SERIES A1100

- Absolute / relative positioning commands
- Limited jerk motion commands
- Time Curves
- PLC or Stand-Alone Solutions
- Digital IO's
- Supports Plug and Play
- CE / UL / CSA

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Servo Drive A1100

Series A1100 drives are compact servo drives with 32-bit position resolution and integrated power stage, for linear motors.

The drives are suitable for simple and standard position tasks with point-to-point motions and have a plug and play function.

c**UL**us

E316095
INT. CONT. EQ.
UL508C

CE

CONNECTION TO MACHINE CONTROL

The Series A1100 Servo Drives can be actuated by machine controls from many manufacturers or brands, via digital inputs, outputs, serial interface, or by CAN-open interfaces.

PROCESS AND SENSOR INTERFACES

Fast process interfaces for direct processing of sensor signals are available as freely programmable analog and digital inputs and fast trigger inputs.

LOGIC AND POWER SUPPLY

The Servo Drives need two separate power supplies for the logic and power elements.
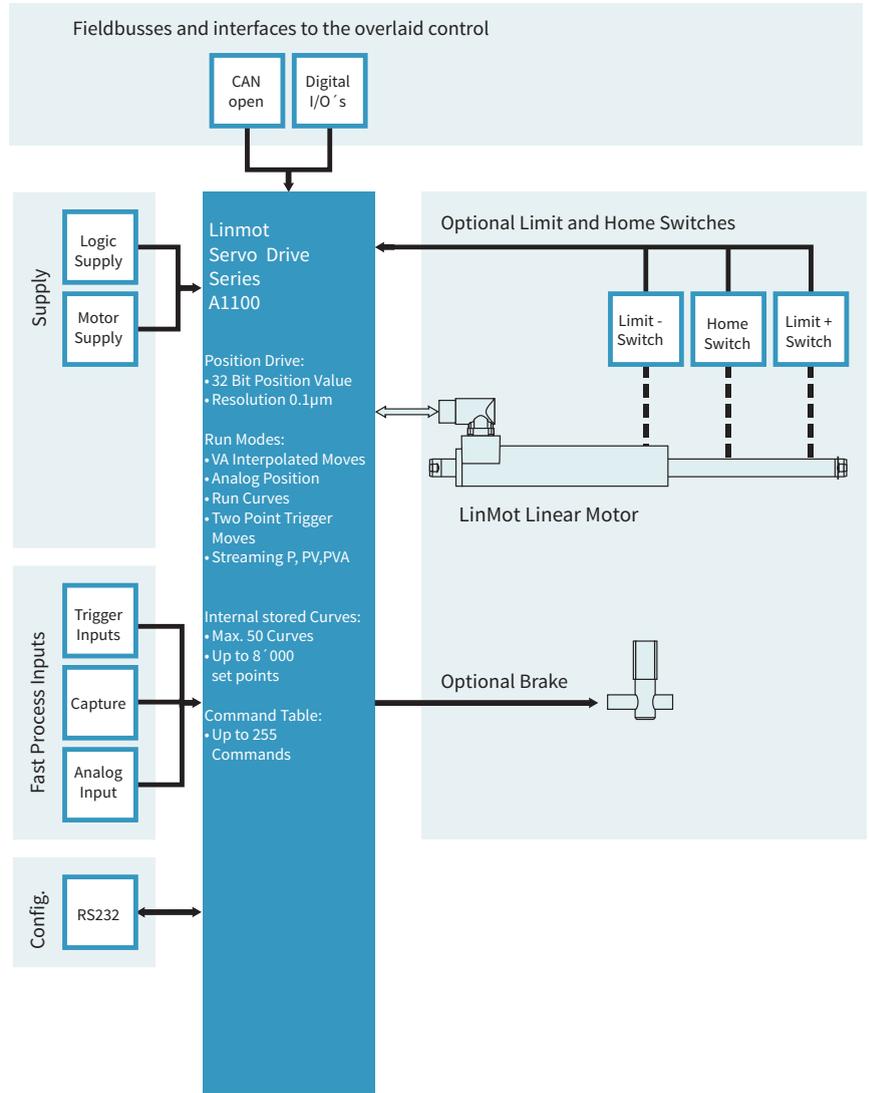
In an E-stop and safe stop of the drive, only the motor power supply is cut off from the drive. The logic supply and the drive continue to run.

