

PMIvisu/PMIopen IV



Operator terminals

► D

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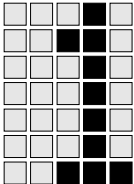
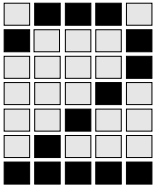
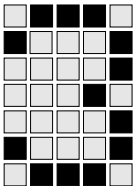
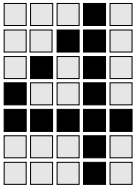
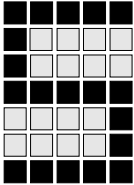
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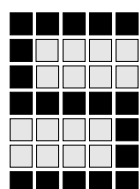
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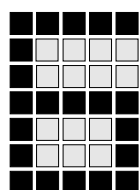
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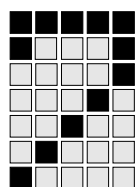
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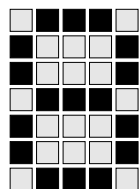
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Introduction

This operating manual is for the following units:

- **PMI v416 / PMI o416**
- **PMI v426 / PMI o426**
- **PMI v431 / PMI o431**
- **PMI v438 / PMI o438**

The documentation comprises:

- The PMIvisu/PMIopen hardware description
- The setup description



INFORMATION

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

Overview of operating manual

This operating manual is divided into the following chapters:

1 Introduction

The introduction is designed to familiarise you with the contents, structure and specific instructions in this operating manual.

2 Overview

This chapter provides information on the unit's most important features and gives a brief overview of the application range.

3 Safety

This chapter **absolutely must** be read. It contains important information on safety and intended use.

4 Unit description

Introduces the PMIvisu/PMIopen in short, simplified form.

5 Installation and wiring

This chapter describes how to install and wire the PMIvisu/PMIopen.

6 Commissioning

This chapter describes the setup.

Introduction

7 Care and maintenance

This chapter describes how to care for and maintain the PMlvisu/PMlopen.

8 Technical details

Terminology

- **PMI v416, PMI v426, PMI v431 and PMI v438**

... are called **PMlvisu** in this operating manual.

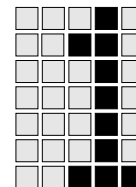
- **PMI o416, PMI o426, PMI o431 and PMI o438**

... are called **PMlopen** in this operating manual.

- **PMlvisu and PMlopen**

... are called **PMI** in this operating manual.

Differences between the units will be indicated where necessary.



Definition of symbols

Information in this manual that is of particular importance can be 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** which could lead to **serious injury or 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.



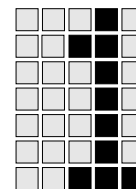
NOTICE

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



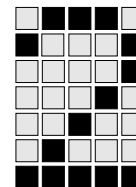
INFORMATION

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



Introduction

Notes



Overview

Concept

PMIvisu/PMIopen is an operator terminal that is used to operate and monitor technical processes. The touchscreen is integrated in a robust housing. When installed properly, the front of the unit meets protection type IP 65. PMIvisu/PMIopen is an information system with graphics capability. Typically it is used as an interface between man and machine (MMI function). **PMIvisu** is supplied **with** graphics software and **PMIopen** is supplied **without** graphics software.

Components

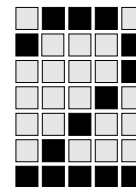
Display

- PMI 416: 6.5" (165 mm), 640 x 480 pixels and 65 536 colours
- PMI 426: 10.4" (269 mm), 640 x 480 pixels and 65 536 colours
- PMI 431: 12.1" (307 mm), 800 x 600 pixels and 65 536 colours
- PMI 438: 15.1" (380 mm), 1024 x 768 pixels and 65 536 colours

Interfaces

The operator terminal has:

- Two serial RS-232 interfaces; one of the interfaces is switchable (RS-232/422/485).
- Four USB host interfaces
- One USB slave interface
- One parallel printer interface
- One PS/2 connection
- One Ethernet interface
- One additional Ethernet interface (optional)
- Internal fieldbus interface (optional; only on **PMIvisu**)
- Two audio interfaces (Line In/Line Out)



Overview

- PCMCIA: 1 slot type II or type III
- External VGA connection

Range

PMI 416

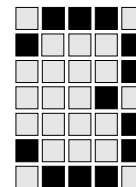
- Operator terminal
- 5 PMI retaining clamps
5 raised head screws (M4)
- Plug for supply voltage
- Documentation

PMI 426, PMI 431

- Operator terminal
- 6 PMI retaining clamps
12 screws (M4)
5 raised head screws (M4)
- Plug for supply voltage
- Documentation

PMI 438

- Operator terminal
- 8 PMI mounting plates
16 screws (M4)
16 raised head screws (M4)
- Plug for supply voltage
- Documentation



Safety

Intended use

This unit is used to operate and monitor technical processes.

PMlopen provides the opportunity to install third-party software.

PILZ GmbH & Co. KG accepts no liability for any damages, nor does it provide support or any guarantee for the functionality of the installed software.

PMlopen is supplied without any application software.

It is up to the customer to install this and start it appropriately.



INFORMATION

Please ensure that the graphics software is suitable for the ARMV4 processor type and the Windows CE.NET 4.2 operating system.

The installation of the following software has been tested:

- zenOn from COPA-DATA
- Web Studio from InduSoft
- Movicon from Progea

With **PMIvisu**, the process can be visualised by means of screens which are directly edited by the user, and it can also be controlled via various available functions. The software used to provide the link to the technical process is described in the "PMI-PRO (open) driver description" documentation.



CAUTION!

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

The unit is designed to be installed within an electromagnetic industrial environment. To ensure electromagnetic compatibility, the correct procedures must be carried out when installing the unit. Intended use includes complying with the technical details stated at the end of this operating manual. Any component, technical or electrical modifications carried out will be deemed as improper use.

Safety

Safety regulations

Failure to keep to the following safety regulations will render all warranty and liability claims invalid.

Additionally, all rules and regulations for accident prevention for the particular area of application must be met. In particular, VDE and all local regulations regarding safety measures should also be taken into account.

Use of qualified operating personnel

It is the owner's responsibility to employ only personnel who

- are familiar with the basic regulations concerning health and safety/accident prevention,
- have read and understood the safety information given in this operating manual.

Installation and commissioning must only be carried out by competent, qualified personnel. This is particularly important for electrical connections.



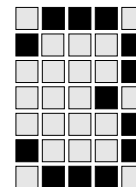
CAUTION!

Electrostatic discharge can damage components in the unit. Before working in the area of the interfaces and memory cards, ensure against discharge by touching an earthed, conductive surface or by wearing an earthed armband, for example.

Warranty and liability

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

- The unit was used contrary to the purpose for which it is intended
- Damage can be attributed to not having followed the guidelines in the documentation
- Unauthorised modifications were carried out
- The unit was used outside the technical specifications
- The unit was opened or unauthorised repairs were carried out
- Operating personnel were not suitably trained or adequately instructed



Unit-specific safety regulations

Before you install and commission the unit, you should refer to any regulations to this regard as laid down by the controller manufacturer or owner.

