



**SEW  
EURODRIVE**

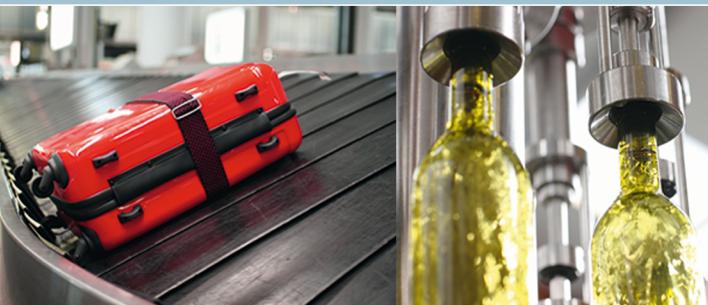
# Manual



## MOVITRAC® LTE-B/LTP-B

### Accessories

### Option Cards



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## 1 General information

### 1.1 About this documentation

This documentation is an integral part of the product. The documentation is intended for all employees who perform assembly, installation, startup, and service work on the product.

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

### 1.2 Rights to claim under limited warranty

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

### 1.3 Other applicable documentation

This document supplements the operating instructions and limits the application notes according to the following information. Use this document only together with the operating instructions.

### 1.4 Copyright notice

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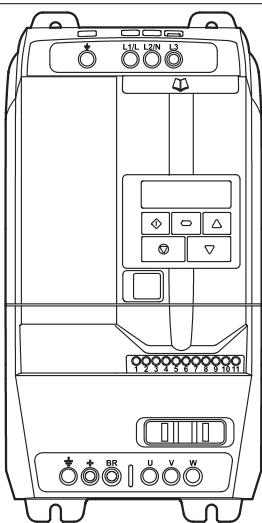
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## 2 System overview

### 2.1 System overview of MOVITRAC® LTE-B+

#### Frequency inverter

LTE-B+



- Performance classes: 0.37 – 37 kW
- Voltage range: 1 × 115 V, 1 × 230 V, 3 × 230 V, 3 × 400 V,
- Overload capacity: 150% for 60 s, 175% for 2 s

For further information on this device, refer to the following documents:

- "MOVITRAC® LTE-B+ Frequency Inverters" operating instructions

#### Option cards

OB LT 2ROUT B	Second relay output
OB LT HAVAC-B	Second signal relay
OB LT VCON A	110 V/24 V converter card
OB LT VCON B	234 V/24 V converter card

#### System components

BR	Braking resistor
NF LT	Line filter
ND LT	Line choke
HD LT	Output choke

#### Remote keypads

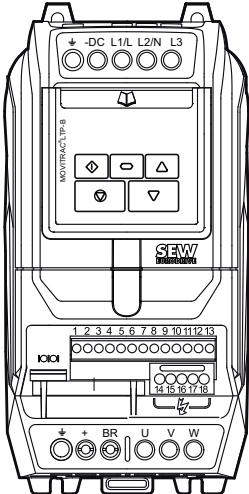
LT BG C	7-segment display keypad
LT BG OLED A	Full-text OLED keypad

#### Accessories

Cable set A	Basic package
Cable set B	Expansion package
Cable set C	PC engineering package
LT BP-C	Bluetooth® parameter module
OB LT LOCMO	Control board
LT SB 23 A	Shield plate for IP20 devices of size 2 + 3

<b>Software</b>	
MOVITOOLS® MotionStudio	Software for parameterization and data backup
LT Shell	Software for parameterization, data backup, firmware updates, and scope

## 2.2 System overview of MOVITRAC® LTP-B

<b>Frequency inverter</b>	
LTP-B	 <ul style="list-style-type: none"> <li>Performance classes: 0.75 – 160 kW</li> <li>Voltage range: 1 × 230 V, 3 × 230 V, 3 × 400 V, 3 × 575 V</li> <li>Overload capacity: 150% for 60 s, 175% for 2 s</li> </ul> <p>For further information on this device, refer to the following documents:</p> <ul style="list-style-type: none"> <li>"MOVITRAC® LTP-B Frequency Inverter" operating instructions</li> </ul>

<b>Option cards</b>	
LT OB 3ROUT A	Relay expansion card
LT OB IO A	Digital I/O expansion card
LT OB ENC A	Encoder card TTL
LT OB ENH A	Encoder card HTL
LT X-H1 A	Servo extension
LT FP 11A	PROFIBUS DP (M30)
LT FP 12A	PROFIBUS DP (M40)
LT FE 32A	PROFINET IO (M30)
LT FE 34A	PROFINET IO (M40)
LT FE 33A	EtherNet/IP™ (M30)
LT FE 35A	EtherNet/IP™ (M40)
LT FE 24A	EtherCAT® (M30)
LT FD 11A	DeviceNet™ (M30)
LT FE 31A	Modbus TCP (M30)
LT FE 25A	POWERLINK (M40)

<b>System components</b>	
BR	Braking resistor

**System components**

NF LT	Line filter
ND LT	Line choke
HD LT	Output choke

**Remote keypads**

LT BG C	7-segment display keypad
LT BG OLED A	Full-text OLED keypad

**Accessories**

Cable set A	Basic package
Cable set B	Expansion package
Cable set C	PC engineering package
LTBP-C	Bluetooth® parameter module
LT OB LOCMO B	Control board with switch and potentiometer
LT SB 23 A	Shield plate for IP20 devices of size 2 + 3

**Software**

MOVITOOLS® MotionStudio	Software for parameterization and data backup
LT Shell	Software for parameterization, data backup, firmware updates, and scope

## 3 Option cards of MOVITRAC® LTE-B+

### 3.1 Installation

Disconnect the MOVITRAC® LT from the supply system before starting to work. Observe the corresponding operating instructions.



#### ⚠ WARNING

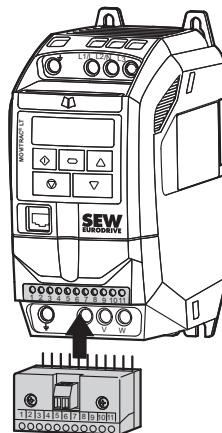
Electric shock due to charged capacitors. Dangerous voltage levels may still be present inside the unit and at the terminals up to ten minutes after disconnection from the power supply.

Severe or fatal injuries.

- Wait ten minutes after disconnecting the frequency inverter from the power supply as well as disconnecting the line voltage and the DC 24 V voltage. Then, establish that the unit has been de-energized. Only then, start to work on the unit.

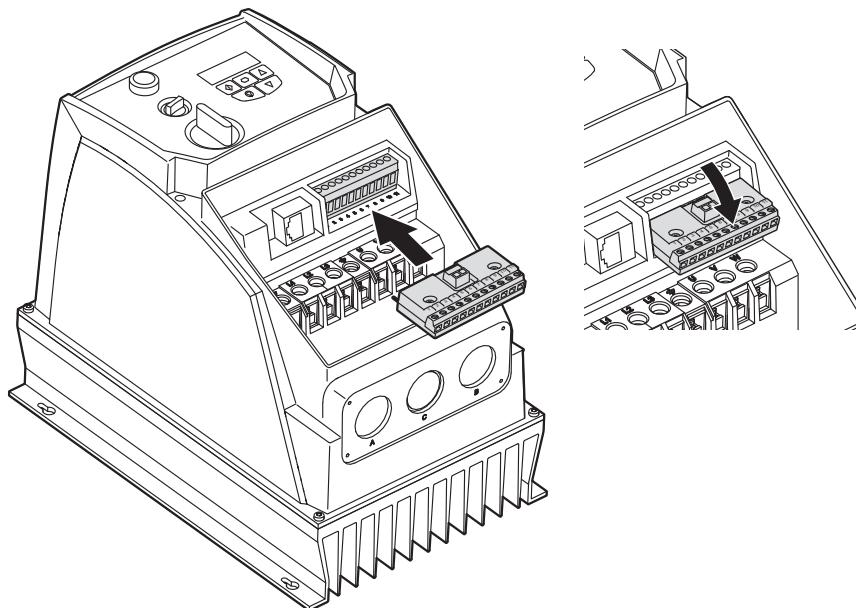
For installation of the respective option card, proceed as follows.

1. Plug the option card into the control terminal of the frequency inverter.
2. Tighten the clamping screws at the frequency inverter to ensure stable electrical contact.
3. Hold the option card while you tighten the clamping screws.



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4. In case of IP55/IP66 devices, the option card must be slightly bent downwards to enable the front cover to close. This does not impair the function of the option card.



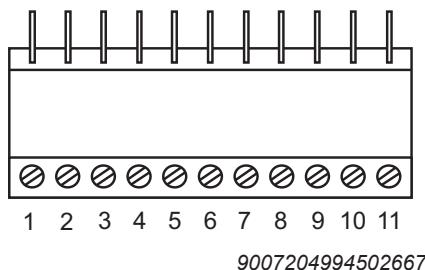
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### 3.2 Second relay output

Type	Part number
OBLT2ROUTB	18223168

If 2 relay outputs are required, use this option card. The second relay output is suitable for applications where the analog output of the MOVITRAC® LTE-B is converted into a relay output.

The functions of the relay can be programmed in the frequency inverter.



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If this option card is used, the terminal assignment differs from the inverter. The following assignment applies in conjunction with this option card.

Ter-minal no.	Signal	Connection	Description
1	+24 V	Output +24 V: Reference voltage	Reference voltage for control of the digital inputs (100 mA max.)
2	DI 1	Binary input 1	Compatible with PLC requirement if 0 V is connected to terminal 7.
3	DI 2	Binary input 2	
4	DI 3/AI 2	Binary input 3 Analog input 2 (12 bits)/ thermistor contact	digital: 0/24 V analog: 0 – 10 V, 0 – 20 mA, 4 – 20 mA, 20 – 4 mA, PtC-th
5	+10 V	Output +10 V: Reference voltage	10 V reference voltage for analog input (Pot. supply +, 10 mA max., 1 kΩ min.)
6	AI 1/DI 4	Analog input 1 (12 bit) Binary input 4	analog: 0 – 10 V, 0 – 20 mA, 4 – 20 mA, 20 – 4 mA digital: 0/24 V
7	0 V	0 V: Reference potential	0 V: Reference potential for analog input (potential shift)
8	Relay 2 contact	Relay contact	NO contact (AC 250 V / DC 220 V max. 1 A)
9	Relay 2 reference	Relay reference potential	
10	Relay 1 contact	Relay contact	NO contact (AC 250 V / DC 220 V max. 1 A)
11	Relay 1 reference	Relay reference potential	

## INFORMATION



In case of IP66 devices, the option card must be slightly bent downwards to enable the front cover to close. This does not impair the function of the option card.

### 3.2.1 Technical data

Maximum relay switching voltage	AC 250 V / DC 220 V
Maximum relay switching current	1 A
Conformity	IP00, UL94V-0
Ambient temperature	-10 °C to +50 °C
Dimensions	56 × 24 (without pins) × 14 mm

### 3.2.2 Startup and operation

#### Programming the first relay output

The first relay output is parameterized via the parameter *P-18*. The possible settings are listed in the following table.

#### Programming the second relay output

The second relay output is parameterized via parameter *P-25*. The possible settings are listed in the following table.

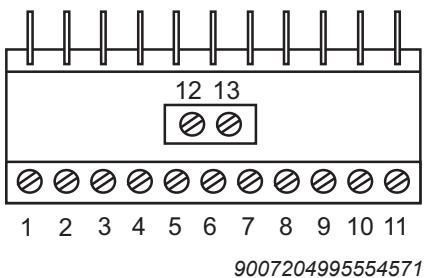
Setting <i>P-18/25</i>	Function
0	Frequency inverter enabled
1	Frequency inverter ready for operation
2	Motor at setpoint speed
3	Frequency inverter in fault status
4	Motor speed $\geq$ limit value
5	Motor current $\geq$ limit value
6	Motor speed $<$ limit value
7	Motor current $<$ limit value

For further descriptions of the functions refer to the operating instructions "MOVITRAC® LTE-B+ frequency inverter" in chapter "P-18 user relay output function selection".

### 3.3 Two signal relays

Type	Part number
OB LT HVAC-B	18218180

HVAC-B option card is suitable for applications that require 2 status messages. For example, the status message "frequency inverter in fault status" can be extended by "frequency inverter enabled".



If this option card is used, the terminal assignment differs from the inverter. The following assignment applies in conjunction with this option card.

Terminal no.	Signal	Connection	Description
1	+24 V	Output +24 V: Reference voltage	Reference voltage for control of the digital inputs (100 mA max.)
2	DI 1	Binary input 1	Compatible with PLC requirement if 0 V is connected to terminal 7 or 9.
3	DI 2	Binary input 2	
4	DI 3/AI 2	Binary input 3 Analog input 2 (12 bit)	digital: 0/24 V analog: 0 – 10 V, 0 – 20 mA, 4 – 20 mA, 20 – 4 mA, Ptc-th
5	+10 V	Output +10 V: Reference voltage	10 V reference voltage for analog input (Pot. supply +, 10 mA max., 1 kΩ min.)
6	AI 1/DI 4	Analog input 1 (12 bit) Binary input 4	analog: 0 – 10 V, 0 – 20 mA, 4 – 20 mA, 20 – 4 mA digital: 0/24 V
7	0 V	0 V: Reference potential	0 V: Reference potential for analog input (potential shift)
8	AO/DO	Analog output (10 bits) Digital output	analog: 0 – 10 V, max. 20 mA digital: 0/24 V, max. 20 mA
9	0 V	0 V: Reference potential	0 V: Reference potential for analog output
10	Relay 1 contact	Relay contact	NO contact (AC 250 V / DC 220 V max. 1 A)
11	Relay 1 reference	Relay reference potential	

Ter-minal no.	Signal	Connection	Description
12	Relay 2 contact	Relay contact	NO contact (AC 250 V / DC 220 V max. 1 A)
13	Relay 2 reference	Relay reference potential	

## INFORMATION



In case of IP66 devices, the option card must be slightly bent downwards to enable the front cover to close. This does not impair the function of the option card.

### 3.3.1 Technical data

Maximum relay switching voltage	AC 250 V / DC 220 V
Maximum relay switching current	1 A
Conformity	IP00, UL94V-0
Ambient temperature	-10 °C to +50 °C
Dimensions	56 × 24 (without pins) × 14 mm

### 3.3.2 Startup and operation

#### Programming the relay output

In most cases, leaving the function assignment for both relays in the factory settings (*P-18 = 1*) is sufficient. But there is also the possibility, to change the function assignment according to the following table.

Setting <i>P-18</i>	Relay 1	Relay 2
0	Frequency inverter ready for operation	Frequency inverter enabled
1	Frequency inverter in fault status	Frequency inverter enabled
2	Motor < setpoint speed	Motor at setpoint speed
3	Frequency inverter ready for operation	Frequency inverter in fault status
4	Motor speed < limit value	Motor speed ≥ limit value
5	Motor current < limit value	Motor current ≥ limit value

The switching threshold of the limit value is defined in *P-19*.

The relay contact is designed as NO contact.

