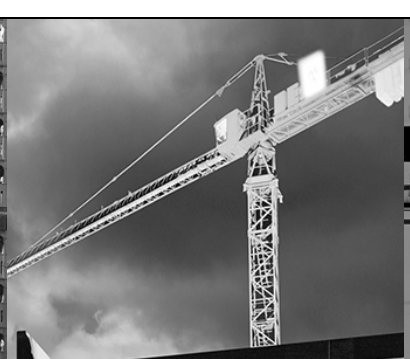
SEW EURODRIVE

Stationary Energy Supply
MOVITRANS® TPS10A Stationary Converter

Edition 08/2009
16754417 / EN

Operating Instructions




KKFU 144794 3
42G1

Content

1 General Information

1.1 How to use the operating instructions

The operating instructions are an integral part of the product and contain important information on operation and service. The operating instructions are written for all employees who assemble, install, startup, and service this product.

The operating instructions must be accessible and legible. Make sure that persons responsible for the system and its operation, as well as persons who work independently on the unit, have read through the operating instructions carefully and understood them. Consult SEW-EURODRIVE if you have any questions or if you require further information.

1.2 Structure of the safety notes

1.2.1 Meaning of the signal words

The following table shows the grading and meaning of the signal words for safety notes, notes on potential risks of damage to property, and other notes.

Signal word	Meaning	Consequences if disregarded
⚠ DANGER	Imminent danger	Severe or fatal injuries
⚠ WARNING	Possible dangerous situation	Severe or fatal injuries
⚠ CAUTION	Possible dangerous situation	Minor injuries
NOTICE	Possible damage to property	Damage to the drive system or its environment
INFORMATION	Useful information or tip: Simplifies the handling of the drive system.	

1.2.2 Structure of the section safety notes

The section safety notes do not apply to a specific action, but to several actions pertaining to one subject. The used pictograms indicate either a general or a specific hazard.

This is the formal structure of a section safety note:

⚠ SIGNAL WORD

Nature and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

This is an example for a section safety note:

⚠ WARNING

Falling of suspended loads.

Severe or fatal injuries.

- Do not stand under the suspended load.
- Secure the danger zone.

1.2.3 Structure of the embedded safety notes

The embedded safety notes are directly integrated in the instructions just before the description of the dangerous action.

This is the formal structure of an embedded safety note:

- ⚠**SIGNAL WORD** Nature and source of hazard.

  Possible consequence(s) if disregarded.

  – Measure(s) to prevent the hazard.

This is an example for an embedded safety note:

- ⚠**DANGER** Risk of crushing if the drive restarts unintentionally.

  Severe or fatal injuries.

  – De-energize the drive.

  – Secure the drive against unintended restart.

1.3 Rights to claim under limited warranty

A requirement of fault-free operation and fulfillment of any rights to claim under limited warranty is that you adhere to the information in the operating instructions. Therefore, read the operating instructions before you start working with the unit!

1.4 Exclusion of liability

You must comply with the information contained in these operating instructions to ensure safe operation of the MOVITRANS® units and to achieve the specified product characteristics and performance requirements. SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of these operating instructions. In such cases, any liability for defects is excluded.

1.5 Copyright

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 lines 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 immediately upon receipt for any damage that may have occurred during transportation.
- 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" section.
- Remove securing devices used for transportation 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 Assembly

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 EN 50178.

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. 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

Repairs may only be carried out by SEW-EURODRIVE.

2.13 Disposal

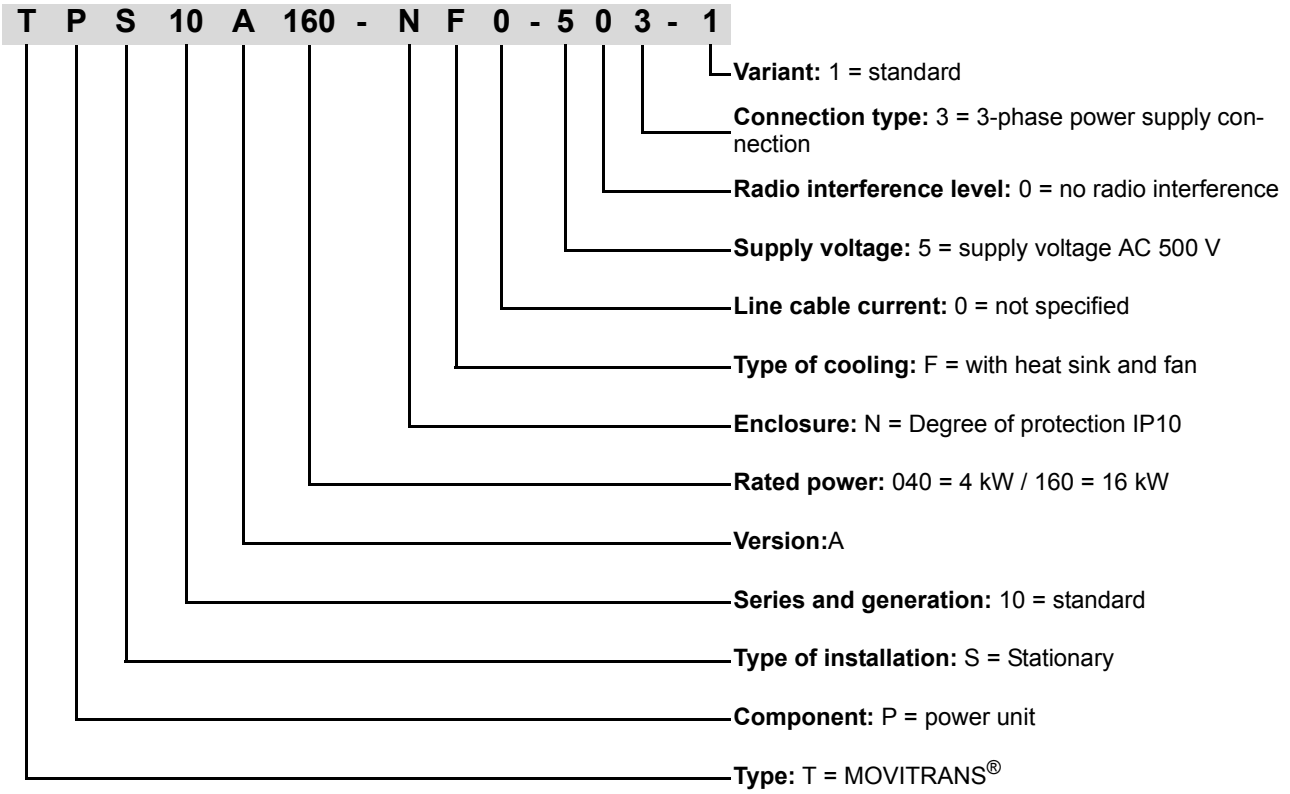
Please observe the applicable national regulations. Dispose of materials separately in accordance with the regulations in force, for example:

- Electronics scrap
- Plastic
- Sheet metal
- Copper
- Aluminum

3 Unit Design

3.1 Unit designation

The unit designation of the MOVITRANS® TPS10A stationary converter comprises the following characteristic data:



3.2 Short designation

The following short designations are used:

Unit	Short designation
MOVITRANS® TPS10A...-NF0-503-1 stationary converter	TPS10A stationary converter
MOVITRANS® TPS10A040-NF0-503-1 stationary converter	TPS10A040 stationary converter
MOVITRANS® TPS10A160-NF0-503-1 stationary converter	TPS10A160 stationary converter

3.3 Scope of delivery

The TPS10A stationary converter is available in 2 sizes.

3.3.1 Size 2

The scope of delivery comprises the following components:

Unit
1 MOVITRANS® TPS10A stationary converter (power section with control unit)
With 1 power shield clamp.
MOVITRANS® TPS10A040-NF0-503-1 stationary converter

3.3.2 Size 4

The scope of delivery comprises the following components:

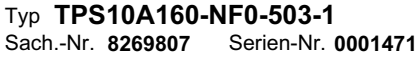
Unit
1 MOVITRANS® TPS10A stationary converter (power section with control unit)
With 2 touch guards for the power terminals.
MOVITRANS® TPS10A160-NF0-503-1 stationary converter

3.4 Nameplate

The nameplate of the TPS10A stationary converter is attached on the left side of the control unit. The following figure shows an example of a nameplate:

9007199401568651

A type label is attached to the front of the control unit (above the TERMINAL slot). The following figure shows an example of a type label for MOVITRANS® TPS10A stationary converters:



9007199401588235

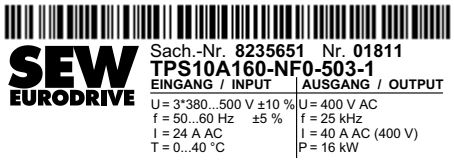
Nameplate of the control unit

The nameplate of the control unit is attached on the left side of the control unit. The following figure shows an example of a control unit nameplate.

2111995531

Nameplate of the power section

The nameplate of the power section, which contains important information, is attached on the right side of the power section cover. The following figure shows an example of a power section nameplate.

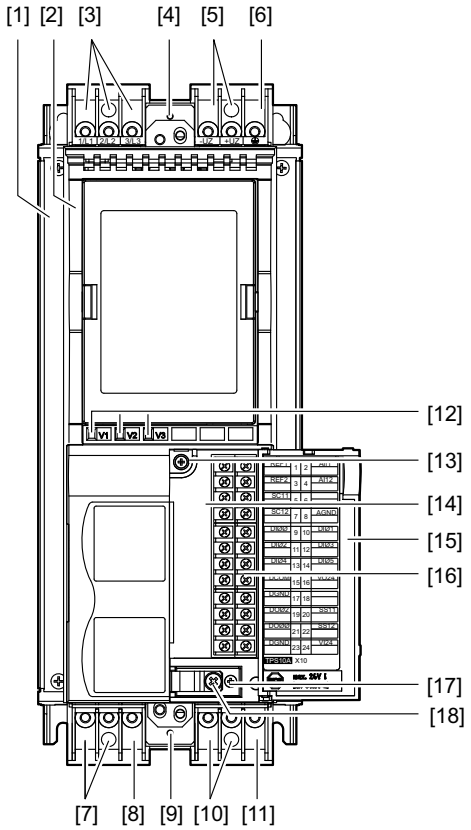


2111992843

U	Voltage
f	Frequency
I	Current
T	Ambient temperature
P	Output power

3.5 Size 2 (TPS10A040)

The following figure shows the unit design of the TPS10A040 stationary converter:

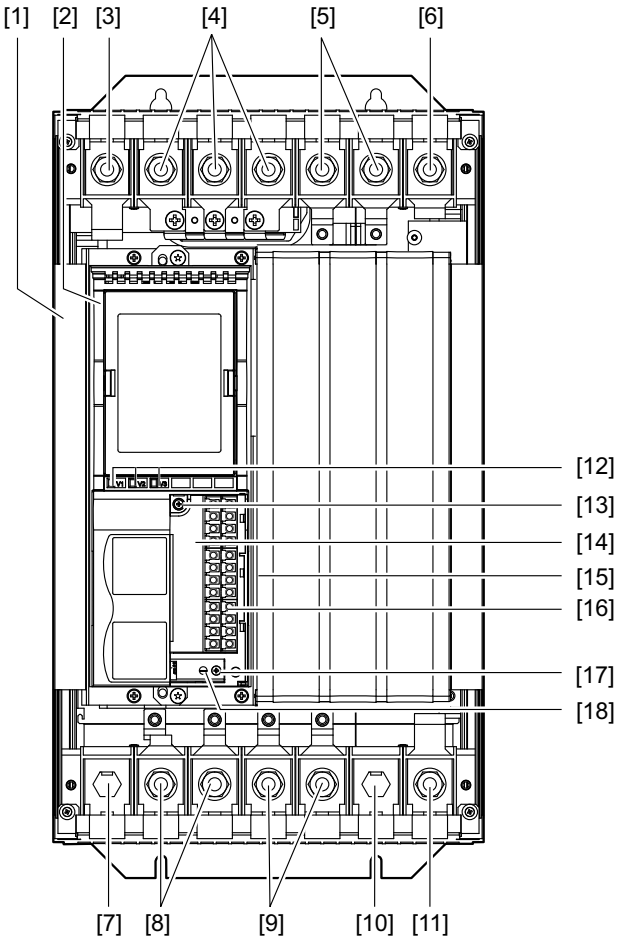


9007199401609995

[1] Power section
[2] Control unit
[3] X1: Supply system connection L1 (1) / L2 (2) / L3 (3)
[4] X5: Connection for power shield clamp
[5] X4: DC link connection $-U_Z$ / $+U_Z$
[6] X4: PE connection ⏚
[7] X2: Gyrator connection G1 (4) / G2 (5)
[8] Terminal has no function
[9] X6: Connection for the power shield clamp
[10] X3: Current feedback -I (6) / +I (9)
[11] X3: PE connection ⏚
[12] Operation LEDs V1 / V2 / V3
[13] Retaining screw A for connection unit
[14] Connection unit for control leads, detachable
[15] Flap on connection unit with labeling tile
[16] X10: Electronics terminal strip
[17] Retaining screw B for connection unit
[18] Screw for electronics shield clamp

3.6 Size 4 (TPS10A160)

The following figure shows the unit design of the TPS10A160 stationary converter:



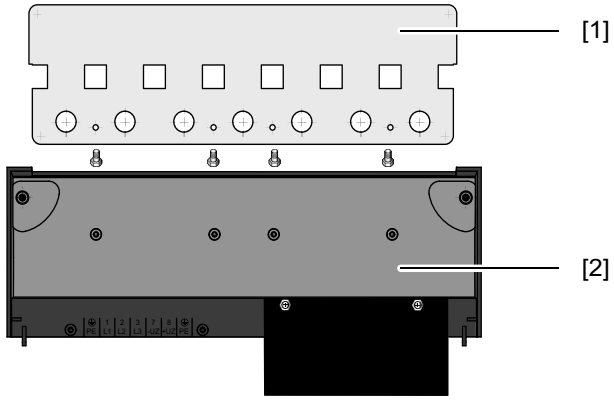
9007199401633931

[1] Power section
[2] Control unit
[3] X1: PE connection ⏚
[4] X1: Supply system connection L1 (1) / L2 (2) / L3 (3)
[5] X4: DC link connection $-U_Z$ / $+U_Z$
[6] X4: PE connection ⏚
[7] Terminal has no function
[8] X2: Gyrator connection G1 (4) / G2 (5)
[9] X3: Current feedback -I (6) / +I (9)
[10] Terminal has no function
[11] X3: PE connection ⏚
[12] Operation LEDs V1 / V2 / V3
[13] Retaining screw A for connection unit
[14] Connection unit for control leads, detachable
[15] Flap on connection unit with labeling tile
[16] X10: Electronics terminal strip
[17] Retaining screw B for connection unit
[18] Screw for electronics shield clamp

3.6.1 Touch guard for size 4

The TPS10A160 stationary converter units (size 4) include 2 touch guard elements and 8 retaining screws.

The following figure shows the touch guard for the TPS10A160 stationary converter:



9007199665102091

[1] Touch guard
[2] Protection cover

The degree of protection of TPS10A160 stationary converter with touch guard is IP10, without touch guard, it is IP00.

3.7 Optional serial interface USS21A

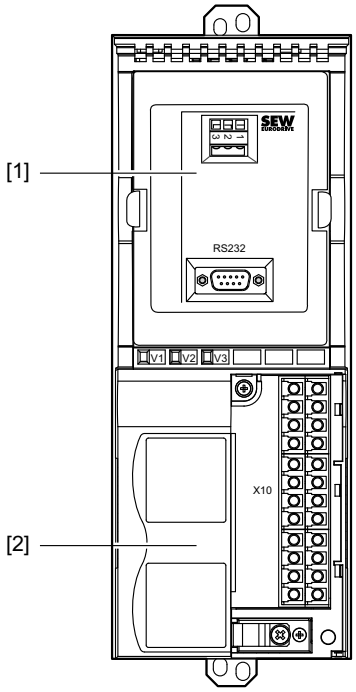
3.7.1 Description

The serial interface is optional. It can be ordered under the following part number:

Unit	Part number
Serial interface type USS21A (RS 232)	822 914 7

The TPS10A stationary converter can be equipped with the potential-free RS232 interface. The RS232 interface is designed as a 9-pole sub-D socket (EIA standard). The interface is accommodated in a housing to be plugged into the inverter (TERMINAL option slot). You can plug in the option during operation. The transmission rate of the RS-232 interface is 9600 baud.

Startup, operation and service can be controlled by the PC via the serial interface. Use the MOVITOOLS® MotionStudio software for this purpose. The following figure shows the control unit of the TPS10A stationary converter with serial interface type USS21A (RS232):



9007199401625227

[1] Serial interface type USS21A (RS232)
[2] Control unit

4 Mechanical Installation

4.1 Mounting position

INFORMATION

Do not install the units horizontally, tilted or upside down.

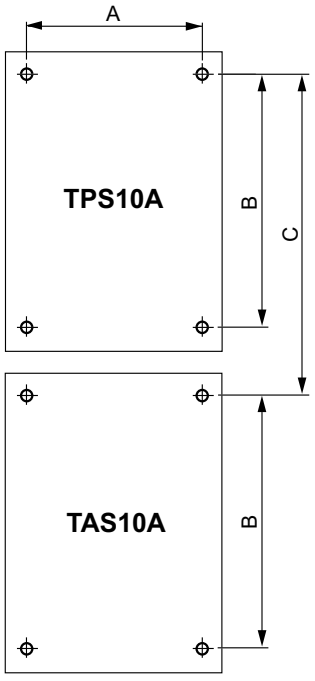
Install the TPS10A stationary converter and the TAS10A transformer module vertically on top of one another. SEW-EURODRIVE recommends this mounting position.

If required by the installation, you may also install the TPS10A stationary converter and the TAS10A transformer module next to one another.

4.1.1 Vertical installation

Observe the following installation instructions:

- Install the TPS10A stationary converter and the TAS10A transformer module vertically on top of one another.
- Leave at least 100 mm (4 in) clearance at the top and bottom for optimum heat dissipation. For project planning, refer to the chapter "Technical Data".
- With the TPS10A160 stationary converter (size 4), do not install any components that are sensitive to high temperatures less than 300 mm above the unit.
- Use twisted cables for connecting TPS10A040 and TAS10A040, as described in the chapter "Wiring diagram, size 2".
- Use standardized connection conductor rails as described in the chapters "Connection conductor rails, size 4" and "Wiring diagram, size 4 (connection variant I)" for connecting TPS10A160 and TAS10A160.
- Ensure the distance between the units for installation according to the following illustration:



1797939595

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)	500 +1 (19.7 + 0.04 in)	548+2 (21.6 + 0.08 in)

4.1.2 Horizontal installation

Observe the following installation instructions:

- Install the TPS10A stationary converter and the TAS10A transformer module next to one another. There is no need for clearance at the sides. You can line up the units directly next to one another.
- Leave at least 100 mm (4 in) clearance at the top and bottom for optimum heat dissipation. For project planning, refer to the chapter "Technical Data".
- With the TPS10A160 stationary converter (size 4), do not install any components that are sensitive to high temperatures less than 300 mm above the unit.
- Use twisted cables for connecting TPS10A040 and TAS10A040, as described in the chapter "Wiring diagram, size 2".
- Use twisted cables and a choke for connecting TPS10A160 and TAS10A160 , as described in the chapter "Wiring diagram, size 4 (connection variant II)".

5 Electrical Installation

⚠ WARNING

Faulty installation.

Severe or fatal injuries.

- It is essential to comply with the safety notes in chapter 2 during installation.

5.1 Assembly and installation notes

Comply with the following installation instructions during installation.

5.1.1 Tightening torques

Only use genuine connection elements.

Size 2

Observe the following tightening torques for the TPS10A040 stationary converter:

Designation	Tightening torque
Power terminals	1.5 Nm (13.3 lb.in)

Size 4

Observe the following tightening torques for the TPS10A160 stationary converter:

Designation	Tightening torque
Power terminals	14 Nm (124 lb.in)

5.1.2 Recommended tools

Only use the following tools to connect the X10 electronics terminals strip. Other tools will damage the screw head.

- Phillips screwdriver size 1 according to DIN 5262 PH1
- Slotted screwdriver to DIN 5265, size 4.0 × 0.8 or 4.5 × 0.8

5.1.3 Line contactor

Only use line contactors (K11) of utilization category AC3 (IEC 158-1).

5.1.4 Line choke

If you connect more than 4 units to a line connector dimensioned for the total current, connect a 3-phase line choke in between for limiting the inrush current.

5.1.5 Separate cable ducts

Route power cables and electronics cables in separate cable ducts.

5.1.6 Input fuses and earth-leakage circuit breakers

Install input fuses for the line protection (no unit protection) at the beginning of the supply system lead behind the supply bus junction. Use D, DO, NH or circuit breakers.

An earth-leakage circuit breaker as sole protection device (exception: a universal current-sensitive earth-leakage circuit breaker) is not permitted. During normal operation of the inverter, earth-leakage currents of > 3.5 mA may occur.

5.1.7 PE supply system connection (→ EN 50178)

Dimension the PE supply system connection as follows:

Supply system lead < 10 mm^2 (AWG7):

- Route a second PE conductor with the same cable cross section as the supply system lead in parallel to the protective earth via separate terminals.

  or

- Route a copper protective earth conductor with a cable cross section of 10 mm^2 (AWG7).

Supply system lead ≥ 10 mm^2 (AWG7):

- Route a copper protective earth conductor with the cross section of the supply system lead.

5.1.8 Input filter

A line filter is required for compliance with limit class A according to EN 55011 and EN 55014. See Sec. "Technical Data".

- NF014-503 (part number: 827 116 X) for TPS10A040 stationary converter
- NF035-503 (part number: 827 128 3) for TPS10A160 stationary converter

Observe the following mounting instructions:

- Install a line filter close to the unit outside the minimum clearance.
- Limit the length of the cable between the line filter and unit to the absolute minimum needed.
- Use twisted and shielded cables for long distances between the control cabinet and line filter and between the line filter and unit.

5.1.9 IT systems

SEW-EURODRIVE recommends using earth-leakage monitors with pulse code measuring in voltage supply systems with a non-grounded star point (IT systems). Use of such devices prevents the earth-leakage monitor miss-tripping due to the ground capacitance of the unit.

5.1.10 Cable cross sections

Electronics cables:

- 1 core per terminal 0.20 – 2.5 mm^2 (AWG24 - 12)
- 2 cores per terminal 0.20 – 1 mm^2 (AWG24 - 17)

Supply system cable:

- Cable cross section according to nominal input current I_{line} at nominal load.

Size 2 The cable cross section between X2/X3 of the TPS10A040 stationary converter and X2/X3 of the TAS10A040 transformer module is 4 mm^2.

Size 4 The cable cross section between X2/X3 of the TPS10A160 stationary converter and X2/X3 of the TAS10A160 transformer module is 16 mm^2.

5.1.11 Unit output

Only connect valid components to the unit, such as the TAS10A transformer module.

5.1.12 Binary inputs/outputs

Observe the following information:

- The binary inputs are electrically isolated by optocouplers.
- Binary outputs are short-circuit proof but not protected against external voltage. External voltages can cause irreparable damage!

5.1.13 Shielding and grounding

Observe the following installation instructions for shielding and grounding:

- Connect the shield by the shortest possible route and make sure it is grounded over a wide area at both ends. 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 in grounded sheet metal ducts or metal tubes for shielding purposes. Install the power and signal lines separately.
- Ground the TPS10A stationary converters and all additional devices high-frequency compatibly. To do so, provide a wide area metal-on-metal contact between the unit housing and ground (e.g. unpainted control cabinet mounting panel).

5.2 UL-compliant installation

INFORMATION

UL certification does not apply to operation in voltage supply systems with a non-earthed star point (IT systems).

Observe the following instructions for UL-compliant installation:

- Only use copper cables with the following temperature ranges as connection cables: 60 °C / 75 °C for TPS10A (sizes 2 and 4)
- For permitted tightening torques of the power terminals, refer to the chapter "Assembly and installation notes, tightening torques".
- TPS10A stationary converters are suitable for operation on voltage supply systems with grounded star point (TN and TT nets) supplying a maximum line current according to the following tables and with a maximum voltage of AC 500 V. Only use fuses as the main safety feature. The performance data of these fuses must not exceed the values in the following table.

