TP 04M, TP 06M, TP 06S, TP 07T

Touch panels with STN/FSTN or TFT display

AUTOMATION

Data sheet
7313_en_03

1   Product description

The touch panels TP 04M, TP 06M, TP 06S and TP 07T are part of a modern, scalable and seamless HMI family. Through the use of a comprehensive range of functions, the touch panels provide an innovative operating concept for complex machine visualizations.

The touch panels have full-graphics 4", 6" or 7" displays.

Each touch panel is equipped with one Ethernet interface and two USB interfaces.

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i Make sure you always use the latest documentation.
It can be downloaded at www.download.phoenixcontact.com.

A conversion table is available on the Internet at www.download.phoenixcontact.com/general/7000_en_00.pdf.

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i This data sheet is valid for the products listed on the following page:

PHŒNIX CONTACT

INSPIRING INNOVATIONS

2   Ordering data

Products

Description	Type	Order No.	Pcs./Pkt.
Touch panel with integrated runtime of VISU+ visualization software			
– With 3.8" FSTN display, 5 gray scales, 320 x 240 pixels	TP 04M	2985152	1
– With 5.7" FSTN display, 5 gray scales, 320 x 240 pixels	TP 06M	2985165	1
– With 5.7" C-STN display, 125 colors, 320 x 240 pixels	TP 06S	2985178	1
– With 7" TFT display, 65535 colors, 800 x 480 pixels	TP 07T	2913085	1

Documentation

Description	Type	Order No.	Pcs./Pkt.
Quick Start Guide	UM QS EN OT TP	2888903	1

3   Technical data

Electrical data	TP 04M	TP 06M	TP 06S	TP 07T
Supply voltage	24 V DC (SELV according to DIN EN 61131)			
Residual ripple	10%, maximum			
Minimum voltage	18 V			
Maximum voltage	30 V			
Current consumption (at 24 V, typical)	0.25 A	0.25 A	0.4 A	0.6 A
Current consumption (maximum)	0.35 A	0.35 A	0.5 A	0.8 A
Connected load	6 W	6 W	9.6 W	19.2 W
Fuse	Semiconductor fuse, self-resetting			
Protection against polarity reversal	Integrated			

Ethernet	
X5 Ethernet	10/100Base-T

USB	
In accordance with the "Universal Serial Bus Specification Rev. 2.0"	
X9, X10 host	

Minimum:
  Maximum:
  Maximum output current:
	1.5 Mbps
	12 Mbps
	100 mA per output

Central processing unit	
Central processing unit	RISC ARM9
Clock frequency	200 MHz
Other features	Watchdog timer, realtime clock, battery monitoring

Memory

Application memory	8 Mbytes
Flash	32 Mbytes
SDRAM	64 Mbytes

Connection method

Network	Ethernet (10/100 Mbps), RJ45
USB interface	2 x USB 2.0

Climatic data

Temperature (operation)	0°C ... 50°C
Ambient temperature (storage/transport)	-25°C ... +70°C
Relative humidity (operation and storage)	10% ... 95%, no condensation

Standards and directives

Noise immunity	DIN EN 61000-4-2 DIN EN 61000-4-3 DIN EN 61000-4-4 DIN EN 61000-4-5 DIN EN 61000-4-6 DIN EN 61000-6-2
Noise emission	DIN EN 55011 limit value class A DIN EN 55022 limit value class A DIN EN 6100-6-4
Equipment requirement	DIN EN 61131-2
Storage and transport	DIN EN 61131-2
Power supply units	DIN EN 61131-2
Electromagnetic compatibility	2004/108/EC (including all applicable modifications)
Degrees of protection	DIN EN 60529
Impact load, shocks	DIN EN 60068-2-27
Sinusoidal vibrations	DIN EN 60068-2-6

> **i** This device is classified as Class A equipment. It may cause radio interference in residential areas. In such cases, the operator may be held liable for taking appropriate measures and for the incurrence of costs.

Housing and front plate	TP 04M	TP 06M	TP 06S	TP 07T
Housing		Sheet steel, galvanized		
Front plate, natural anodized aluminum (H x W x D)	96 x 130 x 5 mm		147 x 203 x 5 mm	
Grommet		Circumferential rubber grommet on the rear		
Mounting cutout (H x W)	88 x 122 mm		139 x 195 mm	
Installation depth	33 mm, approximately		54 mm, approximately	
Degrees of protection		Front: IP65; rear: IP20		
Total weight	500 g, approximately		1000 g, approximately	

4 Mounting

⚠️ When mounting the touch panel, leave a circumferential gap of at least 30 mm in order to provide sufficient air circulation.

⚠️ If the touch panel is mounted horizontally, please note that additional heat sources may cause a build-up of heat below the touch panel.
Provide sufficient heat dissipation!
Please observe the permissible temperature range specified in the technical data when operating the device.

⚠️ In order to ensure the specified degree of protection, make sure that the grommet lies flat against the mounting surface and the threaded pins of the mounting brackets are tightened uniformly.

