LinMot®

B1100 Drive
Installation Guide

Eine Deutsche Version kann unter http://www.linmot.com bezogen werden!
Please visit http://www.linmot.com to check for the latest version of this document!

This document applies to the following drives:

B1100-PP (-HC, -XC)

B1100-VF (-HC, -XC)

B1100-GP (-HC, -XC)

The information in this documentation reflects the stage of development at the time of press and is therefore without obligation. NTI AG reserves itself the right to make changes at any time and without notice to reflect further technical advance or product improvement.

Document version 3.17/ Ro, July 2012

Table of Content

1 Important Safety Notes for B1100 Series Drives

C A U T I O N !

In order to assure a safe and error free operation, and to avoid severe damage to system components, all system components must be directly attached to a single ground bus that is earth or utility grounded.

Each system component should be tied directly to the ground bus (star pattern), rather than daisy chaining from component to component. (LinMot motors are properly grounded through their power cables when connected to LinMot drives).

All connectors <u>must not be connected or disconnected while DC voltage is applied</u>. Do not disconnect system components until all LinMot drives LEDs have turned off. (Capacitors in the power supply may not fully discharge for several minutes after input voltage has been disconnected). Failure to observe these precautions may result in severe damage to electronic components in LinMot motors and/or drives.

<u>Do not switch Power Supply DC Voltage.</u> All power supply switching and E-Stop breaks should be done to the AC supply voltage of the power supply.

<u>Do not connect or disconnect the motors from drives while voltage is applied.</u> Wait to connect or disconnect motors until all LinMot drives LEDs have turned off. (Capacitors may not fully discharge for several minutes after power has been turned off).
Failure to observe these precautions may result in severe damage to electronic components in LinMot motors and/or drives.
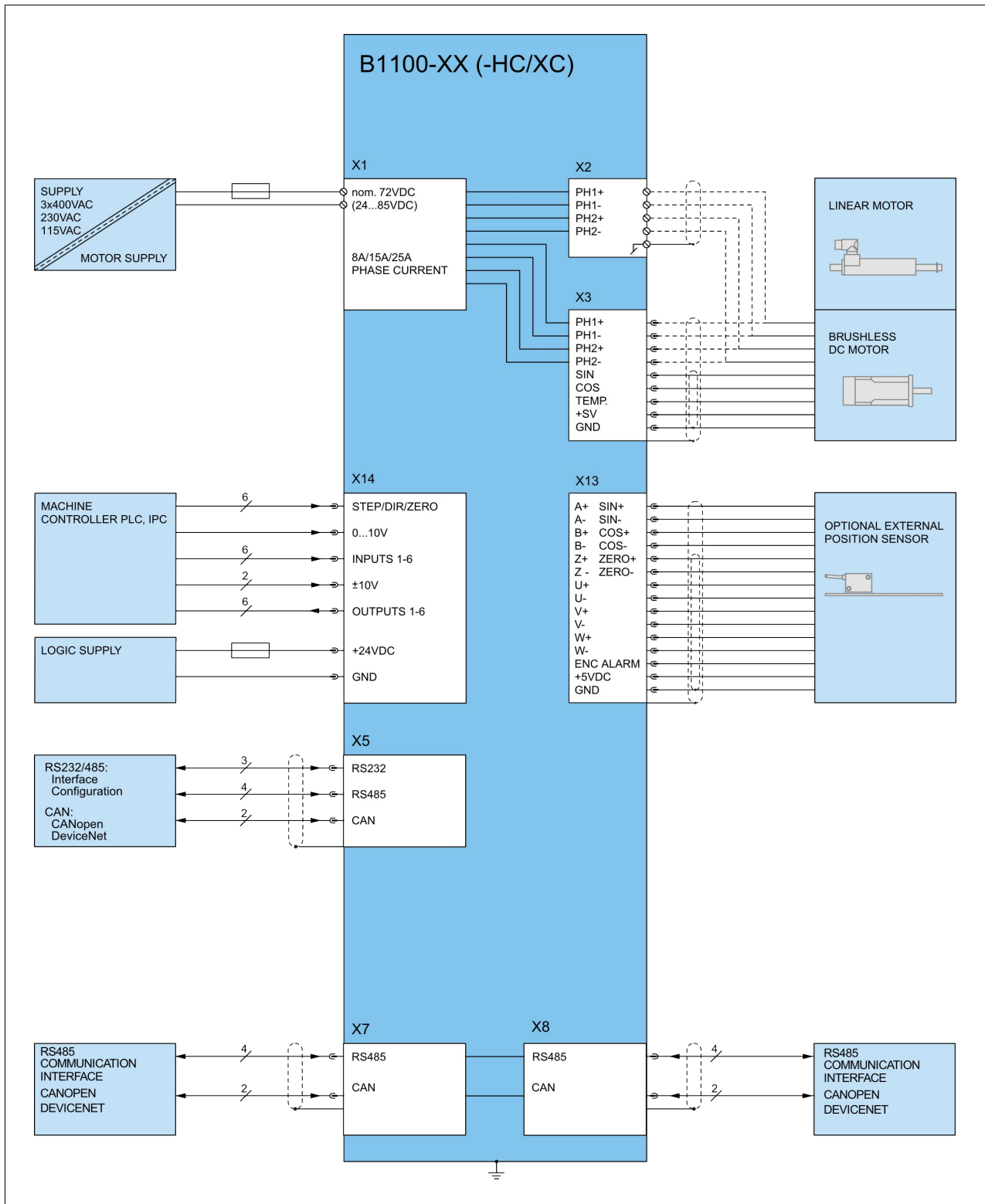
2 System Overview

