



SEW
EURODRIVE

Operating Instructions

60 A/25 kHz



Contactless Energy Transfer System

MOVITRANS® line TIS20A Installation Components

Transmission System for U-Shaped THM11C and THM21C Pick-Ups



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31977200/EN – 10/2024

1 General information

1.1 About this documentation

The documentation at hand is the original.

This documentation is an integral part of the product. The documentation is intended for all employees who perform work on the product.

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

1.2 Other applicable documentation

Observe the corresponding documentation for all additional components.

1.3 Structure of the safety notes

1.3.1 Meaning of signal words

The following table shows the graduation and meaning of the signal words in the warnings:

Signal word	Meaning	Consequences if not observed
⚠ DANGER	Imminent danger	Death or severe injuries
⚠ WARNING	Possible dangerous situation	Death or severe injuries
⚠ CAUTION	Possible dangerous situation	Minor injuries
NOTICE	Possible damage to property	Damage to the product or its environment
INFORMATION	Useful information or tip: Simplifies handling of the product.	

1.3.2 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.

1.3.3 Structure of embedded safety notes

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

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This is the formal structure of an embedded safety note:

▲ SIGNAL WORD! Type and source of danger. Possible consequence(s) if disregarded. Measure(s) to prevent danger.

1.4 Decimal separator in numerical values

In this document, a period is used to indicate the decimal separator.

Example: 30.5 kg

1.5 Rights to claim under limited warranty

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

1.6 Recycling, reprocessing, reuse

SEW-EURODRIVE GmbH & Co KG strives to use as few new natural resources as possible in the production of its products. An important aspect of this is the circular economy with the recycling of materials as well as the inspection and/or reprocessing of returned components and their reuse in new products. SEW-EURODRIVE GmbH & Co KG only uses these processes if the resulting materials and components are of the same quality as new parts.

1.7 Product names and trademarks

The product names mentioned in this documentation are trademarks or registered trademarks of the respective titleholders.

1.8 Copyright notice

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2 Safety notes

2.1 Preliminary information

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

2.2 Duties of the user

As the user, you must ensure that the basic safety notes are observed and complied with. Make sure that persons responsible for the machinery and its operation as well as persons who work on the device independently have read through the documentation carefully and understood it.

As the user, you must ensure that all of the work listed in the following is carried out only by qualified specialists:

- Setup and installation
- Installation and connection
- Startup
- Maintenance and repairs
- Shutdown
- Disassembly

Ensure that the persons who work on the product pay attention to the following regulations, conditions, documentation, and information:

- The national and regional regulations governing safety and the prevention of accidents
- The warning and safety signs on the product
- All other associated project planning documents, installation and startup instructions, as well as wiring diagrams
- Do not assemble, install or operate damaged products
- All system-specific specifications and regulations

Ensure that systems in which the product is installed are equipped with additional monitoring and protection devices. Observe the applicable safety regulations and legislation governing technical work equipment and accident prevention regulations.

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2.3 Target group

Specialist for mechanical work

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

- Qualifications in the field of mechanics in accordance with the national regulations
- Familiarity with this documentation

Specialist for electrotechnical work

Any electrotechnical work may be performed only by electrically skilled persons with a suitable education. Electrically skilled persons in the context of this documentation are persons who are familiar with electrical installation, startup, troubleshooting, and maintenance of the product, and who possess the following qualifications:

- Qualifications in the field of electrical engineering in accordance with the national regulations
- Familiarity with this documentation

Additional qualifications

In addition to that, these persons must be familiar with the valid safety regulations and laws, as well as with the requirements of the standards, directives, and laws specified in this documentation.

The persons must have the express authorization of the company to operate, program, parameterize, label, and ground devices, systems, and circuits in accordance with the standards of safety technology.

Instructed persons

All work in the areas of transport, storage, installation, operation and waste disposal may only be carried out by persons who are trained and instructed appropriately. These instructions must enable the persons to carry out the required activities and work steps safely and in accordance with regulations.

2.4 Creating a safe working environment

Before you work on the product, ensure a safe working environment. Observe the following basic safety note:

2.4.1 Performing work on the product safely

Defective or damaged product

Never install defective or damaged products. Observe the following information to avoid injuries or damage:

- Before installation, check the product for external damage and replace a damaged product.

Hot surfaces

The surfaces of the product can become very hot during operation. Observe the following information to avoid burns:

- Let the product and its accessories cool down before touching it.
- Do not touch any surfaces of the product during operation, except for the control elements.
- Also observe the labels and hazard symbols on the product.

Falling load

Observe the following information to avoid death or severe injury due to falling loads:

- Do not stand under the load.
- Secure the area where loads can fall down.
- Use personal protective equipment (such as helmet and safety shoes).
- Use a suitable lifting tool (chain hoist, forklift) and transport protection.

Rotating parts

When working on the product, there may be a risk of exposed rotating parts and uncontrolled movement of the components. Observe the following information to avoid body parts getting crushed or pulled in:

- Switch off the product before you start working on it.
- Observe all technical data of the product.
- Do not reach into the hazard zone.
- Follow the 5 safety rules in chapter: "Performing electrical work safely" (→ 10).

Sharp edges

Observe the following information to avoid cuts and malfunctions caused by sharp or non-deburred cutting edges:

- Wear safety gloves.

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2.4.2 Performing electrical work safely

Observe the following information to perform electrical work safely:

Electrical work may only be performed by a qualified electrician or an electronically instructed person under the supervision of an electrician.

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

Dangerous voltage

Observe the 5 safety rules in the specified sequence when working on electrical components, unless there are important reasons to deviate from them (observe the specifications of DIN EN 50110-1 (VDE 0115-1)):

- Disconnect.
- Secure the device against a restart.
- Check that no voltage is applied.
- Ground and short-circuit.
- Cover or cordon off neighboring live parts.

Dangerous voltage

When the system is switched on, dangerous voltages are present at all power connections as well as any cables and terminals that are connected. This also applies even when the voltage supply has been disconnected at the device's switch disconnecter or if the product is inhibited. Observe the following information to avoid the risk of electric shock:

- Do not touch any exposed live parts (e.g. male contacts, plug connectors, terminals).
- Secure all open live components with a touch guard.
- Ensure that the connection boxes are closed and screwed down before applying the supply voltage.
- Before applying the supply voltage, make sure that all required covers are mounted.

Dangerous voltage due to charged capacitors

Voltage from charged capacitors can still be present in live components or power connections after disconnecting from the supply voltage. Observe the following information:

- Observe the following waiting period after disconnecting the supply voltage and before performing any electrical work: **10 minutes**.
- Ensure that the unit is de-energized.
- Also observe the labels and hazard symbols on the product.

Dangerous voltage due to charged energy storage units

Products with a connected energy storage unit are not de-energized even when they have been disconnected from the supply system. Observe the following information:

- Before performing any electrical work, and after disconnecting the supply voltage, energy storage units must be discharged using a discharge unit.

- Observe the following waiting period after disconnecting the supply voltage and before performing any electrical work: **10 minutes**.
- Ensure that the unit is de-energized.
- Also observe the labels and hazard symbols on the product.

Danger due to electric arc

An electric arc may occur when plug-in connections are disconnected or connected while voltage is applied (e.g. connection between drive and control). In order to avoid damaging electrical components, observe the following information:

- Do not disconnect power connections during operation.
- Do not connect power connections during operation.
- Ensure that the product is de-energized before disconnecting and connecting the plug-in connections.

Damage to property due to damaged or loose cables

To avoid damaging electrical components (e.g. cables and plug-in connections), observe the following information:

- Do not insert plug-in connections if cables are subjected to tensile stress.
- Do not kink cables when connecting plug-in connections.
- Replace loose or defective plug-in connections.
- Make sure that cables are not pinched or crushed.
- Do not run cables near or along a sharp edge.

2.5 Designated use

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

The product is intended for mobile use in industrial and commercial systems with contactless energy transfer systems.

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

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

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

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

Only operate the installation system with the appropriate pick-ups.

2.6 Functional safety technology

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

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2.7 Transport

Inspect the shipment for damage as soon as you receive the delivery. Inform the shipping company immediately about any damage. If the product or the packaging is damaged, do not assemble, install, connect, or start up the product. If the packaging is damaged, the product itself may also be damaged.

Observe the following notes when transporting the device:

- Ensure that the product is not subject to mechanical impact.

If necessary, use suitable, sufficiently dimensioned handling equipment.

Observe the information on climatic conditions in chapter "Technical data" (→ 59) of the documentation.

2.8 Installation/assembly

Ensure that the product is installed and cooled in accordance with the regulations in the documentation.

Protect the product from excessive mechanical strain. The product and its mounted components must not protrude into the path of persons or vehicles. Ensure that no components are deformed or no insulation spaces are modified, particularly during transportation. Electrical components must not be mechanically damaged or destroyed.

Observe the notes in chapter "Mechanical installation" (→ 19) in the documentation.

2.8.1 Restrictions of use

The following applications are prohibited unless the device is explicitly designed for such use:

- Use in potentially explosive areas.
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, and radiation.
- Operation in applications with impermissibly high mechanical vibration and shock loads in excess of the regulations stipulated in EN 60068-2-6 and/or EN 60068-2-27.
- Operation at an elevation of more than 2000 m above sea level.
- Operation in outdoor areas

2.9 Electrical installation

Ensure that all of the required covers are correctly attached after the electrical installation.

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

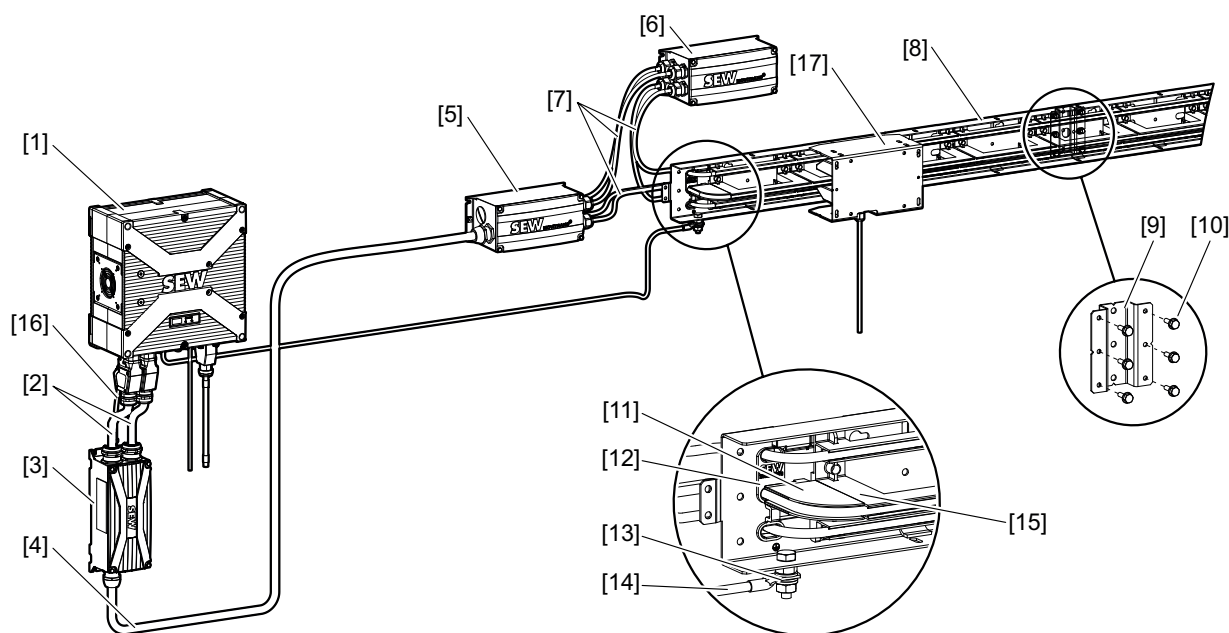
2.10 Electromagnetic fields

Observe ICNIRP 2010 and IEEE C95.1-2019 or the national installation regulations, for example DGUV regulation 15 - "Electromagnetic fields", when installing, starting up and operating systems with a contactless energy transfer system based on the inductive principle in the vicinity of workplaces. For more information on electromagnetic fields, refer to the manual "MOVITRANS® Protective Measures and Planning Information for Systems".

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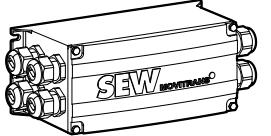
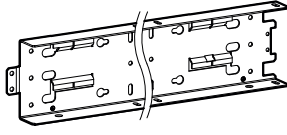
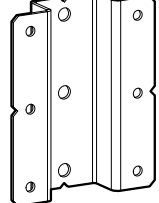
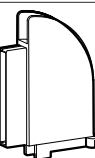
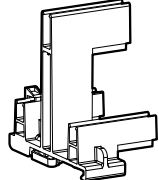
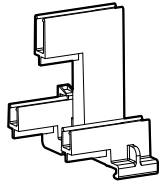
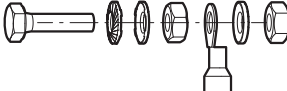
3 Product structure

3.1 System overview with the installation components

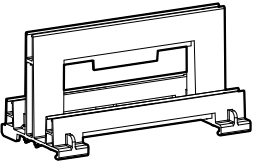
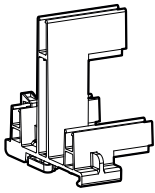
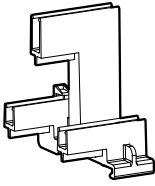
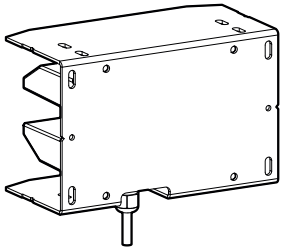
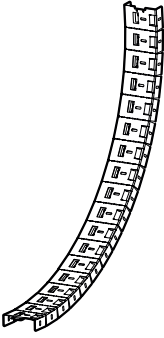
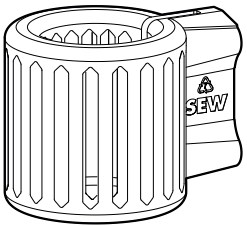


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Figure	Component	Type designation	Part number	Pack-aging unit*
[1]	Decentralized supply unit	TES31A080-EF6-5B3-A TES31A160-EF6-5B3-A 2 x TES31A160-EF3-5B3-A	—	1
[2]	Load cable	—	18182313	1 _{load cable}
[3]	Compensation box (fine compensation)	TCS31A-EA8-XXX-0	—	1
[4]	Supply cable	TLS10E006-06-1	13227793	1 _{supply cable}
[5]	Connection distributor	TVS10B-E06-000-1	—	1

	Figure	Component	Type designation	Part number	Pack-aging unit*
[6]		Compensation box (track compensation)	TCS10B-EA6-090-1 TCS10B-EA8-209-1	–	1
[7]		Line cable	TLS10E008-01-1	13227742	I _{TLs}
[8]		Mounting rail, straight (set)	TIS20A008-HS01-0	28309081	5
[9]		Mounting panel (set)	TIS20A008-MB01	28309162	11
[10]		Self-tapping screw (set)			60
[11]		Cable entry frame, left (set)	TIS20A008-AL4-0	TIS20A ac- cessories 28215346	1
		Cable entry frame, right (set)	TIS20A008-AR4-0		1
[12]		Cable bushing (set)	–		2
–		Cable holder for curved tracks, left (set)	TIS20A008-HL4-0		1
–		Cable holder for curved tracks, right (set)	TIS20A008-HR4-0		1
[13]		Grounding set	–	28309154	1

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	Figure	Component	Type designation	Part number	Packaging unit*
[14]	—	Protective earth 16 mm ² to the grounding point of the mounting rail	—	—	—
[15]		Cable holder for straight tracks (set)	TIS20A008-H04-0	28238117	50
—		Cable holder for curved tracks, left (set)	TIS20A008-HL4-0	18244408	20
—		Cable holder for curved tracks, right (set)	TIS20A008-HR4-0		20
[16]	—	Protective earth 16 mm ² to the fine compensation grounding point	—	—	—
[17]		Pick-up (figure with shield plate)	THM11C/THM21C	—	1
—		Mounting rail, curved (set)	TIS20A008-HS02	28309103	4
—		Coil body	—	27712788	1

*The number of components and the length of the cables is determined for each specific order. Further information can be found in the "MOVITRANS® line TIS20A transmission system" project planning manual.

The cable glands can be found in chapter: "Cabling and cable glands" (→ 40).

Mounting rail,
straight (set)

Each straight mounting rail [8] covers a track length of 1.80 m.

Mounting rail,
curved (set)

Each curved mounting rail produces a curve length of 1.332 m.

Mounting panel
(set)

The mounting panels [9] enable mechanical installation of the mounting rails [8]. They compensate for linear thermal expansion and ensure the required degree of protective bonding between the mounting rails. For installation, you will need 2 mounting panels for each mounting rail and 1 additional mounting panel for the end of a track section.

TIS20A accessories

At the beginning and end of a track section, use the two left and right cable entry frames [11] to guide the line cables [7] out of the cable holders [15] and through the mounting rails [8]. To protect the line cables, use a cable bushing [12] for each cable.

Always install compensation boxes within the transmission path (see chapter: "Installation 6: Capacitive compensation and balancing within the transmission path" (→ 53)) at the junction point of two mounting rails [8]. Using the two left and right cable entry frames [11], guide the line cables [7] here through the mounting rails [8] and use a total of 2 cable bushings [12] to protect the line cables.

Cable holder for
straight tracks (set)

You will need 9 cable holders [15] for each straight mounting rail [8].

Cable holders for
curved tracks (set)

You will need 18 cable holders for each curved mounting rail. Both designs (right or left) can be used. Note that the selected design must be maintained within a curve. For the curve entry and exit points, you will need a total of one cable holder for straight tracks [15], which must be cut to the appropriate dimensions in order to fill both of the gaps on the straight mounting rails.