The device enables quick and easy mounting from the rear. Ideally, mounting should be in control panels with a plate thickness of approximately 1 mm to 6 mm.

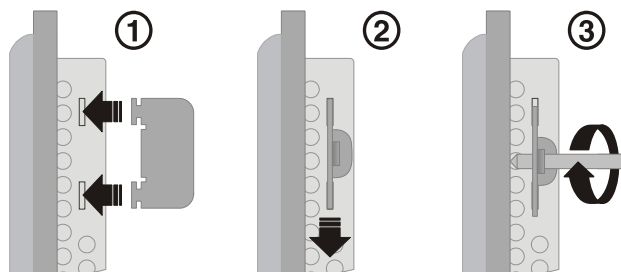1. Push the device through the mounting cutout from the front.

Figure 1 Mounting with mounting bracket

2. Place the mounting brackets in the appropriate slots (1) and pull the brackets downwards until they snap into place (2).
3. Secure the device using the threaded pins (3).
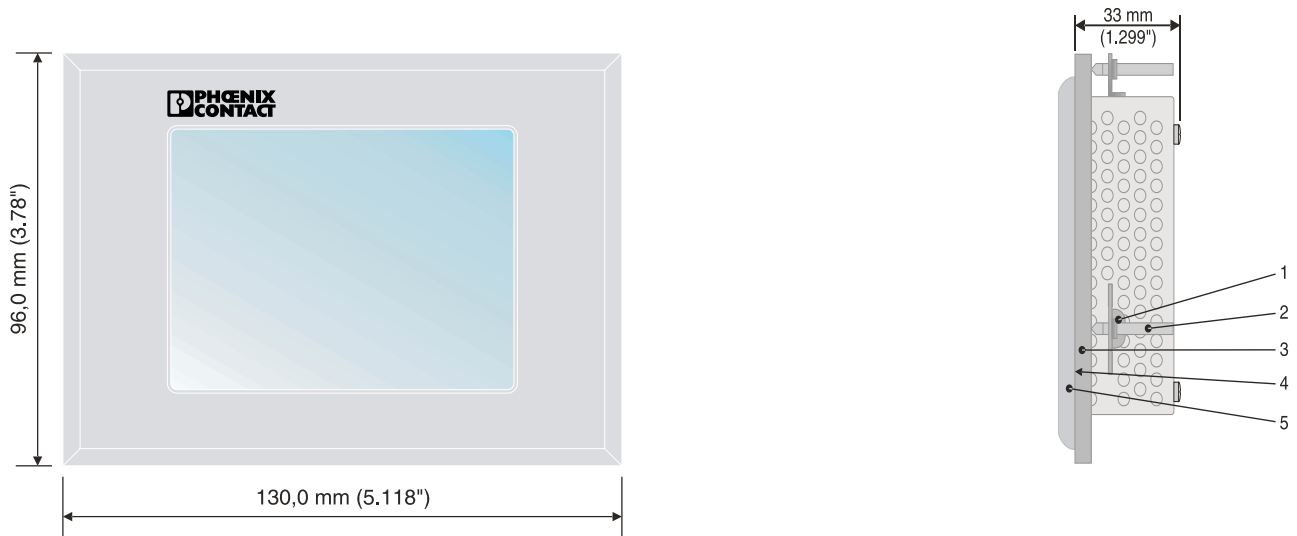
5 Housing dimensions

5.1 TP 04M touch panel

96,0 mm (3.78")

130,0 mm (5.118")

33 mm (1.299")

