



E14x0 V1 Rev. E and Rev. F Servo Drives Installation Guide

*Eine Deutsche Version kann unter <http://www.linmot.com> bezogen werden!
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This document applies to the following drives:

E1400-GP-QN-xS	E1430-DP-QN-xS
E1450-PL-QN-xS	E1450-EC-QN-xS
E1450-SE-QN-xS	E1450-PN-QN-xS
E1450-IP-QN-xS	E1450-SC-QN-xS



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



DC01-E1400/X4/X30
DC01-E1400/X4/X30/X33

Drive Connector Set for E1400-0S
Drive Connector Set for E1400-1S

0150-3452
0150-3453

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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

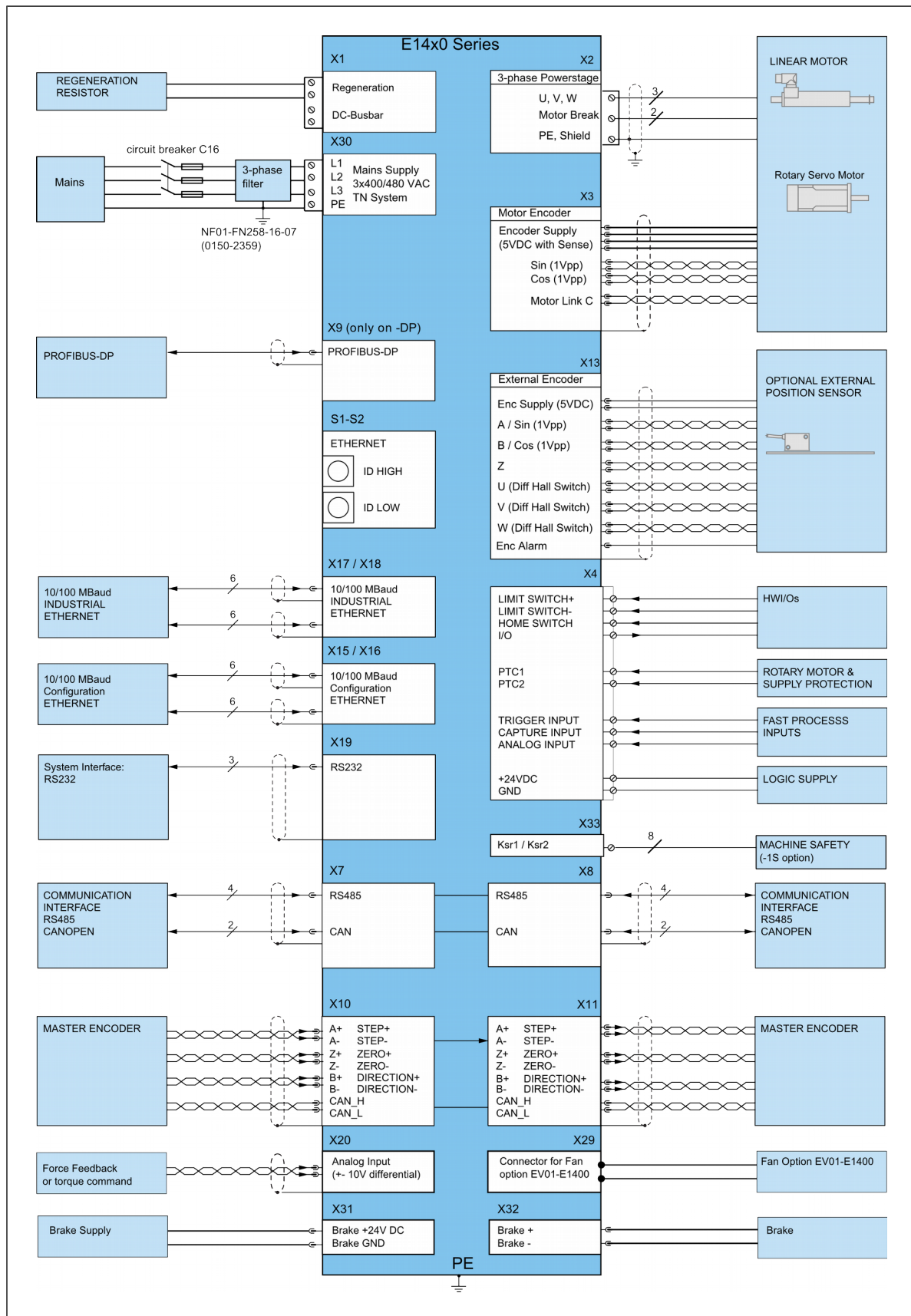


- Before working on the drive, check that no voltage is applied to the power terminals:
 - The power terminals U, V, W, DC+, DC-, RR+, and RR- remain live for at least 5 minutes after disconnecting from mains.
 - The power terminals L1, L2, L3; U, V, W, KTY+, KTY-, DC+, DC-, RR+ and RR- remain live when the motor is stopped.
- The leakage current to earth (PE) is >3.5 mA. According to EN 50178 a fixed installation is required and a double PE connection is required.



