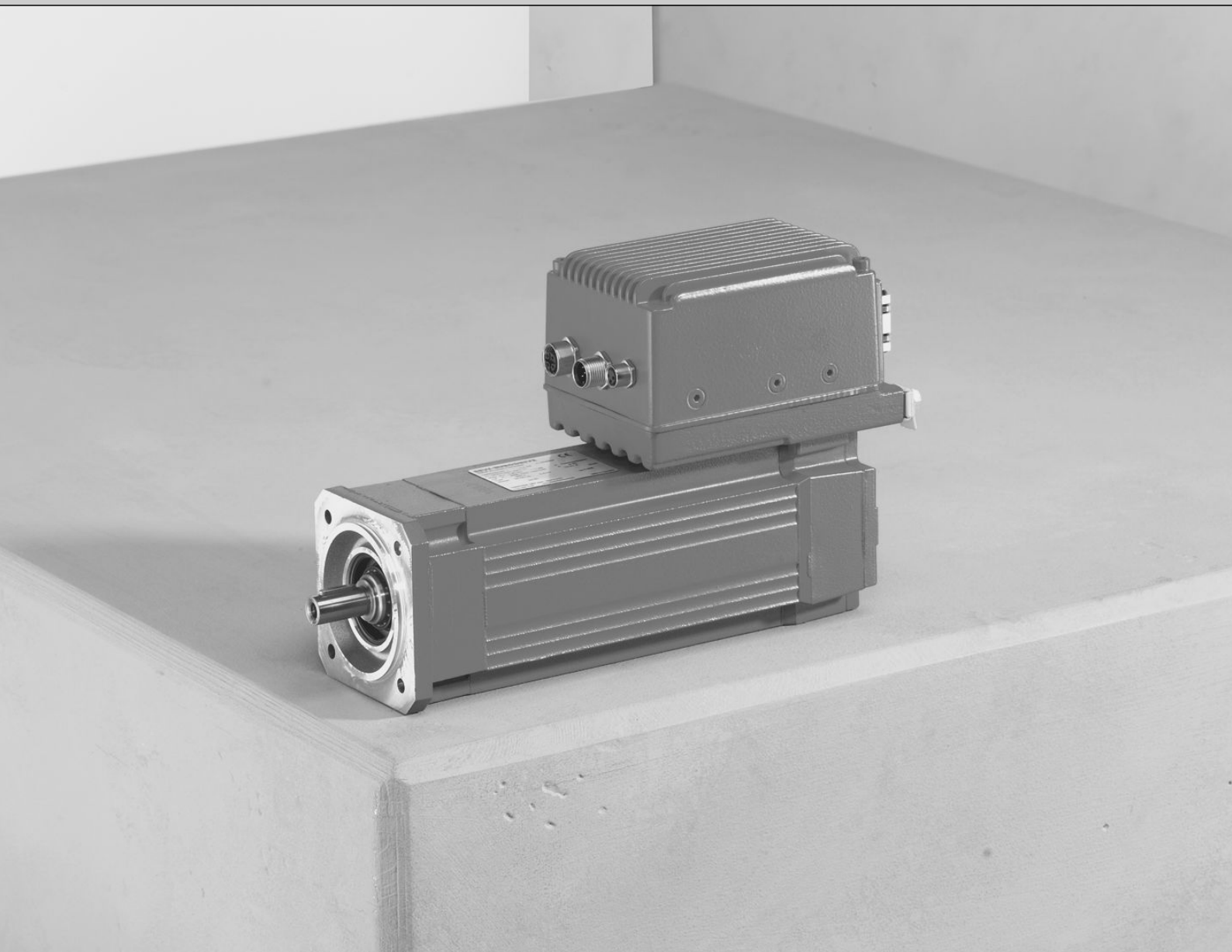




SEW
EURODRIVE

Operating Instructions



Decentralized Extra-Low Voltage Servo Drive
CMP ELVCD



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1 General information

1.1 About this documentation

This documentation is an integral part of the product. The documentation is intended for all employees who perform assembly, installation, startup, and service work on the 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 device 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
▲ DANGER	Imminent hazard	Severe or fatal injuries.
▲ WARNING	Possible dangerous situation	Severe or fatal injuries
▲ CAUTION	Possible dangerous situation	Minor injuries
NOTICE	Possible damage to property	Damage to the drive system or its environment.
INFORMATION	Useful information or tip: Simplifies handling of the drive system.	

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

Hazard symbol	Meaning
	Warning of dangerous electrical voltage
	Warning of hot surfaces
	Warning of risk of crushing
	Warning of suspended load
	Warning of automatic restart

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 unit!

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 Other applicable documentation

Note also the following documentation:

- Operating instructions for the gear unit (only for gearmotors)
- "MultiMotion" manual (for startup)

You can download or order these publications on the Internet (<http://www.sew-eurodrive.com> under the heading "Documentation").

1.6 Product names and trademarks

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

1.7 Copyright notice

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Unauthorized reproduction, modification, distribution or any other use of the whole or any part of this documentation is strictly prohibited.

2 Safety notes

The following basic safety notes are intended to prevent injury to persons and damage to property. The user must ensure that the basic safety notes are read and observed. Ensure that persons responsible for the system and its operation, as well as persons who work independently on the unit, have read through the operating instructions carefully and understood them. If you are unclear about any of the information in this documentation or require further information, please contact SEW-EURODRIVE.

2.1 General information

Never install or operate damaged products. In the event of damage, submit a complaint to the shipping company immediately.

During operation, ELVCD drives can have live, bare and movable or rotating parts as well as hot surfaces, depending on their enclosure.

Unauthorized removal of covers, improper use, or incorrect installation and operation may result in severe injury to persons, or damage to machinery.

Refer to the documentation for additional information.

2.2 Target group

Only qualified electricians are authorized to install, start up or service the units or correct unit faults (observing IEC 60364 or CENELEC HD 384 or DIN VDE 0100 and IEC 60664 or DIN VDE 0110 as well as national accident prevention regulations).

Qualified electricians in the context of these basic safety notes are all persons familiar with installation, assembly, startup and operation of the product who possess the necessary qualifications.

All persons involved in any other work, such as transportation, storage, operation and waste disposal, must be trained appropriately.

2.3 Designated use

ELVCD drives are components intended for installation in electrical systems or machines.

In case of installation in machines, startup of the ELVCD drives (i.e. start of designated operation) is prohibited until it is determined that the machine meets the requirements stipulated in the EC Directive 2006/42/EC (machine directive).

Startup (i.e. the start of designated use) is only permitted under observance of EMC directive 2004/108/EC (EMC Directive).

Adhere to the technical data and information on the connection requirements as provided on the nameplate and in the documentation.

2.3.1 Safety functions

ELVCD drives may **not** perform safety functions unless these functions are described and expressly permitted.

2.3.2 Lifting applications

ELVCD drives are not designed for use as safety devices in lifting applications.

Contact SEW-EURODRIVE before using them in lifting applications.

2.4 Transportation and storage

Observe the notes on transportation, storage and proper handling. Comply with the requirements for climatic conditions stated in chapter "Technical data". Mounted gear units have separate suspension attachments, which must be used according to the gear unit operating instructions when lifting the ELVCD drive. Do not attach any additional loads. Use suitable, sufficiently rated handling equipment (e.g. rope guides) if required.

2.5 Installation

The units must be installed and cooled according to the regulations and specifications in the corresponding documentation.

Protect the ELVCD drives from excessive strain.

The following applications are prohibited unless explicitly permitted:

- Use in potentially explosive atmospheres.
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc.
- Use in non-stationary applications that are subject to mechanical vibration and shock loads as stated in the documentation for ELVCD drives.

NOTICE: ELVCD drives and corresponding mount-on parts must not protrude into footways.

2.6 Electrical connection

Working on live parts of ELVCD drives is not permitted.

The drive is operated as a generator due to the kinetic energy of the plant/machine. Secure the output shaft against rotation prior to the electrical installation.

Electrical installation must be carried out in compliance with pertinent regulations (e.g. cable cross sections, fusing, protective conductor connection). For any additional information, refer to the applicable documentation.

You will find notes on EMC-compliant installation, such as shielding, grounding, arrangement of filters and routing of lines, in the documentation of the ELVCD drives. The manufacturer of the system or machine is responsible for maintaining the limits established by EMC legislation.

Preventive measures and protection devices must correspond to the regulations in force (e.g. EN 61800-3).

2.7 Protective separation

ELVCD drives meet all requirements for protective separation of power and electronics connections in accordance with EN 61800-5-1. All connected circuits must also satisfy the requirements for protective separation to ensure protective separation.

2.8 Operation

Systems with integrated ELVCD drives must be equipped with additional monitoring and protection devices according to the applicable safety guidelines, such as the law governing technical equipment, accident prevention regulations, etc. Additional protective measures may be necessary for applications with increased hazard potential. Changes to ELVCD drives using the operating software are permitted.

The connection boxes must be closed and screwed on before the supply voltages are connected to the ELVCD drive. All plug connectors must be installed and fastened.

Mechanical blocking or internal safety functions of the unit 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, disconnect the unit from the supply system before correcting the error.

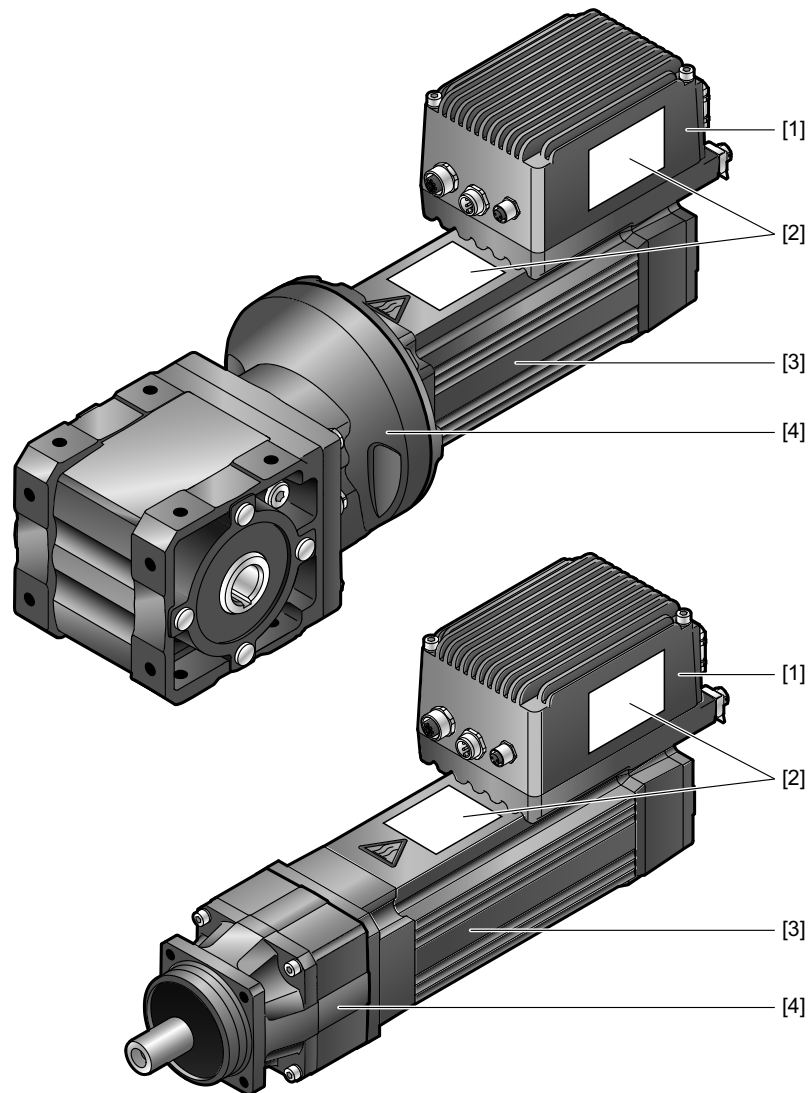
NOTICE Risk of burns: The surface temperatures of the ELVCD drives can be more than 60 °C during operation.

3 Unit structure

3.1 CMP ELVCD decentralized extra-low voltage servo drive

The CMP ELVCD decentralized extra-low voltage servo drive (= ELVCD drive) is used in a system with a DC 48 V voltage source.

The following figure shows an example of ELVCD drives with helical-bevel gear unit and planetary gear unit:

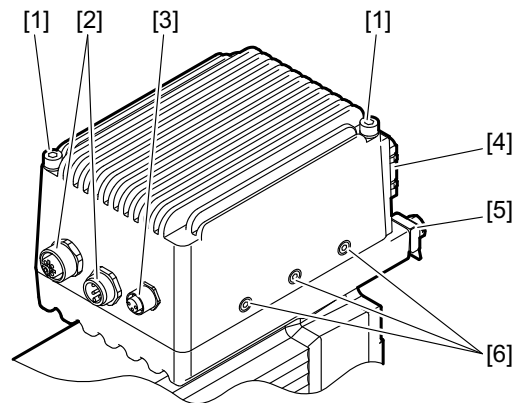


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- [1] ELVCD inverter
- [2] Nameplate
- [3] CMP.. servomotor
- [4] Gear unit (option)

3.2 ELVCD inverter

The following figure shows the ELVCD inverter:



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- [1] ELVCD inverter retaining screws
- [2] CAN interface plug connector
- [3] Diagnostic interface
- [4] Plug connector voltage supply and digital inputs/outputs
- [5] Equipotential bonding connection
- [6] Screws

NOTICE! If you loosen the 3 screws [6], parts may become loose within the ELVCD inverter.

Damage to the ELVCD inverter.

- Do not ever loosen the 3 screws [6].

INFORMATION



Only SEW-EURODRIVE Service may open the ELVCD inverter.

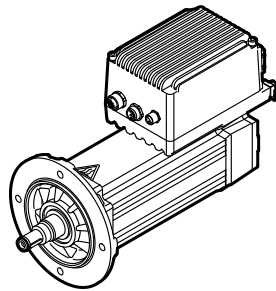
- Do not loosen the retaining screws [1] of the ELVCD inverter.

3.3 Position of the plug connector

The ELVCD drive is available with the following plug connector positions:

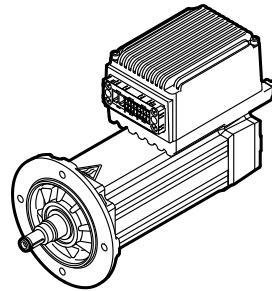
Power connector position
3
(standard)

KKL3



Power connector position
1

KKL1

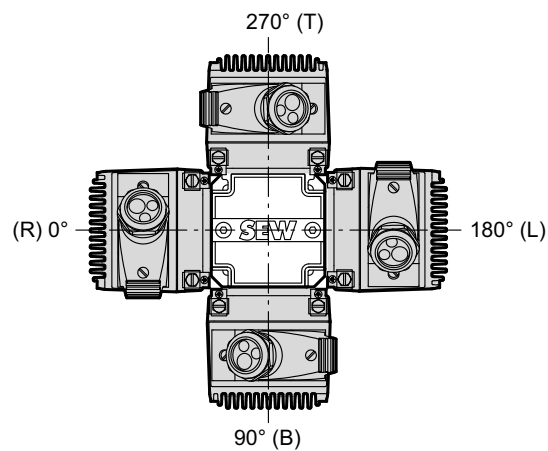


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3.4 Position of the inverter

The ELVCD drive is available with the following inverter positions:

(standard)



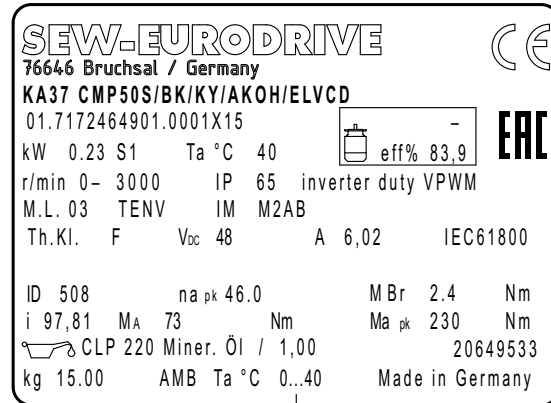
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Depending on the gear unit design, there may be restrictions regarding the inverter position.

3.5 Nameplate and type designation

3.5.1 Nameplate

The following figure gives an example of a nameplate of an ELVCD drive with helical-bevel gear unit.



[1]

9007211531974667

The nameplate is located on the side of the motor and on the inverter.

ELVCD drives are available in standard design and low temperature design. Observe the permitted ambient temperature [1] on the nameplate.

3.5.2 Type designation

The following table shows an example of the type designation of the **KA37 CMP50S/BK/KY/AK0H/ELVCD** ELVCD drive:

KA	Gear unit type	
37	Gear unit size	
CMP	Motor series	
50S	Motor size	50S = Size 50S 50M = Size 50M
/BK	Brake (option)	BK = Permanent magnet brake BP = Spring-loaded brake
/KY	Temperature sensor	
/AK0H	Encoder	RH1M = Resolver AK0H = HIPERFACE® encoder (Multiturn)
/ELVCD	ELVCD inverter	

The ELVCD drive is available as stand-alone motor or gearmotor.

Nearly all gear unit designs that can be combined with the CMP50S and CMP50M motors can be realized with the ELVCD drive.

4 Mechanical installation

4.1 Installation notes

INFORMATION



Adhere to the safety notes during installation.



▲ WARNING

Improper installation of ELVCD drive or mount-on components.

Risk of injury.

- Adhere to the notes on installation.
- Before releasing shaft connections, make sure that there are no active torsional moments present (tensions within the system).



▲ WARNING

Risk of injury if the ELVCD drive starts up unintentionally.

Severe or fatal injuries.

- Secure the output shaft against rotation.

4.2 Required tools and resources

- Set of wrenches
- Torque wrench
- Mounting device
- Compensation elements (shims and spacing rings), if necessary
- Fasteners for output elements
- Lubricant (e.g. NOCO® fluid)
- Standard parts are not included in the delivery

4.2.1 Installation tolerances for motor shaft ends

The following tables shows the permitted tolerances of the shaft ends and flanges of the ELVCD drive.

Shaft end	Flanges
Diameter tolerance according to EN 50347 <ul style="list-style-type: none"> • ISO k6 • Center hole in accordance with DIN 332, shape DR.. 	Centering shoulder tolerance in accordance with EN 50347 <ul style="list-style-type: none"> • ISO j6

4.3 Installation requirements

Check that the following conditions have been met:

- The information on the nameplate of the ELVCD drive must match the voltage grid.
- The ELVCD drive is undamaged (no damage caused by transportation or storage).
- The ambient temperature according to the operating instructions and nameplate.
- The ELVCD drive must not be installed in the following ambient conditions:
 - Potentially-explosive atmosphere
 - Oils
 - Acids
 - Gases
 - Vapors
 - Radiation
- Thoroughly clean the output shafts and the flange surfaces and make sure that they are free from anti-corrosion agent, dirt or the like. Use a commercially available solvent. Do not expose the sealing lips of the radial oil seals to the solvent – damage to the material.
- When the drive is installed in abrasive ambient conditions, protect the output end radial oil seals against wear.

4.4 Permitted mounting position

The ELVCD drive is installed in the system together with the servomotor.

Observe the mounting position specified on the motor nameplate.

4.5 Installing the ELVCD drive

4.5.1 Notes

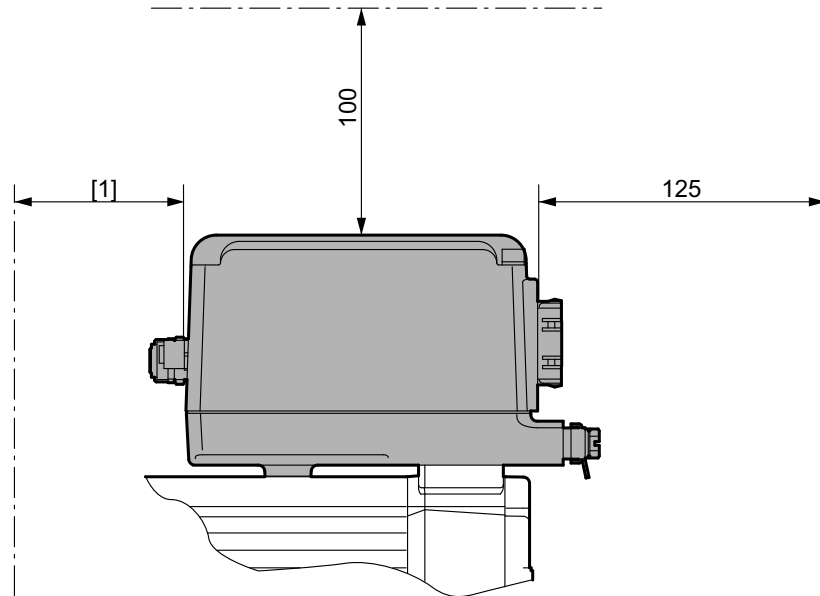
- Only install the ELVCD drive on a level, low-vibration, and torsionally rigid support structure.
- Thoroughly remove any anti-corrosion agent from the shaft end. Use a commercially available solvent. Do not allow the solvent to penetrate the bearings and shaft seals – this could damage the material.
- Align the motor carefully to avoid placing any unacceptable strain on the motor shafts. Observe the permitted overhung and axial loads specified in the gear unit catalog.
- Do not jolt or hammer the shaft end.
- Ensure sufficient clearance around the unit to allow for adequate cooling. Warm outlet air of other units must not affect the cooling.
- Balance components that were subsequently mounted to the shaft with a half key (output shafts are balanced with a half key).
- Use suitable cable glands for the supply leads (use reducing adapters if necessary).
- Seal the cable entry properly.
- If the corrosion protection coating is damaged, restore the coating.
- Check whether the degree of protection specified in the operating instructions and on the nameplate is permitted in the ambient conditions on site.

