PMI 5

▸ Operator terminals

PILZ
THE SPIRIT OF SAFETY

1   Introduction

1.1   Validity of the documentation

This operating manual is valid for the following products:

‣ PMI 509
‣ PMI 515
‣ PMI 516
‣ PMI 518
‣ PMI 526
‣ PMI 531
‣ PMI 538

This operating manual explains the function and operation, describes the installation and provides guidelines on how to connect the product.

1.1.1   Retaining the documentation

This documentation is intended for instruction and should be retained for future reference.

1.2   Definition of symbols

Information that is particularly important is identified as follows:

DANGER!

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

WARNING!

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

CAUTION!

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

NOTICE

This describes a situation in which the product or devices could be damaged and also provides information on preventive measures that can be taken. It also highlights areas within the text that are of particular importance.

INFORMATION

This gives advice on applications and provides information on special features.

2 Overview

2.1 Unit structure

The PMI is an operator terminal that is used to operate and monitor technical processes.

2.1.1 Unit features

▶ Analogue resistive touchscreen

▶ Character set: Unicode

▶ PMI 509: in addition

– 4 function keys (F1 … F4) and

– 4 system keys (ESC, ENTER, cursor up, cursor down)

▶ Memory:
  256 MB DDR SDRAM
  512 MB Flash

▶ 1 serial interface

▶ 1 Ethernet Interface

▶ 1 USB slave interface

▶ 1 USB host interface (PMI 509/PMI 515)
  2 USB host interfaces (PMI 516/PMI 518/PMI 526/PMI 531/PMI 538)

▶ Battery-buffered real-time clock

▶ User-specific applications and various visualisation software packages can be installed

2.2 Front view

2.2.1 PMI 509
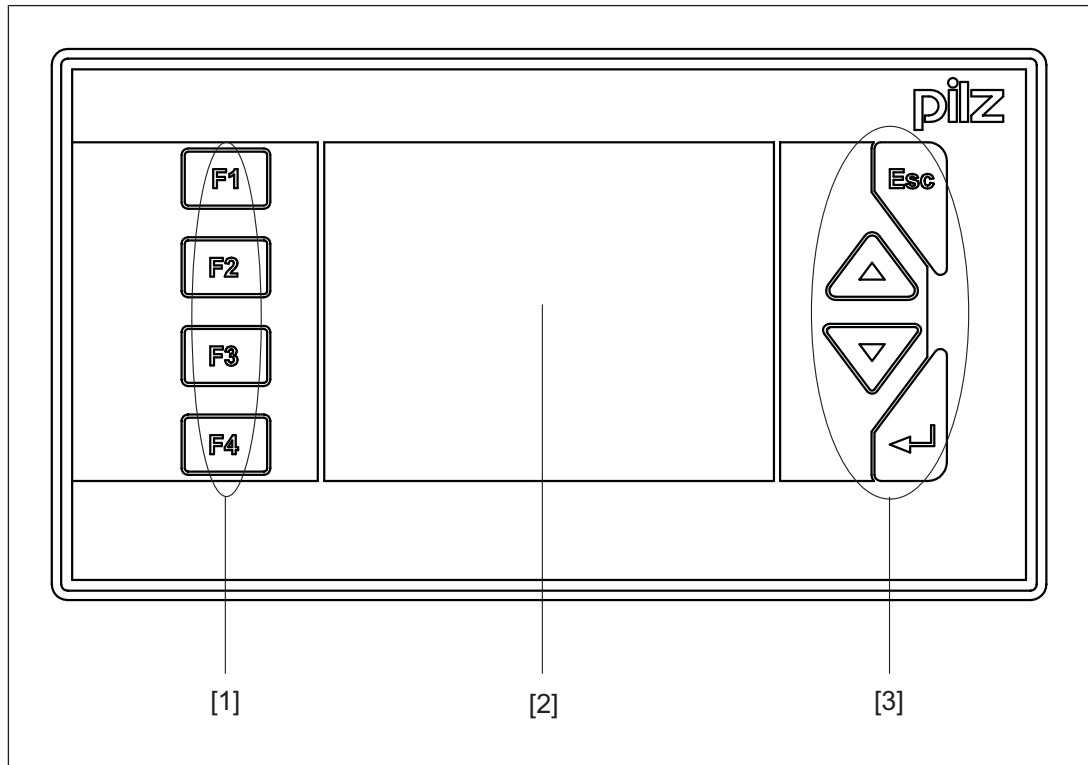
Fig.: Front view PMI 509

Legend

[1] F1 ... F4 (function keys)

[2] Touchscreen (see Technical details [📖 45])

[3] ESC, ENTER, cursor up, cursor down

The key allocation is predefined by the operating system, the configuration can be changed as desired.

2.2.2   PMI 515/PMI 516/PMI 518/PMI 526/PMI 531/PMI 538

[1]
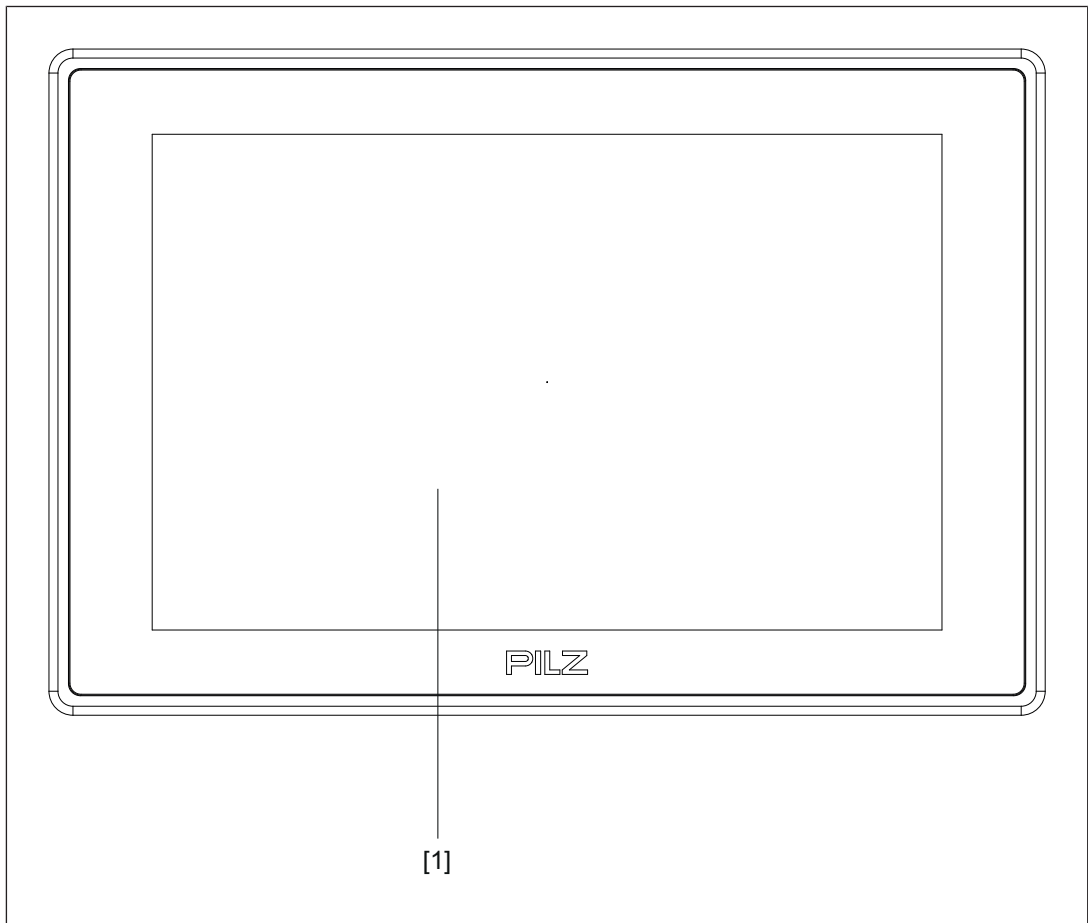
Fig.: Front view of PMI 515/PMI 516/PMI 518/PMI 526/PMI 531/PMI 538

Legend

[1] Touchscreen (see Technical Details) [📖 45]

2.3   Scope of supply

PMI 509

▶ Operator terminal

▶ 2 retaining clamps

▶ Connector plug for power supply

▶ Projection stand

▶ SD card with PMI Assistant

▶ Device documentation on CD/DVD

PMI 515

▶ Operator terminal

▶ Cover plate

▶ Connector plug for power supply

▶ Projection stand

▶ SD card with PMI Assistant

▸ Device documentation on CD/DVD

PMI 516/PMI 518/PMI 526/PMI 531/PMI 538

▸ Operator terminal

▸ Retaining clamps

▸ Connector plug for power supply

▸ Projection stand

▸ SD card with PMI Assistant

▸ Device documentation on CD/DVD

3　Safety

3.1　Intended use

This device is used to operate and monitor technical processes.

The PMI offers the possibility of installing software from third-party suppliers. Pilz GmbH & Co. KG accepts no liability for any damages, nor does it provide support or any guarantee for the functional efficiency of the installed software.

> **INFORMATION**
>
> Ensure that the graphics software is suitable for the ARMV4i processor type and the Windows CE 6.0 embedded operating system.

> **CAUTION!**
>
> The unit is not designed for use in applications with stringent safety requirements (e.g. E-STOP).

The following is deemed improper use in particular:

▸　Any component, technical or electrical modification to the product

▸　Use of the product outside the areas described in this manual

▸　Use of the product outside the technical details (see Technical details [📖 45]).

> **NOTICE**
>
> **EMC-compliant electrical installation**
>
> The product is designed for use in an industrial environment. The product may cause interference if installed in other environments. If installed in other environments, measures should be taken to comply with the applicable standards and directives for the respective installation site with regard to interference.

3.2 Safety regulations

3.2.1 Use of qualified personnel

The products may only be assembled, installed, programmed, commissioned, operated, maintained and decommissioned by competent persons.

A competent person is someone who, because of their training, experience and current professional activity, has the specialist knowledge required to test, assess and operate the work equipment, devices, systems, plant and machinery in accordance with the general standards and guidelines for safety technology.

It is the company's responsibility only to employ personnel who:

▶ Are familiar with the basic regulations concerning health and safety / accident prevention

▶ Have read and understood the information provided in this description under "Safety"

▶ And have a good knowledge of the generic and specialist standards applicable to the specific application.

3.2.2 Warranty and liability

All claims to warranty and liability will be rendered invalid if

▶ The product was used contrary to the purpose for which it is intended

▶ Damage can be attributed to not having followed the guidelines in the manual

▶ Operating personnel are not suitably qualified

▶ Any type of modification has been made (e.g. exchanging components on the PCB boards, soldering work etc.).

3.2.3 Disposal

▶ When decommissioning, please comply with local regulations regarding the disposal of electronic devices (e.g. Electrical and Electronic Equipment Act).

3.3 Unit-specific safety regulations

Before you install or commission the system, you should refer to any guidelines laid down by the control manufacturer or operator.

3.3.1 Installation site

▶ Do not position PMI close to highly flammable materials.

▶ When installing the unit within a control cabinet, you must ensure the ventilation slots are not obstructed, otherwise the unit could be damaged through overheating.

▶ Protect the unit from direct sunlight and dust.

