SIEMENS

SIMATIC HMI

Operator Panel OP37/Pro

Equipment Manual

6AV6591-1DA01-0AB0

Release 07/98

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:

⚠ **Warning**

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

⚠ **Caution**

indicates that minor personal injury or property damage can result if proper precautions are not taken.

Note

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

Qualified Personnel

Equipment may be commissioned and operated only by **qualified personnel**. Qualified personnel within the meaning of the safety notices in this manual are persons who are authorized to commission, ground and identify equipment, systems and circuits in accordance with safety engineering standards.

Correct Usage

Note the following:

⚠ **Warning**

The equipment may be used only for the applications stipulated in the catalog and in the technical description and only in conjunction with other equipment and components recommended or approved by Siemens.

Startup must not take place until it is established that the machine, which is to accommodate this component, is in conformity with the guideline 89/392/EEC.

Faultless and safe operation of the product presupposes proper transportation, proper storage, erection and installation as well as careful operation and maintenance.

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Impressum

Editor and Publisher: A&D PT1

Preface

Purpose

This equipment manual contains precise information on the technical design of operator panel OP37/Pro.

Where to find what

The OP37/Pro equipment manual contains the following chapters:

Chapters 1-3   contain information about the individual components of the operator panel and describe its physical and electrical installation.

Chapters 4-5   describe the user-definable settings in the Setup program.

Chapter 6   provides information about servicing the operator panel.

The Appendix   contains the technical data and the ESD guidelines.

Abbreviations

The abbreviations used in the *User's Guide for OP37/Pro* have the following meanings:

DOS	Disk Operating System
ESD	Electrostatic Sensitive Device
EM	Equipment Manual
LCD	Liquid Crystal Display
LED	Light-Emitting Diode
MPI	Multipoint Interface (SIMATIC S7)
OP	Operator Panel
PC	Personal Computer
PCMCIA	Personal Computer Memory Card International Association
PU	Programming Unit
RAM	Random Access Memory (main memory)
TFT	Thin-film transistor

Other Sources of Assistance   In the event of technical queries, please get into touch with your point of contact at the Siemens agency or branch which takes care of your affairs. You will find their addresses in Appendix C of this manual.

SIMATIC Customer Support Hotline

Available worldwide around the clock:

Simatic Basic Hotline
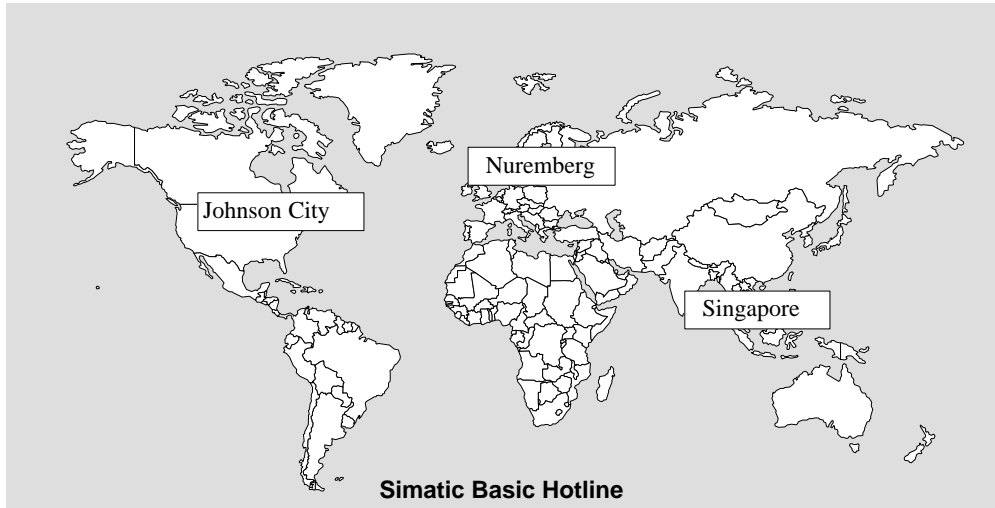
Nuremberg		**Johnson City**		**Singapore**	
SIMATIC BASIC Hotline		**SIMATIC BASIC Hotline**		**SIMATIC BASIC Hotline**	
Local time:	Mon-Fri 8:00 to 18:00	Local time:	Mon-Fri 8:00 to 17:00	Local time:	Mon-Fri 8:30 to 17:30
Tel.:	+49 (911) 895-7000	Tel.:	+1 423 461-2522	Tel.:	+65 740-7000
Fax:	+49 (911) 895-7002	Fax:	+1 423 461-2231	Fax:	+65 740-7001
E-mail:	simatic.support@ nbgm.siemens.de	E-mail:	simatic.hotline@ sea.siemens.com	E-mail:	simatic@ singnet.com.sg

SIMATIC Premium Hotline

(chargeable, SIMATIC Card required)

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SIMATIC Customer Support Online Services

SIMATIC Customer Support offers you comprehensive additional information about SIMATIC products through its Online Services as follows:

- Up-to-date general information is provided

    - on the **internet** at `http://www.ad.siemens.de/simatic`

    - from the **fax polling service on** 08765-93 02 77 95 00

- Up-to-date product information and downloads for practical use can be found

    - on the **internet** at `http://www.ad.siemens.de/support/html-00/`

    - 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

<div style="text-align: right; font-size: large;">**1**</div>

Overview

This opening chapter provides a brief overview of the OP37/Pro and its

- performance characteristics and
- controls, display and indicators.

1.1 OP37/Pro Facilities

Area of application of operator panel

Operator panel OP37/Pro is suitable for sophisticated tasks in the field of "operator control and monitoring". It is designed as a fitted unit for use directly on the machine.

Owing to its high degree of protection (IP65 on the front panel), the OP can even be used in harsh industrial environments. The OP can be fitted in the following locations:

- control cabinets/desks
- 19" cabinets/racks.

Specifications

The following table presents an initial overview of the configuration of the OP37/Pro. More precise information about the individual components is provided in the subsequent, more detailed chapters.

Overview: OP37/Pro configuration		
Processor	Pentium	166 MHz
Memory and disk storage	Second-level cache (pipeline burst)	512 Kbytes
	Hard disk	$\geq$ 1.6 GB
	System memory	16 MB
	Floppy disk drive	3½" drive (1.44 MB)
Software	Operating system	MS Windows 95
	Executable system software	SIMATIC ProTool/Pro Runtime
Ports	PLC, PC/PU	Serial (see Chapter 3.1)
	Printer	serial/parallel (see Chapter 3.1)
	Operation of external MF2 keyboard	Connection on front panel
	Operation of external PS/2 keyboard	Connection on rear panel
	Operation of external PS/2 mouse	Connection on rear panel
	Slot for PCMCIA cards	Slot A for type I, II; III Slot B for type I, II
Display	LCD color display	10"; TFT (actively driven) with backlighting
	Resolution (pixels)	640×480
	Number of colors	256

Overview: OP37/Pro configuration		
Sealed Keyboard	System keys with permanent functions	32 (4 with LED)
	Function keys with programmable functions	36 (28 with LED)
	Function key labeling	System-specific using labeling strips
AT expansion box (option)	Slots Plug-in AT cards	ISA slots 2/3-length 16-bit cards (ISA)
Direct key module (option)	Digital outputs, key-driven	16
Special features:	Hardware clock (buffered)	Yes
	Processor cooling	Heat pipe: a tube that runs directly from the heat sink on the processor to the heat sink on the outer wall of the OP and discharges the heat via the OP outer wall. Fully industry-compatible in contrast with fan cooling.

1.2 Controls, Display and Indicators

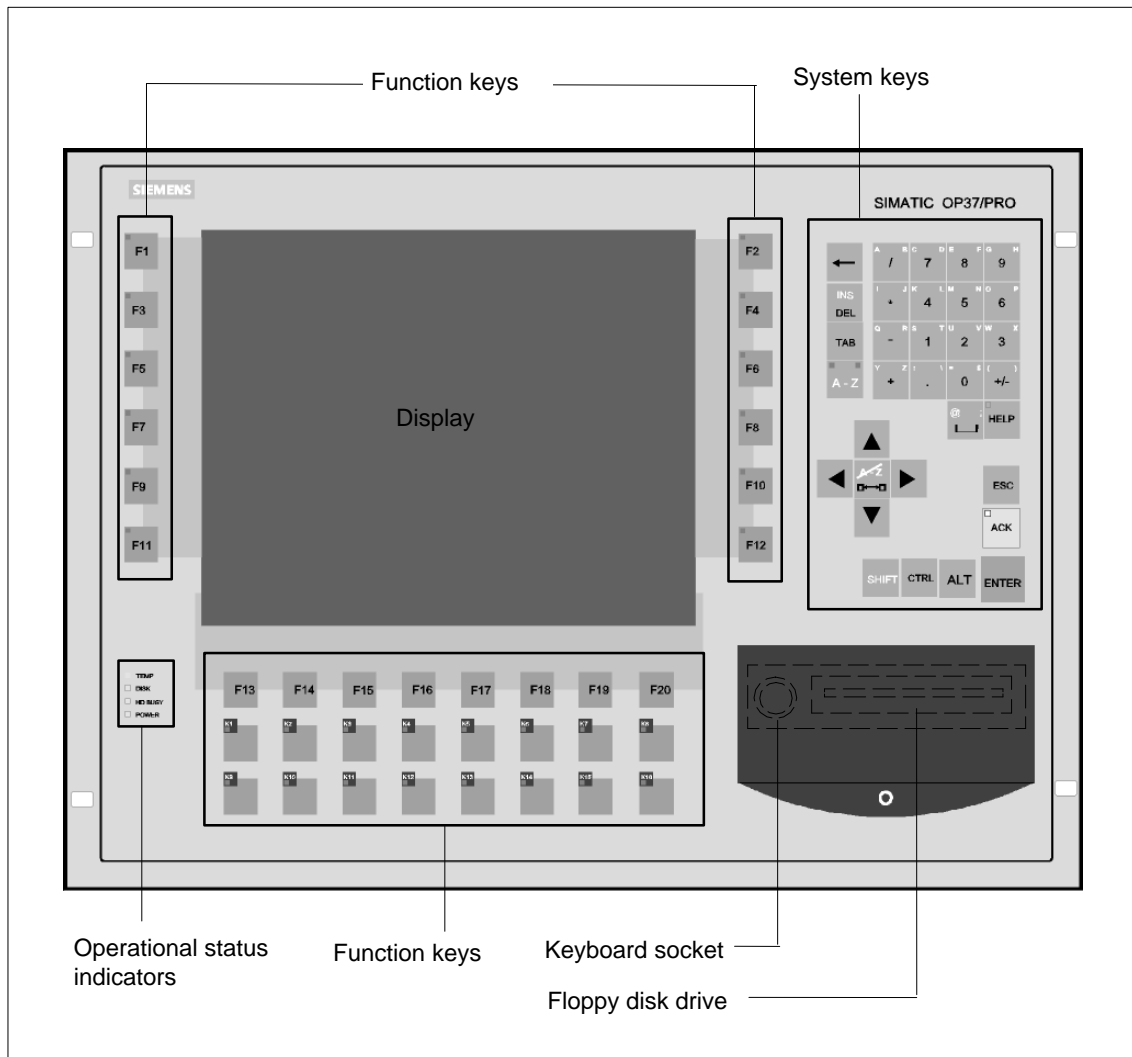Figure 1-1   Arrangement of controls, display and indicators

Physical Installation

<div style="text-align: right; font-size: 3em; font-weight: bold;">2</div>

Overview

This chapter provides information on the OP37/Pro with regard to

- Installing the operator panel
- Unit dimensions
- Function key labeling

2.1   Installing the OP37/Pro

Mounting location and installation conditions

The OP37/Pro is suitable for installation in

- 19" (48,26 cm) cabinets/racks,
- front panels of control cabinets and desks.

Caution

- In order to prevent the operator panel overheating,
  - the unit must not be exposed to direct sunlight (this also prevents the keyboard sealing film fading)
  - the vent slots on the unit casing must not be covered over when the unit is in its installed position.
- When installing the OP37/Pro, take the following points into account:
  - The temperature inside the OP rises when it is installed on a slant. The angle of inclination must not exceed 25° (refer to Appendix A). If not installing the unit vertically, reduce the maximum ambient temperature, e.g. by means of additional heat removal facilities (fan).
  - The operator panel must not be installed horizontally since the cooling principle of the heat pipe would not work any more.

Note

The IP65 enclosure rating of the front panel is only guaranteed if

- the seal on the front panel of the OP is properly seated
- the OP is correctly installed using the screw clamps supplied.

Before installation

If you want to change the labeling of the function keys, perform the steps prior to installing the OP37/Pro as described in Section 2.3.

Plan sufficient space so as to be able to open the OP37/Pro even when it is installed. For example, when you replace the back-lighting, it must be possible to swing a plate (refer to Figure 6-3 on page 6-4) through 90° after opening the OP.