### 3.4 Converter card

Type	Part number	Description
OB LT VCON A	18217672	110/24 V converter
OB LT VCON B	18221947	230/24 V converter

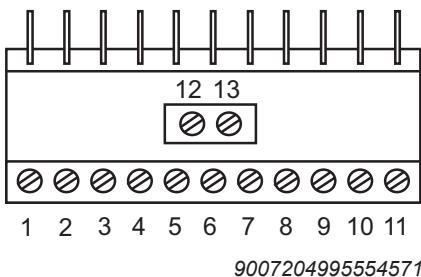
Via the converter card, the digital inputs of the frequency inverter can also be controlled directly by a 110 V or 240 V control supply, without an interconnected relay.

#### INFORMATION



The existing analog input can further be used by connecting the analog signal at terminal 6. This has no influence on the other inputs/outputs of the frequency inverter.

The digital input terminals are isolated via optocoupler.



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If this option card is used, the terminal assignment differs from the inverter. The following assignment applies in conjunction with this option card.

Terminal no.	Signal	Connection	Description
1	Neutral	Neutral	Do not connect to 0 V
2	DI 1	Binary input 1	AC 380 – 250 V, 68 kΩ impedance
3	DI 2	Binary input 2	
4	DI 3	Binary input 3	
5	+10 V	Output +10 V: Reference voltage (Pot. supply +, 10 mA max., 1 kΩ min.)	10 V reference voltage for analog input
6	AI 1/DI 4	Analog input 1 (12 bit) Binary input 4	analog: 0 – 10 V, 0 – 20 mA, 4 – 20 mA, 20 – 4 mA digital: 0/24 V
7	0 V	0 V: Reference potential	0 V: Reference potential for analog input (potential shift)
8	AO/DO	Analog output (10 bits) Digital output	analog: 0 – 10 V, max. 20 mA digital: 0/24 V, max. 20 mA
9	0 V	0 V: Reference potential	0 V: Reference potential for analog output

Ter-minal no.	Signal	Connection	Description
10	Relay 1 contact	Relay contact	NO contact (AC 250 V / DC 220 V max. 1 A)
11	Relay 1 reference	Relay reference potential	
12	Neutral	Neutral	Do not connect to 0 V.
13	DI 4	Binary input 4	AC 80 – 250 V, 68 kΩ impedance

## INFORMATION



In case of IP66 devices, the option card must be slightly bent downwards to enable the front cover to close. This does not impair the function of the option card.

### 3.4.1 Technical data

Maximum relay switching voltage	AC 250 V / DC 220 V
Maximum relay switching current	1 A
Conformity	IP00, UL94V-0
Ambient temperature	-10 °C to +50 °C
Dimensions	56 × 24 (without pins) × 14 mm

## 4 Option cards installation of MOVITRAC® LTP-B

Disconnect the MOVITRAC® LT from the supply system before starting to work. Observe the corresponding operating instructions.

### **⚠ WARNING**



Electric shock due to charged capacitors. Dangerous voltage levels may still be present inside the device and at the terminals up to 10 minutes after disconnection from the power supply.

Severe or fatal injuries.

- Wait 10 minutes after you have de-energized the inverter and have switched off the line voltage and the DC 24 V voltage. Do not start working on the device until you have made sure that it is de-energized.

For installation of the respective option card, proceed as follows.

### 4.1 Removing the terminal cover

The front cover of the inverter must be removed to access the terminals of inverters with degree of protection IP55/IP66. Only use cross-head or slot screwdrivers to open the terminal cover.

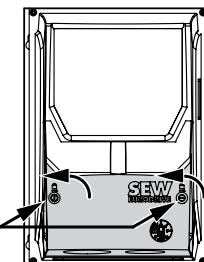
The terminals can be accessed when the marked screws on the front of the product are removed as shown below.

The front cover is attached by proceeding in reverse order.

#### 4.1.1 Inverters with degree of protection IP66/NEMA 4X

The following inverters have the housing shown below:

Nominal line voltage	Power of the inverter
230 V	0.75 – 4 kW
400 V	0.75 – 7.5 kW
575 V	0.75 – 11 kW



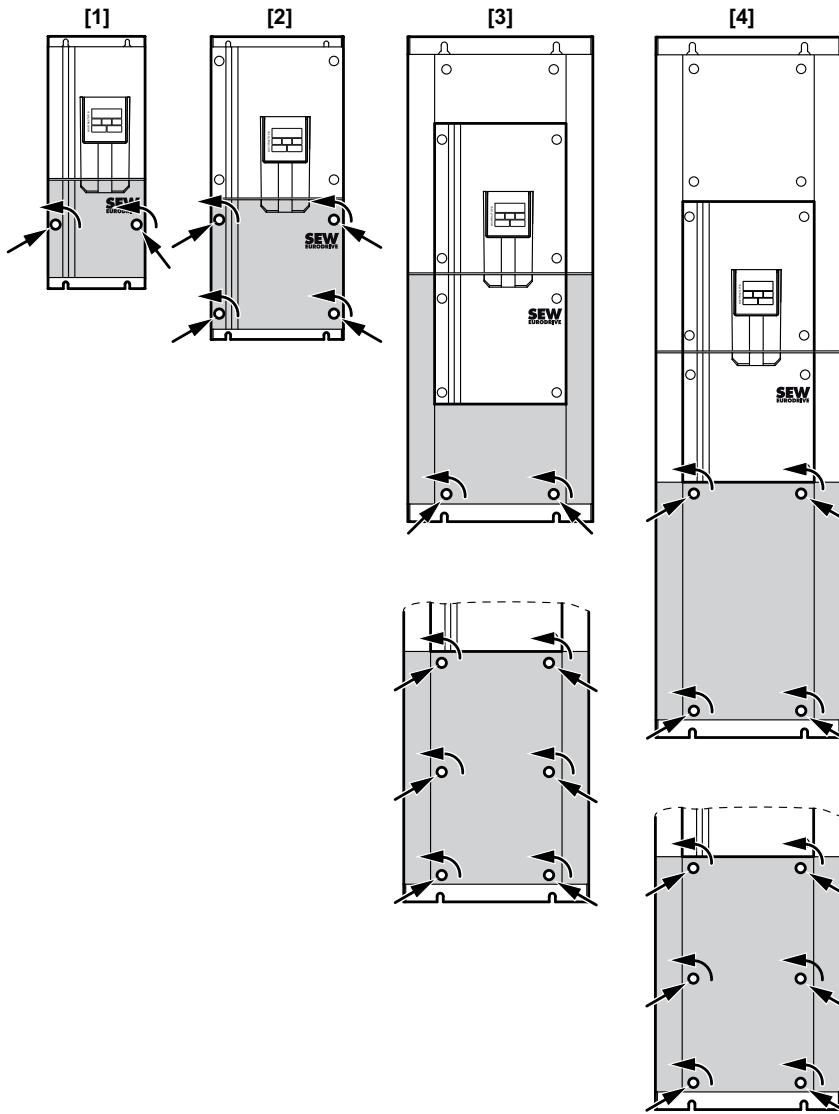
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[1] Screws of the front cover

#### 4.1.2 Inverters with degree of protection IP55/NEMA 12K

The following inverters have the housing shown below:

Nominal line voltage	Power of the inverter
230 V	5.5 – 75 kW
400 V	11 – 160 kW
575 V	15 – 110 kW



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[1] • 230 V: 5.5 – 11 kW

- 400 V: 11 – 22 kW
- 575 V: 15 – 30 kW

[2] • 230 V: 15 – 18.5 kW

- 400 V: 30 – 37 kW
- 575 V: 37 – 45 kW

[3] • 230 V: 22 – 45 kW

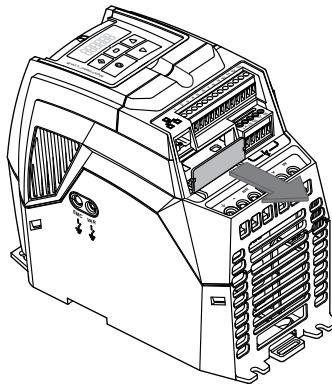
- 400 V: 45 – 90 kW
- 575 V: 55 – 110 kW

[4] • 230 V: 55 – 75 kW

- 400 V: 110 – 160 kW

## 4.2 Removing the cover

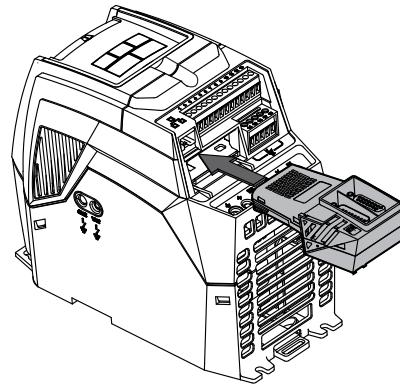
Remove the cover for option pcb slot from the frequency inverter as depicted, to access the option card slot. The cover for option pcb slot is available at all IP20 and IP55 frequency inverters. It is situated near the signal terminals.



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## 4.3 Inserting the option card

Carefully plug in the option card into the option slot. To avoid damaging the contacts, make sure to slide the option card evenly into the slot.



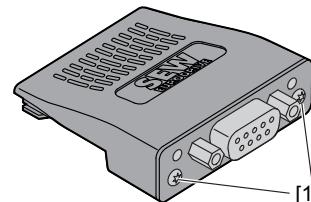
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## 4.4 Attaching the option card

### 4.4.1 Option cards

Tighten the screws at the module using a T8 screwdriver and applying a tightening torque of 0.25 Nm.

Example for a figure:

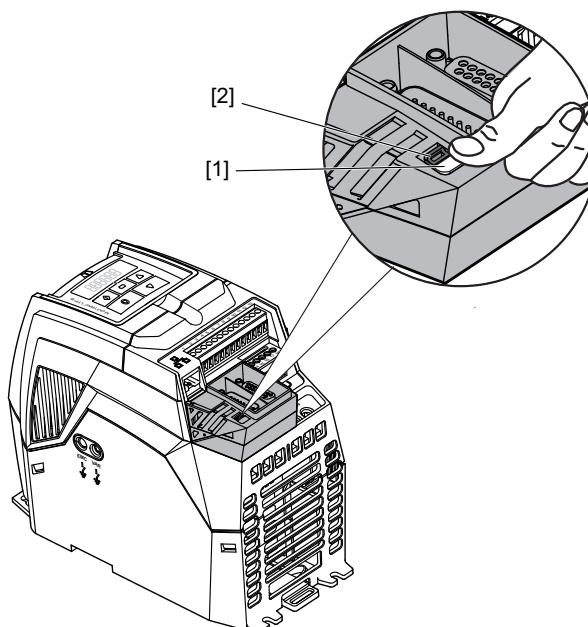


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[1] T8 screw

### 4.4.2 LTX absolute encoder card

Press the push button [1] to secure the LTX servo module.



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[1] Push button  
[2] Detent

Push the detent [2] towards the slot to unlock the push button [1] and remove the LTX servo module.

## 5 Interface extension for option cards of MOVITRAC® LTP-B

### 5.1 Overview of option cards

Type	Designation	Part number
"Relay expansion card" (→ <a href="#">21</a> )	LT OB 3ROUT A	28201159
"Digital I/O expansion card" (→ <a href="#">24</a> )	LT OB IO A	28201167

### INFORMATION



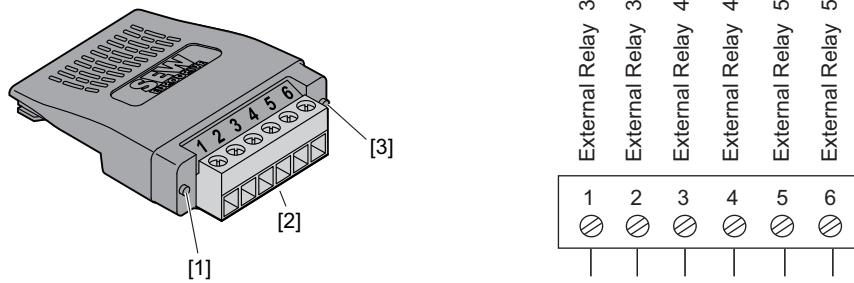
Note that only one option card can be used per frequency inverter.

## 5.2 Relay expansion card

Designation	Part number
LT OB 3ROUT A	28201159

In case an application requires more relay outputs than the frequency inverter provides, the relay output option card can be used.

The option card relay output offers 3 additional relay outputs.



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- [1] LED: A
- [2] Labeling: Cascade Control
- [3] LED: B

### 5.2.1 Technical data

Maximum input voltage	AC 250 V/DC 30 V
Maximum relay switching current	AC 6 A (250 V)/DC 5 A (30 V)
Digital input	8 – 30 V
Digital input response time	< 8 ms
Conformity	IP20, UL94V-0, IP55 (for IP55 devices)
Ambient temperature	-10 °C to +50 °C
Storage temperature	-40 °C to +60 °C
Tightening torque of terminal strip	0.5 Nm

### 5.2.2 Startup and operation of the relay

Function and limit settings for the following parameters:

Paramet- ers	Description
P5-15	Expansion relay 3 function selection
P5-16	Relay 3 upper limit 0.0 – <b>100.0</b> – 200.0%
P5-17	Relay 3 lower limit <b>0.0</b> – 200.0%
P5-18	Expansion relay 4 function selection
P5-19	Relay 4 upper limit 0.0 – <b>100.0</b> – 200.0%
P5-20	Relay 4 lower limit <b>0.0</b> – 200.0%

Relay outputs 3 and 4 can be individually programmed according to the parameters specified in the table below. Relay output 5 is permanently set to function 3 motor speed  $\geq 0$ .

Set- tings	Function	Explanation
0	Inverter enabled	Relay contact closed when the inverter is enabled.
1	/Failure. Inverter ready	Relay contact closed when inverter is operable (no error).
2	Motor at setpoint speed	Relay contact closed if output frequency = setpoint frequency (hysteresis P6-04).
3	Motor speed $\geq 0$	Relay contact closed if output frequency $>$ speed 0 min $^{-1}$ (hysteresis P6-04).
4	Motor speed $\geq$ limit value	Relay contact closed if the level is greater than or equal to the value set in parameter "Upper user relay limit/analog output".
5	Motor current $\geq$ limit value	Relay contact open if the level is below the value set in parameter "Lower user relay limit/analog output".
6	Motor torque $\geq$ limit value	Relay contact open if the level is below the value set in parameter "Lower user relay limit/analog output".
7	Analog input 2 $\geq$ limit value	Relay contact open if the level is below the value set in parameter "Lower user relay limit/analog output".
8	Hoist (for P2-18 only)	This setting is made automatically if the hoist function is activated via P4-12.  The inverter controls the relay according to the hoist function.
9	STO status	Relay contacts closed if STO circuit is supplied with 24 V.  Relay contacts open if STO circuit is open (inverter indicates "inhibit").
10	PID error $\geq$ limit value	Relay contact closed if the control error is greater than or equal to the value set in parameter "User relay upper limit".  Relay contact open if the control error is less than the value set in parameter "User relay lower limit".  The relay opens also with negative control errors.

### 5.2.3 LED status

The relay output card has 2 LEDs, designated as LED A and B.

#### LED A

State	Description
Lights up green	No fault, card ready for operation.
Flashing green	No connection to the frequency inverter.
Off	No supply voltage.

