SIEMENS

SIMATIC HMI

**PP7, PP17-I, PP17-II
Push Button Panels**

Equipment Manual

Preface, Contents

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Release 06/98

Safety Guidelines

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 highlighted in the manual by a warning triangle and are marked as follows according to the level of danger:

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indicates that death, severe personal injury or substantial property damage **can** result if proper precautions are not taken.

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draws your attention to particularly important information on the product, handling the product, or to a particular part of the documentation.

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Warning

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We have checked the contents of this manual for agreement with the hardware and software described. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the data in this manual are reviewed regularly and any necessary corrections included in subsequent editions. Suggestions for improvement are welcomed.

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Preface

Purpose

This equipment manual is designed to provide operators, installation personnel, planners and system maintenance technicians with information concerning the functionality, operation and technical configuration of Push Button Panels.

Organization of the manual

The *equipment manual for the Push Button Panels PP7, PP17-I and PP17-II* is divided into the following sections:

Chapters	Content
1	General description of the Push Button Panels
2	Step-by-step instructions on how to configure a Push Button Panel
3	Detailed information on the interrelationship between the Push Button Panel and PLC
4	Mechanical and electrical installation of the Push Button Panels
5 - 7	Unit description of the various Push Button Panel versions
8	Information on labelling
9	Information on spare parts
Appendices	Technical data, system messages, hardware test

Further support

Please address technical questions to your local Siemens partners in the subsidiaries and branch offices responsible for your area. Refer to Appendix D of this equipment manual for a list of addresses.

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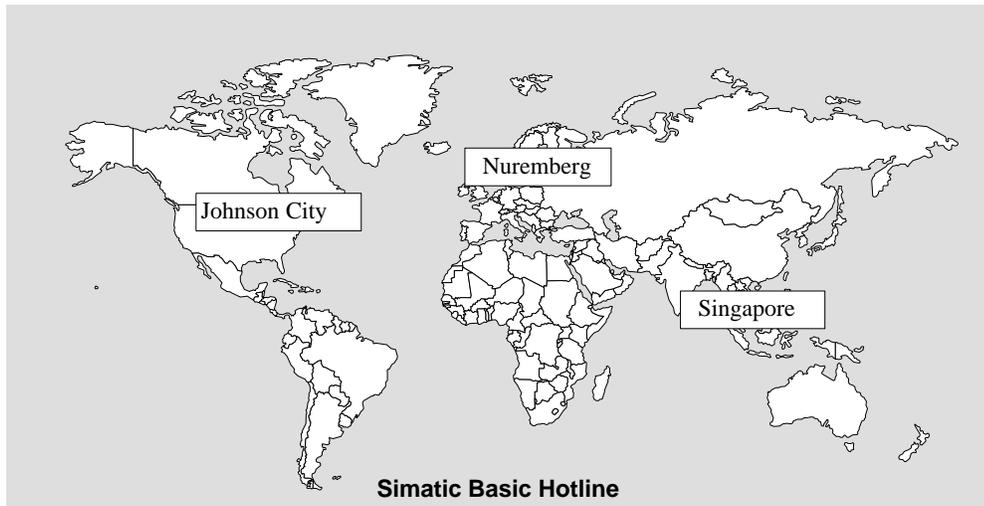
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    - from the **Bulletin Board System** (BBS) in Nuremberg (*SIMATIC Customer Support Mailbox)* on +49 (911) 895-7100.

    For calling up the mailbox, you should use a modem with up to V.34 (28.8 kBaud) capability and set the parameters as follows: 8, N, 1, ANSI, or connect via ISDN (x.75, 64 kBit).

Contents

Product Description

1

Use of Push Button Panels

The Push Button Panels can be used to display the operating statuses of a machine or system and to control processes.

Until now, keys and lamps had to be individually mounted, wired and tested for this purpose. This was also a time-consuming process. In contrast to this, installation of Push Button Panels requires only a rectangular cut-out and a bus connection (DP or MPI). The standard configuration ensures that the panel is ready to operate immediately after all the connections have been made. This results in considerable advantages in respect of time compared to conventional connections.

The Push Button Panels provide a large variety of features which can be used without the necessity of PLC programs:

- Short-stroke keys with surface illumination according to the LED colors
- Additional 24 V digital inputs and outputs
- All short-stroke keys and digital 24 V inputs can also be individually configured as switches
- Integrated lamp and key test
- Central release input to lock all operating actions
- Integrated flash timing
- Color-coding for LEDs, such as red, green, orange
- Pulse extension for short-stroke keys and digital 24 V inputs can be specified via parameters
- Perforated cut-outs for 22.5 mm standard optional elements, such as key-operated switch and emergency shutdown switch
- OP design, can be set in rows, without gaps

Installation possibilities

The Push Button Panels have been conceived for installation in cabinets and can be implemented in all situations where keys, switches and lamps are required.

The high degree of protection (IP65 on the front side) and the fact they are maintenance-free make the Push Button Panels suitable for use even in rough industrial environments.

Connection types   The Push Button Panels can be operated using the following connections:

- via MPI to a SIMATIC S7-200
- via MPI to a SIMATIC S7-300
- via MPI to a SIMATIC S7-400
- via PROFIBUS-DP to a SIMATIC S5
- via PROFIBUS-DP to a SIMATIC S7
- via PROFIBUS-DP as standard slave to a DP master from a different manufacturer; possible restrictions regarding configuration of the Push Button Panel.

Unit configuration   Parameters in the Push Button Panels are predefined and the unit is thus immediately ready to operate. Various options can also be activated by adjusting certain parameters. Each key, LED, digital input and output can be individually adapted according to specific requirements.

No special configuration software is necessary for the Push Button Panel. All adjustment of the settings is carried out either directly on the Push Button Panel or by means of the PLC configuration software.

All adjustments to settings carried out on the Push Button Panel are stored in its memory module. In cases where the unit electronics or the entire unit are replaced, the interface need not be reconfigured. Only the old memory module needs to be transferred to the new unit.

1.1 Push Button Panel Overview
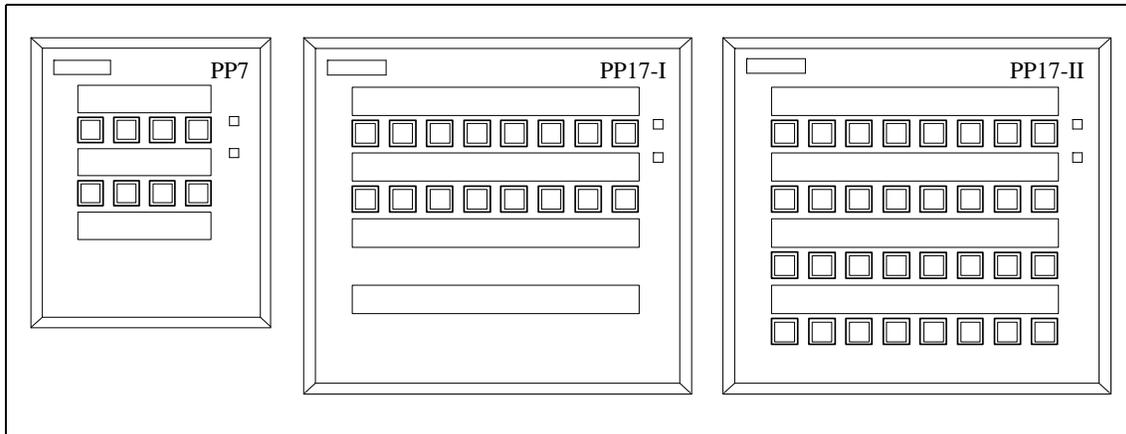
Hardware		PP7	PP17-I	PP17-II
Short-stroke keys, surface illumination	Number of short-stroke keys	8	16	32
Inputs/Outputs	Number of digital inputs	4	16	16
	Number of digital outputs	-	16	16
Installable operating elements	Number of 22.5 mm elements which can be integrated	3	12	–
Release input	Lock operation of the Push Button Panel	-	✓	
Interfaces	PLC connection	MPI or Profibus DP		
Communication	**SIMATIC S5** – PROFIBUS-DP	✓	✓	✓
	SIMATIC S7/M7 – MPI – PROFIBUS-DP	✓ ✓	✓ ✓	✓ ✓
Data transmission	Baud rate	Max. 1.5 MBaud	Max. 12 MBaud	

1.2 Operating and Display Elements

Standard operating and display elements

The Push Button Panels are all equipped with a keyboard containing short-stroke keys. The individual keys can be configured in respect of their function as either switches or keys.

Function momentary–contact switch:

The corresponding bit in the PLC is set as long as the key is pressed.

Function switches: Pressing the key sets the corresponding bit, pressing again resets it.

Two LEDs are integrated in the keys and are used to display the bit status of the connected PLC. The LEDs can indicate four different statuses, one of which can be defined via parameters.

Operating concept

All the operating elements of the Push Button Panels are linked to bits in the PLC. The keys on the Push Button Panel can be used to influence the bits in the PLC and thus control the affect of processes. At the same time, the LEDs indicate the bit status of the PLC and, thus, the operating status of the process being monitored.

When several keys are pressed simultaneously, it is detected by the Push Button Panel and the bits are set in the PLC. After restarting the system following a power failure, all the bits are set to 0.

Digital inputs and outputs

Additional 22.5 mm elements can be connected using the digital inputs and outputs. Non-connected digital inputs are automatically set to 0.

Release input

The release input serves to lock the Push Button Panel. A key-operated switch can be connected here, for example. The release input permits switching between normal operation (open contact) and monitoring mode (closed contact). In normal operation, all the functions on the Push Button Panel are available for use, whereas in monitoring mode, the following restrictions are valid

- the inputs are locked, no signal exchanges are reported to the PLC,

- the last status of all the keys is maintained by the PLC until normal operation returns.