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3.2 Type designation

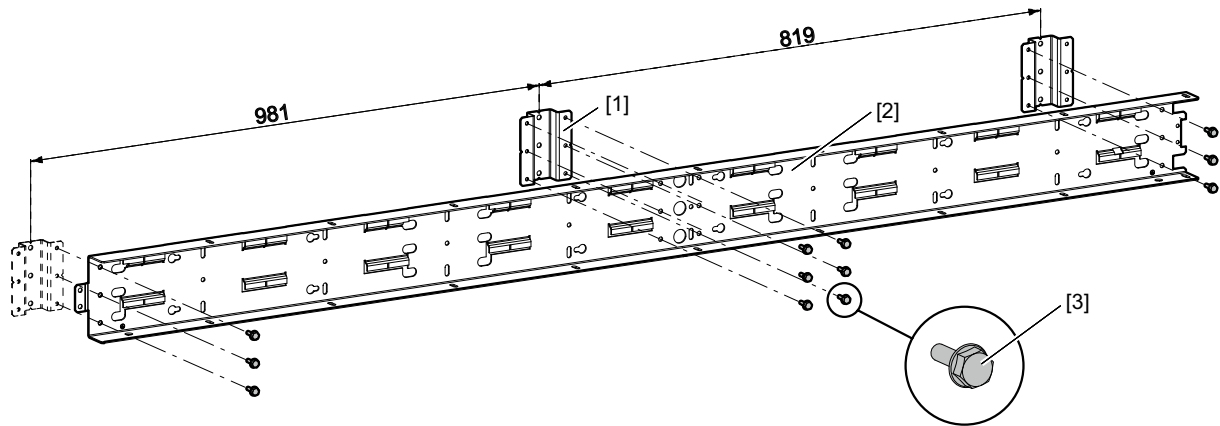
The type designation MOVITRANS® TIS comprises the following characteristic data:

TIS20A	MOVITRANS® stationary installation component	
008	Cable cross section:	
	008	8 mm ²
-		
...	H04	Cable holder for straight tracks
	HL4	Cable holder for curved tracks, left
	HR4	Cable holder for curved tracks, right
	AL4	Cable entry frame, left
	AR4	Cable entry frame, right
	HS01	Straight mounting rail
	HS02	Curved mounting rail
	MB01	Mounting panel
-		
0	Design: Standard	

4 Mechanical installation

4.1 Mounting the mounting rail

4.1.1 Straight mounting rail with mounting panels



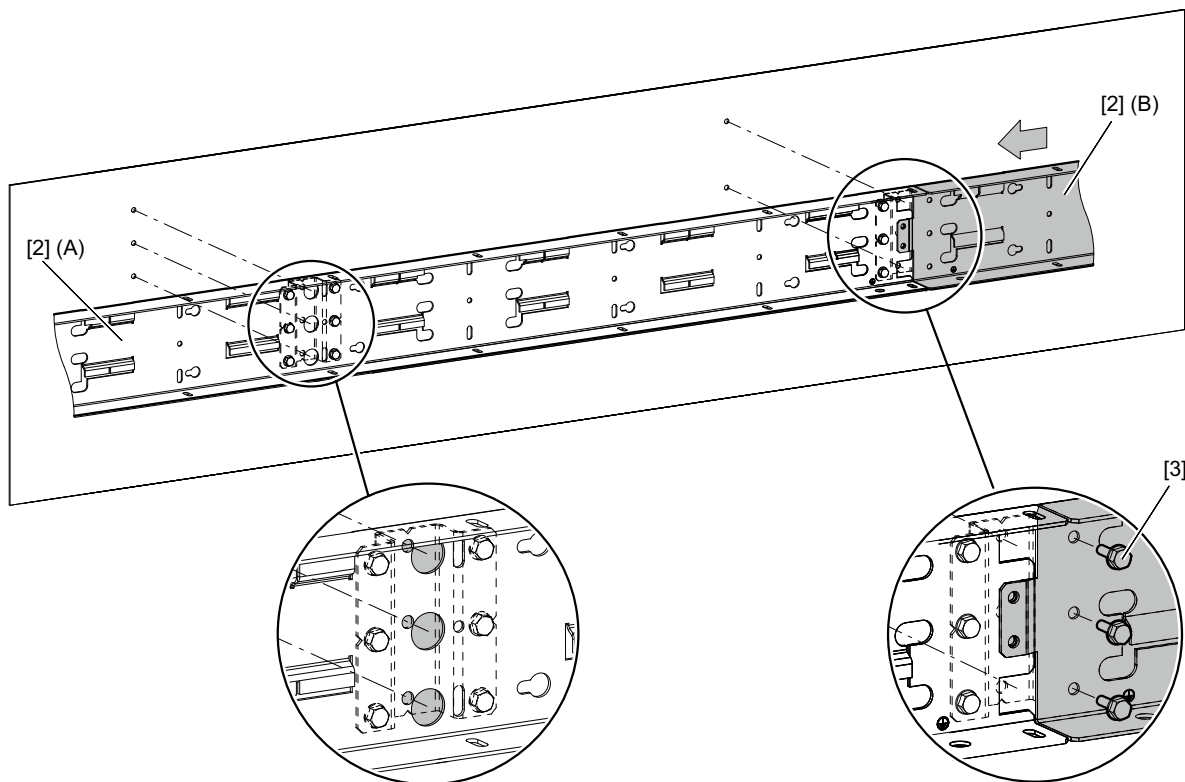
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- [1] Mounting panel
- [2] Straight mounting rail
- [3] Self-tapping screw

1. Depending on the structure of the track, attach 2 or 3 mounting panels [1] to the rear of the mounting rail [2] at the designated positions (start, middle, end).
2. To do this, insert the self-tapping screws [3], which are included in the assembly set, through the designated through holes in the mounting rail [2] from the front.
3. Screw the self-tapping screws [3] into the pre-drilled holes in the mounting rail [2] initially until they are hand-tight. When doing this, the self-tapping screws will cut their own thread.
4. At the central position of the mounting rail, screw all 6 self-tapping screws [3] hand-tight into the arms of the mounting panel [1] as shown in the figure.
5. At the two outer positions, screw 3 self-tapping screws [3] hand-tight into the inner arms of each mounting panel [1] as shown in the figure.

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6. Using the mounting panels [1], screw the mounting rail [2](A) hand-tight to your substructure (e.g. wall) in the desired alignment. The mounting panels are provided with 3 through holes for M6 screws.



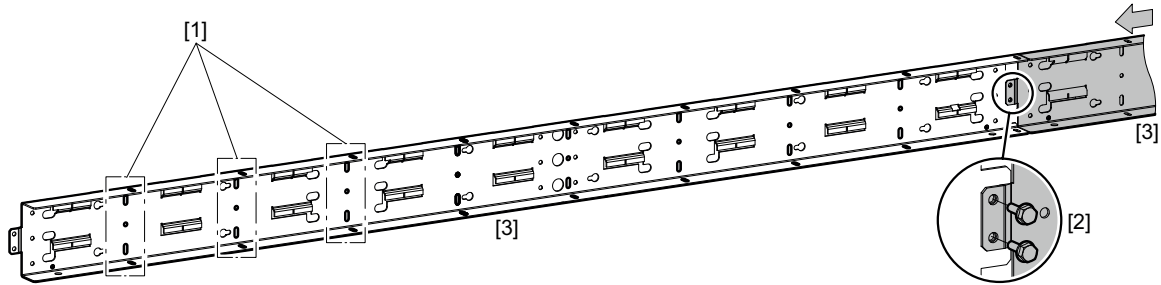
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- [1] Mounting panel
[2] Straight mounting rail
[3] Self-tapping screw

7. Use the tab on the mounting rail to position the mounting rail [2](B) in line with the mounting rail [2](A).
⇒ A 2 mm gap is produced between mounting rail (A) and (B), which is intended to compensate for thermal expansion.
8. Now screw the mounting rail [2](A) hand-tight to the mounting panel [1] by using the remaining 3 self-tapping screws [3].
9. Tighten all of the self-tapping screws [3] with a tightening torque of 6 Nm.
⇒ The protective bonding has been established for mounting rails (A) and (B).
10. Screw the mounting rail [2](A) to the substructure.
11. Repeat this procedure to mount additional mounting rails.

4.1.2 Straight mounting rail without mounting panels

If the mounting rails are to be attached to the substructure without using mounting panels, the protective bonding between two mounting rails must be established by inserting two self-tapping screws into the tab [2].



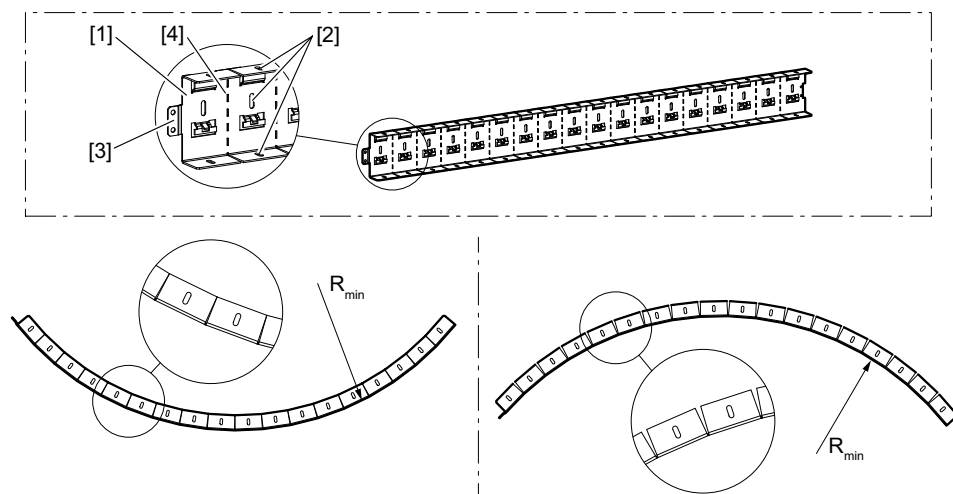
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- [1] Through holes for M6 screws
- [2] Protective bonding via a tab with self-tapping screws
- [3] Straight mounting rail

1. To establish the protective bonding between two mounting rails, screw two self-tapping screws hand-tight through the connecting tabs of the mounting rails [2].
2. Then tighten the self-tapping screws with a tightening torque of 6 Nm.
3. Subsequently, connect the mounting rails to the substructure via the designated through holes [1] in the mounting rail. Be aware of a possible thermal expansion of the mounting rails.

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4.1.3 Curved mounting rail



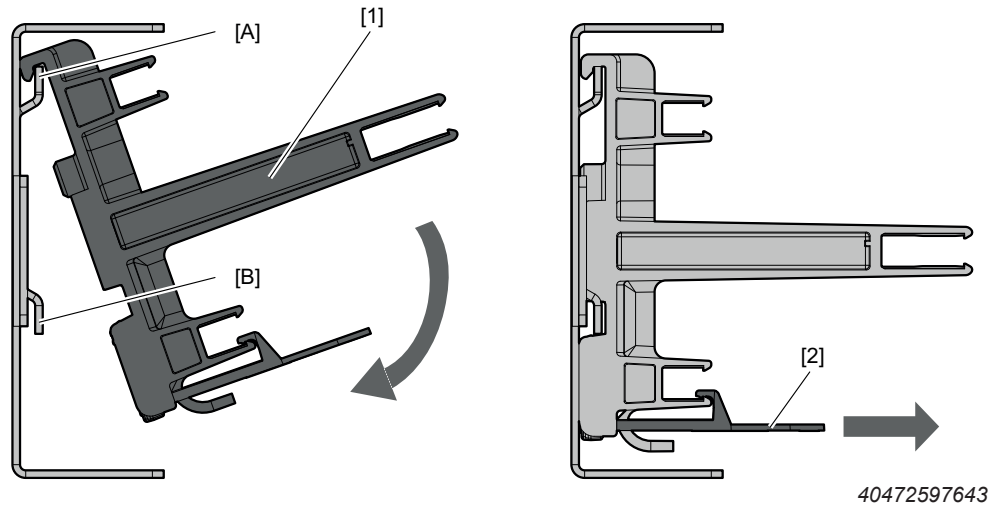
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- [1] Curved mounting rail
- [2] Mounting holes for M6 screws
- [3] Connecting tab
- [4] Bending line

1. Depending on the respective application, use the bending line [4] of the individual segments to bend the curved mounting rail [1] into an inner or outer curve. When doing this, note the minimum bending radius $R_{\min} = 750 \text{ mm}$.
2. Screw the curved mounting rail [1] to your substructure at suitable positions. For this purpose, use the designated mounting holes for M6 screws [2] in the individual segments of the rail. Secure unshortened curved mounting rails at 3 positions (start, middle, end).
3. To establish the protective bonding between two mounting rails, screw two self-tapping screws hand-tight through the connecting tabs [3] of the mounting rails, as described in chapter "Straight mounting rail without mounting panels" (→ 21).
4. Then tighten the self-tapping screws with a tightening torque of 6 Nm.

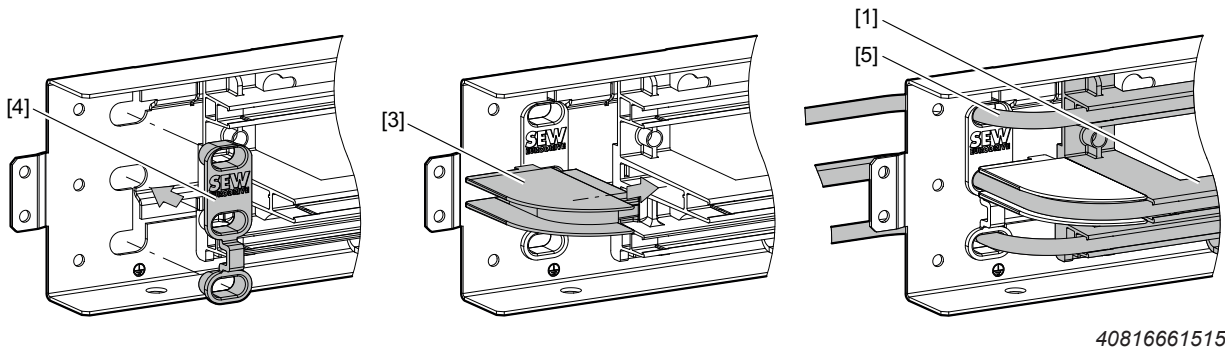
4.2 Assembling the mounting rail

4.2.1 Straight mounting rail



- [A] Upper top hat rail
- [B] Lower top hat rail
- [1] Cable holder for straight tracks
- [2] Locking clip

1. Insert the cable holder [1] into the upper top hat rail [A] of the mounting rail as shown in the figure.
2. Press the cable holder [1] against the bar of the lower top hat rail [B].
3. Pull off the locking clip [2].
⇒ The cable holder [1] snaps into place.

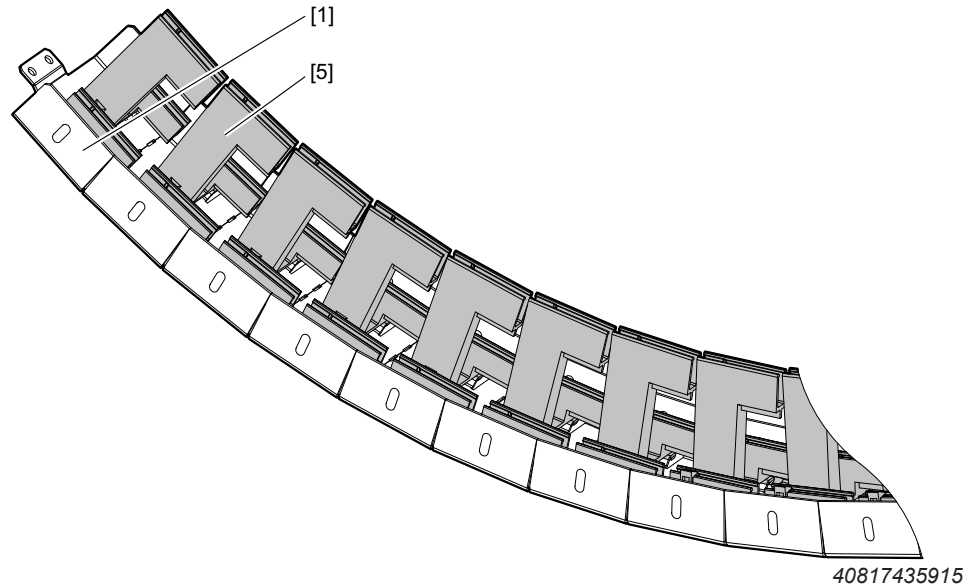


- [1] Cable holder for straight tracks
- [3] Cable entry frame
- [4] Cable bushing
- [5] Line cable

4. In order to be able to feed the line cable [5] through the mounting rail afterwards without damaging it, insert the cable bushing [4] into the designated recesses of the mounting rail.
5. Then slide the cable entry frame [3] onto the cable holder [1], as shown in the figure, until it snaps into place.
6. Press the line cables [5] into the designated grooves of the cable holders [1] and cable entry frames [3].
7. Route the cables through the cable bushing [4].

60 A/25 kHz

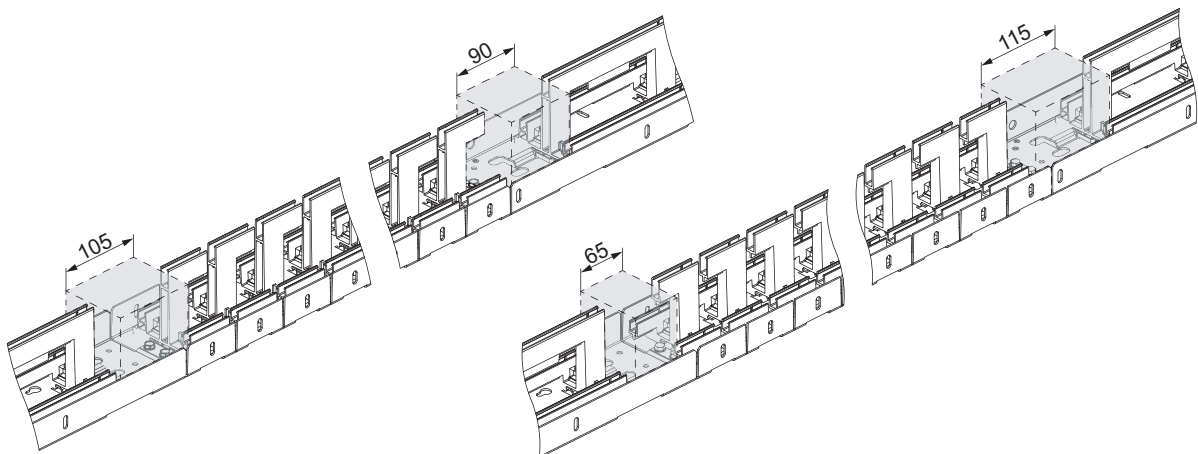
4.2.2 Curved mounting rail



- [1] Curved mounting rail
[5] Cable holder for curved tracks

1. Insert the cable holder for curved tracks [5] into the upper top hat rail of the mounting rail [1].
2. Press the cable holder for curved tracks [5] against the bar of the lower top hat rail.
3. Pull off the locking clip.
⇒ The cable holder for curved tracks [5] snaps into place.
4. Insert a cable holder for curved tracks [5] into each segment of the curved mounting rail [1]. Both designs of the cable holder (right / left) can be used. Note that the selected design must be maintained within a curve.

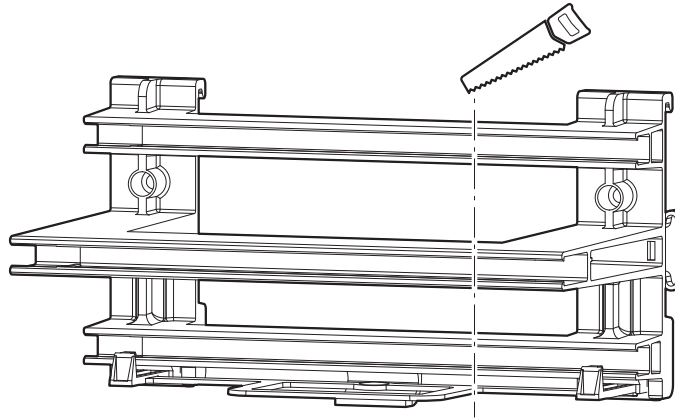
For the curve entry and exit points, you will need a total of one cable holder for straight tracks, which must be cut to the appropriate dimensions in order to fill both of the gaps on the straight mounting rails.



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Depending on the design used (cable holder right / left), you will need either a 105 mm / 90 mm cut or a 65 mm / 115 mm cut.

