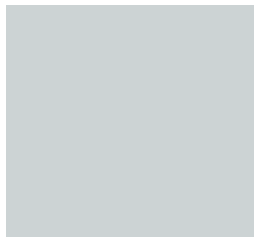
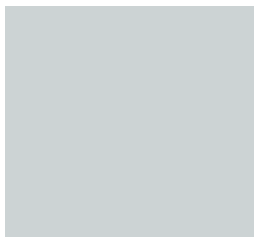
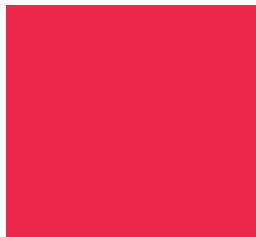


Operating instructions

Portal axes PEL/PDL



 **afag**

 **eps**

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2 Preface

It is our aim to present all essential information contained in these operating instructions as clearly and concisely as possible. However, please do not hesitate to contact us should you have any queries.

We are always very grateful for your suggestions.

We wish you a successful integration of our devices into your machines or systems.

3 Safety information

3.1 General safety information

The pick and place EPS devices are constructed according to the state of the art and the acknowledged safety-related guidelines; they may only be used

- for their intended purpose,
- and only when in an operationally safe condition.

3.2 Please observe the information in the operating instructions!

The prerequisite for the safe handling and smooth operation of the pick and place EPS devices is awareness of the fundamental safety standards

Every person tasked with the installation, commissioning, maintenance and operation of the pick and place EPS devices is required to have thoroughly read and understood the entire user manual, particularly the "safety information" chapter.

Furthermore, the rules and regulations on accident prevention applicable at the place of installation/operation must also be observed. Improper use may result in dangers to the life and limb of the operator or third parties and in impairments to the machine or other assets.

In the event of faults that could impair safety, the machine must be switched off immediately and secured to prevent restarting. The fault must then be remedied.

All work on the machines must be carried out with the machines depressurised and disconnected from the electrical power supply.

For the operation of the machines, the user must provide protective covers, safety doors or other safety precautions conforming to the normal safety guidelines and safety standards which prevent people from entering or remaining in the working area of the machines during operation. The machines may only be put into operation when the guards are securely closed.

3.3 Protection against dangerous movements

Dangerous movements can occur if drives are actuated incorrectly. The drive components are monitored so that a malfunction can be effectively ruled out. For reasons of personal safety, the risk of injury and the risk of material damage, however, this must not be relied on completely. Faulty drive movements must be expected until installed monitoring devices go into effect.

3.4 Explanation of symbols and signs

The following warnings and symbols help readers understand this manual quickly and ensure the EMD modules can be handled safely.

3.4.1 Warnings

**Danger**

This symbol draws attention to an imminently hazardous situation that will result in serious personal injury or even death if the safety regulations are not observed.

**Warning**

This symbol draws attention to a potentially hazardous situation that will result in serious personal injury or property damage if the safety regulations are not observed.

**Caution**

This symbol draws attention to a potentially hazardous situation that will result in property damage if the safety regulations are not observed.

3.4.2 Symbols

**Information sign**

This symbol indicates information that contributes to better understanding.

4 Product description

4.1 Intended use

The pick and place EPS devices are used in automation systems and are intended exclusively for moving workpieces.

The pneumatic modules are intended exclusively for operation with compressed air (4.7 bar). Use for any other purpose does not constitute an intended use.

The electric axes are intended exclusively for operation with original LinMot components (controllers, cables...). Use for any other purpose does not constitute an intended use.

The intended use also includes compliance with the prescribed installation and removal instructions, the service and maintenance conditions and observance of the specifications in the data sheets.

4.2 Warranty and liability

The "General Conditions of Sale and Delivery" of eps GmbH shall apply in all cases.

The term of the warranty on Afag handling components and systems is:

- 24 months following commissioning, but not exceeding 27 months following delivery.
- Wear parts (e.g. shock absorbers) are excluded from the warranty. *

The guarantee covers the use or repair of defective Afag parts. No further claims will be accepted.

The warranty will be voided in event of the following:

- Use for other than the intended purpose
- Failure to observe the information on installation, commissioning, operation and maintenance in the operating instructions.
- Improper installation, commissioning, operation and maintenance
- Independent repairs and constructional changes without prior instruction by Afag Automation AG/eps GmbH
- Removal of the serial number on the product
- Using the module without shock absorbers, or with defective shock absorbers
- Inadequate monitoring of wear parts
- Failure to observe the EC Machinery Directive, accident prevention regulations, VDE guidelines as well as the safety/installation instructions
- Emergencies caused by external influence or force majeure.

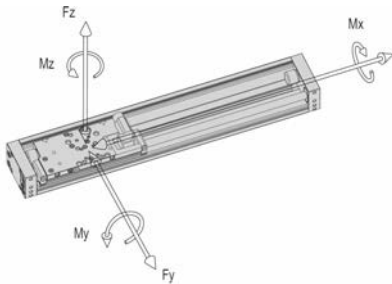
*A customer has the right to a defect-free product. This is also applicable for accessories and wear parts, if they are defective.

4.3 Portal axis

4.3.1 PEL20-SL



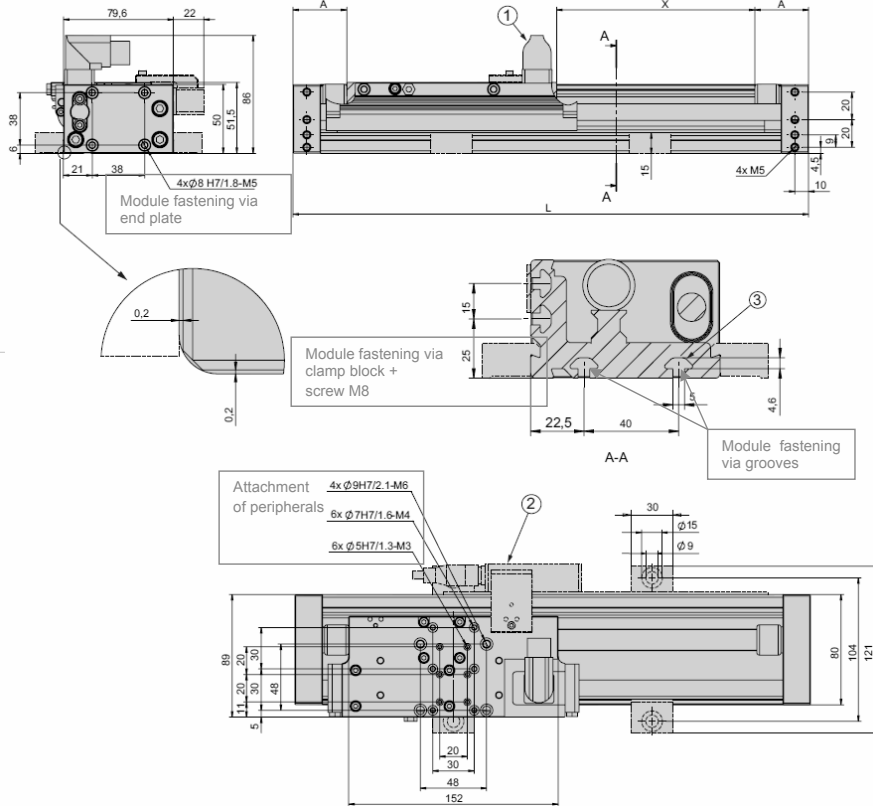
Technical data	PEL20-SL
Drive type	electric, linear motor
Stroke	80, 140, 210, 270, 370, 550, 640 mm
max. speed	6.8 m/s
Peak force	67 N
Permanent force	15N
Repeat accuracy	± 0.05mm
-with external path measuring system (1 µm)	± 0.02mm
Max. payload (centric)	5 kg
Net weight	2.8 kg + 0.5 kg each 100 mm stroke
Moved mass incl. stator	0.8 kg



Module stresses	
Dynamic torque Mx	50Nm
Dynamic torque My	40Nm
Dynamic torque Mz	50Nm
Peak force Fy	4500 N
Peak force Fz	4500 N

Type	A	L
PEL20-X-SL	41 mm	X + 234 mm

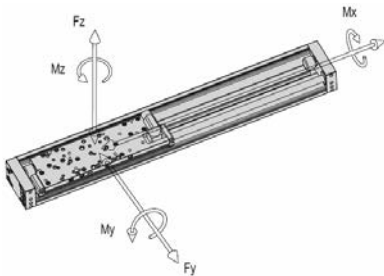
- 1 - 270° rotatable connector
- 2 - External path measuring system
- 3 - Groove for size 5 slotted nut
- X - stroke