Pulse diagrams   The following pulse diagrams elucidate the relationship between the actions initiated on the Push Button Panel and changing bit status in the PLC:

Function as momentary–contact switch

Function as switch
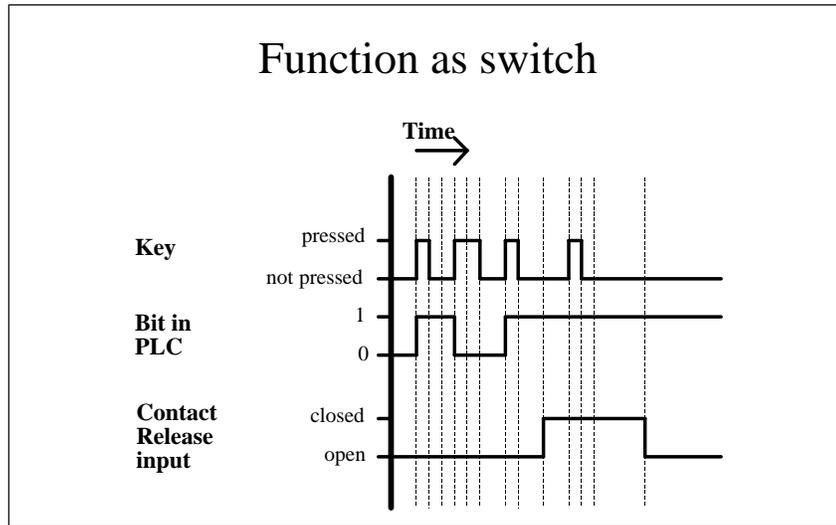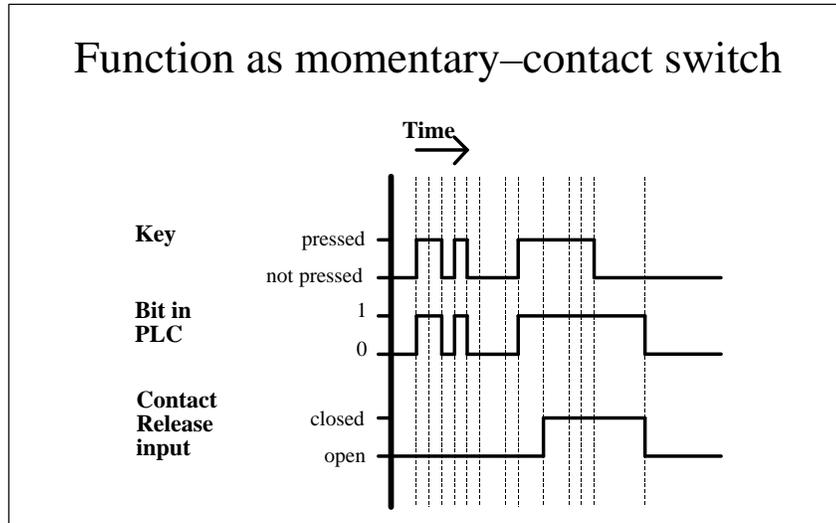
Lamp/Key test   The Lamp/Key test serves to test the functional capability of all the keys and lamps on the Push Button Panel. The Lamp/Key test can be activated by the following measures in normal operation:

- By pressing the key assigned to the Lamp/Key test function by the corresponding parameter.

- By setting the two LED bits of the key assigned to the Lamp/Key test function according to the configuration. The bits must be set in the PLC using a relevant program.

The Lamp/Key test function is assigned to Key 1 (top right) in the pre-adjusted system settings.

On activating the Lamp/Key test, the unit switches to the corresponding operating mode. In this case

- the ERROR LED blinks,
- the LEDs integrated in the Push Button Panel keyboard are activated,
- all the Push Button Panel digital outputs are set to 1.

After pressing any key when in operating mode Lamp/Key test,

- the LED/lamps go out for the period in which the key is pressed,
- all the Push Button Panel digital outputs are set to 1.

This is valid for the period in which the key is pressed. All the keys and digital inputs can be tested in this way.

In order that no unwanted signals are transmitted to the PLC during the Lamp/Key test, the following restrictions are valid in respect of Push Button Panel operation:

- the inputs are locked and no signal exchanges are reported to the PLC,
- the last status of all the keys is maintained by the PLC until normal operation returns.

The last key operation reported to the PLC is the pressing of the Lamp/Key test button.

To terminate the Lamp/Key test,

- release the corresponding key, or
- reset the corresponding bits in the PLC

The unit returns to normal operation and the restrictions regarding the Push Button Panel operation are released.

Starting Up the Push Button Panel

2

The following section provides help regarding the configuration possibilities of the Push Button Panel. Connection type MPI is pre-selected in the system settings.

MPI connection

The system settings for the MPI connection are:

MPI address:	3
Baud rate:	187.5 KBaud
Data area type:	Marker byte
Memory word:	100
Configuring data block:	0
PLC address:	2
PLC type:	300 (S7-300)
Highest station address:	126
Number of MPI masters:	1

The following table provides an overview of the possibilities for modifying the defined system settings:

Intention	Procedure	Chapters
Modify MPI address	Set MPI address on Push Button Panel	2.1
Change baud rate	Change baud rate on Push Button Panel	2.1
Change data area type	Change data area type on Push Button Panel	2.1
Configure Push Button Panel properties which deviate from pre-adjusted system settings	Set up configuring data block in the PLC	2.3.1
	Set parameter	2.3
	Set the number of the configuring data block on the Push Button Panel	2.1

DP connection   The system settings for the DP connection are:

DP slave address: 3

Baud rate: 1500 KBaud

The following table provides an overview of the possibilities for modifying the defined system settings:

Intention	Procedure	Chapters
Set connection type DP	Set connection type DP on the Push Button Panel	2.1
Change DP slave address	Change the DP slave address on the Push Button Panel	2.1
Change baud rate	Change baud rate on Push Button Panel	2.1
Configure Push Button Panel properties which deviate from pre-adjusted system settings	Set parameter in the configuration software	2.3

2.1 Configure Interface to PLC on the Push Button Panel

Calling in and operating configuration mode

The settings of the interface to the PLC are menu-controlled and can be defined via the rear side display of the Push Button Panel. The so-called configuration mode is provided for this.

All the parameters concerning the interface to the PLC are stored in the Push Button Panel memory module. In cases where the unit electronics or the entire unit are replaced, the interface need not be reconfigured. Only the old memory module needs to be transferred to the new unit.
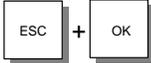
Key	Description
ESC + OK	If this key combination is pressed while the unit is starting up (directly after switching on), the unit enters configuration mode.
OK	In configuration mode, this key serves to store a modification in the current menu level and skip forward to the next menu level. The key has no function in the bottom menu level.
◄	In configuration mode, this key serves to skip back to the superordinated menu level. The key has no function in the top menu level. Caution: Any modifications carried out to the settings in the current menu level are not stored.
►	In configuration mode, this key serves to skip forward to the next menu level. The key has no function in the bottom menu level. Caution: Any modifications carried out to the settings in the current menu level are not stored.
▲	In configuration mode, this key serves to scroll upwards through the alternatives within a menu level.
▼	In configuration mode, this key serves to scroll downwards through the alternatives within a menu level.
ESC	This key serves to exit from configuration mode. The current settings are stored. The key can be operated in any menu level.

The following menu structure is displayed in configuration mode (the numeric values and underlined alternatives indicate the predefined system settings):

```
                        ┌──────────────┐
                        │   DEFAULT    │
                        │   YES / NO   │
                        └──────┬───────┘
                               │
                        ┌──────▼───────┐
            DP          │  CONNECTION  │        MPI
      ┌─────────────────│   DP / MPI   │─────────────────┐
      │                 └──────────────┘                 │
 ┌────▼──────┐                                   ┌────────▼─────┐
 │ SLAVE-ADR │ 3                                 │  PP-MPI-ADR  │ 3
 └────┬──────┘                                   └───────┬──────┘
      │                                                  │
 ┌────▼──────┐                                   ┌───────▼──────┐
 │ BAUDRATE  │ 1500 KBaud                        │   BAUDRATE   │ 187,5 KBaud
 └───────────┘                                   └───────┬──────┘
                                                         │
                                  MB              ┌──────▼──────┐        DB
                          ┌───────────────────────│    DATA     │──────────────┐
                          │                        │   MB / DB   │              │
                    ┌─────▼─────┐                  └─────────────┘        ┌─────▼─────┐
               100  │    MW     │                                         │    DB     │ 100
                    └─────┬─────┘                                         └─────┬─────┘
                          │                                               ┌─────▼─────┐
                          │                                               │    DW     │ 0
                          │                                               └─────┬─────┘
                          └────────────────┬──────────────────────────────────┘
                                     ┌─────▼──────┐
                                     │ PARAM.-DB  │ 0
                                     └─────┬──────┘
                                     ┌─────▼──────┐
                                     │  PLC-ADR   │ 2
                                     └─────┬──────┘
                                     ┌─────▼──────┐      400
                                     │  PLC-TYPE  │──────────────┐
                                     │  2 / 3 / 400 │            │
                                     └─────┬──────┘              │
                                200    300 │             ┌───────▼──────┐
                                           │             │   RACK-NO    │ 0
                                           │             └───────┬──────┘
                                           │             ┌───────▼──────┐
                                           │             │   SLOT-NO    │ 3
                                           │             └───────┬──────┘
                                           └────────────►┌───────▼──────┐
                                                         │     HSA      │ 126
                                                         └───────┬──────┘
                                                         ┌───────▼──────┐
                                                         │  NUMBER OF   │ 1
                                                         │  MPI-MASTER  │
                                                         └──────────────┘
```
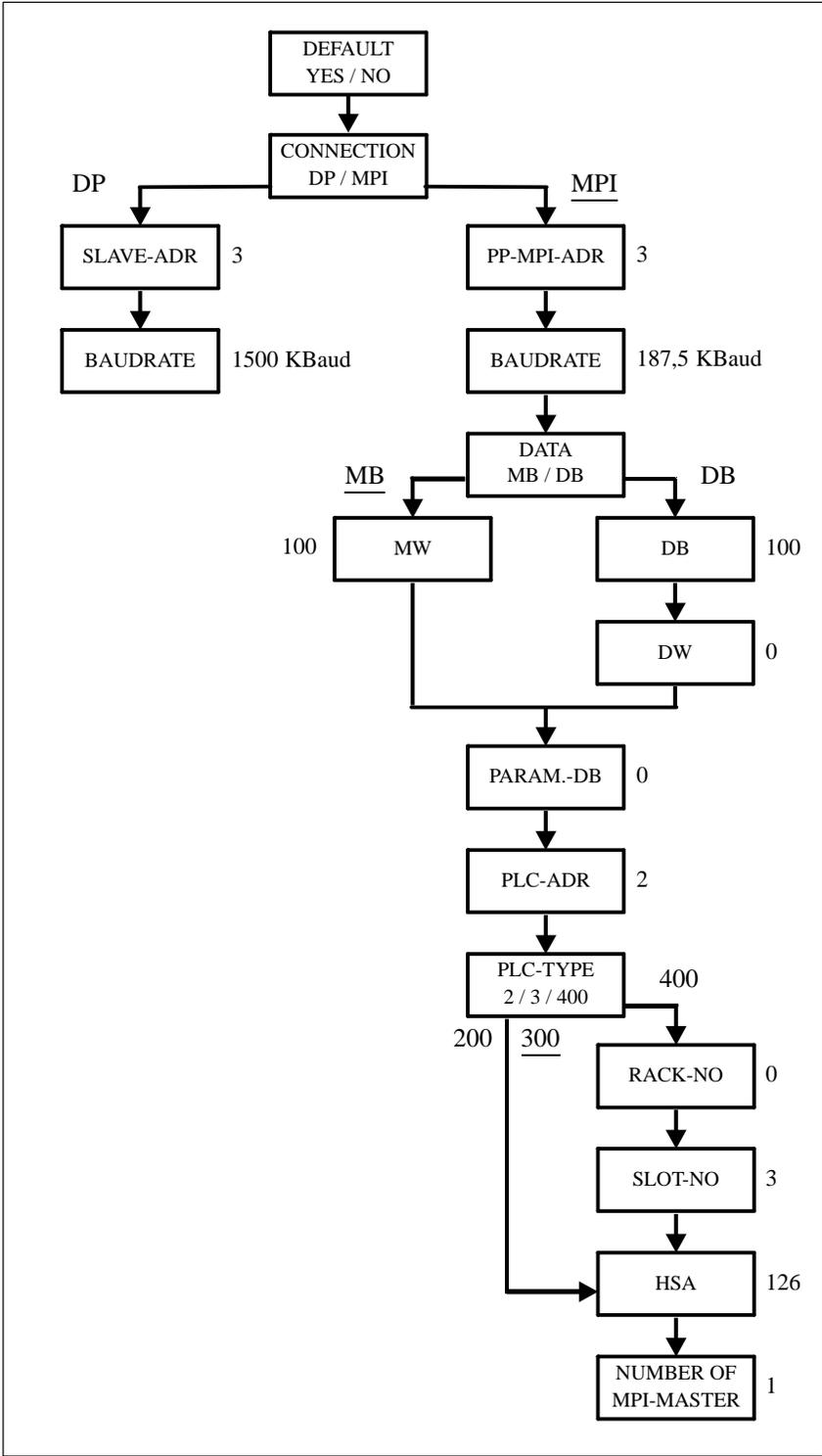
Refer to the following table for the significance of the various menu items:

Name	Explanation
DEFAULT	Used to select whether all the parameters should be reset to the predefined system settings values.
CONNECTION DP/MPI	Used to select the system connection type. Either MPI or PROFIBUS-DP.
SLAVE-ADR	Defines the slave address of the Push Button Panel in the PROFIBUS-DP system.
PP-MPI-ADR	Defines the MPI address of the Push Button Panel.
BAUDRATE	Defines the baud rate for data transmission using connection type MPI or PROFIBUS-DP in KBaud.
DATA MB/DB	Used to select whether the data area for the Push Button Panel is created as a Memory Byte (MB) or Data Block (DB).
MW	Defines the number of the first, reserved memory word for the Push Button Panel.
DB	Defines the number of the data block in which the data area for the Push Button Panel is reserved.
DW	Defines the number of the first, reserved data word for the Push Button Panel in the data block.
PARAM.-DB	Defines the number of the configuring data block.
PLC-ADR	Defines the address of the PLC to which the Push Button Panel is connected.
PLC-TYPE 2/3/400	Used to select the type of PLC to which the Push Button Panel is connected.
RACK-NO	Defines the number of the rack in which the PLC is installed.
SLOT-NO	Defines the number of the slot within the rack.
HSA	Defines the highest station address within the MPI system.
NUMBER OF MPI-MASTER	Defines the number of the MPI master in the system.

2.2 Define Configuration in PLC

2.2.1 MPI connection

If connection type MPI is used for the Push Button Panel, no hardware configuration is necessary. Only the MPI address needs to be set on the Push Button Panel.

Interrelated memory areas must be set up in the PLC for the keys, LEDs and digital inputs and outputs. The following table indicates the length of the memory areas to be set up for the various unit versions.

Memory area	PP7	PP17-I	PP17-II
Keys	1 Byte	2 Bytes	4 Bytes
Digital inputs	1 Byte	2 Bytes	2 Bytes
LEDs	2 Bytes	4 Bytes	8 Bytes
Digital outputs	–	4 Bytes	4 Bytes
Total	4 Bytes	12 Bytes	18 Bytes

In order to modify system settings, a data block must be created in the PLC which contains the configuration data for the Push Button Panel. The structure of this configuring data block is depicted in Chapter 2.4. The number of the configuring data block must be specified when configuring the Push Button Panel.

2.2.2 PROFIBUS-DP connection

When connection type PROFIBUS-DP is used, the Push Button Panel must be installed in the PROFIBUS configuration software as a slave in the network. In the case of SIMATIC S5, the configuration software used is COM-PROFIBUS, and for SIMATIC S7 connection to the network is performed via HW-CONFIG. The configuration software defines the following:

- station address,
- the I/O area used
- and the configuration of the buttons and LEDs.

Ensure that the same station address is specified that is set on the Push Button Panel.

The special GSD files transfer information concerning the Push Button Panel to the configuration software COM-PROFIBUS (SIMATIC S5) and HW-CONFIG (SIMATIC S7). Older versions of the configuration software do not contain these GSD files. For this reason, a disk is enclosed with the manual which contains the current GSD files for the Push Button Panel.

The following procedure is recommended in respect of the GSD files:

Step	
1	Check whether your system is already provided with the special GSD file required for your Push Button Panel. To do this, call in the configuration software COM-PROFIBUS (SIMATIC S5) or HW-CONFIG (SIMATIC S7).

<table>
<tr><td></td><td>COM-PROFIBUS (SIMATIC S5)</td><td>Check whether an entry exists in the hardware family SIMATIC or SIMATIC PP for your Push Button Panel.</td></tr>
<tr><td></td><td>HW-CONFIG (SIMATIC S7)</td><td>Check whether an entry exists in the hardware catalog under PROFIBUS-DP/ ADDITIONAL FIELD DEVICES/ SIMATIC for your Push Button Panel.</td></tr>
<tr><td></td><td colspan="2">If the corresponding entry already exists, the system already contains the GSD files. In this case, skip the points 2 and 3 of these instructions.</td></tr>
<tr><td>2</td><td colspan="2">If the respective entry is not available in COM-PROFIBUS (SIMATIC S5) or HW-CONFIG (SIMATIC S7), the GSD files relevant to your Push Button Panel must be loaded in the system. The GSD files for the Push Button Panels are contained on the disk enclosed with this manual.</td></tr>
<tr><td></td><td>COM-PROFIBUS (SIMATIC S5)</td><td>Copy:
1. all the files from directory GSD on the disk to subdirectory GSD in the COM-PROFIBUS installation, and
2. all the files from directory BITMAPS on the disk to subdirectory BITMAPS in the COM-PROFIBUS installation.</td></tr>
<tr><td></td><td>HW-CONFIG (SIMATIC S7)</td><td>Copy:
1. all the files from directory GSD on the disk to the path S7DATA/GSD in the STEP 7 installation, and
2. all the files from directory BITMAPS on the disk to the path S7DATA/ NSBMP in the STEP 7 installation.</td></tr>
</table>

Step	
3	Update the GSD files available in the system.
	COM-PROFIBUS (SIMATIC S5) — Select the command *Update DDB Files* from the menu *File*.
	HW-CONFIG (SIMATIC S7) — Select the command *Update DDB Files* from the menu *Options*.

After the GSD files have been correctly integrated in the system, the Push Button Panel can be used in your configuration.

2.3 Configuring Keys/LEDs

The switches and keys need only be configured when a configuration deviating from the predefined system settings is required.

The following parameters can be adjusted for the Push Button Panel:

Parameter	Description
Pulse exten-sion	The signal pulse regarding all operations initiated by pressing buttons on the PLC is extended in order to ensure reliable switch/key polling by the PLC even when pressed very briefly.
	The extension of the signal pulse results from: Pulse = Entered value x 20 ms
	Value range: 0 to 50
	System default setting: No pulse extension
Lamp/Key test	A key on the keyboard is assigned for activating the Lamp test. The parameter indicates the number of the key which is assigned the Lamp test function. The keys are numbered from right to left, in rows, beginning at the top right moving down. The value 0 deactivates the Lamp test.
	Value range: 0 to total number of keys
	System default setting: Lamp test assigned to Key 1 (top right)
Function keys	It is possible to define whether a key on the keyboard should function as a key or switch.
	Function momentary–contact switch: The corresponding bit in the PLC is set as long as the key is pressed.
	Function switch: Pressing the key sets the corresponding bit, pressing again resets it.
	The way in which each key functions is defined by a single bit. The keys are numbered from right to left, in rows, begin-ning at the top right moving down, so that the first bit in the configuration is designated for the key at the top right and the last bit for the key at the bottom left. Bit = 0: Function momentary–contact switch Bit = 1: Function switch
	System default setting: All the keys are configured as keys.

Parameter	Description
Function of digital inputs	Analog to the functionality of the keys on the keyboard, the functioning of the digital inputs is defined here. The digital inputs on the rear side of the Push Button Panel are counted from top to bottom. Here, too, the way each input functions is defined by a single bit.
	System default setting: All digital inputs are configured as momentary–contact switch.
LED mode	Two control bits are reserved in successive bytes for configuring the mode of an LED. The diagram below clarifies the position of the control bits in a memory byte or data block.

<table>
<tr><td></td><td></td></tr>
</table>

Bit 7   Bit 0

Byte n

Byte n+1

} Control bits for LED 1
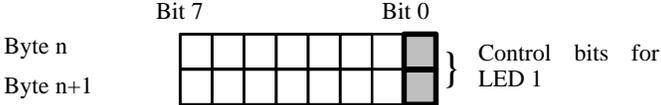
Two successive configuration bits in one configuring data block define the way in which the status of the control bits are displayed. The following table illustrates the effects of the various combinations of configuration bits on the LED display:

Configuration bits	Control bits	LED
xx	00	off
xx	01	lights green
xx	10	lights red
00	11	flashes green
01	11	lights orange
10	11	flashes red
11	11	flashes orange

System default setting: Configuration bits = 00

2.3.1 Configuring Keys/LEDs When Using MPI Connection

The structure of this configuring data block is depicted in the following table. In order to simplify the creation of such a data block, library elements for STEP 7 are available. These are contained in directory UDT on the disk enclosed with this manual.

