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TURCK

TX100 HMI Series

Operating instructions



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1 About this document

These operating instructions describe the structure, functions and the use of the product and will help you to operate the product as intended. Read these instructions carefully before using the product. This is to avoid possible damage to persons, property or the device. Retain the instructions for future use during the service life of the product. If the product is passed on, pass on these instructions as well.

1.1 Target Groups

These instructions are aimed at qualified personnel and must be carefully read by anyone mounting, commissioning, operating, maintaining, dismantling or disposing of the device.

1.2 Explanation of symbols

The following symbols are used in these instructions:



DANGER!

DANGER indicates a dangerous situation with high risk of death or severe injury if not avoided.



WARNING!

WARNING indicates a dangerous situation with medium risk of death or severe injury if not avoided.

CAUTION!

CAUTION indicates a dangerous situation of medium risk which may result in minor or moderate injury if not avoided.



NOTICE!

NOTICE indicates a situation which may lead to property damage if not avoided.



NOTE

NOTE indicates tips, recommendations and useful information on specific actions and facts. The notes simplify your work and help you to avoid additional work.

CALL TO ACTION

➤ This symbol denotes actions that the user must carry out.

RESULTS OF ACTION

➡ This symbol denotes relevant results of actions.

1.3 Additional Documents

The following additional documents are available online at www.turck.com

- Data sheet
- Quick Start Guide
- CAD data
- Online help for TX Visu Pro

1.4 Feedback about these instructions

We make every effort to ensure that these instructions are as informative and as clear as possible. If you have any suggestions for improving the design or if some information is missing in the document, please send your suggestions to techdoc@turck.com.

2 product overview

The graphical user interface of the TX100 HMIs is created with the visualization software Suite TX VisuPro. The TX VisuPro software supports the following functions, among others:

- Full vector graphic support, gallery of vector symbols and objects
- Screen object dynamics
- Multilanguage applications with TrueType fonts.
- Data display (numerical, text, bargraph, analog gauges and graphic image formats)
- Data acquisition and logging
- Trend presentation
- Alarm handling
- Scheduler and timed actions
- Recipes
- Security and user management
- Email and RSS feeds
- Several communication drivers, multiple-driver communication capability
- Remote monitoring and control with Client-Server functionality
- On-line and Off-line simulation with TX VisuPro
- Scripting language for automating HMI applications
- Script debugger

2.1 Product Identification

The manual refers to the following models:

- TX104 Operator interface with TFT color 4.3" widescreen display touchscreen
- TX107 Operator interface with TFT color 7" widescreen display touchscreen
- TX110 Operator interface with TFT color 10.1" widescreen display touchscreen

The type plate is located on the rear of the device.

An example of this plate is shown in the figure below:



TX110	Product model name
100002313	Product part number
1832	Year/week of production
AA...	Serial number number
V...	Internal version ID of the product

2.2 Type Code

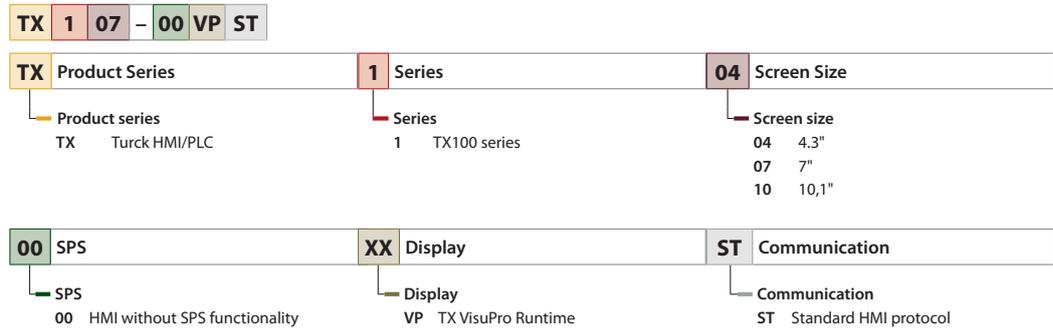


Fig.1: Type Code TX100

2.3 List of Available Devices

Ident no.	Device
100002311	TX104-00VPST
100002312	TX107-00VPST
100002313	TX110-00VPST

3 Standards and Approvals

The products have been designed for use in an industrial environment in compliance with the 2014/30/EU EMC Directive.

The products have been designed in compliance with:

EN 61000-6-4	EN 55011 Class A
EN 61000-6-3	EN 55022 Class B
EN 61000-6-2	EN 61000-4-2
EN 61000-6-1	EN 61000-4-3
	EN 61000-4-4
	EN 61000-4-5
	EN 61000-4-6
	EN 61000-4-8

EN 60079-0
EN 60079-7
EN 60079-11



NOTICE!

Operation in residential and commercial areas
Electromagnetic disturbances!

- In case of the operation of the devices in residential and commercial areas, observe the measurement values according to IEC-61000-6-3.

The products are in compliance with the Restrictions on Certain Hazardous Substances (RoHS) Directive 2011/65/EU.

In compliance with the above regulations the products are CE marked.