The OP37/Pro has a depth of approximately 330 mm with swung-out plate, as measured from the front panel.

Mounting in 19" cabinets/rack

Use the section bars of the cabinet or rack manufacturer concerned to mount the OP37/Pro.

Mounting dimensions of the OP37/Pro for a standard 19" cabinet:

Width: 19" (48.26 cm)   height: 7 height modules

The OP/OP front panel is fixed to the frame sections by means of four screws.

Installing in control cabinets/desks

To install the unit, proceed as follows:

1. Make a mounting cutout in the front panel having a size of $436_{-1.5}$ x $295_{-1.5}$ (width x height in mm).
   The front panel must not be thicker than 16 mm. You will find details of the useful depth in the Technical Data contained in the appendix.

2. Insert the operator panel in the prepared cutout from the front. Take suitable precautions to prevent the OP from falling out of the front panel until it has been properly secured.

3. Securely attach the OP to the front panel using the six screw clamps ①
   supplied. Figure 2-1 shows the positions for the screw clamps.
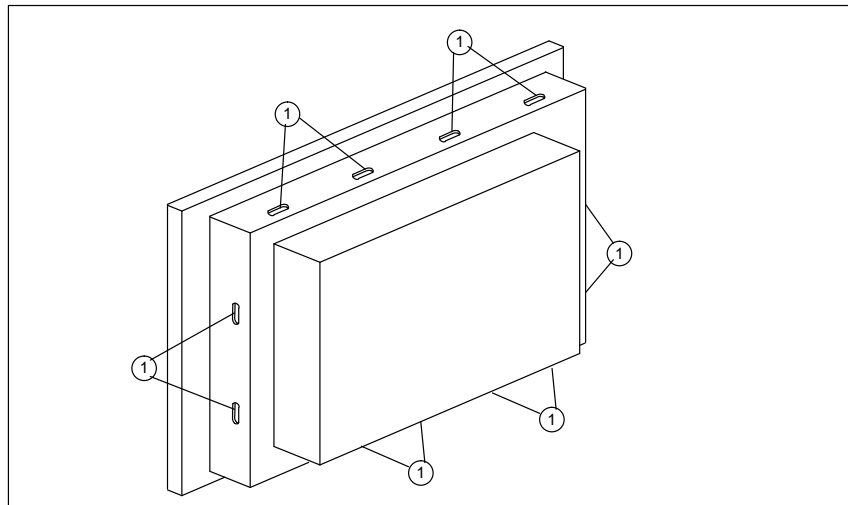
Figure 2-1   Positions for the screw clamps

The screw clamps should be hooked into the OP casing and then the stud screws tightened against the front panel from the back (see Figure 2-2).
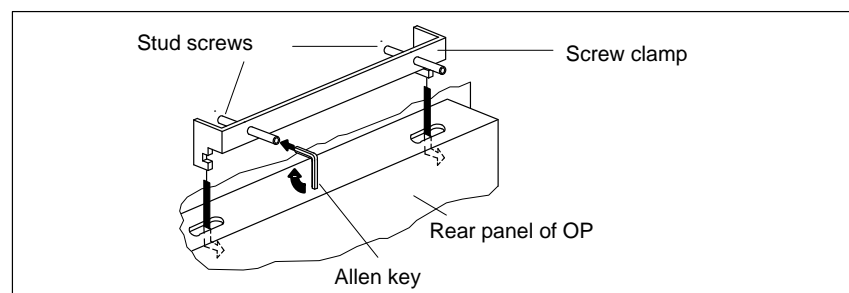
Figure 2-2   Locating and tightening the screw clamps

2.2 Unit Dimensions

Note the different device dimensions contained in the following drawings when installing the OP37/Pro.
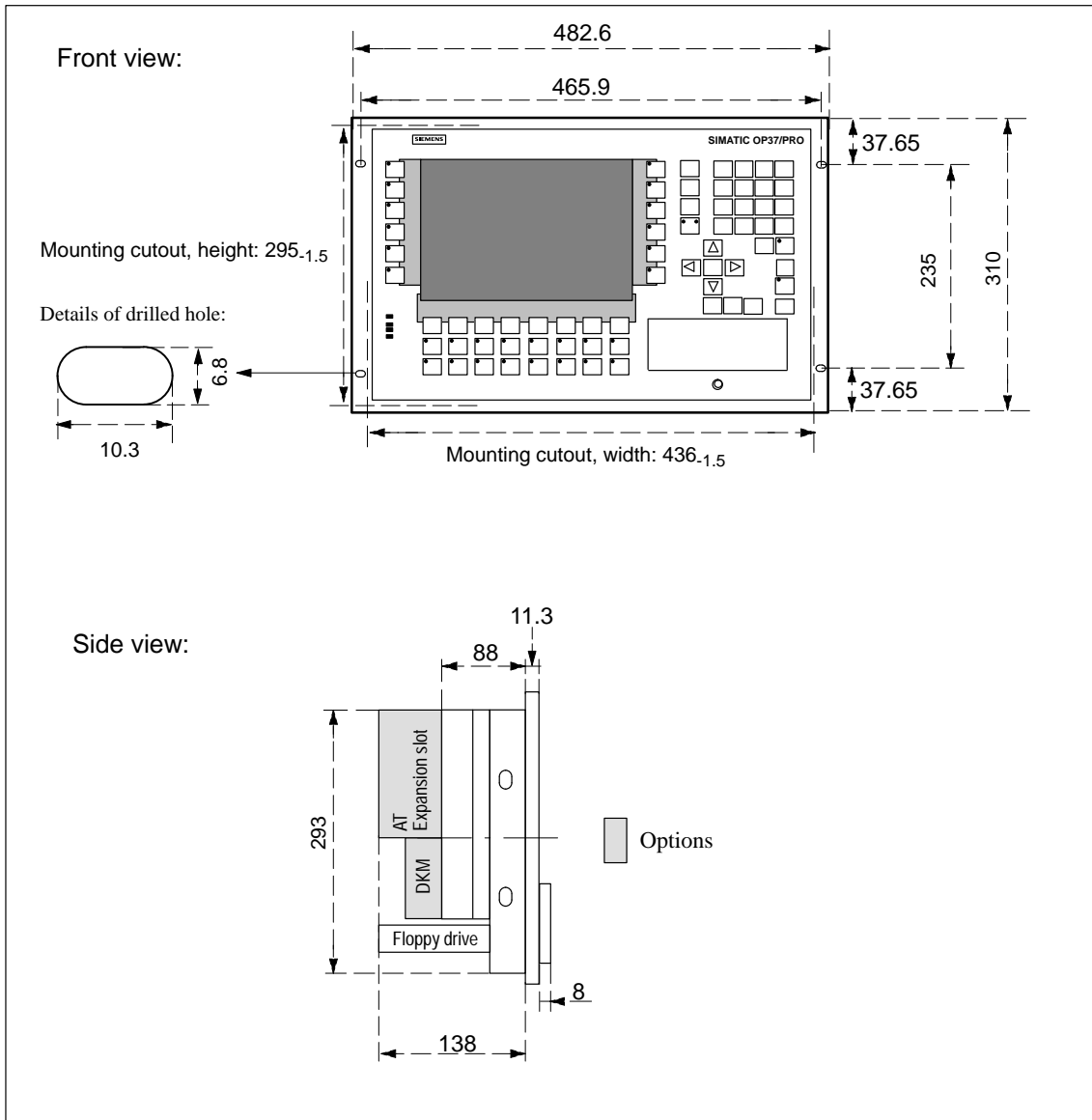
Figure 2-3   Dimensions of OP37/Pro (in mm)

2.3   Labeling Function Keys

Labeling when supplied

When the unit is supplied, the operator panel function keys are labeled as follows:

- F1 to F20 and

- K1 to K16.

A set of unlabeled strips is included with the OP. This means that you can prepare labels for the OP specifically for your system.

Replacing labeling strips

To replace the labeling strips proceed as follows:

1. Place the unit face down.

⚠ **Caution**

Make sure the OP is disconnected from the power supply.

2. With reference to Figure 2-4, release the rivets ①.
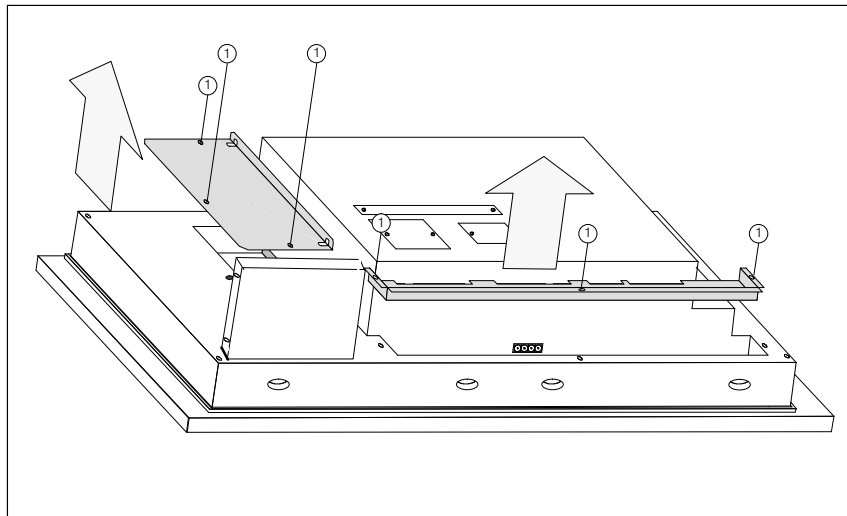
Figure 2-4   Release rivets

3. Remove the covers.

4. Insert the strips ② – with the labeling facing downwards – into the slits on the front panel (refer to Figure 2-5).
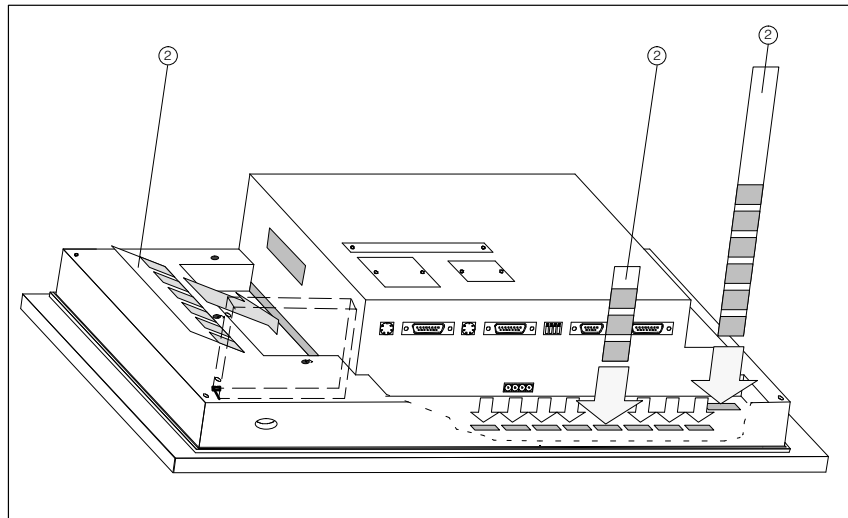
Figure 2-5   Inserting the labeling strips

Note

The lettering on the labeling strips must be completely smudge-proof before they are inserted. If the keyboard sealing film is soiled on the inside it can not be cleaned and can only be replaced at the factory.

5. Screw the covers back on after inserting the labeling strips.

Electrical Installation

3

General notes on installation

The basis for trouble-free operation is electromagnetic-compatible PLC design and the use of interference-free cables.

The guidelines for the interference-free installation of your PLC apply to the electrical installation of your operator panel too.

⚠️ **Caution**

- All signal links must use shielded wiring only.
- All connectors must be secured by screws or catches.
- Signal lines must not share a common cable duct with high-power cables.

Configuration options

Figure 3-1 shows some of the configuration options for OP, PLC and peripherals.
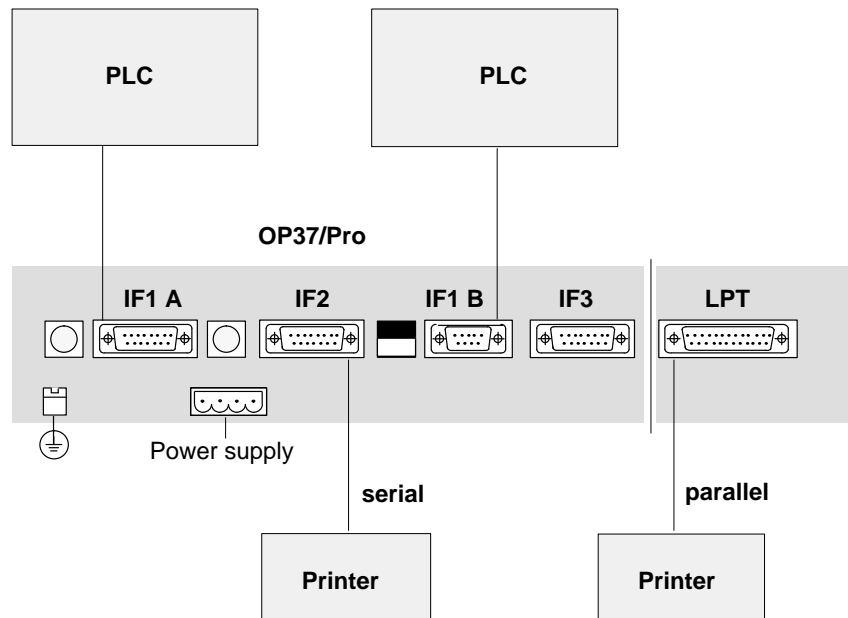
Figure 3-1   Configuration options

Detailed information on electrical connections is given in the later chapters.

