

LinMot®

E1100 CONTROLLER

Import Belgium & Luxembourg

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The linear motor technology for industrial applications

Notes :

[illegible]

Servo Controller E1100

Series E1100 servo controllers are modular axis controllers, with 32-bit position resolution and an integrated power element, for linear motors and rotary drives.

The controllers are suitable for simplest, standard, and high-end positioning tasks, across the entire force range of the LinMot product range.



Connection to Machine Controller

The Series E1100 servo controllers can be actuated by machine controls from any manufacturer or brand, via digital inputs and outputs, RS232 or RS485 serial interface, CanBus CANopen and DeviceNet interfaces, Profibus DP, or industrial ETHERNET.

For complex motion sequences that are run in an overlaid position controller, B1100 small servo amplifiers are available, with analog velocity or force control and encoder simulation.

Process and Safety 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.

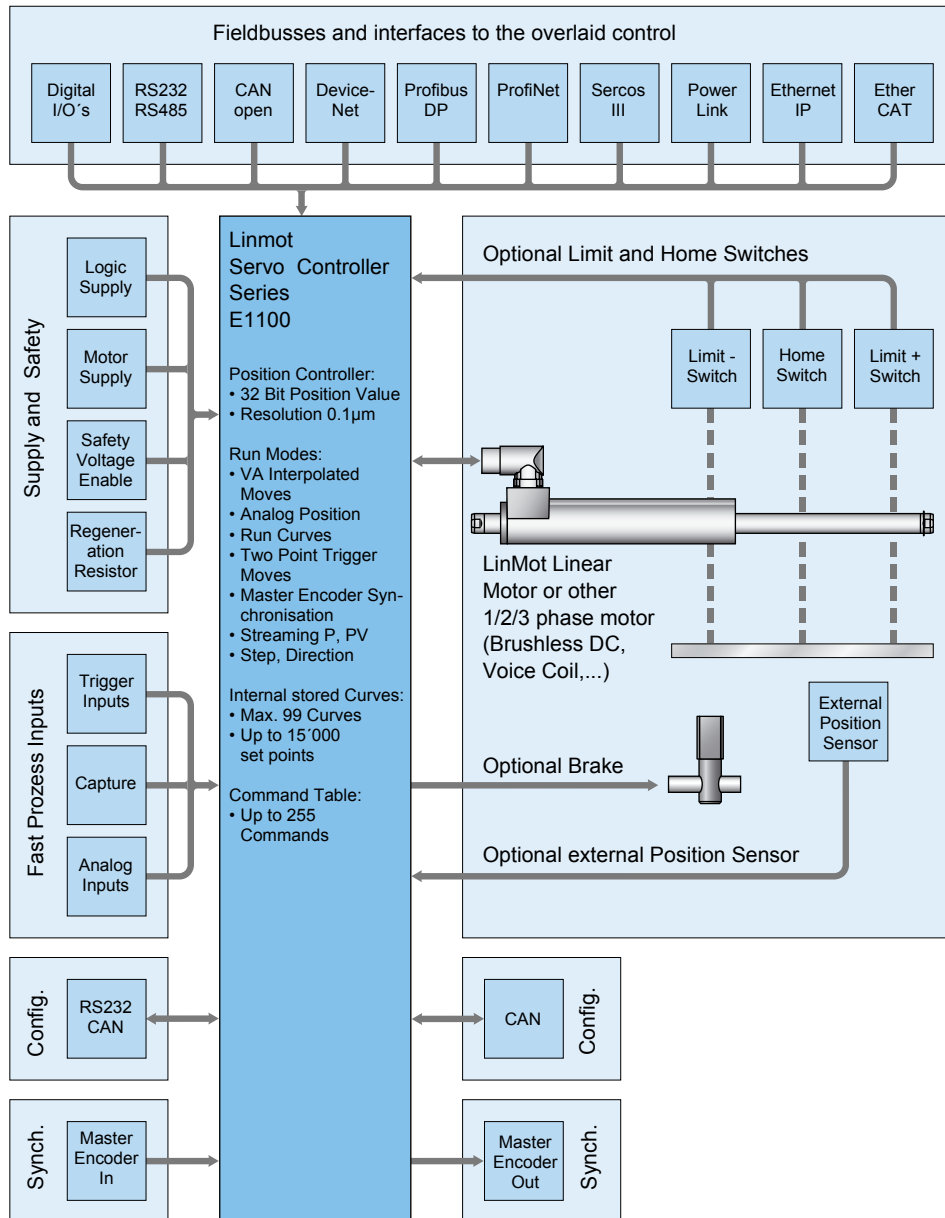
The safe pulse inhibitor on servo controller with fieldbus interfaces or industrial ETHERNET allows safe stoppage of the drives via control signals, per EN 954-1, without interrupting the power supply.

Logic and Power Supply

The servo controllers have two separate power supplies for the logic and power elements.

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

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



System Integration

Flexible hardware enables control of any 1/2/3-phase motors. Thus, low-power rotary servomotors, such as brushless DC motors, can be integrated in the same controls 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 E1100 servo controllers have analog and digital inputs and outputs, serial interfaces, fieldbuses, and ETHERNET connections. The user is therefore not dependent on the selection of the overlaid controller. An appropriate interface is available, with associated protocols, for any PLC or IPC solution.

With flexibility and a compact form factor, LinMot Series E1100 servo controllers provide a complete solution for a flexible drive concept in single and multiple axis applications, with linear motors and other actuators.

Technology Functions

Technology functions are functional blocks that provide a complete solution for standard applications and frequently encountered, customer-specific problems. Technology functions can, for example, handle the complete sequence for winding textile yarns or glass fiber cables, or high-precision joining processes with force control can be implemented directly in the controller.

Option: Master Encoder Module

For synchronization to a mechanical master shaft, or a rotating main drive, the Axis (linear motors and rotary motors) can be coupled to an electronic main shaft via the Master Encoder Interface.

The encoder signal from the main shaft can be passed through by the Master Encoder Interface, so that any number of linear motors can be synchronized to the main shaft.

Motor Interfaces

E1100 servo controllers 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.

In special applications, two drives can be synchronized with each other using the synchronization interface in master booster or master gantry mode.

Configuration

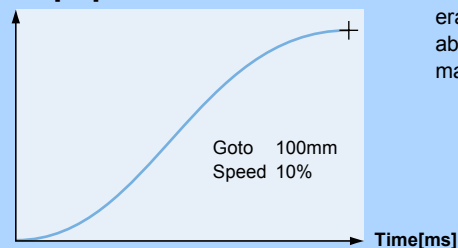
Parameterization and configuration of the servo controller is done via the RS232 interface on the front side, or CANBus for simultaneous configuration of several controllers.

LinMot Talk 1100 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 controllers can also be configured directly by the overlaid control.

MPC Commands

Stroke [mm]

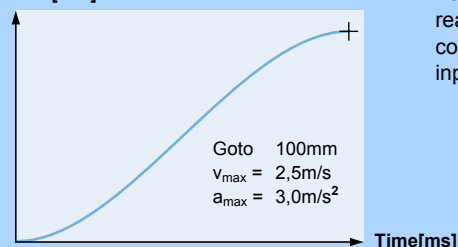


For MPC commands, the controller automatically calculates the maximum velocity and acceleration (100%) based on the mounting orientation and load. Three commands are available: absolute positioning, relative motion, and a press command with a force limit. The MPC commands are invoked via 8 digital inputs (for details see page 344)

Stroke range:	±100m
Position Resolution:	0.01mm
Positioning time:	0-100%
Press force:	0-580N

VA-Interpolated Moves

Stroke [mm]

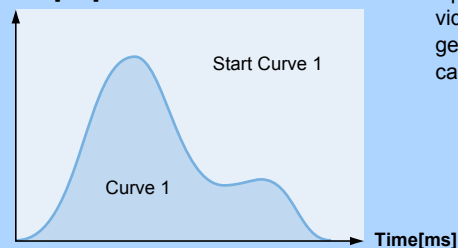


For direct position targets, using absolute or relative positioning, the desired position is reached using an acceleration and velocity-limited motion profile (VA interpolator). Positioning commands can be invoked via the serial interface, fieldbusses, ETHERNET, or the trigger input.

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

Time Curves

Stroke [mm]

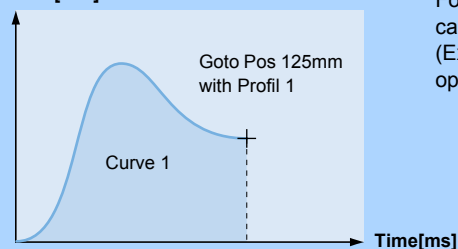


Up to 99 different time curves can be stored Series E1100 controllers, with up to 16,000 individual waypoints. The motor can thus travel along time curves of any complexity, such as those generated by CAD programs and stored in the controller (Excel CSV format). The time curves can be invoked via the serial interface, fieldbusses, ETHERNET, or the trigger input.

Stroke range:	±100m
Position Resolution:	0.1µm (32Bit)
Motion profiles:	Max. 99 Time Curves
Curve points:	Max. 16'000 points

Profiled Moves

Stroke [mm]



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 controller 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:	0.1µm (32Bit)
Motion profiles:	Max. 99 Bewegungsprofile
Curve points:	Max. 16'000 Punkte

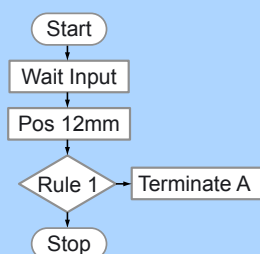
Easy Steps

Input 1	Pos 125mm
Input 2	Pos 250mm
Input 3	Curve 1
Input 4	Pos -30mm
Input 5	Pos +12,5mm
Input 6	Curve 2
Input 7	Pos 2mm
Input 8	Pos -12,5mm

With the Easy Steps function, up to 8 positions or independent travel commands can be stored on the controller, and addressed via 8 digital inputs or fieldbus interfaces/ETHERNET.

Digital inputs:	max. 8
Interface:	X4
Resolution:	10 Bit
Scanning rate:	330µsec

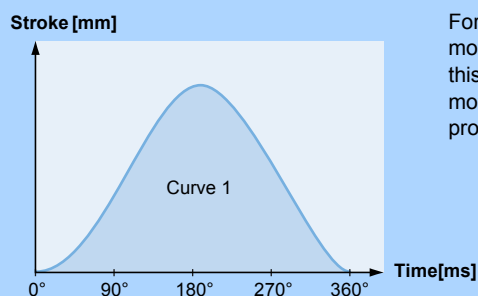
Command Table



Entire motion sequences with up to 256 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 controller. In the Command Table, the programmer has access to all motion commands, internal parameters, and digital inputs and outputs.

Commands:	max. 256
Cycle time:	330µsec

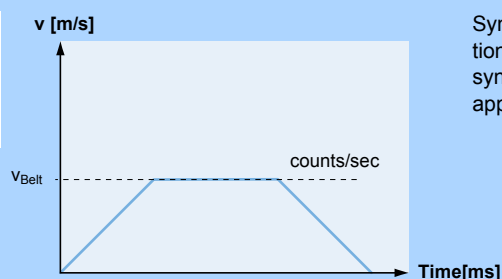
Master Encoder Synchronization (MT)



For synchronization to an external main or master shaft, the linear motor travels along the motion profiles stored in the controller, at the machine speed (machine angle 0...360°). Using this function, mechanical cam discs can be replaced with highly dynamic linear motors. The motion profiles can be freely defined, and the correct motion profile can be invoked during product changeover with no changeover time.

Motion profiles	Max. 99 curve profiles
Curve points:	Max. 16'000 points
Encoder Counter:	32 Bit
Encoder Input:	A/B/Z (RS422)
Max. counting frequency	Max. 4.5 MHz

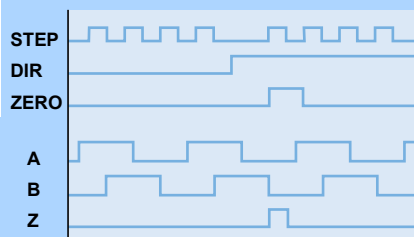
Belt Synchronization



Synchronization to a belt speed can be done using the Master Encoder Interface or Step/Direction/Zero interface. Applications such as the "flying saw", synchronous loading or unloading, synchronous filling or labeling of bottles or containers on a conveyor belt, and many other applications can be implemented in this way.