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System Integration

Series A1100 Servo Drives have analog inputs and digital inputs and outputs, serial interfaces, and Bus connections. The user is therefore not dependent on the selection of the higher level controller.

Additionally, the drives can be equipped with optional peripherals, such as reference and end stop switches.

With flexibility and a compact form factor, LinMot Series A1100 Servo Drives provide a complete solution for a flexible drive concept in single and multiple axes applications, with linear motors.

Fieldbusses and interfaces to the overlaid control

CAN open

Digital I/O´s

Supply

Logic Supply

Motor Supply

Linmot Servo Drive Series A1100

Position Drive:
• 32 Bit Position Value
• Resolution 0.1µm

Run Modes:
• VA Interpolated Moves
• Analog Position
• Run Curves
• Two Point Trigger Moves
• Streaming P, PV, PVA

Internal stored Curves:
• Max. 50 Curves
• Up to 8´000 set points

Command Table:
• Up to 255 Commands

Fast Process Inputs

Trigger Inputs

Capture

Analog Input

Config.

RS232

Optional Limit and Home Switches

Limit - Switch

Home Switch

Limit + Switch

LinMot Linear Motor

Optional Brake

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POSITION STREAMING

With a cyclical target value, or "position streaming," the overarching NC or CNC drive communicates with the Servo Drive through CANopen.

The position and velocity calculated in the overarching drive is transmitted to the Servo Drive cyclically. The P, PV, or PVA mode is available for this transmission.

MOTOR INTERFACES

A1100 Servo Drives provide all necessary interfaces to operate linear motors with optional external peripherals, such as end position and reference switches.

CONFIGURATION

Parameterization and configuration of the Servo Drive is done via RS232.

LinMot Talk user-friendly PC software is available for configuration. In addition to online documentation, LinMot Talk provides extensive debugging tools, such as an oscilloscope and an error inspector, for simple and rapid start-up of the axes.

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INTERPOLATED MOVES

Stroke [mm]

Goto 100 mm
v_{max} = 2,5 m/s
a_{max} = 3,0 m/s^2

Time [ms]
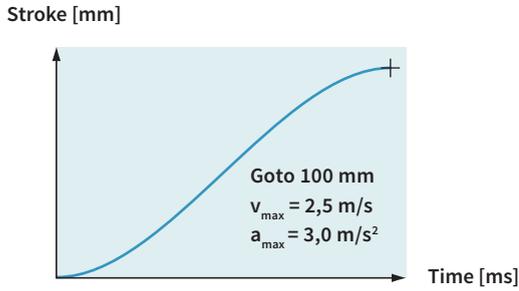
For direct position targets, using absolute or relative positioning, the desired position is reached using acceleration and velocity-limited motion profiles or jerk optimized profiles (jerk limited and Bestehorn). Positioning commands can be invoked via the serial interface, CAN-open or a trigger input.

|	
Stroke range:	±100 m
Position Resolution:	0.1 µm (32Bit)
Velocity Resolution:	1.0 µm/s (32Bit)
Acceleration Resol.:	10.0 µm/s^2 (32Bit)

TIME CURVES

Stroke [mm]

Start Curve 1

Curve 1

Time [ms]
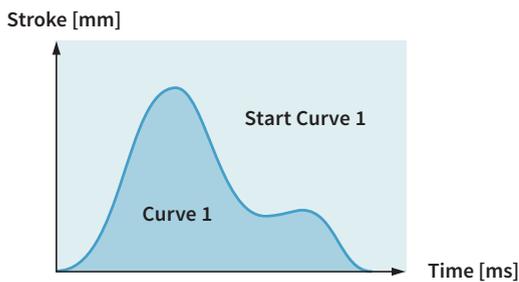
Up to 50 different time curves can be stored in Series A1100 drives, with up to 8,000 individual set points. The motor can thus travel along time curves of any complexity, such as those generated by CAD programs and stored in the drive (Excel CSV format). The time curves can be invoked via the serial interface, fieldbusses or the trigger input.

