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SIEMENS

COROS

Operator Panel
OP25, OP35, OP45

Equipment Manual

Preface, Table of Contents

Introduction

Functions od the Operator Panel

Commissioning and Operation

Device Description,
Installation and Maintenance

Appendices

Glossary, Index

6AV3991–1AD02–0AB0

Release 04/96

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Preface

Purpose

This equipment manual contains precise information about the functionality and technical design of operator panels OP25, OP35, and OP45.

Audience

The present equipment manual is written for operators, fitters, configurers, and system support engineers.
The **operator** of an operator panel will find all the information he requires for handling the device in Part II.
For the **fitter**, Part IV contains all the information he requires to install and commission the operator panel.

Applicability

The different versions of the equipment manual refer to the following OP firmware and ProTool versions:

Release	Remarks	OP Firmware	ProTool Version
04/95	Initial release of Equipment Manual Summary of OP25, OP35 Equipment Manual, and OP45 added	OP25: from V. 1.31 OP35: from V. 1.31 OP45: from V. 1.31	Up to V. 1.31 Up to V. 1.31 Up to V. 1.31
10/95	Extensions for Release 2	OP25: from V. 1.31 OP35: from V. 1.31 OP45: from V. 1.31	Up to V 2.0 Up to V 2.0 Up to V. 2.0
04/96	SINEC L2-DP for OP45 and MPI for SIMATIC S7 added	OP25: from V. 2.0 OP35: from V. 2.0 OP45: from V. 1.40	Up to V 2.0 Up to V 2.0 V. 2.0[1]

1) As well as an upgrade floppy disk

Further support

Should you have any queries regarding technical matters, please get into touch with your point of contact at the Siemens agency or branch responsible. You will find the addresses in Appendix F of this manual, in catalogs, and in Compuserve (go autforum) ..., for instance. In addition, you can call our hotline by dialing +49(911) 895-7000 (fax 7001).

Conventions

The following conventions are used in this manual:

`Trans Mode`	Text on the display of the OP appears in the manual in Courier
Login:	Field name on screens
(→ section 7.2)	Cross-reference, reference to additional information

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How the manual is organized

The OP25/35/45 Equipment Manual is organized as follows:

Chapters 1 to 2 provide an overview of the operator panels and their functions in tabular form.

Chapters 3 to 9 describe in step-by-step instructions how to operate operator panels – for example, how to

- create new screens (in addition to the standard screens)
- output messages or alarms
- enter recipe data records
- print messages or screens.

Chapters 10 to 13 contain information on

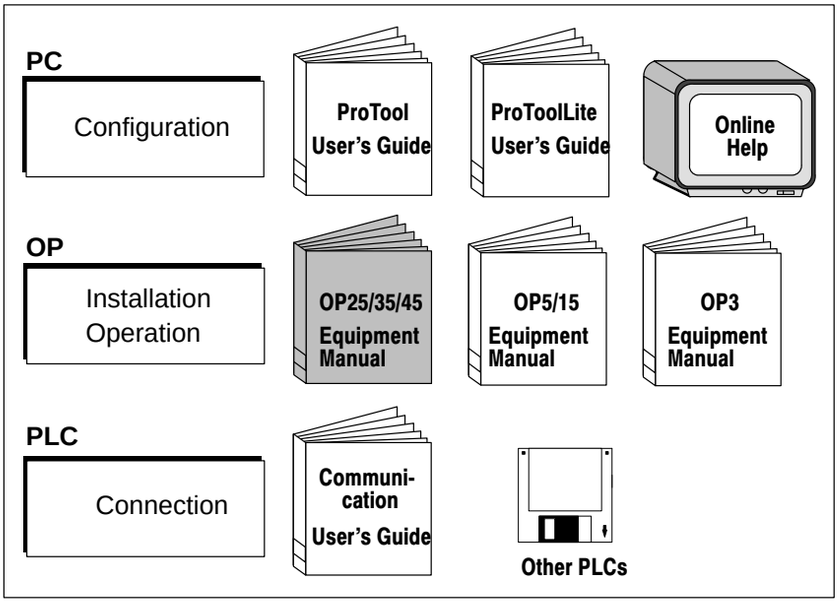
- how you commission operator panels
- which system settings you can perform, and
- how you can back up and restore data.

Chapters 14 to 18 contain detailed information about the different devices, as well as their mechanical and electrical installation and maintenance.

In the appendices you will such items as technical data, interface assignments, test functions, and system messages.

Related documents

The illustration shown below provides an overview of how the complete range of documents covering manuals and online help is organized. The present manual is shaded.



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Part I

INTRODUCTION

1 Product Description

2 Functionality

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Product Description

1

Overview

Electronically controlled machines are usually supervised and controlled ”on the spot”. Depending on the size and complexity of the machine or system, the requirements for operator interface systems differ greatly.

Application of operating panels

Operator panels OP25/35/45 allow a realistic graphical display of the machine or system under supervision and are designed for easy machine control.

With operator panels OP25/35/45 you can

- Control and supervise the process by means of menus – for example, you can control setpoints or signal control elements by means of inputs, soft keys, and function and system keys.
- Visualize processes, machines and systems as pixel or character graphics images.
- Display event and alarm messages as well as process variables as an output field, a bar graph, trends or a status display, for instance.
- Intervene in the process flow using the integrated keyboard.

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Installation options

Operator panels OP25, OP35 and OP45 are panel mounting devices for use locally on the machine.

Due to the high degree of protection (IP65 at the front panel), the OP is also suitable for hostile industrial environments.

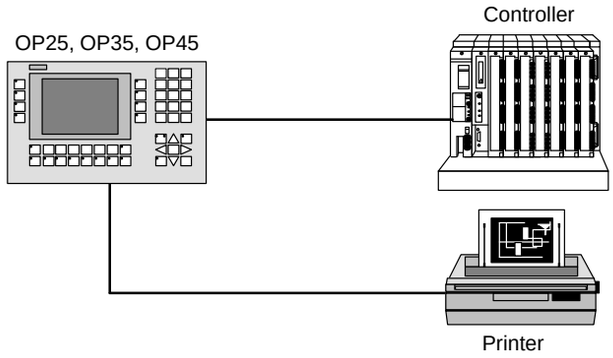
Possible installation locations for the OPs are:

- Cabinets or panels
- 19” cabinets or racks (OP35 and OP45 only)

System configuration

The OP’s integrated interfaces permit it to be connected directly to controllers.

A printer can also be added for hardcopies and listings.

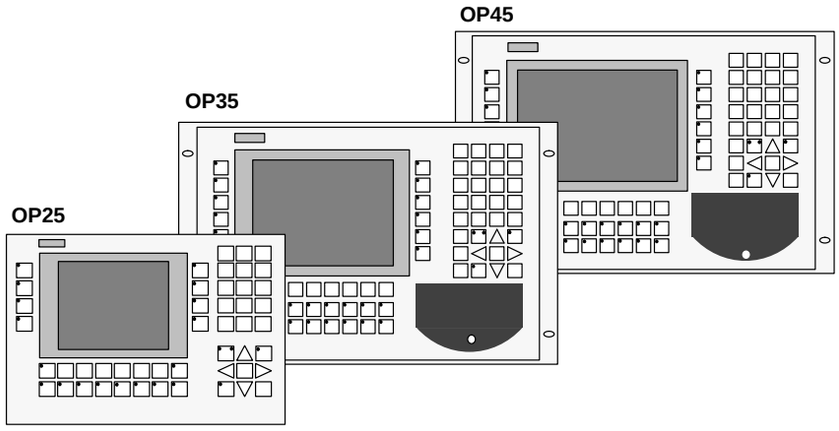


Planning

A PC or programmer is used to configure the OP with ProTool (a configuring program which runs under Windows).

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1.1 The Operator Panel at a Glance



Basic Models		OP25	OP35	OP45
Models	Black and white display	Yes	Yes	–
	Color display	–	Yes	Yes
Display	Type	STN-LCD	STN-LCD	TFT-LCD
	Resolution (in pixels)	320 x 240	640 x 480	640 x 480
	Background illumination	Yes	Yes	Yes
Sealed keyboard	System keys with fixed functions	24 (4 with LED)	32 (4 with LED)	32 (4 with LED)
	Function keys with configurable functions	24 (18 with LED)	36 (28 with LED)	36 (28 with LED)
	Softkeys thereof	14	20	20
	Function key labels	Customized labelling with label strips		
Interfaces	Serial interfaces for connection of controller, PC/PG, printer	2 x V.24/TTY 1 x RS 422/RS 485 1 x TTY/RS 422/RS 485		1 x V.24/TTY 1 x V.24 1 x RS 485

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Basic Model		OP25	OP35	OP45
Memory	Flash EPROM for firmware and user data	1 Mbyte	2 Mbytes	–
	Working storage (DRAM)	2 Mbytes	4 Mbytes	8 Mbytes
	Memory for configuration	1 Mbyte	3 Mbytes	5.5 Mbytes
Floppy disk drive		–	Optional	Yes
Hard disk		–	–	425 Mbytes
Special features	Hardware clock (buffered)	Yes	Yes	Yes
	Relay output	Yes	Yes	–
	Operation of an external MF2 keyboard	–	–	Yes
	DOS operation	–	–	Yes
	Operation of an external monitor	–	–	Yes
	Module slot for PCMCIA/JEIDA cards	Yes	Yes	–

Options		OP25	OP35	OP45
Direct key module	Digital outputs, addressable via either keys or configurable ports	8	16	16
Floppy disk drive		–	3 ½” drive	(Included in standard model)

Installation Possible in	OP25	OP35	OP45
Switching cabinets/consoles	Yes	Yes	Yes
19” cabinets/racks	–	Yes	Yes

Controllers That Can Be Used	OP25	OP35	OP45
SIMATIC S5 programmable controllers	Yes	Yes	Yes (AS 511 only)
SIMATIC S7 automation system	Yes	Yes	–
SIMATIC 500/505	Yes	Yes	–
PC/AT-compatible computers	Yes	Yes	–
Controllers of other manufacturers	Yes	Yes	–

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1.2 Process Visualization and Manipulation

"One picture is worth a thousand words" goes the familiar saying.

This is particularly true of machine and system monitoring where it is important to provide the operator with clear and easy-to-understand information about the state of the process.

Screens

Process values and process sequences are shown by screens which can contain graphics, texts and values. Process values in a system are often related in some way. Screens show this relationship and thus represent an image of the process.

Full graphic plant screens

The OP permits you to represent machines and plants as **full graphic screens**. This improves operator orientation.

Bars, curves

You can show current process values (e.g., filling level and speed) as numeric values, or symbolically as text or **bars**.

Curves are a particularly good way to show changeable process values (e.g., changes in temperature) over a period of time.

Symbolic graphics

Symbolic graphics are another way to indicate process values. Symbolic graphics are graphic elements (i.e., bit maps) which are indicated alternately to show different process states (e.g., valve open or closed).

Process manipulation

The operator can use the OP's integrated keyboard to intervene in the process sequence.

For example, you can control actuators (e.g., valves) by specifying process values (i.e., setpoints).

Features important to operator control include ease of handling, short training periods, and a high degree of reliability.

You can configure the structure of the OP operating environment as desired (i.e., you can tailor operator control to your particular application).

A few features:

- Free configurable function keys
- Softkeys
- Pop-up windows for symbolic entries

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Messages

Process or machine states (e.g., the current operating mode) are displayed by the OP as plain-text event messages.

Alarm messages provide information on critical machine states.

Current measured values (e.g., temperatures, speeds, etc.) can also be included in the text of event or alarm messages.

Event and alarm messages are stored with date and time in a message buffer. At the same time, all event and alarm occurrences can be printed (if message logging is switched on and a printer is connected).

Information texts

Information texts can be configured. You can use them to give the operator additional information which will help him/her to correct a malfunction.

Recipes

Complete blocks of machine data can be stored as recipes on the OP.

The structure of a recipe is specified during the configuring phase. It makes no difference whether the recipes are “real recipes” or only piece number specifications, traversing paths or temperature progressions.

You can change or redefine recipe data directly on the OP.

Password protection

The OP offers password protection. Each operator can be assigned a different password. A password level can then be used to enable or disable each operator’s access to special operating functions. This prevents incorrect entries and improves system security.

Multiple languages

All messages and texts for screens can be stored in the OP in up to three different languages.

This permits international use even when operating personnel speak different languages.

PG functions

The “STATUS/FORCE VARIABLE” PG functions are available for testing and trouble-shooting. They can be used on the OP to specify and change address areas in the controller. This makes on-site troubleshooting fast even without a programmer.

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Functionality

2

The functions of the operating panels are listed below. The numerical values contained in the tables are the maximum values that can be managed by an OP and are limited possibly only by the size of the user memory.

Functions		OP25	OP35	OP45
Event messages	Number	2000		
	Indication	In message line/message window		
	View all queued events	On message page		
	Length of message text (in characters)	2 x 35	70	70
	Lines per message	2	1	1
	Process values in message text	8		
Alarm messages	Number	2000		
	Indication	In message line/message window		
	Indication type	1st value/last value (can be selected)		
	View all queued alarms	On message page		
	Length of message text (in characters)	2 x 35	70	70
	Lines per message	2	1	1
	Process values in message text	8		
	Acknowledge single alarm messages	Yes		
	Acknowledge several alarm messages simultaneously	Yes, 16 acknowledgement groups		
Message logging	Logged on a printer	Yes		
Message buffer	Capacity	512 message occurrences		
	Look at buffered event messages/ alarm messages	On puffer page		
	Delete	Yes		
	Buffer overflow warning	Yes		
	Forced printout for buffer overflow	Yes		

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Functions		OP25	OP35	OP45
Message acquisition	Time of occurrence	Date/time		
	Message status	Arriving, departing, acknowledged		
Screens	Indicate	Yes		
	Print (hardcopy)	Yes		
	Static screen elements	Static full graphics Fixed text Semigraphic characters		
	Input/output elements	Input fields Output fields Combined input/output fields Symbolic input (pop-up window) Symbolic output (graphics/text) Bars Curves		
	Operator prompting	Icons for softkey functions		
	Fixed window	Yes		
Limit value monitoring	For inputs/outputs	Yes		
Conversion functions	For inputs/outputs	Linear Square		
Fonts	Loadable fonts per language	3		
	Fonts not dependent on language (with semigraphic characters)	1		
	Character sizes in pixels	8 x 8 to 64 x 64		
Text attributes	Display	Flashing, inverse, underlined		
	Printer	Bold, italics, underlined		
Information texts	Lines/characters	7/35		
	For messages	Yes		
	For input fields	Yes		
	For screens	Yes		
Password protection	Number of passwords Password levels	50 9		

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Functions		OP25	OP35	OP45
Recipes	Number	255		
	Data records per recipe	500		
	Entries per data record	500		
	Save data records (set up)	Controller/OP → storage medium		
	Load data records	Storage medium → OP/controller		
	Delete data records	In storage medium		
	Change data records (edit)	In storage medium		
	Transfer current values	Controller → OP OP → controller		
	Transfer data records	Data medium → OP OP → data medium		
	Parameter records	Yes		
Print functions	Hardcopy of the contents of the display Character mode (ASCII) Graphic mode	 Yes Yes		
	Direct message logging	Yes		
	Screen printout in character mode (ASCII)	Yes	Yes	–
Data backup	Backup/restore function for PCMCIA/JEIDA cards	Yes	Yes	–
Online language switchover	Number of languages	3		
PG functions (Status/force variable)	For SIMATIC S5	Yes	Yes	Yes
	For SIMATIC S7	Yes	Yes	Yes
Loop–through operation	For PG or additional TD/OP (only with SIMATIC S5 and AS 511 protocol)	Yes	Yes	No
Display	Setting for display brightness/ contrast	Yes	Yes	–
	Blanking circuit	Yes	Yes	–
Connection to PLC	SIMATIC S5-AS511 SIMATIC S5-FAP SIMATIC S5-L2-DP SIMATIC S7-MPI SIMATIC S7-PPI SIMATIC 500/505 Free Serial Allen Bradley Mitsubishi Telemecanique	Yes Yes Yes Yes Yes Yes Yes Yes [3] Yes [3] Yes [3]	Yes Yes Yes Yes Yes Yes Yes Yes [3] Yes [3] Yes [3]	Yes – No [2] – – – – – – –

2) The immunity to interference cannot be guaranteed on account of the hardware characteristics of the OP45
3) Driver available as an option

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FUNCTIONS OF THE OPERATOR PANEL

Part II

3 Using the OP

4 Screens

5 Messages

6 Recipes

7 Print Functions

8 Password Protection

9 Status/Force Variable with the OP

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Using the OP

3

Overview

Processes (e.g., a machine tool, mixing station or similar) are displayed on the OP with screens. The processes can also be manipulated.

Screen section

One screen takes up the entire display. An example of a possible layout is shown below.

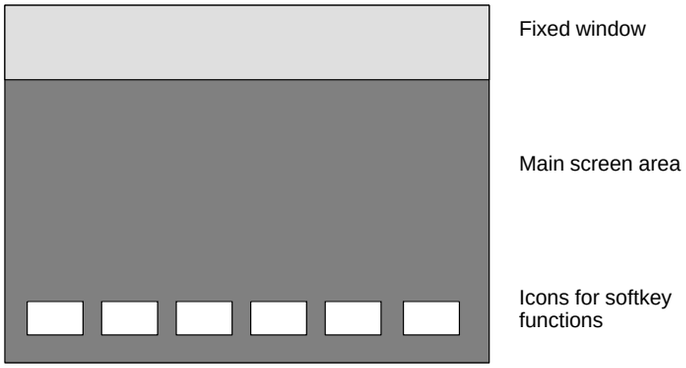


Figure 3-1 Screen layout for the OP25

Fixed window

The fixed window provides the operator with a continuous stream of important process variables regardless of which screen is open at the moment.

Main screen area

The main screen area contains the actual contents of the currently opened screen.

Additional windows (e.g., message windows, help windows and pop-up windows) are faded in over the main screen area and the fixed window.

Icons

Icons symbolize softkey functions related to specific screens.

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3.1 Keyboard

Overview

The keyboard of the OP is equipped with two blocks of keys:

- The function keys/softkeys
- The system keys

Function keys/ softkeys

A **function key** always triggers the same action in the OP or controller (i.e., global significance for the OP) regardless of which screen is currently open. A few possible actions are listed below.

- Open a screen
- Indicate the current alarm messages
- Start a hardcopy of a screen
- Indicate the time window

The term **softkey** means that function keys can have a meaning related to the currently open screen (i.e., local).

The function of a softkey can vary from screen to screen. When a screen is open, a softkey's function is shown by an icon in the margin of the monitor screen.

The following keys can have softkey functionality:

- For OP25: F1 to F14
- For OP35/OP45: F1 to F20

Repeat function (for OP45 only)

The repeat function activates when a key is repeatedly pressed.

Note

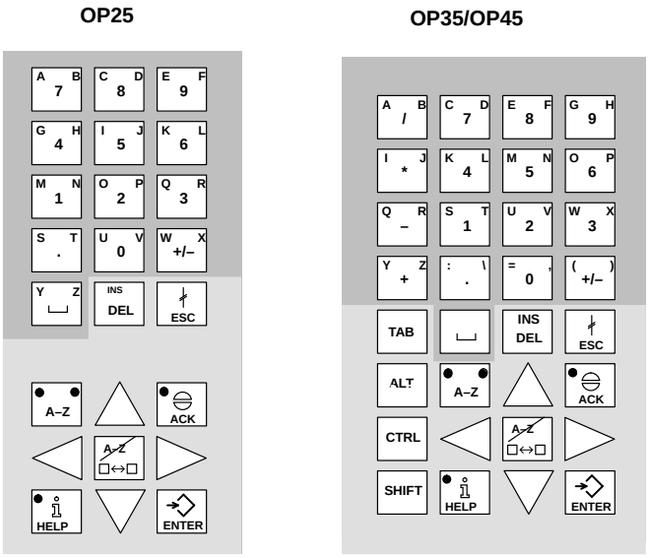
Do not press several keys on the OP45 at the same time. This can cause incorrect entries.

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System keys

The system keys are used to make entries on the OP.

Figure 3-2 shows the system keyboard for the OP25 and OP35/OP45.



= Input keys for numeric and alphanumeric characters

= Control keys

Figure 3-2 Assignment of the system keys

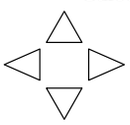
Note

The TAB, ALT, CTRL and SHIFT keys of the OP35 have no function.

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Key functions

The control keys of the OP have the following functions:

Key	Description
A–Z Shift key	This key is used to shift the input keys from numeric to alphanumeric. The key is equipped with two LEDs which indicate the current status. No LED is on. • Numeric assignment of the input keys is active. • Alphanumeric assignment of the input keys becomes active when this key is pressed once. One of the two LEDs (i.e., left or right) is on. • Left or right alphanumeric assignment of the input keys is active. • Input key assignment alternates between the left and right alphanumeric assignment each time this key is pressed.
A–Z □↔□	• Switches the active window (OP25/OP35 only) • Switch from alphanumeric assignment of the input keys back to numeric assignment
INS DEL	• Activates edit mode (OP25/OP35 only) • Deletes/inserts single characters
ESC Cancel key	This key cancels already started actions. Some examples are listed below. • Delete an already entered character for a value input • Delete a queued system message
ACK Acknow-ledgement key	This key acknowledges the currently indicated alarm message or all messages of an acknowledgement group. The LED remains on as long as an unacknowledged alarm message is queued.
HELP Info key	This key is used to open a window containing a help text for the selected object (e.g., message, input field). The LED goes on when a help text is available for the selected object. The help window is closed by pressing any key.
ENTER Apply key	• Accept and exit an entry • Open the pop-up window for a symbolic entry
Cursor keys 	• Move the cursor to the individual input fields in a screen • Move the cursor within an input field • Select an entry from the message buffer • Select a value from the pop-up window

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3.2 Input/Output Fields

Overview

The screens on the OP contain different types of input/output fields.

- Numeric fields (digital or analog)
- String fields
- Symbolic fields

Values can be entered on the OP in these input fields which are then transferred to the controller.

Procedure

The basic procedure for entering values on the OP is described below.

1. Using the cursor keys, position the cursor on the desired input field.
2. Enter the value. The method of entry varies depending on the type of field. See the following subsections for information on handling the individual fields.
3. Confirm the entry with with ENTER key.

Correcting/canceling entries

The following methods of correction are available before the entry is applied.

- Using the INS/DEL key, insert/delete single characters where the cursor is positioned. Then use the ENTER key to confirm the correct value.
- Cancel the entry with the ESC key.

  The original value is then automatically rewritten in the field. Enter the correct value, and confirm with the ENTER key.

Edit mode (OP25/35 only)

An edit function is available on the OP25/35. This edit function can be used to edit entries which have already been applied.

1. Position the cursor on the desired input field.
2. Activate edit mode by pressing the INS/DEL key.

   In contrast to input mode, the indicated value is retained.
3. Move the cursor to the appropriate position of the input field.
4. Using the INS/DEL key, insert/delete characters where the cursor is positioned.
5. Confirm the entry with the ENTRY key.

   The entry can be canceled with the ESC key. The old value is indicated again.

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3.2.1 Numeric Fields

The shape of the cursor changes in input mode. Input starts at the right-hand edge of the input field. Digits are shifted to the left similar to a pocket calculator.

Entry

To make entries in a numeric field, proceed as follows:

Step		Key	Description
1	Enter decimal value	0 to 9 +/– , .	
	Enter hexadecimal value	A B to E F 0 to 9	The characters A to F must be entered in alpha mode.
	Enter digital value	0 , 1	
2	Apply entry	ENTER	• The entered value becomes valid. • The entry becomes invalid if the entered value violates a configured limit value or an incorrect entry is made. The “old” value is retained.
	Or		
	Cancel entry	ESC	The “old” value becomes valid again.

Correction

If you have made a mistake and have not yet applied the entry, proceed as follows:

IF ...	THEN ...
Wrong digit	◁ ▷ Position the cursor on the digit and overwrite. (The cursor remains on this position.)
One digit too many	INS DEL Deletes the digit at the cursor position and consolidates the input from the left.
One digit too few	1. A–Z Switch to alpha mode. 2. INS DEL Inserts a blank where the cursor is positioned and shifts the entry to the left starting at the cursor position. 3. A–Z □↔□ Shift back to numeric assignment of the input keys. 4. Overwrite blank.

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3.2.2 String Fields

Both numeric characters (i.e., digits) and alphanumeric characters (i.e., letters of the alphabet) can be entered in a string field. Strings may also contain blanks.

The cursor changes shape in input mode. The entry starts at the left edge of the input field. The cursor jumps one position to the right each time a character is entered.

Entry

To make entries in a string field, proceed as follows:

Step		Key	Description
1	Enter digits	0 to 9 +/– , .	If necessary, switch back from alpha mode.
	Enter letters	A–Z A B to Y Z	Switch to alpha mode.
2	Apply entry Or Cancel entry	ENTER ESC	• The entered string becomes valid. • Switch back from alpha mode[4] • The input cursor is deleted. • Switch back from alpha mode[1] • The “old” string becomes valid again.

Correction

If you have made a mistake and have not yet accepted the entry, proceed as follows:

IF ...	THEN ...
Wrong character	◁ ▷ Position the cursor on the character and overwrite. (The cursor jumps one position to the right after the overwrite.)
One character too many	INS DEL Deletes the character at the cursor position and consolidates the input from the right.
One character too few	1. A–Z Switch to alpha mode. 2. INS DEL Inserts a blank where the cursor is positioned and shifts the entry to the right starting at the cursor position. 3. Overwrite blank.

4) Not applicable to OP45

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Example of a string entry

You want to enter “valve 05”. Proceed as follows:

Key	Display
A–Z	
A–Z , U V	V
A–Z , E F	VA
A–Z , M N	VAL
S T	VALV
A–Z , I J	VALVE
A–Z , K L	VALVE
A–Z , ␣	VALVE
0	VALVE 0
5	VALVE 05
ENTER	Apply entry.

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3.2.3 Symbolic Fields

Entries in symbolic fields are made with a pop-up window indicating the entries available for this field.

Entry

To make an entry in a symbolic field, proceed as follows:

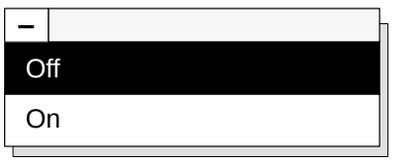
Step		Key	Description
1	Open pop-up window	ENTER	
2	Select entry	△ ▽	
3	Apply entry Or Cancel entry	ENTER ESC	• The value belonging to the selected entry becomes valid. • The pop-up window is closed. • The “old” value becomes valid again. • The pop-up window is closed.

Example

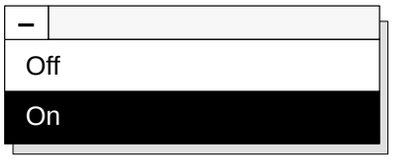
You want to use a symbolic entry to turn on mixer 3.

ENTER — The pop-up window appears.

Mixer 3 is marked “off”.



▽ — You select mixer 3 “on”.



ENTER — The entry you selected is applied (i.e., accepted).

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3.3 Using the Windows of OP25/OP35

Several windows can be displayed at the same time on the OP.

To use them, you can switch between the individual windows.

Switches between the following windows are possible.

- Main screen
- Fixed screen
- Message line and message window

Selecting a window

Use the middle cursor key to select the window in which you want to work or make entries.

Key	Description
	Each time you press this key the cursor jumps from one window to the next.

The window in which the cursor is located is the active window (i.e., you can make entries or perform other operations in this window).

Restrictions/ special features

You cannot switch to windows which do not contain input fields.

Exceptions: Message line, message window and message page

For these exceptions, the cursor is positioned on the first message. You can then select the information text pertaining to the message.

Information key

How to use the information key

- The first time the key is pressed

  The information text pertaining to the selected field or message is displayed.

- The second time the key is pressed

  The information text pertaining to the main screen is displayed.

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Static and dynamic windows

The position of the displayed window is static on the OP25.

When an alarm message window or a pop-up window is displayed, for example, an entry field hidden by the window cannot be used.

Generally, entries on the OP25 cannot be made unless all windows are closed.

The OP35 can be configured with dynamic window positioning.

When a window is to be displayed, it jumps automatically to a position which does not cover up the input field or the cursor.

This means that entries can always be made regardless of the contents of the display.

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Screens

4

Overview

Logically related process values are combined into screens. Graphic elements illustrate the relationships between these values. The individual screens provide a quick overview of a process or a system. In addition to showing what is happening in the process, screens can also be used to control the process by entering new process values.

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4.1 The Operator Panel in Action

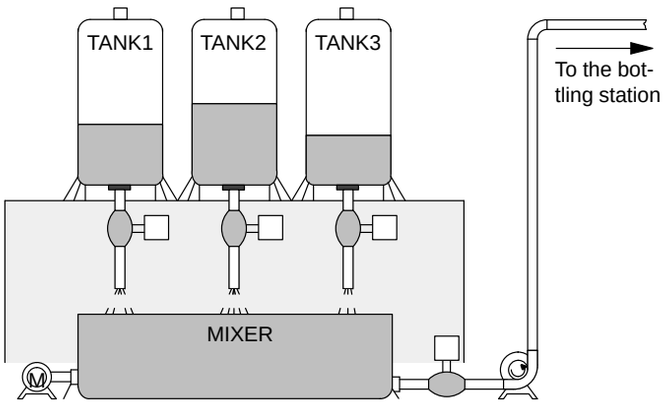
The OP is to control and monitor a plant which mixes and bottles various fruit juices. Plant functions are divided roughly into the mixing and bottling stations.

Mixing station

The ingredients for the juices are stored in three tanks. The ingredients are mixed in certain proportions depending on which fruit juice is to be produced.

Bottling station

After the juice is mixed, a valve is opened, and the finished fruit juice flows into a filling tank and is then bottled. The bottles are transported on a conveyor belt. Before being filled, they are checked for glass breakage. After being filled, the bottles are sealed, labelled and palletized.