Encoder Counter:	32 Bit
Encoder Input:	A/B/Z (RS422), max. 5 MHz
	STEP/DIR/ZERO
Max. counting frequency	Max. 4.5 MHz

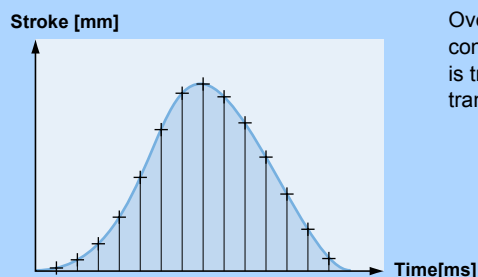
Position Indexing



In position indexing, the linear motor is controlled like a stepper motor, using Step/Dir/Zero, or A/B/Z signals. The step distance is freely programmable from $1.5 \times 10^{-6} \mu\text{m}$ to 3.275mm./ step. The input signal can be used directly as the target position, or it can be filtered by the VA interpolator.

Operating Modes:	Step/Dir/Zero, A/B/Z
Inputs:	differential RS422 (X10)
Step distance:	$1.5 \times 10^{-6} \mu\text{m}$3.275mm, 32 Bit
Max. counting frequency:	4.5 MHz

Setpoint Streaming

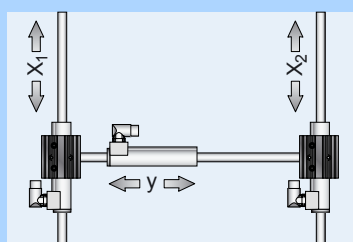


Overlaid NC controllers with fieldbus or ETHERNET interfaces communicate with the servo controllers via "Position Streaming". The position and velocity calculated in the overlaid control is transmitted to the servo controller cyclically. The P, PV, or PVT mode is available for this transmission.

Position Resolution:	32 Bit
Velocity Resolution	32 Bit
Interpolator:	3 kHz
cycle times:	2-5ms

Master-Booster Synchronisation

Master-Booster Synchronisation



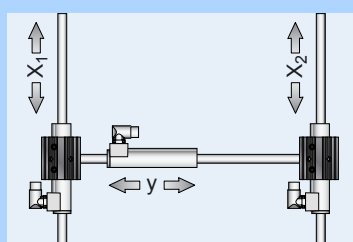
Using master-slave synchronization, two linear motors can be synchronized via a serial communications connection between two controllers, so that the overlaid controller can control them as a single axis.

Master Booster Synchronization

Master booster synchronization is used to double the force when two motors are mechanically rigidly connected to each other.

Master-Gantry Synchronisation

Master-Gantry Synchronisation

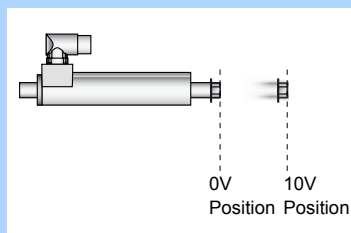


Using master-slave synchronization, two linear motors can be synchronized via a serial communications connection between two controllers, so that the overlaid controller can control them as a single axis.

Master Gantry Synchronization

Master gantry synchronization is used for portal designs with two parallel Axis at different locations.

Analog Position

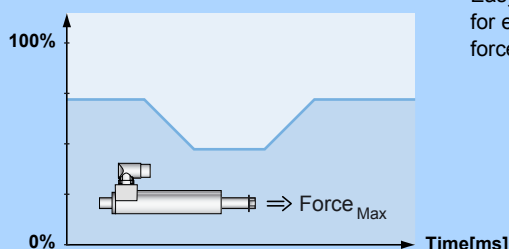


For an analog position target, the linear motor travels to a position proportional to the input voltage. The position is either scanned continuously, or only after a rising edge of the trigger signal. In order to prevent uncontrolled jumps in position, the motor travels to the positions with a programmable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

Inputs:	Analog Input (X4.4)
Voltage range:	0-10VDC
Resolution:	10 Bit
Scanning rate:	330µsec

Easy Steps Parameter Scale

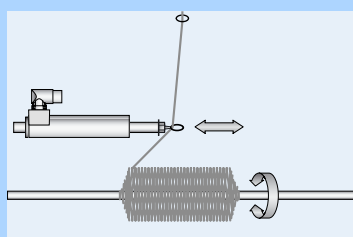
Maximum Force [0...10V => 0...100%]



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.

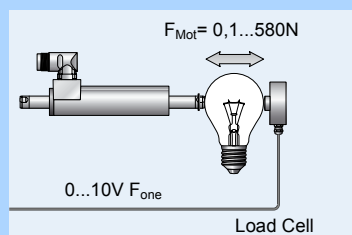
Inputs:	2 x Analog (X4.4, X4.7)
Voltage range:	0-10VDC
Resolution:	10 Bit
Resolution	330µsec

Winding Application



For winding textile yarns, glass fiber optics, or wires, a complete functional block is available that controls the entire sequence of a complete winding process.

Closed Loop Force Control



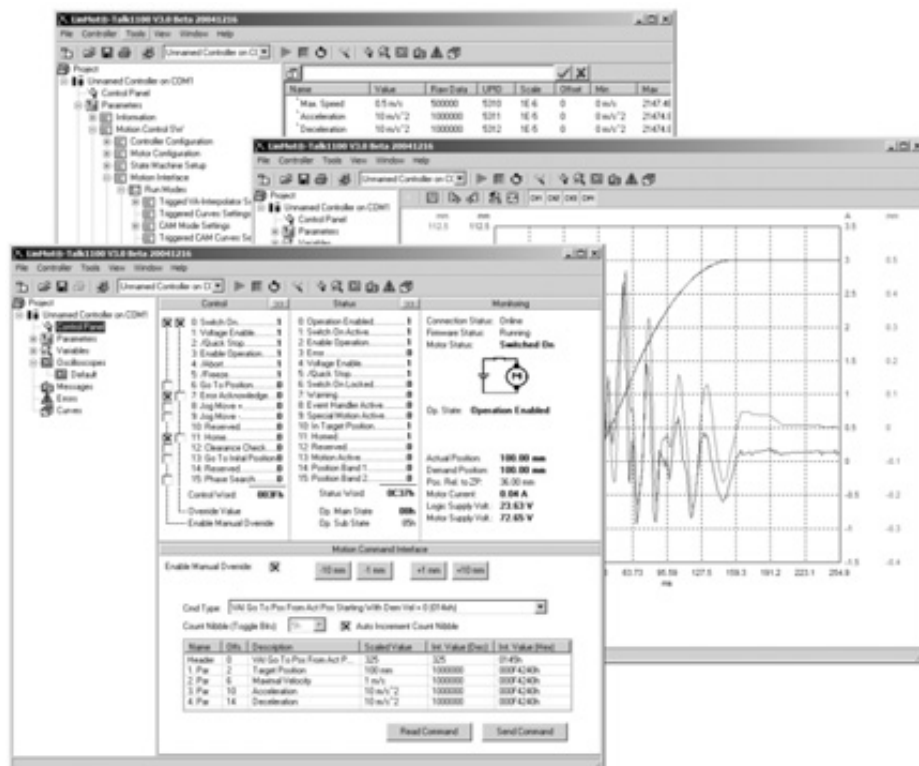
Using the Force Control technology function, precise joining processes can be implemented reliably and reproducibly with high-precision force control. For force control, the current motor force is measured with a load cell and controlled in the controller. Joining process or quality checks with high requirements for applied force can be implemented.

Analog Input:	0-10V
Resolution:	10 Bit
Min. Force Resolution:	0.1N

LinMot Talk 1100

LinMot Talk 1100 configuration software is a Windows-based interface that supports the user during start-up and configuration of the LinMot Series E1100 servo controllers. The software has a powerful, modular, graphical interface that covers all the tasks surrounding the LinMot servo controller. Great emphasis was placed on a high level of user-friendliness during development.

In addition to start-up, LinMot Talk 1100 can also be used for training purposes and for actuation via serial interfaces, fieldbuses, or industrial ETHERNET. Using the integrated Control Panel, the user has direct access to control and status words, as well as all commands that are invoked for operation by the overlaid control. The user learns the meaning of the control and status words easily, and can get to know the individual commands in the Motion Command Interface.



Start-up and Analysis Tools

Using the LinMot Talk PC interface, LinMot servo controllers are configured. Additionally, the drives can be monitored during operation with the machine running, and the current motion sequences, as well as earlier warnings and error messages, can be analyzed in detail (monitoring).

Single or Multiple Axis Configuration

For start-up and monitoring, the servo controller is connected to a PC via the RS232 interface on the front or via CAN Bus. If the connection to the PC is made via USBSCAN converter (see accessories,) then up to 16 Axis can be configured and monitored simultaneously.

Online Help & Documentation

Using the multilingual Online Help, the user can find useful information about the individual parameters and their functionality. All manuals and installation instructions can then be called up on the PC, after LinMot Talk is installed, via the Windows Start Menu, or they can be directly generated in HTML format.

Parameterization

Using the "Parameter Inspector," the controllers 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.

The "Curve Inspector" allows creation of motion profiles. 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 controller.

Optimization

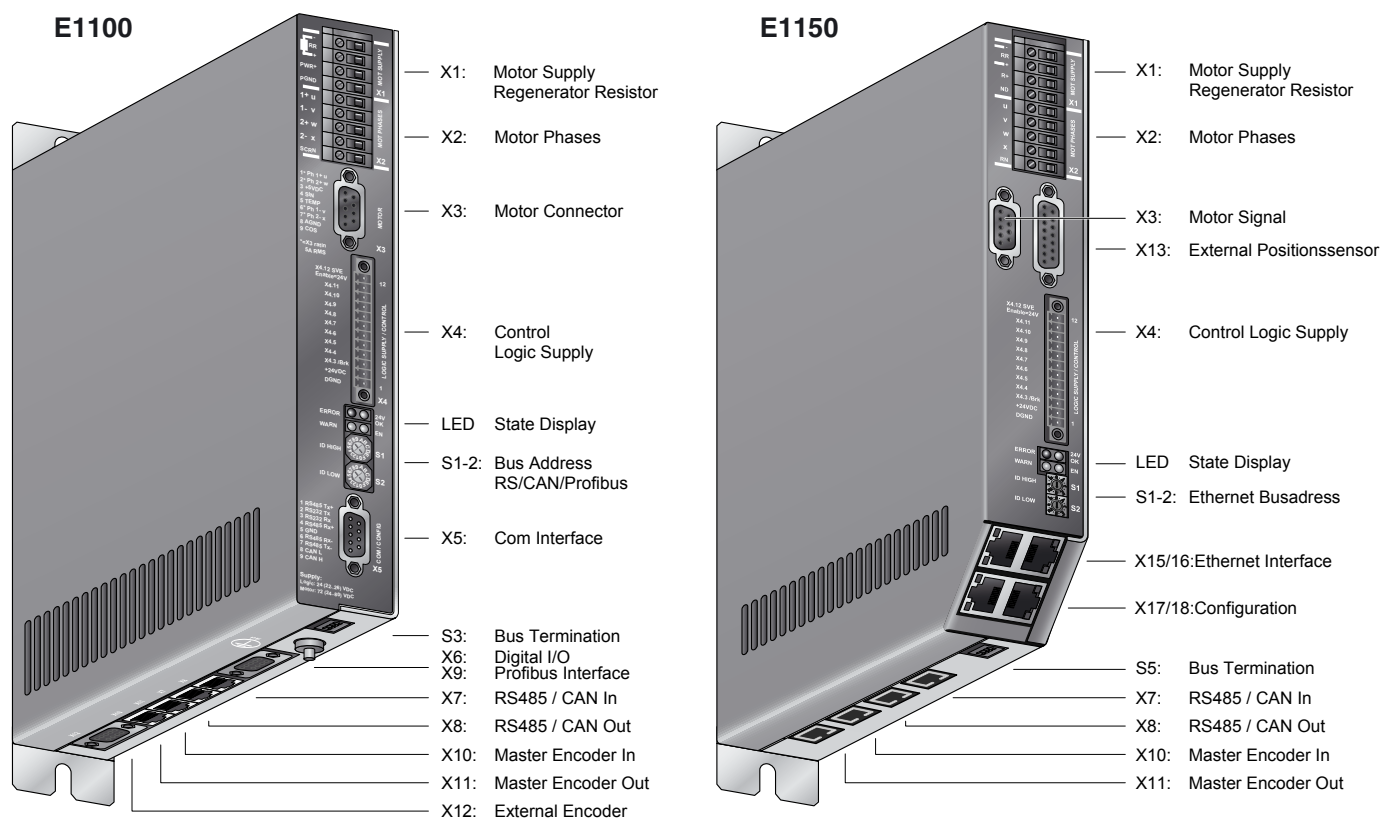
The integrated 4-channel oscilloscope helps the user during start-up and optimization of the drive system. Internal variables, such as the target and actual position, can be shown in real time on the screen, and then printed out. The displayed data can be stored in CSV format for further processing in MS Excel, or stored for documentation purposes.