3.3.2   Measures to protect against interference

▶ If necessary, use bulkhead separators to protect the unit from sources of interference.

▶ Inductive loads within the environment (e.g. contactor, relay and solenoid valve coils) should be wired using suppression elements (e.g. RC elements). This is particularly important if these inductive loads are fed from the same supply.

▶ The power cables and the data cables should be physically separated from each other in their own conduits (recommended minimum distance: 10 cm/3.94"). This will avoid inductive and capacitive interference.

▶ The prescribed earth point ⏚ for the functional earth guarantees compliance with noise immunity requirements.
Connect the functional earth to the central earth point in star form. A cable cross section of at least 1.5 mm² should be used for the connection. Connections should be kept as short as possible.

3.3.3   Supply voltage

▶ The supply voltage must be +24 V DC

> ⚠ **CAUTION!**
>
> Safe electrical isolation must be ensured for the external power supply generating the 24 V voltage supply. Failure to do so could result in electric shock. Power supplies must conform to DIN VDE 0551/EN 60742 and EN 50178.

3.3.4   Operation

▶ Plan the system correctly to ensure that a communication error between the PMI and the host computer does not cause a malfunction.

▶ Do not operate the touchscreen interface using hard or heavy objects or apply excessive pressure.

▶ The maximum ambient temperature must not be exceeded when using the unit.

▶ Do not pour liquids over the unit or insert any objects into the unit.

▶ When in storage and during operation, protect the unit from vibration and shock.

▶ Avoid using chemicals close to the system.

3.3.5   Maintenance

▶ Do not use thinners or organic solvents to clean the unit and touchscreen surface.

> ⓘ **NOTICE**
>
> The touchscreen surface is not abrasion resistant; if it is dirty, please clean with care and do not apply heavy pressure.

Further information on care and maintenance of the touchscreen can be found in the chapter "Care and Maintenance".

4   Function description

4.1   Features

The operator terminal has a memory in which graphics display software can be installed. With the help of this software, processes can be shown on the display and directly influenced via the touchscreen. An Ethernet interface is available for the transfer of data, e.g. diagnostic data, and for communication with other subscribers.

The PMI 509 has additional buttons which can be used to control special functions within an application.

The device is fitted with a real-time clock that is battery-buffered, so allowing it to run for 90 days without an external power supply. The battery is automatically charged during normal operation by the power supply for the device.

4.2   Unit views

4.2.1   PMI 509
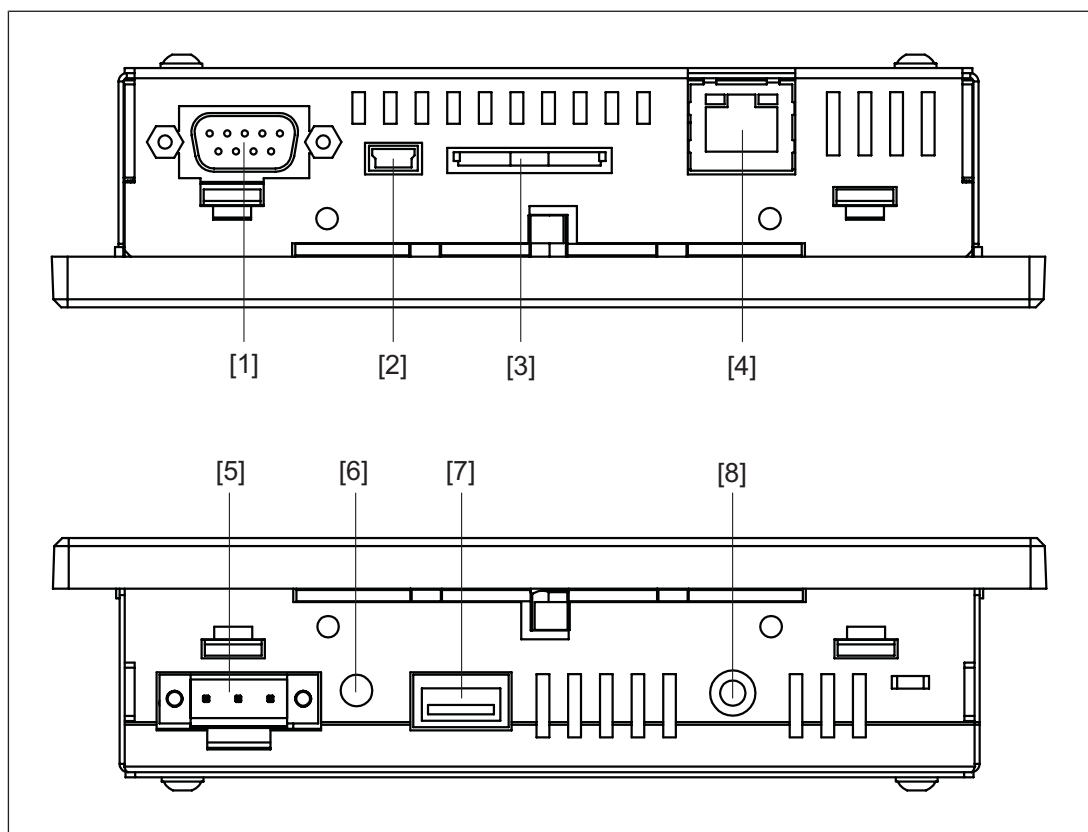
Fig.: Top: plan view of PMI 509, Bottom: view of PMI 509 from below

Legend

[1] Serial interface COM1 (RS232)

[2] USB Slave

[3] SD/SDHC card

[4] Ethernet interface (100 BaseTX)

[5] Supply voltage +24 VDC

[6] Audio interface LINE OUT

[7] USB Host

[8] Functional earth

4.2.2 PMI 515
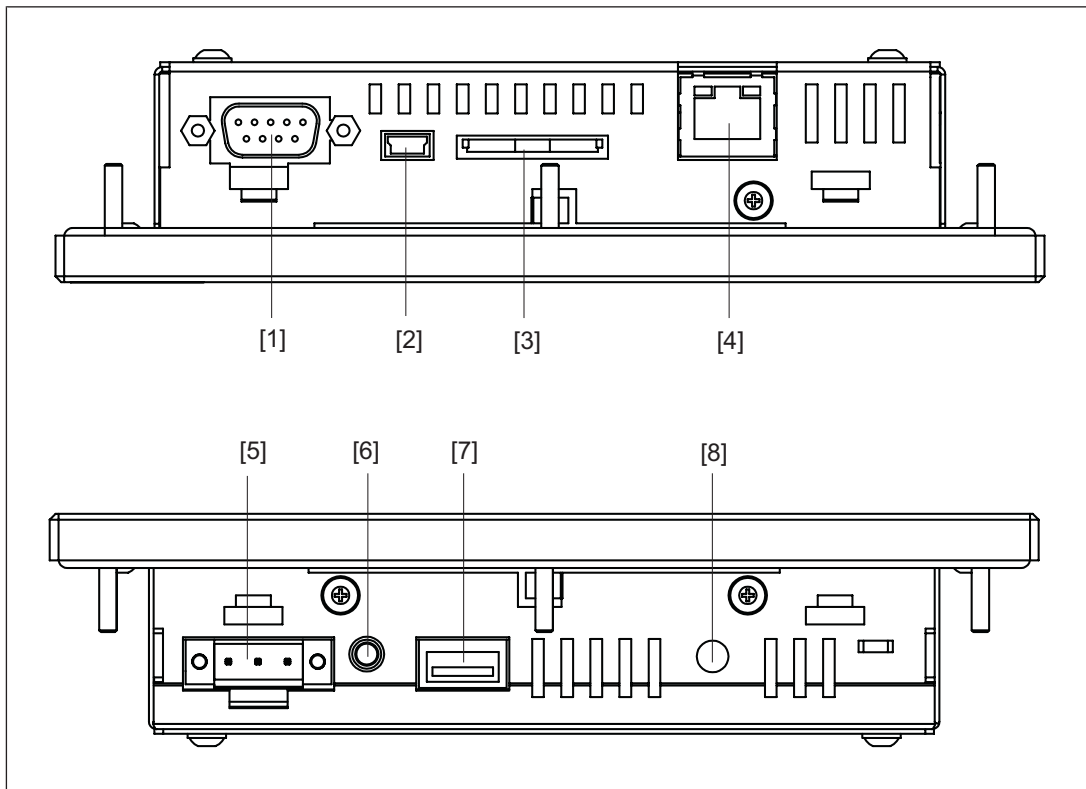
Fig.: Top: plan view of PMI 515, Bottom: view of PMI 515 from below

Legend

[1] Serial interface COM1 (RS232)

[2] USB Slave

[3] SD/SDHC card

[4] Ethernet interface (100 BaseTX)

[5] Supply voltage +24 VDC

[6] Audio interface LINE OUT

[7] USB Host

[8] Functional earth

4.2.3 PMI 516/PMI 518/PMI 526/PMI 531/ PMI 538

Fig.: Top: plan view of PMI 516/PMI 518/PMI 526/PMI 531/PMI 538, Bottom: view of PMI 516/PMI 518/PMI 526/PMI 531/PMI 538 from below

Legend

[1] Audio interface LINE OUT

[2] SD/SDHC card

[3] Ethernet interface (100 BaseTX)

[4] Supply voltage +24 VDC

[5] Serial interface COM1 (RS232)

[6] USB Slave

[7] USB Host 1

[8] USB Host 2

[9] Functional earth

5 Installation

5.1 Safety

> **NOTICE**
>
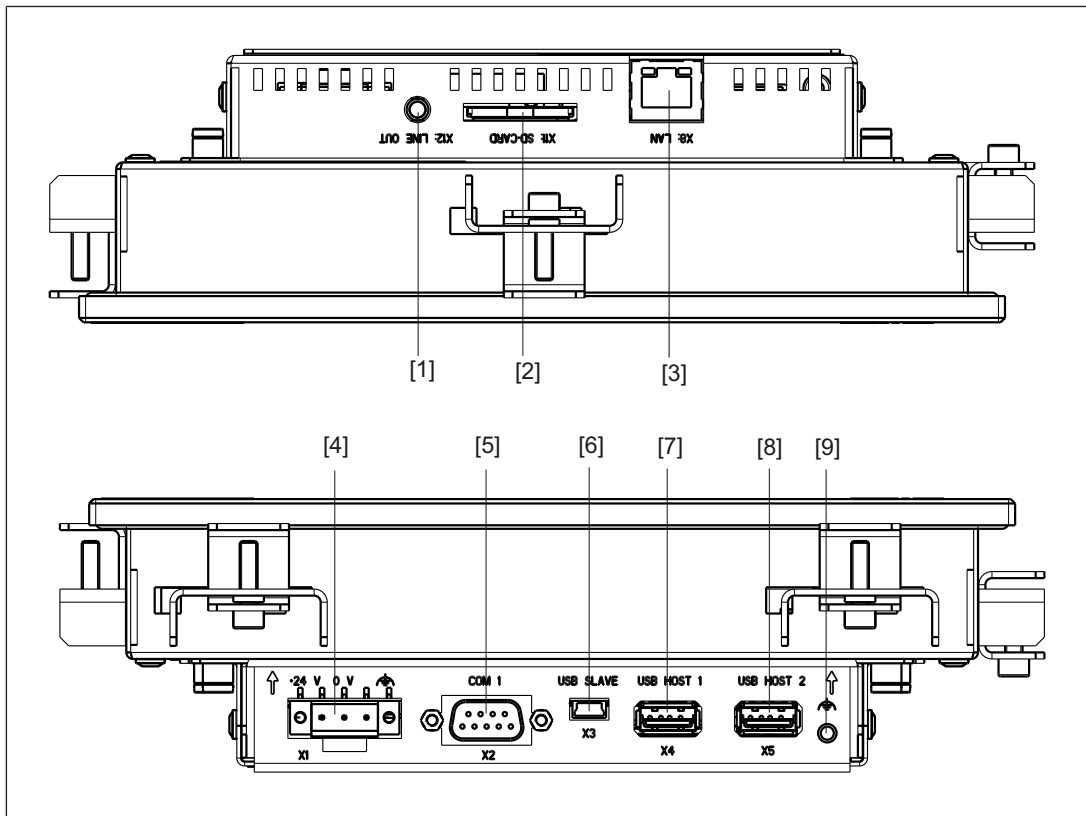> Damage due to electrostatic discharge!
>
> Electrostatic discharge can damage components. Ensure against discharge before touching the product, e.g. by touching an earthed, conductive surface or by wearing an earthed armband.

