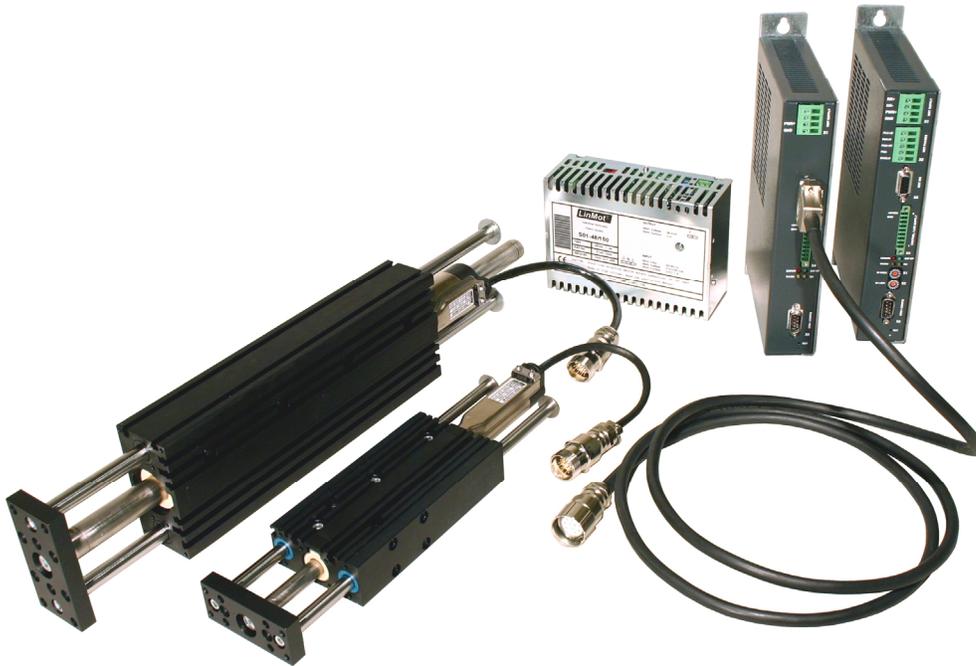# Installation Guide
Multi Position Servo Controller

E1100-MT and E1100-MT-HC

Content

Important notes for E1100 series controllers

CAUTION !!

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 (see chapter Power Supply and Grounding).

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 controllers) (see chapter Power Supply and Grounding).

All connectors must not be connected or disconnected while DC voltage is present. Do not disconnect system components until all LinMot controller LED's have turned off. (Capacitors in the power supply may not fully discharge for several minutes after input voltage been disconnected). Failure to observe these precautions may result in severe damage to electronic components in LinMot motors and/or controllers.

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.

Do not connect or disconnect the motors from controllers with voltage present. Wait to connect or disconnect motors until all LinMot controller LED's 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 controllers.

System Overview

Complete Multi Position Servo System E1100-MT Servo Controller, Linear Motor and Power Supply.