B1100-XX (-HC/XC)

X1	X2
SUPPLY 3x400VAC 230VAC 115VAC	nom. 72VDC (24...85VDC)	PH1+ PH1- PH2+ PH2-	LINEAR MOTOR
MOTOR SUPPLY	8A/15A/25A PHASE CURRENT		

X3

PH1+
PH1-
PH2+
PH2-
SIN
COS
TEMP.
+SV
GND

BRUSHLESS
DC MOTOR

X14

MACHINE
CONTROLLER PLC, IPC

6 — STEP/DIR/ZERO
0...10V
6 — INPUTS 1-6
2 — ±10V
6 — OUTPUTS 1-6

LOGIC SUPPLY

+24VDC
GND

X13

A+ SIN+
A- SIN-
B+ COS+
B- COS-
Z+ ZERO+
Z - ZERO-
U+
U-
V+
V-
W+
W-
ENC ALARM
+5VDC
GND

OPTIONAL EXTERNAL
POSITION SENSOR

X5

RS232/485:
Interface
Configuration

CAN:
CANopen
DeviceNet

3 — RS232
4 — RS485
2 — CAN

X7

RS485
COMMUNICATION
INTERFACE

CANOPEN
DEVICENET

4 — RS485
2 — CAN

X8

RS485

CAN

4 — RS485
2 — CAN

RS485
COMMUNICATION
INTERFACE

CANOPEN
DEVICENET

Typical servo system B1100-XX-YY: Servo drive, motor and power supply.

3 B1100 Interfaces
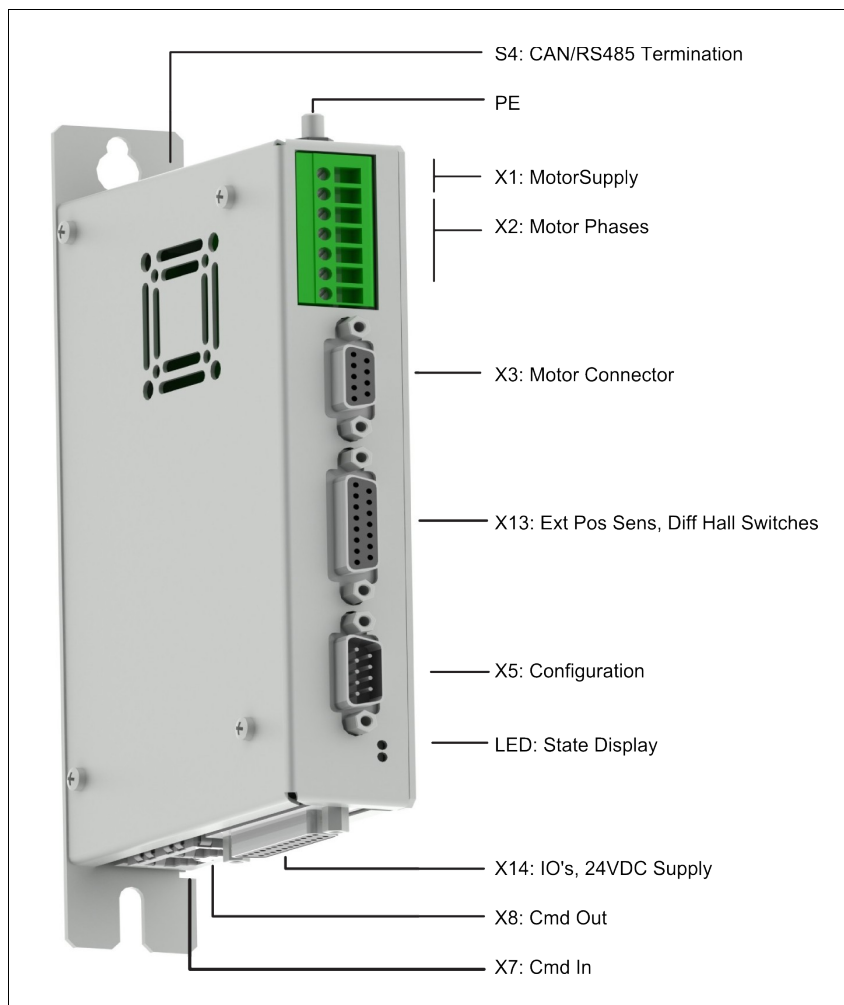
Connector		B1100-PP-XX	B1100-VF-XX	B1100-GP-XX
X1	Motor Supply	●	●	●
X2	Motor Phases (Screw Terminals)	●	●	●
X3	Motor / Motor Signals	●	●	●
X5	Com / Config RS232, RS485, CAN	●	●	●
X7	RS485 / CAN In	●	●	●
X8	RS485 / CAN Out	●	●	●
X13	External/Simulated Position Encoder Diff Hall Switches	●	●	●
X14	6 Digital Inputs 6 Digital Outputs Analog In 0..10V Analog In –10V.. +10V Diff Step Dir zero 24V Logic Supply	●	●	●
LED	State Indicator	●	●	●
S4	Bus Termination	●	●	●