- **Installation site**

- Do not position PMlvisu/PMlopen close to flammable materials.
- When installing the unit within a control cabinet, you must ensure the unit's venting slots are not obstructed, otherwise the unit could be damaged via overheating.
- Protect the unit from direct sunlight and dust.

- **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) are to be wired using suppression elements (e.g. RC elements). This is particularly important if these inductive loads are fed from the same supply.
- Route power cable physically separate from the data lines (recommended minimum distance: 10 cm/3.94"). This will avoid inductive and capacitive interference.
- Connect the earth point to the earth conductor PE  using the shortest possible copper conductor (cross section $\geq 2.5 \text{ mm}^2$). Interference voltages (supply and signal lines) and electrostatic voltages (contact) are diverted via the earthing point.

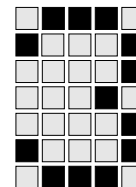
- **Supply voltage**

- The supply voltage must be +24 V DC.



WARNING!

Safe electrical isolation must be ensured for the external 24 V supply. Failure to do so could result in electric shock. Power supplies must conform to DIN VDE 0551/EN 60 742 and EN 50178.



Safety

- **Operation**

- Plan the system correctly to ensure that a communication error between the PMIvisu/PMIopen 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 unit.

- **Maintenance**

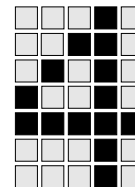
Do not use thinners or organic solvents to clean the unit and touchscreen interface.



NOTICE

The touchscreen interface 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 chapter 7.



Unit description

Front view, PMI 416/426/431/438

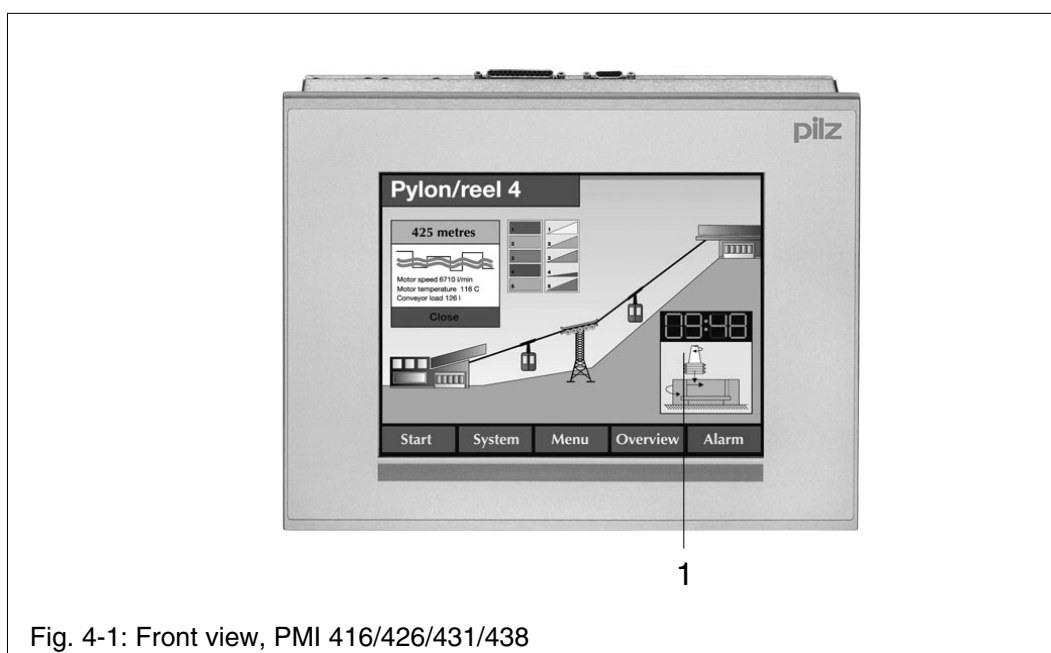


Fig. 4-1: Front view, PMI 416/426/431/438

- 1: Touchscreen (see "Technical details")

Unit description

Side view, PMI 416

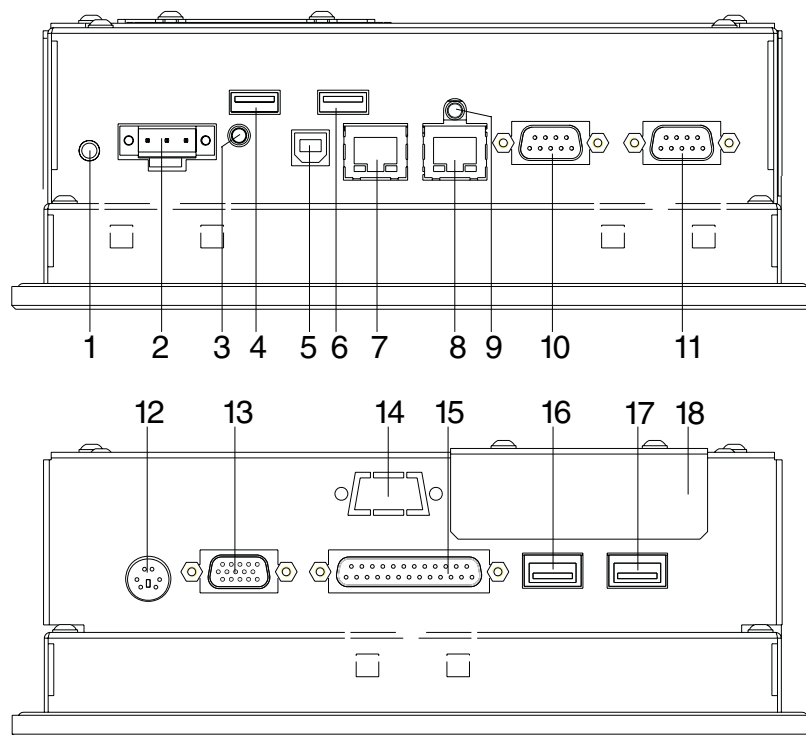
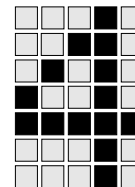


Fig. 4-2: Side view, PMI 416

- 1: Earthing
- 2: +24 V DC supply voltage
- 3: LINE IN audio interface
- 4: USB host 1
- 5: USB-Slave
- 6: USB host 2
- 7: Ethernet interface (100 BaseTX)
- 8: Ethernet interface (100 BaseTX) (optional)
- 9: LINE OUT audio interface
- 10: COM1 (RS-232) serial interface
- 11: COM2 (RS-232/422/485 switchable) serial interface
- 12: PS/2
- 13: External VGA connection
- 14: Fieldbus connection (optional)
- 15: Parallel interface
- 16: USB host 3
- 17: USB host 4
- 18: PCMCIA



