

LinMot®



C1250 Servo Drives 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:
C1250-PL-XC-xS-yyy, C1250-EC-XC-xS-yyy, C1250-DS-XC-xS-yyy
C1250-SE-XC-xS-yyy, C1250-PN-XC-xS-yyy, C1250-PD-XC-xS-yyy
C1250-IP-XC-xS-yyy, C1250-SC-XC-xS-yyy



ATTENTION: The connectors have to be ordered separately and are not included with the drive!



DC01-C1X00-0S/X1/X4
DC01-C1X00-1S/X1/X4/X33

Drive Connector Set for C1X00-0S
Drive Connector Set for C1X00-1S

0150-3527
0150-3528

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1 Important Safety Instructions



For your personal safety

Disregarding the following safety measures can lead to severe injury to persons and damage to material:

- Only use the product as directed.
- Never commission the product in the event of visible damage.
- Never commission the product before assembly has been completed.
- Do not carry out any technical changes on the product.
- Only use the accessories approved for the product.
- Only use original spare parts from LinMot.
- Observe all regulations for the prevention of accidents, directives and laws applicable on site.
- Transport, installation, commissioning and maintenance work must only be carried out by qualified personnel.
 - Observe IEC 364 and CENELEC HD 384 or DIN VDE 0100 and IEC report 664 or DIN VDE 0110 and all national regulations for the prevention of accidents.
 - According to the basic safety information, qualified, skilled personnel are persons who are familiar with the assembly, installation, commissioning, and operation of the product and who have the qualifications necessary for their occupation.
- Observe all specifications in this documentation.
 - This is the condition for safe and trouble-free operation and the achievement of the specified product features.
 - The procedural notes and circuit details described in this documentation are only proposals. It is up to the user to check whether they can be transferred to the particular applications. NTI AG / LinMot does not accept any liability for the suitability of the procedures and circuit proposals described.
- LinMot servo drives and the accessory components can include live and moving parts (depending on their type of protection) during operation. Surfaces can be hot.
 - Non-authorized removal of the required cover, inappropriate use, incorrect installation or operation create the risk of severe injury to persons or damage to material assets.
 - For more information, please see the documentation.
- High amounts of energy are produced in the drive. Therefore it is required to wear personal protective equipment (body protection, headgear, eye protection, hand guard).

Application as directed

- Drives are components which are designed for installation in electrical systems or machines. They are not to be used as domestic appliances, but only for industrial purposes according to EN 61000-3-2.
- When drives are installed into machines, commissioning (i.e. starting of the operation as directed) is prohibited until it is proven that the machine complies with the regulations of the EC Directive 98/37/EC (Machinery Directive); EN 60204 must be observed.
- Commissioning (i.e. starting of the operation as directed) is only allowed when there is compliance with the EMC Directive (2004/108/EC).
- The technical data and supply conditions can be obtained from the nameplate and the documentation. They must be strictly observed.

Transport, storage

- Please observe the notes on transport, storage, and appropriate handling.
- Observe the climatic conditions according to the technical data.

Installation

- The drives must be installed and cooled according to the instructions given in the corresponding documentation.
- The ambient air must not exceed degree of pollution 2 according to EN 61800-5-1.
- Ensure proper handling and avoid excessive mechanical stress. Do not bend any components and do not change any insulation distances during transport or handling. Do not touch any electronic components and contacts.
- Drives contain electrostatic sensitive devices which can easily be damaged by inappropriate handling. Do not damage or destroy any electrical components since this might endanger your health!

Electrical connection

- When working on live drives, observe the applicable national regulations for the prevention of accidents.
- The electrical installation must be carried out according to the appropriate regulations (e.g. cable cross-sections, fuses, PE connection). Additional information can be obtained from the documentation.



- This product can cause high-frequency interferences in non industrial environments which can require measures for interference suppression.

Operation

- If necessary, systems including drives must be equipped with additional monitoring and protection devices according to the valid safety regulations (e.g. law on technical equipment, regulations for the prevention of accidents). The drives can be adapted to your application. Please observe the corresponding information given in the documentation.
- After the drive has been disconnected from the supply voltage, all live components and power connections must not be touched immediately because capacitors can still be charged. Please observe the corresponding stickers on the drive. All protection covers and doors must be shut during operation.

Protection of persons

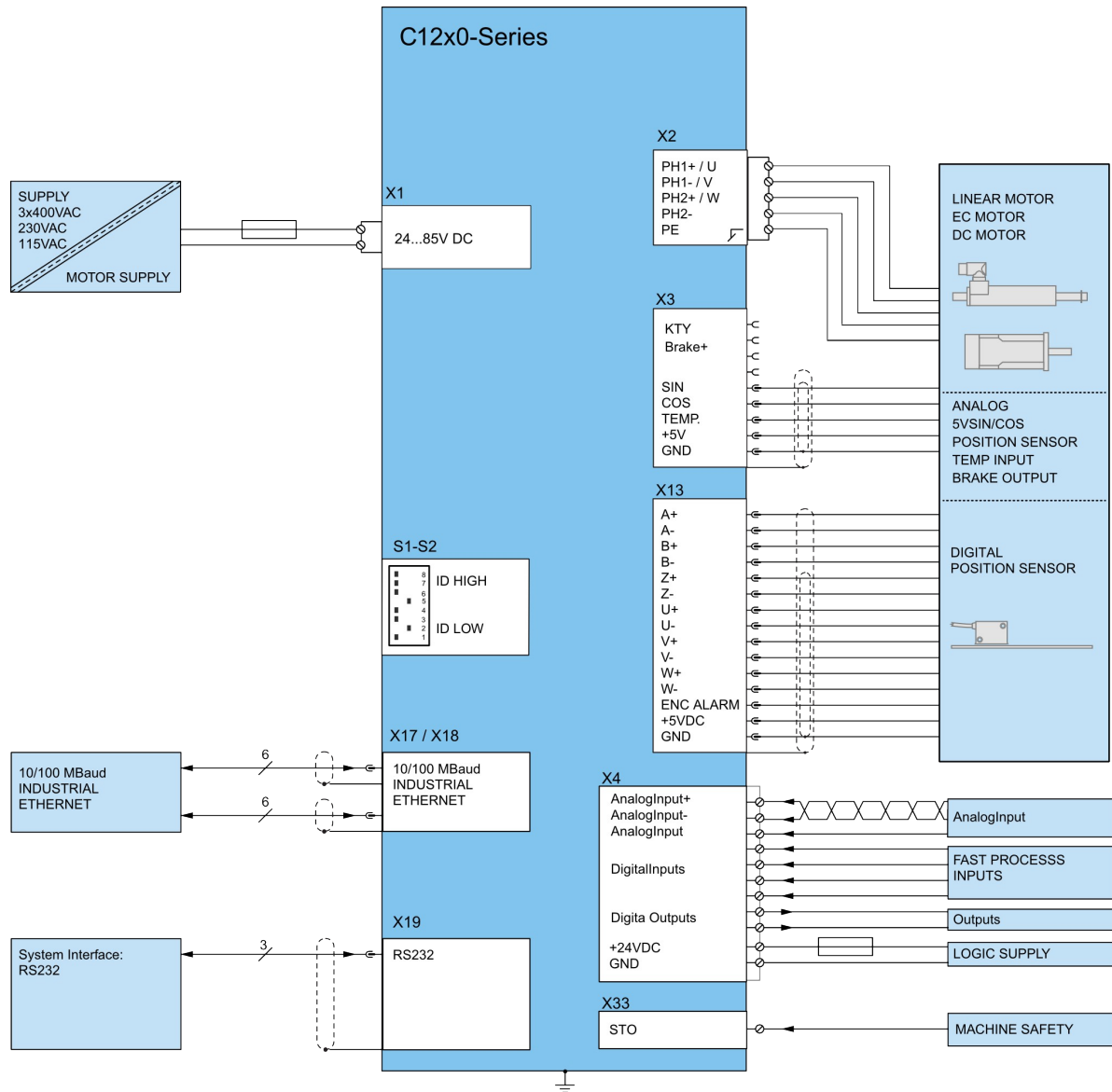


- The power terminals Ph1+, Ph1-, Ph2+, Ph2- and PWR+ remain live for at least 5 minutes after disconnecting from the power supplies.
- Before servicing, disconnect supply, wait 5 minutes and measure between PWR+ and PGND to be sure that the capacitors have discharged below 42VDC