3.1 Special Instruction for Use

- The equipment shall only be used in an area of not more than pollution degree 2, as defined in IEC/EN 60664-1.
- The equipment shall be installed in an enclosure that provides a degree of protection not less than IP 54 in accordance with IEC/EN 60079-7.
- Transient protection shall be provided that is set at a level not exceeding 140 % of the peak rated voltage value at the supply terminals to the equipment.
- Care shall be taken not to allow layers of dust to form on the graphic panel in a way that might cause the accumulation of static charges.

4 Technical features

4.1 Technical Data

	TX104	TX107	TX110
Touchscreen technology	Resistive		
Display/backlight	TFT Color / LED		
Colors	64 K		
Brightness	200 Cd/m ² typ.		
Resolution	480 × 272	800 × 480	1024 × 600
Diagonal (inches)	4,3" widescreen (16:9)	7" widescreen (16:9)	10.1" widescreen (16:9)
Dimming	Yes		
CPU	ARM Cortex - A8 – 300 MHz	ARM Cortex - A8 – 1 GHz	
Operating system	Linux 3.12		
Flash	2 GB	4 GB	4 GB
SD card slot	No		
RAM	256 MB DDR	512 MB DDR	512 MB DDR
Serial port	1 × DB 9 (software configurable as RS232, RS485 or RS422)		
Ethernet port	1 × 10/100 Mbit		
USB Host port	1 × USB 2.0, max. 500 mA		
Power supply	DC Power Connector - AWG24 wire size - R/C Terminal Blocks (XCFR2), Female pitch 5.08 mm, torque 4.5 lb-in. 3 conductor 1,5 mm ² wire size minimum, DC		
Real time clock	Yes		
RTC backup	Supercapacitor		
Recipe memory	Flash		
Operating voltage	24 VDC (10...32 VDC)		
Current consumption (at 24 VDC)	0.25 A	0.30 A	0.38 A
Weight	0.4 kg	0.6 kg	1 kg
Input protection	Automatic		
Accuracy RTC (at 25 °C)	< 100 ppm		



NOTE

For applications requiring compliance with EN 61131-2 and specifically in reference to 10 ms voltage dips, the minimum power supply voltage is 18 VDC.

4.2 Environmental Conditions/Protection Class

Environmental conditions		Standards
Operating temperature (surrounding air temperature)	0...+50 °C (vertical installation)	EN 60068-2-14
Storage temperature	-20...+70 °C	EN 60068-2-14
Operating and storage humidity	5...85 % RH non-condensing	EN 60068-2-30
Vibrations	5...9 Hz, 7 mm _{p-p} 9...150 Hz, 1 g	EN 60068-2-6
Shock	± 50 g, 11 ms, 3 pulses per axis	EN 60068-2-27
Protection class		
Front panel	IP66, Type 2 and 4x (front); IP 20 (rear)	EN 60529

**NOTE**

The front face of the unit installed in a solid panel meets the standards in the section "Environmental conditions/protection class". However, oils that have no effect on the TX100 may damage the unit. This can occur in applications where either vaporized oils are present or where low viscosity cutting oil are allowed to adhere to the unit for long periods of time. If the front face protection sheet on the TX200 is peeled off or damaged, this may lead to the ingress of oil into the unit and separate protection measures are suggested.

If the installation gasket is used for a long period of time, or if the unit and its gasket are removed from the mounting plate, the original level of the protection cannot be guaranteed.

4.3 Electromagnetic Compatibility (EMC)/Durability

Electromagnetic compatibility (EMC)		
Radiated disturbance test	Class A	EN 55011
Electrostatic discharge immunity test	8 kV (air electrostatic discharge) 4 kV (contact electrostatic discharge)	EN 61000-4-2
Radiated, radio-frequency, electromagnetic field immunity test	80 MHz ... 1 GHz, 10 V/m 1,4 GHz ... 2 GHz, 3 V/m 2 GHz ... 2.7 GHz, 1 V/m	EN 61000-4-3
Burst immunity test	± 2 kV DC power port ± 1 kV signal line	EN 61000-4-4
Surge immunity test	± 0,5 kV DC power port (line to earth) ± 0,5 kV DC power port (line to line) ± 1 kV signal line (line to earth)	EN 61000-4-5
Immunity to conducted disturbances induced by radiofrequency field	0.15...80 MHz, 10 V	EN 61000-4-6
Power frequency magnetic field immunity test	Enclosure, 50/60Hz, 30A/m	EN 61000-4-8
Voltage dips, short interruptions and voltage variations immunity test	Port: AC mains; Level: 100 % duration: 1 cycle and 250 cycles (50 Hz); 40 % duration: 10 cycles (50 Hz); 70 % duration: 25 cycles (50 Hz); Phase: 0°-180°	
Test executed on the 230 VAC side of the power supply		EN 61000-4-11
Durability information		
Backlight service life (LED type)	20000 Hrs. or more (Time of continuous operation until the brightness of the backlight reaches 50% of the rated value when the surrounding air temperature is 25 °C, see Note blow)	
Front foil (without direct exposure to sunlight or UV)	10 years if the surrounding air temperature is 25 °C	
UV Resistance	Indoor applications: After 300 hours cycled humidity in QUV accelerated weathering, some yellowing and brittleness may be present.	
Solvent resistance	– Contact for 30 minutes at 21 °C, no visible effect: Acetone, Butyl Cellosolve, Cyclohexanone, Ethyl Acetate, Hexane, Isopropyl Alcohol, MEK, Methylene Chloride, Toluene, Xylene – Contact for 24 hours at 49 °C, no visible effect: Coffee, Ketchup, Lemon Juice, Mustard (slight yellow stain), Tea, Tomato juice.	
Touchscreen reliability	> 1 million operations	


NOTE

Extended use in environments where the surrounding air temperature is 40 °C or higher may degrade backlight quality/reliability/durability.

