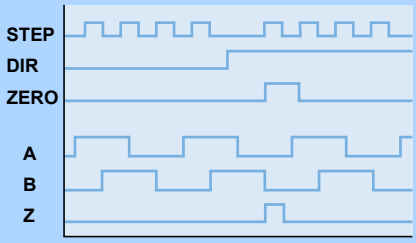
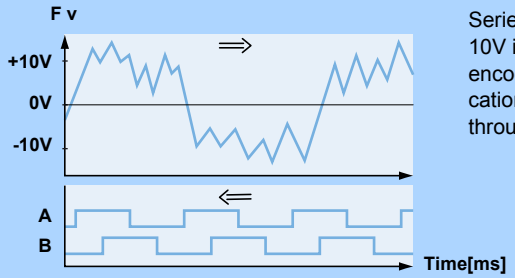
Position Indexing



In position indexing, the linear motor is controlled like a stepper motor, using Step/Dir/Zero, or A/B signals. The step distance is freely programmable from $1.5x10^{-6}$µm 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
Inputs:	differential RS422 (X13/14)
Step distance:	$1.5x10^{-6}$µm....3.275mm, 32 Bit
Max Input Frequency:	2 MHz

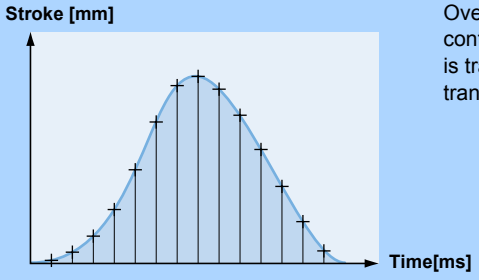
+/- 10V Analog Force / Velocity Control



Series B1100 controllers allow analog force (torque) or velocity targets to be set, via the +/- 10V interface, by an overlaid position controller. The current actual position is output via the encoder interface, with adjustable resolution, as positioning feedback. In high-precision applications with high-resolution external position sensors, the sensor signals can be passed through in the controller.

Analog Input:	-10...+10V, differential
Resolution:	Max. 12 Bit
Scanning rate:	Max. 10 kHz
Encoder Simulation:	1,2,5,10,20µm Resolution

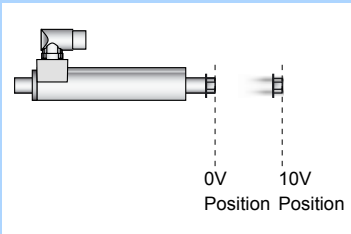
Setpoint Streaming



Overlaid NC controllers with CANopen or DeviceNet 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:	5 kHz
cycle times:	2-5ms

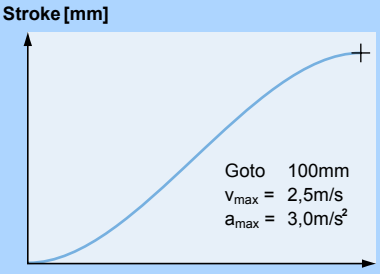
Analog Position



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 Inputs (X14.20, X14.8/X14.21)
Voltagvte range:	0 - 10VDC (X14.20)
	-10 - +10VDC (X14.18/X14.21)
Resolution:	10 Bit
Scanning rate:	400µsec

VA-Interpolated Moves



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, CANopen, DeviceNet, or the trigger input.

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

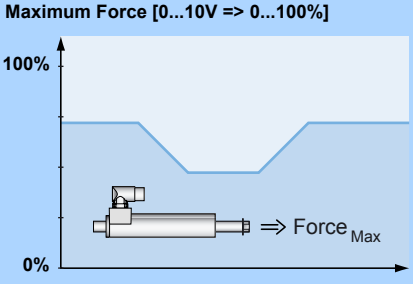
Easy Steps

Input 1	Pos 125mm
Input 2	Pos 250mm
Input 3	Pos 50mm
Input 4	Pos -30mm

With the Easy Steps function, up to 6 positions or independent travel commands can be stored on the controller, and addressed via 6 serial interfaces, CANopen or DeviceNet.

Digital inputs:	max. 6
Interface:	X14
Scanning rate:	400µsec

Easy Steps Parameter Scale



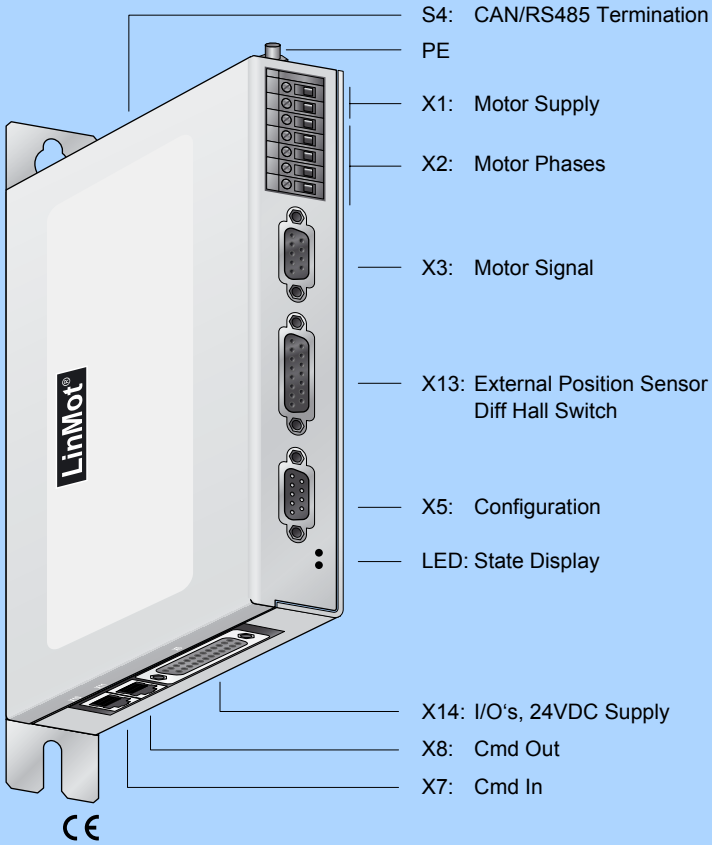
Easy Steps provide the ability to parameterize internal parameters using two analog inputs. If, for example, the maximum motor current is read at an analog input, then the maximum motor force can be provided as analog for freely programmable joining processes.

