



Compact Operating Instructions



Mobile Energy Supply **MOVITRANS®** Stationary Components





Contents

1	General Information	4
1.1	Scope of this documentation.....	4
1.2	Validity of this documentation	4
2	Safety Notes	5
2.1	Preliminary information	5
2.2	General information	5
2.3	Target group	5
2.4	Designated use	6
2.5	Transport.....	7
2.6	Storage	7
2.7	Installation	7
2.8	Functional safety technology	7
2.9	Electrical connection	8
2.10	Safe disconnection.....	8
2.11	Startup/operation	9
2.12	Inspection/maintenance	10
2.13	Disposal	10
3	Mechanical Installation.....	11
3.1	TPS stationary converter and TAS transformer module	11
3.2	Installation Material TCS, TVS, TLS, TIS (Transmission Line)	13
4	Electrical Installation	14
4.1	TPS stationary converter and TAS transformer module	14



1 General Information

1.1 *Scope of this documentation*

This documentation comprises the general safety notes and a selected information regarding the device.

- Please note that this documentation does not replace the detailed operating instructions.
- Read the detailed operating instructions before you start working with the device.
- Observe the information, instructions and notes in the detailed operating instructions. This is essential for fault-free operation of the unit and fulfillment of any rights to claim under guarantee.
- The enclosed CD or DVD contains PDF files of the additional operating instructions as well as further documentation regarding the device.
- All SEW-EURODRIVE's technical documentation is available for download in PDF format from the SEW-EURODRIVE website: www.sew-eurodrive.de

1.2 *Validity of this documentation*

This documentation applies to the following stationary MOVITRANS® units:

- TPS stationary converter
- TAS transformer module
- Installation Material TCS, TVS, TLS, TIS



2 Safety Notes

2.1 Preliminary information

The following basic safety notes must be read carefully to prevent injury to persons and damage to property. The operator must ensure that the basic safety notes are read and observed.

Make sure that persons responsible for the plant and its operation, as well as persons who work independently on the units, have read through the documentation carefully and understood it. Consult SEW-EURODRIVE if you have any questions or if you require further information.

The following safety notes are primarily concerned with the use of MOVITRANS® units. If you use other SEW components, also refer to the safety notes for the respective components in the corresponding documentation.

Please also observe the supplementary safety notes in the individual sections of this documentation.

2.2 General information

Removing covers without authorization, improper use as well as incorrect installation or operation may result in severe injuries to persons or damage to property.

2.3 Target group

Any mechanical work may only be performed by adequately qualified personnel. Qualified personnel in this context are persons who are familiar with the setup, mechanical installation, troubleshooting and maintenance for the units. Further, they are qualified as follows:

- Training in mechanical engineering, e.g. as a mechanic or mechatronics technician (final examinations must have been passed).
- Knowledge of this documentation

Any electronic work may only be performed by adequately qualified electricians. Qualified electricians in this context are persons who are familiar with the electronic installation, startup, troubleshooting and maintenance for the units. Further, they are qualified as follows:

- Training in electrical engineering, e.g. as an electrician or mechatronics technician (final examinations must have been passed).
- Knowledge of this documentation

All work in further areas of transportation, storage, operation and waste disposal may be carried out only by persons who are trained appropriately.



2.4 Designated use

Note the designated use of the following MOVITRANS® units:

- **MOVITRANS® units in general**

MOVITRANS® units are intended for use in industrial and commercial installations for the operation of contactless power transmission systems.

- **TPS stationary converter and TAS transformer modules**

TPS stationary converters and TAS transformer modules are designed to be installed in control cabinets. Only connect MOVITRANS® devices that are designed and suitable for connection to TPS stationary converters and the TAS transformer modules, such as TLS line cables, TVS connection distributors and TCS compensation boxes.

- **TLS line cable**

The TLS line cables are laid along the transmission line. The TLS line cables are suitable for the connection to the TAS transformer module on the output side.

- **TCS compensation boxes**

In longer transmission lines, the TCS compensation boxes are connected in series to the TLS line cables.

- **TVS connection distributor**

The TVS connection distributors are used as connection points for the TLS line cable in the field.

- **TIS installation material**

The installation components TIS...025... may only be used with flat pick-ups THM..E.

The installation components TIS...008... may only be used with U-shaped pick-ups THM..C.

Observe all information on the technical data and the permitted conditions where the units are operated.

Do not start up the unit (operate in the designated fashion) until you have established that the machine complies with the EMC Directive 2004/108/EC and that the end product categorically conforms to Machinery Directive 98/37/EC (with reference to EN 60204).

The rules and regulations of the German employers' liability insurance association ["Berufsgenossenschaft" - BG], in particular BG rules B11 concerning electromagnetic fields, must be observed during installation, startup and operation of systems with contactless energy transfer by induction for use in industrial workplaces.



2.5 Transport

Observe the following instructions when you receive a shipment:

- Inspect the shipment for any damage that may have occurred in transit as soon as you receive the delivery.
- Inform the shipping company immediately about any damage.
- Do not startup any units if they were damaged in transit.

Observe the following notes for the transportation of MOVITRANS® units:

- Make sure that the units are not subject to mechanical impact during transport.
- Use suitable, sufficiently rated handling equipment.
- Observe the notes on the climatic conditions in the "Technical Data" chapter.
- Remove transport fixtures prior to startup.

2.6 Storage

Observe the following instructions when shutting down or storing MOVITRANS® units:

- Make sure that the units are not subject to mechanical impact during storage.
- In case of long-term storage, connect the TPS stationary converter to the power supply for at least 5 minutes every 2 years.
- Observe the notes on storage temperature in the "Technical Data" chapter.

