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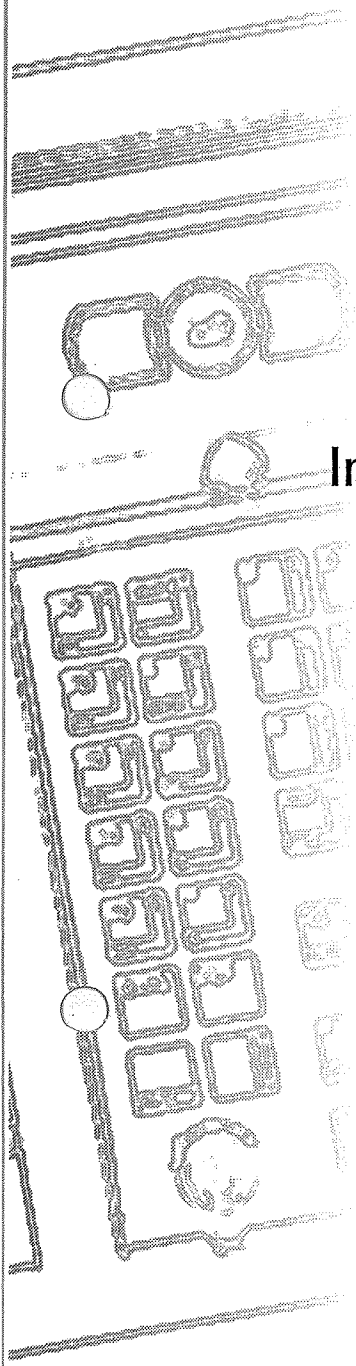
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pilz

Industrial Computers

PIPANEL
Operating Manual
Item No. 19 522

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Version IV, December 1998

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Introduction

This operating manual is valid for the following systems:

PIPANEL Keyboard (compact industrial PC with membrane keypad)
PIPANEL Sensor mouse (compact industrial PC with membrane keypad and sensor mouse)
PIPANEL Touch (compact industrial PC with touchscreen)

Description

Pilz PIPANEL industrial computers are compact systems which incorporate all the main functions of a PC within a single housing and have been designed for use in rugged industrial areas.
The computers are graphics information systems which are normally used as interfaces between man and machine (MMI function).

Software allows PIPANEL systems to
- Detect plant status
- Display current process data
- Acknowledge signals (no safety function)
- Transfer parameters

The basis of the systems is an All-in-One CPU.
The current version of the chosen operating system MS-DOS, Windows 3.11, Windows 95, WINDOWS NT or OS/2 and a keyboard driver can be installed ex-works if requested. Additional application-specific software must be transferred to the hard drive via the integrated floppy drive network connection or an external CD-ROM drive.

PIPANEL systems can be used with different interfaces (e.g. RS 232, RS 485, Ethernet, parallel interface). The interface used will depend on the application requirement.

Data exchange in the control mode is carried out via one of the serial interfaces or an Ethernet interface.

PIPANEL can be used with all commercially available PC SCADA software and driver software.

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Introduction

The unit can be expanded using plug-in cards with space available for up to 2 expander modules. The plug-in card must correspond with the PC/104 standard. Please note the maximum dimensions for the PC/104 card (see the section entitled "System Expansion" from page 6-3 onwards).

Range

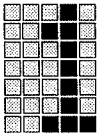
PIPANEL Keyboard and PIPANEL Sensor mouse

- PIPANEL system
- 4 nuts (M5) for securing the system
- Connection plug for supply voltage
- 1 disk with VGA driver for OS/2 and Windows 95
- 1 disk with VGA driver for Windows 3.1
- 1 disk with VGA driver for Windows NT
- 1 disk with keyboard driver
- Documentation

PIPANEL Touch

- PIPANEL system
- 4 nuts (M5) for securing the unit
- Connection plug for supply voltage
- 1 disk with VGA driver for OS/2 and MS-Windows 95
- 1 disk withVGA driver for Windows 3.1
- 1 disk with VGA driver for Windows NT
- 1 disk with driver software for touchscreen
- Documentation

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System versions

PIPANEL Keyboard, PIPANEL Sensor mouse and PIPANEL Touch

Processor	RAM (in MB)				Display (TFT)	
	16	32	64	128	10.4" 640x480	12.1" 800x600
Pentium	•	•	•	•	•	•

Interfaces

Serial	RS 232	RS 485
COM1	•	
COM2	•	•
COM3	•	
COM4	•	
Parallel	**LPT1** (25-pin D-Sub printer interface)	
Ethernet	**RJ45**	
Keyboard (external)	**MF2** (5-pin standard DIN socket)	
Monitor (external)	**VGA** (15-pin standard interface)	

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Introduction

Definition of symbols

Information in this manual which is of particular importance can be identified as follows:



DANGER!

This warning must be heeded! It warns of a **hazardous situation which poses an immediate threat of serious injury and death,** and indicates preventive measures which may be taken.



WARNING!

This warning must be heeded! It warns of a **hazardous situation which could lead to serious injury and death,** and indicates preventive measures which may be taken.



CAUTION!

This refers to a hazard which can lead to a less serious or minor injury plus material damage, and also provides information on preventive measures which may be taken.



NOTICE

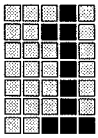
This describes a situation in which the system(s) could be damaged and also provides information on preventive measures which may be taken.



INFORMATION

This gives advice on applications and provides information on special features, as well as highlighting areas within the text which are of particular importance.

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Terminology

The description "PIPANEL Keyboard" or "PIPANEL Touch", for example, is used in this manual if the text relates specifically to these systems.

The description "PIPANEL" is used in this manual if it relates, in general, to all system versions.

Overview of manual

This operating manual is divided into 9 chapters:

Chapter 1 provides information on the features of PIPANEL, its functions, the range and system versions.
It also provides an overview of the structure and contents of this manual.

Chapter 2 must be read before you power-up, install or commission the system(s). It contains information on the **intended application** and **safety regulations.**

Chapter 3 describes the systems' hardware in a simplified form. You will find information on the layout and function of the connector elements, interfaces and membrane keypad.

Chapter 4 contains important information on the systems' dimensions, front panel mounting and electrical installations.

Chapter 5 describes the commissioning procedure in a step by step form.

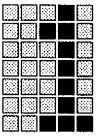
Chapter 6 provides information on expanding the system(s) and carrying out modifications.

Chapter 7 provides information on care and maintenance (cleaning, changing the battery etc.).

Chapter 8 contains tables giving an overview of the technical data.

Chapter 9 provides additional information on character sets and key codes, plus an update list of amendments made to the manual from previous versions.

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Notes

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Safety Regulations

The safety guidelines are an important part of this manual. Failure to keep to these guidelines will render all warranty and liabiltiy claims invalid.
All local regulations regarding health and safety/accident prevention must be observed.

Suitability of operating personnel

Operating personnel should:

- Be familiar with fundamental regulations concerning health and safety/accident prevention
- Have read and understood the safety guidelines given in this manual

Installation and commissioning must be carried out by competent, qualified personnel.

Warranty and liability

All claims to warranty and liability will be rendered invalid if:

- The system was used contrary to the purpose for which it was intended
- Damage can be attributed to not having followed the guidelines in this manual
- Unauthorised modifications were carried out
- The unit was used outside the specifications given in technical data
- Unauthorised repairs were carried out
- Operating personnel are not suitably qualified.

Intended application

Pilz PIPANEL computer systems were developed specifically for process data visualisation and can be used for display and monitoring purposes close to machinery.
They are normally used for

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- Detecting plant status
- Displaying current process data
- Acknowledging signals (no safety functions)
- Transferring parameters

The details given in the chapter "Technical Data" are as specified. Use of the system outside the specifications given in this manual will be deemed as improper application.
Any component, technical or electrical amendments to the systems (see chapter 6) outside the specifications given are deemed as improper application.
Following the information and details given in this manual contibutes as part of an intended application.



WARNING!

This unit is **not** designed for use in applications having high safety requirements.

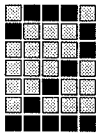
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Unit-specific safety guidelines

Before installing and commissioning the system, you should refer to the guidelines laid down by the plant manufacturer or operator.