Inputs:	Analog Inputs (X14.20, X14.8/X14.21)
Voltagvte range:	0 - 10VDC (X14.20)
	-10 - +10VDC (X14.18/X14.21)
Resolution:	10 Bit
Scanning rate:	400µsec

B1100-PP
B1100-PP-HC
B1100-PP-HC-XC

- ✗ Position Indexing
- ✓ ±10V Force or Velocity Control
- ✗ Setpoint Streaming (CAN)
- ✓ Analog Position Target
- ✓ MPC Commands
- ✓ Easy Step
- ✓ Easy Steps Parameter Scale
- ✗ Serial Infaces RS232/RS485
- ✗ CANopen
- ✗ DeviceNet
- ✗ Encoder Simulation

Point to Point



Replacing Pneumatics

Due to their simple controls via digital inputs and outputs, B1100-PP controller make excellent substitutes for pneumatic cylinders.

Using digital inputs, the linear motor can move to up to six freely programmable positions. As soon as the linear motor has reached the position, the corresponding InPostion output is actuated.

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

Easy Steps positioning commands

Using the Easy Steps function, up to six absolute or relative move commands can be stored in the controller, and invoked via six digital inputs.

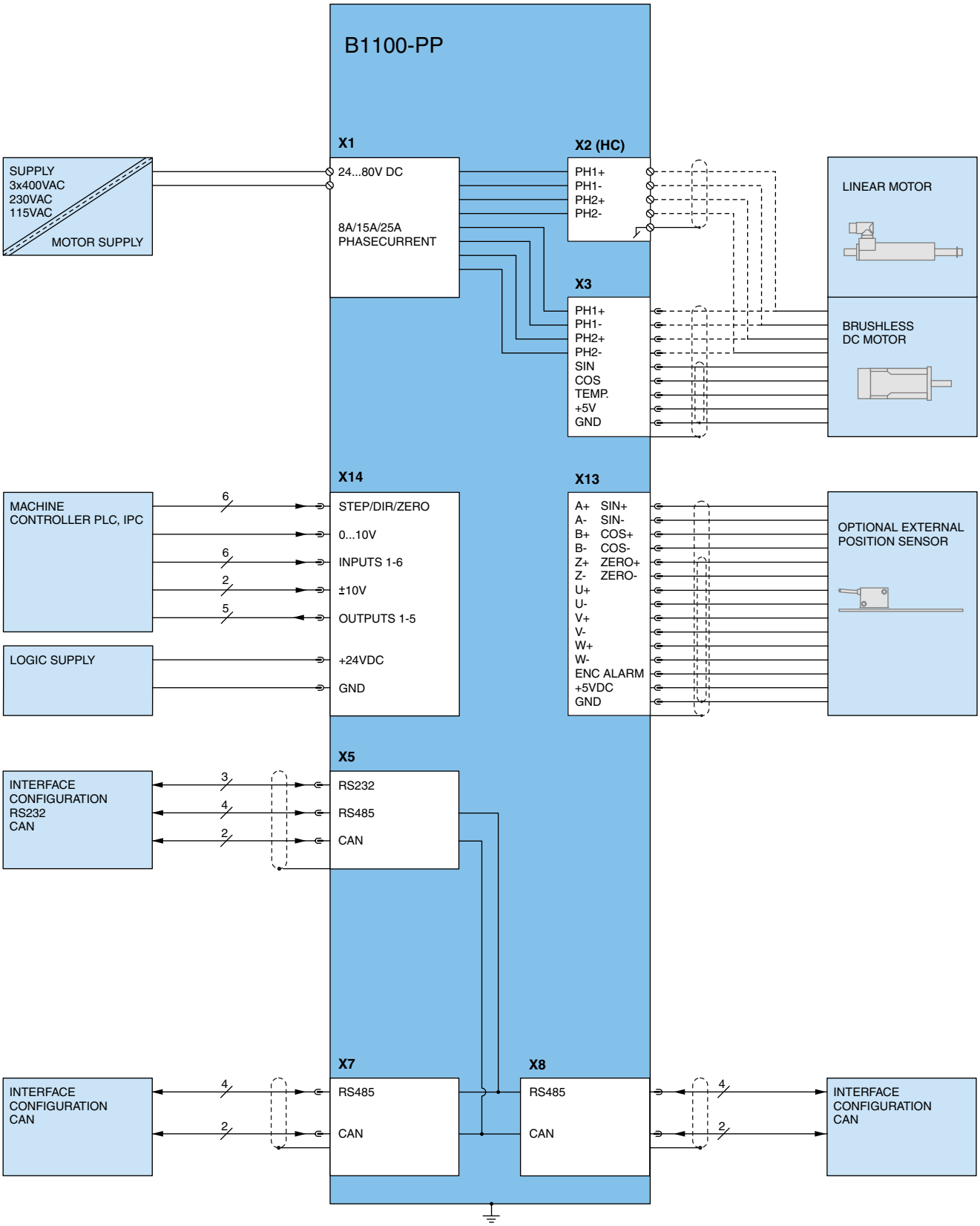
Easy Steps also provide the ability to parameterize internal parameters using two analog inputs. If, for example, the maximum motor current is read at an analog input, then the maximum motor force can be provided as analog for freely programmable joining processes.