	Entry for PP7	Entry for PP17-I	Entry for PP17-II
Byte 0	0	0	0
Byte 1	0	0	0
Byte 2	P	P	P
Byte 3	P	P	P
Byte 4	0	1	1
Byte 5	7	7	7
Byte 6	1	2	4
Byte 7	2	4	8
Byte 8	1	2	2
Byte 9	0	4	4
Byte 10	0	0	0
Byte 11	0	0	0
Byte 12	Pulse extension	Pulse extension	Pulse extension
Byte 13	Lamp test key	Lamp test key	Lamp test key
Byte 14	Function: key 1-8	Function: key 1-8	Function: key 1-8
Byte 15	Function: digital input 1-4	Function: key 9-16	Function: key 9-16
Byte 16	Mode: LED 1-4	Function: digital input 1-8	Function: of key 17-24
Byte 17	Mode: LED 5-8	Function: digital input 9-16	Function: key 25-32
Byte 18		Mode: LED 1-4	Function: digital input 1-8
Byte 19		Mode: LED 5-8	Function: digital input 9-16
Byte 20		Mode: LED 9-12	Mode: LED 1-4
Byte 21		Mode: LED 13-16	Mode: LED 5-8
Byte 22			Mode: LED 9-12
Byte 23			Mode: LED 13-16

	Entry for PP7	Entry for PP17-I	Entry for PP17-II
Byte 24			Mode: LED 17-20
Byte 25			Mode: LED 21-24
Byte 26			Mode: LED 25-28
Byte 27			Mode: LED 29-32

2.3.2 Configuring Keys/LEDs When Using PROFIBUS-DP Connection

After having loaded the GSD files in the system, as described in Chapter 2.2, the configuration software COM-PROFIBUS (SIMATIC S5) or HW-CONFIG (SIMATIC S7) can be used to define all the settings for the Push Button Panel.

COM-PROFIBUS   Call in dialog box *Slave properties* by double clicking on the PP symbol. When it appears, click on button *Configure*.

HW-CONFIG   Select property page *Configure* in dialog box *Object properties*.

2.4 Coordinating the Push Button Panel and PLC

Introduction

In the case of connection type MPI, so-called control and acknowledgment bits are provided for the coordination between the Push Button Panel and PLC. They are used for the following functions:

- Detection of Push Button Panel startup by the S7 program

- Analysis of Push Button Panel life bit by the S7 program

- Polling error information in the S7 program

The control and acknowledgment bits are set in the first and second byte of the configuring data block. In order to use the above mentioned functions, a configuring data block must be created, as described in Chapter 2.4.

The first byte is reserved.

Description Byte n+1

The figure below illustrates the structure of byte n+1. The individual bits are described underneath the figure.
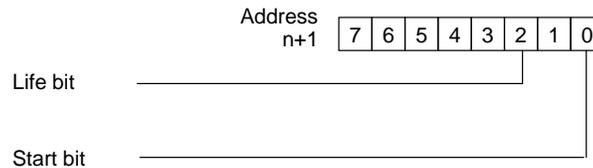
Bit 0   Start bit: 1 = Push Button Panel has started up

The bit is set by the Push Button Panel on completion of startup. You can reset the bit via the S7 program and thus detect if the OP is restarted.

Bit 2   Life bit :

The life bit is set from 0 to 1 by the Push Button Panel. You can cyclically reset the bit via the S7 program to detect whether the connection to the Push Button Panel still exists.

Control Bit Assignment

3

This chapter explains the relationship between the control bits and the keys and LEDs assigned to them on the Push Button Panels.

The following figures clarify the numeration of keys, LEDs and digital inputs on the Push Button Panel, and their links to bits in the PLC.

Keys

	Bit 7							Bit 0
Byte n	T8							T1
Byte n+1	T16							T9
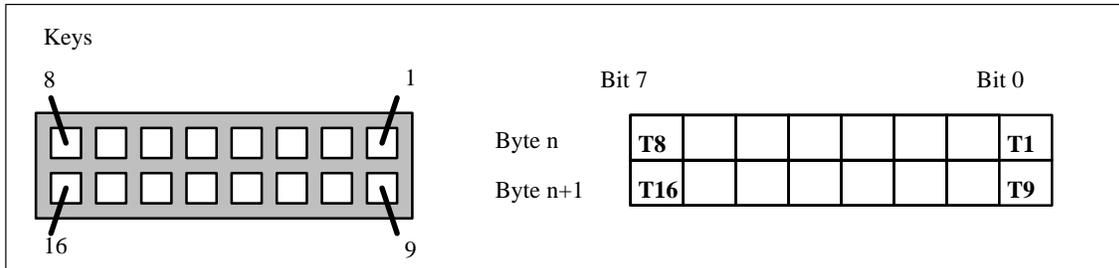
Figure 3-1   Numeration of keys on the Push Button Panel

Digital inputs

	Bit 7							Bit 0
Byte n	DI8							DI1
Byte n+1	DI16							DI9
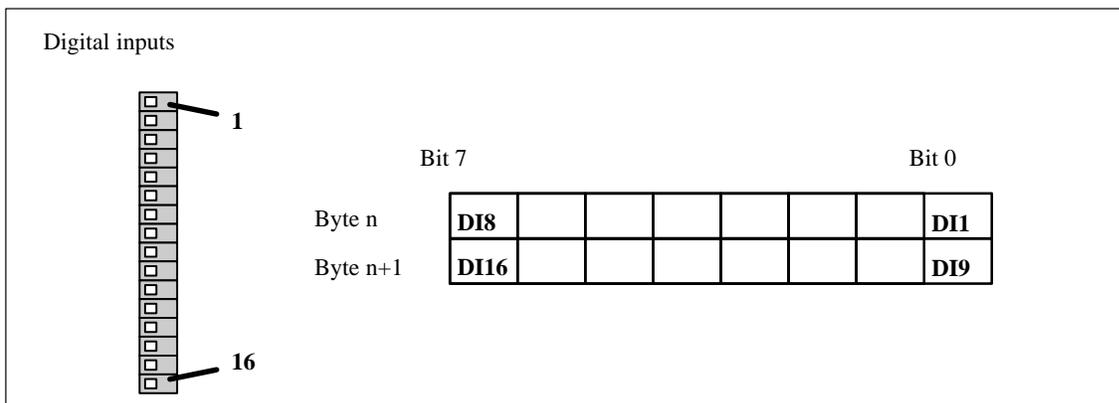
Figure 3-2   Numeration of the digital inputs on the Push Button Panel

LEDs
8   1
16   9

Bit 7   Bit 0

	Bit 7							Bit 0	
Byte n	L8							L1	Red
Byte n+1	L8							L1	Green
Byte n+2	L16							L9	Red
Byte n+4	L16							L9	Green
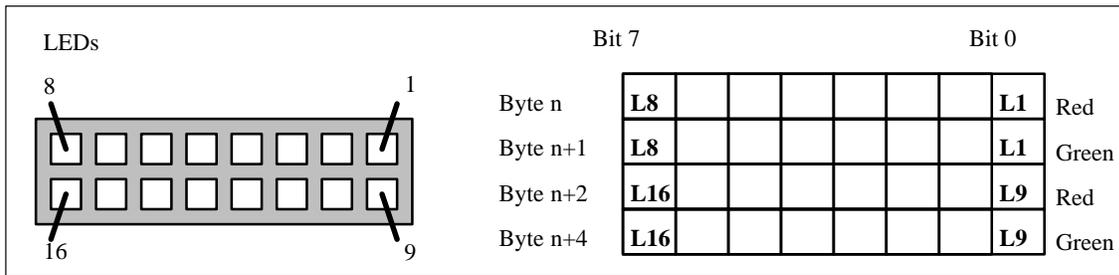
Figure 3-3   Numeration of the LEDs on the Push Button Panel

Digital outputs

1

16

Bit 7   Bit 0

	Bit 7							Bit 0
Byte n	DO8							DO1
Byte n+1	DO8							DO1
Byte n+2	DO16							DO9
Byte n+4	DO16							DO9
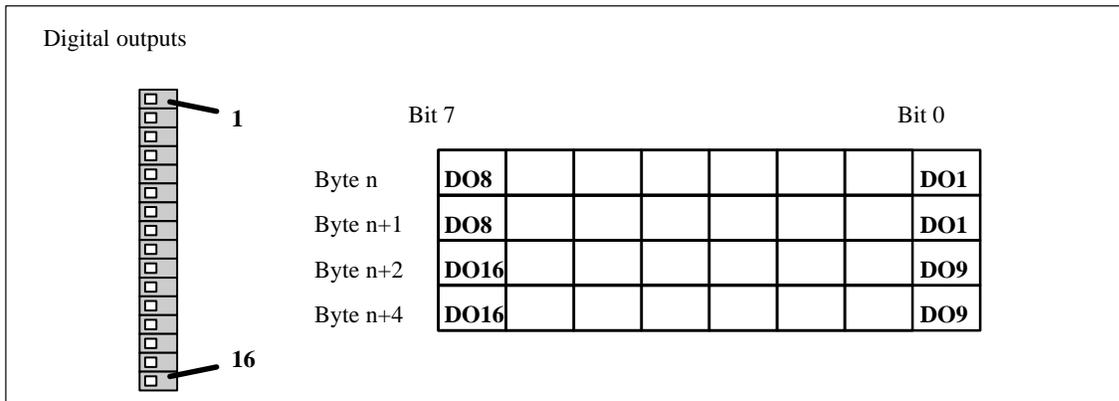
Figure 3-4   Numeration of the digital outputs on the Push Button Panel

The following table indicates the data area for keys, LEDs, digital inputs and digital outputs of the Push Button Panel in the PLC:

Marker area	PP7	PP17-I	PP17-II
Keys	1 Byte	2 Bytes	4 Bytes
Digital inputs	1 Byte	2 Bytes	2 Bytes
LEDs	2 bytes	4 Bytes	8 Bytes
Digital outputs	-	4 Bytes	4 Bytes
Total	4 Bytes	12 Bytes	18 Bytes

A data area for the entire length must be set up, even when the full functional capacity of the unit is not used.

The figures below illustrate the structure of the data areas in the PLC which are assigned to the Push Button Panel. It is important to note that two control bits are assigned to each LED and each output, and the bits are distributed on successive bytes. The combination of these bits determines the appearance of the LED or display element.

Figure 3-5   Control bits for PP7

Figure 3-6   Control bits for PP17-I

Figure 3-7   Control bits for PP17-II

Installation

4

**Degree of Protec-
tion**

⚠

Caution

- The Push Button Panel must be brought to room temperature before it is commissioned. If condensation forms, do not switch the Push Button Panel on until it is absolutely dry.

- To prevent the Push Button Panel overheating during operation, ensure the air vents in the housing are not covered following installation.

- The Push Button Panel was function-tested before shipping. If a fault occurs however, please enclose a full account of the fault when returning the unit.