4 Functionality

|	B1100-PP	B1100-PP-HC	B1100-PP-XC	B1100-VF	B1100-VF-HC	B1100-VF-XC	B1100-GP	B1100-GP-HC	B1100-GP-XC
Supply Voltage									
Motor Supply 72VDC (24...85VDC)	•	•	•	•	•	•	•	•	•
Logic Supply 24VDC (22...26VDC)	•	•	•	•	•	•	•	•	•
Motor Phase Current									
8A $_{peak}$ / 6A $_{rms}$	•			•			•		
15A $_{peak}$ / 9A $_{rms}$		•			•			•	
25A $_{peak}$ / 12A $_{rms}$			•			•			•
Controllable Motors									
LinMot P01-23x…	•	•	•	•	•	•	•	•	•
P01-37x…	•	•	•	•	•	•	•	•	•
P01-48x…	•	•	•	•	•	•	•	•	•
DC Motors	•	•	•	•	•	•	•	•	•
Brushless DC / EC Motors	•	•	•	•	•	•	•	•	•
Command Interface									
Easy Steps Max. 6 Commands	•	•	•	•	•	•	•	•	•
+/-10V Current Command Interface				•	•	•	•	•	•
Step Direction Indexer Interface				•	•	•	•	•	•
Cmd Tab IO Interface (X14-IOs) (with EasySteps)				•	•	•	•	•	•
RS232 up to 115.2 kBaud							•	•	•
RS485 up to 115.2 kBaud							•	•	•
CANOpen up to 1MBaud							•	•	•
DeviceNet 125, 250, 500 kBaud							•	•	•
External Position Sensor									
Incremental RS422 up to 2 MHz	•	•	•	•	•	•	•	•	•
Position Indexer Input									
Step Dir Zero/ ABZ RS422 up to 2 MHz				•	•	•	•	•	•
Position Encoder Simulation									
AB RS422 up to 2.5 MHz				•	•	•	•	•	•
Configuration									
RS232 Configuration	•	•	•	•	•	•	•	•	•
CAN Multi Axes Configuration	•	•	•	•	•	•	•	•	•

5 Software

The configuration software LinMot-Talk is free of charge and can be downloaded from the LinMot homepage.

For fast results see also the quick start guides and configurations for the B1100-PP and B1100-VF drives:

- QuickStartGuide_B1100-PP.pdf
- QuickStartGuide_B1100-VF.pdf

This quick start guides are distributed with the LinMot-Talk software.

6 Power Supply and Grounding
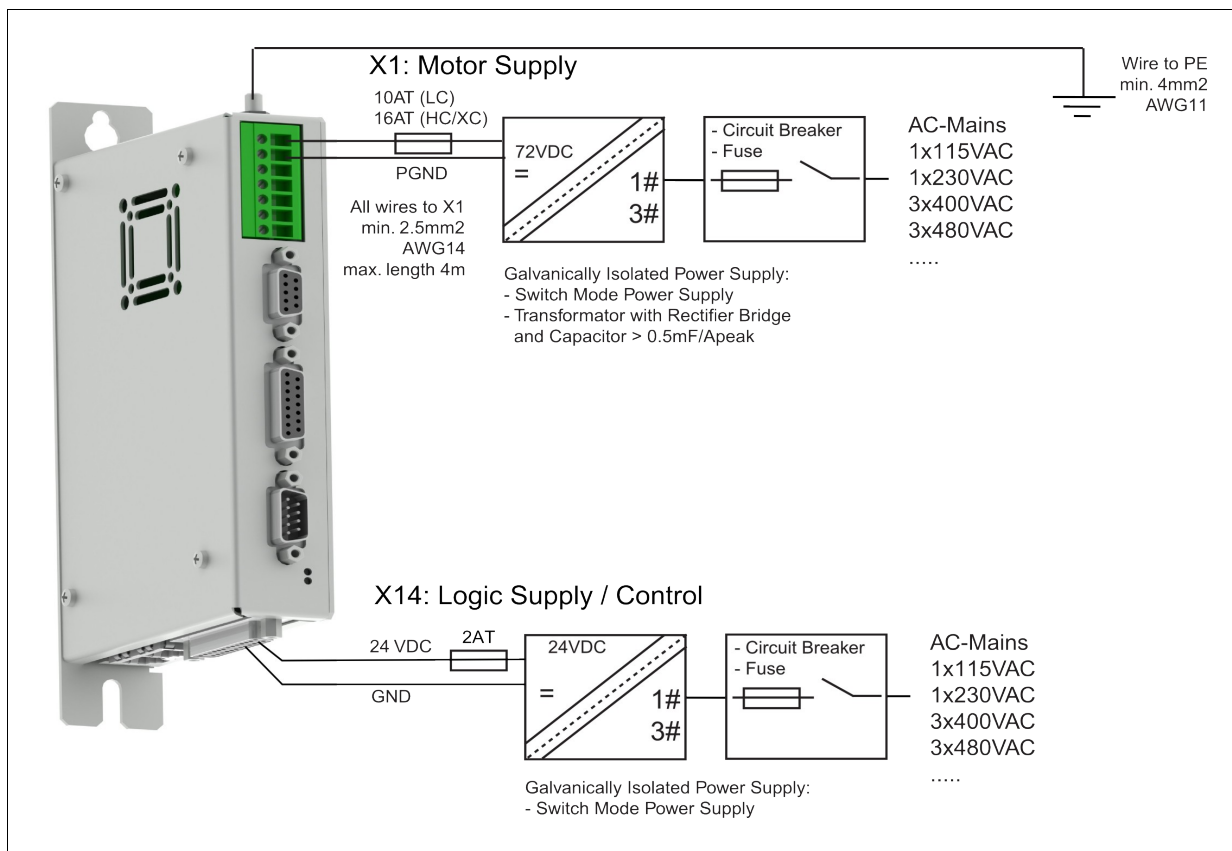
In order to assure a safe and error free operation and to avoid severe damage to system components* must be well grounded to either a single earth or utility ground. This includes both LinMot and all other control system components to the same ground bus.

