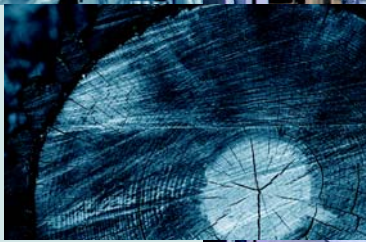
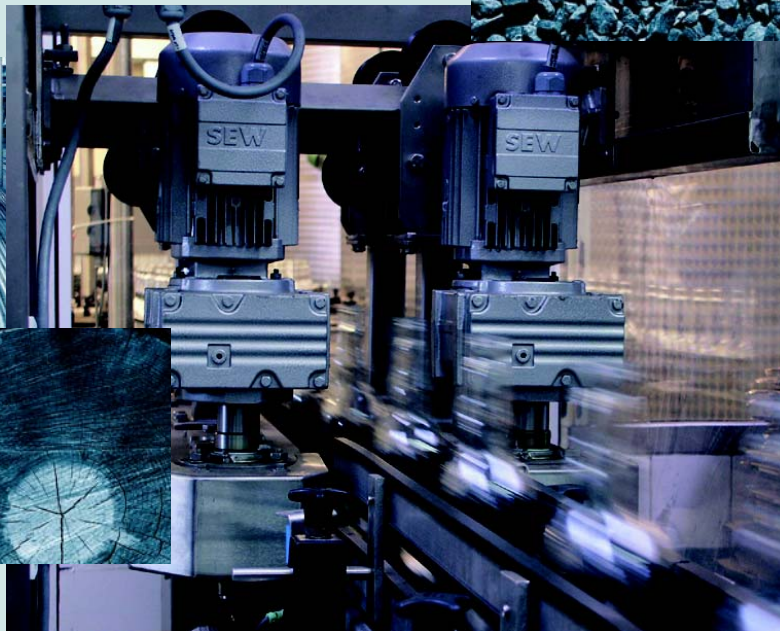




System Manual



DOP11B Operator Terminals





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1 General Information

1.1 How to use this documentation

The documentation is an integral part of the product and contains important information on operation and service. The documentation is written for all employees who assemble, install, start up, and service this product.

The documentation must be accessible and legible. Make sure that staff responsible for the plant and its operation, as well as persons who work independently on the unit, have read the operating instructions carefully and understood them. If you are unclear about any of the information in this documentation, or if you require further information, contact SEW-EURODRIVE.

1.2 Structure of the safety notes

1.2.1 Meaning of the signal words

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

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

1.2.2 Structure of the section-related safety notes

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

This is the formal structure of a section safety note:



▲ SIGNAL WORD

Type and source of danger.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the danger.

1.2.3 Structure of the embedded safety notes

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

This is the formal structure of an embedded safety note:

- **▲ SIGNAL WORD** Nature and source of hazard.
Possible consequence(s) if disregarded.
 - Measure(s) to prevent the danger.



1.3 *Right to claim under limited warranty*

You must observe this manual as the prerequisite for fault-free operation and fulfillment of any right to claim under warranty. Therefore, read the documentation before you start working with the software and the connected units from SEW-EURODRIVE.

Make sure that the documentation is available to persons responsible for the machinery and its operation as well as to persons who work independently on the devices. Also ensure that the documentation is legible.

1.4 *Exclusion of liability*

You must adhere to this documentation and the documentation of the connected devices from SEW-EURODRIVE to ensure safe operation and to achieve the specified product characteristics and performance features.

SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of the documentation. In such cases, any liability for defects is excluded.

1.5 *Copyright*

© 2010 - All rights reserved.

Unauthorized reproduction, copying, distribution or any other use of the whole or any part of this documentation is strictly prohibited.

1.6 *Product names and trademarks*

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

1.7 *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 the sake of simplicity, **both units (PLC and inverter)** will be referred to as **controller** in this documentation.



2 Safety Notes

2.1 General information

- Read the safety notes carefully.
- Check the delivery for damage caused during transport on receipt. If damage is found, advise your supplier.
- The terminal meets the requirements of article 4 of the EMC Directive 2004/108/EC.
- Do not use the terminal in or near a mining facility, or outdoors, or in areas where there is a risk of explosion or fire 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 SEW-EURODRIVE specifications.
- Read the installation and operating instructions 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 Target group

Any mechanical work on connected units may only be performed by adequately qualified personnel. Qualified staff in the context of this documentation are persons familiar with the design, mechanical installation, troubleshooting and servicing of the product who possess the following qualifications:

- Training in mechanical engineering, e.g. as a mechanic or mechatronics technician (final examinations must have been passed).
- Knowledge of this documentation and other applicable documentation.

Any electrical work on connected units may only be performed by adequately qualified electricians. Qualified electricians in the context of this documentation are persons familiar with electrical installation, startup, troubleshooting and servicing of the product who possess the following qualifications:

- Training in electrical engineering, e.g. as an electrician or mechatronics technician (final examinations must have been passed).
- Knowledge of this documentation and other applicable documentation.
- Knowledge of the relevant safety regulations and laws.
- Knowledge of the other standards, guidelines, and laws mentioned in this documentation.



Any work with the software may only be performed by adequately qualified personnel. Qualified personnel in this context are persons who have the following qualifications:

- Appropriate instruction.
- Knowledge of this documentation and other applicable documentation.
- SEW-EURODRIVE recommends additional product training for products that are operated using this software.

The staff responsible for this work must be given express permission from the company to start up, program, configure, label and ground units, systems and circuits in accordance with the standards of the safety technology.

All work in further areas of transportation, storage, operation and waste disposal must only be carried out by persons who are trained appropriately.

2.3 Designated use

The operator terminals of the DOP11B series are intended for the operation and diagnosis of industrial and commercial systems.

The DOP11B series comprises terminals for fixed installation and a terminal (DOP11B-M70) for mobile use.

Mobile use is determined by the cable length and is permitted at suitable locations (dry, weak magnetic field, no direct sunlight) within the operating range of the system/machine.

A suitable response to communication errors between the DOP11B and the controller must be implemented for control. Suitable measures (e.g. limit switches, position monitoring) must be implemented to ensure that no damage occurs as a result of a communication error with DOP11B.

Do not take the terminal into operation until you have ensured that the local laws and guidelines are complied with. For the member states of the European Union (EU) this means that the machine complies with EMC Directive 2004/108/EC and the end product with Machinery Directive 2006/42/EC; EN 60204 must be adhered to.

2.3.1 Safety functions



WARNING

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

Severe or fatal injuries.

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



2.4 Non-designated use

- Do not install or operate the terminals where they will be exposed to direct sunlight.
- The DOP11B-M70 must not be used to frequently connect it to the system/machine temporarily. Else, the permanent availability of the integrated emergency stop switch is not ensured.

In a few cases (for instance at startup or for eliminating malfunctions), it is allowed to temporarily plug and unplug the cable connected to the machine/system. However, the operator takes responsibility for doing so.

2.5 Bus systems

A bus system makes it possible to adapt frequency inverters and/or motor starters to the particulars of the machinery within wide limits. This results in the risk that a change of parameters that cannot be detected externally can result in unexpected, though not uncontrolled, system behavior.



2.6 Protective measures and protection devices

Make sure that **protective measures** and **protection devices** comply with **applicable regulations** (e.g. EN 60204 or EN 50178).

Required protective measure: Ground the unit

Required protection devices: Overcurrent protection devices

2.6.1 Protection devices for DOP11B-M70

The mobile DOP11B-M70 terminal comes additionally equipped with the following protection devices:

- Device to control enable (enabling button)
- Emergency stop

Enabling button



DANGER

Improper use or the absence of an enabling button can have fatal consequences. Severe or fatal injuries.

- It is not permitted to fix the enabling button in the enabling position using mechanical means.
- The proper functioning of the enabling button must be checked every 6 months by activating the emergency position.

For a detailed description of button positions, refer to chapter "Unit design of DOP11B-M70".

- The enabling button must **not** be set to enabling position when switching on the machine/system or when changing the operating mode (manual mode!). If this is the case, the evaluation (2 circuits) of the enabling button must cause the machine/system to stop.

A monitoring device and further components are required to ensure proper evaluation of the enabling button. These are not included in the scope of delivery of SEW-EURODRIVE.

- The enabling button must only be evaluated up to a specified period. After this period, the button must be released and then set to enabling position again. The duration of the period must be selected depending on the requirements.
- The enabling button is only suited as a protective function if the person actuating it identifies a risk of injury in due time and can take immediate measures to avoid any hazard.

An additional measure can be to reduce the velocity of the movement. The permitted velocity must be determined in a risk assessment.

- An enabling button alone must not be used to initiate commands for hazardous conditions. A second, deliberate start command is required for this purpose (key on the operator terminal).
- Only the person actuating the enabling button is allowed to be present in the hazardous area.



Safety Notes

Protective measures and protection devices

Emergency stop button

The red/yellow emergency stop button on the DOP11B-M70 operator terminal meets the requirements of EN ISO 13850. Its mode of operation must be designed based on the risk assessment for the machine as stop of category 0 or category 1 (see EN 60204-1, section 9.2.5.4.2).

The emergency stop button is wired in 2 circuits and the contacts are designed as normally closed contacts.

The wiring of the force guided switch contacts must comply with the category (according to EN ISO 13849-1) that is defined based on the risk analysis (according to EN ISO 14121-1) of the machine.



⚠ DANGER

Improper use or the absence of an emergency stop button can have fatal consequences.

Severe or fatal injuries.

- Red/yellow emergency stop buttons must function properly in any operating mode of a machine or system.
- Operator terminals with red/yellow emergency stop that are not connected to a machine must be locked to prevent them from being mistaken for a functioning emergency stop in the event of emergency.
- Operator terminals that are frequently used to temporarily plug and unplug the cable to and from the system/machine, must not be equipped with red/yellow emergency stop buttons. This is the reason why DOP11B-M70 units must not be used in such cases.
- Unlocking the emergency stop device must not cause an uncontrolled restart.
- The emergency stop does not replace safety devices.
- The emergency stop on the operator terminal does not replace the emergency stop button that is installed directly on the machine.
- Certain mechanical faults occurring in the event of an emergency stop can only be detected when actuating it.

The emergency stop button must be checked for proper functioning if it was subjected to severe impact (e.g. dropped to the floor).

Additionally, the emergency stop must be checked for proper functioning every 6 months by actuating it.



2.7 Transport/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.

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

2.8 Installation and startup

- Place the terminal on a stable base during installation. The terminal can be damaged when it is dropped.
- Install the terminal according to the accompanying installation instructions.
- Ground the unit 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 therefore must not be covered.
- Do not install the terminal in locations where it will be exposed to a powerful magnetic field.
- 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 after installation to prevent static electricity causing damage to the terminal.

INFORMATION



The following additional (special) information applies to the mobile DOP11B-M70 terminal.

- Read the following chapters and adhere to the information in them:
 - Unit design of DOP11B-M70
 - Protection devices for DOP11B-M70
 - Connecting DOP11B-M70



2.9 **Notes on operation**

- Always keep the terminal clean.
- The emergency stop function and other functions must not be controlled using the operator terminal. The only exception is the emergency stop button and the enabling button on the mobile DOP11B-M70 terminal.
- Do not touch the keys, display, etc. with sharp objects.
- Bear in mind that the terminal is ready for operation even if the backlighting is no longer illuminated, which means that entries made on the keyboard and touchscreen will still be registered.

2.10 **Service and maintenance**

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

2.11 **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 capacitors and display.



Observe the applicable national regulations.

Dispose of the following materials separately in accordance with the country-specific regulations in force, as:

- Electronics scrap
 - Plastics
 - Sheet metal
 - Copper
- etc.



3 Device Information, Installation and Hardware

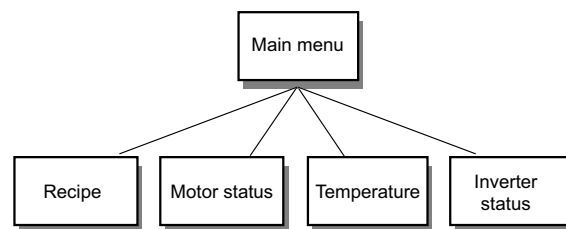
3.1 Introduction

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. Operator terminals make human-machine communication simple and safe even for the most advanced processes.

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, etc. They simplify the operators work since they can easily be adapted to the working environment. This means operators can continue to use the concepts they are familiar with.

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

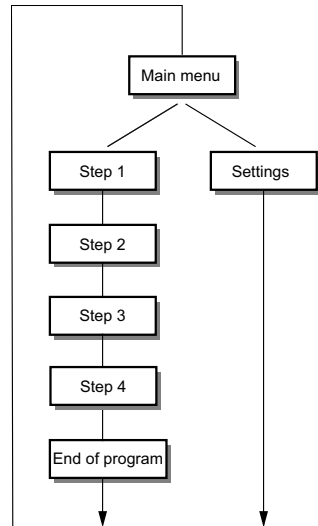
The menus in the operator terminals are called blocks.



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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 management
- Print
- Trends
- Recipe handling
- Time control
- Language handling

The functions are not only easy to use but are also cost-efficient compared to conventional solutions with switches, indicator lights, time relays, preselection counters, and week timers. The operator terminal also provides functions to improve the application of the drive electronics.



3.1.1 Programming

The operator terminals are programmed using a PC and the HMI Builder software.

The operator terminal is mainly object-oriented. This means an object is selected first and then the function of the object is assigned. 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 SEW frequency inverters

There are many advantages in connecting a terminal to a controller:

- The operator does not need to make any changes to the existing controller.
- The terminal does not block any of the inputs or outputs on the controller.
- The overview of the controller functions is optimized, e.g. time control and alarm handling.

3.1.3 Status display and control

The operator is already familiar with the indicator lamps and the analog and digital status displays 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. 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 due to the fact that all the information is exchanged through "blocks" in the terminal. Blocks can be text blocks with only text information, or graphic blocks, with full graphical presentation.

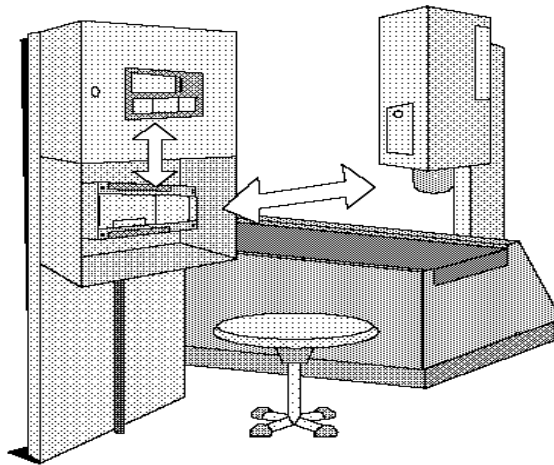
The operator terminals are equipped with function keys for direct control. These function keys are each assigned specific commands to enable control.

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



3.1.4 Setting up the operator terminal

The terminal should be set up close to 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. Monitoring, control and maintenance are remote functions and can be executed, for example, from a different position in the building or a different location. In such instances, communication can take place via LAN (Local Area Network), Internet or -modem. In long production lines with many workplaces, several terminals can be connected to one or more controllers in the network.



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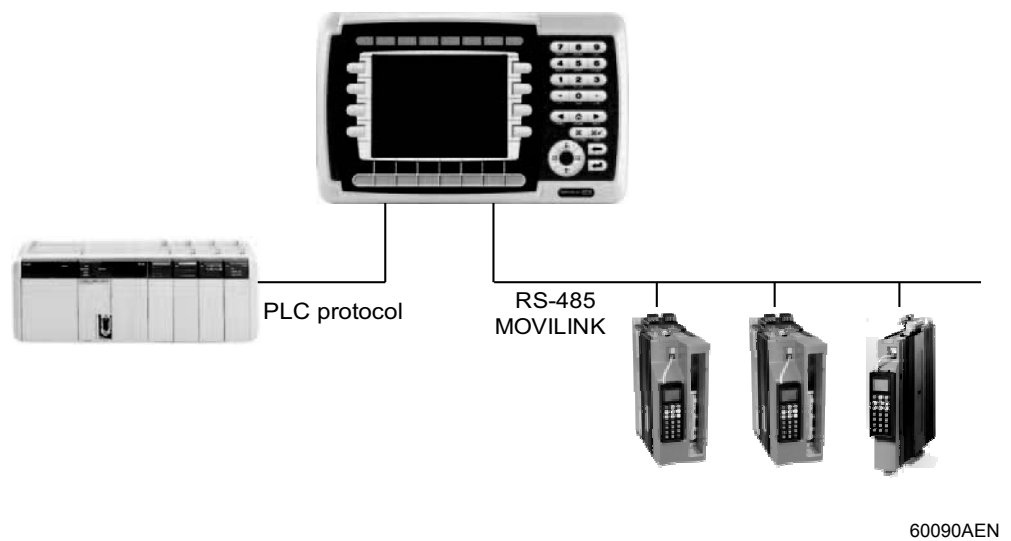


3.1.5 Compact solutions

External units, such as barcode scanners, weighing machines, modems, etc., can be connected via the terminal to the controller. The connection only requires an RS-232 interface and an ASCII communication protocol. Data entering the terminal is written directly to registers.

It is also possible to connect a unit working in parallel, such as an additional terminal or a PC with MOVITOOLS® MotionStudio for programming the inverter. You can simultaneously program the controller and communicate with it via the terminal.

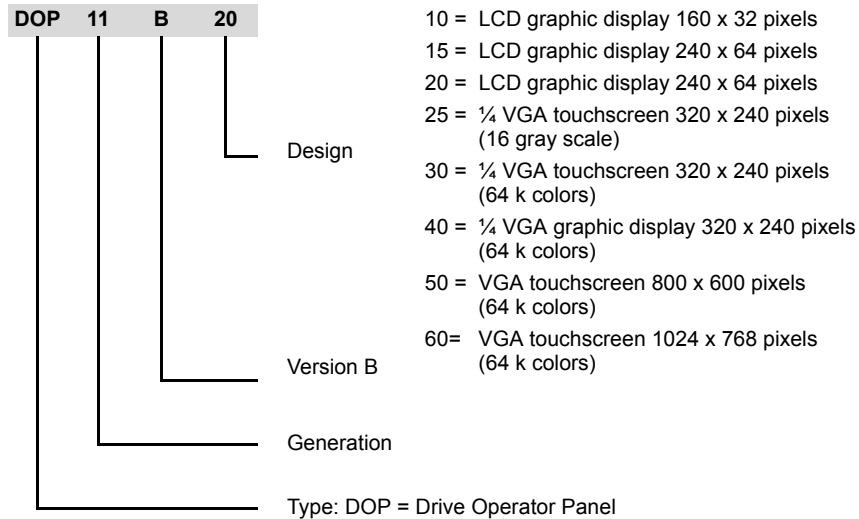
When the PLC and inverter are connected to a terminal (two drivers in the terminal), data can be exchanged between the two units (analog and digital signals).





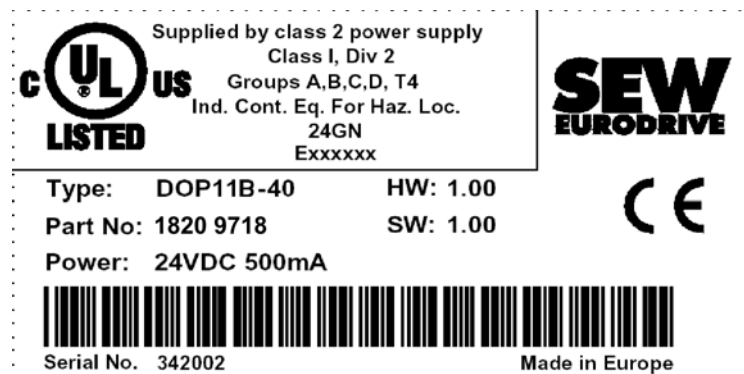
3.2 Type designation and nameplates (DOP11B-10 through DOP11B-60)

3.2.1 Sample type designation



3.2.2 Sample nameplate

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



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3.3 *Scope of delivery*

3.3.1 DOP11B-10 to DOP11B-60

Included in the scope of delivery:

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

3.3.2 DOP11B-M70

Included in the scope of delivery:

- DOP11B-M70 operator terminal
- Quick reference guide with assembly and installation notes



3.4 Unit design DOP11B-10

Part number: 1822 0266



63944AXX

- [1] Display
- [2] Function keys with inscription area
- [3] Numerical keys

- 160 x 32 pixel LCD graphic display (monochrome) with backlighting
- Voltage supply: DC 24 V, 100 mA
- 2 serial interfaces (RS-232 and RS-485 / RS-422); 2 can be used simultaneously
- IP66 membrane keypad with navigation keys, numeric keypad and 6 function keys
- 6 LEDs (two colors red / green)
- 1 expansion slot
- 512 KB application memory



3.5 Unit design DOP11B-15

Part number: 1822 0274



63945AXX

- [1] Display
- [2] Function keys with inscription area
- [3] Numerical keys
- [4] Navigation keys

- 240 x 64 pixel LCD graphic display (monochrome) with backlighting
- Voltage supply: DC 24 V, 100 mA
- 2 serial interfaces (RS-232 and RS-485 / RS-422); 2 can be used simultaneously
- IP66 membrane keypad with navigation keys, numeric keypad and 6 function keys
- 6 LEDs (two colors red / green)
- 1 expansion slot
- 512 KB application memory



3.6 Unit design DOP11B-20

Part number: 1820 9661



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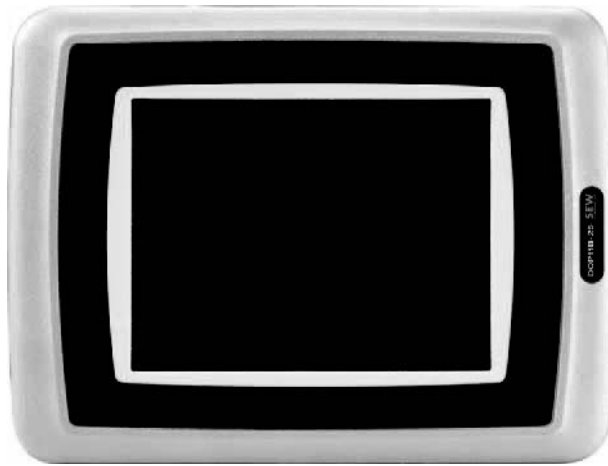
- [1] LEDs red / green
- [2] Display
- [3] Function keys
- [4] Navigation keys
- [5] Inscription areas
- [6] Numerical keys

- 240 x 64 pixel LCD graphic display (monochrome) with backlighting
- Voltage supply: DC 24 V, 350 mA
- 2 serial interfaces (RS-232 and RS-485 / RS-422); 2 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
- 12 MB application memory



3.7 Unit design DOP11B-25

Part number: 1796 6566



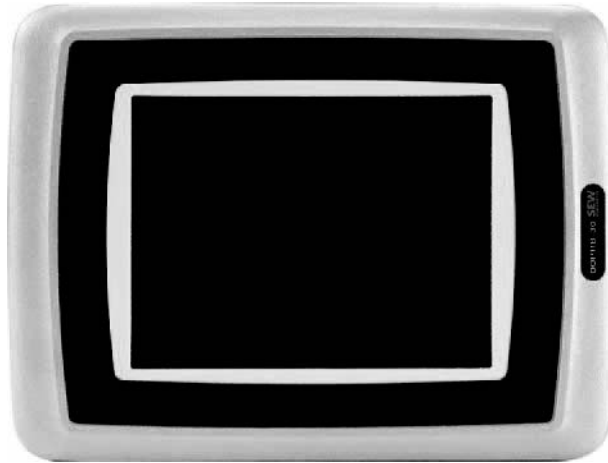
60065AXX

- 320 x 240 pixels, ¼ VGA touchscreen (16 gray scale, STN, 5.7") with backlighting
- Voltage supply: DC 24 V, 450 mA
- 2 serial interfaces (RS-232, RS-485 / RS-422); 2 can be used simultaneously
- 1 Ethernet interface (RJ45 socket)
- 1 USB interface
- IP66
- Horizontal or vertical installation
- 1 expansion slot
- 12 MB application memory



3.8 Unit design DOP11B-30

Part number: 1796 6574



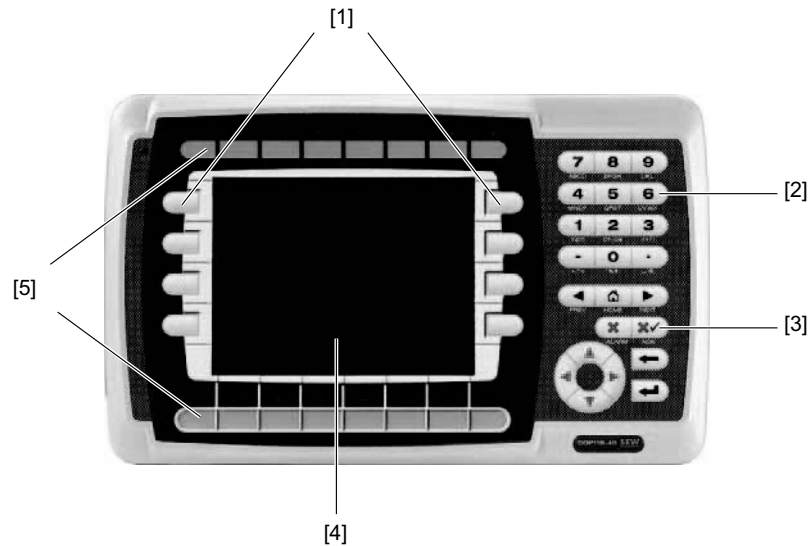
60066AXX

- 320 x 240 pixels, ¼ VGA touchscreen (64 k colors, TFT, 5.7") with backlighting
- Voltage supply: DC 24 V, 450 mA
- 2 serial interfaces (RS-232, RS-485 / RS-422); 2 can be used simultaneously
- 1 Ethernet interface (RJ45 socket)
- 1 USB interface
- IP66
- Horizontal or vertical installation
- 1 expansion slot
- 12 MB application memory



3.9 Unit design DOP11B-40

Part number: 1796 6582



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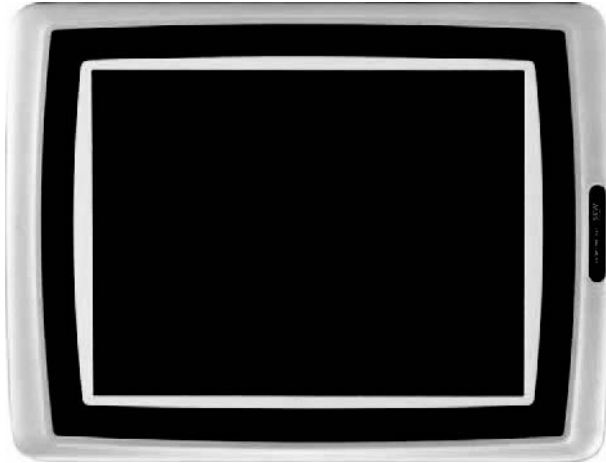
- [1] Function keys
- [2] Numerical keys
- [3] Navigation keys
- [4] Display
- [5] Inscription areas

- 320 x 240 pixels, ¼ VGA graphic display (64 k colors, TFT, 5.7") with backlighting
- Voltage supply: DC 24 V, 500 mA
- 2 serial interfaces (RS-232 and RS-485 / RS-422); 2 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
- 12 MB application memory



3.10 Unit design DOP11B-50

Part number: 1820 9726



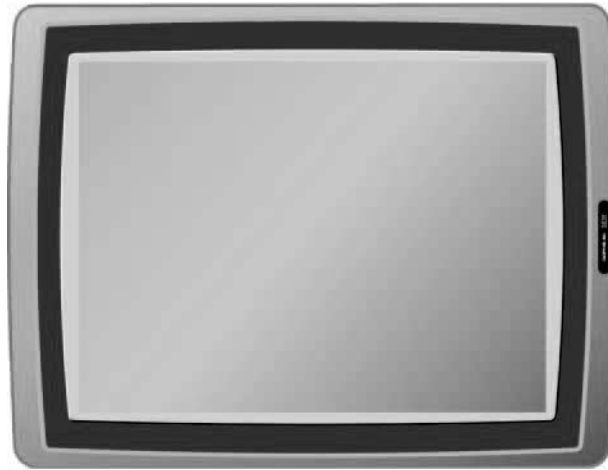
60068AXX

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



3.11 Unit design DOP11B-60

Part number: 1822 0282



64006AXX

- 1024 x 768 pixels, VGA touchscreen (64k colors, 15") with backlighting
- Voltage supply: DC 24 V, 1.2 A
- 2 serial interfaces (RS-232 and RS-485 / RS-422); 2 can be used simultaneously
- 1 Ethernet interface (RJ45 socket)
- 1 USB interface
- IP66
- Horizontal or vertical installation
- 1 expansion slot
- 12 MB application memory



3.12 Unit design of DOP11B-M70

Part number: 1822 4164

Front view:

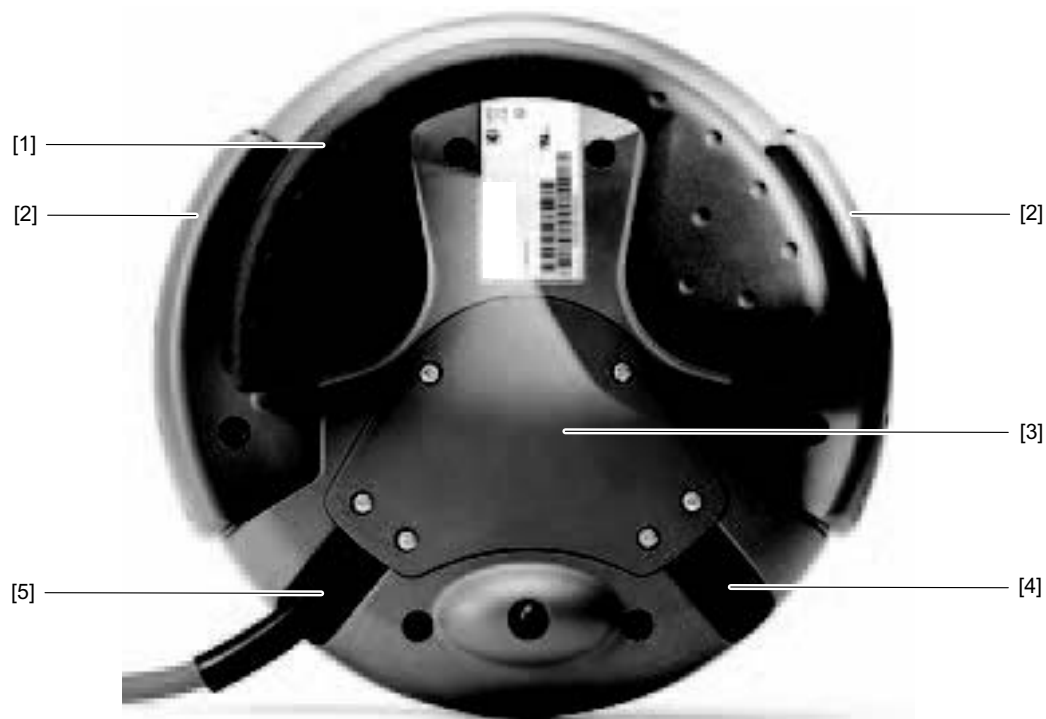


68260AXX

- [1] Keyswitch
- [2] Emergency stop button
- [3] Stylus
- [4] TFT touchscreen
- [5] Function keys
- [6] LED "Power supply present"
- [7] Cover of the socket for a USB flash drive



Rear view:



68297AXX

- [1] Handle
- [2] Enabling buttons (right and left)
- [3] Connection box
- [4] Filler plug
- [5] Hybrid cable¹⁾ with integrated strain relief and bending protection

1) The hybrid cable is not included in the scope of delivery of the -M70 terminal. The cables are available as accessory in various lengths. You find order information under "Accessories and options (DOP11B-M70)".

- 640 x 480 pixels, TFT touchscreen (64k colors, 6.5") with backlighting
- Voltage supply: DC 24 V, 900 mA
- Serial interfaces (RS-232) or Ethernet interface
- 1 USB interface
- IP65 membrane keypad with navigation keys and 8 function keys
- Emergency stop button
- Two 3-position enabling buttons (switched in parallel)
- 12 MB application memory



3.12.1 Enabling button

Functional principle



⚠ DANGER

Improper use or the absence of an enabling button can have fatal consequences.

Severe or fatal injuries.

- Follow the safety notes on page 11 "Protection devices for DOP11B-M70".

The DOP11B-M70 operator terminal has two enabling buttons (one at each side of the unit).

In this way the enabling button can be activated with the left or the right hand. Both enabling buttons are switched in parallel and have the same effect on the shared safety circuits in the connection cable. Only one button has to be pressed. The enabling button consists of a three-stage control element. The position is determined by microswitches.

Button positions

An enabling button can be set to the following 3 positions:

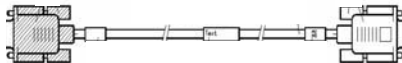
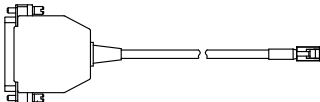
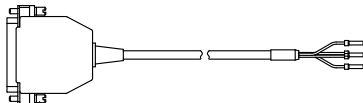


Button position	Function	Enabling button	Switching contact
1	Zero position	Not activated	OFF (open)
2	Enabling position	Activated	ON (closed)
3	Emergency position ¹⁾	Pressed down	OFF (open)

- 1) Pressing the enabling button to emergency position is evaluated in such a way that the position is skipped when releasing the button.



3.13 Accessories and options (DOP11B-10 to -60)

Cables for programming the operator terminal (DOP11B-10 to -60) and for communication between the operator terminal and MOVIDRIVE®.

Option	Description	Part number
PCS11B (Panel Cable Serial)	Connection cable between operator terminal DOP11B (RS-232, max. 115.2 Kbit/s) and PC (RS-232) for programming the operator terminal. Fixed length of 3 m. 	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). Fixed length of 5 m. 	1820 6328
PCS22A (Panel Cable Serial)	Communication cable from operator terminal (RS-485, max. 57.6 Kbit/s) to open cable end. Fixed length of 5 m. 	1821 1054
Prefabricated cable D-SUB-9 PO	Communication cable between operator terminal (RS-232, max. 57.6 Kbit/s) and UWS11A or UWS21A (RS-232) interface converter. For communication with SEW frequency inverters. Fixed length of 1.8 m. 	814 6144
PFE11B (Panel Fieldbus Ethernet)	Ethernet TCP/IP option (10 Mbit/s) To connect operator terminals DOP11B-10 and -15 to the customer's PC network. The following functions become available by using the Ethernet option: <ul style="list-style-type: none"> • Operation of the HMI Builder software for programming the operator terminals via Ethernet (projects can be uploaded and downloaded quickly). • Communication with PLC and drive technology via TCP/IP services (only suitable for DOP11B-10 and -15) 	1822 2307



Device Information, Installation and Hardware

Accessories and options (DOP11B-10 to -60)

Option	Description	Part number
UWS11A	Interface adapter for support rail mounting RS-232 ↔ RS-485 <div style="text-align: center;"> </div>	822 689X
UWU52A	Switched-mode power supply Input AC 100 ... 240 V Output DC 24 V, 2.5 A <div style="text-align: center;"> </div>	188 1817



3.14 Accessories and options (DOP11B-M70)

Hybrid cables of various lengths, connection box and wall bracket for the mobile operator terminal DOP11B-M70:

Option	Description	Part number
PCM05B (Panel Cable Mobile)	Hybrid cable between DOP11B-M70 operator terminal and connection box PTB11B. Fixed length of 5 m (no figure).	1822 4172
PCM10B (Panel Cable Mobile)	Hybrid cable between DOP11B-M70 operator terminal and connection box PTB11B. Fixed length of 10 m (no figure).	1822 4180
PCM15B (Panel Cable Mobile)	Hybrid cable between DOP11B-M70 operator terminal and connection box PTB11B. Fixed length of 15 m (no figure).	1822 4199
PCB11B (Panel Connection Box)	Connection box for connecting the DOP11B-M70 to the machine/system using a PCMxxB hybrid cable. The connection box is suited for wall mounting (no figure).	1822 4202
PMK11B (Panel Mounting Kit)	Wall bracket for DOP11B-M70 operator terminal and PCMxxB hybrid cable (no figure).	1822 4210



4 Installation (DOP11B-10 to DOP11B-60)

4.1 Installation instructions for the basic unit

4.1.1 Separate cable ducts

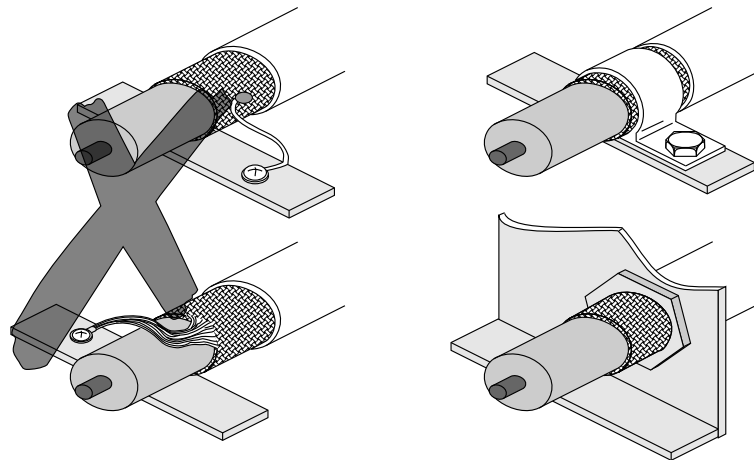
Route **power cables** and **electronics cables** in **separate cable ducts**.

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 to 17)
 - 2 conductors per terminal 0.20 ... 0.75 mm² (AWG 20 to 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**. You can ground one end of the shield via a 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 1: Example of correct shield connection with metal clamp (shield clamp) or metal cable gland

- **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 voltage supply.



4.2 UL-compliant installation

Note the following points for UL-compliant installation:

- This unit is designed exclusively for use in class 1, division 2, group A, B, C and D or in non-hazardous areas. Unit combinations in your system must be checked by the official inspection authority responsible at the time of installation.
- Use only copper conductors with a temperature range of 60/75 °C as connection cables.
- For horizontal installation, the maximum ambient temperature is 40 °C; for vertical installation the maximum temperature is 50 °C.



WARNING – RISK OF EXPLOSION!

- Only disconnect the units when no voltage is applied or when it poses no danger to the area.
- Exchanging components can impair suitability for class 1, division 2.
- Only connect the following extension devices to the connection labeled "Extension":
 - PFE11B, only for DOP11B-10 and -15.
- Only replace the extension device when no voltage is applied or when it poses no danger to the area.
- This device includes a battery that may only be exchanged in a non-hazardous area. Use only the following battery type as a replacement: Lithium battery CR2450, 550 mAh.
- The unit must be used on an even surface with protection 4X. Only for indoor use.

INFORMATION



Electrical connection must be made in line with the methods described in class 1, paragraph 2 (article 501-4(b) according to the National Electric Code NFPA70).

NOTICE



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

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

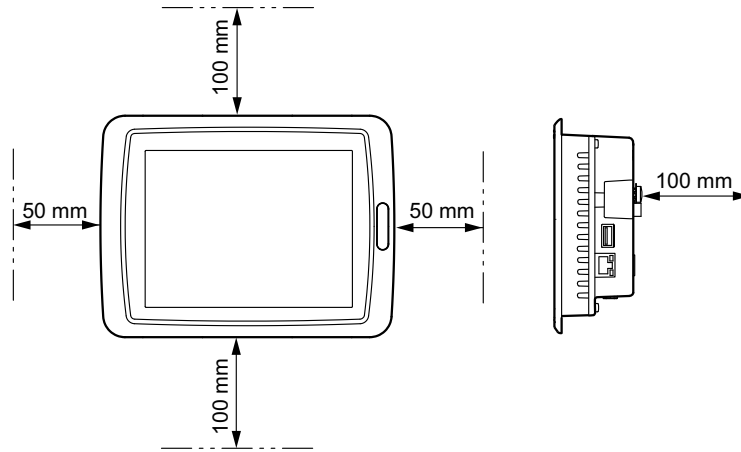


Installation (DOP11B-10 to DOP11B-60)

Space required for installation

4.3 Space required for installation

- Thickness of mounting panel: 1.5 - 7.5 mm (0.06 - 0.3 in)
- Space required for installing the operator terminal:



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NOTICE

The openings in the housing are used for convection cooling and must not be covered.



4.4 Installation procedure

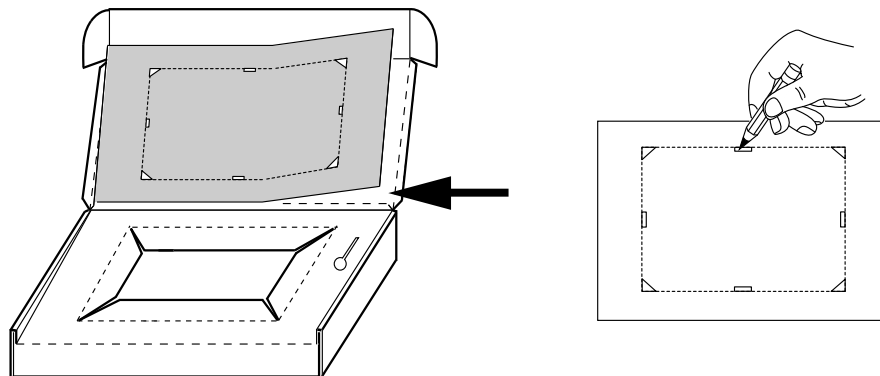
1. Unpack the delivery and check it. Inform your supplier immediately in the event of damage.



NOTICE

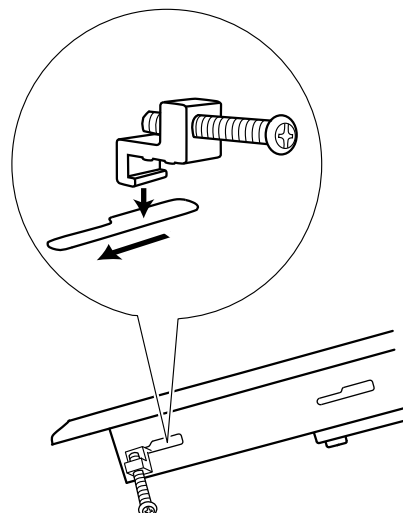
Place the operator terminal on a stable base during installation. If the unit falls down, it could be damaged.

2. Position the template where you want to install the operator terminal. Draw around the outer edge of the openings and cut out the markings.

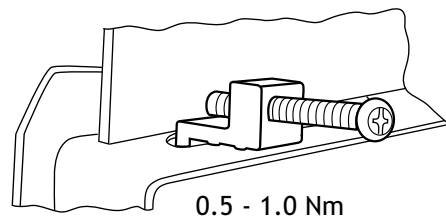


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3. Use all the retaining bores and the brackets and screws supplied to fix the operator terminal in place.



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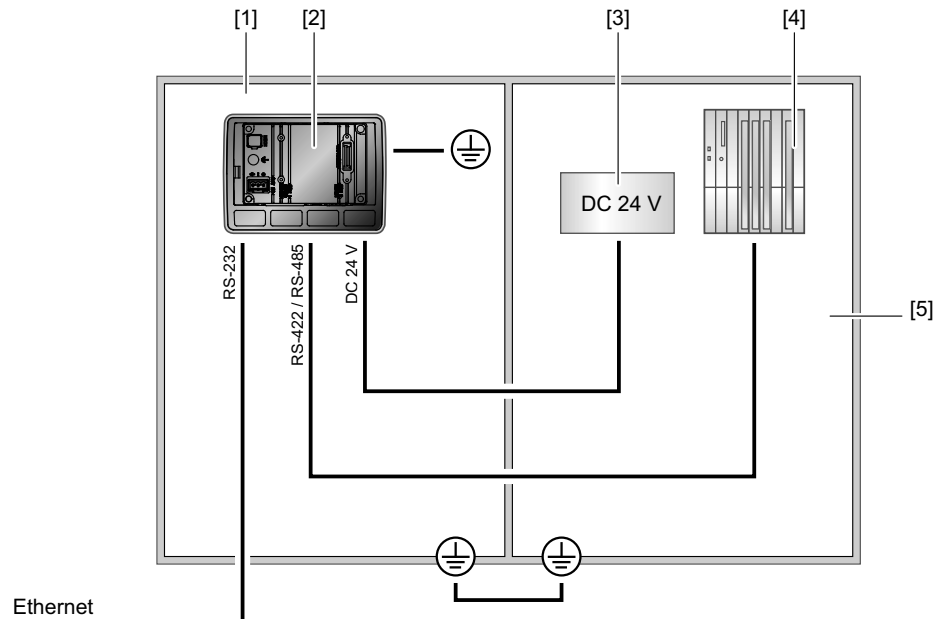
63825AXX



Installation (DOP11B-10 to DOP11B-60)

Installation procedure

4. Connect the cables in the indicated order.



63822AXX

- [1] Make sure that the operator terminal and controller have the same electrical grounding (reference voltage value), as otherwise there may be problems with communication.
 - [2] Use an M5 screw and a PE conductor (as short as possible) with a minimum cross section of 2.5 mm².
 - [3] Only use shielded communication cables.
Route high-voltage cables separately from signal and supply cables.
 - [4] The operator terminal must adjust to the ambient temperature before it is taken into operation. If condensation builds up, you must ensure that the operator terminal is dry before connecting it to the power supply.
Ensure that the voltage and polarity of the power source are correct.
 - [5] Control cabinet
5. Carefully remove the protective film from the display of the operator terminal to prevent damage from static electricity.



4.5 Connecting basic units (DOP11B-10 to DOP11B-60)

4.5.1 Voltage supply



NOTICE

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



INFORMATION

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.

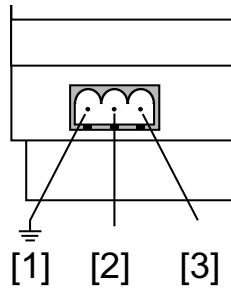
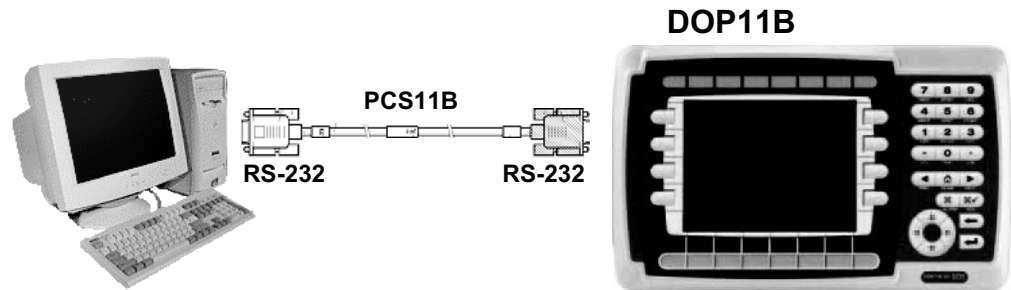


Figure 2: Voltage supply for DOP11B-10 to DOP11B-60 ^{60059AXX}

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



4.6 Connection to a PC



60060AXX

Figure 3: Connection to a PC

The operator terminal is programmed using the HMI Builder software. The PCS11B communication cable is required to program the operator terminal.

INFORMATION



Alternatively, the operator terminal can be programmed via Ethernet.



NOTICE

Possible damage to property

The power must be switched off when connecting the units.



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

4.7.1 Wiring diagram: RS-485 interface

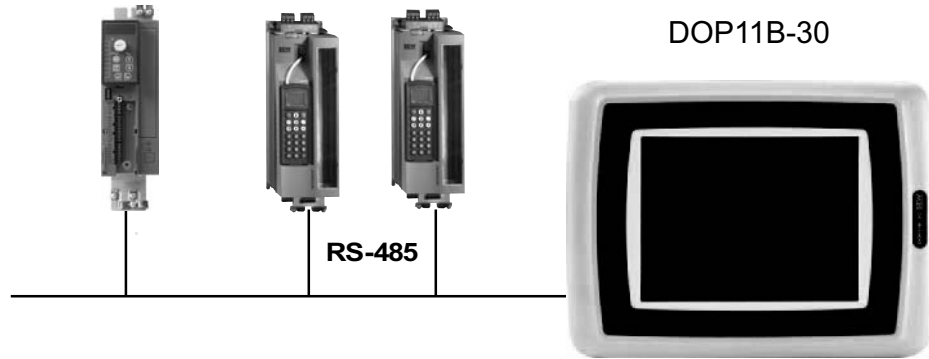


Figure 4: RS-485 connection

60093AXX

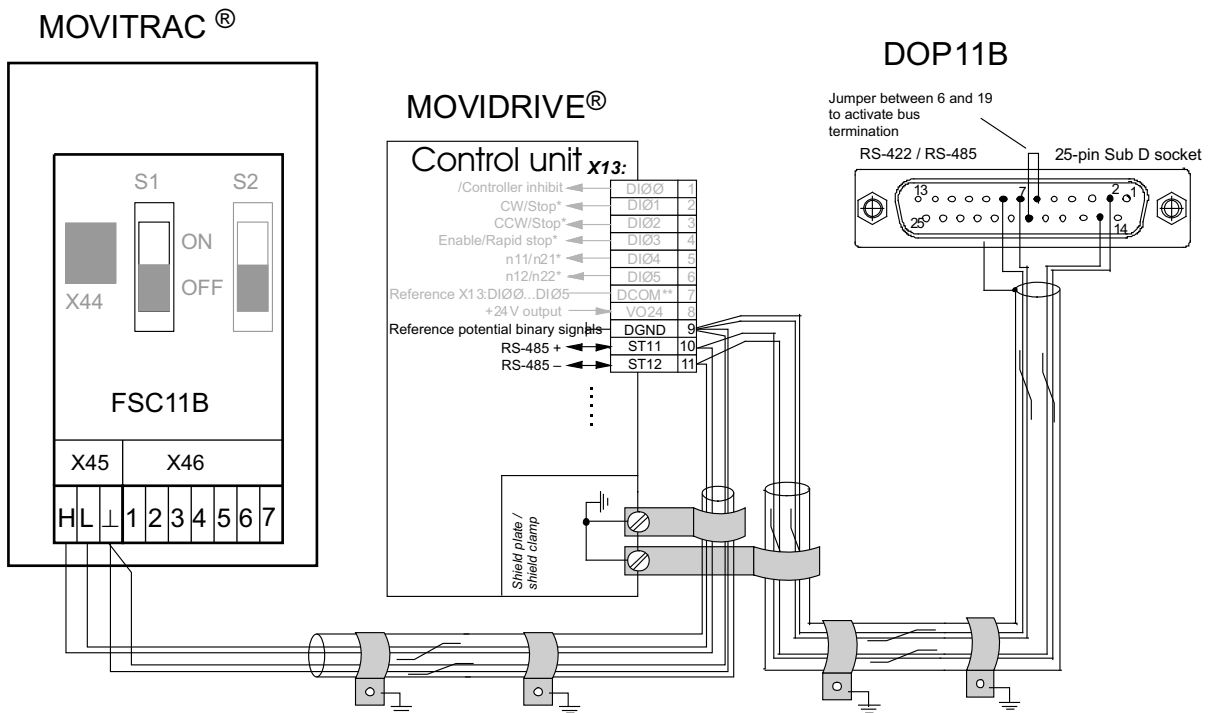


Figure 5: Pin assignment for DOP11B

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INFORMATION



Alternatively, you can use the PCS22A cable.



Installation (DOP11B-10 to DOP11B-60) RS-485 connection

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 to 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:

- Lapp cable, UNITRONIC® BUS CAN, 2 x 2 x 0.22 mm².

Connecting the shield

Apply the shield at 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.



NOTICE

The bus controller may suffer irreparable damage as a result of a short circuit in the EMC decoupling between the electronics and ground.

Never connect the shield ends to DGND!

Cable length

The total permitted cable length is 200 m.

Terminating resistor

The controller and UWS11A interface adapter are equipped with dynamic terminating resistors. In this case, do not connect **any external terminating resistors!**

If the DOP11B 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 (jumper between pin 6 and pin 19) if the operator terminal is the first or last station.

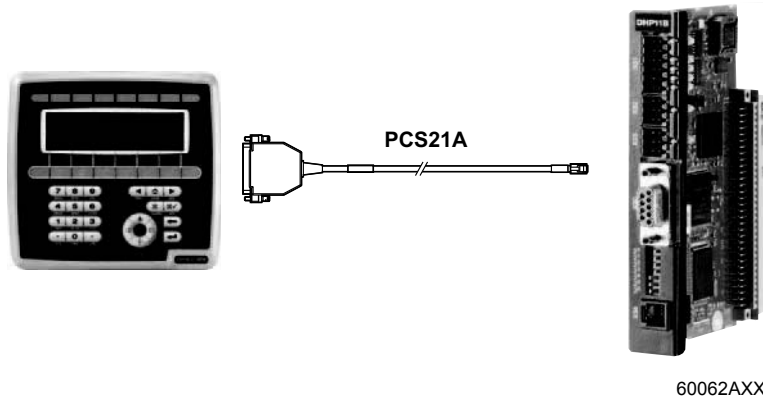


NOTICE

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



4.8 Connecting RS-485 to PCS21A



4.8.1 Connecting the shield

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.



NOTICE

The bus controller may suffer irreparable damage as a result of a short circuit in the EMC decoupling between the electronics and ground.

Never connect the shield ends to DGND!

4.8.2 Terminating resistor

The controller comes equipped with dynamic terminating resistors. 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.



NOTICE

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



4.9 RS-232 connection via UWS11A

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

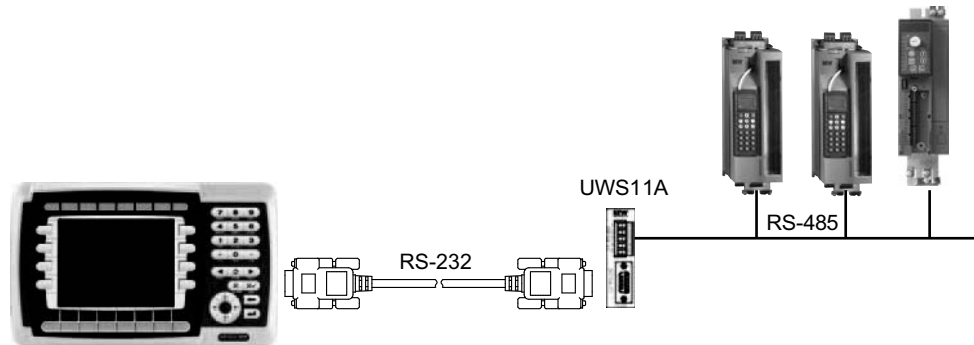


Figure 6: Connection via serial connection (UWS11A)

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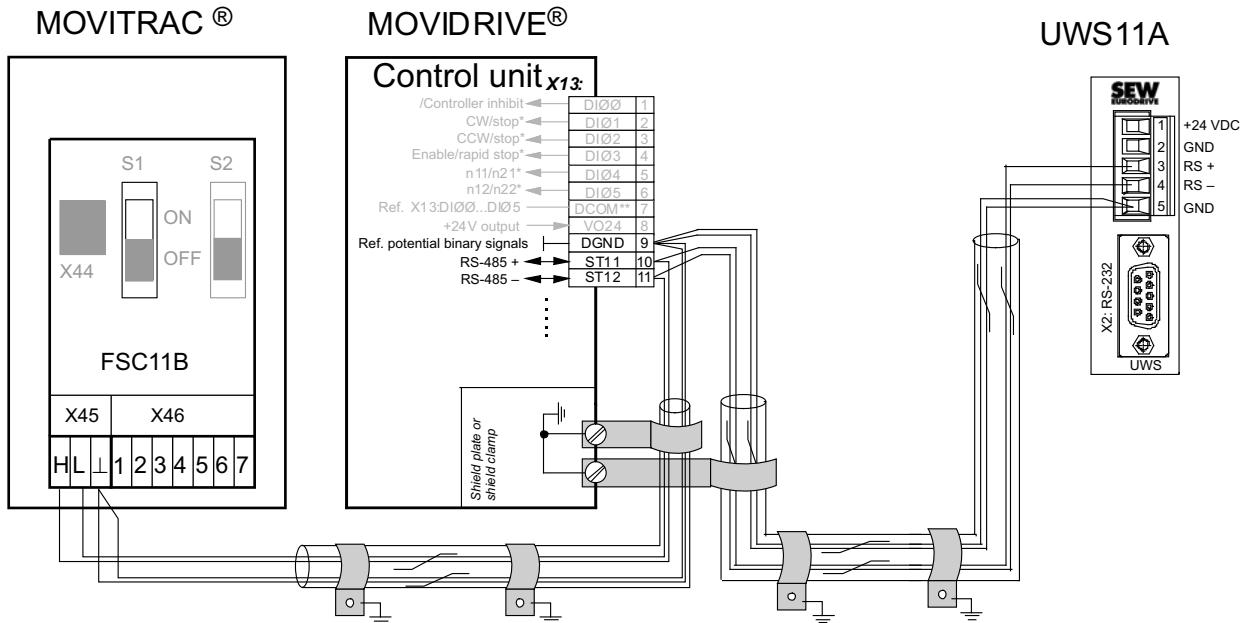


Figure 7: UWS11A terminal assignments

58787AEN

INFORMATION



Alternatively, you can use the D-SUB-9PO cable for the RS-232 connection (see chapter "Accessories and options" on page 33).

4.9.1 RS-485 connection

See chapter "RS-485 connection" on page 43 for the cable specification.



4.10 Ethernet connection

Connecting DOP11B to a PC for programming and remote maintenance via Ethernet and TCP/IP.

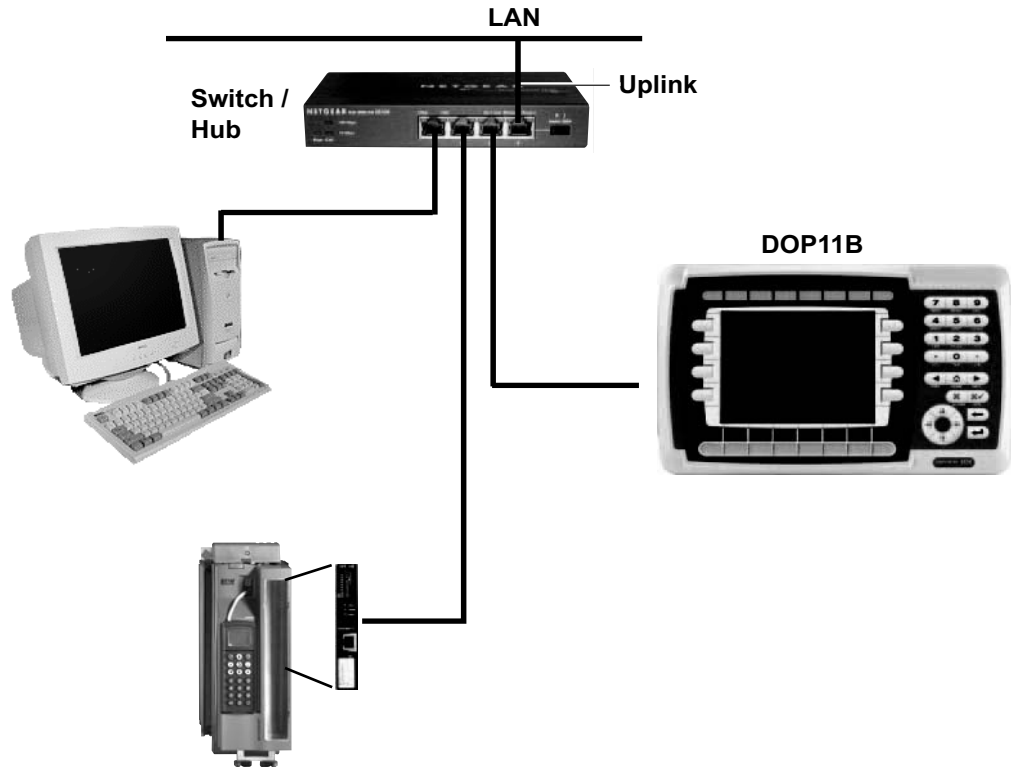


Figure 8: Ethernet connection

60095AXX

4.10.1 Cable specification

Use a standard shielded Ethernet cable with shielded RJ45 connectors and cables according to the CAT5 specification. The maximum cable length is 100 m.

For example, the following cable is suitable:

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

INFORMATION



For a description of how to determine the Ethernet (MAC) address of the option card, see the chapter "Configuration mode (SETUP)" on page 68.



Installation (DOP11B-10 to DOP11B-60) Ethernet connection

4.10.2 Ethernet interface of DOP11B-20 to -60

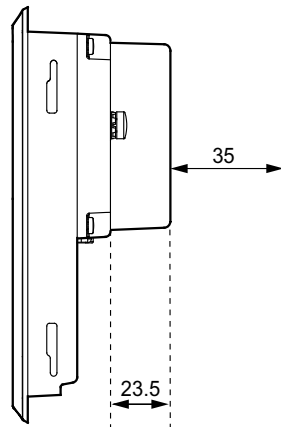
DOP11B-20 to DOP11B-60 terminals are equipped as standard with an Ethernet interface. Two LEDs are integrated into the RJ-45 socket.

The LEDs have the following functions:

Green LED	Illuminated	The Ethernet cable is connected correctly.
	Flashing	Data is being sent or received.
Yellow LED	Illuminated	The setting 100 Mbit, full duplex is active.
	Flashing	The setting 100 Mbit, half duplex is active.

4.10.3 Ethernet interface PFE11B for DOP11B-10 and -15

Space requirements



63798AXX

Installation

1. Unpack the delivery and check the contents for completeness and possible damage. Inform your supplier immediately in the event of damage.

Scope of delivery:

- Expansion module
- 4 x M3x6
- 4 spacers

NOTICE

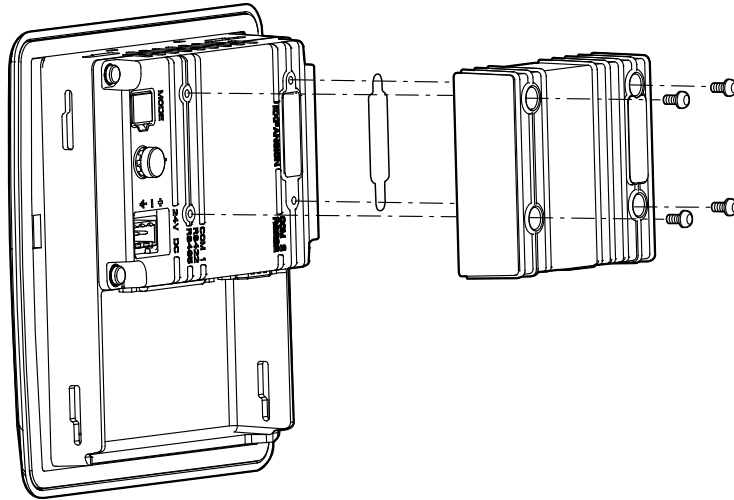


Place the terminal on a stable base during installation. If the unit falls down, it could be damaged.

2. Disconnect the operator terminal from the voltage supply.



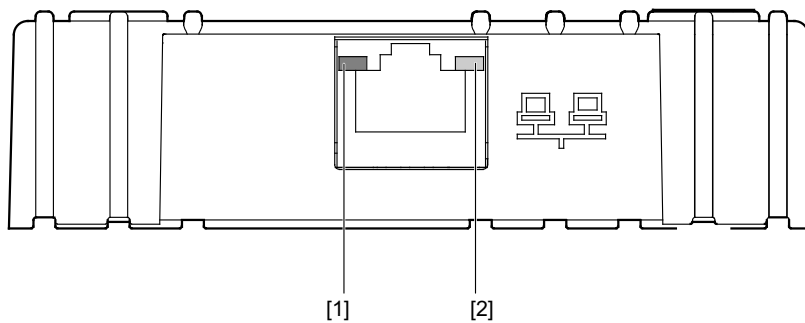
- Remove the plastic cover from the expansion interface.



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- Fix the expansion module in place using the screws supplied.
- Connect the operator terminal to the power supply.

LEDs on PFE11B



63810AXX

- [1] Green LED
- [2] Yellow LED

The expansion card has 2 LEDs with the following functions:

Green LED	Flashing	Data is being sent or received.
Yellow LED	Illuminated	The (twisted pair) Ethernet cable is connected correctly.



Installation (DOP11B-10 to DOP11B-60) Ethernet connection

Activating expansion interface

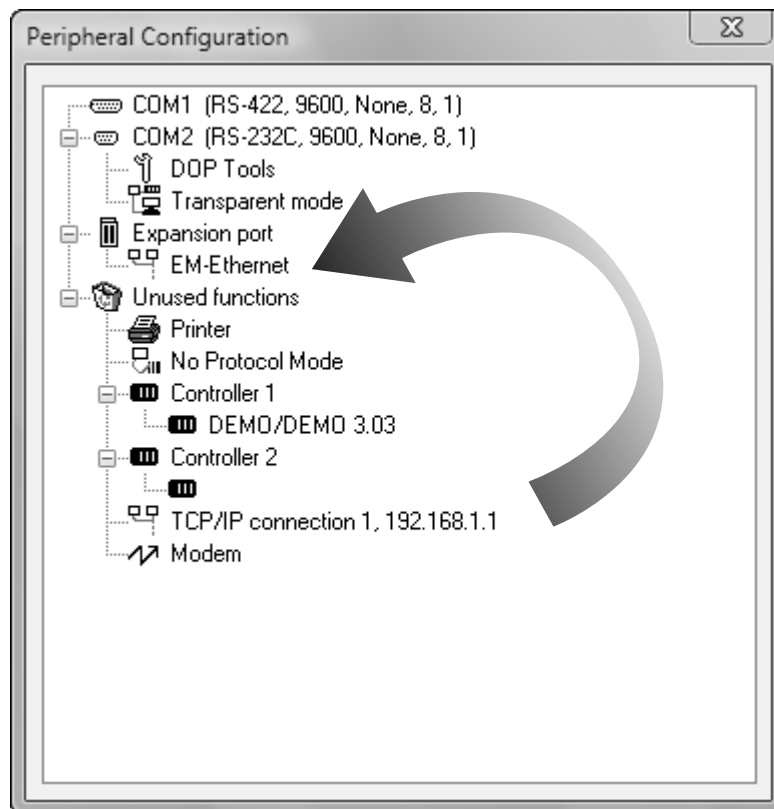
- Perform a factory setting to activate the expansion interface. To do so, set DIP switch 3 on the rear of the unit to "ON" position.
- Make a restart and follow the instructions of the terminal.

Note: Without factory setting, a ping command is answered but a project cannot be downloaded via Ethernet.

- Before downloading a new project, set an expansion interface (PFE11B) as periphery in the configuration tool.

Setting the periphery in the configuration tool

- Double-click the [Peripherals] directory in the project manger in the configuration tool for the operator terminal.



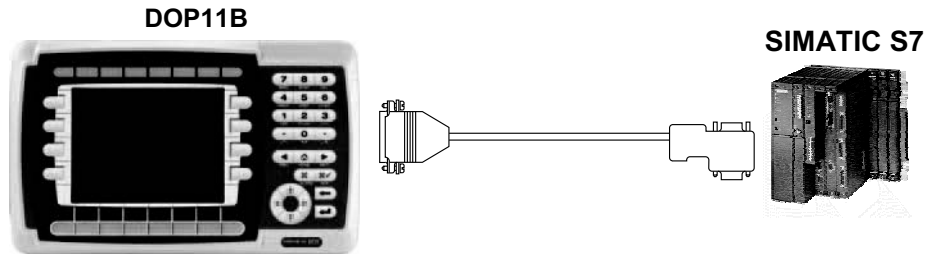
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- Make a right mouse click on [Expansion port] and choose [EM Ethernet].
- Drag the TCP/IP connection and, if required, the controller with the associated driver onto the Ethernet module.
- To modify the selected driver, select [Properties] from the [project] menu. You find more information in the driver documentation.



4.11 Connection to Siemens S7

4.11.1 MPI (RS-485)



63682AXX

Figure 9: Connection to a Siemens S7 via MPI and RS-485

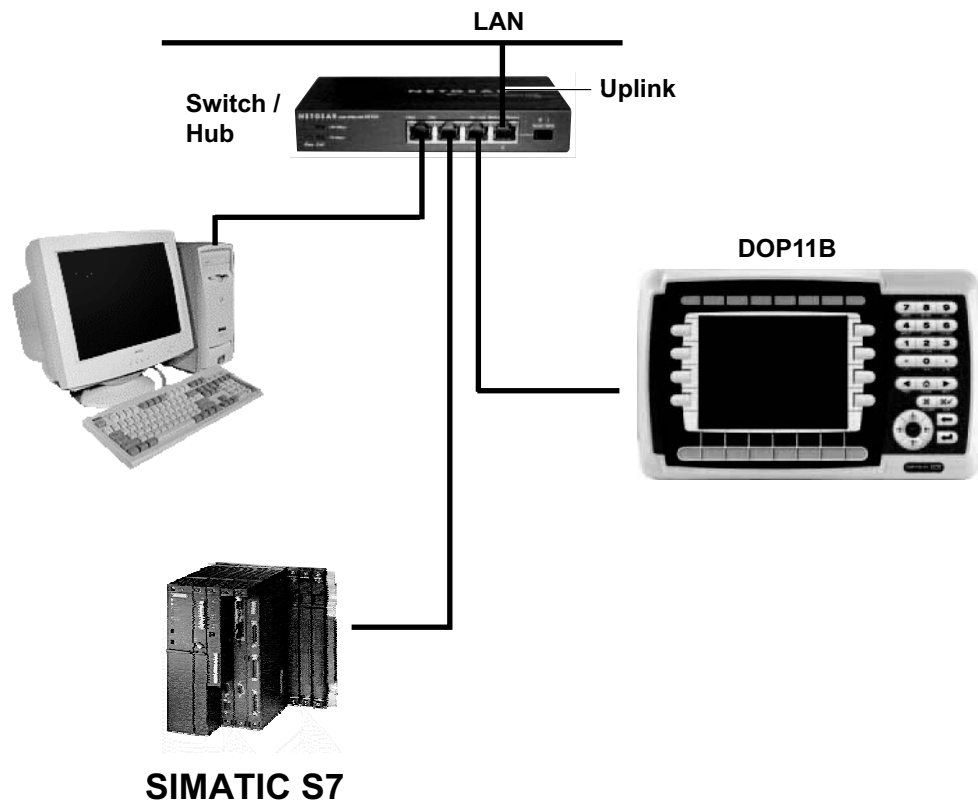
Use the driver "S7 MPI Direct".

INFORMATION



Alternatively, the PCS22A cable can be used with a commercially available D-sub connector or PROFIBUS connector (see also chapter "Accessories and options" on page 33).

4.11.2 Ethernet



64328AXX

Figure 10: Ethernet connection

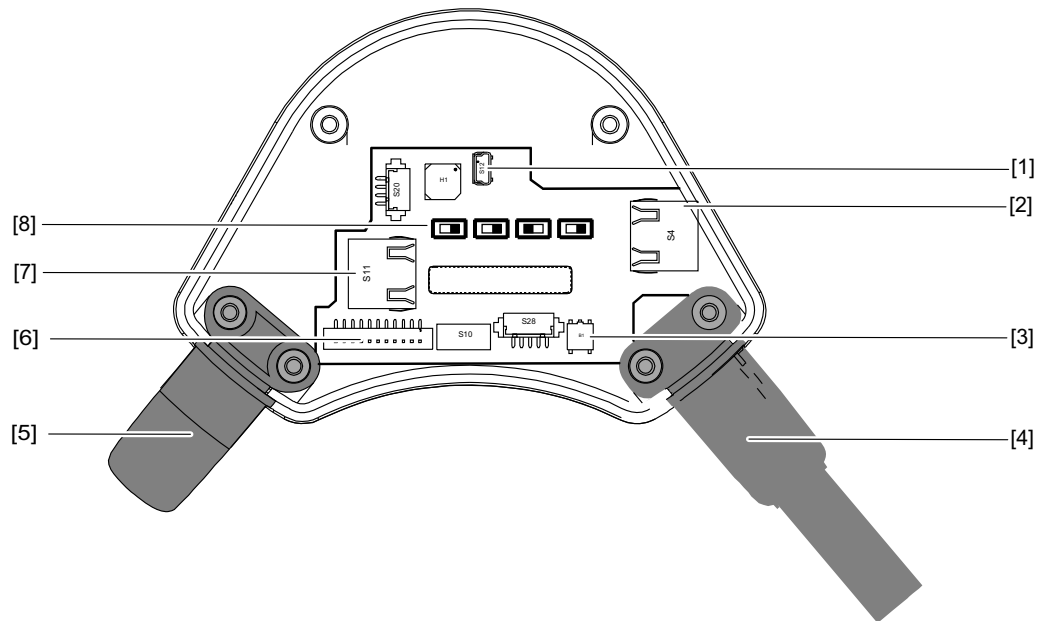
Use driver "S7 ISO over TCP/IP".



5 Installation (DOP11B-M70)

5.1 Connection box

The following figure depicts the inside of the connection box. In this example, the cable entry is at the right side:



68298AXX

Figure 11: Interior of the connection box (cable entry from the right side)

Position	Designation	Function
[1]	S12 socket	USB connection
[2]	S4 socket	Connection for Ethernet
[3]	Reset button	Restart of the unit Note: All data that has not been saved will be lost when pressing the reset button.
[4]	Hybrid cable	Connection cable for voltage supply and data communication (with integrated strain relief and bending protection).
[5]	Filler plug	Ensures that the terminal is sealed (degree of protection IP65)
[6]	S22 main terminal strip	For connecting the voltage supply and control lines
[7]	S11 socket	Serial port
[8]	4 DIP switches	Specify the transmission standard of serial communication on S11: <ul style="list-style-type: none"> • RS-232-C (default) • RS-422-A For switch positions, see chapter "Switches on the DOP11B-M70 terminal" (page 66)



5.2 Voltage supply



NOTICE

- Ensure correct polarity when connecting the terminal. Incorrect polarity will damage the unit.
- All power supply circuits to the DOP11B-M70 terminals must be fused with a maximum of 3.15 A.



INFORMATION

Make sure the operator terminal and the controller system have the same electrical grounding (reference voltage value). Else, communication errors might occur.

The following table shows the specification of the voltage supply:

Designation	Permitted value
Cross section	0.24 mm ² (AWG24)
Material	Tin coated stranded copper wire
Conductor resistance	≤ 90 Ω/km
Required supply voltage (directly on the operator terminal)	DC 24 V
Power consumption	9.6 W (400 mA, DC 24 V)
Max. interruption duration	≤ 10 ms (lt. IEC 61131)



5.3 **Opening the connection box**

Before opening the connection box, adhere to the following safety instruction:



NOTICE

Possible damage to property

The power supply of the connection cable must be separated before opening the operator terminal.

Do the following to open the connection box:

1. Place the operator terminal on a level and clean base with the display facing downwards to prevent the operating and display elements from being damaged.

Note: It is recommended to place the operator terminal onto an ESD mat to prevent the components from being destroyed by electrostatic discharge.