#### LED B

State	Description
Off	No function

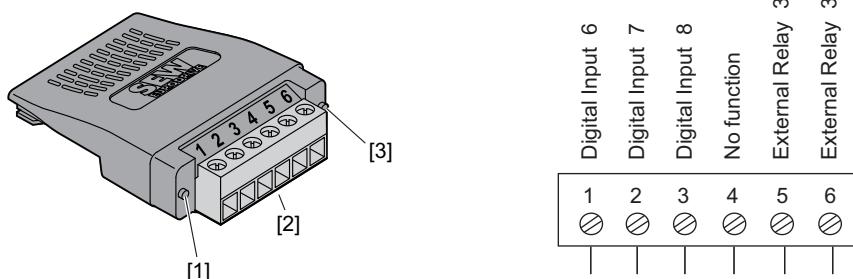
### 5.3 Digital I/O expansion card

Designation	Part number
LT OB IO A	28201167

If an application requires more digital inputs/outputs than the frequency inverter supplies, the option card digital I/O can be used. The option card provides 3 additional digital inputs and an additional relay output. The digital inputs can be assigned to various functions in the frequency inverter. In addition, their status can be read by the higher-level controller via process data communication.

The digital I/O expansion card supports:

- 3 digital inputs (DI 6, DI 7, DI 8)
- 1 relay output (relay 3)



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- [1] LED: A
- [2] Labeling: Digital I/O
- [3] LED: B

#### 5.3.1 Technical data

Maximum input voltage	AC 250 V/DC 30 V
Maximum relay switching current	AC 6 A (250 V)/DC 5 A (30 V)
Digital input	8 – 30 V
Digital input response time	< 8 ms
Conformity	IP20, UL94V-0, IP55 (for IP55 devices)
Ambient temperature	-10 °C to +50 °C
Storage temperature	-40 °C to +60 °C
Tightening torque of terminal strip	0.5 Nm

### 5.3.2 Startup and operation of the relay

Function and limit settings for the following parameters:

Paramet- ers	Description
P5-15	Expansion relay 3 function selection
P5-16	Relay 3 upper limit 0.0 – <b>100.0</b> – 200.0%
P5-17	Relay 3 lower limit <b>0.0</b> – 200.0%

Relay 3 can be individually programmed according to the parameters specified in the table below.

Set- tings	Function	Explanation
0	Inverter enabled	Relay contact closed when the inverter is enabled.
1	/Failure. Inverter ready	Relay contact closed when inverter is operable (no error).
2	Motor at setpoint speed	Relay contact closed if output frequency = setpoint frequency (hysteresis P6-04).
3	Motor speed $\geq$ 0	Relay contact closed if output frequency > speed 0 min <sup>-1</sup> (hysteresis P6-04).
4	Motor speed $\geq$ limit value	Relay contact closed if the level is greater than or equal to the value set in parameter "Upper user relay limit/analog output".
5	Motor current $\geq$ limit value	Relay contact open if the level is below the value set in parameter "Lower user relay limit/analog output".
6	Motor torque $\geq$ limit value	Relay contact open if the level is below the value set in parameter "Lower user relay limit/analog output".
7	Analog input 2 $\geq$ limit value	Relay contact open if the level is below the value set in parameter "Lower user relay limit/analog output".
8	Hoist (for P2-18 only)	This setting is made automatically if the hoist function is activated via P4-12.  The inverter controls the relay according to the hoist function.
9	STO status	Relay contacts closed if STO circuit is supplied with 24 V.  Relay contacts open if STO circuit is open (inverter indicates "inhibit").
10	PID error $\geq$ limit value	Relay contact closed if the control error is greater than or equal to the value set in parameter "User relay upper limit".  Relay contact open if the control error is less than the value set in parameter "User relay lower limit".  The relay opens also with negative control errors.

### 5.3.3 Startup and operation of the digital inputs

The functions of the digital inputs can be programmed individually.

To do so, set parameter *P1-15* to 0. All digital inputs at the frequency inverter are then set to no function and must be defined via parameter group 9.

For this, observe the description of parameter group 9 in the operating instructions "MOVITRAC® LTP-B".

### 5.3.4 LED status

The digital I/O expansion card has 2 LEDs, designated as LED A and B.

#### LED A

State	Description
Lights up green	No fault, card ready for operation.
Flashing green	No connection to the frequency inverter.
Off	No supply voltage.

#### LED B

State	Description
Off	No function

## 6 Encoder option cards of MOVITRAC® LTP-B

### 6.1 Overview of encoder cards

Type	Designation	Part number
"Absolute encoder card" (→ 28)	LT X-H1 A	18239226
"TTL encoder card, 5 V" (→ 30)	LT OB ENC A	28201175
"HTL encoder card, 8 – 30 V" (→ 32)	LT OB ENH A	28226437

### INFORMATION



Note that only one option card can be used per frequency inverter.

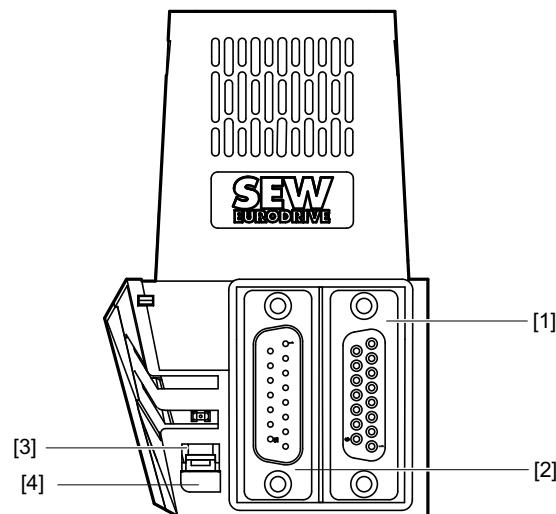
## 6.2 Absolute encoder card

Designation	Part number
LT X-H1 A	18239226

With the absolute encoder card (LTX servo module), CMP.. motors can be operated with HIPERFACE® encoders. The following conditions must be met:

- MOVITRAC® LTP-B sizes 2 or 3 (230 V/400 V) in design IP20 or IP55
- CMP40M – CMP71L, speed classes  $4500 \text{ min}^{-1}$ , AK0H HIPERFACE® encoder

Choose only combinations listed in the Smart Servo Brochure. Especially for 400 V units in IP20 design, SEW-EURODRIVE recommends using a shield terminal.



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- [1] Motor connection X13
- [2] Application connection X14
- [3] Detent
- [4] Push button and operating state display (LED)

## INFORMATION



If you use the LTX servo card, the RTU Modbus is no longer available.

For further information refer to the publication "Addendum to the Operating Instructions MOVITRAC® LTX Servo Module".

### 6.2.1 Technical data

Compatible encoders	LTX: AK0H absolute encoder
Maximum cable length	30 m, twisted in pairs, shielded
Relative humidity	95% (without condensation)
Conformity	IP20, IP55 (for IP55 devices)
Ambient temperature	0 °C to +50 °C
Storage temperature	-20 °C to +60 °C
Tightening torque of terminal strip	0.5 Nm

### 6.2.2 Startup and operation

See "Addendum to the Operating Instructions MOVITRAC® LTX Servo Module".

### 6.2.3 Errors and status codes

See the chapter "Error list" (→ 64).

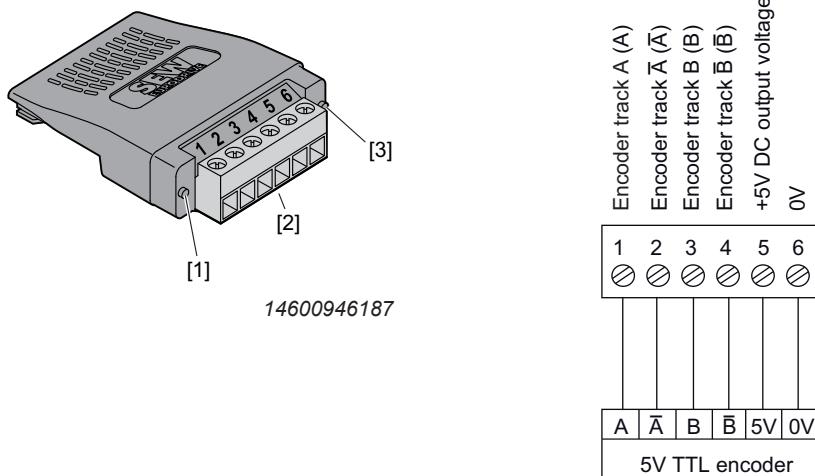
# 6 Encoder option cards of MOVITRAC® LTP-B

## TTL encoder card

### 6.3 TTL encoder card

Designation	Part number
LT OB ENC A	28201175

The TTL encoder card serves only to regulate speed control with the frequency inverter and cannot be used for positioning. The TTL encoder card enables a detailed speed control under 1 Hz and a full torque from a speed of 0 on.



- [1] LED: A
- [2] Labeling: Line Encoder
- [3] LED: B

#### 6.3.1 Technical data

Compatible encoders	5 V, channel A and B with complement
Minimal and maximal PPR count	512 – 4096
Maximum input frequency	500 kHz
Maximum input voltage	5.5 V DC
Maximum output voltage/current	5.5 V DC, 200 mA
Maximum cable length	100 m, twisted in pairs, shielded
Relative humidity	95% (without condensation)
Conformity	IP20, IP55 (for IP55 devices)
Ambient temperature	0 °C to +50 °C
Storage temperature	-20 °C to +60 °C
Dimensions (L × W × H)	52 × 50 × 22 mm
Tightening torque of terminal strip	0.5 Nm

### 6.3.2 Startup and operation

Use shielded encoder cables only, both cable ends must be grounded over a large surface area. Adhere to the technical data.

To ensure fault-free operation of the encoder card, the following parameters must be correctly set:

- *P1-09* rated motor frequency
- *P1-10* nominal motor speed
- *P6-06* PPR count

6

Note the correct direction of rotation when wiring motor cable and encoder cable.

- Perform a startup for asynchronous motors with VFC speed control, according to the operating instructions "MOVITRAC® LTP-B". Start the automatic measuring procedure via *P4-02*.
- Check the correct direction of rotation, by testing the value *P0-58* at slow speed in clockwise rotation (2 – 5 Hz). The parameter should show a positive value. If this is not the case, turn the A and B track of the encoder.
- Set the parameter *P6-05* "Active encoder feedback" to "1".

### 6.3.3 LED status

The TTL encoder card has 2 LEDs, designated as LED A and B.

#### LED A

State	Description
Lights up green	No fault, card ready for operation.
Off	No supply voltage.

#### LED B

State	Description
Constant red	The error will be shown on the display of the frequency inverter.
Flashing red	Card error, wrong cabling
Off	Encoder OK

### 6.3.4 Errors and status codes

See the chapter "Error list" (→ 64).

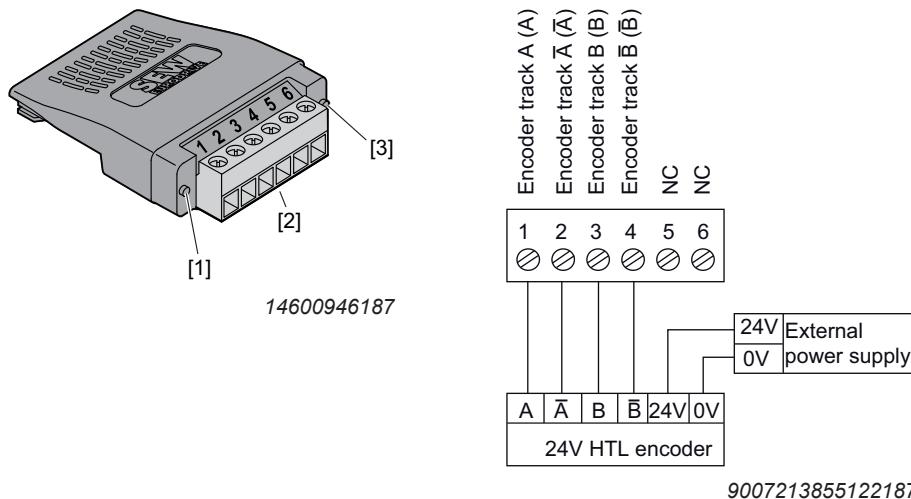
# 6 Encoder option cards of MOVITRAC® LTP-B

## HTL encoder card

### 6.4 HTL encoder card

Designation	Part number
LT OB ENH A	28226437

The HTL encoder card serves only to regulate speed control with the frequency inverter and cannot be used for positioning. The HTL encoder card enables a detailed speed control under 1 Hz and a full torque from a speed of 0 on.



- [1] LED: A
- [2] Labeling: Line Encoder
- [3] LED: B

#### 6.4.1 Technical data

Compatible encoders	30 V, channel A and B with complement INFORMATION: The HTL encoder card requires an external DC 24 V power supply.
Minimal and maximal PPR count	512 – 4096
Maximum input frequency	500 kHz
Maximum input voltage	30 V DC
Maximum output voltage/current	External voltage supply
Maximum cable length	200 m, twisted in pairs, shielded
Relative humidity	95% (without condensation)
Conformity	IP20, IP55 (for IP55 devices)
Ambient temperature	0 °C to +50 °C
Storage temperature	-20 °C to +60 °C
Dimensions (L × W × H)	52 × 50 × 22 mm
Tightening torque of terminal strip	0.5 Nm

#### 6.4.2 Startup and operation

Use shielded encoder cables only, both cable ends must be grounded over a large surface area. Adhere to the technical data.

To ensure fault-free operation of the encoder card, the following parameters must be correctly set:

- *P1-09* rated motor frequency
- *P1-10* nominal motor speed
- *P6-06* PPR count

6

Note the correct direction of rotation when wiring motor cable and encoder cable.

- Perform a startup for asynchronous motors with VFC speed control, according to the operating instructions "MOVITRAC® LTP-B". Start the automatic measuring procedure via *P4-02*.
- Check the correct direction of rotation, by testing the value *P0-58* at slow speed in clockwise rotation (2 – 5 Hz). The parameter should show a positive value. If this is not the case, turn the A and B track of the encoder.
- Set the parameter *P6-05* "Active encoder feedback" to "1".

#### 6.4.3 LED status

The HTL encoder card has 2 LEDs, designated as LED A and B.

##### LED A

State	Description
Lights up green	No fault, card ready for operation.
Off	No supply voltage.

##### LED B

State	Description
Constant red	The error will be shown on the display of the frequency inverter.
Flashing red	Card error, wrong cabling
Off	Encoder OK

#### 6.4.4 Errors and status codes

See the chapter "Error list" (→ 64).