2.7 Installation

Observe the following notes for installing the MOVITRANS® units:

- Protect the MOVITRANS® units from excessive strain.
- Ensure that components are not deformed and/or insulation spaces are maintained, particularly during transportation and handling.
- Electric components must not be mechanically damaged or destroyed.

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

- Use in potentially explosive atmospheres.
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc.
- Use in applications that are subject to mechanical vibration and shock loads in excess of the requirements in EN61800-5-1.

2.8 Functional safety technology

MOVITRANS® units may not execute any safety functions without master safety systems.



2.9 Electrical connection

Observe the following notes for the electrical connection of MOVITRANS® units:

- Do not connect or disconnect any cables, plug connectors or conductor rails while they are energized.
- Observe applicable national accident prevention guidelines when working on live parts of MOVITRANS® units.
- Perform electrical installation according to the pertinent regulations (e.g. cable cross-sections, fusing, protective conductor connection). For any additional information, refer to the applicable documentation.
- Preventive measures and protection devices must correspond to the regulations in force (e.g. EN 60204-1 or EN 50178).

Required preventive measures: – Ground the units

Required protection device: – Over-current protection devices for the supply system lead

- Take suitable steps to ensure that the preventive measures and protection devices described in the operating instructions for the individual MOVITRANS® units have been implemented correctly.

2.10 Safe disconnection

The TPS stationary converter meets all requirements for safe disconnection of power and electronics connections in accordance with EN 50178. All connected circuits must also maintain the requirements for safe disconnection.



2.11 Startup/operation

Observe the following notes for starting up and operating the MOVITRANS® units:

- Only qualified electricians with the relevant accident prevention training are allowed to perform installation, startup and service work on the unit. They must also comply with the regulations in force (e.g. EN 60204, VBG 4, DIN-VDE 0100/0113/0160).
- Never install damaged units and put them into operation.
- Do not deactivate monitoring and protection devices even for a test run.
- Take appropriate measures (for example, connect binary input DI00 "/CONTROLLER INHIBIT" to DGND on the TPS stationary converter) to ensure that the system does not start up unintentionally when power is switched on.
- During operation, the MOVITRANS® units can have live, bare and movable or rotating parts as well as hot surfaces, depending on their enclosure.
- When the unit is switched on, dangerous voltages are present at the output terminals and at any connected cables, terminals and MOVITRANS® units. Dangerous voltages can be present even when the TPS stationary converter supply is disabled and the system is at a standstill.
- The fact that the operation LED V1 and other display elements are no longer illuminated on the TPS stationary converter does not indicate that the device and connected MOVITRANS® units have been disconnected from the power supply and do not carry any voltage.
- Safety functions within the unit may cause system standstill. Removing the cause of the problem or performing a reset can result in an automatic restart of the plant. If safety reasons prohibit this action, disconnect the TPS10A stationary converter from the power supply before correcting the fault.
- Before removing the protective cover, disconnect the units from the supply system. Dangerous voltages may still be present in the units and the connected MOVITRANS® devices for up to 10 minutes after disconnection.
- With the protective cover removed, the MOVITRANS® units have enclosure IP00. Dangerous voltages are present at all components. All units must be closed during operation.
- Please wear appropriate protective clothing during assembly, especially when soldering the TLS line cables.
- Take appropriate security measures to prevent burns by the soldering iron or by hot solder. Take appropriate measures to prevent hot solder from leaking.



2.12 Inspection/maintenance

Only SEW-EURODRIVE is authorized to carry out repairs.
Never open the unit.

2.13 Disposal

Observe the latest national regulations in effect!

Dispose of materials separately in accordance with the regulations in force, for example:

- Electronics scrap
- Plastics
- Sheet metal
- Copper
- Aluminum



3 Mechanical Installation

3.1 TPS stationary converter and TAS transformer module

3.1.1 Tightening torques

Only use genuine connection elements.

Observe the following tightening torques:

- TPS stationary converter, size 2
 - all power terminals → 1.5 Nm (13.3 lb.in)
- TPS stationary converter, size 4
 - all power terminals → 14 Nm (124 lb.in)
- TAS transformer module, size 2:
 - Terminals X2/X3 → 1.5 Nm (13.3 lb.in)
 - Terminals LA/LI → 8 Nm (69.33 lb.in)
- TAS transformer module, size 4:
 - all power terminals → 14 Nm (124 lb.in)

3.1.2 Mounting position

The TPS stationary converter and the TAS transformer module must only be installed in upright position. You must **not** install them horizontally, tilted or upside down!

3.1.3 Installation

The TPS stationary converter and the TAS transformer module can be installed stacked or next to each other. SEW-EURODRIVE recommends a stacked installation.

Stacked installation

Observe the following notes regarding the stacked installation of the TPS stationary converter and the TAS transformer module:

- Install the TPS stationary converter and the TAS transformer module vertically on top of one another.
- Use twisted cables as described in section "Wiring diagram – power terminals" to connect the size 2 TAS transformer module to the size 2 TPS stationary converter.

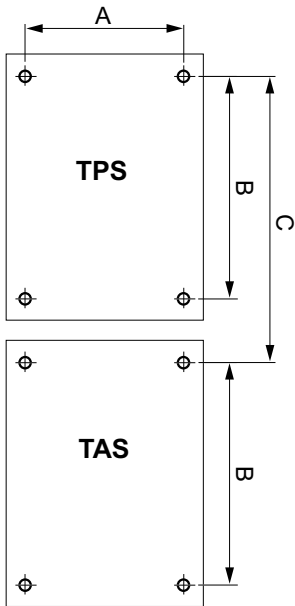
Use standardized connection conductor rails as described in section "Wiring diagram – power terminals" to connect the size 4 TAS transformer module to the size 4 TPS stationary converter.