4 Mechanical installation

Installing the ELVCD drive

4.5.2 Minimum installation clearance

Observe the minimum installation clearance as shown in the following figure:



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[1] Angled SBus plug connector:	40 mm
Straight SBus plug connector:	75 mm

For detailed dimension drawings, refer to chapter "Technical data".

4.5.3 Installation in damp locations or outdoors

ELVCD drives are supplied in corrosion-resistant design for use in damp areas or in the open.

Repair damage to the paint work.

Condensation is not permitted for ELVCD drives.

4.5.4 Painting the ELVCD drive



NOTICE

Breather valves and oil seals may be damaged during painting or re-painting.

Possible damage to property.

- Clean the surface of the ELVCD drive and make sure it is free from grease.
- Thoroughly cover the breather valves and sealing lip of the oil seals with strips prior to painting.
- Remove the strips after painting.

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5 Electrical installation

INFORMATION



Adhere to the safety notes during installation.

5.1 Installation planning taking EMC aspects into account

5.1.1 Notes on arranging and routing installation components

Successful installation of decentralized drives depends on selecting the correct cables, providing correct grounding and a functioning equipotential bonding.

Always apply the **relevant standards**.

Note the following:

5.1.2 Equipotential bonding

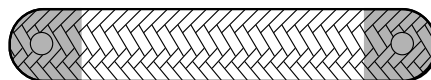
INFORMATION



Due to the extra-low voltage of DC 48 V, it is not necessary to connect a protective earth PE.

It is, however, essential that **low-impedance, HF-capable equipotential bonding** is provided (see also EN 60204-1 or DIN VDE 0100-540):

- Between the ELVCD drive and the mounting rail, provide for a connection over a wide area.
- To do so, use a ground strap (HF litz wire), for example, to connect the ELVCD drive and the grounding point of the plant.



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5.1.3 EMC-compliant installation

INFORMATION



This drive system is not designed for operation on a public low voltage supply system that supplies residential areas.

This is a product with restricted availability (categories C1 to C4 according to IEC 61800-3). This product may cause EMC interference. In this case, it is recommended for the operator to take suitable measures.

With respect to the EMC regulation, frequency inverters and ELVCD drives cannot be seen as stand-alone units. Regarding EMC, they can only be evaluated when they are integrated in a drive system. Conformity is declared for a described, CE-typical drive system. These operating instructions contain further information.

5.2 Installation instructions

5.2.1 Connecting a supply cable

- The nominal voltage of the ELVCD drive must correspond to the data for the supply voltage.
- Dimension the cable cross section according to the input current I_N for rated power (see "Technical data" chapter).
- Install the fuses F11/F12/F13 at the beginning of the supply cable after the power supply unit (DC 24 V, DC 48 V), see chapter "Installation topology".
Dimension the fuses according to the cable cross section.
- Use only copper conductors with a minimum temperature range of 85 °C as supply cable.
- The DC 24 V and DC 48 V supplies have a common ground potential (GND). The central star point of the reference potential must be installed as close to the power supply units as possible.
- The maximum length of the supply cable between power supply unit and the ELVCD drive must not exceed 10 m at a core cross section of 2.5 mm². If longer cables are required, consult SEW-EURODRIVE.
- If you connect more than one ELVCD drive to one power supply unit, install the drives in star configuration. The star point must be installed as close to the power supply unit as possible. Dimension the cable cross sections to the star point according to the total current. Contact SEW-EURODRIVE in such cases.

5.2.2 Contactor



NOTICE

Damage to the ELVCD inverter due to jog mode of the contactor.

Damage to the ELVCD inverter.

- Do not use the contactor (see chapter "Installation topology" (→ 21)) for jog mode but only for switching the ELVCD inverter on and off. Use the control commands for jog mode.
 - Observe a minimum switch-off time of 2 s for the contactor.
-
- If the contactor is installed in the DC 48 V supply cable, use only a contactor of utilization category DC-3 (EN 60947-4-1).

5.2.3 Installation above 1000 m amsl

ELVCD drives can also be operated with line voltages of 48 V at an altitude of 1000 – 4000 m amsl.

To do so, observe the basic conditions in chapter "Technical data".

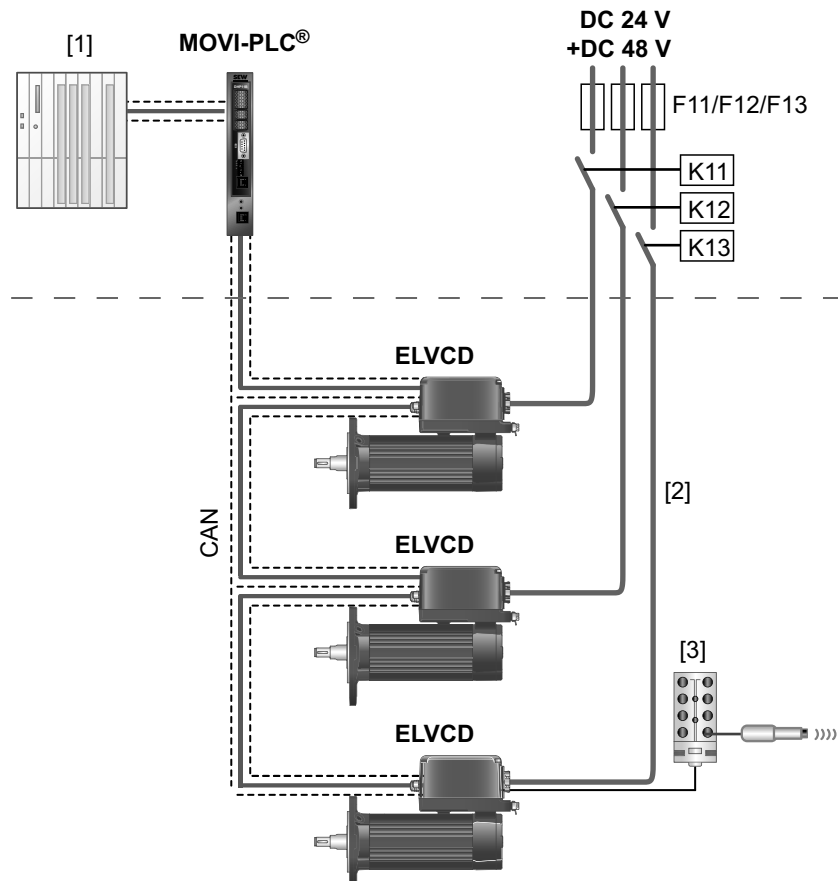
5.3 Installation topology (example)

INFORMATION



The following figure shows a basic installation topology with ELVCD drive.

Observe the installation instructions in the documentation of the MOVI-PLC® controller.



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- [1] Higher-level controller
- [2] The 24 V electronics supply and the 48 V inverter DC link supply is provided by 1 shared connection cable or by 2 separate supply cables.
- [3] Sensor/actuator box for connecting sensors/actuators (accessories)

5.4 Notes on the supply

5.4.1 Dimensioning the DC 24 V supply

The required power of the DC 24 V supply depends on the number and the current consumption of the connected ELVCD drives.

The current demand of an ELVCD drive is a combination of the basic current consumption of the electronics and the current consumption of the used options (e.g. brake).

5.4.2 Dimensioning the DC 48 V supply

The DC 48 V supply must provide the power that is required at the output shaft of the ELVCD drive. Determine the maximum power demand observing the efficiency.

A power supply unit with a rated power of 500 W allows for operation below the S1 characteristic curve (see chapter "Technical data" > "Characteristic curves" > "Thermal characteristic curves"). With dynamic capacity utilization, the power demand may exceed 1200 W.

For an appropriate dimensioning of the DC 48 V supply, consult SEW-EURODRIVE.

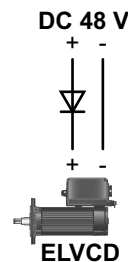
5.4.3 Regenerative operation

In regenerative operation (braking operation) of the ELVCD drive, energy is fed into the DC 48 V supply circuit. This results in a rise of the supply voltage at the ELVCD inverter and at the 48 V power supply unit output.

Industrial-quality switched-mode power supplies are equipped with output voltage monitoring. If the applied voltage exceeds the switching threshold (depends on device type), the power supply unit switches off the voltage. The ELVCD drive signals a failure. Further operation is only possible after a reset.

To avoid the possible regenerative voltage rise at the output of the 48 V power supply unit and the resulting switch-off, you may install a diode.

Install the diode in the + cable of the DC 48 V supply as shown in the following figure:



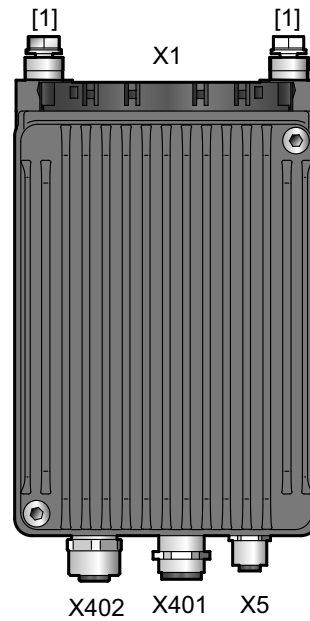
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Dimension the diode according to the currents and the voltage of the 48 V supply.

5.5 CMP ELVCD connection

5.5.1 Plug connector positions

The following figure shows possible plug connector positions:



12224819851

- [1] Equipotential bonding
- X1 DC 24 V input, DC 48 V input, and digital inputs/outputs
- X401 CAN interface – input
- X402 CAN interface – output
- X5 Diagnostic interface

5.6 Plug connector



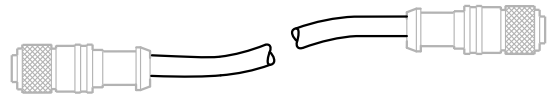

The wiring diagrams of the plug connectors depict the contact end of the connection.

5.6.1 Connection cables

Connection cables are not included in the delivery.

The number and type of required connection cables depend on the design of the units and the components to be connected. This is why not all listed cables are required.

The following figure shows the various cable types:

Cables	Length	Installation type
	Fixed length	Suitable for cable carrier installation 
	Variable length	Not suitable for cable carrier installation 

5.6.2 X1: DC 24 V input, DC 48 V input, and digital inputs/outputs

The following table shows information about this connection:

Function			
DC 24 V input for unit electronics supply			
DC 48 V input for DC link supply			
Digital inputs/outputs			
Connection type			
Phoenix PLUSCON – VARIOCON with 18 contacts			
Wiring diagram			
Assignment			
Module	No.	Name	Function
A	1	DO00	Digital output, ready for operation
	2	DI08	Digital input, limit switch CW/positive (locks at n > 0, clockwise rotation)
	3	Res.	Reserved
	4	Res.	Reserved
	5	DI09	Digital input, switch on output stage ¹⁾
	6	DI07	Digital input, limit switch CCW/negative (locks at n < 0, counterclockwise rotation)
	7	Res.	Reserved
	8	Res.	Reserved
B	1	Res.	Reserved
	2	DO02	Digital output 2, parameterizable ²⁾
	3	Res.	Reserved
	4	GND	Reference potential for binary signals ³⁾
	5	Res.	Reserved
	6	DO01	Digital output 1, parameterizable ²⁾
	7	Res.	Reserved
	8	+24 V	DC 24 V voltage supply for electronics
C	1	GND	Reference potential for DC link and electronics
	2	+DC link	DC 48 V voltage supply for DC link

1) Jumper pin A5 with pin B8 (+24 V) in the connector or connect Pin A5 directly to a DC 24 V supply.

2) See chapter "Parameter description"

3) Switching of digital inputs: DC 24 V electronics supply → Jumper pin B4 to pin C1 required. DC 24 V external voltage → Connection of pin B4 with reference potential of the external voltage required.

Mating connector

Use the following mating connector for connection to the X1 plug connector:

Type	
Phoenix PLUSCON – VARIOCON assembly kit	
comprising:	<ul style="list-style-type: none"> • 1 × VC-TSF 2 • 2 × VC-TFS 8 • 1 × VC-TR2/3M-PEA • 1 × VC-MEMV-T2-Z • PG21 cable gland
Assignment	
See X1 plug connector assignment.	

The components of the mating connector can be ordered from PHOENIX CONTACT individually or as a set with a part number.

The Variocon set VC-M-T2/10() S822 NZ:TS02 with part number 1623598 comprises:

- 1 × VC-TSF 2
- 2 × VC-TFS 8
- 1 × VC-TR2/3M-PEA
- 1 × VC-MEMV-T2-Z
- 1 × shield VC-BSZ WH
- PG21 cable gland with feed-through
 - 11.5 – 15.5 mm
 - 9 – 13 mm
 - 1 × 6 mm/2 × 9 mm (incl. locking bolt)

Permitted connection cross section and current carrying capacity of the terminals

X1		
Module	A	B and C
Connection cross section	0.2 – 4 mm ²	0.14 – 1.5 mm ²
Current carrying capacity (max. continuous current)	20 A	10 A
Single conductor stripping length	10 mm	6 mm

5.6.3 X401: CAN interface – input

INFORMATION



To ensure a continuous connection from the housing to the unit, use CAN connection cables whose shield is connected with the connector housing in such a way that it is EMC capable.

The following table shows information about this connection:

Function		
CAN interface – input		
Connection type		
M12, 5-pin, male, A-coded		
Wiring diagram		
18014400774300171		
Assignment		
No.	Name	Function
1	Drain wire	Shield/equipotential bonding CAN bus
2	Res.	Reserved
3	CAN_GND	Reference potential CAN bus
4	CAN_H	CAN data line (high)
5	CAN_L	CAN data line (low)

5.6.4 X402: CAN interface – output

INFORMATION



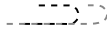

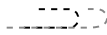
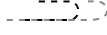

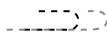
To ensure a continuous connection from the housing to the unit, use CAN connection cables whose shield is connected with the connector housing in such a way that it is EMC capable.

The following table shows information about this connection:

Function		
CAN interface – output		
Connection type		
M12, 5-pin, female, A-coded		
Wiring diagram		
18014400774298251		
Assignment		
No.	Name	Function
1	Drain wire	Shield/equipotential bonding CAN bus
2	Res.	Reserved
3	CAN_GND	Reference potential CAN bus
4	CAN_H	CAN data line (high)
5	CAN_L	CAN data line (low)

Connection cables

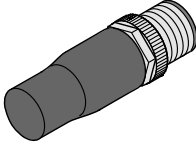
The following table shows the cables available for this connection:

Connection cable		Part number	Length/ installa- tion type	Nominal voltage
ELVCD	ELVCD	13286331	5 m: 	DC 60 V
		13286358	10 m 	
	M12 5-pin Male A-coded	M12 5-pin Female A-coded	13286366	
MOVI-PLC®	ELVCD	19111665	5 m: 	DC 60 V
		19129270	10 m: 	
	Open (conductor end sleeves)	M12 5-pin Female A-coded	19129289	

Connection cables with right-angle connectors

Connection cables with right-angle connectors can be purchased from specialist electrical retailers (e.g. PHOENIX CONTACT).

Bus termination

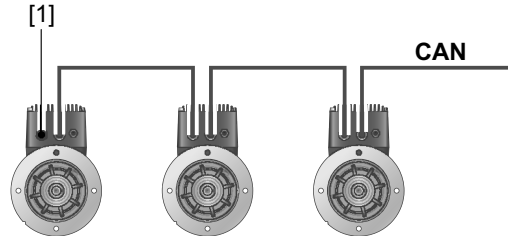
	Part number
Bus terminating resistor ¹⁾ 	13287036

1) A resistor of 120 Ω is installed in the bus terminating resistor between pin 4 and 5.

The CAN segment must be terminated using bus terminating resistors at the first and last physical station to prevent malfunctions in the bus system due to reflections, etc.

The first bus station is the master.

Terminate the last CAN station by inserting a 120 Ω bus terminating resistor at plug connector X402 [1].



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[1] Bus terminating resistor 120 Ω

5.6.5 X5: Diagnostic interface

INFORMATION



Diagnostic interface X5 may only be used by SEW-EURODRIVE Service.

Never remove the screw plug from diagnostic interface X5.

6 Startup

6.1 Startup notes



INFORMATION

It is essential to adhere to the safety notes during startup.



▲ WARNING

Risk of injury due to missing or defective protection covers.

Severe or fatal injuries.

- Install the protective covers of the system according to the instructions.
- Never start up the drive if the protective covers are not installed.



▲ WARNING

Risk of burns caused by hot surfaces.

Severe injuries

- Let the units cool down before touching them.



▲ WARNING

Unit malfunction due to incorrect unit setting.

Severe or fatal injuries.

- Observe the startup notes.
- Installation may only be carried out by qualified personnel.
- Only use settings that are suitable for operation.



INFORMATION

- To ensure fault-free operation, do not disconnect or connect signal cables during operation.

6.2 Prerequisites for startup

6.2.1 Before startup

Before startup, make sure that:

- The drive is undamaged and not blocked
- The measures described in chapter "Extended storage" are performed after an extended storage period
- All connections have been made properly
- The direction of rotation of the drive is correct
- All protective covers have been properly installed
- All motor protection equipment is active and set for the rated motor current
- There are no other sources of danger
- No heat-sensitive or insulating materials are covering the surface of the drive

6.2.2 During startup

During startup, make sure that:

- The motor is running properly, which means
 - No overload,
 - No speed fluctuation,
 - No loud noises,
 - No unusual vibrations, etc.

In case of problems, refer to chapter "Service".

6.3 Startup procedure

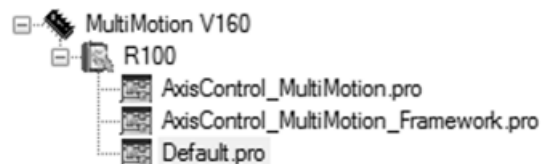
INFORMATION



This chapter describes the startup of the ELVCD drive using the MultiMotion program module of the MOVITOOLS® MotionStudio software.

Refer to the "MultiMotion" manual for further information on the MultiMotion program module.

1. Check whether the ELVCD drive is installed correctly both mechanically and electrically.
See chapters "Mechanical installation" and "Electrical installation".
2. Connect the PC/laptop with the MOVI PLC® controller via USB (e.g. DHE41B, DHR41B, DHF41B, only with technology level T2).
3. Apply voltage to the MOVI-PLC® controller.
4. Start the MOVITOOLS® MotionStudio software.
5. Scan the network as follows:
 - Go to "Choose connection mode and create network" and configure the connection type (USB or Ethernet).
 - Make sure that you are in "Online mode".
 - Use the right mouse button to click on the network icon in the lower window and select the [Network scan] menu item. The MOVI-PLC® controller in the network appears.
 - Configure the device by dragging and dropping the device icon in the configuration window. An offline data set is created.
6. Open the PLC Editor as follows:
 - Make sure that the latest version of MultiMotion (at least V160.100) is installed on your PC/laptop (see MOVITOOLS® menu [Help] > [Installed components] > [Add-ins]).
 - Right-click the MOVI-PLC® icon.
 - In the [Programming] context menu, select [Create new PLC Editor project].
 - Select one of the templates "AxisControl_MultiMotion" or "AxisControl_MultiMotion_Framework".



Enter the name of the new PLC Editor project.

Click the [OK] button to open the PLC Editor.

7. Set the task configuration in the "resources" tab as follows:
 - In the "TaskPriority" folder, set the TaskPriority cycle time to 10 ms.
 - Add "MC_CommunicationTask_CAN ();" to the last line of the TaskPriority.

- In "TaskMain", enter "MC_ElvcdCommunication();" before "AxisHandler_BasicMotion();".

```

TaskMain
├── PRG_Start_MultiMotion();
├── MC_FieldbusHandlerIN( Enable := TRUE );
├── MC_MoviPlcHandlerIN( Enable := TRUE );
├── PRG_TaskMain();
├── MC_ElvcdCommunication();
├── AxisHandler_BasicMotion();
├── AxisHandler_Main_MultiMotion();
├── MC_MsgHandler();
├── MC_MoviPlcHandlerOUT( Enable := TRUE );
├── MC_FieldbusHandlerOUT( Enable := TRUE );
TaskPriority
├── PRG_TaskPriority();
├── AxisHandler_Priority_MultiMotion();
└── TraceHandler();

```

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8. Set the task configuration in the "control configuration" tab as follows:
 - Set the CAN nodes used to "enabled" or/and remove the existing SEW drives.
 - In the "module parameter" tab, set the transmission rate of the respective CAN bus (CAN 1 or CAN 2) of the MOVI-PLC® to 500 kBaud. The ELVCD drive does only support 500 kBaud. Changes via the parameter tree are not possible. The parameter tree requires correct settings.
9. Compile the project by pressing the <F11> key.
10. Load the PLC project as a boot project by clicking on the [Online] > [Generate boot project] menu item.
11. Start the project by pressing the <F5> key.

