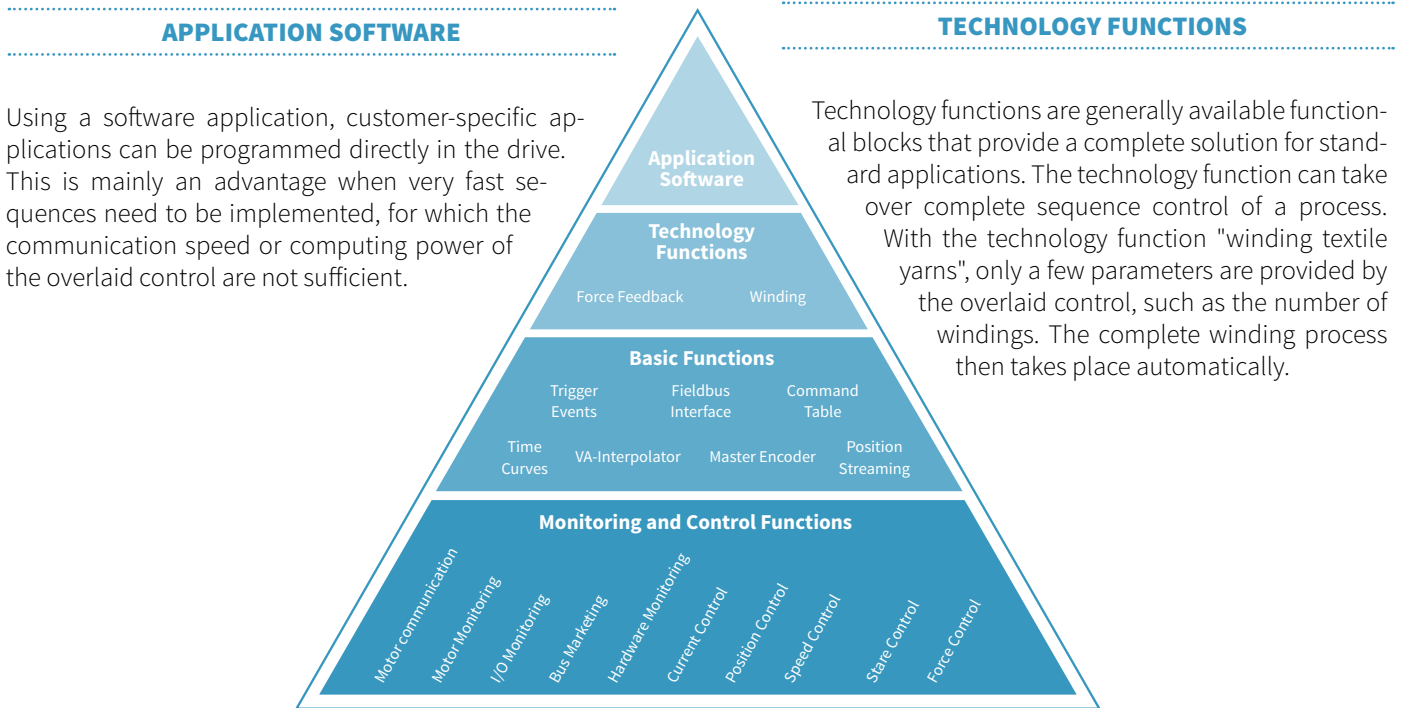# SERVO DRIVES

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.

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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.

APPLICATION SOFTWARE

Using a software application, customer-specific applications can be programmed directly in the drive. This is mainly an advantage when very fast sequences need to be implemented, for which the communication speed or computing power of the overlaid control are not sufficient.

TECHNOLOGY FUNCTIONS

Technology functions are generally available functional blocks that provide a complete solution for standard applications. The technology function can take over complete sequence control of a process. With the technology function "winding textile yarns", only a few parameters are provided by the overlaid control, such as the number of windings. The complete winding process then takes place automatically.

Application Software

Technology Functions

Force Feedback   Winding

Basic Functions

Trigger Events   Fieldbus Interface   Command Table

Time Curves   VA-Interpolator   Master Encoder   Position Streaming

Monitoring and Control Functions

Motor communication · Motor Monitoring · I/O Monitoring · Bus Marketing · Hardware Monitoring · Current Control · Position Control · Speed Control · Stare Control · Force Control

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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.

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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 servo-motors 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.

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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

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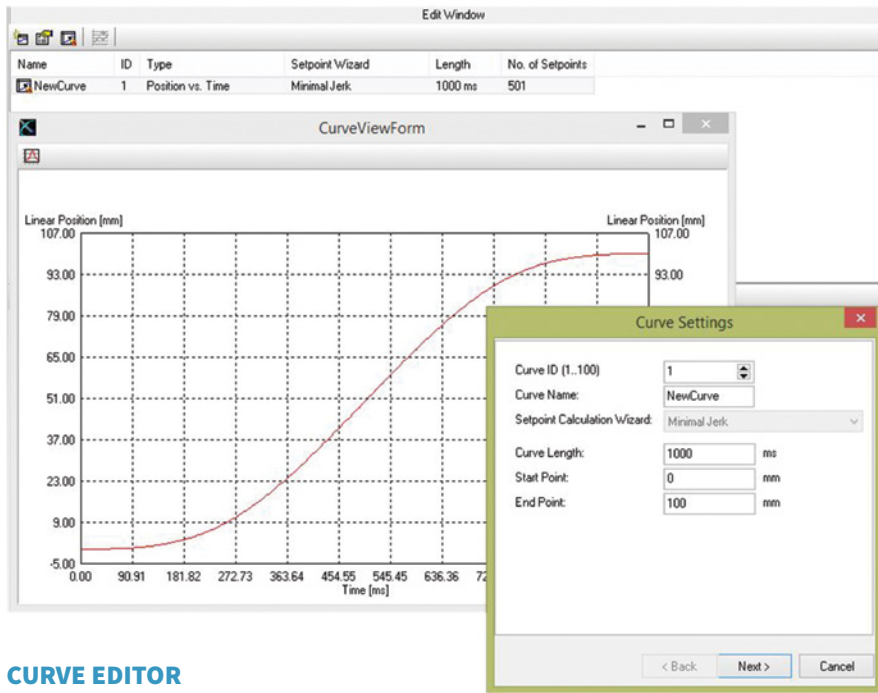
PARAMETERIZATION

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.
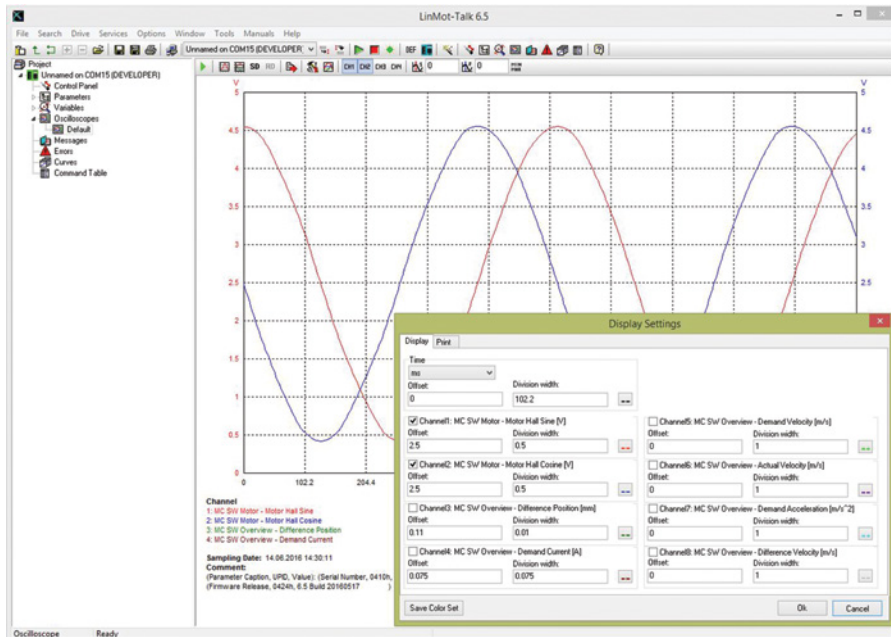
OSCILLOSCOPE

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.

