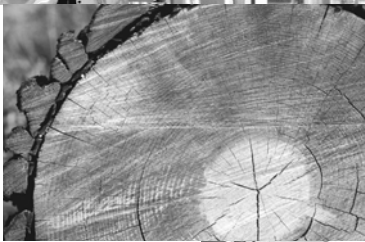


Stationary Energy Supply MOVITRANS[®] TPS10A Stationary Converter

Edition 08/2007

11491426 / EN

Operating Instructions





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1 General Notes

1.1 Safety and warning instructions

Always observe the safety and warning information in this documentation.



Electrical hazard

Possible consequences: Severe or fatal injuries.



Hazard.

Possible consequences: Severe or fatal injuries.



Hazardous situation.

Possible consequences: Slight or minor injuries.



Harmful situation.

Possible consequences: Damage to the unit and the environment.



Tips and useful information.



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

The **operating instructions** contain **important information about service** and should be kept **near the unit**.

1.2 Designated use



MOVITRANS[®] TPS10A stationary converters are intended for use in industrial and commercial systems for the operation of contactless power transmission systems. Only connect suitable components to the stationary converter that have been specifically designed for this purpose, such as the MOVITRANS[®] TAS10A transformer module.

MOVITRANS[®] TPS10A stationary converters are designed to be installed in control cabinets. Observe all information on the technical data and the permitted conditions where the unit is operated.

Do not operate the unit until you have established that the machine complies with the EMC Directive 89/336/EEC and that the conformity of the end product has been determined in accordance with the Machinery Directive 89/392/EEC (with reference to EN 60204).



General Notes

Operational environment

The rules and regulations of the Professional 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.

1.3 Operational environment



The following uses are prohibited, unless measures are expressly taken to make them possible:

- In areas with explosion-hazard
- In areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc.
- In non-stationary applications with mechanical vibration and shock loads exceeding the values set forth in EN 50178

1.4 Disposal

Please follow the current regulations: Dispose of the following materials in accordance with the regulations in force:

- Electronics scrap (circuit boards)
 - Plastic (housing)
 - Sheet metal
 - Copper
- etc.



2 Safety Notes

2.1 Installation and startup



- Never install damaged products or take them into operation. Submit a complaint to the shipping company immediately in the event of damage.
- Only specialists with the appropriate accident prevention training are allowed to perform installation, startup and service work for the unit. These specialists must also comply with the regulations in force (e.g. EN 60204, VBG 4, DIN-VDE 0100/0113/0160) when performing this work.
- Follow the specific instructions during installation and startup of the other components!
- Preventive measures and protection devices must correspond to the regulations in force (e.g. EN 60204 or EN 50178).
Required preventive measures: Ground the unit
Required protection device: Overcurrent protection devices
- The unit meets all requirements for safe isolation of power and electronic connections in accordance with EN 50178. All connected circuits must also satisfy the requirements for safe disconnection.
- Take appropriate measures (for example, connect binary input "DIØØ /OUTPUT STAGE INHIBIT" to DGND) to ensure that the system does not startup unintentionally when power is switched on.

2.2 Operation and service



- Before removing the protective cover, disconnect the unit from the supply system. Dangerous voltages may still be present for up to 10 minutes after disconnection from the power supply source.
- The unit has IP00 enclosure with the protective cover removed. Dangerous voltages are present at all subassemblies except for the control electronics. The unit must be closed during operation.
- When the unit switch is in the ON position, dangerous voltages are present at the output terminals as well as any connected cables and terminals. This is also the case when the unit is inhibited.
- The fact that the status LED V1 and other display elements are no longer illuminated does not indicate that the unit has been disconnected from the power supply and no longer carries any voltage.



- Safety functions within the unit may cause system standstill. Removing the cause of the problem or performing a reset can result in the system re-starting on its own. If safety reasons prohibit this action, disconnect the unit from the power supply before correcting the fault.



3 Index of Changes

3.1 Changes to the previous version

The following section lists the changes made to the individual chapters from edition 09/2004, publication number 11304812 (EN).

Overview

- The following sections have been restructured:
 - Unit Design
 - Installation
 - Operation
 - Service

Installation

- The sections "Wiring diagram control unit (TPS10A)" and the corresponding "Description of terminal functions" have been amended.
- The sections "Installing the system bus (SBus)" and "Installing the synchronization signal" have been added. They comprise the following subsections:
 - Cable specification
 - Shielding
 - Cable length
 - Terminating resistor, only for installing the system bus (SBus)

Parameters

- The section "Parameter list" has been added. It contains a list of all parameters with setting ranges, factory settings and the MOVILINK[®] indexes and subindexes.
- Further, descriptions of all parameters have been added.

Startup

- The section "Startup" has been amended by the following subsections:
 - Overview (control source and setpoint source)
 - Control via terminals (control command and setpoint selection)
 - Communication via system bus (MOVILINK[®] protocol and reading a parameter)
 - Control via system bus (control via process data telegrams and control via parameter telegrams)
 - Synchronization
 - Compensation (track compensation, procedure and flow diagram)

Appendix

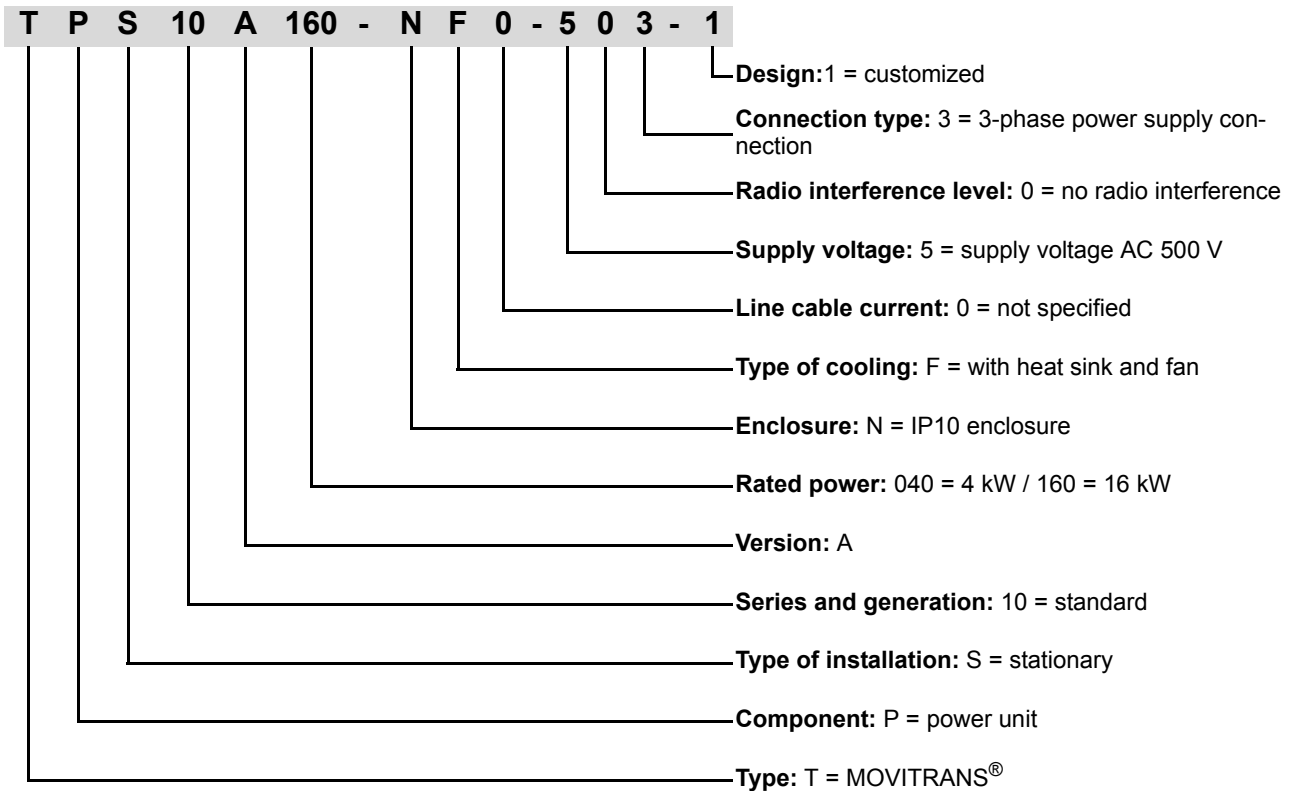
- The section "Appendix" has been amended and contains a list of all parameters ordered by indexes.



4 Unit Design

4.1 Unit designation

The following figure shows an example of a unit designation for MOVITRANS® TPS10A stationary converters:



4.2 Nameplate

The nameplate is attached to the side of the unit. The following figure shows an example of a nameplate for MOVITRANS® TPS10A stationary converters:



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In addition, there is a type label attached to the control unit (above the TERMINAL socket). The following figure shows an example of a type label for MOVITRANS TPS10A stationary converters:

Typ **TPS10A040-NF0-503-1**
 Sach.Nr. **6269793** Serien Nr. **0000646**

146847243

4.3 Scope of delivery

The following components are included in the scope of delivery:

- Power section with control unit
- In addition for size 2 (TPS10A040): One (1) power shield clamp
- In addition for size 4 (TPS10A160): 2 touch guards for the power terminals

4.4 Short designations

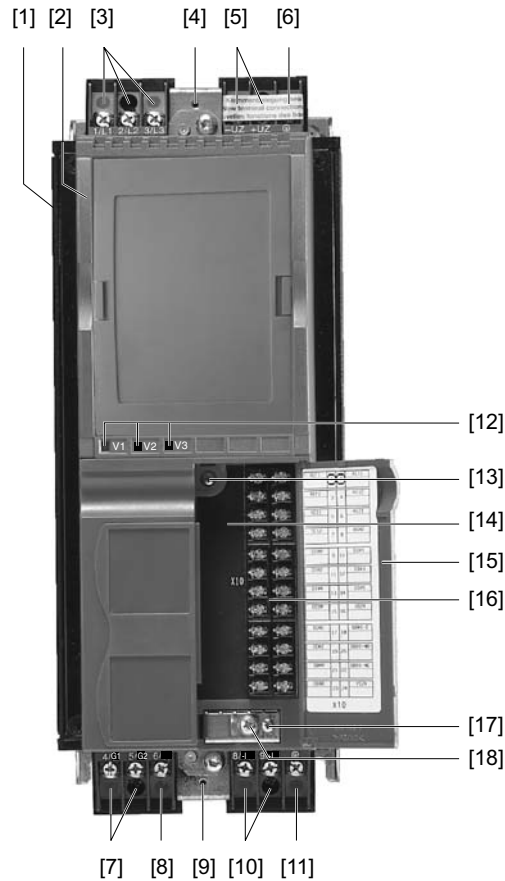
The following short designations are used in this documentation:

Units	Short designations	
MOVITRANS® TPS10A040 stationary converter	TPS10A040 stationary converter	TPS10A stationary converter
MOVITRANS® TPS10A160 stationary converter	TPS10A160 stationary converter	



4.5 Size 2 (TPS10A040)

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



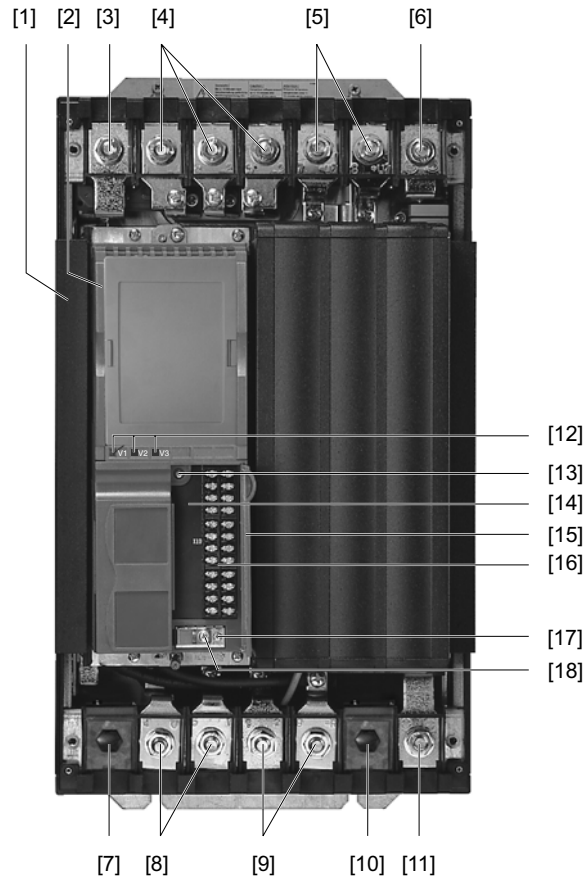
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- [1] Power section
- [2] Control unit
- [3] X1: Power supply connection L1 (1) / L2 (2) / L3 (3)
- [4] X5: Connection for power shield clamp
- [5] X4: DC link connection -VDC link / +VDC link
- [6] X4: PE connection (⊕)
- [7] X2: Gyrator connection 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



4.6 Size 4 (TPS10A160)

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



- [1] Power section
- [2] Control unit
- [3] X1: PE connection (⊕)
- [4] X1: Power supply connection L1 (1) / L2 (2) / L3 (3)
- [5] X4: DC link connection -VDC link / +VDC link
- [6] X4: PE connection (⊕)
- [7] Terminal has no function
- [8] X2: Gyator 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

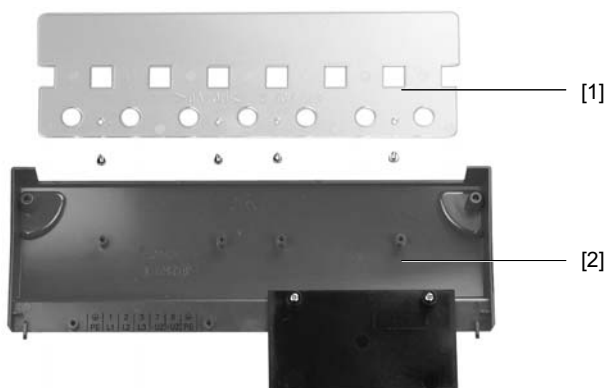
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4.6.1 Touch guard for size 4

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:



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- [1] Touch guard
- [2] Protection cover

The TPS10A160 stationary converter units comply with enclosure IP10 with the touch guard and IP00 without the touch guard.