Multi Position Controller *E1100-MT / -MT-HC*   **LinMot®**

E1100-MT Series Function and Wiring
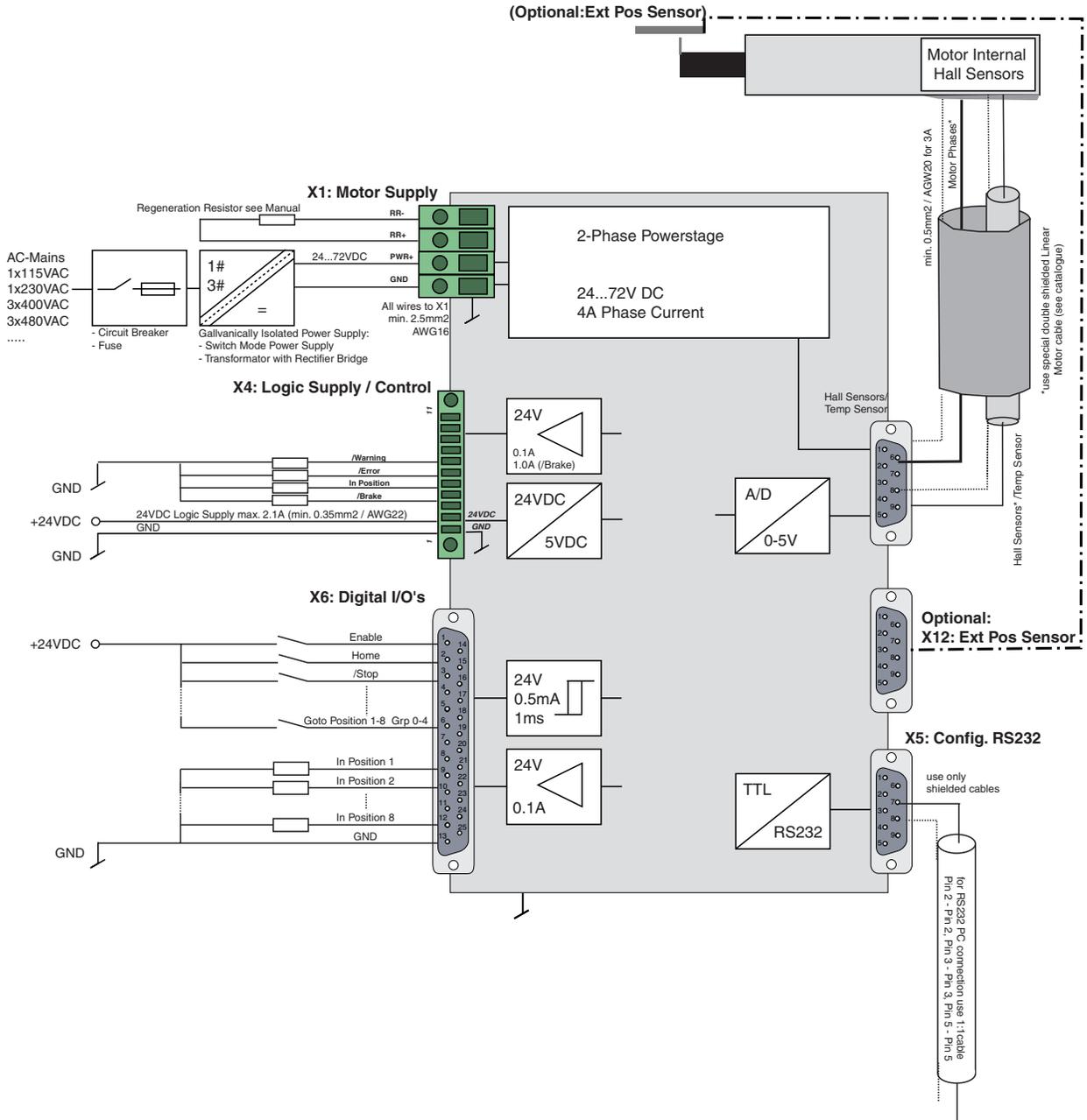
Multi Position Servo System E1100-MT Servo Controller, Linear Motor and Power Supply. All connections for the motor are done within the DSUB-9 connector.

E1100-MT-HC Series Function and Wiring

(Optional:Ext Pos Sensor)

Motor Internal
Hall Sensors

min. 1.0mm2 / AGW20

Motor Phases

use special double shielded Linear
Motor cable (see catalogue)

Hall Sensors /Temp Sensor

X1: Motor Supply

Regeneration Resistor see Manual

RR-
RR+
PWR+
GND

**X2:
Motor Phases**

2-Phase Powerstage

24...72V DC
15 A Phase Current

24...72VDC

AC-Mains
1x115VAC
1x230VAC
3x400VAC
3x480VAC
.....