Please read the safety guidelines before assembling and installing the PMI.

Before you install or commission the system, you should refer to any guidelines laid down by the plant manufacturer or operator.

5.1.1 Installation site and unit surroundings

▸ Keep as large a distance as possible between the system and any electromagnetic fields, particularly when frequency converters are nearby.

▸ To avoid the build-up of heat, a distance of 10 cm/3.94" should be kept free all round the unit.

▸ Protect the system from direct sunlight and dust

▸ Do not use chemicals close to the system.

▸ Ensure the maximum ambient and operating temperatures are not exceeded.

▸ Ensure that neither liquids nor objects can enter the unit at any time.

▸ Do **not** position the system close to flammable materials.

5.2 Dimensions PMI 509
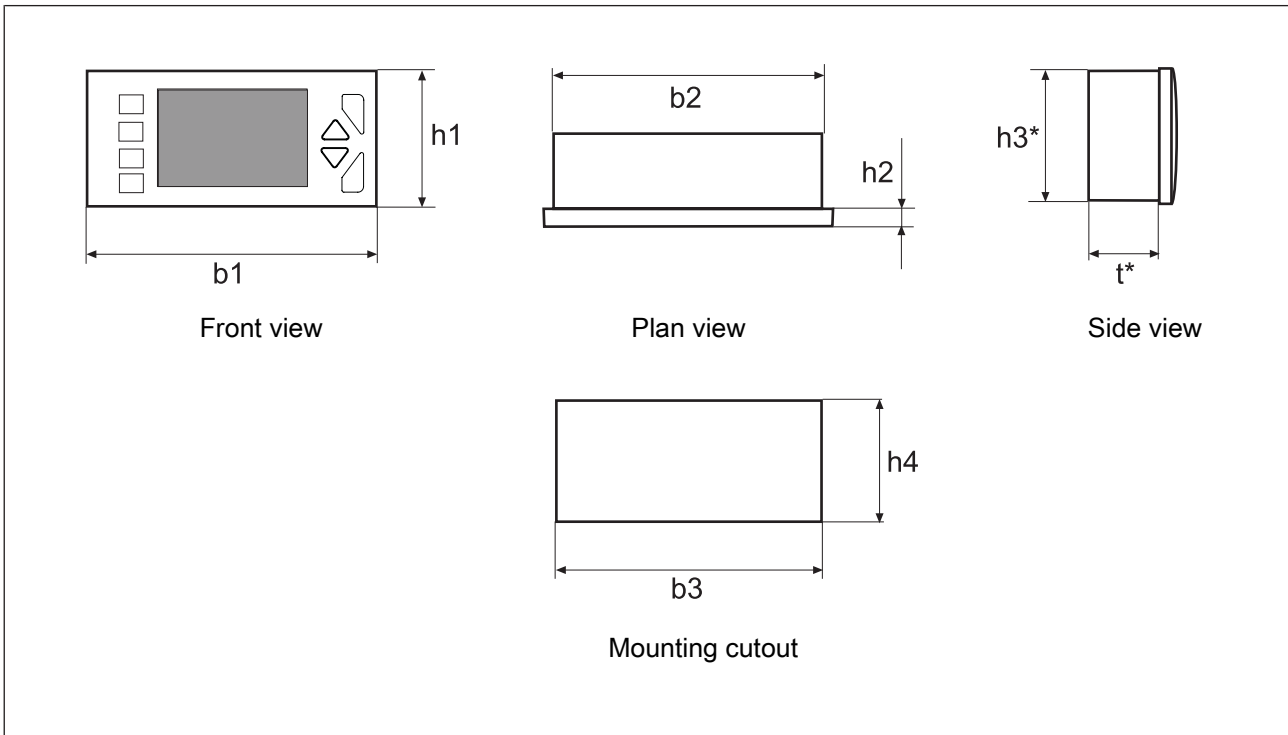
Fig.: Dimensions PMI 509

	PMI 509
b1/mm h1/mm	157 (6.181") 87 (3.425")
b2/mm h2/mm	135.9 (5.350") 8 (0.314")
h3*/mm t*/mm	66 (2.598") 32 (1.259")
b3/mm h4/mm	138 + 1 (5.433" + 0.039") 68 + 0.7 (2.677" + 0.027")

h*/t* = Dimensions without connections

Allow extra for hardware connections!

5.3 Dimensions PMI 515

Fig.: Dimensions PMI 515

	PMI 515
b1/mm h1/mm	170 (6.693") 144 (5.669")
b2/mm h2*/mm t*/mm	135.9 (5.350") 66 (2.598") 32 (1.259")
b3/mm h3/mm	154 + 1 (6.063" + 0.039") 128 + 1 (5.039" + 0.039")

h*/t* = Dimensions without connections

Allow extra for hardware connections!

5.4 Dimensions PMI 516/PMI 518/PMI 526/PMI 531/PMI 538

Front view   Plan view   Side view

Mounting cutout
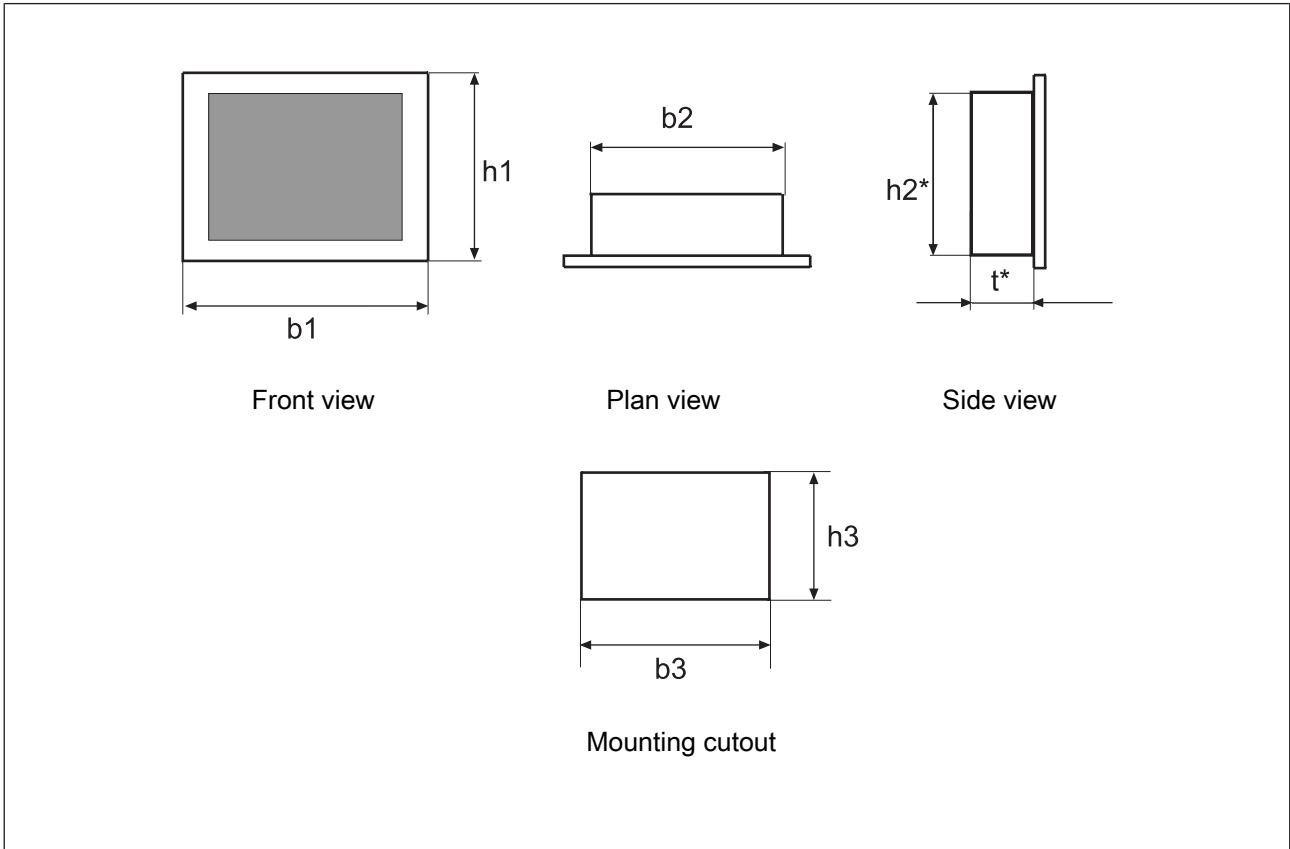
Fig.: Dimensions PMI 516/PMI 518/PMI 526/PMI 531/PMI 538