Monitoring

The user has many tools available for monitoring and analysis of the drive. Both current warnings and fault messages, and older fault messages stored in non-volatile memory, state changes, and many other pieces of information can be obtained.

Internal variables, drive parameters, inputs, and outputs can be combined as desired and display cyclically.

Using the oscilloscope, internal parameters can be charted when warning and fault messages occur.



		E1100-MP	E1100-MT	E1100-RS	E1100-CO	E1100-DN	E1100-DP	E1100-GP	E1150
Interfaces									
X1	Motor Supply Regeneration Resistor	●	●	●	●	●	●	●	●
X2	Motor Phases	■	●	●	●	●	●	●	●
X3	Motor Connector	●	●	●	●	●	●	●	●
X4	Control / Logic Supply	●	●	●	●	●	●	●	●
X5	COM Interface	□	□	●	●	●	●	●	
	RS232			●	●	●	●	●	
	RS485			●	●	●	●	●	
	CAN			●	●	●	●	●	
X6	Digital I/O	●	●					●	
X7	RS485 / CAN In			●	●	●	●		●
X8	RS485 / CAN Out			●	●	●	●		●
X9	Profibus Interface						●		
X10	Master Encoder In			●	●	●	●	●	●
X11	Master Encoder Out			●	●	●	●	●	●
X12	External Encoder (D-Sub 9)		●	●	●	●	●	●	
X13	External Encoder (D-Sub 15)								●
X15/16	Ethernet Real Time								●
X17/18	Ethernet Configuration								●
LED	State Display	●	●	●	●	●	●	●	●
S1	Bus Address RS/CAN/ETH High			●	●	●	●	●	●
S2	Bus Address RS/CAN/ETH Low			●	●	●	●	●	●
S3	Bus Termination			●	●	●	●	●	
S5	Bus Termination								●

□ only for configuration

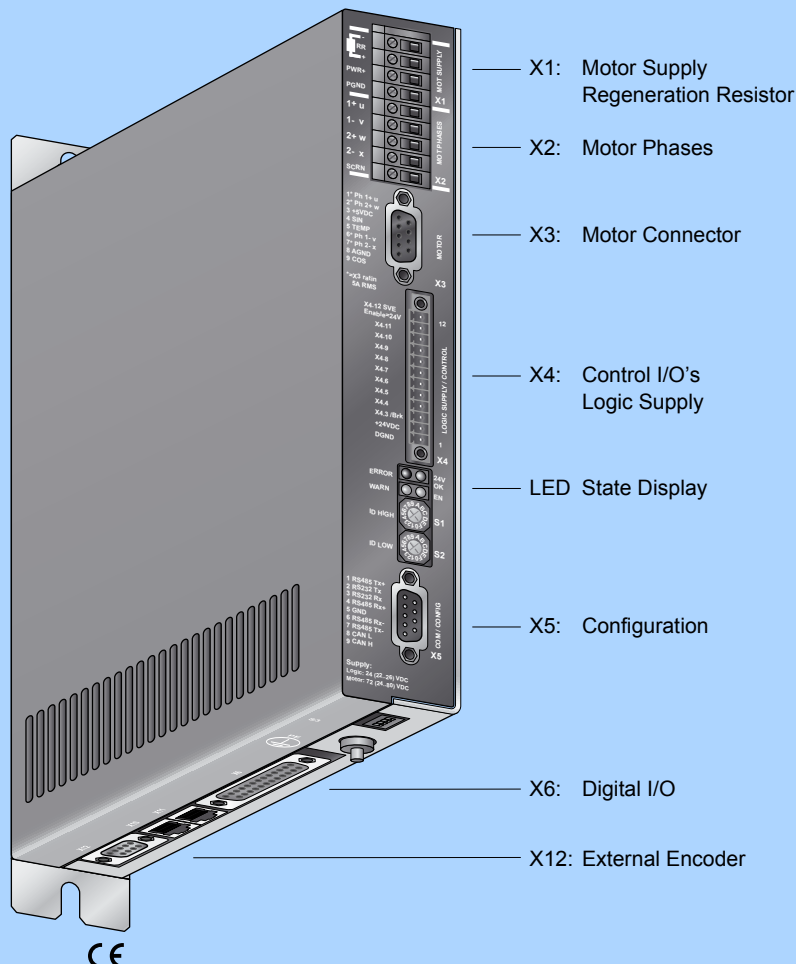
■ only E1100-MP-HC

E1100-MP
E1100-MP-HC

E1100-MT
E1100-MT-HC

M P C

- ✓ MPC Commands
- ✗ Absolute & Relative Positioning
- ✗ Travel Along Time Curves
- ✗ Positioning using Motion Profiles
- ✗ Internally stored Motion Commands
- ✗ Internally stored Motion Sequences
- ✗ Master Encoder Synchronization
- ✗ Synchronization to Belt Speed
- ✗ Step and Direction Interface
- ✗ Position Streaming
- ✗ Master-Slave Synchronization
- ✗ Analog Position Target
- ✗ Analog Parameter Scaling
- ✗ Winding Function Block
- ✗ Force Control Technology Function
- ✗ Customer-Specific Functions



MPC Commands

Servo controllers are designed as simple positioning units. The positions to be approached are stored in the controller, and invoked by an overlaid controller via digital I/Os.

Up to 8 or 255 positions or commands can be stored in one table in the controller.

The following commands are available:

- Absolute Positioning
- Relative Positioning
- Press command with adjustable force

Dynamics can be scaled as a % of the maximum velocity

Simple Start-up

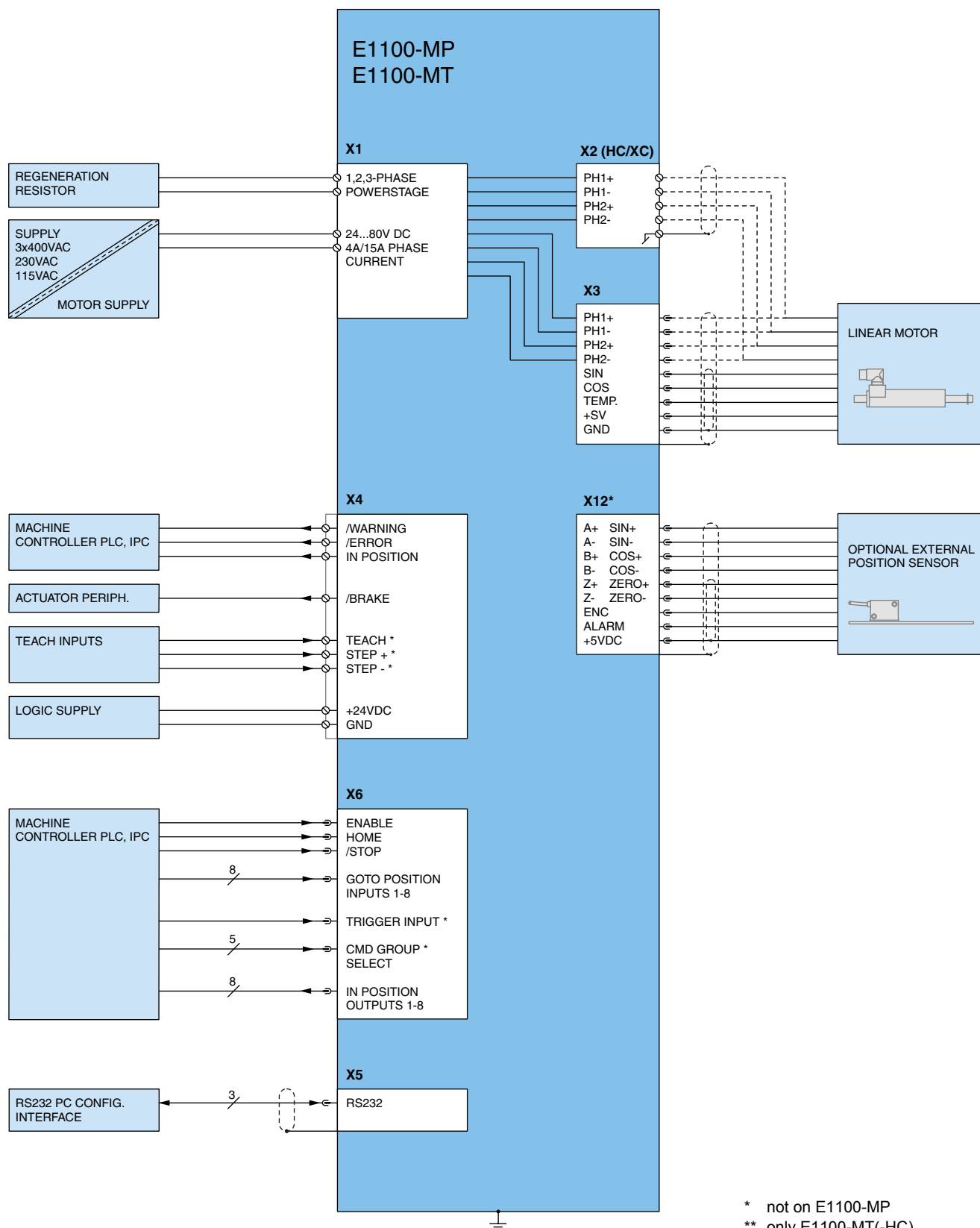
Since no time-consuming mechanical adjustment is needed during startup, MPC systems can be brought on line very quickly and easily. To configure motion sequences, only the target position, speed, and load mass are required.

Control settings and the maximum speed for each motion are calculated by the program based on the load mass and the mounting orientation. Each individual target position is automatically approached with optimal settings. Warnings and fault messages are shown in clear text in the desired language.

Replacing Pneumatics

The MPC Controller was developed especially for flexible and highly dynamic positioning tasks that can no longer be solved with pneumatic drives.

The end positions can be easily and quickly entered in the PC interface using Teach-In. Additionally, the E1100-MT controller has a digital teach input. This allows positions to be stored without a PC by sliding the linear axis to the desired end position by hand.



E1100-RS
E1100-RS-HC
E1100-RS-XC

E1100-DN
E1100-DN-HC
E1100-DN-XC

E1100-CO
E1100-CO-HC
E1100-CO-XC

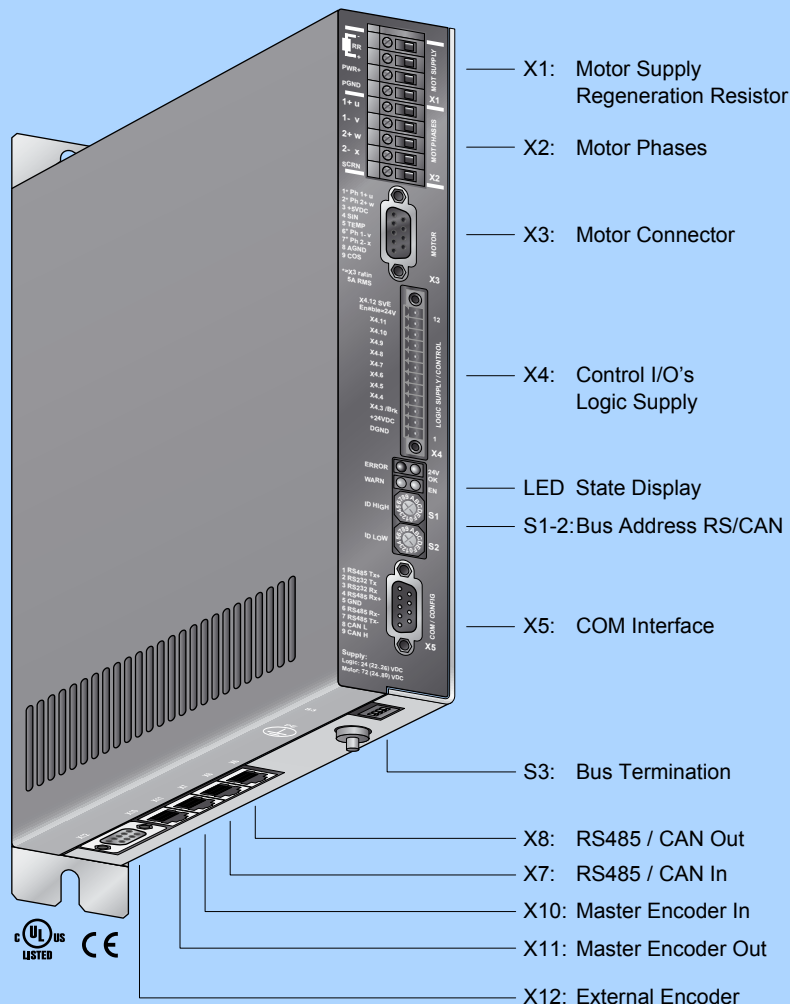
- X MPC Commands
- ✓ Absolute & Relative Positioning
- ✓ Travel Along Time Curves
- ✓ Positioning using Motion Profiles
- ✓ Internally stored Motion Commands
- ✓ Internally stored Motion Sequences
- ✓ Master Encoder Synchronization
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- ✓ Customer-Specific Functions

RS 232

RS 485

DeviceNet

CANopen



LinRS Serial Interface

The LinMot Series E1100-RS servo controllers support the LinRS serial communication protocol. LinRS is a proprietary protocol for actuating LinMot servo controllers via the RS 232, RS 422, and RS 485 interfaces.