## 7 Fieldbus option cards of MOVITRAC® LTP-B

### 7.1 Overview of fieldbus interfaces

Module	Designation	Part number
"PROFIBUS DP (M30 module)" (→ 35)	LT FP 11A	28203941
"PROFINET IO (M30 module)" (→ 39)	LT FE 32A	28226402
"EtherNet/IP™ (M30 module)" (→ 43)	LT FE 33A	28203917
"EtherCAT® (M30 module)" (→ 47)	LT FE 24A	28226410
"DeviceNet™ (M30 module)" (→ 51)	LT FD 11A	28203925
"Modbus TCP (M30 module)" (→ 54)	LT FE 31A	28228154
"POWERLINK (M40 module)" (→ 56)	LT FE 25A	28226429
"PROFINET IO (M40 module)" (→ 60) <sup>1)</sup>	LT FE 34A	28233468
EtherNet/IP™ (M40 module) <sup>1)</sup>	LT FE 35A	28233476

1) In preparation

### INFORMATION



Note that only one option card can be used per frequency inverter. When the fieldbus option card is used, the Modbus RTU is no longer available via the RJ45 bushing at the frequency inverter.

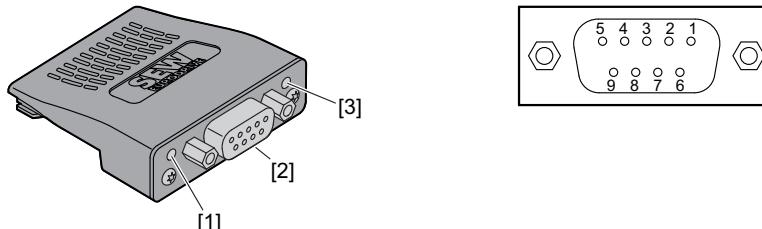
## 7.2 PROFIBUS DP (M30 module)

Designation	Part number
LT FP 11A	28203941

The PROFIBUS DP option card in combination with the MOVITRAC® LTP-B offers a direct bus connection.

### Scope of functions:

- Cyclic process data exchange
- 4 process input words
- 4 process output words



[1]	LED: A	1	N/C
[2]	Labeling: PROFIBUS DP	2	N/C
[3]	LED: B	3	Receiving/sending data P RxD/TxD-P (not B/B)
		4	Repeater control signal (TTL) CNTR-P
		5	Data reference potential (5 V) DGND
		6	Data reference potential (5 V) insulated and short-circuit protection
		7	N/C
		8	Receiving/sending data P RxD/TxD-P (not A/A)
		9	N/C

## INFORMATION



Use a straight connector to connect the PROFIBUS. The angled connector cannot be installed in all sizes due to its housing.

### 7.2.1 Technical data

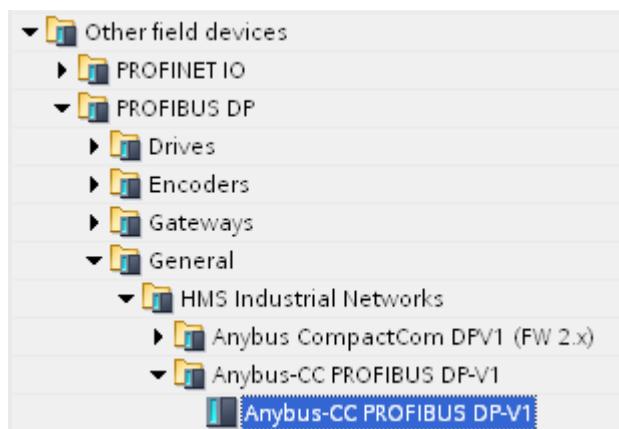
Ambient temperature during operation	-40 °C (no hoarfrost) to +70 °C
Storage temperature	-40 °C to +85 °C
Relative humidity	5% to 95%, without condensation
Conformity	IP20/55/66, RoHS, UL
Voltage supply via backplane	3.3 ±0.15 V DC
Power consumption	< 500 mA
Network interface	electrically isolated
Dimensions (L × W × H)	52 × 50 × 22 mm
Tightening torque of terminal strip	0.5 Nm
Tightening torque of the connecting terminal	0.5 Nm
Automatic baud rate detection	9.6 – 12 MBd
Connection technology	9-pin D-sub connector
Bus termination	Not integrated, implement using suitable PROFIBUS connector with terminating resistors that can be activated.

### 7.2.2 Startup and operation

	<b>PROFIBUS DP</b>
Parameter setting	$P1-12 = 7$ (fieldbus) $P1-14 = 101$ (extended parameter description)
Address	$P5-01$ = frequency inverter address
General station description	The GSD file can be downloaded from the SEW-EURODRIVE website ( <a href="http://www.sew-eurodrive.de">www.sew-eurodrive.de</a> ).
DP ID number	1811
Bus structure and bus termination	Connect the PROFIBUS DP units according to current applicable regulations. If the MOVITRAC® LTP-B is situated at the beginning or end of a PROFIBUS segment, and if only one PROFIBUS cable leads to the PROFIBUS card, use a PROFIBUS connector with integrated bus terminating resistor.

### 7.2.3 Configuration

1. Download the GSD file from the SEW-EURODRIVE website.
2. Unzip the file and install it in the engineering tool.
3. Integrate the file into the engineering tool.  
⇒ You can find the file in the folder structure shown below.



7

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4. Set the PROFIBUS station address in *P5-01*.
5. Configure the process data according to the following figure.

The screenshot shows a 'Device overview' table and a 'Catalog' panel. The 'Device overview' table has columns: Module, Rack, Slot, I address, Q addr..., Type, Article... . It lists several modules: Slave\_1, Output 4 words\_1, Input 4 words\_1, and many others from slot 3 to 13. Arrows point from the 'Output 4 words\_1' and 'Input 4 words\_1' rows to the catalog. The catalog on the right is filtered for 'Anybus-CC PROFIBUS DP-V1' and lists various module types, with 'Output 4 words' being selected.

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### INFORMATION



The configurations allows for only 4 process output data words in slot 1 and then 4 process input data words in slot 2.

### 7.2.4 LED status

The PROFIBUS DP option card has 2 LEDs, designated as "OP = Operating mode" and "ST = Status".

#### LED operating mode

State	Explanation
Off	No supply voltage available.
Lights up green	Connection established, communication available.
Flashing green	Connection established, communication not available.
Flashing red, 1 ×	Parameterization error in DP master
Flashing red, 2 ×	Network error

#### LED status

State	Explanation
Off	No supply voltage available.
Lights up green	Initialization
Flashing green	Initialization, self test
Lights up red	Fault

### 7.2.5 Errors and status codes

See the chapter "Error list" (→ 64).

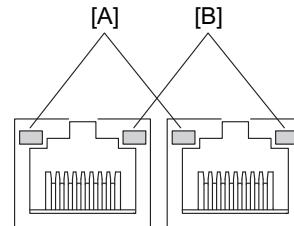
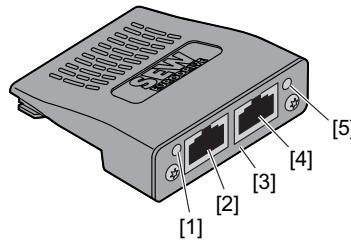
### 7.3 PROFINET IO (M30 module)

Designation	Part number
LT FE 32A	28226402

The PROFINET IO option card in combination with the MOVITRAC® LTP-B offers a direct bus connection.

#### Scope of functions:

- Cyclic process data exchange
- 4 process input words
- 4 process output words



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- |     |                       |
|-----|-----------------------|
| [1] | LED: NS               |
| [2] | RJ45: P1              |
| [3] | Labeling: PROFINET IO |
| [4] | RJ45: P2              |
| [5] | LED: MS               |

- |     |               |
|-----|---------------|
| [A] | LED: Activity |
| [B] | LED: Link     |

#### 7.3.1 Technical data

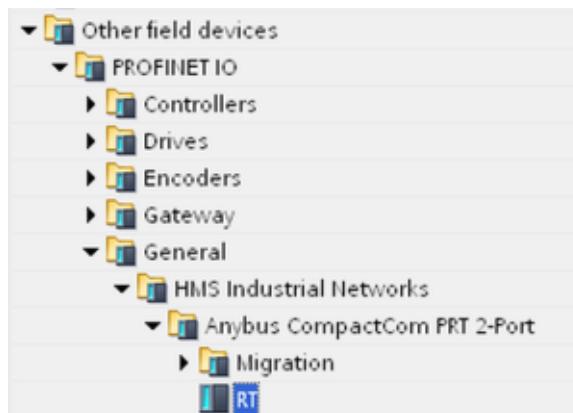
Ambient temperature during operation	-40 °C (no hoarfrost) to +70 °C
Storage temperature	-40 °C to +85 °C
Relative humidity	5% to 95%, without condensation
Conformity	IP20/55/66, RoHS, UL
Voltage supply via backplane	3.3 ±0.15 V DC
Power consumption	< 500 mA
Network interface	electrically isolated
Dimensions (L × W × H)	52 × 50 × 22 mm
Tightening torque of terminal strip	0.5 Nm
Baud rate	10/100 MBd in full duplex mode
Connection technology	2 × RJ45

### 7.3.2 Startup and operation

	<b>PROFINET IO</b>
Parameter setting	$P1-12 = 7$ (fieldbus) $P1-14 = 101$ (extended parameter description)
PROFINET device name	The PROFINET device name can be assigned using the "Engineering Tool" of the PROFINET IO controller. The PROFINET device name is saved on the option card.
IP address	The basic setting of the option card is the DHC protocol. To establish communication with the network, set the IP address using the "Anybus IPconfig" software. The free software is available at <a href="http://www.anybus.com">www.anybus.com</a> .
General station description	The GSDML file can be downloaded from the SEW-EURODRIVE website ( <a href="http://www.sew-eurodrive.de">www.sew-eurodrive.de</a> ).
Bus structure	You can use the integrated Ethernet switch to achieve line topologies known from the fieldbus technology. Other bus topologies such as star or tree are, of course, also possible. Ring topologies are not supported.

### 7.3.3 Configuration

1. Download the GSDML file from the SEW-EURODRIVE website.
2. Unzip the file and install it in the engineering tool.
3. Integrate the file into the engineering tool.  
⇒ You can find the file in the folder structure shown below.



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4. Assign a PROFINET device name in the engineering tool.
5. Configure the IP address in the engineering tool.
6. Configure the process data according to the following figure.

The image displays two windows of a configuration software. On the left is the 'Device overview' window, which lists a 'LTFE32A' module with its sub-components: 'Interface', 'Output 4 word\_1', and 'Input 4 word\_1'. Arrows point from these components to their corresponding entries in the 'Catalog' window on the right. The 'Catalog' window shows a tree structure under 'Module' with 'Input/Output' selected, listing various input and output types. The configuration number 28498320779 is visible at the bottom right of the interface.

28498320779

## INFORMATION



The configurations allows for only 4 process output data words in slot 1 and then 4 process input data words in slot 2.

### 7.3.4 LED status

The PROFINET IO option card has 2 LEDs, designated as "NS = Network status" and "MS = Module status".

#### LED network status

State	Explanation
Off	No supply voltage available.
Lights up green	Connection established, communication available.
Flashing green	Connection established, communication not available.

#### LED module status

State	Explanation
Off	No supply voltage available.
Lights up green	Normal operation
Flashing green, 1 ×	Diagnostic result available.
Flashing green, 2 ×	Network node identification.
Lights up red	Fault
Flashing red, 1 ×	The hardware configuration differs from the existing configuration.
Flashing red, 2 ×	The IP address has not been assigned correctly.
Flashing red, 3 ×	PROFINET device name has not been assigned.
Flashing red, 4 ×	An internal error has occurred.

### 7.3.5 Errors and status codes

See the chapter "Error list" (→ 64).

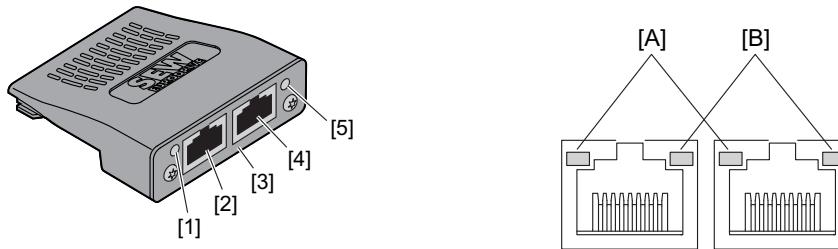
## 7.4 EtherNet/IP™ (M30 module)

Designation	Part number
LT FE 33A	28203917

The EtherNet/IP™ option card in combination with the MOVITRAC® LTP-B offers a direct bus connection.

### Scope of functions:

- Cyclic process data exchange
- 4 process input words
- 4 process output words
- DLR (Device Level Ring)



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- |     |                        |     |               |
|-----|------------------------|-----|---------------|
| [1] | LED: NS                | [A] | LED: Activity |
| [2] | RJ45: P1               | [B] | LED: Link     |
| [3] | Labeling: EtherNet/IP™ |     |               |
| [4] | RJ45: P2               |     |               |
| [5] | LED: MS                |     |               |

### 7.4.1 Technical data

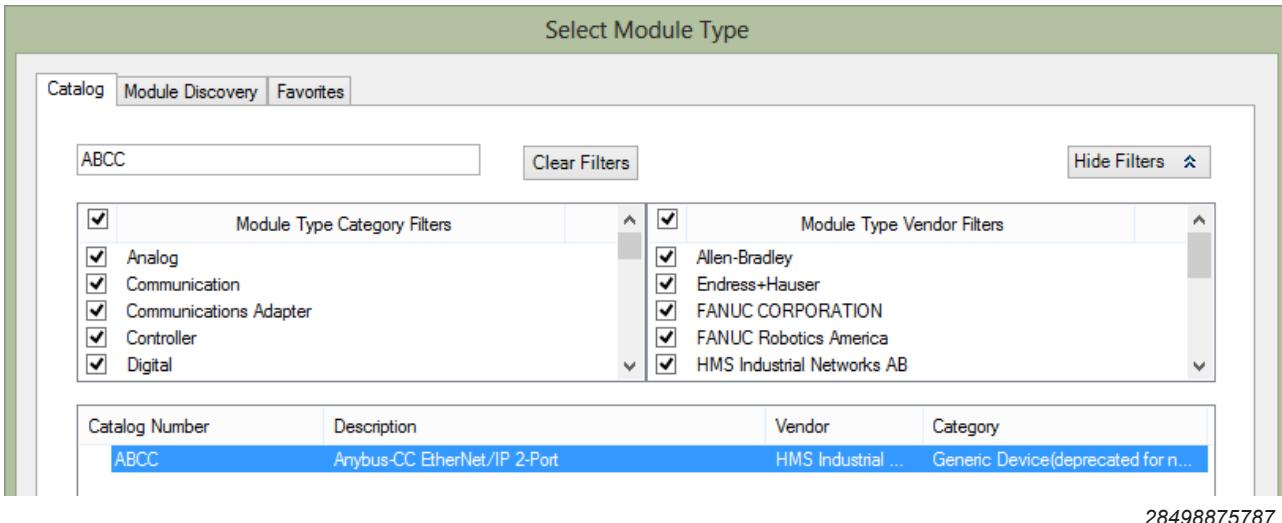
Ambient temperature during operation	-40 °C (no hoarfrost) to +70 °C
Storage temperature	-40 °C to +85 °C
Relative humidity	5% to 95%, without condensation
Conformity	IP20/55/66, RoHS, UL
Voltage supply via backplane	3.3 ±0.15 V DC
Power consumption	< 500 mA
Network interface	electrically isolated
Dimensions (L × W × H)	52 × 50 × 22 mm
Tightening torque of terminal strip	0.5 Nm
Baud rate	10/100 MBd in full duplex mode
Connection technology	2 × RJ45