- **Mounting and unit surroundings**
  - Keep as large a distance as possible between the unit and any electromagnetic fields. This is especially important when frequency converters are nearby
  - To avoid heat build-up, a distance of 10 cm/3.94" should be maintained all round the unit
  - Protect the unit from direct sunlight and dust
  - Avoid using chemicals near the unit
  - Ensure the maximum ambient and operating temperatures are not exceeded
  - Ensure that liquids or objects cannot, in any way, enter the system
  - Do **not** position the unit near to flammable liquids.
- **Installation**
  - Always mount the unit horizontally, with the front vertical
  - IP 65 protection is only guaranteed, if
    - fastening nuts are used
    - the disk drive is protected by the cover supplied with the system
  - Guard against the unit falling i.e. ensure that the fastening screws are firmly in place.
- **Measures to protect against interference voltages**
  - Please read the information on avoiding interference given in the section "Connecting the system" on page 4-6.
- **Supply voltage**
  - The power supply for the unit must be designed for a peak switching current of $15I_N$ (15 x nominal current).
  - Before power-up, check the voltage information given on the PIPANEL (model label) matches your supply.
  - Ensure the fixing screws of the plug contacts are firmly in place so good contact to the supply voltage is maintained.

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- **Commissioning**
  - Switch off the voltage supply before you install/connect the system or remove or change connection cables.

- **System expansion**



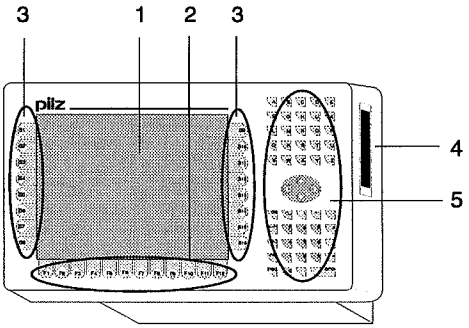
WARNING!

High voltages are present within the PIPANEL.
Disconnect from the mains before opening the housing and expanding the system (see chapter 6).
Failure to do so could result in loss of life, and damage the system irreparably.

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Housing

PIPANEL Keyboard: Front view



1: VGA-TFT-LC display
- 10.4"/640x480 pixels
or
- 12.1"/800x600 pixels

2: 12 function keys (F1 ... F12, MF2 compatible)

3: 16 special keys (S1 ... S16)

4: 3.5" floppy drive with cover

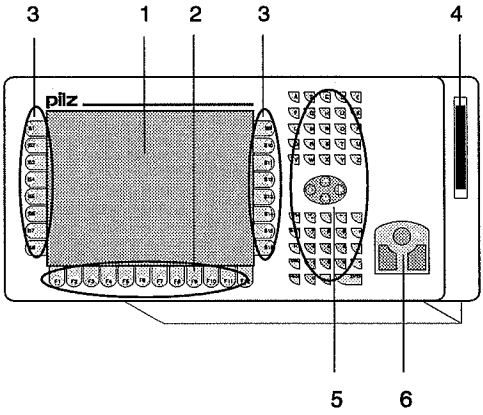
5: Membrane keypad with MF2-compatible character set

Fig. 3-1-1: PIPANEL Keyboard

NOTICE
Protect the floppy drive using the cover supplied with the system; this will guarantee protection to IP 65. (See also the section "Unit-specific safety guidelines" on page 2-3.)

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PIPANEL Sensor mouse: Front view



1: VGA-TFT-LC display
- 10.4"/640x480 pixels or
- 12.1"/800x600 pixels

2: 12 function keys (F1 ... F12, MF2 compatible)

3: 16 special keys (S1 ... S16)

4: 3.5" floppy drive with cover

5: Membrane keypad with MF2-compatible character set

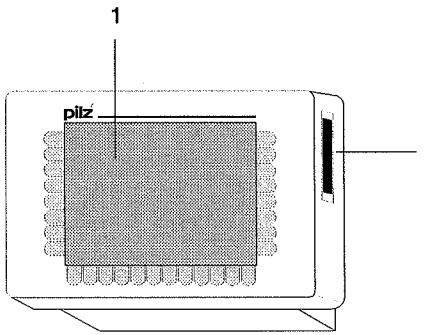
6: Sensor mouse

Fig. 3-2-1: PIPANEL Sensor mouse

NOTICE
Protect the floppy drive using the cover supplied with the system; this will guarantee protection to IP 65. (See also the section "Unit-specific safety guidelines" on page 2-3.)

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PIPANEL Touch: Front view



1: Resistive touch screen
- VGA-TFT-LC display
- 10.4"/640x480 pixels
  or
- 12.1"/800x600 pixels

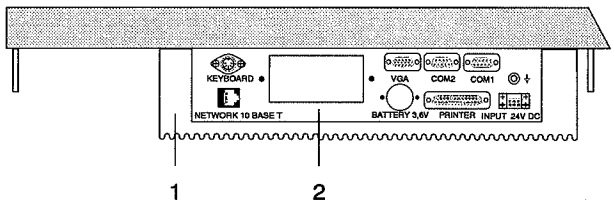
2: 3.5" floppy drive with cover

Fig. 3-3-1: PIPANEL Touch

NOTICE
Protect the floppy drive using the cover supplied with the system; this will guarantee protection to IP 65. (See also the section “Unit-specific safety guidelines” on page 2-3.)

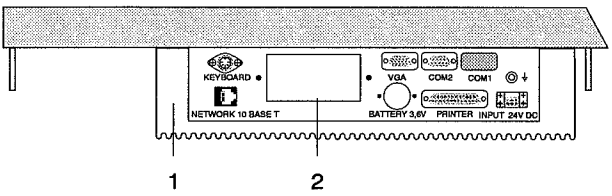
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Base view



1: Die-cast aluminium housing with integrated cooling fins
2: Cut-out with connections for:
- supply voltage
- interfaces
- earth tag
- battery compartment
- cover for expansion slots (PC/104 cards)

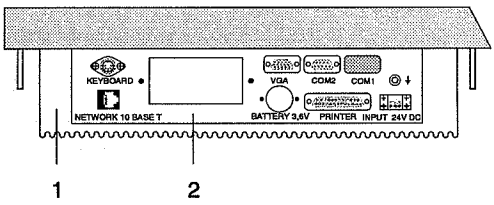
Fig. 3-4-1: PIPANEL Keyboard



1: Die-cast aluminium housing with integrated cooling fins
2: Cut-out with connections for:
- supply voltage
- interfaces
- earth tag
- battery compartment
- cover for expansion slots (PC/104 cards)

Fig. 3-4-2: PIPANEL Sensor mouse

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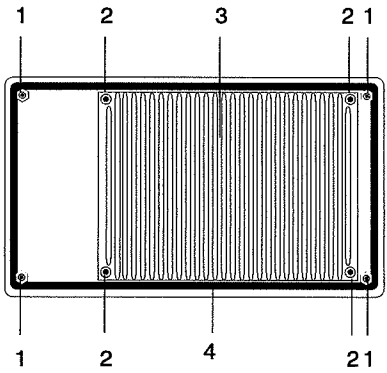


1: Die-cast aluminium housing with integrated cooling fins
2: Cut-out with connections for:
- supply voltage
- interfaces
- earth tag
- battery compartment
- cover for expansion slots (PC/104 cards)

Fig. 3-5-1: PIPANEL Touch

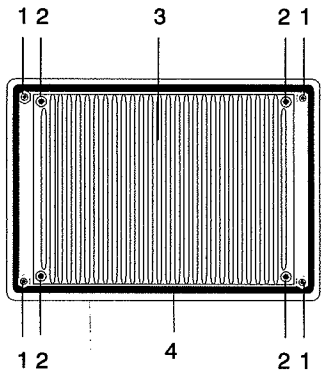
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Rear view



1: Insert nut (M5x30) to mount the unit with washer and nut
2: To secure the housing
3: Die-cast aluminium housing with integrated cooling fins
4: Sealing ring

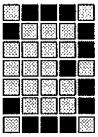
Fig. 3-6-1: PIPANEL Keyboard and PIPANEL Sensor mouse



1: Insert nut (M5x30) to mount the unit with washer and nut
2: To secure the housing
3: Die-cast aluminium housing with integrated cooling fins
4: Sealing ring

