PMI m309 diag

Operator terminals

Operating manual – No. 21870-EN-02

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SD means Secure Digital.

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ENGLISH

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Introduction

This operating manual is valid for the following unit:

PMI m309 diag

It is valid until new documentation is published. The latest documentation is always enclosed with the unit.

In this manual the unit is called **PMI**.

The documentation comprises:

- The hardware description for the PMI m309 diag
- A description of the setup and configuration required for connection to the PVIS OPC Server

A description of the PVIS expanded diagnostics with PVIS ActiveX Control and the connection to the PVIS OPC Server can be found in the following operating manual:
PVIS System 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.

Introduction

4 Unit description
Introduces the PMI m309 diag in short, simplified form.

5 Installation and wiring
This chapter describes how to install and wire the PMI m309 diag.

6 Commissioning
This chapter describes the setup and the connection to the OPC Server.

7 Care and maintenance
This chapter describes how to care for and maintain the PMI m309 diag.

8 Technical details

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!

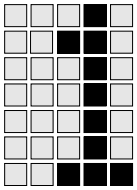
This warning must be heeded! It warns of a **hazardous situation** which could lead to **serious injury or death** and indicates preventive measures that can be taken.

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.



Notes

Overview

Concept

The diagnostic terminal PMI m309 diag is used for diagnostics on PVIS-compatible devices. Diagnostics are facilitated through the connection of these devices to the PVIS OPC Server.
The PMI is supplied with a default diagnostic configuration and a default PMI configuration, so it can immediately be used for device diagnostics (display of system messages).
The touchscreen is integrated within a robust housing. The function keys can be used to call up various defined functions.
When installed properly, the front of the unit meets protection type IP65.

Components

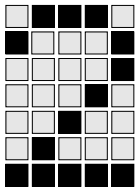
Display

- PMI m309 diag: 3.5" (89 mm), 320 x 240 pixels and 32 768 colours

Interfaces

The operator terminal has:

- Two serial RS 232 interfaces; one of the interfaces is switchable (RS 232/422/485).
- One Ethernet interface
- Two USB Host interfaces
- One USB Slave interface
- One audio interface



Overview

Range

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

Safety

Intended use

The diagnostic terminal PMI m309 diag is used for diagnostics on PVIS-compatible devices. PVIS-compatible devices are:

- Programmable safety and control systems
  - (PSS/SafetyBUS p) 3rd generation with an FS operating system version >= 53
- PNOZmulti safety relays:
  - PNOZ m0p from Version 2.0
  - PNOZ m1p from Version 5.0
  - PNOZ m2p from Version 2.0

Diagnostics are facilitated through the connection of these devices to a PVIS OPC Server.

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 PMI m309 diag 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 ≥ 2.5 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.

- **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.

Front view

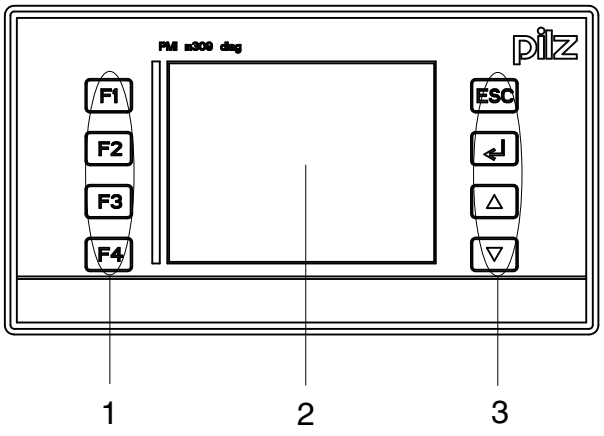


Fig. 4-1: Front view

1: F1 ... F4 (function keys)
2: Touchscreen (see "Technical details")
3: ESC, Enter, Cursor Up, Cursor Down