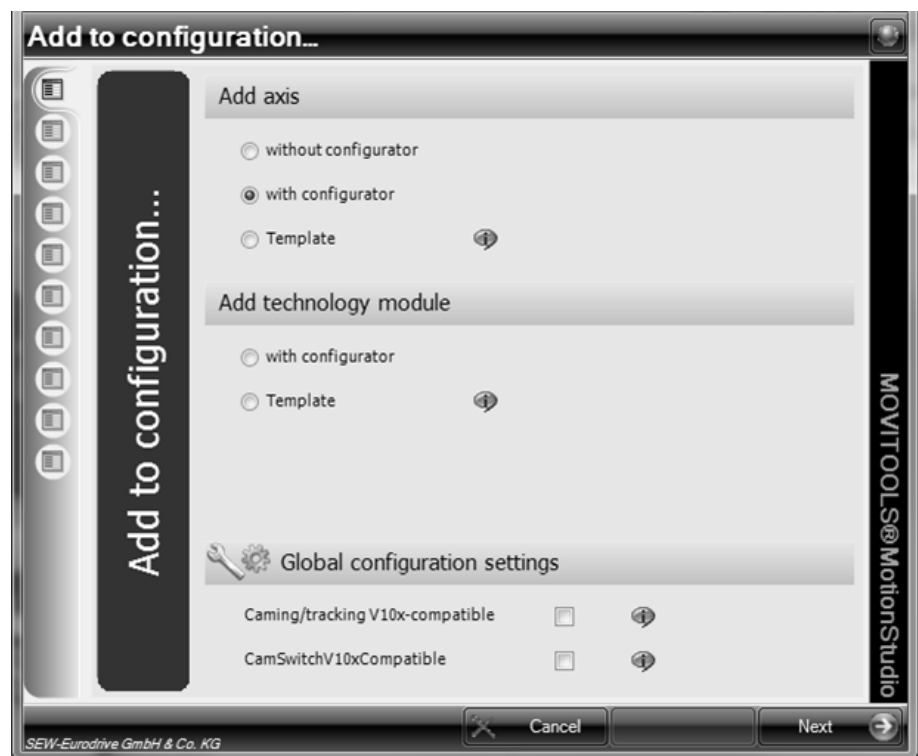
12. To start configuration, right-click the MOVI-PLC® icon and select the [Technology editors] > [MultiMotion] menu item.



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Using the configurator assistant, create a new drive axis by clicking [Create new configuration]. If a configuration has already been created, click the [Open controller configuration] button.

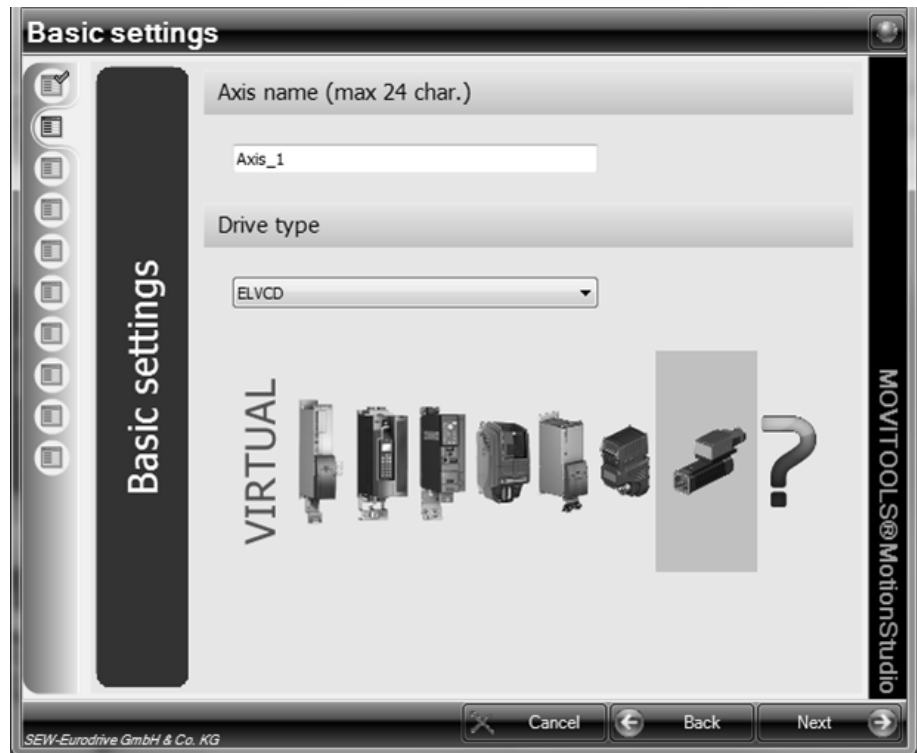
13. Select the "with configurator" check box to create the axis using the guided configuration interface.



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Click [Next] to continue.

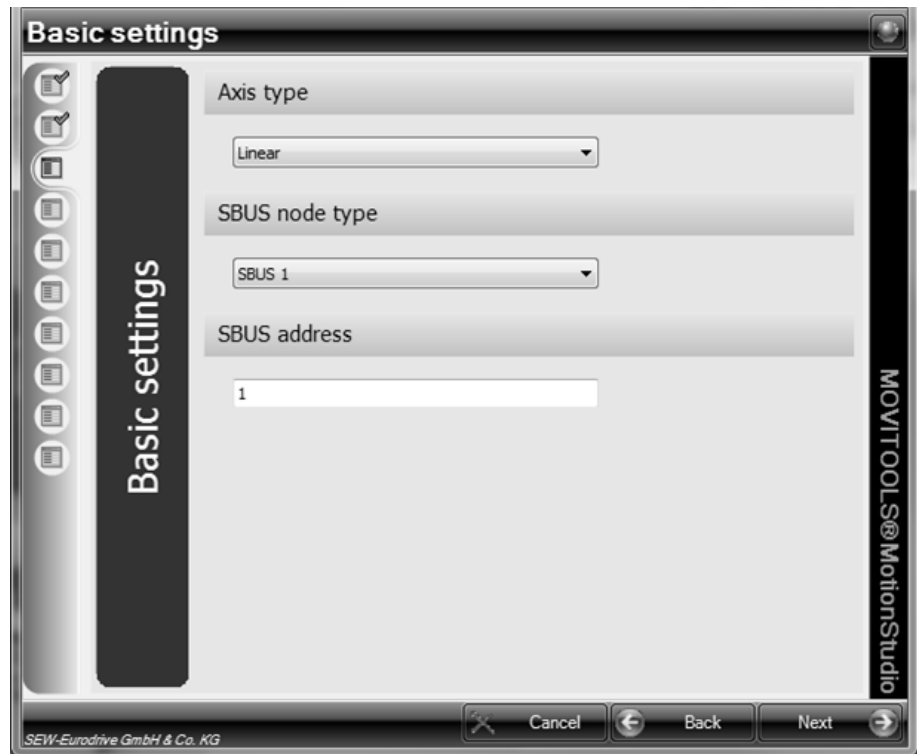
14. Enter the axis name and select the drive type of the motor axis.



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Click [Next] to continue.

- Select the axis type and the SBus connection type (SBUS 1 or SBUS 2) for the motor axis and enter the SBus address of the motor axis.

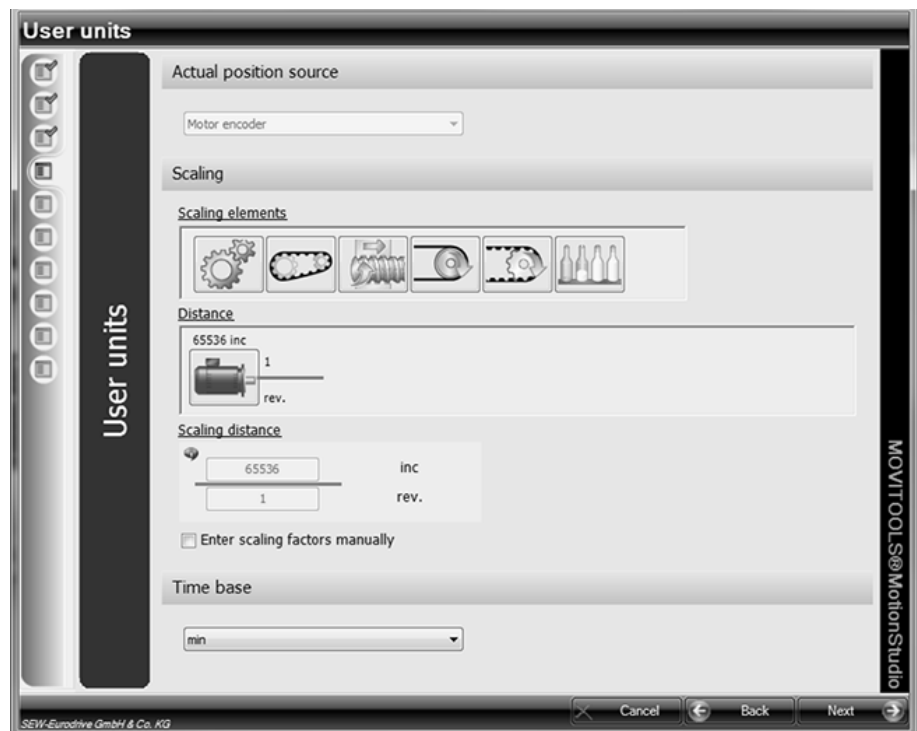


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Address settings are automatically assigned during the MOVI-PLC® boot process.

Click [Next] to continue.

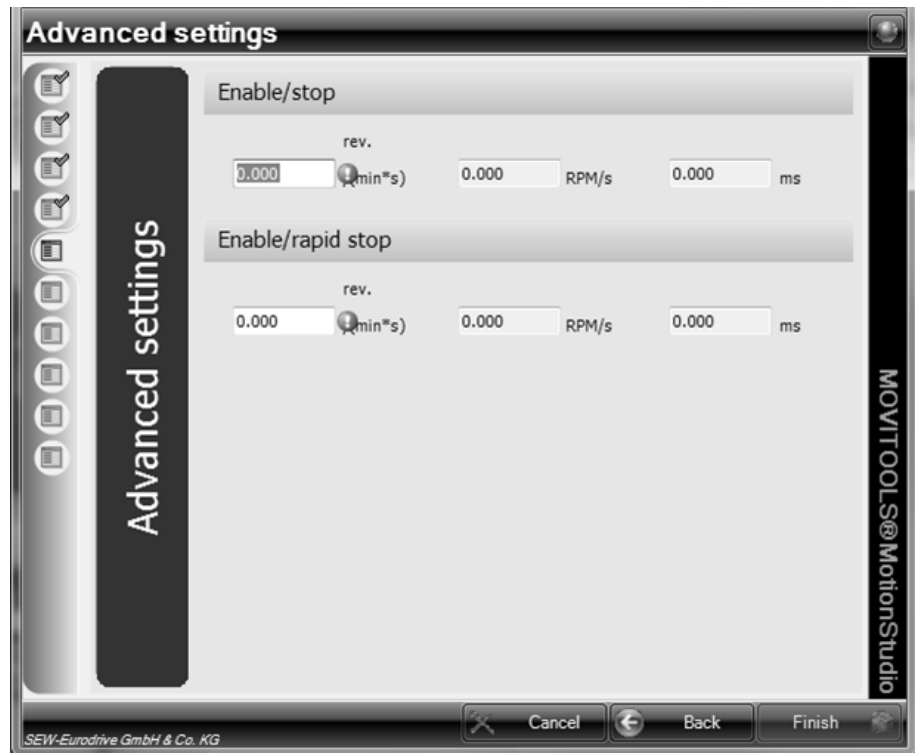
- Select the MultiMotion scaling elements for the user-defined units.



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Click [Next] to continue.

17. Enter the stop ramp and the serial number of the motor axis.



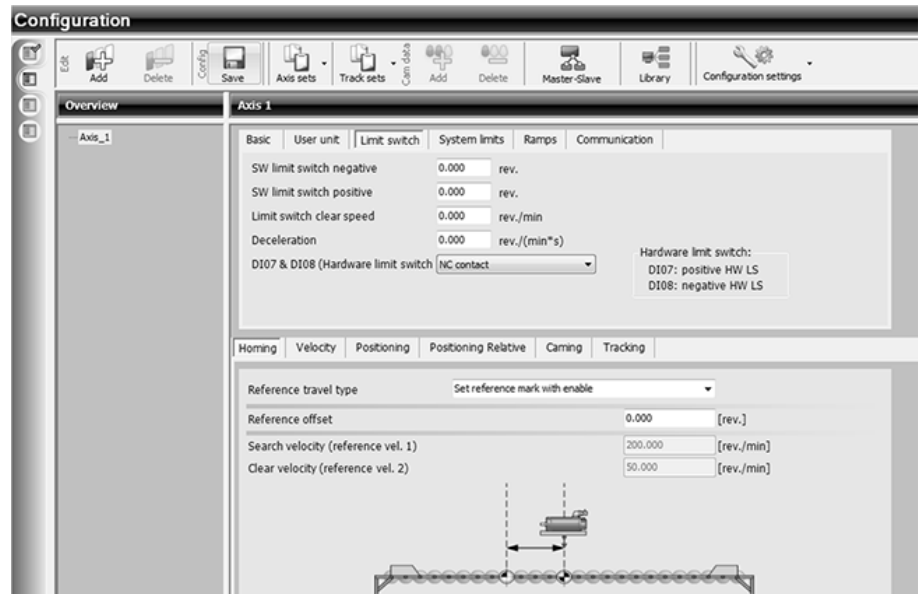
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MultiMotion only checks whether the values are $\neq 0$.

MultiMotion sets the rapid stop ramp = stop ramp.

Click the [Finish] button.

18. Parameterize the software and hardware limit switches in the "Limit switch" tab.



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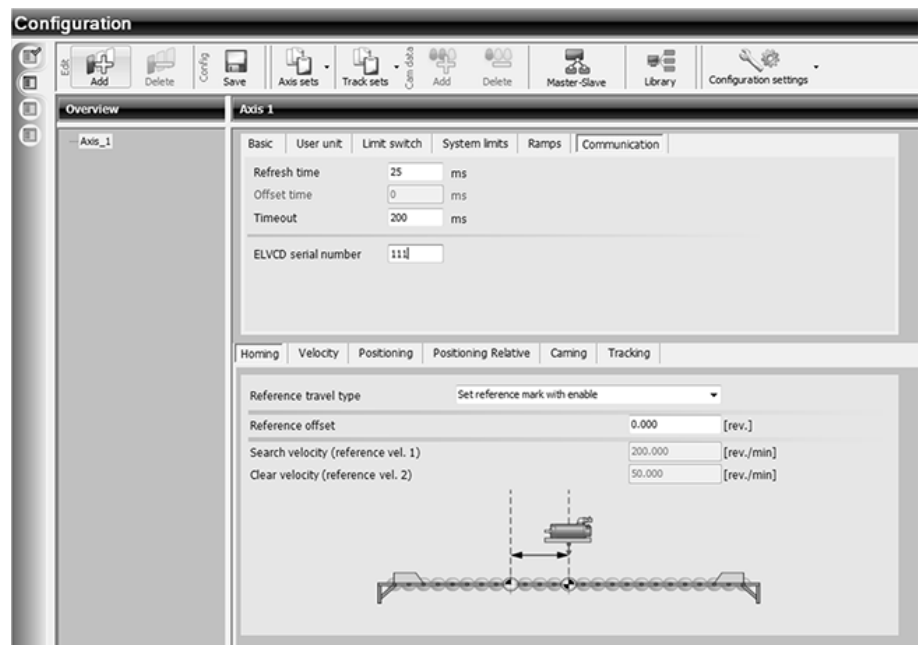
Select the type of hardware limit switch ("NC contact" or "NO contact").

D107: Limit switch CCW/negative (blocks $n > 0$)

D108: Limit switch CW/positive (blocks $n < 0$)

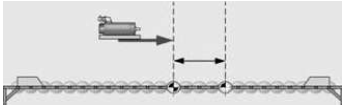
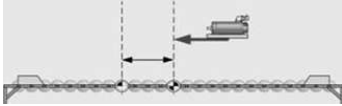
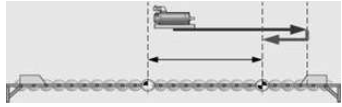
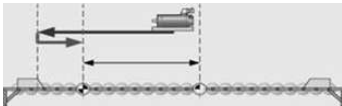
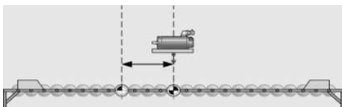
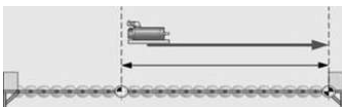
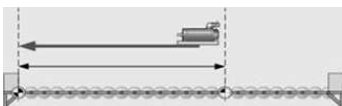
If no hardware limit switches are required, set the hardware limit switch type to "NO contact".

19. Enter the ID (serial number) of the unit in the "ID" edit box in the [communication] tab. The ID is given on the motor nameplate.

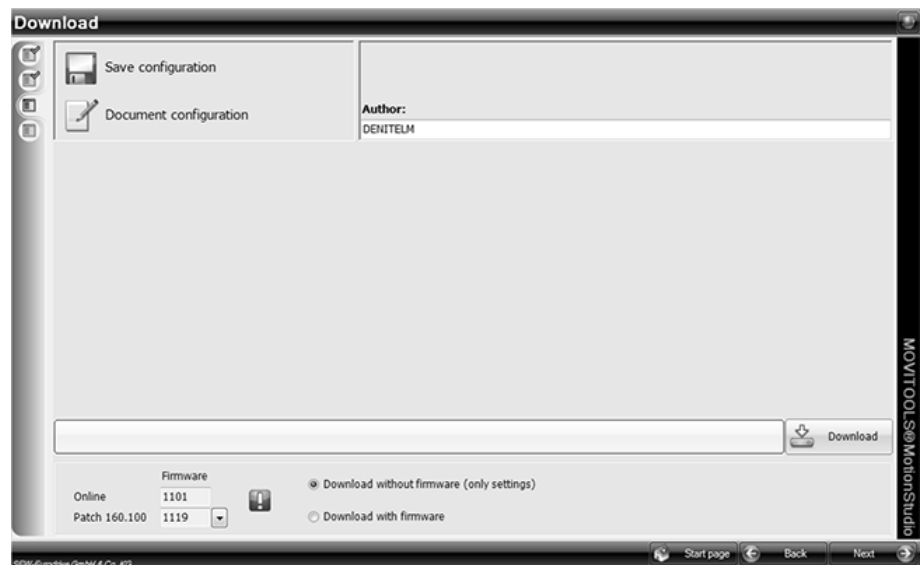


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20. Select the reference travel type based on the following table:

Reference travel type	Figure	Sequence	Description
Zero pulse positive direction		1	Reference travel takes place without motion, by setting the encoder offset to zero pulse in positive direction. New actual position = current modulo position + offset
Zero pulse negative direction		2	Reference travel takes place without motion, by setting the encoder offset to zero pulse in negative direction. New actual position = current modulo position + offset
Limit switch CW/positive		3	Reference travel takes place by approaching the limit switch in positive direction. New actual position = offset
Limit switch CCW/negative		4	Reference travel takes place by approaching the limit switch in negative direction. New actual position = offset
Set reference point with enable		5	Referencing is performed by starting the "Homing" operating mode. New actual position = zero
Fixed stop positive		6	Reference travel takes place by approaching the stop in positive direction. New actual position = offset
Fixed stop negative		7	Reference travel takes place by approaching the stop in negative direction. New actual position = offset

21. Save the configuration on the PC/laptop by selecting the [Save configuration] button.



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22. Select the [Download] button to transfer the configuration files to the SD memory card of the MOVI-PLC® controller.
23. Start the "ELVCD DriveManager" plugin. You can order the plugin from your SEW contact person.

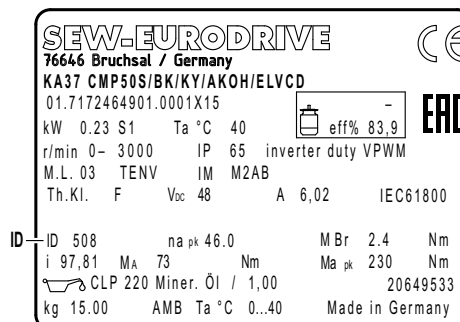


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The "ELVCD DriveManager" lists the previously configured ELVCD drives.

Assign the SBus address of the ELVCD drives once as follows:

- Enter the ID of the ELVCD drives in the "ID" edit boxes [1]. The IDs are specified on the motor nameplates.



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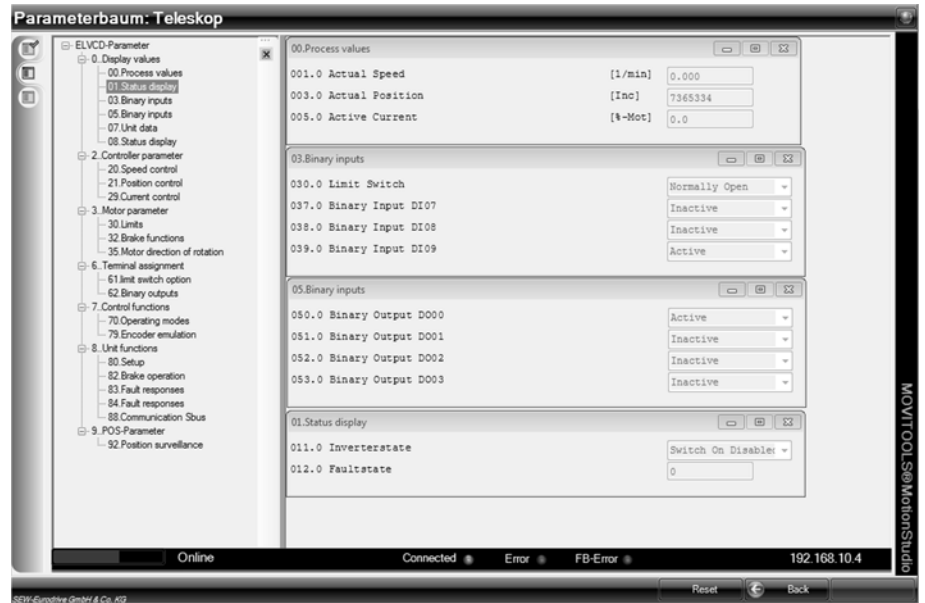
- Click on the icon in the "SBus" [2] column.
- After a short time, the LEDs in the "Axis-Connected" column [7] light up. The LEDs indicate that the ELVCD drives are connected.

