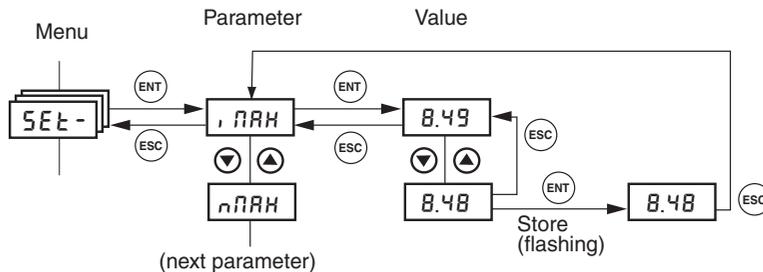


Figure 1.2 HMI menu structure

### HMI, example of parameter setting



The adjacent figure shows an example for calling a parameter (second level) and the input or selection of a parameter value (third level).

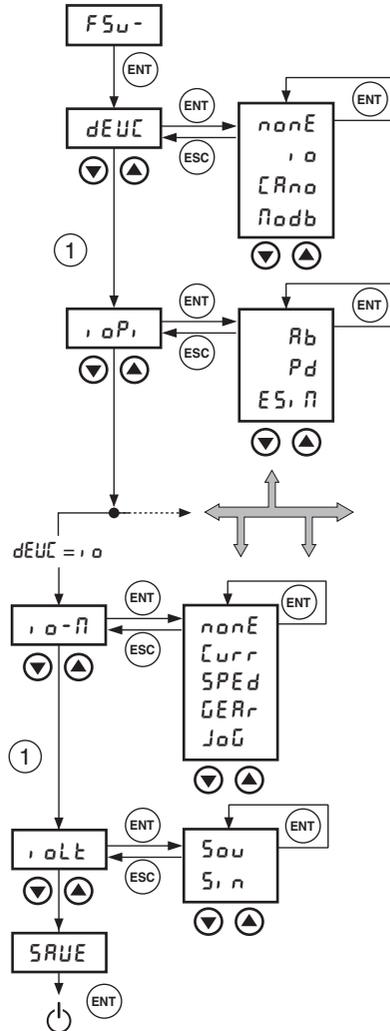
When you press ENT, the selected value is accepted. Confirmation is indicated by the display flashing once. The modified value is saved in the EEPROM immediately.

# 1.7 "First Setup" (FSU) via HMI

NOTE: The protection level must be set according to the maximum motor current or maximum torque permissible for the application according to the instructions in section 7.4.2 of the Lexium 05 A manual

The factory settings are configured with "First Setup" depending on their application.

For a simple initial test commissioning without a coupled load select the settings with this character: →



► Set control mode with *dEUC*

- *i o* Local control mode
- CRno* Fieldbus control mode, see product manual
- nodb* Fieldbus control mode, see product manual

► Use the parameter *IOposInterfac* (*i o P, '*) to set the assignment for the RS422 interface.

► Selecting the operating mode, *o-n*

- Cur* Current control
- *SPEd* Speed control
- GERr* Electronic gear
- JoG* Jog

► Select logic type, *i o L t* (see "Engineering" product manual)

- SoU* Logic type "Source" (see also page 1-13)
- Si n* Logic type "Sink" (see also page 1-13)

► Save settings.

- *SAVE* Save settings in device.

◁ The device saves all set values in the EEPROM and displays the status *nr dY*, *r dY* or *d, 5* on the HMI.

► Switch controller supply voltage off and on again.

*Restore factory setting with HMI*

Proceed as follows to restore the factory settings:

- Set *drL* and then *F L 5* on the HMI and confirm your selection with *Y E 5*.

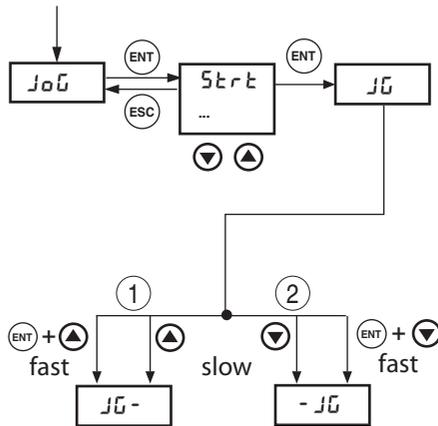
The new settings only become effective after switching off and switching on the device again.

## 1.8 Jog



For a simple initial commissioning the motor should not be connected to the system. If the motor is connected to the system, all limiting parameters must be checked and an EMERGENCY STOP button must be within reach before the first motor movement, see product manual.