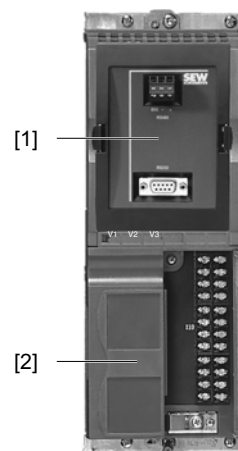
4.7 Serial interface option type USS21A (RS-232)

4.7.1 Description

The serial interface type USS21A (RS232) has the following part number: 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). The option can be plugged in during operation. The transmission rate of the RS-232 interface is 9600 baud.

Startup, operation and service can be carried out at 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):



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[1] Serial interface type USS21A (RS232)

[2] Control unit



5 Installation

5.1 Notes



Comply with the safety instructions during installation.

5.1.1 Tightening torque

Only use genuine connection elements.

Note the tightening torque values of the power terminals:

- size 2 (TPS10A040) → 1.5 Nm
- size 4 (TPS10A160) → 14 Nm

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 according to DIN 5265, size 4.0 × 0.8 or 4.5 × 0.8

5.1.3 Heat dissipation and mounting position

Leave at least 100 mm clearance at the top and bottom for optimum heat dissipation. For project planning, refer to the section "Technical Data". There is no need for clearance at the sides. You can line up the units next to one another. With size 4 (TPS10A160), do not install any components that are sensitive to high temperatures less than 300 mm above the unit.

Install the units vertically. You must not install it horizontally, tilted or upside down!

5.1.4 Input contactor

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

5.1.5 Line choke

With more than 4 units on an input contactor configured for the total current:

Insert a 3-phase line choke in the circuit to limit the inrush current.

5.1.6 Separate cable ducts

Route power cables and electronics cables in separate cable ducts.



5.1.7 Input fuses and earth-leakage circuit breaker

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.

5.1.8 PE input connection (→ EN 50178)

If the supply system lead is < 10 mm² (AWG8), route a second PE conductor with the cross section of the supply system lead in parallel to the protective earth using separate terminals. Alternatively, use a protective earth conductor with a cross section of ≥ 10 mm² (AWG8) Cu. If the supply system lead is 10 mm² (AWG8), use a Cu protective earth conductor with the cross section of the supply system lead.

5.1.9 Line filter

A line filter is required for compliance with class A limit according to EN 55011 and EN 55014 (→ Section Technical Data):

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

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.

5.1.10 IT systems

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

5.1.11 Cross sections

Supply lead: Cable cross section according to nominal input current I_{mains} at rated load.

Cable cross section between X2/X3 of the TPS10A stationary converter and X2/X3 of the TAS10A transformer module:

- Size 2 (TPS10A040) → 4 mm²
- Size 4 (TPS10A160) → 16 mm²

Electronics cables:

- One core per terminal 0.20...2.5 mm² (AWG24...12)
- Two cores per terminal 0.20...1 mm² (AWG24...17)

5.1.12 Unit output

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



5.1.13 Binary inputs / binary outputs

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!

5.1.14 Shielding and grounding

SEW-EURODRIVE recommends that you shield the control cables.

Connect the shield by the shortest possible route and make sure it is grounded over a wide area 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

Note the following points for UL-compliant installation:

- Use only copper cables with the following temperature ranges as connection cables:
 - for TPS10A stationary converters, 60/75 °C temperature range
- The permitted tightening torque values for power terminals are:
 - TPS10A040 (size 2) → 1.5 Nm
 - TPS10A160 (size 4) → 14 Nm
- TPS10A stationary converters are suitable for operation on voltage supply systems with grounded star point (TN and TT nets) supplying a maximum supply 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 table.

TPS10A stationary converter	Max. supply current	Max. supply voltage	Fuses
040 (size 2)	AC 5000 A	AC 500 V	110 A / 600 V
160 (size 4)	AC 10000 A	AC 500 V	350 A / 600 V

- Use only tested units with a limited output voltage ($V_{\max} = \text{DC } 30 \text{ V}$) and limited output current ($I \leq 8 \text{ A}$) as an external DC 24 V voltage source.



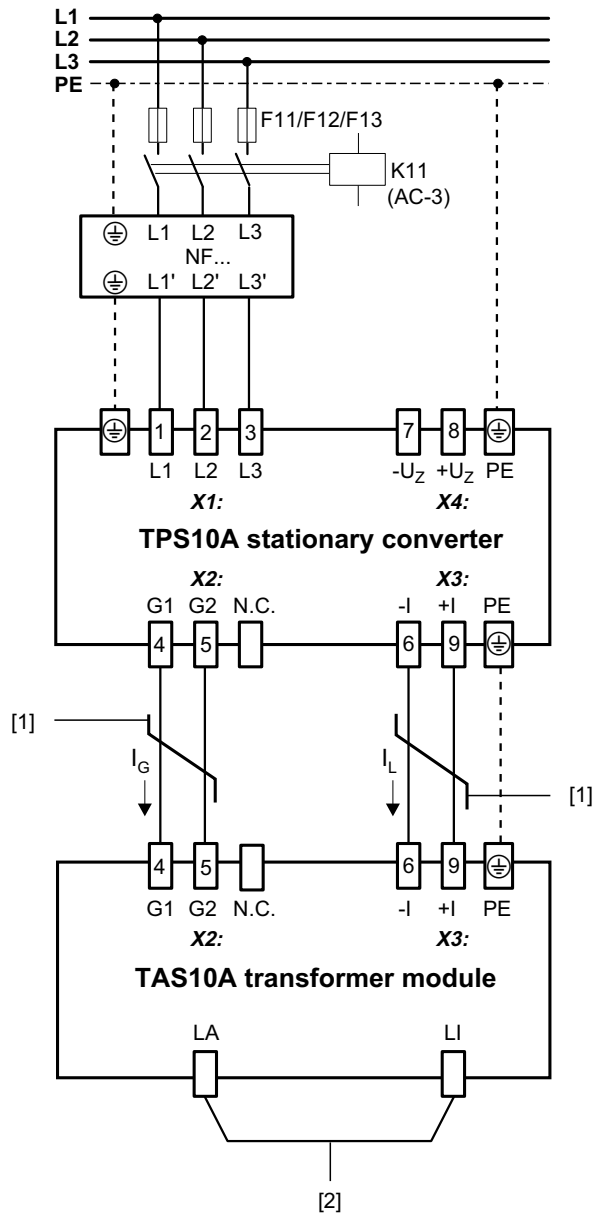
UL certification does not apply to operation in voltage supply systems with a non-earthed star point (IT systems).



5.3 Wiring diagram, size 2 (TPS10A040)

5.3.1 Power section size 2

Connect the power section of the TPS10A040 stationary converter as illustrated in the following figure:



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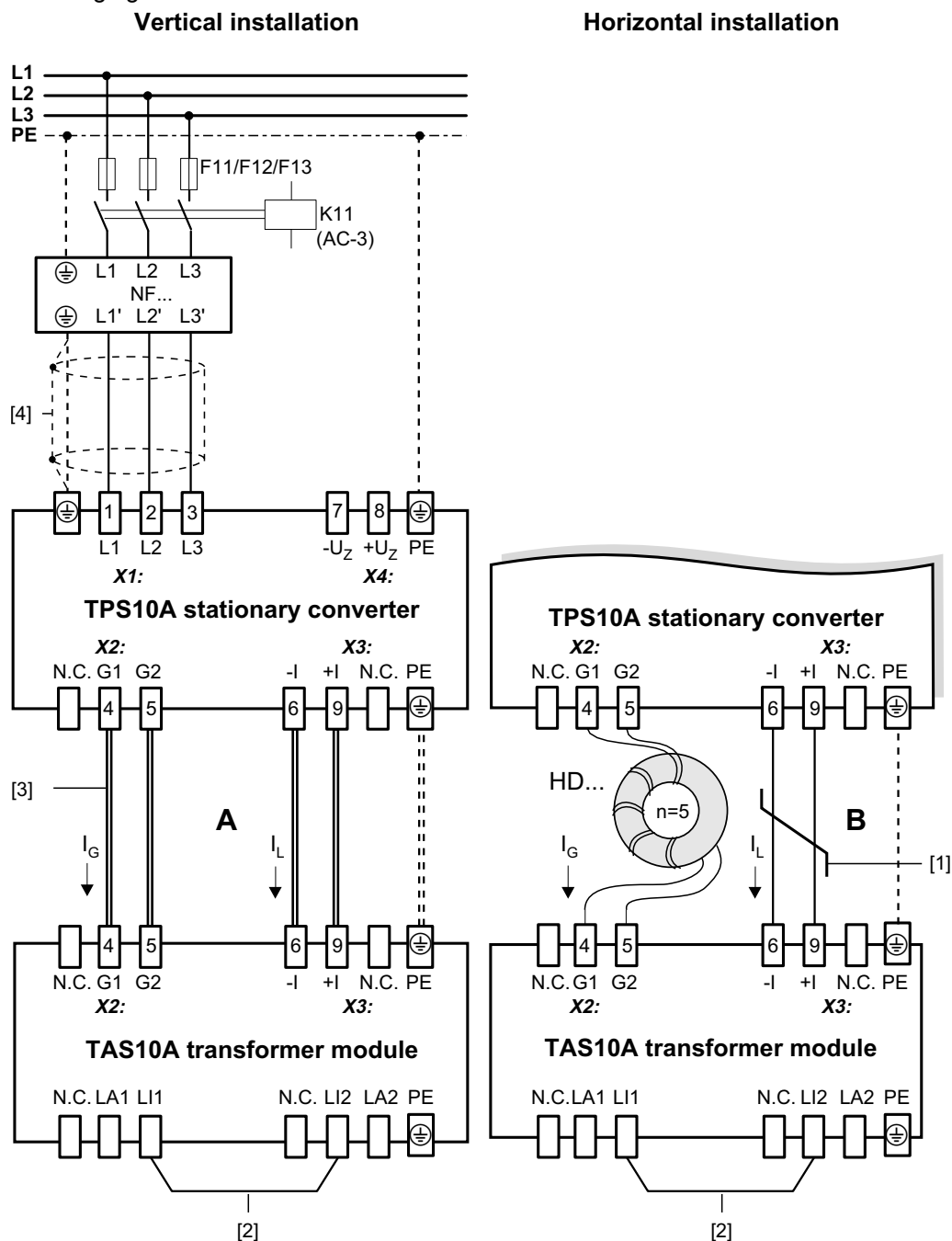
- [1] Twisted cables
- [2] Short-circuit hoop (for startup of TPS10A040 stationary converter **without** connected line cable)



5.4 Wiring diagram, size 4 (TPS10A160)

5.4.1 Power section size 4

Connect the power section of the TPS10A160 stationary converter as illustrated in the following figure:



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- [1] Twisted cables
- [2] Short-circuit hoop for startup of TPS10A160 stationary converter **without** connected line cable
- [3] Connection conductor rail
- [4] Shielded cables
- A Variant A TAS10A160 transformer module connected to TPS10A160 stationary converter with conductor rails
- B Variant B TAS10A160 transformer module connected to TPS10A160 stationary converter with twisted cables



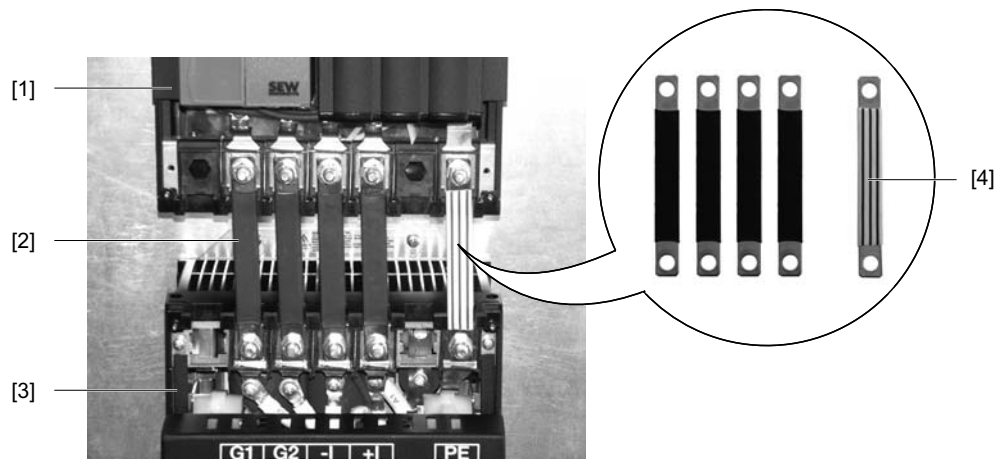
5.4.2 Variants

The TAS10A160 transformer module can be connected to the TPS10A160 stationary converter using version A or B:

Version A

With this version, 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 preferred installation (vertically on top of one another) and the connection of the units using conductor rails:



146886411

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

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

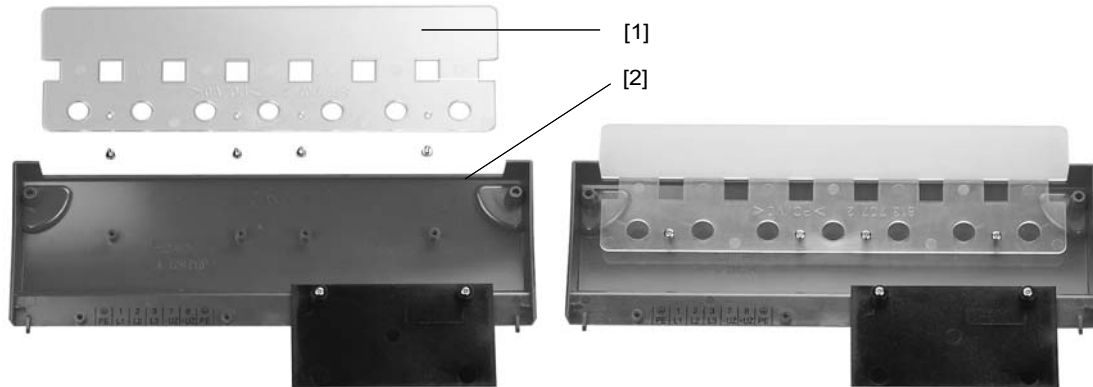
Variant B

With this version, you use twisted cables and connect the output choke HD003 at output X2:G1/G2 to link the TAS10A160 transformer module to the TPS10A160 stationary converter.