3.1   Connectors/Interfaces

1 = Connection for PS/2 keyboard
2 = Serial interface IF1 A
3 = Connection for PS/2 mouse
4 = Serial interface IF2
5 = DIP switches
6 = Serial interface IF1 B
7 = Serial interface IF3

8 = Connection for 24 V DC power supply, relay output (not usable)
9 = Parallel interface LPT1
10= Battery compartment
11= Interface for direct key module
12= Connection for AT expansion box
13= PCMCIA slot A and slot B (not visible in diagram)
14= Relay output for temperature monitoring

Figure 3-2   Connections and interfaces
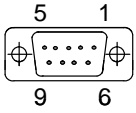
Designation	Description	
Serial interfaces	Level	Usage
IF1 A	V.24/TTY (active/passive)	PLC
IF2	V.24/TTY (active/passive)	PC, PU, printer
IF1 B	RS422/RS485 (floating)	PLC
IF3	TTY (passive) /RS422/RS485	Use optional
DIP switches	For setting the IF1 B serial interface (refer to Figure 3-2, item 6). The DIP switch settings are described in Section 3.1.2.	
Parallel interface LPT1	For parallel printer	
Interface for PS/2 keyboard	On rear panel	
Interface for PS/2 mouse	On rear panel	
Interface for MF2 keyboard	On front panel	
Options – AT expansion box; – Direct key module	For accommodating two $^2/_3$-length ISA AT cards; 16 digital outputs for key operation without communication-related delays	
PCMCIA slot A and slot B	**PCMCIA cards**	

3.1.1 Connector Pin Assignment

IF1 A, IF2
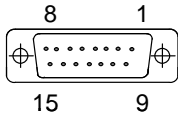
Sub-D socket	Pin No.	General	V.24	TTY
8 1 15 9	1	Casing		
	2			RxD–
	3		RxD	
	4		TxD	
	5		CTS	
	6			TxD+
	7			TxD–
	8	Casing		
	9			RxD+
	10		RTS	
	11			+20 mA
	12	GND		
	13			+20 mA
	14	+ 5 V		
	15	GND		

IF1 B
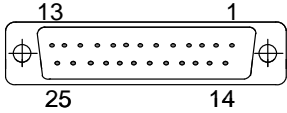
Sub-D socket	Pin No.	General	RS422	RS485
5 1 9 6	1			
	2			
	3		TxD(B)	Data B
	4		RxD(B)	RTS[1]
	5	GND (elec. isol.)		
	6	+5 V (elec. isol.)		
	7			
	8		TxD(A)	Data A
	9		RxD(A)	RTS[1]

1) Can be set by means of DIP switches
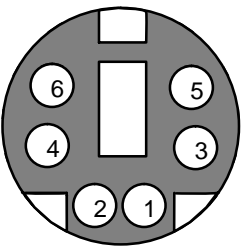
IF3

Sub-D socket	Pin No.	General	TTY	RS422	RS485
8　　　1 ┌─────────┐ ⊕ | ∙∙∙∙∙∙∙∙ | ⊕ └─────────┘ 15　　　9	1	Casing			
	2		RxD–		
	3			RxD(B)	Data B
	4			TxD(B)	
	5			RxD(A)	
	6		TxD+		
	7		TxD–		
	8	Casing			
	9		RxD+		
	10			TxD(A)	Data A
	11	+24 V			
	12	GND (5 V)			
	13	–			
	14	+ 5 V			
	15	GND (24 V)			
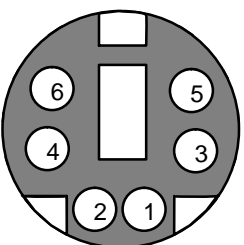
LPT

Socket	Pin No.	Signal Description	Input/Output
13　　　　　　1 ┌──────────────┐ ⊕ | ∙∙∙∙∙∙∙∙∙∙∙∙∙ | ⊕ └──────────────┘ 25　　　　　14	1	– Strobe	Output (open collector)
	2	+ Data Bit 0	Output (TTL level)
	3	+ Data Bit 1	Output (TTL level)
	4	+ Data Bit 2	Output (TTL level)
	5	+ Data Bit 3	Output (TTL level)
	6	+ Data Bit 4	Output (TTL level)
	7	+ Data Bit 5	Output (TTL level)
	8	+ Data Bit 6	Output (TTL level)
	9	+ Data Bit 7	Output (TTL level)
	10	– Acknowledge	Input (4.7 kΩ pull up)
	11	+ Busy	Input (4.7 kΩ pull up)
	12	+ Paper End	Input (4.7 kΩ pull up)
	13	+ Select	Input (4.7 kΩ pull up)
	14	– Auto Feed	Output (open collector)
	15	– Error	Input (4.7 kΩ pull up)
	16	– Init. Printer	Output (open collector)
	17	– Select Input	Output (open collector)
	18...25	Ground	Ground
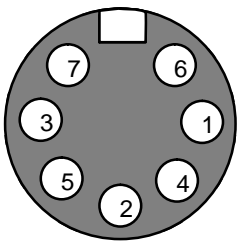
PS/2 Mouse

Socket	Pin	Designation	Input/Output
	1	Data	Input/Output
	2	Not used	–
	3	0 V	–
	4	5 V power supply	Output
	5	Clock	Input/Output
	6	Not used	–

PS/2 Keyboard

Socket	Pin	Designation	Input/Output
	1	Keyboard data	Input/Output
	2	Mouse data	Input/Output
	3	0 V	–
	4	5 V power supply	Output
	5	Keyboard clock	Input/Output
	6	Mouse clock	Input/Output

MF2 Keyboard

Socket	Pin	Designation	Direction
	1	Clock	Keyboard
	2	Data	Keyboard
	3	–	–
	4	0 V	–
	5	+ 5 V	–
	6	–	–
	7	–	–

3.1.2   Setting Serial Interface IF1B

**DIP switches for
IF1B**

The IF1B serial interface is set to RS485 with RTS on pin 4 ex works. Using the DIP switches next to the socket, the interface can be set to other RS485 modes or to RS422 mode. Only the switch settings shown in Figure 3-3 are permissible.
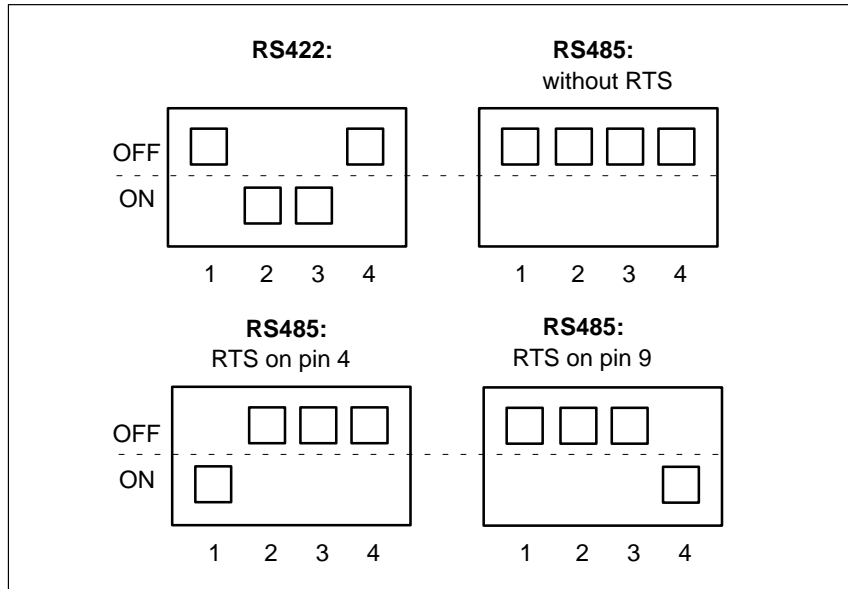
Figure 3-3   Permissible DIP switch settings

3.2 Connection of Power Supply

Power supply requirements

Rated voltage: 24 V DC

Voltage range: 18 V to 30 V

Caution
- With a 24 V supply, make sure the extra-low voltage is **safely isolated**. Use only power supply units to IEC 364-4-41 or HD 384.04.41 (VDE 0100, Part 410) standard!
- The supply must must be within the above-mentioned voltage range. If it is not, the possibility of functional failure on the part of the unit can not be excluded.

Pinout of the plug connector for the power supply

The four-pin socket for the power supply has the following pin assignment:

1 2 3 4   Contact assembly (without function)

GND

+ 24 V DC
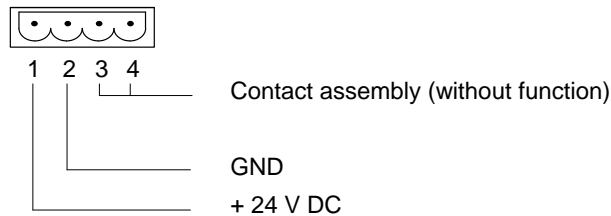
Terminal block

The power supply is connected via the four-pole terminal block supplied as follows:

- Secure wires in terminal block (wire cross-sectional area: 0.5...2.5 mm^2)
- Plug terminal block into lower connector on OP

Electrical bonding (grounding screw)

The grounding screw on the rear panel of the unit (see Figure 3-1) must be connected to the cabinet ground.

User-Specific Settings

4

Overview   This chapter tells you how to perform the settings on the BIOS Setup pages.

4.1   The Setup Program

The Setup program is in the ROM BIOS. The system configuration settings are stored in the operator panel's battery-protected memory.

You can use Setup to define the system configuration (e.g. hard disk type) and system properties. Setup is also used to set the system date and time on the clock module.

Before you can modify Setup, you have to connect an external keyboard.

⚠ **Caution**

The OP37/Pro is preconfigured for work with the software supplied with it. You should only alter the existing settings if you have made technical modifications to the unit.

Starting Setup

Following the OP self-test, BIOS gives you an opportunity to start Setup so that you can alter specific system settings.

To start Setup, press DEL during the boot process as soon as you are prompted to on the screen.

Setup main menu

When Setup starts, you are first presented with the Setup Main Menu from where you can switch to the individual Setup screens.

```
               ROM PCI/ISA BIOS (2A59F000)
                    CMOS SETUP UTILITY
                   AWARD SOFTWARE, INC.


  STANDARD CMOS SETUP            INTEGRATED PERIPHERALS
  BIOS FEATURES SETUP            PASSWORD SETTING
  CHIPSET FEATURES SETUP         IDE HDD AUTO DETECTION
  PNP/PCI CONFIGURATION          SAVE & EXIT SETUP
  LOAD BIOS DEFAULTS             EXIT WITHOUT SAVING
  LOAD SETUP DEFAULTS



  Esc : Quit                   ↑↓→←    : Select Item
  F10 : Save & Exit Setup      (Shift)F2 : Change Color

             Time, Date, Hard Disk Type ...
```

Figure 4-1   Setup Main Menu

Go to Setup pages   From the Main Menu, you can switch to the required Setup screens as follows:

Step	Action	Result
1	Select the Setup page you require by means of the arrow keys ↓ and ↑.	The selected screen is highlighted in inverse type.
2	Press RETURN.	The required Setup screen is displayed.
3	After returning to the Main Menu from a Setup screen:	
	– Press ESC	To quit Setup without saving the changes made
	– Press F10	To quit Setup and save the changes made
4	Press Y (press Z on German keyboard)	To confirm that you wish the changes to be saved
	or	or
	Press N	To discard the changes

Operation within the Setup pages   The Setup screens offer the following program control options:

Key	Function
Arrow keys ↓ and ↑	Activate option boxes and enable scrolling within an input box
ESC	Returns you to the Setup Main Menu, any changes are retained but at that point not saved
Page Up/Page Dn/+/−	Scroll the list of possible options for the box concerned
F1	Activates Online Help
F5	Restores the last values saved for the displayed Setup page.
F6	(=Load BIOS Defaults) Loads default values of the BIOS manufacturer for the displayed Setup page. These create a stable overall system condition.
F7	(=Load Setup Defaults) Loads default values for optimum OP system configuration with regard to the displayed Setup page. This means that optimum system loading and best possible performance of the OP system are assured. The settings required for the SIMATIC ProTool/Pro Runtime are described in the commissioning instructions.