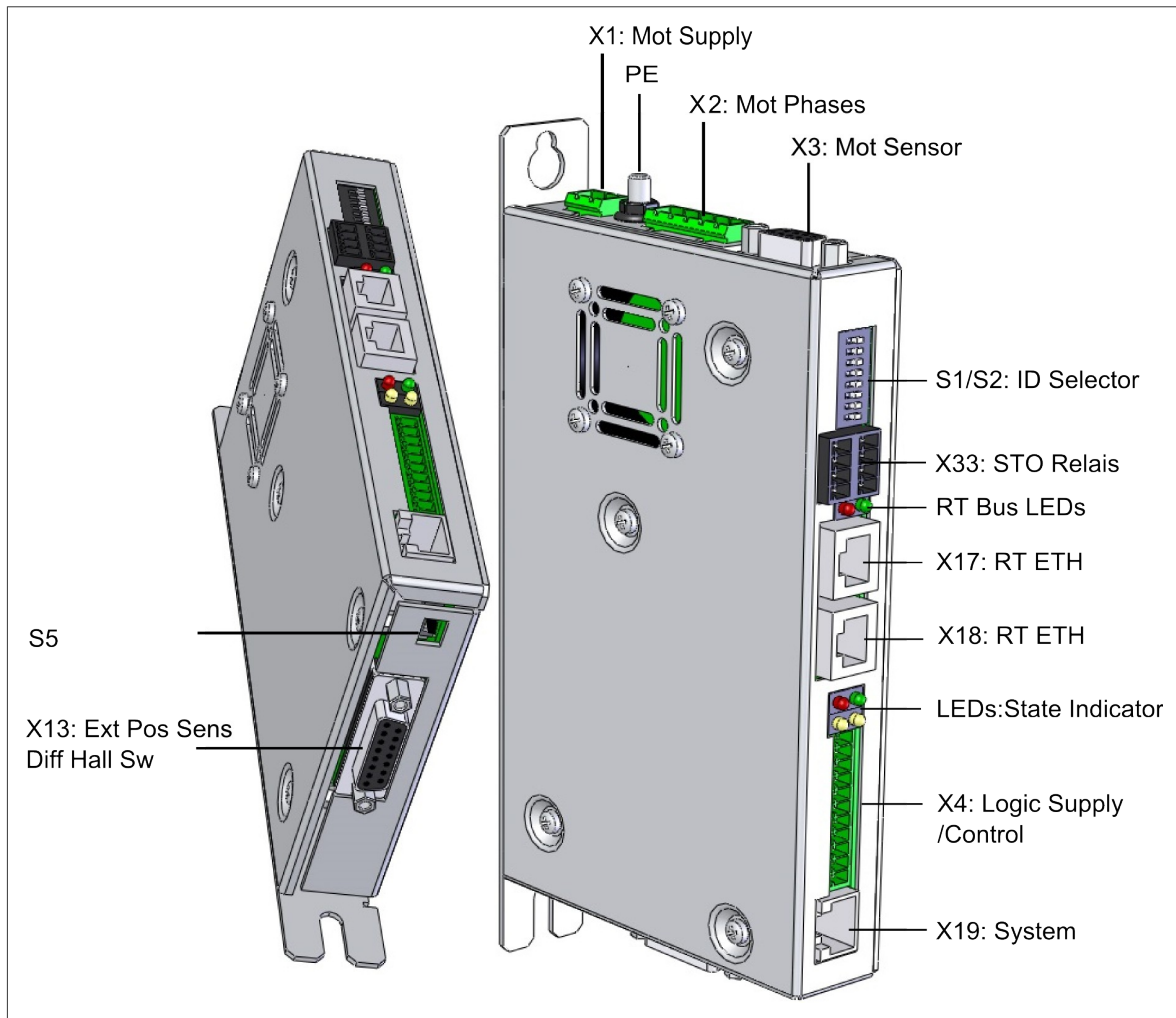
- The heat sink of the drive can have an operating temperature of > 80 °C: Contact with the heat sink results in burns.

2 System Overview



Typical Servo System C1250: Servo Drive, Motor and Power Supply.

3 Interfaces



C1250-xx-XC-xS-xxx

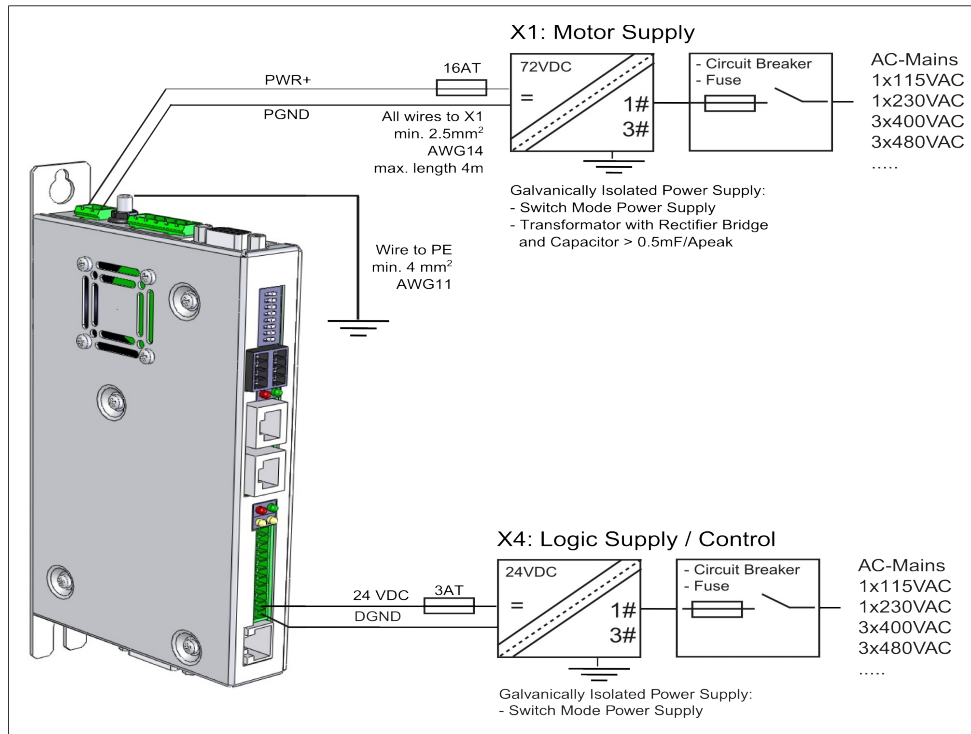
4 Functionality and Interfaces

	C1250-PL-XC-0S	C1250-PN-XC-0S	C1250-PD-XC-0S	C1250-SC-XC-0S	C1250-IP-XC-0S	C1250-LU-XC-0S	C1250-EC-XC-0S	C1250-DS-XC-0S	C1250-SE-XC-0S	C1250-PL-XC-1S	C1250-PN-XC-1S	C1250-PD-XC-1S	C1250-SC-XC-1S	C1250-IP-XC-1S	C1250-LU-XC-1S	C1250-EC-XC-1S	C1250-DS-XC-1S	C1250-SE-XC-1S	
Supply Voltage																			
Motor Supply 72VDC (24...85VDC)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Logic Supply 24VDC (22...26VDC)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Motor Phase Current																			
25A _{peak} (0-500Hz)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Controllable Motors																			
LinMot P01...(Motor Link P)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Selected motors (contact support)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Plug and Play (PnP) Auto Configuration	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Command Interface																			
POWERLINK	•									•									
PROFINET		•									•								
PROFINET Profidrive			•									•							
SERCOS III				•									•						
ETHERNET IP					•									•					
LinUDP						•									•				
ETHERCAT							•									•			
ETHERCAT CiA402								•									•		
ETHERCAT SoE									•										•
Programmable Motion Profiles (Curves)																			
Up to 100 Motion Profiles Up to 16302 Curve Points	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Programmable Command Table																			
Command Table with up to 255 entries	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
External Position Sensor																			
Incremental (RS422 up to 25 M counts/s)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Absolute (SSI)(Reads actual position at power up)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Configuration Interface																			
RS232	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Integrated Safety Functions (-1S Option)																			
STO (2 Safety Relays)										•	•	•	•	•	•	•	•	•	•