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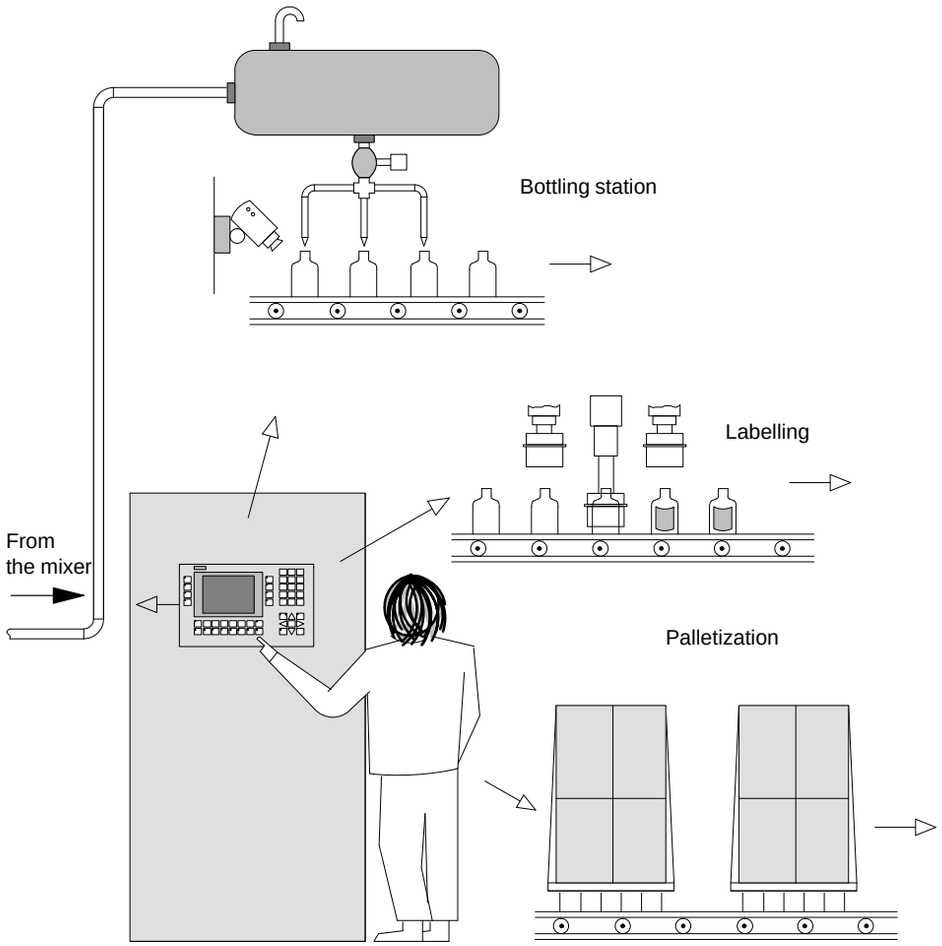


Figure 4-1 Mixing and bottling stations

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4.2 Screen Elements

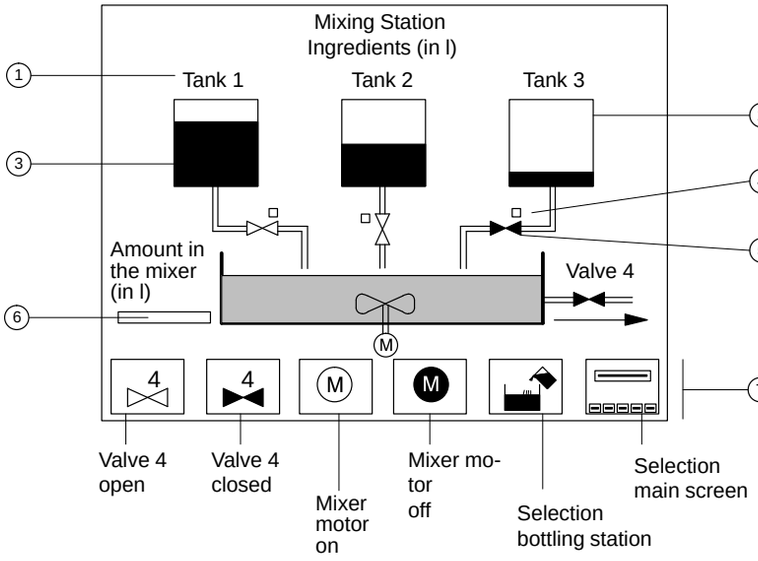
Screens on the OP are made up of various screen elements. Some examples are listed below.

- Fixed texts
- Semigraphic characters
- Input fields for process values
- Output fields for process values
- Bars
- Curves
- Symbolic graphics

We will use the mixing station of the fruit juice plant to show you the various screen elements.

Screen elements of the sample screen

The screen might look something like this.



1. Fixed text
2. Semi-graphic (corresponding to tank)
3. Bar shows filling level of the tank graphically.
4. Symbolic input field to open and close the valve
5. Symbolic graphic shows the status of the valve (i.e., open or closed)
6. Numeric output field
7. Icons for the softkey functions

Figure 4-2 Sample screen for a mixing station

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4.3 Selecting a Screen

You can select a screen in the following ways.

- Via function key (softkey)
- Via an appropriately configured input field
- Via job from the controller

Via function key

You can open a certain screen by pressing a function key (or a softkey).

Via input field

A screen is opened after an entry has been executed in an input field configured for the selection of this screen.

Via job from the controller

When the state of the process/plant requires, the controller causes a screen to be selected on the OP.

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4.4 Standard Screens

The OP comes already equipped with standard screens. You can use these standard screens for your configuration, or adapt them to fit your application.

Main screen

The standard screens are called from a main screen via softkey.

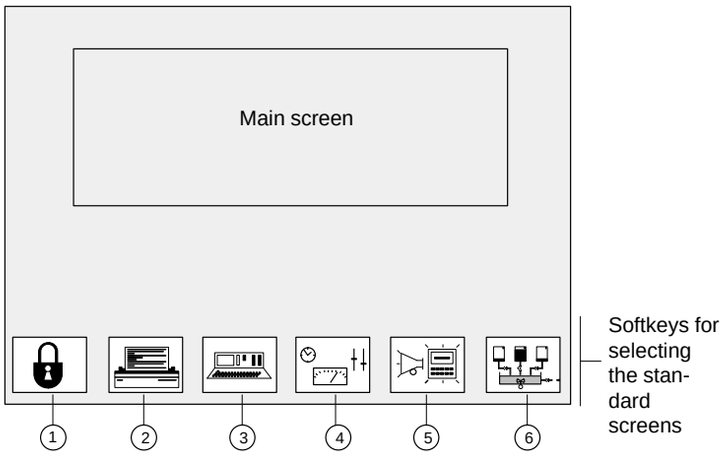


Figure 4-3 Main screen (example)

① Password processing

② Printer settings

③ Status Variable

④ System settings

⑤ Message processing

⑥ Mixing station (our example)

For detailed information on function and use of the standard screens, see the applicable sections in this manual.

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Messages

5

Messages inform the operator of certain occurrences by displaying a text.

There are three types of messages.

- **Event messages** indicate process states during normal operation of the system.
- **Alarm messages** indicate malfunctions/interruptions in the process.
- **System messages**

  In contrast to event and alarm messages which contain process-related information, system messages provide information on internal operating states/errors of the OP.

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5.1 Event and Alarm Messages

Event and alarm messages provide information on normal or critical process states by indicating message texts. The message texts may also contain current measured values.

Below are two examples showing the differences between event and alarm messages.

Event messages

The fruit juice plant has finished a mixing procedure. An event message informs the operator of this. The event message might look something like this:

```
Mixing procedure finished
Juice in the mixer: 5000 l
```

Alarm messages

The operator would now like to start the bottling procedure but has forgotten to open the filling valve. The controller automatically stops the bottling procedure and outputs an alarm message. The alarm message might look something like this:

```
Bottling procedure terminated
Filling valve is closed !
```

Because of their urgency, alarm messages must be acknowledged to ensure that the operator has noticed the message.

Acknowledgement can also be performed by the controller.

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5.1.1 General Features

Available methods of indication

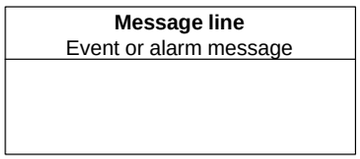
The OP offers the following ways to indicate event and alarm messages.

Message line, message window

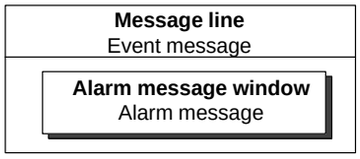
You can indicate a current event or alarm message in a message line or in a message window.

You can configure one of the following combinations:

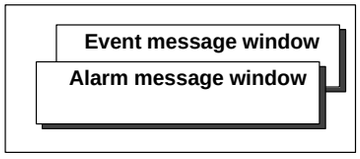
- Indicate an event or alarm message in the message line



- Indicate an event message in the message line and an alarm message in the message window



- Indicate an event/alarm message in the appropriate message window



Event message page, alarm message page

The operator can look at all still queued event messages or alarm messages on the appropriate message page.

Message buffer

The OP stores all messages in a battery-buffered memory. The operator can look at these stored messages.

Indication priorities

Each message is given a priority during configuration. This priority determines the importance of the message.

- When several messages are queued, the message with the highest priority is indicated first.
- When several, unacknowledged alarm messages are queued, either the **first** (i.e., the oldest) or the **last** (i.e., the latest) message is indicated.

  The operator can change the configured type of indication (*first/last*).
- When several event messages with the same priority are queued, the latest is indicated.

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Message states

Message occurrences may assume the following states:

Arriving	Marks the occurrence of the message
Departed	Cause of the message no longer exists.
Acknowledged	Only for alarm messages. The operator or the controller has recognized the message and confirmed it.

The OP acquires these message states with the precise time and outputs them when a message page or the message buffer is indicated.

Message indicator

At least one alarm message is still queued when this symbol appears on the OP's display.



Acknowledging alarm messages

Alarm messages must be acknowledged by either the operator or the controller.

Key	Description
	Acknowledge indicated alarm message

After acknowledgement, the next unacknowledged message (if one exists) is then faded in.

Acknowledgement groups

You can combine messages into **acknowledgement groups**.

When the indicated message belongs to an acknowledgement group, its acknowledgement automatically acknowledges all other alarm messages of this acknowledgement group.

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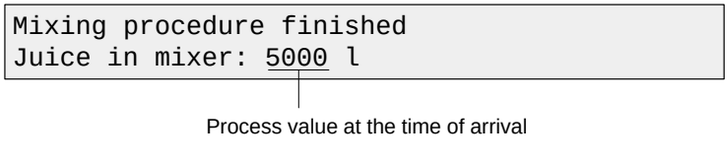
5.1.2 Current Messages

Message line

The message line is always present regardless of which screen is selected.

Depending on your configuration, event messages and/or alarm messages are displayed in the message line.

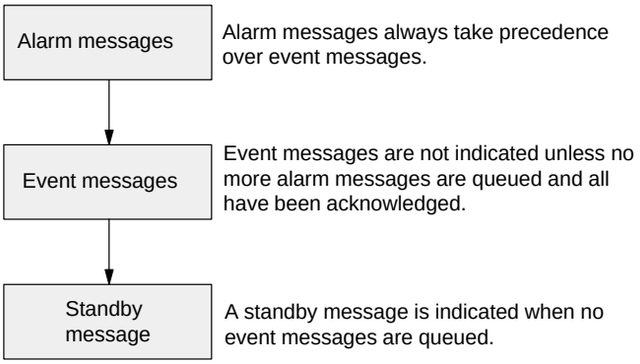
Example of an event message:



Flashing alarm messages

Alarm messages flash to distinguish them from event messages.

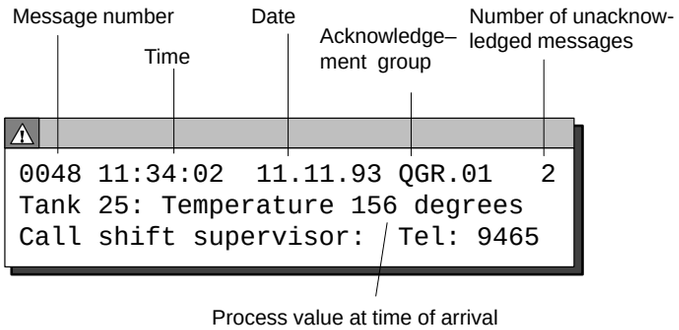
Priorities of indication



Message window

In addition to the message text, messages in a message window contain other information (e.g., message number and date/time of the arrival of a message).

Example of an alarm message window:

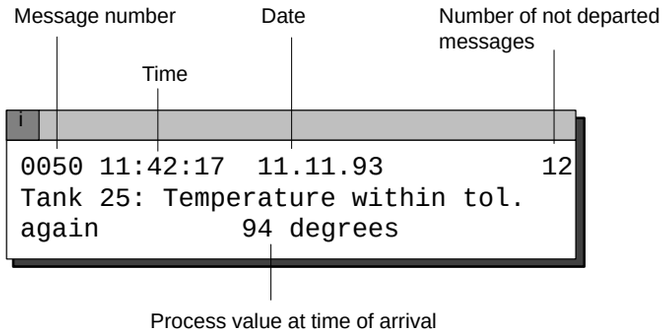


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Event message window

The event message window is not automatically faded in. It must be selected by the operator or the controller and then deselected again later.

A standby message is displayed when no current event message is queued.



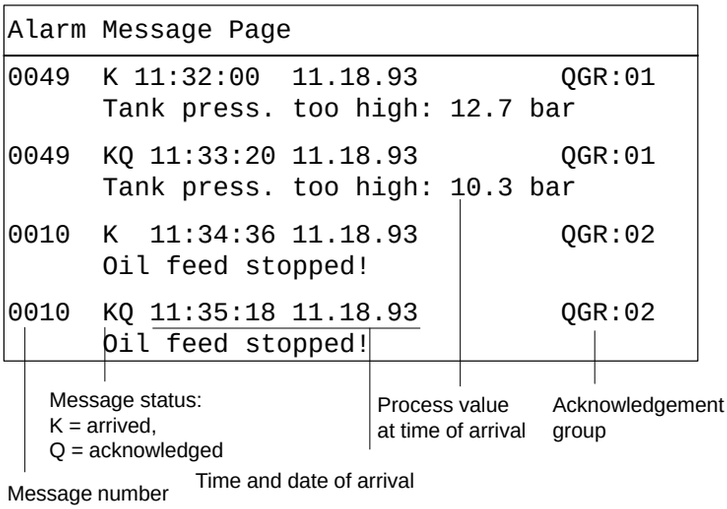
Alarm message page, event message page

The message pages give the operator an overview of the still queued (i.e., not yet departed) alarm or event messages.

The event message page or the alarm message page can be selected on the OP or via the controller.

The individual message occurrences are sorted by **indication priority** and, if alarm messages, listed by **first/last** setting.

Example of an alarm message page:



If all messages do not fit on the display at the same time, you can scroll the contents of the message page up/down with the ▽ , △ cursor keys.

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The message page contains the following information for each message occurrence.

- Message number
- Message status with date and time

  The OP updates the message status display (e.g., *K* for arriving, *Q* for acknowledged).
- Acknowledgement group to which an alarm message belongs
- Message text, with process values if applicable

  When a message contains process values, the OP indicates these values as they were when the state occurred or stopped occurring (i.e., time of arrival or time of departure).

  The OP does not acquire current process values after the message has been acknowledged.

To message buffer and back

You can switch back and forth between indication of the message page and the message buffer by repeatedly pressing the function key which you used to call the alarm message page/event message page.

Message logging

All message occurrences are logged directly on a printer (if message logging is switched on and a printer is connected).

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5.1.3 Stored Messages

The OP stores all message occurrences in a battery-buffered memory.

This allows you to indicate the messages at a later time.

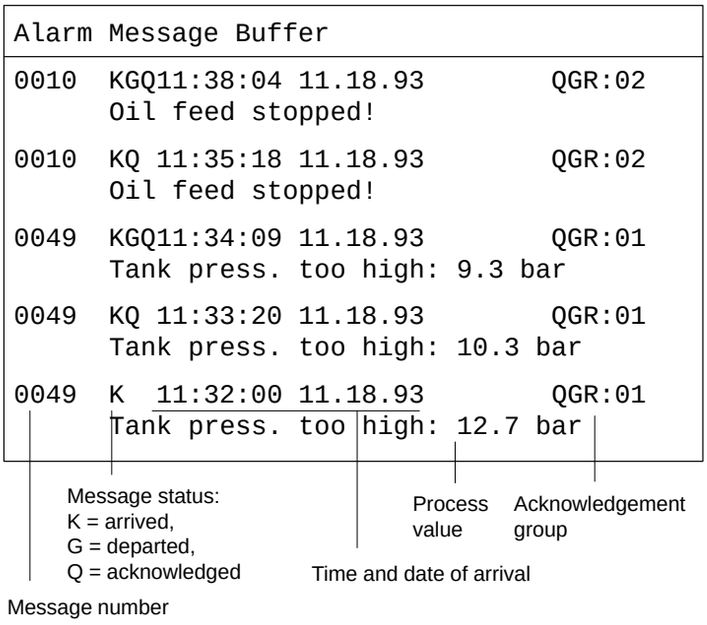
Alarm message buffer, event message buffer

The stored message occurrences are indicated in the alarm message buffer or the event message buffer depending on what type of message they are.

A buffer page can be selected on the OP or via the controller.

All messages are indicated **in the order of when they occurred.** The latest message is shown at the top of the display.

Example of indicating the alarm message buffer:



If a message text contains process values, the OP indicates these values as they were when the message occurrence arrived and departed.

Otherwise, the information is identical to that of the event message page or alarm message page.

Deleting the buffer

The event message buffer/alarm message buffer can be deleted by operator input on the OP or via the controller.

Exceptions:

- Queued messages
- Not yet acknowledged alarm messages

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Buffer overflow

The OP stores message occurrences in a common memory area for event and alarm messages (i.e., the so-called message buffer).

If there is only a certain amount of memory space left in the message buffer (i.e., remaining buffer space), the OP can fade in a system message to that effect.

If there is no space left in the message buffer and new messages arrive, the OP continues deleting message occurrences from the message buffer until a certain remaining buffer space is available again.

The oldest message occurrences are deleted in the following order.

1. Event messages which have already departed
2. Alarm messages which have departed and have been acknowledged
3. Event messages which are queued
4. Alarm messages which are queued

A forced printout of the deleted messages is made (if **overflow** was configured as on, and a printer is connected).

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5.1.4 Standard Screen: Message Processing

Layout

Event and alarm messages can be processed with the standard screen *Message Processing*.

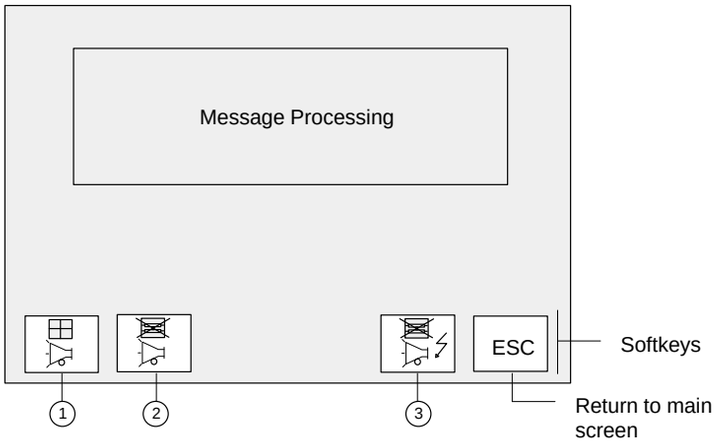


Figure 5-1 Standard screen: Message Processing

Uses

The softkeys have the following meaning:

① Open event message window

② Delete event message buffer

③ Delete alarm message buffer

In addition, the following functions can be selected via function keys.

K1 Open event message page, alternate between indicating the event message page and the event message buffer

K2 Open alarm message page, alternate between indicating the alarm message page and the alarm message buffer

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5.2 System Messages

System messages inform you of certain internal operating states of the OP. The messages include everything from informational notes to serious and fatal error messages.

System messages can be caused by the following:

- Operator errors

  (e.g., illegal entries)

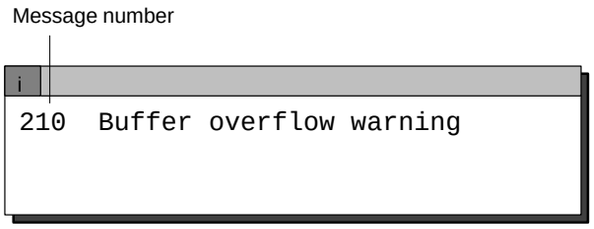
- System errors

  (e.g., disturbed communication between OP and controller)

System message window

As soon as a certain operating state/error occurs, the OP automatically fades in a window containing a system message.

Example of a system message window:



A system message consists of a message number and a message text. The message text can also contain internal system variables which help to localize the cause of the error message.

Some system messages expect a confirmation from or a decision by the operator. For example:

“Format data medium? 0 Yes/ 1 No”

The entry of 0 (yes) or 1 (no) then determines what happens next.

Deselecting

The system message window can be closed by pressing the cancel key or by selecting another screen.

Error causes, remedies

The appendix of this manual contains a list of system messages including additional information on the cause of the message and any system variables indicated. In some cases, possible remedies are also shown.

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Recipes

6

Our fruit juice plant was introduced in section 4 of this manual. The finished product of our fruit juice plant is a bottle of fruit juice.

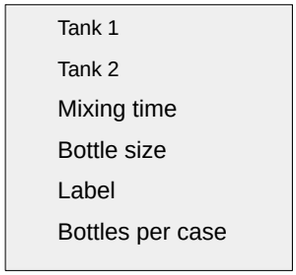
The finished product (i.e., a bottle of fruit juice) is determined by the various variables of the system.

You can combine the variables for one type of juice into a set of “processing instructions”. This set of “instructions” is called a recipe. The individual variables are called recipe entries. Recipes are configured and cannot be changed on the OP.

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Example of a recipe

We will call our recipe “ORANGE”.



One type of juice can be mixed in different concentrations to make orange “drink”, orange “nectar” or “pure” orange juice, for example. The juice can then be bottled in different-sized containers. All this is performed with the same recipe but using different values for the individual entries. Related values for the entries (e.g., for the orange drink) are combined into a data record.

Data records

The data records for a recipe are put together on the OP. An example of how they could appear is shown below.

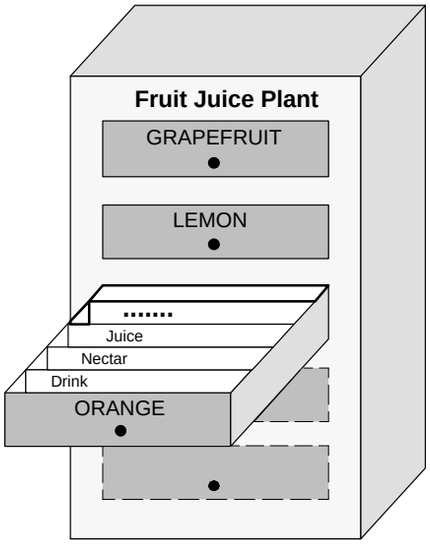
“ORANGE” Recipe	Data Records For Drink	Nectar	Juice
Tank 1	90	70	0
Tank 2	10	30	100
Mixing time	5	10	0
Bottle size	1	0.7	1
Label	4	2	1
Bottles per case	6	12	6

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Analogy of a file cabinet

A file cabinet is a good way to illustrate how recipes function.

The file cabinet is the plant or the process to be controlled. Each of the individual drawers represents the fixed structure of one recipe. Index cards in the drawer contain the data records for that recipe.



The operator uses the operator panel to “handle the index cards”.

We will now show you how to do this in the following subsections.

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6.1 Processing and Transferring the Data Records

Up to now, you have learned that the recipe and its entries are configured and that you cannot change the recipes with the OP later on.

Thus, handling of the recipes with the operator panel is limited to the following operations on the data records.

- Store (set up)
- Load
- Delete
- Edit

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6.1.1 Standard Screens: Data Record Processing and Data Record Transferring

The standard screen *Data Record Processing* is available for processing data records. A second standard screen called *Data Record Transmission* provides you with special transmission functions.

Data record processing screen

Layout of the “Data Record Processing” Standard Screen

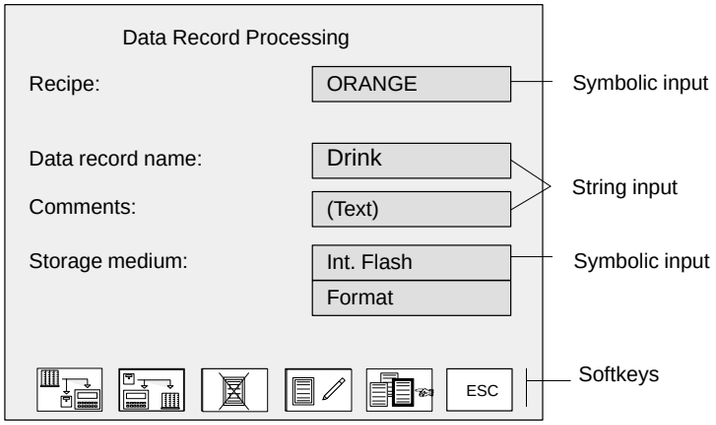


Figure 6-1 Standard Screen: Data record processing

The icons in the softkey bar have the following meaning:

Softkey	Description
SAVE	Copy the current values from the PLC to the OP and store them as a data record on the required storage medium (→ Chap. 13): • OP25/35: internal flash memory or Jeida / PCMCIA-module • OP35/45: floppy disk • OP45: hard disk
LOAD	Load the selected data record from the selected storage medium in the OP and transfer to the controller
DELETE	Delete the selected data record from the selected storage medium **Note:** If you want to delete all data records, it is easier to just reformat the FLASH memory or floppy disk.
EDIT	Edit (change) the selected data record on the selected storage medium
SELECT	Select a data record from the selected recipe

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Data record transmission screen

You can transfer the current values back and forth between the OP and the controller without storing the values on a data medium. This makes process start-ups easier, for example.

Transmission between OP and data medium is also possible.
The *Data Record Transmission* screen is available for these transmissions.

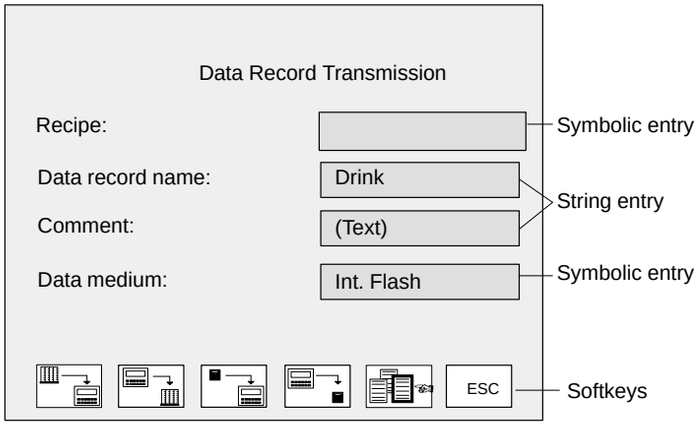


Figure 6-2 Example of a data record transmission screen

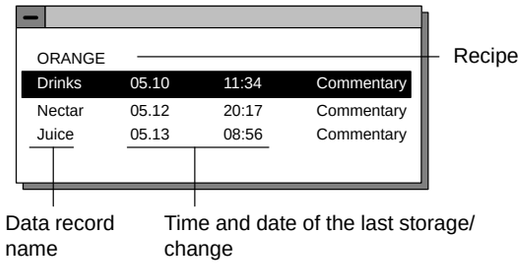
The icons in the softkey bar have the following meaning:

Softkey	Description
SPS → OP	Transfer the current values from the controller to the OP (update values in the OP)
OP → SPS	Transfer the current values from the OP to the controller (transfer values to the controller)
Dat → OP	Transfer a data record from the data medium to the OP
OP → Dat	Transfer a data record from the OP to the data medium
SELECT	Select a data record name

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General use

The following table shows you how to use the standard screens “Data Record Processing” and “Data Record Transmission”.

Step		Key/ Softkey	Description
1	Select recipe name		
2	Entering data record names or Select data record name		Adhere to the following conventions when assigning data record names. • Names may not contain more than 11 characters. After the eighth character is entered, a period is inserted automatically. • After the period, up to three characters can still be entered. • Special characters, blanks and commas may not be used. Activating the softkey causes a window to appear indicating all data records of the selected recipe.  Using the data record selection window: 1. △ , ▽ keys: Select the desired data record with the cursor 2. ENTER: Accept selected data record, and close window.
3	Select data medium		Data records can be stored/archived on the following data mediums to the extent that the OP is equipped with these: Internal FLASH, floppy disk, hard disk and PCMCIA/JEIDA card
4	With the softkey, select the function to be executed (e.g., load, save, and edit).		

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6.1.2 Setting Up and Editing Data Records

Only the recipe structure is specified during configuration of the OP. No data records exist yet. These are generated/set up on the OP.

Setting up/editing data records

The standard screen called *Data Record Processing* contains an edit function. You can use this function to accomplish the following.

- Set up new data records on a selected data medium
- Change the contents of data records stored on a data medium

To set up/edit data records, proceed as follows.

1. Select recipe.
2. Enter data record names.

   If you are setting up a new data record, enter a data record name which does not exist yet.
3. Select data medium on which the data record is to be stored.

Note

The data medium must be formatted before data are stored on it for the first time.
The screen called *Data Record Processing* contains a format function which you can use to format flash disks and diskettes.

---

4. Select edit mode.

   The data record which you have selected is shown as a list in the edit window (i.e., each line contains one recipe entry and value).

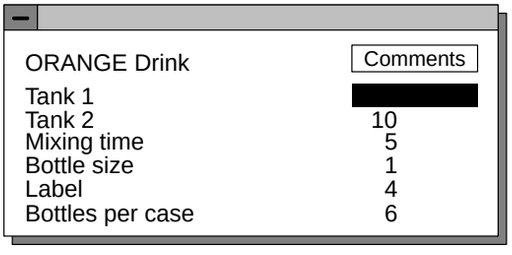


Figure 6-3 Data record in the edit window

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Using the edit window:

Step		Key	Description
1	Select the value to be changed.	△ , ▽	
2	Enter new value.		Only decimal numbers and strings are permissible.
3	Enter commentary (optional).	△	Starting from the top input field, you can reach the commentary field with the △ cursor key. **Note** Comments entered in the data record transmission screen are not included in the edit window.
4	Accept new values. Or cancel entry	ENTER ESC	A safety prompt appears. 0 Yes: New values will be entered in the data record and the edit window closed. 1 No: Continue to use edit window. A safety prompt appears.

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Accepting values from the controller

If you want your data records to contain the current values from the controller, perform the following steps in the *Data Record Processing* screen.

1. Select recipe to which a data record is to be assigned.
2. Enter data record name and commentary (commentary is optional).
3. Select data medium on which you want the data record stored.
4. Store the data record.

   The current values from the controller will now be transferred to the OP and stored as a data record on the data medium you have selected. The time at which the storage took place is also included.

Note

If the recipe does not yet contain a data record with the same name, the record is stored immediately.

Otherwise, you will be asked if you really want to store the record before it is overwritten.

---

5. To set up additional data records, repeat steps 1 to 4 for each data record.

Copying data records

Copying means that you use the current values in the OP as your basis, and transfer these values to the data medium under different data record names.

You can then edit/adjust these data records later.

Proceed as described below in the *Data Record Transmission* screen.

1. Select recipe.
2. Enter data record name and commentary (commentary is optional).
3. Transfer data record from the OP to the data medium.
4. Repeat steps 1 to 3 for each new data record.

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6.2 Parameter Records

Definition

The parameter record is a combination of one data record each from various recipes with a common name.

The data records of a parameter record contain all values required to set a machine or plant. For example, you can use a parameter record to load the basic settings for machines which are identically equipped but produce different products.

Example

We will now expand our example of a fruit juice plant to include three identically equipped production lines. The recipes ORANGE, GRAPEFRUIT and LEMON are run parallel on these production lines. Each of the recipes contains a “drink” data record. These three data records make up the parameter record called “drink”.

At the beginning of a shift, for example, each of the three production lines must be set to produce a special drink. You can do this with just one load operation.

Processing

A parameter record is processed in the *Data Record Processing* screen in the same manner as a data record.

The following can be performed on a parameter record.

- Select
- Store (set up)
- Load
- Delete

Selection

Parameter record must be selected as the recipe name in the *Recipe:* symbolic field.

Note

When “parameter record” is selected as the recipe, all data records of all recipes are indicated after the SELECT softkey is pressed in the data record selection window.
Parameter records (data records which exist more than once with the same name) are identified with an asterisk (*) preceding the name.