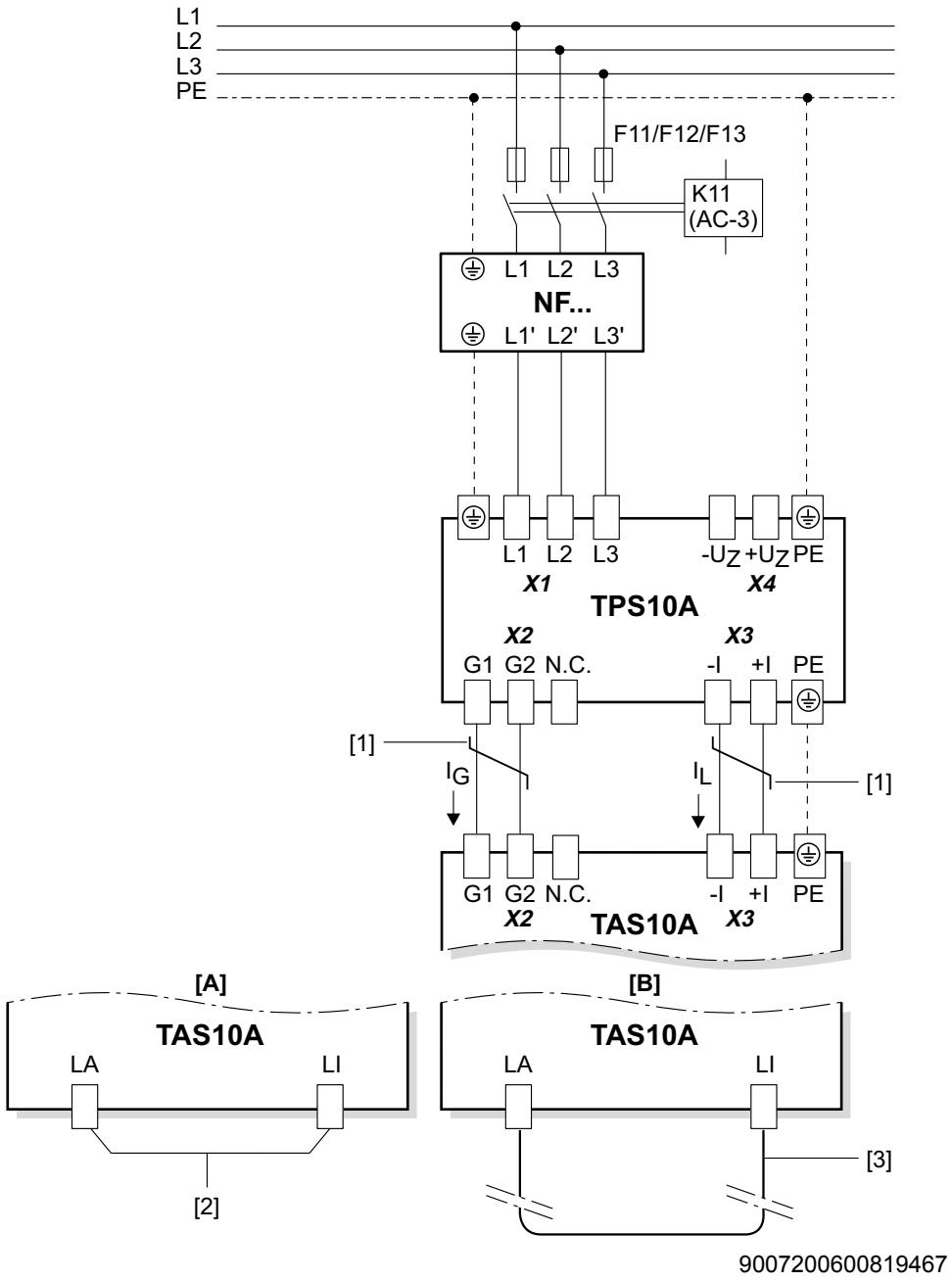
Stationary converter	Max. supply current	Max. supply voltage	Fuses
TPS10A040 (size 2)	AC 5000 A	AC 500 V	110 A / 600 V
TPS10A160 (size 4)	AC 10000 A	AC 500 V	350 A / 600 V

- Only use certified units with a limited output voltage (U_{max} = DC 30 V) and limited output power(P_{max} = 100 VA) as an external DC 24 V voltage source.

5.3 TPS10A040 stationary converter (size 2)

5.3.1 Wiring diagram for size 2

The following figure shows the wiring diagram for the TAS10A040 transformer module (size 2) to the power section of the TPS10A040 stationary converter (size 2):



[1] Twisted cables
[2] Short-circuit hoop
[3] Line cable loop

[A] Connection variant A (delivery state):
For startup of TPS10A040 stationary converter without connected TLS line cable
[B] Connection variant B
For startup and operation with connected line cable loop

5.3.2 Connecting TAS10A040 to TPS10A040

INFORMATION

Only the connection of the TAS10A040 transformer module to the TPS10A040 stationary converter is described here.

For information about connecting

- a short-circuit hoop (variant A)
- a line cable loop (variant B)

to the TAS10A040 transformer module, refer to the "MOVITRANS® TAS10A Transformer Module" operating instructions.

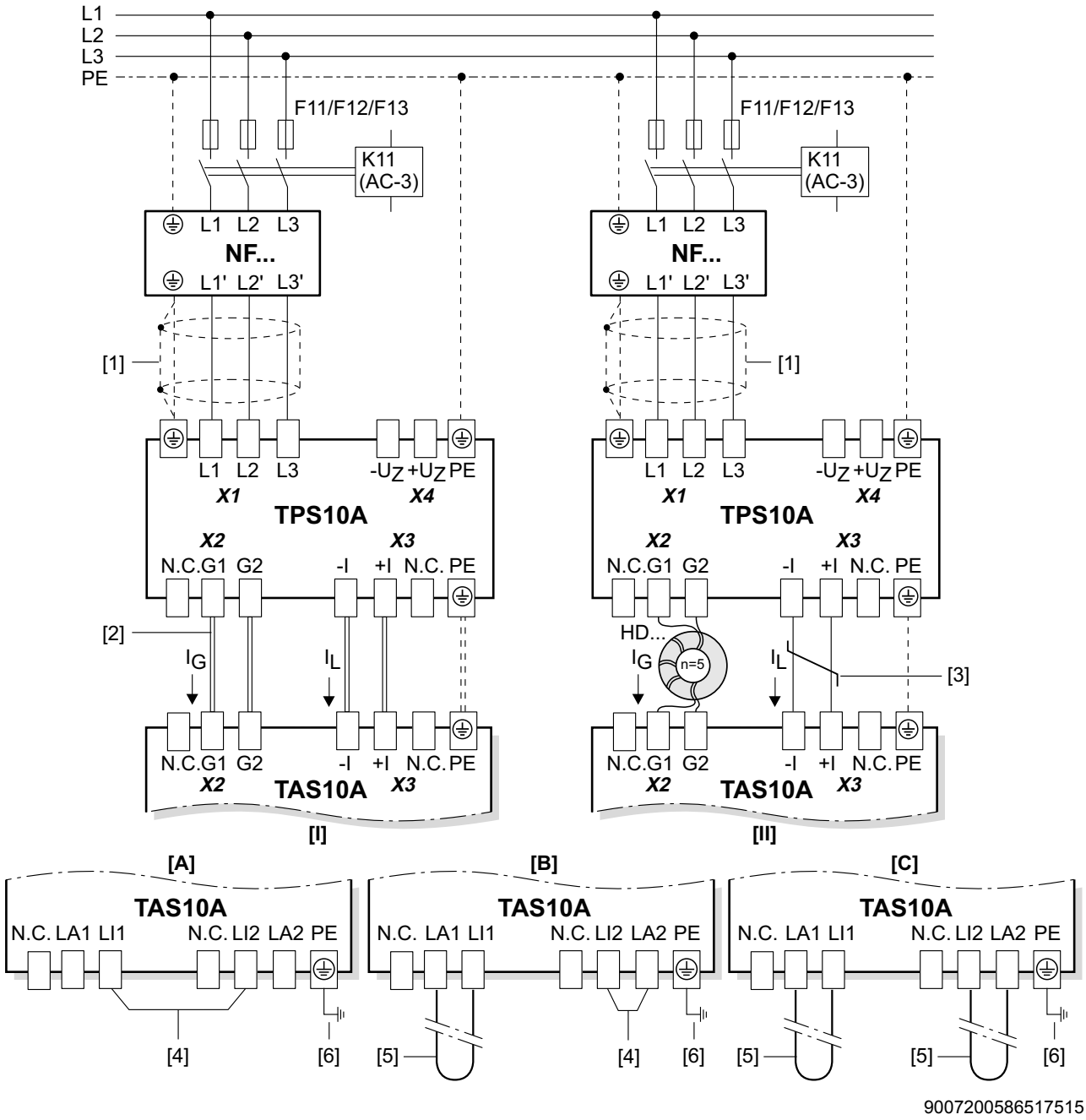
1. Connect identical terminals between TPS10A040 stationary converter and TAS10A040 transformer module using twisted cables. See wiring diagram, size 2.

   Ensure proper cable cross sections and cable routing.

5.4 TPS10A160 stationary converter (size 4)

5.4.1 Wiring diagram, size 4

The following figure shows the wiring diagram for the TAS10A160 transformer module (size 4) to the power section of the TPS10A160 stationary converter (size 4):



[1] Shielded cables
[2] Connection conductor rails
[3] Twisted cables
[4] Short-circuit hoop
[5] Line cable loop
[6] Optional PE connection for ensuring high-frequency grounding

[I] Connection variant I: Installing TPS10A160 and TAS10A160 on top of one another
Connecting TAS10A160 to TPS10A160 with connection conductor rails

[II] Connection variant II: Installing TPS10A and TAS10A next to one another
Connecting TAS10A160 to TPS10A160 using twisted cables and output choke

[A] Connection variant A (delivery state):
For startup of TPS10A160 stationary converter without connected TLS line cable
[B] Connection variant B:
For startup and operation with one line cable loop and one short-circuit hoop
[C] Connection variant C:
For startup and operation with 2 line cable loops

5.4.2 Connecting TAS10A160 to TPS10A160

INFORMATION

Only the connection of the TAS10A160 transformer module to the TPS10A160 stationary converter is described here.

For information about connecting

- a short-circuit hoop (variant A)
- a line cable loop (variant B)
- two line cable loops (variant C)

to the TAS10A160 transformer module, refer to the "MOVITRANS® TAS10A Transformer Module" operating instructions.

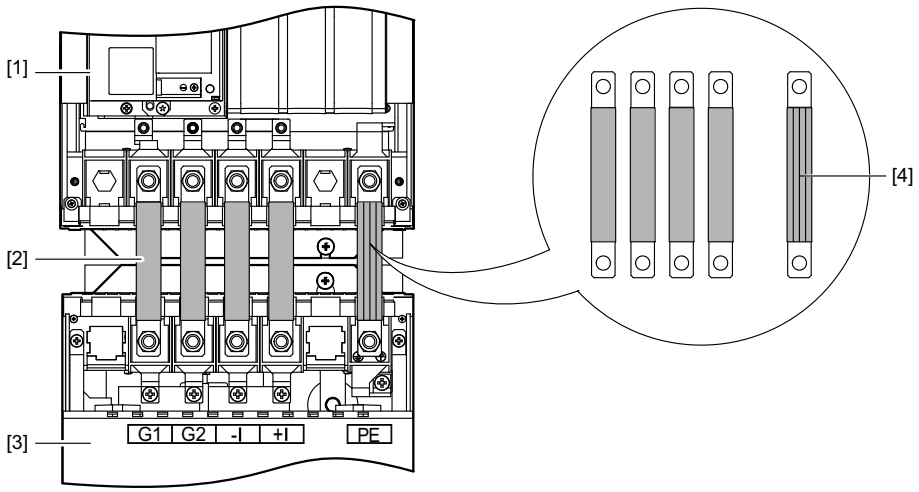
Variant I

Installation on top of one another

The TPS10A160 stationary converter and the TAS10A160 transformer module are installed on top of one another as recommended.

1. Use standardized connection conductor rails to connect the TAS10A160 transformer module to the TPS10A160 stationary converter. The rails are included in the delivery scope of the TAS10A160 transformer module.

The following figure shows the units connected with connection conductor rails:



147077515

[1] MOVITRANS® TPS10A160 stationary converter
[2] Connection conductor rails
[3] MOVITRANS® TAS10A160 transformer module
[4] Connection conductor rails (detail view)

For more information on this topic, refer to the "MOVITRANS® TAS10A Transformer Module" operating instructions.

Variant II

Horizontal installation

The TPS10A160 stationary converter and the TAS10A160 transformer module are installed next to one another as recommended.

1. Connect identical terminals between TPS10A160 stationary converter and TAS10A160 transformer module using twisted cables. See wiring diagram, size 4.

   Ensure proper cable cross sections and cable routing.

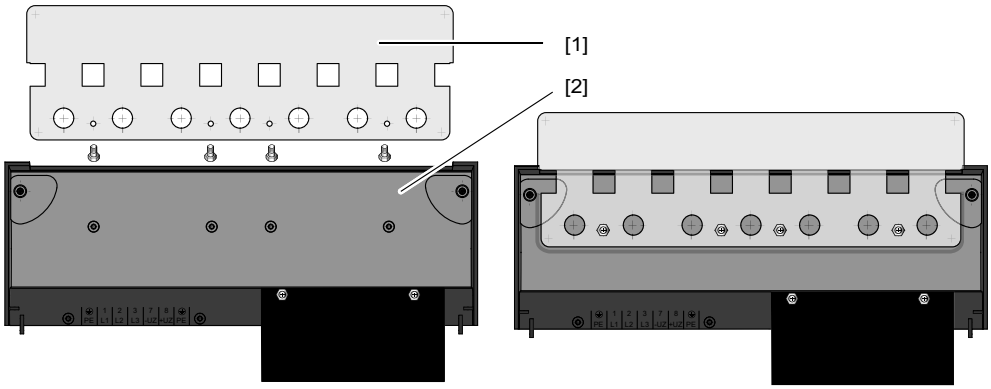
   Before connecting the second cable end to X2:G1 / G2 on the TAS10A160 transformer module, you have to wind the twisted cable five times around the output choke (ferrite core).

Order the output choke separately:

Output choke	HD003
Inside diameter d	88 mm (3.5 in)
For cable cross sections	≥ 16 mm^2 (AWG6)

5.4.3 Touch guard

Install the touch guard on both covers of the power section terminals. The following figure shows the touch guard for the TPS10A160 stationary converter:



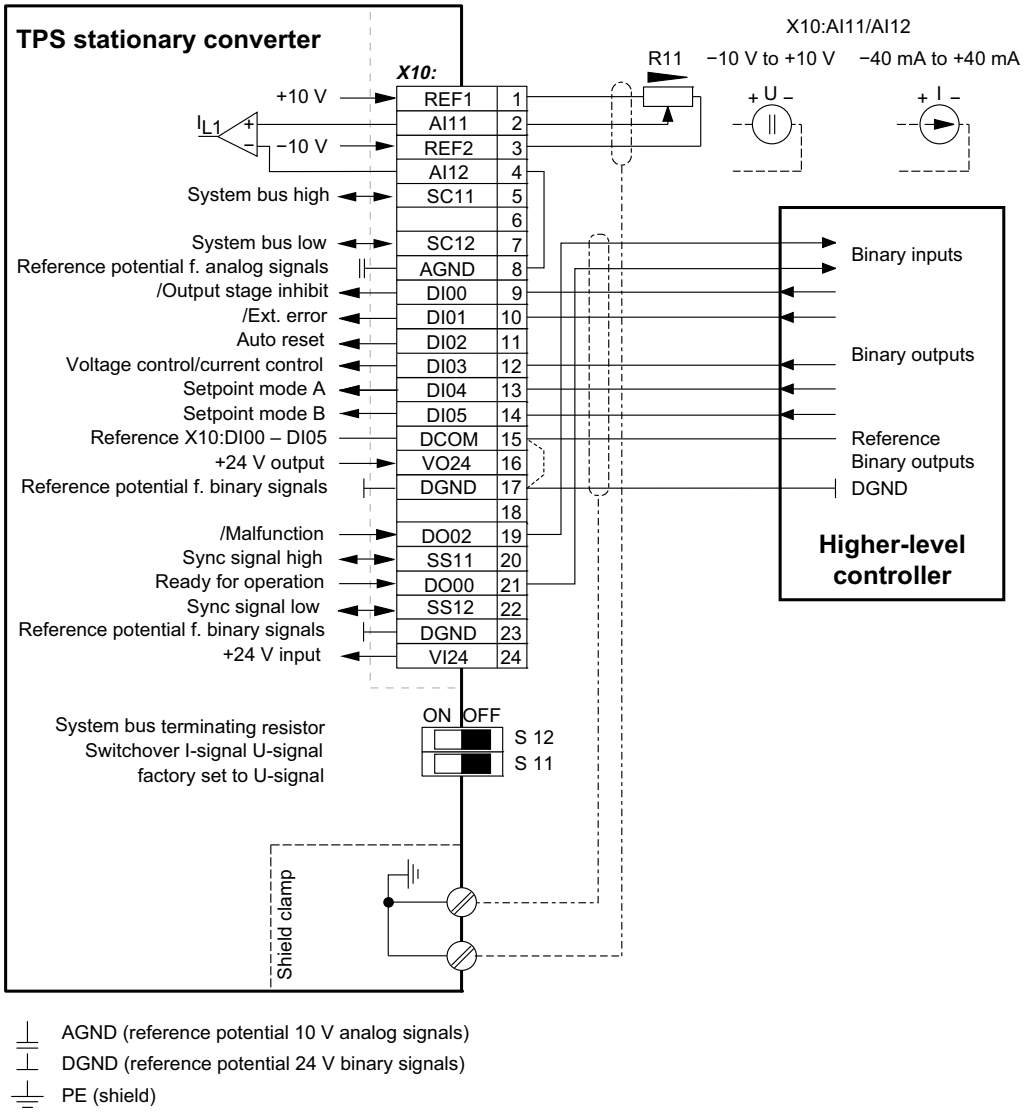
9007199401573003

[1] Touch guard
[2] Protection cover

5.5 Control unit (TPS10A)

5.5.1 Control unit, size 2 and 4

Connect the control unit of the TPS10A stationary converters as illustrated in the following figure:



18014398656370571

Observe the following installation instructions:

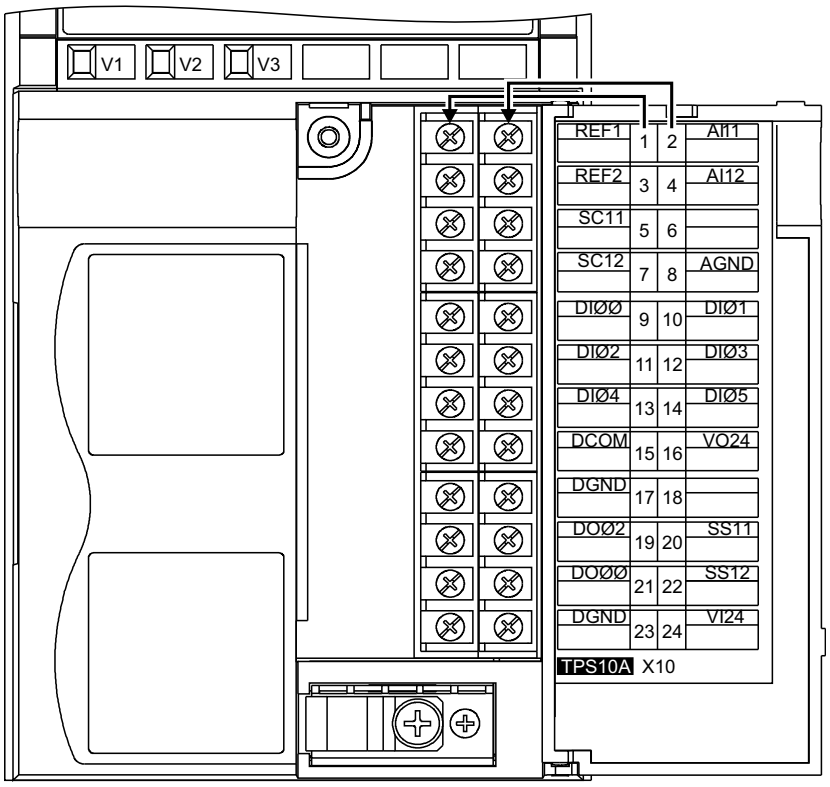
- If the binary inputs are set with the DC 24 V voltage supply X10:16 "VO24", you must install a jumper between X10:15 and X10:17 (DCOM-DGND) at the control unit.
- DIP switches S11 and S12 cannot be accessed unless the connection unit is removed.
- The resistance $R11_{min}$ must be at least 4.7 kΩ .

5.5.2 Description of terminal functions (power section and control unit)

Terminal		Function	
X1:1/2/3	**L1 / L2 / L3**	Supply system connection	
X2: 4/5	**G1 / G2**	Gyrator connection	
X3:6/9	**−I / +I**	Current feedback	
X4: $+U_Z$ / $-U_Z$	**$+U_Z$ / $-U_Z$**	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 "Controller 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 "External 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, error 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**	24 V power supply input Only required for diagnostic purposes.	
S11	**I ↔ U**	AI11/AI12 switchover I-signal (-40 mA to +40 mA) ↔ U-signal (-10 V to +10 V), Set to U-signal at the factory	
S12	**On ↔ Off**	System bus terminating resistor	

5.5.3 Assignment of the electronics terminals and label

The following figure shows the assignment of the electronics terminals to the label:



322198027

5.6 Connection unit assembly and removal

⚠ WARNING

Dangerous voltages during impermissible operation without protective cover.

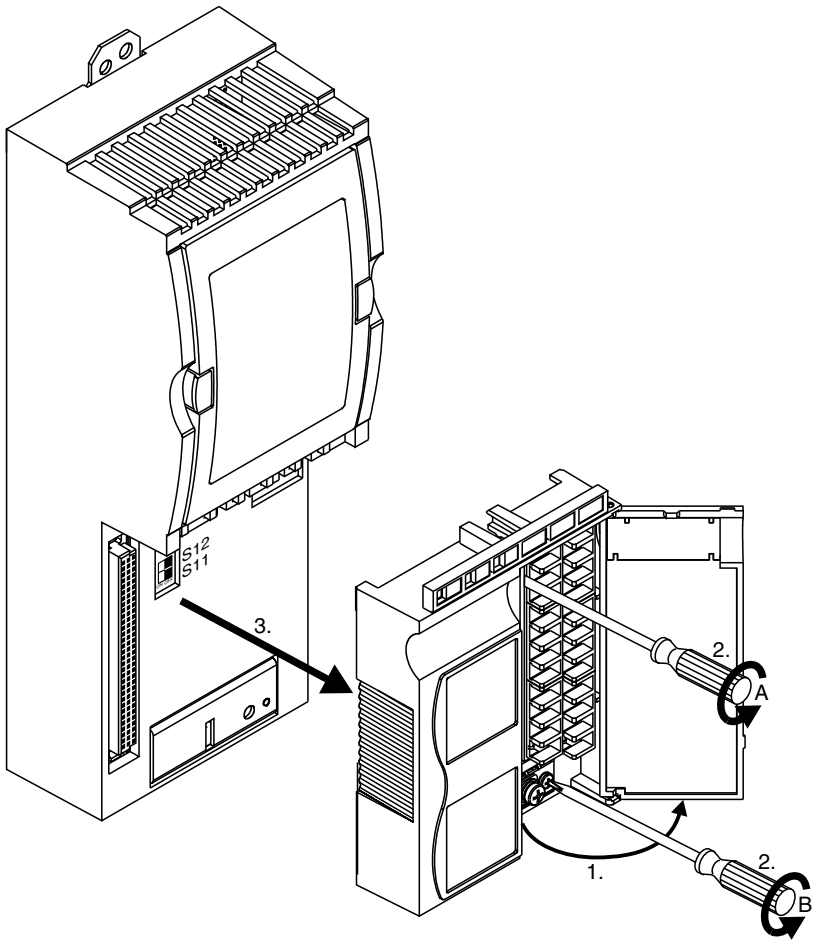
Severe or fatal injuries.

- Operation of MOVITRANS® units without protective cover is prohibited.
- Disconnect the TPS10A stationary converter from the supply system before you remove the protective cover. Dangerous voltages may still be present for up to 10 minutes after disconnection from the supply system.

You can remove the entire connection unit from the control module to facilitate installation of the control cables and to easily replace the unit in case it has to be serviced. Proceed as follows:

1. Open the flap of the connection unit.
2. Loosen the retaining screws A and B.

   The retaining screws are captive and cannot fall out.
3. Remove the connection unit from the control module.

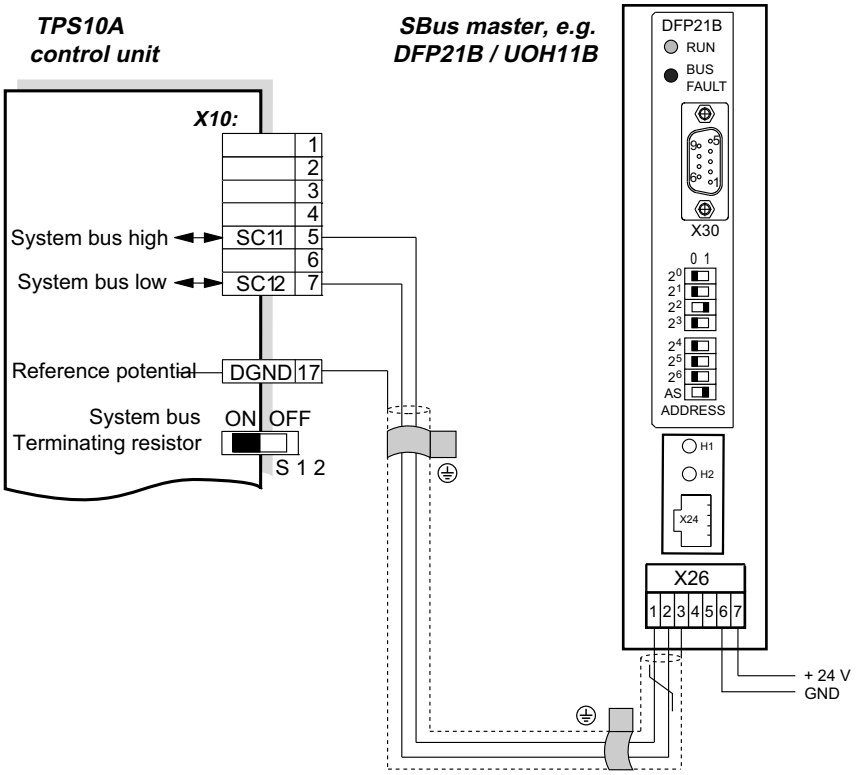


9007199401579531

Follow the instructions in reverse order when installing the connection unit.