Standard CMOS Setup

The screen "Standard CMOS Setup" provides the facility for setting various system components as follows:

- Date and time

- Hard disk parameters:
  The default setting is **Primary Master: Auto**; in other words, the hard disk used on the OP is automatically detected when the OP starts up. The hard disk settings should not be altered.

- FD information:
  Assignment of the drive letter of the floppy disk drive on the OP and floppy disk capacity.

- Display parameters

- Memory details

```
                    ROM PCI/ISA BIOS (2A59F000)
                        CMOS SETUP UTILITY
                        AWARD SOFTWARE, INC.

   Date (mm:dd:yy) : Sat, Feb 07 1998
   Time (hh:mm:ss) : 15 : 26 : 28
   HARD DISKS          TYPE    SIZE    CYLS   HEAD  PRECOMP  LANDZ  SECTOR   MODE

   Primary Master   : Auto      0       0      0      0       0       0     AUTO
   Primary Slave    : Auto      0       0      0      0       0       0     AUTO
   Secondary Master : Auto      0       0      0      0       0       0     AUTO
   Secondary Slave  : Auto      0       0      0      0       0       0     AUTO


                                       Base Memory:     640K
                                   Extended Memory:   15360K
                                      Other Memory:     384K

                                   Total Memory:      16384K

   ESC: Quit               ↑↓→←    : Select Item      PU/PD(+/- : Modify
   F1 : Help           (Shift)F2 : Change Color
```

Figure 4-2   "Standard CMOS Setup" screen

BIOS Features Setup

This screen specifies the default settings for the components used in the system, e.g. the boot disk drive sequence (default setting: A, C, SCSI).

At **Security Option** you can define the area for which password protection is required to be set. Possible settings are "Setup" and "System" (the default setting is Setup).

The password itself can be defined on the "Password Setting" screen (see Figure 4-7).

Apart from the **Security Option** setting, you are urgently recommended not to alter the default settings of this screen.

```
               ROM PCI/ISA BIOS (2A59F000)
                    CMOS SETUP UTILITY
                   AWARD SOFTWARE, INC.

CPU Internal Cache       : Enabled    Video BIOS Shadow  : Enabled
External Cache           : Enabled    C8000-CBFFF Shadow : Disabled
Quick Power On Self Test : Disabled   CC000-DFFFF Shadow : Disabled
Boot Sequence            : A, C, SCSI D0000-D3FFF Shadow : Disabled
Boot Up Floppy Seek      : Enabled    D4000-D7FFF Shadow : Disabled
Boot Up NumLock Status   : On         D8000-DBFFF Shadow : Disabled
Boot Up System Speed     : High       DC000-DFFFF Shadow : Disabled
Gate A20 Option          : Normal

Security Option          : Setup
PCI/VGA Palette Snoop    : Disabled
OS Select For DRAM > 64 MB: Non-OS2

                                     ESC: Quit        ↑↓→←:Select Item
                                     F1 : Help        PU/PD(+/- : Modify
                                     F5 : Old Values  (Shift)F2 : Color
                                     F6 : Load BIOS Defaults
                                     F7 : Load Setup Defaults
```

Figure 4-3   "BIOS Features Setup" screen

Chipset Features Setup

This screen contains the defaults for chipset-specific settings and settings for system components (memory etc.). The settings have been selected for optimum system performance and should therefore not be altered.

```
              ROM PCI/ISA BIOS (2A59F000)
                   CMOS SETUP UTILITY
                  AWARD SOFTWARE, INC.
Auto Configuration       : Enabled    Memory Parity/ECC Check : Auto
DRAM Timing              : 60ns       Single Bit Error Report : Enabled
DRAM RAS# Precharge Time : 3          L2 Cache Cacheable Size : 64MB
DRAM R/W Leadoff Timing  : 6/5        Chipset NA# Asserted    : Enabled
Fast RAS# To CAS# Delay  : 3          Pipeline Cache Timing   : Faster
DRAM Read Burst (EDO/FPM): x222/x333  Passive Release         : Enabled
DRAM Write Burst Timing  : x222       Delayed Transaction     : Disabled
Turbo Read Leadoff       : Disabled
DRAM Speculative Leadoff : Enabled
Turn-Around Insertion    : Disabled
ISA-Clock                : PCICLK/4

System BIOS Cacheable    : Enabled
Video  BIOS Cacheable    : Enabled
8 Bit I/O Recovery Time  : 3
16 Bit I/O Recovery Time : 2          ESC: Quit          ↑↓→←:Select Item
Memory Hole At 15M-16M   : Disabled   F1 : Help          PU/PD(+/- : Modify
Peer Concurrency         : Enabled    F5 : Old Values   (Shift)F2 : Color
Chipset Special Features : Disabled   F6 : Load BIOS Defaults
DRAM ECC/PARITY Select   : ECC        F7 : Load Setup Defaults
```

Figure 4-4   "Chipset Features Setup" screen

PNP/PCI Configuration

This screen contains the settings for the system's "Plug-and-Play" functions. The settings have been selected for optimum system performance and should therefore not be altered.

```
┌─────────────────────────────────────────────────────────────────────────┐
│                  ROM PCI/ISA BIOS (2A59F000)                            │
│                     CMOS SETUP UTILITY                                   │
│                    AWARD SOFTWARE, INC.                                  │
├─────────────────────────────────────────┬───────────────────────────────┤
│ Resources Controlled By  : Manual        │  PCI IRQ Actived By   : Level │
│ Reset Configuration Data : Disabled       │  PCI IDE IRQ Map To   : PCI-AUTO │
│                                           │   Primary   IDE INT# : A      │
│ IRQ-3  assigned to : Legacy ISA           │   Secondary IDE INT# : B      │
│ IRQ-4  assigned to : Legacy ISA           │                               │
│ IRQ-5  assigned to : PCI/ISA PnP          │                               │
│ IRQ-7  assigned to : PCI/ISA PnP          │                               │
│ IRQ-9  assigned to : PCI/ISA PnP          │                               │
│ IRQ-10 assigned to : PCI/ISA PnP          │                               │
│ IRQ-11 assigned to : PCI/ISA PnP          │                               │
│ IRQ-12 assigned to : PCI/ISA PnP          │                               │
│ IRQ-14 assigned to : PCI/ISA PnP          │                               │
│ IRQ-15 assigned to : PCI/ISA PnP          │                               │
│ DMA-0  assigned to : PCI/ISA PnP          ├───────────────────────────────┤
│ DMA-1  assigned to : PCI/ISA PnP          │                               │
│ DMA-3  assigned to : PCI/ISA PnP          │ ESC: Quit      ↑↓→←:Select Item │
│ DMA-5  assigned to : PCI/ISA PnP          │ F1 : Help      PU/PD(+/- : Modify │
│ DMA-6  assigned to : PCI/ISA PnP          │ F5 : Old Values   (Shift)F2 : Color │
│ DMA-7  assigned to : PCI/ISA PnP          │ F6 : Load BIOS Defaults       │
│                                           │ F7 : Load Setup Defaults      │
└─────────────────────────────────────────┴───────────────────────────────┘
```

Figure 4-5   "PNP/PCI Configuration" screen

Integrated Peripherals

This screen defines the interface parameters for connecting peripherals.

```
                    ROM PCI/ISA BIOS (2A59F000)
                        CMOS SETUP UTILITY
                       AWARD SOFTWARE, INC.

IDE HDD Block Mode       : Disabled  | Serial 1 Address  : COM1
                                     |          Interrupt : IRQ4
On-Chip Primary   PCI IDE: Enabled   |          Physical  : TTY/V24 (IF1A)
On-Chip Secondary PCI IDE: Disabled  | Serial 2 Address  : COM2
IDE Primary Master PIO   : Auto      |          Interrupt : IRQ3
IDE Primary Slave  PIO   : Auto      |          Physical  : TTY/V24 (IF2)
                                     | Serial 3 Address  : Disabled
FDC Controller           : Enabled   |          Interrupt : Disabled
PCMCIA ATA HDD           : Disabled  |          Physical  : TTY/V24 (IF3)
                                     | Serial 4 Address  : Disabled
Parallel Port            : LPT1/IRQ7 |          Interrupt : Disabled
                                     |          Physical  : RS232 (IF4)
ASPC2                    : Disabled  |
Matrix Keyboard          : Disabled  |
                                     | ESC: Quit       ↑↓→←:Select Item
PS/2 mouse               : IRQ12     | F1 : Help       PU/PD(+/- : Modify
                                     | F5 : Old Values (Shift)F2 : Color
                                     | F6 : Load BIOS Defaults
                                     | F7 : Load Setup Defaults
```

Figure 4-6   "Integrated Peripherals" screen

- PCMCIA ATA HDD:
  Has to be set to "enabled" when the OP is required to be booted from a PCMCIA hard disk.

- Parallel port:
  The default setting is "LPT1/IRQ7" for connecting a printer to the parallel interface. You can alter the setting for connecting various other devices (e.g. a CD-ROM drive).
  Possible parameters: Disabled, LPT1, EPP, ECP.

- ASPC2:
  The integrated ASPC2 for MPI/DP communication is deactivated when the device is supplied. When you connect a SIMATIC S7 to the OP37/Pro, activate the ASPC2. Interrupt IRQ5 is assigned for this purpose. The requisite driver is installed with the ProTool/Pro runtime software.

- Serial 1 through Serial 4:
  Here you perform the settings for the external interfaces on the rear panel of the OP. The default settings correspond to the assignment of the SIMATIC HMI OP family as supplied.

  Interface IF4 is used internally.

Password Settings　　On this screen you can specify, alter or disable the password required for starting Setup.

```
┌─────────────────────────────────────────────────────────────────────┐
│                  ROM PCI/ISA BIOS (2A59F000)                        │
│                     CMOS SETUP UTILITY                              │
│                    AWARD SOFTWARE, INC.                             │
│  ─────────────────────────────────────────────────────────────────  │
│                                                                     │
│   STANDARD CMOS SETUP              INTEGRATED PERIPHERALS           │
│   BOIS FEATURES SETUP              PASSWORD SETTING                 │
│   CHIPSET FEATURES SETUP           IDE HDD AUTO DETECTION           │
│   PNP/PCI CONFIGURATION            SAVE & EXIT SETUP                │
│   LOAD BIOS DEFAULTS               EXIT WITHOUT SAVING              │
│   LOAD SETUP DEFAULTS                                               │
│                        ┌──────────────────────────┐                │
│                        │Enter Password:           │                │
│  ──────────────────────└──────────────────────────┘──────────────  │
│   Esc : Quit                   ↑↓→←   : Select Item                │
│   F10 : Save & Exit Setup      (Shift)F2 : Change Color            │
│  ─────────────────────────────────────────────────────────────────  │
│                                                                     │
│              Change/Set/Disable Password                           │
│                                                                     │
└─────────────────────────────────────────────────────────────────────┘
```

Figure 4-7　　Password setup

IDE HDD Auto Detection   The screen "IDE HDD Auto Detection" shows the hard disk parameters identified by the "Autodetect" function.
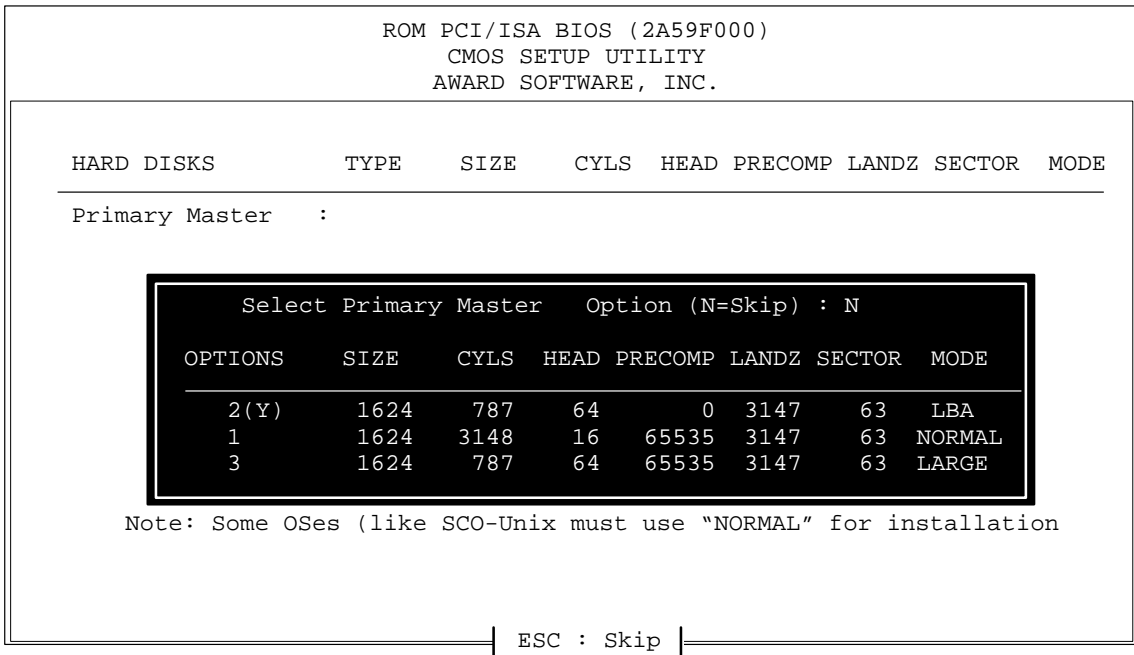
```
                    ROM PCI/ISA BIOS (2A59F000)
                       CMOS SETUP UTILITY
                       AWARD SOFTWARE, INC.


   HARD DISKS          TYPE   SIZE    CYLS  HEAD PRECOMP LANDZ SECTOR  MODE

   Primary Master   :


        Select Primary Master   Option (N=Skip) : N

        OPTIONS     SIZE    CYLS   HEAD PRECOMP  LANDZ SECTOR   MODE

         2(Y)       1624    787    64        0   3147    63     LBA
          1         1624    3148   16    65535   3147    63     NORMAL
          3         1624    787    64    65535   3147    63     LARGE

     Note: Some OSes (like SCO-Unix must use "NORMAL" for installation



                              ┤ ESC : Skip ├
```

Figure 4-8   "IDE HDD Auto Detection" screen

Installing Expansion Modules and Optional Equipment 5

This chapter contains instructions for

- installing the AT expansion box

- installing AT cards in the AT expansion box

- installing a direct key module

- as well as a table of interrupt assignments.