1#
3#

=

- Circuit Breaker
- Fuse

Gallvanically Isolated Power Supply:
- Switch Mode Power Supply
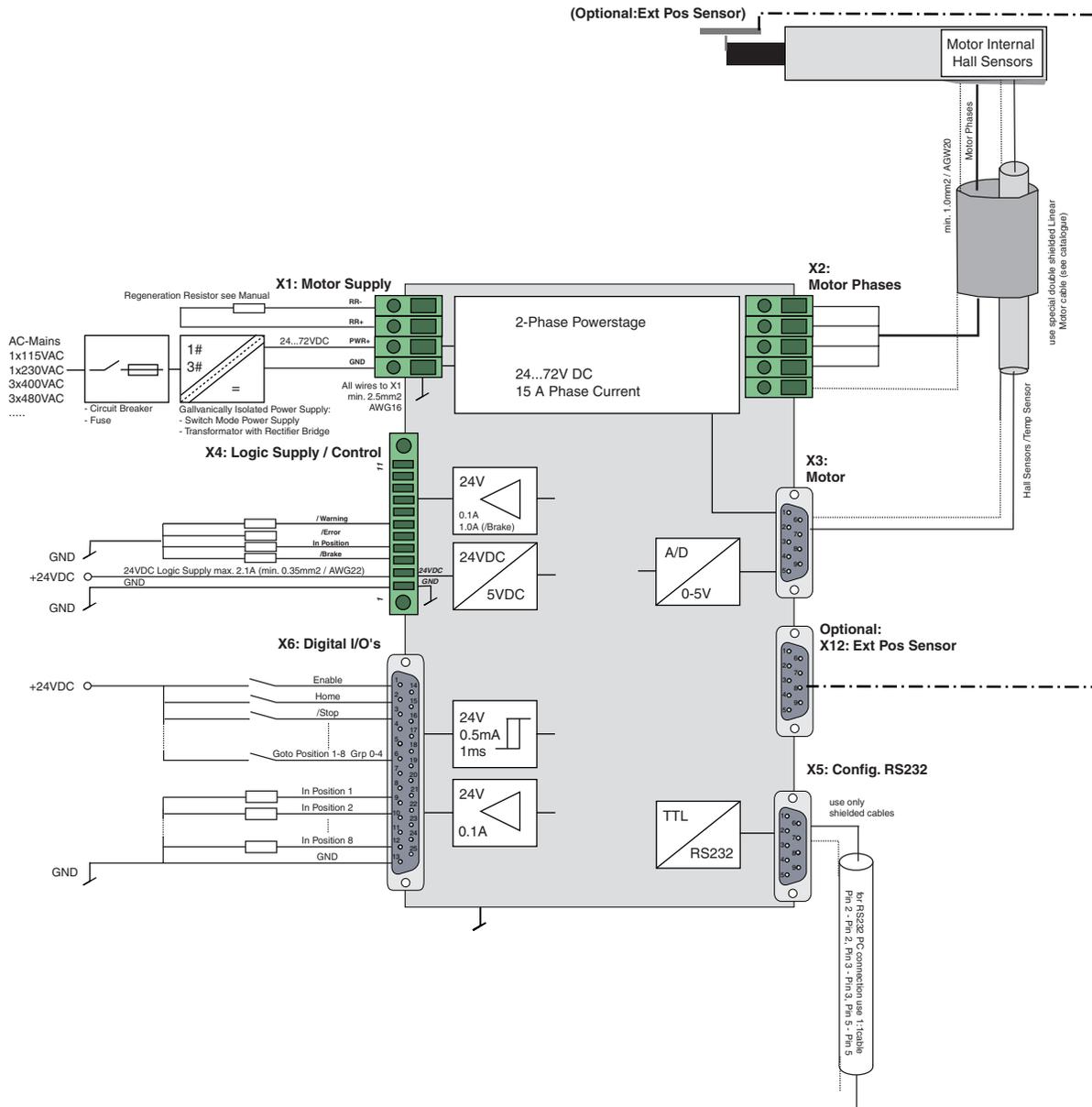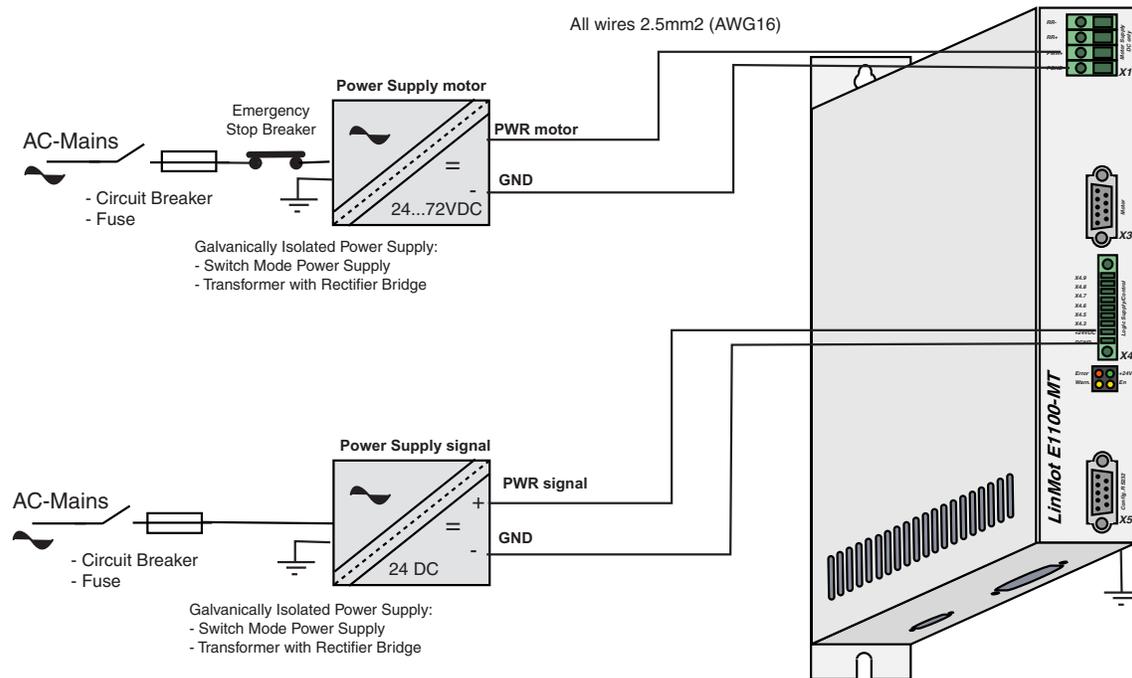- Transformator with Rectifier Bridge