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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.

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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			

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	E1200	C1400	E1400
	24…72VDC	1x200…240VAC	3x400…480VAC
	32A$_{pk}$	15A$_{pk}$	28A$_{pk}$
	•		
		•	•
	•	•	•
	•		
		•	•
	•		

E1200	C1400	E1400
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

E1200	C1400	E1400
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

E1200	C1400	E1400
2/1	1/1	2/1
8	4/2	8
24V/1.0A	24V/1.5A	24V/1.5A

E1200	C1400	E1400
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

E1200	C1400	E1400
200 µs	250 µs	250 µs
20 kHz	8 kHz	8 kHz
≥ 100 µs	≥ 125 µs	≥ 125 µs
100 µs	125 µs	125 µs

E1200	C1400	E1400
•	•	•
•	•	•
•		•

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S1
5 8

S2
1 4

CTS 206-8 T340

ID LOW   ID HIGH

X33 STO
RELAIS

WARN ERROR

EN   24V
OK

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

11

X4 LOGIC SUPPLY / CONTROL

1

X19 SYSTEM
8

C1100

C1100

S1
5 8

S2
1 4

CTS 206-8 T340

ID LOW   ID HIGH

X33 STO
RELAIS

SERIES C1200

- Absolute / relative positioning commands
- Limited jerk motion commands
- Time Curves
- Real Time (Streaming)
- Synchronous control (Drive profiles)
- PLC or Stand-Alone Solutions
- Digital and Analog IO's
- Safe Torque Off
- Interface for optional incremental or absolute sensor
- Supports Plug and Play
- CE / UL / CSA

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Servo Drive C1200

Series C1200 servo drives are axis controllers,
with 32-bit position resolution and an integrated
power stage, for linear and rotary motors.
The controllers are suitable for standard and
high-end positioning tasks with NC Synchronisation.

CONNECTION TO MACHINE CONTROL

The Series C1200 servo drives can be actuated by machine controls from many manufacturers or brands, via digital inputs and outputs over Industrial Ethernet.

Bus-Interfaces:
» ProfiNet / ProfiDrive
» EtherCat, SoE, CoE
» Ethernet IP
» PowerLink
» Sercos III

PROCESS AND SENSOR INTERFACES

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

The safety IO's on Servo Drives with the -1S option with industrial ETHERNET allows safe torque off (STO) of the drives via control signals, without interrupting the power supply.

Drives with -0S option comes without safety IO's and is easier to wire in applications without safety needs.

LOGIC AND POWER SUPPLY

The servo drives have two separate inputs for the logic and motor elements.

This has the advantage that the drive and linear motor do not need to be reinitialized when the machine is restarted, since all process data, including the actual position of the linear motor, is still up to date.
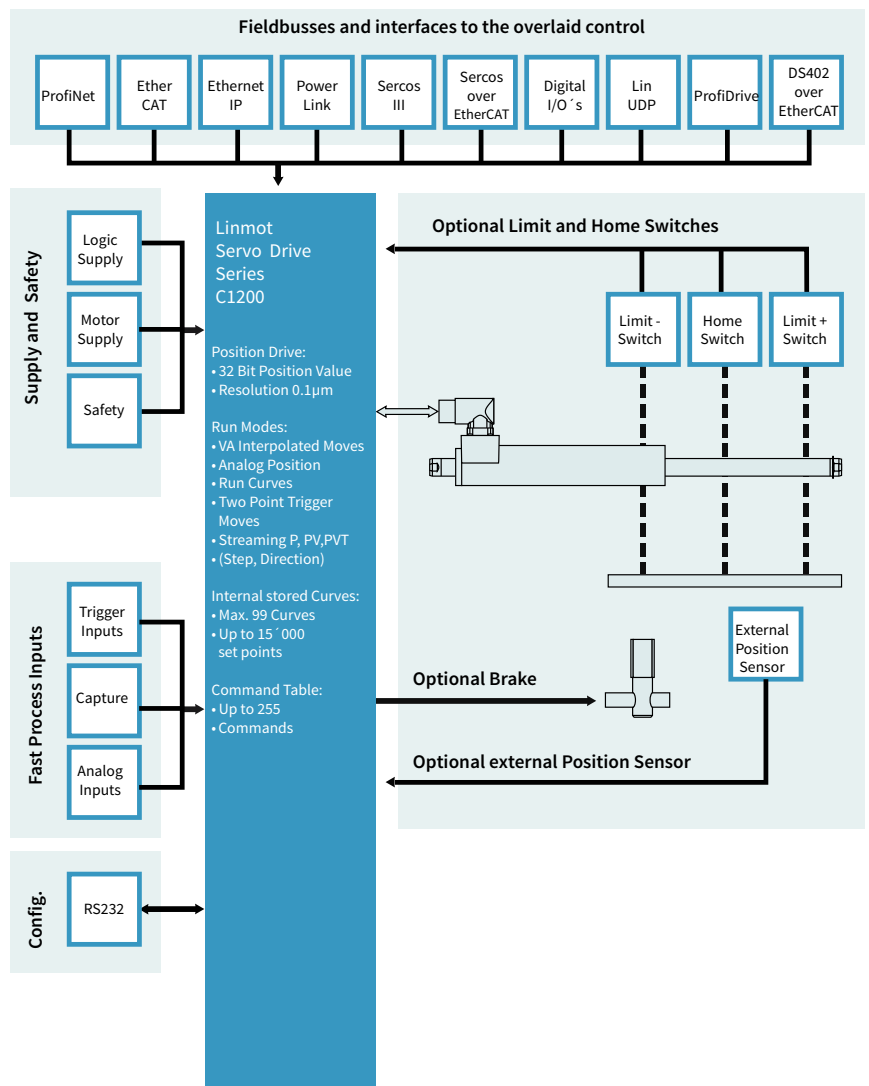
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System Integration

Flexible hardware enables control of many 1/2/3-phase motors. Thus, low-power rotary servomotors, such as brushless DC motors, can be integrated in the same control concept.

Additionally, the drives can be equipped with optional peripherals, such as reference and end stop switches, high-precision external position sensors, or a mechanical holding brake.

