

SIEMENS

SIMATIC HMI

Mobile Panel 170

Equipment Manual

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This manual contains notices which you should observe to ensure your own personal safety, as well as to protect the product and connected equipment. These notices are marked as follows according to the level of danger:



Danger

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



Warning

indicates a potentially hazardous situation which, if not avoided, **could** result in death or serious injury.



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used with the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

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used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

Notice

indicates that unwanted events or status can occur if the relevant information is not observed.

Note

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Preface

This manual

The “Mobile Panel 170” Equipment Manual is part of the SIMATIC HMI documentation.

The manual provides operation, installation, configuration planning and maintenance personnel with information concerning configuration, functional scope, installation and operation of the Mobile Panel 170.

History

The release of this manual corresponds to the following versions of the ProTool CS configuration software:

Release	Comment	ProTool CS
Release 09/02	First edition of the “Mobile Panel 170” equipment manual	From V6.0 + SP2

Notation

The following conventions are used throughout this manual:

<i>Motor off</i>	Text in the operating unit display is presented in this typewriter font.
<i>Tag</i>	Symbolic names representing tag values on the screen are presented in this italic typewriter font.
<i>Screens</i>	Functions available for selection are presented in this italic font.
ESC	The names of keys and buttons are displayed in this font.

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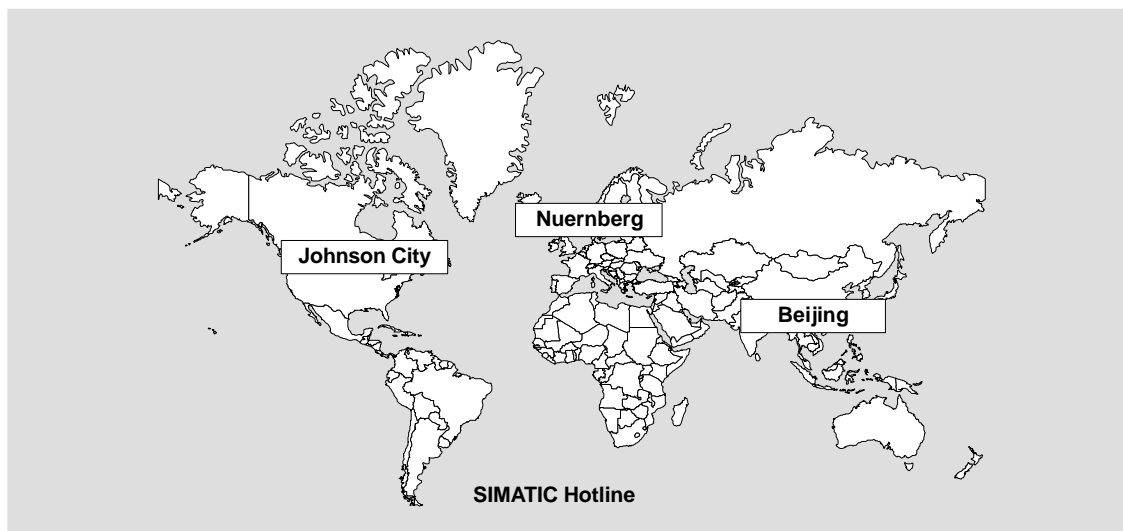
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- in the Internet under
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- in the Interactive Catalog CA01
<http://www.siemens.com/automation/ca01>

SIMATIC HMI Documentation

The SIMATIC HMI Documentation includes the following components:

- User guides for
 - configuration software
 - runtime software
 - communication between PLC and operating unit
- Equipment manuals for the following operating units:
 - SIMATIC PC
 - MP (Multi Panel)
 - OP (Operator Panel)
 - TP (Touch Panel)
 - TD (Text Display)
 - PP (Pushbutton Panel)
 - SIMATIC Mobile Panel 170
- Online help for the configuration software
- Installation guides
- Quick reference manuals

The following table provides titles of SIMATIC HMI manuals which contain information beyond the scope of this equipment manual.

Documentation	Target group	Contents
Getting Started Quick Reference Manual	Beginners	Examples are used to explain the configuration of <ul style="list-style-type: none"> • a screen with various objects, • changing a screen, and • a message step-by-step. This documentation is available for <ul style="list-style-type: none"> • text-based displays, • graphics displays, • touch panels, • Windows-based systems.
ProTool Configuring Windows- based Systems User's Guide	Configuration planners	Provides information on the configuration software: <ul style="list-style-type: none"> • principles of the configuration • detailed description of objects and functions which can be configured • examples

Documentation	Target group	Contents
ProTool Online Help	Configuration planners	Provides information on working with ProTool on the configuration computer: <ul style="list-style-type: none">• context-sensitive help• detailed instructions and examples• detailed information• all information from the user guides
Communication for Win- dows-based Systems User's Guide	Programmers	Provides information on connecting Windows-based systems to the following PLCs: <ul style="list-style-type: none">• SIMATIC S5• SIMATIC S7• SIMATIC 505• SIMATIC WinAC• SIMOTION• PLCs of other manufacturers This documentation describes <ul style="list-style-type: none">• the configuration and parameters necessary for connecting the operating unit to a PLC and the data network, and• the user data areas which serve for data exchange between the operating unit and PLC.

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Introduction

1

Mobile Panel 170

The Mobile Panel 170 belongs to the product category of mobile operating units and is based on the innovative Microsoft Windows CE operating system.

The standard version of the Mobile Panel 170 is equipped with one serial and one MPI/PROFIBUS-DP interface. The MPI/PROFIBUS-DP interface can also be used for downloading configurations. A configuration computer must be connected to the operating unit in the case of configurations made using ProTool CS which should only be downloaded via a serial interface.

The Mobile Panel 170 memory is designed for small to medium sized configurations.

Here is a short selection of features:

- Automatic transfer detection for downloading configurations
- Password protection
- Input/Output fields to display and modify process parameters
- Configurable buttons and function keys to control input/output and data bits
- State view for configuring warning indicators (alarm lamps)
- Bars to display dynamic values graphically
- Standard library for graphics and buttons can be used under ProTool CS
- Graphics can be configured to label buttons or as format-filling background screens
- Fixed text for labeling buttons, process screens or process values in any character size
- Print functions
- Trends
- Scheduler
- Messages with buffering feature
- Recipe management
- Backing up recipe data and configurations on CF memory cards

A complete overview of the functional range of the Mobile Panel 170 is provided in Chapter 2.

Area of use

Regardless of the industrial sector in which you operate or the application with which you work, the Mobile Panel 170 fulfills all demands of an operating panel when on-site operation and observation together with a high degree of mobility are the major factors.

This advantage is particularly apparent in the case of larger production plants, complexes or enclosed systems, long transfer and production lines and in conveying methods. The user or machine operator is always at the scene of events. This provides an optimum view of the workpiece or the process combined with the possibility of direct influence on the process being monitored.

Fast, precise setting up and positioning during the start-up phase helps reduce downtimes caused by retrofitting, maintenance and fault elimination.

The high degree of protection (IP65 on the front side), non-implementation of moving storage media and self-ventilation ensure the Mobile Panel 170 is also suitable for use in hostile industrial environments.

The Mobile Panel 170 provides the user with the opportunity to graphically display operating statuses, current process values and faults in a connected PLC using Windows-based applications.

The Mobile Panel 170 can be used to:

- control and monitor the process by means of the menu system.
Setpoint values or control element settings, for instance, can be modified by entering values, activating configured function keys or buttons;
- display the system to be monitored on full-graphic, dynamic screens,
- display and edit messages and process tags e.g. in output fields, bar graphs, trend curves or status displays,
- intervene directly in the running process by input.

Note

Observe the applicable safety regulations.

With regard to the operation and monitoring using an operating unit, the term “system to be monitored” used in the following refers to machines, processing centers, systems and processes.

Configuration using ProTool CS

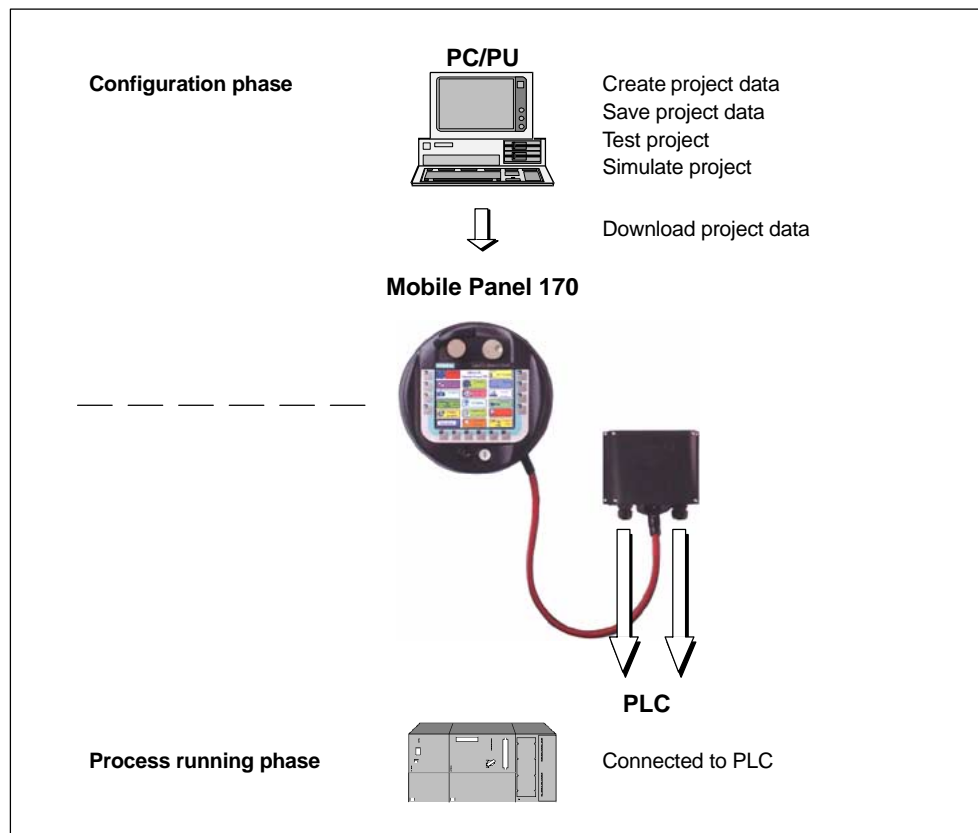
Note

The Mobile Panel 170 can be configured, as required, using the configuration software ProTool/Pro CS, ProTool or ProTool/Lite. Throughout this manual, the term **ProTool CS** is used to represent all three software versions.

Graphics, texts and operating and display elements which need to be represented on the operating units must first be created on a configuration computer (PC or PU) using the SIMATIC ProTool CS configuration software.

The configuration computer must be connected to the operating unit for serial downloading of the configuration to the operating unit (refer to “Configuration phase” in Figure 1-1). The connection can also be via an MPI/PROFIBUS-DP network.

Once the project has been successfully downloaded, connect the operating unit to the PLC. The operating unit can then communicate with the PLC and respond according to the information configured for running the program in the PLC (refer to “Process control phase” in Figure 1-1).



Picture 1-1 Configuration and process running phase

Further information

Detailed descriptions of the creation of projects for the operating unit and configuration software functions are provided in the *ProTool Configuring Windows-based Systems* User's Guide and in the online help for ProTool CS.

Any new information which could not be taken into account for printing in the guides is provided in the *Readme.pdf* file on the ProTool CD.

Functionality

2

Configuration

The following configuration software can be used with the Mobile Panel 170:

- SIMATIC ProTool/Lite from V6.0 + SP2
- SIMATIC ProTool from V6.0 + SP2
- SIMATIC ProTool/Pro from V6.0 + SP2

The following table summarizes the range of functions provided by the operating unit. The values specified are the maximum values which can be managed by the units. The defined values are limited by the size of the configuration memory.

Function		
Event messages	Number	2000 ¹⁾
	Display	Message line Message window Message page Message display
	View all queued messages	Message page/Message display
	Message length per line	70 characters (font-dependent)
	Process values in message text	8
	Edit messages	x

1) Total number for event and alarm messages

Function		
Alarm messages	Number	2000 ¹⁾
	Display	Message line Message window Message page
	Type of display	First/last, selectable
	View all queued messages	In message page/ message display
	Message length per line	70 characters (font-dependent)
	Process values in message text	8
	Acknowledge individual alarm messages	x
	Acknowledge several alarm messages simultaneously (group acknowledgment)	16 acknowledgment groups
	Edit messages	x
ALARM_S	Display S7 messages	x
Message logging	Output to printer	x
Volatile message buffer	Message buffer capacity	128 message events
	View event/alarm messages	x/x
	Delete	x
	Print	x
	Message events queued simultaneously (max.)	64
Message acquisition	Time of occurrence	Date and time
	Message events	Arrived, departed, acknowledged
Screens	Number	100
	Fields per screen	50
	Tags per screen	50
	Complex elements per screen	5
	View	x
	Print (hardcopy)	x
	Screen objects	
	<ul style="list-style-type: none"> • Text • Graphics • Output field • Input field 	<ul style="list-style-type: none"> x x x x

1) Total number for event and alarm messages

Function		
Screens	• Symbolic output field	x
	• Selection field	x
	• Date and time	x
	• Graphic display	x
	• Graphics list	x
	• Graphic box	x
	• Vector graphic	x
	• Button	x
	• Status button	x
	• State view	x
	• Switches	x
	• Hidden button	x
	• Trend view	x
	• Bar	x
	• Message view	x
	• Single message display	x
	• Password list	x
	• Recipe display	x
	Operator guidance	
	• Help text	x
• Dynamic attributes	x	
• Call/Hide objects	x	
• Icons for softkeys	x	
• TAB sequence	—	
• LEDs in function keys	x	
Fixed window	x	
Tags	Number	1000
Limit value monitoring	Inputs/outputs	x
Conversion functions	Inputs/outputs	x
Help text	Lines/characters	7/35 (font-dependent)
	For messages	x
	For screens	x
	For screen objects	
	• Input field	x
• Selection field	x	
• Button	—	
• Status button	—	

Function		
Help text	• Switches	–
	• Hidden button	–
Trends	Number	50
Graphic objects	Number	500
Text elements	Number	2000
Print functions	Hardcopy of screen content	x
	Direct message logging	x
Password protection	Number of passwords	50
	Password level	10 (0 to 9)
Recipes	Number	20
	Data records per recipe	50 ²⁾
	Entries per recipe	60
Online languages	Number of languages	5
Screen settings	Contrast	x
	Touch calibration	x
Scheduler	Trigger functions cyclically or once	x
Connections ³⁾	Number	4

2) Limited by storage medium

3) With SIMATIC S7

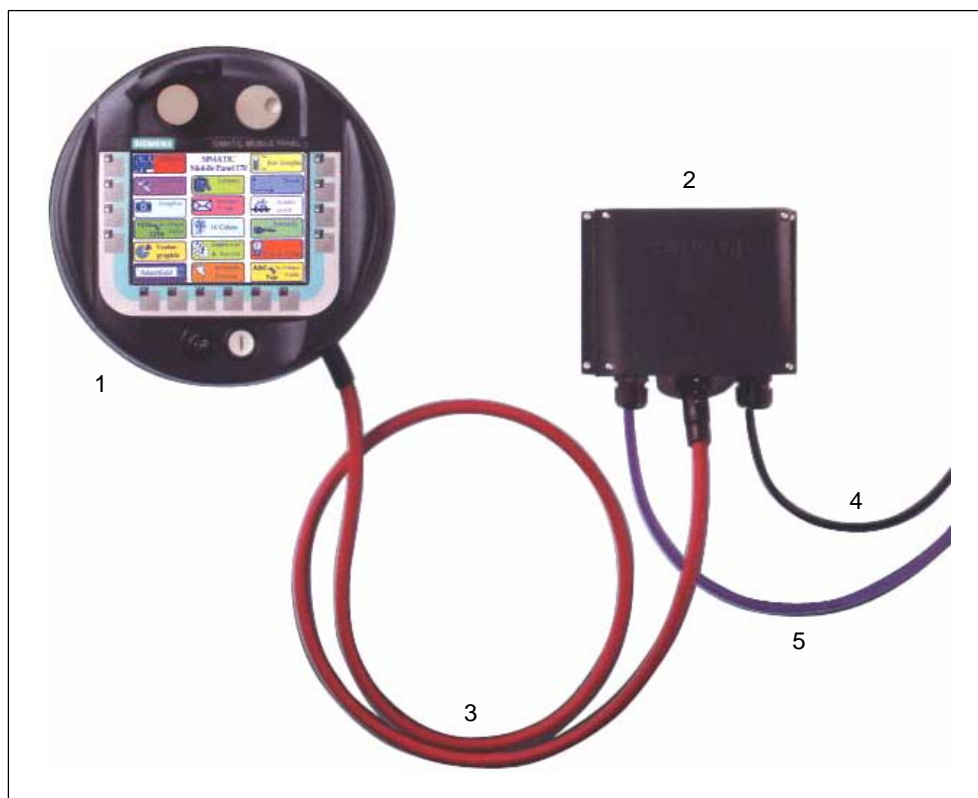
Function			
Communication	SIMATIC S5		
	• PROFIBUS-DP	x	
	SIMATIC S7-200	x	
	SIMATIC S7-300/400	x	
	SIMATIC 505		
	• NTP	x	
	• PROFIBUS-DP	x	
	SIMOTION	x	
	Connection to PLCs from other manufacturers		
	Allen Bradley via DF1		
	• DF1	x	
	• DF1/DH+	x	
	• DF1/DH485	x	
	Allen Bradley via DF485		
	• DH485	x	
	GE-Fanuc Automation		
	• SNP/SNPX	x	
LG Industrial Systems (Lucky Goldstar)			
• Dedicated communication	x		
Mitsubishi Electric			
• FX protocol	x		
Mitsubishi Melsec			
• Protocol 4	x		
Modicon			
• Modbus	x		
Omron			
• Hostlink/Multilink protocol	x		
Schneider Automation (Modicon)			
• Modicon Modbus	x		
Schneider Automation (Telemecanique)			
• Uni-Telway	x		

Design

3

Overview

The following figure illustrates the Mobile Panel 170 connected to a connectivity box. In order that the Mobile Panel 170 is securely fixed for stationary operation, a wall mounting bracket is available.



Picture 3-1 Mobile Panel 170 – design

BY implementing the Mobile Panel 170 (1) the system to be monitored can be operated from several connectivity boxes (2) alternately. A plug connector on the connection cable (3) enables a quick change to another connectivity box.

The cables for connection to the process (5) and for the power supply and safety functions (4) are not component parts of the material supplied.

3.1 Mobile Panel 170



Picture 3-2 Mobile Panel 170 – front view

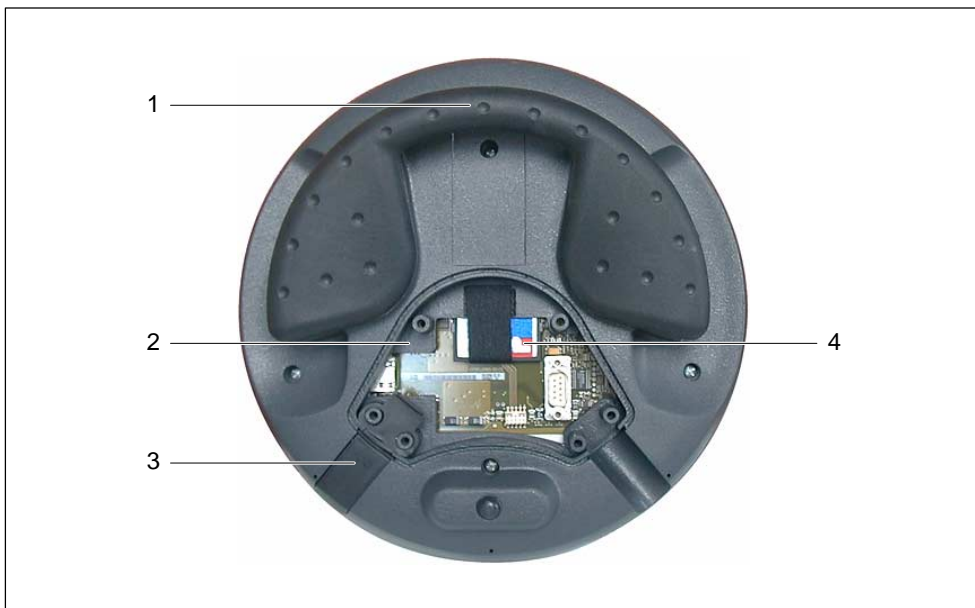
No.	Operating Element
1	Knob, optional
2	Stop button, 2-circuit, optional
3	C-STN LC display, with touchscreen, analog, resistive: 5.7", Q-VGA resolution 320 x 240
4	Membrane keyboard with contact acknowledgement
5	Pushbutton with integrated LED, optional
6	Key-operated switch, optional

The Mobile Panel 170 distinguishes itself through its robust qualities in respect of

- applications which can be installed due to dispensing with moving storage media,
- the use of the real time operating system and
- the mechanical design of the housing.

The Mobile Panel 170 is available in three different versions:

- with Acknowledgement button
- with Acknowledgement button and Stop button
- with Acknowledgement button, Stop button, handwheel, key-operated switch and illuminated pushbutton (refer to Figure 3-2)



Picture 3-3 Mobile Panel 170 – rear view with open connection compartment

No.	Operating Element
1	Handle
2	Connection compartment
3	Plugs (to ensure degree of protection IP65)
4	CF memory card



Picture 3-4 Mobile Panel 170 – side view

No.	Operating Element
1	Acknowledgement buttons, 3-level, 2-circuit The Acknowledgement buttons are arranged on both sides of the Mobile Panel 170.

3.2 Connection Cable



Picture 3-5 Connection cable

No.	Operating Element
1	Metallic push-pull round connection plug
2	Strain-relief and kinking protection for connection cable
3	RJ45 connector
4	Plug connector

The connection cable serves to connect the Mobile Panel 170 to the connectivity box. It is suitable for industrial environments and, thus, resistant against numerous solvents and lubricants. The flexional resistance of the connection cable corresponds to the conditions which prevail at the location of use.

Connections, operating unit side:

- RJ45, 8-pin
- Connector, 10-pin

Connections, connectivity box side:

- Metallic push-pull, round connection plug, 22-pin

Note

When plugged in, this round plug guarantees the IP65 degree of protection.

The connection cable is available in the lengths 5 m and 10 m. More information on this is provided in the current ST 80 catalog.

3.3 Connectivity Box



Picture 3-6 Connectivity box

No.	Element
1	PU screw fitting for process data cable
2	PU screw fitting for power supply cable and shield
3	PU screw fitting for data cable for additional Stop and Acknowledgement button and accompanying PLC signals
4	Connection socket for connection cable plug
5	Dummy cap

Note

The IP65 degree of protection is only guaranteed when the dummy plug is plugged in.

Variants

The connectivity box is available for supply in the following variants:

- Connectivity Box Basic
- Connectivity Box Plus

The difference between the two variants lies in the switching-related evaluation of the Stop or Emergency Stop circuit signal of the system to be monitored and the response to it by the system to be monitored itself. More information is provided in Chapters 4.4 and 6.6.

3.4 Wall Mounting Bracket



Picture 3-7 Wall mounting bracket

The wall mounting bracket serves to fix the Mobile Panel 170 securely when being used for stationary operation.

3.5 Protective Covers and Protective Foil

In order to protect the customized labeling of the Mobile Panel 170 keyboard, protective covers are available for the labeling strips in sets of 5 covers.

A set of protective foils is also available for the touchscreen. The foil protects the touchscreen from scratches caused by touching the screen surface during input. The set contains 5 protective foils.

4.1 Operational Safety

The operating unit complies to the following standards

- EN 60204-1
Safety of machines – electrical equipment of machines
- EN 61131-1 and EN 61131-2
Programmable logic controllers
- The EMC test for the operating unit was completed in accordance with the following standards:
 - EN 50081-2, EMC – Interference suppression
 - EN 61000-6-2, Generic standards – Immunity standard for industrial environments
 - IEC 61131-2, Draft 10.03.02, Programmable logic controllers
- STOP button for fast machine shutdown:
EN 60947-5-1:1997, K 2.2, Low-voltage switching devices, normally closed contacts

When using an external monitoring unit, EN 954 Category 3 can be achieved (refer to connection example in Appendix, Chapter B.3). Two potential-free, normally closed contacts for the connection of external periphery units, 24 V nominal voltage (extra low voltage complying to EN 61131-2 and EN 50178, high voltage systems with electrical resources), maximum current of 500 mA.

- Acknowledgement equipment complying to EN 60204-1 in safety categories complying to EN 954-1:1996, Safety-related parts of controllers:
 - When using an external monitoring unit, EN 954, Safety Category 3 can be achieved (refer to connection example in Appendix, Chapter B.3)
 - 2 normally open contacts, switched parallel, or the connection of external periphery units, 24 V nominal voltage (extra low voltage complying to EN 61131-2 or EN 50178), typical current 500 mA.

If the Mobile Panel 170 is implemented to monitor a system, it fulfills the following standards:

- prEN 1921, Industrial automation systems – safety of integrated production systems
- EN 12417:2001, Machine tools – safety – machining centers
- UL 508, Industrial Control Equipment
- CSA C22.2 No. 14, Industrial Control Equipment

4.2 Safety Regulations



Warning

The instructions provided in this manual must be followed precisely in all cases. Otherwise, sources of risks may develop or the safety equipment integrated in the Mobile Panel 170 rendered ineffective.

The safety and accident prevention regulations applicable to the respective situation must also be observed independently of the safety notes provided in this manual.



Warning

The configuration planner of a machine or system control must integrate measures by which a program, interrupted due to a voltage drop or power failure, can be resumed properly. Dangerous operating statuses must not develop, not even for a short time.

In all cases, where faults occurring in the system to be monitored could lead to personal injury or extensive property damage, additional measures must be met, outside the scope of the system to be monitored, which also ensure the operating status of that system remains safe.

The configuration planner of the system to be monitored must integrate measures which prevent unauthorized personnel from modifying stored data which could lead to a dangerous status developing.

The function of the STOP button must be checked cyclically.



Warning

If the operating unit is exposed to a heavy impact (e.g. it is dropped), the functionality of the safety-related parts must be checked.

The manual movements executed using the Mobile Panel 170 may only be performed in conjunction with the Acknowledgement button **and** at reduced speed.

If the system to be monitored is operated via the Mobile Panel 170, ensure that operation at that moment is only possible via the Mobile Panel 170 and not from another point of the system being monitored.

4.3 Power Supply



Warning

The operating unit complies to Protection Class III in accordance with EN 61131-2 and EN 50178. The 24 VDC power supply must be provided by properly isolating the extra-low voltage from voltages which are dangerous on contact (e.g. by implementing a safety isolation transformer or equivalent devices).

The power supply circuit must be protected by a 3.15 A fuse.

Therefore, when dimensioning the power supply, take a voltage drop in the connection cable into account!

4.4 STOP Button

The Mobile Panel 170 can be equipped with a Stop button as an optional operating element.

The STOP button on the Mobile Panel 170 ensures that the system to be monitored is shut down safely in accordance with EN 60204-1:1997, Paragraph 9.2.5.3. The Stop function can be in the category 0, 1 or 2 complying to EN 60204-1:1997, Paragraph 9.2.2 and must be defined according to the risk assessment.

Therefore, the Stop function of the Mobile Panel 170 can be used for a safe system shutdown as well as for looping in the Emergency Stop circuit of the system to be monitored.

The signals from the STOP button differ according to the connectivity box version used. In the case of Connectivity Box Plus, the signals from the Stop or Emergency Stop circuit control the system to be monitored. If no Mobile Panel 170 is connected, the Stop or Emergency Stop circuit is closed. When the Connectivity Box Basic is used, on the other hand, the signals from the Stop and Emergency

Stop circuit are fed to the STOP button. If no Mobile Panel 170 is connected, the Stop or Emergency Stop circuit of the system to be monitored is opened.

The term stop looping has the following significance:

The stop or emergency stop circuit of the system to be monitored is looped through by the connectivity box and not interrupted, regardless of whether the Mobile Panel 170 is connected to the connectivity box (and the STOP button has not been operated) or not.

This functionality is only available with the Connectivity Box Plus (refer to Chapter 4.4.1).

**Warning**

If the Mobile Panel 170 is equipped with a STOP button but it is not connected to the connection box, a stop cannot be triggered by the Mobile Panel 170 STOP button; i.e. the Mobile Panel 170's STOP button is ineffective.

Install stationary Stop buttons which are available on the system to be monitored at all times.

**Warning**

If the Stop circuit is defined as a Category 0 or 1 stop, the stop function must be effective regardless of the operating mode. A Category 0 stop must have priority. Releasing the STOP button must not initiate any risk-related conditions (also refer to EN 60204-1:1997 Chapter 9.2.5.3).

The stop is not a substitute for safety equipment.

Notice

Only install connectivity boxes of one type to the system to be monitored; i.e. only Connectivity Box Plus or Basic.

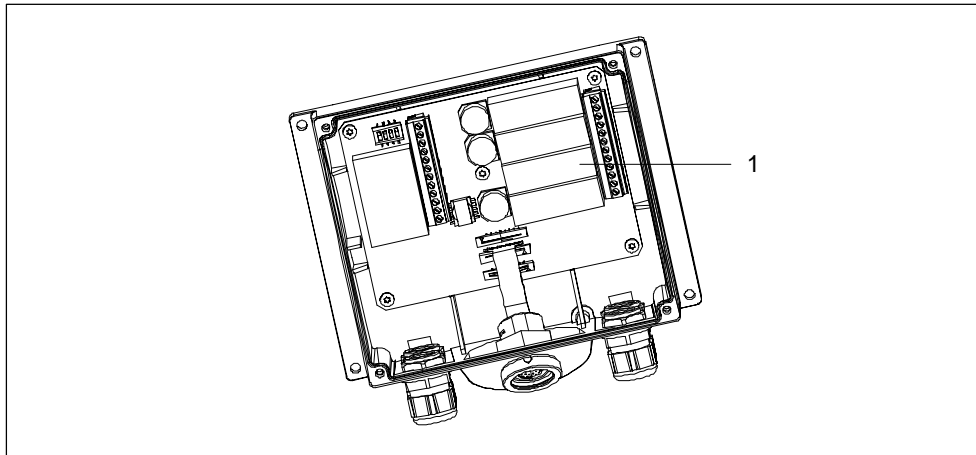
Notice

Applies when the Mobile Panel 170 is connected to a connectivity box:

The STOP button on the Mobile Panel 170 may be triggered if the unit is dropped and cause the machine being monitored to shut down.

An example connection of a monitoring unit and STOP button is provided in Appendix, Chapter B.

4.4.1 Connectivity Box Plus



Picture 4-1 Connectivity Box Plus

A Connectivity Box Plus is identified by the presence of the four relays (1).

Switching statuses of the connectivity box's stop or emergency stop circuit

Switching statuses of the Stop or Emergency Stop circuit in the case of a connected Mobile Panel 170 **with** STOP button and Connectivity Box Plus:

Mobile Panel 170	STOP button	Switching statuses of the Stop or Emergency Stop circuit
Connected	Not pressed	The Stop or Emergency Stop circuit in the connectivity box remains closed.
Connected	Pressed	The Stop or Emergency Stop circuit in the connectivity box is open . System being monitored is shut down.
Not connected	–	The Stop or Emergency Stop circuit in the connectivity box remains closed.

Switching statuses of the Stop or Emergency Stop circuit in the case of a connected Mobile Panel 170 **without** STOP button and Connectivity Box Plus:

Mobile Panel 170	STOP button	Switching statuses of the Stop or Emergency Stop circuit
Connected	Not available	The Stop or Emergency Stop circuit in the connectivity box remains closed.
Not connected	Not available	The Stop or Emergency Stop circuit in the connectivity box remains closed.

**Warning**

If the system to be monitored has been shut down, the STOP button may only be released or the system being monitored restarted when the reasons which caused the stop have been eliminated and starting up presents no dangers or risks.

**Warning**

Unplugging the Mobile Panel 170 from the Connectivity Box Plus always causes the stop or emergency stop circuit to be closed and, thus, to releasing the stop status of the system to be monitored, even if the STOP button on the Mobile Panel 170 was pressed!

Notice

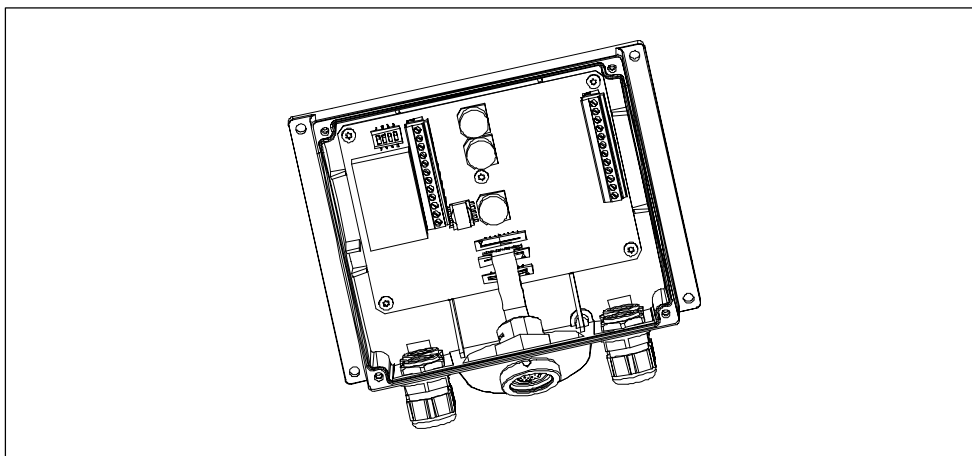
There is a delay of approx. 100 ms between triggering the STOP button and the reaction of the Stop contacts in the Connectivity Box Plus.

4.4.2 Connectivity Box Basic

The Connectivity Box Basic is not equipped with a "stop looping" function, as opposed to Connectivity Box Plus.

Caution

The Stop or Emergency Stop circuit is fed via the STOP button if a Mobile Panel 170 is connected. If the connection cable from the Mobile Panel 170 to the Connectivity Box Basic is disconnected, the Stop or Emergency Stop circuit is broken and the system being monitored is shut down or an emergency stop routine is performed safely.



Picture 4-2 Connectivity Box Basic

The Connectivity Box Basic is identified by the missing four relays (1) (refer to Figure 4-1).

Switching statuses of the Connectivity Box Basic's Stop or Emergency Stop circuit

Switching statuses of the Stop or Emergency Stop circuit in the case of a connected Mobile Panel 170 **with** STOP button and Connectivity Box Basic:

Mobile Panel 170	STOP button	Switching statuses of the Stop or Emergency Stop circuit
Connected	Not pressed	The Stop or Emergency Stop circuit in the connectivity box remains closed.
Connected	Pressed	The Stop or Emergency Stop circuit in the connectivity box is open . System being monitored is shut down.
Not connected	–	The Stop or Emergency Stop circuit in the connectivity box is open . System being monitored is shut down.

Switching statuses of the stop circuit in the case of a connected Mobile Panel 170 **without** STOP button and Connectivity Box Basic:

Mobile Panel 170	STOP button	Switching statuses of the Stop or Emergency Stop circuit
Connected	Not available	The Stop or Emergency Stop circuit in the connectivity box remains closed.
Not connected	Not available	The Stop or Emergency Stop circuit in the connectivity box is open . System being monitored is shut down.



Warning

If the system to be monitored has been shut down, the STOP button may only be released or the system being monitored restarted when the reasons which caused the stop have been eliminated and starting up presents no dangers or risks.

4.5 Acknowledgement Equipment

The acknowledgement equipment consists of the two Acknowledgement buttons corresponding to Figure 3-4.

Each machine has the operating modes normal mode and special mode. In normal mode (Automatic), the machine fulfills its operational task. Safety, in this mode, is ensured by closed, isolating protective equipment and/or with highly functional access-inhibiting, non-isolating protective equipment.

The special modes provided by a machine serve to maintain the normal mode. In this case, safety must be ensured in a different way to that in normal mode because hazardous areas of the machine must be accessed and specific movements must be possible.

The system being monitored must be operated at a reduced speed in this case, according to the risk assessment whereby a movement is only possible when an acknowledgement feature is actuated simultaneously. The operator must have the necessary qualification and training and know the details of the intended use set out in Chapter 1, Section "Area of Use".

The safety-related components of the PLC for speed reduction and the acknowledgement equipment is constructed in such a way that they fulfill the safety category complying to EN 954-1, defined according to the risk assessment.

Fulfilling the requirements of Safety Category 3 complying to EN 954-1:1996 is possible by realizing the acknowledgement equipment in a 2-circuit design. The following is defined in the draft C norm concerning machine and processing tools:

”Acknowledgement equipment can relate to a 2-position command device linked to a stop device or a 3-position command device. The 3-position command device is preferable.”

EN 60204 describes the functioning methods of the acknowledgement equipment. As a result of information gathered from accident research and technical solutions existing today, the 3-position Acknowledgement button represents state-of-the-art technology. The positions 1 and 3 of the Acknowledgement button are 'Off' functions. Only the middle position enables acknowledgement. EN 60204-1:1997 is identical to IEC 60204-1, whereby the 3-position Acknowledgement button is internationally accepted.

The stop category of the acknowledgement equipment must be selected according to a risk assessment and correspond to a stop of Category 0 or 1.



Warning

Acknowledgement buttons may only be implemented when the person operating the Acknowledgement button recognizes a situation in which persons are at risk in good time and can immediately initiate measures to prevent the danger!

No commands related to dangerous statuses may be initiated by the Acknowledgement button alone. A second, conscious start command is necessary using a button on the Mobile Panel 170. Only the person who actuated the Acknowledgment button may be in the hazard zone.

When implementing special operating modes, safety is ensured by using the Acknowledgement button in conjunction with a reduced speed of the hazard-creating drive.

Two example connections of a monitoring unit and Acknowledgement button are provided in the Appendix, Chapter B.3.

4.6 Risk analysis of the system to be monitored

The following standards must be implemented in order to complete the risk assessment:

- EN 292, General guidelines on machine design
- EN 1050, Risk assessment of machines
- EN 954-1, Safety-related machine components

These considerations result in a safety category (B, 1, 2, 3, 4) complying to EN 954-1 which finally determine how the safety-related components of the system to be monitored must be.

The connection examples with three different monitoring units in the Appendix, Chapter B.3 illustrate how **Safety Category 3** can be achieved in compliance with EN 954-1 with the Mobile Panel 170 and its safety-related components. It is important to take into account that the entire concept of the system to be monitored must be designed for this.

Commissioning

5

General notes

Caution

Always terminate the runtime software before disconnecting the Mobile Panel 170 connection cable in order to prevent loss of data.

To terminate the runtime software, press the operating element assigned the *Exit_runtime* function in the configuration. Wait until the start (Loader) menu (refer to Figure 5-1) appears on the operating panel before unplugging the connection cable of the Mobile Panel 170 which disconnects the power supply.

Caution

Observe the installation notes in Chapter 10.3.

Notice

High frequency radiation, e.g. from mobile telephones, can cause exceptional operating situations.

Note

The interface mentioned below, interface IF1, comprises the interfaces for MPI/PROFIBUS-DP, for SIMATIC PLCs and PLCs from other manufacturers (refer to Figures 10-2 and 10-6).

5.1 Initial Startup

Action

When the operating unit is started up for the first time, no configuration has been loaded on it. In order to download the necessary project data and the runtime software from the configuration computer to the operating unit, proceed as follows, observing the sequence:

Step	Action
1	Connect the interface to the configuration computer according to Chapter 10.5 using a suitable standard cable. Default setting: Serial connection
2	Switch on the power supply for the operating unit by connecting the connection cable to the connectivity box.
3	When the operating unit is started up, it automatically switches from the start menu to download mode. Press the <code>Cancel</code> button to access the Start menu and, from there, the Windows Control Panel.
4	Check the settings defined for the interface in the download settings (serial or MPI) and adapt them as necessary (refer to Chapter 5.4). Default setting: Serial connection
5	Close the Control Panel and activate download mode.
6	Start downloading the configuration on the configuration computer. Further settings necessary on the configuration computer for the download operation are provided in the <i>ProTool Configuring Windows-based Systems</i> User's Guide. The configuration computer checks the connection to the operating unit. If the connection is not available or defective, the corresponding error message appears. If downloading from the configuration computer is terminated as a result of a compatibility conflict, the operating unit's operating system must be replaced (refer to Chapter 14). If the connection is correct, the project data is downloaded to the operating unit. Following successful downloading, the operating unit restarts and displays the start screen of the projects that has just been loaded.

5.2 Recommissioning

Purpose

During recommissioning, a project already loaded on the operating unit is replaced by another. In this case, the project data is downloaded from the configuration computer to the operating unit.

The following options are available to switch the operating unit to download mode:

- Start downloading manually during the operating unit start-up phase
- Start downloading automatically while the operating unit is in operation
- Start downloading via a correspondingly configured operating element while the operating unit is in operation (refer to Chapter 9.2).

5.2.1 Start downloading manually

Start downloading manually during the start-up phase of the operating unit:

Step	Action
1	Connect the interface to the configuration computer according to Chapter 10.5 using a suitable standard cable.
2	Switch on the power supply for the operating unit by connecting the connection cable to the connectivity box.
3	Press the Cancel button to access the Start menu and, from there, the Windows Control Panel.
4	Check the settings defined for the interface in the Transfer Settings window and adapt them as necessary.
5	Close the Control Panel and activate download mode.
6	<p>Start downloading the project on the configuration computer.</p> <p>The configuration computer checks the connection to the operating unit. If the connection is not available or defective, the configuration computer issues the corresponding error message.</p> <p>If downloading from the configuration computer is terminated as a result of a compatibility conflict, the operating unit's operating system must be replaced (refer to Chapter 14).</p> <p>If the connection is correct, the new configuration is downloaded to the operating unit. Following successful transfer of data, the configuration is started and the unit displays the start screen of the configuration that has just been loaded.</p>

5.2.2 Start downloading automatically during normal operation

Download settings

The operating unit can be switched automatically to download mode from normal operation as soon as downloading is started on the connected configuration computer. This option is particularly recommended for the test phase involving a new configuration project because the data is transferred without having to intervene on the operating unit.

A condition for this is that, with regard to the operating unit, the required transfer connection is set in the *Transfer Settings* window and the corresponding *Remote Control* function is activated (refer to Figure 5-2).

A detailed description of the possible download settings is provided on Page 5–5.

Close dialogs

If the *Remote Control* option is active, the runtime is automatically shut down and the operating unit switched to download mode. If dialogs are still open, the runtime cannot be shut down when downloading has been started on the operating unit.

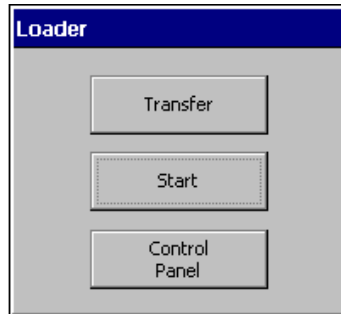
In such cases, close the dialog or interrupt downloading on the configuration computer.

Recommendation

Following the start-up phase, switch the automatic download option off to prevent inadvertently switching the operating unit to download mode in a system which is running, which would cause the runtime to shut down. To do this, deactivate the *Remote Control* option in the download settings defined for the operating unit (refer to Figure 5-2).

5.3 Operating Unit Start Menu

During the start-up phase, the start menu (Loader) depicted below appears. When the runtime has ended, the following appears:



Picture 5-1 Start menu

Press the *Transfer* button to switch the operating unit to download mode.

Press the *Start* button to start the runtime automatically.

Press the *Control Panel* button to access the Windows CE Control Panel (see Figure 9-1) in which various settings can be defined. The settings for the download mode options can be defined here, for example.

