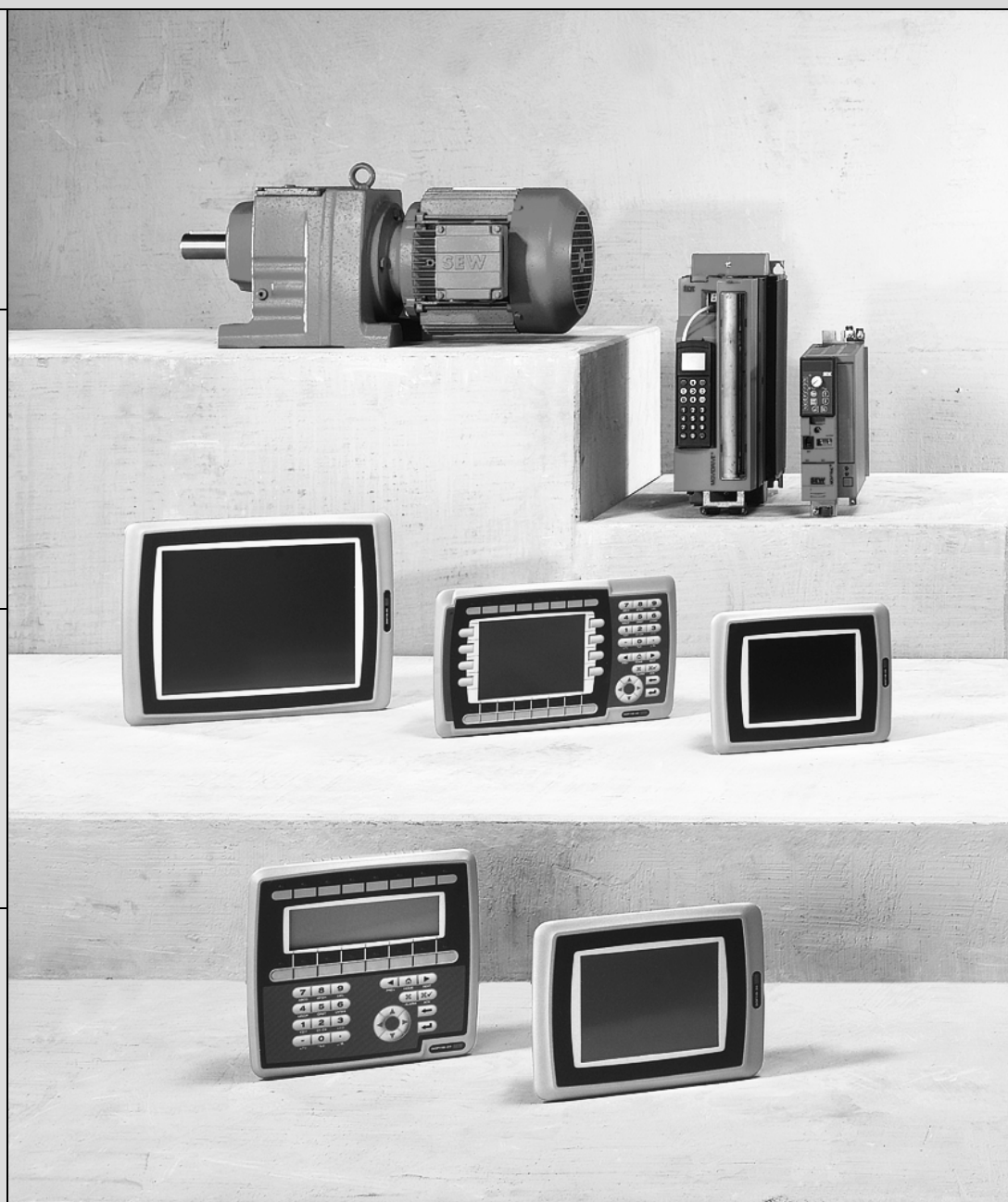
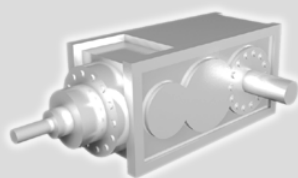
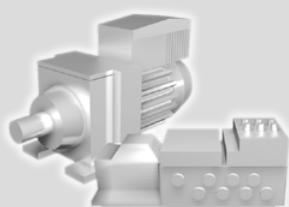
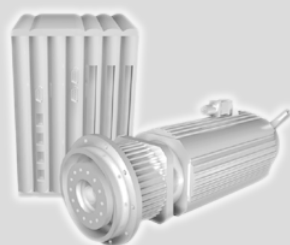
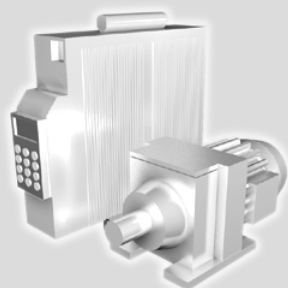




SEW
EURODRIVE



DOP11B Operator Terminals

Edition 02/2007

11503017 / EN

Operating Instructions





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1 Important Notes

1.1 Safety and warning instructions

Always observe the safety and warning instructions in this documentation.



Hazard

Indicates an imminently hazardous situation which, if not avoided, **WILL** result in death or serious injury.



Warning

Indicates an imminently hazardous situation caused by the product which, if not avoided, **WILL** result in death or serious injury. You will also find this signal to indicate the potential for damage to property.



Caution

Indicates a potentially hazardous situation which, if not avoided, **MAY** result in minor injury or damage to products.



Note

Indicates a reference to applications, for example for startup, or other useful information.



Documentation reference

Indicates a reference to a document, such as operating instructions, catalog, data sheet.

You must adhere to the operating instructions to ensure:

- Fault-free operation
- Fulfillment of any rights to claim under limited warranty

Consequently, read the operating instructions before you start working with the unit!

The operating instructions contain important information on servicing. Therefore, keep them close to the unit.



Important Notes

Notes on terminology

1.2 Notes on terminology

The operator terminals of the DOP11B series (Drive Operator Panel) can communicate with SEW frequency inverters and selected programmable logic controllers (PLC) via different communication paths at the same time.

For simplicity sake, we will be referring to **both units (PLC and inverter)** as **controller** in this document.

1.3 Designated use



The operator terminals of the DOP11B series are units for operation and diagnostics of industrial and commercial systems.

Do not operate the unit until you have established that the machine complies with the EMC Directive 89/336/EEC and that the conformity of the end product has been determined in accordance with the Machinery Directive 98/37/EC (with reference to EN 60204).

1.4 Operational environment

The following uses are prohibited unless the units are expressly designed for the purpose:



- Use in potentially explosive areas.
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc. You will find a list of the approved materials in the appendix.
- Use in non-stationary applications that are subject to mechanical vibration and shock loads in excess of the requirement in EN 50178.

1.5 Safety functions



The operator terminals of the DOP11B series may not execute any safety functions without master safety systems.

Use higher-level safety systems to ensure protection of equipment and personnel.



1.6 Liability for defects

Incorrect handling or any action performed that is not specified in these operating instructions could impair the properties of the product. In this case, you lose any right to claim under limited warranty against SEW-EURODRIVE GmbH & Co KG.

1.7 Product names and trademarks

The brands and product names contained within these operating instructions are trademarks or registered trademarks of the titleholders.

1.8 Disassembly and waste disposal



- Complete or partial recycling of the operator terminal is subject to local regulations.
- Note that the following components contain substances that may represent a health hazard and cause environmental pollution: Lithium battery, electrolyte condensers and display.



2 Safety Notes

2.1 General notes

- Read the safety notes carefully.
- Check the delivery for transport damage. If damage is found, advise your supplier.
- The terminal fulfills the requirements of article 4 of EMC directive 89/336/EEC.
- Do not use the terminal in an environment with high explosive hazard.
- SEW-EURODRIVE is not liable for modifications, changes, additions and / or alterations to the product.
- Use only spare parts and accessories manufactured according to the specifications of SEW-EURODRIVE.
- Read the installation and operating instructions completely and carefully prior to installation, use or repair of the terminal.
- Never allow fluids to penetrate the slots or holes in the terminal. This may lead to a fire or cause the equipment to become live.
- Operation of the terminal is restricted to qualified personnel.

2.2 Installation and startup

- The terminal has been designed for stationary installation.
- Place the terminal on a stable base during installation. The terminal may be damaged if it is dropped.
- Install the terminal according to the accompanying installation instructions.
- The unit must be grounded according to the accompanying installation instructions.
- The installation must be performed by qualified personnel.
- Route high-voltage cables, signal cables and supply cables separately from one another.
- Make sure that the voltage and polarity of the electrical power source are correct before you connect the terminal to the power supply.
- The openings in the housing are designed to allow air to circulate and must not be covered over.
- Do not install the terminal in locations where it will be exposed to a powerful magnetic field.
- **Do not install or operate the terminal where it will be exposed to direct sunlight.**
- The peripheral equipment must be suitable for the application.
- On certain terminal models, the display glass is covered with a laminated foil to protect it from scratches. Pull off the foil carefully following installation to prevent static electricity causing damage to the terminal.



- Make sure that **preventive measures** and **protection devices** correspond to the **applicable regulations** (e.g. EN 60204 or EN 50178).

Required preventive measures: Ground the unit

Required protection devices: Overcurrent protective devices

2.3 *Transportation/storage*

Inspect the shipment for any damage that may have occurred in transit as soon as you receive the delivery. Inform the shipping company immediately. Do not operate the operator terminal if it is damaged.

Use suitable, sufficiently rated handling equipment if necessary.



Possible damage caused by incorrect storage!

Store the operator terminal in a dry, dust-free room if it is not to be installed straight away.

2.4 *Operating notes*

- Always keep the terminal clean.
- **Emergency stop and other safety functions should not be controlled from the terminal.**
- Do not touch the keys, displays, etc. with sharp objects.
- Bear in mind that the terminal is ready to operate even if the backlighting no longer functions. This means keyboard and touchscreen inputs will still be registered.

2.5 *Service and maintenance*

- The agreed limited warranty applies.
- Clean the display and face of the terminal with a soft cloth and mild detergent.
- Repairs must be performed by qualified personnel.



3 Unit Information, Installation and Hardware

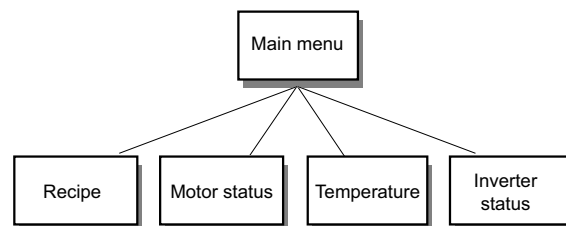
3.1 Introduction

Requirements in modern industrial environments are steadily increasing and operator tasks at machines or on production lines are becoming increasingly more complex and involve more responsibility. The operator must be able to obtain information on the current status quickly and easily, and be able to influence the operation of the machine immediately. The functions in control systems are also increasing and becoming more advanced, enabling more complicated processes to be controlled efficiently. The operator terminals make human-machine communication simple and safe even for the most advanced production processes.

The graphical operator terminals have been developed to meet the requirements for human-machine communication when controlling or monitoring different applications in the manufacturing and process industries. They simplify the operator's work since they can easily be adapted to the working environment. This means the operator can continue to use the concepts he or she is familiar with.

Projects can be built up as menu hierarchies or sequences in the terminal. A menu hierarchy consists of a main menu (with an overview, for example) and a number of sub-menus with more detailed information on the relevant area. The operator normally selects which menu is to be shown.

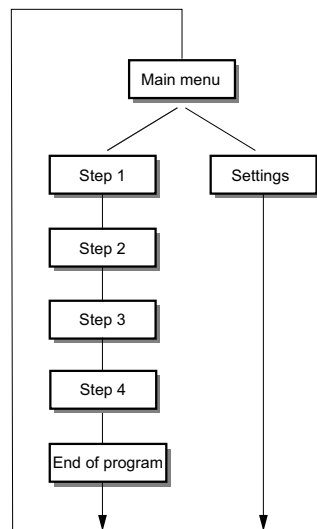
The menus in the operator terminals are called blocks.



53717AEN



A sequence is also based on a main menu, from which the operator selects a sequence showing the blocks in a predetermined order. The program in the controller is usually used to control the block display.



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The functions of the operator terminals enable the process to be displayed as graphics or as text. There are also functions for

- Alarm handling
- Printing
- Trends
- Recipe management
- Time control

The functions are not only easy to use in the terminal, they are also cost-efficient in comparison with conventional solutions with buttons, indicator lamps, time relays, preset counters and seven-day clocks. There are also functions to improve the application of the drive electronics.



3.1.1 Programming

You program the operator terminal using a PC and the HMI-Builder software.

The operator terminal is to a large extent object-oriented, i.e. first an object is selected and then the function the object is to have. All types of signals are defined on this principle.

The programmed project is stored in the operator terminal.

3.1.2 Connecting the terminal to the SEW frequency inverter

There are many advantages in using a terminal together with the controller system:

- The user need not make any changes or additions in the existing controller programs
- and the terminal does not block any of the inputs or outputs in the controller system.
- Overview of controller functions will be optimized, e.g. time control and alarm handling.

3.1.3 Status display and control

The operator is familiar with indicator lamps as well as analog and digital display instruments since these are used in the majority of applications today. The same applies to push buttons and rotary and thumbwheel switches for controlling a system. The terminal enables the operator to have all status displays and controls in one unit.

The operator can easily see and influence information in the controller system. Moreover, it is possible to clearly see and influence all the signals affecting a specific object, e.g. a pump or a drive unit, which further simplifies the work.

This is possible thanks to the fact that the interchange of all information takes place through so-called blocks in the terminal. Blocks can be of the text block type, with only text information, or of the graphic block type, with full graphical presentation.

The operator terminals are equipped with function keys for direct control. Maneuvering is controlled by linking different commands to the function keys. This optimizes the control process.

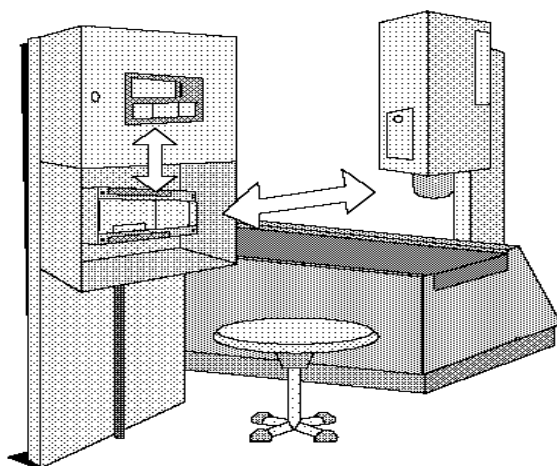
If several blocks are used, the operator can jump between the different blocks by using jump objects. This creates a menu hierarchy, which produces a structured application.