If the inertia ratio of Jext/Jmotor > 10 (external load on motor), the initial setting of the controller parameter may result in an unstable controller



▶ Start the jog operating mode. (HMI:  $JG-$  /  $Start$ )

◁ HMI display:  $JG$

▶ Start a movement in clockwise rotation (1)  
(HMI: "up arrow")

◁ The motor rotates in the clockwise rotation. HMI display  $JG-$

▶ Start a movement in counterclockwise rotation (2)  
(HMI: "down arrow")

◁ The motor rotates in counterclockwise direction of rotation. HMI display:  $-JG$

You can change from slow to fast movement by simultaneously pushing the ENT-button.

*If the motor does not rotate:*

- Is the device in status *ready*? For more information see the product manual.
- Is the controller supply voltage switched on?
- Is the power amplifier supply voltage switched on?
- Has "First Setup" been conducted or have device settings been imported? Was the controller supply voltage switched off and on after that?
- Is the safety function correctly wired? Was the safety function triggered?
- Have the limit switches been correctly wired for fieldbus control mode or is a limit switch actuated?

## 1.9 Duplicate existing device settings

- Application and advantage*
- Multiple devices should have the same settings, e.g. when devices are replaced.
  - "First setup" does not need to be carried out using the HMI.
- Requirements*
- Device type, motor type and device firmware must be identical. The tool is the Windows-based commissioning software. The controller supply voltage must be switched on at the device.
- Export device settings*
- The commissioning software installed on a PC can apply the settings of a device as configuration.
- ▶ Load the configuration of the device into the commissioning software with "Action - Transfer".
  - ▶ Highlight the configuration and select "File - Export".
- Import device settings*
- A stored configuration can be imported into a device of the same type. Please note that the fieldbus address is also copied with this information.
- ▶ In the commissioning software select the menu item "File - Import" and load the desired configuration.
  - ▶ Highlight the configuration and select "Action - Configure".

## 1.10 Error numbers

Errors are shown on the display of the HMI (without "I"). In the "local" control mode an error can be acknowledged with `Fault_Reset`.

Error number	Error in range
E 1xxx	General error
E 2xxx	Excess current error
E 3xxx	Voltage error
E 4xxx	Temperature error
E 5xxx	Hardware error
E 6xxx	Software error
E 7xxx	Interface error, wiring error
E 8xxx	Fieldbus error CANopen
E Axxx	Drive error, movement error
E Bxxx	Communication error

For detailed information on error classes and error bits see the product manual. Class par. = configurable

Error number	Class	Bit	Description
E 1100	0	0	parameter out of permissible range
E 1101	0	0	parameter does not exist
E 1102	0	0	parameter does not exist
E 1103	0	0	parameter write not permissible (READ only)
E 1104	0	0	write access denied (no access authorisations)
E 1106	0	0	Command not allowed while power amplifier is active
E 1107	0	0	Access via other interface blocked
E 1108	0	0	parameter not readable (Block Upload)
E 1109	1	0	Data that are saved following a power failure are invalid
E 110A	0	0	System error: boot loader not present
E 110B	3	30	Initialisation error (additional info=modbus register address)
E 110D	1	0	Basic configuration of controller required after factory setting.
E 110E	0	0	Parameters are changes that are only active after restarting the controller
E 1300	3	4	Power Removal tripped (PWRR_A, PWRR_B)
E 1301	4	24	PWRR_A and PWRR_B different level
E 1310	3	9	Reference signal frequency too high
E 1311	0	0	The selected input or output function cannot be configured
E 1312	0	0	Limit or reference switch signal in I/O functions not defined
E 1603	0	0	Capture memory occupied by other function
E 1606	0	0	Recording still active
E 1607	0	0	Recording: no trigger defined
E 1608	0	0	Recording: trigger option not permissible
E 1609	0	0	Recording: no channel defined
E 160A	0	0	Recording: no data present
E 160B	0	0	parameter not recordable
E 160C	1	0	Autotuning: moment of inertia outside permissible range
E 160D	1	0	Autotuning: the value of parameter 'AT_n_tolerance' may be too low for the identified mechanical system
E 160E	1	0	Autotuning: Test movement could not be started
E 160F	1	0	Autotuning: Power amplifier cannot be enabled
E 1610	1	0	Autotuning: Processing discontinued
E 1611	1	0	System error: Autotuning internal write access
E 1612	1	0	System error: Autotuning internal read access
E 1613	1	0	Autotuning: max. permissible positioning range exceeded
E 1614	0	0	Autotuning: already active

