



Operating Instructions



Operator Panels **DOP21C-T70-0, DOP21C-T70-1**



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1 General information

1.1 About this documentation

The documentation at hand is the original.

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

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

1.2 Other applicable documentation

Observe the corresponding documentation for all additional components.

1.3 Structure of the safety notes

1.3.1 Meaning of signal words

The following table shows the graduation and meaning of the signal words in the safety notes.

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

1.3.2 Structure of section-related safety notes

Section-related safety notes do not apply to a specific action but to several actions pertaining to one subject. The hazard symbols used either indicate a general hazard or a specific hazard.

This is the formal structure of a safety note for a specific section:



SIGNAL WORD

Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

1.3.3 Structure of embedded safety notes

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

This is the formal structure of an embedded safety note:

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

1.4 Decimal separator in numerical values

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

Example: 30.5 kg

1.5 Rights to claim under limited warranty

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

1.6 Product names and trademarks

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

1.7 Copyright notice

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2 Safety notes

2.1 Preliminary information

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

2.2 Duties of the user

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

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

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

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

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

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

2.3 Target group

Specialist for mechanical work

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

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

Specialist for electrotechnical work	Any electrotechnical work may be performed only by electrically skilled persons with a suitable education. Electrically skilled persons in the context of this documentation are persons who are familiar with electrical installation, startup, troubleshooting, and maintenance of the product, and who possess the following qualifications: • Qualifications in the field of electrical engineering in accordance with the national regulations • Familiarity with this documentation
Additional qualifications	In addition to that, these persons must be familiar with the valid safety regulations and laws, as well as with the requirements of the standards, directives, and laws specified in this documentation. The persons must have the express authorization of the company to operate, program, parameterize, label, and ground devices, systems, and circuits in accordance with the standards of safety technology.
Instructed persons	All work in the areas of transport, storage, installation, operation and waste disposal may only be carried out by persons who are trained and instructed appropriately. These instructions must enable the persons to carry out the required activities and work steps safely and in accordance with regulations.

2.4 Designated use

The operator panel can be used for operation and diagnostics purposes for industrial and commercial plants.

An appropriate reaction to communication errors between the operator panel and the controller must be implemented in the controller. In addition, you have to provide for appropriate measures (e.g. limit switches, position monitoring) to make sure that there is no risk of damages in the event of a communication error between the operator panel and the controller.

In case of installation in electrical systems or machines, startup (meaning the start of proper use) is prohibited until it is determined that the machine meets the requirements stipulated in the EC Directive 2006/42/EC (Machinery Directive) and the EMC Directive (2014/30/EU). Observe EN 60204-1.

2.5 Predictable misuse

Fixing the enabling button in switch position 2 using mechanical devices is not permitted and is considered predictable misuse that must be prevented. To do so, take the following measures, for example, which bring the machine to the idle state during manual operation:

- The enabling function must be deactivated before the machine can be brought into operation again, e.g., when changing the operating mode.
- The enabling button must be released within a specific amount of time and brought into the enabling position again. Select the length of time depending on the requirements of the task.

2.6 Functional safety technology

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

2.7 Network security and access protection

A bus system makes it possible to adapt electronic drive technology components to the particulars of the machinery within wide limits. There is a risk that a change of parameters that cannot be detected externally may result in unexpected but not uncontrolled system behavior and may have a negative impact on operational safety, system availability, or data security.

Ensure that unauthorized access is prevented, especially with respect to Ethernet-based networked systems and engineering interfaces.

Use IT-specific safety standards to increase access protection to the ports. For a port overview, refer to the respective technical data of the device in use.

2.8 Transportation/storage

Inspect the shipment for damage as soon as you receive the delivery. Inform the shipping company immediately about any damage. If the product is damaged, it must not be assembled, installed or started up.

If necessary, use suitable, sufficiently dimensioned handling equipment.

Observe the information on climatic conditions in chapter "Technical data" (→  48) of the documentation.

Store the operator panel in a dry, dust-free room if you do not install it right away.

2.9 Setup/installation

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

- Operation in a mining facility or outdoors
- Operation in potentially explosive atmospheres and high fire risk areas
- Use in areas with a strong magnetic field
- Use in direct sunlight

2.10 Installation

Install the product according to the accompanying installation instructions.

Place the product on a stable surface during installation. If the product falls down, it could be damaged.

Route high-voltage cables, signal cables and supply cables separately from one another.

Make sure that the voltage and polarity of the current source are correct before you connect the product to the current supply.

To prevent scratches on the touchscreen of the product during delivery, the touchscreen has a laminated protective film. To avoid static electricity damaging the product, only remove the protective film from the glass after the installation.

2.11 Electrical connection

Familiarize yourself with the applicable national accident prevention regulations before working on the product.

Perform electrical installation according to the pertinent regulations (e.g. cable cross-sections, fusing, protective conductor connection). The documentation at hand contains additional information.

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

Protective measures and protection devices must comply with the regulations in force.

2.11.1 Required preventive measure

Make sure that the product is correctly attached to the ground connection.

2.11.2 Required protection devices

Make sure the product is protected against overload and short circuit by an overcurrent protection device.

2.12 Protective separation

The product meets all requirements for protective separation of power and electronics connections in accordance with IEC 61800-5-1. The connected signal circuits must meet requirements according to SELV (**S**afety **E**xtra **L**ow **V**oltage) or PELV (**P**rotective **E**xtra **L**ow **V**oltage) to ensure protective separation. The installation must meet the requirements for protective separation.

In order to avoid exceeding the permitted contact voltages in SELV or PELV power circuits in the event of a fault, continuous equipotential bonding is required in the vicinity of these power circuits. If this is not possible, other preventive measures must be taken. These preventive measures are described in IEC 61800-5-1.

2.13 Startup and operation

Observe the safety notes in the chapters "Startup and Operation" in the documentation.

Always keep the operator panel clean.

The openings in the housing are designed to allow air to circulate and must not be covered over. Make sure that no liquids enter the openings. This may lead to a fire or cause the equipment to become live.

Do not control any emergency stop functions and other safety functions with the operator panel.

Make sure that the touchscreen is not touched by any sharp objects.

Bear in mind that the operator panel is ready for operation even if the backlighting is no longer illuminated, which means that entries made on the touchscreen will still be registered.

2.14 Service/maintenance

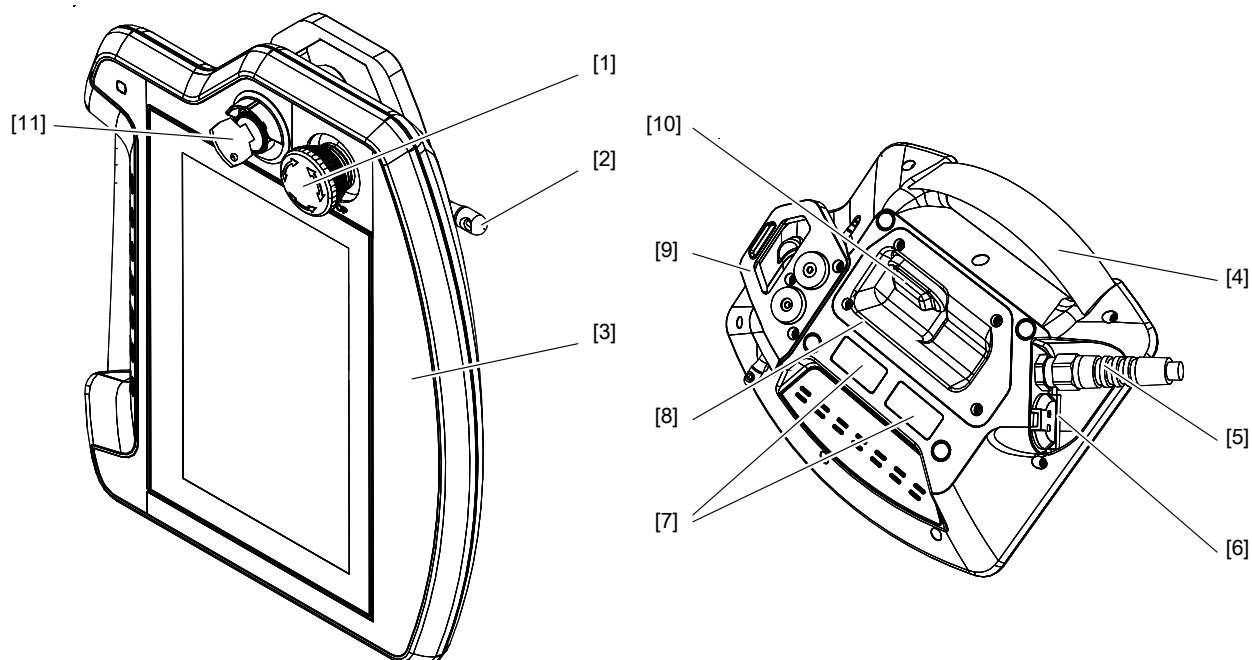
Use only spare parts and accessories manufactured according to the specifications of SEW-EURODRIVE. SEW-EURODRIVE is not liable for modifications, changes, additions and / or alterations to the product.

Clean the touchscreen and face of the operator panel with a soft cloth and mild cleaning agent.

3 Device structure

3.1 Basic device

The following figure shows the front and rear of the device:



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- [1] Emergency stop switch (DOP21C-T70-0) (→ 15)
Stop switch (DOP21C-T70-1) (→ 15)
- [2] Touch pen
- [3] Keypad and LEDs (→ 14)
- [4] Hand strap
- [5] Strain relief and anti-kink device for connection cable
- [6] USB port
- [7] Nameplates (→ 13)
- [8] Connection port cover
- [9] Device hanging bracket
- [10] Enabling button (→ 16)
- [11] Key switch (→ 15)

3.2 Type designation and nameplates

3.2.1 Example nameplate

Two nameplates are attached to the rear of the device.



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3.2.2 Sample type designation

DOP21C-T70-0		
Type	DOP	Drive Operator Panel
Mounting variant	21	Mobile
Generation	C	
Size	T70	TFT/LCD display with 7-inch screen diagonal, 600 × 1024 pixels (16 700 000 colors)
Design	0	0 = with emergency stop switch 1 = with stop switch

3.3 Scope of delivery

The following components are included in the scope of delivery:

- Operator panel
- Touch pen
- 2 keys
- User instructions for installation

3.4 Functional description

3.4.1 Touchscreen

The analog resistive touchscreen can be operated with a finger (with or without a glove) or with the touch pen. When operating the device with gloves, make sure that no metal shavings or abrasive objects (e.g., sand, abrasive paste) are embedded in the material of the glove. Do not expose the touchscreen to continuous sunlight.

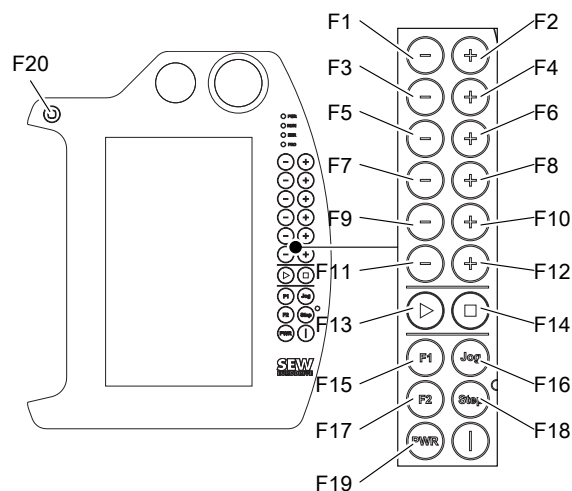
In rare cases, a slight warping of the touchscreen film (pillowing) can occur. This is acceptable and does not lead to a reduction in function or service life.

3.4.2 Keypad and LEDs

The device has 20 function keys, 1 On/Off key, and 5 LEDs.

Function keys

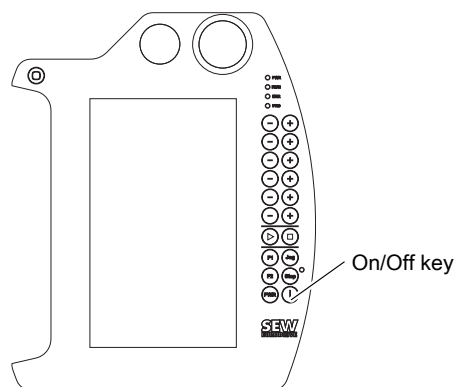
The key functions are assigned by the `keymap.cfg` file. Edit this file to adapt the assignment of the membrane keypad to your requirements. For further information, refer to chapter "Key configuration" (→ 37). The following figure shows the default assignment of the membrane keypad with the function keys F1 to F20:



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On/Off key

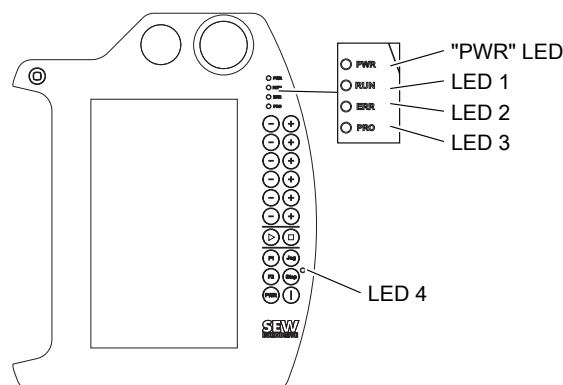
The device is switched on and off with the On/Off key. The assignment of the "On/Off" key cannot be changed.