3.1.4 Setting up the operator terminal

The terminal should be placed at the workplace to ensure maximum usability. This will enable the operator to receive all necessary information and work effectively. Set up the terminal at the correct height so that the user can see and operate it without problems. Visibility of the screen is influenced by distance, height, angle, light and color selection.

Monitoring, control and maintenance are remote functions and can be executed, for example, from a different location in the building or a different city. In such instances communication can take place via LAN (Local Area Network), Internet or modem. If there is a long production line with a large number of workplaces several terminals can be connected to one or more controller systems in the network.



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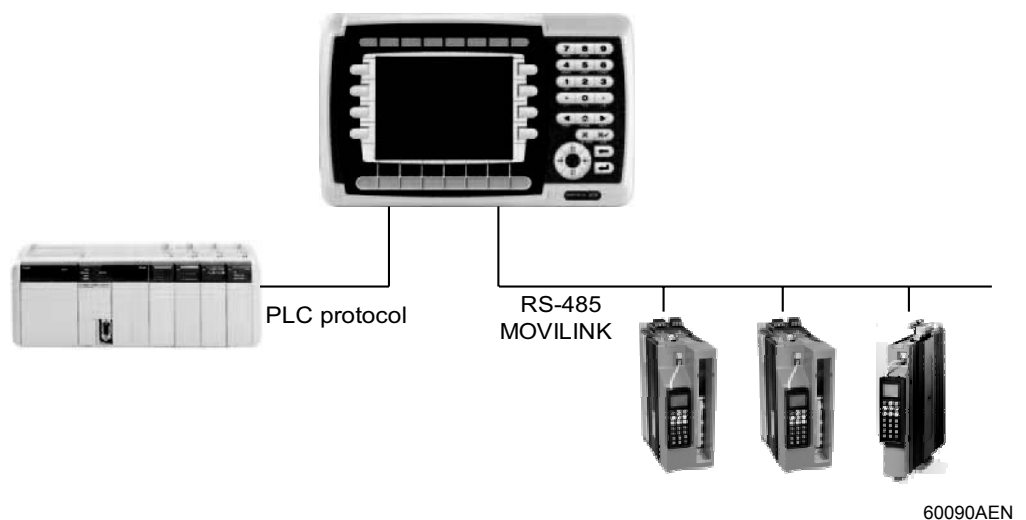


3.1.5 Compact solutions

External units such as barcode scanners, weighing machines, modems, etc. can be connected through the terminal to the controller system. All that is required is for the unit to be connected to an RS-232 interface, and that communication is made through ASCII protocol. Data entering the terminal is written directly to the controller register.

It is also possible to connect a unit working in parallel, such as an additional terminal or a PC with the MOVITOOLS® programming software for the inverter. The terminal then makes it possible to program the controller system while also communicating with the controller system.

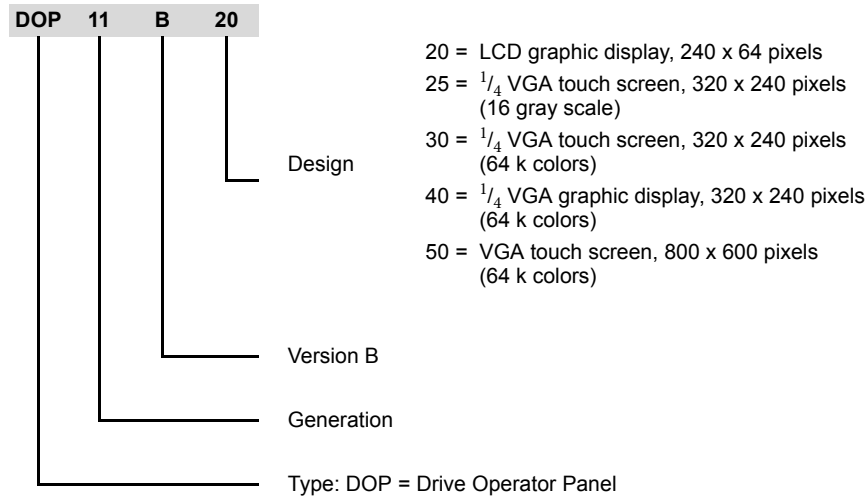
When the PLC and the inverter are connected to one terminal (two drivers in the terminal), data can be exchanged between the two units (analog and digital signals).





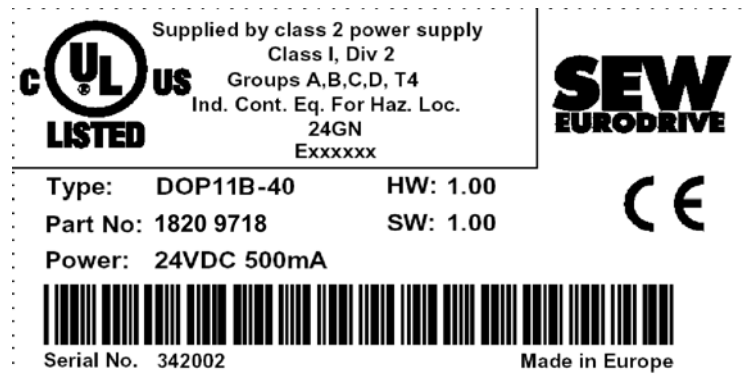
3.2 Unit designation, nameplates and scope of delivery

3.2.1 Example unit designation



3.2.2 Example nameplate

The unit nameplate is attached to the side of the unit.



11596AXX

Figure 1: Unit nameplate

3.2.3 Scope of delivery

Included in the scope of delivery:

- DOP11B operator terminal
- Installation equipment and installation template
- Operating instructions with assembly and installation notes
- Phoenix COMBICON connector for DC 24 V, 5 mm, 3-pin



3.3 Unit design DOP11B-20

Part number: 1820 9661



Figure 2: DOP11B-20

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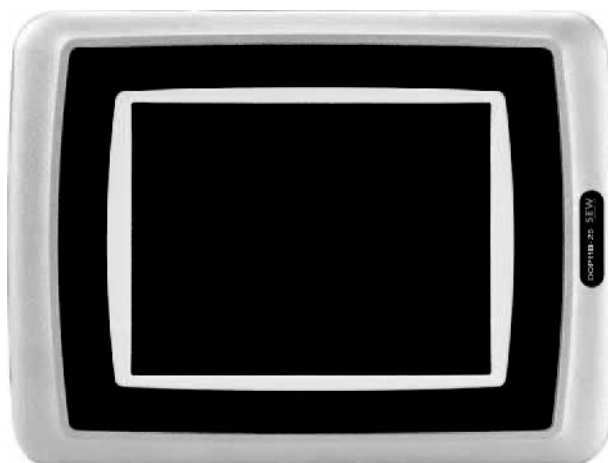
- [1] LEDs red / green
- [2] Display
- [3] Function keys
- [4] Navigation keys
- [5] Labeling tiles
- [6] Numerical keys

- 240 x 64 pixel LCD graphic display (monochrome) with background illumination
- Voltage supply: DC 24 V, 350 mA
- 2 serial interfaces (RS-232 and RS-485/RS-422); two can be used simultaneously
- 1 Ethernet interface (RJ45 socket)
- 1 USB interface
- IP66 membrane keypad with navigation keys, numeric keypad and 8 function keys
- 16 LEDs (two colors red / green)
- 1 expansion slot
- 1 expansion interface
- 12 MB application memory



3.4 Unit design DOP11B-25

Part number: 1820 9688



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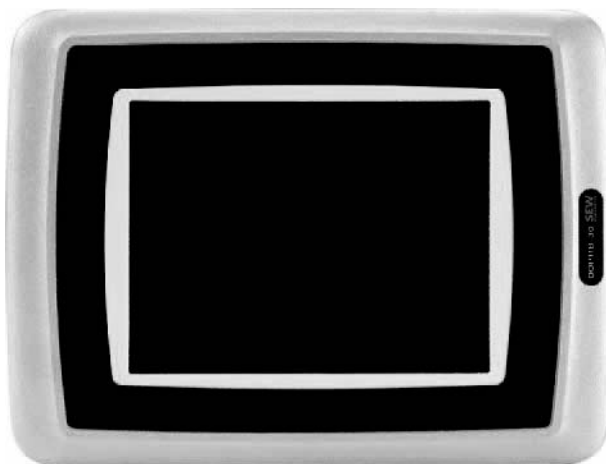
Figure 3: DOP11B-25

- 320 x 240 pixels, $\frac{1}{4}$ VGA touch screen (16 gray scale, STN, 5.7") with background illumination
- Voltage supply: DC 24 V, 450 mA
- 2 serial interfaces (RS-232, RS-485/RS-422); two can be used simultaneously
- 1 Ethernet interface (RJ45 socket)
- 1 USB interface
- IP66
- Horizontal or vertical installation
- 1 expansion slot
- 1 expansion interface
- 12 MB application memory



3.5 Unit design DOP11B-30

Part number: 1820 9696



60066AXX

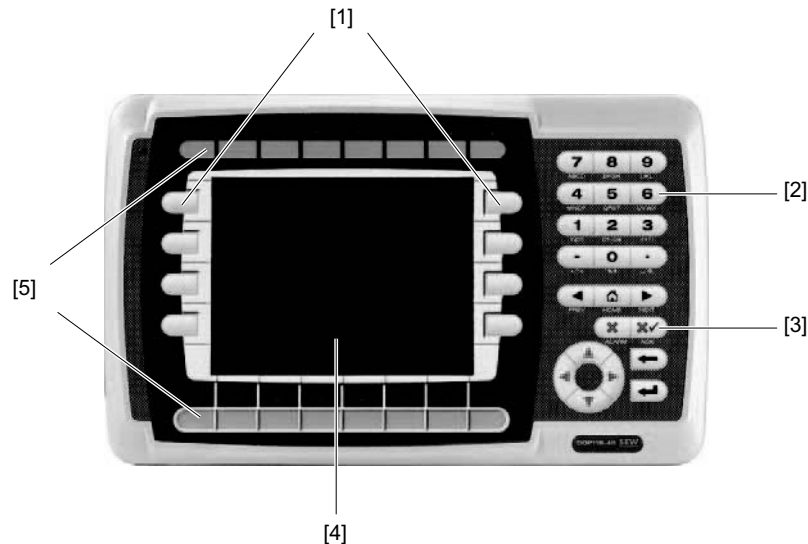
Figure 4: DOP11B-30

- 320 x 240 pixels, $\frac{1}{4}$ VGA touch screen (64 k colors, STN, 5.7") with background illumination
- Voltage supply: DC 24 V, 450 mA
- 2 serial interfaces (RS-232, RS-485/RS-422); two can be used simultaneously
- 1 Ethernet interface (RJ45 socket)
- 1 USB interface
- IP66
- Horizontal or vertical installation
- 1 expansion slot
- 1 expansion interface
- 12 MB application memory



3.6 Unit design DOP11B-40

Part number: 1820 9718



60092AXX

Figure 5: DOP11B-40

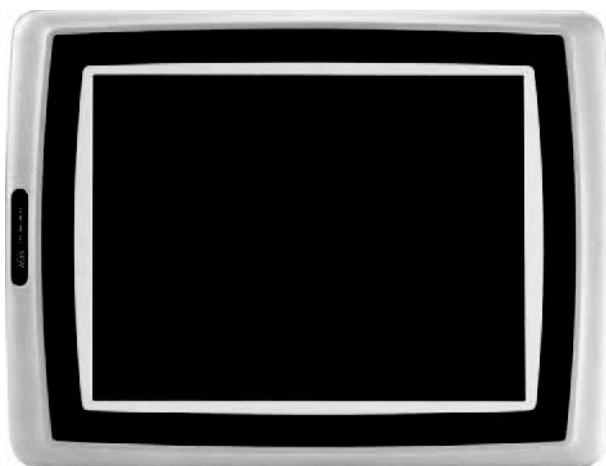
- [1] Function keys
- [2] Numerical keys
- [3] Navigation keys
- [4] Display
- [5] Labeling tiles

- 320 x 240 pixels, $\frac{1}{4}$ VGA graphic display (64 k colors, STN, 5.7") with background illumination
- Voltage supply: DC 24 V, 500 mA
- 2 serial interfaces (RS-232 and RS-485/RS-422); two can be used simultaneously
- 1 Ethernet interface (RJ45 socket)
- 1 USB interface
- IP66 membrane keypad with navigation keys, numeric keypad and 16 function keys
- 16 LEDs (two colors red / green)
- 1 expansion slot
- 1 expansion interface
- 12 MB application memory



3.7 Unit design DOP11B-50

Part number: 1820 9726



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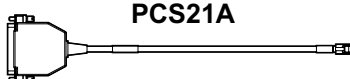
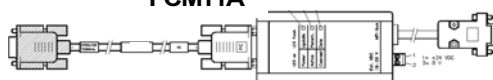

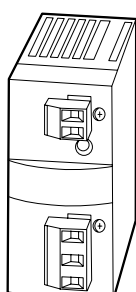
Figure 6: DOP11B-50

- 800 x 600 pixels, VGA touch screen (64 k colors, STN, 10.4") with background illumination
- Voltage supply: DC 24 V, 1.0 A
- 2 serial interfaces (RS-232 and RS-485/RS-422); two can be used simultaneously
- 1 Ethernet interface (RJ45 socket)
- 1 USB interface
- IP66
- 1 expansion slot
- 12 MB application memory

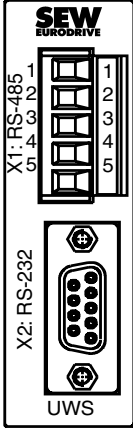


3.8 Accessories and options

Cables for programming of the DOP11B operator terminal and communication between operator terminal and MOVIDRIVE®.