Fig. 3-6-2: PIPANEL Touch

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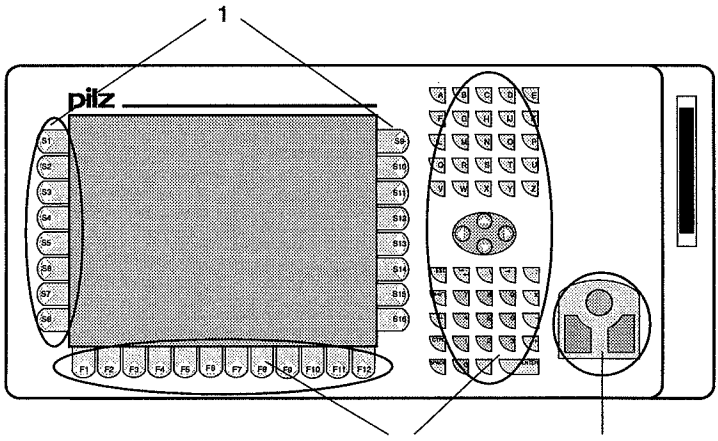


Notes

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Keys

PIPANEL Keyboard and PIPANEL Sensor mouse



1: 16 special keys
2: MF2 compatible keys
3: Sensor mouse (PIPANEL Sensor mouse only)

Fig. 3-8-1: Keys

The PIPANEL Keyboard and PIPANEL Sensor mouse each have an integrated membrane keypad. The keypad is divided into several sections:

- Alphabetical keys
- Numerical keys
- Control keys (ESC etc.)
- Function keys (F1 ... F12)
- Special keys (S1 ... S16)

} MF2 compatible keys

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MF2 compatible keys

With the exception of the special keys (S1 ... S16) the membrane keypad operates in the same way as an MF2-keyboard, however there are less keys on the membrane keypad compared with an MF2. The MF2-compatible keys are also available via corresponding key codes (see "Key codes" on page 9-4).
The membrane keypad can be driven parallel to an MF2-desktop keyboard (see "Interfaces and cables"on page 3-10).

INFORMATION
The following characters are available when the IJ key is used. Please note which characters require you to use the shift and/or ctrl keys:

- IJ pressed alone → "i"
- IJ with the shift key → "I" (capital I)
- IJ with the ctrl key → "j"
- IJ with shift and ctrl → "J"

Special keys

The unit is supplied with the special keys S1 ... S16 assigned a key code (see the section "Key codes" on page 9-4). If required, you can assign and configure a user-specific key code to the special keys using the utility program supplied with the system. **(Please note: this facility is only available under DOS or Windows 95 and not with Windows NT).** Further information can be found in the readme file on the floppy disk. How to assign key codes to the special keys can be found in the sections "Key codes" and "Special keys" in the Appendix on pages 9-4 and 9-10 respectively).

Sensor mouse

The sensor mouse is integrated within the system (PIPANEL Sensor mouse). All standard mouse functions are available and therefore a serial mouse is not required.

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Interfaces and Cables

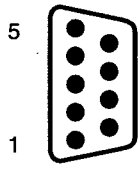
The same variations are possible for both “PIPANEL Keyboard” and “PIPANEL Touch”.

Serial Interfaces

COM1-Interface

COM1 is always configured as a RS-232 interface. The functionality and pin assignment corresponds to the PC-Standard.

COM1
9-pin pin connector



1: DCD
2: RxD
3: TxD
4: DTR
5: GND
6: DSR
7: RTS
8: CTS
9: RI

Fig. 3-8-1: Interface Layout COM1 (RS-232)

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Connection Cable COM1 (9-pin to 9-pin)

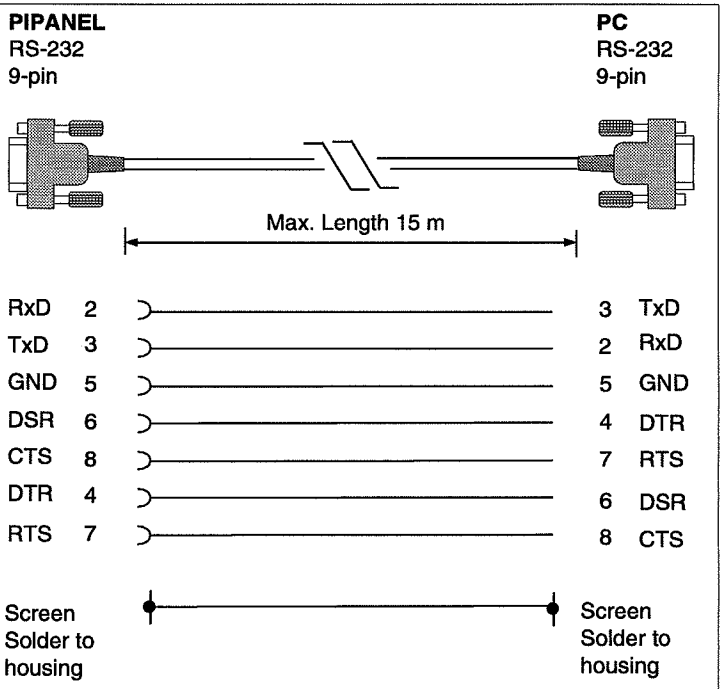


Fig. 3-9-1: Connection Cable COM1 (RS-232)

INFORMATION
We recommend you connect the screening to an earth busbar. Further information is available in chapter 4 under the heading "Screening".

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COM2-Interface

COM2 can be configured as a RS-232 or as a RS-485 interface. COM2 corresponds to a second PC interface in both function and use.

If the **COM2 is configured as a RS-232 interface,** the pin assignment and the connection cable are the same as the COM1.

COM2 configured as a RS-485 interface

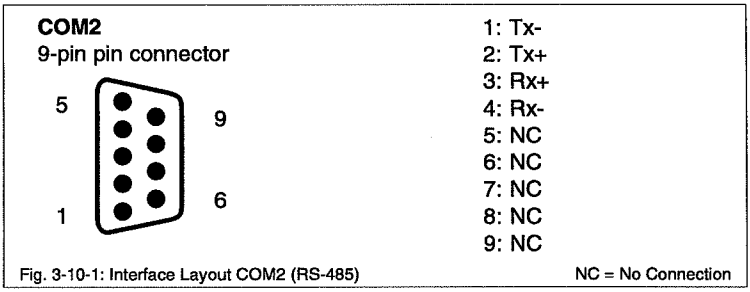


Fig. 3-10-1: Interface Layout COM2 (RS-485)

Connection Cable COM2 (RS-485)

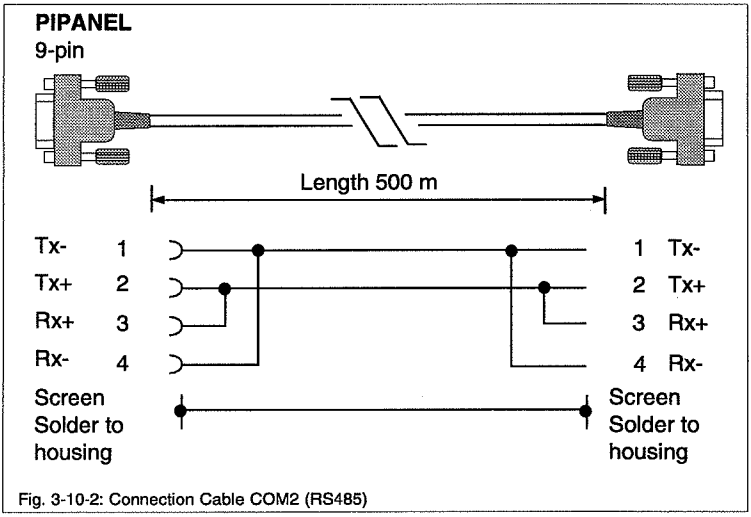


Fig. 3-10-2: Connection Cable COM2 (RS485)

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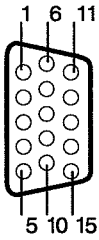
INFORMATION
The connection cable must be twin-core twisted. We recommend the screening is connected to an earth busbar. Further information can be found in chapter 4 under the heading "Screening".

Parallel Interface

The parallel interface is a printer interface. It corresponds to the PC standard in both function and pin assignment.
Connect a printer to the PIPANEL using a commercially available connection cable.

VGA Connection

A standard VGA interface is available on the under side of the housing for connecting an external monitor.
Connect the external monitor to the PIPANEL using a standard VGA cable.



