
LinMot®

Documentation for installing the following Controllers:

- E1100-CO (-HC, -XC)
- E1100-DN (-HC, -XC)
- E1100-RS (-HC, -XC)
- E1130-DP (-HC, -XC)
- E1100-GP (-HC, -XC)



Servo Controller Data Sheet & Installation Guide

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Note

The information in this documentation reflects the stage of development at the time of press and is therefore without obligation.

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Document version 3.12 / June 2010

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Important safety 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 has 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 controllers 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.

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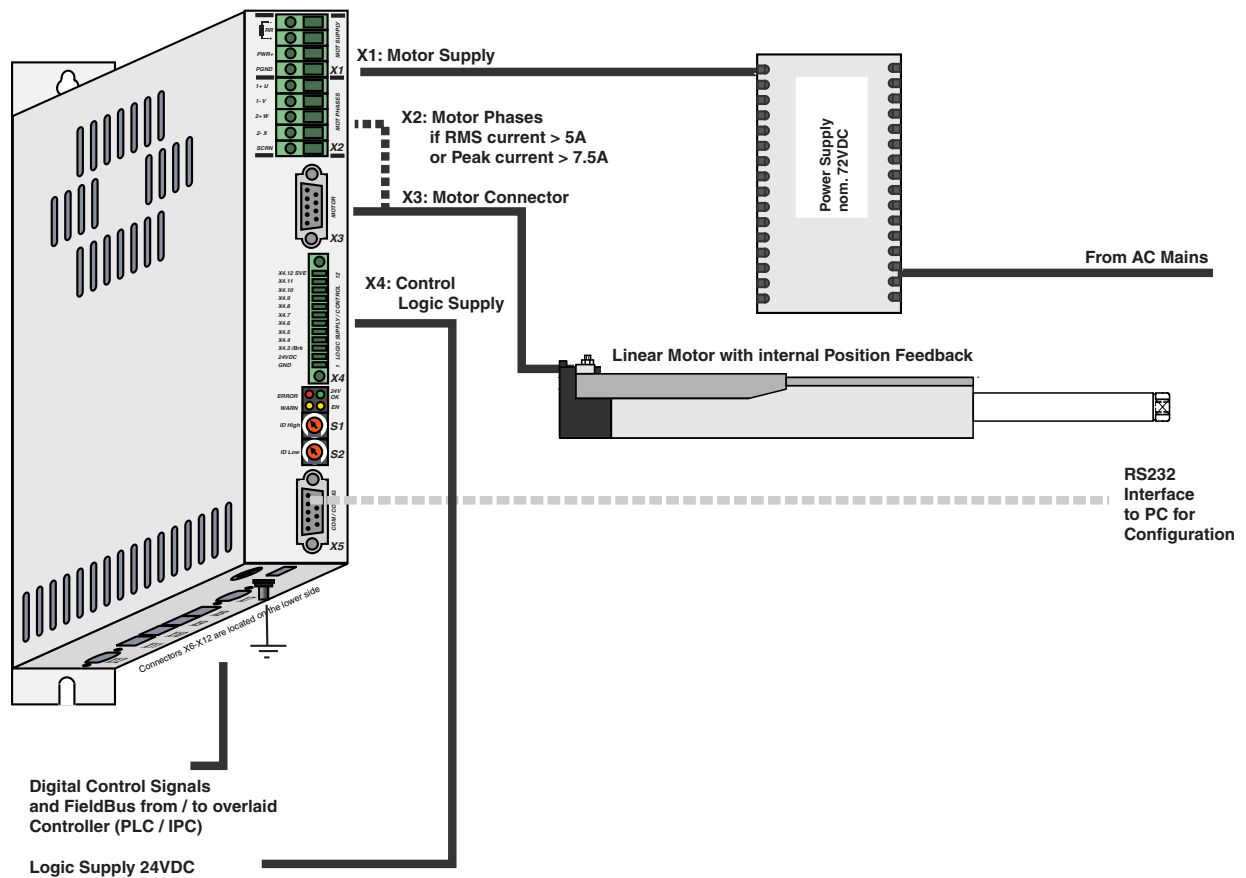
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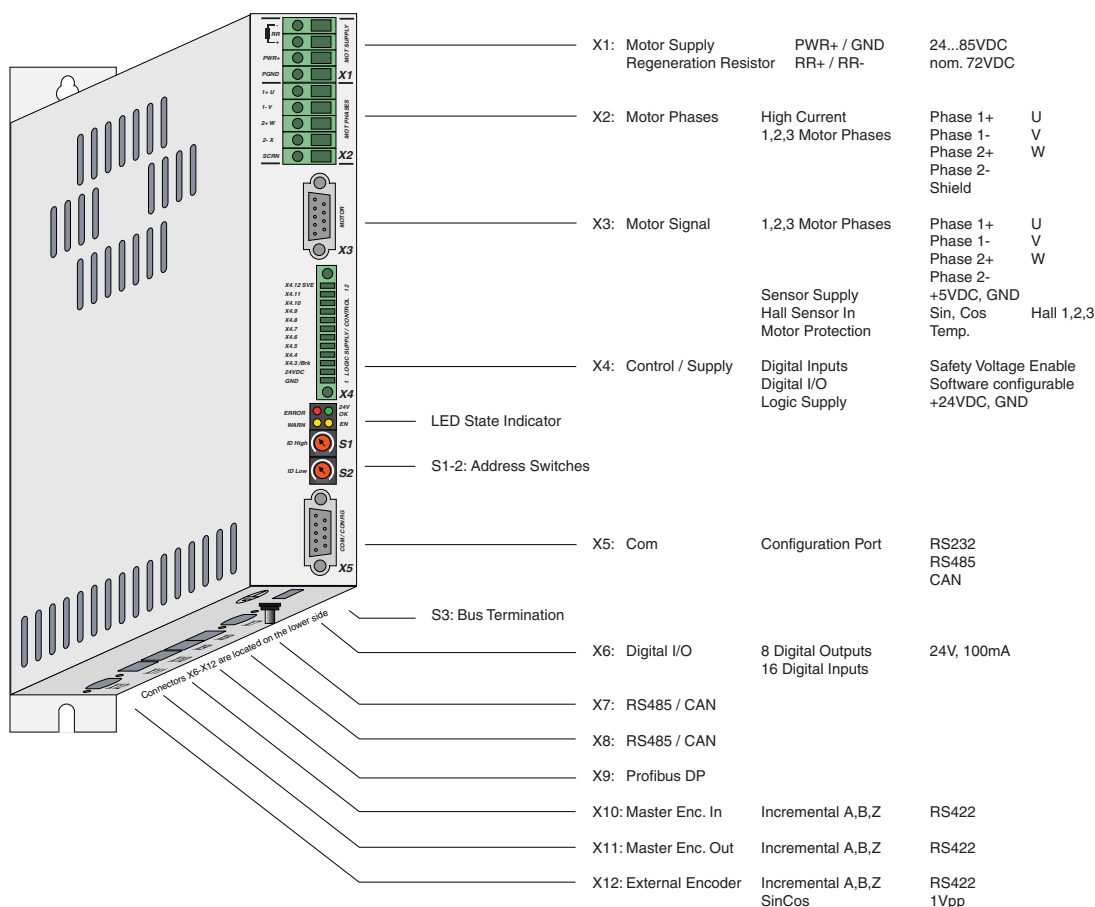
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System Overview



Typical Servo System E1100-XX: Servo Controller, Linear Motor and Power Supply.