If the controller is actuated by the overlaid control via the serial interface, then this is configured from the PC via CANBus. The USBSCAN converter (item no. 0150-3134), supported by LinMot Talk 1100, is used for this.

Adjustable Baud rates: 9.6-115.2kBaud

CANopen

LinMot CO controllers, with integrated CANopen interface, support the CiA DS301 communication profile.

The following resources are available: 3 T_PDO, 3 R_PDO, 1 T_SDO, 1 R_SDO

The following protocols are supported by the CO controllers:

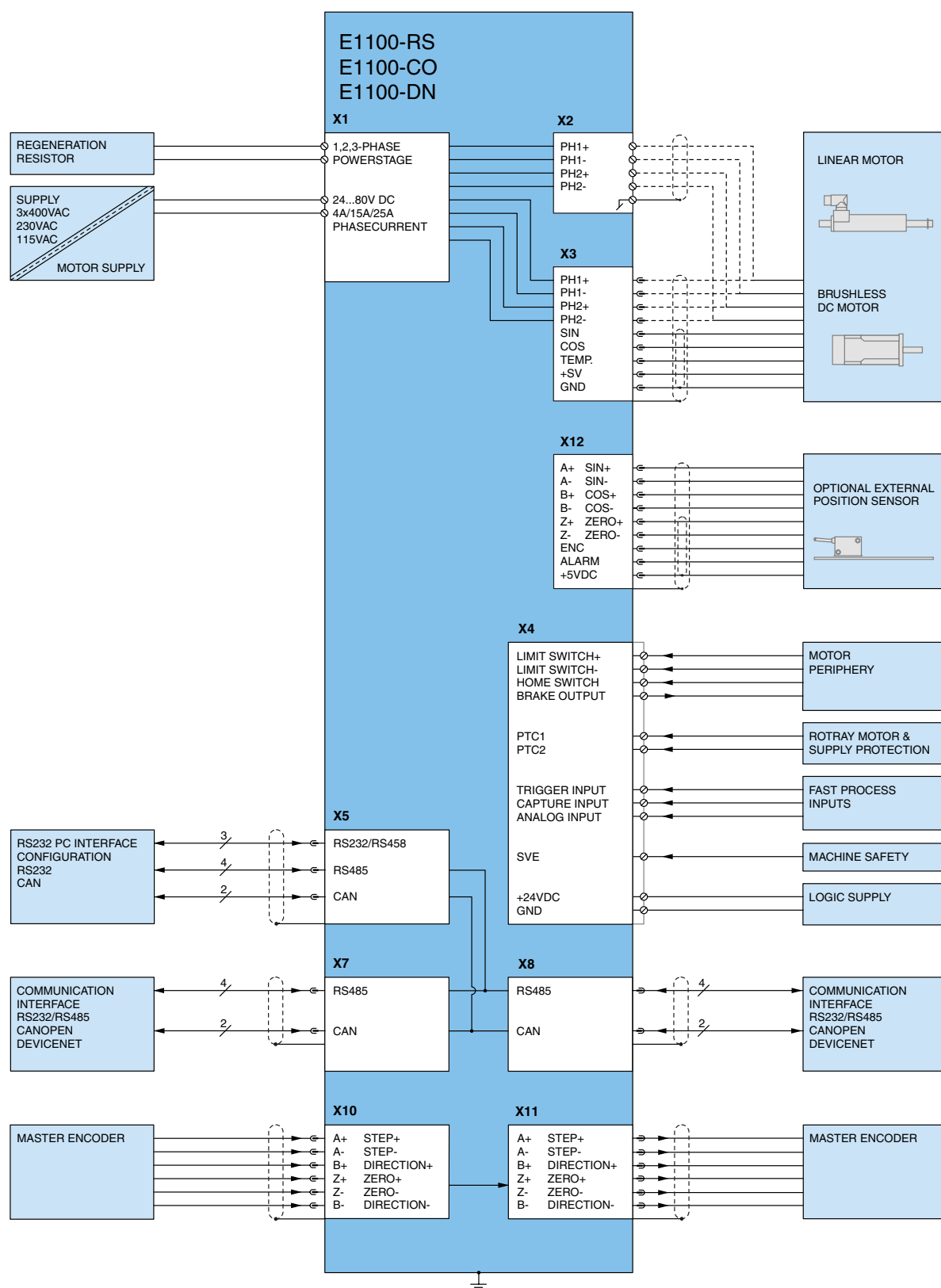
- NMT Error Control (Nodeguarding Protocol or HeartBeat Protocol)
- PDO (Transmission type 254 and 1)
- SDO Upload and Download - NMT (Start, Stop, Enter PreOp, Reset Node, Reset Communication)
- Boot-Up Message

DeviceNet

Series E1100-DN controllers feature an integrated DeviceNet interface. With the DeviceNet interface, even complicated motion sequences can be realized with the highest possible flexibility.

The controller can be actuated and monitored via the DeviceNet connection.

E1100-DN are UCMM Group 3-capable slaves, and support polled IO runtime data transfer



Item	Description	Part Number
E1100-RS	RS232/485 Controller (72V/8A)	0150-1677
E1100-RS-HC	RS232/485 Controller (72V/15A)	0150-1678
E1100-RS-XC	RS232/485 Controller (72V/25A)	0150-1862
E1100-CO	CANopen Controller (72V/8A)	0150-1681
E1100-CO-HC	CANopen Controller (72V/15A)	0150-1682
E1100-CO-XC	CANopen Controller (72V/25A)	0150-1683
E1100-DN	DeviceNet Controller (72V/8A)	0150-1679
E1100-DN-HC	DeviceNet Controller (72V/15A)	0150-1680
E1100-DN-XC	DeviceNet Controller (72V/25A)	0150-1863

E1130-DP
E1130-DP-HC
E1130-DP-XC

- X MPC Commands
- ✓ Absolute & Relative Positioning
- ✓ Travel Along Time Curves
- ✓ Positioning using Motion Profiles
- ✓ Internally stored Motion Commands
- ✓ Internally stored Motion Sequences
- ✓ Master Encoder Synchronization
- ✓ Synchronization to Belt Speed
- ✓ Step and Direction Interface
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- ✓ Master-Slave Synchronization
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- ✓ Analog Parameter Scaling
- ✓ Winding Function Block
- ✓ Force Control Technology Function
- ✓ Customer-Specific Functions

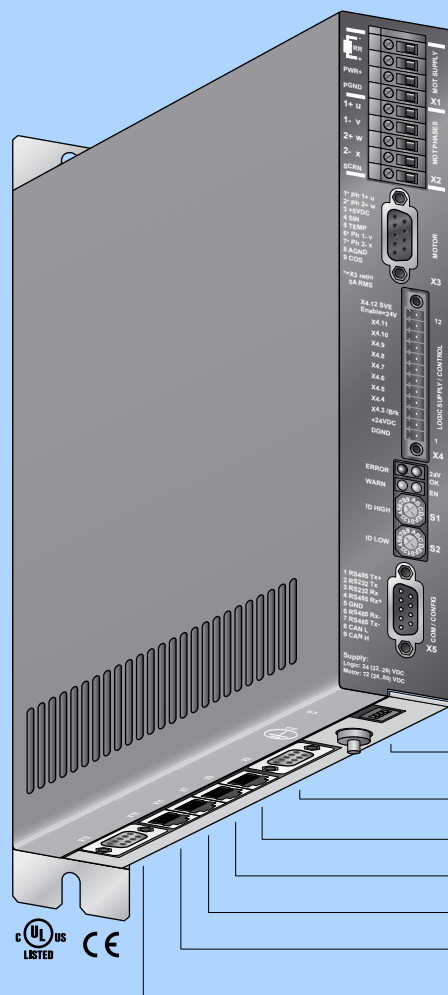
PROFIBUS

RS 232

RS 485

CANopen

DeviceNet

X1: Motor Supply
Regeneration Resistor

X2: Motor Phases

X3: Motor Connector

X4: Control I/O's
Logic Supply

LED State Display

S1-2: Busadresse RS/CAN

X5: Configuration

S3: Bus Termination

X9: Profibus Interface

X8: RS485 / CAN Out

X7: RS485 / CAN In

X10: Master Encoder In

X11: Master Encoder Out

X12: External Encoder

Profibus DP

DP servo controllers feature an integrated PROFIBUS-DP interface. PROFIBUS-DP provides the user with a standardized fieldbus interface for rapid data interchange between the servo controller and the overlaid control.

With fast data transfer and command initiation, as well as simple system integration, the Profibus controllers are the ideal solution for applications with motions and sequences that change frequently, such as are required, for example, in flexible machines and systems with automatic format changes.

The PROFIBUS-DP interface supports all Baud rates from 9.6 Kbits/s to 12 Mbit/s. The maximum net data quantity exchanged in cyclical data traffic is 64 bytes per cycle. The smallest achievable bus cycle time is 100 µs.

The structure and scope of cyclical data can be collected from any individual data modules into an overall data quantity when planning the system.

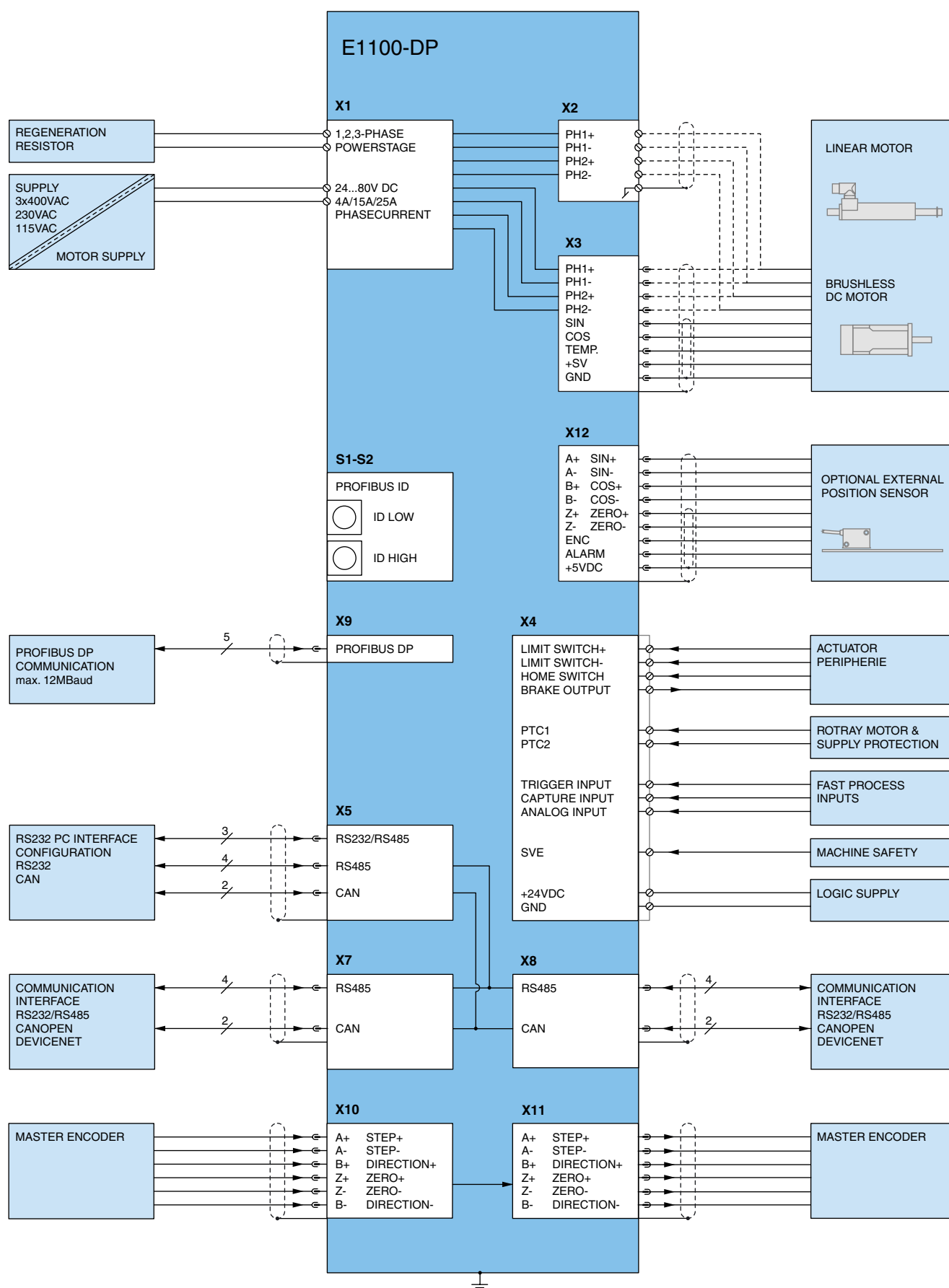
A GSD device master file is provided for open planning in conformance with the PROFIBUS-DP standard.