1: Red Analogue	9: NC
2: Green Analogue	10: GND
3: Blue Analogue	11: ID(0)
4: ID(2)	12: ID(1)
5: GND	13: HSync
6: GND Red	14: VSync
7: GND Green	15: NC
8: GND Blue	

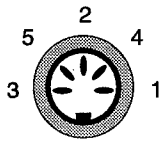
Fig. 3-11-1: Layout of the 15-pin video socket connector

NC = No Connection

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Keyboard Connection

There is a 5-pin DIN-keyboard socket available on the under side of the housing for connecting an external MF2 keyboard



1: KCLK
2: KBD
3: NC
4: GND
5: VCC

Fig. 3-12-1: Layout of the keyboard socket

NC= No Connection

Ethernet Interface

Ethernet
8-pin socket (RJ45 Jack, 10 Base-T)



8 1

1: Tx+
2: Tx-
3: Rx+
4: NC
5: NC
6: Rx-
7: NC
8: NC

Fig. 3-12-2: Layout of the Ethernet connection

NC= No Connection

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Ethernet Connection Cable

PIPANEL
8-pin Western
connector (e.g. AMP)

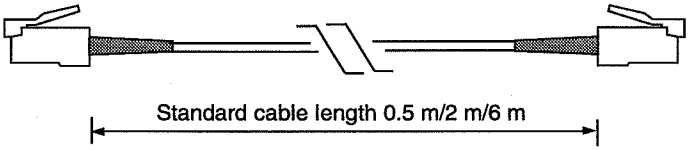
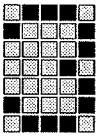


Fig. 3-13-1: Ethernet connection cable

INFORMATION
The Ethernet connection cable corresponds to the Ethernet Standard.
Other cable lengths are available direct from AMP.

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Notes

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Installation



NOTICE

Before mounting or installing the system, please read the information found in chapter 2 “Safety Regulations ”.

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Installation

Dimensions

PIPANEL Keyboard

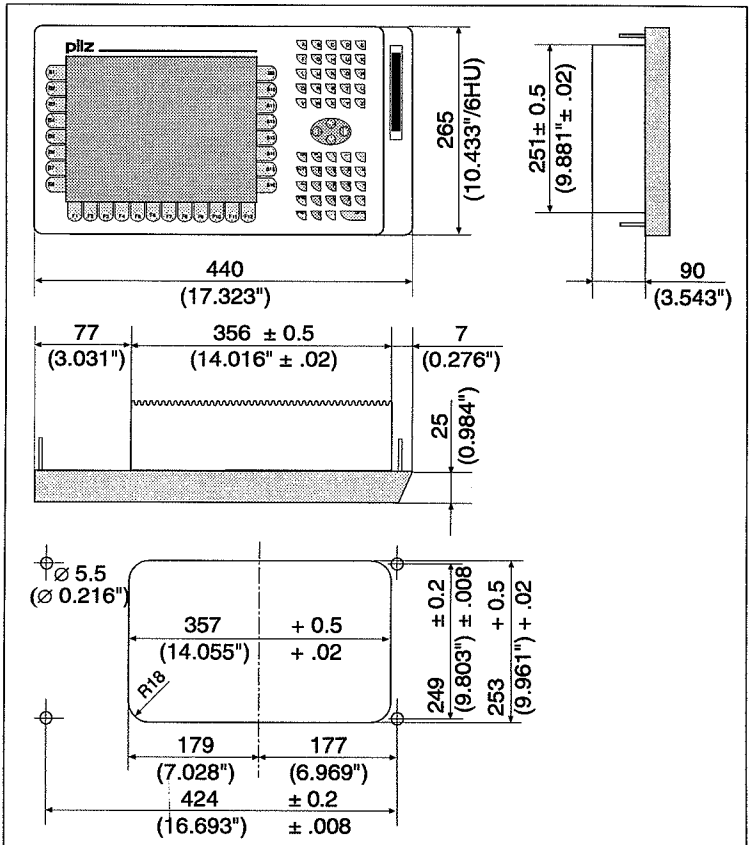


Fig. 4-2-1: System dimensions and mounting cut-out for PIPANEL Keyboard

INFORMATION
Please allow extra for the D-Sub connector under the housing.

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Dimensions

PIPANEL Sensor mouse

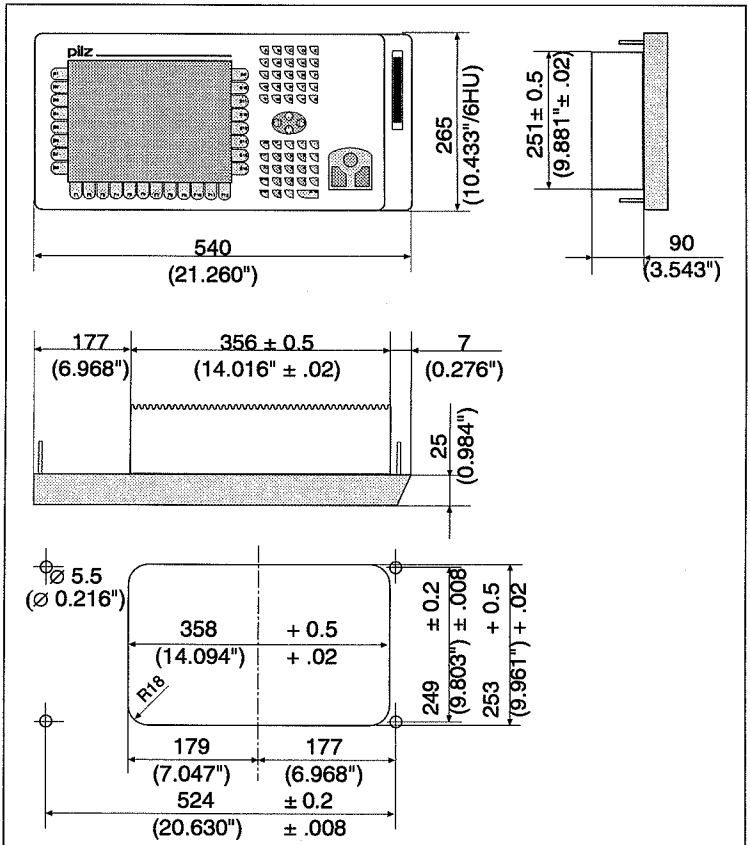


Fig. 4-3-1: System dimensions and mounting cut-out for PIPANEL Sensor mouse

INFORMATION
Please allow extra for the D-Sub connector under the housing.

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PIPANEL Touch

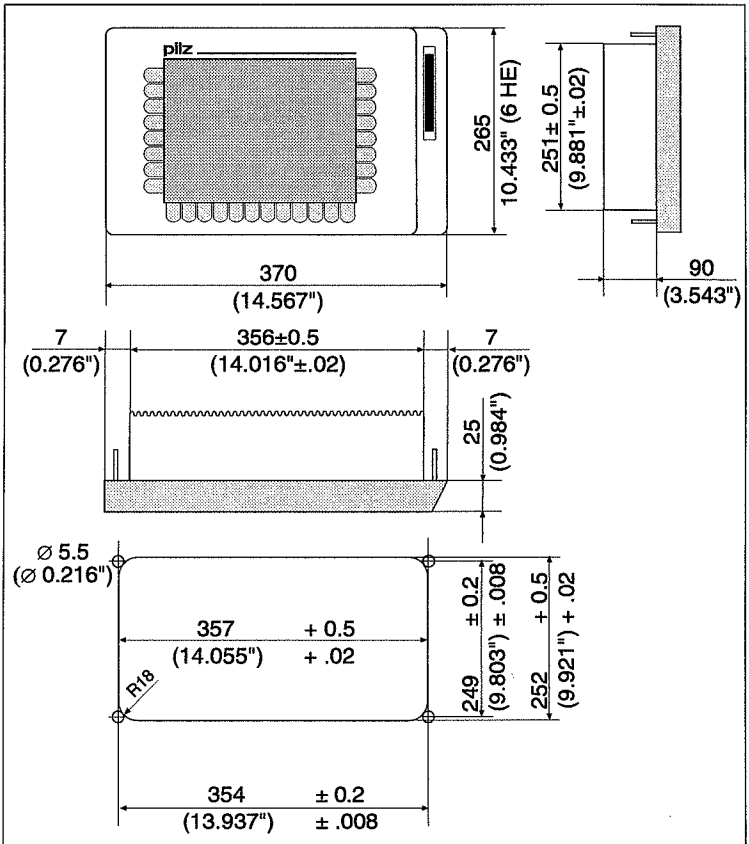


Fig. 4-3-1: System dimensions and mounting cut-out for PIPANEL Touch

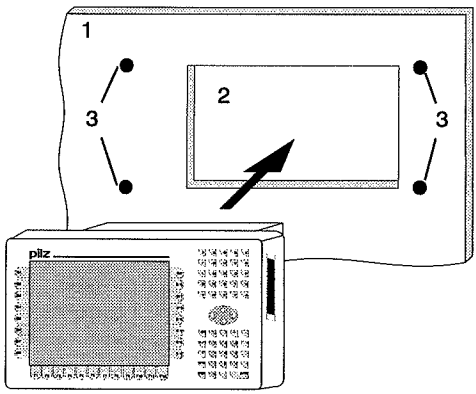
INFORMATION
Please allow extra for the D-Sub connector under the unit.