Each system component* should be tied directly to the ground bus **(star pattern**), rather than daisy chaining from component to component. (LinMot motors are properly grounded through their power cables when connected to LinMot drives.)

Power supply connectors must not be connected or disconnected while DC voltage is present. Do not disconnect system components until all LinMot drive LEDs have turned off. (Capacitors in the power supply may not fully discharge for several minutes after input voltage has been disconnected). Failure to observe these precautions may result in severe damage to electronic components in LinMot motors and/or drives.
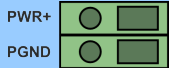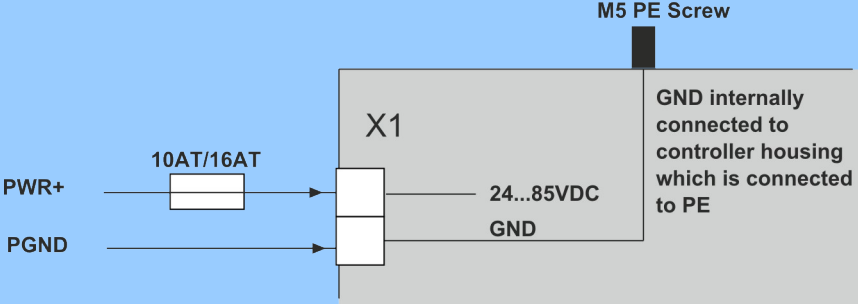
Do not switch Power Supply DC Voltage. All power supply switching and E-Stop breaks should be done to the AC supply voltage of the power supply. Failure to observe these precautions may result in severe damage to drive.
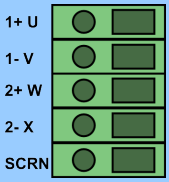
* Inside of the B1100 drive the *PWR motor GND* and *PWR signal GND* is connected together and to the GND of the drive housing. It is recommended that the *PWR motor GND* is NOT grounded at another place than inside of the drive to avoid circular currents.
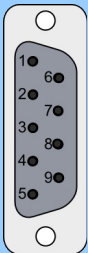
7   Description of the connectors / Interfaces

7.1   X1

X1	Motor Supply

Screw Terminals	Motor Supply: 72VDC nominal, 24...85VDC
	Absolute max. Rating: 72VDC +20%.
	External Fuse: 10AT for LC (8Apeak), 16AT for HC and XC (15A/25Apeak) servos.
	If motor supply voltage exceeds 90VDC, the drive will go into error state.
	- Tightening Torque: min 0.4Nm
	- Screw Thread: M 2,5
	- Use 60/75°C copper conductors only
	- Conductor Cross-Section 2.5mm^2 (AWG14) max Length 4m

7.2   X2

X2	Motor Phases		
		LinMot Motor:	**3-phase EC-Motor:**
1+ U	PH1+ /U	Motor Phase 1+ red	Motor Phase U
1- V	PH1- /V	Motor Phase 1- pink	Motor Phase V
2+ W	PH2+ /W	Motor Phase 2+ blue	Motor Phase W
2- X	PH2-	Motor Phase 2- grey	
SCRN	SCRN	Shield	

Screw Terminals	The motor phases are present at X2 and X3. It is recommended to use X2. It is only allowed to use X3 for connecting motor phases if RMS current is below 2A and peak current is below 4A.
	Never connect motor phases on X2 and X3!
	- Tightening Torque: min 0.4Nm
	- Screw Thread: M 2,5
	- Conductor Cross-: max. 2.5mm^2 (AWG14), Length < 30m
	- Use 60/75°C copper conductors only

7.3 X3

X3	Motor		
		LinMot Motor:	**3-phase EC-Motor:**
	1	Motor Phase 1+	
	2	Motor Phase 2+	
	3	+5VDC	+5VDC (Hall Supply)
	4	Sensor Sine	Hall 1
	5	Temp. In	Hall 3
	6	Motor Phase 1-	
	7	Motor Phase 2-	
	8	AGND	AGND (Hall Supply)
	9	Sensor Cosine	Hall 2
	case	Shield	

DSUB-9 (f)	<u>Note:</u> Use +5V (X3.3) and AGND (X3.8) only for motor internal hall sensor supply (max. 100mA). Cable length < 30m. <u>Caution:</u> Do NOT connect AGND (X3.8) to ground or earth! It is only allowed to use X3 for connecting the motor phases if RMS current is below 2A and peak current below 4A.