1
2
3
4
5

Figure 2   Front and side view of the TP 04M with dimensions

1 Mounting bracket
2 Threaded pin
3 Mounting surface, 1 mm to 6 mm thick
4 Circumferential grommet
5 Front plate
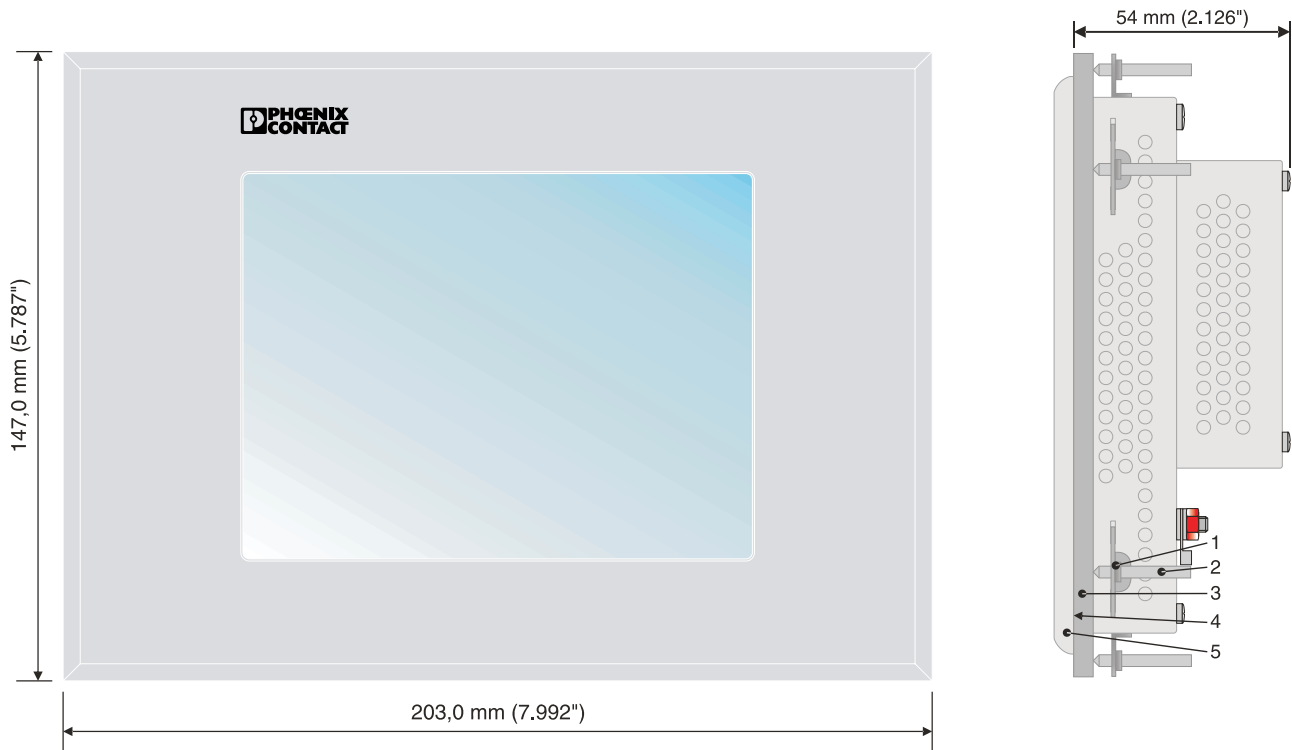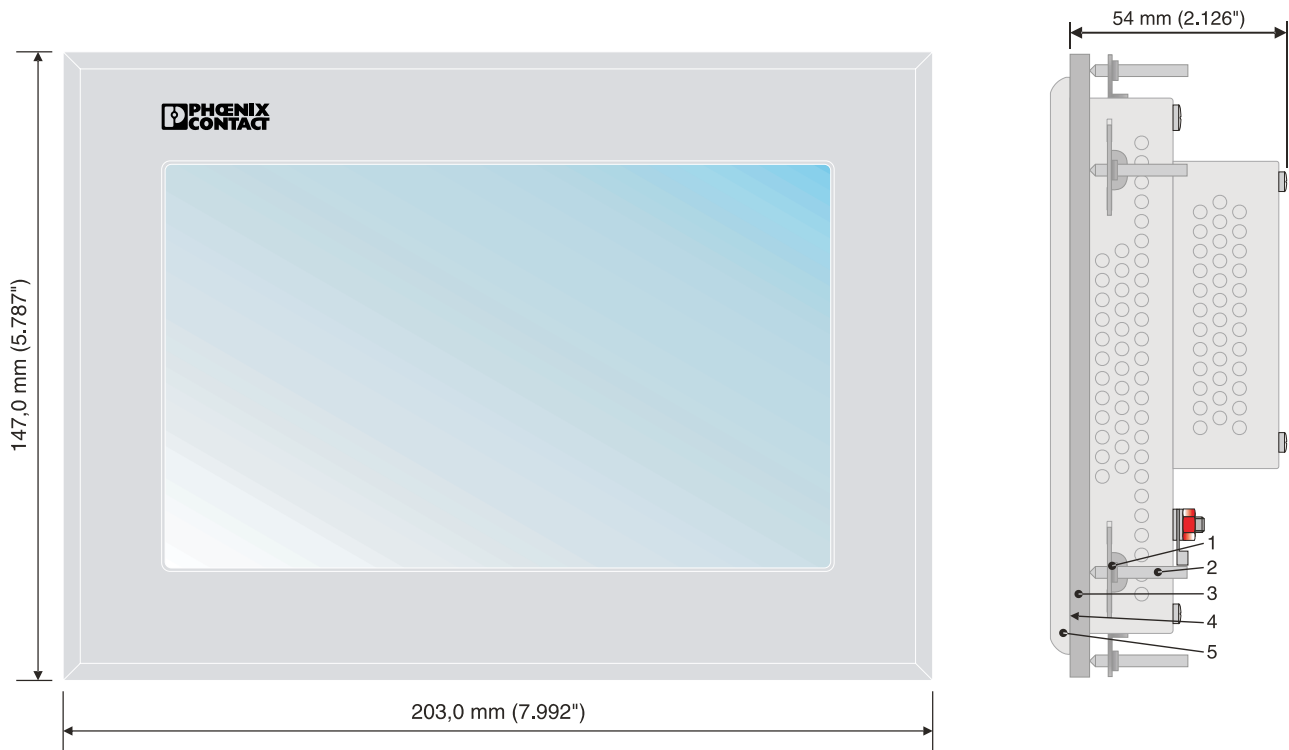
5.2 TP 06M/TP 06S touch panels