It is possible to protect the Start menu from unauthorized access by assigning a password. If the password is subsequently not entered, only the *Transfer* and *Start* buttons are available. This prevents incorrect operation and increases the security of the system to be monitored since settings cannot be modified.

5.4 Options for Download Mode

Overview

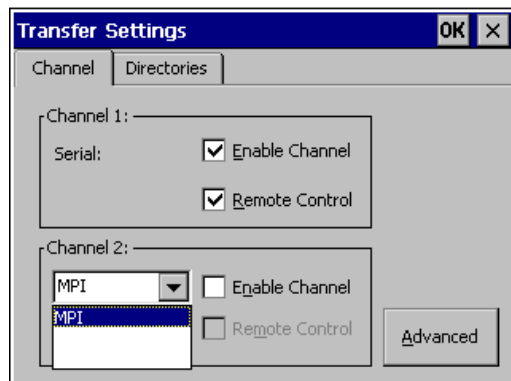
The following options can be set for download mode:

- Download mode can be restricted to a specific connection type so that downloading can only occur either via a serial connection or an MPI connection
- Automatic switching to download mode from normal operation when data transfer is initiated from the connected configuration computer

Note

Modifications must not be carried out when the runtime is in operation or the unit is in download mode.

Access the configuration menu for defining the transfer settings by pressing the *Control Panel* button in the start menu. The Windows CE Control Panel is opened. Select the *Transfer* option.

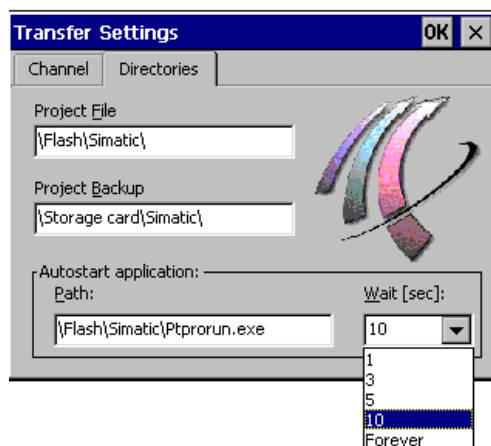


Picture 5-2 Transfer Settings menu, *Channel* tab control

The *Channel* tab control in the Transfer Settings menu can be used to activate the required transfer channel and the respective *Remote Control* option. In addition to the serial transfer channel, a second channel can also be selected to download data from the configuration computer to the operating unit.

Press the *Advanced* button to define the *Address* bus parameter setting and *Transmission Rate* and *Highest Station* network parameter settings for downloading via MPI or PROFIBUS-DP. These parameters are valid for the configuration currently loaded on the operating unit.

In addition to the setting options for download mode, the *Directories* tab control can be used to specify the following paths (refer to Figure 5-3):



Picture 5-3 Transfer settings configuration menu with *Directories* tab control

- *Project File*
The predefined storage location for the project file can be changed here. The internal Flash memory or external Flash cards can be set for the operating units. During the next downloading process, the configuration is stored in the storage location specified.
- *Project Backup*
The predefined storage location for the source file of your configuration can be changed here. This file can be used for restoring (uploading) the configuration. External Flash cards can be set for the operating unit. Information on uploading is provided on Page 5–10.
- *Autostart application*

Path

This defines the storage location for the ProTool runtime software. This is the application with which the configuration runs under Windows CE.

Wait

It is possible to define the number of seconds the Start menu should remain on screen before the runtime is started (1 s, 3 s, 5 s, 10 s or constantly). If no runtime software is available, the unit automatically switches to download mode.

Notice

Do not change the default settings in the fields, except *Wait*, when working with ProTool. Otherwise, the operating unit can no longer start the configuration.

Press the *OK* button to confirm the settings currently defined for the download options. The Transfer Settings menu is closed and the Windows CE Control Panel is displayed.

Press the *X* button to close the Transfer Settings menu and call in the Windows CE Control Panel. Any modifications made to the settings are rejected.

General information on download mode



Warning

When the option *Remote Control* is active, ensure that the operating unit is not inadvertently switched to download mode from the configuration computer when in normal operation.

Notice

Deactivate the *Remote Control* option if the serial transfer channel has been selected and a serial printer is connected to the operating unit. Otherwise, printing is not possible.

Notice

If no transfer channel has been enabled using the *Enable Channel* option, it is not possible to download a configuration from the configuration computer to the operating unit.

Note

The bus parameters for the **MPI transfer** (e.g. MPI address, baud rate, etc.) are read out of the configuration currently loaded on the operating unit.

The settings for MPI transfer can be modified. To do this, stop the runtime, modify the settings and switch to download mode. When the runtime is subsequently started, the bus parameters are overwritten by values from the configuration.



Warning

In the case of Profibus-DP, modifications here may only be made for start up purposes.

For each modification of the settings for Profibus-DP, the operating units only set one corresponding set of standard bus parameters. In unfavorable conditions, this can lead to faults on the DP bus.

In order to calculate the bus parameters exactly, the entire bus topology must be known.

Correct definition of the bus parameters for runtime is automatically ensured by the integrated operation of ProTool in STEP 7.

5.5 Test the Configuration

Conditions

In order to switch the operating unit between the operating modes *OFFLINE* and *ONLINE*, the function *Change_mode* must be linked to an operating element in the project.

Note

During the test phase, it is recommended to enable switching to download mode from normal operation. Further information on this is provided on Page 5–4.



Warning

After the test phase, do not forget to deactivate the *Remote Control* option to prevent inadvertently switching to download mode from the configuration computer when in normal operation.

Testing on the configuration computer

The material supplied with ProTool contains a simulation program which can be used to test the configuration on the configuration computer without the necessity of connecting a PLC or operating unit. Detailed information on this is provided in the *ProTool Configuring Windows-based Systems User's Guide* and in the online help to ProTool CS.

The simulation program can be started using the corresponding button in the toolbar in ProTool



or via *File* → *Test* → *Start Simulator*.

Testing without a PLC connected (OFFLINE mode)

After setting the unit to *OFFLINE* mode, the individual functions of the configuration can be tested on the operating unit without them being affected by the PLC. PLC tags are not updated in *OFFLINE* mode.

Step	Action
1	Switch the operating unit to operating mode <i>OFFLINE</i> (refer to Page 9–2).
2	Check all the configured screens in respect of correct representation.
3	Check the screen hierarchy.
4	Check the input fields.
5	Test the function keys.

Testing with a PLC connected (ONLINE mode)

When a PLC is connected, it is possible to test the communication between the operating unit and PLC in ONLINE mode. This includes checking that the correct data areas have been configured.

Step	Action
1	Connect the operating unit to the PLC.
2	Test all the items in the projects for which communication with the PLC is necessary e.g.: <ul style="list-style-type: none"> • messages • print functions • automatic message logging • selecting screens etc.

5.6 Uploading

Purpose

During downloading, only the run-capable configuration (*.fwd) which has been generated is normally downloaded on the operating unit. If the original source file is to be used for further development of the configuration or for fault analysis, it must remain on the configuration computer.

Not only the generated configurations can be stored on the operating units but also the source file, so that it can be retrieved (downloaded back) from the operating unit later, if necessary.

Advantage

After uploading a configuration back onto the unit, it can be analyzed and modified even if the original cannot be accessed or the source file on it for the configuration is no longer available.

Conditions

The following conditions must be fulfilled in order to retrieve the source file from the run-capable project file:

- CF card is plugged into the Mobile Panel 170,
- Downloading of the current project file from the configuration computer to the operating unit must be performed using the option *Upload*. This option can be activated in ProTool CS via *File* → *Download* → *Preferences*.

What happens during download/upload?

In the case of downloading including transfer of the source file, the configuration is compressed from the source format (*.pdb) and downloaded to the operating unit as a *.pdz file. After uploading, the file is decompressed in the ProTool CS configuration software.

Following uploading, the configuration must be given a new name on the configuration computer.

Note

- The uploaded, decompressed source file can only be opened with a ProTool CS whose version number is greater or equal to that of the configuration software with which the project was created.
 - ProTool CS cannot check whether the source file on the operating unit matches the configuration actually run on it. If downloading is performed at any time without the *Upload* option being activated, it is possible that old project data is on the operating unit which no longer matches the current project.
-

Instructions

Uploading a project from the operating unit:

Step	Action
1	Select the menu option <i>File</i> → <i>Upload</i> → <i>Preferences</i> in ProTool CS on the configuration computer.
2	Use the <i>Upload</i> dialog to select the required connection type between the operating unit and configuration computer and to set the relevant connection parameters.
3	Click on <i>OK</i> .
4	Switch the operating unit to download mode according to the setting in the <i>Transfer Settings</i> configuration menu.
5	Start the uploading function using the <i>Upload</i> → <i>Start</i> in ProTool.
6	Enter a new name or select an existing configuration to be overwritten and click <i>Save</i> . The configuration retrieved is saved and automatically opened in ProTool CS.

5.7 ProSave Service Tool

The *ProSave* tool is supplied together with ProTool. All the functions are provided which are necessary for the transfer of data between the configuration computer and operating unit:

- Data backup using Backup/Restore function (refer to Chapter 5.8)
- Installation and deinstallation of drivers, options and add-ons, i.e. applications and drivers independent of ProTool.
- License transfer (refer to Chapter 5.9)

Integrated operation

ProSave is part of the material supplied with ProTool and can be automatically loaded on the configuration computer with the ProTool installation. The entire function range of ProSave is available within ProTool. In integrated operation, the ProSave dialogs are called from the project. In this way, all the necessary specifications (e.g. target device and download settings) are assumed from the project.

Stand-alone operation

ProSave can also be installed as a stand-alone application. In this case, the settings concerning the device and downloading must be defined in the ProSave user interface and match the operating unit settings.

5.8 Backup/Restore the Internal Flash Memory

Purpose

The functions *Backup* and *Restore* provide the following options:

- creating a copy of the entire configuration on a CF memory card
- creating a copy of the entire configuration on PC (ProSave)
- copying selected objects, such as recipes and passwords, on PC (ProSave)
- restoring the stored elements in the case of a fault
- updating the operating unit regardless of where it is in use without the need of a configuration computer

Notice

If the restore process is interrupted due to a power failure, the operating system is deleted. In this case, the operating system must be reloaded (refer to Chapter 13).

Note

If a message appears during the restore process indicating a compatibility conflict has occurred, the operating system must be reloaded. Ensure that the same version of the operating system is loaded as was installed when the backup was created.

Note

Close all applications before starting the backup or restore process.

Note

Licenses on the Mobile Panel 170 are not stored with a backup.

Each restore initiated on the Mobile Panel 170 deletes all the licenses on it permanently. Therefore, save this data beforehand.


5.8.1 Backup/Restore on CF memory cards

During a backup process, the operating system, application and data are copied from the internal Flash memory to the CF memory card (refer to Chapter 14).

In the case of a restore process, the content of a Flash memory stored on an external storage medium is reloaded into the internal Flash memory. Prior to this, the operating unit's internal Flash memory is completely cleared following confirmation.

Backup on CF card

Proceed as follows to create a backup copy of the internal Flash memory:

Step	Action
1	Deactivate the write protection on the memory card, if set.
2	Insert the memory card in the slot (refer to Figure 12-1).
3	Call in the Windows CE Control Panel (refer to 5-1) and, from there, select the <i>Backup/Restore</i> option depicted on the right. 
4	Start the Backup process by using the Backup button.
5	Confirm the deletion of any existing backup files beforehand.
6	When the data has been completely downloaded, the operating unit issues a message.
7	Remove the memory card from the operating unit.
8	Activate the write protection on the memory card, if available.
9	Label the memory card, e.g. with the date and version of the configuration saved, and keep it in a safe place.

Restore from CF card

Proceed as follows to restore the content of the internal Flash memory:

Step	Action
1	Activate the write protection on the memory card, if available.
2	Insert the memory card in the slot (refer to Figure 12-1).
3	Call in the Windows Control Panel and select the <i>Backup/Restore</i> option.
4	Start the restore process by clicking on the Restore button.
5	Confirm that the internal Flash memory.
6	After confirmation, the operating system is reloaded and the operating unit is automatically restarted. Finally, the remaining data is downloaded.
7	When the data has been completely downloaded, the operating unit issues a message.
8	Remove the memory card.
9	Restart the operating unit.

5.8.2 Backup/Restore using ProSave

In order to save the entire configuration, or even specific parts such as recipes and passwords, on a PC use the *ProSave* service tool. The advantage of *ProSave* is that the Backup/Restore can be performed via the following transfer channels without ProTool:

- Serial
- MPI/PROFIBUS-DP

During a backup process, the operating system, application and data are copied from the internal Flash memory to a PC.

In the case of a restore process, the content of a Flash memory stored on the PC is reloaded into the internal Flash memory on the operating unit. Prior to this, the operating unit's internal Flash memory is completely cleared.

Backup using stand-alone ProSave

Creating a backup using ProSave as a stand-alone application:

Step	Action
1	Start <i>ProSave</i> on the PC using the Windows Start menu.
2	Use the <i>General</i> tab register to select the required device type and connection type with corresponding connection parameters.
3	Use the <i>Backup</i> tab control to select the data to be saved (<i>Recipes</i> , <i>Passwords</i> or <i>Complete Backup</i>).
4	Select the path in which the backup file (*.psb) should be saved.
5	Configure the operating unit according to the required transfer channel and switch to download mode (refer to Chapter 5.1 and 5.2).
6	Start the Backup process by using the Start backup button.
7	A progress indicator appears during the data transfer. When the transfer is successfully completed, a message appears briefly.

Backup using ProSave integrated in ProTool

Creating a backup using ProSave integrated in ProTool:

Step	Action
1	In <i>ProTool</i> , select <i>File</i> → <i>Download</i> → <i>Preferences</i> and use the <i>Set download</i> window to define the connection type with the corresponding connection parameters.
2	Open the <i>Backup</i> window in <i>ProTool</i> by selecting the menu items <i>File</i> → <i>Download</i> → <i>Backup</i> .
3	Select the data to be saved (<i>Recipes</i> , <i>Passwords</i> or <i>Complete Backup</i>).
4	Select the path in which the backup file (*.psb) should be saved.
5	Configure the operating unit according to the required transfer channel and switch to download mode (refer to Chapter 5.1 and 5.2).
6	Start the Backup process by using the Start backup button.
7	A progress indicator appears during the data transfer. When the transfer is successfully completed, a message appears briefly.

Restore using stand-alone ProSave

Proceed as follows to restore the content of the internal Flash memory:

Step	Action
1	Start <i>ProSave</i> on the PC using the Windows Start menu.
2	Use the <i>General</i> tab register to select the required device type and connection type with corresponding connection parameters.
3	Use the <i>Restore</i> tab register to select the path in which the file to be restored is located.
4	The <i>Archive Description</i> displays the unit concerned and the type of backup data contained in the file.
5	Configure the operating unit according to the required transfer channel and switch to download mode (refer to Chapter 5.1 and 5.2).
6	Start the restore process by clicking on the Start restore button.
7	A progress indicator appears during the data transfer. When the transfer is successfully completed, a message appears briefly.

Restore using ProSave integrated in ProTool

Proceed as follows to restore the content of the internal Flash memory:


Step	Action
1	In <i>ProTool</i> , select <i>File</i> → <i>Download</i> → <i>Preferences</i> and use the <i>Set download</i> window to define the connection type with the corresponding connection parameters.
2	Open the <i>Restore</i> window in <i>ProTool</i> by selecting the menu items <i>File</i> → <i>Download</i> → <i>Restore</i> .
3	The <i>Archive Description</i> displays the unit concerned and the type of backup data contained in the file.
4	Configure the operating unit according to the required transfer channel and switch to download mode (refer to Chapter 5.1 and 5.2).
5	Start the restore process by clicking on the Start restore button.
6	A progress indicator appears during the data transfer. When the transfer is successfully completed, a message appears briefly.

5.9 License Transfer (Authorization) Using ProSave


To protect the software, licenses supplied on a Siemens AG disk can be transferred to the operating unit via a PC and enabled.

License transfer using stand-alone ProSave

License transfer to the operating unit:


Step	Action
1	Start <i>ProSave</i> on the PC using the Windows Start menu.
2	Use the <i>General</i> tab register to select the required device type and connection type with corresponding connection parameters.
3	Select the <i>Authorize</i> tab control.
4	Select the disk drive containing the license disk.
5	The licenses available on the disk are displayed under <i>Selection</i> .
6	Select the required license.
7	Configure the operating unit according to the required transfer channel and switch to download mode (refer to Chapter 5.1 and 5.2).
8	Press the button depicted to transfer them to the operating unit. The selection appears in the <i>Installed authorizations</i> : 

Deinstalling licenses from the operating unit:


Step	Action
1	Start <i>ProSave</i> on the PC using the Windows Start menu.
2	Use the <i>General</i> tab register to select the required device type and connection type with corresponding connection parameters.
3	Select the <i>Authorize</i> tab control.
4	Configure the operating unit according to the required transfer channel and switch to download mode (refer to Chapter 5.1 and 5.2).
5	Press the Device Status button to display all the licenses installed on the operating unit. These appear in the <i>Installed authorizations</i> :
6	Select the license to be deinstalled.
7	Press the button depicted to deinstall it from the operating unit. The selected licenses appear under <i>Selection</i> . 

License transfer using ProSave integrated in ProTool

License transfer to the operating unit:

Step	Action
1	In <i>ProTool</i> , select <i>File → Download → Preferences</i> and use the <i>Set download</i> window to define the connection type with the corresponding connection parameters.
2	Open the <i>Authorize</i> window in <i>ProTool</i> by selecting the menu items <i>File → Download → Authorize</i> .
3	Select the disk drive containing the license disk.
4	The licenses available on the disk are displayed under <i>Selection</i> .
5	Select the required license.
6	Configure the operating unit according to the required transfer channel and switch to download mode (refer to Chapter 5.1 and 5.2).
7	Press the button depicted to transfer them to the operating unit. The selection appears in the <i>Installed authorizations</i> : 

Deinstalling licenses from the operating unit:


Step	Action
1	In <i>ProTool</i> , select <i>File → Download → Preferences</i> and use the <i>Set download</i> window to define the connection type with the corresponding connection parameters.
2	Open the <i>Authorize</i> window in <i>ProTool</i> by selecting the menu items <i>File → Download → Authorize</i> .
3	Configure the operating unit according to the required transfer channel and switch to download mode (refer to Chapter 5.1 and 5.2).
4	Press the <i>Device Status</i> button to display all the licenses installed on the operating unit. These appear in the <i>Installed authorizations</i> :
5	Select the license to be deinstalled.
6	Press the button depicted to deinstall it from the operating unit. The selected license appears under <i>Selection</i> . 

Note


Uploading licenses can only be executed to a disk which contained or still contains the same license.

Load applications using ProSave integrated in ProTool

Loading applications on the operating unit:

Step	Action
1	In <i>ProTool</i> , select <i>File → Download → Preferences</i> and use the <i>Set download</i> window to define the connection type with the corresponding connection parameters.
2	Open the <i>Options</i> window in <i>ProTool</i> by selecting the menu items <i>File → Download → Options</i> .
3	Use <i>Selection</i> to select the path containing the required application.
4	The corresponding application is displayed under <i>Available options</i> :. Select the required application.
5	Configure the operating unit according to the required transfer channel and switch to download mode (refer to Chapter 5.1 and 5.2).
6	Press the button depicted to transfer them to the operating unit. The selection appears in the <i>Installed options</i> :. 

Deinstalling an application from the operating unit:

Step	Action
1	In <i>ProTool</i> , select <i>File → Download → Preferences</i> and use the <i>Set download</i> window to define the connection type with the corresponding connection parameters.
2	Open the <i>Options</i> window in <i>ProTool</i> by selecting the menu items <i>File → Download → Options</i> .
3	Configure the operating unit according to the required transfer channel and switch to download mode (refer to Chapter 5.1 and 5.2).
4	Press the <i>Device Status</i> button to display all the licenses installed on the operating unit. These appear in the <i>Installed options</i> :.
5	Select the application to be deinstalled.
6	Press the button depicted to deinstall it from the operating unit. The selected application appears under <i>Available options</i> :. 

6.1 Holding and Setting Down the Operating Unit

Holding the Mobile Panels 170 in Manual mode



Picture 6-1 Lower arm support for right and left handed users

By holding the unit as illustrated above, movements can be executed on the system being monitored in manual, special operating modes.

The Mobile Panel 170 depicted above can be equally well used by both right and left-handed users, whereby the free hand has access to all the operating elements on the front side. The hand holding the Mobile Panel 170 also has access to the Acknowledgement button. Acknowledgement for control input is possible by actuating just one Acknowledgement button.

The Acknowledgement button, which must be pressed to confirm movements, is positioned for easy access and triggers a safety shutdown in the event of a panic reaction in emergency situations (button released or cramping).

The STOP button can also be access quickly with the free hand.

Note

For right-handed users, it is recommended to insert the connection cable in the left cable guide on the Mobile Panel 170. This variation is more user-friendly, otherwise the connection cable would lie on the user's arm. Refer to Chapter 10.3.4 for a description on how to connect the connection cable.

Holding the Mobile Panels 170 for data manipulation

This method of holding is **only** intended for data manipulation on the system to be monitored.



Picture 6-2 Two-handed support

Notice

When using a special operating mode with manual control of movements which involve potential risks, one of the carrying methods on the lower arm, illustrated in Figure 6-1, must be implemented.

Setting down the Mobile Panels 170

A wall mounting bracket is provided to secure the Mobile Panels 170 safely and on-site. It also enables the Mobile Panel 170 to be used as a stationary operating unit.



Picture 6-3 Mobile Panel 170 fixed to the wall mounting bracket

Notice

If the Mobile Panel 170 is hung on an unsuitable wall mounting bracket, the capability to operate the STOP button may be impaired.

6.2 Operating Elements

The Mobile Panel 170 is equipped with the following operating elements:

- C-STN-LC display, Q-VGA, with touchscreen, analog, resistive
- Membrane keyboard
- Acknowledgement buttons

and optionally

- Knob
- STOP button
- Pushbutton with integrated LED
- Key-operated switch

6.3 Touchscreen

Overview

The operating unit touchscreen is used to observe the operating status of the system being monitored and, at the same time, to intervene directly in the process running simply by touching the relevant buttons and input fields displayed.



Picture 6-4 Touchscreen

6.3.1 Operating touch elements

Definition

Touch elements are contact-sensitive operating elements provided on the touchscreen, such as buttons, input fields and message windows. Their operation is basically no different from pressing conventional keys. Touch elements are operated by touching them, e.g. with a finger.



Caution

Touch only **one** point of the Mobile Panel 170 touchscreen. Never touch more than one touch element at a time. Otherwise, an action may be unintentionally initiated.

Note

Never use pointed or sharp instruments to operate the Mobile Panel 170 touchscreen to prevent damage to the plastic surface of the touchscreen.

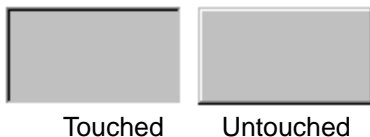
Operation acknowledgement

As soon as the Mobile Panel 170 detects contact of a touch element, it responds with a visual acknowledgement. An acknowledgment is independent of communication with the PLC. It is not an indication of the required action actually having been executed.

The type of visual acknowledgement is dependent on the operating element touched:

- **Buttons**

In the case of 3D-effect configurations, visual representation is distinguished according to the statuses *touched* and *untouched*. The way in which the selected field appears on the screen can be configured (line widths 1 - 10 for the focus and the color of the frame). Examples of representation are illustrated below by means of the Status button.:



- **Hidden buttons**

The focus for hidden buttons does not appear following selection (value for the focus line width is 0, default setting). If the value for the focus width is modified, the dotted outline of the button changes to a line when touched. The outlines remain visible until the focus is moved to another operating element.

- **Input fields**

After touching an input field, the screen keyboard appears as the operation acknowledgement.

Operating screen objects using buttons

Screen objects which are assigned pre-defined buttons can also be operated by buttons outside the screen object. A condition for this is that each function has been linked to the respective button in the configuration.

These functions are compiled in ProTool CS within the *Keyboard action for screen objects*.

6.3.2 Enter numeric values

Screen keyboard for numeric input

In order to enter numeric and hexadecimal values, the Mobile Panel 170 automatically displays a numeric screen keyboard directly after touching an input field on the touchscreen. Keys on the keyboard which are available for operation are highlighted as 3D keys, those not available are simply displayed as areas. After completing the input, the screen keyboard is automatically hidden.

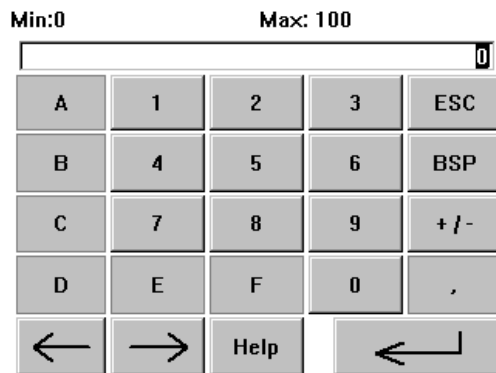
Note

Buttons on the screen keyboard cannot be operated if a decimal field is pressed beforehand.

All keys continue to be operable when they have been used to operate a hexadecimal field.

Figure 6-5 illustrates an example of the screen keyboard for entering numeric values. The keys A to F for entering hexadecimal values are inoperable in this example.

The Help key is only active when a help text has been configured for that particular input field.



Picture 6-5 Screen keyboard for numeric values

The *BSP* key corresponds to the Backspace key.

Action

Numeric and hexadecimal values are entered character by character using the buttons provided on the screen keyboard. Invalid characters are rejected and an error message appears. Confirm the value entered by pressing the Enter key or cancel the input by pressing ESC. The screen keyboard is closed in both cases.

Note

Limit values can be configured for numeric input fields. In this case, values entered are only accepted when they lie within the limits configured. If an attempt is made to enter a value which is outside the configured limits, it is rejected and the original value automatically reinserted. In this case, the operating unit issues a system message.

Note

When the keyboard is displayed, the lower and upper limit values are indicated, when configured.

If the full screen keyboard is open, the PLC job 51 *Changing Screen* has no function.

6.3.3 Enter alphanumeric values

Screen keyboard for alphanumeric values

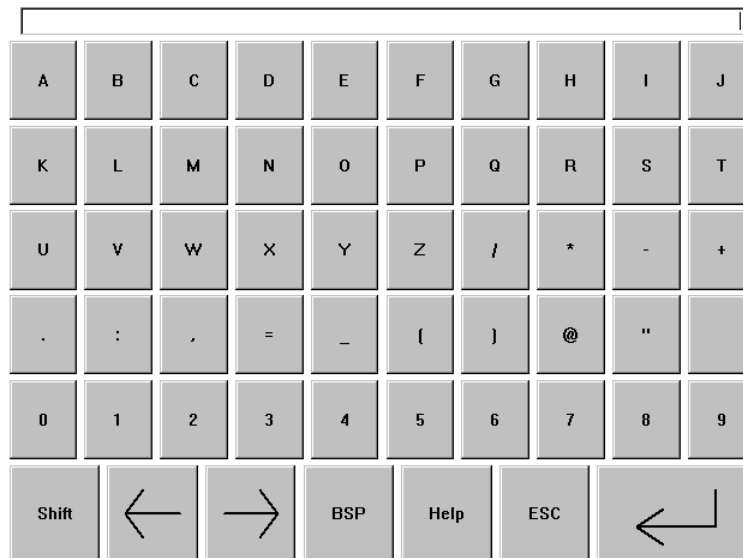
In order to enter a character string, the Mobile Panel 170 automatically displays a full screen alphanumeric keyboard directly after touching an input field on the touchscreen. After completing the input, the screen keyboard is automatically hidden.

Keyboard levels

The full screen keyboard has an alphanumeric layout providing normal and Shift levels. Toggle between the two levels by pressing the `SHIFT` key.

The `Help` key is only active when a help text has been configured for that particular input field.

An example of the keyboard's normal level is illustrated:



Picture 6-6 Screen keyboard for alphanumeric values, normal level

Note

The `BSP` key corresponds to the Backspace key.

Action

Alphanumeric values are entered character by character using the buttons provided on the full screen keyboard. Confirm the value entered by pressing the Enter key or cancel the input by pressing ESC. The screen keyboard is closed in both cases.

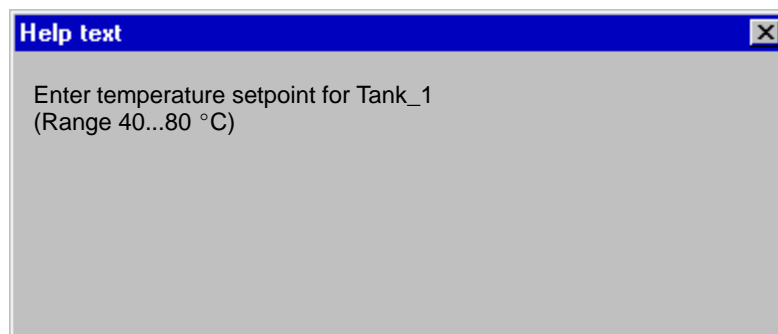
Note

If the full screen keyboard is open, the PLC job 51 *Select Screen* has no function.

6.3.4 Call in help text

Purpose

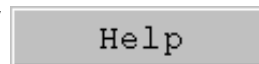
Help texts consist of additional information and operating instructions provided by the configuration planner concerning messages, screens and input fields. Help text, concerning an input field for example, may provide information on permissible value ranges (refer to Figure 6-7) or, in the case of an alarm message, information related to the cause and its elimination.



Picture 6-7 Help text for an input field (example)

Action

- **Help on messages**
Touch the following button in the message window, on the message page, in the message buffer or the message display



- **Help on input fields**
Touch the Help key on the screen keyboard. This key only appears if a configured help text exists.
- **Help on current screen**
If the function *Display Help Text* has been assigned to a button in the project, for example, touch that button to call in the help text configured for the current screen.

6.4 Membrane Keyboard

Overview

The status of the system to be monitored can be observed in the touchscreen and the running process directly influenced by using the integrated membrane keyboard.

Information regarding operation for special screen objects is provided in Chapter 6.

The membrane keyboard of the Mobile Panel 170 is comprised of the function keys F1 to F14 (refer to Figure 6-8).



Picture 6-8 Membrane keyboard

All function keys can be assigned global or picture-specific functions.

Direct keys

In the case of a PROFIBUS-DP connection, buttons can also be configured as direct keys in order to achieve fast keyboard operation. Fast key operation is a condition for Jogging mode (Inching mode), for example.

PROFIBUS-DP direct keys set bits in the I/O area of a SIMATIC S7 directly entered on the operating unit.

Notice

Observe the notes in Chapter 8.2.

Function keys with global function assignment

A function key with **global** function assignment always triggers the same action on the Mobile Panel 170 or in the PLC regardless of the screen currently open (significance of the global function assignment on the Mobile Panel 170). These actions could include:

- Open screen
- Display current alarm messages
- Print screen (hardcopy)

Function keys with local function assignment (softkeys)

A function key with **local** function assignment (softkey) can trigger different actions on the Mobile Panel 170 or in the PLC according to the screen currently open (local significance of current screen). An icon can be configured for each softkey which can then be positioned on the touchscreen.



Caution

If a function key is pressed directly following changing screens, the corresponding function associated with the new screen can be triggered before the screen is generated.

Operating screen objects using function keys

Screen objects assigned to buttons, e.g. message display, trend view representation or recipe view, can also be operated by means of function keys or softkeys. A condition for this is that each relevant function has been linked to a function key or softkey in the project.

These functions are compiled in ProTool CS configuration software in the *Keyboard action for screen objects* group.

6.5 Acknowledgement Button

Overview

The acknowledgement equipment consists of two Acknowledgement buttons which are arranged one on each side of the Mobile Panel 170. The switching positions of the two Acknowledgement buttons is determined by electrical keys. A two-channel evaluation logic is provided for each Acknowledgement button. Each channel converts the information from the Acknowledgement buttons to digital and analog signals (diversity).



Picture 6-9 Acknowledgement button

Operation

Only one Acknowledgement button needs to be actuated. There is no feedback to the PLC, regardless of whether the Mobile Panel 170 is operated with one or two hands.

Note

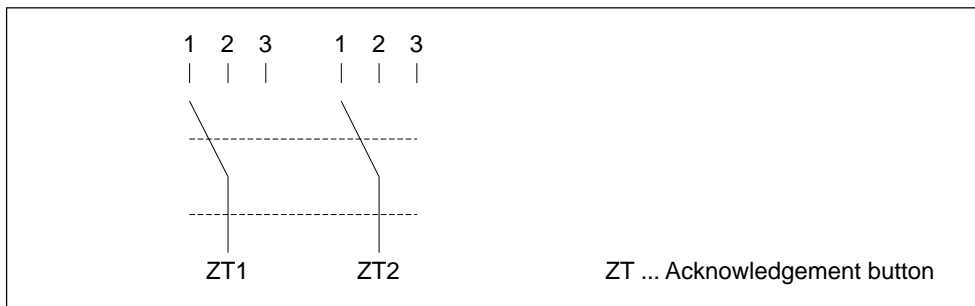
Since there is no electronic connection to the membrane keyboard, the Acknowledgement button and membrane keyboard can be operated simultaneously.

When using an external monitoring unit, the Acknowledgement buttons fulfill the requirements of Safety Category 3 complying to EN 954 (refer to the Appendix, Chapter B.3).

Switch setting

The main function of the evaluation logic is the detection of the three switch positions:

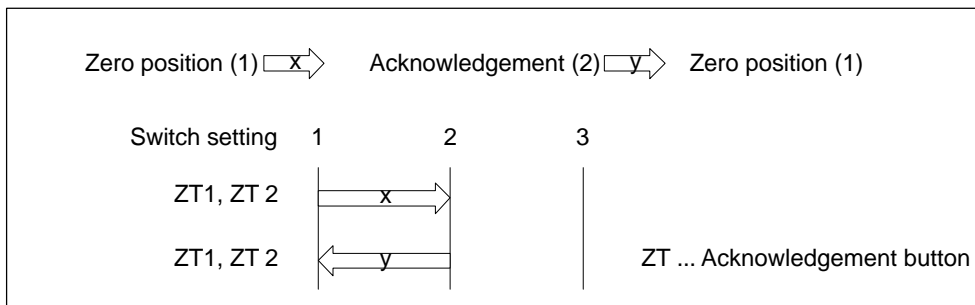
Switch setting	Function	Acknowledgement buttons	Switch status
1	Zero position	Is not pressed	OFF (open)
2	Acknowledgement	Is pressed	ON (closed)
3	Panic	Is pressed through	OFF (open)



Picture 6-10 Switch positions of the Acknowledgement button

The following switching sequences are possible by pressing the Acknowledgement button:

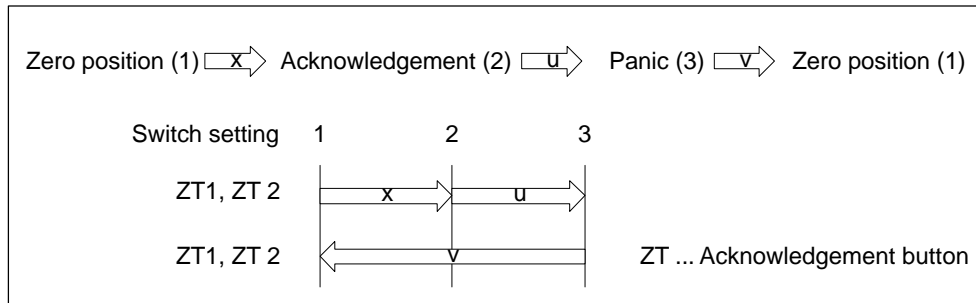
Normal operation



Picture 6-11 Linking of the switch positions when pressed normally

Panic operation

Pressing the Acknowledgement button through to the “Panic” switch position is evaluated so that on releasing the button, the “Acknowledgement” switch position is skipped over.



Picture 6-12 Linking of the switch positions in panic operation

The signals from the Acknowledgement button are transferred to the connectivity box via the connection cable. In the case of manual special operating modes for the system to be monitored, these signals must be transferred from the connectivity box in 2-channel technique into the safety circuit to switch off the power supply.

Furthermore, the positions of the Acknowledgement button can be polled via the CPU in the Mobile Panel 170 and evaluated as non-safety-related functions by the software.

Releasing the Acknowledgement button or bypassing in the panic position does not require an acknowledgement by the safety shutdown feature!

Danger through misuse

To prevent the dangers of misuse of the Acknowledgement button by unauthorized fixation, the following measures are recommended:

- Poll Acknowledgement button. The request must be made
 - when the system to be monitored is switched on and
 - on changing operating mode from “Automatic” to “Manual” mode.
 erfolgen. There must be no acknowledgement in either case.
- The Acknowledgement button must be released within a defined period of time and moved to the “Acknowledgement” switch position again.

The period of time must be selected according to the activity on the system to be monitored.

6.6 STOP button

Overview

The STOP button is an optional operating element for the Mobile Panel 170.

The STOP button is in a 2-circuit design and enables the system to be monitored to be stopped safely.

Depending on the connectivity box implemented, the stop circuit is either broken by unplugging the Mobile Panel 170 or it is automatically bypassed by the connectivity box. More information on the STOP button circuits is available in Chapter 4.4.1 and 4.4.2.

Possible use of the STOP button:

- Initiating a fast stop adapted to the process cycle in a system to be monitored (system, machine or machine zone) with or without disconnection of the power supply.

Advantages:

- Limiting the area affected
 - Quicker capability to restart
 - No loss of machine coordinates and, thus, no recalibration on restarting
 - Preservation of tools and workpieces
- Triggering the emergency stop function in a system to be monitored by looping in the emergency stop circuit.

Advantage:

Simple integration in an existing emergency stop circuit if the system to be monitored has no possibility for a quick-action process stop.



Picture 6-13 STOP button

Operation

The STOP button is operated by pressing it. After the stop has been triggered, the STOP button remains locked in the stop position.

Note

The STOP button is automatically locked when pressed!



Warning

If the STOP button has been pressed and the system to be monitored shut down as a result, the STOP button may only be released when the cause of the stop has been cleared and the system can be restarted without any risks.

To release the STOP button, turn it clockwise. When turned, it automatically springs back to its initial position.

The STOP button is arranged to be equally easily accessible for both right and left-handed operators.

The STOP button, whose height makes it an exposed component on the unit surface, is specially protected by its collar-designed contour. The STOP button can be triggered if the Mobile Panel 170 is dropped, but it is well protected against being broken.

When using an external monitoring unit, the STOP button fulfills the requirements of Safety Category 3 complying to EN 954 (refer to the Appendix, Chapter B.3).

6.7 Knob

Overview

The knob is an optional operating element for the Mobile Panel 170.

It is designed for the entry of incremental values. The knob has no limit stop and no zero setting.



Picture 6-14 Knob

Operation

The knob has a small recess to simplify operation.

Input via the knob can be evaluated by the software as direct DP periphery. The bit coding is described in Chapter 8.2.

6.8 Key-operated Switch

Overview

The key-operated switch is an optional operating element for the Mobile Panel 170.

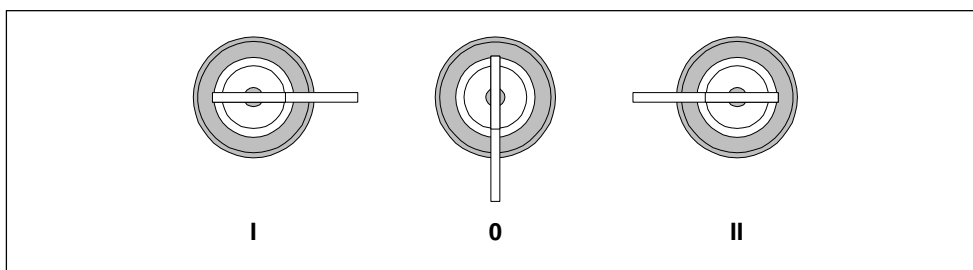
The key-operated switch serves to lock certain function which can be triggered using the Mobile Panel 170.



Picture 6-15 Key-operated switch

Operation

The key-operated switch has three switch positions: I-0-II.



Picture 6-16 Switch positions of the key-operated switch

The switch positions of the key-operated switch can be evaluated by the software as direct decentral periphery. The bit coding of the switch positions is described in Chapter 8.2.

Note

The key for the key-operated switch is enclosed with the operating unit. An operating unit coding is not equipped with this. Therefore, the key can be used for every Mobile Panel 170.

Remove the key after use. This prevents breaking the key should the operating unit fall.

6.9 Pushbutton With Integrated LED

Overview

The pushbutton with integrated LED is an optional operating element for the Mobile Panel 170.

The button is provided for fast digital input. The button is connected to the flat module via a connector.



Picture 6-17 Pushbutton with integrated LED

Operation

The pushbutton with integrated LED is used to key in and is labeled with “I”. When the button is pressed, the LED lights up.

The switching status of the pushbuttons with integrated LED can be evaluated by the software as direct DP periphery. The bit coding of the switch positions is described in Chapter 8.2.

Screen Objects

7

7.1 Operating Screens

Operation of the visualization processes on the operating unit is dependent on the configuration created with the ProTool CS configuration software.

What is a screen?

Screens visualize the progress of processes and display specified process values. A screen contains logically related process data which the operating unit can both display and modify by operating the individual values.

Screens display the current process status in the form of numeric values, bar graphs or trend curves for example. Dynamic screen objects enable, for instance, the current position of a production process to be tracked on the operating unit.

Screen partitions

A screen is basically composed of static and dynamic sections. The terms “static” and “dynamic” do not refer to the possibility of dynamically positioning screen partitions but to the connection to the PLC.

Static partitions, e.g. text and graphics, are not updated by the PLC. Dynamic partitions, e.g. input and output fields, trend curves and bars, are linked to the PLC and display current values constantly read in from the PLC memory. Their connection to the PLC is established by means of tags.

A summary of all the screen objects which the operating unit may contain is provided in Chapter 7.3.

Fixed window

The fixed window is an area at the top of the screen. The height of the fixed window can be configured. Since the content of the fixed window is independent of the screen currently displayed, it is especially suited for displaying important process magnitudes or date and time.

An operating element configured in the fixed window is available in every screen. In the case of the Mobile Panel 170, a button located in the fixed window, for example, can represent a globally effective function key.

Icons

Icons are graphics of a fixed size located at the bottom and sides of the screen. They are defined during configuration and clearly indicate the screen-specific functions of the softkeys in graphic form.

After pressing the respective softkey, the function symbolized on the icon is activated either on the Mobile Panel 170 or the PLC.

Message indicator

The message indicator is a configurable graphical symbol which is displayed on the screen when at least one alarm unit is present or needs to be acknowledged on the operating unit.

The indicator continues to blink as long as unacknowledged messages are present.

The number (in this case 3) represents the number of alarm messages queued.



Operating the message indicator

The response of the message indicator is dependent on whether or not alarm messages are present on the operating unit which still have to be acknowledged at the moment the indicator is touched.

- **Alarm messages to be acknowledged** (message indicator flashing):
The Alarm window is opened after touching the message indicator (see Chapter 7.11.3).
- **Alarm messages to be acknowledged** (static message indicator):
The alarm message page is opened after touching the message indicator (see Chapter 7.11.4).



Use the button depicted to close the alarm window on the Mobile Panel 170 in order to be able to operate screens. The alarm message window can be opened again by touching the message indicator.

Message window

System messages

The operating unit displays internal operating statuses in the system message window. System messages indicate, for example, incorrect operations or communication faults. A summary of some of the most important system messages and explanations on how to eliminate the causes are provided in Appendix, Chapter C of this manual.

- Press the button illustrated.



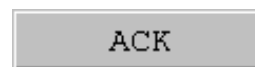
Event Messages

The operating unit uses the event message window to display operating statuses concerning the system to be monitored which is connected to the PLC. The position of the window can be configured.