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Saving (setting up)

There are two ways to set up (i.e., to save on data medium) a parameter record in the *Data Record Processing* screen.

a) Save a data record for each recipe.

1. Select *Parameter Record* as recipe.
2. Specify data record name and data medium.
3. Save parameter record the same as a data record.

b) Store a data record individually for recipe selected.

1. Select recipe name.
2. Specify data record name and data medium.
3. Save data record.
4. Repeat steps 1 and 3 for each data record.

Load

All data records with the selected name on the data medium are loaded to the OP, and then to the controller.
Use the procedure described in section 6.1.1.

Note

Depending on the scope of the recipes, it may require a relatively long period of time to transfer a parameter record to the controller. For this reason, a parameter record should only contain those recipes which are absolutely necessary.

Delete

Complete parameter record:

Use procedure described in section 6.1.1.
Select *Parameter Record* as the recipe name.

Part of a parameter record:

Delete the desired data record individually from the selected recipe.
Use procedure described in section 6.1.1.

Edit

A parameter record cannot be edited.
Only the individual data records within the parameter record can be edited.
Use procedure described in section 6.1.2.

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Print Functions

7

The OP can perform the following functions on a printer.

- Log messages
- Make hardcopies of the contents of the current display

Hardcopy and message logging can be performed at the same time. When a new print job is triggered while another print procedure is already running, the new print job is buffered.

Suitable printers include the DR 215 and DR 235, for example.

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7.1 Hardcopy

Trigger

The hardcopy is triggered by pressing a function key. The screen indicated on the display is then printed as characters (ASCII) or as pixel graphics. Windows currently opened in the screen (e.g., message windows) are not included in the hardcopy.

Cancel

You can cancel an already started hardcopy by pressing the HARDCOPY key again. A system message is issued each time a hardcopy is cancelled.

7.2 Message Logging

Switch message logging on/off

You can switch message logging on and off on the OP.

All message occurrences for which logging is configured are printed out if message logging is active.

Buffering print jobs

During message logging, you can print out messages at the same time. Messages arriving while the copies are being printed are stored in the buffer and printed somewhat later.

7.3 Forced Logging

Configure forced logging

If forced logging has been configured, the messages deleted from the OP are automatically output on a printer when the message buffer overflows.

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7.4 Printing Screen List (OP25, OP35 Only)

Function

For logging purposes, you can configure a list containing up to 20 screens, which are printed automatically one after the other, one screen per page, after a print job has been initiated.

If a screen contains output fields for process values, the current values from the controller are printed for these fields.

Trigger

Printing is initiated by the PLC by pressing a function key or job 85. If printing is initiated by the PLC job, a maximum of 3 screens can be printed.

Printing several screen lists

You can define and print several different screen lists by embedding this function several times – for example, by assigning it to several function keys – or by passing on PLC job 85 several times.

Restrictions

Printing is performed in ASCII mode (i.e., graphic elements in the screens such as full-graphic screens, curves and bars are not printed). Hardcopy is disabled during the printing procedure.

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Password Protection

8

The function keys/softkeys and input fields can be protected with passwords (i.e., only authorized persons can use these keys and fields).

Password, password level

A protected function cannot be used without first entering a password with a certain password level. This password level determines the access rights of the operator.

The required password level is specified during configuration and can be a number from 0 (lowest level) to 9 (highest level).

Super user

This super user has a level-9 password which is especially specified for this purpose during configuration. It permits all operator actions.

The default system superuser password is ”100” on the standard screen on leaving the factory. The super user password can be changed on the OP.

Password screen

A standard screen called *Password Processing* is available for entering passwords and assigning passwords/levels.

Password list

You can look at the passwords in a password list.

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8.1 Logging In on the OP

There are two ways to log in on the OP.

- Using the standard screen
- Using a login window which is displayed automatically

Login via standard screen

Proceed as follows.

1. Call the standard screen **Password Processing**.

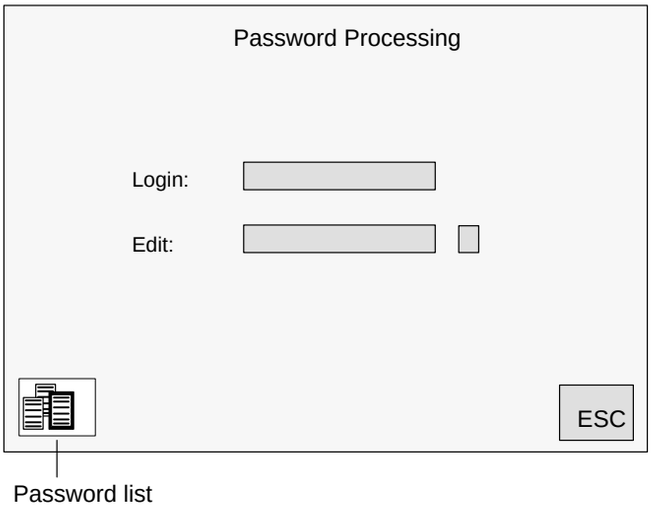


Figure 8-1 Standard screen: Password Processing

2. Enter your personal password in the *Login:* field.

After you have entered a valid password and your entry has been accepted, the assigned password level is indicated.

You can now use all functions assigned to this level or a lower password level.

Login via login window

A login window appears automatically if you want to make an entry or use a function which requires a higher password level than the current one.

After you have entered a valid password, a jump is made back to the place at which you attempted to make an entry or use a function.

You can now repeat your entry.

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8.2 Logging Out on the OP (Logout)

Logout via standard screen

Call the standard screen **Password Processing**.

Enter any character string (i.e., an invalid password) in the *Login:* field.

After your entry has been accepted, you can only use functions with password level 0.

Automatic logout

The operator is automatically logged out if no operator actions are performed on the OP within a period of time specified during configuration.

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8.3 Password Management

Password management includes the following activities.

- Assign up to 50 different passwords
- Assign a password level to each password
- Change existing passwords and password levels
- Delete passwords
- View the already assigned passwords in a password list

Login

Enter a valid password in the password screen.

After the entry has been accepted, you can assign, change and delete passwords in the *Edit:* field.

Access rights

You only have access rights to passwords whose level is equal to or less than the level under which you are logged in.

Define new password

Proceed as follows.

1. Enter a non-existent password in the *Edit* field. You can use up to 8 characters.
2. Enter a password level (from 1 to 8).

After your entries have been accepted, the new password is stored in a memory of the OP which is safe from power failure.

Change password/ password level

Proceed as follows.

1. In the *Edit* field: Enter the password which you want to change or to which you want to assign a new password level.
2. Change password:
   Delete old password.
   Then enter new password.
   (You cannot change the password directly.)

   Change password level:
   Overwrite old password level with the new one.

Delete password

Proceed as follows.

1. In the *Edit* field: Enter the password you want to delete.
   The OP indicates the password level assigned to the password.
2. Overwrite the password level with zeros.
   After the entry is accepted, the password is deleted.

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View password list

The password list is called from the *Password Processing* standard screen with a softkey.

The passwords and their assigned level are displayed in a pop–up window.

Note

Only those passwords are displayed whose password level is less than or equal to the level in which you are currently logged in.

If there are so many passwords that they cannot all be displayed at the same time, you can scroll through the display with the cursor keys.

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Status/Force Variable with the OP

9

The operator panel is equipped with the Status Variable and Force Variable functions. This permits you to use standard screens to indicate operand values from the connected controller in a screen, and to change them in a second screen.

Controller operands can be processed directly on the OP during online operation. A programmer does not need to be connected to the controller.

Status Variable

You can use Status Variable to display the status of operands of a SIMATIC S5 or S7.

Force Variable

You can control operands of a SIMATIC S5 or S7 with Force Variable by modifying the variable values and transferring them back to the PLC.

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9.1 Status Variable

Status Variable standard screen

The Status Variable standard screen is selected in the main screen with a softkey.

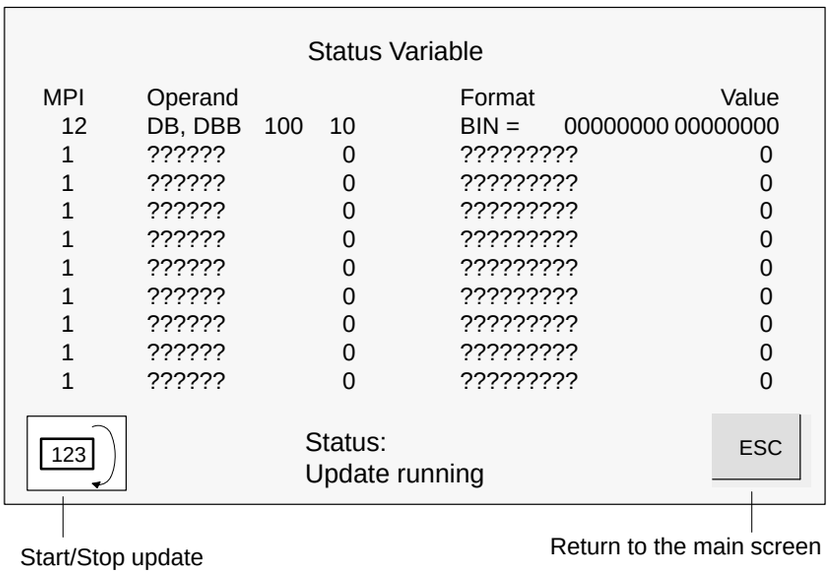


Figure 9-1 Status Variable screen of OP35 and SIMATIC S7

With the OP35/45, every line contains data for an operand; with the OP25, the display is spread over two lines owing to the limited display area.

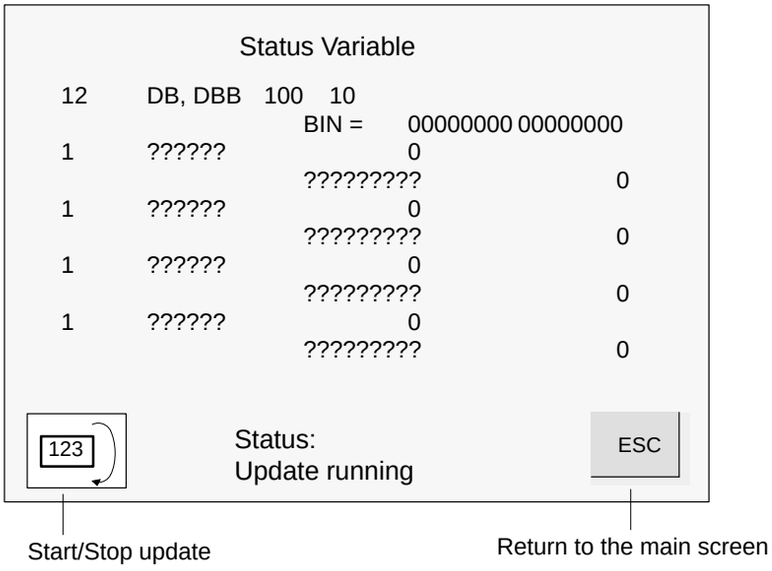


Figure 9-2 Status Variable screen of OP25 and SIMATIC S5/S7

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Operands for SIMATIC S5

Figure 9-3 shows an example of the layout of a line for the SIMATIC S5.

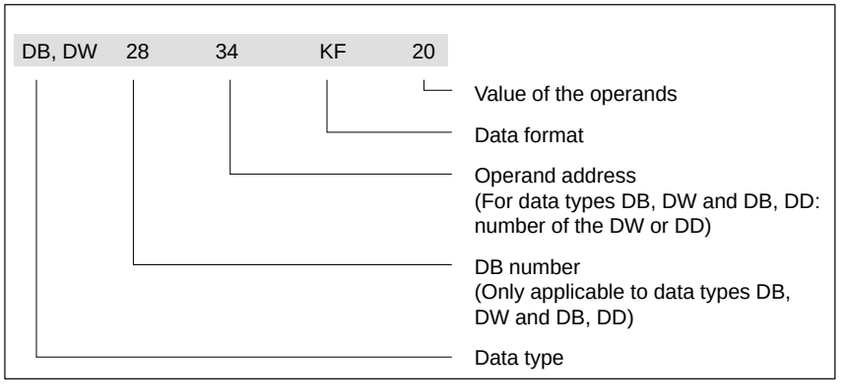


Figure 9-3 Example of the controller operands for SIMATIC S5

Operands for SIMATIC S7

Figure 9-4 shows an example of the layout of a line for the SIMATIC S7.

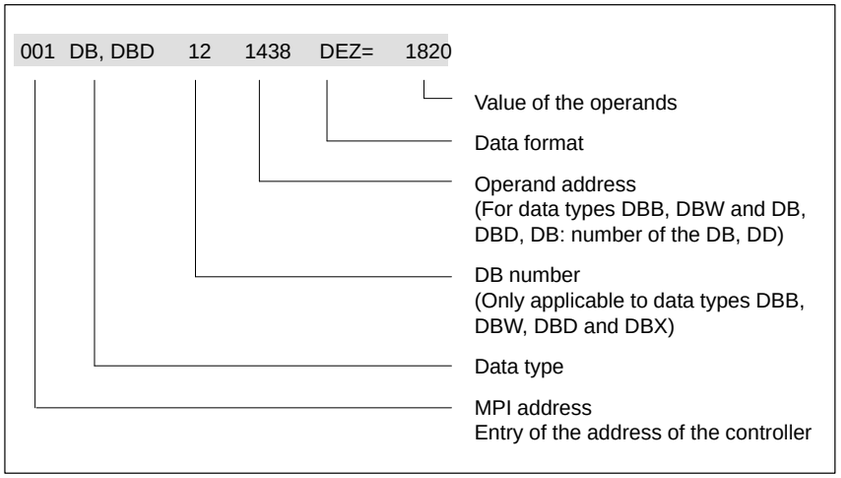


Figure 9-4 Example of the controller operands for SIMATIC S7

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Use To view operand values in the controller, proceed as follows.

Step		Key/ Soft-key	Description
1	Enter operand		After the screen is selected, status processing is in status *Status stop* (indicated in the center of the bottom of the screen). 1. Enter data type for first operand (symbolically via pop-up window, see also 3.2.3). 2. Enter operand address (and DB number for data types DB, DW and DB, and DP). 3. Enter data format (symbolically via pop-up window). 4. Repeat entries for the 2nd to the n^{th} operands. **Note** A system message appears if you make a wrong entry (e.g., data format does not agree with data type entered). The first entry from the pop-up window is then accepted by default in the field.
2	START update		When this softkey is pressed, status processing is switched to *Update running*. The values of the operands are then shown in the last column. The values are updated cyclically.
3	STOP update		When this softkey is pressed again, status processing returns to *Status stop.*

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9.2 Force Variable

Function

In addition to the functions of Status Variable, values of operands can be modified ($\hat{=}$ controlled) with Force Variable.

Force Variable standard screen

You have to configure the *Force Variable standard screen* in ProTool; you select it by means of a function key.

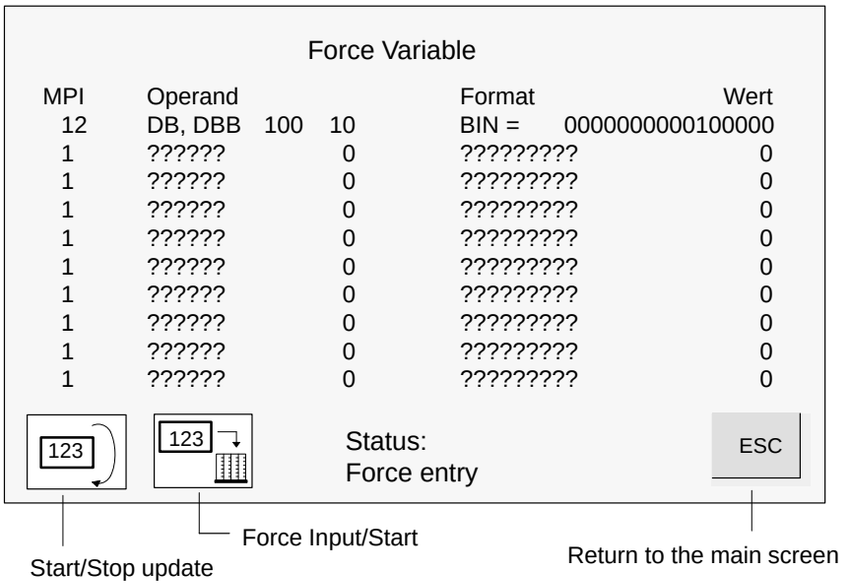


Figure 9-5 Force Variable screen of OP35 and SIMATIC S7

With the OP35/45, every line contains data for an operand; with the OP25, the display is spread over two lines owing to the limited display area.

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Use Procedure for controlling operand values:

Step		Key/ Soft-key	Description
1	START update		Use this softkey to switch status processing to *Update running*
2	Force ENTRY		Switch to *Force Entry.* Status processing is stopped. Entries can now be made.
3	Enter/ modify operand value		When the value of an operand is changed, a modification identifier appears in the last column of the line. FW 250 KT 93.0 X Modification identifier
4	START force Or		The following occurs when the softkey is pressed again. • All operand values marked with an modification identifier are transferred to the controller. • The modification identifiers are reset. • A return to status processing is made automatically (status *Update running).*
	Cancel entry	ESC 	The modified values are not transferred to the controller when the FORCE VARIABLE screen is exited or a switch back to *Update running* status is made.

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COMMISSIONING AND OPERATION

Part III

10 Commissioning

11 System Settings

12 Operating Modes

13 Saving Data on the Memory Module

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Commissioning

10

Overview

The figure below shows the primary commissioning steps.

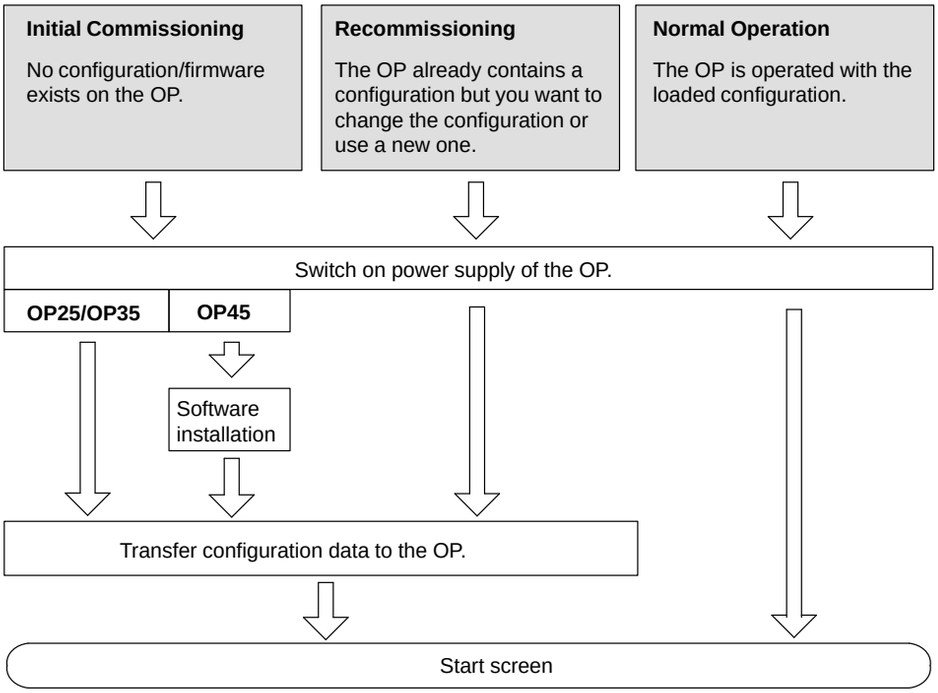


Figure 10-1 General overview of commissioning

Caution

With the SIMATIC S5, compression of the internal program memory on the PLC (PU ”Compress” function, integrated COMPR FB) is not allowed if an OP is connected. During compression, the absolute addresses of the blocks are modified in the program memory. Since an OP reads the addresses only during start-up, it does not detect the change of address and accesses wrong memory areas.

If compression cannot be avoided during routine operation, switch off your OP before compression.

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10.1 Initial Commissioning of the OP25/OP35

Proceed as follows:

1. Using a suitable standard cable, connect the IF2 (V.24/TTY) interface of the OP with the configuration computer (PC/PG).
2. Switch on the power supply of the OP.

   Since no configuration is loaded, the OP automatically goes into transfer mode and waits for data to be transferred.
3. Download your configuration from PC/PG to the OP.

   The firmware of the OP is automatically transferred too.

Note

See the ProTool description for a detailed description of how to proceed.

After successful completion of the data transmission, the OP boots (the message `AG-Anlauf` disappears when the ESC key is pressed) and displays the start screen.

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10.2 Initial Commissioning of the OP45

Initial commissioning of the OP45 is performed in two steps.

- Installation of the OP45 operating system
- Transferring the configuration

Software installation

An OP45 installation floppy disk is included with ProTool.



Caution

Make a backup copy of the original floppy disk, and only use the backup copy.

To install the software, proceed as follows:

1. Place installation floppy disk in the floppy disk drive of the OP45.
2. Turn on the OP45.
   After booting, the DOS prompt `A:>` appears.
3. Enter:
   `INSTALL`

   and press ENTER to conclude the entry.

   Follow the prompts for the rest of the procedure.

Transferring the configuration

Transferring the configuration is described in detail in the ProTool User's Guide.

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10.3 Recommissioning

Overview

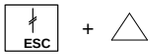
Proceed as follows to replace a configuration which is already loaded on the OP with another configuration.

Serial Transfer

When the serial transfer is used, the configuration is transferred via a V.24/TTY link between the PC/PG and the OP.

Proceed as follows.

1. Using a suitable standard cable, connect the IF2 interface of the OP25/35 respectively the COM2 interface of the OP45 with the configuration computer (PC/PG).
2. Turn on the power supply of the OP.
3. During startup[5], press the key combination

   to switch to transfer mode on the OP.

   `Trans-Mode`. appears in the top line of the display. The contents of the OP are then deleted.
4. Transfer the configuration from the PC/PG to the OP.

   The configuration on the OP is overwritten by the new configuration.

   After successful transmission, the OP boots and displays the start screen of the loaded configuration.

5) OP35: Press these keys when the RAM test (“Testing Memory...”) has been concluded in the self test, and keep these keys pressed until the test results have been deleted.

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10.4 MPI Transfer (OP25/35 only)

Configurations for the SIMATIC S7 can be transferred to the OP via an MPI/ PPI link.

Prerequisite for this transfer: An S7 configuration must already be loaded on the OP, and MPI transfer must be configured.

Proceed as follows.

1. Using a standard cable which has been approved for the OP25/35, connect the IF1B interface of the OP with the configuration computer.

Note

- Disconnection/reconnection of the cables is not necessary for the transfer if the OP and the configuration computer are already linked on the MPI bus.
- If you are using the PPI bus, we recommend disconnecting the OP from this bus since you can perform the transfer at a much higher speed than the 9600 baud rate of the PPI bus.

---

2. Connect the OP to the power supply.
3. Select MPI transfer in the standard screen *System Settings → Operating modes*. The OP now boots.
4. The following screen is displayed in MPI transfer mode.

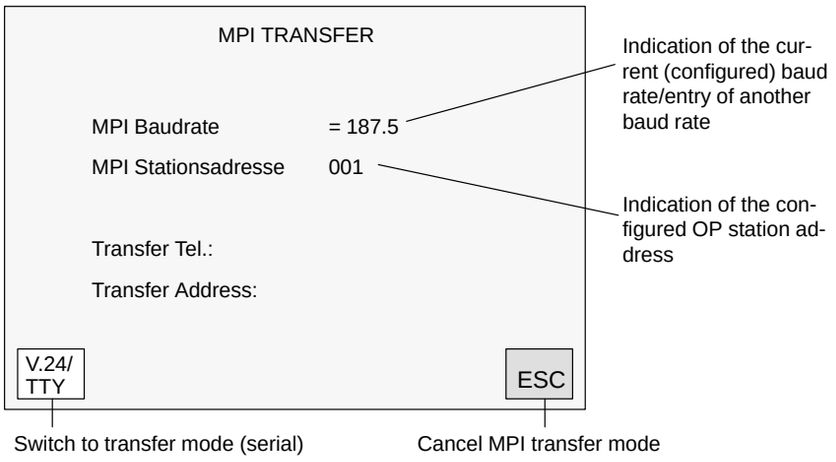


Figure 10-2 MPI transfer

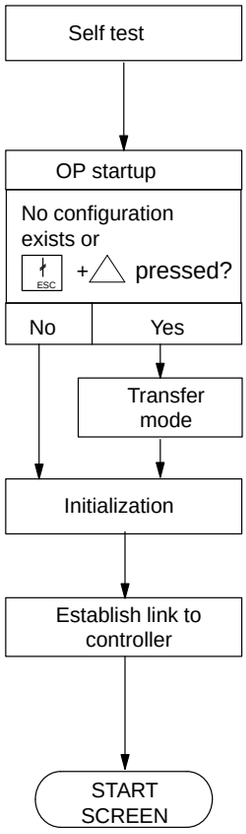
The baud rate can be set from 9.6 Kbaud to 1.5 Mbaud.

5. Transfer configuration from configuration computer (PC/PG) to the OP.

   See ProTool User's Guide for details on how to proceed.

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10.5 Startup Sequence



After the power supply is turned on, the OP performs a self-test.

During the self-test, the OP checks the functionality of the most important components and indicates the test results.

The test results are deleted.
If the OP does not contain a configuration, it goes automatically into transfer mode.

The OP now performs various internal initializations.

During this phase of the startup, the OP attempts to establish a link to the controller.

If communication is not possible (e.g., because the cable to the controller is not connected), the OP displays a system message.

The start screen is then displayed after conclusion of the OP startup.

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10.6 Error Diagnosis

An error during commissioning or normal operation is usually indicated on the display with a system message.

The appendix of this manual contains a list of some of the more important system messages with notes on correcting the errors.

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10.7 Notes on Data Security

The operating data of the OP (variables and message buffer) are retained when a power failure occurs.

The OP25/OP35 and OP45 use the following measures to achieve this.

OP25, OP35

The operating data of the OP25 and OP35 are stored in a buffered SRAM.

The operating data are retained when the power is turned off or a power failure occurs.

OP45

The operating data of the OP45 are saved cyclically on hard disk once per minute.



Caution

A **system conclusion** must be performed before the OP45 is switched off (see *System Settings* standard screen).
If no system conclusion is performed, the OP45 operating data can be lost.

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System Settings

11

The functions described in this section can be used to configure the OP to your requirements.

The following can be set:

- Operating modes of the OP
- Various message functions
- Date/time
- Language
- Brightness, contrast, blanking circuit for OP25/35
- Printer parameters

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11.1 Standard Screen: System Settings

The following settings can be made in the System Settings standard screen.

- Operating modes:
  - Normal operation (online/offline),
  - loop-through operation,
  - transfer mode,
  - MPI transfer,
  - system conclusion for OP45, and
  - DOS operation of OP45
- Message indication: First (oldest) or last (latest) alarm message
- Switch message logging on/off
- Set current date and time
- Switch buffer overflow warning on/off
- Choice of up to 3 languages
- Blanking of the display (OP25/35 only)
- Select backup/restore standard screen (OP25/35 only)

Layout of the standard screen:

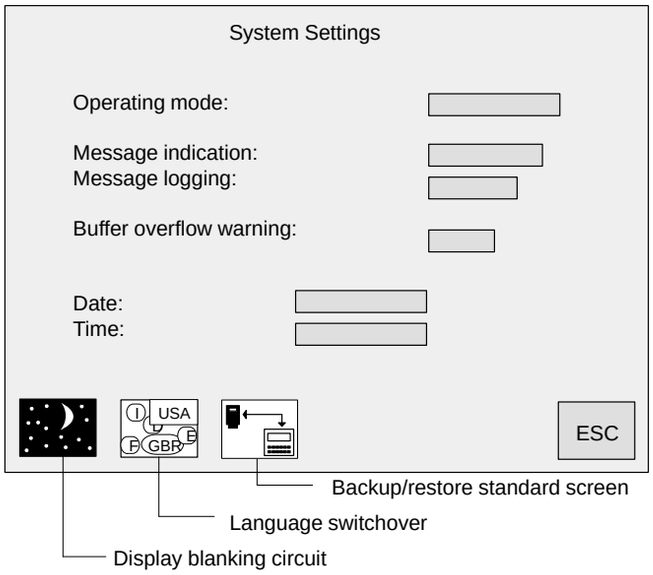


Figure 11-1 Standard screen for system settings

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11.2 Standard Screen: Printer Settings

The type of printer and the transmission parameters can be specified on the OP with the standard screen entitled *Printer Settings*.

The printer and the OP must have the same transmission parameters.

The standard settings are listed below.

Baud rate:	9600
Data bits:	8
Stop bits:	1
Parity:	None

Printer screen (OP25)

This standard screen can be used to set the following parameters.

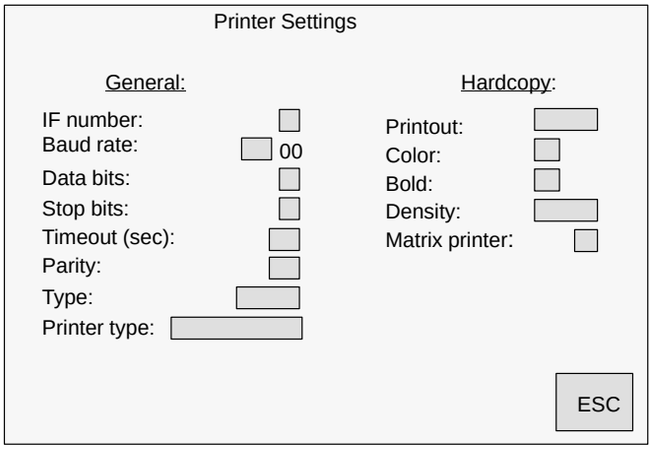


Figure 11-2 OP25: Standard screen for printer settings

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Printer screen (OP35/OP45)

This standard screen can be used for the following purposes.

- Setting the printer parameters
- Fading out single monitor screen colors for the printout

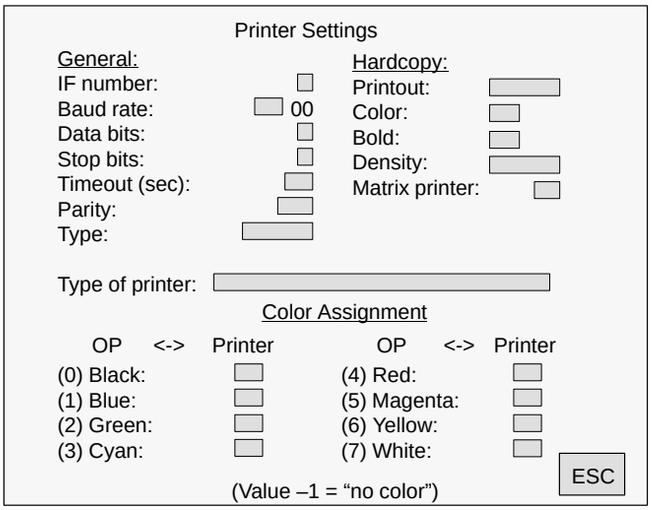


Figure 11-3 OP35/OP45: Standard screen for the printer settings

Notes on color assignment:

Two values are permitted in the input fields.