4.4 Dimensions

4.4.1 TX104

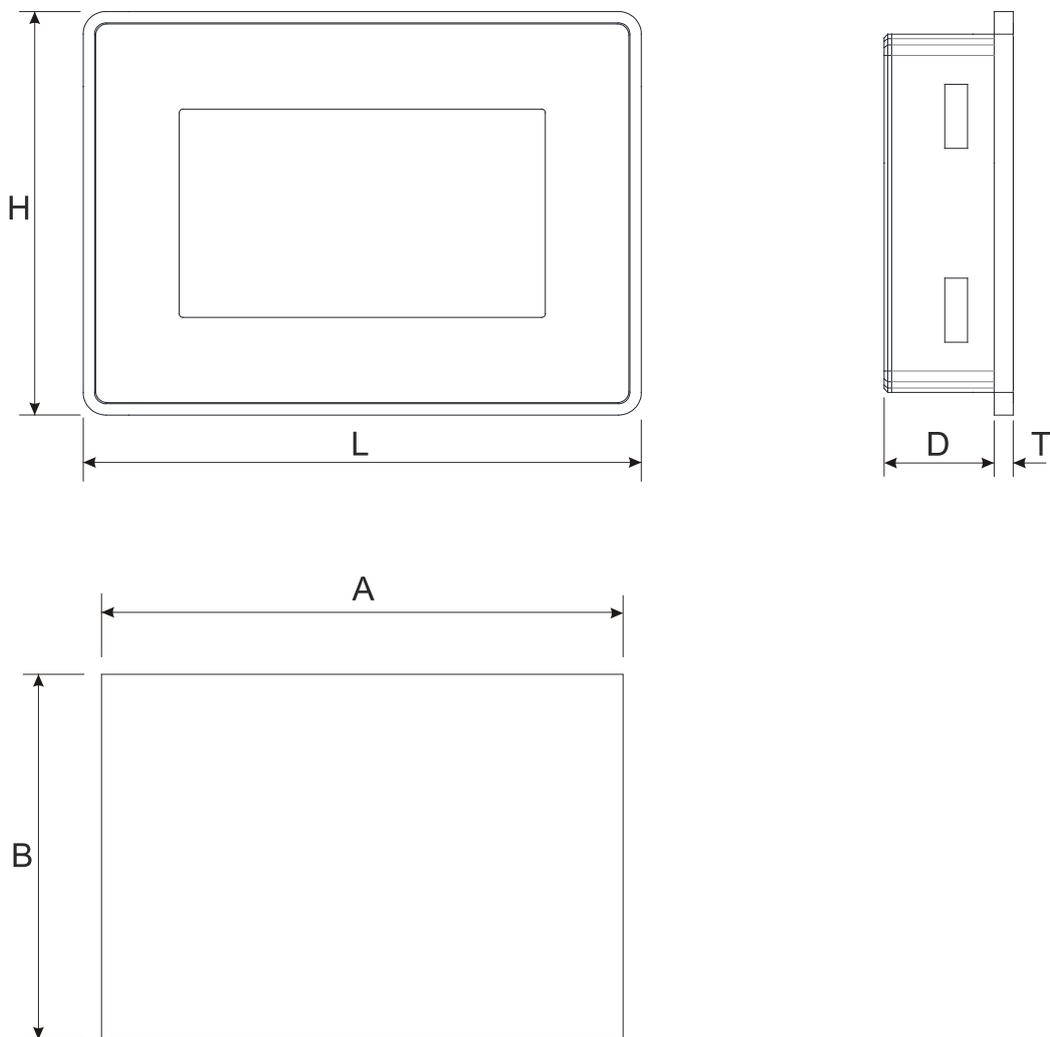


Fig.2: Dimensions TX104

Device	A	B	L	H	D	T
TX104	136 mm/5.35"	96 mm/3.78"	147 mm/5.78"	107 mm/4.21"	29 mm/1.14"	5 mm/0.19"