E1100 Interfaces

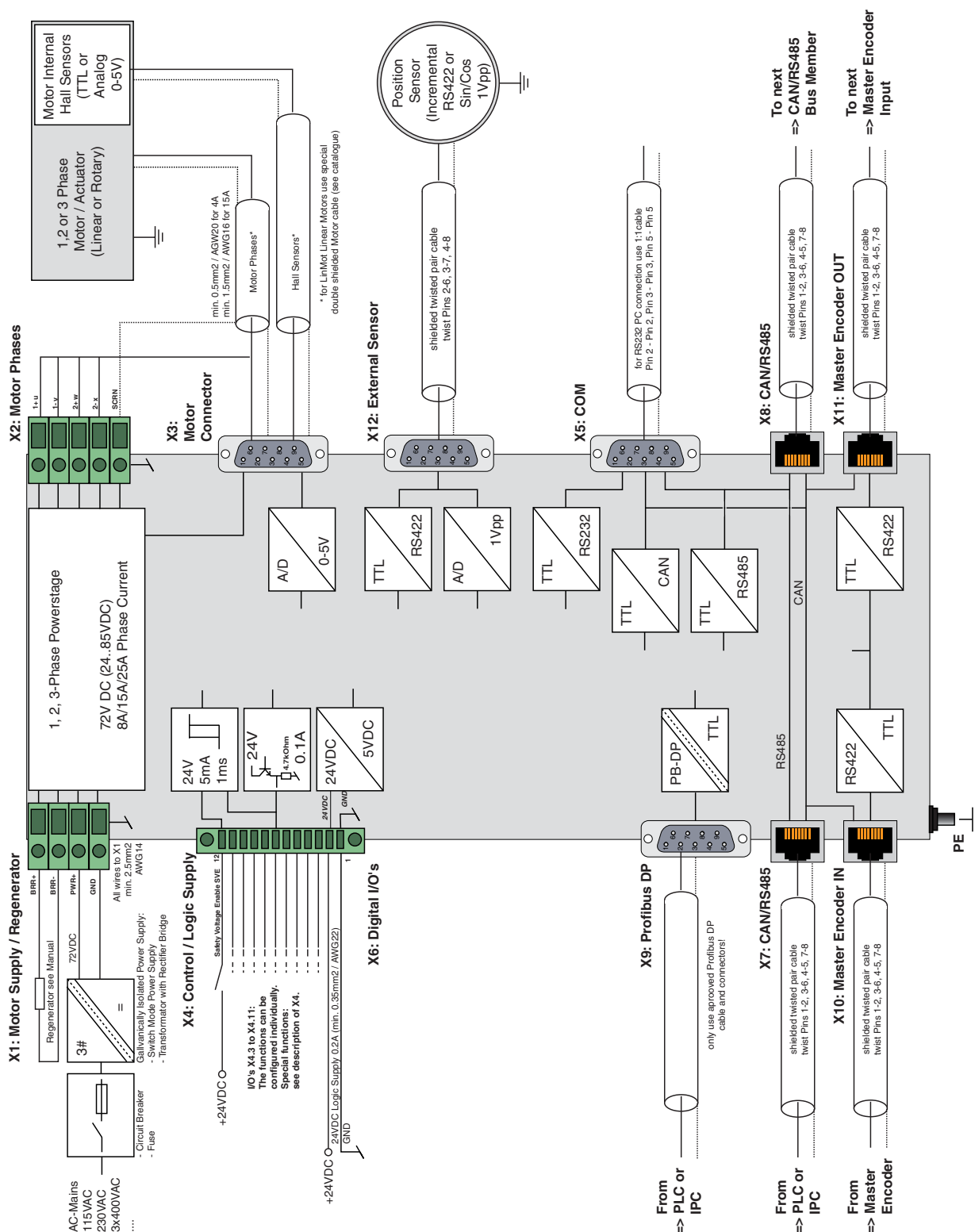


| | E1100-RS(-HC/XC) | E1100-CO(-HC/XC) | E1100-DN(-HC/XC) | E1100-DP(-HC/XC) | E1100-GP(-HC/XC) |
|-----------------------------------|------------------|------------------|------------------|------------------|------------------|
| Connector | | | | | |
| X1 Motor Supply | • | • | • | • | • |
| Regeneration Resistor | • | • | • | • | • |
| X2 Motor Phases (Screw Terminals) | • | • | • | • | • |
| X3 Motor / Motor Signals | • | • | • | • | • |
| X4 Logic Supply / Control | • | • | • | • | • |
| X5 Com RS232 | • | • | • | • | • |
| RS485 | • | • | • | • | • |
| CAN | • | • | • | • | • |
| X6 Digital I/O | | | | | • |
| X7 CMD In (RS485 / CAN) | • | • | • | • | |
| X8 CMD Out (RS485 / CAN) | • | • | • | • | |
| X9 PROFIBUS DP | | | | • | |
| X10 Master Encoder In | • | • | • | • | • |
| X11 Master Encoder Out | • | • | • | • | • |
| X12 External Position Encoder | • | • | • | • | • |
| LED State Indicator | • | • | • | • | • |
| S1 ID Switch High | • | • | • | • | • |
| S2 ID Switch Low | • | • | • | • | • |
| S3 Bus Termination (CAN / RS485) | • | • | • | • | • |