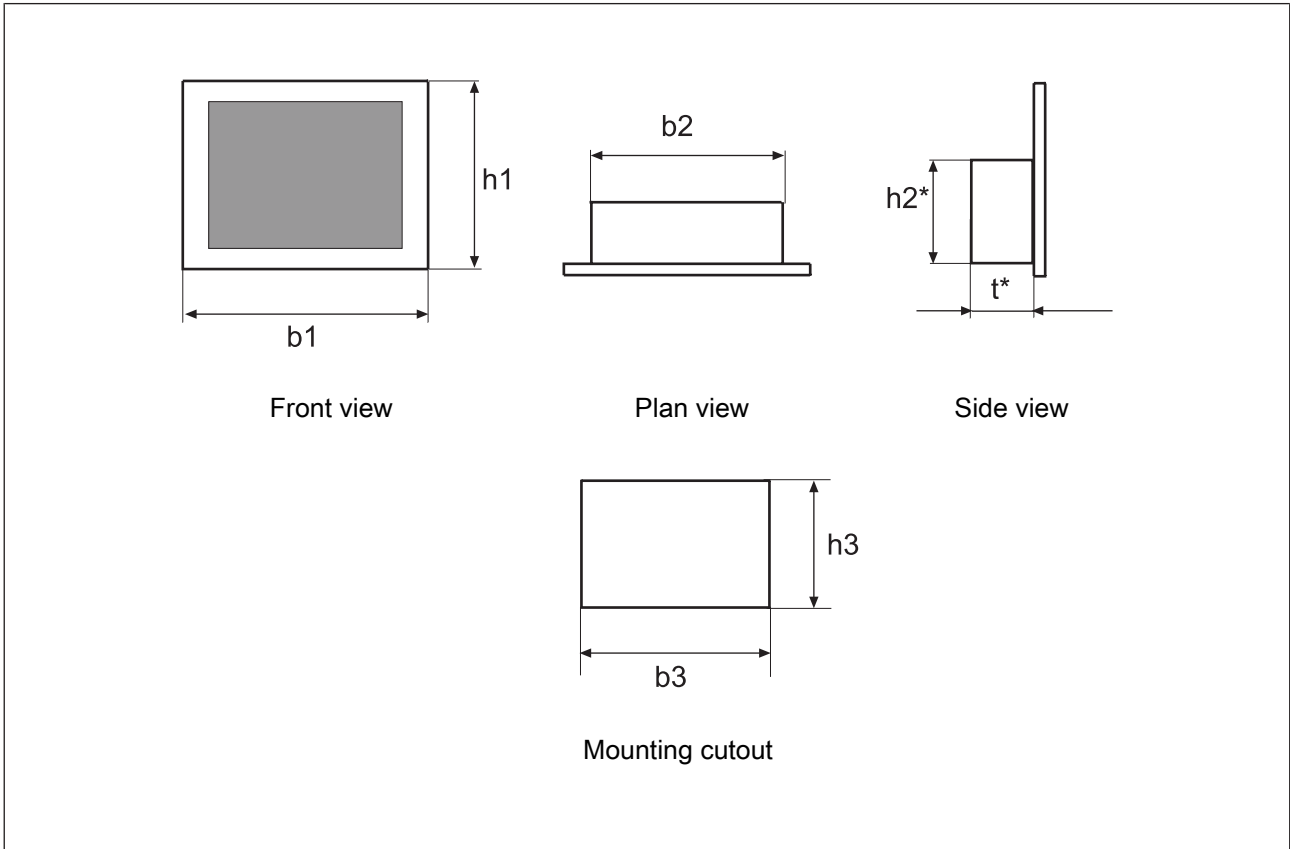|	PMI 516	PMI 518	PMI 526	PMI 531	PMI 538
b1/mm h1/mm	212 (8.346") 165 (6.496")	232 (9.134") 160 (6.299")	317 (12.480") 243 (9.567")	352 (13.858") 276 (10.866")	412 (16.22") 332 (13.071")
b2/mm h2*/mm t*/mm	195 (7.677") 146 (5.748") 56.5 (2.224")	215 (8.465") 141 (5.551") 56.5 (2.224")	300 (11.811") 221 (8.701") 56.5 (2.224")	337 (13.268") 252.4 (9.937") 57.3 (2.255")	390 (15.354") 308.4 (12.142") 57.3 (2.255")
b3/mm h3/mm	197 + 1 (7.756" + 0.039") 148 + 1 (5.827" + 0.039")	217 + 1 (8.543" + 0.039") 143 + 1 (5.63" + 0.039")	302 + 1 (11.89" + 0.039") 223 + 1 (8.78" + 0.039")	339 + 1 (13.346" + 0.039") 255 + 1 (10.039" + 0.039")	393 + 1 (15.472" + 0.039") 311 + 1 (12.244" + 0.039")

h*/t* = Dimensions without connections

Allow extra for hardware connections!

5.5   Installing the unit

When installing the unit, please note the following:

▸ For stability reasons, the front panel, console or control cabinet should have a wall thickness of at least 2.5 mm.

▸ To avoid a build-up of heat, a distance of a 10 cm/3.94" should be kept free all round the system.

▸ Ensure the information given for the ambient and operating temperatures in the technical details is observed.

▸ IP65 protection can only be guaranteed when

– the fixing screws are sufficiently tightened (min. 0.2 Nm).

– the gasket is not damaged.

– the wall thickness is at least 2.5 mm.

▸ Protect the system against falling down, i.e. ensure that the fixing screws are firmly tightened.

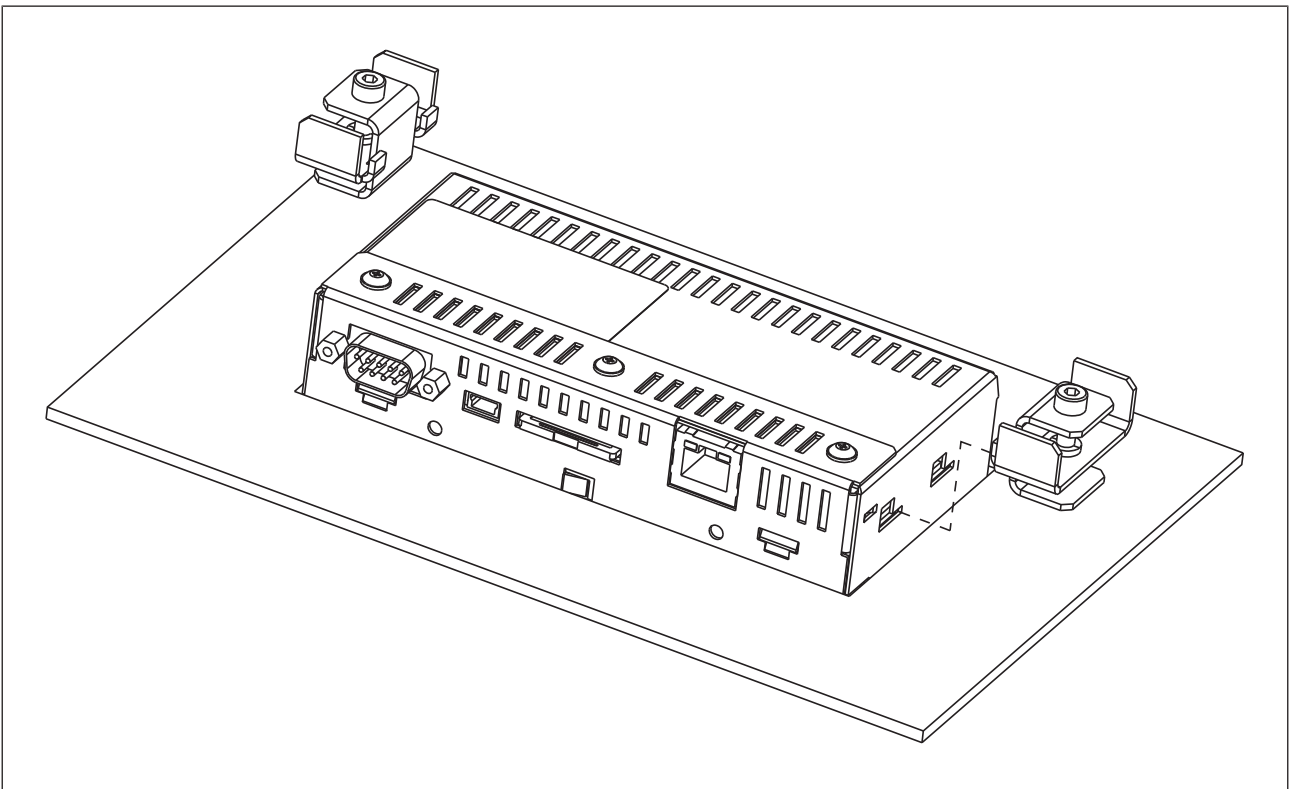## 5.6   PMI 509 Installation

Fig.: PMI 509 Installation

> **NOTICE**
>
> The torque setting for the fixing screws may not exceed 0.3 Nm.

