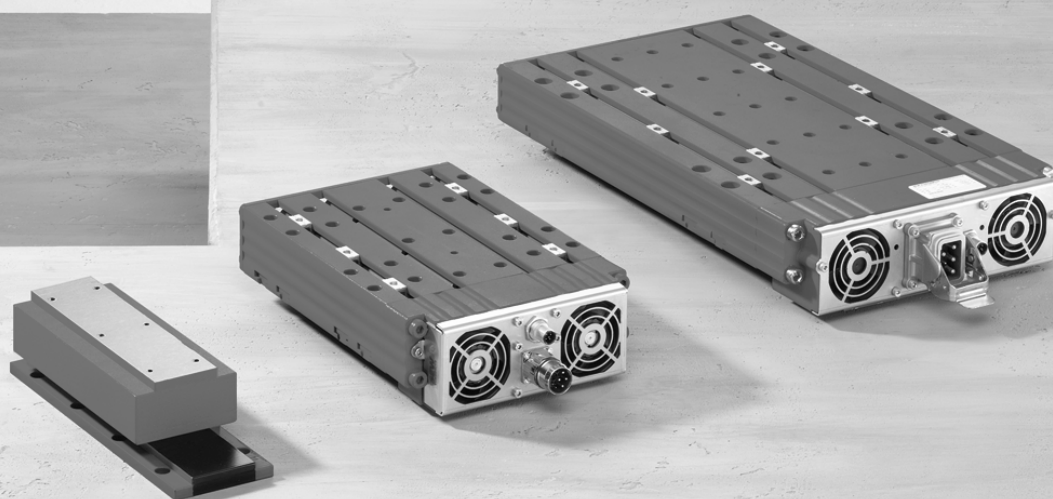




# Operating Instructions



## SL2 Synchronous Linear Motors



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## 1 General information

### 1.1 About this documentation

**The current version of the documentation is the original.**

This documentation is an integral part of the product. The documentation is written for all employees who assemble, install, start up, and service this product.

Make sure this documentation is accessible and legible. Ensure that persons responsible for the machinery and its operation as well as persons who work on the product independently have read through the documentation carefully and understood it. If you are unclear about any of the information in this documentation or require further information, contact SEW-EURODRIVE.

### 1.2 Structure of the safety notes

#### 1.2.1 Meaning of signal words

The following table shows the grading and meaning of the signal words for safety notes.

Signal word	Meaning	Consequences if disregarded
<b>▲ DANGER</b>	Imminent hazard	Severe or fatal injuries
<b>▲ WARNING</b>	Possible dangerous situation	Severe or fatal injuries
<b>▲ CAUTION</b>	Possible dangerous situation	Minor injuries
<b>NOTICE</b>	Possible damage to property	Damage to the product or its environment
<b>INFORMATION</b>	Useful information or tip: Simplifies handling of the product.	

#### 1.2.2 Structure of section-related safety notes

Section-related safety notes do not apply to a specific action but to several actions pertaining to one subject. The hazard symbols used either indicate a general hazard or a specific hazard.

This is the formal structure of a safety note for a specific section:



##### **SIGNAL WORD**

Type and source of hazard.







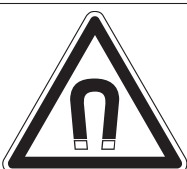
Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.



## Meaning of the hazard symbols

The hazard symbols in the safety notes have the following meaning:

Hazard symbol	Meaning
	General hazard
	Warning of dangerous electrical voltage
	Warning of hot surfaces
	Warning of risk of crushing
	Warning of suspended load
	Warning of automatic start-up
	Warning of magnetic fields

### 1.2.3 Structure of embedded safety notes

Embedded safety notes are directly integrated into the instructions just before the description of the dangerous action.

This is the formal structure of an embedded safety note:

**▲ SIGNAL WORD** Type and source of hazard. Possible consequence(s) if disregarded. Measure(s) to prevent the hazard.

## 1.3 Rights to claim under limited warranty

Read the information in this documentation. This is essential for fault-free operation and fulfillment of any rights to claim under limited warranty. Read the documentation before you start working with the product.

**1.4 Exclusion of liability**

Read the information in this documentation, otherwise safe operation is impossible. You must comply with the information contained in this documentation to achieve the specified product characteristics and performance features. SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of these operating instructions. In such cases, SEW-EURODRIVE assumes no liability for defects.

**1.5 Product names and trademarks**

The brands and product names in this documentation are trademarks or registered trademarks of their respective titleholders.

**1.6 Copyright notice**

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## **2 Safety notes**

### **2.1 Preliminary information**

The following general safety notes have the purpose to avoid injury and damage to property. They primarily apply to the use of products described in this documentation. If you use additional components also observe the relevant warning and safety notes.

### **2.2 Operator's duties**

Make sure that the basic safety notes are read and observed. Make sure that persons responsible for the machinery and its operation as well as persons who work on the device independently have read through the documentation carefully and understood it. If you are unclear about any of the information in this documentation, or if you require further information, contact SEW-EURODRIVE.

The operator must ensure that the following works are only performed by qualified personnel:

- Transport
- Storage
- Setup and assembly
- Installation and connection
- Startup
- Maintenance and repair
- Shutdown
- Disassembly
- Waste disposal

Make sure persons working on the product adhere to the following regulations, requirements, documents and information:

- National and regional safety and accident prevention regulations
- Warning and safety signs on the product
- All other relevant project planning documents, installation and startup instructions, wiring diagrams and schematics
- Do not assemble, install or operate damaged products
- All specific specifications and requirements for the system

Make sure that systems with the product installed are equipped with additional monitoring and protection devices. Observe the applicable safety regulations and legislation governing technical equipment and accident prevention regulations.

### **2.3 Danger due to magnetic fields**

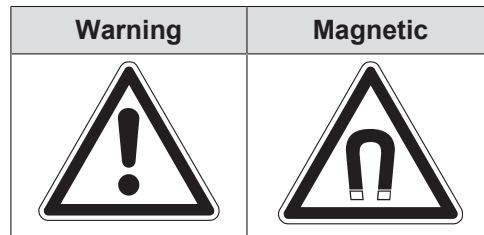
Parts of the linear motor are equipped with permanent magnets that create strong magnetic fields even when the motor is de-energized. During operation, additional electromagnetic fields are generated.

In Germany, workplaces at which persons are exposed to electromagnetic fields must comply with accident prevention regulation BGV B 11 "Electromagnetic Fields". In other countries, the corresponding national and local regulations and provisions must be complied with.

The magnetic field generated by the permanent magnets of the linear motor cause strong forces of attraction with magnetizable materials. The attraction of other objects can cause injuries such as crushing.

Observe the following points when performing any work on the linear motor:

- Magnetic fields may pose a health risk. This especially applies to persons with pacemakers.
- Even at a distance of 100 mm, the magnetic flux density of the secondaries present is < 5 mT (at 150 mm < 0.5 mT).
- Parts of the linear motor that are equipped with permanent magnets must be marked with caution signs.



- Never place the parts of the linear motor that are equipped with permanent magnets onto metal surfaces.
- Never bring metal parts near the linear motor.
- Wear work gloves during transport and installation.
- Hold the tools firmly (using both hands). Bring tools to the linear motor slowly.
- Only perform assembly work together with a second person.

## 2.4 Target group

Specialist for mechanical work

Any mechanical work may only be performed by adequately qualified personnel. Qualified personnel in the context of this documentation are persons familiar with the design, mechanical installation, troubleshooting and maintenance of the product, who possess the following qualifications:

- Qualification in the field of mechanics according to applicable national regulation.
- They are familiar with this documentation

Specialist for electrotechnical work

Any electronic work may only be performed by adequately skilled persons (electrically). Qualified electricians in the context of this documentation are persons familiar with electrical installation, startup, troubleshooting and servicing of the product who possess the following qualifications:

- Qualification in the field of electrical engineering according to applicable national regulation.
- They are familiar with this documentation

In addition to that, these persons must be familiar with the valid safety regulations and laws, as well as with the requirements of the standards, directives and laws specified in this documentation. The above mentioned persons must have the authorization expressly issued by the company to operate, program, configure, label and ground devices, systems and circuits in accordance with the standards of safety technology.

Instructed persons

All work in the areas of transportation, storage, operation and waste disposal must be carried out by persons who are trained appropriately. The purpose of the instruction is that the persons are capable of performing the required tasks and work steps in a safe and correct manner.

## 2.5 Designated use

The product is intended for installation in electrical plants or machines.

In case of installation in electrical systems or machines, startup of the product is prohibited until it is determined that the machine meets the requirements stipulated in the local laws and directives. For Europe, Machinery Directive 2006/42/EC as well as the EMC Directive 2014/30/EU apply. Observe EN 60204-1 (Safety of machinery - electrical equipment of machines). The product meets the requirements stipulated in the Low Voltage Directive 2014/35/EU.

The product in combination with the linear measuring system AL1H is only designated for the use in large-scale fixed installations or in stationary industrial tools according to RoHS Directive 2011/65/EU.

The standards given in the declaration of conformity apply to the product.

The systems can be mobile or stationary. The motors must be suitable for operation with inverters. Do not connect any other loads to the product. Never connect capacitive loads to the product.

Technical data and information on the connection conditions are provided on the nameplate and in chapter "Technical data" in the documentation. Always comply with the data and conditions.

Unintended or improper use of the product may result in severe injury to persons and damage to property.

Do not use the product as a climbing aid.

### 2.5.1 Hoist applications

To avoid danger of fatal injury by falling hoists, observe the following points when using the product in lifting applications:

- Use mechanical protection devices.
- Perform a hoist startup.

## 2.6 Functional safety technology

The product must not perform any safety functions without a higher-level safety system, unless explicitly allowed by the documentation.

## 2.7 Installation/assembly

Ensure that the product is installed and cooled according to the regulations in the documentation.

Protect the product from excessive mechanical strain. The product and its mounted components must not protrude into the path of persons or vehicles. Ensure that components are not deformed and that insulation spaces are maintained, particularly during transportation. Electric components must not be mechanically damaged or destroyed.

Observe the notes in the chapter "Mechanical installation" of the documentation.

### 2.7.1 Restrictions of use

The following applications are prohibited unless explicitly permitted:

- Use in potentially explosive areas
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, and radiation
- Operation in applications with impermissibly high mechanical vibration and shock loads in excess of the regulations stipulated in EN 61800-5-1
- Operation at installation altitudes above 4000 m above sea level

The product can be used at altitudes above 1000 m asl up to 4000 m asl under the following conditions:

- Taking the reduced continuous rated current into consideration, see chapter "Technical data" of the documentation.
- Above 2000 m asl, the air and creeping distances are only sufficient for overvoltage class II according to EN 60664. If the installation requires overvoltage category III according to EN 60664 you have to reduce the overvoltages on the system side from category III to II using additional external overvoltage protection.
- If a protective electrical separation is required, then implement this outside the product at altitudes of more than 2000 m above sea level (protective separation in accordance with EN 61800-5-1 and EN 60204-1)

## 2.8 Electrical connection

Make yourself familiar with the applicable national accident prevention guidelines before you work on the product.

Perform electrical installation according to the pertinent regulations (e.g. cable cross sections, fusing, protective conductor connection). The documentation at hand contains additional information.

Make sure that all required covers are installed correctly after electrical installation.

Make sure that preventive measures and protection devices comply with the applicable regulations (e.g. EN 60204-1 or EN 61800-5-1).

### 2.8.1 Required preventive measure

Make sure that the product is correctly attached to the ground connection.

### 2.8.2 Stationary application

Necessary preventive measure for the product is:

Type of energy transfer	Preventive measure
Direct power supply	<ul style="list-style-type: none"> <li>• Ground connection</li> </ul>

## 2.9 Protective separation

The product meets all requirements for protective separation of power and electronics connections in accordance with EN 61800-5-1. To ensure protective separation, all connected circuits must also meet the requirements for protective separation.

## **2.10 Startup/operation**

Observe the safety notes in the chapters "Startup" and "Operation" in the documentation.

Make sure that the present transport protection is removed.

Do not deactivate monitoring and protection devices of the machine or system even for a test run.

Make sure the connection boxes are closed and screwed before connecting the supply voltage.

Depending on the degree of protection, products may have live, uninsulated, and sometimes moving or rotating parts, as well as hot surfaces during operation.

Additional preventive measures may be required for applications with increased hazard potential. You have to check the protection devices after each modification.

When in doubt, switch off the product whenever changes occur in relation to normal operation. Possible changes are e.g. increased temperatures, noise, or oscillation. Determine the cause. Contact SEW-EURODRIVE if necessary.

When the device is switched on, dangerous voltages are present at all power connections as well as at any connected cables and terminals. This also applies even when the product is inhibited and the motor is at standstill.

Do not separate the connection to the product during operation.

This may result in dangerous electric arcs damaging the product.

If you disconnect the product from the voltage supply, do not touch any live components or power connections because capacitors might still be charged. Observe the following minimum switch-off time:

10 minutes.

Observe the corresponding information signs on the product.

The fact that the operation LED and other display elements are no longer illuminated does not indicate that the product has been disconnected from the supply system and no longer carries any voltage.

Mechanical blocking or internal safety functions of the product can cause a motor standstill. Eliminating the cause of the problem or performing a reset may result in the drive re-starting automatically. If, for safety reasons, this is not permitted for the drive-controlled machine, first disconnect the product from the supply system and then start troubleshooting.

Risk of burns: The surface temperature of the product can exceed 60 °C during operation.

Do not touch the product during operation.

Let the product cool down before touching it.

### **2.10.1 Energy storage unit**

Products with a connected energy storage unit are not necessarily de-energized when they have been disconnected from the supply system. Usually, the energy storage unit stores sufficient energy to continue operation of the connected motors for a limited period of time. It is not sufficient to observe a minimum switch-off time.

Perform a shutdown as described in the documentation in chapter "Service" > "Shutdown".

## 3 Motor design


### 3.1 Type code

#### 3.1.1 Primary

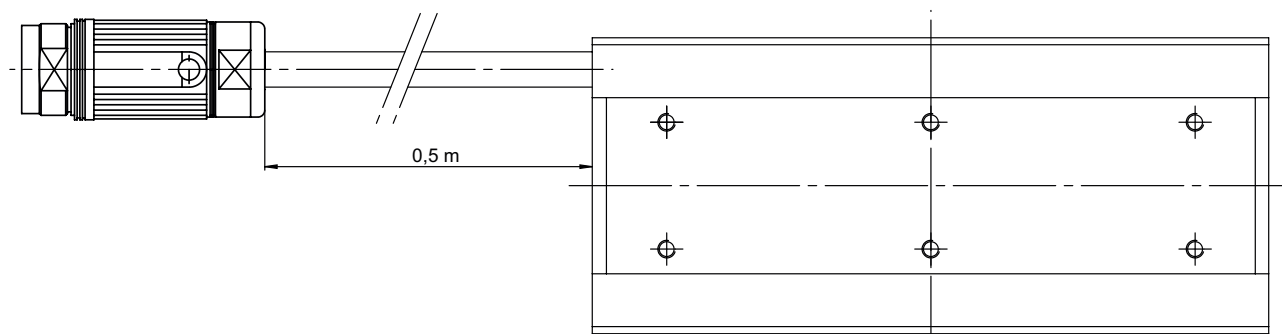
Example: SL2-P050VS-030-TF-B-KVX1-00		
Product name	SL2	• Second-generation synchronous linear motor
Motor component	P	• P = Primary
Active width of the primary	050	<ul style="list-style-type: none"> <li>• 025 = 25 mm</li> <li>• 050 = 50 mm</li> <li>• 100 = 100 mm</li> <li>• 150 = 150 mm</li> <li>• 200 = 200 mm</li> <li>• 250 = 250 mm</li> </ul>
Length of the primary	VS	<ul style="list-style-type: none"> <li>• VS = Very short</li> <li>• S = Short</li> <li>• M = Medium</li> <li>• ML = Medium long</li> </ul>
Speed class	030	<ul style="list-style-type: none"> <li>• 010 = 1 m/s</li> <li>• 030 = 3 m/s</li> <li>• 060 = 6 m/s</li> </ul>
Motor protection	TF	<ul style="list-style-type: none"> <li>• TF = PTC thermistor</li> <li>• KY = Continuous motor temperature monitoring</li> <li>• PK = PT1000<sup>1)</sup></li> </ul>
Motor design	B	<ul style="list-style-type: none"> <li>• B = SL2-Basic</li> <li>• A = SL2-Advanced System</li> <li>• P = SL2-Power System</li> </ul>
Connection	KVX1	<ul style="list-style-type: none"> <li>• KVX1 = Cable extension (SL2 Basic)</li> <li>• AVX0 = Cable extension with connector (SL2-Basic)</li> <li>• SSXS = Connector (SL2-Power System, SL2-Advanced System)</li> </ul>
Design	00	<ul style="list-style-type: none"> <li>• 00 = Standard</li> <li>• 01 = With modified winding</li> </ul>

1) Not available for all part numbers, but additional part numbers can be added.

### 3.1.2 Cable extension SL2-Basic

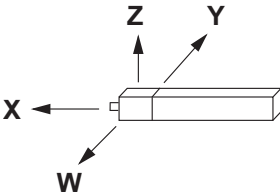
Example: SL2-...-...-KVX1-...		
Connection type	K	<ul style="list-style-type: none"> <li>K = Cable extension</li> <li>A = Connector</li> </ul>
Electrical connection	V	<ul style="list-style-type: none"> <li>V = Connected</li> </ul>
Cable outlet position	X	<ul style="list-style-type: none"> <li>X = Standard</li> </ul> 
Cable extension length	1	<ul style="list-style-type: none"> <li>1 = 1 m (standard)</li> <li>4 = 4 m (can be ordered)</li> <li>0 = 0.5 m (cable length only with connector design)</li> </ul>

The SL2-Basic version with  $I_{\text{nominal}} \leq 26 \text{ A}$  is available with Intercontec round connector → type AVX0



20687053707

### 3.1.3 Connector positions of SL2-Advanced System and SL2 -Power System

Example: SL2-...-...-SSXS-...		
Connection type	S	<ul style="list-style-type: none"> <li>S = Connector</li> </ul>
Mechanical design	S	<ul style="list-style-type: none"> <li>S = Standard</li> </ul>
Position of connector	X	<ul style="list-style-type: none"> <li>X = Standard</li> </ul> <p>Not available for the following motors/plug-in connections:</p> <ul style="list-style-type: none"> <li>SL2-050 Power System with connector position Z<sup>1)</sup></li> <li>SL2-100 Power System with connector position W<sup>1)</sup></li> <li>SL2-150 Power System with connector position Z<sup>1)</sup></li> </ul> 
Design	S	<ul style="list-style-type: none"> <li>S = Standard</li> </ul>

1) Collision with M12 24 V connector



## 3.1.4 Secondary

Example: SL2-S050-128		
Product name	SL2	• Second-generation synchronous linear motor
Part designation	S	• Secondary
Active magnet width of the secondary	050	<ul style="list-style-type: none"> <li>• 025 = 25 mm</li> <li>• 050 = 50 mm</li> <li>• 100 = 100 mm</li> <li>• 150 = 150 mm</li> <li>• 200 = 200 mm</li> <li>• 250 = 250 mm</li> </ul>
Length of the secondary	64	<ul style="list-style-type: none"> <li>• 064 = 64 mm</li> <li>• 128 = 128 mm</li> <li>• 256 = 256 mm</li> <li>• 512 = 512 mm</li> </ul>

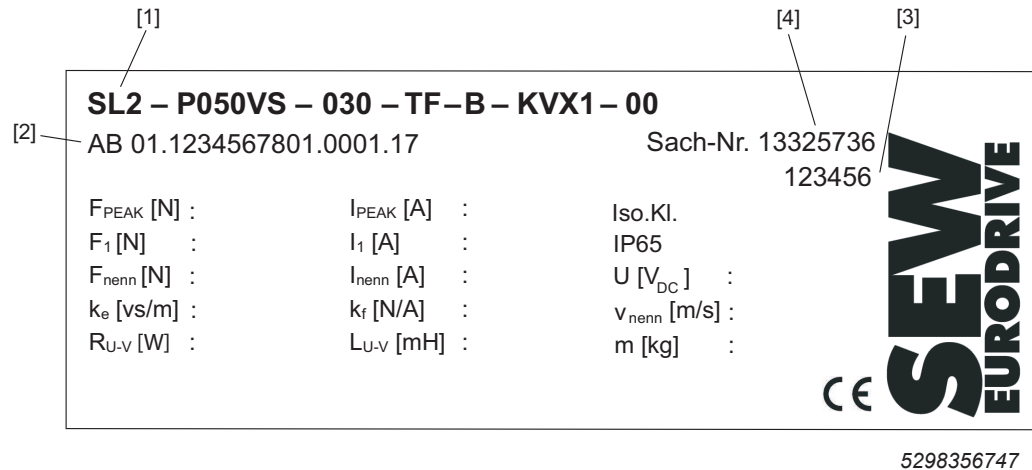
## 3.1.5 Length measuring system

Example: AL1H		
Encoder type	A	• A = Absolute encoder
Measuring system	L	• L = Linear measuring system
Encoder variant	1	<ul style="list-style-type: none"> <li>• 1 = L230</li> <li>• 2 = TTK70</li> </ul>
Encoder interfaces	H	• HIPERFACE®

## 3.2 Nameplate

Nameplates that show the technical data are attached to the primaries and secondaries of the linear motor:



### 3.2.1 Exemplary representation of a nameplate



[1]	Type code
[2]	Customer order number
[3]	Production number
[4]	Part number
$F_{PEAK}$	Maximum force
$F_1$	Maximum force available up to $v_1$
$F_{nominal}$	Rated force
$k_e$	Voltage constant
$R_{U-V}$	Winding resistance <sup>1)</sup>
$I_{PEAK}$	Maximum current
$I_1$	Current at $F_1$
$I_{nominal}$	Rated current
$k_f$	Force factor
$L_{U-V}$	Inductance <sup>1)</sup>
Iso.Kl.	Thermal class
IP	Degree of protection
$V$	DC link voltage
$V_{nominal}$	Nominal speed
$m$	Weight

1) Half the conductor value (UV value) is used for startup.