4.3.2 PEL20



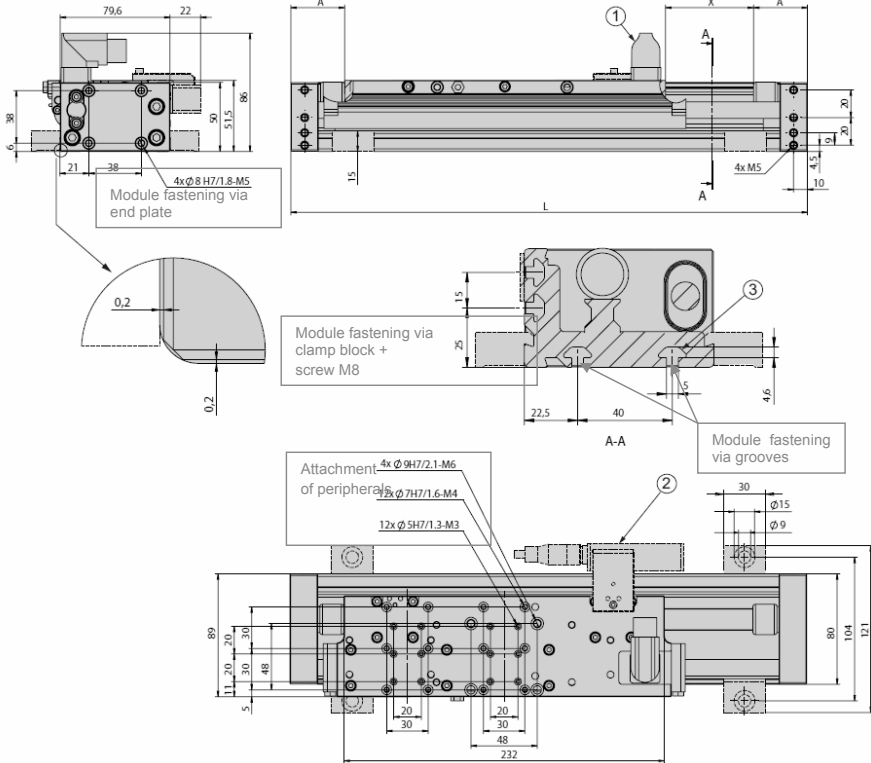
Technical data	PEL20
Drive type	electric, linear motor
Stroke	60, 130, 190, 290, 470, 560 mm
max. speed	4.8m/s
Peak force	137N
Permanent force	31N
Repeat accuracy	± 0.05mm
-with external path measuring system (1 µm)	± 0.02mm
Max. payload (centric)	10 kg
Net weight	3 kg + 0.5 kg each 100 mm stroke
Moved mass incl. stator	1.2 kg



Module stresses	
Dynamic torque Mx	50Nm
Dynamic torque My	850Nm
Dynamic torque Mz	850Nm
Peak force Fy	4500 N
Peak force Fz	4500 N

Type	A	L
PEL20-X	41 mm	X + 314 mm

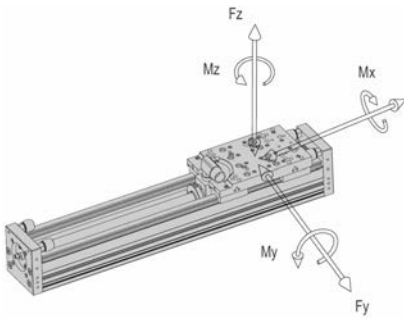
- 1 - 270° rotatable connector
- 2 - External path measuring system
- 3 - Groove for size 5 slotted nut
- X - stroke



4.3.1 PDL30



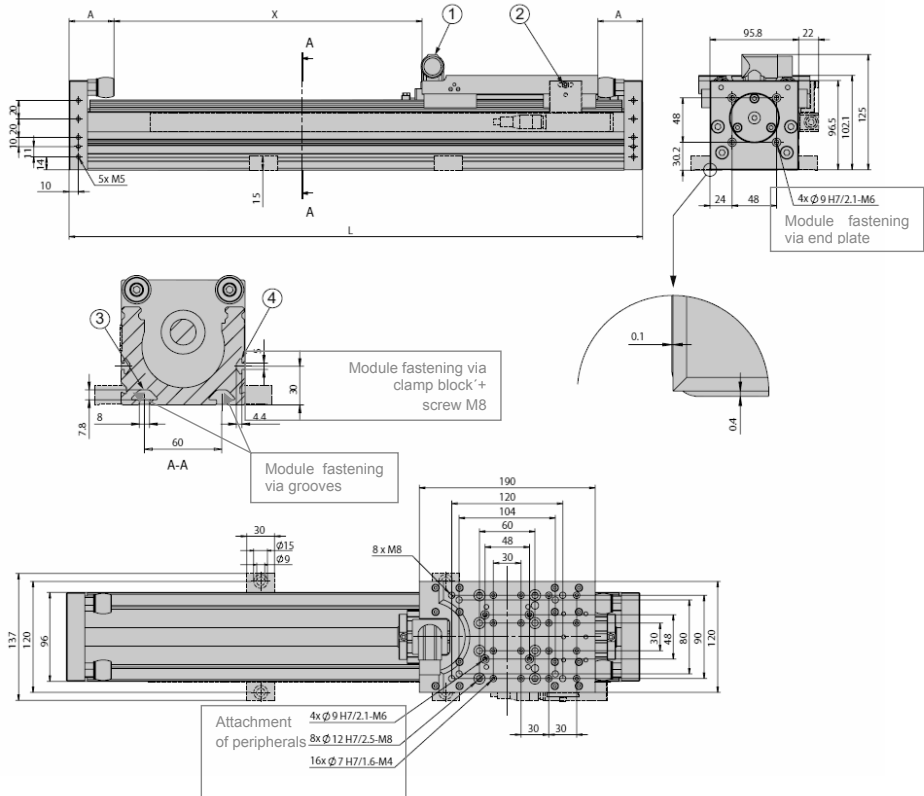
Technical data	PDL30
Drive type	electric, linear motor
Stroke	90, 130, 150, 230, 250, 330, 350, 430, 450, 530, 550, 630, 650, 730, 930, 1130, 1330 mm
max. speed	3.2 m/s
Peak force	255N
Permanent force	51N
Repeat accuracy	± 0.05 mm
-with external path measuring system (1 µm)	± 0.02 mm
Max. payload (centric)	20 kg
Net weight	6.3 kg + 1 kg each 100 mm stroke
Moved mass incl. stator	3.11 kg



Module stresses	
Dynamic torque Mx	850Nm
Dynamic torque My	1400Nm
Dynamic torque Mz	1400Nm
Peak force Fy	4500 N
Peak force Fz	4500 N

Type	A	L
PDL30-X-D19	40 mm	X + 270 mm
PDL30-X-D20	50 mm	X + 290 mm

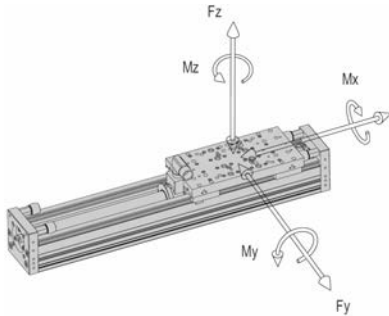
- 1 - 270° rotatable connector
- 2 - External path measuring system
- 3 - Groove for size 8 slotted nut
- 4 - Groove for size 5 slotted nut
- X - stroke



4.3.1 PDL40



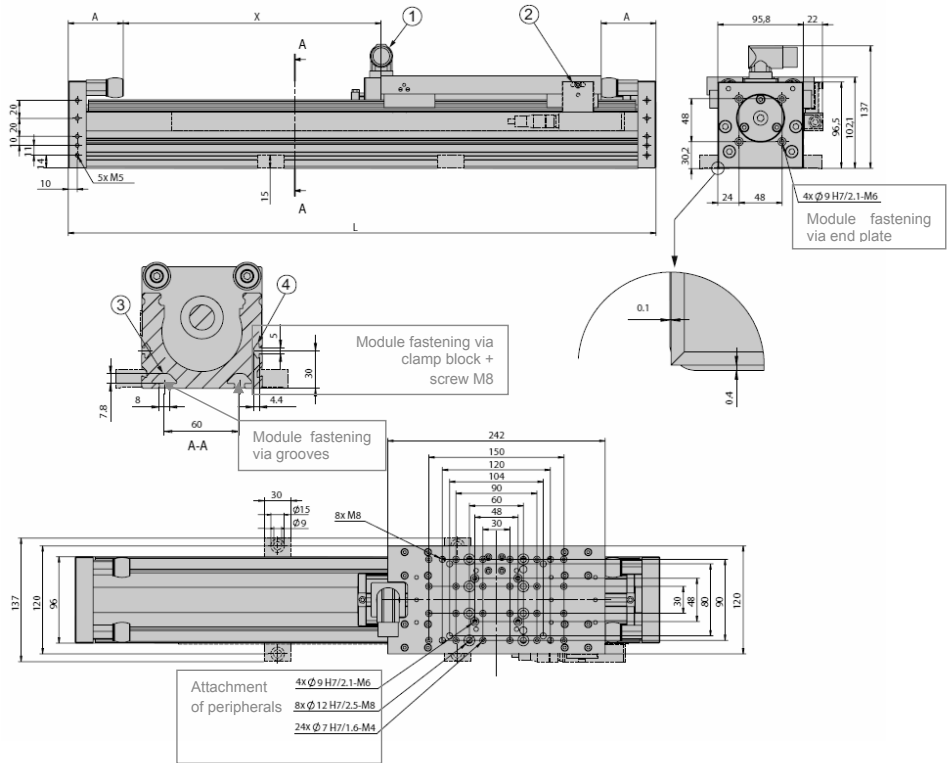
Technical data	PDL40
Drive type	electric, linear motor
Stroke	70, 170, 230, 280, 320, 370, 440, 460, 530, 580, 670, 880, 1060, 1270, 1480, 1660 mm
max. speed	3 m/s
Peak force	550 N
Permanent force	145 N
Repeat accuracy	± 0.05 mm
-with external path measuring system (1 μ m)	± 0.02 mm
Max. payload (centric)	45 kg
Net weight	8.5 kg + 1 kg each 100 mm stroke
Moved mass incl. stator	4.64 kg



Module stresses	
Dynamic torque Mx	850Nm
Dynamic torque My	1900Nm
Dynamic torque Mz	1900Nm
Peak force Fy	4500 N
Peak force Fz	4500 N

Type	A	L
PDL40-X-D27	49 mm	X + 340 mm
PDL40-X-D28	64 mm	X + 370 mm

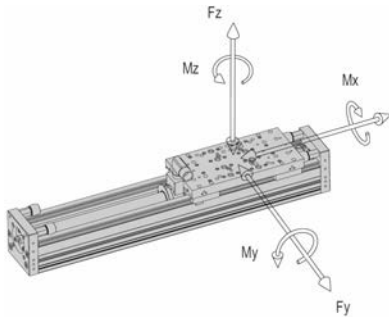
- 1 - 270° rotatable connector
- 2 - External path measuring system
- 3 - Groove for size 8 slotted nut
- 4 - Groove for size 5 slotted nut
- X - stroke