Unit description

Side view

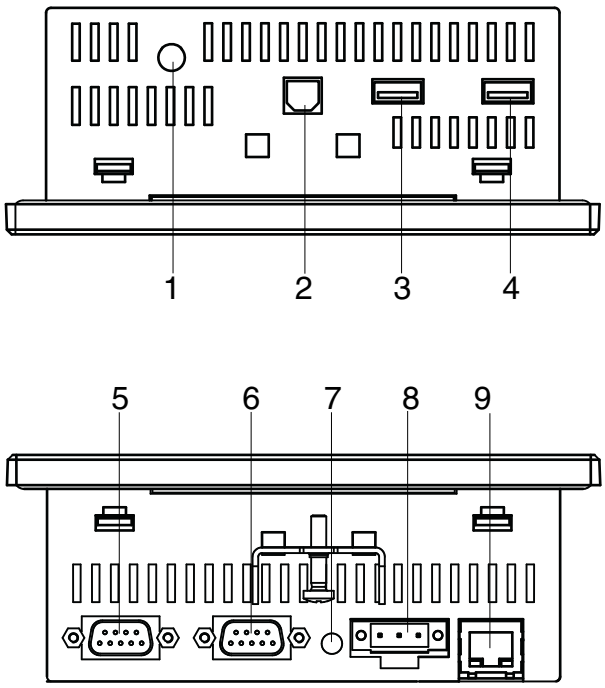
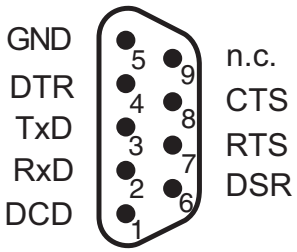


Fig. 4-2: Side view

1: LINE OUT audio interface
2: USB-Slave
3: USB-Host 2
4: USB-Host 1
5: COM2 (RS-232/422/485 switchable) serial interface
6: COM1 (RS-232) serial interface
7: Earthing
8: +24 VDC supply voltage
9: Ethernet interface (100 BaseTX)

Interfaces

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

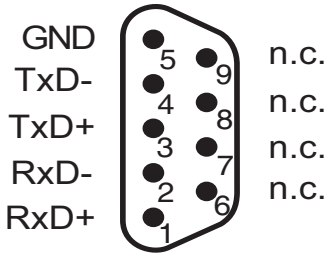


PMI
9-pin
D-Sub connector

n.c. = not connected

Fig. 4-3: Assignment of the RS-232 interfaces

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



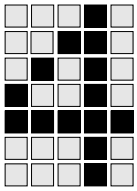
PMI
9-pin
D-Sub connector

n.c. = not connected

Fig. 4-4: Assignment of the RS-422/485 interface

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.