Stroke range:	±100m
Position Resolution:	0.1 µm (32Bit)
Motion profiles:	Max. 50 Time Curves
Curve points:	Max. 8'000 points

PROFILED MOVES

Stroke [mm]

Goto Pos 125 mm
with Profile 1

Curve 1

Time [ms]
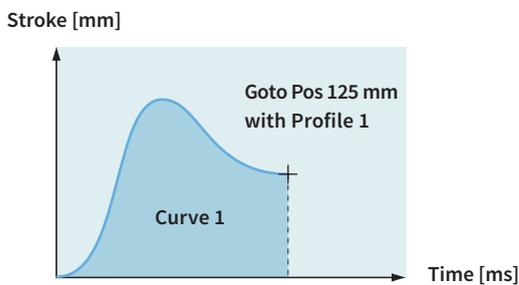
For travel to an absolute position, or shifting by a relative position, any desired motion rules can be stored besides the VA interpolator. They are stored in the drive as motion profiles (Excel CSV format). The positions can be approached, for example, with a sinusoidal motion to optimize power loss, or special reverse optimized motion profiles.

|	
Stroke range:	±100m
Position Resolution:	0.1 µm (32Bit)
Motion profiles:	Max. 50 Time Curves
Curve points:	Max. 8'000 points

SETPOINT STREAMING

Stroke [mm]

Time [ms]
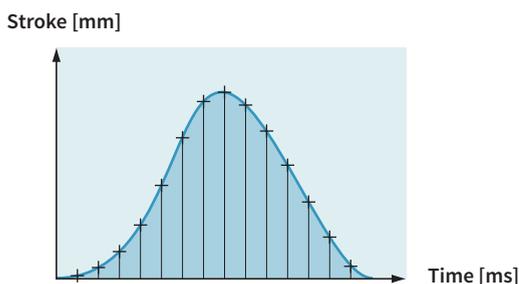
Overlaid NC drives with fieldbus or Ethernet interfaces communicate with the servo drives via "Position Streaming". The position and velocity calculated in the overlaid control is transmitted to the Servo Drive cyclically. The P, PV, or PVA mode is available for this transmission.

Position Resolution:	32 Bit
Velocity Resolution:	32 Bit
Interpolator:	4 kHz
Cycle times:	0.5 - 5 ms

COMMAND TABLE

```
Start
  ↓
Wait Input
  ↓
Pos 12mm
  ↓
Rule 1  →  Terminate A
  ↓
Stop
```
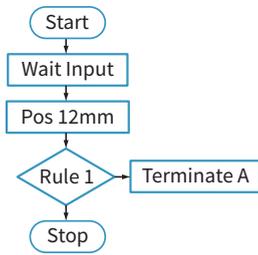
Entire motion sequences with up to 255 individual motion commands can be stored in the Command Table. This is primarily advantageous if complete motion sequences need to be executed very quickly, without dead time from the overlaid PLC. In the Command Table, the programmer has access to all motion commands, internal parameters, and digital inputs and outputs.