The 9-pole Profibus connector on the front side provides power for an external bus termination. A positive directional control signal is provided to control repeaters or optical fibers.

All signals on the PROFIBUS connector are galvanically separated.

The PROFIBUS-DP address is set by two hex code switches (ID1 and ID2).

All addresses permitted by the standard are supported (0..125).



Item	Description	Part Number
E1130-DP	Profibus DP Controller, (72V/8A)	0150-1667
E1130-DP-HC	Profibus DP Controller, (72V/15A)	0150-1668
E1130-DP-XC	Profibus DP Controller, (72V/25A)	0150-1861

E1100-GP
E1100-GP-HC
E1100-GP-XC

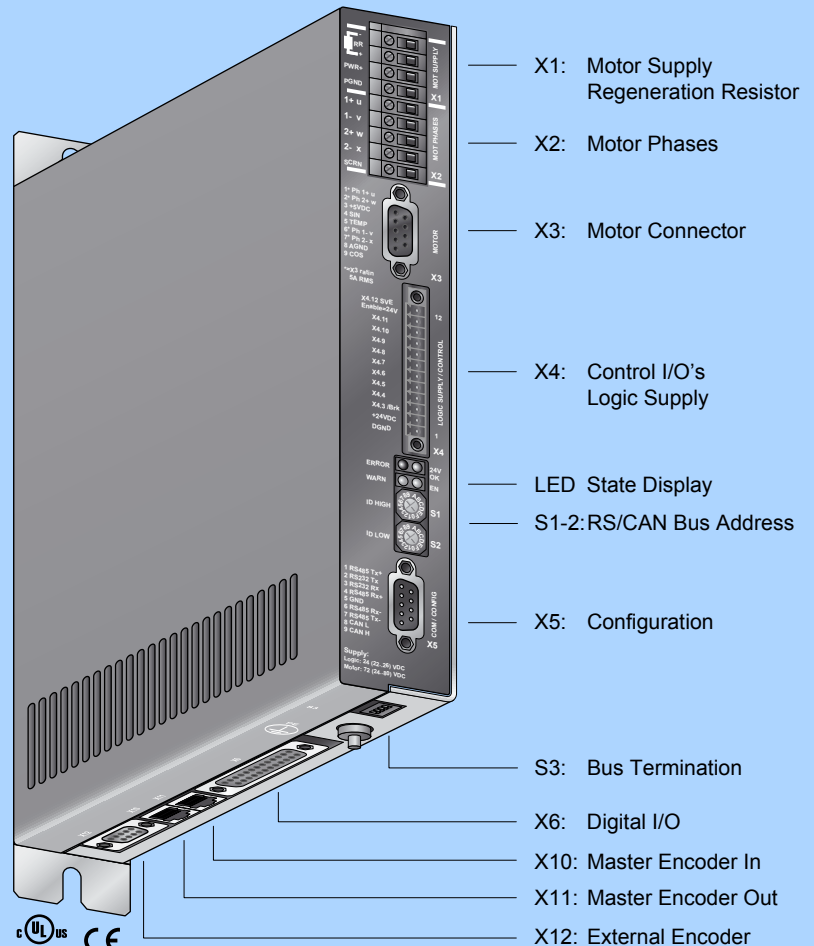
RS 232

RS 485

CANopen

DeviceNet™

- ✓ MPC Commands
- ✓ Absolute & Relative Positioning
- ✓ Travel Along Time Curves
- ✓ Positioning using Motion Profiles
- ✓ Internally stored Motion Commands
- ✓ Internally stored Motion Sequences
- ✓ Master Encoder Synchronization
- ✓ Synchronization to Belt Speed
- ✓ Step and Direction Interface
- ✓ Position Streaming
- ✓ Master-Slave Synchronization
- ✓ Analog Position Target
- ✓ Analog Parameter Scaling
- ✓ Winding Function Block
- ✓ Force Control Technology Function
- ✓ Customer-Specific Functions



General Purpose Controller

Series E1100-GP controllers are multifunctional servo controllers, on which the firmware from the following controllers can be installed:

- Series E1100-MP
- Series E1100-MT
- Series E1100-RS
- Series E1100-CO
- Series E1100-DN

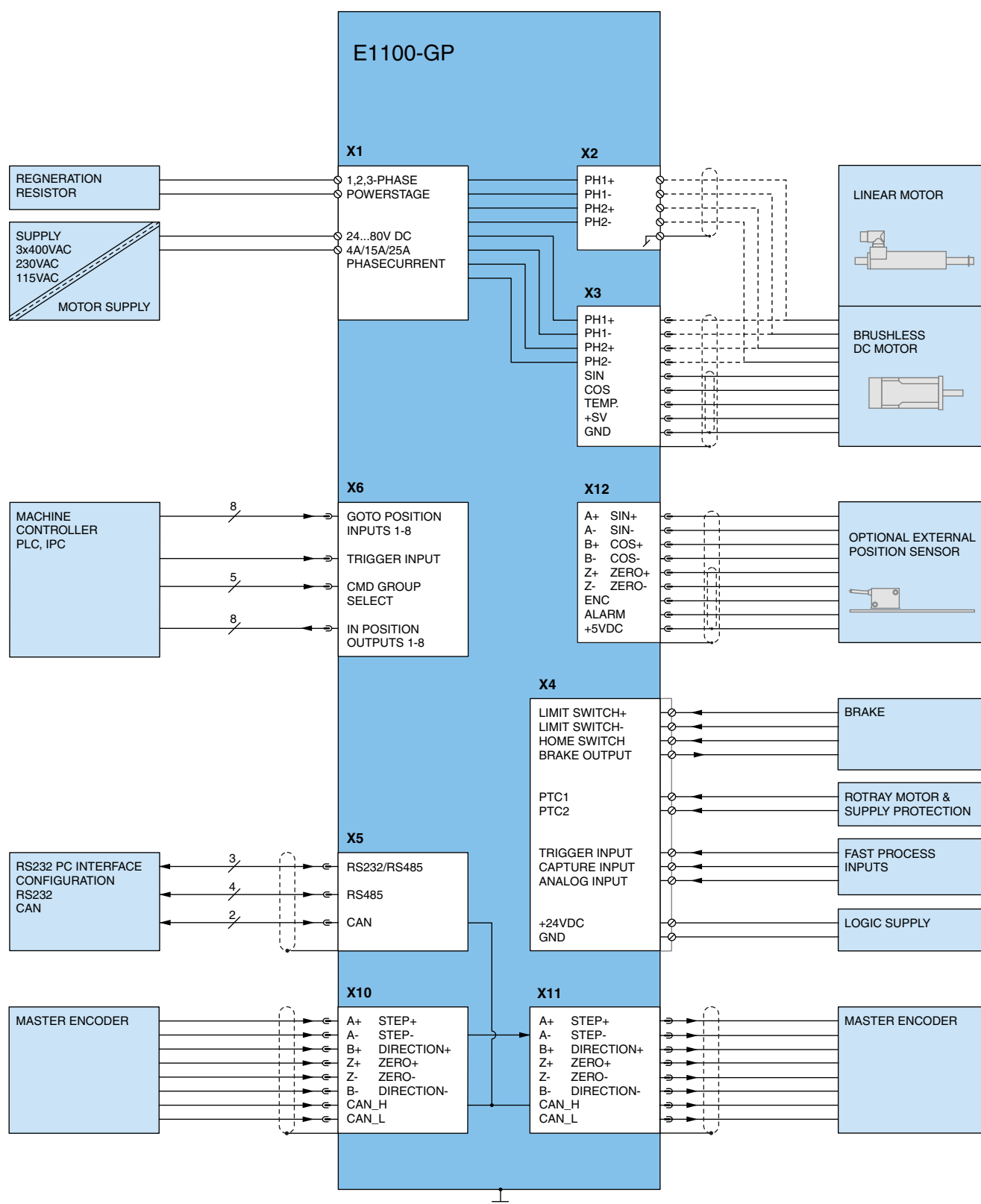
All functions of the controllers listed above, except for safe pulse inhibitors (X4.12) are available in the Series E1100-GP servo controllers.

For actuation by an overlaid controller, the following digital, serial, and fieldbus interfaces are available:

- MPC tables with 8 positions
- MPC tables with 256 positions
- LinRS via RS232, RS485 and RS422
- CANopen - DeviceNet

In addition to actuation via serial interfaces and fieldbuses, Series E1100-GP controllers can use direct addressing of up to 256 commands in the Command Table, via 8 digital inputs (X6).

Even complex drive tasks and complete, automated sequences can be controlled using simple digital signals.

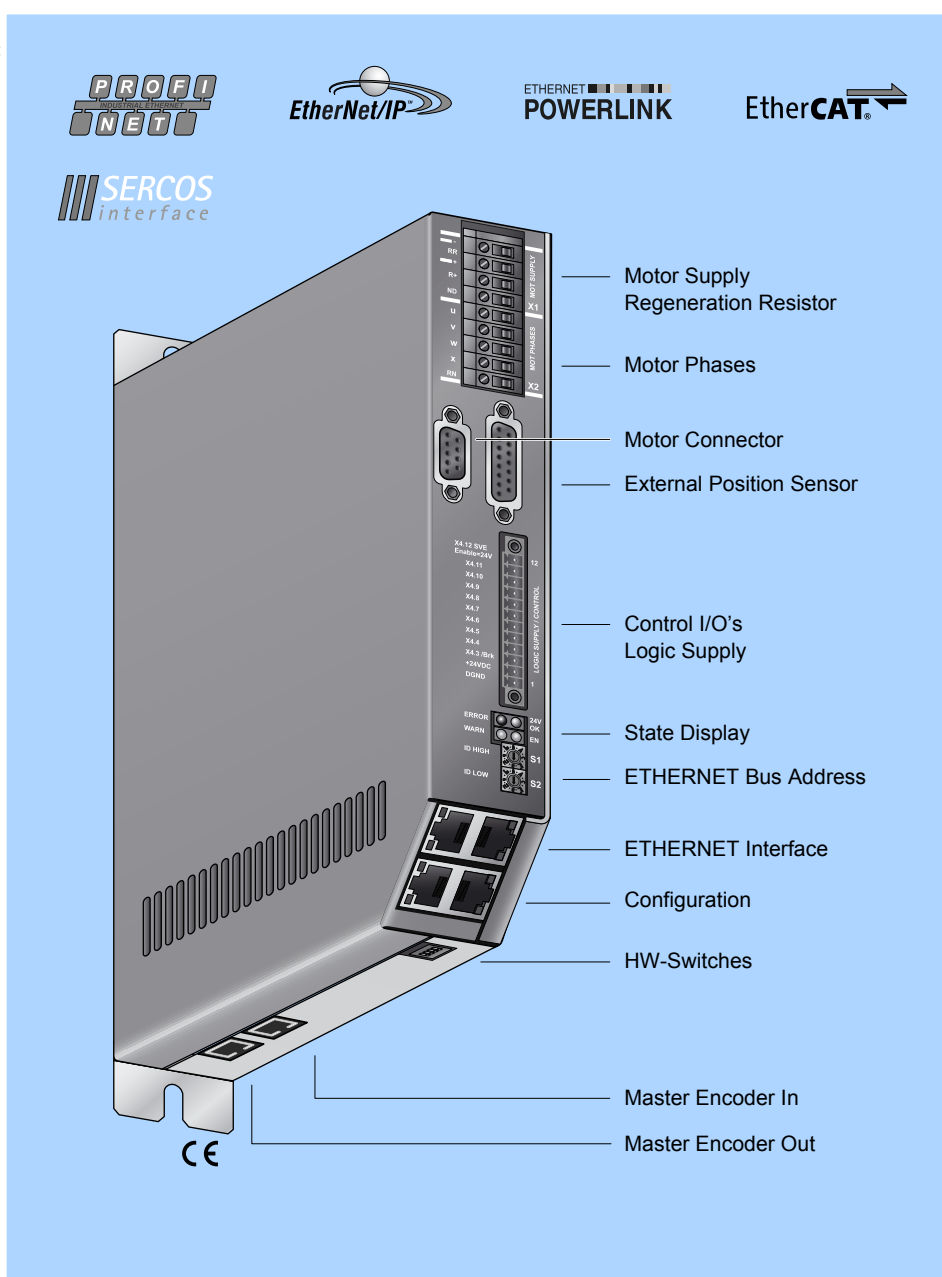


Item	Description	Part Number
E1100-GP	General Pupose (72V/8A)	0150-1665
E1100-GP-HC	General Pupose (72V/15A)	0150-1666
E1100-GP-XC	General Pupose (72V/25A)	0150-1864