**Mechanical instal-
lation of the Push
Button Panel**

Step	Action
1	Insert the Push Button Panel from the front in the mounting cut-out provided.
2	Insert the retaining hooks of the five enclosed screw-type clamps ❶ in the corresponding openings in the Push Button Panel housing. Alternative openings are provided on the sides of the Push Button Panel to enable the installation of several units beside each other without leaving any gaps between them.
3	Secure the Push Button Panel in the front panel ❷ from the rear using a screwdriver. Note: – Do not overtighten the screws to avoid damage.
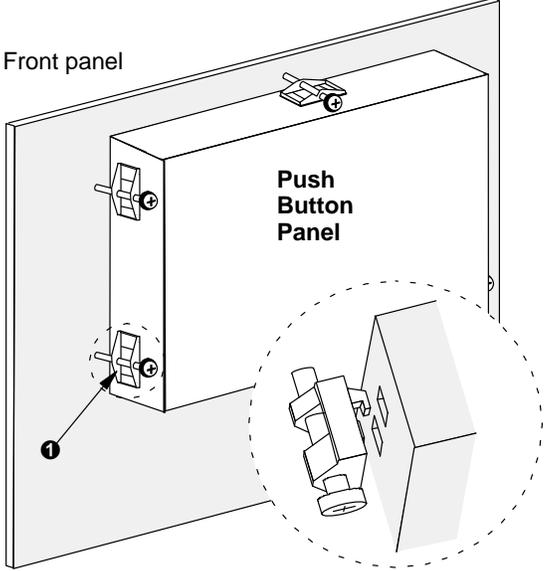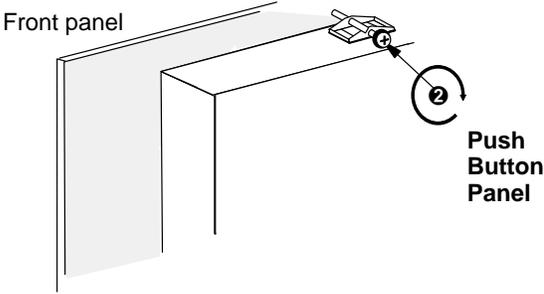
Front panel thickness: max. 6 mm

Mechanical installation of 22.5 mm elements	**Step**	**Action**
	1	Select the snap-out opening on the front of the Push Button Panel in which the 22.5 mm element is to be inserted.
	2	Cut a slit in the foil on the front side of the Push Button Panel. The slit must be located directly above the elongated hole ❶ in the middle of the selected snap-out opening. Use a sharp knife to slit the foil.
	3	Cut the foil corresponding to outer circumference ❷ of the selected snap-out opening. The round piece of foil, in whose place the 22.5 mm element is to be inserted, is only connected to the remaining foil above the three metal bars ❸. Note: Ensure that the foil on the front side of the Push Button Panel is only cut in the area of the snap-out opening. In this way, the degree of protection of the front surface is retained after the 22.5 mm element has been installed.
	4	Insert a screwdriver or similarly appropriate tool from the rear through the elongated hole ❶ in the middle of the selected snap-out hole. Use the screwdriver to lever the metal piece out where the 22.5 mm element is to be inserted.
	5	Cut the foil corresponding to the opening which appears in the front section of the Push Button Panel.
	6	Insert the 22.5 mm element in the opening in the front of the Push Button Panel.
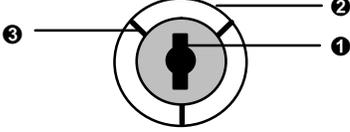
EMC compatible design

The basis for interference-free operation is EMC hardware design of the PLC and the use of interference-proof cables. The guidelines on the interference-free design of the PLC apply equally to the installation of the Push Button Panel.

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.

Cable   All MPI and DP bus cables can be used.

Voltage supply

⚠ **Caution**
- When using a 24 V supply, ensure that the extra-low voltage is safely iso-
  lated.
- The supply voltage must be within the specified voltage range. Voltages
  outside this range may cause malfunctions.

Grounding con-   Connect the grounding connection ⏚ of the Push Button Panel to the cabinet
nection   ground. To do this, use the grounding screw supplied with the Push Button
                             Panel.

Connection of
additional display
and operating ele-
ments
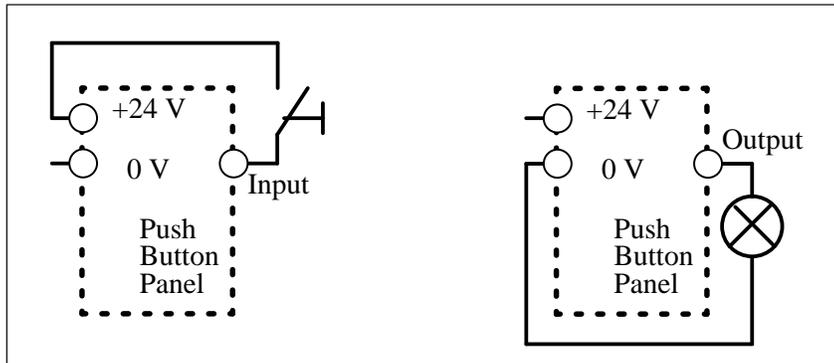
⚠ **Warning**

No safety-related functions may be realized using the Push Button Panel.

Unit Description PP7

5
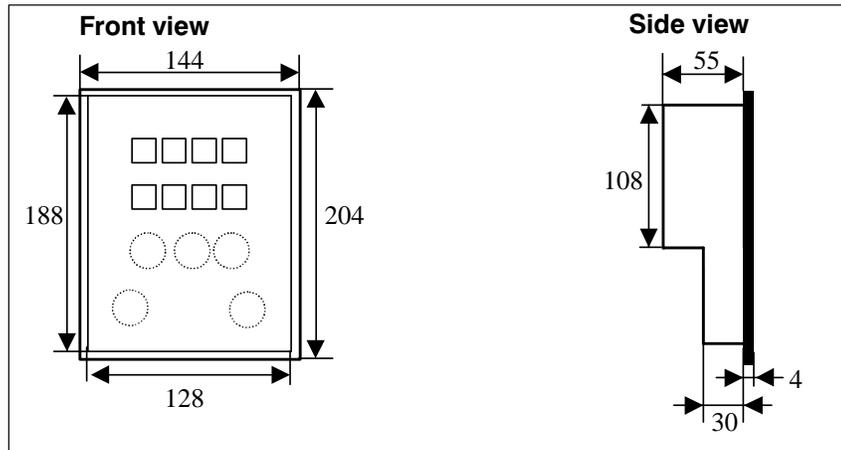
Unit dimensions

Mounting cut-out   The PP7 requires a mounting cut-out of 130 mm x 190 mm (W x H).

Note

The installation depth of the Push Button Panel is dependent on the type of connection cable to the PLC. It does not correspond to the outer dimensions of the unit. Ensure the cable has a sufficient bending radius.

**Rear view**
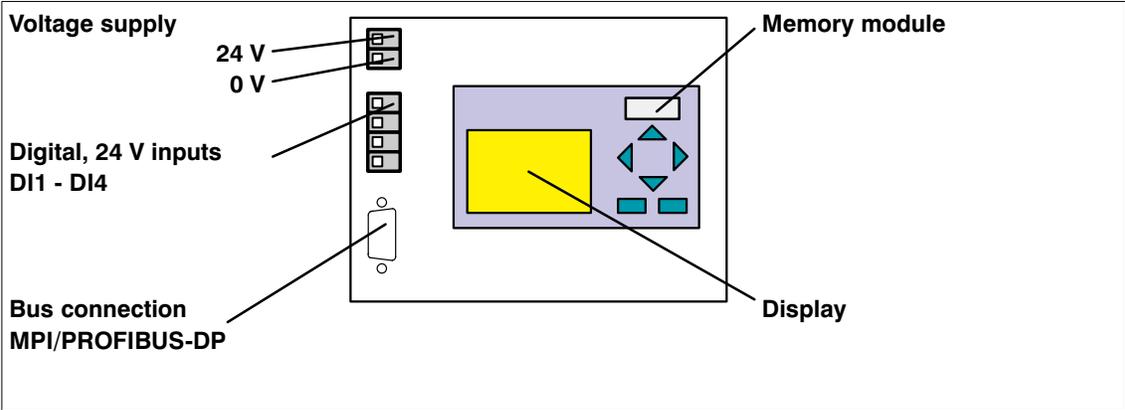
Figure 5-1   Element positions on the rear side of the PP7

Unit Description PP17-I

6

Unit dimensions

Front view

240

188

204

224

Side view

53

95

4

32
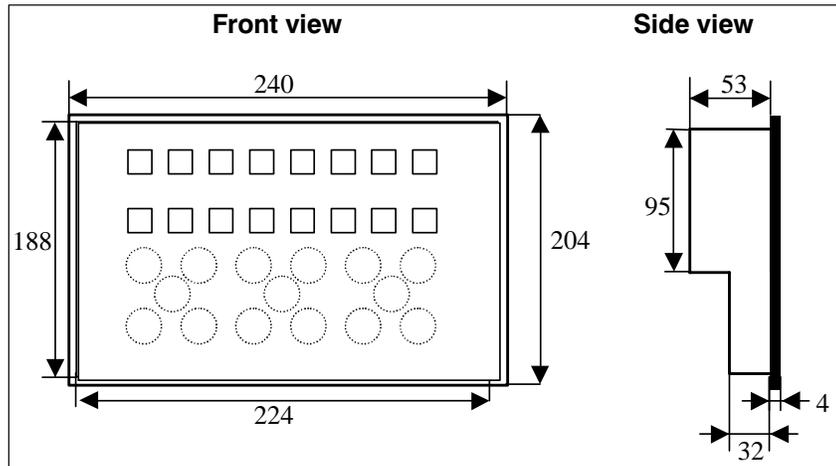
Mounting cut-out   The PP17-I requires a mounting cut-out of 226 mm x 190 mm (W x H).

Note

The installation depth of the Push Button Panel is dependent on the type of connection cable to the PLC. It does not correspond to the outer dimensions of the unit. Ensure the cable has a sufficient bending radius.