All wires to X1
min. 2.5mm2
AWG16

X4: Logic Supply / Control

11

24V

0.1A
1.0A (/Brake)

/Warning
/Error
In Position
/Brake

GND

24VDC

24VDC Logic Supply max. 2.1A (min. 0.35mm2 / AWG22)
GND

+24VDC

GND

24VDC

GND

1

24VDC

5VDC

**X3:
Motor**

A/D

0-5V

**Optional:
X12: Ext Pos Sensor**

X6: Digital I/O's

+24VDC

Enable
Home
/Stop

Goto Position 1-8 Grp 0-4

In Position 1
In Position 2

In Position 8
GND

GND

24V
0.5mA
1ms

24V
0.1A

X5: Config. RS232

TTL

RS232

use only
shielded cables

for RS232 PC connection use 1:1cable
Pin 2 - Pin 2, Pin 3 - Pin 3, Pin 5 - Pin 5

Multi Position Servo System E1100-MT-HC Servo Controller, Linear Motor and Power Supply. The motor connection is done by a DSUB-9 connector for the sensor signals and direct wire connections for the power lines (phases).

Power Supply and Grounding

All wires 2.5mm2 (AWG16)

Power Supply motor

Emergency
Stop Breaker

AC-Mains

- Circuit Breaker
- Fuse

PWR motor

GND

24...72VDC

Galvanically Isolated Power Supply:
- Switch Mode Power Supply
- Transformer with Rectifier Bridge

Power Supply signal

AC-Mains

- Circuit Breaker
- Fuse

PWR signal

+

GND

-

24 DC

Galvanically Isolated Power Supply:
- Switch Mode Power Supply
- Transformer with Rectifier Bridge

LinMot E1100-MT

*Inside of the E1100 controller the *PWR motor GND* and *PWR signal GND* is connected together and to the GND of the controller housing. It is recommended that the *PWR motor GND* is NOT grounded at another place than inside of the controller to reduce circular currents.