Alarm Messages

The operating unit uses the alarm message window to display faults concerning the system to be monitored which is connected to the PLC. The position of the window can be configured.

- Press the button illustrated.



Other possibilities for displaying messages are explained in Chapter 7.11. Detailed information on the message window is provided in Chapter 7.11.3.

Select screen

The operating unit can be used to view, operate and print screens. The relevant screen must have been selected beforehand. There are several ways in which to select a screen:

- **Function key/Button**
Pressing a function key or button opens the corresponding screen defined in the configuration.
- **Edit messages**
When configured, pressing the Edit button calls in the message assigned to the screen in the message window or message display, for example.

Note on configuration

Press the key with which the screen should be selected. Select the *Select_screen* function and enter a name for the screen under the *Screen Name* parameter. In the *Field Number* box, enter the Tab key sequence number of the field in which cursor should be located following a change of screens. As soon as the key is subsequently pressed, the function is triggered and the content of the *Screen Name* and *Field Number* parameters evaluated. The corresponding screen is displayed on the operating unit.

7.2 Logging On and Off

Purpose

Operable screen objects, such as input fields and buttons, can be assigned passwords during configuration to prevent them being modified by unauthorized personnel. Important parameters and settings can then only be modified by authorized personnel.

Information on the *Password list* screen object is provided in Chapter 7.14.

Login

In order to access password protected operating elements, it is necessary to log in on the operating unit. In this case, the function *Logon_User* must be linked with an input field, for example, in the configuration. It is then possible to access all password protected operating elements up to the point of logging off from the operating unit.

When correspondingly configured, it is also possible to log on via an input field for confidential password entry. The character string entered is represented by placeholders (*).

If an element is operated which is protected by a password, the login window automatically appears.

Logoff

In order to rule out operation by unauthorized personnel, the login should not remain active on the operating unit for too long a period of time. The following options are available with which to log off from the operating unit:

- **Configured logout time expires**
If the operating unit is not operated by the user within the configured period (logout time), he is automatically logged off from the operating unit.
- **Log out of the operating unit**
If the configuration links the function *Logoff_User* with an operating element, the element can be used log off from the operating unit.

Note

It is possible to log off by entering an incorrect password.

7.3 Overview of Screen Objects

A summary of the various screen objects which a Mobile Panel 170 configuration may contain is provided in the following table.

Table 7-1 Screen Objects

Screen object	Use/Description
Text	<p>Texts are used in the configuration to label display and operating elements, for example. Texts cannot be modified on the operating unit.</p> <p>The importance of different texts within a screen can be distinguished by assigning different fonts and formats.</p> <p>Texts can be configured to cover several lines and in different languages.</p>
Graphics	<p>Graphics can be used in the configuration, for example, to display the system or as explanatory symbols for display and operating elements which have been configured.</p>
Output field	<p>An output field displays current values from the PLC in numeric or alphanumeric form.</p>
Input field (see chapter 7.4)	<p>The input field is used to enter values which are then transferred to the PLC. The values can be in numeric or alphanumeric form. Entries which lie outside the specified value range are rejected according to the limit values which have been configured.</p> <p>The input can be protected by means of a password.</p>
Symbolic output field	<p>A symbolic output field displays current values from the PLC as plain text.</p> <p>Example: Instead of the values 0 and 1 the symbolic output field displays the texts <code>Motor OFF</code> and <code>Motor ON</code>.</p>
Selection fields (see Chapter 7.5)	<p>Values are not entered in the selection field character by character but are selected from a text list. This enables, for example, a motor to be switched on and off by means of the entries <code>ON</code> and <code>OFF</code>.</p>
Date/Time (see Chapter 7.6)	<p>This screen object is used to display and enter the calendar date and time.</p> <p>The way the date and time are displayed depends on the language set on the operating unit.</p>
Graphic display	<p>The graphic display enables the dynamic positioning of graphics from external graphic programs in the project.</p>

Table 7-1 Screen Objects

Screen object	Use/Description
Graphics list	<p>A graphic list displays current values from the PLC in the form of a graphic. It assigns a graphic to each tag value. The value of the tag during runtime determines which graphic is selected from the list and displayed on the operating unit.</p> <p>Example: Instead of the values 0 and 1, the graphics list displays graphical representations for open and closed valves.</p>
Graphic selection box (see Chapter 7.7))	<p>A graphic box enables the selection of a graphic by selecting an entry from a graphics list.</p> <p>Example: Using a graphic selection list it is possible to design the user interface as language independent, for example.</p>
Vector graphics	<p>The following vector graphic objects can be configured:</p> <ul style="list-style-type: none"> • Line • Rectangle/Square • Rounded rectangle/square • Circle/Ellipse • Polyline/Polygon <p>These objects are combined to form vector graphics with simple, basic geometrical shapes in your configuration. The type, color and width of the lines and their transparency, color filling, rounding radius, etc. can be configured as desired.</p>
Button (see Chapter 7.8)	<p>A button is a virtual key on the operating unit screen that can be assigned one or more functions, depending on the configuration. After pressing the button, the functions configured for the event <i>press</i> are triggered. On releasing the button, the functions configured for the event <i>release</i> are triggered.</p>
Hidden button (see Chapter 7.8)	<p>An invisible button is a transparent button that is not displayed on the operating unit. If invisible buttons are located over graphics, for example, it is possible to operate part of the graphic, e.g. a motor or valve.</p> <p>After pressing the button, the functions configured for the event <i>press</i> are triggered. On releasing the button, the functions configured for the event <i>release</i> are triggered.</p>
Status button (see Chapter 7.9)	<p>A Status button is a display and operating element which has one of two states: <i>Touched</i> and <i>Untouched</i>. The states can be indicated by means of text or graphics.</p> <p>The Status button can be configured to be locking (switch function) or non-locking (keying function).</p>
State view	<p>The state view can be used to configure a warning display or indicate the status of a unit which cannot be viewed from the operating unit (e.g. a motor).</p> <p>The response of the state view can be configured.</p>

Table 7-1 Screen Objects

Screen object	Use/Description
Switch (see Chapter 7.10)	A switch serves to enter and display a binary status. It can only be switched on or off.
Message display (see Chapter 7.11.6)	Special filter criteria are configured in the message view for displaying the volatile message buffer and/or message archive.
Single message display (see Chapter 7.11.7)	A single message display can provide a subset of the functionality of a message display. It can be used, for example, to simply realize a message line in a screen.
Bars (see Chapter 7.12)	Bars represent values from the PLC as rectangular areas. The operating unit thus provides a clear indication of how far the current value is from the limit values, or if a setpoint value has been reached, at a glance. Bars are often used to represent fill levels or workpiece numbers. Direction, scaling, bar and background color and labeling the Y-axis can be configured as required. In order to identify limit values, limit value lines can be called in.
Trend view (see Chapter 7.13)	A trend view provides a particularly clear representation of process data when displayed as a continual progression. Several different trend curves can be displayed simultaneously in the trend view.
Password list (see Chapter 7.14)	The password list can be used to display, enter and modify passwords on the operating unit.
Recipe views (see Chapter 7.15)	A recipe view can be used to create, save and transfer data records on the operating unit.

7.4 Input Field

Purpose

Numeric or alphanumeric values are entered character by character in an input field. A numeric value is a number, e.g. 80 as a setpoint value for a temperature. An alphanumeric value can contain text and digits e.g. Valve_12.

Limit value check

If limit values are configured for the input field tags, the values entered are only accepted when they are within the configured limits. If an attempt is made to enter a value which is outside the configured limits, it is rejected and the original value automatically reinserted. In this case, the operating unit issues a system message.

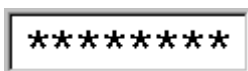
Display

Input fields can be configured differently according to their purpose, e.g.:

- **Numeric input field**
to enter numeric values in decimal, hexadecimal or binary format.
- **Alphanumeric input field**
to enter character strings. It is only possible to enter ASCII characters. They are dependent on the language selected.
- **Input field for date and time**
to enter the calendar date and time. The format is dependent on the language currently set on the operating unit. The figure below illustrates examples of input fields for date and time in US English language format.



- **Input field for confidential password entry**
to enter passwords confidentially. The character string entered is represented by placeholders (*). The figure below illustrates an example.



Operation

Proceed as follows to operate an input field:

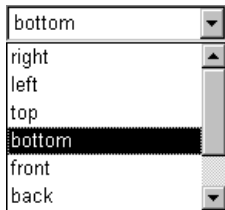
- Touch the input field on the touchscreen.
The screen keyboard automatically appears.
- Enter the required value.
- Confirm the entry
or
- Discard the entry.



7.5 Selection Field

Purpose

Input in a selection field is character by character but are selected from a list.



Picture 7-1 Selection field in opened state (example)

Operation

Touch the selection field on the Mobile Panel 170 touchscreen. In this case, the selection list opens up immediately. After selecting an element from the list, the selection list is closed and the selected text appears in the list box.

If the touch screen is touched outside the pulled down selection list, the list is closed and the entry with the focus appears in the selection field.



Caution

When released, the selected list entry is immediately accepted. Therefore, continue to press the screen with your finger while sliding it to the required entry.

7.6 Date/Time

Purpose

The screen object *Date/Time* displays the calendar date and time. The values can be modified online if the corresponding feature is configured.

The calendar data and time values are synchronized with the operating system values or are read from the PLC. The operating unit accesses these values, for example, to assign time stamps to message events.

Format

The format of the date and time depends on the language currently set. It corresponds to the standard international conventions:

Table 7-2 Examples of language-dependent formats for Date/Time

Language	Example		
	Date		Time
	long	short	
German	Samstag, 7. November 1998	07.11.98	12:59:32
English (USA)	Saturday, November 7, 1998	11/7/98	12:59:32 PM
French	samedi 7 novembre 1998	07/11/98	12:59:32
Italian	sabato 7 novembre 1998	07/11/98	12.59.32
Spanish (traditional)	sábado 7 de noviembre de 1998	7/11/98	12:59:32

The format set for Date and Time can be modified using the *Regional Settings* option in the Windows CE Control Panel. To do so, select the icon depicted on the right. Information on opening the Windows CE Control Panels is provided Chapter 9.3.



Notice

When entering the date and time, ensure that the two values are separated by a space.

Notice

If the operating unit does not support the language specified in the configuration, the display of Date and Time will assume the format of the language currently set in the *Regional Settings* option under *Format*.

Synchronizing date/time with the PLC

Note

The date and time in the operating unit and in the PLC can be synchronized if this feature is configured in the project and PLC program. To do this, the PLC jobs **14** (*Set Time*) and **15** (*Set Date*) are provided. Use PLC jobs **40** and **41** to transfer the date and time from the operating unit to the PLC.

The Mobile Panel 170 can only buffer the date and time for a few days if the power supply is disconnected. If the operating unit will not be used for a longer time, it is recommended to synchronize the date and time via the PLC.

Further information on this is available in the Communication for Windows-based Systems User's Guide.

7.7 Graphic Box

Purpose

The graphic box is an input field for symbolic values. A graphic can be selected by selecting an entry in the graphic list.

Operation

Touch the graphic selection box on the touchscreen. Selection mode is activated. Scroll through the graphic selection list using the scroll bar (vertical or horizontal). Click on the required graphic to select it. The graphic is transferred.

By clicking outside the graphic frame, the graphic selection is rejected.

7.8 Buttons

Purpose

A button is a virtual key located on the operating unit screen. Functions which have been assigned to buttons can be triggered, for example, by the following, configurable events:

- Clicking
- Pressing
- Releasing

Display

- **Labeling**
Buttons can be labeled statically or dynamically. In the case of dynamic labeling, the text or graphic on the button changes during runtime according to the value of a configured tag.

- **Operation acknowledgement**

As soon as the operating element detects a valid operation, it responds with a visual acknowledgement. The acknowledgement, however, does not infer that the required action is actually being executed.

Figure 7-2 illustrates examples of buttons which are pressed (right) and not pressed (left).



Picture 7-2 Example of a button

Hidden buttons

Hidden buttons are transparent buttons which may lie over graphics, for example. This enables plant parts which are graphically displayed on the operating unit to be operated easily (e.g. a motor or valve). If a hidden button is selected on the operating unit, its contour becomes visible and remains so as long as the button is selected. The contour enables the user to detect the operable area of the button. The contour is defined by the configuration.

Operation

Proceed as follows to operate a button:

- Touch the button on the touch screen.

Notice

Click

In the case of a button, a function is triggered when the pressed button is released within the contours of the button.

If the button is pressed using the mouse button or finger (when using touch panels) but moved outside the contour before releasing, the operating unit does not interpret the action as a *click* event. The action is not executed.

Release

In the case of a button, a function is triggered when the pressed button is released.

If the button is pressed using the mouse button or finger (when using touch panels) but moved outside, the function is triggered when the function is released.

Press

In the case of a button, a function is triggered as soon as the button is pressed.

7.9 Status Button

Purpose

The Status button is an operating and display element with the two states *Pressed* and *Released*. Status buttons can indicate the status of units which cannot be seen by the operator (e.g. a motor). At the same time, it is also possible to change the status of the device concerned on the operating unit.

Behavior

The behavior of the Status button can be configured:

- **Switch:**
The switch has two stable states. It toggles from one state to the other each time it is operated, and remains in the respective state until it is operated again.
- **Key:**
The button has a fixed, stable home position. When operated, it switches to the status *pressed* and remains in this state as long as it is kept pressed. When released, it automatically switches back to its *released* position.

Functions which have been assigned to the Status button can be triggered, for example, by the following configurable events:

- Status change
- Pressing
- Releasing

If the status of a *switch* type Status button changes as a result of a modification of configured tags, not through operation, the corresponding function is not executed.

Display

The two indicator statuses of the types *Switch* and *Button with acknowledgement* can be assigned different texts or graphics in ProTool CS which are displayed on the Status button during runtime.

Figure 7-3 illustrates an example of a *switch* type Status button when pressed (left) and not pressed (right).



Picture 7-3 The two statuses relate to the Status button when the Switch option is set

Operation

Proceed as follows to operate a Status button:

- Touch the Status button on the touchscreen.

Notice

Release

In the case of a button, a function is triggered when the pressed button is released.

If the button is pressed using the mouse button or finger (when using touch panels) but moved outside, the function is triggered when the function is released.

Press

In the case of a button, a function is triggered as soon as the button is pressed.

7.10 Switch

Purpose

A switch serves for the input and output of a binary status. It can only be switched on or off. It is linked to a tag to do this. The status *OFF* corresponds to the value 0 (a logical FALSE) of the tag linked to the switch. All tag values other than zero (a logical TRUE) are interpreted as the status *ON*.

Behavior

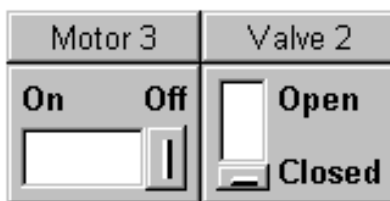
Functions which have been assigned to the switch, can be triggered, for example, by the following, configurable events:

- Change of status
- Switch on
- Switch off

If the switch status changes as a result of a modification of configured tags, not through operation, the corresponding function is not executed.

Display

Figure 7-4 illustrates an example of two switches with different orientation.



Picture 7-4 Switches with different orientation

Operation

Proceed as follows to operate a switch:

- Slide the sliding lever to the required position or double-click on the object. The switch moves to the new position.

7.11 Messages

Message categories

Messages on the operating unit indicate events and statuses related to control processes. The operating unit differentiates between the following message categories:

- **Event messages**
indicate a status in the process, for example, `Motor ON`. Event messages are configured.
- **Alarm messages**
indicate an equipment failure, for example, `Motor temperature too high`. Alarm messages are configured. Alarm messages must be acknowledged due to their critical nature.
- **HMI system messages**
are triggered by the operating unit. They are not configured. System messages indicate, for example, incorrect operations or communication faults. A selection of important system messages is provided in the Appendix, Chapter C.
- **SIMATIC diagnostic events**
provide information on the status of the SIMATIC S7 and SIMOTION. They are not configured in the ProTool CS configuration software. Refer to the S7 manual for the error number indicated on the operating unit to determine the cause of the error.

Acknowledging alarm messages

Alarm messages must be acknowledged due to their importance. This can be done manually on the operating unit or automatically by the PLC. The message indicator depicted continues to be flash as long as unacknowledged alarm messages are still present on the operating unit when this feature has been configured.



If several messages are displayed at the same time and the user acknowledges alarm messages, the acknowledgement acts in hierarchical sequence on the various message displays:

1. Message display with focus
2. Alarm window
3. Message line
4. Message display in basic screen

When configuring messages, it is possible to define whether the operator must acknowledge each message individually or whether the acknowledgement is valid for a group of messages (group acknowledgement). The use of group acknowledgement in respect of messages is particularly useful when they relate to the same cause, e.g. the messages for the first-up fault and the follow-up faults.

Buffering messages

All message events (arrived, departed, acknowledged) are stored in an internal volatile buffer.

Display messages

The events stored in the message buffer can be displayed according to different criteria. The following predefined objects are available for display purposes:

- Message line (refer to Page 7–18)
- Message window (refer to Page 7–19)
- Message page (refer to Page 7–20)
- Message buffer (refer to Page 7–21)
- Message view
 - Message display with full functionality (refer to Page 7–22)
 - Single message display with restricted functionality (refer to Page 7–23)

Deleting messages

All message events concerning event and alarm messages are automatically stored in the message buffer. There are two methods of deleting message events from the message buffer:

- **Automatic deletion on buffer overflow**
When the message buffer is no longer capable of accepting new message events, the operating unit automatically deletes a number of message events until the configured remaining buffer capacity is reached. In this case, the oldest message events are deleted first.
- **Deletion by operating the operating unit**
In order that messages can be deleted manually from the message buffer, the function *Delete_message_buffer* must be defined in the configuration e.g. linked to a button or function key. In this way, the following message categories can be selected for deletion according to the configuration:
 - All messages
 - Alarm messages
 - Event messages
 - HMI System Messages
 - SIMATIC diagnostic events

Print messages

When correspondingly configured, event messages can be printed out directly when the message events *Arrived* and *Departed* occur, and also alarm messages when the event *Acknowledged* occurs. System messages are not logged.

Information on setting printer parameters is provided in Chapter 9.8.

7.11.1 ALARM_S

Definition

ALARM_S is a message number procedure. The message identification numbers are assigned automatically by the configuration in STEP 7 or SIMOTION SCOUT. The unique assignment of the message text is made according to these numbers. The advantage here is that the message texts can be used on various operating units but only need to be entered once.

If a fault occurs, the operating unit receives the message by means of the message number. The associated message is determined and issued according to the number.

In addition to the message status (*arrived*, *departed*, *acknowledged*), the PLC also stores time. This information is retained even after the message has been sent, so that individual network components (e.g. operating units) can log on later and be updated.

Configuring ALARM_S messages

ALARM_S messages are not configured in ProTool CS but in STEP 7, e.g. for S7-300/400-CPU's or in SIMOTION SCOUT. The display of ALARM_S messages can only be configured when a SIMATIC S7 PLC is used and the ProTool CS configuration software has been integrated in STEP 7.

During the configuration, it is useful to define the time of occurrence of a message in milliseconds.

Detailed information on the configuration of ALARM_S messages is available in the *ProAgent/MP and ProAgent/PC* user guides.

Restarting S7 CPUs

Depending on the hardware configuration of the CPUs, it is possible that under certain circumstances all queued ALARM_S messages will be deleted when S7 CPUs are restarted. Older stocks of S7-300 CPUs cannot inform the operating units involved of the restart. The result of this is that messages are indicated on the operating unit as being queued although the CPU has already deleted them.

Remedy:

Disconnect the connection between the operating unit and CPU and then reconnect them again. Use the function e.g. *Connect_Disconnect_PLC*.

7.11.2 Message line

Purpose

When a message line has been configured it is always displayed, regardless of the screen selected. The message line displays the last alarm or event message received. The message line is a permanent feature on the operating unit and always displays the current message. If a separate window has been configured for alarm messages, the message line only receives the current event message.

Display priorities

Alarm messages always have priority over event messages. If no alarm messages are present or they have all been acknowledged, event messages are displayed.

7.11.3 Message window

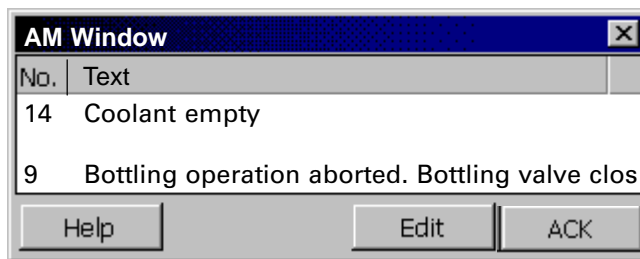
Purpose

The message window displays all messages in the respective message categories which are queued or need to be acknowledged.

It is possible to configure how the alarm messages are sorted. It is also possible to select whether the latest or oldest message is displayed first.

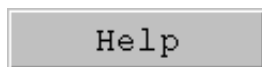
Alarm messages

If one of the display modes *Window/Window*, *Window/Line* or *Window/Off* is configured, the message window for alarm messages opens automatically as soon as an alarm message arrives. Figure 7-5 illustrates an example.



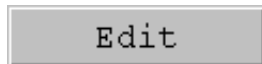
Picture 7-5 Alarm window

Significance of the buttons



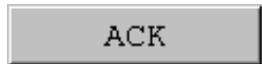
Call Help text

Use this button to call in the help text configured for the selected message.



Edit Message

Use this button to trigger the function assigned to the `Edit Message` event for the selected message.




Acknowledge alarm messages

Use this button to acknowledge unacknowledged alarm messages.

Event messages

In order to be able to open the event message window by means of the mouse or keyboard the function `Display_event_message_window`, for example, must be linked to a function key or button in the project.

System messages

The message window for system messages opens automatically as soon as a system message arrives. The window is closed automatically after the configured duration of display has expired or by pressing .

7.11.4 Message page

Purpose

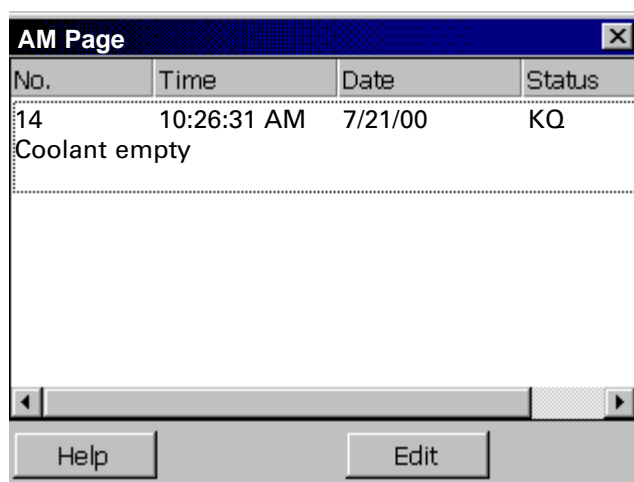
The message page displays all messages allocated a time stamp. It is also possible to select whether the latest or oldest message is displayed first. Open message pages are constantly updated.

Structure

In order to have access to the message page for event messages and/or alarm messages, the following functions must have been configured:

- for event messages: *Display_event_message_page*
- for alarm messages: *Display_alarm_message_page*

Figure 7-6 illustrates an example of the message page for alarm messages.



Picture 7-6 Alarm message page

Information on the significance of the buttons is provided in Chapter 7.11.3.

The queued alarm messages can also be selected via the message indicator.

It is possible to configure how the alarm messages are sorted.

The column width can be modified by means of touch operation.

7.11.5 Message buffer

Purpose

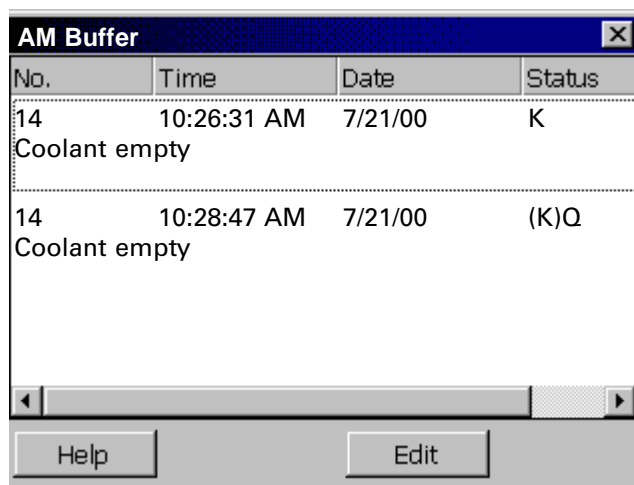
The message buffer displays all message events allocated a time stamp. It is also possible to select whether the latest or oldest message is displayed first. Open message buffers are constantly updated.

Structure

In order to have access to the message buffer for event messages and/or alarm messages, the following functions must have been configured:

- for event messages: *Delete_event_message_buffer*
- for alarm messages: *Delete_alarm_message_buffer*

Figure 7-7 illustrates an example alarm message buffer.



Picture 7-7 Alarm message buffer

Information on the significance of the buttons is provided in Chapter 7.11.3.

The message buffer is organized so that in the case of a buffer overflow the oldest message events are overwritten ("FIFO buffer"). It is also possible to delete the entire buffer or specific message categories from time to time (*Delete_message_buffer*) function. This relieves the system load and provides a clearer overview of the message buffer.

It is possible to configure how the alarm messages are sorted.

The column width can be modified by means of touch operation.

7.11.6 Message display

Purpose

Certain views are defined in the message indicator for messages which are queued or still to be acknowledged or for message events in the message buffer. Various filter criteria are available in ProTool CS for this purpose.

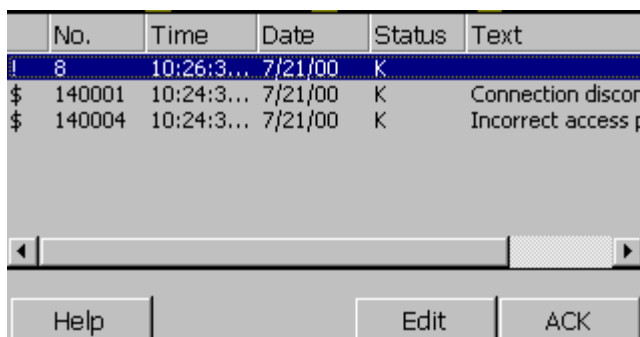
Filter criteria include:

- Message number
- Time
- Message states
- Message text
- Date
- Category name
- Acknowledgment group

The attribute *PLC* is only useful when more than one PLC is configured as source of the message. In this way, the precise fault location can be displayed with date/time of the message event.

Structure

Figure 7-8 illustrates an example of a message display. This display can also be used to acknowledge alarm messages.

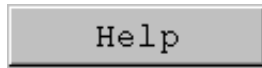


No.	Time	Date	Status	Text	
!	8	10:26:3...	7/21/00	K	
\$	140001	10:24:3...	7/21/00	K	Connection discon
\$	140004	10:24:3...	7/21/00	K	Incorrect access p

Help Edit ACK

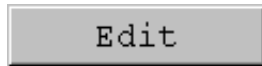
Picture 7-8 Message view

Significance of the buttons



Call Help text

Use this button to call in the help text configured for the selected message.



Edit Message

Use this button to trigger the function assigned to the `Edit Message` event for the selected message.



Acknowledge messages

Use this button to acknowledge unacknowledged alarm messages.

Message categories

In order to be able to distinguish between the different message categories, they are marked in the first column of the message display:

!	Alarm messages
Empty	Event messages
\$	HMI System Messages
S7	SIMATIC diagnostic events

Alarm_S messages are displayed either as alarm messages or event messages. SFM messages (System Fault Messages) are displayed as alarm messages.

7.11.7 Single message display

Purpose

The single message display provides a reduced amount of the functionality of the message display (see Chapter 7.11.6). This provides a simple method with which, for example, to create a message line to display event and system messages in a screen.

Structure

The single message display cannot be operated. The figure below provides an example of a single message display with the following columns configured:

- Date
- Time
- Message number
- Message states
- Message text

```
12.12.99 14:27:06 110001 K
Change to operating status 'online'

12.12.99 14:27:07 140001 K
Connection discontinued: Station 2, Rack 0, Slot 0
```

7.12 Bar Graphs

Purpose

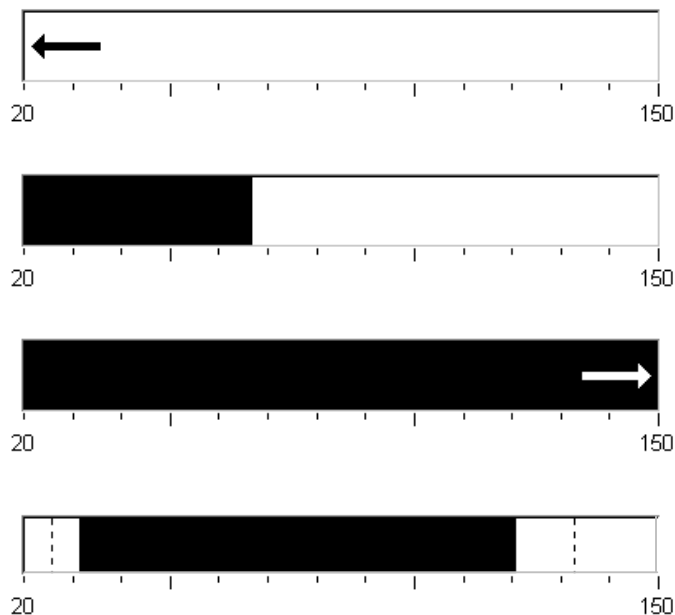
Bar graphs present a value in the form of a rectangular area. The operating unit thus provides a clear indication of how far the current value is from the limit values, or if a setpoint value has been reached, at a glance. Bar graphs can be used to display fill levels or quantities, for example.

Display

It is possible to configure minimum and maximum values and the direction bar graph moves by increasing the tag value:

Figure 7-9 depicts the various states of a horizontal bar graph:

1. Value drops below the minimum value configured
2. Value lies within the configured display range
3. Value exceeds the maximum value configured
4. Value lies within the configured limit range



Picture 7-9 Different bar states

7.13 Trend View

Purpose

The trend view is a particularly clear form of displaying process data in a continuous manner. In the case of processes that only change slowly, the trend view can visualize events that have already occurred and provides access to, and estimate of trends in the process sequence.

Configurable properties

A number of different trends can be displayed simultaneously in the trend view. The following properties are among those which can be configured for a trend graphic:

- **Trend Type:** *Trend curve*
- **Triggering:** *Clock trigger*
- **Limit values:** *Upper and lower limits*
The operating unit displays the points at which configured limit values are reached or exceeded by changing the color of the trend display.
- **Color:** *Uncertain status*

The *uncertain status* function highlights areas of the trend view in which communication to the unit was interrupted and, as a result, no values could be recorded.

Read line

The *read line* function is used in a trend graphic to display or hide a read line which displays Y-values associated to an X-value.

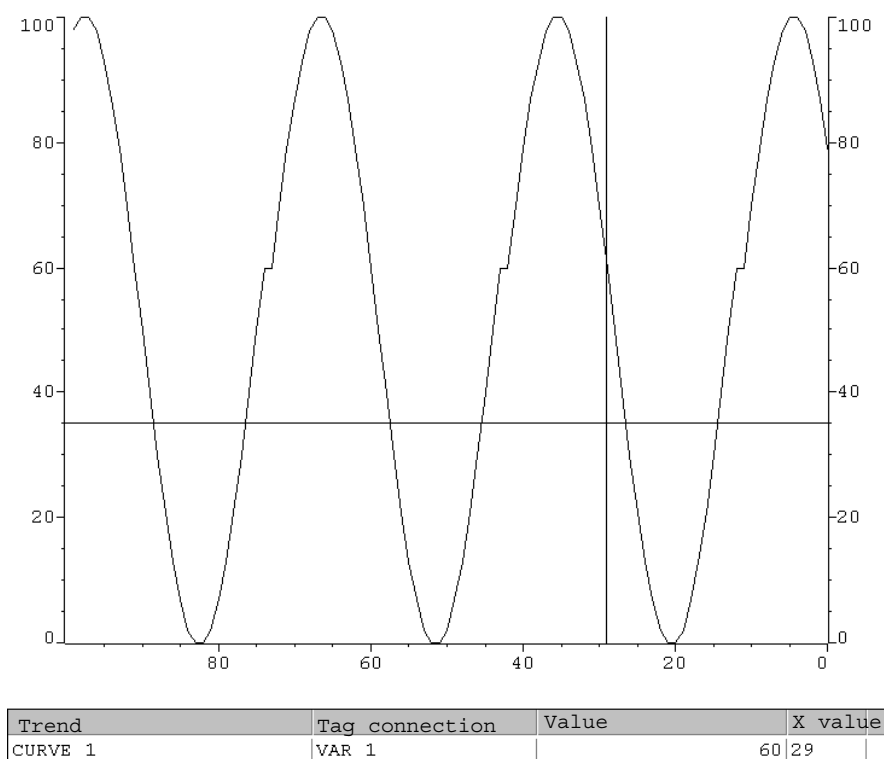
The read line can be activated by means of the *Trend_view_read_mark_on_off* function (default: Off). The color of the read line can be configured in the *Color* tab control.

If the *Display Value Table* function is activated in the *Value Table* tab control, a table appears in the trend view containing the values of the trend curve displayed.

The read line can be operated via touch. It is also possible to configure buttons for the functions *Trend_view_read_mark_forward* and *Trend_view_read_mark_backward*. When the read line is moved, the values in the value table (when activated) are automatically updated accordingly.

Structure

Figure 7-10 illustrates an example of a trend view with a trend curve and configured buttons to navigate in the trend, read line and related value table.



Picture 7-10 Operable trend view with read line (example)

Navigation using buttons or function keys

When correspondingly configured, the following functions may be assigned to buttons, for example, to navigate in the trend view:

Function	Function
Start_stop_trend_display	Interrupts the current updating process for the trend view until the button is pressed again.
Trend_display_back_to_beginning	Scrolls back to the start of the trend recording.
Trend_display_scroll_forward, Trend_display_scroll_back	Shifts the trend section half a window width to the left/right.
Trend_display_extend, Trend_display_compress	Expands/compresses the trend view horizontally.
Trend_view_read_mark_on_off	Switches the read line on or off.
Trend_view_read_mark_forward	Moves the read line to the right.
Trend_view_read_mark_backward	Moves the read line to the left.

7.14 Password List

Purpose

While the system is being configured using ProTool CS, additional operating elements can be protected against unauthorized use by means of passwords. Important parameters and settings can then only be modified by authorized personnel. The password level and user name are stored with the password.

The *Report_password_change* function causes a system message to be issued when a different password is entered on the operating unit, i.e. a new user logs on.

The *Write_user_name_to_tag* function is used to write the name of the user currently logged on into a tag of type "STRING". If the tag is one with a PLC link, the user name also exists in the PLC and can be used for the user-dependent enabling of certain functions. User names must always be unique for the assignment. They are stored in a password file.

Password hierarchy

Hierarchically defined password levels from 0 to 9 exist for password protection purposes. When a password is assigned to an individual user or to a whole user group, the permission to execute functions at a specific level is assigned simultaneously. If, for example, a user is assigned to password level 4, he or she is authorized to execute functions of password levels 0 to 4.

Password level

Password level 0:

This minimum password level is assigned to functions that have no, or only a minimal effect on the course of the process. In order to trigger functions assigned to Password Level 0, no password needs to be entered.

Password levels 1 to 8:

Functions are assigned to levels 1 to 8 according to their increasing importance. Before triggering a function with a password level greater than 0, the operating unit requests the corresponding password to be entered.

Password level 9:

Only the supervisor (system support specialist or service technician) is granted authorization to execute functions assigned to password level 9. The supervisor is authorized to access all the functions on the operating unit.

Logging in on the operating unit (login)

After calling a function protected by a password, the operating unit automatically requests the entry of a password. Once entered, the password need not be entered again in order to call in other functions of this password level or lower.

When correspondingly configured, it is also possible to log on via an input field for confidential password entry. The character string entered is represented by placeholders (*).

Logging off from the operating unit (logoff)

In order to rule out operation by unauthorized personnel, a password level greater than 0 should not remain active on the operating unit over too long a period of time. The following options are available to explicitly reset passwords levels:

- **Configured logout time expires**
If the operating unit is not operated within the period of time configured (logout time), the current password level is automatically reset to 0.
- **Manual logout**
If the function *Logoff_user* is linked to an operating element in the project, it can be used to reset the current password level to 0.

Note

It is also possible to reset the current password level to 0 by entering an incorrect password.

7.14.1 Password management

Individual users can be entered in a password list on the operating unit and assigned a password level according to their specific responsibilities. When processing the list, conclude each field entry by pressing the Enter key. The password list contains all the passwords configured on the operating unit. The list is coded and stored on the operating unit, protected against a power failure.

Figure 7-11 illustrates an example of a password list with six entries.

User	Password	Level
Superuser	100	9
Bayer	pw1	1
Lerp	pw2	2
Müller	pw3	3
Schmidt	pw4	4
Service	pw5	5

Picture 7-11 Example of a password list

View password list

Only those passwords are displayed which have a password level equal to or lower than that with which the user is currently logged in. The operating unit displays the password list entries in alphabetic order.

Creating a password

The user can only edit the password list up to the level with which he is currently logged in. All passwords used in the system must be unique. It is not possible to assign identical passwords to different users. It is possible, however, to assign the same password level to different users without any restrictions.

Deleting a password

To delete a password from the password list, overwrite the password level assigned to it with 0.

7.14.2 Export/Import password list

Purpose

If a system includes several operating units which are accessed by the same users, the same passwords must be installed on each operating unit. In order that the password list need not be re-entered on each operating unit, it can be created on unit and imported on other units.

Note

During an import, all currently valid passwords are overwritten. The imported passwords become valid immediately.

If an existing user name or password is entered, the corresponding system message is issued.

Condition

In order to be able to export/import password lists on the operating unit, the *Import_Export_Passwords* function must be linked to a button or function key, for example. The file name of the password list to be exported/imported must be specified as the function parameter during configuration.

Note

- The password list is coded. It cannot be edited with external tools.
 - Do not export a password list directly after it has been modified. Exit the screen object *Password List* after changing it and wait with the export function until modifications have been written in the internal Flash memory.
-

Action

Proceed as follows to export or import the password list:

1. Insert the CF card.
2. Deactivate the write protection on the CF card.
3. Operate the element linked to the *Export_Import* function.
4. Wait for the message indicating that the import or export has ended.
5. Remove the CF card.

If a fault occurs during the process, a fault message appears.

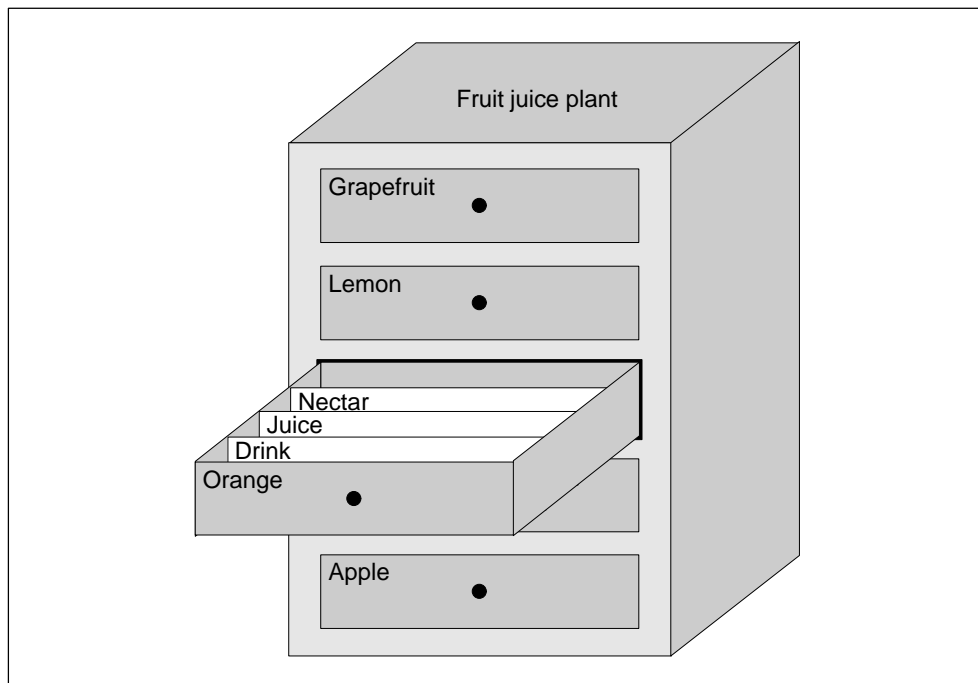
7.15 Recipes

Purpose

The purpose of recipes is to transfer of quantities of related data **together** and **synchronously** from the operating unit to the PLC and back again.

Principles of operation

Using the example of the filing cabinet (refer to Figure 7-12), the two terms *Recipe* and *Data Record* should be defined because they are important for subsequent understanding of the process.



Picture 7-12 Recipe and Data Record, using a filing cabinet as an analogy

- **Recipe**

Recipes correspond to the individual drawers of the filing cabinet illustrated (e.g. grapefruit or lemon). The reference value fields (tags) belonging to the particular recipe are defined in each drawer. The recipes define the data structure in ProTool CS. This structure cannot be modified later on the operating unit.

- **Data record**

Data records correspond to the filing cards in the individual drawers of the cabinet (e.g. Drink, Juice and Nectar). A data record contains the values for a recipe. Data records are created, modified and deleted on the operating unit. The data records are also stored on the operating unit. This saves storage space on the PLC.

The Import/Export function provides the additional option of using external tools to edit exported data records e.g. Excel and then reimporting them on the operating unit.

Example of a recipe

An example for use of a recipe is its application on a filling station of a fruit juice system. The same filling station is used to produce orange drink, orange juice and orange nectar. The mixing ratios are different for each product. The ingredients are always the same.

Assume that a recipe called *Mixture* is created, which has the following data structure:

Tag	Name
Var_2	l orange
Var_3	l water
Var_4	kg sugar
Var_5	g flavor

The designations l Orange, g Aroma etc. of the tags are the so called *entry names*. The entry names represent the ingredients and also appear on the operating unit. In this way, for example, the tag Var_2 can be identified as the tag designating the mixture component Orange.

The data records contain the values for the different drink types. The data records may appear as follows, for instance:

Orange drink		Orange juice		Orange nectar	
l orange	90	l orange	95	l orange	70
l water	10	l water	5	l water	30
kg sugar	1.5	kg sugar	0.5	kg sugar	1.5
g flavor	200	g flavor	100	g flavor	400

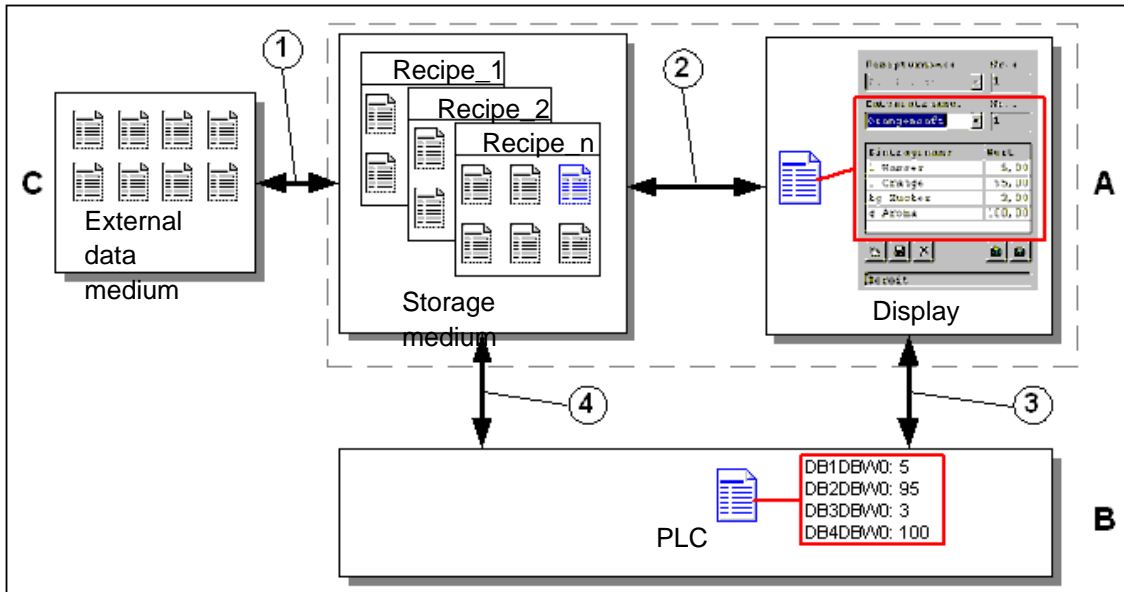
7.16 Use of Recipes

The following section contains a description of the data flow for recipes and three application scenarios illustrating the use of recipes in the form of short, practical examples. They should provide a top level overview of the possibilities for using recipes:

- The first scenario illustrates a recipe configuration in which the data entered is not immediately transferred to the PLC. This configuration is used, for example, when it is necessary to enter data on the operating unit without interfering with an active process.
- In the second scenario, data is immediately transferred to the PLC. This configuration can be used, for example, to start up a machine and correct the positioning data online.
- The third scenario implements data record functions in order to control production automatically via a job list.