Output choke	HD003
Part number	813 558 4
Inside diameter d	88 mm
For cable cross sections	≥ 16 mm ² (AWG 6)

**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:



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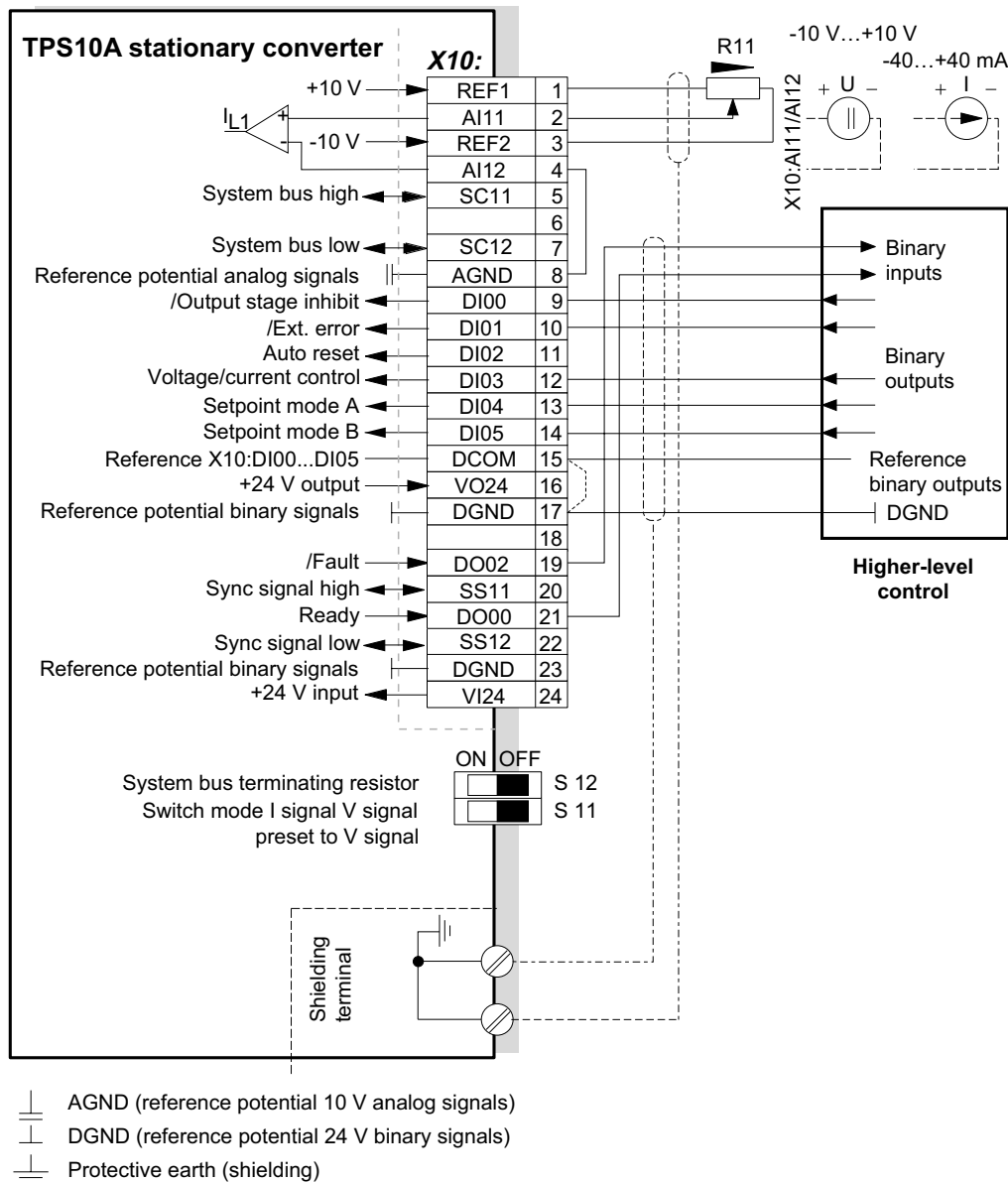
- [1] Touch guard
- [2] Protection cover



5.5 Wiring diagram for 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:



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- If the binary inputs are set with the DC 24 V voltage supply X10:16 ;VO24, you must install the X10:15-X10:17 (DCOM-DGND) jumper at the control unit.
- The S11 DIP switch is only accessible when the connection unit has been removed.
- The resistance $R11_{min}$ must be at least 4.7 kΩ .



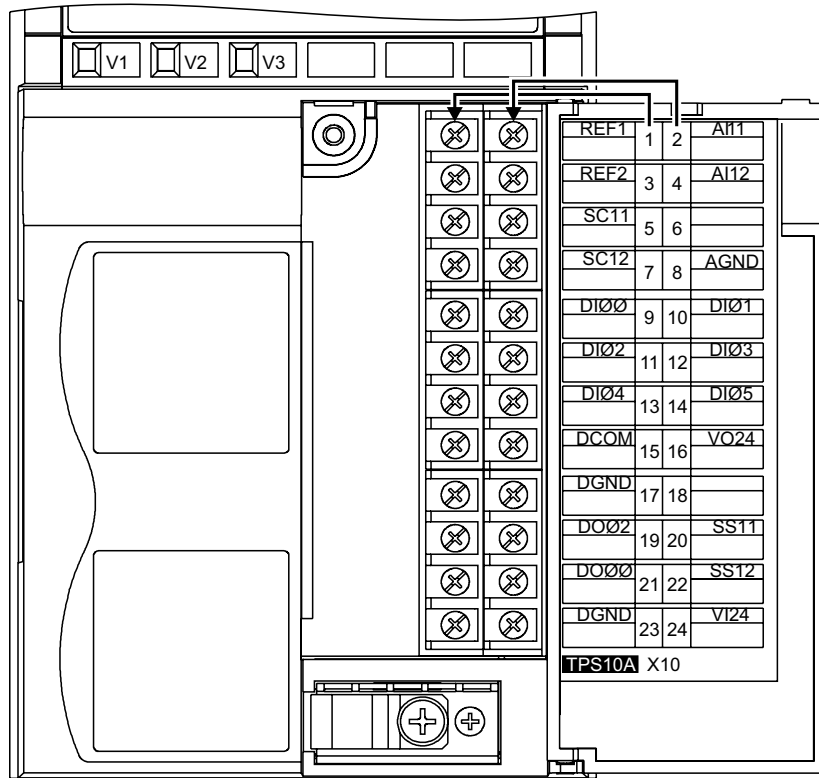
5.5.2 Description of terminal functions (power section and control unit)

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



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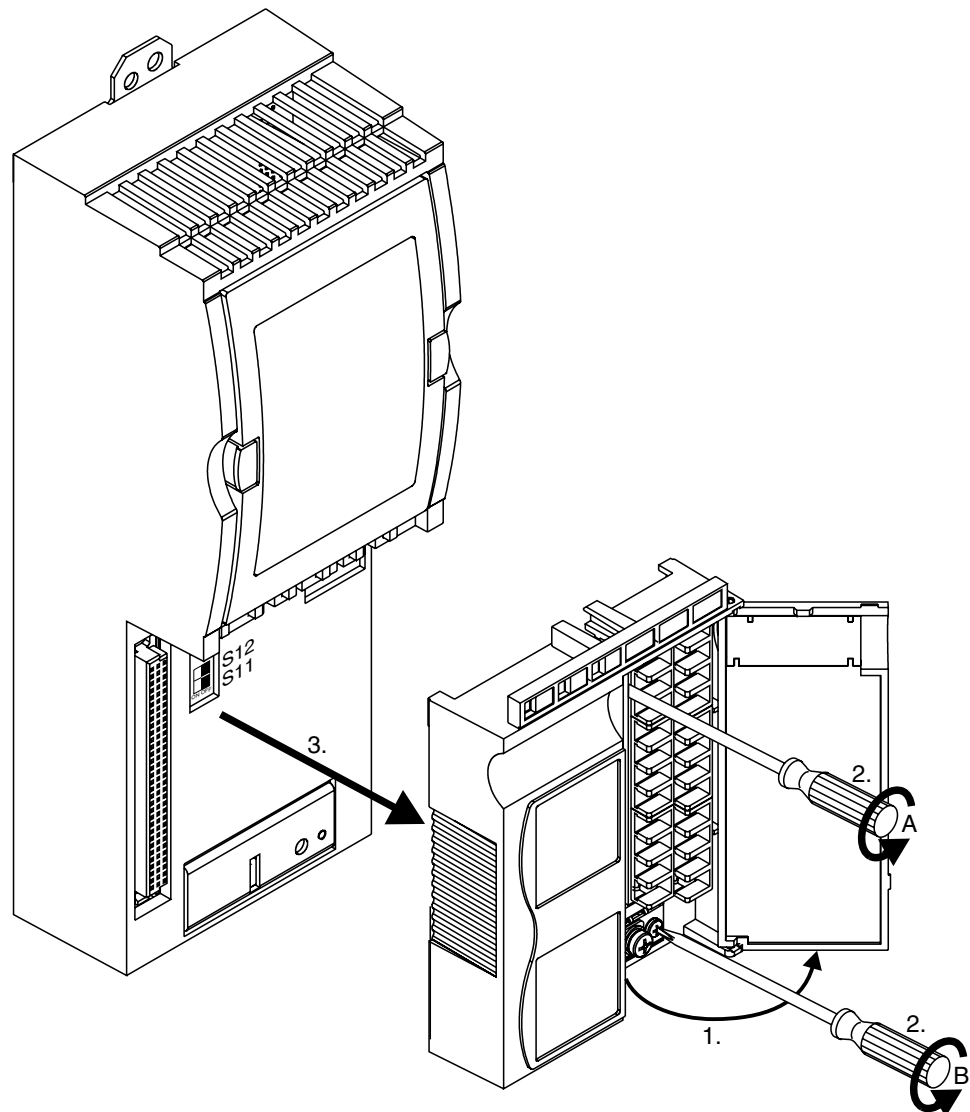
5.6 Connection unit assembly and removal



Remove or mount connection unit only with switched off unit (disconnected from power supply)!

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 retaining screws A and B; they are captive screws and cannot fall out.
3. Remove the connection unit from the control module.



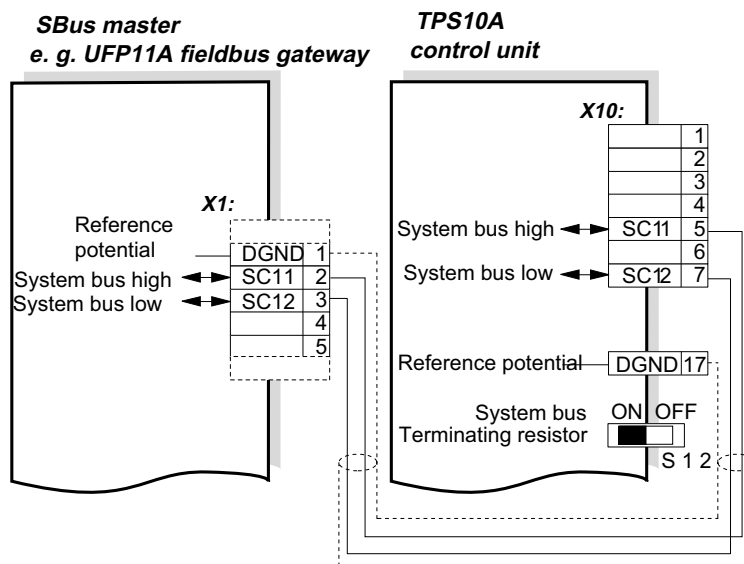
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Follow the instructions in reverse order when installing the connection unit.



5.7 System bus (SBus) installation

The TPS10A stationary converter allows for a communication with an SBus master (e.g. PLC, UFP11A fieldbus interface) via SBus. The stationary converter is always operated as SBus slave.



Refer to the corresponding publication when installing an UFP11A. It is available at SEW-EURODRIVE via the part number 11254416/EN.

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:

- Core cross section 0.75 mm² (AWG 18)
- Line 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 Shielding

Connect the shield at either end to the electronics shield clamp of the TPS10A stationary converter or the SBus master (e.g. UFP11A) and ensure the shield is connected over a large area. Also connect the ends of the shield to DGND.



Installation

System bus (SBus) installation

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	320 m
250 kBaud	160 m
500 kBaud	80 m
1000 kBaud	40 m

A baud rate of 500 kBaud is set as standard.

5.7.4 Terminating resistor

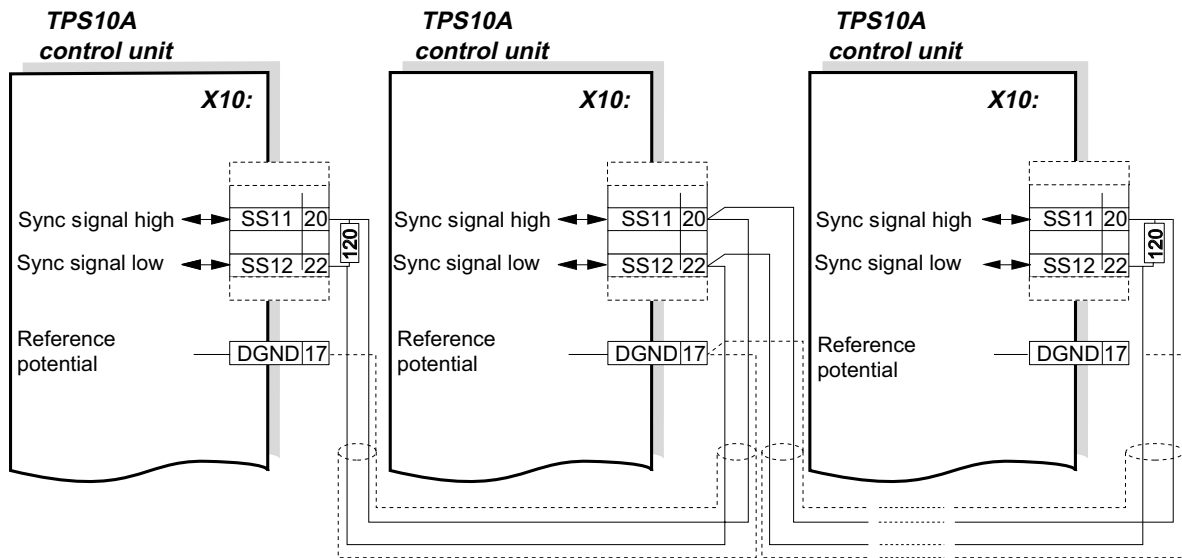
Connect the system bus terminating resistor (S12 = ON) at the TPS10A stationary converter. An SBus master is connected at the end of the system bus connection. Ensure that it contains a terminating resistor. A UFP11A fieldbus gateway already contains a terminating resistor.