5.1   AT Expansion Box and AT Cards

Overview

As an optional extra for the OP37/Pro, you can order an AT expansion box with two slots for 2/3-length 16-bit AT cards.

The AT expansion box is screwed to the rear panel of the OP37/Pro. It can be fitted as an upgrade at any time.

Usability of the AT slots

The slots are not supported by the ProTool/Pro Runtime software. Examples of the AT cards that you can use are communication cards at operating system level.

Installing the AT expansion box and AT card

To install the AT expansion box and the AT cards, perform the following steps:

Caution

- Make sure the OP is disconnected from the power supply.
- Before carrying out any work on the opened unit make sure you have observed the ESD guidelines in the Appendix.

---

1. Place the OP37/Proface down.

2. Undo two screws ① and remove the cover (Figure 5-1) identified by ② from the rear panel of the OP. Screw the screws at their original location back into housing.

3. Insert the AT expansion box via the plug-and-socket device into the socket located under the cover ② in Figure 5-1.
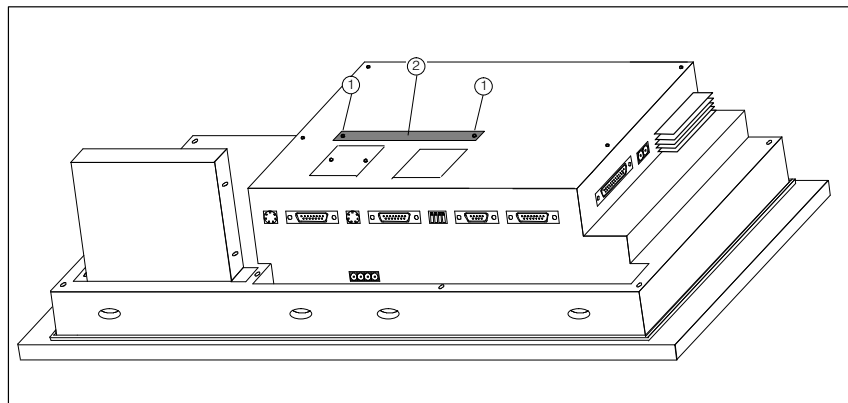
Figure 5-1   Removing the side panel

4. Secure the AT expansion box with two of the four enclosed screws ③ to the OP (Figure 5-2).
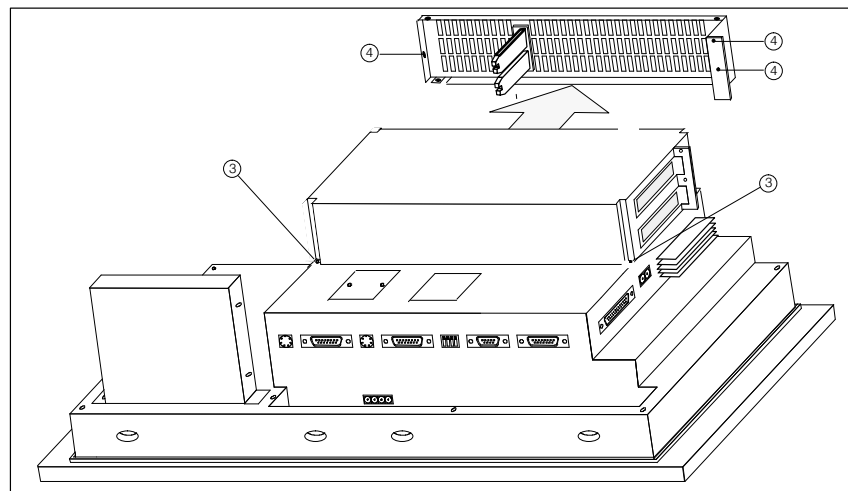
Figure 5-2   Removing the side panel

5. Undo the three screws (refer to Figure 5-2) identified by ④ and remove the side panel.

6. Insert the AT cards carefully into the expansion slot so that the interface sockets are positioned on the interface cutout intended for them on the AT expansion box. The angled fixing bracket of the AT card should locate against the front fixing bracket of the side panel.
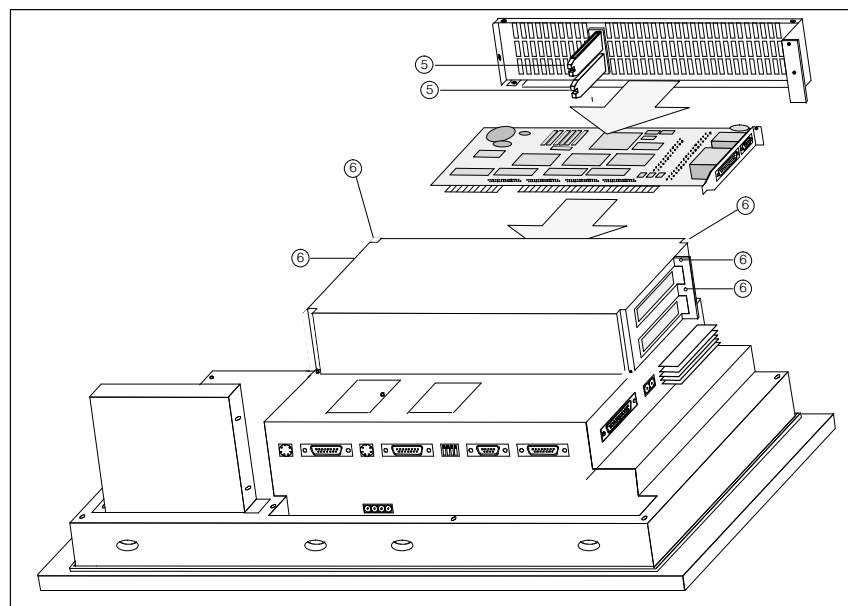
Figure 5-3   Inserting the AT card and securing the side panel

7. Fit the side panel so that the sliders ⑤ firmly position the edges of the in-serted AT cards.

8. The secure the side panel with five screws ⑥ (Figure 5-3).

9. Connect the I/O to the AT cards.

    Remove the AT cards and the AT expansion box in reverse order.

5.2 Direct Key Module

You can order a direct key module for the OP37/Pro as an optional extra. It consists of two module assemblies and a housing, which is screwed to the rear panel of the OP37/Pro. It can be fitted as an upgrade at any time.

The direct key module is supported only by the ProTool/Pro Runtime software.

Function of the direct key module

The direct key module is used in situations where direct operation of the keys without communication-related delays is required. Example: direct keys for inching mode.

The direct key module provides two sets of eight digital outputs. Those outputs are set by pressing the relevant function keys.

External power supply

The digital outputs are electrically isolated from the operator panel by opto-couplers. The module boards therefore require their own separate power supply.

5.2.1 Installing the Direct Key Module

To fit a direct key module to the OP37/Pro, perform the following steps:

1. Place the OP37/Proface down.

⚠ **Caution**

- Make sure the OP is disconnected from the power supply.
- Before carrying out any work on the opened unit make sure you have observed the ESD guidelines in the Appendix.

2. Release the two rivets ① and remove the cover plate shown in Figure 5-4 with the number ② from the back of the OP.
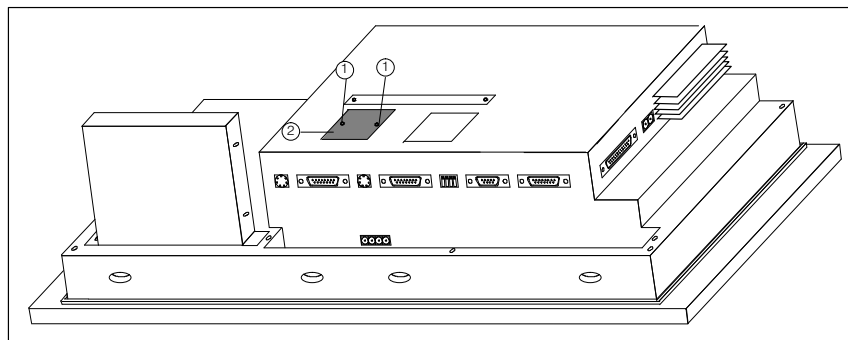
Figure 5-4   Removing the cover plate

3. Insert the plug of the direct key module into the socket (refer to Figure 5-5) located beneath the cover ② (see Figure 5-4).
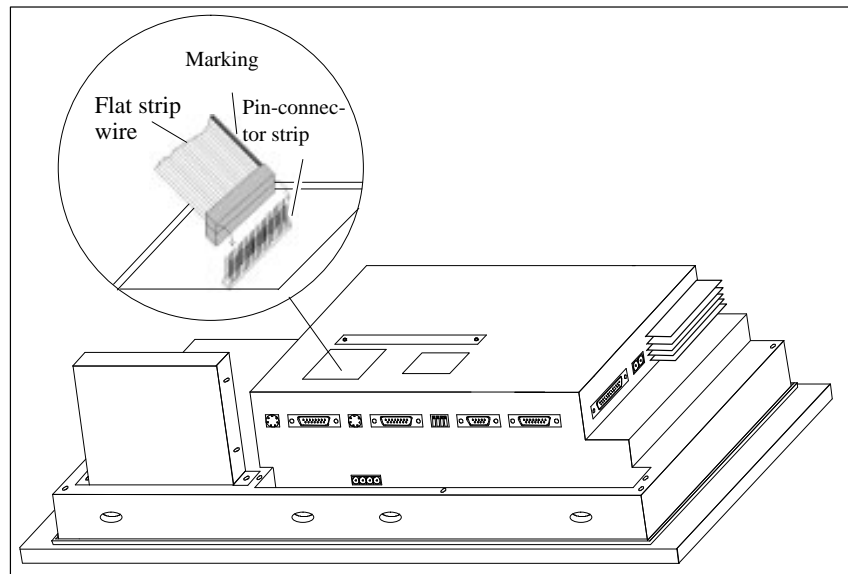
Figure 5-5   Insert the plug of the direct key module

4. Fix direct key module to the OP using the four screws ③ supplied (see Figure 5-6).
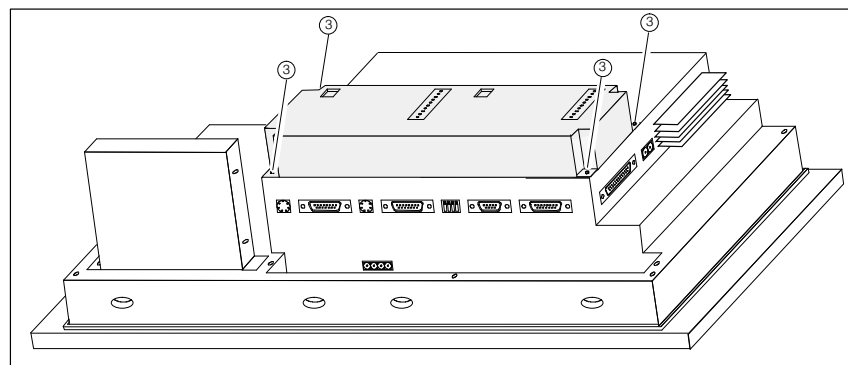

Figure 5-6   Fixing direct key module to OP

5.2.2 Connection Elements and Adjusting Elements

Each of the two module assemblies has

- a 10-pin plug connector
  for connecting the outputs and the external power supply

- a DIP switch
  for setting whether the outputs are activated.

