

SERVO DRIVES

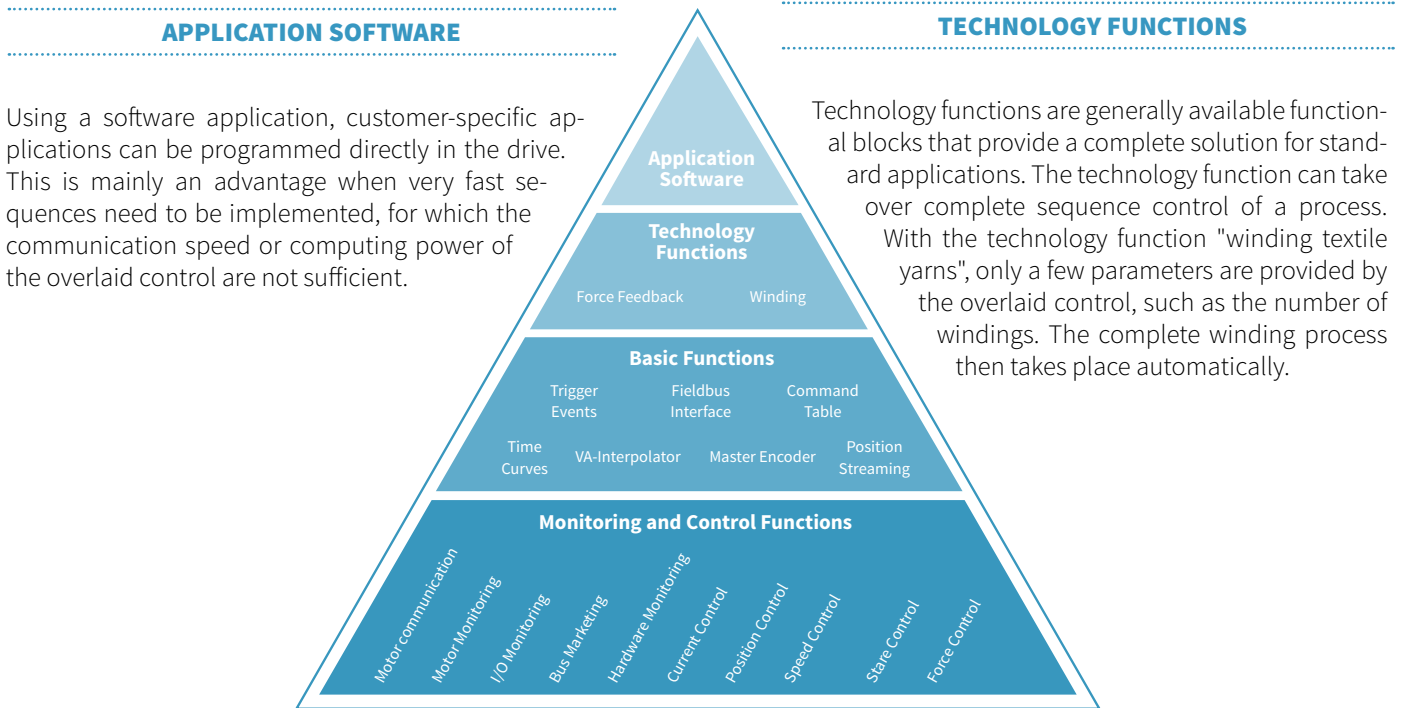


The wide range of drive products allows rapid implementation of simple applications with two end positions, up to complex, high-precision multi-axis applications with synchronization to a main electronic shaft.

The servo drives cover a wide range in terms of performance. Controlling small actuators with low power as well as high-power servomotors with direct feed from the three-phase network can be realized.

LinMot Servo Drives

LinMot Servo Drives are highly integrated inverters with one or more power elements, for controlling the motors, and an intelligent control element with integrated position regulation. The control element performs all drive-related control and monitoring functions. It allows direct position set points, or travel along internally stored motion profiles from the overlaid control, using simple analog or digital signals. Additionally, using the technology functions or a customer-specific software application, complete sequences or functions can be implemented for customerspecific applications.



BASIC FUNCTIONS

The basic functions include communication with the overlaid control, generation of target values for speed and acceleration-limited point-to-point motions, travel along motion profiles, synchronization of drives to an electronic main or master shaft, and synchronization in multi-axis applications.

MONITORING AND CONTROL

The basic functions of the Servo Drive, such as position and current control; control and monitoring of the power element; and monitoring the motor temperature, power, and position are handled by the control, monitoring, and regulation element, which also controls the entire finite state machine of the drive.

SPS LIBRARIES AND PROGRAMMING EXAMPLES

LinMot Drives have all common fieldbus interfaces available for connection to a master controller. In order to realize simple control concept integration, extensive function blocks and programming examples are provided for the customer. These function blocks allow for direct and quick LinMot drive integration. The function blocks run standard functions as well as commands such as drive parameterization and configuration directly from the controller. The complete drive

configuration of the corresponding axis is thus stored on the controller. Maintenance or replacement can be easily realized via automatic drives detection and configuration over the communication bus. Thus manual and time-consuming configuration of the drives in case of failure is eliminated.