Proceed as follows:



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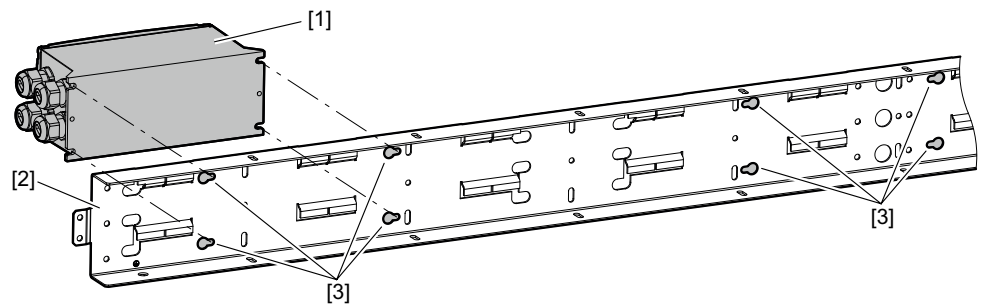
5. For cutting purposes, use a cable holder for straight tracks.
6. Measure the gaps between the cable holders and determine the cut of the cable holder.
7. Cut the cable holder for straight tracks to the required lengths.
8. Insert the cut cable holder into the gaps in the straight mounting rails.

Cable bushings

Preferably, cable bushings should be inserted in the straight mounting rails (see chapter "Straight mounting rail" (→ 23)). Alternatively, a suitable opening for the cable bushing can be reworked in the curved mounting rails.

4.3 Mounting the TCS10B compensation box and the TVS10B connection distributor onto the mounting rail

Depending on your substructure, the TCS10B compensation box (track compensation) [1] and the TVS10B connection distributor [1] can be mounted directly onto the rear of the mounting rail [2]. For this purpose, use the designated keyhole-shaped cut-outs [3] in the mounting rail, M6 screws and M6 nuts and observe a tightening torque of 10 Nm.



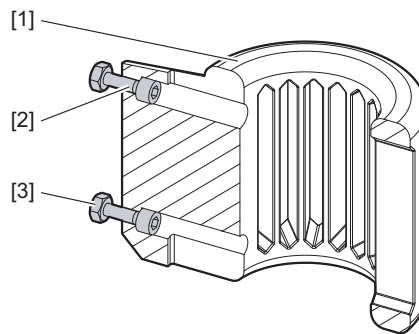
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- [1] TCS10B / TVS10B
- [2] Straight mounting rail
- [3] Keyhole-shaped cut-outs

4.4 Establishing inductive compensation (winding of the coil body)

In the case of very short transmission paths, inductive compensation is required. This inductive compensation is established with the help of the coil body wrapped with line cable. Proceed as follows:

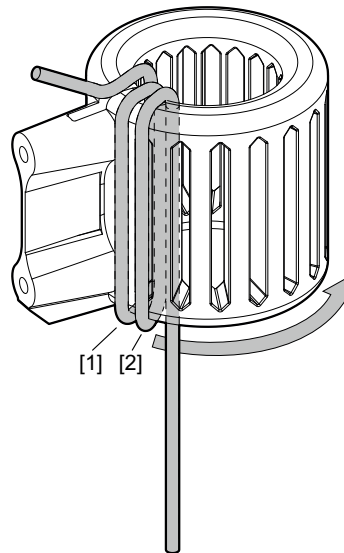
1. Secure the coil body to the substructure by using an M10×40 cap screw [2] and an M10 nut [3] as shown in the figure.
2. Tighten the nuts with a tightening torque of 15 Nm.



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- [1] Coil body
- [2] Cap screw ISO4762 M10x40
- [3] M10 nut

3. Prepare 2 line cables ($1 \times 8 \text{ mm}^2$) with a length of 7 m each. You will need approx. 6 m for one winding. A length of $2 \times 0.5 \text{ m}$ is intended for the connection.
4. Start by running the first line cable to the right of the holding fixture.

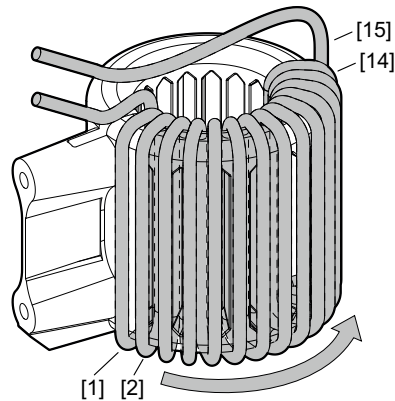


41356375435

- [1] Line cable 1, winding 1
- [2] Line cable 1, winding 2

5. Take the 0.5 m length into account for connecting the TVS10B connection distributor.
6. Pull the line cable through the coil body from above and wrap it once around the body as shown in the figure. Secure the first winding with a cable tie.
7. Position the second winding just to the right of the first winding. Wind the cable as closely as possible along the coil body.

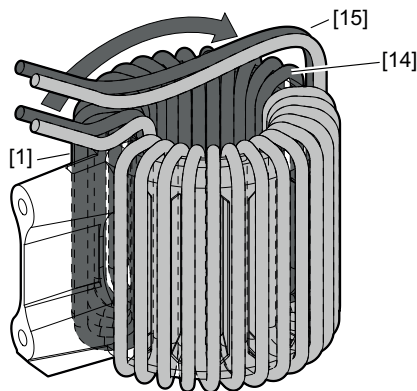
8. Repeat the process until you have reached the 15th winding.



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- [1] Line cable 1, winding 1
- [2] Line cable 1, winding 2
- [14] Line cable 1, winding 14
- [15] Line cable 1, winding 15

9. Now take the second line cable. Start to the left of the holding fixture and wrap 15 windings in a counterclockwise direction.

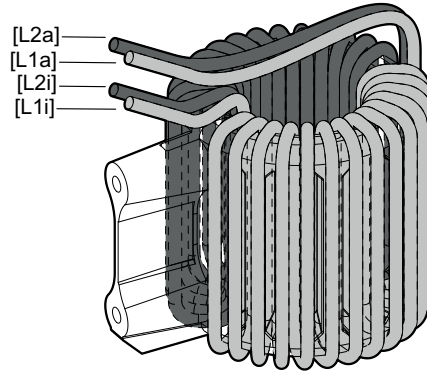


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- [1] Line cable 2, winding 1
- [14] Line cable 2, winding 14
- [15] Line cable 2, winding 15

- ⇒ The starting points of the winding (L1i and L2i) are routed inwards into the coil body. The ends of the winding (L1a and L2a) are routed back outwards.

60 A/25 kHz



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[L2a]	Line cable 2, outwards
[L2i]	Line cable 2, inwards
[L1a]	Line cable 1, outwards
[L1i]	Line cable 1, inwards

4.5 TES31A decentralized supply unit

For detailed information on the mechanical installation, refer to the "MOVITRANS® line TES31A Decentralized Supply Unit" operating instructions.

4.6 TCS31A compensation box (fine compensation)

For information regarding the mechanical installation, refer to the "MOVITRANS® TC-S31A compensation box" operating instructions.

4.7 TVS10B connection distributor and TCS10B compensation box (track compensation)

For information regarding the mechanical installation, refer to the "MOVITRANS® Installation Material TCS, TVS, TLS, TIS" operating instructions.

4.8 THM11C and THM21C pick-up

For information regarding the mechanical installation, refer to the operating instructions: "MOVITRANS® line U-Shaped THM11C/THM21C pick-ups".

5 Electrical installation

5.1 Installation notes

Observe the following points for electrical installation:

- Observe the general safety notes.
- Comply with all instructions referring to the technical data and the permissible conditions where the device is operated.

5.1.1 Preventive measures against electrical hazards

Observe the preventive measures against electrical hazards in the manual: "MOVITRANS® Preventive Measures and Planning Information for Systems".

5.2 Installation notes for the TES31A decentralized supply unit

For information on electrical installation, refer to the "MOVITRANS® line Decentralized Supply Unit TES31A" operating instructions.

5.3 Cable routing

Observe the following points when routing the cables:

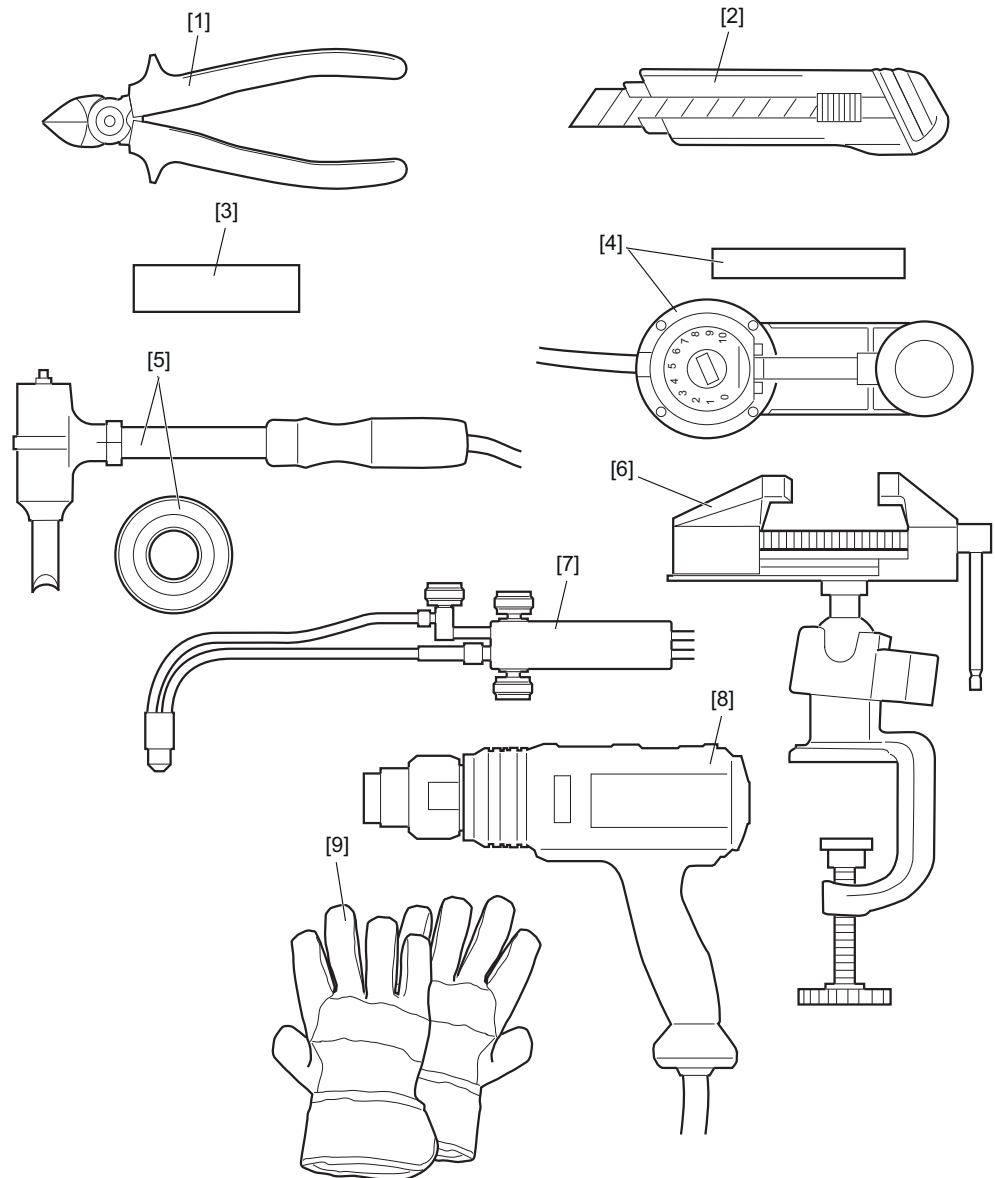
- The power connections are electrically isolated from the housing. When connecting the cables, make sure that stripped cable sections have a minimum distance of 10 mm to bare housing parts.
- To achieve a low routing inductance, route supply cable and return cable closely in parallel to one another. To avoid a change of inductance due to movement of the cables, fasten the cable pair with cable ties.
- You must not crimp the HF litz wire cables. Solder the HF litz wire cables. To ensure conductance of all single conductors, the entire cable cross section has to be tinned. Observe chapter "Assembling the TLS line cables".
- Use cable sleeves to mechanically protect the TLS line cable when it is routed through a mounting panel, see chapter "Available accessories".
- Use suitable cables for connecting the power supply and for communication.
- Route power cables and signal cables in separate cable ducts.
- Provide the greatest possible distance between power cables and signal cables.
- Avoid using long power and signal cables running parallel to one another.
- Route the connection cable with a minimum bending radius of $10 \times$ cable diameter.

60 A/25 kHz

5.4 Assembling cables

5.4.1 Tools

The tools that are required for assembling the TLS line cables are shown below:



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- [1] Diagonal cutting pliers
- [2] Safety knife
- [3] Heat shrink tubing
- [4] Soldering pot
- [5] Hatchet-type soldering iron, alternatively gas torch
- [6] Vise and 2 wooden boards for clamping the cable lugs
- [7] Gas torch, alternatively hatchet-type soldering iron
- [8] Hot air gun
- [9] Work gloves

5.4.2 Assembling the load cable

Cable design



INFORMATION

Note that 2 load cables are required for installation of the TCS31A compensation box (fine compensation). For more information, refer to the operating instructions "MOVITRANS® Compensation Box TCS31A".

The load cable with a cable cross section of $5 \times 6 \text{ mm}^2$ is pre-assembled. The Han® Q 4/2 male insert is mounted and the $5 \times \text{M8}$ cable lugs are crimped (these may also be crimped when cutting to length).

5.4.3 Assembling the supply cable

Cable outlet

The TLS10E006-06-1 supply cable is designed as a six-conductor cable. The six conductors are divided into 3 blue and 3 black conductors. For further information, refer to the "MOVITRANS® Installation Material TCS, TVS, TLS, TIS" operating instructions.

Procedure



INFORMATION

When using cable lugs, observe the size of the respective terminal studs. Use M8 cable lugs in the TCS31A compensation box (fine compensation) and M6 cable lugs in the TVS connection distributors. For cable lug types, refer to chapter "Technical data".



INFORMATION

When assembling the supply cable, the cable lugs can be crimped. Crimping of the cable lugs is permitted for the TLS10E006-06-1 supply cable with a cable cross section of $6 \times 6 \text{ mm}^2$!



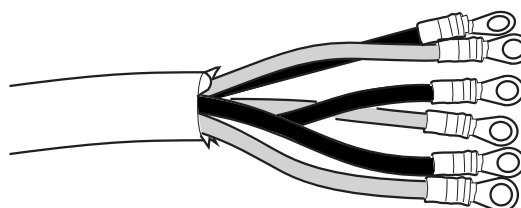
INFORMATION

Always connect the two inner conductors of the transmission path to the blue conductors of the supply cable, and the two outer conductors to the black conductors of the supply cable.

To assemble the supply cable, proceed as follows:

Use a standard tool to crimp each conductor end with a ring cable lug.

The following figure shows the supply cable with ring cable lugs:



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5.4.4 Assembling the line cable

Cable type

The TLS10E008-01-1 line cables that have a cable cross section of 8 mm² are designed as medium-frequency cables. The core of the TLS10E008-01-1 line cable consists of numerous thin stranded wires that are insulated from one another with a layer of enamel. When assembling the line cables, the stranded wires are soldered to a cable lug. Make sure that the individual layers of enamel are fused and that all stranded wires are involved in the conduction of current. Crimping of the cable lugs is not permitted! For further information, refer to the operating instructions "MOVITRANS® Installation Material TCS, TVS, TLS, TIS".

Procedure



INFORMATION

When using cable lugs, observe the size of the respective terminal studs. Use M8 cable lugs in the TCS10B compensation boxes (track compensation) and M6 cable lugs in the TVS connection distributors. For cable lug types, refer to chapter "Technical data".



INFORMATION

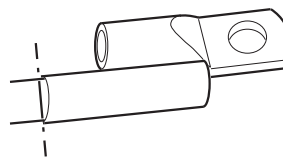
When assembling the line cables, the ends are soldered to a cable lug. Crimping of the cable lugs is not permitted!

If you have a soldering pot available, method 1 is the best for cable assembly: "Cable assembly with soldering pot".

Preparing the cable for soldering

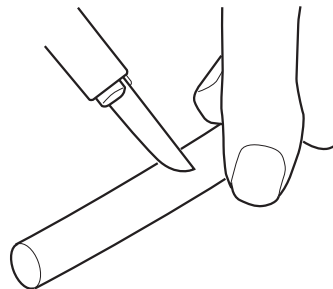
To assemble the line cable, proceed as follows:

1. Slide the heat shrink tubing over the end of the cable.
2. Mark the length that you want to strip.



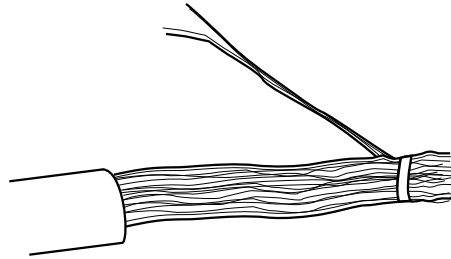
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3. Remove the insulation.



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4. Bundle the stranded wire with an enameled copper wire.

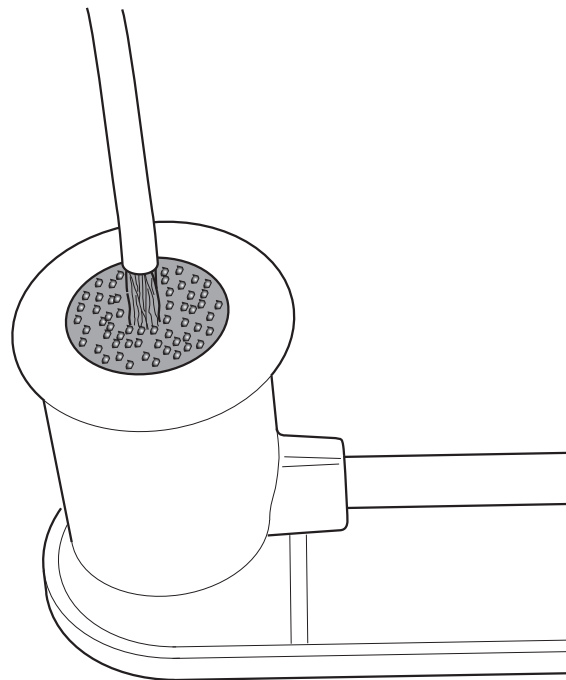


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5. Select one of the following 2 methods to strip the insulation (enamel layer) from the individual wires and solder the cable lug:

Method 1: Cable assembly with soldering pot

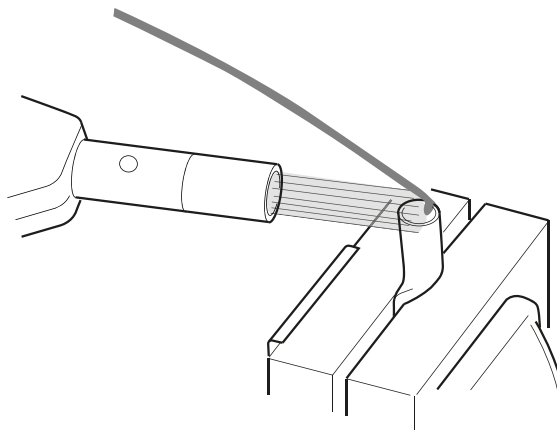
1. **⚠ CAUTION!** Danger of burns due to hot solder. Injury.
Wear heat-resistant gloves when working with a soldering pot, gas torch, or hatchet-type soldering iron.
2. Hold the stripped cable end in the soldering pot until the insulation of the individual wires melts and floats to the top of the soldering cup.