Option	Description	Part number
PCS11B (Panel Cable Serial)	Connection cable between operator terminal (RS-232, max. 115.2 Kbit/s) and PC (RS-232) for programming the operator terminal. Set length of 3 m (10ft.). 	1821 1062
PCS21A (Panel Cable Serial)	Communication cable between the operator terminal (RS-485, max. 57.6 Kbit/s) and SEW frequency inverters (RS-485, RJ-10). Set length of 5 m (10ft.). 	1820 6328
PCS22A (Panel Cable Serial)	Communication cable from operator terminal (RS-485, max. 57.6 Kbit/s) to open cable end. Set length of 5 m (10ft.).	1821 1054
PCM11A (Panel Cable MPI)	Communication cable between operator terminal (RS-232, max. 57.6 Kbit/s) and SIMATIC S7 via MPI (max. 12 Mbit/s). Set length of 3 m (10ft.). 	824 8303
PCC11A (Panel Cable Converter)	Communication cable between operator terminal (RS-422, max. 57.6 Kbit/s) and UWS11A or USS21A (RS-232) interface converters. For communication with SEW frequency inverters. Set length of 3 m (10ft.). 	824 8095
UWU52A	Switched-mode power supply Input AC 100 ... 240 V Output DC 24 V, 2.5 A 	188 1817



Option	Description	Part number
UWS11A	<p>Interface converter for DIN rail mounting RS-232 ↔ RS-485</p> 	822 689X



4 Installation

4.1 Installation instructions for basic unit



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

4.1.1 Separate cable ducts

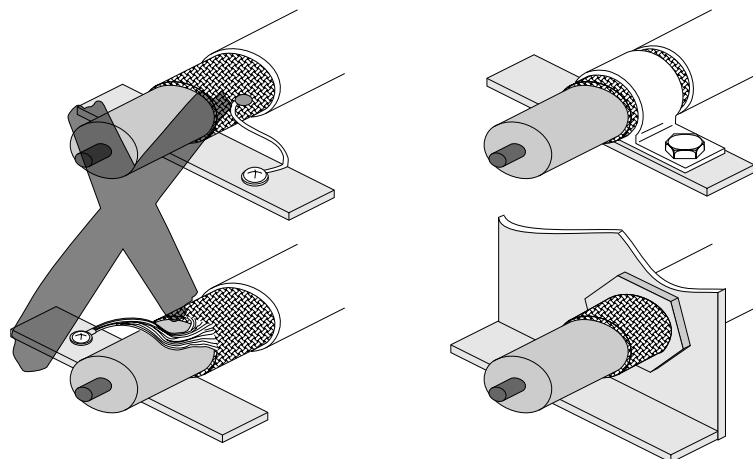
Route **power cables** and **electronics cables** in **separate cable ducts**.

4.1.2 Cross sections

- Voltage supply: **Cross section according to rated input current.**
- Electronics cables:
 - 1 conductor per terminal 0.20 ... 0.75 mm² (AWG 20 ... 17)
 - 2 conductors per terminal 0.20 ... 0.75 mm² (AWG 20 ... 17)

4.1.3 Shielding and grounding

- Use **shielded control cables** only.
- Apply the **shield by the shortest possible route and make sure it is grounded over a wide area at both ends**. Ground one end of the shield via suppression capacitor (220 nF/50 V) to avoid ground loops. If using double-shielded cables, ground the outer shield on the controller end and the inner shield on the other end.



00755BXX
Figure 7: Examples of correct shield connection with metal clamp (shield clamp) or metal cable gland



Installation

Connecting basic unit DOP11A-20 to DOP11A-50

- **Shielding** can also be achieved by laying the cables in **grounded sheet metal ducts or metal pipes**. In this case, the **power cables and control cables** should be **routed separately**.
- The unit is grounded via the connector for 24 V.



See Chapter 8.2 for information on UL compliant installation.

4.2 Connecting basic unit DOP11A-20 to DOP11A-50

4.2.1 Voltage supply



Ensure correct polarity when connecting the terminal. Incorrect polarity will damage the unit.



Make sure that the operator terminal and the controller system have the same electrical grounding (reference voltage value). Communication errors may occur if this is not the case.

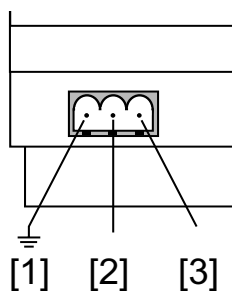
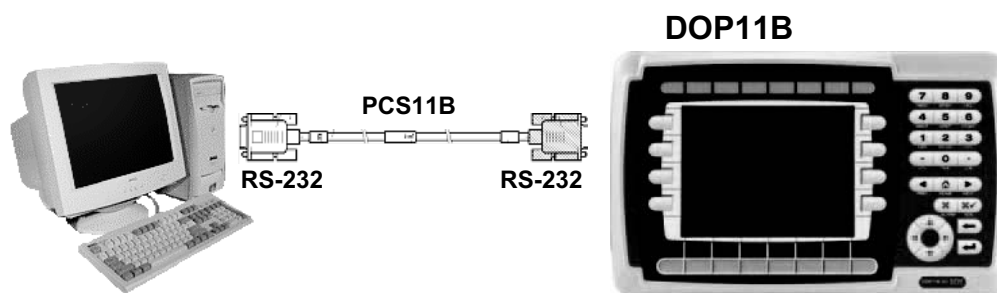


Figure 8: Voltage supply for DOP11B-20 to DOP11B-50 60059AXX

- [1] Ground
- [2] 0 V
- [3] +24 V



4.3 Connection to a PC



60060AXX

Figure 9: Connection to a PC

The operator terminal is programmed using the HMI-Builder programming software. You need the PCS11B communication cable to program the operator terminal.



The power must be switched off when connecting the units.



4.4 RS-485 connection

You can connect up to 31 MOVIDRIVE® units to one operator terminal with the RS-485 interface.

Direct connection of the DOP11B to a type MOVIDRIVE® frequency inverter via the RS-485 interface is implemented using a 25-pin Sub-D connector.

4.4.1 Wiring diagram: RS-485 interface

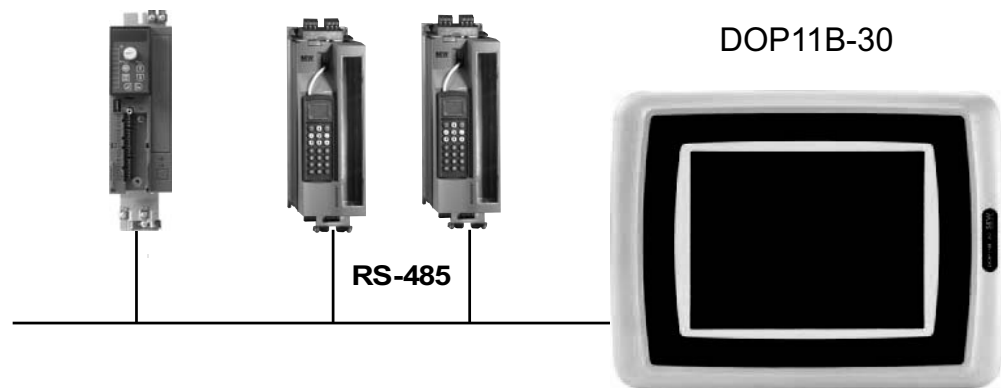


Figure 10: RS-485 connection

60093AXX

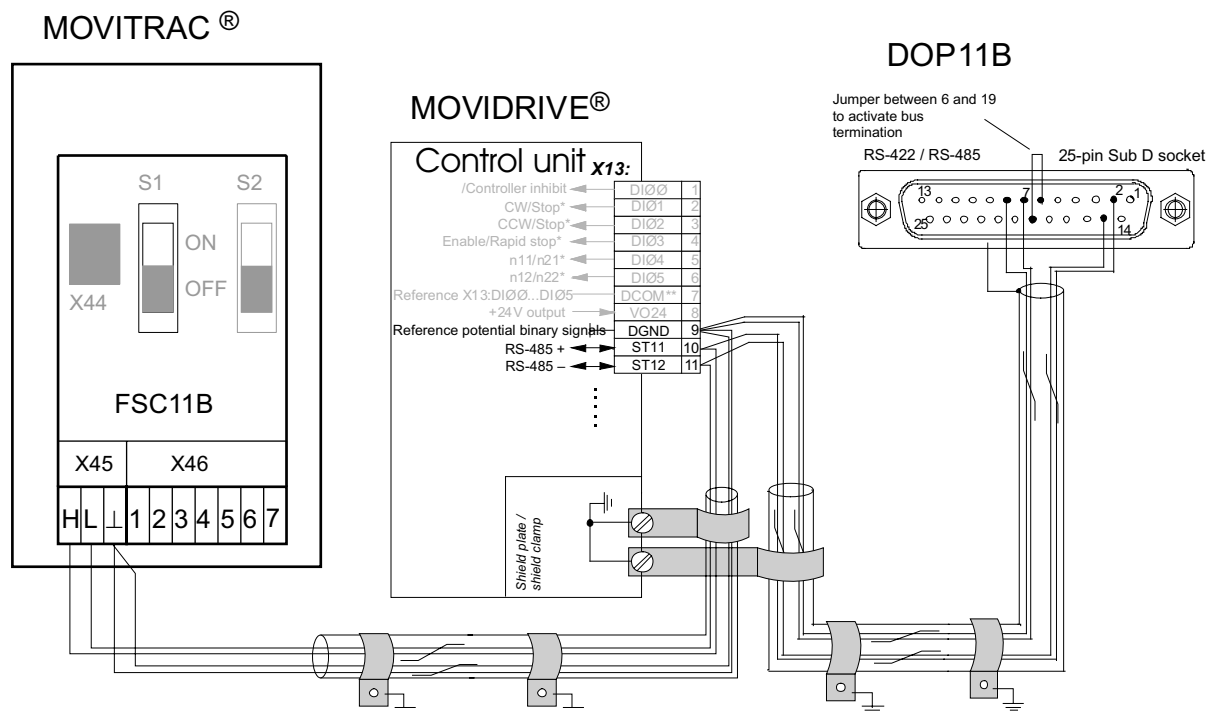


Figure 11: DOP11B pin assignment

60061AEN



**Cable
specification**

Use a 2 x 2-core twisted and shielded copper cable (data transmission cable with braided copper shield). The cable must meet the following specifications:

- Core cross section 0.5 ... 0.75 mm² (AWG 20 ... 18)
- Cable resistance 100 ... 150 Ω at 1 MHz
- Capacitance per unit length ≤ 40 pF/m (12 pF/ft) at 1 kHz.

For example, the following cable is suitable:

- Lappkabel, UNITRONIC® BUS CAN, 2 x 2 x 0.5 mm².

Shielding

Apply shield on both ends over large area at the controller electronics shield clamp and in the housing of the 25-pin Sub-D connector of the operator terminal.



The bus controller may be destroyed by a short circuit of the EMC decoupling between electronics and ground.

Do not connect the shield ends to DGND!

Cable length

The permitted total cable length is 200 m (660 ft).

**Terminating
resistor**

The controller and the UWS11A interface converter come equipped with dynamic terminating resistors. Do not connect **any external terminating resistors** in this instance!

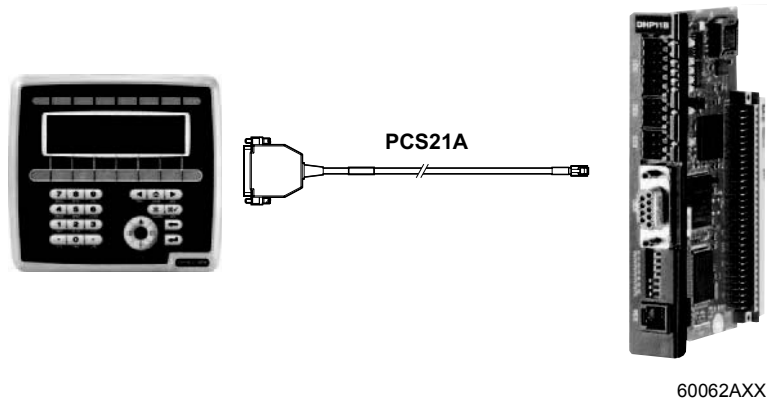
If the DOP11B-10 operator terminal is connected to the frequency inverters via RS-485, activate the terminating resistor in the 25-pin Sub-D connector of the DOP11B-10 (jumper between pin 6 and pin 19) if the operator terminal is the first or last station.



There must not be any difference of potential between the units which are connected together using the RS-485. Take suitable measures to avoid a potential displacement, for example, by connecting the unit grounds (GND) with a separate cable, connecting the voltage supply (24 V) etc.



4.5 Connecting RS-485 to PCS21A



4.5.1 Shielding

Connect the shield to the electronics shield clamp of the controller and make sure it is connected over a wide area. The shielding is already connected in the housing of the 25-pin Sub-D connector of the PCS21A.



The bus controller may be destroyed by a short circuit of the EMC decoupling between electronics and ground.

Do not connect the shield ends to DGND!

4.5.2 Terminating resistor

Dynamic terminating resistors are installed in the controller. Do not connect **any external terminating resistors!**

The terminating resistor in the 25-pin sub-D connector of the DOP11B is already activated by a jumper between pin 6 and pin 19.



There must not be any difference of potential between the units which are connected together using the RS-485. Take suitable measures to avoid a potential displacement, for example, by connecting the unit grounds (GND) with a separate cable, connecting the voltage supply (24 V) etc.



4.6 Connection RS-422 via UWS11A

Connecting the DOP11B to a MOVIDRIVE® frequency inverter via UWS11A.

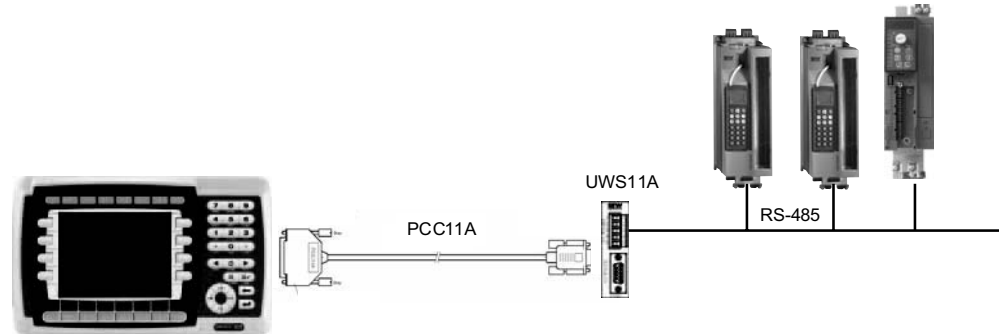


Figure 12: Connection via serial connection (UWS11A)

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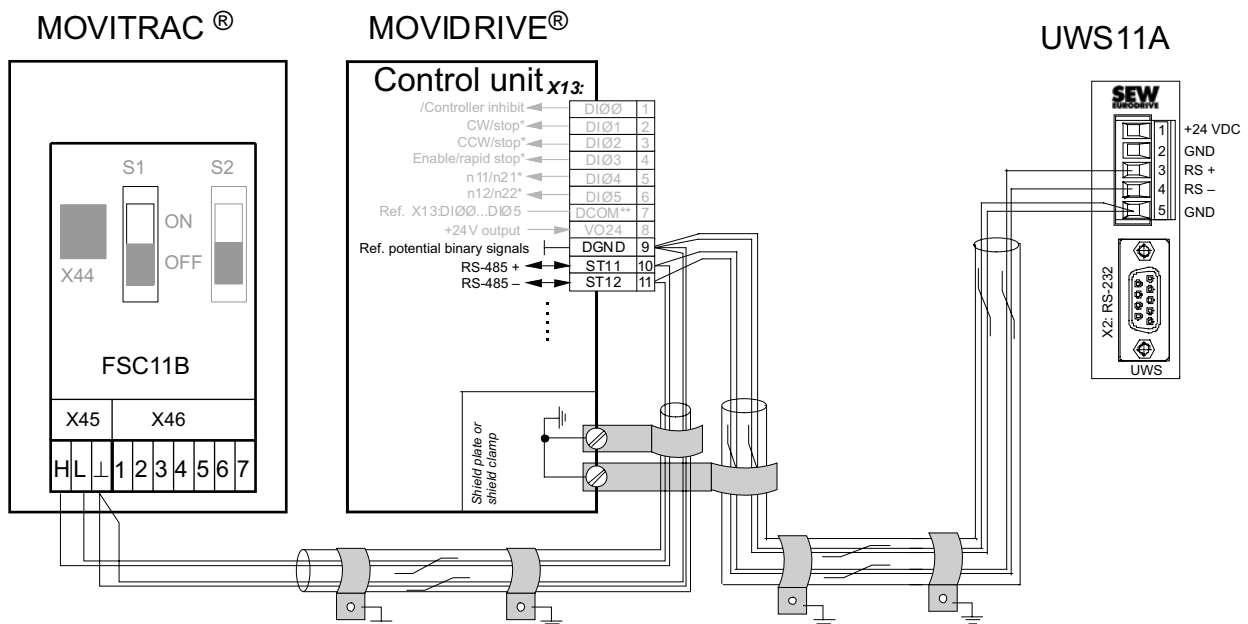


Figure 13: UWS11A terminal assignments

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4.6.1 RS-485 connection

See section "RS-485 connection" on page 26 for the cable specification.