Characteristics

POINT-TO-POINT MOTIONS

Because of their high dynamic capabilities, long life, and ability to travel to several positions, LinMot linear motors are often used as a replacement for pneumatic cylinders.

Various end positions can be stored in the drive and are invoked via digital signals, just as with a pneumatic cylinder. Once the end position is reached, this is reported to the overlaid control via the In-position signal on a digital output. Speed and acceleration can be configured freely for each motion.

NC MOTION

Travel along paths from an overlaid NC drive can be implemented via the +/-10V interface, or in streaming mode (PVT, PV).

The predetermined points are calculated rapidly, so that even irregular and complex curves are realized dynamically.

HIGH-END APPLICATIONS

Complex applications with synchronization to a main or master shaft can be implemented without trouble using the integrated master encoder interface. All incoming signals from the main shaft are processed by the LinMot Drive and depend on the movement type of the linear motor.

Together with a high-resolution, external position sensor, even high-precision positioning tasks in μm range can be handled.

MULTI-AXIS OPERATION

In multi-axes or linked operation, the master encoder interface can control both individually and synchronous to a main or master shaft.

For complex designs, several axes can be synchronized in master-booster or master-gantry mode. This allows simple implementation of portal designs with two synchronized axes, which are controlled by the overlaid control as a single axis.

LINEAR AND ROTARY DRIVES

Using LinMot Servo Drives, rotary servomotors can be used as well as linear motors, or any 1/2/3-phase actuators.

Primarily in assembly automation and feeding applications, small, light brushless DC motors (EC motors) are often needed to rotate a gripper about the Z-axis. The flexibility of the Servo Drive allows such rotary motors to be integrated into the existing controls concept in the same simple manner as linear motors.

STANDARDIZED DEVICE PROFILES

To simplify the integration of different axes, the C Series Servo Drives are equipped with PROFIdrive, Sercos III, SoE (SercosOver-Ethercat) and CoE (CiA402). By using device profiles, the integration of „foreign“ Drives in the motion control is simplified. Further positive aspects are the automatic data exchange in real time and the increase of determinism in the system.

PLUG AND PLAY

LinMot motors with the plug and play functionality are automatically recognized by the A1100 / C1200 / C1100 / E1200 / E1400 servo drives and are immediately ready for use.

The servo drive reads these values when it boots up, and sets the parameters accordingly. This automatic device detection eliminates the selection of the required model parameters from an extensive library. Without having the configuration software to boot, first commands can be sent directly by the PLC control.

INTEGRATED SAFETY FUNCTION

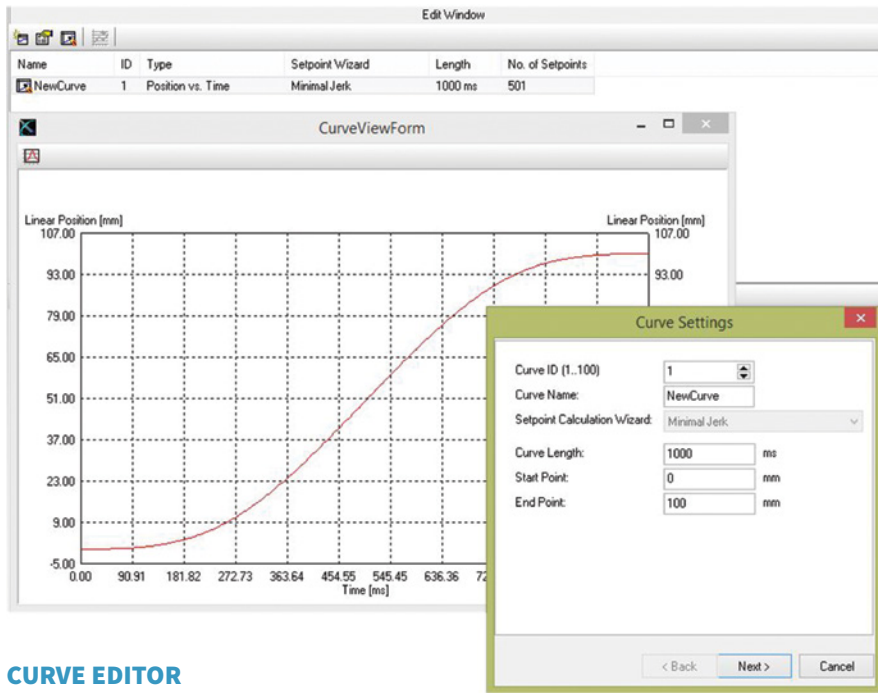
In order to prevent unintended startup, the model C1200 / C1100 / E1200 / E1400 drives have an STO function to safely shut off the output stage. The drive cannot produce any more force when shut off using the "Safe Torque Off" function. A functional safety is currently under preparation and can already be solved today with external components.