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 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 controllers.)
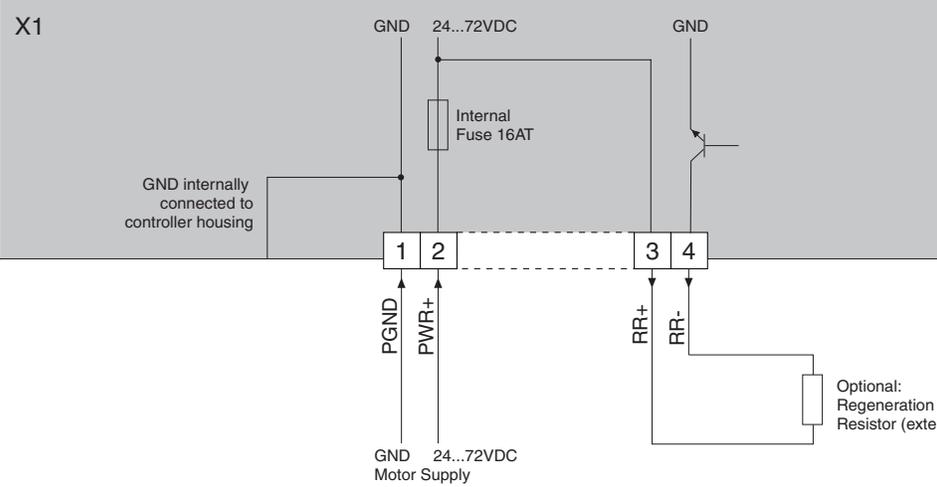
Power supply connectors must not be connected or disconnected while DC voltage is present. Do not disconnect system components until all LinMot controller LED's have turned off. (Capacitors in the power supply may not fully discharge for several minutes after input voltage been disconnected).Failure to observe these precautions may result in severe damage to electronic components in LinMot motors and/or controllers.
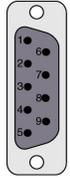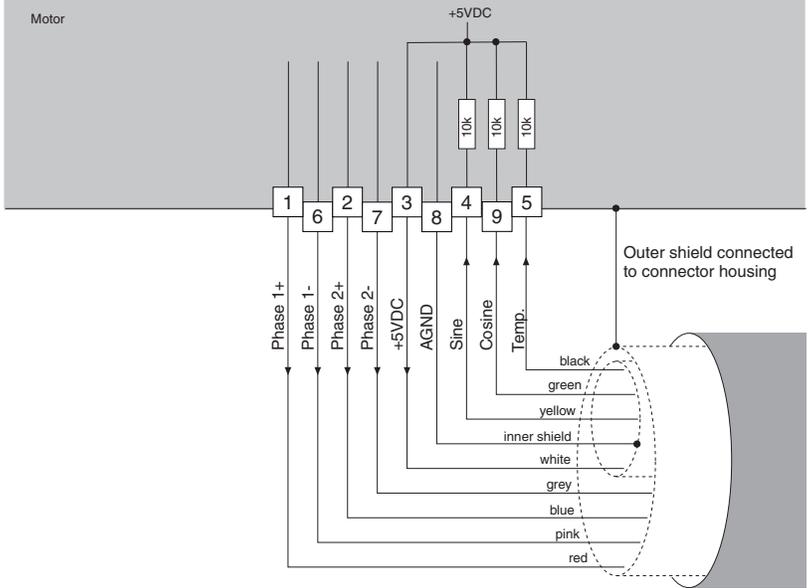