### 3.2.2 Nameplate of SL2-Advanced System and SL2-Power System

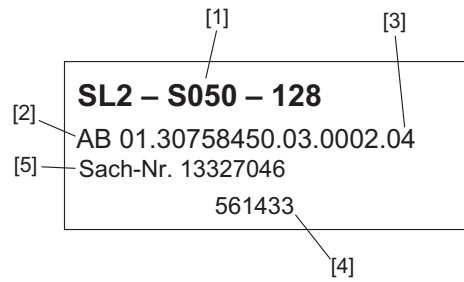
SEW-EURODRIVE										 	
76646 Bruchsal/Germany											
Type	SL2 - P050S - 30 - TF - P - SSXS - 00										
No.	01.1234567801.0001.17										
F <sub>pk</sub>	1300.0	N	I <sub>pk</sub>	11.8	A	kg	12.300				
F <sub>1</sub>	1000.0	N	I <sub>1</sub>	8.7	A	IP	54				
F <sub>N</sub>	760.0	N	I <sub>N</sub>	6.1	A	Th.Kl.	B				
k <sub>e</sub>	76.0	V/s/m	K <sub>f</sub>	131.0	N/A	°C	+5...+40				
R <sub>U-V</sub>	7.02	Ω	L <sub>U-V</sub>	45.0	mH						
U	490.0	V <sub>DC</sub>	f <sub>n</sub>	106.0	Hz	U <sub>p</sub>	258	V			
v <sub>N</sub>	3.4	m/s	Part-No.								
1332 783 6						Made in Germany					

20509321867

Type	Type code
no.	Customer order number
F <sub>pk</sub>	Maximum force
F <sub>1</sub>	Maximum force available up to v <sub>1</sub>
F <sub>N</sub>	Rated force
k <sub>e</sub>	Voltage constant
R <sub>U-V</sub>	Winding resistance <sup>1)</sup>
U	DC link voltage
v <sub>N</sub>	Nominal speed
I <sub>pk</sub>	Maximum current
I <sub>1</sub>	Current at F <sub>1</sub>
I <sub>N</sub>	Rated current
k <sub>f</sub>	Force factor
L <sub>U-V</sub>	Inductance
Part no.	Part number
kg	Weight
IP	Degree of protection
Th.cl.	Thermal class
°C	Ambient temperature range
V <sub>p</sub>	Internal voltage at v <sub>N</sub>
f <sub>n</sub>	Rated frequency
v <sub>1</sub>	Transitional speed

1) Half the conductor value (UV value) is used for startup.

### 3.2.3 Nameplate secondary



5298362123

- [1] Type code
- [2] Customer order number
- [3] Date of production
- [4] Production number
- [5] Part number

### 3.3 Scope of delivery of the system components

The scope of delivery for SL2 linear motors comprises:

- Primaries
- Secondaries with permanent magnets
- SL2-Advanced System
  - Primary installed in motor cooling unit
  - Electrical plug connectors
  - T-slot nuts
- SL2-Power System
  - Primary installed in motor cooling unit
  - Electrical plug connectors
  - Forced cooling fan mounted and electrically wired
  - T-slot nuts
- Prefabricated power and encoder cables
- Control and regulation systems such as MOVIDRIVE®
- Length measuring system
- Encoder mount-on components

#### 3.3.1 Not included in scope of delivery:

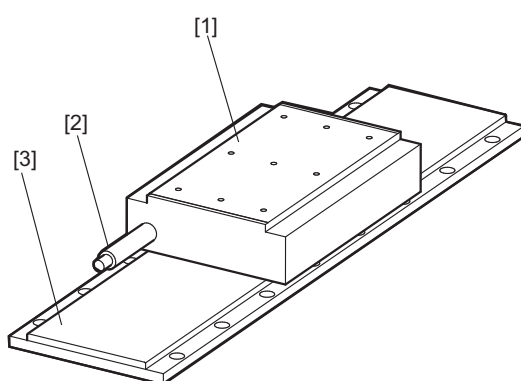
- Linear guide systems
- Linear measuring system (except AL1H and AL2H)
- Cable carriers
- Brake systems
- Buffer/shock absorber

### 3.4 SL2 product designs

SEW-EURODRIVE offers 3 product designs of SL2 linear motors:

<b>SL2-Basic</b>	Primary and secondaries
<b>SL2-Advanced System</b>	Primary integrated in motor cooling unit and secondaries. Prepared for installation of linear guides and the linear encoder.
<b>SL2-Power System</b>	Primary integrated in motor cooling unit with forced cooling fan and secondaries. Prepared for installation of linear guides and the linear encoder.

#### 3.4.1 SL2-Basic



5298320651

- [1] Primary
- [2] Electrical connection in form of a cable extension
- [3] Secondary with permanent magnets

#### Description

The SL2-Basic linear motor consists of the main components primary and secondary. Further components such as e.g. a motor cooling unit are not installed.

The SL2-Basic is available in the following sizes:

- SL2-P025
- SL2-P050
- SL2-P100
- SL2-P150
- SL2-P200
- SL2-P250

The lengths VS, S, M, ML are not available for all sizes. For available assignments, refer to chapter "SL2-Basic motor data" (→ 55).

#### Areas of application

In general, no restrictions for the use of SL2-Basic linear motors exist. The compact design makes this linear motor suitable for even applications with very limited space.

Observe the following note for using the linear motor in hoists.



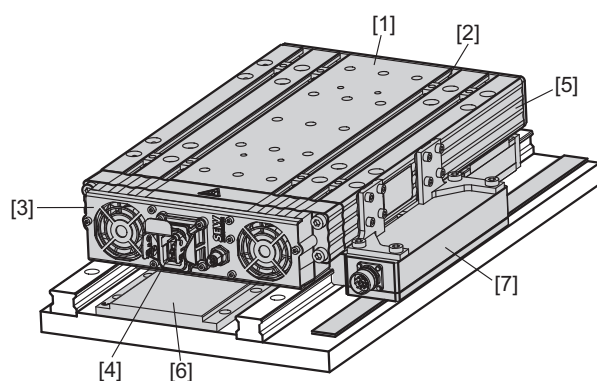
### ▲ WARNING

#### For use in hoists!

The motor system is not equipped with its own holding brake. With incremental encoder, commutation search is required after each reset.

- SEW-EURODRIVE strongly recommends using an absolute measuring system when using the system as hoist drive. You find information in the "SL2 Synchronous Linear Motors" catalog.

### 3.4.2 SL2-Advanced System and SL2-Power System



5298323339

- [1] Optional motor cooling unit
- [2] Prepared grooves as retaining system for customer setup
- [3] Forced cooling fan for motor cooling unit<sup>1)</sup>
- [4] Electrical plug connector
- [5] Primary (not visible) installed in motor cooling unit
- [6] Secondary
- [7] Length measuring system

1) in SL2-Power System only

#### Description

The linear motor is installed into a motor cooling unit at the factory for product groups SL2-Advanced System and SL2-Power System.

With the following motor sizes the motor cooling unit is available for all lengths (except for SL2-P150VS) as system components:

- SL2-P050
- SL2-P100
- SL2-P150

#### Fields of application for the SL2-Advanced System

The SL2-Advanced System can basically be used in all fields of application for the SL2 linear motor. There are no limitations.

Observe the following note for using the linear motor in hoists.





### ▲ WARNING

#### For use in hoists!

The motor system is not equipped with its own holding brake. With incremental encoder, commutation search is required after each reset.

- SEW-EURODRIVE strongly recommends using an absolute measuring system when using the system as hoist drive. You find information in the "SL2 Synchronous Linear Motors" catalog.

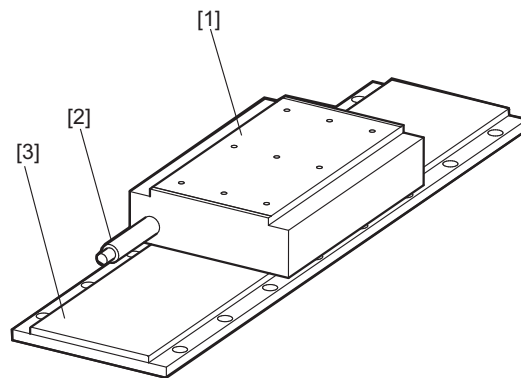
**Fields of application for the SL2-Power System**

The use of the motor cooling unit with forced cooling fans is limited to enclosure IP54.

**3.4.3 Design of the subsystems**

The motor is installed into the motor cooling unit by SEW-EURODRIVE and connected to a standardized power plug. The 24 V power supply for the fans is provided by a separate plug when using forced cooling fans.

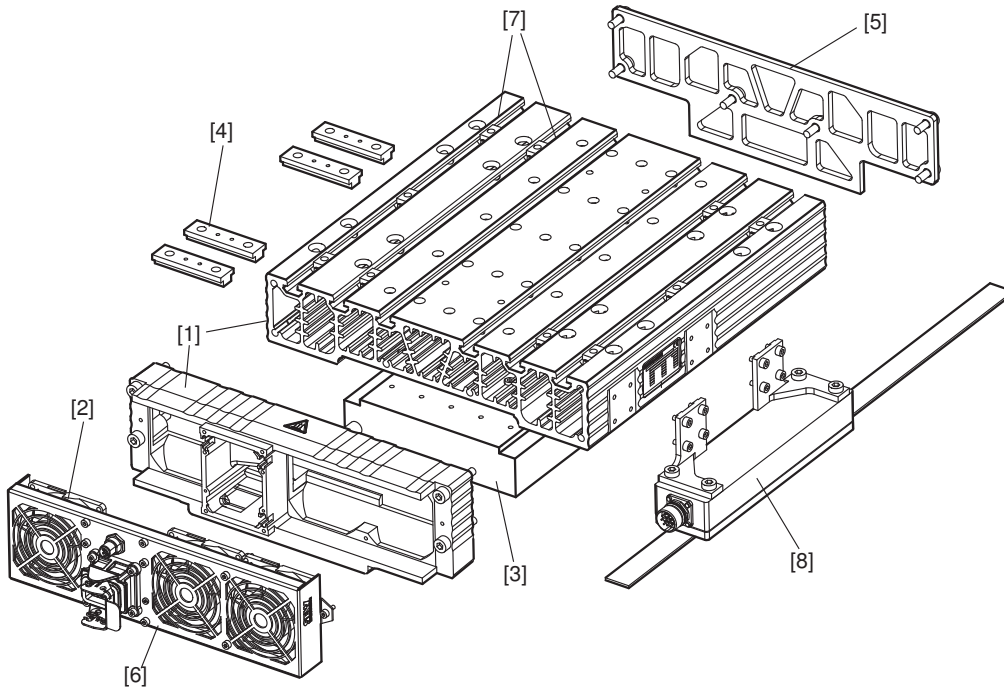
### 3.5 Structure of SL2-Basic



5298320651

- [1] Primary
- [2] Electrical connection in form of a cable extension
- [3] Secondary with permanent magnets

### 3.6 Structure of SL2-Advanced System and SL2-Power System



5298329739

- [1] Motor cooling unit
- [2] Forced cooling fan (in SL2-Power System only)
- [3] Primary
- [4] Integrated non-locating bearing for temperature compensation
- [5] End plate
- [6] Front panel with power plug and fan guard
- [7] Slots for installation of components by customer (T-slot nuts supplied)
- [8] Length measuring system

## 4 Transportation and storage

Observe the notes in chapter Transport.

### 4.1 Transport

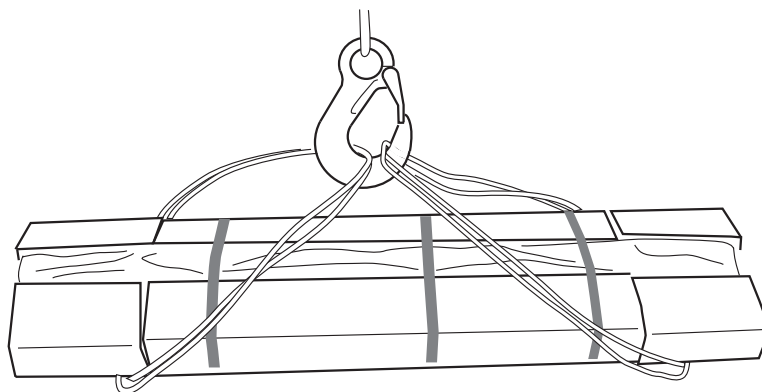
#### 4.1.1 Primaries of SL2-Basic

Primaries of the SL2-Basic with a net weight of more than 18 kg are equipped with the following transportation aids:

- SL2-P100M/ML
- SL2-P150S/M/ML
- SL2-P200S/M/ML
- SL2-P250VS/S/M/ML

#### Packaged primary

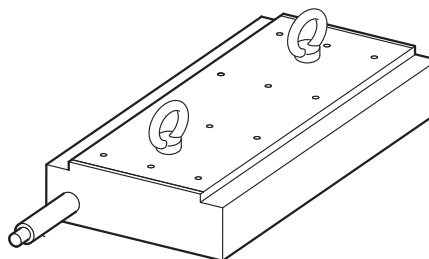
- Only transport the packaged primary using the attached crane sling.
- The weight of the primary is indicated on the nameplate or the dimension sheet.



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#### Unpacked primary

- The primary has 2 M6 threads designated for lifting eyebolts (not included in the delivery) for transportation.



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# 4 Transportation and storage

Storage and corrosion protection

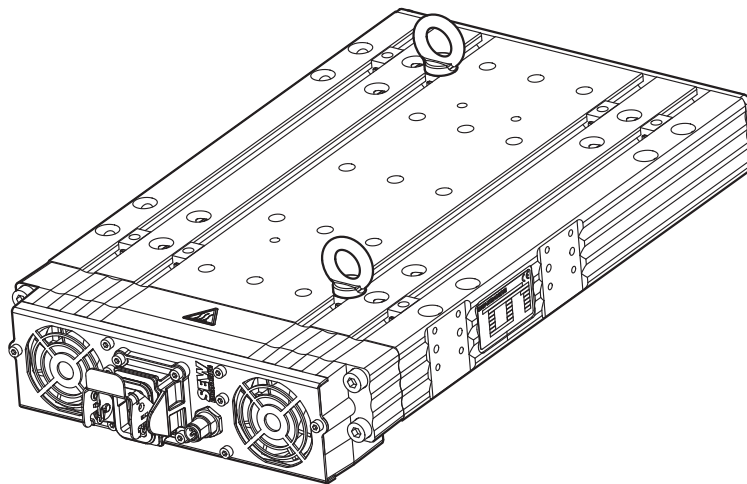
## 4.1.2 Primaries of SL2-Advanced System and SL2-Power System

The following primaries of the SL2-Advanced System and SL2-Power System with a net weight of more than 18 kg can be removed from the box using a lifting device:

- SL2-P050M/ML
- SL2-P100S/M/ML
- SL2-P150S/M/ML

### Unpacked primary

- The T-slot nuts on the motor cooling unit are equipped with two M8 lifting eyebolts (not included in the delivery) for transportation.



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## 4.2 Storage and corrosion protection

The motor parts are protected against corrosion for five years in closed original packaging.

Observe the following storage conditions for SL2 linear motors:

- Store the SL2 linear motors indoors.
- The storage location must be clean and dry.
- The storage temperature should be between -5 °C and +70 °C.
- The humidity must not exceed 95%.
- The original packaging must not be damaged.

Stored SL2 linear motors must be equipped with the following warning labels:

Warning	Magnetic

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### **4.3 Return delivery to SEW-EURODRIVE**

Return primary and secondary components in original packaging only.



## 5 Mechanical installation

### 5.1 Notes

Install the linear motor only if the following conditions are met:

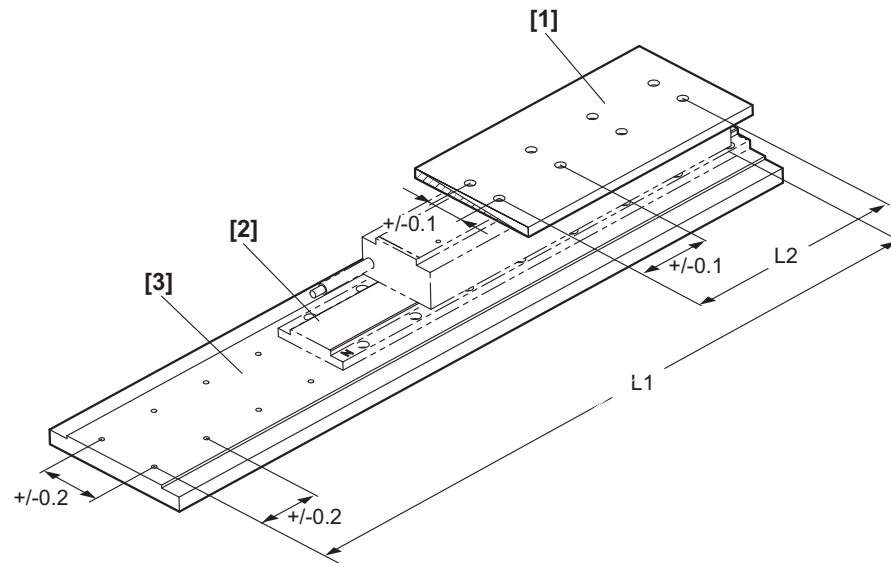
- The components of the linear motor must be undamaged (no damage caused by shipping or storage).
- All securing devices must be removed.
- The ambient temperature must be between +5 °C and +40 °C, otherwise the linear motor must be operated according to the special ambient conditions.
- The installation altitude must be no higher than 1000 m above sea level, otherwise the linear motor must be designed to meet the special environmental conditions.
- The surrounding area is free from oils, acids, gases, vapors, and radiation.

Due to the strong magnetic fields, the safety notes in chapter "Danger due to magnetic fields" (→ 9), as well as the following points must be observed.

- Do not remove the packaging of the secondary until directly before it is installed.
- Cover the permanent magnets with a non-magnetizable material such as wood as long as possible.
- If necessary customized installation appliances should be used to facilitate and safeguard work.
- Make sure that the primary is grounded according to regulations with the PE grounding bar in the control cabinet as a reference potential.

## 5.2 Tolerances

Installation tolerances



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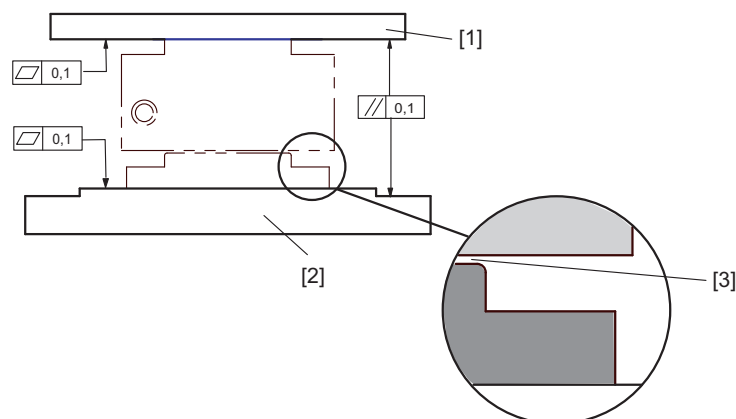
- |                               |  |
|-------------------------------|--|
| [1] Installation of primary   | Max. deflection length/width 0.1 mm, referring to the largest primary                            |
| [2] Secondary                 | Max. deflection 0.1 mm, referring to a length of 512 mm  |
| [3] Installation of secondary | L1 $\pm 0.3$ mm, referring to the total length<br>L2 $\pm 0.2$ mm, referring to the total length |

Air gap

### INFORMATION



The tolerance of the air gap is  $\pm 0.05$  mm.



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- |     |   |
|-----|---|
| [1] | Installation of primary (mounting plate)                  |
| [2] | Installation of secondary (basic body, e. g machine base) |
| [3] | Air gap   |

#### Form and position tolerances

The shape and position tolerances must be observed for the correct function of the SL2 linear motor, see also the figure above. Depending on the used measuring system, it may be necessary to have a greater accuracy of the mounted parts for safe operation. These accuracies are sufficient for the functionality of the AL1H and AL2H encoder systems.

These shape and position tolerances will have to be observed in operating mode at steady-state temperature of the SL2 linear motor. Also consider the influence of loads on the customer side.

### 5.3 Required tools/resources

- Standard tools

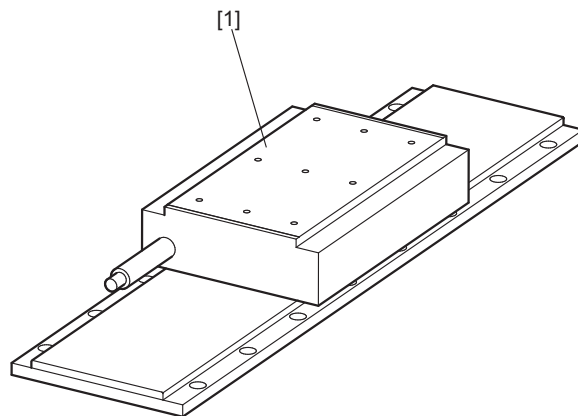
## 5.4 Installation of the SL2-Basic

### INFORMATION



Start with the installation of the primary. Only mount the secondaries after all other mounting work is finished, directly before startup of the drive. If you carry out any work, observe the safety notes in chapter "Danger due to magnetic fields" (→ 9).