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

2 System Overview



Typical Servo System E14x0-XX: Servo Drive, Motor and Power Supply.

3 Functionality and Interfaces

	E1450-PL-QN-0S	E1450-PN-QN-0S	E1450-SC-QN-0S	E1450-IP-QN-0S	E1450-EC-QN-0S	E1430-DP-QN-0S	E1450-GP-QN-0S	E1450-PL-QN-1S	E1450-PN-QN-1S	E1450-SC-QN-1S	E1450-IP-QN-1S	E1450-EC-QN-1S	E1430-DP-QN-1S	E1400-GP-QN-1S
Supply Voltage														
Motor Supply 3x400 VAC / 3x480 VAC	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Logic Supply 24VDC (22...26VDC)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Motor Phase Current (preliminary)														
28A _{rms peak} (0-500Hz)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
4 A _{rms continuous} (0-500Hz) (without forced cooling)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
12 A _{rms continuous} (0-500Hz) (with fan option EV01-E1400)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
18 A _{rms continuous} (0-500Hz) (cold plate 20°C)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Controllable Motors														
LinMot P10-70x...(Motor Link C)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Selected motors (contact support)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Command Interface														
CANopen	•	•	•	•	•	•	•	•	•	•	•	•	•	•
LinRS	•	•	•	•	•	•	•	•	•	•	•	•	•	•
POWERLINK	•							•						
PROFINET		•							•					
SERCOS III			•							•				
ETHERNET IP				•							•			
LinUDP				•							•			
ETHERCAT					•							•		
PROFIBUS-DP						•							•	
Programmable Motion Profiles (Curves)														
Up to 99 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)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SinCos (1Vpp differential)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Absolute (SSI)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Synchronisation														
Master Encoder In/Out (RS422 up to 25 M counts/s)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Configuration Interface														
RS232	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ethernet 10/100 Mbit/s (2-Port Switch integrated)	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Integrated Safety Functions (-1S Option)														
STO (2 Safety Relays)								•	•	•	•	•	•	•

4 IP Address Selection

The default mode for acquiring an IP address is via DHCP. If no servers respond on the connected network, the drive switches to the IPv4 Link-Local addressing scheme (also known as APIPA on Windows systems). This way the drive automatically assigns itself an address within the range of 169.254.0.1 through 169.254.255.254 (Subnet Mask 255.255.0.0).

Please note that this process can take up to a minute until a valid address is assigned to the drive.