To guarantee correct operation and to display the parameters in the ELVCD Drive-Manager, it is obligatory to assign the addresses.

In addition, the following ELVCD DriveManager the following functions are available:

- Save the parameter set by clicking the button [3].
- Load the parameter set by clicking the button [4].
- Reset the ELVCD drive by clicking the button [6].

- Switch to the parameter tree by clicking the button [5].
You can adjust the parameters for your requirements in the parameter tree.



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Once startup has been successfully completed, you can control the ELVCD drive using the MOVI-PLC® controller.

6.4 Parameter list

No.	Index dec.	Sub-index dec.	Name	MOVITOOLS® MotionStudio (Range/ factory setting)	MOVILINK® scaling or bit assignment
0_ Display values					
00_ Process values					
001.0	32769	0	Actual speed	-3000 – 0 – +3000 [1/min]	
003.0	32771	0	Actual position	$(-2^{31}-1) - 0 - (+2^{31}-1)$	
005.0	32773	0	Active current	0 – 400 [% $I_{N Motor}$]	
01_ Status displays					
011.0	32779	0	Inverter status	0: Not ready 1: Switch-on inhibited 2: No enable 3: On 4: Enabled 5: Rapid stop active 6: Error response active 7: Error	
012.0	32780	0	Error status	Error number and error text	
03_ Digital inputs					
030.0	148	0	Limit switch type	0: NC contact 1: NO contact	Bit 2
037.0	32817	0	Digital input DI07 (limit switch CCW/negative)	Inactive/Active	Bit 7
038.0	32817	0	Digital input DI08 (limit switch CW/positive)	Inactive/Active	Bit 8
039.0	32817	0	Digital input DI09 (controller enable)	Inactive/Active	Bit 9
05_ Digital outputs					
050.0	32818	0	Digital output DO00 (ready for operation)	Inactive/Active	Bit 0
051.0	32818	0	Digital output DO01 (Status of the function that is de- fined in parameter <i>P620.0</i>)	Inactive/Active	Bit 1
052.0	32818	0	Digital output DO02 (Status of the function that is de- fined in parameter <i>P621.0</i>)	Inactive/Active	Bit 2
053.0	32818	0	Digital output DO03 (Brake output)	Inactive/Active	Bit 3
07_ Unit data					
070.0	23	0	Firmware version (Main version/subversion)	[Text]	

No.	Index dec.	Sub-index dec.	Name	MOVITOOLS® MotionStudio (Range/ factory setting)	MOVILINK® scaling or bit assignment
071.0	20	0	ID	e.g. 111	
072.0	27	0	Nominal motor voltage	48 V	1 digit = 2 ⁻¹⁶ V
073.0	28	0	Nominal motor current	CMP 50S: 6.4 A CMP 50M: 8.3 A	1 digit = 2 ⁻¹⁶ A
074.0	32	0	No-load speed	3000 1/min	1 digit = 2 ⁻¹² 1/min
075.0	35	0	Stator inductance	CMP 50S: 64 mH CMP 50M: 33 mH	1 digit = 2 ⁻²⁴ H
075.1	36	0	Stator resistance	CMP 50S: 0.25 Ω CMP 50M: 0.11 Ω	1 digit = 2 ⁻⁸ Ω
076.0	31	0	Torque constant	CMP 50S: 0.12 Nm/A CMP 50M: 0.14 Nm/A	1 digit = 2 ⁻¹² Nm/A
077.0	161	0	Angular encoder type	0: Resolver 1: Sine/cosine encoder	Bit 12, 13, 14, 15
078.0	163	0	Offset_rotor position	-180° – 0 – +180°]	1 digit = 180/2 ¹⁵ °
078.1	34	0	Number of pole pairs	3	
079.0	4414	0	Encoder offset	(-2 ³¹ -1) – 0 – (+2 ³¹ -1)	1 digit = increment
08_	Error and warning messages				
080.0	112	0	Overtemperature_motor	Inactive/Active	Bit 2
080.1	112	0	Undertemperature/overtemperature_power electronics	Inactive/Active	Bit 3
080.2	112	0	Error_SINCOS supply	Inactive/Active	Bit 4
080.3	112	0	Error_SINCOS_RS485 communication	Inactive/Active	Bit 5
080.4	112	0	Error_SINCOS_track signal	Inactive/Active	Bit 6
080.5	112	0	Error_resolver_track signal_or_carrier failure	Inactive/Active	Bit 7
080.6	112	0	Error_5 V electronics supply	Inactive/Active	Bit 8
080.7	112	0	Error_12 V electronics supply	Inactive/Active	Bit 9
080.8	112	0	Error_24 V logic supply	Inactive/Active	Bit 10
080.9	112	0	Error_offset_current measurement	Inactive/Active	Bit 12
081.0	112	0	Overcurrent_DC link/output stage	Inactive/Active	Bit 13
081.1	112	0	Undervoltage_DC link	Inactive/Active	Bit 14
081.2	112	0	Overvoltage_DC link	Inactive/Active	Bit 15
081.3	112	0	Error_hall sensor	Inactive/Active	Bit 16
081.4	112	0	I ² t error_motor_ (I ² t_at_100%)	Inactive/Active	Bit 18

No.	Index dec.	Sub-index dec.	Name	MOVITOOLS® MotionStudio (Range/ factory setting)	MOVILINK® scaling or bit assignment
081.5	112	0	I ² t error_controller_ (I ² t_at_100%)	Inactive/Active	Bit 19
081.6	112	0	I ² t_at_80%	Inactive/Active	Bit 25
081.7	112	0	Temperature_motor_5 °C_be- low_maximum	Inactive/Active	Bit 26
081.8	112	0	Temperature_output stage_5 °C_below_maximum	Inactive/Active	Bit 27
081.9	112	0	Lag error monitoring	Inactive/Active	Bit 28
082.0	112	0	Error_limit switch	Inactive/Active	Bit 30
082.1	113	0	Timeout_at_rapid stop	Inactive/Active	Bit 2
082.2	113	0	Error_reference travel	Inactive/Active	Bit 3
082.3	113	0	Motor and angle resolver identi- fication	Inactive/Active	Bit 7
082.4	113	0	Travel program:_unknown_error	Inactive/Active	Bit 10
082.5	113	0	Travel program:_invalid_jump destination	Inactive/Active	Bit 11
082.6	113	0	Error_CAN communication	Inactive/Active	Bit 22
082.7	113	0	Error_RS232 communication	Inactive/Active	Bit 23
082.8	113	0	Error_position data set	Inactive/Active	Bit 24
082.9	113	0	Faulty_operating mode change	Inactive/Active	Bit 25
083.0	113	0	Error_in_precalculation_posi- tioning	Inactive/Active	Bit 27
083.1	113	0	Stack_Overflow	Inactive/Active	Bit 29
083.2	113	0	Checksum error	Inactive/Active	Bit 30
083.3	113	0	Initialization error	Inactive/Active	Bit 31
2__	Control parameter				
20_	Speed control				
200.0	235	0	Speed controller configuration	0: Ramp inactive 1: Ramp active	Bit 0
201.0	236	0	Speed controller gain	0.1 – 0.5 – 64	1 digit = 2 ⁻¹⁶
202.0	237	0	Speed controller time constant	0.2 – 8 – 100 [ms]	1 digit = 0.001 ms
203.0	242	0	Speed controller filter time	0.2 – 1.6 – 50 [ms]	1 digit = 0.001 ms
21_	Position control				
210.0	278	0	Position controller gain	0.1 – 0.2 – 64	1 digit = 2 ⁻¹⁶
211.0	279	0	Position controller corrective speed	0 – 500 – 32768 [1/min]	1 digit = 2 ⁻¹² 1/min
212.0	283	0	Position controller dead zone position difference	0 – 0.00031 – 32768 [In- crements]	1 digit = 2 ⁻¹⁶ incr.

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No.	Index dec.	Sub-index dec.	Name	MOVITOOLS® MotionStudio (Range/ factory setting)	MOVILINK® scaling or bit assignment
29_ Current control					
290.0	208	0	Current controller gain	0.1 – 1 – 64	1 digit = 2 ⁻¹⁶
291.0	209	0	Current controller time constant	0.2 – 2 – 100 [ms]	1 digit = 0.001 ms
3_ Motor parameters					
30_ Limits					
302.0	33	0	Maximum speed	2 – 3300 – 32768 [1/min]	1 digit = 2 ⁻¹² 1/min
303.0	29	0	Maximum current	0.11 – 32 [A]	1 digit = 1/92682 A
305.0	30	0	I ² t time constant	400 – 2000 – 10000 [ms]	1 digit = 0.001 ms
32_ Brake function					
325.0	51	0	Brake release time	0 – 80 – 6553.5 [ms]	1 digit = 0.001 ms
325.1	52	0	Brake application time	0 – 20 – 6553.5 [ms]	1 digit = 0.001 ms
35_ Direction of motor rotation					
350.0	48	0	Direction of rotation reversal	0: Off (direction of rotation is not reversed) 1: On (direction of rotation is reversed)	Bit 10
6_ Terminal assignment					
61_ Limit switch option					
610.0	49	0	Limit switch option lock direction of rotation	0: On (direction of rotation locked) 1: Off (direction of rotation not locked)	Bit 4
62_ Digital outputs					
620.0	137	0	Configuring digital output DO01	0: No function 1: Output stage active 2: I ² t message 3: Warning 4: Lag error	Bit 8, 9, 10, 11
621.0	137	0	Configuring digital output DO02	0: No function 1: Output stage active 2: I ² t message 3: Warning 4: Lag error	Bit 0, 1, 2, 3
7_ Control functions					
70_ Operating modes					

No.	Index dec.	Sub-index dec.	Name	MOVITOOLS® MotionStudio (Range/ factory setting)	MOVILINK® scaling or bit assignment
703.0	54	0	Controller enable logic	2: Enable via digital input DI9 and CAN bus (set fixed)	
8__	Unit functions				
80_	Setup				
806.0	7	0	Undervoltage detection threshold	0 – 40 [V]	1 digit = 2 ⁻¹⁶ V
82_	Braking operation				
822.0	10	0	Brake chopper switch-on threshold	Switch-off threshold – 60 V	1 digit = 2 ⁻¹⁶ V
823.0	11	0	Brake chopper switch-off threshold	57 V – switch-on threshold	1 digit = 2 ⁻¹⁶ V
83_	Error responses				
830.0	114/ 116	0	Motor overtemperature	0: No response 1: Display warning 2: Rapid stop 3: Immediate stop	Bit 2
831.0	114/ 116	0	Undertemperature/overtemperature of the power electronics	0: No response 1: Display warning 2: Rapid stop 3: Immediate stop	Bit 3
832.0	114/ 116	0	DC link undervoltage	0: No response 1: Display warning 2: Rapid stop 3: Immediate stop	Bit 13
833.0	114/ 116	0	I ² t motor error (I ² t at 100%)	0: No response 1: Display warning 2: Rapid stop 3: Immediate stop	Bit 18
834.0	114/ 116	0	I ² t controller error (I ² t at 100%)	0: No response 1: Display warning 2: Rapid stop 3: Immediate stop	Bit 19
835.0	114/ 116	0	I ² t at 80%	0: No response 1: Display warning 2: Rapid stop 3: Immediate stop	Bit 25

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No.	Index dec.	Sub-index dec.	Name	MOVITOOLS® MotionStudio (Range/ factory setting)	MOVILINK® scaling or bit assignment
836.0	114/ 116	0	Motor temperature 5 °C below maximum	0: No response 1: Display warning 2: Rapid stop 3: Immediate stop	Bit 26
837.0	114/ 116	0	Output stage temperature 5 °C below maximum	0: No response 1: Display warning 2: Rapid stop 3: Immediate stop	Bit 27
838.0	114/ 116	0	Lag error monitoring	0: No response 1: Display warning 2: Rapid stop 3: Immediate stop	Bit 28
839.0	114/ 116	0	Limit switch fault	0: No response 1: Display warning 2: Rapid stop 3: Immediate stop	Bit 30
840.0	115/ 117	0	CAN communication error	0: No response 1: Display warning 2: Rapid stop 3: Immediate stop	Bit 22
88_	SBus communication				
886.0	320	0	CAN address	0 – 63	
887.0	324	0	CAN active	0: CAN not active 1: CAN active	Bit 0
888.0	49	0	CAN active after bus errors	0: CAN not active after bus errors 1: CAN active after bus errors	Bit 16
889.0	325	0	CAN DSP305 active	0: Automatic address assignment not active 1: Automatic address assignment active	Bit 2
9_	POS parameter				
92_	Position monitoring				
923.0	282	0	Lag error window	0 – 1 – 32767 [Increments]	1 digit = 2 ⁻¹⁶ incr.
925.0	281	0	Response delay of lag error	0 – 200 – 26214 [ms]	1 digit = 0.001 ms

6.5 Parameter description

6.5.1 Display values

Parameter 001.0

Actual speed (signed)

The parameter indicates the actual speed of the motor that the inverter calculates based on the encoder signals.

Parameter 003.0

Actual position

The parameter indicates the signed position of the drive in encoder increments.

Parameter 005.0

Active current

Range of values 0 – 400% of nominal motor current

The parameter indicates the current active current of the drive.

Parameter 011.0

Inverter status

The following inverter statuses are possible:

- Not ready
- Switch-on inhibited
- No enable
- On
- Enabled
- Rapid stop active
- Error response active
- Error

Parameter 012.0

Error status

The parameter indicates the error code and the error designation.

Parameter 030.0

Limit switch type

The parameter indicates the limit switch type (NC or NO contact).

The limit switch type is configured in MultiMotion.

Parameter 037.0

Digital input DI07 (limit switch CCW/negative)

The parameter indicates the state of the digital input DI07 (limit switch CCW/negative).

Parameter 038.0**Digital input DI08 (limit switch CW/positive)**

The parameter indicates the state of the digital input DI08 (limit switch CW/positive).

Parameter 039.0**Digital input DI09 (controller enable)**

The parameter indicates the state of the digital input DI09 (controller enable). The parameter indicates whether the inverter is enabled.

Parameter 050.0**Digital output DO00 (ready for operation)**

The parameter indicates the state of the digital output DO00 (ready for operation). The parameter indicates whether the drive is ready for operation.

Parameter 051.0**Digital output DO01**

The parameter indicates the state of the digital output DO01. The parameter indicates whether the function set in parameter *P620.0* is active.

Parameter 052.0**Digital output DO02**

The parameter indicates the state of the digital output DO02. The parameter indicates whether the function set in parameter *P621* is active.

Parameter 053.0**Digital output DO03 (Brake output)**

The parameter indicates the state of the digital output DO03 (brake output). The parameter indicates whether the brake is released.

Parameter 070.0**Firmware version**

The parameter indicates the firmware version (main version, subversion) of the inverter.

Parameter 071.0**ID**

The parameter indicates the serial number (ID) of the inverter.

Parameter 072.0**Nominal motor voltage**

The parameter indicates the nominal voltage of the motor.

Parameter 073.0**Nominal motor current**

The parameter indicates the nominal current of the motor (r.m.s. value).

Parameter 074.0**No-load speed**

The parameter indicates the nominal speed of the motor.

Parameter 075.0**Stator inductance**

The parameter indicates the inductance of the motor stator.

Parameter 075.1**Stator resistance**

The parameter indicates the resistance of the motor stator.

Parameter 076.0**Torque constant**

The parameter indicates the torque constant of the motor.

Parameter 077.0**Angular encoder type**

The parameter indicates the encoder type (resolver/sine-cosine encoder).

Parameter 078.0**Offset rotor position**

The parameter indicates the offset of the rotor position in angular degree.

Parameter 078.1**Number of pole pairs**

The parameter indicates the number of pole pairs of the motor.

Parameter 079.0**Encoder offset**

The parameter indicates the encoder offset in increments.

Parameter 080.0**Message motor overtemperature**

The parameter indicates whether the motor temperature is too high.

Parameter 080.1**Message undertemperature/overtemperature of the power electronics**

The parameter indicates whether the temperature of the power electronics of the inverter is too high or too low.

Parameter 080.2**Message error SINCOS supply**

The parameter indicates whether

- the sine-cosine encoder is not supplied
- or the encoder is configure incorrectly.

Parameter 080.3**Message error SINCOS RS485 communication**

The parameter indicates whether

- the communication of the sine-cosine encoder is present
- or the encoder is configure incorrectly.

Parameter 080.4**Message error SINCOS track signals**

The parameter indicates whether

- the track signals of the sine-cosine encoder are present
- or the encoder is configure incorrectly.

Parameter 080.5**Message error resolver track signals or carrier failure**

The parameter indicates whether

- the track signals of the resolver are present
- or the encoder is configure incorrectly.

Parameter 080.6**Message error 5 V electronics supply**

The parameter indicates whether the 5 V electronics supply failed.

Parameter 080.7**Message error 12 V electronics supply**

The parameter indicates whether the 12 V electronics supply failed.

Parameter 080.8**Message error 24 V logic supply**

The parameter indicates whether the 24 V logic supply failed.

Parameter 080.9**Message error offset current measurement**

The parameter indicates an offset error during current measurement. Contact SEW-EURODRIVE Service.

Parameter 081.0**Message overcurrent DC link output stage**

The parameter indicates a defect in the winding or the output stage.

Parameter 081.1**Message DC link undervoltage**

The parameter indicates whether

- the power supply is not present
- of whether the value is set too high.

Parameter 081.2**Message DC link overvoltage**

The parameter indicates whether the DC link voltage is > 70 V.

Parameter 081.3**Message error hall sensor**

This parameter indicates whether an error has occurred at the encoder. Check the encoder configuration.

Parameter 081.4**Message I²t error motor (I²t at 100%)**

The parameter indicates whether the calculated value I²t of the motor protection model reached 100%.

Parameter 081.5**Message I²t error controller (I²t at 100%)**

The parameter indicates whether the calculated value I²t of the controller protection model reached 100%.

Parameter 081.6**Message I²t error (I²t at 80%)**

The parameter indicates whether the calculated value I²t of the motor or controller protection model reached 80%.

Parameter 081.7**Message motor temperature 5 °C below maximum**

The parameter indicates whether the motor temperature reached the threshold of 5 °C below the permitted maximum.

Parameter 081.8**Message output stage temperature 5 °C below maximum**

The parameter indicates whether the inverter output stage temperature reached the threshold of 5 °C below the permitted maximum.

Parameter 081.9**Message lag error monitoring**

The parameter indicates whether actual position is outside the permitted lag error window.

Parameter 082.0**Message error limit switch**

The parameter indicates whether both limit switches are active at the same time.

Parameter 082.1**Message timeout at rapid stop**

The parameter indicates whether rapid stop ramp is configured incorrectly.

Parameter 082.2**Message reference travel error**

The parameter indicates whether the reference travel has not been completed successfully. Check the configuration.

Parameter 082.3**Message motor and angle resolver identification**

The parameter indicates whether the encoder identification is not correct. Check the encoder configuration.

Parameter 082.4**Message travel program: unknown error**

Contact SEW-EURODRIVE Service.

Parameter 082.5**Message travel program: invalid jump destination**

Contact SEW-EURODRIVE Service.

Parameter 082.6**Message CAN communication fault**

The parameter indicates whether the CAN bus communication failed. Check whether CAN bus addresses have been assigned twice.

Parameter 082.7**Message RS232 communication fault**

The parameter indicates whether the serial communication is faulty. Check the diagnostics cable.

Parameter 082.8**Message position data set error**

Contact SEW-EURODRIVE Service.

Parameter 082.9**Message faulty operating mode change**

The parameter indicates whether the output stage was switched on during operating mode change.

Parameter 083.0**Message error during positioning precalculation**

Contact SEW-EURODRIVE Service.

Parameter 083.1**Message stack overflow**

Contact SEW-EURODRIVE Service.

Parameter 083.2**Message checksum error**

Contact SEW-EURODRIVE Service.

Parameter 083.3**Message initialization error**

Contact SEW-EURODRIVE Service.

6.5.2 Control parameter

Parameter 200.0

Speed controller configuration

This parameter defines

- whether the speed setpoint is set by the position controller (ramp inactive, default setting as profile is defined by MOVI-PLC®)
- or whether the speed setpoint of the position controller is changed via the internal ramp times. (ramp active)

Parameter 201.0

Speed controller gain

This parameter defines the gain factor of the speed controller.

Parameter 202.0

Speed controller time constant

This parameter defines the time constant of the speed controller.

Parameter 203.0

Speed controller filter time

This parameter defines the filter time of the fed back actual speed.

Parameter 210.0

Position controller gain

This parameter defines the gain factor of the position controller.