Side view, PMI 426/431/438

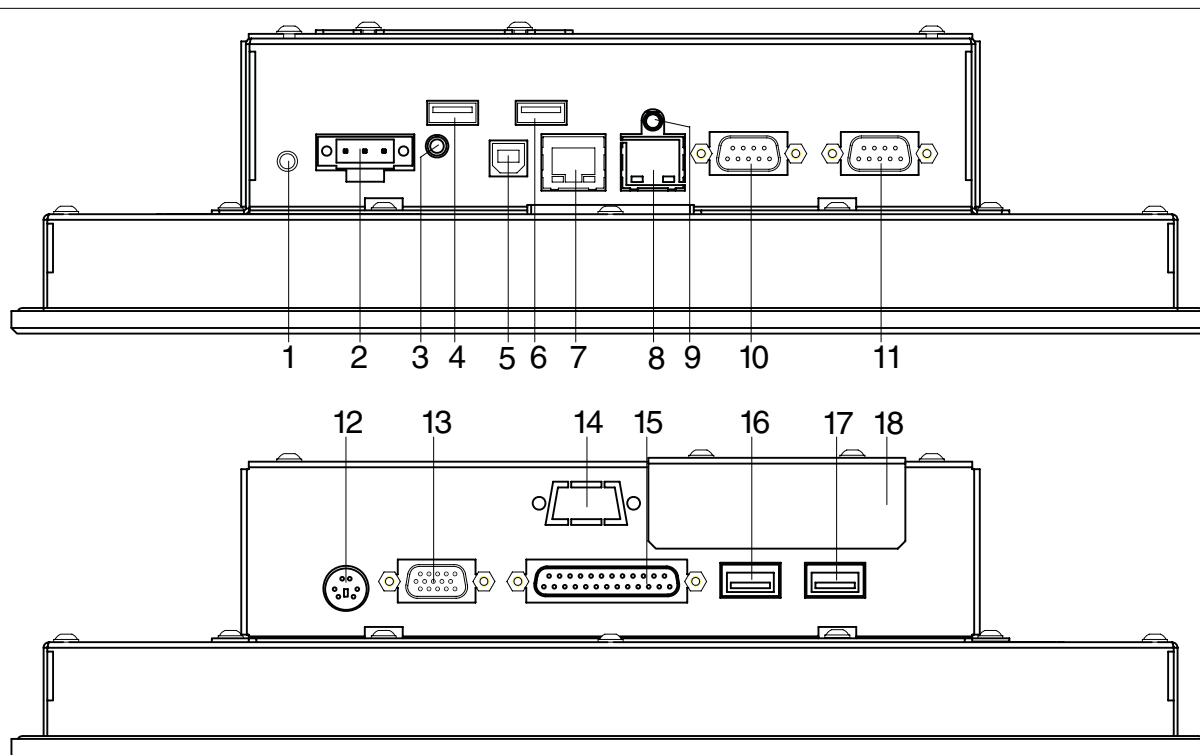
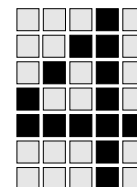


Fig. 4-3: Side view, PMI 426/431/438

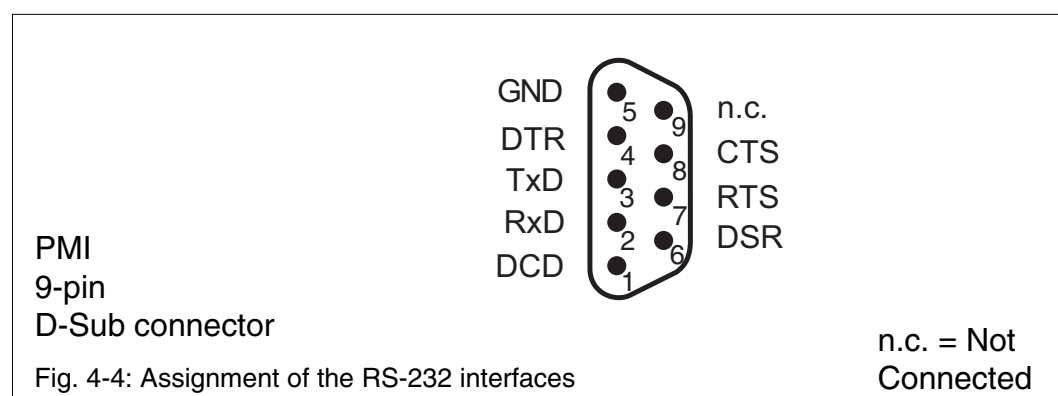
- 1: Earthing
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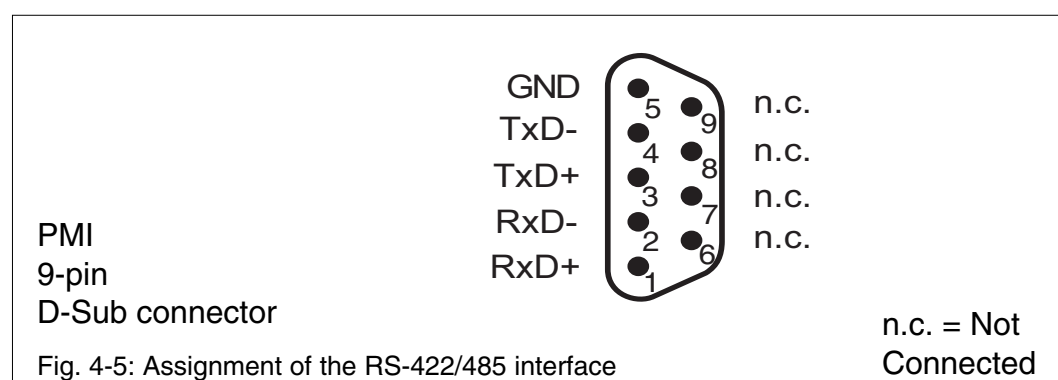
Unit description

Interfaces

Assignment of the RS-232 interfaces (COM1, COM2 in RS-232 mode)



Assignment of the RS-422/485 interface (COM2, must be switched to RS-422/485 in the setup)

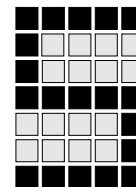


USB port



INFORMATION

The USB port is a standard interface, which is unsuitable for continuous duty in an industrial environment due to its reduced noise immunity. For this reason you should limit the time you spend using the USB port to data transfer and PMI diagnostics.



Installation and wiring

Safety

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

Before you install and commission the unit, you should refer to any regulations to this regard as laid down by the manufacturer or operator.

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 maintained all round the unit.
- Protect the unit from direct sunlight and dust.
- Do not use chemicals close to the unit.
- Ensure the maximum permissible ambient and operating temperatures are not exceeded.
- Ensure that neither liquids nor objects can enter the unit at any time.
- Do **not** position the unit close to flammable materials.