5 Power Supply and Grounding



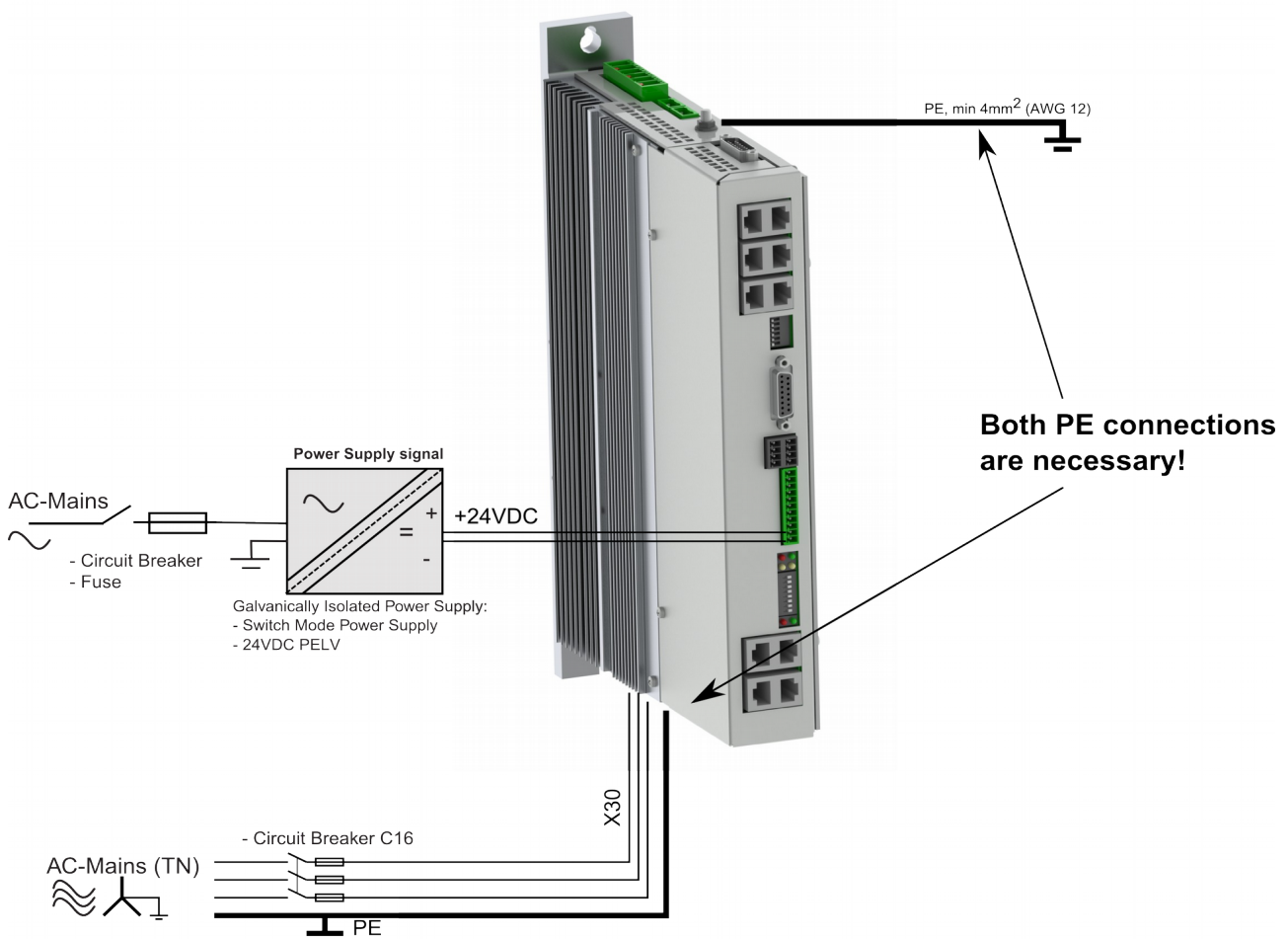
In order to assure a safe and error free operation, and to avoid severe damage to system components, **all system components must be well grounded to protective earth PE.** This includes both LinMot and all other control system components on the same ground bus.



The leakage current to earth (PE) is >3.5 mA. According to EN 50178 a fixed installation is required and **a double PE connection is required.** One PE connection is on X30, the second one is an M5 bolt on top of the housing.



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.)

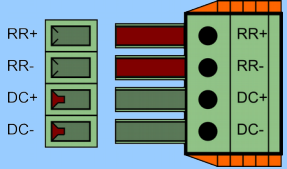


6 Description of the connectors / Interfaces

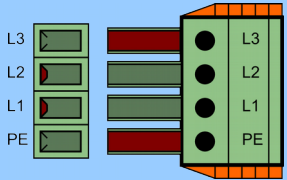
6.1 PE

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

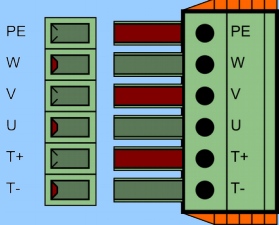
6.2 X1-V1 Rev. D/E

X1	DC Busbar/ Regeneration Resistor
	<p>RR+: Positive connection for Regeneration Resistor RR-: Negative connection for Regeneration Resistor DC+: DC busbar + DC-: DC busbar -</p> <p>Screw Terminals:</p> <ul style="list-style-type: none"> Tightening torque: 0.7 - 0.8 Nm (6.2 – 7.0 lbin) Use a cross-head screw driver (PH1) Use 60/75°C copper conductors only Conductor cross-section: 0.25 – 4 mm² (depends on Motor current) / AWG 24 -12 Stripping length 10mm

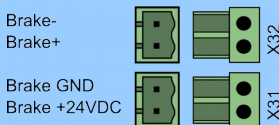
6.3 X30-V1 Rev. D/E

X30	Motor Supply Mains
	<p>L1 – L3: 3x400 / 3x480VAC 50/60 Hz PE: PE, Protective Earth</p> <p>Screw Terminals:</p> <ul style="list-style-type: none"> Tightening torque: 0.7 - 0.8 Nm (6.2 – 7.0 lbin) Use a cross-head screw driver (PH1) Use 60/75°C copper conductors only Conductor cross-section: 2.5 – 4 mm² (depends on Motor current) / AWG 24 -12 Stripping length 10mm