Parameter 211.0

Position controller corrective speed

This parameter defines the value that is added to the setpoint speed in case of a deviation between setpoint and actual position.

Parameter 212.0

Position controller dead zone position difference

This parameter defines the area where the position controller is not active.

Parameter 290.0

Current controller gain

This parameter defines the gain factor of the current controller.

Parameter 291.0

Current controller time constant

This parameter defines the time constant of the current controller.

6.5.3 Motor parameters

Parameter 302.0

Maximum speed

This parameter defines the maximum speed n_{\max} of the position controller.

The drive does not exceed this speed value even when the setpoint specification is higher than the maximum speed.

Parameter 303.0

Maximum current

This parameter specifies the maximum current in case of overload.

Parameter 305.0

I²t time constant

This parameter defines the time constant for the motor protection model.

Parameter 325.0

Brake release time

This parameter defines the delay until the brake is released.

Parameter 325.1

Brake application time

You can use this parameter to set the time required for the mechanical brake to apply.

Parameter 350.0

Direction of rotation reversal

This parameter assigns the respective angle counting direction, the required sign of speed and current/torque to a direction of movement.

6.5.4 Terminal assignment

Parameter 610.0

Limit switch option lock direction of rotation

The parameter defines if counterclockwise rotation is blocked as long as limit switch CCW/negative is active.

The parameter defines if clockwise rotation is blocked as long as limit switch CW/positive is active.

Parameter 620.0, 621.0

Configuring digital outputs DO01, DO02

Parameter *P260.0* defines the function of digital output DO01.

Parameter *P261.0* defines the function of digital output DO02.

You can set the following functions:

- 0: no function
- 1: Output stage active
- 2: I²t message
- 3: Warning
- 4: Lag error

6.5.5 Control functions

Parameter 703.0

Controller enable logic

The parameter defines what kind of signals enable the controller. The parameter cannot be changed. Controller is enabled via digital input DI9 and CAN bus.

6.5.6 Unit functions

Parameter 806.0

Undervoltage detection threshold

This parameter defines the threshold for detection of undervoltage errors in DC link. If the DC link voltage drops below the set threshold value, the inverter sends the DC link undervoltage error.

Parameter 822.0

Brake chopper switch-on threshold

This parameter determines the switch-on threshold of the brake chopper.

Parameter 823.0

Brake chopper switch-off threshold

This parameter determines the switch-off threshold of the brake chopper.

Parameters 830.0 – 840.0

Error responses

Parameters 830 – 840 define the error responses for the following errors.

Parameter	Error	Factory setting	Bit	Adjustable responses ¹⁾
P830.0	Motor overtemperature	3: Immediate stop	Bit 2	0: no response => "114" = 0 and "116" = 0 1: Displayed warning => "114" = 1 and "116" = 0 2: Rapid stop => "114" = 0 and "116" = 1 3: Immediate stop => "114" = 1 and "116" = 1
P831.0	Undertemperature/ overtemperature of the power electronics	3: Immediate stop	Bit 3	
P832.0	DC link undervoltage	3: Immediate stop	Bit 13	
P833.0	I ² t error motor (I ² t at 100%)	1: Display warning	Bit 18	
P834.0	I ² t error controller (I ² t at 100%)	1: Display warning	Bit 19	
P835.0	I ² t at 80%	1: Display warning	Bit 25	
P836.0	Motor temperature 5 °C below maximum	3: Immediate stop	Bit 26	
P837.0	Output stage temperature 5 °C below maximum	3: Immediate stop	Bit 27	
P838.0	Lag error monitoring	3: Immediate stop	Bit 28	
P839.0	Limit switch fault	3: Immediate stop	Bit 30	
P840.0	CAN communication error	3: Immediate stop	Bit 22	0: no response => "115" = 0 and "117" = 0 1: Displayed warning => "115" = 1 and "117" = 0 2: Rapid stop => "115" = 0 and "117" = 1 3: Immediate stop => "115" = 1 and "117" = 1

1) The responses are set by the parameter indexes "114" – "117".

Parameter 886.0

CAN address

This parameter indicates the current drive CAN address. The address is set in MultiMotion.

Parameter 887.0

CAN active

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The parameter defines whether CAN bus is set to active.

Parameter 888.0

CAN active after bus errors

The parameter defines whether CAN bus remains active after bus errors.

Parameter 889.0

CAN DSP305 active

This parameter indicates whether the automatic address assignment of the CAN bus is active.

6.5.7 POS parameter

Parameter 923.0

Lag error window

This parameter defines the tolerance by which the actual position may deviate from the target position without displaying an error message.

Parameter 925.0

Response delay of lag error

This parameter defines how long the actual position may be outside the tolerance window before the "lag error" message is displayed.

6.6 Operating notes

Observe the following notes during operation:

- If to command "Save parameter" is executed with an enabled drive ("Enabled_Stop" and "Enable_RapidStop" = TRUE) in interpolation operation, the drive signals "Ready for operation" but without the "InGear" message.
- During homing, the command "Save parameter" is executed as well. If "homing" is interrupted without the message "Homing Done", the drive signals "Ready for operation" but without the "InGear" message.

To switch back to operating state "InGear", set the enable bits "Enable_Stop" and "Enable_RapidStop" = TRUE.

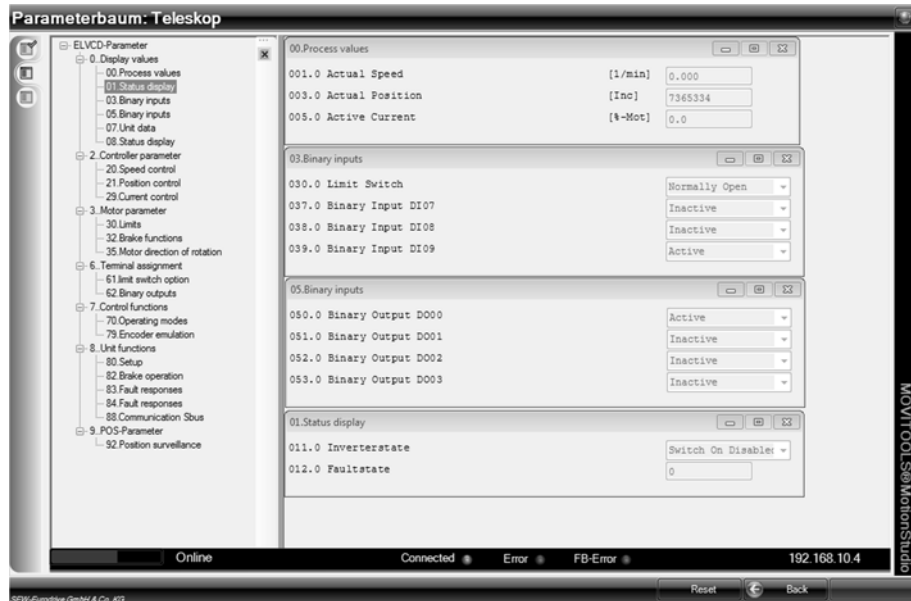
7 Operation

7.1 Operation with MultiMotion

The ELVCD drive is operated exclusively in the MOVI-PLC® software via the CAN bus connection.

Manual mode via MOVITOOLS® MotionStudio is not possible.

The controller parameters can be changed in the parameter tree of the MOVITOOLS® MotionStudio plug-in "ELVCD DriveManager".



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7.2 CMP ELVCD status list

The program module shows the current status of the ELVCD drive. The following table shows a descriptions of the status:

Code	Operating status	Meaning
00h	NOT_READY_TO_SWITCH_ON	The inverter performs a self-test. CAN communication not yet possible.
40h	SWITCH_ON_DISABLED	The controller has completed the self-test. CAN communication is possible.
21h	READY_TO_SWITCH_ON	The inverter waits until the digital input DI9 "Controller enable" is set to "1". (Controller enable logic "Digital input and CAN").
23h	SWITCHED_ON	You can switch on the inverter output stage.
27h	OPERATION_ENABLE	The motor is connected to the voltage supply. The motor is controlled according to the selected operating mode.
0Fh	QUICKSTOP_ACTIVE	The Quick Stop function is executed. The motor is connected to the voltage supply. The motor is controlled according to the Quick Stop function.
0Fh	FAULT_REACTION_ACTIVE	An error has occurred. When critical faults occur, the inverter switches to the "Fault" status straightaway. The inverter executes the action specified in <code>fault_reaction_option_code</code> . The motor is connected to the voltage supply. The motor is controlled according to the Fault Reaction function.
07h	FAULT	An error has occurred. The motor is de-energized.

8 Service

8.1 Malfunctions

8.1.1 Malfunctions on the ELVCD drive

Fault	Possible cause	Measure
Motor heats up excessively and trips with an error	Overload	Measure power, use larger motor or reduce load if necessary, check travel profile
	Ambient temperature too high	Observe permitted temperature range
	Insufficient cooling	Clean the ELVCD drive
Running noise on motor	Bearing damage	<ul style="list-style-type: none"> Contact SEW-EURODRIVE Service. Replace motor
	Vibration of rotating parts	Rectify cause, possible imbalance
Oil leaks in the connection box or at the motor/flange (only with gearmotors)	Internal seal defective	<ul style="list-style-type: none"> Contact SEW-EURODRIVE Have SEW-EURODRIVE Service change the internal seal

8.1.2 Brake malfunctions

Fault	Possible cause	Measure
Brake does not release	Inverter defective	<ul style="list-style-type: none"> Contact SEW-EURODRIVE Have SEW-EURODRIVE Service exchange the brake and motor
	Max. permitted working air gap exceeded because brake lining worn down	<ul style="list-style-type: none"> Contact SEW-EURODRIVE Have SEW-EURODRIVE Service exchange the brake and motor
	Brake defective	<ul style="list-style-type: none"> Contact SEW-EURODRIVE Have SEW-EURODRIVE Service exchange the brake and brake control
Motor does not brake	Brake lining worn	<ul style="list-style-type: none"> Contact SEW-EURODRIVE Have SEW-EURODRIVE Service exchange the brake and motor
	Incorrect braking torque	<ul style="list-style-type: none"> Contact SEW-EURODRIVE

8.2 Evaluating error messages using MultiMotion

INFORMATION



The MultiMotion program module displays software error codes in the "FBError" field, and displays inverter errors in the "Error(Inv)" field in the "Diagnostics" tab.

You can find a description of the inverter errors in the chapter "ELVCD error list".

8.3 ELVCD error list

The following table helps you with troubleshooting:

Code	Error	Possible cause	Measure
8977	I ² t controller error (I ² t at 100%) I ² t controller monitoring has triggered.	Incorrect nominal current setting	Check/correct the nominal motor current setting.
		The angular encoder offset is incorrect.	Check/correct angular encoder, number of pole pairs and direction of rotation.
		The motor is blocked.	Remove motor blockage.
8978	I ² t motor error (I ² t at 100%) I ² t motor monitoring has triggered.	Incorrect nominal current setting	Check/correct the nominal motor current setting.
		The angular encoder offset is incorrect.	Check/correct angular encoder, number of pole pairs and direction of rotation.
		The motor is blocked.	Remove motor blockage.
8992	DC link overcurrent Output stage I > 95 A	The motor is defective, e.g. winding overloaded, short circuit between winding and housing, output stage defective.	Contact SEW-EURODRIVE Service.
9088	I ² t at 80%	WARNING: The load threshold of 80% has been reached.	Remove motor blockage.
12816	DC link overvoltage	48 V voltage supply too high (> DC 70 V).	Reduce 48 V voltage supply.
		When braking the motor axes, the regenerative energy fed into the DC link is too large.	Check/correct configuration of the drive.
12832	DC link undervoltage	The 48 V voltage supply has failed or does not have sufficient capacity, e.g. during acceleration.	Ensure DC 48 V voltage supply. Check if there is a link between failure and the acceleration process.
16912	Undertemperature/over-temperature of the power electronics	The temperature of the power electronics is beyond the permitted range of -40 °C to +85 °C.	Check ambient temperature. Observed derating characteristic curve. Contact SEW-EURODRIVE Service.
17024	Output stage temperature 5 °C below maximum limit	The thermal load of the drive is reaching its critical limit.	Check/correct configuration of the drive.

Code	Error	Possible cause	Measure
17168	Motor overtemperature	The KTY motor temperature sensor indicates that the motor temperature has exceeded the permitted limit.	Check if the drive is unable to move freely. Contact SEW-EURODRIVE Service.
17280	Motor temperature 5 °C below maximum limit	The motor temperature is reaching its critical limit.	Check/correct configuration of the drive.
20609	STO - driver supply, plausibility signal PWM ≠ driver supply	Internal error	Contact SEW-EURODRIVE Service.
20610	STO - driver supply, plausibility signal PWM ≠ power drivers	Internal error	Contact SEW-EURODRIVE Service.
20754	24 V supply fault (out of range)	The 24 V voltage supply out of the permitted range of 16 – 32 V.	Check/correct 24 V supply.
20755	Error 5 V electronics supply	Internal error	Contact SEW-EURODRIVE Service.
20756	Error 12 V electronics supply	Internal error	Contact SEW-EURODRIVE Service.
21008	Offset current measurement fault ADC offset > 5% of the dynamic range	Internal error	Contact SEW-EURODRIVE Service.
21889	Checksum error	Internal error	Contact SEW-EURODRIVE Service.
24960	Stack overflow	Internal error	Contact SEW-EURODRIVE Service.
24967	Error during initialization	Internal error	Contact SEW-EURODRIVE Service.
24976	Position precalculation error. The motor can no longer be braked up to the target position.	Internal error	Contact SEW-EURODRIVE Service.
24983	Motor identification and angular encoder identification error	Error identifying the motor encoder	Contact SEW-EURODRIVE Service.
24985	Timeout during rapid stop	The rapid stop ramp was not executed correctly.	Check/correct the acceleration value for rapid stop.
25472	Operating mode switching error	The operating mode was switched with enabled output stage.	Contact SEW-EURODRIVE Service.
29568	Resolver track signals fault/carrier failure or offset error	The angular encoder is defective or an incorrect angular encoder was selected.	Contact SEW-EURODRIVE Service.
29573	HALL track signal error All Hall signals are "1" or all "0".	Internal error	Contact SEW-EURODRIVE Service.

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Code	Error	Possible cause	Measure
29574	PWM encoder error PWM frequency is incorrect.	Internal error	Contact SEW-EURODRIVE Service.
29575	PWM encoder initialization error PWM frequency could not be correctly determined.	Internal error	Contact SEW-EURODRIVE Service.
29584	Sine-cosine encoder track signals error or offset error	The angular encoder is defective or an incorrect angular encoder was selected.	Contact SEW-EURODRIVE Service.
29585	Sine-cosine encoder RS485 communication fault, communication failure, wrong checksum.	The angular encoder is defective or an incorrect angular encoder was selected.	Contact SEW-EURODRIVE Service.
29586	Sine-cosine encoder supply error	The angular encoder is defective or an incorrect angular encoder was selected.	Contact SEW-EURODRIVE Service.
29968	RS232 communication fault. Group fault	Communication is interrupted.	Provide for EMC measures. Check the cable connection.
32903	STO plausibility STO 1 & 2 (STO 1 \neq STO 2)	The STO plausibility check signals an error.	Contact SEW-EURODRIVE Service.
33024	CAN communication fault. Group fault	A CAN communication error (SBus) has occurred.	Check CAN cable Check the shielding. Switch drive off and on again.
33056	Node guarding timeout error	No new NMT message was received within the parameterized node guarding time.	Check CAN cable. Provide for EMC measures. Check MOVI-PLC [®] functionality.
34320	Lag error monitoring	The actual position of the motor has gone beyond the lag error window because the deviation to the setpoint is too large.	Check maximum current. Check the motor for blockage. Check the controller settings, particularly the internal closed loop systems for current and speed. Check the acceleration parameters. Check that the lag error window is sufficiently large enough.
34321	Lag error monitoring	The actual position of the motor has gone beyond the lag error window because the deviation to the setpoint is too large.	Check maximum current. Check the motor for blockage. Check the controller settings, particularly the internal closed loop systems for current and speed. Check the acceleration parameters. Check that the lag error window is sufficiently large enough.

Code	Error	Possible cause	Measure
34322	Limit switch fault Both limit switches are active simultaneously.	Limit switch signals are not plausible.	Check the configuration of the limit switches. If there are no limit switches connected, set the limit switch type to NO contact. Check wiring.
34690	SYNC_TIMEOUT No SYNC signal received within the 2.5 SYNC period.	SYNC signal failure.	Check MOVI-PLC® status. Contact SEW-EURODRIVE Service.
35456	Reference travel error	An error has occurred during reference travel.	Check the reference travel configuration. Check controller setting.

8.4 Resetting fault messages

An error message can be acknowledged by:

- Sending the "Reset command" via the controller/PLC.

⚠ WARNING



Eliminating the cause of the problem or performing a reset may result in the ELVCD drive re-starting automatically.

Severe or fatal injuries.

- Program the application program such that the ELVCD drive is not enabled when an error occurs.

8.5 Unit replacement

INFORMATION



If the ELVCD drive is defective,

- you have to replace it completely (gear unit + servomotor + inverter),
- or send it to SEW-EURODRIVE Service for repair.

8.6 SEW-EURODRIVE Service

8.6.1 Sending in a unit for repair

If a fault cannot be rectified, please contact the SEW-EURODRIVE Electronics Service (see chapter "Address list").

When you contact the SEW Electronics Service, always quote the digits on the status label so that our service personnel can assist you more effectively.

Provide the following information when sending the unit in for repair:

- Serial number (see nameplate)
- Type designation
- Unit variant
- Short description of the application (application, control mode, etc.)
- Nature of the fault
- Accompanying circumstances
- Your own presumptions as to what has happened
- Any unusual events preceding the problem, etc.

8.7 Shutdown

To shut down the ELVCD drive, de-energize the drive using appropriate measures.

8.8 Storage

Observe the following instructions when shutting down or storing the ELVCD drive:

- If you shut down and store the ELVCD drive for a longer period, you must close open cable bushings and cover ports with protective caps.
- Make sure that the unit is not subject to mechanical impact during storage.

Observe the notes on storage temperature in the "Technical data" chapter.

8.9 Extended storage

8.9.1 Electronics

In case of extended storage, connect the unit to the supply voltage for at least 5 minutes every 2 years. Otherwise, the service life of the unit may be reduced.

8.10 Waste disposal

Observe the applicable regulations: Dispose of the following materials in accordance with the regulations in force:

- Aluminum scrap
 - Housing parts
- Steel scrap:
 - Shafts
 - Rolling bearing
 - Sheet metal
- Electronics scrap (printed circuit boards, encoders)
- Plastic (screw plugs, plug connectors), copper, magnets etc.

9 Inspection and maintenance work

9.1 Inspection and maintenance intervals

INFORMATION



The amount of wear depends on many factors and may be high. The system manufacturer must calculate the required inspection/maintenance intervals individually in accordance with the project planning documents.

The following factors may lead to shorter inspection and maintenance intervals:

- Number of real emergency switching off braking operations
- Particularly high number of cycles with high motor acceleration
- Especially high cyclic duration factor at high speed
- Changing direction of rotation (reversing operation)
- Vertical mounting positions and pivoted mounting positions
- High mass moments of inertia due to the motion of the drive, e.g. in mobile drives or drives subject to high impact and vibration load
- Application-related retrodriving torques or torsional vibrations
- External environmental influences, such as moisture, high degree of UV exposure, low ambient temperatures.

9.1.1 Motor

The following table shows the inspection intervals for the motor:

Time interval	What to do?	Who is permitted to perform the work?
Every 3000 hours of operation, at least every 6 months	Check running noise for possible bearing damage	Qualified personnel at customer site
	In the event of a bearing damage: Have the bearing replaced by SEW-EURODRIVE Service or qualified personnel trained by SEW-EURODRIVE.	SEW-EURODRIVE Service Qualified personnel trained by SEW-EURODRIVE
Recommendation: Every 10000 operating hours ¹⁾	Have the motor inspected by SEW-EURODRIVE Service or qualified personnel trained by SEW-EURODRIVE.	SEW-EURODRIVE Service
		Qualified personnel trained by SEW-EURODRIVE
Varying (depending on external factors)	Touch up or renew the surface protection/anticorrosion coating.	Qualified personnel at customer site

1) Wear times are influenced by many factors. The system manufacturer must calculate the required inspection/maintenance intervals individually in accordance with the project planning documents.

9.1.2 Brake

Notes on the BP brake

- The BP brake does not require any maintenance.
- The working air gap cannot be measured directly, as the brake is integrated in the motor.
- The brake must be replaced when the permitted total work W_{insp} , determined during project planning, is reached. Please contact SEW-EURODRIVE.

Notes on the BK brake

- The BK brake does not require any maintenance.
- The working air gap cannot be measured directly, as the brake is integrated in the motor.
- The brake must be replaced when the permitted total work W_{insp} , determined during project planning, is reached. Please contact SEW-EURODRIVE.
- The brake may only be replaced by SEW-EURODRIVE.

The following table shows the inspection intervals for the brakes:

If used as a holding brake		
Time interval	What to do?	Who is permitted to perform the work?
Every 1 to 2 years ¹⁾	Have the brake inspected by SEW-EURODRIVE Service.	SEW-EURODRIVE Service

1) Wear times are influenced by many factors. The system manufacturer must calculate the required inspection/maintenance intervals individually in accordance with the project planning documents.