Commands:	max. 255
Cycle time:	250 μsec

ANALOG POSITION

0V
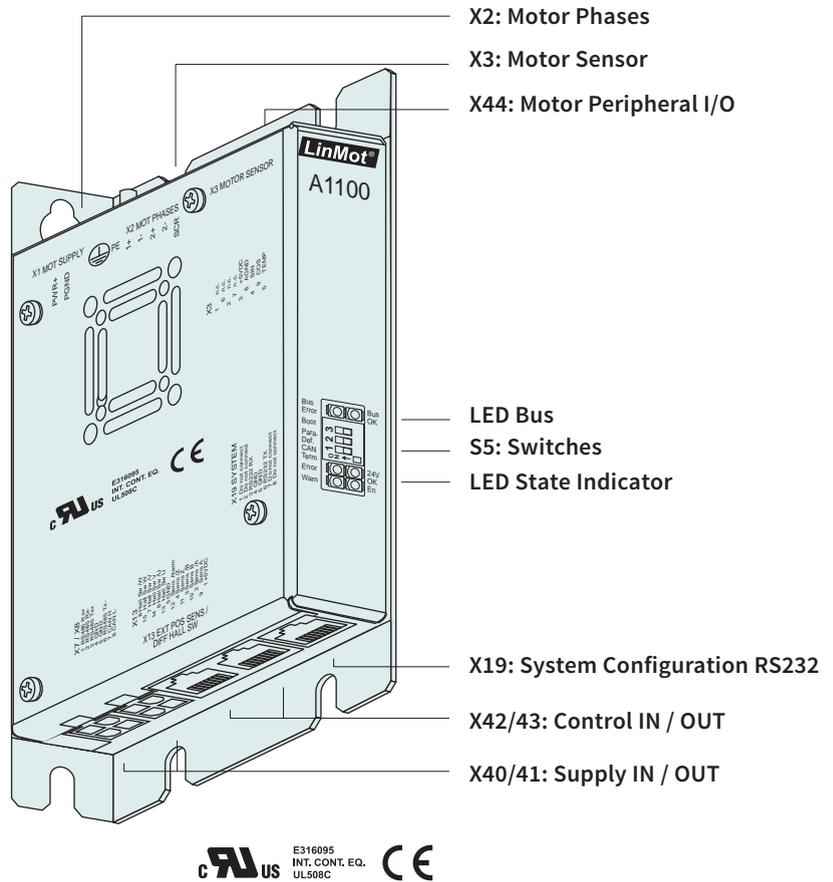**Position**

10V
Position
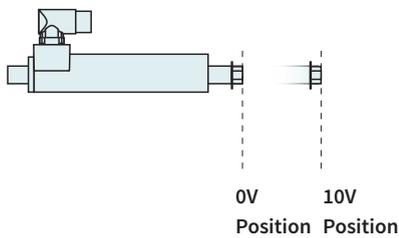
For an analog position target, the linear motor travels to a position proportional to the input voltage. The position is either scanned continuously, or only after a rising edge of the trigger signal. In order to prevent uncontrolled jumps in position, the motor travels to the positions with a programmable maximum acceleration and velocity (VA interpolator).

Inputs:	Analog Input X44
Voltage range:	0-10VDC
Resolution:	10 Bit
Scanning rate:	250 μsec

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CANopen *Point ● ●*
 to Point ●

A1100-GP

» Absolute & Relative Positioning
» Time based motion profiles
» Internally stored Motion Sequences
» Position Streaming
» Analog Position Target
» Customer-Specific Functions

X2: Motor Phases
X3: Motor Sensor
X44: Motor Peripheral I/O

LED Bus
S5: Switches
LED State Indicator

X19: System Configuration RS232
X42/43: Control IN / OUT
X40/41: Supply IN / OUT

E316095
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UL508C

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CANOPEN

The LinMot A1100-GP drives support the CiA DS301 communications protocol. The following resources are available:
4 T_PDO, 4 R_PDO, 1 T_SDO, 1 R_SDO