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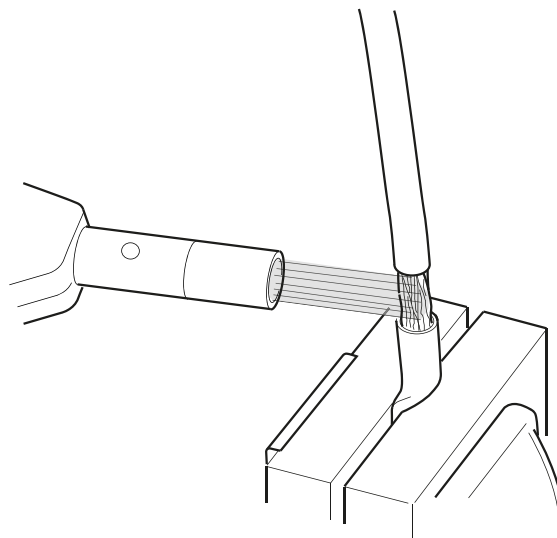
60 A/25 kHz

3. Fill the cable lug with a little solder.



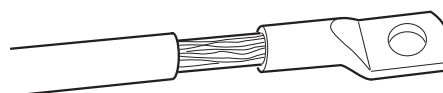
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4. Insert the cable end in the cable lug.
5. Heat the cable lug again with the hatchet-type soldering iron, gas torch or hot air dryer. Add more solder, if necessary.



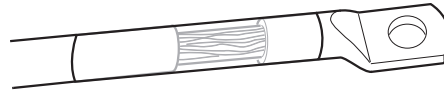
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6. Cut the heat shrink tubing in such a way that it completely covers the insulation of the TLS line cable inside the housing up to the cable gland. For use in UL-approved systems, use UL-approved heat shrink tubing (permitted operating temperature at least 105 °C).
7. Push the heat shrink tubing over the soldering point.



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8. Heat the shrink tubing until it closes tightly around the soldering point.

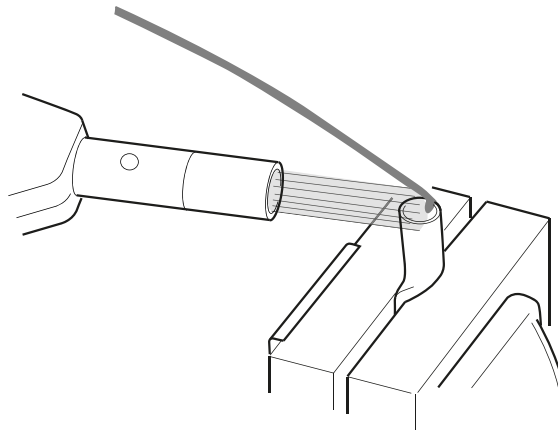


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9. To ensure that the contact surfaces of the cable lug lie flat on the connection surface after assembly, clean the contact surfaces of the cable lug from paint and tin residues.

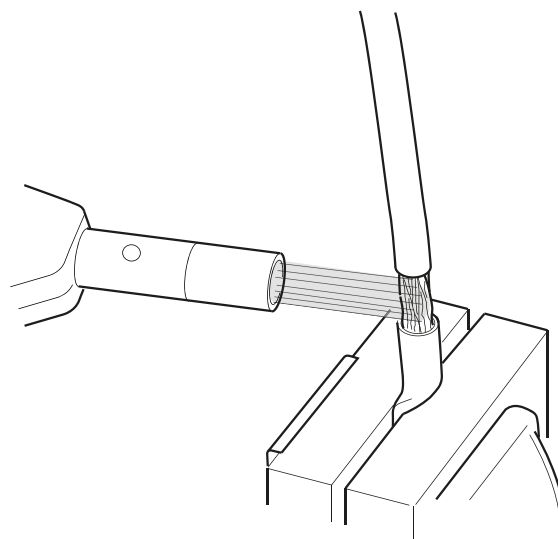
Method 2: Cable assembly without soldering pot

1. **⚠ CAUTION!** Danger of burns due to hot solder. Injury.
Wear heat-resistant gloves when working with a with soldering pot, gas torch, or hatchet-type soldering iron.
2. Fill the cable lug with a little solder:



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3. Insert the stripped cable end in the cable lug.
4. Heat the cable lug with the hatchet-type soldering iron, gas torch or hot air dryer until the insulation of the individual wires melts and leaks out of the cable lug as brown waste. Add more solder, if necessary.

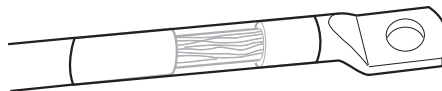


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5. Remove the waste.
6. Push the shrinking tube over the soldering point.

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7. Heat the shrink tubing with the hot air dryer until it closes tightly around the soldering point.

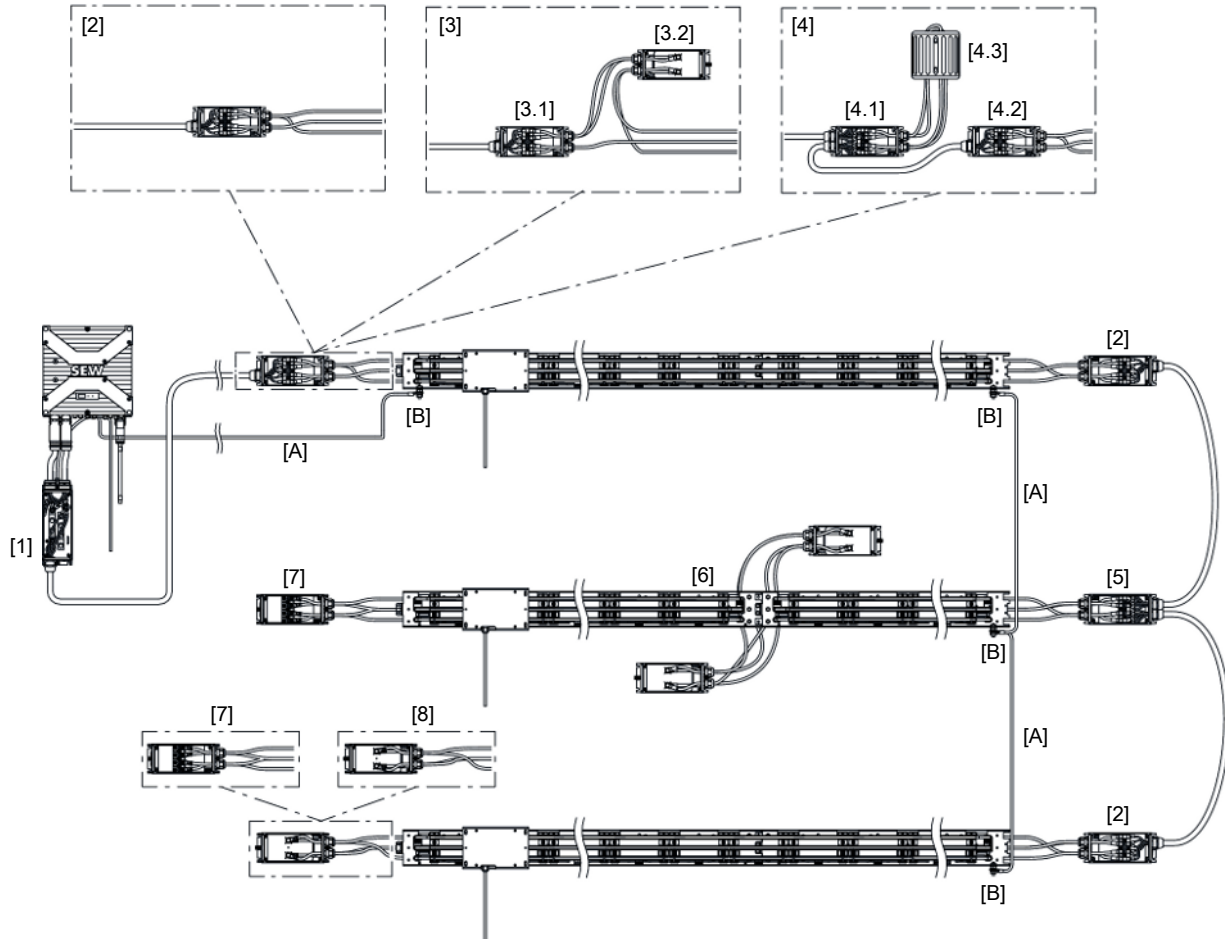


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8. Remove any coating and solder residue from the contact surfaces of the cable lug so that the lug is flush with the connection surface after assembly.

5.5 Installation of compensation boxes and connection distributors

The figure shows the possible locations of the TCS31A compensation box (fine compensation), the TCS10C compensation box (track compensation), and the TVS10B connection distributor.



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- [1] Installation 1: Fine compensation
- [2] Installation 2: Start of track without compensation
- [3] Installation 3: Start of track with capacitive compensation
- [4] Installation 4: Start of track with inductive compensation
- [5] Installation 5: Series connection of track sections
- [6] Installation 6: Capacitive compensation and balancing within the transmission path
- [7] Installation 7: End of track without compensation
- [8] Installation 8: End of track with capacitive compensation
- [A] Protective earth 16 mm²
- [B] Mounting rail grounding point

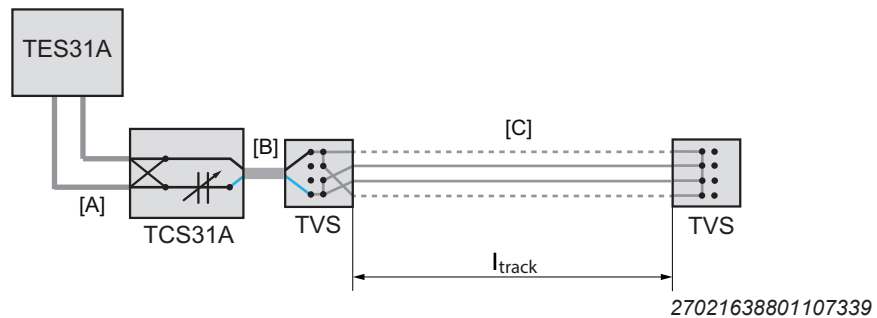
5.5.1 Information regarding compensation

As the length of the transmission path increases, its inductance also increases. Compensation capacities are connected in series to compensate this inductive reactance. Low inductance levels are balanced using the TCS31A compensation box (fine compensation) [1]. For larger inductance levels, additional TCS10B compensation boxes (track compensation) [3], [6] and [8] are required. In the case of very short transmission paths, inductive compensation [4] is required.

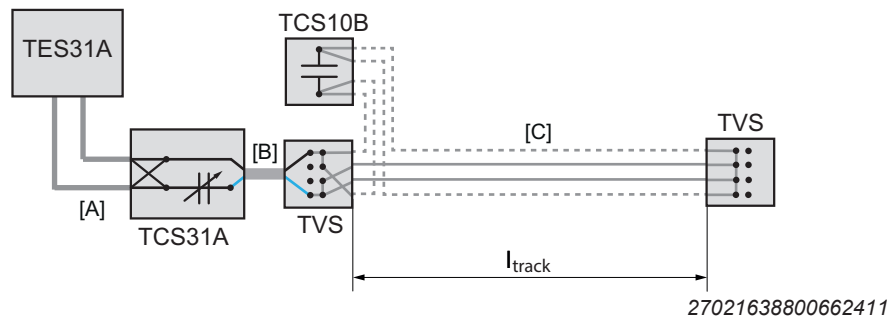
Capacitive compensation

The following figures show examples of different transmission paths:

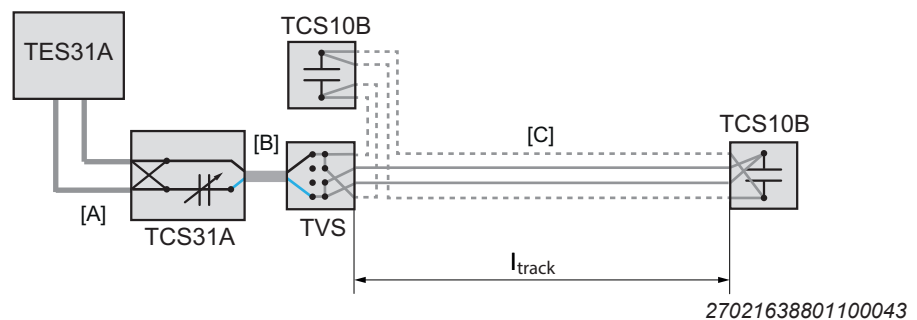
No TCS10B compensation box → 2 x TVS connection distributors

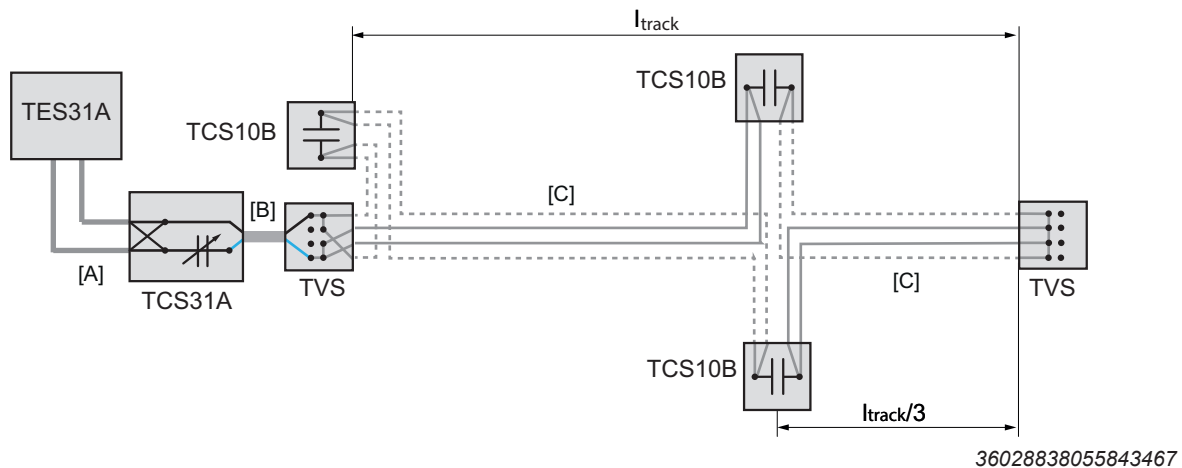
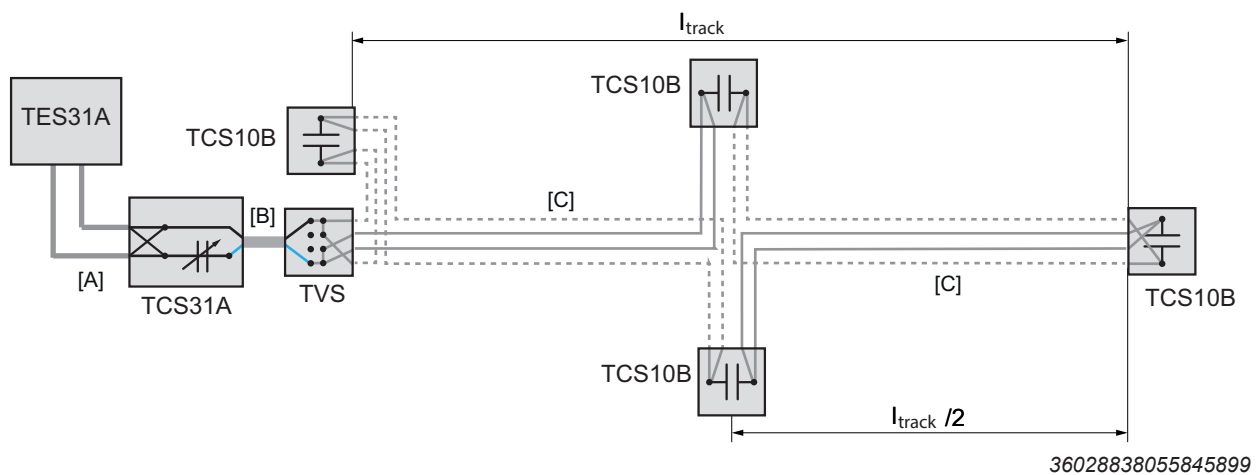


1 x TCS10B compensation box → 2 x TVS connection distributors



2 x TCS10B compensation boxes → 1 x TVS connection distributor



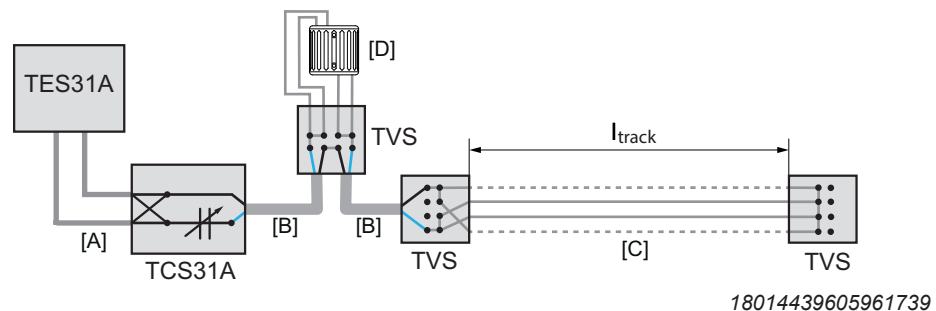
3 x TCS10B compensation boxes → 2 x TVS connection distributors**4 x TCS10B compensation boxes → 1 x TVS connection distributor**

- [A] 2 x load cables ($5 \times 6 \text{ mm}^2$ including PE)
 [B] Supply cable ($6 \times 6 \text{ mm}^2$ without PE)
 [C] 4 x TLS line cables ($1 \times 8 \text{ mm}^2$)

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Inductive compensation**Inductive compensation with coil body → 3 TVS connection distributors**

Inductive compensation [D] is required for very short transmission paths. In this case, you do not need a TCS10B compensation box.



- [A] 2 load cables ($5 \times 6 \text{ mm}^2$ including PE)
 [B] Supply cable ($6 \times 6 \text{ mm}^2$ without PE)
 [C] 4 TLS line cables ($1 \times 8 \text{ mm}^2$)
 [D] Inductive compensation: Coil body wrapped with line cable

5.5.2 Preparation and cabling of compensation boxes and connection distributors

Cabling and cable glands

The following table describes the cabling and cable glands that are required for the respective location:

Installation	Compensation box and connection distributor	Cabling	Cable glands required
[1]*	TCS31A-EA8-XXX-0	2 × load cables + 1 × supply cable	1 × M32 cable gland 2 × M32 EMC cable glands
[2], [3.1], [4.2]	TVS10B-E06-000-1	1 × supply cable + 4 × line cables	1 × M32 cable gland 4 × M25 / M20 thread reducers 4 × M20 cable glands
[4.1], [5]	TVS10B-E06-000-1	2 × supply cable + 4 × line cables	2 × M32 cable gland 4 × M25 / M20 thread reducers 4 × M20 cable glands
[7]	TVS10B-E06-000-1	4 × line cables	4 × M25 / M20 thread reducers 4 × M20 cable glands
[3.2]	TCS10B-EA6-090-1 TCS10B-EA8-209-1	4 × line cables	4 × M25 / M20 thread reducers 4 × M20 cable glands
[6], [8]	TCS10B-EA6-090-1	4 × line cables	4 × M25 / M20 thread reducers 4 × M20 cable glands

*TCS-Pack 3 with the following part number is available for installation of the fine compensation element: 28262565.