If used as a holding brake with braking work done in case of emergency switching off braking operations		
Time interval	What to do?	Who is permitted to perform the work?
Every 3000 hours of operation, every 2 years at the latest ¹⁾	Have the brake inspected by SEW-EURODRIVE Service.	SEW-EURODRIVE Service
After this much braking work has been done ¹⁾ BP04 brake: 1000 kJ BK02 brake: 350 kJ	Have the motor and brake exchanged by SEW-EURODRIVE Service.	SEW-EURODRIVE Service

1) Wear times are influenced by many factors. The system manufacturer must calculate the required inspection/maintenance intervals individually in accordance with the project planning documents.

9.2 Inspection and maintenance work

9.2.1 Preliminary work regarding inspection and maintenance

Observe the following notes before you start with inspection/maintenance work on the drive:



▲ WARNING

Danger of falling hoist.
Severe or fatal injuries.

- Secure or lower the hoist before you carry out any work (risk of falling).



▲ WARNING

Risk of injury if the drive starts up unintentionally.
Severe or fatal injuries.

- Before starting work, de-energize the drive via a suitable external disconnection device.
- Secure the drive against unintended re-connection of the voltage supply.
- Secure the output shaft against rotation.



▲ WARNING

Risk of burns caused by hot surfaces.
Severe injuries.

- Let the units cool down before touching them.



NOTICE

Damage to the drive.
Possible damage to property.

- Note that only the SEW-EURODRIVE Service or qualified personnel trained by SEW-EURODRIVE is allowed to carry out maintenance work on the motor or the brake.

9.2.2 Painting the drive

1. Observe the notes in chapter "Preliminary work for inspection and maintenance".
2. **NOTICE:** Breather valves and oil seals may be damaged during painting or re-painting.

Possible damage to property.

- Clean the surface of the drive and make sure it is free from grease.
- Thoroughly cover the breather valves and sealing lip of the oil seals with strips prior to painting.
- Remove the strips after painting.

9.2.3 Cleaning the drive

Observe the notes in chapter "Preliminary work for inspection and maintenance".

Excessive dirt, dust or chips can have a negative impact on the function of synchronous motors; in extreme cases, these factors can cause the motor to break down.

For this reason, you must clean the drives at regular intervals (after one year at the latest) to ensure a sufficiently large area for heat dissipation.

Insufficient heat dissipation can have unwanted consequences. The service life of the bearings and the inverter is reduced through operation at impermissibly high temperatures (bearing grease degrades).

9.2.4 Connection cables

Observe the notes in chapter "Preliminary work for inspection and maintenance".

Check the connection cable for damage at regular intervals and replace if necessary.

10 Technical data

10.1 CMP ELVCD technical data

10.1.1 General technical data

Type		CMP50S ELVCD	CMP50M ELVCD
Connection voltage DC link	V_{nom}	DC 48 V (max. DC_60 V)	
Connection voltage Electronics		DC 24 V \pm 10%, Residual ripple < 1.5 V _{pp,100Hz} approx. 200 mA without brake + approx. 300 mA with brake + approx. 100 mA with CAN bus and I/Os	
Brake chopper		Switching threshold on: DC 60 V \pm 5% Switching threshold off: DC 55 V \pm 5%	
Input current	I_N	15 A	
	I_{max}	35 A for 2 s	
Output frequency	f_A	0 – 500 Hz	
Nominal motor current	$I_{N motor}$	8.44 A at $\vartheta_A = 20\text{ }^\circ\text{C}$	12.08 A at $\vartheta_A = 20\text{ }^\circ\text{C}$
		6.02 A at $\vartheta_A = 40\text{ }^\circ\text{C}$	7.93 A at $\vartheta_A = 40\text{ }^\circ\text{C}$
Motor power S1	P_{Mot}	0.33 kW / 0.44 hp at $\vartheta_A = 20\text{ }^\circ\text{C}$	0.5 kW / 0.67 hp at $\vartheta_A = 20\text{ }^\circ\text{C}$
		0.23 kW / 0.31 hp at $\vartheta_A = 40\text{ }^\circ\text{C}$	0.33 kW / 0.44 hp at $\vartheta_A = 40\text{ }^\circ\text{C}$
Nominal motor speed	n_N	3000 1/min	
Nominal motor torque	M_N	1.05 Nm at $\vartheta_A = 20\text{ }^\circ\text{C}$	1.6 Nm at $\vartheta_A = 20\text{ }^\circ\text{C}$
		0.75 Nm at $\vartheta_A = 40\text{ }^\circ\text{C}$	1.05 Nm at $\vartheta_A = 40\text{ }^\circ\text{C}$

Type		CMP50S ELVCD	CMP50M ELVCD
Mass moment of inertia of the motor	J_{mot}	Without brake: $0.42 \times 10^{-4} \text{ kgm}^2$	Without brake: $0.67 \times 10^{-4} \text{ kgm}^2$
		With BK02 brake: $0.53 \times 10^{-4} \text{ kgm}^2$	With BK02 brake: $0.78 \times 10^{-4} \text{ kgm}^2$
		With BP04 brake: $0.48 \times 10^{-4} \text{ kgm}^2$	With BP04 brake: $0.73 \times 10^{-4} \text{ kgm}^2$
PWM frequency	10 kHz		
Interference immunity	EN 61800-3 category C3		
Interference emission	EN 61800-3 category C3		
Ambient temperature (Standard design)	ϑ_A	0 °C to +50 °C (EN 60721-3-3) Derating: 2% $I_{N \text{ motor}}$ per K at ϑ_A 40 °C to 50 °C	
Ambient temperature (Low temperature design)	ϑ_A	-25 °C to +10 °C (EN 60721-3-3)	
Climate class		EN 60721-3-3; class 3K3, no condensation	
Storage temperature	ϑ_S	-25 °C to +70 °C (EN 60721-3-3)	
Proof of mechanical strength		According to EN 61800-5-1	
Degree of protection	IP	IP 65 according to EN 60529 (housing closed and all plug connectors inserted or sealed)	
Operating mode		S1, S3 (EN 60034-1)	
Type of cooling		Natural cooling to DIN 41751 and EN 61800-5-1	
Installation altitude	h	<p>Up to $h < 1000 \text{ m}$ without restrictions.</p> <p>The following restrictions apply at $h \geq 1000 \text{ m}$:</p> <ul style="list-style-type: none"> From 1000 m to max. 4000 m: Depending on electrical safety, the nominal power must be reduced due to the reduced cooling capacity. I_N reduction by 1% per 100 m From 2000 m to max. 4000 m: At heights over 2000 m, you must take limiting measures to reduce line side overvoltage from category III to category II for the entire system. Measures should be taken according to the installation standards for overvoltage protection devices, IEC 60364-4-443; DIN VDE 0100-443 and IEC 60364-5-53; DIN VDE 0100-534. 	
Weight	m	Without brake: 2.9 kg	Without brake: 3.55 kg
		With brake: 3.25 kg	With brake: 3.9 kg

10.1.2 Current carrying capacity of the plug connectors

Current carrying capacity of the plug connectors		
Power/signal plug connectors 2-pin contact insert VC-TFS-2	X1	20 A nominal current
Power/signal plug connectors 8-pin contact insert VC-TFS-8	X1	10 A nominal current

10.1.3 Digital inputs

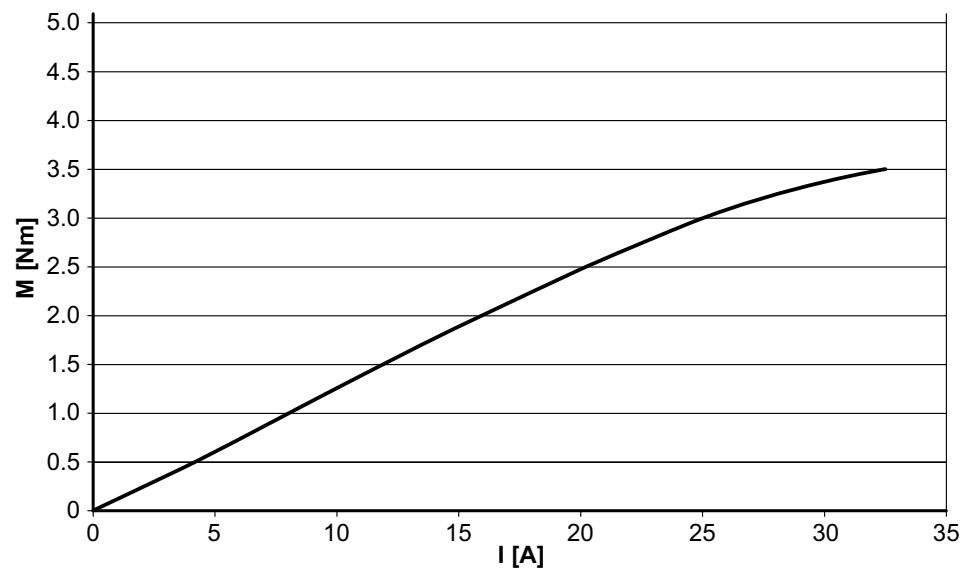
Digital inputs		
Input type	D107 to D109	PLC-compatible according to EN 61131-2 (digital inputs type 1)
Signal level		-3 V to +5 V: "0" = contact open +15 V to +30 V: "1" = contact closed

10.1.4 Technical data of SBus interface

Standard	CAN specification 2.0 part A
Protocol	CANopen to DS301, DS402
Baud rate	500 kBd
Address	Automatic according to DS305; address assignment according to serial number, can be set via MultiMotion configuration
Number of drives that can be addressed	8
Cable length	max. 100 m
Number of stations	Max. 127 CAN stations
Interface	Chapter "Electrical installation"
Bus termination	
Timeout monitoring	Can be set via MultiMotion configuration, according to chapter "Startup"

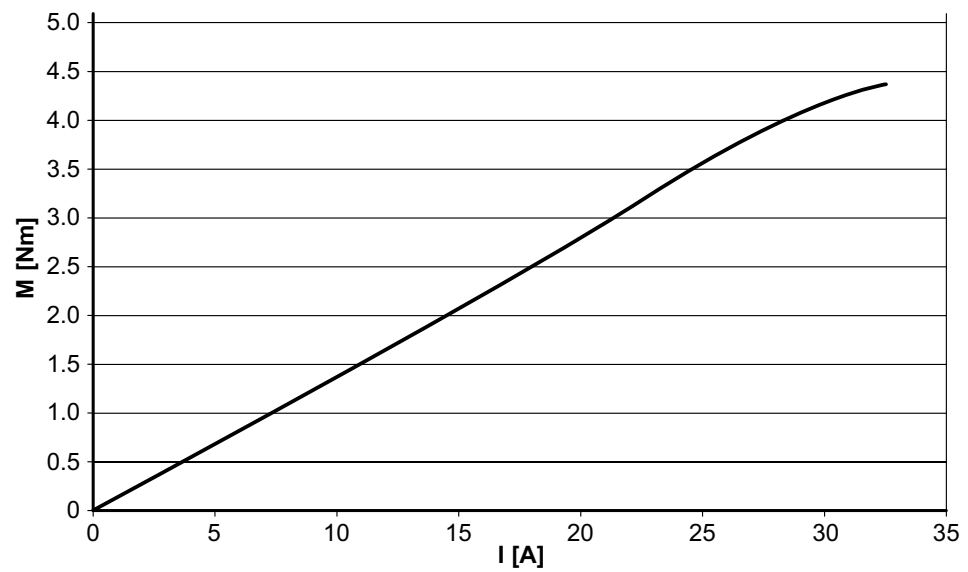
10.2 Characteristic curves

10.2.1 CMP 50S ELVCD overload characteristic curve



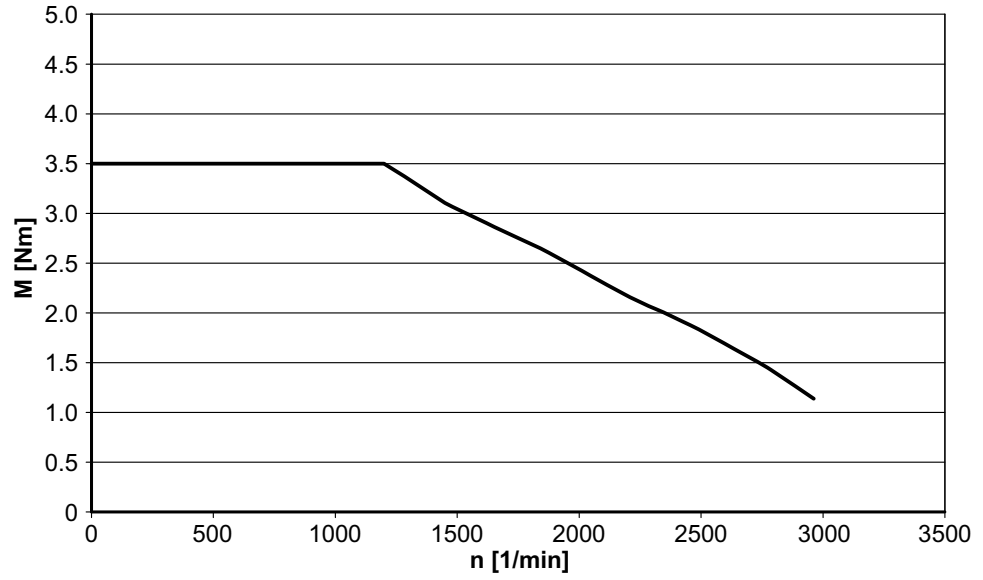
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10.2.2 CMP 50M ELVCD overload characteristic curve



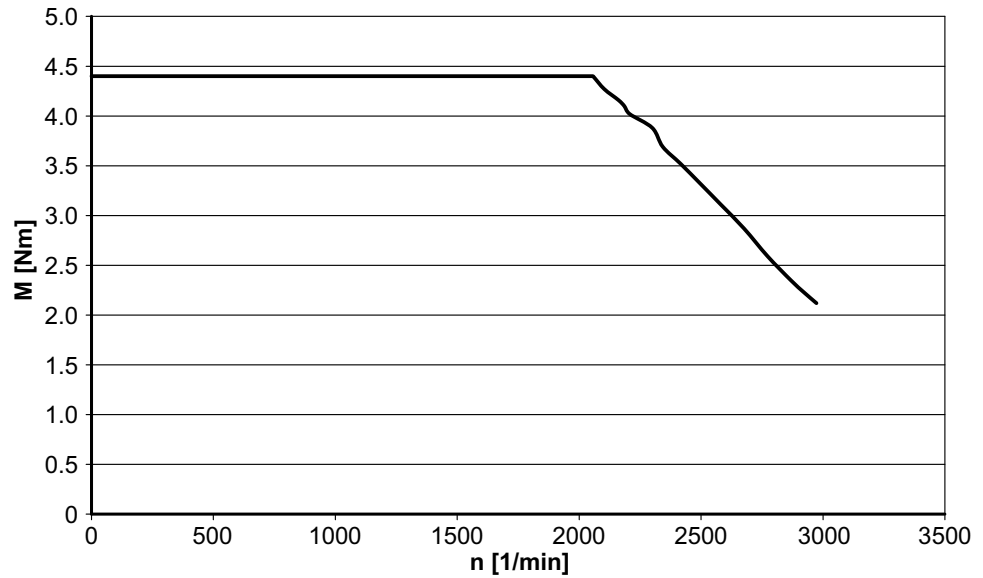
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10.2.3 CMP 50S ELVCD dynamic characteristic curve



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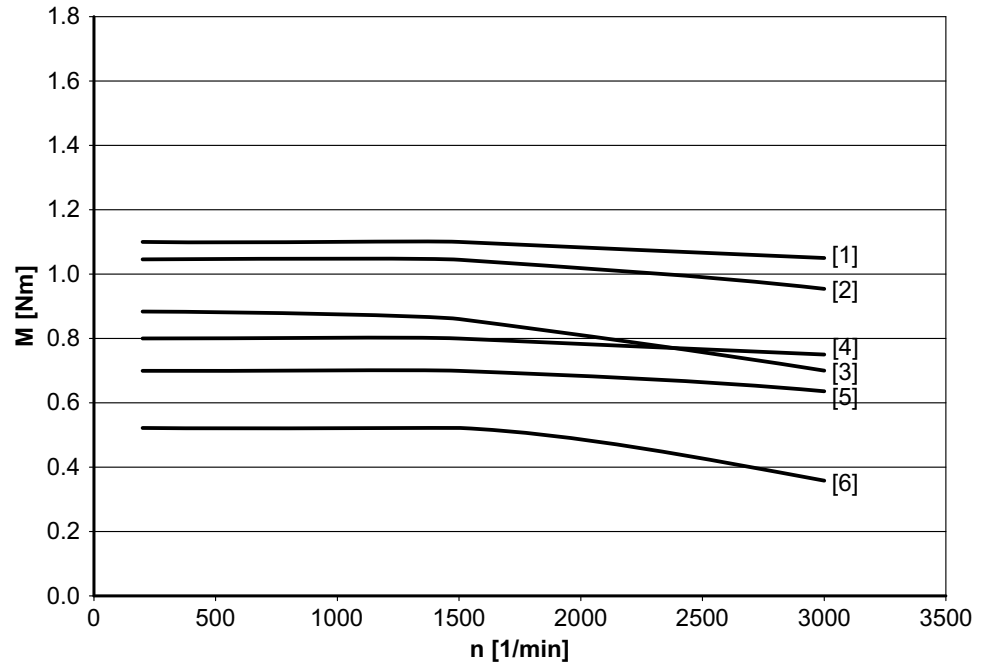
10.2.4 CMP 50M ELVCD dynamic characteristic curve



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10.2.5 CMP 50S ELVCD thermal characteristic curves

The following diagram shows the thermal characteristic curves of the CMP 50S ELVCD drive in S1 operation with and without braking power at $\vartheta_A = 20/40\text{ °C}$:



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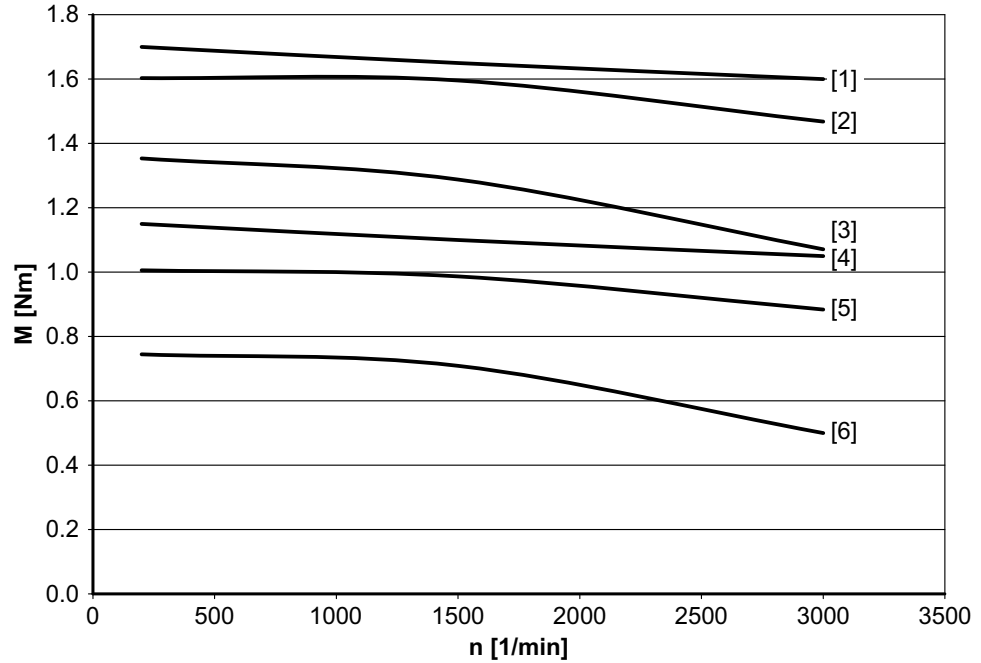
- [1] 0 W chopper, $\vartheta_A = 20\text{ °C}$
- [2] 7.5 W chopper, $\vartheta_A = 20\text{ °C}$
- [3] 15 W chopper, $\vartheta_A = 20\text{ °C}$
- [4] 0 W chopper, $\vartheta_A = 40\text{ °C}$
- [5] 7.5 W chopper, $\vartheta_A = 40\text{ °C}$
- [6] 15 W chopper, $\vartheta_A = 40\text{ °C}$

The following table shows the torques of the CMP 50S ELVCD drive in S1 operation:

Speed n [1/min]	Torque at 20 °C M_{20} [Nm]	Torque at 40 °C M_{40} [Nm]
200	1.1	0.8
1500	1.1	0.8
3000	1.05	0.75

10.2.6 CMP 50M ELVCD thermal characteristic curves

The following diagram shows the thermal characteristic curves of the CMP 50M ELVCD drive in S1 operation with and without braking power at $\vartheta_A = 20/40\text{ °C}$:



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- | | |
|---|---|
| [1] 0 W chopper, $\vartheta_A = 20\text{ °C}$ | [4] 0 W chopper, $\vartheta_A = 40\text{ °C}$ |
| [2] 7.5 W chopper, $\vartheta_A = 20\text{ °C}$ | [5] 7.5 W chopper, $\vartheta_A = 40\text{ °C}$ |
| [3] 15 W chopper, $\vartheta_A = 20\text{ °C}$ | [6] 15 W chopper, $\vartheta_A = 40\text{ °C}$ |

The following table shows the torques of the CMP 50M ELVCD drive in S1 operation:

Speed n [1/min]	Torque at 20 °C M_{20} [Nm]	Torque at 40 °C M_{40} [Nm]
200	1.70	1.15
1500	1.65	1.10
3000	1.60	1.05

10.3 Technical data brake

10.3.1 BP brake

Motor type	Brake type	$M_{2, 20\text{ °C}}$ Nm	$M_{4, 100\text{ °C}}$ Nm	$M_{1m, 100\text{ °C}}$ Nm	W_1 kJ	W_2 kJ	W_{insp} 10 ³ kJ	P W	t_1 ms	t_2 ms
CMP50S / M	BP04	3.1	1.9	1.2	0.6	7.2	1.0	10.2	200	75

$M_{2, 20\text{ °C}}$ Nominal torque for slipping brake disk (relative speed between brake disk and friction surface: 1 m/s) at 20 °C

$M_{4, 100\text{ °C}}$ Minimum static braking torque (holding torque) at 100 °C

$M_{1m, 100\text{ °C}}$ Minimal averaged dynamic braking torque in case of emergency switching off at 100 °C

W_1 Permitted braking work per braking operation

W_2 Permitted braking work per hour

W_{insp} Permitted total braking work (braking work until maintenance)

P Power consumption of the coil

t_1 Brake response time

t_2 Brake application time

INFORMATION



The response and application times are guide values that were determined at maximum braking torque.