Rear view
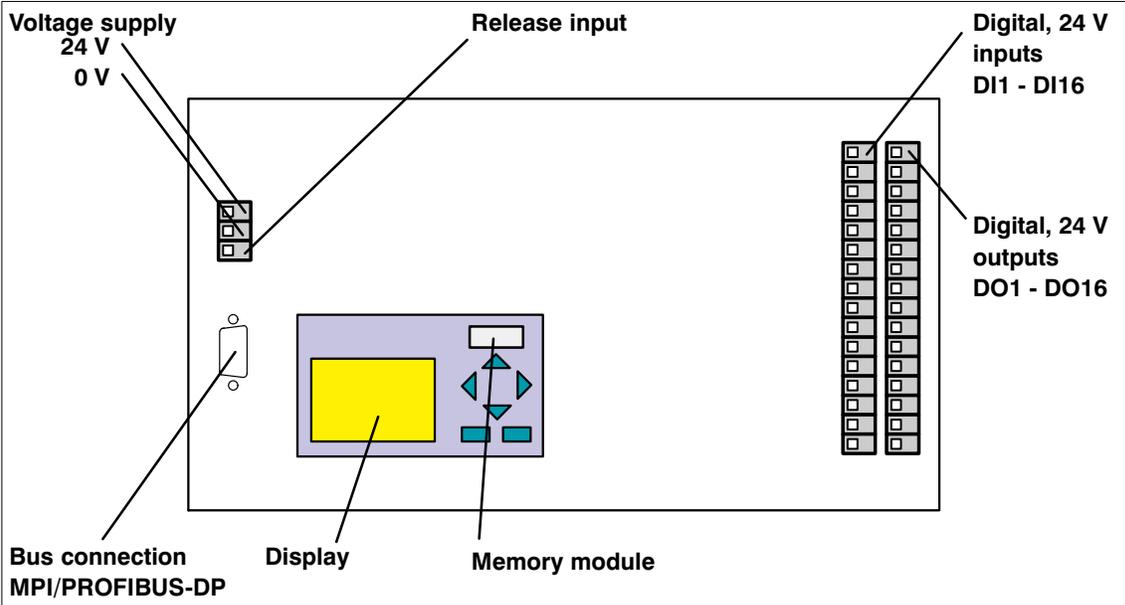
Figure 6-1   Element positions on the rear side of the PP17-I

Unit Description PP17-II

7
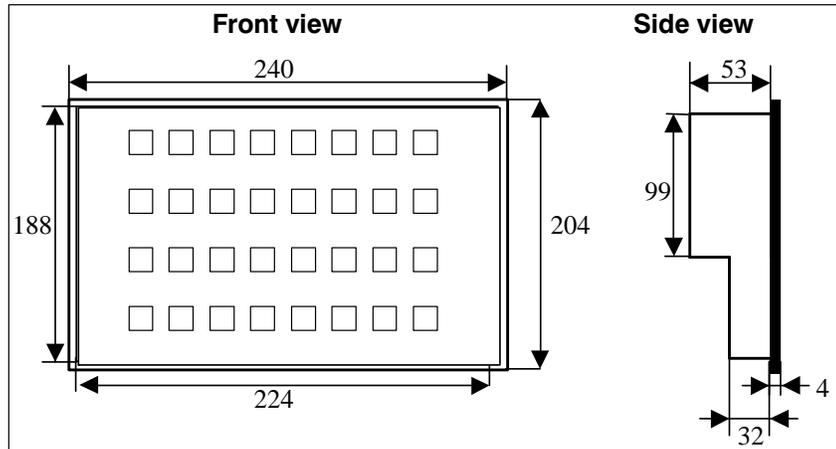
Unit dimensions

Mounting cut-out   The PP17-II requires a mounting cut-out of 226 mm x 190 mm (W x H).

Note

The installation depth of the Push Button Panel is dependent on the type of connection cable to the PLC. It does not correspond to the outer dimensions of the unit. Ensure the cable has a sufficient bending radius.

Rear view
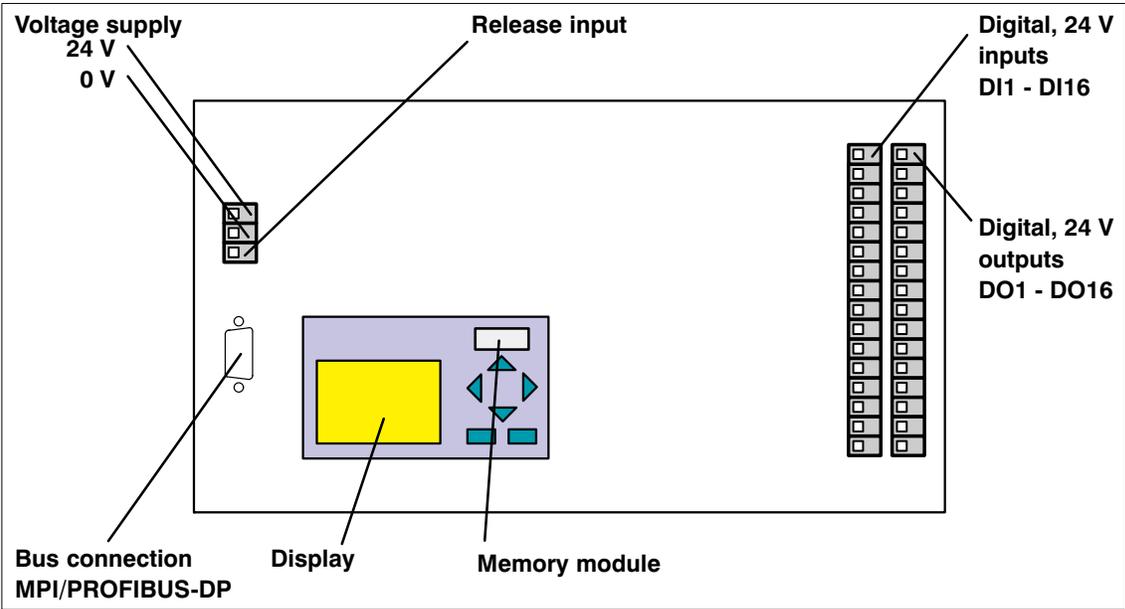
Figure 7-1   Element positions on the rear side of the PP17-II

Attach Labeling Strips

8

The function of all the keys on the Push Button Panel can be clearly indicated by attaching labeling strips. Standard commercial transparent foil or even normal paper, up to a thickness of 0.25 mm, can be used for this. The labeling strips must be inserted from the rear side of the unit in the openings provided behind the IP65 front panel. The Push Button Panel need not be opened to do this. If the worktop in which the Push Button Panel is less than 1 mm, the labeling strips can be inserted or replaced when in an assembled state. The foil or paper labeling strips can be produced by implementing a commercially available text program and printing out on a standard printer.

The disk supplied with this document contains a directory SLIDES in which the file SLIDES.DOC is stored. This is a text file in Word for Windows 6.0 format with which the labeling strips for the Push Button Panel can be printed in the correct size.

Labeling strip dimensions

The following table contains the dimensional specifications for producing the labeling strips:

Size	PP7	PP17-I	PP17-II
Labeling strip length	133.25 mm	253.0 mm	
Labeling strip height	15.7 mm		

In order to ease insertion of the labeling strips, the corners can be rounded on the insertion side.

Refer to the following figure to determine the position of the inscriptions on the labeling strips. Please note that the diagrams are not true to scale (all specifications in mm).
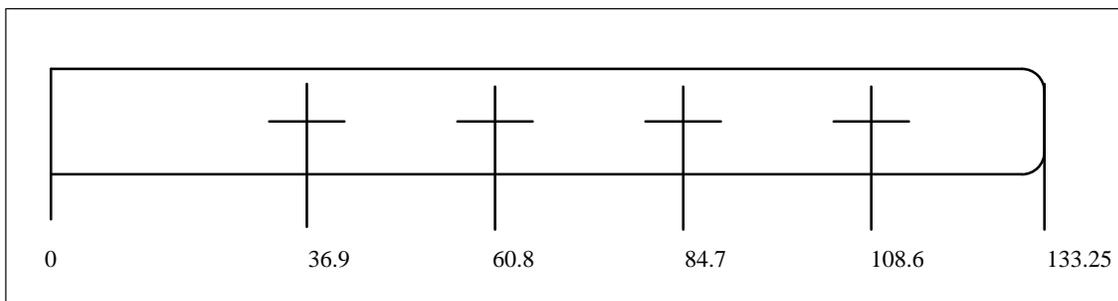
Figure 8-1   Text positions for keyboard PP7
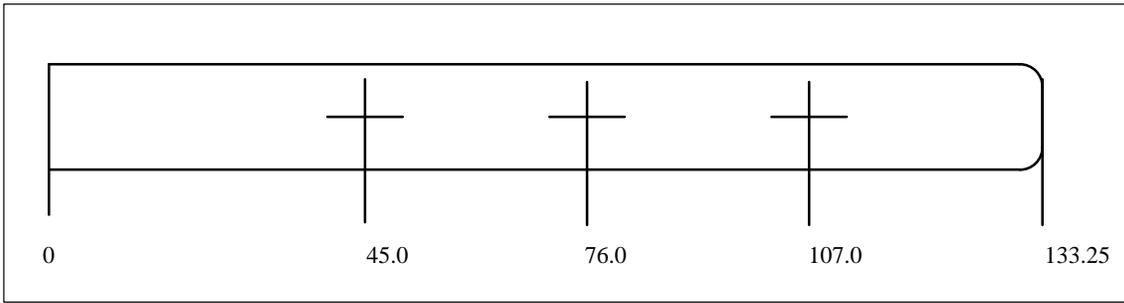
Figure 8-2   Text positions for 22.5 mm elements PP7
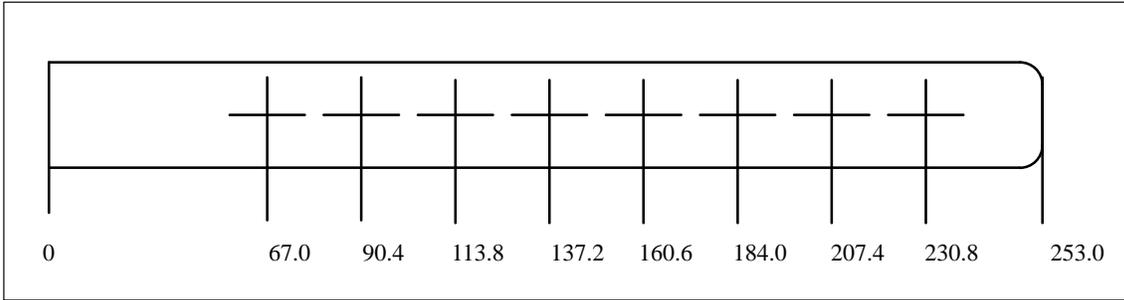
Figure 8-3   Text positions for keyboards PP17-I and PP17-II
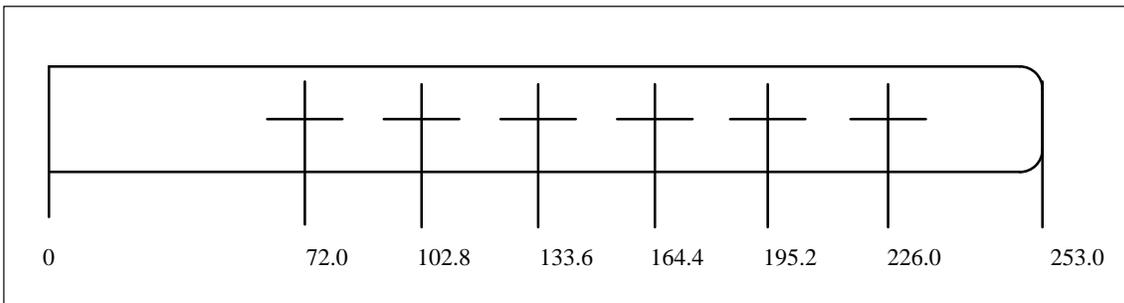
Figure 8-4   Text positions for 22.5 mm elements PP17-I

Spare Parts

9

The memory module is available as a spare part for all the Push Button Panel unit versions.