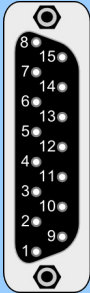
6.4 X2-V1 Rev. D/E

X2 Motor Phases	
	<p>PE: Protective Earth W: Motor Phase W V: Motor Phase V U: Motor Phase U T+: Temperature Sensor KTY+ (on DC- voltage level!) T-: Temperature Sensor KTY- (on DC- voltage level!)</p> <p>The Shield of the motor cable has to be mounted with a surface as large as possible (low ohm, low impedance). Use an EMC shield clamp for fixing.</p> <p>Attention: KTY+ and KTY- are not referenced to ground! They are on DC- voltage! An isolated thermistor is necessary! Especially LinMot D01 and D02 Motors can not be connected!</p> <p>Screw Terminals:</p> <ul style="list-style-type: none"> - Tightening torque: 0.7 - 0.8 Nm (6.2 – 7.0 lbin) - Use a cross-head screw driver (PH1) - Use 60/75°C copper conductors only - Conductor cross-section: 0.25 – 4 mm² (depends on Motor current) / AWG 24 -12 - Stripping length 10mm <p>Attention: The type of connector and pin assignment on V1 Rev. D and V2 drives is different from V1 (Rev. A-C) drives (different coding)!</p>


6.5 X31-X32

X31-X32 Motor Brake and Motor Brake Supply	
	<p>X32: Brake- Brake+</p> <p>X31: Brake Supply GND Brake Supply +24VDC</p>


6.6 X3-V2

X3 Motor Encoder (Motor Link C / BISS)	
	<p>8 Motor Link C -</p> <p>15 Motor Link C +</p> <p>7 Clock -</p> <p>14 Clock +</p> <p>6 Data -</p> <p>13 Data +</p> <p>5 GND</p> <p>12 do not connect</p> <p>4 GND Sense</p> <p>11 +5V Sense</p> <p>3 Cos-</p> <p>10 Cos+</p> <p>2 Sin-</p> <p>9 Sin+</p> <p>1 +5V</p> <p>case shield</p>
	DSUB-15 (m)
	Motor Link C is a high speed serial communication protocol to the motor encoder.

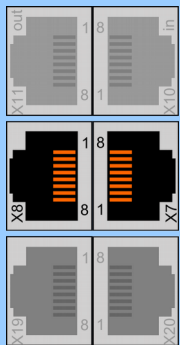
6.7 X4

X4 Logig Supply / IO Connection	
 <p>X4.11</p> <p>X4.10</p> <p>X4.9</p> <p>X4.8</p> <p>X4.7</p> <p>X4.6</p> <p>X4.5</p> <p>X4.4</p> <p>X4.3</p> <p>+24VDC</p> <p>DGND</p> <p>1 Logic Supply / Control</p>	<p>11 Input Quickstop Quickstop, PTC2 Input</p> <p>10 I/O X4.10 Configurable IO, PTC1 Input</p> <p>9 I/O X4.9 Configurable IO</p> <p>8 I/O X4.8 Configurable IO</p> <p>7 I/O X4.7 Configurable IO, Analog Input for EasySteps Application</p> <p>6 I/O X4.6 Configurable IO, Trigger Input</p> <p>5 I/O X4.5 Configurable IO</p> <p>4 I/O X4.4 Configurable IO, Analog Input (configurable as high imp. Input)</p> <p>3 I/O X4.3 Configurable IO</p> <p>2 +24VDC Supply Logic Supply 22-26 VDC</p> <p>1 GND Supply Ground</p>
	Spring cage connector
	<p>Inputs (X4.3 .. X4.11): 24V / 5mA (Low Level: -0.5 to 5VDC, High Level: 15 to 30VDC)</p> <p>Outputs (X4.3 .. X4.10): 24V / max.100mA, Peak 370mA (will shut down if exceeded)</p> <p>Supply 24V / type. 1.5A / max. 2.5A (if all outputs "on" with max. load.)</p> <p>- Use 60/75°C copper conductors only</p> <p>- Conductor cross-section max. 1.5mm²</p> <p>- Stripping length: 10mm</p> <p>- Internal Fuse (F2): 3AT (slow blow, Schurter OMT125, 3404.0118.xx, UL File Number: E41599)</p> <p>CAUTION: For continued protection against risk of fire, replace only with same type and rating of fuse.</p>

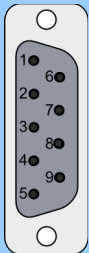
6.8 X33

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 3 / 7 2 / 6 1 / 5	Ksr + Ksr - Ksr f+ 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	- 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!			