E1150-PN	E1150-IP	E1150-SC
E1150-PN-HC	E1150-IP-HC	E1150-SC-HC
E1150-PN-XC	E1150-IP-XC	E1150-SC-XC

E1150-PL	E1150-EC
E1150-PL-HC	E1150-EC-HC
E1150-PL-XC	E1150-EC-XC

- ✗ MPC Commands
- ✓ Absolute & Relative Positioning
- ✓ Travel Along Time Curves
- ✓ Positioning using Motion Profiles
- ✓ Internally stored Motion Commands
- ✓ Internally stored Motion Sequences
- ✓ Master Encoder Synchronization
- ✓ Synchronization to Belt Speed
- ✓ Step and Direction Interface
- ✓ Position Streaming
- ✓ Master-Slave Synchronization
- ✓ Analog Position Target
- ✓ Analog Parameter Scaling
- ✓ Winding Function Block
- ✓ Force Control Technology Function
- ✓ Customer-Specific Functions



Industrial ETHERNET

Series E1150 controllers allow integration of LinMot linear motors in controls concepts with industrial ETHERNET interfaces. The user can integrate Series E1150 controllers regardless of the provider of the overlaid control.

LinMot controllers are available with 5 typical industrial ETHERNET protocols. Since all ETHERNET controllers 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 controllers without a problem.

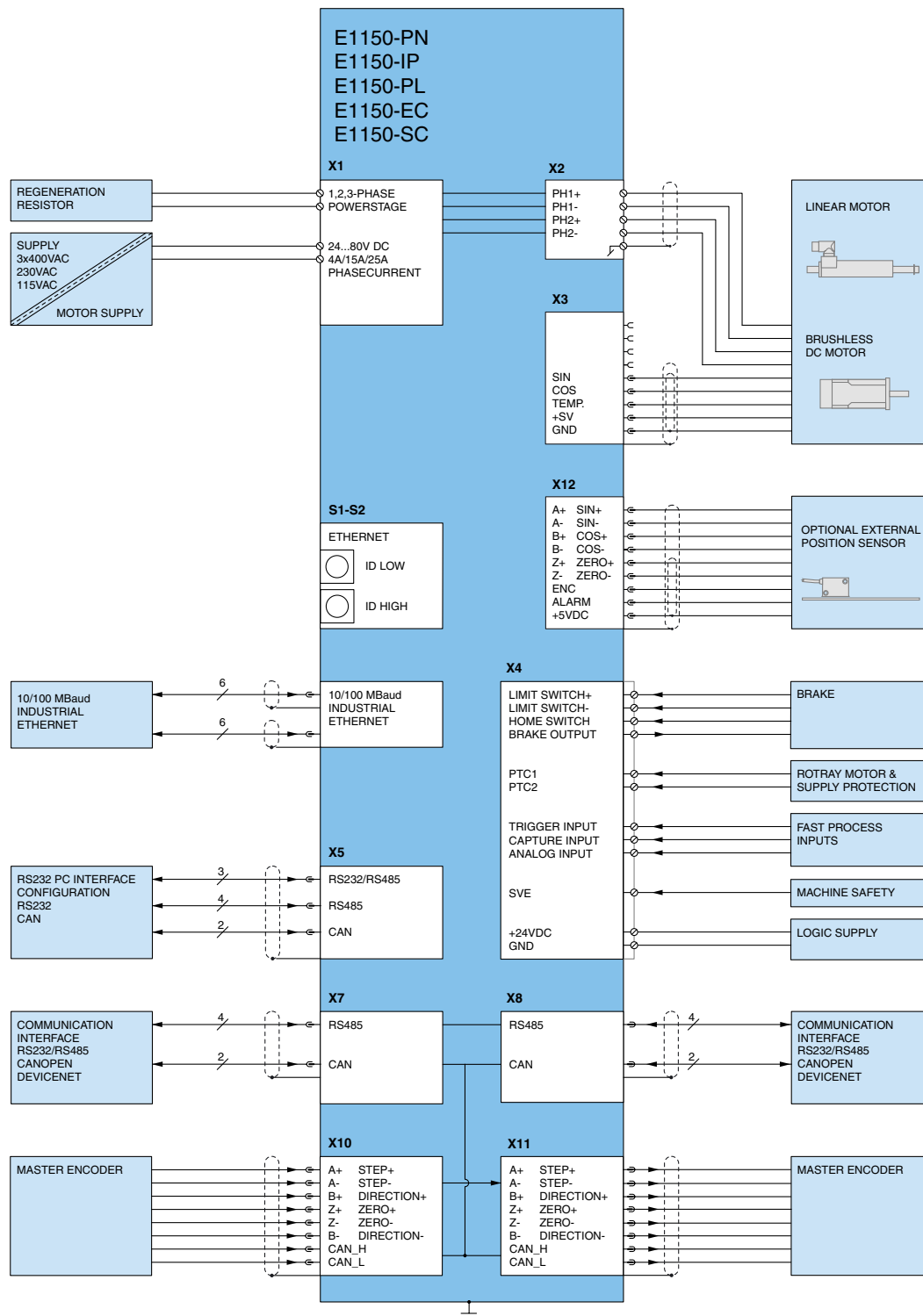
Series 1150 servo controllers support the following industrial **ETHERNET** protocols:

- Profinet
- Industrial IP
- PowerLink
- EtherCat
- Sercos III

The appropriate controller is available for each protocol.

Technical Data

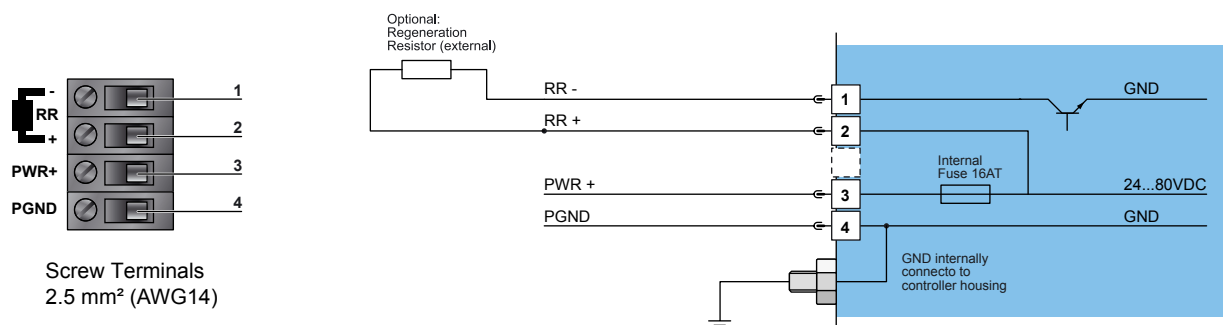
Type:	Realtime ETHERNET
Switch/Hub:	Integrated 2-Port Hub/Switch
Transfer rate:	10/100MBit/sec



Item	Description	Part Number
E1150-PL	PowerLink Controller (72V/4A)	0150-1690
E1150-PL-HC	PowerLink Controller (72V/15A)	0150-1691
E1150-PL-XC	PowerLink Controller (72V/25A)	0150-1751
E1150-IP	Ethernet/IP Controller(72V/4A)	0150-1692
E1150-IP-HC	Ethernet/IP Controller (72V/15A)	0150-1693
E1150-IP-XC	Ethernet/IP Controller (72V/25A)	0150-1752
E1150-PN	ProfiNet Controller(72V/4A)	0150-1694
E1150-PN-HC	ProfiNet Controller (72V/15A)	0150-1695
E1150-PN-XC	ProfiNet Controller (72V/25A)	0150-1753
E1150-EC	EtherCat Controller(72V/4A)	0150-1696
E1150-EC-HC	EtherCat Controller (72V/15A)	0150-1697
E1150-EC-XC	EtherCat Controller (72V/25A)	0150-1754
E1150-SC	Sercos III Controller(72V/4A)	0150-1698
E1150-SC-HC	Sercos III Controller (72V/15A)	0150-1699
E1150-SC-XC	Sercos III Controller (72V/25A)	0150-1755

X1

Motor Supply / Regeneration Resistor



Motor Supply:

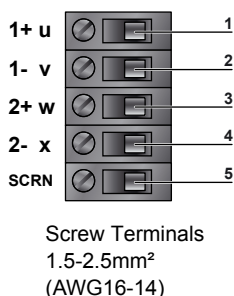
Motor Supply Voltage 24...80VDC.
Absolute max. Rating 72VDC + 20%



If motor supply voltage is exceeding 90VDC, the controller will go into error state

X2

Motor Phases

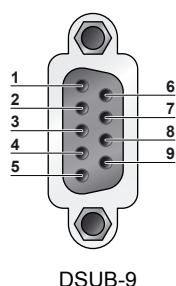


Nr.	Designation	LinMot Linear Motor	Color	3-Phase-Motor
1	PH1+ /U	Motor Phase 1+	red	Motor Phase U
2	PH1- /V	Motor Phase 1-	pink	Motor Phase V
3	PH2+ /W	Motor Phase 2+	blue	Motor Phase W
4	PH2- /	Motor Phase 2-	grey	
5	SCRN	Shield		

- If the RMS current is not higher than 5Arms, respectively 7.5 Apeak, the phases can be connected to X3.
- Do NOT connect X2 and X3.

X3

Motor

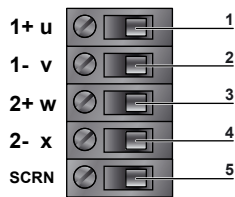


Nr	LinMot Linear Motor	3-Phase-Motor
1	Motor Phase 1+	Motor Phase U
2	Motor Phase 2+	Motor Phase W
3	+5VDC	
4	Sine	Hall U
5	Temperature	Hall W
6	Motor Phase 1-	Motor Phase V
7	Motor Phase 2-	
8	AGND	
9	Cosine	Hall V
Case	Shield	

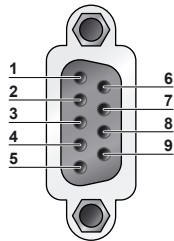
- Use X2 for motor phase wiring if phase current exceeds 5Arms or 7.5Apeak
- Use +5V (X3.3) and AGND (X3.8) only for motor internal Hall Sensor supply (max. 100mA)
- Do NOT connect AGND (X3.8) to ground or earth!