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Installation

The systems are designed for use in front panels, consoles and control cabinets.

- For stability reasons the front panel, console or the control cabinet should have a wall thickness of at least 4 mm.
- To avoid a build up of heat, keep a distance of at least 10/3.94" cm free all round the unit.
- Please follow and keep within the operating and ambient temperatures specified in the technical data.
- The system can be inclined to a maximum of 30°.



1: Control cabinet or mounting plate

2: Mounting cut-out

3: 4 mounting holes for fixing screws M5x30

Fig. 4-5-1: Mounting a PIPANEL using a PIPANEL Keyboard as an example

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Installation

Connecting the system

NOTICE
Switch off the voltage supply before you install or connect the system, remove or change the connection cables.
Please read the information given in chapter 2 "Safety Regulations".

Layout of cables

Separate electrical or electronic components (contactors, thyristors, relay coils and magnetic valve coils) from data lines.
We recommend you use a sheet metal (MU-metal) bulkhead between both ranges.

- Data and power lines should be installed separately to avoid capacitive and inductive transmission (recommended min. distance = 10 cm/3.94").
- Screened data lines should be installed in a different cable duct to the main power lines.
- All power lines should be as a short as possible.
- Main power lines should be twisted pair cables.

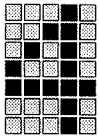
Earth connector

- Connect the housing earth tag (insert nut M4x10 on the underneath side of the housing) to the earth busbar of the control cabinet or plant.
  Use as short a copper conductor as possible (cross section ≥1.5 mm²).
- If there are several units in the control cabinet, ensure the earth conductor is connected in star formation on the busbar.



Fig. 4-6-1: Connection diagram for the earth connector

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- The earth conductor (cross sectional area min. 1.5 mm²) should be connected to the terminal marked ⏚ on the supply voltage connector.

Screening

- Connect the screening of the power cables direct to earth.
- Use screened data cables only.
- Due to high frequency, we recommend the screened connection of the data lines (RS-232 and RS-485 cables) to be earthed on both sides. If you have longer cables with compensating current, we recommend one of the following measures:
  - use equipotential bonding cable lines
  - potential separation
- Data line screening should be connected to a busbar
- The connection between the busbar and control cabinet/system should be as short as possible and direct to earth
- Fasten the braided screening to the busbar over a largest surface area as possible (e.g. with metal clips or polyurethane (PU) cable clips).

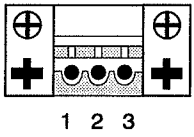
EMC protection (Measures to protect against interference voltages)

- Wire inductive loads (e.g. contactor coils, relay coils and magnetic valve coils) with suppression elements (e.g. RC-networks). This is particularly important when these inductive loads are near to the supply voltage or fed from the same supply voltage.
- If there are high magnetic fields present, we recommend a bulkhead separation is used, i.e. metal sheet (MU-metal).

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Installation

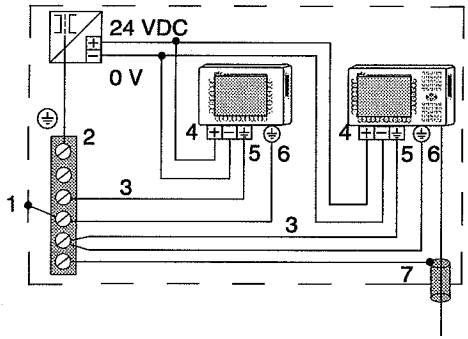
Supply voltage



1: Earth (electronic)
2: 0 V
3: + 24 VDC

Fig. 4-8-1: Supply voltage connector

Connection diagram



1: Earth star point of plant or control cabinet
2: Earth busbar
3: Mains filter (supplied with unit)
4: Supply voltage
5: Earth terminal (electronic)
6: Earth tag (housing)
7: Data line screening

Fig. 4-8-2: Connection

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Commissioning

The PIPANEL is supplied with the operating system requested at the time of order. If required the operating system can also be installed ex-works. The following operating systems are available:

- MS-DOS
- WINDOWS 3.11
- WINDOWS 95
- WINDOWS NT (with driver disk)
- OS/2

System power-up

Check all electrical connections
- Is everything within the safety guidelines?
- Are the interfaces connected correctly?
- Is the power supply correct?
- Is the supply voltage connected correctly?

Operating system

If you have chosen a PIPANEL where the operating system is not pre-installed then you must install the operating system first.
Installation can be carried out using the built-in 3.5" floppy drive. Insert a BOOTABLE disk in the floppy drive.

It is possible to use an external CD-ROM drive or network connection to install, for example, Windows 95, Windows NT or OS/2.

- **Before the system is powered up**, connect the CD-ROM drive into the free parallel interface available or ensure you have the Ethernet cable connected to your host
- Switch on the system and boot up using a bootable disk
- Install the CD-ROM driver
- Install the operating system from the CD-ROM

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After power-up

If the operating system is not installed, follow the instructions given in the installation menu.

Otherwise:

PIPANEL boots up and carries out a self-test. The current status of the PIPANEL can be seen on the display.

INFORMATION
On the PIPANEL Touch an additional serial mouse can be installed at COM2 when installing the Touch-Software.

The serial interface COM1 is reserved on standard systems for PIPANEL Sensor mouse and PIPANEL Touch.
On PIPANEL Sensor mouse, COM1 is occupied by the sensor mouse and on the PIPANEL Touch with the touch operator screen.

Installing drivers for WIN NT Workstation 4.0

Your system may come supplied with Windows NT Workstation 4.0 operating system already installed, if requested when ordering. If so you will also have received the operating system on CD-ROM.

- **Installing drivers with the operating system already installed**
  Drivers can be installed easily as the following directories were copied on to your hard drive during installation
  - **C:\i386** and
  - **C:\DRVLIB**

- **Installing the drivers using an external CD-ROM drive**
  If for whatever reason the files are deleted or missing, or you are installing the operating system yourself, the drivers can be easily installed from the CD-ROM on to your hard drive using an external drive.
  - Connect an external CD-ROM drive to the free parallel interface
  - Switch on the system
  - Install the driver using the help of the WINDOWS NT Workstation 4.0 CD-ROM.

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Character set

When supplied the unit has the German character set installed. The IK.EXE utility program (supplied with the unit) is available to enable you to adapt different country-specific layouts (see also "Adapting the character set" in the Appendix on page 9-1).

The utility program IK.EXE can run under the following operating systems:

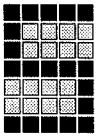
- DOS
- DOS under WINDOWS 3.11
- DOS under WINDWS 95

The following country settings are available:

- German
- French
- English
- American

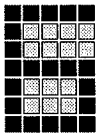
INFORMATION
When running WINDOWS NT, the IK.EXE program cannot be used. Therefore when ordering the system, please state the character set required.
Pilz can supply keyboard EPROMS for English (UK) and German (GR).

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Notes

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System Expansion

Upgrading the random access memory

PIPANEL can have up to 128 MB RAM.

- When upgrading the memory, ensure both banks are matched.
- Only use 72-pin SIMM modules of type PS2 (with parity) and an operating voltage of 5 VDC.

The following RAM configurations are permitted:

RAM	SIMM-Modules
8 MB	2 x 4 MB
16 MB	2 x 8 MB
32 MB	2 x 16 MB
64 MB	2 x 32 MB

INFORMATION
Pilz cannot be held responsible for RAM memory installed at a later date.

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System Expansion

CAUTION
High voltage
Disconnect the mains plug before opening the housing.
Some parts within the unit carry high voltage.