CERTIFICATION

The current LinMot Drives are marked with CE and approved as components according to the UL regulation for variable-frequency controllers. Thus they meet the requirements for the US and Canadian market.

Configuration with LinMot Talk

LinMot Talk configuration software is a Windows- based interface that supports the user during start-up and configuration of the LinMot Servo Drives. The software has a powerful, modular, graphical interface that covers all the tasks surrounding the LinMot Servo Drive. Using LinMot Talk PC interface, the engineer can configure LinMot servo drives. The motors are also monitored during operation and the current motion sequences are analysed (monitoring). The integrated control panel gives the user direct access to the control and status words, as well as all commands that are invoked by the upper-level controller.



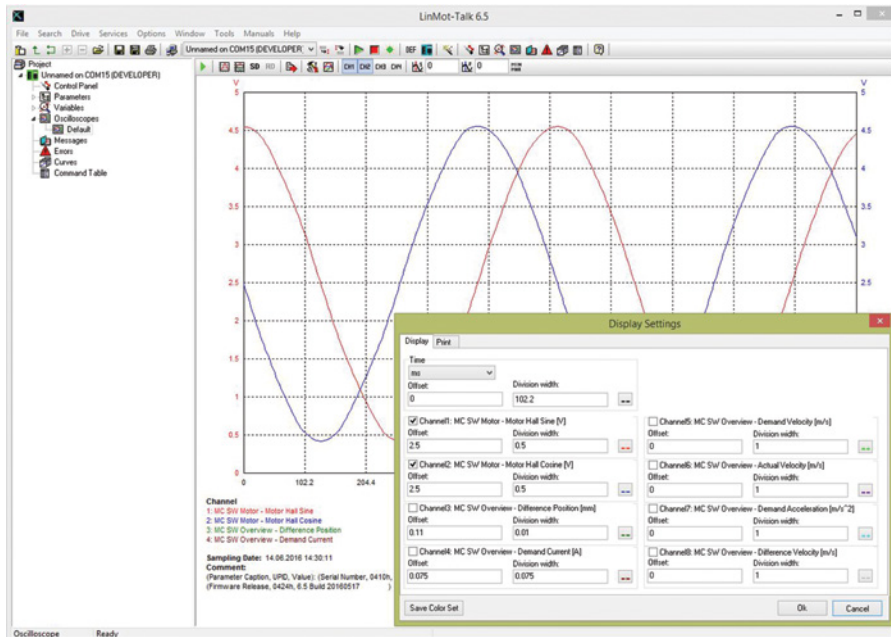
CURVE EDITOR

PARAMETERIZATION

Using the "Parameter Inspector," the drives are parameterized in a simple manner. The user has a wide range of adjustments available for operating modes, error management, warning messages, and regulating parameters. Entire parameter sets can be stored, loaded, and printed out.

CURVE EDITOR

The "Curve Editor" allows creation of travel curves. In addition, existing curves can be loaded, stored, edited, combined, and printed out. Further, complex motion sequences can be generated as desired in MS Excel, and loaded into the drive.



OSCILLOSCOPE

OPTIMIZATION

The integrated oscilloscope helps the user during start-up and optimization of the Parameterization Optimization Monitoring drive system. Internal variables, such as the target and actual position, can be shown in real time on the screen, and then printed out. The displayed data can be stored in CSV format for further processing in MS Excel, or stored for documentation purposes.

MONITORING

Using the "Error Inspector," the user can read out stored errors, as well as the currently active warnings and error messages in the LinMot Servo Drive. A list of the last error messages are stored in non-volatile memory on the Servo Drive, together with the operating hours counter.

Overview Servo Drives



A1100

Space-saving servo drive for instrument engineering



C1100

Compact drive for an ideal use in point-to-point applications.



C1200

Servo Drive for demanding tasks with axis, NC synchronization and an industrial ETHERNET interface.



E1200

High-End Servo Drive with configuration via ETHERNET.



C1400

Servo Drive with direct power supply for simple motions as well as complex axis synchronization. Designed to control the P10 motor family.



E1400

Servo Drive for P10 motors with direct main supply and 3x400 VAC technology. Equipped with an ETHERNET Config. interface.