4.7 ETHERNET connection

Connection of the DOP11B to a PC for programming and remote maintenance via ETHERNET and TCP/IP.

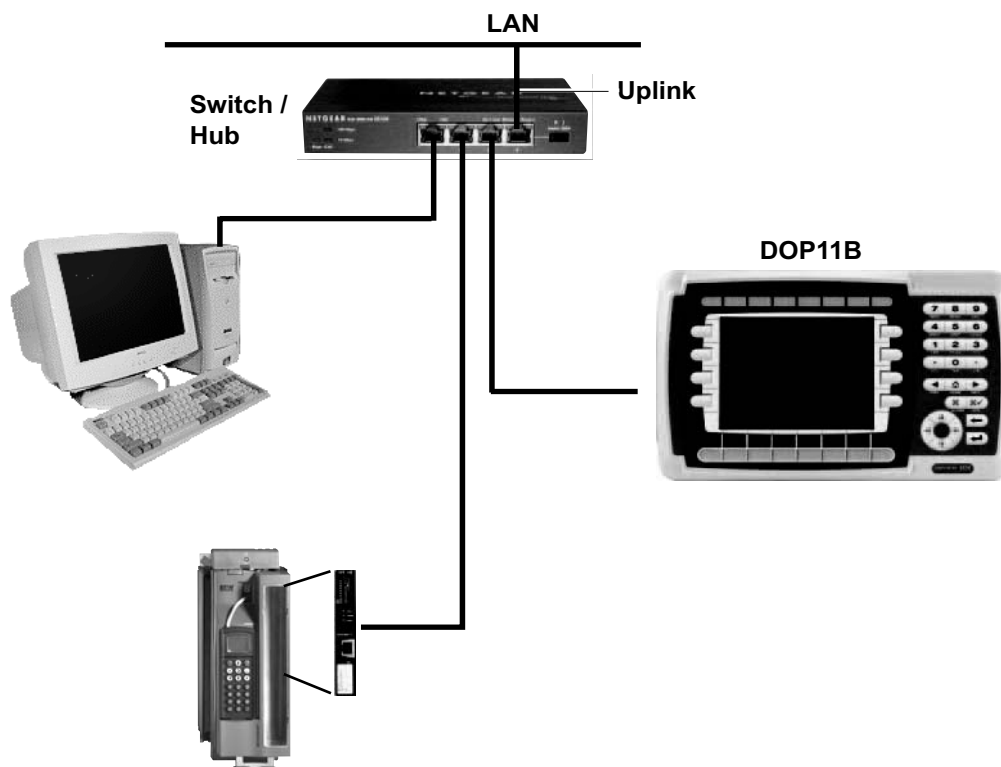


Figure 14: ETHERNET connection

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4.7.1 Cable specification

Use a shielded standard ETHERNET cable with shielded RJ45 connectors and cables according to specification CAT5. The maximum cable length is 100 m (300ft.).

For example, the following cable is suitable:

- Lappkabel, UNITRONIC® LAN UTP BS flexible 4 x 2 x 26 AWG



For a description of how to determine the ETHERNET (MAC) address of the option card, see the "Configuration mode (SETUP)" section on page 38 .



4.8 Connection to Siemens S7 via MPI and PCM11A

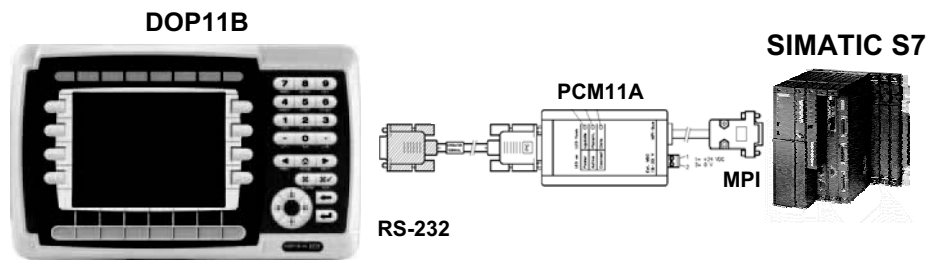


Figure 15: Connection to Siemens S7 via MPI and PCM11A

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5 Startup



It is essential to comply with the safety notes during startup!

5.1 General startup instructions

Requirement for a successful startup is the correct electrical connection of the operator terminal.

The functions described in this section enable users to upload a project to the operator terminal and establish the unit in the necessary communication pathways.



Do not use the DOP11B operator terminals as safety devices for industrial applications. Use monitoring systems or mechanical protection devices as safety equipment to avoid possible damage to property or injury to people.

5.2 Preliminary work and resources

- Check the installation
- Take suitable measures to prevent the motor from starting up unintentionally via the connected frequency inverter.
 - Remove the electronics input X13.0/controller inhibit in MOVIDRIVE® or
 - disconnect the supply voltage (24 V backup voltage must still be applied)
 - Remove terminals "CW operation" and "Enable" in MOVITRAC® 07

Furthermore, additional safety precautions must be taken depending on the application to avoid injury to people and damage to machinery.

- Connect the operator terminal to MOVIDRIVE® or MOVITRAC® 07 using the appropriate cable.

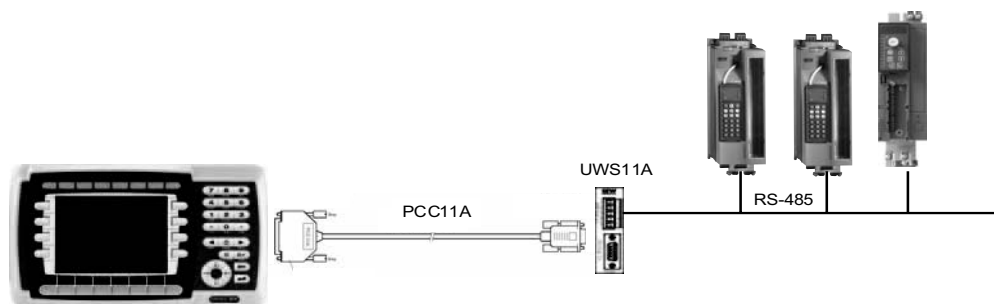


Figure 16: Connection between operator terminal and MOVIDRIVE® MDX60B/61B

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- Connect the operator terminal to the PC using the PCS11B (RS-232) programming cable. Operator terminal and PC must be de-energized when you do this, otherwise undefined states may occur. Switch on the PC. If the HMI-Builder project planning software is not already installed on the PC, install it now and then start the software.

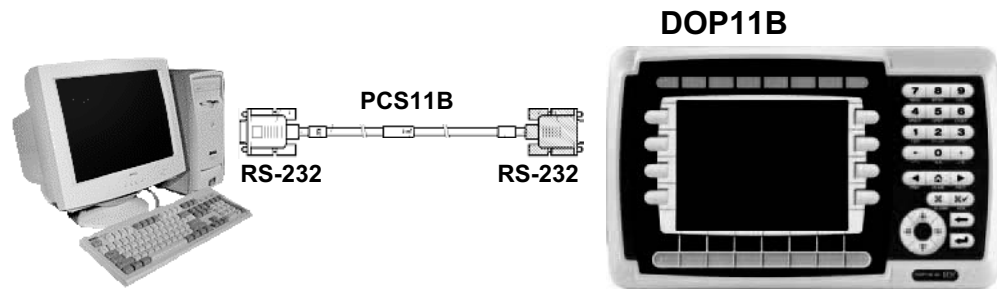


Figure 17: Connection between PC and operator terminal

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- Activate the supply (24 V) for the operator terminal and connected frequency inverters.



5.3 Initial operation



Units are delivered without a loaded project.

Units with a membrane keypad (DOP11B-20 and DOP11B-40) will display the following information when they are initially taken into operation:



Figure 18: DOP11B-20 initial screen in delivery state

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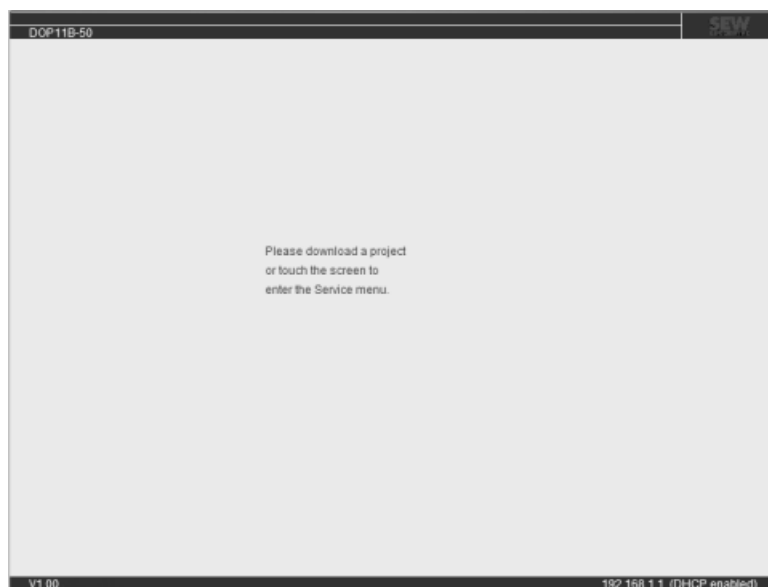


Figure 19: DOP11B-50 initial screen in delivery state

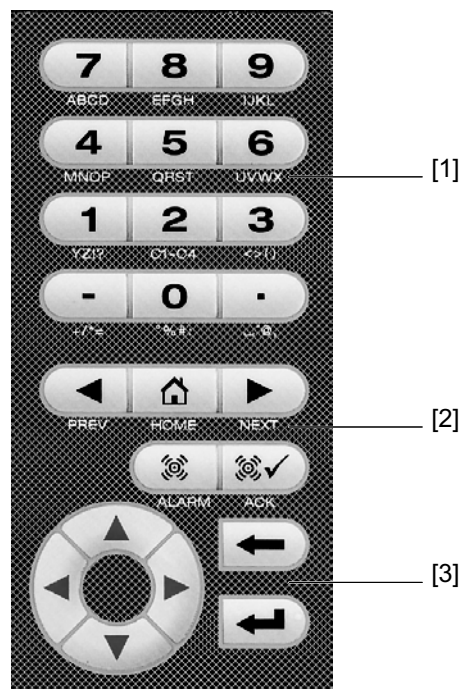
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5.4 Operator terminal functions

This chapter describes the different modes in the operator terminal, the keyboard and the information page in the terminal.

5.4.1 The keyboard in the terminal



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- [1] Integrated function keys
- [2] Arrow keys
- [3] Alphanumeric keys



Startup

Operator terminal functions

Alphanumeric keys

The following characters can be entered in dynamic text and numerical objects during the run mode in the terminal using the alphanumeric keyboard.

0-9

A-Z

a-z

! ? < > () + / * = ° % # . ' @

National characters

Numeric values are entered by pressing the respective key once.

Enter capital letters (A to Z) by pressing the respective key two to five times.

Enter lower case letters (a to z) by pressing the respective key six to nine times.

A time interval between pressing can be set. If the key is not pressed within the specified time interval the cursor moves to the next position.

Enter national characters by pressing key <2> (C1C4) two to nine times. This option offers characters that are not included in the standard character set of the alphanumeric terminal keyboard.



You can use all characters of the selected character set in the HMI-Builder except those characters reserved for static text. Enter the required character by pressing the <ALT>+<0> (zero) key combination on the numeric keyboard of the PC; then enter the character code. You select the used character set in the HMI-Builder.

Reserved characters

The ASCII characters 0-32 (hex 0-1F) and 127 are reserved for internal terminal functions and must not be used in projects or files in the terminal. These characters are used as control characters.

Arrow keys

Use the arrow keys to move the cursor in a menu or dialog box.

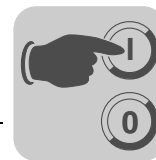
Integrated function keys

Not all the keys are available on all terminals.

Key	Description
Enter key	Use the ENTER key to confirm the setting made and to go to the next line or level.
<PREV>	Use this key to return to the previous block.
<NEXT>	Use this key to return to the next block.
<ALARM>	Use this key to display the alarm list.
<ACK>	Use this key to acknowledge alarms in the alarm list.
<HOME>	Use this key to jump to block 0 in run mode.
<←>	Use this key to delete characters to the left of the cursor.

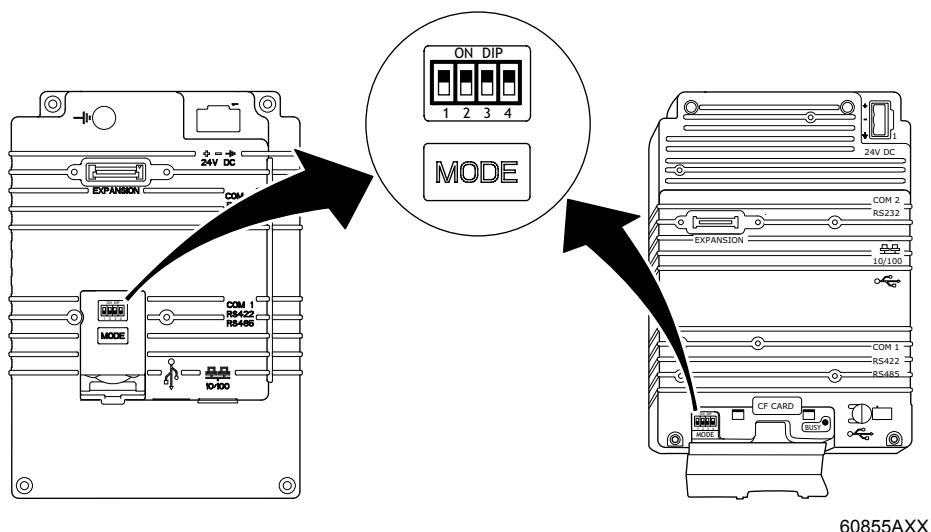


When the main block (block number 0) has been display, the <PREV> key will not work, since the block history is deleted when the main block is shown.