5.8 Installing the synchronization signal

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

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



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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 (AWG 18)
- Line resistance 120Ω at 1 MHz
- Capacitance per unit length $\leq 40 \text{ pF/m}$ at 1 kHz

Suitable cables are CAN bus or DeviceNet cables.

5.8.2 Shielding

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.

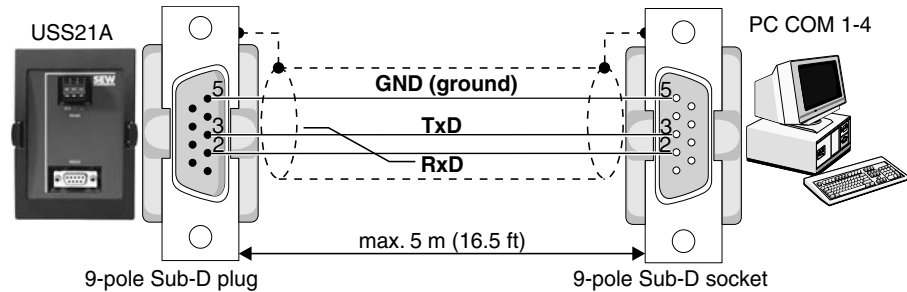


Installation

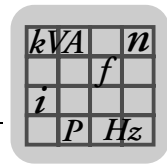
Serial interface option type USS21A (RS232)

5.9 Serial interface option 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.



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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:

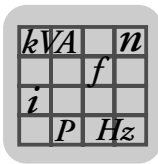
- with the MOVITOOLS[®] MotionStudio software. PC connection via the USS21A serial interface
- via the serial interface. Programming by the customer
- via the SBus interface. Programming by the customer

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

6.2 Parameter list

The following table shows all parameters with setting ranges, factory settings and the MOVILINK[®] indexes and subindexes:

Display values	Indexes/ subindexes ¹⁾	Description
Unit data		
Unit type	8301	--
Unit series	8301	--
Power section	9701/12	--
Firmware	8300	--
Process values		
Error	8702/5	--
Sub error	10071/1	--
Output stage	8310	--
Duty cycle type	8334	--
Setpoint	102371/1	--
Ramp time	10232	--
Output voltage	8723	--
Output current	8326	--
Load current	10089	--
Load current fluctuation	8940	--
Heat sink temperature	8327	--
Utilization	8730	--
DC link voltage	8325	--
DC link ripple	8946	--



Parameters

Parameter list

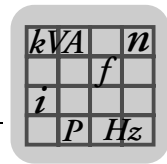
Display values	Indexes/ subindexes ¹⁾	Description
Min. / max. values		
Min. output voltage	8973	--
Max. output voltage	8974	--
Min. output current	8975	--
Max. output current	8976	--
Min. load current	8977	--
Max. load current	8978	--
Min. load current fluctuation	8979	--
Max. load current fluctuation	8980	--
Min. heat sink temperature	8981	--
Max. heat sink temperature	8982	--
Min. capacity utilization	8983	--
Max. capacity utilization	8984	--
Min. DC link voltage	8985	--
Max. DC link voltage	8986	--
Min. DC link ripple	8987	--
Max. DC link ripple	8988	--
Reset statistics data	8596	--
Error memories t-0 ... t-4		

1) Subindexes are only mentioned if they are different to the standard subindex 0.

Startup	Indexes / subindexes ¹⁾	Description
Compensation		
Nominal line conductor current	depending on input data	--
Relative compensation error	depending on input data	--
Absolute compensation error	depending on input data	--

1) Subindexes are only mentioned if they are different to the standard subindex 0.

Unit function	Indexes / subindexes ¹⁾	Description
Reset response		
Auto reset	8618	--
Reset counter	10236/1	--
Restart time	8619	--
Setpoint selection		
Setpoint source	8461	Fixed setpoint / AI01
Control signal source	8462	Terminals
Analog / setpoint reference I00	10420/1	100 ...150%
Fixed setpoint I01	8814	0 ...150%
Fixed setpoint I10	8815	0 ...50 ...150%
Fixed setpoint I11	8816	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



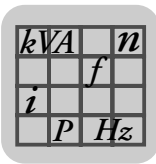
Unit function	Indexes / subindexes ¹⁾	Description
Pulse mode P00	10421/1	ED100
Pulse mode P01	10421/2	ED100
Pulse mode P10	10421/3	ED100
Pulse mode P11	10421/4	ED100
Binary outputs		
Binary output DO00	8352	Ready for operation
Binary output DO02	8350	Malfunction, 0-active
Serial communication		
RS485 address	98597	0 ...99
RS485 group address	9598	100 ...199
SBus 1 Address	8600	0 ...63
SBus 1 Group address	8601	0 ...63
SBus 1 Baud rate	8603	125/250/500/1000 kB
SBus 1 Timeout delay	8602	0 – 650 s
Modulation		
Frequency mode	10233/1	25 kHz (master)
Sync timeout response	10244/1	Display only
Sync phase angle	10422/1	0 ...360°
Damping	10233/2	Off
Load current fluctuation	8940	--
Setup		
Reset statistics data	8596	No
Factory settings	8594	No
Process data description		
Setpoint description PO1	8304	--
Setpoint description PO2	8305	--
Setpoint description PO3	8306	--
Actual value description PI1	8307	--
Actual value description PI2	8308	--
Actual value description PI3	8309	--
Fault responses		
Response ext. Error	8609	Output stage inhibit / locked
Response SBus 1 timeout	8615	Display only
Response V DC link undervoltage	10235/1	Display / error history
Sync timeout response	10244/1	Display only

1) Subindexes are only mentioned if they are different to the standard subindex 0.

Manual operation	Indexes / subindexes	Description
Manual operation on /off	--	--
Control	--	--
Setpoint	--	--

The parameters of the parameter groups display values, startup, and unit function can be opened by double-clicking on the respective parameters.

Refer to the Modular Engineering Software System MotionStudio MOVITRANS® Parameter Tree (part number 11532211/EN) for detailed information on the individual parameters.



6.3 Unit data

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

- Unit type
- Unit series
- Power section
- Firmware

6.4 Process values

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

- Error code
- Output stage (inhibited or enabled)
- Duty cycle type

The current operating mode (voltage control or current control) is displayed here. 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.

- 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
- Output current

The r.m.s. value of the output current I_G is displayed here. The TPS10A stationary converter uses this current for supplying the TAS 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

The r.m.s. value of the load current I_L is displayed here. 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. It 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

kVA	n
	f
i	
P	Hz

The capacity utilization is displayed here. It represents 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 error message "Over-current error".



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

- DC link voltage
- DC link ripple

The DC link ripple is displayed here. It 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

Click on *Reset statistic data* in the "Min / max values" window to replace the documented display values with the present process values.

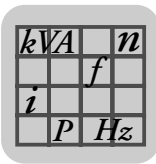
6.6 Error memory

The TPS10A stationary converter can store several faults. 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
- Duty cycle type
- 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, indicate the line conductor current for the system in question (rated output current of the TAS10A transformer module). This value is used to calculate the absolute compensation error correctly.

- Relative compensation error

The relative compensation error is displayed here ($\Delta r = \text{output current/load current}$ 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

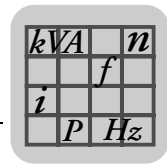
The auto reset function can be set to On or Off:

- On:

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 faults can be reset:

- Error "Overcurrent"
- Error "Overtemperature"



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!

– Off:

No auto reset

- Reset counter

The number of resets 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 fault 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 setpoint and control specifications 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

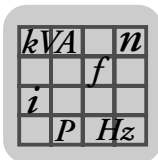
The setpoint is provided by the analog input (AI01) or the fixed setpoints.

The setpoint IXX is selected by 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 through 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 by 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 stationary converter is to receive its control commands (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 takes place through a parameter WRITE service via SBus or the RS485 interface and the binary inputs.
- Analog / setpoint reference I00

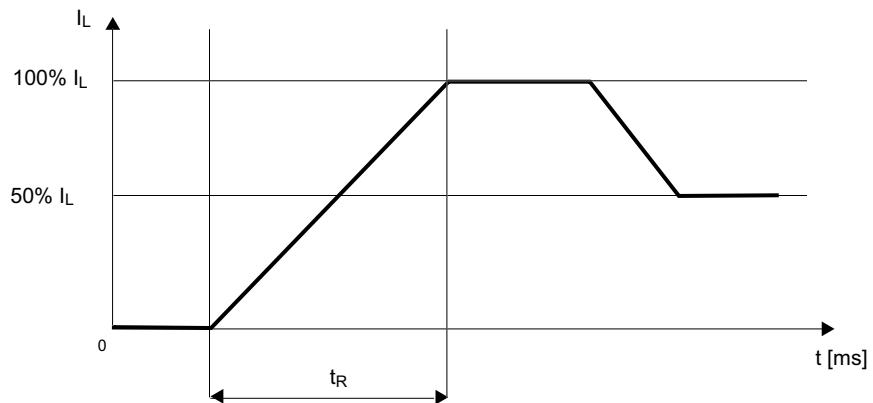
Setting range: **100**..150% I_L .

The analog setpoint reference I00 defines the setting range of the analog input (AI01): -10 V ...+10 V (-40 ...+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.

kVA	n
f	
i	
P	Hz



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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%

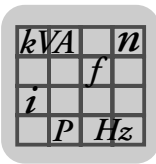
6.10 Binary outputs

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		factory set to
	"0" signal	"1" signal	
No function	always "0" signal	--	--
Malfunction, 0-active	Collective fault signal	No malfunction	DO02
Ready for operation	Not ready for operation	Ready for operation	DO00
Current reference message	$I_{Last} < I_{XX}$ setpoint not reached	$I_{Last} = I_{XX}$ setpoint reached	--
Voltage limit message	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 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.

Here, the system bus group address for multicast telegrams of the stationary converter is set.

- SBus 1 Baud rate

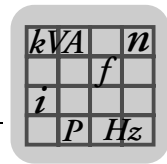
Setting range: 125; 250; **500**; 1000 kBaud.

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

- SBus 1 Timeout delay

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 stationary converter executes the set error response. See parameter *Response SBus 1 - timeout*. No monitoring of cyclic data transmission via the system bus takes place when the SBus timeout delay is set to the value "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 "Installing the synchronization signal" for additional information.

You can choose from the following frequency modes:

- **25.00 kHz - (master)**

The output frequency of the 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 stationary converter executes the set error response. See parameter description *Response SBus timeout*.

- 24.95 kHz

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

- 25.05 kHz

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

- Sync timeout response

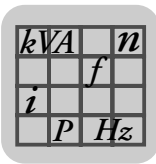
If the stationary converter is in the "Slave" frequency mode and receives a faulty synchronization signal, or none at all, the error response set here is executed.

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® Motion-Studio. 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 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.

- Damping

Setting range: On or **off**.

This parameter activates or deactivates a damping algorithm. If the load current fluctuation is high ($> 5\%$), activate the damping function.

- Load current fluctuation

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

6.13 Setup

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

- Reset statistics data

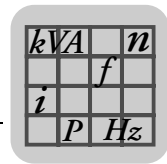
Selection: Error memory and min. / max. values.

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 reset the adjustable parameters stored in the EEPROM to the factory setting. 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 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 Fault responses

Programmable error responses are 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:

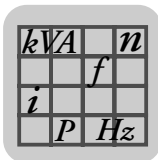
Response	Description
No response	The issued error is ignored, i.e. the error is not indicated, and no error response is executed.
Display only	The error is displayed via the operation LED V3 and MOVITOOLS® Motion-Studio. If the respective parameter is set, an error message is sent via the binary output 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 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. fault*.

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**.

You can use this parameter for programming 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 stationary converter can only be enabled after the error has been reset.
Display / error history	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. fault*.

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.

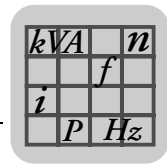
6.16 Manual operation

Control commands and setpoints can be set manually via the manual operation mode in MOVITOOLS® MotionStudio. The Manual operation mode supports the startup of the TPS10A stationary converter and the compensation of the line conductor.

When manual operation is deactivated, the fixed setpoints and control commands become active again. Make sure that:



- An automatic restart cannot put persons or equipment at risk, or
- The "Output stage inhibit" operating status is active ("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. In order to enable the output stage, terminal DI00 must be set to "1".
- Setpoint
In the "Setpoint" field, the setpoint 0...150% I_L for the TPS10A stationary converter is set.



7 Startup



- It is essential to comply with the safety notes during startup!
- Correct installation of the unit is a prerequisite for successful startup!
- You require the MOVITOOLS® MotionStudio software for startup.

7.1 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.

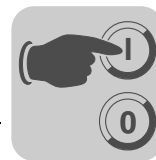
7.1.1 Control source

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
Duty cycle type	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 SBus" > "MOVILINK protocol" for additional information.



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"

Ensure that an automatic restart does not represent any danger to persons or devices, and that the "output stage inhibit" operating mode is activated (= "0" signal at DI00 → connect X10:9 to DGND).



7.1.2 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 by 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 indicated 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.



7.2 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.

7.2.1 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)	Duty cycle type	Voltage control	Current control



Make sure the "output stage inhibit" operating status is active for startup (= 0 signal on DI00 connect X10:9 with DGND) when the power supply is switched on.

7.2.2 Setpoint selection

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... +10 V (-40 ... +40 mA) = 0 ... 100 % I_L (...150% I_L , depending on specified analog setpoint reference I00)	Ramp time T00	Pulse mode P00
"0"	"1"	Fixed setpoint I01 (adjustable 0...150% I_L)	Ramp time T01	Pulse mode P01
"1"	"0"	Fixed setpoint I10 (adjustable 0...150% I_L)	Ramp time T10	Pulse mode P10
"1"	"1"	Fixed setpoint I11 (adjustable 0...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.



Check the correct setting of the S11 DIP switch with the setpoint selection "analog input AI11/AI12 active".

- I signal for current setpoints -40 ...+40 mA
- V signal for voltage setpoints -10 ... +10 V (factory setting)



Startup

Control via terminals

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).



7.3 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 UFP11A, 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.