2. Open the cover of the connection box by loosening the 6 screws. Use a Philips screwdriver for this purpose (size 2).

5.4 **Routing hybrid cables and connecting cables**

Do the following to route the hybrid cable and connect the cables:

1. Insert the hybrid cable into the cable entry on the required side (left or right).
2. Make sure that strain relief and bending protection are intact.
3. Connect the cables according to the required communication (Ethernet or serial), see the "cable routing" chapter.
4. Make sure all plug connections are properly closed.

Observe the notes on loosening and closing plug connections.



5.5 Loosening plug connections

Observe the following notes for loosening plug connections:

- Loosen the plug connection of the main plug (S22) by carefully pulling the cores. Do not use any sharp objects.
- To loosen the RJ45 plug (S11 and S4), first press the locking lever [1].

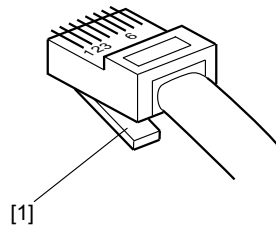


Figure 12: Locking lever

68289AXX

5.6 Closing plug connections

Observe the following notes for closing plug connections:



DANGER

Emergency stop not available.

Severe or fatal injuries.

- Check to see that the main plug (S22) is properly connected, else the emergency stop function is not ensured.
- It is important that the locking lever of the RJ45 plug (S11 and S4) locks into place and shielding is ensured.



5.7 Cable routing

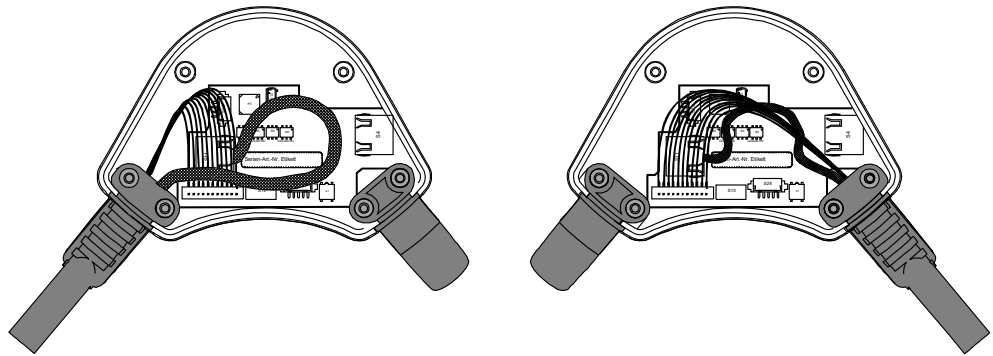
INFORMATION



It is not possible to use the serial interface and the Ethernet interface at the same time.

5.7.1 Serial

The following figure shows how the cables are routed for serial communication:



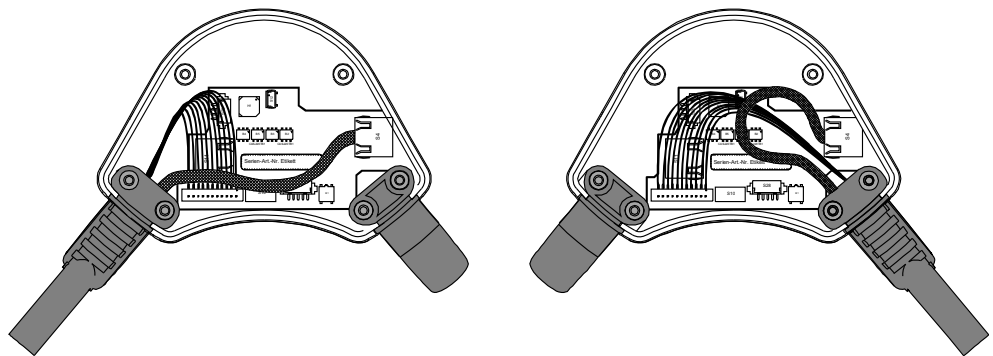
68299AXX

Figure 13: Cable routing serial (entry from the left/right)

You find the corresponding wiring diagram in chapter "Technical data and dimension sheets".

5.7.2 Ethernet

The following figure shows how the cables are routed for communication via Ethernet:



68300AXX

Figure 14: Cable routing Ethernet (entry from the left/right)

You find the corresponding wiring diagram in chapter "Technical data and dimension sheets".



5.8 Closing the connection box and checking emergency stop

Do the following to close the connection box:

1. Close the cable entry not in use with a filler plug to ensure that the terminal is sealed (degree of protection IP65).
2. Check to see that the gasket is clean and undamaged and is positioned properly in the cover.
3. Carefully place the cover onto the connection box to prevent cables from jamming.
4. Secure the cover with 6 screws. The permitted torque is 0.4 to 0.5 Nm to ensure degree of protection IP65.
5. Before taking the terminal into operation again, check that the emergency stop button functions properly.



Installation (DOP11B-M70)

Connecting DOP11B-M70 to PCB11B

5.9 Connecting DOP11B-M70 to PCB11B

5.9.1 Overview

The PCB11B is used to integrate the DOP11B-M70 operator terminal into the machine/system.

Adhere to the following safety instructions before connecting the DOP11B-M70 terminal to the PCB11B using the hybrid cable:



⚠ DANGER

Impermissibly high voltage supply

Severe or fatal injuries from electric shock.

- Supply the unit exclusively from voltage sources with extra-low voltage (for example SELV or PELV according to IEC 61131 2)
- Connect only voltages and power circuits to connections, terminals or interfaces up to 50 V that are reliably separated from hazardous voltages (e.g. by sufficient insulation).



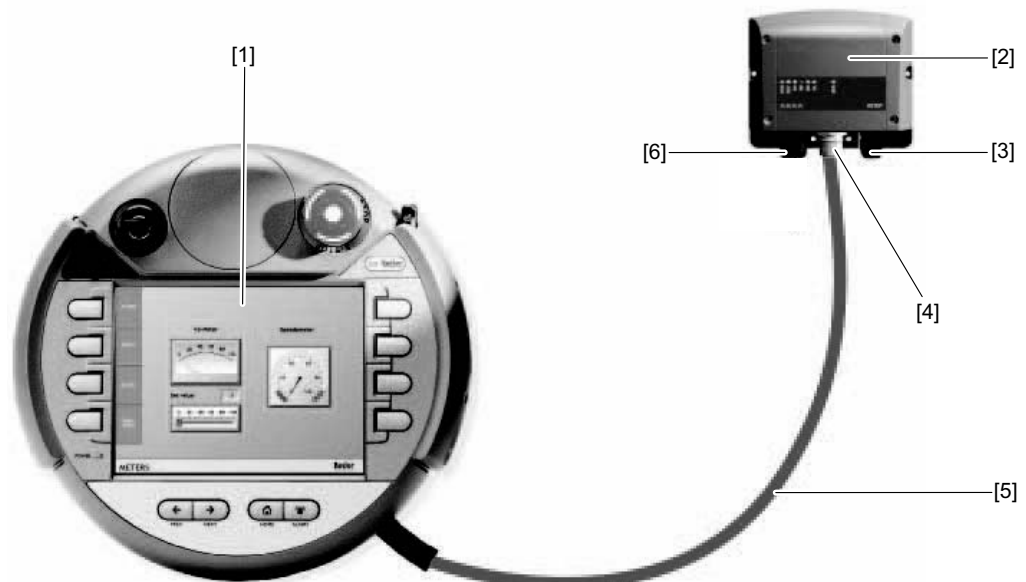
NOTICE

Possible damage to property

The voltage supply of PCB11B must be separated before connecting the hybrid cable.

5.9.2 Connection

1. Connect one end of the hybrid cable [5] with the DOP11B-M70 terminal [1], as already shown.



68333AXX

2. Connect the other end of the hybrid cable [5] with the PCB11B.
To do so, plug the 17-pin round connector (M23) into the socket K1 [4] at the bottom of the PCB11B.



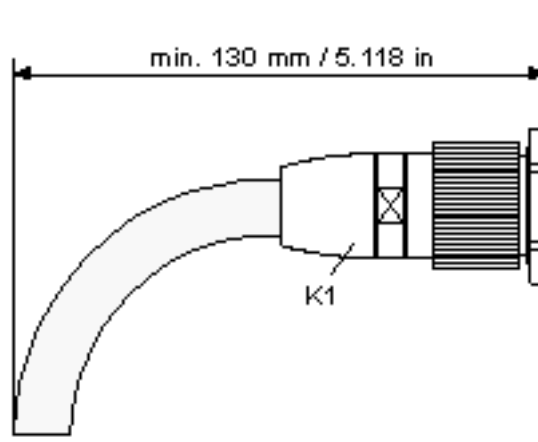
3. Connect the machine/system with the PCB11B [2] via cable entries [3] and [6]:

Position in the figure	Function of the cables	Terminal in the PCB11B
[3]	Data communication (serial or Ethernet)	X3
[6]	Voltage supply, control lines for enabling button and emergency stop	X1

For wiring diagrams and terminal assignment of X1 and X3, refer to chapter "Terminal assignment for PCB11B".

4. It is important that there is sufficient space inside and outside the control cabinet because of the bending radii of the cables.

The bending radius of the hybrid cable is shown in the following figure:



68334AXX



6 Startup



! DANGER

Danger of electric shock.

Severe or fatal injuries!

- Adhere to the safety instructions in chapter 2 during installation.
-

6.1 *General startup instructions*

Requirement for 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.



! WARNING

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

Severe or fatal injuries.

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



6.2 Preliminary work and resources

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

Additional safety measures must be taken depending on the application to avoid injury to people and damage to machinery.

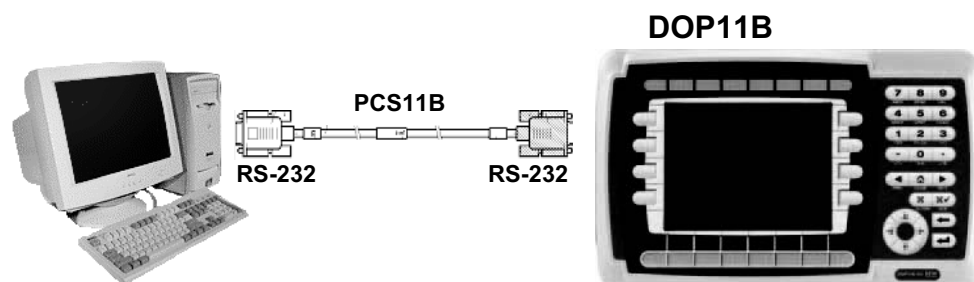
- Connect the operating terminal to MOVIDRIVE® or MOVITRAC® using an appropriate cable.



60093AXX

Figure 15: Connection between operator terminal and MOVIDRIVE® MDX60B/61B

- 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.



60060AXX

Figure 16: Connection between PC and operator terminal



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

INFORMATION



Alternatively, DOP11B can be programmed via Ethernet (see page 208) and via USB (see page 209).

6.3 Initial operation

INFORMATION



Units are delivered without a loaded project.

Once the units are switched on, they show the following information:



Figure 17: DOP11B-20 initial screen in delivery state

11597AXX



Figure 18: DOP11B-50 initial screen in delivery state

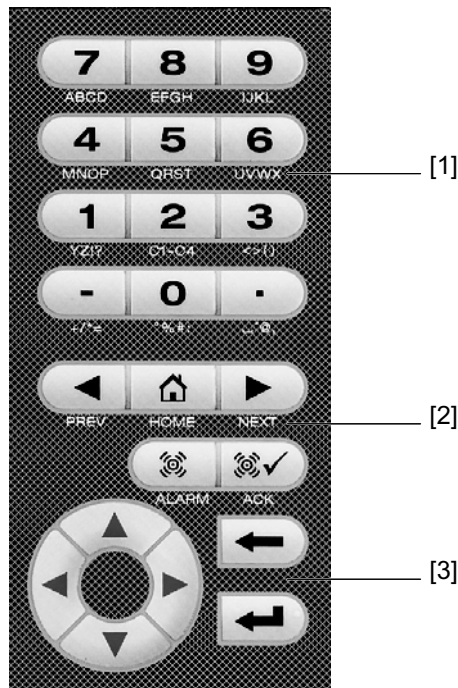
12076AXX



6.4 Terminal functions

This section describes the individual operating modes of the terminal, the keyboard, buttons and the information page in the terminal.

6.4.1 Terminal keypad



60097AXX

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

Alphanumeric keys

You can use the alphanumeric keyboard to enter the following characters in dynamic text and numerical objects during run mode.

0-9

A-Z

a-z

! ? < > () + / * = ° % # : ' @

Country-specific characters



To enter numeric values, press the relevant key once.

To enter capital letters (A to Z), press the relevant key two to five times.

To enter lower case letters (a to z), press the relevant key six to nine times.

You can select the time interval between presses. 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.

INFORMATION



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> 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. The 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

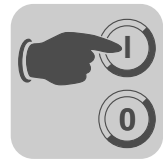
Not all the keys are available on all terminals.

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

INFORMATION

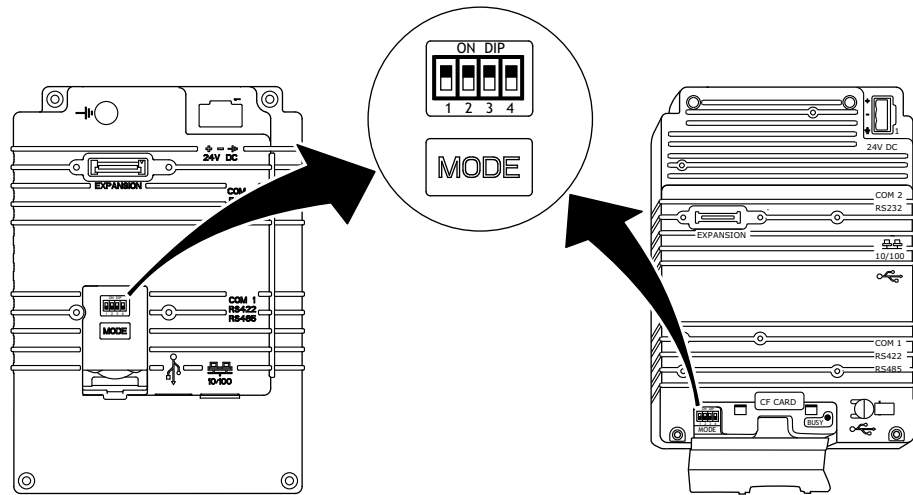


When the main block (block number 0) was displayed, the <PREV> key will not work because the block history is deleted once the main block has been reached.



6.4.2 Switches on the DOP11B 10-60 terminals

Four switches for selecting the operating mode (DIP switches) are located on the back of DOP11B operator terminals.



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DIP switches have the following assignment:

1 = ON, 0 = OFF

You have to interrupt the power supply to the terminal to call up individual modes for DOP11B.

Turn 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 (delivery status)
0100	Sysload
1000	Configuration mode (SETUP)
1100	No function (RUN)
1110	Activate self-test function
XXX1	Hard reset



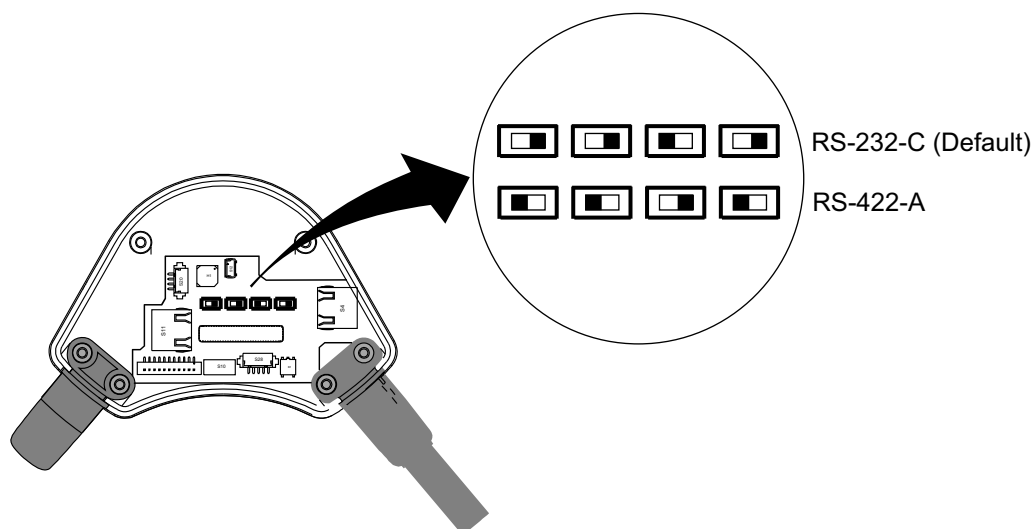
6.4.3 Switches on the DOP11B-M70 terminal

The operator terminal DOP11B-M70 has a keyswitch on the front with the following assignment:

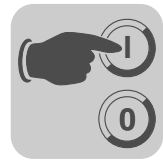
Keyswitch position	Function
Left	Calibrate touchscreen
Center	Normal operation
Right	Service menu

The operator terminal DOP11B-M70 has 4 DIP switches inside the connection box to set the transmission standard (RS-232-C / RS-422-A) for serial communication.

- Set the required transmission standard using the depicted DIP switches:



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6.4.4 Service menu

To call up the service menu, set the operating mode switches on the operator terminal to "1000". For information on the operating mode switches, see the chapter "Switches on the DOP11B 10-60 terminals" on page 65.

The service menu includes the following options:

Network settings Choose this option to access the network menu.

Network menu The options in the network menu match the selection made in [Settings] / [Network] in the HMI Builder. It includes the following entries:

Menu entry	Described in
TCP/IP settings	Network communication via Ethernet (see page 282).
Accounts	Network accounts (see page 321).
Services	Network services (see page 290).

Erase project memory This option erases the project memory.

Load project from memory card An empty operator terminal can be started using an existing information designer project from another terminal. To do so, you must first copy the project to a compact Flash memory card or USB stick using the function "Save project to memory card" (e.g. via a function key).

Insert the memory card into the empty operator terminal when it is off. Next select the command "Load project from memory card" from the service menu and follow the instructions.

Enter transfer mode Enables manual access to the transfer mode which is required to download projects via a GSM modem. More information can be found in the section "Transfer via GSM modem" on page 213.

Enter run mode Enables manual access to the operating mode. More information can be found in the section "Transfer via GSM modem" on page 213.

Update system program from memory card Insert a compact flash memory card or USB memory stick loaded with a new system program and follow the instructions. The system program can also be updated using configuration software for the operator terminals.

Calibrate touchscreen Follow the instructions on the screen to calibrate the touchscreen.



6.4.5 Operating modes RUN and SETUP

The operator terminal has two operating modes.

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

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 includes the function [Erase Memory]. Use this function to erase 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 erasure is completed.
<PREV>	Returns to previous level without erasing the memory.

INFORMATION



When the memory is erased, all the data stored on 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 displayed on the screen when changing 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 controller, an error message will be shown on the screen. The terminal starts automatically once communication is reestablished. If you enter 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 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 checks whether the register has been updated. If it has not, an alarm indicating a communication error can be activated in the controller.

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



6.4.6 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.

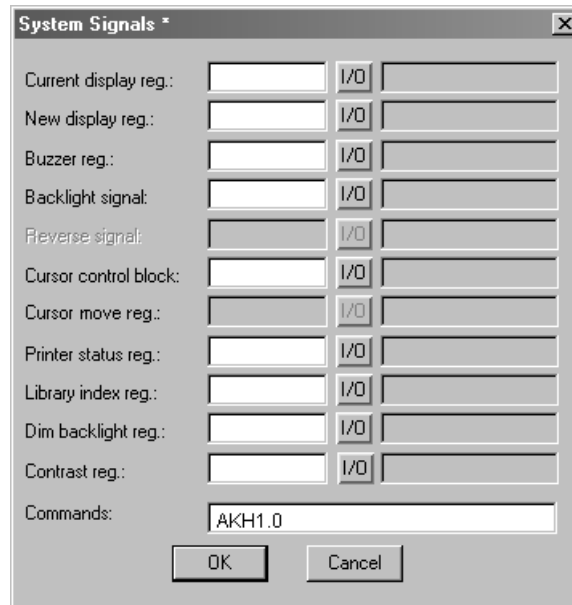
Parameters	Description
STARTS	Number of terminal starts
RUN	Number of terminal operating hours
CFL	Number of hours the backlighting has been switched on
32°C MIN: 21 MAX: 38 (example)	Current operating temperature, lowest and highest measured temperatures
DYNAMIC MEMORY	Available RAM memory (working memory) in 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 1 continuously monitored (STATIC) and the number in the current block (MONITOR)
ANALOG I/Os	The number of analog signals linked to controller 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 2 continuously monitored (STATIC) and the number in the current block (MONITOR).
ANALOG I/Os	The number of analog signals linked to controller 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



6.4.7 Joystick functions

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 in the [System signals] window. Example: "AKH1.0" (command AK and memory cell H11, bit 0).



11486AEN

Figure 19: System signals

Memory cell H1 acts as the enable signal and the following four memory cells have functions according to the following control block:

Memory cell	Example	Description
Hn0	H1.0	Active = Joystick function. Disabled = Normal function.
Hn1	H1.1	LEFT ARROW
Hn2	H1.2	DOWN ARROW
Hn3	H1.3	UP ARROW
Hn4	H1.4	RIGHT ARROW

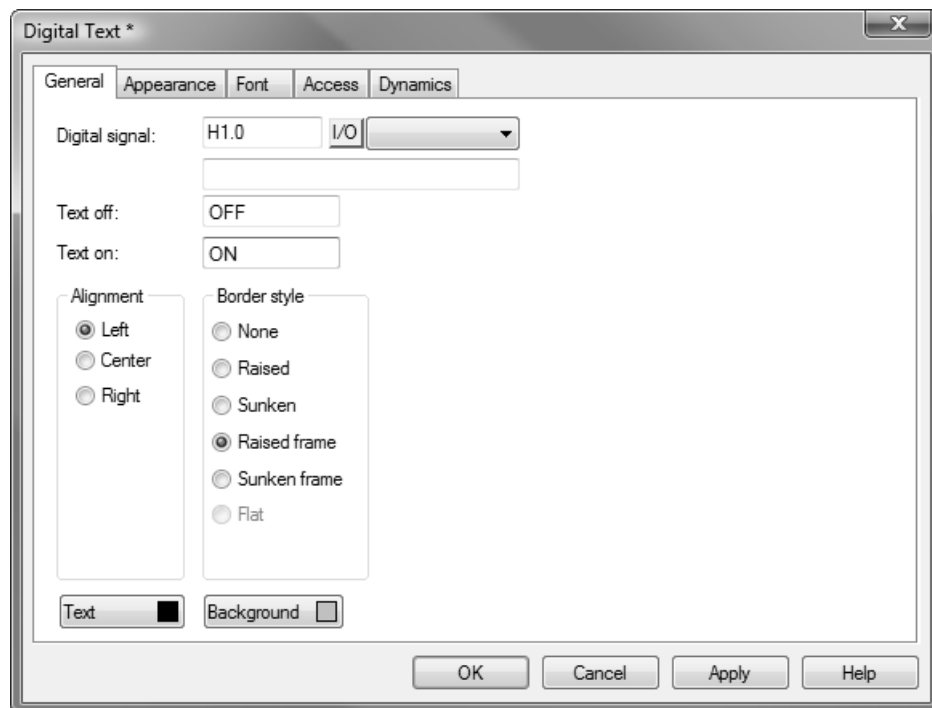
If you press an arrow when the enable signal is active, the memory cell corresponding to the key you press will be activated. When the enable signal is issued, the arrow keys will not perform their normal functions.

**Example**

The following example can be used to switch between the joystick function and normal function.

Perform the following steps:

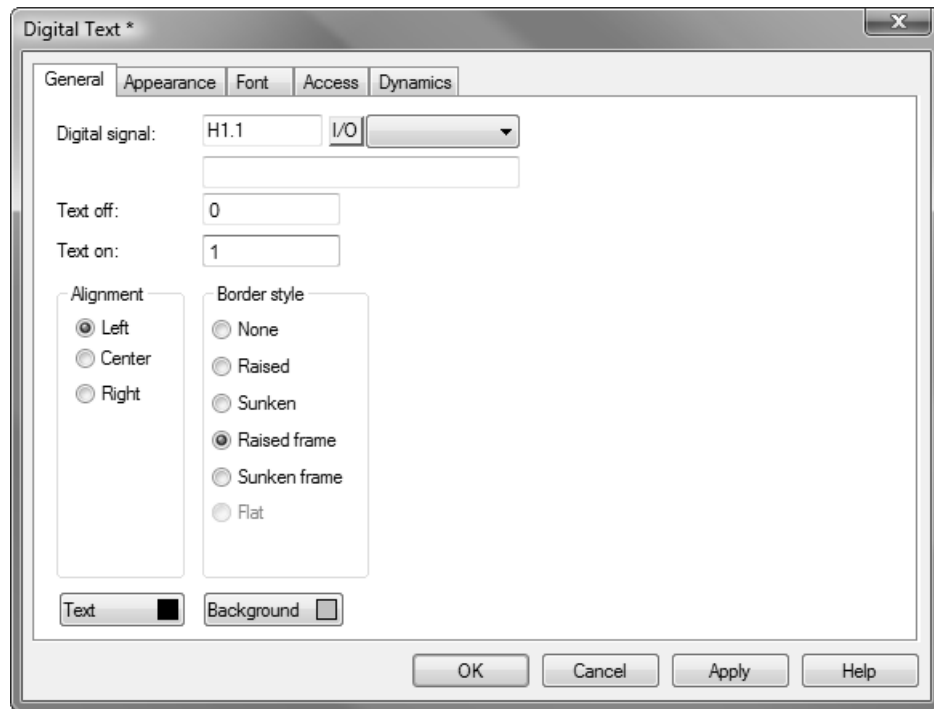
- Use the SEW-MOVILINK (serial) driver.
- Enter the text "AKH1.0" under [System signals] / [Commands].
- Generate a text block.
- Enter the static text "JOYSTICK."
- Create an object with the following settings:



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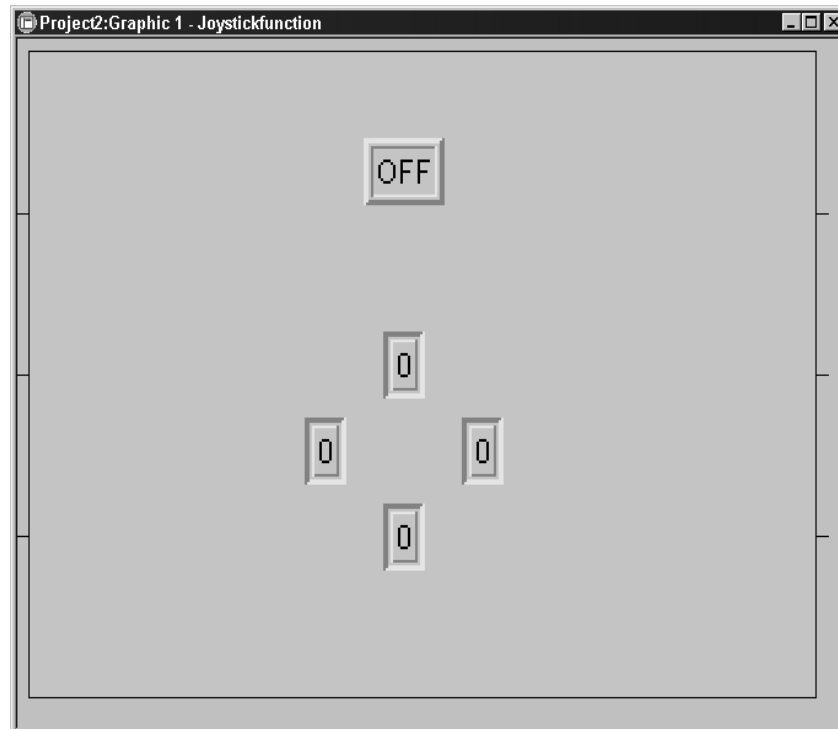


- Generate another four objects to monitor the memory content of H1.1, H1.2, H1.3 and H1.4.



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Appearance of the text block based on the sample settings:



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7 Operation and Service

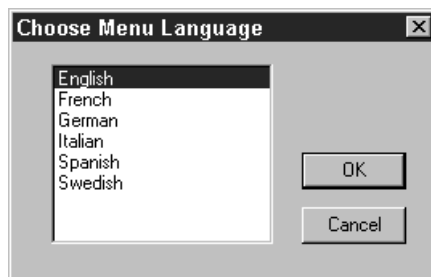
7.1 Transferring projects with PC and HMI Builder

You need the HMI Builder software to start up the operator terminal with your PC.

1. Start the HMI Builder program.
2. Choose the language in the [Settings] / [Menu language] selection field.



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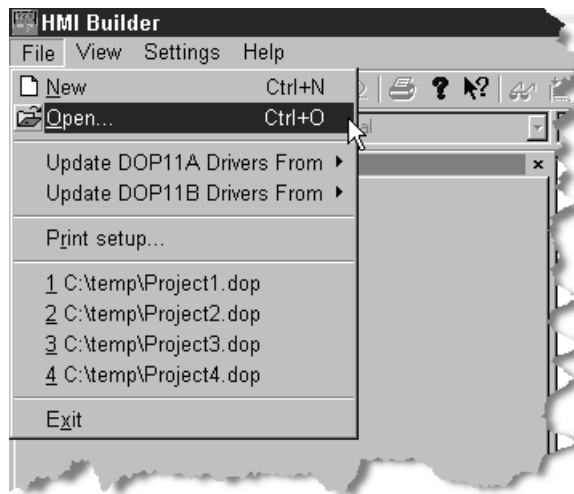
11244AEN



Operation and Service

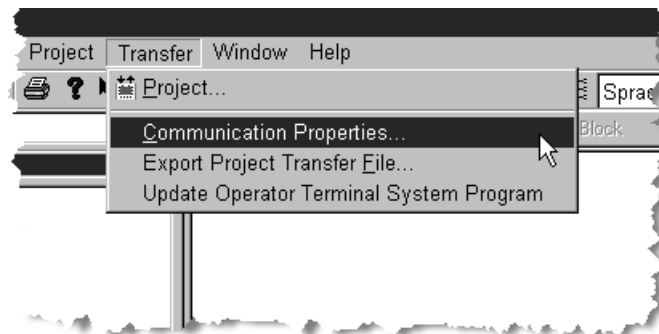
Transferring projects with PC and HMI Builder

- Use the [File] / [Open] function to open the project file you would like to transfer to the operator terminal.



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- In the selection field [Transfer] / [Communication properties], select the communication connection [Use serial transfer] and enter the required parameters:



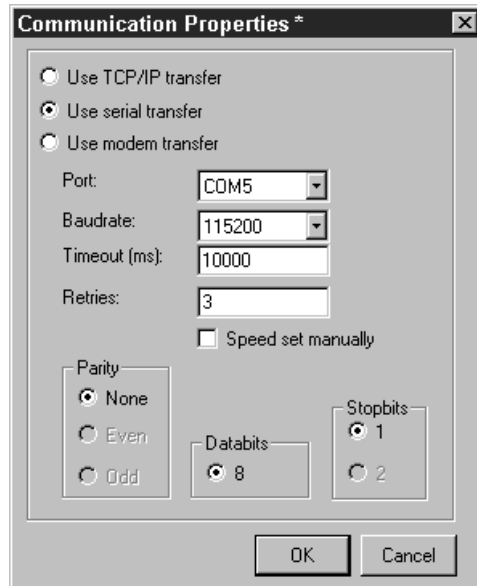
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Serial transfer using the PCS11B programming cable.

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)



11490AEN

5. The project can now be transferred to the terminal by using the selection field [Transfer] / [Project].

The following functions are active by default and must not be changed.

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



Data is downloaded once you click the [Send] button.

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The following steps will be executed one after the other:

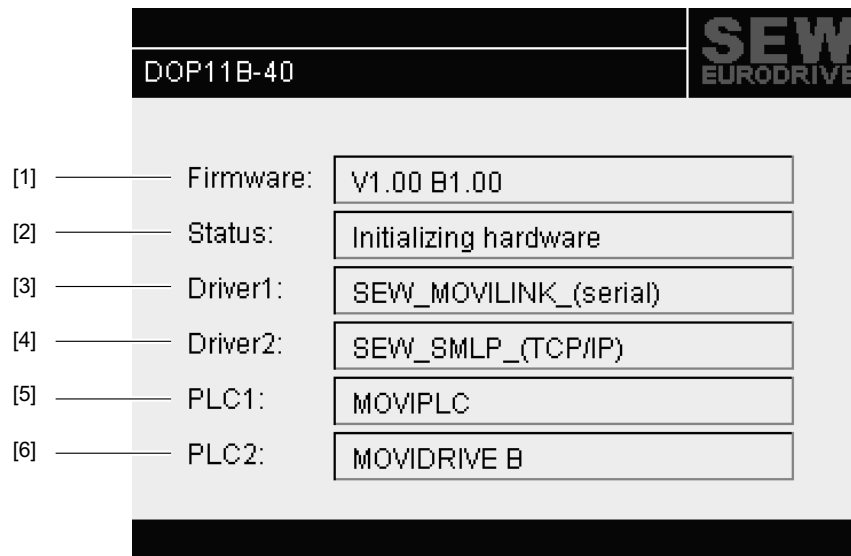
- Switch the terminal to transfer mode (TRANSFER)
- Transfer the communication driver for inverter and PLC
- Transfer project data
- Switch the terminal to RUN mode

The individual steps will be displayed in the terminal display during transfer.

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



7.2 Operating display at unit start



11592AXX

- [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
 ...



7.3 Error messages

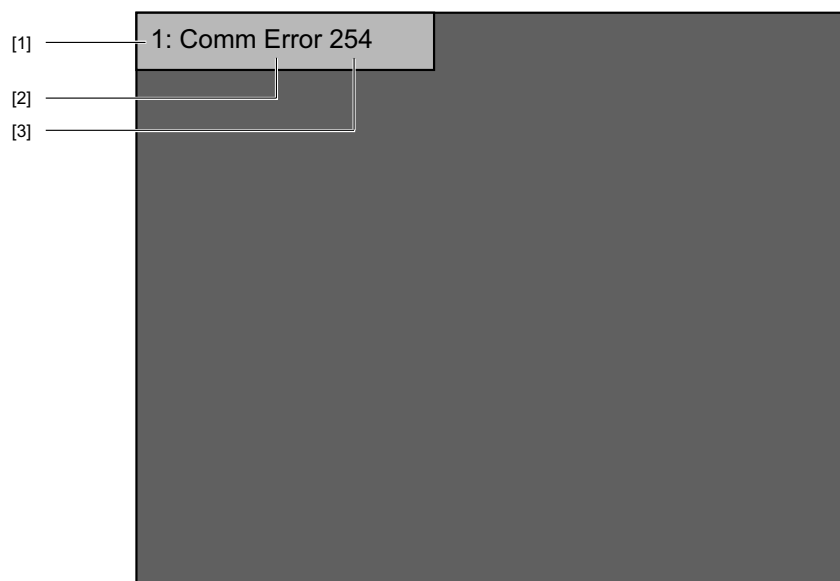
Errors in RUN mode will be displayed in the upper left hand corner of the display as error messages.

They are divided into two groups:

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

7.3.1 Boot error (no inverter found)

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



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- [1] Controller in which 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!)



7.3.2 Operating 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 recognize parameter addressed by the operator terminal. Check to see whether the proper MOVILINK[®] driver was connected. Individual parameters of MOVITRAC[®] 07, MOVIDRIVE[®] A and MOVIDRIVE[®] B controllers are slightly different. The error may also be caused by the controller's 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 operator terminal's project.
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. To deactivate the parameter lock, set parameter P803 to "OFF" by using the controller keypad or the MOVITOOLS[®] PC software.
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 controller's parameter list.
value too small	00 16	Value for parameter too small <ul style="list-style-type: none"> Operator terminal attempts 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 find the respective limit values in the controller's parameter list.
option missing	00 17	Required option card missing for this function / this 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 when the controller is inhibited. 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	Incorrect value <ul style="list-style-type: none"> Some parameters can only be programmed to certain values. You 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).



7.4 SEW Electronics Service

7.4.1 Send in for repair

Contact **SEW Electronics Service** if a fault cannot be rectified.

When contacting the SEW electronics service, always quote the digits of the type designation so that our service staff can assist you more effectively.

Provide the following information when sending the unit in for repair:

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



8 Programming

8.1 Creating a project

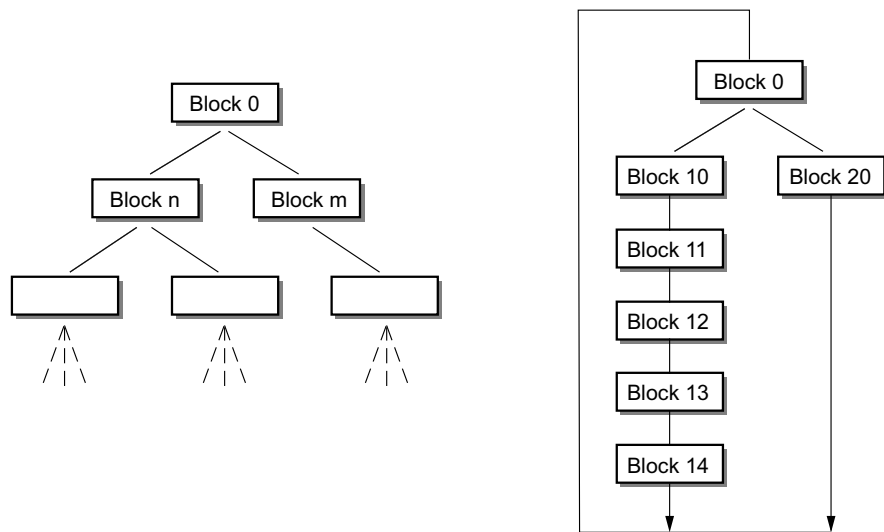
8.1.1 Basics

This chapter 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.

Procedure for programming a project

The graphical structure of the application in the terminal makes the monitoring tool easy to use. It is important to organize the application carefully and to consider which functions are necessary. Start with the overall view, and then work down to the detailed level. When programming a project, start with the functions in your application. Depending on the complexity, each function corresponds to one or more blocks. 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 procedures for the machine operator. The application can also be organized as a sequence control.

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



53375AXX

Figure 20: Block structure



Effective communication

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

Signals that influence the communication time

Only signals for objects in the current block are 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
- Backlighting signal
- Cursor control block
- Recipe control block
- Library index register
- Index register
- Register for PLC clock if used in the 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 on page 82) are read fastest if they are bundled into 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 longer.

Effective block change

You will reach an optimum block change by using the block jump function of the function keys or by using jump objects. The display signal in the block header may only be used if the controller wants 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 then 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. Instead, the information is separated into packages that each contain several signals. The number of signals in each package depends on the selected driver.

The number of packages must be kept to a minimum to speed up communication. Grouped signals only require a minimum number of packages. Such programming is not possible in all cases. In such cases, there are spaces between two signals. 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.

Signal	1	2	3	4	5	6	7	8	9	10
Use	X	X					X	X	X	

Space

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User interface

Use graphic blocks for the user interface.

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

Use 3D effects for an appealing user interface.

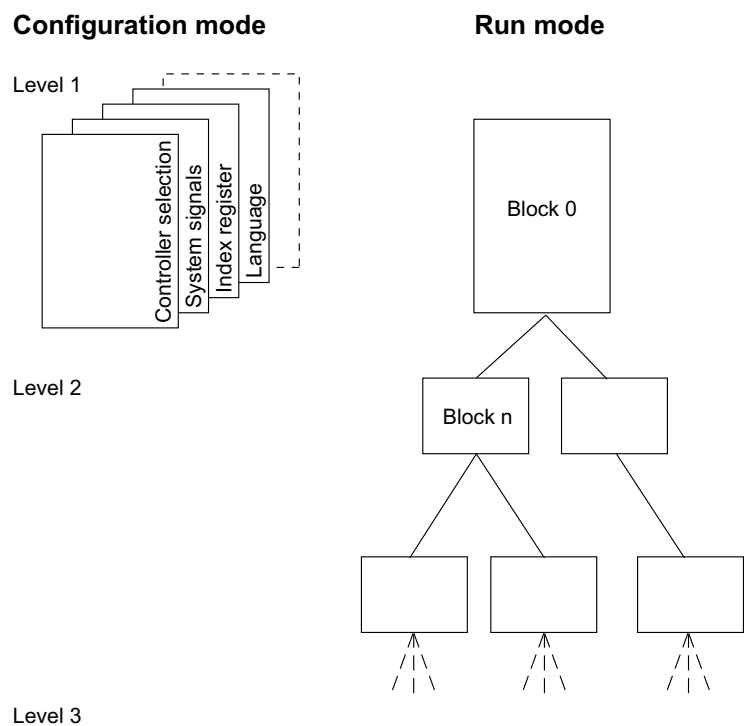
You can achieve an impressive visual design by combining objects with frames and 3D rectangles. Such a design simulates light incidence from top left. This creates shadow effects at the lower and right sides of raised objects as well as on the upper and left sides of lowered objects.



Menu structure

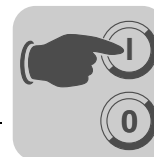
The terminal provides two operating modes: *configuration mode* and *run mode*. Each mode offers a number of different levels, depending on the function. Each level consists of a menu where you make a selection or enter parameters before going to the next level (menu).

An application is made up of blocks, graphic blocks and/or text blocks (primarily for report printouts). Values from the controller are shown and changed in the blocks. The programmer assigns each block a number between 0 and 989. Blocks 990-999 are reserved for special purposes. These are known as system blocks. The terminal is object oriented, which means that a block can contain all the signals linked to an object for the control and monitoring of, for example, a pump.



53376EN

Figure 21: Configuration mode and run mode



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 referred to as blocks:

- Alarm
- Time channels
- System monitor
- E-mail
- Contrast settings

These are known as system blocks. You can define up to 990 blocks.

INFORMATION

The block type cannot be changed for a defined block.



Signal formats

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

Format type	Section
Signed 16-bit	-32768 ... +32767
Unsigned 16-bit	0 ... +65535
Signed 32-bit	-2147483648 ... +2147483647
Unsigned 32-bit	0 ... +4294967295
Floating-point number with exponent, 32-bit	±3.4E38, a number larger than 1000000 is shown with exponent (not with MOVILINK® driver).
Floating-point number without exponent, 32-bit	Parameter positions (including decimal point and characters) and decimals indicate the available area. For example, 8 positions and 3 decimals result in ±999.999 (not with MOVILINK® driver).
BCD floating point number	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 numerical object that can be displayed in the time format. Syntax: <Hours:Minutes:Seconds> (not with MOVILINK® driver).
Seconds 32-bit	Analog numerical object that can be displayed in the time format. Syntax: <Hours:Minutes:Seconds> (not with MOVILINK® driver).
Character string	Character string that can be used in the [Dynamic for graphic objects] function in models DOP11B-20 to DOP11B-50. Example: In the objects static symbol, digital symbol and multiple symbol, the dynamic property "symbol" can be linked to a register with the character string format.
16-bit array	Table format that can be used for an event in a dynamic function for graphic objects in models DOP11B-20 to DOP11B-50. Example: A group of registers is to be allocated different values when the value entered is equal to 99. The first value in the value field will then be entered in register D21 in the signal field. If the value field appears as follows <1,2,3,4> the value 2 will be entered in the subsequent register (D22), etc.



8.1.2 Installing the HMI Builder

Programming software

The HMI Builder programming software can be used to create projects for DOP11B series operator terminals. 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 Users Guide for information on key combinations.

In the programming software, a project is created with graphic blocks and text blocks, which are then transferred to the operator terminal.

An online help is available for all functions. The help text for the current function is obtained by pressing the <F1> key. Information on the function is shown by pressing the help button in the toolbox and then clicking on a function.

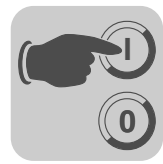
System prerequisites

The configuration software runs on a PC with a minimum of 100 MB free memory and Microsoft Windows 2000/XP Professional. The software can be used with a color or monochrome monitor screen. Microsoft Internet Explorer Version 5.0 or later 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 should start automatically. If it doesn't, select [Run] in the Start menu and enter the command `D:/setup.exe` (where 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	Includes the following functions: <ul style="list-style-type: none"> • Cut • Copy • Paste
View	The following menus can be called up: <ul style="list-style-type: none"> • Block manager • Alarm manager • 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 set the basic configuration for the terminal.
Object	Is only available in the managers and holds all objects. The objects are also included in the toolbox.
Layout	Is only available in graphic block manager and includes functions for positioning 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 bar

The status bar is located at the bottom of the HMI Builder program window. In the [View] menu there is 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 22: Status line



8.2 Communication with MOVIDRIVE® and MOVITRAC®

This chapter describes the communication between operator terminals and frequency inverters MOVIDRIVE® and MOVITRAC®.

There is also an explanation of how parameters and variables can be addressed and read. Constellations with more than one inverter connected via RS-485 are also described.

8.2.1 Serial connection between operator terminal and inverter

Connect the inverter to the operator terminal as described in chapter 4.

Use the PCS11B cable to connect the PC to the operator terminal. The operator terminal is programmed via this cable.

PCS11B programming cable

Connection cable between operator terminal and PC for programming the operator terminal.

Fixed length: 3 m.

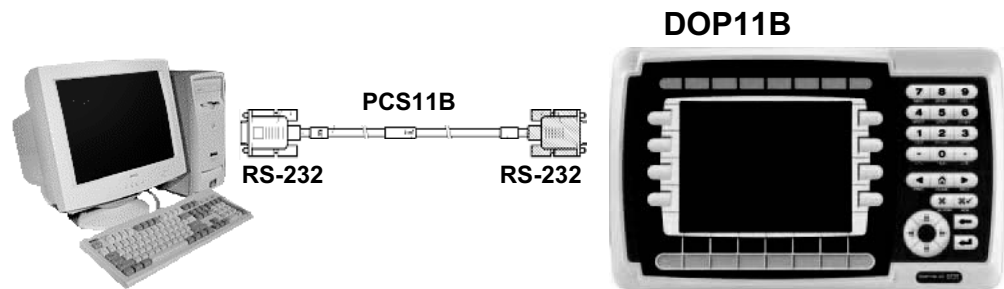


Figure 23: PCS11B programming cable

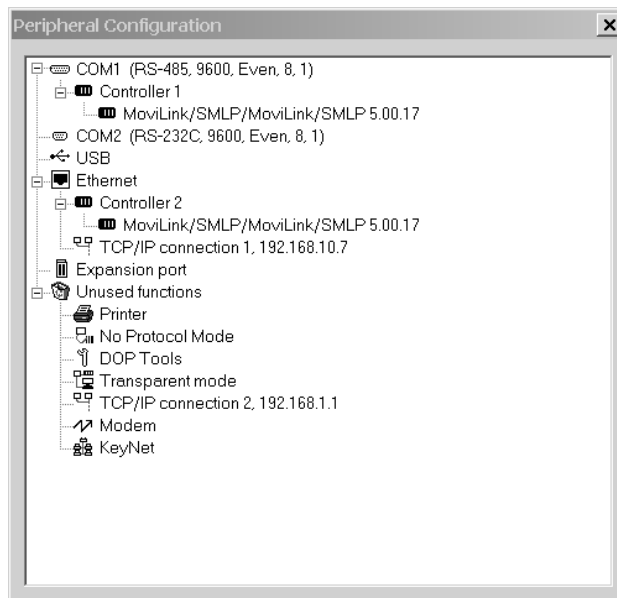
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8.2.2 Communication settings in HMI Builder

Setting up communication between operator terminal and inverter

The settings for communication between the operator terminal and inverter are made in the HMI Builder under [Setup] / [Peripherals].



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Figure 24: Communication settings

To change the communication port, select [Controller 1] (or [Controller 2]), press and hold down the left mouse button and drag the controller to the other communication port.

To enter communication parameters, press the right mouse button.

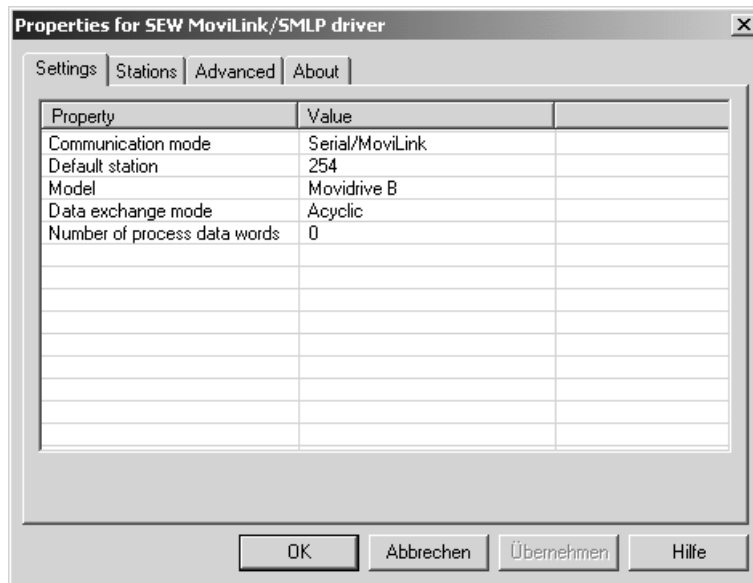
INFORMATION



The settings must correspond with the physical structure.

**MOVILINK® / SMLP driver (Serial / Ethernet)**

Settings



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Figure 25: Properties for MOVILINK® / SMLP driver, Settings

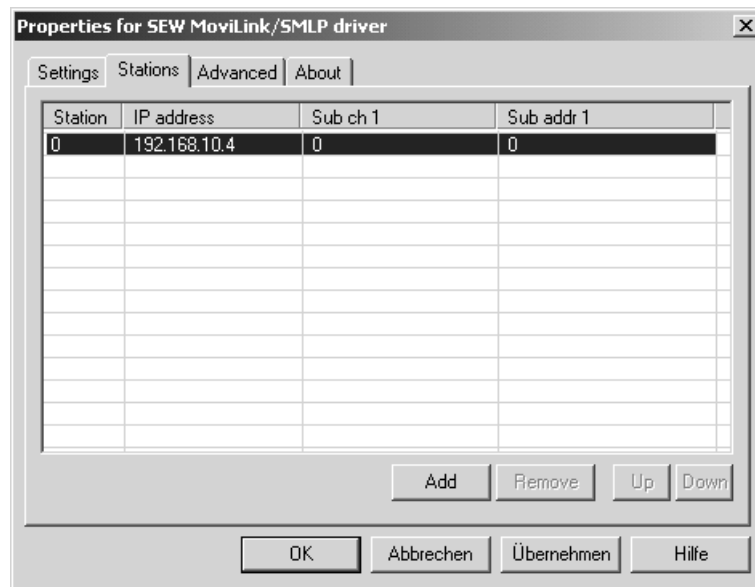
Parameters	Description								
Communication mode	Specifies whether there is a serial or Ethernet connection.								
Default station	<p>This address is always used if no other address is specified when defining the communication objects.</p> <p>Meaning when using the "Ethernet/SMLP" communication mode: In Ethernet communication mode, this number refers to the IP addresses defined under "Stations". To avoid communication errors, only use stations that have been defined.</p> <p>Meaning when using the "Serial/MOVILINK" communication mode:</p> <table border="1"> <tbody> <tr> <td>0 - 99</td> <td>Individual inverter addresses</td> </tr> <tr> <td>100 - 199</td> <td>Group addresses</td> </tr> <tr> <td>254</td> <td>Peer-to-peer communication This address must not be used when several inverters are connected to the operator terminal.</td> </tr> <tr> <td>255</td> <td>Broadcast address All inverters connected to the RS-485 bus receive data but do not send a response to the operator terminal.</td> </tr> </tbody> </table>	0 - 99	Individual inverter addresses	100 - 199	Group addresses	254	Peer-to-peer communication This address must not be used when several inverters are connected to the operator terminal.	255	Broadcast address All inverters connected to the RS-485 bus receive data but do not send a response to the operator terminal.
0 - 99	Individual inverter addresses								
100 - 199	Group addresses								
254	Peer-to-peer communication This address must not be used when several inverters are connected to the operator terminal.								
255	Broadcast address All inverters connected to the RS-485 bus receive data but do not send a response to the operator terminal.								
Model	Defines which inverter type is connected.								
Data exchange mode	Used to select cyclic or acyclic communication for the PDU type. This function is only available in the "Serial/MOVILINK" communication mode.								
Number of process data words	Defines the length of the telegram. 8-byte parameter channel and 0 - 3 process data words. This function is only available in the "Serial/MOVILINK" communication mode.								



Standard settings for using the "Serial/MOVILINK" communication mode:

Parameters	Description
Port	COM1, RS-485 COM2, RS-232 (with UWS11A)
Baud	9600
Data bits	8
Stop bits	1
Parity	Even

Stations



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Figure 26: Properties for MOVILINK® / SMLP driver, Stations

Parameters	Description
Station	Station number via which the TCP/IP addresses can be addressed conveniently.
IP address	IP address During startup, the operator terminal establishes a connection to each IP address entered here.
Sub ch 1	Activates the routing to the subordinate bus system specified here, e.g. from fieldbus gateway DFE33B / UOH11B to the SBus. For information on the available subordinate bus systems, refer to the documentation of the respective device (gateway).
Sub addr 1	Address of the inverters in the subordinate bus system.



Default settings when using "Ethernet/SMLP" communication mode:

Parameters	Description
Port	Ethernet
Default station	0
Data exchange mode	Acyclic

Advanced

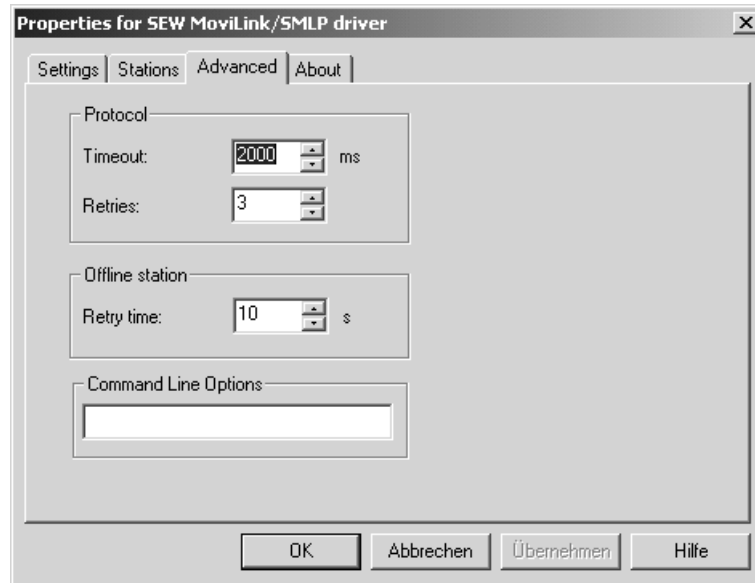
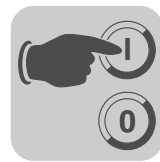


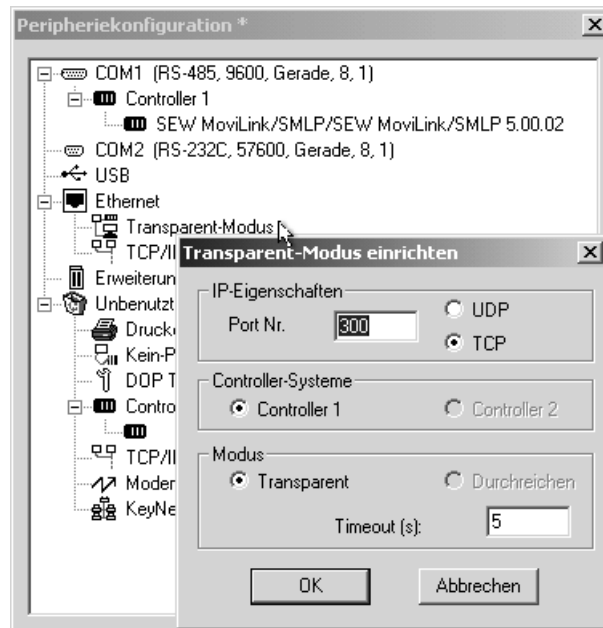
Figure 27: Properties for MOVILINK® / SMLP driver, Advanced

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Parameters	Description
Timeout	Time in [ms] for repeat transmission.
Retries	Number of retries until a communication error is displayed.
Retry time	Wait time in [s] until a communication error is reset. Another attempt will be made to reestablish communication once this time has elapsed.
Command line options	No function.



Transparent mode



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Figure 28: Properties for MOVILINK® / SMLP driver, Transparent mode

The driver supports a special transparent mode exclusive to the SEW driver.

If the driver is configured for serial communication and the transparent mode port is configured for the Ethernet port with TCP and port number 300, special routing behavior is activated. This enables MOVITOOLS® MotionStudio to use an Ethernet query to detect both the DOP11B units and the SEW devices connected via the DOP11B units' serial port.

These devices can be addressed as an Ethernet gateway in MOVITOOLS® MotionStudio via Ethernet and the DOP11B units.

Transparent mode does not work in any other configuration.



8.2.3 Addressing parameters and variables

Addressing

The MOVILINK® driver recognizes the following data formats:

P	For parameters (volatile writing)
NVP	For parameters (non-volatile writing)
X	For index (volatile writing)
NVX	For index (non-volatile writing)
H	For IPOS variables (volatile writing)
NVH	For IPOS variables (non-volatile writing)

Without the suffix NV, the data is written to the RAM of the inverter and is lost when the inverter is switched off.

INFORMATION



The suffix NV is required for non-volatile storage. In this case, the data is written to the EEPROM of the inverter. Note that only a limited number of write services can be executed on the EEPROM. Therefore, you should use the suffix NV carefully.

Digital data (bit-wise access)

Device	Minimum address	Maximum address	Comment
P <i>rr . bb</i>	P0.0	P999.31	Bit <i>bb</i> in register <i>rr</i>
NVP <i>rr . bb</i>	NVP0.0	NVP999.31	Bit <i>bb</i> in register
X <i>rr . bb</i>	X8192.0	X24575.31	Bit <i>bb</i> in register <i>rr</i>
NVX <i>rr . bb</i>	NVX8192.0	NVX24575.31	Bit <i>bb</i> in register <i>rr</i>
H <i>rr . bb</i>	H0.0	H511.31 (H1023.31 for MOVIDRIVE® B / H2048 for MOVI-PLC®)	Bit <i>bb</i> in register <i>rr</i>
NVH <i>rr . bb</i>	NVH0.0	NVH511.31 (NVH1023.31 for MOVIDRIVE® B / H2048 for MOVI-PLC®)	Bit <i>bb</i> in register <i>rr</i>

Analog signals

Device	Minimum address	Maximum address	Comment
P <i>rr</i>	P0	P999	Register <i>rr</i>
NVP <i>rr</i>	NVP0	NVP999	Register <i>rr</i>
X <i>rr</i>	X8192	X24575	Register <i>rr</i>
NVX <i>rr</i>	NVX8192	NVX24575	Register <i>rr</i>
H <i>rr</i>	H0	H511 (H1023 for MOVIDRIVE® B)	Register <i>rr</i>
NVH <i>rr</i>	NVH0	NVH511 (NVH1023 for MOVIDRIVE® B)	Register <i>rr</i>

INFORMATION



All parameters, variables and indices are 32-bit values.



**Analog signals
(partial access)**

For a number of the inverter parameters, several pieces of information are stored in one parameter. This means parameters P10, P11 and P12 are coded via index 8310. You can use the following notation to partially evaluate these parameters:

- H100.0-15 Low word of IPOS variable H100
- H100.16-32 High word of IPOS variable H100

Device	Minimum address	Maximum address	Comment
P rr . a-b	P0.0-1	P999.0-31	P rr . a-b a = Start bit b = Stop bit Example H 100 . 7-14 Data is read from bit 7 up to and including bit 14.
NVP rr . a-b	NVP0.0-1	NVP999.0-31	
X rr . a-b	X8192.0-1	X24575.0-31	
NVX rr . a-b	NVX8192.0-1	NVX24575.0-31	
H rr . a-b	H0.0-1	H511.0-31 (H1023.0-31 for MOVIDRIVE® B)	
NVH rr . a-b	NVH0.0-1	NVH511.0-31 (NVH1023.0-31 for MOVIDRIVE® B)	

Subindex

The subindex can only be used in conjunction with the index (X and NVX).
 The notation is as follows: X8192/1, where 1 indicates access to subindex 1.
 Other examples:

- 2:X8192/23.31 Address 2, index 8192, subindex 23, bit 31
- 7:X8192/9.0-15 Address 7, index 8192, subindex 9, bit 0 to bit15

Communication with inverters in the RS-485 network

The following notation is used for addressing inverters with a defined RS-485 address:

Example

Default station RS-485 address 254 (peer-to-peer). Only to be used if only one inverter is connected to the operator terminal.

P100	Communication with parameter P100. The address that was entered in the [Default station] input field when configuring the driver is used as communication address.
2:P100	Communication with parameter P100 of the inverter with address 2
4:H102	Communication with IPOS variable H102 of the inverter with address 4



Communication with inverters connected in the Ethernet network

While the operator terminal is starting up, communication is established with all TCP/IP address entered in the driver configuration.

The address in line 0 is also used when no other address is specified.

The following notation is used for addressing inverters with a defined TCP/IP address:

Example:

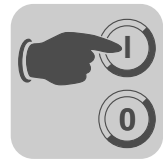
TCP/IP address in line 0 is 10.12.234.4.

TCP/IP address in line 1 is 10.12.234.5.

TCP/IP address in line 2 is 10.12.234.6.

TCP/IP address in line 3 is 10.12.234.7.

P100	Communication with parameter P100. The address that was entered in input field [1] when configuring the driver is used as the communication address (10.12.234.4).
1:P100	Communication with parameter P100 of the inverter with address 2 (10.12.234.5).
3:H102	Communication with IPOS variable H102 of the inverter with address 4 (10.12.234.7).



Process data

The MOVILINK® driver can operate 1 to 3 process data items per inverter depending on the setting.

A distinction is made between process output data (PO data from the PLC to the inverter) and process input data (PI data from the inverter to the PLC).

The number of process data items is set in the MOVILINK® driver *Dialog*. The inverter parameter P90 PD configuration must have the same value.

Bit-wise access to process data

Device	Minimum address	Maximum address	Comment
PO <i>rr . bb</i>	PO1.0	PO3.15	Bit <i>bb</i> in register <i>rr</i>
PI <i>rr . bb</i>	PI1.0	PI3.15	Bit <i>bb</i> in register

Word-by-word access to process data (16-bit)

Device	Minimum address	Maximum address	Comment
PO <i>rr</i>	PO1	PO3	Register <i>rr</i>
PI <i>rr</i>	PI1	PI3	Register <i>rr</i>

INFORMATION



"Ethernet/SMLP" communication mode does not support process data.



Indexed communication with inverters in the RS-485 network

In addition to directly specifying the RS-485 address, communication can also be performed via index. This means the RS-485 address is stored in a variable of the operator terminal and can be set by the operator.

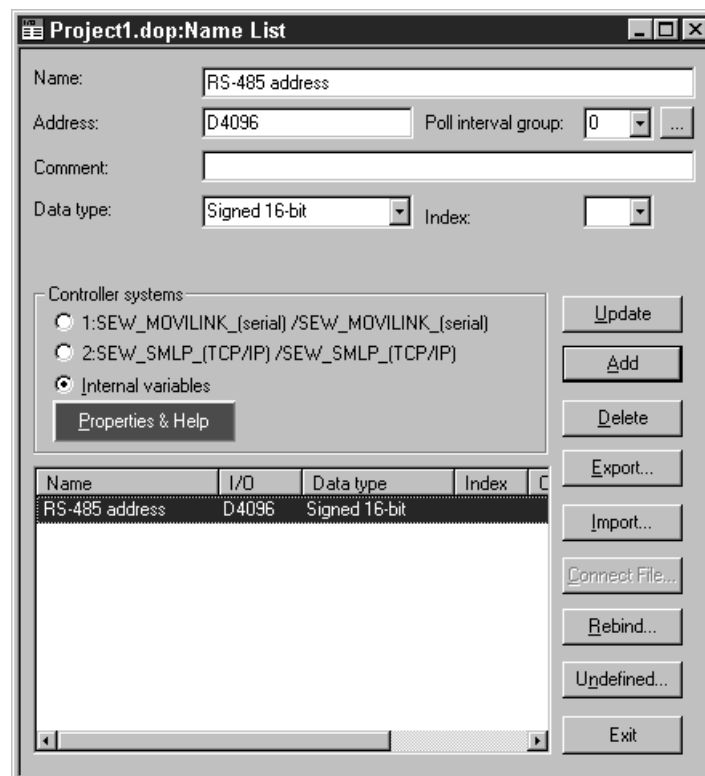
This function is also available with the SMLP driver. In this case, the IP station is addressed instead of the RS-485 address.

Example

A project is created in which the operator can enter the RS-485 address of the inverter. This has the advantage that you do not have to know the actual address of the inverter when creating the DOP project. The user can enter and specify the address during system operation.

The actual speed of a drive should be indexed. The actual speed is displayed in parameter P000.

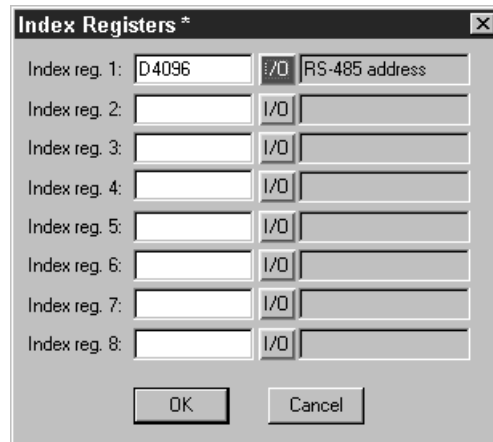
1. In the HMI Builder under [View] / [Name list], define register D4096 (internal variables) in which the RS-485 address of the inverter to be addressed will be stored and define Parameter P000 as the symbolic name for the actual speed:



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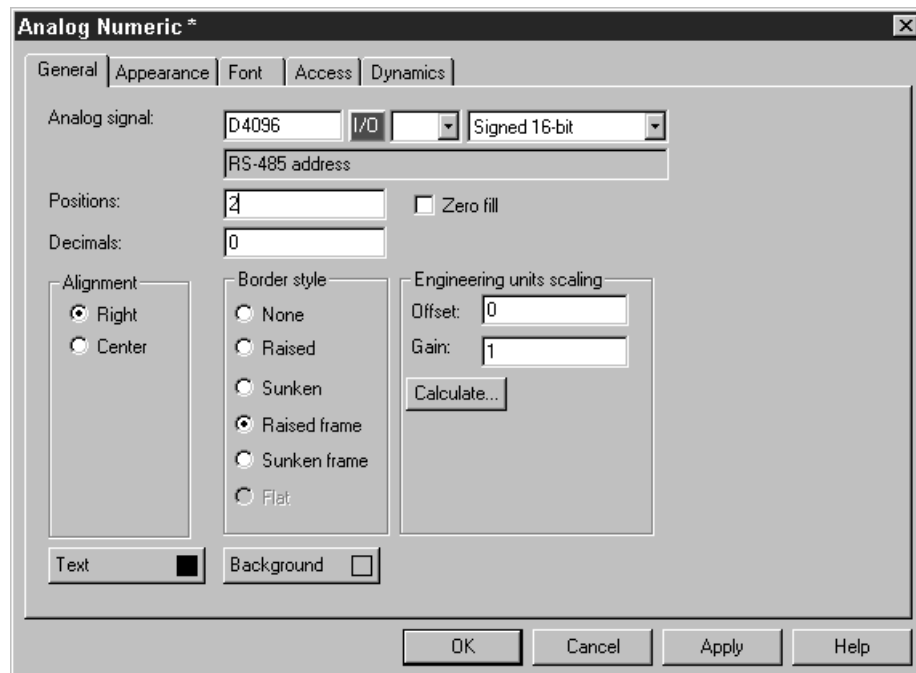


- Under [Setup] / [Index registers], link the pointer index register 1 to the variable D4096:

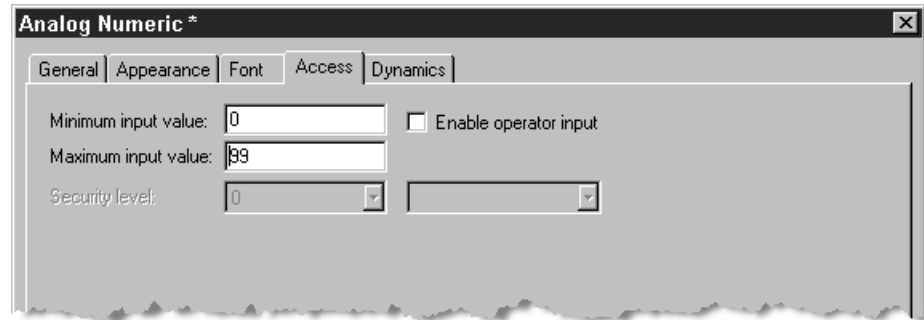


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- Next, define the analog numeric object **0.3** to enable the user to enter the RS-485 address. Link this object to variable D4096 and select the "Enable operator input" checkbox on the [Access] tab page.



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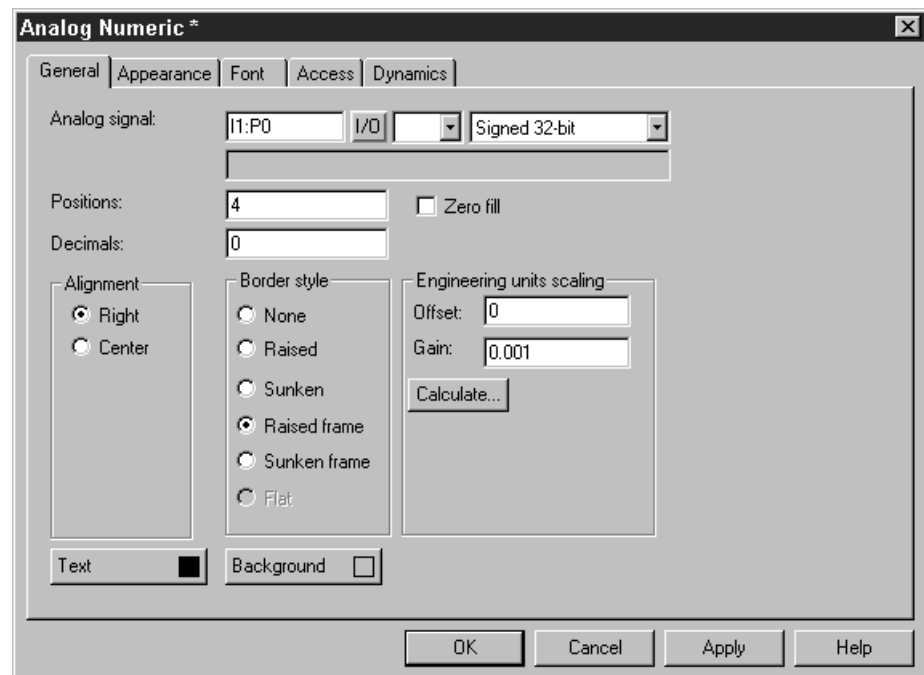
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Note the minimum and maximum input values.

- Now define another analog numeric object **03** to display the actual speed. Link this object with parameter P000 and enter the necessary scaling (0.001 in the example). The pointer I1 is now handled as a preset RS-485 address: I1:P000.

This ensures that the inverter address stored in the target of pointer I1 is the one that is addressed.

Enter a gain of 0.001 to display the actual speed in the unit [1/min].

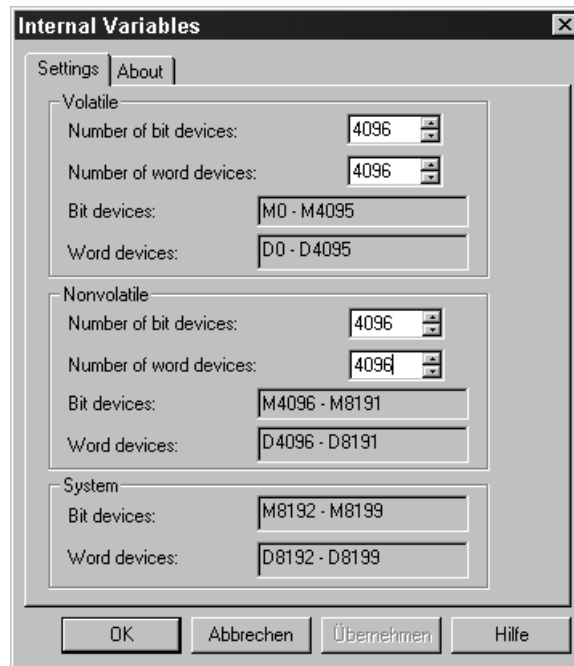


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8.3 Internal variables

Internal variables are selected and used just like drivers. A series of volatile and non-volatile user-defined variables are available for selection. If a value is changed, the non-volatile variables are stored in the Flash memory. You can import them again the next time you start the unit. System variables cannot be changed. They are used to display query intervals and to switch functions. To access the window below, click in the I/O browser on "Properties & Help" or select "Functions" / "I/O configuration" / "Internal variables" to open the next window.



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Variable type	Address range, bit	Address range, memory cell
Volatile	M0 ... M4095	D0 ... D4095
Non-volatile	M4096 ... M8191	D4096 ... D8191
System	M8192 ... M8199	D8192 ... D8199



The system variables are assigned as follows:

Bit	Description
M8192	Always ON
M8193	Switches between OFF and ON every second
M8194	Switches between OFF and ON every 500 ms
M8195	Switches between OFF and ON every 200 ms
M8196	Communication error bit for driver 1. Value "0" indicates a communication error. Does not apply to slave drivers.
M8197	Communication error bit for driver 2. Value "0" indicates a communication error. Does not apply to slave drivers.
M8198 - M8199	Not assigned.

Memory cell	Description
D8192	Driver query interval 1 (ms)
D8193	Driver query interval 2 (ms)
D8195 ... D8199	Not used

8.4 Programming with the programming software

8.4.1 Starting the HMI Builder

Click on [Start] / [Programs] / [Drive Operator Panels DOP] / [HMI Builder] / [HMI Builder].

The following menus are available to start the HMI Builder without loading a project:

- File
- View
- Settings
- Help

Once you have created a project, all menus are available for selection.

File Edit View Functions Setup Project Transfer Window Help

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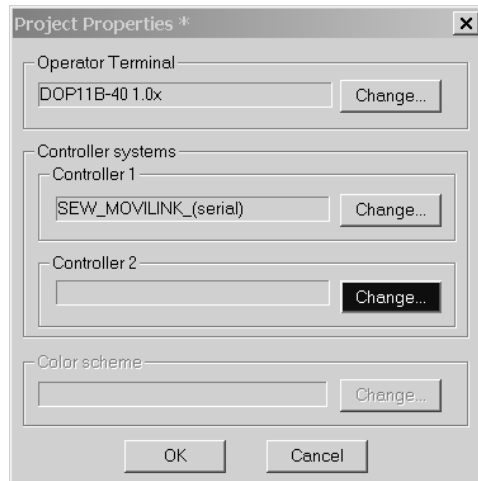
8.4.2 Selecting a language

Select the language for the user interface (including menu texts, object names, etc.) under [Settings] / [Menu language]. It is assumed in this manual that you have selected *English*.