Installation and wiring

Nominal dimensions, PMI 416

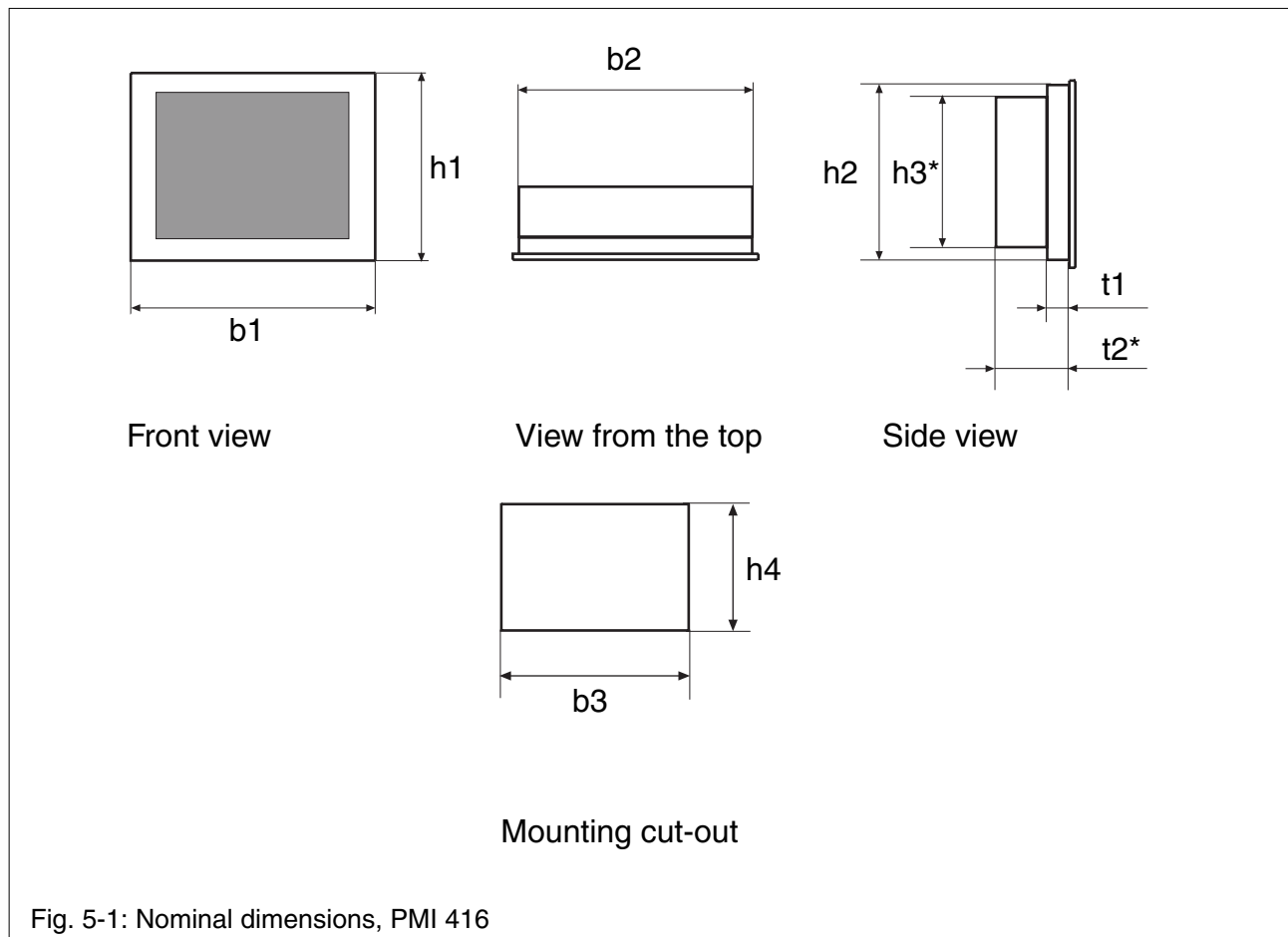
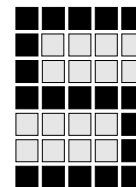


Fig. 5-1: Nominal dimensions, PMI 416

	PMI 416
b1/mm	212 (8.346")
h1/mm	165 (6.496")
b2/mm	195 (7.677")
h2/mm	146 (5.748")
h3*/mm	126,5 (4.980")
t1/mm	24 (0.944")
t2*/mm	71,7 (2.823")
b3/mm	197 + 1 (7.756" + 0.039")
h4/mm	148 + 1 (5.826" + 0.039")

h^*/t^* Nominal dimensions without connectors

NOTE: Allow extra for hardware connections!



Nominal dimensions, PMI 426/431/438

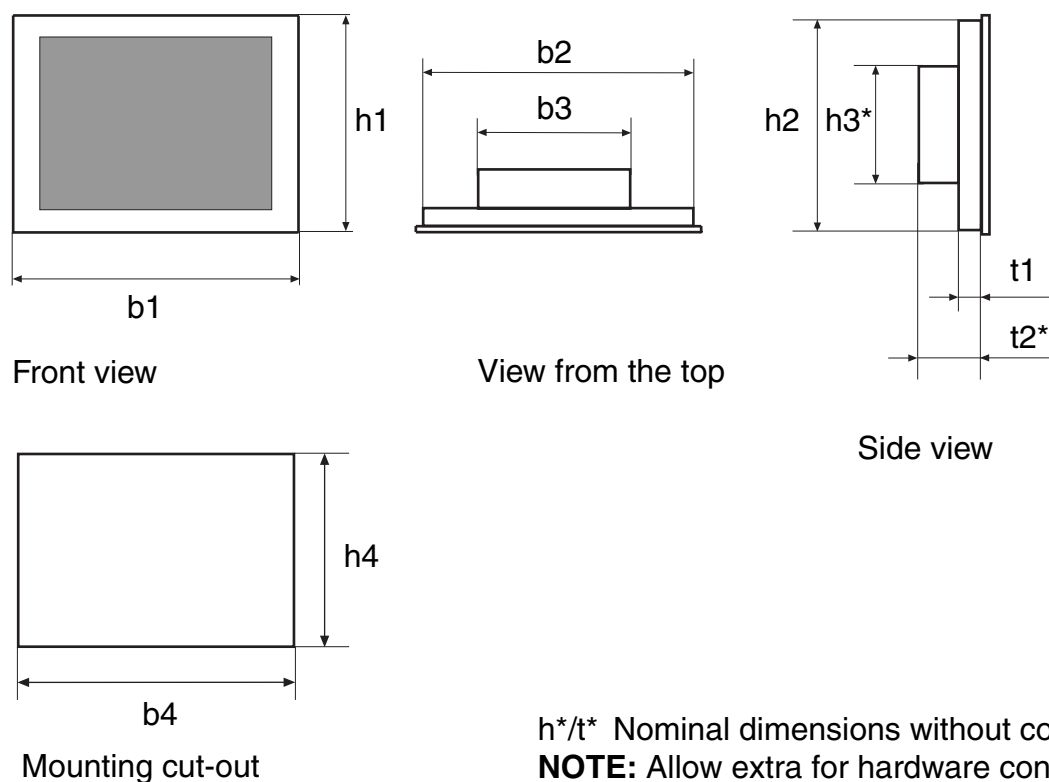


Fig. 5-2: Nominal dimensions, PMI 426/431/438

	PMI 426	PMI 431	PMI 438
b1/mm	317 (12.480")	352 (13.858")	412 (16.220")
h1/mm	243 (9.567")	276 (10.87")	332 (13.071")
b2/mm	300 (11.811")	337 (13.267")	390 (15.354")
b3/mm	195,4 (7.692")	195,4 (7.692")	195,4 (7.692")
h2/mm	221 (8.7")	252,4 (9.937")	308,4 (12.141")
h3*/mm	127,5 (5.019")	127,5 (5.019")	127,5 (5.019")
t1/mm	29,9 (1.177")	30,7 (1.208")	31 (1.220")
t2*/mm	75,4 (2.968")	76,2 (3")	76,2 (3")
b4/mm	302 + 1 (11.889" + 0.039")	339 + 1 (13.346" + 0.039")	393 + 1 (15.472" + 0.039")
h4/mm	223 + 1 (8.779" + 0.039")	255 + 1 (10.039" + 0.039")	311 + 1 (12.220" + 0.039")

Installation and wiring

Installing the unit

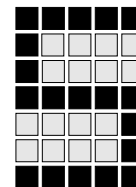
When installing the unit, please note the following:

- For reasons of stability, 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 10 cm/3.94" should be maintained all round the unit.
- 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.
 - the gasket is not damaged.
 - the wall thickness is at least 2.5 mm.
- Protect the unit from falling by ensuring that the fixing screws are sufficiently tightened.