4.3.1 PDL40-HP



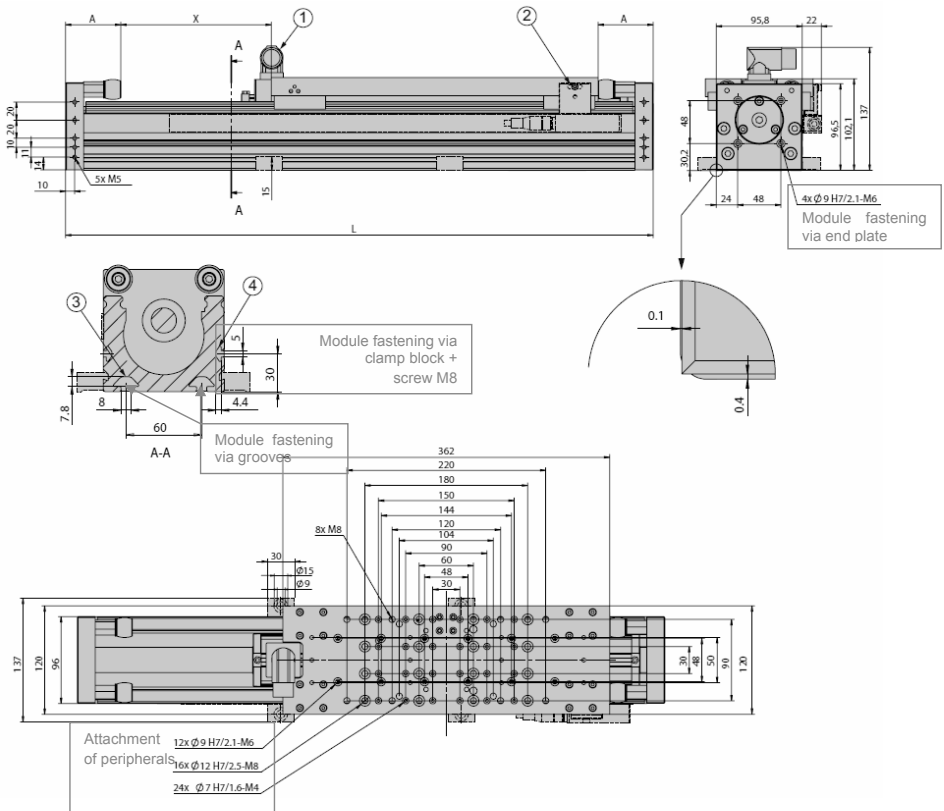
Technical data	PDL40-HP
Drive type	electric, linear motor
Stroke	110, 160, 200, 250, 320, 340, 410, 460, 550, 760, 940, 1150, 1360, 1540 mm
max. speed	2 m/s
Peak force	1024 N
Permanent force	203 N
Repeat accuracy	± 0.05 mm
-with external path measuring system (1 µm)	± 0.02 mm
Max. payload (centric)	85 kg
Net weight	12 kg + 1 kg each 100 mm stroke
Moved mass incl. stator	6.3 kg



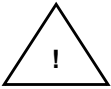
Module stresses	
Dynamic torque Mx	850Nm
Dynamic torque My	1900Nm
Dynamic torque Mz	1900Nm
Peak force Fy	4500 N
Peak force Fz	4500 N

Type	A	L
PDL40-X-HP-D27	49 mm	X + 460 mm
PDL40-X-HP-D28	64 mm	X + 490 mm

- 1 - 270° rotatable connector
- 2 - External path measuring system
- 3 - Groove for size 8 slotted nut
- 4 - Groove for size 5 slotted nut
- X - stroke

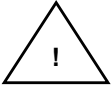


4.4 Installation



Caution

The pick and place EPS device is a precision-mechanical unit. Therefore, you must work to ensure the necessary care and cleanliness during transportation, installation and adjustment.



Caution

Only original LinMot cables may be used for the operation of the electric axes. Otherwise, damage or faults may occur.

The installation material is dependent on the module utilised as well as the adaptors and weights.

Type	Recommended installation material
PEL20	<ul style="list-style-type: none"> • 2x Ø 9h6 centring sleeves + 4x screws M6 / 2x Ø 7h6 centring sleeves + 4x screws M4 / 2x Ø 5h6 centring sleeves + 4x screws M3 / • 2x cylindrical pins 5m6 • Attachment block for PEL20_PDL30_PDL40 + screws M8
PDL30	<ul style="list-style-type: none"> • 2x Ø 9h6 centring sleeves + 4x screws M6 / 2x Ø 7h6 centring sleeves + 4x screws M4 / 2x Ø 12h6 centring sleeves + 4x screws M8 / • 2x cylindrical pins 8m6 • Attachment block for PEL20_PDL30_PDL40 + screws M8
PDL40	<ul style="list-style-type: none"> • 2x Ø 9h6 centring sleeves + 4x screws M6 / 2x Ø 7h6 centring sleeves + 4x screws M4 / 2x Ø 12h6 centring sleeves + 4x screws M8 / • 2x cylindrical pins 8m6 • Attachment block for PEL20_PDL30_PDL40 + screws M8

5 Connection

5.1 Power supplies

Brief overview of the technical data of the power supplies. More detailed information can be found in the operating manual of the power supply.



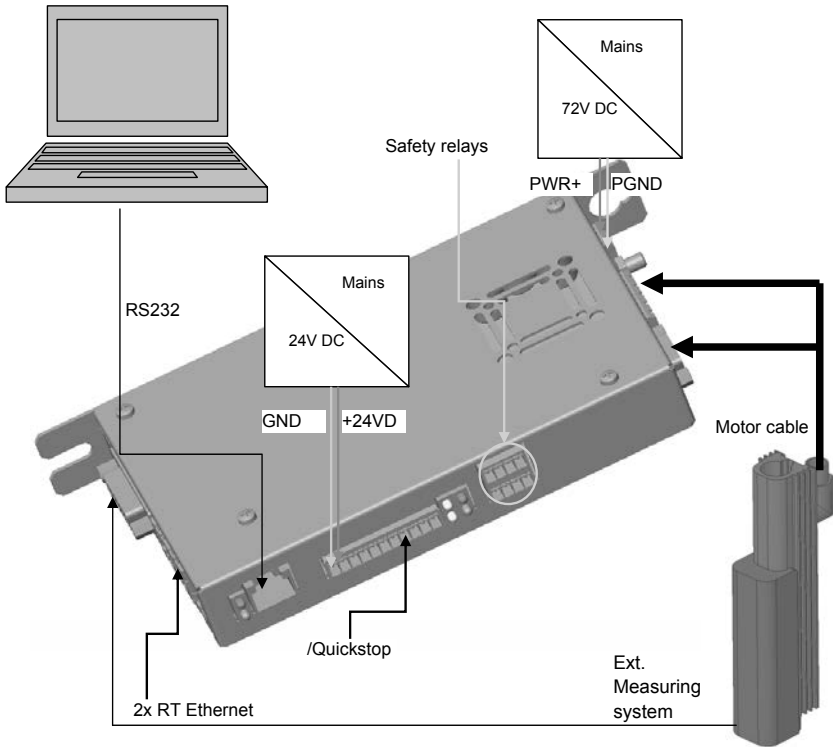
Technical data	SPH500-7207	SPH1013-7214	NT01-72/1500Multi
Type	Primary switched-mode power supply	Primary switched-mode power supply	Primary switched-mode power supply
Primary voltage	90 -132VAC, 50/60Hz or 180 - 264VAC, 50/60Hz (automatic switching)	3x340 – 550VAC, 50/60Hz	3x230/400/480 VAC, 50/60Hz
Secondary voltage	54-80VDC variable	54-80 VDC variable	72 V DC
Output power	480W	960W	1500W
Peak output current (>0,5 s)	10A	27 A	50A
Efficiency	88%	91.5%	85% (at rated power)
Protection type	IP 20	IP 20	IP 20
Operating temperature	-25...70°C	-25...70°C	0...40°C
Mass	1kg	2kg	17kg
Dimension (HxWxD)	125x62x121mm	230x66x177mm	275x280x165mm
External fuse	6A (C,D,K type)	16-32A (C,D,K type)	8A (C,D,K type)

5.2 Axis controller C11x0

Brief overview of the interfaces of the controller C11x0. More detailed information can be found in the operating manual of the controller.

The controllers are preconfigured so that software modifications are generally not necessary. If a modification is necessary, the LinMot-Talk 1100 software can be downloaded free of charge from the website www.linmot.com.

Technical data	C1150-EC-XC	C1150-PN-XC	C1250-GP-XC
Logic power supply	24V DC	24V DC	24V DC
Motor voltage supply	24...80V DC	24...80V DC	24...80V DC
Max. output current motor (at 72V)	25A	25A	25A
Bus system interfaces	EtherCat CANopen DeviceNet RS485/232 Digital I/Os	<i>Profinet</i> CANopen DeviceNet RS485/232 Digital I/Os	CANopen DeviceNet RS485/232 Digital I/Os
Max. power consumption	30W	30W	30W
Protection type	IP 20	IP 20	IP 20
Operating temperature	0...40°C	0...40°C	0...40°C
Mass	1.5kg	1.5kg	1.5kg
Distance between controllers	20mm left/right 50mm below/above	20mm left/right 50mm below/above	20mm left/right 50mm below/above
Fuse 72V supply	16 AT	16 AT	16 AT
Fuse 24V supply	3 AT	3 AT	3 AT



Connection	Description
X1 PWR+	Motor voltage supply +72VDC
X1 PGND	Motor voltage supply GND
X2	Motor phases
X3	Motor signals
X33	Safety relay (optional on -S1 version)
X4.8	/Quickstop
X4.7	Reference sensor (optional)
X4.2	Logic power supply +24VDC
X4.1	Logic power supply GND



Danger when the safety door is open

The "safety relay" input (X33) on the controller C11x0 must be deactivated or the power pack (72V) must be reliably disconnected from the power supply on the primary side.