0 OP color is printed.

–1 OP color is not printed.

Default: All OP colors except white are printed.

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11.3 Blanking Circuit (OP25/35 Only)

Lifespan of CCFL tubes

The background illumination of the display uses a CCFL tube (**C**old **C**athode **F**luorescence **L**amp).

For technical reasons, the brightness of these CCFL tubes decreases with use.

The average lifespan is given as 10,000 hrs by the manufacturer of the display.

An automatic blanking circuit can be used to increase the useful life of CCFL tubes.

Blanking circuit for OP25/OP35

This blanking circuit can be configured via ProTool.

If no key is pressed within a configured period of time, the display background illumination is switched off automatically.

Note

Blanking cannot be configured for the OP45.

Cancelling the blanking circuit

The background illumination goes on again automatically when any key is pressed.

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11.4 Contrast and Brightness Adjustment on the OP25/35

The following can be adjusted at all times on the OP during operation:

- Display contrast
- Brightness of the display background illumination

Press one of the key combinations shown below simultaneously:

Display contrast	Higher	A–Z + ▷
	Lower	A–Z + ◁
Brightness of the display back-ground illumina-tion	Higher	A–Z + △
	Lower	A–Z + ▽

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11.5 System-Related Key Assignments (OP45 Only)

Key assignment on delivery

On delivery, your OP45 has the key assignment described in this manual.

You will never need to change the key assignment unless you install different system software (e.g., COROS LS-B) on your OP45 later.

Configuration disk

The ProTool software includes a floppy disk containing the TASTDRV.EXE keyboard driver. You can use this driver to set the code table you want to use for your system software.

Changing the key assignment

Setting is performed under DOS with the following command.

```
TASTDRV [-s1|2|3|a|b|c|x]
```

`-s1`	DOS table is set.
`-s2`	LS-B/WIN code table is set.
`-s3`	LS-B/FlexOS code table is set.
`-sa`	standard code table for LS-A is set.
`-sb`	standard code table for LS-B is set.
`-sc`	standard code table for LS-C is set.
`-sx`	standard code table is set.
`-?` or `-h`	displays the syntax.

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11.6 User-Specific Key Assignment (OP45 Only)

Overview

Depending on the requirements on the machine or system, you can also set a different key assignment. The procedure for doing this is described on the next few pages.

Scope of supply

The scope of supply includes a program package with which you can program the two keyboards of the OP45.

The program package comprises the following files:

KEYVERS.EXE	for retrieving the version of the keyboard controller
DEFPAD.EXE	for compiling the configuration file
TASTDRV.EXE	for downloading the compiled configuration file to the keyboard controller
TSCAN.EXE	for retrieving the key codes
OP45_FUN.DEF	File with example configuration for the function keyboard
OP45_FUN.PAD	compiled example file for the function keyboard
OP45_SYS.DEF	file with example configuration for the system keyboard
OP45_SYS.PAD	compiled example file for the system keyboard

Creating the configuration file

Under MS-DOS, you create a configuration file containing the key definitions for every keyboard that you wish to program (system and/or function keyboard(s)).

The key definition includes the key code and the key characteristic – for example, auto-repeat. The key code is discontinued on pressing or releasing the key.

Definitions

The file contains the following definitions:

- PADTYPE: ”1” for OP45
- KEYPAD: ”keypad_id”

  Keypad id = 0 for system keyboard
  = 1 for function keyboard

- ALPHA ”alpha level”: ”alpha key”, ”alpha led” [,”alpha flags”]

  alpha level = 1 or 2

  alpha key = number of the key that enables the ALPHA level.

  alpha led = 0 signifies that no LEDs are on.
  Number of the LED which is required to go on when the ALPHA key is pressed.

Note

Make sure that an LED is assigned to keys 1 to 16 on the system keyboard.

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alpha flags ALPHA-key characteristics:

TOGGLE	ALPHA key changes its status every time the key is pressed.
GLOBAL	ALPHA key affects both OP keyboards.
LOCKOUT	ALPHA key automatically turns off the other ALPHA key.

- KEY ”key no”[a1|a2|a12] : ”make eodes” [/”break codes”], ”key flags”

  key no number of key to which the definition applies:

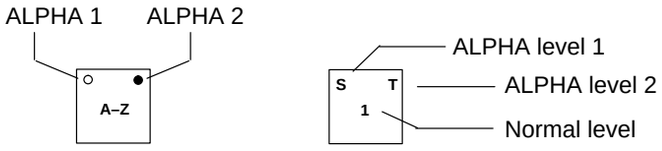
  If the definition applies to an ALPHA level, the ALPHA level should be specified for the key number:

al	ALPHA level 1 enabled and ALPHA level 2 disabled.
a2	ALPHA level 2 enabled and ALPHA level 1 disabled.
a12	ALPHA level (1 + 2) enabled.

The ALPHA level (1 + 2) can be used only with the TOGGLE ALPHA flag. The ALPHA levels disable each other with the LOCKOUT ALPHA flag. Thus only two ALPHA levels are available.

Example

Level assignment:



make codes key code that is discontinued when the key is pressed (hexadecimal – for example, 6C)

break codes key code that is discontinued when the key is released (hexadecimal – for example, F0 6C)

key flags characteristics of key

MAKE	The code entered under ”make_codes” is discontinued when the key is pressed.
BREAK	The code entered under ”break_codes” is discontinued when the key is released.
NOLOCK	Key cannot be locked with the lock switch.

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TYPEMATIC	The code entered under ”make_codes” is repeated continuously when the key is pressed (repeat function).
TYPEMATC1	The same as TYPEMATIC, except that the first byte of the code entered under ”make_codes” is suppressed.
TYPEMATIC2	The same as TYPEMATIC, except that the first **and** second bytes of the code entered under ”make_codes” are suppressed.

KEYPAD and KEY must be specified, though not all keys of a submodule need to be assigned. Definition of a maximum of three ALPHA keys is optional. Definitions must start and end on a line of their own. Definitions occupying two lines are not allowed.

The keys are numbered in every key mode from left to right and from top to bottom. The top left key is given the value 1.

Example of system keyboard

```
KEYPAD:1
ALPHA 1:1,1, TOGGLE
ALPHA 2: 2, 2, TOGGLE
KEY 3: 6C / F0 6C, MAKE TYPEMATIC BREAK
KEY 3a1:116C / F0 6C F0 11, MAKE TYPEMATIC1 BREAK
KEY 3a2:12 05 / F0 05 F0 12, MAKE TYPEMATIC BREAK
KEY 3a12:1405 / F0 05 F0 14, MAKE TYPEMATIC1 BREAK
```

You can assign any file name. The extension, however, must always be ”.DEF”.

Example:	PADSYS.DEF	for the system keyboard
	PADFUNC.DEF	for the function keyboard

Compiling the configuration file

Every configuration file has to be compiled using the DEFPAD program. When this is done, the consistency of the key definitions is checked, and a file having the extension ”.PAD” is created.

Syntax

```
DEFPAD filename [.def] [–oname].pad
```

`filename`	name of configuration file.
`–oname`	name of compiled file.
`–s`	provides a brief summary of the definitions.
`–?` or `–h`	displays the syntax.

Example

```
DEFPAD PADSYS.DEF –oPADSYS.PAD
```


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Downloading the compiled file

The compiled file is downloaded to the keyboard controller using the TASTDRV driver.

Syntax

`TASTDRV [filel] [file2] [–i]`

`file1, file2` names of compiled files required to be downloaded to the keyboard controller.

`–i` The driver is loaded as memory-resident.

`–?` or `–h` displays the syntax.

Example

```
TASTDRV PADSYS.PAD PADFUNC.PAD
```

Checking the key codes

Using TSCAN, you can check which code is discontinued when a key is pressed. The check can be made for any of the keyboards that can be connected.

To perform a check, call the program called TSCAN. If you then press a key, the corresponding key code is shown on the display. You can terminate and quit the program by pressing ESC.

Validity of programming

Programmed and downloaded key assignments are valid until the operating panel is turned off. A RESET does not clear key assignments. The default assignment of the keyboard controller takes effect when the operating panel is turned on again.

If you wish the key assignments you have configured to take effect every time you switch on your OP45, make the following entry in your AUTOEXEC.BAT file:

```
C:\KEYDEF\TASTDRV
C:\[pfad]\FILE1.PAD
C:\[pfad]\FILE2.PAD
```


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12 Operating Modes

The operator panels recognize the following operating modes.

- Normal operation, online/offline
- Loop-through operation
- Transfer mode

In addition, the OP45 offers DOS operation.

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12.1 Normal Operation, Loop-Through Operation and Transfer Mode

Normal operation, online

This is the standard operating mode for unrestricted manipulation and visualization of the processes.

The OP is connected to the controller and exchanges data with it.

Normal operation, offline

Communication with the controller does not take place in this operating mode.

Process manipulation and visualization are not possible. Entries can still be made on the OP.

Loop-through operation (OP25/35 only)

The is a special form of normal operation. A programmer or a second OP can be operated on the OP during loop-through operation.

Note

Loop-through operation requires the AS 511 protocol be used to link the OP with the controller.

The following restrictions apply to loop-through operation.

- No message to the OP when a controller failure occurs
- Longer reaction times (drop in performance)
- Communication of the OP with the controller is interrupted during “status processing running” on the PG. Entires cannot be made on the OP during this time. The OP continues on automatically afterwards without a new start.

Transfer mode

Configuration data can be downloaded from the PC/PG to the OP in transfer mode.

Entries cannot be made on the OP in this operating mode.

MPI transfer (OP25/35 only)

If MPI transfer is configured, configuration data for the SIMATIC S7 can be transferred to the OP via an MPI link.

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12.2 Setting/Changing the Operation Mode

Overview

You can set/change the operating mode of the OP either on the OP or via a job from the controller.

The current operating mode is stored by the OP and cannot be lost during a power failure. After the power is switched on, the OP returns to the operating mode which was set last.

During operation

Setting/changing the operating mode can be performed in the *System Settings* standard screen, for example.

During startup

You can use key combinations during OP startup[6] to set the operating modes shown below.

Key Combination	Description
ESC + △	Transfer mode (serial transfer) You can exit transfer mode with ESC as long as no data transmission between the PC/PG and the OP is running.
ESC + A–Z	Alternate (toggle) between online and offline operation.
ESC + ▷ + ▽	Transfer firmware and configuration again.
ESC + ▽	Change to DOS operation (for OP45 only)

6) For OP35: Press this key combination when the RAM text (“Testing Memory...”) is concluded during the self test, and hold the keys down until the test results are deleted

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12.3 DOS Operation with the OP45

Operating states of OP45

The OP45 can be operated with two different operating systems. For this, the hard disk is divided into two partitions:

- RMOS partition: the OP45 operates during normal operation as an operator panel.
- DOS partition: the OP45 operates as a PC/AT-compatible computer on which DOS/Windows applications can be run.

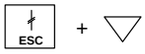
OP45 as configuration computer

The primary advantage of DOS operation is the fact that configuration via ProTool can be performed on the OP45. This makes the OP both the configuration computer and destination computer to which the configuration is transferred (self-configuration).

Starting DOS operation

To access DOS operating mode, proceed as follows:

- Turn on the OP45.
- During startup, press the following key combination:



Exiting DOS operation

During installation of the OP45 software, the program *BOOT.EXE* is stored in the catalog *OP45TOOL*.
This program is used to change from DOS operation to normal operation of the OP45.

Proceed as follows:

1. Exit all DOS/Windows application programs.
2. Change to the *OP45TOOL* catalog.
3. Enter:
   `BOOT /OP45`

   The OP45 performs a new start and goes into *normal operation* operating mode.

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Storing and Loading Data

13

Overview

For saving your configuration data, the data records of recipes and to transfer the firmware, the operator panel has been equipped either with an internal flash memory, a module slot, a floppy disk drive or a hard disk drive.

Descriptions are provided on the next few pages, explaining

- How you store data on the various data media.
- The settings you have to perform.
- The points you have to bear in mind.

Table 13-1 provides an overview of the storage media available for the different operating panels (OP25/35/45).

Table 13-1 Available Storage Media

Storage Medium	OP25	OP35	OP45
Internal flash (buffered)	Yes	Yes	—
Jeida/PCMCIA module	Yes	Yes	—
3.5” floppy disk drive	—	Optional	Yes
Hard disk drive	—	—	Yes

Purpose

Depending on the volume and type of the data, the data are loaded onto the storage medium to

- Back up the data.
- Restore saved data.
- Load or store recipe data records.
- Load the data from the place where they were configured onto a different target OP.

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13.1 Storage Principle and Storage Media (Data Media)

Type of data

Depending on their association, data are organized into:

- Configuration data
- Firmware data
- Recipe data.

Storage principle

Data can be meaningfully stored only in the following combinations:

- Firmware and configuration and recipe data records.
- Firmware and configuration[7].
- Recipe data.

Internal flash memory

The default storage medium in the OP25/35 is the internal flash memory having a storage capacity of 1 Mbyte on the OP25 and 2 Mbytes on the OP35. You can store all kinds of data on the flash memory – configuration, firmware and recipe data.

Memory module

With ProTool 2.0 or higher, you can also use memory modules on the OP25/35. If you intend using a memory module, you must first load version 2.0 of the firmware onto the OP (refer to ProTool Readme file).



Caution

Jeida/PCMCIA modules containing stored configurations can be used only on OPs of the corresponding type. A system crash will result if the modules are inserted in other types of OP.

Jeida/PCMCIA standard

The memory modules use the Jeida/PCMCIA[8]standard, which defines, among other things, the storage format for the data, data organization and system specifications.

7) This function is not contained on the standard screen and has to be configured.
8) **P**ersonal **C**omputer **M**emory **C**ard **I**nternational **A**ssociation = PCMCIA
Japan **E**lectronic **I**ndustry **D**evelopment **A**ssociation = JEIDA

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Benefits

Compared to the internal flash memory, the Jeida/PCMCIA module features the following benefits:

- The Jeida/PCMCIA module is a portable storage medium; for example, recipe data can be ported from one OP to another.
- Configurations can be run directly from the module, since the OP detects whether a module has been inserted and, in this instance, first accesses the module and then the internal flash memory.
- A storage capacity of up to 16 Mbytes means that there is space for large configurations or a large number of recipe data records.

Distribution of stored data

The configuration and the firmware must always be stored on the same storage medium. You should not store recipe data on different storage media.

The following table shows you a few ways in which you can store data:

Store Data Type	On Medium
Configuration and firmware Recipe data records	Module Flash
Configuration and firmware Recipe data records	Flash Module
Configuration and firmware and recipe data records	Flash or module
Recipe data records	Floppy disk

3.5” floppy disk drive (OP35/45)

The OP35 can be supplied as an option with a 3.5” floppy disk drive. By default, the OP45 is equipped with a floppy disk drive.

Note

You can store only recipe data records on a floppy disk.

Benefits

If you frequently require or have to load new or modified data records on the system but the configuration remains unchanged, the 3.5” floppy disk drive is a convenient and advantageous solution, since it is accessible from the front of the OP35.

Hard disk drive (OP45 only)

The hard disk of the OP45 is divided into two partitions for the two operating systems RMOS and DOS, so that the OP45 can be operated as an OP or a PC.

Benefits

In this way you have the option, if you connect an additional external keyboard and a mouse, of performing the configuration directly on the OP45.

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13.2 Backup and Restore with the OP25/35

Standard screen Backup/Restore

The standard screen for backup and restore is called from the *System Settings* standard screen by means of a soft key. The soft keys have the meanings shown in Figure 13-1:

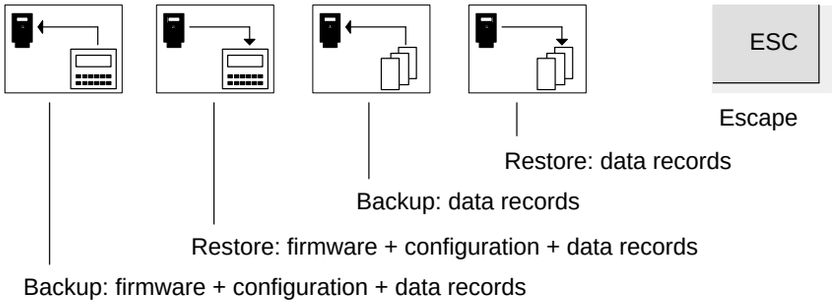


Figure 13-1 Soft Keys for Backup and Restore

The backup and restore functions of configuration and firmware are not contained on the standard screen; they can be configured.

Note

To avail yourself of the backup and restore functions, you must have logged in as the system administrator.

Deleting the flash/ memory module

Before you can store new recipe data or a modified configuration on the storage medium, it is preferable to create a defined starting condition beforehand. Initially, you do not insert a memory module.

1. Change to Transfer mode:

   – During start-up, press the ESC + △ keys.

   Or

   – On the ”System Settings” standard screen, select ”Serial Transfer” mode.

2. Before the OP changes to Download mode, press on the OP the ESC + ▷ + ▽ keys.

3. Insert the Jeida/PCMCIA module. The following messages appear on the OP:

```
Press 'DEL' to erase total Flash.
Press 'DEL' to init Flash.
Press 'DEL' to erase total Module.
Press 'DEL' to init Module.
```


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Caution

If you delete a memory module or flash memory, or if you delete or format a floppy disk, all your data will be lost.

If you initialize a memory module or a flash memory, any configurations that are present will be deleted; recipe data records are not affected.

4. Select with ENTER the function which you wish to execute:
   Example:

   If you wish to delete the flash memory, select:
   `Press 'DEL' to erase total Flash`

   or

   If you wish to delete the Jeida/PCMCIA module, select:
   `Press 'DEL' to erase total Module`

5. Then press INS DEL , to execute the function.

Reserved storage area for recipe data

A storage area is reserved for recipe data on the flash memory and on the Jeida/PCMCIA module. The default settings are

- 64 Kbytes on the internal flash memory
- 128 Kbytes on the Jeida/PCMCIA module.

If the default values are not sufficient, you can re-define this storage area. Remember, though, that you will have less space for your configuration.

1. In ProTool, use the menu command **System → Parameters → Miscellaneous** to open the ”Miscellaneous” dialog box.
2. In the bottom right rectangle, you can reserve the storage area in blocks of 128 kB for both the flash memory and the memory module.

Note

Remember that, apart from the storage area reserved for the recipe data records, a further 64 kB are required on the internal flash memory and 128 kB on the Jeida/PCMCIA module for management purposes.

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Backup flash → module

You can perform a backup from the internal flash memory → module during normal operation of the OP:

1. Insert the memory module in the module shaft on the OP.
2. Delete or initialize the module before creating a backup.
3. Start the backup function with the function key or soft key; a corresponding message is output on the OP once transfer has been successful.
4. Remove the memory module from the OP.

Restore module → flash

If a memory module contains nothing but recipe data records, these can be restored during normal operation of the OP:

1. Insert the memory module in the module shaft on the OP.
2. Start the Restore function with the function key or soft key.

   The recipe data records in the internal flash memory are now overwritten with the data records stored on the module.
3. Remove the memory module.

Note

Recipe data records stored with Backup on the Jeida/PCMCIA module have to be transferred first with Restore to the internal flash memory before they can be edited.

Recipe data records which have been created directly on the Jeida/PCMCIA module – for example, by means of a standard screen – cannot be uploaded with Restore into the internal flash memory.

Restore firmware/ configuration

To restore a backup of the firmware or configuration to the OP, proceed as follows:

1. Insert the memory module containing the firmware or configuration in the module shaft on the OP.

   The OP now starts up with the firmware or configuration contained on the memory module.
2. Start the Restore function with the function key or soft key.

   The memory contents of the internal flash memory are overwritten by the firmware and configuration contained on the memory module.

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Initializing Backup/ Restore

If you suspend the Backup and Restore functions at the ”Initialize” entry point, this function is executed whenever loading is performed from the memory module. You are then prompted to decide whether or not the internal flash memory should be overwritten with the data on the memory module.

1. In ProTool, choose **System → Functions → Initialization** from the menu:
2. Specify the direction of transfer and the type of data which you want to transfer. The parameters mean:

Direction	= 0	OP → module (not sensible upon Initialize)
	= 1	Module → OP
Quantity	= 0	Firmware + configuration + recipe data records
	= 1	Firmware + configuration
	= 2	Recipe data records

3. Transfer the configuration.
   After the transfer has been completed successfully, acknowledge the prompt during start-up with ”yes”.
4. Remove the memory module.

Application option

Thanks to the Jeida/PCMCIA module, you can load the stored data directly on the target OP on the machine or system, that is, the configuration or recipe data records can be updated or modified irrespective of the location of the target OP.

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DEVICE DESCRIPTION, INSTALLATION, AND MAINTENANCE

Part IV

14 Device Description

15 Labelling the Function Keys

16 Mechanical Installation

17 Electrical Installation

18 Maintenance

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Device Description

14

Overview

Section 14 contains separate subsections for the OP25, OP35 and OP45. These subsections cover the following subjects.

- Operating and indicating elements
- Connections/interfaces
- Device dimensions

An additional subsection describes available options (e.g., direct key module for OP25/OP35).

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14.1 Device Description: OP25

14.1.1 Operating and Indicating Elements of the OP25

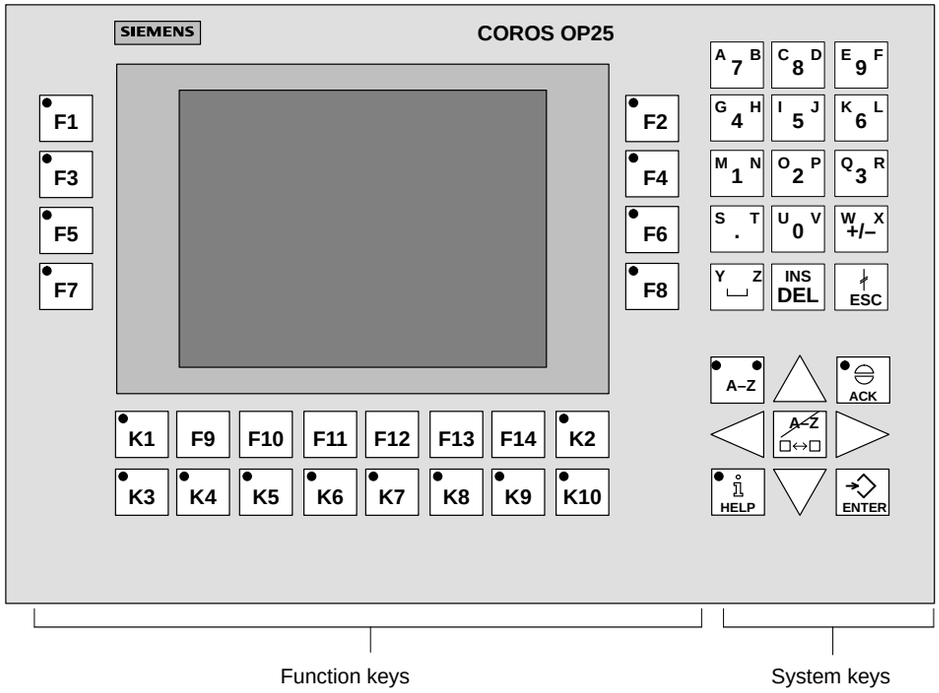


Figure 14-1 OP25: Location of the operating and indicating elements

Designation	Description
Display	LC display (monochrome) with background illumination Resolution of 320 x 240 pixels
System keys	24 system keys with fixed functions
Function keys	24 configurable function keys (18 of these keys are equipped with an LED.)

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14.1.2 Connections of the OP25

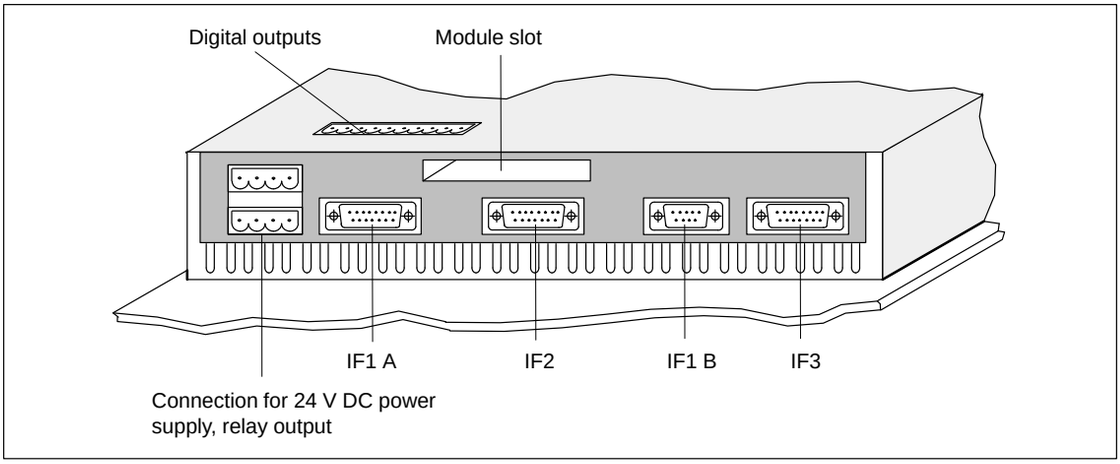


Figure 14-2 OP25: Location of the connections

Designation		Description	
Serial interfaces		Level	Use
	IF1 A	V.24/TTY (active/passive)	Controller
	IF2	V.24/TTY (active/passive)	PC, PG, printer, second TD/OP
	IF1 B	RS 422/RS 485 (floating)	Controller
	IF3	TTY (passive) / RS 422/RS 485	Not used at present
Relay output		Relay contact to control a horn or lamp, for example, to call attention to dangerous situations	
Module slot		For PCMCIA/JEIDA cards	
Digital outputs (optional)		8 digital outputs (only available on OP with direct key module)	

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14.1.3 Dimensions of the OP25

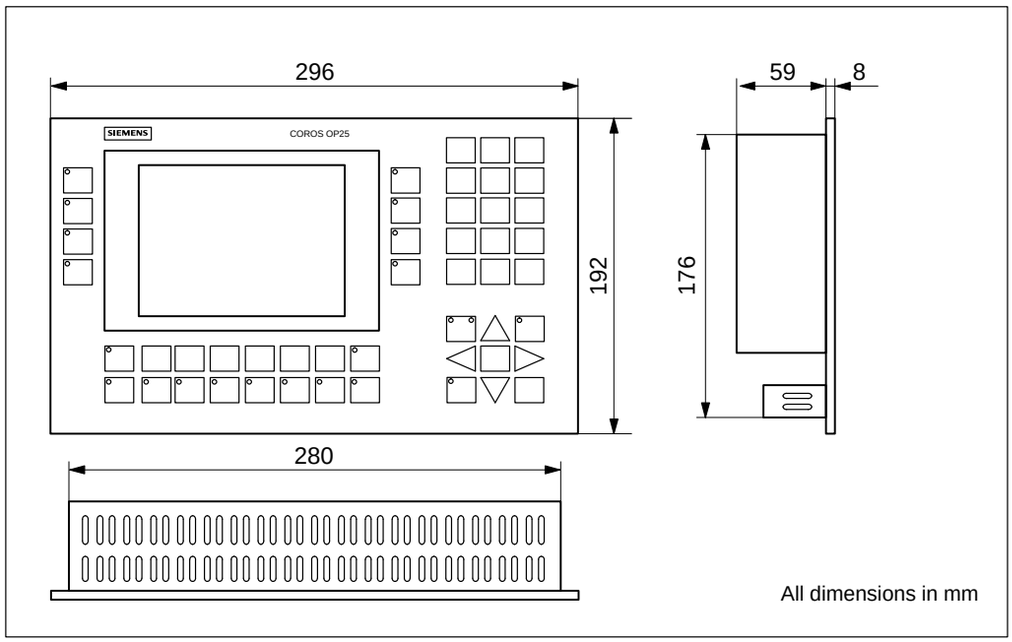


Figure 14-3 Dimensions of the OP25

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14.2 Device Description: OP35

14.2.1 Operating and Indicating Elements of the OP35

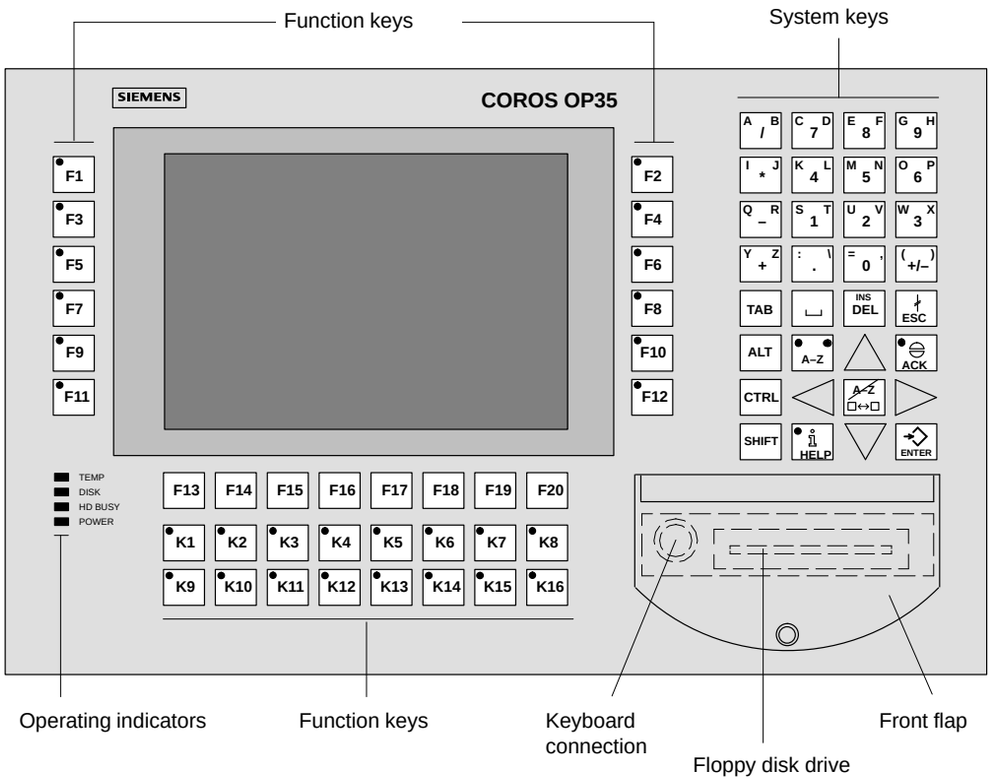


Figure 14-4 OP35: Location of the operating and indicating elements

Designation	Description
Display	LC display (monochrome or color) with background illumination Resolution of 640 x 480 pixels
System keys	32 system keys with fixed functions
Function keys	36 configurable function keys (28 with LED) Label strips for customized labelling
Operating indicators	TEMP Interior temperature has exceeded the permissible limit values. DISK Read/write access to PCMCIA module HD BUSY No function POWER OP is in operation.
Floppy disk drive (option)	$3^1/_2$" drive for HD floppy disks (1.44 MB)
Keyboard connection	Not used at present
Front flap	IP65 protection rating (when closed)

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14.2.2 Connections/Interfaces of the OP35