Notes

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

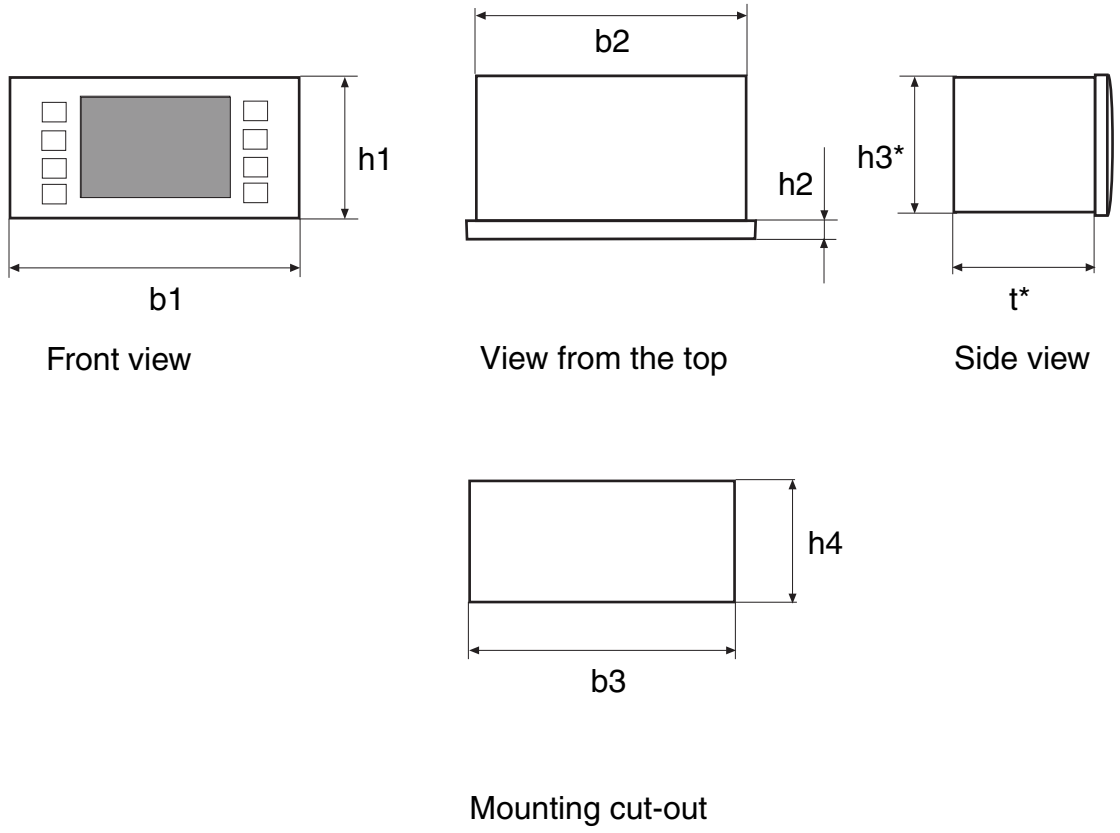


Fig. 5-1: Nominal dimensions

	PMI m309 diag
b1/mm	157 (6.181")
h1/mm	87 (3.425")
b2/mm	135,8 (5.354")
h2/mm	8 (0.314")
h3*/mm	66 (2.598")
t*/mm	52 + 28 (2.047" + 1.102")
b3/mm	138 + 1 (5.433" + 0.039")
h4/mm	68 + 0,7 (2.677" + 0.027")

h*/t* Nominal dimensions without connectors
NOTE: Allow extra for hardware connections!

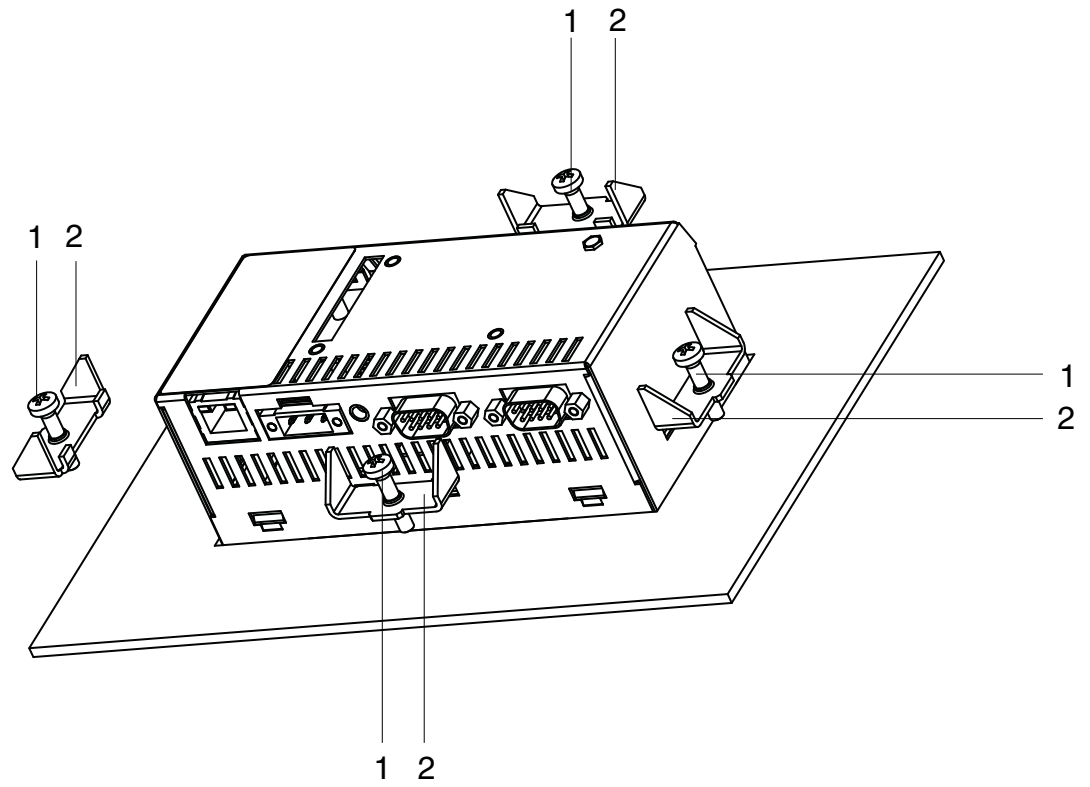
Installing the unit

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

Installation and wiring

Installing



The PMI 309 fastening kit consists of:

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

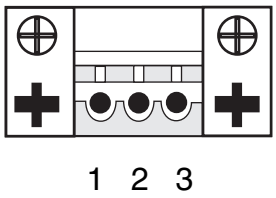
Fig. 5-2: Installing

NOTICE
The torque setting for the fixing screws may not exceed 0.25 Nm.

Connecting the unit

Supply voltage

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



1: Earthing
2: 0 V
3: + 24 V DC

Fig. 5-3: Assignment of supply voltage connector

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 mm ^{2}).
- 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 mm^2) must be connected to the terminal marked ⏚ on the supply voltage connector.

Fig. 5-4: Connection diagram for earth conductor

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

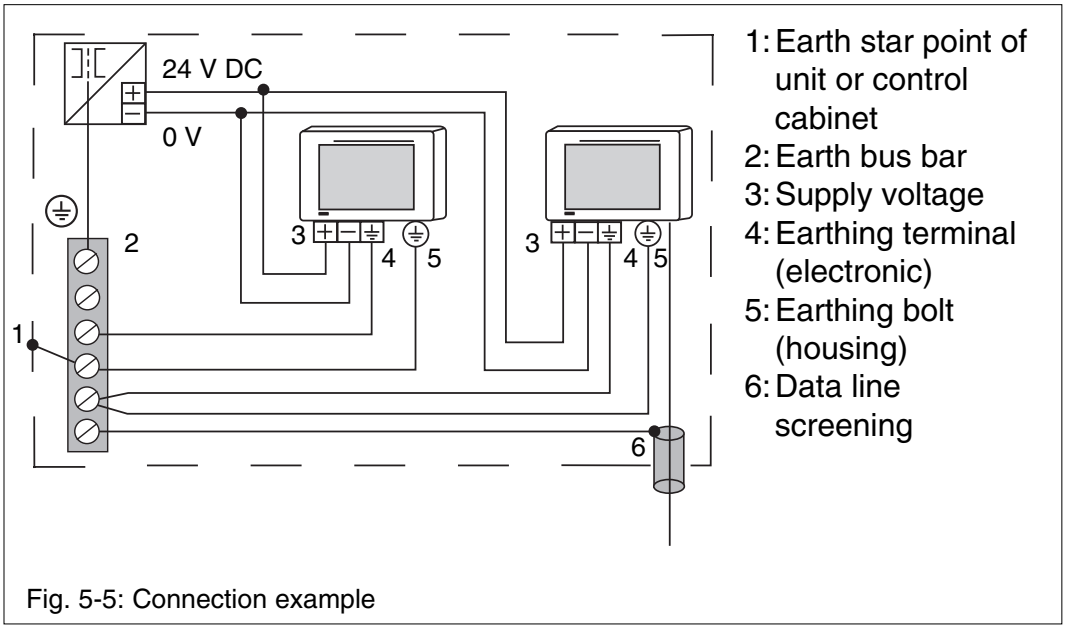
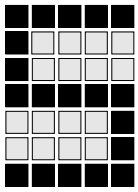


Fig. 5-5: Connection example



Notes

Commissioning

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

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.

NOTICE
The settings in the PMI configuration must only be changed via ***SETUP***, otherwise the changes will not be applied to the active application.

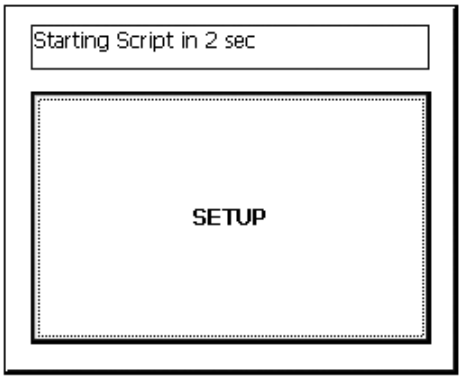


Fig. 6-1: Setup activation

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.

