PMI v704e/v707e

PILZ
THE SPIRIT OF SAFETY

- Operator terminals

Operating Manual-1003980-EN-01

1 Introduction

1.1 Validity of documentation

This operating manual is valid for the following products

- PMI v704e
- PMI v707e

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.

1.3 Legal information

This product includes Open Source software, licensed under GPL v1/v2/v3, and under other licences. You can receive further information by calling up the button  in the PMI Manager sidebar (see also Licence information [📖 30]). The relevant source codes can be requested via opensource@pilz.de.

Your request should include the following: (a) the firmware name, (b) the firmware version, (c) your name, (d) your company name (if applicable), (e) your reply address and your E-mail address (if possible).

Pilz can charge a fee for the data medium and for sending.

The request for the source code must be received 3 years at the latest after the receipt of the relevant GPL or LPG. Irrespective of this period we will send you a complete, machine-readable copy of the source code as long as Pilz offers spares or technical support for this device.

Pilz allows the purchaser of this product to edit proprietary components from Pilz which are linked to Open Source components under the LGPL. Further, Pilz allows reverse engineering for the purpose of debugging the edited, proprietary components. The results of reverse engineering must not be disclosed to any third party and the edited software must not be distributed to any third party.

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

- Capacitive touchscreen
- Character set: Unicode
- Memory:
  512 MB DDR SDRAM
  2 GB Flash
- 1 Ethernet interface
- 1 USB Host interface 2.0 Type A
- Capacitor-buffered real-time clock
- Pre-installed software:
  - Pilz visualisation software

2.2 Front view

2.2.1 PMI v704e

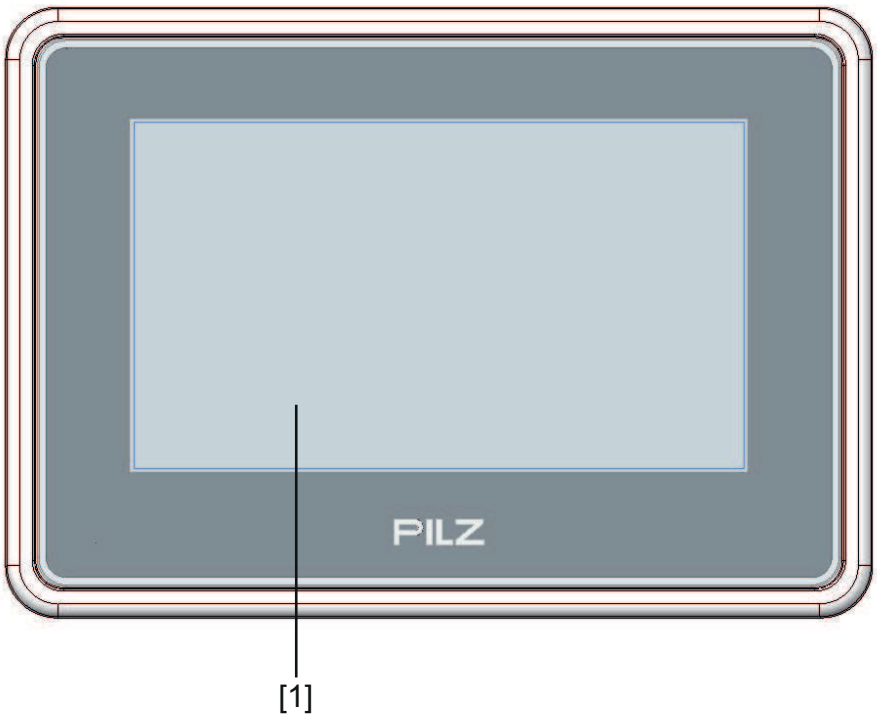

Fig.: Front view PMI v704e

Legend

[1] Touchscreen (see Technical details [📖 33])

2.2.2 PMI v707e

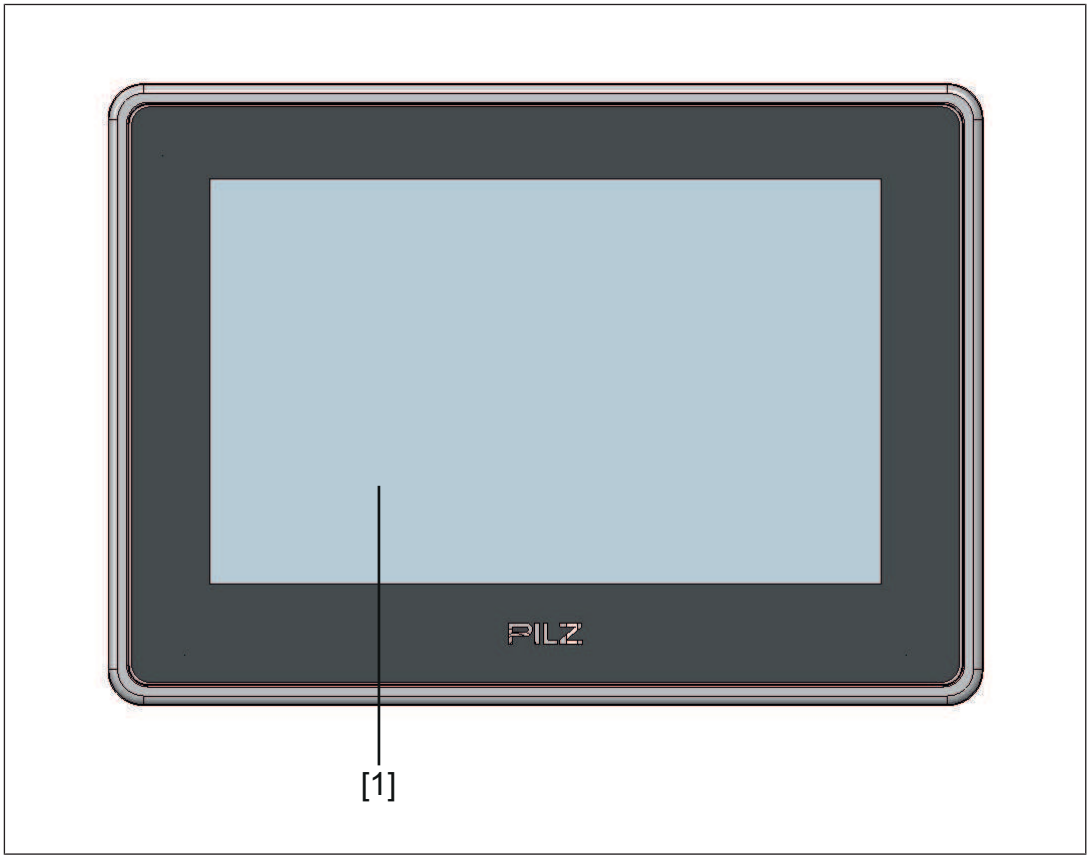

Fig.: Front view PMI v707e

Legend

[1] Touchscreen (see Technical details [33])

2.3 Scope of supply

- Operator terminal
- 1 clamp frame for installation
- 1 set of screws and connectors
- Projection stand in the shape of the packaging carton