5.7 System bus (SBus) installation

The TPS10A stationary converter allows for communication with an SBus master (e.g. PLC or DF.B fieldbus interface in the UOH11B gateway housing) via SBus. The stationary converter is always operated as SBus slave.



2083995659

The following table shows all fieldbus interfaces that can be used with the TPS10A stationary converter.

Fieldbus interface DF.B	Gateway housing	Fieldbus type
DFD11B	UOH11B	DeviceNet
DFP21B	UOH11B	PROFIBUS
DFE32B	UOH11B	PROFINET IO
DFE33B	UOH11B	EtherNet/IP and Modbus/TCP
DFE24B	UOH11B	EtherCAT

A connection to the INTERBUS fieldbus system can only be established via the UFI11A fieldbus interface.

The operating instructions for the fieldbus interface can be ordered from SEW-EURODRIVE or downloaded from the Internet under www.sew-eurodrive.de.

5.7.1 Cable specification

Use a 2-core twisted and shielded copper cable (data transmission cable with braided copper shield).

The cable must meet the following specifications:

- Cable cross section 0.25 mm^2 – 0.75 mm^2 (AWG23 – AWG18)
- Cable resistance 120 Ω at 1 MHz
- Capacitance per unit length ≤ 40 pF/m at 1 kHz

Suitable cables are CAN bus or DeviceNet cables.

5.7.2 Connecting the shield

Connect the shield at either end to the electronics shield clamp of the TPS10A stationary converter or the SBus master (e.g. DFP21A in the UOH11B gateway housing) and ensure the shield is connected over a large area. Connect the shield ends to DGND.

5.7.3 Cable length

The permitted total cable length depends on the baud rate setting of the SBus (P816):

SBus baud rate	total cable length
125 kbaud	500 m (1640 ft)
250 kbaud	250 m (820 ft)
500 kbaud	100 m (328 ft)
1000 kbaud	25 m (82 ft)

A baud rate of 500 kBaud is set as standard.

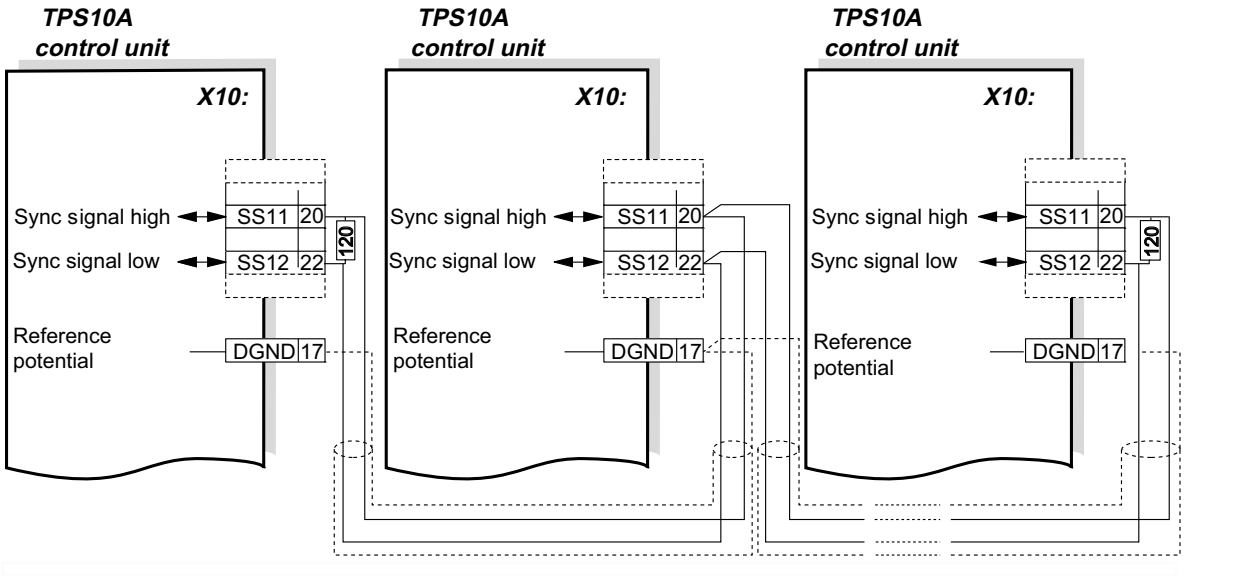
5.7.4 Terminating resistor

Connect the system bus terminating resistor (S12 = ON) at the TPS10A stationary converter. An SBus master is connected at the end of the system bus connection. Ensure that it contains a terminating resistor. The terminating resistor is already installed in the DF.B fieldbus interface in the UOH11B gateway housing.

5.8 Synchronization signal

A synchronization signal is available at terminals X10:20 (SS11) and X10:22 (SS12) to allow for the synchronization of several TPS10A stationary converters.

An external terminating resistor R = 120 Ω must be connected at the start and the end of the synchronization cable.



321135371

5.8.1 Cable specification

Use a 2-core twisted and shielded copper cable (data transmission cable with braided copper shield).

The cable must meet the following specifications:

- Core cross section 0.75 mm^2 (AWG18)
- Cable resistance 120 Ω at 1 MHz
- Capacitance per unit length ≤ 40 pF/m at 1 kHz

Suitable cables are CAN bus or DeviceNet cables.

5.8.2 Connecting the shield

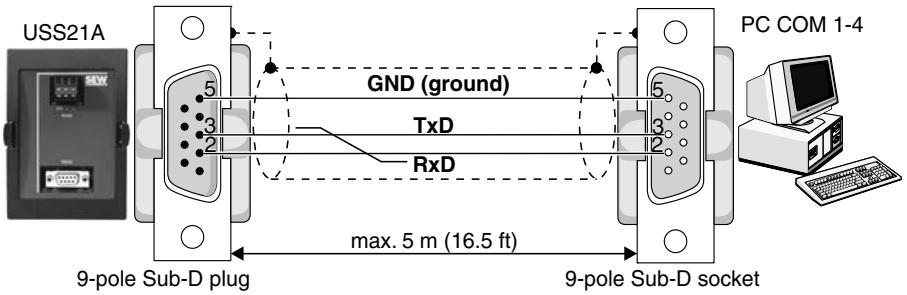
Connect the shield at either end to the electronics shield clamp of the TPS10A stationary converters and ensure the shield is connected over a large area. Also connect the ends of the shield to DGND.

5.8.3 Cable length

The permitted total cable length is 320 m.

5.9 Optional serial interface type USS21A (RS232)

To connect a PC to the USS21A option of the TPS10A stationary converter, use a commercial shielded serial interface cable with a 1:1 connection assignment.



146834187

6 Parameters

6.1 Notes

The following section describes the information windows in the MOVITRANS® parameter tree view with the display values for start up and the unit functions.

The parameter names correspond to those displayed in MOVITOOLS® MotionStudio.

The factory setting is indicated in **bold**.

Refer to the appendix for a description of the indexes of the individual parameter settings.

Usually, the parameter menu is only required for startup and in case of service. This is why the TPS10A stationary converter can be retrofitted with the appropriate communication option.

There are different approaches to set the parameters:

- Using the MOVITOOLS® MotionStudio software; PC connection via the USS21A serial interface
- Via the serial interface; programming by the customer
- Via the SBus interface; programming by the customer

You can access the parameters of the groups "Display values", "Startup" and "Unit functions" with a double click. Refer to the "Modular Engineering Software System MotionStudio MOVITRANS® Parameter Tree" publication for detailed information on the individual parameters.

The latest version of the MOVITOOLS® MotionStudio software is available for download on the SEW website www.sew-eurodrive.de.

6.2 Parameters ordered by parameter tree

The following table provides an overview of all parameters ordered by their position in the parameter tree.

Parameters ordered by parameter tree position				
List in the parameter tree/ list entry	**Parameters**	**Index**		**Description**
		Dec	**Sub**	
Display values/unit data (See section 6.3)	Unit type	8301	0	–
	Power section	9701	12	–
	Firmware	8300	0	–

Parameters ordered by parameter tree position				
List in the parameter tree/ list entry	Parameters	Index		Description
		Dec	Sub	
Display values/process values (See section 6.4)	Error code	9702	5	–
	Suberror code	10071	1	–
	Output stage (status word 1)	8310	0	–
	Operating mode (Binary inputs DI00-DI08)	8334	0	–
	Current setpoint	10237	1	–
	Ramp time	10232	1	–
	Output voltage	8723	0	–
	Output current	8326	0	–
	Load current	10089	1	–
	Load current fluctuation	8940	0	–
	Heat sink temperature	8327	0	–
	Utilization	8730	0	–
	DC link voltage	8325	0	–
	DC link ripple	8946	0	–
Display values/min./max. values (See section 6.5)	Min. output voltage	8973	0	–
	Max. output voltage	8974	0	–
	Min. output current	8975	0	–
	Max. output current	8976	0	–
	Min. load current	8977	0	–
	Max. load current	8978	0	–
	Min. load current fluctuation	8979	0	–
	Max. load current fluctuation	8980	0	–
	Min. heat sink temperature	8981	0	–
	Max. heat sink temperature	8982	0	–
	Min. utilization	8983	0	–
	Max. utilization	8984	0	–
	Min. DC link voltage	8985	0	–
	Max. DC link voltage	8986	0	–
	Min. DC link ripple	8987	0	–
	Max. DC link ripple	8988	0	–
	Reset statistics data	8596	0	–

Parameters ordered by parameter tree position				
List in the parameter tree/ list entry	**Parameters**	**Index**		**Description**
		Dec	**Sub**	
Display values/error memory (See section 6.6)	Error code t-0	8366	0	–
	Error code t-1	8367	0	–
	Error code t-2	8368	0	–
	Error code t-3	8369	0	–
	Error code t-4	8370	0	–
	Suberror code t-0	10072	1	–
	Suberror code t-1	10072	2	–
	Suberror code t-2	10072	3	–
	Suberror code t-3	10072	4	–
	Suberror code t-4	10072	5	–
	Output stage (status word t-0)	8391	0	–
	Output stage (status word t-1)	8392	0	–
	Output stage (status word t-2)	8393	0	–
	Output stage (status word t-3)	8394	0	–
	Output stage (status word t-4)	8395	0	–
	Operating mode (binary inputs t-0)	8371	0	–
	Operating mode (binary inputs t-1)	8372	0	–
	Operating mode (binary inputs t-2)	8373	0	–
	Operating mode (binary inputs t-3)	8374	0	–
	Operating mode (binary inputs t-4)	8375	0	–
	Current setpoint t-0	10237	2	–
	Current setpoint t-1	10237	3	–
	Current setpoint t-2	10237	4	–
	Current setpoint t-3	10237	5	–
	Current setpoint t-4	10237	6	–
	Ramp time t-0	10232	2	–
	Ramp time t-1	10232	3	–
	Ramp time t-2	10232	4	–
	Ramp time t-3	10232	5	–
	Ramp time t-4	10232	6	–
	Output voltage t-0	8724	0	–
	Output voltage t-1	8725	0	–
	Output voltage t-2	8726	0	–
	Output voltage t-3	8727	0	–
	Output voltage t-4	8728	0	–
	Output current t-0	10090	1	–
	Output current t-1	10090	2	–
	Output current t-2	10090	3	–
	Output current t-3	10090	4	–
	Output current t-4	10090	5	–

Parameters ordered by parameter tree position				
List in the parameter tree/ list entry	**Parameters**	**Index**		**Description**
		Dec	**Sub**	
Display values/error memory (See section 6.6)	Load current t-0	10091	1	–
	Load current t-1	10091	2	–
	Load current t-2	10091	3	–
	Load current t-3	10091	4	–
	Load current t-4	10091	5	–
	Load current fluctuation t-0	8941	0	–
	Load current fluctuation t-1	8942	0	–
	Load current fluctuation t-2	8943	0	–
	Load current fluctuation t-3	8944	0	–
	Load current fluctuation t-4	8945	0	–
	Heat sink temperature t-0	8396	0	–
	Heat sink temperature t-1	8397	0	–
	Heat sink temperature t-2	8398	0	–
	Heat sink temperature t-3	8399	0	–
	Heat sink temperature t-4	8400	0	–
	Utilization t-0	8416	0	–
	Utilization t-1	8417	0	–
	Utilization t-2	8418	0	–
	Utilization t-3	8419	0	–
	Utilization t-4	8420	0	–
	DC link voltage t-0	8421	0	–
	DC link voltage t-1	8422	0	–
	DC link voltage t-2	8423	0	–
	DC link voltage t-3	8424	0	–
	DC link voltage t-4	8425	0	–
	DC link ripple t-0	8947	0	–
	DC link ripple t-1	8948	0	–
	DC link ripple t-2	8949	0	–
	DC link ripple t-3	8950	0	–
	DC link ripple t-4	8951	0	–
Display values/compensation (See section 6.7)	Nominal line conductor current	Depending on input data		–
	Relative compensation error	Depending on input data		–
	Absolute compensation error	Depending on input data		–
Unit functions/ reset behavior (See section 6.8)	Auto reset	8618	0	–
	Reset counter	10236	1	–
	Restart time	8619	0	–

Parameters ordered by parameter tree position				
List in the parameter tree/ list entry	Parameters	Index		Description
		Dec	Sub	
Unit functions/ Setpoint selection (See section 6.9)	Setpoint source	8461	0	**Fixed setpoint / AI01**
	Control signal source	8462	0	**Terminals**
	Analog/setpoint reference	10420	1	**100** – 150 %
	Fixed setpoint I01	8814	0	**0** – 150 %
	Fixed setpoint I10	8815	0	0 – **50** –150 %
	Fixed setpoint I11	8816	0	0 – **100** –150 %
	Ramp time T00	10232	7	**20 ms**
	Ramp time T01	10232	8	**20 ms**
	Ramp time T10	10232	9	**20 ms**
	Ramp time T11	10232	10	**20 ms**
	Pulse mode P00	10421	1	**ED100**
	Pulse mode P01	10421	2	**ED100**
	Pulse mode P10	10421	3	**ED100**
	Pulse mode P11	10421	4	**ED100**
Unit functions/ Binary outputs (See section 6.10)	Binary output DO00	8352	0	**Ready**
	Binary output DO02	8350	0	**Malfunction, 0-active**
Unit functions/ Serial communication (See section 6.11)	RS-485 address	8597	0	**0** – 99
	RS-485 group address	8598	0	**100** – 199
	SBus address	8600	0	**0** – 63
	SBus group address	8601	0	**0** – 63
	SBus baud rate	8603	0	125 / 250 / **500**/1000 kB
	SBus timeout interval	8602	0	**0** – 650 s
Unit functions/modulation (See section 6.12)	Frequency mode	10233	1	**25 kHz (master)**
	Sync timeout response	10244	1	**Display only**
	Sync phase angle	10422	1	**0** – 360°
	Attenuation	10233	2	**Off**
	Load current fluctuation	8940	0	–
Unit functions/setup (See section 6.13)	Reset statistics data	8596	0	**No**
	Factory setting	8594	0	**No**
Unit functions/ Process data description (See section 6.14)	Setpoint description PO1	8304	0	–
	Setpoint description PO2	8305	0	–
	Setpoint description PO3	8306	0	–
	Actual value description PI1	8307	0	–
	Actual value description PI2	8308	0	–
	Actual value description PI3	8309	0	–
Unit functions/ Error responses (See section 6.15)	Response ext. Error	8609	0	**Output stage inhibit / locked**
	Response SBus timeout	8615	0	**Display only**
	V DC link undervoltage response	10235	1	**Display/error memory**
	Sync timeout response	10244	1	**Display only**

6.3 Unit data

The following information is displayed in the "Unit data" window:

- Unit type

  This is where the connected type of the TPS10A stationary converter is displayed.

- Unit series

  This is where the connected unit series is displayed.

- Power section

  This is where the rated power of the connected TPS10A stationary converter is displayed.

- Firmware

  This is where the part number of the used firmware is displayed.

6.4 Process values

The following information is displayed in the "Process values" window:

- Error code

  This is where the current error status is displayed using the respective error code. If an error has occurred, another field with the designation "Sub code" appears below the "Code" field. For a complete list of all possible error messages with error causes and remedial measures, refer to the "Overview of errors" section.

- Output stage

  The status of the output stage is displayed here. The following display values are possible:

  – Inhibited

  – Enabled

- Operating mode

  The current operating mode is displayed here. The following display values are possible:

  – Voltage control

  – Current control

  SEW EURODRIVE recommends to activate current control. The operating mode is set via terminals (DI03) or the control word (bit 3) depending on the control signal source.

- Setpoint

  The setpoint selection for the current is displayed here. The specified setpoint is determined based on the setpoint source or control source/fixed setpoints. The following is an example of a setpoint specification:

  – 7.5 A 100.0 % digital I11

    The percentages of the current setpoint are based on the values of the nominal load current I_L. The above values are examples of setpoints for a 4 kW TPS10A stationary converter with a nominal load current of I_L = 7.5 A_{eff}.

- Ramp time

  The active ramp time is displayed here. The ramp times are set in the "Setpoint selection" window in the "Unit functions" parameter group.

- Output voltage

  This is where the r.m.s. value of the output voltage of the TPS10A stationary converter is displayed.

- Output current

  This is where the r.m.s. value of the output current I_G is displayed. The TPS10A stationary converter uses this current for supplying the TAS10A transformer module. The output current is proportional to the transferred apparent power. The reactive power consumption is minimized by track compensation , which means that the output current is basically proportional to the output power.

- Load current

  This is where the r.m.s. value of the load current I_L is displayed. A so-called gyrator circuit in the TAS transformer module provides for a constant load current independent of the load. The load current is set via setpoint selection. The transformation ratio of the so-called matching transformer in the TAS transformer module ensures that for a selected setpoint of 100 % I_L, the rated output current of the transformer module is flowing (e.g. 60 A_{eff} or 85 A_{eff}).

- Load current fluctuation

  The load current fluctuation is displayed here.

  The load current fluctuation represents the fluctuation range of the load current based on the value of the nominal load current ($\Delta I_L / I_L$).

- Heat sink temperature

  The heat sink temperature is displayed here.

- Utilization

  The capacity utilization is displayed here.

  The capacity utilization is the present unit output current based on the maximum permitted unit output current. When the unit reaches a capacity utilization of 100%, the unit switches off and outputs the "Overcurrent error" error message.

  Refer to sections "Operation" and "Service" for further information on utilization and output stage.

- DC link voltage

  The DC link voltage is displayed here.

- DC link ripple

  The DC link ripple is displayed here. The DC link ripple represents the fluctuation range of the DC link voltage.

6.5 Min./max. values

The minimum and maximum process values, recorded since the last time the unit was switched on, are stored in the "Min./max. values" window.

- Output voltage
- Output current
- Load current
- Load current fluctuation
- Heat sink temperature
- Utilization
- DC link voltage
- DC link ripple

6.5.1 Min./max. values

To reset these values to the current process values, press the reset button. There are two ways to reset the min./max. values:

1. Select the option "Min./max. values" in the "Min./max. values" window in the selection list "Reset statistic data" [9].
2. Select the option "Min./max. values" in the "Setup" window in the selection list "Reset statistic data".

6.6 Error memory

The TPS10A stationary converter can store several errors. 5 error memories (t-0, t-1, t-2, t-3 and t-4) are available.

The errors are stored in chronological order with the most recent error event being stored in error memory t-0. If more than five errors occur, the oldest error, which is stored in error memory t-4, is deleted.

The following information is stored:

- Error code
- Output stage
- Operating mode
- Setpoint
- Ramp time
- Output voltage
- Output current
- Load current
- Load current fluctuation
- Heat sink temperature
- Utilization
- DC link voltage
- DC link ripple

6.7 Compensation

The "Compensation" window is used during the startup of the TPS10A stationary converter to support the compensation of the line conductor.

- Nominal line conductor current

  The nominal line conductor current at 100% setpoint is displayed here.

  In the line conductor current field, enter the line conductor current for the respective system (rated output current of the TAS10A transformer module). This value is used to calculate the absolute compensation error correctly.

- Relative compensation error

  This is where the relative compensation error is displayed (△r = output current/load current in %).

- Absolute compensation error

  The absolute compensation error is displayed here.

6.8 Reset response

You can use the reset function to reset errors that occur in the TPS10A stationary converter automatically after a set time.

The following information is displayed in the "Reset response" window:

- Auto reset

  The current status of the auto reset function is displayed here.

  The following display values are possible:

  – On

    Information The auto reset function must not be used in systems where the automatic restart represents a risk of injury to persons or damage to equipment.

    The auto reset function is activated. In case of an error, this function automatically resets the unit after a pre-defined time of 50 ms (restart time). A maximum of 3 auto resets are possible during an auto reset phase. If more than 3 errors occur that are reset by an auto reset, no more auto resets are possible until one of the following actions has been carried out:

    – An error reset as described in section "Error reset"

    – The unit is completely switched off and then on again

      Now, auto reset is possible again.

    The following errors can be reset:

    – "Overcurrent" error

    – "Overtemperature" error

  – **Off**

    The auto reset function is deactivated.

- Reset counter

  The number of resets still possible is displayed here.

  When the auto reset function is activated, up to 3 automatic resets are possible.

- Restart time

  The restart time; that is, the interval between the time when the error and occurs and the time it is reset, is displayed here.

  The restart time is set to 50 ms.

6.9 Setpoint selection

The following information can be set in the "Setpoint selection" window:

- Setpoint source

  This parameter sets the source from which the TPS10A stationary converter receives the setpoint with ramp time and pulse mode. Refer to the "Startup" section for additional information on the setpoint source.

  The following options can be selected:

  – **Fixed setpoint / AI01**

    The setpoint is provided by the analog input (AI01) or the fixed setpoints.

    The setpoint IXX is selected via the activated control signal source:

    – Via terminals DI04, DI05 (control signal source: terminals),

    – Via bit 4 and bit 5 of the control word from the process output data PO1 (control signal source: SBus 1) or

    – Via bit 4 and bit 5 of the parameter control word (control signal source: parameter control word).

      The following settings apply:

DI05/bit 5	DI04/bit 4	Setpoint	Ramp time	Pulse mode
0	0	Analog input AI01	Ramp time T00	Pulse mode P00
0	1	Fixed setpoint I01	Ramp time T01	Pulse mode P01
1	0	Fixed setpoint I10	Ramp time T10	Pulse mode P10
1	1	Fixed setpoint I11	Ramp time T11	Pulse mode P11

  – SBus 1

    Setpoints are specified using process data communication via SBus 1. Process output data word 2 contains the setpoint. The set ramp time T00 and the pulse mode P00 are active.

  – Parameter setpoint

    Setpoints are specified via the parameter WRITE service of index 10237/10. This can be performed via RS485 interface or SBus.

    The set ramp time T00 and the pulse mode P00 are active.

- Control signal source

  The control signal source field specifies from where the TPS10A stationary converter is to receive its control signals (output stage inhibit, auto reset and operating mode). If the setpoint source "Fixed setpoint/AI01" is activated, the setpoint IXX is selected via the control commands of the control control source. See also section "Setpoint source" / " Fixed setpoint / AI01".

  The following control signal sources can be set:

  – **Terminals**

    Control is performed via the binary inputs.

  – SBus 1

    Control takes place via cyclical SBus process data communication and the binary inputs. The control commands are transferred to the unit via control word 1 (PO1).

  – Parameter control word

    Control is performed using a parameter WRITE service via SBus or the RS485 interface and the binary inputs.

- Analog / setpoint reference I00

  Setting range: (**100** – 150) % I_L

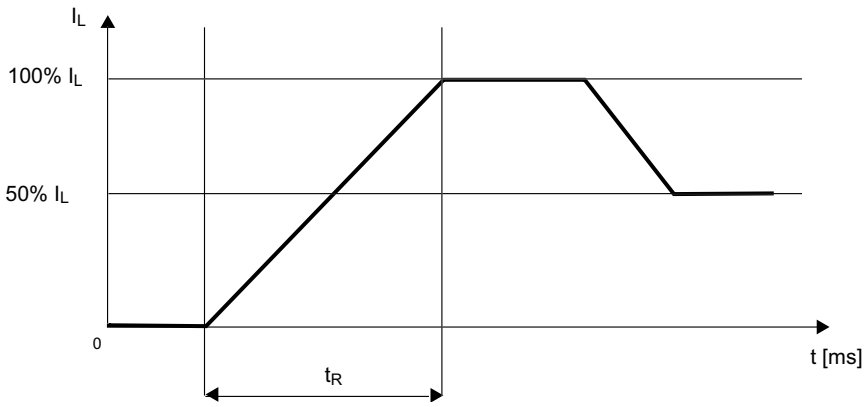
  The analog setpoint reference I00 defines the setting range of the analog input (AI01): −10 V to +10 V (−40 mA to +40 mA) = (0 – 100) % I_L

- Fixed setpoint IXX

  Setting range: (0 – 150) % I_L

- Ramp time TXX

  Here, the ramp time (t_R) is set. You can choose from the following pre-defined ramp times: **20 ms**, 100 ms, 200 ms, 600 ms, 1700 ms and 3500 ms.



267623691

The ramp time is based on a setpoint difference of 100 %.

In case of a setpoint change, the drive moves to the new setpoint using the respective ramp.

- Pulse mode PXX

  The pulse mode is used to determine the cyclic duration factor and the rest period. Depending on the power demand of the mobile consumers, reduced cyclic duration factors can also be activated.

  You can choose from the following four pulse modes:

  – **ED100**: Cyclic duration factor is 100 %, no pulsing
  – ED95: Cyclic duration factor 95 %
  – ED67: Cyclic duration factor 67 %
  – ED20: Cyclic duration factor 20 %

6.10 Binary outputs

In the "Binary outputs" window, functions can be assigned to both outputs.