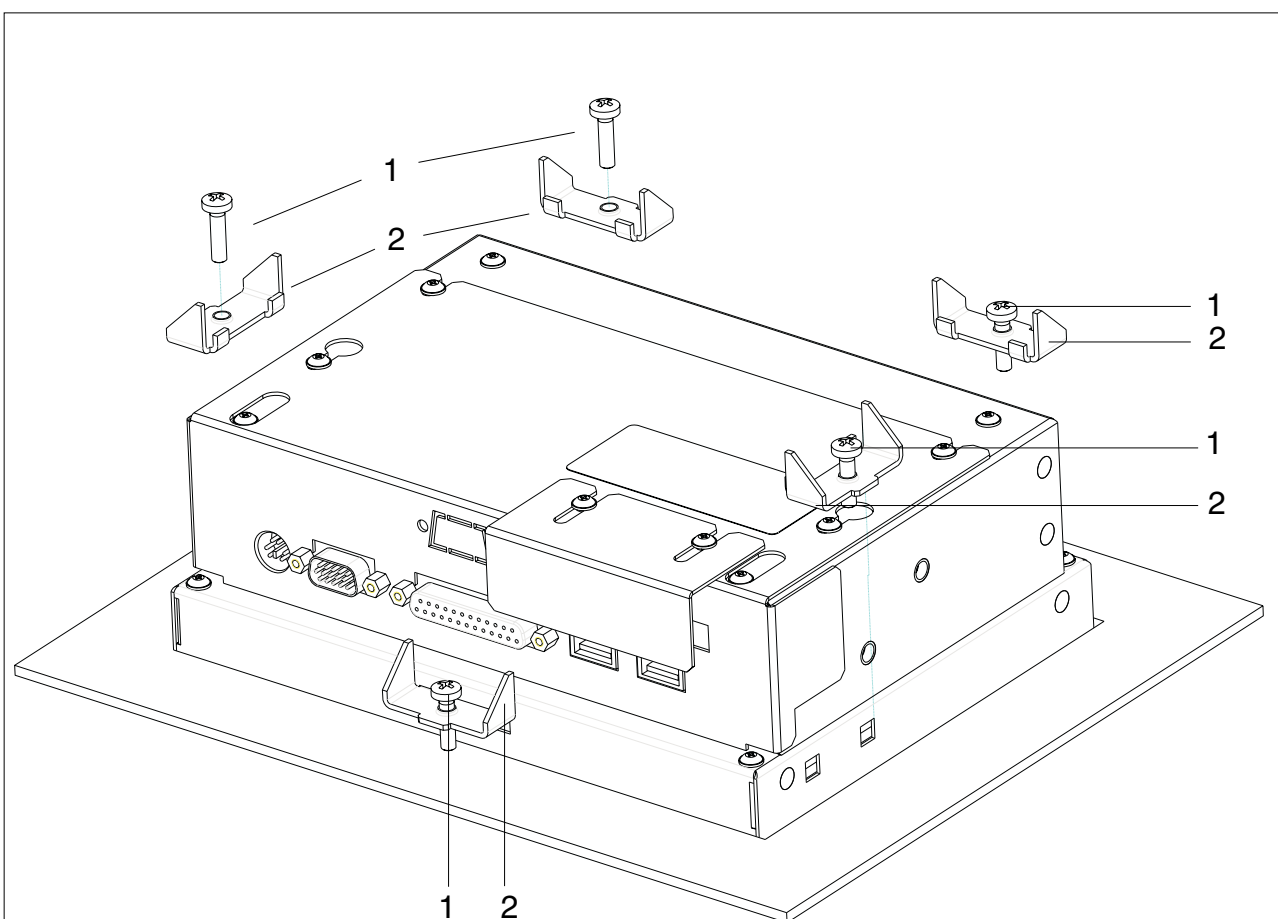


NOTICE

The torque setting on the fixing screws should be max. 0.15 Nm.



Installing the PMI 416



ENGLISH

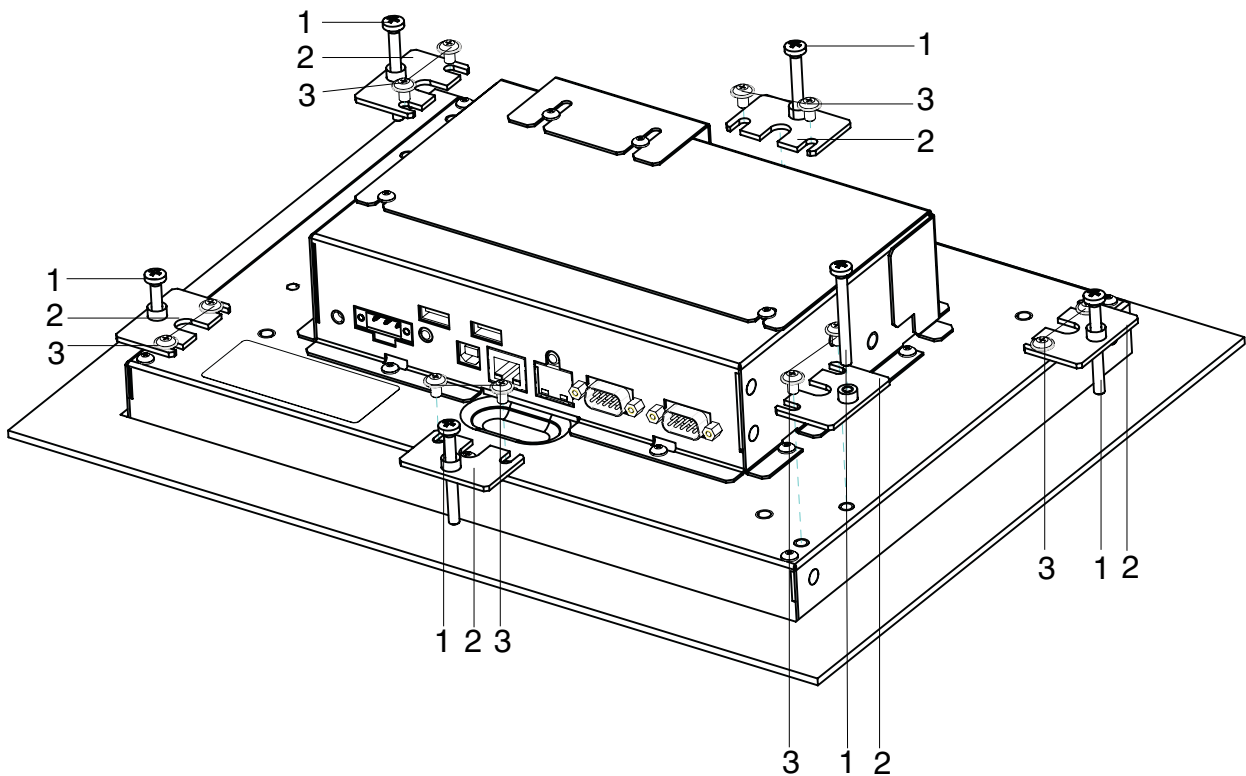
The PMI 416 fastening kit consists of:

- 1: Raised head screw (M4)
- 2: Retaining clip

Fig. 5-3: Installing the PMI 416

Installation and wiring

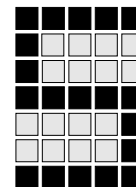
Installing the PMI 426/431/438



The PMI 426/431/438 fastening kit consists of:

- 1: Raised head screw (M4)
- 2: Mounting plate
- 3: Screws (M3)

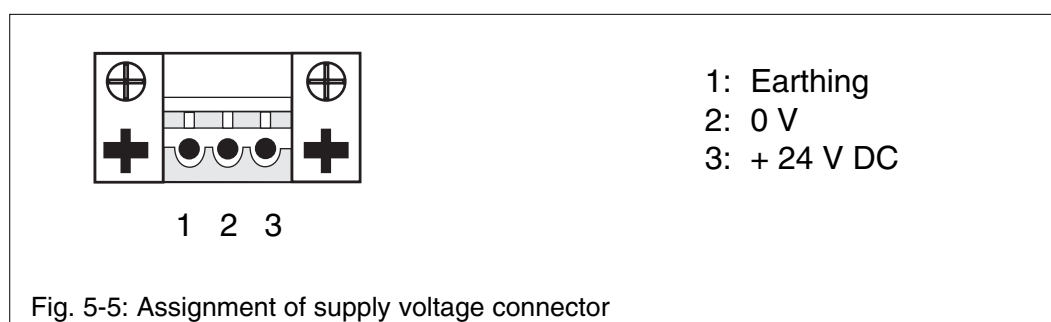
Fig. 5-4: Installing the PMI 426/431/438



Connecting the unit

Supply voltage

The 24 V DC supply voltage connection is on the side of the housing (see Fig. 4-2 and Fig. 4-3).



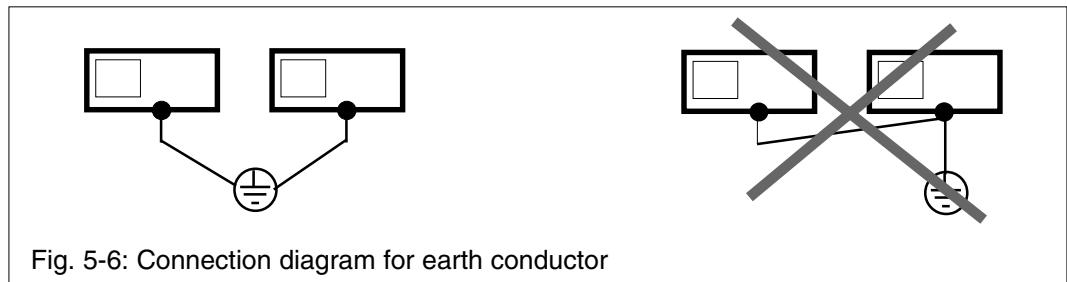
Cable layout

- Electrical or electronic components which could cause interference (contactors, thyristors, relay coils and solenoid valve coils) must be physically separate from data lines.
We recommend you use a sheet metal (MU metal) bulkhead between both areas.
- Data lines and power lines must be laid separately to avoid capacitive and inductive transmission (recommended minimum distance = 10 cm/3.94").
- Screened data lines also must always be laid in a different cable duct than the one used for the main power lines.
- Power lines should be as short as possible.
- Power lines should be twisted pair cables.

Installation and wiring

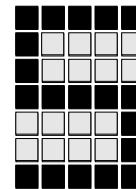
Earth connector

- Connect the earthing socket on the housing (press-fit bush M4 on the side of the housing) to the earth bus bar on the control cabinet or unit. Use as short a copper conductor as possible (cross section min. 2.5 mm²).
- If there are several units in the control cabinet or unit, ensure the earth conductor is connected in a star formation on the bus bar.
- The earth conductor (cross section min. 2.5 mm²) must be connected to the terminal marked  on the supply voltage connector.



Screening

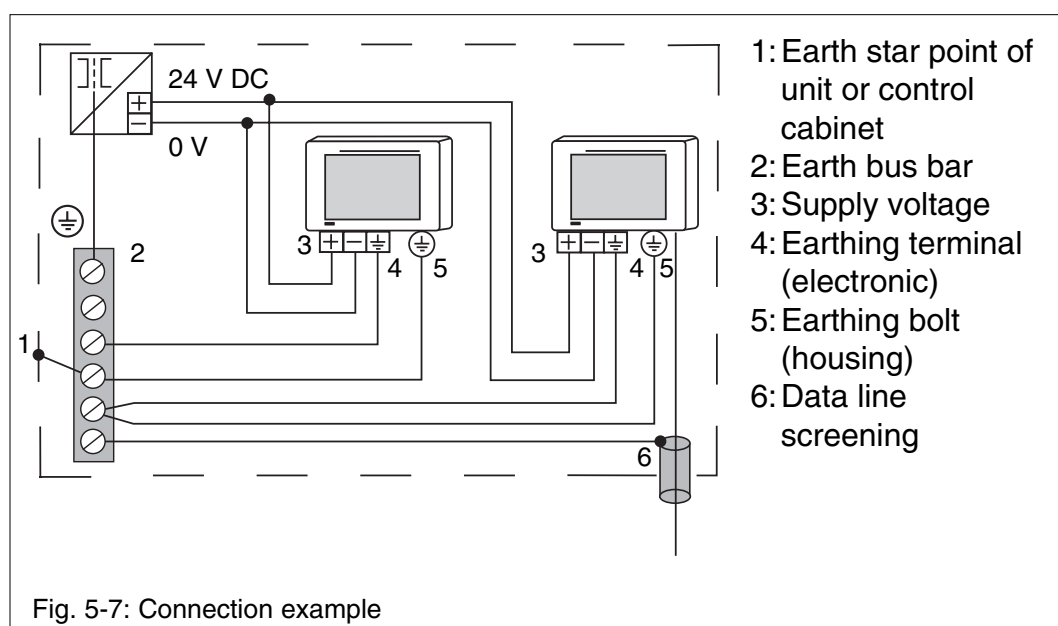
- Connect the power cable screening with low impedance to earth.
- Use screened data cable only.
- Due to high frequency, we recommend that the screening connection on the data line cable (RS-232 cable) is earthed on both sides. If you are using longer cables and there is the possibility of transient currents, we recommend one of the following methods:
 - use equipotential bonding cable
 - isolate the potentials
- Data line screening is connected to a bus bar.
- The connection between the bus bar and the control cabinet/unit must be short and with low impedance.
- Fasten the braided screening to the screen bar over as large a surface area as possible (e.g. with metal hose clips or polyurethane (PU) cable clips).