7.3.1 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

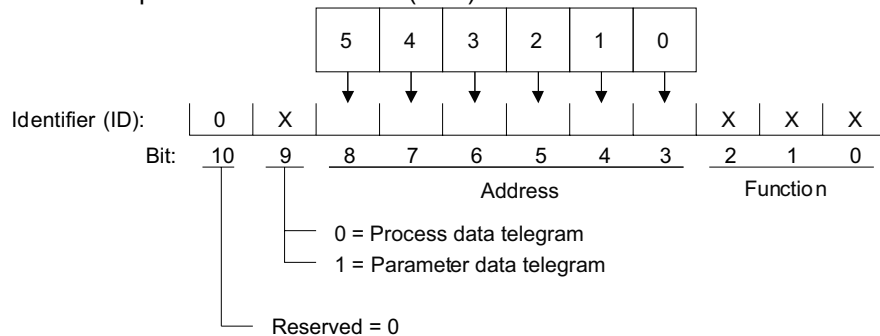
As SBus slave, the TPS10A stationary converter can receive and respond to parameter and process data telegrams.

**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 set via the parameter "SBus address" or "SBus group address".

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



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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 includes the "SBus address" of the unit that is addressed by a request. For group parameter and group process data telegrams it includes 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:

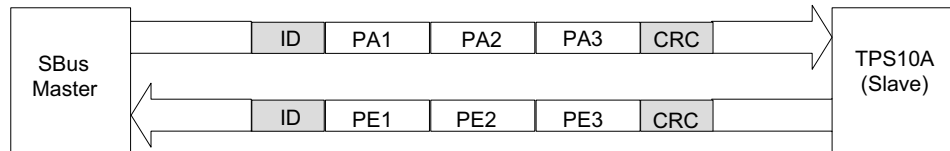
Identifier	Telegram type
8 x SBus address + 3	Process output data telegrams (PO)
8 x SBus address + 4	Process input data telegrams (PI)
8 x SBus group address + 6	Group process output data telegram (GPO)
8 x SBus address + 512 + 3	Parameter request telegram
8 x SBus address + 512 + 4	Parameter response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



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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:

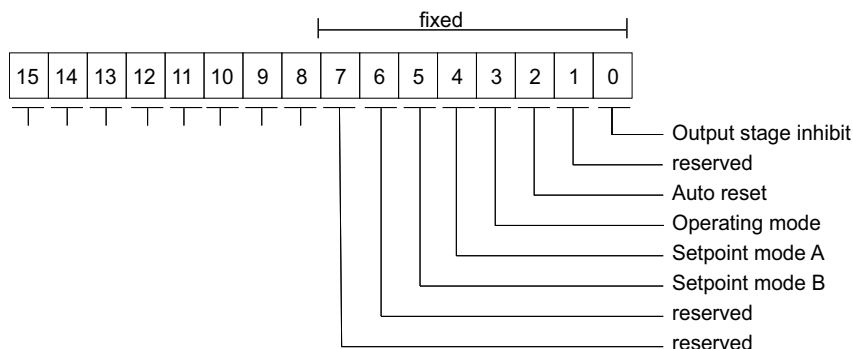
Process output data PO	Contents
PO1	Control word 1
PO2	Current setpoint in 1/10%
PO3	No function
Process input data PI	Contents
PI1	Status word 1
PI2	Temperature
PI3	Utilization

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 illustration provides an overview of the control word structure:

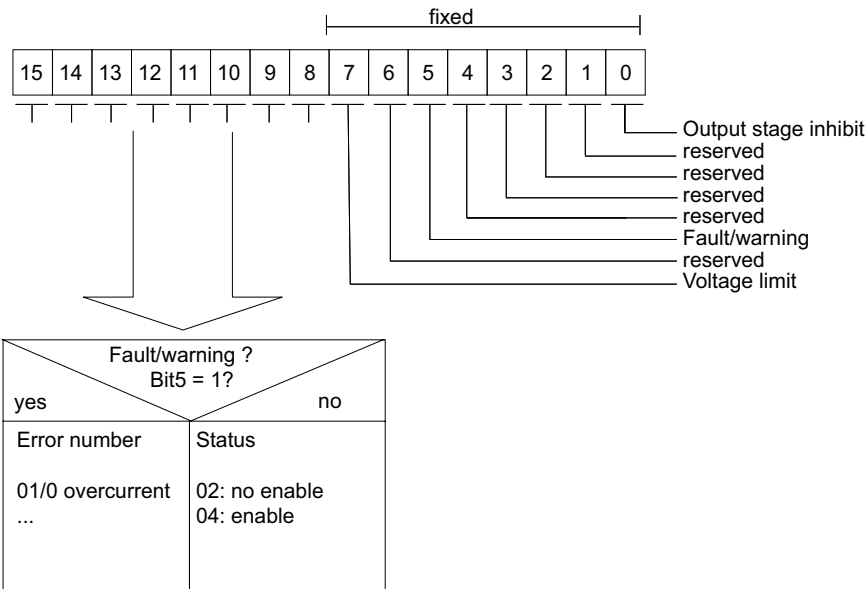


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Bit	Control command	Assignment
0	Output stage inhibit	0 = Inhibited 1 = Enable
2	Auto reset function	0 = auto reset off 1 = auto reset on
3	Duty cycle type	0 = Voltage control 1 = Current control
4	Setpoint mode A	see setpoint selection
5	Setpoint mode B	

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

The status word 1 carries the following information from the TPS10A stationary converter:



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Bit	Control command	Assignment
0	Output stage inhibit	0 = Output stage inhibited 1 = Output stage enabled
5	Fault/warning	0 = No fault/warning 1 = Fault/warning exists

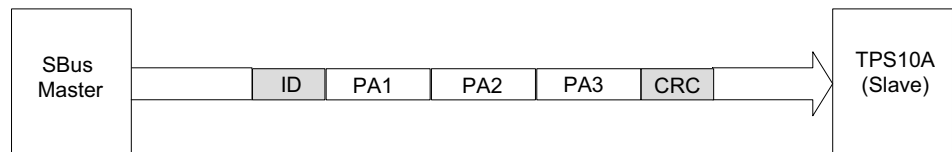


Bit	Control command	Assignment
7	Voltage limit	0 = Voltage limit not reached 1 = Voltage limit reached

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 message 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 message.



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Parameter telegrams

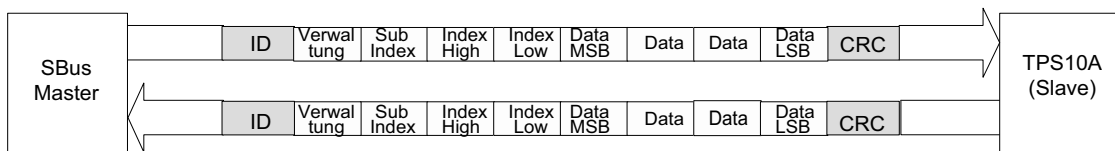
The parameter telegrams comprise a parameter request telegram and a parameter response telegram. The parameter request telegram is sent by the master in order to read or write a parameter value.

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
Management	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 parameter response telegram is sent by the slave in response to the parameter request telegram from the master. The request and response telegram have the same structure.

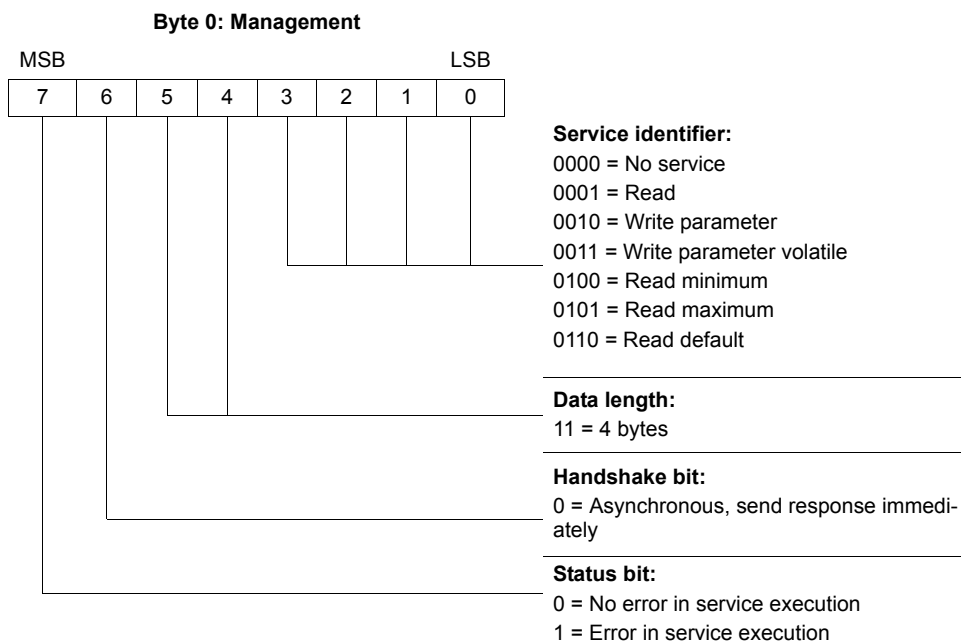


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Management of the parameter telegram

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 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 bit4 and bit5. 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.



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 performed incorrectly. If the status bit now signals an error, the error code is entered in the data range of the parameter telegram. Byte 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 MQI 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



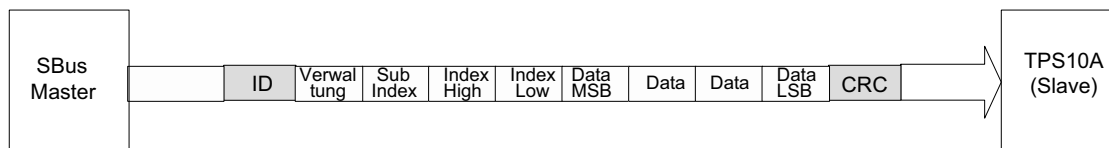
Invalid parameter setting represents a special case:

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 code	5	Service
Error code	5	Invalid value
Add. code high	0	--
Add. code low	0	--

Group parameter telegram

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



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7.3.2 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, $8 \times \text{SBus address} + 512 + 3 = 539$ (21B hex)
- **Administration:** read parameter, 4 bytes long, 0011 0001 b = 21 hex
- **Index:** load current, 10089 (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	21	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	21	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 x 0.001 = 7.5 A

7.4 Control via SBus

7.4.1 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)

$8 \times \text{SBus address} + 3 = 8 \times 3 + 3 = 27 \text{ dez} = 1 \text{ B hex}$

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 set 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 = $-246\text{ }^{\circ}\text{C} + 273.15\text{ K} = 27.15\text{ }^{\circ}\text{C}$

PI3 (Byte4, Byte5): utilization, 0175 hex = 373 dez = $373/10\text{ \%} = 37.3\text{ \%}$



7.4.2 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):

$8 \times \text{SBus address} + 512 + 3 = 8 \times 3 + 512 + 3 = 539 = 21\text{B hex}$

Management byte:

write parameter volatile, 4 bytes: 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 dez = 0186A0 hex) is to be determined for the TPS10A stationary converter.

Identifier (ID):

$8 \times \text{SBus address} + 512 + 3 = 8 \times 3 + 512 + 3 = 539 = 21\text{B hex}$

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



7.5 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.



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:

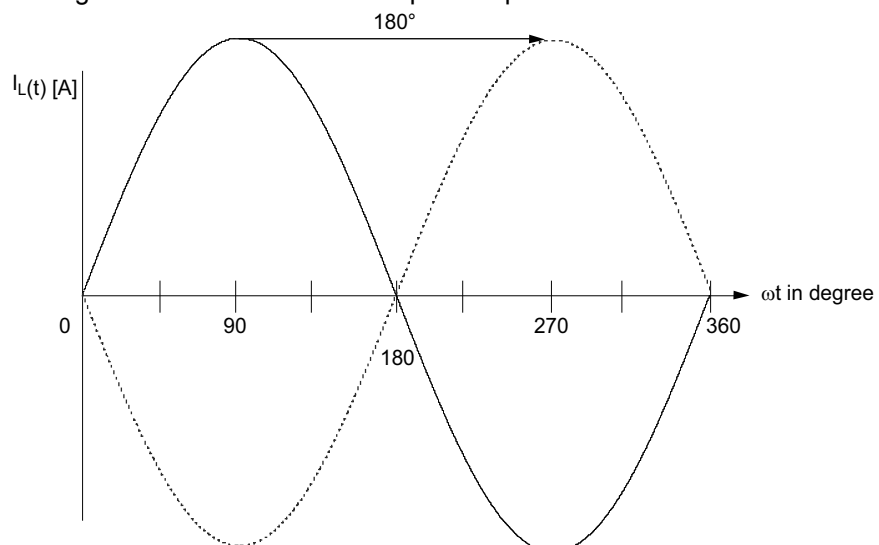
Stationary converters that are set as synchronization slaves perform the specified error response in case of the following errors:

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

Sync phase angle:

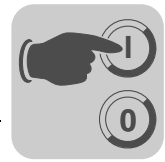
A fixed phase shift can be determined via the *Sync phase angle* parameter. This can only be set at a synchronization slave and always refers to the phasing of the master.

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



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A 0° 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 180° 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 0° or 180°. This, however, is usually not required.

7.6 Compensation

7.6.1 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.



7.6.2 Prerequisites

MOVITOOLS® MotionStudio and the operating instructions for the TAS10A transformer module (part number 11306912/EN) 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.