5.7   PMI 515 Installation
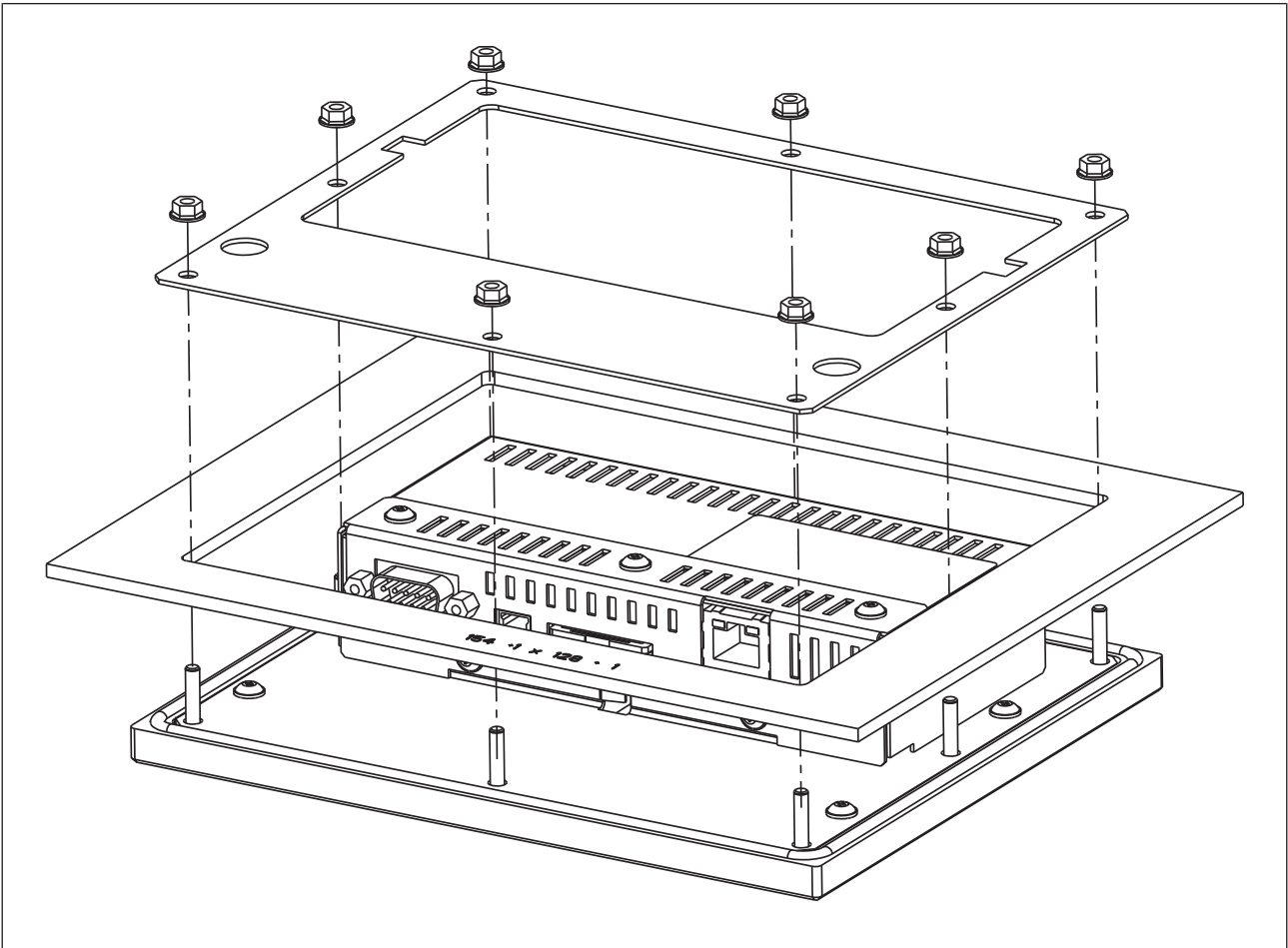

Fig.: PMI 515 Installation

5.8   Installing the PMI 516/PMI 518/PMI 526/PMI 531/PMI 538
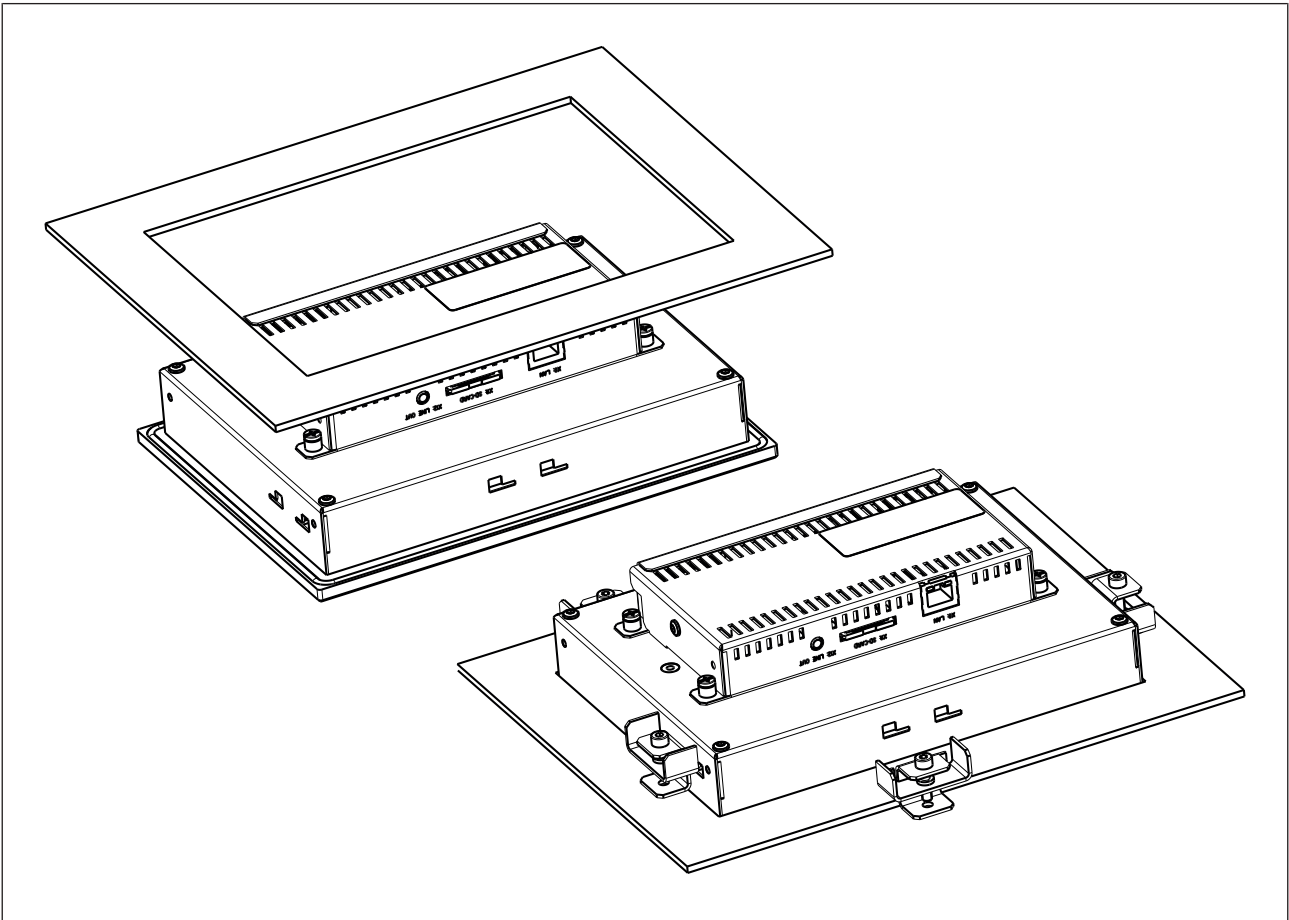

Fig.: Installing the PMI516/PMI 518/PMI 526/PMI 531/PMI 538

6 Wiring

6.1 General wiring guidelines

▸ Electrical or electronic components which could cause interference (contactors, thyristors, relay coils and solenoid valve coils) should be physically separate from data lines. We recommend you use a sheet metal (MU metal) bulkhead between both areas.

▸ Data lines and power lines should be laid separately to avoid capacitive and inductive interference (recommended minimum distance = 10 cm/3.94").

▸ Screened data lines should also be laid in a different cable duct to the main power lines.

▸ Power lines should be as short as possible

▸ Power lines should be twisted pair cables.

▸ We recommend a max. length of 2 m for the USB cable, to guarantee reliable data transfer.

▸ UL requirement: only use copper wiring that will withstand 60/75°C for the supply voltage; maximum torque setting: 0.5-0.6 Nm.

6.1.1 Shielding

▸ Connect the power cable shield with low impedance to earth.

▸ Use only shielded data lines.

▸ For high-frequency reasons, we recommend that the shielding on the data line cable (RS 232 cable) is earthed on both sides. If you are using longer cables and there is the possibility of transient currents, we recommend one of the following methods:

– Use equipotential bonding conductors

– Use electrical isolation

▸ Connect data line shields to a bus bar.

▸ Make the connection of the bus bar to the control cabinet/system as short and with as low impedance as possible.

▸ Fasten the braided shield to the shield bar over as large a surface area as possible (e.g. with metal hose clips or PUK cable clips).

6.1.2 Measures to protect against interference voltages

▸ Wire-up inductive loads (e.g. contactor coils, relay coils and solenoid valve coils) using suppression elements (e.g. RC networks). This is particularly important if these inductive loads are very close to the power supply or are fed from the same supply.

▸ If strong magnetic fields are present, we recommend you use a bulkhead separator, i.e. metal sheet (MU-metal).

6.2   Connecting the Unit

6.2.1   Supply voltage

The connection for the 24 V DC supply is located on the side of the housing.
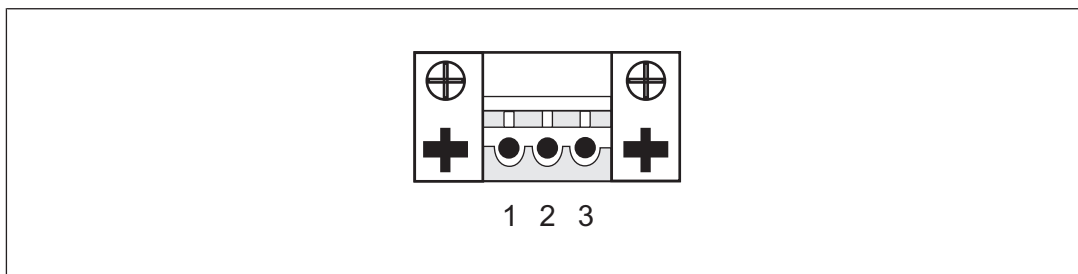
Fig.: Layout of supply voltage connector

▸ 1: Functional earth

▸ 2: 0 V

▸ 3: + 24 V DC

UL requirement: Use a 24 VDC power supply (isolating source). Connect a max. 5 A fuse between the power supply and PMI.

6.2.2   Connection example
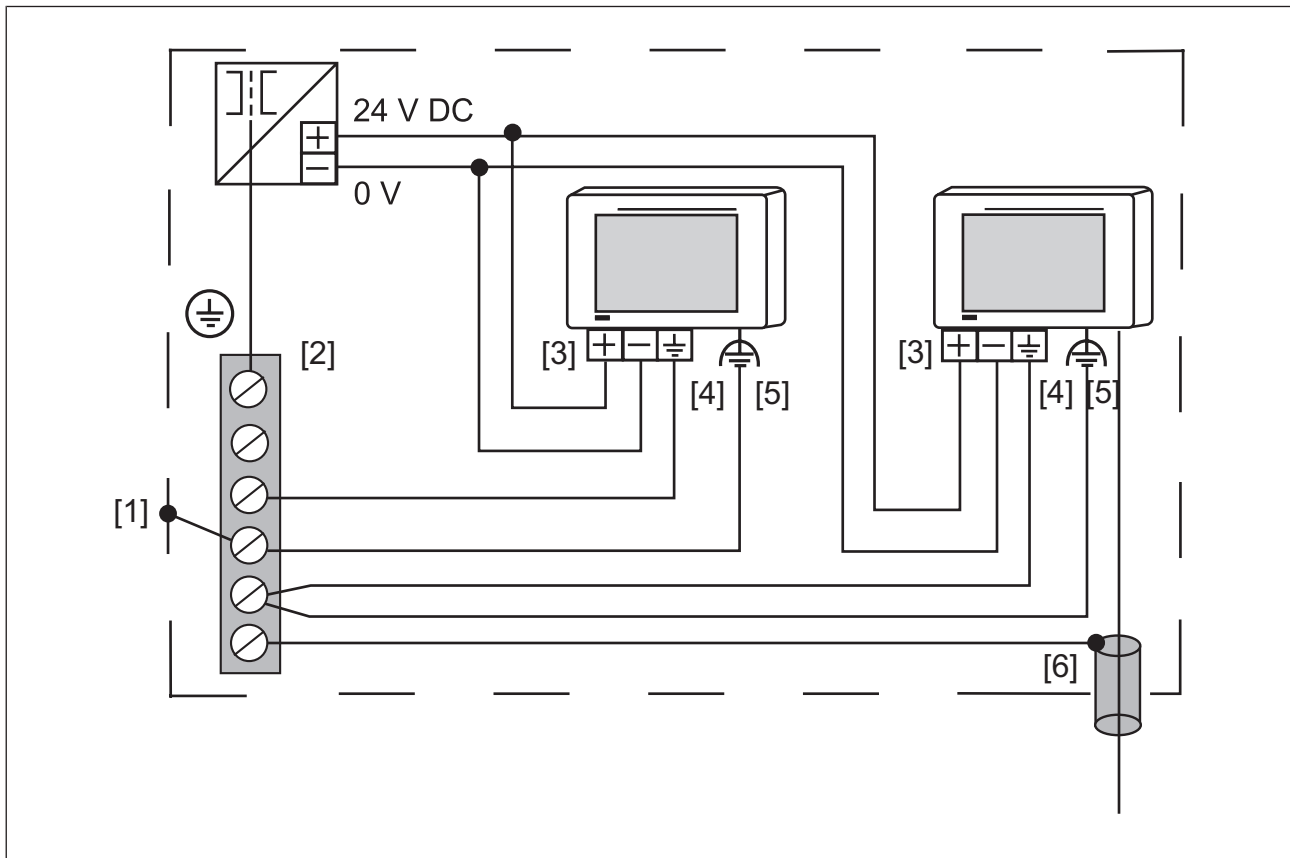
Fig.: Connection example

Legend

[1] Earth star point of the unit or control cabinet

[2] Earth bus bar

[3] Supply voltage

[4] Functional earthing terminal (electronic)

[5] Functional earthing bolts (housing)

[6] Data line shield

0 V and ⏚ are connected internally.

6.2.3 Interfaces

Pin assignment of RS232 interface
(COM1)