7.16.1 Data flow for recipes

The diagram illustrates various possibilities concerning data flow when using recipes. The data flow between the active components operating unit (A), PLC (B) and external data medium (C) is dependent on the configuration of the recipe and the functions used.



Picture 7-13 Data flow for recipes

The operating unit (A) stores the recipe data records on a storage medium, e.g. Flash. The recipe data record can be edited in a recipe view or recipe screen on the operating unit display:

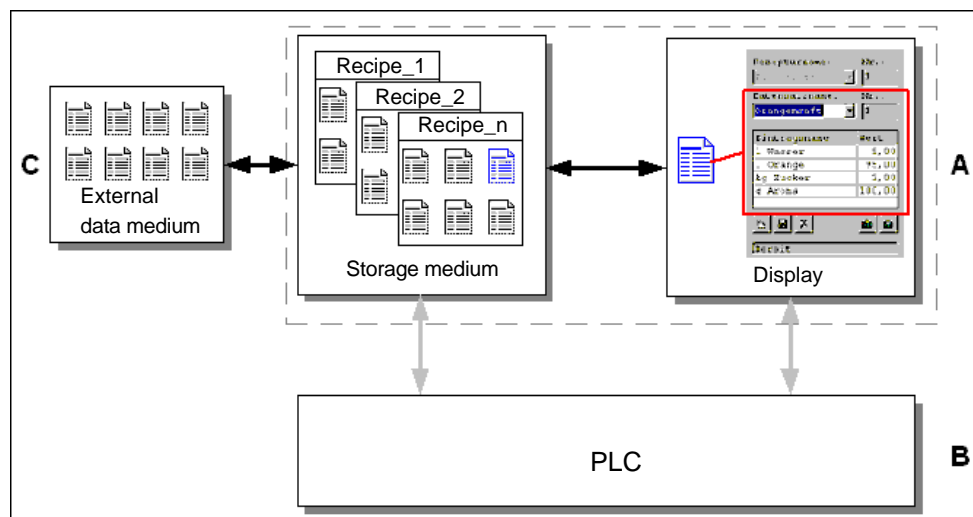
- A new data record can be entered and can then, for example, be stored on the storage medium (2) and transferred (3) to the PLC (B).
- The data record can be exported to an external data medium (C), e.g. a PC. The data record is saved in CSV format, regardless of the recipe. This file can then be loaded and edited in MS Excel, for example.
- A data record can be loaded (2) from the operating unit storage medium or import (1) it as a CSV file from an external data medium.

A recipe data record can also be transferred (4) directly from the storage medium to the PLC or loaded from the PLC to the storage medium. In the same way, a recipe in the display can be transferred (3) to the PLC or loaded from it.

7.16.2 Application examples

Scenario 1: Enter data record

Production data must be entered on operating unit (A) without interfering in the active process. The production data should not be transferred to the PLC (B).

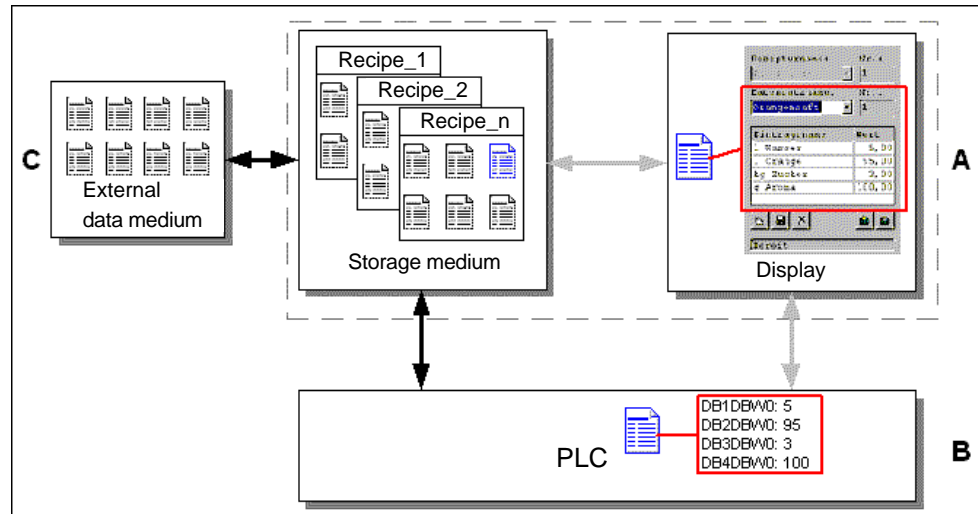


Picture 7-14 Process

Enter the production data in the recipe view or recipe screen, assign a data record name and save the new data record on the operating unit storage medium.

Scenario 2: Automatic production process

Production should be automated by means of a job list. The production data should be transferred directly to the PLC (B) either from the data medium in the operating unit (A) or from an external data medium (C). It is not necessary to show it in the display.



Picture 7-15 Process

Production can be controlled via PLC jobs which automatically transfer the production data records to the PLC.

The automatic production process can be realized using the data record functions provided: The *Import_Data_Records* function loads data records from a CSV file to the data medium. The *Data_Record_DAT_to_PLC* function transfers a data record from the data medium to the PLC.

7.17 Recipe Configuration

Basic procedure

The basic steps to configuring a recipe are listed below:

1. Define the structure of the recipe:

Assign tags to the recipe structure. These tags are assigned entries from the data records.

Define a name for the recipe. This name is used to select the recipe in the project and on the operating unit.

2. Set recipe tag properties

The following options can be configured in ProTool CS:

- *Synchronize tags*
This option defines that the data from a data record has been read from the PLC or data medium and written in the tag or read from the tags configured for the recipe. This establishes a connection between the tags configured in the recipe and the tags in the screens. When a data record is loaded, the values are written to the tags used in the screens.
- *Tags offline*
If this option is also activated, the values entered are only stored in the tags, and not transferred to the PLC. Otherwise, values entered are transferred directly to the PLC.

3. Define data record storage medium operating unit

The data storage location for data records can be configured. The following settings are possible:

- Internal Flash memory
- Memory card (CF card)

Caution

Cyclical writing access is not permitted for the internal Flash memory because it reduces the service life of the Flash memory and thus the service life of the operating unit. Use an external memory card instead.

4. Set download synchronization

It is possible to configure whether the data records are downloaded to the PLC with or without synchronization.

5. Creating a recipe screen

Configure one or more screens in order to create, store, and download data records on the operating unit. Depending on the application, use either the recipe view or create a copy of the system, e.g. using input/output fields in recipe screens.

- Recipe view:
The recipe view enables an uncomplicated, quick method of handling recipes and data records with a minimum of configuration work. Normally, they are used to process data records with smaller recipes in table form.
- Recipe screen:
The operator can use recipe screens to customize the user interface for editing data records and, for example, simulating the system visually, providing graphics and individual masks for entering data records. Recipe screens are particularly recommended for data records with a relatively large number of entries.

Further information

Detailed information on how to create a recipe is provided in the online help to the ProTool CS configuration software and in the *ProTool Configuring Windows-based Systems* user's guide.

System limits

The table provides an overview of the system limits for recipes.

Elements	Number
Number of recipes	100
Data records per recipe	200 (limited by storage medium)
Entries per recipe	200

Memory requirements for data records

The memory requirements per recipe (in kByte) is calculated from the three summands $D1 + D2 + D3$.

The following applies:

$$D1 = [(no. of entries \times 9 + \text{tag name total length}) + 4] : 1024$$

$$D2 = [(no. of data records \times 12) + 4] : 1024$$

$$D3 = [no. of data records \times (\text{data record length} + N) + 4] : 1024$$

$D1$, $D2$ and $D3$ are rounded up to the next whole number.

A data record length is the sum of all the tag lengths configured for the data record in bytes. For example, a tag of the type *FLOAT* has a length of 4 byte.

The tag name total length is the sum of the length of all the tag names which are used in the entries.

The following applies for N :

Data record name < 13 characters: $N = 12$

Data record name > 12 characters: $N = 40$

Notice

The internal Flash memory has a maximum storage capacity of 32 kByte.

Note

In the interest of optimizing the service life of the operating unit and achieving a better performance, use an external memory card to store data records.

7.18 Editing Data Records

Methods

Data records can be edited on the operating unit in tables or screens:

- **Tabular editing**

The recipe view (refer to Chapter 7.18.1) is available for editing data records in tabular form. The recipe view enables recipes and data records to be handled in an uncomplicated, quick way.

Normally, they are used to process data records with smaller recipes offline. Values entered on the operating unit are not directly transferred to the PLC when entered.

- **Editing in recipe screens**

The configuration planner can use recipe screens (refer to Chapter 7.18.2) to customize the user interface for editing data records and, for example, simulating the system visually, providing graphics and individual masks for entering data records.

This method is typically used for processing medium and large data records offline in the recipe view. The values entered on the operating unit are only saved in the tags, not transferred to the PLC directly on input.

7.18.1 Recipe view

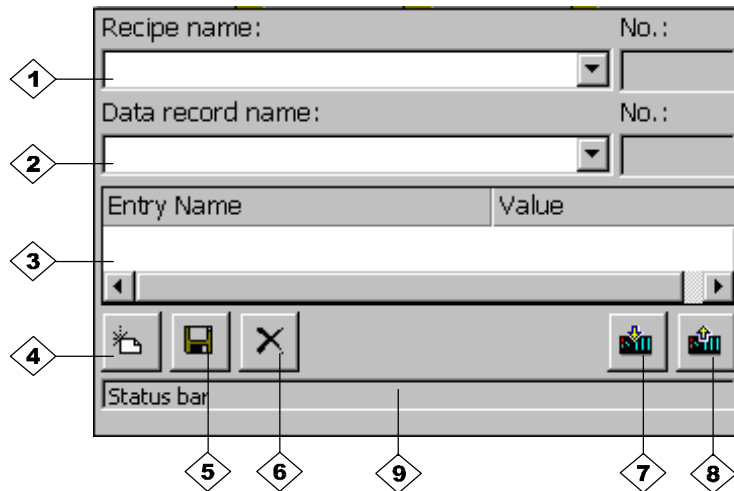
Purpose

The recipe view is typically used to edit recipe data records in tabular form. This provides an uncomplicated method of displaying, creating, copying, modifying, deleting and downloading data records on the operating unit.

All descriptions on editing data records provided in this Chapter 7.18.1 relates purely to the use of the recipe view. Information on editing data records in recipe screens is provided in Chapter 7.18.2.






Display





Figure 7-16 illustrates an example of the layout of the recipe view. Some of the operating and display elements can be configured so that they are faded out on the operating unit.



Picture 7-16 Layout of the recipe view (example)



Significance of the operating and display elements

No.	Function
 1	<p>Select recipe</p> <p>If the corresponding function is enabled in ProTool CS, it is possible to select a configured recipe in this selection field. The number of the selected recipe is displayed to the right of the selection field. This number is only relevant during the configuration. They cannot be modified on the operating unit.</p>
 2	<p>Select data record</p> <p>As soon as a recipe has been selected, the data records available are displayed in this field. In addition, the data record number is displayed to the right. The number field only becomes active when the input of a data record number is permitted, e.g. after changing the data record number or creating a new data record.</p>
 3	<p>View/Edit entries</p> <p>This table contains all the entries which are configured in the selected data record. Sorting complies to the configured sequence. The right-hand column displays the associated values.</p> <p>The entry names cannot be edited on the operating unit.</p>
 4	<p> Create new data record</p> <p>This button initiates the creation of a new data record. The setpoint values are predefined with default values configured as start values for the respective tags.</p>

No.	Function
5	 <p>Save data record This button is used to save the current values of the data record displayed on the operating unit data medium. The memory location is defined in ProTool CS. The data record is stored under the currently defined name and number.</p>
6	 <p>Delete data record This button is used to delete the data record currently displayed for the defined recipe from the operating unit data medium.</p>
7	 <p>Read data record from the PLC This button is used to read the data record related to the currently set recipe from the PLC and display the values on the operating unit.</p>
8	 <p>Write data record in the PLC This button is used to write the current data record values in the PLC.</p>
9	<p>Status bar The operating unit displays the status of the current operation in this line, e.g. Downloading.</p>

Other buttons

The following buttons are only visible when they have been correspondingly configured by means of an attribute in the recipe view:

	<p>Synchronize This button is used to synchronize the data in a recipe view with the associated tag. Modified values are written in the corresponding tags in the table of a recipe view. All the values are then written from the tags to the recipe view and updated in the table. This ensures consistency between the recipe view and tags. The button is only enabled for use in the case of recipes with synchronized tags.</p>
	<p>Save data record as After pressing this button, a dialog appears in which to select an existing data record name and modify it. After confirming the dialog, the current values are stored under the new name.</p>

Note

- If the two options *Synchronize Tags* and *Tags Offline* are activated in the project, the values from the table are applied when values in the tables and screens are changed simultaneously.
- If the data record currently being edited in the recipe view is changed in the background (e.g. by means of a PLC job), the recipe view is not automatically updated.

Notes on operation using the recipe views

- **Quick selection of recipes and data records**

When the selection field is opened up, enter the first letter of the recipe or data record to be selected to access the relevant area of long lists, thus speeding up the selection procedure.

- **Edit entries**

If the value marked in the recipe view is to be modified, it is initially deleted by pressing one of the alphanumeric keys. This occurs with regard to all list elements in Windows. In order to prevent this, proceed as follows:

- After selecting the value to be changed, press the Enter key.
- Move the text cursor to the position to be changed using the cursor keys.
- Insert the modifications.
- Confirm the changes, e.g. by pressing the Enter key.



Displaying data records

Proceed as follows to display data records on the operating unit data medium:

Step		Action
1	Select recipe	<p>Step 1 is only possible when recipe selection has been configured.</p> <ul style="list-style-type: none"> • Select the selection field for the configured recipes (Position 1 in Figure 7-16). • Open the selection field and mark the required recipe in the opened selection list. • Confirm the selection.
2	Select data record	<ul style="list-style-type: none"> • Select the selection field for the existing data records (Position 2 in Figure 7-16). • Open the selection field and mark the required data record in the opened selection list. • Confirm the selection. <p>The selected data record is loaded. The configured entries are displayed in table form with name and setpoint value.</p>

Creating new data records

Proceed as follows to create new data records on the operating unit:

Step		Action
1	Select recipe	<ul style="list-style-type: none"> Select the required recipe as described in <i>Displaying data records</i> Step 1 on Page 7–41.
2	Create data record 	<ul style="list-style-type: none"> Press the key depicted on the left. <p>The data record name must then be entered. The smallest possible number is suggested as the number for the data record. The entries in the table are assigned the configured start values.</p>
3	Enter data record name	<ul style="list-style-type: none"> Enter a new data record name in the selection field for data records (Position 2 in the figure on Page 7–39). After entering the data record name, the next free data record number is automatically entered on the right. This number can be changed, if necessary.
4	Change values	<ul style="list-style-type: none"> Enter a setpoint value for each entry configured in the table (Position 3 in the figure on Page 7–39).
5	Save data record 	<ul style="list-style-type: none"> Press the key depicted on the left. <p>The new data record is written on the data medium.</p> <p>The operating unit responds with a system message if the name or number entered already exist.</p>


Storage location for new data records

The data storage location for the new data record can be configured. The following settings are possible:

- Internal Flash memory
- Memory card (CF card)


Copying data records

In order to copy data records, save them under new names. Proceed as follows:

Step		Action
1	Select recipe and data record	<ul style="list-style-type: none"> Select the required recipe and the data record to be copied as described in <i>Displaying data records</i>, Steps 1 and 2 on Page 7–41.
2	Enter data record name	<ul style="list-style-type: none"> Enter a new data record name in the selection field for data records (Position 2 in the figure on Page 7–39). After entering the data record name, the next free data record number is automatically entered on the right. This number can be changed, if necessary.
3	Save data record 	<ul style="list-style-type: none"> Press the key depicted on the left. <p>The new data record is written on the data medium.</p> <p>The operating unit responds with a system message if the name or number entered already exist.</p>


Proceed as follows to copy an existing data record and select a data record name

Proceed as follows to copy an existing data record after selecting the data record name:

Step		Action
1	Select recipe and data record	<ul style="list-style-type: none"> Select the required recipe and the data record to be copied as described in <i>Displaying data records</i>, Steps 1 and 2 on Page 7–41.
2	Change values	<ul style="list-style-type: none"> Modify the values necessary.
3	Save data record as 	<ul style="list-style-type: none"> Press the key depicted on the left. A dialog opens containing a data record name selection field which can be edited. The selection field contains the name of the data record selected. Select the required data record name and edit it. After confirming with <i>OK</i>, a new data record is created under the name specified with the current values based on the previously selected data record. <p>The newly created data record is displayed in the recipe view.</p>

Changing data records

Proceed as follows to change existing data records:

Step		Action
1	Select recipe and data record	<ul style="list-style-type: none"> Select the required recipe and the data record to be copied as described in <i>Displaying data records</i>, Steps 1 and 2 on Page 7–41.
2	Change values	<ul style="list-style-type: none"> Change the setpoint value in the table (Position 3 in the figure on Page 7–39). The entry names cannot be edited on the operating unit.
3	Save data record 	<ul style="list-style-type: none"> Press the key depicted on the left. The modified data record overwrites the original data record on the data medium.

Notice


If large-scale modifications have been carried out in recipes in ProTool CS and, after downloading the modified project, the data records on the operating unit data medium deviate a great deal from the original recipe structure, it is recommended to reorganize the data medium:

- Firstly, export the data records of all the recipes (refer to Chapter 7.18.4).
- delete the data records using the function *Delete_Data_Record_Memory*.
- import the data records using the function *Import_Data_Records*.

In this way, all the tags no longer used are deleted.


Renaming data records

Proceed as follows to rename existing data records:

Step		Action
1	Select recipe and data record	<ul style="list-style-type: none"> Select the required recipe and the data record to be copied as described in <i>Displaying data records</i>, Steps 1 and 2 on Page 7–41.
2	Enter data record name	<ul style="list-style-type: none"> Enter a new data record name in the selection field for data records (Position 2 in the figure on Page 7–39). After entering the data record name, the next free data record number is automatically entered on the right. Reset this number to its original value.
3	Save data record 	<ul style="list-style-type: none"> Press the key depicted on the left. The modified data record is written on the data medium. The operating unit responds with a system message if the name or number entered already exist.

Deleting data records

Proceed as follows to delete data records on the operating unit data medium:

Step		Action
1	Select recipe and data record	<ul style="list-style-type: none"> Select the required recipe and the data record to be modified as described in <i>Displaying data records</i>, Steps 1 and on Page 7–41.
2	Delete data record 	<ul style="list-style-type: none"> Press the key depicted on the left. <p>The data record is deleted from the data medium after confirming a confirmation request.</p>


Note

It is possible to configure the *Delete_Data_Records* function to directly delete individual recipes, all data records in a recipe or all recipes. To delete data records using this function, it is not necessary to configure a recipe view.

It is still possible to configure the *Delete_Data_Record_From_View* function with which the currently displayed data record will be deleted.

Reading data records from the PLC


Proceed as follows to update data records in the operating unit working memory with values from the PLC:

Step		Action
1	Select recipe	<ul style="list-style-type: none"> Select the required recipe as described in <i>Displaying data records</i> Step 1 on Page 7–41.
2	Read values 	<ul style="list-style-type: none"> Press the key depicted on the left. The current values are read from the PLC and displayed.
3	Edit data records	<ul style="list-style-type: none"> The data can then be edited, e.g. values modified, saved, downloaded to PLC, etc. <p>The operating unit responds with a system message if downloading from the PLC is not possible because, in cases where synchronization with the PLC is configured, for example, the data mailbox is currently locked.</p>

Downloading data records to the PLC


In order that a modified or new data record can take effect in the PLC, it must be downloaded to the PLC.

Proceed as follows to download data records to the PLC:

Step		Action
1	Select recipe and data record	<ul style="list-style-type: none"> Select the required recipe and the data record to be downloaded as described in <i>Displaying data records</i>, Steps 1 and 2 on Page 7–41.
2	Write values 	<ul style="list-style-type: none"> Press the key depicted on the left. The values are written in the PLC. <p>The operating unit responds with a system message if downloading from the PLC is not possible because, in cases where synchronization with the PLC is configured, for example, the data mailbox is currently locked.</p>

Synchronizing a data record

Proceed as follows to synchronize the data in a recipe view with the associated tag:

Step		Action
1	Select recipe and data record	<ul style="list-style-type: none"> Select the required recipe and the data record to be copied as described in <i>Displaying data records</i>, Steps 1 and 2 on Page 7–41.
2	Synchronize data record 	<ul style="list-style-type: none"> Press the key depicted on the left. Modified values in the recipe view are written in the corresponding tags. Finally, all the values are read from the tags to table, which is updated accordingly. This ensures consistency between the recipe view and tags.

7.18.2 Recipe screens

Purpose

Recipe screens are typically representations of the system. The screens provide display and operating elements with which to create, save, modify, delete and download data records. Large recipes can be split into several topic-specific screens and clearly displayed, e.g. with graphic elements.

Components for editing data records

In order to be able to edit data records in recipe screens on the operating unit, the corresponding components, e.g. input/output fields and functions, must be configured:

- **Recipe view:**
Recipe screens can contain a recipe view (Page 7–38) not only to enable the easy selection of recipes and data records but also for editing data records. The configured functional scope of the recipe view can vary, according to the intended purpose.

Information on editing data records in recipe screens is provided from Page 7–38. The instructions stipulated there generally also apply for editing data records in recipe screens. However, in this case, input is performed in the screens.

- **Functions:**
Depending on whether a recipe view is configured in the project or not, and on the properties assigned to it, there are various functions available to transfer data records between operating unit and PLC, e.g.:

for recipe views

- *Load_Data_Record*
- *Save_Data_Record_from_Display_as*
- *Save_Data_Record_from_Display*
- *Delete_Data_Record_from_Display*
- *Synchronize_Data_Record_in_Display*
- *Data_Record_Display_to_PLC*
- *Data_Record_PLC_to_Display*

for recipe screens

- *Load_Data_Record*
- *Save_Data_Record*
- *Delete_Data_Record*
- *Data_Record_PLC_to_Tags*
- *Data_Record_Tags_to_PLC*
- *Recipe_Tags_Online_Offline*

for downloading data records between data medium and PLC

- *Data_Record_DAT_to_PLC*
- *Data_Record_PLC_to_DAT*

for exporting and importing data records

– *Export_Data_Records*

– *Import_Data_Records*

Further functions for recipes:

– *Delete_Data_Record_Memory*

– *Convert_Data_Record_Number_to_Name*

More functions and PLC jobs, which are linked to the downloading of data records, are described on Page 7–50.

Note

It is possible to read in data or data records from the PLC. To do this, functions such as *Data_Records_PLC_to_Tags* or *Data_Records_Tags_to_PLC* and parameters such as *Recipe number/name* and *Data record number/name* are available in which to assign specific names.

Editing data records offline

The way in which data records are edited on the operating unit is defined during configuration. It is typically used for the offline editing of data records in recipe screens. Values entered on the operating unit are not directly transferred to the PLC when entered.

Proceed as follows to edit data screens in recipe screens offline:

Step	Action
1	Trigger reading of the selected data record from the storage medium: <ul style="list-style-type: none"> • With recipe view It is automatically loaded on selecting the data record. Select the required data record as described in <i>Displaying data records</i> in Steps 1 and 2 on Page 7–41. • Without recipe view Activate the operating element linked with the <i>Load_Data_Record</i> function. The function parameters must have been set accordingly beforehand.
2	The data of the data record is written to the tags.
3	Edit the tags using the configured input/output fields.
4	Save the modified tags. <ul style="list-style-type: none"> • With recipe view Click the Save button. If necessary, you must first specify a new name. • Without recipe view Activate the operating element linked with the <i>Save_Data_Record</i>. The function parameters must have been set accordingly beforehand.

Editing data records online

In order to edit data records online, the option must either be defined during configuration or the *Recipe_Tags_Online_Offline* function configured in the project. In the case of online editing, the values entered are transferred directly to the PLC. This method is normally used when commissioning the system to be monitored for test, run-up and positioning purposes.

Proceed as follows to edit data records on the operating unit online:

Step	Action
1	If data records are edited offline in the configuration, switch to offline mode at this point by using the <i>Recipe_Tags_Online_Offline</i> function.
2	<p>Trigger reading of the selected data record from the storage medium:</p> <ul style="list-style-type: none"> • With recipe view It is automatically loaded on selecting the data record. Select the required data record as described in <i>Displaying data records</i> in Steps 1 and 2 on Page 7–41. • Without recipe view Activate the operating element linked with the <i>Load_Data_Record</i> function. The function parameters must have been set accordingly beforehand.
3	The data of the data record is written to the tags and thus also to the PLC.
4	Edit the tags using the configured input/output fields. This will simultaneously change the values in the PLC as well.
5	<p>Save the modified tags.</p> <ul style="list-style-type: none"> • With recipe view Click the <i>Save</i> button. If necessary, you must first specify a new name. • Without recipe view Activate the operating element linked with the <i>Save_Data_Record</i>. The function parameters must have been set accordingly beforehand.

Note

When editing data records online, the entered values are transferred to the PLC without synchronization. Therefore, when changing individual values, ensure that no impermissible operating statuses occur in the system to be monitored.

7.18.3 Functions and PLC jobs

Functions

The following functions can be used to import and export recipe data records for editing with external tools:

- *Export_Data_Records*
- *Import_Data_Records*

They can be used to either import and export either individual data records or all data records in a recipe, according to the configured parameters.

The following functions can be used to transfer data records between the PLC and operating unit data medium.

- *Data_Record_DAT_to_PLC*
- *Data_Record_DAT_to_PLC*

The data medium is the internal Flash memory, the memory card or any network path. Both the recipe and data record must be specified as parameters in which the values should be written.

The following functions enable data records to be transferred to the PLC which are currently being displayed in the recipe view on the operating unit.

- *Data_Record_PLC_to_Display*
- *Data_Record_Display_to_PLC*

The values from the data record tags are written directly to the addresses in the PLC.

Parameters which can be changed for recipe functions

- **Return values**

It is possible to configure the optional *Return values* parameter for various recipe functions. This parameter enables a message to be issued concerning the status of a function. Functions can be processed in succession using *Change value*.

Values

- 2: Function in progress
- 4: Function completed without errors
- 12: Function completed with errors

- **Status message**

It is possible to configure the *Status message* parameter for various recipe functions. This parameter defines whether a corresponding system message should appear when a function has been completed.

Values

1: After importing the data records, a status message is issued.

0: No status message

PLC jobs

The following two PLC jobs can be used to transfer data records between the PLC and operating unit automatically:

- *No. 69: "PLC → DAT"* (read data record from PLC)
- *No. 70: "DAT → PLC"* (write data record in PLC)

Information on PLC jobs is provided in the *Communication for Windows-based Systems User's Guide*.

7.18.4 Import/Export data records**Purpose**

When the appropriate features have been configured, data records on the operating unit can be exported as CSV files to the data medium. This feature can be used to edit data records with external tools, e.g. with a spreadsheet program or text editor and import them on the operating unit again.

Condition

In order to export and import data records during runtime, the project must contain the following functions:

- *Export_Data_Records*
- *Import_Data_Records*

These functions must be linked in the ProTool CS configuration software, e.g. to a function key or button.

File format CSV

With file format CSV, the table columns (entry name and value) are separated by a separator (e.g. semicolon). Each table row (entry) is terminated by a line feed.

The example in Figure 7-16 (Page 7–39) appears as follows in CSV format for the individually exported data record *juice*:

```
Orange;Juice
3;2
Var_2;95
Var_3;5
Var_4;0.5
Var_5;100
```

Additional information is stored in the first two lines:

- Line 1:
Name of the recipe and data record
- Line 2:
Number of the recipe and data record

The operating unit interprets the information on importing the file.

Note

When the CSV files are edited with an external text editor, the modifications are saved in text format (without control codes).

Export/Import all data records of a recipe or all recipes

When appropriately configured, all the data records in a recipe or all recipes can be imported/exported together. The CSV file for the example on Page 7–32 then appears as follows:

```
Orange;Drink;Juice;Nectar
3;1;2;3
Var_2;90;95;70
Var_3;10;5;30
Var_4;1.5;0.5;1.5
Var_5;200;100;400
```

Additional information is stored in the first two lines:

- Line 1:
Name of the recipe and all the configured data records
- Line 2:
Number of the recipe and all the configured data records

The operating unit interprets the information on importing the file.

In this way, the CSV file can be used, for example, to create new data records by means of a spreadsheet program (Figure 7-17). After importing the modified file, the new data records can be used on the operating unit.

The screenshot shows a Microsoft Excel spreadsheet with the following data:

	A	B	C	D	E
1	Orange	Drink	Juice	Nectar	
2		3	1	2	3
3	Var_2		90	95	70
4	Var_3		10	5	30
5	Var_4		1.5	0.5	1.5
6	Var_5		200	100	400
7					
8					
9					
10					

Picture 7-17 Create data records externally (example: Microsoft® Excel)

If all the recipes are exported, a CSV file is created for each recipe.

Exporting, editing and importing data records

Proceed as follows in order to export data records on the operating unit in a CSV file, edit it using with an external tool (e.g. spreadsheet program or text editor) and import it back on the operating unit:

Step	Action
1	<p>Export data record</p> <ul style="list-style-type: none"> Press the operating element linked with the <i>Export_Data_Records</i> function (e.g. function key or button). Depending on the configuration, either all the data records are exported to the data medium or only the data record defined in the project. The data records are exported in the file which was configured in the parameter <i>File Name</i> in the function <i>Export_Data_Records</i>. Copy the CSV file onto a changeable data medium.
2	<p>Edit CSV file</p> <ul style="list-style-type: none"> Carry out the modifications in the CSV file with an external tool, e.g. Microsoft® Excel or a text editor. Save all the modifications on the memory card (CF card). Copy the CSV file back to the original directory.
3	<p>Import data records</p> <ul style="list-style-type: none"> Activate the operating element linked with the <i>Import_Data_Records</i> function. The data records are copied in the data storage area configured for the recipe.

Note

If data records should be exported and the CSV files edited on a different Windows system using a spreadsheet program (e.g. Microsoft® Excel), ensure that the decimal separator and list separator are identical on the two different systems.

These settings can be modified from the Windows Start menu using: *Settings* → *Control Panel* → *Language* on the *Numbers* tab control (refer to Page 9–9).

The operating unit is supplied with the German language options set.

7.18.5 Reaction on changing the recipe structure

Standard behavior

The following section describes the standard behavior of the operating unit when it detects differences between the data record structure stored on the data medium and the recipe structure currently loaded on the operating unit.

Load and export data records, and write in the PLC

- The data record on the data medium contains additional tags:
The values are rejected.
- The data record on the data medium contains values which cannot be converted to the assigned tag type:
The configured start value for the tag is used.
- Tags are missing in the data record on the data medium:
The configured start value for the tag is used.

**Warning**

The assignment is lost on changing the tag name.

Note

Export the data record after changing the recipe structure and check the exported values.

Notice

If large-scale modifications have been carried out in recipes in ProTool CS and, after downloading the modified project, the data records on the operating unit data medium deviate a great deal from the original recipe structure, it is recommended to reorganize the data medium:

- firstly, export the data records of all the recipes (refer to Chapter 7.18.4),
- delete the data records using the function *Delete_Data_Record_Memory*,
- import the data records using the function *Import_Data_Records*.

In this way, all the tags no longer used are deleted.

Import data records

- The imported data record contains additional tags:
The values are rejected.
- The imported data record contains values which cannot be converted to the assigned tag type:
The configured start value for the tag is used. This occurs, for example, when the tag type in the project has been changed.
- Tags are missing in the imported data record:
The configured start value for the tag is used.

Note

Export the data record after changing the recipe structure and check the exported values. Also observe the applicable safety notes in Chapter 7.18.1, Section “Changing data records”.

Special Functions for Mobile Operation and Monitoring

8

8.1 Connection Point Dependent Screen and Function Selection

Note

A system to be monitored can be divided into several zones or function areas by means of the connectivity boxes, whereby the safety functions can also be set up according to the zones. I.e. both the Acknowledgement button and STOP button can each only be effective for one respective zone.

Configuration detection

If different operating screens and functions are required by the Mobile Panel 170 at various connection points, it is recommended to proceed as follows:

1. In order to detect the connectivity box to which the Mobile Panel 170 in the PLC, the connectivity box must be wired on the hardware side to a PLC input signal.

If the Mobile Panel 170 is connected to one of the connectivity boxes, the input bit in the PLC is set to "1".

2. These inputs can be polled by means of a ProTool tag and used in the configuration to call in and hide screens and functions.

Notice

Observe the information in Table B-5 and the notes on the switches "Present 31" and "Present 32".

Note

By using the *User Version* area pointer, it is possible to ensure that the Mobile Panel 170 is connected to the PLC defined in the configuration.

The *User Version* area pointer can only be assigned to one PLC per configuration (refer to the “Communication for Windows-based Systems” User’s Guide).

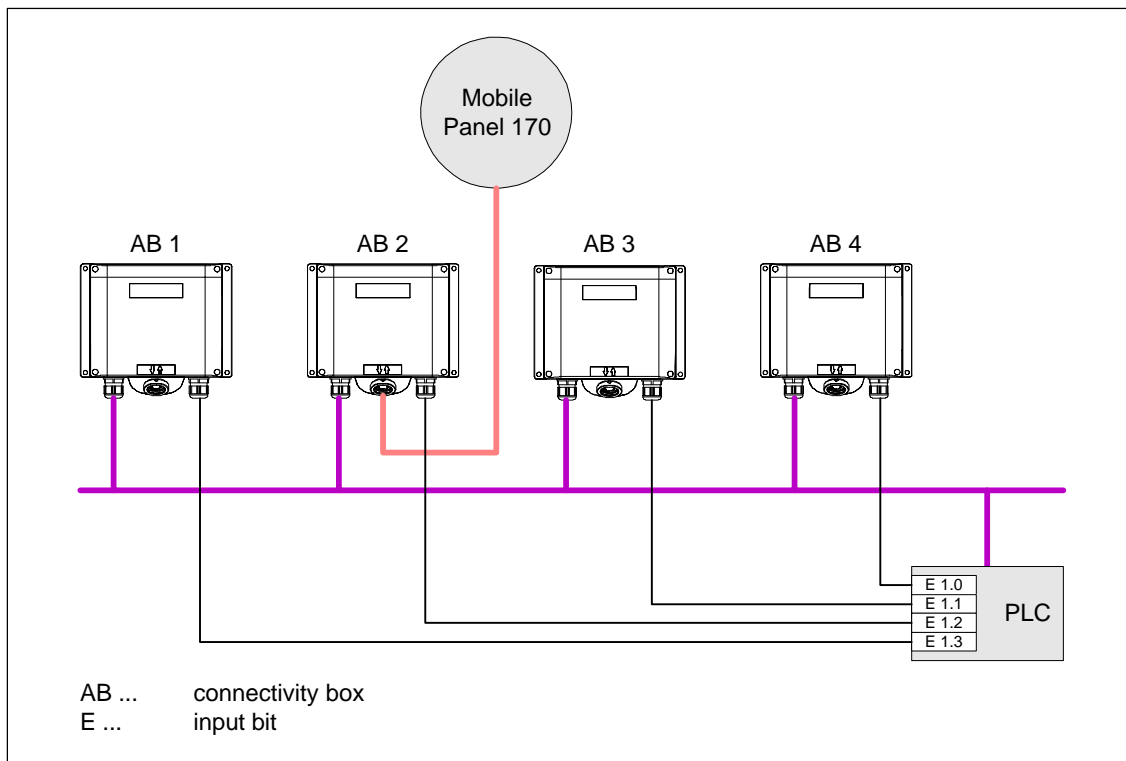
The following chapters contain examples on the configuration of screen and function selection according to the connection of the connectivity boxes.

Note

The output of the Connectivity Box Basic is connected to the power supply. The output of the Connectivity Box Plus is 2-pin and connected to a relay.

8.1.1 Application example 1

Four connectivity boxes are connected to one and the same PLC in a **network** configuration. The Mobile Panel 170 can be connected to every connectivity box.



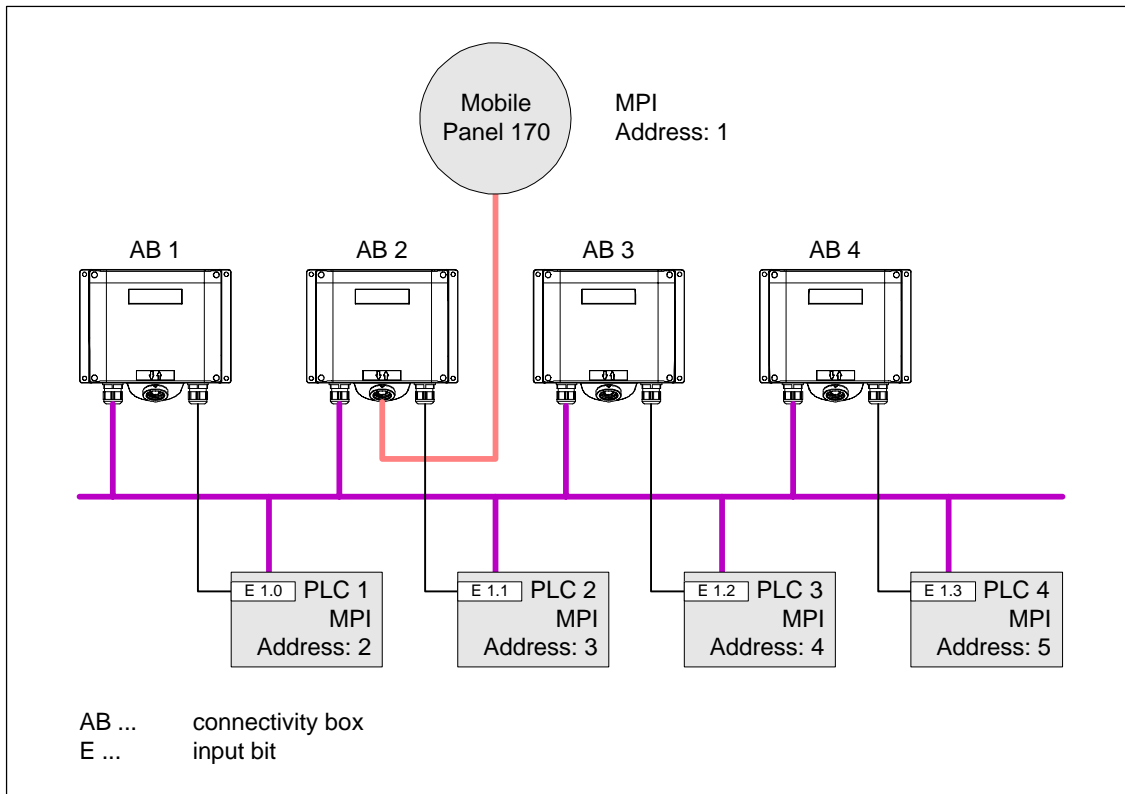
Picture 8-1 Application example 1

Conditions

- The connectivity boxes are connected to one and the same PLC.
 - Each connectivity box must have a unique identification bit in the PLC.
- The identification bit enables the screens and functions configured to be called in and displayed according to the individual connectivity boxes.

8.1.2 Application example 2

Four connectivity boxes are each connected to a different PLC in a **network** configuration. The Mobile Panel 170 can be connected to every connectivity box.



Picture 8-2 Application example 2

Conditions

- The PLCs have different MPI addresses and can be of different types.
- Each connectivity box must have a unique identification bit in the PLC.

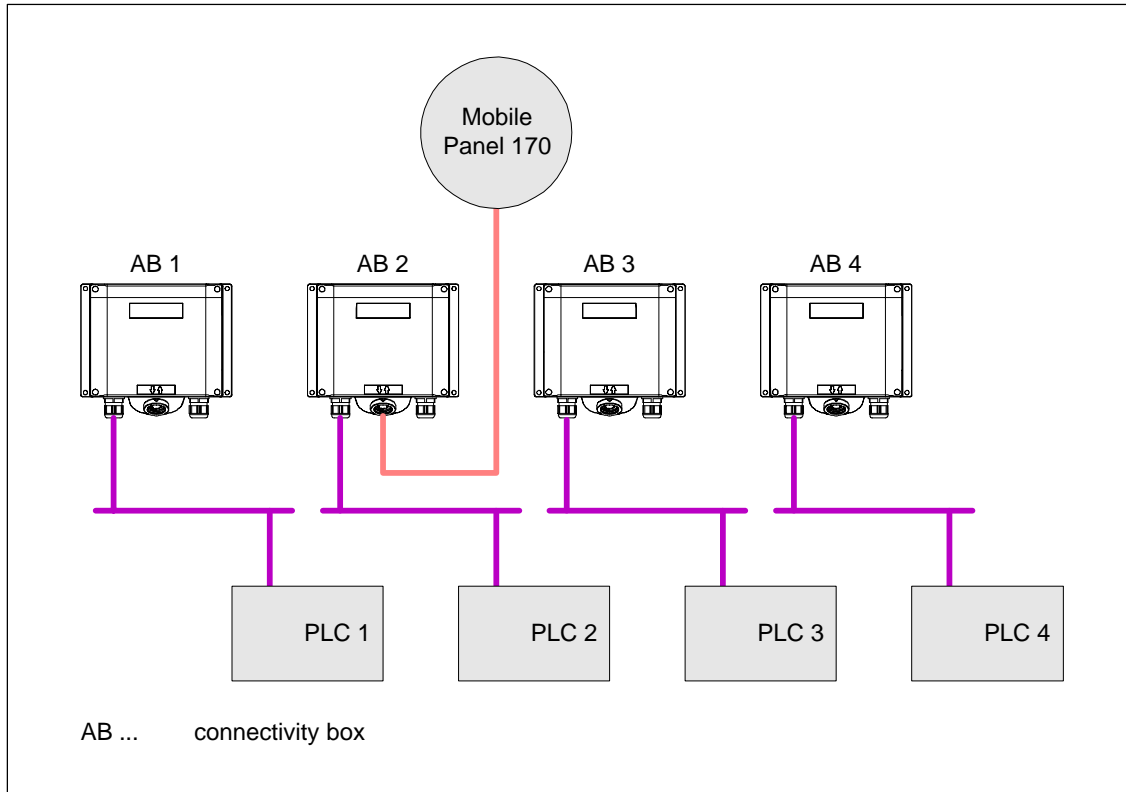
The identification bit enables the screens and functions configured to be called in and displayed according to the individual connectivity boxes.