Series C1200 servo drives have analog and digital inputs and outputs, serial interfaces, fieldbusses, and Ethernet. The user therefore is not dependent on the selection of the overlaid controller. An appropriate interface is available, with associated protocols, for many PLC or IPC solutions.

With flexibility and a compact form factor, LinMot Series C1200 servo drives provide a complete solution for a flexible drive concept in single and multiple axes applications, with linear motors and other actuators.

Fieldbusses and interfaces to the overlaid control

ProfiNet	Ether CAT	Ethernet IP	Power Link	Sercos III	Sercos over EtherCAT	Digital I/O´s	Lin UDP	ProfiDrive	DS402 over EtherCAT

Supply and Safety
- Logic Supply
- Motor Supply
- Safety

Linmot Servo Drive Series C1200

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,PVT
- (Step, Direction)

Internal stored Curves:
- Max. 99 Curves
- Up to 15´000 set points

Command Table:
- Up to 255
- Commands

Optional Limit and Home Switches
- Limit - Switch
- Home Switch
- Limit + Switch

External Position Sensor

Optional Brake

Optional external Position Sensor

Fast Process Inputs
- Trigger Inputs
- Capture
- Analog Inputs

Config.
- RS232

HIGH-END AND NC-MOTIONS

The ultra-fast control cycle together with the high resolution A/D converters of the C1200 series drives guarantee perfect motor control for demanding Positioning tasks.

The various drive profiles available on the series C1200 drives makes it easy to integrate these drives into systems with synchronized axes and overlaid NC-position controllers with industrial Ethernet communication.

MOTOR INTERFACES

C1200 servo drives provide all necessary interfaces to operate linear or rotary motors with optional external peripherals, such as end position and reference switches, a mechanical brake, or a high-resolution external position sensor.

CONFIGURATION

LinMot Talk, a 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 Axis.

Fieldbus and Ethernet drives can also be configured directly by the overlaid control, by downloading the configuration parameters via Bus/Ethernet

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INTERPOLATED MOVES

Stroke [mm]

Goto 100 mm
v_{max} = 2,5 m/s
a_{max} = 3,0 m/s²

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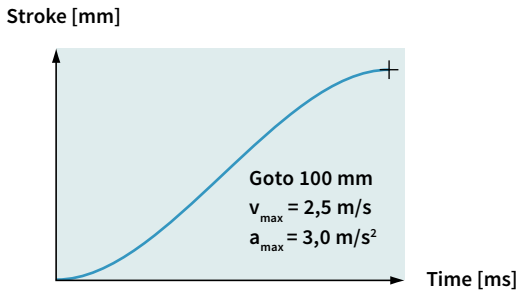
For direct position targets, using absolute or relative positioning, the desired position is reached using acceleration and velocity-limited motion profiles or jerk optimized profiles (example: Bestehorn). Positioning commands can be invoked via serial Ethernet or a trigger input.

Stroke range:	±100 m
Position Resolution:	0.1 µm (32Bit)
Velocity Resolution:	1.0 µm/s (32Bit)
Acceleration Resol.:	10.0 µm/s² (32Bit)

TIME CURVES

Stroke [mm]

Start Curve 1

Curve 1

Time [ms]
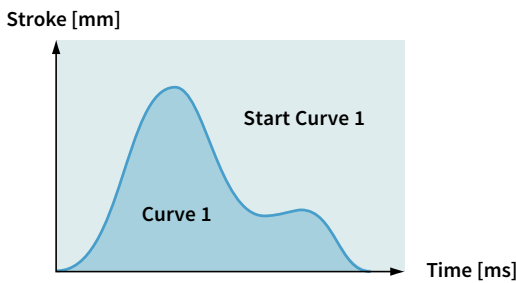
Up to 100 different time curves can be stored on Series C1200 drives, with up to 16,000 individual waypoints. The motor can thus travel along time curves of any complexity, such as those generated by CAD programs and stored in the drive (Excel CSV format). The time curves can be invoked via the serial interface, fieldbusses, Ethernet, or the trigger input.

Stroke range:	±100m
Position Resolution:	0.1 µm (32Bit)
Motion profiles:	Max. 100 Time Curves
Curve points:	Max. 16'000 points

PROFILED MOVES

Stroke [mm]

Goto Pos 125 mm
with Profil 1

Curve 1

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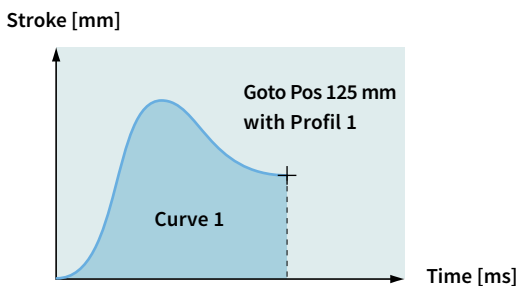
For travel to an absolute position, or shifting by a relative position, any desired motion rules can be stored besides the VA interpolator. They are stored in the drive as motion profiles (Excel CSV format). The positions can be approached, for example, with a sinusoidal motion to optimize power loss,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

Stroke range:	±100m
Position Resolution:	0.1 µm (32Bit)
Motion profiles:	Max. 100 Time Curves
Curve points:	Max. 16'000 points

SETPOINT STREAMING

Stroke [mm]

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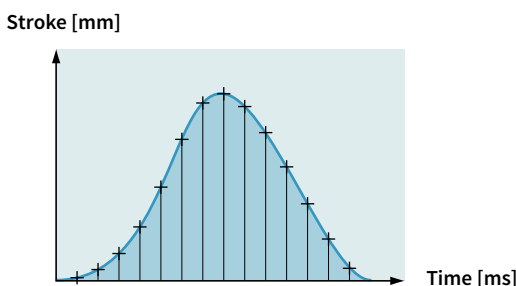
Overlaid NC drives with fieldbus or Ethernet interfaces communicate with the servo drives via "Position Streaming". The position and velocity calculated in the overlaid control is transmitted to the Servo Drive cyclically. The P, PV, or PVA mode is available for this transmission.

Position Resolution:	32 Bit
Velocity Resolution:	32 Bit
Interpolator:	8 kHz
Cycle times:	0.25 - 5 ms

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EASY STEPS

Input 1	Pos 125 mm
Input 2	Pos 250 mm
Input 3	Curve 1
Input 4	Pos -30 mm

With the Easy Steps function, up to 4 positions or independent travel commands can be stored on the drive, and addressed via 4 digital inputs or fieldbus interfaces/Ethernet.

|	
Digital inputs:	4
Interface:	X4
Scanning rate:	250 µsec

COMMAND TABLE
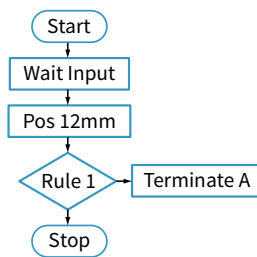
Entire motion sequences with up to 255 individual motion commands can be stored in the Command Table. This is primarily advantageous if complete motion sequences need to be executed very quickly, without dead time from the overlaid PLC. In the Command Table, the programmer has access to all motion commands, internal parameters, and digital inputs and outputs.