Motor

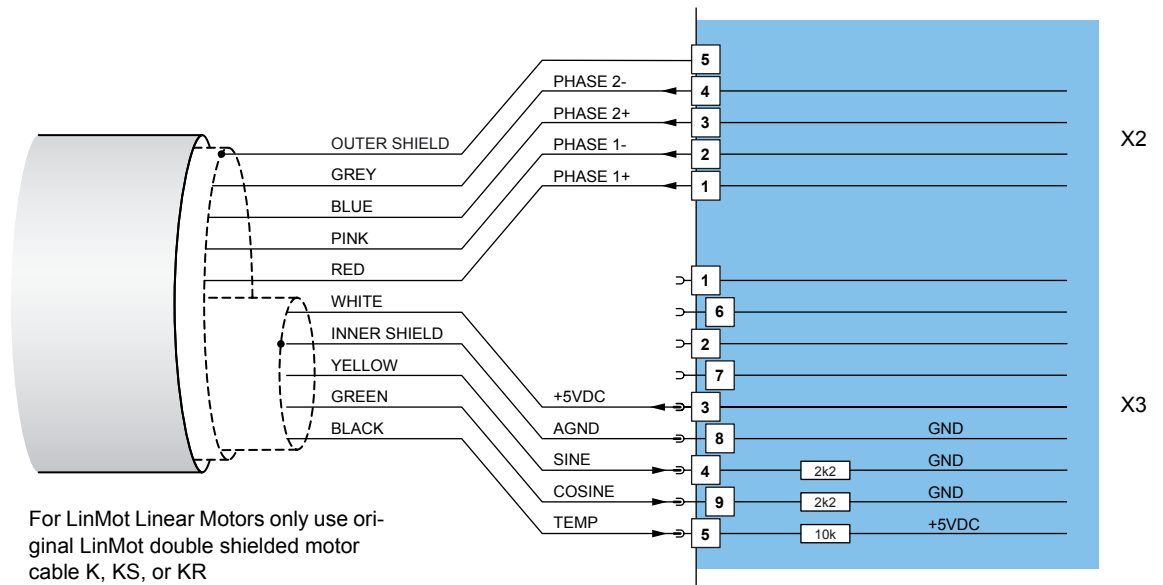
Motor wiring



X2: Screw Terminals

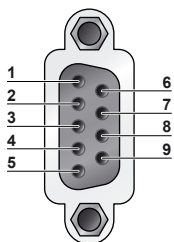


X3: DSUB-9 (f)

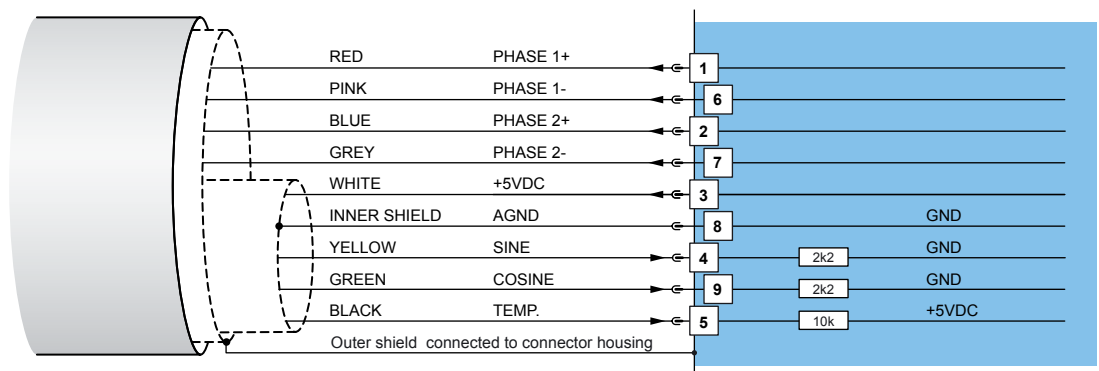


Motor

Motor wiring for phase current below 5Arms and below 7.5Apeak



X3: DSUB-9 (f)



S1-3

Address Selectors / Bus Termination



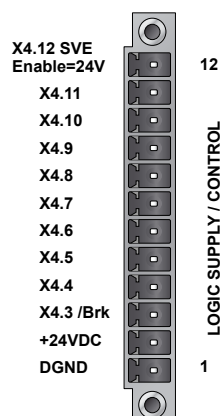
Switch		
S1	Bus ID High (0...F)	HEX-Switches for Bus ID address range 0.255
S2	Bus ID Low(0...F)	

Switch	E1100	
S3	Switch 1: RS232 "off" / RS485 "on"	Select serial RS23 or RS485
	Switch 2: RS485 Termination on/off	
	Switch 3: CAN Termination on/off	Factory settings: all switches "off"
	Switch 4: Bus Interface on/off	

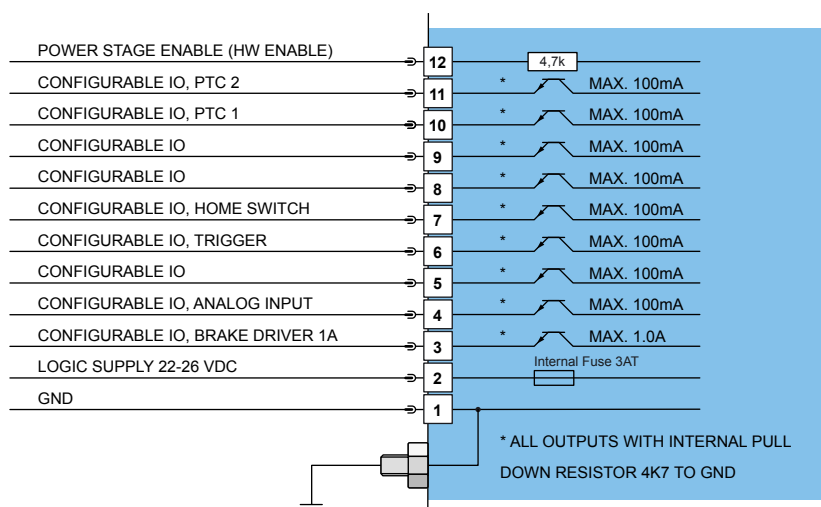
Switch	E1150	
S3	Switch 1: RS485 Termination on/off	Factory settings: all switches "off"
	Switch 2: CAN0 Termination on/off	
	Switch 3: CAN1 Termination on/off	
	Switch 4: Hardware Reset	

X4: 12pin

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

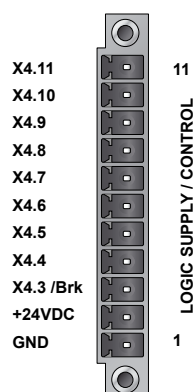


Phoenix MC1,5/12-STF-3,5
0.25-1.5mm² (AWG24-16)

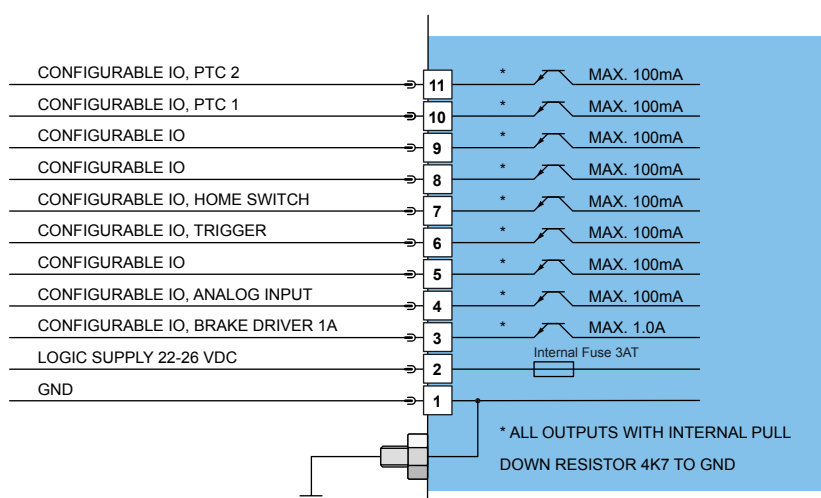


X4: 11pin

Control / Supply (E1100-GP(-HC))



Phoenix MC1,5/11-STF-3,5
0.25-1.5mm² (AWG24-16)

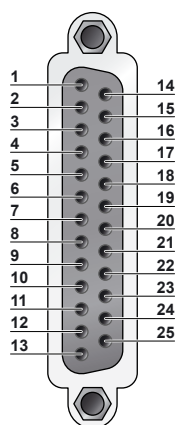


No		Description	
12	Input	Safety Voltage Enable	Power Stage Enable (HW Enable)
11	I/O	X4.11	Configurable IO, PTC 2
10	I/O	X4.10	Configurable IO, PTC 1
9	I/O	X4.9	Configurable IO
8	I/O	X4.8	Configurable IO
7	I/O	X4.7	Configurable IO, Home Switch
6	I/O	X4.6	Configurable IO, Trigger
5	I/O	X4.5	Configurable IO
4	I/O	X4.4	Configurable IO, Analog Input
3	I/O	X4./Brk	Configurable IO, Brake Driver 1A
2	+24VDC	Supply	Logic Supply 22-26 VDC
1	GND	Supply	Ground

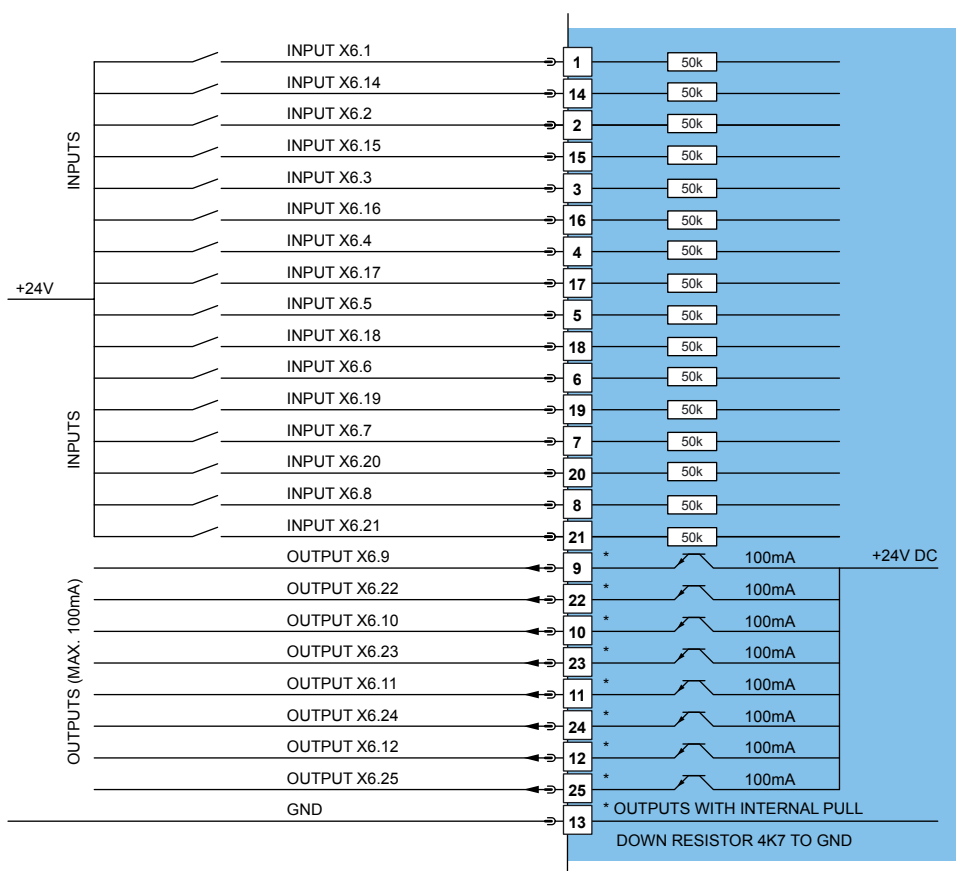
Inputs	24V / 1mA
Outputs	24V / max.100mA
Brake Output (X4.3)	24V / max.1.0A
Sample Rate	Inputs/Outputs 1ms, Trigger Input 0.315msec
Supply	24VDC / typ. 400mA / max. 2.1A (if all outputs "on" with max. load.)
Wiring	0.25-1.5mm ² (AWG24-16)

X6

Digital I/O E1100-MT/MP(-HC)



X6: DSUB-25 (f)



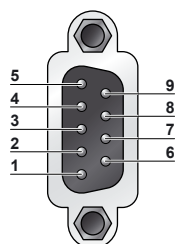
All Inputs: Direct interfacing to digital 24VDC PLC outputs.
 Input current: 1mA
 low level: -0.5...5VDC
 high level: 15...30VDC
 Sample rate: 625µs

All Outputs: Short circuit and overload protected high side switches
 Voltage: 24VDC
 Max. current: 100mA
 High Level: 15...30VDC
 Update rate: 625µs

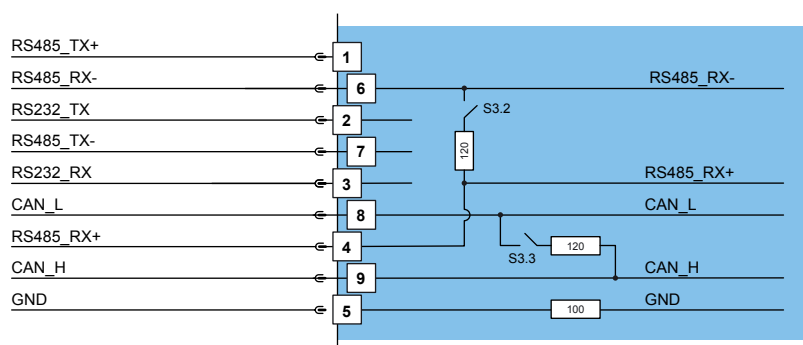
Outputs may directly drive inductive loads

X5 COM

COM Interface



X5: DSUB-9 (m)

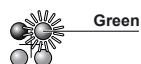


RS232: Configuration on all Controllers: use 1:1 connection cable to PC

LED

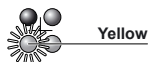
State Display

Green:



24VDC Logic Supply OK

Stat A Yellow:



Motor Enabled

Stat B Yellow:



Warning

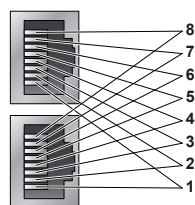
Red:



Error

X7-X8

RS485/CAN



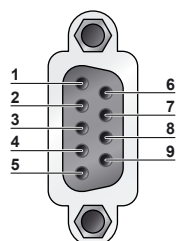
RJ-45

Nr		
1	RS485_Rx+	A
2	RS485_Rx-	B
3	RS485_Tx+	Y
4	GND	
5	GND	
6	RS485_Tx-	Z
7	CAN_H	
8	CAN_L	
Case	Shield	

- X7 internally connected to X8 (1:1 connection)
- Use twisted pair (1-2, 3-6, 4-5, 7-8) cable for wiring.
- The built in CAN and RS485 terminations can be activated by S3.2 and S3.3.