Figure 3   Front and side view of the TP 06M/TP 06S with dimensions

1   Mounting bracket
2   Threaded pin
3   Mounting surface, 1 mm to 6 mm thick
4   Circumferential grommet
5   Front plate

5.3   TP 07T touch panel

Figure 4   Front view of the TP 07T with dimensions

1   Mounting bracket
2   Threaded pin
3   Mounting surface, 1 mm to 6 mm thick
4   Circumferential grommet
5   Front plate

6 Switching on

The touch panel is equipped with the Windows CE operating system suitable for VISU+ visualization runtime.

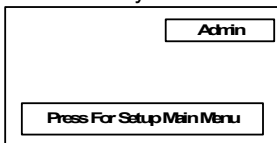## 6.1 Loading process within the Windows CE operating system

The touch panel allows you to modify the configuration during the startup phase using buttons.

The touch panel has two operating modes:
– Normal (no button pressed)
– Setup Main (**Press For Setup Main Menu** button pressed)

6.2 Normal operating mode

The AppStarter.exe program is started from the internal flash memory.

```
┌──────────────────────────────────┐
│        ┌──────────────┐          │
│        │    Admin      │          │
│        └──────────────┘          │
│                                    │
│  ┌──────────────────────┐        │
│  │ Press For Setup Main Menu │    │
│  └──────────────────────┘        │
└──────────────────────────────────┘
```

Display after startup

ℹ	Please note that the device can only be reached via Ethernet after an Ethernet address has been assigned.

6.3 Setup Main operating mode

Press the **Press For Setup Main Menu** button during the startup phase to start the Setup Main operating mode.
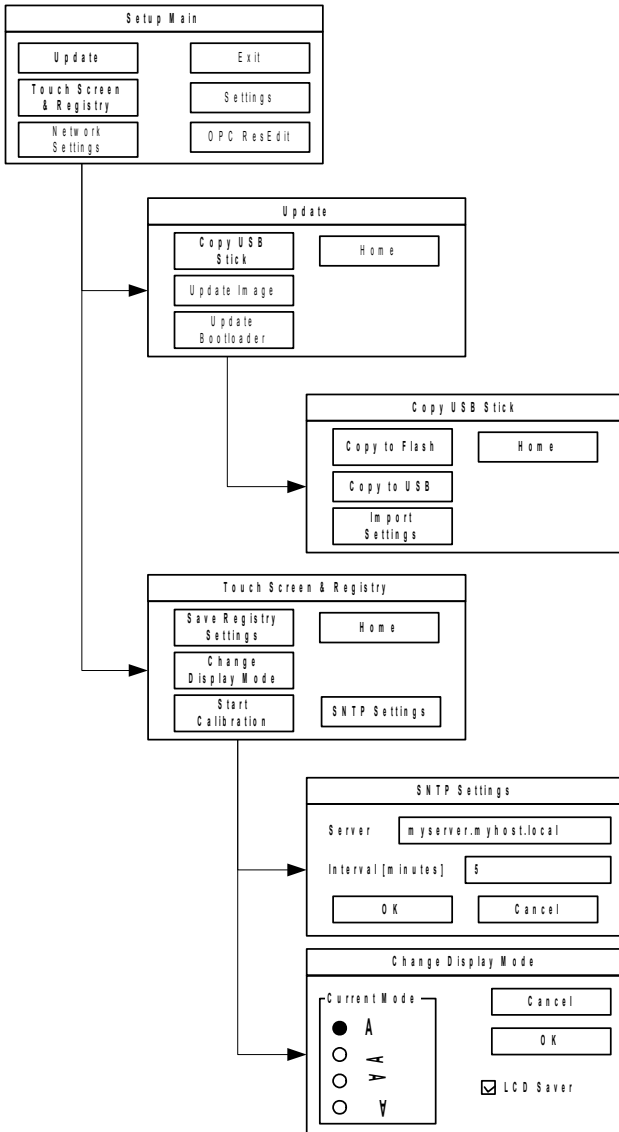

Figure 5   Update, Registry

To transfer data and settings to another device, proceed as follows:

1. "Copy to USB" on current device.
2. "Copy to Flash" on destination device.
3. Select "Backup" directory.

The device is restarted.

4. "Import Settings" on destination device.

Update, Copy USB Stick, Copy to Flash:

Copies the data from the USB stick to the internal flash file system. The root, backup or any other directory can be selected.

Selection	Function
Root	All files (no directories) of the root directory are copied to the root directory of the flash memory.
Backup	The contents of the directory are copied to the root directory of the flash memory.
XYZ (any)	The selected directory (including subdirectories) is copied 1:1 to the flash memory.

Update, Copy USB Stick, Copy to USB:

Copies the contents of the flash file system to the backup directory of the USB stick. Protected system files are excluded. A log file is also copied, which can be used to restore system settings via the "Import Settings" menu item.