When installed, the plug connector and DIP switch are located on the rear panel of the OP.
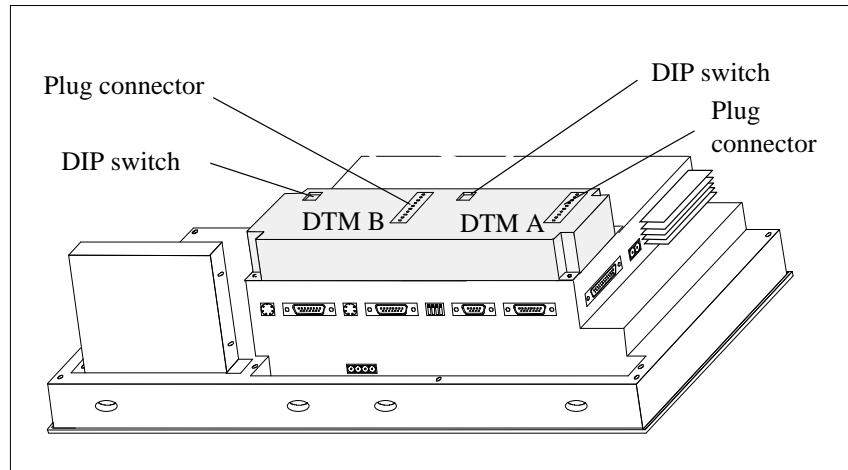
Figure 5-7   Position of connections and adjusters

Pin-connector strips

The pin assignment of the connector strips on module boards DTM A and DTM B is as follows:
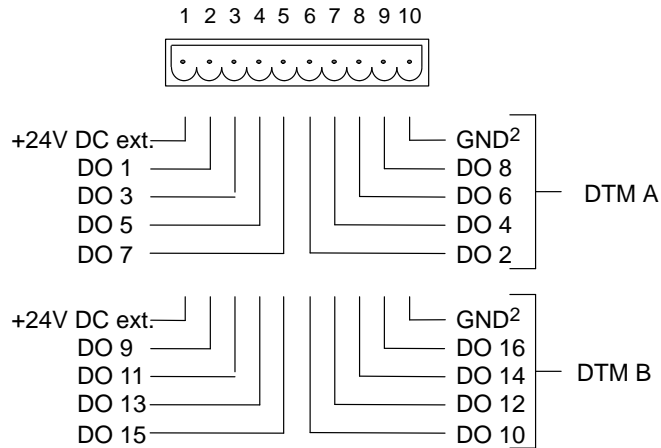
2)   Electrically isolated

The components to be controlled, (e.g. relays, indicator lamps, etc.) are connected as follows using the five-pin terminal strips supplied:

- Terminate the cabling (cable cross-section: 0.5 to 2.5 mm^2)

- Plug terminal blocks into connector on direct key module

DIP switches   The setting of the DIP switches determines how the digital outputs of the direct key module are controlled.

- When the switches are set to OFF the outputs are controlled by means of function keys.

- Setting the switches to ON has no function.

DIP switch settings:
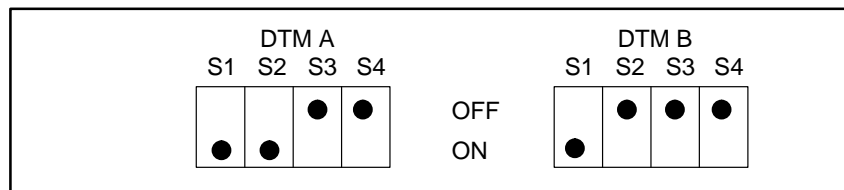
Switch	DTM A		DTM B	
S1	The switch setting for DTM A and DTM B is always ON			
S2	The switch setting OFF/ON determines whether the DTM is used as DTM A or DTM B:			
	ON (=DTM A)		OFF (=DTM B)	
	Function key	Sets output	Function key	Sets output
S3 OFF	F1	DO 1	F9	DO 9
	F3	DO 3	F11	DO 11
	F5	DO 5	—	DO 13
	F7	DO 7	—	DO 15
S4 OFF	F2	DO 2	F10	DO 10
	F8	DO 4	F12	DO 12
	F6	DO 6	—	DO 14
	F8	DO 8	—	DO 16
The assignment of the function keys in this table relates to the standard key assignment without plug-in module.				

5.3   Interrupt Assignment

The interrupt assignment is listed in the table below.

This information is required primarily in order to prevent conflicts between modules (e.g. caused by using the same hardware interrupt) when using additional modules.

The 16 hardware interrupts (IRQ 0 through IRQ 15) are processed on the OP37/Pro by two type 82C59 integrated interrupt controller.

The INT output of the slave controller is connected to the IRQ 2 input of the master controller.

Table 5-1   I/O addresses of interrupt controllers

List of Hardware Interrupts		Parameterized Interrupt Vector, Memory Address
NMI	RAM parity; I/O channel parity	INT 2_H
IRQ 0	Timer output 0, internal peripheral-device controller (ISP)	INT 8_H
IRQ1	Keyboard (output buffer full)	INT 9_H
IRQ 2	Interrupt of slave interrupt controller	INT A_H
IRQ 3[*)	Serial interface (COM 2)	INT B_H
IRQ 4[*)	V.24/V.28 interface, serial interface (COM 1)	INT C_H
IRQ 5[*)	ASPC2	INT D_H
IRQ 6[*)	Floppy controller	INT E_H
IRQ 7[*)	Parallel printer interface 1 (LPT)	INT F_H
IRQ 8[*)	Real-time clock (RTC) low active	INT 70_H
IRQ 9[*)	User-assignable	INT 71_H
IRQ 10[*)	User-assignable	INT 72_H
IRQ 11[*)	User-assignable	INT 73_H
IRQ 12[*)	PS2 mouse	INT 74_H
IRQ 13	Maths processor	INT 75_H
IRQ 14[*)	Hard disk controller; IDE interface	INT 76_H
IRQ 15[*)	User-assignable	INT 77_H

*   These signals are fed to the I/O connectors and can be assigned to the PCMCIA interface.

Servicing/Maintenance

6

Overview

The operator panel is designed for low maintenance.

The tasks involved in maintaining the OP are the following:

- Regular cleaning of the keyboard overlay and of the display with a damp cloth (water only)
- Replacing the backup battery and
- Replacing the display backlighting.

Parts that you can fit or remove from the OP37/Pro on your own:

- Floppy disk drive and
- Hard disk

A description of how to replace the hard disk is enclosed with the spare part called "hard disk".

The installation of optional upgrades – in other words, the AT expansion box, AT cards and the direct key module – has already been described in Chapter 5.

Safety precautions

Observe the following precautions before opening the unit:

⚠

Warning
- Repairs to the unit may only be carried out by suitably qualified and authorized technical staff!
- Opening of the unit by unauthorized persons and failure to follow the correct repair procedures can be highly dangerous.

⚠

Caution
- The backlighting uses voltages > 1000 V. Make sure that the OP is disconnected from the power supply.
- Opening of the unit by unauthorized persons and failure to follow the correct repair procedures can be highly dangerous.
- Before carrying out any work on the opened unit make sure you have observed the ESD guidelines in the Appendix.

6.1 Housing Components

Overview   The rear panel of the OP37/Pro consists of outer and inner housing rear panels.

For maintenance and repair work, except for replacing the backup battery, it is necessary to remove the outer rear panel to be able to tilt the PC box of the OP37/Pro upward.
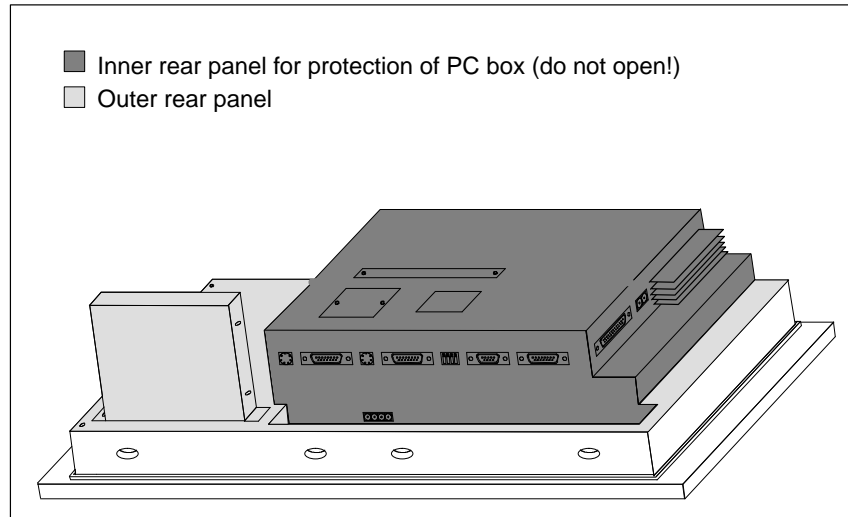

Figure 6-1   Inner and outer rear panels

It is sufficient to remove the **outer** rear panel to replace the following components:

- display back-lighting

- floppy disk drive.

⚠ **Caution**

If you remove the unit immediately after switching it off, the outer case will still be hot due to heat dissipation from the heat pipe.

When you open the OP, you must not open the inner rear panel. The screws are sealed. If those seals are broken, the manufacturer's guarantee on your OP will be void. Assuming the manufacturer's guarantee for your unit has not expired, you should have any work on components inside the processor box carried out by your local Siemens agents.

6.2 Replacing the Back-Lighting

Overview

The back-lighting tubes are mounted at the rear of the display and are concealed by the tilting PC box.

The difference in brightness between a new and an old CCFL backlighting tube is clearly noticeable on the display. For that reason, if one tube has failed you should replace the other one at the same time. This will also save you the trouble of opening up the unit again within a short time when the second tube fails.

To replace the tubes, proceed as follows:

1. Remove the outer rear panel.

2. Fold out the PC box.

3. Remove the tube covers.

4. Change the tubes and attach the tube covers.

5. Close the OP and affix the outer rear panel.

⚠️

Warning

Liquid crystal can leak out of a damaged display.

It is absolutely essential to avoid skin contact with the fluid and inhaling the vapor. If you should inadvertently come into contact with the liquid crystal, clean the skin immediately with alcohol.

Consult a doctor immediately!

⚠️

Caution

The backlighting uses voltages > 1000 V. Make sure that the OP is disconnected from the power supply.

**Removing the
outer rear panel**

To access the screw connections of the PC box, remove the outer rear panel:

1. Place the OP face down.

2. Unscrew eight screws ①.

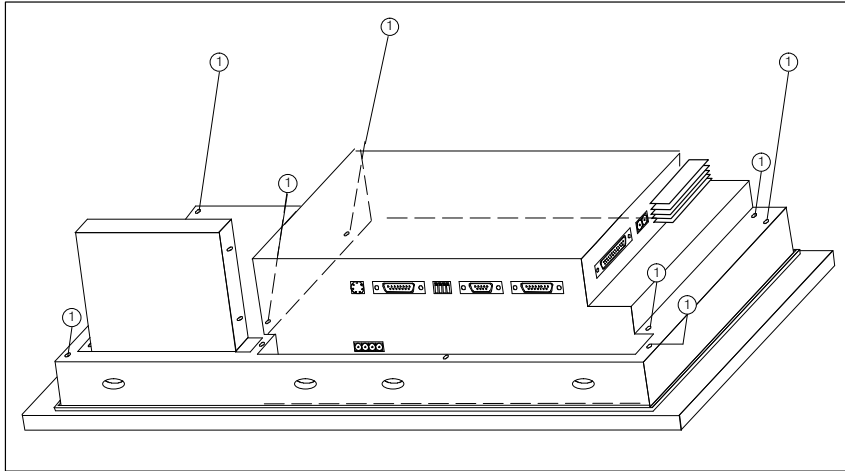3. Remove the outer rear panel.