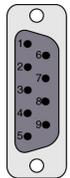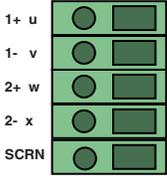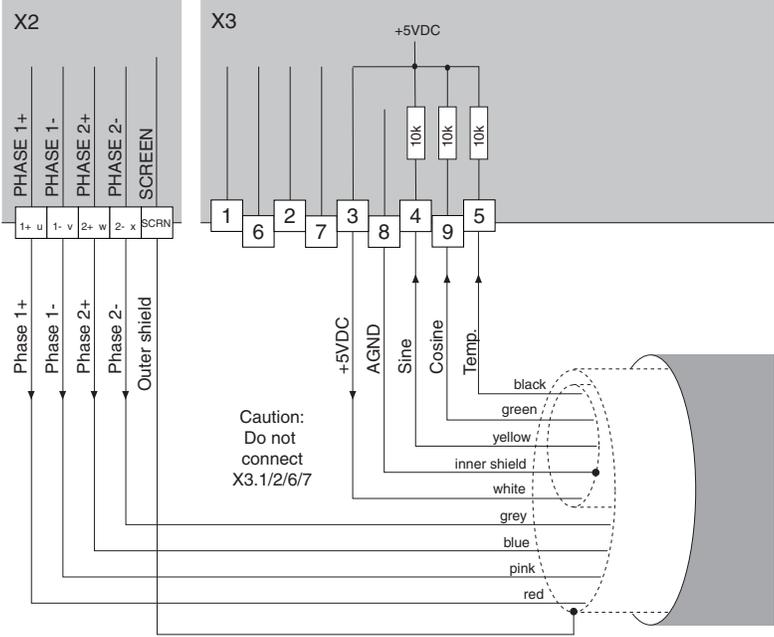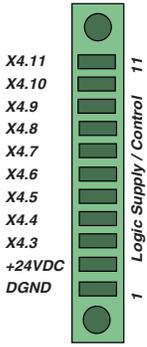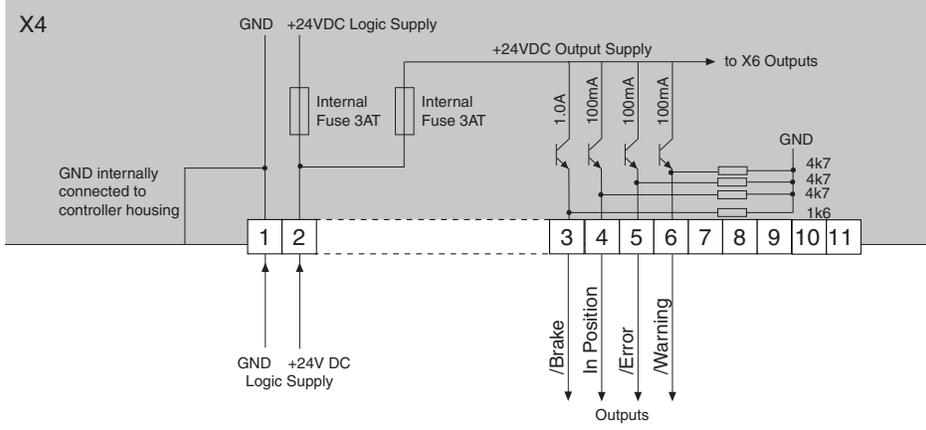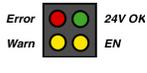**Do not switch Power Supply DC Voltage.** All power supply switching and E-Stop breaks should be done to the AC supply voltage of the power supply. Failure to observe these precautions may result in severe damage to controller.

Description of the connectors / Interfaces

Note: The E1100-MT /-MT-HC controllers may have more connectors and switches than described below. Do not connect these additional connectors.