- Binary outputs DO0X

  The following functions can be assigned to the binary outputs:

Function	Binary output		Default setting
	"0" signal	"1" signal	
No function	Always "0" signal	--	--
Malfunction, 0-active	Collective malfunction information	No malfunction	DO02
Ready	Not ready	Ready	DO00
Current reference message	I_{Last} < IXX setpoint not reached	I_{Last} = IXX setpoint reached	--
Voltage limit signal	Voltage limit not reached	Voltage limit reached	--

6.11 Serial communication

In the "Serial communication" window, addresses and communication data are set.

- RS485 Address

  Setting range: **0** – 99.

  This address setting enables communication via MOVITOOLS® MotionStudio and the RS485 serial interface (USS21A). TPS10A stationary converters are always set to the address 0 on delivery. To avoid problems during data exchange in serial communication with several stationary converters, we recommend that you do not use address 0.

- RS485 group address

  Setting range: **100** – 199.

  This parameter allows you to combine several TPS10A stationary converters into a group for communication via the serial interface. All units with the same RS485 group address are then addressed with one multicast telegram. The data received via the group address is not acknowledged by the TPS10A stationary converter. For example, the RS485 group address makes it possible to send setpoint selections to a group of stationary converters simultaneously. Group address 100 means that the TPS10A stationary converter is not assigned to a group.

- SBus 1 address

  Setting range: **0** – 63.

  Here, the system bus address of the TPS10A stationary converter is set.

- SBus 1 Group address

  Setting range: **0** – 63.

  This is where you can set the system bus group address for multicast telegrams of the TPS10A stationary converter.

- SBus 1 Baud rate

  Setting range: 125; 250; **500**; 1000 kBaud.

  This parameter is used for setting the baud rate of the system bus.

- SBus 1 timeout interval

  Setting range: **0** – 650 s.

  This parameter sets the monitoring time for cyclical data transmission via the system bus. If no cyclical data transfer (process data communication) takes place during the set time via the system bus, the TPS10A stationary converter executes the set error response. See parameter *Response SBus 1 - timeout*. The cyclic data transmission is not monitored via the system bus when the SBus timeout delay is set to "0".

6.12 Modulation

Parameters for modulation are set in the "Modulation" window.

- Frequency mode

  This parameter is used for setting the frequency of the line cable current of the TPS10A stationary converter.

  The TPS10A stationary converter allows you to synchronize several supply units or to set a defined frequency shift between several supply units. For synchronization, the TPS10A stationary converters must be connected by a synchronization cable.

  Refer to section "Installation", sub-section "Installing the synchronization signal", for additional information.

  You can choose from the following frequency modes:

  – **25.00 kHz - (master)**

    The output frequency of the TPS10A stationary converter is 25.00 Hz. In synchronization mode, this stationary converter is used as a master. It forwards the synchronization signal via the synchronization cable to the slaves. Only one master is permitted per synchronization network.

  – Slave

    The TPS10A stationary converter waits for the synchronization signal at the synchronization interface. The parameters *Sync timeout response* and *Sync phase angle* are displayed as well. If the slave receives a faulty synchronization signal, or none at all, the TPS10A stationary converter executes the set error response. See parameter description *Response SBus timeout*.

  – 24.95 kHz

    The output frequency of the TPS10A stationary converter is 24.95 kHz. Synchronous operation is not possible.

  – 25.05 kHz

    The output frequency of the TPS10A stationary converter is 25.05 kHz. Synchronous operation is not possible.

- Sync timeout response

  If the TPS10A stationary converter is in the "Slave" frequency mode and receives a faulty synchronization signal, or none at all, the error response set here is executed.

  The following responses can be set:

Response	Description
No response	The issued error is ignored, i.e. the error is not indicated, and no error response is executed.
Display only	The error is displayed via the operation LED V3 and MOVITOOLS® MotionStudio. If the respective parameter is set, an error message is sent via the binary output terminals. Otherwise, the unit performs no error response. The error can be reset.
Output stage inhibit / locked	The TPS10A stationary converter performs an immediate switch-off. The corresponding error message is displayed, and the output stage is inhibited. If the respective parameter is set, the ready message is revoked via the binary output terminals. The TPS10A stationary converter can only be enabled after the error has been reset.

- Sync phase angle

  Setting range: **0** – 360°.

  In synchronous operation, the phase angle of the line cable current of a slave can be matched to that of the master. If the phase angle remains at factory setting 0°, the phase angles are the same. The setting 180° reverses the current direction.

- Attenuation

  Setting range: On or **Off**.

  This parameter activates or deactivates a damping algorithm. The damping function is to be activated if the load current fluctuation is high (> 5 %).

- Load current fluctuation

  The load current fluctuation represents the fluctuation range of the load current based on the value of the nominal load current ($\triangle I_L$ / I_L).

6.13 Setup

In the "Setup" window, you can reset statistics and activate factory settings.

- Reset statistics data

  Selection: Error memory and min./max. values.

  The *Reset statistic data* parameter can be used for resetting the statistics of the error memories stored in the EEPROM or the volatile min./max. values.

- Factory setting

  Selection: **Standard**.

  Select factory settings (Standard) to restore the factory settings of the adjustable parameters stored in the EEPROM. In this case, the statistics are not reset. They must be reset separately via the *Reset statistic data* parameter.

6.14 Process data description

The content of the process data is displayed in the "Process data description" window.

The pre-defined contents of the process output data *PO1/PO2/PO3* are displayed via the following parameters *POX*.

- Setpoint description PO1: Control word 1
- Setpoint description PO2: Current setpoint
- Setpoint description PO3: No function

The pre-defined contents of the process input data *PI1/PI2/PI3* are displayed via the following parameters *PIX*.

- Setpoint description PI1: Status word 1
- Setpoint description PI2: Heat sink temperature
- Setpoint description PI3: Utilization

6.15 Error responses

Programmable error responses can be set in the "Error responses" window.

- Response ext. Error

  Factory setting: **Output stage inhibit/locked**.

  This parameter can be used for programming a response which is triggered via the DI01 input terminal.

  The following responses can be programmed:

Response	Description
No response	The issued error is ignored, i.e. the error is not indicated, and no error response is executed.
Display only	The error is displayed via the operation LED V3 and MOVITOOLS® MotionStudio. If the respective parameter is set, an error message is sent via the binary output terminals. Otherwise, the unit performs no error response. The error can be reset.
Output stage inhibit / locked	The TPS10A stationary converter performs an immediate switch-off. The corresponding error message is displayed, and the output stage is inhibited. If the respective parameter is set, the ready message is revoked via the binary output terminals. The TPS10A stationary converter can only be enabled after the error has been reset.

- Response SBus 1 timeout

  Factory setting: **Display only**.

  This parameter can be used for programming a response. For responses that can be programmed, see *Response ext. error*.

  If no cyclical data transfer (process data communication) takes place during the set *SBus 1 timeout delay* via the system bus, the TPS10A stationary converter executes the set error response.

- V DC link undervoltage response

  Factory setting: **Display/error history**.

  Use this parameter to program a response which is triggered in case of V DC link undervoltage:

Response	Description
No response	The issued error is ignored, i.e. the error is not indicated, and no error response is executed (setting for 24 V backup mode).
Display only	The error is displayed via the operation LED V3 and MOVITOOLS® MotionStudio. If the respective parameter is set, an error message is sent via the binary output terminals. Otherwise, the unit performs no error response. The error can be reset.
Output stage inhibit / locked	The TPS10A stationary converter performs an immediate switch-off. The corresponding error message is displayed, and the output stage is inhibited. If the respective parameter is set, the ready message is revoked via the binary output terminals. The TPS10A stationary converter can only be enabled after the error has been reset.
Display/error memory	The error is displayed via the operation LED V3 and MOVITOOLS® MotionStudio and is written into the error memory. If the respective parameter is set, an error message is sent via the binary output terminals. Otherwise, the unit performs no error response. The error can be reset.

- Sync timeout response

  Factory setting: **Display only**.

  For responses that can be programmed, see *Response ext. error*.

  If the TPS10A stationary converter is in the "Slave" frequency mode and receives a faulty synchronization signal, or no signal at all, the error response set here is executed.

6.16 Manual operation

In the "Manual operation" window, you can manually set control commands and setpoints. The Manual operation mode supports the startup of the TPS10A stationary converter and the compensation of the line conductor.

- ⚠**DANGER** Machine starts automatically when manual operation is deactivated.

  Severe or fatal injuries.

  – Make sure that an automatic restart of the machine represents no danger to people or equipment. (TPS10A p.44)

  – Inhibit the output stage ("0" signal at DI00 → connect X10:9 to DGND).

- Activating / deactivating manual operation

  The manual operation mode can be changed by clicking on the [Activate/deactivate manual operation] button.

- Control

  In the "Control" field, control commands can be transferred to the TPS10A stationary converter. Terminal DI00 must be set to "1" in order to enable the output stage.

- Setpoint

  In the "Setpoint" field, the setpoint (0 – 150) % I_L for the TPS10A stationary converter is set.

7 Operation of MOVITOOLS® MotionStudio

7.1 About MOVITOOLS® MotionStudio

7.1.1 Tasks

The software package enables you to perform the following tasks with consistency:

- Establishing communication with units
- Executing functions with the units

7.1.2 Establishing communication with other units

The SEW Communication Server is integrated into the MOVITOOLS® MotionStudio software package for establishing communication with the units.

The SEW Communication Server allows you to create **communication channels**. Once the channels are established, the units communicate via these communication channels using their communication options. You can operate up to four communication channels at the same time.

MOVITOOLS® MotionStudio supports the following types of communication channels:

- Serial (RS-485) via interface adapters
- System bus (SBus) via interface adapters
- Ethernet
- EtherCAT
- Fieldbus
  - PROFIBUS DP/DP-V1
- S7-MPI

The available channels can vary depending on the units and its communication options.

7.1.3 Executing functions with the units

The software package offers uniformity in executing the following functions:

- Parameterization (for example in the parameter tree of the unit)
- Startup
- Visualization and diagnostics
- Programming

The following basic components are integrated into the MOVITOOLS® MotionStudio software package, allowing you to use the units to execute functions:

- MotionStudio
- MOVITOOLS®

All functions communicate using **tools**. MOVITOOLS® MotionStudio provides the right tools for every unit type.

7.2 First steps

7.2.1 Starting the software and creating a project

Proceed as follows to start MOVITOOLS® MotionStudio and create a project:

1. Start the MOVITOOLS® MotionStudio from the Windows start menu via:

   [Start]/[Programs]/[SEW]/[MOVITOOLS-MotionStudio]/[MOVITOOLS-MotionStudio]

2. Create a project with name and storage location.

7.2.2 Establishing communication and scanning the network

Proceed as follows to establish a communication with MOVITOOLS® MotionStudio and scan your network:

1. Set up a communication channel to communicate with your units.

   For detailed information on how to configure a communication channel, see the section regarding the relevant communication type.

2. Scan your network (unit scan). Press the [Start network scan] button [1] in the toolbar.

1132720523

3. Select the unit you want to configure.
4. Right-click to open the context menu.

   As a result you will see a number of unit-specific tools to execute various functions with the units.

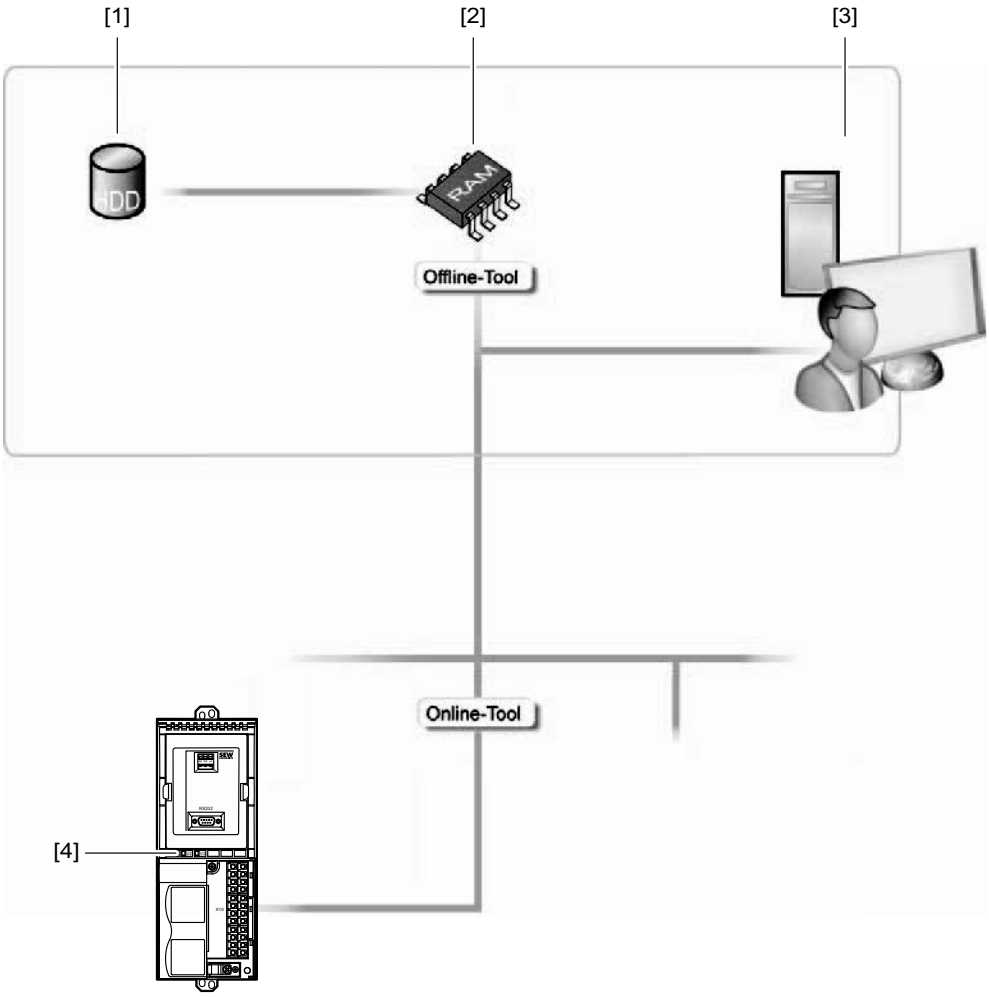
7.3 Connection mode

7.3.1 Overview

MOVITOOLS® MotionStudio differentiates between the "online" and "offline" communication mode.

You can select the communication mode yourself. Depending on the selected communication mode, you can choose offline or online tools specific to your unit.

The following figure illustrates the two types of tools:



2129752587

[1] Hard drive of the engineering PC
[2] RAM of the engineering PC
[3] Engineering PC
[4] Unit

Tools	Description
Offline tools	Changes made using offline tools affect **"ONLY"** the RAM [2]. • Save your project so that the changes can be stored on the hard disk [1] of your engineering PC [3]. • Execute the "Download (PC → unit)" function if you want to transfer the changes to your unit [4] as well.
Online tools	Changes made using online tools affect **"ONLY"** the unit [4]. • Perform the "Upload (unit → PC)" function if you want to transfer the changes to your RAM [2]. • Save your project so that the changes can be stored on the hard disk [1] of your engineering PC [3].

INFORMATION

The "online" communication mode is **NOT** a response message which informs you that you are currently connected to the unit or that your unit is ready for communication.

- Should you require this feedback, observe section "Setting the cyclical accessibility test" in the online help (or the manual) of MOVITOOLS® MotionStudio.

INFORMATION

- Project management commands (such as download and upload), the online unit status, and the unit scan work independent of the set communication mode.
- MOVITOOLS® MotionStudio starts up in the communication mode that you set before you closed down.

7.3.2 Selecting the communication mode (online or offline)

Proceed as follows to select the communication mode:

1. Select the communication mode:
   - "Switch to online mode" [1] for functions (online tools) that should directly influence the unit.
   - "Switch to offline mode" [2] for functions (offline tools) that should influence your project.

1134457227

[1] "Switch to online mode" symbol
[2] "Switch to offline mode" symbol

2. Select the unit node.
3. Right-click to open the context menu and display the tools for configuring the unit.

7.4 Serial (RS-485) communication via interface adapters

7.4.1 Engineering via interface adapters (serial)

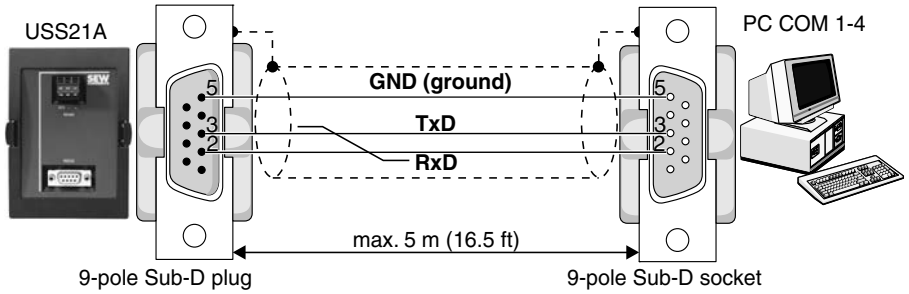
As your unit supports "Serial" communication, you can use a suitable interface adapter for engineering.

The interface adapter is additional hardware that you can obtain from SEW-EURODRIVE. You can use it to connect your engineering PC with the respective communication option of the unit.

You can only use the USS21A interface adapter (order no.: 8229147) for the TPS10A stationary converter.

7.4.2 Starting up the USB11A interface adapter

To connect a PC to the USS21A option of the TPS10A stationary converter, use a commercial shielded serial interface cable with a 1:1 connection assignment.



146834187

7.4.3 Configuring the serial communication

You must have a serial connection between your PC and the units you want to configure. You can establish one, for example, using the USS21A interface adapter.

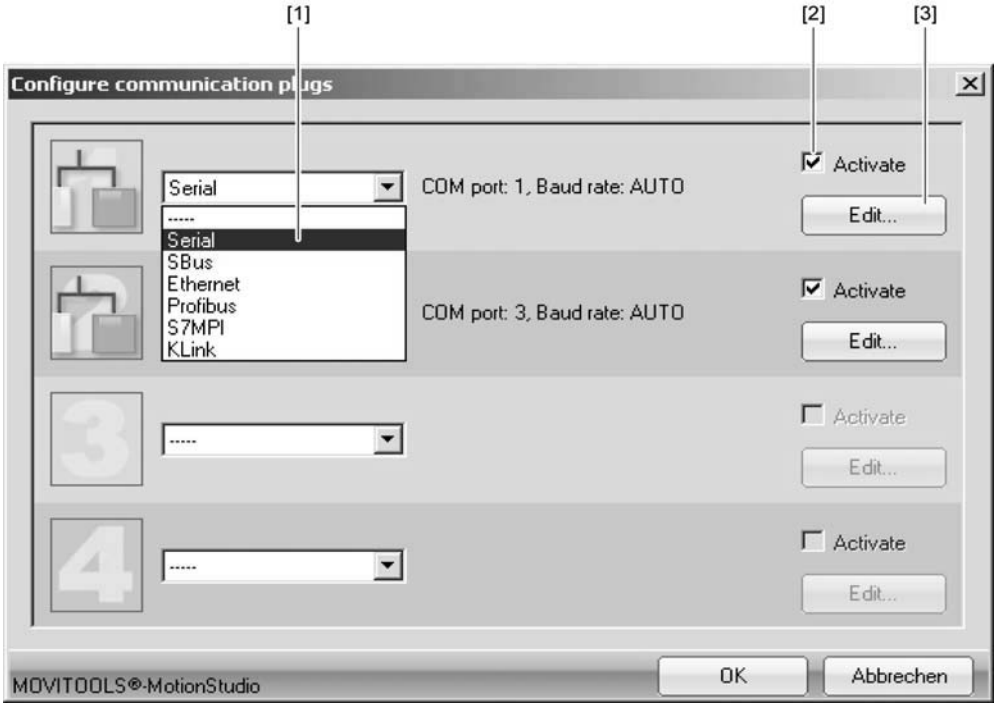
Proceed as follows to configure serial communication:

1. Click on "Configure communication plugs" [1] in the toolbar.

1133341835

[1] "Configure communication plugs" symbol

This will open the "Configure communication plugs" window.



946942987

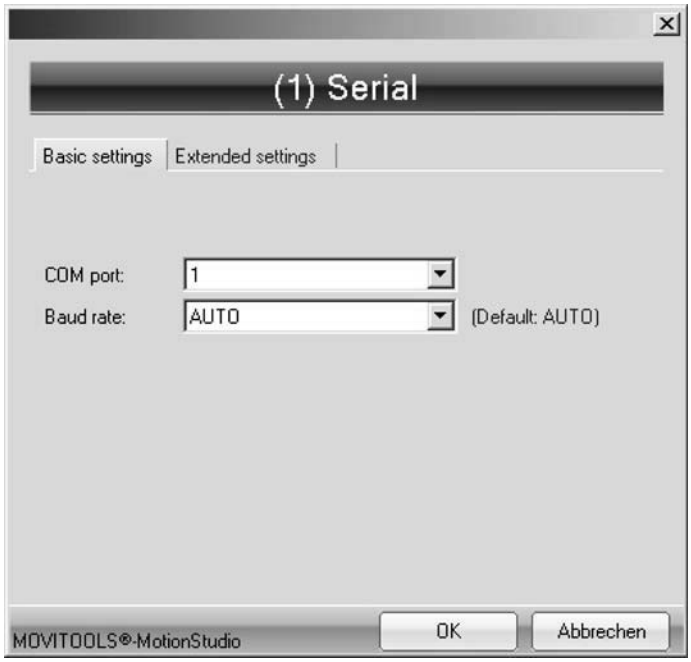
[1] "Type of communication" selection list
[2] "Activate" checkbox
[3] [Edit] button

2. From the list [1], select "Serial" as the communication type.

   In the example, "Serial" is activated as the communication type for the first communication channel [2].

3. Press the [Edit] button [3] on the right side of the "Configure communication plugs" window.

This will display the settings for the "serial" communication type.



946948747

4. It might be necessary to change the preset communication parameters on the tab pages [Basic settings] and [Advanced settings]. When doing so, refer to the detailed description of the communication parameters.

7.4.4 Parameters for serial communication (RS-485)

The following table describes the [basic setting] for the serial (RS-485) communication channel:

Communication parameters	Description	Note
COM port	Serial port connected to the interface adapter	• If there is no value entered here, the SEW Communication Server uses the first available port. • A USB interface adapter is indicated by the addition of "(USB)".
Baud rate	Transmission speed with which the connected PC communicates with the unit in the network via the communication channel.	• Possible values: – 9.6 kBit/s – 57.6 kBit/s – AUTO (default setting) • Find the correct value for the connected unit in the documentation. • If you set "AUTO", the units are scanned with both baud rates in succession. • Set the starting value for automatic baud rate detection under [Settings] / [Options] / [Communication].

The following table describes the [extended setting] for the serial (RS-485) communication channel:

Communication parameters	Description	Note
Parameter telegrams	Telegram with a single parameter	Used for transmitting a **single parameter** of a unit.
Multibyte telegrams	Telegram with several parameters	Used for transmitting the **complete parameter set** of a unit.
Timeout	Waiting time in [ms] that the master waits for a response from a slave after it has sent a request.	• Default setting: – 100 ms (parameter telegram) – 350 ms (multibyte telegram) • Increase the value if not all units are detected during a network scan.
Retries	Number of request retries after the timeout is exceeded	Default setting: 3

7.5 SBus (CAN) communication via interface adapter

7.5.1 Engineering via interface adapters (SBus)

Since your unit supports the "SBus" communication option, you can use a suitable interface adapter for engineering.

The interface adapter is additional hardware that you can obtain from SEW-EURODRIVE. You can use it to connect your engineering PC with the respective communication option of the unit.

The following table shows the different types of interface adapters available, and for which units they are suitable:

Interface adapter type (option)	Order no.	Scope of delivery	Units
PC-CAN interface from SEW-EURODRIVE (incl. prefabricated connection cable with integrated terminating resistor)	18210597	• Prefabricated cable with 9-pin sub-D connector for connection to the unit, length 2 m • A 120 Ω terminating resistor is fitted to one end of the prefabricated cable (between CAN_H and CAN_L).	• MOVIAXIS® • MOVIDRIVE® B • MOVITRAC® B • MOVI-PLC® (*basic* and *advanced*) • MOVITRANS® TPS
PCAN-USB ISO from Peak	IPEH 002022	• Without connection cable • Without terminating resistor	

To connect the PC CAN interface to the unit, you need an additional connection cable with terminating resistor. The scope of delivery of the PC CAN interface from SEW-EURODRIVE includes a prefabricated connection cable on the unit with terminating resistor. Therefore, only this PC-CAN interface is described in the following chapter.

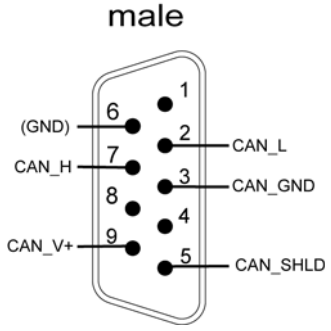
7.5.2 Starting up the USB-CAN interface

Overview

This section describes how to connect the PC-CAN interface from SEW-EURODRIVE to the SBus interface or your units and what must be considered for this.