Mechanical Installation

TPS stationary converter and TAS transformer module

- Ensure the distance between the units for installation according to the following illustration:



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Size	A [mm]	B [mm]	C [mm]
Size 2	105 (4.13 in)	300+1 (11.8 + 0.04 in)	348+2 (13.7 + 0.08 in)
Size 4	140 (5.51 in)	502+1 (19.8 + 0.04 in)	548+2 (21.6 + 0.08 in)

Installation next to each other

Refer to the following publication for information regarding the installation next to each other:

- "MOVITRANS® TAS10A Transformer Module" operating instructions

3.1.4 Compensation

Refer to the following publication for information regarding the compensation capacitors:

- "MOVITRANS® TAS10A Transformer Module" operating instructions



3.2 *Installation Material TCS, TVS, TLS, TIS (Transmission Line)*

Depending on the respective plant topology, refer to the following publications for information regarding the structure of the transmission line:

- MOVITRANS® Installation Material TVS / TCS / TLS / TIS" operating instructions
- "MOVITRANS® Project Planning" manual
- "MOVITRANS® Installation
of Transmission Lines with Casting Resin for THM10E Pick-Ups" manual
- "MOVITRANS® Installation
of Transmission Lines with TIS Installation Plate for THM10E Pick-Ups" manual



4 Electrical Installation

4.1 TPS stationary converter and TAS transformer module

4.1.1 Cable cross sections

Note the following cable cross sections:

- TPS stationary converter:
 - Supply system lead → cable cross section according to rated input current I_{mains} at rated load.
 - Electronics cables:
 - One core per terminal → 0.20...2.5 mm² (AWG24...12)
 - 2 cores per terminal → 0.20...1 mm² (AWG24...17)
- TPS stationary converter and TAS transformer module:
 - Cable cross section between X2/X3 (TPS) and X2/X3 (TAS):
 - Size 2 (TPS10A040 and TAS10A040) → 4 mm² (AWG11)
 - Size 4 (TPS10A160 and TAS10A160) → Connection conductor rail or
→ 16 mm² (AWG5)

4.1.2 PE supply system connection (EN 50178)

Observe the following notes regarding the PE supply system connection:

- For a supply lead < 10mm² (AWG8), 2 variants of a PE mains connection are permitted:
 - Route a second PE conductor with the same cross section as the supply lead in parallel to the protective earth via separate terminals, or
 - route a Cu protective earth with a cross section of 10mm² (AWG8).
- If the supply system lead is ≥ 10 mm² (AWG8), use a Cu protective earth conductor with the cross section of the supply system lead.

4.1.3 Line cable connection

Observe the following information regarding the line cable connection:

- Connect approved TLS line cables only. TLS line cables must be connected properly.
- Use a powerful soldering iron (at least 200 W) or a soldering bath to attach the cable lugs to the high-frequency litz wire. Pressing on is not permitted.
- Also observe the additional information and wiring diagrams in section "Wiring diagram – power terminals".



4.1.4 Line cable routing

Note the following on line cable routing:

- Route the line cables close together (cable ties, cable duct, etc.). Avoid close proximity to sheet metal or other magnetic metals (heating through eddy currents). Possible installation options include
 - Plastic duct or pipe on spacers
 - Spacing layer of aluminum sheet metal
- If the cables are routed through walls (control cabinet, etc.), you should try to have a common screw fitting for supply and return cable. Install a duct board made of aluminum or plastic if this is not possible. Install the line cables, power and signal lines separately.

4.1.5 Shielding and grounding

Observe the following note on shielding and grounding:

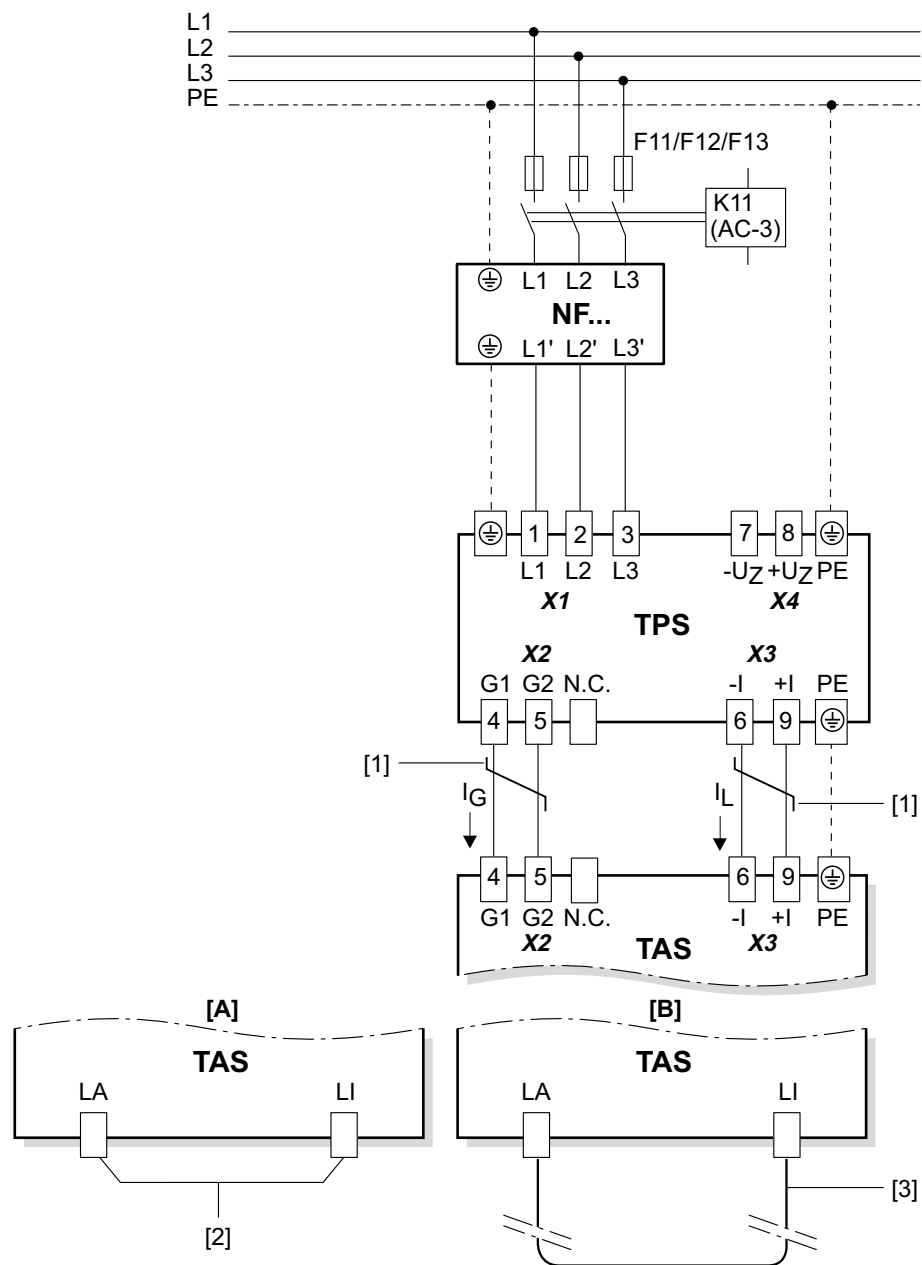
- SEW EURODRIVE recommends that you shield the control cables.
- Connect the shield by the shortest possible route and make sure it is grounded over a wide area. To avoid ground loops, you can ground one end of the shield via a suppression capacitor (220 nF / 50 V). If using double-shielded cables, earth the outer shield on the unit end and the inner shield on the other end.
- You can also route the cables (not the line cable!) in the control cabinet in grounded sheet metal ducts or metal tubes for shielding purposes. Install the power and signal lines separately.
- Ground the MOVITRANS® unit and all additional devices to meet the high-frequency guidelines. To do so, provide a wide area metal-on-metal contact between the unit housing and ground (e.g. unpainted control cabinet mounting panel).



4.1.6 Wiring diagram – power terminal

Size 2

Connect the power section of the size 2 TPS stationary converter and the size 2 TAS transformer module according to the following figure:



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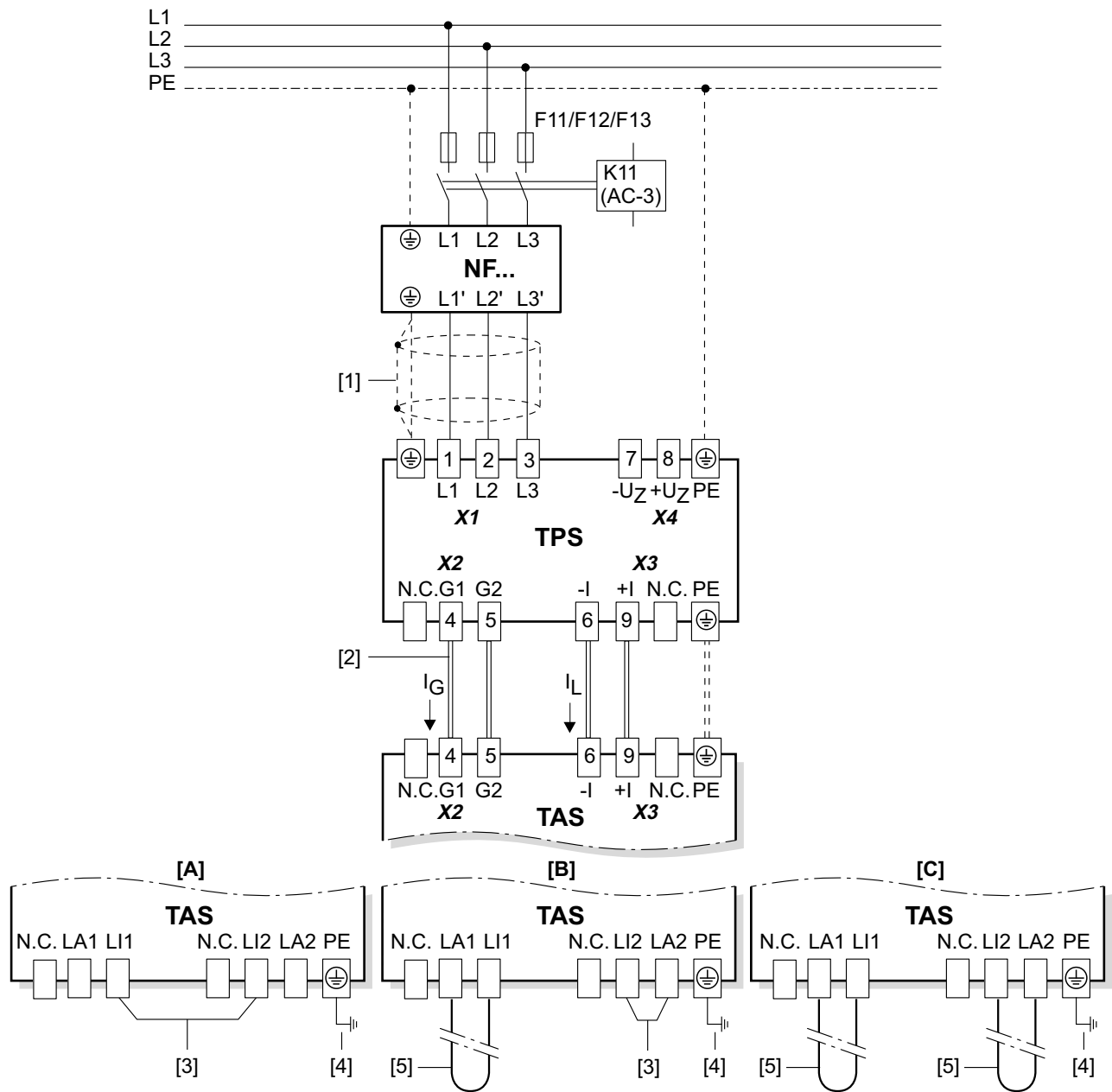
- [1] Twisted cables
- [2] Short-circuit hoop
- [3] TLS line cable