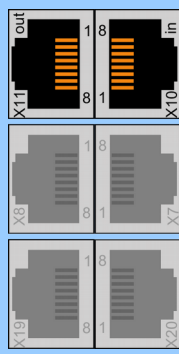
6.9 X7 - X8

X7 - X8 CMD (RS485/CAN)				
	1 2 X3 4 5 6 7 8 case	RS485_Rx+ RS485_Rx- RS485_Tx+ GND GND RS485_Tx- CAN_H CAN_L Shield	A B Y Z	
RJ-45	Use twisted pair (1-2, 3-6, 4-5, 7-8) cable for wiring. The built in RS485 and CAN terminations can be activated by S5.2 and S5.3. X7 is internally connected to X8 (1:1 connection)			

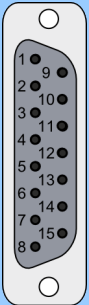
6.10 X9

X9 PROFIBUS DP (only available on E1430-DP-QN)				
	1 2 3 4 5 case	Not connected +5V Not connected Not connected RxD/TxD-P RxD/TxD-N CNTR-P Not connected GND Shield	 (isolated) (isolated)	
DSUB-9 (f)	Max. Baud rate: 12Mbaud			

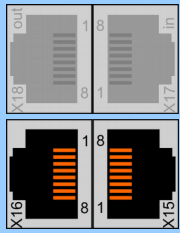
6.11 X10 - X11

X10 - X11		Master Encoder IN (X10) / Master Encoder OUT (X11)		
		<u>Incremental:</u>	<u>Step/Direction:</u>	<u>EIA/TIA 568A colors:</u>
	1	A+	Step+	Green/White
	2	A-	Step-	Green
	3	B+	Direction+	Orange/White
	4	Z+	Zero+	Blue
	5	Z-	Zero-	Blue/White
	6	B-	Direction-	Orange
	7	CAN_H	CAN_H	Brown/White
	8	CAN_L	CAN_L	Brown
	case	Shield	Shield	
RJ-45	<p>Use twisted pair (1-2, 3-6, 4-5, 7-8) cable for wiring.</p> <p><u>Master Encoder Inputs:</u> Differential RS422, max. 25 M counts/s, 40ns edge separation</p> <p><u>Master Encoder Outputs:</u> Amplified RS422 differential signals from Master Encoder IN (X10)</p> <p>The CAN bus can be terminated with S5.4.</p> <p>All devices, which are connected to X10/X11 must be referenced to the same ground.</p>			

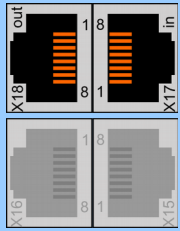
6.12 X13

X13		External Position Sensor Differential Hall Switches		
		1	+5V DC	
	9	A+		
	2	A-	B+	
	3	B-	Z+	
	4	Z-	Encoder Alarm	
	5	GND	U+	
	6	U-	V+	
	7	V-	W+	
	8	W-		
	case	Shield		
DSUB-15 (f)	<p><u>Position Encoder Inputs (RS422):</u> Max Input Frequency: 25 M counts/s with quadrature decoding, 40ns edge separation</p> <p><u>Encoder Simulation Outputs (RS422):</u> Max Output Frequency: 4 M counts/s with quadrature decoding, 250ns edge separation</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 / 9VDC 100mA (SW selectable)</p>			

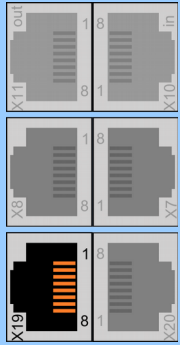


6.13 X15 - X16

X15 - X16		Config Ethernet 10/100 Mbit/s
	X15	Internal 2-Port 10BASE-T and 100BASE-TX Ethernet Switch with Auto MDIX.
	X16	LEDs on the lower side of the device indicate "Link/Activity" per port, the upper ones are not used.
RJ-45		

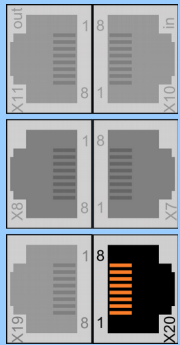
6.14 X17 - X18

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

6.15 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.

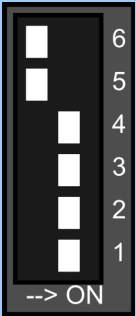
6.16 X20

X20 Analog In (+-10V Differential Analog Input)	
	<p>1 Do not connect</p> <p>2 Do not connect</p> <p>3 Analog In -</p> <p>4 GND</p> <p>5 GND</p> <p>6 Analog In +</p> <p>7 Do not connect</p> <p>8 Do not connect</p> <p>case Shield</p>
RJ-45	