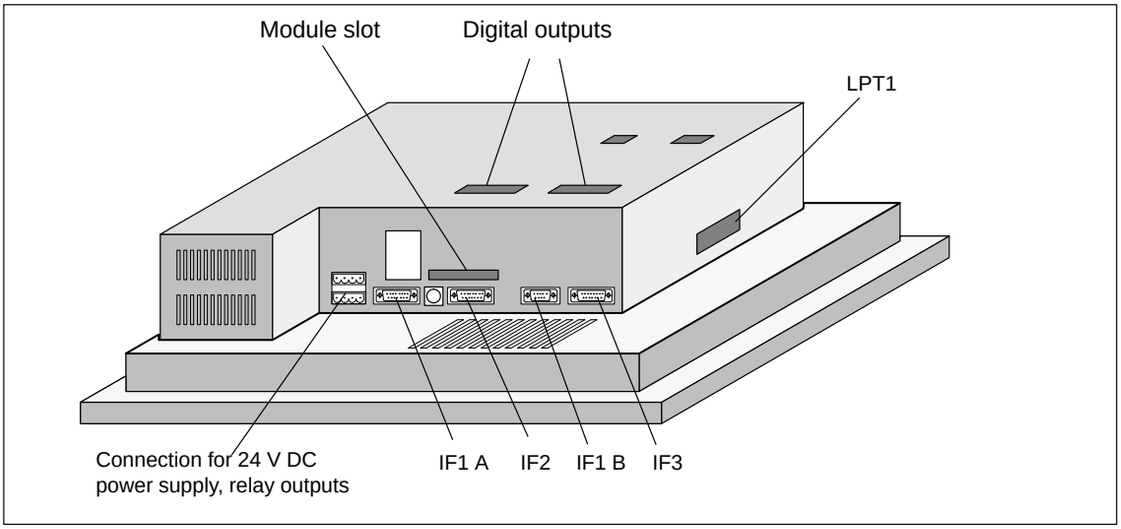


Figure 14-5 OP35: Location of the connections

Designation		Description	
Serial interfaces		Level	Use
	IF1 A	V.24/TTY (active/passive)	Controller
	IF2	V.24/TTY (active/passive)	PC, PG, printer, second TD/OP (loop-through operation)
	IF1 B	RS 422/RS 485 (floating)	Controller
	IF3	TTY (passive) /RS 422/RS 485	Not used at present
Parallel interface	LPT1	Not used at present	
Relay output		Relay contact to control a horn or lamp, for example	
Module slot		For PCMCIA/JEIDA cards	
Digital outputs (optional)		16 digital outputs (only available on OP with direct key module)	

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14.2.3 Dimensions of the OP35

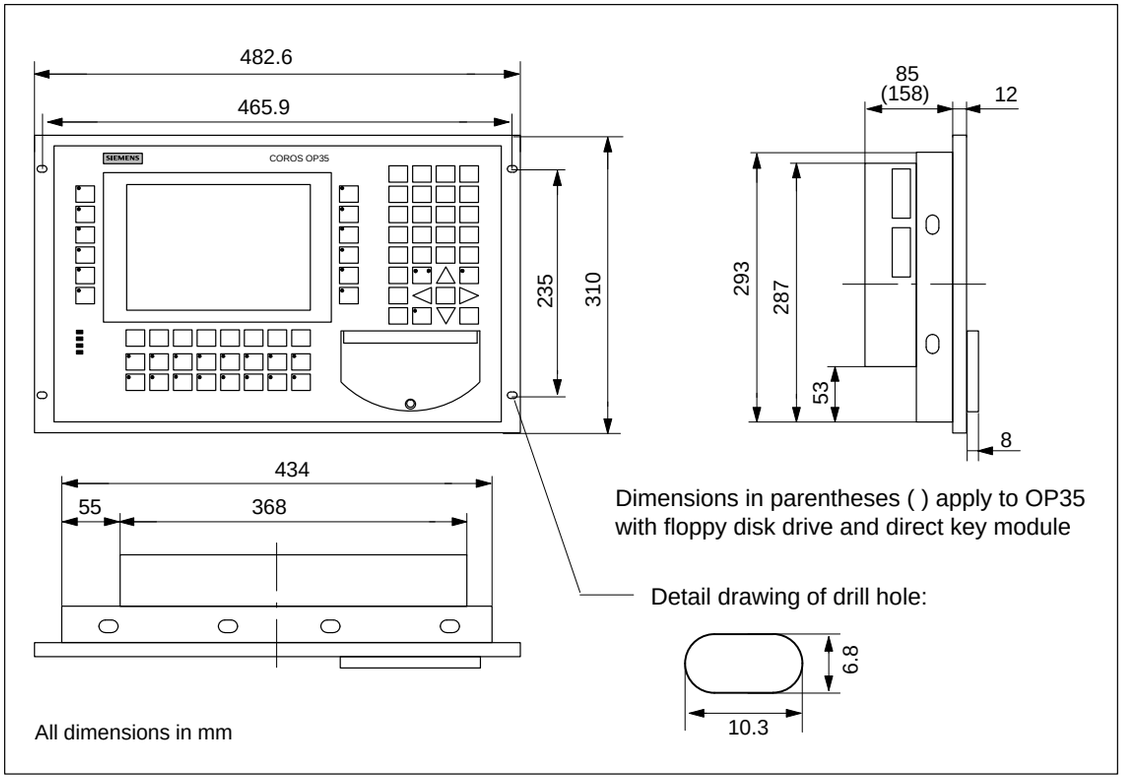


Figure 14-6 Dimensions of the OP35

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14.3 Device Description: OP45

14.3.1 Operating and Indicating Elements of the OP45

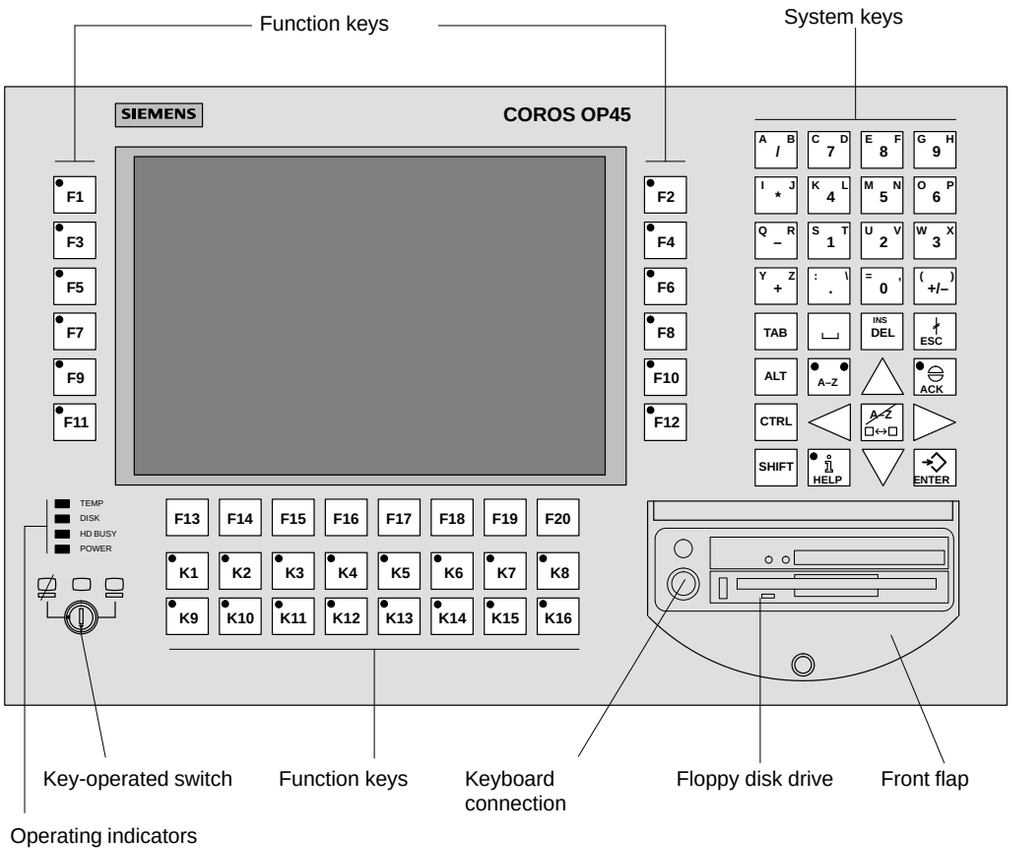
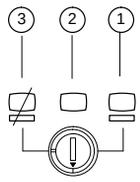


Figure 14-7 OP45: Location of the operating and indicating elements

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Designation	Description
Display	TFT color display with background illumination Resolution of 640 x 480 pixels
System keys	32 system keys with fixed functions
Function keys	36 configurable function keys (28 with LED) Label strips for customized labelling
Key-operated switch	The key-operated switch has three switch positions. The key can be removed in every position.  ① OP45 is on; keyboard entries possible. ② OP45 is on; keyboard entries not possible. ③ OP45 is off.
Operating indicators	The operating indicators have the following meaning: TEMP No function DISK Read/write access to floppy disk drive HD BUSY Read/write access to hard disk POWER OP is in operation.
Floppy disk drive	$3^1/_2$” drive for HD floppy disks (1.44 MB)
Keyboard connection	Connection for external MF2 keyboard (front and rear)
Front flap	IP65 protection rating (when closed)

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14.3.2 Connections of the OP45

Serial interfaces, keyboard and monitor connection

Figure 14-8 shows the location of the connections on the right side of the OP45.

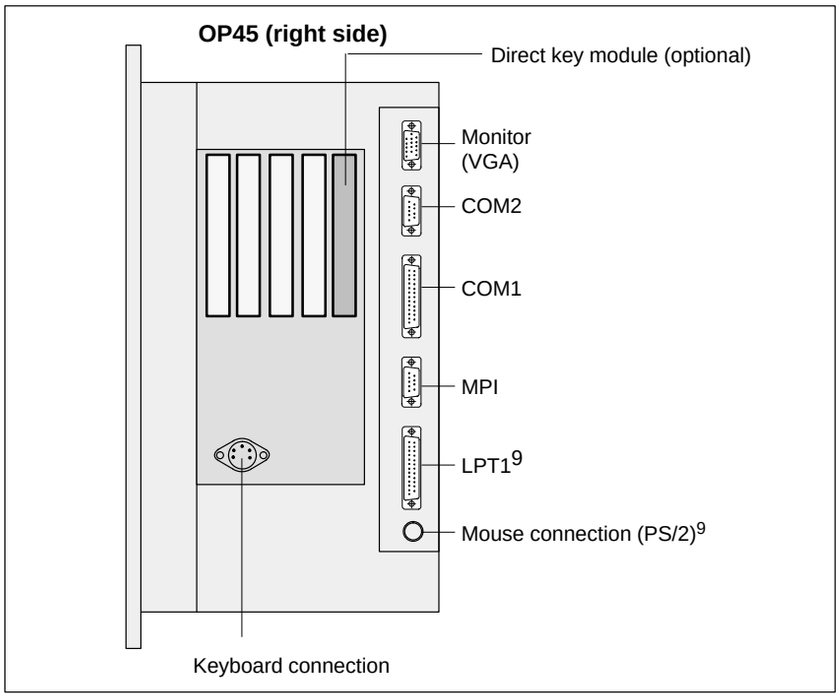


Figure 14-8 OP45: Serial interfaces, keyboard and monitor connection

Designation		Description	
Serial interfaces		Level	Use
	COM1	V.24/TTY	SIMATIC S5 (AS 511 only)
	COM2	V.24	Printer, PC, PG, second TD/OP (loop-through operation)
	MPI	RS 485	No function
Parallel interface	LPT1	Connection for printer (can only be used under DOS)	
Mouse connection (PS/2)		Can only be used under DOS	
Digital outputs (optional)		16 digital outputs	
Keyboard connection		Connection for external MF2 keyboard (An additional connection is located on the front of the OP.)	
Monitor		VGA connection for external monitor	

9) Can only be used under DOS

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Power connection and voltage selection switch

Figure 14-9 shows the location of the connections on the left side of the OP45.

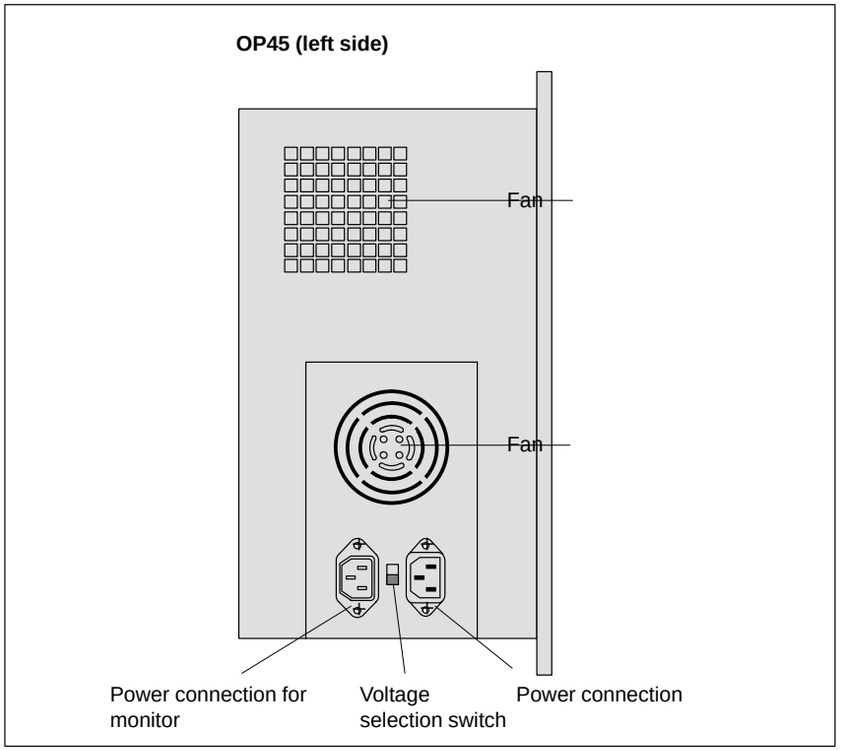


Figure 14-9 OP45: Power connection and voltage selection switch

Designation	Description
Power connection	The OP45 can be operated on 230 V AC or 115 V AC power.
Power connection for monitor	Connection for external monitor (230/115 V AC)
Voltage selection switch	Selector switch for either 230 V or 115 V power. 230 V set at the factory **Caution** Switching the voltage also changes the voltage on the power connection for the monitor.

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14.3.3 Dimensions of the OP45

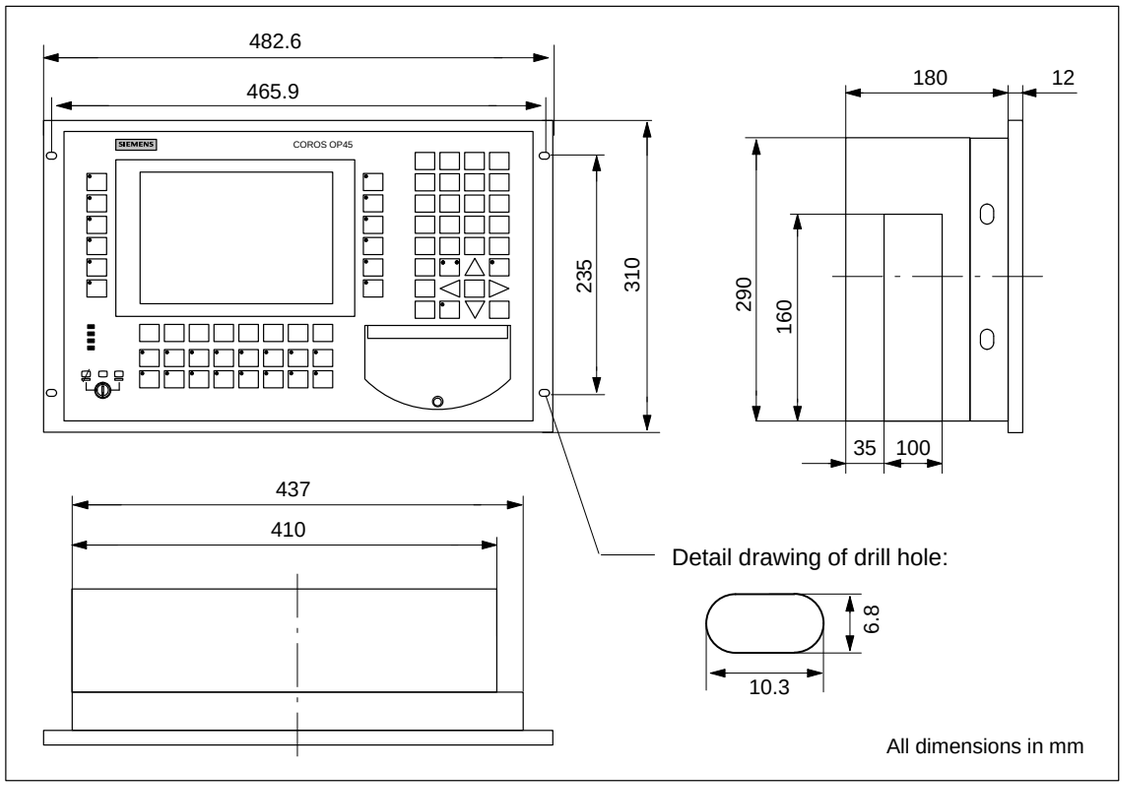


Figure 14-10 Dimensions of the OP45

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14.4 Options

Direct key modules

You can order the OP25 with one optional direct key module and the OP35 with two, optional direct key modules.

These modules are permanently installed. They cannot be added later.

The direct key modules for the OP45 can be ordered separately as a plug-in card. A detailed description is supplied with the plug-in card.

Purpose of the direct key module

Each direct key module (DTM) provides eight, digital outputs.

These outputs are

- set by pressing the corresponding function key or
- controlled via configurable ports by the software.

The function can be set via DIP switches.

External voltage supply

Since the digital outputs are galvanically isolated from the operator panel by optocouplers, the direct key module requires its own voltage supply.

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14.4.1 Direct Key Module for the OP25

Connection and setting elements

Pin strip and DIP switch of the direct key module are located on the back of the OP.

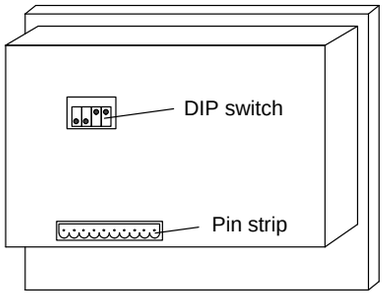
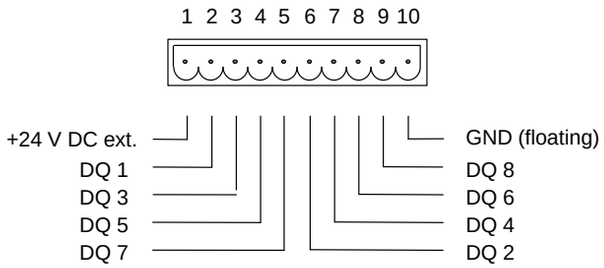


Figure 14-11 OP25: Location of the connection and setting elements of the direct key module

Pin strip

The pin strip has the following pin assignment.



The components to be addressed by the digital outputs (e.g., relays, etc.) are connected via the two 5-pin terminal blocks as described below.

- Connect the lines (line cross section: 0.5 to 2.5 mm^2).
- Insert terminal blocks on the pin strip of the direct key module.

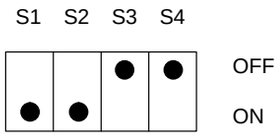
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DIP switch

The digital outputs are set in accordance with the setting on the DIP switch

- by pressing a key (F1 to F8) or
- by the software.

Setting of the DIP Switch:



Switches S1 and S2 are always set to ON. Switches S3 and S4 each manipulate a group of outputs.

- S3 manipulates DQ 1, DQ 3, DQ 5, and DQ 7.
- S4 manipulates DQ 2, DQ 4, DQ 6, and DQ 8.

		OFF	ON
DTM A	S3	F1/F3/F5/F7 act as direct keys.	DQ 1/DQ 3/DQ 5/DQ 7 addressed by the software
	S4	F2/F4/F6/F8 act as direct keys.	DQ 2/DQ 4/DQ 6/DQ 8 addressed by the software

When switch S3 or S4 is set to OFF, the digital outputs are permanently assigned to keys F1 to F8.

Key F1 sets output DQ 1.

•
•
•

Key F8 sets output DQ 8.

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14.4.2 Direct Key Module for the OP35

Connection and setting elements

Each of the two direct key modules is equipped with the following:

- A 10-way, pin strip

  For connection of the outputs and the external supply voltage

- A DIP switch

  For setting whether the outputs are to be set via pressing a key or via software

Pin strips and DIP switches are located on the back of the OP.

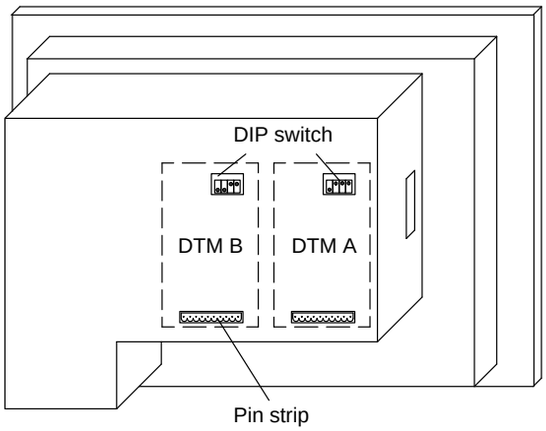
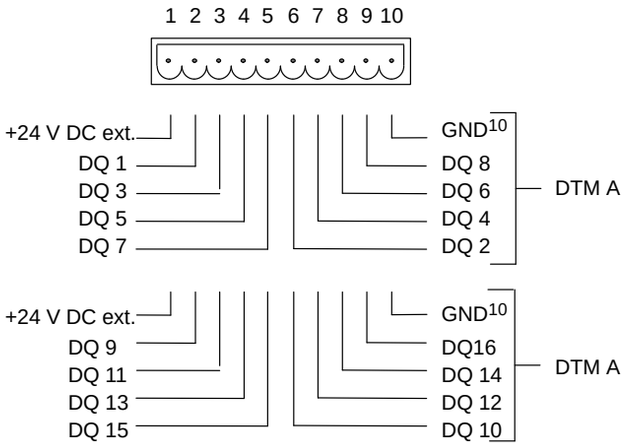


Figure 14-12 OP35: Location of the connection and setting elements of the direct key modules (DTM)

Pin strips

The pin strips of direct key module (DTM) A and direct key module B have the following pin allocation:



10) Floating

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The components to be controlled (e.g., relays, signal lamps, etc.) are connected via the five-pin terminal blocks included.

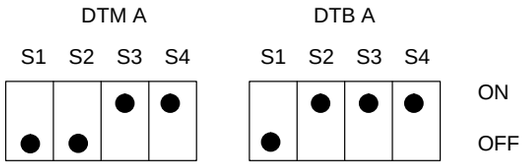
- Connect the lines to the terminal block (wire cross section: 0.5 to 2.5 mm^2).
- Install terminal blocks on the pin strip of the direct key module.

DIP switches

The setting of the DIP switch determines how the digital outputs of the direct key module will be addressed.

- Switch setting OFF: By pressing function keys
- Switch setting ON: By the software

Setting of the DIP switch:



S1 is always ON; S2 selects the direct key module (DTM).

S3 and S4 each manipulate a group of outputs.

		OFF	ON
DTM A	S3	F1/F3/F5/F7 act as direct keys.	DQ 1/DQ 3/DQ 5/DQ 7 addressed by software
	S4	F2/F4/F6/F8 act as direct keys.	DQ 2/DQ 4/DQ 6/DQ 8 addressed by software
DTM B	S3	F9/F11 act as direct keys.	DQ 9/DQ 11/DQ 13/DQ 15 addressed by software
	S4	F10/F12 act as direct keys.	DQ 10/DQ 12/DQ 14/DQ 16 addressed by software

If switch S3 or S4 is set to OFF, the digital outputs are permanently assigned to keys F1 to F12.

The F1 key sets output DQ 1.

The F2 key sets output DQ 2.

•
•
•

The F12 key sets output DQ 12.

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Labelling the Function Keys

15

On delivery

On delivery, the function keys of the operator panel are labelled as follows:

- OP25: F1 to F14 and K1 to K10
- OP35/OP45: F1 to F20 and K1 to K16

Customized labelling

A set of blank label strips is included with the OP. You can use these to make your own labels for the OP keys.

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15.1 Labelling the Keys for OP25

Labelling

Read and adhere to the following caution note before inserting the labelling strips.



Caution

Make sure that the labels are dry (i.e., do not smudge when wiped) before being inserting them since a keyboard foil which is soiled from the inside cannot be cleaned and must be replaced at the manufacturer’s plant.

Inserting the label strips

Proceed as follows:

1. Pull out any “old” label strips.
2. Insert your own customized label strips in the appropriate slits from the back of the device.

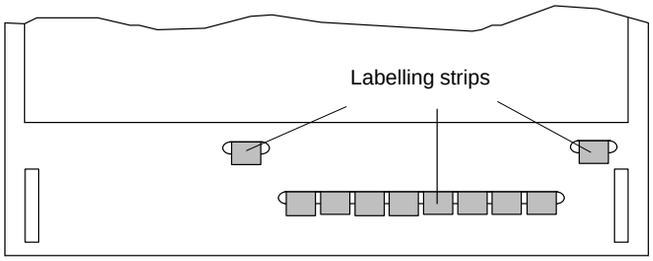


Figure 15-1 OP25: Inserting the labelling strips

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15.2 Labelling the Keys for OP35

Opening the operator panel

You will have to open the housing of the operator panel to insert the labelling strips.

Caution

- Only **qualified personnel** may perform work on this device.
- Before performing work on the open device, be sure to read and adhere to the ESD guidelines contained in the appendix of this manual.

To open the operator panel, proceed as follows:

1. Position the device with the front plate facing down.
2. Remove the 4 housing screws ①.

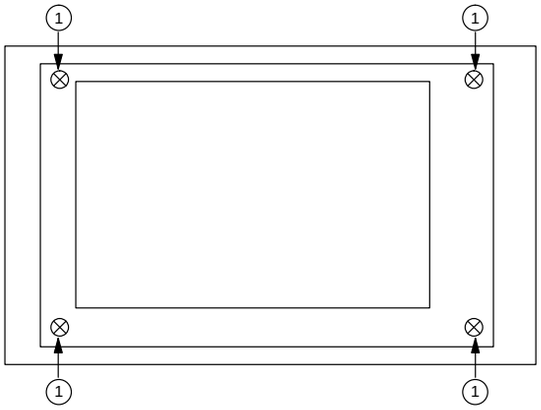


Figure 15-2 OP35: Opening the housing of the OP (removing the housing screws)

3. Lift OP housing to the right.

Caution

The OP housing and the display are connected by cables.

Some models have short connection cables to the display, and some have long connection cables.

If your model has long connection cables, skip step 4.

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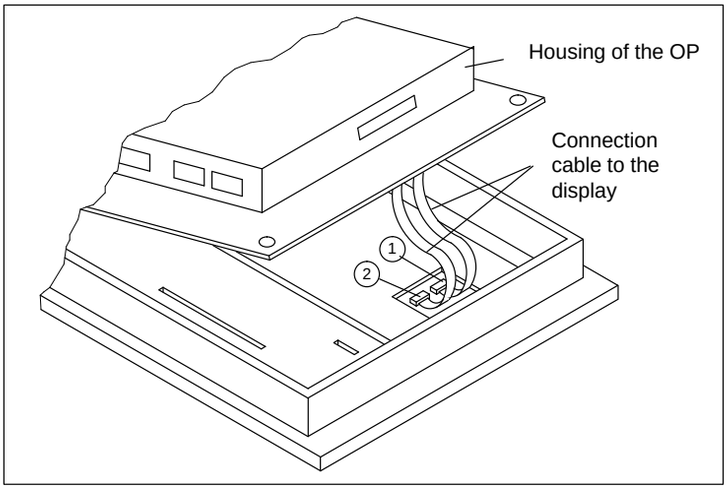


Figure 15-3 OP35: Opening the housing of the OP (lifting the housing)

4. Short connection cables to the display:

   Disconnect connectors ① and ② by pulling the cables evenly. (The OP35 with the monochrome display has only one connector.)

5. Disconnect connector ③ (see figure 15-4).
6. Carefully lay the OP housing aside, and protect it from slipping.



Caution

Make sure that the remaining connection cables (e.g., of the sealed keyboard) are not subjected to pull strain.

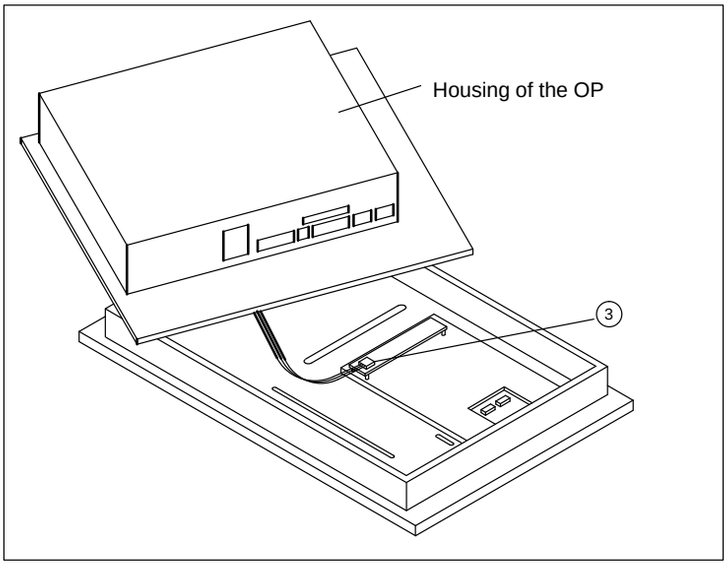


Figure 15-4 OP35: Opening the housing of the OP (laying the housing aside)

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Labelling

Before inserting the labelling strips, be sure to read and adhere to the caution note.

Caution

Make sure that the labels are dry (i.e., do not smudge when wiped) before inserting them since a keyboard foil which is soiled from the inside cannot be cleaned and must be replaced at the manufacturer's plant.

Inserting the label strips

Insert the finished label strips in the slits of the front plate with the writing facing down.

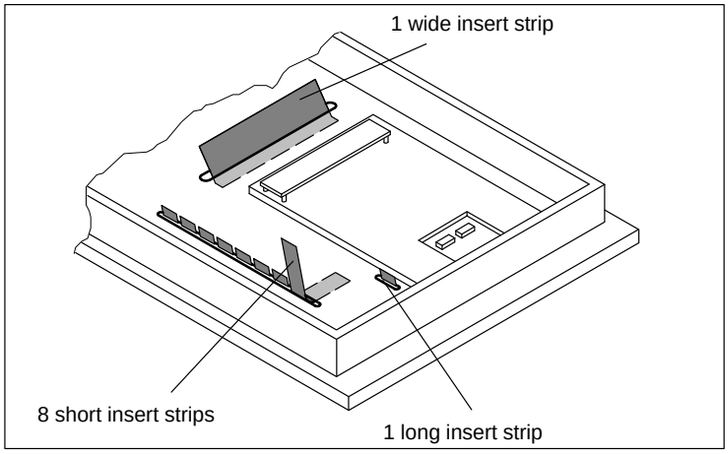


Figure 15-5 OP35: Inserting the labelling strips

Closing the operator panel again

To close the operator panel, proceed as follows:

1. Position the OP housing just close enough so that the disconnected connectors ①, ② and ③ can be carefully reconnected.
2. Place the OP housing in its final position, and tighten the 4 housing screws again.