Analog Position Target

Any position can be set, using an analog 0…10V signal.

During configuration, for each position value, one input signal of 0V and 10V is programmed. Any intermediate position can then be set via the analog input signal during operation.

The dynamics can be constrained by limits on speed and acceleration.

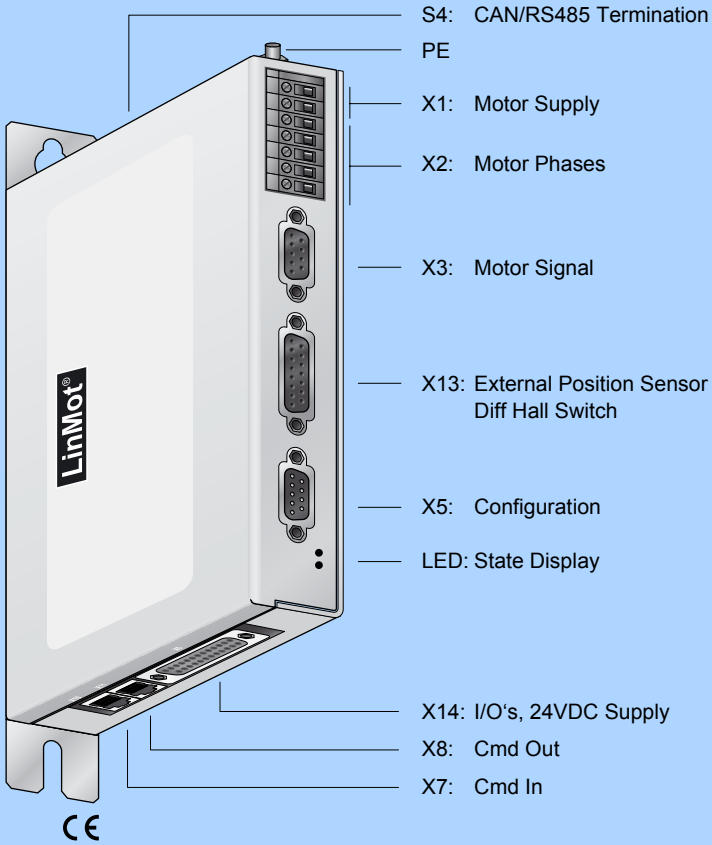


Item	Description	Part Number
B1100-PP	Point to Point Controller (72V/8A)	0150-1735
B1100-PP-HC	Point to Point Controller (72V/15A)	0150-1736
B1100-PP-XC	Point to Point Controller (72V/25A)	0150-1740

B1100-VF
B1100-VF-HC
B1100-VF-XC

- ✓ Position Indexing
- ✓ ±10V Force or Velocity Control
- ✗ Setpoint Streaming (CAN)
- ✓ Analog Position Target
- ✓ MPC Commands
- ✓ Easy Step
- ✓ Easy Steps Parameter Scale
- ✗ Serial Infaces RS232/RS485
- ✗ CANopen
- ✗ DeviceNet
- ✓ Encoder Simulation

±10V Force Velocity
STEP DIRECTION
Point to Point



±10V 10V Force or Velocity Control,

The B1100-VF servo amplifier allows LinMot linear motors to be integrated in systems an overlaid axis controller with analog velocity (RPM) or force target (torque).

In velocity mode, the analog input voltage is used as a velocity target for the connected linear motor. The velocity control loop is closed via a PI controller in the amplifier.

In force mode, the amplifier works like a torque amplifier for rotary motors. The analog control signal is converted to a current that the VF amplifier applies to the connected motor.

Step and Direction Interface

Motor force is proportional to the current motor current (see motor data sheets for force constant cf).

For step-direction targets, the target position is provided by the overlaid controller via STEP, DIRECTION, and ZERO signals.

The maximum motor current (force) can be limited via a digital input.