5 Software

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

6 Power Supply and Grounding



In order to assure a safe and error free operation, and to avoid severe damage to system components, **all system components must be well grounded to protective earth PE.** This includes both LinMot and all other control system components on the same ground bus.



Each system component* should be tied directly to the ground bus (**star pattern**). Daisy chaining from component to component is forbidden. (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 the drive.

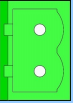
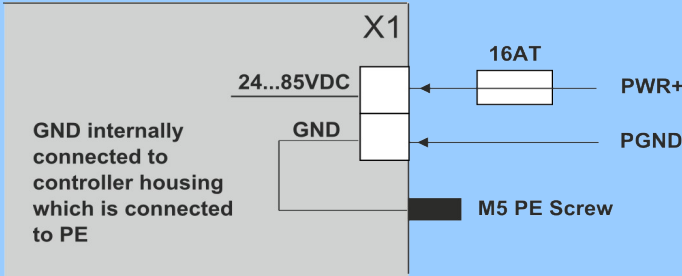
* Inside of the C1250 drive the *PWR motor GND* and *PWR signal GND* is connected together and to the GND of the drive housing. It is recommended that the *PWR motor GND* is NOT grounded at another place than inside of the drive to reduce circular currents.

7 Description of the connectors / Interfaces


7.1 PE

PE	Protective Earth
PE	<ul style="list-style-type: none"> Use min. 4mm² (AWG11) Tightening torque: 2Nm (18 lbin)

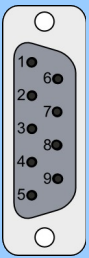
7.2 X1

X1	Motor Phases
	<p>PWR+</p> <p>PGND</p>  <p>GND internally connected to controller housing which is connected to PE</p> <p>16AT</p> <p>M5 PE Screw</p>
<p>Connector has to be ordered separately: see chapter 13</p>	<p>Motor Supply: 72VDC nominal, 24...85VDC</p> <p>Absolute max. Rating: 72VDC +20%.</p> <p>External Fuse: 16AT (16A slow blow) / min. 100VDC</p> <p>If motor supply voltage exceeds 90VDC, the drive will go into error state.</p> <ul style="list-style-type: none"> Use 60/75°C copper conductors only Conductor Cross-Section 2.5mm² (AWG14) max Length 3m

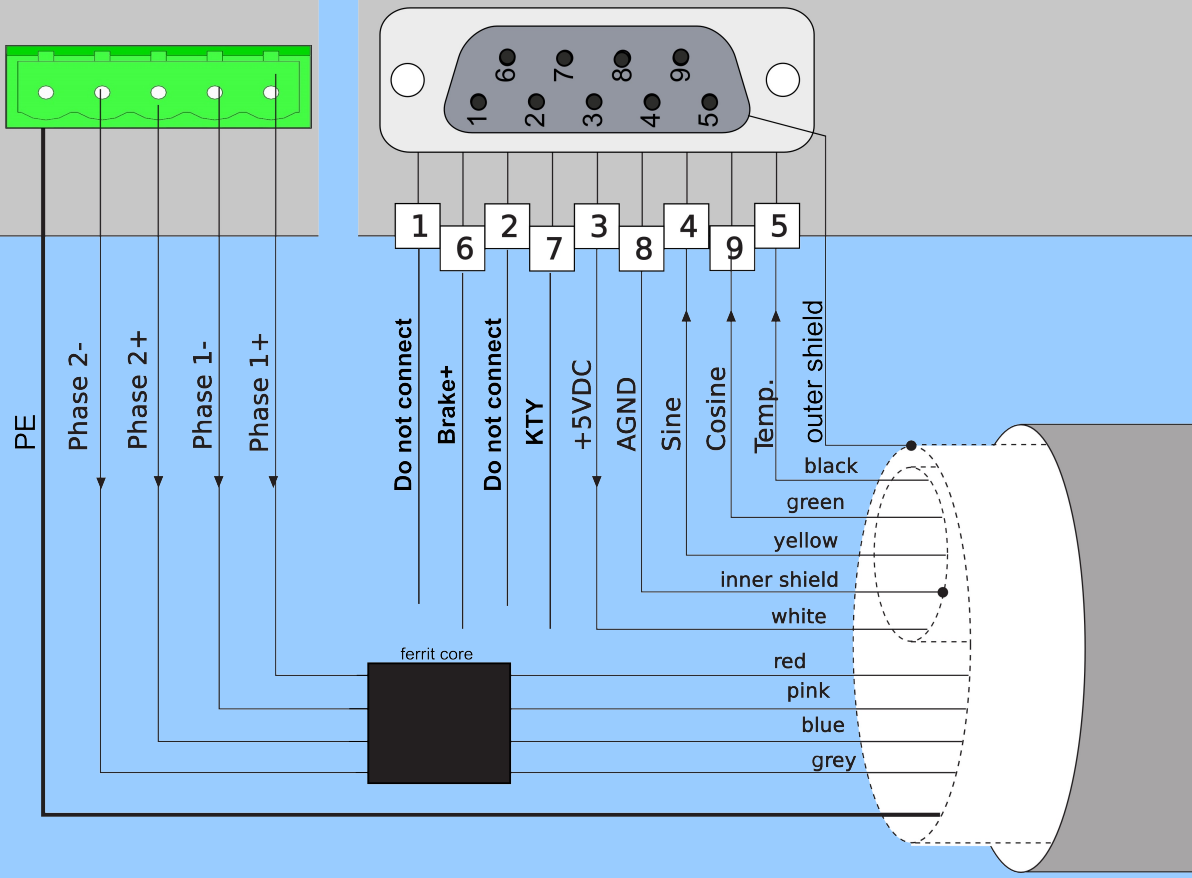
7.3 X2

X2	Motor Phases																		
	<table border="1"> <thead> <tr> <th></th> <th>LinMot Motor:</th> <th>3-phase EC-Motor:</th> </tr> </thead> <tbody> <tr> <td>PH1+</td> <td>Motor Phase 1+ red</td> <td>Motor Phase U red</td> </tr> <tr> <td>PH1-</td> <td>Motor Phase 1- pink</td> <td>Motor Phase V pink</td> </tr> <tr> <td>PH2+</td> <td>Motor Phase 2+ blue</td> <td>Motor Phase W blue</td> </tr> <tr> <td>PH2-</td> <td>Motor Phase 2- grey</td> <td>Motor Phase X grey</td> </tr> <tr> <td>PE/SCRN</td> <td>Protective Earth / Shield</td> <td>Shield</td> </tr> </tbody> </table>		LinMot Motor:	3-phase EC-Motor:	PH1+	Motor Phase 1+ red	Motor Phase U red	PH1-	Motor Phase 1- pink	Motor Phase V pink	PH2+	Motor Phase 2+ blue	Motor Phase W blue	PH2-	Motor Phase 2- grey	Motor Phase X grey	PE/SCRN	Protective Earth / Shield	Shield
	LinMot Motor:	3-phase EC-Motor:																	
PH1+	Motor Phase 1+ red	Motor Phase U red																	
PH1-	Motor Phase 1- pink	Motor Phase V pink																	
PH2+	Motor Phase 2+ blue	Motor Phase W blue																	
PH2-	Motor Phase 2- grey	Motor Phase X grey																	
PE/SCRN	Protective Earth / Shield	Shield																	
	<ul style="list-style-type: none"> Use 60/75°C copper conductors only Conductor cross-section: 0.5 – 2.5mm² (depends on Motor current) / AWG 21 -14 																		