2.4 Accessories

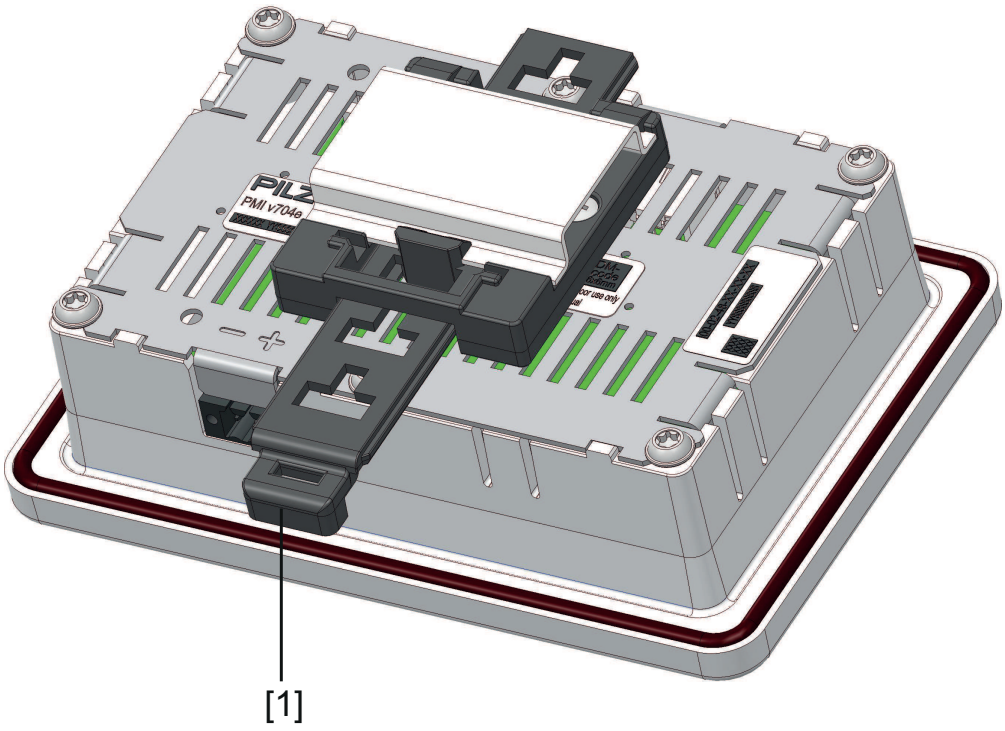

Fig.: Top hat rail for PMI v704e

Legend

[1] Top hat rail for installation in the control cabinet, see order data [35]

NOTICE

The top hat rail may only be used for PMI v704e.

3 Safety

3.1 Intended use

This device is used to create a point-to-point connection with a PNOZmulti device, to operate and to monitor the device.

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 [33]).

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.

3.1.1 Supported hardware and software

- PNOZmulti base units from the following versions:
  - Configurable safety systems PNOZmulti
    - PNOZ m0p from Version 2.0
    - PNOZ m1p from Version 5.0
    - PNOZ m2p from Version 2.0
  - Configurable compact controllers PNOZmulti Mini
    - PNOZ mm0.1p from Version 1.0
    - PNOZ mm0.2p from Version 1.0
  - Configurable compact controllers PNOZmulti 2
    - PNOZ m B0 from Version 1.0
    - PNOZ m B1 from firmware Version 1.1.1
- PNOZmulti Configurator from Version 10.x.x
- PASvisu Builder from Version 1.6.x
  Further information on PASvisu can be found in the PASvisu online help.

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 a qualified and knowledgeable person who, because of their training, experience and current professional activity, has the specialist knowledge required. To be able to inspect, assess and operate devices, systems and machines, the person has to be informed of the state of the art and the applicable national, European and international laws, directives and standards.

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 the section entitled Safety
- 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 magnetic 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 separate from each other in their own conduits (recommended minimum distance: 10 cm/3.94"). This will avoid inductive and capacitive interference.
- PMI v707e: The prescribed earth point ⏚ for the functional earth is designed to guarantee compliance with noise immunity requirements.
  Always 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. 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.
- 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.

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

4 Function description

4.1 Device properties

The operator terminal has a memory in which a Pilz visualisation software is preinstalled. 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 device is fitted with a real-time clock that is capacitor-buffered, so allowing it to run for approx. 14 days without an external power supply. The capacitor is automatically charged during operation via the device's power supply.

4.2 Side view

4.2.1 PMI v704e

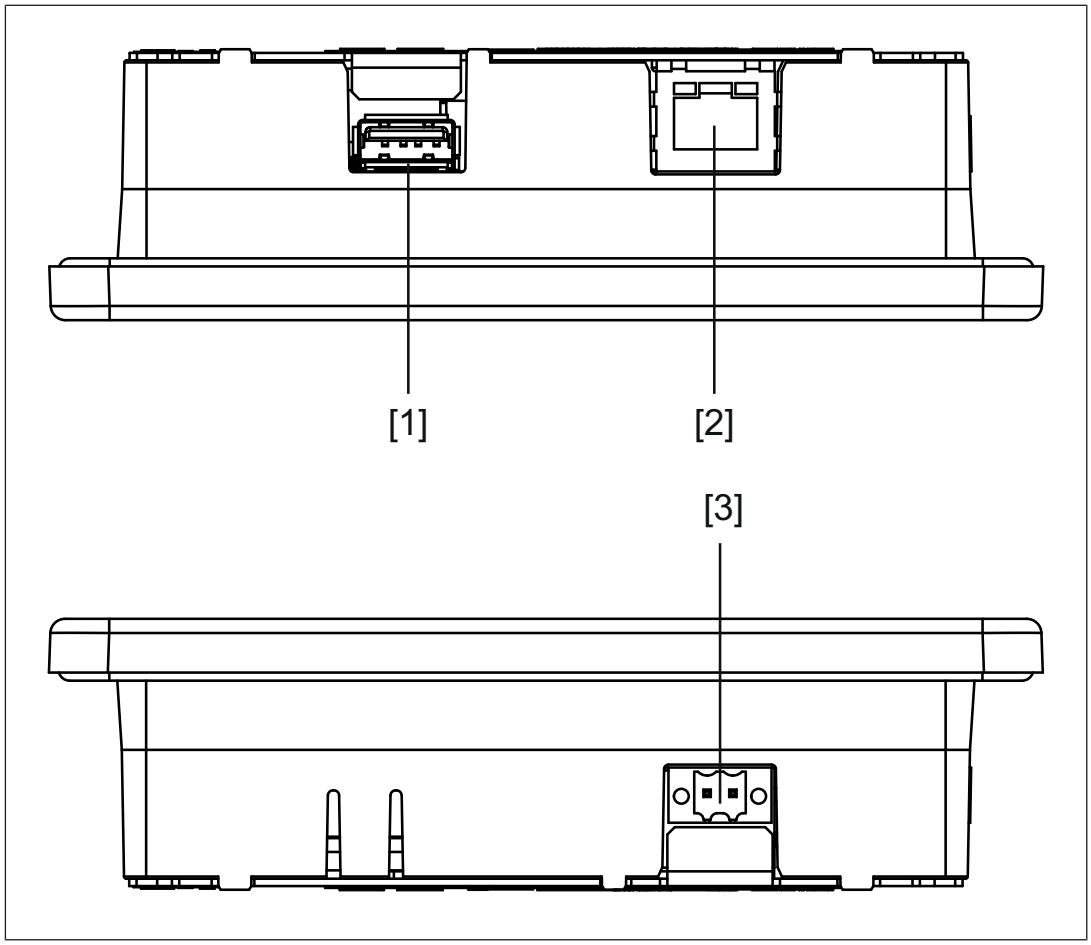

Fig.: Side view PMI v704e

Legend

[1] USB Host

[2] Ethernet interface (100 BaseTX)

[3] Supply voltage

4.2.2 PMI v707e

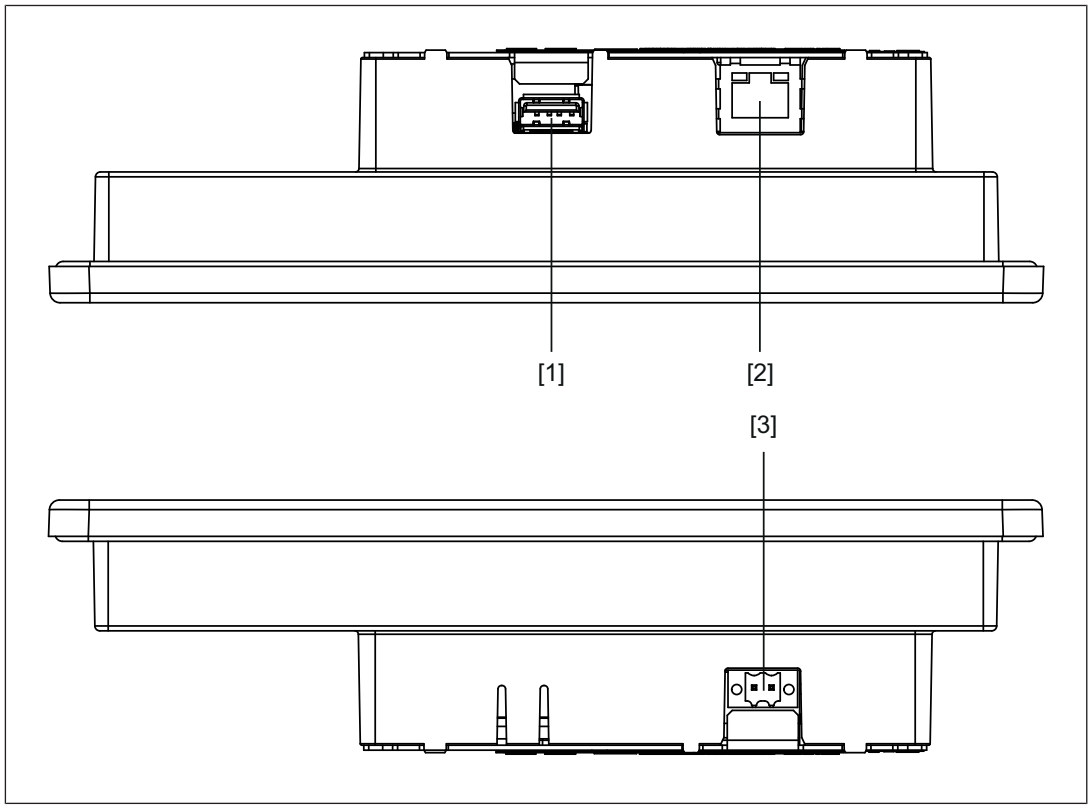

Fig.: Side view PMI v707e

Legend

[1] USB Host

[2] Ethernet interface (100 BaseTX)