6.17 X29

X29 Connector for Fan Option	
	<p>Connector for the external fan option (Art. Nr. 0150-xxxx).</p> <p>Output: 24 VDC / 0.4 A (Short circuit protected, current monitored)</p> <p>Stripping length: 8mm</p> <p>Conductor cross section: 0.2 – 1.5 mm² (AWG 24 - 16)</p>



6.18 S5

S5 Bus Termination / Analn2 Pull Down	
	<p>S5</p> <p>Switch 6: Override Configuration Ethernet to DHCP</p> <p>Switch 5: Bootstrap: Must be off for normal operation</p> <p>Switch 4: CAN termination on ME (120R between pin 7 and 8 on X10/X11) on/off</p> <p>Switch 3: CAN termination on CMD (120R between pin 7 and 8 on X7/X8) on/off</p> <p>Switch 2: Termination resistor for RS485 on CMD (120R between pin 1 and 2 on X7/X8) on/off</p> <p>Switch 1: Anln2 pull down (4k7 Pull down on X4.4). Set to ON, if X4.4 is used as digital output.</p> <p>Factory setting: all switches “on” except S5.5 (Bootstrap) and S5.6 (Override to DHCP)</p>

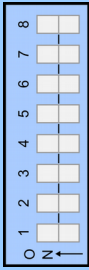
6.19 LEDs

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



6.20 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.		

6.21 S1 - S2

S1 - S2	Address Selectors	
	S1 (5..8) S2 (1..4)	Bus ID High (0 ... F). Bit 5 is the LSB, bit 8 the MSB. Bus ID Low (0 ... F). Bit 1 is the LSB, bit 4 the MSB.
The use of these switches depends on the type of fieldbus which is used. Please see the corresponding manual for further information.		

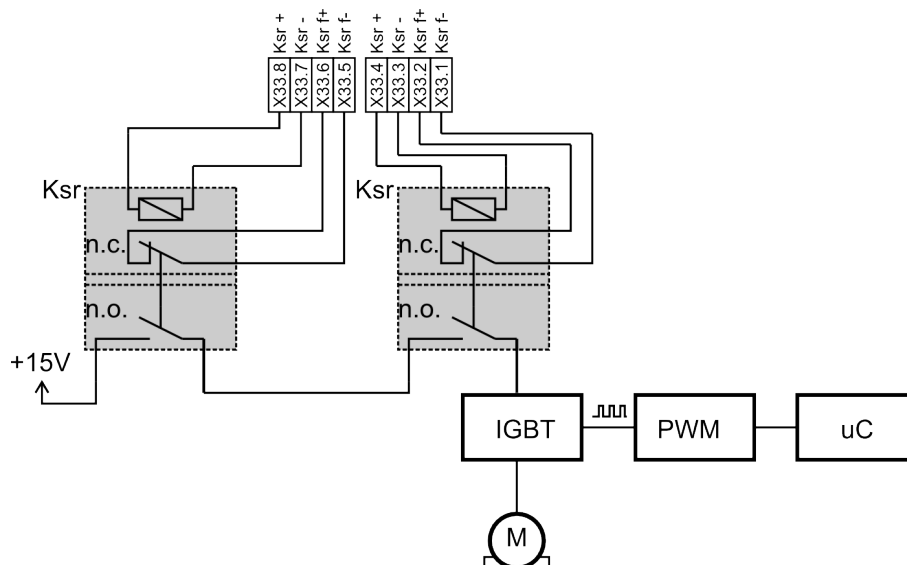
7 Error Codes

Error 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.
● ~4Hz	● ~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 is 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	*● ~2Hz	*● ~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.

8 Safety Wiring

The E1400 Drive with the -1S option has internal safety functions:
Two Safety relays Ksr in series, 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!

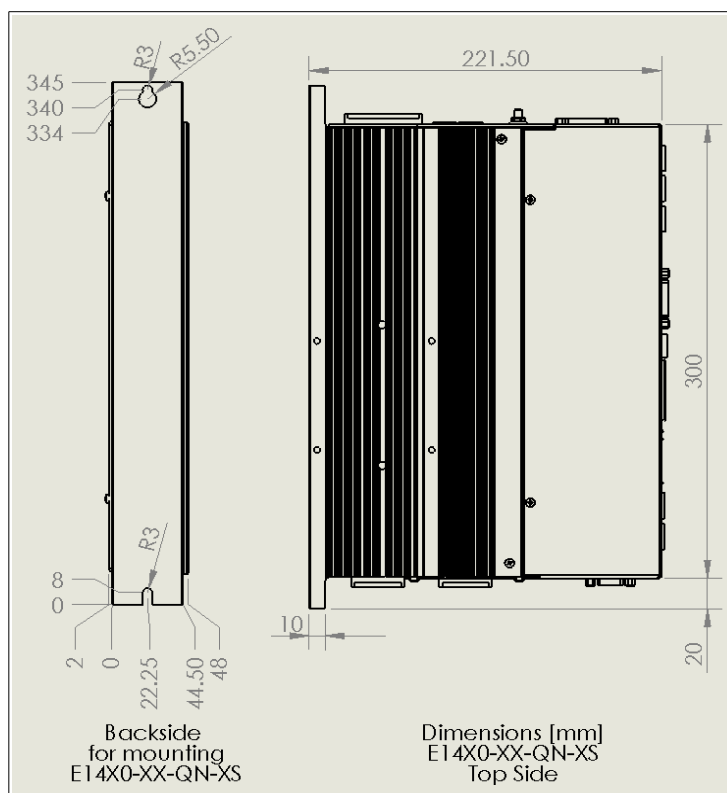
If an overvoltage protection is needed, it must be provided externally and sized according the safety circuit of the machine!