#### 7.4.2 Startup and operation

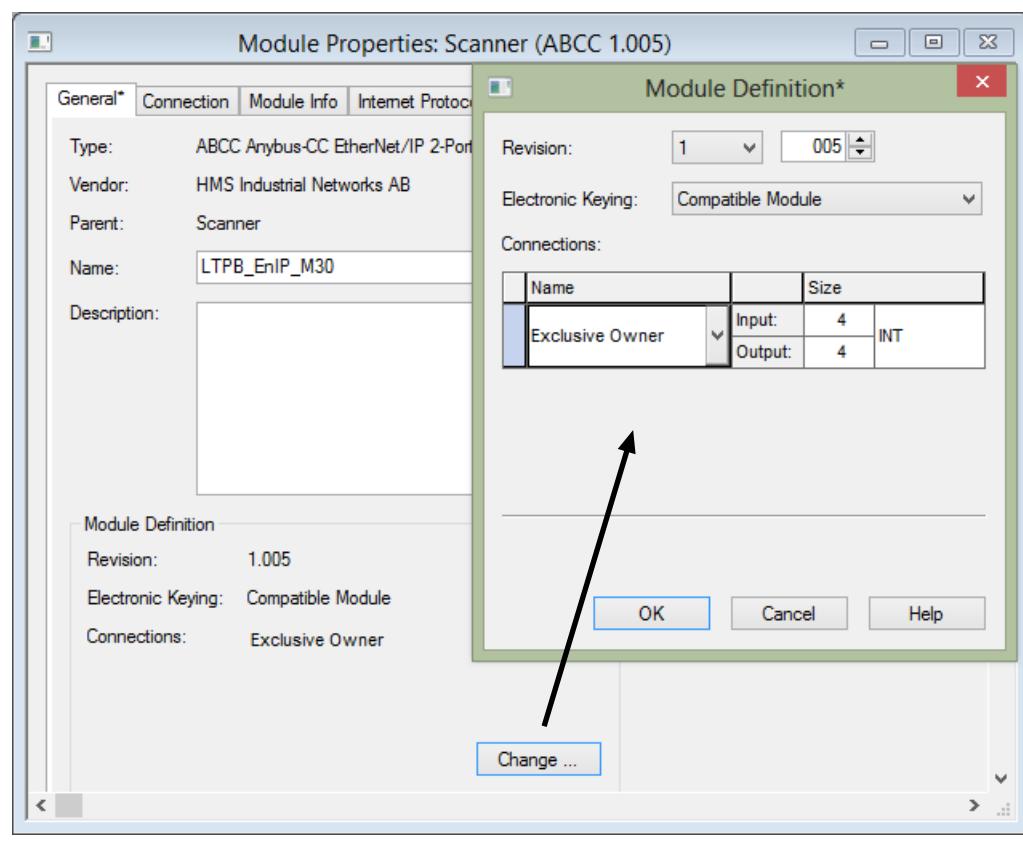
	<b>EtherNet/IP™</b>
Parameter setting	$P1-12 = 7$ (fieldbus) $P1-14 = 101$ (extended parameter description)
IP address	The basic setting of the option card is the DHC protocol. To establish communication with the network, set the IP address using the "Anybus IPconfig" software. The free-ware is available at <a href="http://www.anybus.com">www.anybus.com</a> .
Configuration file	The EDS file can be downloaded from the SEW-EURODRIVE website ( <a href="http://www.sew-eurodrive.de">www.sew-eurodrive.de</a> ).
Bus structure	You can use the integrated Ethernet switch to achieve line topologies known from the fieldbus technology. Other bus topologies such as star or tree are, of course, also possible. Ring topologies are not supported.

#### 7.4.3 Configuration

1. Download the EDS file from the SEW-EURODRIVE website.
2. Unzip the file and install it in the engineering tool.
3. Integrate the file into the engineering tool (search word ABCC).



4. Assign a name in the engineering tool.
5. Configure the IP address in the engineering tool.
6. Configure the process data according to the following figure.



## INFORMATION



The basic device supports only 4 process input data and 4 process output data.

### 7.4.4 LED status

The EtherNet/IP™ option card has 2 LEDs, designated as "NS = Network status" and "MS = Module status".

#### LED network status

State	Explanation
Off	No supply voltage available.
Lights up green	Connection established, communication available.
Flashing green	Connection established, communication not available.
Lights up red	Acknowledgeable faults
Flashing red	Fault

#### LED module status

State	Explanation
Off	No supply voltage available.
Lights up green	Normal operation
Flashing green	Inverter not configured.
Lights up red	Fault
Flashing red	Acknowledgeable faults
Red/green, alternating	Self-test

### 7.4.5 Errors and status codes

See the chapter "Error list" (→ 64).

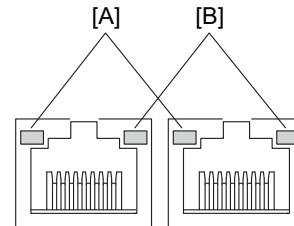
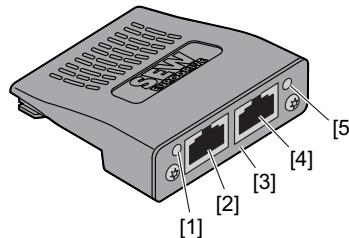
## 7.5 EtherCAT® (M30 module)

Designation	Part number
LT FE 24A	28226410

The EtherCAT® option card in combination with the MOVITRAC® LTP-B offers a direct bus connection.

### Scope of functions:

- Cyclic process data exchange
- 4 process input words
- 4 process output words

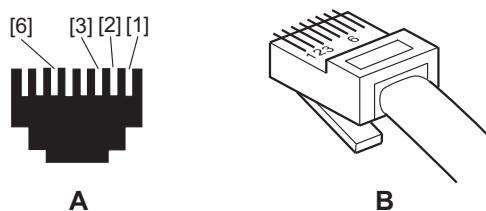


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- |     |  |     |               |
|-----|--|-----|---------------|
| [1] | LED: RUN                                 | [A] | LED: Activity |
| [2] | RJ45: IN, incoming EtherCAT® connection  | [B] | LED: Link     |
| [3] | Labeling: EtherCAT®                      |     |               |
| [4] | RJ45: OUT, outgoing EtherCAT® connection |     |               |
| [5] | LED: ERR                                 |     |               |

### Pin assignment

Use prefabricated, shielded RJ45 plug connectors compliant with IEC 11801, edition 2.0, category 5.



3011902475

- |     |                            |
|-----|----------------------------|
| A   | View from front            |
| B   | View from back (angularly) |
| [1] | Pin 1 TX+ Transmit Plus    |
| [2] | Pin 2 TX- Transmit Minus   |
| [3] | Pin 3 RX+ Receive Plus     |
| [6] | Pin 6 RX- Receive Minus    |

### Connection

Option is equipped with 2 RJ45 connectors for a linear bus structure. The EtherCAT® master is connected (if necessary, via additional EtherCAT® slaves) to IN (RJ45) with a shielded, twisted-pair cable. Additional EtherCAT® devices are then connected via OUT (RJ45).

Route the bus cables closely along existing grounding surfaces.

## INFORMATION



In accordance with IEC 802.3, the maximum permitted cable length for 100 MBd Ethernet (100BaseT), e.g. between 2 option cards, is 100 m.

In case of fluctuations in the ground potential, a compensating current may flow via the bilaterally connected shield that is also connected to the protective earth (PE). Make sure you supply adequate equipotential bonding in accordance with relevant VDE regulations in such a case.

### 7.5.1 Technical data

Ambient temperature during operation	-40 °C (no hoarfrost) to +70 °C
Storage temperature	-40 °C to +85 °C
Relative humidity	5% to 95%, without condensation
Conformity	IP20/55/66, RoHS, UL
Voltage supply via backplane	3.3 ±0.15 V DC
Power consumption	< 500 mA
Network interface	electrically isolated
Dimensions (L × W × H)	52 × 50 × 22 mm
Tightening torque of terminal strip	0.5 Nm
Baud rate	100 MBd in full duplex process
Connection technology	2 × RJ45

### 7.5.2 Startup and operation

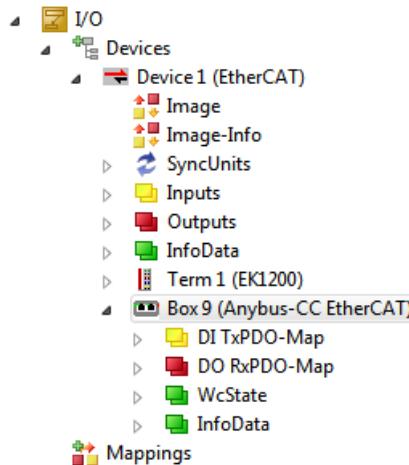
The EtherCAT® option card is equipped with 2 RJ45 connectors for a linear bus structure. The EtherCAT® master is connected (if necessary, via additional EtherCAT® slaves) to IN (RJ45) with a shielded, twisted-pair cable. Additional EtherCAT® devices are then connected via OUT (RJ45).

	<b>EtherCAT®</b>
Parameter setting	P1-12 = 7 (fieldbus) P1-14 = 101 (extended parameter description)
Configuration file	The ESI file can be downloaded from the SEW-EURODRIVE website ( <a href="http://www.sew-eurodrive.de">www.sew-eurodrive.de</a> ).

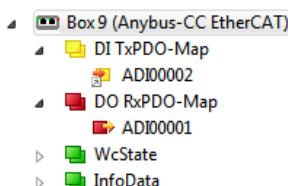
### 7.5.3 Configuration

1. Download the ESI file from the SEW-EURODRIVE website.
2. Unzip the file and save it under the following path:  
C:\TwinCAT\3.1\Config\Io\EtherCAT
3. With the start of the engineering tool, the file is automatically loaded into the device catalog.
4. Scan your EtherCAT® network.

⇒ The device is displayed as follows:



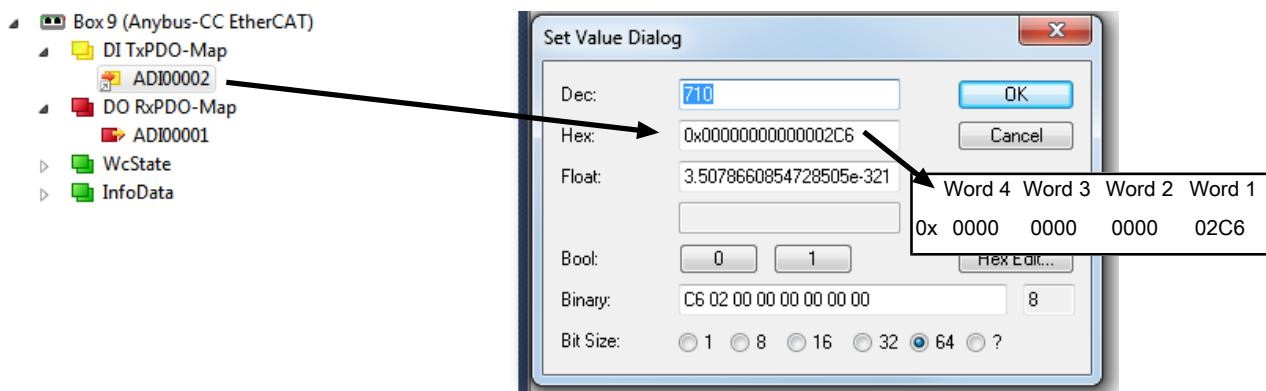
⇒ The length of the process data image cannot be changed. 4 input and 4 output words are always used.



Name	Online	Type	Size	>Addr...	In/Out	User ID
ADI00002	X 710	ULINT	8.0	55.0	Input	0
WcState	0	BIT	0.1	1522.1	Input	0
InputToggle	1	BIT	0.1	1524.1	Input	0
State	8	UINT	2.0	1600.0	Input	0
AdsAddr	192.168.20.2.2.1:1008	AMSADDR	8.0	1602.0	Input	0
ADI00001	15728640	ULINT	8.0	55.0	Output	0

28499057035

⇒ The assignment of the process data is as follows:



28499102347

#### 7.5.4 LED status

The EtherCAT® option card has 2 LEDs, designated as "RUN" and "ERR = Error".

##### RUN LED

State	Status	Explanation
Off	INIT	The option card has the status INIT.
Lights up green	OPERATIONAL	Mailbox communication and process data communication possible.
Flickering green	INITIALISATION or BOOTSTRAP	The option card is booting and has not yet reached the status INIT. The option card has the status BOOTSTRAP. The firmware is being downloaded.
Flashing green, 1 ×	SAFE-OPERATIONAL	Mailbox communication and process data communication possible. The slave outputs are not output yet.
Flashing green	PRE-OPERATIONAL	Mailbox communication is possible but no process data communication.
Lights up red	NOT CONNECTED	The option card was not yet addressed by an EtherCAT® master after switching it on.

##### LED error

State	Explanation
Off	No supply voltage available.
Lights up red	Option card fault
Flashing red	Invalid configuration
Flashing red, 2 ×	Watchdog timeout application

#### 7.5.5 Errors and status codes

See the chapter "Error list" (→ 64).

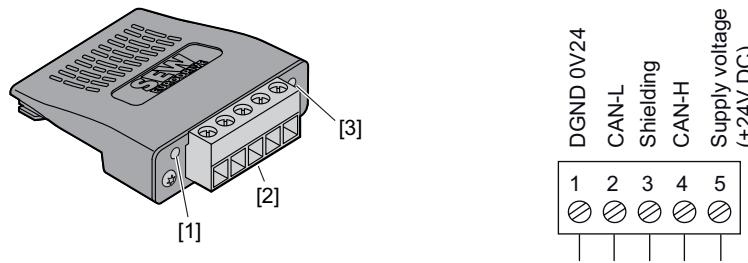
## 7.6 DeviceNet™ (M30 module)

Designation	Part number
LT FD 11A	28203925

The DeviceNet™ option card in combination with the MOVITRAC® LTP-B offers a direct bus connection.

### Scope of functions:

- Cyclic process data exchange
- 4 process input words
- 4 process output words



- [1] LED: NS
- [2] Labeling: DeviceNet™
- [3] LED: MS

### 7.6.1 Technical data

Ambient temperature during operation	-40 °C (no hoarfrost) to +70 °C
Storage temperature	-40 °C to +85 °C
Relative humidity	5% to 95%, without condensation
Conformity	IP20/55/66, RoHS, UL
Voltage supply via backplane	3.3 ±0.15 V DC
Power consumption	< 500 mA
Network interface	electrically isolated
Dimensions (L × W × H)	52 × 50 × 22 mm
Tightening torque of terminal strip	0.5 Nm
Baud rate	125, 205, 500 kBd, can be set via parameters
MAC-ID (Media Access Control Identifier)	The MAC-ID supports address range 0 – 63
Connection technology	3-wire bus and 2-wire supply voltage DC 24 V with 5-pin Phoenix terminal
Pin assignment	According to DeviceNet™ specification

### 7.6.2 Startup and operation

	DeviceNet™
Parameter setting	$P1-12 = 7$ (fieldbus) $P1-14 = 101$ (extended parameter description)
Address (MAC-ID)	The MAC-ID (Media Access Control Identifier) is set directly in the frequency inverter via parameter $P5-01$ , it supports the address range 0 to 63.
Baud rate	$P5-02$ = Baud rate
Configuration file	The EDS file can be downloaded from the SEW-EURODRIVE website ( <a href="http://www.sew-eurodrive.de">www.sew-eurodrive.de</a> ).
Bus structure	According to the DeviceNet™ specification, a linear bus structure without or with very short droplines is required. The DeviceNet™ interface supports RS485 transmission technology and requires cable type A specified for DeviceNet™ in accordance with EN 50170 as shielded, twisted pair cable for the physical connection.