|	
Commands:	max. 255
Cycle time:	125 µsec

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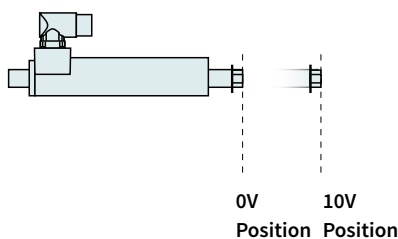
For an analog position target, the linear motor travels to a position proportional to the input voltage. The position is either scanned continuously, or only after a rising edge of the trigger signal. In order to prevent uncontrolled jumps in position, the motor travels to the positions with a programmable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

|	
Inputs:	Analog Input X4
Voltage range:	0-10VDC or ±10V
Resolution:	12 Bit
Scanning rate:	>=125 µsec (adjustable)

EASY STEPS PARAMETER SCALE

Maximum Force [0...10V => 0...100%]
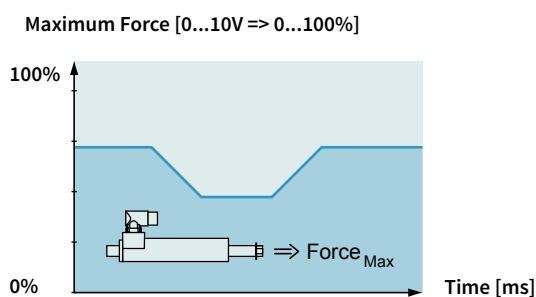
Easy Steps provide the ability to parameterize internal parameters using two analog inputs. If, for example, the maximum motor current is read at an analog input, then the maximum motor force can be provided as analog for freely programmable joining processes.
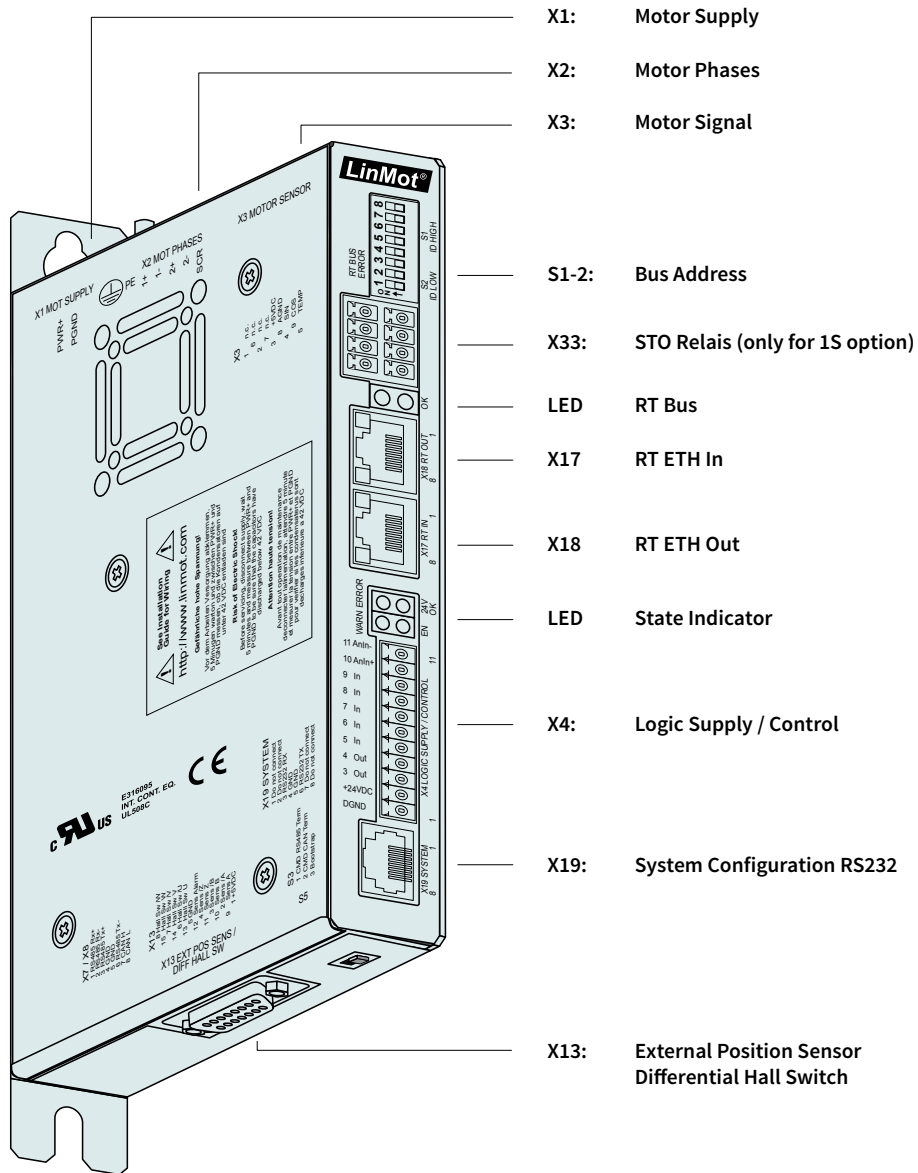
Inputs:	2 x Analog
Voltage range:	0-10VDC
Resolution:	12 Bit
Scanning rate:	250 µsec

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CLOSED LOOP FORCE CONTROL
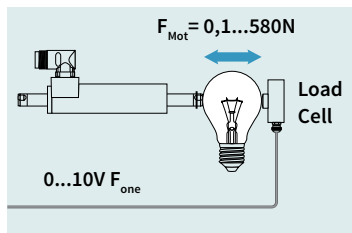
Using the force control technology function, precise joining process-es can be implemented reliably and reproducibly with high-precision force control. For force control, the current motor force is measured with a load cell and controlled in the drive. Joining process or quality checks with high requirements for applied force can be implemented.
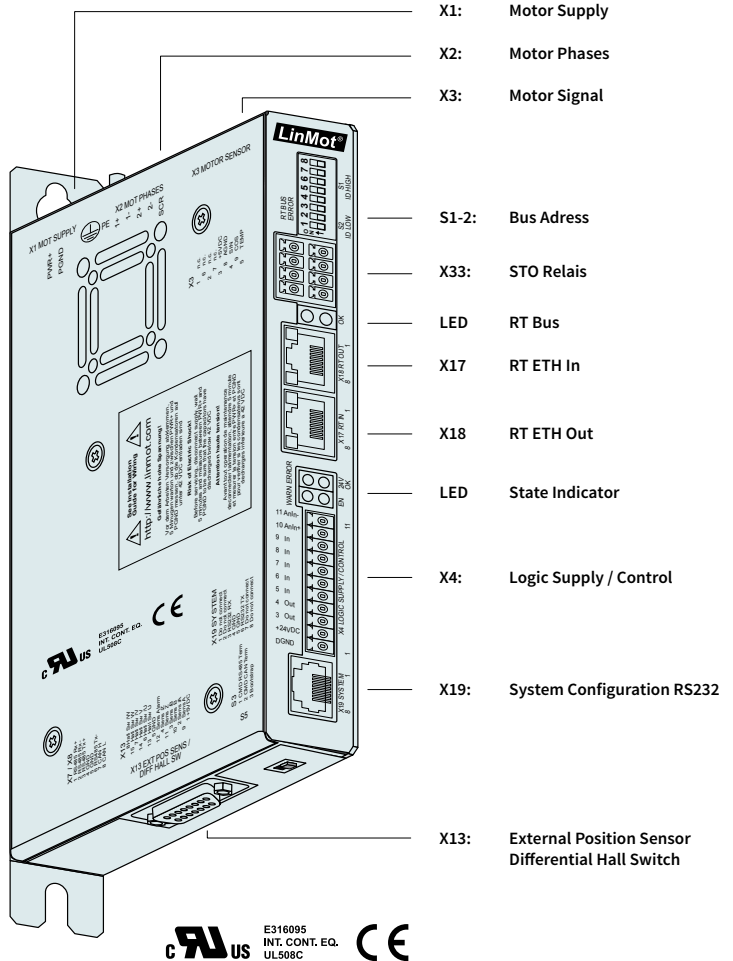
Analog input:	0-10V or ±10V
Resolution:	12 Bit
Min. Force Resolution:	0.1N