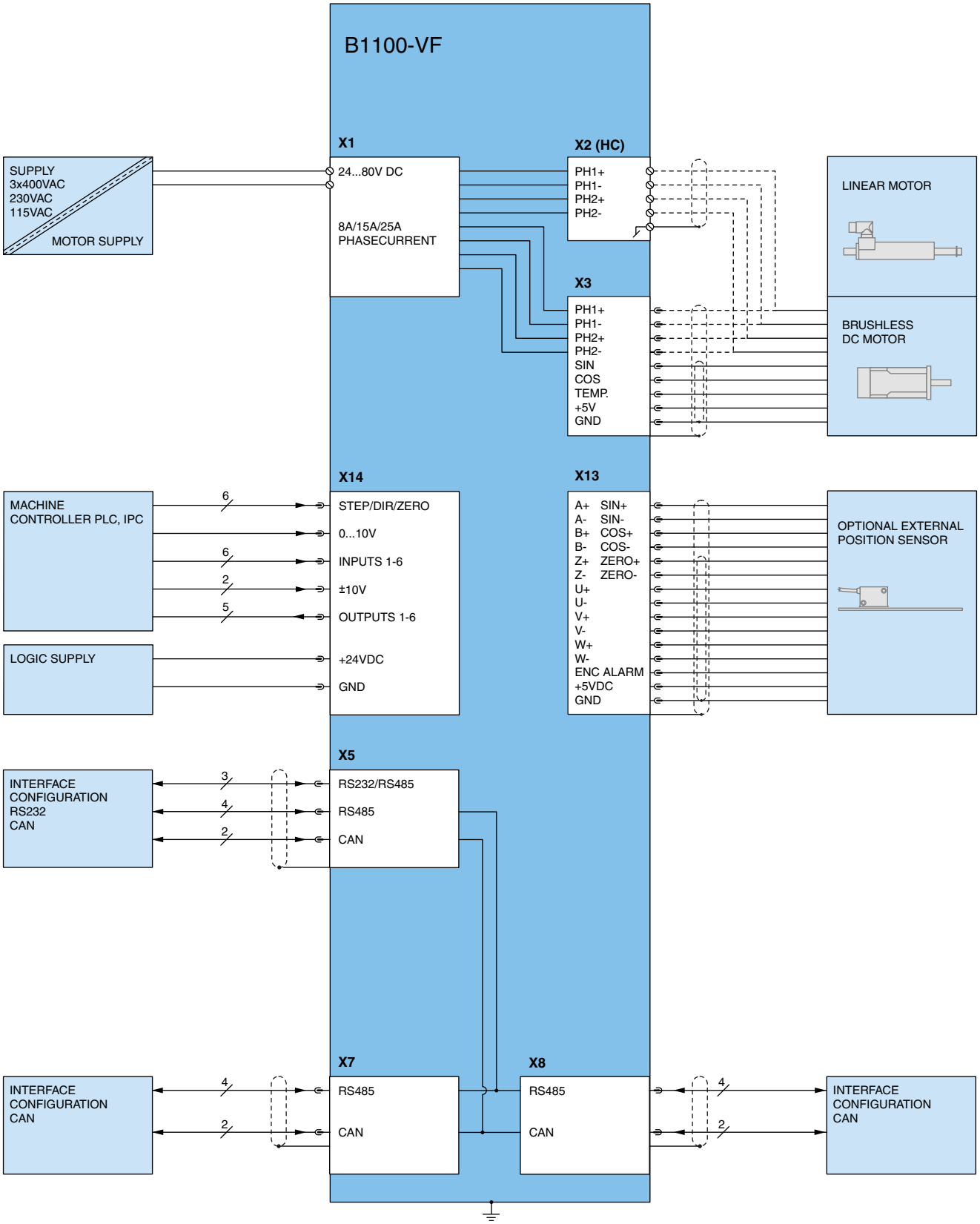
Encoder Simulation

No additional external sensors are needed for position measurement. The current actual position of the linear motor is captured by the integrated position measurement, and is available to the overlaid position controller as an encoder signal.

The resolution of the differential A/B encoder signals (RS422) is adjustable in the following ranges:

1µm, 2µm, 5µm, 10µm, 20µm, 50µm

If an external position sensor is used, it can be read by the B1100 amplifier.



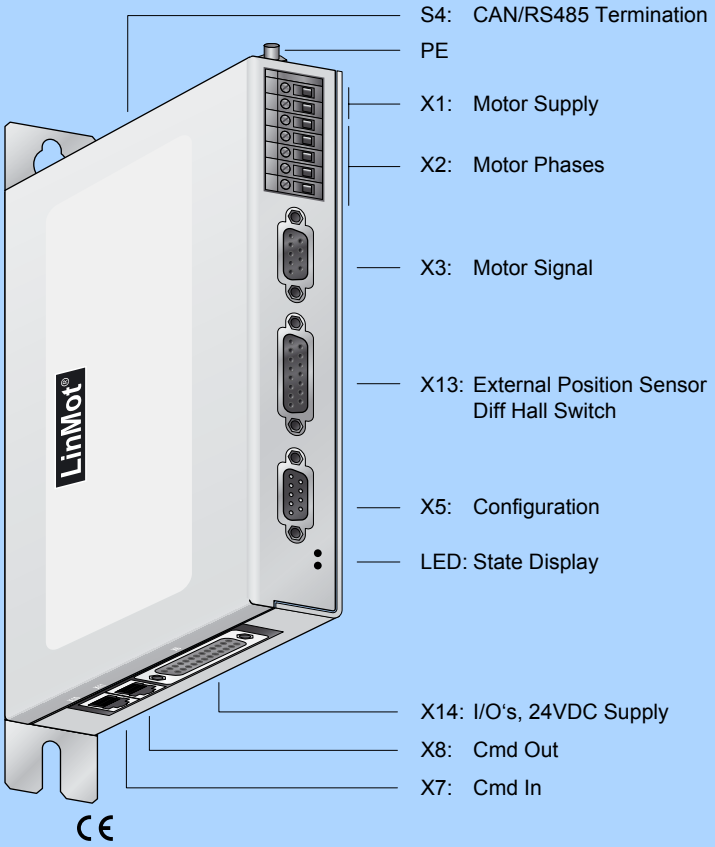
Item	Description	Part Number
B1100-VF	Force Velocity Controller (72V/4A)	0150-1685
B1100-VF-HC	Force Velocity Controller (72V/15A)	0150-1686
B1100-VF-XC	Force Velocity Controller (72V/25A)	0150-1739

B1100-GP
B1100-GP-HC
B1100-GP-XC

- Position Indexing
- ±10V Force or Velocity Control
- Setpoint Streaming (CAN)
- Analog Position Target
- MPC Commands
- Easy Step
- Easy Steps Parameter Scale
- Serial Infaces RS232/RS485
- CANopen
- DeviceNet
- Encoder Simulation

RS 232 485 | CANopen | DeviceNet

±10V Force Velocity | STEP DIRECTION | Point to Point



RS232 / RS485

The LinMot B1100-GP series servo controllers support the LinRS serial communications 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 overarching controller 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

The LinMot B1100-GP controllers support the CiA DS301 communications protocol.