Motor Wiring for Phase Currents above 2A RMS or 4A peak (recommended general wiring)

Caution:
Do not connect
X3.1/2/6/7
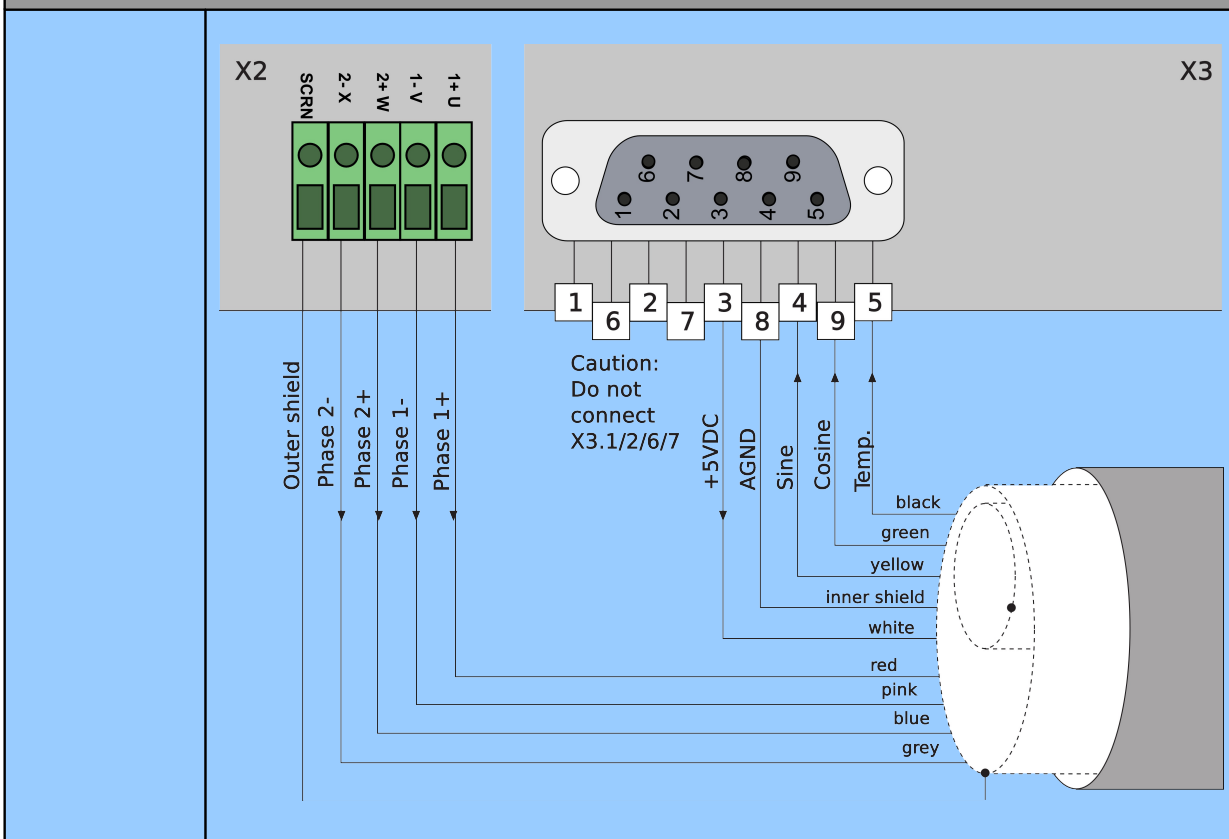
Important:
If motor phase current exceeds 2A$_{RMS}$ or 4A$_{peak}$, motor phases must be wired to X2!

Motor wiring for Phase Currents below 2A RMS and 4A peak

X3

Phase 1+ · Phase 1- · Phase 2+ · Phase 2- · +5VDC · AGND · Sine · Cosine · Temp.
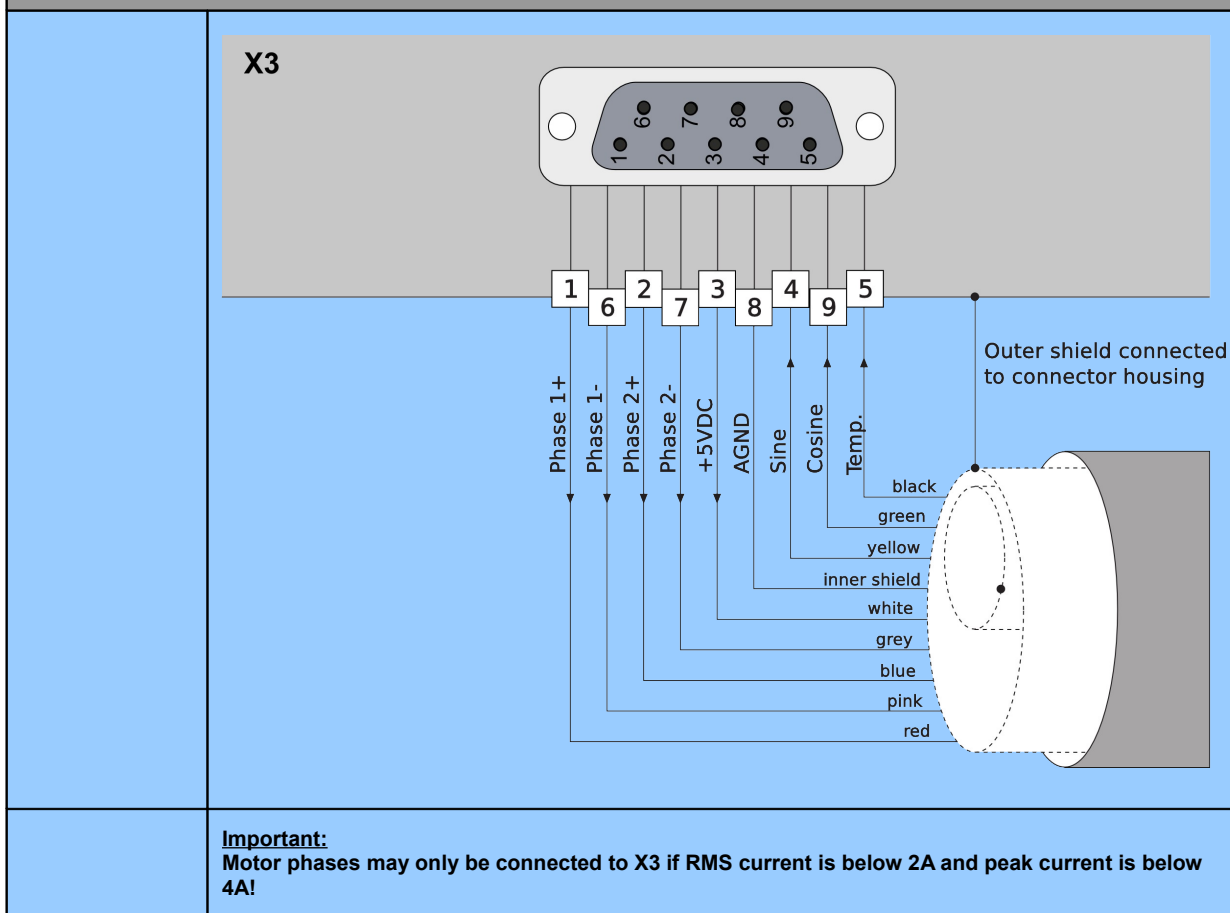
black
green
yellow
inner shield
white
grey
blue
pink
red