7.6.3 Procedure

Perform the following steps to ensure successful startup:

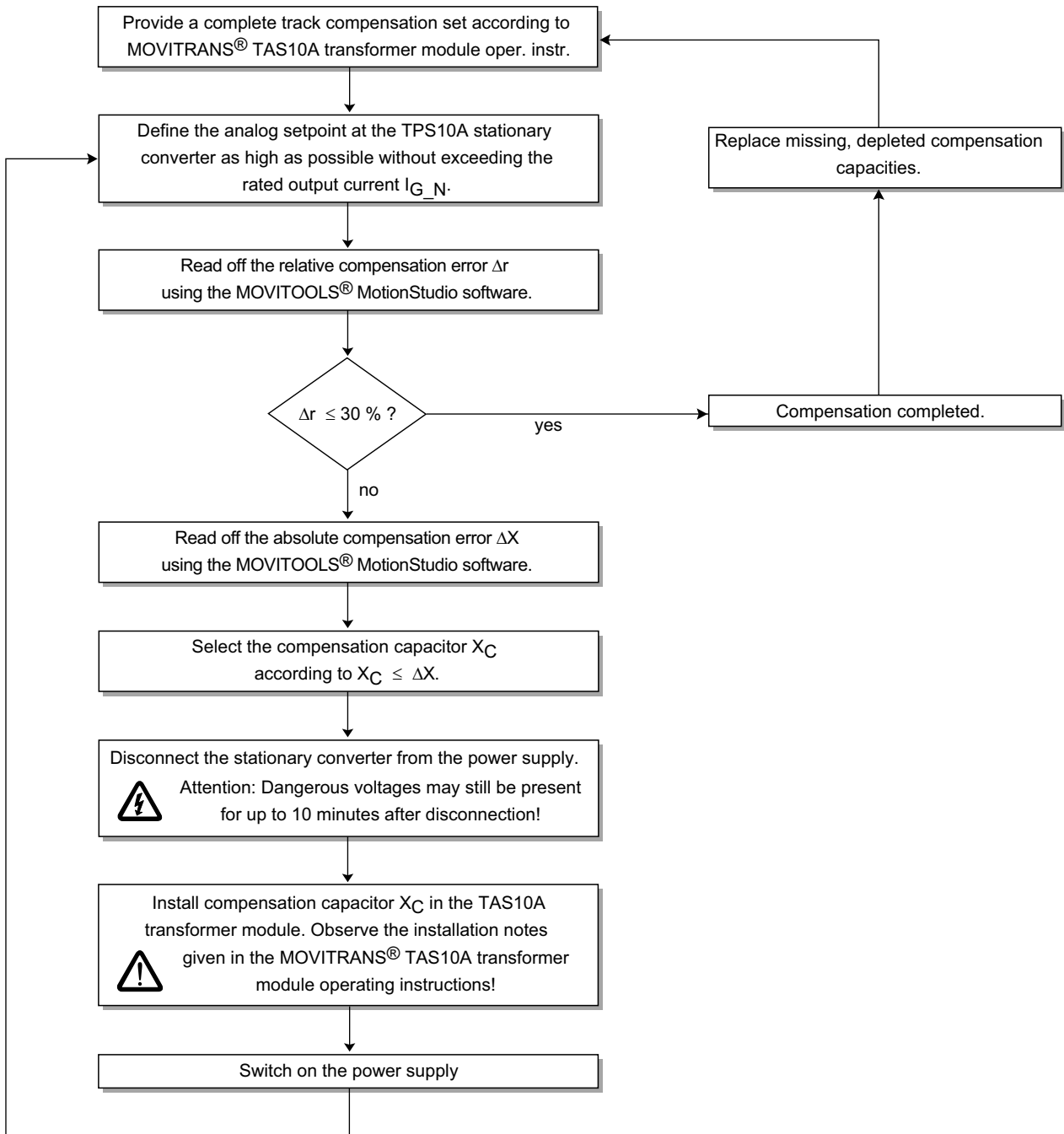
1. Establish a connection to the TPS10A using the MOVITOOLS® MotionStudio software.
2. Select [Startup] [Compensation] in the parameter tree.
3. In the [Compensation] window, choose the line conductor current from the input field *Nominal line conductor current at 100% setpoint* for the system in question.
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:
 - Fault Status = No fault
 - 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 compensation has been performed for the line conductor.

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".



7.6.4 Flow diagram

Proceed as follows to determine the track compensation:



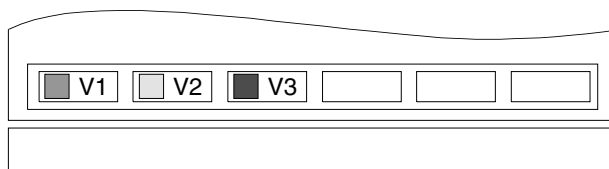
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8 Operation

8.1 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.



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8.1.1 V1: Operating state

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	Fault triggers output stage inhibit.

8.1.2 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: <ul style="list-style-type: none"> 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



8.1.3 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 RS485 interface"
Green	Steady light	25	0	Error "EEPROM"
Green	Flashing	97	0	Error "Copy parameter set"
Green / red	Flashing	68	11	Error "External synchronization" / Lost synchronization, sync signal invalid
Red	Steady light	1	0	Error "Overcurrent"
Red	Flashing	11	10	Error "Overtemperature"



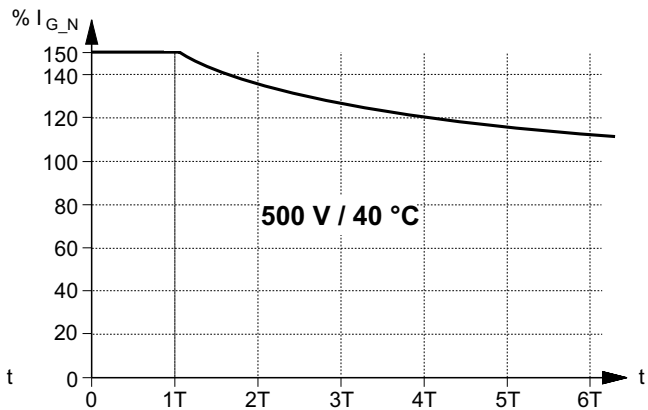
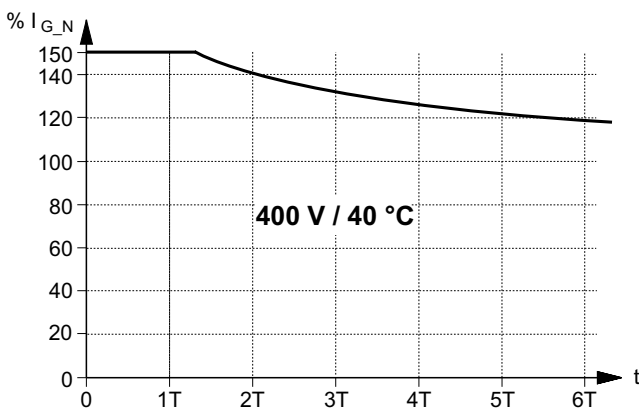
8.2 Overload capacity

8.2.1 Continuous output current

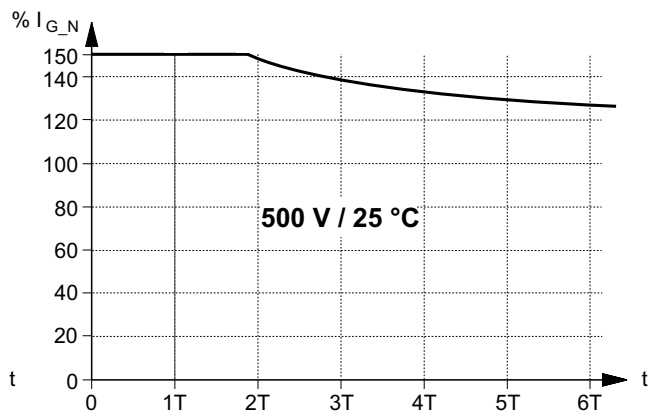
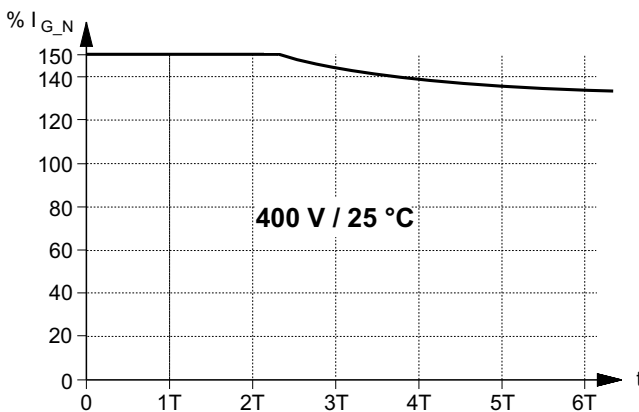
The TPS10A stationary converters calculate the load on the inverter output stage permanently (unit utilization). They can output the maximum possible power in every operating status. The permitted continuous output current depends on the ambient temperature, heat sink temperature, supply voltage. If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

8.2.2 Temperature change over time

The following illustrations show the temperature changes of the units over time and the permitted output currents when $V_{\text{mains}} = 400 \text{ V}$ and $V_{\text{mains}} = 500 \text{ V}$ and the ambient temperatures $T_U = 25 \text{ }^\circ\text{C}$ and $T_U = 40 \text{ }^\circ\text{C}$.



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8.2.3 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 .

8.3 Cut-off limits

The following table shows the load capacity of the units:

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

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



9 Service

9.1 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	Error "Overcurrent"	Output stage inhibit		<ul style="list-style-type: none"> Short circuit output Gyrator impedance too small TAS output open Faulty output stage 	<ul style="list-style-type: none"> 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" / V DC link undervoltage error	Only error message; no output stage inhibit	P ¹⁾	<ul style="list-style-type: none"> Power supply voltage too low Voltage drop too large on power supply system line Phase failure of power supply system line 	<ul style="list-style-type: none"> Connect to correct supply 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	Error "Overtemperature"	Output stage inhibit		<ul style="list-style-type: none"> Thermal overload of unit 	<ul style="list-style-type: none"> Reduce load and / or ensure adequate cooling
25	0	Error "EEPROM"	Output stage inhibit		<ul style="list-style-type: none"> Error when accessing EEPROM 	<ul style="list-style-type: none"> Check factory setting Restart the unit and set parameters anew Contact SEW service if the error occurs again
26	0	Error "External terminal"	Output stage inhibit	P ¹⁾	<ul style="list-style-type: none"> Read in external error signal via DI01 	<ul style="list-style-type: none"> Correct external fault Make sure that DI01 is set to "1"
43	0	Error "Communication time-out at RS485 interface"	Output stage inhibit		<ul style="list-style-type: none"> Communication between stationary converter and PC interrupted 	<ul style="list-style-type: none"> Check connection between stationary converter and PC. Consult SEW Service
45	0	Error "System initialization" / General error during initialization	Output stage inhibit		<ul style="list-style-type: none"> No parameters set for EEPROM in power section, or parameters set incorrectly. 	<ul style="list-style-type: none"> Reset factory settings. If the error cannot be reset: Consult SEW Service
47	0	Error "Time-out SBus #1" / "Time-out system bus (CAN) 1"	Only error message; no output stage inhibit	P ¹⁾	<ul style="list-style-type: none"> Fault during communication via system bus 1 	<ul style="list-style-type: none"> Check system bus connection
68	11	Error "External synchronization" / Lost synchronization, sync signal invalid	Only error message; no output stage inhibit	P ¹⁾	<ul style="list-style-type: none"> Error during transmission of the sync signal 	<ul style="list-style-type: none"> Check synchronization connection Check master / slave settings
97	0	Error "Copy parameter set"	Output stage inhibit		<ul style="list-style-type: none"> Error during data transmission 	<ul style="list-style-type: none"> Repeat copying process

1) This response can be programmed. The factory set fault response is listed in the "Response" column.



9.2 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

9.3 Auto reset function



Important:

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!

9.3.1 Description of functions

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

The following faults can be reset:

- Error "Overcurrent"
- Error "Overtemperature"

9.3.2 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



9.3.3 Auto reset

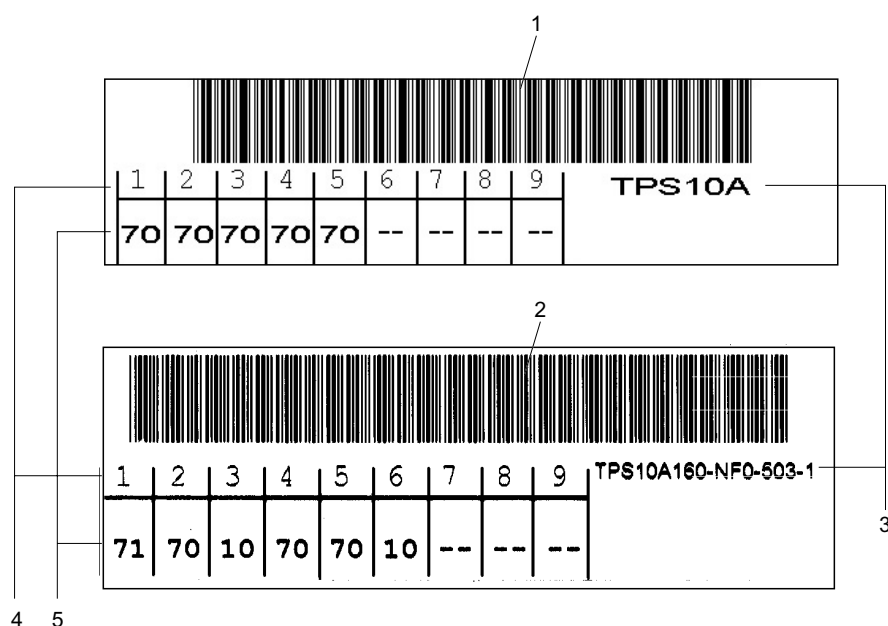
When an error occurs, the auto reset function resets the system automatically after a fixed time of 50 ms (restart time). A maximum of three successive faults can be reset.

Further auto resets are only possible when a fault reset, as described in the "Fault reset section", has been performed.

9.4 Electronics service

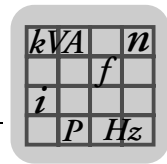
9.4.1 Service label

The TPS10A stationary converters have a service label for the power section and one for the control unit. They are attached to the side of the unit next to the nameplate.



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



10 Technical Data

10.1 Basic unit

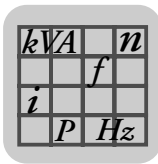
The following table contains all technical data that apply to all TPS10A stationary converters regardless of size and power rating.

TPS10A stationary converter	All sizes
Interference resistance	Fulfills EN 61800-3
Interference emission with EMC-compliant installation	Class A limit according to EN 55011 and EN 55014, meets EN 61800-3
Ambient temperature ϑ Climate class	0 °C... +40 °C EN 60721-3-3, class 3K3
Storage and transportation temperature ¹⁾ ϑ_L	-25° C ... +75 °C (EN 60721-3-3, class 3K3)
Degree of protection size 2 (TPS10A040) size 4 (TPS10A160)	IP20 IP00, IP10 with installed touch guard
Pollution class	2 according to IEC 60664-1 (VDE 0110-1)
Duty cycle type	DB (EN 60149-1-1 and 1-3)
Installation altitude	$h \leq 1,000$ m I_{G_N} reduction: 1 % per 100 m from 1,000 m to max. 2,000 m
Resistance to vibration	Fulfills 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.