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:

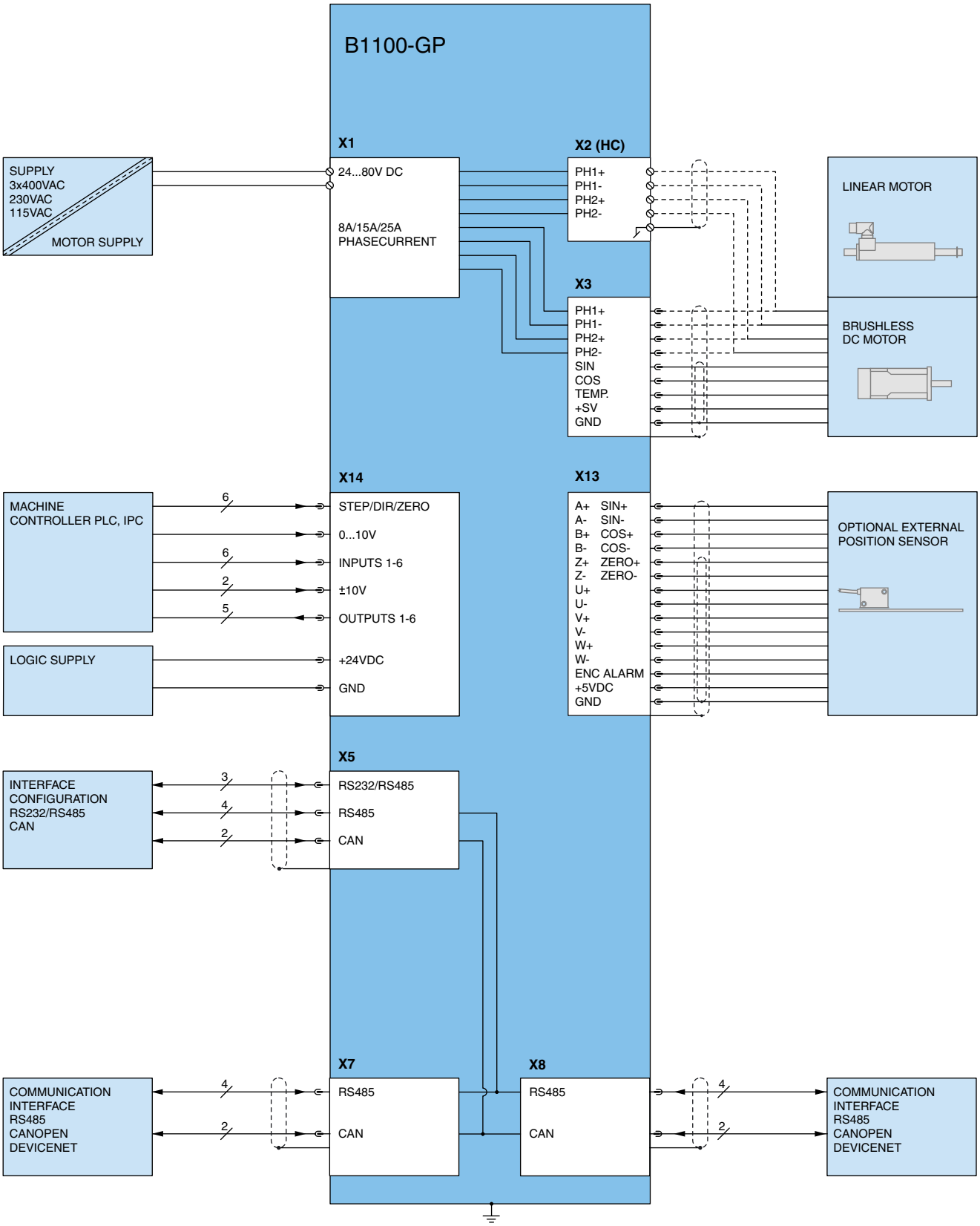
- NMT Error Control (Nodeguarding Protocol or HeartBeat Protocol)
- PDO (Transmission type 254 and 1)
- SDO Upload and Download
- NMT (Start, Stop, Enter PreOp, Reset Node, Reset Communication) Boot-Up Message

DeviceNet

With the DeviceNet protocol, even complicated motion sequences can be realized with the highest possible flexibility.

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

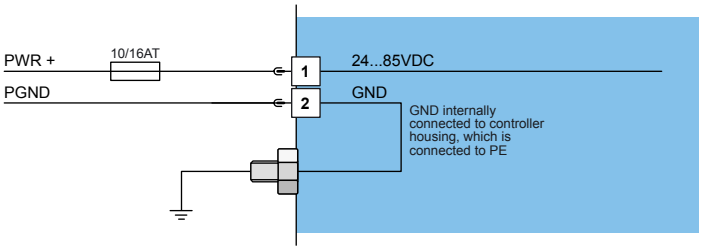
B1100-DN are UCMM Group 3-capable slaves, and support polled IO runtime data transfer.