Note

If practically the same screens and functions are used for all PLCs and the PLCs are of the same type, the configuration can be set up so that only one PLC connection is configured. The various PLCs can be addressed using the *Change PLC function*.

8.1.3 Application example 3

Four connectivity boxes are each connected to a different PLC in a **stand-alone** configuration. The Mobile Panel 170 can be connected to every connectivity box.



Picture 8-3 Application example 3

Conditions

- In the case of such configurations, tags stored for a specific PLC can be used to configure connection point dependent screens and functions. Identification bits are not absolutely essential in this case.
- In the event that all the PLCs are of different types (e. g. S7-300, S7-200 and SIMOTION), it is recommended to configure all PLCs *offline* in the configuration. It should be possible to use the *Connect_Disconnect_PLC* function in the start screen to activate the relevant PLC according to the connection point.

Identification bits are not absolutely essential in this case. Activate the required PLC using the *Connect_Disconnect_PLC* function.

8.2 Operating Elements via Decentral Periphery

The following operating elements can be connected on the Mobile Panel 170 as direct keys:

- Function keys
- Knob
- Key-operated switch
- Pushbutton with integrated LED

The configuration of the DP direct keys is described in “Communication for Windows-based Systems, Part 1” manual, Chapter 6.5.

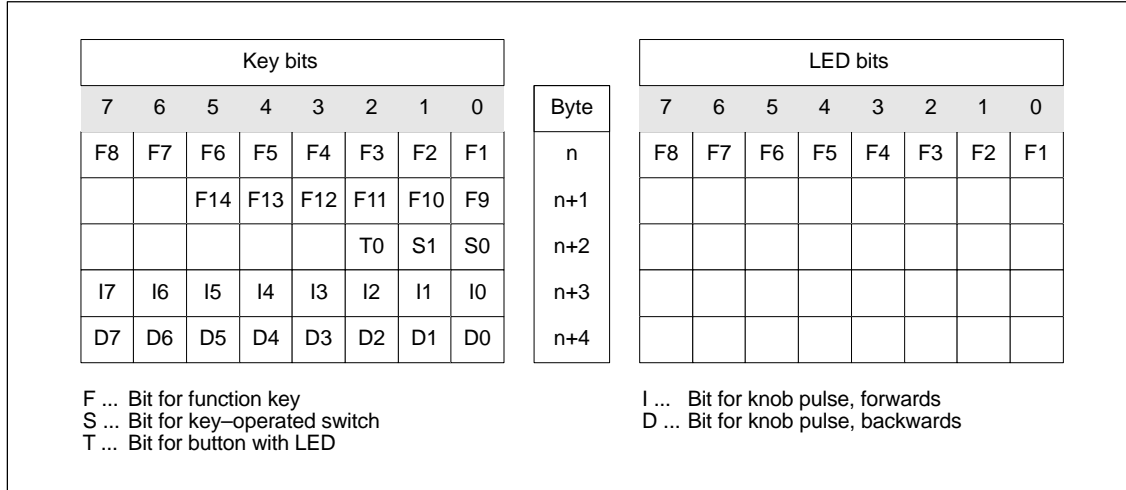
Notice

The keyboard and operating elements of the Mobile Panel 170 can be integrated as DP slaves in the PROFIBUS network. By disconnecting the connection cable causes the DP slave to fail immediately and, thus, causes the CPU to stop. Configure the corresponding programming measures in the PLC to prevent this happening. More information on this is available in the documentation provided by the PLC manufacturer.

The direction pulse of the handwheel and switching status of the function keys, key-operated switch and buttons with integrated LEDs are read out directly from the Mobile Panel 170 and can be transferred to the PLC for evaluation. Five bytes are available for the evaluation. These are assigned as follows:

Byte assignment

The following figure illustrates the byte assignment in the input/output area for the Mobile Panel 170 operating elements.



Picture 8-4 Byte assignment of keys and LEDs in input/output area

Bit coding

The bit coding for function keys, key-operated switch, buttons with integrated lamps and knob is indicated in the following table:

- Bit coding of the function keys

Switch setting	F1 to F14
Not pressed	0
Pressed	1

- Bit coding of the function key LEDs

Switch setting	F1 to F8
LED does not light up	0
LED lights up	1

- Bit coding of the key-operated switch

Switch setting	S1	S0	Key position
Position 0	0	0	In middle position
Position I	0	1	Turned counterclockwise to stop
Position II	1	0	Turned clockwise to stop

- Bit coding of buttons with integrated lamps

Switch setting	T0
Not pressed	0
Pressed	1

- Bit coding of the rotary knob
 - No setpoint value is defined for the knob.
 - After the Mobile Panel 170 has started up, bytes n+3 to n+4 (refer to Figure 8-4) are set to zero.

Turning the knob generates positive or negative pulses according to the direction it is turned. The number of positive pulses is stored in bits I0–I7 and the number of negative pulses in bits D0–D7.

The values are entered in binary format whereby Bit 0 has the lowest value and Bit 7 the highest.

One revolution of the knob provides 50 pulses.
 - Each knob pulse is added to the corresponding byte, n+3 or n+4, according to the direction of rotation. There are no negative values. If the permitted value range is exceeded, a flashover occurs:

If the value 255 is increased by one pulse, it results in the value 0.

Example of bit coding the rotary knob

The following table contains an example of rotation direction definition with pulses which are stored in bytes n+3 and n+4 and measured during the time points t_1 to t_4 .

The numbers in the following table represent a byte in the PLC.

Evaluation time point	Knob		Evaluation
	Pulse, Forwards	Pulse, Backwards	
t_1	255 ($\wedge = -1$)	245 ($\wedge = -11$)	—
t_2	10	245 ($\wedge = -11$)	Pulse, forwards: 11 Pulse, backwards: 0 Resulting value: +11
t_3	10	4	Pulse, forwards: 0 Pulse, backwards: 15 Resulting value: -15
t_4	15	5	Pulse, forwards: 5 Pulse, backwards: 1 Resulting value: +4

The resulting value, and thus the direction of rotation is established from the difference between two successive time points t_n and t_{n+1} . Refer to the table for the number of forward pulses and backwards pulses

- at time point t_n and
- at time point t_{n+1}

Then define the resulting value. This results from:

Resulting value =
pulses, forwards, t_{n+1} – pulses, forwards, t_n –
(pulses, backwards, t_{n+1} – pulses, backwards, t_n)

Response time

The bytes n+3 and n+4 must be polled on the PLC side within one second and cyclically. This ensures that no more than 256 pulses can be added between two successive polling actions to the knob. Approx. 4.5 revolutions of the knob are required for 256 pulses.

The speed pulse transmitter supplies max. 200 pulses per second.

Notice

The pulses entered should affect the PLC immediately and cause a reaction on the system being monitored. Therefore, set up an acquisition cycle of ≤ 100 ms in the PLC to achieve this specification.

System Settings

9

9.1 Set Language

Language-dependent objects

When downloading the project from the configuration computer, up to five languages can be loaded on the operating unit. The ASIA language variants are also supported. It is possible to switch between the languages, online, at any time and display language-dependent objects (texts and formats) in other languages.

The following are language-dependent, for example

- Messages
- Screens
- Text lists
- Help texts
- Date and time
- Static texts

Condition

In order to change languages on the operating unit while it is in operation, the following conditions must be fulfilled:

- The selected language must have been loaded on the operating unit. The project languages available during runtime are defined in ProTool CS under *System* → *Language Assignment: OP Languages*.
- The *Language* function must be assigned to an operating element, e.g. a function key or button.

Each time the operating unit is started up, all language dependent texts are displayed in the language last activated, which is at the top of the configured languages list.

Change language

Immediately after activating the function, all the language-dependent objects are displayed in the new language.

Two different types of language change can be configured:

1. Each time the function is activated, the operating unit switches one language further, cyclically.
2. After activating the function, the language can be explicitly selected.

Note

The language is only saved when the runtime software is ended.

9.2 Setting an Operating Mode

Conditions for changing operating modes

In order to switch between the operating modes described below, the function *Change mode* must be linked to an operating element in the project.

Operating modes

It is possible to switch between various operating modes on the operating unit according to the configuration:

Offline mode

In this mode, there is no logical connection between the operating mode and PLC. The operating unit can be operated but data cannot be downloaded.

Online mode

When using this mode, processes can be operated and visualized without restriction. There is a logical connection between the operating unit and PLC or the operating unit attempts to establish one.

Online mode is the predefined operating mode each time the operating unit is started up.

Download mode

This operating mode is used to transfer a configuration from the configuration computer to the operating unit. Further information on download mode is provided in Chapter 5.4.

9.3 Settings in Windows CE Control Panel

The Windows CE Control Panel

The following settings can be defined for the system using the Windows CE Control Panel:

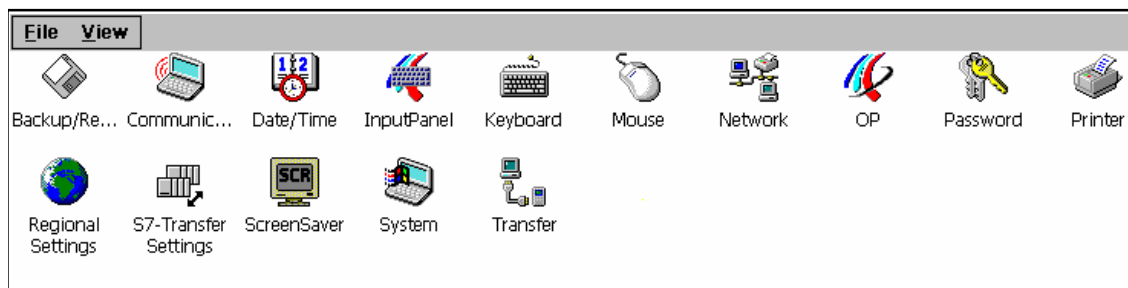
- Date and time
- Operating unit settings (e.g. contrast and calibration of touchscreens)
- Language settings
- Screen saver
- Screen keyboard
- Printer
- Backup/Restore
- Transfer (download)

Open Control Panel

Various settings can be defined after pressing the *Control Panel* button in the start menu. It may be necessary to enter a password.

The following possibilities are available with which to open the Control Panel(Figure 9-1):

- **During the start-up phase:**
Use the *Control Panel* button in the Start menu to open the Windows CE Control Panel containing the various options.
- **In normal operation:**
If configured, use the operating element assigned to the *Start_Control_Panel* function.



Picture 9-1 Windows CE Control Panel with options


Change language settings



Caution

Stop the runtime software before modifying the system settings otherwise the changes, e.g. B. for downloading, do not take effect.

Proceed as follows to change settings in the Windows CE Control Panel:

Step	Action
1	Exit runtime Stop the runtime software before starting to change any system settings.
2	Open Control Panel Open the Control Panel as described on Page 9–3.
3	Change language settings Change the settings for the system in the Control Panel.
4	Close Control Panel Close the Control Panel. Press the button illustrated. 
5	Restart runtime Start the runtime software via the Start menu.

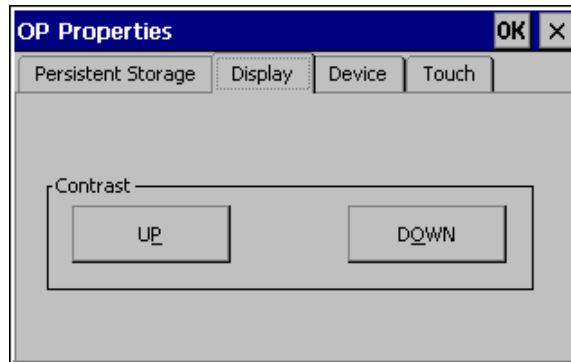
9.4 Operating Unit Settings

Purpose

The *OP properties* option provides the following setting options.

- Set contrast
- Calibrate touch screen
- Display operating unit data
- Backup non-resistant data

Set contrast



Picture 9-2 *OP Properties* option, *Display* tab control

Step	Action
1	Open the <i>Display</i> tab control (Figure 9-2) in the <i>OP Properties</i> option.
2	Use the <i>Contrast up</i> and <i>Contrast down</i> buttons to adjust the screen contrast.
3	Touch the <i>OK</i> button to close the Properties menu.

Note

Wait at least 10 seconds after changing the settings before switching the operating unit off. Otherwise, the changes will not be saved.

Calibrate touchscreen



Recalibrate the Windows CE operating unit screen if your input is not correctly executed. Press the *Recalibrate* button to start the recalibration function.

Picture 9-3 *OP Properties* option, *Touch* tab control

Purpose

Depending on the installation position and viewing angle, it is possible that a more or less strong parallax may occur during operation. In order to prevent operating errors occurring as a result, the screen can be calibrated during the start-up phase and normal operation.

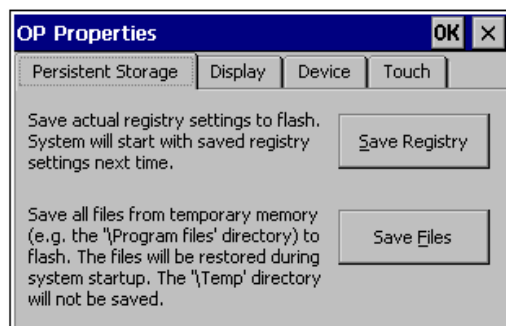
Step	Action
1	Open the <i>Touch</i> tab control (Figure 9-3, Page 9–5) in the <i>OP Properties</i> option.
2	Press the <i>Recalibrate</i> button to start the calibration process. Five calibration crosses appear in succession on the screen. Follow the instructions on the screen and touch each respective calibration cross as it appears with a touch pen.
3	Apply calibration: Touch any point of the screen after the calibration process for the new calibration data to take effect. Reject calibration: Wait 30 seconds, until the seconds counter displayed has reached zero, before rejecting the new calibration data. If calibration is not performed correctly, the new values are not accepted.
4	Touch the <i>OK</i> button to close the Properties menu.

Configured function

When the *Touch Calibration* function has been linked to an operating element in the configuration, the touch screen can be calibrated while in normal operation. The triggering operating element can be configured so that a password must be entered to enable the touch calibration process.

The calibration process is identical with steps described for the start-up phase 2 and 3.

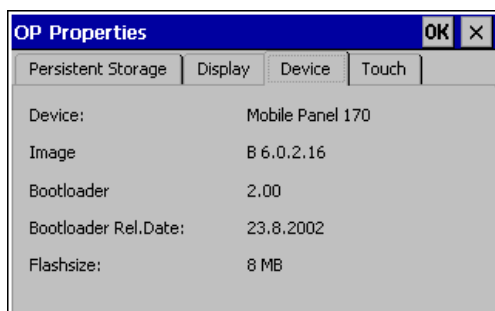
Persistent storage of registrations



Picture 9-4 *OP Properties* option, *Persistent Storage* tab control

Step	Action
1	Open the <i>Persistent Storage</i> tab control (Figure 9-4, Page 9–6) in the <i>OP Properties</i> option.
2	Press the <i>OK</i> button to start the storage process. The current registration settings are stored in the Flash memory.
3	Press the <i>Save Files</i> button to start the copy the files in the RAM file system to the Flash memory. When the system is restarted, the files saved are restored in the file system.
4	Touch the <i>OK</i> button to close the <i>OP Properties</i> menu.

Display operating unit data

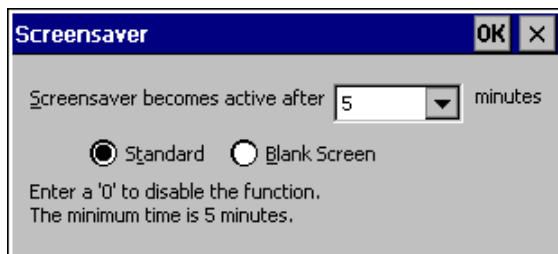


Picture 9-5 Option *OP*, *Device* tab control (Example)

Step	Action
1	Open the <i>Device</i> tab control (Figure 9-5) in the <i>OP Properties</i> option.
2	Various operating unit data is displayed.
3	Close the menu using the <i>OK</i> button.

9.5

Screensaver



Picture 9-6 Screensaver option

It is possible to define a period of time (in minutes) for automatic activation of the screen saver on the operating unit. The screen saver settings are defined in the *Screensaver* option of the Windows CE Control Panels (refer to Page 9–3).

The screen saver is automatically activated if the operating unit is not operated within the defined period of time.

On entering the value 0, the screen saver is deactivated permanently. The screen saver is deactivated on pressing any key or touching the touch screen. The function assigned to that key is not triggered.

9.6

Screen Keyboard



This is used to define the position of the screen keyboard when it appears on the operating unit. Proceed as follows:

Step	Action
1	Select the <i>Input Panel</i> option.
2	Move the screen keyboard to the required position.
3	Store the new settings by pressing the <i>Save</i> button.
4	Close the option by pressing the <i>Close Input Panel</i> button or the <code>Enter</code> key.

Note

The screen keyboard is only used for input using the Windows CE Control Panel.

9.7 Regional Settings



Language-specific settings can be defined here, e.g.:

- Date and time format (refer to Chapter 7.6)
- Decimal separator and list separator

The operating unit is supplied with the German language options set.

Note

If the operating system does not support the language set on the operating unit, the language predefined for the operating system is used.

9.8 Set Printer



A printer can be selected and set up using the *Printer* option. Some settings are only relevant for printing a hardcopy of the screen contents and have no influence on the message logging, e.g. color or quality of graphics printing.

Information on connecting printers is provided on Page 10–23.

Set printer



A printer can be selected and set up at this point. Some settings are only relevant for printing a hardcopy of the screen contents and have no influence on the message logging.

The setting possibilities available are dependent on the printer selected. The following can be selected, for example:

- **Printer**
Select the printer from the list to which the operating unit is connected.
- **Port**
Select the port and baud rate used by the operating unit to transfer data to the printer, e.g. `IF2: 9600`.
- **Paper size**
Select the paper size used in the printer, e.g. `A4` or `Letter`.
- **Draft mode**
Define the quality of the printout of graphics. If the option is activated, printout is performed in draft quality, if deactivated printout is in high quality.
- **Orientation**
Define whether the page should be printed in `Portrait` or `Landscape` format.

Note

If a serial printer is connected, the following settings are necessary on the printer:

- RS 232, whereby only the RxD, TxD and GND signals are required (refer to the Appendix, Chapter B)
 - 8 data bits
 - 1 stop bit
 - No parity
 - Baud rate between 9600 and 57600, printer-dependent
-

Default settings

When the operating unit is supplied, the following default settings are defined:

- Printer: EPSON 9 matrix printer
- Port: IF2
- Baud rate: 9600 bit/s

Installation

10

10.1 Mechanical Installation

Installation location and conditions

The operating unit is intended for mobile use and, therefore, not designed for installation. A wall mounting bracket, which can be mounted at a suitable location, is available for permanent installation (refer to Chapter 3).

Degree of protection

The dust and splashproof housing provides the operating unit with the IP65 degree of protection.



Caution

- The operating unit must be brought to room temperature before it is started up. If condensation forms, do not switch the operating unit on until it is absolutely dry.
 - In order to prevent overheating during operation, the operating unit must not be exposed to direct sunlight.
-

Notice

The operating unit was function-tested before shipping. If a fault occurs nevertheless, please enclose a full account of the fault when returning the unit.

Installing the wall mounting bracket

The dimension drawings for the wall mounting bracket are available in Chapter 11.2.

Notice

Select a vertical surface or one which slopes back slightly for installing the wall mounting bracket. Otherwise, there is no guarantee that the Mobile Panel 170 will be secure when mounted.

It may then fall, inadvertently triggering the STOP button (option).

1. Select an easy to reach, non-hazardous position for the wall mounting bracket.

Note

It is recommended to select a position at eye level. This enables the Mobile Panel 170 to be operated even when it is installed in the wall bracket.

2. Install the wall mounting bracket from the front on the mounting location.
3. Mark the screw holes for the bracket using a scribing iron.
4. Drill three holes or three M5 threaded holes.
5. Secure the wall mounting bracket.

The bracket installation is thus complete.

Mounting the connectivity box

The dimension drawings for the connectivity box are available in Chapter 11.3.

Note

When selecting the position for the connectivity box, take the maximum length of the connection cable into account.

1. Select an easy to reach, non-hazardous position for the connectivity box.
2. Position the connectivity box on the installation location.
3. Mark the screw holes for the bracket using a scribing iron.
4. Drill four holes or four M4 threaded holes.
5. Secure the connectivity box.

Notice

The housing of the connectivity box is made of plastic. Tighten the screws using a torque of 0.4 – 0.5 Nm as specified.

The installation of the connectivity box is completed.

10.2 Electrical Installation

Electrical connections

The electrical installations concern:

- the Mobile Panel 170 and
- the connectivity box.

The units require the following electrical connections:

Connection to	Mobile Panel 170	Connectivity box
Configuration computer (PU or PC)	x	–
Printer	x	–
PLC	–	x
Power supply	–	x
STOP button	–	x
Acknowledgement buttons	–	x
Monitoring signal of the STOP button	–	x
Line for input bit to connection detection	–	x

x Electrical connections

An electrical connection to the PU/PC is only required for downloading the project data. Following the configuration and test phases, a serial printer can be connected to the operating unit instead of the configuration computer.

The permissible voltage is stipulated in Appendix, Chapter A.

The way in which the Mobile Panel 170 and connectivity box are connected is described in Chapters 10.3 and 10.4.

EMC compatible installation

A precondition for error-free operation is an EMC hardware design of the PLC and the use of interference-proof cables. The guidelines on interference-free design of the PLCs apply equally to installation of the operating unit.



Caution

- Only shielded cables are permitted for all signal connections.
 - Screw or lock all plug connections.
 - Do not install signal lines in the same cable ducts as power cables.
 - Siemens AG refuses to accept liability for malfunctions and damage arising from use of self-made cables or cables from other manufacturers.
-

10.3 Mobile Panel 170

10.3.1 Communication interfaces

The Mobile Panel 170 is equipped with communication interfaces for peripheral units and PLCs. Information on the interfaces is provided in Chapters 10.5 to 10.7 and in the Appendix, Chapter B.

Communication interface for peripheral units

Periphery unit	Protocol	Interface
Configuration computer	RS 232	IF2
Local printer, local	RS 232	IF2

Communication interface for PLCs

The communication interface for all PLCs is located in the connectivity box on terminal strip 1 (refer to Table B-4).

Siemens PLC	Protocol	Interface
SIMATIC S5	PROFIBUS-DP	IF1
SIMATIC S7	MPI ¹ PPI PROFIBUS-DP	IF1
SIMATIC 500/505	NITP PROFIBUS-DP	IF1
SIMATIC WinAC Soft/Slot PLC (from V3.0)	SIMATIC S7-300/400	IF1
SIMOTION	PROFIBUS-DP	IF1
SIMATIC S7-NC	PROFIBUS-DP MPI	IF1

¹ Not possible with connection to SIMATIC S7-212

PLC manufacturer	Protocol	Interface
Allen Bradley	DF1 ¹ DH+ ² DH485 ³	IF1
GE-Fanuc Automation	SNP/SNPX	IF1
LG Industrial Systems/IMO	Dedicated communication ⁴	IF1
Mitsubishi Electric	FX	IF1
Mitsubishi Melsec	Protocol 4	IF1
Omron	Hostlink/Multilink	IF1
Schneider Automation (Modicon)	Modicon Modbus	IF1
Schneider Automation (Telemecanique)	Uni-Telway	IF1

¹ Applies for PLCs SLC500, PLC5/20, MicroLogix

² Applies for PLCs SLC500, PLC5/20 via DF1

³ Applies for PLCs SLC500, MicroLogix

⁴ Lucky Goldstar via PROFIBUS-DP, also integrated to SIMATIC S7, WinAC, SIMATIC S5, SIMATIC 505

The assignment of the IF1 interface is described in the Appendix, Chapter B.2.

10.3.2 Opening the connection compartment

Before beginning:

- Pay attention to cleanliness – foreign bodies and fluids must not get onto the PCB or inside the operating unit.
- Set the operating unit down with the front face on a flat, clean surface to protect it from damage.
- Use a size 2 cross-tip screwdriver to open and close the connection compartment.

Caution

Disconnect the Mobile Panel 170 from the connectivity box.

It is possible to inadvertently trigger the STOP button or other operating elements (key-operated switch, buttons) causing maloperations when the operating unit is set down on its front side.

Caution

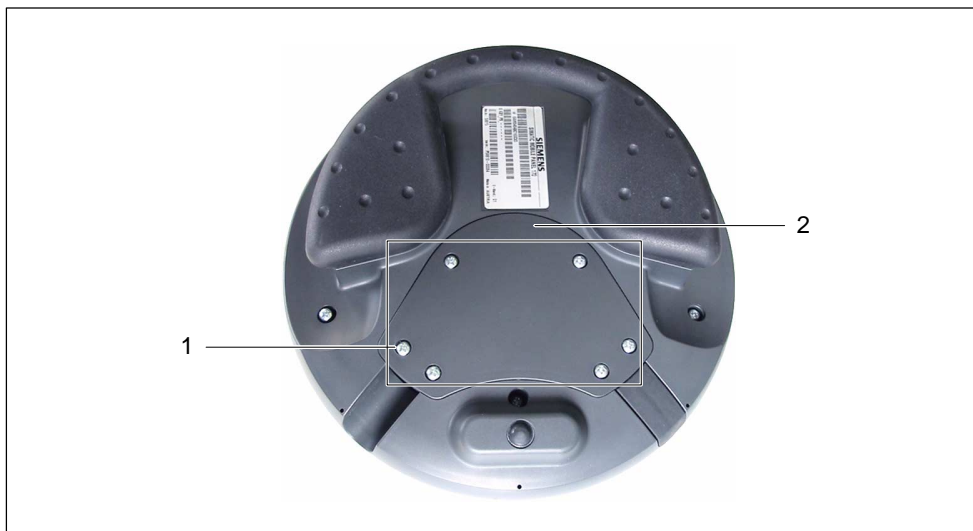
Observe the ESD information in the Appendix, Chapter E.

In order to access the connectors of the Mobile Panel 170, remove the cover on the rear of the Mobile Panel 170.

Notice

The housing of the Mobile Panel 170 is made of plastic. As a result, the threads in the retaining holes are not as resistant to tension as comparable metallic housing. Tighten the screws using a torque of 0.4 – 0.5 Nm as specified.

When the screws are tightened more than 20 times, there is a risk that the threads become damaged.



Picture 10-1 Opening the connection compartment

1. Unscrew the six screws (1) on the rear side of the Mobile Panel 170 approx. 1 cm.

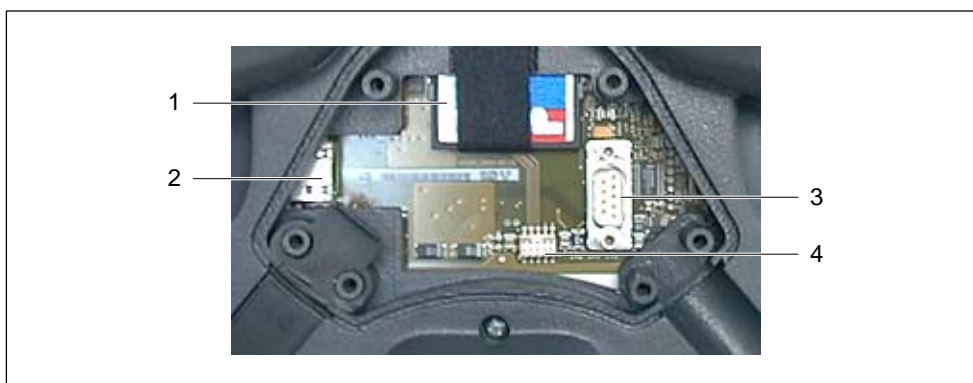
Note

The cover has been so conceived that the screws cannot be fully removed. Therefore, they need only be unscrewed 1 cm. The cover can then be removed with the screws still inserted.

2. Put the cover (2) with the screws in a safe place.

10.3.3 Connections

Figure 10-2 illustrates the arrangement of the connections in the Mobile Panel 170 after having removed the cover from the connection compartment.



Picture 10-2 Arrangement of connections

No.	Name	Description	Usage
1	Slot	Memory card (CF card) ²	<ul style="list-style-type: none"> Data storage Backup/Restore
2	RJ45 socket ¹	–	Connector for connectivity box
3	Sub-D connector ¹ , 9-pin	RS 232	IF2, connection for <ul style="list-style-type: none"> Configuration computer Printer
4	Support plug connector ¹	–	Connection for <ul style="list-style-type: none"> Connectivity box

1 Connection pin assignment, see Appendix, Chapter B.

2 Replacing the memory card, refer to Chapter 12.

10.3.4 Connecting the cable

Caution

Observe the ESD information in the Appendix, Chapter E.

Notice

Ensure the plug connector is fully engaged otherwise there is a danger of triggering a Stop or the communication not functioning.

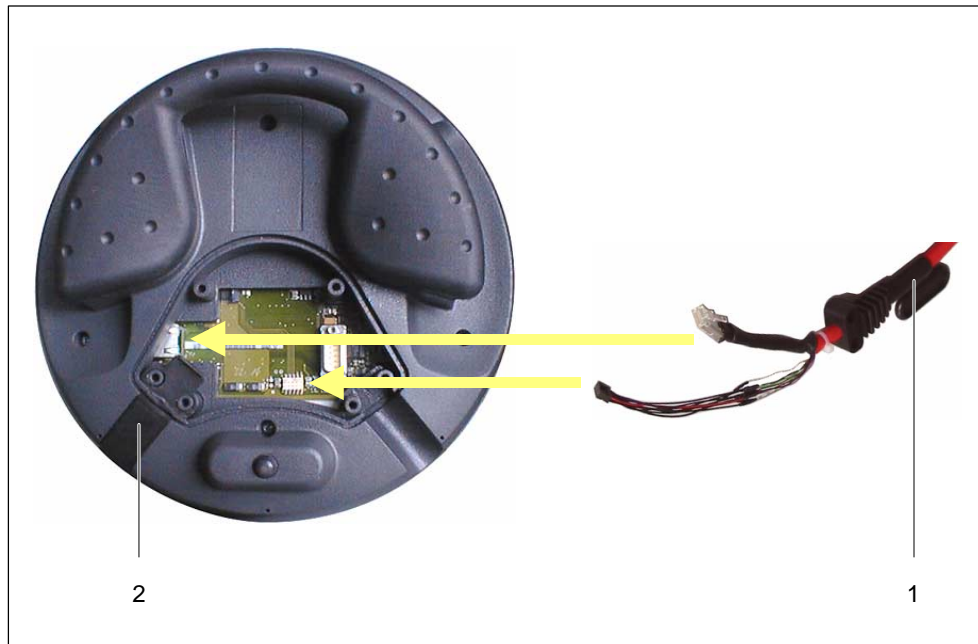
Note

Before disconnection, carefully raise the strain relief from the cable guides first.

Connecting the connection cable

- The operating unit has two cable guides for left or right side cable connection.

Select the cable guide applicable to your specific requirements and insert the connection cable (1) in relevant cable guide. Insert the dummy plugs (2) in the cable guide not required.



Picture 10-3 Connecting the connection cable

Notice

The locking hooks on the RJ45 connector can break. Therefore, avoid using excessive force. Connection cables with damaged RJ45 connector must not be used.

When disconnecting the RJ45 connector, use the associated locking lever. Do not use force or sharp-edged tools.

2. Connect the two plug connectors from the connection cable to the contact points in accordance with Figure 10-3.
3. Check that both plugs are connected properly.

Applies to removal:

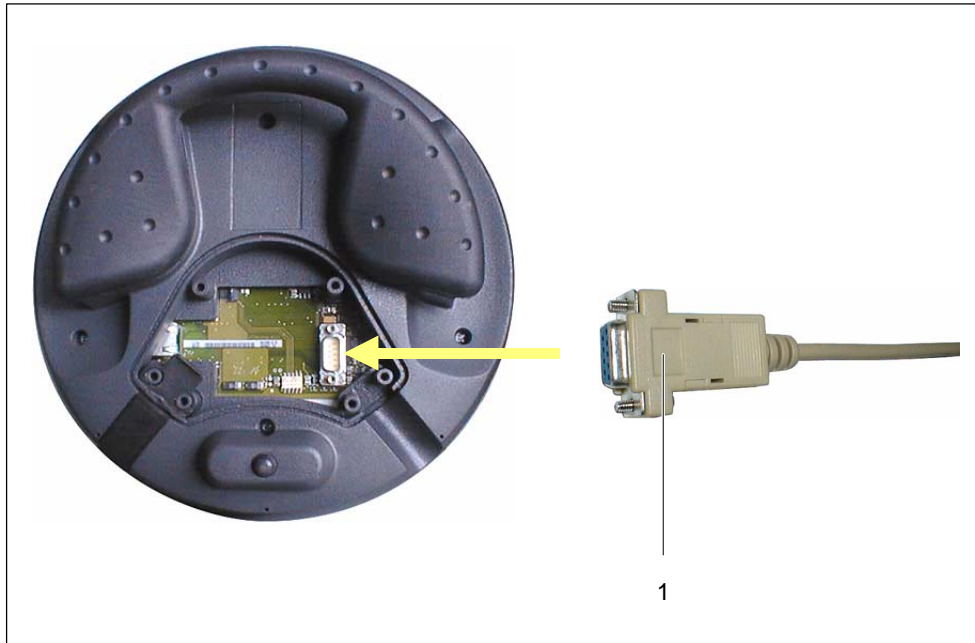
Avoid jolting movements when removing the strain relief from the connection cable. Such movements can cause damage.

Continue with the work in the following section or close the connection compartment according to Chapter 10.3.5.

Connecting a configuration computer or printer

Notice

Data transfer to the configuration computer and to the printer is only possible with the connection compartment open. The IP65 degree of protection is no longer realized under these conditions.



Picture 10-4 Connecting the RS 232 cable

Note

For reasons of illustration, the necessary connection cable is not depicted in Figure 10-4.

1. Connect the plug on the RS 232 cable to the contact point as illustrated in Figure 10-4.
2. Secure the RS 232 cable with the connector fastening screws.
3. Put the Mobil Panel 170 down in a safe place.

Disconnect the RS 232 cable when the data transfer is completed. Close the connection compartment according to Chapter 10.3.5.

10.3.5 Closing the connection compartment

1. Close the Mobile Panel 170 with the cover and screw in the six retaining screws (refer to Figure 10-1). Ensure that the rubber seal is seated correctly in the cover.

Notice

The housing of the Mobile Panel 170 is made of plastic. As a result, the threads in the retaining holes are not as resistant to tension as comparable metallic housing. Tighten the screws using a torque of 0.4 – 0.5 Nm as specified.

When the screws are tightened more than 20 times, there is a risk that the threads become damaged.

2. Check that the cover, connection cable and dummy plugs are fitted correctly. This completes the connection of the connection cable to the Mobile Panel 170.

10.4 Connectivity Box

Caution

Short circuits in the connectivity box can impair the functionality of the Mobile Panels 170.

In the case of manipulations with the housing open, it is essential that no conductive, residual cable or such gets into the electrical circuitry.

Caution

When working on the unit with the housing open, ensure that no power conducting wires come into contact with the electrical circuitry.

Caution

Observe the ESD information in the Appendix, Chapter E.

10.4.1 Opening the connectivity box

In order to access the connections in the connectivity box, remove the cover from the connectivity box.

Notice

The housing of the connectivity box is made of plastic. As a result, the threads in the retaining holes are not as resistant to tension as comparable metallic housing. Tighten the screws using a torque of 0.4 – 0.5 Nm as specified.

When the screws are tightened more than 10 times, there is a risk that the threads become damaged.

1. Loosen the four screws (1).



Picture 10-5 Connectivity box

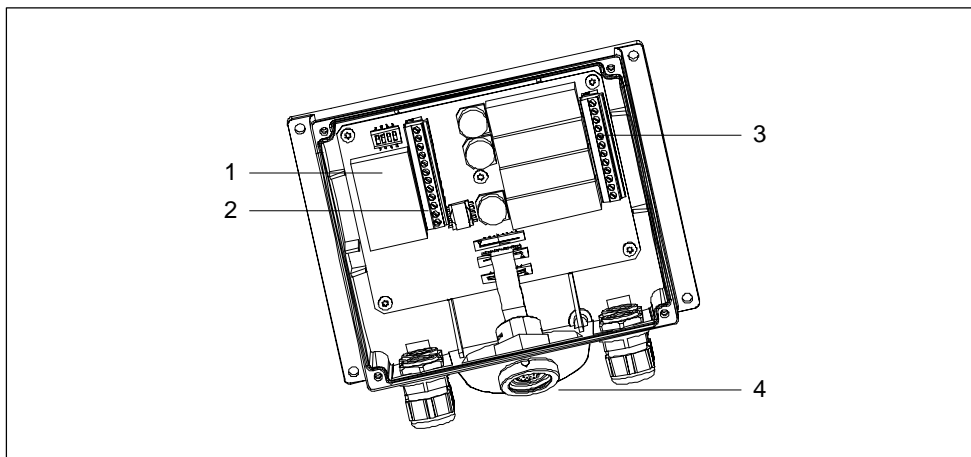
2. Put the screws (1) and cover (2) down in a safe place.
3. Replace the cover on the connection box after completing the connection work described in the following sections.

Notice

After completing the connections, check that the PU screw fittings which are not used are fitted with rubber seals. Otherwise, the IP65 degree of protection is not guaranteed.

10.4.2 Connections

Figure 10-6 illustrates the arrangement of the connections in the connectivity box.



Picture 10-6 Arrangement of connections

No.	Name	Description	Usage
1	Fast connector ¹	–	Connection for MPI/PROFIBUS-DP and RS 485
2	Terminal strip ¹	RS 232 RS 422 RS 485	<ul style="list-style-type: none"> • IF1
		+24 VDC	<ul style="list-style-type: none"> • Power supply
3	Terminal strip ¹	–	<ul style="list-style-type: none"> • Safety functions for STOP and Acknowledgement buttons • Additional functions for the PLC
4	Socket	–	Connection for connection cable

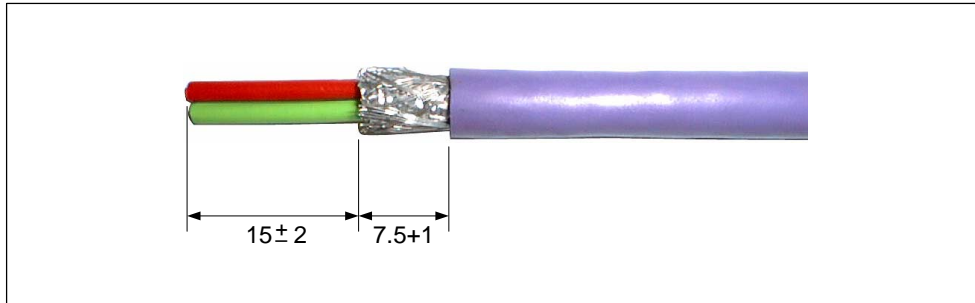
¹ Connection pin assignment, see Appendix, Chapter B.

The following chapters describe the connections which must be made and provide information concerning the method of connection.

10.4.3 Connecting the MPI/PROFIBUS-DP cable

Stripping insulation

Insulate the MPI/PROFIBUS-DP cable according to the figure below.



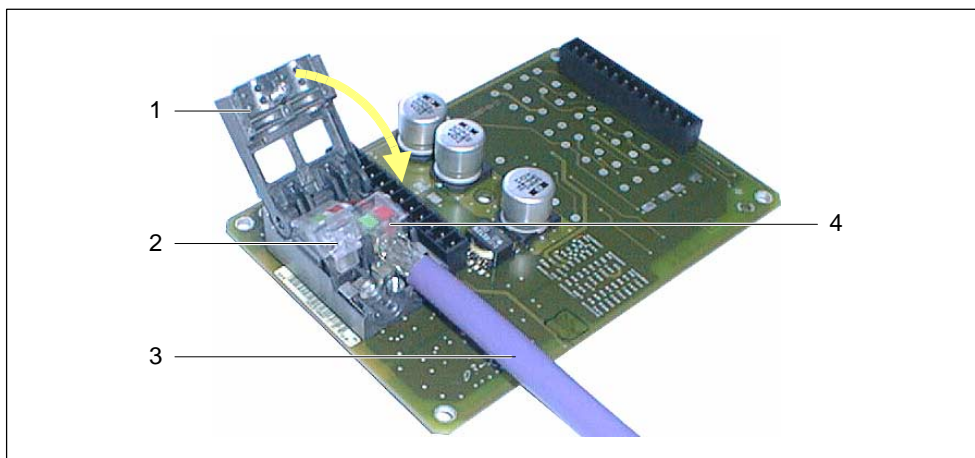
Picture 10-7 Stripping the MPI/PROFIBUS-DP cable

Note

Use the insulation stripping pliers in Catalog IK 10 to strip the cable quicker and to the correct length.

Connecting

1. Screw on the fast connector and open the cover (1).
2. Prize up the insulation displacement contact (2) or (4).
3. Insert the two wires of the MPI/PROFIBUS-DP cable (3) according to the color-coding in the corresponding opening of the insulation displacement contact.



Picture 10-8 Connecting the MPI/PROFIBUS-DP cable

Note

To show the connection more clearly, Figure 10-8 illustrates the equipment with the PCB removed.

Also observe the labeling on the inside of the connectivity box cover.

4. Press the insulation displacement contact down.

The wires are thus pressed in insulation terminals, located below the insulation displacement contacts, making the contact.

5. Connect the MPI/PROFIBUS-DP cable for the insulation displacement contact (2) in the same way.
6. Close the cover and screw it tight.

Note

If the connectivity box is the bus end subscriber, the DIP switch must be set on the free insulation displacement contact according to Table 10-1. This activates the terminal resistors.

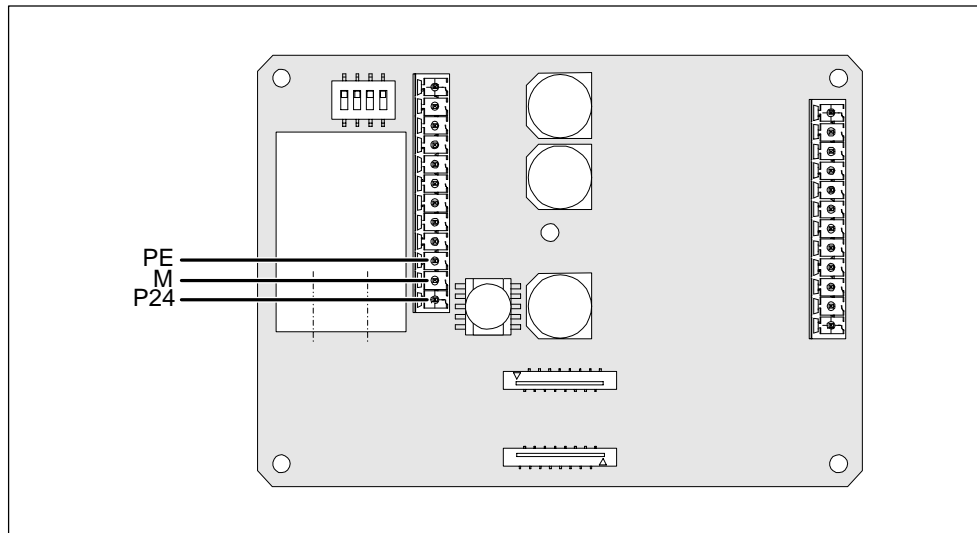
10.4.4 Connecting the power supply

The power supply for the operating unit is connected at the 12-pin plug connector of the connectivity box. Use the 2-pin terminal block supplied for this purpose. The terminal block is designed for cables with a cross-section not larger than 2.5 mm².

Connect the grounding conductor of the connectivity box to the rack ground.