CAN pin assignment

The figure below shows the pin assignment of the 9-pin D-sub connector of the PC-CAN interface from SEW (view from top):

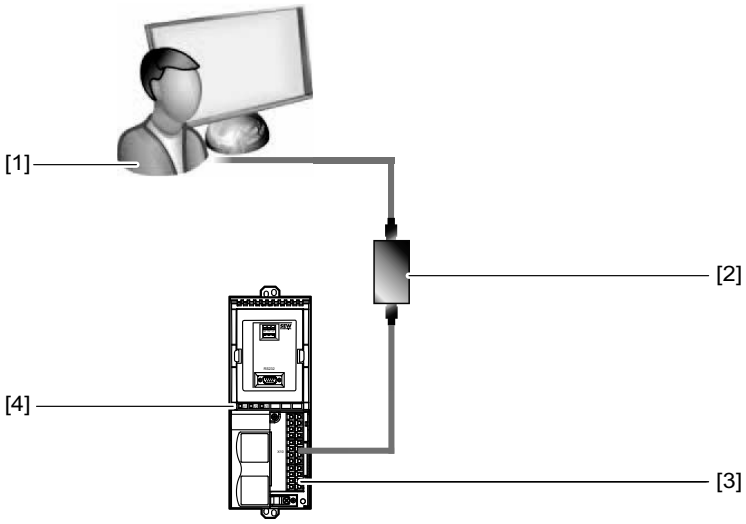


1535400843

Connecting the USB-CAN interface to the unit

The connection of the TPS via the CAN interface is described in chapter 5.7 "System bus installation".

The figure shows how the USB-CAN interface adapter [2] from SEW-EURODRIVE is connected with the TPS [4] and the PC [1] via the SBus interface [3].



2129755275

[1] PC
[2] USB-CAN interface with prefabricated connection cable with terminating resistor (Included in the scope of delivery)
[3] SBus interface X10
[4] TPS

To connect the USB-CAN interface with the PC and TPS, proceed as follows:

1. Connect the 9-pin D-sub connector of the USB-CAN interface with the prefabricated connection cable. Make sure that the cable end with the terminating resistor leads to the USB-CAN interface.
2. Connect the second cable end (without terminating resistor) with the SBus interface [3] of the TPS [4].
   - Connect the cores of the prefabricated cable to the X10 terminal of TPS as follows:

Signal	Terminal of TPS	CAN pin assignment	Core (Deviations are possible)
CAN_H / SC11	X10:5	PIN 7	Brown
CAN_L / SC12	X10:7	PIN 2	White
CAN_GND / DGND	X10:17	PIN 3	Shielding

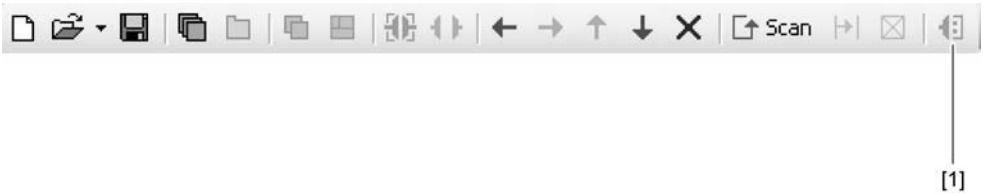
3. If the USB-CAN interface is connected to the first or last unit in a network, switch on the terminating resistor on this unit (DIP switch S12 to "ON").
4. Plug the USB-**A** connector of the USB cable into a free USB interface on your PC [1].

7.5.3 Configuring the SBus communication

You need an SBus connection between your PC and the units you want to configure. You can use a USB-CAN interface for this purpose.

Proceed as follows to configure SBus communication:

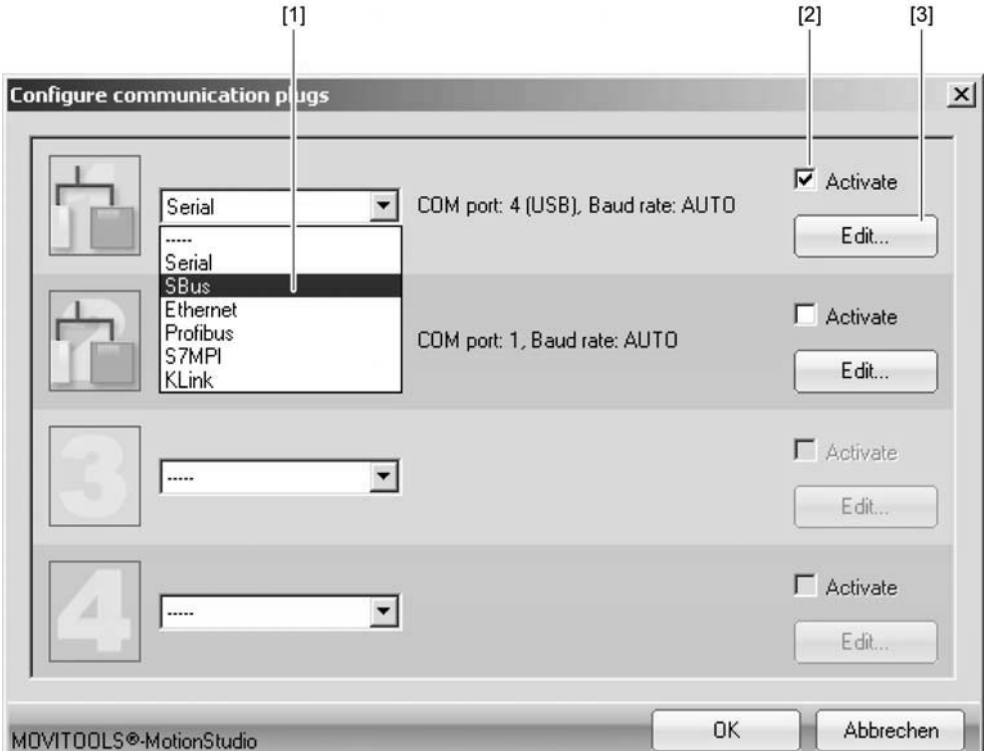
1. Click on "Configure communication plugs" [1] in the toolbar.



1133341835

[1] "Configure communication plugs" symbol

This will open the "Configure communication plugs" window.



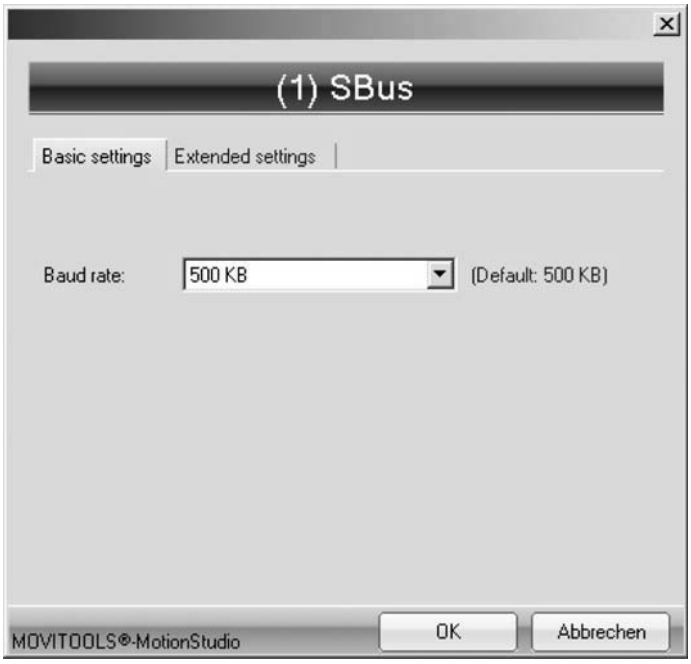
1166386443

[1] "Type of communication" selection list
[2] "Activate" checkbox
[3] [Edit] button

2. From the list [1], select "SBus" as the communication type.

   In the example, "SBus" is activated as the communication type for the first communication channel [2].

3. Press the [Edit] button [3] on the right side of the "Configure communication plugs" window.



1166386443

   This will display the settings for the "SBus" communication type.

4. It might be necessary to change the preset communication parameters on the tab pages [Basic settings] and [Advanced settings]. When doing so, refer to the detailed description of the communication parameters.

7.5.4 Communication parameters for SBus

The following table describes the [Basic setting] for the SBus communication channel:

Communication parameters	Description	Note
Baud rate	Transmission speed with which the connected PC communicates with the unit in the network via the communication channel.	• Adjustable values (permitted total cable length): – 125 kBaud (500 m) – 250 kBaud (250 m) – 500 kBaud (100 m) (default) – 1 MBaud (25 m) • All connected units must support the same baud rate.

The following table describes the [Advanced setting] for the SBus communication channel:

Communication parameters	Description	Note
Parameter telegrams	Telegram with a single parameter	Used for transmitting a **single parameter** of a unit.
Multibyte telegrams	Telegram with several parameters	Used for transmitting the **complete parameter set** of a unit.
Timeout	Waiting time in [ms] that the master waits for a response from a slave after it has sent a request.	• Default setting: – 100 ms (parameter telegram) – 350 ms (multibyte telegram) • Increase the value if not all units are detected during a network scan.
Retries	Number of request retries after the timeout is exceeded	Default setting: 3

7.6 Executing functions with the units

7.6.1 Parameterizing units in the parameter tree

Units are parameterized in the parameter tree.

The parameter tree displays all unit parameters, grouped into folders.

You can manage unit parameters with the context menu or the toolbar. The following steps illustrate how to read/edit unit parameters.

7.6.2 Reading/editing unit parameters

Proceed as follows to read/edit unit parameters:

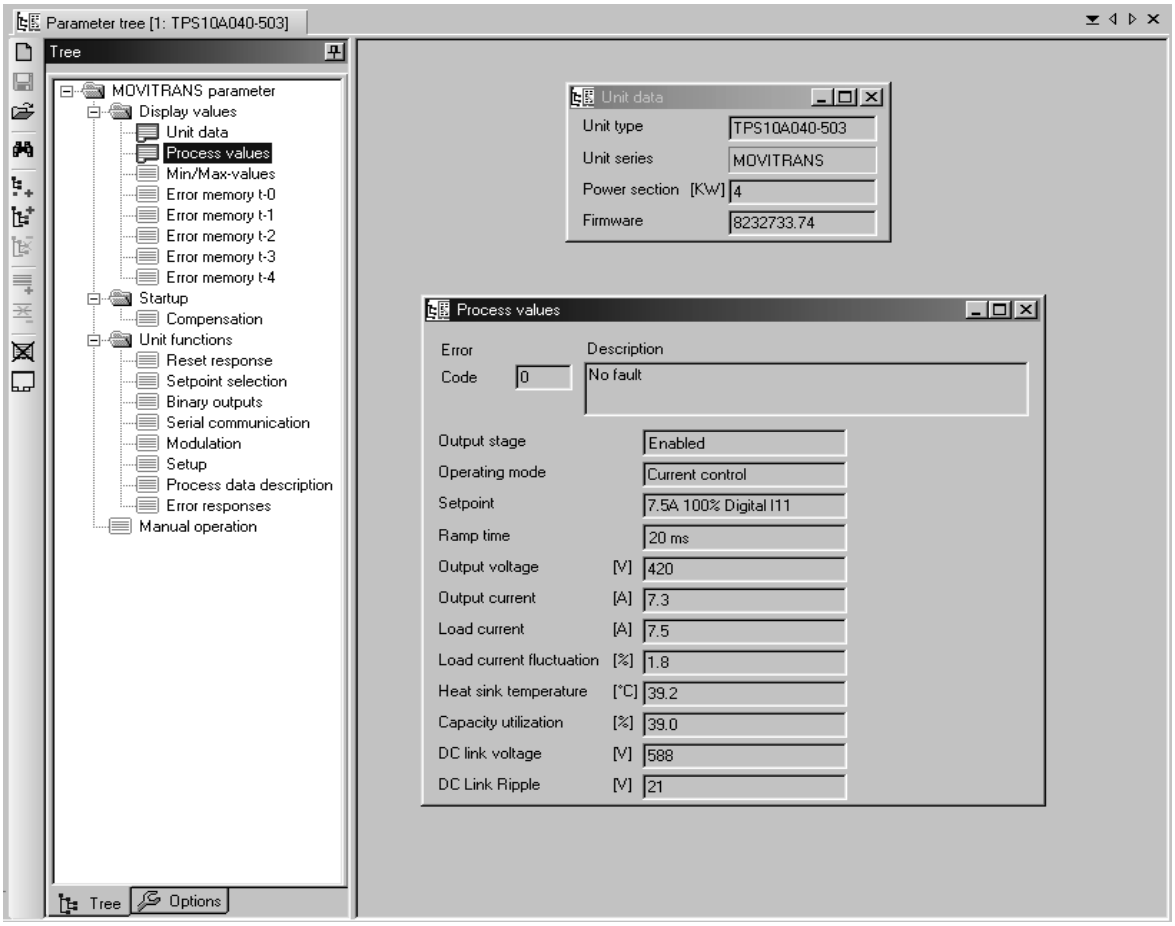
1. Switch to the required view (project view or network view).
2. Select the communication mode:
   - Press the [Switch to online mode] button [1] if you would like to read or change parameters directly on the **unit**.
   - Press the [Switch to offline mode] button [2] if you would like to read or change parameters in the **project**.

1134457227

[1] "Switch to online mode" symbol
[2] "Switch to offline mode" symbol

3. Select the unit you want to set parameters for.
4. Open the context menu and select the [Parameter tree] command.

   Then, the "Parameter tree" view opens on the right section of the screen.
5. Expand the "Parameter tree" up to the node you require.



2128926603

6. Double-click to display a particular group of unit parameters.
7. Press the enter key to finalize any changes you make to numerical values in the input fields.

7.6.3 Starting up units (online)

Proceed as follows to start up the units (online):

1. Switch to the network view.
2. Click on "Switch to online mode" [1] in the toolbar.

1184030219

[1] "Switch to online mode" symbol

3. Select the unit you want to startup.
4. Open the context menu and select the following command:
   [Startup] / [Parameter tree]
5. The parameter settings required for startup are listed in the following chapter.

8 Startup

⚠ WARNING

Incorrect startup.

Severe or fatal injuries.

- It is essential to comply with the safety notes in chapter 2 during startup.
- Check whether the installation is correct before commencing startup.

⚠ WARNING

Machine starts automatically when supply system is connected.

Severe or fatal injuries.

- Make sure that an automatic start of the machine represents no danger to people and equipment.
- Enable the output stage ("0" signal at DI00 → connect X10:9 to DGND).

INFORMATION

You require the MOVITOOLS® MotionStudio software for starting up the TPS10A stationary converter.

8.1 Overview

The following sources must be configured for the startup of the TPS10A stationary converter:

- Control signal source
- Setpoint source

The TPS10A stationary converter can be controlled via various control sources. The control source depends on the system environment, e.g. the higher-level control.

The settings of the setpoint source also depend on the system environment. This is why the control source and the setpoint source must be configured once during the startup of the TPS10A stationary converter.

8.1.1 Control source

The control source determines the source of the control commands for the TPS10A stationary converter. The following table gives an overview of possible control commands:

Control command	Control signal source			Assignment
	Terminal	Control word SBus (PO1)	Parameter control word	
Output stage inhibit	DI00	Bit0 and DI00	Bit0 and DI00	0 = Inhibited 1 = Enable
Auto reset function	DI02	Bit2	Bit2	0 = auto reset off 1 = auto reset on
Operating mode	DI03	Bit3	Bit3	0 = Voltage control 1 = Current control
Setpoint mode A	DI04	Bit4	Bit4	See setpoint source
Setpoint mode B	DI05	Bit5	Bit5	

If the TPS10A stationary converter is controlled via SBus1 or parameter control word, the output stage inhibit is additionally ANDed with terminal DI00.

Refer to the section "Communication via system bus, MOVILINK® protocol" for additional information about control words.

If "parameter control word" is set as control source, the following control commands are applied to the TPS10A stationary converter when the power supply is switched on:

- Output stage enabled
- Auto reset active
- "Current control" operating mode
- Setpoint mode A = "1"
- Setpoint mode B = "0"

Make sure that an automatic start of the machine represents no danger to people and equipment. Enable the output stage ("0" signal at DI00 → connect X10:9 to DGND).

8.1.2 Setpoint source

This parameter sets the source from which the stationary converter receives the setpoint with ramp time and pulse mode.

- Fixed setpoint / AI01

  The setpoint is provided by the analog input (AI01) or the fixed setpoints.

  The setpoint IXX is selected via the activated control signal source:

  – Via terminals DI04, DI05 (control signal source: terminals),

  – Via bit 4 and bit 5 of the control word from the process output data PO1 (control signal source: SBus 1) or

  – Via bit 4 and bit 5 of the parameter control word (control signal source: parameter control word).

  The following settings apply:

Control signal source						Setpoint	Ramp time	Pulse mode
Terminals		Control word SBus1 (PO1)		Parameter control word				
DI05	DI04	Bit5	Bit4	Bit5	Bit4			
0	0	0	0	0	0	Analog input AI01	Ramp time T00	Pulse mode P00
0	1	0	1	0	1	Fixed setpoint I01	Ramp time T01	Pulse mode P01
1	0	1	0	1	0	Fixed setpoint I10	Ramp time T10	Pulse mode P10
1	1	1	1	1	1	Fixed setpoint I11	Ramp time T11	Pulse mode P11

- SBus 1

  Setpoints are specified through process data communication via SBus 1. Process output data word 2 contains the setpoint. The setpoint is indicated in 1/10 percent. Thus, a transferred value of 1000 is the equivalent of 100 %. The set ramp time T00 and the pulse mode P00 are active.

- Parameter setpoint

  The setpoints are specified via the parameter WRITE service of index 10237/10. This can be carried out via the RS485 interface or SBus. The setpoint is given in 1/1000 percent. Thus, a transferred value of 100,000 is the equivalent of 100 %. The set ramp time T00 and the pulse mode P00 are active.

8.2 Control via terminals

If the TPS10A stationary converter is to receive control commands and setpoint selections, the parameters must be set as follows:

Parameters	Setting
Control signal source	Terminals
Setpoint source	Fixed setpoint / AI01

These are the factory settings of the unit.

8.2.1 Control commands

The following operating states are available at the TPS10A converter with the binary inputs X10:9 "/output stage inhibit" (DI00), X10:11 "Auto reset" (DI02) and X10:12 "voltage control/current control" (DI03):

Terminal	Function	"0"	"1"
X10:9 (DI00)	Output stage inhibit	Output stage inhibited	Output stage enabled
X10:11 (DI02)	Auto reset	Auto reset switched off	Auto reset switched on
X10:12 (DI03)	Operating mode	Voltage control	Current control

Make sure the "output stage inhibit" operating status is active for startup ("0" signal at DI00 → connect X10:9 with DGND) when the supply system is connected.

8.2.2 Setpoint selection

NOTICE

Incorrect setpoint selection.

Damage to the energy transfer system.

- Check the correct setting of the S11 DIP switch with the setpoint selection "Analog input AI11/AI12 active".
  - I signal for current setpoints −40 mA to +40 mA
  - U-signal for voltage setpoints from −10 V to +10 V (factory setting)

The following setpoint selections can be made at the TPS10A stationary converter via binary inputs X10:13 "setpoint mode A" (DI04) and X10:14 "setpoint mode B" (DI05):

X10:14 (DI05)	X10:13 (DI04)	Setpoint selection	Ramp time	Pulse mode
"0"	**"0"**	Analog input AI11/AI12 active −10 V to +10 V (−40 mA to +40 mA) = 0 to 100 % I_L (up to 150 % I_L, depending on the set analog setpoint reference I00)	Ramp time T00	Pulse mode P00
"0"	**"1"**	Fixed setpoint I01 (adjustable 0 to 150 % I_L)	Ramp time T01	Pulse mode P01
"1"	**"0"**	Fixed setpoint I10 (adjustable 0 to 150 % I_L)	Ramp time T10	Pulse mode P10
"1"	**"1"**	Fixed setpoint I11 (adjustable 0 to 150 % I_L)	Ramp time T11	Pulse mode P11

In case of a setpoint change, the drive moves to the new setpoint using the respective ramp.

The line cable compensation is usually carried out during startup. To do so, the load current I_L must be set variably. This means that you have to set the setpoint selection "analog input AI11/AI12 active" ("0" signal on DI04 and DI05) and set the initial setpoint 0% I_L (−10 V or −40 mA on AI11/AI12).

8.3 Communication via system bus

Via its SBus interface, the TPS10A stationary converter allows for a connection to a higher-level automation system. The TPS10A stationary converter is always operated as SBus slave. SBus master can be control devices (PLC) and PCs with a CAN bus interface. If the TPS10A stationary converter is to be controlled via a fieldbus, fieldbus gateways, such as DFP21B/UOH11B, are used as master.

For SBus communication, the nodes (master and slaves) must be connected as described in section "System bus (SBus) installation". The SBus is a CAN bus according to the CAN specification 2.0, parts A and B. It supports all services offered by the MOVILINK® SEW unit profile.

8.3.1 MOVILINK® protocol

The MOVILINK® protocol handles automation tasks, such as the control and configuration of the TPS10A stationary converters via cyclical data exchange, as well as startup and display tasks.

Various telegram types are specified for the communication with a master control. These types of telegrams can be divided into 2 categories:

- Process data telegrams
- Parameter telegrams

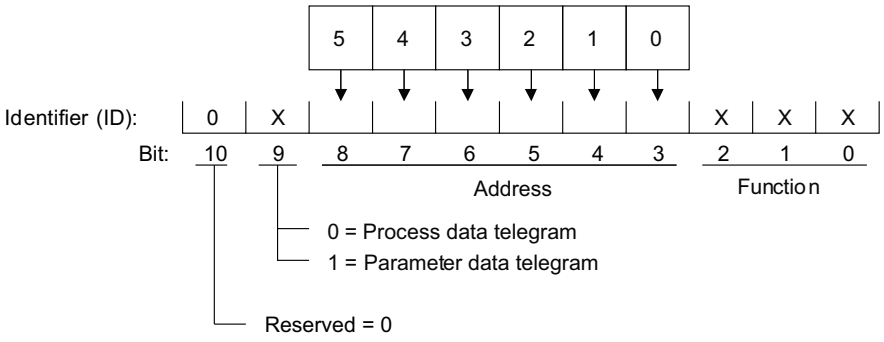
As SBus slave, the TPS10A stationary converter can receive and respond to parameter and process data telegrams.

CAN bus identifier

On the SBus, it is necessary to differentiate between these various types of telegrams by means of the identifiers (ID). This is why the ID of an SBus telegram comprises the telegram type and the SBus address. The SBus address is set via the "SBus address" parameter or the "SBus group address" parameter.

The CAN bus identifier consists of 11 bits, since only standard identifiers are used. The 11 bits of the identifier are divided into 3 groups:

- Function (bit 0 - 2)
- Address (bit 3 - 8)
- Process data/parameter data switch (bit 9)



322607883

Bit 9 is used to distinguish between process and parameter data telegrams. Bit 10 is reserved and must be 0. For parameter and process data telegrams, the address contains the "SBus address" of the unit. The unit is addressed with a request telegram. For group parameters and group process data telegrams, the address contains the "SBus group address".

Creating the identifiers

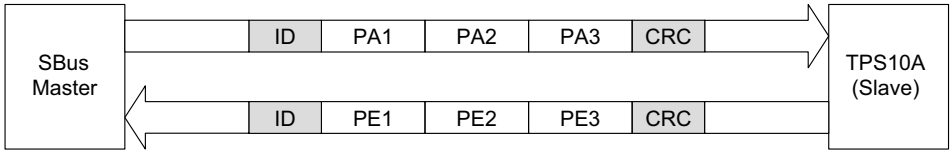
The following table shows the relationship between the type of telegram and the address when creating the identifiers for SBus MOVILINK® telegrams:

Identifier	Telegram type
8 × SBus address + 3	Process output data telegrams (PO)
8 × SBus address + 4	Process input data telegrams (PI)
8 × SBus group address + 6	Group process output data telegram (GPO)
8 × SBus address + 512 + 3	Parameter request telegram
8 × SBus address + 512 + 4	Parameter response telegram
8 × SBus address + 512 + 6	Group parameter request telegram

Process data telegrams

The process data telegrams comprise a process output data telegram and a process input data telegram. The process output data telegram is sent from the master to a slave and contains the setpoints for the slave. The process input data telegram is sent from the slave to the master and contains actual values of the slave.

The fixed setting for the number of process data is "3 process data words".



9007199577393163

The master control can arbitrarily send the asynchronous process output data that is responded to by the TPS10A stationary converter with a process input data telegram within at most a millisecond.

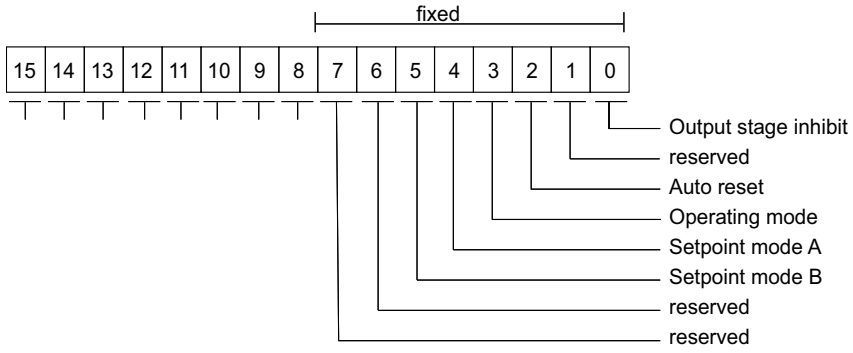
For the TPS10A stationary converter, the content of the process data is fixed:

Process output data PO	**Contents**
PO1	Control word 1
PO2	Current setpoint in 0.1%
PO3	No function
Process input data PI	**Contents**
PI1	Status word 1
PI2	Temperature
PI3	Utilization

The TPS10A stationary converter allows for a monitoring of the cyclic process data communication.