X1	Motor Supply
RR- **RR+** **PWR+** **PGND** Screw Terminals	

Motor Supply:
Motor Supply Voltage 24...72VDC. Absolute max. Rating 72VDC +10%.

Note: Inside of the E1100 controller the *PWR motor GND* and *PWR signal GND* is connected together and to the GND of the controller housing

Regeneration Resistor:
Optional external Regeneration Register for long stroke movements with high velocity and fast stops. Only needed if Motor Supply voltage during stops exceeds the max. limit.
Use only Regeneration Resistor RR01-10/60   (10 Ohm, 60 W Part-No 0150-3088) or RR01-10/150 (10 Ohm, 150 W Part-No 0150-3088)

Caution:
Exceeding 90VDC supply voltage, the controller will go into error state and may be damaged.

Wiring:
2.5mm² (AWG 14)

X3	Motor Connector for **E1100-MT** and **E1100-MT-HC** with less than 5A rms

DSUB-9 (f)

Note: E1100-MP-HC If motor current exceeds 5 Arms, then use x2 connector for phases!

X2 & X3	Motor Connector for **E1100-MT-HC** Version

X3

DSUB-9 (f)

X2

1+ u		
1- v		
2+ w		
2- x		
SCRN		

Note:
- PS01-48x.. and PS01-37x240-F stators must be connected to X2 and X3 connectors of E1100-MT-HC controllers
- Use only special double-shielded Linear Motor Cable.
- Use +5V (X3.3) and AGND (X3.8) only for motor internal Hall Sensor supply (max. 100mA).
- Do NOT connect AGND (X3.8) to ground or earth!
- Inner shield (AGND) and outer shield (earth) must be isolated to each other.

Caution:
- Wrong Motor wiring may damage Linear Motors and/or Servo Controller.
- If you are assembling motor cable by your own, double check motor wiring carefully before power up.

X4	Control / Logic Supply

Digital I/O's:
Inputs   24V / 5mA / 1msec   (Trigger Input 0.25msec)
Outputs   24V / max.100mA   (Break Output max.1A)

Supply:
24VDC   min. 100mA   (no load on the outputs)
                typ. 1.1A   (all 10 outputs "on" with 100mA load and /Break with no load)
                max. 2.1A   (all 10 outputs "on" with 100mA load and /Break with 1A load)

Wiring: 0.2-1.5mm² (AWG24-16)

LED	State Display

Green	24V Logic Supply OK
Yellow	Motor Enabled
Yelllow	Warning
Red	Error

X5:	COM

RS232:   38.4kBaud, use 1:1 connection cable to PC

X6:	Digital I/O

All Inputs:
Direct interfacing to digital 24VDC PLC outputs.

Max. Low Level:	<1.5V	Min. High Level:	>4.0V
Input current:	0.5mA	Sample rate:	1ms

All Outputs:
Short circuit and overload protected high side switches

Voltage:	24VDC	Max. Output current:	100mA
Update rate:	1ms		

Outputs may directly drive inductive loads.

X12:	Ext Pos Sensor

External Position Sensor according to RS422

Physical Dimension

Dimensions in mm

		E1100-MT / E1100-MT-HC
		Single axes controller
Width	mm (in)	40 (1.6)
Height	mm (in)	250 (9.9)
Height without fixings	mm (in)	235 (9.3)
Depth	mm (in)	180 (7.1)
Weight	Kg (lb)	1.5 (3.3)
Case	IP	40
Storage Temperature	°C	-25…70
Operating Temperature	°C	0…50
Max. Case Temperature	°C	65

( ) dimensions in inch

Power Supply Requirement

Power Supply motor
The calculation of the needed power for the Motor supply is depending on the application and the used motor.