#### 5.4.1 Preparing the SL2-Basic primary for installation



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Mounting surfaces [1]:

The mounting surfaces of the primary were treated with an anti-corrosion agent at the factory. Do not remove this protection layer.

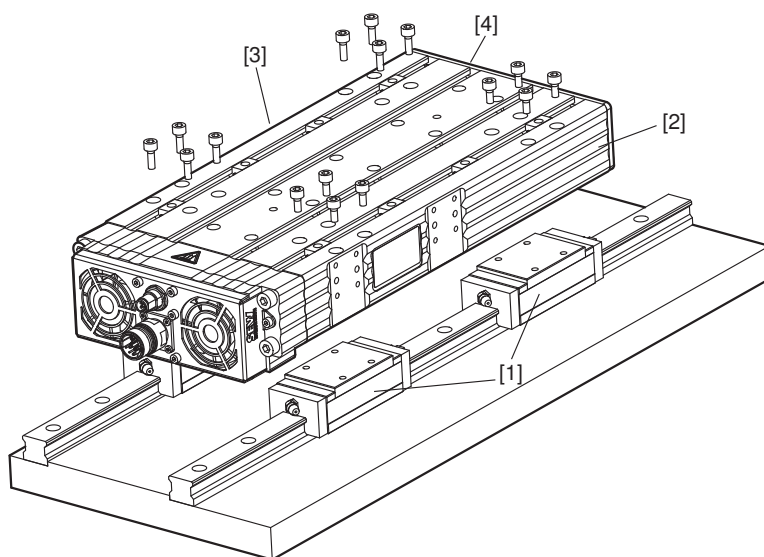
Wipe the surface only lightly with a lint free cloth to remove any dust, dirt, etc. before the assembly.

Retaining screws:

Use **all** M5 tapped holes in the mounting surface for retaining purposes. Use screws of size M5, strength class 8.8 or higher. The minimum depth of engagement is  $7 + 1$  mm.

The tightening torque is always 6 Nm and may not be exceeded, even with screws of a higher strength class.

## 5.5 Installation of the SL2-Advanced System and SL2-Power System



5298685835

- [1] Guide carriage
- [2] Fixed bearing end
- [3] Floating bearing end
- [4] End plate

The SL2-Advanced System and SL2-Power System are screwed onto the guide carriages [1]. Bores for cylinder screws to DIN EN ISO 4762 are provided for this purpose on the primary housing (screws are not included in the delivery).

### INFORMATION



For guide systems available for SL2-Advanced System and SL2-Power System, refer to chapter "Technical data for linear guide systems" (→ 73).

This screw connection essentially determines the mechanical load capacity of the primary. Only use screws in strength class 8.8.

The maximum surface pressure of 230 N/mm<sup>2</sup> below the screw head must not be exceeded. The friction coefficient  $\mu_{\text{head}}$  beneath the screw head is 0.15.

Type	Bearing side	Screw size	Tightening torque Nm	Number of screws for respective primary length			
				VS	S	M	ML
SL2-050	Fixed bearing end [2]	M6×12	10	8	8	12	12
	Floating bearing end [3]	M6×16	10	8	8	12	12
SL2-100	Fixed bearing end [2]	M8×16	20	8	8	12	12
	Floating bearing end [3]	M8×20	20	8	8	12	12

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Type	Bearing side	Screw size	Tightening torque Nm	Number of screws for respective primary length			
				VS	S	M	ML
SL2-150	Fixed bearing end [2]	M8×16	20	-	8	8	12
	Floating bearing end [3]	M8×20	20	-	8	8	12

### 5.5.1 Prerequisite for assembly

First assemble the guide system including the guide carriage according to the manufacturer's specifications. Especially observe the requirements regarding accuracy of the mounting surfaces, see chapter "Tolerances" (→ 31).

### 5.5.2 Starting the installation



#### ▲ WARNING

Improper installation may result in hazardous situations.

Severe or fatal injuries.

- Only mount the secondaries after all other mounting work is finished, directly before startup of the drive. Observe the safety notes about handling the secondaries in the individual chapters.

### 5.5.3 Installing the primary

1. Wipe the surface of the primary lightly with a lint free cloth to remove any dust, dirt, etc.
2. Align the guide carriages [1] on the guide rails (see figure on the previous page) so that the primary can be installed.
3. Place the primary onto the guide carriages [1]. Use suitable hoists for heavy parts, see chapter "Transportation and storage" (→ 27).
4. Insert all screws for fastening the primary to the guide carriages [1]. The screws need not be greased or lubricated.

#### INFORMATION



Use a magnetic hexagon socket tool to insert the screws. They prevent screws from falling out in unfavorable mounting positions. If screws fall inside the primary housing, it is essential that you remove them. The end plate [4] can be removed for easier access (see illustration on the previous page).

5. First tighten the screws at the locating bearing end [2] in accordance with the tightening torque (see table on the previous page).
6. Then tighten the screws on the non-locating bearing end [3].

## 5.6 Installation of secondaries

### 5.6.1 Installation preparation



#### **⚠ WARNING**

Danger caused by magnetic field.

Severe or fatal injuries.

- Do not unpack parts until you are ready for installation.
- 

#### **Preparing installation of secondaries size 050-200**

First prepare the M6 retaining threads in the machine base to install the secondaries.

#### **Preparing installation of secondaries size 250**

Parallel pins are additionally needed to install size SL2-S 250. Pin holes with a bore diameter of 5 H7 mm must be provided in the machine base. Observe a distance tolerance of  $\pm 0.02$  mm for the bores.

Use cylinder pins according to ISO 2338-5m6 for securing by pins.

In case of blind holes, using parallel pins with female thread is recommended, so that the pins can be removed easier.

#### **INFORMATION**



The studs must fit tightly in the locating hole. Check if the stud connection is performed correctly.

---

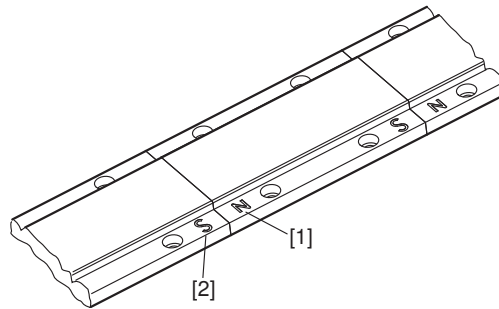
The mounting surfaces of the secondary were treated with an anti-corrosion agent at the factory. Do not remove this protection layer. Wipe the surface of the primary lightly with a lint free cloth to remove any dust, dirt, etc.



### 5.6.2 Installation

The first secondary is mounted at the end of the travel distance and then proceeds in another direction. The orientation of the first part can be random. The adjoining part will have the same orientation.

The north [1] (N) and south [2] (S) poles are identified on the secondaries (see following illustration). You can combine secondaries of different lengths.



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[1] North pole

[2] South pole

Use **all** bores of the secondary for retaining purposes. For this purpose, use screws of size M6 and strength class 8.8 or higher.

The engagement depth and tightening torque (generally 10 Nm) depend on the customer support structure.

Move primary over secondaries by hand prior to startup of drive to check for un-hindered operation.

Use non-magnetic testing devices, such as feeler gauges made of stainless steel, aluminum, brass or copper sheets if you are planning to check the visible air gap.

#### **⚠ DANGER**

Danger of electric shock.

Severe or fatal injuries

Induced voltages of up to 500 V at the primary's power connector can be generated by movement of the primary (generator principle) even if the motor is not connected.

- Only remove the protection cap on the power connector of the primary immediately before connecting the power connector to the power supply.



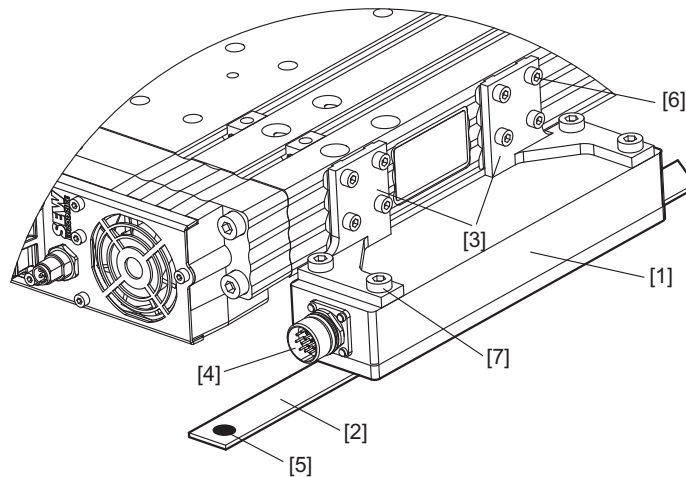
## 5.7 Installing the measuring system AL1H

### INFORMATION



Observe the assembly instructions by the encoder system manufacturer.

Note for installation of the magnetic tape [2] that the end identified by a dot [5] is stuck on in the direction of the connecting plug [4].



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- [1] Linear sensor
- [2] Magnetic tape
- [3] Encoder mount-on components
- [4] Linear sensor connection
- [5] Identification of the installation direction of the magnetic tape
- [6] Screw for primary housing/mount-on components
- [7] Screw for linear sensor/mount-on components

Use any non-magnetic stainless steel screws M8×20 for screwing the mount-on components [7] to the linear sensor. Tighten the screws with a tightening torque of 16 Nm.

To fasten the mount-on components [6] to the primary housing, fasten the M5×12 screws using a tightening torque of maximum 5 Nm.

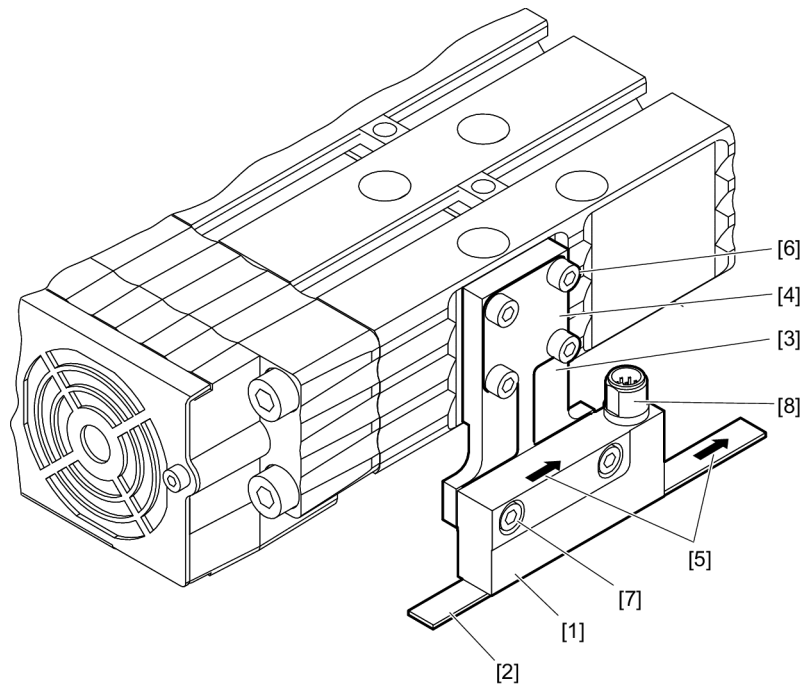
## 5.8 Installing the measuring system AL2H

### INFORMATION



Observe the assembly instructions by the encoder system manufacturer.

During the assembly make sure that the linear sensor [1] is installed as depicted in the following illustration. Also make sure that the travel direction [5] specified on the magnetic tape [2] and on the linear sensor match.



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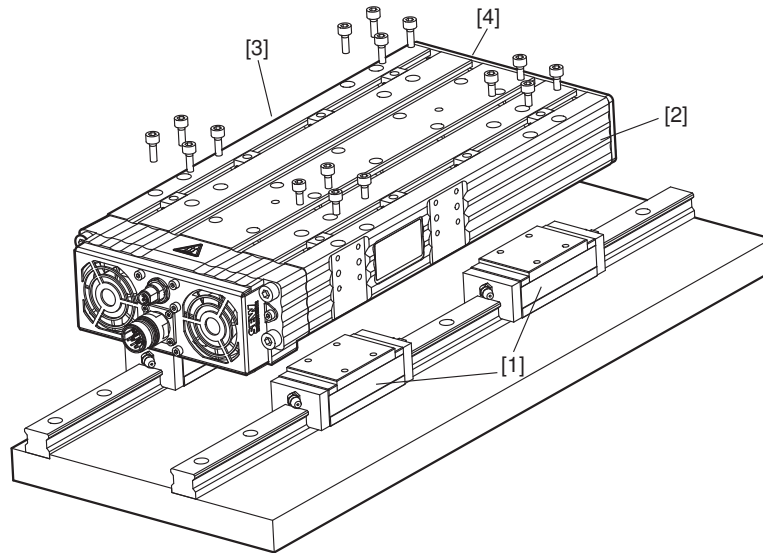
- [1] Linear sensor
- [2] Magnetic tape
- [3] Mounting plate
- [4] Shield plate
- [5] Mark the positive counting direction
- [6] M5x14 screws
- [7] Screws
- [8] Linear sensor connection

1. Position the shield plate [4] between linear encoder [1] and mounting plate [3].
2. Tighten the M5x14 screws with a maximum tightening torque of 5 Nm.

### 5.9 Installation of customer components on primary

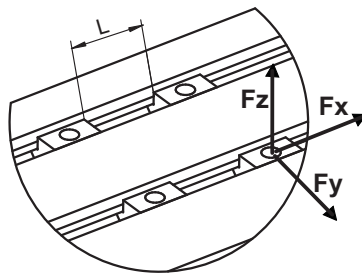
T-slot nuts are inserted in the primary housing at the factory for the installation of customer components. If required, the distribution of the T-slot nuts within the primary housing can be adapted.

Remove the end plate [4], push the t-slot nuts with the springs into the desired groove, and screw the end plate back on.



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- [1] Guide carriage
- [2] Fixed bearing end
- [3] Floating bearing end
- [4] End plate



The design of the slot system is based on the modular profile system from Bosch/Rexroth so that components from this modular system or similar modular systems can be used.

Permitted static load for the slot:

In direction	Fz	12000 N	(plastic deformation starts)
In direction	Fx	1000 N	
In direction	Fy	1000 N	

## INFORMATION



Rule of thumb: 1000 N ( $\approx$  100 kg) per T-slot nut in every direction

As long as the minimum distance "L" between the T-slot nuts is observed, the T-slot nuts can be distributed as required within the customer mounting surface.

Motor type	Number of installed T-slot nuts	Min. distance (L) between the T-slot nuts mm
SL2-050VS	6	70
SL2-050S	8	80
SL2-050M	10	90
SL2-050ML	10	90
SL2-100VS	8	70
SL2-100S	8	80
SL2-100M	10	90
SL2-100ML	10	90
SL2-150S	10	80
SL2-150M	12	90
SL2-150ML	14	90

To make it easier for customers to install/remove loads, each cooling unit comes equipped with pin holes for positioning. Additionally, the T-slot nuts are secured to ensure that they do not shift.

Any other loads acting on the screw connection of the T-slot nuts must be determined in accordance with the standard calculation procedures used in mechanical engineering. The customer loads and design of the mount-on components are included in the calculation.

Generally, the permitted load of the primary is limited by the screw itself.

## 6 Electrical installation

### INFORMATION



A bag containing the important information is attached to the motor:

#### Observe the following information

- Safety notes
- Wiring diagram

### 6.1 Electrical connection

#### 6.1.1 SL2-Basic electrical connection

### INFORMATION



The current carrying capacity only applies to the SL2-Basic design with standard cable length 1 m.

Cable extension type	1	2	3	4	5
Outer diameter in mm	9.2	10.8	13	17.5	20.5
Cores	4 x 1.5 + 1 x 2 x 0.5	4 x 2.5 + 1 x 2 x 0.5	4 x 4 + 1 x 2 x 0.5	4 x 6 + 1 x 3 x 1.5	4 x 10 + 1 x 3 x 1.5
Current load in A at ambient temperature 30 °C	18	26	34	44	61
Current load in A at ambient temperature 40 °C	16	23	30	40	55
Current load in A at ambient temperature 60 °C	12	17	24	31	43
Labeling	Power				
Phase U	BK (1)	BK (1)	BK (1)	BK (U/L1)	BK (U/L1)
Phase V	BK (2)	BK (2)	BK (2)	BK (V/L2)	BK (V/L2)
Phase W	BK (3)	BK (3)	BK (3)	BK (W/L3)	BK (W/L3)
Protective earth	GNYE	GNYE	GNYE	GNYE	GNYE
Temperature sensor identification	TF				
PTC 140/TF 1	WH	WH	WH	BK (1)	BK (1)
PTC 140/TF 2	BN	BN	BN	BK (2)	BK (2)
Temperature sensor identification	KY				
KTY84 – 130/anode (-)	WH	WH	WH	BK (1)	BK (1)
KTY84 – 130/anode (+)	BN	BN	BN	BK (2)	BK (2)
Temperature sensor identification	PK				
PT1000/WH	WH	WH	WH	BK (1)	BK (1)
PT1000/YE	BN	BN	BN	BK (2)	BK (2)
Minimum bending radius in mm at fixed installation	20	22	26	53	62
Minimum bending radius in mm at constant movement	92	110	130	175	205

### 6.1.2 Pin assignment of the power connection for the SL2-Advanced System and SL2 -Power System

The following pin assignments is described as viewed onto the motor.

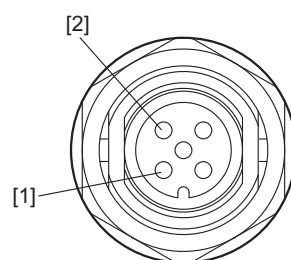
Size SL2-P050 and design AVX0

Contact	Connection	Plug connector
1	V	
4	V	
3	W	
2	PE	
A	TF1/KTY+/PK	
B	TF2/KTY-/PK	
C	n.c.	
D	n.c.	

Size SL2-P100, SL2-P150

Contact	Connection	Plug connector
U1	U1	
V1	V1	
W1	W1	
PE	Green/yellow	
3	n.c.	
4	(TF1)/KTY-/PK	
5	(TF2)/KTY+/PK	

### 6.1.3 Pin assignment for the power supply to the fan in the SL2-Power System



- [1] +24 V
- [2] Grounding

### 6.1.4 Encoder connection

Observe the following instructions when connecting an encoder:

- Only use a shielded cable with twisted pair conductors.

- Connect the shield to the PE potential on both ends over a large surface area.
- Route signal cables separately from power cables or brake cables (minimum distance 200 mm).

### 6.1.5 Thermal motor protection

#### NOTICE

Thermal inertia at loads caused by high motor currents

Damage to property.

- Use the KTY or PT1000 temperature sensor to ensure a continuous temperature monitoring.



#### INFORMATION

When an older MOVIDRIVE® *compact* MCH inverter is used, SEW-EURODRIVE recommends that you use an external TF evaluation unit (e.g. EMT6-K from Möller or 3RN1011 from Siemens).



#### INFORMATION

If you use a KTY (KTY84 – 140) or PT1000 temperature sensor, contact SEW-EURODRIVE.



#### INFORMATION

In case you use a third-party inverter, consult SEW-EURODRIVE for the customer-provided thermal motor monitoring.

### Temperature sensor KTY84 – 130



#### NOTICE

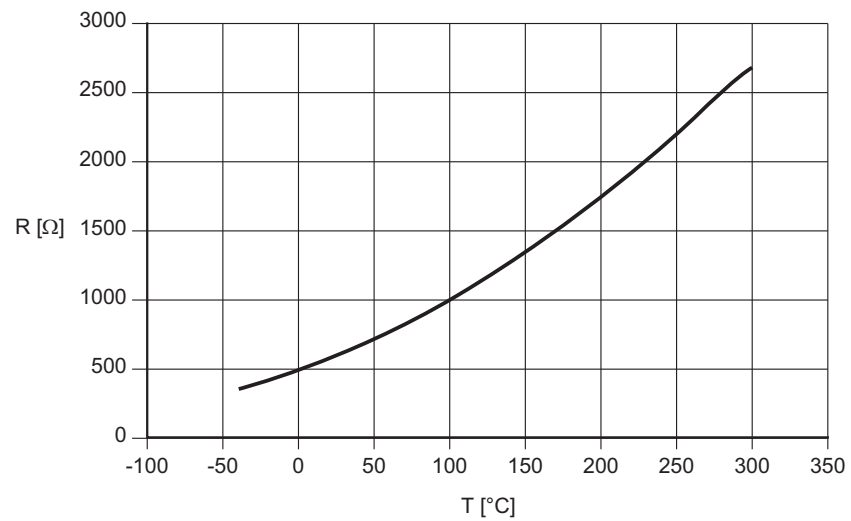
Excessive self-heating of the temperature sensor can damage the insulation of the temperature sensor as well as the motor winding.

Possible damage to property.

- Use test currents < 3 mA in the KTY circuit.



Typical characteristic curve of KTY:



2903302923

For detailed information on connecting the KTY sensor, refer to the contact assignments of resolver/encoder cables. Observe the correct polarity.

## PT1000 temperature sensor

### Technical data

The PT1000 temperature sensor continuously detects the motor temperature.