A monitoring time can be set via the *SBus timeout delay* parameter. The TPS10A stationary converter performs the error response set in the *SBus-timeout response* parameter if there is no data exchange via process data telegrams within this time.

The following figure provides an overview of the control word structure:

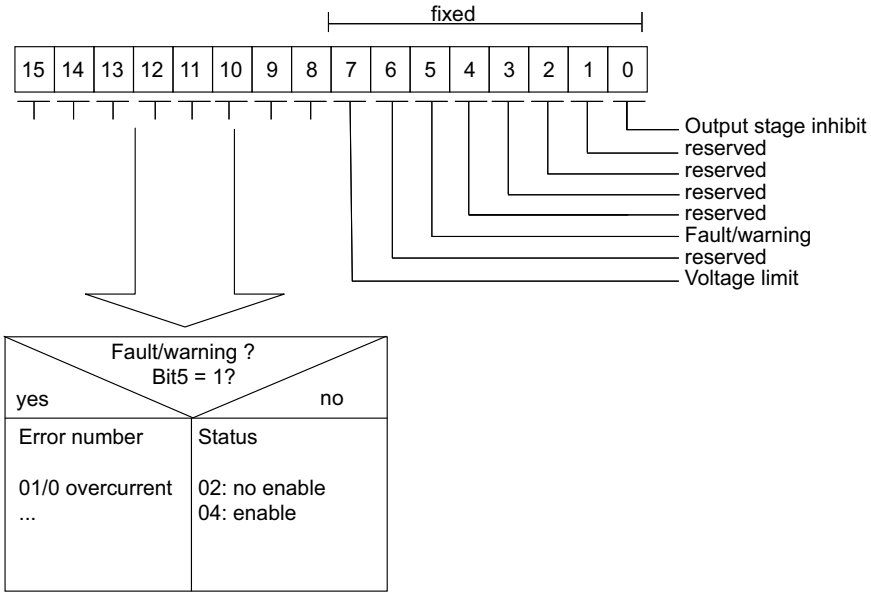


322201355

Bit	Control command	Assignment
0	Output stage inhibit	0 = Inhibited 1 = Enable
2	Auto reset function	0 = auto reset off 1 = auto reset on
3	Operating mode	0 = Voltage control 1 = Current control
4	Setpoint mode A	See setpoint specification
5	Setpoint mode B	

The "Output stage inhibit" control command is additionally ANDed to terminal DI00.

Status word 1 carries the following information from the TPS10A stationary converter:



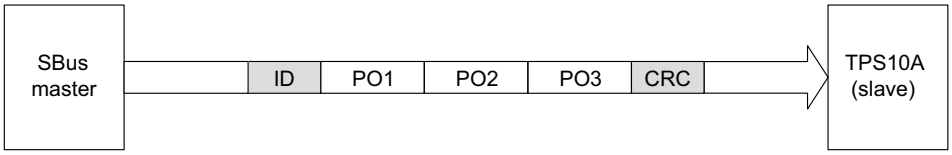
322687499

Bit	Control command	Assignment
0	Output stage inhibit	0 = Output stage inhibited 1 = Output stage enabled
5	Error/warning	0 = No error/warning 1 = Error/warning pending
7	Voltage limit	0 = Voltage limit not reached 1 = Voltage limit reached

The utilization is coded in 1/10 percent. Thus a value of 1000 corresponds to 100 %.

Group process data telegram

The group process data message is sent from the master to one or more slaves with the same SBus group address. It has the same structure as the process output data telegram. This telegram can be used for sending the same setpoint values to several slaves which share the same SBus group address. The slaves do not respond to the telegram.



9007199577435403

Parameter telegrams

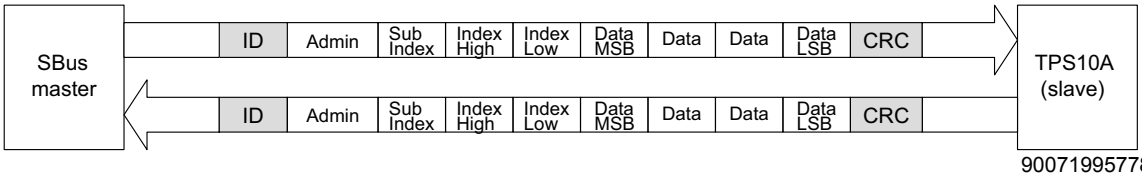
Parameter telegrams are made up of a parameter request telegram and a parameter response telegram. The parameter request telegram is sent by the master in order to read or write a parameter value.

The parameter telegrams are structured as follows:

- Management byte
- Subindex byte
- Index high byte
- Index low byte
- 4 data bytes

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Manage-ment	Subindex	Index high	Index low	MSB data	Data	Data	LSB data
		Parameter index		4 byte data			

The management byte specifies which service should be performed. Index and subindex determine the parameter the service is carried out for. The four data bytes contain the numerical value that is read or written. Refer to the appendix for a detailed list of all parameters supported by the TPS10A stationary converter. The slave sends the parameter response telegram in response to the parameter request telegram from the master. Request and response telegrams have the same structure.

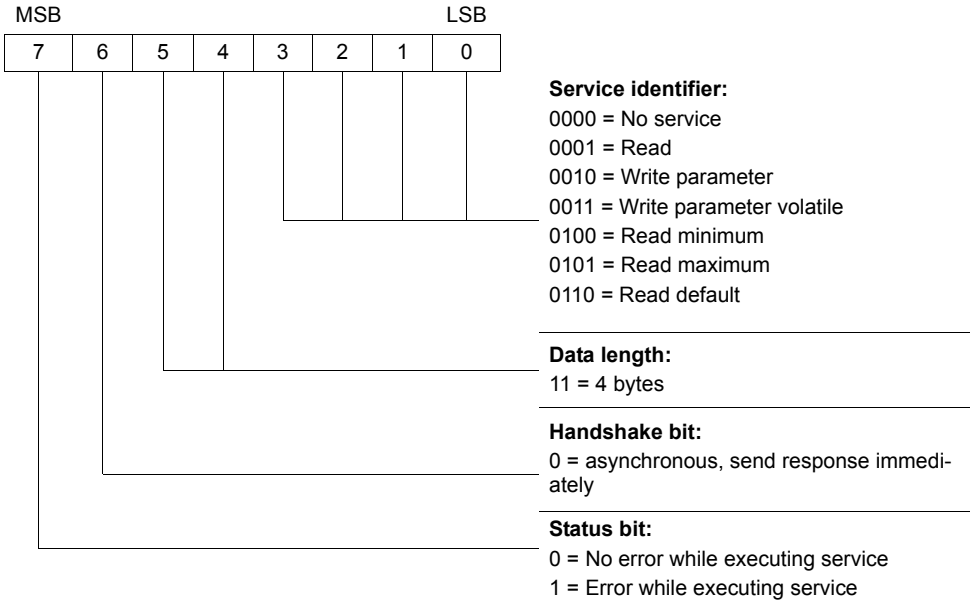


9007199577835531

Management of the parameter telegram

The entire procedure for setting parameters is coordinated using management byte 0. This byte provides important service parameters such as service identifier, data length, version and status of the service performed. The following table shows that the bits 0 – 3 contain the service identifier and thus define the service to be carried out. The data length for the WRITE service that generally has to be set to 4 bytes for the TPS10A stationary converter is specified via bit 4 and bit 5. The following applies: Handshake mode bit is always 0: asynchronous communication. Status bit 7 indicates whether the service was carried out properly or whether it is faulty.

Byte 0: Management



Index addressing

The following bytes determine the parameter to be read or written via the fieldbus system.

- Byte 1: Subindex
- Byte 2: Index high
- Byte 3: Index low

The parameters of the TPS10A stationary converter are addressed with a uniform index including subindex regardless of the fieldbus system which is connected.

Data range

The data are located in byte 4 to byte 7 of the parameter telegram. This means up to 4 bytes of data can be transmitted per service. The data is always entered with right-justification. Byte 7 contains the least significant data byte (LSB data), thus byte 4 is the most significant data byte (MSB data).

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Management	Subindex	Index high	Index low	MSB data	Data	Data	LSB data
				High byte 1	Low byte 1	High byte 2	Low byte 2
				High word		Low word	
				Double word			

Incorrect execution of a service

The status bit in the management byte is set to signal that a service has been executed incorrectly. If the status bit now signals an error, the error code is entered in the data range of the parameter telegram. Bytes 4 – 7 send back the return code in a structured format.

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Management	Subindex	Index high	Index low	Error class	Error code	Add. code high	Add. code low

↓

Status bit = 1: Incorrect performance of service

Return codes for parameter setting

In case of incorrect parameter setting, the TPS10A stationary converter returns various return codes to the parameter setting master. The codes offer detailed information on the cause for the error. All of these return codes are structured in accordance with EN 50170. The MQP distinguishes between the following elements:

- Error class
- Error code
- Additional code

Return codes that are provided by the TPS10A stationary converter are all included in error class "Error class 8 = other error" and in the "Error code = 0 (other error code)". The error can be identified more precisely using the *additional code* element:

Add. code high (hex)	Add. code low (hex)	Meaning
00	00	No error
00	10	Illegal parameter index
00	11	Function/parameter not implemented
00	12	Read access only
00	13	Parameter lock is active
00	14	Factory setting is active
00	15	Value for parameter too large
00	16	Value for parameter too small
00	17	Required option card missing for this function/ parameter
00	18	Error in system software
00	19	Parameter access only via RS-485 process interface to X13
00	1A	Parameter access only via RS-485 diagnostics interface
00	1B	Parameter is access-protected
00	1C	Controller inhibit required
00	1D	Invalid value for parameter
00	1E	Factory setting was activated
00	1F	Parameter was not saved in EEPROM
00	20	Parameter cannot be changed with enabled output stage

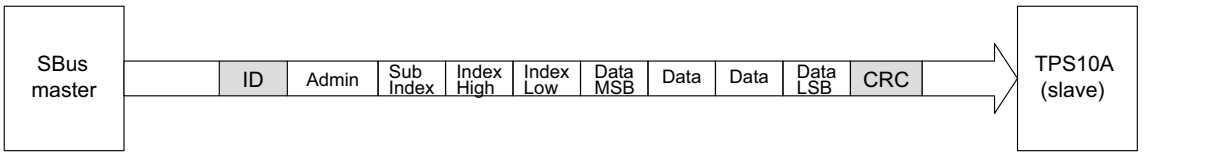
Invalid parameter setting represents a special case:

An incorrect code was entered in the management byte during execution of a read or write service via the CAN bus:

	Code (dec)	Meaning
Error class	5	Service
Error code	5	Invalid value
Add. code high	0	--
Add. code low	0	--

Group parameter telegrams

The group parameter telegram is sent from the master to one or more slaves with the same SBus group address. It has the same structure as the process request telegram. You can only write parameters to the slave units with this telegram. The slaves do not respond to the telegram.



9007199578071819

8.3.2 Reading a parameter

The following example describes how a parameter (see parameter list in appendix) can be read from the TPS10A stationary converter via parameter communication.

The TPS10A stationary converter (SBus slave) has SBus address 3.

- **Identifier:** Parameter request telegram

  8 × SBus address + 512 + 3 = 539 (21B hex)

- **Administration:** read parameter, 4 bytes long, 0011 0001 b = 31 hex
- **Index:** Load current, 10089

  10089 = 2769 hex (index low = 69 hex, index high = 27 hex), subindex 1

The SBus master sends the following CAN message:

ID	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
21B	31	01	27	69	00	00	00	00

The TPS10A stationary converter responds (example):

ID	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
21C	31	01	27	69	00	00	1D	4C

According to parameter table: measurement index = 22; unit = Ampere; conversion index = −3

Numerical value: 1D4C hex = 7500

Thus, the load current is 7500 mA = 7500 A × 0.001 = 7.5 A

8.4 Control via SBus

8.4.1 Control via process data telegrams

If the TPS10A is to be controlled via the process data telegrams, the parameters must be set as follows:

Parameters	Setting
Control signal source	SBus 1
Setpoint source	SBus 1

Additionally, the parameters *SBus timeout delay* and *SBus timeout response* must be configured.

Example

A TPS10A stationary converter with SBus address 3 is to be controlled cyclically via a PLC (SBus master). The process output data is to be sent every 10 ms.

Identifier (ID):

Process output data telegram (PO)

8 × SBus address + 3 = 8 × 3 + 3 = 27 dec = 1B hex

PO1, Control word 1

Bit 0: 1 output stage inhibit

Bit 3: 1, Current control

This means: PO1 = 09 hex

In order to enable the output stage, terminal DI00 must be wired to "1".

PO2 current setpoint:

Setpoint: 100 %, thus PO2 = 1000 = 3E8 hex

Thus the SBus master sends:

ID	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
1B	00	09	03	E8	00	00
	PO1		PO2		PO3	

The TPS10A stationary converter responds to the process output data telegram (PO) with the process input data telegram (PI):

ID	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
1C	00	01	FF	0A	01	75
	PI1		PI2		PI3	

PI1 (Byte0, Byte1): status word, bit0 = 1: Output stage enabled

PI2 (Byte2, Byte3): Temperature, FF0A hex = −246 °C + 273.15 K = 27.15 °C

PI3 (byte 4, byte 5): utilization, 0175 hex = 373 dec = 373/10 % = 37.3%

8.4.2 Control via parameter telegrams

The TPS10A stationary converter can also be controlled via parameter telegrams. As opposed to the process data telegram, the parameter telegrams can be sent acyclically.

To do so, the parameters must be set as follows:

Parameters	Setting
Control signal source	Parameter control word
Setpoint source	Parameter setpoint

Example

Parameter control word

A TPS10A stationary converter with SBus address 3 is to be controlled via a PLC .

Identifier (ID):

8 × SBus address + 512 + 3 = 8 × 3 + 512 + 3 = 539 = 21B hex

Management byte:

Write parameter volatile, 4 byte: 33 hex

Index:

Parameter control word, 8785 (index low = 51 hex, index high = 22 hex), subindex: 0

ID	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
21B	33	00	22	51	00	00	00	00

Parameter setpoint

A setpoint of 100% (100.000 dec = 0186A0 hex) is to be determined for the TPS10A stationary converter.

Identifier (ID):

8 × SBus address + 512 + 3 = 8 × 3 + 512 + 3 = 539 = 21B hex

Management byte:

write parameter volatile, 4 Bytes: 33 hex

Index:

Parameter setpoint, 10237 (index low = FD hex, index high = 27 hex), subindex 10

ID	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
21B	33	0A	27	FD	00	01	86	A0

8.5 Synchronization

With TPS10A stationary converter it is possible to synchronize the phasing of line cable currents of various supplies.

Proceed as follows:

1. Connect the stationary converters with a synchronization cable (see section "Installation").
2. Define one TPS10A stationary converter as synchronization master.
3. Configure it as "25.0 kHz (master)" with the MOVITOOLS® MotionStudio startup software via the *Frequency mode* parameter.

   INFORMATION Only **one** synchronization master is permitted per network.

4. Use the *Frequency mode* parameter to configure each individual remaining TPS10A stationary converter as "slave".

Optionally, you can set additional parameters for a synchronization slave:

Sync timeout response:

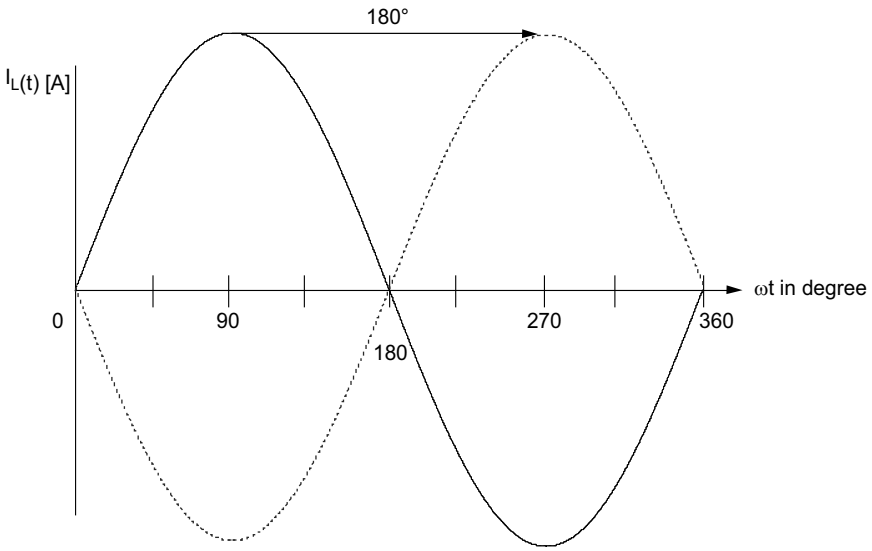
Stationary converters that are set as synchronization slaves perform the specified error response in case of the following errors:

- more than one active master
- the synchronization cable is faulty.

Sync phase angle:

A fixed phase shift can be determined via the *Sync phase angle* parameter. This can only be set at a synchronization slave and always refers to the phasing of the master.

The following illustration shows an example of a phase shift of 180º to the master.



A 0º phase shift is preset. Thus, the currents of two supplies flow in phase. Then, there is almost the full power available at joints of the respective line cable systems.

A 180º phase shift makes sense if the current direction is reversed at joints due to unfavorable cabling and a re-cabling is to be prevented.

Runtime-related errors can be precisely adjusted with phase shifts that slightly vary from 0º or 180º. This, however, is usually not required.

8.6 Compensation

8.6.1 Track compensation

The inductance of the line conductor increases as the cable length increases.

This inductive reactance must be compensated by connecting compensation capacitors in series (track compensation).

For more information on this topic, refer to the MOVITRANS® TAS10A transformer module operating instructions in the sections "Wiring diagrams for line conductors on TAS10A040" and "Wiring diagrams for line conductors on TAS10A160".

8.6.2 Prerequisites

MOVITOOLS® MotionStudio and the operating instructions for the TAS10A transformer module are required for compensation.

In order to be able to perform the compensation successfully, the current setpoint (% I_L) must be varied. This can be done via the setpoint selection of the analog input (AI11/ AI12) or via the manual operation mode in MOVITOOLS® MotionStudio.

You can use an R11 potentiometer for analog setpoint selection, as described in the section Wiring diagram for the TPS10A control unit.

8.6.3 Procedure

Perform the following steps to ensure successful startup:

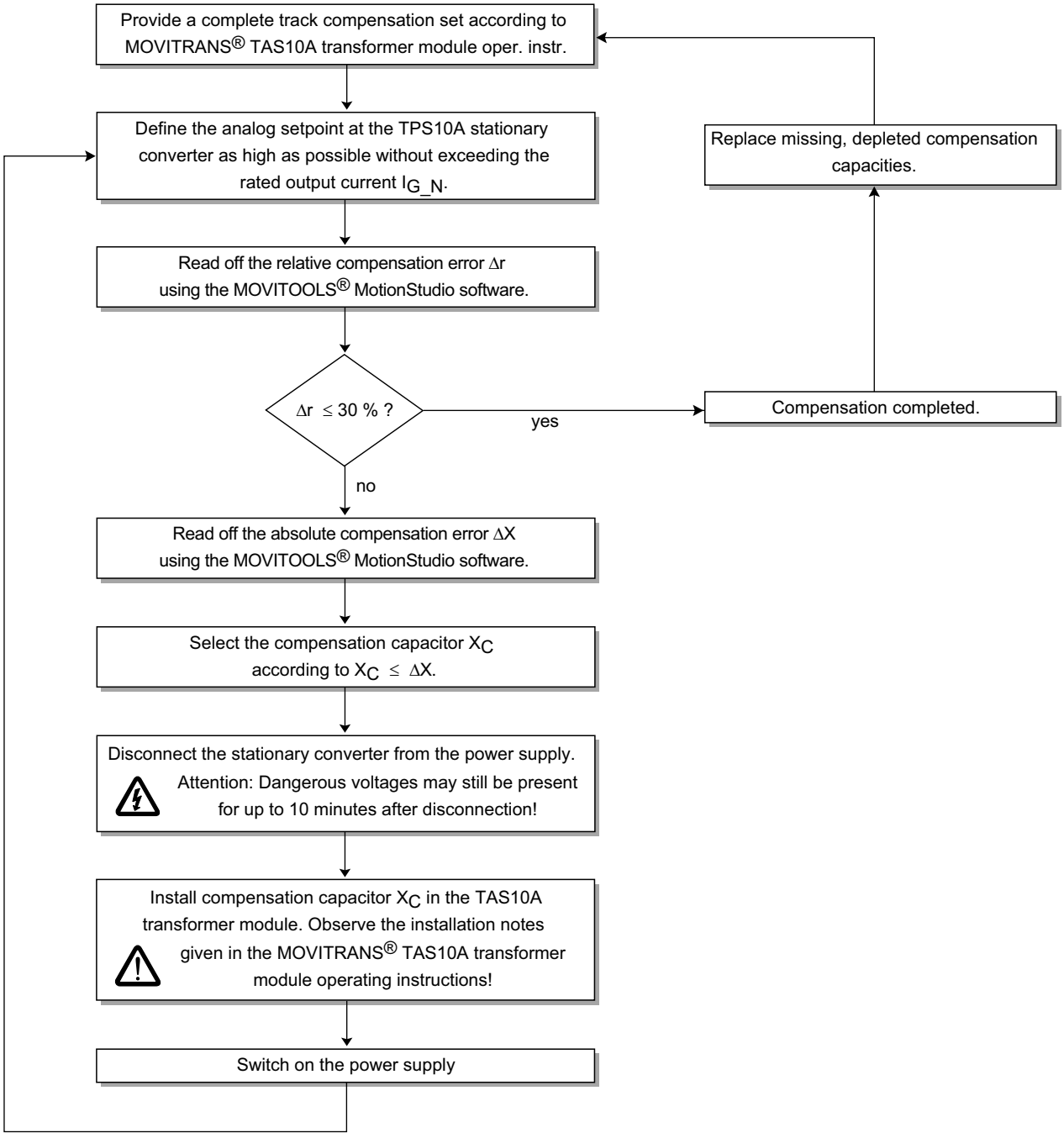
1. Establish a connection to the TPS10A using the MOVITOOLS® MotionStudio software.
2. Select [Startup] [Compensation] in the parameter tree.
3. In the [Compensation] window, choose the line conductor current from the input field *Nominal line conductor current at 100% setpoint* for the system in question.

   The value corresponds to the rated output current of the TAS10A transformer module and is used to calculate the absolute compensation error correctly.
4. Select [Display values] [Process data] in the parameter tree.
5. In the [Process Values] window, check the following values:
   - Error status = No error
   - Output current = 0.0 A
6. If required, change your settings as follows:
   - Make sure that a "1" signal is applied to the binary input "Ext. error" (error status = no external error).
   - Enable the output stage with the control command.
   - Select the desired setpoint. 0 – 100 % I_L.
7. Carry out compensation of the line conductor:
   - Ensure that no real power can be transmitted while the measurement is taken.
   - Proceed as described in the following flow diagram.
8. Choose the setpoint as required after track compensation has been performed.

For additional information, refer to the section "Technical Data" in this documentation or to the sections "Technical Data" and "Compensation Capacitors" in the operating instructions "MOVITRANS® TAS10A Transformer Module".

8.6.4 Flow diagram

Proceed as follows to determine the track compensation:

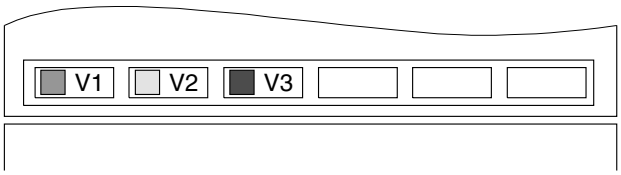


146882059

9 Operation

9.1 Operation LEDs

Operating status, setpoint modes and error messages of the TPS10A stationary converter are indicated by the three-color (green/yellow/red) LEDs V1, V2 and V3.



146840715

9.1.1 V1: Operating status

The operation LED V1 indicates the operating status of the unit.

Color V1		Operating state	Description
-	**OFF**	Without voltage	No supply voltage and no 24 V_{DC} backup voltage.
Yellow	**Steady light**	Output stage inhibit	Unit ready but output stage inhibit active.
Green	**Flashing**	Enable with voltage control	Output stage enabled, voltage control active.
Green	**Steady light**	Enable with current control	Output stage enabled, current control active.
Red	**Steady light**	System error	Error triggers output stage inhibit.