NOTICE
When working within the unit wear an earthed armband. The cards have highly sensitive components, and must be protected against electrostatic charges.

Proceed as follows:

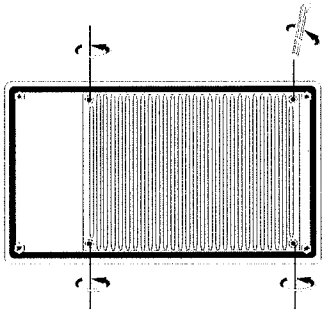


Fig. 6-2-1: Removing the housing
(Example PIPANEL Keyboard)

- Switch off the unit and disconnect the mains plug
- Lay the SIMM module ready in the anti-static film
- Put on an earthed armband
- Loosen the four housing screws with an allen key (size 3, DIN 911)
- Remove the housing.

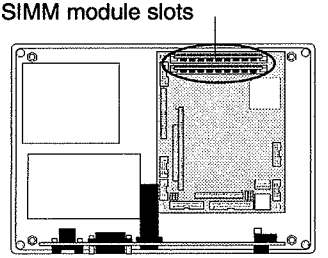
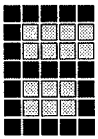


Fig. 6-2-2: Position of SIMM module

- Remove the old SIMM module from the socket
- Place the new SIMM module in the socket
- Ensure that the SIMM module is placed correctly
- Ensure that the SIMM module is firmly in place
- Close the housing and tighten the screws firmly in place.

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Testing the system

The memory installation can be tested using the following method:

- Power-up the system
- PIPANEL will boot-up and carry out a self-test
- During the self-test the PIPANEL will display the amount of RAM detected.

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System Expansion

Expansion using PC/104 plug-in modules

PIPANEL has space for additional PC/104 plug-in modules to expand the function. The PC/104 module can be either 8-Bit or 16-Bit.

INFORMATION

- Ensure that only PC/104 plug-in modules are used that can have a 5 VDC supply and a power consumption that does not exceed 500 mA.
- Before expanding the system, ensure that this is possible with your particular system

CAUTION!

High voltage
Pull out the mains plug before opening the housing.
Certain parts within the unit carry high voltage.

NOTICE

When working within the unit wear an earthed armband. The cards have highly sensitive components and must be protected against electrostatic charges.

Proceed as follows:

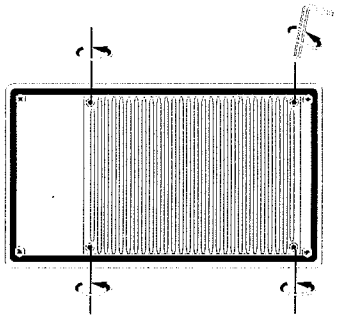
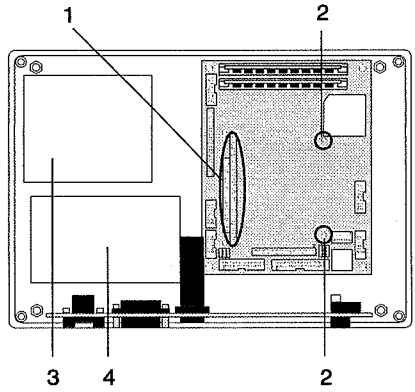


Fig. 6-3-1: Removing the housing
(PIPANEL Keyboard as example)

- Switch off the unit and disconnect the mains plug
- Lay the PC/104 module in the anti-static film ready.
- Put on an earthed armband
- Loosen the four housing screws with an allen key (size 3, DIN 911)
- Remove the housing

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1: Bus connection socket- for PC/104 module (8-Bit or 16-Bit)

2: 2 fixing pins for the PC/104 module

3: Floppy drive

4: Power supply

Fig. 6-5-1: Opened PIPANEL

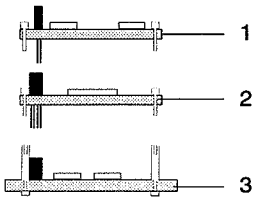


Fig. 6-5-2: Inserting a PC/104 module

- Secure the PC/104 module with the enclosed fixing material to the main circuit board.

1: 8-Bit module or with the
2: 16-Bit module
3: Main circuit board

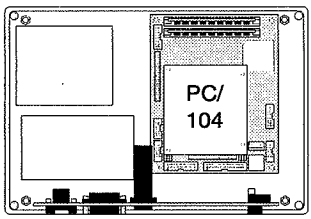
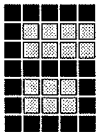


Fig. 6-5-3: A built-in PC-104 module

- Ensure that the module is placed correctly
- Ensure that the module is in place securely
- Close the housing and tighten the screws
- Carry out a function test.

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Care and Maintenance

Cleaning the front

The front of the PIPANEL is covered with a film.

- Do **not** use any strong, abrasive cleaning agents
- When cleaning the front, please keep within the guidelines regarding protection to IP65 (see chapter 2 "Safety Regulations")
- Under **no** circumstances should pointed or sharp-edged objects be used on the front of the unit.

Changing the battery

The battery is required for storing the BIOS settings and the motherboard clock. The battery can be accessed from outside and the compartment is located on the under side of the housing.

- Change the battery at least every 2 years
- Use a 3.6 V battery, size AA
- Ensure the polarity of the battery is correct when inserting into the compartment
- Dispose of the battery in accordance with local environmental guidelines.

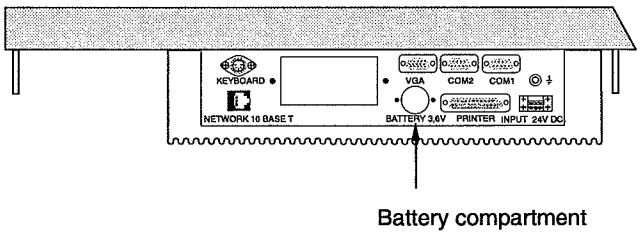


Fig. 7-1-1: Battery compartment, under side of the housing (example used PIPANEL Keyboard)

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Changing the battery:

- Have a new battery ready
- You can change the battery while the system is switched on. This means BIOS and clock settings will not be lost
- Using a coin or a screwdriver open the battery compartment flap
- Remove the old battery
- Place the new battery in the compartment checking the polarity is correct
- Ensure that the battery is securely in place and close the battery compartment.

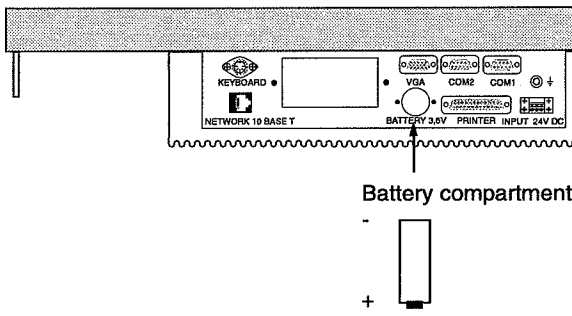


Fig. 7-2-1: Changing the battery (example used PIPANEL Keyboard)

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Technical Data

Supply voltage (galvanically isolated)		24 VDC
Voltage range		18 ... 36 VDC
Connection power		Max. 50 W
Switch-on current		Max. 30 A, 1 ms
Electromagnetic Compatibility (EMC):		
Burst mains	EN 61000-4-4:	2 kV
Burst signal	EN 61000-4-4:	1 kV
Static discharge	EN 61000-4-2:	6 kV contact/15kV air
Interference emission	EN 55 022/08.94	
Interference resistance	EN 50 082-2/03.95	
Protection and Safety Requirements:		
Integrated front (with sealing ring (and floppy drive cover)	DIN 40 050:	IP 65
Rear	DIN 40 050:	IP 54
Electric shock	DIN 57 106 Part 1/5.82	
Insulation voltage	DIN VDE 0160/1.86	
Differential current	DIN VDE 0160/1.86	
Earth conductor connection	DIN VDE 0160/1.86	
Ambient Conditions:		
Operating temperature	IEC 68-2-1/-2:	+5° ... +45 °C
Transport and storage temperature		-20 ... +70 °C
Humidity	IEC 68-2-3:	5 ... 75% relative humidity non-condensing
Temperature drift	IEC 68-2-14:	
switched-on :		+5 °C ... +45 °C in 3 hours max. 10° C/h
switched-off:		-20 °C ... +70 °C in 3 hours max. 20° C/h
Function range		Up to 3,000 m above mean sea level
Vibration	IEC 68-2-6:	10 ... 100 Hz with amplitude 0.1mm
Shock		10 g, 11ms, half-sine
Drop height	IEC 68-2-32:	1 m, original packaging