7.4 X3

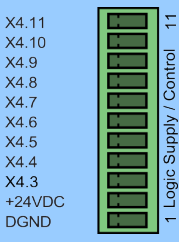
X3 Motor Sensor			
	<table border="0"> <tr> <td style="vertical-align: top;"> LinMot Motor: 1 Do not connect 2 Do not connect 3 +5VDC 4 Sensor Sine 5 Temp In 6 Brake+ 7 Do not connect 8 AGND 9 Sensor Cosine case Shield </td> <td style="vertical-align: top;"> EC Motor: Do not connect Do not connect +5VDC Sensor Sine / Hall Switch U Hall Switch W Brake+ KTY AGND Sensor Cosine / Hall Switch V Shield </td> </tr> </table>	LinMot Motor: 1 Do not connect 2 Do not connect 3 +5VDC 4 Sensor Sine 5 Temp In 6 Brake+ 7 Do not connect 8 AGND 9 Sensor Cosine case Shield	EC Motor: Do not connect Do not connect +5VDC Sensor Sine / Hall Switch U Hall Switch W Brake+ KTY AGND Sensor Cosine / Hall Switch V Shield
LinMot Motor: 1 Do not connect 2 Do not connect 3 +5VDC 4 Sensor Sine 5 Temp In 6 Brake+ 7 Do not connect 8 AGND 9 Sensor Cosine case Shield	EC Motor: Do not connect Do not connect +5VDC Sensor Sine / Hall Switch U Hall Switch W Brake+ KTY AGND Sensor Cosine / Hall Switch V Shield		
DSUB-9 (f)	<p>Note: Use +5V (X3.3) and AGND (X3.8) only for motor internal hall sensor supply (max. 100mA). Cable length < 30m. Brake+: 24V / max. 100mA, Peak 370mA (will shut down if exceeded)</p> <p>Caution: Do NOT connect AGND (X3.8) to ground or earth!</p>		

X2
X3

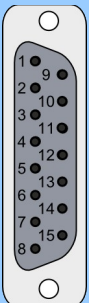


Use Y-style motor cables only (for example K15-Y/C)! A W-style cable has a different shielding, so it cannot be modified to a Y-style cable!

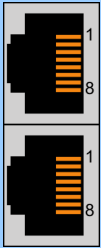
7.5 X4

X4		Logic Supply / IO Connection		
	11	AnIn-	X4.11	Configurable Analog Input differential (with X4.10)
	10	AnIn+	X4.10	Configurable Analog Input differential (with X4.11)
	9	AnIn	X4.9	Configurable Analog Input single ended
	8	In	X4.8	Configurable Input
	7	In	X4.7	Configurable Input
	6	In	X4.6	Configurable Input
	5	In	X4.5	Configurable Input
	4	Out	X4.4	Configurable Output
	3	Out	X4.3	Configurable Output
	2	+24VDC	Supply	Logic Supply 22-26 VDC
	1	GND	Supply	Ground
<p>Spring cage connector (has to be ordered separately: see chapter 13)</p>	<p>Inputs (X4.5 .. X4.8): 24V / 5mA (Low Level: -0.5 to 5VDC, High Level: 15 to 30VDC) Outputs (X4.3 & X4.4): 24V / max.100mA, Peak 370mA (will shut down if exceeded) Analog inputs: 12 bit A/D converted. X4.9: Single ended analog input to GND, 0..10V X4.10/X4.11: Differential analog input, +/- 10V. Common mode range: +/- 5VDC to GND.</p> <p>Supply 24V / typ. 0.7A / max. 1.61A (if all outputs "on" with max. load.) - Use 60/75°C copper conductors only - Conductor cross-section max. 1.5mm² - Stripping length: 10mm</p>			

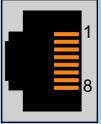
7.6 X13

X13		External Position Sensor Differential Hall Switches			
		ABZ with Hall Switches		SSI	
	1	+5V DC		+5V DC	
	2	9	A-	A+	
	3	10	B-	B+	
	4	11	Z-	Z+	
	5	12	Encoder Alarm		Encoder Alarm
	6	13	U-	U+	nc
	7	14	V-	V+	nc
	8	15	W-	W+	Clk+
	8	case	Shield		Clk- Shield
	DSUB-15 (f)	<p><u>Position Encoder Inputs (RS422):</u> Max. counting frequency: 25 M counts/s with quadrature decoding. A minimum of 40ns edge separation must be guaranteed by the encoder under any circumstances! The maximal frequency of each signal is 6.25 MHz.</p> <p><u>Differential Hall Switch Inputs (RS422):</u> Input Frequency: <1kHz</p> <p><u>Enc. Alarm In:</u> 5V / 1mA</p> <p><u>Sensor Supply:</u> 5VDC max 100mA</p>			


7.7 X17 - X18

X17 - X18		RealTime Ethernet 10/100 Mbit/s
	X17 RT ETH	Specification depends on RT-Bus Type. Please refer to according documentation.
	X18 RT ETH	
RJ-45		

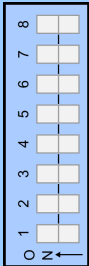
7.8 X19

X19		System
	1	(Do not connect)
	2	(Do not connect)
	3	RS232 Rx
	4	GND
	5	GND
	6	RS232 Tx
	7	(Do not connect)
	8	(Do not connect)
	case	Shield
RJ-45	Use isolated USB-RS232 converter (Art.-No. 0150-2473) for configuration over RS232.	

7.9 X33

X33		Safety Relays (only with the -1S option)		
X33.4/8 Ksr+ X33.3/7 Ksr- X33.2/6 Ksr f+ X33.1/5 Ksr f-		STO Relays	4 / 8 Ksr + 3 / 7 Ksr - 2 / 6 Ksr f+ 1 / 5 Ksr f-	Safety Relay 1 / 2 Input positive Safety Relay 1 / 2 Input negative Safety Relay 1 / 2 feedback positive Safety Relay 1 / 2 feedback negative
Spring cage connector (has to be ordered separately: see chapter 13)		- Use 60/75°C copper conductors only - Conductor cross-section max. 1.5mm ² - Stripping length: 10mm - Never connect the safety relays to the logic supply of the drive!		





7.10 S1 - S2

S1 - S2		Address Selectors
	S1 (5..8)	Bus ID High (0 ... F). Bit 5 is the LSB, bit 8 the MSB.
	S2 (1..4)	Bus ID Low (0 ... F). Bit 1 is the LSB, bit 4 the MSB. Setting the ID high & low to FF resets the drive to manufacturer settings!
The use of these switches depends on the type of fieldbus which is used. Please see the corresponding manual for further information.		



7.11 S5

S5		Bootstrap
S5	Bootstrap	





7.12 LEDs

LEDs	State Display	
Error   24VOK Warn   EN	Green Yellow Yellow Red	24V Logic Supply OK Motor Enabled / Error Code Low Nibble Warning / Error Code High Nibble Error

7.13 RT BUS LEDs

RT Bus LEDs	RT Bus State Display	
 	Green Red	OK Error
The use of these LEDs depends on the type of fieldbus which is used. Please see the corresponding manual for further information.		