Error number	Class	Bit	Description
E 1615	0	0	Autotuning: this parameter cannot be changed while autotuning is active
E 1616	1	0	Autotuning: static friction for selected speed jump height 'AT_n_ref' too high
E 1617	1	0	Autotuning: Frictional or load moment too great
E 1618	1	0	Autotuning: optimisation aborted
E 1619	0	0	Autotuning: the speed jump height 'AT_n_ref' is too small compared to 'AT_n_tolerance'
E 1620	1	0	Autotuning: load torque too high
E 1A00	0	0	System error: FIFO memory overflow
E 1A01	3	19	motor has been changed
E 1A02	3	19	motor has been changed
E 1B00	4	31	System error: faulty parameter for motor or power amplifier
E 1B01	3	30	User parameter max. speed of rotation too high
E 1B02	3	30	User parameter max. current, holding current or Quick Stop current too high
E 1B03	4	30	Encoder is not supported by current operating system
E 1B04	3	30	ESIM resolution too high with selected n_max
E 2300	3	18	power amplifier overcurrent
E 2301	3	18	braking resistor overcurrent
E 3100	par.	16	mains power supply phase fault
E 3200	3	15	DC bus overvoltage
E 3201	3	14	DC bus undervoltage (switch-off threshold)
E 3202	2	14	DC bus undervoltage (Quick Stop threshold)
E 3203	4	19	Motor encoder supply voltage
E 3206	0	11	DC bus undervoltage, no mains phase (warning)
E 4100	3	21	Power amplifier overtemperature
E 4101	0	1	warning power amplifier overtemperature
E 4102	0	4	Power amplifier overload ( $I^2t$ ) warning
E 4200	3	21	device overtemperature
E 4300	3	21	motor overtemperature
E 4301	0	2	warning motor overtemperature
E 4302	0	5	Motor overload ( $I^2t$ ) warning
E 4402	0	6	Braking resistor overload ( $I^2t$ ) warning
E 5200	4	19	Fault in connection to motor encoder
E 5201	4	19	errors in motor encoder communication
E 5202	4	19	Motor encoder is not supported
E 5203	4	19	Fault in connection to motor encoder

Error number	Class	Bit	Description
E 5204	3	19	Connection to motor encoder lost
E 5205	4	19	Connected motor (motor family) is not supported
E 5430	4	29	System error: EEPROM read error
E 5431	3	29	System error: EEPROM write error
E 5435	4	29	System error: EEPROM not formatted
E 5437	4	29	System error: EEPROM checksum error in manufacturer data
E 5438	3	29	System error: EEPROM checksum error in user-defined parameter
E 5439	3	29	System error: EEPROM checksum error CAN parameter
E 543A	4	29	System error: EEPROM hardware info invalid
E 543B	4	29	System error: EEPROM Manufacturer data invalid
E 543C	3	29	System error: EEPROM CAN-data invalid
E 543D	3	29	System error: EEPROM user parameter invalid
E 543E	3	29	System error: EEPROM checksum error Nolnit parameter
E 5450	3	29	System error: error in program transfer to the FPGA
E 5600	3	17	motor connection phase fault
E 5601	4	19	Interruption or faulty encoder signals
E 5602	4	19	Interruption or faulty encoder signals
E 5603	4	17	Commutation error
E 6107	0	0	Parameters outside value range (calculation error)
E 6108	0	0	Function not available
E 6109	0	0	System error: internal range overflow
E 610A	2	0	System error: calculation value cannot be shown as 32-bit value
E 610D	0	0	Error in selection parameter
E 610E	4	28	System error: 24VDC has not reached PowerDown threshold
E 610F	4	30	System error: Internal time base failed (Timer0)
E 7120	4	19	Invalid motor data
E 7121	2	19	System error: errors in motor encoder communication
E 7122	4	30	Motor data not acceptable
E 7123	4	30	motor current offset outside permissible range
E 7124	4	19	System error: Motor encoder faulty
E 7126	0	19	No answer has been received yet
E 7200	4	30	System error: calibration of analogue/digital converter
E 7201	4	30	System error: motor encoder initialising (quadrant evaluation)
E 7327	4	19	System error: position sensor not ready
E 7328	4	19	Motor encoder sends: position capture errors