GND 5 · · 9 n.c.
n.c. 4 · · 8 CTS
TxD 3 · · 7 RTS
RxD 2 · · 6 n.c.
n.c. 1 ·

n.c. = Not connected
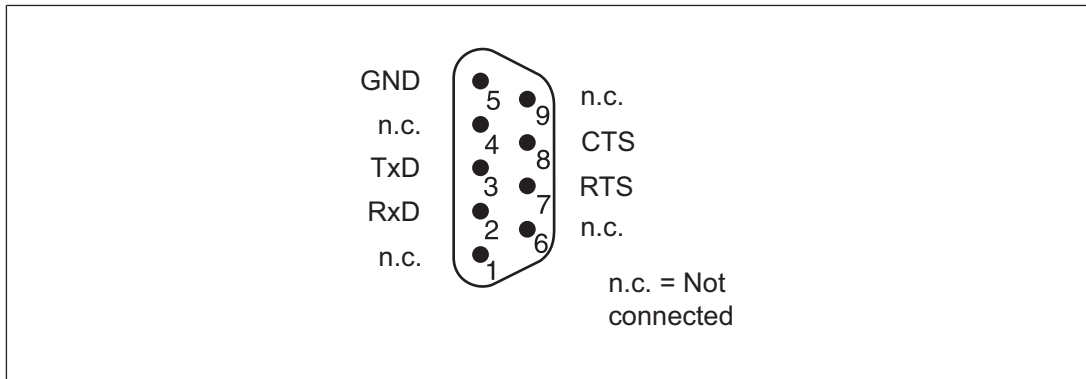
Fig.: Pin assignment of RS232 interface, Sub-D connector, 9-pin

7 Putting into Service

Behaviour after switch-on

There may be a delay of several seconds between switch-on and the unit being ready for operation.

The application software can then be installed and started.

7.1 Activating the setup

When starting the PMI, click on the *Start PMI Assistant* button or on *Setup*. The SD card supplied on which the PMI Assistant is installed must be connected to do this. When the SD card is not connected, the Control Panel is started.

Further information on the PMI Assistant can be found in the "PMI Assistant Operating Manual".

7.2 Control Panel

All system settings can be made from the Control Panel of Windows Embedded CE 6.0. Special features and device-specific settings are described in the following.
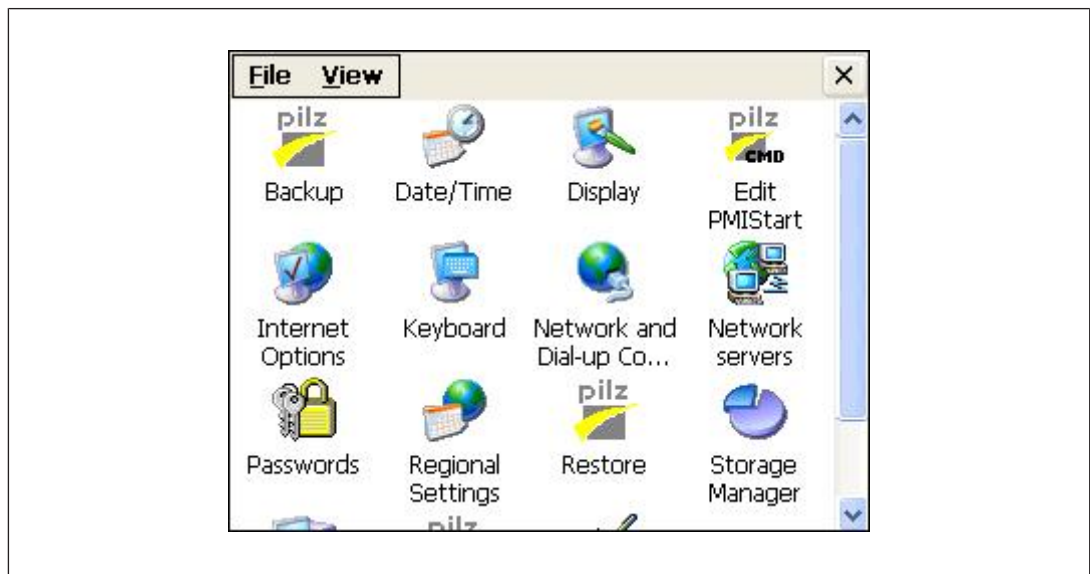
7.2.1 Backup and restore

Program which you can use to save or restore an entire directory structure.

7.2.2 Password settings

Assign a password for the Control Panel to protect the settings in this area. Two levels can be protected with different passwords.

Level 1: Master Control panel password
The whole Control Panel can be protected with a password.
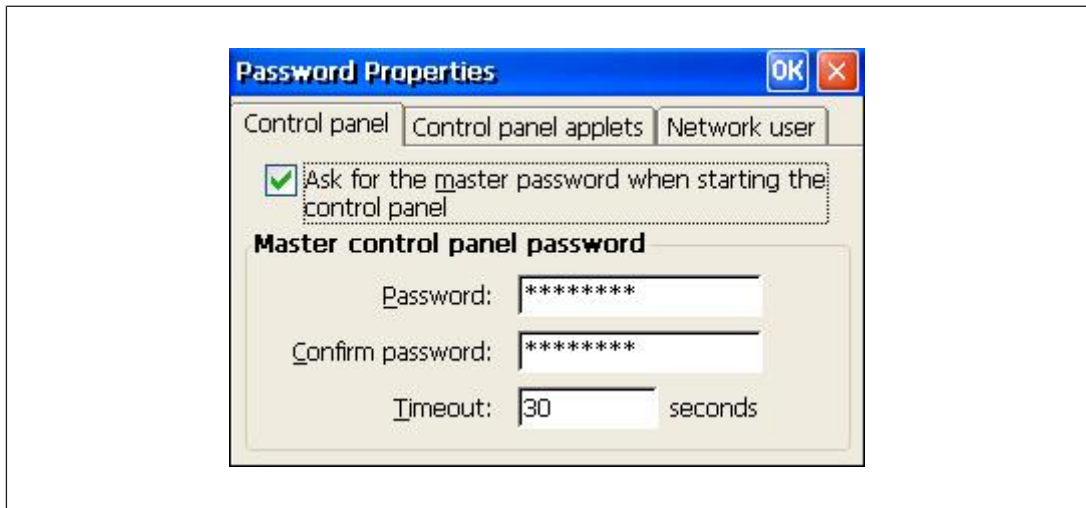
Defining a password: Enter a password. Enter the password again under "Confirm password".
Change password: Same as for defining a password
Delete password: Deselect *Ask for master password …*.

If you select *Ask for master password ...*, then the system will request that the master password is entered before the Control Panel opens.

Timeout
If an incorrect password is entered three times or no valid password is entered within the selected time, then the Control Panel is closed.

Level 2: Control panel applets

Individual Control Panel "applets" can be protected with a password.

Add

Add Control Panel "applets" to the password protected area. This area is protected with a password.

Remove

Remove Control Panel "applets" from the password protected area. This area is not protected with a password.

INFORMATION

Add **Password Settings** to the password protected area, otherwise the password you enter will be unprotected and can be changed.

Level 3: Network user

Access to the network servers is controlled by a central user.
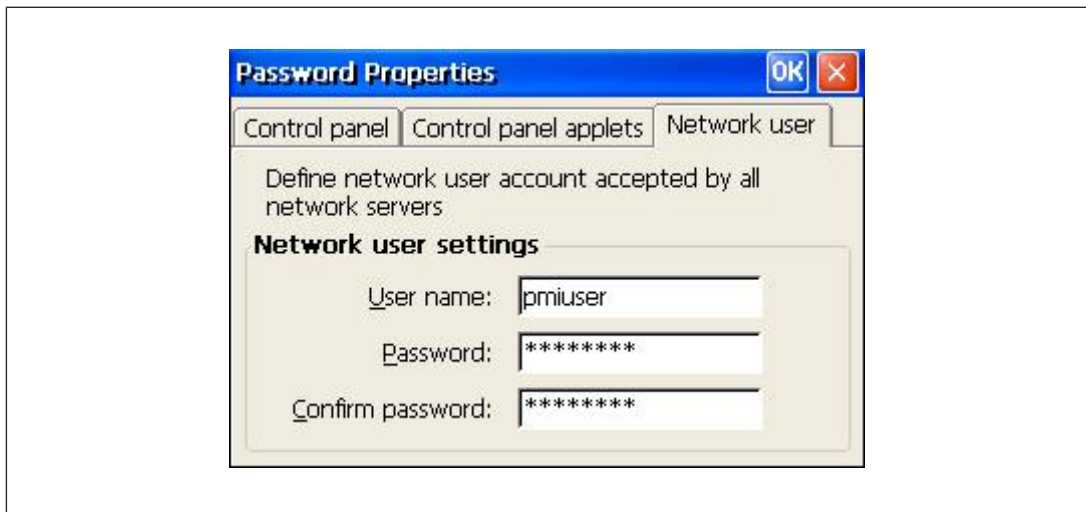
To change the default settings, follow the instructions below:

User name: Enter a user name
Password: Enter a password for the network user
Confirm password: Enter the new password again

> **INFORMATION**
>
> The ex-works setting for the network user is:
> User name: pmiuser
> Password: 1234

8   Care and Maintenance

8.1   Cleaning the touchscreen

Clean the unit's touchscreen at regular intervals. Use a damp cloth to do this.

> **!** **NOTICE**
>
> Make sure the unit is switched off before cleaning it. This prevents you from accidentally triggering functions when you touch the touchscreen.

Cleaning agents

Only use water and washing-up liquid to dampen the cloth. Never spray the cleaning agent directly onto the touchscreen - spray it onto the cleaning cloth instead. Never use aggressive solvents or abrasive cleaning agents.