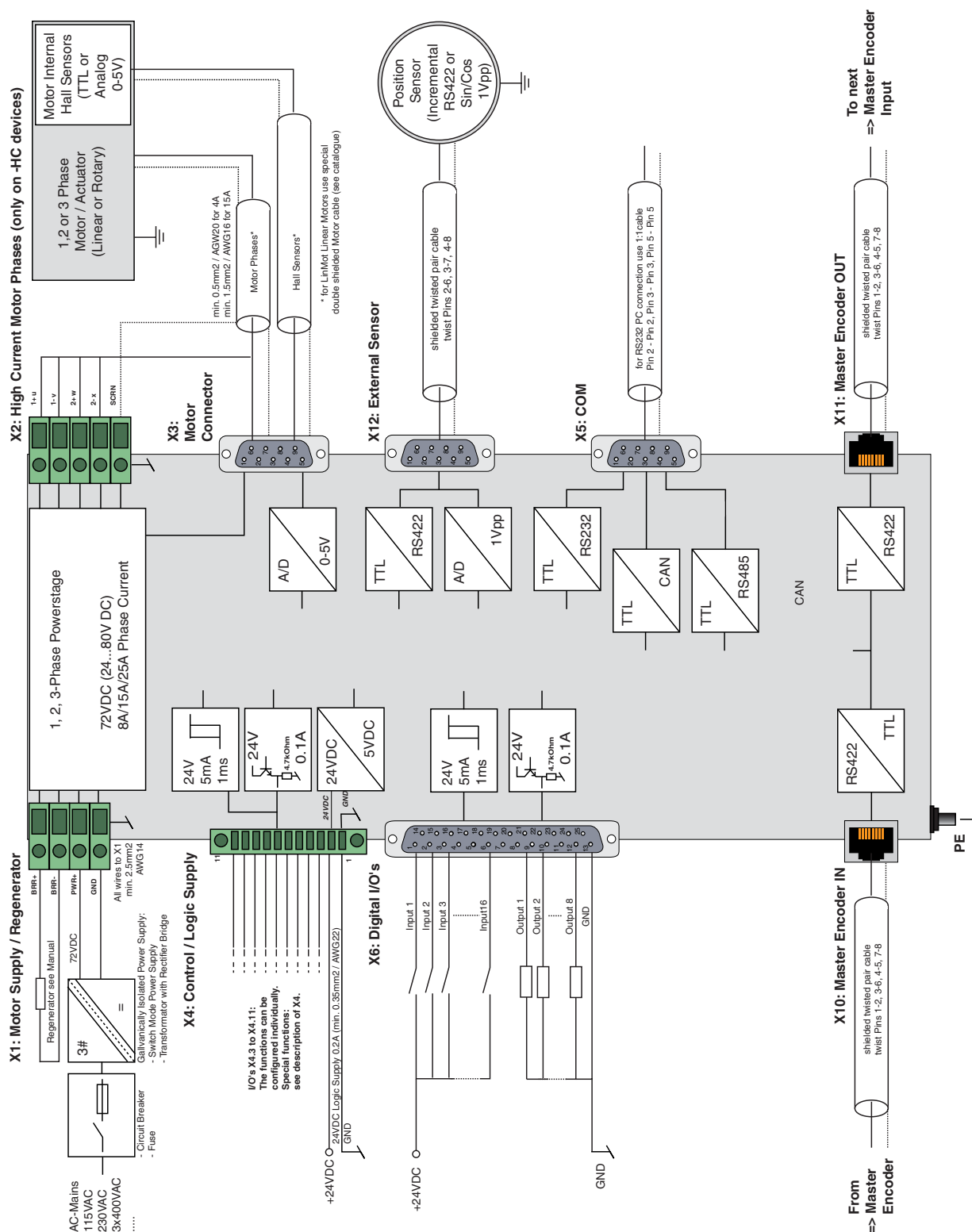
Functionality

| | E1100-RS | E1100-RS-HC | E1100-RS-XC | E1100-CO | E1100-CO-HC | E1100-CO-XC | E1100-DN | E1100-DN-HC | E1100-DN-XC | E1130-DP | E1130-DP-HC | E1130-DP-XC | E1100-GP | E1100-GP-HC | E1100-GP-XC |
|--|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|----------|-------------|-------------|
| Supply Voltage | | | | | | | | | | | | | | | |
| Motor Supply 72VDC (24...85VDC) (30...85VDC for UL) | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| Logic Supply 24VDC (22...26VDC) | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| Motor Phase Current | | | | | | | | | | | | | | | |
| 8A _{peak} / 6A _{rms} | • | | | • | | | • | | | • | | | • | | |
| 15A _{peak} / 9A _{rms} | | • | | | • | | | • | | | • | | | • | |
| 25A _{peak} / 12A _{rms} | | | • | | | • | | | • | | | • | | | • |
| Controllable Motors | | | | | | | | | | | | | | | |
| LinMot P01-23x... | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| P01-37x... | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| P01-48x... | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| DC Motors | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| Brushless DC / EC Motors | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| Command Interface | | | | | | | | | | | | | | | |
| Easy Step Application Layer (X4-I/Os) | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| Cmd Tab IO Interface (X6-I/Os) | | | | | | | | | | | | | • | • | • |
| RS232 up to 115.2 kBaud | • | • | • | | | | | | | • | • | • | • | • | • |
| RS485 up to 115.2 kBaud | • | • | • | | | | | | | • | • | • | • | • | • |
| CANOpen up to 1MBaud | | | | • | • | • | | | | • | • | • | • | • | • |
| DeviceNet 125, 250, 500 kBaud | | | | | | | • | • | • | • | • | • | • | • | • |
| PROFIBUS DP up to 12 MBaud | | | | | | | | | | • | • | • | | | |
| Programmable Command Table | | | | | | | | | | | | | | | |
| Command Table with up to 255 entries | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| External Position Sensor | | | | | | | | | | | | | | | |
| Incremental RS422 up to 2 MHz | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| Sin/Cos 1Vpp up to 10 kHz | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| Synchronisation | | | | | | | | | | | | | | | |
| Master Encoder In/Out RS422 up to 2 MHz | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| Configuration | | | | | | | | | | | | | | | |
| RS232 Configuration | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| CAN Multi Axes Configuration | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |