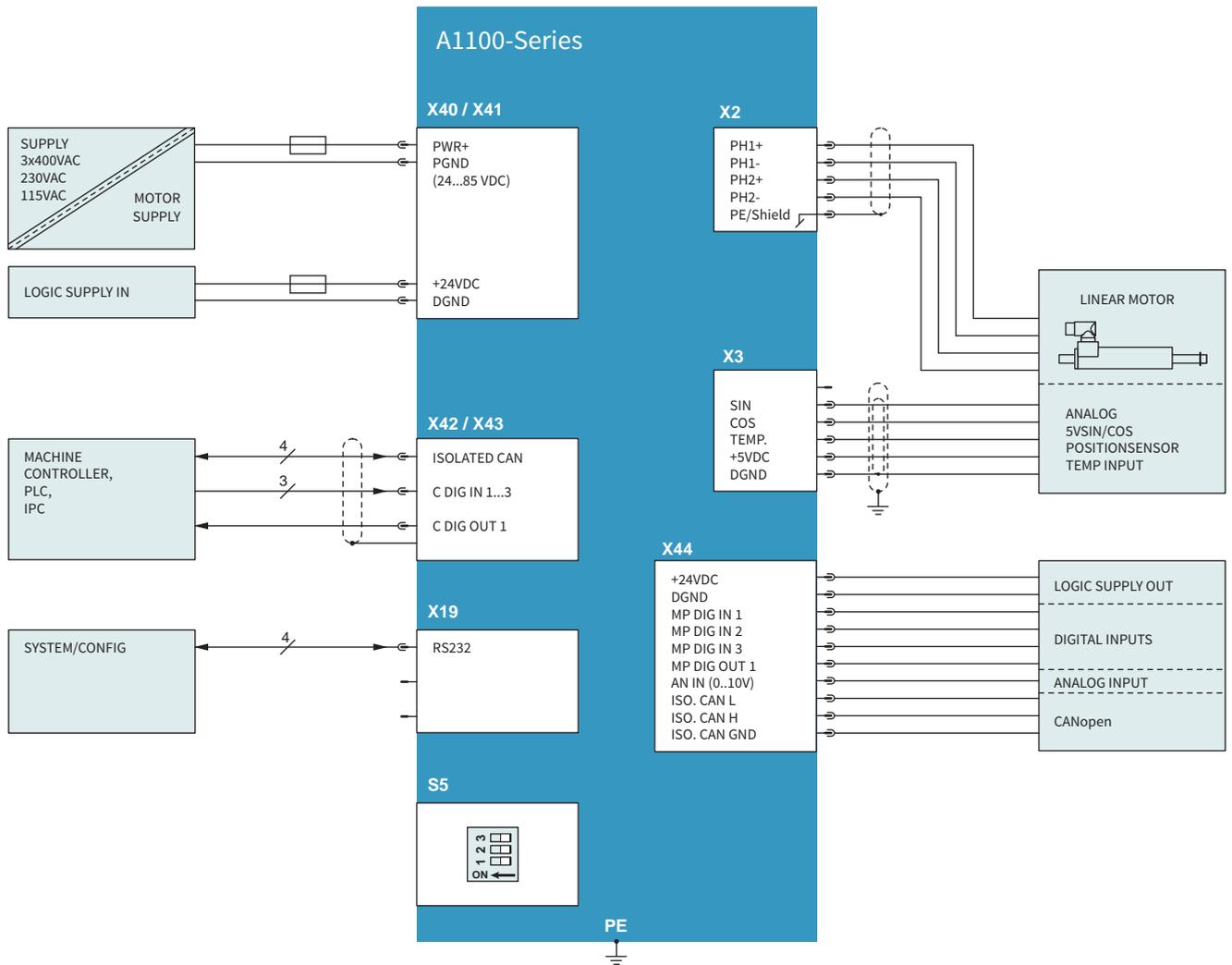The following protocols are also supported by the drives:
» NMT Error Control (Nodeguarding Protocol
  or HeartBeat Protocol)
» PDO (Transmission type 1 to 254)
» SDO Upload and Download
» NMT (Start, Stop, Enter PreOp, Reset Node,
  Reset Communication, Boot-Up Message)
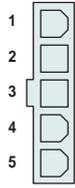
REPLACING PNEUMATICS

Due to their simple controls via digital inputs and outputs, A1100 drives make excellent substitutes for pneumatic cylinders.