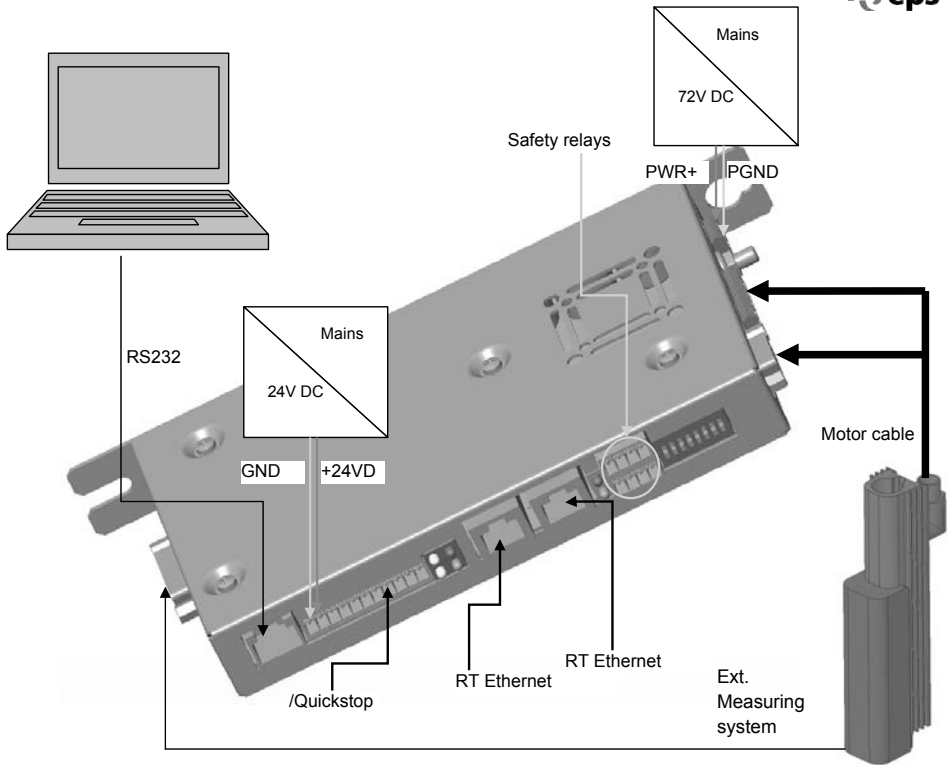
5.3 Axis controller C12x0

Brief overview of the interfaces of the controller C12x0. More detailed information can be found in the operating manual of the controller.

The controllers are preconfigured so that software modifications are generally not necessary. If a modification is necessary, the LinMot-Talk 1100 software can be downloaded free of charge from the website www.linmot.com.

Technical data	C1250-EC-XC	C1250-IP-XC	C1250-PL-XC	C1250-PN-XC
Logic power supply	24V DC	24V DC	24V DC	24V DC
Motor voltage supply	24...80V DC	24...80V DC	24...80V DC	24...80V DC
Max. output current motor (at 72V)	25A	25A	25A	25A
Bus system interfaces	EtherCat CANopen DeviceNet RS485/232 Digital I/Os Master Encoder	Ethernet IP CANopen DeviceNet RS485/232 Digital I/Os Master Encoder	PowerLink CANopen DeviceNet RS485/232 Digital I/Os Master Encoder	Profinet CANopen DeviceNet RS485/232 Digital I/Os Master Encoder
Max. power consumption	30W	30W	30W	30W
Protection type	IP 20	IP 20	IP 20	IP 20
Operating temperature	0...40°C	0...40°C	0...40°C	0...40°C
Mass	1.5kg	1.5kg	1.5kg	1.5kg
Distance between controllers	20mm left/right 50mm below/above	20mm left/right 50mm below/above	20mm left/right 50mm below/above	20mm left/right 50mm below/above
Fuse 72V supply	16 AT	16 AT	16 AT	16 AT
Fuse 24V supply	3 AT	3 AT	3 AT	3 AT

Technical data	C1250-SC-XC	C1250-SE-XC
Logic power supply	24V DC	24V DC
Motor voltage supply	24...80V DC	24...80V DC
Max. output current motor (at 72V)	25A	25A
Bus system interfaces	Sercos III CANopen DeviceNet RS485/232 Digital I/Os Master Encoder	Sercos over EtherCAT CANopen DeviceNet RS485/232 Digital I/Os Master Encoder
Max. power consumption	30W	30W
Protection type	IP 20	IP 20
Operating temperature	0...40°C	0...40°C
Mass	1.5kg	1.5kg
Distance between controllers	20mm left/right 50mm below/above	20mm left/right 50mm below/above
Fuse 72V supply	16 AT	16 AT
Fuse 24V supply	3 AT	3 AT



Connection	Description
X1 PWR+	Motor voltage supply +72VDC
X1 PGND	Motor voltage supply GND
X2	Motor phases
X3	Motor signals
X33	Safety relay (optional on -S1 version)
X4.8	/Quickstop
X4.7	Reference sensor (optional)
X4.2	Logic power supply +24VDC
X4.1	Logic power supply GND



Danger when the safety door is open

The "safety relay" input (X33) on the controller C12x0 must be deactivated or the power pack (72V) must be reliably disconnected from the power supply on the primary side.

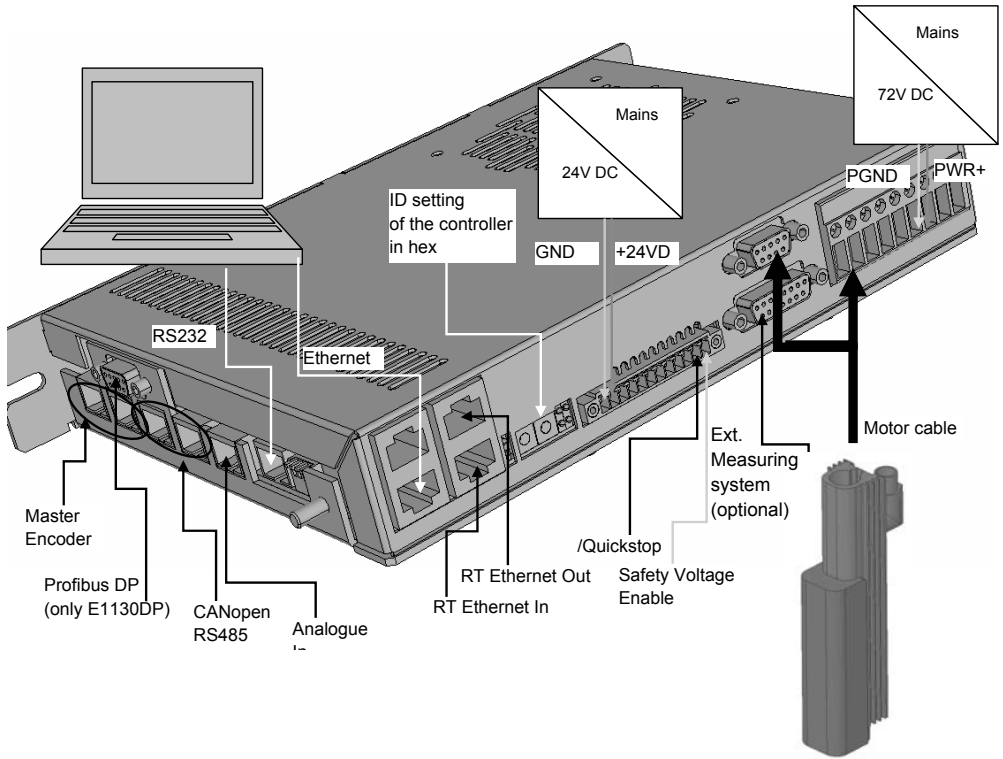
5.4 Axis controller E12x0

Brief overview of the interfaces of the controller E12x0. More detailed information can be found in the operating manual of the controller.

The controllers are preconfigured so that software modifications are generally not necessary. If a modification is necessary, the LinMot-Talk 1100 software can be downloaded free of charge from the website www.linmot.com.