4.4.2 TX107

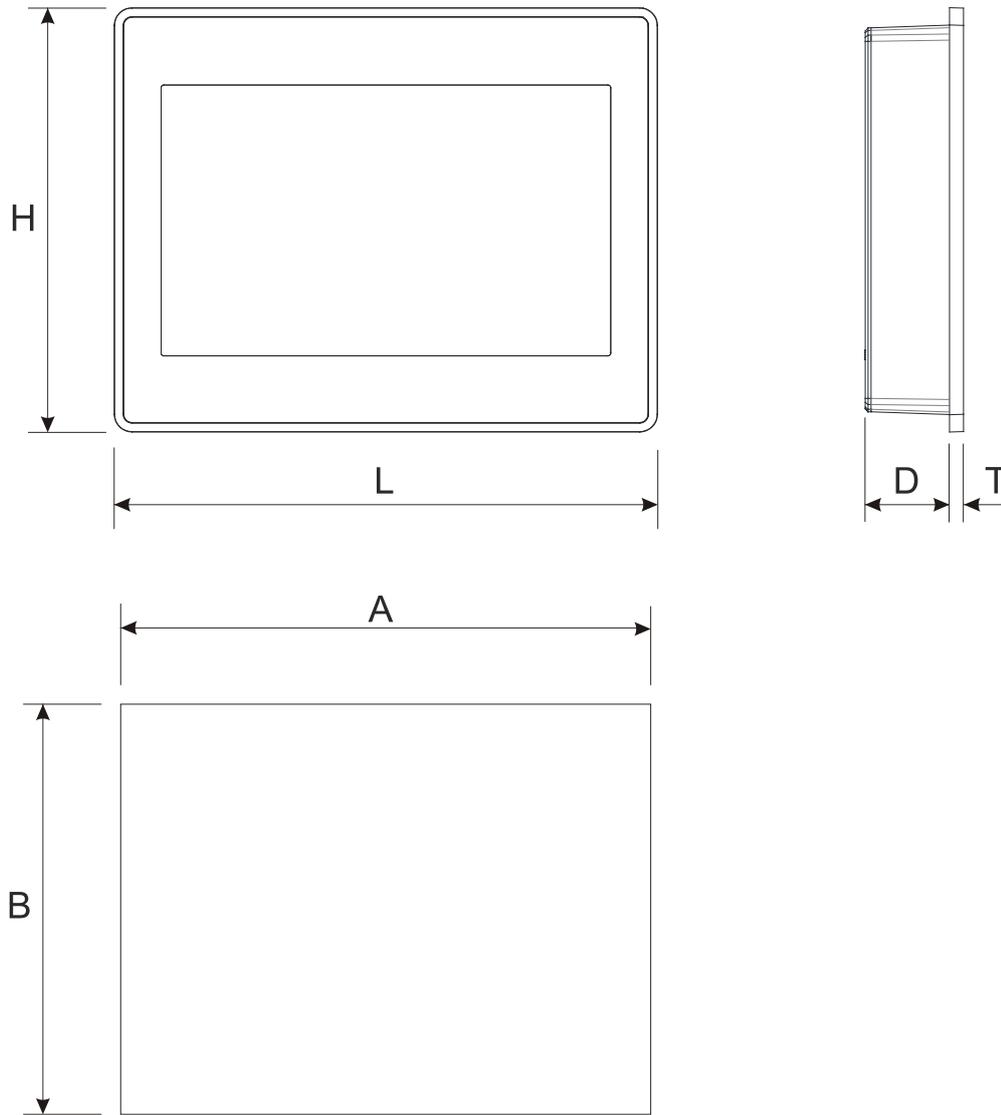


Fig.3: Dimensions TX107

Device	A	B	L	H	D	T
TX107	176 mm/6.90"	136 mm/5.35"	187 mm/7.36"	147 mm/5.79"	29 mm/1.14"	5 mm/0.19"