8.4.3 Creating a project

To create a new project, select [File] / [New]. In the [Project properties] dialog box, you can select [Operator terminal], [Controller systems] and [Color scheme]. Not all options are available for all terminals. To create a new project, click on [OK].

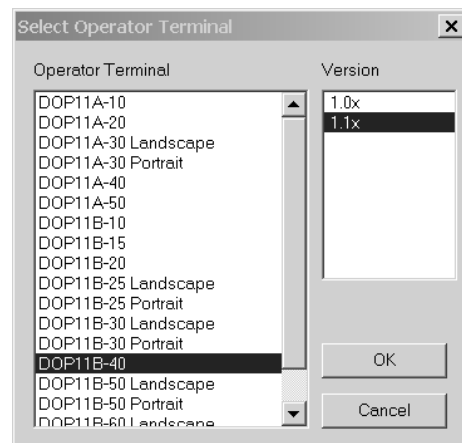


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Figure 29: Project properties

Terminal

Click on [Change].



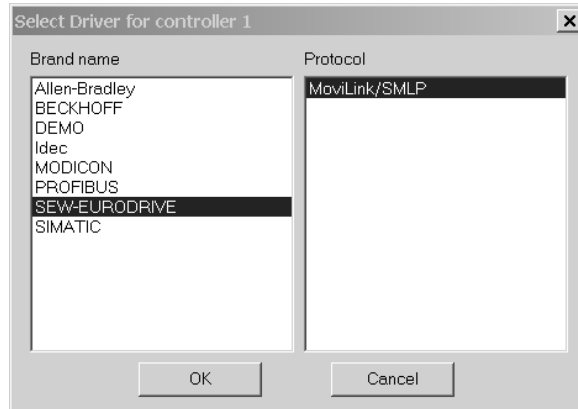
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Figure 30: Select an operator terminal

Select a terminal and the version (system program) of the selected terminal type.

**Controller**

Here you define the controller to which the operator terminal will be connected. Clicking on the [Change] button opens the following dialog. The list shows all installed drivers. Select [Brand name] and [Protocol]. Click [OK] to confirm your selection. To cancel your selection, click [Cancel].



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Figure 31: Controller

Two drivers can be used in a project (terminal). The driver for the second controller is selected in the same way as the first one.

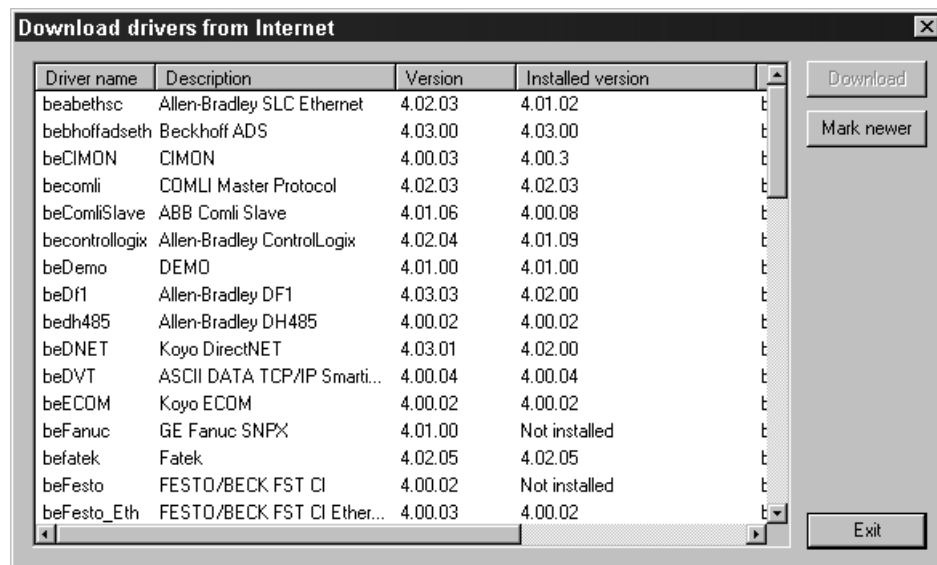
For more detailed information on using two drivers in one terminal, refer to chapter "Communication with two controllers (two drivers)" on page 269.



8.4.4 Updating drivers

From the Internet To update available drivers to the latest version or to install a new driver, select [File] / [Update terminal driver] / [Internet].

Close all projects before using this function. The computer must be connected to the Internet. A web browser is not required. After the connection is established, a list with all drivers that can be downloaded from the Internet will be displayed.



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Figure 32: Downloading a driver from the Internet

The list shows the version numbers of available and already installed drivers. Select the driver(s) to be installed in the HMI Builder. The function [Mark newer] highlights all drivers of a higher version that are not installed. Next, click "Download". Each driver file size is about 500 kB and is ready to be used directly after download.

From disk

To update existing drivers to the most recent version or install a new driver from a file, use the function [File] / [Update terminal driver] / [From data medium] in the HMI Builder. Close all projects before you use this function. Open the uncompressed MPD file in the driver directory. A list opens with all drivers that can be installed.

The list shows the version numbers of available and already installed drivers. Select the driver(s) to be installed in the HMI Builder. Next, click [Install]. Once the installation is complete, click on [Close] to return to the HMI Builder.



8.4.5 Changing project settings

The selected terminal or controller can be changed for a project. To do so, choose [Project] / [Properties...] from the menu and click [Change] next to the parameter *Terminal* and/or *Controller*.

Changing the terminal

When updating the system program in the terminal, the terminal version must be adjusted accordingly in the [Project properties] menu. Otherwise, the scope of functions provided by the new terminal version will not be available.

Changing the controller

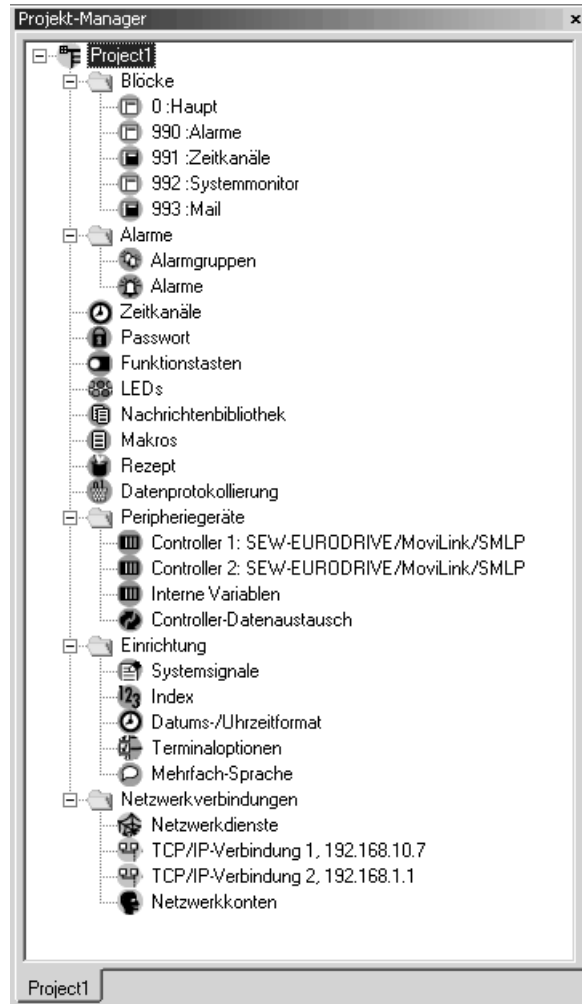
If you exchange the controller in a project for another controller with different signal names, then you also have to make a change for these signals. Use the internal name list for this purpose. See the section "Name list" on page 135.

1. Select [View] / [Name list] from the menu.
2. Click the [Undefined] button to add all I/Os used in the project to the name list.
3. Click [Export] to output the name list as a text file. Enter a name and click on [Save]. Define a separator for the text file.
4. Open the text file with an editor, such as Wordpad.
5. Change all I/Os into signals that will be used in the new controller. Save the file in a text format.
6. In the [Name list] dialog box, click the [Import] button and answer the question whether you are sure you want to delete all invalid I/Os with [No].
7. Click [Reconnect] to update all new I/Os in the project with the new name.
8. Select [Project] / [Properties...] from the menu and click [Change].
9. Select the new controller and double-click [OK].



Project manager

As soon as you create a project, the project manager is displayed with all the existing blocks and components. Click on the plus signs in the directory nodes to open the directories.



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Figure 33: Project manager



8.4.6 Creating blocks with the block manager

Double-click on the directory [Blocks] to open the block manager. The block manager contains an overview of all the project blocks.

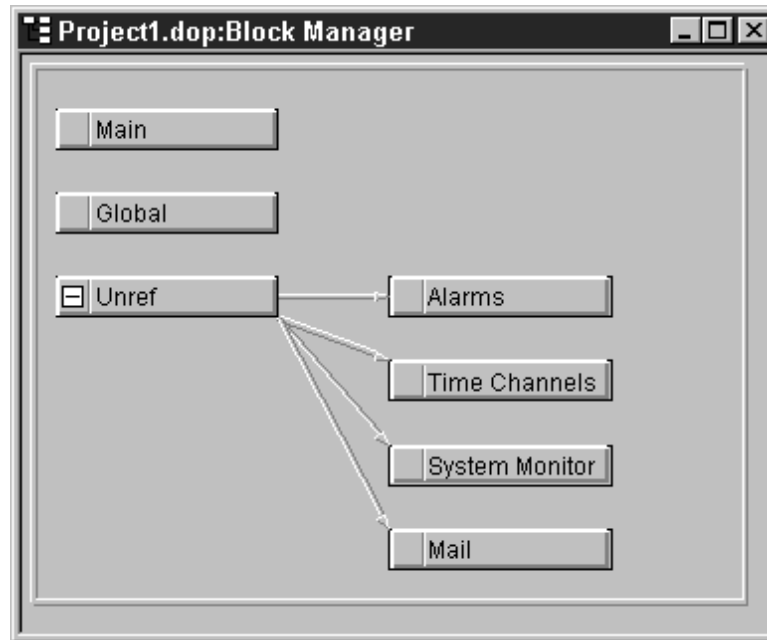


Figure 34: Creating blocks

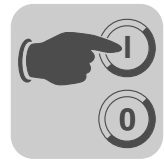
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When the block manager is displayed, the toolbars of the block manager and the zoom function are marked.

INFORMATION

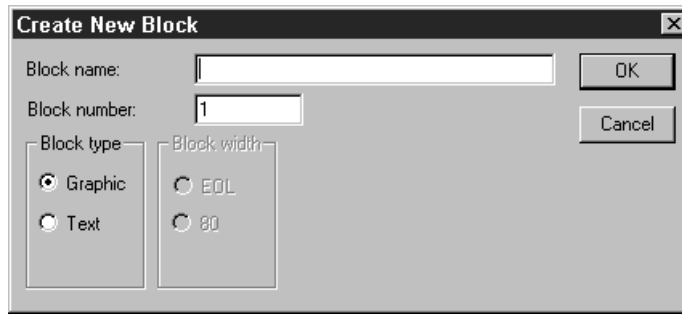


The DOP11B-20 model does not have the [System monitor] block.



Defining blocks

Adding a block opens the following dialog box. The dialog box is a simplified representation of the complete block header. Click [OK] to open and display the created block.



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Figure 35: Creating a new block

Parameters	Description
Block name	You can enter a name for the block in this field. The block name will be displayed in the block manager and in the block list.
Block number	The block number is specified in this field. If the number you enter is already assigned to a block, the defined values will appear automatically. Block 0 is automatically created at the start of the program and must exist in every project.
Block type	Select whether you want the block to be a graphic block or a text block.
Block width	Define the font size for a text block. The font size cannot be changed for a defined block.



Block properties

The [Block properties] menu contains basic parameters that apply to each individual block. The appearance of the block header depends on the selected block type. To define a complete block header, in the project manager or block manager click the right mouse button on a block and choose [Properties].

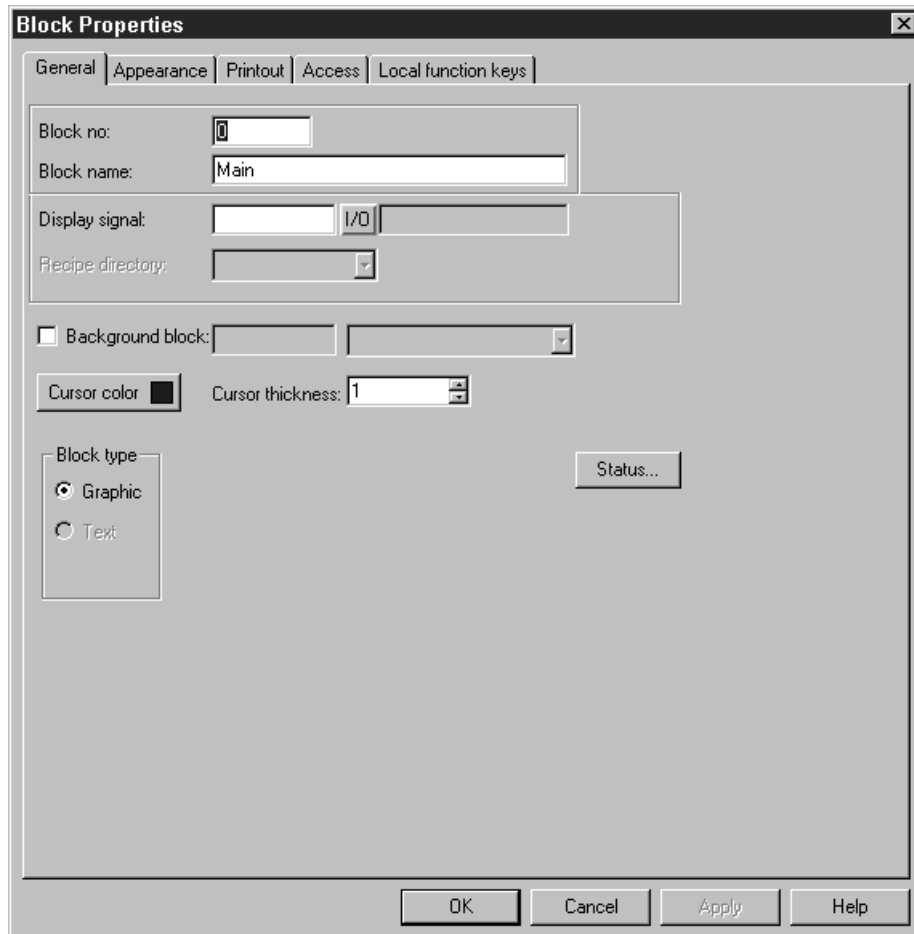
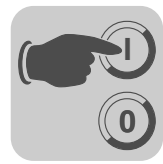


Figure 36: Block properties

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In the project manager or block manager, click the right mouse button on a block and choose [Properties] to enter detailed block information.



The terms used for defining the block header are explained below:

Tab page	Name	Description	
General	Block number	The block number is specified in this field. If the number you enter is already assigned to a block, the defined values will appear automatically. Block number 0 is automatically created at the start and must exist in every project.	
	Block name	You can enter a name for the block in this field. The block name will be displayed in the block manager, in the project manager and in the block list.	
	Display signal	Digital signal that displays the selected block on the terminal screen. Use display signals in series to change blocks as quickly as possible. No entry is made in this field if you use another block changing method.	
	Recipe directory	Select a recipe directory where all recipes created in the block will be stored. See chapter "Recipe management" on page 229.	
	Background block	Applies to graphic blocks only. You can select another block as the background block if, for example, several blocks are to be displayed with the same background color. When the graphic block manager is activated, you can define whether the background block is shown when editing the selected block using the [View] / [Options] / [Show background block] function.	
	Cursor color	Applies to graphic blocks only. Determines the color of the cursor in the operator terminal.	
	Cursor thickness	Applies to graphic blocks only. Determines the size of the cursor in the operator terminal.	
	Block type	The block type is defined when the block is created and cannot be changed here.	
	Status	When you click the [Status] button, the [Block options] dialog box is displayed. It shows the following status properties of the operator terminal screen. These properties do not affect the system blocks.	
		Parameters	Description
		Cursor off	Applies to text blocks only. Indicates whether the cursor is visible in the block in run mode.
		Place cursor on first manual object	Applies to text blocks only. Defines whether the cursor is to be positioned on the first maneuverable object in the block instead of in the top left hand corner.
		Disable the <MAIN> key	Deactivates the key when the current block is displayed on the screen.
		Disable the <LIST> key	Deactivates the key when the current block is displayed on the screen.
Additional notes		Applies to text blocks only. Defines whether the [+] sign is to appear at the bottom and top right corner of the screen if the block contains more characters than can be displayed on the screen.	
Automatic data entry		Moves the cursor to the next maneuverable object after data has been entered. In this mode, the cursor can only point to maneuverable objects.	
Deactivate the function key		Deactivates the key and the function <Return to previous block> when the current block is displayed on the screen.	
Deactivate the function key	Only applies to digital objects. Deactivates the key when the current block is displayed on the screen.		



Programming

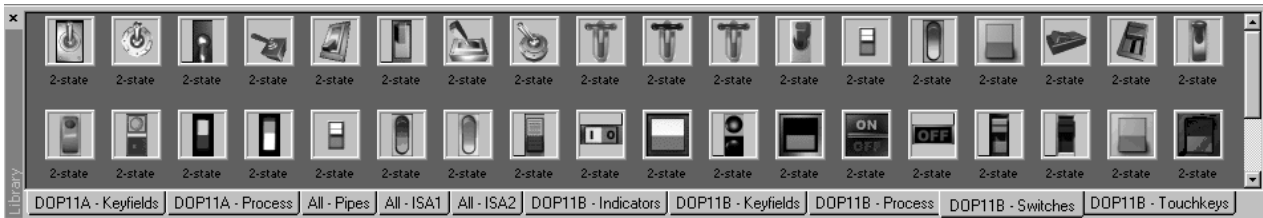
Programming with the programming software

Tab page	Name	Description
Appearance		You can change the color and the color shading on the [Appearance] tab page.
Print	Print signal	Digital signal that sends the block to the connected printer. Display and print signals can be identical. Use print signals in series for fastest possible printing.
	End signal	Digital signal that is output by the terminal when the print process has been completed. The signal is enabled by default. Selecting the [Reset] option resets the signal when the print process has been completed.
E-mail		The [E-mail] tab page is only available for text blocks.
	Send e-mail signal	When the specified digital signal is enabled, the text block will be sent as an e-mail. The block name corresponds to the subject of the e-mail. Only text blocks can be sent as e-mail.
	Mail completion signal	Digital signal that is output by the operator terminal after an e-mail has been sent. The signal is enabled by default. Selecting the [Reset] option resets the signal when the e-mail has been sent.
	Mail to address	The e-mail address of the recipient is entered in this field. Clicking the [...] button enables you to select up to eight recipients from a list. The address list is defined under [Setup] / [Network] / [Services] / [SMTP client]. See chapter "STMP client" on page 300.
	Attach file	Enter the name of a trend or recipe file you want to attach to your mail. If a trend file and a recipe file have the same name, the trend file will be attached.
Access	Security level	Define the security level (0-8) for the block. If you enter a security level higher than "0", you will have to logon with a password that corresponds to the defined security level or higher.
Local function keys		You can define local function keys for the block on the [Local function keys] tab page. For more information, see the section "Function keys" on page 257.



8.4.7 Library

The library includes a series of catalogs with different symbol objects. You can also define catalogs created by the user. To do so, click the right mouse button on the library and choose [Directory] / [New].



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Figure 37: Library

Grouped objects and symbols can be saved in the library or in other projects. Objects and symbols stored in the library can be used again with other projects. Click the right mouse button on a grouped object or symbol in the work area, choose [Copy], click the right mouse button on the library and choose [Paste]. Library objects can be dragged from the library to the work area.

You can adjust the way the data is displayed by clicking the right mouse button on the library. To close the library catalog, make a right mouse click on the catalog and select "Directory" / "Close".

You can hide the library by choosing [View] / [Toolbar] / [Library].

Symbol objects used in a project are stored in the project directory. These symbols can also be defined using the [Select symbol] dialog box.

Saving symbols in the library

Use the cursor to select one or more objects (grouped or ungrouped) in the work area. Click with the right mouse button on the selection and choose [Copy]. Click the right mouse button in the library and choose [Paste].

**8.4.8 Show terminal around the work area**

The terminals have the menu entry [View] / [Options] / [Show terminal]. Selecting this option shows the current terminal around the work area of the active block. You can click on the function keys, LEDs and text fields of the terminal view.

Defining function keys

You can select whether you want to define a local or global function key by double-clicking a function key. The double-click opens the manager for the selected function. For further information on defining function keys, refer to the section "Function keys" on page 257.

Defining LEDs

Double-click an LED to open the manager for defining LEDs. For further information on defining LEDs, refer to the section "LEDs" on page 257.

Creating text strips

Double-clicking on a text strip field opens a dialog box where you can enter a text and define the orientation and font of a text. This function enables you to define text strips and print them out.



8.4.9 I/O browser

When creating a local name list in your project, you can select I/O signals from this list when defining objects.

To do so, click on the [I/O] button. The [I/O] button is available in all fields in which an address can be entered. The [I/O browser] has an incremental search algorithm. This means a search is initiated by entering characters into the field for a name or signal. The I/O list is sorted by signals or names.

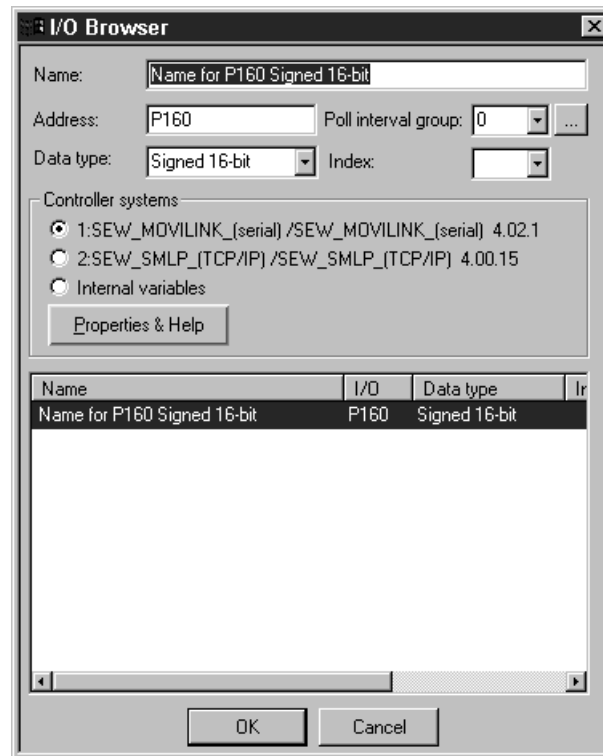


Figure 38: [I/O browser]

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8.4.10 Programming blocks

Double-click the required block in the block manager. The double-click opens the work area for the block and the toolbox. The work area shows the graphic block or text block manager depending on whether you open a graphic block or a text block. The toolbox contains all objects that can be created in the block.

To select an object, click on the object in the toolbox and move the cursor to the position in the work area where you want to place the object. A mouse click activates the dialog box for the selected object. Enter the parameters into the dialog and click [OK]. The object now appears on the work area. Static text or graphics are displayed directly on the work area.

General object parameters are described in the section "Basics" on page 81. Graphic and text objects are explained in the sections "Graphic display and control" (page 154) and "Text-based display and control" (page 199).

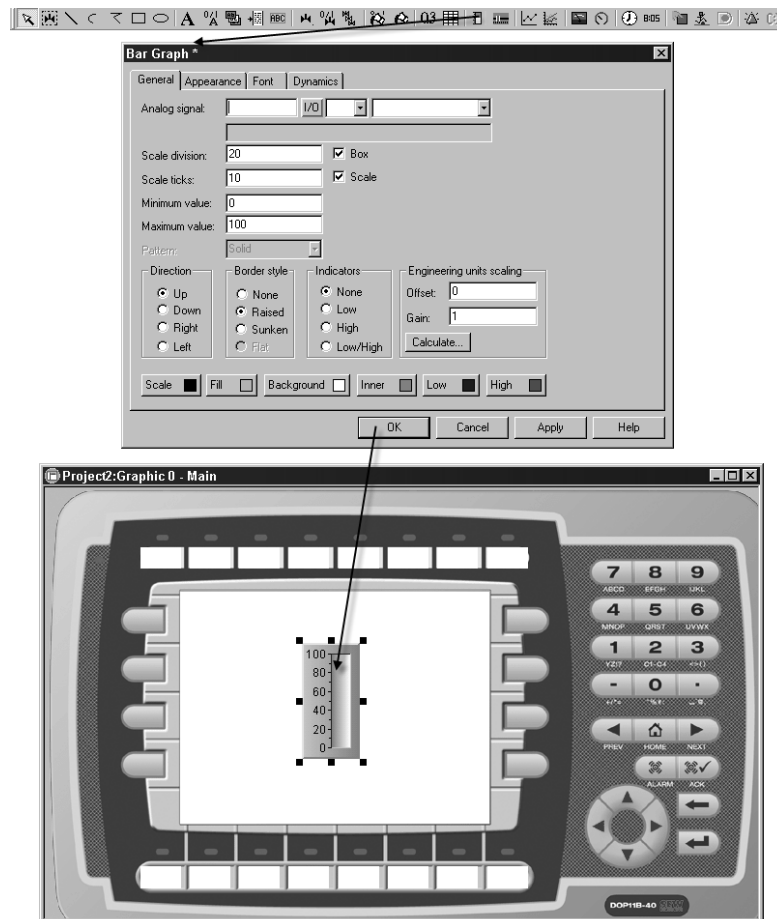


Figure 39: Programming blocks

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8.4.11 Graphic block manager

This section describes the graphic block manager in the HMI Builder. The method of operation and the appearance are based on the Windows standard.

In the graphic block manager, graphic blocks are created using static and dynamic graphic elements.

Opening the graphic block manager

To open the [Graphic block manager] menu, double-click on a defined graphic block in the [block manager] or in the [Block list].

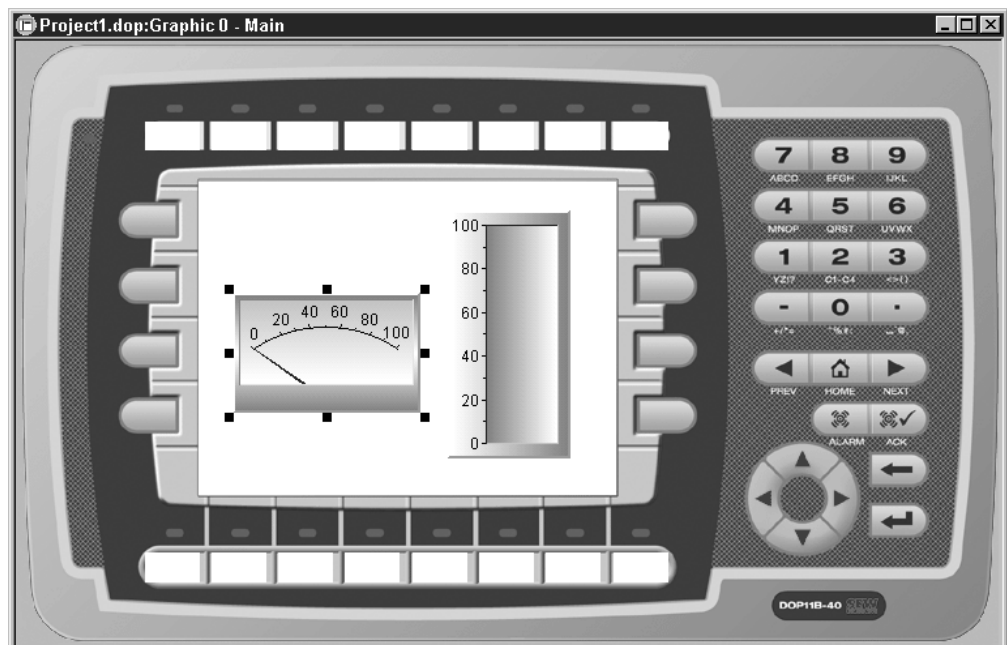
Mouse, keys and cursor

The following section explains what you can do with the mouse and keys in the graphic block manager and also explains the different cursor shapes.

Use the mouse to perform the following actions:

- Select objects from the toolbox
- Select objects by clicking on them
- Select several objects (by clicking next to the objects, keeping the left mouse button pressed down and drawing a selection rectangle around the required objects.)
- Move objects (by keeping the left mouse button pressed down while the cursor is positioned over an object and moving the mouse.)
- Change object size
- Open the parameter dialog box (by double-clicking on an object)

The figure below shows what a selected object looks like.



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Figure 40: Selected object







Use the keys to perform the following actions:

- Create objects using the [Object] menu
- Use the arrow keys to move the cursor
- Move the cursor pixel-wise (by pressing the key combination <Ctrl> + arrow key)
- Select or deselect an object (by positioning the cursor over the object and pressing the space bar)
- Select several objects (by selecting [Object] / [Pointer] from the menu and drawing a frame around the objects using the space bar and arrow keys)
- Move an object (by positioning the cursor over the object, keeping the space bar pressed down and pressing the arrow keys)
- Resize an object (by positioning the cursor over an object handle, keeping the space bar pressed down and pressing the arrow keys)
- Open the dialog box for a selected object (by pressing the Enter key)

Cursor

The cursor can take four different shapes:

	Within an object
	Object size can be changed
	In the graphic work area
	When selecting a function from the menu or the toolbox



Creating objects

Click on the required object in the toolbox and move the cursor to the position in the work area where you want to place the object. Click the mouse to position the object.

Static graphics are displayed by clicking on the work area. For dynamic objects, a dialog box opens for the current object. Click [OK] in the object dialog box to display the object on the screen.

Once the object is displayed it has handles and selection mode is active.

Static graphic

Static graphic objects comprise

- Line
- Curve
- Polylines
- Ellipsis
- Rectangle
- Symbol
- Text

They are used to draw background graphics. You can change static graphic objects into dynamic objects by linking them to the objects on the [Dynamic signals] tab page.

Dynamic objects

Dynamic objects are linked with signals to generate control and monitoring functions, etc. For more information on defining objects, refer to the section "Graphic display and control" on page 154.

Selecting several objects

There are two ways of selecting several objects in the graphic block manager.

- Press the left mouse button and keep it pressed down while drawing a selection rectangle around the required objects. The last object you have created will be displayed with filled handles.
- Select the pointer from the toolbox. Hold the shift key pressed while selecting the required objects. The last object you have selected will be displayed with filled handles.



Positioning objects The [Layout] menu offers several functions for easily positioning objects:

- Aligning
- Same size
- Space evenly
- Tile

You can also access these functions from a separate toolbox.

You can only access these functions when at least two objects have been selected. The functions perform their positioning calculations based on one or two reference objects.

The functions "Align", "Make same size" and "Tile" use the object that was last selected or created as the reference object. See the section "Selecting several objects" on page 119.

The function [Space evenly] takes the object furthest to the bottom/top or left/right as the reference object. The functions do not affect the reference object.

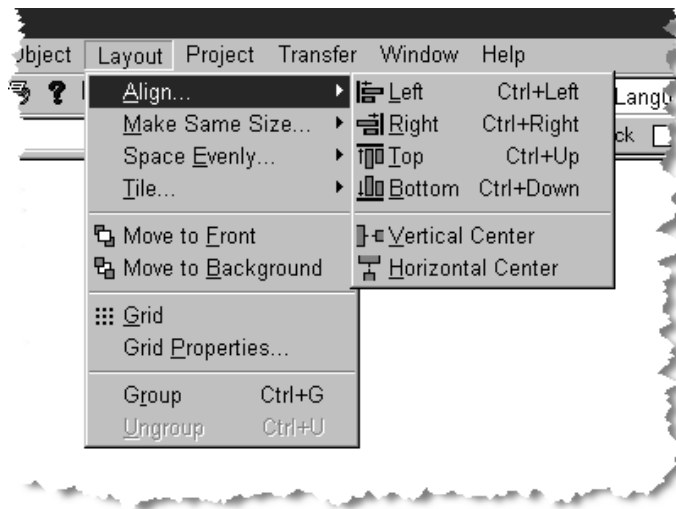
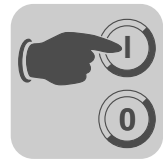


Figure 41: [Layout] menu

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Aligning

The [Align] function offers six menu options for aligning objects vertically or horizontally.

Left	Aligns the selected objects flush left with the reference object.
Right	Aligns the selected objects flush right with the reference object.
Top	Aligns the selected objects flush with the top of the reference object.
Bottom	Aligns the selected objects flush with the bottom of the reference object.
Vertical center	Centers the selected objects vertically based on the reference object.
Horizontal center	Centers the selected objects horizontally based on the reference object.

Same size

The "Make same size" option offers three functions to make selected objects the same size.

Width	Matches the width of the selected objects to that of the reference object.
Height	Matches the height of the selected objects to that of the reference object.
Both	Matches the size of the selected objects to that of the reference object.

Space evenly

The [Space evenly] option offers two functions to change the distance between two selected objects.

Vertical	Changes the position of the selected objects to an identical vertical distance. The objects closest to the top and bottom are not moved. At least three objects must have been selected.
Horizontal	Changes the position of the selected objects to an identical horizontal distance. The objects closest to the left and right side are not moved. At least three objects must have been selected.

Tile

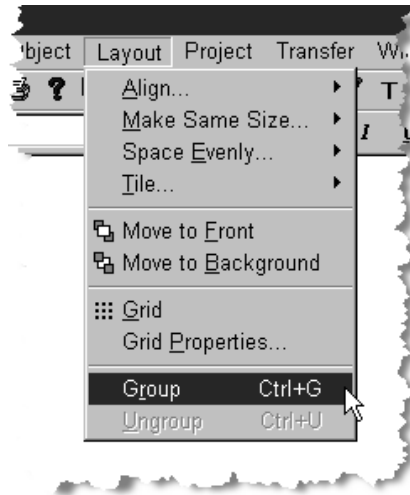
The [Tile] option offers two functions that enable you to position two objects next to each other

Vertical	Changes the vertical position of the marked objects so that they are aligned with the reference object.
Horizontal	Changes the horizontal position of the marked objects so that they are aligned with the reference object.



Grouping objects

The [Layout] menu offers functions for grouping several objects. Select the required objects and choose [Layout] / [Group] from the menu. The group of objects will now be treated like a single object and you can resize the objects all at once. You can still define the color and font individually for each object in the group. Clicking an object in the group opens the edit dialog box for the corresponding object.



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Figure 42: Grouping objects

The [Layout] / [Ungroup] function allows you to separate a group into individual objects.

Saving and loading grouped objects

You can save or load grouped objects by clicking the [Library] button in the toolbox in the graphic block manager.



Creating tables

Object tables in a graphic block can be created as follows:

1. First, create two rows or columns with the same object.

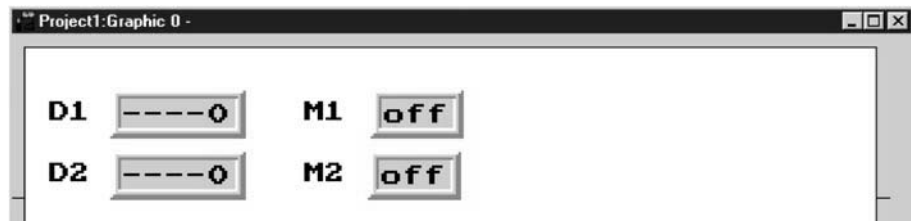
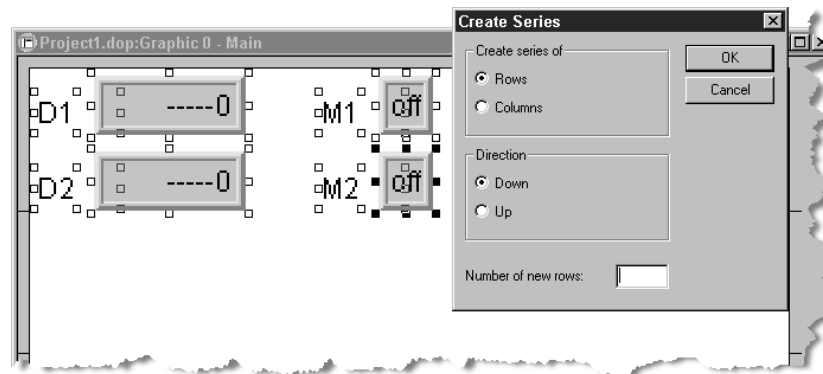


Figure 43: Object tables

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2. Select the objects and select [Object] / [Create series of] from the menu.



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This opens a dialog box.

3. If you want to create a table, define the number of rows and columns and the direction into which you want to expand the table.

If you click [OK], the programming software creates a table with the defined number of rows or columns.

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The object alarm banner cannot be included in a table.



Symbols



Symbols can be imported into the project. The bitmap library, which contains numerous buttons, pump symbols, etc., or graphic files on the PC can be used as the source.

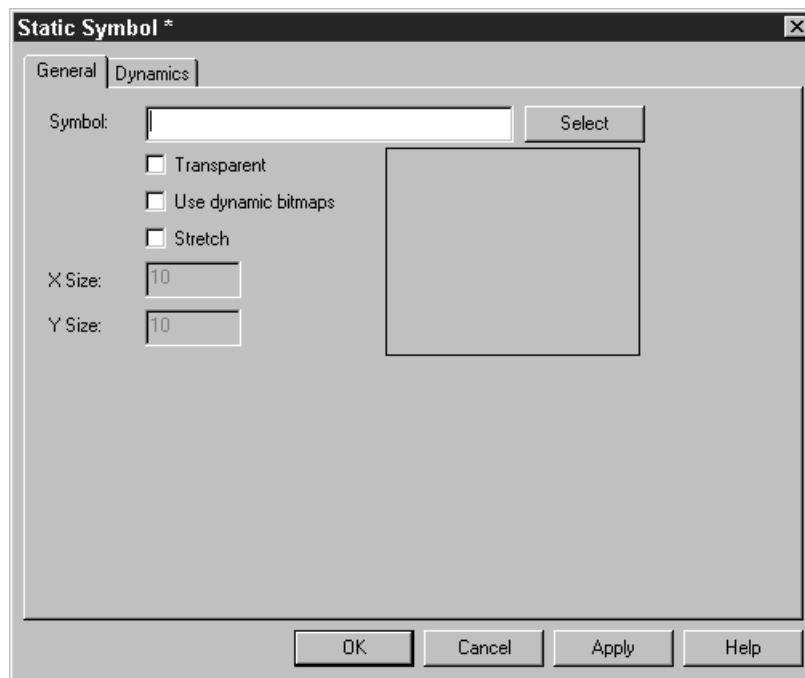
Image files can be imported from other Windows applications (e.g. Paint) to the symbol library in the following formats:

- bmp
- jpg
- gif
- wmf

Symbol names can comprise a maximum of 30 characters. Umlauts are permitted.

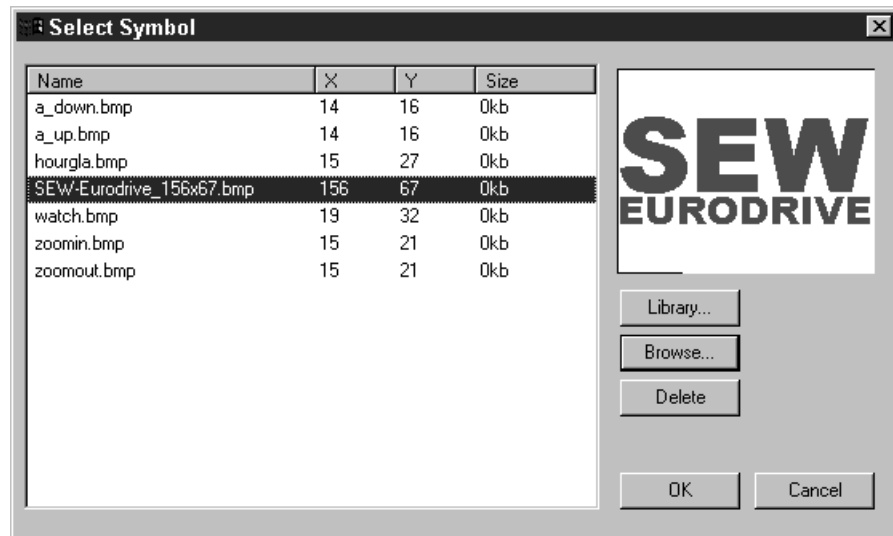
Adding a static symbol to a block

Click [Symbol] in the toolbox and move the cursor over the block in the work area where you want to place the symbol. Next, make a mouse click. Clicking on the work area opens the [Static symbol] dialog box.



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Enter the name of the symbol you want to add or click on [Select] to open the [Select symbol] dialog box.

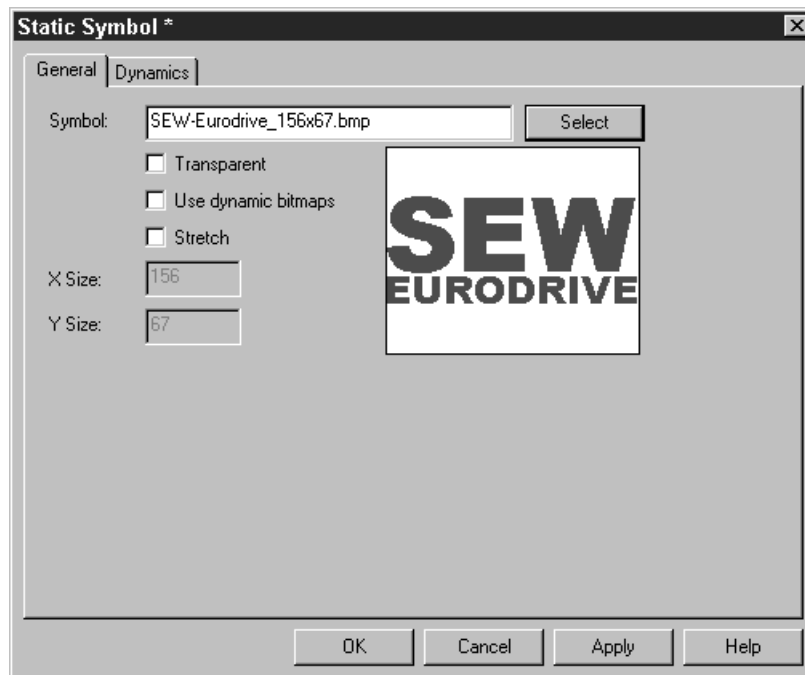


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Click on [Library] to import a static symbol from the bitmap library. Alternatively, click on [Browse] to upload a graphic file from the PC.

The chosen symbol is displayed in the [Preview] window. BMP symbols are displayed as thumbnails in the preview window.

Click [Open] and then [OK] to select a symbol. The symbol is now displayed in the [Static symbol] dialog box.



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[General] tab

Parameters	Description
Symbol	Symbol of the name of the selected symbol.
Select	Button to select library symbols or external image files.
Transparent	Makes the symbol background transparent. The color of the upper left pixel is defined as the transparency color.
Stretch	When this option is enabled, you can change the x or y size of the object.

[Dynamics] tab

The functions on the [Dynamics] tab are described in the section "General parameters" on page 154 .

Copying a graphic from an application

Proceed as follows to do so:

1. Copy an object in another application, e.g. Paint to the clipboard.
2. Open the graphic block manager in the programming software and select the [Paste] command.
3. Enter a name for the symbol. The name must not exceed 30 characters.
4. The symbol will then be saved in the symbol library under the specified name.

Graphics and symbols can be copied from one block to another and from one project to another in the HMI Builder using the [Copy] and [Paste] functions.



8.4.12 Text block manager

Dialog fields and reports are created in the text block manager. A text block can consist of static text and dynamic objects. Static text is not changed during program execution whereas dynamic objects are linked with controller signals.

Eight dynamic object types are available:

- Digital text
- Multiple selection
- Message
- ASCII
- Analog numeric
- Bar chart
- Digital clock
- Jump

Opening the text block manager

To open the text block manager, double click on a defined text block in the block manager or in the block list. Select a defined block from the block list or create a new text block.

Mouse and keys

Click on the start of the text to be selected and drag the cursor over the text. To select text using keys, hold down the shift key and select the text using the arrow keys.

Selected text is deleted using the [Cut] function.

To view an object's properties, double-click an object and press the <F4> key.






Toolbox

The text block manager provides a toolbox with the following functions.

- Increase
- Reduce
- OEM mark

All functions are also available from the menus. For further information on defining and using the different objects in text blocks, see the section "Text-based display and control" on page 199.

	Increase
	Reduce
	ASCII selection list. For selecting characters that cannot be entered directly on the keyboard.

Defining text blocks

Static text

The text block manager is a text manager for entering static text. The Windows functions [Copy] and [Paste] can be used to copy and paste text in a block from one block to another or from one program to another (e.g. Microsoft Word). This function can be used to document applications quickly and easily.

Dynamic objects

Dynamic objects can be defined at any text position. Select the object type from the toolbox or the [Object] menu. This opens a dialog where you can define the object.

The dynamic object is marked with a hash key (#) followed by one or more hyphens (-) depending on the position. For more information on defining dynamic objects, see the section "Text-based display and control" on page 199.



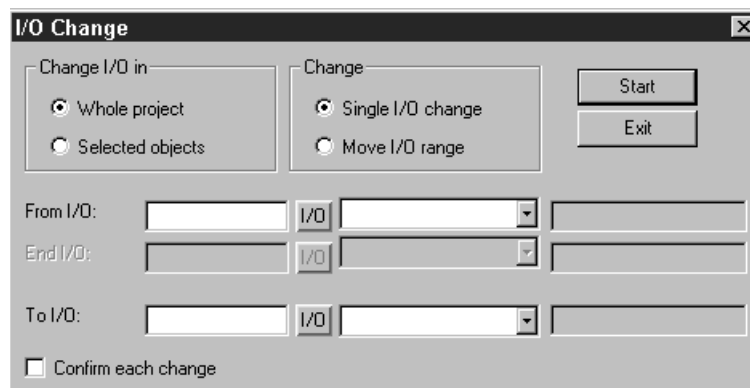
8.4.13 I/O change

The [I/O change] function enables you to change I/Os or move an entire I/O range. I/O changes can be made for the entire project or only for selected objects.

The function can be used in the following areas:

- Blocks in the block list
- Objects in graphic and text blocks
- Lines in the alarm list
- Lines in the function key manager
- Lines in the LED manager
- Lines in the cross reference list

Select [Edit] / [I/O change] from the menu.



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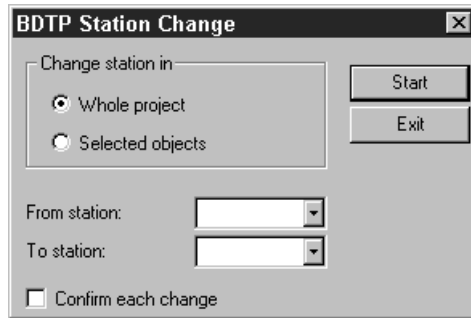
Figure 44: I/O change

Parameters	Description
Change I/Os in	Specify whether I/Os should be changed in the entire project or for selected objects.
Change	Choose whether an individual I/O is to be changed or an entire I/O area is to be moved.
From I/O, End I/O, To I/O	Enter the I/O to be changed and define the I/O area that a move is to be made for/into.
Confirm each change	Select this checkbox if you want to confirm each I/O change for an object.



8.4.14 BDTP station change

This function enables you to change the index numbering for a BDTP client project in a BDTP network, e.g. from station 1 to station 3. Select [Edit] / [BDTP station change] from the menu.



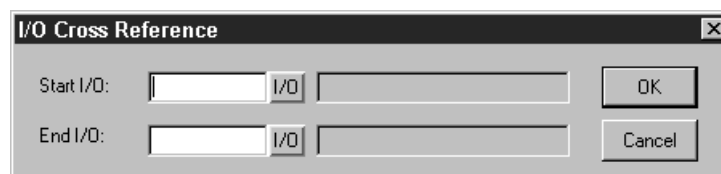
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Figure 45: BDTP station change

Parameters	Description
Change station in	Specify whether the index numbering is to be changed in the entire project or for selected objects.
From station, to station	Specify the index number to be changed as well as the BDTP station index number in this field.
Confirm each change	Enable this checkbox if you want to confirm each BDTP station change for an object.

8.4.15 I/O cross reference

The [I/O cross reference] function is used to document I/Os clearly. Select this function via [View] / [I/O cross reference].



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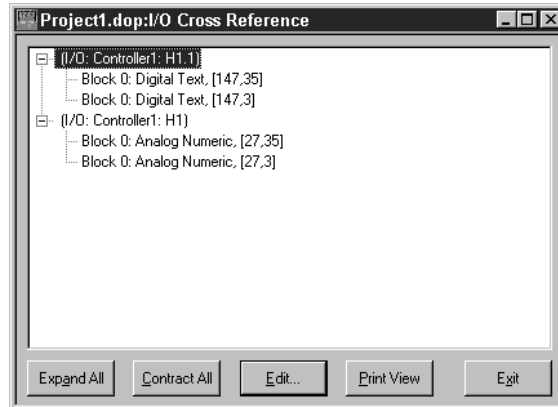
Figure 46: [I/O cross reference]

Enter [Start I/O] and [End I/O] in the dialog box that opens. If you leave the field [Start I/O] empty, all I/Os up to the value in the field [End I/O] are included. If you leave the field [End I/O] empty, all I/Os up to the value in the field [Start I/O] are included. If you do not enter a value in any field, all I/Os will be included in the list.



Illustration

The results output by this function will be displayed in a list with two levels. The first level lists the available I/Os and the number of objects belonging to each IO. To open the second level, click the plus symbol on the left of the I/O. This displays all the objects that are included in the selected I/O. The plus symbol then changes to a minus symbol.



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Figure 47: [I/O cross reference] display

You can select a row in the list and copy it to the clipboard from where you can paste it, for example, into a Microsoft Word document.

8.4.16 Other managers

The HMI Builder also includes managers for handling:

- Function keys
- LEDs
- Alarms
- Alarm groups
- Passwords
- Time channels
- Message library
- Macros
- Data exchange
- Name list

These managers are called up from the [Functions] menus and are used in the same way. The parameters in the respective manager are described in the corresponding chapters.

The definitions for function keys, LEDs, alarms, alarm groups, time channels, message library, macros and data exchange are listed in the relevant manager. New definitions can be inserted using the [Append] or [Insert] functions.

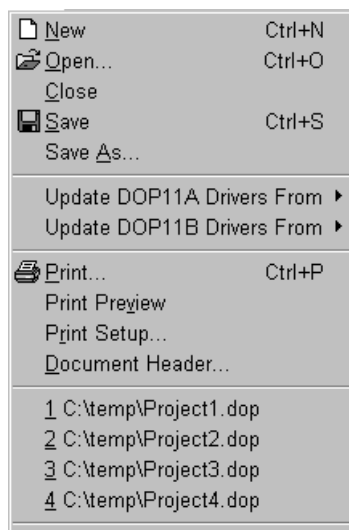


To change a definition, select the definition you want to change, make the change and click [Update]. To easily change several definitions, click [Update] or [Append] only once and then confirm each change with the Enter key.

The [Append] and [Update] functions remain active until another function is called. Use the [Delete] function to delete a selected definition. To close the manager, click [Close]. The following example applies to the alarm manager.

8.4.17 File [Menu]

The [File] menu includes functions for creating, opening, saving and closing projects. These functions are available in the standard toolbar. The print options can also be accessed using this menu. You can use the [Update driver] function to download new drivers from the Internet or install them from a disk.



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Figure 48: File [Menu]

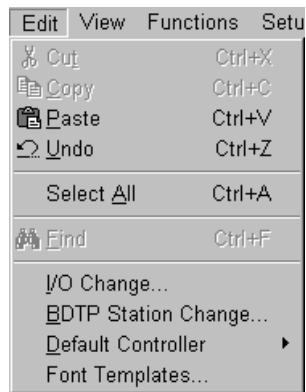


8.4.18 "Edit" menu

The [Edit] menu comprises the following functions:

- Cut
- Copy
- Paste
- Undo
- Select all

The [Find] function is available for editing texts in different languages. The menus also includes the functions [I/O change], [BDTP station change] and the options [Standard controller] and [Font templates].



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Figure 49: [Edit] menu

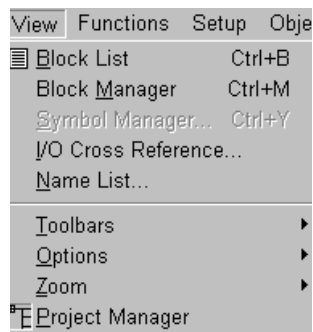


8.4.19 [View] menu

The [View] menu includes

- Block manager
- I/O cross reference
- Name list
- Project manager

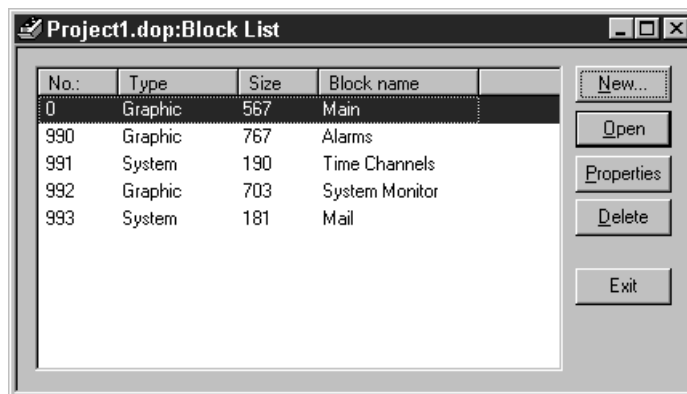
The menu also provides functions for setting various display modes in the program. Some functions appear in Windows applications as standard, others are HMI Builder specific. A description of the functions specific to HMI Builder are given below.



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Block list

The [Block list] menu shows the blocks belonging to the application. To create a new block, click on [New] in the block list. To open an existing block, click on [Open]. Clicking the [New] button opens the [Create new block] dialog box. Here you can define basic parameters for the block. To open the [Create new block] dialog box for a selected block in the list, click on the [Properties] button. To delete a selected block, click [Delete].



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Block manager

In the [Block manager] menu, all blocks in an application are presented graphically. Using this menu, you can create new blocks, define the block header and define jumps via toolbox functions.

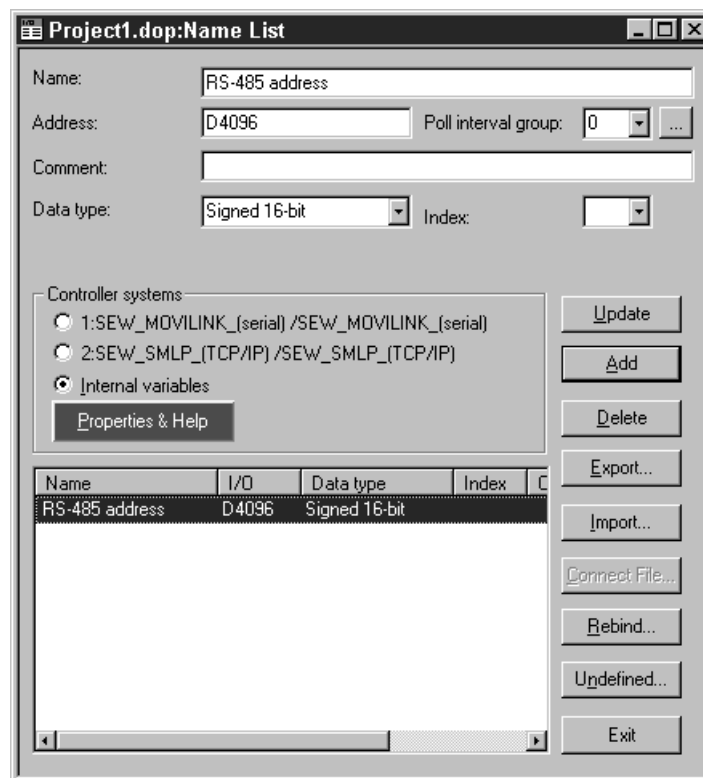
I/O cross reference

The [I/O cross reference] menu item can be used to display a list of the I/Os.

Name list

The [Name list] menu enables you to define a local name list for the signals used. Signals in the project that do not have a name can be added to the name list using the [Undefined] function. You can insert new signals or edit and update existing ones. Use the [Update] function to update the project with the changes you have made in the name list.

You can export a name list to a text file. You can also import a text file into a name list. Tab, semicolon, comma or blank can be used as separators for the file contents. You can sort an internal name list. The text file must not contain special country-specific characters, such as Ä, Ö and Ü.



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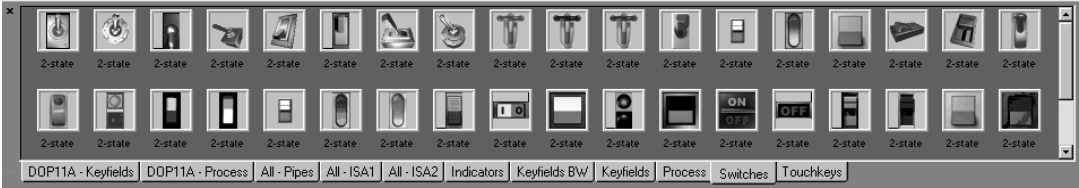



Toolbars

You can show or hide all the HMI Builder toolbars using the [Tool bars] menu item.

Parameters	Description
Standard layout	Selecting this option resets all the toolbars to their default settings.
Standard	
Status bar	<p>The status bar is located at the bottom of the configuration software window. The left area of the status bar includes a description of the selected menu or a brief description of the object that the cursor is pointing to in the toolbar. It also displays the coordinates (lines and column) in the block manager. The right area of the status bar displays the terminal model and driver version of the current project and the available terminal memory once the project has been transferred. OVR indicates that the overwrite button has been pressed.</p>
Block manager	See the section "[View] menu" on page 134.
Object	<p>To choose objects, select them in the object bar and move them to the work area. Click on an object to display its properties dialog box. Enter the parameters and click [OK]. The object now appears in the work area. Static text or graphics are displayed directly in the work area. The static graphic objects line, curve, ellipsis, rectangle, symbol and text are used to draw background graphics. You can change static graphic objects into dynamic objects by linking them to the objects on the [Dynamic signals] tab page. Dynamic objects are linked with signals to generate control and monitoring functions, among others. The general object parameters are described in chapter "Basics" (page 81). Graphic and text objects are explained in the sections "Graphic display and control" (page 154) and "Text-based display and control" (page 199). Next to the objects there is a button for selecting symbols and a pointer (far left in the toolbar). See also the section "Static / dynamic graphic objects" (page 163).</p>
Font	<p>You can use the font toolbar to select a predefined text style or to create a user-defined style. The text style is defined for the selected object. If you select a different font type, size or style for an object, a new text style is created and displayed in the list field.</p>
Controller	<p>The driver for the current object can be selected using the controller toolbar. Click the I symbol to select the internal variables.</p>
Language	
Alignment	<p>The alignment toolbar makes it easier to align objects on the screen. Objects can be aligned vertically and horizontally and changed in size based on the object that was most recently created (reference object). You can use the buttons in the toolbar to distribute objects evenly over the screen or tile them next to one another. When you move the cursor over a button in the toolbar, a brief description of the button is displayed. A more detailed description is given in the status bar (bottom left).</p>
Line width	<p>In this toolbar you can select the line thickness for straight lines, curves, polygons, rectangles and circles. The line thickness can also be specified in the object's properties dialog box.</p>
Color	<p>The color toolbar shows the foreground and background color of the current object and the block color. Click on the buttons to select a different color from the palette.</p>



Parameters	Description
Layout	 <p>You can use the buttons in the layout toolbar to move objects in front of or behind other objects and to hide or show a grid.</p>
Zoom	 <p>The buttons in the zoom toolbar are used to increase or decrease the size of the work area or the block manager.</p>
Library	 <p>See the section "Library" (page 113).</p>
Execute	 <p>You can use the simulator to execute a project on a PC. Save the project and choose [Project] / [Execute]. A window that can be used as a virtual operator terminal is displayed. Press to close the simulator and return to the configuration software.</p>

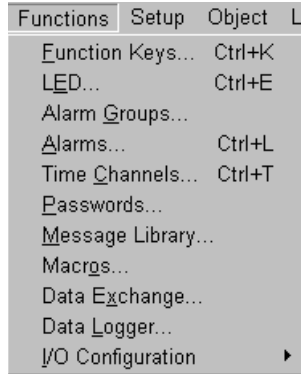
Options

Parameters	Description
Show terminal	Selecting this option displays a terminal around the work area in the graphic manager. You can use the terminal display to call up the managers for LEDs, function keys and text strips. Double-clicking on a function (e.g. a function key) opens the corresponding edit dialog box.
Show background block	Applies to graphic blocks only. With this option, you can display the background block when working in the graphic block manager.
Show language index	For multi-language support only. Shows the index number for the text in the application.
Quick info	Quick info is displayed for a function when the cursor is moved over the corresponding button.
Use terminal font	Here, you can select whether the text you have entered in the dialog boxes should be displayed by the program in the terminal font.
Choose Unicode font	Select a Unicode font from the dialog box. This font will be used in the programming software for multi-language support.



8.4.20 [Functions] menu

The [Functions] menu includes managers for:



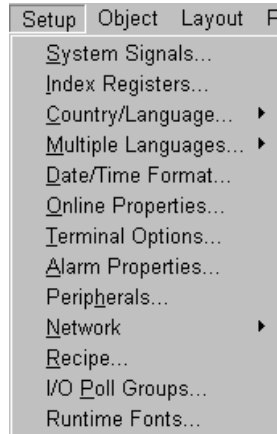
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Function	Description
Function keys	Here you can define global and local function keys. See the section "Function keys" on page 257.
LED	With this option you can define functions for the LEDs. See the section "LEDs" on page 257.
Alarm groups	With this option, you can group alarms (e. g. by severity levels) to detect and remedy them more efficiently. See the section "Alarm management" on page 220.
Alarms	With this option you can define alarm messages and signals that trigger an alarm. See the section "Alarm management" on page 220.
Time channels	With this option you can define time channels that control events in processes at a certain time. See the section "Time control" on page 248.
Passwords	With this option you can define passwords for the various security levels in the application. See the section "Passwords" on page 241.
Message library	With this option you can create message tables where values between 0 and 65535 are linked with texts. See the section "Message library" on page 218.
Macros	With this option you can create events that affect all function and touch keys. See the section "Macros" on page 265.
Data exchange	With this option you can define the conditions for data exchange between the selected controllers.
Data logger	Data can be logged and saved in a file. The data is saved at defined intervals or when values are changed.
I/O configuration	To display the properties of the controller driver and internal variables, select [I/O configuration].



8.4.21 [Setup] menu

The [Setup] menu includes functions for configuring the terminal.



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System signals

With this option you can define handshake signals between the terminal and controller.

Register current display

Data register in the controller that contains the number of the block (in run mode) to be displayed on the screen. The data register is automatically updated when the block is changed. This register does not affect block selection.

Register new display

Data register in the controller that defines which block will be displayed on the screen.

Buzzer register

The value of this register defines the buzzer tone. Tones and scales are given in the table below. When the value is 0, no sound is issued. All values in the table are given in Hz.

	C	D	E	F	G	A	H
Small	-	-	-	-	-	220	247
One	262	294	330	349	392	440	494
Two	523	587	659	698	784	880	988
Three	1046	1174	1318	1397	1568	1760	1975
Four	2093	2348	2636	2794	3136	3520	3950
Five	4186	-	-	-	-	-	-



Backlighting signal

Digital signal that activates or deactivates the backlighting.

Cursor control block

The start register for a control block is specified in the terminal. The start register writes the current cursor position in the graphic block to the data register in the controller.

Tab	Description
0	Current graphic cursor position X (in pixels): 0-239 for DOP11B-20 and 0-319 for DOP11B-40.
1	Current graphic cursor position Y (in pixels): 0-63 for DOP11B-20 and 0-239 for DOP11B-40.
2	Status register
0	Normal
1	The user attempts to move the cursor downward but there is no object at the selected position.
2	The user attempts to move the cursor upward but there is no object at the selected position.
3	The user attempts to move the cursor to the left but there is no object at the selected position.
4	The user attempts to move the cursor to the right but there is no object at the selected position.

The following table applies only to models with touchscreen.

The cursor control block is the start register in a control block that writes the current pointer position in the graphic block to the controller's data register.

Tab	Description
0	x-coordinate (in pixels): 0-319
1	y-coordinate (in pixels): 0-239
2	Status register: 0 Not pressed, 1 Pressed

Cursor movement register

The position of the cursor in a graphic block can be controlled via a register. The meaning of the register values is described below. Value 0 must be assigned to the register between the same command for the movement. We recommend that you also use the [Cursor control block] option to optimize this function.

Register value	Description
1	Moves the cursor to the first maneuverable object.
2	Moves the cursor to the next maneuverable object.
3	Moves the cursor up one step.
4	Moves the cursor down one step.
5	Moves the cursor left one step.
6	Moves the cursor right one step.



Print status register

Not relevant for the DOP11B series.

Library index register

This register is used for indexing the message library. The library number from which the texts are to be retrieved is indicated in the message object.

When defining an index register, its contents is added to the number specified in the object. This means a register can control from which library the texts are to be retrieved.

Commands

One or more of the following commands can be entered in the command line. Commands are separated by spaces. All commands are capitalized.

Command	Description
ABUPx	Enables alarms to be saved on an external memory card by specifying the bit device "x".
AKx	Activates the joystick function. See the section "Joystick function " on page 70.
AUCR	Register [AlwaysUpdateCurrentRecipe]. Updates the recipe of the current recipe register on saving. The recipe does not have to be loaded again.
ALDR	Enables 2 alarm lines to be used per alarm. See the section "Operator terminal alarms" on page 227.
ALOFx	AlarmListOverflow The bit device "x" shows when active alarms are to be deleted from the alarm list.
AMBn	Enables several alarm backup files to be saved on an external memory card. "n" stands for the number of backup files that can be saved.
AUCR	Register "AlwaysUpdateCurrentRecipe". Updates the recipe of the current recipe register on saving. The recipe does not have to be loaded again.
BCTO	Displays the error message "BDTG comm. Error" only the first time a BDTP client attempts to reestablish a connection with a BDTP server.
BFF	Block Form Feed. Adds a page break after each block during printing.
BTIMx	BDTP response timeout, where "x" stands for the number of seconds. For more information, see the section "BDTP" on page 291.
DBAF	Deactivates the query for creating a backup file structure when a USB Flash drive is connected.
DBKL	Unlocks keyboard and touchscreen when the backlighting needs to be replaced. The default locks the keyboard and touchscreen when the backlighting is not active.
DD	Disable Delete. Deactivates the deletion of alarms from the alarm list. When this command is issued, inactive or acknowledged alarms are not deleted from the alarm list.
DGP	Removes the alarm group from alarm printouts.
DNBW	Deactivates the warning "No block x". If this warning is not deactivated, it is issued, for example, when a block jump has not been configured for an existing block number or when the function [New display register] is used in order to use the data registers in the controller to specify which block is to be displayed on the screen.



Command	Description
FLIP	Turns the screen display in portrait or landscape format by 180° to allow reverse assembly.
FTNO	Deletes the line with the OFF indicators in trend files when using FTP.
LOBx	Activates the digital signal x when the battery of the real-time clock needs to be replaced. For example, LOBM0 activates M0 when the battery needs to be replaced.
MClx	MemCardInserted Activates the digital signal x when a memory card is inserted.
MCRD#	Enables individual recipes to be stored on an external memory card. See the section "Store individual recipes on an external memory card during operation" on page 240.
NHD	This command allows for printing graphic blocks without block header (which includes block name, block number, date and time) on a laser printer.
NMAN	Activates the warning "Not maneuverable" for operator terminals with touchscreen.
NTx	Timeout in x ms for a message in no protocol mode.
Rx	Maximum number of transmission attempts, x = number of attempts. Applies to communication with the controller. Example: R5@2 applies to controller 2.
Tx	Global timeout in x ms. Applies to communication with the controller. Example: T10000@1 applies to the timeout for controller 1.
PDxxxxxxx	Password protecting access to the [Transfer] menu. More information can be found in the section "Passwords" on page 241.
PSxxxxxxx	Password that has priority over all other password levels. Used, for example, for support and maintenance. More information can be found in the section "Passwords" on page 241.
PSCE	Calculates the size of the project and displays the result on the diagnostics page and in the file <code>info.txt</code> . Using this command in projects with numerous trend curves slows the loading process and the use of FTP functions considerably. See also the section "FTP server" on page 295.
PWDF	Activates the use of a password for a USB Flash drive.
SCRR	Limits the number of characters for recipe names and recipe directories that can be stored in the controller to 8. See also the section "Limit the length of recipe names and directories that can be stored in the controller" on page 234.
SJAFx	Displays the text "Remote access" in the top right corner when a VNC client is connected. x = character size
TBS	A sign must be entered after the command to show which trends or data logs should be copied to the external memory card. On activation of the "TBUP" signal, only the trends or data logs starting with this sign are copied over. See the section "Trends" on page 261.
TBUP	Used to backup trend files. More information can be found in the section "Creating backup copies for trend data" on page 264.
TCFx	Value to set the temperature compensation for the terminal contrast. The standard value is determined based on test results. However, in areas with wide and frequent temperature fluctuations, this value may have to be adapted. To lower the temperature compensation, increase the value "x". Enter the value "0" to deactivate the temperature compensation.
TESOSn	Saves a sample trend. See the section "Creating backup copies for trend data" on page 264.
TMBx	Trend Multi Backup. See the section "Creating backup copies for trend data" on page 264.
VNCD	VNC Disconnect. Disconnects the current VNC session when the bit device "x" is set.

Index register

Index addressing of dynamic objects. For more information, see the section "Index addressing" (page 214).



Country/language Character set

The selected character set determines which character table will be used in the terminal and which special country-specific characters will be available.

System language

Menu language selection: British English, German, Swedish or American English. By default, the menu texts in the terminal are set to British English.

Multi-lingual functions

Menu	Description
New language	Starts the wizard for creating multi-lingual applications.
Edit	With this option you can edit or translate texts in the application.
Setup	This function displays the tree structure for the languages in the application. For more information on possible settings, see the section "Language management" on page 249.
Export	This function exports the application languages to a Unicode text file. Choose this function to export user texts. The dialog box "Export multi-lingual texts" is displayed. Enter the destination and the format of the file to be saved.
Import	This function imports a language for use in the terminal. Choose this function to import user texts. The dialog box "Import multi-lingual texts" is displayed. Enter the name of the text file to be imported.
Display index	This function displays the index in objects instead of texts. You can also enter text for the index display. In this way, the new text is assigned a new index.
Cross reference	Displays a cross reference list with the indices for the application blocks.
Reuse index	If this function is active when copying an object, a new object will be created with the same index.
Choose Unicode font	Choose a Unicode font for use in the programming software.



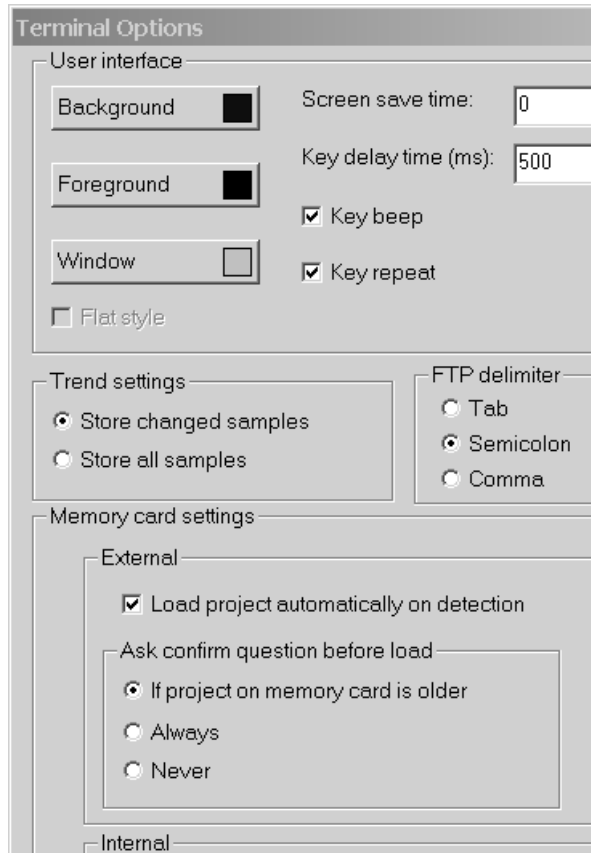
Date/time format Setting the date and time format.

Menu	Description	
Date format	The following date formats are possible: <ul style="list-style-type: none"> • YY-MM-DD • YYMMDD • DD.MM.YY • DD/MM/YY • DD/MM/YY Y = year, M = month, D = day.	
Time format	The following time formats are possible: <ul style="list-style-type: none"> • HH:MM:SS • HH:MM H = Hours, M = Minutes, S = Seconds.	
Activate clock	Select this checkbox to activate the clock in the terminal. When controller 1 or 2 is selected, the clock refers to the clock in controller 1 or 2.	
Clock → controller 1/2	Select this option if you want to transfer the data of the terminal clock to a data register in controller 1 or 2. If the controller has an activated real-time clock and the terminal clock sends data to the same data register, the controller clock will have priority.	
Update interval	Here you can define how often the terminal sends clock data to the controller. Enter the value in seconds. The recommended value is 60 seconds. Shorter update intervals slow down the communication between terminal and controller.	
Controller register	Enter the start address for saving the date and time in the controller. If you use this function, the terminal clock will be written to 7 successive registers (see table below).	
	Controller register CR	Time segment
	CR	Seconds
	CR+1	Minutes
	CR+2	Hours
	CR+3	Day
	CR+4	Month
	CR+5	Year
CR+6	Day of the week (1 ... 7; 1 = Sunday)	
Daylight saving time	Here you can specify dates for the start and end of daylight saving time. Enter the day of week, week of month, month, hour and setting. You can choose between Europe and U.S. standard time. To deactivate daylight saving time, leave both month fields blank.	

Online properties Enables selected functions to be changed on the operator terminal.



Terminal options



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Figure 50: Terminal options

Option	Description
Background	Defines the background color for the terminal.
Foreground	Defines the text color for the terminal.
Window	Defines the window color for the terminal.
Screen saver time (min)	Enter the screen saver activation time in minutes. The default setting is 0 which means the screen saver is disabled. A screen saver extends the life of your monitor.
Key delay time(ms)	Time interval in milliseconds between 2 hits of the same key before the cursor automatically moves to the next position. Is used when ASCII characters (A-Z, etc.) are entered. See the section "Alphanumeric keys" on page 63.
Key tone	Defines whether the terminal produces a signal tone when a key is pressed.
Key repetition	Specifies whether a function is repeated as long as a key is being pressed. This does not apply to function keys and the entry of alphanumeric characters (A-Z, etc.).
Trend settings	General trend settings are made in this field.