9.1.2 V2: Setpoint selection

The operation LED V2 indicates the active setpoint selection, ramp time and pulse mode:

Color V2		Setpoint selection	Ramp time	Pulse mode
Green	**Flashing**	Depending on specified setpoint source: • Analog input AI11/AI12 active • Process data word PO2 via SBus1 active • Parameter setpoint active	Ramp time T00	Pulse mode P00
Yellow	**Steady light**	Fixed setpoint I01 (adjustable 0 – 150 % I_L)	Ramp time T01	Pulse mode P01
Yellow-green	**Flashing**	Fixed setpoint I10 (adjustable 0 – 150 % I_L)	Ramp time T10	Pulse mode P10
Green	**Steady light**	Fixed setpoint I11 (adjustable 0 – 150 % I_L)	Ramp time T11	Pulse mode P11

9.1.3 V3: Error messages

In case of an error (V1 = red), the operation LED V3 displays the following error messages:

Color V3		Error code	Error subcode	Error message
--	Off	45	0	Error "System initialization"/General error during initialization
Yellow	Steady light	7	2	Error "DC link voltage" / V DC link undervoltage
Yellow	Flashing	47	0	Error "Timeout SBus #1"/Timeout system bus (CAN) 1
Yellow/red	Flashing	26	0	Error "External terminal"
Green / yellow	Flashing	43	0	Error "Communication timeout at RS-485 interface"
Green	Steady light	25	0	"EEPROM" error
Green	Flashing	97	0	"Copy parameter set" error
Green / red	Flashing	68	11	Error "External synchronization"/Lost synchronization, sync signal invalid
Red	Steady light	1	0	"Overcurrent" error
Red	Flashing	11	10	"Overtemperature" error

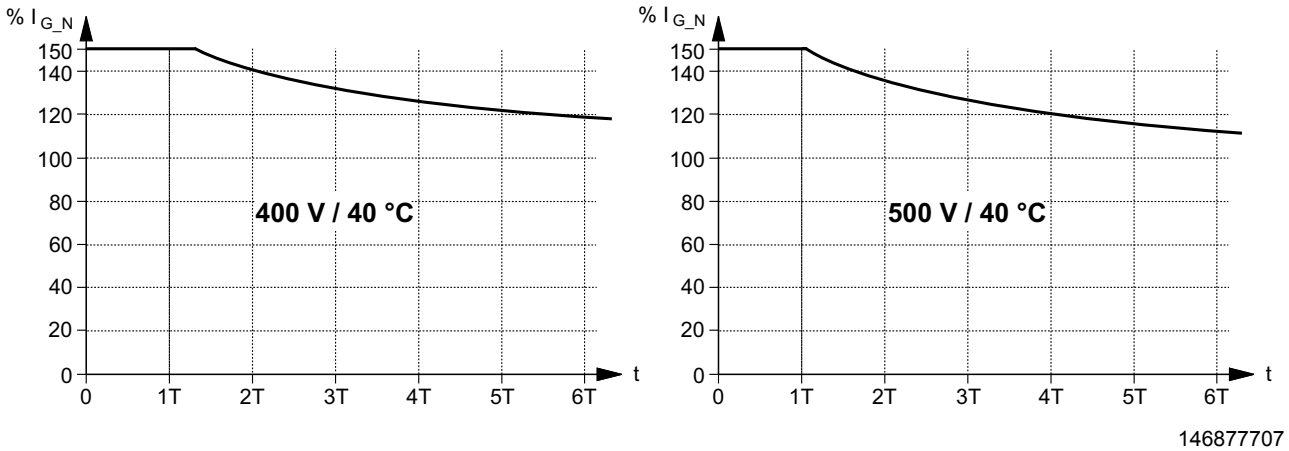
9.2 Overload capacity

9.2.1 Continuous output current

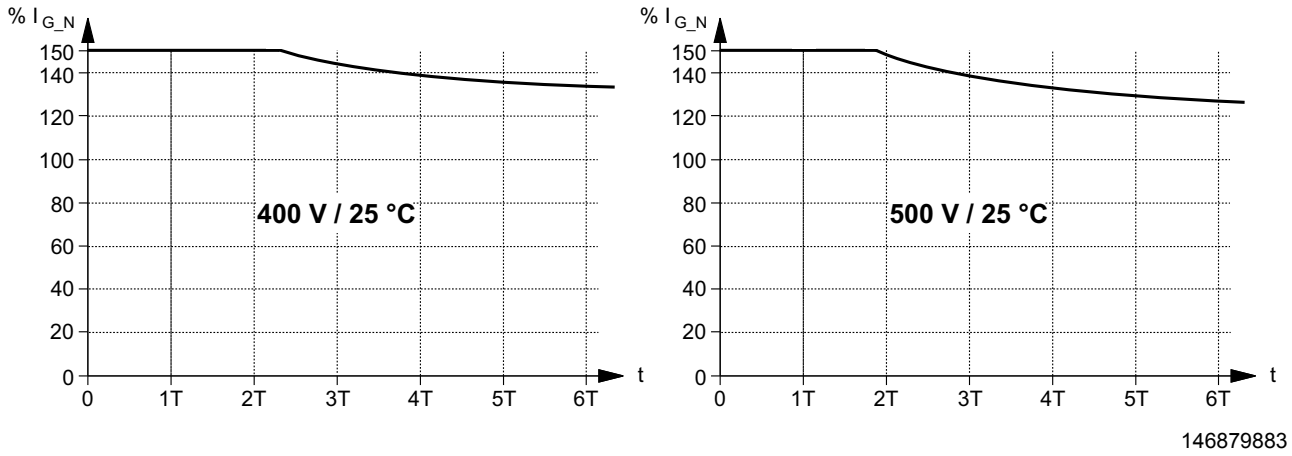
The TPS10A stationary converters calculate the load on the inverter output stage permanently (unit utilization). They can output the maximum possible power in every operating state. The permitted continuous output current depends on the ambient temperature, heat sink temperature, supply voltage. If the load on the stationary converter is higher than permitted, the unit outputs the error message "Overcurrent" (output stage inhibit) and switches off immediately.

9.2.2 Temperature change over time

The following figures show the temperature changes of the units over time and the permitted output currents when V_{line} = 400 V and V_{line} = 500 V and ambient temperatures T_A= 25 °C and T_A = 40 °C.



146877707



9.2.3 Load period

The following table shows the time constant T and the rated output current I_{G_N} for sizes 2 and 4:

TPS10A stationary converter	040 (size 2)	160 (size 4)
Time constant t [s]	50	80
Rated output current I_{G_N} [A_{eff}]	10	40

The apparent power is proportional to the output current I_G.

9.3 Cut-off limits

The following table shows the load capacity of the units:

Range	Heat sink temperature ϑ	Current rating
1	0 °C to 60 °C	The maximum current carrying capacity is 1.8 x I_{G_N}.
2	60 °C to 90 °C	The maximum current carrying capacity is reduced in linear form to 1.2 x I_{G_N}.
3	> 90 °C	Unit switches off due to overtemperature (output stage inhibit).

When the unit output current I_G exceeds the maximum possible current carrying capacity, the unit switches off due to overcurrent (output stage inhibit).

10 Service

10.1 Error overview

The following table contains a list of error codes, subcodes and possible error corrections:

Code	Sub-code	Description	Response	P	Cause(s)	Measure(s)
0	0	No error	--		--	--
1	0	"Overcurrent" error	Output stage inhibit		• Short circuit at output • Gyrator impedance to small • TAS output open • Faulty output stage	• Rectify the short circuit • Connect the correct TAS • Observe the wiring diagrams of the MOVITRANS® TAS10A operating instructions • Use a short-circuit hoop • Consult SEW Service
7	2	"DC link voltage" error/ V DC link undervoltage	Only error message; no output stage inhibit	P[1)]	• Power supply voltage too low • Voltage drop too large on power supply system line • Phase failure of power supply system line	• Connect to correct supply system voltage (400/500 V) • Design power supply system line so that the voltage drop is relatively small • Check power supply system line and fuses
11	10	"Overtemperature" error	Output stage inhibit		• Thermal overload of unit	• Reduce load and/or ensure adequate cooling
25	0	"EEPROM" error	Output stage inhibit		• Error while accessing EEPROM	• Check factory setting • Restart the unit and parameterize • Contact SEW service if the error occurs again
26	0	"External terminal" error	Output stage inhibit	P[1)]	• Read in external error signal via DI01	• Correct external error • Make sure that DI01 is set to "1"
43	0	"Communication time-out at RS485 interface" error	Output stage inhibit		• Communication between stationary converter and PC interrupted	• Check connection between stationary converter and PC. • Consult SEW Service
45	0	"System initialization" error/General error during initialization	Output stage inhibit		• No parameters set for EEPROM in power section, or parameters set incorrectly	• Reset factory settings. If the error cannot be reset: • Consult SEW Service
47	0	"Time-out SBus #1" error/"Time-out system bus (CAN) 1" error	Only error message; no output stage inhibit	P[1)]	• Error during communication via system bus 1	• Check system bus connection
68	11	"External synchronization" error/Lost synchronization, sync signal invalid	Only error message; no output stage inhibit	P[1)]	• Error during transmission of the sync signal	• Check synchronization connection • Check master/slave settings
97	0	"Copy parameter set" error	Output stage inhibit		• Error during data transmission	• Repeat copying process

1) This response can be programmed. The default error response is listed in the "Response" column.

10.2 Error reset

Proceed as follows to reset an error:

- Eliminate the cause of the error.
- Perform the "1" → "0" edge change on the "Output stage inhibit" control function

  or
- perform the "1" → "0" edge change on the "Auto reset" control function.

The unit is now ready for operation again.

The assignment of the control functions "Output stage inhibit" and "Auto reset" depends on the control source:

Control signal source	"Output stage inhibit" control function	"Auto reset" control function
Terminals	DI00	DI02
Control word SBus (PO1)	Bit0 and DI00	Bit2
Parameter control word	Bit0 and DI00	Bit2

10.3 Auto reset function

The auto reset function must not be used in systems where automatic restart represents a risk of injury to persons or damage to equipment.

10.3.1 Description of function

The auto reset function of the TPS10A stationary converter offers the option of resetting errors automatically when they occur on the unit.

The following errors can be reset:

- "Overcurrent" error
- "Overtemperature" error

10.3.2 Switching on / off

The auto reset function is switched on or off via the "Auto reset" control function. The following applies:

- "0" = Auto reset switched off
- "1" = Auto reset switched on

Control signal source	Auto reset function
Terminal	DI02
Control word SBus (PO1)	Bit2
Parameter control word	Bit2

10.3.3 Auto reset

When an error occurs, the auto reset function resets the system automatically after a fixed time of 50 ms (restart time). A maximum of 3 successive errors can be reset.

Further auto resets are only possible when an error reset, as described in the "Error reset" section, has been performed.

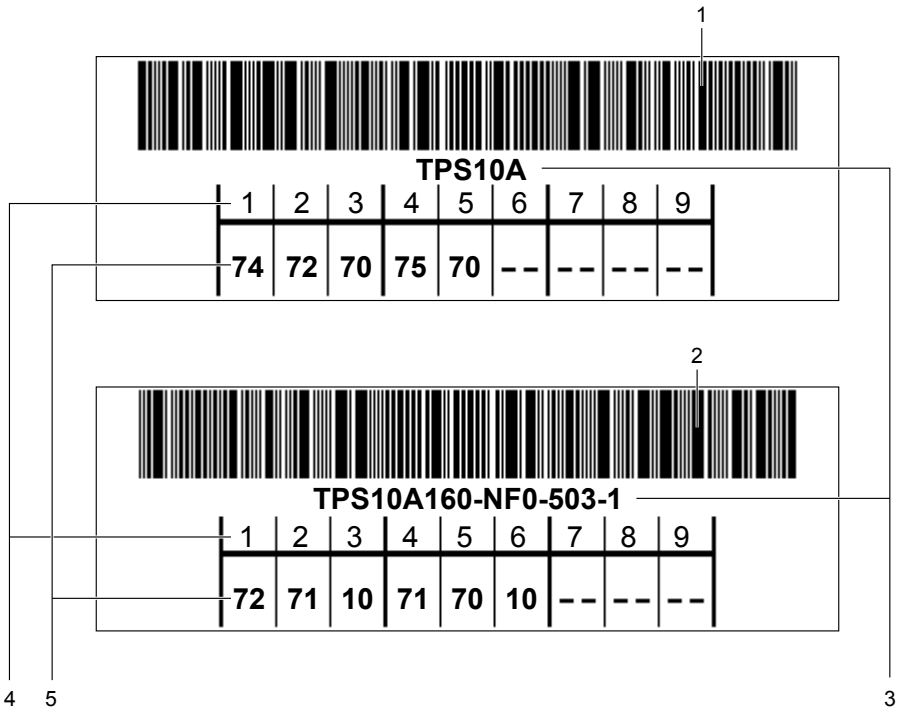
10.4 Electronics service

10.4.1 Service label

The TPS10A stationary converters are equipped with a service label for the power section and a service label for the control unit.

The service label for the control unit is attached on the left side of the control unit.

The service label for the power section is attached on the right side of the power section cover.



9007199401586059

[1] Service label of the control unit
[2] Service label of the power section
[3] Unit designation
[4] Component / part
[5] Service code

11 Technical Data

11.1 Basic unit

The following table contains all technical data that apply to all TPS10A stationary converters regardless of size and power rating.

TAS10A transformer module		All sizes
Interference immunity		Meets EN 61800-3
Interference emission with EMC-compliant installation		According to limit class A to EN 55011 and EN 55014, complies with EN 61800-3
Ambient temperature T **Climate class**		0 °C to +40 °C (32 °F to 104 °F) EN 60721-3-3, class 3K3
Storage and transportation temperature[1)] T_L		−25 °C to +75 °C (−13 °F to +167 °F) (EN 60721-3-3, class 3K3)
Degree of protection	**size 2 (TPS10A040)**	IP20
	size 4 (TPS10A160)	IP00, IP10 with installed touch guard
Pollution class		2 according to IEC 60664-1 (VDE 0110-1)
Operating mode		Continuous duty (EN 60149-1-1 and 1-3)
Resistance to vibration		Complies with EN 50178
Relative humidity		≤ 95 %, condensation not permitted

1) In case of long-term storage, the unit must be connected to the mains voltage for at least 5 minutes, otherwise the unit's service life may be shortened.

11.2 Unit data

The table below shows the unit data of all TPS10A stationary converters:

TPS10A stationary converter		TPS10A040-NF0-503-1	TPS10A160-NF0-503-1
		Input	
Supply voltage	**V_{supply}**	AC 380 V −10 % – 500 V +10 %	
Line frequency	**f_{line}**	50 Hz – 60 Hz ±5 %	
Nominal line current (at V_{line} = 3 × AC 400 V)	**I_{line}**	AC 6.0 A	AC 24.0 A
		Output	
Nominal output power	**P_N**	4 kW	16 kW
Nominal output current	**I_{G_N}**	AC 10 A	AC 40 A
Load current	**I_L**	AC 7.5 A	AC 30.0 A
Nominal output voltage	**V_{A_N}**	AC 400 V	
Output frequency	**f_o**	25 kHz	
		General information	
Power loss at I_{G_N}	**P_V**	300 W	1800 W
Cooling air consumption		80 m^3/h	360 m^3/h
Weight		5.9 kg	26.3 kg
Dimensions W × H × D		130 mm × 335 mm × 207 mm	280 mm × 522 mm × 227 mm

11.3 Electronics data

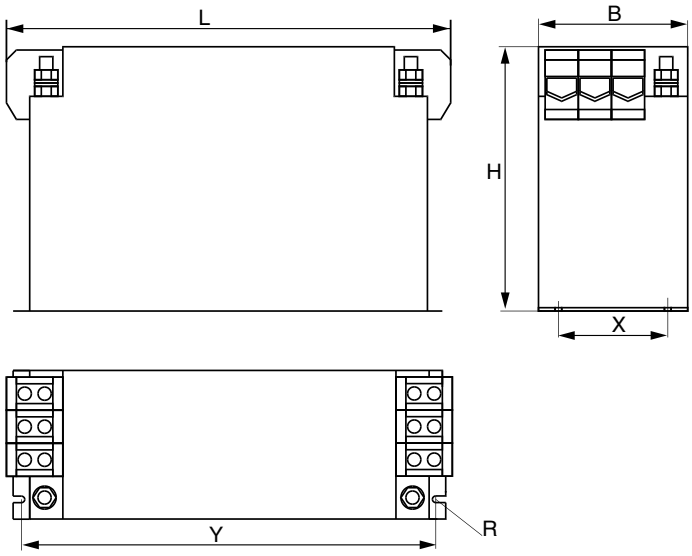
The table below shows the electronics data of all TPS10A stationary converters:

TPS10A stationary converter		General electronics data	
System bus (SBus)	**X10:5/7**	SC11/SC12: System bus (SBus) high/low	
Synchronization signal	**X10:20/22**	SS11/SS12: Synchronization signal high/low	
Voltage supply	**X10:1**	REF1: +10 V +5 % / −0 %, I_{max} = 3 mA	Reference voltages for setpoint potentiometer
For setpoint potentiometer	**X10:3**	REF2: −10 V +0 % / −5 %, I_{max} = 3 mA	
Setpoint input I_{L1}	**X10:2**	I_{L1} = −10 V – +10 V ≙ (0 – I00) % I_L	I_{L1} = −40 mA – +40 mA ≙ (0 – I00) % I_L
AI11/AI12	**X10:4**	Resolution: 10 bits, sample rate: 800 µs	Resolution: 10 bits, sample rate: 800 µs
(differential input)		R_i = 40 kΩ (external voltage supply) R_i = 20 kΩ (supply from X10:1/X10:3)	R_i = 250 Ω
Auxiliary voltage output VO24[1]	**X10:16**	V = DC 24 V, current carrying capacity: I_{max} = 200 mA	
External voltage supply VI24[1]	**X10:24**	V_N = DC 24 V −15% / +20% (range: DC 19.2 V – 30 V) according to EN 61131-2	
Binary inputs DI00 – DI05		Isolated via optocoupler (EN 61131-2), R_i ≈ 3.0 kΩ, I_E ≈ 10 mA PLC compatible, sample rate: 400 µs	
Signal level		+13 V – +30 V = "1" = Contact closed according to EN 61131-2 −3 V – +5 V = "0" = Contact open	
Control functions	**X10:9**	DI00: with fixed assignment /controller inhibit	
	X10:10	DI01: with fixed assignment /Ext.Error	
	X10:11	DI02: With fixed assignment Auto reset	
	X10:12	DI03: with fixed assignment voltage control/current control	
	X10:13	DI04: With fixed assignment Setpoint mode A	
	X10:14	DI05: With fixed assignment Setpoint mode B	
Binary outputs DO00 – DO02[1]		PLC compatible (EN 61131-2), response time: 400 µs **Caution:**Do not apply external voltage! I_{max} = 50 mA (short-circuit proof)	
Signal level		"0" = 0 V, "1" = 24 V	
Control functions	**X10:19/21**	DO02/00: Option parameter binary input 8350 DO02/8352 DO00	
Reference terminals	**X10:8**	AGND: Reference potential for analog signals (AI11, AI12, REF1, REF2)	
	X10:17/ X10:23	DGND: Reference potential for binary signals, system bus (SBus), synchronization signal	
	X10:15	DCOM: Reference for binary inputs DI00 – DI05	
Permitted cable cross section		Single core: 0.20 mm^2 – 1.5 mm^2 (AWG24 – 16)	
		Double core: 0.20 mm^2 – 1 mm^2 (AWG24 – 17)	

1) The unit provides a current of I_{max} = 400 mA for the DC 24 V outputs X10:16 (VO24), X10:19 (DO02) and X10:21 (DO00). An external DC 24 V supply (backup voltage) can be connected so that the electronic components remain ready for operation even in case of a power failure.

11.4 Line filter

The following figure shows a line filter:



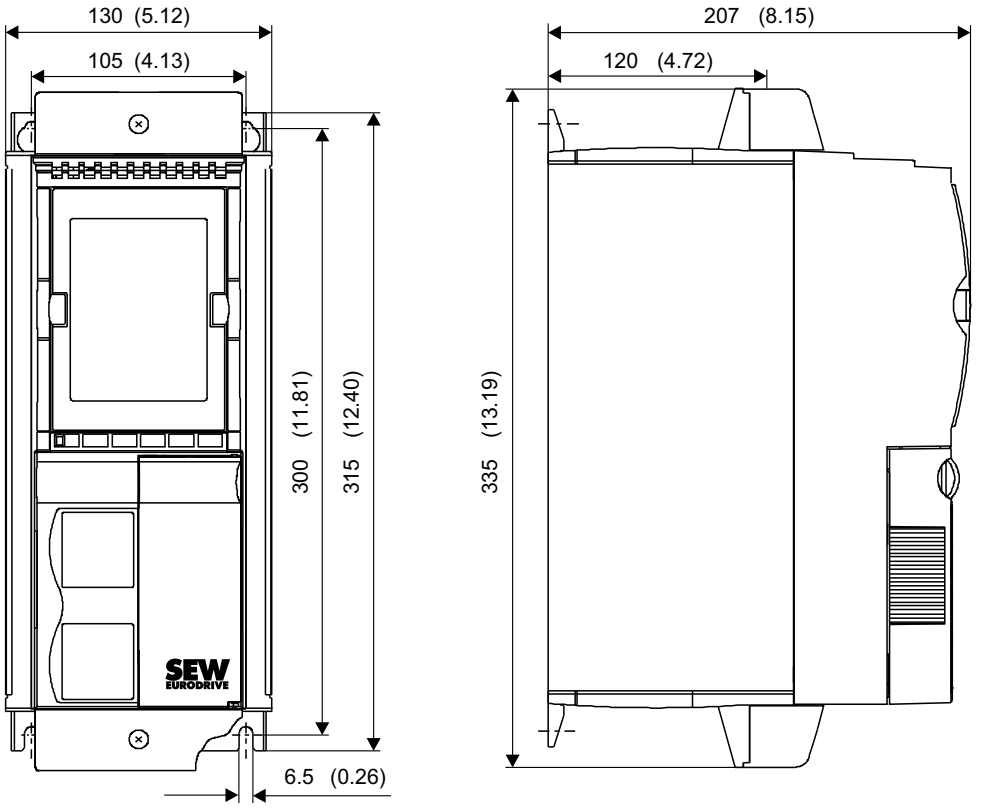
146842891

Type	L_{max} [mm] ([in])	H_{max} [mm] ([in])	B_{max} [mm] ([in])	X [mm] ([in])	Y [mm] ([in])	R [mm] ([in])	Terminal [mm^2]	Ground stud	Current [A]
NF 014-503	225 (8.86)	80 (3.15)	50 (1.97)	20 (0.79)	210 (8.27)	5.5 (0.22)	4 (AWG11)	M5	9
NF 035-503	275 (10.83)	100 (3.94)	60 (2.36)	30 (1.18)	255 (10.04)	5.5 (0.22)	10 (AWG7)	M5	35

11.5 Dimension sheets

11.5.1 TPS10A040 stationary converter – size 2

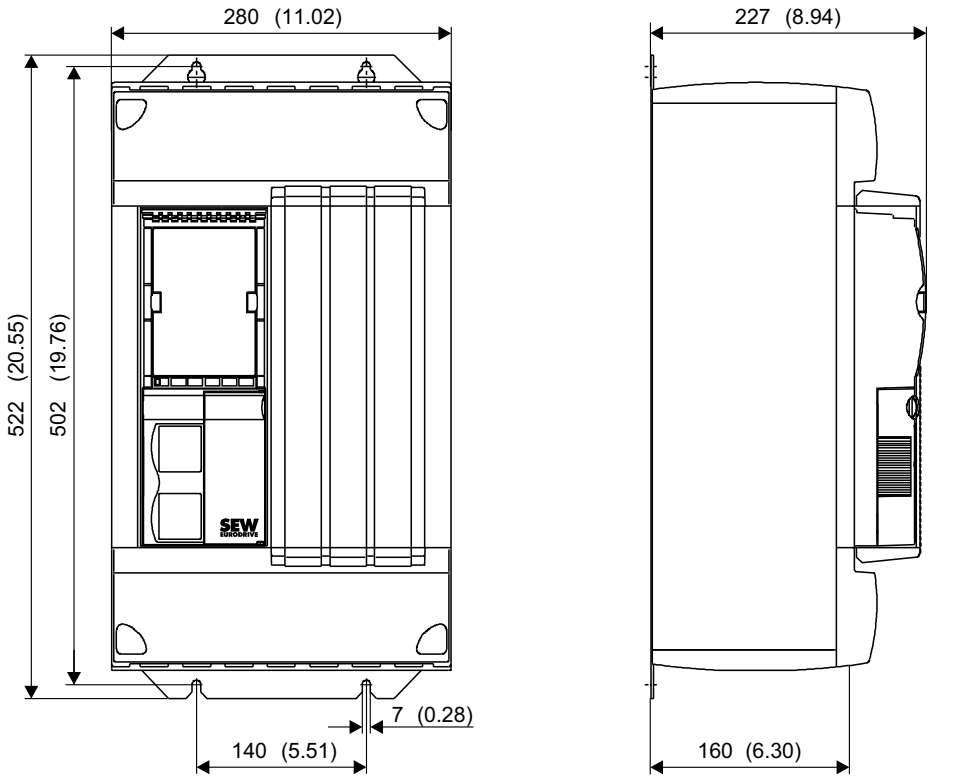
The following figure shows the dimension drawing of the TPS10A040 stationary converter, dimensions in mm (in):



9007199401614347

11.5.2 TPS10A160 stationary converter – size 4

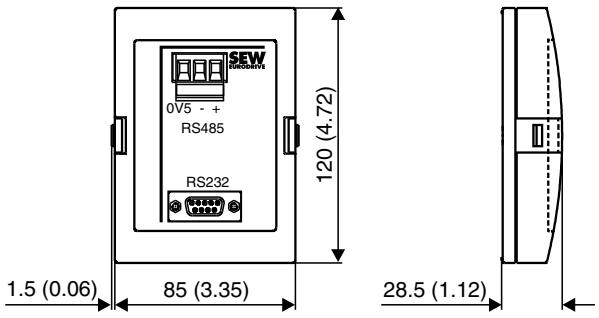
The following figure shows the dimension drawing of the TPS10A160 stationary converter, dimensions in mm (in):



9007199401616523

11.5.3 Optional serial interface USS21A type (RS-232)

The following figure shows the dimension sheet with USS21A option, dimensions in mm (in):



9007199401570827

12 Appendix

12.1 Parameters ordered by indexes

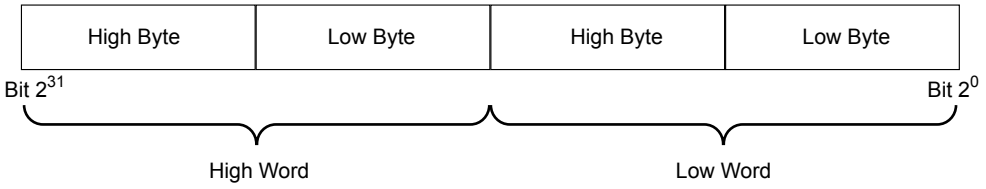
The following table provides an overview of all parameters ordered by indexes.