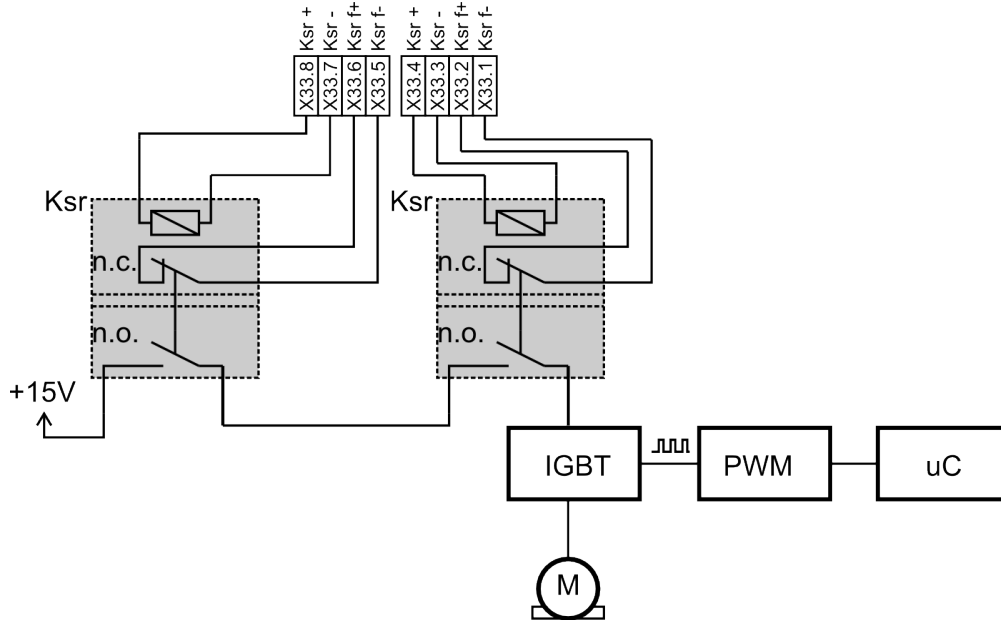
8 LED Blink Codes

LED Blink Codes			
Error   24VOK Warn   EN			
Error	Warn	EN	Description
Off	Warning	Operation Enabled	Normal Operation: Warnings and operation enabled are displayed.
On	<ul style="list-style-type: none"> • ~2Hz 0..15 x Error Code High Nibble 	<ul style="list-style-type: none"> • ~2Hz 0..15 x Error Code Low Nibble 	Error: The error code is shown by a blink code with "WARN" and "EN". The error byte is divided into low and high nibble (= 4 bit). "WARN" and "EN" are blinking together. The error can be acknowledged. (e.g.: WARN blinks 3x, EN blinks 2x; Error Code = 32h)
<ul style="list-style-type: none"> • ~2Hz 	<ul style="list-style-type: none"> • ~2Hz 0..15 x Error Code High Nibble 	<ul style="list-style-type: none"> • ~2Hz 0..15 x Error Code Low Nibble 	Fatal Error: The error code is shown by a blink code with "WARN" and "EN". The error byte is divided into low and high nibble. "WARN" and "EN" are blinking together. Fatal errors can only be acknowledged by a reset or power cycle. (e.g.: WARN blinks 3x, EN blinks 2x; Error Code = 32h)
<ul style="list-style-type: none"> • ~4Hz 	<ul style="list-style-type: none"> • ~2Hz 0..15 x Error Code High Nibble 	<ul style="list-style-type: none"> • ~2Hz 0..15 x Error Code Low Nibble 	System Error: Please reinstall firmware or contact support.
<ul style="list-style-type: none"> • ~0.5Hz 	<ul style="list-style-type: none"> • ~0.5Hz 	On	Signal Supply 24V too low: The error and warn LEDs blink alternating if the signal supply +24V (X4.2) is less than 18VDC.
Off	*•••	•*••	Plug&Play Communication Active This sequence (Warn on, then En on, then both off, complete sequence of the 4 states ca. 1Sec) signalizes the state when the plug and play parameters are being read from the motor.
<ul style="list-style-type: none"> *• ~4Hz 	<ul style="list-style-type: none"> •* ~4Hz 	off	Waiting for Defaulting Parameters When ID (S1, S2) is set to 0xFF, the drive starts up in a special mode and the Error and Warn LED blink alternating ~4Hz. When the ID ist set to 0x00, all parameters will be set to their default value. To leave this state, power down the drive and change the ID. Also see in the Usermanual_LinMot-Talk under chapter trouble shooting.
Off	<ul style="list-style-type: none"> *• ~2Hz 	<ul style="list-style-type: none"> *• ~2Hz 	Defaulting Parameters Done When the parameters have set to their default values (initiated via S1/S2 on power up) the Warn and En LEDs blink together at 2 Hz. To leave this state, power down the drive. Also see in the Usermanual_LinMot-Talk under chapter trouble shooting.

The meaning of the error codes can be found in the Usermanual_MotionCtrl_Software_SG5 and the user manual of the installed interface software. These documents are provided together with LinMot-Talk configuration software and can be downloaded from www.linmot.com.

9 Safety Wiring

The C1250 drives with the -1S option have internal safety functions: Two Safety relays Ksr, which support the supply voltage for the motor drivers. There are also two feedback contacts for each relay.



To enable the -1S drives both relays have to be switched on.

Minimal wiring:

- Connect X33.8 and X33.4 to 24VDC (from safety)
- Connect X33.7 and X33.3 to GND (from safety)



Attention: Never connect X33.8 and X33.4 to the logic supply of X4!

If an over voltage protection is needed, it must be provided externally and sized according the safety circuit of the machine!

Attention: The drop out time of the relays is depending on the external circuitry!

Safety Relay Ksr	
Nominal voltage	24 VDC
Min. pick-up voltage at 20°C	≤ 16.8V
Drop-out voltage at 20°C	≥ 2.4 V
Drop-out time (no protection circuit)	Typ. 3ms
Coil resistance at 20°C	2'100 Ω ± 10%
Type	EN 50205, type A
Contact lifetime	> 10'000'000
Manufacturer and type	Elesta relays / SIS112 24VDC

Drive Classification according EN ISO 13849-1 (safety of machinery) (preliminary)	
Category	cat = 3
Performance Level	PL = d
Diagnostic Coverage	DC = high (99%)
Mean Time to hazardous failure of one channel	MTTFd = high (100 years typically, see calculation example below)

DC (Diagnostic Coverage) is high (99%) assuming that the state of the feedback contacts is checked after each change of the state of the control contacts.

MTTF_d mainly depends on the number of operations of the safety relays.

Example calculation of MTTF_d:

Assuming that the safety function is requested every 20s on a machine running 24h per day and 7 days per week.