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LED

The "PWR" LED shows the operation status of the device. LEDs 1 to 4 are controlled using C#. For further information, refer to chapter "Programming interface for control and display elements" (→ 40). The following figure shows the position of the LEDs on the device:



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3.4.3 Key switch

The operator panel is equipped with a key switch that is connected directly to the connection cable.

INFORMATION



The safety logic must check the position of the key switch for exclusivity to detect multiple operating modes selected simultaneously

3.4.4 Emergency stop switch (DOP21C-T70-0)

The switch is wired to 2 circuits; the contacts are designed as NC contacts. It meets the requirements of EN ISO 13850.

On the basis of the risk assessment for the machine, the operating principle of the red-yellow emergency stop switch must be designed as a category 0 or category 1 stop (see EN 60204-1). The wiring of the positive-opening switch contacts must meet the requirements of EN ISO 13849-1 that are established on the basis of the risk analysis of the machine according to EN ISO 12100:2010.

3.4.5 Stop switch (DOP21C-T70-1)

INFORMATION



Hand-held terminals intended to be frequently temporarily plugged into and unplugged from machines must not have a red-yellow emergency stop switch.

The switch is wired to 2 circuits; the contacts are designed as NC contacts. It meets the requirements of EN ISO 13850.

The stop switch mechanically corresponds to the emergency stop switch (→ 15). It is suited for stopping the machine but not for procedures in an emergency situation (emergency stop, emergency off) in accordance with EN 60204-1.

3.4.6 Enabling button

The operator panel has an enabling button. The enabling button consists of a three-stage control element. The two-circuit design and the positive opening operation in accordance with EN 60947-1 and EN 60947-5-8 in the third switch position are essential features.

Operating principle

The enabling button can assume three different switch positions:

Button position	Function	Enabling button	Switching contact
1	OFF position	Actuator is not pressed	Open
2	ON position	Actuator is pressed to the middle position	Closed
3	OFF position	Actuator is fully pressed	Open

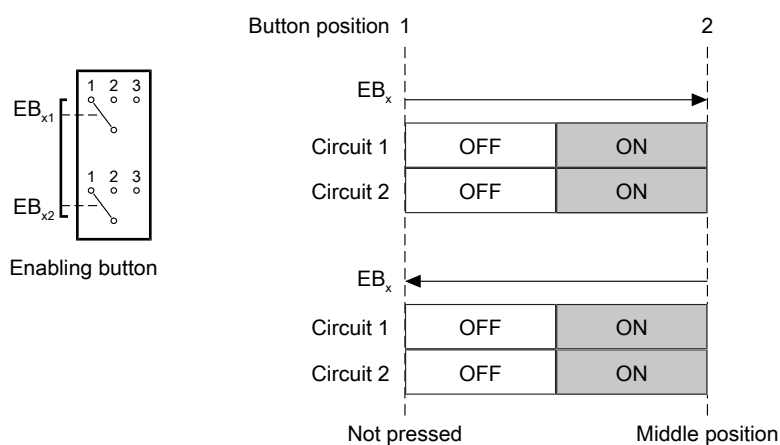
INFORMATION



The enabling button must be tested every 6 months by actuating switch position 3 (actuator is fully pressed).

Switch position 2

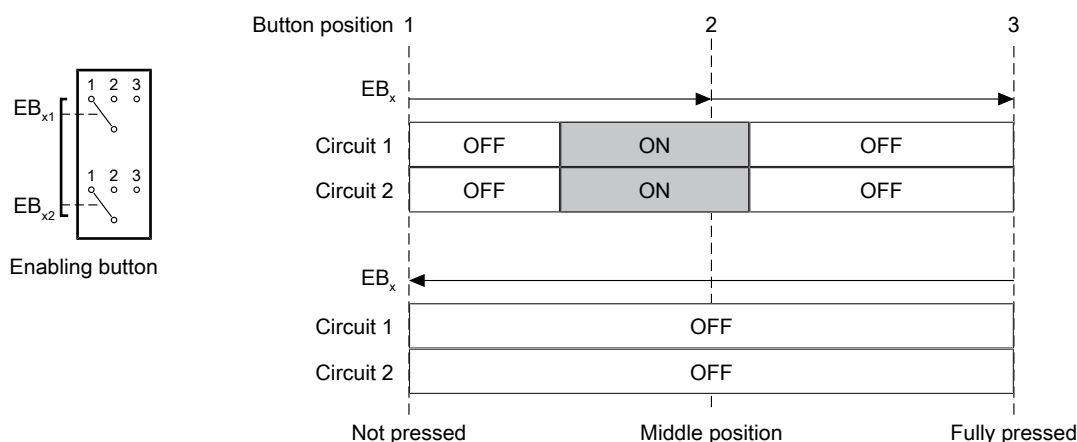
The following figure shows the contact travel diagram:



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Switch position 3

The following figure shows the contact travel diagram:



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When the enabling button is released after being fully pressed, it skips the "ON position" function. The enabling button goes directly to the neutral position.

Category 4 and PL e according to EN ISO 13849-1 can be achieved by implementing the enabling button with 2 circuits and suitable dynamic monitoring, taking into account the actuation cycles with regard to the B_{10d} value of the safety-related components. For an example of such a connection, refer to chapter "With enabling button and emergency stop" (→ 27).

In accordance with EN 60204-1, the enabling button must be implemented so that at least one of the stop categories 0, 1, or 2 is initiated at switch position 1 and switch position 3.

To determine the achieved performance level of the "enabling" function, you must include the safety-related characteristic values (category, diagnostic coverage [DC], MTTFd, and B_{10d}) of all safety components involved. For details on determining the performance level for the entire safety function, refer to EN ISO 13849-1.

To avoid an undetected accumulation of errors which can compromise safety, concurrency monitoring is required. This is achieved by using a corresponding safety controller.

Predictable misuse

Fixing the enabling button in switch position 2 using mechanical devices is not permitted and is considered predictable misuse that must be prevented. To do so, take the following measures, for example, which bring the machine to the idle state during manual operation:

- The enabling function must be deactivated before the machine can be brought into operation again, e.g., when changing the operating mode.
- The enabling button must be released within a specific amount of time and brought into the enabling position again. Select the length of time depending on the requirements of the task.

3.4.7 Ethernet interface

The Ethernet interface with 10/100 Mbit is suitable for full duplex operation.

Connection diagram



No.	Name	Function
1	TX+	Sending cable (+)
2	TX-	Sending cable (-)
3	RX+	Receiving cable (+)
4	n.c.	Not connected
5	n.c.	Not connected
6	RX-	Receiving cable (-)
7	n.c.	Not connected
8	n.c.	Not connected

3.4.8 USB interface

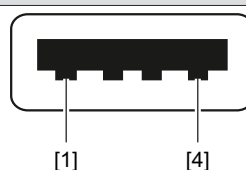
The protection cap must be fully closed for the specified degree of protection to be maintained.

NOTICE

Notice:

Never remove a USB stick while content is being saved. Improper removal can cause data loss.

Connection diagram



No.	Name	Function
1	+USB_VCC	DC 5 V output
2	USB_D-	Data line (-)
3	USB_D+	Data line (+)
4	GND	Reference potential

3.5 Accessories

INFORMATION



The delivery does not include accessories such as 24 V voltage supply and connection cables.

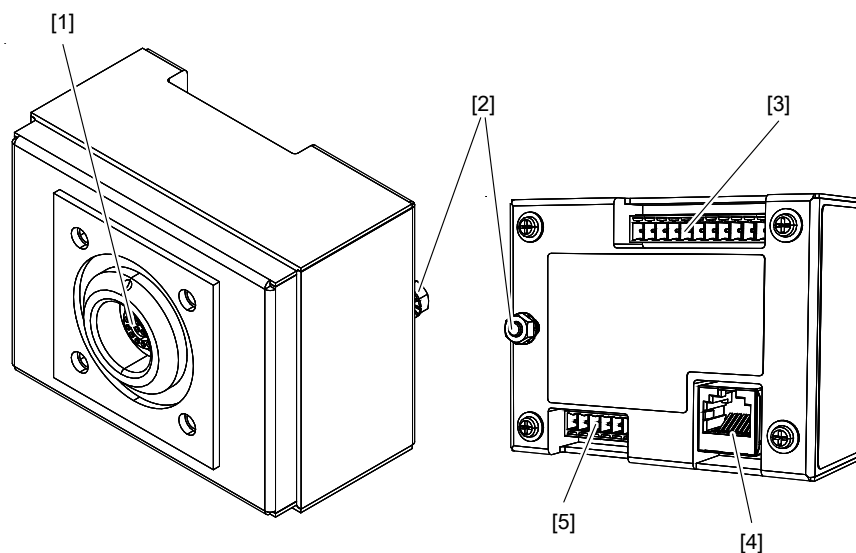
If you are not sure which accessories you need, employees at SEW-EURODRIVE will be happy to help you make the right selection.

The following accessories are available for the operator panel:

Accessories	Part number
CB0-20-P connection unit	19503601
CAB-05-20P connection cable, length 5 m	19503628
CAB-10-20P connection cable, length 10 m	19503636
CAB-15-20P connection cable, length, 15 m	19503644
MC-T70 magnetic bracket	19503652
WB-T70 wall bracket	19503660

3.5.1 CB0-20-P connection unit

The CB0-20-P connection unit is used to connect an operator panel to a controller via Ethernet with the CAB-...-20P 20-pin connection cable. The following figure shows the front and rear of the connection unit:



34353180427

- [1] X4 plug connector
- [2] Ground stud
- [3] X1 plug connector
- [4] X3 plug connector
- [5] X2 plug connector

4 Mechanical installation

4.1 Operator panel

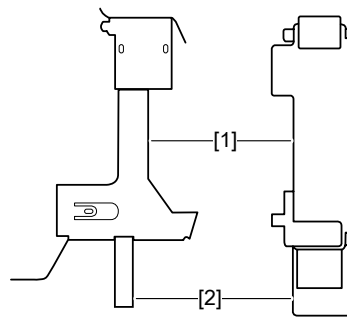
The device is designed for mobile use. A magnetic bracket and a wall bracket are available as accessories.

4.1.1 MC-T70 magnetic bracket

The magnetic bracket is mounted directly to the device and fixes the device to a metal surface. It consists of two magnets, which are attached to the device's hanging bracket using the two M4 × 8 hex head screws that are supplied with the device.

4.1.2 WB-T70 wall bracket

The powder-coated black wall bracket is used for stationary operation or for storing the device. The following figure shows an example of the WB-T70 wall bracket with a cable holder:

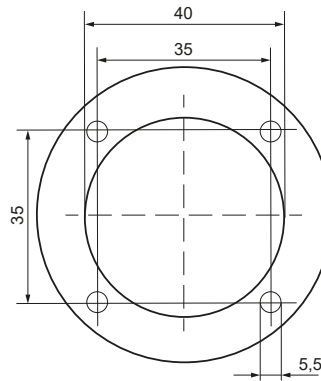


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- [1] Device carrier
- [2] Cable holder

4.2 Connection unit

The connection unit is designed for installation in the control cabinet. The wall thickness must not exceed 5 mm. An opening for the plug connector and fastening holes are required in the control cabinet wall. The following figure shows the appropriate dimensions:



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5 Electrical installation

5.1 Installation notes

NOTICE

Risk of damage due to incorrect connection of the voltage supply.

Possible damage to property.

- Connect the device only to a voltage supply that provides the specified input power and meets the protective extra-low voltage (SELV) and limited current source (LPS) requirements pursuant to UL/IEC 60950-1 or PS2 pursuant to UL/IEC 62368-1.
- Use the 24 V supply connector included in the delivery for a connection to the input current connection of the device.
- Check the electrical specification on the nameplate of the device.

NOTICE

Risk of damage when disconnecting or connecting voltage-carrying plug connectors.

Possible damage to property.

- Switch off the line voltage.
- Never plug or unplug plug connectors while they are energized.