Technical Specifications

	A1100	C1100	C1200
Motor Supply			
	24...72VDC	24...72VDC	24...72VDC
Motor Current			
	8A _{pk}	25A _{pk}	25A _{pk}
Control of			
LinMot Motors P0x/ PR01	•	•	•
LinMot Motors P10			
Rotary Motors		•	•
EC02 Motors		•	•
AC Servo Motors			
3rd Party Motors		•	•
Functionality			
	Point-to-Point	Point-to-Point	Point-to-Point
	Command Table	Closed Loop Force Control	Limited jerk motion commands
	Motion Profiles	Command Table	NC Motion
		Motion Profiles	Closed Loop Force Control
			Command Table
			Motion Profiles
Ethernet & Fieldbuses			
	CANOpen	PROFINET	PROFINET
		EtherCAT (LinMot Profile)	PROFINET Profidrive
		EtherCAT (CiA402)	EtherNet/IP
		EtherCAT (SoE)	Sercos III
		CANOpen	Powerlink
			LinUDP
			EtherCAT
			EtherCAT (CiA402)
			EtherCAT (SoE)
Interfaces			
Analog Inputs 0..10V / +-10V	1 / 0	1/1	1/1
Number of digital Inputs / Outputs	6 / 2	4/2	4/2
Brake Output	(-)	24V/0.5A	24V/0.5A
External Encoder			
		A/B/Z (RS422)	A/B/Z (RS422)
		SSI	SSI
		BISS	BISS
			EnDat
Timings			
Min. Bus Cycle Time	250 µs	250 µs	125 µs
PWM Frequency	16 kHz	16 kHz	16 kHz
Trigger Commands	≥ 250 µs	≥ 250 µs	≥ 125 µs
Position Drive	250 µs	250 µs	125 µs
Configuration			
RS 232	•	•	•
ETHERNET			•
ETHERNET –Maintenance			

E1200	C1400	E1400
24...72VDC	1x200...240VAC	3x400...480VAC
32A _{pk}	15A _{pk}	28A _{pk}
•	•	•
•	•	•
•	•	•
•	•	•
Point-to-Point	Point-to-Point	Point-to-Point
NC Motion	Limited jerk motion commands	Limited jerk motion commands
Master Encoder / CAM	NC Motion	NC Motion
Belt Synchronization	Master Encoder / CAM	Master Encoder / CAM
Master Booster (up to 4 slaves)	Belt Synchronization	Belt Synchronization
Master Gantry (up to 4 slaves)	Closed Loop Force Control	Master Booster (up to 4 slaves)
Winding Application	Command Table	Master Gantry (up to 4 slaves)
Closed Loop Force Control	Motion Profiles	Winding Application
Command Table		Closed Loop Force Control
Motion Profiles		Command Table
		Motion Profiles
PROFINET	PROFINET	PROFINET
PROFINET Profidrive	PROFINET Profidrive	PROFINET Profidrive
EtherNet/IP	EtherNet/IP	EtherNet/IP
Sercos III	Sercos III	Sercos III
Powerlink	Powerlink	Powerlink
LinUDP	LinUDP	LinUDP
Profibus DP	CANOpen	Profibus DP
CANOpen	EtherCAT	CANOpen
EtherCAT	EtherCAT (CiA402)	EtherCAT
EtherCAT (CiA402)	EtherCAT (SoE)	EtherCAT (CiA402)
EtherCAT (SoE)		EtherCAT (SoE)
LinRS		LinRS
2/1	1/1	2/1
8	4/2	8
24V/1.0A	24V/1.5A	24V/1.5A
A/B/Z (RS422)	A/B/Z (RS422)	A/B/Z (RS422)
Sin/Cos (1Vpp)	SSI	SSI
SSI (only position recovery)	BISS	BISS
	EnDat	EnDat
200 μs	250 μs	250 μs
20 kHz	8 kHz	8 kHz
≥ 100 μs	≥ 125 μs	≥ 125 μs
100 μs	125 μs	125 μs
•	•	•
•	•	•
•	•	•



LinMot®

LinMot®

LinMot®

S2 1 4 5 8
S1 1 2 3 4 5 6 7 8
CTS 206-8 T340
ID LOW ID HIGH

S2 1 4 5 8
S1 1 2 3 4 5 6 7 8
CTS 206-8 T340
ID LOW ID HIGH

S2 1 4 5 8
S1 1 2 3 4 5 6 7 8
CTS 206-8 T340
ID LOW ID HIGH

X33 STO RELAYS

X33 STO RELAYS

X33 STO RELAYS

WARN ERROR
EN 24V OK

WARN ERROR
EN 24V OK

WARN ERROR
EN 24V OK

X4 LOGIC SUPPLY / CONTROL

11 AnIn-
10 AnIn+
9 AnIn
8 In
7 In
6 In
5 In
4 Out
3 Out
24VDC
DGND

X4 LOGIC SUPPLY / CONTROL

X19 SYSTEM

X19 SYSTEM

X19 SYSTEM

C1100

C1100

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

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.



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INT. CONT. EQ.
UL508C



CONNECTION TO MACHINE CONTROL PROCESS AND SENSOR INTERFACES LOGIC AND POWER SUPPLY

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.

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

The Servo Drives need two separate power supplies for the logic and power elements.