Error number	Class	Bit	Description
E 7329	0	8	Motor encoder sends: Warning
E 7330	4	19	System error: motor encoder (Hiperface)
E 7331	4	30	System error: Motor encoder initialisation
E 7333	4	30	System error: Discrepancy during calibration of analogue/digital converter
E 7334	0	0	System error: Analogue/digital converter offset too big
E 7335	0	8	Communication to motor encoder occupied
E 7336	3	0	Offset with Sincos drift compensation too high
E 7337	1	8	Offset could not be successfully written
E 7338	0	13	No valid motor absolute position
E 7400	0	31	System error: illegal interrupt (XINT2)
E 7500	0	9	RS485/Modbus: overrun error
E 7501	0	9	RS485/Modbus: framing error
E 7502	0	9	RS485/Modbus: Parity-error
E 7503	0	9	RS485/Modbus: receive error
E 7601	4	19	System error encoder type is not supported
E 8110	0	7	CANopen: CAN overflow (message lost)
E 8120	0	7	CANopen: CAN Controller in Error Passive
E 8130	2	7	CANopen: Heartbeat or Life Guard error
E 8140	0	0	CANopen: CAN Controller was in Busoff, communication possible again
E 8141	2	7	CANopen: CAN Controller in Busoff
E 8201	0	7	CANopen: RxPdo1 could not be processed
E 8202	0	7	CANopen: RxPdo2 could not be processed
E 8203	0	7	CANopen: RxPdo3 could not be processed
E 8204	0	7	CANopen: RxPdo4 could not be processed
E 8205	0	7	CANopen: TxPdo could not be processed
E 8206	0	7	CANopen: Internal queue overflow message lost
E A060	2	10	Calculation error with electronic gear
E A061	2	10	Change in reference value with electronic gear too great
E A300	0	0	Braking procedure after stop request still active
E A301	0	0	Drive in status 'QuickStopActive'
E A302	1	1	Interruption by LIMP
E A303	1	1	Interruption by LIMN
E A304	1	1	Interruption by REF
E A305	0	0	Power amplifier cannot be activated in current operating status of status machine
E A306	1	3	Interruption by user initiated software stop

Error number	Class	Bit	Description
E A307	0	0	Interruption by internal software stop
E A308	0	0	Drive in 'Fault' status
E A309	0	0	Drive not in 'OperationEnable' status
E A310	0	0	Power amplifier not active
E A312	0	0	Profile generating interrupted
E A313	0	0	Position overrun (pos_over=1), reference point is therefore no longer defined (ref_ok=0)
E A314	0	0	No reference position
E A315	0	0	Homing active
E A316	0	0	Overflow on acceleration calculation
E A317	0	0	Drive not at standstill
E A318	0	0	Operating mode active (x_end = 0)
E A319	1	2	Manual/Autotuning: distance range overflow
E A31A	0	0	Manual/Autotuning: amplitude/offset set too high
E A31B	0	0	HALT requested
E A31C	0	0	Illegal position setting with software limit switch
E A31D	0	0	Speed range overflow (CTRL_n_max)
E A31E	1	2	Interruption by pos. software limit switch
E A31F	1	2	Interruption by neg. software limit switch
E A320	par.	22	position tracking error
E A321	0	0	RS422 position interface not defined as input signal
E A322	0	0	error in ramp calculation
E A324	1	10	Error when homing (additional info = detailed error number)
E A325	1	10	Approach limit switch not enabled
E A326	1	10	REF switch not found between LIMP and LIMN
E A327	1	10	Reference movement to REF without direction reversal, improper enabling of limit switch LIM
E A328	1	10	Reference movement to REF without direction reversal, overrun of LIM or REF not permissible
E A329	1	10	More than one signal LIMP/LIMN/REF active
E A32A	1	10	Ext. monitoring signal LIMP with counterclockwise rotation
E A32B	1	10	Ext. monitoring signal LIMN with clockwise rotation
E A32C	1	10	Error with REF (switch signal enabled briefly or switch overrun)
E A32D	1	10	Error with LIMP (switch signal enabled briefly or switch overrun)
E A32E	1	10	Error with LIMN (switch signal enabled briefly or switch overrun)
E A32F	1	10	index pulse not found