Note

The connectivity box has reverse pole protection.



Picture 10-9 Interface for power supply and grounding conductor

The abbreviations in Figure 10-9 have the following significance:

- PE stands Protective Earth
- M stands for ground
- P24 stands for DC +24 V

Please refer to the technical data in Appendix, Chapter A for information on the power supply requirements.



Caution

- When using a 24 VDC supply, make sure that the extra-low voltage is isolated safely. Use only power supply units complying with IEC 364-4-41 or HD 384.04.41 (VDE 0100, Part 410).
- The supply voltage must be within the specified voltage range. Voltages outside this range can cause malfunctions on the operating unit.



Warning

Personal injury and equipment damage can occur. If the 24 VDC power supply for the Mobile Panel 170 is not correctly applied, components in the automation system could be damaged and persons could be injured.

Only use a safety extra-low voltage (SELV) for the 24 VDC supply voltage to the Mobile Panel 170.

10.4.5 Equipotential

Potential differences

Differences of potential can occur in separate system sections which lead to high equipotential flows, e.g. when cable screening is applied on both sides and grounded at two different system parts.

The cause of potential differences may be due to different mains power feed sources.



Warning

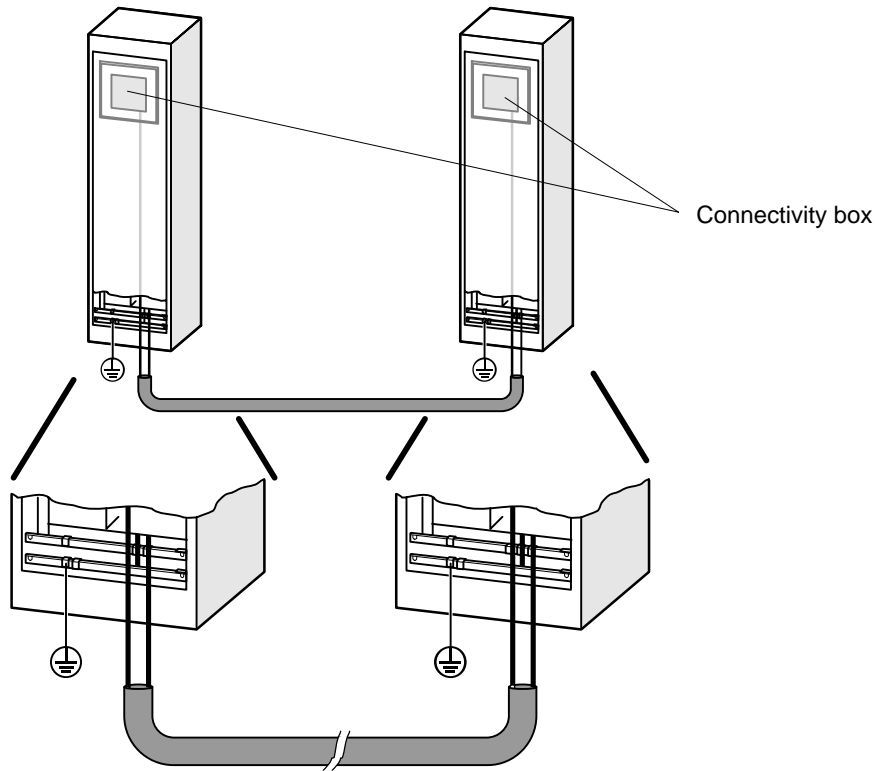
Cable screening is not designed for potential equalization. Only use lines provided for the purpose (e.g. with a 16 mm² cross-section). When setting up MPI/PROFIBUS-DP networks, ensure cables with a sufficient cross-section are used otherwise the interface hardware may be damaged or even destroyed.

Potential equalization line

The potential differences must be reduced by the provision of potential equalization lines so that proper functioning of the electrical components installed is guaranteed.

When installing potential equalization lines, observe the following points:

- The efficiency of the potential equalization is greater the smaller the impedance of the potential equalization line is.
- If two system parts are connected by screened signal lines, whose screening is connected on both sides to the grounding/earthed conductor, the impedance of the additionally laid potential equalization lines may be maximally 10 % of the screening impedance.
- The cross-section of a potential equalization line must be dimensioned for the maximum equalizing current which can flow. Experience has shown that potential equalization lines with a cross-section of 16 mm² suffice.
- Use potential equalization lines made of copper or galvanized steel. Connect the lines with the ground connection/ground conductor and protect from corrosion.
- Lay the potential equalization lines so that the area between the potential equalization line and signal lines is small (refer to the following diagram).

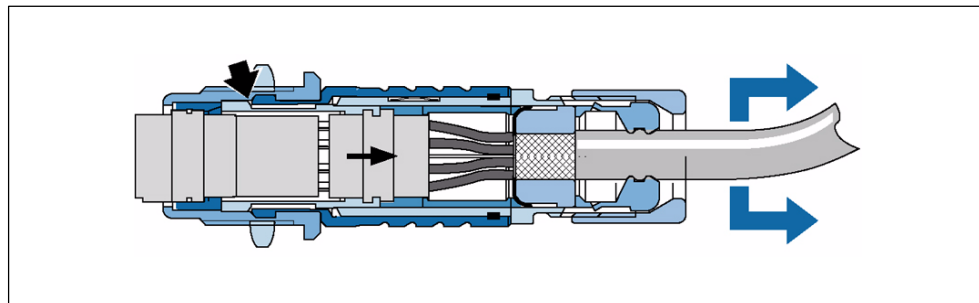


Picture 10-10 Equipotential

10.4.6 Connecting the connection cable

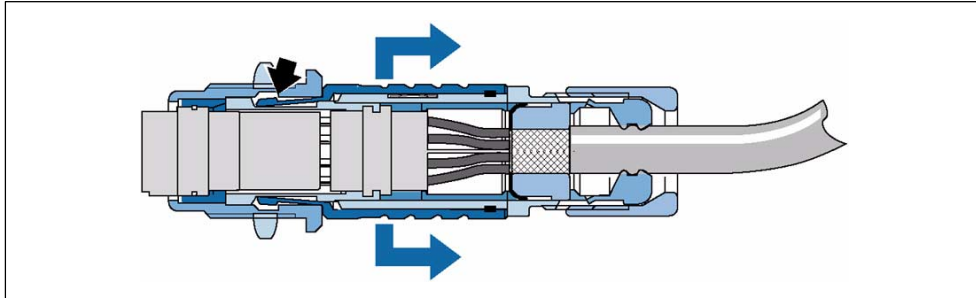
The connection cable can be connected to the connectivity box by means of the plug connector (metallic push-pull round plugs). The plug is coded by groove and spring.

Locking mechanism



Picture 10-11 Functioning method of the locking mechanism

By pulling on the cable or the tensioning nut, the taper sleeve moves under the locking pins and forces them in the locking slot. As a result, the plug connection **cannot** be disconnected.



Picture 10-12 Releasing the plug connector

On pulling the outer sleeves, the locking pins slide out of the locking slot enabling the plug to be disconnected easily.

Plug connection

Connection is made as follows:

1. Pull the outer sleeve on the plug connector back.
2. Insert the plug connector in the connectivity box socket with the outer sleeve pulled back.
3. Release the outer sleeve.

It slides towards the connectivity box automatically and thereby locking the plug.

Disconnecting the plug

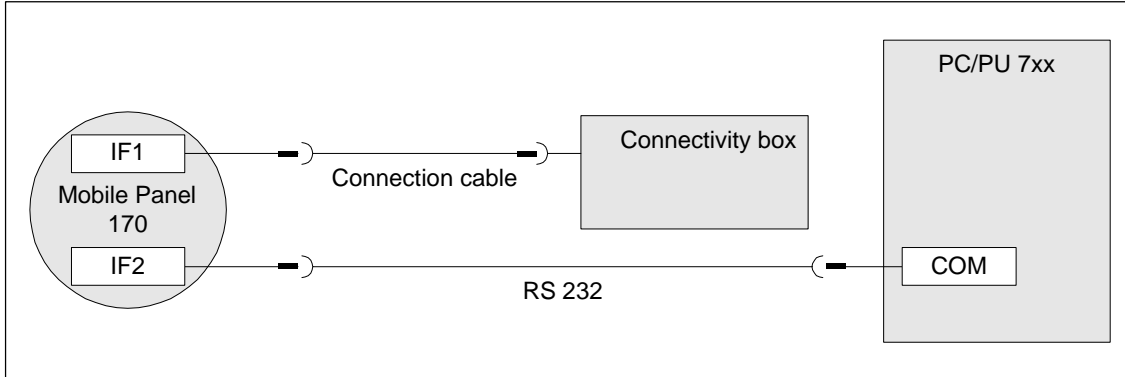
1. Pull the outer sleeve on the plug connector back.
2. Pull the plug connector from the connectivity box socket with the outer sleeve pulled back.
3. If the Mobile Panel 170 is not to be connected to another connectivity box, put the Mobil Panel 170 down in a safe place.

10.5 Connect Configuration Computer

Standard cables are available for the connections shown (refer to the ST 80 catalog).

Connection configuration for serial downloading

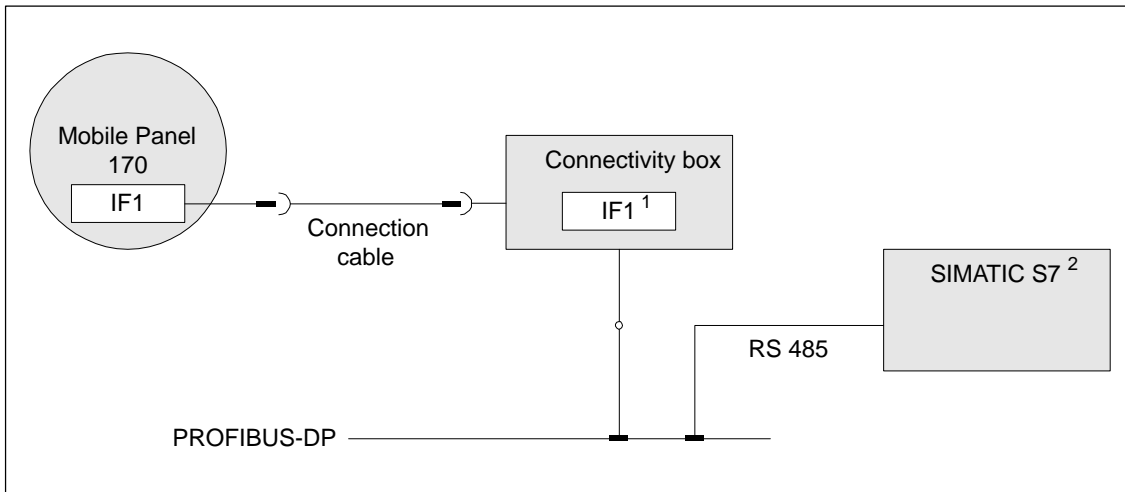
Figure 10-13 illustrates the connection of the operating unit to a configuration computer (PC or PU) for transferring the configuration data using serial downloading.



Picture 10-13 Connection configuration diagram for configuration computer

Connection configuration for downloading via MPI/PROFIBUS-DP

Figure 10-14 illustrates the connection of the operating unit to a configuration computer (PC or PU) for transferring the configuration data when downloading via MPI/PROFIBUS-DP.

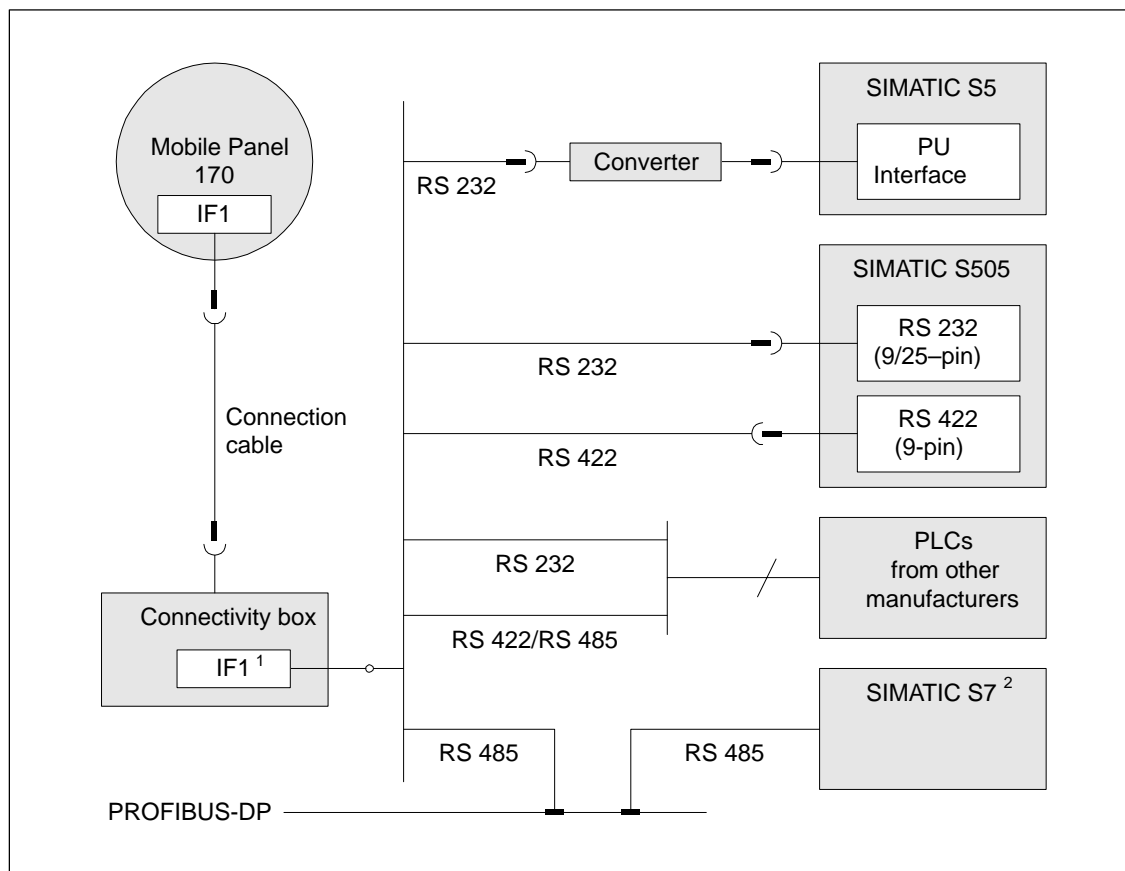


Picture 10-14 Connection configuration diagram for configuration computer

- 1 To enable operation using the serial interface, connect either the IF1A (RS 232) or IF1B (RS 422/485), but not both.
- 2 Use only the approved cables for connection to the SIMATIC S7 PLC.

10.6 Connect PLC

Connection configuration



Picture 10-15 Connection configuration diagram for PLCs

- 1 To enable operation using the serial interface, connect either the IF1A (RS 232) or IF1B (RS 422/485), but not both.
- 2 Use only the approved cables for connection to the SIMATIC S7 PLC.

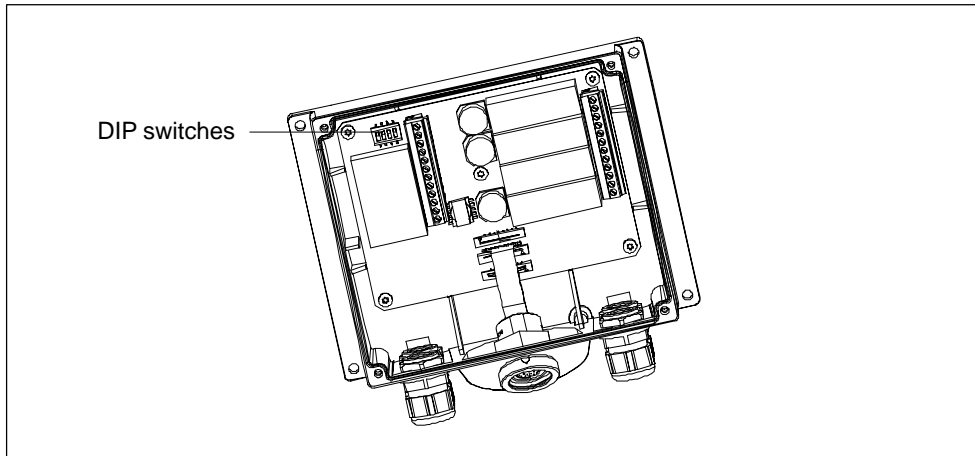
Notice

The converter must be installed in such a way as to ensure the IP65 degree of protection. Also observe the maximum permissible cable lengths for the process connection.

Configure interface IF1

The IF1 interface can be configured using the DIP switches. In this case, the RTS signal is interchanged for RS 485 and for RS 422 receive data. By default, the RTS signal is not required by the communication peer.

Figure 10-16 illustrates the position of the DIP switches.



Picture 10-16 Position of the DIP switches

The table shows the permissible DIP switch settings and the protocol assigned for the data transmission.

Table 10-1 DIP switch settings

Communication		Switch Setting
	<div style="display: flex; justify-content: space-around; width: 100px;"> 1234 </div> <div style="display: flex; justify-content: space-around; width: 100px;"> <div style="width: 10px; height: 10px; background-color: black;"></div> <div style="width: 10px; height: 10px; background-color: black;"></div> <div style="width: 10px; height: 10px; background-color: black;"></div> <div style="width: 10px; height: 10px; background-color: white;"></div> </div> <div style="display: flex; justify-content: space-around; width: 100px;"> ONOFF </div>	
	<div style="display: flex; justify-content: space-around; width: 100px;"> 1234 </div> <div style="display: flex; justify-content: space-around; width: 100px;"> <div style="width: 10px; height: 10px; background-color: black;"></div> <div style="width: 10px; height: 10px; background-color: black;"></div> <div style="width: 10px; height: 10px; background-color: black;"></div> <div style="width: 10px; height: 10px; background-color: white;"></div> </div> <div style="display: flex; justify-content: space-around; width: 100px;"> ONOFF </div>	
	<div style="display: flex; justify-content: space-around; width: 100px;"> 1234 </div> <div style="display: flex; justify-content: space-around; width: 100px;"> <div style="width: 10px; height: 10px; background-color: black;"></div> <div style="width: 10px; height: 10px; background-color: white;"></div> <div style="width: 10px; height: 10px; background-color: black;"></div> <div style="width: 10px; height: 10px; background-color: black;"></div> </div> <div style="display: flex; justify-content: space-around; width: 100px;"> ONOFF </div>	

Last subscriber

Compressing the internal program memory with SIMATIC S5



Caution

With the SIMATIC S5, compression of the internal program memory on the PLC (PU "Compress" function, integrated FB COMPR) is not permitted when an operating unit is connected. Compression modifies the absolute addresses of the blocks in the program memory. Since the operating unit only reads the address list during startup, it does not detect any address modifications and subsequently accesses the wrong memory areas.

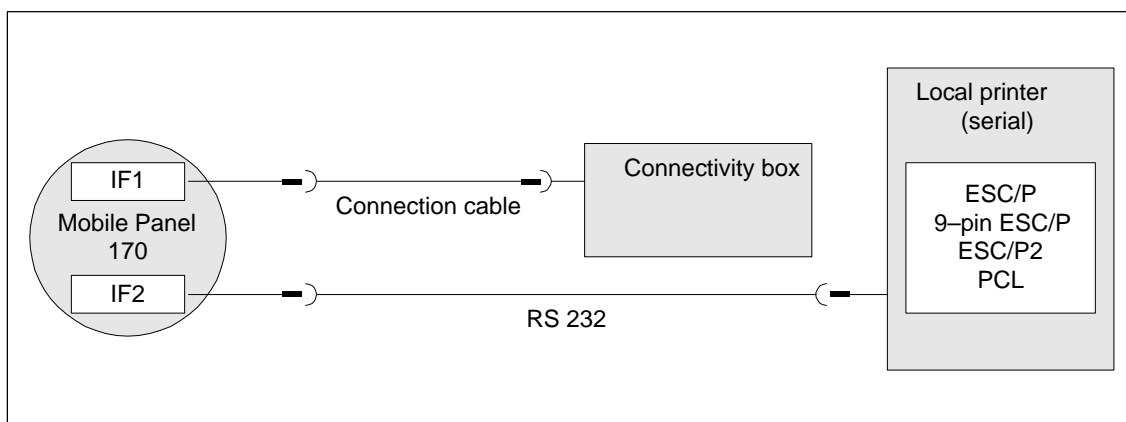
If compression is inevitable during running operations, the operating unit must be switched off before compressing.

10.7 Connect Printer

Connection configuration

Figure 10-17 illustrates how to connect a serial printer to the Mobile Panel 170. The operating unit supports the following printer standards:

- compatible with ESC/P, 9-pin ESC/P or ESC/P2 (EPSON)
e.g. EPSON FX850, Brother 1250
- compatible with PCL3 (Hewlett Packard)
HP LaserJet 5M



Picture 10-17 Printer connection configuration

Information on printer settings is provided in Chapter 9.8.

Note

- Only use a cable with braided metal screening grounded at each end for connecting the operating unit and printer.
 - In the Configuration menu (refer to Chapter 5.4), deactivate the *Remote Control* option if a serial printer is to be connected to the operating unit via the IF2 interface.
 - Some printers may require that the ASCII character set used in the configuration is defined on the printer as well.
-

Note

If a serial printer is connected, the following settings are necessary on the printer:

- RS 232, whereby only the RxD, TxD and GND signals are required (refer to the Appendix, Chapter B.1)
 - 8 data bits
 - 1 stop bit
 - No parity
 - Baud rate between 9600 and 57600, printer-dependent
 - XON/XOFF protocol
-

Proceed as follows to start up the connectivity box:

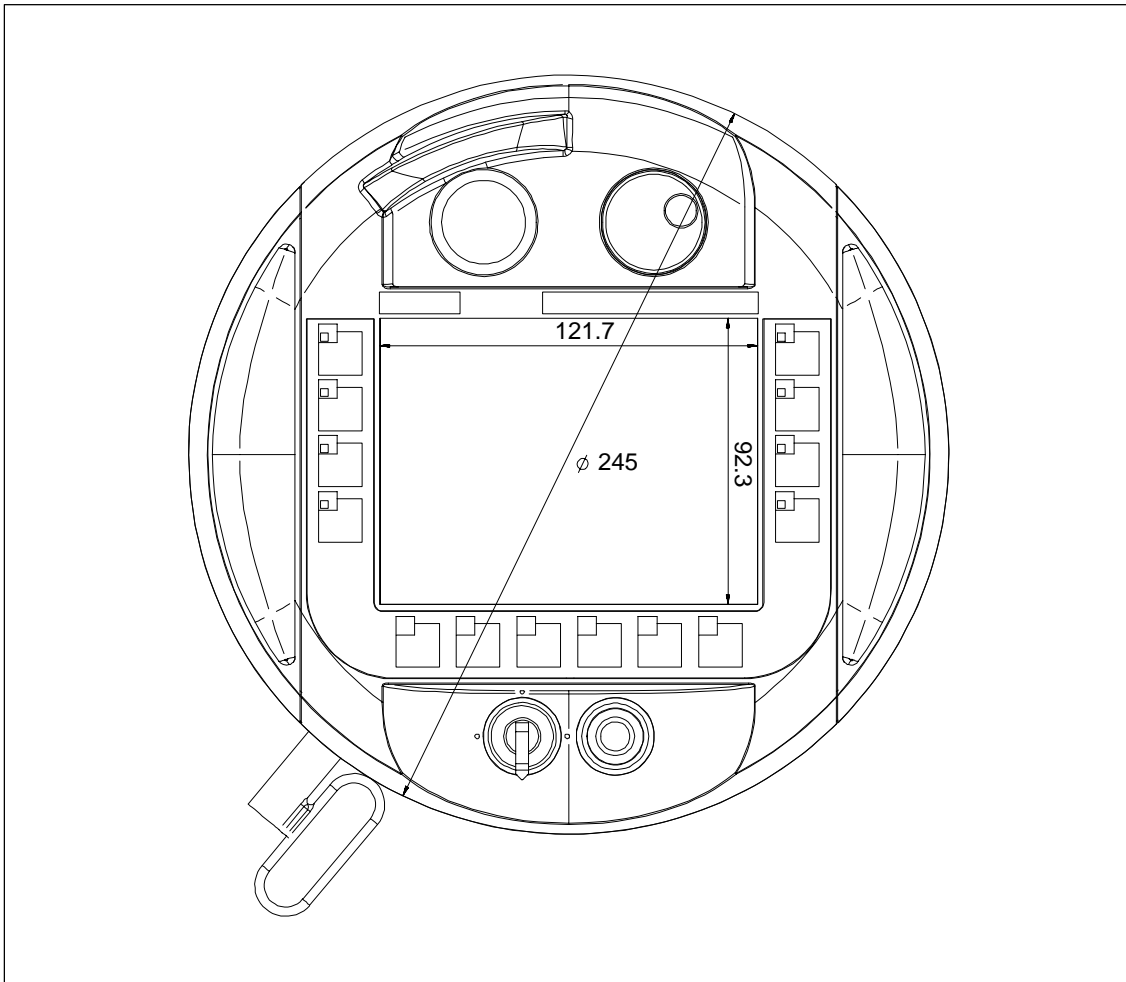
1. Connect the connectivity box to the power supply.
2. Switch on the power supply.
If the operating unit does not start up, the connections are probably reversed.
Swap the connections over in this case.
3. Wait for the operating system to boot.
4. Connect the configuration computer or other periphery equipment to it.

Dimensions

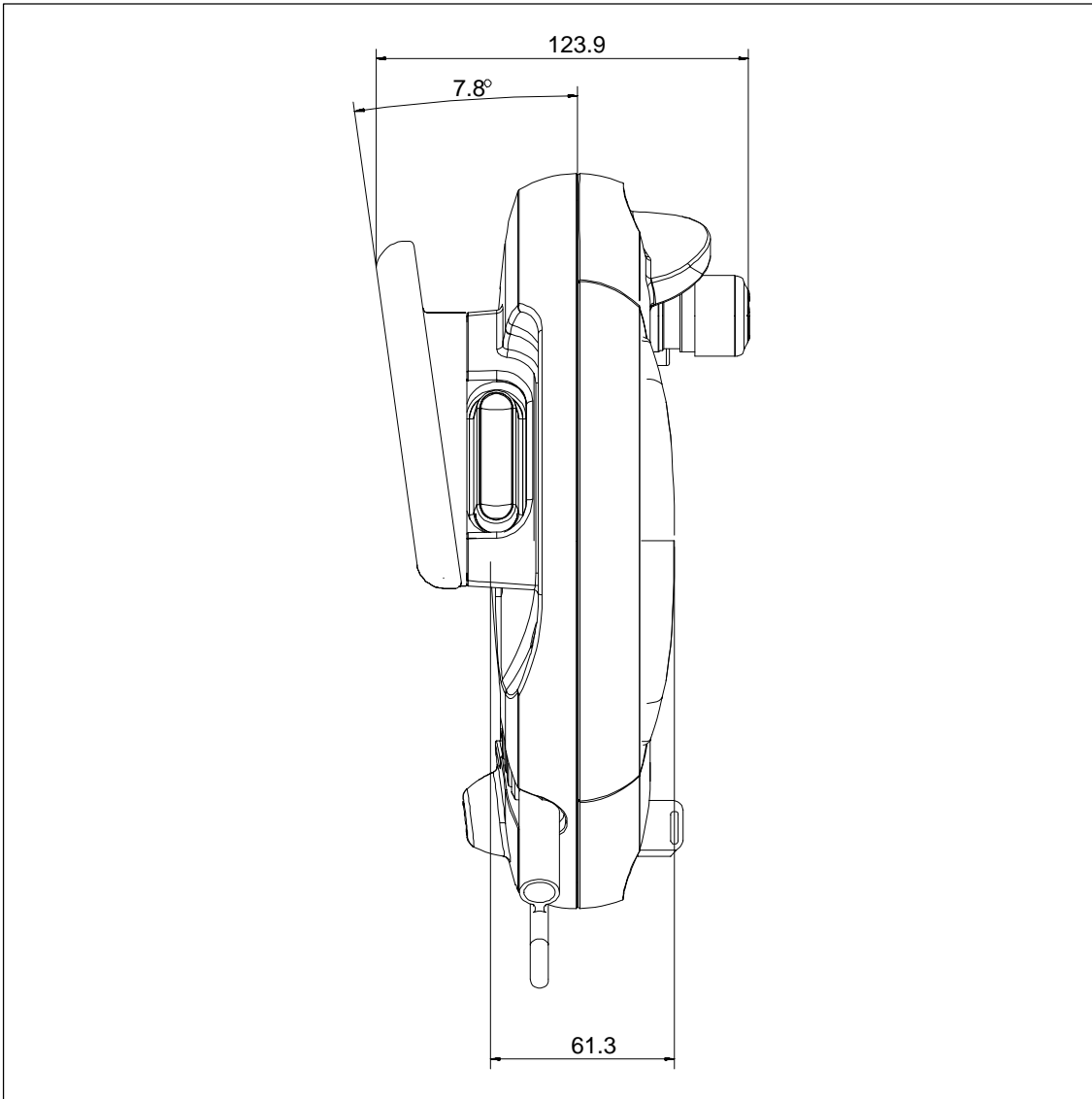
11

11.1 Mobile Panel 170

11.1.1 Dimensions



Picture 11-1 Mobile Panel 170 – front view



Picture 11-2 Mobile Panel 170 – side view

11.1.2 Labeling function keys

Labeling

The function keys on the membrane keyboard are labeled **F1** to **F14**.

Labeling strips can be produced for system-specific labeling and attached to the Mobile Panel 170. Protective covers are available to protect the labeling strips.

Labeling strip template

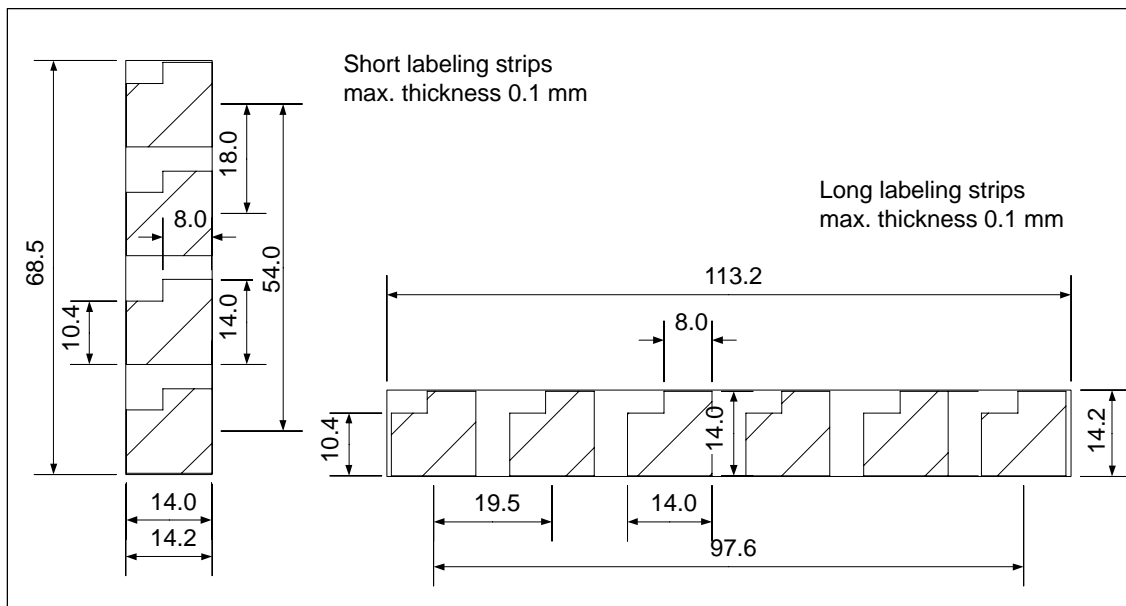
The ProTool CS configuration software contains formatted patterns for labeling function keys individually for various SIMATIC operating units.

The patterns are stored on the Installation CD under `\UTIL-ITY\SLIDE_MOBILE_PANEL.DOC` in Word format. This enables labeling strips to be created for a specific Mobile Panel 170 without extensive design and printing operations.

The labeling strips have areas on them which can be labeled.

Create labeling strips

Only use transparent foil to create your own labeling strips so that the LEDs in the function keys remain visible. Label the foil either with a printer or a waterproof felt-tip pen. Cut the strips according to the specifications depicted in Figure 11-3.



Picture 11-3 Labeling strip dimensions

Note

Use stickers preferably as labeling strips.

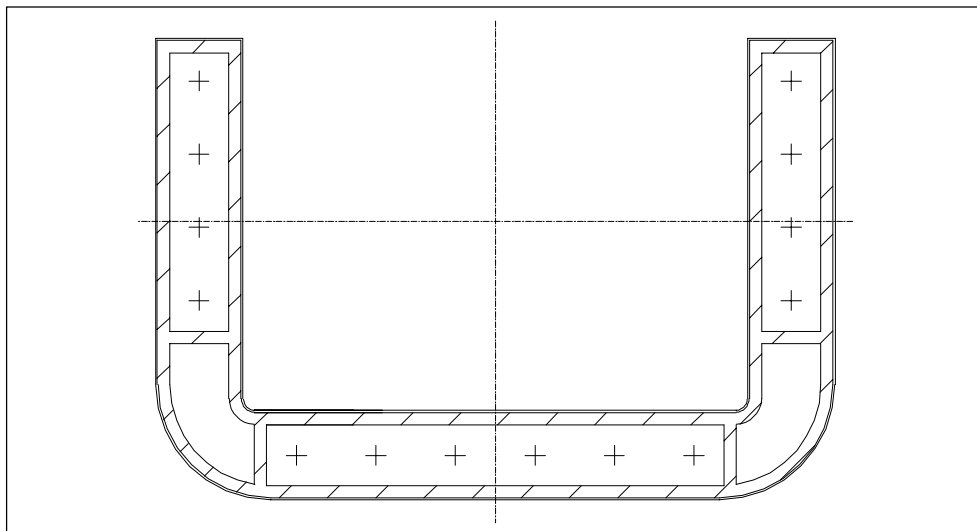
Attaching labeling strips

1. Lay the Mobile Panel 170 on its rear side.
2. Clean the membrane keyboard according to Chapter 13.
3. Label the labeling strips according to the system-specific requirements.

Notice

Before attaching the labeling strips, wait until the inscription is dry.

4. Place or adhere the labeling strips on the membrane keyboard.

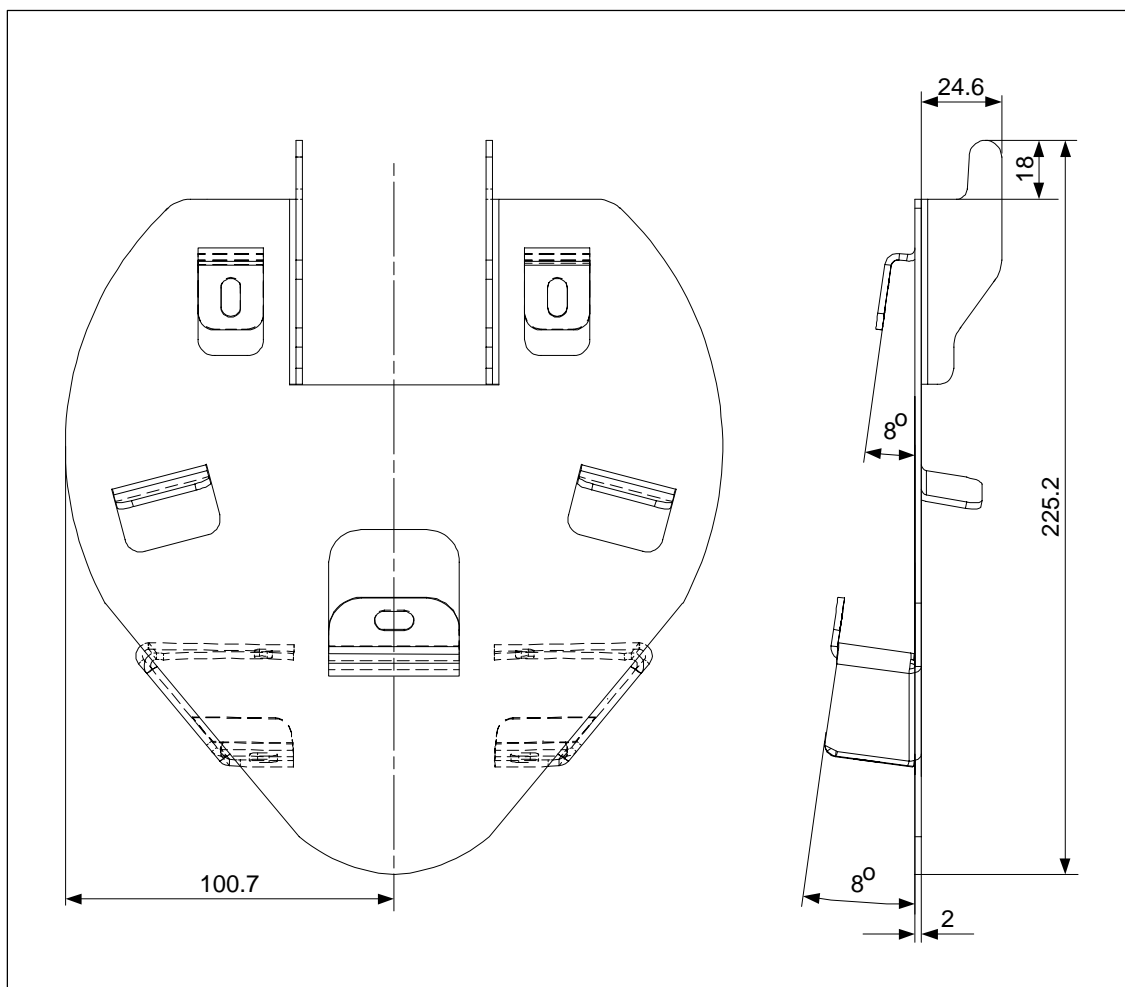
Applying the protective covers

Picture 11-4 Protective cover

1. Take a protective foil and carefully pull off the protective foil.
2. Adhere the label protective cover to the membrane keyboard.
3. Press the protective cover down using medium pressure so that the entire surface sticks.

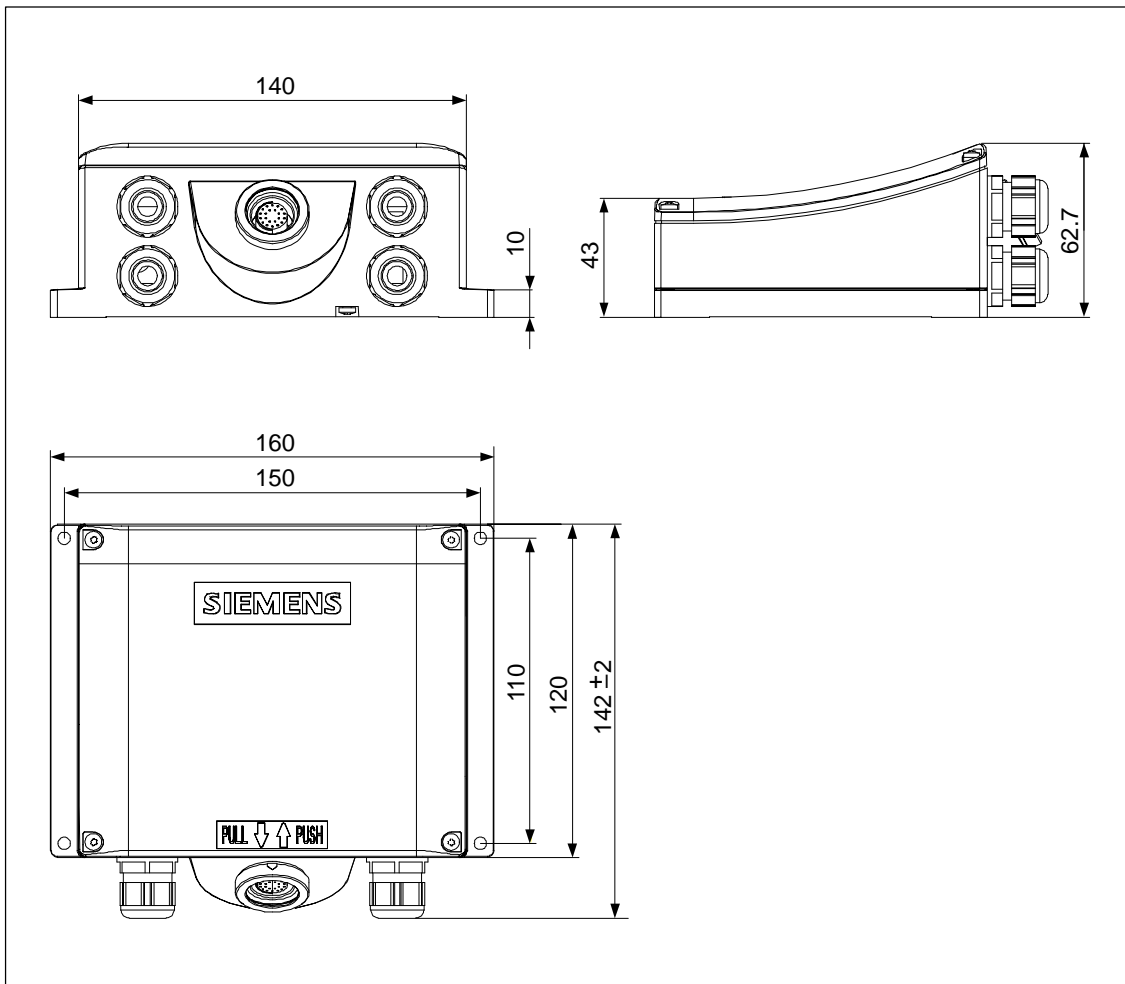
11.2 Wall Mounting Bracket

When installing the wall mounting bracket, ensure that the supporting area is suitable for the Mobile Panel 170.



Picture 11-5 Wall bracket dimensions

11.3 Connectivity box



Picture 11-6 Connectivity box dimensions

Memory Cards

12

Purpose

Memory cards can be used, for example, to archive important process data or execute a backup/restore of the internal Flash memory (refer to Chapter 5.8).

If the power supply is interrupted inadvertently during normal operation, the operating unit checks the memory card after power is returned, repairing defect areas if necessary.

Notice

The housing of the connectivity box is made of plastic. As a result, the threads in the retaining holes are not as resistant to tension as comparable metallic housing. Tighten the screws using a torque of 0.4 – 0.5 Nm as specified.

When the screws are tightened more than 20 times, there is a risk that the threads become damaged.

Memory card type

The operating unit supports the use of memory cards complying to Compact-Flash (CF) standards.

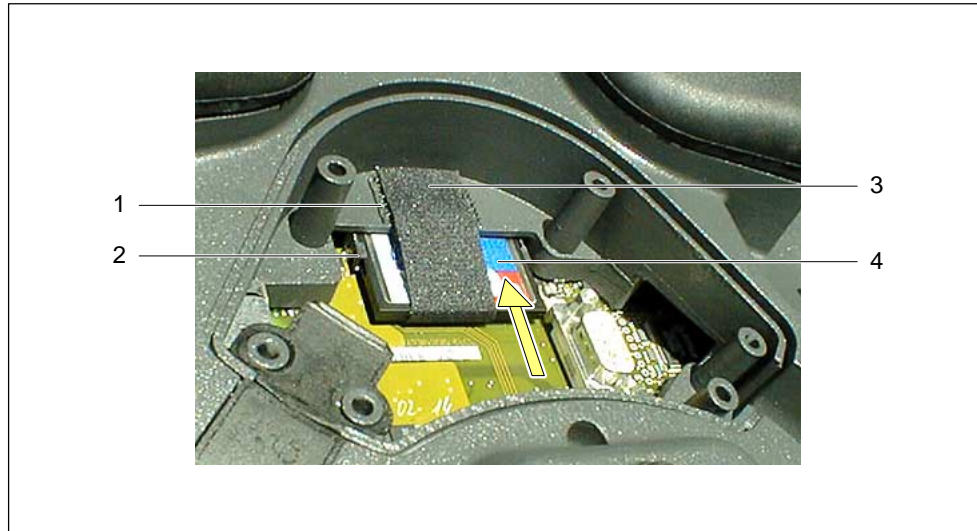
The interface supplies the memory card with necessary 3.3 VDC.