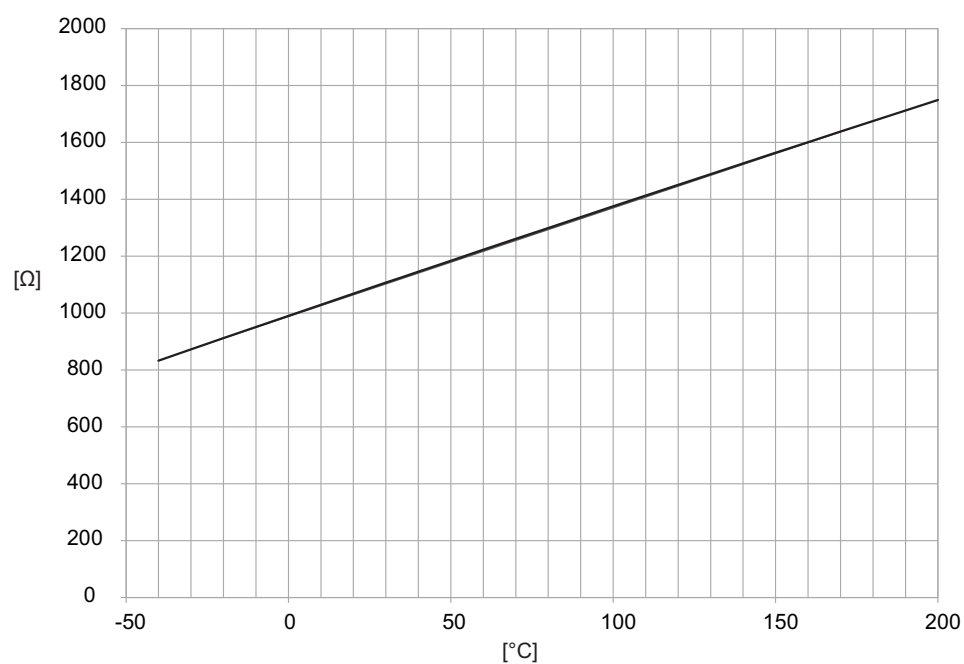
	PT1000
Connection	Black – red
Total resistance at 20 – 25 °C	1050 Ω < R < 1150 Ω
Test current	< 3 mA

## INFORMATION



The temperature sensor is unipolar which means that interchanging the incoming cables does not change the measurement result.

Typical characteristic curve of PT1000



## 7 Startup



### ⚠ DANGER

Danger of electric shock.

Severe or fatal injuries.

- When motors are powered from inverters, you must observe the wiring instructions issued by the inverter manufacturer. Observe the operating instructions of the inverter.

Observe the following points before startup:

- Never work in the travel range when the machine is switched on.
- Ensure free axis travel.
- Check the final positions.
- Check the linear measuring system prior to starting the machine.
- Limit the maximum power at the inverter.
- Set the velocity limits at the inverter to small values.
- SL2-Basic, SL2-Advanced System and SL2-Power System are started up in the same way.
- Strictly observe the safety notes in the following chapters.

### 7.1 Prerequisites for startup

Make sure the following points apply before startup:

- The primary moves along the entire travel distance easily, without collisions and free from mechanical contact between the primary and secondary.
- All connections have been made correctly.
- All protection devices are installed correctly.
- All motor protection devices are activated.
- The brake operates correctly with lifting applications.
- MOVIDRIVE® B operates with firmware that supports SL2 linear motors, such as MOVIDRIVE® B MDX...-0T (firmware 824 854 0.18 available since week 14/2007), or older inverters (special design -08;)
- MOVIAXIS® operates with firmware that supports SL2 linear motors (such as MOVIAXIS® with firmware 21 or higher (available as of February 2007)
- All sources of danger have been removed.
- The MOVITOOLS® MotionStudio startup software is installed on your PC.

## 7.2 Commutation travel process

Contrary to rotating systems, there is initially no mechanical connection between the encoder system, primary and secondary in linear motors.

This connection must be made during startup. The synchronous linear motor can then be controlled directly by the inverter.

This process is referred to as commutation search or commutation travel.

The commutation travel is performed depending on the used position measuring system:

- Once during "encoder adjustment" for absolute distance measuring systems.
- Every time the unit is turned on and reset in case of incremental distance measuring systems.

The following section describes a standard commutation travel. How this standard commutation travel is activated in the relevant inverter is described in the startup procedures for the relevant MOVIDRIVE® and MOVIAXIS® inverters.

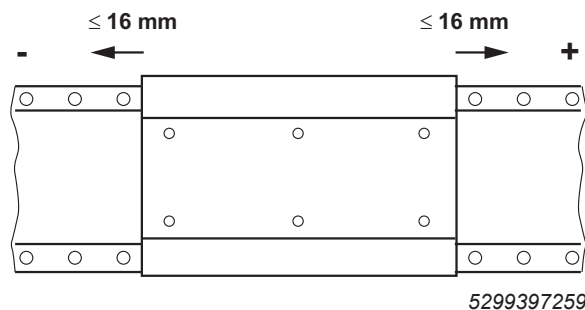
### INFORMATION



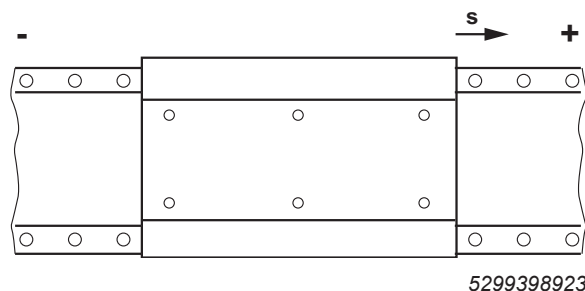
If the standard commutation travel is not possible or recommended in your application, other types of commutation travel are available upon request.

#### 7.2.1 Commutation travel process

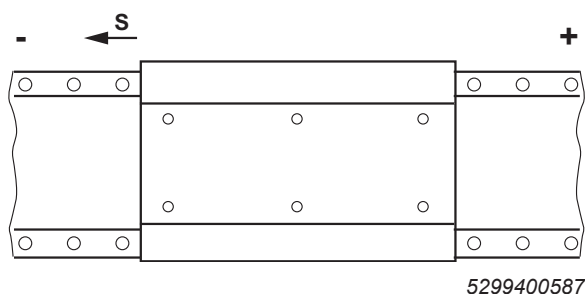
1. The linear motor moves to a random position. This can be a distance of between 0 mm to max. 16 mm in either direction from the start position. The linear motor stops here for about one second.



2. The linear motor is moved  $S = 32$  mm with MOVIDRIVE®,  $S = 64$  mm with MOVIAXIS® in positive direction. The linear motor stops here for about one second.



3. The linear motor is moved  $S = 32$  mm with MOVIDRIVE®,  $S = 64$  mm with MOVIAXIS® in negative direction. The linear motor stops here for about one second.



The inverter repeats the commutation process if the linear motor hits a hardware limit switch during commutation travel. The linear motor then moves to a new start position, 32 mm away from the limit switch. The cycle restarts.

**You will then hear a quiet cracking noise and the linear motor switches from controlled to automatic mode.**

### 7.3 Startup procedure

The startup of the linear motor is part of the inverter startup, and is performed using the engineering software MOVITOOLS® MotionStudio.

For detailed information on startup and parameter settings, refer to the system manuals of the SEW-EURODRIVE inverters.

Information on starting the MOVITOOLS® MotionStudio engineering software, refer to the "MOVITOOLS® MotionStudio" manual.

This chapter describes the relevant steps, important information, and settings required for startup of the linear motor.

#### 7.3.1 MOVIDRIVE® B

- Parameterization
- Checking the encoder evaluation

Manually move the primary in one direction and observe parameter P003 (actual position) in MOVITOOLS®. Determine the positive direction of movement. Then slide the linear motor once over the entire travel distance to check if the encoder works correctly in all areas.

- Testing the hardware limit switch

Set the parameters for the hardware limit switch. Check the limit switch function by manually moving the primary to the limit switches.

- Activating the drive limitation for initial startup

For initial startup, limit the maximum speed via parameter P302 (max. speed 1) and the maximum force via parameter P304 (torque limit). This prevents the motor from developing its full force and speed in case of an uncontrolled axis movement.

- Communication travel

Deactivate the controller inhibit DI00 = 1. The linear motor then performs the commutation procedure (→ 48) described above.

- Optimizing the axis
- Further settings

- With an absolute encoder, you will now execute the menu item "Encoder adjustment". The linear motor is then ready for operation immediately once the system is turned on.

If you do not execute the menu item "Encoder adjustment", an absolute encoder will behave like an incremental encoder and the linear motor will carry out a commutation travel once the controller inhibit has been removed and the unit switched on.

- If you need a different positive encoder counting direction for your linear axis, activate the reversal option for the motor rotation via parameter P350.
- Remove the TF line from the inverter when the motor is at a standstill or enabled. Check whether TF monitoring responds (Error 31; TF trigger).
- If the drive has an external brake, we recommend that you control it directly. The brake is controlled using parameters P730 - P732.
- To allow for an easier replacement of the sensor head for AL1H or AL2H in case service is required, set parameter P948 "Automatic encoder detection" to OFF.

If P948 is set to ON, the inverter automatically resets the bit H473 (bit 25 "LSM commutated") when the encoder is replaced. The inverter then must perform another commutation travel.

SEW-EURODRIVE recommends setting P948 to OFF as the absolute information is on the magnetic tape, and the actual position and the commutation information are not lost after sensor replacement.

### 7.3.2 MOVIAxis®

- Parameterization
- Checking the encoder evaluation

Manually move the primary in one direction and observe index 9704.1 "Actual position" in MOVITOOLS® MotionStudio. Determine the positive direction of movement. Then slide the linear motor once over the entire travel distance to check if the encoder works correctly in all areas.

- Testing the hardware limit switch

Set the hardware limit switch parameters and check their function by manually sliding the primary to the limit switches.

- Activating the drive limitation for initial startup

For initial startup, limit the maximum speed and the maximum force using the application limit. This prevents the motor from developing its full force and speed in case of an uncontrolled axis movement.

- Communication travel

Use FCB 18 "Encoder adjustment" for the described procedure of the standard commutation travel (→ 48). With incremental encoders and AL1H or AL2H, an offset is saved in the inverter after a successful commutation travel when mode "Automatically write encoder offset to parameter" is active.

After selecting the FCB set the controller inhibit DI00 = 1. Observe the following notes if you wish to use the other modes of FCB 18. If you want to use FCB 25 "Rotor position identification" in exceptional cases, contact SEW-EURODRIVE.

After successful commutation travel, the inverter automatically sets the bit "Motor commutated" in the status word. This value is later to be evaluated in the PLC to permit inverter enable. With absolute encoders such as the AL1H or AL2H the bit "Motor commutated" is not created and thus not set during calibration.

- Optimizing the axis

The external axis mass as well as the external load moment of inertia of a rotary axis can be determined in the dialog window "Controller configuration" during start-up via the "Measure" button.

Reset the application limit values of current and force to the original values and optimize the control loop of the drive as for rotative servomotors.

- Further settings

- With MOVIAxis® you can adjust the counting direction of the encoder to the direction of rotation from the motor phase without having to swap 2 motor phases. For this purpose index 9719.1/2/3 can for example be set via the following sub-dialog in the encoder configuration during startup.
- If you need a different positive encoder counting direction for your linear axis, activate the reversal option for the motor rotation via index 8537.0 "Direction of rotation reversal".

- Remove the TF line from the encoder plug of MOVIAXIS® when the motor is at standstill and enabled to check whether TF monitoring is responding.
- If the drive has an external brake, SEW-EURODRIVE recommends controlling it directly. Use the indexes of the brake in the motor parameters to control the brake and set the time for brake release and brake application.



## 8 Inspection/maintenance

### 8.1 Notes



#### ⚠ DANGER

##### **Danger of electric shock.**

Induced voltages of up to 500 V can be generated by movement of the primary (generator principle) even if the motor is not connected. Only remove the protection cap on the power plug of the primary immediately before the connection.

- After separating the inverter from the supply voltage, wait for at least ten minutes before touching any live parts (e.g. contacts, stud bolts) or loosen connections. To be on the safe side, measure the voltage on the DC link and wait until the voltage has dropped below 40 V.



#### ⚠ WARNING

Touching the linear motors when they have not cooled down could result in burns. The linear motor can have a surface temperature of more than 60 °C.

##### **Danger of burns!**

- Never touch the linear motor during operation or in the cool down phase once it has been switched off.
- Notice any noises.
- The power connections can conduct voltages even if the motor does not turn. Never disconnect electrical connections of motors while they are energized.
- Wear work gloves when carrying out maintenance and repair work.
- Ensure safe disconnection from the voltage supply before working on the machine.
- Never work in the travel range when the machine is switched on.
- Remove any chips from the motor area on a regular basis.
- Use only genuine spare parts in accordance with the valid spare parts list.
- Disconnect the linear motor from the power supply before starting work and protect it against unintentional re-start.

### 8.2 General maintenance work

The primaries and secondaries are maintenance-free and cannot be repaired. Replace defective parts.

Remove any traces of dirt, chips, dust, etc. from the secondaries using a soft cloth (depending on the environmental conditions).

Note that mobile cables are subject to wear. They have to be checked for external changes on a regular basis.

### 8.3 Additional maintenance for Power version

Keep air entry screen on fans free from congestion.

## 9 Technical data

### 9.1 General technical data

The following table shows the technical data that apply to all SL2 motors.

Thermal class	B (130 °C)
Operating temperature	+5 – +40 °C
Degree of protection	IP65 (Basic/Advanced) IP54 (Power)
DC link voltage	490 V <sub>DC</sub>

### 9.2 Derating

#### 9.2.1 Influence of the ambient temperature on linear motors

	Ambient temperature in °C				
	0 – 40	45	50	55	60
Nominal feed force	$1.0 \times F_N$	$0.96 \times F_N$	$0.92 \times F_N$	$0.87 \times F_N$	$0.82 \times F_N$

#### 9.2.2 Influence of the installation altitude on linear motors

	Installation altitude in m						
	Up to 100	1500	2000	2500	3000	3500	4500
Nominal feed force	$1.0 \times F_N$	$0.97 \times F_N$	$0.94 \times F_N$	$0.9 \times F_N$	$0.86 \times F_N$	$0.82 \times F_N$	$0.77 \times F_N$

#### 9.2.3 Influence of increasing the mechanical air gap S in linear motors

### INFORMATION



SEW-EURODRIVE recommends that customers set an air gap of 1 mm for the SL2-Basic, SL2-Advanced System and SL2-Power System motors (smaller air gaps are only possible if the customer's surrounding structure is very stable).

The following feasible thrust forces require that air gap tolerances of  $\pm 0.05$  mm are observed.

$\Sigma$	Mechanical air gap $d_{\text{mech}}^{1)}$ in mm.				
	0.5	0.6	0.7	0.8	0.9
Maximum force $F_1$	$1.0 \times F_1$	$0.995 \times F_1$	$0.99 \times F_1$	$0.983 \times F_1$	$0.975 \times F_1$
Force of magnetic attraction $F_D$	$1.0 \times F_D$	$0.99 \times F_D$	$0.98 \times F_D$	$0.967 \times F_D$	$0.95 \times F_D$

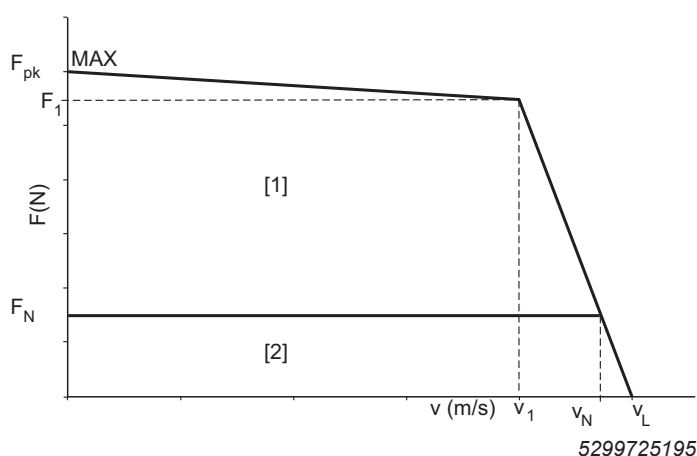
1) Visible air gap between primary and secondary in installed state of motor, referred to as SIGMA S.

$\Sigma$	Mechanical air gap $d_{\text{mech}}^{1)}$ in mm.					
	1.0 <sup>2)</sup>	1.1 <sup>2)</sup>	1.2 <sup>2)</sup>	1.3 <sup>2)</sup>	1.4 <sup>2)</sup>	1.5 <sup>2)</sup>
Maximum force $F_1$	$0.965 \times F_1$	$0.955 \times F_1$	$0.94 \times F_1$	$0.93 \times F_1$	$0.915 \times F_1$	$0.90 \times F_1$
Force of magnetic attraction $F_D$	$0.93 \times F_D$	$0.90 \times F_D$	$0.865 \times F_D$	$0.83 \times F_D$	$0.78 \times F_D$	$0.73 \times F_D$

1) Visible air gap between primary and secondary in installed state of motor, referred to as SIGMA S.

2) Recommended by SEW-EURODRIVE

### 9.3 SL2-Basic motor data



[1] Dynamic limit forces

[2] Thermal limit forces

$F_N$  Rated force

**when mounting to a horizontal aluminum cooling surface with**

- Four times primary flange surface.
- 10 mm thickness.
- Up to an ambient temperature of 40 °C.
- Installation altitude of up to 1000 m.

$F_1$  Maximum force available up to  $v_1$

$F_{pk}$  Maximum force

$v_L$  Theoretical maximum traveling velocity

$v_1$  Base velocity up to which the force  $F_1$  is available

$v_N$  Nominal speed

$I_N$  Rated current

$I_1$  Current at  $F_1$

$I_{pk}$  Maximum current

$F_D$  Force through magnetic attraction

Motor type	Version	Speed class	$F_{pk}$	$F_1$	$F_N$	$F_D$	$v_1$	$v_N$	$I_{pk}$	$I_1$	$I_N$	$R_1$	$L_1$	Weight	Cable cross section
			N	N	N	N	m/s	m/s	A	A	A	Ohm	mH	kg	mm <sup>2</sup>
SL2-P025VS-...	00	3	330	240	125	750	3	3.2	3	2	0.95	22.6	100	2.5	1.5
SL2-P025VS-...	00	6	330	225	125	750	6.5	6.8	6	4	2	4.75	22.5	2.5	1.5
SL2-P025S-...	00	1.5	650	470	240	1450	1.5	1.6	3	2	0.9	45.1	201	4.1	1.5
SL2-P025S-...	00	3	650	470	240	1450	3	3.2	6	3.9	1.8	11.3	50.5	4.1	1.5
SL2-P050VS-...	00	3	650	500	280	1480	3.2	3.4	6	4.4	2.2	7	43	3.6	1.5