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)	
Category	cat = 3
Performance Level	PL = d
Diagnostic Coverage	DC = high
Mean Time to hazardous failure of one channel	MTTFd = high

9 Physical Dimensions



E1400 Series single axis drive

Width	mm (in)	50 (2)
Height	mm (in)	300 (11.8)
Height with fixings	mm (in)	345 (13.6)
Depth	mm (in)	221.5 (8.8)
Weight	kg (lb)	4.3 (9.5)
Mounting		2 x M5, Distance 332 (13.07)
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)
Pollution	IEC/EN 60664-1	Pollution degree 2
Site altitude	m amsl	to be defined
Shock resistance (16ms)	-1S option	3.5g
Vibration resistance (10-200Hz)	-1S option	1g
Max. Case Temperature	°C	90
Max. Power Dissipation	W	100
Mounting place		In the control cabinet
Mounting position		vertical ¹
Distance between drives (passive convection cooling)	mm (in)	≥ 35 (1.4) left (heat sink side) ≥ 5 (0.2) right ≥ 200 (8) top / bottom
Distance between drives (with fan option EV01-E1400)	mm (in)	≥ 40 (1.6) left (heat sink side) ≥ 5 (0.2) right ≥ 200 (8) top / bottom
Distance between drives (cold plate cooling)	mm (in)	≥ 0 (0) left/right ≥ 200 (8) top / bottom

1 Drive can be mounted upside down (motor connector on bottom side)

10 Power Supply Requirements

Motor Power Supply

Direct AC mains connection:	3/PE AC	400V (±10%) / 50-60Hz / TN System
	3/PE AC	480V (±10%) / 50-60Hz / TN System



Only 3-phase supply is supported! The mains must be a symmetrical four-wire system with grounded neutral.

DC Supply (for example 72VDC) for initial test setups can be supplied through the 3-phase supply connector.

Use a circuit breaker C16 and conductor cross section of 2.5mm² for mains connections!

The LinMot line filter NF01-FN258-16-07 must be connected near the supply connector of the drive to conform to the EMC requirements of CE.

Current consumption:

Startup Current: Soft start over 50 Ohm charge resistor.

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. 1.5A (all 10 outputs "on" with 100mA load and /Brake with no load)

max. 2.5A (all 10 outputs "on" with 100mA load and /Brake with 1A load)



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

11 Regeneration of Power / Regeneration Resistor

There are two possibilities to deal with power regeneration:

Option A: DC Link coupling or additional Capacitors

Option B: Install a regeneration resistor to X1 (RR+ and RR-). The threshold value of the voltage depends on the used motor voltage power supply. The max. threshold value must not exceed 780 VDC.

Item	Description	Art. No.
Regeneration Resistor	RR01-68/100 (68 Ohm, 100 W)	0150-3373