Error number	Class	Bit	Description
E A330	0	0	Reproducibility of the index pulse movement uncertain, index pulse motion too close to the switch
E A331	3	0	No run-up operating mode with local control mode selected
E A332	1	10	Error with jog (additional info = detailed error number)
E A334	2	0	Timeout at Standstill window monitor
E A335	1	10	Processing only possible in fieldbus mode
E A337	0	10	Operating mode cannot be continued
E A338	0	0	mode dies not exist
E A33A	0	0	Reference point is not defined (ref_ok = FALSE)
E B100	0	9	RS485/Modbus: unknown service
E B200	0	9	RS485/Modbus: Protocol error
E B201	2	6	RS485/Modbus: Nodeguard error
E B202	0	9	RS485/Modbus: Nodeguard Warning
E B203	0	9	RS485/Modbus: number of monitor objects incorrect
E B204	0	9	RS485/Modbus: service too long
E B400	2	7	CANopen: Network management service reset with active power amplifier
E B401	2	7	CANopen: Network management service stop with active power amplifier

## 1.11 Technical Data

LXM05•...		D10F1	D17F1	D28F1	D10M2	D17M2	D28M2
Nominal voltageInput frequency (50/60 Hz)	[V]	115 (1~)	115 (1~)	115 (1~)	230 (1~)	230 (1~)	230 (1~)
Current consumption at nominal voltage	[A <sub>rms</sub> ]	7.3	11	21.6	7	11	20
nominal power (device power output)	[kW]	0.4	0.65	0.85	0.75	1.2	2.5
max. permissible short circuit current of mains	[kA]	1	1	1	1	1	1
power loss	[W]	43	76	150	48	74	142
continuous output current at 4kHz	[A <sub>rms</sub> ]	4	8	15	4	8	15
	[A <sub>pk</sub> ]	5.66	11.31	21.21	5.66	11.31	21.21
peak output current at 4kHz	[A <sub>rms</sub> ]	7	12	20	7	12	20
	[A <sub>pk</sub> ]	9.90	16.97	28.28	9.90	16.97	28.28
continuous output current at 8kHz	[A <sub>rms</sub> ]	3.2	7	13	3.2	7	13
	[A <sub>pk</sub> ]	4.53	9.90	18.38	4.53	9.90	18.38

<b>LXM05•...</b>		<b>D10F1</b>	<b>D17F1</b>	<b>D28F1</b>	<b>D10M2</b>	<b>D17M2</b>	<b>D28M2</b>
peak output current at 8kHz	[A <sub>rms</sub> ]	6	11	20	6	11	20
	[A <sub>pk</sub> ]	8.49	15.56	28.28	8.49	15.56	28.28
Primary fuse	[A]	10	15/16	25	10	15/16	25
Max/min wire gauge to be permitted in terminals	[AWG]	14-20	10-16	10-16	14-20	10-16	10-16
Terminal screw tightening torque	[in-lbs]	4.5-5.6	5.6-6.8	5.6-6.8	4.5-5.6	5.6-6.8	5.6-6.8

<b>LXM05•...</b>		<b>D10M3X</b>	<b>D17M3X</b>	<b>D42M3X</b>	<b>D14N4</b>	<b>D22N4</b>	<b>D34N4</b>	<b>D57N4</b>
Nominal voltage Input frequency (50/60Hz)	[V]	230 (3~)	230 (3~)	230 (3~)	480 (3~)	480 (3~)	480 (3~)	480 (3~)
Current consumption at nominal voltage	[A <sub>rms</sub> ]	4.5	7.75	16.5	4	6	9.2	16.8
nominal power (device power output)	[kW]	0.75	1.4	3.2	1.4	2.0	3.0	6.0
max. permissible short circuit current of mains	[kA]	5	5	5	5	5	5	22
power loss <sup>1)</sup>	[W]	43	68	132	65	90	147	240
continuous output current at 4kHz	[A <sub>rms</sub> ]	4	8	17	6	9	15	25
	[A <sub>pk</sub> ]	5.66	11.31	24.04	8.49	12.73	21.21	35.36
peak output current at 4kHz	[A <sub>rms</sub> ]	7	12	30	10	16	24	40
	[A <sub>pk</sub> ]	9.90	16.97	42.43	14.14	22.63	33.94	56.57
continuous output current at 8kHz	[A <sub>rms</sub> ]	3.2	7	15	5	7	11	20
	[A <sub>pk</sub> ]	4.53	9.90	21.21	7.07	9.90	15.56	28.28
peak output current at 8kHz	[A <sub>rms</sub> ]	6	11	30	7.5	14	18	30
	[A <sub>pk</sub> ]	8.49	15.56	42.43	10.61	19.80	25.46	42.43
Primary fuse <sup>2)</sup>	[A]	10	10	25	10	15/16	15/16	25
Max/min wire gauge to be permitted in terminals	[AWG]	14-20	10-16	10-16	10-16	10-16	10-16	6-12
Terminal screw tightening torque	[in-lbs]	4.5-5.6	5.6-6.8	5.6-6.8	5.6-6.8	5.6-6.8	5.6-6.8	5.6-6.8

1) condition: internal braking resistor not active; value with nominal current, nominal voltage and nominal power

2) Fuses: fusible links of class CC or J as per UL 248-4, alternatively miniature circuit-breakers with B or C-characteristic. 15/16A specification: circuit breakers are available with 16A nominal current, UL fuses with 15A.