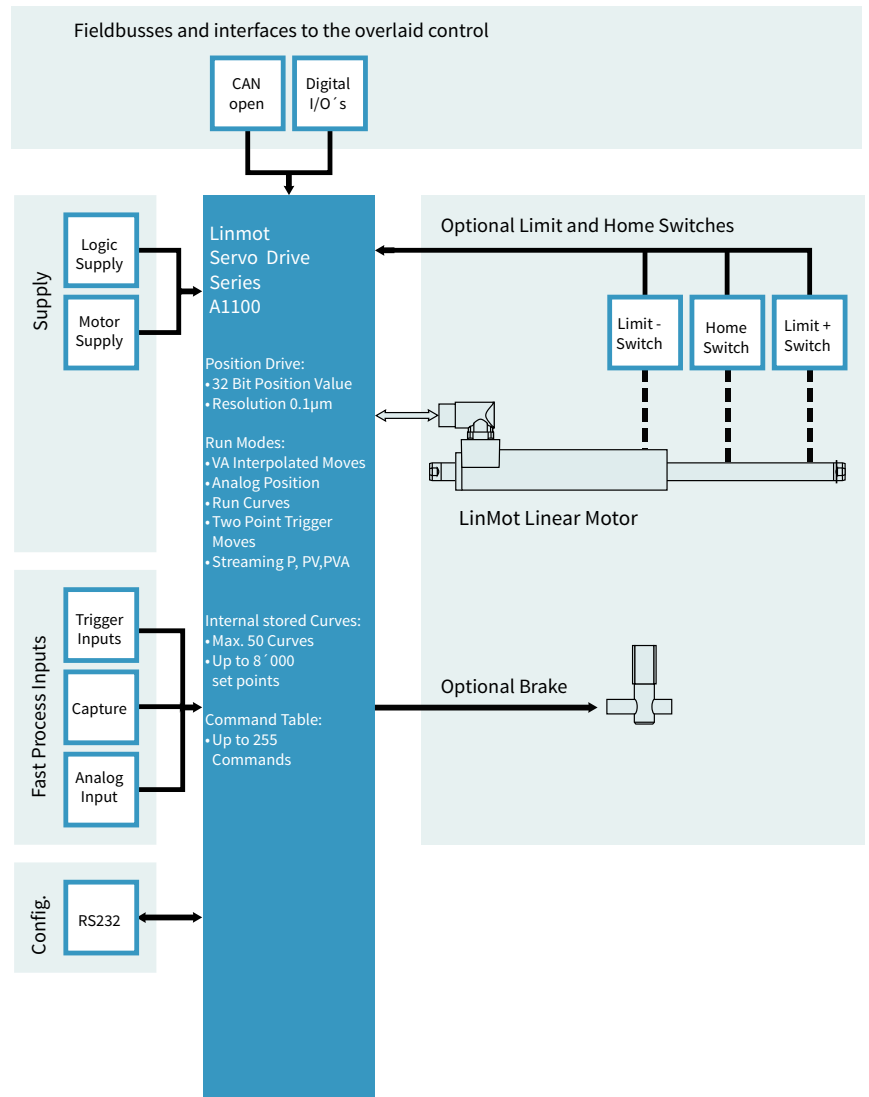
In an E-stop and safe stop of the drive, only the motor power supply is cut off from the drive. The logic supply and the drive continue to run.

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.



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

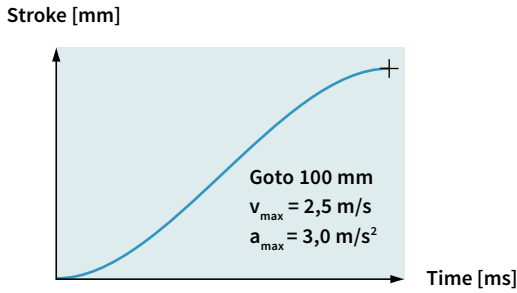
A1100 Servo Drives provide all necessary interfaces to operate linear motors with optional external peripherals, such as end position and reference switches.

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.

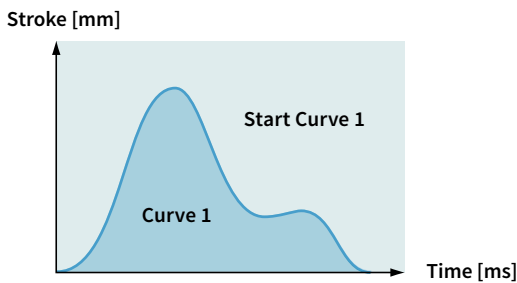
INTERPOLATED MOVES



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)

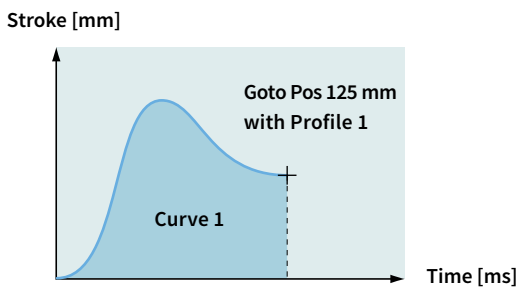
TIME CURVES



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, fieldbuses 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