12 Ordering Information

Item	Description	Art. No.
E1450-PL-QN-0S	POWERLINK Drive (3x400/480VAC/28A)	0150-1791
E1450-PN-QN-0S	PROFINET Drive (3x400/480VAC/28A)	0150-1783
E1450-EC-QN-0S	ETHERCAT Drive (3x400/480VAC/28A)	0150-1784
E1450-SC-QN-0S	SERCOS III Drive (3x400/480VAC/28A)	0150-1785
E1450-IP-QN-0S	ETHERNET IP Drive (3x400/480VAC/28A)	0150-1782
E1450-SE-QN-0S	SERCOS over ETHERCAT Drive (3x400/480VAC/28A)	0150-1899
E1430-DP-QN-0S	PROFIBUS-DP Drive (3x400/480VAC/28A)	0150-1786
E1400-GP-QN-0S	GENERAL PURPOSE Drive (3x400/480VAC/28A)	0150-1779
E1450-PL-QN-1S	POWERLINK Drive (3x400/480VAC/28A/STO)	0150-2355
E1450-PN-QN-1S	PROFINET Drive (3x400/480VAC/28A/STO)	0150-2356
E1450-EC-QN-1S	ETHERCAT Drive (3x400/480VAC/28A/STO)	0150-2353
E1450-SC-QN-1S	SERCOS III Drive (3x400/480VAC/28A/STO)	0150-2357
E1450-IP-QN-1S	ETHERNET IP Drive (3x400/480VAC/28A/STO)	0150-2354
E1450-SE-QN-1S	SERCOS over ETHERCAT Drive (3x400/480VAC/28A/STO)	0150-2358
E1430-DP-QN-1S	PROFIBUS-DP Drive (3x400/480VAC/28A/STO)	0150-2352
E1400-GP-QN-1S	GENERAL PURPOSE Drive (3x400/480VAC/28A/STO)	0150-2351
Accessories	Description	Art. No.
Isolated USB-RS232 converter	Isolated USB RS232 converter with config. cable	0150-2473
RS232 PC config. Cable 2.5m	For C1100/C1250/E1200/E1400/M8000	0150-2143
Isolated USB-serial converter	Isolated USB RS232/422/485 converter	0150-3120
RR01-68/100	Regeneration resistor (68R, 100W, 1000V) (X1 connector is included)	0150-3373
EV01-E1400	Fan Option for E1400 (X29 Fan connector is included)	0150-5055
NF01-FN258-16-07	3-phase line filter for E1400	0150-2359
DC01-E1400/X4/X30	Drive Connector Set for E1400-0S	0150-3452
DC01-E1400/X4/X30/X33	Drive Connector Set for E1400-1S	0150-3453
DC01-E1400/X1	Drive Connector Regeneration / Busbar	0150-3445
DC01-E1400/X2	Drive Connector Motor Phases	0150-3446
DC01-E1400/X4	Drive Connector 24VDC & Logic	0150-3447
DC01-E1400/X29	Drive Connector Fan	0150-3448
DC01-E1400/X30	Drive Connector Mains Supply (3x400/480VAC)	0150-3449
DC01-E1400/X31/X32	Drive Connector Brake	0150-3450
DC01-E1400/X33	Drive Connector Safety (-1S)	0150-3451


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!

13 International Certifications

Certifications	
Europe 	See chapter "14 Declaration of Conformity CE-Marking"
UL	UL508C pending

14 Declaration of Conformity CE-Marking

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Products: LinMot® drives

Type	Art.-No.	Type	Art.-No.	Type	Art.-No.
E1450-PL-QN-0S	0150-1791	E1450-IP-QN-0S	0150-1782	E1450-EC-QN-0S	0150-1784
E1450-PN-QN-0S	0150-1783	E1430-DP-QN-0S	0150-1786	E1450-SC-QN-0S	0150-1785
E1400-GP-QN-0S	0150-1779	E1430-SE-QN-0S	0150-1899		
E1450-PL-QN-1S	0150-2355	E1450-IP-QN-1S	0150-2354	E1450-EC-QN-1S	0150-2353
E1450-PN-QN-1S	0150-2356	E1430-DP-QN-1S	0150-2352	E1450-SC-QN-1S	0150-2357
E1400-GP-QN-1S	0150-2351	E1430-SE-QN-1S	0150-2358		

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 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 and Safety tests according to the 2006/95/EC harmonized standard EN 50371: 2002.

Standards Complied with:

EN 61000-6-2: 2005		Immunity for industrial environments	
	EN 61000-4-2	Class B and FS	Electrostatic discharge immunity (ESD)
	EN 61000-4-3	Class A and FS	Radiated electromagnetic field immunity
	EN 61000-4-4	Class B and FS	Fast transients / burst immunity (EFT)
	EN 61000-4-5	Class B and FS	Slow transients immunity (Surge)
	EN 61000-4-6	Class A and FS	Conducted radio frequency immunity
	EN 61000-4-8	Class A and FS	Power frequency magnetic field immunity
	EN 61326-3-1	FS	EMC immunity (functional safety)
EN 61000-6-4: 2007		Emission for industrial environments	
	EN 55022	Class A	Stationary interference voltage AC mains
	EN55022	Class A	Stat. Asym. Interference current on Telco lines
	EN 55022	Class A	Radiated Emission
EN 61326-3-1:2008		Functional Safety	
	EN 50371		Human exposure to electromagnetic fields
	EN 5022		Radio disturbance (IT equipment)
	EN 5011		Radio disturbance (ISM)
	CISPR 22: 2005		Radio disturbance (IT equipment)

Company: NTI Ltd.
Spreitenbach, May 02, 2012



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