X9

Profibus DP



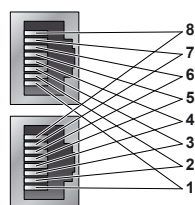
DSUB-9

Nr		
1	-	
2	-	
3	RxD/TxD-P	
4	CNTR-P	
5	GND	(galvanically separated)
6	+5V	(galvanically separated)
7	-	
8	RxD/TxD-N	
9	-	
Case	Shield	

Max. Baud rate: 12 Mbaud

X10-X11

Master Encoder IN (X10) / Master Encoder OUT (X11)



RJ-45

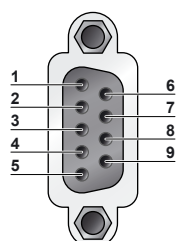
Nr	Incremental	Step/Direction	EIA/TIA 568A colors
1	A+	Step+	Green/White
2	A-	Step-	Green
3	B+	Direction+	Orange/White
4	Z+	Zero+	Blue
5	Z-	Zero-	Blue/White
6	B-	Direction-	Orange
7	CAN_H*	CAN_H*	Brown/White
8	CAN_L*	CAN_L*	Brown
Case	Shield	Shield	

*only on E1100-GP

- CAN internally connected to X7, X8
- CAN und RS485 Termination can be turned on by S3.2 alt. S3.3.
- X10 an X11: Use twisted pair (1-2, 3-6, 4-5, 7-8) cable for wiring.
- X10 Master Encoder Inputs: Differential RS422, max. Input Frequency 4.5MHz
- X11 Master Encoder Outputs: Amplified RS422 differential signals from Master Encoder IN (X10)

X12

External Positions Sensor



DSUB-9

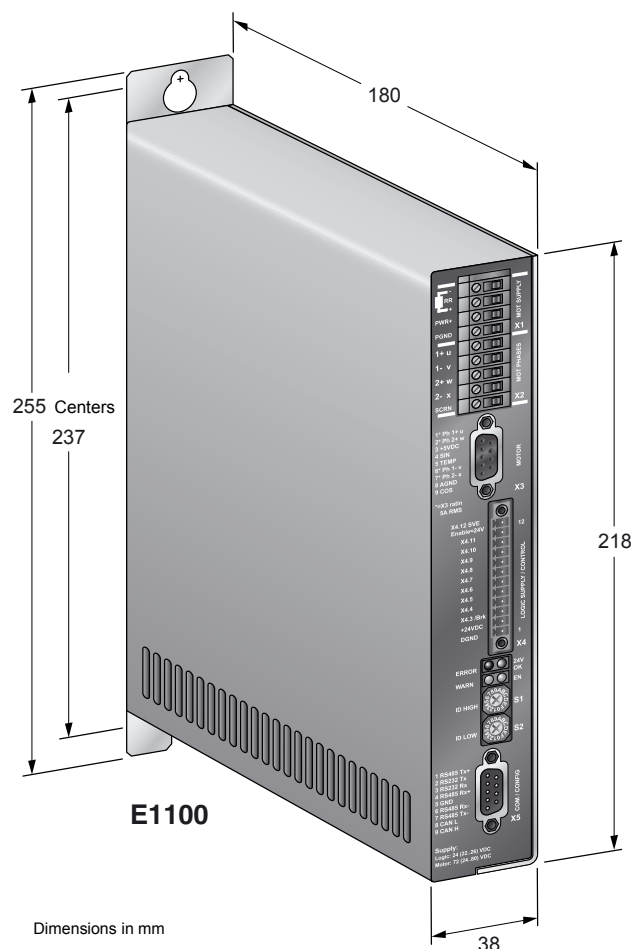
Nr	Incremental:	Sin/Cos
1	+5V DDC	+5V DC
2	A-	SIN-
3	B-	COS-
4	Z-	ZERO-
5	GND	GND
6	A+	SIN+
7	B+	COS+
8	Z+	ZERO+
9	Enc. Alarm	Enc. Alarm
Case	Shield	Shield

Encoder Inputs: - Incremental: RS422
- Sin/Cos: 1Vpp

Maximal Input Frequency: 4.5 Mio. Incr./sec (incremental RS422), minimal pulsewidth > 220nsec
10kHz (analog 1Vpp), 10Bit AD

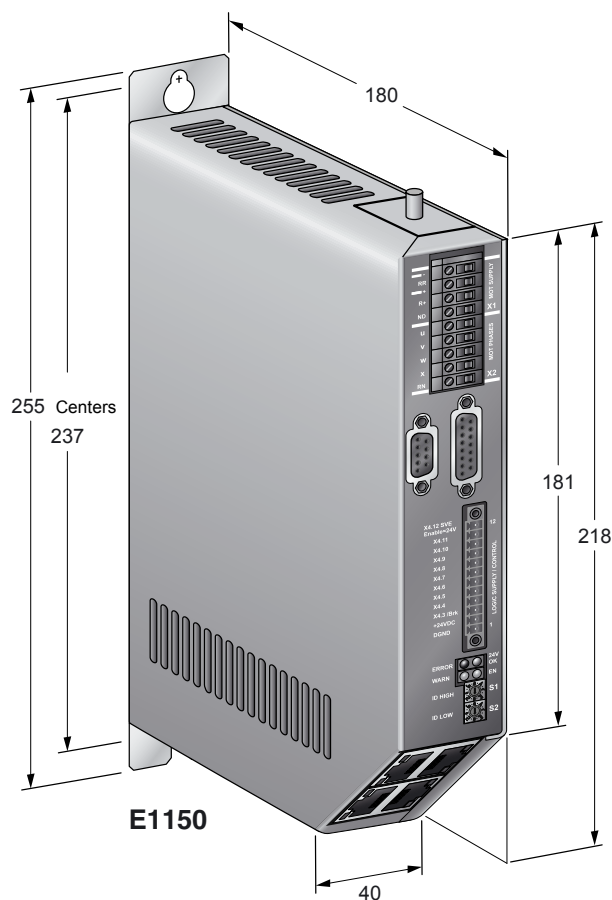
Sensor Supply: 5VDC (max. 100mA)

Sensor Alarm Input: 5V / 1mA



E1100

Dimensions in mm



E1150

Preliminary Information

Servo Controllers Series		E1100		E1150	
Width	mm (in)	38	(1.5)	40	(1.6)
Height	mm (in)	255	(10.0)	255	(10.0)
Height without fixings	mm (in)	218	(8.6)	218	(8.6)
Depth	mm (in)	180	(7.1)	180	(7.1)
Weight	kg (lb)	1.5	(3.3)	1.4	(3.1)
IP Protection class	IP	20		20	
Storage temperature	°C	-25...40		-25...40	
Transport temperature	°C	-25...70		-25...70	
Operating temperature	°C	0...40 at rated date 40...50 with power derating		0...40 at rated date 40...50 with power derating	
Max. case temperature	°C	65		65	
Max. power dissipation	W	30		30	
Min. distance between controllers	mm (in)	20	(0.8) left/right 50 (2) top/bottom	20	(0.8) left/right 50 (2) top/bottom

Artikel	Beschreibung	Artikelnummer
E1100-MP	Multi Position Controller (72V/4A)	0150-1661
E1100-MP-HC	Multi Position Controller (72V/15A)	0150-1662
E1100-MT	Multi Trigger Controller (72V/4A)	0150-1663
E1100-MT-HC	Multi Trigger Controller (72V/15A)	0150-1664
E1100-RS	RS232/485 Controller (72V/4A)	0150-1677
E1100-RS-HC	RS232/485 Controller (72V/15A)	0150-1678
E1100-RS-XC	RS232/485 Controller (72V/25A)	0150-1862
E1100-CO	CANopen Controller (72V/4A)	0150-1681
E1100-CO-HC	CANopen Controller (72V/15A)	0150-1682
E1100-CO-XC	CANopen Controller (72V/25A)	0150-1683
E1100-DN	DeviceNet Controller (72V/4A)	0150-1679
E1100-DN-HC	DeviceNet Controller (72V/15A)	0150-1680
E1100-DN-XC	DeviceNet Controller (72V/25A)	0150-1863
E1100-GP	General Purpose (72V/4A)	0150-1665
E1100-GP-HC	General Purpose (72V/15A)	0150-1666
E1100-GP-XC	General Purpose (72V/25A)	0150-1864
E1130-DP	Profibus DP Controller, (72V/4A)	0150-1667
E1130-DP-HC	Profibus DP Controller, (72V/15A)	0150-1668
E1130-DP-XC	Profibus DP Controller, (72V/25A)	0150-1861
E1150-PL	PowerLink Controller (72V/4A)	0150-1690
E1150-PL-HC	PowerLink Controller (72V/15A)	0150-1691
E1150-PL-XC	PowerLink Controller (72V/25A)	0150-1751
E1150-IP	Ethernet/IP Controller(72V/4A)	0150-1692
E1150-IP-HC	Ethernet/IP Controller (72V/15A)	0150-1693
E1150-IP-XC	Ethernet/IP Controller (72V/25A)	0150-1752
E1150-PN	ProfiNet Controller(72V/4A)	0150-1694
E1150-PN-HC	ProfiNet Controller (72V/15A)	0150-1695
E1150-PN-XC	ProfiNet Controller (72V/25A)	0150-1753
E1150-EC	EtherCat Controller(72V/4A)	0150-1696
E1150-EC-HC	EtherCat Controller (72V/15A)	0150-1697
E1150-EC-XC	EtherCat Controller (72V/25A)	0150-1754
E1150-SC	Sercos III Controller(72V/4A)	0150-1698
E1150-SC-HC	Sercos III Controller (72V/15A)	0150-1699
E1150-SC-XC	Sercos III Controller (72V/25A)	0150-1755

Switched-Mode Power Supplies

115VAC / 230VAC



Item	Description	Part Number
S01-72/300	Switched-Mode Power Supply 72V / 300W	0150-1942
S01-72/600	Switched-Mode Power Supply 72V / 600W	0150-1943
SM01-300	Mounting part for 300W Switched-Mode Power Supplies	0150-3040
SM01-600	Mounting part for 600W Switched-Mode Power Supplies	0150-3041

Transformer Supply T01

3x230/280/400/480VAC



Item	Description	Part Number
T01-72/420...1500-Multi	Transformer Supply 3x230/280/400/480VAC, 50/60Hz, 420...1500W	see page 328

Control Box B01-E1100



Item	Description	Part Number
B01-E1100	Control Box for E1100 (incl. cable and connectors)	0150-1970
B01-B1100	Control Box for B1100 (incl. cable and connectors)	0150-2110

Connector Cable and USB-Converter



Item	Description	Part Number
RS232 PC cable	RS232 PC cable for drive configuration (1.5m, 9 pin DSUB, f/f, 1:1)	0150-3009
USB-RS232 converter	USB to RS232 converter (0.3m, USB-9 pin DSUB, f)	0150-3110
USB-CAN converter	USB to CAN converter	0150-3134
RJ45-08/0.3	RJ45 patch cable for X7/8, X10/11 (0.3m, shielded, EIA/TIA568A)	0150-1852
RJ45-08/0.6	RJ45 patch cable crossover (0.6m, shielded, EIA/TIA568A)	0150-1853

Option: External High Resolution Encoder



Item	Description	Part Number
MS01-1/D	Linear Encoder 1um, A/B (for 1mm magnetic band)	0150-1840
MB01-1000	Magnetic Band 1mm pitch, per cm	0150-1663