Outer shield connected to connector housing

Important:
Motor phases may only be connected to X3 if RMS current is below 2A and peak current is below 4A!

7.4   X5

X5	COM / Config	
	1	RS485_Tx+ Y
	2	RS232_Tx
	3	RS232_Rx
	4	RS485_Rx+ A
	5	GND
	6	RS485_Rx- B
	7	RS485_Tx- Z
	8	CAN_L
	9	CAN_H
	case	Shield

X5

RS485_Rx+
120   S4.2
RS485_Rx-

CAN_L
120   S4.3
CAN_H

100   GND

RS485_Tx+ · RS485_Rx- · RS232_Tx · RS485_Tx- · RS232_Rx · CAN_L · RS485_Rx+ · CAN_H · GND

DSUB-9 (m)	RS232:	Configuration on all drives: use 1:1 connection cable to PC with only pins 2,3 and 5 connected. Use LinMot RS configuration cable (Art.-No. 0150-3307). Cable length < 30m.

7.5 X7 - X8

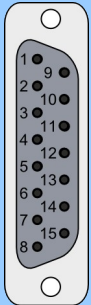| X7 - X8	RS485/CAN
	1 RS485_Rx+ A 2 RS485_Rx- B 3 RS485_Tx+ Y 4 GND 5 GND 6 RS485_Tx- Z 7 CAN_H 8 CAN_L case Shield
RJ-45	Use twisted pair (1-2, 3-6, 4-5, 7-8) cable for wiring. The built in CAN and RS485 terminations can be activated by S4.2 and S4.3. X7 is internally connected to X8 (1:1 connection). Cable length < 30m.

7.6 X13

X13	External Position Sensor Differential Hall Switches
	1 +5V DC 9 A+ 2 A- 10 B+ 3 B- 11 Z+ 4 Z- 12 Encoder Alarm 5 GND 13 U+ 6 U- 14 V+ 7 V- 15 W+ 8 W- case Shield
DSUB-15 (f)	<u>Position Encoder Inputs (RS422):</u> Max Input Frequency: 2MHz, 4 M counts/s with quadrature decoding, 240ns edge separation <u>Encoder Simulation Outputs (RS422):</u> Max Output Frequency: 2.5MHz, 5 M counts/s with quadrature decoding, 200ns edge separation <u>Differential Hall Switch Inputs (RS422):</u> Input Frequency: <1kHz <u>Enc. Alarm In:</u> 5V / 1mA <u>Sensor Supply:</u> 5VDC max 100mA Cable length < 30m.

7.7 X14

X14	24VDC Supply and IOs
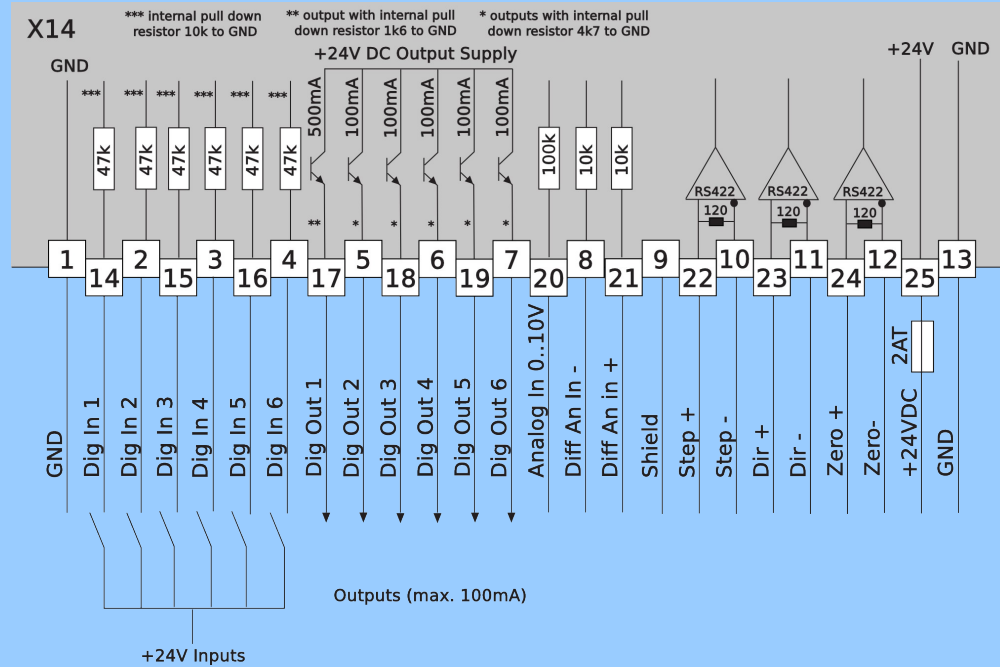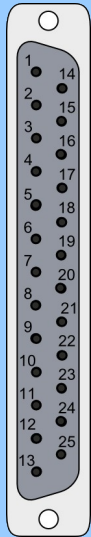
| DSUB-25 (f) | <u>Logic Supply:</u>
Switch Mode Power Supply: 24VDC (22...26VDC)
External Fuse: 2AT