### 7.6.3 LED status

The DeviceNet™ option card has 2 LEDs, designated as "NS = Network status" and "MS = Module status".

#### LED network status

State	Explanation
Off	No supply voltage available.

State	Explanation
Lights up green	Connection established, communication available.
Flashing green	Connection established, communication not available.
Lights up red	Fault
Flashing red	Acknowledgeable faults
Red/green, alternating	Self-test

7

**LED module status**

State	Explanation
Off	No supply voltage available.
Lights up green	Normal operation
Flashing green	Inverter not configured.
Lights up red	Fault
Flashing red	Acknowledgeable faults
Red/green, alternating	Self-test

**7.6.4 Errors and status codes**

See the chapter "Error list" (→ 64).

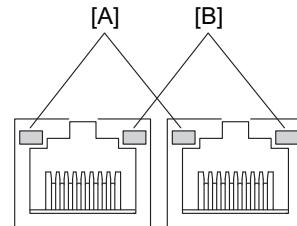
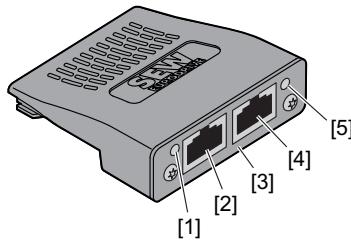
## 7.7 Modbus TCP (M30 module)

Designation	Part number
LT FE 31A	28228154

The Modbus TCP option card in combination with the MOVITRAC® LTP-B offers a direct bus connection.

### Scope of functions:

- Cyclic process data exchange
- 4 process input words
- 4 process output words



14600378763

- |     |                      |
|-----|----------------------|
| [1] | LED: NS              |
| [2] | RJ45: P1             |
| [3] | Labeling: Modbus TCP |
| [4] | RJ45: P2             |
| [5] | LED: MS              |

- |     |               |
|-----|---------------|
| [A] | LED: Activity |
| [B] | LED: Link     |

### 7.7.1 Technical data

Ambient temperature during operation	-40 °C (no hoarfrost) to +70 °C
Storage temperature	-40 °C to +85 °C
Relative humidity	5% to 95%, without condensation
Conformity	IP20/55/66, RoHS, UL
Voltage supply via backplane	3.3 ±0.15 V DC
Power consumption	< 500 mA
Network interface	electrically isolated
Dimensions (L × W × H)	52 × 50 × 22 mm
Tightening torque of terminal strip	0.5 Nm
Baud rate	10/100 MBd in full duplex mode
Connection technology	2 × RJ45

### 7.7.2 Startup and operation

	<b>Modbus TCP</b>
Parameter setting	$P1-12 = 7$ (fieldbus) $P1-14 = 101$ (extended parameter description)
IP address	The basic setting of the option card is the DHC protocol. To establish communication with the network, set the IP address using the "Anybus IPconfig" software. The free-ware is available at <a href="http://www.anybus.com">www.anybus.com</a> .
Bus structure	You can use the integrated Ethernet switch to achieve line topologies known from the fieldbus technology. Other bus topologies such as star or tree are, of course, also possible. Ring topologies are not supported.

### 7.7.3 LED status

The Modbus TCP option card has 2 LEDs, designated as "NS = Network status" and "MS = Module status".

#### LED network status

<b>State</b>	<b>Explanation</b>
Off	No supply voltage available.
Lights up green	Connection established, communication available.
Flashing green	Connection established, communication not available.
Lights up red	IP address is set to 0.0.0.0.
Flashing red	Communication timeout

#### LED module status

<b>State</b>	<b>Explanation</b>
Off	No supply voltage available.
Lights up green	Ethernet connection established, communication not available
Lights up red	Option card fault
Flashing red	IP conflict

### 7.7.4 Errors and status codes

See the chapter "Error list" (→ 64).

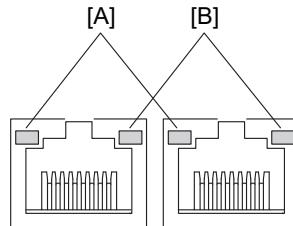
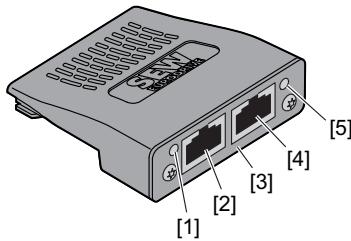
## 7.8 POWERLINK (M40 module)

Designation	Part number
LT FE 25A	28226429

The POWERLINK option card in combination with the MOVITRAC® LTP-B offers a direct bus connection.

### Scope of functions:

- Cyclic process data exchange
- 4 process input words
- 4 process output words



14600378763

- |     |                     |
|-----|---------------------|
| [1] | LED: STS            |
| [2] | RJ45: P1            |
| [3] | Labeling: POWERLINK |
| [4] | RJ45: P2            |
| [5] | LED: ERR            |

- |     |               |
|-----|---------------|
| [A] | LED: Activity |
| [B] | LED: Link     |

### 7.8.1 Technical data

Ambient temperature during operation	-40 °C (no hoarfrost) to +70 °C
Storage temperature	-40 °C to +85 °C
Relative humidity	5% to 95%, without condensation
Conformity	IP20/55/66, RoHS
Voltage supply via backplane	3.3 ±0.15 V DC
Power consumption	< 500 mA
Network interface	electrically isolated
Dimensions (L × W × H)	52 × 50 × 22 mm
Tightening torque of terminal strip	0.5 Nm
Baud rate	10/100 MBd in full duplex mode
Connection technology	2 × RJ45

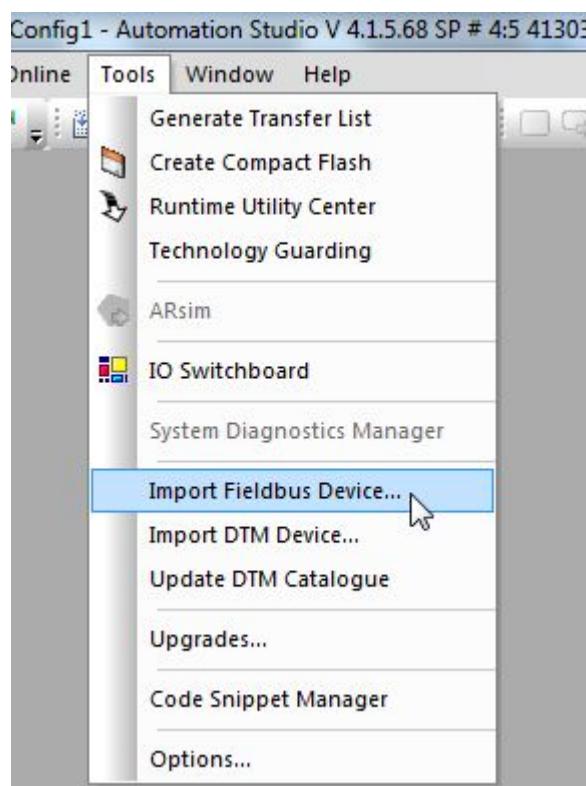
### 7.8.2 Startup and operation

	<b>POWERLINK</b>
Parameter setting	$P1-12 = 7$ (fieldbus) $P1-14 = 101$ (extended parameter description)
Address	$P5-01 =$ frequency inverter address = 1
Configuration file	The EDS file can be downloaded from the SEW-EURODRIVE website ( <a href="http://www.sew-eurodrive.de">www.sew-eurodrive.de</a> ).

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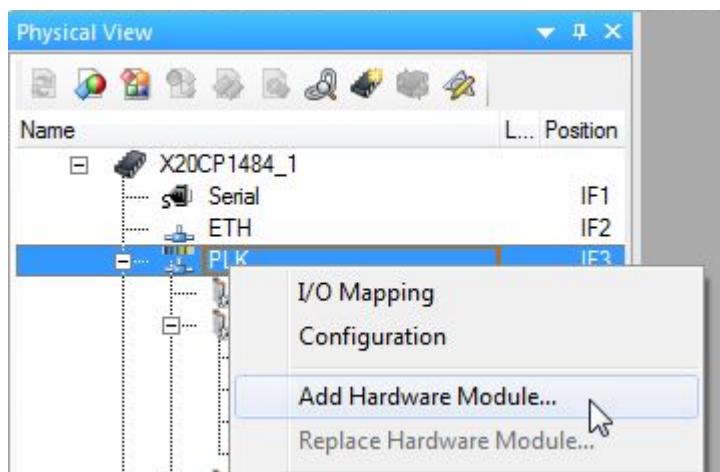
### 7.8.3 Configuration

1. Download the XDD file from the SEW-EURODRIVE website.
2. You can import the file into the hardware catalog.



28502797707

3. Add the device from the hardware catalog to the PLK bus in the physical network view.



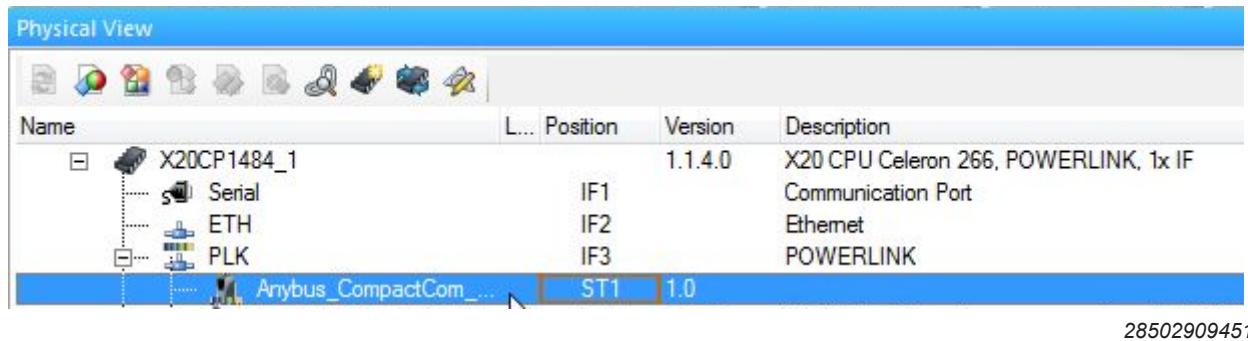
28502903307

⇒ The file is displayed in the hardware catalog under the following name:



28502906507

4. Set the knot number according to the bus address P5-01.



28502909451

## INFORMATION



The basic device supports 4 process input data and 4 process output data.

#### 7.8.4 LED status

The POWERLINK option card has 2 LEDs, designated as "STS = Status" and "ERR = Error".

##### LED status

State	Explanation
Off	No supply voltage available.
Lights up green	Connection established, communication available.
Flashing green	Connection established, communication not available.
Slowly flashing green	Connection established, communication not available, no PDO data
Quickly flashing green	Basic Ethernet status, no POWERLINK traffic recognized
Flashing green, 1 ×	Only asynchronous data, no PDO data
Flashing green, 2 ×	Asynchronous and synchronous data, no PDO data
Flashing green, 3 ×	Ready for operation, no PDO data
Lights up red	Module in exceptional state

##### LED error

State	Explanation
Off	No supply voltage available.
Lights up red	Card error

#### 7.8.5 Errors and status codes

See the chapter "Error list" (→ 64).

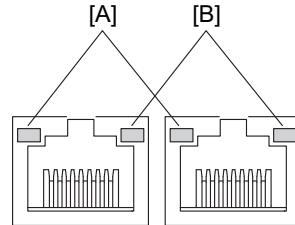
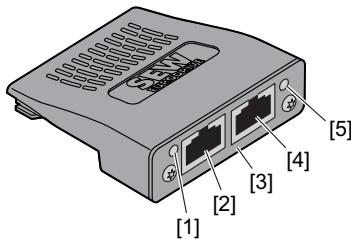
## 7.9 PROFINET IO (M40 module)

Designation	Part number
LT FE 34A	28233468

The PROFINET IO option card in combination with the MOVITRAC® LTP-B offers a direct bus connection.

### Scope of functions:

- Cyclic process data exchange
- 4 process input words
- 4 process output words
- MRP (Media Redundancy Protocol)
- LLDP (Link Layer Discovery Protocol)



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- |     |                       |
|-----|-----------------------|
| [1] | LED: NS               |
| [2] | RJ45: P1              |
| [3] | Labeling: PROFINET IO |
| [4] | RJ45: P2              |
| [5] | LED: MS               |

- |     |               |
|-----|---------------|
| [A] | LED: Activity |
| [B] | LED: Link     |

### 7.9.1 Technical data

Ambient temperature during operation	-40 °C (no hoarfrost) to +70 °C
Storage temperature	-40 °C to +85 °C
Relative humidity	5% to 95%, without condensation
Conformity	IP20/55/66, RoHS, UL
Voltage supply via backplane	3.3 ±0.15 V DC
Power consumption	< 500 mA
Network interface	electrically isolated
Dimensions (L × W × H)	52 × 50 × 22 mm
Tightening torque of terminal strip	0.5 Nm
Baud rate	10/100 MBd in full duplex mode
Connection technology	2 × RJ45

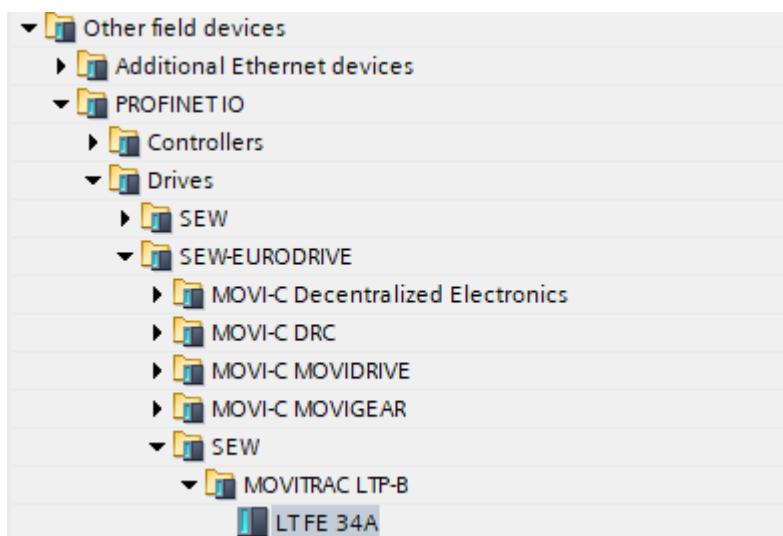
### 7.9.2 Startup and operation

	<b>PROFINET IO</b>
Parameter setting	$P1-12 = 7$ (fieldbus) $P1-14 = 101$ (extended parameter description)
PROFINET device name	The PROFINET device name can be assigned using the "Engineering Tool" of the PROFINET IO controller. The PROFINET device name is saved on the option card.
IP address	The basic setting of the option card is the DHC protocol.
General station description	The GSDML file can be downloaded from the SEW-EURODRIVE website ( <a href="http://www.sew-eurodrive.de">www.sew-eurodrive.de</a> ).
Bus structure	You can use the integrated Ethernet switch to achieve topologies known from the fieldbus technology. <ul style="list-style-type: none"> <li>• Line topologies</li> <li>• Star topologies</li> <li>• Tree topologies</li> <li>• Ring topologies</li> </ul>