Sets with cable glands and thread reducers can be found in chapter: "Cable glands and thread reducers" (→ 62).

Opening and closing compensation boxes and connection distributors

Opening the device

To open the device, proceed as follows:

1. Loosen the 4 × M5 hex head screws on the housing cover.

Closing the device

To close the device, proceed as follows:

2. Attach the housing cover including the gasket using the 4 M5 hex head screws and a tightening torque of 3.1 – 3.5 Nm.
3. To ensure the IP65 degree of protection, you must ensure that:
 - ⇒ the cover seal is fitted correctly
 - ⇒ the cover screws are securely tightened
 - ⇒ the cable gland sealing inserts are of a practical shape and size
 - ⇒ the cable gland securely surrounds the cable without any leaks when closing.

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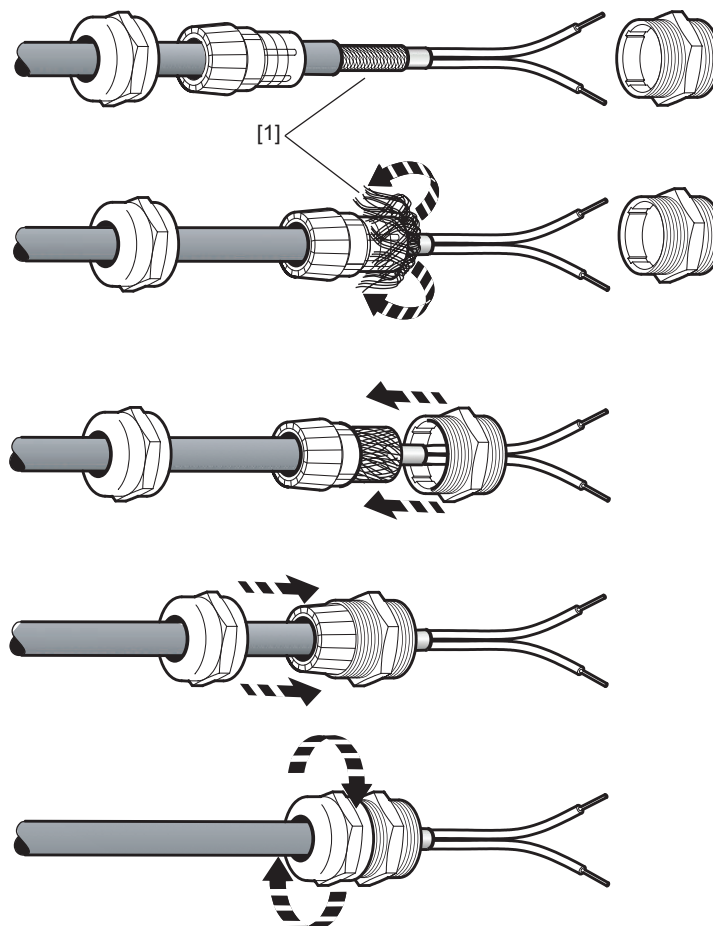
Attaching the cable glands

First, unscrew the factory-installed blanking plugs at the required positions and attach the cable glands that are available as accessories.

Use M32 EMC cable glands to feed through the two load cables.

Assembly of EMC cable glands

Install EMC screw fittings supplied by SEW-EURODRIVE according to the following figure:



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[1] Fold back the braided shield and trim to the correct length.

Use M32 plastic cable glands to feed through the TLS10E006-06-1 supply cable.

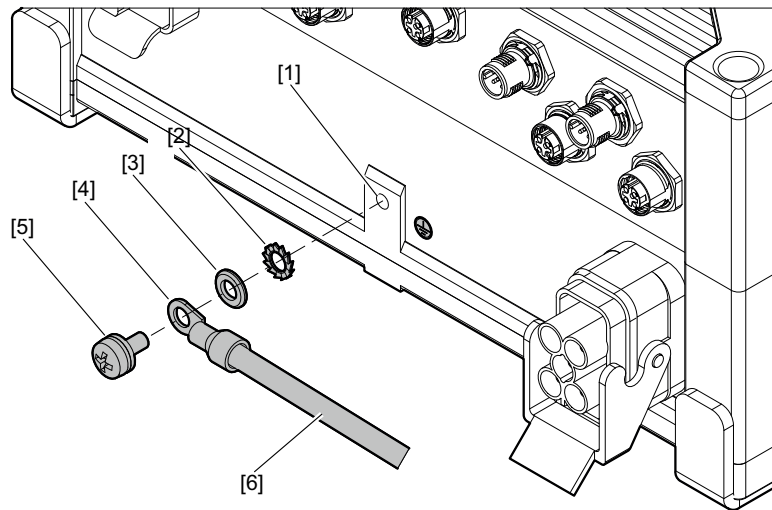
Use M20 plastic cable glands with the reduction M25 to M20 to feed through the TLS10E008-01-1 line cable.

5.5.3 Protective bonding

Connect the grounding point of the TES31A decentralized supply unit to the TCS31A compensation box (fine compensation) and the mounting rail. Protective bonding must be established for each section of the transmission path. Observe the preventive measures against electrical hazards in the manual: "MOVITRANS® Preventive Measures and Planning Information for Systems".

Protective bonding of the TES31A decentralized supply unit

To establish the protective bonding of the TES31A decentralized supply unit, proceed as follows:



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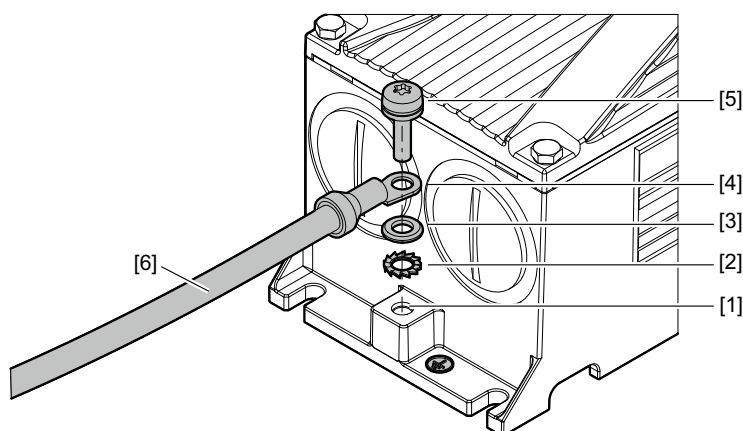
- [1] Protective bonding connection
- [2] Serrated lock washer
- [3] Washer
- [4] M6 ring cable lug
- [5] M6 screw and washer assembly
- [6] Protective earth 16 mm²

1. Loosen the M6 screw and washer assembly [5] at the protective bonding connection of the TES31A decentralized supply unit [1].
2. Place the M6 ring cable lug [4] of the 16 mm² protective earth [6] onto the washer [3].
3. Make sure that the washer [3] is positioned on top of the serrated lock washer [2].
4. Tighten the M6 screw and washer assembly [5] with a tightening torque of 3.5 Nm.
5. Using the shortest possible route, connect the protective earth [6] to the protective bonding connection of the TCS31A compensation box (fine compensation) or the grounding point of the mounting rail.

60 A/25 kHz

Protective bonding of the TCS31A compensation box (fine compensation)

To establish the protective bonding of the TCS31A compensation box (fine compensation), proceed as follows:



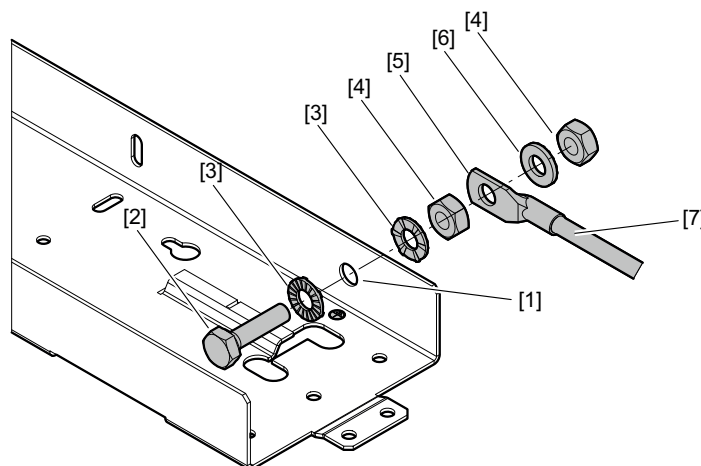
40860647947

- [1] Protective bonding connection
- [2] Serrated lock washer
- [3] Washer
- [4] M6 ring cable lug
- [5] M6 screw and washer assembly
- [6] Protective earth 16 mm²

1. Loosen the M6 screw and washer assembly [5] at the protective bonding connection of the TCS31A compensation box (fine compensation) [1].
2. Place the M6 ring cable lug [4] of the 16 mm² protective earth [6] onto the washer [3].
3. Make sure that the washer [3] is positioned on top of the serrated lock washer [2].
4. Tighten the M6 screw and washer assembly [5] with a tightening torque of 3.5 Nm.
5. Using the shortest possible route, connect the protective earth to the protective bonding connection of the TES31A decentralized supply unit.

Protective bonding of the mounting rail

Observe the required grounding points of the mounting rail according to chapter "Installation of compensation boxes and connection distributors" (→ 37). To establish the protective bonding of the mounting rail, proceed as follows:



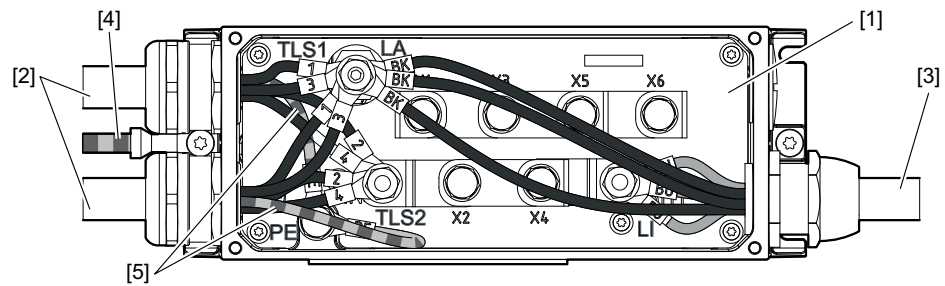
40299569291

- [1] Mounting rail grounding point
- [2] M10 hex head screw
- [3] Detent-edged washer (Teckentrup NSK K10) (note its alignment)
- [4] M10 hex nut
- [5] M10 ring cable lug
- [6] Detent-edged washer (Teckentrup NSK E10)
- [7] Protective earth 16 mm²

1. Slide a detent-edged washer [3] onto the M10 hex head screw [2]. When doing this, ensure the serrations of the washer are facing the neck of the screw.
2. Insert the prepared screw into the grounding point of the mounting rail [1] from the inside.
 - ⇒ The serrations of the detent-edged washer [3] are now in contact with the mounting rail.
3. Thread another detent-edged washer [3] onto the M10 hex head screw [2] from the outside (with the serrations facing the mounting rail) and tighten the screw using an M10 hex nut [4].
4. Thread the M10 ring cable lug [5] of the 16 mm² protective earth [7] and a detent-edged washer [6] onto the M10 hex head screw [2] and secure everything in place by using another M10 hex nut [4] and applying a tightening torque of 18 Nm.
5. Using the shortest possible route, connect the protective earth to the protective bonding connection of the TES31A decentralized supply unit or the grounding point of another track section.

60 A/25 kHz

5.5.4 Installation 1: Fine compensation



40314258187

- [1] TCS31A compensation box (fine compensation)
- [2] Load cables
- [3] Supply cable
- [4] Protective earth 16 mm²
- [5] Protective earths of the load cables

Inside the TCS31A compensation box (fine compensation) [1] there are 3 x M8 stud bolts (TLS1, TLS2, LI) for connecting the load cables [2] and the supply cable [3], as well as 1 x M8 screw and washer assembly (PE) for connecting the earth conductors [5].

Connecting load cables

Proceed as follows to connect the load cables [2]:

1. Route the 2 load cables through the M32 EMC cable glands on the left. Observe the information in chapter "Preparation and cabling of compensation boxes and connection distributors" (→ 40).
2. Connect the conductors 1 and 3 of the load cables to connection point TLS1, and the conductors 2 and 4 to connection point TLS2.
3. Tighten the M8 nuts with a tightening torque of 12 Nm.
4. Position the green/yellow protective earths [5] on the PE connection point.
5. Tighten the M8 screw and washer assembly with a tightening torque of 12 Nm.

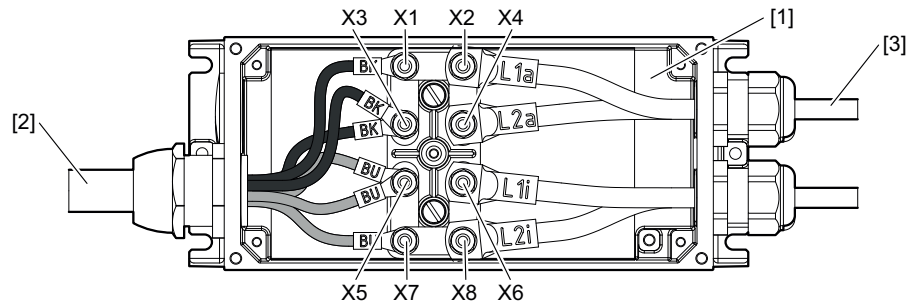
Connecting the supply cable

Proceed as follows to connect the supply cable [3]:

1. Route the supply cable through the M32 cable gland on the right.
2. Position the 3 black conductors (BK) on connection point TLS1 and the 3 blue conductors (BU) on connection point LI.
3. Tighten the M8 screw and washer assembly with a tightening torque of 12 Nm.

In the TCS31A compensation box (fine compensation), the capacitive compensation is set by connecting the jumpers between X1 – X6. For further information about the various setting options, refer to the operating instructions: "MOVITRANS® TCS31A Compensation Box".

5.5.5 Installation 2: Start of track without compensation



40314260619

- [1] TVS10B-E06-000-1
- [2] Supply cable
- [3] Line cable

Inside the TVS10B connection distributor [1] there are 8 × M6 stud bolts (X1 to X8) for connecting the cables. Connect the connection points X3 and X1, X1 and X2, X2 and X4, X5 and X7, X7 and X8, as well as X8 and X6 to the connection jumpers that are included in the scope of delivery, as shown in the figure. Use 2 connection jumpers on top of each other in each case.

Connecting the supply cable

Proceed as follows to connect the supply cable [2]:

1. Route the supply cable through the M32 cable gland on the left.
2. Position 1 black conductor (BK) on connection point X1 and 2 black conductors (BK) on connection point X3.
3. Position 2 blue conductors (BU) on connection point X5 and 1 blue conductor (BU) on connection point X7.
4. Tighten the M6 nuts with a tightening torque of 3.0 Nm.

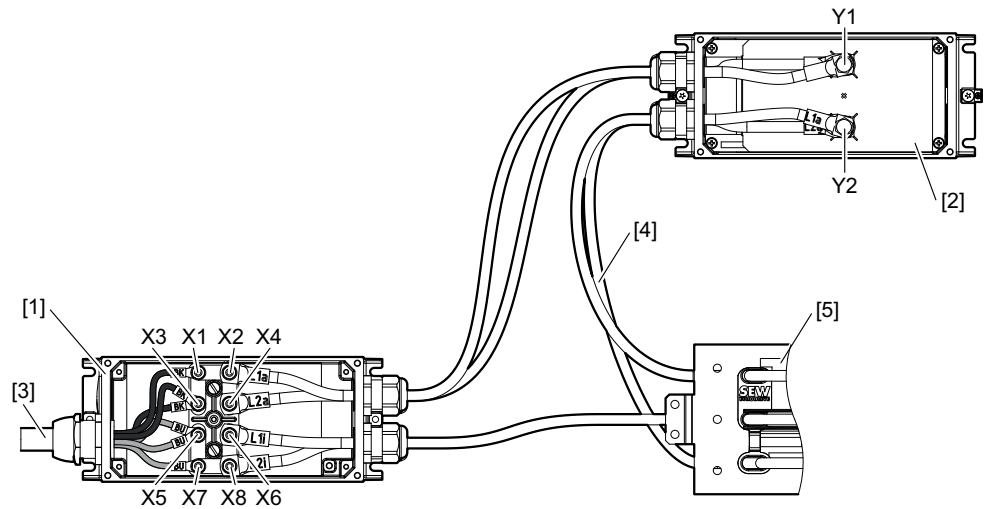
Connecting the line cable

Proceed as follows to connect the line cable [3]:

1. Route each line cable through an M20 cable gland on the right.
2. Connect the outer conductor L1a to connection point X2 and the outer conductor L2a to connection point X4.
3. Connect the inner conductor L1i to connection point X6 and the inner conductor L2i to connection point X8.
4. Tighten the M6 nuts with a tightening torque of 3.0 Nm.

60 A/25 kHz

5.5.6 Installation 3: Start of track with capacitive compensation



40314255755

- [1] TVS10B-E06-000-1
- [2] TCS10B-EA6-090-1 or TCS10B-EA8-209-1
- [3] Supply cable
- [4] Line cable
- [5] Transmission path

Inside the TVS10B connection distributor [1] there are 8 × M6 stud bolts (X1 to X8) for connecting the cables. Connect the connection points X3 and X1, X1 and X2, X2 and X4, X5 and X7, X7 and X8, as well as X8 and X6 to the connection jumpers that are included in the scope of delivery, as shown in the figure. Use 2 connection jumpers on top of each other in each case.

Inside the TCS10B compensation box (track compensation) [2] there are 2 × M8 screw and washer assemblies (Y1 to Y2) for connecting the cables.

Connecting the supply cable

Proceed as follows to connect the supply cable [3] to the TVS10B connection distributor [1]:

1. Route the supply cable through the M32 cable gland on the left.
2. Position 1 black conductor (BK) on connection point X1 and 2 black conductors (BK) on connection point X3.
3. Position 2 blue conductors (BU) on connection point X5 and 1 blue conductor (BU) on connection point X7.
4. Tighten the M6 nuts with a tightening torque of 3.0 Nm.

Connecting the line cable

Proceed as follows to connect the line cable [4] to the TVS10B connection distributor [1]:

1. Route each line cable through an M20 cable gland on the right.
2. Connect the outer conductor L1a to connection point X2 and the outer conductor L2a to connection point X4.

3. Connect the inner conductor L1i to connection point X6 and the inner conductor L2i to connection point X8.
4. Tighten the M6 nuts with a tightening torque of 3.0 Nm.