<u>All Digital Inputs:</u>
Direct interfacing to digital 24VDC PLC outputs.
Input Current: 1mA
Logic Levels: Low Level: guaranteed: -5 to 5VDC, typically < 8VDC
                           High Level guaranteed: 20..30VDC, typically > 16VDC
Sample Rate: 400us

<u>All Digital Outputs:</u>
Short circuit and overload protected high side switches.
Voltage: 24VDC
Update Rate: 400us
Max. Current: 100mA / 500mA for X14.17
Peak Current: 370mA / 1100mA for X14.17

Outputs may directly drive inductive loads. Do not connect any capacity because of the peak current!

<u>Analog Input on X14.20:</u>
Range: 0V..+10V   10Bit ADC
Sample Rate: 400us

<u>Differential Analog Input on X14.8 X14.21 X14.9 Shield:</u>
Range: -10V..+10V 10Bit ADC
Sample Rate: 400us
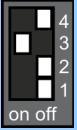
<u>Differential Step Dir Zero:</u>
Indexer Inputs: RS422, Max. Input Frequency: 2MHz, 4 M counts/s with quadrature decoding, 240ns edge separation

Cable length < 30m. |

7.8   LEDs

LEDs	State Display	
Error ● ● 24VOK	Green Red	24V Logic Supply OK Error
● ~0.5Hz	Green On Red blinking	**Signal Supply 24V too low:** The error LEDs blinks slowly if the signal supply +24VDC (X14.25) is less than 18VDC.

7.9   S4

S4	Bus Termination	
[switch image: 4 3 2 1 / on off]	S4	Switch 4: Bootstrap Switch 3: Termination CAN on/off Switch 2: Termination RS485 on/off Switch 1: RS232 (switch "off" / RS485 "on"). Selection for RS232 or RS485 Factory settings: Switch 3 "on", all other switches "off"

B1100 Installation Guide

8   Physical Dimension

Fixing for
2x M5 screws
Dimensions in mm

106

206

Centers 195

166

31
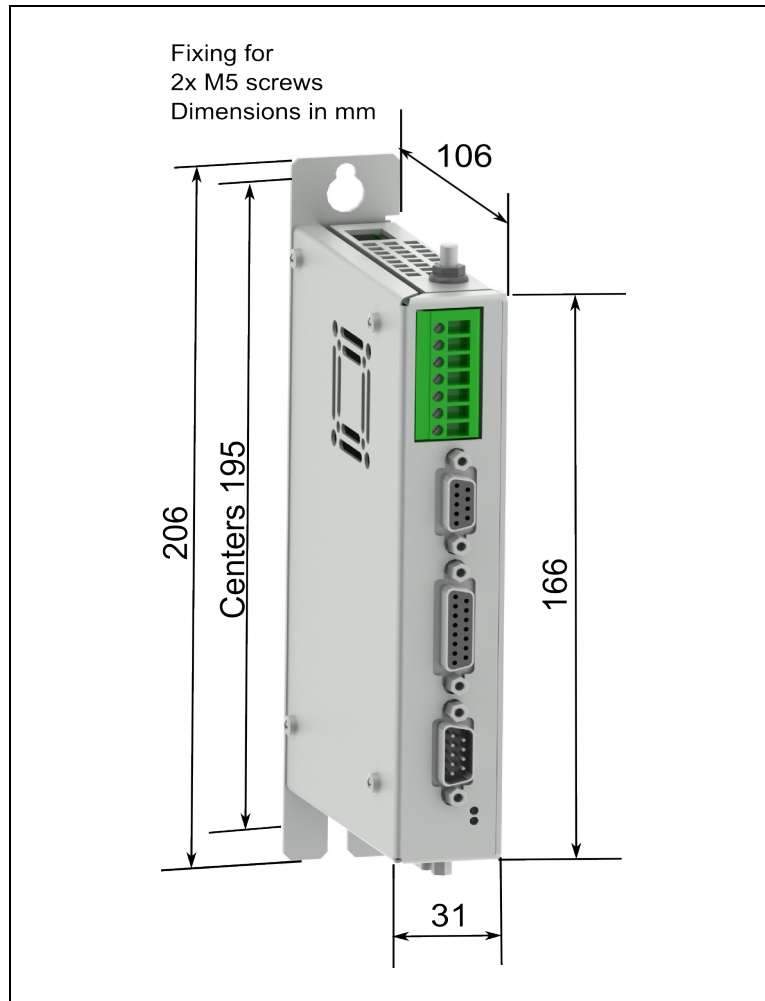
B1100 *Single axis drive*		
Width	mm (in)	31 (1.3)
Height	mm (in)	166 (6.6)
Height with fixings	mm (in)	206 (8.1)
Depth	mm (in)	106 (4.2)
Weight	g (lb)	700 (1.6)
Case	IP	20
Storage Temperature	°C	-25…40
Transport Temperature	°C	-25…70
Operating Temperature	°C	0…40 at rated data 40…50 with power derating
Relative humidity		95% (non-condensing)
Max. Case Temperature	°C	70
Max. Power Dissipation	W	30
Distance between Drives	mm (in)	20 (0.8) horizontal 50 (2) vertical