NOTICE

Risk of damage to connectors and cables due to improper handling.

Possible damage to property.

- Always touch the connector when plugging or unplugging a cable.

INFORMATION



To remove the protective film, pull the protective film off the front of the device to the side.

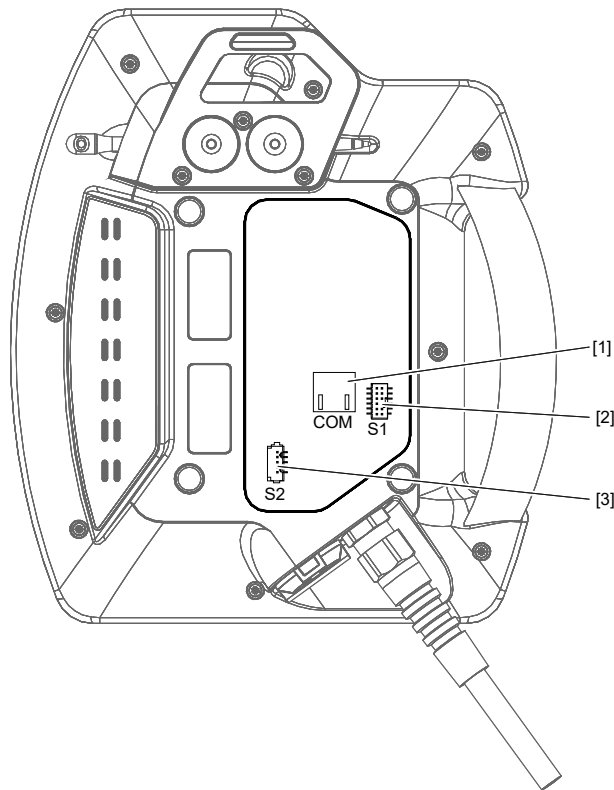
INFORMATION



Adhere to the "safety notes" (→  7) during installation.

5.2 Connections

The connections are found on the rear of the device beneath a cover. The following figure shows the connections:



9007233494151691

- [1] COM: Ethernet interface
- [2] S1: Supply and control cables
- [3] S2: Control element signals

5.3 Cable installation

The following tools are required for installing the cables:

- Wrench, size 19
- Torx, size 10

INFORMATION



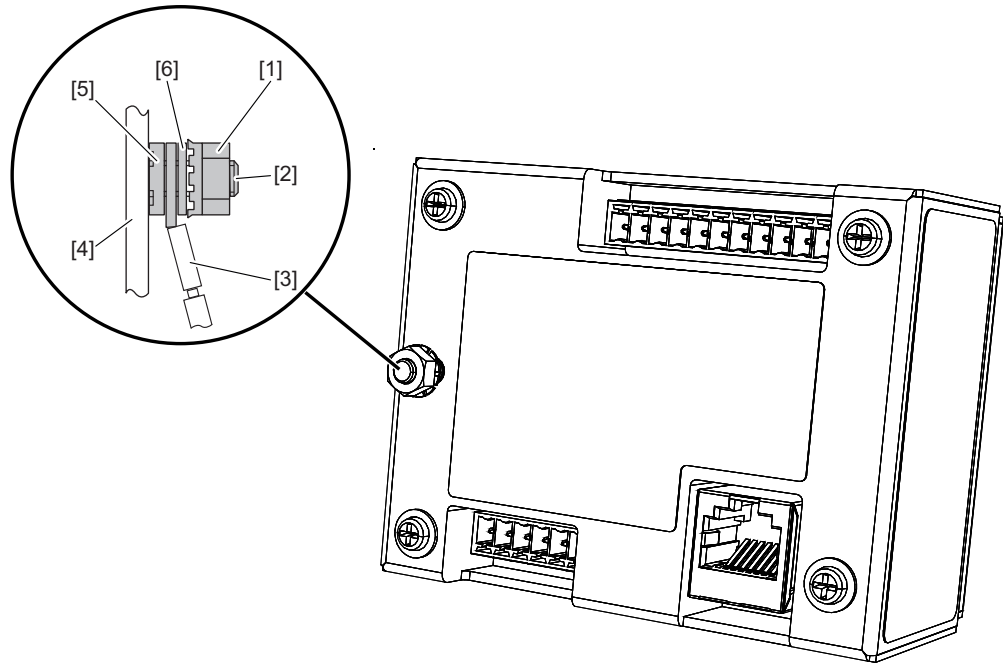
- Make sure that the seal is clean and undamaged.
- Ensure that the cables are not crushed at any point.
- Ensure that all the screws are fastened with the recommended torques. Otherwise, the degree of protection cannot be guaranteed.

Proceed as follows:

1. Place the operator panel on a level, clean, and soft surface, e.g., an ESD mat, with the display facing down. Be careful not to damage the device and its control elements.
2. Loosen the Torx screws in the cover plate with the Torx screwdriver.
3. Remove the cover plate. Be careful not to damage the cables of the enabling button.
4. Remove the gray nut and the strain relief device from the connection cable. The gray nut is then no longer needed.
5. Run the connection cable through the through hole in the device provided for this purpose. A gray nut for fastening the connection cable is integrated into this through hole.
6. Fix the insertion sleeve in place with the wrench and a torque of 3 Nm.
7. Connect the plug-in connections.
8. Position the cable so that the cable jacket extends past the strain relief device into the interior of the device.
9. Position the rubber ring of the strain relief device under the insertion sleeve.
10. Fix the strain relief device in place with the wrench.
11. Position the cover plate on the connection port.
12. Install the cover with the Torx screws with a torque of 0.8 Nm to 1.0 Nm.

5.4 Installing the connection unit ground connection

If required by the electrical safety of the end application, ground the connection unit along the shortest path.



9007233684639115

- [1] Hex nut with tooth lock washer
- [2] Ground stud (M4)
- [3] Grounding cable with appropriately sized crimp cable lug
- [4] Connection unit
- [5] Grounding washer
- [6] Flat washer

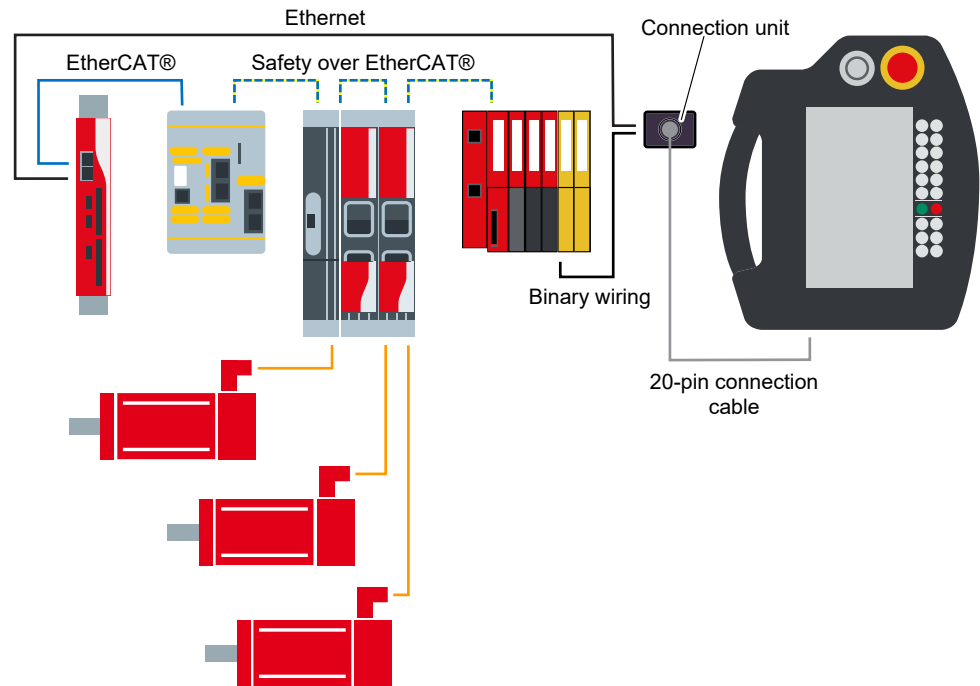
You will find the ground stud for the ground connection on the rear of the connection unit. The ground stud is marked with a "ground" ⊥ icon.

✓ You have prepared a grounding cable with an appropriately sized crimp cable lug.

1. Loosen the nut.
2. Remove the nut, flat washer, and grounding washer from the ground stud.
3. One after the other, slide the grounding washing, the crimp cable lug for the protective earth, and the flat washer onto the ground stud.
4. Tighten the nut with a maximum tightening torque of 2 Nm.

5.5 Example connections with safety controller

The following figure shows the integration of a DOP21C-T70-0 into a system with components from SEW-EURODRIVE:



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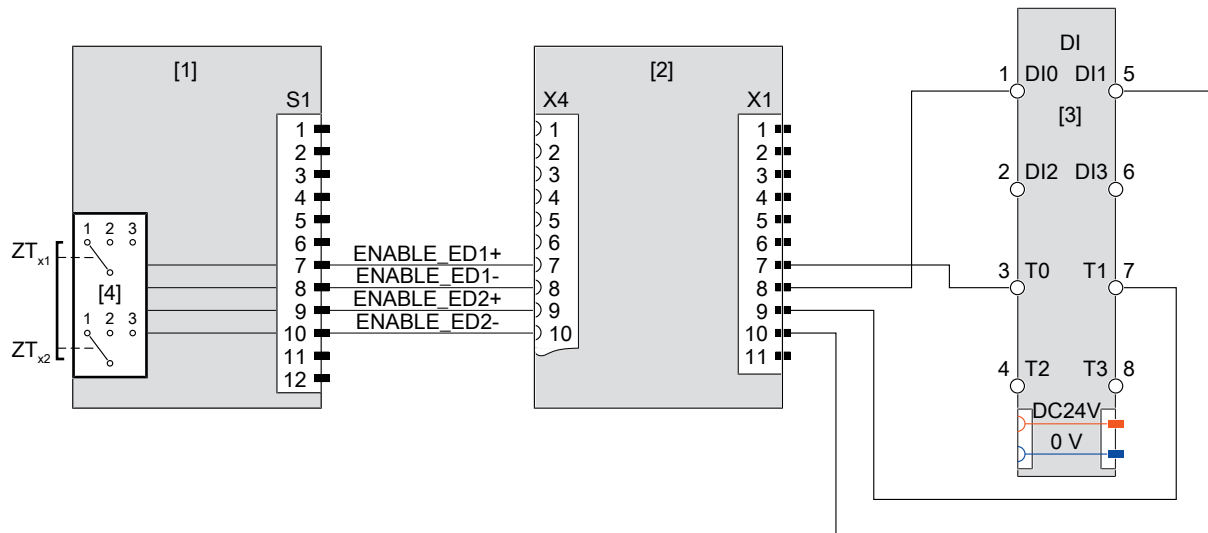
5.5.1 With enabling button

Only when both enabling circuits are closed simultaneously is a partial safety function, which is activated in the inverter, overridden via FSoE by the FSoE master and moving a drive becomes possible.

If one of the two enabling circuits is interrupted in the actuated state due to the enabling button being released or due to an error, the inverter stops and the safety function is reactivated. It is only overridden again when both enabling circuits are opened and simultaneously closed again.

This fulfills the requirement that a single fault should not lead to the loss of the safety function. A single fault is detected in this way at the latest during the next cycle; re-enabling is no longer possible. In the event of a short-circuit or crossfault, the MOVI-PLC® I/O system C reports a fault and must be reset using the safety controller.

The following figure shows a circuit recommendation for achieving category 3/PL d for the enabling function with a digital input module with functional safety (OFI41C as part of the MOVI-PLC® I/O system C) and an FSoE master, e.g. SCU1 EC S. Observe the applicable documentation for these devices. When calculating the overall safety function "Enable via enabling button", take into account the monitoring device and involved components.