[3] Supply voltage

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

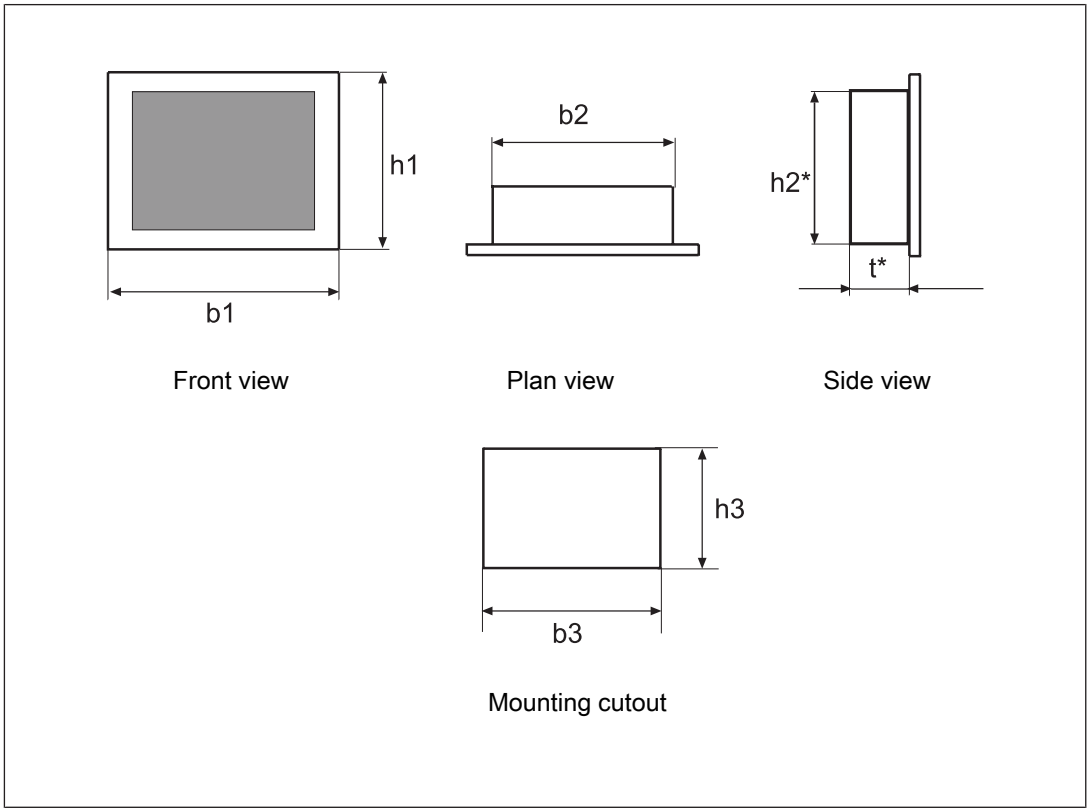

Fig.: Dimensions

	PMI v704e	PMI v707e
b1/mm h1/mm	135 (5.315") 95 (3.740")	200 (7.874") 142 (5.591")
b2/mm h2*/mm t*/mm	116,6 (4.591") 77,6 (3.055") 29 (1.142")	182 (7.165") 124 (4.882") 43 (1.693")
b3/mm h3/mm	117 + 1 (4.606" + 0.039") 78 + 1 (3.071" + 0.039")	183 + 1 (7.205" + 0.039") 125 + 1 (4.921" + 0.039")

h*/t* = Dimensions without connections
b2/h2* = Dimensions without press-in frame
Allow extra for hardware connections!

5.3 Installing the unit

When installing the device, 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. The wall thickness may be maximum 5 mm.
- To avoid a build-up of heat, a distance of a 10 cm/3.94" should be maintained all round the system.
- Note the information given for the ambient and operating temperatures in the Technical details [📖 33].

- IP65 protection can only be guaranteed when
  - the device's fixing screws are tightened with a torque of 1 Nm
  - the gasket is not damaged
  - the mounting position is vertical (the Pilz logo has to be at the bottom)
  - the wall thickness is at least 2.5 mm.