4.4.3 TX110

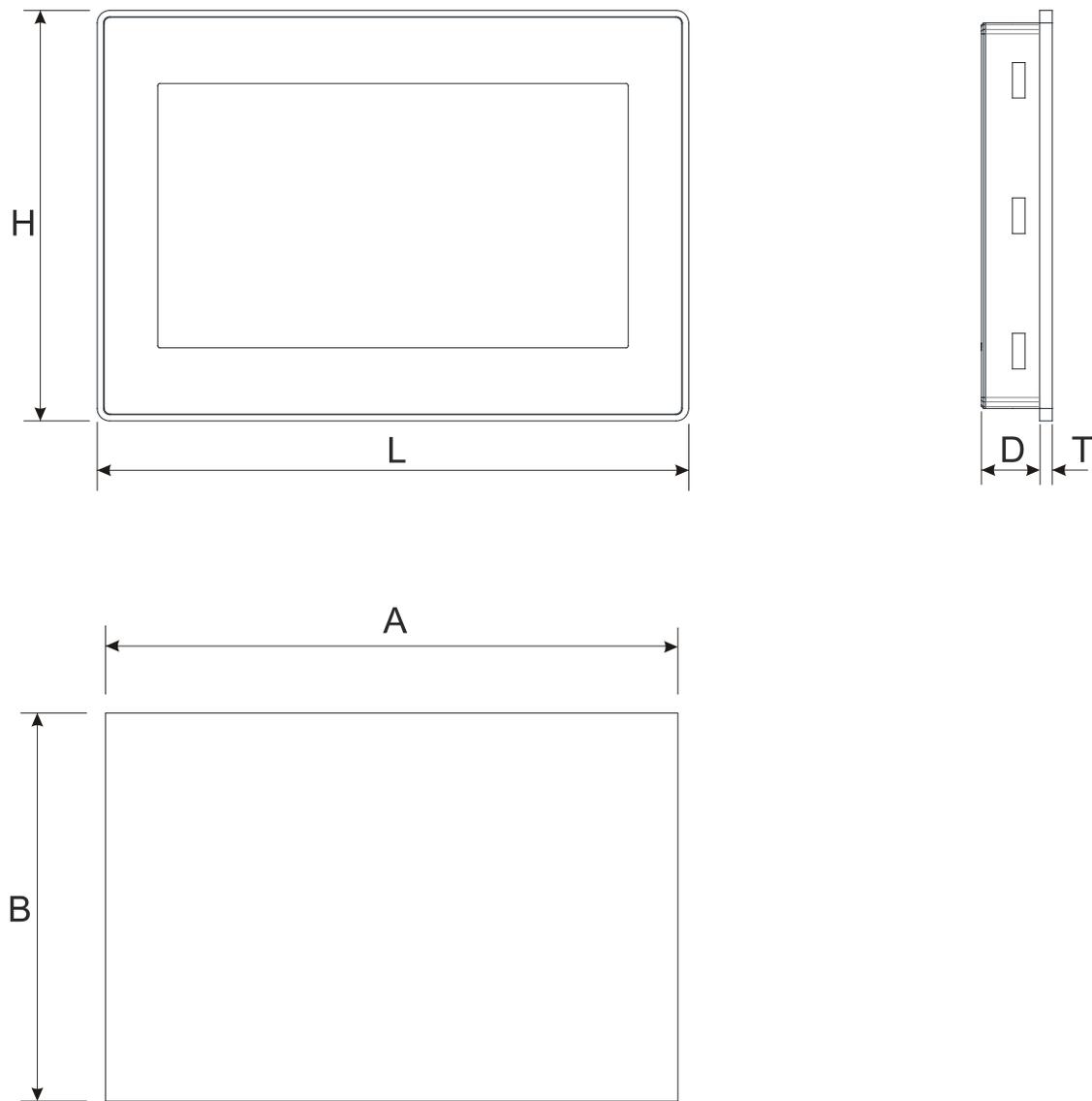


Fig.4: Dimensions TX110

Device	A	B	L	H	D	T
TX110	271 mm/10.66"	186 mm/7.32"	282 mm/11.10"	197 mm/7.75"	29 mm/1.14"	6 mm/0.23"

5 Installing the HMI

5.1 Installation Environment

In order to meet the front panel protection class, proper installation procedure must be followed:

- The borders of the cutout must be flat
- Screw up each fixing screw until the bezel corner get in contact with the panel.
- The cut-out for the panel must be of the dimensions indicated in these instructions.

The equipment is not intended for continuous exposure to direct sunlight. This might accelerate the aging process of the front panel film.

The equipment is not intended for installation in contact with corrosive chemical compounds. Check the resistance of the front panel film to a specific compound before installation.

► Do not use tools of any kind (screwdrivers, etc.) to operate the touch screen of the panel.

- The IP66 is guaranteed only under the following conditions:
 - Max. deviation from the plane surface to the cut-out: ≤ 0.5 mm
 - Thickness of the case on which the equipment is mounted: 1,5 mm to 6 mm
 - Max. surface roughness where the gasket is applied: ≤ 120 μ m

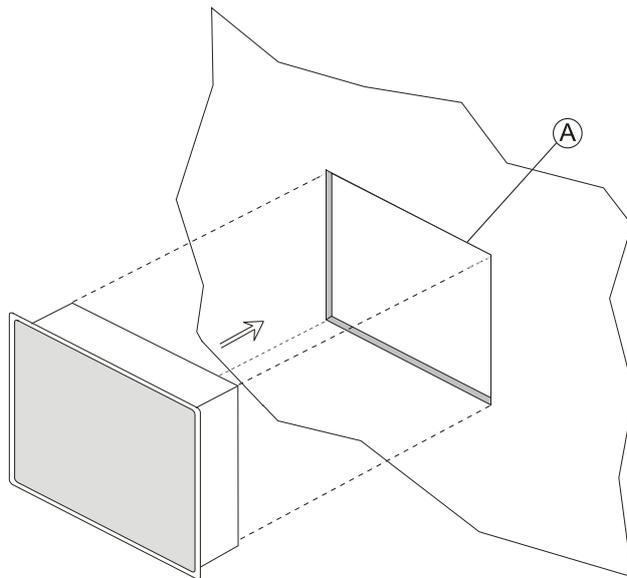


Fig.5: HMI TX100 – Mounting

5.2 Mounting of the HMI



NOTE

For all installation notes, please refer to the Installation Guide provided with the product.

- Place the fixing brackets contained in the fixing kit as follows:

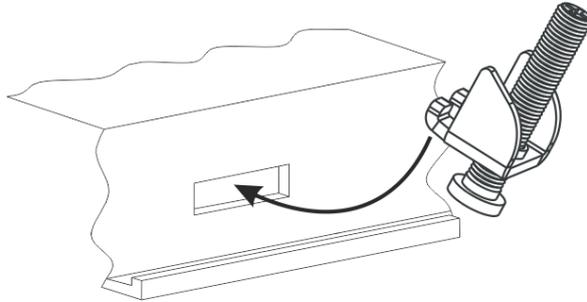


Fig.6: Mounting the fixing brackets

- Screw each fixing screw until the bezel corners get in contact with the HMI.