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15.3 Labelling the Keys for OP45

Opening the operator panel

You will have to open the housing of the operator panel to insert the labelling strips.

Warning

Disconnect power plug before opening the device.

Caution

- Only **qualified personnel** may perform work on this device.
- Before performing work on the open device, be sure to read and adhere to the ESD guidelines contained in the appendix of this manual.

To open the operator panel, proceed as follows:

1. Remove the three housing screws ① .

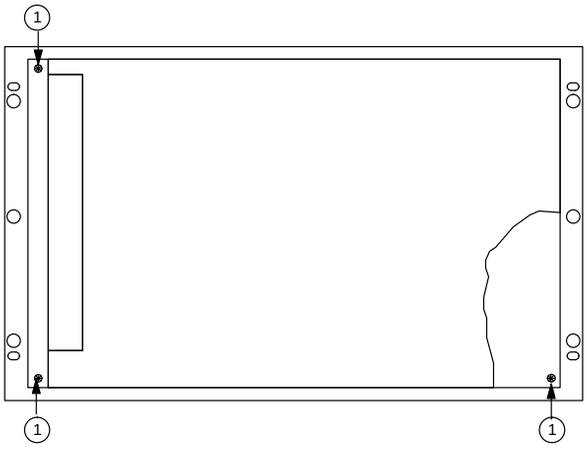


Figure 15-6 OP45: Opening the housing of the OP (removing the housing screws)

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2. Pull front plate/frame out of the OP housing as far as it will go (the front plate is connected to the OP housing with a hinge). Fold down the front plate.

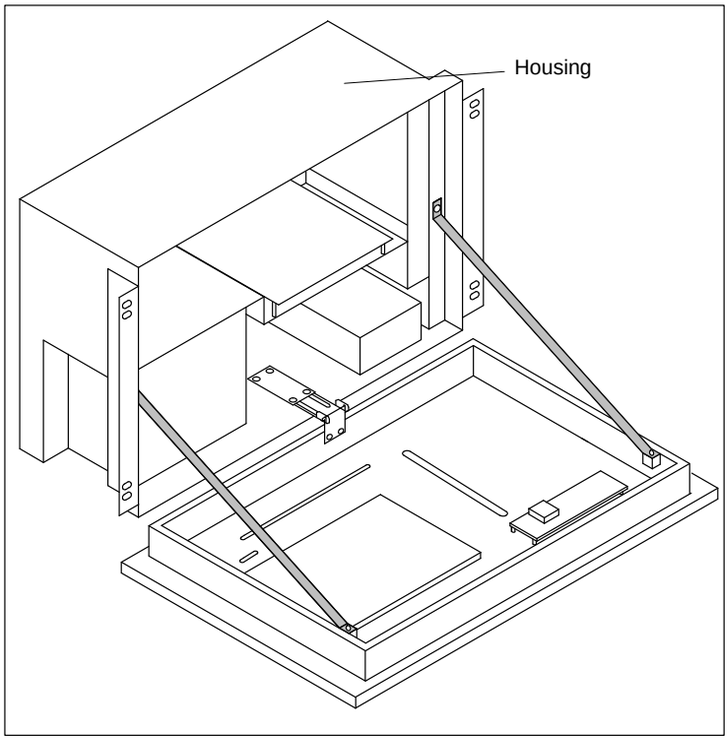


Figure 15-7 OP45: Opening the housing of the OP (folding down the front plate)

Labelling

Before inserting the labelling strips, be sure to read and adhere to the caution note.

Caution

Make sure that the labels are dry (i.e., do not smudge when wiped) before being inserting them since a keyboard foil which is soiled from the inside cannot be cleaned and must be replaced at the manufacturer's plant.

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Inserting the label strips

Insert the finished label strips in the slits of the front plate with the writing facing down.

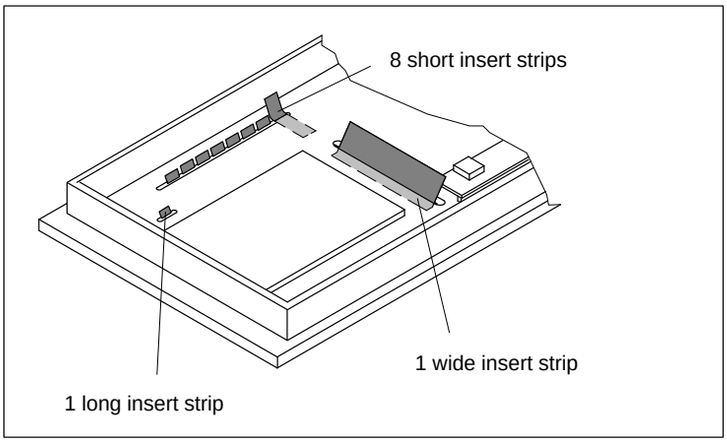


Figure 15-8 OP45: Inserting the labelling strips

Closing the operator panel again

To close the operator panel, proceed in reverse order.

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Mechanical Installation

16

Operator panels OP25, OP35 and OP45 are designed for installation in the front panels of switching cabinets and consoles.

The OP35 and OP45 can also be used in 19” cabinets or racks.



Caution

Commissioning is prohibited until it has been determined that the machine in which these components are to be installed meets the regulations contained in the 89/392/EEC guidelines.

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16.1 Installing the OP25

Deciding on an installation site and preparation

You can install the OP25 in switching cabinets or consoles. You will need to make a cutout in the front panel.

Width x height (in mm): 282_{-1} x 178_{-1}

See “Technical Specifications” (→ appendix) for information on the mounting depth.

The thickness of the front panel may not exceed 16 mm.



Caution

Protect the OP from overheating during operation:

- Protect the device from direct sunlight. (This also helps to prevent the foil sealed front from fading.)
- Make sure that the ventilation slits are not obstructed after installation.

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Installing the device

To install, proceed as follows:

1. Working from the front, place the OP in the prepared cutout.

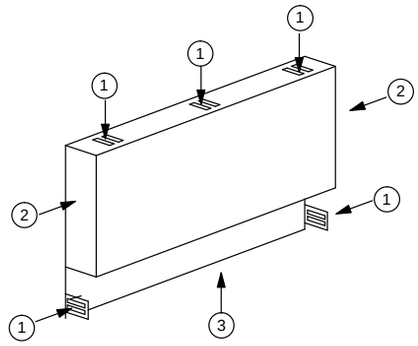
Note

The IP65 protection rating on the front cannot be ensured unless the sealing is positioned correctly on the front plate of the OP.

Caution

Provide suitable measures to prevent the OP from falling out of the front panel before the device is permanently secured.

2. Secure the device in the front panel with the included **screw-type clamps**.



Screw-type clamps are not required for positions (2) and (3) unless the front panel is not level and protection rating IP65 is to be achieved. Position (3) requires that a mounting bracket be screwed to the mounting strip.

Figure 16-1 OP25: Positions of the screw–type clamps

Hook the screw-type clamps into the OP housing (see figure 16-2) and turn the threaded spindles on the back against the front panel.

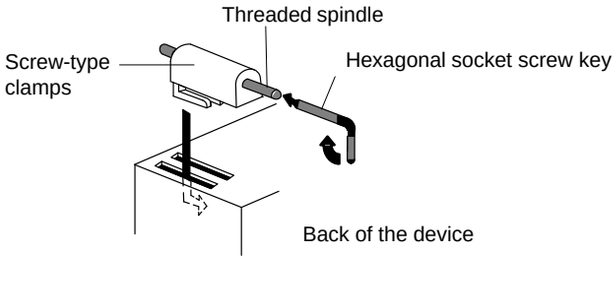


Figure 16-2 OP25: Hooking in and tightening the screw-type clamps

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16.2 Installing the OP35

Deciding on the installation site

You can install/mount the OP35 in the following locations:

- In 19” (48.26 cm) cabinets/racks
- In front panels of switching cabinets and consoles

  When installed correctly with the included screw-type clamps, the front of the OP35 has an IP protection rating of IP65.



Caution

- To prevent the OP from overheating during operation:
  - Protect the OP from direct sunlight. (This also keeps the sealed foil front from fading.)
  - Ensure that installation does not obstruct the ventilation slits of the housing.
- If you are using the OP35 with floppy disk drive, make sure of the following:

  The angle of inclination of the OP to the vertical surface may not exceed 25°. Otherwise the floppy disk drive may malfunction.

16.2.1 Installation in 19” Cabinets/Racks

To mount the OP35, use the cabinet braces available from the manufacturer of your cabinet or rack.

Mounting dimensions of the OP35 for a standard, 19” cabinet:

Width: 19” (48.26 cm) Height: 7 “units of height”

The OP or the OP front plate is secured to the cabinet braces with four screws.

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16.2.2 Installation in Switching Cabinets/Consoles

Preparations

A cutout must be made in the front panel.

Width x height (in mm): $436_{-1.5}$ x $295_{-1.5}$

See “Technical Specifications” (→ appendix) for information on the mounting depth.

The thickness of the front panel may not exceed 16 mm.

Installation

To install, proceed as follows:

1. Working from the front, place the OP in the prepared cutout.

Note

The IP65 protection rating on the front cannot be ensured unless the sealing is positioned correctly on the front plate of the OP.



Caution

Use suitable measures to prevent the OP from falling out of the front panel before it is permanently secured.

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2. Secure the OP to the front panel with the six screw-type clamps ① included.

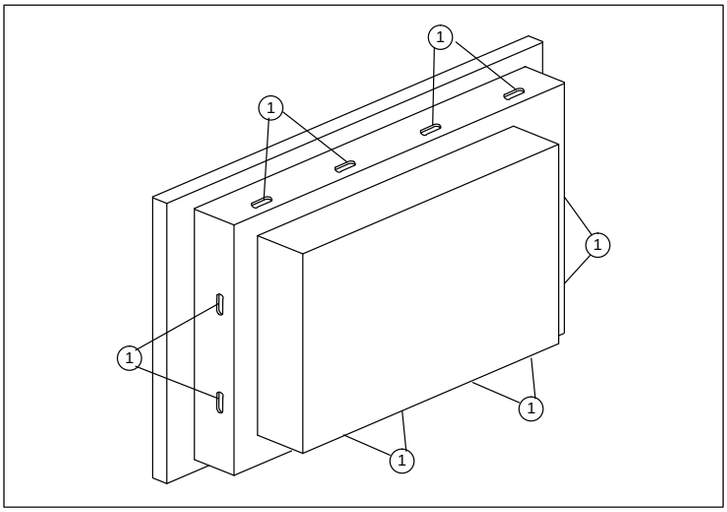


Figure 16-3 OP35: Positions of the screw-type clamps

To do this, hook the screw-type clamps into the housing of the OP, and turn the threaded spindles on the back against the front panel.

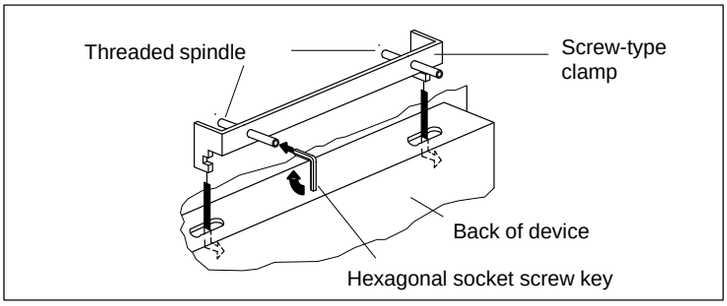


Figure 16-4 OP35: Hooking in and tightening the screw-type clamps

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16.3 Installing the OP45

Deciding on the installation site

You can install/mount the OP45 in the following locations:

- In 19” (48.26 cm) cabinets/racks
- In front panels of switching cabinets and consoles

  When installed correctly with the included screw-type clamps, the front of the OP45 has an IP protection rating of IP65.



Caution

- To prevent the OP from overheating during operation:
  - Protect the OP from direct sunlight. (This also keeps the sealed foil front from fading.)
  - Ensure that installation does not obstruct the ventilation slits of the housing.
- The OP45 may only be operated when mounted vertically.

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16.3.1 Installation in 19” Cabinets/Racks

There are two ways to secure the OP45 in 19” cabinets.

- Secure the front plate of the OP to the cabinet braces with four screws.
- Screw the housing of the OP45 to the cabinet braces with mounting brackets.

Mounting dimensions of the OP45 for a standard, 19” cabinet:

Width: 19” (48.26 cm) Height: 7 “units of height”

Securing with mounting brackets

Follow the steps shown below to secure the OP45 with mounting brackets.

Opening the housing

Proceed as follows:

1. Remove the three housing screws ① .

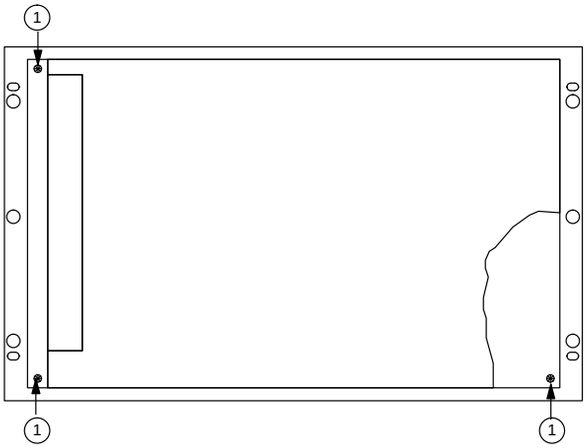


Figure 16-5 OP45: Opening the housing of the OP

2. Pull front plate/frame out of the OP housing as far as it will go (the front plate is connected to the OP housing with a hinge), and open.

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Securing the OP

Proceed as follows:

1. Secure included mounting brackets to the OP housing with three screws ② each.
2. Secure OP housing to the cabinet braces with two screws ③ each.

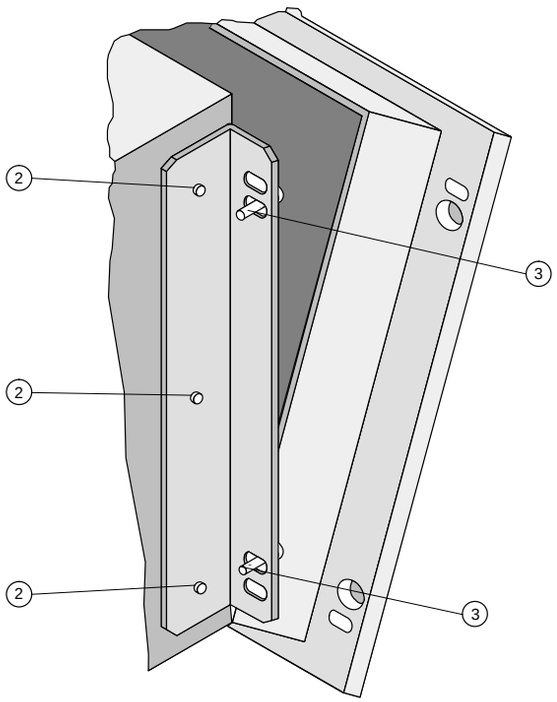


Figure 16-6 OP45: Mounting with mounting brackets

Closing the OP again

Close the front plate again, and tighten the housing screws ① .

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16.3.2 Installation in Switching Cabinets/Consoles

Preparations

A cutout must be made in the front panel. Dimensions of the cutout:

Width x height (in mm): 438_{-1} x 297_{-1}

Mounting depth (in mm): 180

The thickness of the front panel may not exceed 16 mm.

Installation

To install, proceed as follows:

1. Working from the front, place the OP in the prepared cutout.

Note

The IP65 protection rating on the front cannot be ensured unless the sealing is positioned correctly on the front plate of the OP.



Caution

Use suitable measures to prevent the OP from falling out of the front panel before it is permanently secured.

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2. Secure the OP to the front panel with the six screw-type clamps ① included.

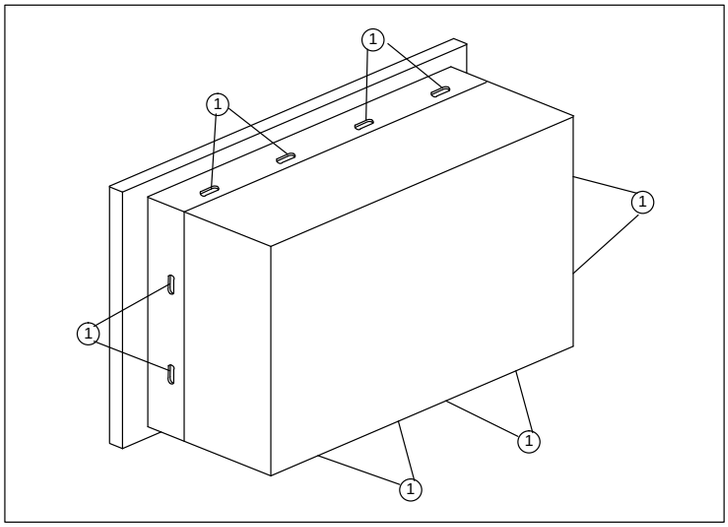


Figure 16-7 OP45: Positions of the screw-type clamps

To do this, hook the screw-type clamps into the housing of the OP, and turn the threaded spindles on the back against the front panel.

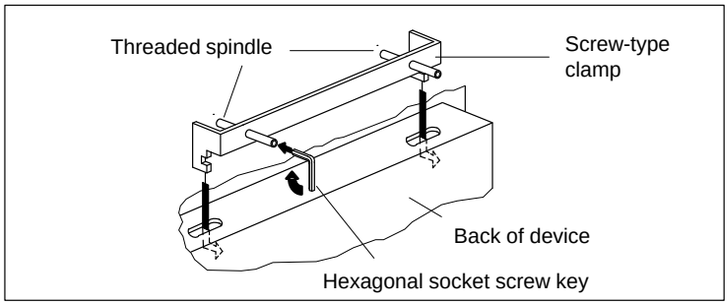


Figure 16-8 OP45: Hooking in and tightening the screw-type clamps

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Electrical Installation

17

Overview

The operator panel requires the following connections for operation.

- To the power supply
- To the configuring computer (PC or programmer)
- To the controller

After you have completed the configuration and test phase, you can connect a printer in place of the configuring computer.

General installation notes

Interference-free operation is based on two factors: the interference-proof setup of the controller hardware in accordance with EMC guidelines, and the use of interference-proof cables.

EMC directives

The directives defined in the description ”SIMATIC S5 Directives for the Interference-Proof Assembly of Programmable Logic Controllers” (Order No. 6ES5998-7AB11) apply to the interference-proof assembly and installation of operator panels.



Caution

- The setup guidelines contained in your controller’s system manual also apply to the OP.
- Use only shielded cable for all signal connections.
- Screw down or lock all plug connections.
- Do not install signal lines in the same cable ducts as high voltage lines.

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17.1 Electrical Installation of the OP25/OP35

Overview

Figure 17-1 shows several possible configurations for the OP, controller and I/O devices.

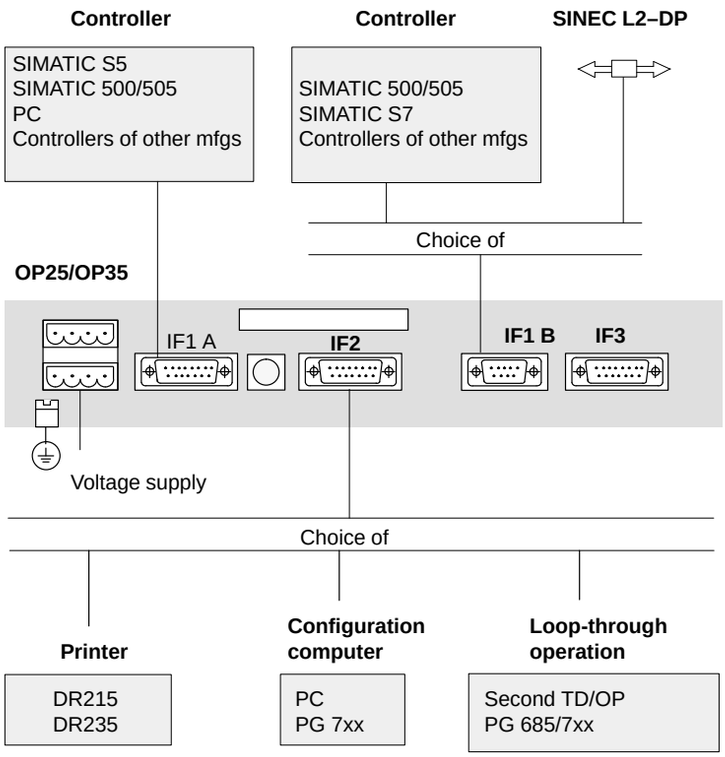


Figure 17-1 OP25/OP35: Some possible configurations

The following subsections provide detailed information on connecting the devices.

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17.1.1 Connecting the Voltage Supply and Relay Contacts

Specifications of the voltage supply

Nominal voltage	24 V DC
Voltage range	18 V to 30 V

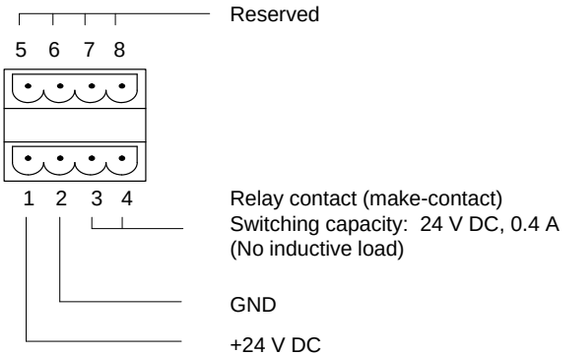


Caution

- 24 V supply: Ensure safe electrical separation of the extra-low voltage. Only use powerpacks which meet IEC 364–4–41 or HD 384.04.41 (part 410, VDE 0100) regulations.
- The supply voltage must remain within the voltage range shown above. If not, function failures may occur on the device.

Allocation of the pin strips

The pin strips on the OP are allocated as follows:



Terminal block

Use the included four-pin terminal block to connect the supply voltage.

- Connect the lines (line cross section: 0.5 to 2.5 mm^2).
- Insert terminal block on the lower pin strip on the OP.

Ground connection

The grounding point on the back of the device (see figure 17-1) must be connected with cabinet ground.

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17.1.2 Connecting the Configuration Computer

The configuration computer is connected to interface IF2 of the operator panel.

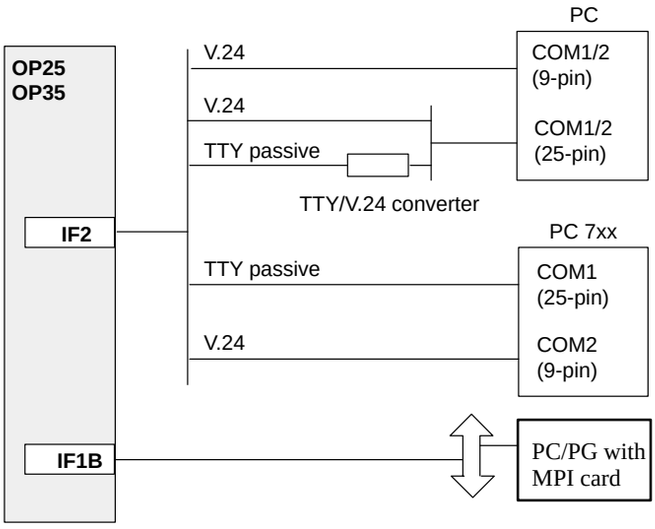


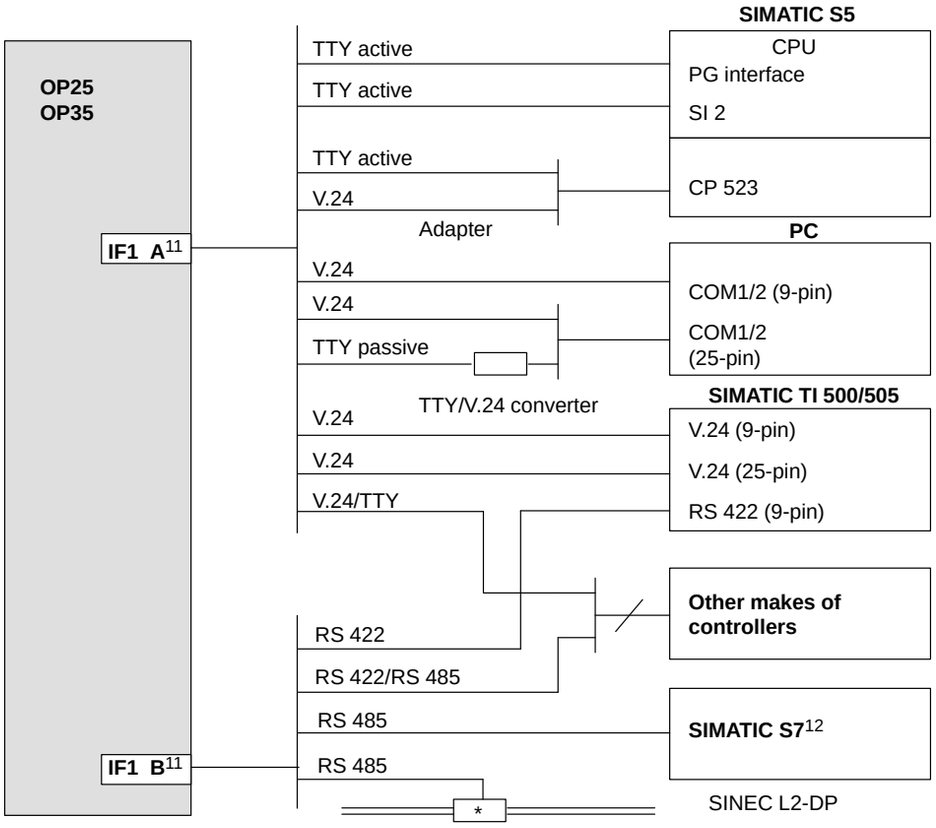
Figure 17-2 OP25/OP35: Connection of the configuration computer

Standard cables are available for the connections shown above (see ST80.1 catalog).

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17.1.3 Link to the Controller

Standard cables are available for the connections shown below (see ST80.1 catalog).



*) Any SINEC L2 bus terminal (except factory-built-assembly)

Figure 17-3 OP25/OP35: Connection configuration for controllers

11) When using serial interfaces, either IF1 A (V.24/TTY) or IF1 B (RS 422/RS 485) can be connected (but not both at the same time).

12) Use only approved cables when using the SIMATIC S7.

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17.1.4 Connecting the Printer

A printer can be connected to interface IF2 of the OP25/OP35.

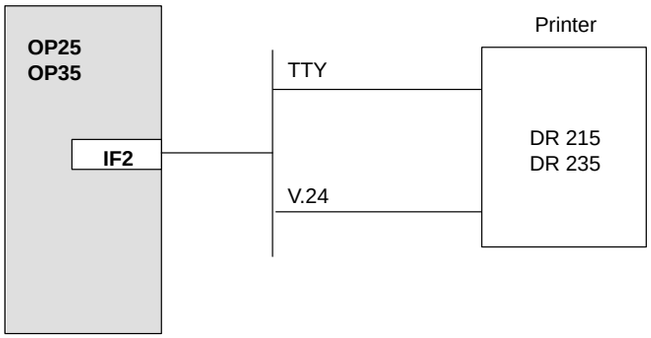


Figure 17-4 OP25/OP35: Connection configuration for printers

Printer settings

The type of printer and the transmission parameters can be specified on the OP with the *Printer Settings* standard screen.

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17.1.5 Loop-Through Operation

The IF2 interface of the OP25/OP35 is available for looping through a programmer or an additional TD/OP. This provides the following advantages.

- Access to the controller during operation
- Inexpensive way to connect a second TD/OP to a controller

Figure 17-5 gives you an overview of the connections in AS 511 loop-through operation.

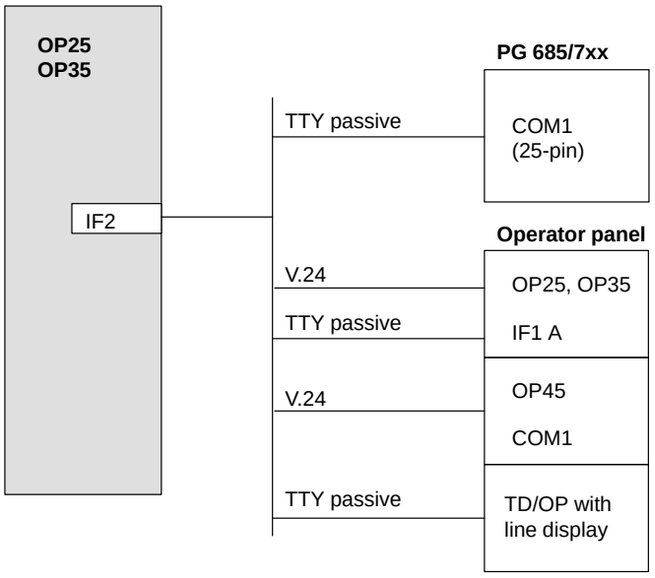


Figure 17-5 OP25/OP35: Connection configuration for AS 511 loop-through operation

Standard cables are available for the connections shown above (see ST80.1 catalog).

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17.2 Electrical Installation of the OP45

Overview

Figure 17-6 shows several possible configurations for the OP45, controller and I/O devices.

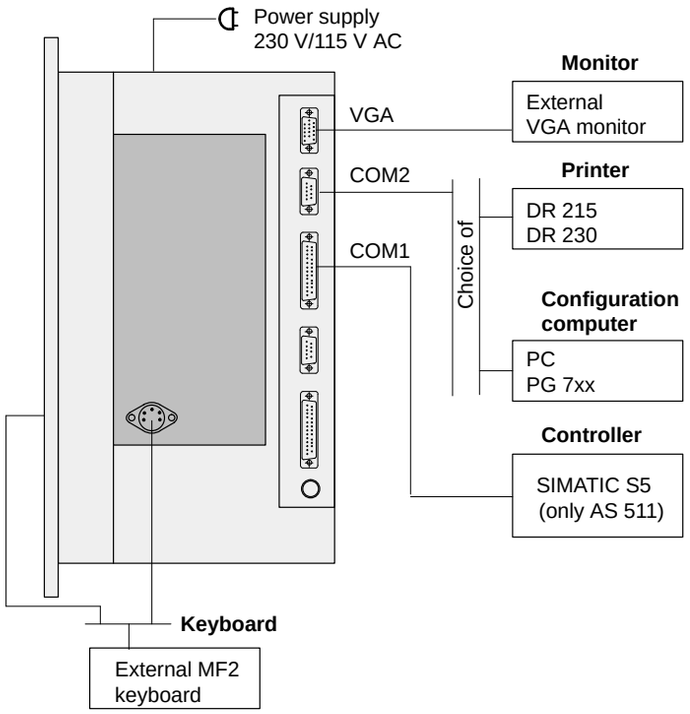


Figure 17-6 OP45: Some possible configurations

The following subsections provide detailed information on connecting the devices.

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17.2.1 Connection to the Power Supply

Safety notes

Before connecting the OP45 to the power supply, read and adhere to the following safety notes.



Warning

- This device may only be operated on power networks with grounded protective conductors or electrical outlets with protective conductors.
- Do not connect the device if it shows signs of exterior damage.
- Important when using the OP outside Germany:

  If another power cable is substituted for the one included with the OP, this cable must meet the safety regulations and standards of the country in which the OP is being used.