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- [1] Operator panel
- [2] Connection unit
- [3] Digital input module with functional safety OFI41C
- [4] Enabling button

5.5.2 With enabling button and emergency stop

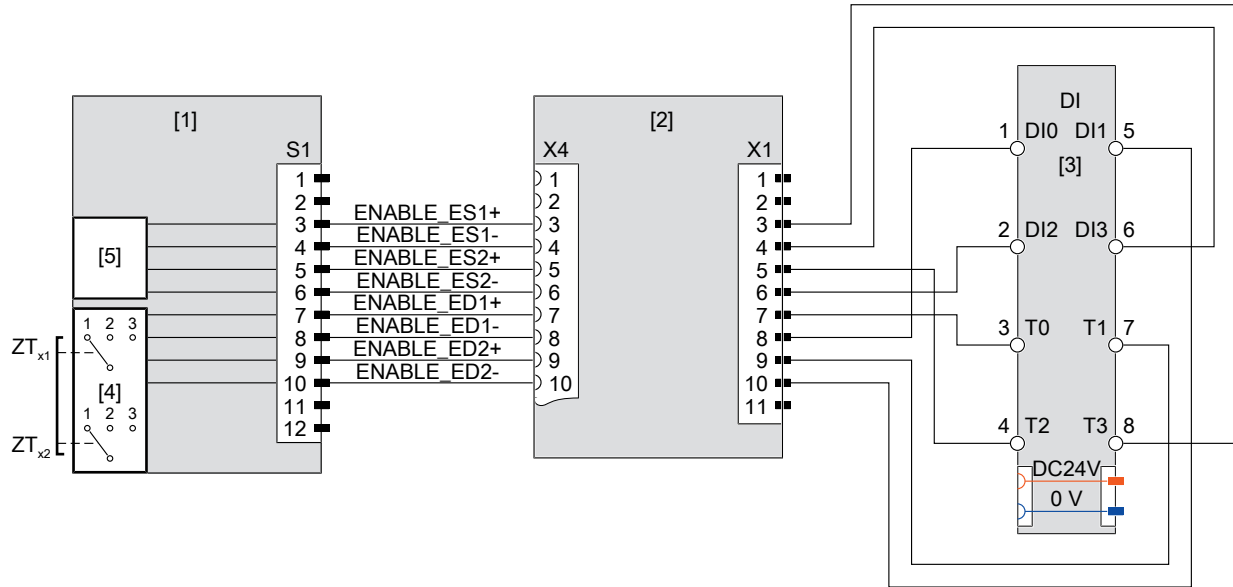
To achieve category 4/PL e, you must parameterize the following configurations in the safety controller:

- You have activated test pulse monitoring.
For this purpose, it is absolutely essential to use the 24 V voltage outputs of the OFI41C that are supplied with test pulses. A separate clocked 24 V supply voltage is assigned to each secure input.
- You have configured time monitoring of the input element (enabling button).
- If you use a contactor as an actuator, you must implement external device monitoring (EDM).
- You have configured a start test.

Each time the safety controller is switched on, a test of the sensor is performed in the direction of the low-signal level (defined safety status). This can be, for example, actuating the enabling button.

The figure shows a circuit recommendation with an enabling button and emergency stop switch with a digital input module with functional safety (OFI41C as part of the MOVI-PLC® I/O system C), which must be connected to a corresponding safety controller. When designing the circuit, refer to the project planning manual for the safety

controller and the documentation for the programming tool of the safe application (e.g., SafePLC2) and the OFI41C. When calculating the overall safety function "Enable via enabling button", take into account the operator panel, the safety controller, and all of the following components.



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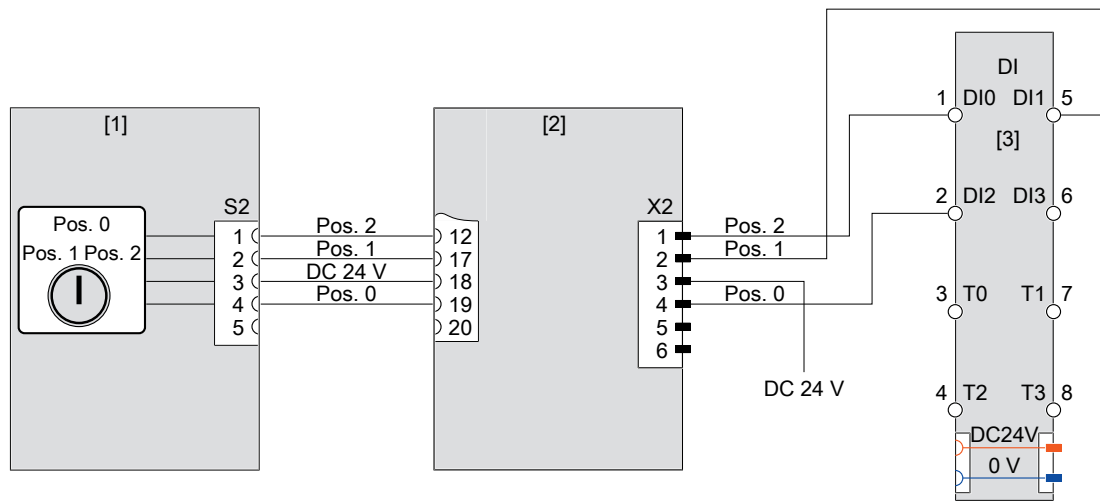
- [1] Operator panel
- [2] Connection unit
- [3] Digital input module with functional safety OFI41C
- [4] Enabling button
- [5] Emergency stop switch

5.5.3 With optional key switch for selecting the operating mode

Since the key switch is supplied by a universal potential, it is not possible to use the 24 V voltage outputs of the OFI41C that are supplied with test pulses. Deactivate test pulse monitoring in the OFI41C parameters.

Design the safety program so that exactly one operating mode is detected at any given time. If a signal is detected at none of the inputs or at multiple inputs simultaneously, the status is not permissible and the safety program must react accordingly.

The following figure shows the connection of the operation selection switch with a digital input module with functional safety (OFI41C as part of the MOVI-PLC® I/O system C), which must be connected to a corresponding safety controller.



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- [1] Operator panel
- [2] Connection unit
- [3] Digital input module with functional safety OFI41C

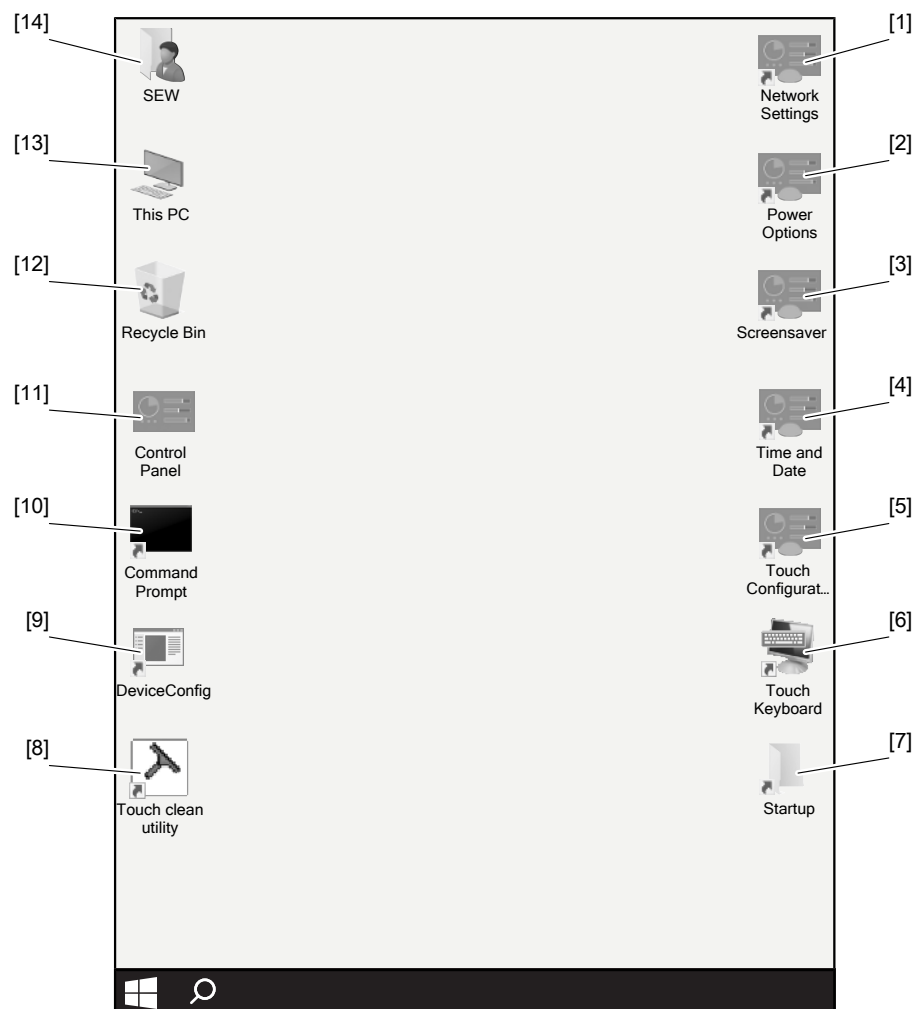
6 Startup

6.1 Starting the operator panel

The start-up process of the device begins after the voltage supply is connected. To start when the voltage supply is already connected, press the On/Off key. The start-up process runs in the following steps:

1. The boot splash screen is displayed.
2. The operating system is started. This process can take up to 3 minutes. During this time, a black screen is displayed.
3. If auto-login is deactivated, the login dialog is displayed.
4. The Windows desktop is displayed.

6.2 Desktop



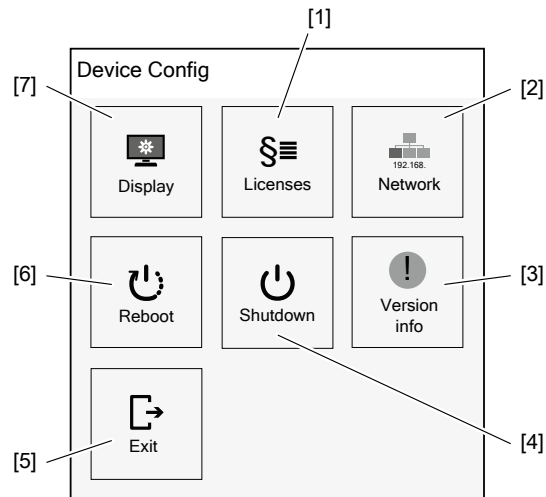
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Item	Name	Link to
[1]	Network Settings	Ethernet settings
[2]	Power Options	Energy options
[3]	Screensaver	Screensaver
[4]	Time and Date	Date and time
[5]	Touch Configuration	Pen and touch input
[6]	Touch Keyboard	On-screen keyboard
[7]	Startup	"Autostart" folder
[8]	Touch clean utility	Touchscreen cleaning mode
[9]	DeviceConfig	Device configuration (→ 32)
[10]	Command Prompt	Command prompt
[11]	Control Panel	Control panel
[12]	Recycle Bin	Waste paper bin
[13]	This PC	Computers
[14]	SEW	User files

6.3 Device configuration

To access device configuration, double click the "[DeviceConfig]" icon on the device's desktop.



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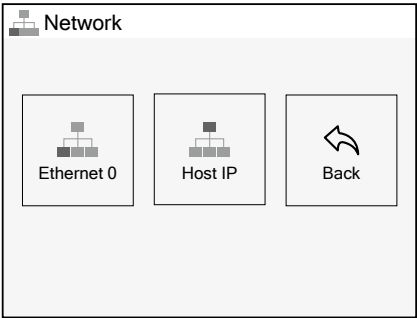
- [1] "Licenses" menu (→ 32)
- [2] "Network" menu (→ 33)
- [3] Version info (→ 34)
- [4] Shutdown (→ 34)
- [5] Exit device configuration
- [6] Reboot (→ 34)
- [7] "Display" menu (→ 34)

6.3.1 "Licenses" menu

To display the license information, press the [Licenses] button. To return to the "Device Config" menu, press the [OK] button.

6.3.2 "Network" menu

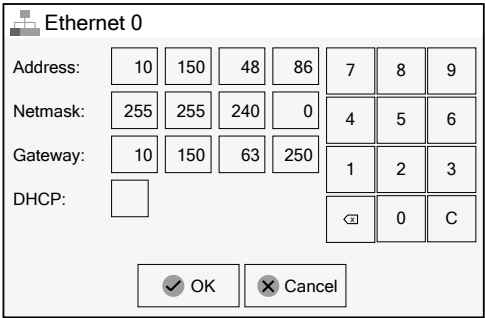
To access the [Network] menu, press the [Network] button. There you will find the network settings for the Ethernet interface. To return to the "Device Config" menu, press the [Back] button.



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Changing the network settings for the Ethernet interface

The network address can either be retrieved via DHCP or permanently assigned. To access the Ethernet interface settings, press the [Ethernet 0] button.



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Designation	Meaning
"Address" edit box	IP address of the operator panel
"Net mask" edit box	Associated subnet mask
"Gateway" edit box	Standard gateway
"DHCP" check box	By activating "DHCP", the IP address is automatically retrieved through a DHCP server, and the rest of the input lines are deactivated.
[OK] button	Save settings and return to the "Network" menu.
[Cancel] button	Return to the "Network" menu without saving.

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6.3.3 Version info

To display the software statuses of the operator panel and the connection unit, press the [Version info] button. To return to the "Device Config" menu, press the [OK] button.

6.3.4 Shutdown

To shut down the device, press the [Shutdown] button.