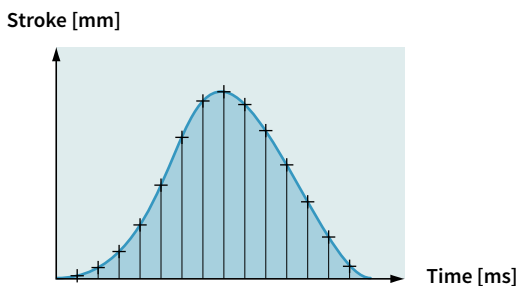
PROFILED MOVES



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

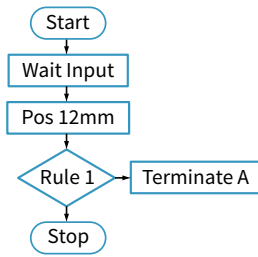
SETPOINT STREAMING



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

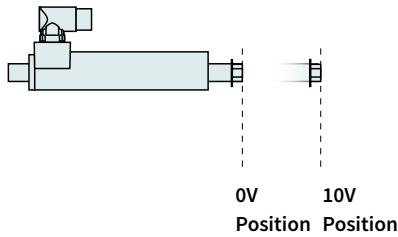
COMMAND TABLE



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



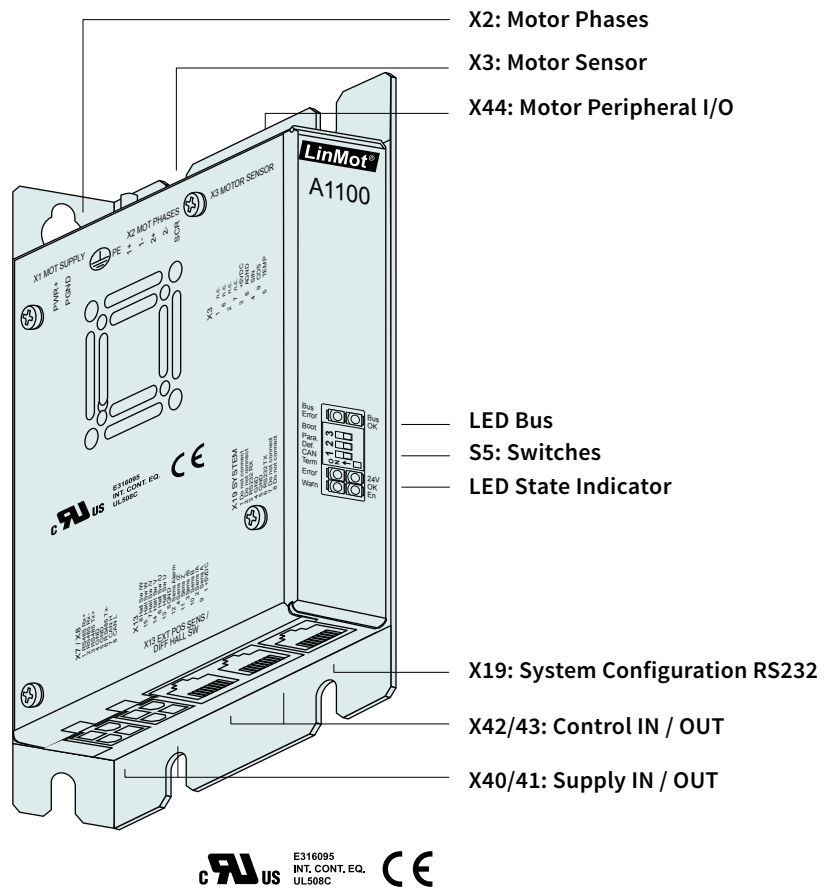
For an analog position target, the linear motor travels to a position proportional to the input voltage. The position is either scanned continuously, or only after a rising edge of the trigger signal. In order to prevent uncontrolled jumps in position, the motor travels to the positions with a programmable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

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

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



11

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:

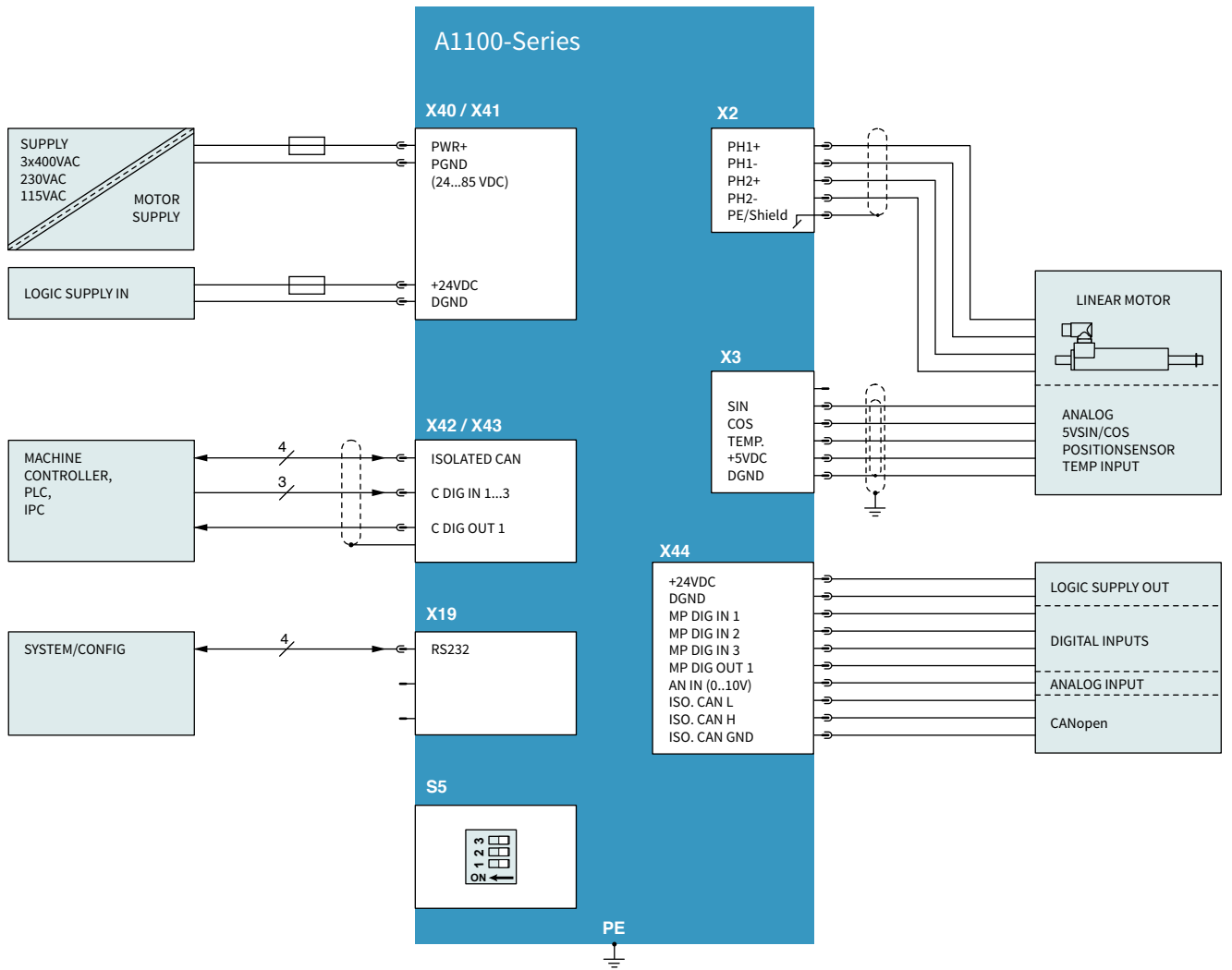
- » NMT Error Control (Nodeguarding Protocol or HeartBeat Protocol)
- » PDO (Transmission type 1 to 254)
- » SDO Upload and Download
- » NMT (Start, Stop, Enter PreOp, Reset Node, Reset Communication, Boot-Up Message)

REPLACING PNEUMATICS

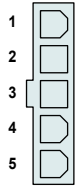
Due to their simple controls via digital inputs and outputs, A1100 drives make excellent substitutes for pneumatic cylinders.

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-Position output is actuated.

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



X2 MOTOR PHASES

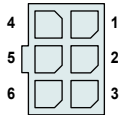


Nr	Designation	LinMot Linear Motor	Color
1	PH1+ /U	Motor Phase 1+	red
2	PH1- /V	Motor Phase 1-	pink
3	PH2+ /W	Motor Phase 2+	blue
4	PH2- /X	Motor Phase 2-	grey
5	SCRN	Shield	