Possible response times of switching elements or controllers were not taken into account.

INFORMATION



If the permitted braking work per braking W_1 is exceeded during braking or if the permitted total braking work W_{insp} is reached, it can no longer be guaranteed that the brake is released.

In this case, the error messages 8977 to 8978 are signaled.

INFORMATION



For the current project planning standard for BK and BP brakes of the CMP50 ELVCD and the functional principal of the brakes, refer to the SEW-EURODRIVE "Synchronous Servomotors CMP40 – CMP112, CMPZ71 – CMPZ100" catalog.

If you have questions concerning the BP brake project planning, contact the SEW-EURODRIVE support.

10.3.2 BK brake

Motor type	Brake type	$M_{4, 100\text{ °C}}$ Nm	$M_{1m, 100\text{ °C}}$ Nm	M_{1max} Nm	W_1 kJ	W_2 kJ	W_{insp} 10 ³ kJ	P W	t_1 ms	t_2 ms
CMP50S / M	BK02	2.4	1.9	5.3	0,175	3.50	0,350	6.7	80	20

$M_{4, 100\text{ °C}}$ Minimum static braking torque (holding torque) at 100 °C

$M_{1m, 100\text{ °C}}$ Minimal averaged dynamic braking torque in case of emergency switching off at 100 °C

M_{1max} Maximum dynamic braking torque in case of emergency switching off

W_1 Permitted braking work per braking operation

W_2 Permitted braking work per hour

W_{insp} Permitted total braking work (braking work until maintenance)

P Power consumption of the coil

t_1 Brake response time

t_2 Brake application time

INFORMATION



The response and application times are guide values that were determined at maximum braking torque.

Possible response times of switching elements or controllers were not taken into account.

INFORMATION



If the permitted braking work per braking W_1 is exceeded during braking or if the permitted total braking work W_{insp} is reached, it can no longer be guaranteed that the brake applies.

In this case, the drive does not brake.

10.4 Connection cables

10.4.1 Specification of recommended CAN connection cable

When individual CAN connection cables are used, SEW-EURODRIVE recommends the cable type "Belden 9841/LOW-capacitance computer cable for EIA".

Description

24 AWG stranded TC wire, insulated with polyethylene, drilled, shielded with Beldfoil® (100%) + TC braid (90% shielding), 24 AWG stranded TC drain wire, PVC sheath.

Physical properties (in total)

Conductor:			
AWG			
Twisted-pairs	AWG	Stranding	Conductor material
1	24	7x32	TC – tinned copper

Mechanical properties (in total)

Mechanical properties (in total)	
Operating temperature	-30 °C to +80 °C
Nominal UL operating temperature	80 °C
Weight of raw cable	36 lbs/1000 ft.
Max. recommended tensile stress	72.3 lbs.
Min. bending radius of secondary axis	2.5 inch

Applicable specifications and compliance with regulatory specifications (total)	
Applicable standards	
NEC/(UL) specification	CM
CEC/C(UL) specification	CM
AWM specification	UL style 2919 (30 V 80°)
EU CE mark (Y/N)	Yes
EU RoHS compliant (Y/N)	Yes
EU RoHS compliance date (MM/DD/YYYY)	01/01/2004
Plenum / Non-Plenum:	No
Plenum (Y/N)	
Plenum number	82841, 89841

Electrical properties (in total)

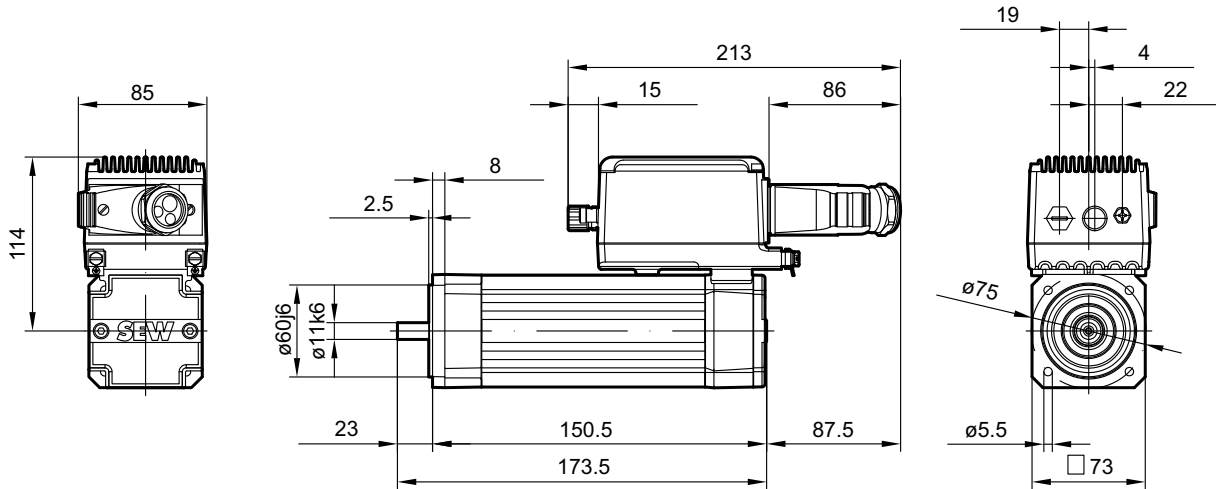
Electrical properties (in total)	
Characteristic rated impedance Impedance (ohms)	120
Nominal capacitance conductor/conductor Capacitance (pF/ft)	12.8
Nominal capacitance conductor/other conductor & shield Capacitance (pF/ft)	23.0
Nominal propagation speed VP (%)	66
Nominal delay time Delay (ns/ft)	1.6
Nominal value of the direct current resistance of the conductor Nominal DC resistance at 20 °C (ohm/1000 ft)	24.0
Nominal value of the direct current resistance of the outer shield Nominal DC resistance at 20 °C (ohm/1000 ft)	3.4
Nominal attenuation Attenuation (dB/100ft)	0.6 (at 1 MHz)
Max. operating voltage – UL Voltage	300 V RMS 20 V RMS (UL AWM Style 2919)
Max. recommended amperage Amperage	2.1 A per conductor at 25 °C

10.5 Dimension drawings

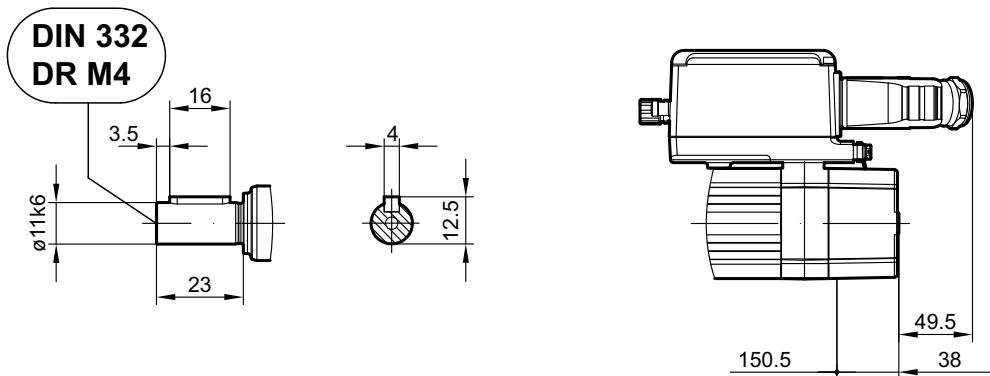
CMP50S ELVCD

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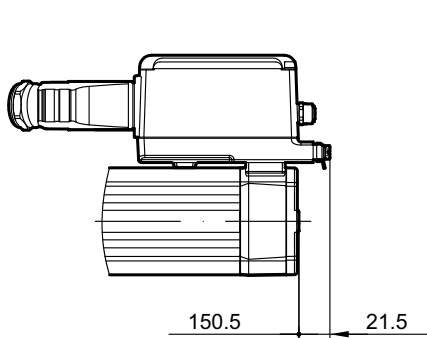
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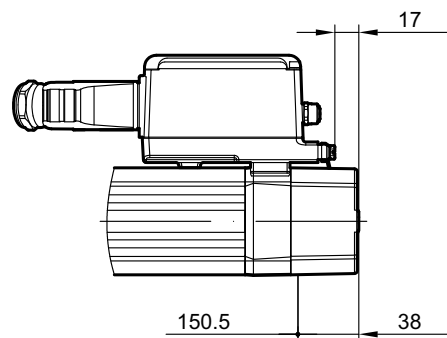
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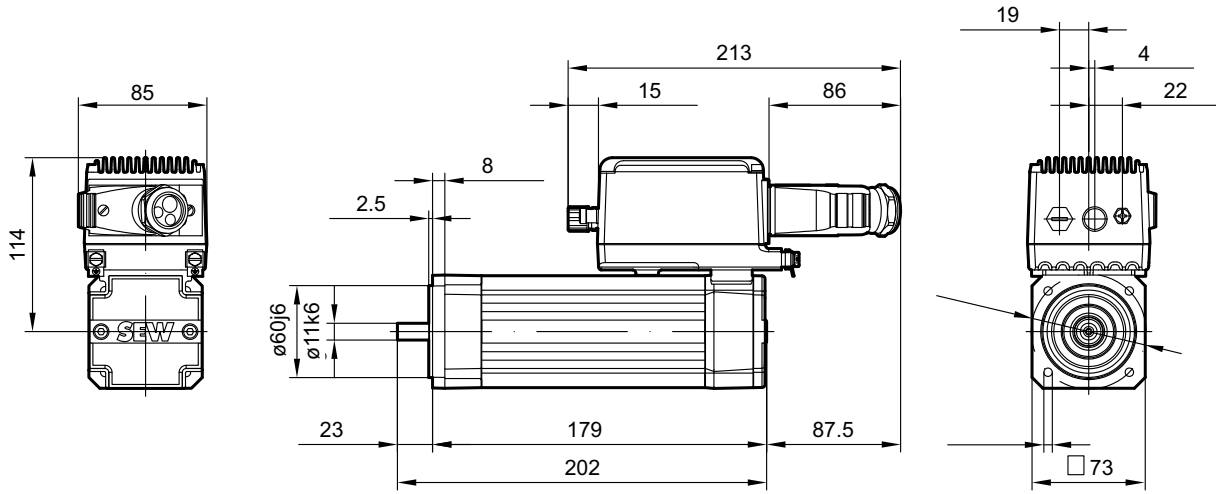


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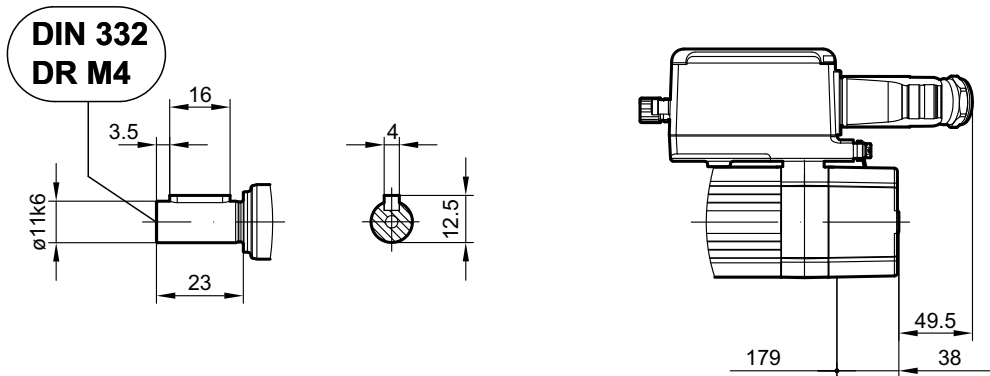
CMP50S BK/BP ELVCD

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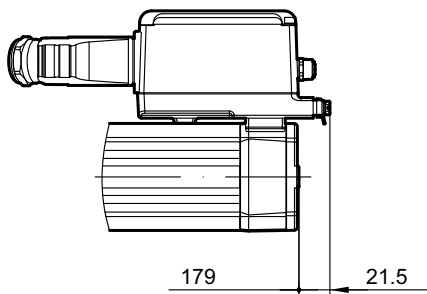
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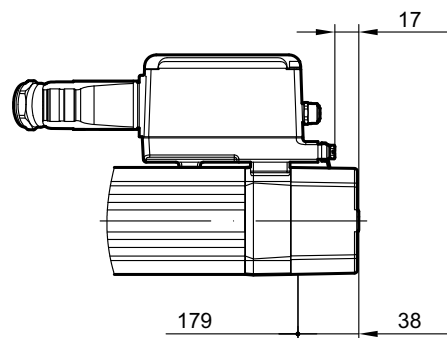
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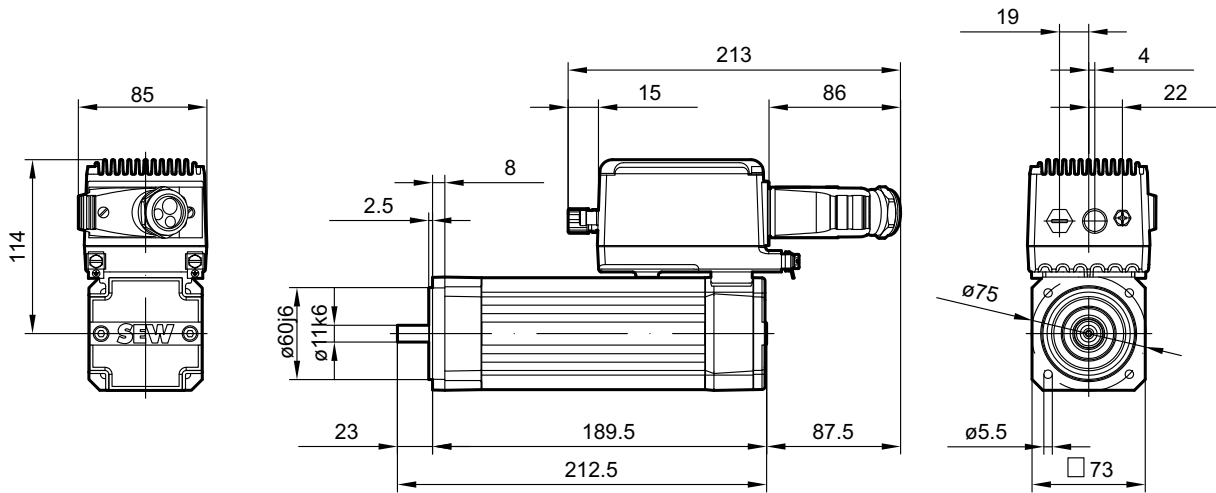
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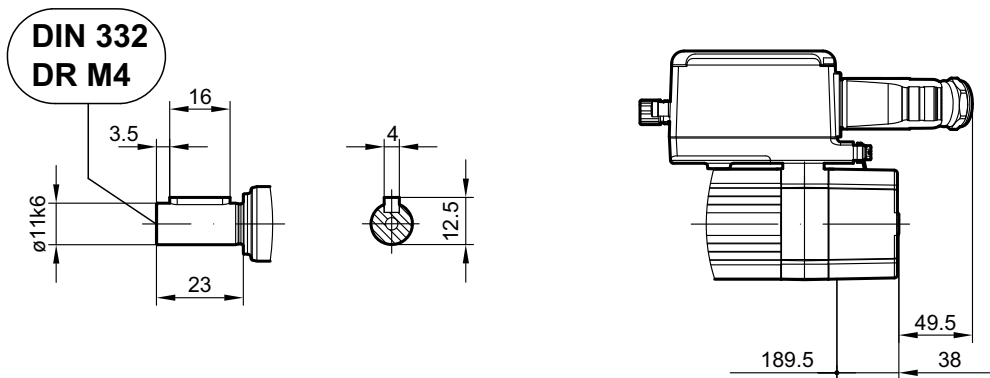
CMP50M ELVCD

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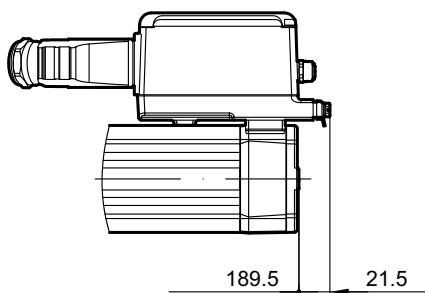
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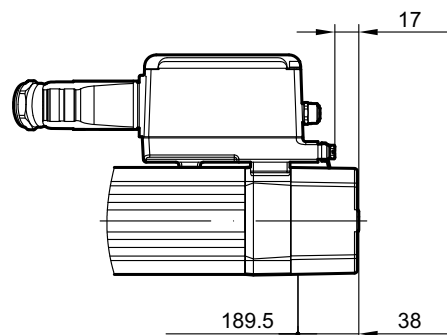
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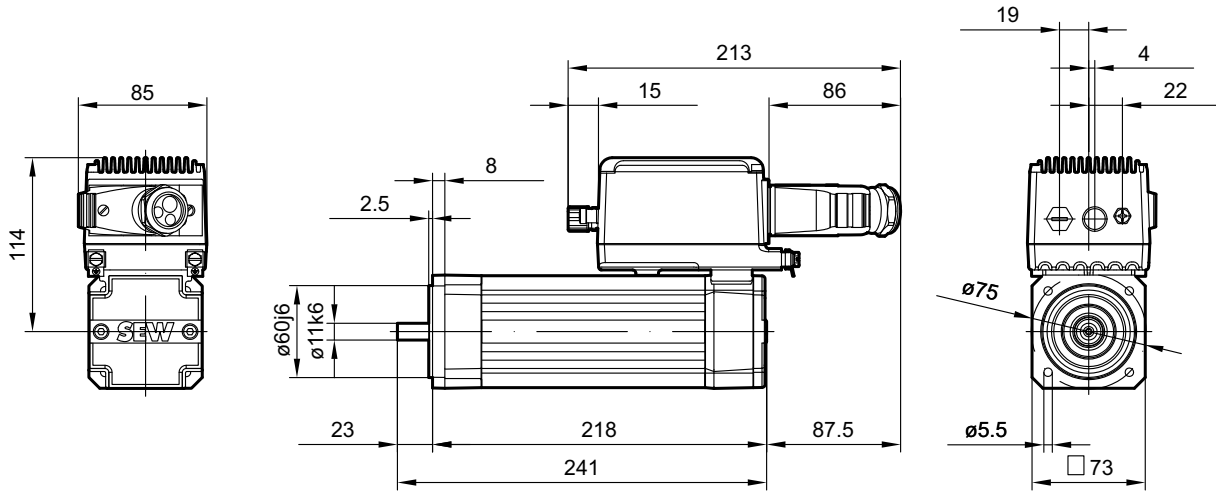


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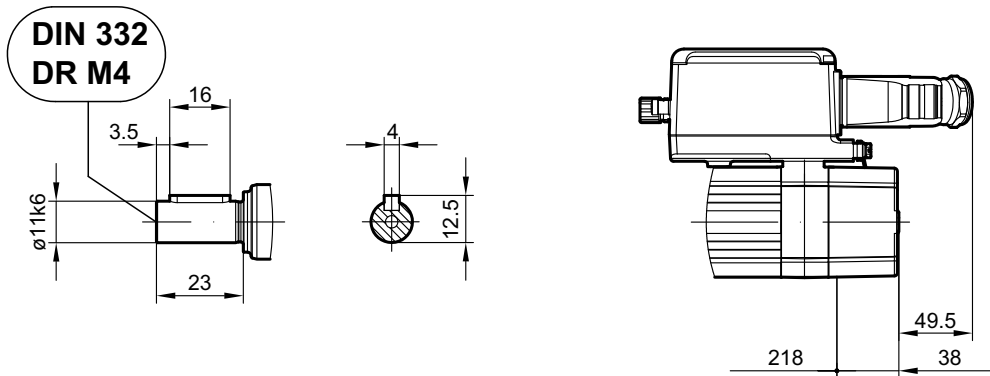
CMP50M BK/BP ELVCD