5.4 Installation

5.4.1 PMI v704e

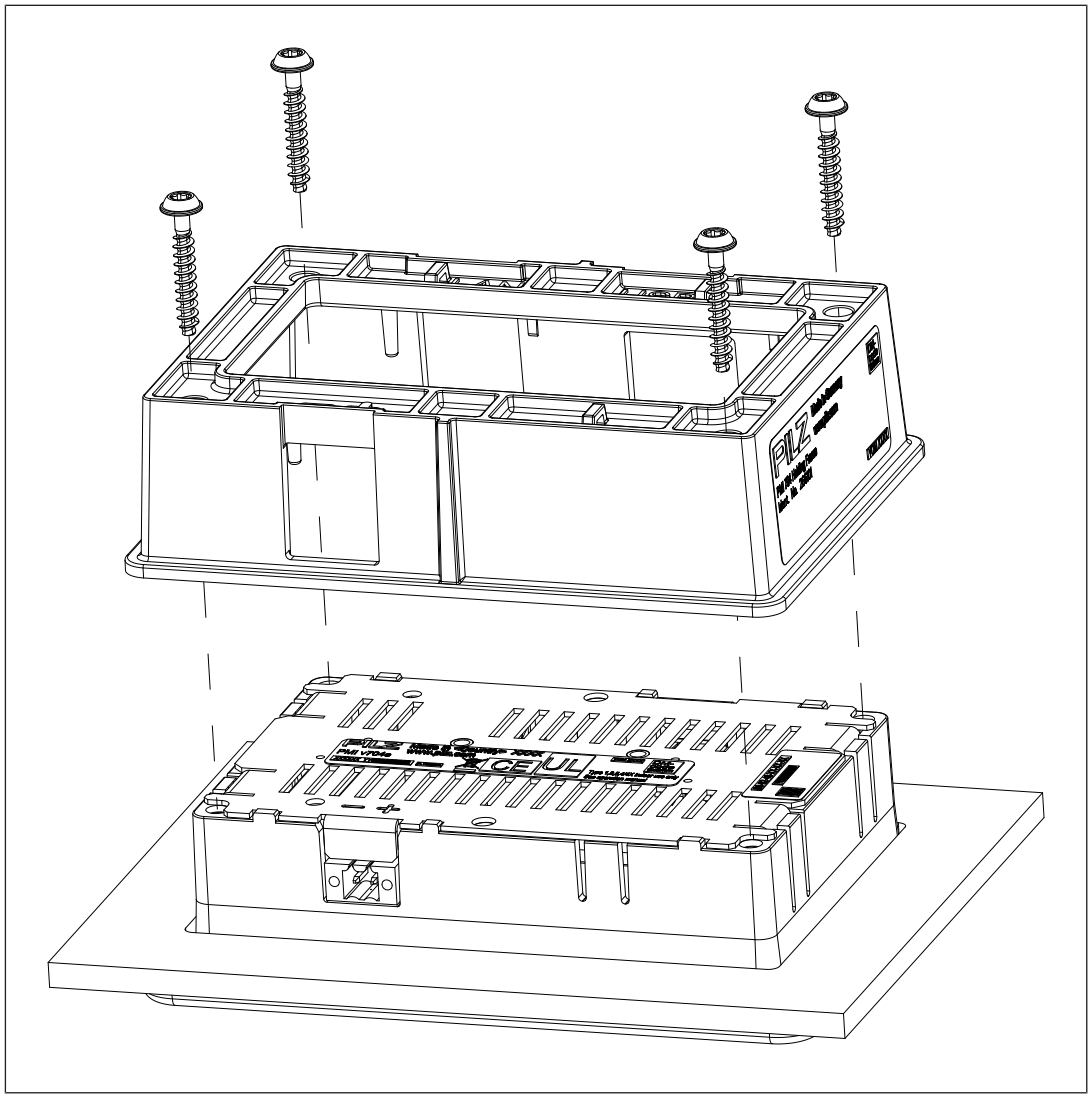

Fig.: Installing PMI v704e

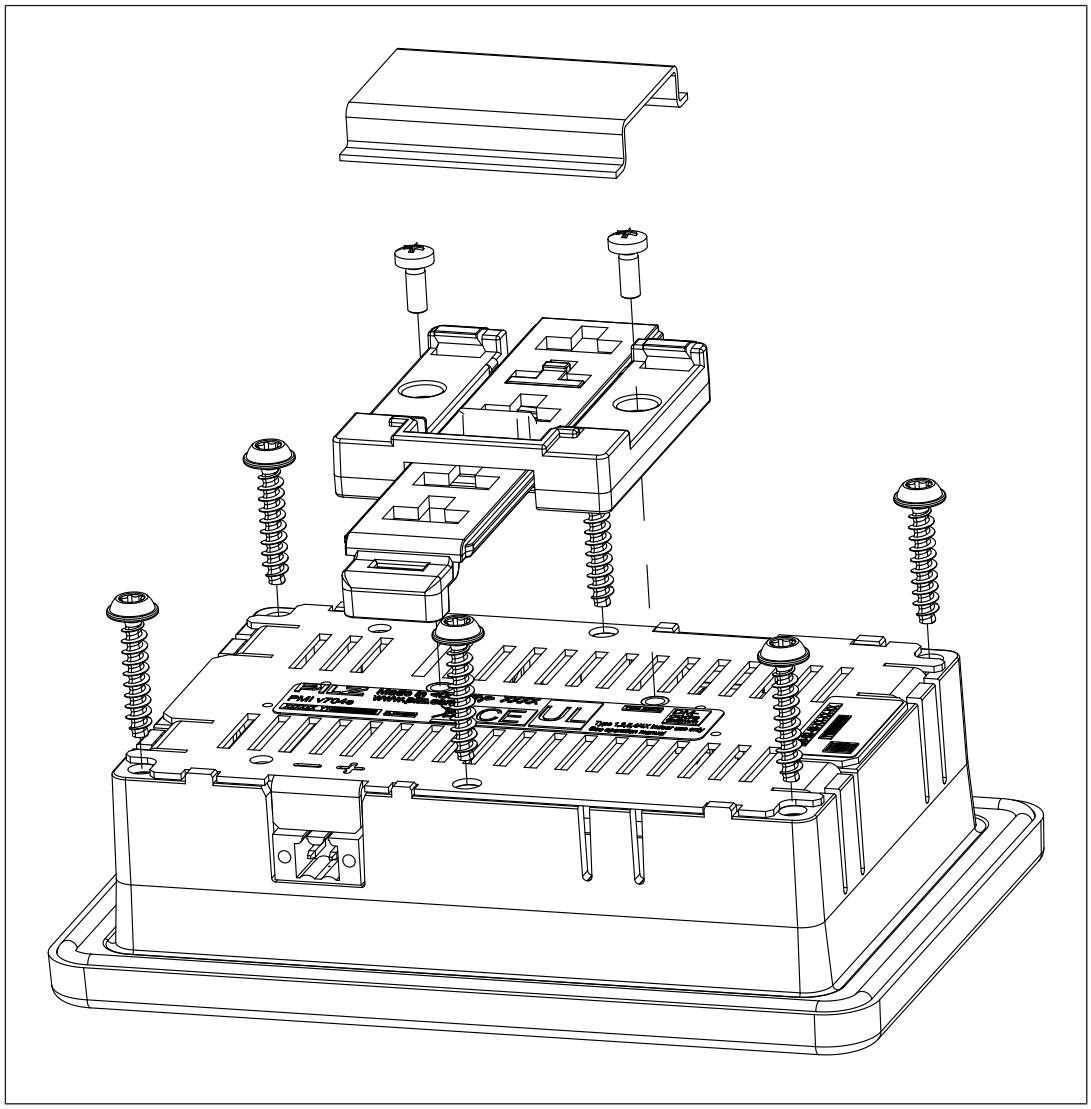

Fig.: Installing PMI v704e with top hat rail

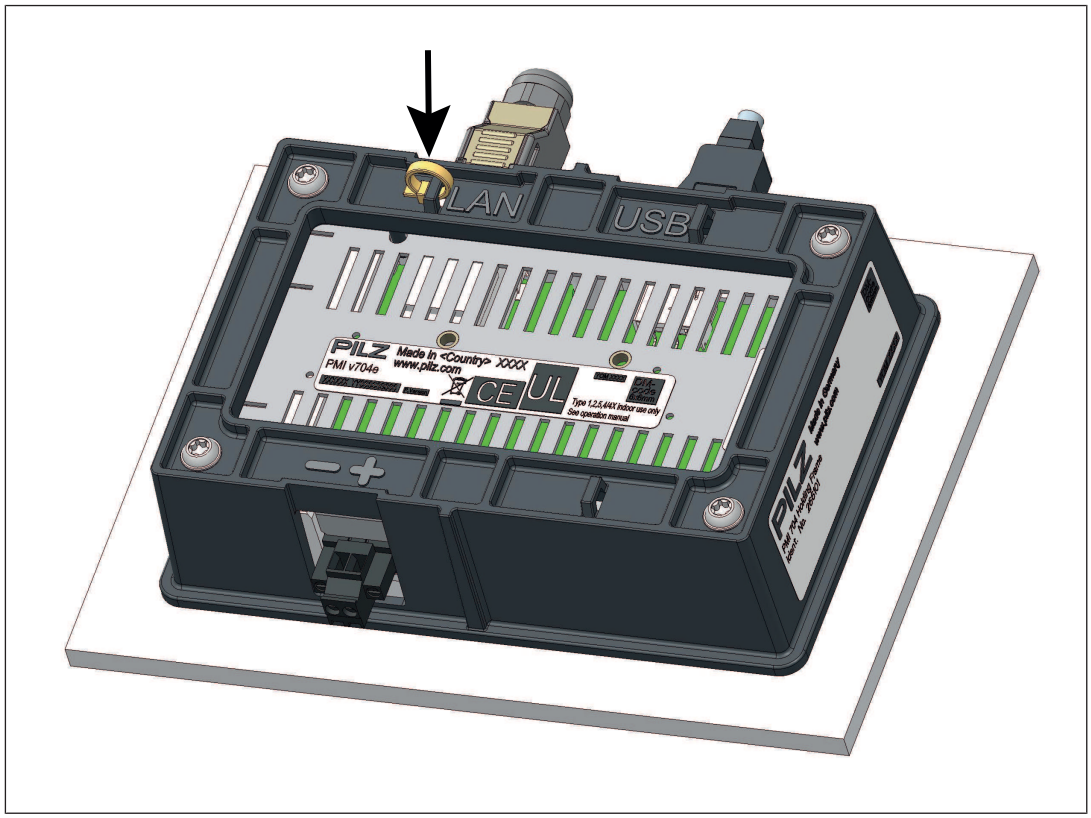

Fig.: Strain relief for Ethernet and USB cables PMI v704e

5.4.2 PMI v707e

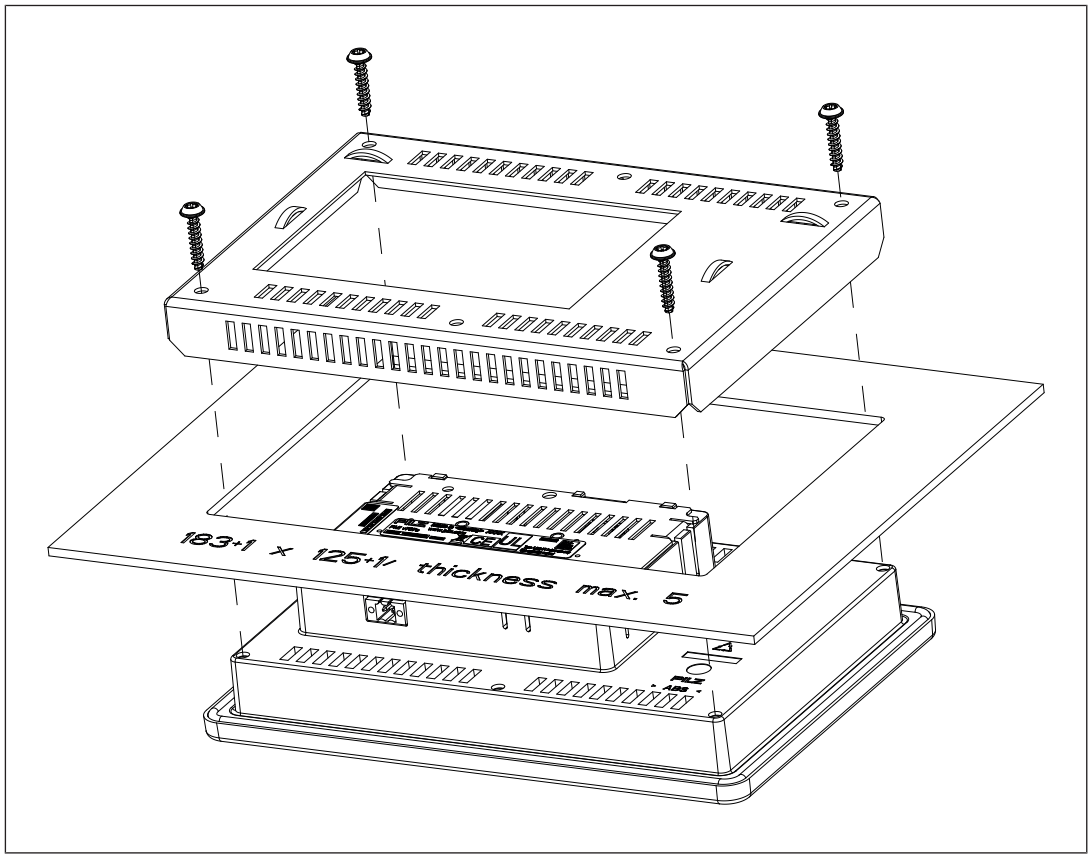

Fig.: Installing PMI v707e

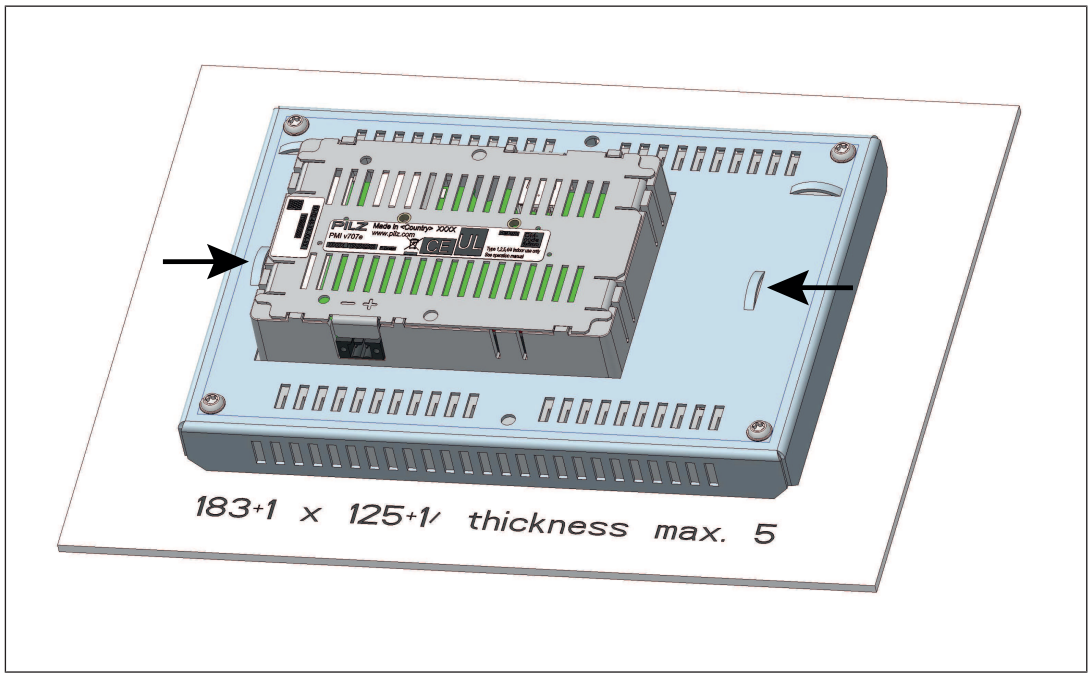

Fig.: Strain relief for Ethernet and USB cable PMI v707e

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")
- Shielded data cables should also be laid in a different cable duct to the main power cables.
- Power cables should be as short as possible.
- Power cables should be twisted pair cables.