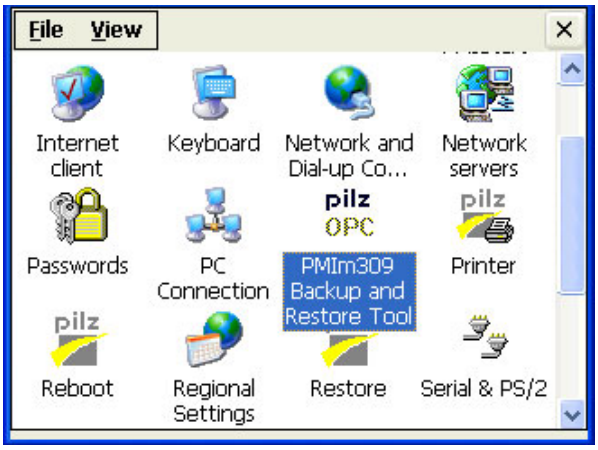


Fig. 6-2: Systemsteuerung

Default diagnostic setting

The PMI is supplied with a default diagnostic configuration and a default PMI configuration, so it can immediately be used for device diagnostics (display of system messages).

PVIS expanded diagnostics

The diagnostic terminal PMI m309 diag is used for diagnostics on PVIS-compatible devices. PVIS-compatible devices are:

- Programmable safety and control systems
  - (PSS/SafetyBUS p) 3rd generation with an FS operating system version >= 53
- PNOZmulti safety relays:
  - PNOZ m0p from Version 2.0
  - PNOZ m1p from Version 5.0
  - PNOZ m2p from Version 2.0

Diagnostics are facilitated through the connection of these devices to a PVIS OPC Server.

A description of the PVIS expanded diagnostics with PVIS ActiveX Control and the connection to the PVIS OPC Server can be found in the following operating manual:
PVIS System Description

Connect to PVIS OPC Server

To configure the necessary settings for PVIS expanded diagnostics on the PMI, activate the applet ***PMIm309 Backup and Restore Tool***.

Select device/project (Restore)

Under the Restore tab, select the device on which diagnostics are to be run. The following devices are available for selection:

- PNOZmulti
- PSS

INFORMATION
The default setting is PNOZmulti.

Press ***Install***. A prompt will appear before your selection is saved.

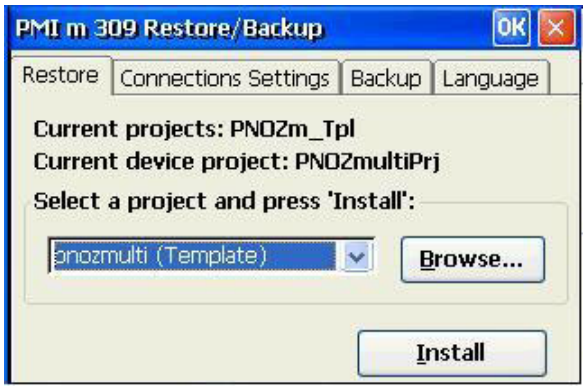


Fig. 6-3: Restore

Configure connection (Connection Settings)

The connection to PNOZmulti and the PSS can be established either via the serial interfaces (COM1/COM2 -> PG interface) or via TCP (Ethernet).

PNOZmulti/PSS (Serial)

Select the interface (***Port***) under the Connection Settings tab.

- COM1
- COM2

Press ***Set Connection***. A prompt will appear before your selection is saved.