**DIP switches on
DOP11B
terminals**

DOP11B operator terminals have four DIP switches on the rear for selecting the operating mode.



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DIP switch assignment:

1 = ON, 0 = OFF

Interrupt the power supply to the terminal to call up individual modes for DOP11B.

Set the DIP switch on the side or back of the terminal to the position shown in the following table. You can now turn on the power supply again.

Switch position 1234	Function
0000	Run mode (RUN, standard operation)
0010	Reset system (factory reset)
0100	Sysload
1000	Configuration mode (SETUP)
1100	No function (RUN)
1110	Activates self-test function
XXX1	Hard reset



5.4.2 RUN and SETUP operating modes

The terminal has two operating modes.

- **Configuration mode (SETUP):** All basic settings are made in this mode, such as selection of controller system and menu language.
- **Run mode (RUN):** This mode is for running the application.

Switching between operating modes

Switch between RUN and SETUP

Press <←> and <MAIN> simultaneously to enter configuration mode (SETUP). You can now press any key when the start-up menu is shown to enter the configuration mode (SETUP). To return to RUN mode, press <←> and <MAIN>.

Configuration mode (SETUP)

This section contains a description of functions that cannot be carried out with the HMI-Builder.

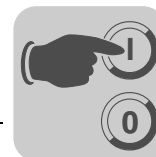
Erasing the memory

The [Setup] menu in the terminal contains the [Erase Memory] function. This function erases the terminal's application memory. All blocks and definitions for alarms, time channels, function keys and system signals are erased.

Parameters	Description
Enter key	Memory is erased. The configuration menu is shown automatically when the erasure is completed.
<PREV>	Return to previous level without erasing the memory.



When the memory is erased all data stored in the terminal will be lost. The language selection parameter is not affected by this function. All other parameters will be erased or reset to their default values.



Run mode (RUN)

The application is executed in run mode. Block 0 will automatically be shown on the display when transferring to run mode.

The integrated keyboard is used to highlight and change values in run mode.

If a communication error occurs between the terminal and the controller system, an error message will be shown on the screen. The terminal starts automatically once communication is reestablished. If you press an I/O key combination while a communication error is active, the combination will be stored in the terminal buffer and transferred to the controller system once communication resumes.

The terminal clock can continuously send data to a register in the controller to activate a monitoring function. The controller can use this monitoring function to detect a communication error. The controller system checks if the register has been updated, if not an alarm indicating a communication error is activated in the controller system.

The functional principle of individual objects and functions in operating mode will be explained in connection with the description of the respective objects and functions.

5.4.3 Information page

The terminal contains an information page. The information page is activated by pressing the key combination <←> and <PREV> simultaneously in run mode. A function or touch key can also be used or configured to call up the information page.

The current terminal, system program version and hardware version are shown at the top of the information page.

Parameters	Description
STARTS	Number of terminal starts
RUN	Number of terminal operating hours
CFL	Number of hours the backlighting has been switched on
32°C MIN: 21 MAX: 38 (example)	Current operating temperature, lowest and highest temperature measurement
DYNAMIC MEMORY	Available RAM memory (working memory) in number of bytes.
FLASH MEM PROJ	Available Flash memory (project memory) in number of bytes.
FLASH MEM BACK	Reserved
FLASH CACHEHITS	Percentage of block / allocation cache hits in the file system.
FLASH ALLOCS	Maximum percentage of used or active allocations per block in the file system.
DRIVER 1	Current driver and driver version
DIGITAL I/Os	The number of digital signals linked to controller system 1 continuously monitored (STATIC) and the number in the current block (MONITOR).
ANALOG I/Os	The number of analog signals linked to controller system 1 continuously monitored (STATIC) and the number in the current block (MONITOR).
I/O POLL	The time in ms between 2 readings of the same signal in controller 1
PKTS	The number of signals in each package transferred between the terminal and controller 1
TOUT1	The number of timeouts in communication with controller 1
CSUM1	The number of checksum errors in communication with controller 1
BYER	The number of byte errors in the communication
DRIVER 2	Current driver and driver version. The parameters for Driver 2 are only shown if controller 2 is defined in the project.
DIGITAL I/Os	The number of digital signals linked to controller system 2 continuously monitored (STATIC) and the number in the current block (MONITOR).



Startup

Operator terminal functions

Parameters	Description
ANALOG I/Os	The number of analog signals linked to controller system 2 continuously monitored (STATIC) and the number in the current block (MONITOR).
I/O POLL	The time in ms between 2 readings of the same signal in controller 2
PKTS	The number of signals in each package transferred between the terminal and controller 2
TOUT2	The number of timeouts in communication with controller 2
CSUM2	The number of checksum errors in communication with controller 2
1 / 2 / 3	Current port for FRAME, OVERRUN and PARITY. 1 = RS-422 port, 2 = RS-232 port and 3 = RS-485 port.
FRAME	The number of frame errors in each port
OVERRUN	The number of overrun errors in each port
PARITY	The number of parity errors in each port



5.4.4 Joystick function

Only applies to DOP11B-20 and DOP11B-40.

This function makes it possible to use the arrow keys as function keys. Enter the command "AK" and an address in the command line under [system signals]. Example: "AKM100" (command AK and memory cell M100).

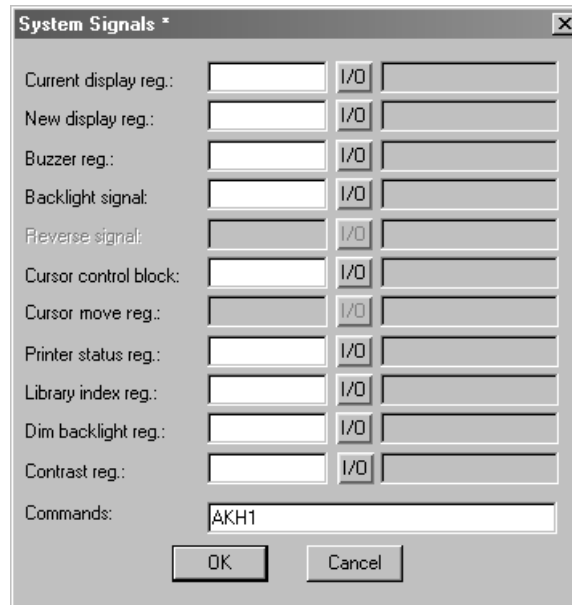


Figure 20: System signals

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Memory cell M100 is the enable signal and the following four memory cells have functions according to the following control block:

Memory cell	Description
Mn0	Enabled = Joystick function. Disabled = Normal function.
Mn1	LEFT ARROW
Mn2	DOWN ARROW
Mn3	UP ARROW
Mn4	RIGHT ARROW

If you press an arrow when the enable signal is present, the memory cell corresponding to the key you press will be activated. When the enable signal is set to one the arrow keys will not have their normal functions.

**Example**

Use the following example to switch between joystick function and normal function.

Perform the following steps:

- Use the DEMO driver.
- Enter the text "AKM1" under [System signals] / [Commands].
- Create a text block.
- Enter the static text "JOYSTICK."
- Create a digital object with the following settings:
 - Digital signal: M1
 - Text 0: OFF
 - Text 1: ON
 - Activate input: YES
- Create four additional digital objects to monitor the memory contents of M2, M3, M4 and M5.

Display of text block according to sample settings:

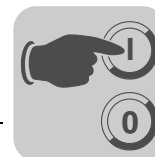
JOYSTICK # - - -

M2 #

M3 #

M4 #

M5 #

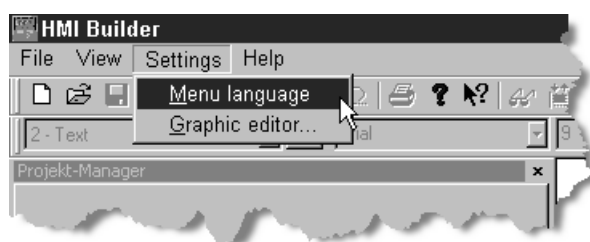


6 Operation and Service

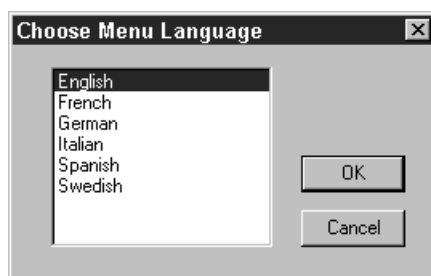
6.1 Project transfer with PC and HMI-Builder

You need the HMI-Builder software for starting up the operator terminal with your PC.

1. Start the HMI-Builder program.
2. To set the required language, choose [Settings] / [Menu language] from the menu.



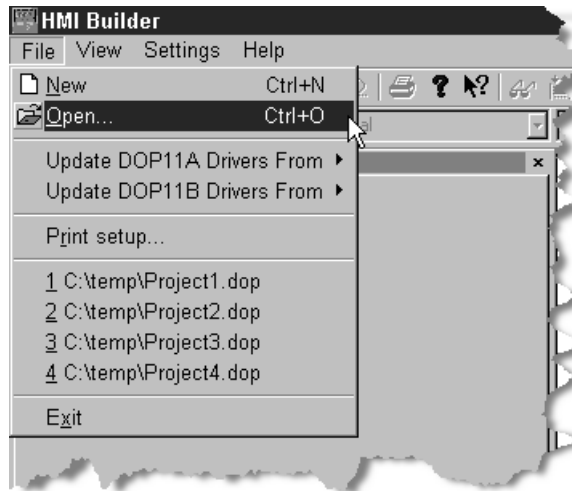
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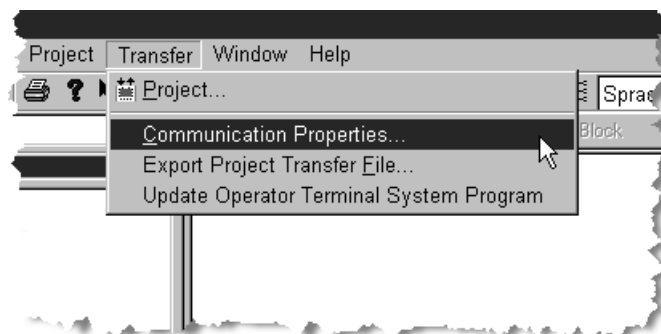


3. Use the [File] / [Open] function to open the project file you want to load to the operator terminal.



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4. From the [Transfer] menu, choose [Communication properties] and [serial transfer] and enter the required parameters:

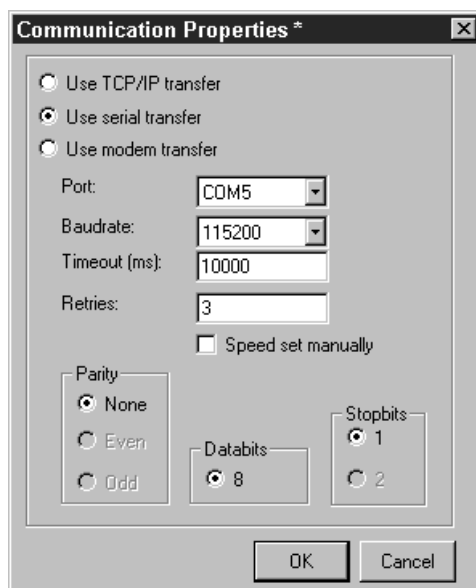
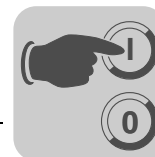


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Serial transfer when using the PCS11B programming cable.

Enter the following information:

- Communication port of the PC (e.g. Com1)
- Data transfer rate (default 152000)
- Timeout period (free entry, default 10,000 ms)
- Number of retries in case of communication problems (default 3)



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5. Choose [Transfer] / [Project] to transfer the project to the terminal.

The following functions are active as standard and must remain in this setting.

- Test project on send
- Send complete project
- Automatic terminal RUN/TRANSFER switching
- Check terminal version



Press the [Send] button to download the data.

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The following steps will be executed one after the other:

- Switch the terminal to transfer mode (TRANSFER)
- Transfer the communication driver for inverter and PLC
- Transfer project data
- Switch the terminal to RUN mode

The individual steps during transfer are displayed in the terminal.

After transfer is completed, exit the dialog window using the [Exit] button and close the HMI-Builder.



6.2 Creating a project

6.2.1 Basics

This section describes the system structure of the terminal and its basic functions. There is also an explanation of the general principles, object parameters and joint functions applicable in the terminal.

Method for programming a project

The graphical structure of the application in the terminal means that the monitoring tool is easy to use for the operator. It is important to organize the application well and to consider which functions are necessary. Start with the overall view, and then work down to the detailed level. When a project is programmed you start with the functions in your application. Each function corresponds to one or more blocks, depending on the complexity of the function. A project can contain both graphic and text blocks, and each block can contain static and dynamic objects. The blocks should be arranged in hierarchies to achieve a structured application, and to simplify work procedures for the machine operator. The application can also be organized as sequence controls.

The application can be tested in full or in part prior to startup.

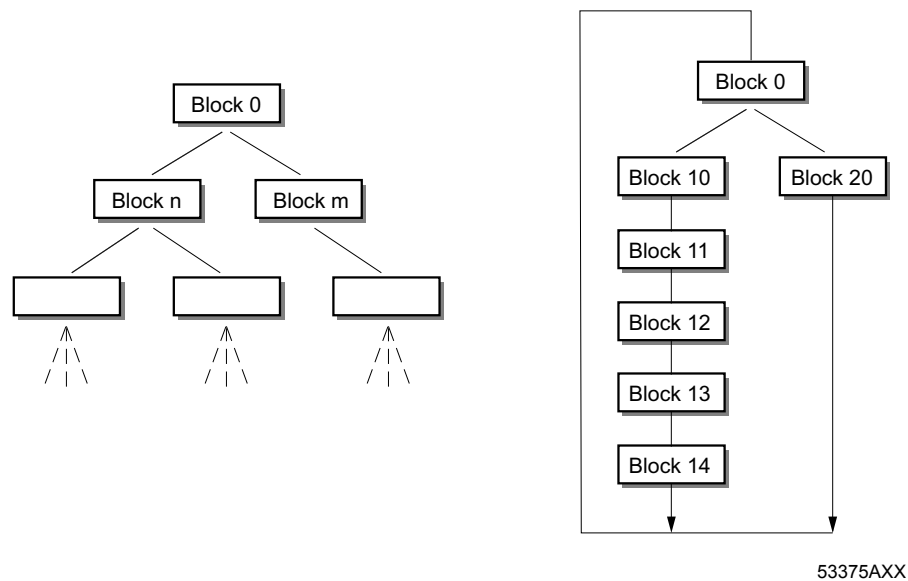


Figure 21: Block structure



Effective communication

Read the following notes on signal transmission and their optimization for fast and effective communication between terminal and controller.