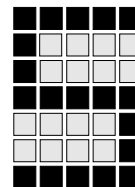


Measures to protect against interference voltage

- Wire inductive loads (e.g. contactor coils, relay coils and solenoid valve coils) using suppression elements (e.g. RC elements). This is particularly important if these inductive loads are close to the supply voltage or are fed from the same supply voltage.
- If strong magnetic fields are present, we recommend you use a bulkhead separator, i.e. metal sheet (MU metal).

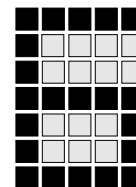
Connection example





Installation and wiring

Notes



Commissioning

Procedure after power-up

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

PMIopen

Software

No other user software apart from the operating system (Windows CE.NET 4.2) is installed when the unit is delivered.

It is up to the customer to install the user software and start it appropriately. The installation of the following software has been tested:

- zenOn from COPA-DATA
- Web Studio from InduSoft
- Movicon from Progea

PMIvisu

Activating the setup

If you do not press the **SETUP** button within 2 seconds, the "PMIStart.cmd" script file will be run. "PMIStart.cmd" is a batch file which is processed step by step.



INFORMATION

The "PMIStart.cmd" script file must contain the PMI-PRO runtime and the transport service.

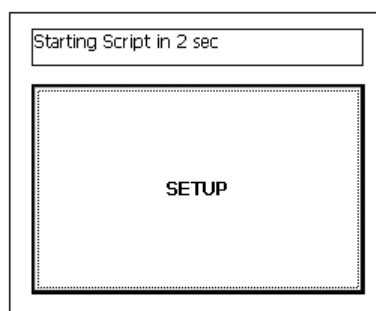


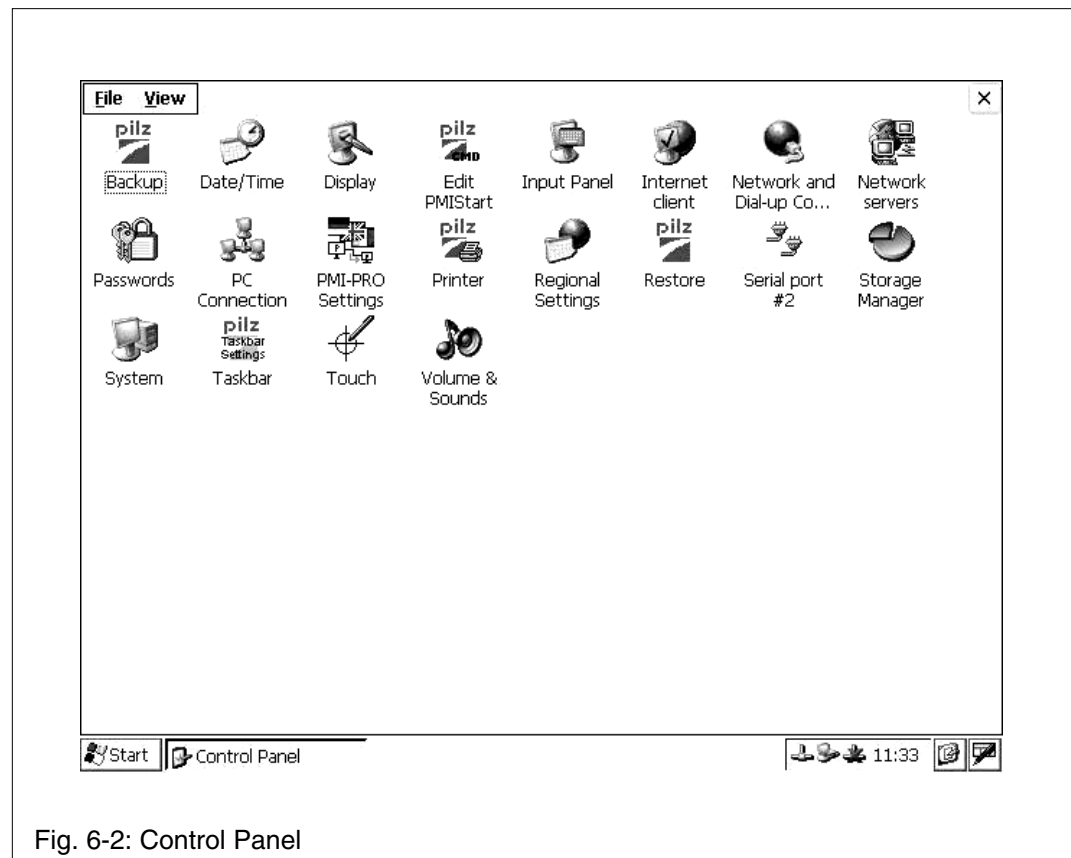
Fig. 6-1: Setup activation

Commissioning

Control Panel

All system settings can be made via the Control Panel in Windows CE.NET 4.2.

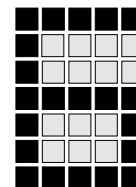
Special features and device-specific settings are described in the following.



Backup and Restore



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



Password Properties



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 complete Control Panel can be protected with a password.

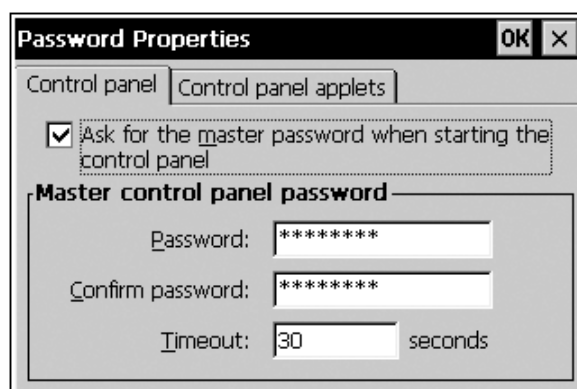


Fig. 6-3: Password Properties/Master Control Panel password

Defining a password: Enter a password. Enter the password again in the "Confirm password" field.

Changing a password: Analogous to defining a password.

Deleting a password: Select **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.

Commissioning

Level 2: Control panel applets

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

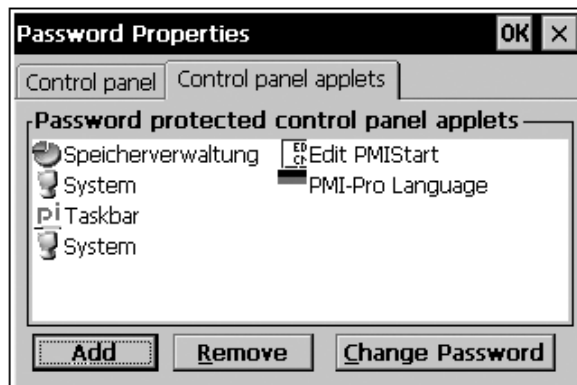


Fig. 6-4: Password Properties/Control Panel applets

Add

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

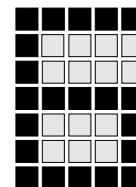
Remove

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



INFORMATION

Add **Password Properties** to the password protected area, as otherwise the entered password is not protected and is open to being changed.