9 Attachment

9.1 Supported Windows components

The devices work with the operating system "Microsoft Windows CE 6.0 Professional", the following Windows components are supported:

Applications

▸ Active Sync (Microsoft Windows Mobile Device Center)
▸ CAB File Installer/Uninstaller
▸ WordPad

Application and Service Development

▸ .NET Compact Framework 3.5
▸ Active Template Library (ATL)
▸ C Libraries and Runtimes (except OEM Floating Point CRT)
  - C++ Runtime Support for Exception Handling and Runtime Type Information
  - Full C Runtime
  - Standard IO (STDIO)
  - Standard IOASCII (STDIO)
  - Standard String Functions - ASCII (corestra)
▸ Component Services (COM and DCOM)
  - DCOM
  - DCOM Remoting
▸ Message Queuing (MSMQ)
▸ OBEX Client
▸ SOAP Client
▸ String Safe Utility Function
▸ XML - MSXML 3.0
  - XML Core Services and Document Object Model (DOM)
    - XML Error Strings
    - XML HTTP
    - XML Query Languages (XQL)
    - XML Stylesheet Language Transformations (XSLT)
    - XML SAX
  - XML Minimal Parser

Communication Services and Networking

▸ Networking General
  - Extended DNS Querying and Update (DNSAPI)
  - NDIS Packet Capturing DLL
  - NDIS User-mode I/O Protocol Driver
  - Network Driver Architecture (NDIS)
  - Network Utilities (IpConfig, Ping, Route)
  - TCP/IP

                  - It includes support for IP, ARP, ICMP, IGMP, TCP, UDP, name resolution and registration, DHCP.
- Windows Networking API/Redirector (SMB/CIFS)
- Winsock Support

▸ Networking - Local Area Networking (LAN)
  - Wired LAN (802.3, 802.5)

▸ Networking - Wide Area Networking (WAN)
  - Dial Up Networking (RAS/PPP)
  - Telephony API (TAPI 2.0)

▸ Servers
  - Core Server Support
  - File Server
      - File Server (SMB/CIFS)
  - FTP Server
  - Simple Network Time Protocol (SNTP)
      - SNTP Client with DST
      - SNTP Server
  - Telnet Server
  - Web Server (HTTPD)
      - Active Server Pages (ASP) Support
          - JScript 5.6
          - VBScript 5.6
      - Web Server Administration ISAPI
      - WEBDAV Support

Core OS Services

▸ System Event Log
▸ Battery Driver
  - Debugging Tools
      - Toolhelp API
▸ Device Manager
▸ Display Support
▸ Kernel Functionality
  - Fiber API
  - Format Message API
      - Format Message API - System Error Messages
  - Memory Mapped Files
  - Message Queue - Point-to-Point
  - Target Control Support (Shell.exe)
▸ UI based Notification
▸ Notification LED Support
▸ Power Management (Full)
▸ Serial Port Support
▸ UI Proxy for Kernerl-Mode-Drivers
▸ USB Host Support

- USB Function Driver
- USB Host Driver
- USB Human Input Device (HID) Class Driver
- USB Printer Class Driver
- USB Storage Class Driver
▶ Windows Embedded CE Driver Development Kit Support Library

File System and Data Store

▶ Compression
▶ Database Support (CEDB Database Engine)
    - CEDB Database Engine
▶ File and Database Replication (Bit-based)
▶ File System - Internal (RAM and ROM File System)
▶ Registry Storage (Hive-based Registry)
▶ Storage Manager
    - CD/UDFS File System
    - exFAT File System
    - FAT File System
    - Partition Driver
    - Release Directory File System
    - Storage Manager Control Panel Applet
    - Transaction-Safe FAT File System (TFAT)
▶ System Passwort

Fonts

The following fonts have been preinstalled:
▶ Arial
▶ Comic Sans MS
▶ Courier New
▶ Georgia
▶ Impact
▶ Kino
▶ MSLogo
▶ Symbol
▶ Tahoma
▶ Times New Roman
▶ Trebuchet MS
▶ Verdana
▶ Webdings
▶ Webding
▶ Wingding

> **INFORMATION**
>
> TTF formats can be post-installed.
>
> – Option 1:
>   Use the Windows CE Shell command "fontreg" (see Windows CE
>   Shell command- Pilz extensions)
>   Syntax: fontreg.exe FONTNAME [/h] [/H] [/?] [/help]
>
> – Option 2:
>   Create a new "Fonts" folder under "Flash/Windows" and save all TTF
>   fonts under "Flash/Windows/Fonts". Please note that after each re-
>   boot the complete content of "Flash/Windows" is copied to the "Win-
>   dows " folder of the RAM.

Graphics and multimedia formats

▶ Audio (Waveform Audio)

▶ Graphics

  - Alphablend API (GDI version)
  - DirectDraw
  - Gradient Fill Support
  - Imaging
     - Still Imagine Codec Support (Encode and Decode)
     - Still Image Decoders
        - BMP
        - GIF
        - ICO
        - JPG
        - PNG
        - TIFF
  - Still Image Encoders
     - BMP
     - GIF
     - JPG
     - PNG
     - TIFF

International

▶ Input Method Manager (IMM)

▶ Locale Service (National Language Support (NLS))

▶ Locale Specific Support (English US - US Keyboard)

Internet Client Services

▶ Browser Application
   - Internet Explorer 6.0 for Windows Embedded CE - Standard Components
      - Internet Explorer 6.0 Sample Browser
▶ Internet Explorer 6.0 for Windows Embedded CE Components
   - Internet Explorer Browser Control Host
   - Internet Explorer HTML/DHTML API
      - Internet Explorer Plug-in Image Decoder API
         - Internet Explorer PNG Image Decoder
         - MSHTML Data Binding
      - Internet Explorer Multi-Language Base API
      - URL Moniker Service
      - Windows Internet Services
      - XML Data Islands
      - XML MIME Viewer
   - Internet Option Control Panel
   - Scripting
      - JScript 5.6
         - Script Authoring (Jscript)
         - Script Encode (Jscript)
      - VBScript 5.6
         - MsgBox and InputBox support
         - Script Authoring
         - Script Encode (VBScript)

Security

▶ Authentication Services (SSPI)
   - NTLM
   - Schannel (SSL/TLS)
▶ Credential Manager
▶ Cryptography Service (CryptoAPI 1.0) with High Encryption Provider
   - Certificates (CryptoAPI 2.0)

Shell and User Interface

▶ Graphics, Windowing and Events
   - Minimal GDI Configuration
   - Minimal GWES Configuration
   - Minimal Input Configuration
   - Minimal Window Manager Configuration
▶ Shell
   - AYGShell API Set
   - Command Shell
      - Command Processor
      - Console Window
   - Graphical Shell - Standard Shell

▸ User Interface
- Common Controls
- Common Control
- Common Dialog Support
- Control Panel Applets
- Customizeable UI
- Windows XP-like Sample Skin
- Gesture
- Gesture Animation Support
- Gesture Support for Win32 Controls
- Single-Touch Gesture Recognition
- Mouse
- Network User Interface
- Software Input Panel
- Software-based Input Panel (SIP)
- SIP for Large Screens
- SIP for Small Screens
- Software-based Input Panel Drivers
- Touch Screen (Stylus)

Windows Embedded CE Error Reporting

▸ Error Report Generator

▸ Error Report Transfer Driver

9.2   Windows CE Shell commands

Commands Shell parameters

Command	Description
"/C"	Execute command and exit "Command processor shell".
"/K"	Execute command, "Command processor shell" remains active
"string"	Command that is to be executed

Syntax of the command line

Command	Description
"COMMAND"	Command name
"OPTIONS"	Command specification
">"	Forward the output text to a file
"2>"	Forward the output fault to a file
">>"	Attach the output text to a file
"2>>"	Attach the output fault to a file
"<"	reads input text from a file
"&"	separates a command or several commands

Command	Description
"|"	separates a command or several commands and sends the output of a command as input for the command that follows
"file1"	Name of the file that includes the output
"file2"	Name of the file that includes the input

List of all possible Shell commands

Command	Description
"ATTRIB"	shows or changes the properties of a file
"CALL"	calls up a batch program from another batch program
"CHDIR, CD"	shows the name of the current directory or changes the current directory
"CLS"	deletes the screen
"COPY"	copies one or several files to a different directory
"DATE"	shows or sets the date
"DIR"	shows the files and subdirectories that a directory includes
"ECHO [message] [on| off] "	shows a message or activates/deactivates the echo
"ERASE, DEL"	deletes a file or several files
"EXIT"	exits "command processor shell"
"GOTO"	causes the "command processor" to jump into a highlighted line in a batch program
"HELP"	shows a list of available commands
"IF"	executes conditional processing in a batch program
"MKDIR, MD"	creates a directory
"MOVE"	moves files from one directory to another
"net"	executes network-related operations
"PATH"	shows or sets a search path for executable files
"PAUSE"	interrupts the processing of a batch program
"PROMPT"	changes the prompt for the "command processor"
"PWD"	prints the current directory path
"REM"	saves comments to a batch file
"RENAME, REN"	changes the name of one or several files
"RMDIR, RD"	deletes a directory
"SET"	sets or removes an environment variable or shows the values of all environment variables
"SHIFT"	changes the position of variable parameters in a batch file
"START"	starts a separate window that executes a certain application or command
"TIME"	shows the system time or sets it

Command	Description
"TITLE"	sets the title of the "command processor" window
"TYPE"	shows the content of a text file or several text files

9.3   Windows CE Shell commands - Pilz expansions

INFORMATION

You can use the command **"/?"** to call up the help. There you find more information on the individual commands.

Common parameters

Command	Description
"/h"	shows the help
"/H"	shows the help
"/?"	shows the help
"/help"	shows the help

fontreg

Command for registering additional TTF fonts on the device
Syntax: *fontreg FONTNAME*

Parameter	Description
FONTNAME	can include placeholders, e. g. *.ttf; when "FONT-NAME" is a directory, all the fonts are registered in the directory.

format

Command for formatting a removable data medium for use with Windows CE
Syntax: *format <volume> [/Q] [/A size] [/FS <File system>]*

Parameter	Description
/FS	determines the file system (FAT12, FAT16, FAT32, or exFAT)
/Q	performs quick formatting
/LLF	performs formatting with a low formatting rate
/PART	creates a standard partition after formatting with a low formatting rate
/A	overwrites the standard sizes of memory allocation
/T	creates a TFAT format
/Y	Confirmation

hostetc

Administration of host name assignment to the IP address
Syntax: *hostetc [/add] [/ipv4 <ip string>] <hostname>*

Parameter	Description
/add	adds a new host
/delete	deletes a host
/list	shows all hosts
/a	creates an Alias name (e. g. -a alias1,alias2)
/ipv4	IP-String v4
/ipv6	IP-String v6
/t	Period of validity (example: \"1985-04-12T23:20:50.52Z\", rfc 3339)

kill

Command used to force the completion of a process
Syntax: *kill [EXENAME] /[PID]*

Parameter	Description
EXENAME	completes the process via the process name (e. g. kill *pnotepad.exe)*
/PID	completes the process via the PID hexadecimal format (e. g. *kill /fa00ce)*

pnotepad

Command use to start a simple text editor
Syntax: *pnotepad file*

Parameter	Description
file	after starting the text editor a file is opened

ps

shows all the active processes
Syntax: *ps*

reboot

Command used to restarting the unit
Syntax: *reboot <sec>*

Parameter	Description
<sec>	Waiting period in seconds before the device is restarted.

regedit

Command used to start the registration editor
Syntax: *regedit*

regerase

Command used to delete the present registration of the device; in the next boot process the device uses the default registration
Syntax: *regerase [-r]*

Parameter	Description
-r	forces a reboot process

regexp	Commend used to export a registration key including subkeys to a file (*.reg) Syntax: *regexp /r <BaseKey> /f <OutFile> [/c] [ALL]*

Parameter	Description
/r <BaseKey>	Registration key that is to be exported
/f <OutFile>	Name of the target file
/c	converts REG_MUI_SZ to REG_SZ
/ALL	Parameter used to export the whole registration to a file (*.reg)

regimp	Command used to import a registration file (*.reg) Syntax: *regimp <InFile> [/temp] [/info]*

Parameter	Description
<InFile>	File name
/temp	temporarily saved, the present registration is not overwritten
/info	Status information on the success/failure of the action

regsave	Command used to permanently save the current registration Syntax: *regsave*

regsvrce	Command used to register ActiveX module (*.ocx, *.dll) Syntax: *RegsvrCE [/u] [/n] [/s] [/i[:cmdline]] dllname*

Parameter	Description
/u	Deregisters the server
/n	"DllRegisterServer" is not called up, the parameter must be used with "/i"
/s	suppresses messages on the display
/i <cmdline>	transmits an optional command line (cmdline) to DllInstall; when "/i" is combined with "/u", DllUninstall is executed
dllname	DLL name

screenshot	Command used to print a screenshot or to save a file Syntax: screenshot -p <port> -d <devicename> -x <filename> -f <formsize> -o [p]ortrait [l]andscape -q [d]raft, [h]igh -s <scalefactor> -c [c]olor,[m]ono -n <copies>