- Use only a max. length of 3 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 network cable shields with low impedance to earth.
- Use shielded data lines only.
- Use equipotential bonding cables.
- Perform a potential isolation.
- Data line shielding should be connected to a cable shield bus bar.
- The connection between the cable shield bus bar and the control cabinet/system should be as short as possible and with low impedance.
- Fasten the braided screening to the bus bar over a largest surface area as possible (e.g. with metal hose clips or polyurethane (PU) 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.

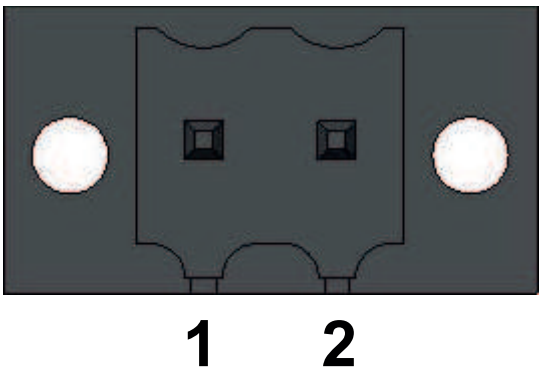

Fig.: Layout of supply voltage connector

- 1: 0 V
- 2: + 24 V DC

UL requirement: Use a 24 VDC power supply (isolating source).