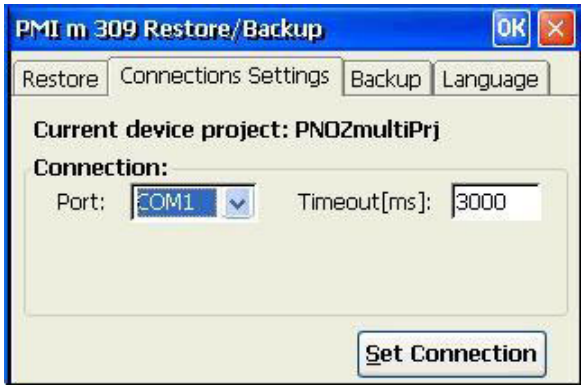


Fig. 6-4: Connection Settings PNOZmulti/PSS (Serial)

PNOZmulti/PSS (TCP)

INFORMATION
Use a converter (Ethernet -> Serial) to connect the PMI to the PNOZmulti. The same applies if you are using the fieldbus module PNOZ mc8p.

Select the interface (***Port***) under the Connection Settings tab:

- TCP

Enter the IP address of the converter/PSS.
Default setting ***Port-No***: 1025

Press ***Set Connection***. A prompt will appear before your selection is saved.

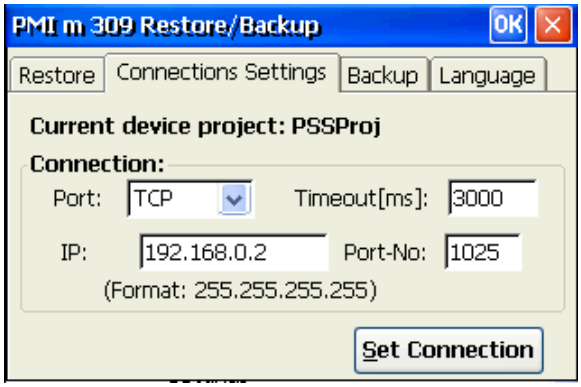


Fig. 6-4: Connection Settings PNOZmulti/PSS (TCP)

Enter PMI's IP address

INFORMATION
If the PMI is not connected to a network with a DHCP Server, you will need to enter an IP address for the PMI.

Proceed as follows:

- Under Control Panel, activate the applet ***Network and Dial-up Connections***.

A window will open.

- Activate the applet ***ONBOARD ETHERNET #1***.
- Enter the IP address of the PMI.

Save diagnostic project (Backup)

Create a backup of the diagnostic project.

Backup name: Here you should enter the project name.
Backup target folder: Here you should select the target directory.
Workdir: Working directory of the current project.

Press ***Pack***. The diagnostic project is saved as a “zip file”.

Fig. 6-5: Backup

Select diagnostic language (Language)

Select the language in which the diagnostics are to be displayed. All the languages of the PVIS expanded diagnostics system are available:

- DE
- EN
- ...

INFORMATION
You can change the language setting online at any time.

Press ***Set***. A prompt will appear before your language selection is saved.

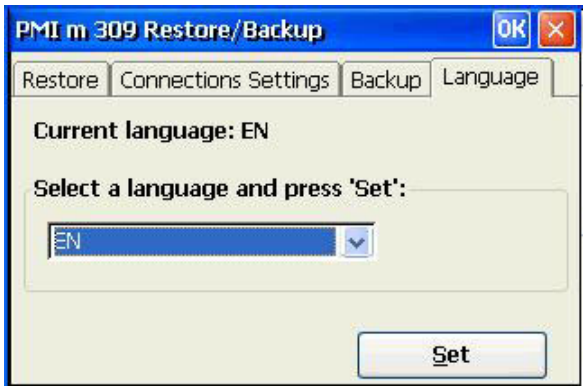


Fig. 6-6: Language

Backup and Restore

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

Password Properties

Passwords

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

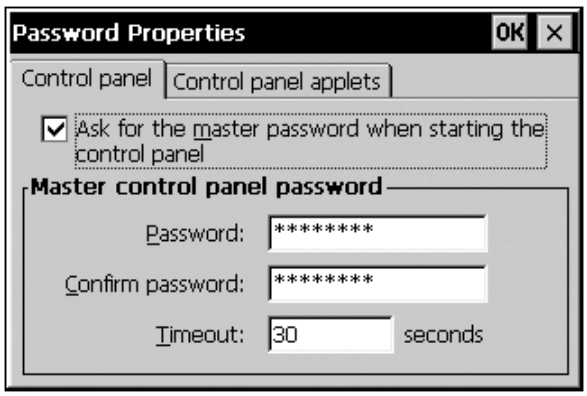


Fig. 6-7: Password Properties/Master control panel password

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.