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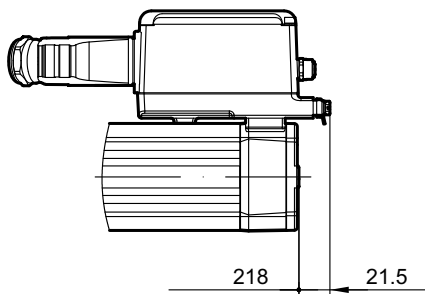
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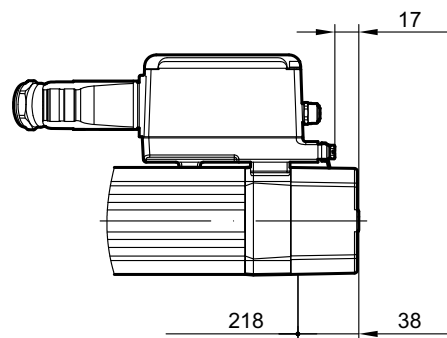
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/RH1M /KKL 1



/AK0H /KKL 1



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11 Address list

Algeria			
Sales	Algiers	REDUCOM Sarl 16, rue des Frères Zaghounne Bellevue 16200 El Harrach Alger	Tel. +213 21 8214-91 Fax +213 21 8222-84 http://www.reducom-dz.com info@reducom-dz.com
Argentina			
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 http://www.sew-eurodrive.com.ar sewar@sew-eurodrive.com.ar
Australia			
Assembly Sales Service	Melbourne	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au
Austria			
Assembly Sales Service	Vienna	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://www.sew-eurodrive.at sew@sew-eurodrive.at
Croatia	Zagreb	KOMPEKS d. o. o. Zeleni dol 10 HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr
Romania	Bucharest	Sialco Trading SRL str. Brazilia nr. 36 011783 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro
Serbia	Belgrade	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor SRB-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.rs
Slovenia	Celje	Pakman - Pogonska Tehnika d.o.o. Ul. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net
Bangladesh			
Sales	Bangladesh	SEW-EURODRIVE INDIA PRIVATE LIMITED 345 DIT Road East Rampura Dhaka-1219, Bangladesh	Tel. +88 01729 097309 salesdhaka@seweurodrivebangla- desh.com
Belarus			
Sales	Minsk	Foreign Enterprise Industrial Components RybalkoStr. 26 BY-220033 Minsk	Tel. +375 17 298 47 56 / 298 47 58 Fax +375 17 298 47 54 http://www.sew.by sales@sew.by
Belgium			
Assembly Sales Service	Brussels	SEW-EURODRIVE n.v./s.a. Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.be info@sew-eurodrive.be
Service Competence Center	Industrial Gears	SEW-EURODRIVE n.v./s.a. Rue de Parc Industriel, 31 BE-6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be

Brazil			
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 sew@sew.com.br
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 montadora.rc@sew.com.br
	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 filial.sc@sew.com.br
Bulgaria			
Sales	Sofia	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@bever.bg
Cameroon			
is supported by Germany.			
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 http://www.sew-eurodrive.ca 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 RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 2757 7000 Fax +56 2 2757 7001 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl
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 http://www.sew-eurodrive.cn 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

China			
	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
Colombia			
Assembly Sales Service	Bogota	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sew@sew-eurodrive.com.co
Croatia			
Sales Service	Zagreb	KOMPEKS d. o. o. Zeleni dol 10 HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr
Czech Republic			
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 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
	Drive Service Hotline / 24 Hour Service	+420 800 739 739 (800 SEW SEW)	Service Tel. +420 255 709 632 Fax +420 235 358 218 servis@sew-eurodrive.cz
Denmark			
Assembly Sales Service	Copenhagen	SEW-EURODRIVEA/S Geminivej 28-30 DK-2670 Greve	Tel. +45 43 95 8500 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk
Egypt			
Sales Service	Cairo	Copam Egypt for Engineering & Agencies 33 El Hegaz ST Heliopolis, Cairo	Tel. +20 222566299 Fax +20 2 22594-757 http://www.copam-egypt.com copam@copam-egypt.com
Estonia			
Sales	Tallin	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 http://www.alas-kuul.ee veiko.soots@alas-kuul.ee
Finland			
Assembly Sales Service	Hollola	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Service	Hollola	SEW-EURODRIVE OY Keskikankaantie 21 FIN-15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Production Assembly	Karkkila	SEW Industrial Gears Oy Santasalonkatu 6, PL 8 FI-03620 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 http://www.sew-eurodrive.fi sew@sew.fi

France			
Production Sales Service	Hagenau	SEW-USOCOME 48-54 route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Production	Forbach	SEW-USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 F-57604 Forbach Cedex	Tel. +33 3 87 29 38 00
	Brumath	SEW-USOCOME 1 rue de Bruxelles F-67670 Mommenheim	Tel. +33 3 88 37 48 48
Assembly Sales Service	Bordeaux	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan – B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Nantes	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles F-44140 Le Bignon	Tel. +33 2 40 78 42 00 Fax +33 2 40 78 42 20
	Paris	SEW-USOCOME Zone industrielle 2 rue Denis Papin F-77390 Verneuil l'Étang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88

Gabon

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Germany

Headquarters Production Sales	Bruchsal	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 – D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Production / Industrial Gears	Bruchsal	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Str. 10 D-76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-2970
Production	Graben	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-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 D-76684 Östringen	Tel. +49 7253 9254-0 Fax +49 7253 9254-90 oestringen@sew-eurodrive.de
Service Competence Center	Mechanics / Mechatronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 scc-mechanik@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 scc-elektronik@sew-eurodrive.de
Drive Technology Center	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-30823 Garbsen (Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 dtc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane (Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 dtc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 dtc-sued@sew-eurodrive.de

Germany			
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 dtc-west@sew-eurodrive.de
Drive Center	Berlin	SEW-EURODRIVE GmbH & Co KG Alexander-Meißner-Straße 44 D-12526 Berlin	Tel. +49 306331131-30 Fax +49 306331131-36 dc-berlin@sew-eurodrive.de
	Saarland	SEW-EURODRIVE GmbH & Co KG Gottlieb-Daimler-Straße 4 D-66773 Schwalbach Saar – Hülzweiler	Tel. +49 6831 48946 10 Fax +49 6831 48946 13 dc-saarland@sew-eurodrive.de
	Ulm	SEW-EURODRIVE GmbH & Co KG Dieselstraße 18 D-89160 Dornstadt	Tel. +49 7348 9885-0 Fax +49 7348 9885-90 dc-ulm@sew-eurodrive.de
	Würzburg	SEW-EURODRIVE GmbH & Co KG Nürnbergerstraße 118 D-97076 Würzburg-Lengfeld	Tel. +49 931 27886-60 Fax +49 931 27886-66 dc-wuerzburg@sew-eurodrive.de
Drive Service Hotline / 24 Hour Service			+49 800 SEWHELP +49 800 7394357
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 http://www.sew-eurodrive.co.uk 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 GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr
Hungary			
Sales Service	Budapest	SEW-EURODRIVE Kft. Csillaghegyi út 13. H-1037 Budapest	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 http://www.sew-eurodrive.hu office@sew-eurodrive.hu
Iceland			
Sales	Reykjavik	Varma & Vélaverk ehf. Knarrarvogi 4 IS-104 Reykjavik	Tel. +354 585 1070 Fax +354 585)1071 http://www.varmaverk.is 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 http://www.seweurodriveindia.com 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 35301400 salespune@seweurodriveindia.com
Indonesia			
Sales	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

Indonesia

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 http://www.aplindo.com
Medan	PT. Serumpun Indah Lestari JI.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 http://www.serumpunindah.com
Surabaya	PT. TRIAGRI JAYA ABADI Jl. Sukosemolo No. 63, Galaxi Bumi Permai G6 No. 11 Surabaya 60111	Tel. +62 31 5990128 Fax +62 31 5962666 sales@triagri.co.id http://www.triagri.co.id
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	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 http://www.alperton.ie info@alperton.ie
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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
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Italy

Assembly Sales Service	Solaro	SEW-EURODRIVE di R. Blicke & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 79 97 81 http://www.sew-eurodrive.it sewit@sew-eurodrive.it
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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
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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
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Kazakhstan

Sales	Almaty	SEW-EURODRIVE LLP 291-291A, Tole bi street 050031, Almaty	Tel. +7 (727) 238 1404 Fax +7 (727) 243 2696 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	SEW-EURODRIVE LLP Representative office in Mongolia Suite 407, Tushig Centre Seoul street 23, Sukhbaatar district, Ulaanbaatar 14250	Tel. +976-77109997 Fax +976-77109997 http://www.sew-eurodrive.mn sew@sew-eurodrive.mn

Kenya

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Latvia			
Sales	Riga	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 6 7139253 Fax +371 6 7139386 http://www.alas-kuul.lv info@alas-kuul.com
Lebanon			
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 / Saudi Arabia / Syria	Beirut	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
Lithuania			
Sales	Alytus	UAB Irseva Statybininku 106C LT-63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 http://www.sew-eurodrive.lt irmantas@irseva.lt
Luxembourg			
Assembly Sales Service	Brussels	SEW-EURODRIVE n.v./s.a. Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.lu info@sew-eurodrive.be
Macedonia			
Sales	Skopje	Boznos DOOEL Dime Anicin 2A/7A 1000 Skopje	Tel. +389 23256553 Fax +389 23256554 http://www.boznos.mk
Madagascar			
Sales	Antananarivo	Ocean Trade BP21bis. Andraharo Antananarivo 101 Madagascar	Tel. +261 20 2330303 Fax +261 20 2330330 oceantrabp@moov.mg
Malaysia			
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
Mexiko			
Assembly Sales Service	Quéretaro	SEW-EURODRIVE MEXICO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Quéretaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@sew-eurodrive.com.mx
Mongolia			
Technical Office	Ulaanbaatar	SEW-EURODRIVE LLP Representative office in Mongolia Suite 407, Tushig Centre Seoul street 23, Sukhbaatar district, Ulaanbaatar 14250	Tel. +976-77109997 Fax +976-77109997 http://www.sew-eurodrive.mn sew@sew-eurodrive.mn
Morocco			
Sales Service	Mohammedia	SEW-EURODRIVE SARL 2 bis, Rue Al Jahid 28810 Mohammedia	Tel. +212 523 32 27 80/81 Fax +212 523 32 27 89 http://www.sew-eurodrive.ma sew@sew-eurodrive.ma

11 Address list

Namibia			
Sales	Swakopmund	DB Mining & Industrial Services Einstein Street Strauss Industrial Park Unit1 Swakopmund	Tel. +264 64 462 738 Fax +264 64 462 734 anton@dbminingnam.com
Netherlands			
Assembly Sales Service	Rotterdam	SEW-EURODRIVE B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-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
New Zealand			
Assembly Sales Service	Auckland	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz
Nigeria			
Sales	Lagos	EISNL Engineering Solutions and Drives Ltd Plot 9, Block A, Ikeja Industrial Estate (Ogba Scheme) Adeniyi Jones St. End Off ACME Road, Ogba, Ikeja, Lagos	Tel. +234 1 217 4332 http://www.eisnl.com team.sew@eisnl.com
Norway			
Assembly Sales Service	Moss	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no
Pakistan			
Sales	Karachi	Industrial Power Drives Al-Fatah Chamber A/3, 1st Floor Central Commercial Area, Sultan Ahmed Shah Road, Block 7/8, Karachi	Tel. +92 21 452 9369 Fax +92-21-454 7365 seweurodrive@cyber.net.pk
Paraguay			
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 sewpy@sew-eurodrive.com.py
Peru			
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 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe
Philippines			
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 mech_drive_sys@ptcerna.com http://www.ptcerna.com
Poland			
Assembly Sales Service	Łódź	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 293 00 00 Fax +48 42 293 00 49 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
	Service	Tel. +48 42 293 0030 Fax +48 42 293 0043	24 Hour Service Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl

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Portugal			
Assembly Sales Service	Coimbra	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt
Romania			
Sales Service	Bucharest	Sialco Trading SRL str. Brazilia nr. 36 011783 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro
Russia			
Assembly Sales Service	St. Petersburg	ZAO SEW-EURODRIVE P.O. Box 36 RUS-195220 St. Petersburg	Tel. +7 812 3332522 / +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru
Sambia			
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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 http://www.senemeca.com senemeca@senemeca.sn
Serbia			
Sales	Belgrade	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor SRB-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.rs
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 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com
Slovakia			
Sales	Bratislava	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-831 06 Bratislava	Tel.+421 2 33595 202, 217, 201 Fax +421 2 33595 200 http://www.sew-eurodrive.sk sew@sew-eurodrive.sk
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 SK-040 01 Košice	Tel. +421 55 671 2245 Fax +421 55 671 2254 Mobile +421 907 671 976 sew@sew-eurodrive.sk
Slovenia			
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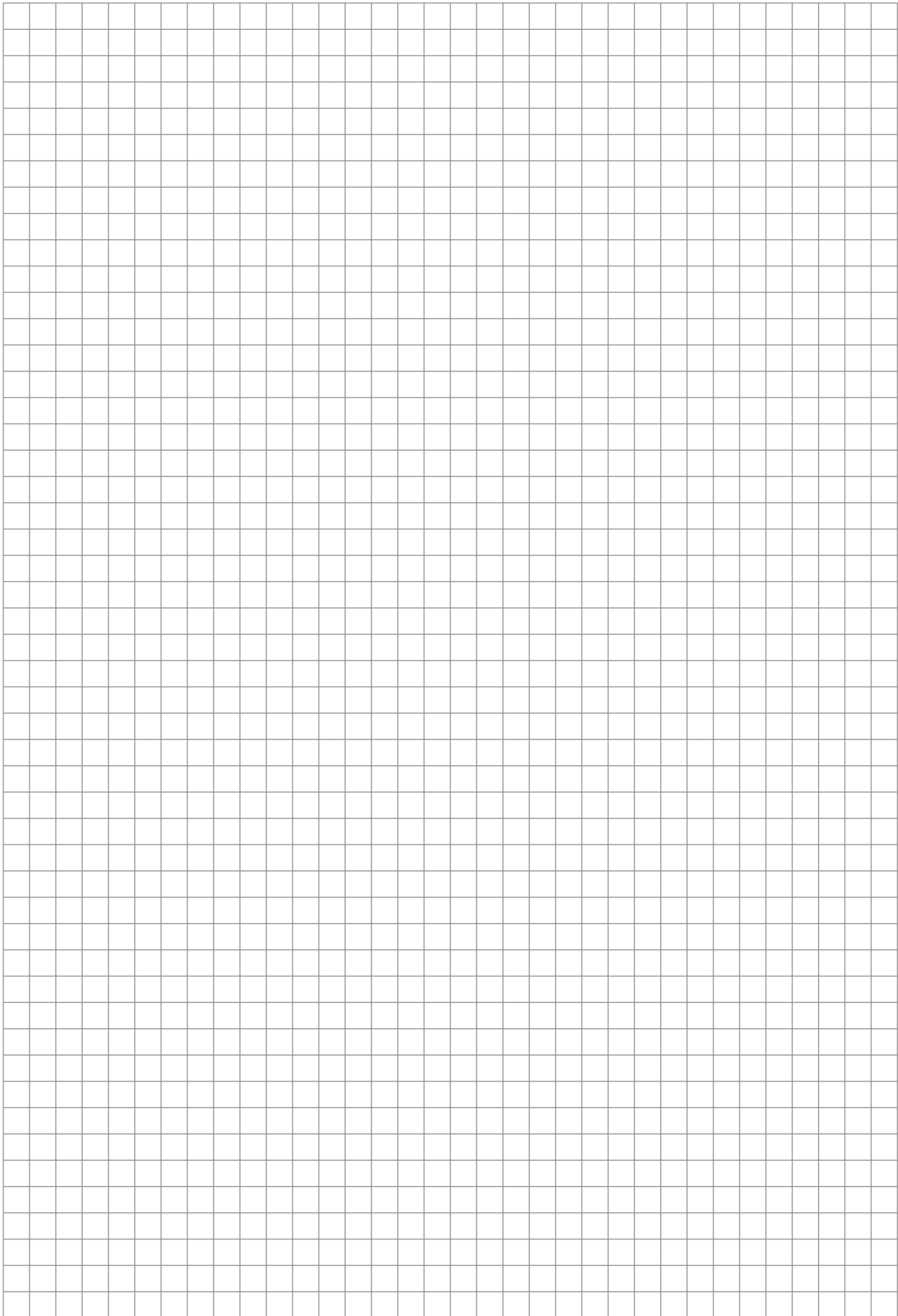
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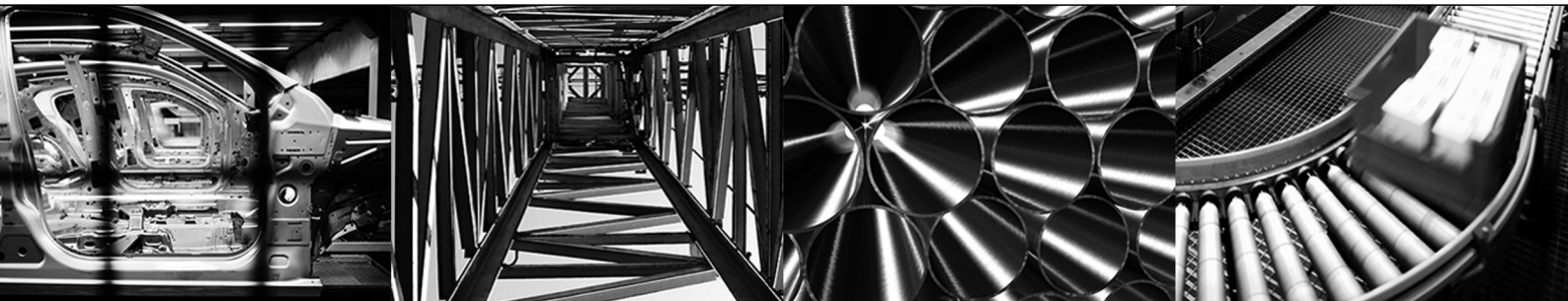
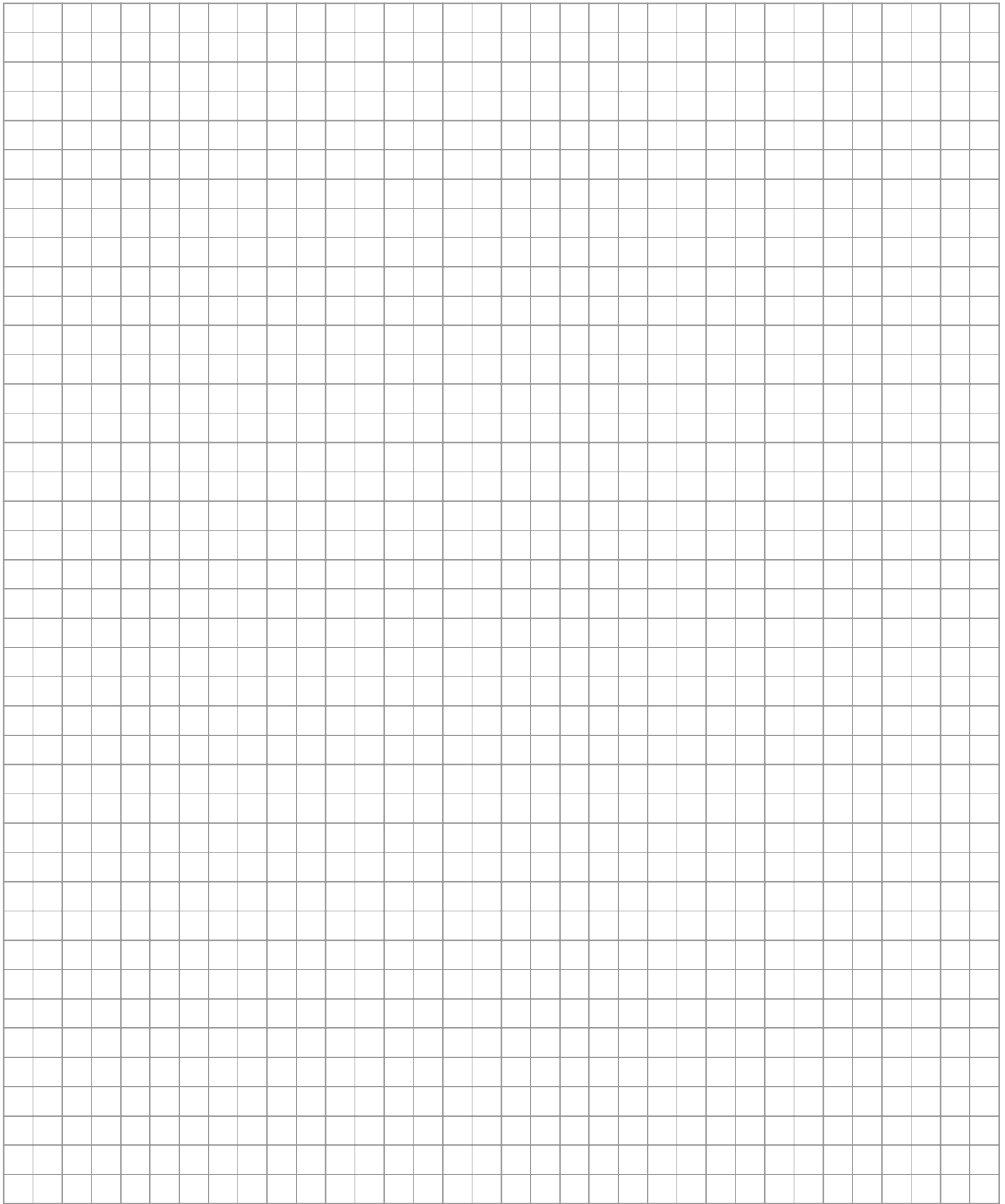
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