- [A] Connection variant A: for starting up the TPS stationary converter without connected TLS line cable
- [B] Connection variant B: for startup and operation with connected TLS line cable



Size 4

Connect the power section of the size 4 TPS stationary converter and the size 4 TAS transformer module according to the following figure:



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- [1] Shielded cables
- [2] Connection conductor rail
- [3] Short-circuit hoop
- [4] optional PE connection to ensure the high-frequency-compliant grounding
- [5] TLS line cable

- [A] Connection variant A: for startup the TPS stationary converter without connected TLS line cable
- [B] Connection variant B: for startup and operation with a conductor loop
- [C] Connection variant C: for startup and operation with 2 conductor loops



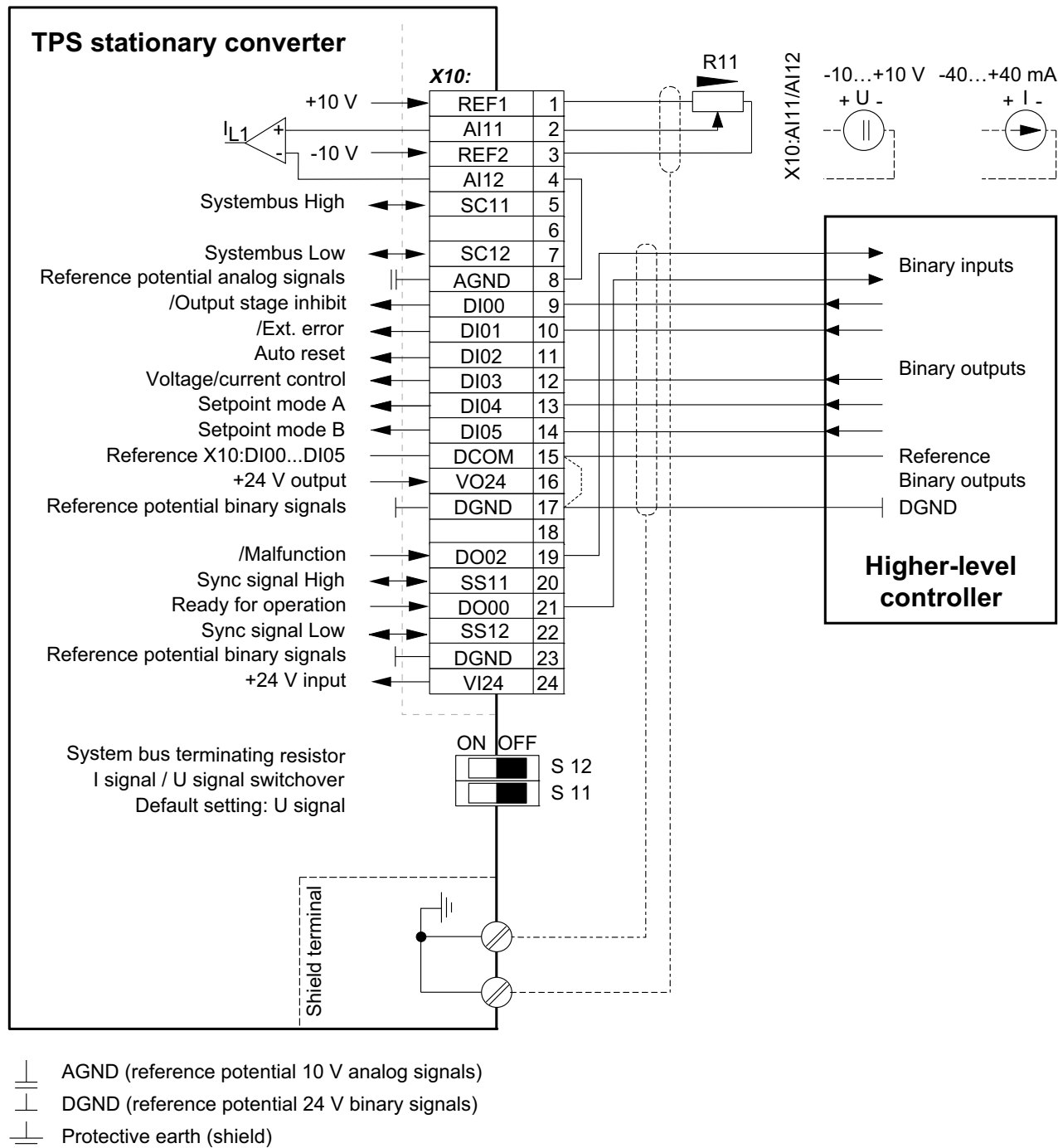
Electrical Installation

TPS stationary converter and TAS transformer module

4.1.7 Wiring diagram – control terminals

Sizes 2 and 4

Connect the control unit of the size 2 and 4 TPS stationary converter according to the following figure:



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4.1.8 Functional description of the power and control terminals

TPS stationary converter

The following table shows the functional description of the power and control terminals of the size 2 and 4 TPS stationary converter:

Terminal		Function	
X1: 1/2/3	L1 / L2 / L3	Power supply	
X2: 4/5	G1 / G2	Gyrator connection	
X3: 6/9	-I/+I	Current feedback	
X4: +UZ/-UZ	+V _Z /-V _Z	DC link connection	
X10: 1	REF1	Reference voltage +10 V (max. 3 mA) for setpoint potentiometer	
X10: 2/4	AI11/AI12	Setpoint input I _{L1} (differential input), switching between current/voltage input with S11	
X10: 3	REF2	Reference voltage -10 V (max. 3 mA) for setpoint potentiometer	
X10: 5/7	SC11/SC12	System bus (SBus) high/low	
X10: 6	-	No function	
X10: 8	AGND	Reference potential for analog signals (REF1, REF2, AI11, AI12)	
X10: 9	DI00	Binary input 1, with fixed assignment /Output stage inhibit	The binary inputs are electrically isolated by optocouplers. DCOM must be connected to DGND if the binary inputs are controlled with +24 V by VO24!
X10: 10	DI01	Binary input 2, with fixed assignment /Ext. Error	
X10: 11	DI02	Binary input 3, with fixed assignment "Auto-reset"	
X10: 12	DI03	Binary input 4, with fixed assignment "Voltage/current control"	
X10: 13	DI04	Binary input 5, with fixed assignment "Setpoint mode A"	
X10: 14	DI05	Binary input 6, with fixed assignment "Setpoint mode B"	
X10: 15	DCOM	Reference for binary inputs DI00...DI05	
X10: 16	VO24	Auxiliary voltage output +24 V (max. 200 mA)	
X10: 17	DGND	Reference potential for binary signals	
X10: 18	-	No function	
X10: 19	DO02	Binary output 2, malfunction configurable	Load capacity: Max. 50 mA
X10: 21	DO00	Binary output 0, ready configurable	
X10: 23	DGND	Reference potential for binary signals	
X10: 20/22	SS11/SS12	Synchronization signal high/low	
X10: 24	VI24	Input +24 V power supply (only required for diagnostic purposes)	
S11	I ↔ U	AI11/AI12 toggle I signal (-40 ... +40 mA) ↔ V signal (-10 ... +10 V), factory setting V	
S12	On ↔ Off	System bus terminating resistor	