Using digital inputs or CAN bus, the linear motor can move to programmable positions. As soon as the linear motor has reached the set position, the In-Postion output is actuated.

The linear motor can thus be controlled like a programmable pneumatic cylinder with end position switches.

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A1100-Series

X40 / X41

SUPPLY
3x400VAC
230VAC
115VAC

MOTOR
SUPPLY

PWR+
PGND
(24...85 VDC)

LOGIC SUPPLY IN

+24VDC
DGND

X2

PH1+
PH1-
PH2+
PH2-
PE/Shield

LINEAR MOTOR

X3

SIN
COS
TEMP.
+5VDC
DGND

ANALOG
5VSIN/COS
POSITIONSENSOR
TEMP INPUT

X42 / X43

MACHINE
CONTROLLER,
PLC,
IPC

4

3

ISOLATED CAN

C DIG IN 1...3

C DIG OUT 1

X44

+24VDC
DGND
MP DIG IN 1
MP DIG IN 2
MP DIG IN 3
MP DIG OUT 1
AN IN (0..10V)
ISO. CAN L
ISO. CAN H
ISO. CAN GND

LOGIC SUPPLY OUT

DIGITAL INPUTS

ANALOG INPUT

CANopen

X19

SYSTEM/CONFIG

4

RS232

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**S5**

1 2 3
ON ←

PE

X2   MOTOR PHASES

Nr	Designation	LinMot Linear Motor	Color
1	PH1+ /U	Motor Phase 1+	red
2	PH1- /V	Motor Phase 1-	pink
3	PH2+ /W	Motor Phase 2+	blue
4	PH2- /X	Motor Phase 2-	grey
5	SCRN	Shield	

Molex
Mini-Fit Jr.™
Molex Art. Nr.:
50-36-1747

»   Use 60/75°C copper conductors only
»   Cable length <30m
»   13A max. current per circuit when header is mated to a receptacle loaded with a 45750 Mini-Fit® Plus HCS Crimp Terminal crimped to a 16 AWG wire
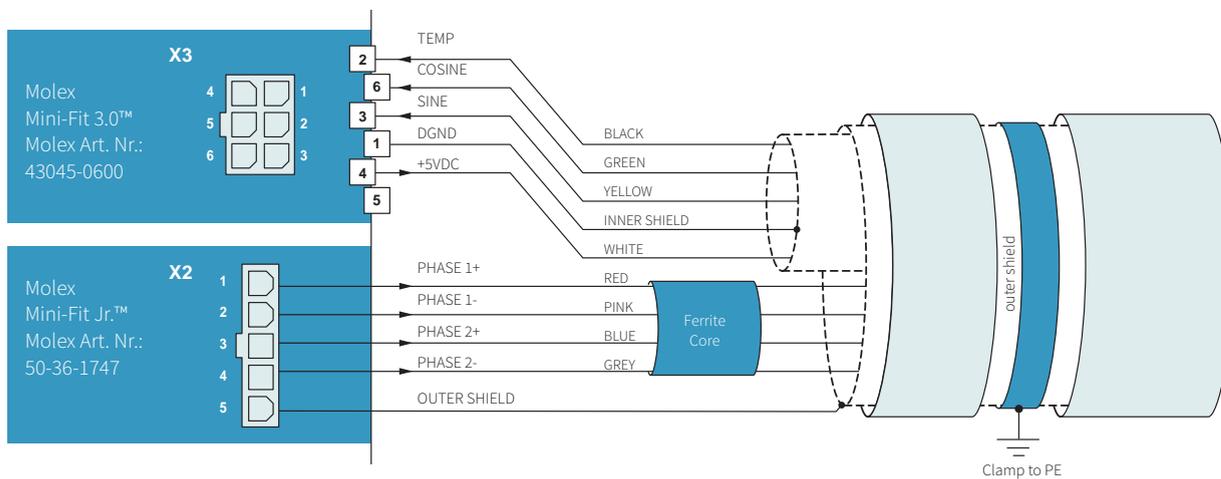
X3   MOTOR SENSOR
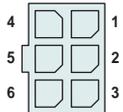
Nr	LinMot Motor
1	DGND
2	Temp
3	Sensor Sine
4	+5VDC
5	(Do not connect)
6	Sensor Cosine