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X1:	Motor Supply	
X2:	Motor Phases	
X3:	Motor Signal	
S1-2:	Bus Address	
X33:	STO Relais (only for 1S option)	
LED	RT Bus	
X17	RT ETH In	
X18	RT ETH Out	
LED	State Indicator	
X4:	Logic Supply / Control	
X19:	System Configuration RS232	
X13:	External Position Sensor Differential Hall Switch	

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Interfaces	C1250-PN-XC	C1250-PD-XC	C1250-EC-XC	C1250-DS-XC	C1250-SE-XC	C1250-IP-XC	C1250-PL-XC	C1250-SC-XC	C1250-LU-XC
PROFINET	•								
PROFINET ProfiDrive		•							
ETHERCAT			•						
ETHERCAT CiA402				•					
ETHERCAT SoE					•				
ETHERNET IP						•			
POWERLINK							•		
SERCOS III								•	
LinUDP									•

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C1250-PN-XC
C1250-EC-XC
C1250-IP-XC
C1250-PL-XC
C1250-SC-XC
C1250-SE-XC
C1250-PD-XC
C1250-DS-XC
C1250-LU-XC

» Absolute & Relative Positioning
» Time based motion profiles
» Internally stored Motion Sequences
» Position Streaming
» Analog Position Target
» Analog Parameter Scaling
» Force Control Technology Function
» Customer-Specific Functions

11

X1:	Motor Supply
X2:	Motor Phases
X3:	Motor Signal
S1-2:	Bus Adress
X33:	STO Relais
LED	RT Bus
X17	RT ETH In
X18	RT ETH Out
LED	State Indicator
X4:	Logic Supply / Control
X19:	System Configuration RS232
X13:	External Position Sensor Differential Hall Switch

INDUSTRIAL ETHERNET

Series C1200 drives allow integration of Lin-Mot linear motors in controls concepts with industrial Ethernet interfaces. The user can integrate Series C1200 drives regardless of the provider of the overlaid control.

LinMot drives are available with common industrial Ethernet protocols. Since all Ethernet drives have the same motion command interface, and the control and status word are identical, software blocks that have been implemented once can be transferred to other drives without a problem.
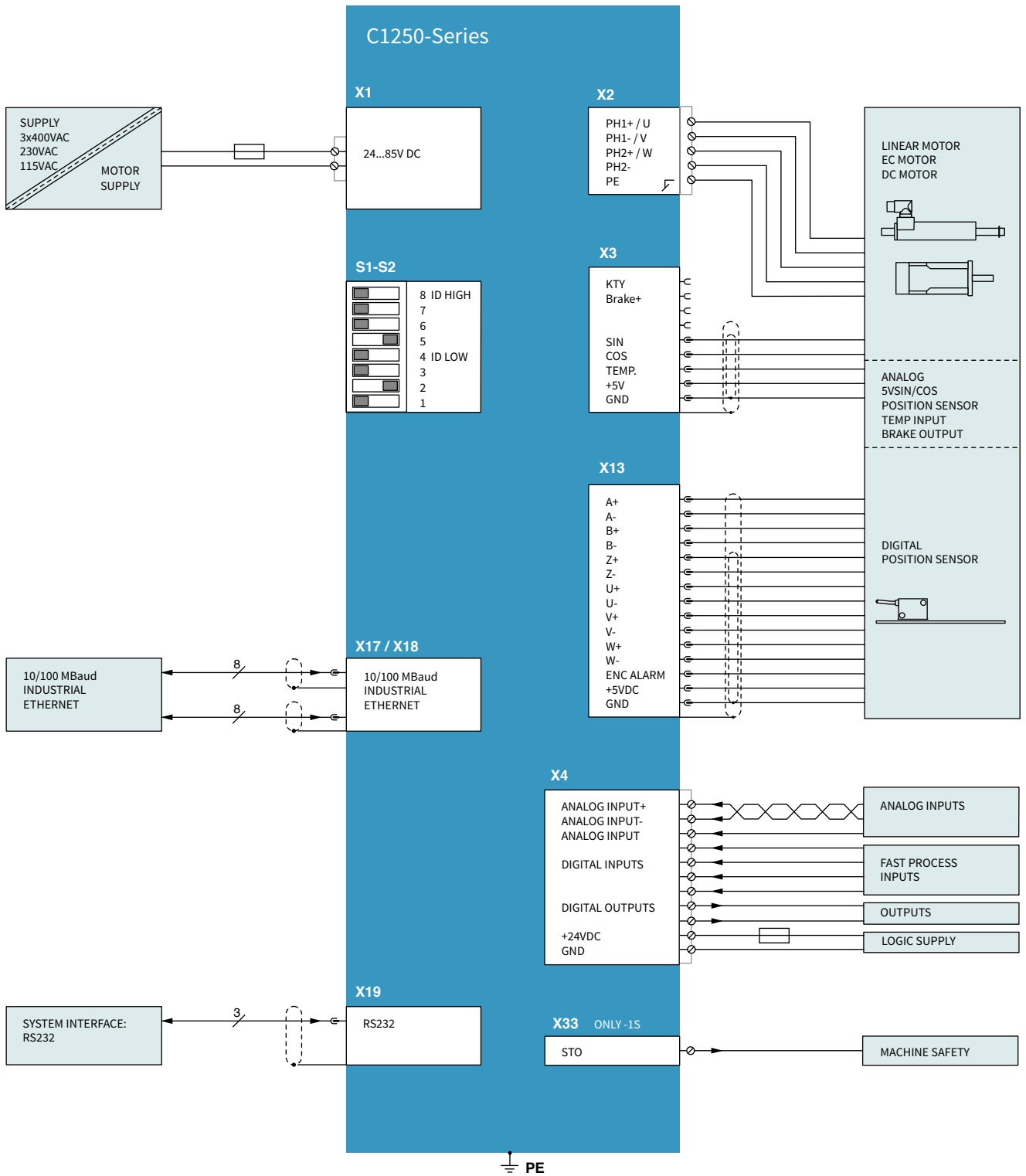
The series C1200 servo drives support the following industrial Ethernet protocols:

» Profinet
» EtherCAT
» Ethernet IP
» PowerLink
» Sercos III
» Sercos over EtherCAT
» ProfiDrive
» CiA 402
» LinUDP

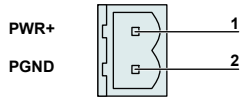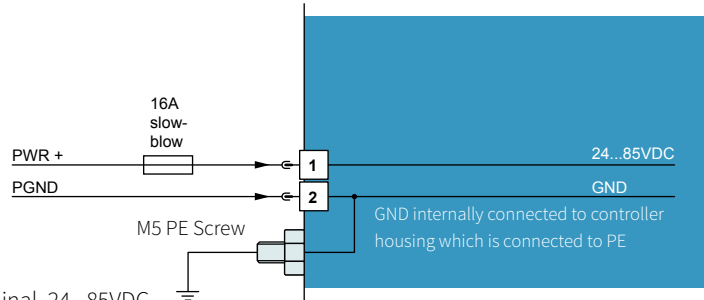The appropriate drive is available for each protocol.