All the parameters concerning the interface to the PLC are stored in the Push Button Panel memory module. In cases where the unit electronics or the entire unit are replaced, the interface need not be reconfigured. Only the old memory module needs to be transferred to the new unit.

If the Push Button Panel memory module is defect, the message `EEPROM ERR` appears in the display in both normal operation and hardware test mode. In this case, the memory module must be replaced.

The following spare parts are only available for the PP17-I unit:

- Standard keyboard
- Electronics
- Front panel

It is not necessary to remove the Push Button Panel from the cabinet in order to install the spare parts. Even the 22.5 mm elements, individually installed and connected by the customer, can remain in position.

Technical Data

<div style="text-align: right">

A

</div>

A.1 General technical data

Housing	PP7	PP17-I	PP17-II
External dimensions W x H x D (mm)	240 x 144 x 53	204 x 240 x 53	
Mounting cut-out W x H (mm)	130 x 190	226 x 190	

Mounting depth (mm)
• without bus connector
• with angled bus connector
  Order no.: GES 7972 - 0BB10-0 x 70
• with non-angled bus connector
  Order no.: GGK 1500 - 0EA00
	53
	
	75
	
	130		

Degree of protection • Front panel • Rear panel	IP65 IP20		
Weight approx. (kg)	0.72	1.13	

24 V voltage supply	PP7	PP17-I	PP17-II
Rated voltage (VDC)	+24		
Permissible range (VDC)	+18 to +30		
Typical power consumption at 24 V with no load applied at digital outputs	0.2 A	0.4 A	
Starting current inrush I^2t	30×10^{-3} A^2s		
Fuse type, internal	Electronic fuse		
Reverse battery protection	Yes		

Ambient conditions	PP7	PP17-I	PP17-II
Ambient temperature • In operation • Shipping, storage	0 to 55˚ C -20 ... 70˚ C		
Relative humidity • Operation • Shipping, storage	≤ 95%, no condensation ≤ 95%		

Ambient conditions	PP7	PP17-I	PP17-II
Shock loading • Operation • Shipping, storage	15 g/11 msec 25 g/6 msec		
Vibration • Operation • Shipping, storage	0.075 mm (10 Hz ... 58 Hz) 1 g (58 Hz ... 500 Hz) 3.5 mm (5 Hz ... 10 Hz) 1 g (10 Hz ... 500 Hz)		
Max. pressure difference (front/rear sides)	2hPa		
Barometric pressure • Operation • Shipping, storage	706 to1030 hPa 581 to 1030 hPa		

The conformity of the product described with the regulations of Directive 89/336 EEC is proved by compliance with the following standards:

Interference immunity EN 50082-1	PP7	PP17-II	PP17-II
Static discharge (contact discharge)	EN 61000-4-2 Class 3		
RF irradiation	EN 61000-4-3 Class 3		
Pulse modulation	ENV 50204 (900 MHz $\pm$ 5 MHz)		
RF conduction	ENV 50141 Class 3		
Burst interference	ENV 61000-4-4 Class 3		

Radio interference EN 50081-2	PP7	PP17-I	PP17-II
RFI suppression	EN 55011 Class A		

A.2   Digital inputs and outputs

24 V digital inputs	PP7	PP17-I	PP17-II
Power supply • Rated value • Permissible range • Value at t < 0.5 s	+ 24 V DC +18.0 ... +30.0 V 35 V		
Connectable	Keys, switches		
Number of inputs	4	16	
Potential isolation from internal circuitry	-		

24 V digital inputs	PP7	PP17-I	PP17-II
Input voltage • Rated value • with signal "0" • with signal "1"		24 V DC 0 ... 5 V 15 ... 30 V	
Input current with signal "1"		Typ. 5 mA at 24 V	
Time delay of imputs		0.3 ms	
Connection of mechanical switches		Possible	
Bouncing time		≤ 10 ms	
Maximum cable length • with unshielded cables • with shielded cables		1 m > 1 m	

24 V Digital outputs	PP7	PP17-I	PP17-II
Number of outputs • in groups of • output DO1 to DO4 • output DO5 to DO8 • output DO9 to DO12 • output DO13 to DO16	– – – – – –	16 4 Group 1 Group 2 Group 3 Group 4	
Potential isolation	–	–	
Short circuit protection	–	Yes	
Permissible loads	– – –	Resistive Lamps Inductive	
Max. inductive power	–	200 mWs	
Output voltage • With signal "0" • With signal "1"	– –	Max. 2 V (idling) Min. voltage supply -3 V	
Output current • with signal "0" • with signal "1"	– –	Max. 1 mA Max. 500 mA per group; 1 output 200 mA and the others 100 mA	
Switching frequency with • resistive load • lamp load • inductive load	– – –	Max. 100 Hz Max. 8 Hz Max. 0.5 Hz	

24 V Digital outputs	PP7	PP17-I	PP17-II
Load current per group			
• aggregate current	–	500mA	
• on short circuit	–	Deactivation of all outputs	
Maximum cable length			
• with unshielded cables	–	1 m	
• with shielded cables	–	> 1 m	

Release input	PP7	PP17-I	PP17-II
Potential isolation from internal logic	–	–	
Input voltage			
• rated value	–	24 V DC	
• release on entry	–	0 ... 5 V	
• lock on entry	–	15 ... 30 V	
Input current with entry locked	–	Typ. 2 mA at 24 V	

A.3 Interface assignment

Bus connection PROFIBUS-DP MPI
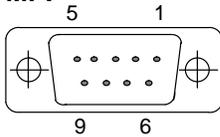
Assignment of the 9-pin Sub-D socket:

Pin	Assignment
1	
2	
3	Data B
4	
5	GND (floating)
6	+5 V (floating)
7	
8	Data A
9	

System Messages

<div style="text-align: right; font-size: 2em;">**B**</div>

Messages during unit start-up

The following message appears in the Push Button Panel display when the unit is starting up:

```
                PPxx Vy.y

                   START
```

When the start-up routine has been completed and communication with the PLC has begun, the following message appears in the Push Button Panel display:

```
                PPxx Vy.y

                   READY
```

These messages contain the following information:

xx	Unit identification of the Push Button Panel: 7 or 17
y.y	Version identification of the Push Button Panel

Error LED signals

The following table should help to determine the cause of Error LED signals:

Signal	Cause	Remedy
LED flashes (Normal operation)	The unit is in Lamp/Key test mode.	Terminate the Lamp test by • releasing the corresponding key, or • resetting the corresponding bits in the PLC.
LED lights up (Hardware test mode)	Hardware test mode is displayed.	Restart the unit or terminate Hardware test mode via the menu.
LED lights up (Normal operation)	The unit has detected a communication or software error.	Note the error message in the display.

Display messages   The following table should help to determine the cause of error messages which appear in the display:

Message	Cause	Remedy
Error message in Hardware Test mode	A defect in the Push Button Panel electronics has been detected.	Return the unit for repair.
EEPROM ERR	The memory module is faulty or not available.	Install a memory module. Replace the current memory module, if necessary.
EEPROM INV	The memory module contains invalid data.	Configure the interface on the Push Button Panel again.
NO PLC	Connection to the PLC cannot be established because • a bus cable is faulty, or • the interface configuration is incorrect.	Check all cables and connections. Check the configuration of the interface on the Push Button Panel.
PP START (PROFIBUS-DP connection)	There is a connection fault.	Check the network configuration and the configuration of the interface on the Push Button Panel.
PP START (MPI connection)	Connection to the defined MPI address cannot be established.	Check the following settings in the Push Button Panel interface configuration: • BAUDRATE, • PLC-ADR, • RACK-NO and • SLOT-NO.
NO PAR. DB	The set configuring data block in the PLC is not available.	Create a configuring data block. In order to use the system default settings for keys and LEDs, set PARAM-DB in the Push Button Panel interface configuration to 0.
PARAM ERROR	The configuring data block defined in the PLC contains invalid data.	Check the structure of the configuring data block parameter.
DIAG-ERROR	There is a short circuit in one of the digital outputs.	Check the wiring of the digital outputs.

Hardware Test

C

Activating and operating Hardware Test mode

The hardware components of the Push Button Panel can be tested via a menu. The so-called Hardware Test mode mode is provided for this.

Key	Description
ESC + ▲	If this key combination is pressed while the unit is starting up (directly after switching on), the unit enters Hardware Test mode. The message `Any key to enter display mode` appears in the display. Acknowledge it by pressing any key.
OK	In Hardware Test mode, this key serves the function in the current menu level. The results of the individual tests appear as they are completed: OK: A fault has occurred. ERROR: The functional unit tested is defective.
▲	In Hardware Test mode, this key serves to skip back to the superordinated menu level. The key has no function in the first menu level.
▼	In Hardware Test mode, this key serves to skip forward to the next menu level. The key has no function in the bottom menu level.

Exit from Hardware Test mode by switching the unit off or executing the function `TEST END` in the bottom menu level.

Functions in Hardware Test mode

The following functions are available for selection after activating Hardware Test mode:

Function	PP7 display	PP17-I and PP17-I display	Comment
EPROM TEST	CHECK SUM xxxx		Message concerning the valid checksum for the respective firmware version
DISPL TEST	Displays the code of the key pressed		Terminate the function with key combination ESC + OK
KEYB. TEST	After pressing a key on the keyboard, the corresponding LED lights up orange		Terminate the function with key ▲ or ▼
EEPROM TEST	EEPROM OK		
SPC2-TEST/ ASPC2-TEST	SPC2 OK	ASPC2 OK	
DIGIO-TEST	DI = xxxx	DI = xxxx DO = xxxx	xxxx = Status of the digital inputs and outputs as hexadecimal values
KEY-TEST	Not implemented	xx	Status of the release input
KEYB.ID	Not implemented	xxxx	Keyboard identification: PP17-I: 2010 PP17-I: 4020
EXT MODUL	Not implemented	xxxx xxxx xxxx xxxx	Extension module identification
TEST END			Terminate Hardware Test mode
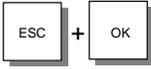
Siemens Worldwide

D

In this Appendix In this appendix you will find a list of:

- All cities in the Federal Republic of Germany with Siemens Sales Offices and

- All European and non-European Siemens Companies and Representatives

Siemens Sales Offices in the Federal Republic of Germany The following table lists all Siemens Sales Offices in the Federal Republic of Germany.