Update, Copy USB Stick, Import Settings:

An automatically generated log file can be used to restore system settings. If the backup directory of the USB stick contains a corresponding log file, the settings can be restored.
This is only possible when using identical types of device.

Update, Update Image:

If the image subdirectory of the memory stick contains an "xxxx.nb0" file, then this file is used to perform the image update. There must only be one "xxxx.nb0" file in this directory.
During this procedure flash registry is deactivated. This means that "image" is operated with a new default registry.

Update, Update Bootloader:

If the bootloader subdirectory of the memory stick contains an "xxxx.nb0" file, then this file is used to perform the bootloader update. There must only be one "xxxx.nb0" file in this directory.
The user is informed after every successful update.

Registry, Save Registry Settings:

The complete registry is stored.
This entry is password-protected.

Registry, Change Display Mode:

Settings of display orientation.
This entry is password-protected.

Registry, Start Calibration:

Touch calibration is initiated. After calibration the values must be saved via "Save Registry Settings".
This entry is password-protected.

Registry, SNTP Settings:

You can enter the address of an Intranet or Internet time server. Enter the synchronization interval in minutes.
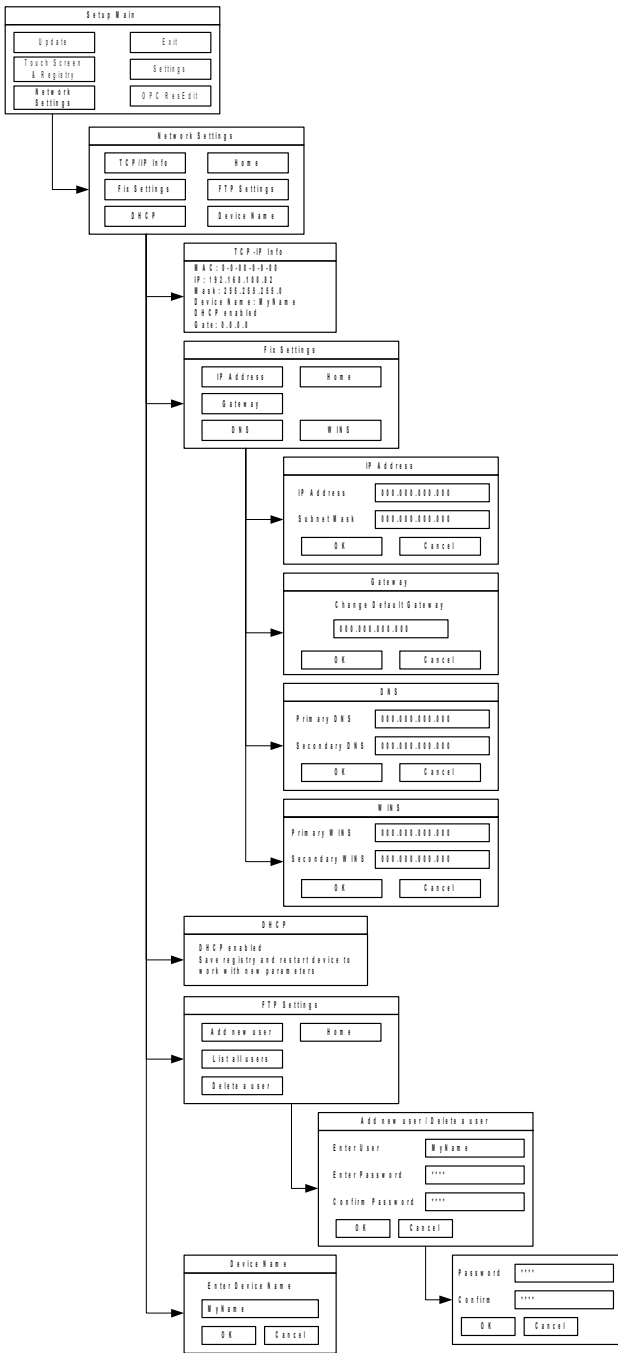This entry is password-protected.

Figure 6   Network Settings

All addresses must be entered in the format "xxx.xxx.xxx.xxx".
Numbers less than 100 must be filled with leading zeros.
(Example: 192.168.42.1 -> 192.168.042.001)

Network Settings, Fix Settings, IP Address:

Enter an IP address and the subnet mask.
After confirming the information, DHCP is automatically deactivated.

This entry is password-protected.

Network Settings, Fix Settings, Gateway:

Define the default gateway.
After confirming the information, DHCP is automatically deactivated.

This entry is password-protected.

Network Settings, Fix Settings, DNS:

Here you can enter a primary and a secondary DNS server address.
After confirming the information, DHCP is automatically deactivated.

This entry is password-protected.

Network Settings, Fix Settings, WINS:

Here you can enter primary and secondary WINS addresses.
After confirming the information, DHCP is automatically deactivated.

This entry is password-protected.