TECHNICAL DATA

Type:	Realtime ETHERNET
Switch/Hub:	Integrated 2-Port Hub/Switch
Transfer rate:	10/100MBit/sec

Minimal cycle times:

Bus cycle:	250 µs
IO update:	250 µs
Trigger Input:	125 µs
Position control loop:	125 µs
Current control loop:	62.5 µs

LinMot®

C1250-Series

X1

SUPPLY
3x400VAC
230VAC
115VAC

MOTOR
SUPPLY

24...85V DC

X2

PH1+ / U
PH1- / V
PH2+ / W
PH2-
PE

LINEAR MOTOR
EC MOTOR
DC MOTOR

S1-S2

8 ID HIGH
7
6
5
4 ID LOW
3
2
1

X3

KTY
Brake+

SIN
COS
TEMP.
+5V
GND

ANALOG
5VSIN/COS
POSITION SENSOR
TEMP INPUT
BRAKE OUTPUT

X13

A+
A-
B+
B-
Z+
Z-
U+
U-
V+
V-
W+
W-
ENC ALARM
+5VDC
GND

DIGITAL
POSITION SENSOR

10/100 MBaud
INDUSTRIAL
ETHERNET

X17 / X18

8

8

10/100 MBaud
INDUSTRIAL
ETHERNET

X4

ANALOG INPUT+
ANALOG INPUT-
ANALOG INPUT

DIGITAL INPUTS

DIGITAL OUTPUTS

+24VDC
GND

ANALOG INPUTS

FAST PROCESS
INPUTS

OUTPUTS

LOGIC SUPPLY

SYSTEM INTERFACE:
RS232

3

X19

RS232

X33 ONLY -1S

STO

MACHINE SAFETY

PE

LinMot®

X1 + PE   MOTOR SUPPLY / REGENERATION RESISTOR

PWR+   1

PGND   2

Connector has to be ordered separately

16A slow-blow

PWR +   1   24...85VDC

PGND   2   GND

M5 PE Screw

GND internally connected to controller housing which is connected to PE

Motor Supply: 72VDC nominal, 24...85VDC
Absolute max. Rating: 72VDC +20%.
External Fuse: 16A slow-blow / min. 100VDC
If motor supply voltage exceeds 90VDC, the drive will go into error state.
»   Use 60/75°C copper conductors only
»   Conductor Cross-Section 2.5mm2 (AWG14) max Length 3 m

X2   MOTOR PHASES

1+ u   1
1- v   2
2+ w   3
2- x   4
PE / SCR   5
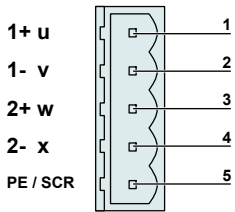
Nr	Designation	LinMot Linear Motor	Color	3-Phase EC-Motor	Color
1	PH1+	Motor Phase 1+	red	Motor Phase U	red
2	PH1-	Motor Phase 1-	pink	Motor Phase V	pink
3	PH2+	Motor Phase 2+	blue	Motor Phase W	blue
4	PH2-	Motor Phase 2-	grey	Motor Phase X	grey
5	PE/SCR	Shield		Shield	

Connector has to be ordered separetely

»   Use 60/75°C copper conductors only
»   Conductor cross-section: 0.5 – 2.5mm2 (depends on Motor current) / AWG 21 -14

X3   MOTOR SENSOR / BRAKE
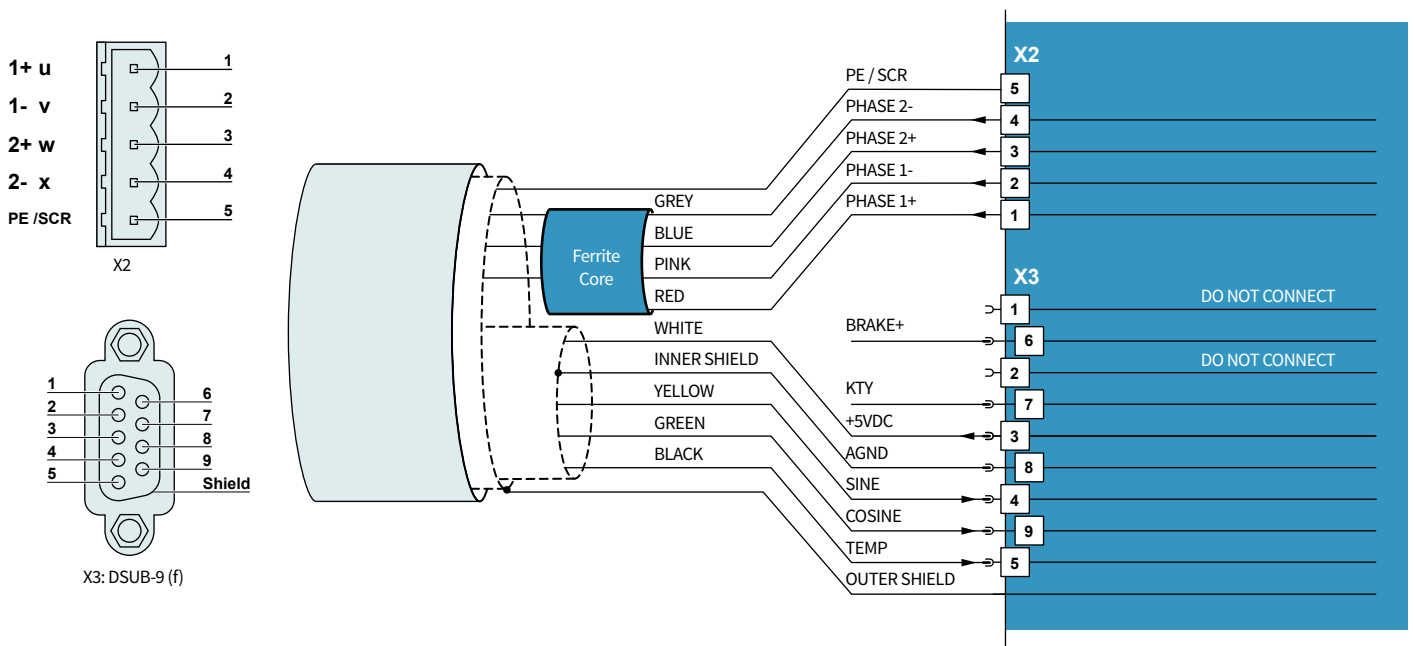
1   6
2   7
3   8
4   9
5
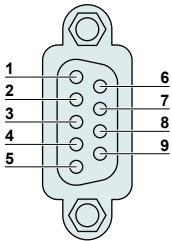
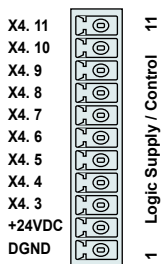| Nr		LinMot Motor	EC Motor
1		Do not connect	Do not connect
	6	Brake+	Brake+
2		Do not connect	Do not connect
	7	Do not connect	KTY
3		+5VDC	+5VDC
	8	AGND	AGND
4		Sensor Sine	Sensor Sine / Hall Switch U
	9	Sensor Cosine	Sensor Cosine / Hall Switch V
5		Temp In	Hall Switch W
	Case	Shield	Shield