Programming

Programming with the programming software

Option	Description
Save changed samples	Saves changed samples in trends only if the value has changed since the last measurement.
Save all samples	Saves all samples in trends, even if the value has not changed since the last measurement. These parameters affect all defined trends.
FTP delimiter	The terminal can save the transferred files locally. Access is enabled via FTP or external memory card. The content of recipe or trend files, for example, can be delimited using the separators tab, semicolon or comma. When the FTP delimiter is changed, the separators of all internally saved recipes are checked and, if necessary, adapted. For more information, see the section "FTP server" on page 295.

Memory card settings

Here you can make settings for external memory cards.

External	You can connect either a compact Flash card (only for DOP11B-50) or a USB Flash drive externally. The external memory can be used to back up projects or store recipe files. This option cannot be used to extend the project memory. DOP11B-50 does not support the use of 2 external storage devices at the same time. If two storage devices are connected, the compact Flash card has priority over the USB drive.
Internal	Applies only to DOP11B-50. If an internal compact Flash memory card is used to extend the project memory, you must specify its size here.

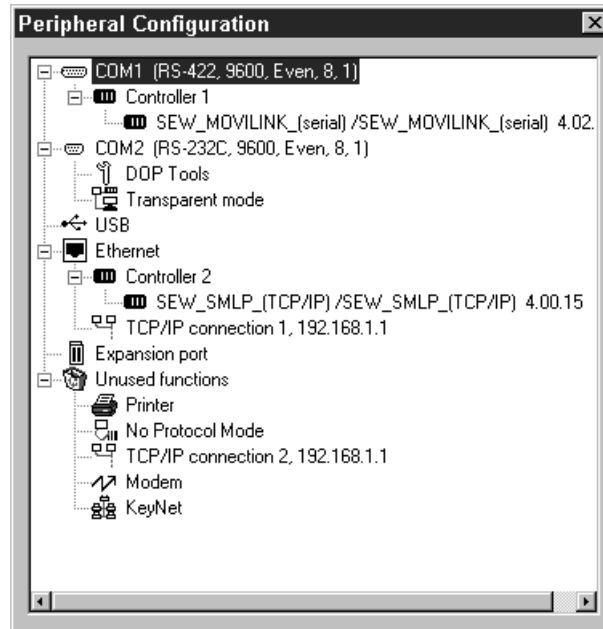
Alarm properties

General properties for alarm management. For more information, see the section "Alarm management" on page 220.



Peripherals

All communication settings are made under [Setup] / [Peripherals] or by double-clicking on the [Peripherals] directory in the project manager. Devices can be moved using the mouse.



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Port properties

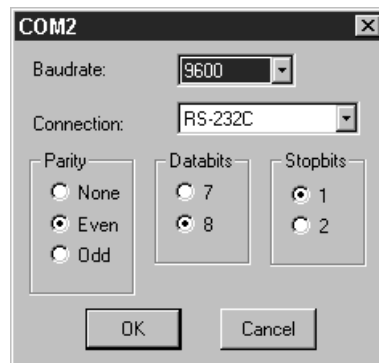
Click the right mouse button on a connection to display or change the current configuration.

COM2:RS-232C

Select the [RS-232C] COM2 port and click the right mouse button. The following dialog box opens.

Assign the following parameters to the port:

- Baud rate
- Parity
- Data bits
- Stop bits



10481AEN



Programming

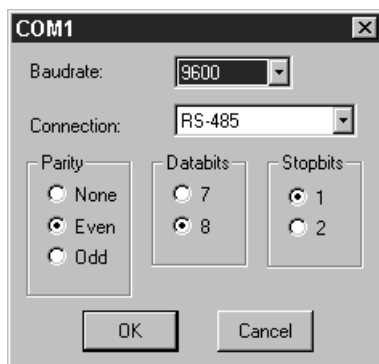
Programming with the programming software

**COM1:RS-485 /
RS-422**

Select the [RS-485 / RS-422] COM1 port and click the right mouse button. The following dialog box opens.

Assign the following parameters to the port:

- Baud rate
- Parity
- Data bits
- Stop bits



10482AEN

For communication with MOVIDRIVE[®], choose 9600, RS-485, even, 8, 1.

USB

You can use the USB host connection to connect external devices, such as a USB hub, Flash drive, mouse, or keyboard.

Ethernet

The operator terminal has an Ethernet connection for connection with a TCP/IP network.

Printer

Right-click on the option [Printer] to open the dialog box for the printer properties. For more information, see the section "Printing reports" on page 244.

Parameters	Description
No protocol mode	The no protocol mode is described in chapter "Communication" (page 269).
Controller 1 and Controller 2	Right-click on [Controller 1] or [Controller 2] and choose [Properties] to change the selected protocol.
TCP/IP connection 1 and TCP/IP connection 2	Right-click on [TCP/IP connection 1] or [TCP/IP connection 2] and choose [Properties] to enter the TCP/IP settings.
Modem	For more information, see the section "Communication" on page 269.
Transparent mode	For more information, see the section "Transparent mode" on page 271.



Network

The network properties are explained in the following sections:

- "Network services" (page 290)
- "Network accounts" (page 321)
- "Network communication via Ethernet (TCP/IP connections)" (page 282)

Recipe

Here you can enter the properties for recipe management. See the section "Recipe management" (page 229).

I/O query groups

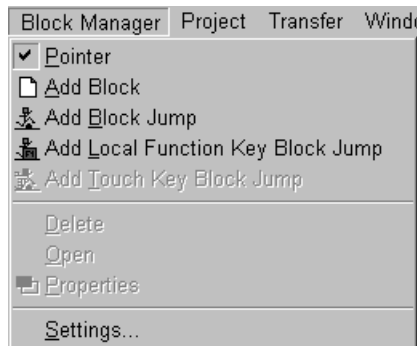
The I/O query interval groups define the query intervals for signal groups in ms. You can enter values from 0 to 65535 ms. If a signal is not assigned an I/O query interval group, the signal is queried continuously. The I/O query interval group for a signal is assigned during the object definition using the I/O button. The I/O button is available in all dialog boxes in which a signal can be entered. See the section "I/O browser" (page 115).

Runtime fonts

Runtime fonts are font attributes and effects for menus (e.g. system texts) and dialog boxes (virtual keyboard models for touchscreen) on the operator terminal. The DOP11B series cannot process formulas.

8.4.22 [Block manager] menu

The [Block manager] menu comprises functions for programming blocks.

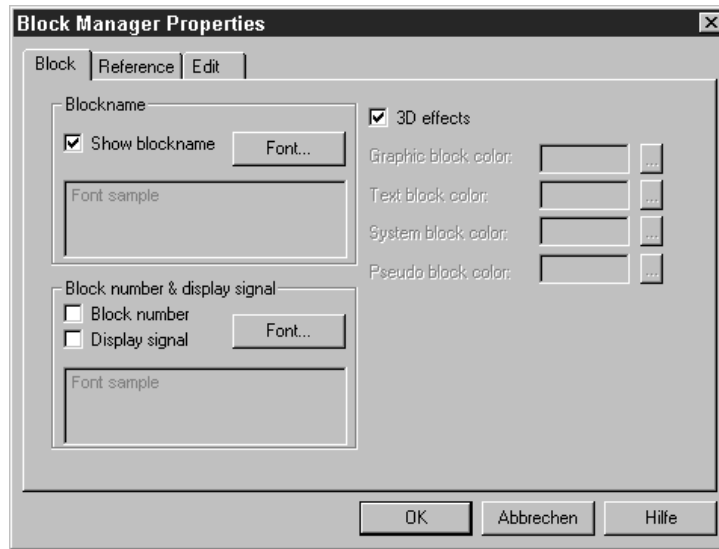


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Settings for the block manager

The block manager display is configured under [Block manager] / [Settings].



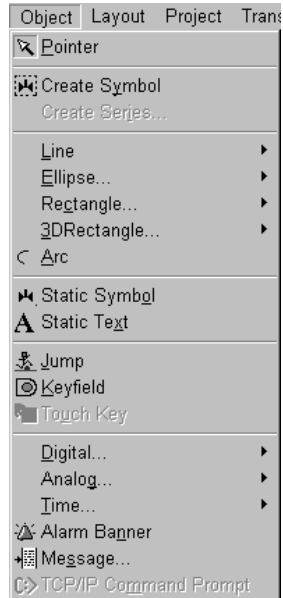
10442AEN

Tab	Description
Block	Define the appearance of data for the block in the block manager.
Reference	You can set the overview for the block manager here.
Edit	This tab includes special functions for the display in the block manager.



8.4.23 [Object] menu

The [Object] menu lists all objects available in the program. The number of objects depends on the terminal type. For a description of the objects, see the sections "Graphic display and control" (page 154) and "Text-based display and control" (page 199).

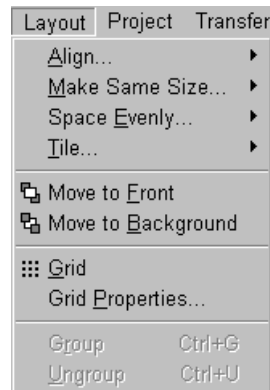


11520AEN



8.4.24 [Layout] menu

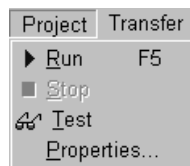
The [Layout] menu provides functions for aligning and adjusting several objects. These functions are described in the section "Positioning objects" on page 120 .



11521AEN

8.4.25 [Project] menu

The [Project] menu includes functions for testing projects, changing project properties and simulating projects.



11601AEN

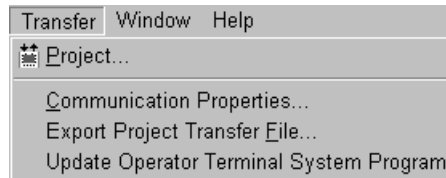
Simulator

You can use the simulator to execute a project on a PC. Save the project and choose [Project] / [Execute]. A window that can be used as a virtual operator terminal is displayed. Press <Esc> to close the simulator and return to the configuration software.



8.4.26 [Transfer] menu

The [Transfer] menu provides functions for transferring projects, selected blocks and communication settings between the PC and terminal. See the section "Transferring projects" on page 204.



11522AEN

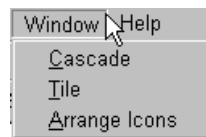
INFORMATION



The communication settings for the programming software and terminal must be identical.

8.4.27 [Window] menu

Here, you can define the appearance of the program windows in the configuration software.



11523AEN

8.4.28 [Help] menu

The [Help] menu is used to call up the online help for the configuration software or the controller. The menu also includes information on the version number and allows you to activate/deactivate the Tip of the Day.



11524AEN



8.5 Graphic display and control

This chapter lists all the graphic objects in tables and explains each in detail. This section only applies to terminals that support graphic display.

8.5.1 General parameters

To call up the [Properties] dialog box for an object, double-click on the object in the work area.

General

The properties displayed in the [General] tab page are object-specific. They are described for each object.

All dynamic objects can be connected to a digital or analog signal.

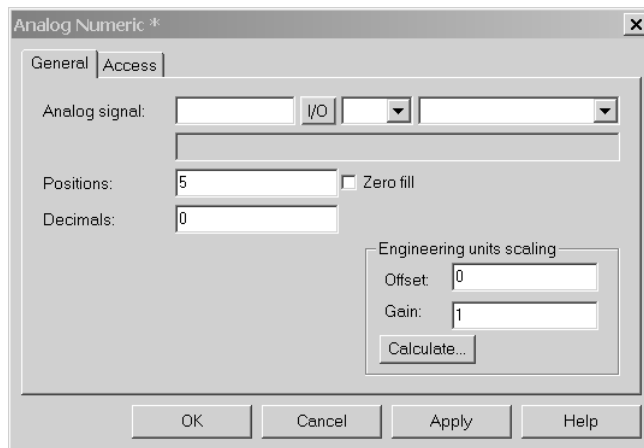


Figure 51: [General] tab

11988AEN



Engineering units scaling

The *offset* and *gain* parameters are used to scale the register value to a display value according to the following formula.

$$\text{Display value} = \text{offset} + \text{gain} \times \text{register value}$$

If you change a value for an object in run mode using the terminal, the display value will be scaled according to the following formula:

$$\text{Register value} = (\text{display value} - \text{offset}) / \text{gain}$$

The scaling affects neither the defined maximum/minimum values nor the number of decimal places.

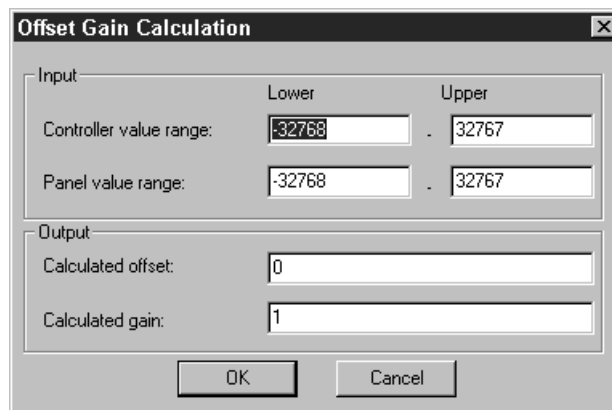
INFORMATION



The functions for increasing/decreasing values affect the register value for the maneuverable object but not the display value.

Calculating technical units

The [offset/gain calculation] function serves as a tool for calculating the parameters *offset* and *gain*. Enter the value for the *offset* and *gain* of the object on the [General] tab and click [Calculate]. The following dialog box opens:



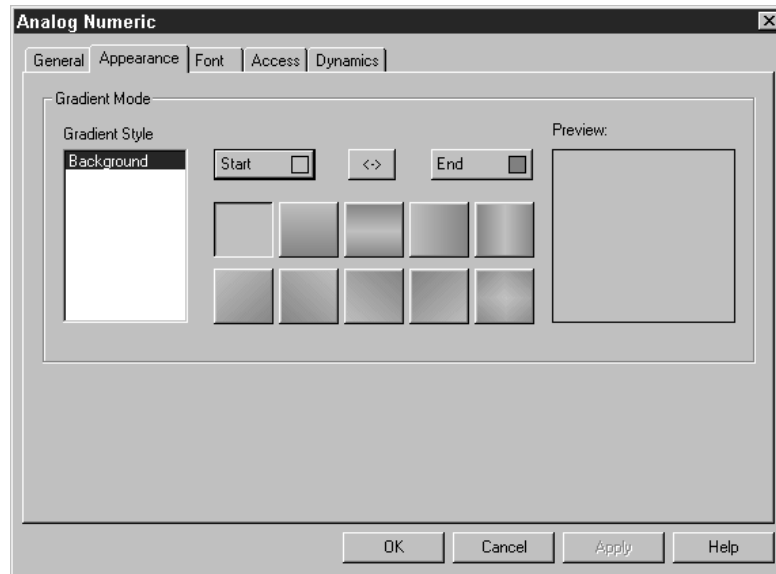
10591AEN

Enter the range for the controller and terminal values. The function determines the correct values for the *offset* and *gain* parameters.



Appearance

The properties of the [Appearance] tab page are object-specific.



11602AEN

The operator terminals with color display support object and bitmap images with 65536 colors. DOP11B-25 supports 16 greyscales. The DOP11B-20 has a black-and-white display.

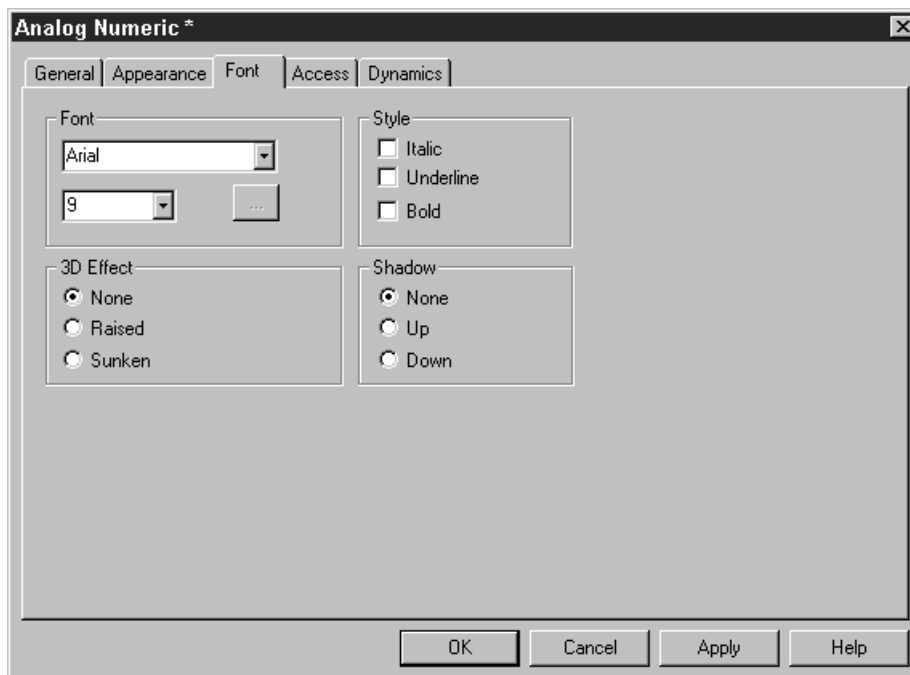
The use of colors facilitates the creation of more realistic objects with 3D effect and shading. You can choose the foreground and background colors for blocks and the color gradient styles for objects. You can also select the colors for scales, curves, etc. in graphic objects.

Use the buttons [Start] and [End] to call up the color palette in order to define your own colors. Click the button <-> to reverse the current color gradient. You can click several color gradient style buttons until you have found the style you require.

The result is displayed in the [Preview] window.



Font

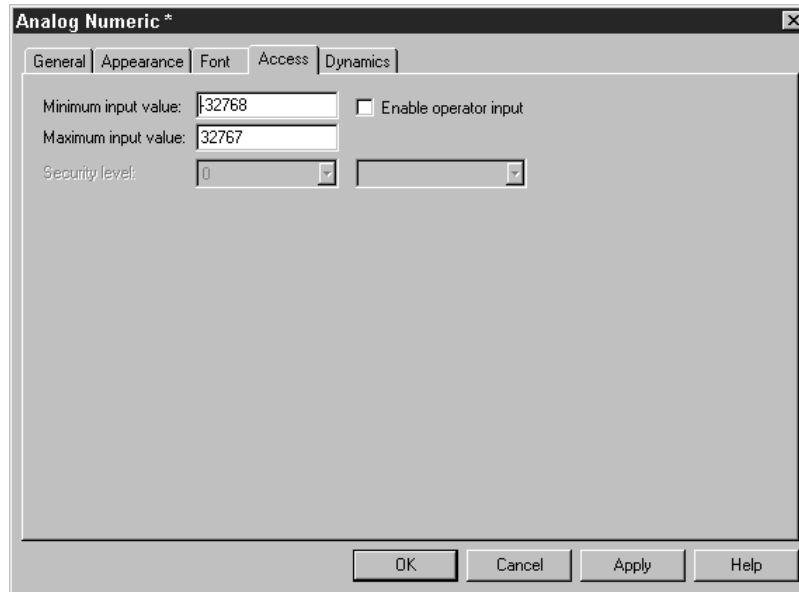


11525AEN

Parameters	Description
Font	Choose a font and font size from the drop-down lists. Click the [...] button to select a font from the Windows dialog box.
Style	Text can be displayed in italics, underlined or bold. If you do not select one of the checkboxes, standard text is used.
3D effect	Here you can assign 3D effects to texts.
Shadow	Texts can be displayed with a shadow effect.



Access



11526AEN

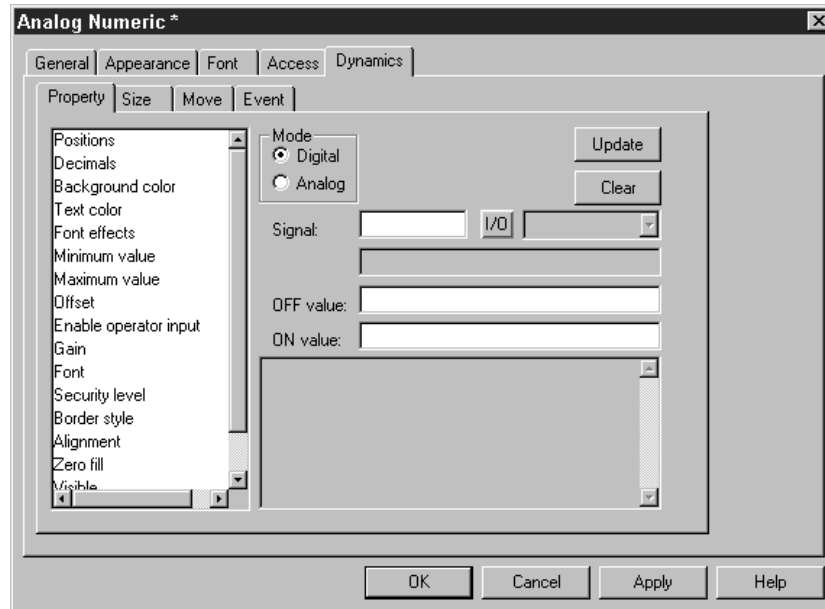
On the [Access] tab you define whether you want the object to be a maneuverable object. Enter the [Minimum input value] and [Maximum input value] for the object (and the access). You can also specify the security level for the object. Security levels are defined under [Functions] / [Passwords].



Dynamics

This section describes the functions on the [Dynamics] tab page.

Feature



11527AEN

On the [Property] tab, you can specify which signal a property should control. You can choose between digital and analog control.

- Choose the property to be controlled by the controller from the list. The property can only be used once per object/signal.
- A property being used is marked red.
- Enter a signal or click on the [I/O] button to select a signal using the I/O browser.

The values "OFF" and "ON" are permitted for digital signals. If you do not specify OFF/ON values, the OFF value is set to 0 and the ON value to 1 by default.

You can use the "Character string" format type to define the length of analog signals.

INFORMATION



Connect the servomotor only as shown in the following wiring diagram, which is included with the servomotor.

If analog control is selected for a property that can only be assigned the values OFF and ON, the property remains ON for as long as the signal is assigned a value other than 0.

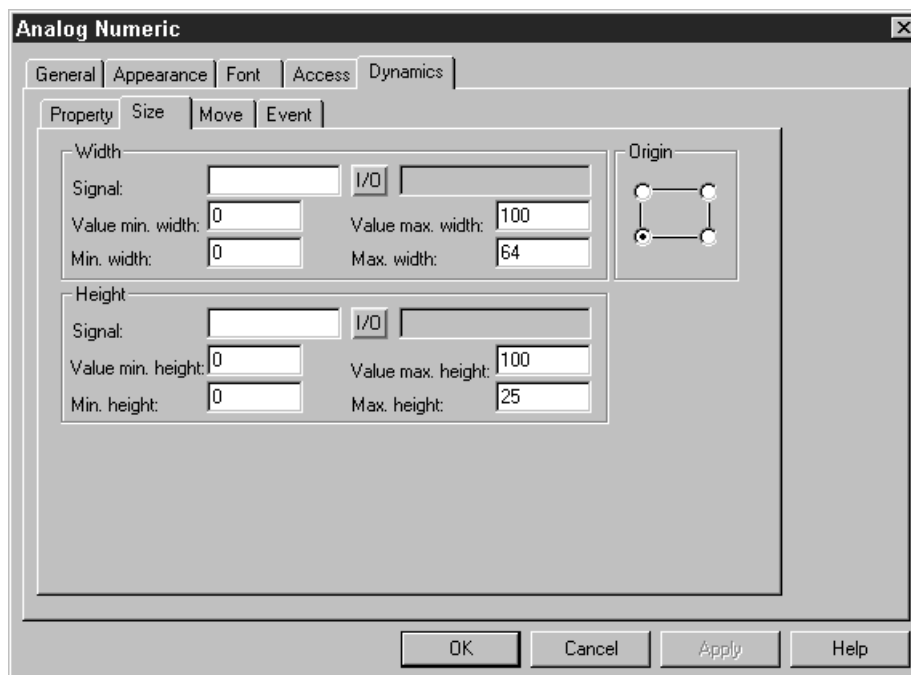
The *offset/gain* of an object can only be changed when the *offset/gain* for the object is not 0 or 1.

The *Visible* property must not be used simultaneously with the *Positions* property.

Dynamic texts are not converted into Unicode format. Instead, a question mark will appear.



Size:



11528AEN

On the "Size" tab you can define the values for "Width", "Height" and "Origin". Define 2 analog signals for which the signal values determine the size of the object relating to the X axis (width) or the Y axis (height).

INFORMATION

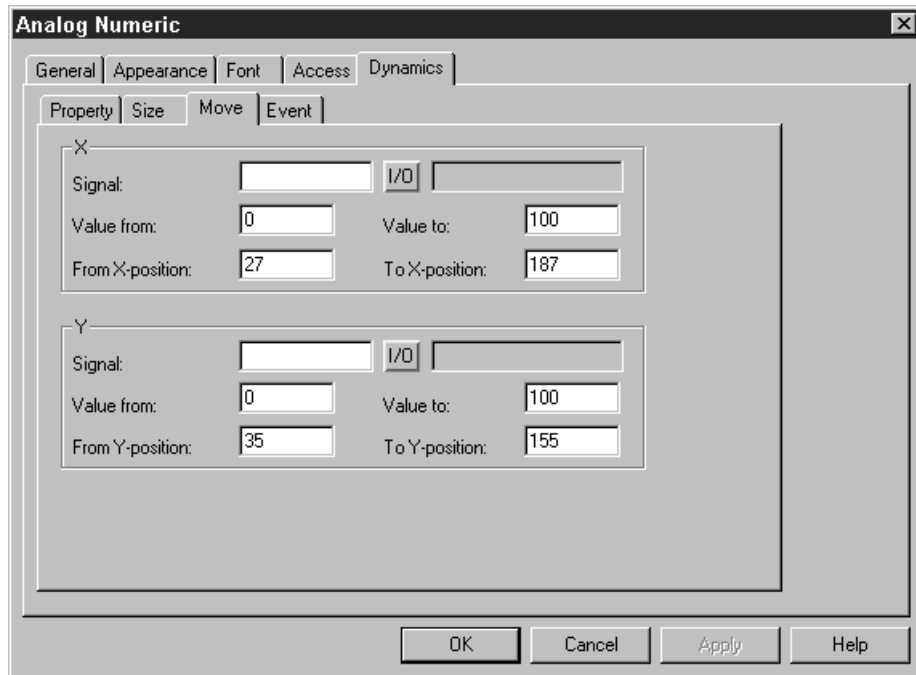


If you enter an invalid value, for example a value that does not enable the object to be displayed on the screen, the value will be ignored.

Parameters	Description
Signal	Enter an analog signal.
Value min. width / height	Enter the minimum value of the analog signal.
Value max. width / height	Enter the maximum value of the analog signal.
Min. width / height	Enter the minimum value for the width/height of the object in pixels at which the minimum value corresponds to the defined value.
Max. width / height	Enter the maximum value for the width/height of the object in pixels at which the maximum value corresponds to the defined value.
Origin	Select the starting position of the object for display on the screen.



Move



11529AEN

On the [Move] tab, enter two analog signals whose values determine the x (width) and y (height) coordinates of the object.

INFORMATION



If you enter an invalid value, for example a value that does not enable the object to be displayed on the screen, the value will be ignored.

Parameters	Description
Signal	Enter an analog signal.
Value from	Enter the minimum value of the analog signal.
Value to	Enter the maximum value of the analog signal.
From x / y position	Enter the x and y coordinates of the object, i.e. the pixel value on the screen at which the value of the parameter <i>corresponds with the value of the defined value</i> .
To x / y position	Enter the x and y coordinates of the object, i.e. the pixel value on the screen at which the value of the parameter <i>value to</i> corresponds with the defined value.

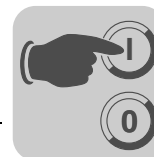


Event

11530AEN

On the [Event] tab you can define the parameters described below. You can update existing events, add new events or delete events by clicking the corresponding buttons in the dialog box.

Parameters	Description	
Event name	Enter a name for the event or select an entry from the list.	
Condition	Select a condition from the list. You can choose between four conditions:	
	Equal to	The signal reports an event when the object value matches the parameter value. The value has to be entered by the user.
	Not equal to	The signal reports an event when the object value does not match the parameter value. The value has to be entered by the user.
	Larger than	The signal reports an event when the object value is greater than the parameter value. The value has to be entered by the user.
	Lower than	The signal reports an event when the object value is lower than the parameter value. The value has to be entered by the user.
Action	Select one of the following options: <ul style="list-style-type: none"> • Digital signal • Analog signal • Macro 	
Signal	Select the signal that should be influenced when the condition is fulfilled.	
Value	Enter the value that the signal in question should take on if the condition is fulfilled.	



8.5.2 Graphic objects










Static/dynamic graphic objects

Static graphic objects are used for creating graphics. On the [Dynamics] tab page, you can assign dynamic properties to graphic objects.

INFORMATION



In the display, static objects are always placed behind dynamic objects.

Symbol	Object
	Line
	Curve
	Rectangle
	Symbol
	Static text
	Ellipsis
	Keypad object
	Polygon line
	Touch button






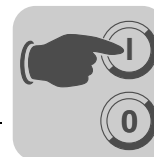
Dynamic bitmap management

If you activate the [Use dynamic bitmaps] checkbox for a static symbol object, the terminal will call up the specified bitmap file (namn.bmp) from the [IMAGES] library in the terminal file system. The bitmap graphic is displayed on the terminal screen in run mode. The graphic to be displayed must be transferred to the [IMAGES] library in the terminal via FTP. You can add, exchange or delete dynamic bitmap graphics via FTP. This is done by overwriting, saving or deleting BMP files in the [IMAGES] library. The image for a dynamic bitmap graphic object is displayed on the terminal in run mode only. The bitmap graphics in the library are not available in the programming software and can therefore not be displayed.

Dynamic digital graphic objects

Digital graphic objects are linked to signals in the controller.

Symbol	Object	Description
	Digital text	Toggles between two texts depending on the state of a digital signal.
	Digital symbol	Changes between two symbols depending on the state of the digital signal.
	Digital fill	Used for filling a framed area with one of 2 colors. The color depends on the state of the digital signal.



Dynamic analog graphic objects

Analog graphic objects are linked to registers in the controller.

Symbol	Object	Description
	Analog numeric	Input and display of numerical values.
	Bar	Displays a value in the form of a bar chart.
	Diagram	Used for drawing an x / y diagram that corresponds to the data register content.
	VU meter	Creates a graphic VU meter on the screen.
	ASCII	Controls ASCII character strings in graphic blocks.
	Slider	Allows for increasing or decreasing the value for an analog signal.
	Trend	Displays the values retrieved from data registers in the form of a curve.
	Speedometer	Creates a graphic speedometer on the screen.
	Analog fill	Used for filling a framed area with one of 16 colors. The color depends on the register value.
	Multiple symbol	Shows one of up to eight symbols. The symbol depends on the data register value. Allows you to move symbols on the screen.
	Multiple selection	Linked to a data register that can have up to eight different states. A text with up to 30 characters can be assigned to each state.
	Message	Object that displays texts from a message library.
	Analog numeric table	Creates a table with numeric objects.



Other objects

Symbol	Object	Description
	Jump	Jump to another block.
	Alarm banner	Used to display a line from the alarm list.
	Analog clock	Object to display an analog clock.
	Digital clock	Object to display a digital clock.
	TCP/IP command entry	Object for transferring a TCP/IP command to other units. Only applies to terminals that are connected to a TCP/IP network.

Digital text



Text object used for switching between two entered texts depending on the state of a digital signal. The text can have up to 30 characters.

11531AEN



[General] tab page

Parameters	Description
Digital signal	Address of the digital signal
Text Off	Text that is to be displayed when the signal state is 0.
Text On	Text that is to be displayed when the signal state is 1.
Alignment	Specify whether you want the text left-justified, centered or right-justified.
Border style	Specify whether you want the object to be displayed with a border.
Text	Choose a text color for the object.
Background	Choose a background color for the object.

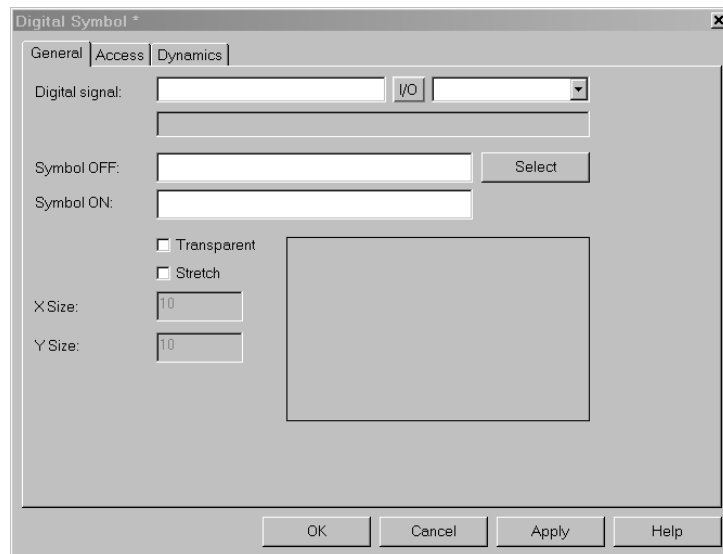
Other tabs

The functions on the [Appearance], [Font], [Access] and [Dynamics] tabs are described in the section [General parameters] on page 154 .

Digital symbol



Object that is used to change between two selected symbols depending on the state of the digital signal.



11532AEN



[General] tab page

Parameters	Description
Digital signal	Signal address
Symbol OFF	Select the symbol you want to have displayed when the signal state is 0.
Symbol ON	Select the symbol you want to have displayed when the signal state is 1.
Transparent	If you select this option, the symbol will be transparent. The color of the upper left pixel is defined as the transparency color.
Stretch	If you select this option, the object's x and y dimensions can be adapted using the x and y fields or by moving the cursor in the work area.

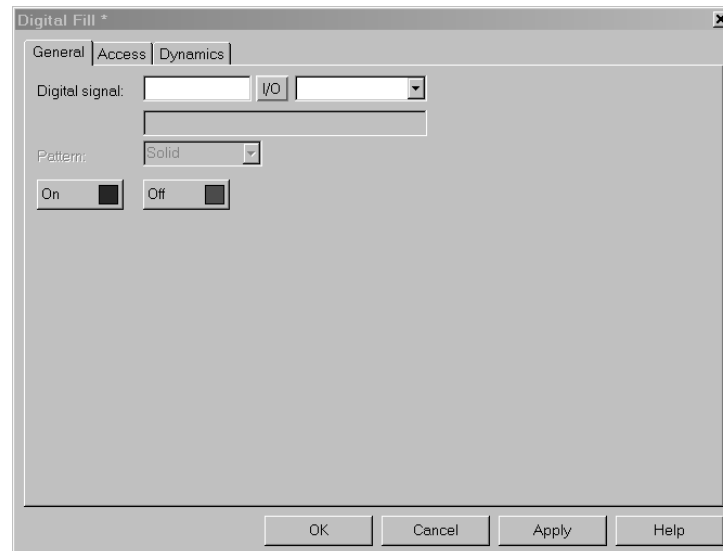
Other tabs

The functions on the [Appearance], [Access] and [Dynamics] tab pages are explained in section "General parameters" on page 154 .

Digital fill



Object used for filling a framed area with any color.



11533AEN

INFORMATION



Filling very irregular areas may lead to system errors during operation. In certain cases, the filling process will slow down the loading time of images.



[General] tab

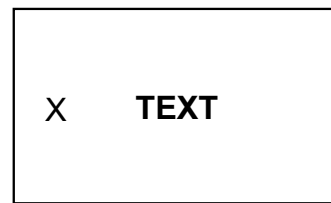
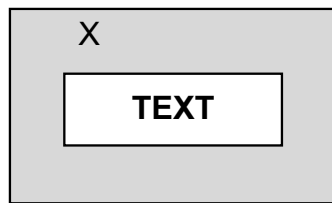
Parameters	Description
Digital signal	Address of the digital signal
On	Defines the object color for signal value 1.
Off	Defines the object color for signal value 0.

Other tabs

The functions on the [Access] and [Dynamics] tab pages are explained in section "General parameters" on page 154 .

Object positioning

The program calculates which area will be filled. The object must therefore be positioned correctly. Incorrectly positioned objects may cause application errors during operation. The area to be filled is only limited by static objects and static parts of dynamic objects. Filled objects can be replaced by digital symbol objects or multiple symbol objects to increase efficiency within a project.



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X = Object positioning

Correct: Draw a frame around the text in the area to be filled to speed up image loading.

Incorrect: Image loading is slowed down because the program must perform extensive calculations for filling the area between the letters.



Jump



Object used for jumping to another object. This object enables a menu tree to be created in the project. You can go back to the previous block (up to nine levels back) by pressing the <PREV> button on the terminal. See the section "Function keys" on page 257.

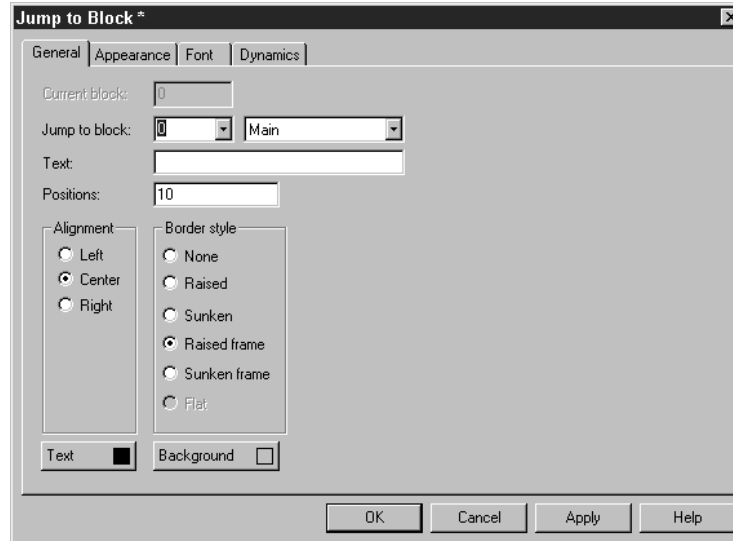


Figure 52: Jump to another block

11534AEN

[General] tab page

Parameters	Description
Current block	The number of the current block is displayed in this field. This number cannot be changed.
Jump to block	Enter the number or name of the block to which you want the program to jump.
Text	Enter any text you want to appear in the object.
Positions	Number of positions for the text.
Alignment	Specify whether you want the text left-justified, centered or right-justified.
Border style	Specify whether you want the object to be displayed with a border.
Text	Choose a color for the text in the object.
Background	Choose a background color for the object.

INFORMATION



If a jump to a block that does not exist is initiated during operation, an error message will appear.

Other tabs

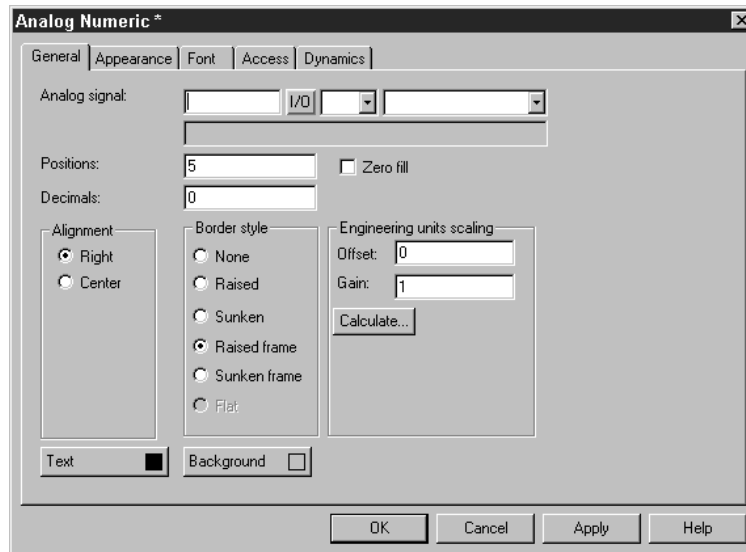
The functions on the [Appearance], [Font] and [Dynamics] tab pages are explained in section "General parameters" on page 154 .



Analog numeric

03

Object for entering and displaying numerical values. This object is used, for example, for creating input fields.



11535AEN

[General] tab page

Parameters	Description
Analog signal	Signal address
Positions	Number of positions for displaying the entered value including comma and minus sign.
Zero fill	Specify whether you want empty positions to be filled with zeros.
Decimals	Number of decimal places for displaying the entered value.
Alignment	Specify whether you want the input field to be formatted right-justified or centered.
Border style	Specify whether you want the object to be displayed with a border.
Engineering units scaling	These fields are used for scaling the register value. See the section "General parameters" on page 154.
Text	Choose a color for the text in the object.
Background	Choose a background color for the object.

Other tabs

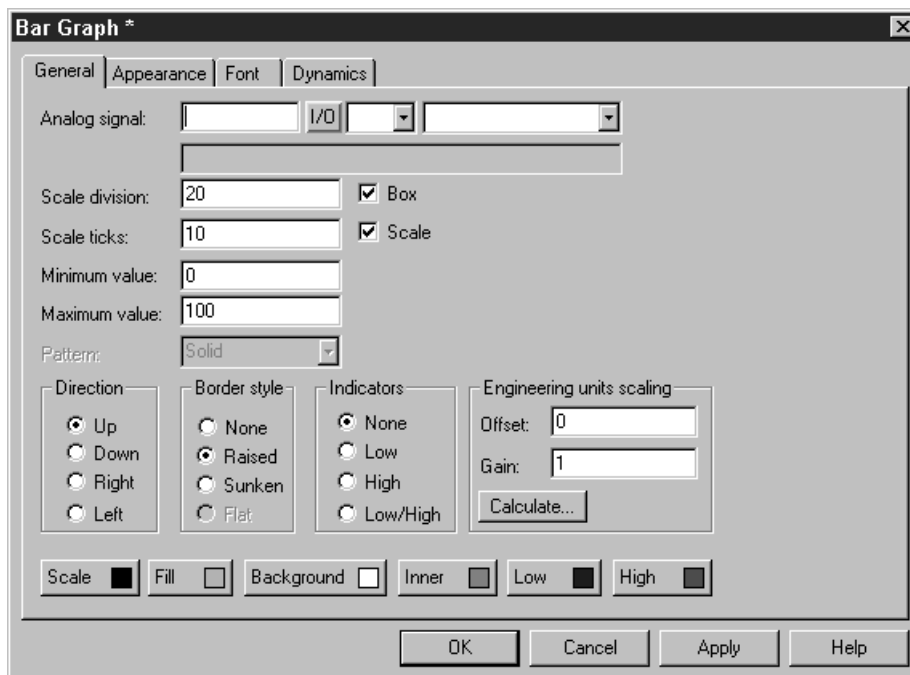
The functions on the [Appearance], [Font], [Access] and [Dynamics] tab pages are described in the section [General parameters] on page 154 .



Bar graph



Object that displays integers or floating point numbers in the form of bar graphs.



11536AEN

[General] tab

Parameters	Description
Analog signal	Signal address
Scale division	Specify the scale division that should be used.
Field	Specify whether a box should be drawn around the bar.
Scale ticks	Specify the interval between the displayed scale ticks.
Scale	Select whether a scale should be displayed on the chart.
Minimum value	Specify the permitted minimum value for the signal.
Maximum value	Specify the permitted maximum value for the signal.
Direction	Specify whether you want the border to appear on the top, bottom, right, or left.
Pattern	Specify whether you want the graph to be filled completely or dot-wise.
Border style	Specify whether you want the object to be displayed with a border.
Display	Specify whether the highest and/ or lowest signal value should be entered on the axis. The indicators are reset when the operator terminal is started. This reset can also be performed on the operator terminal by selecting the bar chart and pressing the key. (Point to the chart if your terminal has a touchscreen.) The indicators support 16-bit characters only (signed).
Engineering units scaling	Used for scaling the register value. See the section "General parameters" on page 154.
Scale	Choose a color for the scale in the object.
Fill	Choose a fill color.
Background	Choose a background color for the object.
Inner	Specify the color of the bar that is not filled in.
Low	Select a color for low.
High	Select a color for high.



Other tabs

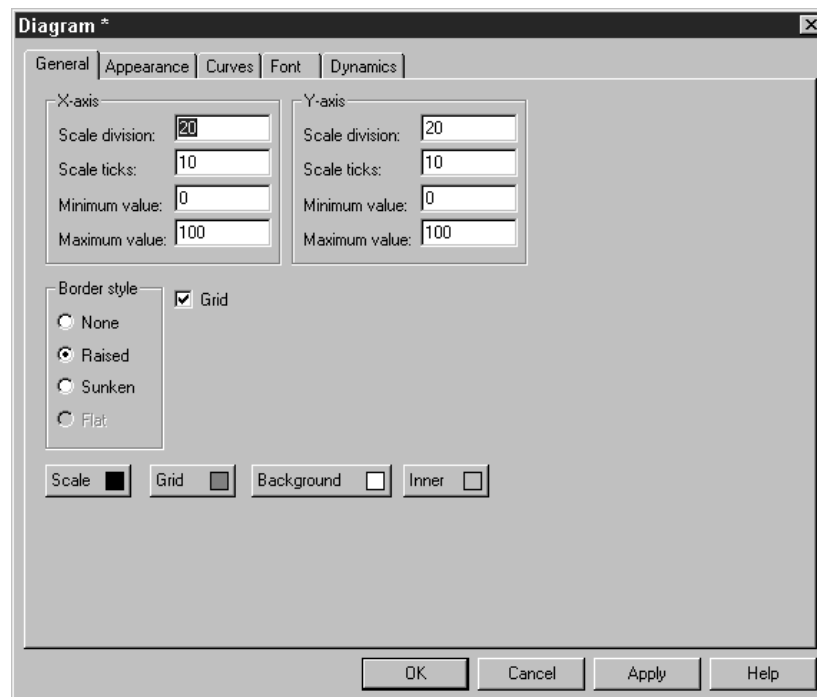
The functions on the [Appearance], [Font], [Access] and [Dynamics] tab pages are described in the section [General parameters] on page 154 .

Diagram



Object used for creating an x/y diagram that corresponds to the register content in the controller. This function is a realtime function. The object is usually used for time-independent displays. A time-dependent display with an update cycle of < 1 s is possible if the controller records the data. In the following example, the value in register 0 serves as the first x-coordinate and the value in register 10 as the first y-coordinate. There are 4 register pairs. The table and figure are provided to illustrate the example.

X-coordinate	Tab	Value	Y-coordinate	Tab	Value
X0	0	0	Y0	10	11
X1	1	41	Y1	11	40
X2	2	51	Y2	12	85
X3	3	92	Y3	13	62



11537AEN



[General] tab page

Parameters	Description
Scale division	Interval between the numerical scale marks on the x and y axes.
Scale ticks	Interval between the scale ticks displayed on the x and y axes.
Minimum value	Minimum value for the x and y coordinates.
Maximum value	Maximum value for the x and y coordinates.
Border style	Specify whether you want the object to be displayed with a border.
Grid (checkbox)	Select this checkbox to display a grid in the diagram.
Scale	Choose a color for the scale in the diagram.
Grid	Choose a color for the grid in the diagram.
Background	Choose a background color for the object.
Inner	Choose a color for the inside of the object.

[Curves] tab page

11538AEN

Parameters	Description
Graph name	Enter a name for the respective curve in this field.
X analog signal	Data register that contains the first x coordinate for the corresponding curve.
Y analog signal	Data register that contains the first y coordinate for the corresponding curve.
Register pair count	Number of register pairs to be drawn (as points or bar). A total of 49 register pairs can be used.
Value form	Specify whether you want the diagram to appear as a bar chart or line diagram. In a bar chart, a bar is drawn for each register pair. In a line diagram, the x/y coordinates are displayed as points connected with a line.
Curve	Choose a color for the corresponding curve.
Thickness	Specify the line thickness for the curve.



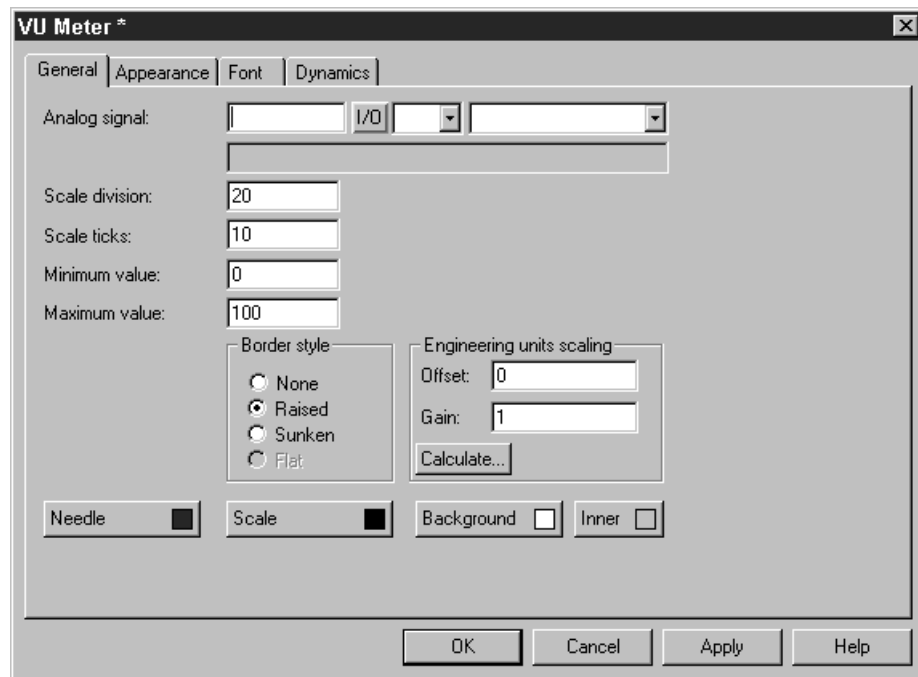
Other tabs

The functions on the [Appearance], [Font], [Access] and [Dynamics] tab pages are described in the section [General parameters] on page 154 .

VU meter



Object used for creating a graphic VU meter on the screen.



11539AEN

[General] tab page

Parameters	Description
Analog signal	Signal address
Scale division	Specify the scale division that should be used.
Scale ticks	Specify the interval between the displayed scale ticks.
Minimum value	Specify the permitted minimum value for the signal.
Maximum value	Specify the permitted maximum value for the signal.
Border style	Specify whether you want the object to be displayed with a border.
Engineering units scaling	Used for scaling the register value. See the section "General parameters" on page 154.
Needle	Choose a color for the pointer needle in the object.
Scale	Choose a color for the scale in the object.
Background	Choose a background color for the object.
Inner	Choose a color for the inside of the object.

Other tabs

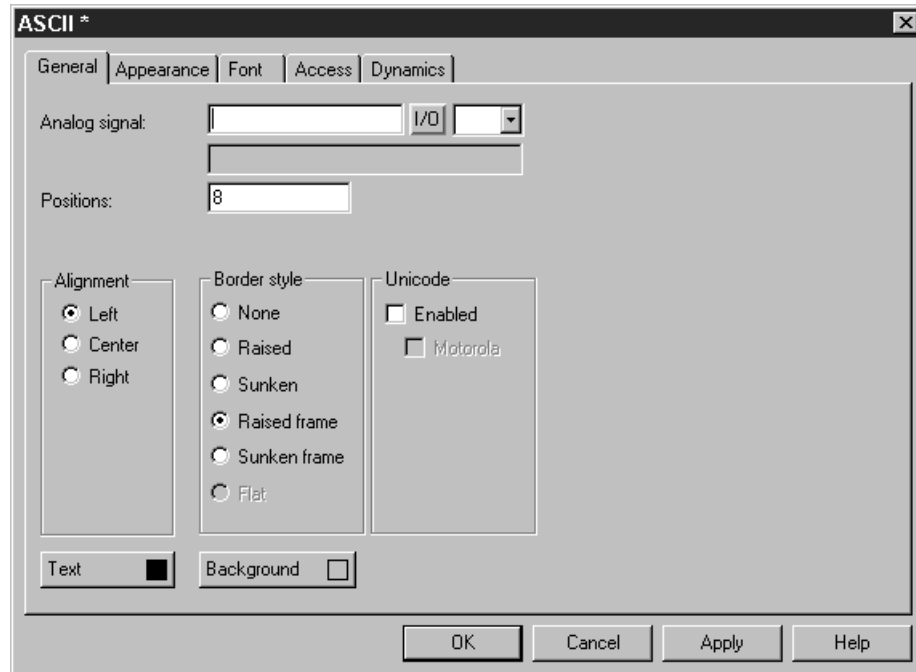
The functions on the [Appearance], [Font], [Access] and [Dynamics] tab pages are described in the section [General parameters] on page 154 .



ASCII



The ASCII object processes ASCII character strings. Text stored in the controller's data register can be displayed. The texts must be available in expanded IBM ASCII format. The texts can be changed in run mode from the operator terminal. To do so, open and close the input field by pressing the Enter key.



11540AEN

[General] tab page

Parameters	Description
Analog signal	Specify the data register where you want to store the text for the first position.
Positions	Specify the number of positions for the text on the screen.
Alignment	Specify whether you want the text left-justified, centered or right-justified.
Border style	Specify whether you want the object to be displayed with a border.
Text	Choose a color for the text in the object.
Background	Choose a background color for the object.

Other tabs

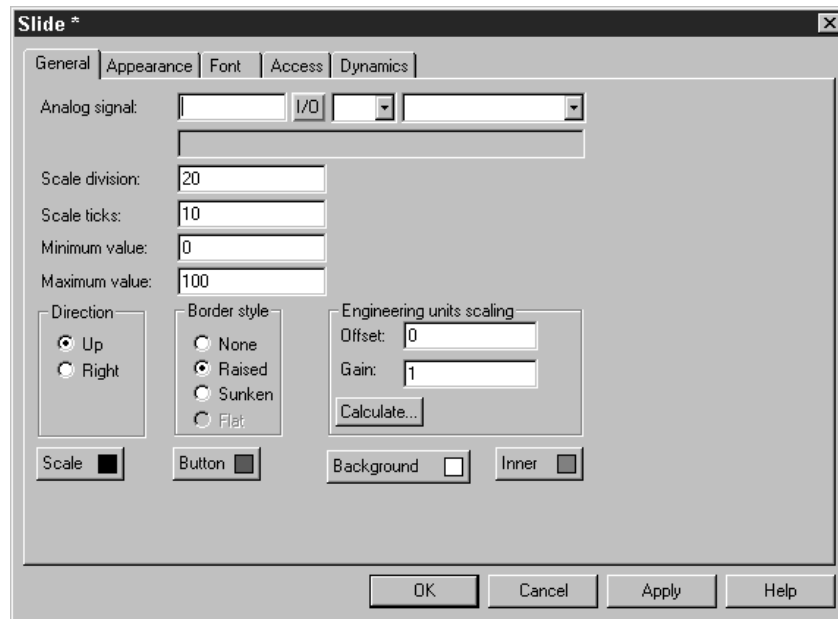
The functions on the [Appearance], [Font], [Access] and [Dynamics] tab pages are described in the section [General parameters] on page 154 .



Slider



Object that displays the value for an analog signal in a slider and enables the value for the analog signal to be increased and decreased.



11541AEN

[General] tab page

Parameters	Description
Analog signal	Signal address
Scale division	Specify the scale division that should be used.
Scale ticks	Specify the interval between the displayed scale ticks.
Minimum value	Specify the permitted minimum value for the object.
Maximum value	Specify the permitted maximum value for the object.
Direction	Specify whether you want the object to be displayed vertically or horizontally.
Border style	Specify whether you want the object to be displayed with a border.
Engineering units scaling	These fields are used for scaling the register value. See the section "General parameters" on page 154.
Scale	Choose a color for the scale in the object.
Button	Choose a color for the display button in the object.
Background	Choose a background color for the slider.
Inner	Choose a color for the inside of the slider.

INFORMATION



The file format BCD floating point number without exponent cannot be used for SEW communication drivers.

Other tabs

The functions on the [Appearance], [Font], [Access] and [Dynamics] tab pages are described in the section [General parameters] on page 154 .



Trend



Object that displays values recorded by analog signals.

You can define the following parameters for the trend object. Under [Setup] / [Terminal options], you can define whether you want to save only changed trends or all of them.

11542AEN

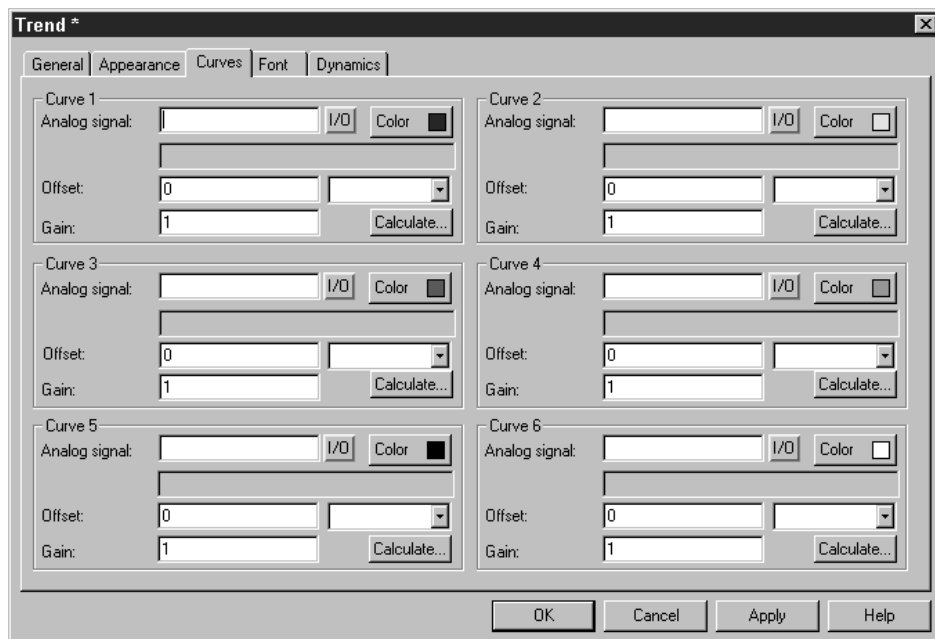
[General] tab page

Parameters	Description
Name	Enter a name for the trend object. Each object must be assigned an unambiguous name. The object name must not exceed eight characters. The characters A ... Z, 0 ... 9 and _ are permitted. The parameter is mandatory.
Sample interval	Enter a time interval for recording data. The minimum value is 1 s.
Sample count	Enter the number of values to be stored. The maximum number of values is 65534.
Sample full limit	Enter the number of samples at which the "Sample full limit" should be activated.
Sample full signal	Specify a digital signal that should be activated when the number of samples under "Sample full limit" has been reached.
Enable sample signal	Enter the digital signal that, if enabled, should start the process of data acquisition. Acquisition stops when the signal is reset. You do not have to enter any parameters.
Erase sample signal	Specify a digital signal that, if enabled, deletes all trend data in the history.



Parameters	Description
y scale	Specify whether you want the y scale to be hidden, appear left, right, or on both sides.
Minimum value	Enter a minimum value for the y axis. This value is called up by the specified register.
Maximum value	Enter a maximum value for the y axis. This value is called up by the specified controller register.
Division	Specify which scale division should be used on the y axis.
Scale ticks	Specify the interval between the displayed scale ticks.
Time scale	
Time range	Enter the time range that should be displayed in the trend diagram.
Division	Specify which scale division should be used on the x axis.
Scale ticks	Specify the interval between the displayed scale ticks.
Border style	Specify whether you want the object to be displayed with a border.
Grid	Specify whether you want to display a grid in the object.
Scale	Choose a color for the scale in the object.
Grid	Choose an appropriate color for the grid.
Background	Choose a background color for the object.

[Curves] tab page



11543AEN

Parameters	Description
Analog signal	Analog signals that the object records and for which the values should be displayed. Only 16-bit numbers may be used.
Color	Choose the color for the corresponding curve. For DOP11B-20, you can also choose between <i>Dotted</i> or <i>Continuous</i> curves.
Offset and gain	Used for scaling the register value. See the section "General parameters" on page 154.



Other tabs

The functions on the [Appearance], [Font], [Access] and [Dynamics] tab pages are described in the section [General parameters] on page 154 .

INFORMATION

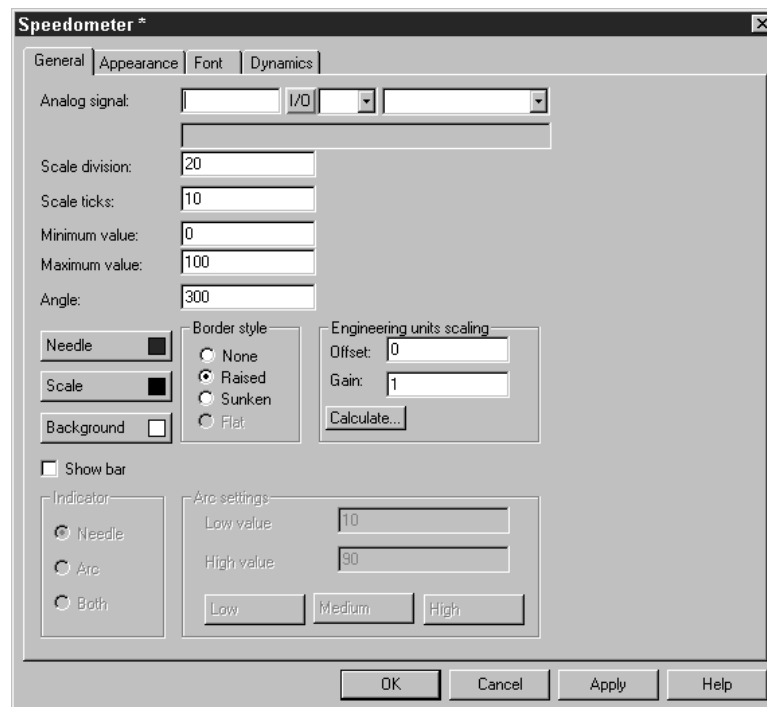


If you copy a block with trend data, you will have to rename the trend object. Do not use the same name for two trend objects.

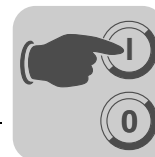
Speedometer



Object for creating a graphic speedometer on the screen.



11544AEN



[General] tab page

Parameters	Description
Analog signal	Signal address
Scale division	Specify the scale division that should be used.
Scale ticks	Specify the interval between the displayed scale ticks.
Minimum value	Specify the minimum value that the speedometer can display.
Maximum value	Specify the maximum value that the speedometer can display.
Angle	Specify an angle (work area for the object) between 10 and 360 degrees.
Engineering units scaling	These fields are used for scaling the register value. See the section "General parameters" on page 154.
Border style	Specify whether you want the speedometer to be displayed with a border.
Needle	Choose a color for the pointer needle in the speedometer.
Scale	Choose a color for the scale.
Background	Choose a background color for the speedometer.
Show bar	Select this checkbox to show a bar for the speedometer. Activating this option means the associated configuration options are available.
Pointer	Choose <i>Needle</i> , <i>Arc</i> or <i>Both</i> .
Arc settings	Define minimum and maximum values and the colors for the different ranges.

Other tabs

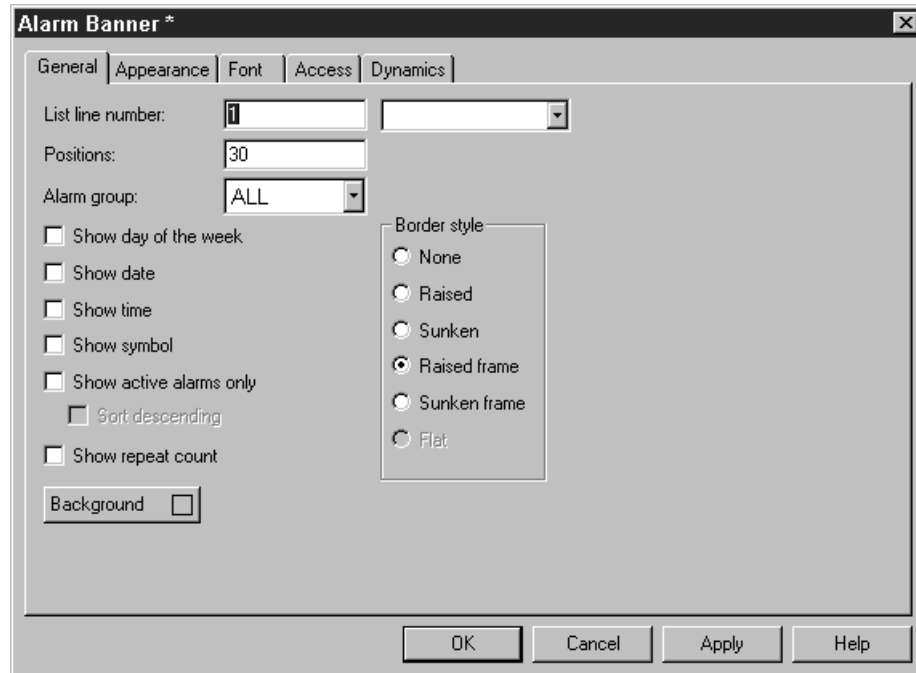
The functions on the [Appearance], [Font], [Access] and [Dynamics] tab pages are described in the section [General parameters] on page 154 .



Alarm banner



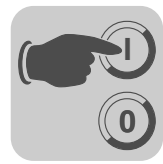
Object used for displaying a line in the alarm list.



11545AEN

[General] tab page

Parameters	Description
Line number	Enter the line number in the alarm list from which you want to retrieve information (1 = first line, 2 = second line, etc.) when the specified alarm group is shown in the alarm list.
Positions	Enter the number of positions to be displayed. The maximum length (date, time and alarm text) is 101 characters.
Alarm group	Specify the alarm group you want to display. The object is shown in the color defined for the alarm group.
Show day of the week	Select whether you want the week day to be displayed.
Show date	Select whether you want the date to be displayed.
Show time	Select whether you want the time to be displayed.
Show symbol	Select whether you want alarm symbols to be displayed. See the section "Alarm management " on page 220.
Show active alarms only	Choose whether only active alarms should be displayed in the alarm banner. If no active alarm has been triggered, the alarm banner remains empty. An alarm does not have to be acknowledged, just inactive, so that the next alarm can be displayed in the alarm banner.
Sort descending	Active alarms are displayed in decreasing order, which means the last active alarm is displayed. Only possible if you have selected <i>Show active alarms only</i> .
Show repeat count	Select whether you want the repeat counter to be displayed. The repeat counter indicates how often the alarm has been repeated. See the section "Alarm management " on page 220.
Border style	Specify whether you want the alarm banner to be displayed with a border.
Background	Choose a background color for the alarm banner.



INFORMATION



To acknowledge an alarm in the alarm banner, you must activate the [Enable acknowledge] checkbox on the [Access] tab.

The foreground color for the alarm text is specified by the color defined for the alarm group.

Other tabs

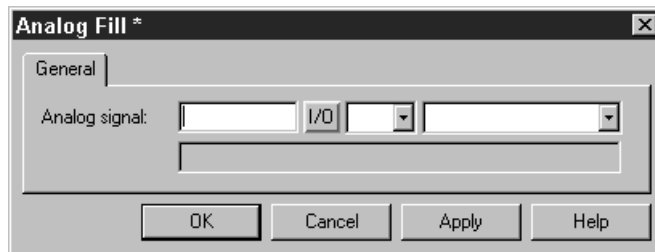
The functions on the [Appearance], [Font], [Access] and [Dynamics] tab pages are described in the section [General parameters] on page 154.

See also the section "Alarm management" on page 220.

Analog fill



The analog fill object fills a box with color. The color depends on the register value (see table below).



11546AEN

Parameters	Description
Analog signal	Enter the data register whose content controls the object color. See the table below.

Register content	Color	Register content	Color
0	Black	8	Gray
1	Blue	9	Light blue
2	Green	10	Light green
3	Cyan	11	Light cyan
4	Red	12	Light red
5	Magenta	13	Light magenta
6	Yellow	14	Light yellow
7	Light gray	15	White

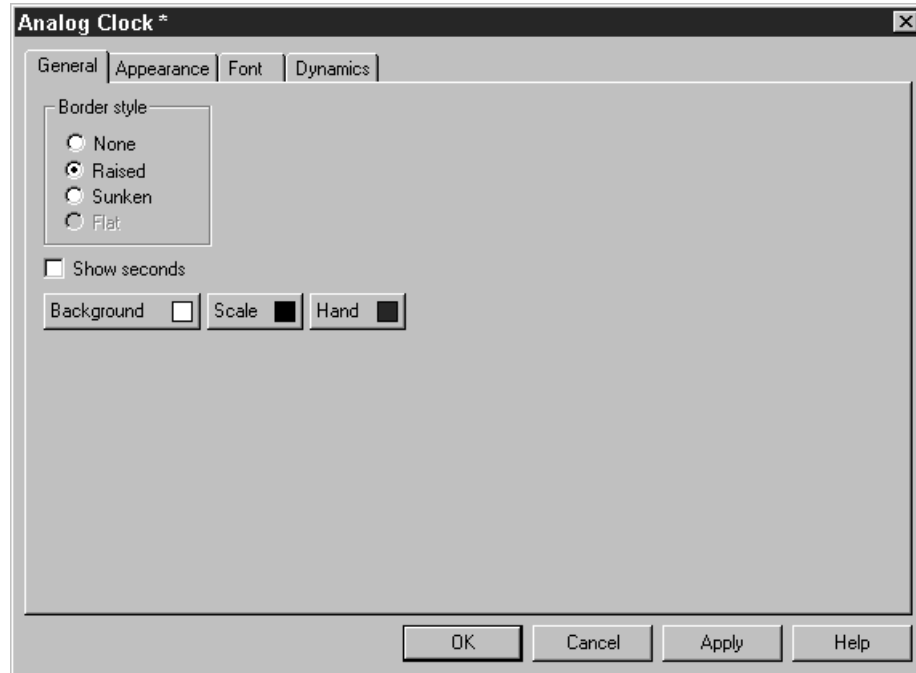
For limitations and information on object positioning, see the section "Digital fill" on page 168.



Analog clock



Time object for displaying an analog clock.



11547AEN

[General] tab page

Parameters	Description
Border style	Specify whether you want the clock to appear with a border.
Seconds	Select whether you want a second hand to be displayed.
Background	Choose a background color for the clock.
Scale	Choose a color for the scale in the object.
Hand	Choose a color for the hand in the object.

INFORMATION



You have to specify a maneuverable date / time object (digital clock) to set the clock in run mode.

Other tabs

The functions on the [Appearance], [Font] and [Dynamics] tab pages are explained in section "General parameters" on page 154 .

INFORMATION

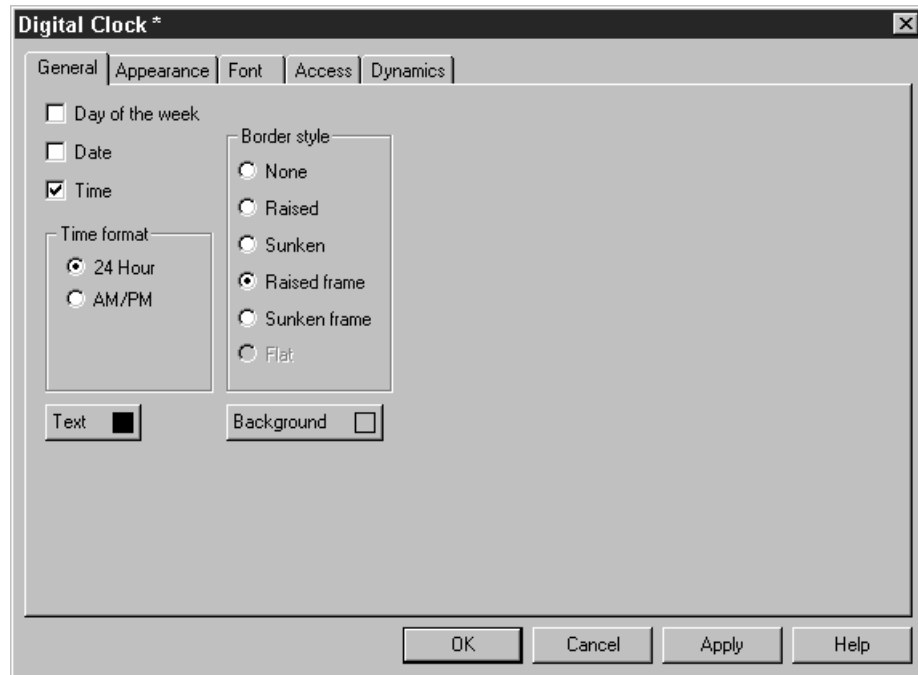


Further setting options are available under [Setup] / [Date/time format].



Digital clock

Time object for displaying the digital clock, week day and date.



11548AEN

[General] tab page

Parameters	Description
Week day	Select whether you want the week day to be displayed.
Date	Select whether you want the date to be displayed.
Time	Select whether you want the time to be displayed.
Time format	Choose whether the time should be displayed in 12 or 24 hour mode.
Border style	Specify whether you want the object to be displayed with a border.
Text	Choose a color for the text in the object.
Background	Choose a background color.

INFORMATION



You have to specify a maneuverable date / time object (digital clock) to set the clock in run mode.



Other tabs

The functions on the [Appearance], [Font], [Access] and [Dynamics] tab pages are described in the section [General parameters] on page 154 .

INFORMATION

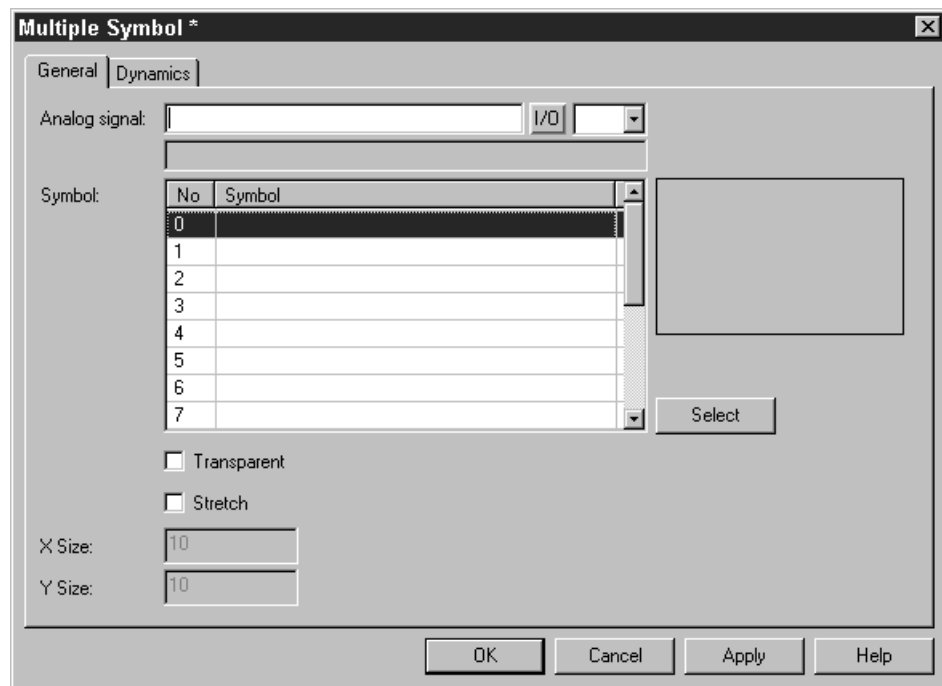
Further setting options are available under [Setup] / [Date/time format].