System



System

Tab: Compatibility

Flash file system: Enter a name here for the flash memory (e.g.: FlashFS).

Second serial port: Select the unit name of the COM interface (COM2 or COM3) for the second COM interface.

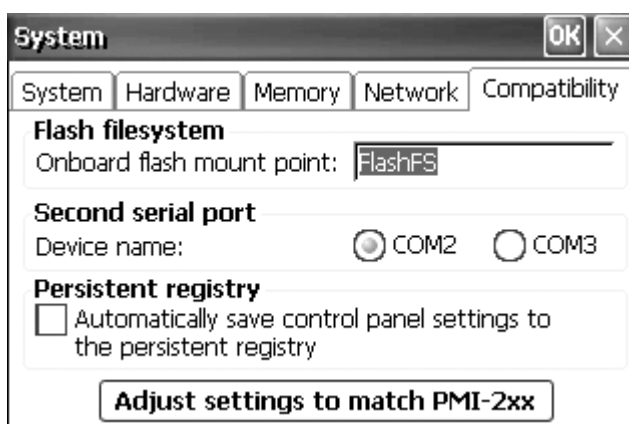


Fig. 6-5: Compatibility

Persistent registry: The registry is a database and is the central storage place for settings. If this option is selected, then all of the settings made in the Control Panel are saved in the registry. Otherwise the settings are lost the next time the system is started.

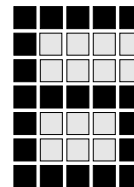
If this option is deselected, then it is also possible to save the settings by running "**regsave.exe**".



NOTICE

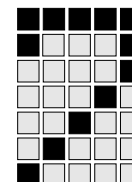
If you delete the registry, the touchscreen calibration will also be deleted; the unit will need to be recalibrated after a restart.

Adjust settings to match PMI 2xx: If you press this button, then all of the settings (COM interface etc.) of the predecessor type PMI 2xx are transferred to PMIvisu/PMIopen.



Commissioning

Notes



Care and maintenance

Cleaning the touchscreen

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



IMPORTANT

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 make the cloth damp. Never spray the cleaning agent directly onto the touchscreen - spray it onto the cleaning cloth instead. Never use aggressive solvents or abrasive cleaning agents!

Protective membranes

A protective membrane is available for PMIvisu and PMIopen. However, the protective membrane is not supplied with the unit.

Unit	Order number for the protective membrane
PMI 416	375 311
PMI 426	375 312
PMI 431	375 314
PMI 438	375 316

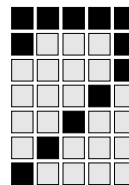
The self-adhesive membrane protects the touchscreen against scratches and dirt.

The protective membrane can be removed at any time as required - without leaving any traces of adhesive on the touchscreen.



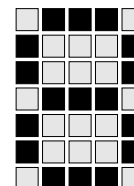
NOTICE

Never use a sharp or pointed object (like a knife) to remove the protective membrane. This could cause damage to the touchscreen.



Care and maintenance

Notes



Appendix

Technical details (general)

Electrical data	
Supply voltage range	20.4 ... 27.6 V DC
Rated supply voltage	24 V DC
Display	
Touchscreen	Analogue-resistive, according to DIN 42115
Character set	Unicode
Interfaces	
Serial interfaces	• 1 x RS-232, 9-pin D-Sub connector(s) (male) • 1 x RS-232/422/485 (switchable, driver-dependent); 9-pin Sub-D male connector(s)
Printer interface	• USB host • Parallel
PS/2 interface	1
USB host interfaces	4
USB slave interface	1
Internal fieldbuses	• MPI (optional) • Others (optional)
Audio interface	LINE OUT (L/R) , LINE IN (L/R) 2 x Stereo jack socket, 3.5 mm
Ethernet interface	• Ethernet RJ45, 10/100 MBit/s • Second interface (optional)
PCMCIA	1 slot: 1 x type II or 1 x type III
Computer	
Processor	RISC processor, 624 MHz
Operating system	Windows CE.NET 4.2
Memory	• 64 MByte Flash • 128 MByte SDRAM • 32 KByte NVRAM battery-buffered
Realtime clock	Battery-buffered realtime clock
Environmental data	
EMC	
Noise immunity	EN 61000-6-2
Noise emission	EN 61000-6-4
Protection type (EN 60529, 10/91 + A1)	Front: IP65, back: IP20
Protection class (EN 60950)	1
Ambient temperature (EN 60068-2-14)	0 °C ... +50 °C

Appendix

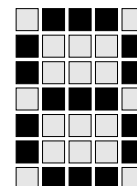
Environmental data (continued)	
Storage temperature (EN 60068-2-1/-2)	-25 °C ... +60 °C
Climatic suitability (EN 60068-2-78)	Max. 90 % r.h., at +40 °C
Condensation	Not permitted
Vibration (EN 60068-2-6)	Frequency: 10 ... 150 Hz, constant 1 g
Shock (EN 60068-2-27)	15 g, 11 ms

The standards current on 2007-09 apply.

Technical details (type-specific)

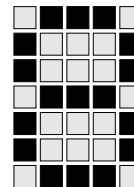
PMI 416	
Display type	LCD (TFT), 65,536 colours, typ. 400 cd/m ²
Screen diagonal	6.5"/165 mm
Screen resolution	640 x 480 pixels, VGA
Luminosity halved after (back lighting)	30,000 hrs.
Monitor interface	VGA
Power consumption	typ. 12 W
Mechanical data	
Dimensions (H x W x D)	165 x 212 x 79 mm
Weight	1.8 kg

PMI 426	
Display type	LCD (TFT), max. 65,536 colours, typ. 450 cd/m ²
Screen diagonal	10.4"/269 mm
Screen resolution	640 x 480 pixels, VGA
Luminosity halved after (back lighting)	50,000 hrs.
Monitor interface	VGA
Power consumption	typ. 15 W
Mechanical data	
Dimensions (H x W x D)	243 x 317 x 82 mm
Weight	2.3 kg



PMI 431	
Display type	LCD (TFT), max. 65,536 colours, typ. 450 cd/m ²
Screen diagonal	12.1"/307 mm
Screen resolution	800 x 600 pixels, SVGA
Luminosity halved after (back lighting)	50,000 hrs.
Monitor interface	VGA
Power consumption	typ. 15 W
Mechanical data	
Dimensions (H x W x D)	276 x 352 x 83 mm
Weight	3.2 kg

PMI 438	
Display type	LCD (TFT), 65,536 colours, typ. 300 cd/m ²
Screen diagonal	15"/380 mm
Screen resolution	1024 x 768 pixels, XVGA
Luminosity halved after (back lighting)	40,000 hrs.
Monitor interface	VGA
Power consumption	typ. 25 W
Mechanical data	
Dimensions (H x W x D)	332 x 412 x 83 mm
Weight	4.8 kg



Appendix

Note



► ...
In many countries we are represented by our subsidiaries and sales partners.

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