Power Supply signal

24VDC	min. 100mA	(no load on the outputs)
	typ. 1.1A	(all 10 outputs "on" with 100mA load and /Break with no load)
	max. 2.1A	(all 10 outputs "on" with 100mA load and /Break with 1A load)

Regeneration of Power / Regeneration Resistor

There are two possibilities to deal with power regeneration:

Option A: Connect an additional capacitor to the motor power supply. It is recommended to use a capacitor >= 10'000 µF (install capacitor close to the power supply!)

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 88 Vdc.

Item	Description	Art. No.
Capacitor	Capacitor 10'000 µF / 100 V	0150-3075
Regeneration Resistor	RR01-10/60 (10 Ohm, 60 W)	0150-3088
Regeneration Resistor	RR01-10/150 (10 Ohm, 150 W)	0150-3090

Ordering Information

Servo Controller	Description	Art. No.
E1100-MT	Multi Trigger Controller, 256 Commands 72VDC/4A	0150-1663
E1100-MT-HC	Multi Trigger Controller, 256 Commands 72VDC/15A	0150-1664

Declaration of Conformity CE-Marking

Manufacturer: NTI AG
                      LinMot ®
                      Haerdlistrasse 15
                      CH-8957 Spreitenbach
                      Switzerland
                      Tel.:   +41 (0)56 419 91 91
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Products: *LinMot* ® Controllers

Type	Art.-No.	Type	Art-No.	Type	Art.-No.
E1100-MT	0150-1663				
E1100-MT-HC	0150-1664				

The product must be mounted and used in strict accordance with the installation instruction contained within the User's Manual, 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 EMC Directive (89/336/EEC) and is marked in accordance with the CE Marking Directive (93/68/EEC).

Standards Complied with:

EMI	EN 55011	Class A
EN 61000-6-4		
Electromagnetic	EN 61000-4-2	4 kV / 8kV
Suspectibility EMC	EN 61000-4-4	1 kV / 2kV
EN 61000-6-2	EN 61000-4-3	10 V/m
	EN 61000-4-6	10 V
	ENV 50204	10 V/m

Company
NTI Ltd.

Zürich, June 29, 2004

R. Rohner / CEO NTI Ltd.

Error codes

In case of an error the following messages will be showed on the connected computer.

Error ID	Error Message
1	Logic supply voltage too low
2	Logic supply voltage too high
3	Motor supply voltage too low
4	Motor supply voltage too high
5	Regeneration Resistor not connected
10	Sensor Signals missing
13	Over Current
16	Servo Controller Ph1+ too Hot
17	Servo Controller Ph1- too Hot
18	Servo Controller Ph2+ too Hot
19	Servo Controller Ph2- too Hot
20	Servo Controller DCLV too Hot
22	Servo Controller Connector too Hot
23	Servo Controller Core too Hot
24	Servo Controller Power Bridge Ph1+ defect
25	Servo Controller Power Bridge Ph1- defect
26	Servo Controller Power Bridge Ph2+ defect
27	Servo Controller Power Bridge Ph2- defect
28	Servo Controller Supply DigOut IC Fuse Blow
29	Servo Controller Supply Motor 5VA Fuse Blow
30	Servo Controller Supply Motor AGND Fuse Blow
32	Motor Temp Sensor too hot
33	Motor Hall Signals missing
34	Motor Slider missing
35	Motor too hot calculated
36	Regeneration Resistor too hot calculated
40	Motor Ph1+ Short circuit to GND
41	Motor Ph1- Short circuit to GND
42	Motor Ph2+ Short circuit to GND
43	Motor Ph2- Short circuit to GND
44	Motor Short circuit Ph1 to Ph2
48	Wrong Wiring Motor Ph1+ To Ph2+
49	Wrong Wiring Motor Ph1+ To Ph2-
50	Wiring Broken Motor Ph1+ To Ph1-
51	Wrong Wiring Motor Ph2+ To Ph1+
52	Wrong Wiring Motor Ph2+ To Ph1-
53	Wiring Broken Motor Ph2+ To Ph2-
192	MPC data not found or defective!

Contact Addresses

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