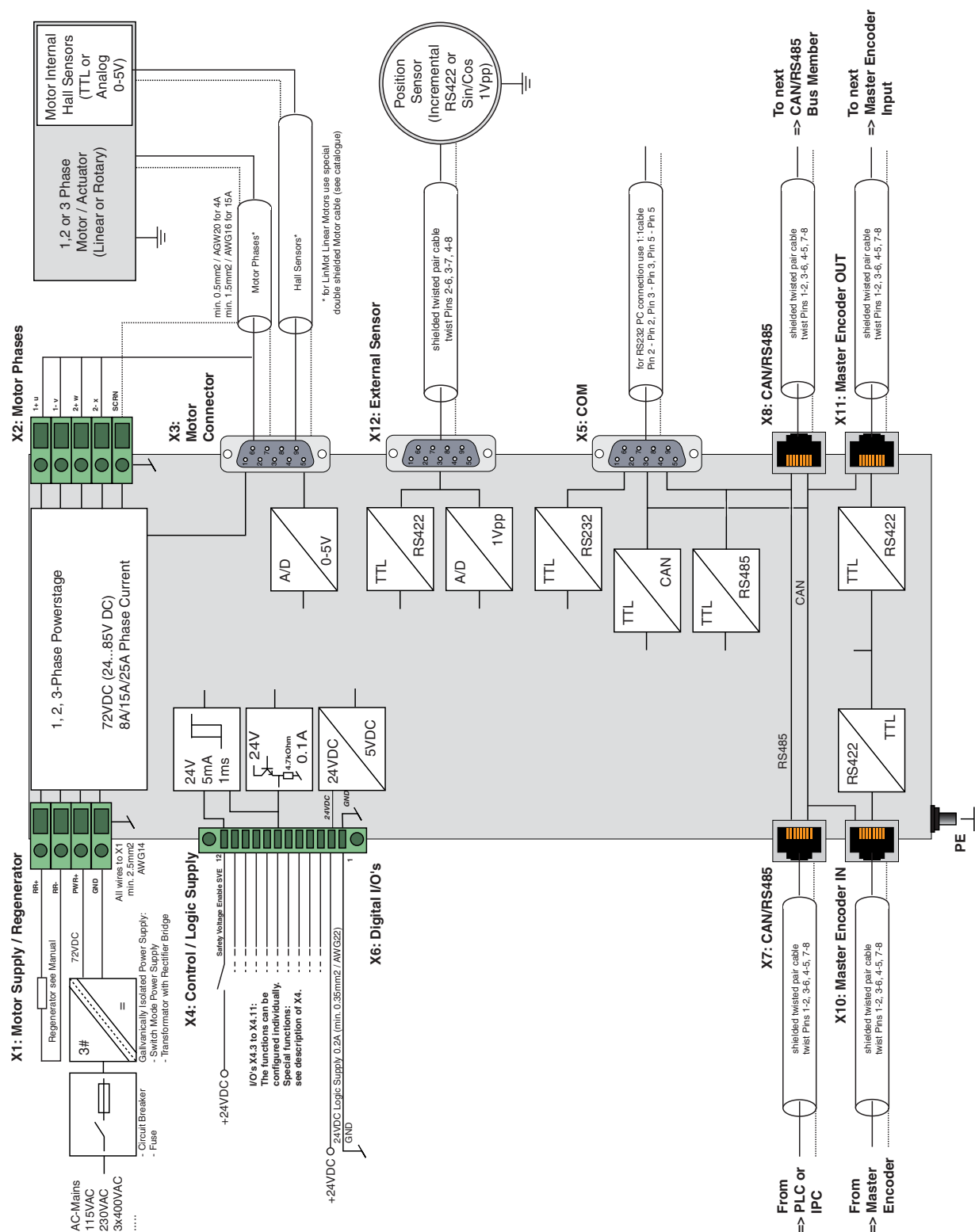
E1130-DP(-HC, -XC) Functions and Wiring



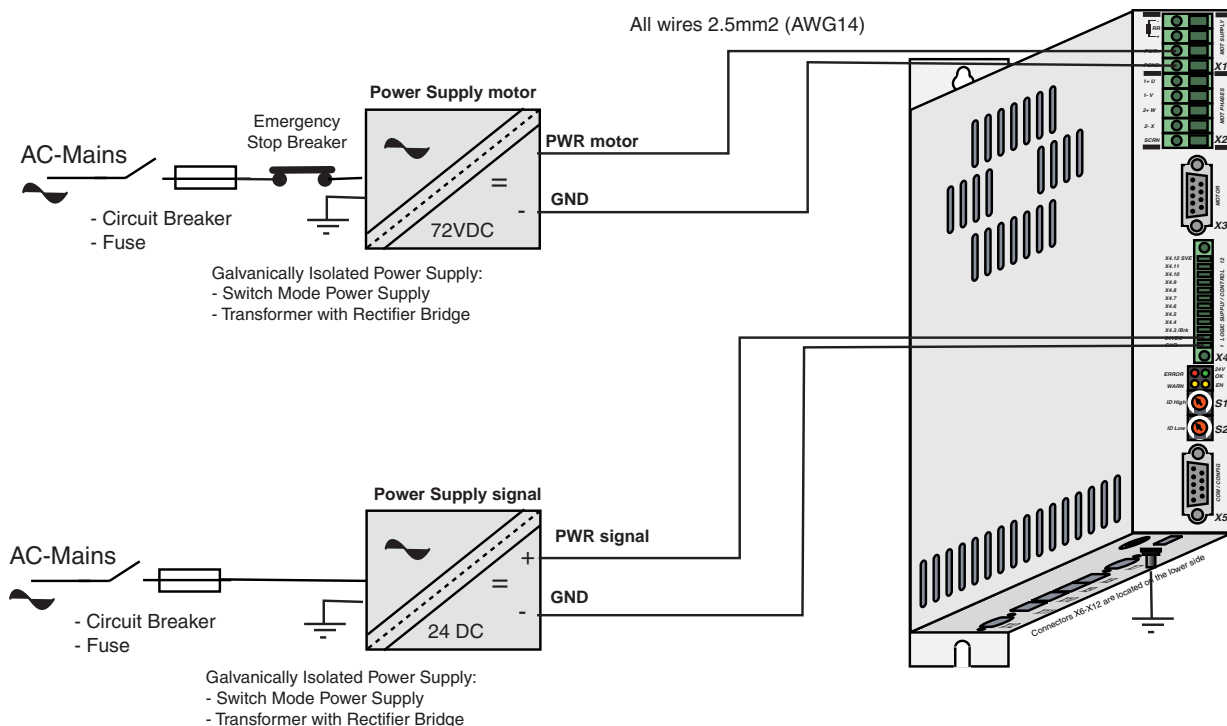
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E1100-CO(-HC, -XC), -DN(-HC, -XC), -RS(-HC, -XC) Functions and Wiring



Power Supply and Grounding



*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.)

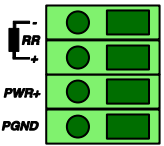
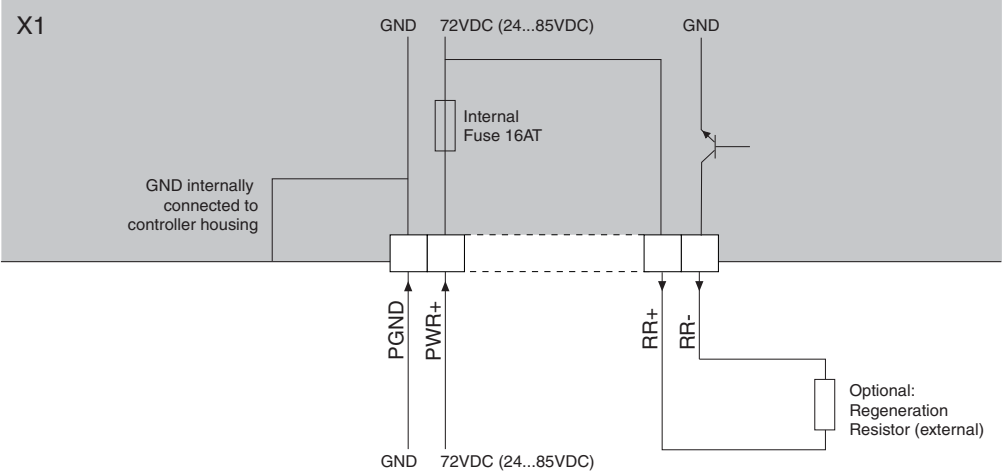
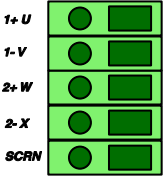


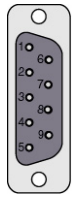
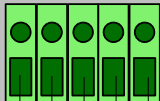

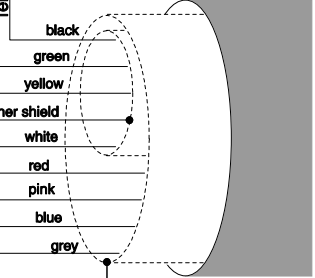
Power supply connectors must not be connected or disconnected while DC voltage is present. Do not disconnect system components until all LinMot controller LED's have turned off. (Capacitors in the power supply may not fully discharge for several minutes after input voltage has been disconnected). Failure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