230/115 V voltage selector switch

Check to determine whether the nominal voltage set on the voltage selector switch corresponds to your local power voltage. 230 V has been set at the factory.



Caution

Changing the voltage also changes the voltage on the power connection for the monitor. (If necessary, adjust the voltage selector switch on the monitor.)

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17.2.2 Connecting the Configuration Computer

A configuration computer (e.g., PC, PG) can be temporarily connected to the COM2 interface of the OP45, and is only used to transmit configuration data.

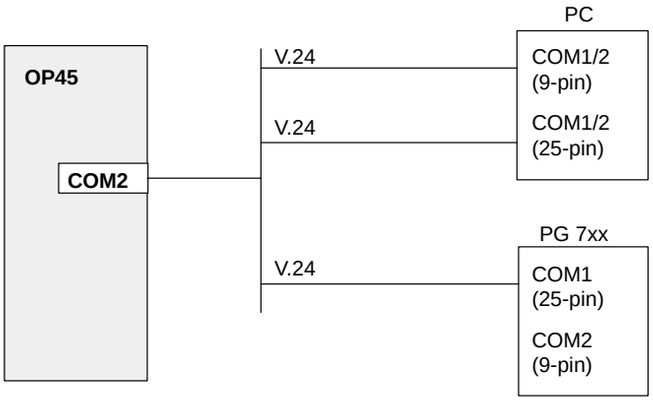


Figure 17-7 OP45: Connection of the configuration computer

Standard cables are available for the connections shown above (see ST80.1 catalog).

17.2.3 Link to the Controller

Figure 17-8 gives an overview of which controllers can be connected to the operator panel and which interfaces are used.

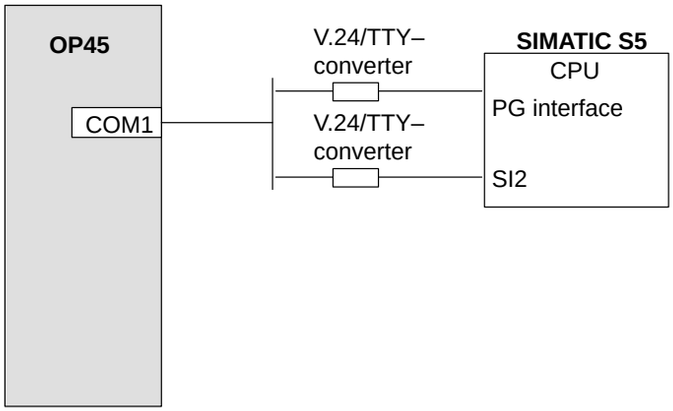


Figure 17-8 OP45: Connection configuration for controllers

Standard cables are available for the connections shown above (see ST80.1 catalog).

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17.2.4 Connecting the Printer

A printer can be connected to the COM2 interface of the OP45.

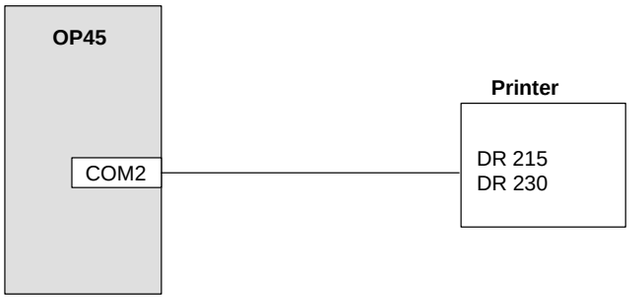


Figure 17-9 OP45: Connection configuration for printers

Printer settings

The type of printer and the transmission parameters can be specified on the OP with the *Printer Settings* standard screen.

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17.2.5 Connecting an MF2 Keyboard

An external MF2 keyboard can be operated on the OP45 at the same time as a built-in sealed keyboard.

A choice of two ways to connect the MF2 keyboard is available.

- To the keyboard connection under the front flap
- To the keyboard connection on the right side of the OP45

Note

Two external keyboards cannot be used at the same time.

Key assignment

Some OP keys do not exist on an MF2 keyboard. Combinations of keys must be used for these entries. The following table shows which key combinations on the MF2 Keyboard correspond to the OP keys.

OP-Keyboard	MF2-Keyboard
QUIT	CTRL+ENTER
INFO	CTRL+ALT+;
F1	F1
F2	F2
:	:
:	:
:	:
F12	F12
F13	SHIFT+F1
F14	SHIFT+F2
F15	SHIFT+F3
F16	SHIFT+F4
F17	SHIFT+F5
F18	SHIFT+F6
F19	SHIFT+F7
F20	SHIFT+F8

OP-Keyboard	MF2-Keyboard
K1	SHIFT+F9
K2	SHIFT+F10
K3	SHIFT+F11
K4	SHIFT+F12
K5	CTRL+F1
K6	CTRL+F2
K7	CTRL+F3
K8	CTRL+F4
K9	CTRL+F5
K10	CTRL+F6
K11	CTRL+F7
K12	CTRL+F8
K13	CTRL+F9
K14	CTRL+F10
K15	CTRL+F11
K16	CTRL+F12

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Special features

Using an external MF2 keyboard with the OP45:

- The NUM Lock key of the external keyboard is operational although the corresponding LED is always on when a switch is made.
- If you have activated the NUM Lock key, you will have to switch back by pressing cursor control again before disconnecting the external keyboard.

  If you do not do this, the OP keys will not function correctly (e.g., pressing the cursor key will give you the number “2”).

  How to fix keys which do not function correctly:

  Method A:

  Connect an external keyboard to the OP, and then press the NUM Lock key. Disconnect the external keyboard again.

  Method B:

  – OP45 is in normal operating mode.
  Perform a system conclusion (use the numeric keys for the cursor control). Then switch the OP off and on again with the key lock switch.

  – OP45 is in DOS operating mode.
  Press CTRL + ALT + DEL to reset the OP.

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Maintenance

18

Overview

The operator panel is designed for low-maintenance operation.

Maintenance of the OP includes the following:

- Cleaning the keyboard foil and display with a damp cloth (water only) at regular intervals
- Replacing the backup battery on OP25 and OP35

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18.1 Backup Battery

Purpose

The backup battery of the OP25/OP35 ensures the following when the supply voltage is switched off.

- The operating data in the SRAM of the OP are retained.
- The hardware clock continues to run.

Lifespan

The OP is equipped with a lithium battery which has already been installed on delivery. Under normal conditions, the battery has an average life of approximately 5 years.

Battery status

An empty battery is indicated by a system message while the OP is running. You should replace the backup battery as soon as possible after this message occurs.

Supply sources

New batteries can be obtained from the replacement part department of Siemens. The batteries are ready to be installed (with cable and connection plug).

Safety Notes

Adhere to the following when handling lithium batteries.



Warning

- Improper handling of the lithium battery may cause an explosion.
- Batteries:
  - – Never charge.
  - – Do not open.
  - – Do not short circuit.
  - – Do not reverse poles.
  - – Do not expose to temperatures of over 100° C.
  - – Protect from direct sunlight.
- Do not allow moisture to condense on the batteries.
- If transportation is required, regulations pertaining to dangerous freight must be adhered to for the carrier (obligation to identify).

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Battery covering

The next two figures show the location of the battery covering on the OP25 and OP35.

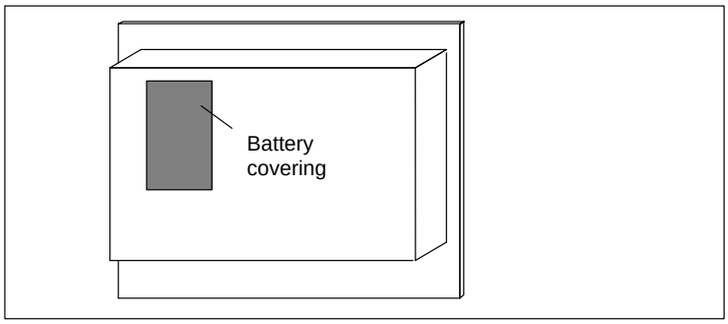


Figure 18-1 Location of the battery covering on the OP25

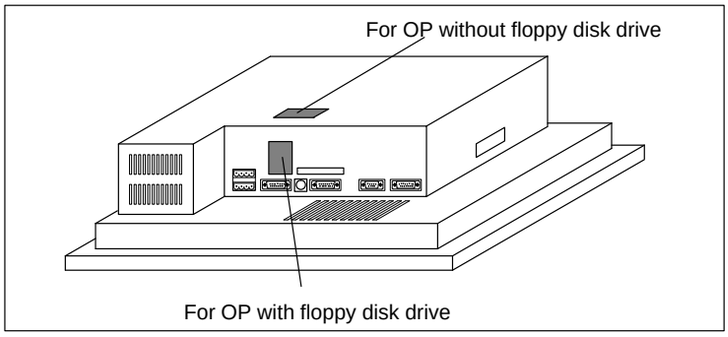


Figure 18-2 Location of the battery covering on the OP35

Before changing the battery

Before changing the battery, read and adhere to the following.



Caution

- The battery may only be changed by qualified personnel.
- Before changing the battery, read and adhere to the ESD guidelines contained in the appendix of this manual.

Note

To prevent data loss, always change the battery with the voltage supply switched on.

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Changing the battery

To replace the battery, proceed as follows:

3. Loosen the battery covering (→ figures 18-1 and 18-2).
4. Fold back covering with empty battery, and disconnect the connection plug of the battery cable. Remove battery from the covering.
5. Proceed in reverse order to install new battery.



Caution

Used lithium batteries require special waste disposal. Wrap them individually in a leakproof plastic bag before disposing of them.

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18.2 Display

The following subsections describe how to replace the display of the OP25, OP35 and OP45.

Notes on safety

Before replacing the display, adhere to the following notes.



Warning

- Maintenance on the device may only be performed by qualified and authorized trained personnel.
- Unauthorized opening of the device and incorrect repairs can create substantial danger to the user.
- Crystal liquid can escape from a display which has been damaged.

  Do not under any circumstances permit this liquid to come in contact with your skin or breathe in its fumes. If you do come in contact with the crystal liquid, wash the affected area with alcohol and consult a doctor immediately.

Disposal

Read and adhere to the following when disposing of LC displays.



Warning

LC displays do not belong in ordinary household trash.

Adhere to the applicable regulations of your country or locality pertaining to the disposal of special wastes.

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18.2.1 Replacing the Display for the OP25

Before opening the OP

Before opening the OP, read and adhere to the following caution note:

Caution

- Make sure that the OP is separated from the voltage supply.
- Before beginning work on the open device, read and adhere to the ESD guidelines contained in the appendix of this manual.

Opening the OP

To open the OP, proceed as follows:

1. Remove the four screws on the back of the housing.

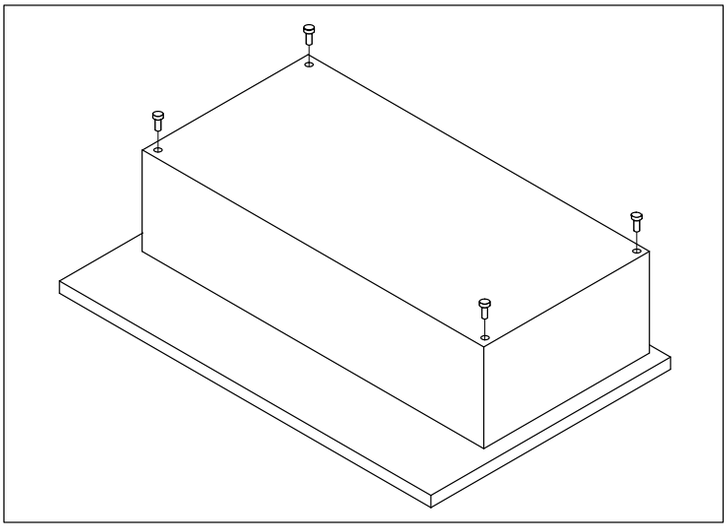


Figure 18-3 OP25: Opening the OP housing (removing the housing screws)

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2. Remove back panel cover and fold it back.

Caution

The backup battery on the back panel cover is connected to the electronics module with a plug-in line.

Do not disconnect this connection or all operating data stored in the SRAM will be lost.

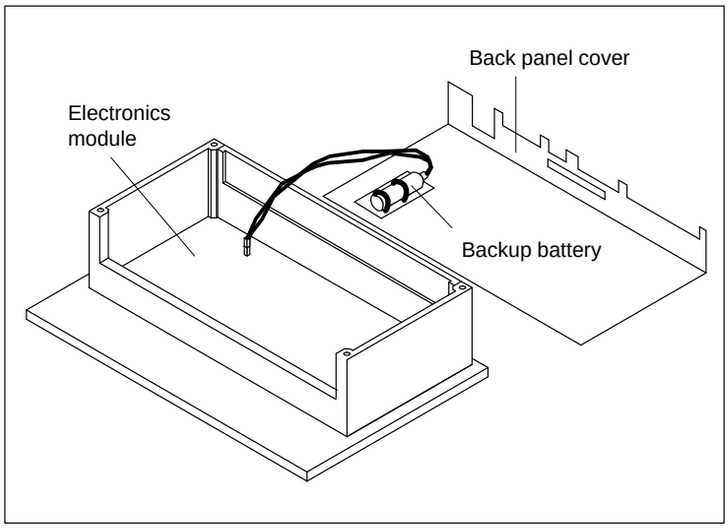


Figure 18-4 OP25: Opening the OP housing (removing the back panel cover)

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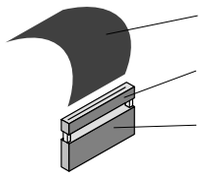
Removing the electronics module

To remove the electronics module, proceed as follows:

1. Disconnect the plug connectors or cables at positions ① , ② and ③ of the electronics module.

Caution

Before disconnecting the foil cable (position ③), unlock the plug connection by pulling up the holder.



2. Remove the five screws ④ . Lift out the electronics module and place on an ESD surface.

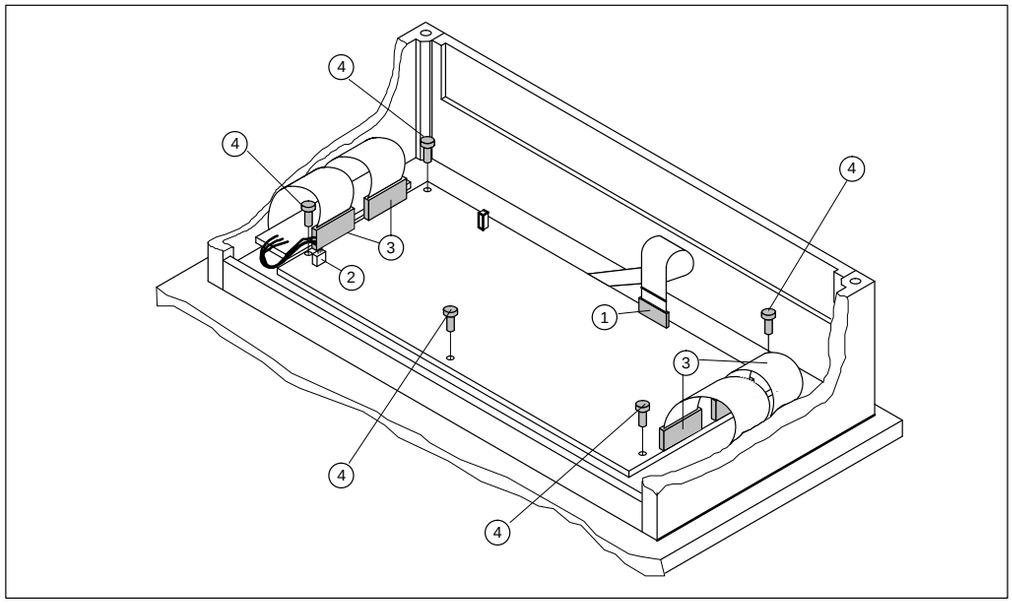


Figure 18-5 OP25: Removing the electronics module

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Replacing the display

To replace the display, proceed as follows:

1. Disconnect plug connection (5) .
2. Remove the four screws (6) .
3. Take out the old display, and put in the new one.

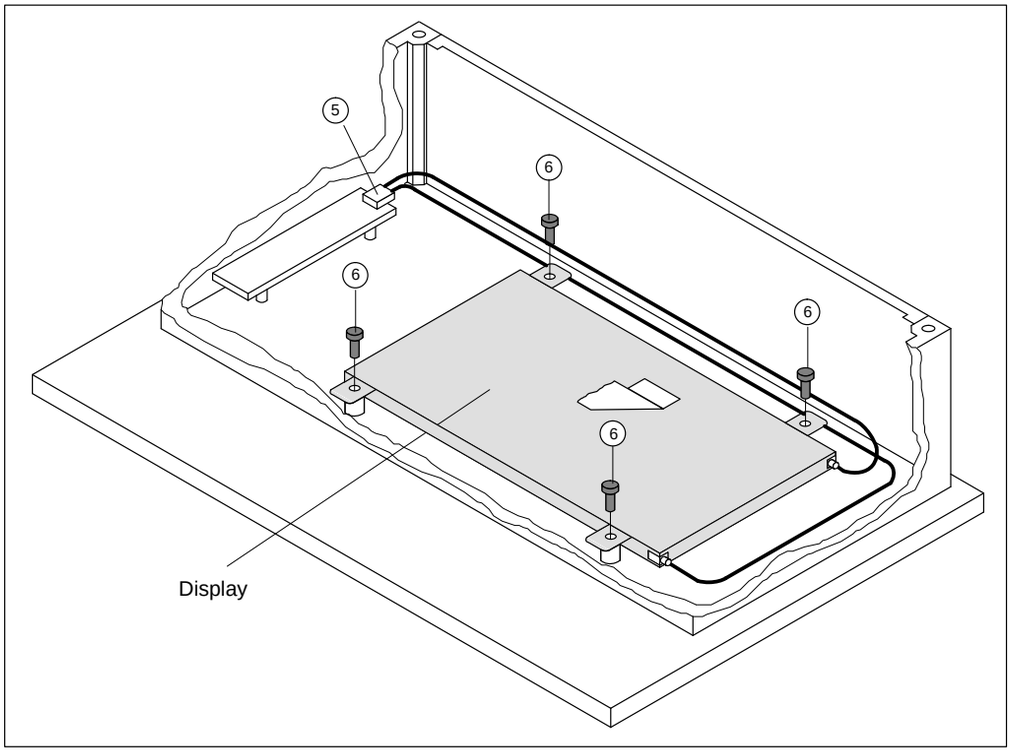


Figure 18-6 OP25: Replacing the display

Reassembling the OP

To reassemble the OP, proceed in reverse order.

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18.2.2 Replacing the Display for the OP35

Before opening the OP

Before opening the OP, read and adhere to the following caution note:



Caution

- Make sure that the OP is separated from the voltage supply.
- Before beginning work on the open device, read and adhere to the ESD guidelines contained in the appendix of this manual.

Opening the OP

To open the OP, proceed as follows:

1. Position the device with the front plate pointing down.
2. Remove the four ① housing screws.

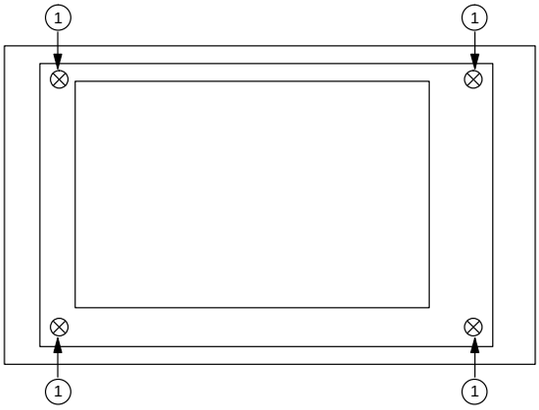


Figure 18-7 OP35: Opening the OP (removing the housing screws)

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3. Disconnect connectors ② and ③ by pulling the cable evenly. (The OP35 with the monochrome display has only one connector.)

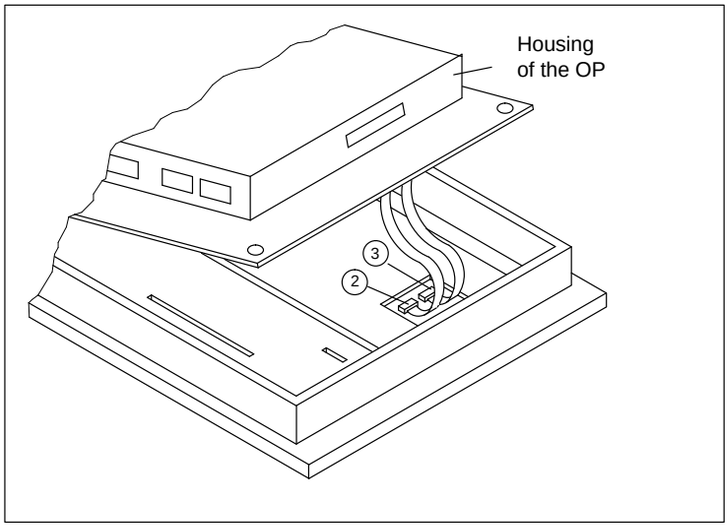


Figure 18-8 OP35: Opening the housing (disconnectiog the display cables)

4. Disconnect connector ④ (see ③ in figure 15-4).
5. Disassemble temperature sensor by unscrewing the nut ⑤ .
6. Carefully lay the OP housing aside, and protect it from slipping.



Caution

Make sure that the remaining connection cables (e.g., the cable of the sealed keyboard) are not subjected to pulling.

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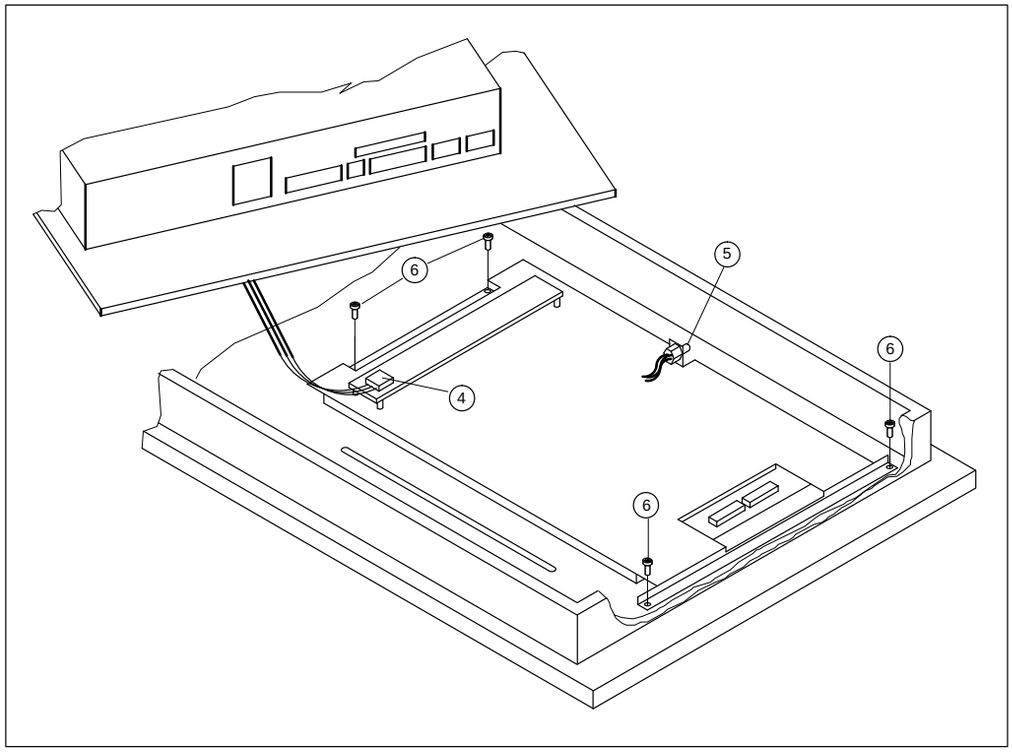


Figure 18-9 OP35: Opening the housing of the OP (putting the housing aside)

Replacing the display

To replace the display, proceed as follows:

1. Remove the four screws ⑥ (→ figure 18-9).
2. Take out the old display, and put in the new one.

Reassembling the OP

To reassemble the OP, proceed in reverse order.

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18.2.3 Replacing the Display for the OP45

Before opening the OP

Before opening the OP, read and adhere to the following notes:

Warning

Make sure that the power plug of the OP has been pulled.

Caution

Before beginning work on the open device, read and adhere to the ESD guidelines contained in the appendix of this manual.

Opening the OP

To open the OP, proceed as follows:

1. Remove the three ① housing screws.

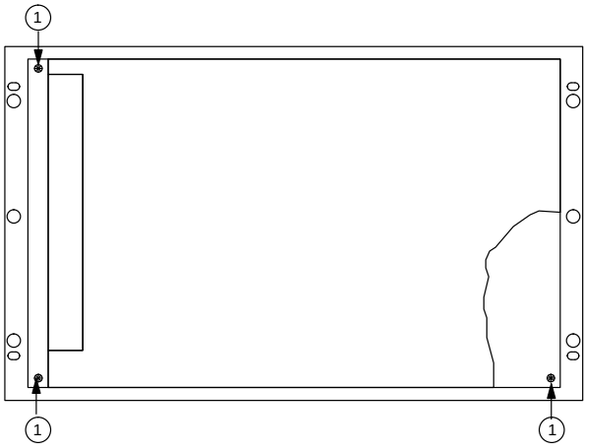


Figure 18-10 OP45: Opening the OP (removing the housing screws)

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Depending on how the OP is mounted, perform step 2a or 2b.

2a The OP is either dismounted or secured with a mounting bracket in the 19” cabinet/rack.

Pull front plate/frame as far as it will go out of the OP housing, and fold down the front plate.

2b The front plate of the OP is screwed to the cabinet braces of the cabinet/rack.

Pull off the OP housing as far as it will go from the front plate, and fold down the housing.

Replacing the display

To replace the display, proceed as follows:

1. Disconnect plug connections ② , ③ , ④ and ⑤ .
2. Remove the four screws ⑥ .
3. Take out the old display, and put in the new one.

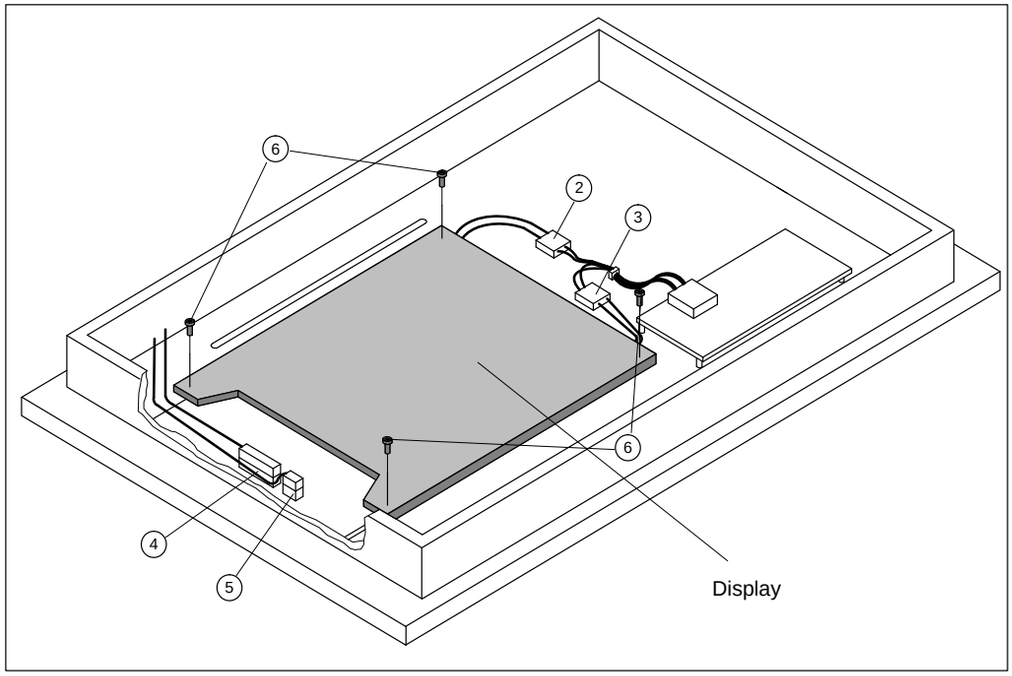


Figure 18-11 OP45: Replacing the display

Reassembling the OP

To reassemble the OP, proceed in reverse order.

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Part V

APPENDICES

A Technical Data

B Interface Assignment

C Test Functions

D System Messages

E ESD Guidelines

F Siemens Worldwide

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Technical Data

A

	OP25	OP35	OP45
Housing			
Exterior dimensions (W x H) in mm	296 x 192	482 x 310	482 x 310
Mounting cutout (W x H) in mm	282_{-1} x 178_{-1}	$436_{-1.5}$ x $295_{-1.5}$	438_{-1} x 297_{-1}
Mounting depth without options in mm With floppy disk drive With direct key module and cable	59 – 79	85 138 158	180 180 –
Protection rating Front Back	 IP65 IP20	 IP65 IP20	 IP65 IP20
Weight With floppy disk drive	1.85 kg	6.35 kg 7.2 kg	14 kg

Processor			
Type	F8680	386SL	DX2-66
Clock pulse frequency	14 MHz	25 MHz	33 MHz

Memory			
FLASH	1 Mbyte	2 Mbytes	–
DRAM	2 Mbytes	4 Mbytes	8 Mbytes (can be expanded to 64 Mbytes)
SRAM (buffered)	128 Kbytes	128 Kbytes	–
Floppy disk drive	–	1.44 Mbytes (optional)	1.44 Mbytes
Hard disk	–	–	425 Mbytes [13]

13) Subject to change without prior notice

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	OP25	OP35	OP45
Display			
Type	STN-LCD	STN-LCD	TFT-LCD
Resolution (hor. x vert.)	320 x 240 mm	640 x 480	640 x 480 mm
Active monitor screen area	115 x 86 mm	192 x 144 mm	211 x 158 mm
Background illumination	CCFL tube	CCFL tube	2 CCFL tube
Lifespan [14]	Approx. 10,000 hours		
Keyboard			
Type	Sealed keyboard	Sealed keyboard	Sealed keyboard
System keys	24	32	32
Function keys	24 (18 with LED)	36 (28 with LED)	36 (28 with LED)
Voltage Supply			
Nominal voltage	24 V DC	24 V DC	115/230 V AC (50/60 Hz)
Permissible range	18 V to 30 V	18 V to 30 V	±10%
Max. permissible transients	35 V (500 msec)	35 V (500 msec)	–
Time between transients	Min. of 50 sec	Min. of 50 sec	–
Current consumption (without options)			
Typical	0.4 A	0.8 A	0.3 A
Max. continuous current	0.6 A	1.0 A	1.4 A
Fuse	Internal, electronic	Internal, electronic	Internal, safety fuse
Backup Battery for SRAM			
Type	3.6 V	3.6 V	–
Voltage; capacity [15]	Lithium battery (approx. 1.5 Ah)	Lithium battery (approx. 1.5 Ah)	–
Relay Contact			
Switching capacity	24 V DC, 0.4 A (no inductive load)	24 V DC, 0.4 A (no inductive load)	–

14) The background illumination tube of the display is subject to wear, and is not included in the warranty. Depending on the operating temperature, the tube has a life span of approximately 10, 000 hours. Under unfavorable operating conditions, we recommend replacing the tube after this time. The tube is available as a spare part. The actual replacement must be performed by SIEMENS service personnel.