Level 2: Control panel applets
Individual "applets" of the Control Panel can be protected with a password.

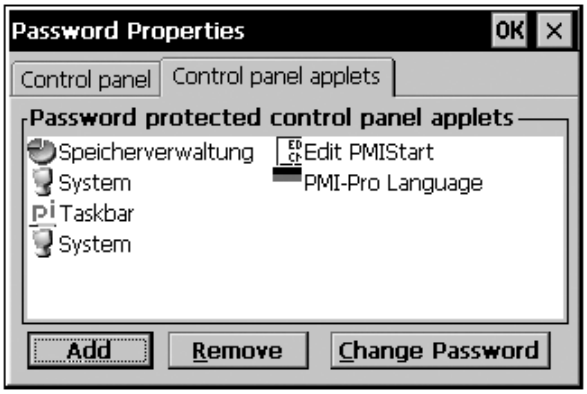


Fig. 6-8: Password Properties/Control panel applets

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.

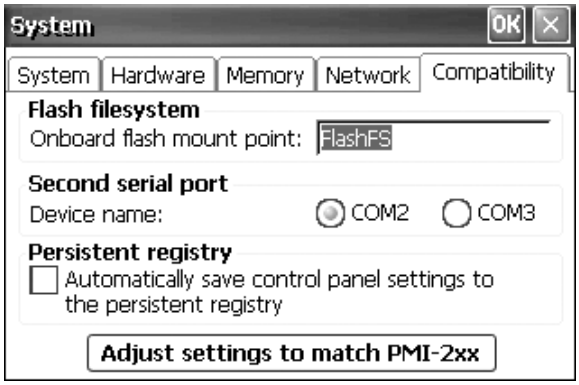


Fig. 6-5: System Compatibility

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 PMI.

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

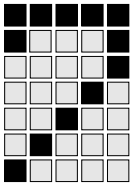
A protective membrane is available for PMI. However, the protective membrane is not supplied with the unit.

Unit	Order number for the protective membrane
PMI m309 diag	On request

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.



Notes

Appendix

Technical details

Electrical data	
Supply voltage range	20,4 ... 27,6 V DC
Rated supply voltage	24 V DC
Power consumption	typ. 6.0 W
Anzeige	
Display type	LCD (TFT), 32 768 colours, typ. 200 cd/m²
Screen diagonal	3.5"/89 mm
Screen resolution	320 x 240 pixels QVGA
Touchscreen	Analogue-resistive, according to DIN 42115
Character set	Unicode
Luminosity halved after (back lighting)	10,000 hrs.
Operating elements	
Keyboard type	Membrane keypad with snap dome
Number of keys	4 function keys (F1 ... F4), 4 system keys (ESC, ENTER, Cursor Up, Cursor Down)
Average service life	$\geq 10^6$ switching cycles
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)
USB host interfaces	2
USB slave interface	1
Ethernet interface	Ethernet RJ45, 10/100 MBit/s
Computer	
Processor	RISC processor, 400 MHz
Operating system	Windows CE.NET 4.2
Memory	• 32 MByte Flash • 64 MByte/128 MByte (optional) SDRAM • 32 KByte NVRAM battery-buffered
Realtime clock	Battery-buffered realtime clock
Environmental data	
EMC Noise immunity Noise emission	 EN 61000-6-2; EN 61000-6-4
Protection type (EN 60529 + A1)	Front: IP65, back: IP20

Appendix

Environmental data (continued)	
Ambient temperature (EN 60068-2-14)	0 °C ... +50 °C
Storage temperature (EN 60068-2-1/-2)	-25 °C ... +60 °C
Climatic suitability (EN 60068-2-78)	max. 90 % r. F., bei +40 °C
Condensation	Not permitted
Vibration (EN 60068-2-6)	Frequency: 10 ... 150 Hz, constant 1 g
Shock (EN 60068-2-27)	15g, 11 ms
Mechanical data	
Dimensions (H x W x D)	87 x 157 x 52 mm
Weight	420 g

The standards current on 2007-01 apply.

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

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