Multiple symbol



Object that can display one of up to 16 symbols. The symbol depends on the data register value.



11549AEN

[General] tab page

Parameters	Description
Analog signal	Data register that controls the symbol to be displayed. If the register value is 1, symbol 1 will be displayed, etc.
Symbol 0 ... 15	Select the symbol you want to display. If the register value is 0, symbol 0 will be displayed, etc.

[Dynamics] tab

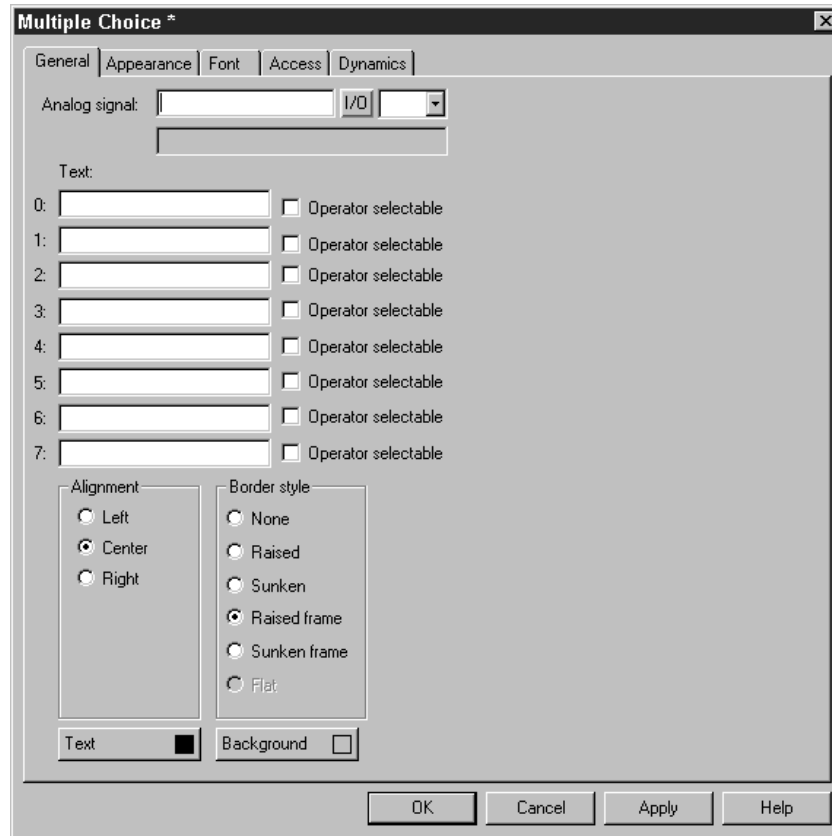
The functions on this tab page are explained in the section "General parameters" on page 154 .



Multiple selection



Object that can exist in several states. The object is linked to a data register that can have up to eight different states. A text with up to 30 characters can be assigned to each state.



11550AEN

[General] tab page

Parameters	Description
Analog signal	Data register that controls the text to be displayed. If the register value is 1, text 1 will be displayed, etc.
Text 0 ... 7	Enter the texts that should be displayed for each object status.
User selectable 0 ... 7	Activate the corresponding checkbox to maneuver the object to this status from the terminal in run mode.
Alignment	Specify whether you want the text left-justified, centered or right-justified.
Border style	Specify whether you want the object to be displayed with a border.
Text	Choose a color for the text in the object.
Background	Choose a background color for the object.

Other tabs

The functions on the [Appearance], [Font], [Access] and [Dynamics] tab pages are described in the section [General parameters] on page 154 .

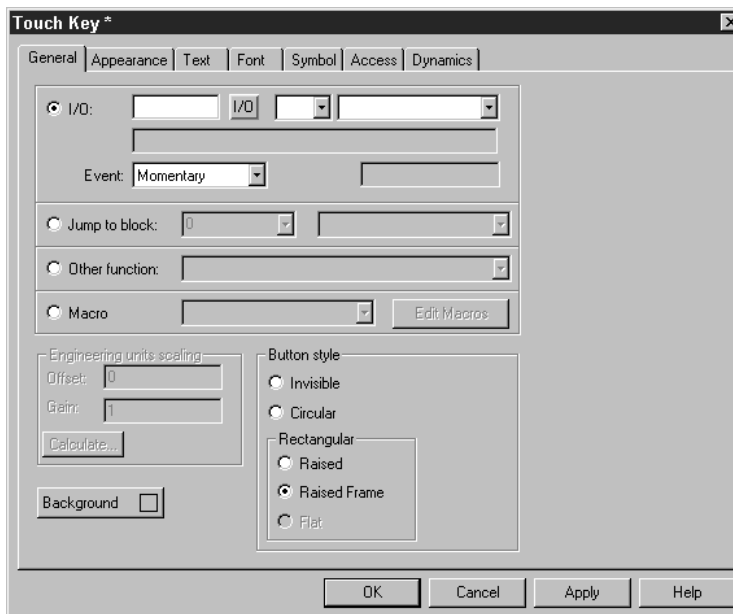


Touch key



Only applies to DOP11B-25, -30 and -50. See the sections "Using touchscreen" on page 196 and "Function keys" on page 257.

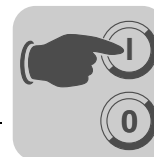
This object creates a touch-sensitive surface that corresponds to a function key. It can be used to change the display, control memory cells, etc.



11551AEN

[General] tab page

Parameters	Description
I/O	Signal type influenced by the object. For a description of the predefined functions, see the section "Function keys" on page 257.
Event	Choose how the object should affect the signal. Use the option <i>Set</i> to activate the signal when the object is triggered.
Set	Press the touch key to set the signal to high.
Grouped	All signals belonging to a touch key with current group number are reset. The group number is specified under <i>Group no.</i> A group comprises a maximum of eight touch keys.
Decrease analog	In this field, the analog signal linked to the function key is decreased by the value entered under <i>value</i> .
Temporary	The signal is activated as long as the object is pressed.
Reset	The signal is reset when the object is pressed.
Specify analog	In this field, the analog signal linked to the function key is assigned the value defined under <i>value</i> .
Toggle	The signal is activated and reset alternately when the object is pressed.
Increase analog	The analog signal linked to the function key is increased by the value defined under <i>value</i> .
Set analog	Can be used to influence an analog object. A screen keyboard appears that can be used to enter a value.



Parameters	Description
Jump to block	Jumps to a different block when the object is influenced. Enter the number or name of the block to which you want the program to jump.
Other functions	For a description of the functions, see the section "Function keys" on page 257.
Macro	For a description of the function, see the section "Macros" on page 265.
Button style	Choose the required button style: Round, rectangular or invisible.
Background	Choose a background color for the object.
Text	You can enter up to 5 lines of text. You can set the position of the text. The font size remains the same, even if the size of the touch key is changed.
Symbol	You can label the touch key with a symbol. You can set the position of the symbol. If you activate the option <i>Stretch</i> on the [Symbol] tab page, the symbol covers the entire touch key.

You can use an invisible touch-sensitive area to define areas that make it possible to jump between blocks in an overview (e. g. for a machine). The detailed views are linked to invisible touch-sensitive areas that are positioned at certain parts of the machine. Pressing one of these areas will display the corresponding detailed view.

Other tabs

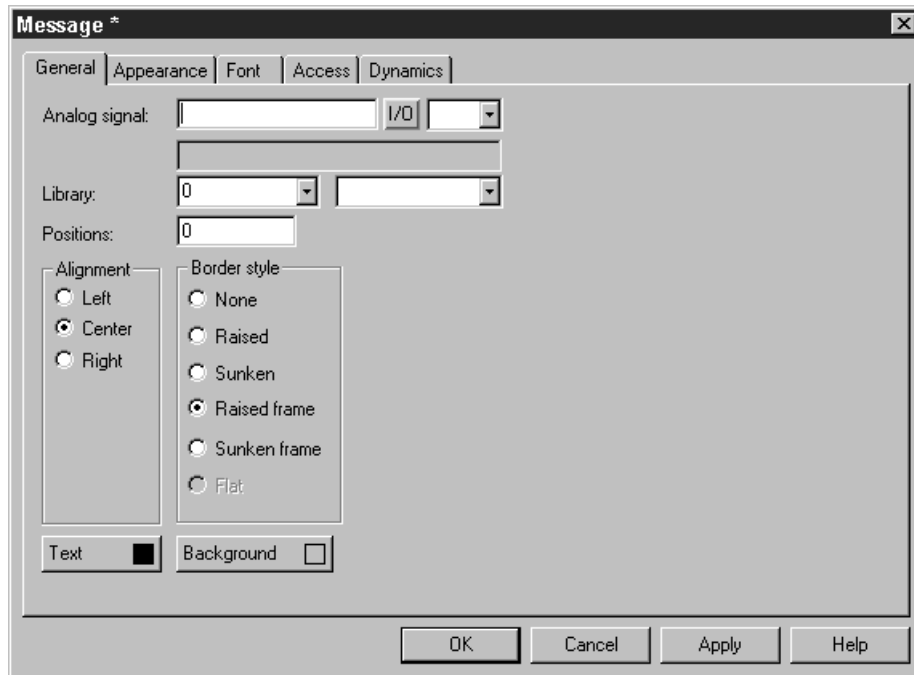
The functions on the [Appearance], [Font], [Access] and [Dynamics] tab pages are described in the section [General parameters] on page 154 .



Message



Object that displays texts from a message library.



11552AEN

[General] tab page

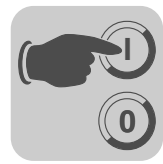
Parameters	Description
Analog signal	Analog signal that controls which text from the selected message library is displayed.
Library	Select the number of the required message library. It is defined under [Functions] / [Message library].
Positions	Specify the number of positions for displaying text; 0 = automatic length adjustment.
Alignment	Specify whether you want the text left-justified, centered or right-justified.
Border style	Specify whether you want the object to be displayed with a border.
Text	Choose a color for the text.
Background	Choose a background color for the object.

INFORMATION



When using the function for an indexed message library, the number of positions must not be 0, otherwise automatic length adjustment will not work.

For more information, see the section "Message library" on page 218.



[Access] tab page

The required maneuvering range is set on the [Access] tab page. An area with a maximum of 64 texts can be maneuvered in run mode. Enter the number of the first and last texts in the area.

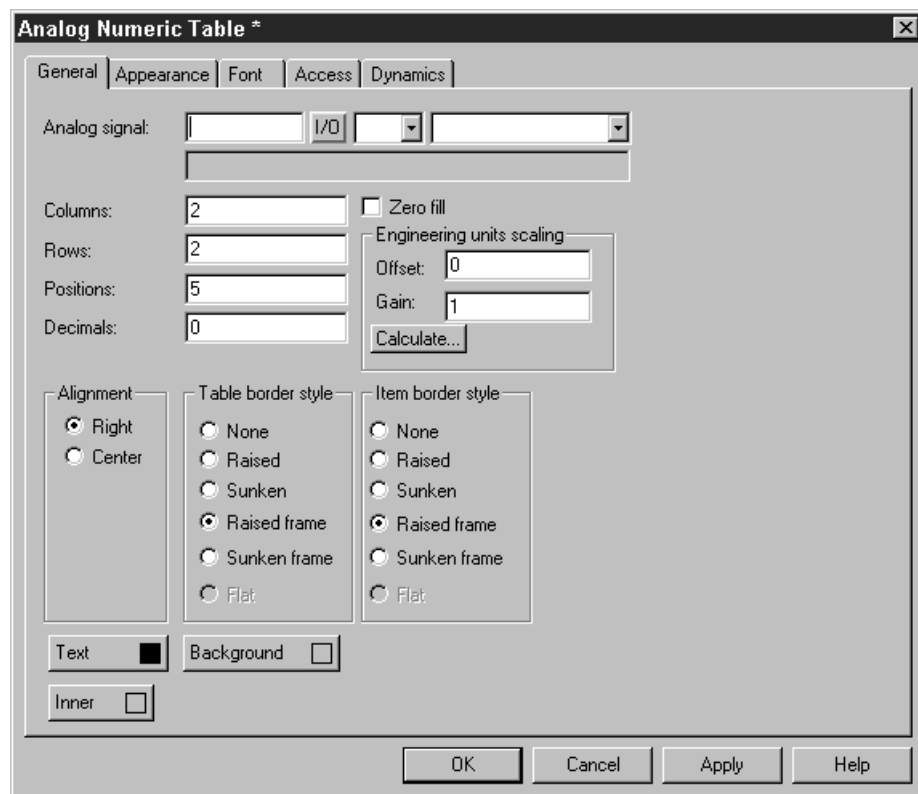
Other tabs

The functions on the [Appearance], [Font], [Access] and [Dynamics] tab pages are described in the section [General parameters] on page 154 .

Analog numeric table



Object used for creating a table with analog numeric objects.



11553AEN

[General] tab page

Parameters	Description
Analog signal	The first signal that appears in the table. Only 16-bit registers are supported.
X size	Specify the number of table columns.
Zero fill	Specify whether you want empty positions to be filled with zeros.
Y size	Specify the number of table rows.
Positions	Specify the number of positions that should be used to display the entered value.
Decimals	Specify the number of decimal points that should be used to display the entered value.



Parameters	Description
Alignment	Specify whether you want the input field to be formatted right-justified or centered.
Table border style	Specify whether you want the table to appear with a border.
Item border style	Specify whether you want each table cell to be displayed with a border.
Text	Choose a color for the text in the object.
Background	Choose a background color for the table.
Inner	Choose an inside color for the table.
Engineering units scaling	These fields are used for scaling the register value. See the section "General parameters" on page 154.

[Access] tab page

Enter the table orientation in the [Access] tab page. The table signals are calculated according to the chosen orientation.

Other tabs

The functions on the [Appearance], [Font] and [Dynamics] tab pages are explained in section "General parameters" on page 154 .

INFORMATION



Minimum and maximum values are only used when the object is a maneuverable object.



8.5.3 Operating graphic blocks

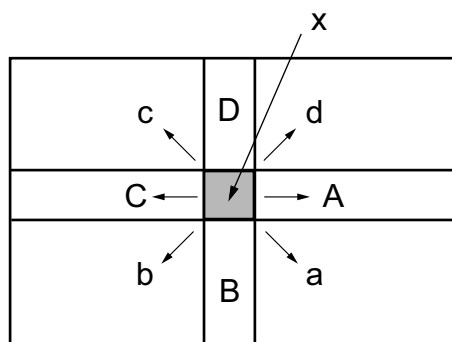
Not applicable to DOP11B-25, -30 and -50.

Press the arrow keys to switch between maneuverable objects. A selected object is identified by a flashing border.

Selecting maneuverable objects

Press the arrow keys to change between maneuverable objects. The objects are selected according to the following principle:

The cursor is positioned in the middle of a cross. Pressing the right arrow key selects the first object located in area "A" (see figure). If the system cannot find an object in the narrow strip on the right, it searches area "a". Press the down arrow key to search for objects in areas "B" and "b". Press the left arrow key to search in areas "C" and "c". Press the up arrow key to search objects in areas "D" and "d".



53964AXX

x = cursor position

Digital objects

Digital objects, text objects, symbol objects and filled objects change their state when the Enter key is pressed. If the functions for increasing and decreasing are linked to function keys, the signal linked to the object with these keys will be enabled or reset.

Analog objects

ASCII objects

Move the cursor over the object and press the Enter key. Enter the required text and confirm the entry by pressing the Enter key.

Message objects

Move the cursor over the object and press the Enter key. A selection list with all available states opens. Select the required state and press the Enter key. This way, you define the analog signal linked to the object.



Multiple selection objects

Move the cursor over the object and press the Enter key. A selection list with all available states opens. Select the required state and press the Enter key. This way, you define the analog signal linked to the object.

Numeric objects

To control a numeric object, enter a value and press the Enter key. If the value entered is too high or too low, the minimum or maximum value for the object will be displayed. This information will also be issued if you press the Enter key while the object is maneuverable.

Numeric table objects

If a table object is highlighted, press the Enter key to select the first table row. You can now move the cursor over the cells using the arrow keys. Change the value of a selected cell and press the Enter key.

Slider objects

You control the object using the arrow keys by moving the cursor over the object and pressing the Enter key. You can now increase or decrease the value using the arrow keys. Confirm your entry by pressing the Enter key. The value increases or decreases by the number that corresponds to the object setting under scale ticks. Complete the process by pressing the Enter key.

This object can also be increased and decreased using the functions. To do so, the object must be linked to function keys. See the section "Function keys" on page 257.

Bar objects

To change (reset) the minimum and maximum indicators for a specific value in bar objects, place the cursor on the object and press the Enter key.

In terminals with a touchscreen, you can reset the minimum and maximum indicators by touching the bar.



Trend objects

In run mode, trend curves can display ongoing values. Select the required trend object and press the Enter key. This opens a dialog box. Select a time interval and date for the data to be displayed. "History" is displayed at the bottom of the dialog box. To go back to real-time display, press the Enter key again. The trend data are stored in files. You specify the name when defining the trend object.



10657AXX

Other objects

Digital clock

The digital clock (real-time clock) is set by selecting the object and entering the required time. To complete the process, press the Enter key.

INFORMATION

If you use the controller clock, you have to set the time in run mode.



Jump objects

Select the required object and press the Enter key.



8.5.4 Using the touchscreen

This section refers only to DOP11B-25, -30 and -50.

Terminals with a touchscreen do not have a built-in keyboard. The system is controlled using the touchscreen functions only. You should always touch only one spot on the touch-sensitive screen. If you touch two spots at the same time, the spot between the two spots you have touched will be chosen.

INFORMATION



When using terminals with a touchscreen, objects CANNOT be controlled in the text block.

If you touch a non-maneuverable object, the message "Not maneuverable" will appear. If you touch a password protected object, the message "Access denied" will appear.

Digital objects

Digital objects, text objects, symbol objects and filled objects change their state when you touch them with your finger.

Analog objects

ASCII objects

Touch the object with your finger. This displays an alphanumeric keyboard on the screen. Enter the required text by touching the keyboard. Complete your entry by pressing the Enter key.

Multiple selection objects

Touch the object with your finger to open a selection list. To choose an object from the list, touch it with your finger.

Numeric objects

Touch the object with your finger. The numeric keyboard will be displayed. Enter the required value by touching the keyboard. Complete your entry by pressing the Enter key.

Numeric table objects

Touch a cell in the table object with your finger. The numeric keyboard will be displayed. Enter the required value by touching the keyboard. Complete your entry by pressing the Enter key.

Slider objects

Control the object by touching and dragging the buttons.



Bar chart objects

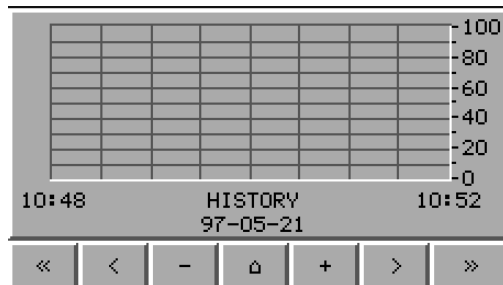
Press the bars to reset the minimum/maximum indicators.

Trend objects

In run mode, trend curves can display ongoing values. Touch the object with your finger. A button toolbar is shown below the trend.

Double arrow	Scrolls the trend horizontally by one screen
Single arrow	Scrolls the trend horizontally by half a screen
-	Maximizes the trend display
+	Minimizes the trend display
^	Returns to the basic setting

To go back to real-time display, click on the object again.



10658AXX

Other objects

Digital clock

Touch the object with your finger. The numeric keyboard will be displayed. Enter the required time by touching the keyboard. Complete your entry by pressing the Enter key.

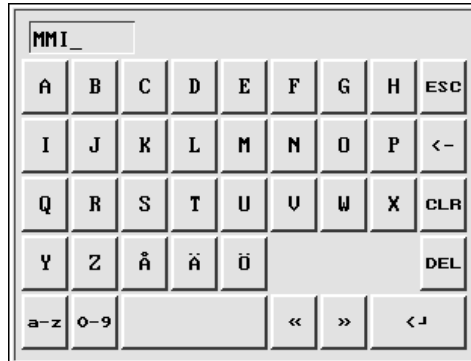
Jump objects

Touch the object with your finger to perform a jump.




Alphanumeric keypad

The alphanumeric keypad appears, for example, when controlling an ASCII object.



10659AXX

Key	Description
A-Z	These keys are used for entering the required text.
ESC	Hides the keyboard and returns to the previous menu.
<-	Deletes one character left of the current position.
CLR	Clears all characters you entered.
DEL	Deletes the character where the cursor is currently positioned.
	Confirms the setting made and hides the keyboard.
@	Used to type the "@" character.
>>	Moves the cursor to the right.
<<	Moves the cursor to the left.
a-z	Toggles between upper and lower case.
0-9	Toggles between letters, numbers, and special characters.
SPC	Opens a selection list with special characters.
MAIL	Opens a list with e-mail addresses.



Selection lists

Selection lists are displayed in addition to alphanumeric and numeric keyboards.

Use the arrows in the selection list to view the top or bottom entry. To close the list without selecting any entry, press [CANCEL].



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8.6 Text-based display and control

Text blocks are only used for printouts and reports. With the exception of DOP11B-20 (which can display text blocks), they cannot be displayed by operator terminals in the DOP11B series.

The text display is used to create different types of report printouts and e-mails e.g. daily reports, status reports, etc.

Reports consist of text blocks, which can include both static and dynamic text. The structure of a report is described in the section "Printing reports" (page 244).

This section describes the text objects.

INFORMATION



Text-based printouts are not supported when using Unicode.



8.6.1 General parameters

Engineering units scaling

The *offset* and *gain* parameters are used to scale the register value to a display value according to the following formula.

Display value = *offset* + *gain* × register value

If you alter the value for an object via the terminal in run mode, the display value will be scaled according to the following formula.

Register value = (display value – *offset*) / *gain*

The scaling affects neither the defined maximum/minimum values nor the number of decimal places.

INFORMATION



The functions for increasing/decreasing values affect the register value for the maneuverable object but not the display value.

Calculating technical units

The [offset/gain calculation] function serves as a tool for calculating the parameters *offset* and *gain*. Enter the value for the *offset* and *gain* of the object on the [General] tab page and click on [Calculate]. The following dialog box opens.

Input		Lower	Upper
Controller value range:		-32768	32767
Panel value range:		-32768	32767

Output	
Calculated offset:	0
Calculated gain:	1

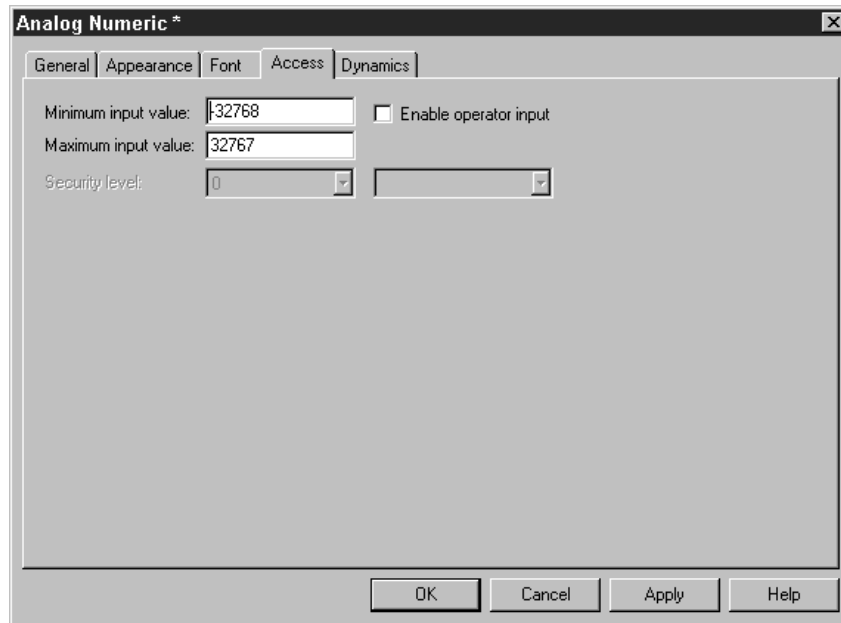
OK Cancel

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Enter the range for the controller and terminal values. The function determines the correct values for the *offset* and *gain* parameters.



Access

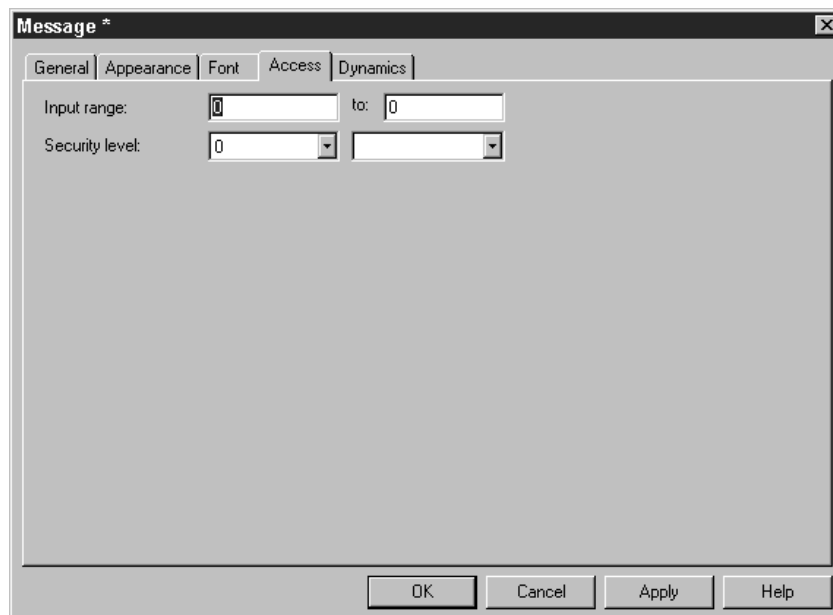


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Under [Access], define whether the object should be maneuverable. Enter the minimum and maximum values. You can also specify the security level for the object. Security levels are defined under [Functions] / [Passwords]. See the section "Passwords" (page 241).

Message

The [Message] dialog box looks as follows:



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Enter the [Input range] for the first and last text in the area. An area with a maximum of 64 texts can be maneuvered in run mode.



8.6.2 Text objects

Dynamic text objects

Symbol	Object	Description
	Analog numeric	Displays the value in numerical form.
	Digital clock	Set date and time.
	Digital text	Toggles between two texts depending on the state of a digital signal.
	Multiple selection	Linked to a data register that can have up to eight different states. A text with up to 30 characters can be assigned to each state.
	Jump	Jump to another block.
	Bar chart	Displays values in the form of a bar chart.
	ASCII	Controls ASCII character strings.
	Message	Object that displays text from a message library.



8.6.3 Operating text blocks

A text block consists of rows of text with static and dynamic objects. The dynamic objects indicate the current state of signals to which the objects are linked. Certain dynamic objects can be maneuvered. Their status can be changed in run mode.

To change a maneuverable object, use the arrow keys and move the cursor over the object you want to change. Text blocks can be scrolled vertically but not horizontally.

INFORMATION



Objects in text blocks cannot be controlled when using terminals with a touchscreen.

Digital objects

Digital objects are operated by selecting the required object. Press the Enter key to change the object status.

Analog objects

Analog objects and date / time objects

To operate these objects, move the cursor over the required object. Enter the new value. Complete your entry by pressing the Enter key. You can reject any changes you make before you press the Enter key. To do so, exit the field using the [↑] or [↓] key. The original value will be retained.

Text objects

To operate a text object, select it and press the Enter key. This opens an input field. The input field will appear in the first or last line depending on the position of the object on the screen. If the text is longer than the width of your screen, the input field will be scrolled. Press the Enter key to confirm your entry.

Message objects

To operate a message object, use the arrow keys to move the cursor to the required object and press the Enter key. A selection list with all available states is displayed on the screen. Select the required state and press the Enter key. The analog signal linked to the object will be changed.



Multiple selection objects

To operate a multiple selection object, use the arrow keys to move the cursor to the required object and press the Enter key. A selection list with all available states is displayed on the screen. Select the required state and press the Enter key. The analog signal linked to the object will be changed.

Jump objects

Select the required object and press the Enter key.

Bar objects

You can set the indicators for the minimum and maximum values to the current value for the bar object. To do so, select the object and press the Enter key.

8.7 Transferring projects

Before a project can be used on the operator terminal, it must be transferred from the PC to the terminal.

Connect the PC with the configuration software to the operator terminal via the PCS11B cable (see page 42) or Ethernet (see page 47).

8.7.1 Setting up your terminal

You do not usually have to make any settings in the terminal. The project transfer process is controlled by the HMI Builder. If required, you can set the transfer parameters in the terminal in configuration mode under [Setup] / [Port parameters] / [HMI Builder].

INFORMATION

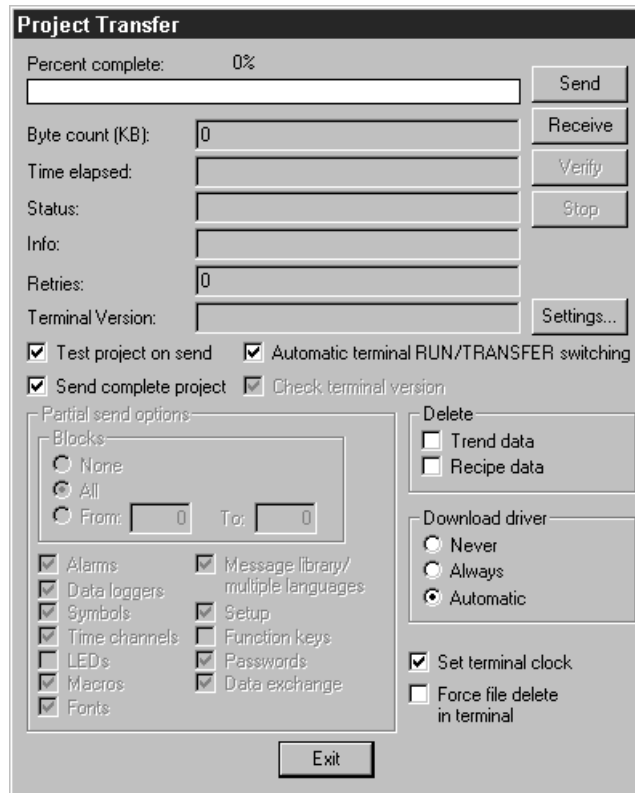


The communication settings for the HMI Builder and terminal must match.



8.7.2 Transfer properties

The transfer is controlled using the HMI Builder. In the HMI Builder, you can set transfer properties under [Transfer] / [Project].



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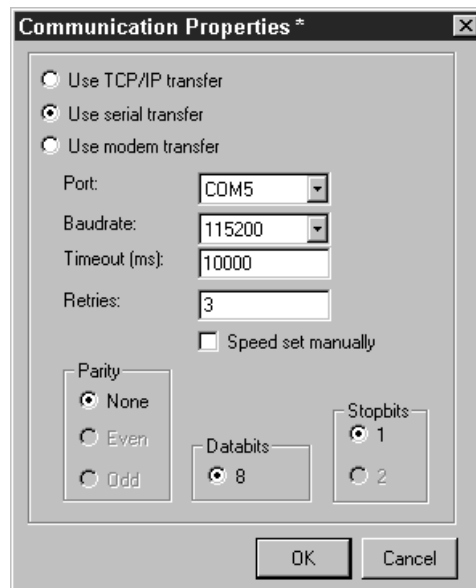
Parameters	Description
Percent complete	Progress indicator that displays the upload status in percentage completed.
Byte counter (kB)	Indicates how many kB have already been uploaded.
Time elapsed	Indicates how much time has elapsed since the send, receive, or verify functions were performed.
Status	Indicates the transfer status and the project section that is currently being transferred, such as properties, individual blocks, alarm groups, individual symbols and function keys.
Info	Displays the driver that is to be loaded to the terminal.
Retries	If problems occur during the upload, the HMI Builder will retry the upload several times before aborting the process.
Terminal version	Displays the current terminal type and version number of the system program after the connection with the terminal is established.
Test project on send	Using this option automatically verifies the project before transfer.
Automatic terminal RUN / TRANSFER switching	If this checkbox is enabled, the terminal will automatically switch to transfer mode. The terminal will return to the previous state once the transfer is complete.
Check terminal version	If this option is enabled, the system program version of the terminal will be compared with the project version set in the HMI Builder.
Send complete project	Specify whether you want to send the complete project.



Parameters	Description	
Partial send options	Block	
	None	No blocks are transferred to the terminal.
	All	All blocks are transferred to the terminal.
	From To	Specify the block sequence to be transferred to the terminal.
	Alarms	Specify whether you want to transfer alarms to the terminal.
	Data logger	Specify whether you want to transfer data protocols to the terminal.
	Symbols	Specify whether you want to transfer symbols to the terminal.
	Time channels	Specify whether you want to transfer time channels to the terminal.
	LEDs	Specify whether you want to transfer LEDs to the terminal.
	Macros	Specify whether you want to transfer macros to the terminal.
	Fonts	Specify whether you want to transfer fonts to the terminal.
	Message library	Specify whether you want to transfer the message library to the terminal.
	Setup	Specify whether you want to transfer the configuration (under <i>Properties</i>) to the terminal.
	Function keys	Specify whether you want to transfer the function keys to the terminal.
Passwords	Specify whether you want to transfer passwords to the terminal.	
Data exchange	Specify whether you want to transfer data exchange to the terminal.	
Delete	Trend data	Choose this option if all the trend data saved on the terminal should be deleted.
	Recipe data	Choose this option if all the recipe data saved on the terminal should be deleted.
Download driver	No	Choose this option when drivers should never be downloaded.
	Always	Choose this option when drivers should always be downloaded.
	Automatic	Choose this option when the driver should be transferred automatically to the terminal, when the drivers in the terminal and in the current project do not match or are the same version.
Set terminal clock	Choose this option when the PC time setting should be transferred to the terminal.	
Enforce file deletion in the terminal	Choose this option when all files on the operator terminal should be deleted and overwritten by new files (e.g. a complete new file structure).	
Send	Click on this button to send the project to the terminal with the specified settings.	
Receive	Click this button to load the project present in the terminal. This means the active project in the HMI Builder will be overwritten. There must be an active project in the HMI Builder to be able to load a project from the terminal.	
Stop	Click this button to cancel the transfer.	
Settings	Configure the transfer parameters here. The transfer values must match the values in the terminal.	



You can call up the communication parameters under [Transfer] / [Communication properties] or by clicking the [Settings] button in the [Project Transfer] dialog box.



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Settings in the communication parameters dialog box.

Parameters	Description
TCP/IP transfer	Specify whether you want to transfer the project using TCP/IP. See chapter "TCP/IP transfer" on page 208.
Use serial transfer	Specify whether you want to transfer the project using serial transfer. See the chapter "Serial transfer" on page 209.
Use modem transfer	Specify whether you want to transfer the project using the modem. See the section "Modem transfer" on page 211.
Port	Select a communication port for the PC.
Baud rate	Specify the transfer speed (bps).
Timeout (ms)	Specify the number of milliseconds between two transfer attempts.
Quantity	Enter the number of transfer attempts before transfer interrupted.
Speed set manually	Only required for older terminal versions with modem communication. The transfer speed must be set manually to the same value in the terminal and the HMI Builder. The terminal must be switched to transfer mode manually.
Parity	Select the type of parity check.
Data bits	Number of data bits for the transfer. The value must be 8.
Stop bits	Select the number of stop bits used for transfer.



INFORMATION



Communication errors may occur if other Windows applications are running while the project is being transferred. Close all other programs to exclude this error source.

Existing links to symbols are taken into account when blocks are transferred.

8.7.3 TCP/IP transfer

To transfer a project via TCP/IP, select the [Use TCP/IP transfer] option from the [Transfer] / [Communication properties] menu. Clicking the [Send] button in the [Project transfer] dialog box opens the following window:

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Parameters	Description
Host address	Enter the IP address for the target terminal.
Terminal control port	Specifies the TCP/IP port number for the changeover from RUN to transfer mode. This value usually need not be changed. The default setting is 6001.
Transfer port	Specifies the TCP/IP port number for the transfer (project transfer server). This value usually need not be changed. The default setting is 6000.
User ID	Enter the user name that is used to check the changeover from RUN to transfer mode. It is not used when the terminal is already in transfer mode.
Password	Enter the password that is used for checking the changeover from RUN to transfer mode. It is not used when the terminal is already in transfer mode. You only have to make this setting when the authorization check under [Setup] / [Network] / [Services] / [Terminal controller] is activated and the users are defined under [Setup] / [Network] / [Accounts].
Save password in project	Select this checkbox if you want to save your password and user ID. You will then not be prompted for them anymore.



8.7.4 Serial transfer

For serial transfer, select the [Use serial transfer] option under [Transfer] / [Communication properties]. To transfer the project to the terminal, click the [Send] button in the [Project Transfer] dialog box.

8.7.5 Update projects with an external memory card

To copy a project to a compact Flash memory card or a USB drive, choose [Transfer] / [Export project transfer file] in the HMI Builder.

INFORMATION



- The USB drive must support the standard **USB Storage Class driver**. DOP11B does not support manufacturer-specific USB drivers.
- The USB storage medium must be formatted in FAT or FAT 32.
- Compact Flash memory cards are only supported by DOP11B-50.

Recommended USB storage medium for DOP11B

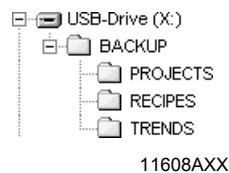
Our engineers have tested a range of USB storage media. The storage media listed below are recommended for use with the DOP11B operator terminals:

Brand and type of USB storage medium	Size
Scandisk Cruzer Micro USB 2.0	1 GB Flash memory
Corsair Flash Readout USB 2.0	1 GB
Kingston Datatraveler II, Pocket Memory, USB 2.0	1 GB
Pendrive, USB 2.0	256 MB
Verbatim Store-N-Go, Hi-speed, USB	1 GB
Scandisk Cruzer Mini, USB 2.0	1 GB Flash memory
Beijer Electronics, USB	256 MB

Our recommendations refer only to the types and sizes listed here.

Load project from memory card

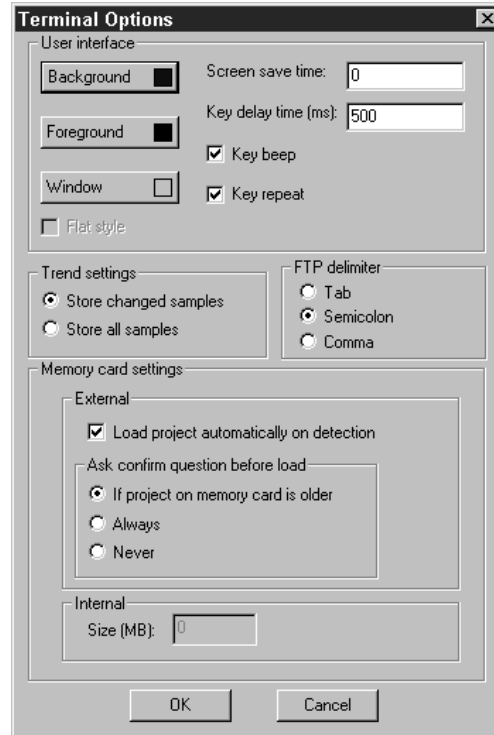
Save the project in the "BACKUP/PROJECTS" library on the external memory card. The file structure is created automatically when the card is formatted in the operator terminal. If there is no operator terminal available, the library structure must be created manually.





Load project automatically on recognition

Save the project file in the master directory of the external memory card. There must only be one project in the master directory at a time, otherwise automatic project recognition and automatic loading of the project does not work. Settings for transferring the project to the operator terminal are made under [Setup] / [Terminal options]



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Memory card settings

Setting	Description
Confirmation prompt before loading	Specify whether, and if so, when a confirmation prompt should appear when loading a project to the operator terminal.
If project on memory card is older	The confirmation prompt is issued when the project is older than the project already available on the operator terminal.
Always	The confirmation prompt is always issued as soon as a project is found in the external memory card.
Never	The project on the external memory card is transferred automatically to the operator terminal without a confirmation prompt.



8.7.6 Modem transfer

For transfer via modem, select the [Use modem transfer] option under [Transfer] / [Communication properties]. To transfer the project to the terminal, click the [Send] button in the [Project transfer] dialog box.

Modem settings

Make the following settings for a modem connected to the operator terminal:

```
AT &F &D0 &K0 &C1 E0 Q0 V1 S0=1 &W
```

Use the following settings for a modem connected to the PC:

```
AT &F &D0 &K0 &C1 E0 Q0 V1 S0=1 &W
```

The modem commands are described in the following table.

Command	Description
AT	Informs the modem about signal input. AT precedes all commands.
&F	Resets the modem to factory defaults.
&E0	Deactivates echo.
Q1	Result codes are not returned.
&D0	Modem ignores DTR.
&K0	No flow control.
&W	Saves the settings.

INFORMATION

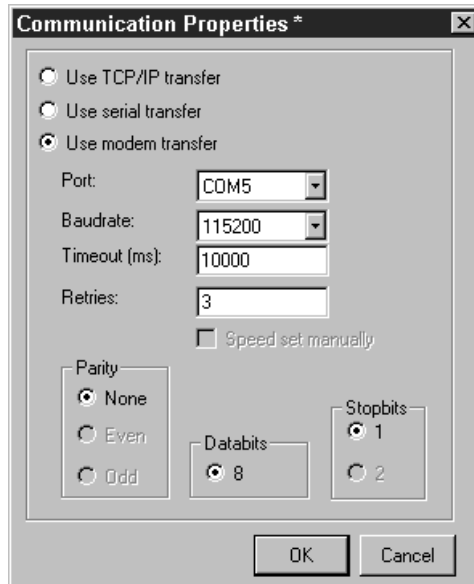


The modem must be set to "auto answer" to enable transfer.



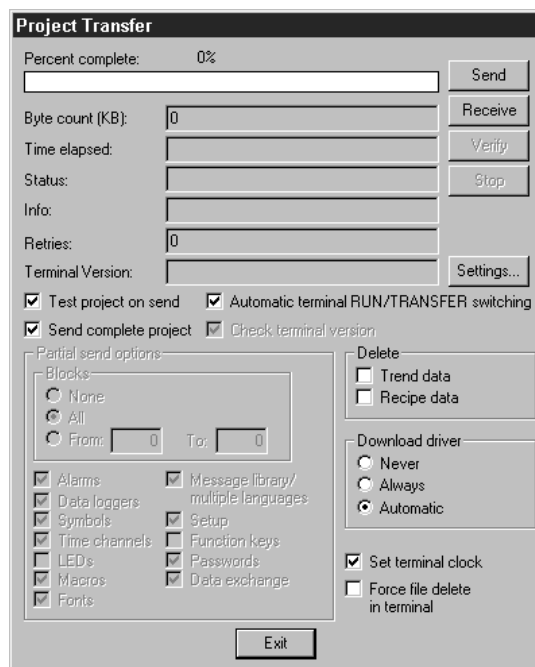
Communication settings

1. Configure the modem.
2. Make the communication settings in the HMI Builder under [Transfer] / [Communication properties]. Select [Use modem transfer].



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3. Specify a port and set the [Baud rate], [Parity] and [Stop bits].
4. Use the program [DOP Tools] / [DOP Modem Connect] to establish the connection.
5. Next, select "Transfer" from the HMI Builder menu.



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6. Select [Automatic RUN/TRANSFER switching] and press [Send].



8.7.7 Transfer via GSM modem

A special procedure is required for transfer via GSM modem. The operator terminal must be switched to transfer and run mode manually.

Select the communication properties for the modem transfer in the Information Designer (see the description in the previous chapter).

In the operator terminal, call up the service menu by setting the operating mode switch on the back of the operator terminal to 1000. For information on the operating mode switches, refer to the hardware and installation manual for the operator terminal.

INFORMATION



The service menu is also displayed (without changing the operating mode switch) when an empty operator terminal is switched on.

Choose "Enter Transfer Mode" from the service menu. Switch off the operator terminal, set the mode switch to 0000 and switch the operator terminal back on again. The operator terminal is now started in transfer mode.

Transfer the project to the operator terminal by clicking on [Send] in the Project transfer dialog box in the Information Designer

Call up the service menu again by setting the mode switch to "1000".

Choose "Enter Run Mode" from the service menu.

Switch off the operator terminal, set the mode switch to "0000" and switch the operator terminal back on again. The operator terminal is now started in run mode.

The downloaded project is now executed on the operator terminal.



8.8 Index addressing

Without index addressing, an object is always linked to the same register (IPOS variable or parameter number). Consequently, only the value of this register can be displayed in the object.

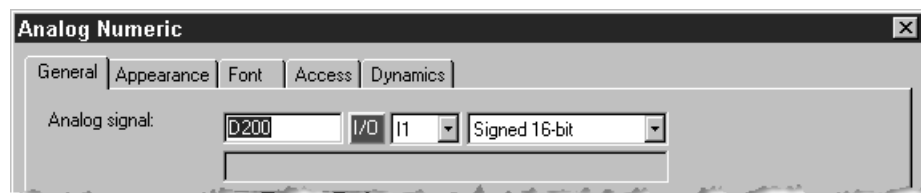
Index addressing enables you to choose in run mode from which register you want an object to import the display value. For this purpose, the value in the index register can be added to the address for the register that displays an analog signal in the object. The following applies:

Display value = content in register (object address + content in index register)

If the index register content is 2 and the address of the register specified in the object is 100, the value displayed in the object will be retrieved from register 102. If the value in the index register is changed to 3, the value for the object will be retrieved from register 103 instead.

The index register is defined in the individual projects. This setting is made under [Setup] / [Index register]. Up to eight index registers can be used in each project. Each index register can be used for more than one object.

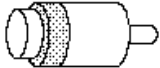
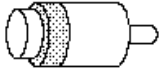
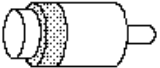
The objects used in the project specify whether index addressing is used and which register acts as the index register. To do so, select I1 to I8 in the dialog box for the object to the right of the specified analog signal.



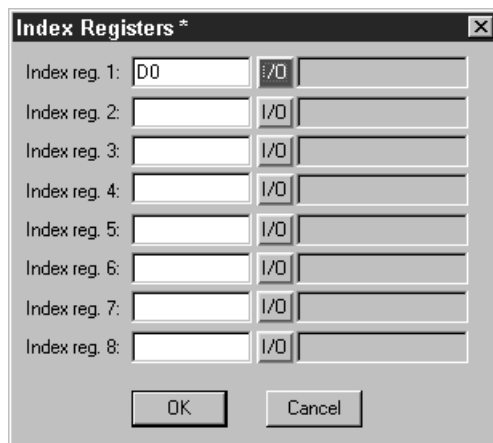
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The following example shows how to control three motors from one block. The motor parameters for torque and speed are stored in six different registers. One of the motors is selected in a block. The current torque and speed for the selected motor are displayed in the block. When selecting another motor, the current torque and speed of the other motor should be displayed instead. Index addressing is used for this purpose.

Motor 1	Motor 2	Motor 3
		
Torque in register D101 Speed in register D201	Torque in register D102 Speed in register D202	Torque in register D103 Speed in register D203

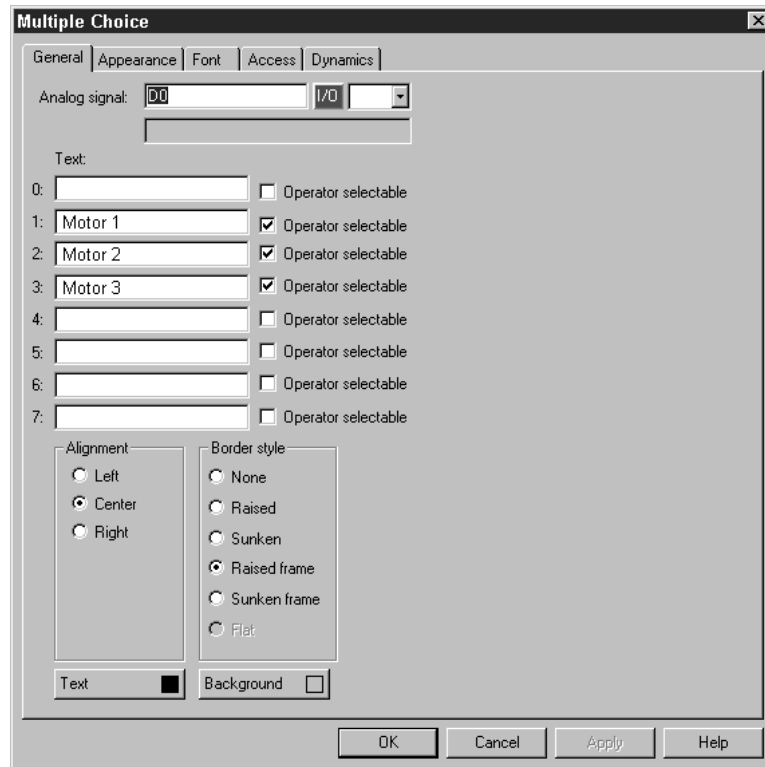
Register D0 is defined as [Index register 1] under [Setup] / [Index register]. The value in the register is used to determine the motor for which the torque and speed are to be displayed.



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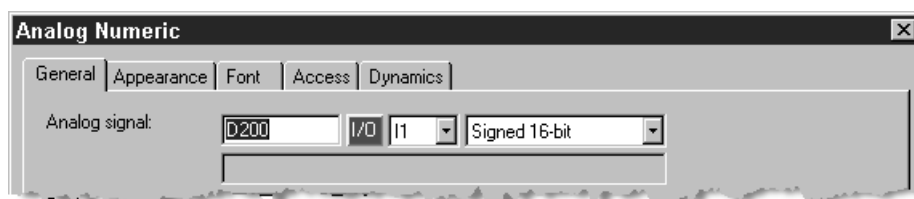


If the value in D0 is 1, then the torque and speed of motor 1 are to be displayed. If the value is 2 or 3, then the parameters for motor 2 or 3 are to be displayed. The value in register D0 is controlled by a multiple selection object in which the texts motor 1, motor 2, and motor 3 appear. In addition, these three options are created as maneuverable.



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Torque and speed are displayed in the form of two numeric objects. In the object for the torque, "D100" is defined as the analog signal and "I1" as the index register.



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In the object for the speed, D200 is defined as the analog signal and I1 as the index register. The maneuverable multiple selection object enables the options motor 1, motor 2, and motor 3 to be called up in run mode. Depending on the selection, one of the values 1, 2 or 3 is stored in register D0. The value in register D0 is added to the addresses of the objects that display torque and speed. Consequently, these can display the values in register D101, D102 or D103, or register D201, D202 or D203.



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- [1] Multiple selection objects - analog signal D0
- [2] Numeric object - analog signal D100, index register D0
- [3] Numeric object - analog signal D200, index register D0

INFORMATION



Other suffixes can be specified in addition to index registers. The index register is not counted twice when using 32-bit registers.

If you connect the terminal to a BDTP network, you have to specify the same index register both in the server and the client, as indexing takes place in the server driver.



9 Unit Functions

9.1 Message library

The [Message library] function enables you to create text tables where values between 0 and 65535 are linked with texts. One of the uses of the "Message library" function is to display each sequence step in a sequence control. The function can also be used to display error codes. An analog signal creates error codes that are linked with texts in a text block. The function is also used for assigning specific values to analog signals depending on the selected text.

The message library consists of one or more text tables, each with up to 512 text character strings. Each text string can have up to 40 characters. Activate this option under [Functions] / [Message library].

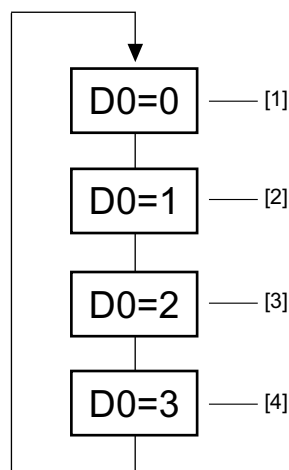
Parameters	Description
Library	Specify a number for the message library.
Name	Enter a name for the message library.

You can edit a message library by selecting the library and clicking [Edit]. Several edit windows can be opened at the same time.

Parameters	Description
Text no.	Enter a number for the text (0 - 65535).
Text	A text that is called up once the current signal assumes the text number for the text.

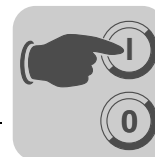
Example

A simple example is given below to explain the function. Each sequence step in our sequence control is displayed by a text.



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- [1] The object is placed onto the conveyor belt.
- [2] Mount tool X
- [3] Mount tool Y
- [4] Remove object from the conveyor belt



Begin by creating a message library with the name "Maskin2."

1. Select [Functions] / [Message library] from the menu.
2. Assign a number (in this case "2") and a name ("Maskin2") to the library.
3. Click on [Add].

You have now created a message library with the name "Maskin2." Next, you have to define the various texts in the library.

4. Select the library and click [Edit].

Enter the text number and text in this dialog box. The text number represents the value for the analog signal linked to the message object. The [Text] button can be used to display the text in the message object.

Once you have completed the message library, you have to create a message object in the application. You can create the message library in the text block or in the graphic block.

5. To do so, select the [Message] object from the toolbox. Move the pointer to where you want to position the object and click the mouse.
6. Define the analog signal that controls the text display.
7. In the [Library] field, you can select the message library from which the text is to be retrieved.
8. Select whether the object should be maneuverable and between which texts it should be able to switch during operation.



9.2 Alarm management

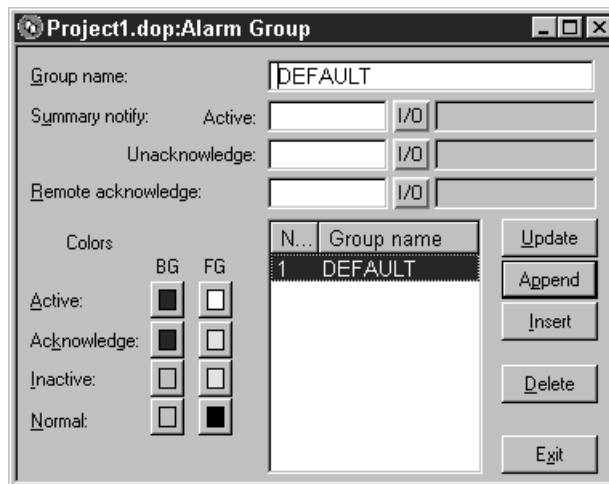
This chapter describes the process of alarm management. It makes the user aware of operating states that require an immediate response. Alarms can be divided into groups based on priority. Alarm lines can display texts and dynamic data in alarm management. The *Alarm banner* object can indicate an alarm in any application block.

9.2.1 Alarm groups

In the operator terminal, alarms can be divided into different groups, e.g. according to priority. Depending on the size of the font, up to 16 groups can be created. Different colors can be assigned to each group. Alarms can be sorted by groups in the alarm block. Alarm groups need not be defined.

Defining alarm groups

Alarm groups are defined in the project manager in the [Alarm] directory under [Alarm groups]. The properties of the alarm group are defined in following dialog box.



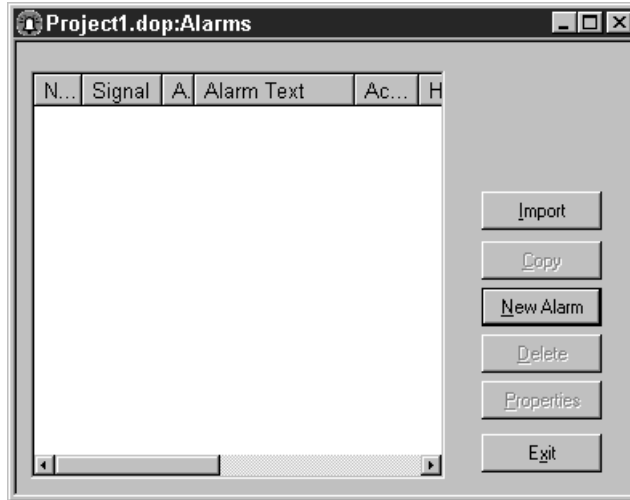
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Parameters	Description	
Group name	User defined name for the alarm group	
Summary notification	Active	Digital signal that is set to 1 when an alarm is activated in the group.
	Unacknowledged	Digital signal that is set to 1 when alarms in the group are not acknowledged.
	Remote acknowledge	Digital signal that, if enabled, acknowledges all alarms in the group at the same time.
Colors	Define the colors for active, acknowledged and inactive alarms as well as for alarms in normal state.	



9.2.2 Alarms

Alarm messages are defined in the project manager in the [Alarms] directory under [Alarms].



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Button	Description
Import	See the section "Alarm import" on page 226.
Copy	Copy alarm
New alarm	Define a new alarm
Delete	Delete an alarm
Features	Display the properties of individual alarms

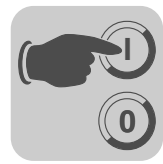


Defining alarms

Click on [New alarm] in the [Alarms] dialog box to define a new alarm. A maximum of 300 alarms is recommended.

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Parameters	Description		
Alarm text	Additional selectable alarm text that is displayed on the alarm page. You can enter up to 78 characters. It can include the following objects:		
		Digital text	Clicking this button adds a digital text object to the alarm text. The text that corresponds to the current value of the digital signal when the alarm is activated is displayed.
		Analog numeric	Clicking this button adds an analog numeric object to the alarm text. The analog value present when the alarm is activated is displayed.
		ASCII	Clicking this button adds an ASCII object to the alarm text. The ASCII text present when the alarm is activated is displayed.
Signal	Specifies the signal (digital or analog) that triggers the alarm when it changes to the defined state.		
Trigger alarm if	Digital signal is:		
	On / Off	Select [On] if an alarm is to be issued when the signal is enabled. Select [Off] if an alarm is to be issued when the signal is disabled.	
	Analog signal is:		
	Equal to	An alarm will be issued if the value of the specified analog signal is equal to the value entered in the following field.	
	Not equal to	An alarm will be issued if the value of the specified analog signal is not equal to the value entered in the following field.	
	Lower than	An alarm will be issued if the value of the specified analog signal is lower than the value entered in the following field.	
	Larger than	An alarm will be issued if the value of the specified analog signal is greater than the value entered in the following field.	



Parameters	Description
Acknowledge notify	Digital signal that is influenced when the alarm is acknowledged. Usually, the signal is set to 1.
Reset	Selecting the [Reset] checkbox disables the above mentioned signal when an alarm is acknowledged.
Remote acknowledge	Digital signal which acknowledges the alarm if enabled.
Alarm group	Specifies the alarm group for the definition (alarm).
Info block	A block number or a block name for a text or graphic block is entered in this field. It displays a help text for the user that contains e.g. information on alarms and relevant remedial measures. If no entries are made in the field, no block will be linked to an alarm. See chapters "Operator terminal alarms" (page 227) and "SMTP Client" (page 300).
Mail to address	Alarms can be sent as an e-mail to a predefined recipient. This mail contains the alarm text. See the section "Alarm properties" (page 224) and "SMTP Client" (page 300).
Acknowledgement required	Indicates whether the alarm needs to be acknowledged or not. The alarm must be acknowledged when the checkbox is activated. If the checkbox is deactivated, the alarm will only serve as an event alarm, i.e. information.
History	Indicates when the alarm should be deleted from the alarm list. An activated checkbox means the alarm remains in the alarm list until the list is full. If the checkbox is activated, the alarm is deleted from the list as soon as it has been acknowledged and is no longer active. If the [Acknowledgment required] checkbox is not selected, the alarm will be deleted from the list once it is no longer active.
To printer	If this checkbox is selected, the alarm message is output on the printer as soon as the alarm status changes.
Repeat counter	If this checkbox is activated, a counter for the alarm will be displayed in alarm management to record the frequency of an alarm. The alarm must be acknowledged to enable the alarm to appear in the list as a new alarm message.

INFORMATION



The value defined for an analog alarm signal cannot be controlled via register. An alarm is logged with a fixed value. Logging in intervals is not possible. Only 16-bit values are supported.



9.2.3 Alarm properties

Click the right mouse button in the project manager on the [Alarms] directory and select [Properties] to make general settings for alarms and alarm lists. The space required by alarms in the alarm lists depends on the length of the alarm text and the number of objects. The space required by an alarm can be calculated using the following formula

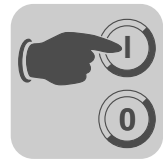
$$S = 42 + NC$$

S = Number of bytes

NC = Number of characters in the alarm text

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Parameters	Description
Active signal	Specifies the digital signal that will be issued by the terminal if the alarm is active.
Unacknowledged signal	Specifies the digital signal that will be issued by the terminal when the alarm is not acknowledged.
List erase signal	Specifies the activated digital signal that deletes deactivated alarms from the alarm list if it is set to 1.
Reset	If this checkbox is activated, the signal entered in the field [List erase signal] is reset when alarm management is deleted.
List size (KB)	Provides information on the size of the list in KB. Note: If the system assigns as much memory as indicated for the list size, the indicated list size will double. The performance of the project is influenced negatively when the list size exceeds 10 KB.



Parameters	Description	
Enable alarm signal	Digital signal that, if enabled, invokes alarm handling in the terminal. This parameter enables the activation or deactivation of alarm management in the terminal. Do not use this parameter if you want alarm management to be active permanently.	
Default font	Specifies the default font size for the alarm list. The default font size in the alarm list is always displayed after a start or restart and when switching between operating modes.	
Alarm symbol	Specifies when the alarm symbol is to be displayed. "ALARM" is displayed in the text block and a bell is shown in the graphic block at the top right corner of the screen.	
	No	The alarm symbol is never displayed.
	Unacknowledged	The alarm symbol is displayed when the alarm list includes unacknowledged alarms.
	Active	The alarm symbol is displayed when the alarm list includes active alarms.
	All	The alarm symbol is displayed when the alarm list includes active and/or unacknowledged alarms.
Send e-mail	Specifies when alarm messages should be sent by e-mail.	
	Always	An alarm is always sent as an e-mail when its status changes.
	Active	An alarm is sent as an e-mail when it is activated.
	Inactive	An alarm is sent as an e-mail when it is deactivated.
	Acknowledged	An alarm is sent as an e-mail when it is acknowledged.
Backlight	Specify whether the backlighting should change when an alarm is activated.	
	On	Means that the lighting will be switched on when the alarm symbol is displayed (default setting).
	Off	The background lighting is not affected by the alarm.
	Timer	The lighting is switched on when a new alarm is activated. The lighting is switched off when the screen saver time has elapsed.
Alarm cursor	Specify the cursor color in the alarm list.	
Repeat count time	Save first	When the alarm is acknowledged, the time that the first alarm was activated is saved in alarm management.
	Save last	When the alarm is acknowledged, the time that the last alarm was activated is saved in alarm management.

The alarm list is rewritten when it is full. 25% of the alarms are deleted from the list when it is rewritten. This means 75% of the previous content will be retained.

Example:

The length of the alarm text is 38 characters. This means each alarm requires 80 bytes in the alarm list. The result is 1024 (list size = 1 KB) / 80 = maximum 12 alarms in the alarm list. When the 13th alarm is issued, the alarm list will be rewritten and only includes the last nine alarms.



9.2.4 Importing alarms

Alarm texts can be imported from name lists that were created for the controller using the HMI Builder configuration software. Before importing alarms, the project in HMI Builder must be linked to a name list. Select the corresponding name file under [View] / [Name list]. Double-click in the project manager on the [Alarms] directory and click the "Import" button to define the alarm import.

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Parameters	Description
Start I/O	Enter the address for the start I/O when importing alarms from the name file. The start I/O can be either an analog or a digital signal.
End I/O	Enter the address for the end I/O when importing alarms from the name file. The end I/O must match the start I/O.
Alarm properties	The properties for all alarms (start I/O to end I/O) that can be imported by clicking on the [Import] button are defined in the alarm properties. For a description of the individual parameters, see the section "Alarms" on page 221. The parameters <i>Signal type</i> , <i>Analog/Digital</i> and <i>Alarm group</i> must be entered before the alarm is imported.



9.2.5 Alarm banner

INFORMATION



Information on the *Alarm banner* object can be found in the section "Graphic display and control" (page 182).

9.2.6 Alarms in the operator terminal

In the graphic block, an alarm is indicated by a flashing bell in the top right corner of the screen. This display can be deactivated by right-clicking the "Alarms" directory and making the appropriate selection from "Properties" in the project manager.

Alarms are displayed in an alarm list with predefined alarm texts. The alarm list includes the last triggered alarms and is sorted by the defined alarm groups. The alarm triggered last is displayed first in the list. The list can be sorted in descending order. More information can be found in the section "Alarm banner" on page 227. To define the size of the alarm list, right click in the project manager on the "Alarms" directory and then select "Properties". Jumping to the alarm block (system block no. 990) will display the alarm management.

The following information is displayed for each alarm: Number of times the alarm is triggered (if selected), alarm status, and the time it was triggered, deactivated or acknowledged in the selected display format.

The counter for the alarm in alarm management is displayed in accordance with the following table, provided that the checkbox [Repeat counter] has been activated for the alarm in the [Alarms] dialog box.

Display format	Description
(12)	Means the alarm was issued twelve times. The alarm must be acknowledged to enable the alarm to appear in the list as a new alarm message.
>999)	Means the alarm was issued more than 999 times without having been acknowledged. The counter can contain a maximum of 999 alarms.

Alarms can assume the following statuses:

Symbol	Status
*	Not active, not acknowledged
\$	Inactive, not acknowledged
-	Active, acknowledged
<Empty>	Not active, acknowledged

Alarm times can be displayed in the following formats:

Display format	Description
S	Time when the alarm was activated. If alarms occur repeatedly, the time when the alarm was activated first will be displayed.
E	Time when the alarm became inactive. If alarms occur repeatedly, the time when the alarm was deactivated last will be displayed.
A	Time when the alarm was acknowledged.



Unit Functions

Alarm management

To go to the alarm block, either define a jump to system block 990 in a block, press <LIST> or have the controller retrieve the list for block 990 via the display signal.

To acknowledge an alarm, move the cursor over the corresponding alarm line in the list and press or use a function key.

When a printer is connected, the alarm can be output directly according to the order or status change. This setting can be specified in the alarm definition.

The alarm is printed with the following information:

- Frequency of occurrence
- Date
- Time
- Status
- Alarm text

To delete inactive acknowledged alarms from the history, press <<-> (back button). To deactivate the function, enter the command "DD" in the command line (in the project manager, double-click on [System signals] in the [Setup] directory)

To return to the previous block, press <PREV> on the terminal or <ESC> on the touch-screen.

When the print signal is output for block 990, the respective alarm list contents can be printed.

Linking blocks with alarms

Text or graphic blocks can be linked with alarms. Choose <INFO> for an alarm in the alarm list to display the block with which the alarm is linked. This block can contain information on the alarm and the corresponding handling recommendations. The <INFO> button is only available when the relevant alarm is linked with a block. To return to the alarm list, press <PREV>.



9.2.7 Graphic alarm page

The page is displayed graphically and can be edited by the user. You can assign functions to function keys or touch keys to maximize or minimize alarm page text and to browse through the pages. You can also select which date and time stamp should be displayed. Alarms can be sorted by groups and the required group can be displayed.

The status is indicated by the colors defined when setting the alarm group.

INFORMATION



The graphic alarm page (alarm list) is printed in text form.

9.3 Recipe management

The [Recipe management] function enables the user to save all the dynamic data of one or more blocks (i.e. signals and their values) in a file in run mode.

The user can transfer the file to the controller, where the loaded values are further processed. The recipe management function makes it possible to reuse comprehensive parameter configurations. Consequently, users can set up a recipe directory with files offering different parameter settings. This function makes for an efficient design of production runs with tight schedules that require a fast product change, such as in the production of identical products in different colors.

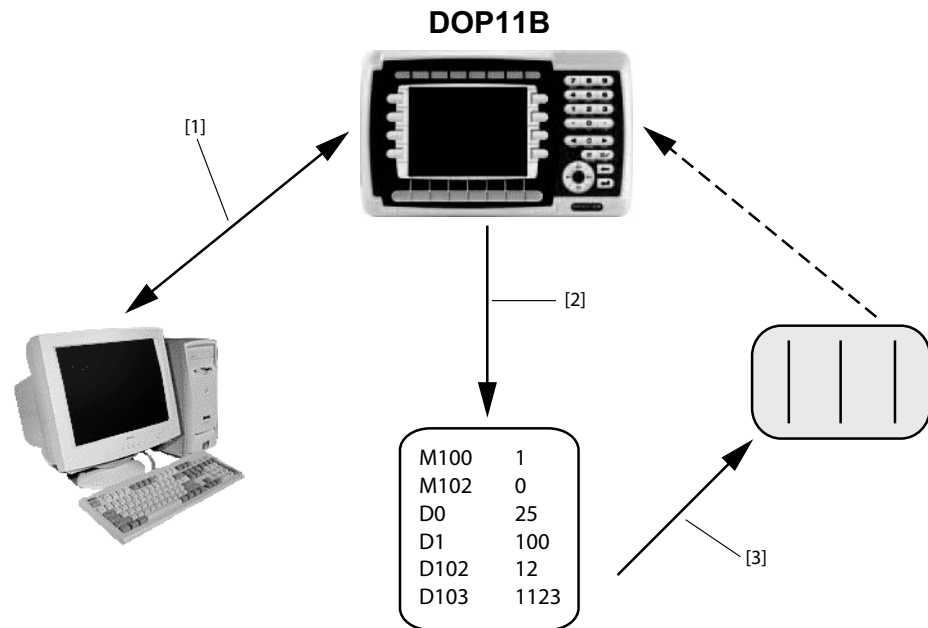
Recipe files can be created on a terminal, controller or PC using the *DOP Tools* software.

The recipe files are stored in the terminal. To use the recipe management function, the functions for saving, loading, deleting and adding recipes have to be linked with function or touch keys. See the section "Function keys" on page 257.

You can send recipe files as attachments from terminals using the e-mail function.



The following figure illustrates the principle of recipe management.



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- [1] The PC is used to program the operator terminal. The FTP program makes it possible to use the PC to back up recipes or create new ones.
- [2] Save the recipe files using the function [Save recipe].
- [3] Transfer the recipe to the controller using the function [Load recipe].



9.3.1 Calculating the recipe size


The following formula is used to calculate the size of the recipe in the project memory. (The formula does not always provide exact results due to the complexity of the file system).

$$S = \Sigma (IOW \times 10)$$

S = Number of bytes. If the calculated value **S** is less than 360, the value 360 must be set for **S**

Σ = Number of I/O series

IOW = Number of words in each I/O series. A word memory is calculated for values less than 16 bit.

	INFORMATION
	<p>If you use the function [Create and transfer recipes using the controller program], the maximum number of I/Os in a recipe is limited to 1000.</p> <p>If you use the function [Create recipes on the terminal], the maximum number of I/Os is only limited by the memory available in the operator terminal.</p>

Example

Our recipe consists of 3 I/O series H0-H109 (=110 double words) and H200-H299 (=100 double words) and H600.0 to H609.0 (=10 words).

This results in the following calculation:

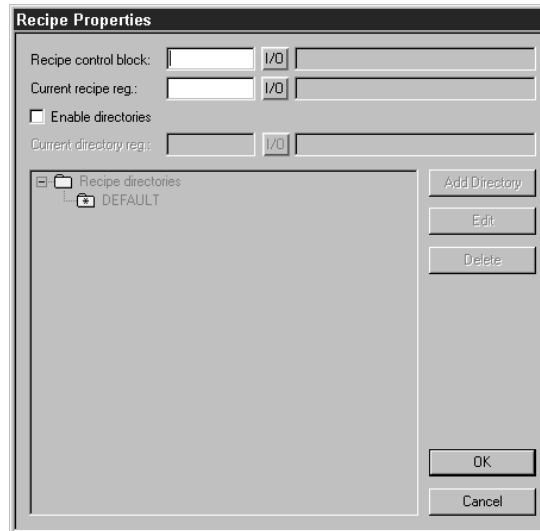
$$S = ((110 \times 2) \times 10) + ((100 \times 2) \times 10) + (10 \times 10)$$

$$S = 4300 \text{ bytes (per recipe)}$$



9.3.2 Recipe properties and recipe directories

In the project manager, double-click on [Recipe] to define the settings for recipe management and to create, edit and delete recipe directories.



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Parameters	Description
Recipe control block	Control block for saving, reading, and deleting recipes via the controller. See the section "Creating and transferring recipes using the controller program" on page 237.
Current recipe register	Enter the first of four or 16 16-bit registers where the terminal stores the name of the recipe that was last loaded to the controller. This name can then be represented as an ASCII object. The function occupies either 4 registers (8 characters) or 16 registers (32 characters).
Enable directories	Selecting this option enables you to create recipe directories in the terminal. See the section "Recipe directory" on page 233.
Current directory register	Enter the first of four or 16 16-bit registers where the terminal stores the name of the recipe directory that was specified for the block. This name can then be represented as an ASCII object. The function occupies either 4 registers (8 characters) or 16 registers (32 characters).

**Recipe directory**

You can use the function [Save recipe on memory card], which is called up via a function key or touch key, to save files on a compact Flash card or a USB Flash drive. Using recipe directories makes for a clearer structure and easier recipe management in applications with many recipes. Thirty-two recipe directories can be created for each level.

Recipe directories are created in the master directory of the terminal memory in the [RECIPE] directory. A recipe directory is linked with one or more blocks under [Block properties]. All recipes created in a block are stored in the selected recipe directory.

See the section "Store individual recipes on an external memory card during operation" on page 240 for information on storing individual recipes on an external memory card.

Recipe directories are created, edited and deleted in the project manager. To do so, double-click on [Set up recipe signals]. Defined recipe directories are displayed in a list that corresponds to the library structure. You can add new recipe directories by clicking the [Add directory] button. The name of the recipe directory must comprise between 1 and 32 characters. The first character must be a letter or a number. The characters A ... Z, 0 ... 9 and _ (underscore) are permitted. The symbol # can also be entered using the command *MCRD#*.

See the section "Store individual recipes on an external memory card during operation" on page 240.

To change a recipe directory, select it and click [Edit]. Choose [Delete] to delete the selected recipe directory.

**Recipe directory
in run mode**

You can create and delete recipe directories in run mode using the [Create recipe directory] and [Delete recipe directory] functions. The functions are linked with function keys or touch keys.

You can change and select recipe directories for the current block in run mode using the [Change recipe settings] function for function keys or touch keys. Pressing the function key or touch key for [Change recipe directory] opens a pick-list with a number of recipe directories. Select a file and press the Enter key. The recipes in the block are then stored in the selected recipe directory. See the section "Function keys" on page 257.

INFORMATION

Recipe directories created in HMI Builder cannot be deleted using the function or touch key linked with the [Delete recipe directory] function. Recipe directories created in the terminal are not included in the terminal project when a project is transferred from the terminal to HMI Builder (via receive function in the [Project transfer] dialog box).