15) Subject to change without prior notice.

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	OP25	OP35	OP45

Direct Key Module (Option)			[16]
Number of outputs	8	2 x 8 [17]	2 x 8 [17]
Maximum output current	300 mA per output	300 mA per output	300 mA per output
External voltage supply	24 V DC	24 V DC	24 V DC
Permissible range	18 V to 30 V	18 V to 30 V	18 V to 30 V

Environmental Requirements			
Environmental temperature			
Operation			
Vertical installation	0˚ to 50˚ C	4˚ to 45˚ C	5˚ to 40˚ C [18]
Horizontal installation	0˚ to 40˚ C	4˚ to 35˚ C	–
(Floppy disk drive not permitted)			
Transportation, storage	–20˚ to 60˚ C	–20˚ to 60˚ C	–25˚ to 60˚ C
Mounting position with floppy disk drive	–	Max. of 25˚ inclination to front or back	Max. of 25˚ inclination to front or back
Relative humidity			
Operation	≤ 85%, no condensation	20% to 80%, no condensation	5% to 85%, no condensation
Transportation, storage		5% to 90%, no condensation	5% to 85%, no condensation
Shock load			
Operation	15 g / 11 ms	5 g/ 11 ms for floppy disk access 15 g / 11 ms otherwise	5 g/11 ms
Transportation, storage	50 g	50 g	50 g
Vibration			
Operation	0.055 mm (10 – 85 Hz) 2 g (30 – 500 Hz)	0.075 mm (10 – 58 Hz) 1 g (58 – 500 Hz) or 0.5 g for floppy disk drive	0.035 mm (to 58 Hz) 0.4 g (58 to 500 Hz)
Transportation, storage	3.5 mm (5 – 12 Hz) 2 g (12 – 500 Hz)	3.5 mm (5 – 8.5 Hz) 1 g (8.5 – 500 Hz)	1 g
Maximum pressure difference (front, back)	2 hPa	–	–
Air pressure			
Operation	706 to 1030 hPa	706 to 1030 hPa	706 to 1030 hPa
Transportation, storage	581 to 1030 hPa	581 to 1030 hPa	581 to 1030 hPa

16) The direct key module is available as a PC plug-in card.

17) Only 12 outputs can be triggered by function keys.

18) At temperatures of 40° to 49° C, changes in the optical features (among others) occur (i.e., reduced contrast). These changes disappear again after a return to the specified temperature range. Temperatures up to 45° C will not destroy the display.

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This product meets the regulations of EEC guideline 89/336 if the standards listed below are fulfilled.

	OP25	**OP35**	**OP45**
Interference Immunity			
Static discharge (contact discharge)	IEC 801–2 class 3	IEC 801–2 class 3	IEC 801–2 class 3
RF irradiation	ENV 50140 10 V/m, 80% AM, 1 kHz	ENV 50140 10 V/m, 80% AM, 1 kHz	ENV 50140 10 V/m, 80% AM, 1 kHz
Pulse modulation	ENV 50204 900 MHz ± 5 MHz 10 $V/m_{r.m.s.}$, 50% ED, 200 Hz	ENV 50204 900 MHz ± 5 MHz 10 $V/m_{r.m.s.}$, 50% ED, 200 Hz	ENV 50204 900 MHz ± 5 MHz 10 $V/m_{r.m.s.}$, 50% ED, 200 Hz
RF conduction	–	ENV 50141 150 kHz – 80 MHz 10 V, 80% AM, 1 kHz	ENV 50141 150 kHz – 80 MHz 10 V, 80% AM, 1 kHz
Burst interference Power lines Supply lines Process data lines Signal lines	IEC 801–4 2 kV 2 kV 1 kV	IEC 801–4 2 kV 2 kV 1 kV	IEC 801–4 2 kV 2 kV 1 kV

Interference Emission			
Radio supression class	EN 55022 (VDE 0878) class B	EN 55022 (VDE 0878) class B	EN 55022 (VDE 0878) class B

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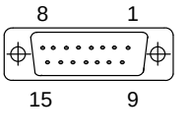
Interface Assignment

B

B.1 Interface Assignment for OP25 and OP35

IF1 A, IF2

Assignment:



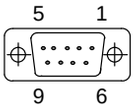
15-pin sub D socket

Pin	General	V.24	TTY
1	Housing		
2			RxD–
3		RxD	
4		TxD	
5		CTS	
6			TxD+
7			TxD–
8	Housing		
9			RXD+
10		RTS	
11			+20 mA
12	GND		
13			+20 mA
14	+ 5 V		
15	GND		

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IF1 B

Assignment:

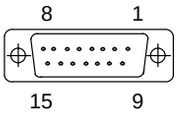


9-pin sub D socket

Pin	General	L2-DP/ MPI	RS 422	RS 485
1				
2				
3		Data B	TxD (B)	Data B
4			RxD (B)	
5	GND (floating)			
6	+5 V (floating)			
7				
8		Data A	TxD (A)	Data A
9			RxD (A)	

IF3

Assignment:



15-pin sub D socket

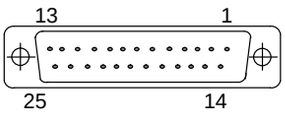
Pin	General	TTY	RS 422	RS 485
1	Housing			
2		RxD–		
3			RxD(B)	
4			TxD(B)	Data B
5			RxD(A)	
6		TxD+		
7		TxD–		
8	Housing			
9		RxD+		
10			TxD(A)	Data A
11	+24 V			
12	GND (5 V)			
13	–			
14	+ 5 V			
15	GND (24 V)			

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B.2 Interface Assignment for OP45

COM1

Assignment:



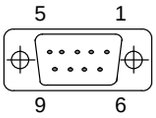
25-pin sub D socket

Pin	General	TTY	V.24
1	Shield	–	–
2		–	TxD (D1)
3		–	RxD (D2)
4		–	RTS (S2)
5		–	CTS (M2)
6		–	DSR (M1)
7		–	GND (E2)
8		–	DCD (M5)
9		+TTY_RxD	–
10		–TTY_RxD	–
11 to 17	Not used	–	–
18		+TTY_TxD	–
19		+20 mA	–
20		–	DTR (S1)
21		–TTY_TxD	–
22		–	RI (M3)
23 to 25	Not used	–	–

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COM2

Assignment:

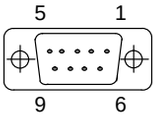


9-pin sub D plug connector

Pin	V.24	Meaning
1	DCD (M5)	Receiving signal level
2	RxD (D2)	Receiving data
3	TxD (D1)	Sending data
4	DTR (S1)	Terminal ready
5	GND (E2)	Operating ground
6	DSR (M1)	Ready for operation
7	RTS (S2)	Switch on sending part
8	CTS (M2)	Ready to send
9	RI (M3)	Arriving call

MPI

Assignment:



9-pin sub D socket

Pin	RS 485	Meaning
1		
2		
3	Data B	Data line
4	RTSAS	Ready to send
5	GND	Ground
6	+5 V	+5V output
7		
8	Data A	Data line
9		

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Test Functions

C

When the voltage supply is turned on or applied, the OP35 and OP45 test the most important hardware components automatically.

The OP25 is equipped with a test program with which the hardware components can be tested if required.

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C.1 Hardware Test for OP25

The following function units can be tested with the OP25 hardware test.

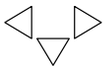
- Internal memory and memory module interface
- Serial interfaces
- Keyboard and display
- Internal function units
  (e.g., watchdog or real time clock)

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C.1.1 General Operating

Calling the test program

While turning on the power supply of the OP, press the

 cursor keys simultaneously, and keep them

pressed until the test menu is indicated.

Test sequence

The test program provides a series of individual tests each of which can be started with a function key (F9 to F14 and K1 to K10).

The test results appear on the display after an individual test is concluded.

OK : No errors

DEF : The tested function unit is defective.

Exiting the test program

The test program can only be exited by switching off the power supply of the OP.

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C.1.2 Individual Tests

Internal/external memory

The memory chips of the OP are tested with read-write tests.

When an error occurs, the faulty memory address is indicated on the display.

Note

Since the contents of the SRAM, EEPROM and Flash memories are stored in the DRAM before the test is performed, we recommend testing the DRAM for errors first.

Since the saved data are not reloaded, the contents of the tested memory are destroyed when an error occurs. The same applies to a power failure.

Individual Memory Tests

K1	**DRAM**
F9	**EPROM**
F10	**SRAM**
F11	**EEPROM**
F12	**Flash**

The Flash test takes approximately 2 minutes.

After the test is concluded, you can either reload or reject the contents of the Flash memory stored in the DRAM.

	Reload data to the Flash memory
	Reject data

F13 **JEIDA test**

The interface to the memory module is tested (only possible when a 512-Kbyte SRAM module is installed).

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Serial interfaces

These tests can only be performed when homemade adapters are installed on the applicable connections. See appendix C.1.3 for circuiting of the adapter.

F14 **IF1 test**

An adapter must be installed on both the IF1 A and the IF1 B for the IF1 test.

V.24 signals:	Adapter 1 on IF1 A and Adapter 4 on IF1 B
TTY signals:	Adapter 2 on IF1 A and Adapter 4 on IF1 B

K2 **IF2 test**

V.24 signals:	Adapter 1
TTY signals:	Adapter 2

K3 **IF3 test**

RS 485 signals:	Adapter 1
TTY signals:	Adapter 3

K4 **MPSS test**

Internal test of the component for the multipoint interface

Keyboard and display

K5 **Keyb/LED (keyboard)**

The keys to be tested are indicated in succession on the display (e.g., “Press F3”). When an LED is assigned to a key, the LED goes on.

Press the indicated key within 10 seconds.

K7 **Display test**

You can adjust contrast and brightness before the actual display test is performed.

◁ ▷	Adjust contrast
△ ▽	Adjust brightness
⊖ ACK	Store settings and start display test
◁	Entire display light
▷	Entire display dark
△	Indicate grid pattern
▽	Indicate font
ESC	Cancel test when erroneous indication occurs
⊖ ACK	Test screen memory and then exit test

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Internal function units

K6 **D module (direct key module)**

Before starting this test, install adapter 5 (→ appendix C.1.3) on the pin strip of the direct key module, and set all switches of the DIP switch on the direct key module to ON.

Test sequence: Address the digital outputs (lightup of all LEDs in succession and various test patterns)

How to use:

	Cancel test if all LEDs do not light up in succession
	Exit test if LED lightup is okay

K8 **Watchdog test**

	OP performs a new start after approximately one second and returns to the hardware test menu. The test results produced up to now are lost.
K8	Test result is indicated.
	Cancel test if watchdog faulty
	Exit test

K9 **RTC/battery (real time clock)**

The result of the battery test is indicated for approximately two seconds. This does not affect the result of the test.

K10 **Test entries**

This function is reserved and may not be selected.

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C.1.3 Test Adapters

The pins specified below must be connected or circuited together for the test adapters.

Adapter 1

15-pin sub D plug connector

3 —— 4
5 —— 10

Adapter 2

15-pin sub D plug connector

2 —— 12
6 —— 13
7 —— 9

Adapter 3

15-pin sub D plug connector

2 —— 15
7 —— 9
6 –▭– 11 (1 kOhm resistor)

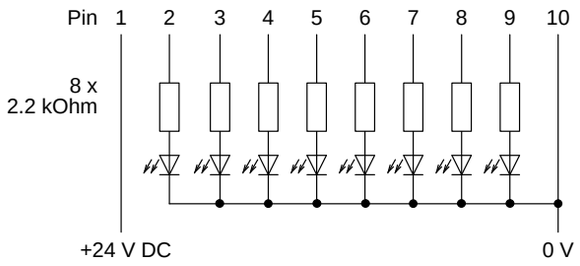
Adapter 4

9-pin sub D plug connector

3 —— 4
8 —— 9

Adapter 5

10-pin terminal block



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System Messages

D

The system messages of the OP can be divided into categories.

The message number contains the category to which a system message belongs.



0	Driver error
1	Startup message
2	Warning
3	Note
4	Operator error
5	Miscellaneous messages
6	Configuring error
7	Internal error

The category of a message gives you a rough idea of what caused the system message.

A selection of important system messages follows stating when they occur and, if applicable, how to correct the cause of the error.

The following system messages are not included.

- Self-explanatory system messages
- System messages caused by a mistake in configuring

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Message	Cause/Remedy
040	The OP is not able to establish a connection to the controller. Possible causes can be: • The connection cable between OP and controller is not plugged in. • Free ASCII protocol (FAP): The character delay time may be configured too short.
041, 044	The connection to the controller is faulty. Possible causes: • Fault in the transmission route (e.g. connection cable defective) • Interface parameters set incorrectly on the OP or on the coupling partner
210, 212	See no. 7xx
250	Impossible to switch to desired OP operating mode via job This message can occur, for example, when an attempt is made to switch to loop-through operation during communication via FAP.
252	OP recipe functions cannot be executed simultaneously. Two examples of situations in which message 252 occurs: • The selected function is already active (e.g., is being used in the background by the controller). • You attempt to transfer or delete a data record while a data record is being selected.
256	Not enough free system memory space to execute the selected function ⇒ Select the function again. If the message appears again anyway, “simplify” the configuration of the screen causing the problem (i.e., use fewer screen elements/functions). Examples: • Move the function causing the message to another screen. • Do not use curves in the screen together with this function.
257	A data record was not stored with the recipe version which is currently loaded. You must enter the old version in the configuration of the recipe if you want to continue using these data records. The assignment of the values of a data record is specified by the recipe structure. An “old” data record may be interpreted incorrectly if the structure was changed in a new configuration.
259	The transfer of a data record to the controller must be performed within a certain amount of time. This time has been exceeded. Possible causes: • The controller (user program) did not acknowledge receipt of the data record. • The data record is very long. The data record is transferred in its entirety although the time was exceeded.
260	Operating mode of the controller (e.g., manual operation, automatic, STOP) does not correspond to the configuration.
261	The data record can no longer be used since the data are no longer reliable.
306	See no. 7xx.
340	Entries cannot be made on the OP while status processing is running on the PG.

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Message	Cause/Remedy
385/386	This message is indicated until one of the following happens. • The data record is transferred. • The data record is acknowledged by the controller (only for transfer to controller). During the transmission (message is indicated), no further entries can be made on the OP.
500 to **505**	The controller is temporarily overloaded, or more than 1.5 seconds have passed since the standard function block was last called.
506	The controller has sent too many “fetch message area” jobs with the same block number within a certain period of time (i.e., the OP is overloaded).
507	The controller (user program) did not acknowledge the recipe within 10 seconds.
510	The controller acknowledged the recipe as faulty. This error can occur, for example, when a process link to a nonexisting DB is configured in a recipe.
541 to **550**	The specified variable does not exist in the controller.
613	The specified data block with DB no. (starting DW and end DW) does not exist in the controller or is too short. (Values in parentheses: First data word, last data word)
645, 649	See no. 7xx.
670	Too many variables were requested at the same time. Remedy: – Configure basic clock pulse longer. – Configure fewer variables in the screen.
681	The connection between OP and controller is faulty. The interface parameters may be set incorrectly.
682	Configure the indicated screen with fewer process links.
7xx	Proceed in steps as shown below when one of these errors occurs. a) – Switch the voltage supply of the OP off and on again. – Perform a new start of the controller. b) – Switch to transfer mode during the OP startup (press ESC + △ simultaneously). – Transfer configuration again. – Perform a new start of the controller. c) Contact your nearest Siemens office if the error continues to occur. Be sure to give the message number and any variables in the message text.

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ESD Guidelines

E

What does ESD mean?

Almost all modern modules are equipped with highly integrated blocks or components which use MOS technology. This technology makes the electronic components very sensitive to overvoltages and electrostatic discharges.

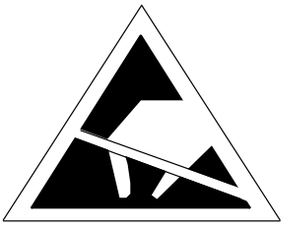
The German abbreviation for such modules is:

“EGB”: Elektrostatisch Gefährdeten Bauelemente

Next to this abbreviation you will often find the common international abbreviation:

“ESD”: Electrostatic Sensitive Device

When it appears on signs on cabinets, module racks or packaging, the symbol below indicates that the module is sensitive to touch since it contains electrostatic sensitive components.



ESDs can be destroyed by voltages and energy far below those perceived by human beings. Such voltages are created just by touching a component or module if the person has not discharged himself/herself electrostatically. In most cases, components subjected to such overvoltages cannot be identified immediately as faulty since they may not malfunction until they have been in operation for a longer period of time.

Important precautions against static charging

Since most plastics have a strong tendency to charge themselves, it is imperative that they be kept away from sensitive components.

Make sure that workers, workplace and packaging are well grounded when electrostatic sensitive components are in the vicinity.

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Handling ESD modules

Never touch electronic modules unless the work required makes this unavoidable. Never under any circumstances touch component pins or printed circuits when handling PCBs.

Components should not be touched unless

- you are continuously grounded with an ESD bracelet
- you are wearing ESD shoes or shoes with ESD protective grounding strips and are walking on ESD flooring.

Before touching an electronic module, you must discharge your own body first. The easiest way to accomplish this is to touch a conductive, grounded object (e.g., the bare metal surfaces of switching cabinets, water pipes, etc.) immediately before touching the module.

Never allow modules to come in contact with chargeable and highly insulating materials (e.g., plastic foil, insulating tabletops, and synthetic fiber clothing).

Always place modules on conductive surfaces (e.g., tables with ESD covering, conductive ESD foam, ESD bags or ESD shipping containers).

Keep modules at least 10 cm away from CRTs, monitors and television sets.

Measuring and modifying ESD modules

Measurements may not be performed on the modules unless

- the measuring device is grounded (e.g., via a protective conductor) or
- the measuring head is briefly discharged (e.g., by touching the bare metal surface of the controller housing) when using a potential-free measuring device.

Always use a grounded soldering iron for soldering work.

Shipping ESD modules

Always store or ship modules and components in conductive packaging (e.g., metallized plastic boxes and metal containers).

If packaging is not conductive, the modules must first be wrapped in conductive material. Examples of wrapping materials which can be used include conductive foam rubber, ESD bags, household aluminum foil or paper. Never under any circumstances use plastic bags or foils.

When packing modules equipped with built-in batteries, make sure that the conductive packaging does not touch or short circuit the battery connections. If necessary, cover the connections with insulating tape or material beforehand.

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Siemens Worldwide

F

In this appendix

In this appendix you will find the following information.

- The location of Siemens offices in the Federal Republic of Germany
- All European and non European branches and representatives of Siemens AG

Siemens Sales Offices in the FRG

The following table lists all Siemens Sales Offices in the Federal Republic of Germany.

Aachen	Kassel
Augsburg	Kempten/Allg.
Bayreuth	Kiel
Berlin	Laatzen
Bielefeld	Leipzig
Bonn	Lingen
Bremen	Magdeburg
Brunswick	Mainz
Chemnitz	Mannheim
Coblenz	Munich
Cologne	Münster/Westf.
Constance	Nuremberg
Darmstadt	Osnabrück
Dortmund	Regensburg
Dresden	Rostock
Duisburg	Saarbrücken
Düsseldorf	Siegen
Erfurt	Stuttgart
Essen	Ulm
Frankfurt am Main	Wetzlar
Freiburg	Wilhelmshaven
Hamburg	Wuppertal
Heilbronn	Würzburg
Karlsruhe	

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- Bregenz
- Graz
- Innsbruck
- Linz
- Salzburg
- Vienna

Belgium

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- Brussels
- Liège

Siemens N. V.

- Antwerp

Bosnia-Herzegovina

Generalexport Predstavnistvo Sarajevo

- Sarajevo

Bulgaria

Siemens AG, Bulgaria Representative

- Sofia

Croatia

Siemens d. o. o.

- Zagreb

Cyprus

GEVO Ltd.

or

Jolali Ltd.

- Nicosia

Czech Republic

Siemens AG

- Brno
- Mladá Boleslav
- Prague

Denmark

Siemens A/S

- Copenhagen, Ballerup

Finland

Siemens Oy

- Espoo, Helsinki

France

Siemens S.A.

- Haguenau
- Lille, Seclin
- Lyon, Caluire-et-Cuire
- Marseille
- Metz
- Paris, Saint-Denis
- Strasbourg
- Toulouse

Great Britain

Siemens plc

- Birmingham, Walsall
- Bristol, Clevedon
- Congleton
- Edinburgh
- Glasgow
- Leeds
- Liverpool
- London, Sunbury-on-Thames
- Manchester
- Newcastle

Greece

Siemens A.E.

- Athens, Amaroussio
- Thessaloniki

Hungaria

Siemens Kft

- Budapest

Iceland

Smith & Norland H/F

- Reykjavik

Ireland

Siemens Ltd.

- Dublin

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Italy

Siemens S.p.A.

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- Bologna
- Brescia
- Casoria
- Florence
- Genoa
- Milan
- Padua
- Rome
- Turin

Luxemburg

Siemens S.A.

- Luxemburg

Malta

J. R. Darmanin & Co. Ltd.

- Valletta

Netherlands

Siemens Nederland N.V.

- The Hague
- Rijswijk

Norway

Siemens A/S

- Bergen
- Oslo
- Stavanger
- Trondheim

Poland

Siemens GmbH

- Gdansk-Letnica
- Katowice
- Warsaw

Portugal

Siemens S.A.

- Albufeira
- Coímbra
- Lisbon, Amadora
- Matosinhos
- Porto

Romania

Siemens birou de consultatii tehnice

- Bukarest

Russia

Siemens AG

or

Mosmatic

- Moscow

Siemens AG

- Ekaterinburg

Slovak Republic

Siemens AG

- Bratislava

Slovenia

Siemens d. o. o.

- Ljubljana

Spain

Siemens S.A.

- Barcelona
- Bilbao
- Gijón
- Granada
- La Coruña
- Las Palmas de Gran Canaria
- León
- Madrid
- Málaga
- Murcia
- Palma de Mallorca
- Pamplona
- Sevilla
- Valencia
- Valladolid
- Vigo
- Zaragoza

Sweden

Siemens AB

- Göteborg
- Jönköping
- Malmö
- Sundsvall
- Upplands Väsby, Stockholm

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Switzerland

Siemens-Albis AG

- Basel
- Bern
- Zürich

Siemens-Albis S.A.

- Renens, Lausanne

Turkey

SIMKO

- Adana
- Ankara
- Bursa
- Istanbul
- Izmir
- Samsun

Ukraine

Siemens AG

- Kiev

Non-European Companies and Representatives

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Africa

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- Alger

Angola

TECNIDATA

- Luanda

Bophuthatswana

Siemens Ltd.

- Mafekeng

Egypt

Siemens Technical Office

- Cairo-Mohandessin

Siemens Technical Office

- Alexandria

EGEMAC S.A.E.

- Cairo-Mattaria

Ethiopia

Addis Electrical Engineering Ltd.

- Addis Abeba

Ivory Coast

Siemens AG

- Abidjan

Libya

Siemens AG, Branch Libya

- Tripoli

Morocco

SETEL

Société Electrotechnique et de Télécommunications S.A.

- Casablanca

Mozambique

Siemens Liaison Office

- Maputo

Namibia

Siemens (Pty.) Ltd.

- Windhoek

Nigeria

Electro Technologies Nigeria Ltd. (ELTEC)

- Lagos

Rwanda

Etablissement Rwandais

- Kigali

Sambia

Electrical Maintenance Lusaka Ltd.

- Lusaka

Simbabwe

Electro Technologies Corporation (Pvt.) Ltd. (ETC)

- Harare

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South Africa

Siemens Ltd.

- Cape Town
- Durban
- Johannesburg
- Middelburg
- Newcastle
- Port Elizabeth
- Pretoria

Sudan

National Electrical & Commercial Company (NECC)

- Khartoum

Swaziland

Siemens (Pty.) Ltd.

- Mbabane

Tanzania

Tanzania Electrical Services Ltd.

- Dar-es-Salaam

Tunesia

Sitelec S.A.

- Tunis

Zaire

SOFAMATEL S.P.R.L.

- Kinshasa

America

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Siemens S.A.

- Bahía Blanca
- Buenos Aires
- Còrdoba
- Mendoza
- Rosario

Bolivia

Sociedad Comercial é Industrial Hansa Ltda.

- La Paz

Brazil

Siemens S.A.

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- Belo Horizonte
- Brasilia
- Campinas
- Curitiba
- Fortaleza
- Pôrto Alegre
- Recife
- Rio de Janeiro
- Salvador de Bahia
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- Vitória

Canada

Siemens Electric Ltd.

- Montreal, Québec
- Toronto

Chile

INGELSAC

- Santiago de Chile

Colombia

Siemens S.A.

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- Bogotá
- Cali
- Medellín

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Siemens S.A.

- Panama
- San José

Cuba

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Consult iva EUMEDA

- La Habana

Ecuador

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Siemens S.A.

- San Salvador

Guatemala

Siemens S.A.

- Ciudad de Guatemala

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Representaciones Electroindustriales S de R.L. - Relectro

- Tegucigalpa

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Siemens S.A. de CV

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- Gómez Palacio
- Guadalajara
- León
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- Monterrey
- Puebla

Nicaragua

Siemens S.A.

- Managua

Paraguay

Rieder & Cia. S.A.C.I.

- Asunción

Peru

Siemsa

- Lima

United States of America

Siemens Industrial Automation Inc.

Automation Division

- Alpharetta, GA

Numeric Motion Control

- Elk Grove Village, Illinois

Uruguay

Conatel S.A.

- Montevideo

Venezuela

Siemens S.A.

- Caracas
- Valencia

Asia

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Transitec Gulf

- Manama

Bangladesh

Siemens Bangladesh Ltd.

- Dhaka

Brunei

- Brunei Darussalam

Hong Kong

Siemens Ltd.

- Hong Kong

India

Siemens Limited

- Ahmedabad
- Bangalore
- Bombay
- Calcutta
- Madras
- New Delhi
- Secúnderabad

Indonesia

P.T. Siemens Indonesia, P.T. Siemens Dian-Grana Elektrika, Representative Siemens AG

- Jakarta

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Iraq

Samhiry Bros. Co. Limited

or

Siemens AG (Iraq Branch)

- Baghdad

Iran

Siemens S.S.K.

- Teheran

Japan

Siemens K.K.

- Tokyo

Korea

Siemens Ltd.

- Changwon
- Seoul
- Ulsan

Kuwait

National & German Electrical and Electronic Services Co. (NGEECO)

- Kuwait, Arabia

Lebanon

Ets. F.A. Kettaneh S.A.

- Beirut

Malaysia

Siemens Electrical Engineering Sdn. Bhd.

- Kuala Lumpur

Nepal

Amatya Enterprises (Pvt.) Ltd.

- Kathmandu

Oman

Waleed Associates

- Muscat

Pakistan

Siemens Pakistan Engineering Co., Ltd.

- Islamabad
- Karachi
- Lahore
- Peshawar
- Quetta

People's Republic of China

Siemens AG Representation

- Beijing
- Guangzhou
- Shanghai

Philippine Islands

Maschinen & Technik Inc. (MATEC)

- Manila

Qatar

Trags Electrical Engineering and Air Conditioning Co.

- Doha

Saudi Arabia

Arabia Electric Ltd. (Equipment)

- Al-Khobar
- Jeddah
- Riyadh

Singapore

Siemens (Pte.) Ltd.

- Singapore

Sri Lanka

Dimo Limited

- Colombo

Syria

Siemens AG, Branch (A.S.T.E.)

- Damascus

Taiwan

Siemens Ltd., TELEUNION Engineering Ltd.

or

TAI Engineering Co., Ltd.

- Taichung
- Taipei

Thailand

Berti Jucker Co. Ltd.

- Bangkok

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United Arab Emirates

Electro Mechanical Co.

or

Siemens Resident Engineers

- Abu Dhabi

Scientechnic

or

Siemens Resident Engineers

- Dubai

Vietnam

OAV Representative Office

- Hanoi

Yemen (Arab. Republic)

Tihama Tractors & Engineering Co., Ltd.

or

Siemens Resident Engineers

- Sanaa

Australia

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Australia

Siemens Ltd.

- Adelaide
- Brisbane
- Melbourne
- Perth
- Sydney

New Zealand

Siemens Ltd.

- Auckland
- Wellington

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Glossary

Alarm message	Indicates a particularly urgent operating state and must be acknowledged
Arrival of a message	Time at which the controller or the OP triggers a message
Automation system	SIMATIC S7 **controller** (e.g., SIMATIC S7-200/300)
Blanking circuit	Switches off the display's background illumination automatically
Booting	Loads the operating system in the working memory of the OP
Configuration	Specification of system-related basic settings, messages, and screens with ProTool.
Controller	Check for devices/systems with which the OP communicates (e.g., SIMATIC programmable controllers and PC)
Departure of a message	Time at which the programmable controller withdraws a message
Event message	Indicates certain operating states of machines or systems connected to the controller
Forced printout	Automatic printout of the alarm or event messages that will be deleted from the message buffer during a buffer overflow
Hardcopy	Printout of the contents of the display on a printer
Icon	Graphic symbol assigned to the individual **softkeys** showing the softkey's function
Info text	Additional configurable information on messages, input fields, selection fields and screens

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Job	Used to manipulate OP functions from the controller
Loop-through operation	Operating mode of the OP. Permits normal operation. Also permits communication via the OP between a PG or an additional OP and the PLC. Requires that the link to the controller use the AS 511 protocol.
Message logging	Configurable printout of alarm and event messages parallel to the printout of the contents of the display
Password **Password level**	Manipulation of a protected function requires the entry of a password with a certain password level. The password level determines operator authorization. The required password level is specified during configuration and can be a number from 1 (lowest level) to 9 (highest level).
Pop-up window	Contains a list of entries from which one entry can be selected
Process screen	Representation of process values and sequences in the form of screens which can contain graphics, texts, and values.
Programmable logic controller	SIMATIC S5 series controllers (e.g., SIMATIC S5-115U and S5-135U)
Softkeys	Function keys can have softkey functionality (i.e., can have different meanings depending on which screen is active).
Startup test	Checks the status of the central processing unit and memory each time voltage is applied
System message	Indicates internal states/errors in the OP and controller
Transfer mode	Operating mode of the OP in which data from the configuration computer are transferred to the OP

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Abbreviations

AS 511	Transmission protocol for the link between OP and controller
DOS	**D**isk **o**perating **s**ystem General term for standard PC operating systems
ESD	**E**lectrostatic **s**ensitive **d**evice
JEIDA	**J**apanese **E**lectronics **I**ndustry **D**evelopment **A**ssociation Goal is to establish an international standard for memory cards and PC expansion cards. Coordinates its work with the PCMCIA.
LCD	**L**iquid **c**rystal **d**isplay
MPI	**M**ulti **p**oint **i**nterface Used to connect the OP to S7-200 and S7-300 automation systems
OP	**O**perator **P**anel
PC	**P**ersonal **c**omputer
PCMCIA	**P**ersonal **C**omputer **M**emory **C**ard **I**ndustrial **A**ssociation Association of computer companies. Goal is to establish an international standard for memory cards and PC expansion cards. Coordinates its work with the JEIDA.
PG	Programmer
PLC	Programmable **l**ogic **c**ontroller of the SIMATIC S5

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