10.2 Unit data

TPS10A stationary converter		TPS10A040-NF0-503-1	TPS10A160-NF0-503-1
Part number		826 979 3	826 980 7
Input			
Supply voltage	V_{mains}	AC 380 V - 10 % ... 500 V \pm 10 %	
Supply frequency	f_{mains}	50 ... 60 Hz 5 %	
Rated mains current (at $V_{mains} = 3 \times$ AC 400 V)	I_{mains}	AC 6.0 A	AC 24.0 A
Output			
Rated output power	P_N	4 kW	16 kW
Rated output current	I_{G_N}	AC 10 A	AC 40 A
Load current	I_L	AC 7.5 A	AC 30.0 A
Rated output voltage	V_{A_N}	AC 400 V	
Output frequency	f_A	25 kHz	
Gyrator impedance	X_G	53.3 Ω	13.3 Ω
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 \times H \times D	130 \times 335 \times 207 mm	280 \times 522 \times 227 mm



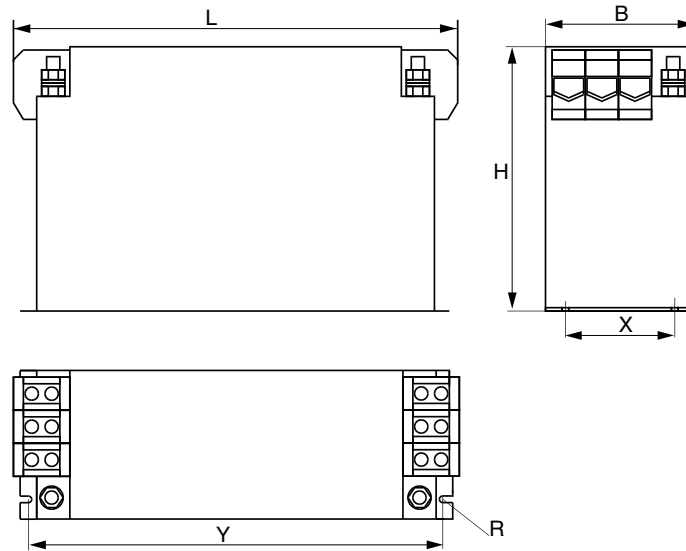
10.3 Electronics data

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 for setpoint potentiometer	X10:1 X10:3	REF1: +10 V +5 % / -0 %, $I_{\max} = 3 \text{ mA}$ REF2: -10 V +0 % / -5 %, $I_{\max} = 3 \text{ mA}$	Reference voltages for setpoint potentiometer
Setpoint input I_{L1}	X10:2	$I_{L1} = -10 \text{ V} \dots +10 \text{ V} = 0 \dots 100 \% I_L$ Resolution: 10 bit, sampling time: 800 μs $R_i = 40 \text{ k}\Omega$ (external voltage supply) $R_i = 20 \text{ k}\Omega$ (supply from X10:1/X10:3)	$I_{L1} = -40 \dots +40 \text{ mA} = 0 \dots 100 \% I_L$ Resolution: 10 bit, sampling time: 800 μs $R_i = 250\Omega$
AI11/AI12 (differential input)	X10:4		
Auxiliary power output VO24 ¹⁾	X10:16	V = DC 24 V, current carrying capacity: $I_{\max} = 200 \text{ mA}$	
External voltage supply VI24 ¹⁾	X10:24	$V_N = \text{DC } 24 \text{ V } -15 \% / +20 \%$ (range DC 19.2...30 V) according to EN 61131-2	
Binary inputs DI00..DI05		Isolated via optocoupler (EN 61131-2), $R_i \approx 3.0 \text{ k}\Omega$, $I_E \approx 10 \text{ mA}$ PLC compatible, sampling time: 400 μs +13 ... +30 V = "1" = Contact closed according to EN 61131-2 -3 ... +5 V = "0" = Contact open	
Signal level			
Control functions	X10:9 X10:10 X10:11 X10:12 X10:13 X10:14	DI00: with fixed assignment /controller inhibit DI01: with fixed assignment /Ext. Error DI02: With fixed assignment Auto reset DI03: with fixed assignment voltage control/current control DI04: With fixed assignment Setpoint mode A DI05: With fixed assignment Setpoint mode B	
Binary outputs DO00 and DO02 ¹⁾		PLC compatible (EN 61131-2), response time: 400 μs Important: Do not apply external voltage! $I_{\max} = 50 \text{ mA}$ (short-circuit proof) "0" = 0 V, "1" = 24 V DO02/00: Option parameter binary input 8350 DO02/8352 DO00	
Signal level			
Control functions	X10:19/21		
Reference terminals	X10:8 X10:17/X10:23 X10:15	AGND: Reference potential for analog signals (AI11, AI12, REF1, REF2) DGND: Reference potential for binary signals, system bus (SBus), synchronization signal DCOM: Reference for binary inputs DI00 ... DI05	
Permitted cable cross section		Single core: 0.20 ... 1.5 mm ² (AWG24...16) Double core: 0.20 ... 1 mm ² (AWG24...17)	

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

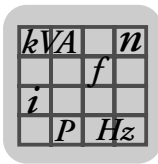
10.4 Line filter

The following illustrations shows a line filter:



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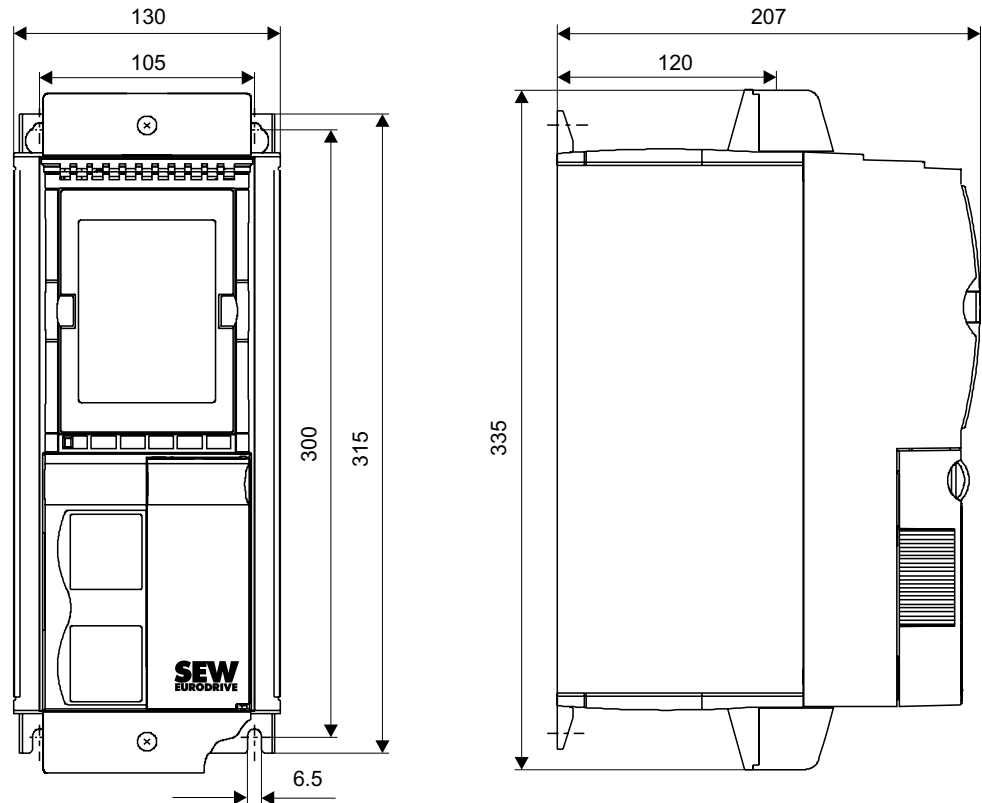
Type Part number	L_{max} [mm]	H_{max} [mm]	B_{max} [mm]	X [mm]	Y [mm]	R [mm]	Terminal [mm ²]	Ground stud	Current [A]
NF 014-503 827,116 X	225	80	50	20	210	5.5	4	M5	9
NF 035-503 827 128 3	275	100	60	30	255	5.5	10	M5	35



10.5 Dimension sheets

10.5.1 TPS10A040 stationary converter - size 2

The following figure shows the dimension sheet of the TPS10A stationary converter size 2 (dimensions in mm):

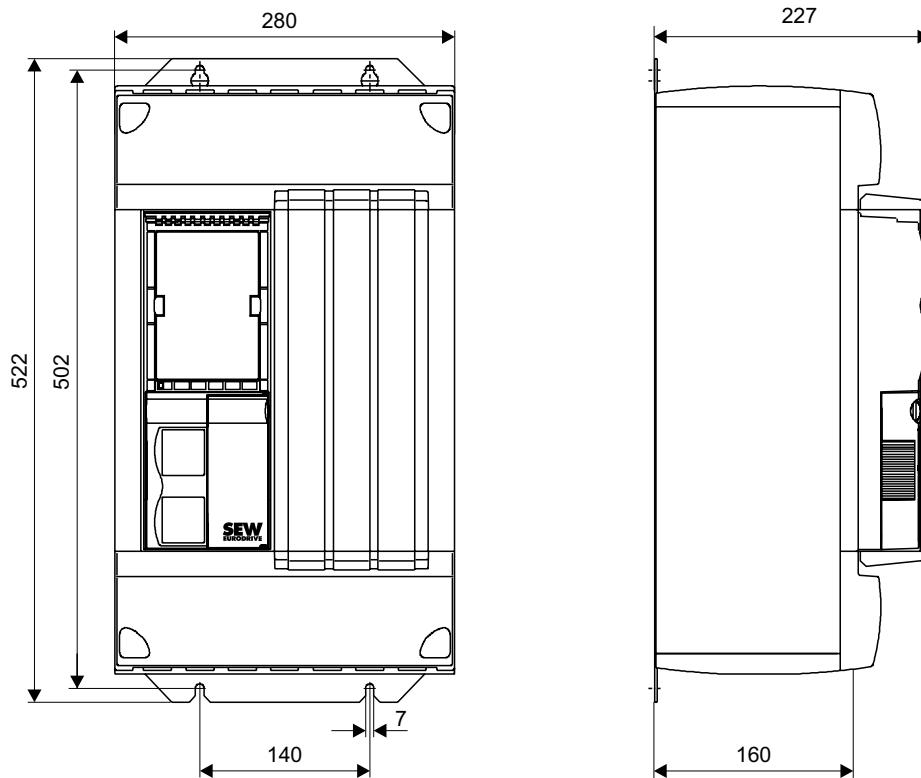


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kVA	n
	f
i	
P	Hz

10.5.2 TPS10A160 stationary converter - size 4

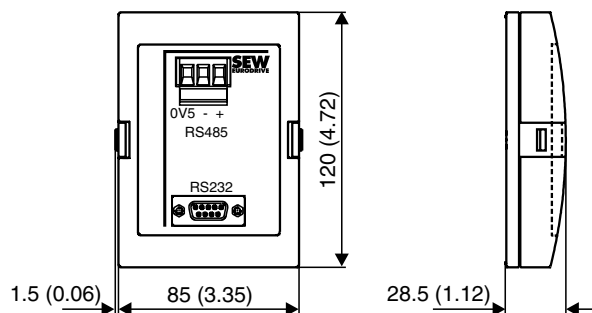
The following figure shows the dimension sheet of the TPS10A stationary converter size 4 (dimensions in mm):



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10.5.3 Serial interface option type USS21A (RS-232)

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



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11 Appendix

11.1 Parameters ordered by indexes

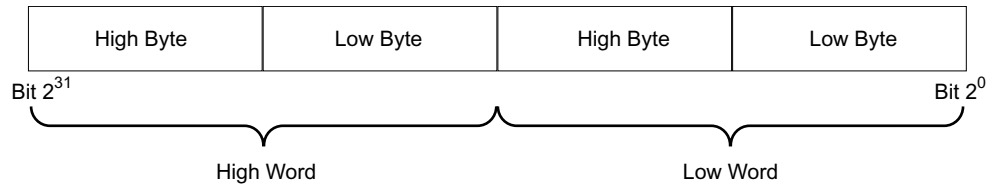
The following table provides an overview of all parameters ordered by indexes.