Figure 6-2   Unscrew the outer rear panel

Folding out PC box

To access the tube covers, tilt the PC box upward:

1. With reference to Figure 6-3, undo two screws ② fixing the tiltable PC box in position.

2. Lift the PC box slightly and remove the ribbon cable from connector ③ in the plate cutout.

3. Tilt the PC to the stop (90 degrees).
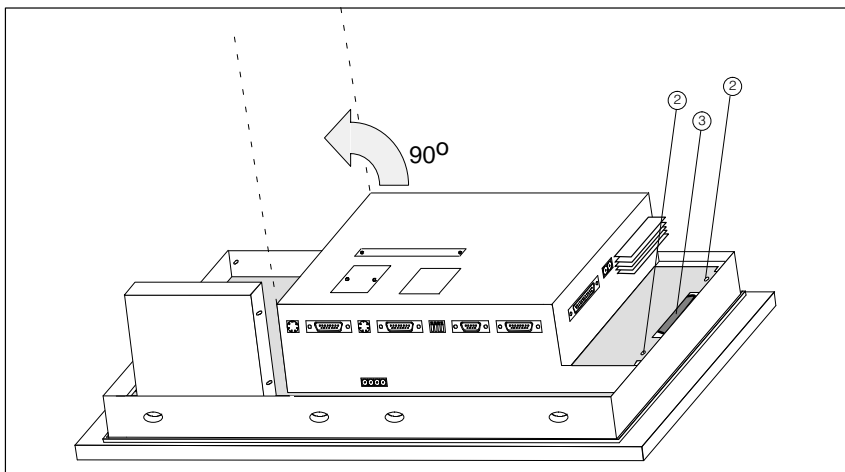
Figure 6-3   Undo screws from bracket of tiltable PC box

Replacing the tubes

To replace the tubes, proceed as follows after folding out the PC box:

1. Release the screws marked in Figure 6-4 with the number ①.

2. Remove covers ② .

3. With reference to Figure 6-4, detach the connectors ③.

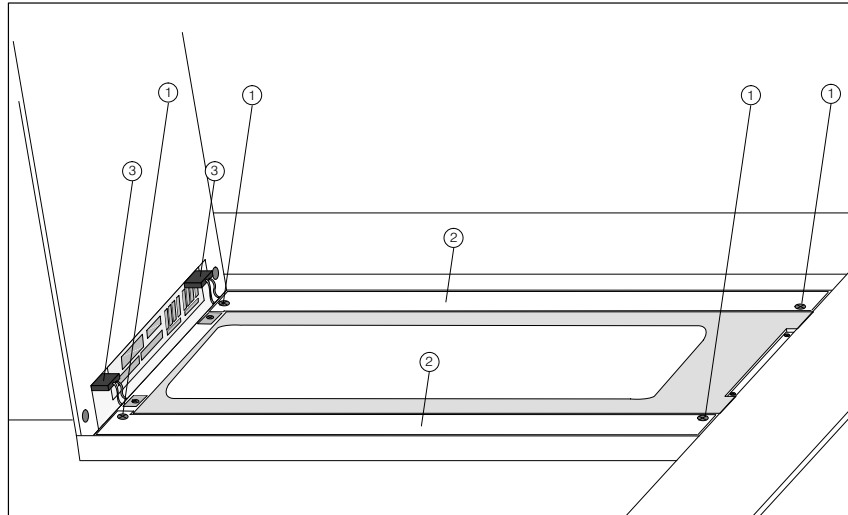4. Replace the tubes.

5. Reassemble unit.

Figure 6-4   Undo screws of tube covers

6.3   Replacing the Floppy Disk Drive

Overview

The floppy disk drive is secured to a mounting plate at the rear of the OP. The screws for mounting the floppy disk drive on the mounting plate are located behind the outer rear panel.

To replace the floppy disk drive, proceed as follows:

1. Detach the ribbon cable.

2. Remove the outer rear panel.

3. Undo the floppy disk drive attaching screws.

4. Change the floppy disk drive and secure it to the bracket.

5. Attach the ribbon cable and affix the outer rear panel.

Detaching the ribbon cable

To detach the ribbon cable, proceed as follows:

1. Slide the connector cover ① in the direction of the arrow as shown in Figure 6-5.

2. Disconnect ribbon cable ② .
   When connecting the cable to the terminal on the new floppy disk drive, make sure that the side of the cable with the end colored blue is facing upwards and the cable contacts are facing downwards.
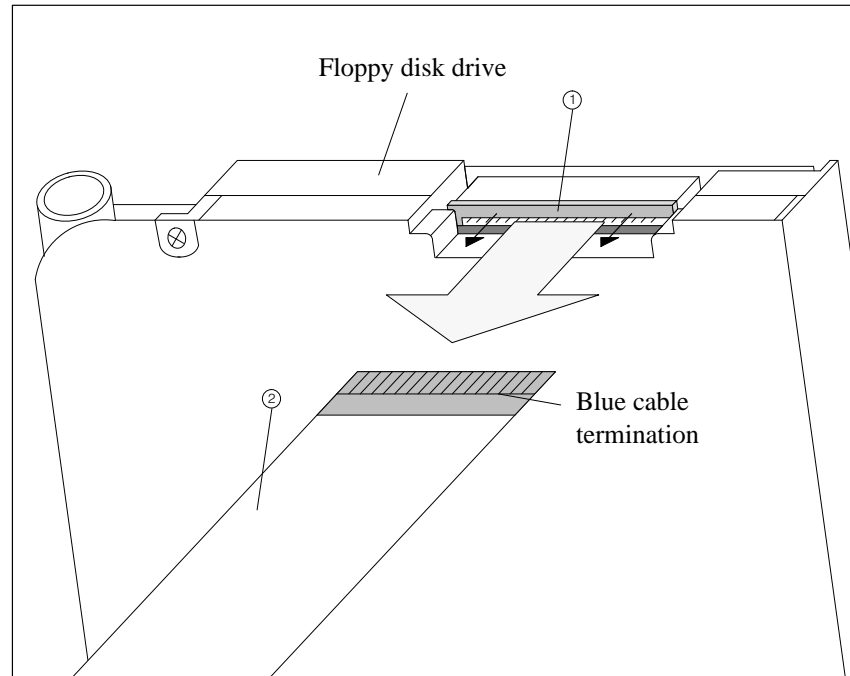

Figure 6-5   Open clamp lock and detach ribbon cable connector

Removing the outer rear panel

To gain access to the floppy disk drive attaching screws, remove the outer rear panel:

1. Place the OP face down.

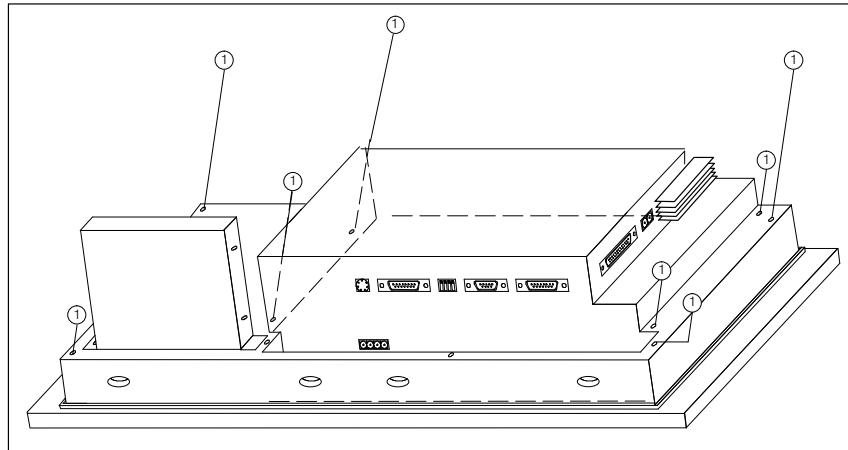2. Unscrew eight screws ① .

3. Remove the outer rear panel.

Figure 6-6   Unscrew the outer rear panel

Removing and mounting the floppy disk drive

To remove and mount the floppy disk drive, proceed as follows:

4. Undo four screws ③ on the side fins of the mother board (refer to Figure 6-7).

5. Withdraw the floppy disk drive.

6. Fit new floppy disk drive by following the reverse procedure.
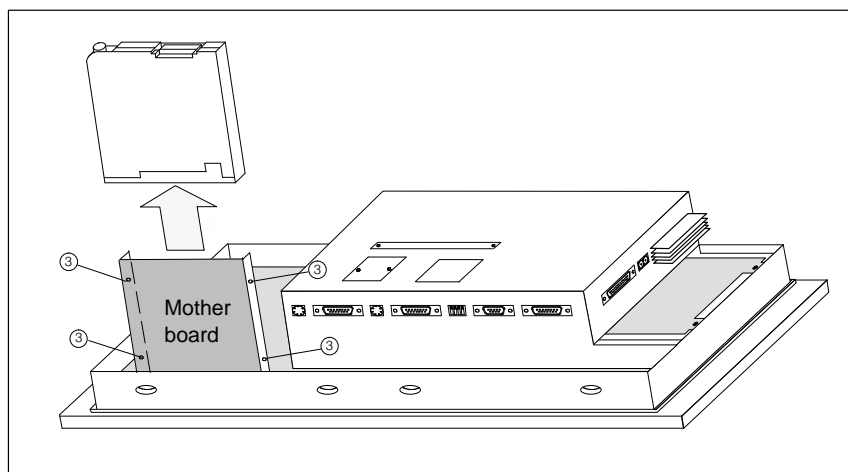
7. Reassemble unit.

Figure 6-7   Undo screws on mother board side Fins and withdraw floppy disk drive

6.4 Backup Battery

Function The backup battery ensures that the hardware clock continues to run when the power supply is turned off.

Battery life The OP uses a lithium battery. It is fitted when the unit is supplied and under normal operating conditions has a typical service life of about 5 years.

Battery suppliers New batteries should be obtained from the Siemens spare parts service. They are supplied ready to fit (with cable and connector).

Safety precautions When handling lithium batteries you should observe the following precautions:

Warning
- If not handled properly, lithium batteries can explode.
- Batteries should never
    - be charged
    - be opened
    - be short circuited
    - have their poles reversed
    - be heated to over 100 ˚C
    - be exposed to direct sunlight for long periods.
- You should not allow condensation to form on batteries.
- If you have to transport the batteries, the hazardous good transport regulations for the relevant mode of transport must be observed (goods subject to identification).

Battery cover   The illustration below shows the position of the battery cover.
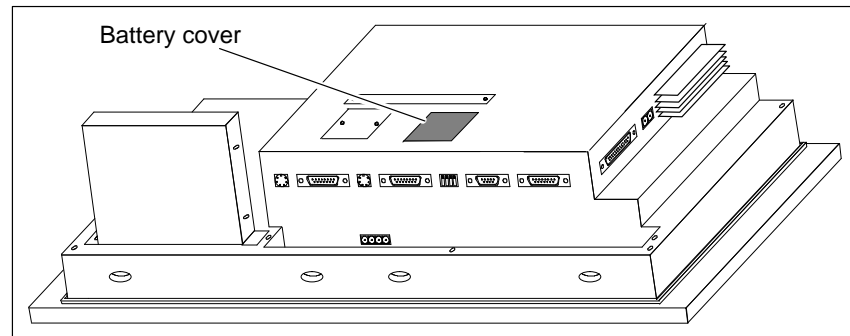

Figure 6-8   Position of battery cover

Before replacing   Before replacing the battery, observe the following precautions:

> **Caution**
> - The battery may be changed only be suitably qualified personnel.
> - Before replacing the battery make sure you have observed the ESD guide-lines in the Appendix to this manual.
> - Before changing the battery, make sure the power supply is turned on in order to prevent a loss of data – passwords for example.

Replacing the battery   To change the battery, proceed as follows:

1. If you have installed a direct key module, you must unscrew it (Section 5.2.1) to gain access to the battery cover (refer to Figure 6-8).

> **Caution**
> Before removing the direct key module you must switch off the OP! You must then switch the power supply on again to prevent loss of data when replacing the battery.

2. Tilt the cover with the exhausted battery backward.

3. Detach the plug connector on the battery cable.

4. Remove the battery from the cover.

5. Fit new battery by following the reverse procedure.

> **Caution**
> Used lithium batteries are classed as special-category waste and must be disposed of accordingly. They should be placed individually in plastic bags and sealed.

Technical Data

A

Overview

This appendix contains the technical data relating to the OP37/Pro as follows:

- Casing

- Processor

- Memory

- Software

- Display

- Keyboard

- Power supply

- Backup battery

- Relay contacts

- Direct key module (optional)

- AT expansion box (option)

- Ambient conditions

- Interference immunity

- Interference emission

Casing	
External dimensions (W x H) in mm	482.6 x 310.3
Fitting cutout (W x H) in mm	436_{-1} x 295_{-1}
Fitting depth in mm	138
Enclosure rating	
Front	IP65
Rear	IP20
Weight	Approx. 10 kg

Processor	
Type	Intel Pentium
Clock frequency	166 MHz

Memory	
DRAM	16 MB
Second-level cache	512 Kbytes
Floppy disk drive	1.44 MB, 3.5"
Hard disk	$\geq$ 1.6 GB
PCMCIA	
• Slot A	For type I, II, III
• Slot B	For type I, II

Software	
Operating system environment	MS Windows 95
System software	SIMATIC ProTool/Pro Runtime

Display	
Type	TFT LCD
Resolution (hor. x vert.)	640 x 480
Effective screen area	211 x 158 mm
Backlighting	2 CCFL tubes
Service life[1]	Approx. 25,000 h

[1] The back-lighting tube of the display is an expendable part and is thus not covered by the warranty. Depending on operating temperature, it has a service life of about 25,000 hours. In unfavorable operating conditions we recommend that the tubes are replaced after that period. The tube is available as a spare part.