NOTE

Tightening torque: 75 Ncm or screw each fixing screw until the bezel corner gets in contact with the panel.

6 Connecting

6.1 Connecting the TX104

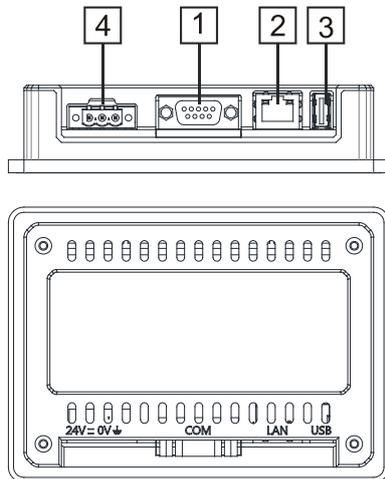


Fig.7: TX104 – connection options

Connector	Description
1	Serial port
2	Ethernet port
3	USB port
4	Power supply

6.2 Connecting the TX107

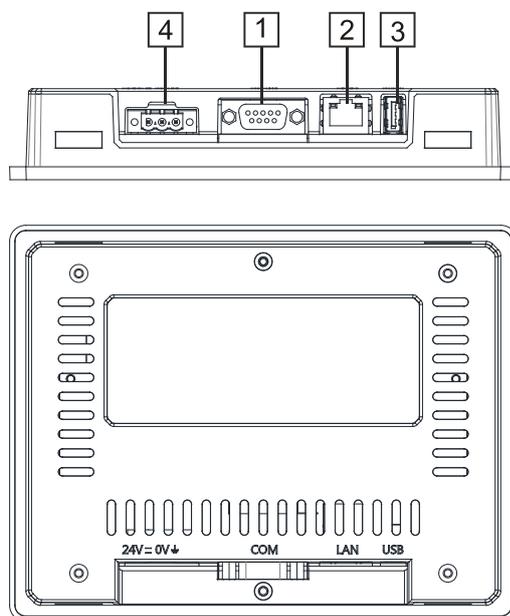


Fig.8: TX107 – connection options

Connector	Description
1	Serial port
2	Ethernet port
3	USB port
4	Power supply

6.3 Connecting the TX110

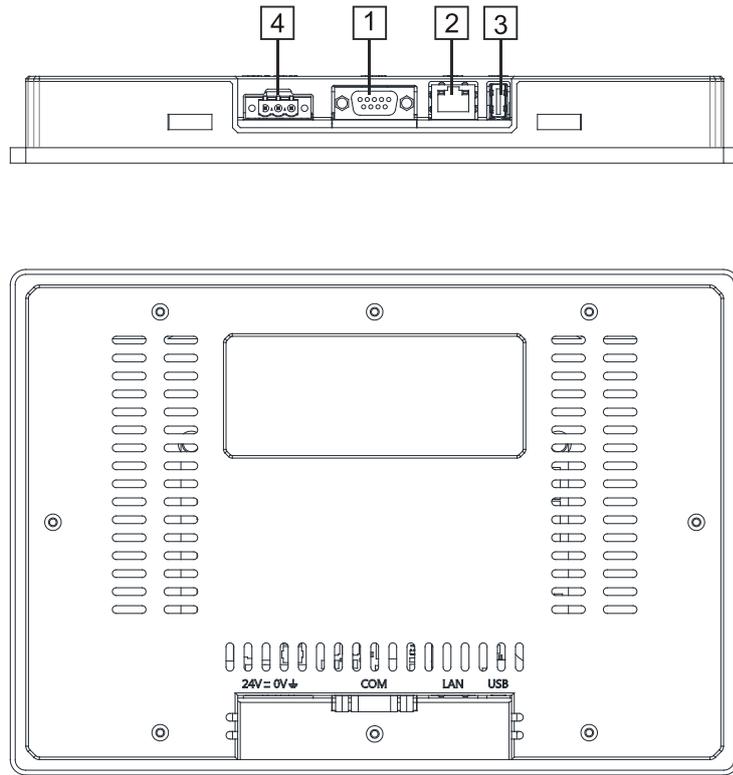


Fig.9: TX110 – connection options

Connector	Description
1	Serial port
2	Ethernet port
3	USB port
4	Power supply

6.4 Serial port

The serial port is used to communicate with a PLC or with another type of device. Different electrical standards are available for the signals in the PLC port connector: RS232, RS422, RS485.

The serial port is software programmable. Make sure you select the appropriate interface in the programming software.

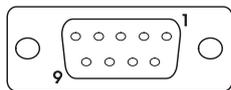


Fig.10: Serial port

Pin	RS232	RS422/RS485
1	GND	GND
2	n.c.	n.c.
3	TX	CHA-
4	RX	CHB-
5	n.c.	n.c.
6	+5 VDC output	+5V output
7	CTS	CHB+
8	RTS	CHA+
9	n.c.	n.c.



NOTE

To operate in RS485, pins 4-3 and 8-7 must be connected externally.

The communication cable must be chosen for the type of device being connected.

6.5 Ethernet ports

The Ethernet ports have 2 status indicators.