Connecting inner conductors and outer conductors

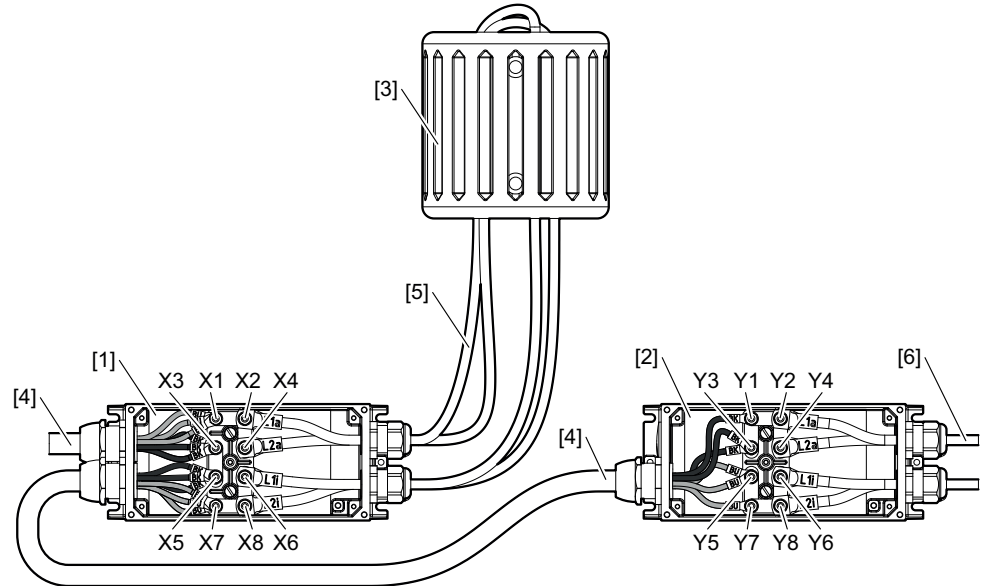
The 2 inner conductors L1i and L2i are routed directly to the track. The 2 outer conductors L1a and L2a are connected to the TCS10B compensation box (track compensation) [2]. Proceed as follows:

1. Route each line cable through an M20 cable gland on the left.
2. Connect the 2 outer conductors L1a and L2a that come from the TVS10B connection distributor [1] to connection point Y1 on the TCS10B compensation box (track compensation) [2].
3. Connect the 2 outer conductors L1a and L2a that run towards the track to connection point Y2 on the TCS10B compensation box (track compensation) [2].
4. Tighten the M8 screw and washer assemblies with a tightening torque of 9.0 Nm.

60 A/25 kHz

5.5.7 Installation 4: Start of track with inductive compensation

Inductive compensation is established with the help of a coil body that is wound with line cable. For further information, refer to chapter: "Establishing inductive compensation (winding of the coil body)" (→ 26).



40314253323

- [1] TVS10B-E06-000-1
- [2] TVS10B-E06-000-1
- [3] Coil body
- [4] Supply cable
- [5] Line cable of the coil body
- [6] Line cable

Inside the TVS10B connection distributor [1] there are 8 × M6 stud bolts (X1 to X8) for connecting the cables. Connect the connection points X1 and X2, X2 and X4, X3 and X5, X7 and X8, as well as X8 and X6 to the connection jumpers that are included in the scope of delivery of the TVS10B connection distributor, as shown in the figure. Use 2 connection jumpers on top of each other in each case.

Inside the second TVS10B connection distributor [2] there are 8 × M6 stud bolts (Y1 to Y8) for connecting the cables. Connect the connection points Y3 and Y1, Y1 and Y2, Y2 and Y4, Y5 and Y7, Y7 and Y8, as well as Y8 and Y6 to the connection jumpers that are included in the scope of delivery, as shown in the figure. Use 2 connection jumpers on top of each other in each case.

Connecting the line cable of the coil body to the TVS10B connection distributor [1]

Before connecting the line cable of the coil body, wind the line cable around the coil body as described in chapter "Establishing inductive compensation (winding of the coil body)" (→ 26). Use suitable M6 ring cable lugs.

At the starting point of the winding, the line cables L1i and L2i are routed inwards into the coil body. At the end of the winding, L1a and L2a are routed back outwards.

Proceed as follows to connect the line cable [5] of the coil body to the TVS10B connection distributor [1]:

1. Route each line cable through an M20 cable gland on the right.
2. Connect the outer conductor L1a to connection point X2 and the outer conductor L2a to connection point X4.

3. Connect the inner conductor L1i to connection point X6 and the inner conductor L2i to connection point X8.
4. Tighten the M6 nuts with a tightening torque of 3.0 Nm.

Connecting supply cables to the TVS10B connection distributor [1]

Proceed as follows to connect the 2 supply cables [4] to the TVS10B connection distributor [1]:

1. Route each supply cable each through an M32 cable gland on the left.
2. Position 3 black conductors (BK) on each of the connection points X3 and X5.
3. Position 3 blue conductors (BU) on each of the connection points X1 and X7.
4. Tighten the M6 nuts with a tightening torque of 3.0 Nm.

Connecting supply cables to the TVS10B connection distributor [2]

Proceed as follows to connect the supply cable [4] to the TVS10B connection distributor [2]:

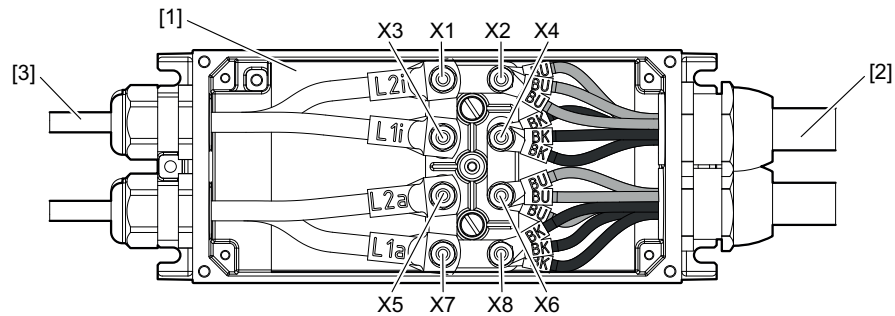
1. Route the supply cable through the M32 cable gland on the left.
2. Position 1 black conductor (BK) on connection point Y1 and 2 black conductors on connection point Y3.
3. Position 2 blue conductors (BU) on connection point Y5 and 1 blue conductor on connection point Y7.
4. Tighten the M6 nuts with a tightening torque of 3.0 Nm.

Connecting the line cable to the TVS10B connection distributor [2]

Proceed as follows to connect the line cable [6] to the TVS10B connection distributor [2]:

1. Route each line cable through an M20 cable gland on the right.
2. Connect the outer conductor L1a to connection point Y2 and the outer conductor L2a to connection point Y4.
3. Connect the inner conductor L1i to connection point Y6 and the inner conductor L2i to connection point Y8.
4. Tighten the M6 nuts with a tightening torque of 3.0 Nm.

5.5.8 Installation 5: Series connection of track sections



40314263051

- [1] TVS10B-E06-000-1
 [2] Supply cable
 [3] Line cable

Inside the TVS10B connection distributor [1] there are 8 × M6 stud bolts (X1 to X8) for connecting the cables. Connect the connection points X3 and X1, X1 and X2, X4 and X6, X5 and X7, as well as X7 and X8 to the connection jumpers that are included in the scope of delivery of the TVS10B connection distributor, as shown in the figure. Use 2 connection jumpers on top of each other in each case.

Connecting the supply cable

Proceed as follows to connect the 2 supply cables [2] to the TVS10B connection distributor [1]:

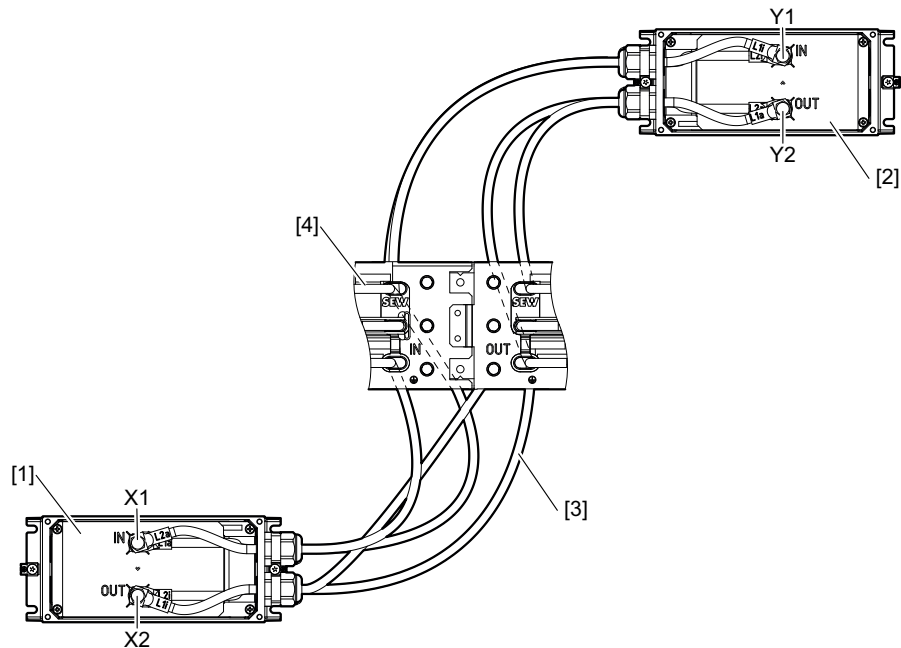
1. Route the supply cable through the M32 cable gland on the right.
2. Position 3 black conductors (BK) on each of the connection points X4 and X8.
3. Position 3 blue conductors (BU) on each of the connection points X2 and X6.
4. Tighten the M6 nuts with a tightening torque of 3.0 Nm.

Connecting the line cable

Proceed as follows to connect the line cable [3] to the TVS10B connection distributor [1]:

1. Route each line cable through an M20 cable gland on the left.
2. Connect the outer conductor L1a to connection point X7 and the outer conductor L2a to connection point X5.
3. Connect the inner conductor L1i to connection point X3 and the inner conductor L2i to connection point X1.
4. Tighten the M6 nuts with a tightening torque of 3.0 Nm.

5.5.9 Installation 6: Capacitive compensation and balancing within the transmission path



40314265483

- [1] TCS10B-EA6-090-1
- [2] TCS10B-EA6-090-1
- [3] Line cable
- [4] Junction point of the "In" and "Out" mounting rails

Inside each of the TCS10B compensation boxes (track compensation) [1] / [2] there are 2 x M8 screw and washer assemblies (X1 – X2 and Y1 – Y2) for connecting the line cables.

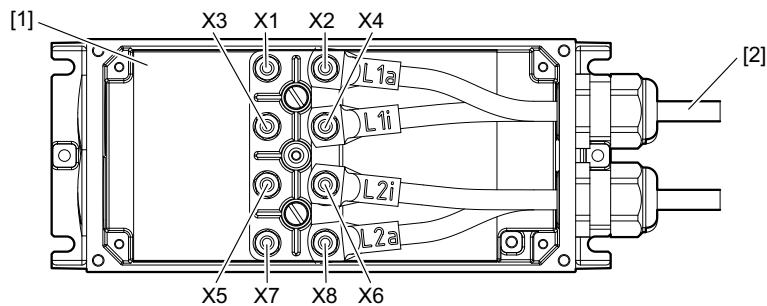
Connecting the line cable

Proceed as follows to connect the line cables [3] to the TCS10B compensation boxes (track compensation) [1] / [2]:

1. Route each line cable through an M20 cable gland.
2. Connect the two inner conductors L1i and L2i that come from the "Out" mounting rail to connection point X2 on the TCS10B compensation box (track compensation) [1].
3. Connect the two outer conductors L1a and L2a that come from the "Out" mounting rail to connection point Y2 on the TCS10B compensation box (track compensation) [2].
4. Connect the two outer conductors L1a and L2a that run towards the "In" mounting rail to connection point X1 on the TCS10B compensation box (track compensation) [1].
5. Connect the two inner conductors L1i and L2i that run towards the "In" mounting rail to connection point Y1 on the TCS10B compensation box (track compensation) [2].
6. Tighten the M8 screw and washer assemblies with a tightening torque of 9.0 Nm.

60 A/25 kHz

5.5.10 Installation 7: End of track without compensation



40314267915

[1] TVS10B-E06-000-1

[2] Line cable

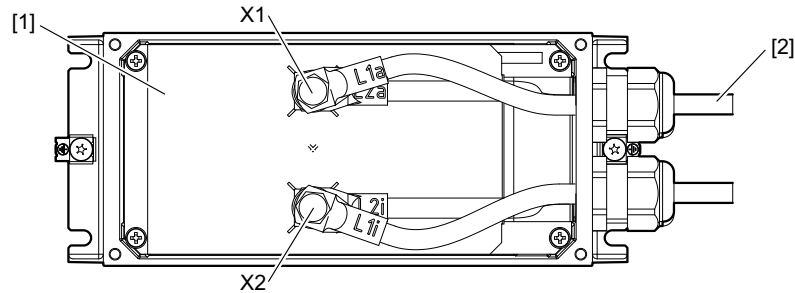
Inside the TVS10B connection distributor [1] there are $8 \times M6$ stud bolts (X1 to X8) for connecting the cables. Connect the connection points X2 and X4, X4 and X6, as well as X6 and X8 to the connection jumpers that are included in the scope of delivery of the device, as shown in the figure. Use 2 connection jumpers on top of each other in each case.

Connecting the line cable

Proceed as follows to connect the line cables [2]:

1. Route each line cable through an M20 cable gland on the right.
2. Connect the outer conductor L1a to connection point X2 and the outer conductor L2a to connection point X8.
3. Connect the inner conductor L1i to connection point X4 and the inner conductor L2i to connection point X6.
4. Tighten the M6 nuts with a tightening torque of 3.0 Nm.

5.5.11 Installation 8: End of track with capacitive compensation



40314270347

[1] TCS10B-EA6-090-1

[2] Line cable

Inside the TCS10B compensation box (track compensation) [1] there are 2 x M8 screw and washer assemblies (X1 – X2) for connecting the cables.

Connecting the line cable

Proceed as follows to connect the line cables [2]:

1. Route each line cable through an M20 cable gland on the right.
2. Connect the outer conductors L1a and L2a to connection point X1 and the inner conductors L1i and L2i to connection point X2.
3. Tighten the M8 screw and washer assemblies with a tightening torque of 9.0 Nm.

5.6 Installation notes for the TCS31A compensation box (fine compensation)

For additional information regarding the electrical installation, refer to the operating instructions "MOVITRANS® Compensation Box TCS31A".

5.7 Installation notes for the TVS10B connection distributor and TCS10B compensation box (track compensation)

For information regarding the electrical installation, refer to the operating instructions "MOVITRANS® Installation Material TCS, TVS, TLS, TIS".

5.8 Installation notes for THM11C and THM21C pick-ups

For additional information regarding the electrical installation, refer to the operating instructions: "MOVITRANS® line U-Shaped THM11C/THM21C pick-ups".

60 A/25 kHz

6 Operation

6.1 Before you start

Observe the following notes:

- Do not deactivate monitoring and protection devices of the machine or system even for a test run.
- For operating information, refer to the documentation: "MOVITRANS® line TES31A Decentralized Supply Unit".

7 Service

7.1 Inspecting the contactless power supply system

The MOVITRANS® system for contactless energy transfer from SEW-EURODRIVE is a maintenance-free system. Nevertheless, we recommend that you perform preventive checks at regular intervals. The following components are subject to certain changes and should be checked regularly – for example, once a year.

7.1.1 Compensation

The line cables in the system are compensated using capacitors. The capacity of these capacitors changes slightly depending on the length of service life. After a while, the track compensation is no longer optimal, which may result in an increased energy consumption, among other things. Therefore, you must check the compensation at regular intervals. The current settings can be checked and optimized using the MOVITOOLS® MotionStudio engineering software.

7.1.2 Line cable connections

A constant current flows through the line cable. If screws at the connection points become loose over time, this can cause increased transition resistances. These resistances result in power losses and excessive heat. Therefore, you must check the screws at the connection points at regular intervals. These checks can also be performed during operation using IT temperature measurements. A temperature of $\leq 80\text{ °C}$ is within the permissible range.

7.2 Waste disposal

Dispose of the product and all parts separately in accordance with their material structure and the national regulations. Put the product through a recycling process or contact a specialist waste disposal company. If possible, divide the product into the following categories:

- Iron, steel or cast iron
- Stainless steel
- Magnets
- Aluminum
- Copper
- Electronic parts
- Plastics

The following materials are hazardous to health and the environment. These materials must be collected and disposed of separately:

- Oil and grease

Collect used oil and grease separately according to type. Ensure that the used oil is not mixed with solvent. Dispose of used oil and grease correctly.

- Screens
- Capacitors

**Waste disposal according to WEEE Directive 2012/19/EU**

This product and its accessories may fall within the scope of the country-specific application of the WEEE Directive. Dispose of the product and its accessories according to the national regulations of your country.

For further information, contact the responsible SEW-EURODRIVE branch or an authorized partner of SEW-EURODRIVE.

8 Technical data

8.1 Markings

The markings depend on the destination country selected when the order is placed. Therefore, combinations of the following markings are possible.

8.1.1 CE marking



The CE mark represents conformity with all standards and directives applicable to the product within the European Union. The applicable standards and directives are listed in the declaration of conformity or declaration of incorporation.

8.1.2 UKCA mark



The UKCA mark states the compliance with British guidelines. Compliance with British guidelines is confirmed by the symbol on the nameplate and in the declaration of conformity or declaration of incorporation.

8.2 TIS20A installation components

8.2.1 General

TIS20A008-H04 / HL4 / HR4 / AL4 / AR4-0		
Material		Plastic: LURAN S 778T
Manufacturer		INEOS
Reaction to fire according to UL		94 HB

60 A/25 kHz

8.3 Line cable and supply cable

8.3.1 Mechanical properties

The following table shows the mechanical properties of the TLS line cable / supply cable:

Type of line cable	Cable cross section	Outer diameter	Installation type	Bending radius
	[mm ²]	[mm]		[mm]
TLS10E006-06-1	6 × 6	19 ±0.5	Fixed or flexible	80/190
TLS10E008-01-1	8	8.6 ±0.3	Fixed	35

Type of line cable	Current
TLS10E006-06-1	60 A
TLS10E008-01-1 (2 line cables laid in parallel)	60 A

8.3.2 Electrical properties

The following table shows the electrical properties of the TLS line cable / supply cable:

Type of line cable	Insulation/sheath material	Electrical line losses ¹⁾	Operating voltage
	[mm]	[W/m]	[V]
TLS10E006-06-1	Thermoplastic/polyurethane	15 (at 60 A, 25 kHz)	1000
TLS10E008-01-1 (2 line cables laid in parallel)		13 (at 60 A, 25 kHz)	1000

1) Electrical line losses per meter of track

8.3.3 Data for connecting the TLS line cable/supply cable with terminal stud M6

The following tables show the data for connecting the TLS line cables / supply cables to the TVS10.-E06-000-. connection distributor with M6 terminal stud.

With UL approval

The following table shows the data for cable lugs with UL approval:

Type of line cable	Cable lug (without UL approval)		Fastening method	Applica- tion	Cable gland	Clamp- ing area
	Type	Width [mm]			(Plastic)	[mm]
TLS10E006-06-1	IKUMA 101036UL	11	Crimp	TVS10B	M32	15 – 25
TLS10E008-01-1	Klauke 3R6	12	Solder	TVS10B	M20	8 – 13

Without UL approval

The following table shows the data for cable lugs without UL approval:

Type of line cable	Cable lug (without UL approval)		Fastening method	Applica- tion	Cable gland	Clamping area
	Type	Width [mm]			(Plastic)	[mm]
TLS10E006-06-1	Klauke 6506	11	Crimp	TVS10B	M32	15 – 25
TLS10E008-01-1	Klauke 702F6	12	Solder	TVS10B	M20	8 – 13

8.3.4 Data for connecting the TLS line cable/supply cable with terminal stud M8

The following tables show the data for connecting the TLS line cable / supply cable to the following components with M8 terminal studs:

- the TCS10B compensation box (track compensation)
- the TCS31A compensation box (fine compensation)

With UL approval

The following table shows the data for cable lugs with UL approval:

Type of line cable	Cable lug (with UL approval)		Fastening method	Application	Cable gland	Clamping area
	Type	Width [mm]			(Plastic)	[mm]
TLS10E006-06-1	IKUMA 101038UL	14	Crimp	TCS31A	M32	15 – 25
TLS10E008-01-1	Klauke 3R8	15*	Solder	TCS10B	M20	8 – 13

*Due to the width of the cable lug, the line cable must be routed through the entire M20 gland before soldering the lug.