DSUB-9

»   Use +5V (X3.3) and AGND (X3.8) only for motor internal hall sensor supply (max. 100mA)
»   Cable length < 30 m
»   Brake+: 24V / max. 500mA, Peak 1.4mA (will shut down if exceeded)
»   Caution: Do NOT connect AGND (X3.8) to ground or earth!

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```
1+ u      1
1- v      2
2+ w      3
2- x      4
PE /SCR   5
```
X2

```
1    6
2    7
3    8
4    9
5    Shield
```
X3: DSUB-9 (f)

X2
```
PE / SCR    5
PHASE 2-    4
PHASE 2+    3
PHASE 1-    2
PHASE 1+    1
```

GREY
BLUE
PINK
RED
WHITE
INNER SHIELD
YELLOW
GREEN
BLACK

Ferrite Core

X3
```
            1    DO NOT CONNECT
BRAKE+      6
            2    DO NOT CONNECT
KTY         7
+5VDC       3
AGND        8
SINE        4
COSINE      9
TEMP        5
OUTER SHIELD
```

⚠ Use Y-style motor cables only (for example K15-Y/C)!
A W-style cable has a different shielding, so it cannot be modified to a Y-style cable!

11

X4   LOGIC SUPPLY / IO CONNECTION

```
X4. 11            11
X4. 10
X4. 9
X4. 8     Logic Supply / Control
X4. 7
X4. 6
X4. 5
X4. 4
X4. 3
+24VDC
DGND             1
```

DSUB-9 (f)
Spring cage connector (has to be ordered separately)

Nr			
11	AnIn-	X4.11	Configurable Analog Input differential (with X4.10)
10	AnIn+	X4.10	Configurable Analog Input differential (with X4.11)
9	AnIn	X4.9	Configurable Analog Input single ended
8	In	X4.8	Configurable Input
7	In	X4.7	Configurable Input
6	In	X4.6	Configurable Input
5	In	X4.5	Configurable Input
4	Out	X4.4	Configurable Output
3	Out	X4.3	Configurable Output
2	+24VDC	Supply	Logic Supply 22-26 VDC
1	GND	Supply	Ground

Inputs: (X4.5...X4.8)   24V / 5mA (Low Level: −0.5 to 5VDC, High Level: 15 to 30VDC)
Outputs: (X4.3 & 4.4)   24V / max. 500mA, Peak 1.4mA (will shut down if exceeded)
Analog inputs: 12 bit A/D converted.
    X4.9:   Single ended analog input to GND, 0..10V, Input Resistance: 51kΩ to GND
    X4.10/X4.11:   Differential analog input, +/- 10V. Common mode range: +/- 5VDC to GND.
    Input Resistance: 11.4kΩ for each signal to GND
Supply 24V: typically 500mA / max. 2.5A (if all outputs "on" with max. load.)
    » Use 60/75°C copper conductors only
    » Conductor cross-section max. 1.5 mm^2
    » Stripping length: 10 mm
    » The 24VDC supply for the control circuit (X4.2) must be protected with an external fuse (3A slow blow)

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X13 — EXTERNAL POSITION SENSOR PIN CONFIGURATION
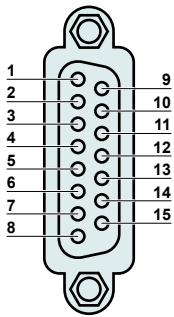
DSUB-15 (f)

Nr		ABZ with Hall Switches	SSI / BiSS / EnDat
1		+5V DC	+5V DC
	9	A+	A+
2		A-	A-
	10	B+	B+
3		B-	B-
	11	Z+	Data+
4		Z-	Data-
	12	Encoder Alarm	Encoder Alarm
5		GND	GND
	13	U+	nc
6		U-	nc
	14	V+	nc
7		V-	nc
	15	W+	Clk+
8		W-	Clk-
Case		Shield	Shield

Position Encoder Inputs (RS422): Max. counting frequency: 25 M counts/s with quadrature decoding. A minimum of 40ns edge separation must be guaranteed by the encoder under any circumstances! The maximal frequency of each signal is 6.25 MHz.

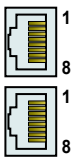**Differential Hall Switch Inputs (RS422):** Input Frequency: <1kHz
Enc. Alarm In: 5V / 1mA
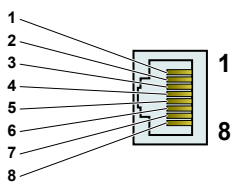**Sensor Supply:** 5VDC, max 100mA

X17 - X18 — REALTIME ETHERNET 10/100 MBIT/S

RJ-45

Nr		
X17	RT ETH In	Specification depends on RT-Bus Type. Please refer to interface documentation.
X18	RT ETH Out	

X19 — SYSTEM

RJ-45

Nr	
1	(do not connect)
2	(do not connect)
3	RS232 RX
4	GND
5	GND
6	RS232 TX
7	(do not connect)
8	(do not connect)
case	Shield

Use isolated USB-RS232 converter (Art.-No. 0150-2473) for configuration over RS232

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X33   SAFETY RELAYS (ONLY FOR -1S)

X33. 4/8 Ksr+
X33. 3/7 Ksr-
X33. 2/6 Ksr f+
X33. 1/5 Ksr f-
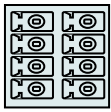
X33 STO RELAYS

Spring cage
connector

Nr		
4 / 8	Ksr +	Safety Relay 1 / 2 Input possitive
3 / 7	Ksr -	Safety Relay 1 / 2 Input negative