7

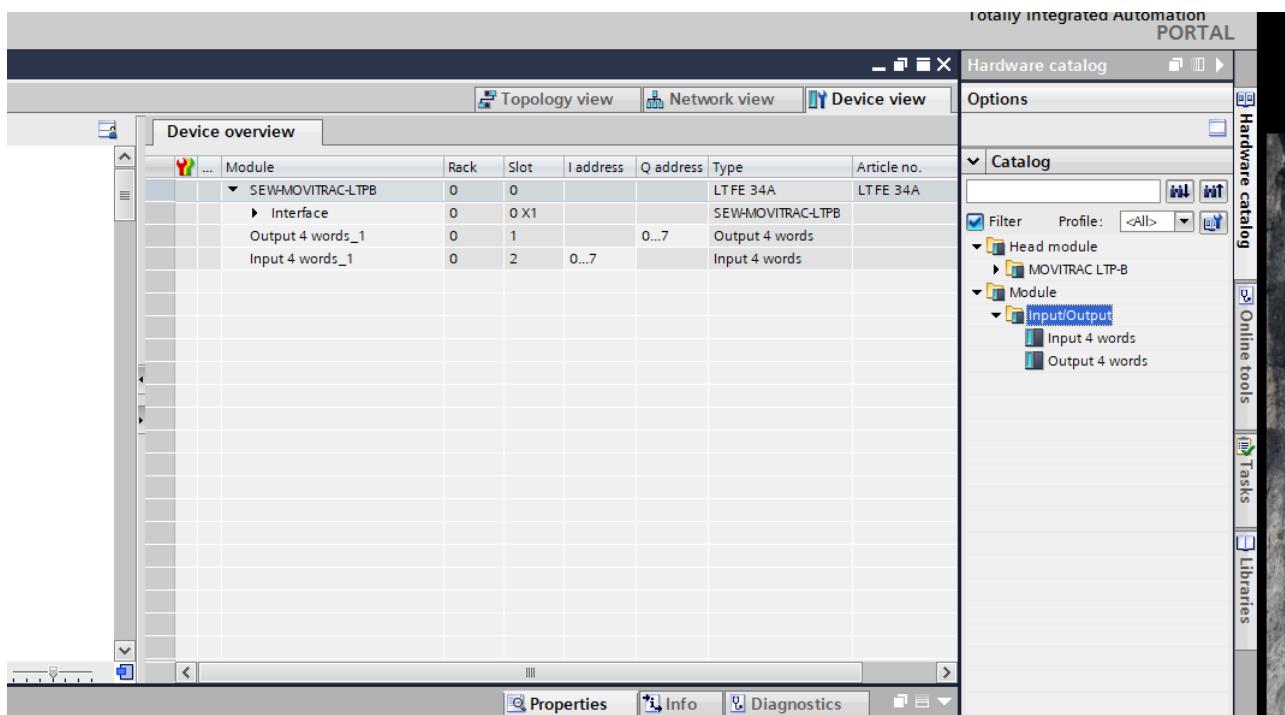
### 7.9.3 Configuration

1. Download the GSDML file from the SEW-EURODRIVE website.
2. Unzip the file and install it in the engineering tool.
3. Integrate the file into the engineering tool.  
⇒ You can find the file in the folder structure shown below.



28503619467

4. Assign a PROFINET device name in the engineering tool.
5. Configure the IP address in the engineering tool.
6. The process data is created automatically as follows:



28503750411

25971875/EN - 04/2018

## INFORMATION



The configurations allows for only 4 process output data words in slot 1 and then 4 process input data words in slot 2.

### 7.9.4 LED status

The PROFINET IO option card has 2 LEDs, designated as "NS = Network status" and "MS = Module status".

7

#### LED network status

State	Explanation
Off	No supply voltage available.
Lights up green	Connection established, communication available.
Flashing green	Connection established, communication not available.

#### LED module status

State	Explanation
Off	No supply voltage available.
Lights up green	Normal operation
Flashing green, 1 ×	Diagnostic result available.
Flashing green, 2 ×	Network node identification.
Lights up red	Fault
Flashing red, 1 ×	The hardware configuration differs from the existing configuration.
Flashing red, 2 ×	The IP address has not been assigned correctly.
Flashing red, 3 ×	PROFINET device name has not been assigned.
Flashing red, 4 ×	An internal error has occurred.

### 7.9.5 Errors and status codes

See the chapter "Error list" (→ 64).

## 8 Error list

Code (inverter display)	Code (MotionStudio in P0-13)	Fault code status word if Bit5 = 1	CANopen Emergency Code	Meaning	Measure
4-20 F	18	0x71	0x1012	Signal loss 4 – 20 mA (> 500 ms)	<ul style="list-style-type: none"> <li>Check whether the input current lies within the range defined in P2-30 and P2-33.</li> <li>Check the connection cable.</li> </ul>
AtF-01	40	0x51	0x1028	The measured stator resistance fluctuates between the phases.	<p>The measured stator resistance of the motor is asymmetrical. Check to see, if:</p> <ul style="list-style-type: none"> <li>The motor is connected correctly and without error.</li> <li>The windings have the correct resistance and symmetry.</li> </ul>
AtF-02	41	0x51	0x1029	The measured stator resistance is too high.	<p>The measured stator resistance of the motor is too high. Check to see, if:</p> <ul style="list-style-type: none"> <li>The motor is connected correctly and without error.</li> <li>The power rating of the motor corresponds with the power rating of the connected inverter.</li> </ul>
AtF-03	42	0x51	0x102A	Measured motor inductance is too low.	<p>The measured motor inductance is too low. Make sure that the motor is connected correctly and without error.</p>
AtF-04	43	0x51	0x102B	Measured motor inductance is too high.	<p>The measured motor inductance is too high. Check to see, if:</p> <ul style="list-style-type: none"> <li>The motor is connected correctly and without error.</li> <li>The power rating of the motor corresponds with the power rating of the connected inverter.</li> </ul>
AtF-05	44	0x51	0x102C	Timeout of inductance measurement	<p>The measured motor parameters are not convergent. Check to see, if:</p> <ul style="list-style-type: none"> <li>The motor is connected correctly and without error.</li> <li>The power rating of the motor corresponds with the power rating of the connected inverter.</li> </ul>
dAtA-E	19	0x62	0x1013	Internal memory error (DSP)	Contact the SEW-EURODRIVE Service.
dAtA-F	17	0x62	0x1011	Internal memory error (IO)	Contact the SEW-EURODRIVE Service.
E-triP	11	0x1A	0x100B	External fault at digital input 5.	<p>NC contact was opened.</p> <ul style="list-style-type: none"> <li>Check motor thermistor (if connected).</li> </ul>
Enc-01	30	0x0E	0x101E	Communication error between encoder card and inverter.	The encoder feedback is activated in P6-05, and no encoder card is plugged in or the encoder card is not recognized.
ENC02	31	0x0E	0x101F	Speed error (P6-07)	<p>The difference between the actual speed and setpoint speed is larger than the percentage value set in P6-07. This fault applies only to vector control or control with encoder feedback. Set a higher value in P6-07. If you wish to deactivate speed monitoring, set P6-07 to 100%.</p>
Enc-03	32	0x0E	0x1020	Incorrect PPR count parameterization.	Check the parameter settings in P6-06 and P1-10.
Enc-04	33	0x0E	0x1021	Encoder channel A fault	The A track of the encoder feedback is not present. Check the wiring.
Enc-05	34	0x0E	0x1022	Encoder channel B error	The B track of the encoder feedback is not present. Check the wiring.
Enc-06	35	0x0E	0x1023	Encoder channel A or B error	The A and B track of the encoder feedback are not present. Check the wiring.
Enc-07	36	0x0E	0x1024	RS485 data channel fault, HIPERFACE® data channel fault	Communication error between encoder card and encoder. Check the encoder card for proper fit and contact.
Enc-08	37	0x0E	0x1025	HIPERFACE® IO communication channel error	Communication error between encoder card and inverter. Check the encoder card for proper fit and contact.

Code (inverter display)	Code (MotionStudio in P0-13)	Fault code status word if Bit5 = 1	CANopen Emergency Code	Meaning	Measure
<b>Enc-09</b>	38	0x0E	0x1026	HIPERFACE® type is not supported.	During the use of Smart Servo Package, a wrong motor/inverter combination was used. Check to see, if: <ul style="list-style-type: none"><li>• The speed class of the CMP.. motor is 4500 min<sup>-1</sup>.</li><li>• The nominal motor voltage equals the nominal inverter voltage.</li><li>• A HIPERFACE® encoder is being used.</li></ul>
<b>Enc-10</b>	39	0x0E	0x1027	Trigger: KTY	KTY has been triggered or is not connected.
<b>Er-LED</b>				Display error	Contact the SEW-EURODRIVE Service.
<b>Err-SC</b>				The keypad lost the communication connection to the inverter.	
<b>Eti-24</b>				External 24 V supply.	Line voltage supply not connected. The inverter is externally supplied with 24 V.
<b>FAULTY</b>				The communication between controller and power section is interrupted	Contact the SEW-EURODRIVE Service.
<b>F-Ptc</b>	21	0x1F	0x1015	Motor protection triggered	The connected motor protection sensor is defined in P2-33 (PTC, TF, TH, KTY or PT1000), and connected to analog input 2 (terminal 10).
<b>FAN-F</b>	22	0x32	0x1016	Internal fan error.	Contact the SEW-EURODRIVE Service.
<b>FLt-dc</b>	13	0x07	0x320D	DC link ripple too high.	Check the current supply
<b>Ho-trP</b>	27	0x27	0x101B	Error during reference travel.	<ul style="list-style-type: none"><li>• Check reference cams</li><li>• Check limit switch connection</li><li>• Check reference travel type setting and the parameters required for it</li></ul>
<b>Inhibit</b>				STO safety circuit open.	Check to see if the terminals 12 and 13 are connected correctly.
<b>Lag-Er</b>	28	0x2A	0x101C	Lag error	<p>Check:</p> <ul style="list-style-type: none"><li>• The encoder connection</li><li>• The wiring of encoder, motor and line phases</li><li>• If the mechanical components can move freely and are not blocked.</li><li>• Extend the ramps.</li><li>• Set a higher P component.</li><li>• Parameterize the speed controller again.</li><li>• Extend the lag error tolerance.</li><li>• Set PLC Prog Task Priority to 10 ms</li><li>• The inverter is operated in Derating and can no longer provide the current for acceleration/constant travel.</li></ul>
<b>I.t-trp</b>	04	0x08	0x1004	Overload of inverter/motor (I2t fault)	<p>Make sure that:</p> <ul style="list-style-type: none"><li>• The motor nameplate parameters are correctly entered in P1-07, P1-08 and P1-09.</li><li>• In vector mode (P4-01 = 0 or 1), the motor power factor in P4-05 is correct.</li><li>• Auto Tune has correctly been performed.</li></ul> <p>Check to see, if:</p> <ul style="list-style-type: none"><li>• The decimals flash (inverter overloaded), increase the acceleration ramp (P1-03) or decrease the motor load.</li><li>• The length of the cable meets the requirements.</li><li>• The load can move freely and there are no blockages or other mechanical failures (mechanically check the load).</li><li>• The thermal motor protection to UL508C is activated in P4-17.</li></ul>
<b>ML</b>				Phase failure	Input phase missing or voltage is outside the specified range.

Code (inverter display)	Code (MotionStudio in P0-13)	Fault code status word if Bit5 = 1	CANopen Emergency Code	Meaning	Measure
O-I	03	0x01	0x2303	Short-term overcurrent at the inverter output. High motor overload.	<b>Fault during stop procedure:</b> Check for premature brake application. <b>Fault when enabling the inverter:</b> Check to see, if: <ul style="list-style-type: none"><li>The motor nameplate parameters are correctly entered in P1-07, P1-08 and P1-09.</li><li>In vector mode (P4-01 = 0 or 1), the motor power factor in P4-05 is correct</li><li>Auto Tune has correctly been performed.</li><li>The load can move freely and there are no blockages or other mechanical failures (mechanically check the load).</li><li>A short circuit between the phases or a ground fault of a phase occurred at the motor and motor connection cable.</li><li>The brake is connected correctly, controlled correctly and correctly releases when the motor has a holding brake.</li></ul> <b>Fault during operation:</b> Check: <ul style="list-style-type: none"><li>For sudden overload or malfunction.</li><li>The cable connection between inverter and motor.</li></ul> The acceleration/deceleration time is too short and requires too much power. If you cannot increase P1-03 or P1-04, use a larger inverter. <b>Measures:</b> Reduce the settings of the voltage gain in P1-11. Set a longer run-up time in P1-03. Disconnect the motor from the inverter. Enable the inverter again. If this fault occurs again, check the entire system and completely replace the inverter. <b>Fault reset delay</b> If the fault occurs again directly after the O-I or hO-I fault messages are reset, the following delay times result for repeated resetting: <ul style="list-style-type: none"><li>First reset after 2 seconds</li><li>Second reset after 4 seconds</li><li>Third reset after 8 seconds</li><li>Fourth reset after 16 seconds</li><li>Fifth reset after 32 seconds</li><li>Further resets after 64 seconds</li></ul>
O-hEAt	23	0x7C	0x4117	Ambient temperature too high.	Check if the ambient conditions are within the range specified for inverters.
OL				Overloads	The output current is higher than the nominal motor current
O-t	8	0x0B		Heat sink overtemperature	The heat sink temperature can be displayed in P0-21. A historical protocol is saved in parameter P0-38 in 30-sec. intervals prior to a switch off with error. This fault message is displayed at a heat sink temperature of $\geq 90$ °C. Check: <ul style="list-style-type: none"><li>The ambient temperature of the inverter.</li><li>The inverter cooling and housing dimensions.</li><li>The function of the internal cooling fan of the inverter.</li></ul> Reduce the settings of the effective clock frequency in parameter P2-24, or the load at the motor/inverter.
O-torq	24	0x34	0x1018	Maximum torque limit timeout.	Check the motor load. Set a higher value in P6-17, if necessary. If you wish to deactivate torque monitoring, set P6-17 to 0.0 sec.