Aachen	Kassel
Augsburg	Kempten/Allg.
Bayreuth	Kiel
Berlin	Laatzen
Bielefeld	Leipzig
Bonn	Lingen
Bremen	Magdeburg
Brunswick	Mainz
Chemnitz	Mannheim
Coblenz	Munich
Cologne	Münster/Westf.
Constance	Nuremberg
Darmstadt	Osnabrück
Dortmund	Regensburg
Dresden	Rostock
Duisburg	Saarbrücken
Düsseldorf	Siegen
Erfurt	Stuttgart
Essen	Ulm
Frankfurt am Main	Wetzlar
Freiburg	Wilhelmshaven
Hamburg	Wuppertal
Heilbronn	Würzburg
Karlsruhe	

European Companies and Representatives

The following table lists all European Siemens Companies and Representatives.

Austria	Finland
Siemens AG Österreich • Bregenz • Graz • Innsbruck • Linz • Salzburg • Vienna	Siemens Oy • Espoo, Helsinki
Belgium	**France**
Siemens S.A. • Brussels • Liège Siemens N. V. • Antwerp	Siemens S.A. • Haguenau • Lille, Seclin • Lyon, Caluire-et-Cuire • Marseille • Metz • Paris, Saint-Denis • Strasbourg • Toulouse
Bosnia-Herzegovina	**Great Britain**
Generalexport Predstavnistvo Sarajevo • Sarajevo	Siemens plc • Birmingham, Walsall • Bristol, Clevedon • Congleton • Edinburgh • Glasgow • Leeds • Liverpool • London, Sunbury-on-Thames • Manchester • Newcastle
Bulgaria	
Siemens AG, Bulgaria Representative • Sofia	
Croatia	
Siemens d. o. o. • Zagreb	
Cyprus	**Greece**
GEVO Ltd. or Jolali Ltd. • Nicosia	Siemens A.E. • Athens, Amaroussio • Thessaloniki
Czech Republic	**Hungaria**
Siemens AG • Brno • Mladá Boleslav • Prague	Siemens Kft • Budapest
	Iceland
	Smith & Norland H/F • Reykjavik
Denmark	**Ireland**
Siemens A/S • Copenhagen, Ballerup	Siemens Ltd. • Dublin

Italy	Romania
Siemens S.p.A.	Siemens birou de consultatii tehnice
• Bari	• Bukarest
• Bologna	**Russia**
• Brescia	Siemens AG
• Casoria	or
• Florence	Mosmatic
• Genoa	• Moscow
• Milan	Siemens AG
• Padua	• Ekaterinburg
• Rome	**Slovak Republic**
• Turin	Siemens AG
Luxemburg	• Bratislava
Siemens S.A.	**Slovenia**
• Luxemburg	Siemens d. o. o.
Malta	• Ljubljana
J. R. Darmanin & Co. Ltd.	**Spain**
• Valletta	Siemens S.A.
Netherlands	• Barcelona
Siemens Nederland N.V.	• Bilbao
• The Hague	• Gijón
• Rijswijk	• Granada
Norway	• La Coruña
Siemens A/S	• Las Palmas de Gran Canaria
• Bergen	• León
• Oslo	• Madrid
• Stavanger	• Málaga
• Trondheim	• Murcia
Poland	• Palma de Mallorca
Siemens GmbH	• Pamplona
• Gdansk-Letnica	• Sevilla
• Katowice	• Valencia
• Warsaw	• Valladolid
Portugal	• Vigo
Siemens S.A.	• Zaragoza
• Albufeira	**Sweden**
• Coímbra	Siemens AB
• Lisbon, Amadora	• Göteborg
• Matosinhos	• Jönköping
• Porto	• Malmö
	• Sundsvall
	• Upplands Väsby, Stockholm

Switzerland	Turkey
Siemens-Albis AG • Basel • Bern • Zürich Siemens-Albis S.A. • Renens, Lausanne	SIMKO • Adana • Ankara • Bursa • Istanbul • Izmir • Samsun
	Ukraine
	Siemens AG • Kiev

Non-European Companies and Representatives   The following table lists all non-European Siemens Companies and Representatives of Siemens AG.

Africa   The following table lists all Siemens Companies and Representatives of Siemens AG in Africa.

Algeria	Morocco
Siemens Bureau d'Alger • Alger	SETEL Société Electrotechnique et de Télécommunications S.A. • Casablanca
Angola	
TECNIDATA • Luanda	
	Mozambique
Bophuthatswana	Siemens Liaison Office • Maputo
Siemens Ltd. • Mafekeng	
	Namibia
Egypt	Siemens (Pty.) Ltd. • Windhoek
Siemens Technical Office • Cairo-Mohandessin Siemens Technical Office • Alexandria EGEMAC S.A.E. • Cairo-Mattaria	
	Nigeria
	Electro Technologies Nigeria Ltd. (ELTEC) • Lagos
Ethiopia	
	Rwanda
Addis Electrical Engineering Ltd. • Addis Abeba	Etablissement Rwandais • Kigali
Ivory Coast	**Sambia**
Siemens AG • Abidjan	Electrical Maintenance Lusaka Ltd. • Lusaka
Libya	**Simbabwe**
Siemens AG, Branch Libya • Tripoli	Electro Technologies Corporation (Pvt.) Ltd. (ETC) • Harare

South Africa	Swaziland
Siemens Ltd.	Siemens (Pty.) Ltd.
• Cape Town	• Mbabane
• Durban	**Tanzania**
• Johannesburg	Tanzania Electrical Services Ltd.
• Middelburg	• Dar-es-Salaam
• Newcastle	**Tunesia**
• Port Elizabeth	Sitelec S.A.
• Pretoria	• Tunis
Sudan	**Zaire**
National Electrical & Commercial Company (NECC)	SOFAMATEL S.P.R.L.
• Khartoum	• Kinshasa

America   The following table lists all Siemens Companies and Representatives of Siemens AG in America.

Argentina	Canada
Siemens S.A.	Siemens Electric Ltd.
• Bahía Blanca	• Montreal, Québec
• Buenos Aires	• Toronto
• Còrdoba	**Chile**
• Mendoza	INGELSAC
• Rosario	• Santiago de Chile
Bolivia	**Colombia**
Sociedad Comercial é Industrial Hansa Ltda.	Siemens S.A.
• La Paz	• Barranquilla
Brazil	• Bogotá
Siemens S.A.	• Cali
• Belém	• Medellín
• Belo Horizonte	**Costa Rica**
• Brasilia	Siemens S.A.
• Campinas	• Panama
• Curitiba	• San José
• Fortaleza	**Cuba**
• Pôrto Alegre	Respresentación
• Recife	Consult iva EUMEDA
• Rio de Janeiro	• La Habana
• Salvador de Bahia	**Ecuador**
• São Paulo	Siemens S.A.
• Vitória	• Quito

El Salvador	Paraguay
Siemens S.A. • San Salvador	Rieder & Cia. S.A.C.I. • Asunción
Guatemala	**Peru**
Siemens S.A. • Ciudad de Guatemala	Siemsa • Lima
Honduras	**United States of America**
Representaciones Electroindustriales S de R.L. - Relectro • Tegucigalpa	Siemens Industrial Automation Inc. Automation Division • Alpharetta, GA Numeric Motion Control • Elk Grove Village, Illinois
Mexico	**Uruguay**
Siemens S.A. de CV • Culiacán • Gómez Palacio • Guadalajara • León • México, D.F. • Monterrey • Puebla	Conatel S.A. • Montevideo
	Venezuela
Nicaragua	Siemens S.A. • Caracas • Valencia
Siemens S.A. • Managua	

Asia The following table lists all Siemens Companies and Representatives of Siemens AG in Asia.

Bahrain	India
Transitec Gulf • Manama	Siemens Limited • Ahmedabad • Bangalore • Bombay • Calcutta • Madras • New Delhi • Secúnderabad
Bangladesh	
Siemens Bangladesh Ltd. • Dhaka	
Brunei	
• Brunei Darussalam	
Hong Kong	**Indonesia**
Siemens Ltd. • Hong Kong	P.T. Siemens Indonesia, P.T. Siemens Dian-Grana Elektrika, Representative Siemens AG • Jakarta

Iraq	People's Republic of China
Samhiry Bros. Co. Limited or Siemens AG (Iraq Branch) • Baghdad	Siemens AG Representation • Beijing • Guangzhou • Shanghai
Iran	**Philippine Islands**
Siemens S.S.K. • Teheran	Maschinen & Technik Inc. (MATEC) • Manila
Japan	**Qatar**
Siemens K.K. • Tokyo	Trags Electrical Engineering and Air Conditioning Co. • Doha
Korea	**Saudi Arabia**
Siemens Ltd. • Changwon • Seoul • Ulsan	Arabia Electric Ltd. (Equipment) • Al-Khobar • Jeddah • Riyadh
Kuwait	**Singapore**
National & German Electrical and Electronic Services Co. (NGEECO) • Kuwait, Arabia	Siemens (Pte.) Ltd. • Singapore
	Sri Lanka
Lebanon	Dimo Limited • Colombo
Ets. F.A. Kettaneh S.A. • Beirut	
	Syria
Malaysia	Siemens AG, Branch (A.S.T.E.) • Damascus
Siemens Electrical Engineering Sdn. Bhd. • Kuala Lumpur	
	Taiwan
Nepal	Siemens Ltd., TELEUNION Engineering Ltd. or TAI Engineering Co., Ltd. • Taichung • Taipei
Amatya Enterprises (Pvt.) Ltd. • Kathmandu	
Oman	
Waleed Associates • Muscat	
	Thailand
Pakistan	Berti Jucker Co. Ltd. • Bangkok
Siemens Pakistan Engineering Co., Ltd. • Islamabad • Karachi • Lahore • Peshawar • Quetta	

United Arab Emirates	Vietnam
Electro Mechanical Co.	OAV Representative Office
or	• Hanoi
Siemens Resident Engineers	**Yemen (Arab. Republic)**
• Abu Dhabi	Tihama Tractors & Engineering Co., Ltd.
Scientechnic	or
or	Siemens Resident Engineers
Siemens Resident Engineers	• Sanaa
• Dubai	

Australia   The following table lists all Siemens Companies and Representatives of Siemens AG in Australia

Australia	New Zealand
Siemens Ltd.	Siemens Ltd.
• Adelaide	• Auckland
• Brisbane	• Wellington
• Melbourne	
• Perth	
• Sydney	

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