Network Settings, Current IP:

Displays the current IP address, subnet mask, device name, DHCP status, and gateway.

Network Settings, DHCP:

This menu item is used to activate the DHCP service. The settings must be saved when exiting the menu or via "Save Registry Settings".

This entry is password-protected.

Network Settings, Device Name:

Specify a device name with a maximum of 15 characters. The device can be accessed by the device name instead of the IP address by using an FTP connection.
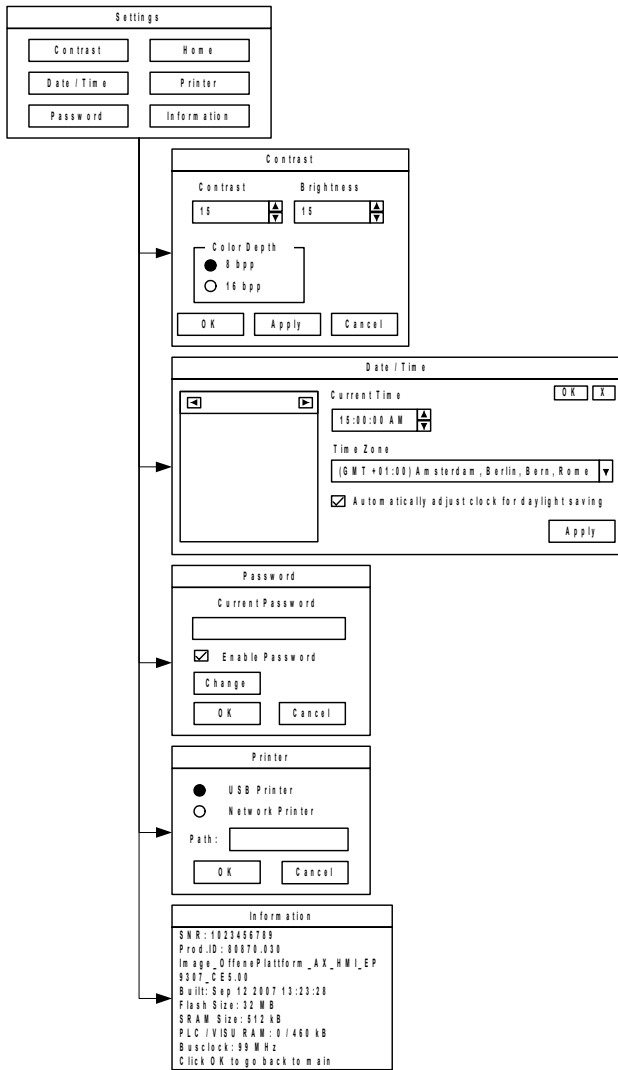
This entry is password-protected.

Figure 7   Setup Main operating mode

Figure 8   OPC ResEdit

Settings, Contrast:

In the Setup Main operating mode display, default values are used for contrast and brightness. This ensures display even in the event of faulty values. Changing a value requires confirmation in an additional dialog box. The values are not accepted if **Cancel** is pressed or confirmation does not take place within 5 seconds.

This entry is password-protected. Depending on the display type, different values can be modified:

Display type	Contrast	Brightness
STN (mono)	X	-
STN (color)	X	X
TFT	-	X

Settings, Date / Time:

Set the date and time. Press Refresh to update the values.

Settings, Password:

The password can be activated, deactivated or redefined. When the password is activated, all password-protected dialog boxes can only be accessed by prior entry of password.

This entry is password-protected.

Settings, Information:

The following information is output: serial number, part number, image version, image date, flash size, SRAM size, and PLC/Visu RAM size.

OPC ResEdit:

The OPC Resource Editor is started. Resource, type and parameter settings can be made.

This entry is password-protected.

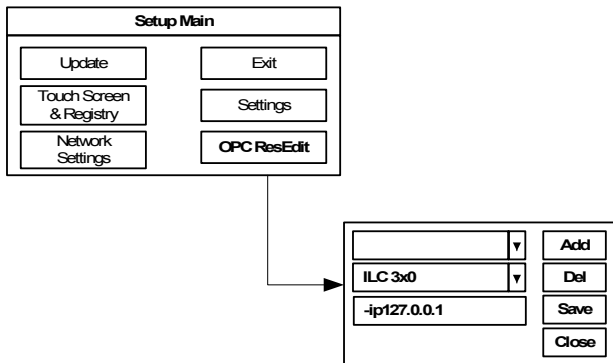> ⓘ The addition "-ip" must always be retained.
> (Example: -ip192.168.42.1)

7 Display

⚠ **DANGER: Poisoning**
If the display is damaged, avoid direct contact with skin, and do not ingest any liquids or inhale any gases.

⚠ **DANGER: Chemical burns**
If the display is damaged, avoid direct contact with skin, and do not ingest any liquids or inhale any gases.

Depending on its design, the touch panel is equipped with different displays.

Touch screen

The touch panel has a resistive 4-wire touch screen, which is used for its operation.