( ) dimensions in inch

9 Power Supply Requirement

Motor Power Supply

The calculation of the needed power for the motor supply depends on the application and the used motor. The nominal supply voltage is 72 VDC. The possible range is from 24 to 85 VDC.

ATTENTION: The motor supply can rise up to 95 VDC when braking. This means that everything connected to that power supply needs a voltage rating of 100 VDC. (Additional capacitors, etc…)

To provide short circuit power limitation, it is required to use an external fuse (10AT for blank labeled (LC) and 16AT for HC and XC labeled drives).

Recommended Power supplies:

Item	Description	Art. No.
T01-72/420	72VDC, 15A peak, 420VA, 3x400VAC	0150-1966
T01-72/420-US	72VDC, 15A peak, 420VA, 3x230VAC	0150-1967
T01-72/900	72VDC, 30A peak, 900VA, 3x400VAC	0150-1842
T01-72/900-US	72VDC, 30A peak, 900VA, 3x230VAC	0150-1843
T01-72/1500	72VDC, 2x30A peak, 1500VA, 3x400VAC	0150-1844
T01-72/1500-US	72VDC, 2x30A peak, 1500VA, 3x230VAC	0150-1845
S01-72/500	72VDC, 500W, 750W peak, 1x100..120VAC/200..240VAC	0150-1874
S01-72/1000	72VDC, 1000W, 2000W peak, 3x380..500VAC	0150-1872

Signal Power Supply

The logic supply needs a regulated power supply with a nominal voltage of 24 VDC. The voltage must be between 22 and 26 VDC.

Current Consumption

Min. 200mA (no load on the outputs)
Typ. 0.5A (all 6 outputs "on" with 50mA load and /Break with no load)
Max. 1.2A (all 6 outputs "on" with 100mA load and /Break with 0.5A load)

**To limit the power in case of malfunction,
it is required to use an external fuse (2AT)!**

10 Ordering Information

Drive	Description		Art. No.
B1100-GP	General Purpose Drive	72VDC/8A	0150-1737
B1100-GP-HC	General Purpose Drive	72VDC/15A	0150-1738
B1100-GP-XC	General Purpose Drive	72VDC/25A	0150-1741
B1100-PP	Point to Point Drive	72VDC/8A	0150-1735
B1100-PP-HC	Point to Point Drive	72VDC/15A	0150-1736
B1100-PP-XC	Point to Point Drive	72VDC/25A	0150-1740
B1100-VF	Current Command Drive	72VDC/8A	0150-1685
B1100-VF-HC	Current Command Drive	72VDC/15A	0150-1686
B1100-VF-XC	Current Command Drive	72VDC/25A	0150-1739
Accessories	**Description**		**Art. No.**
RS232 Config Cable	AC01-Df/Df-2-RS1 RS232 Config Cable DSUB9 f/f 2m (2-2/3-3/5-5)		0150-3307

11 International Certifications

Certifications	
Europe C E	See chapter "Declaration of Conformity CE-Marking"

B1100 Installation Guide

12 Declaration of Conformity CE-Marking

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Switzerland
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Fax: +41 (0)56 419 91 92

Products: *LinMot* ® Drives

Type	Art.-No.	Type	Art-No.	Type	Art.-No.
B1100-GP	0150-1737	B1100-VF	0150-1685	B1100-PP	0150-1735
B1100-GP-HC	0150-1738	B1100-VF-HC	0150-1686	B1100-PP-HC	0150-1736
B1100-GP-XC	0150-1741	B1100-VF-XC	0150-1739	B1100-PP-XC	0150-1740

The product must be mounted and used in strict accordance with the installation instruction contained within the installation guide, a copy of which may be obtained from NTI Ltd.

I declare that as the authorized representative, the above information in relation to the supply/manufacture of this product is in conformity with the stated standards and other related documents in compliance with the protection requirements of the Electromagnetic Compatibility (EMC) Directive 2004/108/EC.

Standards Complied with:

EN 61000-6-2		Compliance Criteria	Immunity for industrial environment
	EN 61000-4-2	B	Electrostatic discharge immunity (ESD)
	EN 61000-4-3	A	Radiated electromagnetic field immunity
	EN 61000-4-4	B	Fast transients / burst immunity (EFT)
	EN 61000-4-6	A	Conducted radio frequency immunity
	EN 61000-4-8	A	Power frequency magnetic field immunity
EN 61000-6-4		**Class**	**Emission for industrial environment**
	EN 55011	Table 3b	Radiated Emission
	EN 55022	Class A	Radiated Emission
	CISPR 22	Am 1, table 9	Radiated Emission

Company
NTI Ltd.

Spreitenbach, September 07, 2010

R. Rohner / CEO NTI AG

13 Contact Addresses

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	E-Mail: Web:	us-sales@linmot.com http://www.linmot-usa.com/

Please visit http://www.linmot.com/ to find the distributor closest to you.

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