Signals that influence the communication time

Only signals for objects in the current block will be read continuously. These include dynamic object signals. Signals for objects in other blocks will not be read. The number of blocks does not affect the communication time.

In addition to signals for objects in the current block, the terminal continuously receives the following signals from the controller:

- Display signals (block header)
- Block print signals (block header)
- LED register
- Alarm signals
- External confirmation signals for alarms and alarm groups
- Login signal (password)
- Logout signal (password)
- Trend curve register
- Register for column objects when min. / max. indicators are used
- New display register
- Buzzer register
- Backlight signal
- Cursor control block
- Recipe control block
- Library index register
- Index register
- Register for PLC clock if it was used in terminal
- List erase signal (alarm settings)
- No protocol mode control register
- No protocol signal

Signals that do not influence the communication time

The following signals do not affect the communication time:

- Signals for function keys
- Time channels
- Objects in alarm texts



Optimize communication

Grouping controller signals

The signals from the controller (see list in previous paragraph) will be read the fastest if they are bundled in one group, such as: If you have defined 100 signals you will reach the highest reading speed by grouping them (e.g. H0-H99). If the signal transfer takes place in individual steps (e.g. P104, H17, H45, etc.), then the update will take much longer.

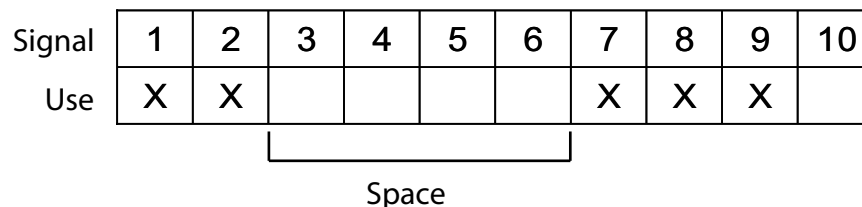
Effective block change

You will reach an optimum block change by using the block jump function of the function keys or via the jump object. The display signal in the block header may only be used if the controller is to enforce the opening of another block. If the controller is to change the display, you can use the new display register. This option affects the communication less than a larger number of display signals.

Signal packages

Transfer of signals between terminal and controller does not take place for all data at the same time. The information is separated into packages that contain several signals each. The number of signals in each package depends on the selected driver.

A minimization of the number of packages is necessary to have the communication take place as quickly as possible. Grouped signals require merely a minimum number of packages. Such programming is not possible in all cases. There may be spaces in between two signals in such cases. A space represents the maximum distance between two signals that are part of the same package. The size of the space depends on the selected driver.



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Figure 22: Signal packages

User interface

Use graphic blocks for the user interface.

Text blocks are mainly for printout of reports. They are slower and require more memory than graphic blocks.

Use 3D effects for an appealing user interface.

You can accomplish a visually high-quality design by combining objects with frame and 3D rectangles. Such a design emulates a light incidence from top left. Such an angle creates shadow effects at the lower and right side of raised objects as well as on the upper and left side of lowered objects.

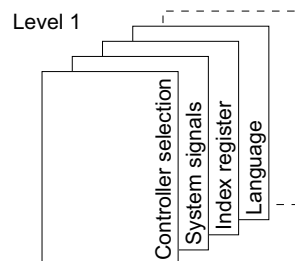


Menu structure

The terminal is divided into two modes: "configuration mode " and "run mode". In each respective mode there are a number of different levels, depending on the function. Each level consists of a menu where you make a selection or enter parameters before going to the next level (menu).

The application consists of blocks, graphic blocks and / or text blocks (primarily for printing out reports). Values from the controller system are shown and changed in the blocks. Each block has a number between 0 and 989 allocated by the programmer. The blocks 990-999 are reserved for special purposes, so-called system blocks. The terminal is object-oriented, which means that a block can contain all the signals linked to an object for controlling and monitoring a certain object (e.g. a pump).

Configuration mode



Level 2

Level 3

Run mode

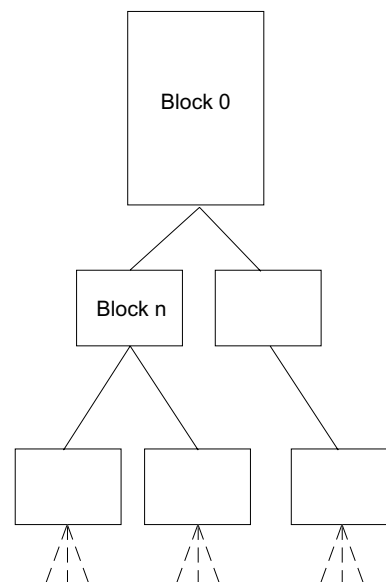
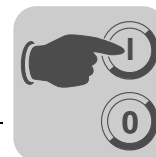


Figure 23: Configuration mode and run mode

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Blocks

A block header is defined for each block. The header contains the block number, block type, status word, etc. The following functions can also be invoked as blocks:

- Alarms
- Time channels
- System monitor
- E-mail
- Contrast setting

These are designated system blocks. In the other terminals a maximum of 990 blocks can be defined.



The block type cannot be changed for a defined block.

Signal formats

The following signal formats are available in the dialog for each object, on the assumption that the selected driver supports the signal format.

Format type	Range
Signed 16-bit	–32768 ... +32767
Unsigned 16-bit	0 – +65535
Signed 32-bit	–2147483648 ... +2147483647
Unsigned 32-bit	0 ... +4294967295
Float with exponent, 32-bit	±3.4E38, numbers larger than 1,000,000 are shown with exponent (not with MOVILINK [®] driver).
Float without exponent, 32-bit	Parameter positions (including decimal point and characters) and decimals indicate the available area. As a result, 8 positions and 3 decimal places result in ±999.999 (not with MOVILINK [®] driver).
BCD Float	0 ... 9999.9999 (not with MOVILINK [®] driver)
BCD 16-bit	0 ... 9999 (not with MOVILINK [®] driver)
BCD 32-bit	0 ... 99999999 (not with MOVILINK [®] driver)
HEX 16-bit	0 ... FFFF
HEX 32-bit	0 ... FFFF FFFF
Seconds 16-bit	Analog numeric object that can be displayed in time format. Syntax: <Hours:Minutes:Seconds> (not with MOVILINK [®] driver).
Seconds 32-bit	Analog numeric object that can be displayed in time format. Syntax: <Hours:Minutes:Seconds> (not with MOVILINK [®] driver).
Character string	Character string that can be used for the [Dynamic] function for graphic objects. Example: In the object [Static symbol], [Digital symbol] and [Multisymbol], the dynamic property Symbol can be linked to a register with the character string format.
Array 16-bit	Table format that can be used for an event in a dynamic function for graphic objects. Example: A group of registers is to be allocated different values when the value entered is equal to 99. This means the first value in the field [Value 9] is entered into register [D21] in the field [Signal]. If the [Value] field appears as follows <1,2,3,4>, the value 2 will be entered in the subsequent register [D22], etc.



6.2.2 Installing HMI-Builder

Programming software

The HMI-Builder is a programming software used to develop projects for operator terminals of the DOP11B series. The functions in the HMI-Builder depend on the selected terminal.

We recommend using a mouse as the input device for the programming software. Refer to the Windows User's Guide for information on short commands.

A project is created with graphic blocks and text blocks in the programming software, which are then transferred to the operator terminal. You will find a description of the programming steps in the DOP11B operator terminal system manual.

An online help is available for all functions. To call up the help text for each function, press the <F1> key. By pressing the help button in the toolbox and then clicking on a function, information is shown on the function.

System requirements

The configuration software runs on a PC with a minimum of 100 MB of free memory and Microsoft Windows 2000 / XP Professional. The software can be used with a color or black and white monitor screen. Microsoft Internet Explorer Version 5.0 upwards must be installed.

Installing HMI-Builder

The programming software is supplied on a CD. When you place the CD in your CD ROM drive the installation will start automatically. If not, select [Run] from the start menu and enter the command D:/setup.exe (if D stands for the CD ROM drive). Install the programming software by clicking on the name and following the instructions.

The installation wizard creates an icon for the programming software in the program group of the programming software. To start the programming software, click on [Start] and select [Programs] / [Drive Operator Panels DOP] / [HMI Builder]. The manual can be read directly from the CD by clicking on [Manuals].



Menu

The menu bar contains a number of drop-down menus.

Menu	Description
File	Contains functions that affect the entire project.
Edit	Contains, among others, the following functions: <ul style="list-style-type: none"> • Cut • Copy • Paste
View	This allows the following functions to be carried out: <ul style="list-style-type: none"> • Block manager • Alarm handling • Symbol manager
Functions	In this menu you can configure the function keys, LEDs, passwords and macros. Alarm texts are entered and alarm groups are defined in this menu as well.
Setup	Here you will set the basic configuration for the terminal.
Object	Is available in the managers only and holds all objects. The objects are also included in the toolbox.
Layout	Is available in graphic block manager only and includes functions for positioning of objects in graphic blocks.
Block manager	Settings for visual representation of block manager
Transfer	The functions in the Transfer menu are used to transfer projects between the programming software and the terminal.
Window	Contains all general Windows functions. You can also make grid settings and define the search path to external programs, such as Paintbrush.
Help	Contains the help functions for the program.

Status line

The status bar is located at the bottom of the HMI-Builder program window. The [View] menu includes a function to show / hide the status bar.

The left part of the status bar describes the menu function selected in the menu. A short description of the function the cursor points to is shown for the functions in the toolbox.

The right part of the status bar indicates which of the following keys are activated:

OVR Overwrite (paste key)

CAP Caps Lock

NUM Num Lock

Coordinates (line and column) in the block manager are also shown.



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Figure 24: Status line

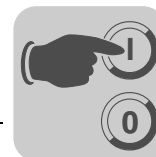


6.3 Operating display at unit start

DOP11B-40		SEW EURODRIVE
[1]	Firmware:	V1.00 B1.00
[2]	Status:	Initializing hardware
[3]	Driver1:	SEW_MOVILINK_(serial)
[4]	Driver2:	SEW_SMLP_(TCP/IP)
[5]	PLC1:	MOVIPLC
[6]	PLC2:	MOVIDRIVE B

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- [1] Firmware version of the operator terminal
- [2] Status of the boot process, e.g.:
 Initializing hardware
 Loading comm. drivers
 Init Alarms
 IP Address: 192.168.1.1
- [3] Communication driver loaded in Controller 1
 e.g.:
 SEW_MOVILINK_(serial)
 SEW_SMLP_(TCP/IP)
 DEMO
 ...
- [4] Communication driver loaded in Controller 2
 e.g.:
 SEW_MOVILINK_(serial)
 SEW_SMLP_(TCP/IP)
 DEMO
 ...
- [5] Communication status of Controller 1
 e.g.:
 NO CONNECTION
 MOVIPLC
 MOVITRAC B
 MOVIDRIVE B
 ...
- [6] Communication status of Controller 2
 e.g.:
 NO CONNECTION
 MOVIPLC
 MOVITRAC B
 MOVIDRIVE B
 ...



6.4 Error messages

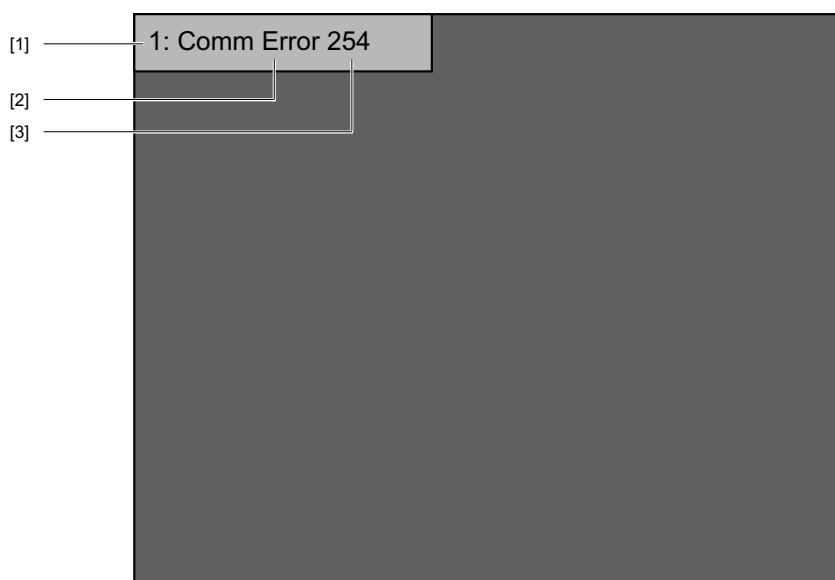
Errors in RUN mode will be displayed in the upper left hand corner of the display as error messages.

They are divided into two groups:

- Boot error (no inverter connected)
- Operation errors - Comm errors (error list)

6.4.1 Boot error (no inverter connected)

Boot error "1: Comm Error 254" means: no communication with connected inverters.



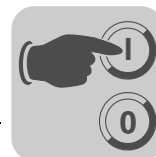
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- [1] Controller where the communication error occurs.
e.g 1 or 2
- [2] Error type
e.g. operation error - Comm Error
- [3] With address:
e.g.
01 - 99
254 (= point to point!)



6.4.2 Operation errors - Comm Errors (error list)

Message from operator terminal	Error code	Description
no error	00 00	No error
invalid parameter	00 10	Illegal parameter index
fct. not implement	00 11	Function / parameter not implemented; <ul style="list-style-type: none"> Controller does not know parameter addressed by the operator terminal. Check selection of MOVILINK[®] driver. Individual parameters of the MOVITRAC[®] 07, MOVIDRIVE[®] A and MOVIDRIVE[®] B controllers are slightly different. Another reason for this error may be the controller firmware. Recently added parameters may not be included in older versions of the unit firmware.
read only access	00 12	Read access only <ul style="list-style-type: none"> No write access to addressed parameter. Deactivate the [Activate input] function in the project of the operator terminal.
param. lock active	00 13	Parameter lock is active <ul style="list-style-type: none"> The [Parameter lock] function was activated via parameter P803 in the addressed controller. Set parameter P803 to "OFF" by using the controller keypad or the PC software MOVITOOLS[®] to deactivate the parameter lock.
fact. set active	00 14	Factory setting is active <ul style="list-style-type: none"> Controller is performing a factory setting. Parameter change option is locked for a few seconds. Communication will be automatically reactivated once factory setting is complete.
value too large	00 15	Value for parameter too large <ul style="list-style-type: none"> Operator terminal is trying to write a value to a parameter that is not within the permitted value range. Adapt the minimum and maximum input values in the [Access] area in the project of the operator terminal. You will find the respective limit values in the parameter list of the controller.
value too small	00 16	Value for parameter too small <ul style="list-style-type: none"> Operator terminal is trying to write a value to a parameter that is not within the permitted value range. Adapt the minimum and maximum input values in the [Access] area in the project of the operator terminal. You will find the respective limit values in the parameter list of the controller.
option missing	00 17	Required option card missing for this function / parameter.
system error	00 18	Error in system software of controller <ul style="list-style-type: none"> Contact SEW service.
no RS485 access	00 19	Parameter access via RS-485 process interface on X13 only
no RS485 access	00 1A	Parameter access via RS-485 diagnostic interface only
access protected	00 1B	Parameter is access-protected <ul style="list-style-type: none"> No read or write access to this parameter; parameter not suitable for use in operator terminal.
inhibit required	00 1C	Controller inhibit required <ul style="list-style-type: none"> The addressed parameter can only be altered with inhibited controller. Activate the controller inhibit status by removing the terminal X13.0 or via fieldbus (control word 1/2 basic block = 01hex).
incorrect value	00 1D	Illegal value <ul style="list-style-type: none"> Some parameters can only be programmed to certain values. You will find the respective limit values in the parameter list of the controller.
fact. set active	00 1E	Factory setting was activated.
not saved in EEPROM	00 1F	Parameter was not saved in EEPROM <ul style="list-style-type: none"> Power-failure save failed.
inhibit required	00 20	Parameter cannot be changed with enabled output stage <ul style="list-style-type: none"> The addressed parameter can only be altered with inhibited inverter. Activate the controller inhibit status by removing the terminal X13.0 or via fieldbus (control word 1/2 basic block = 01hex).