🛈 **NOTE:** Damage
Pointed or sharp objects, such as pins or fingernails, may cause irreparable damage to the touch screen.
Therefore, only use your fingertips or the tools specified in the technical data for operating the touch screen.

8 Interfaces

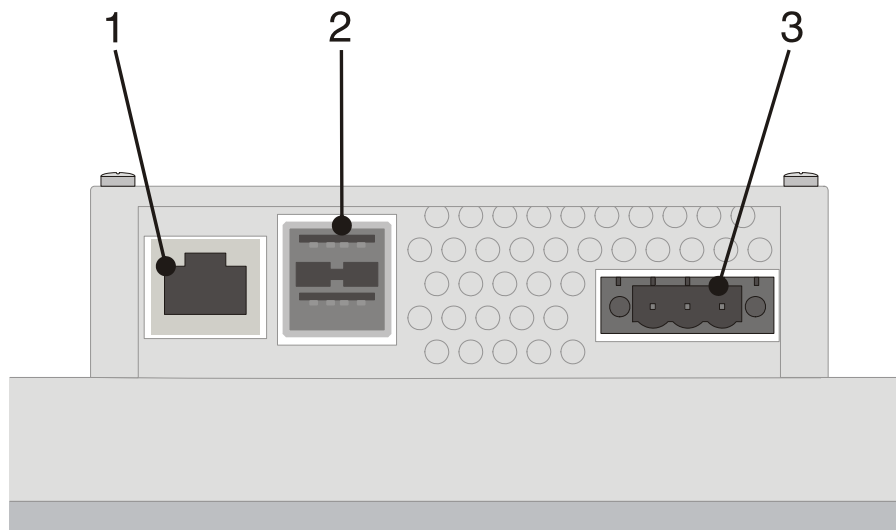Several interfaces are located on the bottom of the touch panel.

Figure 9   Interfaces of the TP 04M, TP 06M, TP 06S and TP 07T touch panels

1 Female connector X5 (Ethernet)
2 Female connector X9, X10 (USB host - type A)
3 Male connector X1 (supply voltage)

9 Interface assignment

⚠ **DANGER: Hazardous contact voltage**

In electrical systems, hazardous voltages may occur posing a danger to humans. There is a risk of electric shock when touching live parts. Work must only be carried out by qualified personnel familiar with the required safety measures.

ⓘ **NOTE:**

Provide a separate cable for protective grounding at the threaded bolt. The cable must have a minimum cross section of 1.5 mm² and must be as short as possible.
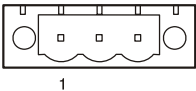
9.1 Supply voltage

Figure 10   Supply voltage

Pin	Designation	Function
1	⏚	Low-noise ground
2	0 V	0 V supply voltage
3	+24 V DC	24 V DC supply voltage

ⓘ Use a fine strand cable with a minimum cross section of 0.75 mm² and a maximum cross section of 2.5 mm² for the supply voltage.
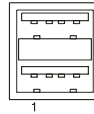
9.2 USB

Figure 11   Two USB host interfaces

Pin	Designation
1	VCC (+5 V DC)
2	Data–
3	Data+
4	GND

ⓘ Use a fine strand cable with a minimum cross section of 0.75 mm² and a maximum cross section of 2.5 mm² for the supply voltage.

ⓘ For the specification of a suitable cable, please refer to the "Universal Serial Bus Specification Rev. 2.0".

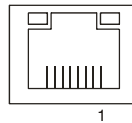ⓘ The maximum cable length for the cable used is 2.5 m.

9.3 Ethernet

Figure 12   Ethernet interface

Pin	Designation	Function
1	Tx+	Transmit data, positive polarity
2	Tx-	Transmit data, negative polarity
3	Rx+	Receive data, positive polarity
4	n.c.	Not connected
5	n.c.	Not connected
6	Rx-	Receive data, negative polarity
7	n.c.	Not connected
8	n.c.	Not connected

ⓘ Use a category 5 (CAT 5) twisted pair cable. The maximum cable length is 100 m.

ⓘ For additional information, please refer to the IEEE 802.3 standard.

10 Diagnostic LEDs

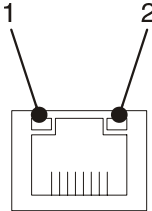Ethernet diagnostic LEDs are located at the Ethernet interface of the touch panel.

Figure 13   Arrangement of the Ethernet diagnostic LEDs

No.	Designation	Color	State	Function
1	XMT	Green	On	Link active
			Off	Link inactive
			Flashing	Transmitting/receiving
2	RCV	Yellow	On	Full duplex mode
			Off	Half duplex mode
			Flashing	Collision detected

11   VISU+

VISU+ is an industrial visualization software which can be used on all hardware platforms under Windows CE and XP operating systems.

The TPxx series uses Windows CE as its operating system. The visualization functionality is limited under Windows CE. In addition, performance is reduced by the choice of hardware.