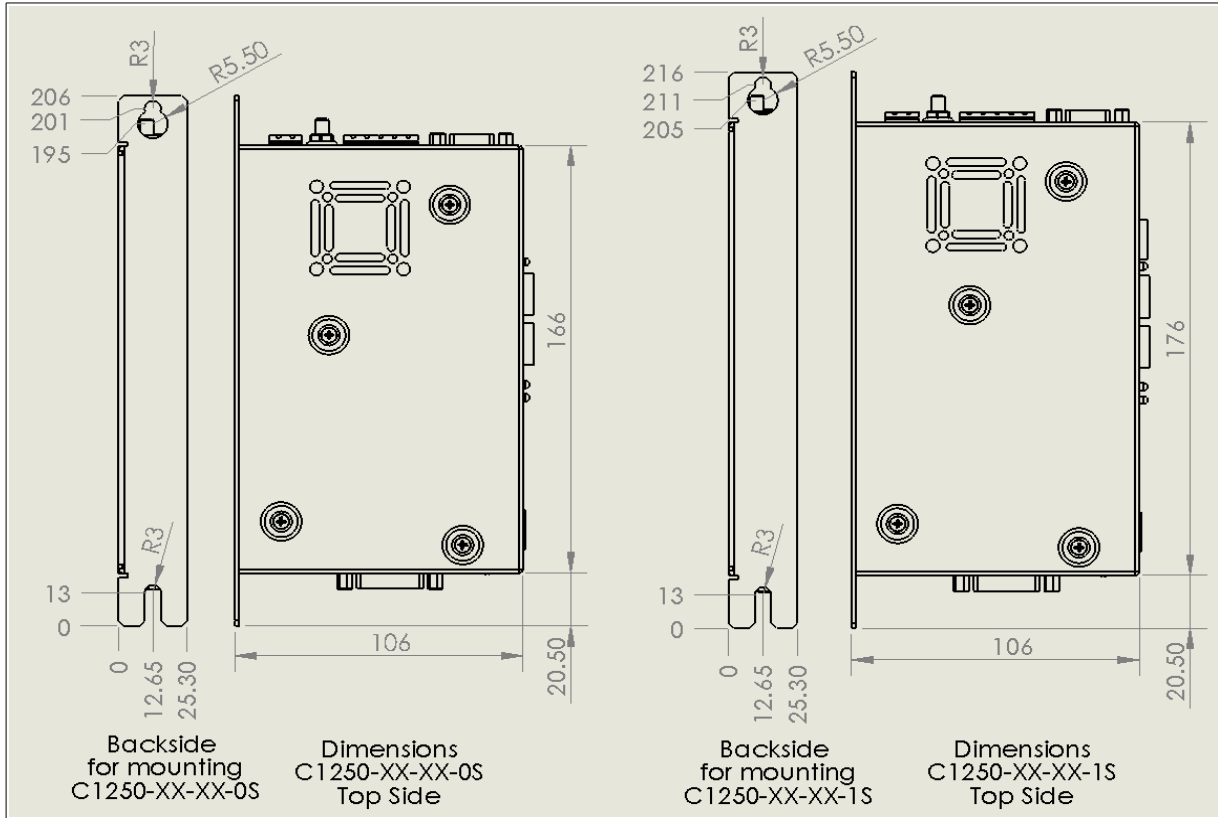
$$B_{10} = 10'000'000$$

$$B_{10d} = 20'000'000 \text{ (according EN ISO 13849-1:2008 table C.1)}$$

$$n_{op} = (24\text{h/day} \cdot 365.25\text{days/year} \cdot 3600\text{s/h}) / 20\text{s} = 1'577'880 \text{ operations per year}$$

$$\begin{aligned} \text{MTTF}_d &= B_{10d} / (0.1 \times n_{op}) = 126.75 \text{ years (this has to be limited to 100years} \\ &\quad \text{according the standard for further calculations)} \\ &= \text{high (100 years)} \end{aligned}$$

10 Physical Dimensions



C1250 Series single axis drive		C12xx-xx-XC-0S	C12xx-xx-XC-1S
Width	mm (in)	25.3 (1.0)	
Height	mm (in)	166 (6.54)	176 (6.93)
Height with fixings	mm (in)	206 (8.11)	216 (8.5)
Depth	mm (in)	106 (4.17)	
Weight	g (lb)	630 (1.4)	700 (1.54)
Mounting Screws		2 x M5	2 x M5
Mounting Distance	mm (in)	188 (7.4)	198 (7.8)
Case	IP	20	
Storage Temperature	°C	-25...40	
Transport Temperature	°C	-25...70	
Operating Temperature	°C	0...40	
Relative humidity	%	95 (non-condensing)	
Pollution	IEC/EN 60664-1	Pollution degree 2	
Shock resistance (16ms)	-1S option		3.5g
Vibration resistance (10-200Hz)	-1S option		1g
Max. Case Temperature	°C	70	
Max. Power Dissipation	W	33	
Mounting place		In the control cabinet	
Mounting position		vertical	
Distance between Drives	mm (in)	Without Power Derating: 20 (0.8) horizontal / 50 (2) vertical With Power Derating: 5 (0.2) horizontal / 20 (0.8) vertical	

11 Power Supply Requirements

Motor Power Supply



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

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...). Due to high braking voltage and sudden load variations of linear motor applications, **only compatible power supplies can be used (see Ordering Information on page 20).**

Signal Power Supply

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

Current consumption:

- min. 0.5A (no load on the outputs)
- typ. 0.7A (all 2 outputs "on" with 100mA load and /Brake with no load)
- max. 1.61A (all 2 outputs "on" with 370mA peak load and /Brake with 370mA peak load)



**Do not connect the safety relays to the 24VDC Signal Supply!
Use a separate power supply for the safety circuit!**

12 Regeneration of Power

If the power supply rises too high when braking, connect an additional capacitor to the motor power supply. It is recommended to use a capacitor $\geq 10'000 \mu\text{F}$ (install capacitor close to the drive supply!)

13 Ordering Information

Drive	Description	Art. No.
C1250-PN-XC-0S-000	PROFINET Drive (72V/25A)	0150-1888
C1250-PD-XC-0S-000	PROFINET Profidrive Drive (72V/25A)	0150-2618
C1250-IP-XC-0S-000	ETHERNET IP Drive (72V/25A)	0150-1886
C1250-LU-XC-0S-000	ETHERNET LinUDP Drive (72V/25A)	0150-2491
C1250-EC-XC-0S-000	ETHERCAT Drive (72V/25A)	0150-1884
C1250-DS-XC-0S-000	ETHERCAT CiA402 Drive (72V/25A)	0150-2415
C1250-SE-XC-0S-000	ETHERCAT SoE Drive (72V/25A)	0150-1897
C1250-PL-XC-0S-000	POWERLINK Drive (72V/25A)	0150-1885
C1250-SC-XC-0S-000	SERCOS III Drive (72V/25A)	0150-1887
C1250-PN-XC-1S-000	PROFINET Drive (72V/25A/STO)	0150-2348
C1250-PD-XC-1S-000	PROFINET Profidrive Drive (72V/25A/STO)	0150-2619
C1250-IP-XC-1S-000	ETHERNET IP Drive (72V/25A/STO)	0150-2346
C1250-LU-XC-1S-000	ETHERNET LinUDP Drive (72V/25A/STO)	0150-2492
C1250-EC-XC-1S-000	ETHERCAT Drive (72V/25A/STO)	0150-2345
C1250-DS-XC-1S-000	ETHERCAT CiA402 Drive (72V/25A/STO)	0150-2416
C1250-SE-XC-1S-000	ETHERCAT SoE Drive (72V/25A/STO)	0150-2350
C1250-PL-XC-1S-000	POWERLINK Drive (72V/25A/STO)	0150-2347
C1250-SC-XC-1S-000	SERCOS III Drive (72V/25A/STO)	0150-2349
Accessories	Description	Art. No.
DC01-C1X00-0S/X1/X4	Drive Connector Set for C1X00-0S	0150-3527
DC01-C1X00-1S/X1/X4/X33	Drive Connector Set for C1X00-1S	0150-3528
DC01-C1X00/X1	Drive Connector for PWR 72VDC Input	0150-3525
DC01-C1X00/X2	Drive Connector Motor Phases	0150-3526
DC01-Signal/X4	Drive Connector 24VDC & Logic	0150-3447
DC01-Safety/X33	Drive Connector Safety	0150-3451
Isolated USB-RS232 converter	Isolated USB RS232 converter with config. cable	0150-2473
Compatible Power Supplies		Art. No.
S01-72/1000	Power Supply 72V/1000W, 3x340-550VAC	0150-1872
S01-72/500	Power Supply 72V/500W, 1x120/230VAC	0150-1874
S01-48/1000	Power Supply 48V/1000W, 3x340-550VAC	0150-????
S01-48/500	Power Supply 48V/500W, 1x120/230VAC	0150-????
S01-24/1000	Power Supply 24V/1000W, 3x340-550VAC	0150-????
S01-24/500	Power Supply 24V/500W, 1x120/230VAC	0150-????
T01-72/420-Multi	T-Supply 72V/420VA, 3x230/400/480VAC	0150-1869
T01-72/900-Multi	T-Supply 900VA, 3x230/400/480 VAC	0150-1870
T01-72/1500-Multi	T-Supply 1500VA, 3x230/400/480 VAC	0150-1871
T01-72/420 -1ph	T-Supply 420VA, 1x208/220/230/240VAC	0150-1859



Bold items are strongly recommended accessories!