6.5 SEW Electronics Service

6.5.1 Sending in for repair

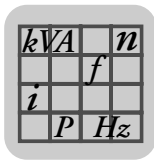
Please contact the **SEW Electronics Service** if a fault cannot be rectified.

When contacting the SEW electronics service, always quote the unit designation so that our service personnel can assist you more effectively.



Please provide the following information when sending the unit in for repair:

- Serial number (→ nameplate)
- Unit designation
- Brief description of the application
- Nature of the error
- Accompanying circumstances
- Your own presumptions as to what has happened
- Any unusual events preceding the problem, etc.

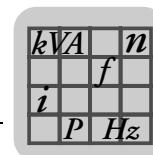


7 Technical Data and Dimension Sheets

7.1 General technical data

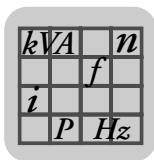
7.1.1 Display

	DOP11B-20	DOP11B-25	DOP11B-30	DOP11B-40	DOP11B-50
Graphics resolution (pixels)	240 x 64	320 x 240	320 x 240	320 x 240	800 x 600
Line x characters text	Graphic				
Active screen size, W x H	127.0 x 33.8 mm	115.2 x 86.4 mm	115.2 x 86.4 mm	115.2 x 86.4 mm	211.2 x 158.4 mm
Background lighting	LED, can be dimmed >50000 h at an ambient temperature of +25 °C.	CCFL, can be dimmed >45000 h at an ambient temperature of +25 °C.	CCFL, can be dimmed >60000 h at an ambient temperature of +25 °C.		CCFL, can be dimmed >50000 h at an ambient temperature of +25 °C.
Contrast setting	Via system variable				
Screen	FSTN LCD screen (liquid crystal), monochrome	FSTN LCD screen (liquid crystal), 16 gray scale	CSTN LCD screen (liquid crystal), 64 k colors		TFT LCD screen (liquid crystal), 64 k colors



7.1.2 Technical data

	DOP11B-20	DOP11B-25	DOP11B-30	DOP11B-40	DOP11B-50
Keyboard	<ul style="list-style-type: none">Numeric keypadNavigation keypad3 function keysNo LEDs	Touch resistive	Touch resistive	<ul style="list-style-type: none">Numeric keypadNavigation keypad16 function keys16 LEDs (red / green)	Touch resistive
Keyboard material / Material for unit face	Membrane keypad with metal caps. Overlay Autotex F157 with back print, 1 million operations	Touchscreen Polymer (Autotex F250) on glass, 1 million operations	Touchscreen Polymer (Autotex) on glass, 1 million operations	Membrane keypad with metal caps. Overlay Autotex F157 with back print, 1 million operations	Touchscreen Polymer (Autotex F250) on glass, 1 million operations
Memory expansion	Via USB memory				Via USB memory or Compact Flash card
Graphical objects	Yes				
Real-time clock	±20 PPM + error display through ambient temperature and supply voltage. Max. total error display: 1 minute/month at +25 °C = 12 minutes/year. The battery life of the real-time is three years. Temperature coefficient: 0.004 ppm/°C ²				
Supply voltage	DC 24 V (DC 20 ... 30 V), 3-pin terminal contact CE: The voltage supply has to meet requirements for SELV or PELV according to IEC 950 or IEC 742. UL: Supply voltage according to guidelines for voltage supply class 2.				
Current consumption at operating voltage	Normal: 0.15 A Maximum: 0.35 A	Normal: 0.25 A Maximum: 0.45 A		Normal: 0.3 A Maximum: 0.5 A	Normal: 0.5 A Maximum: 1.0 A
Fuse	Internal DC fuse, 2.0 AT, 5x 20 mm				Internal DC fuse, 3.15 AT, 5 x 20 mm
Ambient temperature	Vertical installation: 0 °C...+50 °C Horizontal installation: 0 °C...+40 °C				
Storage temperature	-20 to +70 °C				
Humidity	5 ... 85 % (not condensed)				
Front dimensions W x H x D	202 x 187 x 6 mm	201 x 152 x 6 mm		275 x 168 x 6 mm	302 x 228 x 6 mm
Installation depth	56.9 mm	56.8 mm		57.3 mm	58 mm
Degree of protection of unit front	IP66				
Degree of protection of rear side	IP20				
Rear side protection material	Powder coated aluminum				
Weight	0.875 kg	0.87 kg		1.11 kg	2.0 kg
Memory	12 MB (incl. fonts)				
EMC tests on terminal	The terminal complies with the requirements according to article 4 of the EMC directive 89/336/EEC. Tested according to: EN 50081-1 (emission) and EN 50082-2 (interference immunity).				
UL approval	UL 1604 (class I, div 2) / UL 508 / UL 50 4x indoor use only				
DNV approval	In preparation				Yes
NEMA	4x indoor use only				

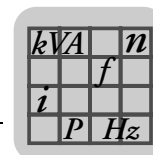


7.1.3 Functionality

	DOP11B-20	DOP11B-25	DOP11B-30	DOP11B-40	DOP11B-50
Network functions	E-mails / web server / remote access / FTP server				
Dual driver with data exchange	Yes				
Pass-through mode	Yes (depending on the driver)				
No protocol mode	Yes				
Multilingual capability	Yes, up to 10 languages in one project				
Standard Windows fonts	Yes				
Internal variables	Yes, volatile and non-volatile				
Trend recordings	Yes				
Recipe management	Yes				
Alarm handling	Yes, up to 16 groups				
Time channels	Yes				
I/O poll groups	Yes				
Passwords	Yes, up to 8 groups				
Message library	Yes				
Macros	Yes				
Printer function	Yes				

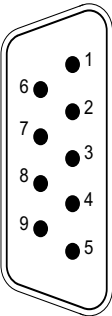
7.1.4 Communication

	DOP11B-20	DOP11B-25	DOP11B-30	DOP11B-40	DOP11B-50
RS-232 serial interface	9-pin sub D connector, installed plug with standard retaining screws 4-40 UNC, up to 187500 bauds can be set.				
RS-422 serial interface	25-pin sub D connector, installed socket with retaining screws 4-40 UNC, up to 187500 bauds can be set.				
Ethernet	Shielded RJ45 socket, 10/100 MBit - full duplex				
USB	Host type A (USB1.1), max. output current 500 mA				Host type A (USB1.1), max. output current 500 mA, device type B (USB1.1)

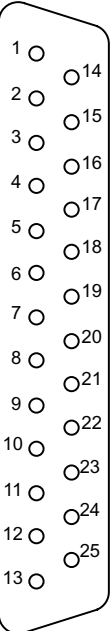


7.2 Pin assignment

7.2.1 RS-232

D-sub 9-pin connector	Termi- nal no.	Designation	Signal direction operator terminal ↔ XXX
	1	DCD	←
	2	RD	←
	3	TD	→
	4	DTR	→
	5	SG	–
	6	DSR	←
	7	RTS	→
	8	CTS	←
	9	RI	←

7.2.2 RS-422/RS-485

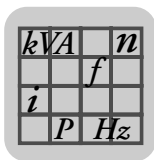
D-sub 25-pin socket	Terminal no.	RS-422		RS-485	
		Designation	Signal direction operator terminal ↔ XXX	Designation	Signal direc- tion operator terminal ↔ XXX
	2	TxD+	→	Tx/Rx+	↔
	15	TxD-	→	Tx/Rx-	↔
	3	RxD+	←	–	–
	16	RxD-	←	–	–
	4	RTS+	→	–	–
	17	RTS-	→	–	–
	5	CTS+	←	–	–
	18	CTS-	←	–	–
	20	1)	–	–	–
	21	1)	–	–	–
	6	Do not assign	–	Bus terminator ²⁾	Connect with pin 19 for bus termination ³⁾
	19	Do not assign	–	Bus terminator ⁴⁾	–
	7,8	0 V	–	0V	–
	14	+5 V < 100 mA	→	+5 V < 100 mA	→

1) Pin 20 connected with pin 21 in the terminal

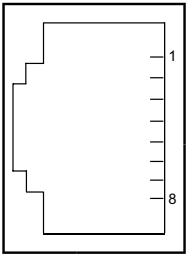
2) Indirectly connected with pin 2 (Tx/Rx+)

3) Note: Only the first and last bus station should have bus termination.

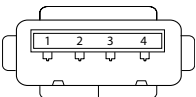
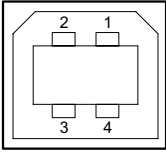
4) Internally connected with pin 15 (Tx/Rx-) via 120 ohm 1/4 resistor.



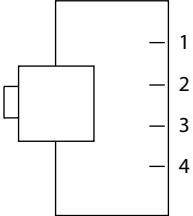
7.2.3 ETHERNET

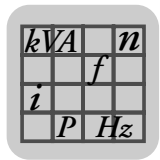
RJ45 socket	Terminal no.	Designation	Signal direction operator terminal ↔ XXX
	1	Tx+	→
	2	Tx-	→
	3	Rx+	←
	6	Rx-	←
	4, 5, 7, 8	GND	—

7.2.4 USB

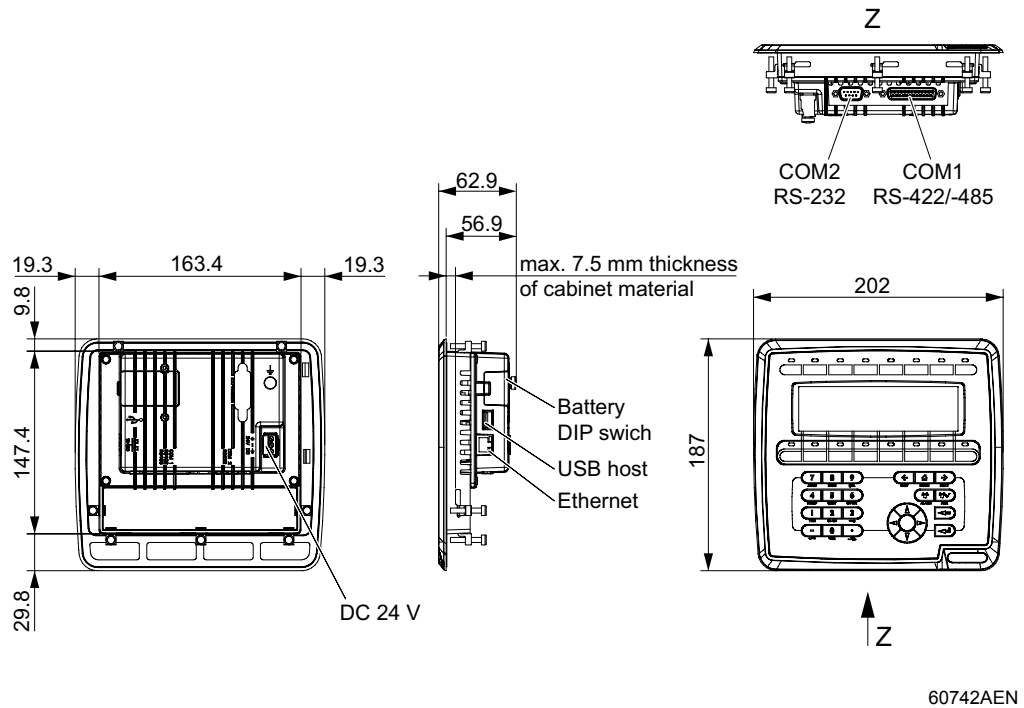
USB socket		Terminal no.	Designation	Signal direction operator terminal ↔ XXX
USB-A		1	VBUS	—
		2	D-	↔
		3	D+	↔
		4	GND	—
USB-B		1	VBUS	—
		2	D-	↔
		3	D+	↔
		4	GND	—

7.2.5 PCS21A

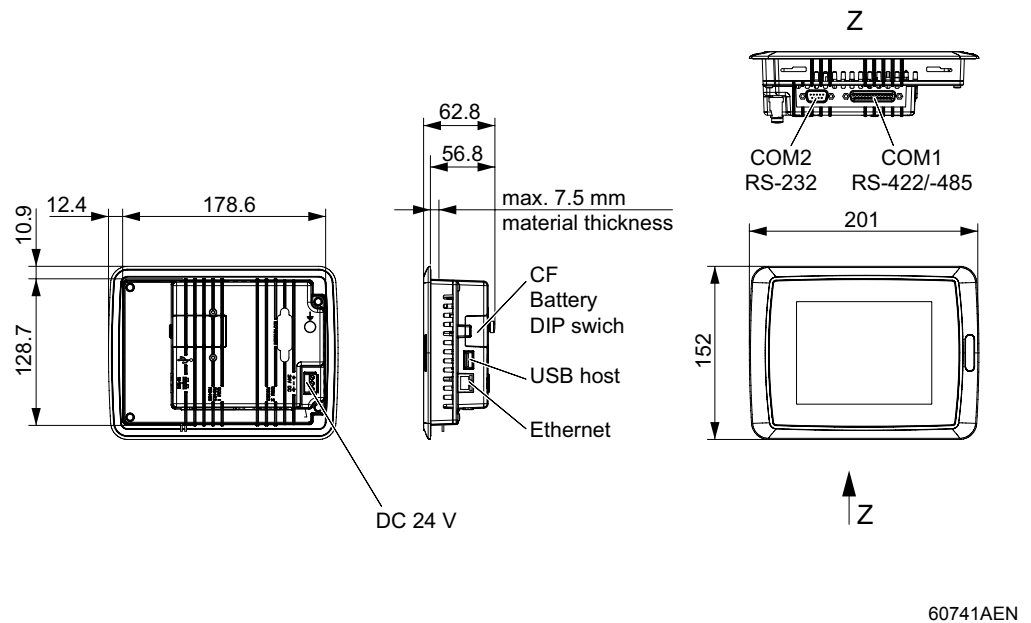
RJ10 4-pin connector	Terminal no.	Designation	Signal direction operator terminal ↔ XXX
	1	Do not assign	Reserved
	2	Tx/Rx+	↔
	3	Tx/Rx-	↔
	4	⊕	