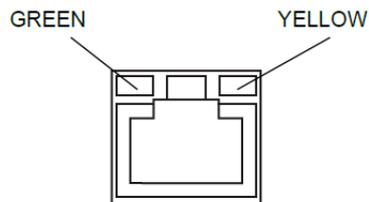


Fig.11: Ethernet ports

Green	Yellow	RS422/RS485
ON	OFF	No LAN cable connected
BLINK (link active)	ON	LAN cable connected with 100 Mbit/s link
BLINK (link active)	OFF	LAN cable connected with 10 Mbit/s link-

6.6 USB port

Allowed formatting	
Format	FAT, FAT32
Max. size	Limited by the FAT32 specification ≤ 4 GB for one single file ≤ 32 GB in total

7 Connecting the Power Supply

The power supply terminal block is shown in the figure below.

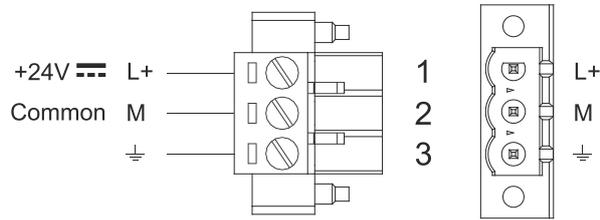


Fig.12: Power supply terminal block



NOTE

Ensure that the power supply has enough power capacity for the operation of the equipment.

7.1 Grounding the device

The unit must always be grounded to earth with A minimum of 1.5mm². Grounding helps to limit the effects of noise due to electromagnetic interference on the control system.

The earth connection will have to be done using the grounding screw located near the power supply terminal block. The screw for the ground connection is marked with an engraved ground symbol. Also connect terminal 3 on the power supply terminal block to ground.

The power supply circuit may be floating or grounded. If the power supply circuit is grounded, connect to ground the power source common as shown in figure (see below) with a dashed line.

When using the floating power scheme, note that the device internally connects the power common to ground with a 1 MΩ resistor in parallel with a 4,7 nF capacitor.

The power supply must have double or reinforced insulation.

The suggested wiring for the power supply is shown below.

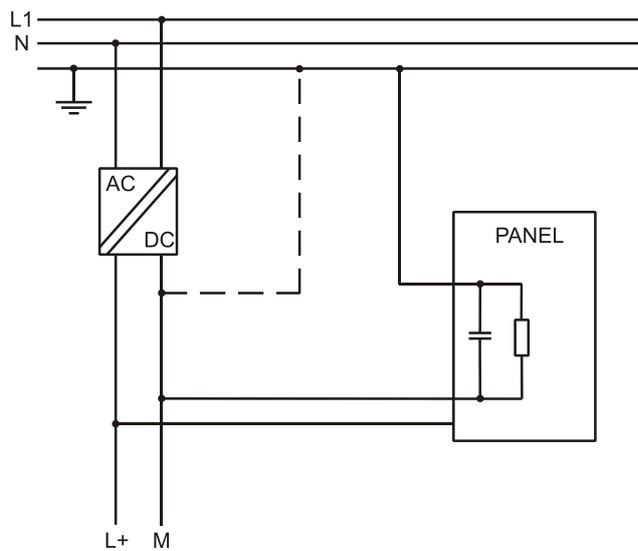


Fig.13: Power supply wiring

All the electronic devices in the control system must be properly grounded. Grounding must be performed according to applicable regulations.



NOTE

The power connector is part of the scope of delivery and can be ordered as spare part, see „12 Anhang: Zubehör“ S. 25.

8 Cleaning faceplates

The equipment must be cleaned only with a soft cloth and neutral soap product. Do not use solvents.

9 Getting Started

9.1 Programming with TX VisuPro

The TX100-HMIs must be programmed with the software TX VisuPro. TX VisuPro is a software tool that must be installed on a computer running Microsoft Windows.

There are two options to transfer a TX VisuPro application project to a HMI device:

- Ethernet
Connect the HMI device to the computer with an Ethernet network connection. From TX VisuPro choose the command Run/Download to target. You may have to ensure that the proper firewall policy has been configured in the computer to allow TX VisuPro to access the network.
- USB
Create an Update Package using TX VisuPro and copy it to a USB Flash drive.

10 Adapting the System Settings

The TX100 HMIs have a system settings interface to allow configuration of system options. The user interface of System Settings is based on HTML pages accessible from the HMI screen or remotely using a Web browser Chrome V44 or higher using port 443. To connect enter the address **https://IP** where IP is the IP address of the HMI device. Default username is “admin”, default password is “admin”. Use navigation menu on the left side of the screen to browse through the available options.