Table header explanation:

Index	16-bit index for addressing the parameter via interfaces
Parameters	Parameter name
Unit / index	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:



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Dec	Index		Parameters	Unit			Access	Default	Comment
	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	



Dec	Index		Parameters	Unit			Access	Default	Comment
	Hex	Sub		Abbr	Size	Conv			
8326	2086	0	Output current	A	22	-3	RO	0	
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 = /Fault 2 = Ready 12 = Current reference message 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..0.100000, step 1000
8417	20E1	0	Utilization t-1	%	27	0	RO	0	0..0.100000, step 1000
8418	20E2	0	Utilization t-2	%	27	0	RO	0	0..0.100000, step 1000
8419	20E3	0	Utilization t-3	%	27	0	RO	0	0..0.100000, step 1000
8420	20E4	0	Utilization t-4	%	27	0	RO	0	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



Dec	Index		Parameters	Unit			Access	Default	Comment
	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	0.0.63, step1
8601	2199	0	SBus group address		0	0	N/E/RW	0	0.0.63, step1
8602	219A	0	SBus timeout delay	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	21AB	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 off
8619	21AB	0	Restart time	s	4	-3	RO	50	0.0.50000, 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..0.150000, step 1000
8785	2251	0	Parameter control word		0	0	RW	0	See control word 1
8814	2129	0	Fixed setpoint I01	%	24	-3	N/E/RW	0	0.0.150000, step 1000
8815	212A	0	Fixed setpoint I10	%	24	-3	N/E/RW	50000	0.0.150000, step 1000
8816	212B	0	Fixed setpoint I11	%	24	-3	N/E/RW	100000	0.0.150000, step 1000
8940	22EC	0	Load current fluctuation	%	27	-3	RO	0	0..0.100000, step 1000
8941	22ED	0	Load current fluctuation t-0	%	27	-3	RO	0	0..0.100000, step 1000
8942	22EE	0	Load current fluctuation t-1	%	27	-3	RO	0	0..0.100000, step 1000
8943	22EF	0	Load current fluctuation t-2	%	27	-3	RO	0	0..0.100000, step 1000
8944	22F0	0	Load current fluctuation t-3	%	27	-3	RO	0	0..0.100000, step 1000
8945	22F1	0	Load current fluctuation t-4	%	27	-3	RO	0	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	



Dec	Index		Parameters	Unit			Access	Default	Comment
	Hex	Sub		Abb r	Size	Con v			
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..0.100000, step 1000
8980	2314	0	Max. load current fluctuation	%	27	-3	RO	0	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. capacity utilization	%	27	-3	RO	0	0..0.100000, step 1000
8984	2318	0	Max. capacity utilization	%	27	-3	RO	0	0..0.100000, step 1000
8985	2319	0	Min. DC link voltage	V	21	-3	RO	0	
8986	2320	0	Max. DC link voltage	V	21	-3	RO	0	
8987	2321	0	Min. DC link ripple	V	21	-3	RO	0	
8988	2322	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	Sub error code		0	0	RO	0	
10072	2757	1	Sub error code t-0		0	0	RO	0	
10072	2757	2	Sub error code t-1		0	0	RO	0	
10072	2757	3	Sub error code t-2		0	0	RO	0	
10072	2757	4	Sub error code t-3		0	0	RO	0	
10072	2757	5	Sub error 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	



Dec	Index		Parameters	Unit			Access	Default	Comment
	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	Damping		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	27FA	10	Parameter setpoint	%	24	-3	RW	0	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	0.0.150000, 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	0.0.360000, step 1000



11.2 Conversion

A conversion is carried out as follows:

(Physical value as multiples or fractions of the unit)

= (transferred value x unit) x A +B

Example:

Numerical value = 1500

Measurement index = 4, measured quantity = time

Conversion index = -3, unit = ms

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

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



12 Address List

Germany			
Headquarters	Bruchsal	SEW-EURODRIVE GmbH & Co KG	Tel. +49 7251 75-0
Production		Ernst-Blickle-Straße 42	Fax +49 7251 75-1970
Sales		D-76646 Bruchsal	http://www.sew-eurodrive.de
		P.O. Box	sew@sew-eurodrive.de
		Postfach 3023 • D-76642 Bruchsal	
Service Competence Center	Central	SEW-EURODRIVE GmbH & Co KG	Tel. +49 7251 75-1710
		Ernst-Blickle-Straße 1	Fax +49 7251 75-1711
		D-76676 Graben-Neudorf	sc-mitte@sew-eurodrive.de
	North	SEW-EURODRIVE GmbH & Co KG	Tel. +49 5137 8798-30
		Alte Ricklinger Straße 40-42	Fax +49 5137 8798-55
		D-30823 Garbsen (near Hannover)	sc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG	Tel. +49 3764 7606-0
		Dänkritzter Weg 1	Fax +49 3764 7606-30
	D-08393 Meerane (near Zwickau)	sc-ost@sew-eurodrive.de	
South	SEW-EURODRIVE GmbH & Co KG	Tel. +49 89 909552-10	
	Domagkstraße 5	Fax +49 89 909552-50	
	D-85551 Kirchheim (near München)	sc-sued@sew-eurodrive.de	
West	SEW-EURODRIVE GmbH & Co KG	Tel. +49 2173 8507-30	
	Siemensstraße 1	Fax +49 2173 8507-55	
	D-40764 Langenfeld (near Düsseldorf)	sc-west@sew-eurodrive.de	
Electronics	SEW-EURODRIVE GmbH & Co KG	Tel. +49 7251 75-1780	
	Ernst-Blickle-Straße 42	Fax +49 7251 75-1769	
	D-76646 Bruchsal	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	Hagenau	SEW-USOCOME	Tel. +33 3 88 73 67 00
Sales		48-54, route de Soufflenheim	Fax +33 3 88 73 66 00
Service		B. P. 20185	http://www.usocomme.com
		F-67506 Hagenau Cedex	sew@usocomme.com
Production	Forbach	SEW-EUROCOME	Tel. +33 3 87 29 38 00
		Zone Industrielle	
		Technopôle Forbach Sud	
		B. P. 30269	
		F-57604 Forbach Cedex	
Assembly	Bordeaux	SEW-USOCOME	Tel. +33 5 57 26 39 00
Sales		Parc d'activités de Magellan	Fax +33 5 57 26 39 09
Service		62, avenue de Magellan - B. P. 182	
		F-33607 Pessac Cedex	
	Lyon	SEW-USOCOME	Tel. +33 4 72 15 37 00
		Parc d'Affaires Roosevelt	Fax +33 4 72 15 37 15
		Rue Jacques Tati	
		F-69120 Vaulx en Velin	
	Paris	SEW-USOCOME	Tel. +33 1 64 42 40 80
		Zone industrielle	Fax +33 1 64 42 40 88
		2, rue Denis Papin	
		F-77390 Verneuil l'Etang	
Additional addresses for service in France provided on request!			



Algeria			
Sales	Alger	Réducom 16, rue des Frères Zagnoun 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
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
	Townsville	SEW-EURODRIVE PTY. LTD. 12 Leyland Street Garbutt, QLD 4814	Tel. +61 7 4779 4333 Fax +61 7 4779 5333 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://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 S.A. 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
Brazil			
Production Sales Service	Sao Paulo	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 50 Caixa Postal: 201-07111-970 Guarulhos/SP - Cep.: 07251-250	Tel. +55 11 6489-9133 Fax +55 11 6480-3328 http://www.sew.com.br sew@sew.com.br
Additional addresses for service in Brazil provided on request!			
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, Ontario L6T3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca marketing@sew-eurodrive.ca	
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta. B.C. V4G 1 E2	Tel. +1 604 946-5535 Fax +1 604 946-2513 marketing@sew-eurodrive.ca	
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger LaSalle, Quebec H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 marketing@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 P. R. China	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 P. R. China	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 P. R. China	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@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@net.hr	



Czech Republic			
Sales	Praha	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Lužná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 220121234 Fax +420 220121237 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 El 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
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 Service	Karkkila	SEW Industrial Gears OY Valurinkatu 6 FIN-03600 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi
Gabon			
Sales	Libreville	Electro-Services B.P. 1889 Libreville	Tel. +241 7340-11 Fax +241 7340-12
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 2 7960477 + 79604654 Fax +852 2 7959129 contact@sew-eurodrive.hk



Hungary			
Sales	Budapest	SEW-EURODRIVE Kft.	Tel. +36 1 437 06-58
Service		H-1037 Budapest Kunigunda u. 18	Fax +36 1 437 06-50 office@sew-eurodrive.hu
India			
Assembly	Baroda	SEW-EURODRIVE India Pvt. Ltd.	Tel. +91 265 2831086
Sales		Plot No. 4, Gidc	Fax +91 265 2831087
Service		Por Ramangamdi • Baroda - 391 243 Gujarat	http://www.seweurodriveindia.com mdoffice@seweurodriveindia.com
Ireland			
Sales	Dublin	Alperon Engineering Ltd.	Tel. +353 1 830-6277
Service		48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Fax +353 1 830-6458 info@alperon.ie
Israel			
Sales	Tel-Aviv	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 office@liraz-handasa.co.il
Italy			
Assembly	Milano	SEW-EURODRIVE di R. Blickle & Co.s.a.s.	Tel. +39 02 96 9801
Sales		Via Bernini,14	Fax +39 02 96 799781
Service		I-20020 Solaro (Milano)	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	Iwata	SEW-EURODRIVE JAPAN CO., LTD	Tel. +81 538 373811
Sales		250-1, Shimoman-no,	Fax +81 538 373814
Service		Iwata Shizuoka 438-0818	http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp
Korea			
Assembly	Ansan-City	SEW-EURODRIVE KOREA CO., LTD.	Tel. +82 31 492-8051
Sales		B 601-4, Banweol Industrial Estate	Fax +82 31 492-8056
Service		1048-4, Shingil-Dong Ansan 425-120	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 gacar@beirut.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	Queretaro	SEW-EURODRIVE MEXIKO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Queretaro C.P. 76220 Queretaro, Mexico	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 22618372 Fax +212 22618351 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
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 69 241-020 Fax +47 69 241-040 http://www.sew-eurodrive.no sew@sew-eurodrive.no



Peru			
Assembly	Lima	SEW DEL PERU MOTORES REDUCTORES S.A.C.	Tel. +51 1 3495280
Sales		Los Calderos, 120-124	Fax +51 1 3493002
Service		Urbanizacion Industrial Vulcano, ATE, Lima	http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe
Poland			
Assembly	Lodz	SEW-EURODRIVE Polska Sp.z.o.o.	Tel. +48 42 67710-90
Sales		ul. Techniczna 5	Fax +48 42 67710-99
Service		PL-92-518 Łódź	http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
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Assembly	Coimbra	SEW-EURODRIVE, LDA.	Tel. +351 231 20 9670
Sales		Apartado 15	Fax +351 231 20 3685
Service		P-3050-901 Mealhada	http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt
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Sales	București	Sialco Trading SRL	Tel. +40 21 230-1328
Service		str. Madrid nr.4	Fax +40 21 230-7170
		011785 Bucuresti	sialco@sialco.ro
Russia			
Assembly	St. Petersburg	ZAO SEW-EURODRIVE	Tel. +7 812 3332522 +7 812 5357142
Sales		P.O. Box 36	Fax +7 812 3332523
Service		195220 St. Petersburg Russia	http://www.sew-eurodrive.ru sew@sew-eurodrive.ru
Senegal			
Sales	Dakar	SENEMECA	Tel. +221 849 47-70
		Mécanique Générale	Fax +221 849 47-71
		Km 8, Route de Rufisque	senemeca@sentoo.sn
		B.P. 3251, Dakar	
Serbia			
Sales	Beograd	DIPAR d.o.o.	Tel. +381 11 347 3244 / +381 11 288 0393
		Ustanicka 128a	Fax +381 11 347 1337
		PC Košum, IV floor	dipar@yubc.net
		SCG-11000 Beograd	
Singapore			
Assembly	Singapore	SEW-EURODRIVE PTE. LTD.	Tel. +65 68621701
Sales		No 9, Tuas Drive 2	Fax +65 68612827
Service		Jurong Industrial Estate	http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com
		Singapore 638644	
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Sales	Bratislava	SEW-Eurodrive SK s.r.o.	Tel. +421 2 49595201
		Rybničná 40	Fax +421 2 49595200
		SK-83554 Bratislava	sew@sew-eurodrive.sk http://www.sew-eurodrive.sk
	Žilina	SEW-Eurodrive SK s.r.o.	Tel. +421 41 700 2513
		ul. Vojtecha Spanyola 33	Fax +421 41 700 2514
		SK-010 01 Žilina	sew@sew-eurodrive.sk
	Banská Bystrica	SEW-Eurodrive SK s.r.o.	Tel. +421 48 414 6564
		Rudlovská cesta 85	Fax +421 48 414 6566
		SK-97411 Banská Bystrica	sew@sew-eurodrive.sk



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Sales Service	Celje	Pakman - Pogonska Tehnika d.o.o. Ul. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net
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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 dross@sew.co.za
	Capetown	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 dswanepoel@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 dtait@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 info@sew-eurodrive.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 5, Rue El Houdaibiah 1000 Tunis	Tel. +216 71 4340-64 + 71 4320-29 Fax +216 71 4329-76 tms@tms.com.tn



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Assembly	Istanbul	SEW-EURODRIVE	Tel. +90 216 4419163 / 164 3838014/15
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Sales	Dnepropetrovsk	SEW-EURODRIVE	Tel. +380 56 370 3211
Service		Str. Rabochaja 23-B, Office 409 49008 Dnepropetrovsk	Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua
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Production	Greenville	SEW-EURODRIVE INC.	Tel. +1 864 439-7537
Assembly		1295 Old Spartanburg Highway	Fax Sales +1 864 439-7830
Sales		P.O. Box 518	Fax Manuf. +1 864 439-9948
Service		Lyman, S.C. 29365	Fax Ass. +1 864 439-0566 Telex 805 550 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly	San Francisco	SEW-EURODRIVE INC.	Tel. +1 510 487-3560
Sales		30599 San Antonio St.	Fax +1 510 487-6381
Service		Hayward, California 94544-7101	cshayward@seweurodrive.com
	Philadelphia/PA	SEW-EURODRIVE INC.	Tel. +1 856 467-2277
		Pureland Ind. Complex	Fax +1 856 845-3179
		2107 High Hill Road, P.O. Box 481	csbridgeport@seweurodrive.com
		Bridgeport, New Jersey 08014	
	Dayton	SEW-EURODRIVE INC.	Tel. +1 937 335-0036
		2001 West Main Street	Fax +1 937 440-3799
		Troy, Ohio 45373	cstroy@seweurodrive.com
	Dallas	SEW-EURODRIVE INC.	Tel. +1 214 330-4824
		3950 Platinum Way	Fax +1 214 330-4724
		Dallas, Texas 75237	csdallas@seweurodrive.com
Additional addresses for service in the USA provided on request!			
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Assembly	Valencia	SEW-EURODRIVE Venezuela S.A.	Tel. +58 241 832-9804
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Service		Zona Industrial Municipal Norte Valencia, Estado Carabobo	http://www.sew-eurodrive.com.ve ventas@sew-eurodrive.com.ve sewfinanzas@cantv.net



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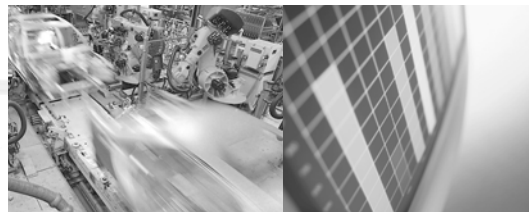


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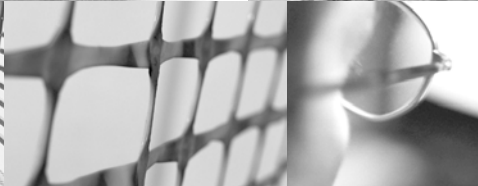
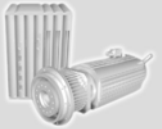
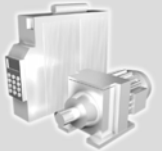
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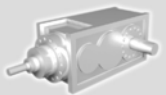
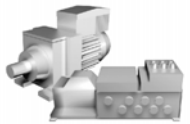


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P.O. Box 3023 · D-76642 Bruchsal / Germany
Phone +49 7251 75-0 · Fax +49 7251 75-1970
sew@sew-eurodrive.com

→ www.sew-eurodrive.com