6.3.5 Reboot

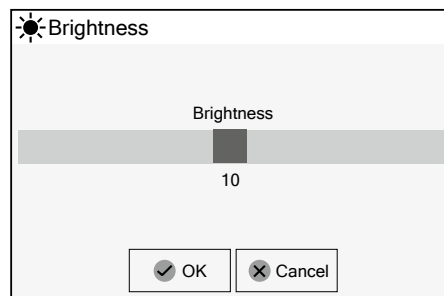
To restart the device, click the [Reboot] button.

6.3.6 "Display" menu

To access the "Display" menu, press the [Display] button. To return to the "Device Config" menu, press the [Back] button.

Adjusting the brightness

To adjust the brightness, press the [Brightness] button. Set the brightness using the slider.



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Designation	Meaning
[OK] button	Save settings and return to the "Display" menu.
[Cancel] button	Return to the "Display" menu without saving.

Calibrating the touch pen

To calibrate the touch pen, press the [Touch Calibration] button.

- Crosshairs for the calibration will be displayed 4 times in succession in all 4 corners of the display.
- Each time one is displayed, tap as precisely as possible on the center of the symbol with the touch pen.
- Tap the points only briefly. Pressing for too long leads to an incorrect calibration.

To conclude the calibration, press the [yes] button.

6.4 Remote access

Various remote access services can be activated using the "Customizing" setup file.

INFORMATION



Activating remote access is a security risk due to possible unauthorized access to the device.

The following services can be activated:

- Remote Desktop (RDP): This service enables access to the device through a Remote Desktop client.
- Server Message Block file sharing (SMB): This service enables access to the device through approved folders.
- ICMP (for ping): This service allows the Ethernet connection to the device to be verified with a "ping".

6.4.1 Activate

Proceed as follows:

1. Call up `WindowsCustomizingSetup` in the `C:\setup\DeviceSetup\WindowsDeviceSetup_Txxx_KEBA_Win10\` directory
2. Click [Change].
3. Select the required service.

Service	Setup Name
Remote Desktop	RDP activation
Server Message Block file sharing	SMB activation
ICMP	PING activation

4. Click the black selection arrow next to the selected service.
 5. Choose [Entire feature will be installed on local hard drive].
 6. Click [Next].
 7. Click [Change].
 8. Click [Finish].
- ⇒ You have finished the installation.

6.4.2 Deactivate

Proceed as follows:

1. Call up `WindowsCustomizingSetup` in the `C:\setup\DeviceSetup\WindowsDeviceSetup_Txxx_KEBA_Win10\` directory
 2. Click [Next].
 3. Click [Change].
 4. Select the service you would like to uninstall.
 5. Click the black selection arrow next to the selected service.
 6. Choose [Entire feature will be unavailable].
 7. Click [Next].
 8. Click [Change].
 9. Click [Finish].
- ⇒ You have finished uninstalling the service.

6.5 Reset setups

You have the option of updating the `Customizing`, `WindowsPlatformDriver`, and `Security` setups with the `WindowsDeviceSetup` setup or resetting them to their original state without losing files. The new setup file must already be located on the device.

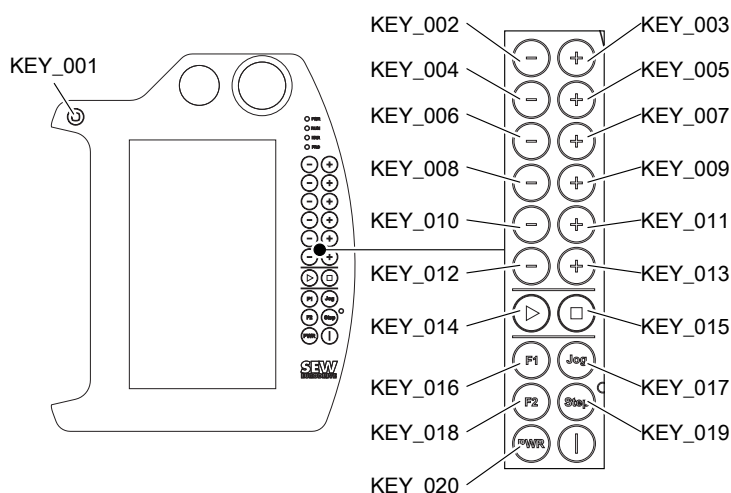
Proceed as follows:

1. Call up "Programs and Features" in the control panel.
2. Uninstall the currently installed `WindowsDeviceSetup`.
3. Install the new `WindowsDeviceSetup` erneut.

6.6 Key configuration

6.6.1 Assign function

The following figure shows the numbering of the keys on the device.



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Upon delivery, the keys on the device are assigned to the function keys F1 to F20. You can adjust this assignment to meet your needs. Change only the "Allocated assignment" and "Allocated modifier" character strings. The following example explains the character string for assigning the "F20" function to the top left key on the device.

KEY_001=00,40,00,00,00,00,00,00,00,6B,00,00,00,00,00,00		
Top left key	KEY_001	Key
	=00,40,00,00,00,00,00,00,00,	Key address
F20	00,6B	Allocated assignment
	,	Padding character
No modification	00,00	Allocated modifier
	,00,00,00,00	Padding character

Proceed as follows:

1. Open the `KeyMapExample.cfg` file in the `C:\ProgramData\KEBA Automation\keview\system` directory with a text editor.
2. Copy all entries in the `[ScancodeMapping_T70_Standard]` section.
3. Paste the copied entries into the `[ScancodeMapping]` section.
4. Identify the key to be assigned using the figure (→ 37).
5. Find the character string for the function in the "Keys" (→ 38) table and enter it.
6. Find the character string for the modifier in the "Modifiers" (→ 38) table and enter it.
7. Save the file as `KeyMap.cfg`. The date and time will be automatically added to the file name.

6.6.2 Key codes

The following tables contain the PS/2 codes available in hexadecimal format.

6.6.3 Modifiers

You can use the following modifiers. The character string "00,00" is interpreted as "no modifier".

Key	Character string	Key	Character string
Left ctrl	00,1D	Right ctrl	E0,1D
Left shift key	00,2A	Right shift key	00,36
Left alt	00,38	Right alt	E0,38
Left Windows key	E0,5B	Right Windows key	E0,5C

6.6.4 Keys

This information is based on the English keyboard layout.

Function keys			
Key	Character string	Key	Character string
F1	00,3B	F13	00,64
F2	00,3C	F14	00,65
F3	00,3D	F15	00,66
F4	00,3E	F16	00,67
F5	00,3F	F17	00,68
F6	00,40	F18	00,69
F7	00,41	F19	00,6A
F8	00,42	F20	00,6B
F9	00,43	F21	00,6AC
F10	00,44	F22	00,6D
F11	00,57	F23	00,6E
F12	00,58	F24	00,76

Letters and numbers			
Key	Character string	Key	Character string
1 !	00,02	i l	00,17
2 @	00,03	j J	00,24
3 #	00,04	k K	00,25
4 \$	00,05	l L	00,26
5 %	00,06	m M	00,32
6 ^	00,07	n N	00,31
7 &	00,08	o O	00,18
8 *	00,09	p P	00,19
9 (	00,0A	q Q	00,10
0)	00,0B	r R	00,13
a A	00,1E	s S	00,1F

Letters and numbers			
Key	Character string	Key	Character string
b B	00,30	t T	00,14
c C	00,2E	u U	00,16
d D	00,20	v V	00,2F
e E	00,12	w W	00,11
f F	00,21	x X	00,2D
g G	00,22	y Y	00,15
h H	00,23	z Z	00,2C

Number pad			
Key	Character string	Key	Character string
0 Ins	00,52	9 PgUp	00,49
1 End	00,4F	+	00,4E
2 Down arrow key	00,50	-	00,4A
3 PgDn	00,51	*	00,37
4 Left arrow key	00,4B	/	E0,35
5	00,4C	=	00,59
6 Right arrow key	00,4D	Enter	E0,1C
7 Home	00,47	. Del	00,53
8 Up arrow key	00,48	Num Lock	00,45

Arrow keys			
Key	Character string	Key	Character string
Left arrow key	E0,4B	Up arrow key	E0,48
Right arrow key	E0,4D	Down arrow key	E0,50

Other keys			
Key	Character string	Key	Character string
Print Screen	E0,37	' "	00,28
Scroll Lock	00,46	, <	00,33
Insert	E0,52	- _	00,0C
Delete	E0,53	. >	00,34
Home	E0,47	/ ?	00,35
End	E0,4F	; :	00,27
Page Up	E0,49	= +	00,0D
Page Down	E0,51	[{	00,1A
Backspace	00,0E	\	00,2B
Enter	00,1C	] }	00,1B
Spacebar	00,39	` ~	00,29

Other keys			
Key	Character string	Key	Character string
Tab	00,0F	Esc	00,01
Shift	00,3A		

6.6.5 Deactivating keys

Proceed as follows:

1. Open the `WinKeyMapExample.cfg` file in the `C:\ProgramData\KEBA Automation\keview\system` directory with a text editor.
2. In the `[Settings]` section, set the "DropAllKeys" parameter to "1".
3. Save the file as `KeyMap.cfg`. The date and time will be automatically added to the file name.

6.7 Programming interface for control and display elements

The device has the "HWAapi" programming interface, through which the control and display elements can be activated and the hardware properties can be called up. To use the programming interface, you need the "HWAapiSDK" programming environment. This is available on the [SEW-EURODRIVE](https://www.sew-eurodrive.com) website.

7 Service

7.1 Waste disposal

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

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

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

- Oil and grease

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

- Screens
- Capacitors
- Rechargeable batteries
- Batteries



Waste disposal according to WEEE Directive 2012/19/EU

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

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



Waste disposal according to the Battery Directive 2006/66/EC

This product contains batteries or accumulators. Dispose of this product and the batteries or accumulators separately from the municipal waste according to the national regulations.

8 Inspection/maintenance

8.1 Cleaning the touchscreen

INFORMATION



Never clean the touchscreen with solvents, abrasive cleaners, or scouring sponges. Otherwise the touch surface could be damaged.

For cleaning, use a soft cloth moistened with water or a mild cleaning agent. The cleaning agent should be sprayed onto the cloth and not directly onto the touch surface.

The touchscreen cleaning mode can be activated using the "Touch clean utility" icon on the desktop. This deactivates the touch surface of the display for a set amount of time (at least 20 seconds). During this time, the display can be cleaned without unintentionally triggering actions with the touch surface.



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8.2 Creating a backup

A backup is created through the Bootable Service System (BSS). This is a program that is accessed through the BIOS boot menu from a plugged-in service USB stick.

Creating a backup is performed through the Bootable Service System (BSS). This is a program that is accessed through the BIOS boot menu via a plugged-in service USB stick.

Preparation

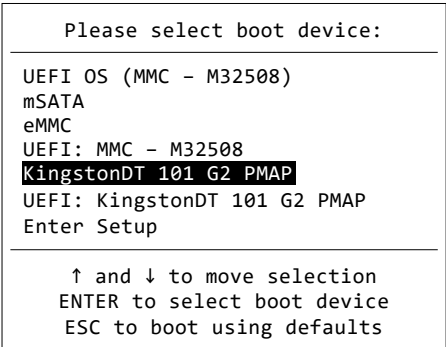
The following is required for the backup process:

- USB hub
- Service USB stick for the BSS application. If this USB stick has enough free memory, the backup image file can also be saved to it.
- USB stick for the image file with at least 32 GB of free storage space and formatted with FAT32
- Keyboard

Proceed as follows:

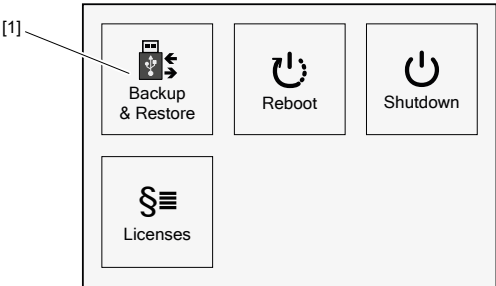
1. Plug the USB hub into the operator panel.
2. Plug the service USB stick and the keyboard into the USB hub.
3. Restart the device (disconnect and reconnect the voltage supply).
4. During the boot process, press F7 when the splash screen appears to enter the BIOS menu.

5. Enter the BIOS password 7090.
6. Select the service USB stick and press Enter. It takes about 30 seconds for the BIOS boot menu to appear.