Electrical Installation

TPS stationary converter and TAS transformer module

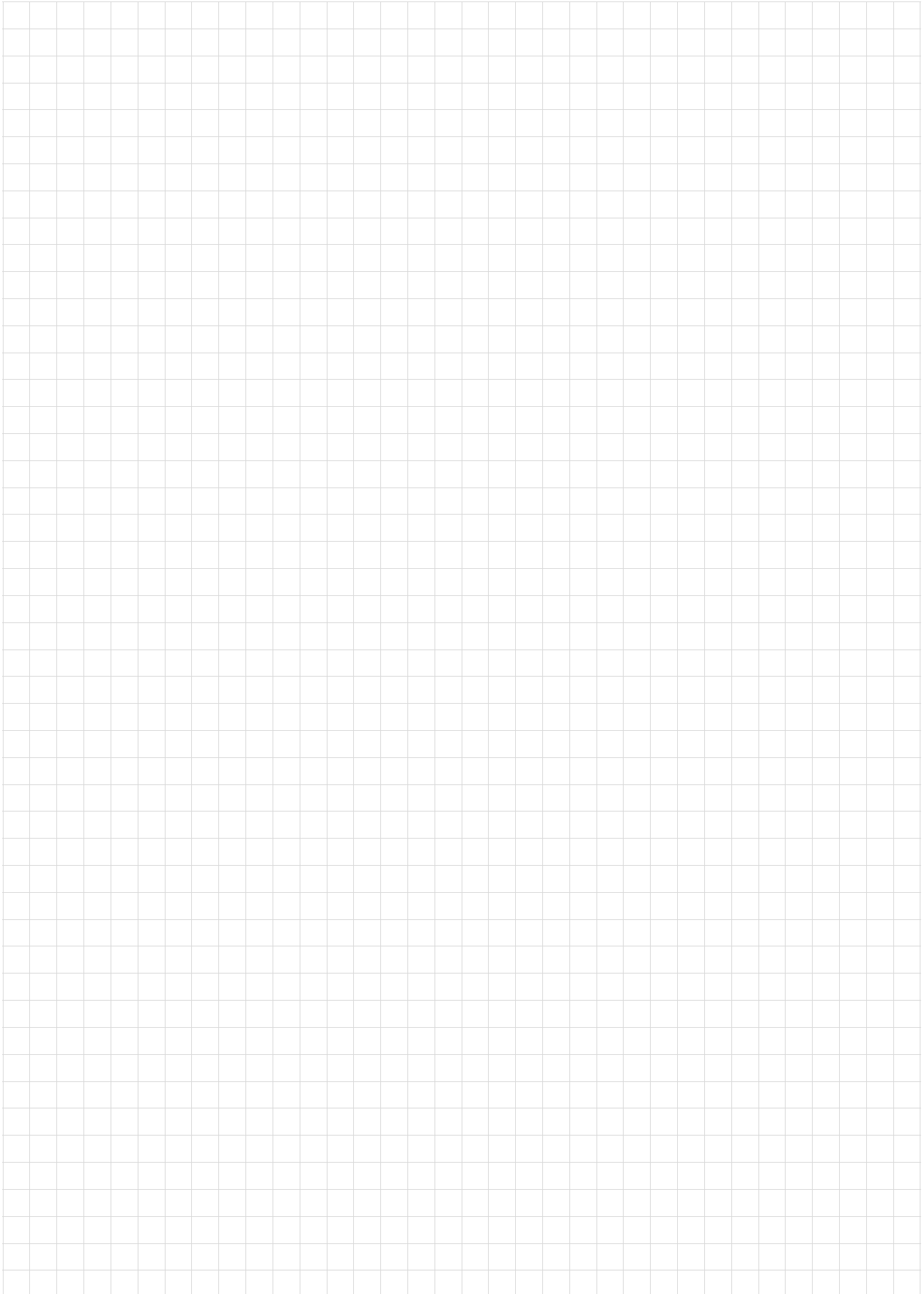
TAS transformer module

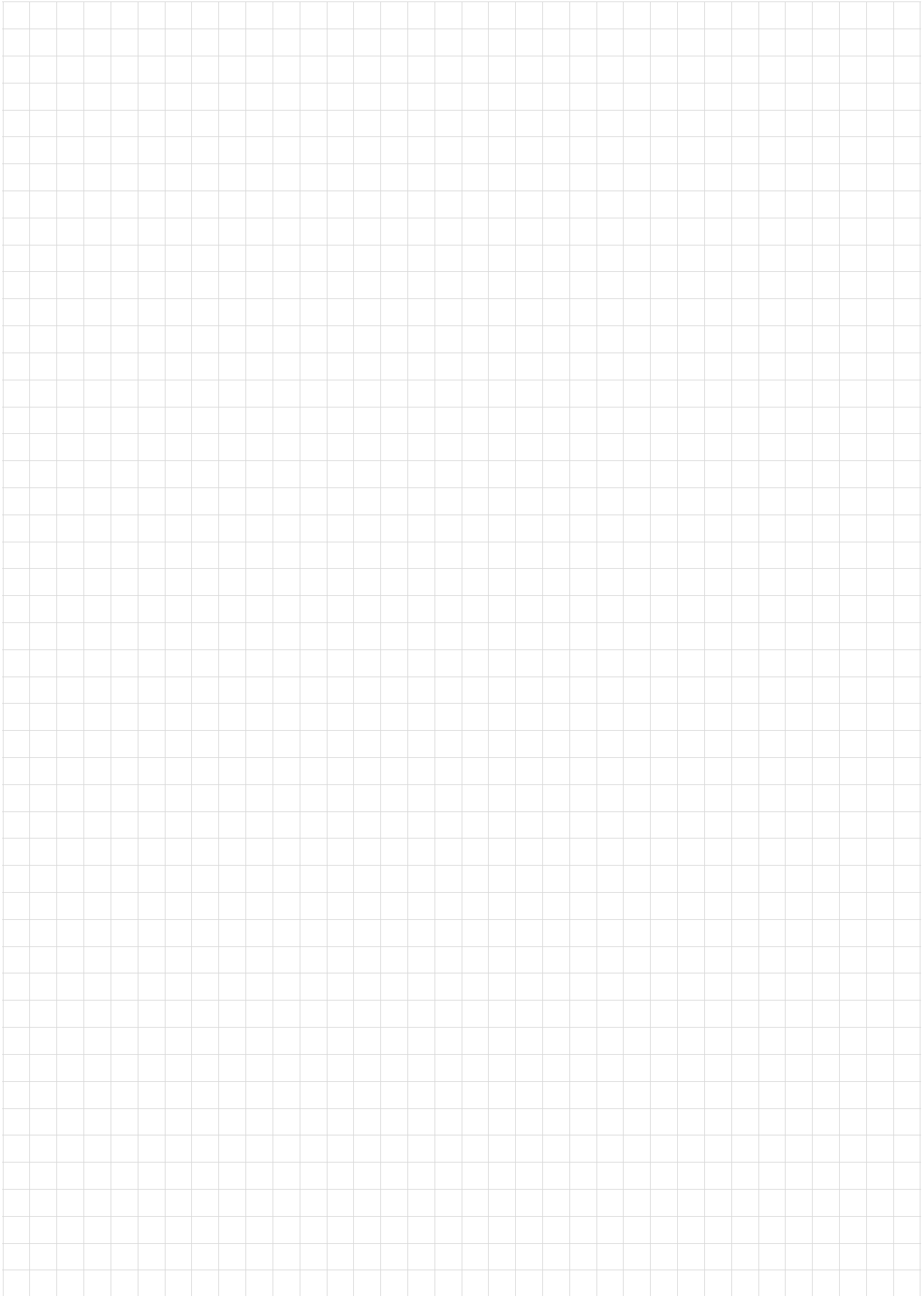
The following table shows the functional description of the power terminals of the size 2 TAS transformer module:

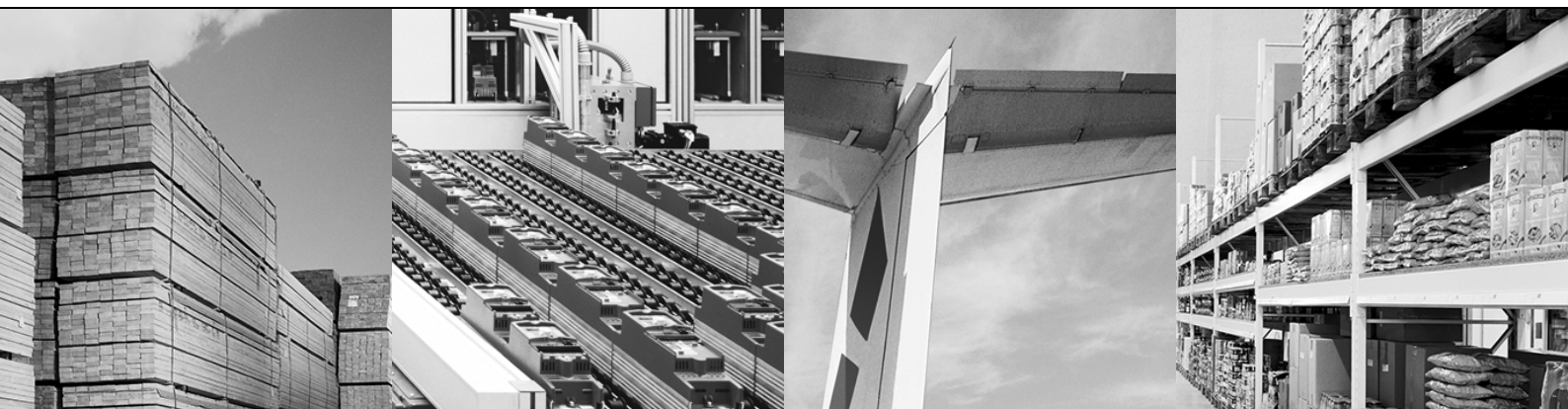
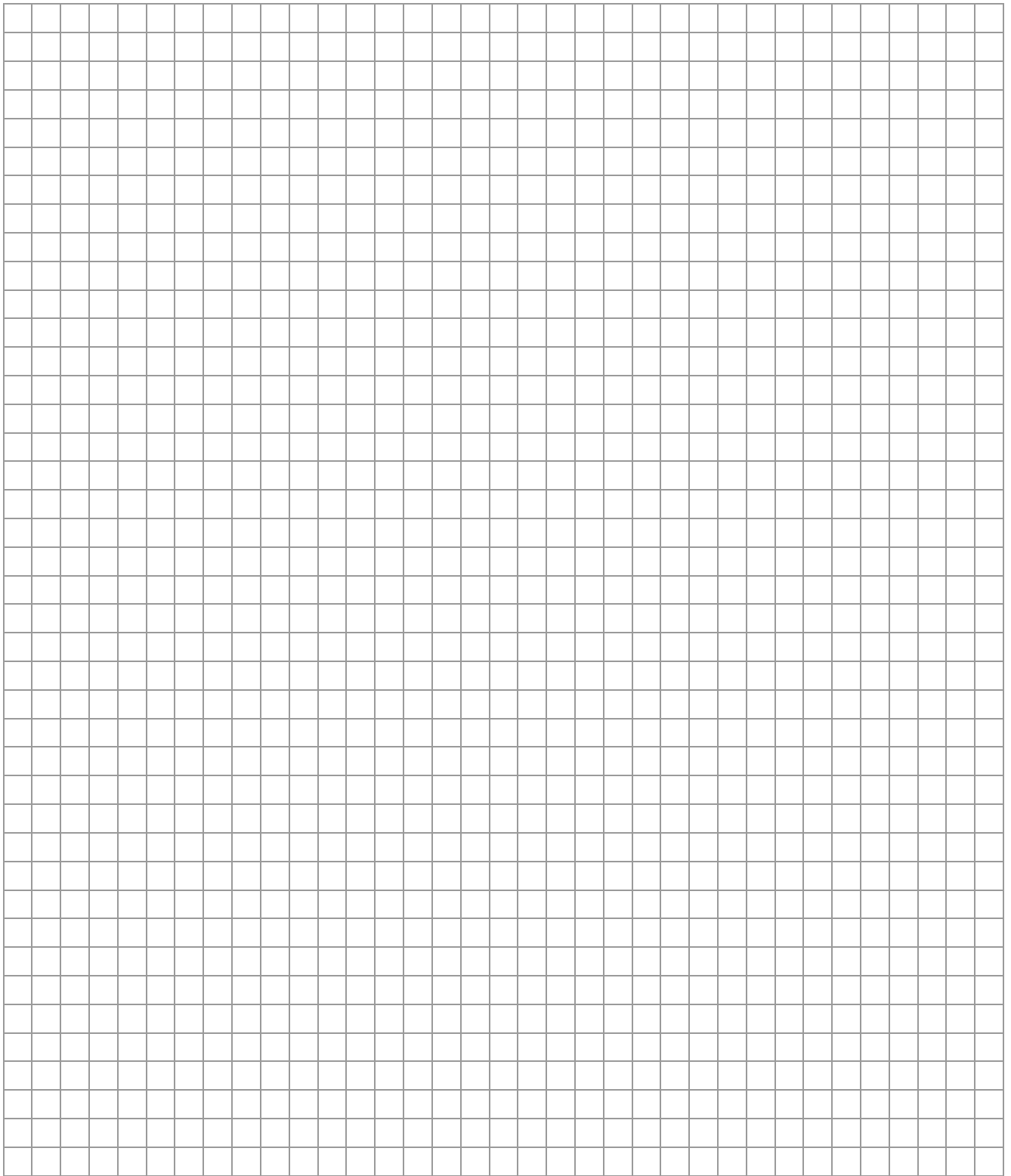
Terminal		Function
X2: 4/5 X3: 6/9	G1 / G2 -I/+I	Gyrator connection (→ from TPS X2: G1/G2) Current feedback (→ from TPS X3: -I/+I)
LA LI		Line cable outer connection Line cable inner connection

The following table shows the functional description of the power terminals of the size 4 TAS transformer module:

Terminal		Function
X2: 4/5 X3: 6/9	G1 / G2 -I/+I	Gyrator connection (→ from TPS X2: G1/G2) Current feedback (→ from TPS X3: -I/+I)
LA1 LI1 LA2 LI2		1. line cable outer connection 1. line cable inner connection 2. line cable outer connection 2. line cable inner connection









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