Technical data	E1230-DP-UC	E1250-EC-UC	E1250-PL-UC	E1250-SE-UC
Logic power supply	24V DC	24V DC	24V DC	24V DC
Motor voltage supply	24...80V DC	24...80V DC	24...80V DC	24...80V DC
Max. output current motor (at 72V)	Standard version 32A	Standard version 32 A	Standard version 32 A	Standard version 32 A
Bus system interfaces	Profibus CANopen DeviceNet RS485/232 Digital I/Os Master Encoder	EtherCat CANopen DeviceNet RS485/232 Digital I/Os Master Encoder	PowerLink CANopen DeviceNet RS485/232 Digital I/Os Master Encoder	Sercos over Ethercat CANopen DeviceNet RS485/232 Digital I/Os Master Encoder
Max. power consumption	30W	30W	30W	30W
Protection type	IP 20	IP 20	IP 20	IP 20
Operating temperature	0...40°C	0...40°C	0...40°C	0...40°C
Mass	1.5kg	1.5kg	1.5kg	1.5kg
Distance between controllers	20mm left/right 50mm below/above	20mm left/right 50mm below/above	20mm left/right 50mm below/above	20mm left/right 50mm below/above
Fuse 72V supply	20 AT	20 AT	20 AT	20 AT
Fuse 24V supply	2 AT	2 AT	2 AT	2 AT

Technical data	Controller E1250-IP-UC	E1250-PN-UC	E1250-SC-UC
Logic power supply	24V DC	24V DC	24V DC
Motor voltage supply	24...80V DC	24...80V DC	24...80V DC
Max. output current motor (at 72V)	Standard version 32A	Standard version 32 A	Standard version 32 A
Bus system interfaces	Ethernet IP CANopen DeviceNet RS485/232 Digital I/Os Master Encoder	Profinet CANopen DeviceNet RS485/232 Digital I/Os Master Encoder	Sercos III CANopen DeviceNet RS485/232 Digital I/Os Master Encoder
Max. power consumption	30W	30W	30W
Protection type	IP 20	IP 20	IP 20
Operating temperature	0...40°C	0...40°C	0...40°C
Mass	1.5kg	1.5kg	1.5kg
Distance between controllers	20mm left/right 50mm below/above	20mm left/right 50mm below/above	20mm left/right 50mm below/above
Fuse 72V supply	20 AT	20 AT	20 AT
Fuse 24V supply	2 AT	2 AT	2 AT



Connection	Description
X1 PWR+	Motor voltage supply +72VDC
X1 PGND	Motor voltage supply GND
X2	Motor phases
X3	Motor signals
X4.12	Safety Voltage Enable
X4.11	/Quickstop
X4.7	Reference sensor (optional)
X14.2	Logic power supply +24VDC
X14.1	Logic power supply GND



Danger when the safety door is open

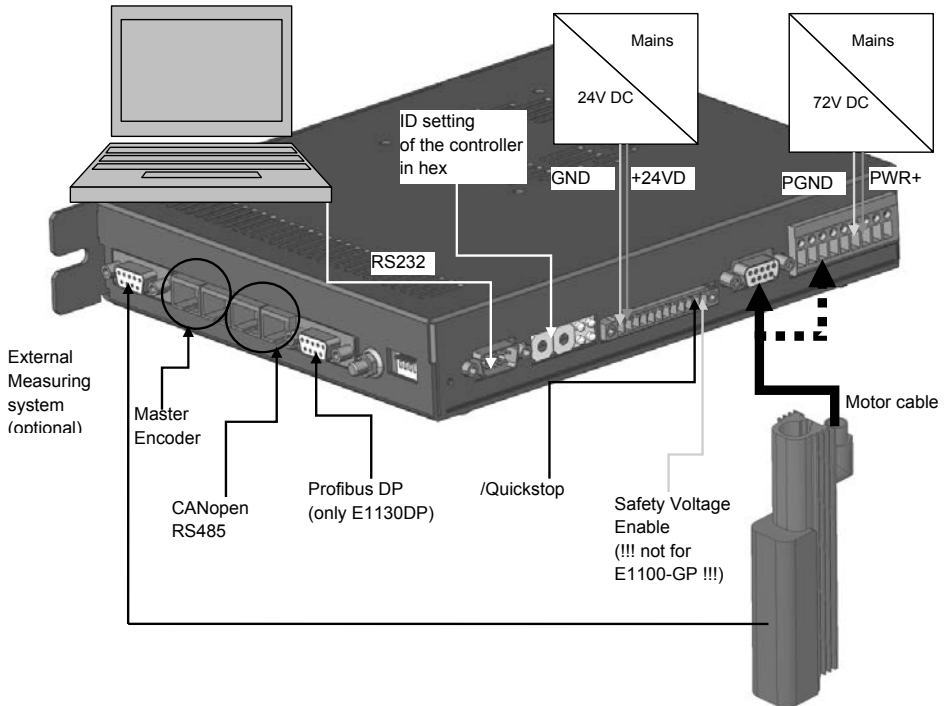
For the controller E12x0, the power pack must be reliably disconnected from the power supply on the primary side.

5.5 Axis controller E11x0

Brief overview of the interfaces of the controller E11x0. More detailed information can be found in the operating manual of the controller.

The controllers are preconfigured so that software modifications are generally not necessary. If a modification is necessary, the LinMot-Talk 1100 software can be downloaded free of charge from the website www.linmot.com.

Technical data	E1100-GP	E1130-DP
Logic power supply	24 V DC	24 V DC
Motor voltage supply	24...80 V DC	24...80 V DC
Max. output current motor (at 72 V)	Standard version: 8 A HC version: 15A XC version: 25 A	Standard version: 8 A HC version: 15A XC version: 25 A
Bus system interfaces	CANopen DeviceNet RS485/232 16 digital inputs 8 digital outputs 9 digital in/outputs	Profibus CANopen DeviceNet RS485/232 Digital I/Os Master Encoder
Max. power consumption	30W	30W
Protection type	IP 20	IP 20
Operating temperature	0...40°C	0...40°C
Mass	1.5kg	1.5kg
Distance between controllers	20mm left/right 50mm below/above	20mm left/right 50mm below/above
Fuse 72 V supply	10 AT (standard controller) 16 AT (HC/XC controller)	10 AT (standard controller) 16 AT (HC/XC controller)
Fuse 24 V supply	2 AT	2 AT



Connection	Description
X1 PWR+	Motor voltage supply +72VDC
X1 PGND	Motor voltage supply GND
X2	Motor phases (optional for HC or XC controllers)
X3	Motor signals
X6	Digital IO interfaces (only E1100-GP, not in image)
X4.12	Safety Voltage Enable (!!! not for E1100-GP !!!)
X4.11	/Quickstop
X4.7	Reference sensor (optional)
X14.2	Logic power supply +24VDC
X14.1	Logic power supply GND



Danger when the safety door is open

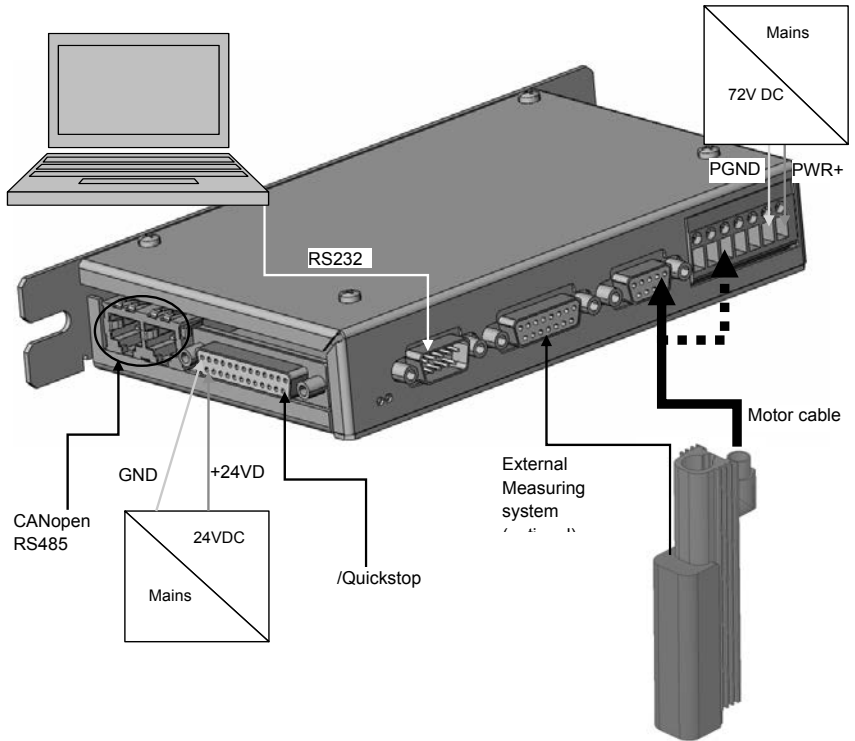
For the controller E11x0, the power pack (72V) must be reliably disconnected from the power supply on the primary side.

5.6 Axis controller B1100

Brief overview of the interfaces of the controller B1100. More detailed information can be found in the operating manual of the controller.

The controllers are preconfigured so that software modifications are generally not necessary. If a modification is necessary, the LinMot-Talk 1100 software can be downloaded free of charge from the website www.linmot.com.

Technical data	B1100-PP	B1100-GP
Logic power supply	24 V DC	24 V DC
Motor voltage supply	24...80 V DC	24...80 V DC
Max. output current motor (at 72 V)	Standard version: 8 A HC version: 15A XC version: 25 A	Standard version: 8 A HC version: 15A XC version: 25 A
Bus system interfaces	6 digital inputs 6 digital outputs (up to 4 positions)	CANopen DeviceNet RS485/232 6 digital inputs 6 digital outputs
Max. power consumption	30W	30W
Protection type	IP 20	IP 20
Operating temperature	0...40°C	0...40°C
Mass	0.7kg	0.7kg
Distance between controllers	20mm left/right 50mm below/above	20mm left/right 50mm below/above
Fuse 72 V supply	10 AT (standard controller) 16 AT (HC/XC controller)	10 AT (standard controller) 16 AT (HC/XC controller)
Fuse 24 V supply	2 AT	2 AT





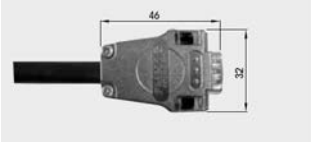
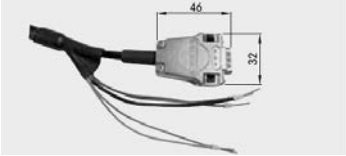
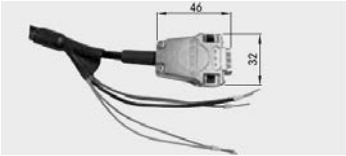
Connection	Description
X1 PWR+	Motor voltage supply +72VDC
X1 PGND	Motor voltage supply GND
X2	Motor phases (optional for HC or XC controllers)
X3	Motor signals
X14.14	/Quickstop
X14.2	Reference sensor (optional)
X14.25	Logic power supply +24VDC
X14.13	Logic power supply GND



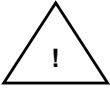
Danger when the safety door is open

For the controller B1100, the power pack (72V) must be reliably disconnected from the power supply on the primary side.