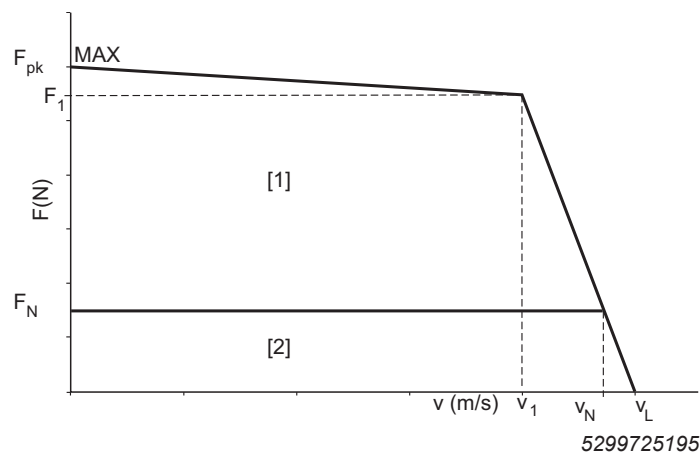
23534451/EN – 06/2017

Motor type	Ver- sion	Speed class	F <sub>pk</sub>	F <sub>1</sub>	F <sub>N</sub>	F <sub>D</sub>	v <sub>1</sub>	v <sub>N</sub>	I <sub>pk</sub>	I <sub>1</sub>	I <sub>N</sub>	R <sub>1</sub>	L <sub>1</sub>	Weight	Cable cross sec- tion mm <sup>2</sup>
			N	N	N	N	m/s	m/s	A	A	A	Ohm	mH	kg	
SL2-P050VS-...	00	6	650	500	280	1480	7.5	8	13.9	10.3	5.3	1.19	8	3.6	1.5
SL2-P050S-...	00	1	1300	1,000	560	2880	1	1.3	4.8	3.5	1.8	22.4	135	6.9	1.5
SL2-P050S-...	00	3	1300	1,000	560	2880	3.3	3.4	11.8	8.7	4.5	3.51	22.5	6.9	1.5
SL2-P050S-...	00	6	1300	1,000	560	2880	6.5	6.9	24.5	17.8	9	0.79	6	6.9	1.5
SL2-P050M-...	01	1	1950	1500	840	4300	1.1	1.1	5.8	4.3	2.1	22	139.5	10.4	1.5
SL2-P050M-...	00	3	1950	1500	840	4300	3.1	3.3	18	12.8	6.5	2.33	16.5	10.4	1.5
SL2-P050M-...	00	6	1950	1500	840	4300	6	6.4	33	24.6	12.6	0.62	4.5	10.4	1.5
SL2-P050ML-...	01	1	2600	2000	1120	5700	1.2	1.2	8.2	6.1	3	15	90.5	13.9	1.5
SL2-P050ML-...	00	3	2600	2000	1120	5700	3.2	3.4	24	17.8	9.1	1.59	11.5	13.9	1.5
SL2-P050ML-...	00	6	2600	2000	1120	5700	6.5	6.9	48	35.5	18.2	0.4	3	13.9	2.5
SL2-P100VS-...	00	1	1325	1,000	600	2950	1	1.1	4.8	3.4	1.9	19.3	142.5	6.5	1.5
SL2-P100VS-...	00	3	1325	1,000	600	2950	3.6	3.8	14.2	10.3	5.6	1.97	15.5	6.5	1.5
SL2-P100VS-...	00	6	1325	1,000	600	2950	6.5	6.9	24.6	17.8	9.7	0.66	6	6.5	1.5
SL2-P100S-...	01	1	2650	2000	1200	5760	1.2	1.2	8	6.1	3.2	12.5	90.5	12.5	1.5
SL2-P100S-...	00	3	2650	2000	1200	5760	3.2	3.4	25	17.8	9.7	1.31	11.5	12.5	1.5
SL2-P100S-...	00	6	2650	2000	1200	5760	6.5	6.9	49	35.5	20	0.33	3	12.5	2.5
SL2-P100M-...	00	1	3970	3000	1800	8570	1.2	1.3	14.2	10.3	5.6	5.95	46	18.9	1.5
SL2-P100M-...	00	3	3970	3000	1800	8570	3	3.2	35	24.6	13.5	1.03	9	18.9	1.5
SL2-P100M-...	00	6	3970	3000	1800	8570	6.5	6.9	75	53.3	29.2	0.22	2	18.9	4
SL2-P100ML-...	01	1	5300	4000	2400	11380	1.2	1.2	17	12.2	6.3	6	45.5	25	1.5
SL2-P100ML-...	00	3	5300	4000	2400	11380	3.2	3.4	49	35.5	19.5	0.66	6.5	25	2.5
SL2-P100ML-...	00	6	5300	4000	2400	11380	6.8	7	100	74.4	40.7	0.14	1.5	25	6
SL2-P150VS-...	00	1	2000	1500	900	4420	1	1.1	6.1	4.4	1.9	16.2	127.5	9.5	1.5
SL2-P150VS-...	00	3	2000	1500	900	4420	3.1	3.3	18	12.8	7	1.78	16	9.5	1.5
SL2-P150VS-...	00	6	2000	1500	900	4420	6	6.4	35	24.6	13.5	0.48	4.5	9.5	1.5
SL2-P150S-...	01	1	3900	3000	1800	8640	1.3	1.4	14	10.3	5.4	5.5	107	18	1.5
SL2-P150S-...	00	3	3900	3000	1800	8640	3	3.2	33.5	24.5	13.5	0.95	9	18	1.5
SL2-P150S-...	00	6	3900	3000	1800	8640	6	6.4	67	49	27	0.24	2.5	18	4
SL2-P150M-...	01	1	5800	4500	2700	12860	1.4	1.5	23	17	9	2.9	24.5	27	1.5
SL2-P150M-...	00	3	5800	4500	2700	12860	3.2	3.4	53	39.2	21.5	0.57	6	27	2.5
SL2-P150M-...	00	6	5800	4500	2700	12860	6	6.4	100	74.5	40.7	0.15	1.5	27	6
SL2-P150ML-...	01	1	7700	6000	3600	17000	1.4	1.5	31	23	12	2.2	18.5	36	1.5
SL2-P150ML-...	00	3	7700	6000	3600	17000	3.5	3.7	76	56.7	31	0.36	3.5	36	4
SL2-P150ML-...	00	6	7700	6000	3600	17000	6	6.4	132	98	53.8	0.12	1.25	36	6
SL2-P200VS-...	00	1	2700	2000	1260	5900	1	1.1	8.1	5.7	3.3	11.3	100	12	1.5
SL2-P200VS-...	00	3	2700	2000	1260	5900	3.2	3.4	25	17.8	10.2	1.17	11.5	12	1.5
SL2-P200VS-...	00	6	2700	2000	1260	5900	7.2	7.6	55	39.2	22.5	0.25	2.5	12	2.5
SL2-P200S-...	00	1	5200	4000	2520	11520	1	1.1	15.6	11.5	6.6	5.6	50	23.5	1.5
SL2-P200S-...	00	3	5200	4000	2520	11520	3.2	3.4	48.2	35.5	20.4	0.59	6	23.5	2.5
SL2-P200S-...	00	6	5200	4000	2520	11520	6.8	7.2	101	74.4	42.7	0.13	1.5	23.5	6
SL2-P200M-...	00	1	7800	6000	3780	17150	1	1.1	23.4	17.2	9.9	3.75	32	35	1.5
SL2-P200M-...	00	3	7800	6000	3780	17150	3.2	3.4	72	53.3	30.1	0.39	3.75	35	4
SL2-P200ML-...	00	1	10350	8000	5040	22780	1	1.1	30.6	22.7	13	2.93	25	47	1.5
SL2-P200ML-...	00	3	10350	8000	5040	22780	3.4	3.6	100	74.4	42.8	0.26	3	47	6
SL2-P250VS-...	00	1	3170	2400	1500	7370	1.1	1.2	10	7.3	4.1	8.4	77.5	15	1.5
SL2-P250VS-...	00	3	3170	2400	1500	7370	3.3	3.5	30	21.8	12.4	0.9	8	15	1.5
SL2-P250VS-...	00	6	3170	2400	1500	7370	6.3	6.6	57	41.2	23.5	0.23	2.25	15	2.5
SL2-P250S-...	00	1	6300	4800	3000	14400	1	1.1	18.7	13.6	7.8	4.46	40	29	1.5
SL2-P250S-...	00	3	6300	4800	3000	14400	3.1	3.3	57	41.2	23.5	0.46	4.5	29	4
SL2-P250S-...	00	6	6300	4800	3000	14400	6.3	6.6	113	82.4	47	0.12	1.25	29	6
SL2-P250M-...	00	1	9450	7200	4500	21430	1	1.1	30	21.8	12.4	2.68	23.5	43	1.5
SL2-P250M-...	00	3	9450	7200	4500	21430	3.3	3.5	90	65	37.2	0.3	2.6	43	6

Motor type	Ver- sion	Speed class	F <sub>pk</sub>	F <sub>1</sub>	F <sub>N</sub>	F <sub>D</sub>	v <sub>1</sub>	v <sub>N</sub>	I <sub>pk</sub>	I <sub>1</sub>	I <sub>N</sub>	R <sub>1</sub>	L <sub>1</sub>	Weight	Cable cross sec- tion mm <sup>2</sup>
			N	N	N	N	m/s	m/s	A	A	A	Ohm	mH	kg	
SL2-P250ML-...	00	1	12600	9600	6000	28450	1	1.1	37	27.2	15.5	2.23	20	58	1.5
SL2-P250ML-...	00	3	12600	9600	6000	28450	3.1	3.3	113	82.5	47	0.23	2.25	58	6

Electrical values refer to sinusoidal commutation and are stated as rms value or refer to rms values.

## 9.4 SL2-Advanced System motor data



[1] Dynamic limit forces

[2] Thermal limit forces

$F_N$  Rated force

**when mounting to a horizontal aluminum cooling surface with**

- Four times primary flange surface.
- 10 mm thickness.
- Up to an ambient temperature of 40 °C.
- Installation altitude of up to 1000 m.

$F_1$  Maximum force available up to  $v_1$

$F_{pk}$  Maximum force

$v_L$  Theoretical maximum traveling velocity

$v_1$  Base velocity up to which the force  $F_1$  is available

$v_N$  Nominal speed

$I_N$  Rated current

$I_1$  Current at  $F_1$

$I_{pk}$  Maximum current

$F_D$  Force through magnetic attraction

Motor type	Version	Speed class	$F_{pk}$	$F_1$	$F_N$	$F_D$	$v_1$	$v_N$	$I_{pk}$	$I_1$	$I_N$	Weight
			N	N	N	N	m/s	m/s	A	A	A	kg
SL2-P050VS-..	00	3	650	500	280	1480	3.2	3.4	6	4.4	2.2	7
SL2-P050VS-..	00	6	650	500	280	1480	7.5	8	13.9	10.3	5.3	7
SL2-P050S-..	00	1	1300	1,000	560	2880	1	1.3	4.8	3.5	1.8	12.1
SL2-P050S-..	00	3	1300	1,000	560	2880	3.3	3.4	11.8	8.7	4.5	12.1
SL2-P050S-..	00	6	1300	1,000	560	2880	6.5	6.9	24.5	17.8	9	12.1
SL2-P050M-..	01	1	1950	1500	840	4300	1.1	1.1	5.8	4.3	2.1	17.6
SL2-P050M-..	00	3	1950	1500	840	4300	3.1	3.3	18	12.8	6.5	17.6
SL2-P050M-..	00	6	1950	1500	840	4300	6	6.4	33	24.6	12.6	17.6
SL2-P050ML-..	01	1	2600	2000	1120	5700	1.2	1.2	8.2	6.1	3	23
SL2-P050ML-..	00	3	2600	2000	1120	5700	3.2	3.4	24	17.8	9.1	23
SL2-P050ML-..	00	6	2600	2000	1120	5700	6.5	6.9	48	35.5	18.2	23
SL2-P100VS-..	00	1	1325	1,000	600	2950	1	1.1	4.8	3.4	1.9	11.3
SL2-P100VS-..	00	3	1325	1,000	600	2950	3.6	3.8	14.2	10.3	5.6	11.3
SL2-P100VS-..	00	6	1325	1,000	600	2950	6.5	6.9	24.6	17.8	9.7	11.3
SL2-P100S-..	01	1	2650	2000	1200	5760	1.2	1.2	8	6.1	3.2	19.4
SL2-P100S-..	00	3	2650	2000	1200	5760	3.2	3.4	25	17.8	9.7	19.4
SL2-P100S-..	00	6	2650	2000	1200	5760	6.5	6.9	49	35.5	20	19.4
SL2-P100M-..	00	1	3970	3000	1800	8570	1.2	1.3	14.2	10.3	5.6	28.4
SL2-P100M-..	00	3	3970	3000	1800	8570	3	3.2	35	24.6	13.5	28.4
SL2-P100M-..	00	6	3970	3000	1800	8570	6.5	6.9	75	53.3	29.2	28.4

Motor type	Version	Speed class	$F_{pk}$ N	$F_1$ N	$F_N$ N	$F_D$ N	$v_1$ m/s	$v_N$ m/s	$I_{pk}$ A	$I_1$ A	$I_N$ A	Weight kg
SL2-P100ML-..	01	1	5300	4000	2400	11380	1.2	1.2	17	12.2	6.3	37
SL2-P100ML-..	00	3	5300	4000	2400	11380	3.2	3.4	49	35.5	19.5	37
SL2-P150S-..	01	1	3900	3000	1800	8640	1.3	1.4	14	10.3	5.4	29.5
SL2-P150S-..	00	3	3900	3000	1800	8640	3	3.2	33.5	24.5	13.5	29.5
SL2-P150S-..	00	6	3900	3000	1800	8640	6	6.4	67	49	27	29.5
SL2-P150M-..	01	1	5800	4500	2700	12860	1.4	1.5	23	17	9	42.6
SL2-P150M-..	00	3	5800	4500	2700	12860	3.2	3.4	53	39.2	21.5	42.6
SL2-P150ML-..	01	1	7700	6000	3600	17000	1.4	1.5	31	23	12	56.1
SL2-P150ML-..	00	3	7700	6000	3600	17000	3.5	3.7	76	56.7	31	56.1

Electrical values refer to sine-shaped commutation and are indicated as effective values or refer to them.

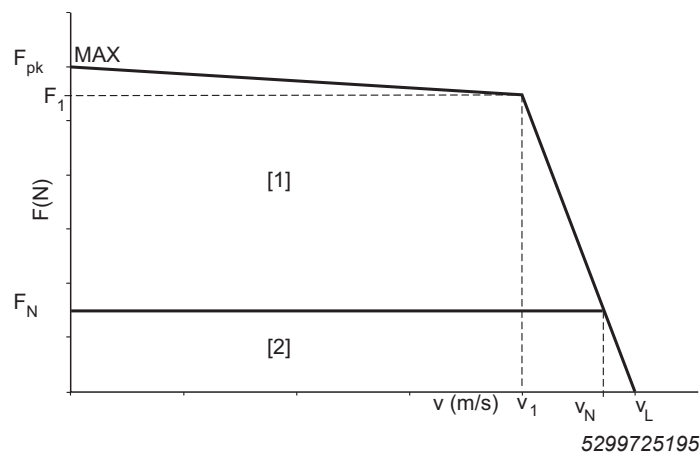
## INFORMATION



$R_1$  and  $L_1$ , see chapter "SL2-Basic motor data" (→ 55)

$F_{pk}$  = identical to  $F_{pk}$  of SL2-Basic

## 9.5 SL2-Power System motor data



[1] Dynamic limit forces

[2] Thermal limit forces

$F_N$  Rated force

**when mounting to a horizontal aluminum cooling surface with**

- Four times primary flange surface.
- 10 mm thickness.
- Up to an ambient temperature of 40 °C.
- Installation altitude of up to 1000 m.

$F_1$  Maximum force available up to  $v_1$

$F_{pk}$  Maximum force

$v_L$  Theoretical maximum traveling velocity

$v_1$  Base velocity up to which the force  $F_1$  is available

$v_N$  Nominal speed

$I_N$  Rated current

$I_1$  Current at  $F_1$

$I_{pk}$  Maximum current

$F_D$  Force through magnetic attraction

Motor type	Version	Speed class	$F_{pk}$	$F_1$	$F_N$	$F_D$	$v_1$	$v_N$	$I_{pk}$	$I_1$	$I_N$	Weight
			N	N	N	N	m/s	m/s	A	A	A	kg
SL2-P050VS-..	00	3	650	500	400	1480	3.2	3.4	6	4.4	3.1	7.2
SL2-P050VS-..	00	6	650	500	400	1480	7.5	8	13.9	10.3	7.6	7.2
SL2-P050S-..	00	1	1300	1000	760	2880	1	1.3	4.8	3.5	2.4	12.3
SL2-P050S-..	00	3	1300	1000	760	2880	3.3	3.4	11.8	8.7	6.1	12.3
SL2-P050S-..	00	6	1300	1000	760	2880	6.5	6.9	24.5	17.8	12.2	12.3
SL2-P050M-..	01	1	1950	1500	980	4300	1.1	1.1	5.8	4.3	2.5	17.8
SL2-P050M-..	00	3	1950	1500	980	4300	3.1	3.3	18	12.8	7.6	17.8
SL2-P050M-..	00	6	1950	1500	980	4300	6	6.4	33	24.6	14.7	17.8
SL2-P050ML-..	01	1	2600	2000	1280	5700	1.2	1.2	8.2	6.1	3.4	23.2
SL2-P050ML-..	00	3	2600	2000	1280	5700	3.2	3.4	24	17.8	10.4	23.2
SL2-P050ML-..	00	6	2600	2000	1280	5700	6.5	6.9	48	35.5	20.8	23.2
SL2-P100VS-..	00	1	1325	1000	780	2950	1	1.1	4.8	3.4	2.5	11.5
SL2-P100VS-..	00	3	1325	1000	780	2950	3.6	3.8	14.2	10.3	7.3	11.5
SL2-P100VS-..	00	6	1325	1000	780	2950	6.5	6.9	24.6	17.8	12.6	11.5
SL2-P100S-..	01	1	2650	2000	1570	5760	1.2	1.2	8	6.1	4.2	19.6
SL2-P100S-..	00	3	2650	2000	1570	5760	3.2	3.4	25	17.8	12.7	19.6
SL2-P100S-..	00	6	2650	2000	1570	5760	6.5	6.9	49	35.5	25.5	19.6
SL2-P100M-..	00	1	3970	3000	2540	8570	1.2	1.3	14.2	10.3	7.9	28.6
SL2-P100M-..	00	3	3970	3000	2540	8570	3	3.2	35	24.6	19.1	28.6
SL2-P100M-..	00	6	3970	3000	2540	8570	6.5	6.9	75	53.3	41.2	28.6



Motor type	Version	Speed class	$F_{pk}$ N	$F_1$ N	$F_N$ N	$F_D$ N	$v_1$ m/s	$v_N$ m/s	$I_{pk}$ A	$I_1$ A	$I_N$ A	Weight kg
SL2-P100ML-...	01	1	5300	4000	2700	11380	1.2	1.2	17	12.2	7.1	37.2
SL2-P100ML-...	00	3	5300	4000	2700	11380	3.2	3.4	49	35.5	21.9	37.2
SL2-P150S-...	01	1	3900	3000	2700	8640	1.3	1.4	14	10.3	8	29.9
SL2-P150S-...	00	3	3900	3000	2700	8640	3	3.2	33.5	24.5	20.3	29.9
SL2-P150S-...	00	6	3900	3000	2700	8640	6	6.4	67	49	40.5	29.9
SL2-P150M-...	01	1	5800	4500	3800	12860	1.4	1.5	23	17	12.7	43.1
SL2-P150M-...	00	3	5800	4500	3800	12860	3.2	3.4	53	39.2	30.1	43.1
SL2-P150ML-...	01	1	7700	6000	4180	17000	1.4	1.5	31	23	13.9	56.6
SL2-P150ML-...	00	3	7700	6000	4180	17000	3.5	3.7	76	56.7	34.5	56.6

Electrical values refer to sine-shaped commutation and are indicated as effective values or refer to them.

## INFORMATION



$R_1$  and  $L_1$ , see chapter "SL2-Basic motor data" (→ 55)

$F_{pk}$  = identical to  $F_{pk}$  of SL2-Basic

## 9.6 Maximum forces with MOVIDRIVE® MDX61B

### 9.6.1 Speed class 1 m/s

The table shows the maximum force that can be reached with the connected MOVIDRIVE® MDX61B inverter.

### INFORMATION



The maximum forces ( $F_{\max}$ ) that can be reached do not depend on SL2-Basic, SL2-Advanced System, SL2-Power System.

Motor $V_{\text{nominal}} =$ 1 m/s	MOVIDRIVE® MDX61B_A...-5_3 (400/500-V device) in the SERVO operating modes (P700)												
	P in kW	0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110	0150
	$I_{\text{nominal}}$ in A	2	2.4	3.1	4	4	5.5	7	9.5	12.5	16	24	32
	$I_{\text{max}}$ in A	4	4.8	6.2	8	6	8.25	10.5	14.25	18.75	24	36	48
	Systems	$F_{\max}$ in N											
SL2-P025S	Basic	650											
SL2-050S	Basic Advanced Power	1115	1300			1300							
SL2-050M	Basic Advanced Power	1380	1620	1950	1950	1950							
SL2-050ML	Basic Advanced Power	1453	1696	2120	2600	2070	2600						
SL2-100VS	Basic Advanced Power	1140	1325	1325	1325	1325							
SL2-100S	Basic Advanced Power	1467	1703	2118	2650	2060	2650						
SL2-100M	Basic Advanced Power			1953	2412	1902	2475	3050	3970				
SL2-100ML	Basic Advanced Power						3000	3710	4800	5300			
SL2-150VS	Basic	1380	1615	2000	2000	1970							
SL2-150S	Basic Advanced Power		1800	2230	2785	2170	2880	3490	3900				
SL2-150M	Basic Advanced Power						3100	3750	4830	5800			
SL2-150ML	Basic Advanced Power							4330	5240	6330	7700		
SL2-200VS	Basic			2145	2670	2090	2700						
SL2-200S	Basic						3050	3710	4810	5200			
SL2-200M	Basic								5150	6450	7800		
SL2-200ML	Basic									6840	8390	10350	
SL2-250VS	Basic			2090	2600	2040	2670	3170					
SL2-250S	Basic							3890	5000	6300			
SL2-250M	Basic								5140	6370	7810	9450	
SL2-250ML	Basic									7020	8620	12300	12 600

## 9.6.2 Speed class 3 m/s

The table shows the maximum force that can be reached with the connected MOVIDRIVE® MDX61B inverter.

Motor $V_{\text{nominal}} = 3 \text{ m/s}$	MOVIDRIVE® MDX61B_A...-5_3 (400/500-V device) in the SERVO operating modes (P700)																
	P in kW	0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110	0150	0220	0300	0370	0450
	$I_{\text{nominal}}$ in A	2	2.4	3.1	4	4	5.5	7	9.5	12.5	16	24	32	46	60	73	89
	$I_{\text{max}}$ in A	4	4.8	6.2	8	6	8.25	10.5	14.25	18.75	24	36	48	69	90	109.5	133.5
Systems		$F_{\text{max}}$ in N															
SL2-P025VS	Basic	330															
SL2-P025S	Basic	650															
SL2-050VS	Basic Advanced Power	460	537	650	650	650											
SL2-050S	Basic Advanced Power			738	926	717	955	1175	1300								
SL2-050M	Basic Advanced Power							1280	1640	1950							
SL2-050ML	Basic Advanced Power							1290	1650	2090	2600						
SL2-100VS	Basic Advanced Power						830	1020	1325								
SL2-100S	Basic Advanced Power								1680	2090	2560	2650					
SL2-100M	Basic Advanced Power									2455	2950	3970					
SL2-100ML	Basic Advanced Power										2950	4050	5200	5300			
SL2-150VS	Basic						1065	1280	1650	2000							
SL2-150S	Basic Advanced Power									2425	2950	3900					
SL2-150M	Basic Advanced Power										3070	4200	5330	5800			
SL2-150ML	Basic Advanced Power											4250	5400	7080	7700		
SL2-200VS	Basic								1650	2100	2610	2700					
SL2-200S	Basic										2920	4050	5200				
SL2-200M	Basic											4340	5490	7480	7800		
SL2-200ML	Basic												5680	7510	9430	10350	
SL2-250VS	Basic								2120	2610	3170						
SL2-250S	Basic											4310	5410	6300			
SL2-250M	Basic												5670	7560	9450		
SL2-250ML	Basic													8270	10340	12260	12 600

## 9.6.3 Speed class 6 m/s

The table shows the maximum force that can be reached with the connected MOVIDRIVE® MDX61B inverter.