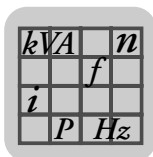


7.3 DOP11B-20

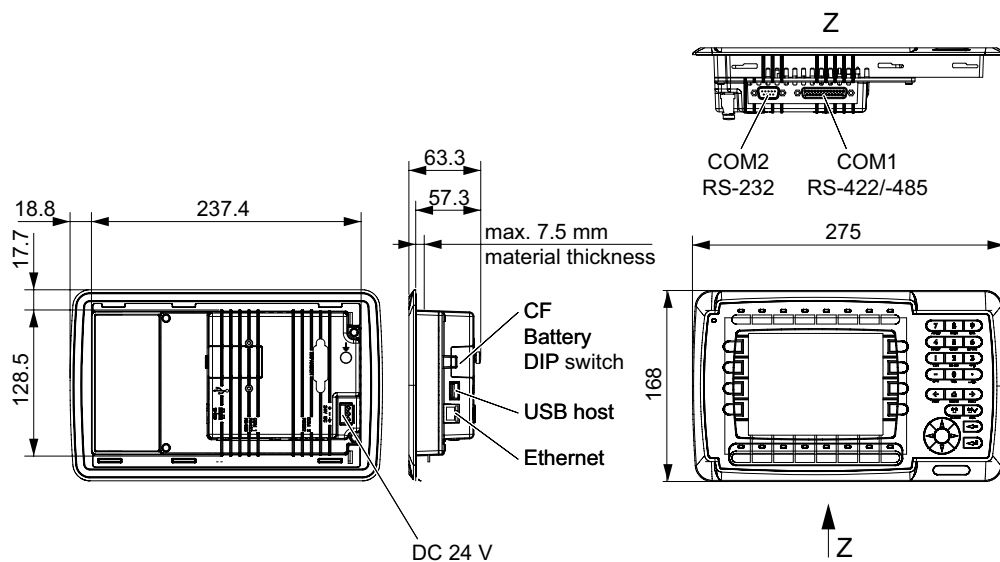


7.4 DOP11B-25 and -30



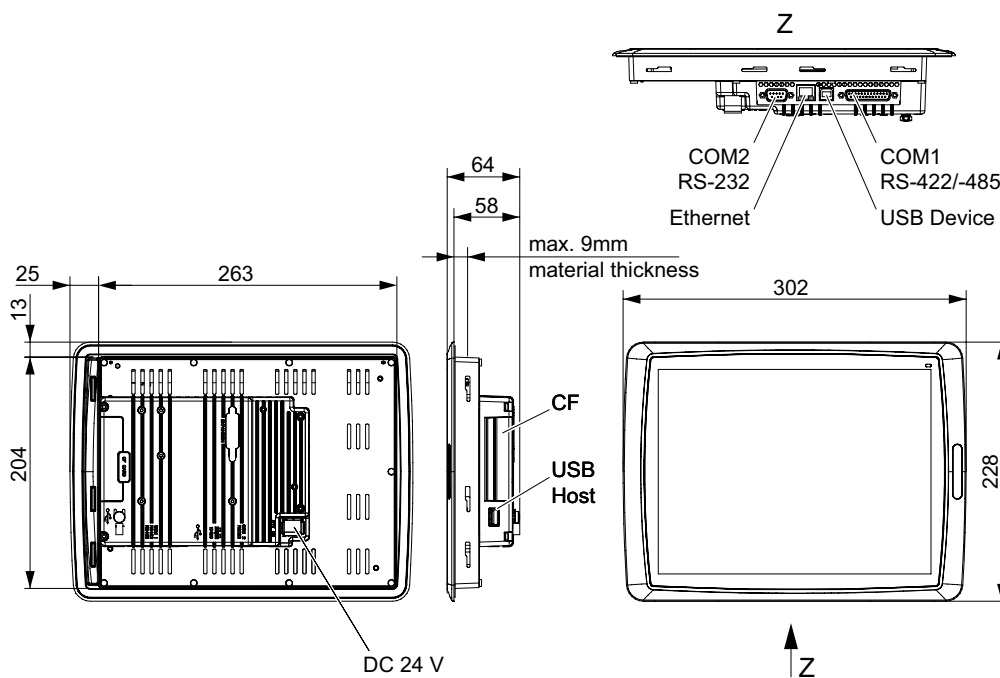


7.5 DOP11B-40



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7.6 DOP11B-50



60739AEN

8 Appendix

8.1 Chemical resistance

8.1.1 Metal housing

Frame and housing consist of power coated aluminum. The powder coating can be exposed to the following substances for more than 24 hours without showing any noticeable changes:

Alcohol 95%	Tap water
Aluminum cleaner	Ligroin
Ammonia	Lactic acid
Butanol	Sodium carbonate 10%
Chloric acid 10%	Saturated sodium dichromate
Diesel oil	Sodium hypochlorite solution
Deionized water	Caustic soda
Acetic acid	Paraffin oil
Ethyl alcohol 99.5% denaturated	Phosphoric acid
FAM motor gasoline	Nitric acid
Glycol	Sulfuric acid
Saturated urea	Edible oil
Hydroperoxide	Turpentine
Isopropyl alcohol	Benzene
Common salt 20%	Citric acid
Cooling liquid	–

8.1.2 Keypad and display

Resistance to solvents of the display surface

The surface of the display can be exposed to the following substances for more than 24 hours without showing any noticeable changes:

2-ethyl hexane acid	Kerosine
Acetone	Methanol
Ammonia solution (relative density 0.9)	Sodium carbonate <20 %
Ammonia solution <10 %	Sodium hypochlorite <10 %
Cottonseed oil	Caustic soda <48 %
Benzene	Olive oil
Hydrogen chloride acid <35 %	Oleic acid
Distilled water	Nitric acid (specific density 1.42)
Dichloromethane	Nitric acid <40 %
Diethyl ether	Salt water
Diisobutylene	Sulfuric acid (specific density 1.84)
Dimethyl formamide	Sulfuric acid <30 %
Pure acetic acid (relative density 1.05)	Carbon tetrachloride
Acetic acid	Toluene
Ethyl acetate	Hydrogen peroxide <28 %
Ethyl alcohol	Citric acid
Isopropyl alcohol	–



Autotex F157 resistance to solvents

Autotex F157 covers the membrane keypad.

Acceptable substances

According to DIN 42 115 part 2, Autotex F157 can be exposed to the following substances for more than 24 hours without showing any noticeable changes:

1.1.1. Trichlorethane (Genklene)	Isophorone
Ethanal	Isopropanol
Acetone	Potassium ferrocyanide/ferrocyanide
Acetonitrile	Caustic potash <30 %
Aliphatics	Potassium carbonate
Alkali carbonate	Linseed oil
Formic acid <50 %	Hydrogen peroxide
Ammonia <40 %	Methanol
Amyl acetate	Methyl ethylene ketones
Gasoline	MIBK
Bichromate	Sodium bisulphate
Butyle cellosolve	Sodium carbonate
Hydrogen chloride acid <36 %	Natrium hypochloride <20 % (bleach)
Cyclohexanol	Caustic soda <40 %
Cyclohexanone	n-butyl acetate
Decontaminated	Paraffin oil
Diacetone alcohol	Phosphoric acid <30 %
Dibutyl phthalate	Nitric acid <10 %
Diesel oil	Salt water
Diethyl ether	Cutting oil
Dioctylphthalate	Sulfuric acid <10 %
Dioxan	Silicone oil
Dowanol DRM/PM	Teepol
Ferric chloride	White spirit
Ferrous chlorine	Petroleum spirit
Acetic acid	Toluene
Ethanol	Triacetin
Ether	Trichloroacetic acid <50 %
Ethyl acetate	Universal brake fluid
Aviation gasoline	Laundry detergent
Formaldehyde 37 % ... 42 %	Water
Blown Castor oil	Fabric softener
Glycerol	Xylene
Glycol	–

Autotex did not show any noticeable changes after being exposed to pure acetic acid for less than one hour according to DIN 42 115 part 2.



Harmful substances

Autotex is not resistant against high pressure vapor of more than 100 °C or against the following substances:

- Benzyl alcohol
- Dichloromethane
- Strong caustic solutions
- Strong mineral acids

Substances that do not change colors

The following substances will not cause a change in colors during 24 hours at a temperature of 50 °C:

Ajax	Lenor
Ariel (laundry detergent)	Milk
Domestos	Persil (laundry detergent)
Downey	Top Job
Fantastic	Grape juice
Formula 409	Vim (cleansing agent)
Gumption	Vortex
Jet Dry	Windex
Coffee	Wisk

Substances that may change colors

Closer examination showed slight discolorations due to contact with the following substances:

Mustard
Ketchup
Tomato juice
Lemon juice



Like all foils based on polyester, Autotex F157 is not suited for exposure to direct sun light for a long time.



8.2 UL compliant installation

This equipment is suitable for use in class 1, division 2, groups A, B, C and D or non-hazardous locations only. Combinations of equipment in your system are subject to investigation by the local authority which has jurisdiction at the time of installation.

Note the following points for UL-compliant installation:

Use only copper conductors with a temperature range of 60 / 75 °C as connection cables.

The maximum ambient temperature is 40 °C when the terminal is mounted horizontally or 50 °C when mounted vertically.



WARNING! – EXPLOSION HAZARD (AVERTISSEMENT – RISQUE D'EXPLOSION)

- Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous. (*Avant de déconnecter l'équipement, couper le courant ou s'assurer que l'emplacement est désigné non dangereux.*)
- Substitution of components may impair suitability for class 1, division 2. (*La substitution de composants peut rendre ce matériel inacceptable pour les emplacements de classe 1, division 2.*)
- Only the following types of expansion unit are allowed to be connected to the port designated "Expansion":
 - Currently no such units are evaluated or allowed.
- Do not replace the expansion unit unless power has been switched off or the area is known to be non-hazardous.
- This unit contains a battery which must only be changed in an area known to be non-hazardous. Only use the following replacement battery type: CR2450, 550 mAh, lithium battery.



Electrical connection according to the methods described in class 1, division 2 (article 501-4(b) according to National Electric Code NFPA70).



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



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



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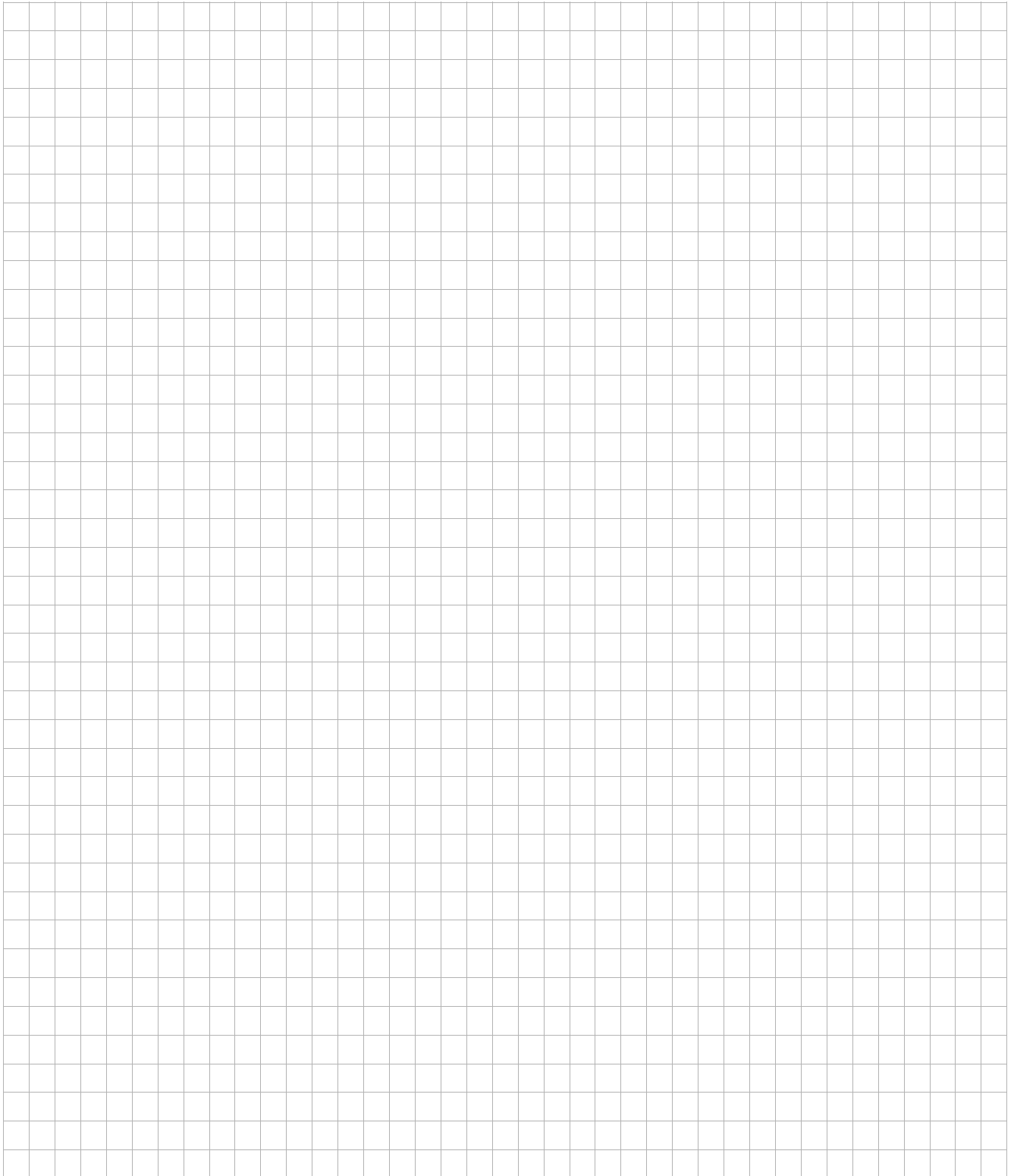


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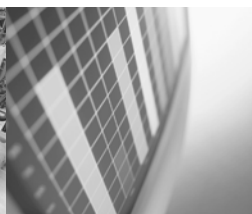
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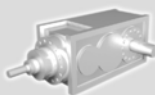
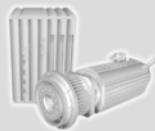
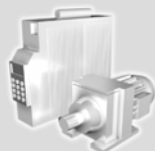


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