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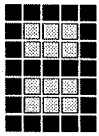
Technical Data

Display		
	Size:	10.4"
	Resolution:	640x480 pixels
	Type:	TFT
or:	Size:	12.1"
	Resolution:	800x600 pixels
	Type:	TFT
Touch		
	Type:	TFT (resistive touchscreen) analogue
	Resolution:	999x999 dots
CPU		
	Processor	Pentium
	RAM	Min. 16 MB (expandable up to 128 MB)
	Hard disk memory	Min. 500 MB/2.5"
	Floppy drive	1.44 MB/3.5" height 0.5"
Interfaces		
	Keyboard connection	External keyboard (MF2 compatible)
	Monitor connection	External monitor (for MultiSync,VGA compatible)
	COM1/3/4	RS 232 9-pin D-Sub-pin connector
	COM2	RS-232, 9-pin D-Sub-pin-connector
or:	COM2	RS 485 9-pin D-Sub-connector (no galvanic isolation)
	LPT1	Printer interface 25-pin D-Sub-connector
	Ethernet	8-pin Western socket connector RJ45 Jack (10 Base T)

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Dimensions in mm (inches)		
PIPANEL Keyboard		
	Front	440 (17.323") x 265 (10.433")
	Depth	90 (3.543")
	Mounting cut-out	358 (14.094") x 253 (9.961")
	Corner radius (mounting cut-out)	16
PIPANEL Sensor mouse		
	Front	540 (21.260") x 265 (10.433")
	Depth	90 (3.543")
	Mounting cut-out	358 (14.094") x 253 (9.961")
	Corner radius (mounting cut-out)	16
PIPANEL Touch		
	Front	370 (14.567") x 265 (10.433")
	Depth	90 (3.543")
	Mounting cut-out	358 (14.094") x 253 (9.961")
	Corner radius (mounting cut-out)	16 (0.630")
Modular Depth		90 (3.543")
Weight		
	PIPANEL Keyboard	9 kg
	PIPANEL Sensor mouse	8 kg
	PIPANEL Touch	7.5 kg

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Appendix

Adapting the character set

The systems are supplied with the standard American character set. To adapt the layout to a country-specific character set you must load the IK.EXE program (supplied with the unit).
Using this program you can switch the character set between American, German, French or English layout (see also under the heading "Key Codes" on page 9-4).

Procedure:

- Copy the program IK.EXE onto your hard drive
- Call up the file AUTOEXEC.BAT with preferred text editor
- Give the command "**IK /L=xx**" directly after the MS-DOS-command "KEYB xx" within the AUTOEXEC.BAT file

  Where "xx" relates to the country code:

Country Code (xx)	Language
GR	German
FR	French
UK	English
US	American

INFORMATION
Procedure if the system runs under WINDOWS NT:
When running WINDOWS NT, the IK.EXE program cannot be used. Therefore when ordering the system, please state the character set required.
Pilz can supply keyboard EPROMS for English (UK) and German (GR).

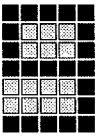
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Appendix

Key combinations

PIPANEL Keyboard	Language English (UK)	Language German (GR)
Shift + \	DEL	DEL
Shift + :	/	<
Ctrl + :		ä
Shift + x	?	?
Ctrl + x		ö
Shift + -	_	_
Ctrl + -		ü
Shift + +	=	#
Ctrl + +	@	
Shift + .	>	>
Shift + ↑	Shift + ↑	Shift + ↑
Ctrl + ↑	Bild ↑	Bild ↑
Shift + ↓	Shift + ↓	Shift + ↓
Ctrl + ↓	Bild ↓	Bild ↓
Shift + ←	Shift + ←	Shift + ←
Ctrl + ←	+	+
Shift + →	Shift + →	Shift + →
Ctrl + →	-	-
Shift + 0	)	=
Shift + 1	!	!
Shift + 2	"	"
Shift + 3	£	§
Shift + 4	$	$
Shift + 5	%	%
Shift + 6	^	&
Shift + 7	&	/

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PIPANEL Keyboard	Language English (UK)	Language German (GR)
Shift + 8	*	(
Shift + 9	(	)
S1	Shift + F1	Shift + F1
S2	Shift + F2	Shift + F2
S3	Shift + F3	Shift + F3
S4	Shift + F4	Shift + F4
S5	Shift + F5	Shift + F5
S6	Shift + F6	Shift + F6
S7	Shift + F7	Shift + F7
S8	Shift + F8	Shift + F8
S9	Ctrl + F1	Ctrl + F1
S10	Ctrl + F2	Ctrl + F2
S11	Ctrl + F3	Ctrl + F3
S12	Ctrl + F4	Ctrl + F4
S13	Ctrl + F5	Ctrl + F5
S14	Ctrl + F6	Ctrl + F6
S15	Ctrl + F7	Ctrl + F7
S16	Ctrl + F8	Ctrl + F8

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Appendix

Key codes

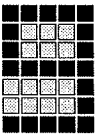
User-specific applications with keyboard prompts can be used via the Interrupt (INT 16H, AH=10H and INT 16H, AH=11H) or depending on the programming language used.
Some programming languages only use the functions INT 16H, AH=0H (Keyboard Read) and INT 16H, AH=1H (Keystroke Status) for keyboard prompts. These functions ignore all Scan-Codes over 84H (132D), and the Scan-Codes from F11 and F12.

Key codes depend on the country code selected. The following tables show the membrane keypad's Scan-Codes and the ASCII-Code (Screen-Code).

Alphabetical keys

The key codes for the alphabetical keys are predefined and **cannot** be reassigned for user-specific applications

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Key codes (without using the Shift-Key)

Function	MFII-Keyboard Key No.	Scan/ASCII-Code (INT 16H,, AH=10H w/o KEYB) /L=US	/L=GR	/L=FR	/L=UK
a	31	1E/61	1E/61	10/71	1E/61
b	50	30/62	30/62	30/62	30/62
c	48	2E/63	2E/63	2E/63	2E/63
d	33	20/64	20/64	20/64	20/64
e	19	12/65	12/65	12/65	12/65
f	34	21/66	21/66	21/66	21/66
g	35	22/67	22/67	22/67	22/67
h	36	23/68	23/68	23/68	23/68
i	37	17/69	17/69	17/69	17/69
k	38	25/6B	25/6B	25/6B	25/6B
l	39	26/6C	26/6C	26/6C	26/6C
m	52	32/6D	32/6D	27/3B	32/6D
n	51	31/6E	31/6E	31/6E	31/6E
o	25	18/6F	18/6F	18/6F	18/6F
p	26	19/70	19/70	19/70	19/70
q	17	10/71	10/71	1E/61	10/71
r	20	13/72	13/72	13/72	13/72
s	32	1F/73	1F/73	1F/73	1F/73
t	21	14/74	14/74	14/74	14/74
u	23	16/75	16/75	16/75	16/75
v	49	2F/76	2F/76	2F/76	2F/76
w	18	11/77	11/77	2C/7A	11/77
x	47	2D/78	2D/78	2D/78	2D/78
y	22	15/79	2C/7A	15/79	15/79
z	46	2C/7A	15/79	11/77	2C/7A



[1] corresponds to "i";
with Ctrl-key: corresponds to "j":

ij	37	24/6	24/6A	24/6A	24/6A

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Appendix

Key codes (using the Shift-Key)

Function	MFII-Keyboard Key No.	Scan/ASCII-Code (INT 16H, AH=10H w/o KEYB) /L=US	/L=GR	/L=FR	/L=UK
A	31	1E/41	1E/41	10/51	1E/41
B	50	30/42	30/42	30/42	30/42
C	48	2E/43	2E/43	2E/43	2E/43
D	33	20/44	20/44	20/44	20/44
E	19	12/45	12/45	12/45	12/45
F	34	21/46	21/46	21/46	21/46
G	35	22/47	22/47	22/47	22/47
H	36	23/48	23/48	23/48	23/48
J	37	24/4A	24/4A	24/4A	24/4A
K	38	25/4B	25/4B	25/4B	25/4B
L	39	26/4C	26/4C	26/4C	26/4C
M	52	32/4D	32/4D	27/3A	32/4D
N	51	31/4E	31/4E	31/4E	31/4E
O	25	18/4F	18/4F	18/4F	18/4F
P	26	19/50	19/50	19/50	19/50
Q	17	10/51	10/51	1E/41	10/51
R	20	13/52	13/52	13/52	13/52
S	32	1F/53	1F/53	1F/53	1F/53
T	21	14/54	14/54	14/54	14/54
U	23	16/55	16/55	16/55	16/55
V	49	2F/56	2F/56	2F/56	2F/56
W	18	11/57	11/57	2C/5A	11/57
X	47	2D/58	2D/58	2D/58	2D/58
Y	22	15/59	2C/5A	15/59	15/59
Z	46	2C/5A	15/59	11/57	2C/5A



[2] corresponds to "I" (capital i);

with Shift and Ctrl keys: corresponds to "J":

IJ	37	24/4A	24/4A	24/4A	24/4A

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Numerical keys

The key codes for the numerical keys are predefined and **cannot** be reassigned for user-specific applications.