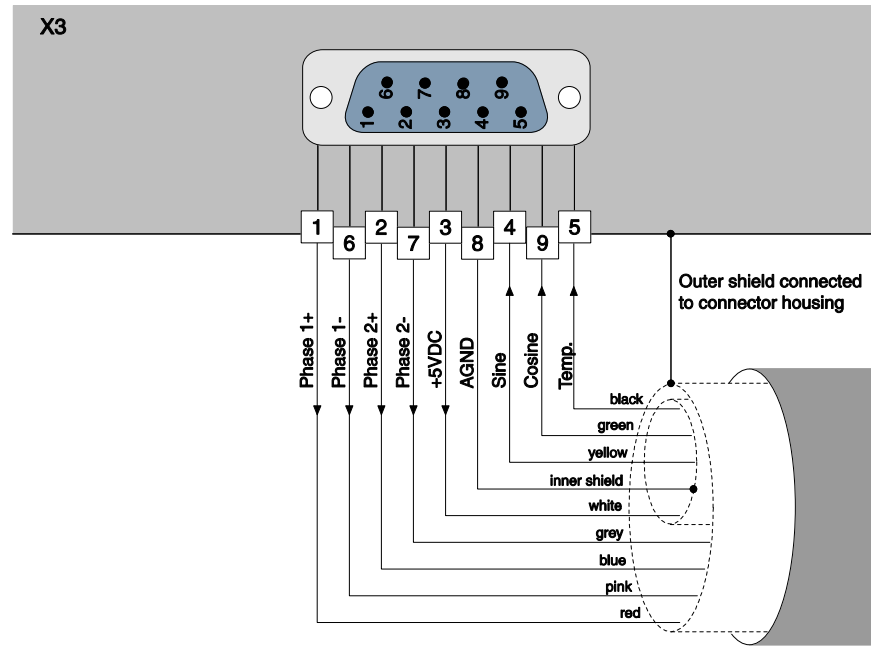
Do not switch Power Supply DC Voltage. All power supply switching and E-Stop breaks should be done to the AC supply voltage of the power supply. Failure to observe these precautions may result in severe damage to controller.

Description of the connectors / Interfaces

| X1: | Motor Supply / Regeneration Resistor | | | | | | | | | | | | | | | | | | | | | | |
|---|---|-------------------|--|---------------|-------------------|---------|--------------------|---------------|---------|---------------------|---------------|---------|---------------------|---------------|---------|---------------------|--|---------|---------------------|--|------|--------|--|
|  | <div data-bbox="400 414 1410 884">  </div> <p>For UL applications RR+ and RR- of terminal X1 must not be connected!</p> <p>Internal Fuse (F300): 16AT (slow blow, Schurter SMD-SPT, 0001.2716.xx, UL File Number: E41599) The fuse is directly soldered onto the PWB. Replacement is only possible by qualified personnel with appropriate equipment. CAUTION: For continued protection against risk of fire, replace only with same type and rating of fuse.</p> | | | | | | | | | | | | | | | | | | | | | | |
| Screw Terminals | <p>External Regeneration Resistor (RR01-10/60, Art. Nr. 0150-3088) For UL applications RR+ and RR- of terminal X1 must not be connected!</p> <p>Motor Supply nominal 72VDC (24...85VDC) (for UL 30...85VDC) Absolute max. Rating 72VDC +20%.</p> <p>If motor supply voltage is exceeds 90VDC, the controller will go into error state.</p> <ul style="list-style-type: none"> - Tightening torque: min 0.4Nm - Screw thread: M 2,5 - Use 60/75°C copper conductors only - Conductor cross-section: use only 2.5mm² (AWG 14) - Max. length: 4m | | | | | | | | | | | | | | | | | | | | | | |
| X2: | Motor Phases | | | | | | | | | | | | | | | | | | | | | | |
|  | <table border="1"> <thead> <tr> <th></th><th data-bbox="564 1451 711 1473">LinMot Motor:</th><th data-bbox="1046 1451 1238 1473">3-phase EC-Motor:</th></tr> </thead> <tbody> <tr> <td data-bbox="400 1491 488 1514">PH1+ /U</td><td data-bbox="564 1491 799 1514">Motor Phase 1+ red</td><td data-bbox="1046 1491 1190 1514">Motor Phase U</td></tr> <tr> <td data-bbox="400 1514 488 1536">PH1- /V</td><td data-bbox="564 1514 799 1536">Motor Phase 1- pink</td><td data-bbox="1046 1514 1190 1536">Motor Phase V</td></tr> <tr> <td data-bbox="400 1536 488 1559">PH2+ /W</td><td data-bbox="564 1536 799 1559">Motor Phase 2+ blue</td><td data-bbox="1046 1536 1190 1559">Motor Phase W</td></tr> <tr> <td data-bbox="400 1559 488 1581">PH2- /X</td><td data-bbox="564 1559 799 1581">Motor Phase 2- grey</td><td></td></tr> <tr> <td data-bbox="400 1581 488 1603">PH2- /X</td><td data-bbox="564 1581 799 1603">Motor Phase 2- grey</td><td></td></tr> <tr> <td data-bbox="400 1603 488 1626">SCRN</td><td data-bbox="564 1603 799 1626">Shield</td><td></td></tr> </tbody> </table> | | | LinMot Motor: | 3-phase EC-Motor: | PH1+ /U | Motor Phase 1+ red | Motor Phase U | PH1- /V | Motor Phase 1- pink | Motor Phase V | PH2+ /W | Motor Phase 2+ blue | Motor Phase W | PH2- /X | Motor Phase 2- grey | | PH2- /X | Motor Phase 2- grey | | SCRN | Shield | |
| | LinMot Motor: | 3-phase EC-Motor: | | | | | | | | | | | | | | | | | | | | | |
| PH1+ /U | Motor Phase 1+ red | Motor Phase U | | | | | | | | | | | | | | | | | | | | | |
| PH1- /V | Motor Phase 1- pink | Motor Phase V | | | | | | | | | | | | | | | | | | | | | |
| PH2+ /W | Motor Phase 2+ blue | Motor Phase W | | | | | | | | | | | | | | | | | | | | | |
| PH2- /X | Motor Phase 2- grey | | | | | | | | | | | | | | | | | | | | | | |
| PH2- /X | Motor Phase 2- grey | | | | | | | | | | | | | | | | | | | | | | |
| SCRN | Shield | | | | | | | | | | | | | | | | | | | | | | |
| Screw Terminals | <p>The motor phases are present at X2 and X3. For any application it is recommended to use X2. It is only allowed to use X3 for connecting the motor phases if RMS current is below 5A and peak current is below 7.5A. For UL applications the motor phases must be wired on X2. Never connect motor phases on X2 and X3!</p> <ul style="list-style-type: none"> - Tightening torque: min 0.4Nm - Screw thread: M 2,5 - Use 60/75°C copper conductors only - Conductor cross-section max. 2.5mm² | | | | | | | | | | | | | | | | | | | | | | |

| X3: | Motor | |
|---|---|---|
|  | LinMot Motor: 1 Motor Phase 1+ 2 Motor Phase 2+ 3 +5VDC 4 Sensor Sine 5 Temp. In 6 Motor Phase 1- 7 Motor Phase 2- 8 AGND 9 Sensor Cosine case Shield | 3-phase EC-Motor: +5VDC (Hall Supply) Hall 1 Hall 3 AGND (Hall Supply) Hall 2 |
| | For UL applications the motor phases must be wired on X2 and not on X3! | |
| DSUB-9 (f) | <p><u>Note:</u> Use +5V (X3.3) and AGND (X3.8) only for motor internal Hall Sensor supply (max. 100mA).</p> <p><u>Caution:</u> Do NOT connect AGND (X3.8) to ground or earth! It is only allowed to use X3 for connecting the motor phases if RMS current is below 5A and peak current is below 7.5A.</p> | |
| Motor Wiring for Phase Currents above 5A RMS 7.5A peak (recommended general wiring) | | |
| | <div><div><div>X2</div><div></div><div>SHIELD PH2- PH2+ PH1- PH1+</div></div><div><div>X3</div><div></div><div>1 6 2 7 3 8 4 9 5</div><div>Caution: Do not connect X3.1/2/6/7</div><div>+5VDC AGND Sine Cosine Temp.</div><div></div></div></div> | |
| | <p><u>Important:</u> If motor phase current exceeds 5A_{RMS} or 7.5A_{peak}, motor phases must be wired to X2. For UL applications the motor phases have to be wired on X2 and not on X3!</p> | |

Motor wiring for Phase Currents below 5A RMS 7.5A peak



Important:

Motor phases may only be connected to X3 if RMS current is below 5A and peak current is below 7.5A. For UL applications the motor phases have to be wired on X2 and not on X3!