5.7 Motor connector

Connector combinations	
Connector on the axis	Connector on the controller
<p>R connector:</p>  <p>Application:</p> <ul style="list-style-type: none"> - Portal axis PEL20 <p>C controller:</p>  <p>Application:</p> <ul style="list-style-type: none"> - Portal axis PEL30 - Portal axis PDL30 - Portal axis PDL40 - Portal axis PDL40-HP 	<p>D connector:</p>  <p>Application:</p> <ul style="list-style-type: none"> - Controller B1100 standard - Controller E11x0 standard <p>W connector:</p>  <p>Application:</p> <ul style="list-style-type: none"> - Controller B1100 standard, HC and XC - Controller E11x0 standard, HC and XC - Controller E12x0 UC <p>Y connector:</p>  <p>Application:</p> <ul style="list-style-type: none"> - Controller C11x0 XC - Controller C12x0 XC

6 Commissioning



All information in the operating manuals of the individual modules must also be observed.

6.1 Setting speeds of the electric axes

The speeds of the electric axes are generally set by the higher-ranking controller.

Example programs are available for a large number of common controllers. This allows the maximum speed, acceleration and target position to be set. These programs are available on the CD provided upon delivery, or you can download them at <http://eps-automation.de/de/software.html>.

These travel profiles are stored in the controller when using the B1100-PP or E1100-GP controller with EasyStep firmware.



Caution

An excessively high speed or acceleration can cause damage to the device or the periphery.

The following tables are intended as references for the parameters (speed, acceleration, deceleration).

Please note that you do not have to adapt the standard parameters for your application. They are heavily dependent on the load mass and the mechanical configuration.

Type	Max. speed [m/s]	Max. accel. [m/s ²]	Max. decel. [m/s ²]	Std speed [m/s]	Std accel. [m/s ²]	Std decel. [m/s ²]	Max. Pos. [mm]	Max Pos. [mm]
PEL20-080-SL	7.3	120	120	3	15	15	80	0
PEL20-140-SL	7.3	120	120	3	15	15	140	0
PEL20-210-SL	7.3	120	120	3	15	15	210	0
PEL20-270-SL	7.3	120	120	3	15	15	270	0
PEL20-370-SL	7.3	120	120	3	15	15	370	0
PEL20-550-SL	7.3	120	120	3	15	15	550	0
PEL20-640-SL	7.3	120	120	3	15	15	640	0
PEL20-060	5.3	80	80	3	10	10	60	0
PEL20-130	5.3	80	80	3	10	10	130	0
PEL20-190	5.3	80	80	3	10	10	190	0
PEL20-290	5.3	80	80	3	10	10	290	0
PEL20-470	5.3	80	80	3	10	10	470	0
PEL20-560	5.3	80	80	3	10	10	560	0
PDL30-90-D19	3.9	80	80	2	15	15	90	0
PDL30-150-D19	3.9	80	80	2	15	15	150	0
PDL30-250-D19	3.9	80	80	2	15	15	250	0
PDL30-350-D19	3.9	80	80	2	15	15	350	0
PDL30-450-D19	3.9	80	80	2	15	15	450	0
PDL30-550-D19	3.9	80	80	2	15	15	550	0
PDL30-650-D19	3.9	80	80	2	15	15	650	0
PDL30-130-D20	3.9	80	80	2	15	15	130	0
PDL30-230-D20	3.9	80	80	2	15	15	230	0
PDL30-330-D20	3.9	80	80	2	15	15	330	0
PDL30-430-D20	3.9	80	80	2	15	15	430	0
PDL30-530-D20	3.9	80	80	2	15	15	530	0
PDL30-630-D20	3.9	80	80	2	15	15	630	0
PDL30-730-D20	3.9	80	80	2	15	15	730	0
PDL30-930-D20	3.9	80	80	2	15	15	930	0
PDL30-1130-D20	3.9	80	80	2	15	15	1130	0
PDL30-1330-D20	3.9	80	80	2	15	15	1330	0
PDL30-1450-D20	3.9	80	80	2	15	15	1450	0

Type	Max. speed [m/s]	Max. accel. [m/s ²]	Max. decel. [m/s ²]	Std speed [m/s]	Std accel. [m/s ²]	Std decel. [m/s ²]	Max. Pos. [mm]	Max Pos. [mm]
PDL40-170-D27	3	80	80	2	15	15	170	0
PDL40-230-D27	3	80	80	2	15	15	230	0
PDL40-320-D27	3	80	80	2	15	15	320	0
PDL40-440-D27	3	80	80	2	15	15	440	0
PDL40-530-D27	3	80	80	2	15	15	530	0
PDL40-70-D28	3	80	80	2	15	15	70	0
PDL40-160-D28	3	80	80	2	15	15	160	0
PDL40-280-D28	3	80	80	2	15	15	280	0
PDL40-370-D28	3	80	80	2	15	15	370	0
PDL40-460-D28	3	80	80	2	15	15	460	0
PDL40-580-D28	3	80	80	2	15	15	580	0
PDL40-670-D28	3	80	80	2	15	15	670	0
PDL40-880-D28	3	80	80	2	15	15	880	0
PDL40-1060-D28	3	80	80	2	15	15	1060	0
PDL40-1270-D28	3	80	80	2	15	15	1270	0
PDL40-1480-D28	3	80	80	2	15	15	1480	0
PDL40-1660-D28	3	80	80	2	15	15	1660	0
PDL40HP-0200-D27	2.1	80	80	1.5	15	15	200	0
PDL40HP-0320-D27	2.1	80	80	1.5	15	15	320	0
PDL40HP-0410-D27	2.1	80	80	1.5	15	15	410	0
PDL40HP-0160-D28	2.1	80	80	1.5	15	15	160	0
PDL40HP-0330-D28	2.1	80	80	1.5	15	15	330	0
PDL40HP-0460-D28	2.1	80	80	1.5	15	15	460	0
PDL40HP-0550-D28	2.1	80	80	1.5	15	15	550	0
PDL40HP-0760-D28	2.1	80	80	1.5	15	15	760	0
PDL40HP-0940-D28	2.1	80	80	1.5	15	15	940	0
PDL40HP-1150-D28	2.1	80	80	1.5	15	15	1150	0
PDL40HP-1360-D28	2.1	80	80	1.5	15	15	1360	0
PDL40HP-1540-D28	2.1	80	80	1.5	15	15	1540	0

The drive must be referenced first. Then you have the following possibilities:

Possibility 1 – move manually:

Move the axes into position by hand (logic voltage ON, motor power OFF) and then read out values from the controller for use in the Pick&Place movement.

Danger



For the controller B1100 or E1100-GP, the power pack (72V) must be reliably disconnected from the power supply on the primary side.

With controller E11x0 (not E1100-GP) the "safety voltage enable" input (X4.12) must be deactivated or the power pack (72 V) reliably disconnected on the primary side.

Possibility 2 – jog mode:

- Buttons +/-10mm | +/- 1mm | +/- 1/10mm.
- Add value to or subtract value from current position
- Can be programmed with relative commands.

The existing module for absolute positioning can be converted into one for relative positioning by changing one variable.

Possibility 3:

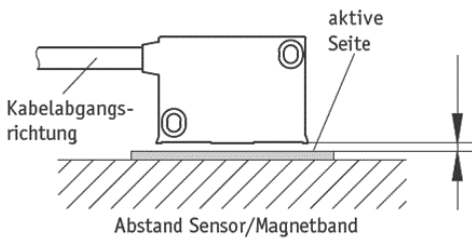
Set-up with safely reduced speed. Please observe the manual on the safely reduced speed.

6.2 Setting the external path measuring system

6.2.1 Distance between the sensor and the belt

The sensor is installed parallel to the belt using a feeler gauge. The distance between the sensor and the belt is dependent on the type utilised. The values may be taken from the table below:

Sensor type	Min. distance	Max. distance	Recommended distance
MSK1000	0.1mm	0.2mm	0.1mm
MSA501	0.1mm	1.5mm	0.5mm



6.2.2 Setting the reference point

The distance between the mechanical stop and the index on the magnetic tape must be set to the distance in the following table.

Sensor type		Distance to be adjusted to	Min. distance	Max. distance	Pole pitch strip
LE100		0.50 mm	0.35 mm	0.65 mm	1 mm

Note:

This process is necessary to ensure that an index is not occasionally recognised too early or too late when referencing the axes.

This would then result in a positional shift in accordance with the pole pitch of the strip

To set the distance, proceed as follows:

1. Carry out the configuration as it is described in the commissioning instructions for LinMot controllers.
Set the "home position" to 0mm.
2. Reference axis.
3. Disconnect the axis from the power supply by removing the "Switch ON" bit.
4. Push the axis to the mechanical stop manually.
5. By moving the sensor, set the "actual position" in such a way that the distance to be set appears with a negative sign.

(e.g. Home Position=0mm → Actual Position = -0.5mm)

Note:

If the "home position" is set to another value, the corresponding offset must be taken into account if necessary.

(e.g. Home Position=50mm → Actual Position = 49.5mm)

If the axis is set to "positive homeing", the distance must be added.

(e.g. Home Position=500mm → Actual Position = 500.5mm)

6. Reference axis again.
7. Move the axis to the mechanical end stop so that the power is at the maximum level. The control the setting (e.g. -0.5mm).

6.3 Switching distance

6.3.1 Reference sensor with electric axes

The sensor is installed parallel to the switching flag at a distance of 0.1 mm using a feeler gauge. The positions can be found in the drawings below and differ, depending on the axis type.

7 Maintenance

The portal axes are high-performance devices with very short cycle times. The service life of the devices depends to a very great extent on the ambient conditions and the maintenance.