Molex
Mini-Fit 3.0™
Molex Art. Nr.:
43045-0600

»   Use +5V (X3.4) and DGND (X3.1) only for motor internal hall sensor supply (max. 100 mA)
»   Cable length < 30m
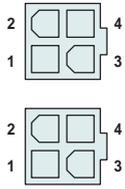»   Caution: Do NOT connect DGND (X3.1) to ground or earth!

MOTOR   LINEAR MOTOR WIRING WITH LINMOT MOTOR CABLE (K-, KS- AND KR-TYPES)

»   For the connection between the linear motor and servo drive, only the specially shielded LinMot cables of type K, KS or KR should be used.
»   The length of the cable can be up to 30 m between the linear motor and the servo drive.
»   Motor cables fabricated by the customer are to be tested with a test voltage of 1500VDC.
»   An improperly fabricated motor cable can damage both the linear motor and the servo drive.
»   The minimum bend radius is to be observed for stationary cables as well as for moving motor cables
»   The motor cable must not be plugged in or unplugged while voltage is still applied.
»   The outer shield of the motor cable has to be clamped to PE as close as possible to the drive.
»   A ferrite core (5mm, 144Ohm @ 100MHz, e.g. Würth Elektronik, Art.Nr.: 7427114) has to be mounted around the motor phases as close to the drive as possible.
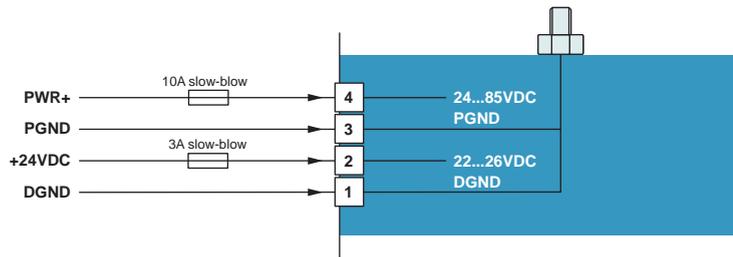
LinMot®

## X40 / X41   SUPPLY IN / OUT

Molex
Mini-Fit Jr.™

Molex Art. Nr.:
50-36-2306

PWR+	10A slow-blow	4 → 24...85VDC PGND
PGND		3
+24VDC	3A slow-blow	2 → 22...26VDC DGND
DGND		1

»   Motor Supply: 72VDC nominal, 24...85VDC
»   Absolute max. Rating: 72VDC +20%
»   External Fuse: Motor Supply = 10AT (10A slow blow) / min. 100VDC
     Logic Supply = 3AT (3A slow blow) / min. 100VDC
»   If motor supply voltage exceeds 90VDC, the drive will go into error state
»   Use 60/75°C copper conductors only
»   13A max. current per circuit when header is mated to a receptacle loaded with a 45750 Mini-Fit® Plus HCS Crimp Terminal crimped to a 16 AWG wire
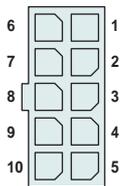
X42 / X43   CONTROL IN / OUT
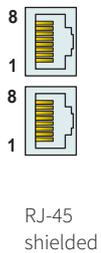
RJ-45
shielded

Nr		
1	C Dig IN 1	Input high voltage: Vin > 16VDC, Input low voltage: Vin < 8VDC
2	C Dig IN 2	Input high voltage: Vin > 16VDC, Input low voltage: Vin < 8VDC
3	C Dig IN 3	Input high voltage: Vin > 16VDC, Input low voltage: Vin < 8VDC
4	CAN GND	
5	CAN GND	
6	C Dig OUT 1	Open Collector Output, 100k Pull-Up to +24VDC
7	Isolated CAN H	
8	Isolated CAN L	
Case	Shield	

»   Use twisted pair (1-2, 3-6, 4-5, 7-8) cable for wiring
»   X42 is internally connected to X43 (1:1 connection)
»   Cable length < 30m.
»   Galvanically isolated CAN transceiver meets the specifications of the ISO11898-2 standard
»   Note: A termination resistor of 120 Ohm can be connected drive internally with the switch S5.1.