X4: 12pin

Control/Supply (E1130-DP(-HC,-XC), E1100-CO(-HC,-XC), E1100-DN(-HC,-XC), E1100-RS(-HC,-XC))

| | | | | |
|--|----|--------|-----------------------|----------------------------------|
| | 12 | Input | Safety Voltage Enable | Power Stage Enable (HW Enable) |
| | 11 | I/O | X4.11 | Configurable IO, PTC2 Input |
| | 10 | I/O | X4.10 | Configurable IO, PTC1 Input |
| | 9 | I/O | X4.9 | Configurable IO |
| | 8 | I/O | X4.8 | Configurable IO |
| | 7 | I/O | X4.7 | Configurable IO |
| | 6 | I/O | X4.6 | Configurable IO, Trigger Input |
| | 5 | I/O | X4.5 | Configurable IO |
| | 4 | I/O | X4.4 | Configurable IO, Analog Input |
| | 3 | I/O | X4.3/Brk | Configurable IO, Brake Driver 1A |
| | 2 | +24VDC | Supply | Logic Supply 22-26 VDC |
| | 1 | GND | Supply | Ground |

Phoenix
MC1,5/12-STF-
3,5

Inputs (X4.3 .. X4.12): 24V / 5mA (Low Level: -0.5 to 5VDC, High Level: 15 to 30VDC)
Outputs (X4.4 .. X4.11): 24V / max.100mA, Peak 370mA (will shut down if exceeds)
Brake Output (X4.3): 24V / max.1.0A

Input X4.12: SVE (Safety Voltage Enable) must be high for enabling the power stage.). If it goes low for more than 0.5ms the PWM generation of the power stage is disabled by hardware.



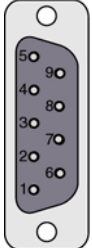
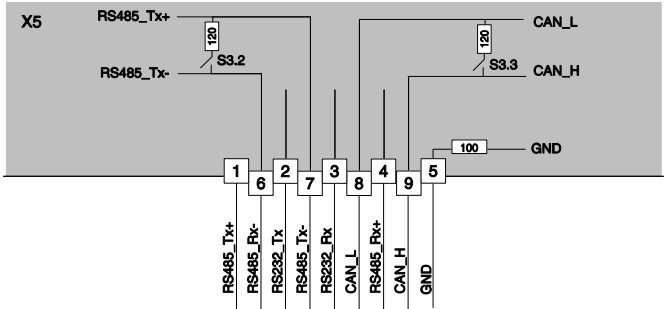
Supply 24V / typ. 400mA / max. 2.1A (if all outputs "on" with max. load.)

- Tightening torque: min 0.22Nm
- Screw thread: M2
- Use 60/75°C copper conductors only
- Conductor cross-section max. 1.5mm²

Internal Fuse (F2): 3AT (slow blow, Schurter OMT125, 3404.0118.xx, UL File Number: E41599)
The fuse is directly soldered onto the PWB. Replacement is only possible by qualified personnel with appropriate equipment.

CAUTION: For continued protection against risk of fire, replace only with same type and rating of fuse.