ATTENTION: The connectors have to be ordered separately and are not included with the drive!

Use isolated USB RS232 converter for configuration!

14 International Certifications

Certifications	
<p>Europe</p> 	<p>See chapter “16 EC Declaration of Conformity CE-Marking“</p>
<p>IECEE CB SCHEME</p>	<p>Ref. Certif. No. CH-7685</p>
<p>USA / Canada</p> 	<p>All products marked with this symbol are tested and recognized by Underwriters Laboratories and the production facilities are checked quarterly by an UL inspector. This mark is valid for the USA and Canada and eases certification of your machines and systems in these areas. File number E316095 UL 508C Power Conversion Equipment CSA C22.2 Industrial Control Equipment</p>

	Ref. Certif. No.
	CH-7685

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

SYSTEME CEI D'ACCEPTATION MUTUELLE DE CERTIFICATS D'ESSAIS DES EQUIPMENTS ELECTRIQUES (IECEE) METHODE OC

CB TEST CERTIFICATE / CERTIFICAT D'ESSAI OC

Product
Produit

Servo drive unit

Name and address of the applicant
Nom et adresse du demandeur

NTI AG Linmot Switzerland
Haerdlistrasse 15
CH-8957 Spreitenbach

Name and address of the manufacturer
Nom et adresse du fabricant

NTI AG Linmot Switzerland
Haerdlistrasse 15
CH-8957 Spreitenbach

Name and address of the factory
Nom et adresse de l'usine

NTI AG Linmot Switzerland
Haerdlistrasse 15
CH-8957 Spreitenbach

Note: When more than one factory, please report on page 2
Note: Lorsque il y plus d'une usine, veuillez utiliser la 2^{ème} page

Ratings and principal characteristics
Valeurs nominales et caractéristiques principales

Additional Information on page 2

Motor supply: 72 VDC (24 – 85 VDC), 15 A
Logic supply: 24 VDC (22 – 26 VDC), 3 A
Class I

Trade mark (if any)
Marque de fabrique (si elle existe)

LinMot

Type of Manufacturer's Testing Laboratories used
Type de programme du laboratoire d'essais constructeur

Model / Type Ref.
Ref. de type

C1250 Servo Drive / C1250-IP-XC-1S-000

Additional information (if necessary may also be reported on page 2)
Les informations complémentaires (si nécessaire, peuvent être indiqués sur la 2^{ème} page

Additional Information on page 2

A sample of product was tested and found to be in conformity with IEC
Un échantillon de ce produit a été essayé et a été considéré conforme à la CEI

61000-6-2(ed.2)
61000-6-4(ed.2);am1

National differences / Comments
Les différences nationales / Commentaires

EU Group Differences;
EU Special National Conditions;
EU A-Deviations

As shown in the Test Report Ref. No. which forms part of this Certificate
Comme indiqué dans le Rapport d'essais numéro de référence qui constitue partie de ce Certificat

14-IK-0141.E03

This CB Test Certificate is issued by the National Certification Body
Ce Certificat d'essai OC est établi par l'Organisme National de Certification

Electrosuisse
Luppenstrasse 1,
CH-8320 Fehraltorf



Signed by: Martin Plüss
2014-12-03



electro
SUISSE

page 1 of 2



Ref. Certif. No.

CH-7685

Additional information (if necessary)
Information complémentaire (si nécessaire)

Type list

Type	Modelnumber	Ratings	
C1250-PN-XC-0S-000	0150-1888	PROFINET Drive	(72 VDC/25 A)
C1250-PD-XC-0S-000	0150-2618	PROFINET Profidrive Drive	(72 VDC/25 A)
C1250-IP-XC-0S-000	0150-1886	ETHERNET IP Drive	(72 VDC/25 A)
C1250-EC-XC-0S-000	0150-1884	ETHERCAT Drive	(72 VDC/25 A)
C1250-DS-XC-0S-000	0150-2415	ETHERCAT CiA402 Drive	(72 VDC/25 A)
C1250-SE-XC-0S-000	0150-1897	ETHERCAT SoE Drive	(72 VDC/25 A)
C1250-PL-XC-0S-000	0150-1885	POWERLINK Drive	(72 VDC/25 A)
C1250-SC-XC-0S-000	0150-1887	SERCOS III Drive	(72 VDC/25 A)
C1250-PN-XC-1S-000	0150-2348	PROFINET Drive	(72 VDC/25 A/STO)
C1250-PD-XC-1S-000	0150-2619	PROFINET Profidrive Drive	(72 VDC/25 A/STO)
C1250-IP-XC-1S-000	0150-2346	ETHERNET IP Drive	(72 VDC/25 A/STO)
C1250-EC-XC-1S-000	0150-2345	ETHERCAT Drive	(72 VDC/25 A/STO)
C1250-DS-XC-1S-000	0150-2416	ETHERCAT CiA402 Drive	(72 VDC/25 A/STO)
C1250-SE-XC-1S-000	0150-2350	ETHERCAT SoE Drive	(72 VDC/25 A/STO)
C1250-PL-XC-1S-000	0150-2347	POWERLINK Drive	(72 VDC/25 A/STO)
C1250-SC-XC-1S-000	0150-2349	SERCOS III Drive	(72 VDC/25 A/STO)

Nomenclature

Code	Description
C1200-	Drive type (Equipment containing Ethernet has an xxx50)
GP-	Interface
LC-	Power output
0S-	Functional safety option
000	Individual extension (e.g. customer related firmware option etc.)

Interfaces			Power output	
Code	Abbr.	Description	Code	Description
0	GP	General Purpose	LC	8 A peak
0	CO	CANopen	HC	15 A peak
0	DN	DeviceNet	XC	25 A peak
10	VF	Velocity and Force	UC	32 A peak
30	DP	PROFIBUS DP		
50	EC	ETHERCAT		
50	PN	ProfiNet		
50	SE	SERCOS over ETHERCAT		
50	PL	POWERLINK		
50	PN	Profinet		
50	PD	Profinet mit Profidrive		
50	IP	ETHERNET IP		
50	SC	SERCOS III		

This CB Test Certificate is issued by the National Certification Body
Ce Certificat d'essai OC est établi par l'Organisme National de Certification

Electrosuisse
Luppenstrasse 1,
CH-8320 Fehraltorf

Signed by: Martin Plüss
2014-12-03



CERTIFICATE OF COMPLIANCE

Certificate Number 20140317-E316095
Report Reference E316095-20140307
Issue Date 2014-March-17

Issued to: NTI AG
 HAERDLISTRASSE 15,
 8957 SPREITENBACH SWITZERLAND

This is to certify that representative samples of COMPONENT - POWER CONVERSION EQUIPMENT
 SEE ADDENDUM PAGE FOR MODELS

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: UL 508C - Power Conversion Equipment
 CSA C22.2 NO. 14-13- INDUSTRIAL CONTROL EQUIPMENT.

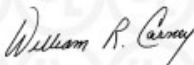
Additional Information: See the UL Online Certifications Directory at www.ul.com/database for additional information

Only those products bearing the UL Recognized Component Marks for the U.S. and Canada should be considered as being covered by UL's Recognition and Follow-Up Service and meeting the appropriate U.S. and Canadian requirements.