Recipe management between terminal and PC takes place using the applications [DOP Tools] / [DOP File Transfer] and [DOP Tools] / [DOP FTP Transfer]. See the section "Using recipes in the PC" on page 236.



9.3.3 Creating recipes on the terminal

When programming the application, you can specify which block(s) can be used to save the recipe. The [Append recipe] function is also available in run mode. All signals to be included in the recipe are defined in the recipe block. All dynamic values of the block are saved in a recipe file. Apart from trend objects, you can use all digital and analog objects as recipe parameters.

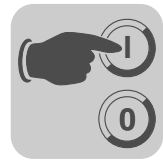
In run mode, a jump is performed to the block containing the recipe parameters. Enter the required values in the dynamic objects and press the function or touch key that is linked with [Save recipe]. The name may have up to 32 characters. The first character must be a letter or a number. The characters A ... Z, 0 ... 9 and _ (underscore) are permitted for the name. Otherwise, the same file name conventions apply as for MS-DOS.

The recipe file is stored in the terminal; either in the recipe directory specified for the block or in the same recipe directory unless you have created specific recipe directories under [Setup] / [Recipe settings].

Limiting the length of recipe names and directories stored in the controller

Some controller programs are configured to support a maximum of 8 characters when saving recipe names and directories in the controller. If names of up to 32 characters are used by mistake, they may overwrite important information in the controller. You can use the command SCRR (ShortCurrentRecipeRegister) to prevent this. To do so, choose [Setup] / [System signals] and enter "SCRR" in the command line.

When this command is entered, no more than 8 characters can be entered in the operator terminal for recipe names and directories.



9.3.4 Appending recipes

You can link the [Append recipe] function to function or touch keys. This function makes it possible to add signals and the associated values of the current block to an existing recipe in run mode. This way, you can store signals and the associated values of different blocks in a common recipe. New signals are appended in this process. Already existing signals are updated when the function is executed.

When pressing the function or touch key for [Append recipe], you have to specify the name of the recipe to which you want to add the current block signals and the associated values. If no recipe is stored in the terminal when the function is executed, a new recipe will be created in the terminal. A new recipe will also be created if you have not specified the same recipe directory for the blocks.

The same or no recipe directory must be specified to add signals from another block to a recipe.

INFORMATION



If a new character string is added to an already existing recipe with character strings, you have to separate the character strings using address separators. Otherwise, the already existing character string will be expanded by the new one.

9.3.5 Transferring recipes to the controller

In run mode, the recipe is transferred to the controller using the [Load recipe] function. This function transfers the signals and values saved in the files to the controller. Pressing the function or touch key for [Load recipe] opens a pick-list with available recipe files. Select a file and press the Enter key. The controller now runs with the loaded values.

9.3.6 Delete recipes

In run mode, the specified recipe can be deleted from the terminal memory using the [Delete recipe] function. Press the function or touch key linked with [Delete recipe]. Doing so opens a pick-list with available recipe files. Select the file you want to delete and press the Enter key. To confirm that you want to delete the file, press Enter. To cancel the action, press <PREV>.



9.3.7 Using recipes in the PC

The [DOP Tools File Transfer] program (icon in the DOP Tools program group) installed on your PC makes it possible to address the terminal like a PC drive. This means the PC can be used to create backup copies of terminal files (e.g. recipe files). This way, new recipes can be created in the PC and transferred to the terminal.

The recipe file is saved in SKV format on the PC and can be called up in Excel. The files can be edited in Excel and then used again in the attachment. Complete the file with the "END" command.

Example

P100;3

P102;0

H50;12

END

You can also transfer recipe files between the terminal and PC via FTP. Use the [DOP Tools] / [DOP FTP Transfer] (standard FTP client) program for this purpose.

INFORMATION



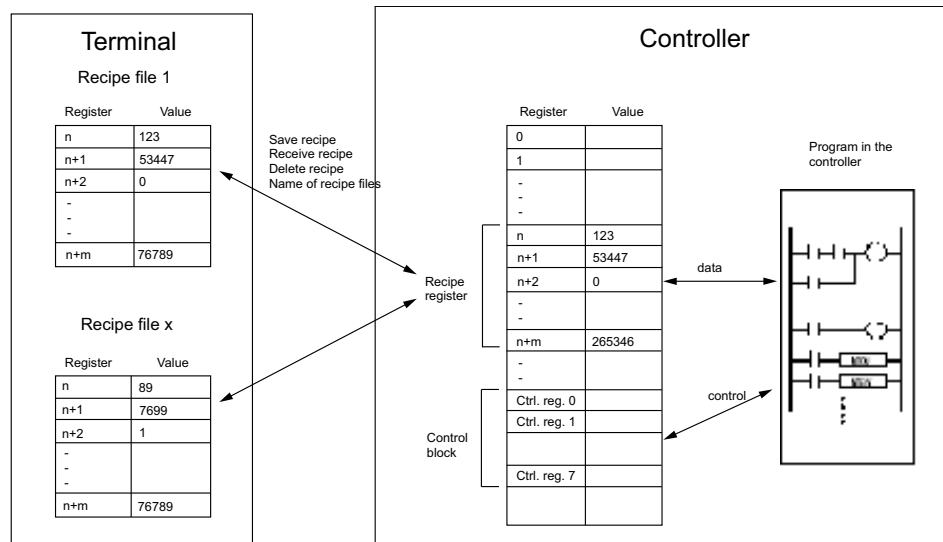
Restrictions apply to recipe files in SKV format when using Unicode.



9.3.8 Creating and transferring recipes with the controller program

Recipe data can be created, transferred and deleted via a control block in the controller. The files created with the controller program are compatible with the recipe files of the terminal. Consequently, the terminal can receive files created by the controller program and vice versa.

The control block looks as follows:



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INFORMATION



The function only processes 16-bit values. No other formats can be used. Only the low word of each variable is stored when you create a recipe using the control block.



Unit Functions

Recipe management

Using recipe names with up to 8 characters

Double-click on [Recipe] in the project manager to define the first control register under [Recipe control block]. This register and the 7 subsequent registers are used as control registers. The control block is described in the following table.

Tab	Content	Description
Control register 0	Command	The command register is defined by the controller. Available commands: 0. No command 1. Save recipe in terminal 2. Transferring recipe to the controller 3. Delete recipe in the terminal 4. Create recipe directory 5. Change recipe directory 6. Delete recipe directory
Control register 1	Handshake	Handshake register defined by the terminal 0. Ready for new command 1. OK 2. Write error in the recipe file 3. Recipe file not found
Control register 2	File name characters 1-2	Name of the recipe file or recipe directory in the terminal.
Control register 3	File name characters 3-4	
Control register 4	File name characters 5-6	
Control register 5	File name characters 7-8	
Control register 6	Start data register	First data register that is loaded from the recipe file or is to be saved in the recipe file.
Control register 7	Number of registers	Number of registers to be loaded from or saved to the recipe file.



Using recipe names with up to 32 characters

Double-click on [Recipe] in the project manager to define the first control register under [Recipe control block]. This register and the 15 subsequent registers are used as control registers. The control block is described in the following table.

Tab	Content	Description
Control register 0	Command	The command register is defined by the controller. Available commands: 10. No command 11. Save recipe in terminal 12. Recipe received by terminal 13. Delete recipe in the terminal 14. Create recipe directory 15. Change recipe directory 16. Delete recipe directory
Control register 1	Handshake	Handshake register defined by the terminal 0. Ready for new command 1. OK 2. Write error in the recipe file 3. Recipe file not found
Control register 2	File name characters 1-2	Name of the recipe file or recipe directory in the terminal.
Control register 3	File name characters 3-4	
Control register 4	File name characters 5-6	
Control register 5	File name characters 7-8	
Control register 6	File name characters 9-10	
Control register 7	File name characters 11-12	
Control register 8	File name characters 13-14	
Control register 9	File name characters 15-16	
Control register 10	File name characters 17-18	
Control register 11	File name characters 19-20	
Control register 12	File name characters 21-22	
Control register 13	File name characters 23-24	
Control register 14	File name characters 25-26	
Control register 15	File name characters 27-28	
Control register 16	File name characters 29-30	
Control register 17	File name characters 31-32	
Control register 18	Start data register	First data register that is loaded from the recipe file or is to be saved in the recipe file.
Control register 19	Number of registers	Number of registers to be loaded from or saved to the recipe file.



Procedure

1. The result code register must be 0. If it is not, set the command register to 0 or 10.
2. Set the command in the command register (e.g. 11).
3. Wait for the ready signal or the error code in the result code register.
4. Set the command register to 0 or 10. The terminal will then set the result register to 0.

INFORMATION



Recipe directories that were created in the HMI Builder programming software cannot be deleted in run mode.

Restrictions

Recipes created in the controller can contain a maximum of 1000 registers. Only word units can be saved.

The recipe name may contain the characters A ... Z, 0 ... 9 and _ (underscore). The symbol # can also be entered using the command *MCRD#*.

9.3.9 Storing individual recipes on the external memory card during operation

You can use the function [Save recipe on memory card], which is called up via a function key or touch key, to save files on a compact Flash card or a USB Flash drive. The whole recipe directory in the operator terminal is transferred to the memory card.

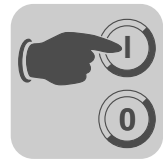
In some cases, you may only want to store some of the recipes on an external memory card. To do so, use the command *MCRD#*. The process of storing individual recipes on an external memory card is described below.

Settings in the HMI Builder

1. Choose [Setup] / [System signals] and enter the command line *MCRD#*. Click [OK].
2. In the [Recipe properties] dialog box, select the checkbox [Activate directories]. Click [OK].

Settings in the operator terminal

1. Create a folder using the command [Create recipe directory], e.g. *#RECIPES_EXTERNAL*. The # symbol must be placed before the directory name.
2. Use the command [Change recipe directory] to go to the new folder.
3. For example, if you press a touch key with the function [Save recipe], the recipes in the *RECIPES_EXTERNAL* directory will be transferred to the external memory card.



9.4 Passwords

This function can be used to create a security system for the machine. In this way, users can be easily assigned specific authorizations for the system.

A security level can be assigned to the following objects:

- Blocks
- Function keys
- Touch keys
- Maneuverable objects

Each security level is protected by a password. To gain access to the individual levels, the user must register with a password for the current level or a higher security level. This function is optional.

9.4.1 Defining security levels

In the dialog box for the object called up from the [Access] tab page, specify a security level (0-8) when the input is active. Security level 0 means all users can access the object. In this case, you will not be prompted for a password.



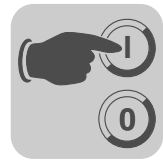
9.4.2 Defining passwords

The passwords for security levels 1-8 are defined under [Functions] / [Passwords].

Parameters	Description
Password 1-8	Enter the password for security levels 1-8.
Confirm question 1-8	Enter a security question with a maximum of 20 characters that is to be answered by the user before being able to access an object with a certain security level. This function is not available if you have defined a security level for a function or touch key.
Comment 1-8	Enter a comment or description for the password or security level. This parameter is optional.
Login signal	This parameter specifies the digital signal that creates an input field for login when enabled. You can also link the login input field with a function or touch key.
Logout signal	This parameter specifies a digital signal that logs out the current user when enabled. This function can also be linked with a function or touch key. See the section "Function keys" on page 257.
Login level reg.	Here, users can specify a register in the controller that executes the control of the security level. The register controls the security level for all objects to which a security level (password) has been assigned. The register value determines the current security level: Value 0 = no security level, 1 = security level 1, etc.
Current level reg.	This parameter specifies a register from which the terminal can retrieve data for displaying the corresponding security level (0-8).
Login timeout	This parameter specifies the amount of idle time for a terminal in minutes after which a user is automatically logged out. If the value 0 is entered, the user will not be logged off automatically.
Password RUN / PROG	Here you can enter a password that is mandatory when changing manually from RUN to PROG mode. This function does not apply to the transition from PROG to RUN or when an automatic terminal switchover RUN/TRANSFER is used in the HMI Builder.
Automatic login	This parameter specifies whether the login screen opens automatically when password-protected blocks, objects or keys are accessed. This function only applies to terminals with a touchscreen and to function keys on all other terminals, because the cursor cannot be positioned on password-protected objects without already being logged in with security level access corresponding to the object.

9.4.3 Login

If the [Automatic login] checkbox under [Functions] / [Passwords] is not activated, login takes place either via function key or touch key, or via a digital signal from the controller (login signal). To open the login input field, press the function key that is linked to the [Login to specified security level] function on the defined security level or activate the digital signal. Enter the password here. The password is linked to a security level. See the section "Defining security levels" on page 241.



9.4.4 Password for project transfer

In the command line under [Setup] / [System signals], enter the command "PDxxxxxxx". This command prompts a password (xxxxxxx) to enable the user to access the functions in the terminal menu [Transfer]. This password must be entered in the terminal when transferring a project from HMI Builder to the terminal.

9.4.5 Multi-access password

In the command line under [Setup] / [System signals], enter the command "PSxxxxxxx". This password (xxxxxxx) grants access to all terminal functions. This command is used, for example, for support and maintenance. Only capital letters can be entered in the command line.

9.4.6 Changing passwords during operation

The [Change login password] function allows users to change passwords for function or touch keys during operation. Pressing the function or touch key linked to [Change login password] opens a dialog box where you can change the password for the relevant security level. See the section "Function keys" on page 257.

INFORMATION



No security level can be entered for block [0].

After logoff, the <PREV> key and the [Return to previous block] function are disabled for function and touch keys to prevent unauthorized users from accessing password-protected blocks.



9.5 Printing reports

A number of reports (such as daily reports or event reports) can be easily created for tracking the production process. The figure below shows the principle for creating daily reports.

9.5.1 Printer connection

The printer must have either a serial or USB connection. Serial printers must support the IBM character set (850). USB printers must support the USB printer class and at least PCL 5. For printout via Ethernet, the network printer must use Windows network services. You make the printer settings under [Setup] / [Peripherals]. For information on the printer configuration, refer to the printer manual.

Possible printers:

Serial printer	= Panasonic KX-P1092
USB printer	= HP Laser Inkjet
	= HP Laser Deskjet

9.5.2 Printing projects

To print a project, select [File] / [Print] from the menu. Select the corresponding checkboxes to define which parts of the project will be printed. Click [Setup] to configure the printer. Click [Preview] to open a print preview.

9.5.3 Printing text blocks

Reports are created as text block with static and dynamic text. The maximum width of the report is 150 characters. You can enter any text in the text block, e.g. the table header or another static text that should always be printed out. To output process values, dynamic objects have to be defined that represent the value for the signal to which the object is linked.

The time when the report is to be printed can be selected, for example, via time channels.

INFORMATION



Text blocks cannot be printed with Unicode.



9.5.4 Printing graphic blocks

Graphic blocks can be printed via Ethernet using a PC server. It is also possible to connect a printer with a USB connection to the operator terminal. The USB printer must support the following printer languages: HP PCL5, PCL5C, PCL6. Graphic blocks can only be printed when they are displayed on the screen. Commands can be entered in the command line. To do so, in the project manager double-click on [System signals] in the [Setup] folder.

If you enter the command *NHD* in the command line, the laser printer will print the graphic block without a header (with block name, block number, date and time).

INFORMATION



The printer buffer must contain at least 5 MB to print graphic blocks.

The alarm block, i.e. the graphic block with the alarm list, is printed in text form.

9.5.5 Defining printouts

The printout is defined in the [Block properties] dialog box on the [Printout] tab page. To open the dialog box, right-click on the block and choose [Properties]. The *Print signal* parameter specifies which digital signal triggers the print process for the block. The digital end signal that is activated by the operator terminal when printing is finished is also entered here. Choose [Reset] to reset the signal.



9.5.6 Printer properties

To define printer properties, open the project manager and double-click on the entry [Peripherals]. Next, right-click on "Printer" and select [Properties]. More information on the printer can be found in the printer manual. The printer must support the expanded IMB-ASCII character set. To print graphic blocks, the printer must support the graphic functions HP PCL5, HP PCL5C or HP PCL6.

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Parameters	Description	
Printer signals	Deactivating	Digital signal that cancels printing if enabled. This enables the printer port to be used for another form of data transfer (e.g. transparent mode).
	Page break alarm	Signal that sends a page break command to the printer. When the alarm command <i>To printer</i> is used, the page break signal is only sent at the end of a page (i.e. not after each alarm). Only for laser and inkjet printers.
Printer type	Choose a standard text printer or the installed printer (PCL inkjet printer or PCL laser printer).	
Page length	Here, you define the number of lines before a page break. No page break is created when the page length is set to 0.	
Paper type	Choose the paper type matching the installed printer.	
Graphic orientation	This parameter specifies whether the graphic is printed in portrait or landscape format.	
Text orientation	Specify whether you want to print the report on a PCL5 printer in portrait or landscape format.	
Network path	Specifies the search path for the network printer.	
User Name	User name on the print server.	
Password	Password on the print server.	
Handshake	Specify whether the handshake between printer and terminal takes place via XON / OFF or CTS / RTS.	
New line character	Specify the end of line character: CR/LF, CR, LF or none.	
Color / monochrome	Specify whether the printout should be in color or black-and-white.	



INFORMATION

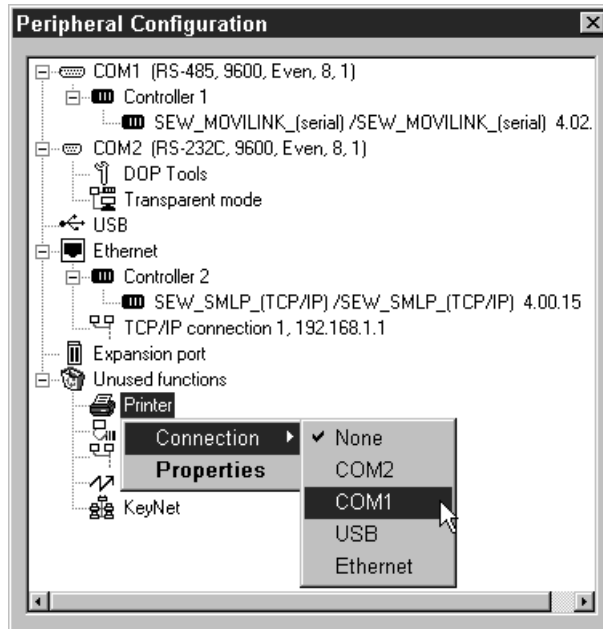


The printer settings apply to parameters such as the character table, font size and borders.

More information on printers can be found in the printer manual.

9.5.7 Setting up a communication port

To select the communication port for the connected printer, go to [Setup] / [Peripherals], right-click on [Printer], and choose [Connection]. You can now select the communication port to which the printer is connected. For information on the correct setup for the communication port and the connected printer, refer to the printer manual for the respective printer.



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Parameters	Description
Baud rate	Define the communication speed (in baud). The speed must correspond with the baud rate of the external units.
Parity	Specify the parity. The parity must correspond with the parity of the external units.
Data bits	Specify the number of data bits. The number of data bits must correspond with that of the external units.
Stop bits	Specify the number of stop bits. The number of stop bits must correspond with that of the external units.



9.5.8 Control codes for the printer

Enter the control codes for the printer in a text block. Type "%%" and add a number between 1 and 31. The numbers 1 to 31 represent the control codes for the printer. Type "%%12" for example. This entry refers to the page break. For a description of the control codes, refer to the printer manual. A command must be followed by a space. The page break ("%%12") must be entered at the end of the line. The "%%" character is not permitted in the text. Several commands are permitted in a line.

9.5.9 Printer status

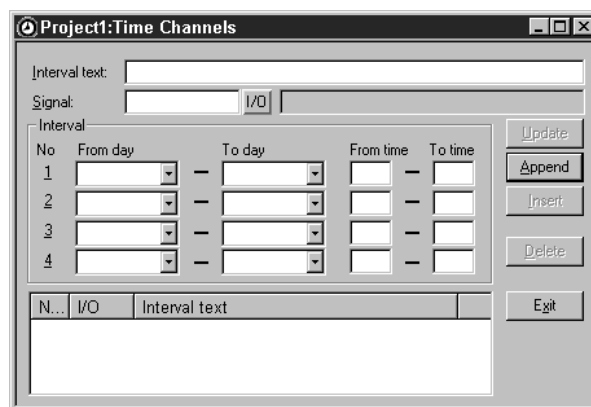
The status of the connected printer can be read using a printer register. This register is specified under [Setup] / [System signals].

9.6 Time control

The [Time control] function allows for enabling and disabling digital signals depending on the realtime clock. You can use this function to control events in the process (e.g. switching motors on and off) at specified times via the terminal. Time channels replace time delay relay and week timers.

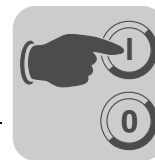
9.6.1 Defining time channels

Time channels are defined under [Functions] / [Time channels].



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Parameters	Description
Interval text	Enter any text for the time channel.
Signal	Define a digital signal that will be activated at the specified time intervals.
Interval	Specify days and times for the interval. You can define four different intervals for each time channel.



9.6.2 Run mode display

The page with the time channels is displayed when system block 991 is activated. The system block is either activated by a jump object or a digital signal that is linked to the block. Time channel values can be read and changed. The [Time channels] option under [Setup] / [Online properties] must be selected to modify time channel values in run mode.

To read or change the values for a time channel, move the cursor to the required line and press the Enter key. You can also touch the required line if the terminal has a touchscreen. Press [OK] to finish time channel definition. Close the time channel menu with <PREV> or, if the terminal has a touchscreen press >CANCEL<. Doing so displays the block from which the time channel block was activated.

9.7 Language management

The programming software supports multi-language applications for DOP series operator terminals. We recommend that you create the entire application in one language using the programming software. Multilingual support enables you to translate all the texts in an application into other languages. The translation can be carried out directly in the programming software. You can also export all texts in the form of a text file and translate them in another software. The translated file can then be reimported into the programming software. A maximum of 10 languages can be created per application.

An index is assigned to each text in the application. To optimize the function and minimize the amount of text, you can copy and paste text that is frequently used in the application. These texts are linked to the same index.

The application language also contains user texts and is linked with a system language that contains system texts. User texts are texts that are entered when programming the project. System texts are texts that already exist when a new project is created and texts in the system program of the terminal.

INFORMATION



Some fonts, particularly Asian fonts, require a lot of space in the memory. This reduces the amount of memory available for the project itself and must be taken into account when projects are to be translated. The entire storage space for a project and accompanying fonts amounts to 12 MB.



9.7.1 Unicode on the operator terminal

Unicode is a global character coding standard that uses 16-bit values for displaying the characters of many languages. The DOP11B operator terminals only support Unicode character sets. Unicode characters can be used in projects and system texts.

Microsoft Windows 2000 and Windows XP have input locales installed. This enables users to enter complex characters and symbols (e.g. Chinese characters) using a normal keyboard. The character sets installed in the computer are used. You can select input locales for various languages via [Control Panel] / [Keyboard] / [Input language]. When installing new character sets, all required characters will be added to the system.

HMI Builder uses a Unicode character set to display Unicode characters in the dialog boxes.

9.7.2 Creating several application languages

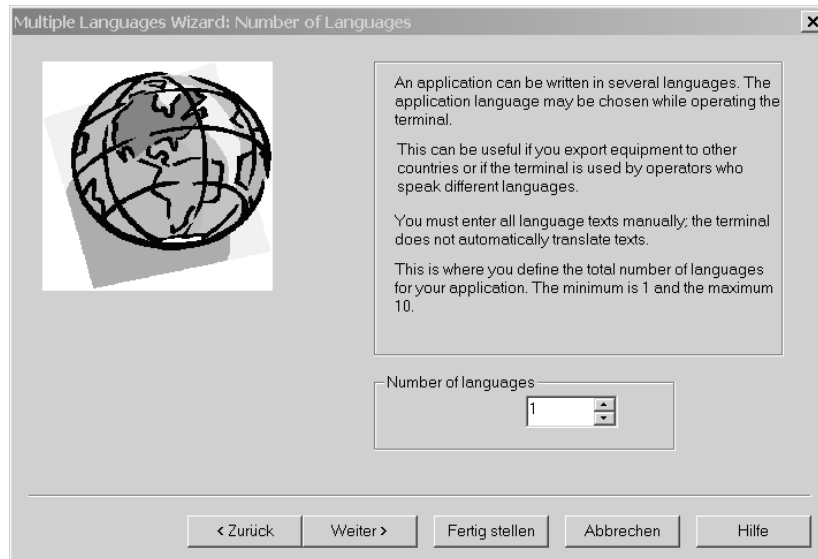
Choose [Setup] / [Multi language] / [New language]. This function calls up a wizard for creating several application languages. Follow the instructions in the dialog box and select or enter the required parameter values or names



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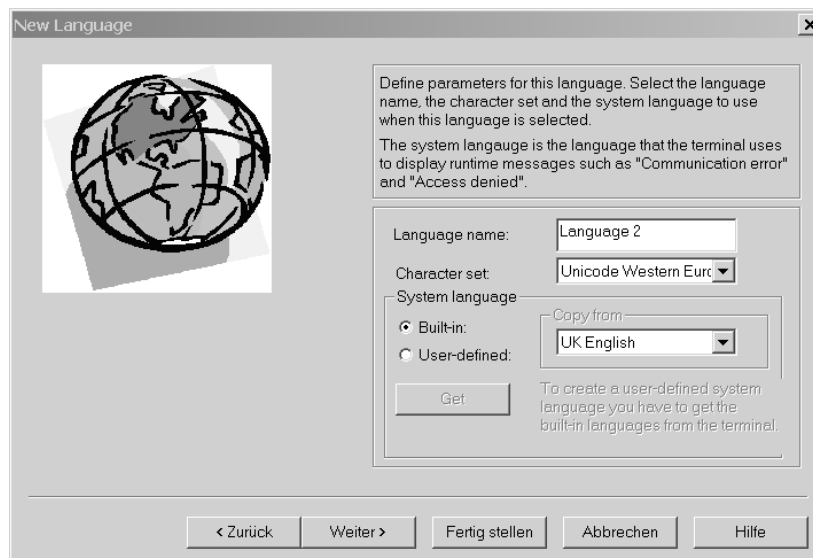


Specify whether you want to have all texts copied from an existing language (i.e. one that has already been created). Language 1 is the language in which the application was created (basic language).



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Choose how many languages should be used in the application. Click "Next".



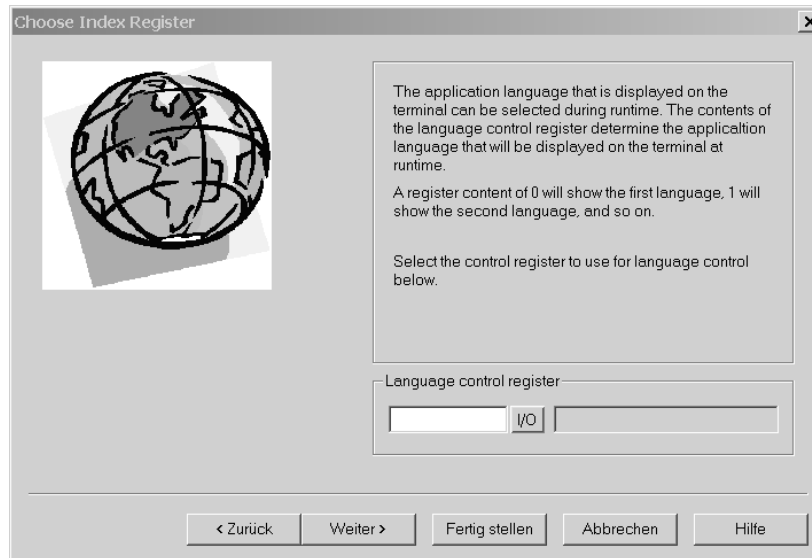
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The software suggests language names. You can change these names.

Under [Character set], select the character set that should be used in the terminal and any special country-specific characters. See the section "Country/language" on page 143.



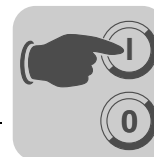
Under [System language], you can choose between [Integrated] or [User defined]. Selecting [Integrated] will display the system texts in the terminal in the selected language. Selecting [User defined] enables you to translate an integrated system language and link it with the system language for the application language (terminal needs to be connected to a PC).



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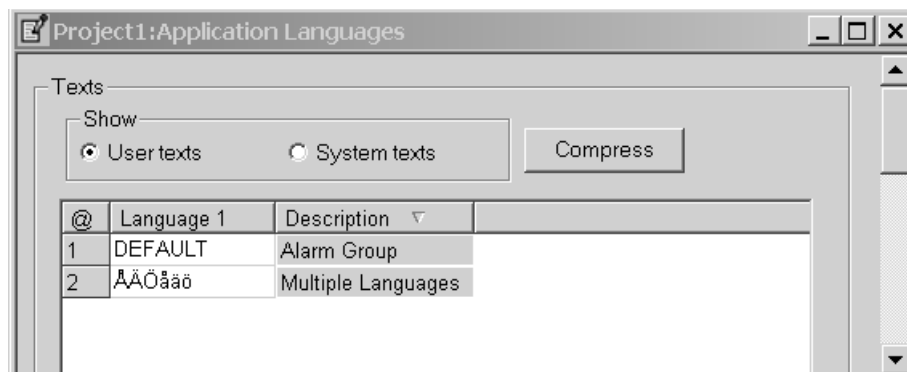
The language control register is defined here. Its value (0 ... 9) specifies which application language (0 ... 9) should be used for the terminal.

Click [End] to exit the wizard. This opens a directory tree with all languages you have created.



9.7.3 Translating and editing texts in the programming software

Choose [Setup] / [Multi language] / [Edit].



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Enter the translation for the respective language in a table cell. Use the arrow keys to move the cursor through rows and columns. Browse the text list via [Edit] / [Find].

You can also export application languages as text files and translate them in another program (e.g. Excel or Notepad). The text file will then be reimported into the application. See the sections "Export" and "Import" on page 255.



9.7.4 Properties of the application language

Choose [Setup] / [Multi language] / [Setup].



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Right-click on [User language] and choose [Properties] to change the register for controlling the language display.

You can make the following settings by right clicking the language name:

Parameters	Description
New language	Use selected language
Character set	Select / change character set
System language	Select / change system language
Delete language	Delete current language
Rename	Rename the current language
Features	Define the data registers that determine the value for the language display

To change the character set for the language, right-click on [Character set].

Right-click on [System language] to change the selected system language.

9.7.5 User-defined system language

To create a user-defined system language, select [User defined], choose the source language and click [Receive]. The [Language transfer] dialog box opens. Click [Load] to load the integrated system languages from the terminal. In this way, you can also edit system texts under [Setup] / [Multi Language] / [Edit]. You can also export texts as text file and edit the text in another program.

All system texts in the terminal (passwords, time channels, etc.) support multilingual applications. You can either use the predefined system languages or create your own (new) languages. All characters in the selected character set are available for the application languages. A text character sequence can be linked to several objects. The maximum number of text character sequences for each language depends on the available project memory in the terminal.

The bottom left area of the application language dialog box provides information on the memory size for the selected language (language file). The information is displayed in X/Y format, where X stands for the occupied memory and Y for the free memory available for each language, e.g. size 7/128.



9.7.6 Export

Languages can be exported, e.g. to Excel, where they can be translated and reimported to the programming software.

Choose [Setup] / [Multi language] / [Export]. Choose user texts (or system texts). Enter the name of the export file into the dialog box that opens and select Unicode as the format.

9.7.7 Importing

Choose [Setup] / [Multi language] / [Import] or click on the button [Import] in the language toolbar.

Next, select [User texts] (or [System texts]). The dialog box [Import multi-lingual texts] is displayed. Enter the name of the text file to be imported. The project language is in Unicode format.

9.7.8 Displaying index numbers

Each object that represents text in an application with multi-lingual support is linked to an index. An index can be linked to various objects containing the same text. To display the index numbers for the object texts, select [Setup] / [Multi Language] / [Show index].

9.7.9 Cross reference

Choose [Setup] / [Multi language] / [Cross reference]. In the cross reference list that opens, you can edit objects by right-clicking them. The cross reference list supports the incremental search when entering index numbers.

9.7.10 Reusing an index

Choose [Setup] / [Multi language] / [Reuse index]. If the [Reuse index] function is active while copying an object, the same index will be assigned to the copy. This way, objects with the same index need only be translated once. Changes made to a text affect all texts with the same index number.

INFORMATION



If you delete an object that has copies with the same index number, only the selected object will be deleted.



9.7.11 Choosing Unicode font

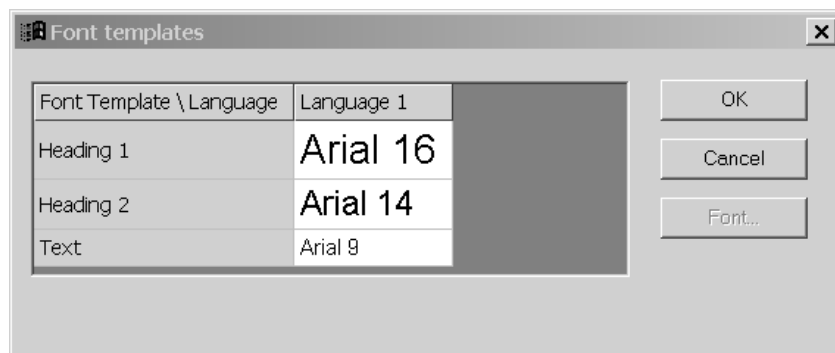
Here you choose a Unicode font if an expanded character set is required for creating the application language.

9.7.12 Application languages in run mode

The application language can be changed in the terminal in run mode. To do so, change the value (0-9) in the specified language control register. Note that the terminal updates the entire block when a new language is selected in run mode. If the terminal has a cursor, it will be positioned on the first maneuverable object in the current block after having performed the change.

9.7.13 Font templates

You can use the font templates to determine which font is assigned to the text objects and languages. Choose [Edit] / [Font templates] to call up a list of the fonts used in the project. If you use a language that contains characters not included in the Windows TrueType fonts such as Arial or Times New Roman, the font must be assigned to the language. Changes made to the font template affect all the text objects linked to the corresponding font.



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INFORMATION



The size of the font files is taken into account when determining the occupied project memory.



9.8 LEDs

Only applies to operator terminals with LEDs.

The operator terminal has integrated LEDs that are linked to a register. The LEDs are defined under [Functions] / [LED]. The register content determines the color and, if required, the flashing frequency of the LED as shown in the table below.

Register value (Hex)	Register value (Dec)	Flashing frequency (Hz)	Color
00	0	-	None
01	1	-	Green
02	2	-	Red
11	17	5	Green
12	18	5	Red
21	33	2,5	Green
22	34	2,5	Red
31	49	1,2	Green
32	50	1,2	Red
41	65	0,6	Green
42	66	0,6	Red

9.9 Function keys

You link a function key to a signal by entering the signal's address according to the relevant key or by choosing the corresponding function from the selection list. The function key linked to a signal will be activated according to the function you have specified when defining the function key.

INFORMATION

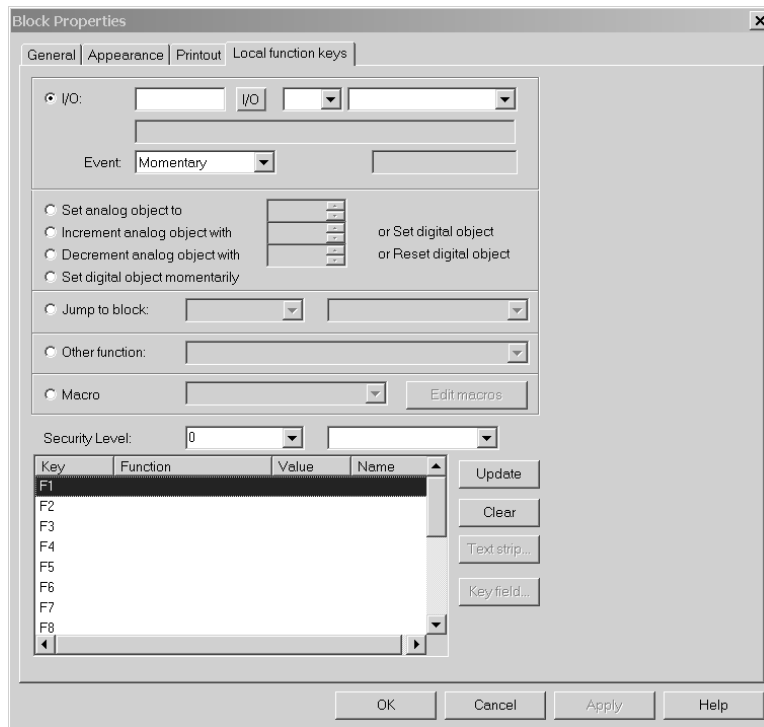


Only two function keys linked to signals can be activated at the same time. If more than two function keys are pressed simultaneously, only the two signals that were triggered first will be activated.

The number of function keys depends on the terminal type.



9.9.1 Defining function keys



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You can define function keys in two ways:

- Globally
- Local

Global definition

- Global function keys are defined and used in the entire application and apply to all blocks.
- A global definition is always available in run mode, as long as the block displayed on the screen does not have any local definitions for the current function key.
- Global definitions are made under [Functions] / [Function keys].

Local definition

- Local function keys are defined and used for a block.
- Local definitions have a higher priority than global definitions.
- Local function keys are defined in the block's "Properties" dialog box on the [Local function keys] tab page.



Function	Description	
EA	Signal that is activated by the function key. (The subsequent field is used for specifying possible index registers and signal formats.)	
Event	The IO event function serves for defining the effect of the function key on the specified signal. The Event function provides the following options:	
	Temporary	The signal is active as long as the key is pressed.
	Toggle	The signal is set or reset when the key is pressed.
	Set	The signal is set when the key is pressed and remains in this state.
	Reset	The signal is reset when the key is pressed and remains in this state.
	Grouped	All signals that are linked to a function key with the current group number are reset. The group number is entered in the [Group no.] field. A group comprises a maximum of eight function keys.
	Set analog	In the [Set analog] option, the analog signal linked to the function key is assigned the value defined in the [Value] field.
	Inc. Analog	The analog signal linked to the function key is increased by the value defined in the [value] field.
	Dec. Analog	The analog signal linked to the function key is decreased by the value defined in the [value] field.
Set analog object to	Assigns the entered value to the maneuverable analog object selected with the cursor.	
Increase analog object by or set digital object	Increases the value of the selected maneuverable analog object by the value specified or activates a selected maneuverable digital object.	
Decrease analog object by or reset digital object	Decreases the value of a maneuverable analog object by the value specified or resets a selected maneuverable digital object.	
Set digital object temporarily	Activates a selected digital object as long as the key is pressed.	
Jump to block	Jumps to the block with the selected name or number.	
Other functions	Function or touch keys are linked to the functions in the selection list. See the separate table "Other functions of function keys and touch keys" on page 260.	
Macro	The selected macro is executed. You can change the name of the selected macro or change the macro event for the selected event by clicking the [Edit macro] button.	
Security level	You can define security levels for function keys. The operator must login with a password for this or another security level to being able to use the function key.	



Other functions of function keys and touch keys

Function	Description
Load recipe	Retrieves the recipe from the memory of the operator terminal.
Save recipe	Saves the recipe in the memory of the operator terminal.
Delete recipe	Deletes the recipe from the memory of the operator terminal.
Append recipe	Appends signals and their values from the current block to an existing recipe. See the section "Recipe management" on page 229.
Login to specified security level	Login. See the section "Passwords" on page 241.
Logoff	Logoff.
Changes login password	Changes the password.
Scrolls one page up	Scrolls one page up in alarm management.
Scrolls one page down	Scrolls one page down in alarm management.
Maximizes text	Maximize text size in alarm management.
Minimizes text	Minimize text size in alarm management.
Saves recipe to memory card	Saves the recipe to the memory card selected for backup.
Loads recipe from memory card	Loads the recipe from the memory card selected for backup.
Deletes recipe on memory card	Deletes the recipe from the memory card selected for backup.
Loads project from memory card	Loads the project from the memory card selected for backup.
Acknowledges alarm	Acknowledge alarm in the alarm list.
Displays alarm list	Display alarm management (block 990).
Jumps to info block connected to the alarm	Jumps to the info block connected to the alarm. Refers to the current alarm line or alarm management.
List alarm groups	Specifies the alarm group from which the alarm is to be displayed in alarm management.
Returns to the previous block	Shows the previous block. You can go back up to nine levels. When block 0 is displayed, this function will not execute a jump to the previous block. This function does not perform block jumps if you have to login to a higher security level than the one you have.
Displays object info	Shows the minimum and maximum values for analog objects in the text block in run mode.
Input	Corresponds to pressing the Enter key.
Displays the diagnostics page	Displays the information window of the operator terminal.
Connect TCP/IP	Establishes the connection for serial TCP/IP communication.
Disconnect TCP/IP	Disconnects the serial TCP/IP connection.
Changes recipe directory	Edit recipe directory in the terminal.
Creates recipe directory	Create recipe directory in the terminal.
Deletes recipe directory	Delete recipe directory in the terminal.



9.9.2 Using function keys to jump to block

This function enables the user to jump to blocks using function keys without using a display signal. Choose [Jump to block] from the selection list when defining the keys (locally or globally).

Changing to a block can be performed easiest using function keys. A digital signal is not assigned in the controller.

9.10 Trends

9.10.1 Development trend

With this function, the controller constantly acquires analog values and displays them in a trend object during operation. The values are displayed in curves. The recorded values are stored in the operator terminal's project memory.

Several independent trend curves can either be displayed in the same block or in different blocks. The number of curves is restricted by the size and capacity of the project memory.

The trend object displays, for example, the time interval between the data recordings and the number of values.

Calculating the trend size

The following formula is used for calculating the trend data size in the project memory for the 16-bit format:

$$S = TOS + AK (2 + (AS + 1) * 8)$$

S	Number of bytes
TOS	Trend object size (If all the parameters are changed for a trend object, the value of the TOS = 320 bytes.)
AK	Number of curves defined in the trend object
AS	Number of scans rounded up to the next hundred

INFORMATION



The RAM memory can also limit the number of trends in an object. This limitation depends on other objects and functions used in the project.

Trend objects can be specified as signed and unsigned 32-bit values. Trend curves in the 32-bit format require more memory space than those in the 16-bit format.



Display in run mode

In run mode, trend curves can display ongoing values. Select the required trend object and press the Enter key. This opens a dialog box. Select a time interval and date for the data to be displayed. "History" is displayed at the bottom of the dialog box. To go back to real-time display, press the Enter key again. The trend data are stored in files. You specify the name when defining the trend object.

9.10.2 Defining trend objects

You can define trend objects in a block exactly like other dynamic objects. The object can be linked with up to 6 analog signals.

Unlike other objects, the trend object name must be specified using 1-8 characters. The first character must either be a letter or a number. A-Z, 0-9 are permitted characters for the trend name. Otherwise, the same file name conventions apply as for MS-DOS.

You can define the following parameters for the trend object. Under [Setup] / [Terminal options], you can define whether you want to save only changed trends or all of them.

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More information on trend objects can be found in the section "Graphic display and control" (page 178).



9.10.3 Transferring trend data

If the [DOP Tools] \ [DOP File Transfer] program is installed on your PC, you will be able to transfer trend data, recipes and alarm lists to and from the PC for statistical calculations, display or for storage purposes.

You can also transfer the following data between PC and terminal using FTP:

- Trend data
- Recipes
- Alarm lists
- HTML files
- Bitmap graphics

An FTP client must be installed on the PC for this purpose. The *DOP Tools* program group includes the *DOP FTP Client* application that acts as the standard FTP client.

You can directly open trend files for statistical calculations, e.g. in Excel.

Trend files

The name for each trend file is specified when defining the trend object. The suffix SKV is assigned to the file.

Line format of the trend file:

DDDD;TTTT;AAAA;BBBB;CCCC;DDDD;EEEE;FFFF:

Format	Description
DDDD	Date format defined under Setup.
TTTT	Time format defined under Setup.
AAAA	Trend curve 1
BBBB	Trend curve 2 (if defined)
CCCC	Trend curve 3 (if defined)
DDDD	Trend curve 4 (if defined)
EEEE	Trend curve 5 (if defined)
FFFF	Trend curve 6 (if defined)

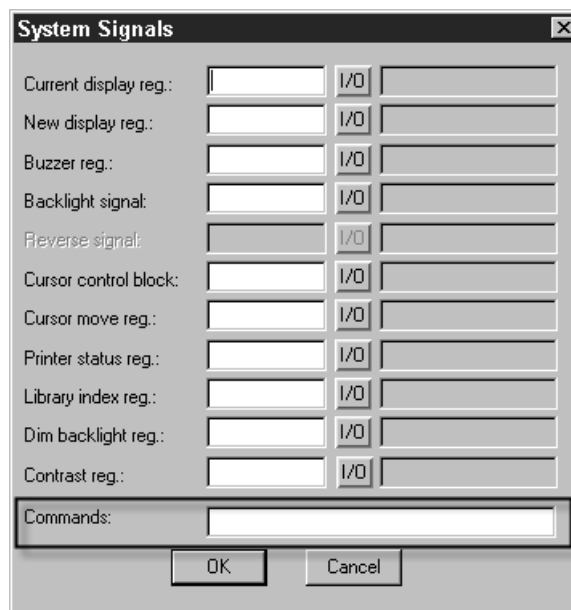
The oldest value is displayed in the first file line, the newest in the last line. The SKV format can be directly exported to Microsoft Excel. The diagram wizard in Excel is used for creating statistical diagrams. You cannot change files and send them to the terminal.



9.10.4 Backing up trend data

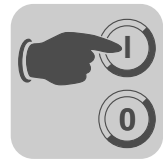
Files containing trend data can be copied from the normal project memory in the operator terminal to an external memory card inserted into the terminal. The memory card in the operator terminal must be formatted as a backup card. It can be inserted into any operator terminal. The data on the card can then be transferred via FTP to a PC and processed there. You find the trend files for which you made a backup in the (library) "Backup" directory of the operator terminal. To transfer trend data files between the terminal and a PC, an FTP client must be installed on the PC (DOP FTP client).

The command TBUP and a memory cell specified in the command line of the configuration software are used to create backup copies for trend data from the operator terminal's project memory to the external memory card in the terminal. In the project manager, double-click on [System signals] in the [Setup] directory.



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Parameters	Description
TBUP	Trend backup. Used to create backup copies of trend files on external memory cards.
TESOSn	When the [Activate] signal is enabled, only a trend sample is saved. When n=* , the setting applies to all trend objects. When n=T , the setting only applies to trend objects beginning with T.
TMBx	Trend multi backup. Used in conjunction with the system command TBUP to create several backup libraries on one memory card. (x is the number of libraries with backup files on the card. When this number is exceeded, the oldest library is overwritten automatically. The default value is 1.)



Enter the command *TBUP* followed by a digital signal (e.g. M10). This digital signal can also be linked to a function key or touch key. When the digital signal is activated by the push of a button, all the trend files from the operator terminal's project memory are backed up on the external memory card. Once the backup process is complete, the operator terminal deactivates the digital signal entered in the command line.

INFORMATION



On an external memory card, it is possible to save only one version of a trend in each library. When a backup is created for a trend already saved, the earlier version is overwritten. The command *TMBx* can be used to create several libraries.

9.11 Macros

A macro combines several events in the terminal into a single command. If you frequently call up certain commands or settings in the terminal, you can automate these processes by creating a macro. A macro is triggered via local or global function keys or touch keys. You call up the [Macros] function under [Functions] / [Macros].

9.11.1 Adding a macro

Clicking on the [Add macro] button opens the selection dialog box.

The dialog box titled "Macro Name" has a close button (X) in the top right corner. It contains two input fields: "Name:" and "Trigger signal:". The "Trigger signal:" field has a small "I/O" button to its right. To the right of the input fields are two buttons: "OK" and "Cancel".

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Enter a name for the macro in the dialog box. The name must be unique. Click [OK] to display the macro in the list under the name you have defined.

The number of user-definable macros is unlimited.



9.11.2 Insert event / Add event

Clicking on the [Insert event] or [Add event] button opens the following selection dialog box:

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Each macro can include a maximum of eight different events (lines).

Parameters	Description	
I/O	With this parameter you define the signal to be linked to an event in the macro. In the [Event] field, select the event to be linked to the signal in the macro. You can choose from the following events:	
	Set	The digital signal is activated when the macro key is pressed and remains in this state.
	Decrease analog	Activating the macro by pressing a key will decrease the analog signal by the value defined in the [value] field.
	Reset	The digital signal is deactivated when the macro key is pressed and remains in this state.
	Set analog	Activating the macro by pressing a key will assign the value defined in the [value] field to the analog signal.
	Toggle	The digital signal is activated and deactivated alternately by pressing the macro key.
	Increase analog	Activating the macro by pressing a key will increase the analog signal by the value defined in the [Value] field.
Jump to block	Enter the number or name of the block you want to jump to when pressing the macro key. A block jump can only be the last event in a macro because it completes the macro.	
Command	Command to be activated. You can choose from the following commands:	
	IPCONFIG	Retrieves and displays the terminal's current IP address.
	PING	Checks whether a host is available.
	ROUTE	Used to display, add and delete files.
Argument	Text field with the command parameter, e.g. 192.168.1.1 for the command PING.	
Show input panel	Yes / No (only for touch keys). Determines whether an input area should be displayed when the program is in operation	
Allow multiple instances	Yes / No Determines whether several instances of the program may run simultaneously.	



9.11.3 Editing

Click on [Edit] to change the name of the current macro or the macro event of the current event. Alternatively, double-click directly on the macro or macro event to edit it.

9.11.4 Activating macros

You activate a macro using function or touch keys. Each key (global or local) can be linked to a macro. You select the macro for the corresponding key in the dialog boxes for local and global function keys and touch keys.

9.12 System monitor

The system monitor is a block used for displaying and changing control signal values when the operator terminal is switched on. The values are displayed as decimal, hexadecimal and ASCII values. The system monitor is always available on the operator terminal. To use the system monitor when the operator terminal is switched on, create a block jump from another block to the system monitor block. To add control signals, for example, you must call up the edit field. It appears as soon as you press the Enter key or click on the button [NEW] when the system monitor is active.



9.13 Data logger

Data can be logged and, like trend data (but without the terminal display), stored in a file. Data can be logged at different intervals or when values are changed. Each data logger supports 16 signals and can log 16-bit, 32-bit and real (floating point) values. The logging process occupies system power and memory space.

In the project manager, double-click on [Data logging]. Then right-click on "Data logging" and select]Add[. Double-clicking on [Data logger] calls up the following dialog box.

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Parameters	Description
Name	Enter a name (file name) for the data logger. This name, which can only be entered once for each logger, may contain a maximum of 8 characters. Only the characters A - Z, 0 - 9 and _ are permitted.
Sample interval	Enter an interval for logging the data. The minimum value is 1 s.
Sample count	Enter the number of values to be saved. The maximum value is 65534. Once the maximum value has been exceeded, the oldest entry is overwritten with each new sample.



10 Network Functions and Communication

10.1 Communication

10.1.1 Communication with two controllers (two drivers)

You can activate two different drivers in the terminal. This means the terminal is capable of communicating with two different controllers simultaneously.

The controllers can be connected with the serial terminal interface or via an Ethernet connection.

Signal addressing to the controller takes place according to the usual procedure for the respective controller (see driver documentation for more details).

- Select [Project] / [Properties] from the menu in HMI Builder.
- Select the controller by clicking [Change] for controller 1 or controller 2. If the driver selected for controller 1 does not support two drivers, then you cannot select a driver for controller 2.
- Click [OK].
- Choose [Setup] / [Peripherals].
- Drag [Controller 1] and [Controller 2] to the connection ports to which the respective controller is connected. The interfaces RS-232C, RS-422 / RS-485 and Ethernet are available for this purpose¹⁾.

Refer to the driver documentation for more details on how to connect the controller and terminal.

Addressing

Signal addressing to the controller takes place according to the usual procedure for the respective controller (see driver documentation for more details). To define the controller to which a created object should be linked, click the button for the required controller ([1] or [2]) in the tool bar in HMI Builder.

Controller 1 is set by default when you create or open a project.

Clicking the [1] button links the signal of an object to be created with controller 1. Clicking the [2] button links the signal of an object to be created with controller 2.

Alternatively, you can click the [I/O] button in the object to be created and use the I/O browser to select the controller to be used for linking to the object.

To address a signal in controller 2 when controller 1 is preset, add "@2" to the signal (or vice versa "@1" for controller 1 if controller 2 is preset).

Example

Controller 1 is preset. Register D0 in controller 2 is to be linked to a slider. Enter "D0@2" under analog signal in the slider dialog box.

1) Not available in DOP11B-M70



I/O cross reference

The [I/O cross reference] function for displaying an overview of I/Os can be used both for controller 1 and controller 2. The cross reference displays the preset controller.

Name list

Controller 1 and controller 2 support the name list with all associated functions.

INFORMATION



If communication with one controller is interrupted, the terminal will continue communication with the other controller. The terminal tries to reestablish the interrupted controller connection every 10 seconds. This process can impair communication with the connected system. The interval can be changed in the driver properties in the offline station parameter.

10.1.2 Data exchange between controllers

When the terminal is connected to two controllers (two drivers in the terminal), data can be exchanged between the two controllers (analog and digital signals). You can also connect two controllers via separate terminals in a BDTP network.

The signal type need not be identical in the two controllers. Data is exchanged between controller 1 and controller 2 via a virtual data channel. You can define eight different data channels. Data exchange can be time-controlled or based on events. You define the conditions for the exchange of data and the signal intervals for each data channel under [Functions] / [Data exchange].

Parameters	Description		
Section	Start I/O 1	Start address for the data channel for controller 1. (The subsequent field is used for specifying possible index registers and signal formats.)	
	Start I/O 2	Start address for the data channel for controller 2. (The subsequent field is used for specifying possible index registers and signal formats.)	
Mode	Specify whether the signals for the data channel are analog or digital signals.		
Size	Specify the number of signals to be transferred in the data channel (start address + subsequent). The maximum number of signals for a data channel is 255.		
Flow 1 → 2	Trigger signal	Digital trigger signal that controls the data exchange for the data channel from controller 1 to controller 2. Meaning of the signal status:	
		0	Inactive
		1	Transmit The terminal deactivates the signal after successful transmission.
	Interval	Indicates the time in seconds that elapses between cyclic transfers in the data channel. Set the interval parameter to zero if there is no cyclic transfer. When the value is higher than zero (1), the parameter has priority over the trigger signal. In this case, a trigger signal will not be able to initiate a transfer. The maximum number of seconds is 65535.	



Parameters	Description	
Flow 2 → 1	Trigger signal	Digital trigger signal that controls the data exchange for the data channel from controller 2 to controller 1. Meaning of the signal status:
		0 Inactive
	1 Transmit The terminal deactivates the signal after successful transmission.	
	Interval	Indicates the time in seconds that elapses between cyclic transfers in the data channel. Set the interval parameter to zero if there is no cyclic transfer. When the value is higher than zero (1), the parameter has priority over the trigger signal. In this case, a trigger signal will not be able to initiate a transfer. The maximum number of seconds is 65535.

When you have completed your data channel settings, click [Add].

INFORMATION



The [Data exchange] function has the same priority as all other terminal functions. Example: If the terminal is working at full capacity (because other functions are being executed), when you request a data exchange, the data transfer time between the controllers will increase.

10.1.3 Transparent mode

In transparent mode, you can use a communication port (programming printer port) on the terminal that is not connected with the controller to connect other parallel units to the controller. Such units can be terminals, a PC with programming tools for the controller or a higher-level operator system.

Refer to the driver manual for information on whether the connected controller supports transparent mode.

Connecting PCs or other computer systems

PCs with a programming tool or another computer system are connected directly to a communication port (in this case programming/ printer port) of the terminal.

The MOVILINK® / SMLP driver supports a special transparent mode exclusive to the SEW driver.

If the driver is configured for serial communication and the transparent mode port is configured for the Ethernet port with TCP and port number 300, special routing behavior is activated. This enables MOVITOOLS® MotionStudio to use an Ethernet query to detect both the DOP11B units and the SEW devices connected via the DOP11B units' serial port.

These devices can be addressed as an Ethernet gateway in MOVITOOLS® MotionStudio via Ethernet and the DOP11B units.

Transparent mode does not work in any other configuration.



Terminal and PC settings

Make the following PC and terminal settings to enable transparent mode.

Make the communication settings in the terminal project in HMI Builder under [Setup] / [Peripherals].

- Drag the [Transparent mode] element to the required communication port (i.e. the port to which the PC is connected with the terminal).
- Right-click the element to configure transparent mode (if supported by the driver, see the driver manual for details).

The settings for the port to which the PC is connected must be identical with the settings in the PC program (programming software for the controller).

Parameters	Description
IP properties	Is only used for communication in transparent mode via Ethernet. The transparent mode unit must be connected with a TCP/IP port for this purpose. Port number 300 usually need not be changed. Select the required protocol: UDP or TCP.
Controller systems	Is only used for communication in transparent mode via Ethernet. The transparent mode unit must be connected with a TCP/IP port for this purpose. Define whether you want the transparent mode to apply to controller 1 or 2.
Mode	Select transparent mode as the communication type. Timeout Enter a time interval in seconds after which the terminal will change from pass-through mode back to run mode if no pass-through communication has taken place.

Connecting two terminals in transparent mode

You can connect several terminals to the same computer in transparent mode. The following section explains how to connect two terminals. Several terminals can be connected in the same way.

INFORMATION



The SEW communication drivers do not support transparent mode.

Cable connections

When connecting two terminals to one controller, the first terminal is connected as described in the installation manual. The two terminals are connected with a cable. The cable connects to the free port of the first terminal and the corresponding port of the second terminal. If the communication distance via RS-232 ports exceeds 15 m, you will require a signal amplifier.

Setting up the first terminal

Make the communication settings in HMI Builder under [Setup] / [Peripherals]. Make the settings for the port connected to the controller as usual. The settings for the port connected to the second terminal can be defined by the user.



Setting up the second terminal

Make the communication settings in HMI Builder under [Setup] / [Peripherals]. The controller must be connected to the port provided for connecting the second terminal to the first terminal. The settings on this port correspond to those of the port of the first terminal to which the second terminal is connected.

Baud rate

The baud rate is between 600 and 115,200 baud. We recommend you use the highest baud rate between the terminals for optimum performance. The communication speed decreases as the number of connected terminals increases (see the following table).

Access time to the controller

Terminals	Terminal 1	Terminal 2	Terminal 3	Terminal 4
1	100%	-	-	-
2	50%	50%	-	-
3	50%	25%	25%	-
4	50%	25%	12.5%	12.5%

Connecting three terminals in pass-through mode

You can connect a third terminal to terminal two in the network using a cable. Setup is the same as for the second terminal.

10.1.4 Pass-through mode

The [pass-through mode] function makes it possible to set the terminal in such a way that communication can take place between the PC programming software (in this case MOVITOOLS®) of the connected controller and the controller itself (MOVIDRIVE® or MOVITRAC® 07) via the operator terminal.

The function is analog to the transparent mode function and also only supports one controller. Consequently, transparent or pass-through mode can only be performed on one communication port of the terminal.

If pass-through mode is active and the PC communicates with the controller via the terminal, the communication between the terminal and connected controller will be interrupted. This is the difference between pass-through mode and transparent mode. A terminal on which communication in pass-through mode is taking place will be locked for the operator. An empty screen is displayed with a reference to the pass-through mode.

Pass-through mode for one of the connected controllers is activated or deactivated using the [DOP Tools] / [DOP Modem Connect] program. The program is available as an icon in the [DOP Tools] program group.

INFORMATION



The MOVILINK® driver for MOVIDRIVE® and MOVITRAC® 07 units only transparent mode. Pass-through mode is not supported.



Properties of the operator terminal and PC

The following PC and terminal settings are required to enable pass-through mode:

Make the communication settings in the terminal project in HMI Builder under [Setup] / [Peripherals]. Drag the [Transparent mode] element to the required communication port (i.e. the port to which the PC is connected with the terminal).

To configure pass-through mode, right-click the element. The settings for the port to which the PC is connected must match the settings in the PC program (programming software for the controller).

Parameters	Description
IP properties	Is only used for communication in pass-through mode via Ethernet. The transparent mode unit must be connected with a TCP/IP port for this purpose. Port number 6004 usually need not be changed. Select the required protocol: UDP or TCP.
Controller systems	Is only used for communication in pass-through mode via Ethernet. The transparent mode unit must be connected with a TCP/IP port for this purpose. Define whether you want the pass-through mode to apply to controller 1 or 2.
Mode	Select pass-through mode as the communication type. Timeout Enter a time interval in seconds after which the terminal will change from pass-through mode back to run mode if no pass-through communication has taken place.

You can use pass-through mode for serial communication as well as for connection via Ethernet.

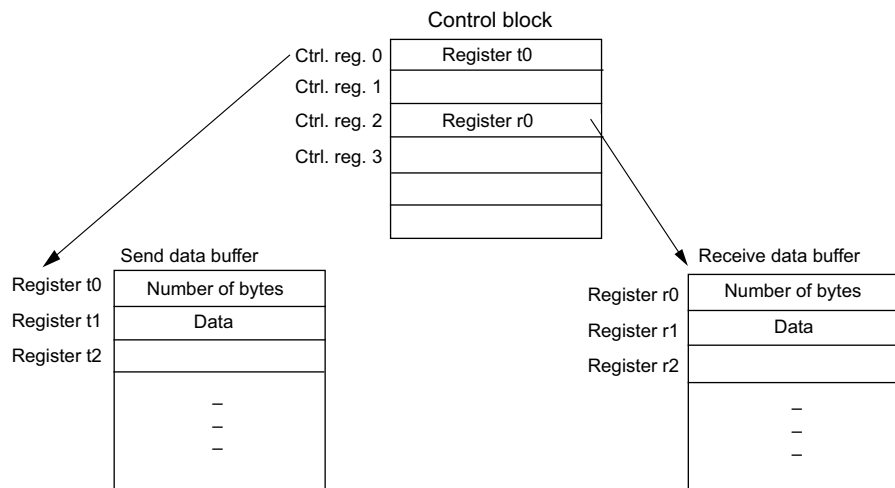


10.1.5 Using the terminal as communication interface (no protocol mode)

The no protocol mode is used for connecting different controllers or for connecting external devices (e. g. barcode scanners or weighing machines) to the controller. The controller monitors data transfer with the communication port. The data arriving at the communication port is stored in registers. Communication takes place by transferring the data register range that corresponds to the following control block.

Click the right mouse button on [No protocol mode] under [Setup] / [Peripherals].

Tabs	Description
Control register 0	Start register for send data buffer <ul style="list-style-type: none"> The first register in the buffer area contains the total number of bytes to be transferred. The subsequent registers contain the transfer data. The maximum buffer size is 127 registers = 254 bytes.
Control register 1	Command register for transfer <ul style="list-style-type: none"> Set to 1 by the controller if transfer is requested. Set to 0 by the terminal after successful transfer.
Control register 2	Start register for receive data buffer <ul style="list-style-type: none"> The first register in the buffer area contains the total number of bytes received. The subsequent registers contain the received data. The maximum buffer size is 127 registers = 254 bytes.
Control register 3	Command register for reception <ul style="list-style-type: none"> Set to 0 by the controller if the controller is ready to receive data. Set to 1 by the terminal when the message is available. Set to -1 (FFFF) if the message is faulty (e.g. too short). Set to 2 by the controller when the connection buffer is to be cleared. Set to 3 by the controller when the connection buffer has been cleared. The connection buffer is automatically cleared when starting the unit and when changing between transparent mode and no protocol mode. The register is assigned the value 3.
Control register 4	End code (1 or 2 bytes) in the received message.
Control register 5	Length of the received message. The end code is used if the register content is 0.



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No protocol signal

Digital signal for switching between no protocol mode and transparent mode, e.g. for selecting a computer and sending a message.

Under [Setup] / [Peripherals], drag the unit to the required communication connection. Click the right mouse button on [No protocol mode] and choose [Properties] to determine which register is the first control register in the transfer area. This register and the five subsequent registers will be used as control registers.

In run mode, the inverter / PLC can change between no protocol mode and transparent mode. To do so, enter a digital signal in the dialog box in the *No protocol signal* parameter.

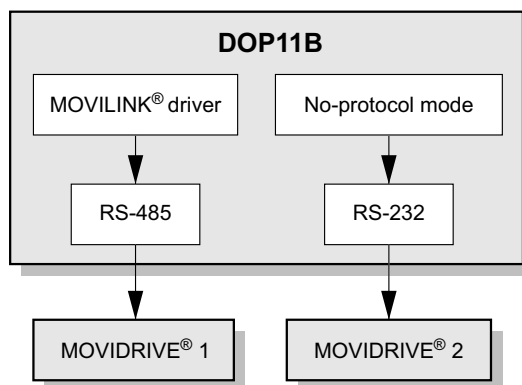
Example of using the no protocol mode

The following example describes the use of the no protocol mode using a MOVILINK® read command.

A MOVIDRIVE® unit is connected to RS-232 and RS-485 respectively on the DOP11B. The MOVIDRIVE® unit connected to the RS-485 interface (MDB1) is controlled as usual using the MOVILINK® driver.

The MOVIDRIVE® unit connected to the RS-232 interface (MDB2) should simulate a barcode scanner, for example. It is assigned RS-232 address 2.

The MDB1 should now read parameters from MDB2 via DOP11B and make them available in IPOS^{plus}® for further processing.



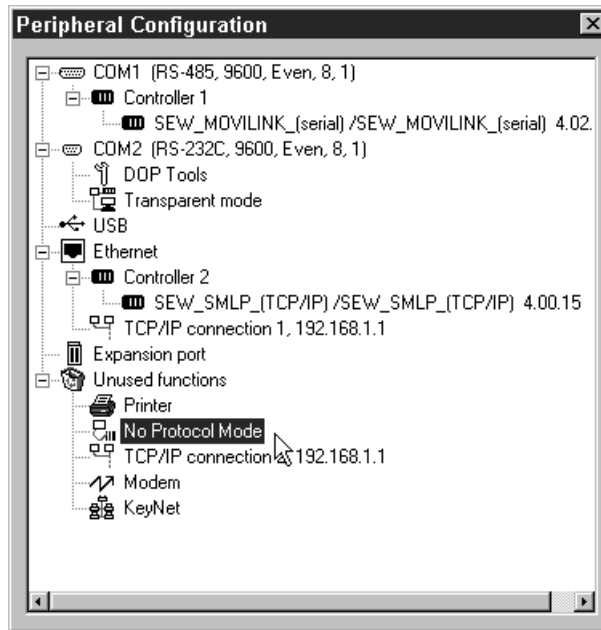
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Make the following settings:

1. Under [Setup] / [Peripherals], drag the [No protocol mode] unit to the required communication port.

Example:



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2. Click the right mouse button on [No protocol mode] / [Properties] to define the first control register.

Example

- No protocol control reg.: H50(Controller 1)
- No protocol at signal: H56.0(Controller 1)

Index 8489 from RS-485 address 2 should be read. The relevant telegram is given as follows in hexadecimal code:

02 02 86 31 00 21 29 00 00 00 00 BF

The control block is defined as H50 to H55 (see above).

At bit H56.0, the program changes to no protocol mode (see above).

The send data buffer should be H60 to H66.

The receive data buffer should be H80 to H86.



Make the following settings in HEX:

Control block

Variable	Hex	Dec	Description
H50:	00 3C;	60	Send data buffer from H60
H51:	00 00;	0	Command register for send
H52:	00 50;	80	Receive data buffer from H80
H53:	00 00;	0	Command register for reception
H54:	00 00;	0	End code for the received message
H55:	00 0C	12	Telegram length of the received message 12 byte

Send data buffer

Variable	Hex	Dec	Description
H60:	00 0C;	12	12 send byte
H61:	02 02, 86 31;	MOVILINK® request: 02 02 86 31 00 21 29 00 00 00 00 BF (See the "MOVIDRIVE® Serial Communication" manual)	
H62:	00 21, 29 00;		
H63:	00 00 00 BF;		
H64:	00 00;		

Set H56.0 = 1 to activate the no protocol mode.

When H51 = 00 01, the telegram defined from H60 is sent.

The sent telegram is written from H80. The terminal then automatically sets H53 to 1.



Input data buffer

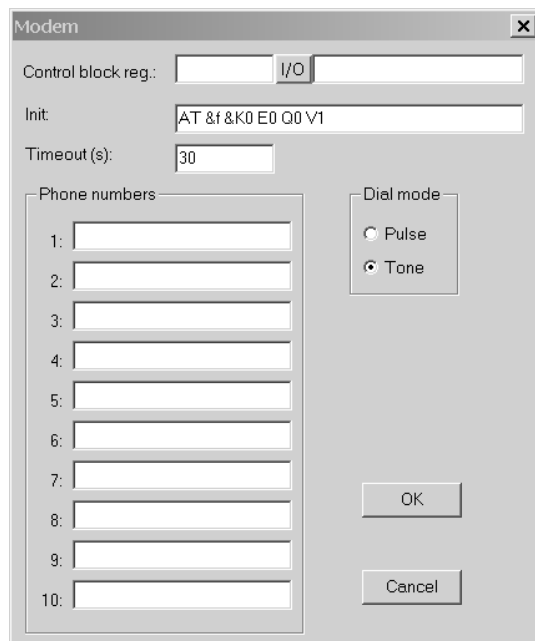
The response should look as follows or similar:

Variable	Hex	Dec	Description
H80:	00 0C;	12	12 bytes received
H81:	1D 02, 86 31;	MOVILINK® response:	
H82:	00 21 29 00;	1D 02 86 31 00 21 29 00 02 49 F0 1B	
H83:	02 49 F0 1B;	(See the "MOVIDRIVE® Serial Communication" manual)	

The entire process was reading index 8489 once. The process can be restarted by setting H51 = 00 01 and H53 = 0.

10.1.6 Connecting a modem

A modem is used for establishing a connection with a PC. You make the connection settings under [Setup] / [Peripherals]. Call up the dialog box by selecting [Modem] and clicking the right mouse button to select [Properties].



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Control block register

Communication is established with three control registers from the control block. The first register in the control block is defined in the [Control block register] dialog box. The functions of the control register are described in the following table.

Tab	Description	
Control register 0	Contains the command that describes how the controller establishes a connection and communication.	
	0	Wait for command
	1 ... 10	Establish a connection using the phone number entered in the [Phone no. 1 - 10] field. Maximum 40 characters are permitted.
	11	Establish a connection using a phone number stored in the controller. The phone number is stored as an ASCII character string that begins in the third control register and in the subsequent registers. The character string must not exceed 40 characters, i.e. 20 registers are permitted. Not all registers must be used. The last register to be read must contain the ASCII code 0.
	101 ... 110	An initialization character string is transferred to the modem. Enter the Hayes modem command in the [Phone no. 1 - 10] field. Command 101 sends the character string entered in the [Phone no. 1] field etc.
	111	An initialization string stored in the controller is sent to the modem. Enter the Hayes modem command that begins in the third control register. See command 11 for more details.
	255	Exiting the connection
Control register 1	The second control register is used as the status register. It contains the result of the modem commands. The status register can include the following:	
	Status codes	
	0	Command was executed correctly
	1	Establish connection
	2	Modem has established a connection
	3	Modem has received a dial tone.
	Error codes	
	101	No connection
	102	Modem carrier signal lost
	103	Unknown modem error
	104	Modem does not receive a dial tone
	105	Busy while establishing a connection
	106	No response while establishing a connection
	107	No response from the modem
	255	Unknown fault / status
Control register 2	The operator terminal can establish a connection with the controller using a phone number stored in the controller. The phone number is stored as an ASCII character string that begins in the third control register and in the subsequent registers. The character string must not exceed 40 characters, i.e. 20 registers are permitted. Not all registers must be used. The last register to be read must contain the ASCII code 0.	



Init

Initialization string for the modem.

Timeout (ms)

Number of seconds after which an inactive line is interrupted. The predefined value is 30 s. You can enter a time between 5 and 600 s.

Dial method

Pulse or touch-tone dialing.

Phone number 1-10

Complete phone number for establishing a connection.

10.2 Network communication

Network communication takes place using TCP/IP (Transmission Control Protocol/Internet Protocol). TCP/IP stands for a group of standard protocols for the exchange of data between systems and devices. The operator terminals can be integrated in the network via Ethernet or serially.

The Ethernet connection of the operator terminal supports TCP/IP connections. The connection takes place in line with the Ethernet standard.

The terminal network is a client/server network. Only clients can access data in the network. The data is provided by servers. An operator terminal can function simultaneously as a client and a server, i.e. it can provide data and receive data from other terminals at the same time. Up to 20 clients can retrieve data from the same server. One client can access data from up to 16 different servers.

All operator terminals must have an IP address. IP addresses from 192.168.0.0 to 192.168.254.254 are recommended for local networks.

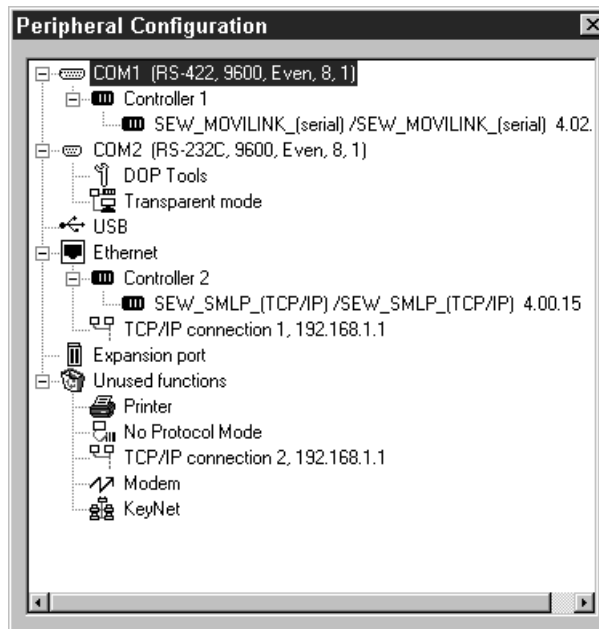
Standard Internet tools, such as web browsers, mail servers, FTP clients and VNC clients, can be used for working on the operator terminal. Web pages can be created on the PC and transferred to the operator terminal. The web pages can contain real-time data from the controller or terminal. Browsers and scripts are used to change values, create signals and confirm alarms. The VNC client can be used to enable remote control and remote access to the operator terminal.

The operator terminal can also send e-mails when certain events occur (e.g. alarms and status reports).



10.2.1 Network communication via Ethernet

In the project manager, double click on [Peripherals] to call up the dialog box [Peripheral configuration].

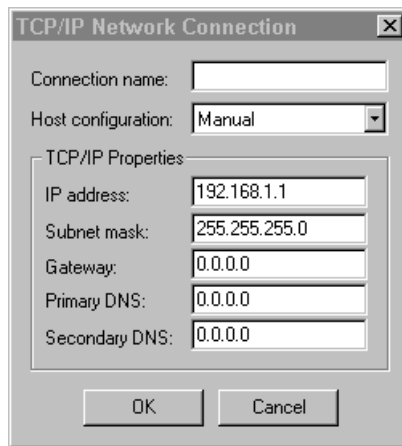


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Features

Right-click on [TCP/IP connection 1] and choose [Properties] to define the properties of the TCP/IP network.