Motor $V_{\text{nominal}} =$ 6 m/s		MOVIDRIVE® MDX61B_A...-5_3 (400/500-V device) in the SERVO operating modes (P700)															
	P in kW	0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110	0150	0220	0300	0370	0450
	$I_{\text{nominal}}$ in A	2	2.4	3.1	4	4	5.5	7	9.5	12.5	16	24	32	46	60	73	89
	$I_{\text{max}}$ in A	4	4.8	6.2	8	6	8.25	10.5	14.25	18.75	24	36	48	69	90	109.5	133.5
	Systems	$F_{\text{max}}$ in N															
SL2-P025VS	Basic			330													
SL2-050VS	Basic Advanced Power				400	320	415	510	650								
SL2-050S	Basic Advanced Power							675	840	1040	1280	1300					
SL2-050M	Basic Advanced Power									1200	1470	1950					
SL2-050ML	Basic Advanced Power										1450	2025	2600				
SL2-100VS	Basic Advanced Power								850	1045	1300	1325					
SL2-100S	Basic Advanced Power											2025	2600	2650			
SL2-100M	Basic Advanced Power											2025	2765	3700	3970		
SL2-100ML	Basic												2800	3750	4780	5300	
SL2-150VS	Basic									1220	1470	2000					
SL2-150S	Basic Advanced Power											2350	2950	3900			
SL2-150M	Basic Advanced Power												3150	4220	5290	5800	
SL2-150ML	Basic Advanced Power														5600	6570	7700
SL2-200VS	Basic											1860	2390	2700			
SL2-200S	Basic													3760	4710	5200	
SL2-250VS	Basic											2150	2730	3170			
SL2-250S	Basic													4150	5180	6130	6300

## 9.7 Maximum forces with MOVIAXIS®

### 9.7.1 Speed class 1 m/s

The table shows the maximum force that can be reached with the connected MOVIAXIS® MX..6300 multi-axis servo inverter.

### INFORMATION



The maximum forces ( $F_{\max}$ ) that can be reached do not depend on SL2-Basic, SL2-Advanced System, SL2-Power System.

Motor $V_{\text{nominal}} = 1 \text{ m/s}$		MOVIAXIS® MX									
		Size 1			Size 2		Size 3		Size 4	Size 5	Size 6
	$I_{\text{nominal}}$ in A	2	4	8	12	16	24	32	48	64	100
	$I_{\text{max}}$ in A	5	10	20	30	40	60	80	120	160	250
	Systems	$F_{\max}$ in N									
SL2-P025S	Basic	285	650								
SL2-050S	Basic Advanced Power	1300									
SL2-050M	Basic Advanced Power	1705	1950								
SL2-050ML	Basic Advanced Power	1798	2600								
SL2-100VS	Basic Advanced Power	1367	1082	1325							
SL2-100S	Basic Advanced Power	1817	2650								
SL2-100M	Basic Advanced Power		2979	3970							
SL2-100ML	Basic Advanced Power		3583	5300							
SL2-150VS	Basic	1694	2000								
SL2-150S	Basic Advanced Power		3399	3900							
SL2-150M	Basic Advanced Power		3579	5800							
SL2-150ML	Basic Advanced Power			6919	7700						
SL2-200VS	Basic	1805	2700								
SL2-200S	Basic		3610	5200							
SL2-200M	Basic			6955	7800						
SL2-200ML	Basic			7319	10350						
SL2-250VS	Basic	1768	3170								
SL2-250S	Basic		3701	6300							
SL2-250M	Basic			6813	9450						
SL2-250ML	Basic				10645	12 600					

## 9.7.2 Speed class 3 m/s

The table shows the maximum force that can be reached with the connected MOVIAXIS® MX multi-axis servo inverter.

Motor $V_{\text{nominal}} = 3 \text{ m/s}$		MOVIAXIS® MX									
		Size 1			Size 2		Size 3		Size 4	Size 5	Size 6
	$I_{\text{nominal}}$ in A	2	4	8	12	16	24	32	48	64	100
	$I_{\text{max}}$ in A	5	10	20	30	40	60	80	120	160	250
	Systems	$F_{\text{max}}$ N									
SL2-P025VS	Basic	225.4	330								
SL2-P025S	Basic	650									
SL2-050VS	Basic Advanced Power	568	650								
SL2-050S	Basic Advanced Power		1116	1300							
SL2-050M	Basic Advanced Power		1220	1950							
SL2-050ML	Basic Advanced Power			2211	2600						
SL2-100VS	Basic Advanced Power		993	1325							
SL2-100S	Basic Advanced Power			2246	2650						
SL2-100M	Basic Advanced Power			2528	3587	3970					
SL2-100ML	Basic Advanced Power				3485	4473	5300				
SL2-150VS	Basic		1223	2000							
SL2-150S	Basic Advanced Power			2528	3587	3900					
SL2-150M	Basic Advanced Power				3594	4630	5800				
SL2-150ML	Basic Advanced Power					4467	6387	7700			
SL2-200VS	Basic			2260	2700						
SL2-200S	Basic				3516	4521	5200				
SL2-200M	Basic					4816	6877	7800			
SL2-200ML	Basic						6737	8678	10350		
SL2-250VS	Basic			2271	3170						
SL2-250S	Basic				3686	4762	6300				
SL2-250M	Basic						6813	8727	9450		
SL2-250ML	Basic						7373	9524	12 600		

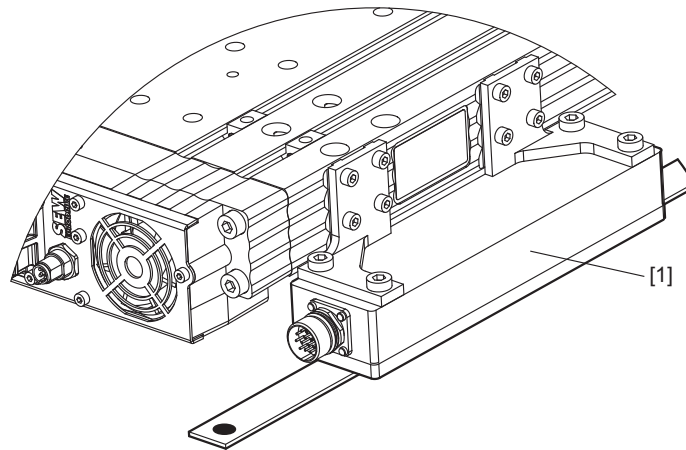
### 9.7.3 Speed class 6 m/s

The table shows the maximum force that can be reached with the connected MOVIAXIS® MX multi-axis servo inverter.

Motor $V_{\text{nominal}} = 6 \text{ m/s}$		MOVIAXIS® MX									
		Size 1			Size 2		Size 3		Size 4	Size 5	Size 6
	$I_{\text{nominal}}$ in A	2	4	8	12	16	24	32	48	64	100
	$I_{\text{max}}$ in A	5	10	20	30	40	60	80	120	160	250
	Systems	$F_{\text{max}}$ N									
SL2-P025VS	Basic	274	330								
SL2-050VS	Basic Advanced Power		486	650							
SL2-050S	Basic Advanced Power			1116	1300						
SL2-050M	Basic Advanced Power			1254	1771	1950					
SL2-050ML	Basic Advanced Power				1728	2211	2600				
SL2-100VS	Basic Advanced Power			1123	1325						
SL2-100S	Basic Advanced Power				1742	2237	2650				
SL2-100M	Basic Advanced Power					2357	3360	3970			
SL2-100ML	Basic						3355	4314	5300		
SL2-150VS	Basic			1264	1793	2000					
SL2-150S	Basic Advanced Power					2528	3587	3900			
SL2-150M	Basic Advanced Power						3775	4854	5800		
SL2-150ML	Basic Advanced Power							5072	7195	7700	
SL2-200VS	Basic				1610	2077	2700				
SL2-200S	Basic						3376	4348	5200		
SL2-250VS	Basic				1843	2381	3170				
SL2-250S	Basic						3686	4762	6300		

## 9.8 Technical data of the absolute linear measuring system AL1H

The absolute linear measuring system corresponds to the linear measuring system from SICK/Stegmann.



16126676875

[1] Linear measuring system (linear sensor)

### 9.8.1 Technical data and characteristics

General data	
Measuring length	max. 40 m
Magnetic tape length of the measuring gauge	+130 mm <sup>1)</sup>
Reproducibility	±10 µm
Measuring accuracy	Type. ±0.3 mm/m at 20 °C
Max. traveling velocity	6 m/s
Temperature expansion coefficient $T_k$ steel band	16 µm/°C/m
Position tolerances and dimensions	See dimension drawing
Weight	
• Sensor part	0.693 kg
• Magnetic tape	0.433 kg/m
Materials	
• Sensor parts	AlmgSiPbF28
• Magnetic tape	Tromaflex 928
• Stainless steel band	No. 14435
Ambient temperature, operation	0 °C to +70 °C
Degree of protection	IP65

1) Technical constant



## 9.8.2 HIPERFACE® interface data

General data	
Period	5 mm $\pm 3\%$
Position resolution (cycle length/32 = 5 mm/32)	156.25 $\mu\text{m}$
Initialization time	2500 ms
Supply voltage	7 V – 12 V DC
Power consumption	4.3 W
Interface signals	
Process data channel • SIN, COS • REFSIN, REFCOS	0.9 V <sub>pp</sub> – 1.1 V <sub>pp</sub> 2.2 V – 2.8 V
Non-linearity within a sine, cosine period, differential non-linearity	$\pm 50\ \mu\text{m}$
Parameter channel	to EIA 485

### NOTICE



Strong magnetic fields at the magnetic tape

Damage to property.

- Do not bring the magnetic tape into contact with secondaries.

### NOTICE



External magnetic fields should not pass the surface of the material measure 64 mT (640 Oe; 52 kA/m) as this could cause irreparable damage to the coding on the material measure. Magnetic fields > 1 mT on the measuring system influence the measuring accuracy.

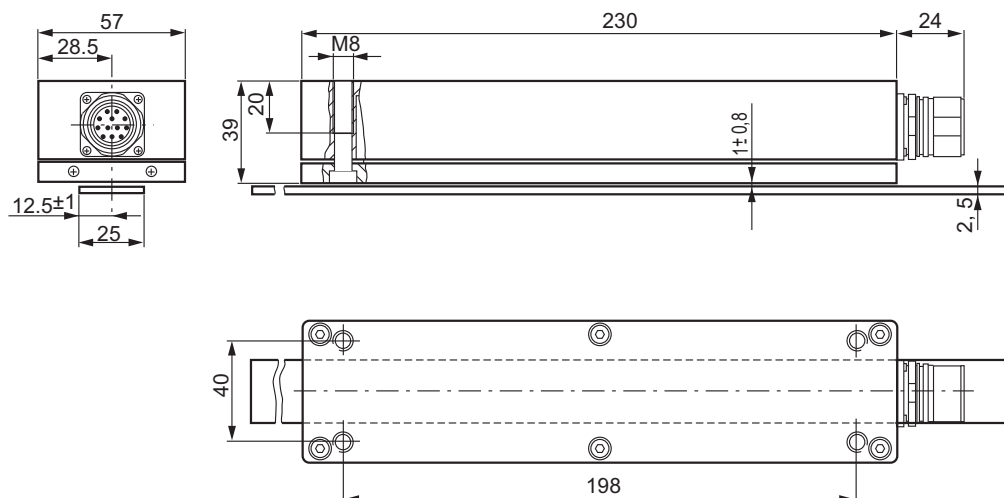
### INFORMATION



The magnetic tape can be ordered in sections of 100 mm.

## 9.8.3 Scale drawings and position tolerances

General tolerances according to DIN ISO 2768-mK



5299651595

**9.8.4 Additional information**

Data for the AL1H linear measuring system in this documentation were based on the data available from SICK/Stegmann at the time of printing. The design and units are subject to change. The data from SICK/Stegmann apply.

Current information can be found in

- the operating instructions from SICK/Stegmann, which are enclosed with the linear motor

or

- at [www.stegmann.de](http://www.stegmann.de)

## 9.9 Technical data of the linear measuring system AL2H

### 9.9.1 Technical data

Measuring length	max. 4000 mm
Length of the magnetic tape	Measuring length +80 mm <sup>1)</sup>
Reproducibility	max. $\pm 5 \mu\text{m}$
Measuring accuracy	$\pm 10 \mu\text{m}$ at 20 °C
Travel speed	Max. 10 m/s
Traveling velocity until which the absolute position can reliably be generated	1.3 m/s
Temperature expansion coefficient Tk of magnetic tape	$(11 \pm 1) \mu\text{m/K/m}$
Position tolerance and dimensions	See dimension drawing
Weight	
– Read head	0.08 kg
– Magnetic tape	0.18 kg/m
Materials	
– Read head	Zinc die casting
– Magnetic tape	17410 hard ferrite 9/28 P
Ambient temperature, operation	-20 °C – +70 °C
Degree of protection (acc. to IEC 60529)	IP65, with mating connector plugged in

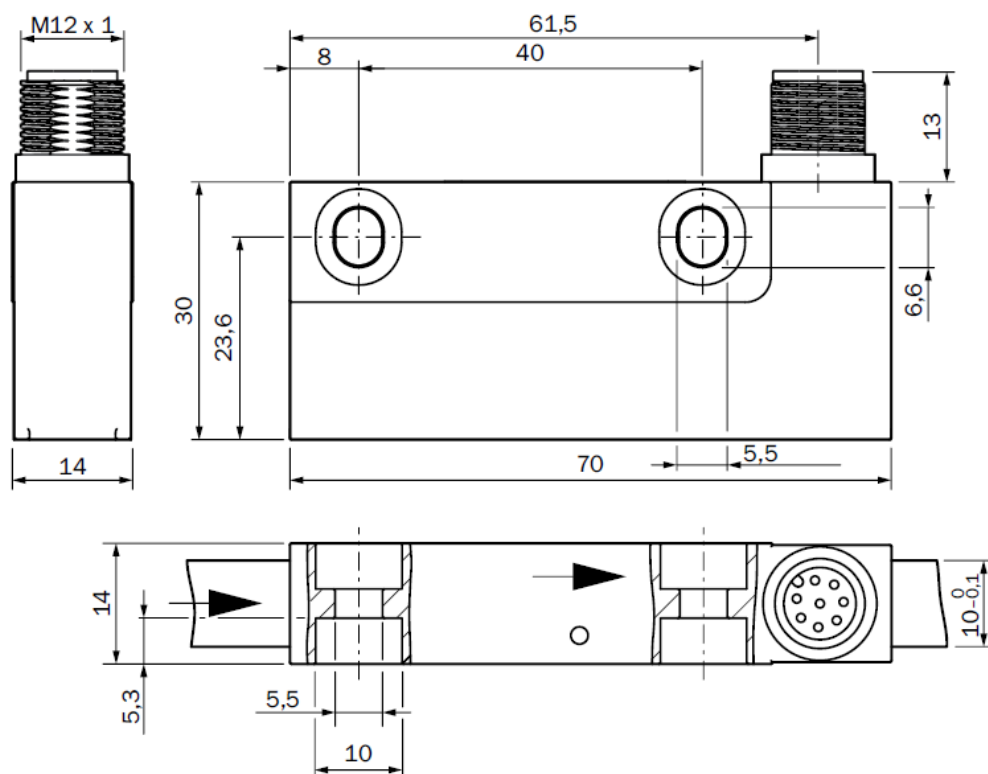
1) Technical constant

### HIPERFACE® interface

Period	1 mm
Measuring step	0.244 $\mu\text{m}$ at interpolation of the sine/cosine signals e. g. with 12 bits
Supply voltage	DC 7 – 12 V
Recommended supply voltage	DC 8 V
Maximum operating current without load <sup>1)</sup>	65 mA
Power consumption	Max. 1 W
Electrical interface	HIPERFACE®
Process data channel – SIN, REFSIN, COS, REFCOS	Analog, differential
Parameter channel – RS485	Digital
Connection type	M12 connector, 8-pole

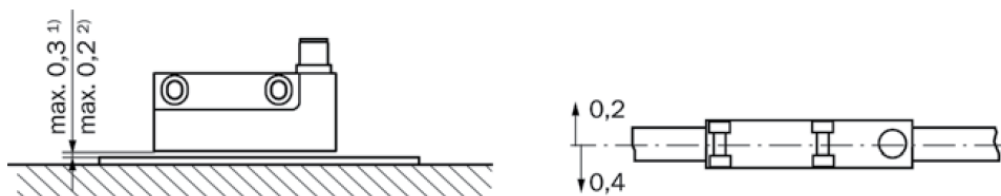
1) During the adjustment process approx. 100 mA

## Dimension drawings



19066915851

## Mounting tolerances



19066920331

1) Without masking tape

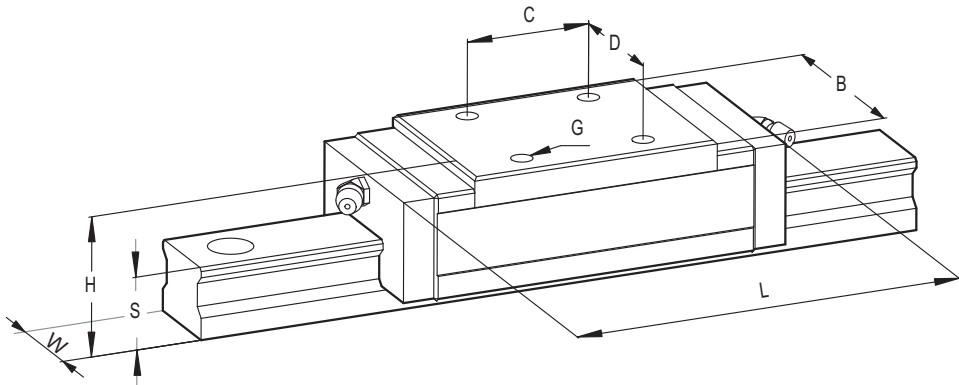
2) With masking tape

General tolerances according to DIN ISO 2768-mK

9.10
 Technical data for linear guide systems

The following guide systems can be installed on the SL2-Advanced System and the SL2-Power System primaries.

9.10.1
 SL2 – P050VS/S/M/ML Advanced/Power



5299659403

Guide systems (standard mounting) to DIN 645-1 version 3M

L <sup>1)</sup> <sub>max.</sub>	B	C	D	H	W	S <sub>max.</sub>	G
mm							
SL2-P050VS = 94 SL2-P050S = 133 SL2-P050M = 144 SL2-P050ML = 190	48	35	35	40	23	24	M6x8

1) The max. length is dependent on the size

9.10.2
 SL2 – P100VS/S/M Advanced/Power

Guide systems (standard mounting) to DIN 645-1 version 3M

L <sup>1)</sup> <sub>max.</sub>	B	C	D	H	W	S <sub>max.</sub>	G
mm							
SL2-P100VS = 94 SL2-P100S = 140 SL2-P100M = 140	60	40	40	45	28	25	M8x10

1) The max. length is dependent on the size

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**9.10.3 SL2 – P100ML Advanced/Power**

Guide systems (standard mounting, long guide carriages ) to DIN 645-1 version 3L

L <sub>max.</sub>	B	C	D	H	W	S <sub>max.</sub>	G
mm							
170	60	60	40	45	28	25	M8x10

**9.10.4 SL2 – P150S/ML Advanced/Power**

Guide systems (standard mounting) to DIN 645-1 version 3M

L <sub>max.</sub>	B	C	D	H	W	S <sub>max.</sub>	G
mm							
170	70	50	50	55	34	29,8	M8x10

**9.10.5 SL2 – P150M Advanced/Power**

Guide systems (standard mounting) to DIN 645-1 version 3L

L <sub>max.</sub>	B	C	D	H	W	S <sub>max.</sub>	G
mm							
250	70	72	50	55	34	29.8	M8x10

## 10 Malfunctions

The inverter indicates malfunctions depending on the type via diagnostic LEDs, or via a 7-segment display and an error code. Consult the system manual or the operating instructions of the used inverter for fault elimination. The following notes offer additional information for troubleshooting in particular for linear motors.

### INFORMATION



Faults may be hard to localize if the EMC wiring is not carried out correctly. These are often coupled into the inverter by the TF lines running in the same duct as the motor cable. To exclude this fault, we recommend that you disconnect the TF for test purposes (set the parameter "Fault response to motor overtemperature" to no response) during commutation travel.