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

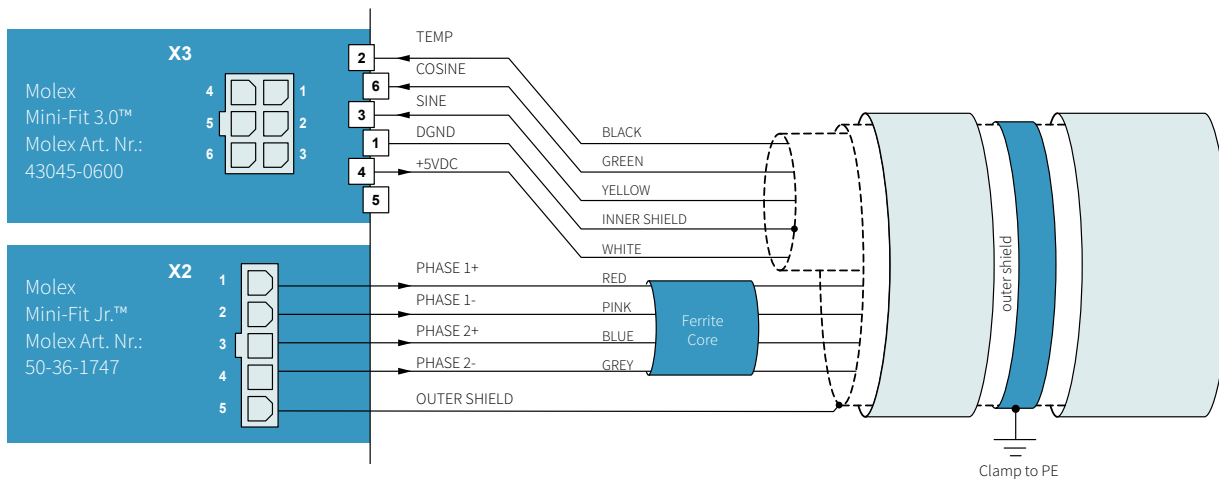


Nr	LinMot Motor
1	DGND
2	Temp
3	Sensor Sine
4	+5VDC
5	(Do not connect)
6	Sensor Cosine

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!

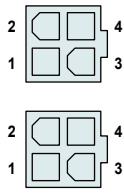
MOTOR LINEAR MOTOR WIRING WITH LINMOT MOTOR CABLE (K-, KS- AND KR-TYPES)



- » 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, 1440hm @ 100MHz, e.g. Würth Elektronik, Art.Nr.: 7427114) has to be mounted around the motor phases as close to the drive as possible.

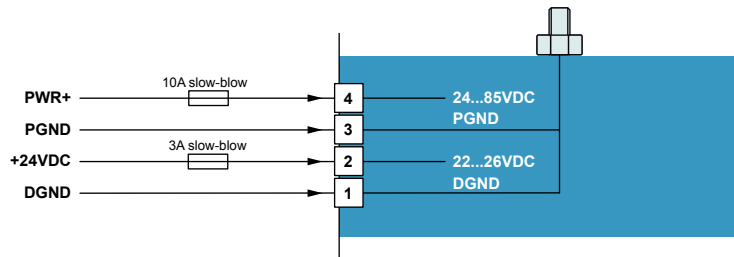


X40 / X41 SUPPLY IN / OUT



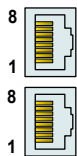
Molex
Mini-Fit Jr.™

Molex Art. Nr.:
50-36-2306



- » 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

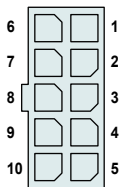


RJ-45
shielded

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



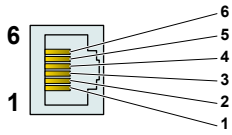
Molex
Mini-Fit 3.0™

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 separate shielded twisted pair cable for the CAN connection
5	Isolated CAN H	Use a separate 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 separate 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 separate 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

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 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

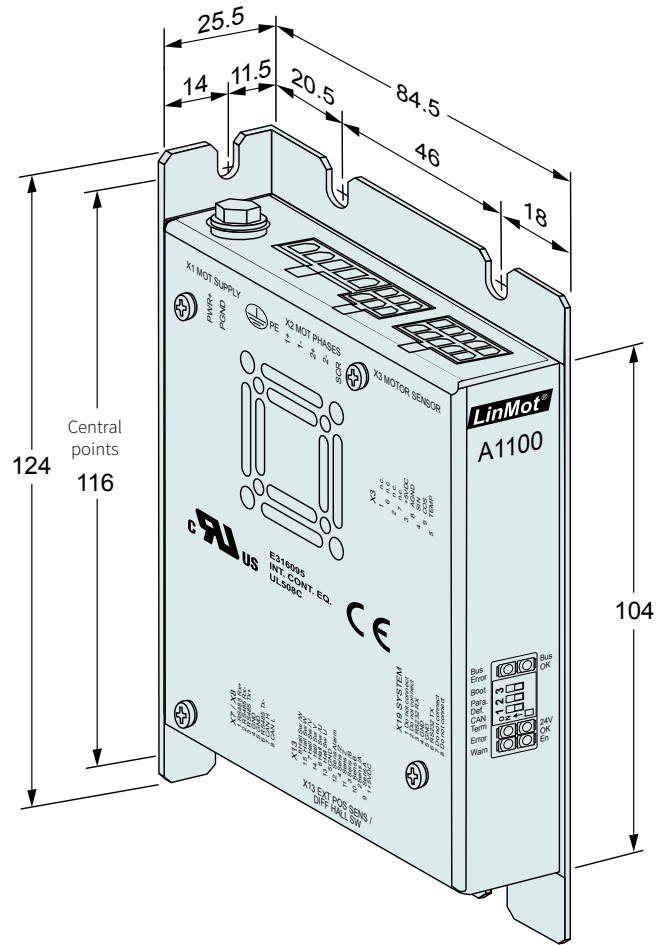


S5.3	Bootstrap (Default = off)
S5.2	Parameter Default (Default = off)
S5.1	CAN Termination (Default = on)

LEDS STATE DISPLAY



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



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

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