Without UL approval

The following table shows the data for cable lugs without UL approval:

Type of line cable	Cable lug (without UL approval)		Fastening method	Application	Cable gland	Clamping area
	Type	Width [mm]			(Plastic)	[mm]
TLS10E006-06-1	Klauke 6508	14	Crimp	TCS31A	M32	15 – 25
TLS10E008-01-1	Klauke 103R8	13	Solder	TCS10B	M20	8 – 13

8.3.5 Cable glands and thread reducers

The following table shows the available cable glands and thread reducers:

Accessories set	Scope of delivery	Part number
Accessories set 3	12 × M32 cable glands	28313178
Accessories set 4	12 × M32 sealing inserts for 2 × TLS10E008-01-1, 12 × M32 cable gland	28313186
Accessories set 7	24 × M25 to M20 thread reducers, 24 × M20 cable glands	28313216

8.4 TES31A decentralized supply unit

For information regarding the technical data, refer to the operating instructions "MOVITRANS® line TES31A Decentralized Supply Unit".

8.5 TCS31A compensation box (fine compensation)

For information regarding the technical data, refer to the operating instructions "MOVITRANS® Compensation Box TCS31A".

8.6 TVS10B connection distributor and TCS10B compensation box (track compensation)

For information regarding the technical data, refer to the operating instructions "MOVITRANS® Installation Material TCS, TVS, TLS, TIS".

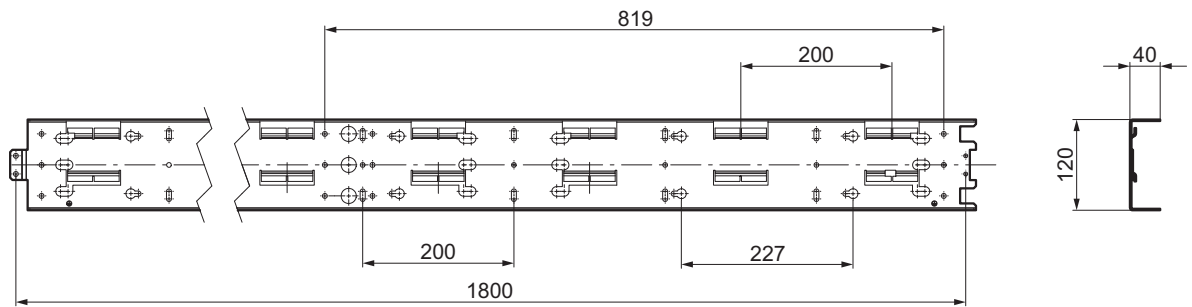
8.7 THM11C / THM21C pick-up

For information regarding the technical data, refer to the operating instructions: "MOVITRANS® line U-Shaped THM11C/THM21C pick-ups".

60 A/25 kHz

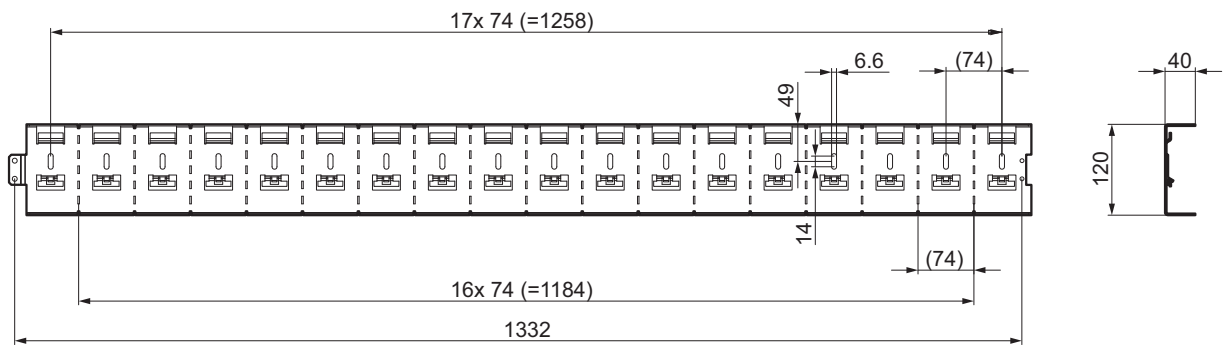
8.8 Dimension drawings

8.8.1 Straight mounting rail



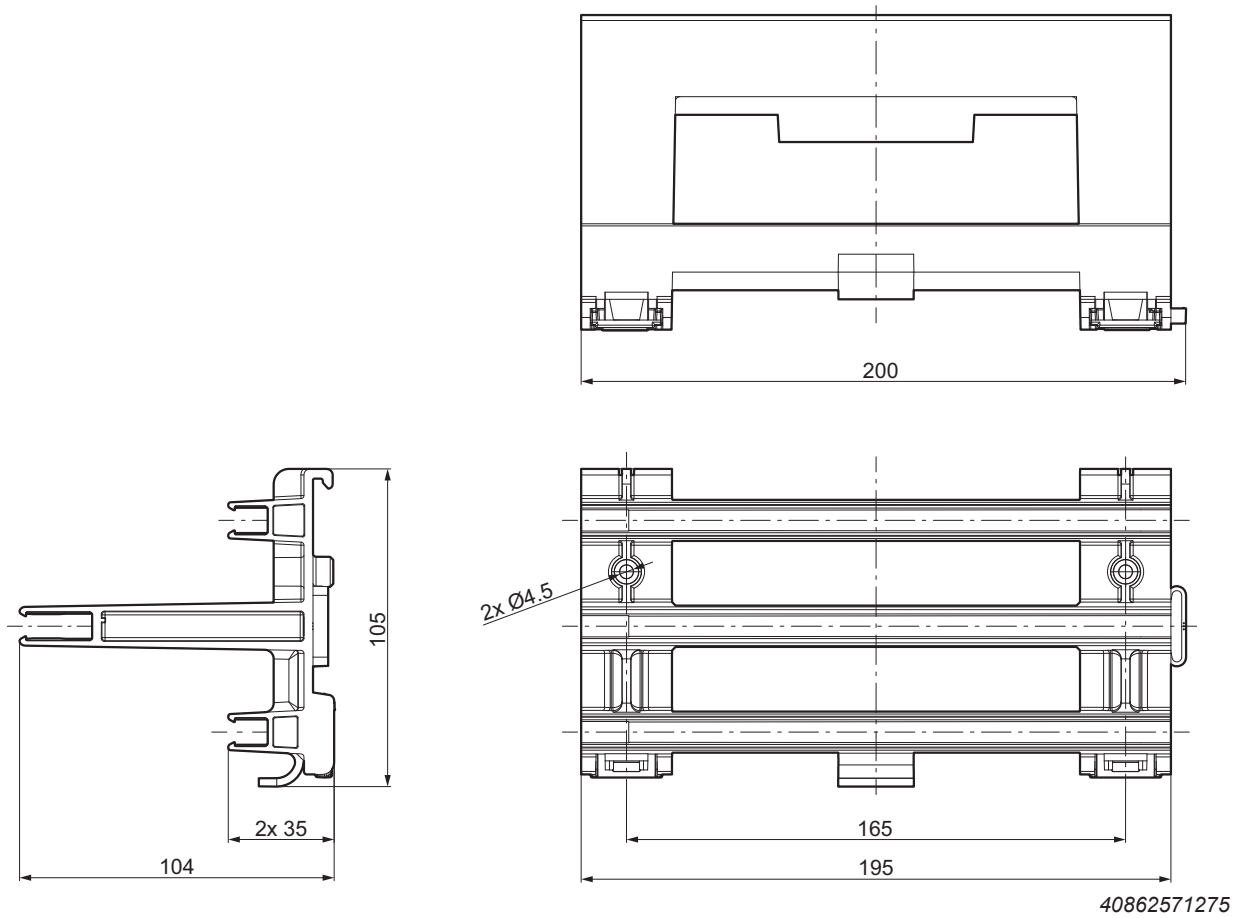
40862917003

8.8.2 Curved mounting rail



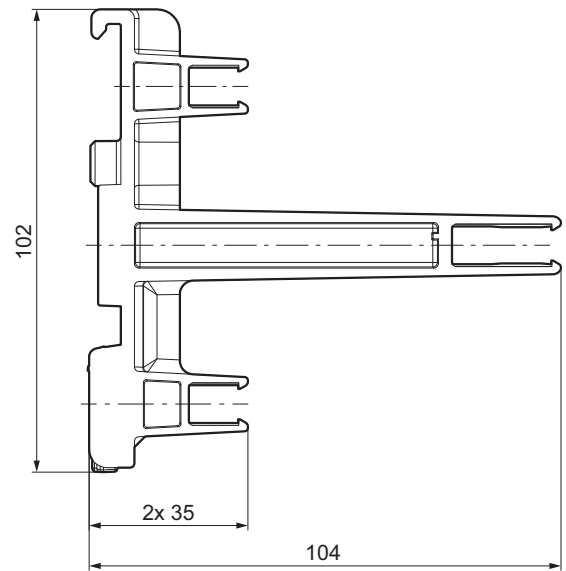
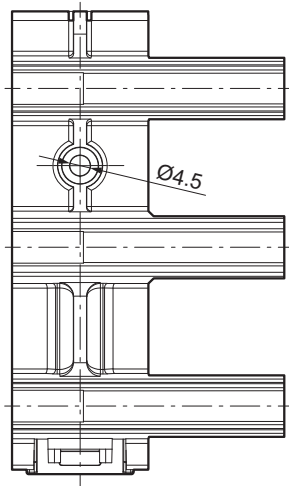
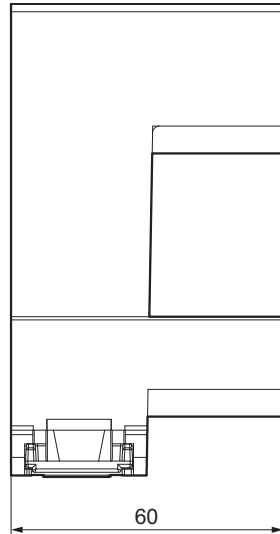
41345868555

8.8.3 Cable holder for straight tracks



60 A/25 kHz

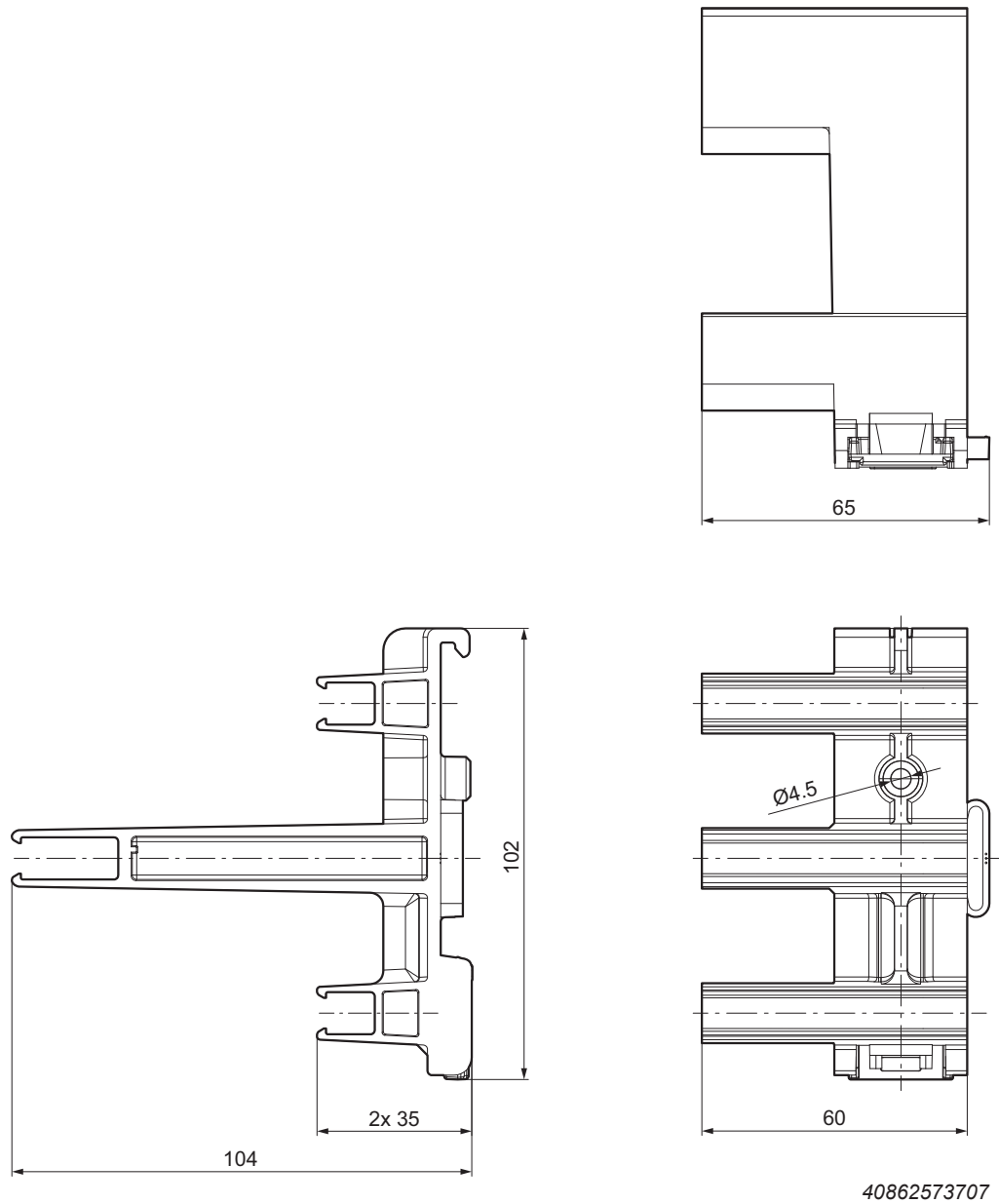
8.8.4 Cable holder for curved tracks, left



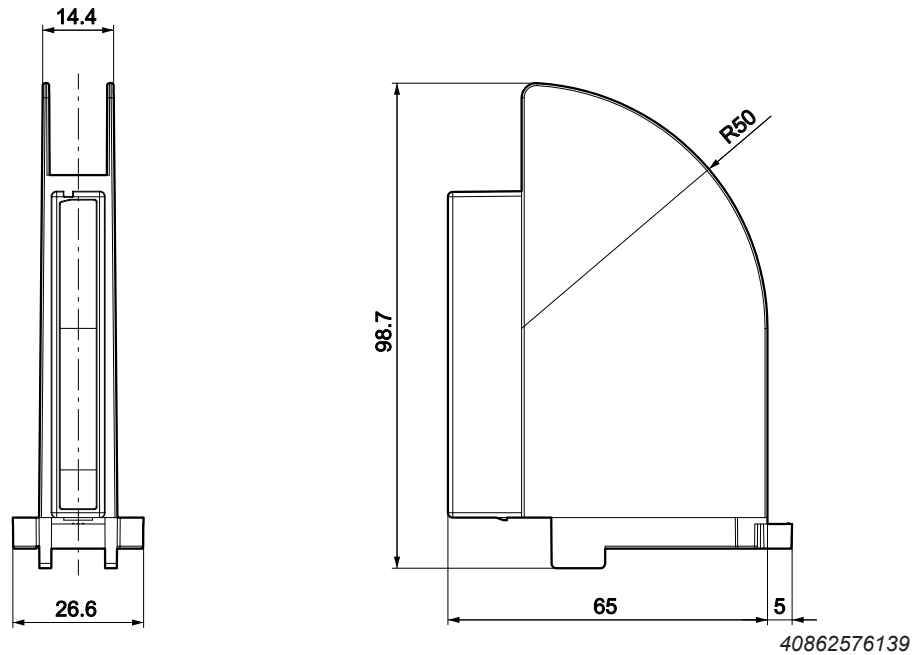
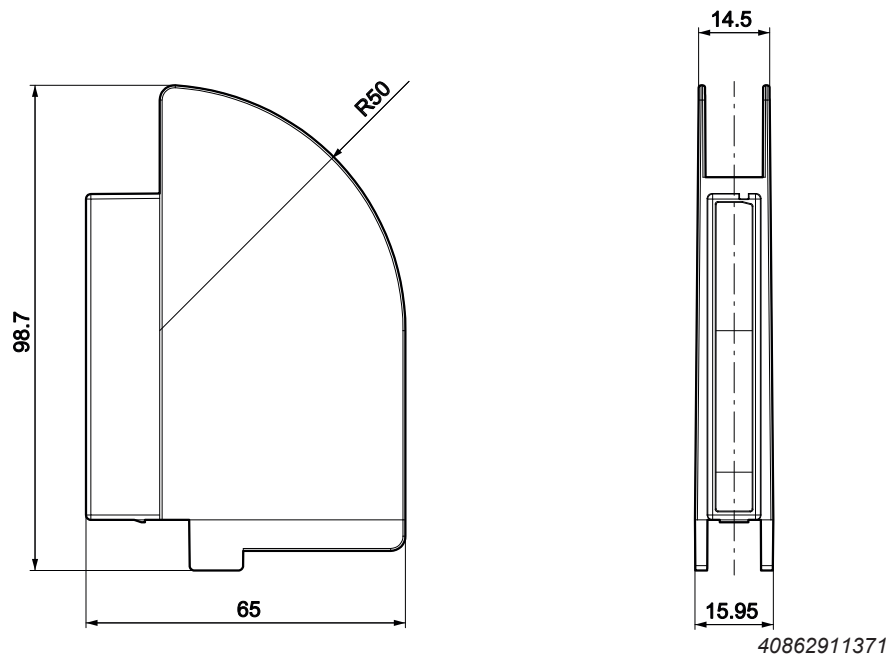
40862568843