1.1 After commissioning

- Check bolts for tightness
- Clean the guides using a slightly oily cloth

1.2 Every 3 months

- Clean the guides and the rotor using a slightly oily cloth
- Using a lubrication gun, apply Klübersynth UH1 14-31 grease to all lubrication points.



Only the grease specified may be used for lubrication.



If the device makes abnormal movements during normal operation, e.g. hard banging, the causes should be immediately remedied.

The service and maintenance intervals must be observed. The intervals are based on a normal environment. The approval of eps GmbH must be obtained in advance if the devices are to be operated in an environment with abrasive dusts or with corrosive or aggressive vapours, gases or liquids.

8 Repairs

Repairs other than those described below may only be carried out by eps GmbH.

If you carry out the repair yourself, approval must be obtained in advance from eps GmbH.



Caution

Repairs may only be carried out by qualified personnel.

9 Component/replacement part lists

The replacement parts for the standard components are listed here. The order numbers on our delivery note are applicable to special components.

9.1 Motor overview

Module	Stator	Rotor	Wiper
PM20-0130 EL	PS01-23x160H-HP-R	PL01-12x420/380-HP	PAW01-12
PM20-0190 EL	PS01-23x160H-HP-R	PL01-12x480/440-HP	PAW01-12
PM20-0290 EL	PS01-23x160H-HP-R	PL01-12x580/540-HP	PAW01-12
PM20-0470 EL	PS01-23x160H-HP-R	PL01-12x760/720-HP	PAW01-12
PM20-0560 EL	PS01-23x160H-HP-R	PL01-12x850/810-HP	PAW01-12
PM20-0140 EL SL	PS01-23x80F-HP-R	PL01-12x350/310-HP	PAW01-12
PM20-0210 EL SL	PS01-23x80F-HP-R	PL01-12x420/380-HP	PAW01-12
PM20-0270 EL SL	PS01-23x80F-HP-R	PL01-12x480/440-HP	PAW01-12
PM20-0370 EL SL	PS01-23x80F-HP-R	PL01-12x580/540-HP	PAW01-12
PM20-0550 EL SL	PS01-23x80F-HP-R	PL01-12x760/720-HP	PAW01-12
PM20-0640 EL SL	PS01-23x80F-HP-R	PL01-12x850/810-HP	PAW01-12
PDL30-90-19	PS01-37x120F-HP-C	PL01-19x240/160	(none)
PDL30-150-19	PS01-37x120F-HP-C	PL01-19x300/220	(none)
PDL30-250-19	PS01-37x120F-HP-C	PL01-19x395/320	(none)
PDL30-350-19	PS01-37x120F-HP-C	PL01-19x500/420	(none)
PDL30-450-19	PS01-37x120F-HP-C	PL01-19x600/520	(none)
PDL30-550-19	PS01-37x120F-HP-C	PL01-19x700/620	(none)
PDL30-650-19	PS01-37x120F-HP-C	PL01-19x800/720	(none)
PDL30-150-20	PS01-37x120F-HP-C	PL01-20x400/340-HP	PAW01-20
PDL30-250-20	PS01-37x120F-HP-C	PL01-20x500/440-HP	PAW01-20
PDL30-350-20	PS01-37x120F-HP-C	PL01-20x600/540-HP	PAW01-20
PDL30-450-20	PS01-37x120F-HP-C	PL01-20x700/640-HP	PAW01-20
PDL30-550-20	PS01-37x120F-HP-C	PL01-20x800/740-HP	PAW01-20
PDL30-650-20	PS01-37x120F-HP-C	PL01-20x900/840-HP	PAW01-20
PDL30-750-20	PS01-37x120F-HP-C	PL01-20x1000/940-HP	PAW01-20
PDL30-950-20	PS01-37x120F-HP-C	PL01-20x1200/1140-HP	PAW01-20
PDL30-1150-20	PS01-37x120F-HP-C	PL01-20x1400/1340-HP	PAW01-20
PDL30-1350-20	PS01-37x120F-HP-C	PL01-20x1600/1540-HP	PAW01-20

Module	Stator	Rotor	Wiper
PDL40-170-27	PS01-48x240F-C	PL01-27x350/270	(none)
PDL40-230-27	PS01-48x240F-C	PL01-27x410/330	(none)
PDL40-320-27	PS01-48x240F-C	PL01-27x500/420	(none)
PDL40-440-27	PS01-48x240F-C	PL01-27x620/540	(none)
PDL40-530-27	PS01-48x240F-C	PL01-27x710/630	(none)
PDL40-50-28	PS01-48x240F-C	PL01-28x410/330	PAW01-28
PDL40-150-28	PS01-48x240F-C	PL01-28x500/420	PAW01-28
PDL40-270-28	PS01-48x240F-C	PL01-28x620/540	PAW01-28
PDL40-360-28	PS01-48x240F-C	PL01-28x710/630	PAW01-28
PDL40-450-28	PS01-48x240F-C	PL01-28x800/720	PAW01-28
PDL40-570-28	PS01-48x240F-C	PL01-28x920/840	PAW01-28
PDL40-660-28	PS01-48x240F-C	PL01-28x1010/930	PAW01-28
PDL40-870-28	PS01-48x240F-C	PL01-28x1220/1140	PAW01-28
PDL40-1050-28	PS01-48x240F-C	PL01-28x1400/1320	PAW01-28
PDL40-1260-28	PS01-48x240F-C	PL01-28x1610/1530	PAW01-28
PDL40-1470-28	PS01-48x240F-C	PL01-28x1820/1740	PAW01-28
PDL40-1650-28	PS01-48x240F-C	PL01-28x2000/1920	PAW01-28
PDL40-1820-28	PS01-48x240F-C	PL01-28x2000/1920	PAW01-28
PDL40-0200-HP-27	PS01-48x360F-C	PL01-27x500/420	(none)
PDL40HP-0320-HP-27	PS01-48x360F-C	PL01-27x620/540	(none)
PDL40HP-0410-HP-27	PS01-48x360F-C	PL01-27x710/630	(none)
PDL40HP-0150-HP-28	PS01-48x360F-C	PL01-28x620/540	PAW01-28
PDL40HP-0240-HP-28	PS01-48x360F-C	PL01-28x710/630	PAW01-28
PDL40HP-0330-HP-28	PS01-48x360F-C	PL01-28x800/720	PAW01-28
PDL40HP-0450-HP-28	PS01-48x360F-C	PL01-28x920/840	PAW01-28
PDL40HP-0540-HP-28	PS01-48x360F-C	PL01-28x1010/930	PAW01-28
PDL40HP-0750-HP-28	PS01-48x360F-C	PL01-28x1220/1140	PAW01-28
PDL40HP-0930-HP-28	PS01-48x360F-C	PL01-28x1400/1320	PAW01-28
PDL40HP-1140-HP-28	PS01-48x360F-C	PL01-28x1610/1530	PAW01-28
PDL40HP-1350-HP-28	PS01-48x360F-C	PL01-28x1820/1740	PAW01-28
PDL40HP-1530-HP-28	PS01-48x360F-C	PL01-28x2000/1920	PAW01-28
PDL40HP-1700-HP-28	PS01-48x360F-C	PL01-28x2000/1920	PAW01-28

9.2 Replacement parts for PEL20/PEL20-SL

Designation	Art. no.
Motor system stator, rotor	see table Motor overview
Wiper seal for EDM20/25EL PM20 PEL20 PAW01-12	530,185
UH1 14-31 grease (100ml)	540,043
Lubrication gun with Klübersynth UH1 14-31	540,057

9.3 Replacement parts for PDL30

Designation	Art. no.
Motor system stator, rotor	see table Motor overview
Wiper seal for EDM30 EL/PDL30 PAW01-20	530,227
UH1 14-31 grease (100ml)	540,043
Lubrication gun with Klübersynth UH1 14-31	540,057

9.4 Replacement parts for PDL40/PDL40HP

Designation	Art. no.
Motor system stator, rotor	see table Motor overview
Wiper seal for PDL40 PAW01-28	530,280
UH1 14-31 grease (100ml)	540,043
Lubrication gun with Klübersynth UH1 14-31	540,057

9.5 Path measuring system

Designation	Art. no.
Magnetic tape MB100	Pole pitch 1mm 520,531
Magnetic sensor MSK1000	520,807
Magnetic tape MBA501	520,694
Magnetic sensor MSA501	520,692
Connection cable, 10m for E11x0	12-pin M12x1 - SubD 9pin 520,754
Connection cable, 10m for B1100/C1xx0/E12x0	12-pin M12x1 - SubD 15pin 520,755

9.6 Motor cable

Designation		Art. no.
Motor cable 4m EDM2x/ES20/SE20/PEL20 drag	Type KS05-Y/R-4	080,685
Motor cable 4m EDM2x/ES20/SE20/PEL20 drag	Type KS05-D/R-4	080,218
Motor cable 4m EDM2x/ES20/SE20/PEL20 drag	Type KS05-W/R-4	080,259
Motor cable 4m PM25HP/30/ES30/SE30/PDL30/40 drag	Type KS10-Y/C-4	080,693
Motor cable 4m PM25HP/30/ES30/SE30/PDL30/40 drag	Type KS10-W/C-4	080,015
Motor cable 6m EDM2x/ES20/SE20/PEL20 drag	Type KS05-D/R-6	080,247
Motor cable 6m EDM2x/ES20/SE20/PEL20 drag	Type KS05-W/R-6	080,297
Motor cable 6m EDM2x/ES20/SE20/PEL20 drag	Type KS05-Y/R-6	080,686
Motor cable 6m PM25HP/30/ES30/SE30/PDL30/40 drag	Type KS10-Y/C-6	080,694
Motor cable 6m PM25HP/30/ES30/SE30/PDL30/40 drag	Type KS10-W/C-6	080,246
Motor cable 8m EDM2x/ES20/SE20/PEL20 drag	Type KS05-D/R-8	080,219
Motor cable 8m EDM2x/ES20/SE20/PEL20 drag	Type KS05-W/R-8	080,244
Motor cable 8m EDM2x/ES20/SE20/PEL20 drag	Type KS05-Y/R-8	080,687
Motor cable 8m PM25HP/30/ES30/SE30/PDL30/40 drag	Type KS10-W/C-8	080,208
Motor cable 8m PM25HP/30/ES30/SE30/PDL30/40 drag	Type KS10-Y/C-8	080,695