Table header explanation:

Index	16-bit index for addressing the parameter via interfaces
Parameters	Parameter name
Unit	Unit index: Abbr. = abbreviation of the unit Size = measurement index Conv = conversion index
Access	Access attributes: RO = Read only E = Output stage inhibit must be active when writing RW = Read/Write N = The EEprom stores the value in the RAM in case of a restart
Default	Factory settings
Comment	Meaning/value range of the parameter

Data format:

All parameters are treated as 32-bit value. They are displayed in Motorola format:



286100875

Parameters ordered by indexes									
Index			Parameters	Unit			Access	Default	Comment
Dec	Hex	Sub		Abbr	Size	Conv			
8300	206C	0	Firmware		0	0	RO	0	Example:823273374 = 8232733.74
8301	206D	0	Unit type		0	0	RO	0	
8304	2070	0	Setpoint description PO1		0	0	RO	9	9 = Control word 1
8305	2071	0	Setpoint description PO2		0	0	RO	2	2 = Setpoint
8306	2072	0	Setpoint description PO3		0	0	RO	0	0 = No function
8307	2073	0	Actual value description PI1		0	0	RO	6	6 = Status word 1
8308	2074	0	Actual value description PI2		0	0	RO	12	12 = Temperature
8309	2075	0	Actual value description PI3		0	0	RO	13	13 = Utilization
8310	2076	0	Status word 1		0	0	RO	0	Low word coded, as status word 1
8314	207A	0	Unit ID string 1		0	0	RO	0	
8315	207B	0	Unit ID string 2		0	0	RO	0	
8316	207C	0	Unit ID string 3		0	0	RO	0	
8317	207D	0	Unit ID string 4		0	0	RO	0	
8325	2085	0	DC link voltage	V	21	-3	RO	0	
8326	2086	0	Output current	A	22	-3	RO	0	

Parameters ordered by indexes									
Index			Parameters	Unit			Access	Default	Comment
Dec	Hex	Sub		Abbr	Size	Conv			
8327	2087	0	Heat sink temperature	°C	17	100	RO	0	
8331	208B	0	Analog input AI01	V	21	-3	RO	0	
8334	208E	0	Binary inputs DI00-DI08		0	0	RO	0	
8350	209E	0	Binary output DO02		0	0	N/E/RW	1	0 = No function 1 = /Malfunction 2 = Ready 12 = Current reference signal 28 = Voltage limit message
8352	20A0	0	Binary output DO00		0	0	N/E/RW	2	
8366	20AE	0	Error code t-0		0	0	RO	0	see error table
8367	20AF	0	Error code t-1		0	0	RO	0	
8368	20B0	0	Error code t-2		0	0	RO	0	
8369	20B1	0	Error code t-3		0	0	RO	0	
8370	20B2	0	Error code t-4		0	0	RO	0	
8371	20B3	0	Binary inputs t-0		0	0	RO	0	
8372	20B4	0	Binary inputs t-1		0	0	RO	0	
8373	20B5	0	Binary inputs t-2		0	0	RO	0	
8374	20B6	0	Binary inputs t-3		0	0	RO	0	
8375	20B7	0	Binary inputs t-4		0	0	RO	0	
8391	20C7	0	Status word t-0		0	0	RO	0	
8392	20C8	0	Status word t-1		0	0	RO	0	
8393	20C9	0	Status word t-2		0	0	RO	0	
8394	20CA	0	Status word t-3		0	0	RO	0	
8395	20CB	0	Status word t-4		0	0	RO	0	
8396	20CC	0	Heat sink temperature t-0	°C	17	100	RO	0	
8397	20CD	0	Heat sink temperature t-1	°C	17	100	RO	0	
8398	20CE	0	Heat sink temperature t-2	°C	17	100	RO	0	
8399	20CF	0	Heat sink temperature t-3	°C	17	100	RO	0	
8400	20D0	0	Heat sink temperature t-4	°C	17	100	RO	0	
8416	20E0	0	Utilization t-0	%	27	0	RO	0	0 – 100000, step 1000
8417	20E1	0	Utilization t-1	%	27	0	RO	0	0 – 100000, step 1000
8418	20E2	0	Utilization t-2	%	27	0	RO	0	0 – 100000, step 1000
8419	20E3	0	Utilization t-3	%	27	0	RO	0	0 – 100000, step 1000
8420	20E4	0	Utilization t-4	%	27	0	RO	0	0 – 100000, step 1000
8421	20E5	0	DC link voltage t-0	V	21	-3	RO	0	
8422	20E6	0	DC link voltage t-1	V	21	-3	RO	0	
8423	20E7	0	DC link voltage t-2	V	21	-3	RO	0	
8424	20E8	0	DC link voltage t-3	V	21	-3	RO	0	
8425	20E9	0	DC link voltage t-4	V	21	-3	RO	0	
8461	210D	0	Setpoint source		0	0	N/E/RW	17	17: Fixed setpoint / AI01 16: SBus 1 15: Parameter setpoint
8462	210E	0	Control signal source		0	0	N/E/RW	0	0 = Terminals 3 = SBus 6 = Parameter control word
8594	2192	0	Factory setting		0	0	E/RW	0	0 = No 1 = Standard

Parameters ordered by indexes									
Index			Parameters	Unit			Access	Default	Comment
Dec	Hex	Sub		Abbr	Size	Conv			
8596	2194	0	Reset statistics data		0	0	RW	0	Reset statistics data: 1: Error memory 100: Min./max. values
8597	2195	0	RS-485 address		0	0	N/E/RW	0	0 – 99, step 1
8598	2196	0	RS-485 group address		0	0	N/E/RW	100	100 – 199, step1
8600	2198	0	SBus address		0	0	N/E/RW	0	0 – 63, step1
8601	2199	0	SBus group address		0	0	N/E/RW	0	0 – 63, step1
8602	219A	0	SBus timeout interval	s	4	-3	N/E/RW	1000	0 – 650000, step10
8603	219B	0	SBus baud rate [kBaud]		0	0	N/E/RW	2	0 = 125 1 = 250 2 = 500 3 = 1000
8609	21A1	0	Response ext. Error		0	0	N/E/RW	2	0 = No response 1 = Display only 2 = Output stage inhibit / locked
8615	21A7	0	Response SBus timeout		0	0	N/E/RW	1	0 = No response 1 = Display only 2 = Output stage inhibit / locked
8618	21AA	0	Auto reset		0	0	RO	0	Auto reset: 0: Auto reset off 1: Auto reset on
8619	21AB	0	Restart time	s	4	-3	RO	50	0 – 50000, step 1
8723	2213	0	Output voltage	V	21	-3	RO	0	
8724	2214	0	Output voltage t-0	V	21	-3	RO	0	
8725	2215	0	Output voltage t-1	V	21	-3	RO	0	
8726	2216	0	Output voltage t-2	V	21	-3	RO	0	
8727	2217	0	Output voltage t-3	V	21	-3	RO	0	
8728	2218	0	Output voltage t-4	V	21	-3	RO	0	
8730	221A	0	Utilization	%	27	-3	RO	0	0 – 150000, step 1000
8785	2251	0	Parameter control word		0	0	RW	0	See control word 1
8814	226E	0	Fixed setpoint I01	%	24	-3	N/E/RW	0	0 – 150000, step 1000
8815	226F	0	Fixed setpoint I10	%	24	-3	N/E/RW	50000	0 – 150000, step 1000
8816	2270	0	Fixed setpoint I11	%	24	-3	N/E/RW	100000	0 – 150000, step 1000
8940	22EC	0	Load current fluctuation	%	27	-3	RO	0	0 – 100000, step 1000
8941	22ED	0	Load current fluctuation t-0	%	27	-3	RO	0	0 – 100000, step 1000
8942	22EE	0	Load current fluctuation t-1	%	27	-3	RO	0	0 – 100000, step 1000
8943	22EF	0	Load current fluctuation t-2	%	27	-3	RO	0	0 – 100000, step 1000
8944	22F0	0	Load current fluctuation t-3	%	27	-3	RO	0	0 – 100000, step 1000
8945	22F1	0	Load current fluctuation t-4	%	27	-3	RO	0	0 – 100000, step 1000
8946	22F2	0	DC link ripple	V	21	-3	RO	0	
8947	22F3	0	DC link ripple t-0	V	21	-3	RO	0	
8948	22F4	0	DC link ripple t-1	V	21	-3	RO	0	
8949	22F5	0	DC link ripple t-2	V	21	-3	RO	0	
8950	22F6	0	DC link ripple t-3	V	21	-3	RO	0	
8951	22F7	0	DC link ripple t-4	V	21	-3	RO	0	
8952	22F8	0	Analog terminal t-0	V	21	-3	RO	0	
8953	22F9	0	Analog terminal t-1	V	21	-3	RO	0	

Parameters ordered by indexes									
Index			Parameters	Unit			Access	Default	Comment
Dec	Hex	Sub		Abbr	Size	Conv			
8954	22FA	0	Analog terminal t-2	V	21	-3	RO	0	
8955	22FB	0	Analog terminal t-3	V	21	-3	RO	0	
8956	22FC	0	Analog terminal t-4	V	21	-3	RO	0	
8973	230D	0	Min. output voltage	V	21	-3	RO	0	
8974	230E	0	Max. output voltage	V	21	-3	RO	0	
8975	230F	0	Min. output current	A	22	-3	RO	0	
8976	2310	0	Max. output current	A	22	-3	RO	0	
8977	2311	0	Min. load current	A	22	-3	RO	0	
8978	2312	0	Max. load current	A	22	-3	RO	0	
8979	2313	0	Min. load current fluctuation	%	27	-3	RO	0	0 – 100000, step 1000
8980	2314	0	Max. load current fluctuation	%	27	-3	RO	0	0 – 100000, step 1000
8981	2315	0	Min. heat sink temperature	°C	17	100	RO	0	
8982	2316	0	Max. heat sink temperature	°C	17	100	RO	0	
8983	2317	0	Min. utilization	%	27	-3	RO	0	0 – 100000, step 1000
8984	2318	0	Max. utilization	%	27	-3	RO	0	0 – 100000, step 1000
8985	2319	0	Min. DC link voltage	V	21	-3	RO	0	
8986	231A	0	Max. DC link voltage	V	21	-3	RO	0	
8987	231B	0	Min. DC link ripple	V	21	-3	RO	0	
8988	231C	0	Max. DC link ripple	V	21	-3	RO	0	
9701	25E5	12	Power section	W	9	0	RO	0	
9702	25E6	5	Error code		0	0	RO	0	see error table
10071	2757	1	Suberror code		0	0	RO	0	
10072	2758	1	Suberror code t-0		0	0	RO	0	
10072	2758	2	Suberror code t-1		0	0	RO	0	
10072	2758	3	Suberror code t-2		0	0	RO	0	
10072	2758	4	Suberror code t-3		0	0	RO	0	
10072	2758	5	Suberror code t-4		0	0	RO	0	
10089	2769	1	Load current	A	22	-3	RO	0	
10090	276A	1	Output current t-0	A	22	-3	RO	0	
10090	276A	2	Output current t-1	A	22	-3	RO	0	
10090	276A	3	Output current t-2	A	22	-3	RO	0	
10090	276A	4	Output current t-3	A	22	-3	RO	0	
10090	276A	5	Output current t-4	A	22	-3	RO	0	
10091	276B	1	Load current t-0	A	22	-3	RO	0	
10091	276B	2	Load current t-1	A	22	-3	RO	0	
10091	276B	3	Load current t-2	A	22	-3	RO	0	
10091	276B	4	Load current t-3	A	22	-3	RO	0	
10091	276B	5	Load current t-4	A	22	-3	RO	0	
10092	276C	1	Maximum possible load current	A	22	-3	RO	0	

Parameters ordered by indexes									
Index			Parameters	Unit			Access	Default	Comment
Dec	Hex	Sub		Abbr	Size	Conv			
10232	27F8	1	Ramp time		0	0	RO	0	0 = 20 ms 1 = 100 ms 2 = 200 ms 3 = 600 ms 4 = 1700 ms 5 = 3500 ms
10232	27F8	2	Ramp time t-0		0	0	RO	0	
10232	27F8	3	Ramp time t-1		0	0	RO	0	
10232	27F8	4	Ramp time t-2		0	0	RO	0	
10232	27F8	5	Ramp time t-3		0	0	RO	0	
10232	27F8	6	Ramp time t-4		0	0	RO	0	
10232	27F8	7	Ramp time T00		0	0	N/E/RW	0	
10232	27F8	8	Ramp time T01		0	0	N/E/RW	0	
10232	27F8	9	Ramp time T10		0	0	N/E/RW	0	
10232	27F8	10	Ramp time T11		0	0	N/E/RW	0	
10233	27F9	1	Frequency mode		0	0	N/E/RW	0	0 = 25.0 kHz (master) 1 = Slave 2 = 24.95 kHz 3 = 25.05 kHz
10233	27F9	2	Attenuation		0	0	N/E/RW	0	0 = OFF 1 = ON
10235	27FB	1	V DC link undervoltage response		0	0	N/E/RW	26	0 = No response 1 = Display only 2 = Output stage inhibit / locked 26 = Display / error memory
10236	27FC	1	Reset counter		0	0	RO	0	0..3
10237	27FD	1	Current setpoint	A	22	-3	RW	0	
10237	27FD	2	Current setpoint t-0	A	22	-3	RO	0	
10237	27FD	3	Current setpoint t-1	A	22	-3	RO	0	
10237	27FD	4	Current setpoint t-2	A	22	-3	RO	0	
10237	27FD	5	Current setpoint t-3	A	22	-3	RO	0	
10237	27FD	6	Current setpoint t-4	A	22	-3	RO	0	
10237	27FD	10	Parameter setpoint	%	24	-3	RW	0	0 – 150000, step 1000
10244	2804	1	Sync timeout response		0	0	N/E/RW	1	0 = No response 1 = Display only 2 = Output stage inhibit / locked
10420	28B4	1	Analog/setpoint reference	%	24	-3	N/E/RW	100000	0 – 150000, step 1000
10421	28B5	1	Pulse mode P00		0	0	N/E/RW	0	0 = ED100 1 = ED95 2 = ED67 3 = ED20
10421	28B5	2	Pulse mode P01		0	0	N/E/RW	0	
10421	28B5	3	Pulse mode P10		0	0	N/E/RW	0	
10421	28B5	4	Pulse mode P11		0	0	N/E/RW	0	
10422	28B6	1	Sync phase angle	10E-3°	12	-3	N/E/RW	0	0 – 360000, step 1000

12.1.1 Conversions

A conversion is carried out as follows:

(Physical value as multiples or fractions of the unit)

= (transferred value × unit) × A +B

Example:

Numerical value = 1500

Measurement index = 4, measured quantity = time

Conversion index = -3, unit = ms

= 1500 ms = 1500 s × A + B = 1500 s × 0.001 + 0 s = 1.5 s

Physical value	Value index 0	Unit (without dimension)	Abbreviation	Conversion index
Time	4	Second Millisecond	s ms	0 -3
Effective power	9	Watt Kilowatt	W kW	0 3
Angle	12	10E-3°		125
Temperature	17	Kelvin Degree Celsius Degree Fahrenheit	K °C °F	0 100 101
Electrical voltage	21	Volt Millivolt	V mV	0 -3
Electrical current	22	Ampere Milliampere	A mA	0 -3
Ratio	24	Percent	%	0

Conversion index	A (conversion factor)	1/A (reciprocal conversion factor)	B (offset)
0	1.E+0	1.E+0	0
1	10 = 1.E+1	1.E-1	0
2	100 = 1.E+2	1.E-2	0
3	1000 = 1.E+3	1.E-3	0
....			
-1	0.1 = 1.E-1	1.E+1	0
-2	0.01 = 1.E-2	1.E+2	0
-3	0.001 = 1.E-3	1.E+3	0
...			
100	1	1	273.15 K
125	Pi/180000	180000/Pi	0

13 Address List

Germany			
Headquarters **Production** **Sales**	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 • D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Service Competence Center	**Central**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 sc-mitte@sew-eurodrive.de
	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-30823 Garbsen (near Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane (near Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (near München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (near Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-elektronik@sew-eurodrive.de
	Drive Service Hotline / 24 Hour Service		+49 180 5 SEWHELP +49 180 5 7394357
	Additional addresses for service in Germany provided on request!		

France			
Production **Sales** **Service**	**Haguenau**	SEW-USOCOME 48-54 route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Production	**Forbach**	SEW-EUROCOME Zone Industrielle Technopôle Forbach Sud B. P. 30269 F-57604 Forbach Cedex	Tel. +33 3 87 29 38 00
Assembly **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Paris	SEW-USOCOME Zone industrielle 2 rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
	Additional addresses for service in France provided on request!		

Algeria			
Sales	**Alger**	Réducom 16, rue des Frères Zaghnoun Bellevue El-Harrach 16200 Alger	Tel. +213 21 8222-84 Fax +213 21 8222-84 reducom_sew@yahoo.fr

Argentina			
Assembly **Sales** **Service**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar

Australia			
Assembly **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au

Austria			
Assembly **Sales** **Service**	**Wien**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://www.sew-eurodrive.at sew@sew-eurodrive.at

Belarus			
Sales	**Minsk**	SEW-EURODRIVE BY RybalkoStr. 26 BY-220033 Minsk	Tel.+375 (17) 298 38 50 Fax +375 (17) 29838 50 sales@sew.by

Belgium			
Assembly **Sales** **Service**	**Brüssel**	**SEW Caron-Vector** Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.be info@caron-vector.be
Service Competence Center	**Industrial Gears**	**SEW Caron-Vector** Rue de Parc Industriel, 31 BE-6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be
	Antwerp	**SEW Caron-Vector** Glasstraat, 19 BE-2170 Merksem	Tel. +32 3 64 19 333 Fax +32 3 64 19 336 http://www.sew-eurodrive.be service-antwerpen@sew-eurodrive.be

Brazil			
Production **Sales** **Service**	**Sao Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 152 - Rodovia Presidente Dutra Km 208 Guarulhos - 07251-250 - SP SAT - SEW ATENDE - 0800 7700496	Tel. +55 11 2489-9133 Fax +55 11 2480-3328 http://www.sew-eurodrive.com.br sew@sew.com.br

Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@fastbg.net

Cameroon			
Sales	**Douala**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 33 431137 Fax +237 33 431137

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

Chile			
Assembly **Sales** **Service**	**Santiago de Chile**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl

China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25322611 info@sew-eurodrive.cn http://www.sew-eurodrive.cn
Assembly **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267891 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478398 Fax +86 27 84478388
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 88241718 Fax +86 29 68686296 logistic-xa@sew-eurodrive.cn
	Additional addresses for service in China provided on request!		

Colombia			
Assembly **Sales** **Service**	**Bogotá**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sewcol@sew-eurodrive.com.co

Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. PIT Erdödy 4 II HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr

Czech Republic			
Sales	**Praha**	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Lužná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 255 709 601 Fax +420 220 121 237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz

Denmark			
Assembly **Sales** **Service**	**Kopenhagen**	SEW-EURODRIVEA/S Geminivej 28-30 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Egypt			
Sales **Service**	**Cairo**	Copam Egypt for Engineering & Agencies 33 EI Hegaz ST, Heliopolis, Cairo	Tel. +20 2 22566-299 + 1 23143088 Fax +20 2 22594-757 http://www.copam-egypt.com/ copam@datum.com.eg
Service	**Sharjah**	Copam Middle East (FZC) Sharjah Airport International Free Zone P.O. Box 120709 Sharjah **United Arabian Emirates**	Tel. +971 6 5578-488 Fax +971 6 5578-499 copam_me@eim.ae

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 sew@sew.fi http://www.sew-eurodrive.fi
Production **Assembly**	**Karkkila**	SEW Industrial Gears Oy Valurinkatu 6, PL 8 FI-03600 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi

Gabon			
Sales	**Libreville**	ESG Electro Services Gabun Feu Rouge Lalala 1889 Libreville Gabun	Tel. +241 741059 Fax +241 741059

Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk

Greece			
Sales **Service**	**Athen**	Christ. Boznos & Son S.A. 12, Mavromichali Street P.O. Box 80136, GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr

Hong Kong			
Assembly **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk

Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 office@sew-eurodrive.hu

India			
Registered Office **Assembly** **Sales** **Service**	**Vadodara**	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 3045200, +91 265 2831086 Fax +91 265 3045300, +91 265 2831087 http://www.seweurodriveindia.com sales@seweurodriveindia.com subodh.ladwa@seweurodriveindia.com
Assembly **Sales** **Service**	**Chennai**	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 c.v.shivkumar@seweurodriveindia.com

Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie http://www.alperton.ie

Israel			
Sales	**Tel-Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il

Italy			
Assembly **Sales** **Service**	**Milano**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 799781 http://www.sew-eurodrive.it sewit@sew-eurodrive.it

Ivory Coast			
Sales	**Abidjan**	SICA Ste industrielle et commerciale pour l'Afrique 165, Bld de Marseille B.P. 2323, Abidjan 08	Tel. +225 2579-44 Fax +225 2584-36

Japan			
Assembly **Sales** **Service**	**Iwata**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp

Korea			
Assembly **Sales** **Service**	**Ansan-City**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master@sew-korea.co.kr
	Busan	SEW-EURODRIVE KOREA Co., Ltd. No. 1720 - 11, Songjeong - dong Gangseo-ku Busan 618-270	Tel. +82 51 832-0204 Fax +82 51 832-0230 master@sew-korea.co.kr

Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 7139253 Fax +371 7139386 http://www.alas-kuul.com info@alas-kuul.com

Lebanon			
Sales	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 4947-86 +961 1 4982-72 +961 3 2745-39 Fax +961 1 4949-71 ssacar@inco.com.lb
	Beirut	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 philipppe.acar@medrives.com

Lithuania			
Sales	**Alytus**	UAB Irseva Naujoji 19 LT-62175 Alytus	Tel. +370 315 79204 Fax +370 315 56175 info@irseva.lt http://www.sew-eurodrive.lt

Luxembourg			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.lu info@caron-vector.be

Malaysia			
Assembly **Sales** **Service**	**Johore**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my

Mexico			
Assembly **Sales** **Service**	**Quéretaro**	SEW-EURODRIVE MEXICO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Quéretaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx

Morocco			
Sales	**Casablanca**	Afit 5, rue Emir Abdelkader MA 20300 Casablanca	Tel. +212 522618372 Fax +212 522618351 ali.alami@premium.net.ma

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu
		VECTOR Aandrijftechniek B.V. Gelderhorst 10 NL-7207 BH Zutphen Industrieterrein de Revelhorst	Tel. +31 575 57 44 94 Fax +31 575 57 24 43 oost@vector.nu
		VECTOR Aandrijftechniek B.V. Mercuriusweg 8A NL-5971 LX Grubbenvorst	Tel. +31 77 36 61 873 Fax +31 77 36 62 109 zuid@vector.nu
		VECTOR Aandrijftechniek B.V. Weberstraat 74 NL-1446 VV Purmerend Industrieterrein "De Baanstee"	Tel. +31 299 66 63 38 Fax +31 299 47 60 55 noordwest@vector.nu

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz

Norway			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no

Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 676 53 00 Fax +48 42 676 53 45 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
		24 Hour Service	Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucureşti**	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Assembly **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 195220 St. Petersburg Russia	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru

Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 senemeca@sentoo.sn

Serbia			
Sales	**Beograd**	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor SCG-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.co.yu

Singapore			
Assembly **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com

Slovakia			
Sales	**Bratislava**	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-831 06 Bratislava	Tel. +421 2 33595 202 Fax +421 2 33595 200 sew@sew-eurodrive.sk http://www.sew-eurodrive.sk
	Žilina	SEW-Eurodrive SK s.r.o. Industry Park - PChZ ulica M.R.Štefánika 71 SK-010 01 Žilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-974 11 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 SK-040 01 Košice	Tel. +421 55 671 2245 Fax +421 55 671 2254 sew@sew-eurodrive.sk

Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net

South Africa			
Assembly **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za info@sew.co.za

South Africa			
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 cfoster@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaco Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 cdejager@sew.co.za

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es

Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442 00 Fax +46 36 3442 80 http://www.sew-eurodrive.se jonkoping@sew.se

Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch

Thailand			
Assembly **Sales** **Service**	**Chonburi**	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com

Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 71 4340-64 + 71 4320-29 Fax +216 71 4329-76 tms@tms.com.tn

Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419163 / 4419164 Fax +90 216 3055867 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr

Ukraine			
Sales **Service**	**Dnepropetrovsk**	SEW-EURODRIVE Str. Rabochaja 23-B, Office 409 49008 Dnepropetrovsk	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua

USA			
Production **Assembly** **Sales** **Service** **Corporate Offices**	**Southeast Region**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manufacturing +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly **Sales** **Service**	**Northeast Region**	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Additional addresses for service in the USA provided on request!		

Venezuela			
Assembly **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve ventas@sew-eurodrive.com.ve sewfinanzas@cantv.net

Index




SEW-EURODRIVE
Driving the world

SEW-EURODRIVE GmbH & Co KG
P.O. Box 3023
D-76642 Bruchsal/Germany
Phone +49 7251 75-0
Fax +49 7251 75-1970
sew@sew-eurodrive.com

➞ **www.sew-eurodrive.com**