Key codes (without the Shift-key)

Function	MFII-Keyboard Key No.	Scan/ASCII-Code (INT 16H,, AH=10H w/o KEYB) /L=US	/L=GR	/L=FR	/L=UK
1	02	02/31	02/31	02/21	02/31
2	03	03/32	03/32	03/40	03/32
3	04	04/33	04/33	04/23	04/33
4	05	05/34	05/34	05/24	05/34
5	06	06/35	06/35	06/25	06/35
6	07	07/36	07/36	07/5E	07/36
7	08	08/37	08/37	08/26	08/37
8	09	09/38	09/38	09/2A	09/38
9	10	0A/39	0A/39	0A/28	0A/39
0	11	0B/30	0B/30	0B/30	0B/30

Control keys

The codes for the control keys are predetermined and **cannot** be reassigned for user-specific applications.

Cursor keys

Function	MFII-Keyboard Key No.	Scan/ASCII-Code (INT 16H,, AH=10H w/o KEYB) /L=US	/L=GR	/L=FR	/L=UK
	83	48/E0	48/E0	48/E0	48/E0
♦	79	4B/E0	4B/E0	4B/E0	4B/E0
∅	89	4D/E0	4D/E0	4D/E0	4D/E0
¬	84	50/E0	50/E0	50/E0	50/E0

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Appendix

Other control keys

Function	MFII-Keyboard Key No.	Scan/ASCII-Code (INT 16H,, AH=10H w/o KEYB) /L=US	/L=GR	/L=FR	/L=UK
ESC	110	01/1B	01/1B	01/1B	01/1B
TAB	16	0F/09	0F/09	0F/09	0F/09
\	5D	00/5C	00/5C	00/5C	00/5C
BS	15	0E/08	0E/08	0E/08	0E/08
:	40	27/3A	34/3E	34/2E	27/2A
SHIFT	44	2A/ -	2A/ -	2A/ -	2A/ -
*	09	09/2A	1B/7D	2B/5C	09/2A
ALT	58	38/ -	38/ -	38/ -	38/ -
-	12	0C2D	35/2F	00/2D	0C/2D
CTRL	30	1D/ -	1D/ -	1D/ -	1D/ -
+	13	0D/2B	1B/5D	0D/2B	0D/2B
SPACE	61	39/20	39/20	39/20	39/20
.	54	34/2E	34/2E	33/3C	34/2E
ENTER	61	39/20	39/20	39/20	39/20

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Function keys

The key codes for the function keys F1 ... F12 are predefined and **cannot** be reassigned for user-specific applications.

Key code (without the Shift- key)

Function	MFII-Keyboard Key No.	Scan/ASCII-Code (INT 16H, AH=10H w/o KEYB) /L=US	/L=GR	/L=FR	/L=UK
F1	112	3B/00	3B/00	3B/00	3B/00
F2	113	3C/00	3C/00	3C/00	3C/00
F3	114	3D/00	3D/00	3D/00	3D/00
F4	115	3E/00	3E/00	3E/00	3E/00
F5	116	3F/00	3F/00	3F/00	3F/00
F6	117	40/00	40/00	40/00	40/00
F7	118	41/00	41/00	41/00	41/00
F8	119	42/00	42/00	42/00	42/00
F9	120	43/00	43/00	43/00	43/00
F10	121	44/00	44/00	44/00	44/00
F11	122	57/00	57/00	57/00	57/00
F12	123	58/00	58/00	58/00	58/00

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Appendix

Special keys

The unit is supplied with the special keys S1 ... S16 already having a key code assigned (ex-works). It is possible, however, to reassign special keys a code for user-specific applications.
An operating program is supplied with the unit for configuring key codes. Further information is available in the Readme-file contained on the floppy disk supplied.

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Amendment List

Changes from Version II to Version III

PIPANEL Sensor mouse has been added to the range of industrial computers. This manual now incorporates the operating instructions for the PIPANEL Sensor mouse. This following table provides an update list.

Old Pages	New Pages	Amendment
1-1	1-1	The operating manual is valid for the PIPANEL Sensor mouse
1-1	1-1	WINDOWS NT operating system can be supplied
1-2	1-2	Expanding the system using a maximum of 2 PC-104 plug-in modules is possible
1-2	1-2	PIPANEL Sensor mouse range
1-3	1-3	System versions for PIPANEL Sensor mouse
1-4	1-4	Definition of symbols in accordance with ANSII
---	3-2	PIPANEL Sensor mouse: Front view
3-2	3-3	PIPANEL Touch: Front view
---	3-4	"Base View" on the PIPANEL Sensor mouse
3-3	3-5	COM1 is reserved on the standard version of PIPANEL Touch
---	3-6	PIPANEL Sensor mouse: Rear view
---	3-8	Operator keys: PIPANEL Keyboard and PIPANEL Sensor mouse
---	3-9	New paragraph "Senor mouse"
---	4-3	System dimensions PIPANEL Sensor mouse (By inserting this paragraph on page 4-3, all subsequent sections in chapter 4 have moved on one page.)
5-1	5-1	Installing an external CD-ROM drive
---	5-2	PIPANEL Touch can be operated with an additional serial mouse at COM 2

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Appendix

Old Page	New Page	Amendment
---	5-2	The serial interface COM1 is reserved on the standard versions of PIPANEL Sensor mouse and PIPANEL Touch.
...	5-2	Installing the drivers for the WIN NT Workstation 4.0 operating system
---	5-3	Under WINDOWS NT, IK.EXE program cannot be used
6-1	6-1	RAM memory on the PIPANEL with processors 486DX/4-100 up to 64 MB
8-2	8-2	RAM memory on processors 486DX/4-100 up to 64 MB
---	9-1	Procedure for the selection of the character set when using WINDOWS NT
---	9-2	Key combinations (All subsequent paragraphs have moved on 3 pages.)
---	9-4	Dimensions for PIPANEL Sensor mouse
---	9-10	Amendment list for the manual

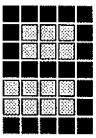
Changes from Version III to Version IV

Old page	New page	Amendment
1-2	1-2	Range expanded
1-3	1-3	System versions and interfaces updated
3-4 f.	3-4 f.	Diagrams amended to include COM3/4
3-9	3-9	Under Information: different codes for the "IJ" key; A note has been added to the effect that the facility for adapting the special key codes is not available under Windows NT
3-10 ff.	3-10 ff.	COM3/4 taken into account
4-2 ff.	4-2 ff.	Dimensions amended
5-3	5-3	Special case "character set under Windows NT"
6-1	6-1	RAM table for 486DX4/100 has been omitted, and updated for the Pentium

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Old Page	New page	Amendment
6-2	6-2	Lower diagram has COM3/4 included
6-5	6-5	Upper and lower diagrams have COM3/4 included
7-1 f.	7-1 f.	Diagrams have COM3/4 included
8-1	8-1	Voltage details
8-2 f.	8-2 f.	Technical data: What has been amended → processor, RAM, HHD memory, interfaces and dimensions; The weight for PIPANEL Sensor mouse included
9-1	9-1	Special case "Character set under Windows NT"
9-5 f.	9-5 f.	Special case "IJ key"
9-10 f.	9-10	Text change under "Special keys"; table showing the ex-works layout for special keys has been omitted

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