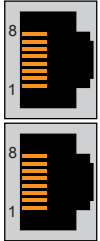
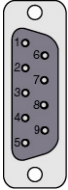
| X4: 11pin | | Control / Supply (E1100-GP(-HC, -XC)) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|---|--------------|--------|-----|-----|-----|----|-----------|-----------|-----------|----|------------|------------|------------|----|------------|------------|------------|----|------------|------------|-------------|----|----------|-----------|-------------|----|-----------|-----------|-------------|----|-----------|-----------|--------------|-------|-----------|-----------|-----------|
| <div><div><div>X4.11</div><div>X4.10</div><div>X4.9</div><div>X4.8</div><div>X4.7</div><div>X4.6</div><div>X4.5</div><div>X4.4</div><div>X4.3 /Brk</div><div>24VDC</div><div>GND</div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>1 LOGIC SUPPLY / CONTROL 11</div></div> | <div><div><div>11</div><div>I/O</div><div>X4.11</div></div><div><div>10</div><div>I/O</div><div>X4.10</div></div><div><div>9</div><div>I/O</div><div>X4.9</div></div><div><div>8</div><div>I/O</div><div>X4.8</div></div><div><div>7</div><div>I/O</div><div>X4.7</div></div><div><div>6</div><div>I/O</div><div>X4.6</div></div><div><div>5</div><div>I/O</div><div>X4.5</div></div><div><div>4</div><div>I/O</div><div>X4.4</div></div><div><div>3</div><div>I/O</div><div>X4.3/Brk</div></div><div><div>2</div><div>+24VDC</div><div>Supply</div></div><div><div>1</div><div>GND</div><div>Supply</div></div></div> | <div><div>Configurable IO, PTC2 Input</div><div>Configurable IO, PTC1 Input</div><div>Configurable IO</div><div>Configurable IO</div><div>Configurable IO</div><div>Configurable IO, Trigger</div><div>Configurable IO</div><div>Configurable IO, Analog Input</div><div>Configurable IO, Brake Driver 1A</div><div>Logic Supply 22-26 VDC</div><div>Ground</div></div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div>Phoenix MC1,5/11-STF- 3,5</div> | <div>Inputs (X4.3 .. X4.11): Outputs (X4.4 .. X4.11): Brake Output (X4.3):</div> | <div>24V / 5mA (Low Level: -0.5 to 5VDC, High Level: 15 to 30VDC) 24V / max.100mA, Peak 370mA (will shut down if exceeds) 24V / max. 1.0A</div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div>Supply 24V / typ. 400mA / max. 3.0A (if all outputs "on" with max. load.)</div> <div><div>- Tightening torque: min 0.22Nm</div><div>- Screw thread: M2</div><div>- Use 60/75°C copper conductors only</div><div>- Conductor cross-section max. 1.5mm²</div></div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LED | | State Display | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div><div><div></div><div></div><div></div><div></div></div></div> | <div>Green Yellow Yellow Red</div> | <div>24V Logic Supply OK Motor Enabled / Error Code Low Nibble Warning / Error Code High Nibble Error</div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S1, S2: | | Baud Rate / Address Selectors | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div><div><div>High</div><div>Low</div></div><div><div>S1</div><div>S2</div></div></div> | <div>S1 S2</div> | <div>Bus ID High / Baud Rate (0...F) Bus ID Low (0...F)</div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div>The switches S1 and S2 define the baud rate and MAC ID depending on the interface and parameter settings. The following description is only valid for default configurations, otherwise see in the interface specific documentation for more information.</div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div>S1: Baud Rate selector for CO, DN and RS interface:</div> <table><tr><td>S1 Pos</td><td>CO:</td><td>DN:</td><td>RS:</td></tr><tr><td>0:</td><td>undefined</td><td>undefined</td><td>undefined</td></tr><tr><td>1:</td><td>125 kBit/s</td><td>125 kBit/s</td><td>4800 Bit/s</td></tr><tr><td>2:</td><td>250 kBit/s</td><td>250 kBit/s</td><td>9600 Bit/s</td></tr><tr><td>3:</td><td>500 kBit/s</td><td>500 kBit/s</td><td>19200 Bit/s</td></tr><tr><td>4:</td><td>1 MBit/s</td><td>undefined</td><td>38400 Bit/s</td></tr><tr><td>5:</td><td>undefined</td><td>undefined</td><td>57600 Bit/s</td></tr><tr><td>6:</td><td>undefined</td><td>undefined</td><td>115200 Bit/s</td></tr><tr><td>7..F:</td><td>undefined</td><td>undefined</td><td>undefined</td></tr></table> | | | | S1 Pos | CO: | DN: | RS: | 0: | undefined | undefined | undefined | 1: | 125 kBit/s | 125 kBit/s | 4800 Bit/s | 2: | 250 kBit/s | 250 kBit/s | 9600 Bit/s | 3: | 500 kBit/s | 500 kBit/s | 19200 Bit/s | 4: | 1 MBit/s | undefined | 38400 Bit/s | 5: | undefined | undefined | 57600 Bit/s | 6: | undefined | undefined | 115200 Bit/s | 7..F: | undefined | undefined | undefined |
| S1 Pos | CO: | DN: | RS: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0: | undefined | undefined | undefined | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1: | 125 kBit/s | 125 kBit/s | 4800 Bit/s | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2: | 250 kBit/s | 250 kBit/s | 9600 Bit/s | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3: | 500 kBit/s | 500 kBit/s | 19200 Bit/s | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4: | 1 MBit/s | undefined | 38400 Bit/s | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5: | undefined | undefined | 57600 Bit/s | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6: | undefined | undefined | 115200 Bit/s | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7..F: | undefined | undefined | undefined | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div>S2: MACID for CO, DN, RS interface and CANTalk¹⁾: Position value is equal to MACID (e.g. position 7 → MACID 0x07h)</div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div>In case of Profibus DP the switches S1 and S2 define the node address, whereas S1 is the high nibble and S2 the low nibble.</div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div>NOTE: The baud rate and MACID will only be set if the interface switch S3.4 is set to "on". In case of CO or DN interfaces, the OS (operating system) sets up the CAN bus baud rate according to the interface settings, but only if the interface is activated (S3.4). Otherwise the baud rate will be set to 500kBaud. The CAN-Talk ID is always taken from both switches S1 and S2</div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| S3: | | Bus Termination | |
|---|--|--|--|
|  | S3 | Switch 4: Interface on/off (All field bus interfaces) Switch 3: Termination CAN on/off Switch 2: Termination RS485 on/off Switch 1: RS232 (switch "off" / RS485 "on") Select serial RS232 or RS485 Factory setting: all switches "off" | |
| |  | To use field bus functionality the switch S3.4 has to be set to position "on"! In position "off" the field bus is deactivated. | |
| X5: | | COM | |
|  | 1 RS485_Tx+ Y 2 RS232_Tx 3 RS232_Rx 4 RS485_Rx+ A 5 GND 6 RS485_Rx- B 7 RS485_Tx- Z 8 CAN_L 9 CAN_H case Shield |  | |
| DSUB-9 (m) | RS232: | Configuration on all Controllers: use 1:1 connection cable to PC | |

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| X10 / X11 | Master Encoder IN (X10) / Master Encoder OUT (X11) | | | |
|---|--|---|--|---|
|  | | <u>Incremental:</u> 1 A+ 2 A- 3 B+ 4 Z+ 5 Z- 6 B- 7 CAN_H (GP) 8 CAN_L (GP) case Shield | <u>Step/Direction:</u> Step+ Step- Direction+ Zero+ Zero- Direction- CAN_H (GP) CAN_L (GP) Shield | <u>EIA/TIA 568A colors:</u> Green/White Green Orange/White Blue Blue/White Orange Brown/White Brown |
| 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. Input Frequency 2MHz, 240ns edge separation</p> <p><u>Master Encoder Outputs:</u> Amplified RS422 differential signals from Master Encoder IN (X10)</p> <p>CAN internally connected to X7, X8</p> <p>The CAN signals on X10/X11 are only available on GP controllers. With the –DP, -RS, -DN and CO controllers use X7/X8 for connection the CAN bus instead.</p> <p>All devices, which are connected to X10/X11 must be referenced to the same ground.</p> | | | |
| X12 : | External Position Sensor | | | |
|  | | <u>Incremental:</u> 1 +5V DC 2 A- 3 B- 4 Z- 5 GND 6 A+ 7 B+ 8 Z+ 9 Enc. Alarm case Shield | <u>Sin/Cos:</u> +5V DC SIN- COS- ZERO- GND SIN+ COS+ ZERO+ Enc. Alarm Shield | |
| DSUB-9 (f) | <p>Max. Input Frequency: 2MHz (Incremental RS422), 240ns edge separation 10kHz (Analog 1Vpp), 10Bit AD converted</p> <p>Sensor Supply (max. 100mA)</p> <p>Encoder Inputs: - Incremental: RS422 - Sin/Cos: 1Vpp</p> <p>Enc. Alarm In: 5V / 1mA</p> | | | |

Error Codes

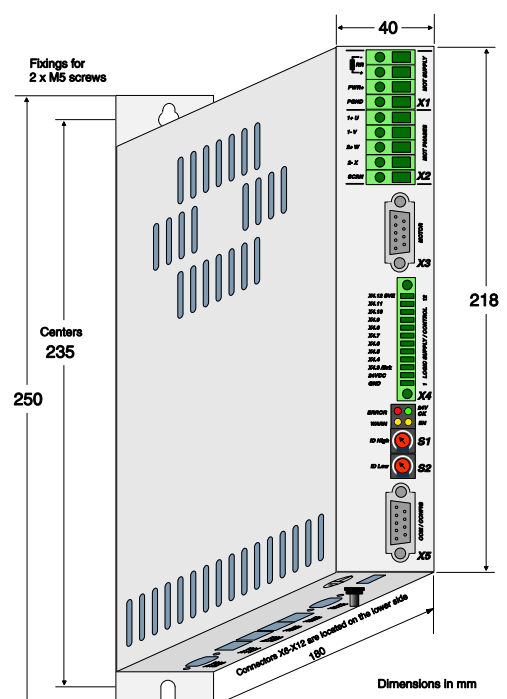
| <div> <div> <div>Error</div> <div>Warn</div> </div> <div> <div>24V OK</div> <div>EN</div> </div> </div> | | | Description |
|---|---|--|--|
| ERROR | WARN | EN | |
| OFF | Warning | Operation Enabled | Normal Operation. Warnings and Operation Enabled are displayed |
| On | ● ~ 2Hz 0..15 x Error Code High Nibble | ● ~ 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. "WARN" and "EN" are blinking together. The error can be acknowledged. (ex.: WARN blinks 3x, EN blinks 2x; Error Code = 32h) |
| ● ~ 2Hz | ● ~ 2Hz 0..15 x Error Code High Nibble | ● ~ 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 (ex.: WARN blinks 3x, EN blinks 2x; Error Code = 32h) |
| ● ~ 4Hz | ● ~ 2Hz 0..15 x Error Code High Nibble | ● ~ 2Hz 0..15 x Error Code Low Nibble | System Error. Please reinstall firmware or contact support. |

The meaning of the Error Codes can be found in the Usermanual_MotionCtrl_Software_E1100 and the user manual of the loaded interface software. These documents are provided together with LinMot-Talk configuration software and can be downloaded from www.linmot.com.