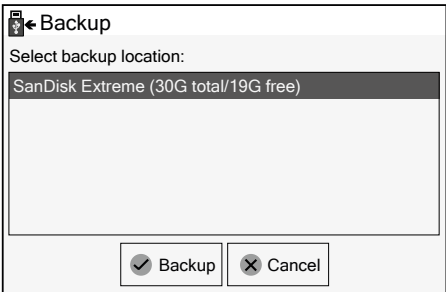
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7. Plug the USB stick for the image file into the USB hub (optional; if the service USB stick does not have enough memory).
8. Choose the "Backup & Restore" [1] menu item.



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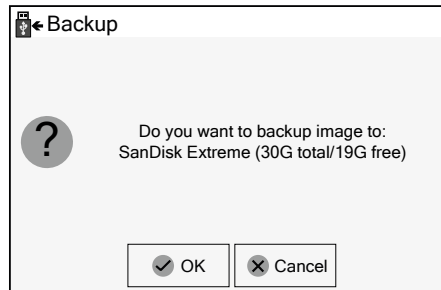
9. Choose "Backup" in the displayed menu.
10. Select the medium on which to save the backup and confirm by pressing "Backup".



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11. Click the [OK] button to confirm and start the backup. A progress bar is displayed. The process takes between 15 minutes and 1 hour, depending on the USB stick used.



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NOTICE

Notice:

Never remove a USB stick while content is being saved. Improper removal can cause data loss.

12. Once the backup is complete, confirm the dialog.
 13. Remove the USB hub.
 14. Choose "Shutdown" to switch off the device or "Reboot" to restart.
- ⇒ The backup has been created and saved to the USB stick in the \images directory. A directory with the device designation, date, and time is created for each backup.

INFORMATION



Copy the backup files to a secure data processing system, since the security of the file on a USB stick cannot be guaranteed over a long period of time.

8.3 Restore backup/update software or firmware

Restoring a backup (Restore) or updating software/firmware are performed through the Bootable Service System (BSS). This is a program that is accessed through the BIOS boot menu via a plugged-in service USB stick.

NOTICE

Damage to firmware due to improper handling

During a restore/update process, the USB stick must not be removed and the voltage supply for the assembly must not be disconnected. This can lead to destruction of the firmware on the components, making further operation impossible.

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BSS preparation

To prepare the USB stick, the archive provided (e.g., ZIP file) must be extracted and the \boot directory must be copied to the root directory of the USB stick. The USB stick should have at least 32 GB of free memory. The prepare.cmd file must then be run in the \boot directory.

Preparation for restoring

To restore a backup, the files generated during the backup are required. For this purpose, copy the \images directory with the backup files onto the USB stick.

Preparation for update

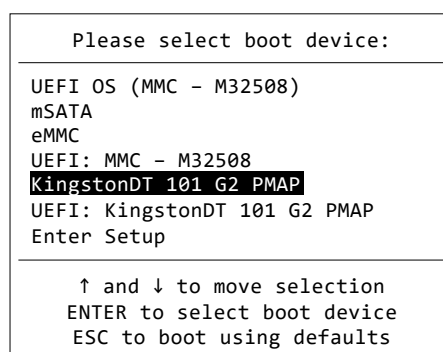
To install an update, the \images directory with the update files is required. The directory is contained in the archive and must be copied to the root directory of the USB stick.

For the restore/update process, the following is required:

- USB hub
- Service USB stick for the BSS application. If this USB stick has enough free memory, the backup/update files can also be saved to it.
- USB stick with the required backup/update files
- Keyboard

To restore a backup or perform a software/firmware update, proceed as follows:

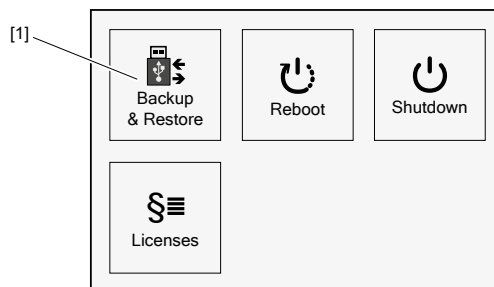
1. Plug the USB hub into the operator panel.
2. Plug the service USB stick and the keyboard into the USB hub.
3. Restart the device (disconnect and reconnect the voltage supply).
4. During the boot process, press F7 when the splash screen appears to enter the BIOS menu.
5. Enter the BIOS password 7090.
6. Select the service USB stick and press Enter. It takes about 30 seconds for the BIOS boot menu to appear.



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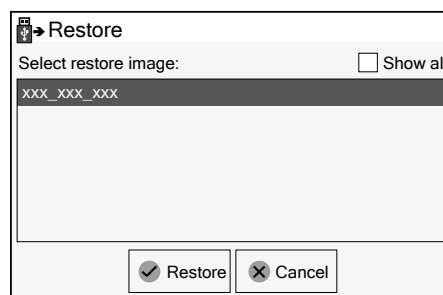
7. Plug the USB stick with the backup/update file into the USB hub (optional; if the service USB stick does not have enough memory).

8. Choose the "Backup & Restore" menu item.



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9. Choose "Restore" in the displayed menu.
10. Select the required USB stick as the source of the restoration or update and confirm by clicking the "Restore" button.



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11. Press [OK] in the confirmation dialog, then the restore/update process is started and a progress bar is displayed. The process takes about 15 to 20 minutes, depending on the USB stick used.



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NOTICE

Notice:

Never remove a USB stick while content is being saved. Improper removal can cause data loss.

12. Once the restore process is complete, confirm the dialog.
 13. Remove the USB hub.
 14. In the menu shown, choose "Shutdown" to shut down or "Reboot" to restart the hand-held terminal.
- ⇒ The backup has been restored/the software/firmware has been updated.

9 Technical data

9.1 Part numbers

Type designation	Part number
DOP21C-T70-0	19503571
DOP21C-T70-	19503598

9.2 DOP21C-T70- operator panel

General	
Nominal voltage	DC 24 V (nominal voltage tolerance range DC 19.2 V to DC 30 V according to EN 61131-2)
Max. interruption duration of the supply voltage	≤ 10 ms (according to EN 61131-2)
Max. inrush current	5.6 A (current limiting present)
Power consumption	12.7 W (530 mA at DC 24 V)
Display	7" TFT-LCD with LED backlighting, resolution 600 x 1024 pixels (WSVGA)
Touchscreen	Analog resistive
Keyboard	• Membrane keypad, 21 keys, with tactile feedback • 4 status LEDs and 1 power LED
Protection class	III according to EN 61131-2 and EN 50178
Degree of protection	IP65
Housing material	ABS plastic
Flame retardant	UL94-V0
Fall resistance	1 m on industrial floor, after that at least degree of protection IP54
Buffer battery	Maintenance-free, service life 17 years after initial use
Mass	950 g
Dimensions (W × H × D)	With emergency stop switch: 212 × 251 × 73 mm With key: 212 × 251 × 78 mm
Ambient conditions	
Storage temperature	-25 °C to +70 °C
Humidity	5% – 95% (non-condensing)
Vibration resistance with 3.5 mm	5 Hz ≤ f < 8.4 Hz (according to IEC 60068-2-6)

Ambient conditions	
Vibration resistance with 1 g	8.4 Hz ≤ f < 150 Hz (according to IEC 60068-2-6)
Shock resistance	15 g/11 ms (according to EN 61131-2)
Altitude	Up to h ≤ 2000 m
Storage temperature	-25 °C to +70 °C
Computer	
Processor	Celeron N2807 Dual Core 1.58 GHz
RAM	4 GB DDR3L
FLASH memory	8 GB eMMC
SSD (add-on memory)	32 GB MLC SSD mSATA
Operating system	Windows 10 IoT Enterprise 2016 LTSP
Communication	
Ethernet interface	1 × 10/100/1000 Mbit, RJ45, shielded
USB interface	1 × USB host 2.0, type A
Emergency stop switch/stop switch	
Nominal voltage (U _e)	DC 24 V
Minimum current (I _e)	10 mA (per contact)
Maximum current carrying capacity	1000 mA (per contact)
Utilization category	DC-13 (according to IEC 60947-5-1)
B _{10D}	250 000
Design	2-circuit, external wiring
Electrical isolation	AC 500 V
Enabling button	
Output type	Electromechanical switch contact
Switchable nominal voltage (U _e)	DC 24 V (nominal voltage tolerance range DC 19.2 V to DC 30 V in accordance with EN 61131-2)
Nominal current (I _e)	500 mA (max.)
Short circuit and overload protection	Yes
B _{10D} switch position 2	10 ⁶
B _{10D} switch position 3	10 ⁶
Actuation force from switch position 1 to 2	Typically 3 N
Actuation force from switch position 2 to 3	Typically 17 N
Electrical isolation	AC 500 V and DC 707 V

Chemical resistance

The following table provides an overview of the basic chemical resistance of the materials used in the device. The list is not exhaustive.

Some substances have strong creep properties, enabling them to penetrate the device and components and damage them. This type of resistance is not evaluated.

The specified values refer only to laboratory tests. The materials used are often subject to influences that cannot be detected in laboratory tests. These include temperature, pressure, and humidity. The specified values therefore serve only as a guide. In case of doubt, performing a test is recommended.

In the following table, the materials will be abbreviated as follows:

H/P: Housing and port cover

K: Keyboard

HB: Hanging bracket

TS: Touchscreen

H: Hand strap

ES: Emergency stop

EB: Enabling button

USB: USB protection cap

CC: Connection cable

The resistance of the materials is divided into the following classifications:

+ Good resistance

o Limited resistance

- Poor resistance

Medium	H/P	K	HB	TS	H	ES	EB	USB	CC
Acetone CAS no.: 000067-64-1	o	+	+	+	+	+	+	o	+
Ammonia CAS no.: 001336-21-6 Concentration: 10%	+	+	+	+	+	+	+	+	+
Gasoline CAS no.: 086290-81-5	+	+	+	+	+	+	+	+	+
Diesel fuel	+	+	+	+	+	+	+	-	+
Acetic acid CAS no.: 000064-19-7 Concentration: 10%	+	+	+	+	+	+	+	-	+
Ethanol CAS no.: 000064-17-5 Concentration: 95%	+	+	+	+	+	+	+	+	+
Hydraulic oil (mineral oil-based)	+	+	+	+	+	+	+	o	+
Potassium hydroxide CAS no.: 001310-58-3 Concentration: 10%	+	+	+	+	+	+	+	o	+
Linseed oil CAS no.: 008001-26-1	+	o	+	+	+	+	o	o	+

Medium	H/P	K	HB	TS	H	ES	EB	USB	CC
Cutting/grinding oil	+	o	+	+	+	+	o	o	+
Methanol CAS no.: 000067-56-1	+	+	+	+	+	+	+	+	+
Methylbenzene (toluene) CAS no.: 000108-88-3	+	+	+	+	+	+	o	-	+
Methyl ethyl ketone (butanone) CAS no.: 000078-93-3	o	o	o	+	+	+	o	-	o
Engine oil	+	o	+	+	+	+	+	o	+
Caustic soda CAS no.: 001310-73-2 Concentration: 10%	o	-	+	o	+	+	+	+	o
Petroleum ether (light petroleum) CAS no.: 008032-32-4	+	+	+	+	+	+	+	+	+
Hydrochloric acid CAS no.: 007647-01-0 Concentration: 10%	+	+	+	+	+	-	+	-	o
Lubricating grease	+	o	+	+	+	+	+	+	+
Sulfuric acid CAS no.: 007664-93-9 Concentration: 10%	+	+	+	+	+	+	o	o	+
Silicone oil	+	+	+	+	+	+	+	+	+
Alcohol	+	+	+	+	+	+	+	o	+
Turpentine	+	+	+	+	+	+	+	-	+

9.3 CB0-20-P connection unit

General	
Nominal voltage	DC 24 V
Protection class	III according to EN 61131-2 and EN 50178
Degree of protection	IP20
Dimensions (L × W × H)	88 × 69 × 57.1 mm
Mass	352 g
Ambient conditions	
Operating temperature	+5 °C to +55 °C
Storage temperature	-25 °C to +70 °C

Ambient conditions	
Relative humidity	5% – 95% (non-condensing)
Vibration resistance	IEC 60068-2-6: 5 Hz ≤ f < 9 Hz with 7 mm 9 Hz ≤ f < 150 Hz with 2 g
Shock resistance	15 g/11 ms (according to IEC 60068-2-27)

9.4 CAB-...-20P connection cable

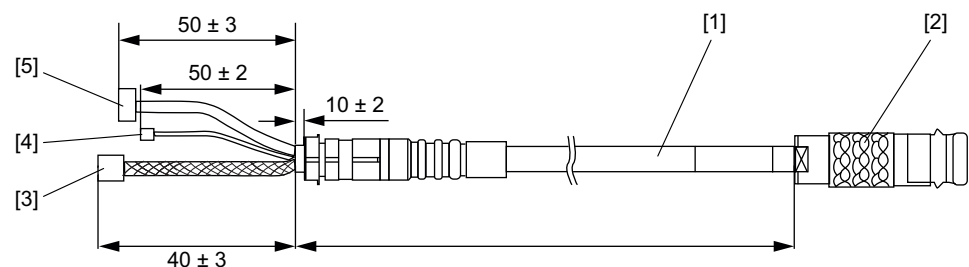
If the connector is replaced by a customer-specific connector, a reduction in interference immunity can result. In this case, ensure that the requirements of the EMC Directive 2014/30/EU are met.