Please observe the following restrictions:

- Lower speed
- Less memory space
- Limited trending
- Limited data logging
- Limited alarming
- Processing of data amount (hardware-dependent)
- Graphical elements of the VISU+ library (e.g., tank views with traverses) cannot be completely displayed.

VISU+ functions	
I/O variables in bytes (tags)	4096
Graphical interface and objects	Limited
Alarms	Limited
Short-cut and menu editor	Yes
Virtual pad (for touch screen)	Yes
Historical log for events	Limited
Dynamic language management	Yes
General logic	Yes
VBA multithreading	Yes
Trending	Limited
Recipe data logger	Limited
Reporting	Not available
Networking	Yes
Statistic alarms	Not available
SMS/voice/fax/e-mails	Not available
Modem services Driver tapi	Not available
Charts	Yes
OPC client	Yes
Runtime user management	Not available (ARM9) Yes (XScale)

Recommendations to improve performance

1.   Reducing the page switchover time (page clearing)

To ensure a rapid switchover time between the pages to be visualized, the "Not destroyable" option should be set in the project file. Using this setting the page remains in RAM. The RAM assignment directly depends on both the displayed page size and the total number of pages. A RAM area of approximately 12 ... 13 MB is available for the saving of pages. A total of approximately 40 ... 50 pages can be saved in this area, depending on the page memory requirements.

For the touch panel templates, the "Not destroyable" option is set by default.

When starting the runtime environment, only pages with the "Not destroyable" option activated will be preloaded into RAM provided that the option "Preload process images" has been selected for the project.

In this case, the starting time will be prolonged once by the page load times.

2.   Using IL (instruction list)

Assigning an IL script to a page requires a RAM area of approximately 800 kB. Due to the limited memory capacity, it is only possible to preload a maximum of 10 pages. In addition, the script runs in the background if the "Not destroyable" option is selected.

The scripts of all pages loaded into RAM are processed in parallel. Even the scripts stored in background are processed. This may lead to undesired interactions.

For the global use of IL scripts within a project, the engine should be stored on the overview page.

	To avoid confusion in the IL scripts, unused pages should always be "cleared" if they contain IL scripts possibly affecting other pages.

3.   Using VBA (Visual Basic for Applications)

Assigning VBA to a page requires a RAM area of approximately 800 kB. Due to the limited memory capacity, it is only possible to preload a maximum of 10 pages. In addition, VBA runs in the background if the "Not destroyable" option is selected.

For the global use of data within a project, the engine should be stored on the overview page.

4. Heap management

Heap management is used for memory management using the VISU+ runtime environment. The request and release of memory areas is both dynamic and unpredictable.

If there is no automatic garbage collection, the fragmentation of the total available memory may lead to new memory requirements not being able to be met even though the sum of available free memory would, theoretically, still be high enough.

Heap management can be activated to ensure a more efficient memory management and thus reduced access times.

For activating the heap management, proceed as follows:
1. Start the project file on the PC.
2. Open all project pages and options of the project file.
3. Stop the project on the PC.
4. Activate heap management by selecting the **Set value of last start** option.

The values automatically determined by the heap management are set.

12 General user notes

Error message

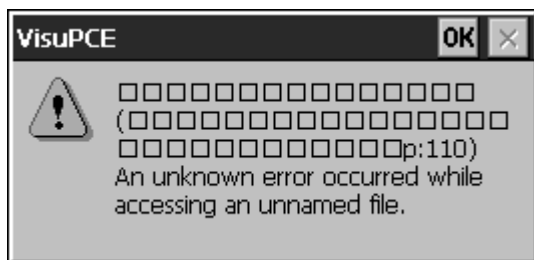| Error message	Remedy
Flash full	Delete any data in the flash memory that is no longer needed. (e.g., via FTP access)
	To swap out memory data, use a USB memory extension, if necessary.

Figure 14 Example, error message

13 Portrait (vertical) mode on the touch panel

Depending on the application to be visualized, it may be necessary to select the portrait mode for representation purposes. By default, all touch panels support a 90° rotation of the visualization.
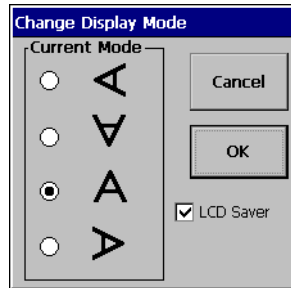

Figure 15 Example, portrait mode

To use the portrait mode, proceed as follows:
1. Set the portrait mode on the touch panel.
2. Set the VISU+ visualization software to portrait mode.
- In the root path of the project, the "Projectname.constraints" configuration file is automatically created and saved during initial project creation. This file contains information, such as the maximum limits of the display device type.
- Close the project file if it is open.
- Open the "Projectname.constraints" configuration file for processing using an editor (e.g., NotePad).
- Swap the X/Y limit value entries with one another:
  – MaxScreenSize CX, e.g., 800 (pixel)
  – MaxScreenSize CY, e.g., 600 (pixel)
- Open the VISU+ program user interface and load the required project file.
- Modify the required X/Y limit values in the program user interface.