Parameter	Description
-p <port>	Printer port
-d <devicename>	Printer name
-x <filename>	Save screenshot as a file
-f <formsize>	Paper size (A4, B5, Legal and Letter)
-o [p] / -o [l]	Print orientation portrait / landscape
-q [d] / -q[h]	Print quality draft / high
-s <scalefactor>	Scaling, format: 1.2 (e.g. 0.5, 2.0,..)
-c[c] /- c[m]	Colour (c) / black and white (m)

	-n <Copies>	Number of copies
sleep	Command used to insert a waiting time between to operations (sleep mode); Syntax: *sleep <ms>*	
	Parameter	Description
	<ms>	Waiting time in milliseconds
usrmgr	Command used to manage network subscribers Syntax: *usrmgr [-a|-d|-l] [<user name> [<password>]] -gn -gd -gl -gm -gat -grf*	
	Parameter	Description
	-a <user name> <password>	Add or update network subscriber
	-d <user name>	Remove network subscriber
	-l	show all network subscribers
	-gn <group name>	add new group
	-gd <group name>	delete group
	-hl	show all groups
	-gm	show group members
	-gat <group name> <user name>	add group member
	-grf <group name> <user name>	delete group member
ver	Command used to show information on the device Syntax: *ver [/d] [/a] [/hw /p /o /l /s /r /c]*	
	Parameter	Description
	/d	Data mode, display without description, e. g.: .. PMI 515 10000007 264515 ..
	/a	show all information
	/hw	outputs the hardware version
	/p	outputs the processor type
	/o	outputs the build version of the operating system
	/l	outputs the bootloader version
	/t	outputs the device type
	/s	outputs the serial number
	/r	outputs the order number
	/c	outputs the chip set version

xcopy Command used to copy files and directory structures
Syntax: *xcopy [-h | -y | -g | -s | -x | -t <title>] <sourcedir> <targetdir>*

Parameter	Description
-y	Messages are suppressed
-g	Use dialog windows
-s	Start copying automatically, only makes sense with -g
-x	End copy dialog automatically, only makes sense with -g
-t	Set window title (default setting: xcopy), only makes sense with -g
-c	Delete target directory first
<SourceDir>	absolute path of the source directory
<TargetDir>	absolute path of the target directory

10 Technical details

Order no. 264509 – 264518

See below for more order numbers

General	264509	264515	264516	264518
Approvals	CE, EAC (Euras-ian), cULus Listed	CE, EAC (Euras-ian), cULus Listed	CE, EAC (Euras-ian), cULus Listed	CE, EAC (Euras-ian), cULus Listed
Electrical data	**264509**	**264515**	**264516**	**264518**
Supply voltage				
Voltage	24 V	24 V	24 V	24 V
Kind	DC	DC	DC	DC
Voltage tolerance	-15 %/+20 %	-15 %/+20 %	-15 %/+20 %	-15 %/+20 %
Output of external power supply (DC)	2,5 W	3,6 W	6,5 W	5,8 W
Display	**264509**	**264515**	**264516**	**264518**
Display type	TFT	TFT	TFT	TFT
Display diagonal	8,9 cm	14,7 cm	16 cm	18 cm
Display resolution	320 x 240	320 x 240	640 x 480	800 x 480
Display colour depth	65536	65536	65536	65536
Touchscreen	Resistive	Resistive	Resistive	Resistive
Operating elements	**264509**	**264515**	**264516**	**264518**
Keyboard type	Membrane keypad with snap dome	–	–	–
Number of keys	8	–	–	–
Electrical life	1,000,000 cycles	–	–	–
CPU	**264509**	**264515**	**264516**	**264518**
Processor type	RISC processor	RISC processor	RISC processor	RISC processor
Processor clock speed	1 GHz	1 GHz	1 GHz	1 GHz
Working memory (RAM)	256 MB	256 MB	256 MB	256 MB
Program memory (Flash)	512 MB	512 MB	512 MB	512 MB
Real-time clock	yes	yes	yes	yes
Removable data medium	**264509**	**264515**	**264516**	**264518**
Type	SD card	SD card	SD card	SD card
USB interface	**264509**	**264515**	**264516**	**264518**
Number of USB Hosts	1	1	2	2
Number of USB Slaves	1	1	1	1
Ethernet interface	**264509**	**264515**	**264516**	**264518**
Number	1	1	1	1

Serial interface	264509	264515	264516	264518
Number of RS232 interfaces	1	1	1	1
Audio interfaces	**264509**	**264515**	**264516**	**264518**
Number	1	1	1	1
Environmental data	**264509**	**264515**	**264516**	**264518**
Ambient temperature				
Temperature range	0 - 50 °C	0 - 50 °C	0 - 50 °C	0 - 50 °C
Storage temperature				
In accordance with the standard	EN 60068-2-1/-2	EN 60068-2-1/-2	EN 60068-2-1/-2	EN 60068-2-1/-2
Temperature range	-25 - 60 °C	-25 - 60 °C	-25 - 60 °C	-25 - 60 °C
Climatic suitability				
In accordance with the standard	EN 60068-2-78	EN 60068-2-78	EN 60068-2-78	EN 60068-2-78
Humidity	93 % r. h. at 40 °C	93 % r. h. at 40 °C	93 % r. h. at 40 °C	93 % r. h. at 40 °C
Condensation during operation	Not permitted	Not permitted	Not permitted	Not permitted
EMC	EN 61000-6-2, EN 61000-6-4	EN 61000-6-2, EN 61000-6-4	EN 61000-6-2, EN 61000-6-4	EN 61000-6-2, EN 61000-6-4
Vibration				
In accordance with the standard	EN 60068-2-6	EN 60068-2-6	EN 60068-2-6	EN 60068-2-6
Frequency	10 - 150 Hz	10 - 150 Hz	10 - 150 Hz	10 - 150 Hz
Acceleration	1g	1g	1g	1g
Shock stress				
In accordance with the standard	EN 60068-2-27	EN 60068-2-27	EN 60068-2-27	EN 60068-2-27
Acceleration	15g	15g	15g	15g
Duration	11 ms	11 ms	11 ms	11 ms
Protection type				
In accordance with the standard	EN 60529	EN 60529	EN 60529	EN 60529
Housing	IP64	IP65	IP65	IP65
In accordance with UL	1,2,5	1,2,5,4/4X indoor use only	1,2,5,4/4X indoor use only	1,2,5
Mechanical data	**264509**	**264515**	**264516**	**264518**
Dimensions				
Height	87 mm	144 mm	165 mm	160 mm
Width	157 mm	170 mm	212 mm	232 mm
Depth	40 mm	40 mm	62,5 mm	62,5 mm
Weight	316 g	659 g	1.344 g	1.364 g

Order no. 264526 – 264538

General	264526	264531	264538
Approvals	CE, EAC (Eurasian), cU-Lus Listed	CE, EAC (Eurasian), cU-Lus Listed	CE, EAC (Eurasian), cU-Lus Listed
Electrical data	**264526**	**264531**	**264538**
Supply voltage			
Voltage	24 V	24 V	24 V
Kind	DC	DC	DC
Voltage tolerance	-15 %/+20 %	-15 %/+20 %	-15 %/+20 %
Output of external power supply (DC)	6,3 W	8,9 W	11 W
Display	**264526**	**264531**	**264538**
Display type	TFT	TFT	TFT
Display diagonal	26 cm	31 cm	38 cm
Display resolution	800 x 600	800 x 600	1024 x 768
Display colour depth	65536	65536	65536
Touchscreen	Resistive	Resistive	Resistive
CPU	**264526**	**264531**	**264538**
Processor type	RISC processor	RISC processor	RISC processor
Processor clock speed	1 GHz	1 GHz	1 GHz
Working memory (RAM)	256 MB	256 MB	256 MB
Program memory (Flash)	512 MB	512 MB	512 MB
Real-time clock	yes	yes	yes
Removable data medium	**264526**	**264531**	**264538**
Type	SD card	SD card	SD card
USB interface	**264526**	**264531**	**264538**
Number of USB Hosts	2	2	2
Number of USB Slaves	1	1	1
Ethernet interface	**264526**	**264531**	**264538**
Number	1	1	1
Serial interface	**264526**	**264531**	**264538**
Number of RS232 interfaces	1	1	1
Audio interfaces	**264526**	**264531**	**264538**
Number	1	1	1
Environmental data	**264526**	**264531**	**264538**
Ambient temperature			
Temperature range	0 - 50 °C	0 - 50 °C	0 - 50 °C
Storage temperature			
In accordance with the standard	EN 60068-2-1/-2	EN 60068-2-1/-2	EN 60068-2-1/-2
Temperature range	-25 - 60 °C	-25 - 60 °C	-25 - 60 °C

Environmental data	264526	264531	264538
Climatic suitability			
In accordance with the standard	EN 60068-2-78	EN 60068-2-78	EN 60068-2-78
Humidity	93 % r. h. at 40 °C	93 % r. h. at 40 °C	93 % r. h. at 40 °C
Condensation during operation	Not permitted	Not permitted	Not permitted
EMC	EN 61000-6-2, EN 61000-6-4	EN 61000-6-2, EN 61000-6-4	EN 61000-6-2, EN 61000-6-4
Vibration			
In accordance with the standard	EN 60068-2-6	EN 60068-2-6	EN 60068-2-6
Frequency	10 - 150 Hz	10 - 150 Hz	10 - 150 Hz
Acceleration	1g	1g	1g
Shock stress			
In accordance with the standard	EN 60068-2-27	EN 60068-2-27	EN 60068-2-27
Acceleration	15g	15g	15g
Duration	11 ms	11 ms	11 ms
Protection type			
In accordance with the standard	EN 60529	EN 60529	EN 60529
Housing	IP65	IP65	IP65
In accordance with UL	1,2,5,4/4X indoor use only	1,2,5,4/4X indoor use only	1,2,5,4/4X indoor use only
Mechanical data	264526	264531	264538
Dimensions			
Height	243 mm	276 mm	332 mm
Width	317 mm	352 mm	412 mm
Depth	62,5 mm	63,3 mm	63,3 mm
Weight	2.227 g	2.860 g	4.166 g

Where standards are undated, the 2010-12 latest editions shall apply.

11   Order reference

Product type	Features	Order No.
PMI 509	Operator terminal, 320 x 240 pixel resolution, analogue resistive touchscreen, 4 function keys	264 509
PMI 515	Operator terminal, 320 x 240 pixel resolution, analogue resistive touchscreen	264 515
PMI 516	Operator terminal, 640 x 480 pixel resolution, analogue resistive touchscreen	264 516
PMI 518	Operator terminal, 800 x 480 pixel resolution, analogue resistive touchscreen	264 518
PMI 526	Operator terminal, 800 x 600 pixel resolution, analogue resistive touchscreen	264 526
PMI 531	Operator terminal, 800 x 600 pixel resolution, analogue resistive touchscreen	264 531
PMI 538	Operator terminal, 1024 x 768 pixel resolution, analogue resistive touchscreen	264 538