### 10.1 MOVIDRIVE®: Faults during commutation search

Fault	Possible cause	Measure
Encoder error (14) when linear motor is moved manually	Encoder not installed correctly	Check installation using the encoder manufacturer information: <ol style="list-style-type: none"> <li>1. Air gap encoder – magnetic tape</li> <li>2. Alignment encoder – magnetic tape</li> <li>3. For HIPERFACE® encoder: Check mounting direction so that cable output shows in the direction of the smaller absolute values (direction dot on the magnetic tape if available)</li> </ol>
	Encoder not connected correctly	Check pin assignment, operate HIPERFACE® encoder as sin/cos encoder for test purposes
Linear motor does not start after removal of CONTROLLER INHIBIT	Motor cable interrupted	Check linear motor connection
	Brake function P730 = ON	P730 must be set to commutation search = OFF
	(only for HIPERFACE® encoder) inverter reports that encoder has already been adjusted (H458=1)	If you want to perform commutation travel, select "Encoder adjustment" in the startup screen. In this case, the inverter will reset the bit automatically.
n-monitoring/ lag error during commutation travel	inverter is not assigned the status "NO ENABLE" because enable is set in addition to CONTROLLER INHIBIT or a terminal has been programmed to "ENABLE".	Assign digital input directly on unit via IPOS <sup>plus</sup> ® control word or via fieldbus with ENABLE, e.g. P603 = ENABLE/ STOP.
	EMC problems	Refer to the system manual. Check for correct shielding, equipotential bonding and observe the note at the beginning of this chapter
Encoder fault after commutation travel. Compensation movement (first movement) without noticeable second movement.	Motor cable interrupted; an alternating field can be established but no rotating field	Check linear motor connection

Fault	Possible cause	Measure
Encoder fault after commutation travel in positive direction (second movement)	Counting direction of the encoder does not correspond to U,V,W phase sequence of motor	Check to see if encoder counts positive in the direction that the primary was moving. If not, swap connections of U and W motor cables.
	Resolution of encoder system incorrect/Encoder defective	Slide the linear motor for a defined distance and check whether the displayed increments correspond to the calculated value using the calculation displayed by MOVITOOLS® MotionStudio. Adjust the encoder resolution in the linear motor startup, if necessary, and check the distance between read head and magnetic tape.
	Current limit reduced too far	Reset P303 to the value set by linear motor startup. Use parameter P304 for force reduction
Encoder fault after commutation travel in negative direction (third movement)	Travel distances are not identical because axle is mechanically sluggish	Make sure that the drive travels with easy movement for the entire distance and no other forces are at play (process forces, weight forces)
	Travel distances are not identical because encoder is defective	Slide the linear motor for a defined distance and check whether the displayed increments correspond to the calculated value using the calculation displayed by MOVITOOLS® MotionStudio. Adjust the encoder resolution in the linear motor startup, if necessary, and check the distance between read head and magnetic tape.
	Current limit reduced too far	Reset P303 to the value set by linear motor startup. Use parameter P304 to reduce the force.
Linear motor rotates too far	EMC problems	Refer to the system manual. Check for correct shielding, equipotential bonding and observe the note at the beginning of this chapter
	Defective spot in linear scale	Slide the linear motor for a defined distance and check whether the displayed increments correspond to the calculated value using the calculation displayed by MOVITOOLS® MotionStudio. Perform the checks at several spots and check the distance between read head and magnetic tape



## 10.2 MOVIDRIVE®: Problems during operation

Fault	Possible cause	Measure
Linear motor with AL1H or AL2H performs commutation travel automatically after encoder replacement or reports fault 81 start condition	Bit 25 in H473 was cleared after installing a replacement encoder because P948 Automatic encoder detection was set to ON.	<ul style="list-style-type: none"> <li>Before you retrofit the new sensor, install old AL1H or AL2H sensor, load data backup, set P948 to OFF. This procedure is preferred for hoists. Check actual position of the axis to old value and carefully check for proper functioning of the axis in manual mode.</li> <li>or</li> <li>Recalibrate new AL1H or AL2H sensor in startup dialog for encoder adjustment (see chapter startup).</li> </ul>
Fault 81 Start condition when using incremental encoder	The controller switches to "Enable" without bit 25 being commutated = 1 in H473 LSM	Refer to Faults during commutation search
Linear motor does not start	Motor cable interrupted	Check motor connection
	Brake does not release	Check brake control; check air supply for pneumatic brakes
Linear motor makes humming noise or does not run smoothly	Encoder cable malfunction	Refer to the system manual. Check for correct shielding, equipotential bonding and observe the note at the beginning of this chapter
	Controller parameters set incorrectly	Perform startup of control loop once again
	Encoder connection with primary not rigid enough	Check to see if mechanical connection between encoder and primary is rigid enough.
	Permitted operating temperature of encoder exceeded	<ul style="list-style-type: none"> <li>Select the travel cycle so that the effective value of the output current is less than the rated current of the motor</li> <li>Arrange for better heat dissipation of primary</li> <li>Decouple encoder thermally (mounting with plastic distance plate)</li> <li>Use encoder system with higher permitted operating temperature</li> </ul>
Linear motor heats up excessively	Overload	Select the travel cycle so that the effective value of the output current is less than the rated current of the motor
	Insufficient cooling	Improve cooling or install fan
	Air gap too large, resulting in power loss at same current (see derating table in catalog)	Adjust air gap
	Ambient temperature too high	Select travel cycle so that effective value of output current is less than rated current of SL2 linear motor

Fault	Possible cause	Measure
HIPERFACE® encoder fault	Problems on encoder cable	If the problems do not occur during manual sliding, they are often caused by problems in the encoder or TF line. Observe the system manual for fault elimination. Check for correct shielding, equipotential bonding and observe the note at the beginning of this chapter
	Encoder not installed correctly	Check installation using the encoder manufacturer information: <ol style="list-style-type: none"> <li>1. Air gap encoder – magnetic tape</li> <li>2. Alignment encoder – magnetic tape</li> <li>3. For HIPERFACE® encoder: Check mounting direction so that cable output shows in the direction of the smaller absolute values (direction dot on the magnetic tape if available). Check rigidity of encoder mounting. Observe the manufacturer tolerances even with fast accelerations.</li> </ol>

### 10.3 MOVIAXIS®: Faults during commutation search

Fault	Possible cause	Measure
Encoder error (14) when linear motor is moved manually	Encoder not installed correctly	Check installation using the encoder manufacturer information: 1. Air gap encoder – magnetic tape 2. Alignment encoder – magnetic tape 3. At HIPERFACE® encoder: Check mounting direction so that cable output shows in the direction of the smaller absolute values (direction dot on the magnetic tape if available)
	Encoder not connected correctly	Check pin assignment, operate HIPERFACE® encoder as sin/cos encoder for test purposes
Linear motor does not start after removal of CONTROLLER INHIBIT	Motor cable interrupted	Check linear motor connection
Fault E16 subcode 1042 with any FCB selection except FCB18 or FCB25	Motor not commutated	Commute motor first with FCB18 or FCB25
n-monitoring/lag error during commutation travel or encoder error at the first moment when the motor receives current	EMC problems	Refer to the system manual. Check for correct shielding, equipotential bonding and observe the note at the beginning of this chapter
Encoder fault after commutation travel. Compensation movement (1st movement) without noticeable second movement.	Motor cable interrupted; an alternating field can be established but no rotating field	Check linear motor connection
Encoder fault after commutation travel in positive direction (second movement)	Counting direction of the encoder does not correspond to U,V,W phase sequence of motor	Check to see if encoder counts positive in the direction that the primary was moving. If not, swap connections of U and W motor cables, or invert direction of rotation of encoder to that of the motor (see chapter "MOVIAXIS" (→ 51)®).
	Resolution of encoder system incorrect/Encoder defective	Push the linear motor for a defined way on the track, and compare the measured travel length to the travel length shown in the actual position. Adjust the encoder resolution in the startup encoder configuration, if necessary, and check the distance between read head and magnetic tape.
	Torque limit reduced too far	Adjust the maximum torque in the application and system limit

Fault	Possible cause	Measure
Encoder fault after commutation travel in negative direction (third movement)	Travel distances are not identical because axle is mechanically sluggish	Make sure that the drive travels with easy movement for the entire distance and no other forces are at play (process forces, weight forces)
	Travel distances are not identical because encoder is defective	Push the linear motor for a defined way on the track, and compare the measured travel length to the travel length shown in the actual position. Adjust the encoder resolution in the startup encoder configuration, if necessary, and check the distance between read head and magnetic tape.
	Torque limit reduced too far	Adjust the maximum torque in the application and system limit
Linear motor rotates too far	EMC problems	Refer to the system manual. Check for correct shielding, equipotential bonding and observe the note at the beginning of this chapter
	Defective spot in linear scale	Push the linear motor for a defined way on the track, and compare the measured travel length to the travel length shown in the actual position. Adjust the encoder resolution in the startup encoder configuration, if necessary, and check the distance between read head and magnetic tape.

## 10.4 MOVIAXIS®: Problems during operation

Fault	Possible cause	Measure
Start condition fault (81) with any FCB selection except FCB18 or FCB25	Motor not commutated	Commutate motor first with FCB18 or FCB25
Linear motor does not start	Motor cable interrupted	Check motor connection
	Brake does not release	Check brake control; check air supply for pneumatic brakes
Linear motor makes humming noise or does not run smoothly	Encoder cable malfunction	Refer to the system manual. Check for correct shielding, equipotential bonding and observe the note at the beginning of this chapter
	Controller parameter not set correctly	Perform startup of control loop once again
	Encoder connection with primary not rigid enough	Check to see if mechanical connection between encoder and primary is rigid enough.
	Permitted operating temperature of encoder exceeded	<ul style="list-style-type: none"> <li>Select the travel cycle so that the effective value of the output current is less than the rated current of the motor</li> <li>Arrange for better heat dissipation of primary</li> <li>Decouple encoder thermally (mounting with plastic distance plate)</li> <li>Use encoder system with higher permitted operating temperature</li> </ul>
Linear motor heats up excessively	Overload	Select the travel cycle so that the effective value of the output current is less than the rated current of the motor
	Insufficient cooling	Improve cooling or install fan
	Air gap too large, resulting in power loss at same current (see derating table in catalog)	Adjust air gap
	Ambient temperature too high	Select travel cycle so that effective value of output current is less than rated current of SL2 linear motor

Fault	Possible cause	Measure
HIPERFACE® encoder fault	Problems on encoder cable	If the problems do not occur during manual sliding, they are often caused by problems in the encoder or TF line. Observe the system manual for fault elimination. Check for correct shielding, equipotential bonding and observe the note at the beginning of this chapter
	Encoder not installed correctly	Check installation using the encoder manufacturer information: <ol style="list-style-type: none"> <li>1. Air gap encoder – magnetic tape</li> <li>2. Alignment encoder – magnetic tape</li> <li>3. For HIPERFACE® encoder: Check mounting direction so that cable output shows in the direction of the smaller absolute values (direction dot on the magnetic tape if available). Check rigidity of encoder mounting. Observe the manufacturer tolerances even with fast accelerations.</li> </ol>

11 Declaration of Conformity

EU Declaration of Conformity



Translation of the original text

900300310/EN

**SEW-EURODRIVE GmbH & Co. KG**  
**Ernst-Blickle-Straße 42, D-76646 Bruchsal**  
declares under sole responsibility that the following products

Linear motors of the series	SL2..
are in conformity with	
Low Voltage Directive	2006/95/EC (valid until April 19, 2016) 2014/35/EU (valid as of April 20, 2016) (L 96, 29.03.2014, 357-374)
Applied harmonized standards:	EN 60034-1:2010/AC:2010 EN 60034-5:2001/A1:2007 EN 60664-1:2007

Bruchsal	18.04.2016		
Place	Date	Johann Soder	
		Managing Director Technology	a) b)
a) Authorized representative for issuing this declaration on behalf of the manufacturer			
b) Authorized representative for compiling the technical documents			

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## 12 Address list

<b>Algeria</b>			
Sales	Algiers	REDUCOM Sarl 16, rue des Frères Zaghroune Bellevue 16200 El Harrach Alger	Tel. +213 21 8214-91 Fax +213 21 8222-84 <a href="http://www.reducom-dz.com">http://www.reducom-dz.com</a> <a href="mailto:info@reducom-dz.com">info@reducom-dz.com</a>
<b>Argentina</b>			
Assembly Sales	Buenos Aires	SEW EURODRIVE ARGENTINA S.A. Ruta Panamericana Km 37.5, Lote 35 (B1619IEA) Centro Industrial Garín Prov. de Buenos Aires	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 <a href="http://www.sew-eurodrive.com.ar">http://www.sew-eurodrive.com.ar</a> <a href="mailto:sewar@sew-eurodrive.com.ar">sewar@sew-eurodrive.com.ar</a>
<b>Australia</b>			
Assembly Sales Service	Melbourne	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 <a href="http://www.sew-eurodrive.com.au">http://www.sew-eurodrive.com.au</a> <a href="mailto:enquires@sew-eurodrive.com.au">enquires@sew-eurodrive.com.au</a>
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 <a href="mailto:enquires@sew-eurodrive.com.au">enquires@sew-eurodrive.com.au</a>
<b>Austria</b>			
Assembly Sales Service	Vienna	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Straße 24 1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 <a href="http://www.sew-eurodrive.at">http://www.sew-eurodrive.at</a> <a href="mailto:sew@sew-eurodrive.at">sew@sew-eurodrive.at</a>
<b>Bangladesh</b>			
Sales	Bangladesh	SEW-EURODRIVE INDIA PRIVATE LIMITED 345 DIT Road East Rampura Dhaka-1219, Bangladesh	Tel. +88 01729 097309 <a href="mailto:salesdhaka@seweurodrivebangladesh.com">salesdhaka@seweurodrivebangladesh.com</a>
<b>Belarus</b>			
Sales	Minsk	Foreign unitary production enterprise SEW- EURODRIVE RybalkoStr. 26 220033 Minsk	Tel. +375 17 298 47 56 / 298 47 58 Fax +375 17 298 47 54 <a href="http://www.sew.by">http://www.sew.by</a> <a href="mailto:sales@sew.by">sales@sew.by</a>
<b>Belgium</b>			
Assembly Sales Service	Brussels	SEW-EURODRIVE n.v./s.a. Researchpark Haasrode 1060 Evenementenlaan 7 3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 <a href="http://www.sew-eurodrive.be">http://www.sew-eurodrive.be</a> <a href="mailto:info@sew-eurodrive.be">info@sew-eurodrive.be</a>
Service Competence Center	Industrial Gears	SEW-EURODRIVE n.v./s.a. Rue de Parc Industriel, 31 6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 <a href="http://www.sew-eurodrive.be">http://www.sew-eurodrive.be</a> <a href="mailto:service-IG@sew-eurodrive.be">service-IG@sew-eurodrive.be</a>
<b>Brazil</b>			
Production Sales Service	São Paulo	SEW-EURODRIVE Brasil Ltda. Estrada Municipal José Rubim, 205 – Rodovia Santos Dumont Km 49 Indaiatuba – 13347-510 – SP	Tel. +55 19 3835-8000 <a href="mailto:sew@sew.com.br">sew@sew.com.br</a>
Assembly Sales Service	Rio Claro	SEW-EURODRIVE Brasil Ltda. Rodovia Washington Luiz, Km 172 Condomínio Industrial Conpark Caixa Postal: 327 13501-600 – Rio Claro / SP	Tel. +55 19 3522-3100 Fax +55 19 3524-6653 <a href="mailto:montadora.rc@sew.com.br">montadora.rc@sew.com.br</a>
	Joinville	SEW-EURODRIVE Brasil Ltda. Rua Dona Francisca, 12.346 – Pirabeiraba 89239-270 – Joinville / SC	Tel. +55 47 3027-6886 Fax +55 47 3027-6888 <a href="mailto:filial.sc@sew.com.br">filial.sc@sew.com.br</a>
<b>Bulgaria</b>			
Sales	Sofia	BEVER-DRIVE GmbH Bogdanovetz Str.1 1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 <a href="mailto:bever@bever.bg">bever@bever.bg</a>

**Cameroon**

Sales	Douala	SEW-EURODRIVE S.A.R.L. Ancienne Route Bonabéri P.O. Box B.P 8674 Douala-Cameroun	Tel. +237 233 39 02 10 Fax +237 233 39 02 10 info@sew-eurodrive-cm
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**Canada**

Assembly Sales Service	Toronto	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 <a href="http://www.sew-eurodrive.ca">http://www.sew-eurodrive.ca</a> l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca

**Chile**

Assembly Sales Service	Santiago de Chile	SEW-EURODRIVE CHILE LTDA Las Encinas 1295 Parque Industrial Valle Grande LAMP Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 2757 7000 Fax +56 2 2757 7001 <a href="http://www.sew-eurodrive.cl">http://www.sew-eurodrive.cl</a> ventas@sew-eurodrive.cl
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**China**

Production Assembly Sales Service	Tianjin	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 78, 13th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25323273 <a href="http://www.sew-eurodrive.cn">http://www.sew-eurodrive.cn</a> info@sew-eurodrive.cn
Assembly Sales Service	Suzhou	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267922 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Taiyuan	SEW-EURODRIVE (Taiyuan) Co., Ltd. No.3, HuaZhang Street, TaiYuan Economic & Technical Development Zone ShanXi, 030032	Tel. +86-351-7117520 Fax +86-351-7117522 taiyuan@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478388 Fax +86 27 84478389 wuhan@sew-eurodrive.cn
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 68686262 Fax +86 29 68686311 xian@sew-eurodrive.cn
Sales Service	Hong Kong	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk

<b>Colombia</b>			
Assembly Sales Service	Bogota	SEW-EURODRIVE COLOMBIA LTDA. Calle 17 No. 132-18 Interior 2 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 <a href="http://www.sew-eurodrive.com.co">http://www.sew-eurodrive.com.co</a> <a href="mailto:sew@sew-eurodrive.com.co">sew@sew-eurodrive.com.co</a>
<b>Croatia</b>			
Sales Service	Zagreb	KOMPEKS d. o. o. Zeleni dol 10 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 <a href="mailto:kompeks@inet.hr">kompeks@inet.hr</a>
<b>Czech Republic</b>			
Assembly Sales Service	Hostivice	SEW-EURODRIVE CZ s.r.o. Floriánova 2459 253 01 Hostivice	Tel. +420 255 709 601 Fax +420 235 350 613 <a href="http://www.sew-eurodrive.cz">http://www.sew-eurodrive.cz</a> <a href="mailto:sew@sew-eurodrive.cz">sew@sew-eurodrive.cz</a>
	Drive Service Hotline / 24 Hour Service	+420 800 739 739 (800 SEW SEW)	Service Tel. +420 255 709 632 Fax +420 235 358 218 <a href="mailto:servis@sew-eurodrive.cz">servis@sew-eurodrive.cz</a>
<b>Denmark</b>			
Assembly Sales Service	Copenhagen	SEW-EURODRIVEA/S Geminivej 28-30 2670 Greve	Tel. +45 43 95 8500 Fax +45 43 9585-09 <a href="http://www.sew-eurodrive.dk">http://www.sew-eurodrive.dk</a> <a href="mailto:sew@sew-eurodrive.dk">sew@sew-eurodrive.dk</a>
<b>Egypt</b>			
Sales Service	Cairo	Copam Egypt for Engineering & Agencies Building 10, Block 13005, First Industrial Zone, Obour City Cairo	Tel. +202 44812673 / 79 (7 lines) Fax +202 44812685 <a href="http://www.copam-egypt.com">http://www.copam-egypt.com</a> <a href="mailto:copam@copam-egypt.com">copam@copam-egypt.com</a>
<b>Estonia</b>			
Sales	Tallin	ALAS-KUUL AS Reti tee 4 75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 <a href="http://www.alas-kuul.ee">http://www.alas-kuul.ee</a> <a href="mailto:veiko.soots@alas-kuul.ee">veiko.soots@alas-kuul.ee</a>
<b>Finland</b>			
Assembly Sales Service	Hollola	SEW-EURODRIVE OY Vesimäentie 4 15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 <a href="http://www.sew-eurodrive.fi">http://www.sew-eurodrive.fi</a> <a href="mailto:sew@sew.fi">sew@sew.fi</a>
Service	Hollola	SEW-EURODRIVE OY Keskikankaantie 21 15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 <a href="http://www.sew-eurodrive.fi">http://www.sew-eurodrive.fi</a> <a href="mailto:sew@sew.fi">sew@sew.fi</a>
Production Assembly	Karkkila	SEW Industrial Gears Oy Santasalonkatu 6, PL 8 03620 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 <a href="http://www.sew-eurodrive.fi">http://www.sew-eurodrive.fi</a> <a href="mailto:sew@sew.fi">sew@sew.fi</a>
<b>France</b>			
Production Sales Service	Hagenau	SEW-USOCOME 48-54 route de Soufflenheim B. P. 20185 67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 <a href="http://www.usocom.com">http://www.usocom.com</a> <a href="mailto:sew@usocom.com">sew@usocom.com</a>
Production	Forbach	SEW-USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 57604 Forbach Cedex	Tel. +33 3 87 29 38 00
	Brumath	SEW-USOCOME 1 Rue de Bruxelles 67670 Mommenheim Cedex	Tel. +33 3 88 37 48 00
Assembly Sales Service	Bordeaux	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan – B. P. 182 33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09

**France**

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**Gabon**

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**Germany**

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Production / Industrial Gears	Bruchsal	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Str. 10 76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-2970
Production	Graben	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 76676 Graben-Neudorf P.O. Box Postfach 1220 – D-76671 Graben-Neudorf	Tel. +49 7251 75-0 Fax +49 7251-2970
	Östringen	SEW-EURODRIVE GmbH & Co KG, Werk Östringen Franz-Gurk-Straße 2 76684 Östringen	Tel. +49 7253 9254-0 Fax +49 7253 9254-90 <a href="mailto:oesstringen@sew-eurodrive.de">oesstringen@sew-eurodrive.de</a>
Service Competence Center	Mechanics / Mechatronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 <a href="mailto:scc-mechanik@sew-eurodrive.de">scc-mechanik@sew-eurodrive.de</a>
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 <a href="mailto:scc-elektronik@sew-eurodrive.de">scc-elektronik@sew-eurodrive.de</a>
Drive Technology Center	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 30823 Garbsen (Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 <a href="mailto:dtc-nord@sew-eurodrive.de">dtc-nord@sew-eurodrive.de</a>
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 08393 Meerane (Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 <a href="mailto:dtc-ost@sew-eurodrive.de">dtc-ost@sew-eurodrive.de</a>
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 85551 Kirchheim (München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 <a href="mailto:dtc-sued@sew-eurodrive.de">dtc-sued@sew-eurodrive.de</a>
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 40764 Langenfeld (Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 <a href="mailto:dtc-west@sew-eurodrive.de">dtc-west@sew-eurodrive.de</a>
Drive Center	Berlin	SEW-EURODRIVE GmbH & Co KG Alexander-Meißner-Straße 44 12526 Berlin	Tel. +49 306331131-30 Fax +49 306331131-36 <a href="mailto:dc-berlin@sew-eurodrive.de">dc-berlin@sew-eurodrive.de</a>
	Ludwigshafen	SEW-EURODRIVE GmbH & Co KG c/o BASF SE Gebäude W130 Raum 101 67056 Ludwigshafen	Tel. +49 7251 75 3759 Fax +49 7251 75 503759 <a href="mailto:dc-ludwigshafen@sew-eurodrive.de">dc-ludwigshafen@sew-eurodrive.de</a>
	Saarland	SEW-EURODRIVE GmbH & Co KG Gottlieb-Daimler-Straße 4 66773 Schwalbach Saar – Hülzweiler	Tel. +49 6831 48946 10 Fax +49 6831 48946 13 <a href="mailto:dc-saarland@sew-eurodrive.de">dc-saarland@sew-eurodrive.de</a>
	Ulm	SEW-EURODRIVE GmbH & Co KG Dieselstraße 18 89160 Dornstadt	Tel. +49 7348 9885-0 Fax +49 7348 9885-90 <a href="mailto:dc-ulm@sew-eurodrive.de">dc-ulm@sew-eurodrive.de</a>