60 A/25 kHz

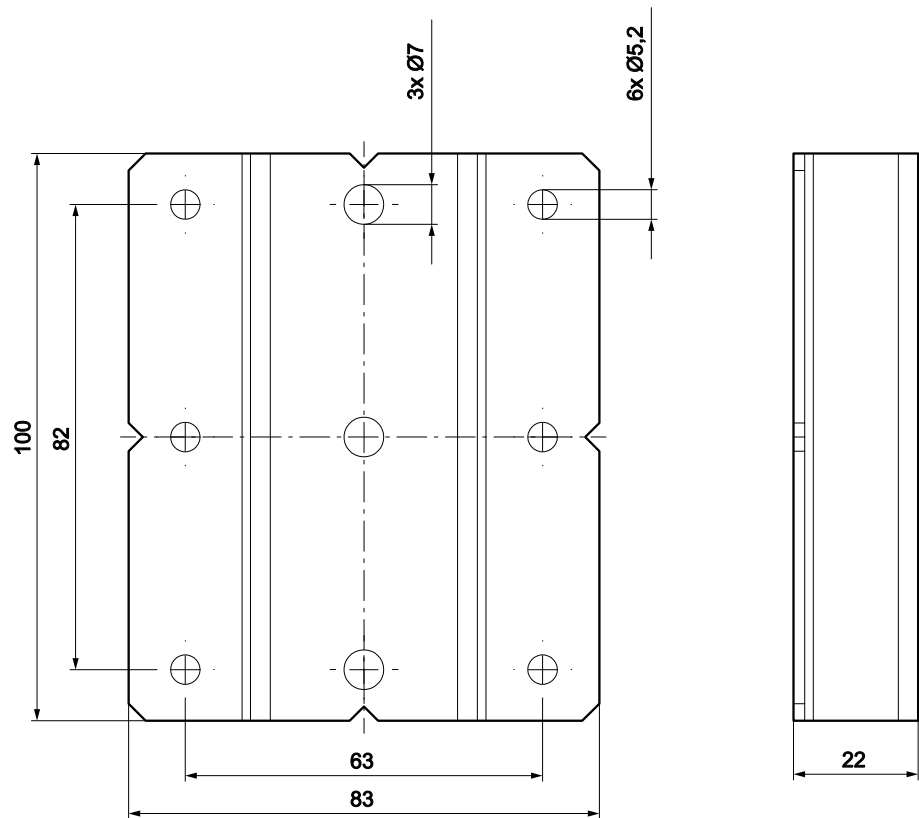
8.8.5 Cable holder for curved tracks, right



60 A/25 kHz

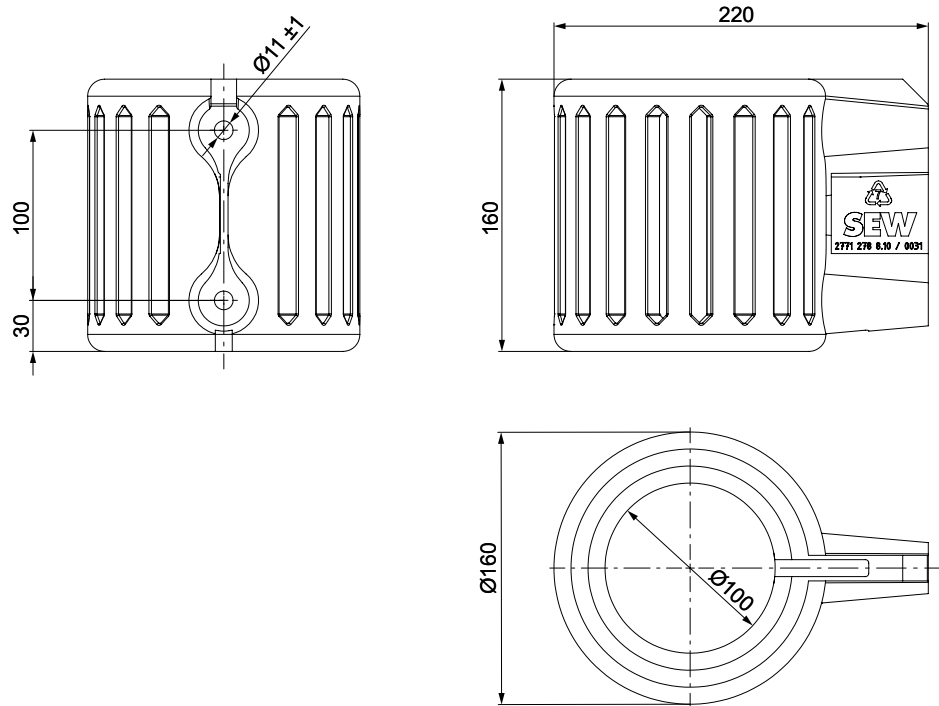
8.8.6 Cable entry frame, left

8.8.7 Cable entry frame, right


8.8.8 Mounting panel



40862920203

8.8.9 Coil body



42767710859

60 A/25 kHz

9 Contacting SEW-EURODRIVE

You can find the worldwide contact data and locations on the **SEW-EURODRIVE website** via the following link or the QR code shown below.

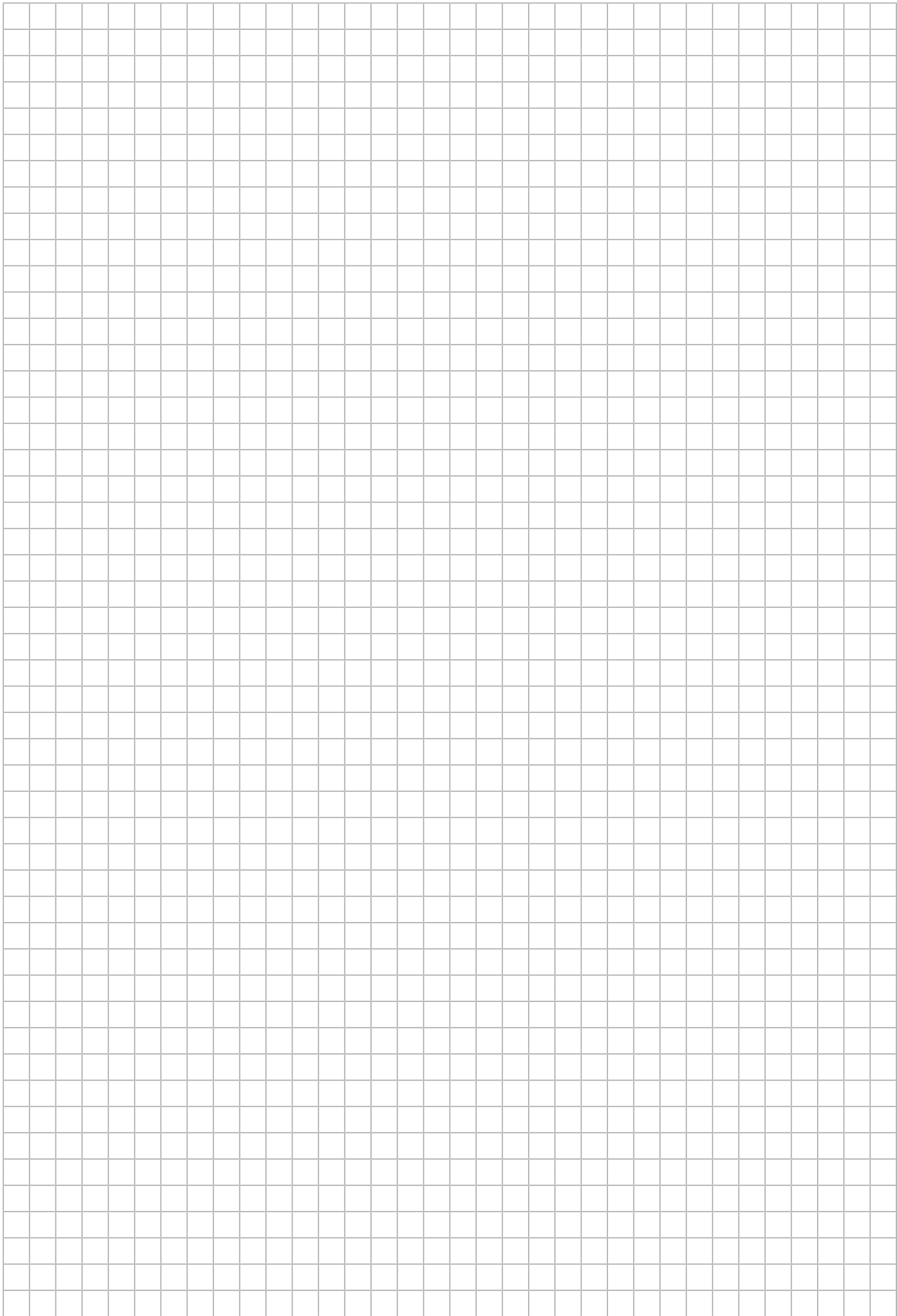
<https://www.sew-eurodrive.de/contacts-worldwide>

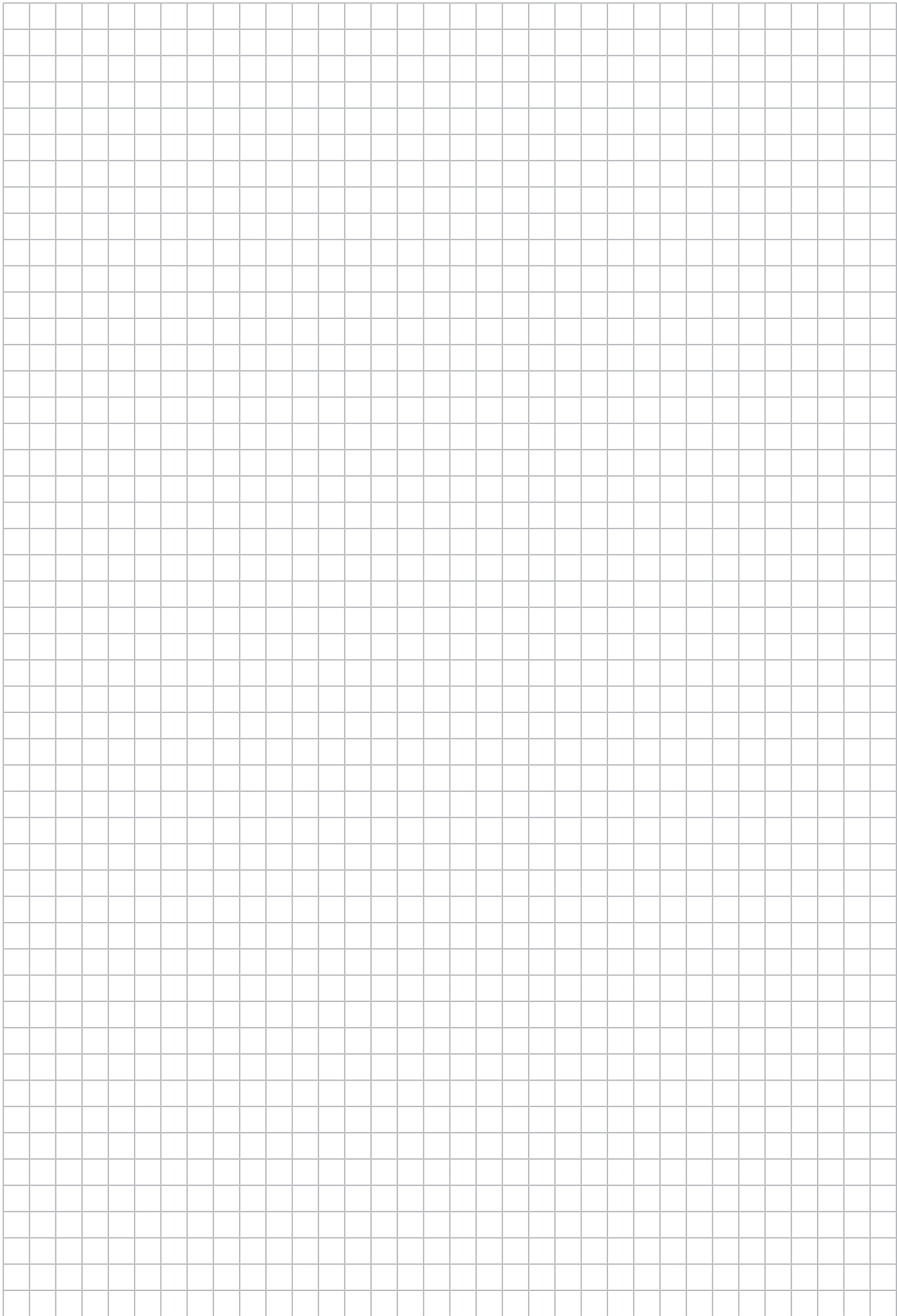


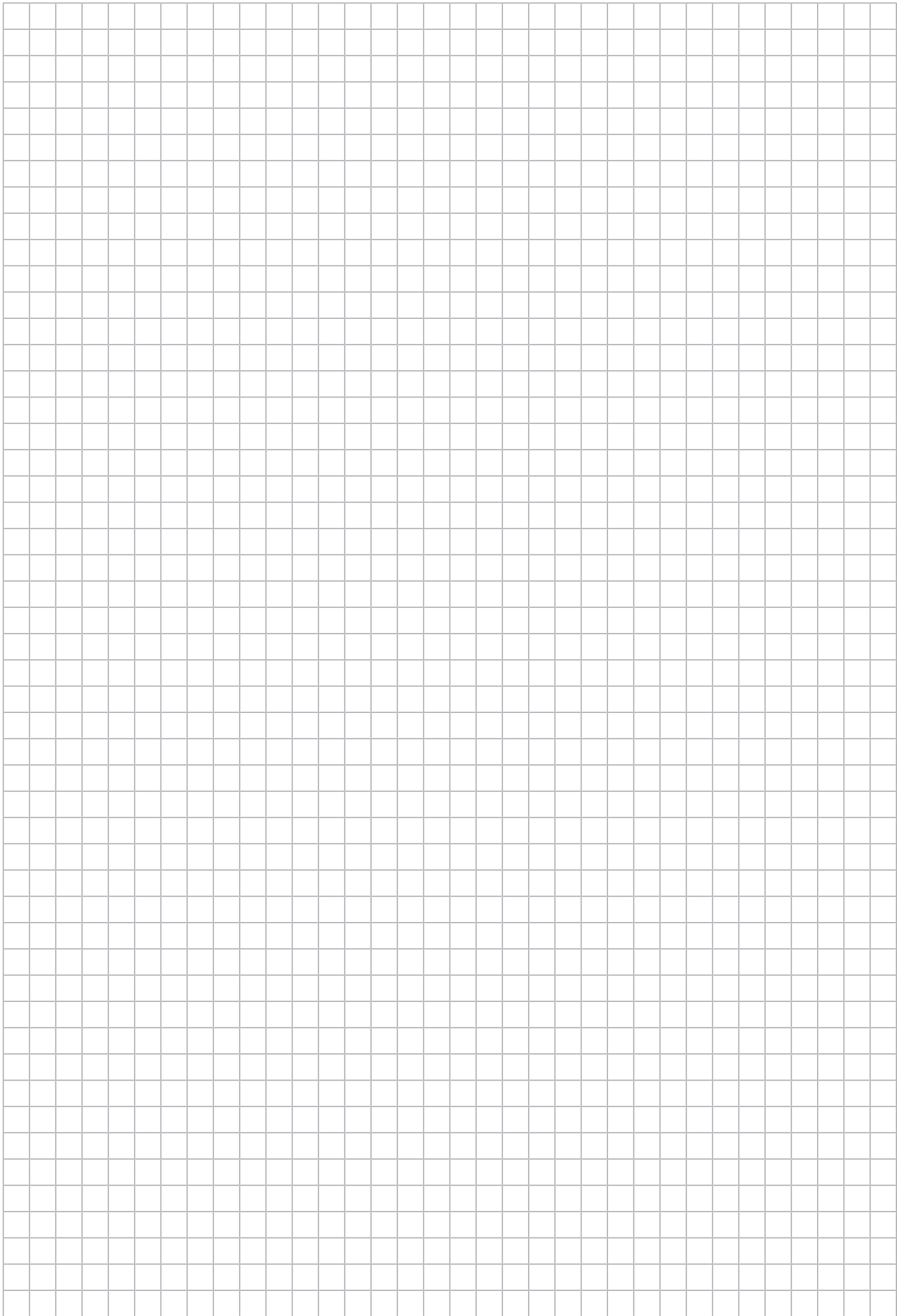
SEW
EURODRIVE

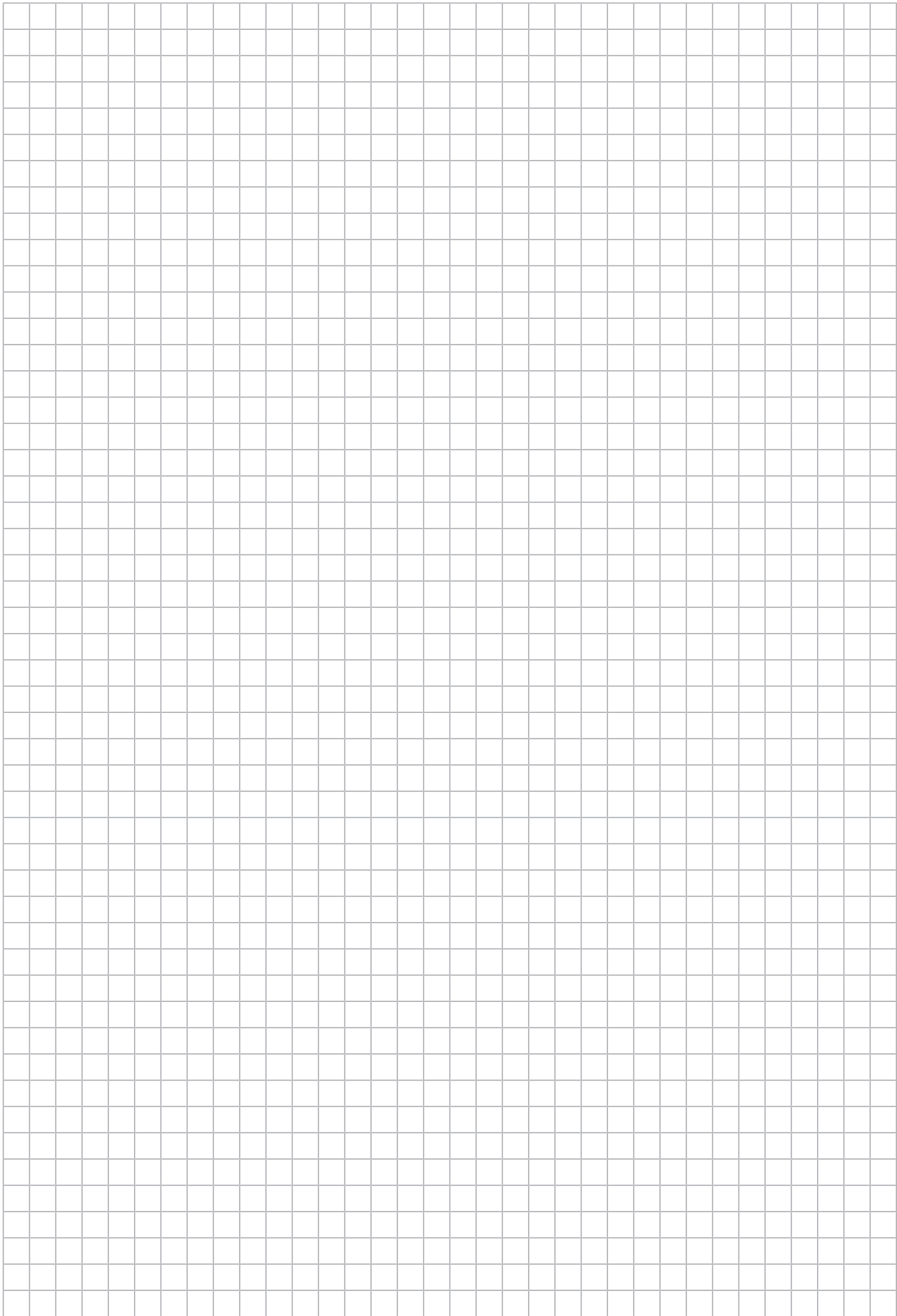


60 A/25 kHz













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Driving the world

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