6.2.2 Connection example

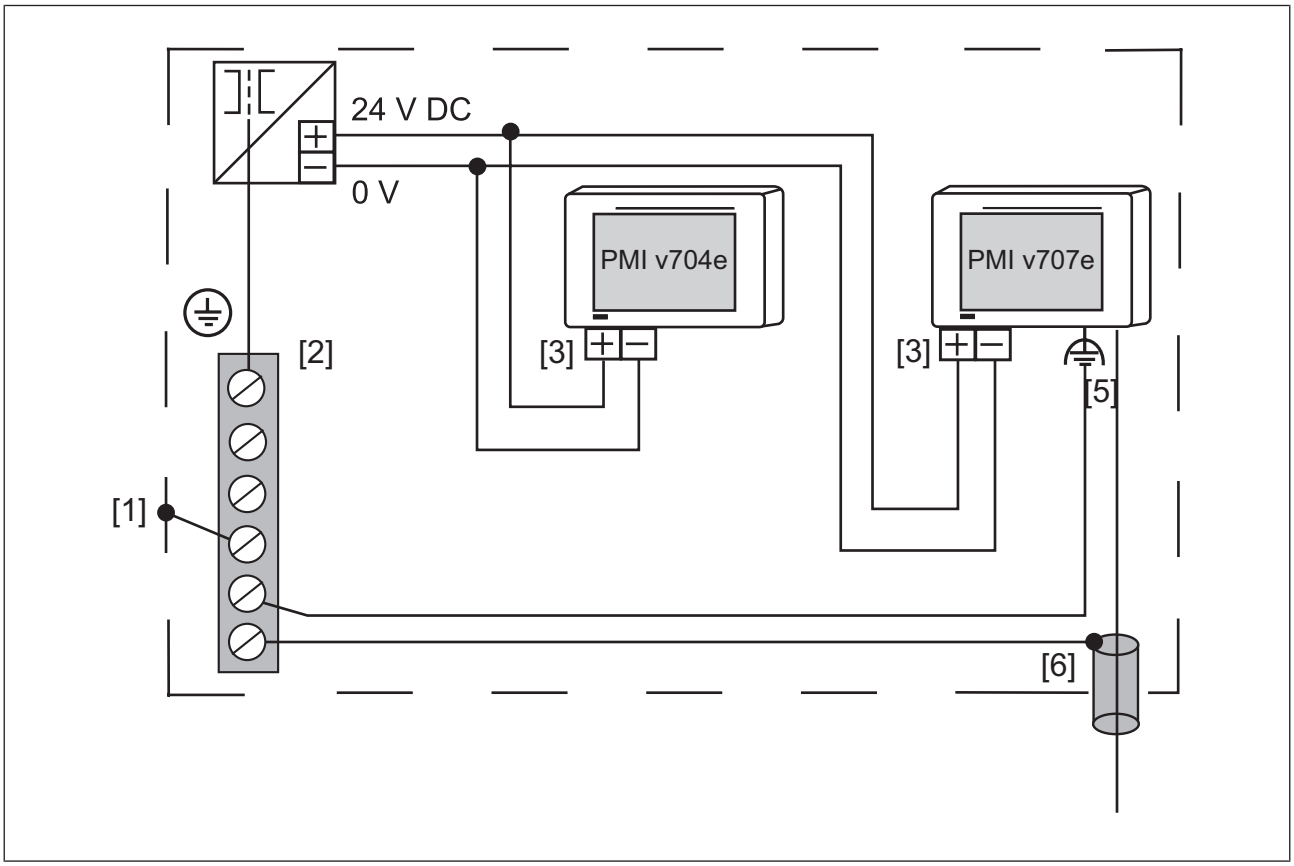

Fig.: Connection example

6.2.3 USB socket

The USB socket (screen/housing) is connected directly (not capacitive) to ground (GND). If a GND connection is to be created to a remote point (e.g. via an USB-RS485 converter or similar), an unlimited and possibly damaging equalising current can flow over the shield. In this case, the interface should be galvanically isolated.

7 Commissioning

Behaviour after switch-on

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

7.1 Setup of the device with the PMI Manager

Fig.: Start screen PMI Manager

After starting the PMI, you can make basic settings for the device in the PMI Manager. To do this, touch the button 

within 5 seconds.
The interface is only available in English.

7.1.1 Network settings

After starting, the following view will open where you can configure all the required network settings:

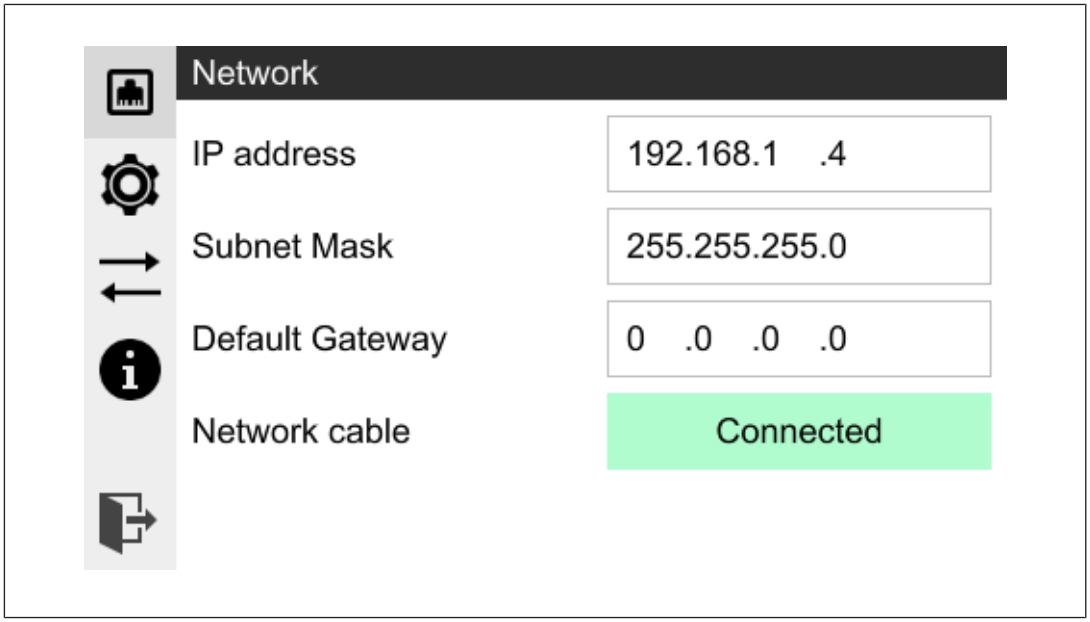

Fig.: Network settings

- When you touch a field, a key field will open for entering the address.

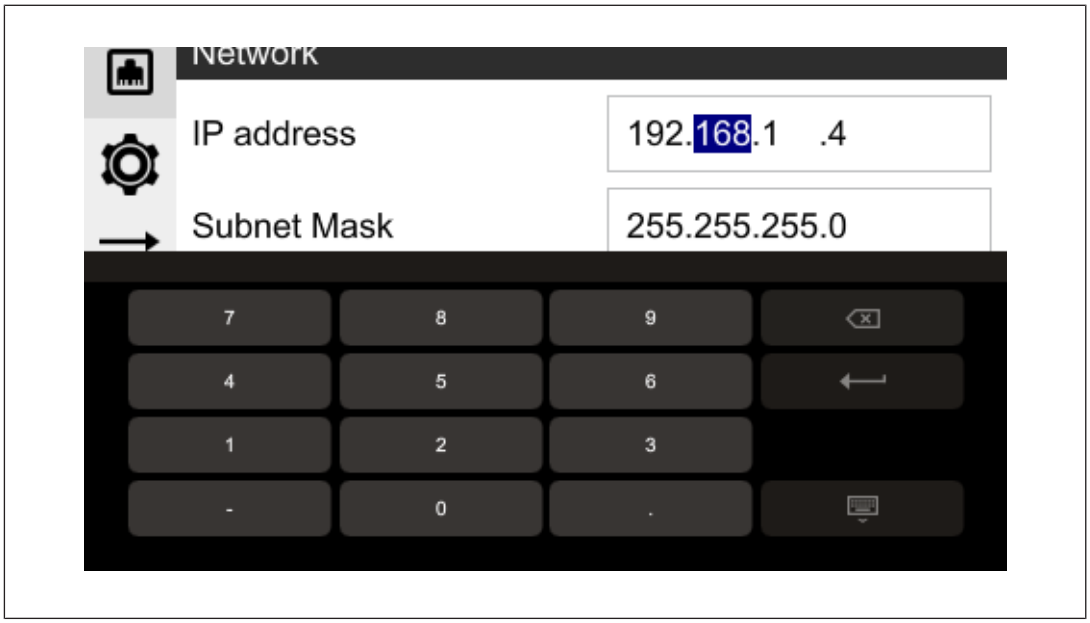

Fig.: Entry network settings

7.1.2 Configuration

In the sidebar, touch the button  to make further settings. The following view will open:

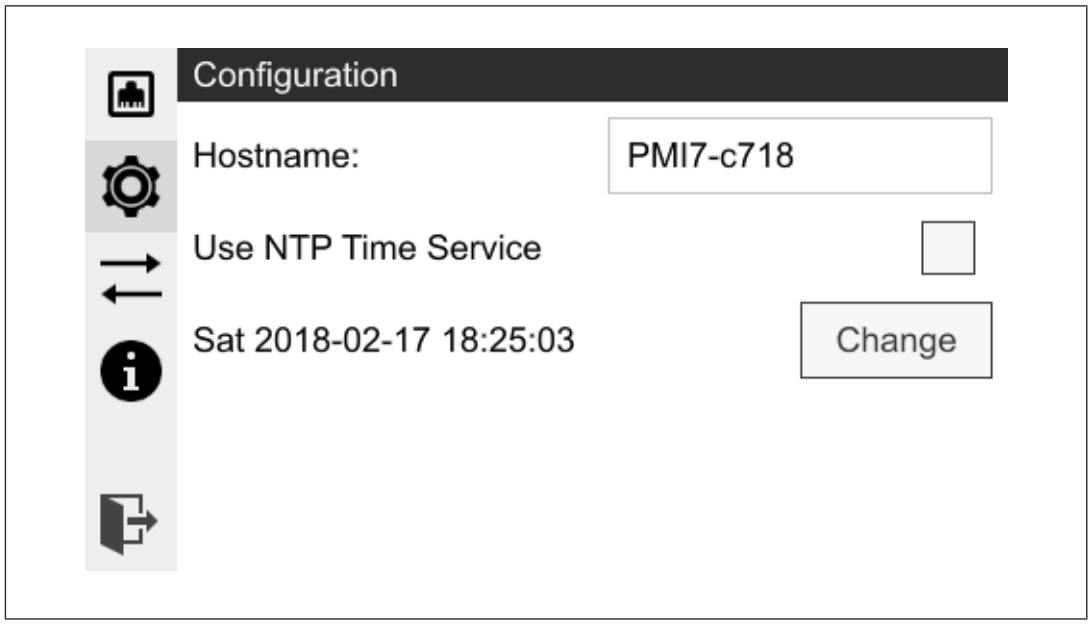

Fig.: Configuration

- The host name is entered automatically and it can be changed.
- You can use a time server. To do this, touch the empty field behind "Use NTP Time Service".
  You can select whether you want to enter an IP address in IPv4 format or an URL (e.g. the address of the Physikalisch-Technische Bundesanstalt "ptbtime1.ptb.de").

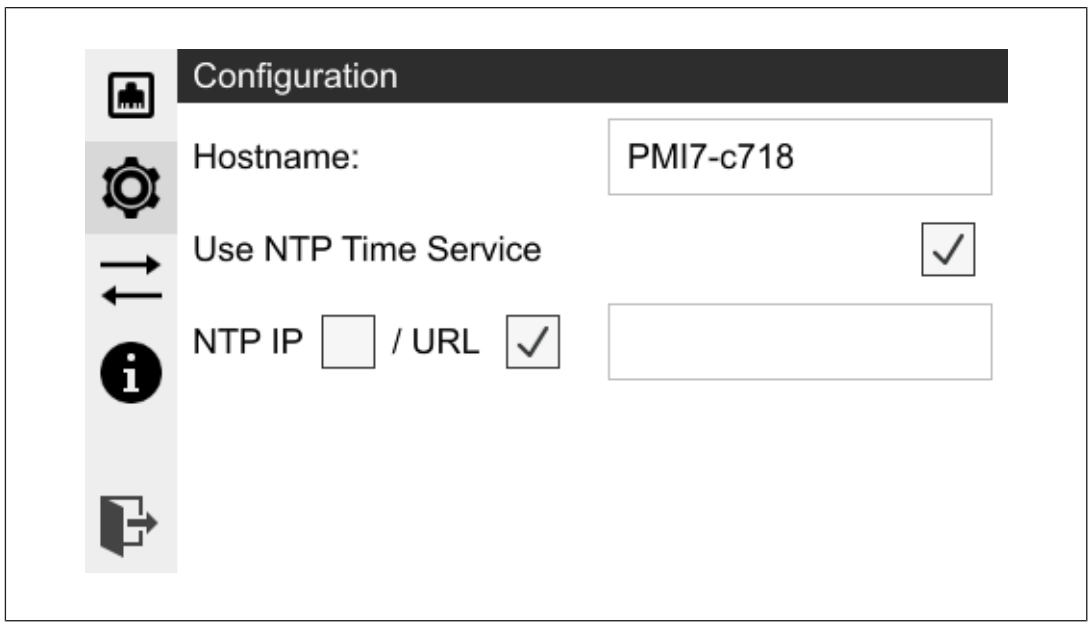

Fig.: Use time server

- The local time will be adapted automatically as the system time.

  Touch the button Change to change the date or time. Enter the time in 24 hour format "hh:mm:ss".

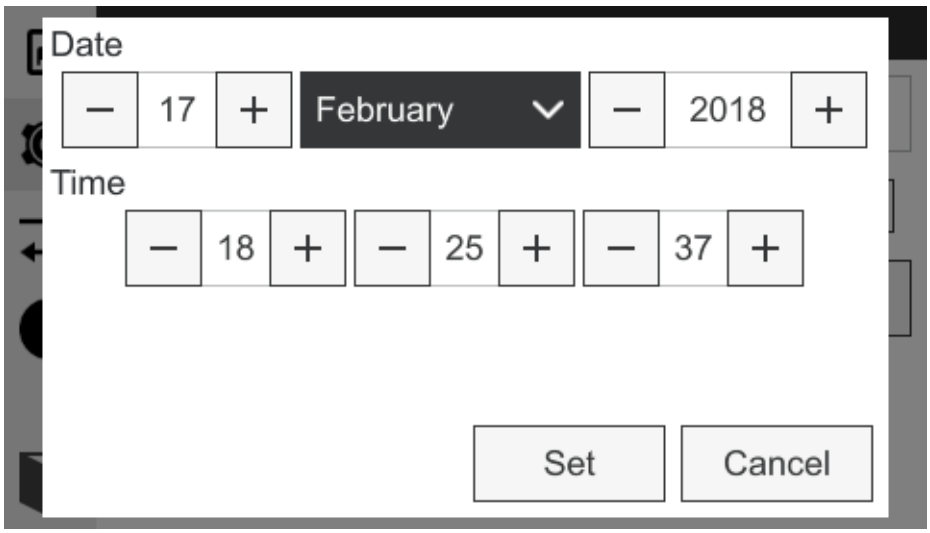

Fig.: Set time and date

7.1.3 Settings for the PASvisu server

In the sidebar, touch the button  to make further settings for the PASvisu server.

- You have the option to use a local PASvisu Server. To do this, enter the IP address of PASvisu Server in IPv4 format.
  Default setting:
  IP address: 127.000.000.001
  Server HTTP port: 40856
  Server WS port: 40857

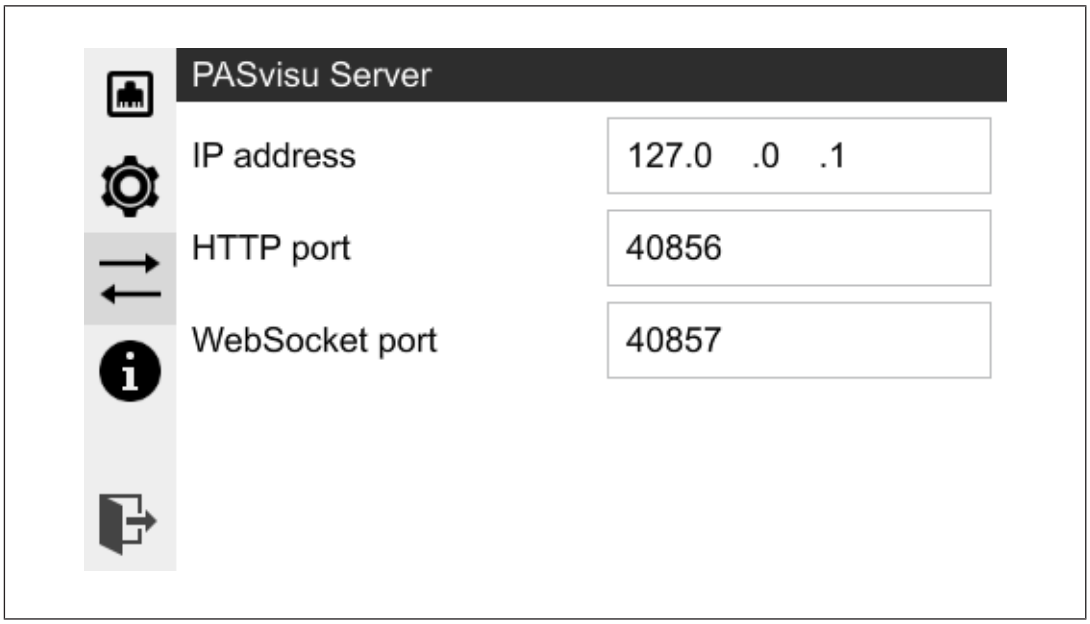

Fig.: Settings PASvisu Server

7.1.4 Licence information

In the sidebar, touch the button  to display the licence information.