Item	Description	Part Number
B1100-GP	Point to Point Controller (72V/8A)	0150-1737
B1100-GP-HC	Point to Point Controller (72V/15A)	0150-1738
B1100-GP-XC	Point to Point Controller (72V/25A)	0150-1741

X1 Motor Supply

Screw Terminals
2.5 mm² (AWG14)



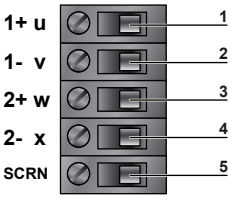
Motor Supply:

Motor Supply Voltage 24...85VDC.
Absolute max. Rating 72VDC + 20%

External fusing: 10AT for LC (8Apeak Servos), 16AT for HC and XC (15/25Apeak) Servos

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

X2 Motor Phases

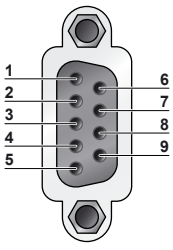


Screw Terminals
1.5-2.5mm²
(AWG16-14)

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		

The motor phases on X2 and X3 are internally connected.
If the RMS current is higher than 5A RMS, the phases must be connected to X2 and not to X3.

X3 Motor

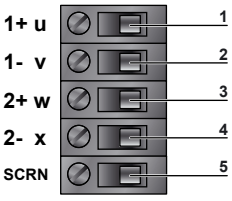


DSUB-9

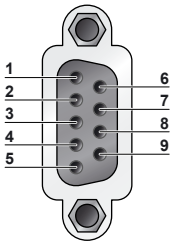
Nr	LinMot Linear Motor	3-Phase-Motor
1	Motor Phase 1+	Motor Phase U
2	Motor Phase 2+	Motor Phase W
3	+5VDC	
4	Sine	Hall U
5	Temperature	Hall W
6	Motor Phase 1-	Motor Phase V
7	Motor Phase 2-	
8	AGND	
9	Cosine	Hall V
Case	Shield	

- Use X3 for motor phase wiring if phase current does not exceed 2Arms or 4Apeak
- X3.3 (+5VDC) may be used only to supply motor hall-effect sensors (max. 100mA).
- X3.8 (AGND) may be used only to supply motor hall-effect sensors, and must not be connected to GND externally

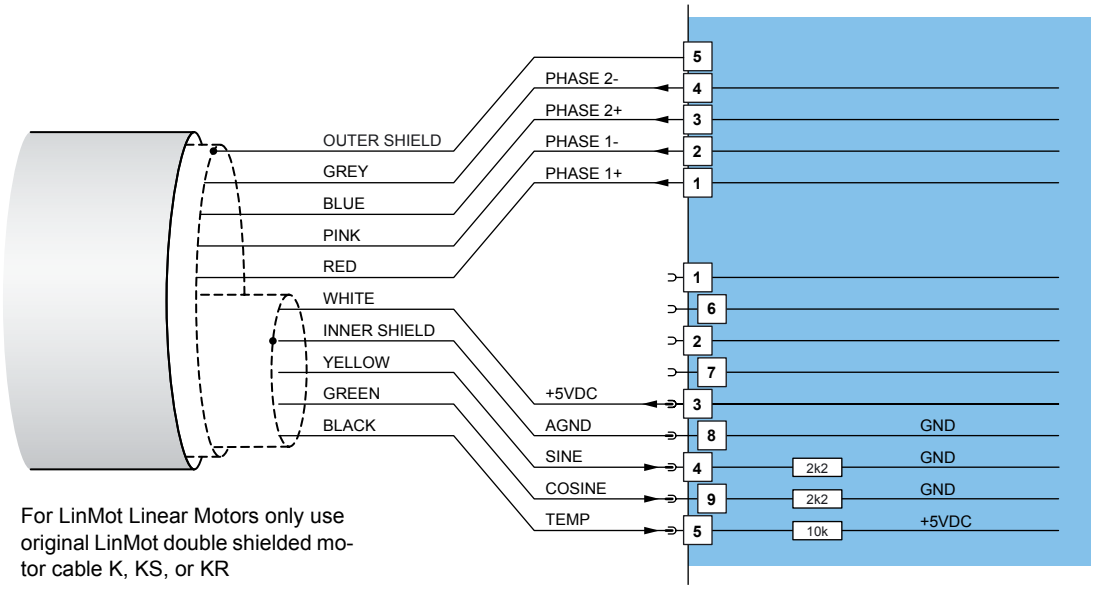
Motor | Motor wiring



X2: Screw Terminals

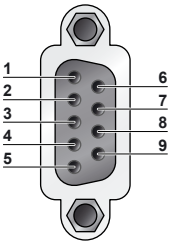


X3: DSUB-9 (f)

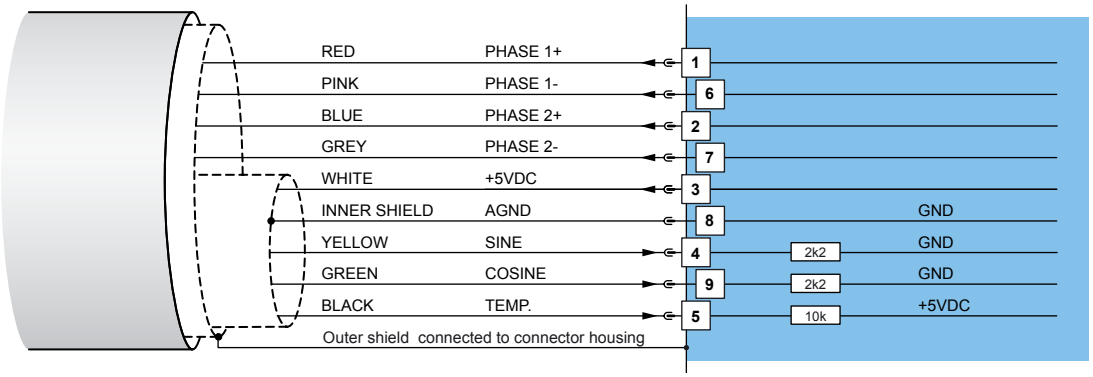


For LinMot Linear Motors only use original LinMot double shielded motor cable K, KS, or KR