Stability

The connection cable is resistant to the following substances:

- Water
- Cleaning agents (alcohols and surfactants)
- Oils
- Cutting oils (drilling oils)
- Greases
- Lubricants.

Cable design



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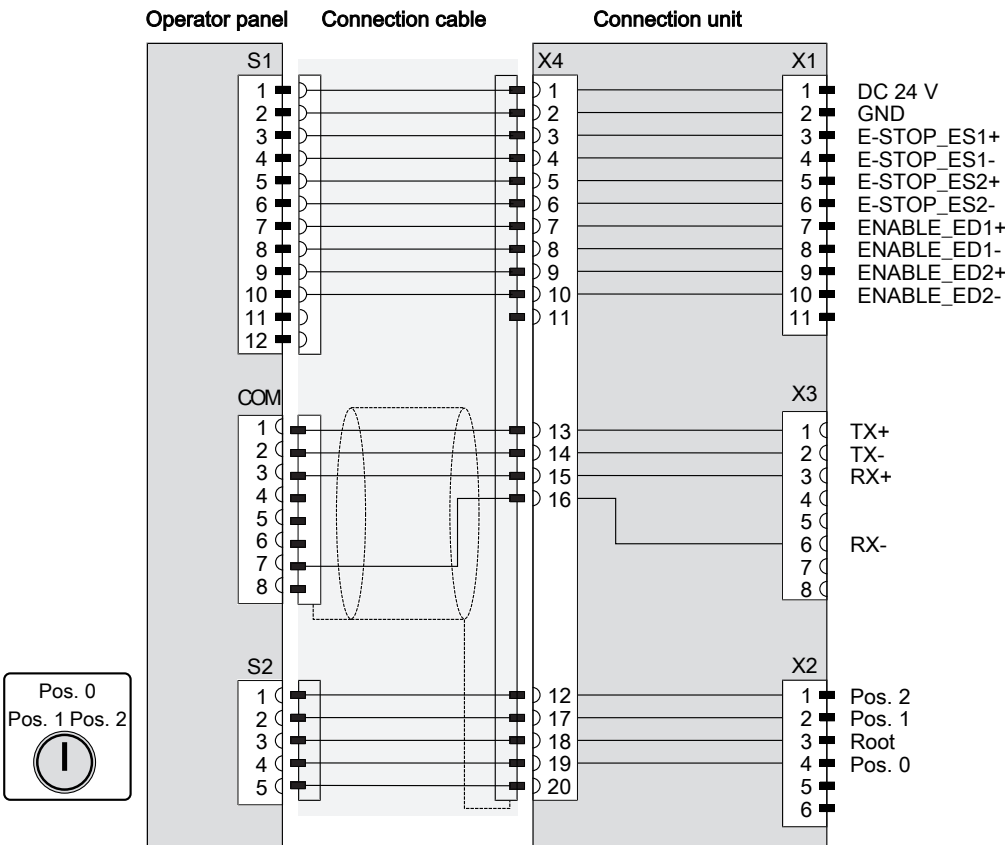
- [1] CAB-...-20P connection cable
- [2] 20-pin push-pull connector
- [3] 8-pin RJ45 connector
- [4] 5-pin socket connector
- [5] 12-pin socket connector

Assembly

If you assemble the connection cable between the connection unit and the operator panel yourself, use a cable with copper strands with a cross section of 0.24 mm² (AWG24) and a conductor resistance of no more than 90 Ω/km.

The supply characteristic values specified in the technical data apply to the device side. Depending on the cable length, voltage losses over the connection cable must also be considered.

9.5 Wiring diagram

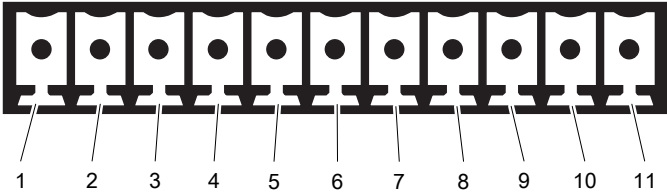


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9.6 Pin assignment

9.6.1 Connection unit

X1

Function		
Supply and control cables		
Connection type		
Push-in PCB connector, 11-pin, 3.5 mm		
Pin assignment		
		
No.	Name	Function
1	+24 V DC	DC 24 V input
2	GND	Reference potential
3	E-STOP_ES1+	Emergency stop/stop switch circuit 1 +
4	E-STOP_ES1–	Emergency stop/stop switch circuit 1 –
5	E-STOP_ES2+	Emergency stop/stop switch circuit 2 +
6	E-STOP_ES2–	Emergency stop/stop switch circuit 2 –
7	ENABLE_ED1+	Enabling button circuit 1 +
8	ENABLE_ED1–	Enabling button circuit 1 –
9	ENABLE_ED2+	Enabling button circuit 2 +
10	ENABLE_ED2–	Enabling button circuit 2 –
11	n.c.	Not connected

X2

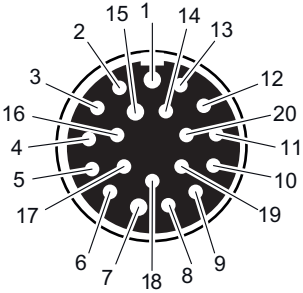
Function		
Control element signals		
Connection type		
Push-in PCB connector, 6-pin, 3.5 mm		
Pin assignment		
No.	Name	Function
1	Pos. 2	Key position 2
2	Pos. 1	Key position 1
3	Root	Root ¹⁾
4	Pos. 0	Key position 0
5	n.c.	Not connected
6	n.c.	Not connected

1) When using a digital input module with functional safety OFI41C: DC 24 V

X3

Function		
Ethernet interface of the connection unit		
Connection type		
Ethernet RJ45		
Pin assignment		
		
No.	Name	Function
1	TX+	Sending cable (+)
2	TX-	Sending cable (-)
3	RX+	Receiving cable (+)
4	res.	Reserved
5	res.	Reserved
6	RX-	Receiving cable (-)
7	res.	Reserved
8	res.	Reserved

X4

Function
Connection to DOP-21C-T70-.
Connection type
Push-pull, 20-pin
Pin assignment


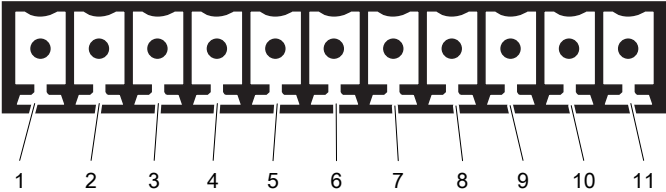
No.	Name	Function
1	+24 V DC	DC 24 V input
2	GND	Reference potential
3	E-STOP_ES1+	Emergency stop/stop switch circuit 1 +
4	E-STOP_ES1-	Emergency stop/stop switch circuit 1 –
5	E-STOP_ES2+	Emergency stop/stop switch circuit 2 +
6	E-STOP_ES2-	Emergency stop/stop switch circuit 2 –
7	ENABLE_ED1+	Enabling button circuit 1 +
8	ENABLE_ED1-	Enabling button circuit 1 –
9	ENABLE_ED2+	Enabling button circuit 2 +
10	ENABLE_ED2-	Enabling button circuit 2 –
11	n.c.	Not connected
12	Pos. 1	Key position 1
13	TX+	Sending cable (+)
14	TX-	Sending cable (-)
15	RX+	Receiving cable (+)
16	RX-	Receiving cable (-)
17	Pos. 2	Key position 2
18	Root	Root ¹⁾
19	Pos. 0	Key position 0
20	n.c.	Not connected

1) When using a digital input module with functional safety OFI41C: DC 24 V

9.6.2 DOP21C-T70- operator panel
 COM

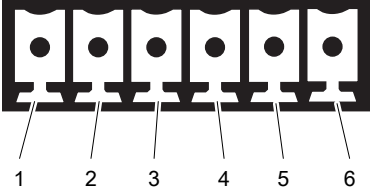
Function		
Ethernet interface of the connection unit		
Connection type		
Ethernet RJ45		
Pin assignment		
		
No.	Name	Function
1	TX+	Sending cable (+)
2	TX-	Sending cable (-)
3	RX+	Receiving cable (+)
4	res.	Reserved
5	res.	Reserved
6	RX-	Receiving cable (-)
7	res.	Reserved
8	res.	Reserved

S1

Function		
Supply and control cables		
Connection type		
Push-in PCB connector, 11-pin, 3.5 mm		
Pin assignment		
		
No.	Name	Function
1	+24 V DC	DC 24 V input
2	GND	Reference potential
3	E-STOP_ES1+	Emergency stop/stop switch circuit 1 +
4	E-STOP_ES1-	Emergency stop/stop switch circuit 1 –
5	E-STOP_ES2+	Emergency stop/stop switch circuit 2 +
6	E-STOP_ES2-	Emergency stop/stop switch circuit 2 –
7	ENABLE_ED1+	Enabling button circuit 1 +
8	ENABLE_ED1-	Enabling button circuit 1 –
9	ENABLE_ED2+	Enabling button circuit 2 +
10	ENABLE_ED2-	Enabling button circuit 2 –
11	n.c.	Not connected
12	n.c.	Not connected

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S2

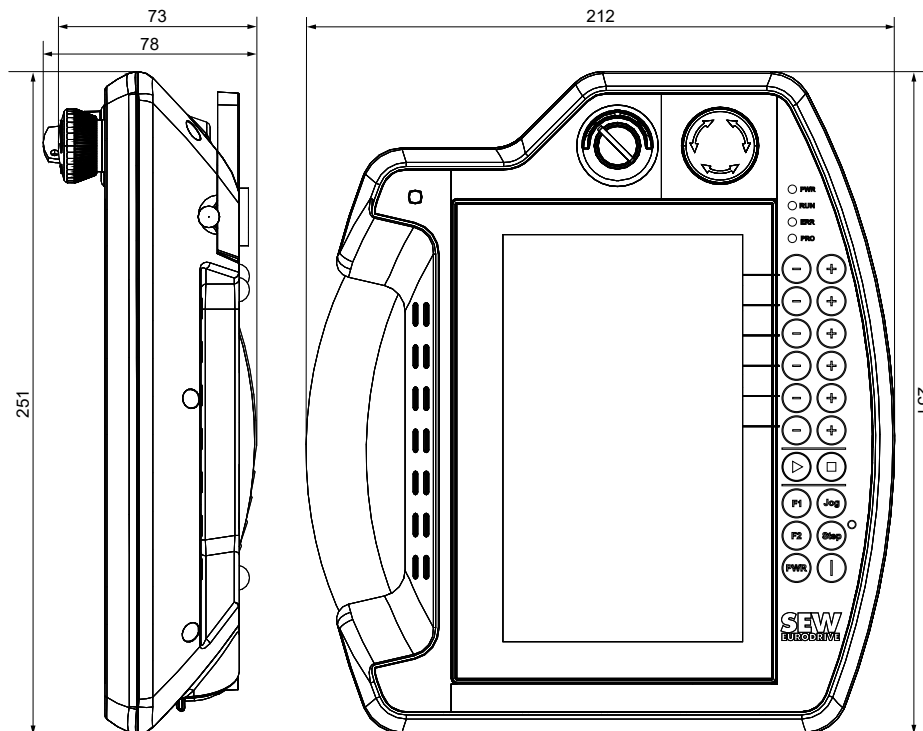
Function		
Control element signals		
Connection type		
Push-in PCB connector, 6-pin, 3.5 mm		
Pin assignment		
		
No.	Name	Function
1	Pos. 1	Key position 1
2	Pos. 2	Key position 2
3	Root	Root ¹⁾
4	Pos. 0	Key position 0
5	n.c.	Not connected

1) When using a digital input module with functional safety OFI41C: DC 24 V

9.7 Dimension drawings

9.7.1 DOP21C-T70- operator panel

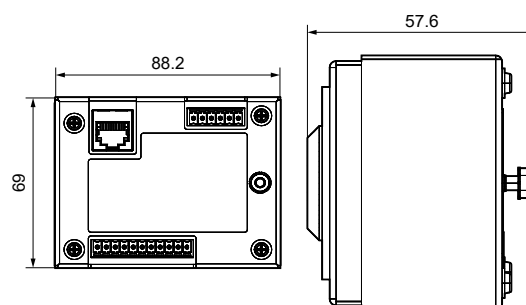
The dimension drawing shows the dimensions in mm.