Note

The Mobile Panel 170 can also be used without a memory card inserted. A data backup is then only possible, however, via a connected PC or PU.

Position

The memory card is located inside the Mobile Panel 170 inserted in a slot in the connection duct on the rear side of the operating unit.



Picture 12-1 Position of the memory card

No.	Element
1	Velcro pad
2	Memory card guide
3	Velcro strip
4	CompactFlash memory card

Before beginning to insert or remove a memory card:

- Pay attention to cleanliness – foreign bodies and fluids must not get onto the PCB or inside the operating unit.
- Set the operating unit down on a flat, clean surface to protect it from damage.
- Use a size 2 cross-tip screwdriver to open and close the connection slot.

Inserting a memory card

1. Open the cover as described in Chapter 10.3.2.
2. Unplug the RJ45 connector (refer to Figure 10-3).
3. Pull the Velcro strip (3) back.
4. Insert the memory card (4) in the guide (2) of the CF slot.
The arrow on the memory card must visibly point upwards.
5. Slide the memory card (4) in the direction of the arrow further into the CF slot until the stop engages and the ejection lever is fully extended.
6. Secure the Velcro strip (3).

Notice

Fasten the Velcro strip so that it is tight on the memory card. This is the only way to ensure that the memory card will remain on the contact strip when the Mobile Panel 170 is implemented for mobile use.

7. Fix the cover according to Chapter 10.3.5.
The degree of protection defined is only maintained under this condition.

Removing the memory card

To terminate the runtime software, press the operating element assigned the *Exit_runtime* function in the configuration. Wait until the operating unit Start menu (refer to Figure 5-1) is displayed. The memory card may then be removed.

Caution

Before removing a memory card, ensure that the Mobile Panel 170 is not accessing the memory card.

If it is not, the memory card can be inserted and removed with the operating unit switched on.

Notice

Before changing the memory card, remove the connection cable strain relief carefully from the cable guide or disconnect the connection cable completely. Carry out the work with the utmost care. Jolting movements can cause damage to the connection cable.

Proceed according to Section “Inserting a memory card”, working steps 1–3.

1. Actuate the ejection lever.

This forces the memory card out.

Notice

Do not press on the memory card during this process. This would prevent the ejection procedure.

2. Close the Velcro strip (3).
3. Keep the memory card in a safe place taking the ESD guidelines into account (refer to Appendix, Chapter E).
4. Fix the cover according to Chapter 10.3.5.

The degree of protection defined is only maintained under this condition.

Maintenance and Repair

13

Scope of maintenance

The operating unit has been designed for low maintenance operation. As a result, maintenance is reduced to regular cleaning

- of the touchscreen, and
- the keyboard foil.

13.1 General notes

Preparation

Clean the touchscreen and keyboard foil of the operating unit at regular intervals. Use a damp cloth.



Warning

Only carry out the cleaning work when the operating unit is switched off. This ensures that functions are not inadvertently triggered on touching the keys or the touchscreen.

Cleaning agents

Only use water with a little washing-up liquid or a foamy screen cleaning agent to moisten the cloth. Never spray the cleaning agent directly onto the touchscreen but on to the cleaning cloth. Never use aggressive solvents or scouring powder.

Caution

When cleaning the touchscreen, ensure that no foreign bodies are pressed under the edge of the display. This can cause damage to the seal.

Do not clean the Mobile Panel 170 or connectivity box using compressed air or steam jet blowers.

13.2 Notes on the Touchscreen

Protective foil

A protective foil is available for the Mobile Panel 170 (refer to the ST 80 Catalog). The protective foil is not part of the material supplied with the operating units.

The self-adhesive foil prevents the touchscreen being scratched and soiled. In addition, the matt surface of the foil reduces reflections.

The protective foil can be removed as necessary without leaving any adhesive residue on the touchscreen.

Caution

Never use sharp or pointed tools to remove the protective foil, such as a knife for instance. This may cause damage to the touchscreen.

Operating System Update

14

Purpose

It is possible that the operating unit's operating system cannot be used for the version of the configuration software used. If such an event occurs, the transfer of a configuration from the configuration computer to the operating unit is terminated and a message appears indicating a compatibility conflict.

In this case, synchronize the operating unit operating system with the version of the SIMATIC ProTool CS configuration software, i. e. update the operating system.

Notice

When the operating system is updated, all the existing data on the operating unit is deleted, including licenses (authorizations)!

Use the ProSave service tool to update the operating system. An advantage is that the operating system, called in without ProTool, can be transferred via the following channels:

- Serial
- MPI/PROFIBUS-DP

Principles of operation

After ProSave has been installed, ProSave can be activated in one of two ways:

- stand-alone
- from ProTool

If an operating system transfer is to be carried out using ProTool, call in ProSave within the scope of a project. The general settings (unit and connection selection) need not then be entered since they are assumed from the project.

The same dialog boxes are opened for both variants.

A distinction must be made between two cases of operating system transfer:

- An operating system already exists on the target device.
In this case, operating system transfer can be performed without activating the *Booting* checkbox.
- The target device has no operating system or one which is not compatible.
In this case, carry out the operating system transfer after activating the *Booting* checkbox.

The procedure for both cases is described below.

Operating system transfer without Booting

In the case of an operating system transfer without Booting, the configuration computer communicates with the target device via the target device's operating system.

Connect the target device to the configuration computer according to one of the following connection types:

- Serial connection
A serial cable must be connected to the Sub-D socket on the Mobile Panel 170 (refer to Chapter 10.3.3). Then connect the cable to the configuration computer.
- MPI/PROFIBUS-DP connection
No additional cabling is necessary.

Proceed as follows in order to adapt the operating system on the operating unit to the configuration software version used:

Step	Action
1	Start ProTool from the Windows Start menu and open a project or start ProSave from the Windows Start menu.
2	In ProTool, select the menu items <i>File</i> → <i>Download</i> → <i>Settings</i> or access the ProSave tab control <i>General</i> and select the <i>Mobile Panel 170</i> operating unit. Select a connection and enter the connection parameters.

Step	Action
3	In ProTool, select the menu items <i>File</i> → <i>Download</i> → <i>OS Update</i> or access the ProSave tab control <i>OS Update</i> . Deactivate the <i>Booting</i> checkbox if it is already activated.
4	In <i>Imagepath</i> , select the directory which contains the image file belonging to the operating unit (file extension <i>.img</i>). The file name contains the character string <i>Mobile</i> and <i>170</i> .
5	Select the <i>Open</i> button. When the image file has been opened successfully, various information related to the version status appears in a screen window.
6	Configure the operating unit according to the required transfer channel and switch to download mode (refer to Chapters 5.1 and 5.2).
7	Start the operating system transfer by pressing the <i>Update OS</i> button. This process takes a different length of time, depending on the connection selected. A progress indicator appears during the data transfer. When the transfer is successfully completed, a message appears briefly.

When downloading is performed successfully, there is no project data on the operating unit. The behavior of the operating unit when no project has been loaded is described in Chapter 5.1.

Operating system transfer with Booting

In the case of an operating system transfer with Booting, ProSave communicates with the download on the target device.

Connect the target device to the configuration computer.

Notice

The operating system transfer with Booting is only possible via the serial connection.

After starting the operating system transfer, the target device must be switched off and on again (rebooted) so that the target device establishes contact via the serial interface.

Proceed as follows in order to adapt the operating system on the operating unit to the configuration software version used:

Step	Action
1	Switch off the power supply to the target device.
2	Start ProTool from the Windows Start menu and open a project or start ProSave from the Windows Start menu.

Step	Action
3	In ProTool, select the menu items <i>File</i> → <i>Download</i> → <i>Settings</i> or access the ProSave tab control <i>General</i> and select the <i>Mobile Panel 170</i> operating unit. Select a connection and enter the connection parameters.
4	In ProTool, select the menu items <i>File</i> → <i>Download</i> → <i>OS Update</i> or access the ProSave tab control <i>OS Update</i> . Deactivate the <i>Booting</i> checkbox if it is already activated.
5	In <i>Imagepath</i> , select the directory which contains the image file belonging to the operating unit (file extension <i>.img</i>). The file name contains the character string <i>Mobile</i> and <i>170</i> .
6	Select the <i>Open</i> button. When the image file has been opened successfully, various information related to the version status appears in a screen window.
7	When the corresponding prompt appears on the screen, switch on the power supply again for the target device. Start the operating system transfer by pressing the <i>Update OS</i> button. A progress indicator appears during the data transfer. When the transfer is successfully completed, a message appears briefly. This process takes a different length of time, depending on the connection selected. A progress indicator appears during the data transfer. When the transfer is successfully completed, a message appears briefly.

When downloading is performed successfully, there is no project data on the operating unit. The behavior of the operating unit when no project has been loaded is described in Chapter 5.1.

Appendices

Technical Data	A
Interface Assignments and Connection Examples	B
HMI System Messages	C
CE Conformity	D
ESD Guidelines	E

Technical Data

A

A.1 Mobile Panel 170

Display	
Type	C-STN LCD
Size in ins./W x H (mm)	5.7"/115 x 86
Resolution (pixels)	320 x 240, Q-VGA
Colors	16
Back-lighting	CCFL tube
MTFB at 25 °C	50,000 h (corresponds to approx. 6 years at 24-hour continuous use)

Input medium	
Type	Touchscreen, analog, resistive, Membrane keyboard
Programmable, free labeling of function keys	14 (F1 to F8 with LEDs)
Acknowledgement buttons	2-circuit, 3-position Connection voltage: 24 VDC Current strength Maximum: 500 mA Minimum: 10 mA
STOP button	Optional, 2-circuit Connection voltage: 24 VDC Current strength Maximum: 500 mA Minimum: 10 mA The contacts are normally closed contacts.
Knob	Optional
Key-operated switch	Optional, 3 switch positions
Pushbutton with integrated LED	Optional

Interfaces	
CompactFlash	Yes
Printer	Serial (IF2): 1 x RS 232

Processor	RISC, 32 bit
Operating system	MS Windows CE
Memory	<ul style="list-style-type: none"> Flash, integrated 768 kbyte for user data (for ProTool configuration data) CompactFlash memory card
Power supply	Via connectivity box
Clock	Hardware clock, not buffered
Dimensions, overall	Diameter: 245 Depth: 58
Weight	Approx. 1.3 kg
Temperature	
Operation	0 to +40 °C
Shipping/Storage	-20 to +60 °C
Relative humidity	
Operation	20 to 80%, no condensation
Shipping/Storage	5 to 90%, no condensation
Max. drop height	1.5 m
Degree of protection	IP65
Connection cable	
Bending radius, admissible	> 40 mm

A.2 Connectivity box

Interfaces	
Fast Connector	MPI/PROFIBUS-DP, 12 Mbaud
Terminal strip 1	<ul style="list-style-type: none"> Serial (IF1): 1 x RS 232, 1 x RS 422, 1 x RS 485 Power supply
Terminal strip 2	<ul style="list-style-type: none"> Safety functions for STOP and Acknowledgement buttons PLC tracing signal
Plug connector	Connection cable

Voltage supply	24 V DC (+20.4 to +28.8 V)
Power consumption, typical Applies at 24 V with Mobile Panel 170 connected.	Approx. 400 mA, Connectivity Box Basic Approx. 500 mA, Connectivity Box Plus
Dimensions, W x H x D	160 x 145 x 65
Weight	Approx. 0.35 kg, Connectivity Box Basic Approx. 0.40 kg, Connectivity Box Plus
Temperature Operation Shipping/Storage	0 to +50 °C –20 to +70 °C
Relative humidity Operation Shipping/Storage	35 to 85%, no condensation 35 to 85%, no condensation
Degree of protection	IP65

A.3 Environmental conditions and interference resistance

Environmental conditions	
Shock loading Operation Shipping, storage	15 g/30 ms 25 g/6 msec
Vibration Operation Shipping, storage	0.75 mm (10–58 Hz) 1 g (58 – 500 Hz) 3.5 mm (5 – 8,5 Hz) 1 g (8.5 – 500 Hz)
Barometric pressure Operation Shipping, storage	706 to 1030 hPa 581 to 1030 hPa

Compliance of the named products with the regulations of Directive 89/336 EEC is verified by conformance with the following standards:

Noise immunity	
Static discharge (contact discharge/air discharge)	EN 61000-4-2 6 kV/8 kV
RF irradiation	EN 61000-4-3 10 V/m, 80% AM, 1 kHz
Pulse modulation	ENV 50204 900 MHz ± 5 MHz 10 V/m _{eff.} , 50% ED, 200 Hz
RF conduction	EN 61000-4-6 150 kHz – 80 MHz 10 V, 80% AM, 1 kHz
Burst interference Supply lines Process data lines Signal lines	EN 61000-4-4 2 kV 2 kV 1 kV
Immunity to high energy pulses (Surge) Supply line complying to EN 61000-4-5	0.5 kV, symmetric 0.5 kV, symmetric

Radio interference	
Radio interference level complying to EN 55011	Class A

A.4 Approvals for Mobile Panel 170 and Connectivity Box

The following approvals have been applied for or already granted on supply. Please refer to the rating plate for identification.

Approbation	Norm
CE conformity	Machine directive 98/97/EU EMC directive 89/336/EEC
cULus General safety and fire protection (USA, Canada)	UL 508
SIBE Switzerland EU design certification	EN 60204-1:1997 EN 954-1:1996

Interface Assignment and Connection Examples

B

B.1 Mobile Panel 170 Interface Assignments

RJ45 plug connector

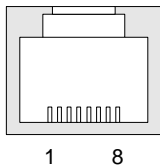
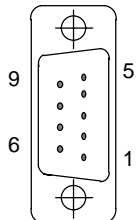


Table B-1 Assignment of the 8-pin, RJ45 plug connector

Pin	Signal
1	RxD-B
2	RxD-A
3	CTS-B
4	RTS-B
5	RTS-A
6	CTS-A
7	TxD-B
8	TxD-A

Sub-D socket

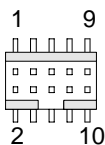
Table B-2 Assignment of the 9-pin Sub-D socket
(configuration via DIP switch, see Chapter 10.6)



Pin	IF2
1	DSR
2	RxD
3	TxD
4	DTR
5	GND
6	DCD
7	RTS
8	CTS
9	Not assigned

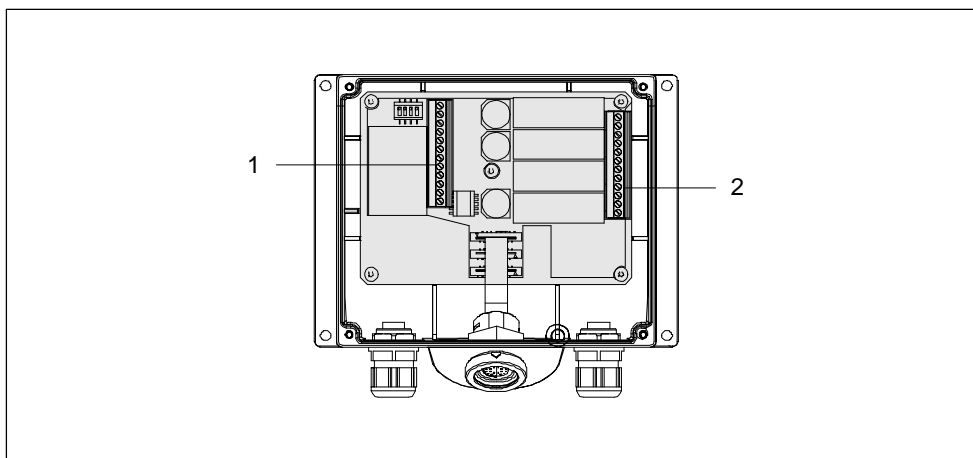
Support plug connector

Table B-3 Assignment of the support plug connector



Pin		Circuit
1	+24 V	Power supply
2	0 V	
3	Stop 23	Stop circuit
4	Stop 24	
5	Stop 13	
6	Stop 14	
7	Enable 1+	Acknowledgement circuit
8	Enable 1-	
9	Enable 2+	
10	Enable 2-	

B.2 Connectivity Box



Picture B-1 Position of the terminal strips 1 and 2

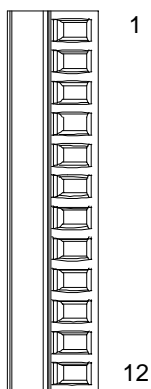


Caution

When connecting terminal strips 1 and 2, ensure that the assignment is as described in the following tables B-4 and B-5 and not swapped. Terminal strip 1 (see Figure B-1) relates to the assignment in Table B-4.

IF1 and power supply

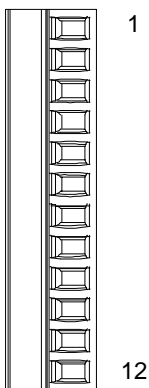
Table B-4 Assignment of the 12-pin terminal strip 1



Pin	RS 232	RS 422	RS 485	Power supply
1	CTS	–	–	–
2	RTS	–	–	–
3	TxD	–	–	–
4	RxD	–	–	–
5	M	M	M	–
6	–	TxD+	Bus + (B)	–
7	–	TxD–	Bus – (A)	–
8	–	RxD+	–	–
9	–	RxD–	–	–
10	PE	PE	PE	PE
11	–	–	–	M24
12	–	–	–	P24

Safety and additional functions

Table B-5 Assignment of the 12-pin terminal strip 2



Pin	Internal linking	Name	Circuit
1		Stop 13	STOP button see Chapter B.3
2		Stop 14	
3		Stop 23	
4		Stop 24	
5	See Tables B-6 and B-7	STOP button pressed 31 ¹	PLC tracing signal
6		STOP button pressed 32 ¹	
7		Mobile Panel 170 31 plugged	
8		Mobile Panel 170 32 plugged ¹	
9		Enable 2+	Acknowledgement button see Chapter B.3
10		Enable 1-	
11		Enable 1+	
12		Enable 2-	



¹ Applies to Connectivity Box Plus

Table B-6 Connectivity Box Basic¹

Link	Name	Digital input 24 V
Not connected 8 ◦	Mobile Panel 170 plugged	1
to DI PLC 7 ◦	Mobile Panel 170 not plugged	0

¹ The “STOP button pressed” function is not available with Connectivity Box Basic.

Table B-7 Connectivity Box Plus¹

Link	Name	Digital input 24 V
+24 V 8  to DI PLC 7	Mobile Panel 170 plugged Mobile Panel 170 not plugged	1 0
+24 V 5  to DI PLC 6	STOP button pressed STOP button not pressed	1 0

¹ The "STOP button pressed" function has no fault detection and must not be used for critical safety applications!

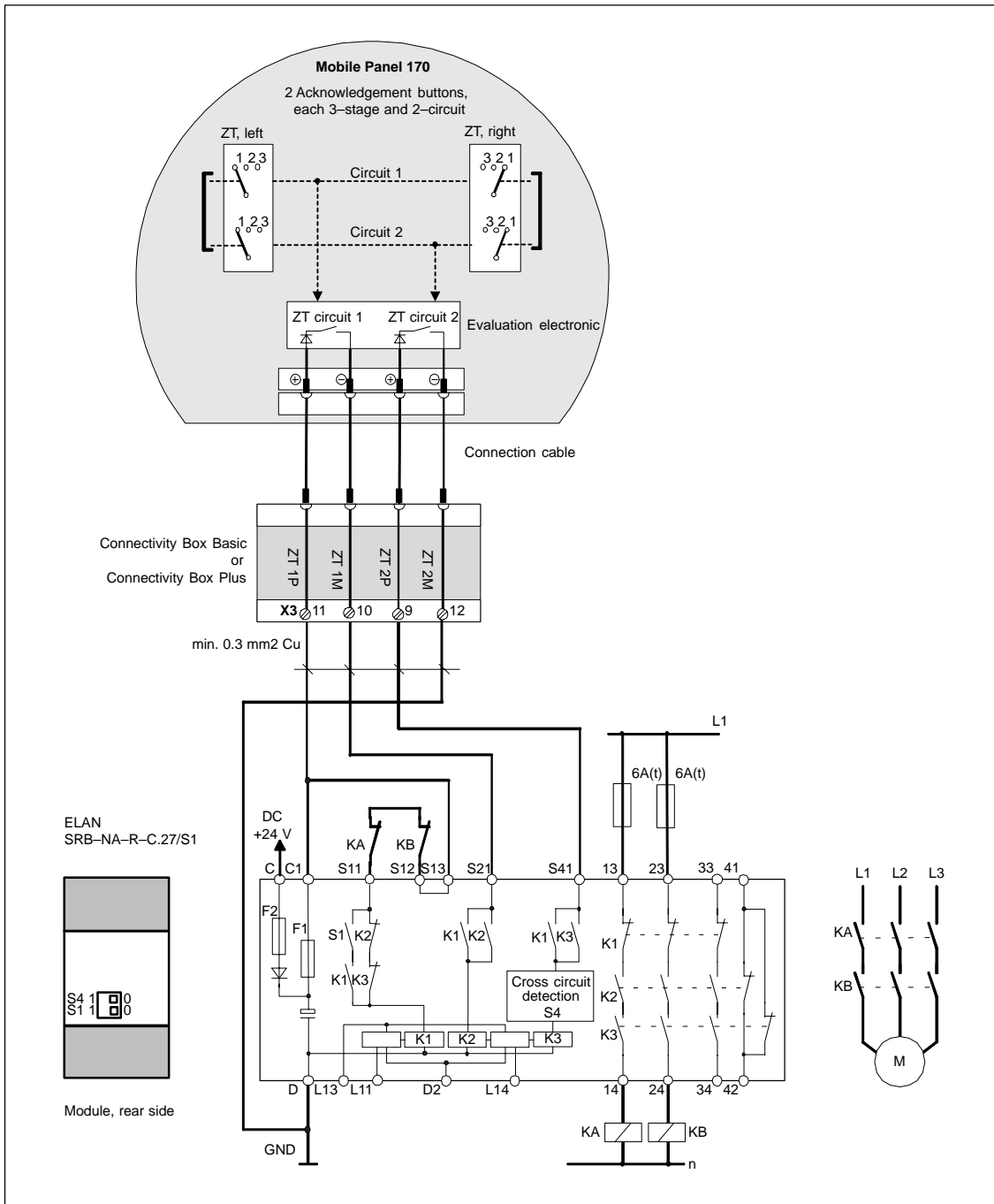
B.3 Connection Examples for Acknowledgement and STOP buttons for Safety Category 3 Complying to EN 954-1

The two following figures contain connection examples for the Acknowledgement button complying to Safety Category 3 in accordance with EN 954-1. Two further connection examples illustrate the connection of the STOP button complying to Safety Category 3 in accordance with EN 954-1 when using a Connectivity Box Plus or Basic.

Notice

In order to ensure Safety Category 3 complying to EN 954-1, also observe the operating manual of the monitoring unit implemented.

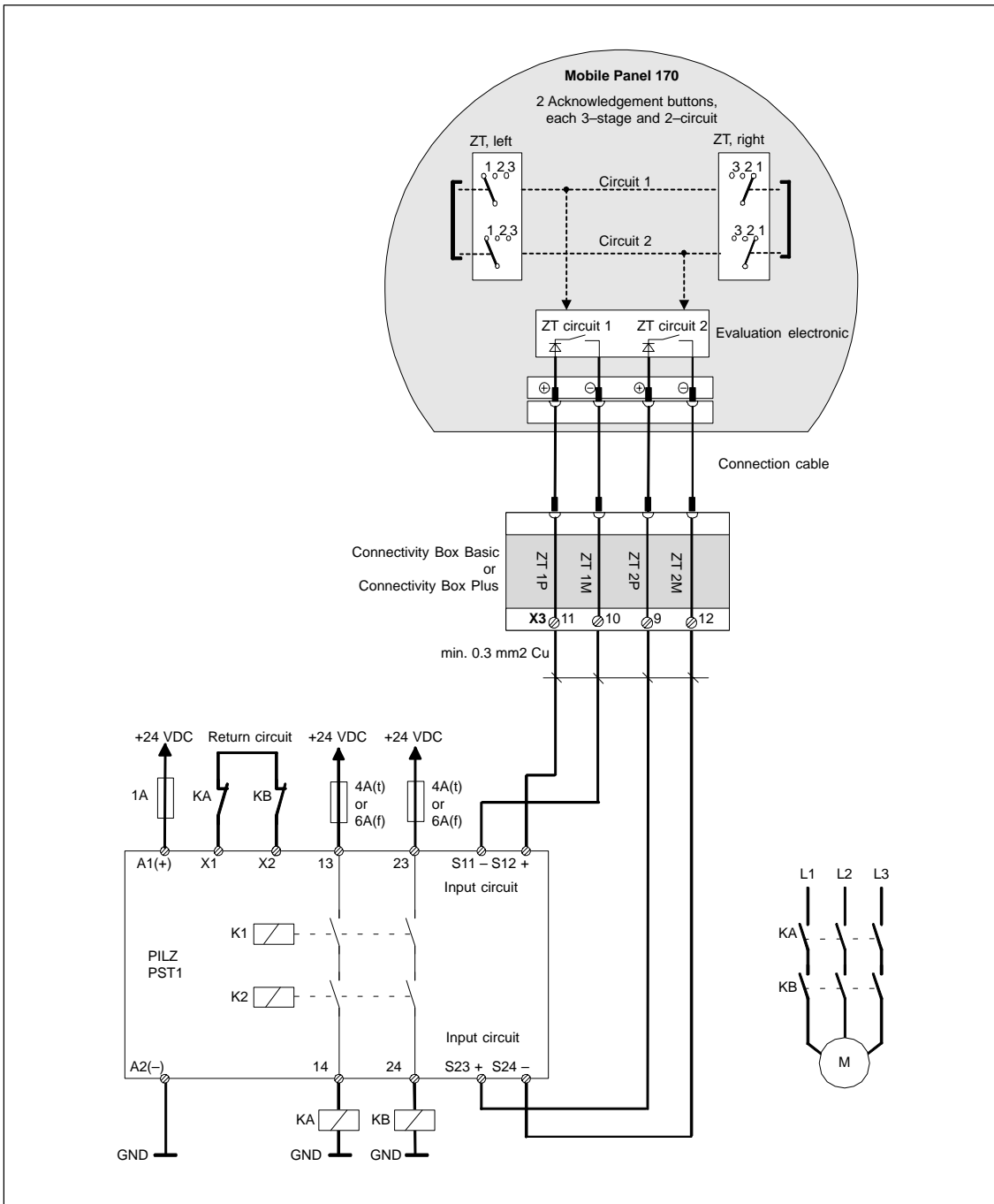
Acknowledgement button with monitoring device ELAN SRB-NA-R-C.27/S1 – for Safety Category 3 complying to EN 954-1



Picture B-2 Acknowledgement button on monitoring unit ELAN SRB-NA-R-C.27/S1

All KA and KB contacts **must** have forced guidance. The switches S1 and S4 on the rear side of the module **must** be set to Position 0.

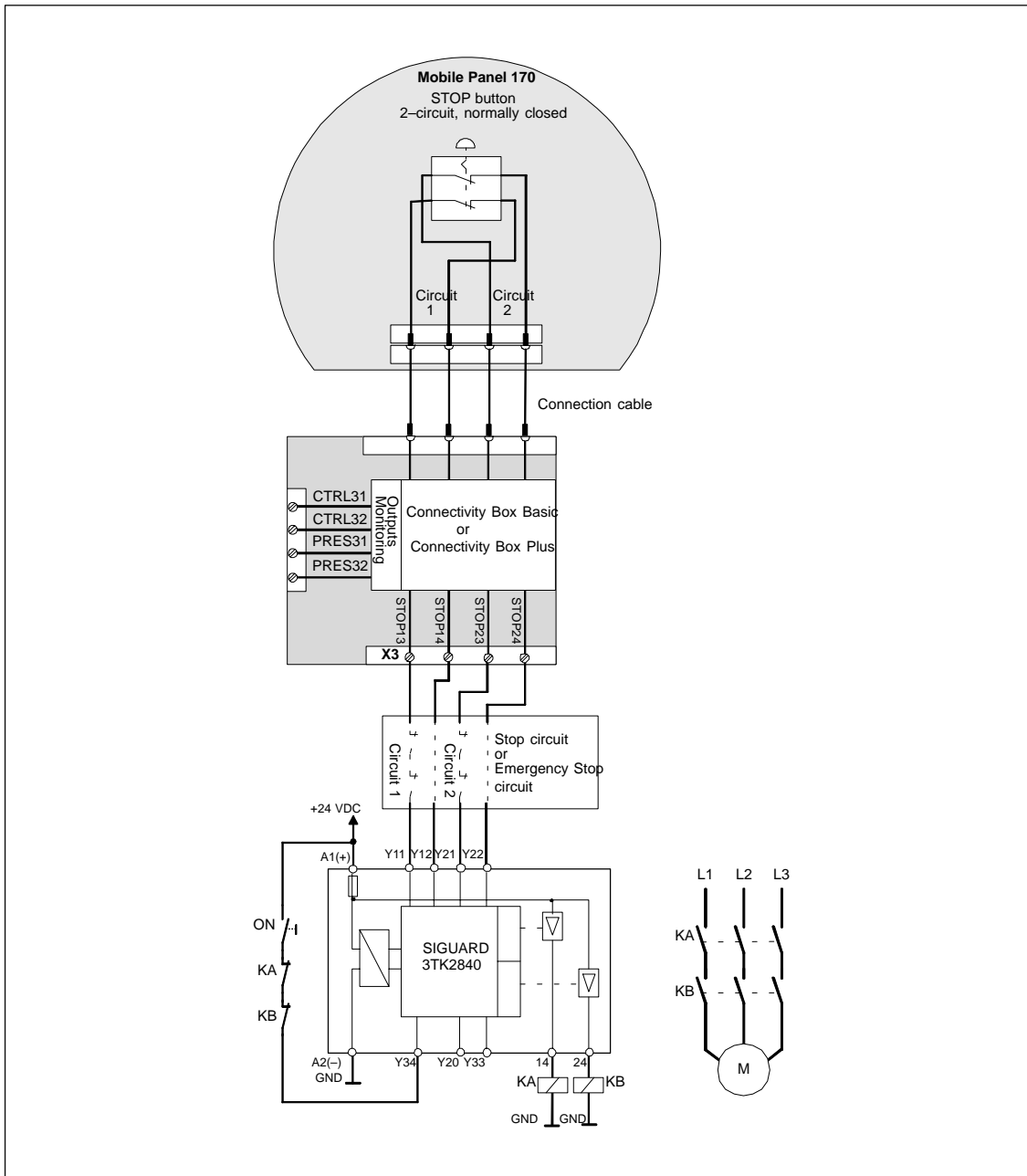
Acknowledgement button with monitoring unit PILZ PST1 – for Safety Category 3 complying to EN 954-1



Picture B-3 Acknowledgement button on the monitoring unit PILZ PST1

All KA and KB contacts **must** have forced guidance.

**STOP button with monitoring unit SIGUARD 3TK2840 –
for Safety Category 3 complying to EN 954-1**



Picture B-4 STOP button on monitoring unit SIGUARD 3TK2840

All KA and KB contacts **must** have forced guidance. The monitoring outputs must not be used for safety-related functions.

HMI System Messages

C

In this chapter

This chapter contains a selection of important HMI system messages for Windows-based systems. The table indicates when the messages occur and how they, or their cause, can be cleared. Not every message is relevant for each operating unit.

HMI system message parameters

The HMI system messages may contain parameters which are not decoded for the user but which are relevant in respect of the cause of an error since they provide a reference to the source code of the runtime software. These parameters are issued according to the text "Error code:".

Notice

HMI system messages are issued in the language currently set on the operating unit.

Number	Effect/Cause	Remedy
10000	The print job could not be started or was terminated for an unknown reason. The printer is incorrectly configured. Or: There are no rights for a network printer available.	Check the printer settings and cable connections. If a fault occurs repeatedly, contact the hotline.
10001	No printer has been installed or no standard printer configured.	Install a printer and/or mark one as standard printer.
10002	The intermediate buffer for printing graphics is full. Up to two graphics can be buffered.	Do not issue print jobs so quickly in succession.
10003	Graphics can be buffered again.	–
10004	The intermediate buffer for printing lines in text mode (e.g. messages) is full. Up to 1000 lines can be buffered.	Do not issue print jobs so quickly in succession.
10005	Lines of text can be buffered again.	–
10006	The Windows print system reports an error. For information on the cause, refer to the text printed and, if available, the error number. Printing is not performed or it is incorrect.	Repeat the action, if necessary.

Number	Effect/Cause	Remedy
20010	A fault has occurred in the script line called in from the specified script. Execution of the script function was, therefore, terminated. In this case, it is advisable to check any previous system messages too.	Select the specified script line in the configuration. Check tags, whether the types used are permissible. Check Functions, whether the number and types of parameter are correct.
20011	An error has occurred in a script called in by the script specified. Execution of the script function- has, therefore, been terminated in the subscript. In this case, it is advisable to check any previous system messages too.	Select the scripts from the configuration which are called in directly or indirectly via the specified script. Check tags, whether the types used are permissible. Check Functions, whether the number and types of parameter are correct.
20012	Inconsistent configuration data is present. Therefore, the script could not be created.	Compile the configuration again.
20013	VBScript.dll is not correctly installed. Therefore, no scripts can be executed.	Re-install ProTool/Pro RT.
20014	A value is returned by the script function which is not written in any configured return tag.	Select the specified script in the configuration. Check whether the script name has been assigned a value.
20015	Too many scripts have been triggered in quick succession. If more than 20 scripts are queued to be processed, any subsequent scripts are rejected. In this case, the script indicated in the message is not executed.	Check where the scripts are being triggered from. Extend the times, e.g. the polling time of the tags, which trigger the scripts.
30010	The tag could not accept the function result, e.g. in the case of exceeding the value range.	Check the tag type of the function parameter.
30011	A function could not be executed because the function was assigned an invalid value or type in the parameter.	Check the parameter value and tag type of the invalid parameter. If a tag is used as a parameter, check its value.
40010	The function could not be executed since the parameters could not be converted to a common tag type.	Check the parameter types in the configuration.
40011	The function could not be executed since the parameters could not be converted to a common tag type.	Check the parameter types in the configuration.
50000	The operating unit receives data faster than it is capable of processing. Therefore, no further data is received until the data currently available has been processed. Data exchange then resumes.	–
50001	Data exchange has been resumed.	–

Number	Effect/Cause	Remedy
60000	This message is generated by the function "Display system messages". The text to be displayed is transferred to the function as a parameter.	–
60010	The file could not be copied in the direction defined because one of the two files is currently open or the source/target path is not available. It is possible that the Windows NT user has no access rights to one of the two files.	Restart the function or check the paths of the source/target files. Using Windows NT with NTFS: The user executing ProTool/Pro RT must be granted access rights for the files.
60011	An attempt was made to copy a file to itself. It is possible that the Windows NT user has no access rights to one of the two files.	Check the path of the source/target file. Using Windows NT with NTFS: The user executing ProTool/Pro RT must be granted access rights for the files.
70010	The application could not be started because it could not be found in the path specified or insufficient memory space was available.	Check whether the application exists in the specified path or close other applications.
70011	The system time could not be modified. The error message only appears in connection with area pointer Date/Time PLC. Possible causes: <ul style="list-style-type: none"> • an impermissible time was transferred in the PLC job, • the Windows NT user has no user rights to modify the system time. If the first parameter in the system message is displayed with the value 13, the second parameter indicates the byte containing the incorrect value.	Check the time which is to be set. Under Windows NT: The user executing ProTool/Pro RT must be assigned the rights to modify the system time from Windows NT (administration/user manager, guidelines).
70012	An error occurred when executing the function <i>Exit Runtime</i> with the option <i>Exit also Windows</i> . Windows and ProTool/Pro RT are not terminated. A possible cause is that other applications cannot be terminated.	Terminate all applications currently running. Then terminate Windows.
70013	The system time could not be modified because an invalid value was entered. Incorrect separators may have been used.	Check the time which is to be set.
70014	The system time could not be modified. Possible causes: <ul style="list-style-type: none"> • an impermissible time was transferred • the Windows NT user has no user rights to modify the system time, • Windows rejects the setting request. 	Check the time which is to be set. Under Windows NT: The user executing ProTool/Pro RT must be assigned the rights to modify the system time from Windows NT (administration/user manager, guidelines).

Number	Effect/Cause	Remedy
70015	The system time could not be read because Windows rejects the reading function.	–
70016	An attempt was made to select a screen by means of a function or job. This is not possible because the screen number specified does not exist. Or: a screen could not be generated due to insufficient system memory.	Check the screen number in the function or job with the screen numbers configured. Refer the number to a screen, if necessary.
70017	Date/Time is not read from the area pointer because the address set in the PLC is either not available or has not been set up.	Change the address or set up the address in the PLC.
70018	Acknowledgement that the password list has been successfully imported.	–
70019	Acknowledgement that the password list has been successfully exported.	–
70020	Acknowledgement for activation of message recording.	–
70021	Acknowledgement for deactivation of message recording.	–
70022	Acknowledgement to starting the <i>Import Password List</i> action.	–
70023	Acknowledgement to starting the <i>Export Password List</i> action.	–
70027	Backing up the RAM file system has been started.	–
70028	Backing up of the RAM file system has been completed successfully. The files from the RAM have been copied in the Flash memory. Following a restart, these saved files will be copied back in the RAM file system.	–
70029	Backup of the RAM file system has failed. No backup copy of the RAM file system has been made.	Check the settings in the <i>OP Properties</i> dialog and save the RAM file system using the <i>Save Files</i> button in the <i>Persistent Storage</i> tab control.
70030	The parameters configured for the function are faulty. The connection to the new PLC was not established.	Compare the parameters configured for the function with the parameters configured for the PLC and correct them as necessary.
70031	The PLC configured in the function is not an S7 PLC. The connection to the new PLC was not established.	Compare the <i>S7 PLC name</i> parameter configured for the function with the parameters configured for the PLC and correct them as necessary.
80001	The archive specified is filled to the size defined (in percent) and must be stored elsewhere.	Store the file or table by executing a 'move' or 'copy' function.

Number	Effect/Cause	Remedy
80002	A line is missing in the specified archive.	–
80003	The copying process for archiving was not successful. In this case, it is advisable to check any subsequent system messages, too.	–
80006	Since archiving is not possible, this causes a permanent loss of the functionality.	In the case of databases, check whether the corresponding data source exists and start up the system again.
80009	A copying action has been completed successfully.	–
80010	Since the path was incorrectly entered in ProTool, this causes a permanent loss of the functionality.	Configure the path for the respective archive again and restart the system when the full functionality is required.
80012	Archive values are stored in a buffer. If the values are read to the buffer faster than they can be physically written (e.g. using a hard disk), overloading may occur and recording is then stopped.	Archive less values. Or increase the recording interval.
80013	The overload status no longer applies. Archiving resumes the recording of all values.	–
80014	The same action was triggered twice in quick succession. Since the process is already in operation, the action is only carried out once.	–
80016	The archives are separated by the function <i>Close archive</i> and the incoming entries exceed the defined buffer size. All the jobs in the buffer are deleted.	Reconnect the archives.
80017	The incoming entries cause the defined buffer size to be exceeded. This can be caused, e.g. by several copying actions being activated at the same time. All the copy jobs in the buffer are deleted.	Terminate the copy process.
80018	All the archives are reconnected by means of the DB layer, e.g. after executing the function <i>Open_archive</i> . Values are then written back into the tables.	–
80019	All the archives are separated from the DB layer and all connections terminated, e.g. after executing the function <i>Close_archive</i> . Values are temporarily buffered and written in the tables when the connection is re-established. There is no connection to the storage medium and a change can take place.	–

Number	Effect/Cause	Remedy
80020	The max. number of simultaneously activated copy actions has been exceeded. Copying is not executed.	Wait until the current copying actions have been completed and restart the last copy action.
80021	An attempt was made to delete an archive which is still involved with a copy action. Deletion has not been executed.	Wait until the current copying action has been completed and restart the last action.
80022	An attempt was made to start a sequence archive, which is not a sequence archive, from an archive using the function <i>Start_sequence_archive</i> . No sequence archive is created.	Check the project for the following: <ul style="list-style-type: none"> the function <i>Start_sequence_archive</i> is correctly configured. the variable parameters are being correctly provided at the operating unit.
80023	An attempt was made to copy an archive to itself. The archive is not copied.	Check the project for the following: <ul style="list-style-type: none"> the function <i>Copy_archive</i> is correctly configured. the variable parameters are being correctly provided at the operating unit.
80024	The function <i>Copy_archive</i> is configured not to permit copying when the target archive already contains data (Parameter: <i>Write mode</i>). The archive is not copied.	Modify the function <i>Copy_archive</i> in the project, if necessary. Before initiating the function, delete the target archive.
80025	The copy action is interrupted. Data written up to this point is retained. Deletion of the target table (if configured) is not executed. The cancellation is documented by an error entry <i>\$RT_ERR\$</i> at the end of the target table.	–
80026	The message is issued after all the archives have been successfully initialized. Values are written in the archives from this moment on. Prior to this, no values are archived even though the runtime software is operating.	–
80027	The internal Flash memory has been specified as the memory location for an archive. This is not permissible. No values will be archived for this archive and the archive will not be created.	Configure "Storage Card" as the memory location or a network path.
80028	The message serves as a status acknowledgment that initialization of the archives is currently running. No values are archived until system message 80026 is issued.	–
80029	The number of archives specified in the message could not be initialized. Initialization of the archives has been completed. The faulty archives are not available for archiving jobs.	Evaluate the additional system message, related to this message, which is also issued. Check the configuration, the ODBC (Open Database Connectivity) and the specified drive.

Number	Effect/Cause	Remedy
80030	The structure of the table(s) available does not match the archiving structure expected. The archiving process is stopped for this archive.	Delete the existing tables manually, in advance.
80032	Archives can be configured with a function trigger. This is triggered as soon as the archive is full. If runtime is started and the archive is already full, the trigger function will not be initiated. The archive specified no longer archives data since it is full.	Stop the runtime, delete the archive and restart the runtime again. Or: Configure a button in the runtime which contains the same actions as the function trigger and press it.
110000	The operating mode status has been changed. The operating mode is now <i>offline</i> .	–
110001	The operating mode status has been changed. The operating mode is now <i>online</i> .	–
110002	The operating mode status has not been changed.	Check the connection to the PLCs. Check whether the address area for the area pointer "Coordination" in the PLC is available.
110003	The operating status of the PLC specified is changed by the function <i>Connect/Disconnect PLC</i> . The operating mode is now <i>offline</i> .	–
110004	The operating status of the PLC specified is changed by the function <i>Connect/Disconnect PLC</i> . The operating mode is now <i>online</i> .	–
110005	An attempt was made to use the function <i>Connect/Disconnect PLC</i> to switch the specified PLC to operating mode <i>online</i> although the entire system is in operating mode <i>Offline</i> . This switch-over is not permissible. The PLC remains in operating mode <i>offline</i> .	Switch the complete system to operating mode <i>online</i> and execute the function again.
110006	The Colorado system has been extended by the addition of the <i>User Version</i> area pointer. If the user version is not correct, the runtime is stopped.	Check the user versions. Either the wrong version was entered in the PLC or configuration or the wrong configuration was started for the PLC.
120000	The trend is not displayed because an incorrect axis to the trend, or incorrect trend, has been configured.	Change the configuration.
120001	The trend is not displayed because an incorrect axis to the trend, or incorrect trend, has been configured.	Change the configuration.