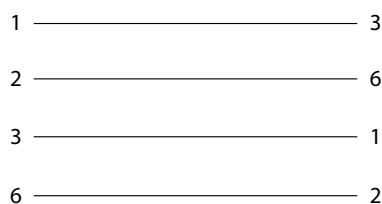
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Parameters	Description
Connection name	Enter a name for the connection. You do not have to enter any parameters.
Host configuration	If [Manual] is selected, the settings made in the [TCP/IP properties] dialog box will be used. Choose another setting when the operator terminal receives one or more TCP/IP parameters from the server.
IP address and subnet mask	Enter the network ID for the node (terminal). Network connection takes place in line with the Ethernet standard. For a local terminal network, IP addresses between 192.168.0.0 and 192.168.254.254 are recommended.
Gateway	Specify which network device can identify other networks in the local network.
Primary DNS and secondary DNS	Enter the DNS server(s).



Ethernet connections

The following section gives two examples of Ethernet connections.



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[1] Node 1

[2] Node 2

Connection between two operator terminals with twisted-pair cable (TP)

The cables have RJ45 connectors. The cable is a shielded or unshielded twisted pair (crossed) CAT5 cable. The distance between operator terminals must not exceed 100 m.

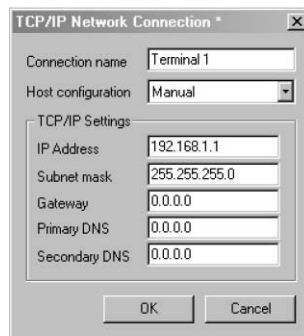


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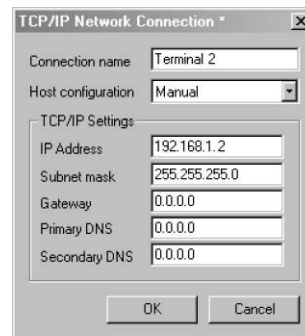
If data exchange does not function properly and the green LED (Link) is not illuminated, you have probably mixed up connections 3 and 6.



TCP/IP settings in the nodes



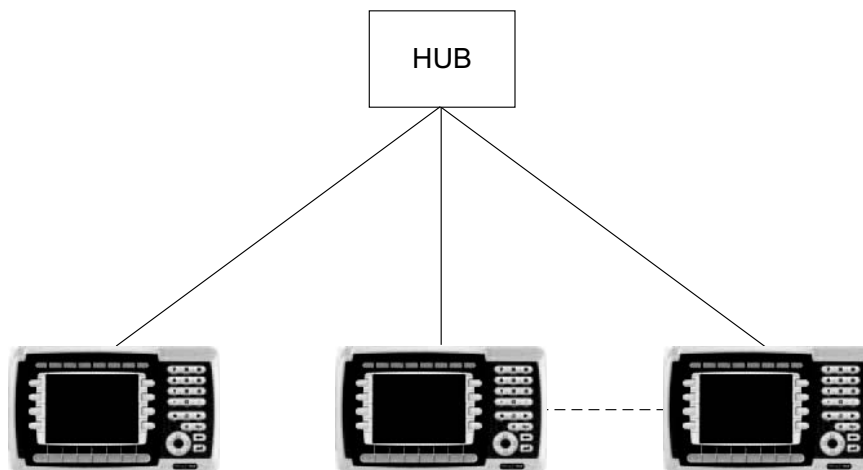
[Setup] / [Network] / [TCP/IP-Connections]



[Setup] / [Network] / [TCP/IP-Connections]

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Connection between more than two operator terminals with twisted-pair cable (TP)



- | | | |
|---|-------|---|
| 1 | _____ | 3 |
| 2 | _____ | 6 |
| 3 | _____ | 1 |
| 6 | _____ | 2 |

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The maximum length between operator terminal and hub is 100 m. The maximum number of nodes per hub depends on the number of connections on the hub. The cables have RJ45 connectors. The cable is a shielded or unshielded twisted pair CAT5 cable.



10.2.2 Serial network communication / PPP

Making the connection

Choose [Setup] / [Peripherals] from the menu. In the [Peripheral configuration] dialog box, select a TCP/IP connection and keep the left mouse button pressed. Drag the mouse to the [COM1] or [COM2] and release the mouse button. TCP/IP connection 1 must be used before TCP/IP connection 2 becomes available.

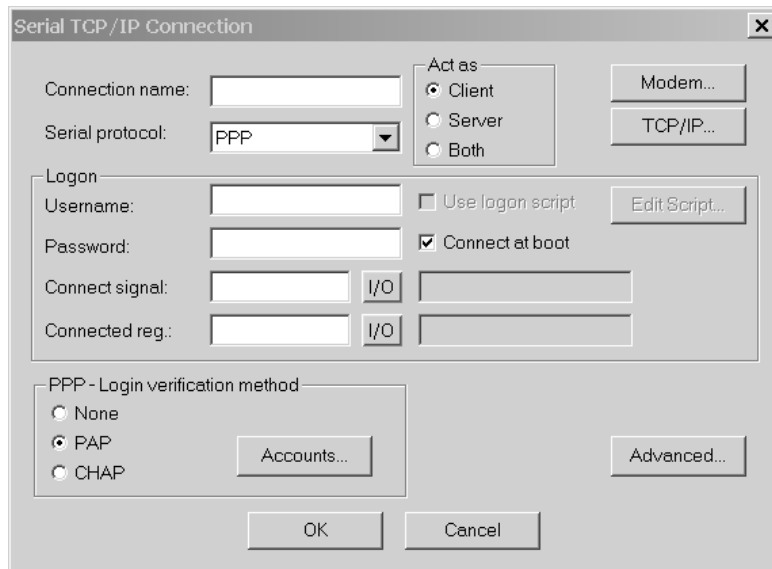
INFORMATION



The parity on the port for the TCP/IP connection must be set to "None".

Setup

Right-click on [TCP/IP connection 2] and choose [Properties] to define the properties of the TCP/IP network.



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Parameters	Description												
Connection name	Enter a name for the connection. You do not have to enter any parameters.												
Serial protocol	The PPP protocol is used for serial communication.												
User Name	User name to log in to the remote network.												
Password	Password to log in to the remote network.												
Connect signal	Digital signal to activate (1) or disconnect (0) the connection.												
Connected register	Analog register that can have one of the following states:												
	<table border="1"> <thead> <tr> <th>Tabs</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Disconnected (PPP client)</td> </tr> <tr> <td>1</td> <td>Wait for connection (PPP server)</td> </tr> <tr> <td>2</td> <td>Connected as PPP client</td> </tr> <tr> <td>3</td> <td>Connected as PPP server</td> </tr> <tr> <td>7</td> <td>Connection error</td> </tr> </tbody> </table>	Tabs	Description	0	Disconnected (PPP client)	1	Wait for connection (PPP server)	2	Connected as PPP client	3	Connected as PPP server	7	Connection error
	Tabs	Description											
	0	Disconnected (PPP client)											
	1	Wait for connection (PPP server)											
	2	Connected as PPP client											
3	Connected as PPP server												
7	Connection error												



Parameters	Description	
Connect at boot	With a PPP connection, the terminal can be connected automatically to another terminal or PC at startup.	
PPP login validation method	Choose a method for validating the user ID. This value usually need not be changed.	
Accounts	Determines who has access to the services.	
Act as	Determines whether the operator terminal should act as a PPP client and / or a PPP server, i.e. whether it should establish a remote data transmission connection or whether another host should dial into the operator terminal.	
Modem	The parameters under [Modem] are only relevant for modem connections. The modem is connected to a commercially available modem cable.	
	Parameters	Description
	Enable modem	The unit checks whether a modem is connected.
	Disconnect if idle (min)	Interrupts the connection if it has been idle for the specified number of seconds. Entering 0 means the connection will never be interrupted.
	Phone number	Enter the remote data transmission number to be dialed.
	Control code for modem	Character string for modem initialization. Refer to the modem manual for more information.
TCP/IP	TCP/IP connection parameters. When the operator terminal is connected to a remote host, the parameters <i>IP address</i> , <i>Subnet mask</i> and <i>Gateway</i> are overwritten by the settings under [Advanced].	
	Parameters	Description
	Host configuration	If [Manual] is selected, the settings made in the [TCP/IP properties] dialog box will be used. Choose another setting when the operator terminal receives one or more TCP/IP parameters from the server.
	IP address and subnet mask	Enter the network ID for the node (terminal). Network connection takes place in line with the Ethernet standard. IP addresses in the range of 192.168.0.0 and 192.168.254.254 are recommended for a local network that only consists of terminals.
	Gateway	Enter the network unit in the local network that is capable of identifying the other networks in the Internet.
	Primary DNS and secondary DNS	Enter the DNS servers here.

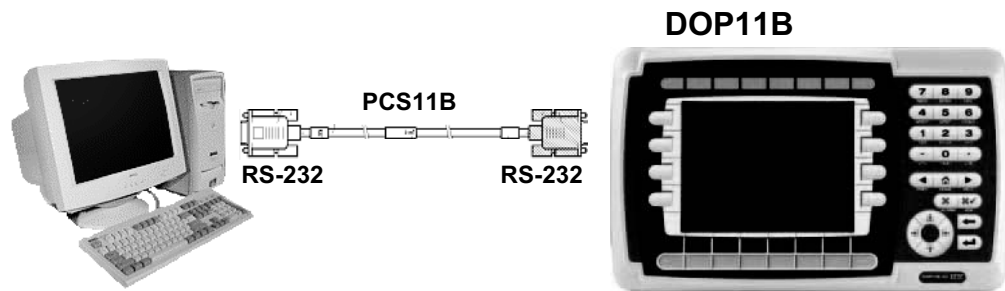


Parameters	Description										
Advanced	Choose [Advanced] to define additional parameters.										
	<table border="1"> <thead> <tr> <th>Parameters</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Use VJ compression for IP headers</td> <td>Compression of the IP header. This value usually need not be changed.</td> </tr> <tr> <td>Supply/request remote address</td> <td>The local IP address is requested and provided. Should be set to 0.0.0.0 if the IP address is to be assigned by the remote node.</td> </tr> <tr> <td>Use remote address as gateway</td> <td>Activate this option if you want to use the IP address of the remote node as gateway (connection port to another network). The option is disabled by default. Note: Data transfer is not possible if the [Use remote address as gateway] checkbox is disabled and you are using a subnetwork. In this case, you cannot send e-mails from the operator terminal either, but other units can log into the operator terminal using an FTP client or browser.</td> </tr> <tr> <td>Supply/request local address</td> <td>The IP address for the remote node is requested and provided. Should be set to 0.0.0.0 if the IP address is to be assigned by the remote node.</td> </tr> </tbody> </table>	Parameters	Description	Use VJ compression for IP headers	Compression of the IP header. This value usually need not be changed.	Supply/request remote address	The local IP address is requested and provided. Should be set to 0.0.0.0 if the IP address is to be assigned by the remote node.	Use remote address as gateway	Activate this option if you want to use the IP address of the remote node as gateway (connection port to another network). The option is disabled by default. Note: Data transfer is not possible if the [Use remote address as gateway] checkbox is disabled and you are using a subnetwork. In this case, you cannot send e-mails from the operator terminal either, but other units can log into the operator terminal using an FTP client or browser.	Supply/request local address	The IP address for the remote node is requested and provided. Should be set to 0.0.0.0 if the IP address is to be assigned by the remote node.
Parameters	Description										
Use VJ compression for IP headers	Compression of the IP header. This value usually need not be changed.										
Supply/request remote address	The local IP address is requested and provided. Should be set to 0.0.0.0 if the IP address is to be assigned by the remote node.										
Use remote address as gateway	Activate this option if you want to use the IP address of the remote node as gateway (connection port to another network). The option is disabled by default. Note: Data transfer is not possible if the [Use remote address as gateway] checkbox is disabled and you are using a subnetwork. In this case, you cannot send e-mails from the operator terminal either, but other units can log into the operator terminal using an FTP client or browser.										
Supply/request local address	The IP address for the remote node is requested and provided. Should be set to 0.0.0.0 if the IP address is to be assigned by the remote node.										
	<pre> graph LR subgraph Node1 [Node 1] R1[Remote 192.168.1.2] L1[Local 192.168.1.1] end subgraph Node2 [Node 2] R2[Remote 0.0.0.0] L2[Local 0.0.0.0] end Node1 --> Node2 Node2 --> Node1 </pre>										



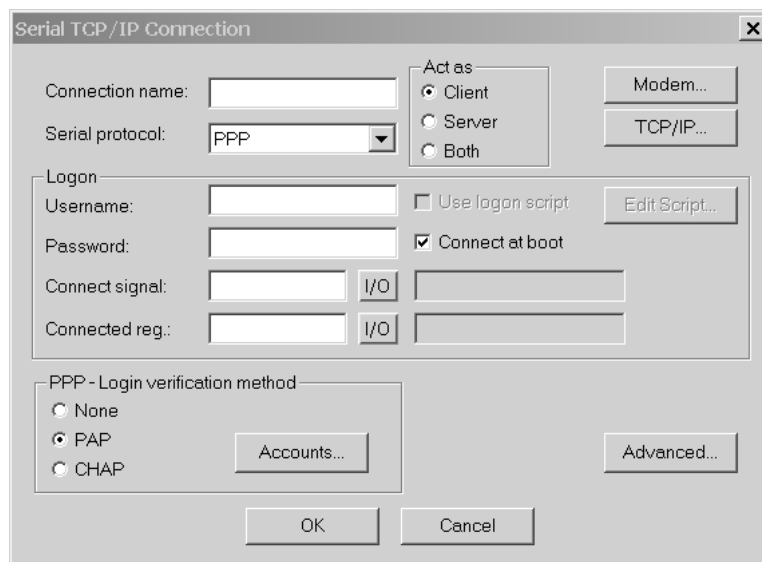
Serial connection

PPP connection between operator terminal and PC



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Properties in the operator terminal



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Choose the TCP/IP connection for the serial connection.

The properties under TCP/IP (IP address, subnet mask and gateway) are not relevant in this case. The PPP is responsible for changing parameters.

INFORMATION

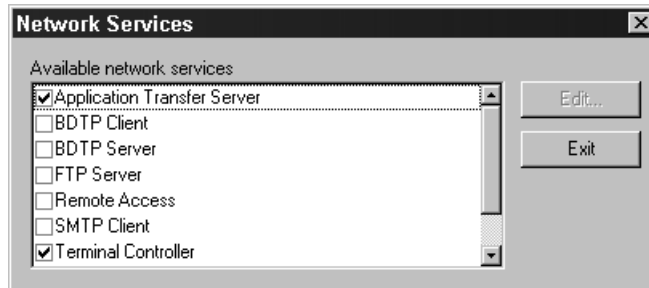
More information can be found in the PC operating system manual.





10.3 Network services

In the project manager, double-click on the directory [Network connections] and choose [Network services]. Select the services that the operator terminal should provide in the network. Select the checkbox to activate a service. To change the properties of a service, choose [Edit].



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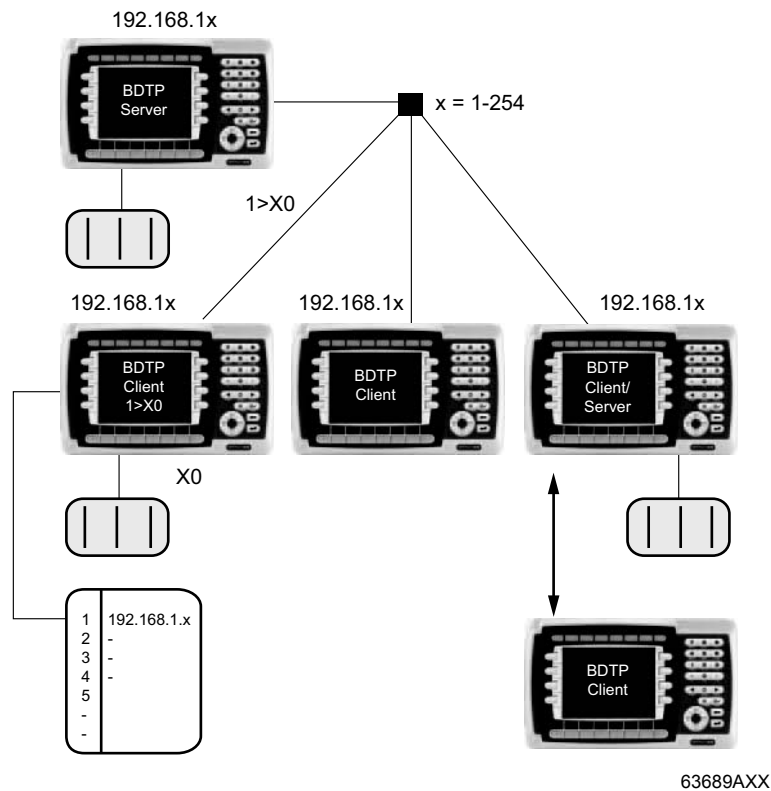
10.3.1 Project transfer server

Projects are transferred using TCP/IP. From the list, choose the option [Project transfer server] and click on [Edit] to enter the number of the port that should be used for the transfer. This value usually need not be changed.



10.3.2 BDTP

BDTP is a protocol that uses client/server communication. A client requests information and obtains this information from the server. The BDTP server can receive I/O requests from the BDTP clients. The operator terminal can be a server, a client, or both at the same time. A client can request data from a maximum of 16 servers. The IP addresses of the server are specified in the BDTP client. Each server can supply up to 20 clients with information. Network communication via BDTP is used to connect two or more operator terminals with one or two controllers, or several terminals with two or more controllers at the same performance level. Example: Production lines with one operator terminal at each work station. If the BDTP server fails, the client will continue to use the existing system connection. The client does not perform a restart to establish a server connection. When the server is active, BDTP communication takes place as before.





10.3.3 BDTP client

For the BDTP client network service, IP addresses are defined for the BDTP server in the network from which the client will request information. From the list, choose the option [BDTP client] and click on [Edit] to select the properties.

Setup BDTP Client Service

General setup

BDTP server port: 6002

Default BDTP server: None

Data register: I/O

Control block: I/O

Synchronize clock with server: 1

BDTP server connections

BDTP server address

Index	BDTP Server

Update
Append
Delete

OK Cancel

11587AEN

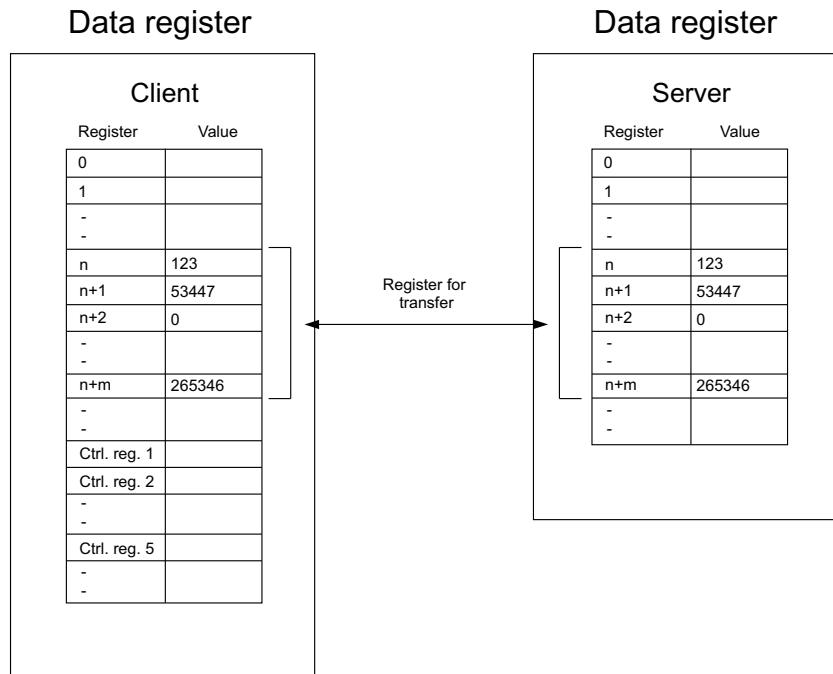
BDTP server port Enter the communication port to which the BDTP server or the network is connected. This value usually need not be changed.

Standard BDTP server You can specify a standard server which will be used by default. If no other entry is made for I/O, the signals will be requested from this server.



Data register

The values in the data register can be transferred between a client and various servers in the network. The first register in the register block of the client that is to be transferred to or from the specified server is defined under Data register. The register type must be the same for client and server.



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Control block

The control block specifies the first register in the control block of the client, which occupies a total of five registers.

Tabs	Content	Description
Control register 1	Command	Command register defined in the client.
		Available commands:
		0 No command
		1 Transfers the register values from the client to the server specified in control register 3. 2 Transfers the register values from the server, which is specified in control register 3, to the client.
Control register 2	Result code	Result code register defined by the client.
		Available commands:
		0 Ready for new command
		1 OK 2 Transfer error
Control register 3	Server index	Number of the server in the network with which data is exchanged.
Control register 4	Index register	The value in the index register is added to the address of the register specified under <i>Data register</i> . When a zero is entered, the register block starts for the address specified in the <i>Data register</i> .
Control register 5	Number of registers	Number of registers whose values are to be transferred from or to the specified server.



The following procedure must be followed for transfer:

1. The result code register must be 0. If it is not, set the command register to 0.
2. Enter the command in the command register.
3. Wait for the ready signal or the error code in the result code register.
4. Set the command register to 0. The operator terminal will then set the result code register to 0.

Synchronize clock with server

Specify whether you want the clock in the client to be synchronized with a certain server (terminal). To do so, enter the number of the required server in the selection field. If the clock in the client is changed locally, the new data will also be transferred to the server.

BDTP server address

Enter the IP address for the server from which the client is to request data. The addresses are indexed in the order they are entered.

When programming the object, it is essential to specify the server from which the address is to be requested. In the address field of the object dialog boxes, enter the text "Server index>device".

For example, if you enter "2>D15" in the address field, the value for the object from register D15 on the server will be retrieved using index 2.

You can change the server index in a client project using the [BDTP station change function].

INFORMATION



If no controller is connected to the BDTP client (operator terminal), the inverter/PLC 1 and inverter/PLC 2 units must be dragged from the RS-232C / RS-422 / RS-485 interfaces to "Unused functions" in the [Peripheral configuration] dialog box. Call up this dialog box from [Setup] / [Peripherals].



10.3.4 BDTP server

The BDTP server handles queries from clients and supplies clients (terminals) with information after a request from a client (terminal). From the list, choose the option [BDTP server] and click on [Edit] to select the properties.

Parameters	Description
Server port	Communication port for the BDTP server. Usually need not be changed.
Max. clients	Maximum number of BDTP clients (terminals) in the network.
Data register	The values in the data register can be transferred between a server and various clients in a network. The first register in the register block of the server that is to be transferred to or from the specified client is defined under [Data register]. The register type must be the same for client and server. Data transfer can only be controlled from the clients. More information on data transfer can be found in the section "BDTP client" on page 292.
Clock server	Specify whether you want all other clients in the network to be synchronized to the current server clock. See also the section "BDTP client" on page 292.

10.3.5 FTP server

FTP (File Transport Protocol) is a standard Internet protocol and the easiest way of exchanging files between computers on the Internet. FTP is an application protocol using the TCP/IP Internet protocol. FTP is usually used to transfer web sites from the computer where they were created to a server connected to the Internet. FTP can also be used for downloading programs and other files from another server (terminal) to your computer. Files can be transferred from or to the terminal when the terminal acts as FTP server. An FTP client must be installed on the PC for file transfer, such as DOP Tools, Internet Explorer, Windows Commander or another FTP standard software.

Files with a length of 0 are displayed in certain libraries. The reason for this is that these files contain dynamic data, which means that their size changes. This means a file of the length 0 is not necessarily empty. The terminal does not work with the file date. Therefore, the date values displayed are not relevant. The terminal can save the contents of all files that can be accessed via FTP using various separators. You can use the following characters as separators for the file contents: Tab (→), semicolon (;) or colon (:).

Make the FTP separator setting in HMI Builder under [Setup] / [Terminal options]. The file name must not contain national special characters, such as, Ä, Ö and Ü. The FTP server of the terminal can process up to three connected clients simultaneously.



INFORMATION



The files in the individual libraries increase the project memory load. For information on the available project memory, see the file `info.txt` in the master directory [Root].

This function facilitates data transfer from a PC to and from the terminal. The FTP server in the terminal supports data transfer in passive mode (PASV). The passive mode should be used if the terminal is **not** connected using PPP connection. This is necessary because it is not possible to determine in advance which components are connected between client and server, e.g. router-based firewalls or gateways.

Using passive mode eliminates several errors. Web browsers use this mode as standard. Passive mode can also be used with PPP connections. Special country-specific characters in file names are not supported. The terminals do not evaluate the dates of files.

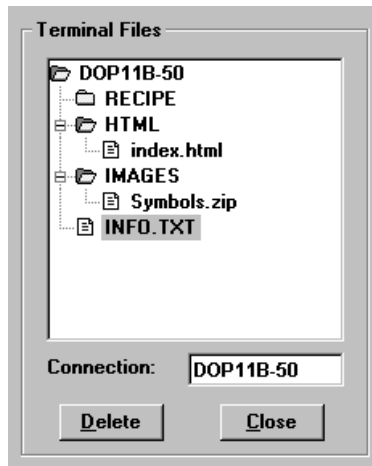
To make the settings for this function, select the entry [FTP server] from [Setup] / [Network / [Services] and click [Edit].

12002AEN

Parameters	Description
Control port number	The default value is 21 and should not be changed.
Data port number	The default value is 20 and should not be changed.
Request login	Here you specify whether the user has to log in to gain access to the FTP server (terminal). Make the user definition under [Setup] / [Network] / [Accounts]. See the section "Network accounts" on page 321. If you do not activate this option, all users will have unlimited access right to the FTP server.
Pre login text	Text that appears after the login: e.g. "You have to log in to the terminal. Enter the login data."
Post login text	Text that appears after the login: e.g. "You are logged in."
Connection timeout (min)	Permitted idle time for the FTP connection before the FTP server (terminal) will disconnect the connection. The default value is 10 minutes.



Master directory



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The master directory (current terminal name) comprises the following directories:

- ALARMS
- HTML
- RECIPE
- TRENDS
- IMAGES

Only directories for which the user has access rights (per account) are shown. The `info.txt` file containing information on the terminal is also stored here.

info.txt file

The `info.txt` file contains the following information on the terminal:

DOP11B-40

Firmware version: V1.20

Build number: 89

Driver1: SEW_MDR 4.01.00

Driver2: MODBUS Master 4.00.06

Dynamic memory: 20328448 bytes free (bytes unoccupied)

Project memory: 1077586 byte used (bytes occupied)

IP address: 10.3.71.2

No files can be deleted from the master directory even if the user has write access. Deleting the [HTML], [RECIPE] or [IMAGES] directories deletes the contents of the respective directory. The directory itself will not be deleted.



[ALARMS] directory

This directory is only shown if alarms have been defined in the terminal and the terminal is in run mode. The alarm groups are displayed as SKV files with a length of 0. This does not necessarily mean that there are no alarms. They are read-only files.

Each alarm is stored in a line ending with a carriage return and a line feed .

File format

A semicolon (;) is used as separator.

Status;Activation date;Activation time;Deactivation date;Deactivation time;Acknowledgement date;Acknowledgement time;Alarm text

All fields are always available. The date and time fields of unacknowledged alarms are empty.

The file is completed with "END" (carriage return, line feed).

[HTML] directory

This directory contains files that are managed by the web server. You can create sub-libraries. The start file (HTML page shown as the start page in the web browser) must always have the name `index.htm`.

The file format depends on the file type. Standard file formats such as HTML are used.

[RECIPE] directory

The individual recipes in the respective recipe directories are displayed as SKV files with a length of 0. This does not mean the recipe is empty. Read and write access is available for files in this library.

Each recipe value is stored in a line ending with a carriage return and a line feed .

File format

A semicolon (;) is used as separator.

e.g. signal;value;date type;length

The file is completed with

"END" (carriage return, line feed).

If the file is of the "Array" (AR) type, each line contains a value. The first line looks as described above. All subsequent lines only have the following entry:

;value



Data types for analog signals

Type	Description
Unoccupied	16-bit character
+	No 16-bit character
L	32-bit character
L+	No 32-bit character
RB	BCD format floating point number
RF	Floating point number with exponent
SB	16-bit BCD format
LB	32-bit BCD format
SH	16-bit hexadecimal
RS	32-bit hexadecimal
RD	Floating point number
AR	16-bit array (signed)
ST	Character string
BI	Bit 0 or 1

[TRENDS] library

This directory is only available if trends have been defined in the terminal and the terminal is in run mode. The various trend objects are displayed as SKV files with a length of 0. They are read-only files. Curve 1 must be used to make sure a trend is valid, Each measured value is stored in a line ending with a carriage return and a line feed.

File format

A semicolon (;) is used as separator.

e.g. Date;time;value1;value2;value3;value4;value5;value6;OFF

The file is completed with

"END" (carriage return, line feed).

Only the number of curves available in the trend (no empty fields) will be transferred.

In the following cases, "OFF" is included in the measured values and indicates an interruption in the capture process.

- When the terminal changes to run mode, a copy of the latest sample will be saved. The copy is marked with "OFF". As soon as the terminal has received the valid value, the new values will be saved without the "OFF" mark.
- When the signal for trend activation is output, a copy is marked with "OFF." When the signal is output, a new value is saved without the "OFF" mark.
- When the stored value is transferred using FTP or HMI-Tools, a sample will be saved marked with "OFF". After the transfer is complete, a new value will be saved without the "OFF" mark.



[IMAGES] directory

You can save graphics in BMP format in this directory. Bitmap graphics can be displayed in static symbol objects when the terminal is in run mode.

Files in this directory can be written, overwritten and deleted. It is not possible to create new sub-libraries. If you activate the [Use dynamic bitmaps] checkbox for a static symbol object, the terminal will call up the specified bitmap file (`namn.bmp`) from the [IMAGES] directory in the terminal file system. In run mode, the bitmap graphic will be displayed on the terminal screen.

The graphic to be displayed must be transferred to the directory via FTP. You can add, exchange or delete dynamic bitmap graphics via FTP. This is done by overwriting, saving or deleting BMP files in the [IMAGES] directory. The image for a dynamic bitmap graphic object is only displayed on the terminal in run mode.

The bitmap graphics in the directory are not available in HMI Builder and can therefore not be displayed.

INFORMATION



Use the same X and Y size for the BMP graphic in the library and for the symbol object defined in HMI Builder.

Files cannot be accessed from the [IMAGES] directory.

When a BMP file is sent to the [IMAGES] directory, transfer is stopped briefly for the time it takes the terminal to convert the standard BMP format into the terminal's special BMP format.

10.3.6 STMP client

SMTP (Simple Mail Transfer Protocol) is a TCP/IP protocol used for sending and receiving e-mails. SMTP is usually used together with one or two other protocols (POP3 or IMAP) as SMTP only provides limited functions for saving received messages. These protocols allow the user to save messages in a server mailbox and retrieve them later. This means SMTP is used for sending e-mails and POP3 or IMAP are used for retrieving e-mails from the local server.

The terminals can act as SMTP client (send e-mails). A mail server is required for using the SMTP client function.

You can use the mail server of your Internet service provider for this purpose. You can also use a local mail server.

This function makes it possible to send e-mails from the operator terminal. You need a mail server to use the SMTP client function so that the operator terminal can send mails. The recipient can access the mails from the mail server. You can use the mail server of your Internet service provider or a local mail server. You can attach trend and recipe files to an e-mail. The attached files can only be read using DOP Tools. Up to a maximum of 20 messages can be sent simultaneously.



Under [Setup] / [Network] / [Services], select the entry [SMTP client] and click [Edit].
Make the following settings here:

12003AEN

Parameters	Description
Server port	The default port number 25 usually need not be changed.
Mail server	IP address for the mail server or alias name (DNS server) for the SMTP mail server. If you enter an alias name, you have to enter the IP address for the DNS server under [Setup] / [Network] / [TCP/IP connections].
Authentication	Is used when the mail server requires SMTP authentication. With SMTP authentication, the user must log on before he can access mails. User name: User names for SMTP authentication Password: Password for SMTP authentication
My e-mail address	Enter your e-mail address. The recipient will see this name as sender. If possible, enter an e-mail address to which the mail server can send back error messages in case of an error.
Send via connection	Specify the TCP/IP connection to be used for sending the e-mail. Note that TCP/IP connection 1 must be used before TCP/IP connection 2 is available.
Predefined recipients	Predefined list with a maximum of 16 recipients (e-mail addresses) to which the terminal will send messages. The maximum length for a recipient address is 60 characters.



Sending alarms by e-mail

Alarms can not only be printed but can also be sent by e-mail. You can transfer the entire alarm list by sending block 990 (see the section "Sending reports by e-mail" on page 303).

Each alarm can be linked to one or more e-mail addresses in the configuration of the SMTP client. You can make a general setting for the status of alarms being sent by e-mail under [Setup] / [Alarm settings]. See the section "Alarm management" on page 320.

11575AEN

Parameters	Description
Info block	If an info block (text block) is specified, it will be included in the e-mail. See the section "Alarm management" on page 320.
Mail to address	Specify the mail recipient. You can choose up to eight recipients from the predefined list in the [Setup SMTP client service] dialog box.



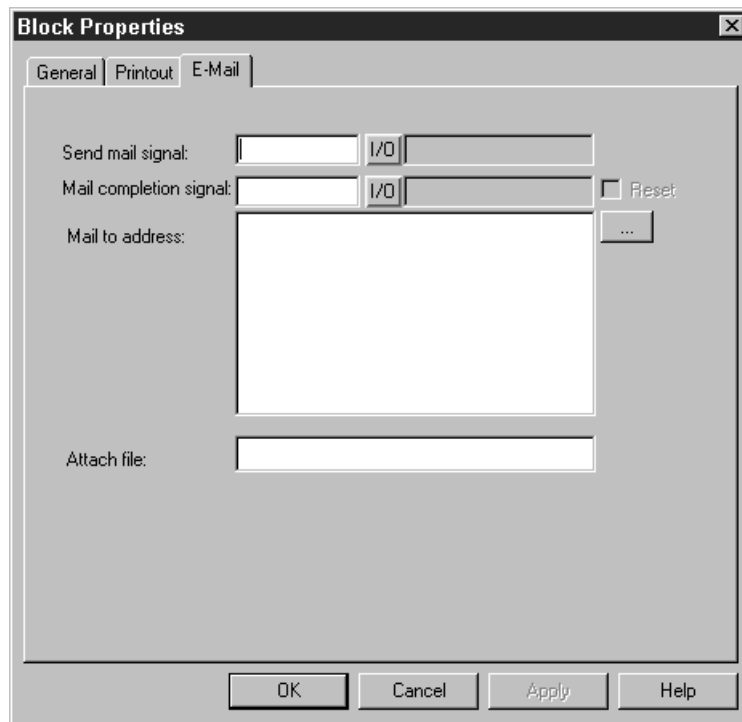
**Sending reports
by e-mail**

Text blocks can not only be printed but can also be sent by e-mail. Alarm block 990 can also be sent as an e-mail.

INFORMATION



Only text blocks can be sent. Alarm block 990 is the only system block that can be sent as e-mail. Trend and recipe files can be sent as attachment to the e-mail message.



11589AEN

Parameters	Description
Send mail signal	An e-mail will be sent when the specified digital signal is activated.
Mail completion signal	Digital signal that is output by the terminal after an e-mail has been sent. The signal is usually activated by the terminal. Selecting the [Reset] option will reset the signal once the e-mail has been sent.
Mail to address	The e-mail address of the recipient is entered in this field. Clicking the [...] button enables you to select up to eight recipients from a list. The list with e-mail addresses is created under [Setup] / [Network] / [Services] in the [Set up SMTP Client Service] dialog box.
Append file	Enter the name of a trend or recipe file you want to attach to your mail. If a trend file and a recipe file have the same name, the trend file will be attached. The file name must not contain national special characters, such as, Ä, Ö and Ü.



Sending e-mails via system block

A block jump to the [E-mail] system block (993) enables you to create and send messages in run mode.

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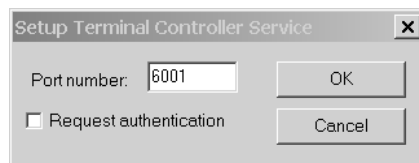
10811AEN

Parameters	Description
Send e-mail	Enter the recipient in this field. You can type an address or select an entry from the global list. To display the global list, press the <LIST> key on terminals with keyboard, or the <MAIL> key on terminals with touchscreen.
Subject	Enter the subject of your message. The subject length is limited to 50 characters. The message text is limited to 10 lines with 50 characters each.



10.3.7 Terminal controller

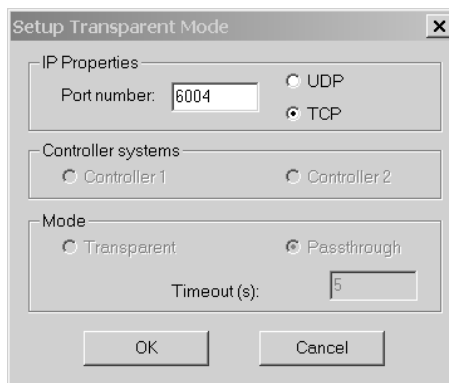
The terminal controller is used to change from RUN to TRANSFER via TCP/IP. Click on [Edit] and enter the port number for the transfer. The port number usually need not be changed. Activate the [Authentication required] option if the user name and password should be specified before transfer. Users are defined under [Setup] / [Network] / [Accounts].



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10.3.8 Transparent mode

Transparent mode is used for communication in transparent / pass-through mode in the terminal network via Ethernet (see also chapters "Communication" on page 269 and "Network services" on page 290). To make the settings for this function, select the entry [Transparent mode] from [Setup] / [Network] / [Services] and click [Edit].



12005AEn

Parameters	Description
IP properties	Port number 6004 usually need not be changed. Select the required protocol: UDP or TCP.
Control systems	Define whether you want the transparent / pass-through mode to apply to controller 1 or 2.
Mode	Select transparent or pass-through mode as communication type. Enter a time interval in seconds under [Timeout] after which the terminal will change from pass-through mode back to run mode if no pass-through communication took place.



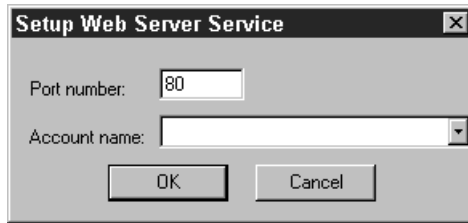
10.3.9 Web server

A web server prepares files so that they can be displayed in a browser (e.g. Internet Explorer). PCs that provide websites must run as web servers.

(WWW server) is a program that uses the client / server model and the Hypertext Transfer Protocol (HTTP) to transfer files that form the web sites of Internet users (with computers with HTTP clients). A web server program must also be installed on all PCs or terminals in the Internet that contain a web site.

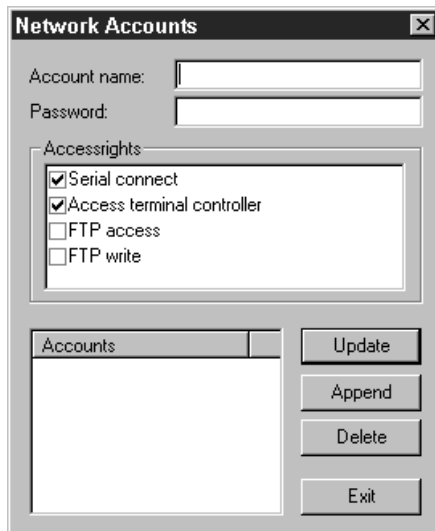
You can configure the web server in the terminal with this function. A web server is a program based on a client/server model that uses Hypertext Transfer Protocol (HTTP). Web servers process files into websites or web pages that can be displayed by HTTP clients.

See also the section "Network services" on page 290.



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Parameters	Description
Port no.	The standard value 80 does not usually have to be changed.
Account name	Defining an account name protects HTML pages in the operator terminal with passwords. Accounts are defined under [Setup] / [Network] / [Accounts].



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Parameters	Description
Account name	The account name that was specified in the previous dialog box is displayed here. Accounts are defined under [Setup] / [Network] / [Accounts].
Password	Enter a password. All HTML pages are protected with this account name and password. To protect an individual page with another account name and password, add the following code to the HTML header: <pre><HTML> <HEAD> <META name="superuser"¹⁾ content="12345"> </HEAD> Contains the remaining HTML code. </HTML></pre>

1) "superuser" stands for the account name and "12345" for the password.

INFORMATION



The header must contain the above mentioned code. The *Name* and *Content* parameters must have an account name and a password.



SSI script

An SSI (Server-Side Include) is a variable value (e.g. a file) that a server can add to an HTML file before sending it. Process as follows to insert an SSI into an HTML file when creating a web site:

```
<!--#echo var="LAST_MODIFIED"-->
```

The following SSI scripts are supported for displaying terminal values in HTML pages:

Name	Parameters	Description	Example
get_ipaddr.fn	None	Shows the IP address of the web server. Used in the CGI script.	<!--#exec cgi="get_ipaddr.fn"-->
get_domainname.fn	None	Shows the domain name of the web server.	<!--#exe cgi="get_domainname.fn"-->
get_date.fn	Date format e.g. MM/DD/YY or YY-MM-DD. If not specified, the terminal settings will be used.	Shows the terminal date.	<!--#exec cgi="/get_date.fn MM/DD/YY"-->
get_time.fn	Time format e.g. HH:MM:SS or HH:MM. If not specified, the terminal settings will be used.	Shows the terminal time.	<!--#exec cgi="/get_time.fn HH:MM"-->
get_device.fn	X, Y, Z X = device Y = display format (see separate table) Z = length (see following table)	Shows the device value (signal value) of the controller.	<!--#exec cgi="/get_device.fn D5"--> <!--#exec cgi="/get_device.fn D5LH"--> <!--#exec cgi="/get_device.fn M7"--> <!--#exec cgi="/get_device.fn D9ST,30"--> <!--#exec cgi="/get_device.fn D0AR,10"-->
get_diag.fn	None	Shows the diagnostics window of the terminal.	<!--#exec cgi="/get_diag.fn"-->
get_mode.fn	None	Shows the operating mode of the terminal: [RUN] / [PROG] / [SETUP] / [TRANSFER]	<!--#exec cgi="/get_mode.fn"-->



Display format for get_device.fn

Name	Length	Description	Example
None	None	Shows the value in signed 16-bit format.	<!--#exec cgi=/get_device.fn D1"-->
+	None	Shows the value in unsigned 16-bit format.	<!--#exec cgi=/get_device.fn D3+"-->
L	None	Shows the value in signed 32-bit format.	<!--#exec cgi=/get_device.fn D7L"-->
L+	None	Shows the value in unsigned 32-bit format.	<!--#exec cgi=/get_device.fn D2L+"-->
RB	None	Shows the value as 32-bit BCD float (SIMATIC).	<!--#exec cgi=/get_device.fn D10RB"-->
RF	None	Shows the value as 32-bit IEEE float.	<!--#exec cgi=/get_device.fn D8RF"-->
RD	None	Shows the value as 32-bit IEEE float without exponent.	<!--#exec cgi=/get_device.fn D1RD"-->
SB	None	Shows the value in 16-bit BCD format.	<!--#exec cgi=/get_device.fn D3SB"-->
LB	None	Shows the value in 32-bit BCD format.	<!--#exec cgi=/get_device.fn D7LB"-->
SH	None	Shows the value in 16-bit HEX format.	<!--#exec cgi=/get_device.fn D2SH"-->
RS	None	Shows the value in 32-bit HEX format.	<!--#exec cgi=/get_device.fn D1LH"-->
AR	None	Shows the number of values in signed 16-bit format.	<!--#exec cgi=/get_device.fn D5AR,10"-->
ST	None	Shows the number of registers as a character string.	<!--#exec cgi=/get_device.fn D9ST,30"-->

Automatic refresh

The HTML page is usually not automatically refreshed. Adding the following code to the HTML page will enable automatic refresh.

```
<meta http-equiv="Refresh"CONTENT="5">
```

CONTENT specifies how often the page should be refreshed (in seconds).

Example of an HTML page with SSI script

```
<HTML>
<HEAD>
<meta http-equiv="Refresh"CONTENT="5">
</HEAD>
<!--#exec cgi="/get_ipaddr.fn"--><BR>
<!--#exec cgi="/get_domainname.fn"--><BR>
<BR>
One IO:<BR>
<!--#exec cgi="/get_date.fn MM/DD/YY"--><BR>
<!--#exec cgi="/get_time.fn HH:MM"--><BR>
D5 = <!--#exec cgi="/get_device.fn D5"--><BR>
M7=<!--#exec cgi="/get_device.fn M7"--><BR>
D9 (string) = <!--#exec cgi="/get_device.fn D9ST,30"--><BR>
D0-D9 =<!--#exec cgi="/get_device.fn D0AR, 10"--><BR>
D8013 = <!--#exec cgi="/get_device.fn D8013"--><BR>
</HTML>
```



CGI script

The CGI (Common Gateway Interface) is a standard method for a web server to manage data for and from the user. When the user opens a website (by clicking a link or entering an address in the web browser) the server sends back the required page. If you fill in and send a form on a website, it is usually received by an application program. The server returns a confirmation. The procedure for data transfer between server and application is referred to as CGI and belongs to the HTTP protocol.

The following CGI scripts are supported to enable values to be changed in the terminal:

Name	Parameters	Description	Example
set_date.fn	Date format, e. g. MM/DD/YY or YY-MM-DD. If not specified, the terminal settings will be used.	Is used with FORM to set the date in the terminal.	<pre><FORM ACTION="http://<!--#exec cgi="/get_ipaddr.fn"-->/ set_date.fn" METHOD="POST"> <INPUT SIZE=10 MAXLENGTH=10 NAME="YY:MM:DD"> <INPUT TYPE="submit" VALUE="Submit"> </FORM></pre>
set_time.fn	Time format, e. g. HH:MM:SS or HH:MM. If not specified, the terminal settings will be used.	Is used with FORM to set the time in the terminal.	<pre><FORM ACTION="http://<!--#exec cgi="/get_ipaddr.fn"-->/ set_time.fn" METHOD="POST"> <INPUT SIZE=10 MAXLENGTH=10 NAME="HH:MM:SS"> <INPUT TYPE="submit" VALUE="Submit"> </FORM></pre>
set_device.fn	XY X = device Y = display format (see separate table) e. g. D0L + D5SH	Is used with FORM to set a device (signal) in the controller.	<pre><FORM ACTION="http://<!--#exec cgi="/get_ipaddr.fn"-->/ set_device.fn" METHOD="POST"> <INPUT SIZE=10 MAXLENGTH=10 NAME="D0L"> <INPUT TYPE="submit" VALUE="Submit"> </FORM></pre>
set_mode.fn	RUN PROG SETUP TRANSFER	Is used with FORM to change the operating mode of the terminal.	<pre><FORM ACTION="http://<!--#exec cgi="/get_ipaddr.fn"-->/ set_mode.fn" METHOD="POST"> <SELECT NAME="MODE"> <OPTION VALUE="RUN">Run <OPTION VALUE="PROG">Prog <OPTION VALUE="SETUP">Setup <OPTION VALUE="TRANSFER">Transfer </SELECT> <INPUT TYPE="submit" VALUE="Submit"> </FORM></pre>
push_key.fn	(see separate table)	Used to simulate the activation of a terminal key.	<pre><FORM ACTION="http://<!--#exec cgi="/get_ipaddr.fn"-->/ push_key.fn" METHOD="POST"> <SELECT NAME="F2"> <OPTION VALUE="SET">Set <OPTION VALUE="RESET">Reset <OPTION VALUE="TOGGLE">Toggle </SELECT> <INPUT TYPE="submit" VALUE="Submit"> </FORM> <FORM ACTION="http://<!--#exec cgi="/get_ipaddr.fn"-->/ push_key.fn" METHOD="POST"> <INPUT SIZE=1 MAXLENGTH=1 NAME="Key"> <INPUT TYPE="submit" VALUE="Submit"> </FORM></pre>



Display format for set_device.fn

Name	Description
None	Shows the value in signed 16-bit format.
+	Shows the value in unsigned 16-bit format.
L	Shows the value in signed 32-bit format.
L+	Shows the value in unsigned 32-bit format.
RB	Shows the value as 32-bit BCD float.
RF	Shows the value as 32-bit IEEE float.
RD	Shows the value as 32-bit IEEE float without exponent.
SB	Shows the value in 16-bit BCD format.
LB	Shows the value in 32-bit BCD format.
SH	Shows the value in 16-bit HEX format.
RS	Shows the value in 32-bit HEX format.
ST	Shows the number of registers as a character string.



Parameters for push_key.fn

Parameters	Description	Example
KEY	Can assume the following values: A-Z 0-9 ACK LIST MAIN PREV BACKSPACE ENTER SAW DOWN LEFT RIGHT	<pre><FORM ACTION="http://<!--#exec cgi="/get_ipaddr.fn"-->/push_key.fn" METHOD="POST"> Key = <SELECT NAME="Key"> <OPTION VALUE="ENTER">Enter <OPTION VALUE="A">A <OPTION VALUE="B">B <OPTION VALUE="1">1 <OPTION VALUE="2">2 <OPTION VALUE="3">3 <OPTION VALUE="UP">Up <OPTION VALUE="DOWN">Down <OPTION VALUE="LEFT">Left <OPTION VALUE="RIGHT">Right <OPTION VALUE="PREV">Prev </SELECT> <INPUT TYPE="submit" VALUE="Submit"> <P> </FORM></pre>
F1-F22	Can assume the following values: SET RESET TOGGLE	<pre><FORM ACTION="http://<!--#exec cgi="/get_ipaddr.fn"-->/push_key.fn" METHOD="POST"> <SELECT NAME="F2"> <OPTION VALUE="SET">Set <OPTION VALUE="RESET">Reset <OPTION VALUE="TOGGLE">Toggle </SELECT> <INPUT TYPE="submit" VALUE="Submit"> </FORM></pre>

Example of an HTML page with SSI and CGI script

```
<HTML>
<FORM ACTION="http://<!--#exec cgi="/get_ipaddr.fn"-->/ set_date.fn"
METHOD="POST">
Set date here (YY:MM:DD):
<INPUT SIZE=10
    MAXLENGTH=10
    NAME="YY:MM:DD"
    VALUE="<!--#exec cgi="/get_date.fn"-->">
<INPUT TYPE="submit" VALUE="Submit"> <P>
</FORM>
<FORM ACTION="http://<!--#exec cgi="/get_ipaddr.fn"-->/ set_time.fn"
METHOD="POST">
Set time here (HH:MM:SS):
<INPUT SIZE=10
    MAXLENGTH=10
    NAME="HH:MM:SS"
    VALUE="<!--#exec cgi="/get_time.fn"-->">
<INPUT TYPE="submit" VALUE="Submit"> <P>
</FORM>
<FORM ACTION="http://<!--#exec cgi="/get_ipaddr.fn"-->/ set_device.fn"
METHOD="POST">
D0 =
<INPUT SIZE=10
    MAXLENGTH=10
    NAME="D0"
    VALUE="<!--#exec cgi="/get_device.fn D0"-->">
<INPUT TYPE="submit" VALUE="Submit">
</FORM>
</HTML>
```




Saving HTML files via FTP

An FTP standard client, such as [DOP Tools] \ [DOP FTP Client], is used for transferring and saving HTML files to and on the terminal.

See the section "FTP server" on page 295.

The files are transferred to the HTML directory of the operator terminal.

File names must be assigned in DOS format (8.3). The length of the file name is limited to eight characters. HTM is used as the suffix.

INFORMATION

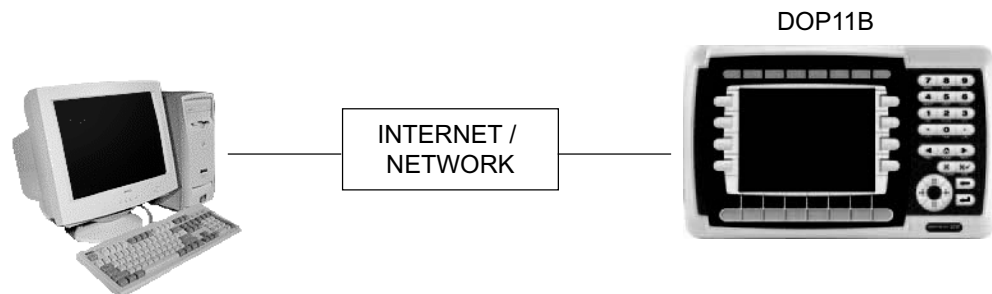


The file INDEX.HTM must always be available.

10.3.10 Remote access

This function enables access to and mirroring and control for an operator terminal from a PC using the free VNC client Remote Access Viewer and the VNC server integrated in the operator terminal.

Remote Access Viewer is a program for remote access and control of the DOP11B operator terminals. The VNC (Virtual Network Computing) client program Remote Access Viewer in conjunction with the integrated VNC server can be used to access, view and control the remote access function in the operator terminal from a PC.



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You can use the VNC technology to access an operator terminal connected to a PC via Ethernet as long as it is connected to the same network. When the PC and operator terminal are connected to the Internet, you can access the operator terminal from any PC with Internet connection from anywhere in the world. The remote access functionality for operator terminals is particularly important for remote customer support, remote control, and troubleshooting.

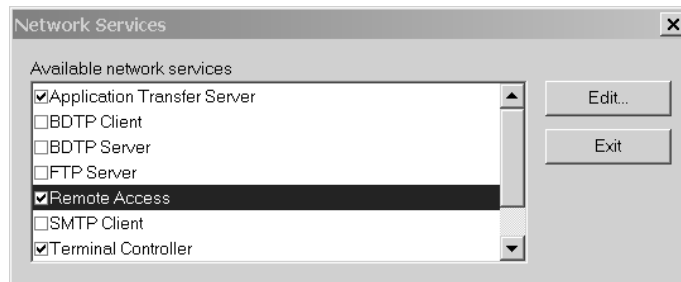


Settings in the operator terminal

The operator terminal has a built-in VNC server. The remote access function must be activated in the project application in the operator terminal. A more detailed description of the configuration tool can be found in the configuration tool manual.

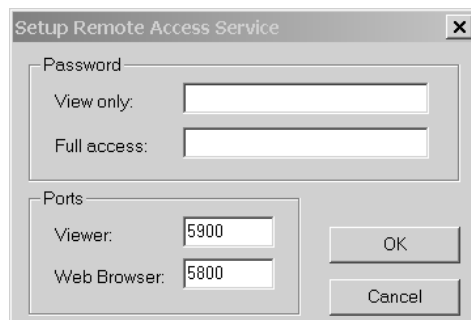
Settings in the configuration tool

1. Open the operator terminal project in the configuration tool.
2. Choose [Setup] / [Network] / [Services].



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3. Select [Remote access] and click [Edit].



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Password

View only	Enter a password for read-only access to the operator terminal in the Remote Access Viewer. A Remote Access Viewer / web browser user that logs on with the view-only password cannot make any changes in the operator terminal.
Full access	Enter a password for full access to the operator terminal in the Remote Access Viewer. A Remote Access Viewer / web browser user that logs on with the password for full access can operate the terminal as if he were standing in front of it.

INFORMATION



If the same password is used for the view-only mode and full access, the Remote Access Viewer / web browser users have full access to the operator terminal.



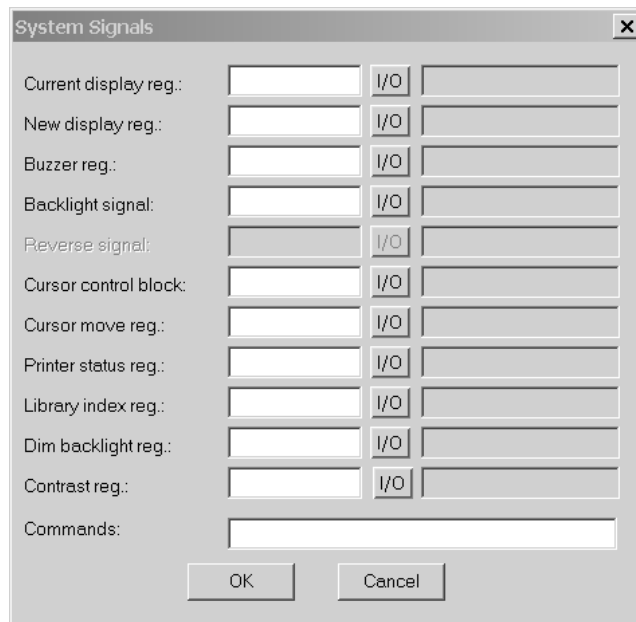
Ports

Viewer (5900)	TCP (Transmission Control Protocol) connection for the Remote Access Viewer; does not usually have to be changed.
Full access (5800)	TCP connection for HTTP (Hypertext Transfer Protocol) connections; does not usually have to be changed.

To end the program, choose OK and Exit. Save the project and transfer it to the operator terminal. The VNC server is now running in the operator terminal.

Command to show whether the VNC client is connected

Enter the command "SJAFx" in the command line under [Setup] / [System signals] in the configuration tool to have the text "Remote access" displayed in the top right-hand corner of the operator terminal when a VNC client (Remote Access Viewer or web browser) is connected with the VNC server in the operator terminal. "x" is an index for the font to be displayed; Available font sizes are displayed in the "Menus" fields in the [Runtime fonts] window ([Setting] / [runtime fonts]).



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Connection to the operator terminal

The VNC server detects HTTP (Hypertext Transfer Protocol) connections on the TCP (Transmission Control Protocol) port 5800 as set in the operator terminal for the remote access function (see page 314).

Enter the IP address of the operator terminal followed by a ":" (colon) and TCP port number 5800 into the address field of the web browser. If the IP address of the operator terminal were 10.3.71.22, for example, you would enter **http://10.3.71.22:5800**.



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Remote Access Viewer displays an image of the operator terminal on the PC screen. The image in the Remote Access Viewer is refreshed on request or at regular intervals. The remote access function fulfills the same function as the actual operator terminal.



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The VNC server integrated in the operator terminal also includes a small VNC applet. You can connect an operator terminal to a web browser that supports Java applets, e.g. Microsoft Internet Explorer.

If you use a web browser, the image of the operator terminal frame is not displayed.



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**VNC
authentication**

- The web browser asks for a password as soon as the connection is established.
- Enter the password set in the operator terminal.
- The operator terminal should now be displayed in the web browser on your PC.



Controlling the operator terminal

An operator terminal with keyboard is controlled using the PC keyboard. The following keys on your PC keyboard match the keys on the operator terminal.

PC keyboard	Operator terminal keyboard
Pos1	MAIN
Shift + F11	LIST
Shift + F12	ACK
Screen ↑	PREV
Screen ↓	NEXT
F1 to F12	F1 to F12
Shift + F1 to F12	F13 to F22
Enter key	ENTER
Arrow keys	Arrow keys

If the terminal has a touchscreen, you can touch the screen directly.

INFORMATION



Connection to the operator terminal via proxy is **not** recommended.

10.3.11 Recommendations and limitations for network communication

Optimal signal transfer is required for fast and efficient communication between terminals and controller in a terminal network (BDTP network). Read the section "Effective communication" on page 82 and follow the instructions for optimizing network functionality in the terminals. A maximum of 3000 signals can be transferred in a terminal network.

Example 1

A terminal network consists of three clients and a server. Each client can access 1000 signals. This means the server has to transfer 3000 signals to the individual clients. This is also the case if the address ranges for the signals in the clients are identical. This ensures that the signal transfer in the network operates to full capacity.

Example 2

The server should retrieve the addresses requested by the clients. The server then requests the controller status, which will be sent to the relevant client.

Example

A terminal network (BDTP network) consists of a server and five clients. Each terminal contains 50 alarms with the same address. For the server, this means that 50 addresses must be queried by the controller. In addition, the server must send 50 alarms to the respective client (5 x 50). Consequently, the server must distribute 250 alarms in the network.



Transparent mode via Ethernet

The following prerequisites must be fulfilled before the [Transparent mode] via Ethernet communication (TCP/IP protocol) function can be used:

- Driver and programming tools must support communication in transparent mode. (For more information, refer to the driver or controller manual.)
- If the configuration software for the controller does not support TCP/IP project transfer, a program simulating the COM connection in a TCP/IP environment must be installed on the PC. This program communicates with the controller in transparent mode via the TCP/IP network.

Pass-through mode via Ethernet

Communication in pass-through mode is only possible if the drivers support this mode. See the section "Communication" on page 269.

The following prerequisite must be fulfilled before pass-through mode via Ethernet communication (TCP/IP protocol) can be used:

- You will have to use a program for conversion from COM port to TCP/IP if the programming software for the controller does not support project transfer via TCP/IP. This program communicates with the controller in transparent mode via the TCP/IP network. (For more detailed information, refer to the driver or controller manual.)

No protocol mode

The [No protocol mode] function, which is used when one or more terminals act as the communication interface (see also the section "Communication" on page 269) is not recommended for large terminal networks (BDTP networks).

A large network is a BDTP network with a high number of signals between server and clients. Control registers and control signals are transferred when the terminal acts as communication interface. These have a negative influence on communication speed and reduce network performance. See the section "Effective communication" on page 82.

Signal packages

Optimal signal transfer is key for fast and efficient communication between terminals and controller (e.g. in a network). Read the section "Effective communication" on page 82 and follow the instructions for optimizing network functionality in the terminals. These requirements apply to all stations in the terminal network. The refresh time may increase if signals are not transferred in packages.



Alarm management

The terminal network is a client/server network. The server stores data (e.g. alarm signals) that is retrieved by the clients. The simultaneous transfer of different signals has a negative impact on the transfer time between operator terminals and controllers. The number of signals should therefore be limited. For more information, refer to the section "Efficient communication" on page 82.

The number of alarm signals in the network must not exceed the number of signals the server is capable of processing in the entire network. A server can process up to 300 alarms depending on the application and the operator terminal. Consequently, a network must not contain more than 300 alarms.

Index in the network client

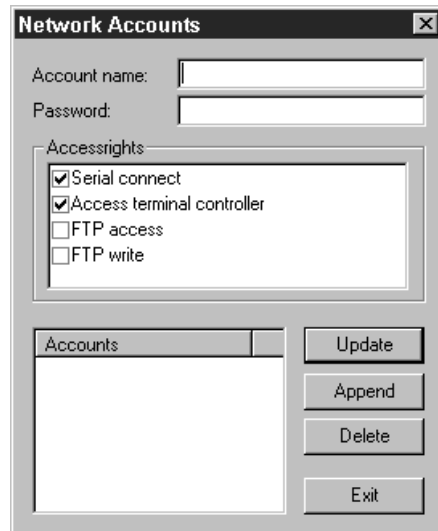
In run mode, index addressing helps to specify the register from which an object should retrieve the displayed value. Index addressing cannot be used in terminals that act as BDTP clients. BDTP clients exclusively use the index register of the BDTP server.

However, if a terminal that acts as a BDTP client also has a local controller, the normal rules apply when using index addressing.



10.4 Network accounts

Under [Setup] / [Network] / [Accounts], you can define who may access terminal services that require login. This function creates an authorization check. This means a user name and password are created for various users with access to different services in the network. Special country-specific characters are not permitted in account names and passwords.



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According to the figure, the account with the name "Superuser" is authorized to access all network functions requiring login. The buttons enable you to update, add and delete accounts in the list.

Parameters	Description
Account name	Enter an account name.
Password	Enter a password for the account.

10.4.1 Access rights

Parameters	Description
Serial connection	The user can establish a serial connection (PPP). This option should be activated.
Access terminal controller	The terminal controller is used to change from RUN to TRANSFER via TCP/IP. This option should be activated.
FTP Access	The user has read access on the FTP server (terminal).
FTP Write	The user has write access on the FTP server. This also requires FTP access.



10.5 Accessing the network settings during runtime

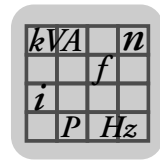
The operator terminal's unique hardware number - its MAC (Media Access Control) address - can be accessed during runtime using a macro with the command "IP-CONFIG" and the argument "/ALL".

The IP configuration is displayed with the MAC address in a Windows CE console.

INFORMATION



More information can be found in the section "Insert event / Add event" (page 266).



11 Technical Data and Dimension Sheets

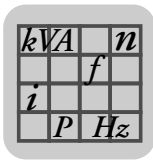
11.1 General technical data

11.1.1 Display

	DOP11B-10	DOP11B-15	DOP11B-20	DOP11B-25
Graphics resolution (pixels)	160 x 32	240 x 64	240 x 64	320 x 240
Line x characters text	Graphic			
Active screen size, W x H	89.6 x 17.9 mm	90.2 x 24 mm	127.0 x 33.8 mm	115.2 x 86.4 mm (5.6")
Backlight	LED, can be dimmed > 50 000 h at an ambient temperature of +25 °C.	LED, can be dimmed > 50 000 h at an ambient temperature of +25 °C.	LED, can be dimmed > 50 000 h at an ambient temperature of +25 °C.	CCFL, can be dimmed > 45000 h at an ambient temperature of +25 °C.
Screen	FSTN-LCD screen (liquid crystal), monochrome	FSTN-LCD screen (liquid crystal), monochrome	FSTN-LCD screen (liquid crystal), monochrome	TFT-LCD screen (liquid crystal), 16 gray scale

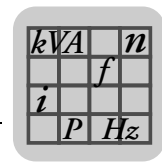
	DOP11B-30	DOP11B-40	DOP11B-50	DOP11B-60
Graphics resolution (pixels)	320 x 240	320 x 240	800 x 600	1024 x 768
Line x characters text	Graphic			
Active screen size, W x H	115.2 x 86.4 mm (5.6")	115.2 x 86.4 mm (5.6")	211.2 x 158.4 mm (10")	304.1 x 228.1 mm (15")
Backlight	CCFL, can be dimmed > 60 000 h at an ambient temperature of +25 °C.		CCFL, can be dimmed > 50 000 h at an ambient temperature of +25 °C.	CCFL, can be dimmed > 35 000 h at an ambient temperature of +25 °C.
Screen	TFT-LCD screen (liquid crystal), 64 k colors		TFT-LCD screen (liquid crystal), 64 k colors	TFT-LCD screen (liquid crystal), 64 k colors

	DOP11B-M70
Graphics resolution (pixels)	640 x 480
Line x characters text	Graphic
Active screen size, W x H	132 x 98 mm (6.5")
Backlight	CCFL, can be dimmed > 50000 h at an ambient temperature of +25 °C.
Screen	TFT-LCD screen (liquid crystal), 64 k colors

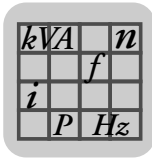


11.1.2 Technical data

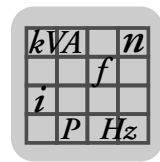
	DOP11B-10	DOP11B-15	DOP11B-20	DOP11B-25
Keyboard	<ul style="list-style-type: none"> Numeric keypad Navigation block 6 function keys 6 LEDs (red/green) 	<ul style="list-style-type: none"> Numeric keypad Navigation block 6 function keys 6 LEDs (red/green) 	<ul style="list-style-type: none"> Numeric keypad Navigation block 8 function keys 16 LEDs 	Touch resistive
Keyboard material / Material for unit front	Membrane keyboard with metal caps. Overlay autotex F207 with back print, 1 million operations		Membrane keyboard with metal caps. Overlay autotex F157 with back print, 1 million operations	Touchscreen Polymer (Autotex F250) on glass, 1 million operations
Additional memory	None		Via USB memory	
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 real-time clock battery has a rating life of 3 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 must meet requirements for SELV or PELV in line with IEC 950 or IEC 742. UL: Supply voltage in line with guidelines for voltage supply class 2.			
Current consumption at operating voltage	Normal: 0.1 A Maximum: 0.3 A		Normal: 0.15 A Maximum: 0.35 A	Normal: 0.25 A Maximum: 0.45 A
Fuse	Internal DC fuse, 1.0 A time-lag, 5 x 20 mm		Internal DC fuse, 2.0 A time-lag, 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% (non-condensed)			
Front dimensions W x H x D	155.2 x 113.6 x 6 mm	155.2 x 155.2 x 6 mm	202 x 187 x 6 mm	201 x 152 x 6 mm
Installation depth	43 mm	44 mm	56.9 mm	56.8 mm
Degree of protection front	IP66			
Degree of protection back	IP20			
Protection material back	Powder-coated aluminum			
Weight	0.4 kg	0.5 kg	0.875 kg	0.87 kg
Memory	512 kB (incl. fonts)	512 kB (incl. fonts)	12 MB (incl. fonts)	
EMC tests on terminal	Checked according to: EN 61000-6-3 (emission) and EN 61000-2-2 (interference immunity).			
UL approval	UL 1604 (Class I, Div 2) / UL 508 / UL 50 4x indoor use only			UL 508 / UL 50 4x indoor use only
DNV approval	Yes			
NEMA	4X, indoor use only			



	DOP11B-30	DOP11B-40	DOP11B-50
Keyboard	Touch resistive	<ul style="list-style-type: none"> Numeric keypad Navigation block 16 function keys 16 LEDs (red/green) 	Touch resistive
Keyboard material / Material for unit front	Touchscreen Polymer (Autotex) on glass, 1 million operations	Membrane keyboard with metal caps. Overlay autotex F157 with back print, 1 million operations	Touchscreen Polymer (Autotex F250) on glass, 1 million operations
Additional memory	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 real-time clock battery has a rating life of 3 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 must meet requirements for SELV or PELV in line with IEC 950 or IEC 742. UL: Supply voltage in line with guidelines for voltage supply class 2.		
Current consumption at operating voltage	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 A time-lag, 5 x 20 mm		Internal DC fuse, 3.15 A time-lag, 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% (non-condensed)		
Front dimensions W x H x D	201 x 152 x 6 mm	275 x 168 x 6 mm	302 x 228 x 6 mm
Installation depth	56.8 mm	57.3 mm	58 mm
Degree of protection front	IP66		
Degree of protection back	IP20		
Protection material back	Powder-coated aluminum		
Weight	0.87 kg	1.11 kg	2.0 kg
Memory	12 MB (incl. fonts)		
EMC tests on terminal	Checked according to: EN 61000-6-3 (emission) and EN 61000-2-2 (interference immunity).		
UL approval	UL 508 / UL 50 4x indoor use only		UL 1604 (class I, Div 2) / UL 508 / UL 50 4x indoor use only
DNV approval	In preparation		Yes
NEMA	4X, indoor use only		



	DOP11B-60	DOP11B-M70
Keyboard	Touch resistive	<ul style="list-style-type: none"> • Touch resistive • Navigation block • 8 function keys
Keyboard material / Material for unit front	Touchscreen Polymer (Autotex F250) on glass, 1 million operations	
Additional 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 clock battery is 3 years. Temperature coefficient: 0.004 ppm/°C ²	without buffer
Supply voltage	DC 24 V (DC 20 ... 30 V), 3-pin terminal contact	DC 24 V (DC 20 ... 30 V)
	CE: The voltage supply must meet requirements for SELV or PELV in line with IEC 950 or IEC 742. UL: Supply voltage in line with guidelines for voltage supply class 2.	
Current consumption at operating voltage	Normal: 1.2 A Maximum: 1.7 A	Normal: 0.4 A Maximum: 0.9 A
Fuse	Internal DC fuse, 3.15 A time-lag, 5 x 20 mm	-
Ambient temperature	Vertical installation: 0 °C ... +50 °C Horizontal installation: 0 °C ... +40 °C	0 °C ... +50 °C
Storage temperature	-20 to +70 °C	
Humidity	5 ... 85% (non-condensed)	
Front dimensions W x H x D	398 x 304 x 6 mm	Ø 250 x 114 mm
Installation depth	58 mm	-
Degree of protection front	IP66	IP65
Degree of protection back	IP20	-
Protection material back	Powder-coated aluminum	Polymer
Weight	3.7 kg	1.25 kg (without cable)
Memory	12 MB (incl. fonts)	
EMC tests on terminal	Checked according to: EN 61000-6-3 (emission) and EN 61000-6-2 (interference immunity).	
UL approval	UL 1604 (class I, Div 2) / UL 508 / UL 50 4x indoor use only	UL 508, 17th edition, CSA C22.2 No. 14 (Industrial Control Equipment, NRAQ, NRAQ 7 UL 1740, 1998 (industrial robots and robotic equipment)
DNV approval	Yes	-
NEMA	4X, indoor use only	-

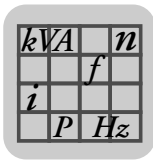


11.1.3 Functionality

	DOP11B								
	-10	-15	-20	-25	-30	-40	-50	-60	-M70
Network functions	No		E-mails / web server / remote access / FTP server						
Dual driver with data exchange	Yes								
Pass-through mode	Yes (depending on driver)								
No protocol mode	Yes								
Multilingual capability	Yes, up to 10 languages in one project								
Standard Windows fonts	No		Yes						
Internal variables	Yes, volatile and non-volatile								
Trend recording	No		Yes						
Recipe handling	Yes								
Alarm management	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								

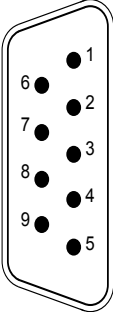
11.1.4 Communication

	DOP11B									
	-10	-15	-20	-25	-30	-40	-50	-60	-M70	
Serial interface RS-232	Up to 115200 baud can be set									
	9-pin D-sub connector, installed plug with 4-40 UNC retaining screws.								-	
Serial interface RS-422	25-pin D-sub connector, installed socket with retaining screws 4-40 UNC, can be set up to 115200 Baud.								-	
Ethernet	As option		Shielded RJ45 socket, 10/100 MBit - full duplex						10 MBit - Half duplex	
USB	No		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)		Host type A (USB1.1), max. output current 500 mA		

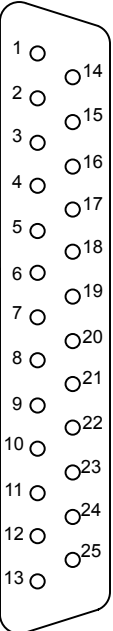


11.2 Pin assignment

11.2.1 RS-232

D-sub 9-pin connector	Terminal 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	←

11.2.2 RS-422 / RS-485

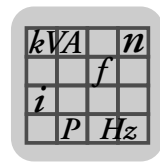
D-sub 25-pin socket	Terminal no.	RS-422		RS-485	
		Designation	Signal direction operator terminal ↔ XXX	Designation	Signal direction operator terminal ↔ XXX
	2	TxD+	→	Tx / Rx+	↔
	15	TxD-	→	Tx / Rx-	↔
	3	RxD+	←	-	-
	16	RxD-	←	-	-
	4	RTS+	→	-	-
	17	RTS-	→	-	-
	5	CTS+	←	-	-
	18	CTS-	←	-	-
	20	1)	-	-	-
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

1) Pin 20 connected to pin 21 in the terminal

2) Connected directly to pin 2 internally (Tx / Rx+)

3) Note: Only the first and last bus stations should have a bus terminator.