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9.7.2 CB0-20-P connection unit

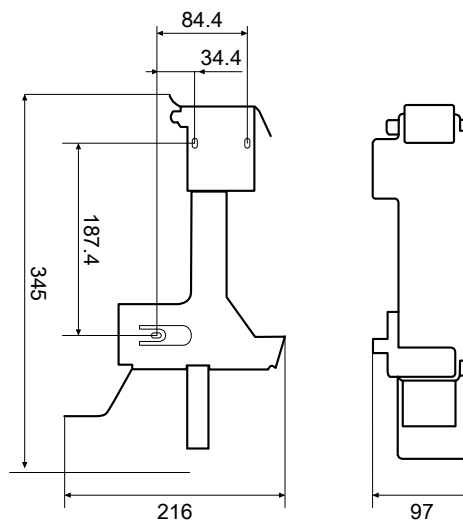
The dimension drawing shows the dimensions in mm.



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9.7.3 WB-T70 wall bracket

The dimension drawing shows the dimensions in mm.



9007233526009995

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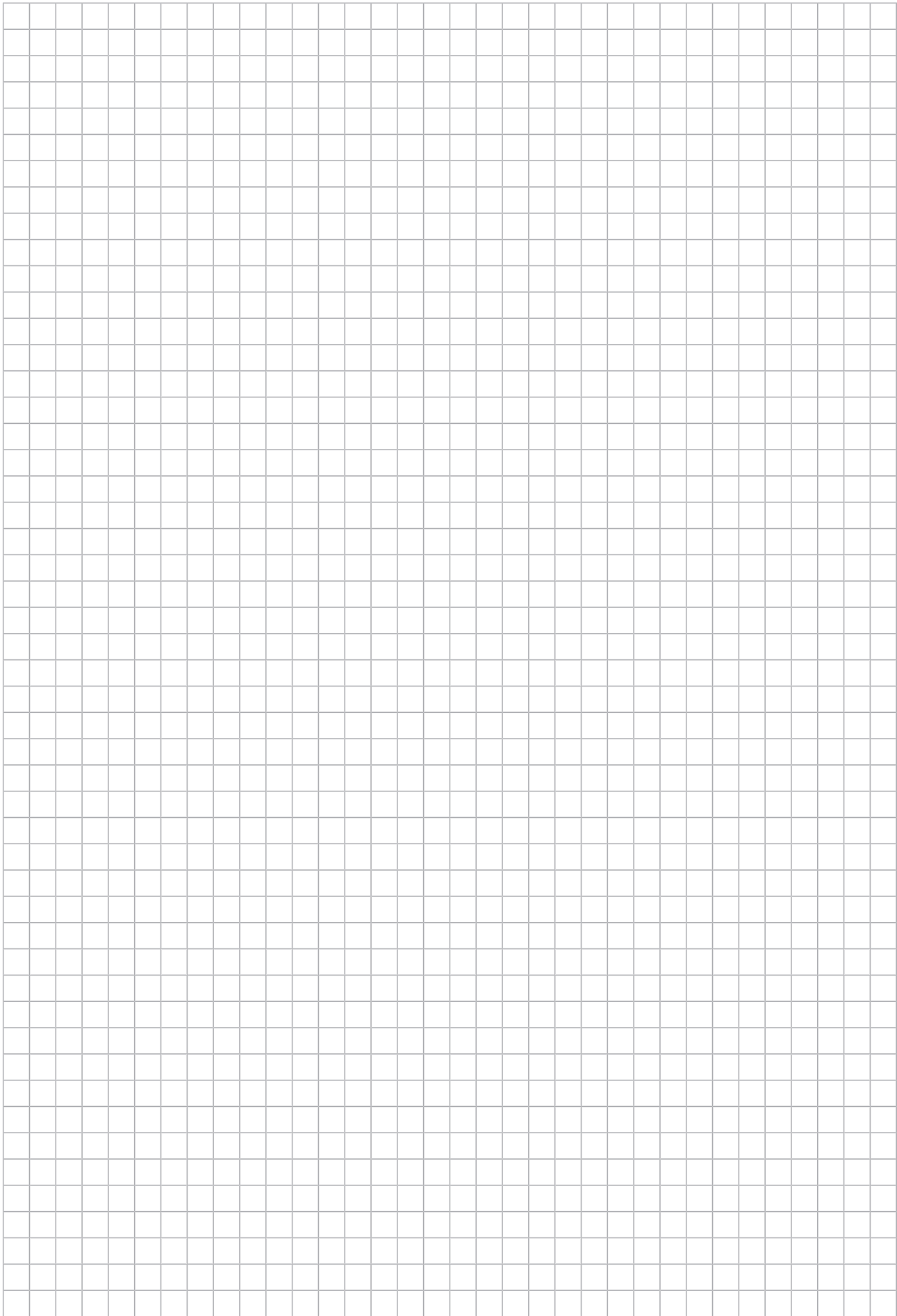
Trademarks 6

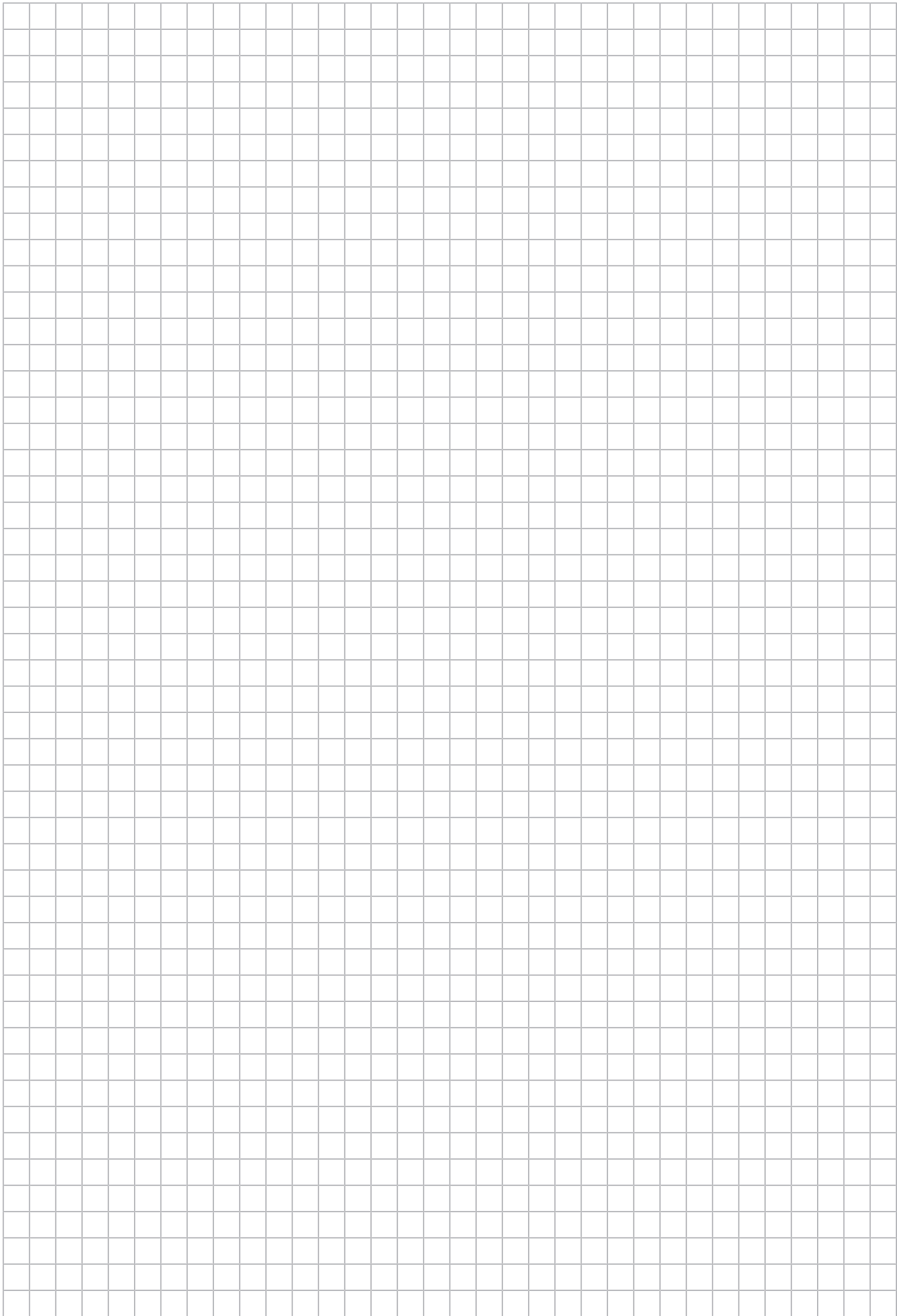
Type designation 13

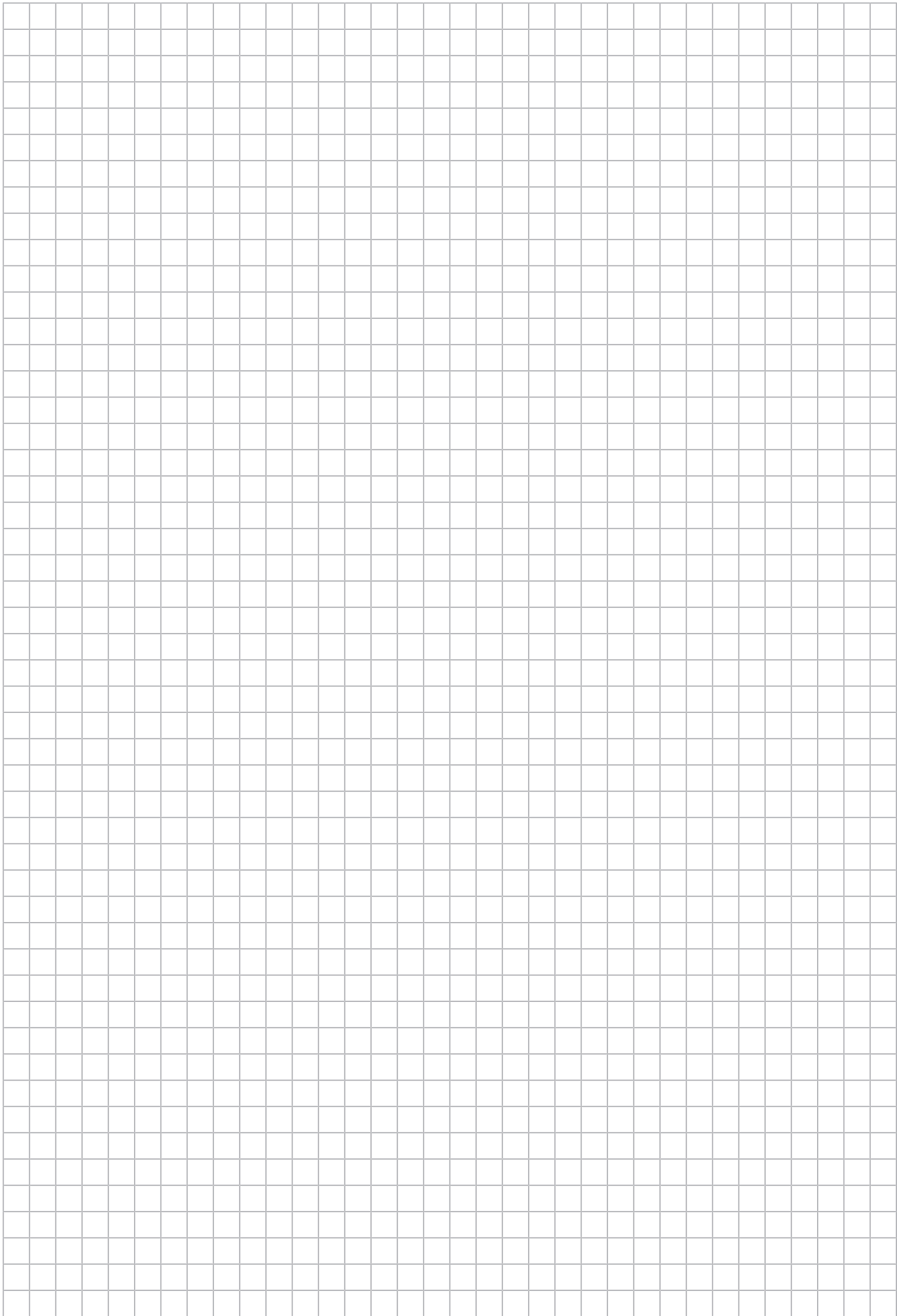
W

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