Keyboard	
Type	Sealed keyboard
System keys	32
Soft keys	20
Function keys	16

Power supply	
Power supply	24 V DC
Permissible range	18 V to 30 V
Max. permissible transients	35 V (500 ms)
Time between transients	50 s min.
Power consumption (without AT cards) Typically Maximum continuous current	Approx. 1.9 A Approx. 2.5 A
Circuit breaker	Internal Electronic

Backup battery	
Type	3.6 V;
Voltage; capacity[2]	Lithium battery Approx. 1.5 Ah

[2] Technical data subject to alteration.

Relay contacts when power supply connected	
Switching capacity	24 V DC, 0.4 A (no inductive load)

Direct key module (optional)	
Number of outputs[3]	2 x 8
Max. output current	300 mA per output
Min. output voltage (high)	15 V per output
Max. output voltage (low)	10 V per output
Ext. Power supply	24 V DC
Permissible range	18 V to 30 V

[3] Only 12 outputs can be controlled by function keys.

AT expansion box (option)	
Slots	2 standard ISA slots
Plug-in AT cards	2/3-length 16-bit cards
Maximum available power for consumption[4] by AT cards at	
• +5 V	2 A
• +12 V	1 A
• –5 V	100 mA
• –12 V	100 mA

[4] The figures quoted apply to both cards together and must not be exceeded. If only one AT card is fitted, the maximum levels can be used by that card alone.

Ambient conditions	
Ambient temperature	
In operation	
– vertical installation	4...40˚ C
– sloping installation not exceeding 25˚ from vertical	4...35˚ C
During shipping, storage	–20...60˚ C
Installation position with FDD	Max. 25˚ inclination to front or rear
Relative air humidity	
During operation	20...80%, no moisture condensation
Transport, storage	5...90%, no moisture condensation
Exposure to shock	
During operation	5 g / 11 msec for floppy disk/hard disk access
	15 g / 11 ms at other times
Transport, storage	50 g
Vibration	
During operation	0.035 mm (10 – 58 Hz)
	1 g (58 – 500 Hz) and
	0.5 g with floppy disk drive/hard disk
Transport, storage	3.5 mm (5 – 8.5 Hz)
	1 g (8.5 – 500 Hz)
Max. differential pressure (front, rear)	
Air pressure	
Operation	706...1030 hPa
Shipping, storage	581...1030 hPa

Conformity of the product described with the requirements of Directive 89/336 EEC is certified by compliance with the following standards:

Interference immunity	
Static discharge (contact discharge)	IEC 801–2 6 kV
HF radiation	ENV 50140 10 V/m, 80% AM, 1 kHz
Pulse modulation	ENV 50204 900 MHz $\pm$ 5 MHz 10 V/m$_{rms}$, 50% ED, 200 Hz
HF current	ENV 50141 150 kHz – 80 MHz 10 V, 80% AM, 1 kHz

Burst interference
   Power lines
   Supply lines
   Process data lines
   Signal lines
	IEC 801–4
	
	2 kV
	2 kV
	1 kV

| **Interference emission**	
	EN 55022 (VDE 0878) Class A

B

ESD Guidelines

What does ESD mean?

Virtually all modern circuit boards are fitted with highly integrated modules or components using MOS technology. Due to the technology involved, such electronic components are very sensitive to excess voltages and therefore to electrostatic discharge.

The common international term for such equipment is

Electrostatically Sensitive Devices

usually abbreviated to ESD.

The symbol illustrated below appears on cabinets, module racks and packaging to indicate that they contain electrostatically sensitive devices and that therefore the appropriate precautions regarding touching those items should be observed.
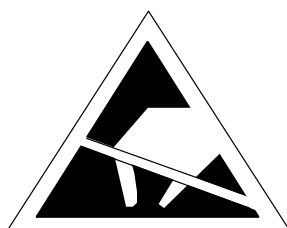
ESDs can be damaged by voltages and energy levels far below those that we as humans are capable of perceiving. Such voltages can occur simply by a component or module being touched by a person whose electrostatic potential has not been discharged. Components subjected to such excess voltages do not normally immediately show obvious signs of damage as malfunction may not occur until the item concerned has been in operation for a long period.

Important safety precautions for preventing static charge

Most plastics very easily become statically charged and should therefore be kept well away from sensitive components!

When handling electrostatically sensitive devices, care should be taken to ensure that people, working surfaces and packaging are properly earthed!

Handling ESDs

The guiding principle is that electronic modules should only be touched if it is absolutely unavoidable in order to carry out work on them. When taking hold of electronic circuit boards, never touch terminal pins or printed conductors.

Components may only be touched provided

- you are permanently earthed by means of a wrist strap connected to earth or

- you are wearing special earthing shoes or earthing strips on your shoes in combination with an earthing floor.

Before you touch an electronic module, you must earth your own body. The easiest way to do this is to touch an electrically conductive object which is connected to earth (e.g. bare metal components of a control cabinet, water pipe, etc.) immediately beforehand.

Modules must not be brought into contact with statically chargeable and non-conducting materials such as plastic film, nonconductive table tops or articles of clothing made of artificial fibers.

Modules may only be placed on electrically conductive surfaces (table with earthing cover, conductive earthing foam, ESD packaging bags, ESD transport containers).

Do not place modules in the vicinity of data display units, televisions or monitors (minimum distance from screen > 10 cm).

Taking measurements on/modifying ESDs

Measurements may only be taken on modules provided

- the measuring instrument is earthed (e.g. via protective earth) or

- before measuring with an electrically isolated instrument, the measuring head is briefly earthed (e.g. by touching against bare metal PLC casing).

Soldering may only be carried out with an earthed soldering iron.

Shipping ESDs

Modules and components must always be stored and shipped in conductive packing – for example, metal-plated plastic boxes and metal cans.

If the packaging is not conductive, modules must be wrapped in conductive material before packing. This can be done using conductive rubber foam, ESD bags, household baking foil or paper (never use plastic bags or plastic film).

In the case of modules with built-in batteries, care should be taken to ensure that the conductive packaging does not touch or short-circuit the battery terminals; if necessary, the terminals should be covered over with insulating tape or insulating material.

Siemens Worldwide

C

In this Appendix   In this Appendix you will find a list of the

- cities in the Federal Rpeublic of Germany with Siemens Branch Offices and

- all European and non-European agents of Siemens AG.

Algeria
Siemens Bureau d'Alger
• Alger
Angola
TECNIDATA
• Luanda
Argentina
Siemens S.A.
• Bahía Blanca
• Buenos Aires
• Còrdoba
• Mendoza
• Rosario
Australia
Siemens Ltd.
• Adelaide
• Brisbane
• Melbourne
• Perth
• Sydney

Austria
Siemens AG Österreich
• Bregenz
• Graz
• Innsbruck
• Linz
• Salzburg
• Wien
Bahrain
Transitec Gulf
• Manama
Bangladesh
Siemens Bangladesh Ltd.
• Dhaka
Belgium
Siemens S.A.
• Bruxelles
• Liège
Siemens N. V.
• Antwerpen

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Siemens Ltd. • Mafekeng	Siemens S.A. • Panama • San José
Bosnia-Herzegovina	**Croatia**
Generalexport Predstavnistvo Sarajevo • Sarajevo	Siemens d. o. o. • Zagreb
Brazil	**Cuba**
Siemens S.A. • Belém • Belo Horizonte • Brasilia • Campinas • Curitiba • Fortaleza • Pôrto Alegre • Recife • Rio de Janeiro • Salvador de Bahia • São Paulo • Vitória	Respresentación Consult iva EUMEDA • La Habana
	Cyprus
	GEVO Ltd. or Jolali Ltd. • Nicosia
Brunei	**Czech Republic**
• Brunei Darussalam	Siemens AG • Brno • Mladá Boleslav • Praha
Bulgaria	**Denmark**
Siemens AG, representation in Bulgaria • Sofia	Siemens A/S • Koebenhavn, Ballerup
Canada	**Ecuador**
Siemens Electric Ltd. • Montreal, Québec • Toronto	Siemens S.A. • Quito
Chile	
INGELSAC • Santiago de Chile	

Eygypt
Siemens Technical Office
• Cairo-Mohandessin
Siemens Technical Office
• Alexandria
EGEMAC S.A.E.
• Cairo-Mattaria

El Salvador
Siemens S.A.
• San Salvador

Ethiopia
Addis Electrical Engineering Ltd.
• Addis Abeba

Federal Republic of Germany
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• Augsburg
• Bayreuth
• Berlin
• Bielefeld
• Bonn
• Braunschweig
• Bremen
• Chemnitz
• Darmstadt
• Dortmund
• Dresden
• Duisburg
• Düsseldorf
• Erfurt
• Essen
• Frankfurt a.M.
• Freiburg

• Hamburg
• Heilbronn
• Karlsruhe
• Kassel
• Kempten/Allg.
• Kiel
• Koblenz
• Köln
• Konstanz

• Laatzen
• Leipzig
• Lingen
• Magdeburg
• Mainz
• Mannheim
• München
• Münster/Westf.
• Nuremberg

• Osnabrück
• Regensburg
• Rostock
• Saarbrücken
• Siegen
• Stuttgart
• Ulm
• Wetzlar
• Wilhelmshaven
• Wuppertal
• Würzburg

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• Haguenau
• Lille, Seclin
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• Marseille
• Metz
• Paris, Saint-Denis
• Strasbourg
• Toulouse

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• Congleton
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• Glasgow
• Leeds
• Liverpool
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• Manchester
• Newcastle

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• Thessaloniki

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• Ciudad de Guatemala

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• Hong Kong

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Siemens Kft
• Budapest

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Smith & Norland H/F
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• Bangalore
• Bombay
• Calcutta
• Madras
• New Delhi
• Secúnderabad

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• Teheran

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or
Siemens AG (Iraq Branch)
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• Tokyo

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• Changwon
• Seoul
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Siemens AG, Branch Libya • Tripoli	Siemens S.A. • Managua
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Malta	
J. R. Darmanin & Co. Ltd. • Valletta	
Marocco	**Oman**
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	Paraguay
	Rieder & Cia. S.A.C.I. • Asunción
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Siemens (Pty.) Ltd. • Windhoek	
Nepal	**Peru**
Amatya Enterprises (Pvt.) Ltd. • Kathmandu	Siemsa • Lima

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Qatar	**Spain**
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Siemens birou de consultatii tehnice • Bucuresti	
Russia	
Siemens AG or Mosmatic • Moskau Siemens AG • Ekaterinburg	
Rwanda	
Etablissement Rwandais • Kigali	
Saudi Arabia	**Sri Lanka**
Arabia Electric Ltd. (Equipment) • Al-Khobar • Jeddah • Riyadh	Dimo Limited • Colombo
Singapore	
Siemens (Pte.) Ltd. • Singapore	

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National Electrical & Commercial Company (NECC)	Sitelec S.A.
• Khartoum	• Tunis
Swaziland	**Turkey**
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Sweden	• Ankara
Siemens AB	• Bursa
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• Jönköping	• Izmir
• Malmö	• Samsun
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• Upplands Väsby, Stockholm	Siemens AG
Switzerland	• Kiev
Siemens-Albis AG	**United Arab Emirates**
• Basel	Electro Mechanical Co.
• Bern	or
• Zürich	Siemens Resident Engineers
Siemens-Albis S.A.	• Abu Dhabi
• Renens, Lausanne	Scientechnic
Syria	or
Siemens AG, Branch (A.S.T.E.)	Siemens Resident Engineers
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Taiwan	**United States of America**
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or	Automation Division
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• Taichung	Numeric Motion Control
• Taipei	• Elk Grove Village, Illinois
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Berti Jucker Co. Ltd.	
• Bangkok	

Venezuela	Zaire
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Yemen (Arab. Republic)	**Zimbabwe**
Tihama Tractors & Engineering Co., Ltd. or Siemens Resident Engineers • Sanaa	Electro Technologies Corporation (Pvt.) Ltd. (ETC) • Harare

Glossary

Definition of Terms

AT expansion slot   Option for the OP37/Pro: a housing for accommodating two 2/3-length 16-bit AT cards.

Automation systems   SIMATIC S7 series **PLCs** – for example, S7-200/300.

BIOS Setup   Contains default settings for the OP37/Pro in DOS operation.

Booting   Startup procedure that loads the operating system into the system memory of the OP.

Direct key module   Option for the OP37/Pro with up to two sets of eight digital outputs for high-speed key operation without communication-related delays.

PCMCIA   **P**ersonal **C**omputer **M**emory **C**ard **I**nternational **A**ssociation

Association of computer manufacturers formed with the aim of defining an international standard for memory modules and PC expansion cards. Cooperates with JEIDA.

PLC   Generic term for devices/systems with which the OP communicates (e.g. SIMATIC programmable controllers or PCs).

Programmable controllers   SIMATIC S5 series **PLCs** (e.g. S5-115U/135U)

Soft keys   Function keys can function as soft keys, i.e. be assigned a different function from one screen to another.

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