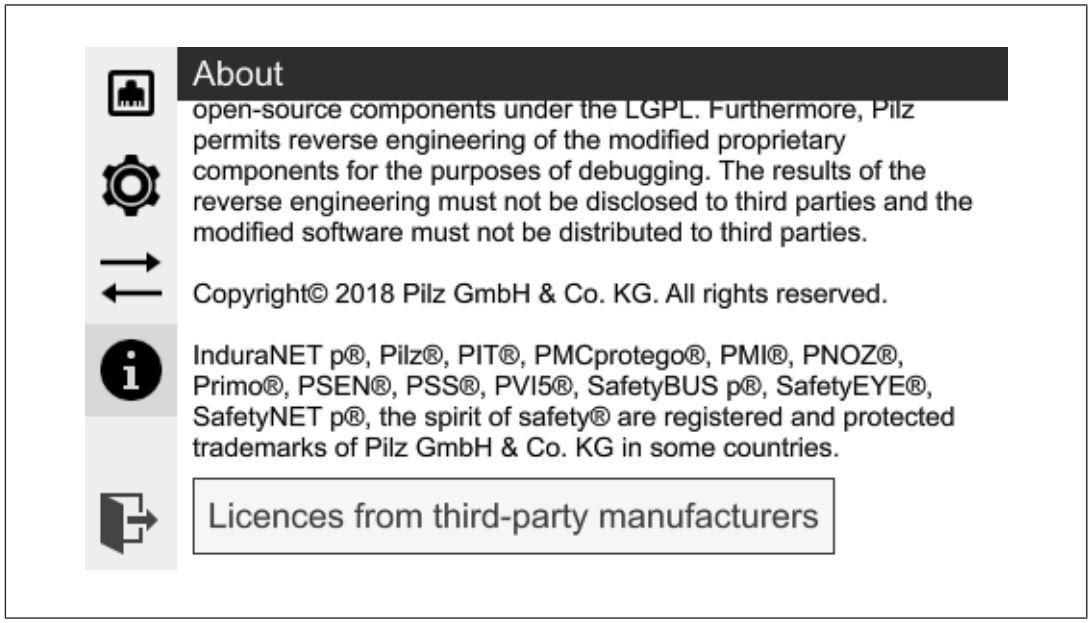

Fig.: Licence information

7.1.5 Exit PMI Manager

In the sidebar, touch the button  to exit the PMI Manager. Then the following view will open:

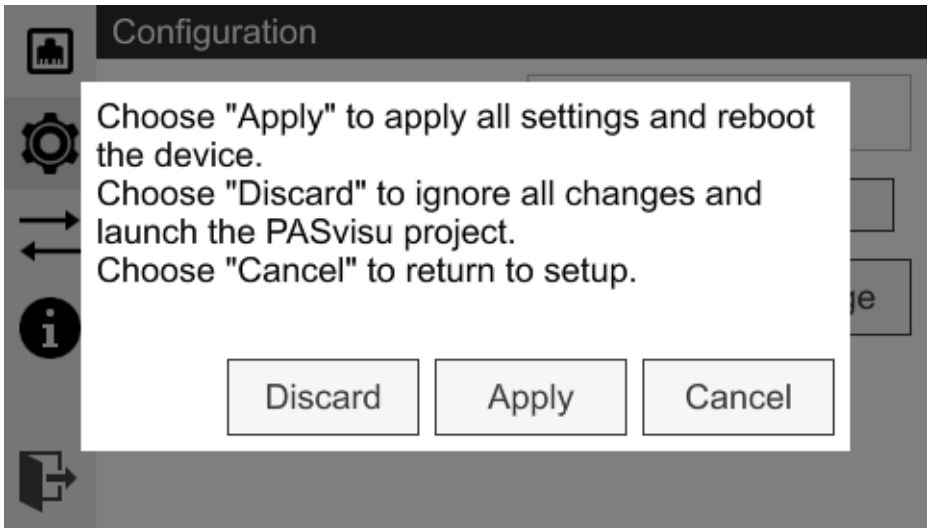

Fig.: Exit PMI Manager

- Touch the button "Apply" to confirm all the entries, and to restart the device.
- Touch the button "Discard" to reject the changes and to start the PASvisu project.
- Touch the button "Cancel" to return to the settings.

Further information on PASvisu can be found in the PASvisu online help.

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 or window cleaner to dampen the cloth. Never use aggressive solvents or abrasive cleaning agents.

9 Technical details

General	266704	266707
Approvals	**CE**	**CE**
Electrical data	**266704**	**266707**
Supply voltage		
Voltage	**24 V**	**24 V**
Kind	**DC**	**DC**
Voltage tolerance	**-10 %/+10 %**	**-15 %/+20 %**
Output of external power supply (DC)	**2 W**	**3 W**
Max. power of external power supply (DC)	**4 W**	**6 W**
Display	**266704**	**266707**
Display type	**TFT**	**TFT**
Display diagonal	**11 cm**	**18 cm**
Display resolution	**480 x 272**	**800 x 480**
Display colour depth	**32768**	**32768**
Touchscreen	**Capacitive**	**Capacitive**
CPU	**266704**	**266707**
Processor clock speed	**800 MHz**	**800 MHz**
Working memory (RAM)	**512 MB**	**512 MB**
Real-time clock	**yes**	**yes**
USB interface	**266704**	**266707**
Number of USB Hosts	**1**	**1**
Type of USB host interface	**USB 2.0 Type A**	**USB 2.0 Type A**
Ethernet interface	**266704**	**266707**
Transmission rate	**100 MBit/s**	**100 MBit/s**
Environmental data	**266704**	**266707**
Ambient temperature		
Temperature range	**0 - 50 °C**	**0 - 50 °C**
Storage temperature		
In accordance with the standard	**EN 60068-2-1/-2**	**EN 60068-2-1/-2**
Temperature range	**-25 - 60 °C**	**-25 - 60 °C**
Climatic suitability		
In accordance with the standard	**EN 60068-2-78**	**EN 60068-2-78**
Humidity	**90 % r. h. at 40 °C**	**90 % r. h. at 40 °C**
Condensation during operation	**Not permitted**	**Not permitted**
EMC	**EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-6-2, EN 61000-6-4**	**EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-6-2, EN 61000-6-4**

Environmental data	266704	266707
Vibration		
In accordance with the standard	**EN 60068-2-6**	**EN 60068-2-6**
Frequency	**10 - 150 Hz**	**10 - 55 Hz**
Acceleration	**1g**	**1g**
Shock stress		
In accordance with the standard	**EN 60068-2-27**	**EN 60068-2-27**
Acceleration	**15g**	**15g**
Duration	**11 ms**	**11 ms**
Protection type		
In accordance with the standard	**EN 60529**	**EN 60529**
Housing	**IP20**	**IP20**
Front	**IP65**	**IP65**
Mechanical data	**266704**	**266707**
Dimensions		
Height	**95 mm**	**142 mm**
Width	**135 mm**	**200 mm**
Depth	**36,3 mm**	**50,3 mm**
Weight	**348 g**	**944 g**

Where standards are undated, the 2018-01 latest editions shall apply.

10 Order reference

10.1 Product

Product type	Features	Order no.
PMI v704e	Operator terminal, 480 x 272 pixel resolution, capacitive touchscreen	266 704
PMI v707e	Operator terminal, 800 x 480 pixel resolution, capacitive touchscreen	266 707

10.2 Accessories

Product type	Features	Order no.
DIN rail adapter TSH 35	DIN top hat rail TSH 35	266 103

Support

Technical support is available from Pilz round the clock.

Americas
Brazil
+55 11 97569-2804
Canada
+1 888-315-PILZ (315-7459)
Mexico
+52 55 5572 1300
USA (toll-free)
+1 877-PILZUSA (745-9872)

Asia
China
+86 21 60880878-216
Japan
+81 45 471-2281
South Korea
+82 31 450 0680

Australia
+61 3 95600621

Europe
Austria
+43 1 7986263-0
Belgium, Luxembourg
+32 9 3217575
France
+33 3 88104000
Germany
+49 711 3409-444
Ireland
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Italy, Malta
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+45 74436332
Spain
+34 938497433
Switzerland
+41 62 88979-30
The Netherlands
+31 347 320477
Turkey
+90 216 5775552
United Kingdom
+44 1536 462203

You can reach our international hotline on:
+49 711 3409-444
support@pilz.com

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Pilz GmbH & Co. KG
Felix-Wankel-Straße 2
73760 Ostfildern, Germany
Tel.: +49 711 3409-0
Fax: +49 711 3409-133
info@pilz.com
www.pilz.com

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