2 / 6	Ksr f+	Safety Relay 1 / 2 feedback positive
1 / 5	Ksr f-	Safety Relay 1 / 2 feedback negative

» Use 60/75°C copper conductors only
» Conductor cross-section max. 1.5 mm^2
» Stripping length: 10 mm
» Never connect the safety relays to the logic supply of the drive!

S1 - S2   ADDRESS SELECTORS

S1
S2

S1 (5...8)	Bus ID High (0 … F). Bit 5 is the LSB, bit 8 the MSB.

S2 (1...4)	Bus ID Low (0 … F). Bit 1 is the LSB, bit 4 the MSB

Setting the ID high & low to FF resets the drive to manfacturer settings!
The use of these switches depends on the type of fieldbus which is used.
Please see the corresponding manual for further information.

11

S5   BUS TERMINATION

S5	Bootstrap (Internal use only)

Default position
View: X13 Connecter is left
next to S5 switch.

LEDS   STATE DISPLAY

Error   24VOK
Warn   EN

24VOK	Green	24V Logic Supply OK
En	Yellow	Motor Enabled / Error Code Low Nibble
Warn	Yellow	Warning / Error Code High Nibble
Error	Red	Error

RT BUS LEDS

BUS   BUS
Error   OK

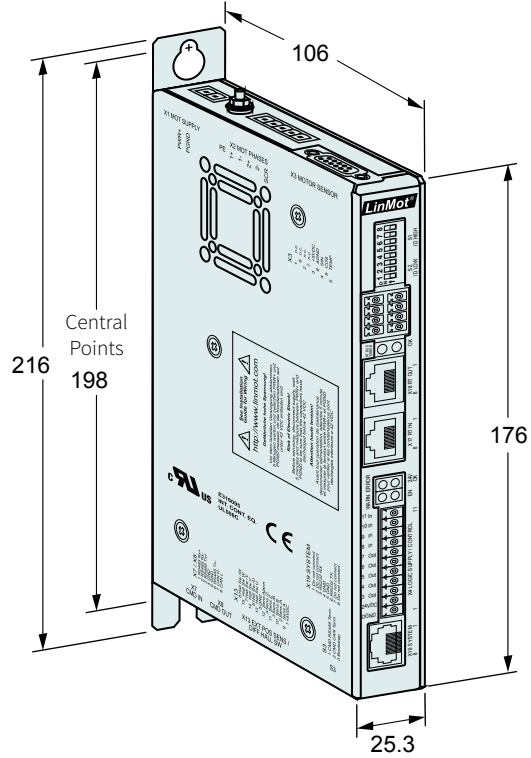| BUS OK	Green	OK
BUS Error	Red	Error

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

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Central Points 188

206

106

166

25.3

C1250-...-0S

Central Points 198

216

106

176

25.3
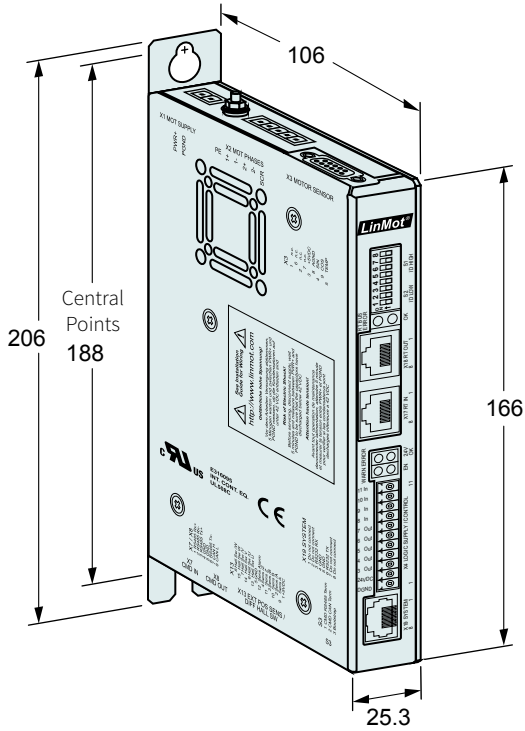
C1250-...-1S

Dimensions in mm
Mounting points for M5 screws

11

Servo Drive Series		C1250-...-0S		C1250-...-1S
Width	mm (in)		25.3 (1.0)	
Height	mm (in)	166 (6.5)		176 (6.9)
Height with fixings	mm (in)	206 (8.1)		216 (8.5)
Depth	mm (in)		106 (4.2)	
Weight	g (lb)	630 (1.4)		700 (1.54)
Mounting Screws		2 x M5		2 x M5
Mounting Distance between screw holes	mm (in)	168 (6.61)		188 (7.4)
Case IP Code	IP		20	
Storage temperature	°C		-25...40	
Transport temperature	°C		-25...70	
Operating temperature	°C		0...40 at rated date 40...50 with power derating	
Relative humidity			95% (non-condensing)	
Pollution	IEC/EN 60664-1		Pollution degree 2	
Shock resistance (16 ms)	-1S option			3.5g
Vibration resistance (10-200Hz)	-1S option			1g
Max. case temperature	°C		70	
Max. power dissipation	W		30	
Mounting place			in the control cabinet	
Mounting position			vertical	
Distance between Drives	mm (in)		Without Power Derating: 20 (0.8) left/right / 50 (2) top/bottom With Power Derating: 5 (0.2) left/right / 20 (0.8) top/bottom	

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Servo Drives

Item	Description	Part Number
C1250-PN-XC-0S-000	ProfiNet Drive (72V/25A)	0150-1888
C1250-PD-XC-0S-000	ProfiNet ProfiDrive (72V/25A)	0150-2618
C1250-EC-XC-0S-000	EtherCAT Drive (72V/25A)	0150-1884
C1250-DS-XC-0S-000	EtherCAT CoE Drive (72V/25A)	0150-2415
C1250-SE-XC-0S-000	EtherCAT SoE Drive (72V/25A)	0150-1897
C1250-IP-XC-0S-000	Ethernet/IP Drive (72V/25A)	0150-1886
C1250-PL-XC-0S-000	Powerlink Drive (72V/25A)	0150-1885
C1250-SC-XC-0S-000	Sercos III Drive (72V/25A)	0150-1887
C1250-LU-XC-0S-000	ETHERNET LinUDP Drive (72V/25A)	0150-2491
C1250-PN-XC-1S-000	Profinet Drive (72V/25A), STO	0150-2348
C1250-PD-XC-1S-000	ProfiNet ProfiDrive (72V/25A), STO	0150-2619
C1250-EC-XC-1S-000	EtherCAT Drive (72V/25A), STO	0150-2345
C1250-DS-XC-1S-000	EtherCAT CoE Drive (72V/25A), STO	0150-2416
C1250-SE-XC-1S-000	EtherCAT SoE Drive (72V/25A), STO	0150-2350
C1250-IP-XC-1S-000	Ethernet/IP Drive (72V/25A), STO	0150-2346
C1250-PL-XC-1S-000	Powerlink Drive (72V/25A), STO	0150-2347
C1250-SC-XC-1S-000	Sercos III Drive (72V/25A), STO	0150-2349
C1250-LU-XC-1S-000	ETHERNET LinUDP Drive (72V/25A), STO	0150-2492

Accessories

Item	Description	Part Number
DC01-CX000-0S/X1/X4	Connector set C1250-...-0S (X1, X4)	0150-3527
DC01-CX000-1S/X1/X4/X33	Connector set C1250-...-1S (X1, X4, X33)	0150-3528
DC01-C1X00/X1	Drive Connector for PWR 72DC Input	0150-3525
DC01-CX000-X2	Motor connector (X2)	0150-3526
DC01-Signal/X4	Drive Connector 24VDC & Logic	0150-3447
DC01-Safety/X33	Drive Connector Safety	0150-3451

11