9.7 Axis controller

Designation		Art. no.
Controller B1100-GP	for CANopen, RS485, digital IO	080,221
Controller B1100-GP-HC	for CANopen, RS485, digital IO	080,027
Controller B1100-GP-XC	for CANopen, RS485, digital IO	080,230
Controller B1100-PP	for digital IO	080,231
Controller B1100-PP-HC	for digital IO	080,232
Controller B1100-PP-XC	for digital IO	080,233
Controller E1100-GP	for CANopen, RS 485, digital IO	080,250
Controller E1100-GP-HC	for CANopen, RS 485, digital IO	080,251
Controller E1100-GP-XC	for CANopen, RS 485, digital IO	080,252
Controller E1100-RS	for RS485	080,016
Controller E1100-RS-HC	for RS485	080,014
Controller E1100-RS-XC	for RS485	080,234
Controller E1130-DP	for Profibus DP	080,020
Controller E1130-DP-HC	for Profibus DP	080,021
Controller E1130-DP-HC	for Profibus DP	080,224
Controller E1250-EC	for EtherCAT	080,243
Controller E1250-PL	for PowerLink	080,239
Controller C1250-SE-XC-1S	for Sercos over EtherCAT	080,409
Controller C1250-SC-XC-1S	for Sercos III	080,417
Controller C1250-PN-XC-1S	for Profinet	080,415
Controller C1250-PL-XC-1S	for PowerLink	080,413
Controller C1250-PD-XC-1S	for Profidrivet	080,763
Controller C1250-LU-XC-1S	for LinUDP	080,741
Controller C1250-IP-XC-1S	for Ethernet IP	080,411
Controller C1250-EC-XC-1S	for EtherCAT	080,405
Controller C1200-GP-XC-1S	for General Purpose	080,407
Controller C1150-SE-XC-1S	for Sercos over EtherCAT	080,768
Controller C1150-PN-XC-1S	for Profinet	080,429
Controller C1150-EC-XC-1S	for EtherCAT	080,434
Controller C1100-GP-XC-1S	for CANopen	080,432

10 Disposal instructions

Products

- Products that are predominantly made out of metal (axes, modules, adaptor plates etc.) must be disposed of in accordance with the national laws of metal recycling.
- Electronic products (controllers, etc.) must be disposed of in accordance with the national laws of electronic scrap.

Packaging

Cardboard, paper or PE film are predominantly used as packaging material.

These are materials that can be used in global recycling processes.

If the packaging is returned to us free domicile, eps will take it back for free and dispose of it accordingly.

11 Installation manual in accordance with Appendix VI (EC-RL 2006/42/EC)

Installation manual in accordance with Appendix VI (EC-RL 2006/42/EC)

For the installation of the partly completed machinery

PEL20-SL
PEL20
PDL30
PDL40
PDL40-HP

the following conditions must be satisfied so that it can be assembled together with other parts to form a complete machine correctly and without endangering the health and safety of persons:

- Please observe the safety information in the risk assessment
- Read, understand and observe the whole operating manual
- Installation may only be carried out by qualified specialist personnel.

12 Installation declaration for partly completed machinery (EC-RL 2006/42/EC)

Installation declaration for partly completed machinery (EC-RL 2006/42/EC)

The manufacturer: eps elektropneumatische Systeme GmbH
Gewerbestrasse 11
D-78739 Hardt

hereby declares that the following products:

PEL20-SL
PEL20
PDL30
PDL40
PDL40-HP

meet the following basic requirements of the **machinery directive 2006/42/EC**:
Appendix I, Article 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4 and 1.5.1.

The partly completed machinery also corresponds to all provisions of the electrical equipment (2014/35/EU) and electromagnetic compatibility (2014/30/EU) directives.

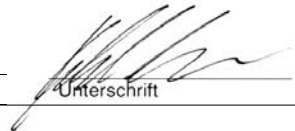
The incomplete machine must only be put into operation when it has been found that the machine into which the incomplete machine is to be installed corresponds to the provisions of the machinery directive 2006/42/EC.

The manufacturer commits to electronically submitting these special documents to individual state offices upon request.

The technical documentation for this machine was drawn up according to Appendix VII, part B.

Name of the authorised representative: Bernhard Moosmann
Address of the authorised representative: Gewerbestraße 11 - 78739 Hardt

15.09.16 Dipl Ing FH Bernhard Moosmann, Managing Director
Date Signatory and attributes of the signatory


Unterschrift

13 Risk assessment (EC-RL 2006/42/EC)

Procedures used for the risk assessment

Diagram utilised for general risk assessment in accordance with ISO/TR 1412-2:

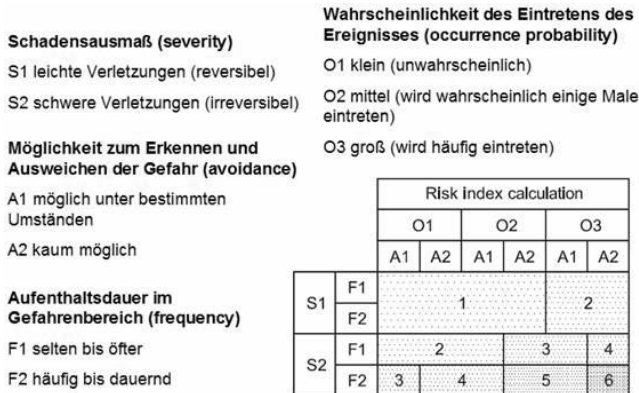


Diagram utilised in accordance with EN 13849 for the determination of the required performance level (PL):



Determination of the machine limitations	
1.	Limits of use
Intended use	Installation and equipping of various components, products
Application area of the machine	
Business	Yes
Industry	Yes
Household	No

	User groups	Function	Qualification/impairments
	Qualified personnel	Maintenance, commissioning Operation	Specialist training
	Apprentices	Operation	trained
	Operators	Operation	experienced/trained

2.	Spatial limits	
	Machine/system description	See system description
	Energy supply interfaces	Electrical energy supply Pneumatic energy supply
3.	Time limits	
	Intended application duration	10 years
	Recommended maintenance intervals	See Maintenance
4.	Additional limits	
	Highest/lowest ambient temperatures	0-50°C
	Required degree of cleanliness	No special requirements
	Materials and properties of processed materials	No special requirements

Identification of hazards					
Pos.	Life phases	Description of hazard	Risk assessment	Measures to reduce risk	PL
1	Transport	Hazard due to improper transportation of machine	S = S2 F = F1 O = O1 A = A1 Erg = 3	Observe the total weight and correct transportation methods in the operating manual.	--
2	Operation, Maintenance Repairs	Electrical hazard. Direct or indirect contact with energised parts when errors occur on electrical components.	S = S2 F = F1 O = O1 A = A1 Erg = 3	<ol style="list-style-type: none"> 1. Electrical equipment designed in accordance with EN 60204. 2. Installation and maintenance of electrical equipment must only be carried out by specialist personnel. 3. Maintenance and repair work must only be carried out in a voltage-free and compressed air-free state. 	S = S2 F = F1 P = P1 PL = c
3	Maintenance Repairs	Pacemakers may be affected by permanent magnets.	S = S2 F = F1 O = O1 A = A1 Erg = 3	<p>Persons who wear pacemakers must maintain a safety distance of a minimum of 0.2 m from the module.</p> <p>The device is equipped with corresponding warning signs.</p> <p>The personnel must be instructed accordingly.</p>	--

Pos.	Life phases	Description of hazard	Risk assessment	Measures to reduce risk	PL
4	Operation	Pacemakers may be	S = S2 F = F1	With the safeguard, a	--

		affected by permanent magnets.	O = O1 A = A1 Erg = 3	safety distance of 0.2m from the pacemaker must be guaranteed	
5	Operation	Risks of limb crushing, bruising and broken bones due to accessing the travel range of the moving device.	S = S2 F = F2 O = O2 A = A1 Erg = 4	Operation of the device behind a safeguard to ensure that access to the travel range is denied.	S = S2 F = F1 P = P1 PL = c
6	Operation, Maintenance Repairs	Burning of the skin due to surface temperatures of up to 60°C.	S = S1 F = F1 O = O2 A = A1 Erg = 1	<ol style="list-style-type: none"> 1. Avoid direct contact when the device is in operation. 2. Allow the device to cool down before carrying out maintenance work, or protect the skin accordingly (gloves, long clothing...) 	--

Pos.	Life phases	Description of hazard	Risk assessment	Measures to reduce risk	PL
7	Maintenance, commissioning	Risks of limb crushing, bruising and broken bones due to accessing the travel range of the device when the protective door is open.	S = S2 F = F2 O = O2 A = A1 Erg = 4	<ol style="list-style-type: none"> 1. The pressurised air supply must be reliably disconnected. 2. The "safety relay" input 	S = S2 F = F1 P = P1 PL = c

			<p>(X33) on the controller C1xx0 must be deactivated or the power pack (72V) must be reliably disconnected from the power supply on the primary side.</p> <p>3. The power pack (72V) must be reliably disconnected from the power on the primary side when using the B1100, E12x0 or E1x00 controllers.</p> <p>4. For linear motor axes (excluding PDL40 and PDL40-HP) through secure monitoring of the reduced speed!!! Observe the special documentation!!! Furthermore, specialist personnel must check that all components have been properly installed and ensure that there is no manipulation.</p>	
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14 Support

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