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



11.2.3 Ethernet

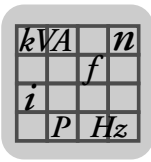
RJ45 socket	Terminal no.	Designation	Signal direction operator terminal ↔ XXX
	1	Tx+	→
	2	Tx-	→
	3	Rx+	←
	6	Rx-	←
	4, 5, 7, 8	GND	-

11.2.4 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	-

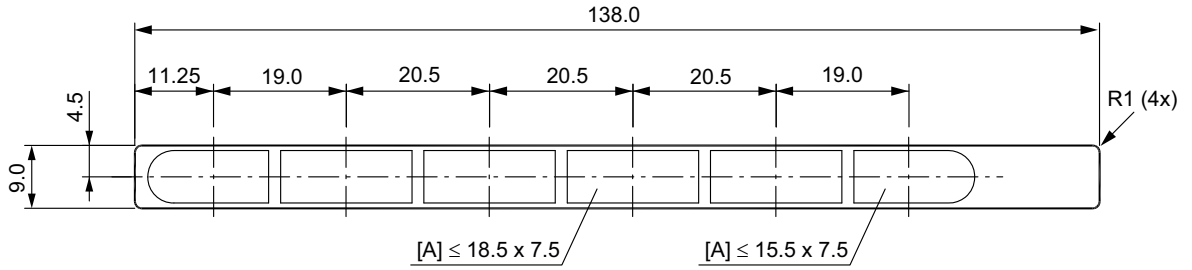
11.2.5 RS-485

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



11.3 DOP11B-10

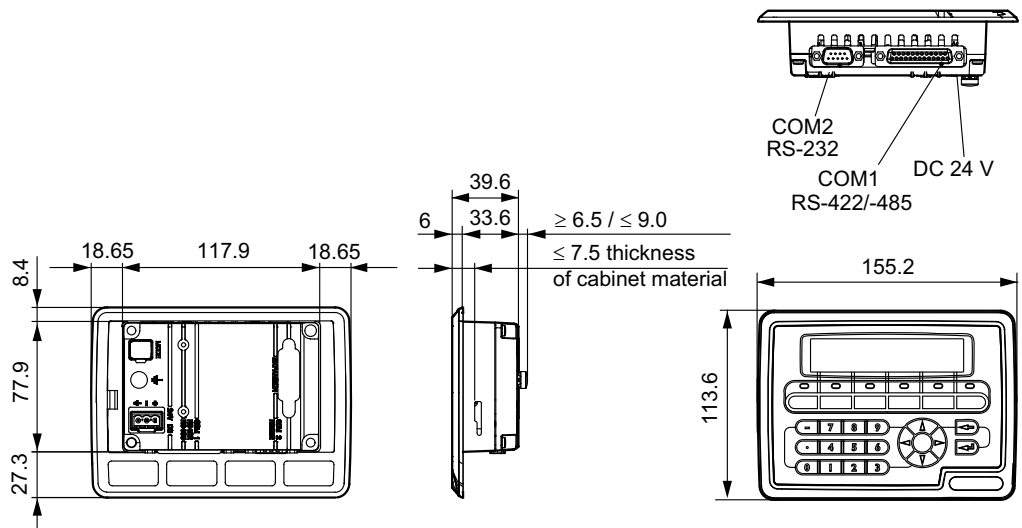
11.3.1 Text strips for DOP11B-10



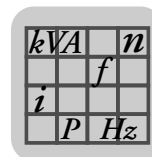
63783AXX

[A] Maximum area for text in mm.

11.3.2 Dimension sheet for DOP11B-10

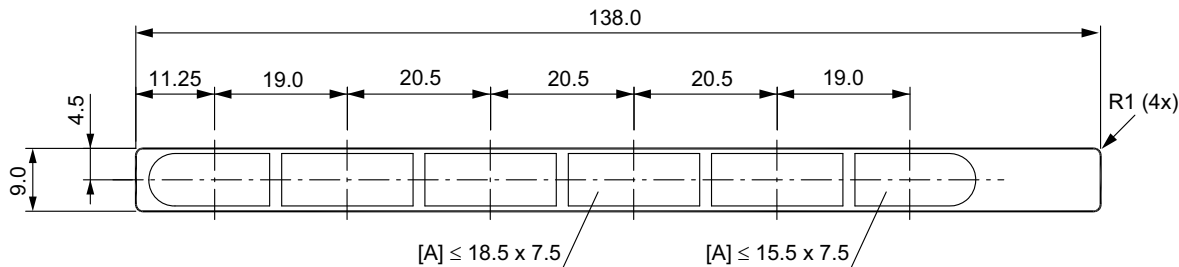


63779AEN



11.4 DOP11B-15

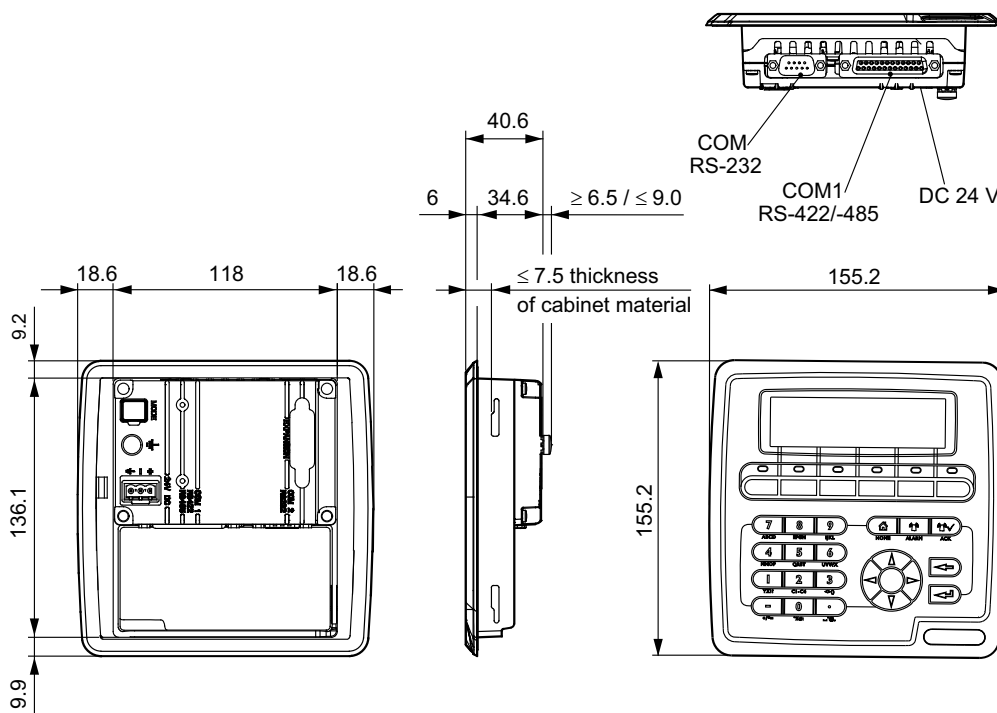
11.4.1 Text strips for DOP11B-15



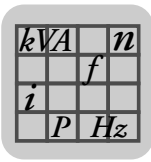
63783AXX

[A] Maximum area for text in mm.

11.4.2 Dimension sheet for DOP11B-15

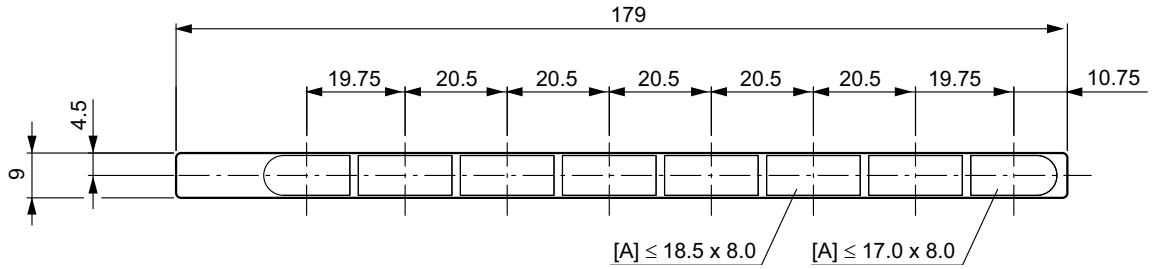


63780AEN



11.5 DOP11B-20

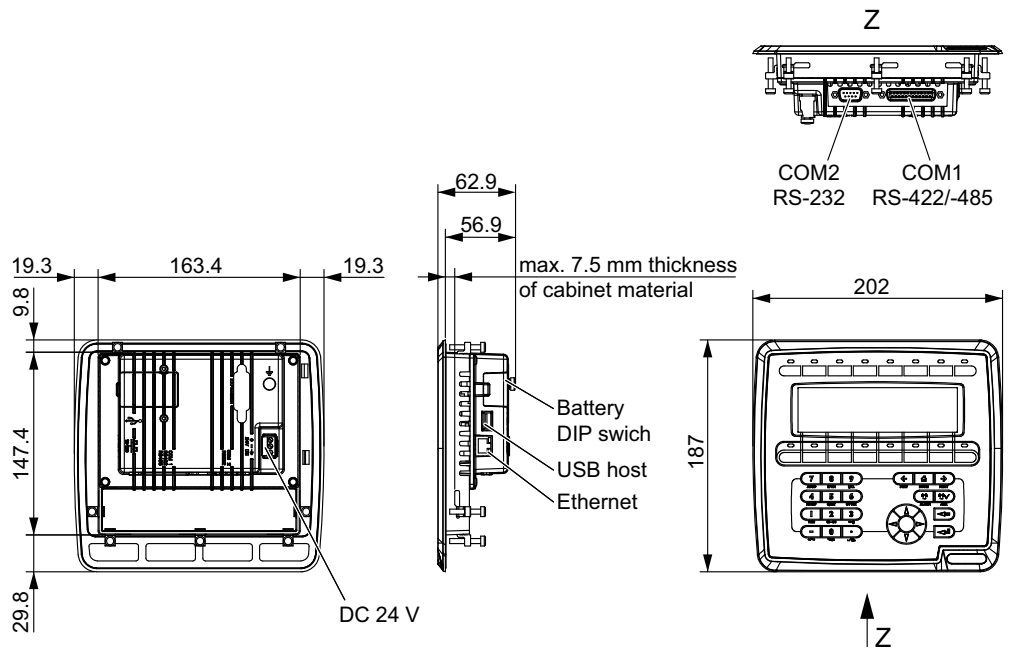
11.5.1 Text strips for DOP11B-20



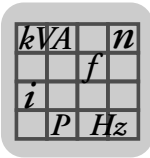
63784AXX

[A] Maximum area for text in mm.

11.5.2 Dimension sheet for DOP11B-20

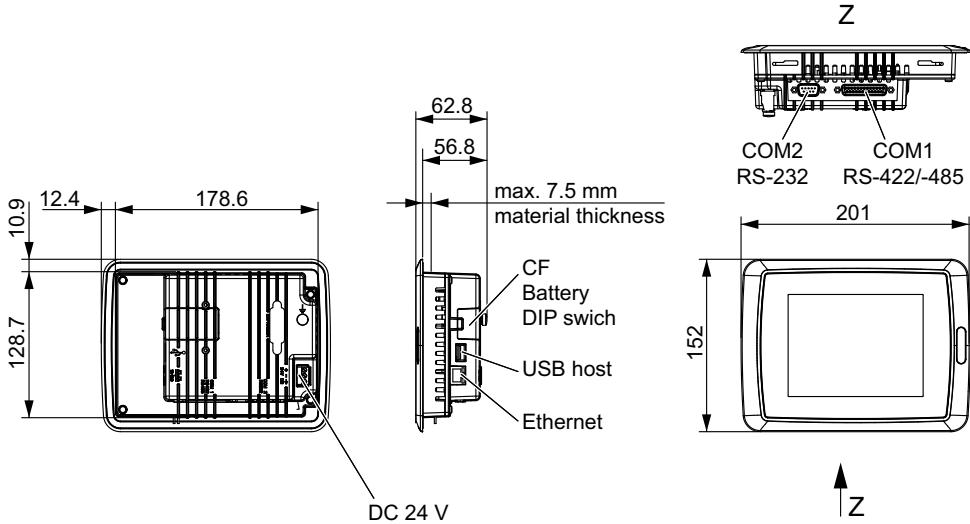


60742AEN

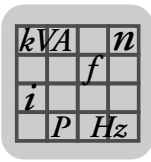


11.6 DOP11B-25 and -30

11.6.1 Dimension sheets for DOP11B-25 and -30

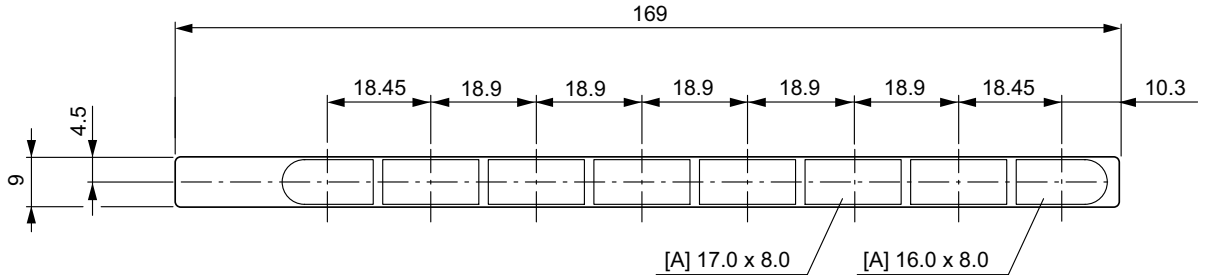


60741AEN



11.7 DOP11B-40

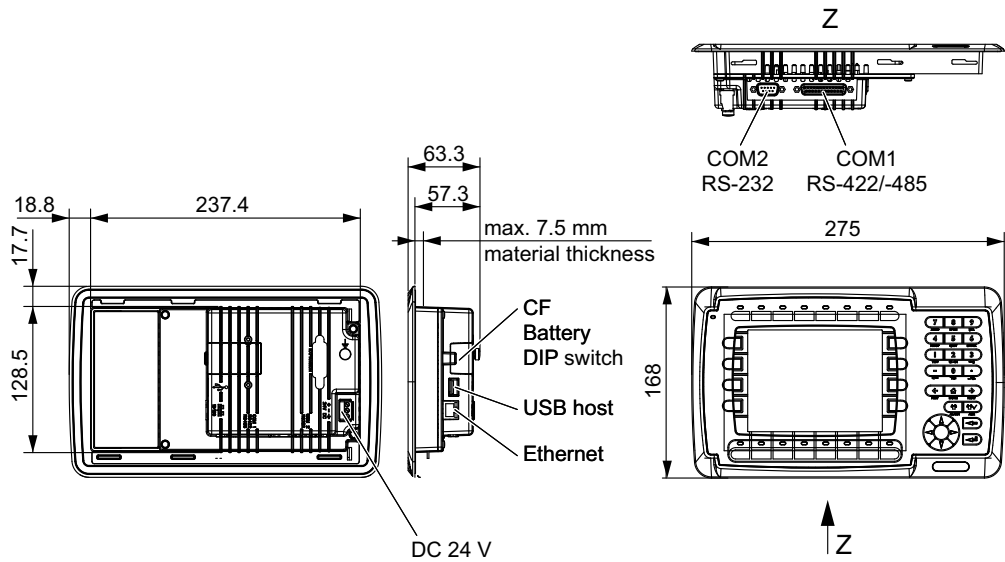
11.7.1 Text strips for DOP11B-40



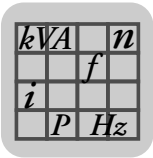
63817AXX

[A] Maximum area for text in mm.

11.7.2 Dimension sheet for DOP11B-40

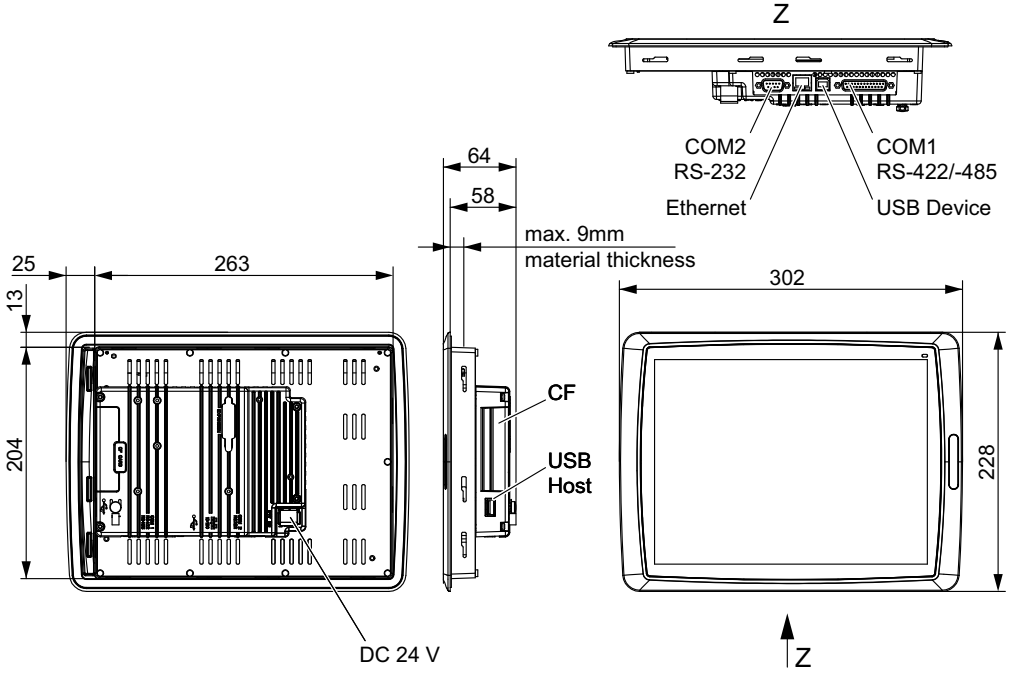


60740AEN

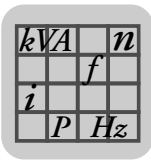


11.8 DOP11B-50

11.8.1 Dimension sheet for DOP11B-50

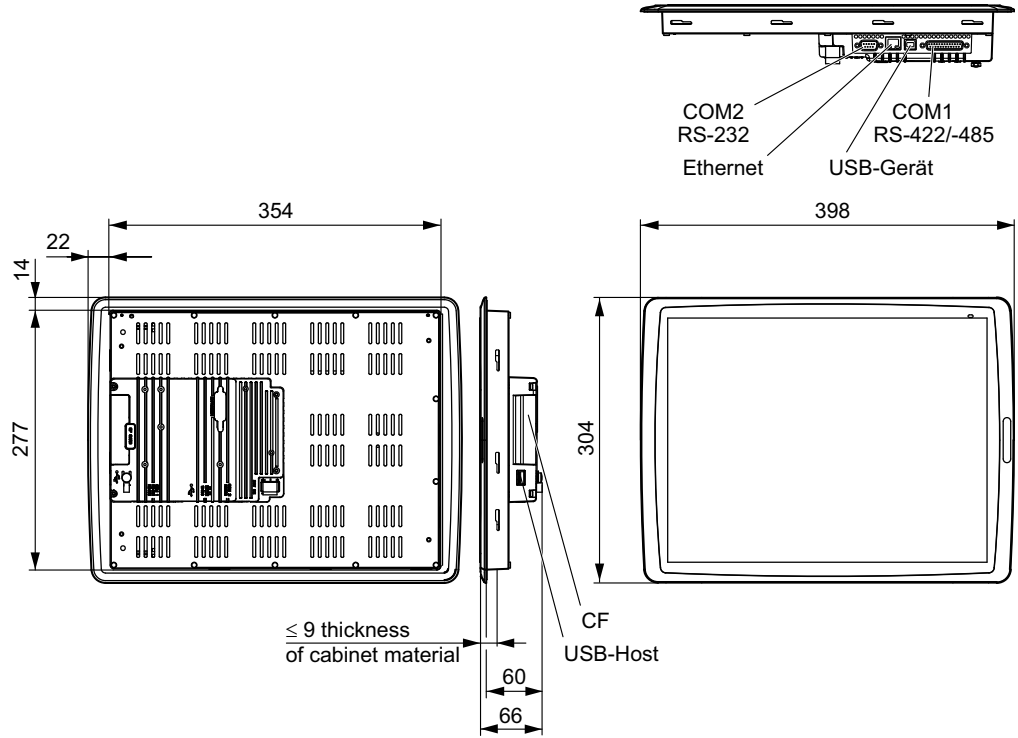


60739AEN



11.9 DOP11B-60

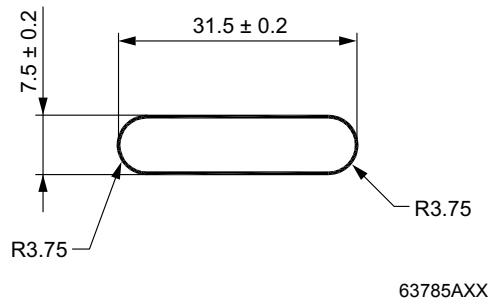
11.9.1 Dimension sheet for DOP11B-60



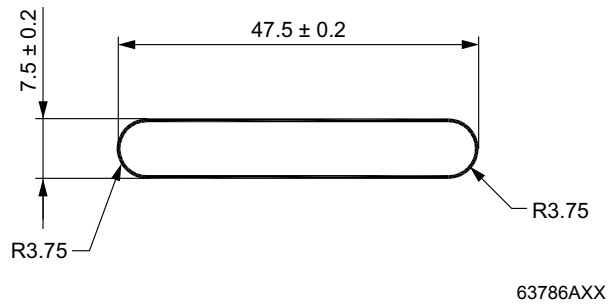
63781AEN

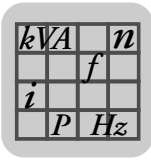
kVA	n
f	
i	
P	Hz

11.10 Label for DOP11B-10 to DOP11B-40



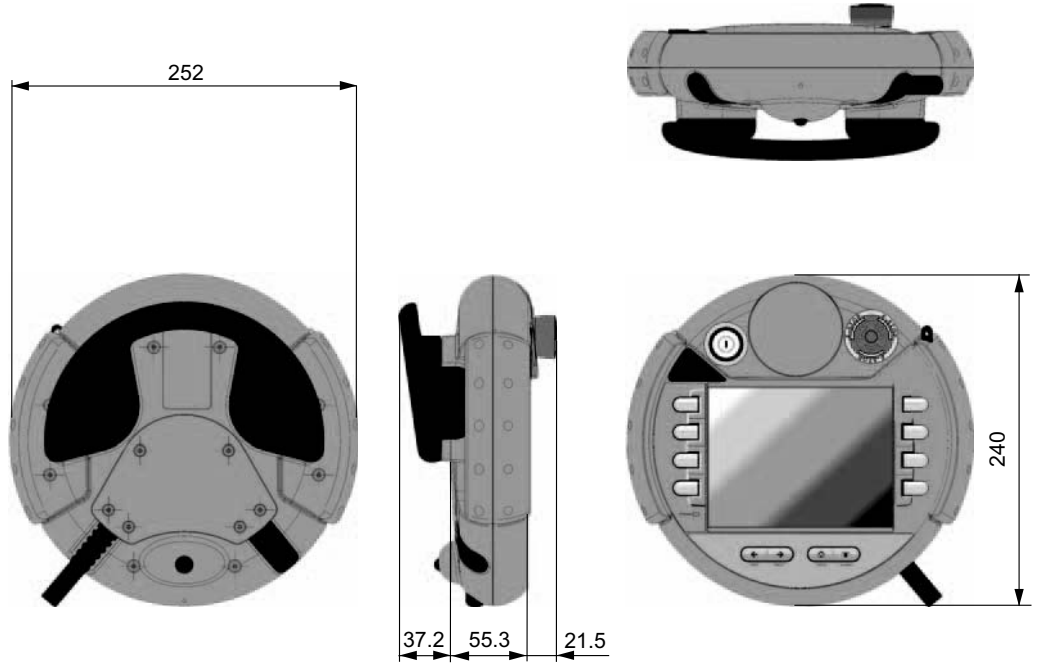
11.11 Label for DOP11B-50 and DOP11B-60



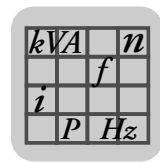


11.12 DOP11B-M70

11.12.1 Dimension sheet for DOP11B-M70



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11.12.2 Emergency stop button

Technical data

Technical data	Emergency stop button
Evaluation	2 circuits
Nominal voltage	DC 24 V
Min.	10 mA current per contact
Max.	1000 mA current per contact
Utilization category	DC-13 (according to IEC 60947-5-1)
EAO BR 84	B _{10d} : 100000
IDEC XA series	B _{10d} : 100000

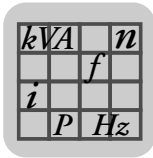
Standards

Standards	
EN ISO 13850	Safety of machinery – Emergency stop – Principles for design
EN 60204-1 chapters 9, 10	Safety of machinery – Electrical equipment of machines Part 1: General requirements

11.12.3 Enabling device (enabling button)

Technical data

Mechanical and electrical characteristics	Enabling button
Evaluation	2 circuits
Type of output	Solid state
Switchable nominal voltage	DC 24 V Voltage tolerance DC 19.2 V up to DC 30 V according to EN 61131-2
Switchable nominal current	500 mA (max.)
Maximum switch-off current	Circuit 1: 1.5 A Circuit 2: 0.8 A
Maximum inductive load	Circuits 1, 2: 145 mJ / 1.16 H with DC 24 V and 500 mA (DC-13 according to EN 60947-5-1)
Polarity reversal protection	Yes
Short circuit and overload protection	Yes
Switching cycles	Switch position 2: 10 ⁵ Switch position 3: 5×10 ⁴
Actuating forces	From switch position 1 to 2: 5 N (typically) From switch position 2 to 3: 20 N (typically)

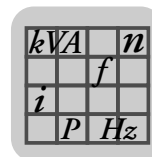


Information on EN ISO 13849-1:2008	Enabling button
Enabling	Category: 3
	Performance level: d
	Proof test interval: 20 years
	MTTF _d symmetrized according to D.2 of EN ISO 13849-1:2008: 78 years ¹⁾
	PFH _d : 1.57×10 ⁻⁷
Emergency	Category: 3
	Performance level: d
	Proof test interval: 20 years
	MTTF _d symmetrized according to D.2 of EN ISO 13849-1:2008: 88 years ¹⁾
	PFH _d : 1.35×10 ⁻⁷

1) The monitoring device is not taken into account.

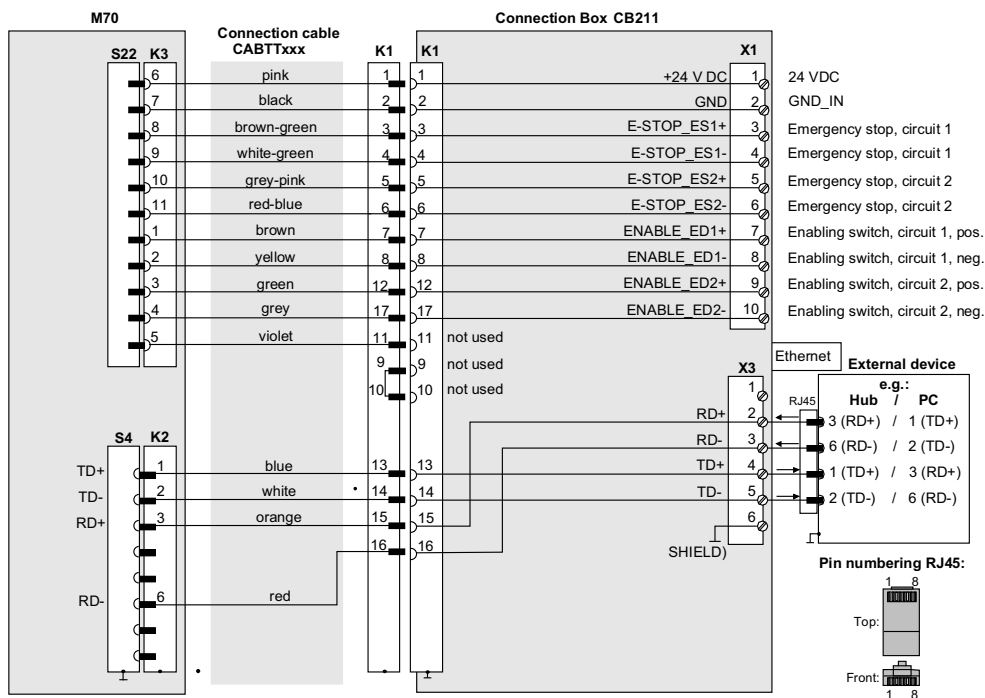
Standards

Standards	
EN ISO 13849-1	Safety of machinery – Safety-related parts of control systems Part 1: General design principles
EN 60204-1	Safety of machinery – Electrical equipment of machines Part 1: General requirements
ISO 10218-1	Manipulating Industrial Robots – Safety



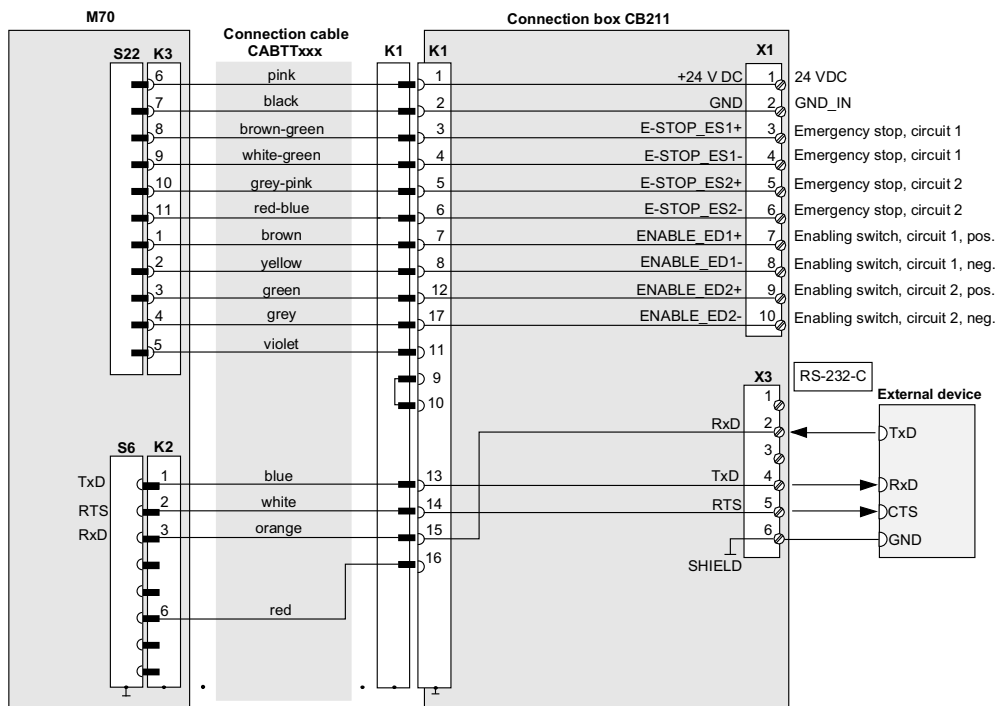
11.12.4 Wiring diagram

Ethernet

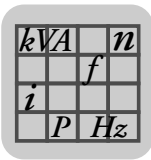


68301AXX

RS-232-C

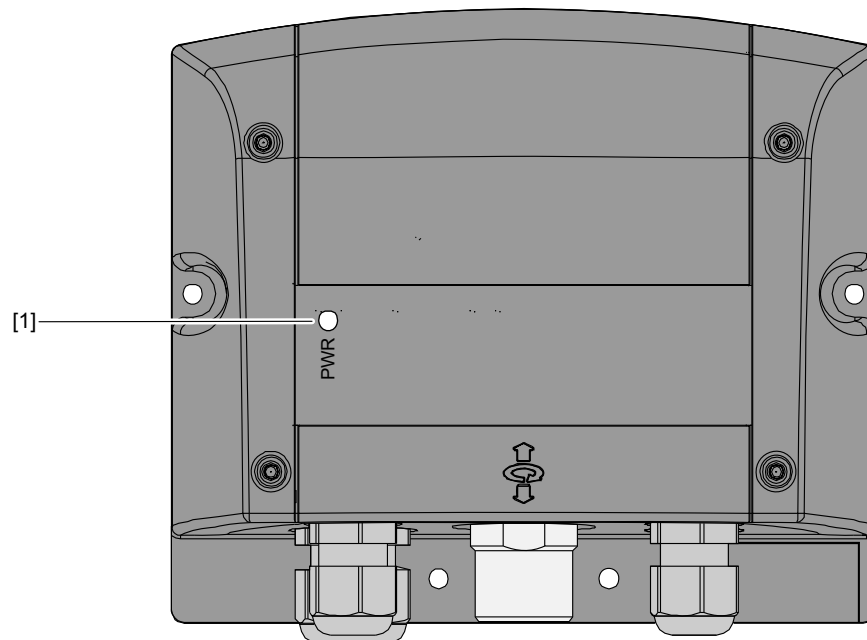
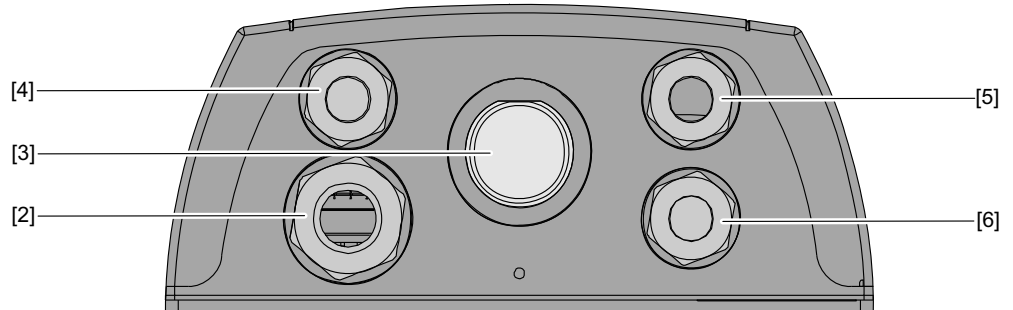


68302AXX



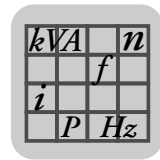
11.13 Connection box PCB11B

11.13.1 Structure

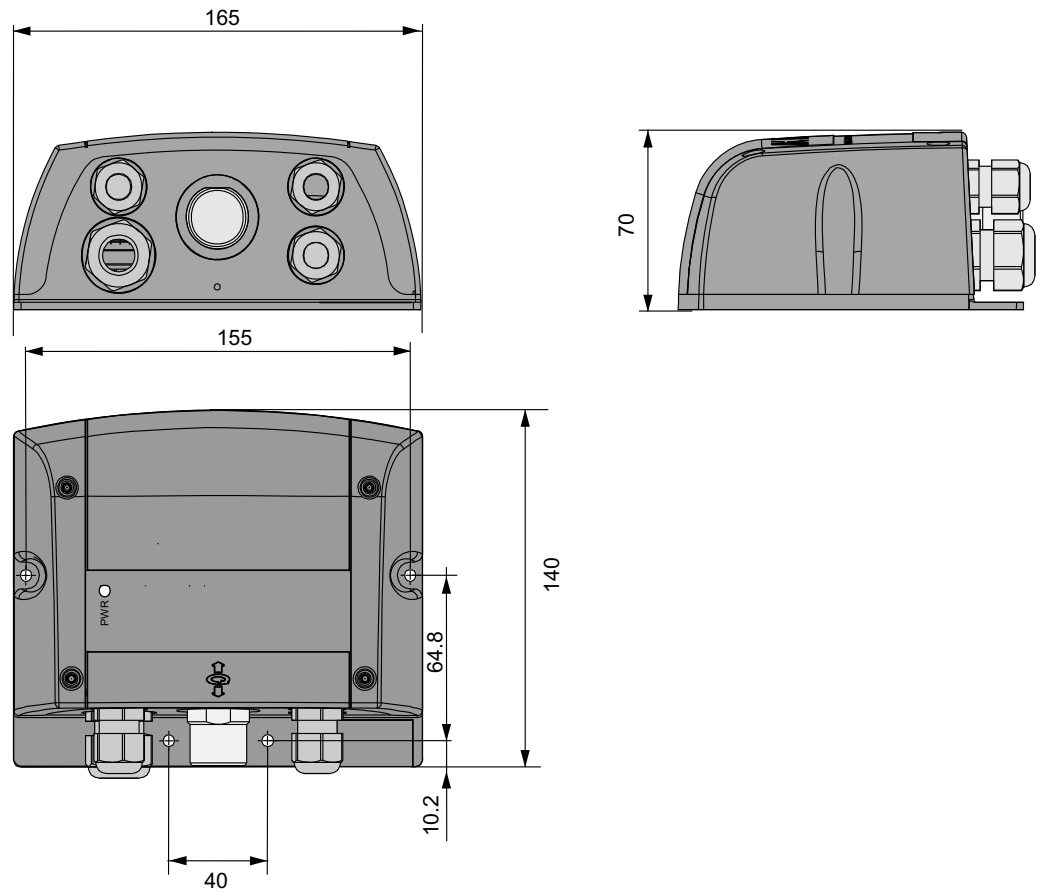


68303AXX

- [1] Power LED
- [2] Cable gland (M20) for connecting the voltage supply, the enabling button, and the emergency stop
- [3] Socket K1: 17-pin hybrid connector M23, female (Phoenix)
- [4] Cable gland (M16) for separate functional ground (delivered with filler plug)
- [5] Cable gland (M16) for connection to communication cables (serial or Ethernet)
- [6] Cable gland (M16) as reserve (delivered with filler plug)



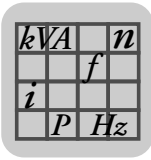
11.13.2 Dimension sheet of PCB11B



68341AXX

The following materials are recommended for wall mounting:

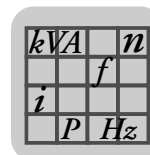
Material	Dimensions
Dowel	6 mm × 30 mm
Screws	Flat head screw: 4 mm × 40 mm Screw head: maximum Ø 9 mm



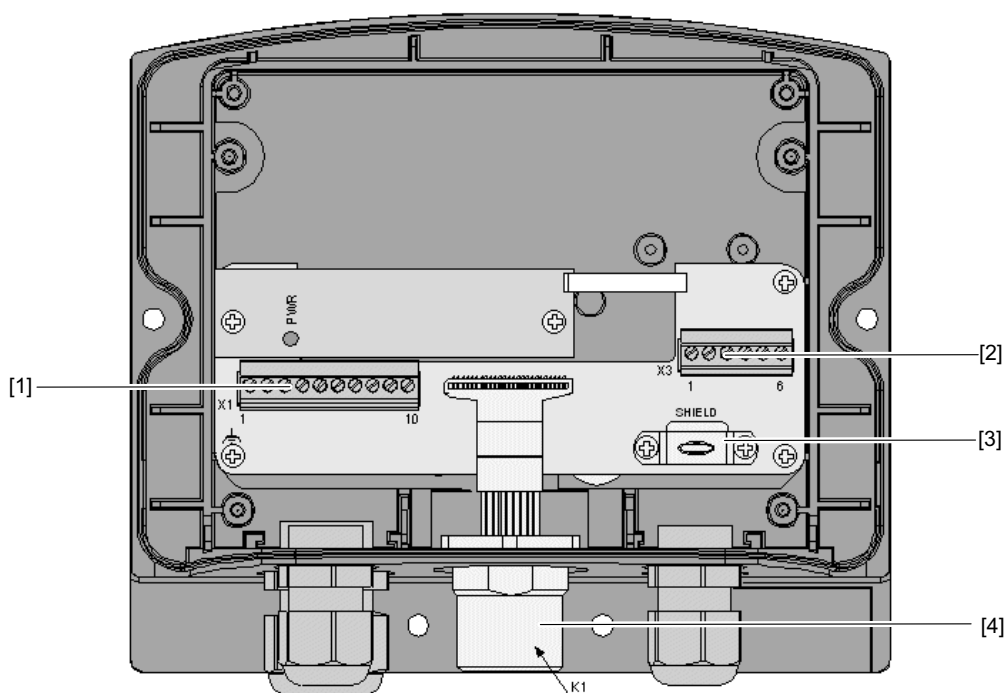
Technical data of the connection box

The following table shows the technical data of the connection box

Technical data	Connection box
Nominal voltage	DC 24 V (voltage tolerance from DC 19.2 V to DC 30 V)
Max. interruption duration of the supply voltage	≤ 10 ms (according to IEC 31131)
Power consumption	10.8 W (600 mA, DC 24 V, 450 mA with DC 24 V)
Inrush current	max. 5.6 A (current limitation available)
Protection class	III according to EN 61131-2 / EN 50178
Housing	Material: ABS Resistant against grease, oils, lubricants, alcohol, and others Flame-inhibiting: UL-94-V0
Dimensions	Width: 160 mm Height: 140 mm Depth: 70 mm
Weight	500 g
Degree of protection	IP65
Display elements	Status LEDs
Operating temperature	0 °C to 50 °C
Storage temperature	-20 °C to +70 °C
Relative humidity (non-condensing)	5% to 95%
Vibration resistance during operation	according to IEC 60068-2-6: 10 Hz ≤ f < 57 Hz with 0.15 mm 9 Hz ≤ f < 150 Hz with 2 g
Shock resistance	15 g / 11 ms (IEC 60068-2-27)



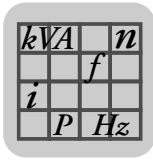
11.13.3 Terminal assignment for PCB11B

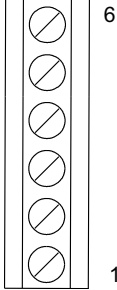


68304AXX

- [1] Terminal X1 (Phönix)
- [2] Terminal X3 (Phönix)
- [3] SHIELD: Clamp with contact surface for shielding the data cable
 (Important: The clamp is not intended as strain relief)
- [4] Socket K1: 17-pin hybrid connector M23, female (Phönix)

X1 10-pin connector	Terminal no.	Designation	Signal direction Terminal ↔ connection box ↔ XXX
	1	DC 24 V	-
	2	GND_IN	-
	3	Emergency stop, circuit 1+	→
	4	Emergency stop, circuit 1-	→
	5	Emergency stop, circuit 2+	→
	6	Emergency stop, circuit 2-	→
	7	Enabling button, circuit 1+	→
	8	Enabling button, circuit 1-	→
	9	Enabling button, circuit 2+	→
	10	Enabling button, circuit 2-	→

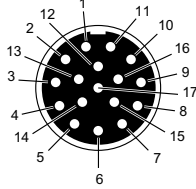


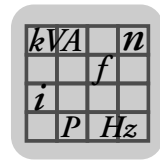
X3 6-pin connector	Terminal no.	Designation		Signal direction Terminal ↔ connection box ↔ XXX
		RS-232-C	Ethernet	
	1	n.c.	n.c.	-
	2	RxD	RD+	←
	3	n.c.	RD-	←
	4	TxD	TD+	→
	5	RTS	TD-	→
	6	SHIELD	SHIELD	-

INFORMATION



- Observe the technical data of the terminal strips when choosing the connection cable.
- To screw on the cables to the terminals, use a screwdriver with the following dimensions:
 - Blade: 0.4 mm × 2.5 mm × 80 mm
 - Length: 160 mm

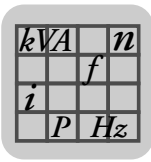
Hybrid cable connection 17-pin socket (M23)	Terminal no.	Designation	Signal direction Terminal ↔ connection box ↔ XXX
 <p>68340AXX (figure from front)</p>	1	24 VDC	-
	2	GND_IN	-
	3	Emergency stop, circuit 1+	→
	4	Emergency stop, circuit 1-	→
	5	Emergency stop, circuit 2+	→
	6	Emergency stop, circuit 2-	→
	7	Enabling button, circuit 1+	→
	8	Enabling button, circuit 1-	→
	9	n.c.	-
	10	n.c.	-
	11	GND	-
	12	Enabling button, circuit 2+	→
	13	Tx+	→
	14	Tx-	→
	15	Rx+	←
	16	Rx-	←
	17	Enabling button, circuit 2-	→



Technical data of terminal strips

The following table shows the technical data of terminals strips X1 and X3

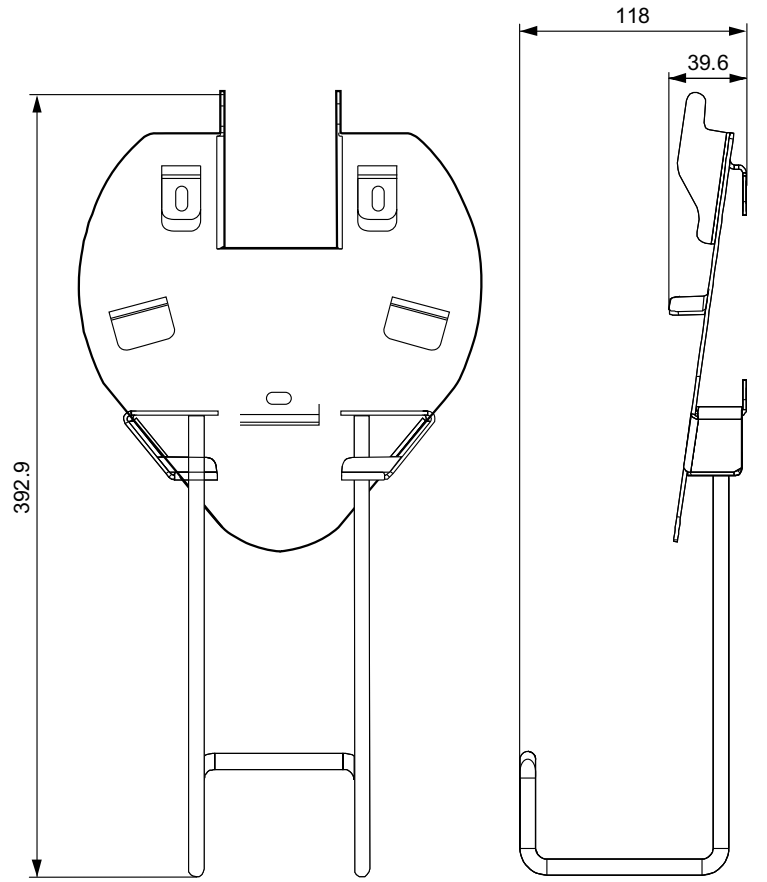
Technical data		Permitted value
Cable cross section	Rigid	0.14-1.5 mm ²
	Flexible	0.14-1.5 mm ²
	AWG	28-16
	Flexible with conductor end sleeves	0.25-1.5 mm ² (without plastic sleeve) 0.25-0.5 mm ² (with plastic sleeve)
Grid dimensions		3.81
Stripping length		7 mm
Tightening torque		0.22-0.25 Nm



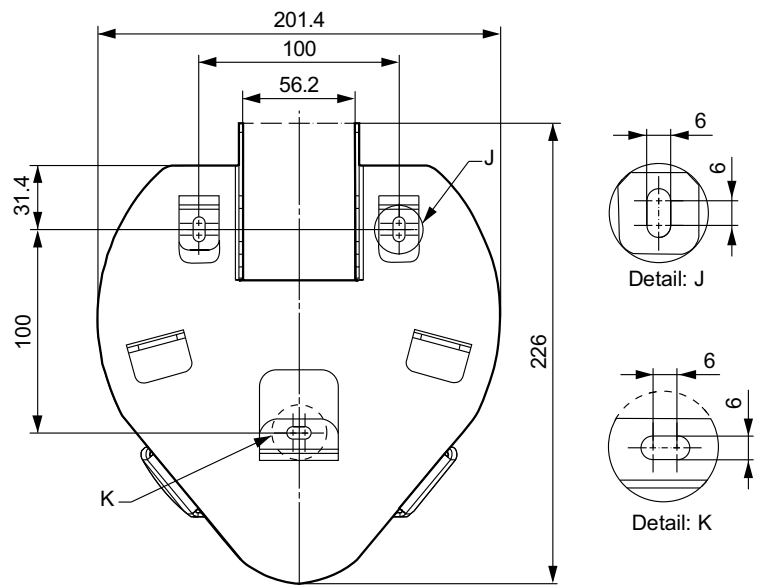
11.14 Wall bracket PMK11B

The PMK11B wall bracket is used for stationary operation of the mobile terminal DOP11B-M70 or for depositing it.

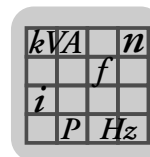
11.14.1 Dimension sheet for PMK11B



68352AXX

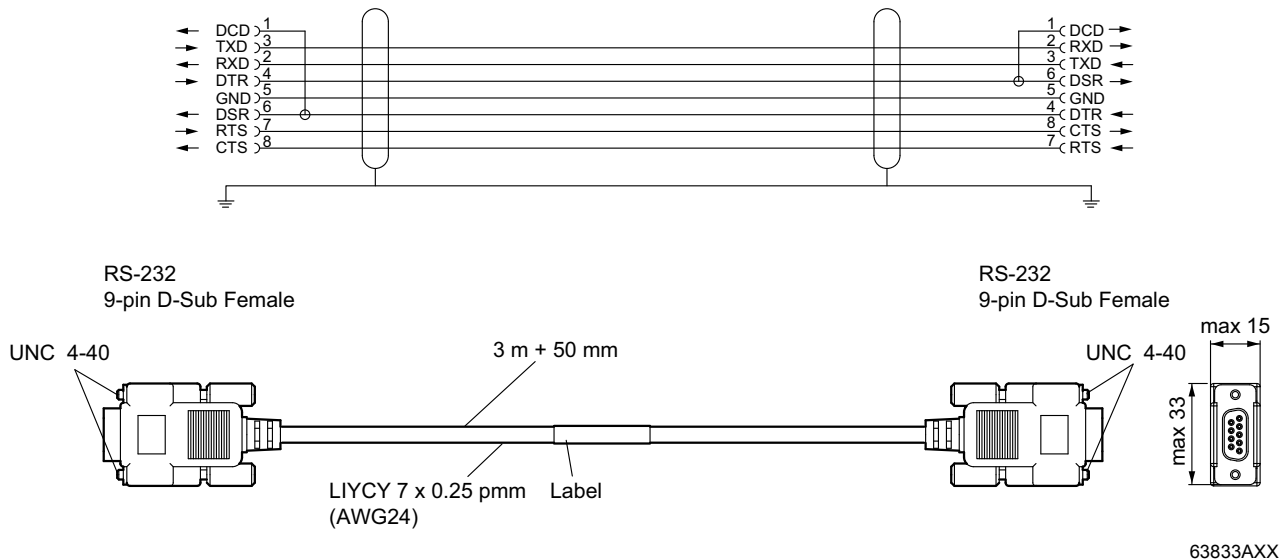


68351AXX

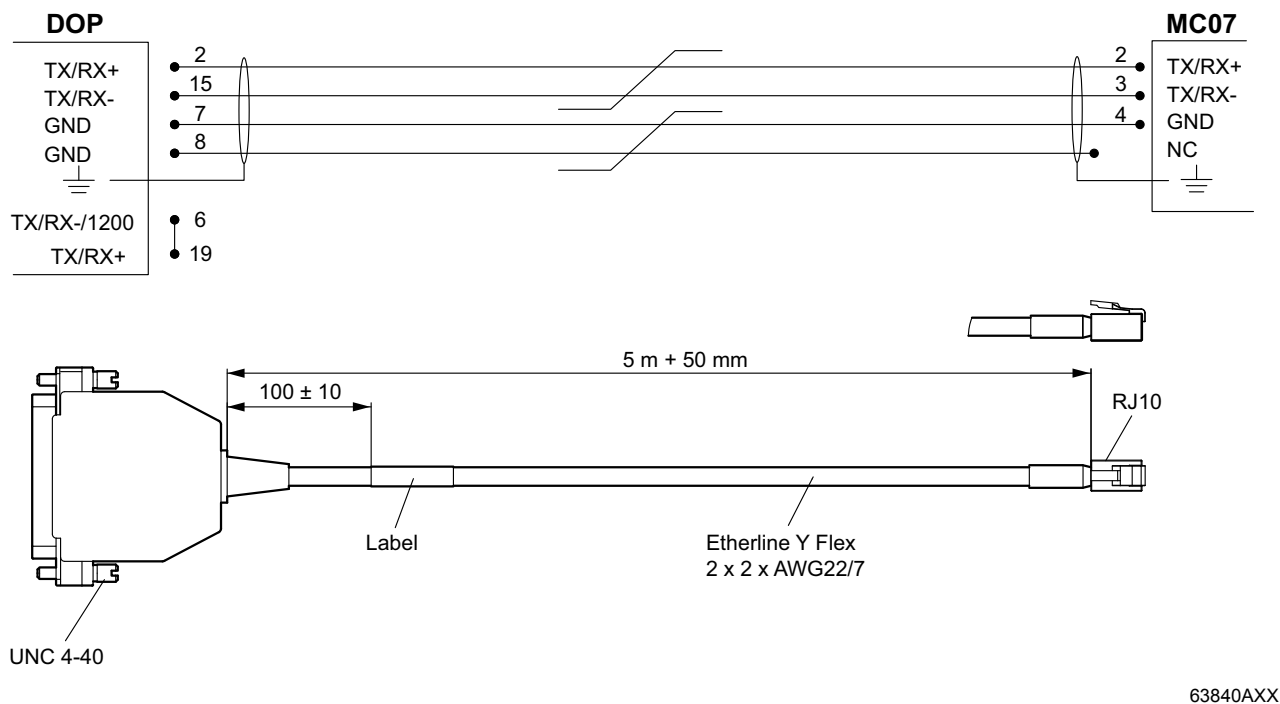


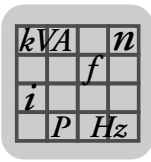
11.15 Cables

11.15.1 PCS11B

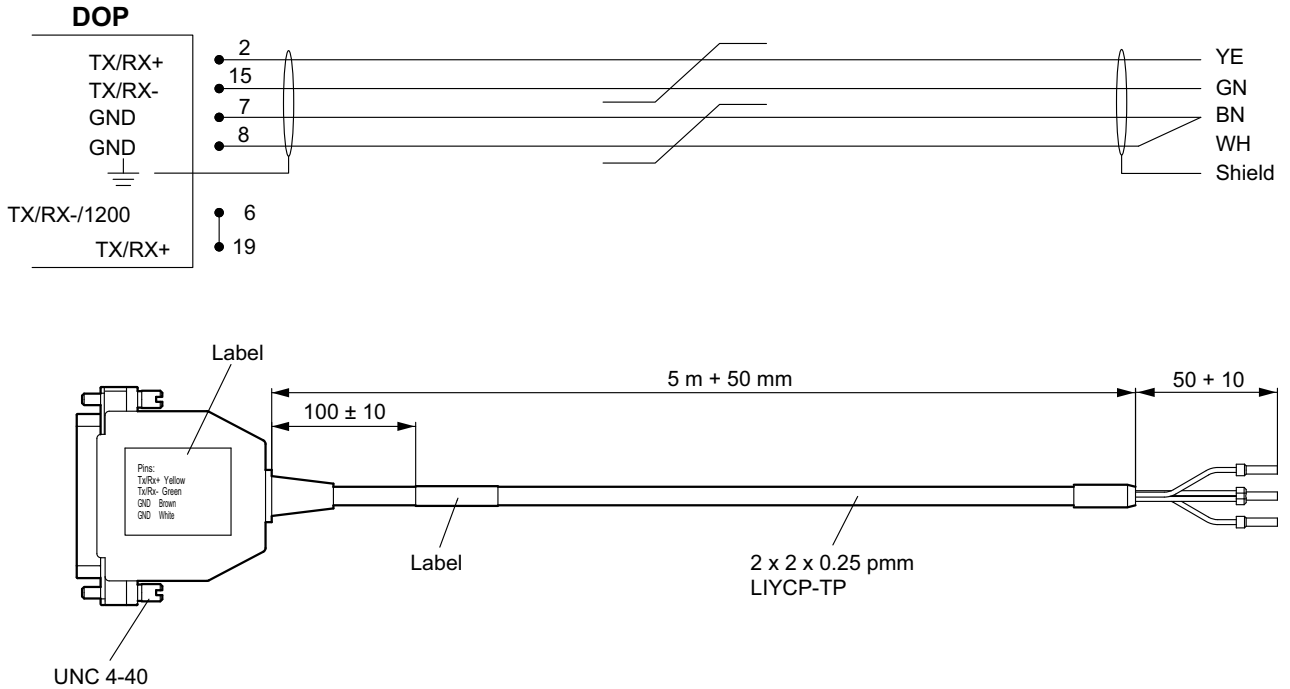


11.15.2 PCS21A



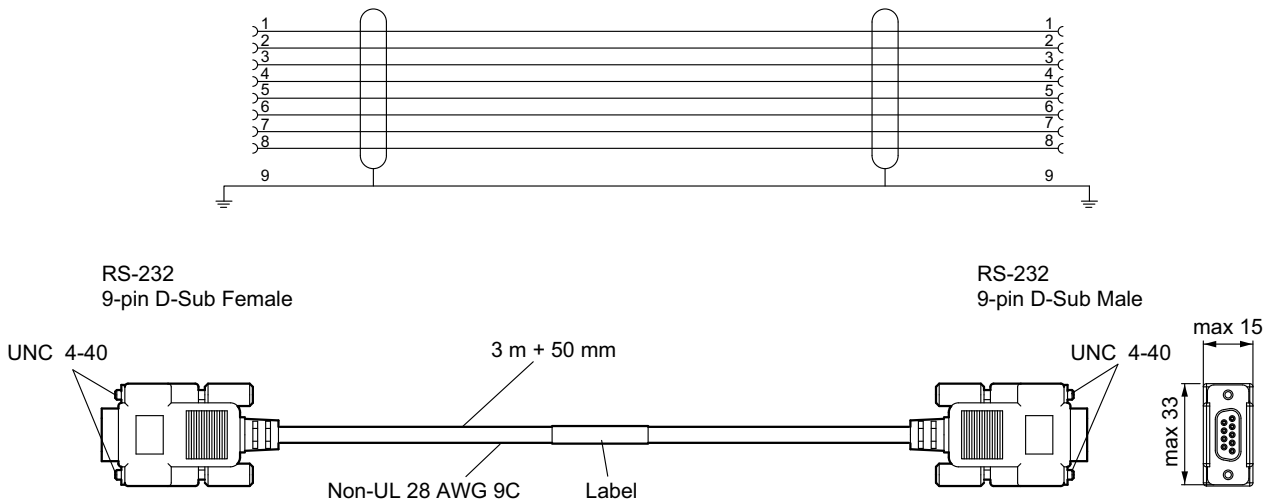


11.15.3 PCS22A



63835AXX

11.15.4 RS-232 communication cable (prefabricated cable D-SUB 9PO)



64007AXX



12 Appendix

12.1 Chemical resistance

12.1.1 Metal housing

The frame and housing are made of powder-coated aluminum. This powder coating can be exposed to the following substances for more than 24 hours without any visible changes:

Alcohol 95%	Tap water
Aluminum cleaner	Ligroin
Ammonia	Lactic acid
Butanol	Sodium carbonate 10 %
Chloric acid 10%	Sodium dichromate, saturated
Diesel oil	Sodium hypochlorite solution
De-ionized water	Sodium hydroxide
Acetic acid	Paraffin oil
Ethanol 99.5%, denatured	Phosphoric acid
FAM engine gasoline	Nitric acid
Glycol	Sulfuric acid
Urea, saturated	Cooking oil
Hydroperoxide	Turpentine
Isoproponal	Washing liquid
Common salt 20%	Citric acid
Cooling agent	-

12.1.2 Keyboard and display

Solvent resistance for the display surface

This surface of the display can be exposed to the following substances for more than 24 hours without any visible changes:

2-ethylene-hexane acid	Kerosene
Acetone	Methanol
Ammonia solution (relative density 0.9)	Sodium carbonate < 20%
Ammonia solution < 10%	Sodium hypochlorite < 10%
Cotton seed oil	Sodium hydroxide < 48%
Benzol	Olive oil
Hydrochloric 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)
Dimethylformamide	Sulfuric acid < 30%
Pure acetic acid (relative density 1.05)	Tetrachloromethane
Acetic acid	Toluene
Ethyl acetate	Hydrogen peroxide < 28%
Ethanol	Citric acid
Isoproponal	-


**Solvent
 resistance for
 Autotex F157**

Autotex F157 is used to cover the membrane keypad.

Compatible substances

In accordance with DIN 42 115 part 2, Autotex F157 can be exposed to the following substances for more than 24 hours without any visible changes:

1.1.1 Trichloroethane (Genklene)	Isophorone
Acetaldehyde	Isopropanol
Acetone	Potassium ferrocyanide / Ferrocyanide
Acetonitrile	Potassium hydroxide < 30%
Aliphatics	Potassium carbonate
Alkali carbonate	Linseed oil
Formic acid < 50%	Hydrogen peroxide
Ammonia < 40%	Methanol
Amyl acetate	Methyl ethyl ketone
Gasoline	MIBK
Bichromate	Sodium bisulphate
Butyl cellosolve	Sodium carbonate
Hydrochloric acid < 36%	Sodium hypochlorite < 20% (bleach)
Cyclohexanol	Sodium hydroxide < 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
Diocetyl phthalate	Sulfuric acid < 10%
Dioxan	Silicone oil
Dowanol DRM / PM	Teepol
Ferric chloride	White spirit
Ferrous chlorine	Test gasoline
Acetic acid	Toluene
Ethanol	Triacetin
Ether	Trichloroacetic acid < 50%
Ethyl acetate	Universal brake fluid
Aviation gasoline	Washing powder
Formaldehyde 37% ... 42%	water
Blown castor oil	Fabric softener
Glycerin	Xylol
Glycol	-

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



Harmful substances



NOTICE

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

- Benzyl alcohol
- Dichloromethane
- Concentrated alkaline solutions
- Concentrated mineral acids

Substances that do not change colors

The surface will not change colors when being exposed to the following substances for 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

INFORMATION



As with all polyester-based films, Autotex F157 is not suited for use in direct sunlight for longer periods.



12.2 Updating the operator terminal

The operator terminal is equipped with a system program (operating system) stored in the terminal memory.

This system program can be replaced by a newer version via PC or external memory card. Not available for DOP11B-10 and -15. See also the section "Downloading system programs in DOP11B-10 and -15" on page 355.

12.2.1 Downloading the system program via PC

HMI Builder is used to download system programs to the operator terminal via a PC. The transfer can take place via serial interface or Ethernet. A PCS11B cable should be used as the serial connection. A crossed CAT5 cable can be used as the Ethernet connection.

The following prerequisites must be fulfilled when transferring the system program to the operator terminal via PC:

PC with HMI Builder

Connection cable between PC and operator terminal

File containing the new system program (OPSys_b*.cab)

INFORMATION

Ensure that the power supply is not interrupted during the transfer.



Preparation

Via serial connection

1. Connect the PCS11B connection cable to the PC and operator terminal.
2. Open a project or create a new one with the required operator terminal type.
3. Choose [Transfer] / [Update operator terminal system program].

No settings are required in the operator terminal.

Under [Options] / [Communication properties], enter the port for the data transfer and the transfer speed.

Via Ethernet

1. Connect the PC and operator terminal using the connection cable.
2. Enter a valid IP address for the operator terminal.
3. Open a project or create a new one with the required operator terminal type.
4. Choose [Transfer] / [Update operator terminal system program].
5. Choose [Settings] / [Use TCP/IP transfer].



12.2.2 Downloading a system program via an external memory card

1. Save the system program file (OPSys_b*.cab) in the master directory of the external compact Flash memory card or the USB Flash drive.
2. Insert the memory card into the operator terminal or connect the USB Flash drive and start the operator terminal to update the system program automatically.

INFORMATION



Compact Flash cards are only supported by DOP11B-50.

12.2.3 Downloading system programs in DOP11B-10 und -15

The Software Image Loader is used to download system programs to the operator terminal via a PC. Image Loader is available to download on the website. Transfer takes place via PCS11B cable using the serial interface.

The following items are required to update the system program on the operator terminal:

- A PC with the "Image Loader" software
- A PCS11B cable

Preparation

1. Double-click the EXE file Image Loader to run it. Proceed as follows:
2. Connect the PCS11B connection cable to the PC and operator terminal.
3. Disconnect the power supply to the operator terminal.
4. Set the operator terminal to the image load mode by switching the operating mode switch 2 to ON.
5. Switch the supply voltage back on.
6. All operator terminals connected to the PC with COM connections and in image load mode are displayed in a drop-down list. Choose the operator terminal that you want to update using the MAC address (hex).
7. Click on Upgrade (update).
8. Once the update is complete, disconnect the power supply to the operator terminal again. Return operating mode switch 2 to the OFF position.
9. Switch the power supply to the operator terminal back on.



12.3 Changing the battery

INFORMATION



- Make sure there is sufficient ESD protection.
- Make a backup copy of the operator terminal project; see the section "Transfer properties" on page 205.

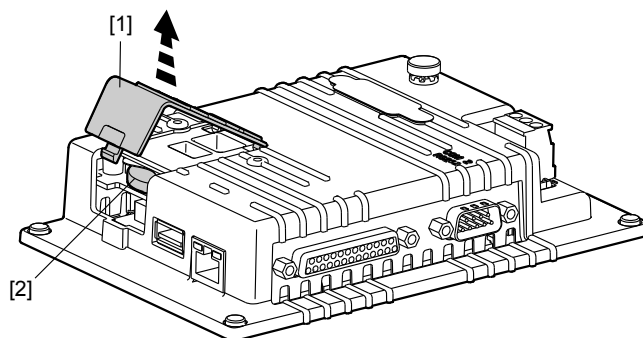
12.3.1 DOP11B-20, -25, -30 and -40

You require:

- Lithium battery, CR2450, 550 mAh

Procedure

1. Disconnect the operator terminal.
2. Open the battery compartment.



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- [1] Battery compartment
[2] Battery

3. Do not use conductive tongs to remove the battery.
4. Insert a new battery.
5. Close the battery compartment again.

INFORMATION



- You should recycle the used lithium battery.



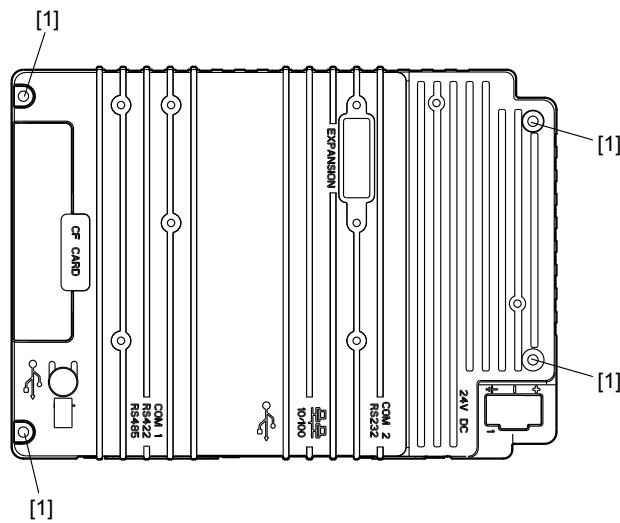
12.3.2 DOP11B-50 and -60

You require:

- Lithium battery, CR2450, 550 mAh
- Hot-melt gun: Jet-Melt TCQ, manufacturer: 3M
- Hot-melt adhesive: 3748 V-O, manufacturer: 3M

Procedure

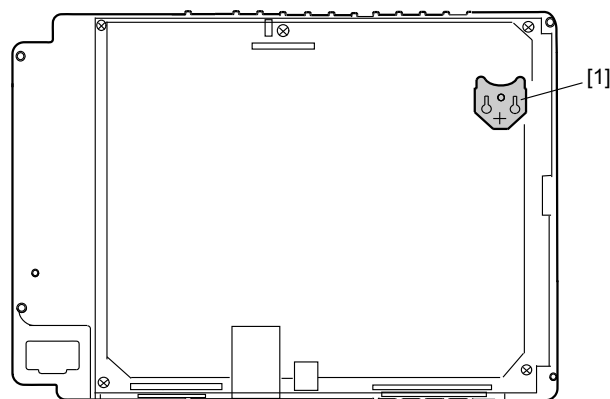
1. Disconnect the operator terminal.
2. Remove the rear cover of the operator terminal by loosening the four Torx screws.



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[1] Torx screws

3. Turn the cover over (the CPU board and battery are located on the rear).



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[1] Battery holder



4. If the battery is fixed in place with a hot-melt adhesive, remove it before carefully removing the battery from the battery holder.
5. Carefully insert a new battery into the battery holder. The plus sign on the battery must be aligned with the plus sign on the holder.
6. Fix the battery in place using a hot-melt adhesive.
7. Reassemble the operator terminal in the reverse order.

INFORMATION

- You should recycle the used lithium battery.
-



12.4 Troubleshooting

The following error list will help you diagnose errors that occur in the operator terminal.

Scenario	Error diagnosis
<ul style="list-style-type: none"> • The operator terminal is not working properly. • The operation LED is not illuminated. 	<ol style="list-style-type: none"> 1. Check the voltage 2. Is enough current being supplied? 3. Check the fuse 4. Check the power card 5. Is the power card installed correctly?
No communication between operator terminal and controller.	<ol style="list-style-type: none"> 1. Check the communication cable between the devices. 2. Check whether the operator terminal has downloaded a controller driver. 3. Check whether the right controller driver is being used. 4. Check the communication connections on the CPU board.
The operator terminal is in operation, but the backlighting does not work.	<ol style="list-style-type: none"> 1. Check the attenuation of the backlighting. 2. Check whether the backlighting is connected to the power card. 3. Replace the backlighting 4. Check DC / AC on the power card.
The operator terminal is not working, the backlighting is off, but the operation LED is illuminated.	<ol style="list-style-type: none"> 1. Check the attenuation of the backlighting. 2. Check the CPU board for scorched components. 3. Download new firmware to the operator terminal.
The operator terminal is not equipped with the latest firmware.	<ol style="list-style-type: none"> 1. Check the version used by the operator terminal. 2. Save a copy of the project on the computer. 3. Use the Image Loader to download an update and follow the instructions.
The operator terminal is in operation, but one or more keys do not work.	<ol style="list-style-type: none"> 1. Check whether the power cable is connected correctly. 2. Replace front section.
The touchscreen works either poorly or not at all.	<ol style="list-style-type: none"> 1. Reset the touchscreen. 2. Check whether the power cable is connected correctly. 3. Replace the display screen of the operator terminal. 4. Check the touchscreen interface on the power card.
Lines on the display panel are the wrong color or the display is displaced.	<ol style="list-style-type: none"> 1. Check whether the display panel has a wide vertical or horizontal area. It should be at least 2-3 cm wide and gray or black. 2. Check whether the cable for the display panel is connected correctly. 3. The display panel cable should not be bent or damaged in any way. If it shows signs of damage, it must be replaced.
The operator terminal does not start after a component has been replaced.	Remove the battery and replace it (applies only to DOP11B-20 to -40).
Battery is weak / no battery	<ol style="list-style-type: none"> 1. Check whether the battery is sitting correctly in the battery holder. 2. If the battery is weak / empty, it must be replaced (see the section "Changing the battery" on page 356.)



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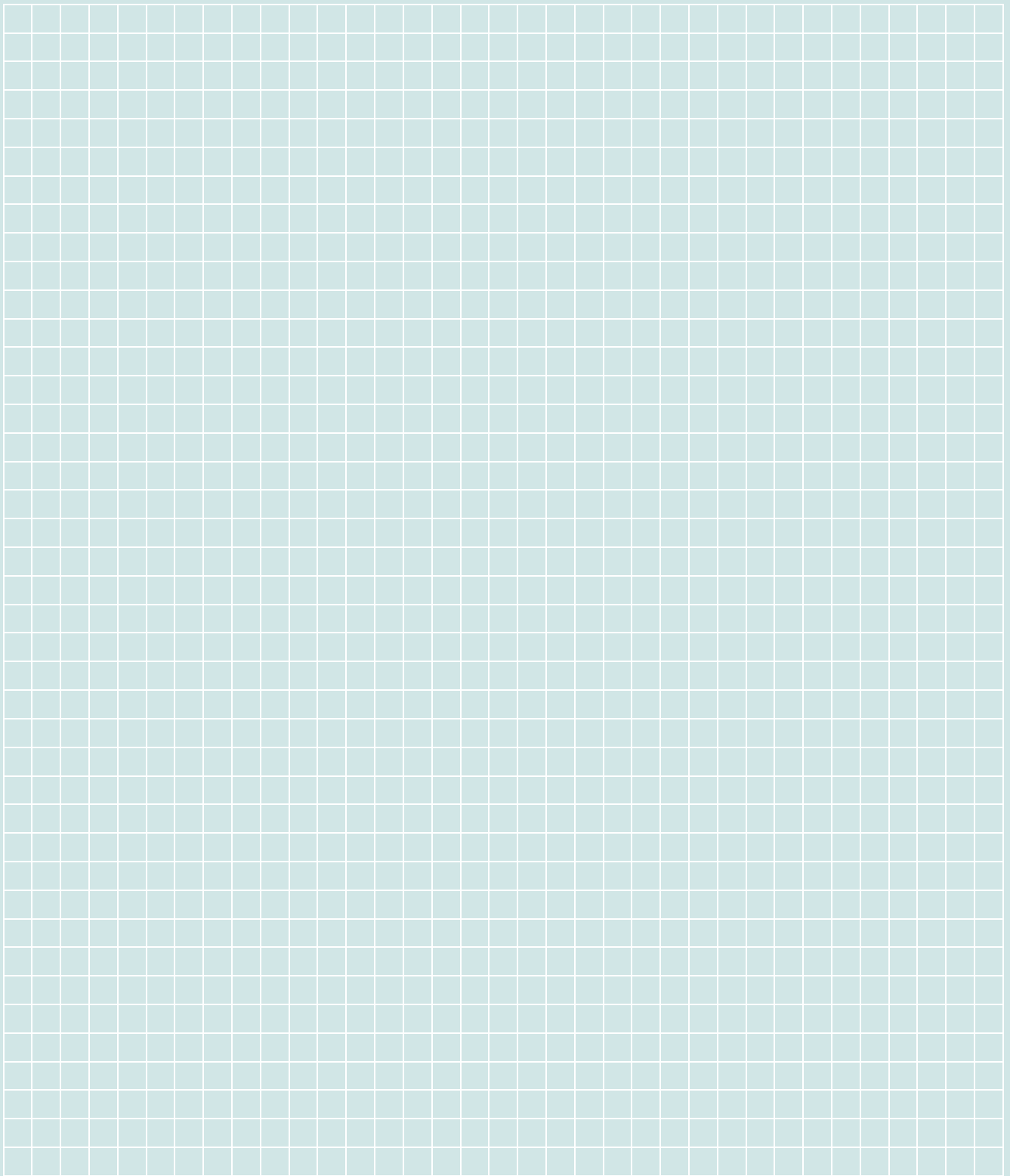
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