Motor | Motor wiring for phase current below 2Arms and below 4Apeak



X3: DSUB-9 (f)

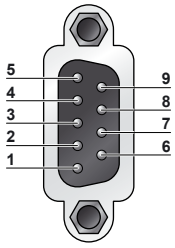


For LinMot Linear Motors only use original LinMot double shielded motor cable K, KS, or KR

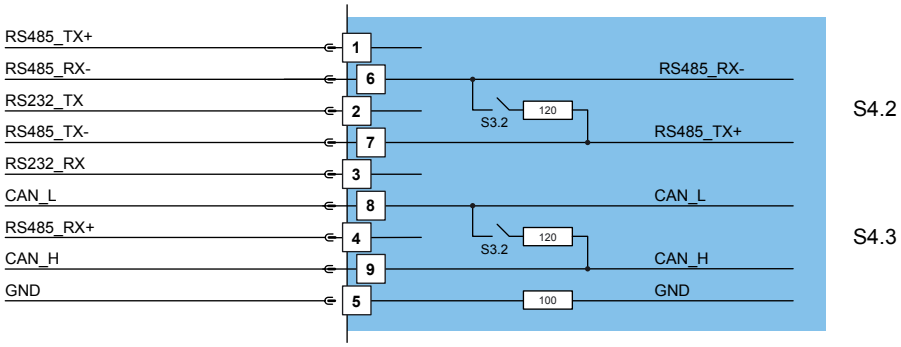
S1-3 | Bus Termination

Switch		
S4	Switch 1: RS232 (switch “off” / RS485 “on”)	Select serial RS23 or RS485
	Switch 2: Termination RS485 on/off	
	Switch 3: Termination CAN on/off	
	Switch 4: Bootstrap	Factory settings: all switches “off”

X5 COM | COM Schnittstelle



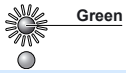
X5: DSUB-9 (m)



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

LED | State Display

Green:

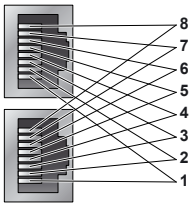


24VDC Logic Supply OK

Red:

State: Error
Blinking: Fatal Error

X7-X8 | RS485/CAN

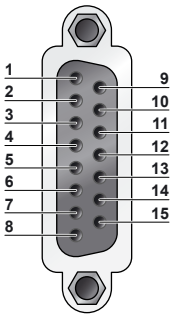


RJ-45

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.

X13 External Position Sensor Commutation



DSUB-15 (f)

Nr		Description	
1		+5V DC	
	9	A+	Encoder
2		A-	Encoder
	10	B+	Encoder
3		B-	Encoder
	11	Z+	Encoder
4		Z-	Encoder
	12	Encoder Alarm	
5		GND	
	13	U+	Commutation
6		U-	Commutation
	14	V+	Commutation
7		V-	Commutation
	15	W+	Commutation
8		W-	Commutation
case		Shield	

Max. Input Frequency: 2MHz (incremental RS422), 240ns edge separation

Sensor Supply Current: max. 100mA

Position Encoder Inputs: RS422, Max Input Frequency: 2MHz, 4 M counts/s with quadrature decoding, 240ns edge separation

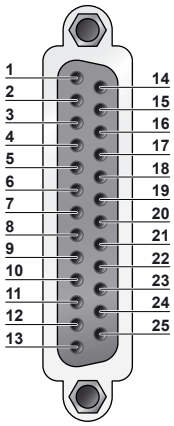
Encoder Simulated Outputs:RS422, Max Output Frequency: 2.5MHz, 5 M counts/s with quadrature decoding, 200ns edge separation