X44   MOTOR PERIPHERAL I/O

Molex
Mini-Fit 3.0™

Molex Art. Nr.:
43045-1000

Nr		
1	DGND	
2	MP Dig IN 1	Input high voltage: Vin > 16VDC, Input low voltage: Vin < 8VDC
3	MP Dig IN 2	Input high voltage: Vin > 16VDC, Input low voltage: Vin < 8VDC
4	CANGND	Use a seperate shielded twisted pair cable for the CAN connection
5	Isolated CAN H	Use a seperate shielded twisted pair cable for the CAN connection
6	+24VDC OUT	Max. Current: 2.5A
7	MP Dig OUT 1	Open Collector Output, No Pull-Up, Max. Current: 1.4A
8	MP Dig IN 3	Input high voltage: Vin > 16VDC, Input low voltage: Vin < 8VDC
9	AN IN (0...10V)	Analog Input 0V..10V
10	Isolated CAN L	Use a seperate shielded twisted pair cable for the CAN connection

»   Galvanically isolated CAN transceiver meets the specifications of the ISO11898-2 standard
»   The CAN bus on X44 is the same one as on X42/43
»   Note: A termination resistor of 120 Ohm can be connected drive internally with the switch S5.1.
»   Use a seperate shielded cable with a twisted pair for CAN L and CAN H when connecting the CAN bus to X44. Clamp the shielding of the cable as close as possible to the drive to PE.
»   Cable length < 30m

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X19   SYSTEM
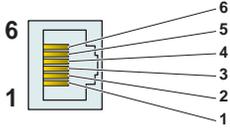
RJ-12 6P6C
unshielded

Nr	Description
1	RS232 Tx
2	GND
3	GND
4	RS232 Rx
5	(Do not connect)
6	(Do not connect)

BUS LEDS   BUS STATE DISPLAY

BUS Error   BUS OK

BUS State Display	
Green	OK
Red	Error

The use of these LEDs depends on the type of fieldbus which is used.
Please see the corresponding manual for further information.

S5

S5.3	Bootstrap (Default = off)
S5.2	Parameter Default (Default = off)
S5.1	CAN Termination (Default = on)

LEDS   STATE DISPLAY

Error   24VOK
Warn   EN

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

Central points
116

124

25.5

14   11.5   20.5   84.5

46

18

104

Dimensions in mm
Mounting points for M3 screws

A1100 Single axis drive			
Width	mm (in)	25.5	(1.0)
Height	mm (in)	124	(4.9)
Depth	mm (in)	84.5	(3.3)
Weight	g (lb)	340	(0.75)
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)	
Pollution	IEC/EN 60664-1	Pollution degree 2	
Max. case temperature	°C	70	
Max. power dissipation	W	30	
Min. distance between drives	mm (in)	20 (0.8) 50 (2)	horizontal vertical

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Servo Drive		
Item	**Description**	**Part Number**
A1100-GP-LC-0S-000	Mini CANopen Drive (72V/8A)	0150-2499

Accessories		
Item	**Description**	**Part Number**
DC01-X44-4m	Cable IO´s for A1100/X44, 4 m flying leads	0150-3553
DC01-X40-4m	Cable Supply A1100/X40, 4 m flying leads	0150-3545
DC01-X40/41-0.15 m	Cable IO for A1100/X40-X41, 0.15 m daisy chain	0150-3552

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