Physical Dimension

| <i>E1100 Single axes controller</i> | | |
|-------------------------------------|---------|--|
| Width | mm (in) | 40 (1.6) |
| Height | mm (in) | 250 (9.9) |
| Height without fixings | mm (in) | 228 (9) |
| Depth | mm (in) | 180 (7.1) |
| Weight | Kg (lb) | 1.5 (3.3) |
| Case | IP | 20 |
| Storage Temperature | °C | -25...40 |
| Transport Temperature | °C | -25...70 |
| Operating Temperature | °C | 0...40 at rated data (UL) 40...50 with power derating |
| Relative humidity | | 95% (non-condensing) |
| Max. Case Temperature | °C | 65 |
| Max. Power Dissipation | W | 30 |
| Distance between Controllers | mm (in) | 20 (0.8) left/right 50 (2) top/bottom |

() 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. The nominal supply voltage is 72 VDC. The possible range is from 24 to 85VDC, for UL from 30 to 85 VDC.



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

Recommended Power supplies:

| Item | Description | Art. No. |
|----------------|-------------------------------------|-----------|
| T01-72/420 | 72VDC, 15A peak, 420VA, 3x400VAC | 0150-1966 |
| T01-72/420-US | 72VDC, 15A peak, 420VA, 3x230VAC | 0150-1967 |
| T01-72/900 | 72VDC, 30A peak, 900VA, 3x400VAC | 0150-1842 |
| T01-72/900-US | 72VDC, 30A peak, 900VA, 3x230VAC | 0150-1843 |
| T01-72/1500 | 72VDC, 2x30A peak, 1500VA, 3x400VAC | 0150-1844 |
| T01-72/1500-US | 72VDC, 2x30A peak, 1500VA, 3x230VAC | 0150-1845 |

Power Supply signal

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. 200mA (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 $\geq 10'000 \mu\text{F}$ (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.



For UL applications, use option A.

| 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. |
|------------------|-------------------------------------|-----------|
| E1130-DP | Profibus Servo Controller 72VDC/8A | 0150-1667 |
| E1130-DP-HC | Profibus Servo Controller 72VDC/15A | 0150-1668 |
| E1130-DP-XC | Profibus Servo Controller 72VDC/25A | 0150-1861 |
| E1100-RS | RS232/485 Controller 72VDC/8A | 0150-1677 |
| E1100-RS-HC | RS232/485 Controller 72VDC/15A | 0150-1678 |
| E1100-RS-XC | RS232/485 Controller 72VDC/25A | 0150-1862 |
| E1100-CO | CANopen Controller 72VDC/8A | 0150-1681 |
| E1100-CO-HC | CANopen Controller 72VDC/15A | 0150-1682 |
| E1100-CO-XC | CANopen Controller 72VDC/25A | 0150-1683 |
| E1100-DN | DeviceNet Controller 72VDC/8A | 0150-1679 |
| E1100-DN-HC | DeviceNet Controller 72VDC/15A | 0150-1680 |
| E1100-DN-XC | DeviceNet Controller 72VDC/25A | 0150-1863 |
| E1100-GP | General Purpose 72VDC/8A | 0150-1665 |
| E1100-GP-HC | General Purpose 72VDC/15A | 0150-1666 |
| E1100-GP-XC | General Purpose 72VDC/25A | 0150-1864 |

International Certifications

| Certifications | |
|---|--|
| USA and Canada  | All products marked with this symbol are tested and listed by Underwriters Laboratories and 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. The E1100 series controllers are listed under UL file number E316095. |
| Europe  | See chapter "declaration of conformity CE-Marking". |

Safety notes for the installation according to UL

Markings:

- Use 60/75 °C or 75 °C copper wire only.
- Maximum ambient temperature 40°C.
- Suitable for use on a circuit capable of delivering not more than 5kA RMS symmetrical amperes, 85VDC Maximum.
- The devices are provided with integral overload protection for the motor.

Terminal tightening torque:

- X1, X2: min 0.4Nm Screw thread: M2.5
- X4: min 0.22Nm Screw thread: M2

Wiring diagram conductor cross-section:

- X1, X2: max. 2.5mm²
- X4: max. 1.5mm²

Ground terminal:

- Threaded Grounding Bolt: M5 (located on the lower side of the housing). Marked with ⚡

Fuse Replacement:

CAUTION: For continued protection against risk of fire, replace only with same type and rating of fuse!

The fuses are directly soldered onto the PWB. Replacement is only possible by qualified personnel with appropriate equipment.

- Internal Fuse F2: 3AT (slow blow, Schurter OMT125, 3404.0118.xx, UL File Number: E41599)
- Internal Fuse F300: 16AT (slow blow, Schurter SMD-SPT, 0001.2716.xx, UL File Number: E41599)

Motor Phase Wiring:

For UL applications the motor phases have to be wired on X2 and not on X3!

Regeneration Resistor:

For UL applications pins RR+ and RR- of terminal X1 must not be connected!

In case of over voltage see chapter "Regeneration of Power / Regeneration Resistor" Option A.

Declaration of Conformity CE-Marking

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

Products: LinMot® Controllers

| Type | Art.-No. | Type | Art.-No. | Type | Art.-No. |
|-------------|-----------|-------------|-----------|------|----------|
| E1130-DP | 0150-1667 | E1100-DN | 0150-1679 | | |
| E1130-DP-HC | 0150-1668 | E1100-DN-HC | 0150-1680 | | |
| E1100-GP | 0150-1665 | E1130-DP-XC | 0150-1861 | | |
| E1100-GP-HC | 0150-1666 | E1100-CO-XC | 0150-1683 | | |
| E1100-RS | 0150-1677 | E1100-DN-XC | 0150-1863 | | |
| E1100-RS-HC | 0150-1678 | E1100-RS-XC | 0150-1862 | | |
| E1100-CO | 0150-1681 | E1100-GP-XC | 0150-1864 | | |
| E1100-CO-HC | 0150-1682 | | | | |

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:

| EN 61000-6-2 | | | Immunity for industrial environment |
|--------------|--------------|---------|---|
| | EN 61000-4-2 | Class A | Electrostatic discharge immunity (ESD) |
| | EN 61000-4-3 | Class A | Radiated electromagnetic field immunity |
| | EN 61000-4-4 | Class A | Fast transients / burst immunity (EFT) |
| | EN 61000-4-5 | Class A | Slow transients immunity (Surges) |
| | EN 61000-4-6 | Class A | Conducted radio frequency immunity |
| EN 61000-6-4 | | | Emission for industrial environment |
| | EN 55022 | Class A | Radiated Emission |

Company
 NTI Ltd.

Zurich, December 16, 2004



 R. Rohner / CEO NTI AG

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