The UL Recognized Component Mark for the U.S. generally consists of the manufacturer's identification and catalog number, model number or other product designation as specified under "Marking" for the particular Recognition as published in the appropriate UL Directory. As a supplementary means of identifying products that have been produced under UL's Component Recognition Program, UL's Recognized Component Mark: , may be used in conjunction with the required Recognized Marks. The Recognized Component Mark is required when specified in the UL Directory preceding the recognitions or under "Markings" for the individual recognitions. The UL Recognized Component Mark for Canada consists of the UL Recognized Mark for Canada: , and the manufacturer's identification and catalog number, model number or other product designation as specified under "Marking" for the particular Recognition as published in the appropriate UL Directory.

Recognized components are incomplete in certain constructional features or restricted in performance capabilities and are intended for use as components of complete equipment submitted for investigation rather than for direct separate installation in the field. The final acceptance of the component is dependent upon its installation and use in complete equipment submitted to UL LLC.

Look for the UL Recognized Component Mark on the product.



William R. Carney, Director, North American Certification Programs
 UL LLC

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CERTIFICATE OF COMPLIANCE


Certificate Number 20140317-E316095
Report Reference E316095-20140307
Issue Date 2014-March-17

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Open type Power Conversion Equipment Models:

- Model A, may be followed by P, followed by 11, followed by 00, 30 or 50, followed by -, followed by GP, PL, PN, SC, IP, EC, SE, PD, DP, VA, CO, CD, DN, DS, CM, or LU, followed by -, followed by LC, followed by -0S, may be followed by - and any characters.

- Model C, may be followed by P, followed by 11 or 12, followed by 00, 30 or 50, followed by -, followed by GP, PL, PN, SC, IP, EC, SE, PD, DP, VA, CO, CD, DN, DS, CM, or LU, followed by -, followed by XC, followed by -0S or -1S, may be followed by - and any characters.



William R. Carney, Director, North American Certification Programs
UL LLC

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Declaration of Conformity to the EtherNet/IP™ Specification

ODVA hereby issues this Declaration of Conformity to *The EtherNet/IP™ Specification* for the product(s) described below. The Vendor listed below (the "Vendor") holds a valid Terms of Usage Agreement, which is incorporated herein by reference, for the EtherNet/IP Technology from ODVA, thereby agreeing that it is the Vendor's ultimate responsibility to assure that its EtherNet/IP Compliant Products conform to *The EtherNet/IP Specification* and that *The EtherNet/IP Specification* is provided by ODVA to the Vendor on an AS IS basis without warranty. NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE BEING PROVIDED BY ODVA.

In recognition of the below EtherNet/IP Compliant Product(s) having been EtherNet/IP Conformance Tested at ODVA-authorized Test Service Provider and having received a passing result from ODVA at the Composite Test Revision Level specified below, this Declaration of Conformity authorizes the Vendor to use the EtherNet/IP Certification Marks in conjunction with the specific EtherNet/IP Compliant Product(s) described below, for so long as the Vendor's Terms of Usage Agreement for the EtherNet/IP Technology remains valid.



EtherNet/IP CONFORMANCE TESTED™

Certification Logo Mark

Certification Word Mark

This Declaration of Conformity is issued on February 2, 2015 on behalf of ODVA by:

Katherine Voss
Executive Director

Vendor Information				
Vendor Name	NTI Limited			
Test Information				
Test Date	December 11, 2014			
Composite Test Revision	CT11			
ODVA File Number	11332.01			
Product Information				
Network Category: Node				
Identity Object Instance				
Vendor ID (Attribute 1)	589			
Device Type (Attribute 2)	0x2B			
Device Profile Name	Generic Device (keyable)			
Products Covered under this Declaration of Conformity (Identity Object Instance)				
No.	Product Code (Attribute 3)	Product Name (Attribute 7)	Product Revision (Attribute 4)	SOC File Name
1	1886	C1250IPXC0S	1.001	C1250IPXC0S.stc
2	2346	C1250IPXC1S	1.001	C1250IPXC1S.stc
3	1761	E1250-IP-UC	1.001	Not Tested
4	1782	E1450IPQN0S	1.001	Not Tested
5	2354	E1450IPQN1S	1.001	Not Tested
6	2610	C1450IPQN0S	1.001	Not Tested
7	2611	C1450IPQN1S	1.001	Not Tested
8	2612	C1450IPQD0S	1.001	Not Tested
9	2613	D1450IPVROS	1.001	Not Tested
10	2614	D1450IPQD0S	1.001	Not Tested
11	2615	D1250IPXC0S	1.001	Not Tested

EtherNet/IP and EtherNet/IP CONFORMANCE TESTED logo mark and word mark are trademarks of ODVA, Inc.

15 Safety notes for the installation according UL

Markings:

- **Wiring terminal markings:**
See markings on the enclosure and the corresponding chapters in the installation guide!
- **Cautionary Marking:**
See markings on the enclosure and the corresponding chapters in the installation guide!
- **Motor overload protection must be provided externally in the end-use.** Motor Overload protection can alternatively be provided when the connected motor has a thermal sensor rated 5V DC, max. 100mA which is connected to the drive thermal sensor input (X3). (The LinMot P01-Motors are therefore protected by the drive)
- **The transients have to be limited to max. 0.8kV on the line side of the drive.**
- **The 24VDC supply for the control circuit must be protected with an external UL Listed 3A DC Fuse.**
- **Proposed ratings, to be evaluated in the end-use:**
 - **Input Voltage:** 72VDC
 - **Input current:** 15A
 - **Output Voltage:** 61.5V rms
 - **Output Current:** 17.7A rms max.
 - **Number of Phases:** 2 by 1 Phase
 - **Frequency range:** 0-500Hz
 - **Duty cycle rating:** 10%
 - **Relays (only for -1S variant):**
 - **rated Contacts:** max. 24VDC 6A.
 - **Coil:** 24VDC
 - **Surrounding air temp:** max. 85°C
 - **Control Power (X4-2):** 24VDC
protected with an external UL Listed 3A DC Fuse
 - **Surrounding Air Temperature:** max. 50°C
- **A separate 24VDC power supply protected with an external UL Listed 3A DC Fuse connected to the output of the power supply must be used to protect the secondary control circuit (safety relays on X33)**

16 EC Declaration of Conformity CE-Marking

NTI AG / LinMot®
Haerdlistrasse 15
8957 Spreitenbach
Switzerland
Tel.: +41 (0)56 419 91 91
Fax: +41 (0)56 419 91 92

declares under sole responsibility the compliance of the products:

- **Drives of the Series C1250-xx-XC-xS-xxx**

with the **EMC Directive 2004/108/EC**.

Applied harmonized standards:

- **EN 61000-6-2: 2005 (Immunity for industrial environments)**
- **EN 61000-6-4: 2007 (Emission for industrial environments)**
- **EN 61326-3-2: 2008 (Functional safety)**

According to the EMC directive, the listed devices are not independently operable products.

Compliance of the directive requires the correct installation of the product, the observance of specific installation guides and product documentation. This was tested on specific system configurations.

The safety instructions of the manuals are to be considered.

These products are intended for installation in machines. Operation is prohibited until it has been determined that the machines in which these products are to be installed, conforms to the above mentioned EC directive.

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

Company: NTI AG
Spreitenbach, March 13, 2014



Dr. Ronald Rohner / CEO NTI AG

17 Contact Addresses**SWITZERLAND****NTI AG**

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CH-8957 Spreitenbach

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Web: <http://www.linmot.com/>

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204 E. Morrissey Dr.
Elkhorn, WI 53121

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262-743-2555

Tech. Support: 877-804-0718
262-743-1284

Fax: 800-463-8708
262-723-6688

E-Mail: usasales@linmot.com

Web: <http://www.linmotusa.com/>

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

Smart solutions are...