Germany			
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Great Britain			
Assembly Sales Service	Normanton	SEW-EURODRIVE Ltd. DeVilliers Way Trident Park Normanton West Yorkshire WF6 1GX	Tel. +44 1924 893-855 Fax +44 1924 893-702 <a href="http://www.sew-eurodrive.co.uk">http://www.sew-eurodrive.co.uk</a> info@sew-eurodrive.co.uk
Drive Service Hotline / 24 Hour Service			Tel. 01924 896911
Greece			
Sales	Athens	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 <a href="http://www.boznos.gr">http://www.boznos.gr</a> info@boznos.gr
Hungary			
Sales Service	Budapest	SEW-EURODRIVE Kft. Csillaghegyi út 13. 1037 Budapest	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 <a href="http://www.sew-eurodrive.hu">http://www.sew-eurodrive.hu</a> office@sew-eurodrive.hu
Iceland			
Sales	Reykjavik	Varma & Vélaverk ehf. Knarrarvogi 4 104 Reykjavik	Tel. +354 585 1070 Fax +354 585)1071 <a href="http://www.varmaverk.is">http://www.varmaverk.is</a> vov@vov.is
India			
Registered Office Assembly Sales Service	Vadodara	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 3045200 Fax +91 265 3045300 <a href="http://www.seweurodriveindia.com">http://www.seweurodriveindia.com</a> salesvadodara@seweurodriveindia.com
Assembly Sales Service	Chennai	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 saleschennai@seweurodriveindia.com
	Pune	SEW-EURODRIVE India Private Limited Plant: Plot No. D236/1, Chakan Industrial Area Phase- II, Warale, Tal- Khed, Pune-410501, Maharashtra	Tel. +91 21 35 628700 Fax +91 21 35 628715 salespune@seweurodriveindia.com
Indonesia			
Sales	Medan	PT. Serumpun Indah Lestari Jl.Pulau Solor no. 8, Kawasan Industri Medan II Medan 20252	Tel. +62 61 687 1221 Fax +62 61 6871429 / +62 61 6871458 / +62 61 30008041 sil@serumpunindah.com serumpunindah@yahoo.com <a href="http://www.serumpunindah.com">http://www.serumpunindah.com</a>
	Jakarta	PT. Cahaya Sukses Abadi Komplek Rukan Puri Mutiara Blok A no 99, Sunter Jakarta 14350	Tel. +62 21 65310599 Fax +62 21 65310600 csajkt@cbn.net.id
	Jakarta	PT. Agrindo Putra Lestari Jl.Pantai Indah Selatan, Komplek Sentra Industri Terpadu, Pantai indah Kapuk Tahap III, Blok E No. 27 Jakarta 14470	Tel. +62 21 2921-8899 Fax +62 21 2921-8988 aplindo@indosat.net.id <a href="http://www.aplindo.com">http://www.aplindo.com</a>

Indonesia			
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	Surabaya	CV. Multi Mas Jl. Raden Saleh 43A Kav. 18 Surabaya 60174	Tel. +62 31 5458589 Fax +62 31 5317220 sianhwa@sby.centrin.net.id http://www.cvmultimas.com
Ireland			
Sales Service	Dublin	Alpert Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 http://www.alpert.ie info@alpert.ie
Israel			
Sales	Tel Aviv	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il
Italy			
Assembly Sales Service	Milan	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 20020 Solaro (Milano)	Tel. +39 02 96 980229 Fax +39 02 96 980 999 http://www.sew-eurodrive.it milano@sew-eurodrive.it
Ivory Coast			
Sales	Abidjan	SEW-EURODRIVE SARL Ivory Coast Rue des Pêcheurs, Zone 3 26 BP 916 Abidjan 26	Tel. +225 21 21 81 05 Fax +225 21 25 30 47 info@sew-eurodrive.ci http://www.sew-eurodrive.ci
Japan			
Assembly Sales Service	Iwata	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp hamamatsu@sew-eurodrive.co.jp
Kazakhstan			
Sales	Almaty	SEW-EURODRIVE LLP 291-291A, Tole bi street 050031, Almaty	Tel. +7 (727) 350 5156 Fax +7 (727) 350 5156 http://www.sew-eurodrive.kz sew@sew-eurodrive.kz
	Tashkent	SEW-EURODRIVE LLP Representative office in Uzbekistan 96A, Sharaf Rashidov street, Tashkent, 100084	Tel. +998 71 2359411 Fax +998 71 2359412 http://www.sew-eurodrive.uz sew@sew-eurodrive.uz
	Ulaanbaatar	IM Trading LLC Narny zam street 62 Sukhbaatar district, Ulaanbaatar 14230	Tel. +976-77109997 Fax +976-77109997 imt@imt.mn
Kenya			
Sales	Nairobi	SEW-EURODRIVE Pty Ltd Transnational Plaza, 5th Floor Mama Ngina Street P.O. Box 8998-00100 Nairobi	Tel. +254 791 398840 http://www.sew-eurodrive.co.tz info@sew.co.tz
Latvia			
Sales	Riga	SIA Alas-Kuul Katlakalna 11C 1073 Riga	Tel. +371 6 7139253 Fax +371 6 7139386 http://www.alas-kuul.lv info@alas-kuul.com



<b>Lebanon</b>			
Sales (Lebanon)	Beirut	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@inco.com.lb
Sales (Jordan, Kuwait , Beirut Saudi Arabia, Syria)		Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 http://www.medrives.com info@medrives.com
<b>Lithuania</b>			
Sales	Alytus	UAB Irseva Statybininku 106C 63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 http://www.irseva.lt irmantas@irseva.lt
<b>Luxembourg</b>			
representation: Belgium			
<b>Macedonia</b>			
Sales	Skopje	Boznos DOOEL Dime Anicin 2A/7A 1000 Skopje	Tel. +389 23256553 Fax +389 23256554 http://www.boznos.mk
<b>Malaysia</b>			
Assembly Sales Service	Johor	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my
<b>Mexiko</b>			
Assembly Sales Service	Quéretaro	SEW-EURODRIVE MEXICO S.A. de C.V. SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Querétaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx
Sales Service	Puebla	SEW-EURODRIVE MEXICO S.A. de C.V. Calzada Zavaleta No. 3922 Piso 2 Local 6 Col. Santa Cruz Buenavista C.P. 72154 Puebla, México	Tel. +52 (222) 221 248 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx
<b>Mongolia</b>			
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<b>Morocco</b>			
Sales Service	Bouskoura	SEW-EURODRIVE Morocco Parc Industriel CFCIM, Lot 55 and 59 Bouskoura	Tel. +212 522 88 85 00 Fax +212 522 88 84 50 http://www.sew-eurodrive.ma sew@sew-eurodrive.ma
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<b>Netherlands</b>			
Assembly Sales Service	Rotterdam	SEW-EURODRIVE B.V. Industrieweg 175 3044 AS Rotterdam Postbus 10085 3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 Service: 0800-SEWHELP http://www.sew-eurodrive.nl info@sew-eurodrive.nl



<b>New Zealand</b>			
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	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 30 Lodestar Avenue, Wigram Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 <a href="mailto:sales@sew-eurodrive.co.nz">sales@sew-eurodrive.co.nz</a>
<b>Nigeria</b>			
Sales	Lagos	Greenpeg Nig. Ltd Plot 296A, Adeyemo Akapo Str. Omole GRA Ikeja Lagos-Nigeria	Tel. +234-701-821-9200-1 <a href="http://www.greenpegltd.com">http://www.greenpegltd.com</a> <a href="mailto:bolaji.adekunle@greenpegltd.com">bolaji.adekunle@greenpegltd.com</a>
<b>Norway</b>			
Assembly Sales Service	Moss	SEW-EURODRIVE A/S Solgaard skog 71 1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 <a href="http://www.sew-eurodrive.no">http://www.sew-eurodrive.no</a> <a href="mailto:sew@sew-eurodrive.no">sew@sew-eurodrive.no</a>
<b>Pakistan</b>			
Sales	Karachi	Industrial Power Drives Al-Fatah Chamber A/3, 1st Floor Central Com- mercial Area, Sultan Ahmed Shah Road, Block 7/8, Karachi	Tel. +92 21 452 9369 Fax +92-21-454 7365 <a href="mailto:seweurodrive@cyber.net.pk">seweurodrive@cyber.net.pk</a>
<b>Paraguay</b>			
Sales	Fernando de la Mora	SEW-EURODRIVE PARAGUAY S.R.L De la Victoria 112, Esquina nueva Asunción Departamento Central Fernando de la Mora, Barrio Bernardino	Tel. +595 991 519695 Fax +595 21 3285539 <a href="mailto:sewpy@sew-eurodrive.com.py">sewpy@sew-eurodrive.com.py</a>
<b>Peru</b>			
Assembly Sales Service	Lima	SEW EURODRIVE DEL PERU S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 <a href="http://www.sew-eurodrive.com.pe">http://www.sew-eurodrive.com.pe</a> <a href="mailto:sewperu@sew-eurodrive.com.pe">sewperu@sew-eurodrive.com.pe</a>
<b>Philippines</b>			
Sales	Makati	P.T. Cerna Corporation 4137 Ponte St., Brgy. Sta. Cruz Makati City 1205	Tel. +63 2 519 6214 Fax +63 2 890 2802 <a href="mailto:mech_drive_sys@ptcerna.com">mech_drive_sys@ptcerna.com</a> <a href="http://www.ptcerna.com">http://www.ptcerna.com</a>
<b>Poland</b>			
Assembly Sales Service	Łódź	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 92-518 Łódź	Tel. +48 42 293 00 00 Fax +48 42 293 00 49 <a href="http://www.sew-eurodrive.pl">http://www.sew-eurodrive.pl</a> <a href="mailto:sew@sew-eurodrive.pl">sew@sew-eurodrive.pl</a>
	Service	Tel. +48 42 293 0030 Fax +48 42 293 0043	24 Hour Service Tel. +48 602 739 739 (+48 602 SEW SEW) <a href="mailto:serwis@sew-eurodrive.pl">serwis@sew-eurodrive.pl</a>
<b>Portugal</b>			
Assembly Sales Service	Coimbra	SEW-EURODRIVE, LDA. Av. da Fonte Nova, n.º 86 3050-379 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 <a href="http://www.sew-eurodrive.pt">http://www.sew-eurodrive.pt</a> <a href="mailto:infosew@sew-eurodrive.pt">infosew@sew-eurodrive.pt</a>
<b>Romania</b>			
Sales Service	Bucharest	Sialco Trading SRL str. Brazilia nr. 36 011783 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 <a href="mailto:sialco@sialco.ro">sialco@sialco.ro</a>
<b>Russia</b>			
Assembly Sales Service	St. Petersburg	ЗАО «СЕВ-ЕВРОДРАЙФ» а. я. 36 195220 Санкт-Петербург	Tel. +7 812 3332522 / +7 812 5357142 Fax +7 812 3332523 <a href="http://www.sew-eurodrive.ru">http://www.sew-eurodrive.ru</a> <a href="mailto:sew@sew-eurodrive.ru">sew@sew-eurodrive.ru</a>

## Sambia

representation: South Africa

## Senegal

Sales	Dakar	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 <a href="http://www.senemeca.com">http://www.senemeca.com</a> <a href="mailto:senemeca@senemeca.sn">senemeca@senemeca.sn</a>
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## Serbia

Sales	Belgrade	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor 11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 <a href="mailto:office@dipar.rs">office@dipar.rs</a>
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## Singapore

Assembly Sales Service	Singapore	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 <a href="http://www.sew-eurodrive.com.sg">http://www.sew-eurodrive.com.sg</a> <a href="mailto:sewsingapore@sew-eurodrive.com">sewsingapore@sew-eurodrive.com</a>
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## Slovakia

Sales	Bratislava	SEW-Eurodrive SK s.r.o. Rybničná 40 831 06 Bratislava	Tel. +421 2 33595 202, 217, 201 Fax +421 2 33595 200 <a href="http://www.sew-eurodrive.sk">http://www.sew-eurodrive.sk</a> <a href="mailto:sew@sew-eurodrive.sk">sew@sew-eurodrive.sk</a>
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 040 01 Košice	Tel. +421 55 671 2245 Fax +421 55 671 2254 Mobile +421 907 671 976 <a href="mailto:sew@sew-eurodrive.sk">sew@sew-eurodrive.sk</a>

## Slovenia

Sales Service	Celje	Pakman - Pogonska Tehnika d.o.o. Ul. XIV. divizije 14 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 <a href="mailto:pakman@siol.net">pakman@siol.net</a>
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## South Africa

Assembly Sales Service	Johannesburg	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 248-7289 <a href="http://www.sew.co.za">http://www.sew.co.za</a> <a href="mailto:info@sew.co.za">info@sew.co.za</a>
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 <a href="mailto:bgriffiths@sew.co.za">bgriffiths@sew.co.za</a>
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 48 Prospect Road Isipingo Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 902 3815 Fax +27 31 902 3826 <a href="mailto:cdejager@sew.co.za">cdejager@sew.co.za</a>
	Nelspruit	SEW-EURODRIVE (PROPRIETARY) LIMITED 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 <a href="mailto:robermeyer@sew.co.za">robermeyer@sew.co.za</a>

## South Korea

Assembly Sales Service	Ansan	SEW-EURODRIVE KOREA CO., LTD. 7, Dangjaengi-ro, Danwon-gu, Ansan-si, Gyeonggi-do, Zip 425-839	Tel. +82 31 492-8051 Fax +82 31 492-8056 <a href="http://www.sew-eurodrive.kr">http://www.sew-eurodrive.kr</a> <a href="mailto:master.korea@sew-eurodrive.com">master.korea@sew-eurodrive.com</a>
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**South Korea**

Busan	SEW-EURODRIVE KOREA CO., LTD. 28, Noksansandan 262-ro 50beon-gil, Gangseo-gu, Busan, Zip 618-820	Tel. +82 51 832-0204 Fax +82 51 832-0230
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**Spain**

Assembly Sales Service	Bilbao	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 <a href="http://www.sew-eurodrive.es">http://www.sew-eurodrive.es</a> <a href="mailto:sew.spain@sew-eurodrive.es">sew.spain@sew-eurodrive.es</a>
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**Sri Lanka**

Sales	Colombo	SM International (Pte) Ltd 254, Galle Raod Colombo 4, Sri Lanka	Tel. +94 1 2584887 Fax +94 1 2582981
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**Swaziland**

Sales	Manzini	C G Trading Co. (Pty) Ltd PO Box 2960 Manzini M200	Tel. +268 2 518 6343 Fax +268 2 518 5033 <a href="mailto:engineering@cgtrading.co.sz">engineering@cgtrading.co.sz</a>
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**Sweden**

Assembly Sales Service	Jönköping	SEW-EURODRIVE AB Gnejsvägen 6-8 553 03 Jönköping Box 3100 S-550 03 Jönköping	Tel. +46 36 34 42 00 Fax +46 36 34 42 80 <a href="http://www.sew-eurodrive.se">http://www.sew-eurodrive.se</a> <a href="mailto:jonkoping@sew.se">jonkoping@sew.se</a>
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**Switzerland**

Assembly Sales Service	Basel	Alfred Imhof A.G. Jurastrasse 10 4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 <a href="http://www.imhof-sew.ch">http://www.imhof-sew.ch</a> <a href="mailto:info@imhof-sew.ch">info@imhof-sew.ch</a>
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**Taiwan**

Sales	Taipei	Ting Shou Trading Co., Ltd. 6F-3, No. 267, Sec. 2 Tung Huw S. Road Taipei	Tel. +886 2 27383535 Fax +886 2 27368268 Telex 27 245 <a href="mailto:sewtwn@ms63.hinet.net">sewtwn@ms63.hinet.net</a> <a href="http://www.tingshou.com.tw">http://www.tingshou.com.tw</a>
	Nan Tou	Ting Shou Trading Co., Ltd. No. 55 Kung Yeh N. Road Industrial District Nan Tou 540	Tel. +886 49 255353 Fax +886 49 257878 <a href="mailto:sewtwn@ms63.hinet.net">sewtwn@ms63.hinet.net</a> <a href="http://www.tingshou.com.tw">http://www.tingshou.com.tw</a>

**Tanzania**

Sales	Daressalam	SEW-EURODRIVE PTY LIMITED TANZANIA Plot 52, Regent Estate PO Box 106274 Dar Es Salaam	Tel. +255 0 22 277 5780 Fax +255 0 22 277 5788 <a href="http://www.sew-eurodrive.co.tz">http://www.sew-eurodrive.co.tz</a> <a href="mailto:info@sew.co.tz">info@sew.co.tz</a>
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**Thailand**

Assembly Sales Service	Chonburi	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 <a href="mailto:sewthailand@sew-eurodrive.com">sewthailand@sew-eurodrive.com</a>
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**Tunisia**

Sales	Tunis	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 79 40 88 77 Fax +216 79 40 88 66 <a href="http://www.tms.com.tn">http://www.tms.com.tn</a> <a href="mailto:tms@tms.com.tn">tms@tms.com.tn</a>
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**Turkey**

Assembly Sales Service	Kocaeli-Gebze	SEW-EURODRIVE Hareket Sistemleri San. Ve TIC. Ltd. Sti Gebze Organize Sanayi Böl. 400 Sok No. 401 41480 Gebze Kocaeli	Tel. +90 262 9991000 04 Fax +90 262 9991009 <a href="http://www.sew-eurodrive.com.tr">http://www.sew-eurodrive.com.tr</a> <a href="mailto:sew@sew-eurodrive.com.tr">sew@sew-eurodrive.com.tr</a>
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Ukraine			
Assembly Sales Service	Dnipropetrovsk	ООО «СЕВ-Евродрайв» ул. Рабочая, 23-В, офис 409 49008 Днеп	Tel. +380 56 370 3211 Fax +380 56 372 2078 <a href="http://www.sew-eurodrive.ua">http://www.sew-eurodrive.ua</a> <a href="mailto:sew@sew-eurodrive.ua">sew@sew-eurodrive.ua</a>
Uruguay			
Assembly Sales	Montevideo	SEW-EURODRIVE Uruguay, S. A. Jose Serrato 3569 Esquina Corumbe CP 12000 Montevideo	Tel. +598 2 21181-89 Fax +598 2 21181-90 <a href="mailto:sewuy@sew-eurodrive.com.uy">sewuy@sew-eurodrive.com.uy</a>
USA			
Production Assembly Sales Service	Southeast Region	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Production +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 <a href="http://www.seweurodrive.com">http://www.seweurodrive.com</a> <a href="mailto:cslyman@seweurodrive.com">cslyman@seweurodrive.com</a>
Assembly Sales Service	Northeast Region	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 <a href="mailto:csbridgeport@seweurodrive.com">csbridgeport@seweurodrive.com</a>
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 332-0038 <a href="mailto:cstroy@seweurodrive.com">cstroy@seweurodrive.com</a>
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 <a href="mailto:csdallas@seweurodrive.com">csdallas@seweurodrive.com</a>
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 <a href="mailto:cshayward@seweurodrive.com">cshayward@seweurodrive.com</a>
	Wellford	SEW-EURODRIVE INC. 148/150 Finch Rd. Wellford, S.C. 29385	<a href="mailto:IGLogistics@seweurodrive.com">IGLogistics@seweurodrive.com</a>
Additional addresses for service provided on request!			
Uzbekistan			
Technical Office	Tashkent	SEW-EURODRIVE LLP Representative office in Uzbekistan 96A, Sharaf Rashidov street, Tashkent, 100084	Tel. +998 71 2359411 Fax +998 71 2359412 <a href="http://www.sew-eurodrive.uz">http://www.sew-eurodrive.uz</a> <a href="mailto:sew@sew-eurodrive.uz">sew@sew-eurodrive.uz</a>
Vietnam			
Sales	Ho Chi Minh City	Nam Trung Co., Ltd Huế - South Vietnam / Construction Materials 250 Binh Duong Avenue, Thu Dau Mot Town, Binh Duong Province HCM office: 91 Tran Minh Quyen Street District 10, Ho Chi Minh City	Tel. +84 8 8301026 Fax +84 8 8392223 <a href="mailto:khanh-nguyen@namtrung.com.vn">khanh-nguyen@namtrung.com.vn</a> <a href="http://www.namtrung.com.vn">http://www.namtrung.com.vn</a>
	Hanoi	MICO LTD Quảng Trị - North Vietnam / All sectors except Construction Materials 8th Floor, Ocean Park Building, 01 Dao Duy Anh St, Ha Noi, Viet Nam	Tel. +84 4 39386666 Fax +84 4 3938 6888 <a href="mailto:nam_ph@micogroup.com.vn">nam_ph@micogroup.com.vn</a> <a href="http://www.micogroup.com.vn">http://www.micogroup.com.vn</a>









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Driving the world

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