Differential Hall Switch Inputs: RS422, Max Input Frequency: <1kHz

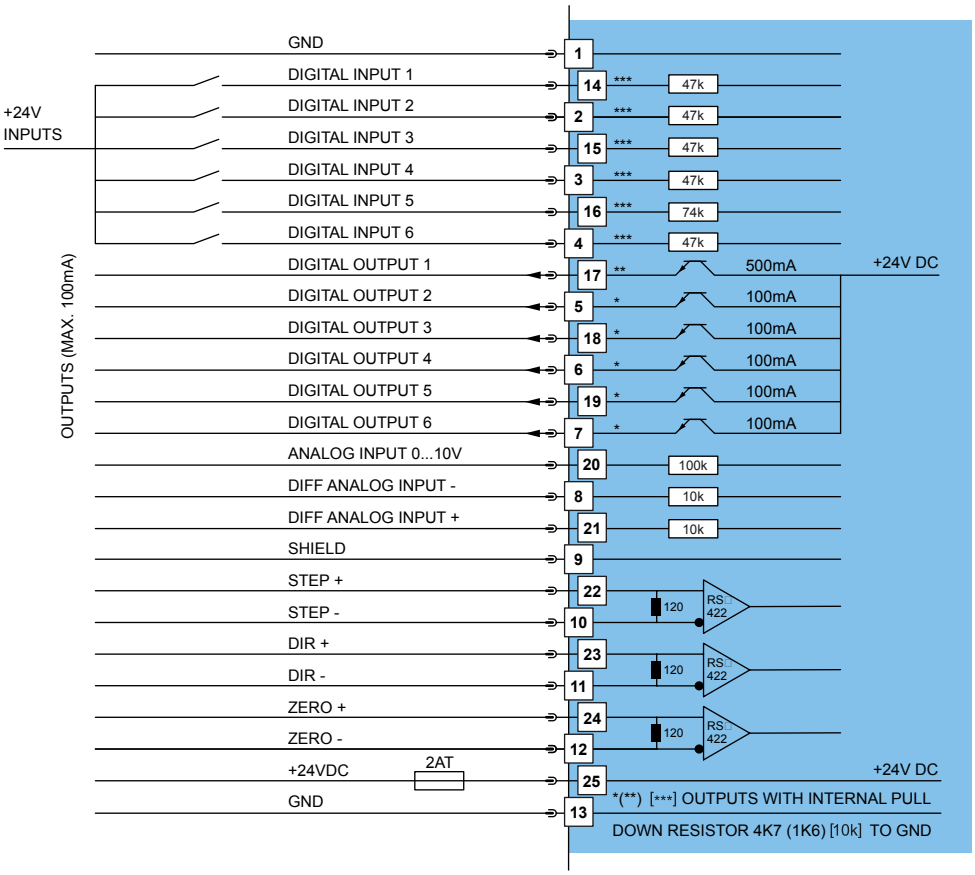
Enc. Alarm In: 5V / 1mA

Sensor Supply: 5VDC, max 100mA

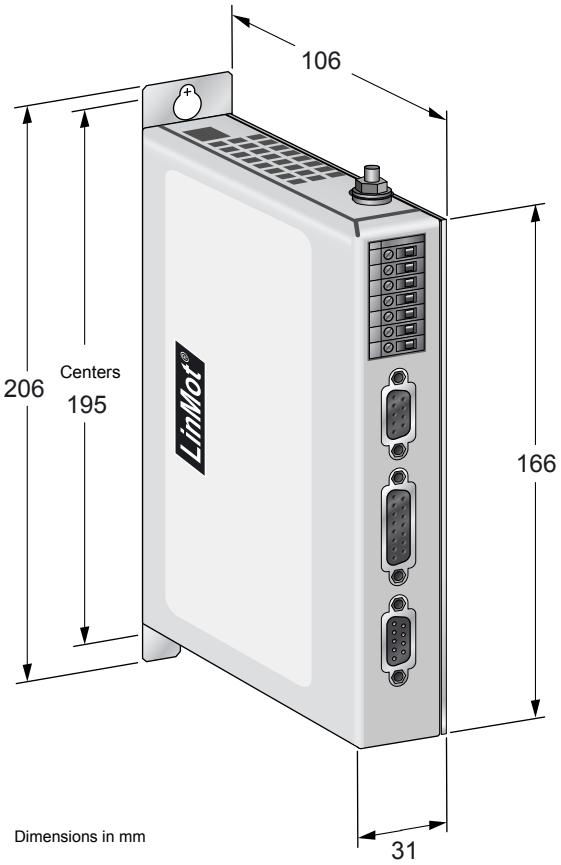
X14 | Digital I/O



X14: DSUB-25 (f)



Logic Supply:	Switch Mode Power Supply:	24VDC (22...26VDC)
	External Fuse:	2AT
All Digital Inputs:	Direct interfacing to digital 24VDC PLC outputs.	
	Input Current:	1mA
	Sample Rate:	400us
All Digital Outputs:	Short circuit and overload protected high side switches	
	Voltage:	24VDC Max. Current: 100mA/500mA (X14.17)
	Update Rate:	400us
	Outputs may directly drive inductive loads.	
Analog Input on X14.20:	Range:	0V..+10V 10Bit ADC
	Sample Rate:	400us
Differential Analog Input on X14.8 X14.21 X14.9 Shield:	Range:	-10V..+10V 10Bit ADC
	Sample Rate:	400us
Differential Step Dir Zero:	Indexer Inputs:	RS422
	Max. Input Frequency:	2MHz
	4 M counts/s with quadrature decoding, 240ns edge separation	



Servo Controller Series B1100		
Width	mm (in)	31 (1.3)
Hight	mm (in)	166 (6.6)
Hight without fixings	mm (in)	206 (8.1)
Depth	mm (in)	106 (4.2)
Weight	g (lb)	700 (1.6)
IP Protection class	IP	20
Storage temperature	°C	-25...40
Transport temperature	°C	-25...70
Operating temperture	°C	0...40 at rated date 40...50 with power derating
Max. case temperature	°C	70
Max. power dissipation	W	30
Min. distance between controllers	mm (in)	20 (0.8) left/right 50 (2) top/bottom

Item	Description	Part Number
B1100-PP	Point to Point Controller (72V/8A)	0150-1735
B1100-PP-HC	Point to Point Controller (72V/15A)	0150-1736
B1100-PP-XC	Point to Point Controller (72V/25A)	0150-1740
B1100-VF	Force Velocity Controller (72V/8A)	0150-1685
B1100-VF-HC	Force Velocity Controller (72V/15A)	0150-1686
B1100-VF-XC	Force Velocity Controller (72V/25A)	0150-1739
B1100-GP	Point to Point Controller (72V/4A)	0150-1737
B1100-GP-HC	Point to Point Controller (72V/15A)	0150-1738
B1100-GP-XC	Point to Point Controller (72V/25A)	0150-1741