Code (inverter display)	Code (MotionStudio in P0-13)	Fault code status word if Bit5 = 1	CANopen Emergency Code	Meaning	Measure
O-Volt	06	0x07	0x3206	DC link over-voltage	The fault occurs if a high flywheel load or overhauling load is connected, and the excess regenerative energy is transferred back to the inverter. If a fault occurs while stopping or during deceleration, increase the deceleration ramp time <i>P1-04</i> or connect a suitable braking resistor to the inverter. The proportional gain in <i>P4-03</i> is reduced in vector mode. In PID control mode, ensure that the ramps are active by reducing <i>P3-11</i> . Additionally check if the supply voltage is within the specified range. Note: The value of the DC bus voltage can be displayed on <i>P0-20</i> . A historical protocol is saved in parameter <i>P0-36</i> in 256 ms intervals prior to a switch off with error.
Ol-b	01	0x04	0x2301	Brake channel overcurrent, Braking resistor overload	Make sure that the connected braking resistor does not fall below the minimum value approved for the inverter (see technical data). Check the braking resistor and the cabling for possible short circuits.
OL-br	02	0x04	0x1002	Braking resistor overload	The software detected an overload at the braking resistor and switches off to protect the resistor. Make sure that the braking resistor is operated within the planned parameters before performing any changes to parameters or system. To reduce the load at the resistor, increase the deceleration time, reduce the load's mass moment of inertia, or connect additional braking resistors in parallel. Note the minimum resistor values for the used inverter.
OF-01	60	0x1C	0x103C	Internal connection to option module error.	Contact the SEW-EURODRIVE Service.
OF-02	61	0x1C	0x103D	Option module fault	Contact the SEW-EURODRIVE Service.
Out-F	26	0x52	0x101A	Inverter output stage fault	Motor phase failure detection: One or more motor phases were disconnected at the inverter output. Check the motor lead. Contact the SEW-EURODRIVE Service.
P-LOSS	14	0x06	0x310E	Input phase failure	An input phase has been separated or interrupted at an inverter planned for a 3-phase supply.
P-dEF	10	0x09	0x100A	Factory settings are restored.	
Ph-lb				Unequal voltage at the input phases	<ul style="list-style-type: none"> <li>Check the device input voltage.</li> <li>Check the values in <i>P0-22</i>, <i>P0-23</i>, <i>P0-24</i>. The values may deviate maximum <math>\pm 10\%</math>. Use an input choke if required.</li> </ul>
PS-trP	05	0xC8	0x1005	Output stage fault (IGBT self-protection in case of overload)	See fault O-l.
SC-0b5	12	1D		Connection between inverter and keypad interrupted.	Check if there is a connection between the inverter and keypad.
SC-F03	52	0x29	0x1034	Fieldbus module communication error (fieldbus side)	Contact the SEW-EURODRIVE Service.
SC-F04	53	0x29	0x1035	Communication error IO option card	Contact the SEW-EURODRIVE Service.
SC-F05	54	0x29	0x1036	LTX module communication error	Contact the SEW-EURODRIVE Service.
SC-F01	50	0x2B	0x1032	Modbus communication error	Check the communication settings.

Code (inverter display)	Code (MotionStudio in P0-13)	Fault code status word if Bit5 = 1	CANopen Emergency Code	Meaning	Measure
<b>SC-F02</b>	51	0x2F	0x1033	SBus/CANopen communication error	<p>Check:</p> <ul style="list-style-type: none"> <li>The communication connection between inverter and external devices.</li> <li>The clearly assigned address per inverter in the network.</li> </ul>
<b>SC-LoS</b>				The communication between controller and power section is interrupted	Contact the SEW-EURODRIVE Service.
<b>SC-OBS</b>				The keypad lost the communication connection to the inverter.	Press the <Stop> key to reset. Check the address of the inverter.
<b>SF</b>				Switching frequency decreased	The PWM frequency was automatically decreased due to the heat sink temperature.
<b>SP-Err</b>	31	0x0E	0x101F	Speed fault (P6-07)	<p>The difference between the actual speed and setpoint speed is larger than the percentage value set in P6-07. This fault applies only to vector control or control with encoder feedback. Set a higher value in P6-07. If you wish to deactivate speed monitoring, set P6-07 to 100%.</p>
<b>Sto-F</b>	29	0x73	0x101D	STO circuit fault	<p>The safety relay must not transmit test pulses. Check the voltage source. STO+ at terminal 12 must be &gt; 18 V.</p>
<b>StoP</b>				The inverter is not enabled.	Activate the enable. Make sure that the enable is switched on after the STO for the hoist function.
<b>th-Flt</b>	16	0x1F	0x1010	Faulty thermistor at heat sink.	Contact the SEW-EURODRIVE Service.
<b>type-f</b>				Parameter module and inverter are not compatible.	The used parameter module is not of type LT BP C
<b>U-dEF</b>				User settings loaded.	The parameter set saved in P6-26 has been restored.
<b>U-torq</b>	25	0x34	0x1019	Minimum torque limit timeout (hoist).	The torque threshold has not been exceeded in time. Increase the time in P4-16 or the torque limit in P4-15.
<b>U-t</b>	09	0x75	0x4209	Undertemperature	Occurs at an ambient temperature below -10 °C. Increase the temperature to above -10 °C to start the inverter.
<b>U-Volt</b>	07	0xC6	0x3207	DC link undervoltage	Occurs routinely when switching off the inverter. Check line voltage if this occurs while the inverter is running.
<b>USr-cl</b>				Parameter backup successfully deleted	The parameter set was successfully deleted using P6-26.
<b>USr-PS</b>				Parameter backup successfully completed.	The parameter set was successful saved using P6-26.

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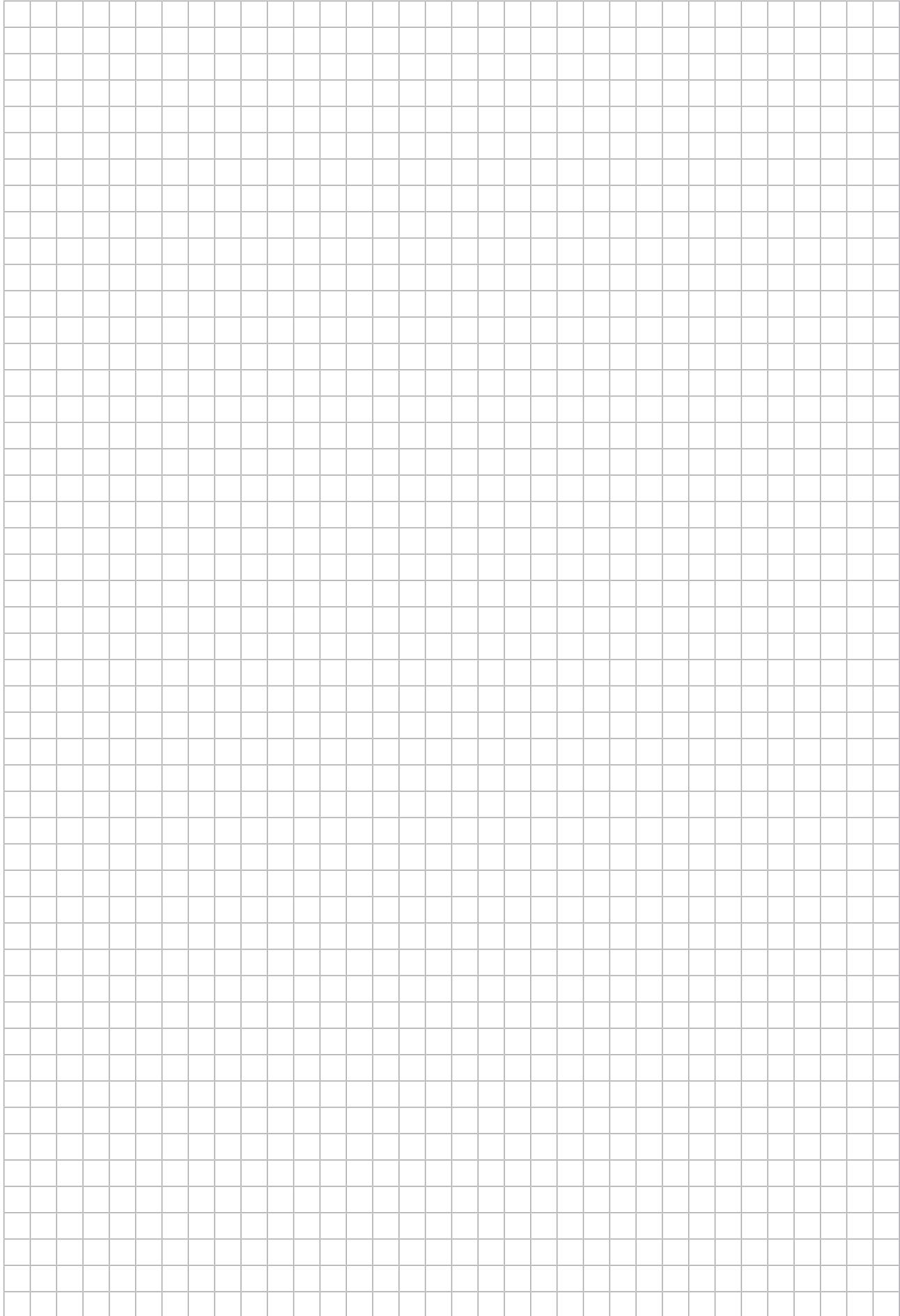
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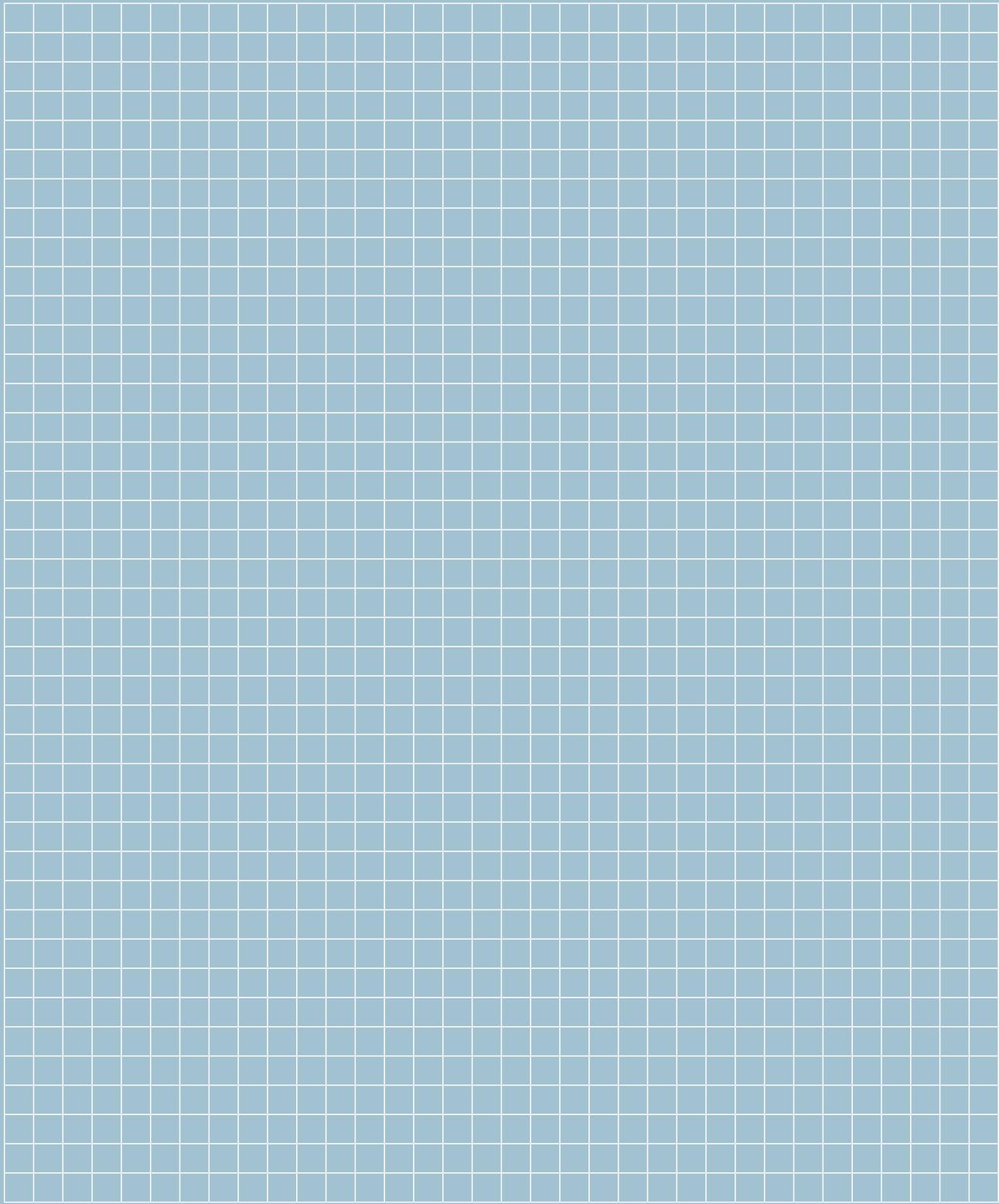
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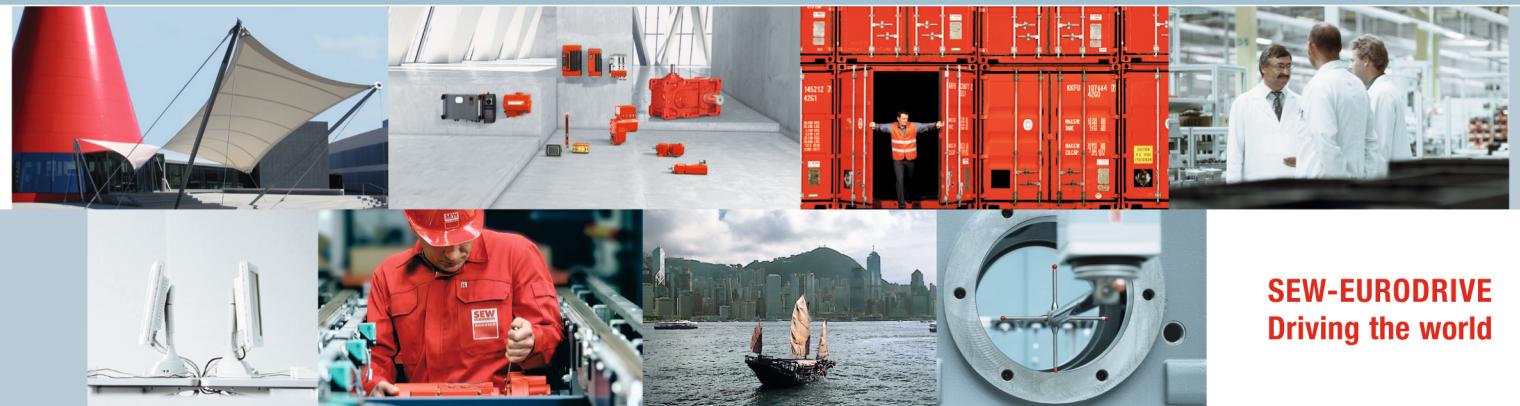
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