For more information see the product manual.

## 1.12 Wiring overview

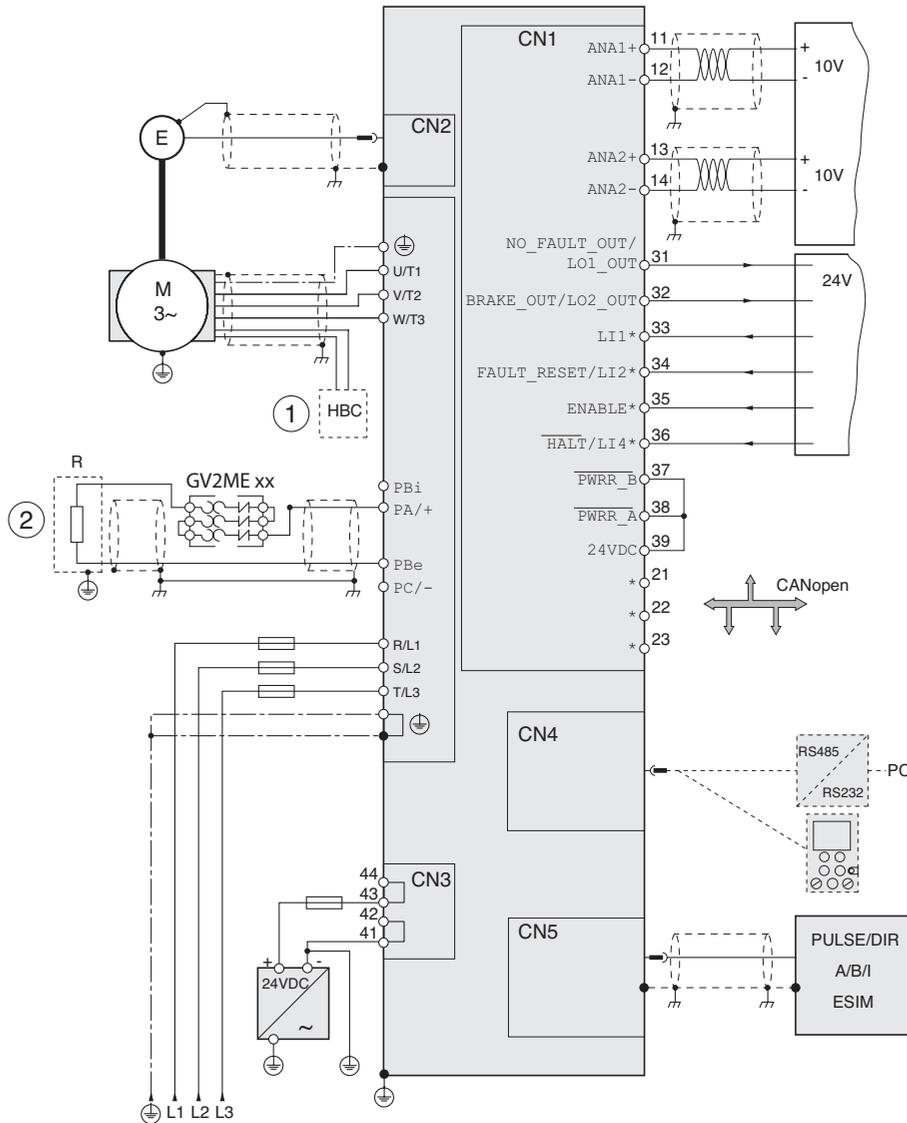


Figure 1.3 Wiring overview of local control mode

- (\*) other signal assignment in fieldbus control mode, see product manual
- (1) Optional: HBC, connection see Figure on page 1-6
- (2) Optional: external braking resistor, connection see figure on page 1-6. If an external braking resistor is installed, the jumper between PA/+ and PBi must be removed.

**LXM05A USA**  
**BLMT00001**  
V1.1, 04.2007