Number	Effect/Cause	Remedy
120002	The trend is not displayed because the tag assigned tries to access an invalid PLC address.	Check whether the data area for the tag exists in the PLC, the configured address is correct or the value range for the tag is correct.
130000	The action was not executed.	Close other applications. Delete files no longer required from the hard disk.
130001	The action was not executed.	Delete files no longer required from the hard disk.
130002	The action was not executed.	Close other applications. Delete files no longer required from the hard disk.
130003	No target data carrier is inserted. The process is stopped.	Check, for example, whether: <ul style="list-style-type: none"> • access has been made to the correct data carrier • the data carrier has been inserted
130004	The target data carrier is write-protected. The process is stopped.	Check whether access has been made to the correct data carrier. Remove the write protection.
130005	The file is write-protected. The process is stopped.	Check whether access has been made to the correct file. Modify the file attributes, if necessary.
130006	No access to file is possible. The process is stopped.	Check, for example, whether: <ul style="list-style-type: none"> • access has been made to the correct file • the file exists • a different action prevents simultaneous access to the file
140000	Online connection to the PLC has been successfully established.	–
140001	Online connection to the PLC has been disconnected.	–
140003	No tag updating or writing is executed.	Check the connection and whether the PLC is switched on. Check the parameter definitions in the Control Panel using "Set PU/PC interface". Restart the system.
140004	No tag updating or writing is executed because the access point or the subrack configuration is incorrect.	Check the connection and whether the PLC is switched on. Check the access point or the subrack configuration (MPI, PPI, PROFIBUS) in the Control Panel with "Set PU/PC interface". Restart the system.

Number	Effect/Cause	Remedy
140005	No tag updating or writing is executed because the address of the operating unit is incorrect (possibly too high).	Use a different operating unit address. Check the connection and whether the PLC is switched on. Check the parameter definitions in the Control Panel using "Set PU/PC interface". Restart the system.
140006	No tag updating or writing is executed because the baud rate is incorrect.	Select a different baud rate in ProTool/Pro (according to subrack, profile, communication peer, etc.).
140007	No tag updating or writing is executed because the bus profile is incorrect (see %1). The following parameters could not be entered in the registry: 1: Tslot 2: Tqui 3: Tset 4: MinTsdr 5: MaxTsdr 6: Trdy 7: Tid1 8: Tid2 9: Gap Factor 10: Retry Limit	Check the user defined bus profile. Check the connection and whether the PLC is switched on. Check the parameter definitions in the Control Panel using "Set PU/PC interface". Restart the system.
140008	No tag updating or writing is executed because the configuration data is incorrect: The following parameters could not be entered in the registry: 0: General errors 1: Incorrect version 2: Profile cannot be entered in the registry. 3: Sub-network type cannot be entered in the registry. 4: Target rotation time cannot be entered in the registry. 5: Highest address (HSA) incorrect.	Check the connection and whether the PLC is switched on. Check the parameter definitions in the Control Panel using "Set PU/PC interface". Restart the system.
140009	No tag updating or writing is executed because the module for the S7 communication was not found.	Re-install the module in the Control Panel using "Set PU/PC interface".
140010	No S7 communication peer could be found because the PLC is switched off. DP/T: The option "Is not active as the only master" is set in the Control Panel under "Set PU/PC interface".	Switch the PLC on. DP/T: If only one master is connected to the network, deactivate the option "Is not active as the only master" in "Set PU/PC interface". If the network has more than one master, switch this master on. Do not modify any settings here, otherwise a bus fault may occur.
140011	No tag updating or writing is executed because communication is interrupted.	Check the connection and that the communication peer is switched on.

Number	Effect/Cause	Remedy
140012	There is an initialization problem (e.g. when ProTool/Pro RT has been terminated in the Task Manager). Or: another application (e.g. STEP 7, WINCC) is active with different bus parameters and the driver cannot be started with the new bus parameters (e.g. baud rate).	Restart the operating unit. Or start ProTool/Pro RT first and then the other applications.
140013	The MPI cable is not plugged in and, thus, there is no power supply.	Check the connections.
140014	–	Modify the operating unit address in the configuration in <i>PLC</i> .
140015	Incorrect baud rate Or: incorrect bus parameter (e.g. HSA) Or: OP address HSA Or: incorrect interrupt vector (interrupt does not arrive at the driver)	Correct the incorrect parameters.
140016	–	Change the interrupt number.
140017	–	Change the interrupt number.
140018	The consistency check was deactivated by Simotion Scout. Only one appropriate note appears.	Activate the consistency check with Simotion Scout again and load the configuration in the project once more.
140019	Simotion Scout loads a new project in the PLC. Connection to the PLC is interrupted.	Wait until the end of the reconfiguration.
140020	The version in the PLC and that in the configuration (FWD file) do not match. Connection to the PLC is interrupted.	<ul style="list-style-type: none"> • Load the current version in the PLC using Simotion Scout. • Generate the anew project using ProTool CS, end ProTool RT and start with the new configuration.
150000	No more data is read or written. Possible causes: <ul style="list-style-type: none"> • The cable is defective. • The PLC does not respond, is defective, etc. • Connection is established via the wrong interface. • The system is overloaded. 	Check that the cable is plugged in, the PLC is operational, the correct interface is used. Reboot the system if the system message is displayed continuously.
150001	Connection is re-established because the cause of the interruption has been eliminated.	–

Number	Effect/Cause	Remedy
160000	No more data is read or written. Possible causes: <ul style="list-style-type: none"> The cable is defective. The PLC does not respond, is defective, etc. Connection is established via the wrong interface. The system is overloaded. 	Check that the cable is plugged in, the PLC is operational, the correct interface is used. Reboot the system if the system message is displayed continuously.
160001	Connection is re-established because the cause of the interruption has been eliminated.	–
160010	There is no connection to the server because the server identification (CLS-ID) cannot be established. Values cannot be read or written.	Check the access rights.
160011	There is no connection to the server because the server identification (CLS-ID) cannot be established. Values cannot be read or written.	Check, for example, whether: <ul style="list-style-type: none"> the server name is correct the computer name is correct the server is registered
160012	There is no connection to the server because the server identification (CLS-ID) cannot be established. Values cannot be read or written.	Check, for example, whether: <ul style="list-style-type: none"> the server name is correct the computer name is correct the server is registered Information for experienced users: Interpret the value from HRESULT.
160013	The specified server was started as InProc Server. This has not been released and may possibly lead to incorrect behavior because the server is running in the same process area as the ProTool/Pro RT runtime software.	Configure the server as OutProc Server or Local Server.
160014	Only one OPC server project can be started on a PC/MP. An error message appears when an attempt is made to start a second project. The second project has no OPC server functionality and cannot be located as an OPC server from external sources.	Do not start a second project with OPC server functionality on the computer.
160015	deviceCOM software for OPC communication could not be started.	Execute an operating system transfer. Observe the online help for ProSave in this case. If the problem persists, contact the hotline service.
160016	deviceCOM transport software for OPC communication could not be started.	If the deviceCOM parameters on the operating unit have been modified manually, check the modifications made. If the problem persists, contact the hotline service.

Number	Effect/Cause	Remedy
170000 ¹	S7 diagnostics messages are not displayed because it is not possible to logon to the S7 diagnostics with this unit. The service program is not supported.	–
170001 ¹	The S7 diagnostics buffer cannot be displayed because communication with the PLC has been switched off.	Switch the PLC <i>online</i>
170002 ¹	The S7 diagnostics buffer cannot be displayed because reading in the diagnostics buffer (SZL) was terminated due to an error.	–
170003 ¹	The display of an S7 diagnostics message is not possible. An internal error %2 has been reported.	–
170004 ¹	The display of an S7 diagnostics message is not possible. An internal error with error class %2, error number %3 has been reported.	–
170007 ¹	It is not possible to read in the S7 diagnostics buffer (SZL) because it was terminated with an internal error with error class %2 and error code %3.	–
180000	A component/OCX receives configuration data with a version identification which is not supported.	Install a newer component.
180001	The system is overloaded because too many actions have been activated simultaneously. Not all the actions can be executed, some are rejected.	<ul style="list-style-type: none"> • Increase the configured cycle times or basic clock. • Generate the messages slower (polling). • Trigger the scripts and functions at greater intervals. • If the message appears more frequently: Restart the operating unit.
180002	The screen keyboard could not be activated. Possible causes: <ul style="list-style-type: none"> • The screen keyboard is not generally supported under Windows 95. • The file "TouchInputPC.exe" was not registered due to an incorrectly executed Setup. 	If Windows 95 is not available: Install the runtime software again.
190000	It is possible that the tag will not be updated.	–
190001	The tag is updated following an error status after the cause of the last error state has been eliminated (return to normal operation).	–

¹ The optional parameter %1 at the start of the message may contain an identification for the S7 connection when several S7s are in parallel operation and are connected to diagnostics equipment.

Number	Effect/Cause	Remedy
190002	The tag is not updated because communication to the PLC has been switched off.	Switch on communication via the function "Set Online".
190004	The tag is not updated because the configured address is not available for this tag.	Check the configuration.
190005	The tag is not updated because the configured PLC type does not exist for this tag.	Check the configuration.
190006	The tag is not updated because it is not possible to map the PLC type in the tag type.	Check the configuration.
190007	The tag values are not modified because the connection to the PLC has been terminated or the tag is offline.	Switch <i>Online</i> or re-establish connection to the PLC.
190008	The threshold values configured for the tag have been violated, e.g. by <ul style="list-style-type: none"> • an entered value, • a function, • a script. 	Observe the configured or current threshold value of the tag.
190009	An attempt has been made to assign a value to a tag which is outside the value range permitted for this type. E.g. a value of 260 entered for a byte tag or a value of -3 for a signless word tag.	Observe the value range for the tag type.
190010	The tag is described with values too often (e.g. in a loop triggered by a script). Values are lost because the maximum of 100 event have been stored in the buffer.	Increase the time interval between the multi-writing tasks.
190011	Possible causes: <ul style="list-style-type: none"> • The value entered could not be written to the configured PLC tag because it was either above or below the value range. The input is rejected and the original value is reset. • Connection to the PLC has been interrupted. 	Ensure that the value entered is within the value range of the PLC tags. Check the connection to the PLC.
190012	It is not possible to convert a value from a source format to a target format, e.g.: <ul style="list-style-type: none"> • A value should be assigned to a counter which is outside the valid, PLC-dependent value range. • A tag of the type <i>Integer</i> should be assigned a value of the type <i>String</i>. 	Check the value range or type of the variable.

Number	Effect/Cause	Remedy
190100	<p>The area pointer is not updated because the configured address for this area pointer is not available.</p> <p>Type:</p> <ul style="list-style-type: none"> 1 Event messages 2 Alarm messages 3 PLC acknowledgment 4 Operating unit acknowledgment 5 LED assignment 6 Trend request 7 Trend transfer 1 8 Trend transfer 2 <p>No.:</p> <p>is the consecutive number displayed in Pro-Tool/Pro.</p>	Check the configuration.
190101	<p>The area pointer is not updated because it is not possible to map the PLC type in the area pointer type.</p> <p>Parameter type and no.:</p> <p>See message 190100</p>	–
190102	<p>The area pointer is updated following an error status after the cause of the last error state has been eliminated (return to normal operation).</p> <p>Parameter type and no.:</p> <p>See message 190100</p>	–
200000	<p>Coordination is not executed because the address configured in the PLC does not exist/has not been set up.</p>	Change the address or set up the address in the PLC.
200001	<p>Coordination is not executed because the address configured in the PLC cannot be written.</p>	Change the address or set up the address in the PLC in an area which can be written.
200002	<p>Coordination is not carried out at the moment because the address format of the area pointer does not match the internal storage format.</p>	Internal error
200003	<p>Coordination can be executed again because the last error status has been eliminated (return to normal operation).</p>	–
200004	<p>It is possible that coordination is not executed.</p>	–
200005	<p>No more data is read or written.</p> <p>Possible causes:</p> <ul style="list-style-type: none"> • The cable is defective. • The PLC does not respond, is defective, etc. • The system is overloaded. 	<p>Check that the cable is connected and the PLC is in order.</p> <p>Reboot the system if the system message is displayed continuously.</p>

Number	Effect/Cause	Remedy
210000	Jobs are not processed because the address configured in the PLC does not exist/has not been set up.	Change the address or set up the address in the PLC.
210001	Jobs are not processed because the address configured in the PLC cannot be written to/read from.	Change the address or set up the address in the PLC in an area which can be written to/read from.
210002	Commands are not executed because the address format of the area pointer does not match the internal storage format.	Internal error
210003	The job mailbox is processed again because the last error status has been eliminated (return to normal operation).	–
210004	It is possible that the job mailbox is not processed.	–
210005	A PLC job was triggered by an impermissible number.	Check the PLC program.
210006	A fault occurred while attempting to execute the PLC job. The PLC job is, therefore, not executed. Observe the subsequent/previous system message, if appropriate.	Check the parameter types in the PLC job. Compile the configuration again.
220000	A WinCC channel provides the message texts via an interface. This text is issued via this message. ProTool/Pro RT has no influence on this texts.	A WinCC channel provides the message texts via an interface. This text is issued via this message. ProTool/Pro RT has no influence on this texts.
220001	The tag is not downloaded because the associated channel/the unit does not support downloading the data type bool/bit.	Change the configuration.
220002	The tag is not downloaded because the associated channel/the unit does not support downloading the data type byte.	Change the configuration.
220003	The associated driver could not be uploaded. It is possible that the driver is not installed.	Install the driver by re-installing ProTool/Pro RT.
220004	Communication is terminated and no update is executed because the cable is not connected or is defect etc.	Check the connection.
220005	Communication is running.	–
220006	The connection is established to the specified PLC at the specified interface.	–

Number	Effect/Cause	Remedy
220007	The connection to the specified PLC at the specified interface is disconnected.	Check that: <ul style="list-style-type: none"> the cable is plugged in the PLC is OK the correct interface is used the configuration is OK (interface parameters, protocol settings, PLC address). Reboot the system if the system message is displayed continuously.
220008	The PLC driver cannot access the specified interface or open it. It is possible that another application is using this interface or an interface is used which is not available on the target device. There is no communication with the PLC.	Terminate all the programs which access the interface and reboot the computer. Use another interface which is available in the system.
230000	The value entered could not be accepted. The entered value is rejected and the previous value is specified again. Either the value range has been exceeded or impermissible characters were entered.	Enter a permissible value.
230002	Since the current password level is inadequate or the password dialog box was closed with ESC, the entry is rejected and the previous value is specified again.	Activate an adequate password level using Login.
230003	Changeover to the specified screen is not executed because the screen is not available/configured. The current screen remains selected.	Configure the screen. Check the selection function.
240000 ²	Runtime is operating in Demo mode. There is either no Stopcopy license or it is defect.	Load the license.
240001 ²	Runtime is operating in Demo mode. Too many tags are configured for the installed version.	Load an adequate license / powerpack.
240002 ²	Runtime is operating with a time-limited standby authorization.	Restore the full authorization.
240003	Authorization cannot be executed. ProTool/Pro RT is running in Demo mode.	Restart ProTool/Pro RT or reinstall it.
240004	Error during reading the standby authorization. ProTool/Pro RT is running in Demo mode.	Restart ProTool/Pro RT, install the authorization or repair the authorization (see Commissioning Instructions Software Protection).
250000	The tag in the specified line in Status/Control is not updated because the address configured for this tag is not available.	Check the set address and then check that the address has been set up in the PLC.
250001	The tag in the specified line in Status/Control is not updated because the PLC type configured for this tag is not available.	Check the set address.

Number	Effect/Cause	Remedy
250002	The tag in the specified line in Status/Control is not updated because it is not possible to map the PLC type in the tag type.	Check the set address.
250003	No connection could be established to the PLC. The tags will not be updated.	Check the connection to the PLC. Check that the PLC is switched on and <i>online</i> is activated.
260000	A password has been entered which is unknown to the system. Therefore, the lowest password level has been set. This corresponds to the status following <i>Logout</i> .	Enter a known password in the password input field (with corresponding level).
260001	A password has been entered whose assigned level does not permit execution of the function. The password level currently set is displayed for information purposes.	Modify the password level in the password input field enter a password with a sufficiently high level.
260003	The user has logged off from the system. If the password level is 0, no user is logged on.	–
270000	A tag is not displayed in the message because it attempts to access an invalid address in the PLC.	Check whether the data area for the tag exists in the PLC, the configured address is correct or the value range for the tag is correct.
270001	There is a unit-dependent limit as to how many messages may be queued simultaneously in order to be displayed (see GHB). This limit has been exceeded. The display no longer contains all the messages. However, all the messages are recorded in the message buffer.	–
270002	Messages are displayed from an archive are displayed for which there is no data in the current project. Placeholders are issued for the messages.	Delete older archive files, if necessary.
270003	The service cannot be set up because too many devices was to set up this service. A maximum of four devices can execute this action.	Connect fewer operating units which want to use the service.
280000	Connection is re-established because the cause of the interruption has been eliminated.	–

Number	Effect/Cause	Remedy
280001	<p>No more data is read or written.</p> <p>Possible causes:</p> <ul style="list-style-type: none"> • The cable is defective. • The PLC does not respond, is defective, etc. • Connection is established via the wrong interface. • The system is overloaded. 	<p>Check that the cable is plugged in, the PLC is operational, the correct interface is used.</p> <p>Reboot the system if the system message is displayed continuously.</p>
280002	<p>A connection is used which requires a function module in the PLC.</p> <p>The function block has replied. Communication can now proceed.</p>	–
280003	<p>A connection is used which requires a function module in the PLC.</p> <p>The function block does not reply.</p>	<p>Check that the cable is plugged in, the PLC is operational, the correct interface is used.</p> <p>Reboot the system if the system message is displayed continuously.</p> <p>The remedy is dependent on the error code:</p> <ol style="list-style-type: none"> 1: The function block must set the COM bit in the response container. 2: The function block may not set the ERROR bit in the response container 3: The function block must respond within the specified time (timeout) 4: Establish an online connection to the PLC
280004	<p>The online connection to the PLC has been interrupted. There is no data exchange at present.</p>	<p>Check the PLC parameters in ProTool Pro: baud rate, block length, station address.</p> <p>Check that the cable is plugged in, the PLC is operational, the correct interface is used.</p> <p>Reboot the system if the system message is displayed continuously.</p>
290000	<p>The tag could not be read or written. It is assigned the start value.</p> <p>The message can be entered in the message buffer for up to four more failed tags, if necessary. After that, the message number 290003 is issued.</p>	<p>Check in the configuration that the address has been set up in the PLC.</p>
290001	<p>An attempt has been made to assign a value to a tag which is outside the value range permitted for this type.</p> <p>The message can be entered in the message buffer for up to four more failed tags, if necessary. After that, the message number 290004 is issued.</p>	<p>Observe the value range for the tag type.</p>

Number	Effect/Cause	Remedy
290002	It is not possible to convert a value from a source format to a target format. The message can be entered in the message buffer for up to four more failed tags, if necessary. After that, the message number 290005 is issued.	Check the value range or type of the variable.
290003	This message is issued when message number 290000 is triggered more than five times. In this case, no further individual messages are generated.	Check in the configuration that the tag addresses have been set up in the PLC.
290004	This message is issued when message number 290001 is triggered more than five times. In this case, no further individual messages are generated.	Observe the value range for the tag type.
290005	This message is issued when message number 290002 is triggered more than five times. In this case, no further individual messages are generated.	Check the value range or type of the variable.
290006	The threshold values configured for the tag have been violated by values entered.	Observe the configured or current threshold value of the tag.
290007	There is a difference between the source and target structure of the recipe currently being processed. The target structure contains an additional data record tag which is not available in the source structure. The data record tag specified is assigned its start value.	Insert the specified data record tag in the source structure.
290008	There is a difference between the source and target structure of the recipe currently being processed. The source structure contains an additional data record tag which is not available in the target structure and therefore cannot be assigned. The value is rejected.	Remove the specified data record tag in the specified recipe from the project.
290010	The storage location configured for the recipe is not permitted. Possible causes: Impermissible characters, write protected, data medium full or does not exist.	Check the path specification configured.
290011	The data record specified by the number does not exist.	Check the source for the number (constant or variable value).
290012	The recipe specified by the number does not exist.	Check the source for the number (constant or variable value).

Number	Effect/Cause	Remedy
290013	An attempt was made to save a data record under a data record number which already exists. The process is not executed.	<ul style="list-style-type: none"> • Check the source for the number (constant or variable value). • Delete the data record beforehand. • Change the function parameter "Overwrite".
290014	The file specified to be imported could not be found.	<ul style="list-style-type: none"> • Check the file name. • Ensure that the file is in the specified directory.
290020	Acknowledgement that downloading of data records from operating unit to PLC has started.	–
290021	Acknowledgement that downloading of data records from operating unit to PLC has been completed without any errors.	–
290022	Acknowledgement that downloading of data records from operating unit to PLC has been terminated due to an error.	<p>Check the configuration:</p> <ul style="list-style-type: none"> • have the tag addresses been set up in the PLC? • does the recipe number exist? • does the data record number exist? • has the function parameters "Overwrite"?
290023	Acknowledgement that downloading of data records from the PLC to the operating unit has started.	–
290024	Acknowledgement that downloading data records from the PLC to the operating unit has been completed without any errors.	–
290025	Acknowledgement that downloading of data records from the PLC to the operating unit has been terminated due to an error.	<p>Check the configuration:</p> <ul style="list-style-type: none"> • have the tag addresses been set up in the PLC? • does the recipe number exist? • does the data record number exist? • has the function parameters "Overwrite"?
290026	An attempt has been made to read/write a data record although the data mailbox is not free at present. This error may occur in the case of recipes for which downloading with synchronization has been configured.	Set the data mailbox status to zero.
290027	No connection to the PLC can be established at present. Therefore, the data record can neither be read nor written. Possible causes: No physical connection to the PLC (no cable plugged in, cable is defect) or the PLC is switched off.	Check the connection to the PLC.

Number	Effect/Cause	Remedy
290030	This message is issued after reselecting a screen that contains a recipe display in which a data record has already been selected.	Reload the data record from the data medium or retain the current values.
290031	While saving, it was detected that a data record with the specified number already exists.	Overwrite the data record or cancel the process.
290032	While exporting data records, it was detected that a file with the specified name already exists.	Overwrite the file cancel the process.
290033	Confirmation request before deleting data records.	–
290040	A data record error with error code %1 has occurred which cannot be described in more detail. The action was canceled. It might be that the data mailbox has not been installed correctly on the PLC.	Check that the data carrier, the data record, the data mailbox and, if necessary, the connection to the PLC. Trigger the action again after waiting a short period. If the error occurs again, please contact the Customer Support. Specify the error code displayed.
290041	A data record or file cannot be saved because the data medium is full.	Delete files no longer required.
290042	An attempt was made to execute several recipe actions simultaneously. The last action was not executed.	Trigger the action again after waiting a short period.
290043	Confirmation request before storing data records.	–
290044	The data store for the recipe has been destroyed and will be deleted.	–
290050	Acknowledgement that the exportation of data records has started.	–
290051	Acknowledgement that the exportation of data records has been completed successfully.	–
290052	Acknowledgement that the exportation of data records has been terminated due to errors.	Ensure that the structure of the data records on the data medium and the current recipe structure on the operating unit are identical.
290053	Acknowledgement that the importation of data records has been started.	–
290054	Acknowledgement that the importation of data records has been completed successfully.	–

Number	Effect/Cause	Remedy
290055	Acknowledgement that the importation of data records has been terminated due to errors.	Ensure that the structure of the data records on the data medium and the current recipe structure on the operating unit are identical.
290056	The value in the specified line/column could not be read/written without errors. The action was canceled.	Check the specified line/column.
290057	The tags of the recipe specified have been switched from operating mode "offline" to "online". Each modification of a tag in this recipe is now immediately transferred to the PLC.	–
290058	The tags of the recipe specified were switched from operating mode "online" to "offline". Modifications to tags in this recipe are no longer immediately transferred to the PLC but must be transferred there explicitly by means of downloading a data record, if necessary.	–
290059	Acknowledgement that the specified data record has been stored successfully.	–
290060	Check-back message that the data record memory has been successfully erased.	–
290061	Check-back message, that erasing the data record memory was aborted with errors.	–
290068	Request to confirm whether all data records in the recipe should be deleted.	–
290069	Request to confirm whether all data records of all recipes should be deleted.	–
290070	The data record specified is not contained in the import file.	Check the source of the data record number or data record name (constant or tag value).
300000	Process monitoring (e.g. using PDiag or S7-Graph) has been incorrectly programmed: More messages are queued than specified in the technical data of the CPU. No further ALARM_S messages can be managed by the CPU and reported to operating systems.	Change the CPU configuration.
310000	An attempt is being made to print too many protocols simultaneously. Since only one protocol can be printed at a time, the print job is rejected.	Wait until printout of the last active protocol has been concluded. Repeat the print job, if necessary.
310001	An error occurred on triggering the printer. The protocol is either not printed or printed with errors.	Evaluate the additional system message, related to this message, which is also issued. Repeat the print job, if necessary.

Number	Effect/Cause	Remedy
320000	The movements have already been indicated by another device. The movements can no longer be served.	Select the movements on the other display units and select the movement screen on the required display unit.
320001	The network is too complex. The defective operands cannot be displayed.	Display the network in AWL.
320002	No diagnostics-capable alarm messages have been selected. The units related to the alarm messages could not be selected.	Select a diagnostics-capable alarm message in the message screen ZP_ALARM.
320003	No alarm messages exist in respect of the selected unit. No network can be displayed in the detail display.	Select the defective unit in the general view screen.
320004	The required signal statuses could not be read by the PLC. The defective operands cannot be established.	Check the consistency between the configuration on the display unit and the PLC program loaded.
320005	The project contains ProAgent partitions which are not installed. No ProAgent diagnostics can be performed.	In order to run the project, install the ProAgent option packet.
320014	The selected PLC cannot be evaluated for ProAgent. The message display configured with the <i>Evaluate_message_display_fault</i> function could not be found.	Check the parameters of the <i>Evaluate_message_display_fault</i> function.

² The specified text comes from the component resources.

Procedure in the case of “internal errors”

Please proceed as follows in the case of all system messages related to “internal errors”:

1. Start up the operating unit again.
2. Download the configuration again.
3. Switch the operating unit off, stop the PLC and then restart both.
4. If the error occurs again, please contact the SIMATIC Customer Support. Make reference to the specified error number and message tags.

CE – Declaration of Conformity

D

Guidelines

The label indicates that the Mobile Panel 170 complies to the EMC guidelines defined by the European Economic Community. In addition, the operating unit also meets the requirements on the safety of components defined in the directive on machines 98/37/EEC.



Warning

This is a Class A product. The product may cause HF interference in residential areas. In such cases, the user may be obliged to take corrective measures.

Norms/Standards

The Mobile Panel 170 complies to the following standards:

General standards	
EN 614-1	Basic ergonomic principles
EN 894-1, -2, -3	Ergonomics and display of operating elements
EN ISO 9241-10	Design of dialog windows
UL 508	Industrial Control Equipment
CSA C22.2 No. 14	Industrial Control Equipment
prEN 1921	Industrial automation systems – safety of integrated production systems
EN 12417:2001	Machine tools – safety – machining centers
EN 60947-5-1:1997, K 2.2	Low voltage switchgear, normally closed contacts

EMC	
EN 50081-2	Electromagnetic compatibility. Generic emission standard. Industrial environment
EN 61000-6-2	Generic standards – Immunity standard for industrial environments

Operation safety	
EN 61131-1 (IEC 61131-1), Draft 10.03.02	General information
EN 61131-2 (IEC 61131-2), Draft 10.03.02	Equipment requirements and tests
EN 60204-1	Safety of machinery – Electrical equipment of machines

Machine directives	
EN 954-1:1996	Safety related parts of control systems
EN 954-1:1997	Safety of Machines – safety-related parts of control systems – methodology
prEN 954–2:2000	Safety of Machines – safety-related parts of control systems – validation
EN 292-1:1991	Basic terminology, methodology
EN 292-2: 1991/A1:1995	Technical principles and specifications
EN 60204-1:1997	Electrical equipment of machines, General requirements

ESD Guidelines



What does ESD mean?

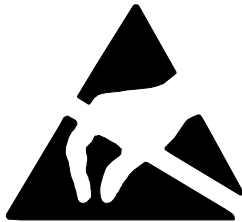
Virtually all present-day modules incorporate highly integrated MOS devices or components. For technological reasons, these electronic components are very sensitive to overvoltages and consequently therefore to electrostatic discharge:

These devices are referred to in German as Elektrostatisch Gefährdeten Bauelemente/ Baugruppen: “**EGB**”

The more frequent international name is:

“**ESD**” (Electrostatic Sensitive Device)

The following symbol on plates on cabinets, mounting racks or packages draws attention to the use of electrostatic sensitive devices and thus to the contact sensitivity of the assemblies concerned:



ESDs may be destroyed by voltages and energies well below the perception threshold of persons. Voltages of this kind occur as soon as a device or an assembly is touched by a person who is not electrostatically discharged. Devices exposed to such overvoltages cannot immediately be detected as defective in the majority of cases since faulty behavior may occur only after a long period of operation.

Precautions against electrostatic discharge

Most plastics are capable of carrying high charges and it is therefore imperative that they be kept away from sensitive components.

When handling electrostatic sensitive devices, make sure that persons, workplaces and packages are properly grounded.

Handling ESD assemblies

A general rule is that assemblies should be touched only when this cannot be avoided owing to the work that has to be performed on them. Under no circumstances should you handle printed-circuit boards by touching device pins or circuitry.

You should touch devices only if

- you are grounded by permanently wearing an ESD wrist strap or
- you are wearing ESD shoes or ESD shoe-grounding protection straps in conjunction with an ESD floor.

Before you touch an electronic assembly, your body must be discharged. The simplest way of doing this is to touch a conductive, grounded object immediately beforehand – for example, bare metal parts of a cabinet, water pipe etc.

Assemblies should not be brought into contact with charge-susceptible and highly insulating materials such as plastic films, insulating table tops and items of clothing etc. containing synthetic fibers.

Assemblies should be deposited only on conductive surfaces (tables with an ESD coating, conductive ESD cellular material, ESD bags, ESD shipping containers).

Do not place assemblies near visual display units, monitors or television sets (minimum distance to screen > 10 cm).

Measuring and modifying ESD assemblies

Perform measurements on ESD assemblies only when

- the measuring instrument is grounded – for example, by means of a protective conductor – or
- the measuring head has been briefly discharged before measurements are made with a potential-free measuring instrument – for example, by touching a bare metal control cabinet.

When soldering, use only grounded soldering irons.

Shipping ESD assemblies

Always store and ship assemblies and devices in conductive packing – for example, metallized plastic boxes and tin cans.

If packing is not conductive, assemblies must be conductively wrapped before they are packed. You can use, for example, conductive foam rubber, ESD bags, domestic aluminum foil or paper (never use plastic bags or foils).

With assemblies containing fitted batteries, make sure that the conductive packing does not come into contact with or short-circuit battery connectors. If necessary, cover the connectors beforehand with insulating tape or insulating material.

Abbreviations

ANSI	American National Standards Institute
AS 511	Protocol of the PU interface to the SIMATIC S5
ASCII	American Standard Code for Information Interchange
CCFL	Cold Cathode Fluorescence Lamp
CF	Compact Flash
CPU	Central Processing Unit
CS	Configuration System
CSA	Customer Specified Articles
CSV	Comma Separated Values
CTS	Clear To Send
DC	Direct Current
DCD	Data Carrier Detect
DI	Digital Input
DIP	Dual In-Line Package
DP	Decentralized Periphery
DRAM	Dynamic Random Access Memory
DSN	Data Source Name
DSR	Data Set Ready
DTR	Data Terminal Ready
EM	Event Messages
EMC	Electromagnetic Compatibility
EN	European Norm
ESD	Electrostatic Sensitive Device
GND	Ground
HF	High Frequency
HMI	Human Machine Interface
IEC	International Electronic Commission (Internationale Elektronische Kommission)
IF	Interface
LCD	Liquid Crystal Display

LED	Light Emitting Diode
MOS	Metal Oxide Semiconductor
MP	Multi Panel
MPI	Multipoint Interface (SIMATIC S7)
MTBF	Mean Time Between Failures
OP	Operator Panel
PC	Personal Computer
PCL	Printer Control Language
PLC	Programmable Logic Control
PPI	Point to Point Interface (SIMATIC S7)
PU	Random Access Memory
RAM	Alarm messages
RTS	Request To Send
RxD	Receive Data
SELV	Safety Extra Low Voltage
SP	Service Pack
SRAM	Static Random Access Memory
STN	Super Twisted Nematic
Sub-D	Subminiatur D (plug connector)
TCP/IP	Transmission Control Protocol/Internet Protocol
TFT	Thin Film Transistor
TP	Touch Panel
TTL	Transistor-Transistor Logic
TxD	Transmit Data
UL	Underwriter's Laboratory
UPS	Uninterruptible Power Supply (USV)
VGA	Video Graphic Array
ZT	Acknowledgement buttons

Glossary

A

Acknowledgement

Acknowledgement of an **alarm message** on the operating unit confirms that it has been noted. After acknowledgement, the message disappears from the operating unit. Alarm messages can be acknowledged either on the operating unit or PLC. Alarm messages can be compiled into groups so that several messages can be acknowledged simultaneously.

Acknowledgement groups

During configuration, several alarm messages can be compiled to form an acknowledgement group. After acknowledging the first message, all the other messages belonging to the same group are simultaneously acknowledged. This enables, for example, acknowledgement of alarm messages for the cause of a fault and all resulting faults (**group acknowledgement**).

Alarm message

Provides information on the operating unit concerning operating errors on the machine or system connected to the **PLC**. The message text may also contain current measured values.

Since alarm messages indicate abnormal operating status, they must be acknowledged.

ALARM_S

Active message procedure by which the CPU issued messages to all the registered network participants. ALARM_S messages are configured in STEP 7.

Archive

A memory area on a data storage medium in which messages or tags can be stored. The size of the archive is defined in ProTool/Pro CS.

Area pointer

Defines a memory area in the **PLC** for data exchange between the PLC and operating unit.

B

Bar graphs

Represent values from the **PLC** as rectangular areas. This is a way of displaying filling levels or workpiece numbers, for example, on the operating unit.

Baud rate

Rate of speed at which data is downloaded. Baud rate is specified in Bit/s.

Blank

Switch off or dimming the screen back-lighting.

Boot

A loading process which downloads the operating system in the working memory of the operating unit

Buttons

A virtual button on the operating unit screen. Buttons on operating units with touch screens are contact sensitive.

C

Clicking

Configurable **event** which can trigger a function assigned to a button, for example, when the button is pressed and released (clicked) within the contour of the button.

If the button is pressed using the mouse button or finger (when using touch panels) but moved outside the contour before releasing, the operating unit does not interpret the action as a *click* event.

Combo box

Contains a list of entries from which one can be selected on the operating unit.

Configuration

Definition of system-specific default settings, messages and screens using the configuration software **ProTool**.

D

Data record

A **recipe** containing data. A recipe can be comprised of several data records. When a data record is downloaded, all the assigned data is transferred to the PLC together and synchronously.

Display message

A screen object with configurable filter criteria which is used to display the volatile **message buffer** or message archive.

Display period

Defines whether and how long a system message is displayed on the operating unit.

Diversity

Diversity is a supplement for **redundancy** and means that a safety function is applied through different functioning principles, measuring systems through different physical measured quantities.

Download

The transfer of run-capable project data to the operating unit. Connect the operating unit to the configuration computer with a standard cable beforehand.

Download mode

Operating unit operating mode in which data can be downloaded from the configuration computer to the operating unit (also refer to **Download**).

E

Event

Functions are triggered after defined events are received, e.g. on pressing or releasing keys or buttons. Events can be configured according to objects.

Event message

Provides information on the operating unit concerning the operating statuses of the machine or system connected to the **PLC**. The message text may also contain current measured values.

F

Fixed window

A configurable window which always appears at the top of the screen whose content is independent of the screen currently open. The fixed window can be used to display important process magnitudes or date and time, for example.

Flash memory

Programmable memory which can be electrically deleted and written to again segment-by-segment.

Function key

Key on the operating unit to which a configurable function can be assigned. A function key with a global function assignment always initiates the same function regardless of the screen currently open. A function key with a local function assignment (**softkey**) can have a different function for each screen.

G

Global tag

This is a process tag linked to the PLC. Global tags have a fixed address in the PLC. The operating unit accesses this address for reading and writing purposes.

Graphic box

A graphic can be selected by selecting an entry in the graphic list.

Graphics list

A list in which each value relates to a tag assigned to a graphic. This enables, for example, the assigned graphic to be displayed on the operating unit output field instead of the value.

Group acknowledgement

During the configuration, each **alarm message** can be assigned to an **acknowledgement group**. When the alarm message is acknowledged, all the other alarm messages in the same group are simultaneously acknowledged.

H

Hardcopy

Represents a printout of the current screen content. Windows called in on top are not printed.

Help text

Configurable, additional information on messages, screens and fields. The help text concerning an alarm message can, for example, contain information on the cause of the fault and methods of elimination.

I

Icon

Pixel graphic of a fixed size, e.g. assigned to a **softkey**, to identify its function.

Input field

Enables the user to enter values which are subsequently downloaded to the **PLC**.

Invisible buttons

Buttons which are only visible during configuration, not on the operating unit. If invisible buttons are superimposed on components in the process screen, the respective components can be operated by clicking the button with the mouse or pressing them on the touch screen.

L

Limit value

Configurable values of a tag defining a value range. Attempts to define values outside these limits, may cause the following effects on the operating unit:

- Input field
input is rejected
- Output field
values are displayed in the configured color
- Trend/Bar
values are displayed in the configured color

Local tag

A tag without a link to the PLC. Local tags are only available on the operating unit.

Logout time

Configurable interval of time after which the password level is reset to zero when the operating unit is not used.

M

Message arrival

Time at which a message was triggered by the **PLC** or operating unit.

Message buffer

Memory area in the operating unit in which **message events** can be stored in chronological order as they arrive. Event messages and alarm messages are stored in separate message buffers.

Message departure

Time at which a message was withdrawn by the **PLC**.

Message events

These are stored in chronological order in the operating unit message archive. Message events consist of:

- Message arrival
- Message acknowledgement
- Message departure

Message indicator

A configurable graphical symbol displayed on the operating unit when at least one alarm message is present.

Message logging

Printout of messages parallel to their display on the operating unit display.

Message view

Screen object to display the volatile message buffer and/or message archive.

N**Normal operation**

Operating unit operating mode in which messages are displayed and screens can be operated.

O**Object**

Is a component part of a screen or message. Depending on the object type, objects serve to display or enter texts and values on the operating unit.

Output field

Displays current values from the **PLC** on the operating unit.

P**Password**

A character string which must be entered on the operating unit before a protected function can be activated. Each password is assigned to a defined **password level**.

Password level

The rights to use operating units can be specifically restricted to certain users and user groups. To do this, the individual functions and operating elements are assigned to hierarchically defined password levels. The password level linked to the **password** allocates the rights to execute functions on the operating unit belonging to that level or lower.

Password list

A screen object for entering passwords related to different authorization levels.

PLC

General term for units and systems with which the operating unit communicates (e.g. SIMATIC S7).

PLC job

PLC jobs can be used by the **PLC** to trigger functions on the operating unit, e.g. display a screen.

Power-up test

Checks the status of the CPU and memory each time the power is switched on.

Print screen

Printout of a copy of the screen contents.

Process screen

The display of process values and process progress on the operating unit in the form of screens, which may contain graphics, texts and values.

Programmable controller

PLC from the SIMATIC S5 series (e.g. AG S5-115U/135U).

Programmable system

PLC from the SIMATIC S7 series (SIMATIC S7-200/300/400).

ProSave

A service tool which provides all the functions which are necessary for the transfer of data between the configuration computer and operating unit.

ProTool

Full-graphic configuration software for configuring text displays, text-based and graphic operator panels as well as the Windows-based units TP170 A, TP170 B, OP170 B and MP270.

ProTool CS

General name for the three configuration software variants **ProTool/Pro CS**, **ProTool** and **ProTool/Lite**.

ProTool/Lite

Full-graphic configuration software for configuring text displays and text-based operator panels as well as the Windows-based units TP170 A.

ProTool/Pro CS

Full-graphic configuration software for configuring the entire SIMATIC HMI product range and Windows-based systems.

Q**Queued message**

A queued message is a message detected by the operating unit as having arrived (message event **Arrived**) but for which the message event **Departed** has not been registered.

R**Recipe**

A combination of tags to a fixed data structure. The data structure configured can be assigned data on the operating unit and is then referred to as a data record. The use of recipes ensures that when a data record is downloaded, all the assigned data is transferred to the PLC together and synchronously.

Recipe view

Screen object to create, edit, store and download **data records**.

Redundancy

Superfluous information. In der areas of information technology theory and communication engineering, it is a term indicating the presence of unnecessary elements in a message which do not supply any additional information but only support the intended, basic information.

Useful redundancy:

Component parts of a message which can be omitted, and when omitted can contain other component parts of the message

Empty redundancy:

Component parts of a message which can be omitted, but which when omitted cannot be replaced by other component parts to support the message.

Release

Configurable **event**, e.g. for a button, which triggers a function as soon as the pressed button is released.

If the button is pressed using the mouse button or finger (when using touch panels) but moved outside, the function is triggered when the function is released.

Remaining buffer

Configurable size of the message buffer. In the case of a buffer overflow, the operating unit deletes message events until the configured remaining buffer capacity is reached.

Runtime software

The program visualization software SIMATIC ProTool/Pro RT with which the project created using ProTool CS can be run on your Windows-based system.

S

Screen

A screen displays all the logically related process data on the operating unit, whereby the individual values can be modified. Screens are composed of static and dynamic parts. Static parts refer to text and graphics, dynamic parts to input and output fields.

Screen keyboard

A virtual keyboard which appears on the operating unit screen. This enables values to be entered without a keyboard actually being connected, in the case of a touch panel for example.

Selection field

An input element which provides a list of predefined entries. One of the entries in the list can be selected on the operating unit.

SIMATIC HMI Symbol Library

Comprehensive library containing graphics from the areas of technology and production. Extends the ProTool library.

Softkey

Function key on the operating unit with a local function assignment. The function triggered by a softkey varies according to the screen currently open.

Start screen

The first screen which automatically appears after the operating unit has started up.

State view

The State view is a configurable display element. Depending on the configuration, it can signal a warning or the status of a unit which cannot be viewed from the operating unit.

Status button

A status button is a display and operating element with two possible states: **ON** and **OFF**, i.e. **touched** and **untouched**. Both states can be configured for display with text or graphics, which then label the status button.

Superuser

A user with permissions to trigger functions of the highest **password level**. The superuser has access to all the operating unit functions.

Switch

A screen object for entering and displaying a binary status. A switch can only be in the status on or off.

System, to be monitored

A machine, processing center, system or process which will be operated and observed by means of an operating unit.

System message

Provides information on the operating unit concerning internal statuses of the operating unit and **PLC**.

T

Trend curve

Curve type by which just one curve value is read from the PLC per cycle or trigger resulting in a curve display. If the configured number of measured values is not achieved, each new value overwrites the oldest value. Trend curves are especially suited to displaying continual progress.

Trend curve graphic

A screen object for displaying the continual progress of process data. Several different **trend curves** can be shown in the trend curve display simultaneously.

Trend view

Trend curves are especially suited to displaying continual progress. Several trend curves can be shown in the trend view simultaneously, e.g. in the form of **trend curves** or **profile curves**.

X

XOFF

Control code (Ctrl S) to revoke the ready to receive state of a modem.

XON

Control code (Ctrl Q) signaling the ready to receive state of a modem.

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