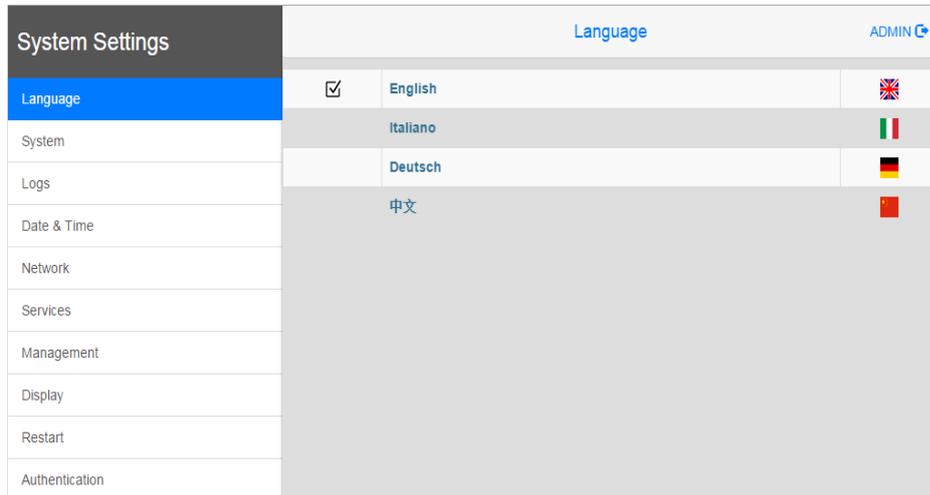


Fig.14: System settings

The active item of menu is highlighted on the left side of the screen. The right side shows related information and settings. Depending on the size of the HMI screen, both menu and content of selected item may be shown on screen at the same time or not.

System Settings has 2 modes of operation:

Mode	Description
User Mode	TX VisuPro runtime is running or the HMI device is in “factory default” status.
System Mode	TX VisuPro runtime is not running or the HMI device has a software failure. System Mode includes all options available in User Mode and additionally includes commands dedicated to system upgrade and recovery not available when running in User Mode.

10.1 Access the System Settings in User Mode



NOTICE!

System modification during operation

Undefined machine states due to device restart or loss of functionality!

- Do not change system or network settings during operation.
- Always stop the machine and disconnect the HMI when modifying the system settings.

	Description
Delivery state	Press "System Setting" button on the HMI screen
TX VisuPro runtime running	Recall context menu and select "System Settings". To recall the context menu click and hold any unused area of the touchscreen for a few seconds. Default hold time is 2 seconds.

10.2 Access the System Settings in System Mode



NOTICE!

System modification during operation

Undefined machine states due to device restart or loss of functionality!

- Do not change system or network settings during operation.
- Always stop the machine and disconnect the HMI when modifying the system settings.

Status	Description
Normal operation	If TX VisuPro runtime is not running: Press "System Setting" button on the device screen to recall System Settings in User Mode. Select "Restart" -> "Config OS" to reboot in System Mode. If TX VisuPro runtime is running: recall context menu and select "System Settings". To recall the context menu click and hold any unused area of the touchscreen for a few seconds. Default hold time is 2 seconds to enter in System Settings in User Mode. Select "Restart" -> "Config OS" to reboot in System Mode.
Recovery operation	If the HMI is not responsive, use the so-called "tap-tap" procedure. This procedure consists in tapping the surface of the touchscreen during the device power-up phase. Tapping frequency must be high (2 Hz or more). Start tapping the touchscreen as soon as power has been applied to the device. When the sequence has been recognized, the system shows the message: "Tap Tap detected, Going to Config Mode" on the screen.

System Settings includes options for basic settings of the device:

setting	Description
Language	Configure language used for System Setting menu only.
System	Show information about platform, status and timers (like System on time, backlight on time).
Logs	Enable persistent log for BSP and allows exporting it.
Date & Time	Change the device date and time, including time zone and NTP Server.
Network	Configure IP Address of Ethernet interface and the other network settings like DNS, Gateway, DHCP, Hostname, routing and bridging.
Services	Enable/disable services. Examples for services: OpenSSH server, Bridge, Cloud, Router, SNMP and logging.
Management	Update of BSP components (Main OS, Config OS, Boot loader, XLoader), check for partitions consistence, update of splash screen, information about usage and size of partitions. The update of Main OS is available only in System Mode, the update of Config OS is only in User Mode.

Display	Adjust display brightness, configure automatic backlight turnoff
Restart	Restart the device. "Main OS" option restarts the device in User Mode, "Config OS" option restarts the device in the System Mode showing System Settings.
Authentication	Configure password for administrator ("admin") and for the standard user ("user"). Administrator has full access to System Settings (updates of BSP and other system components). Standard user has some limitations.

11 Unpacking and Packing the Device

11.1 TX104/TX107

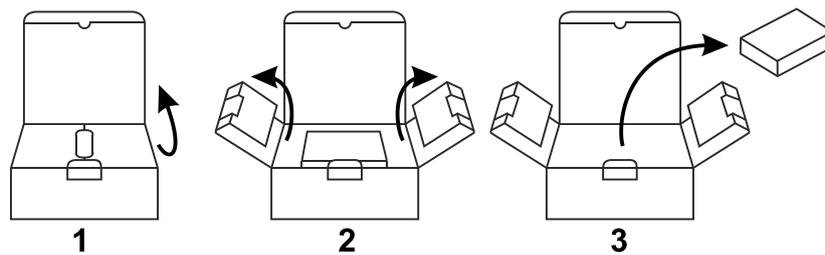


Fig.15: Unpacking TX104/TX107

To repack the unit, please follow the instructions backwards.

11.2 TX110

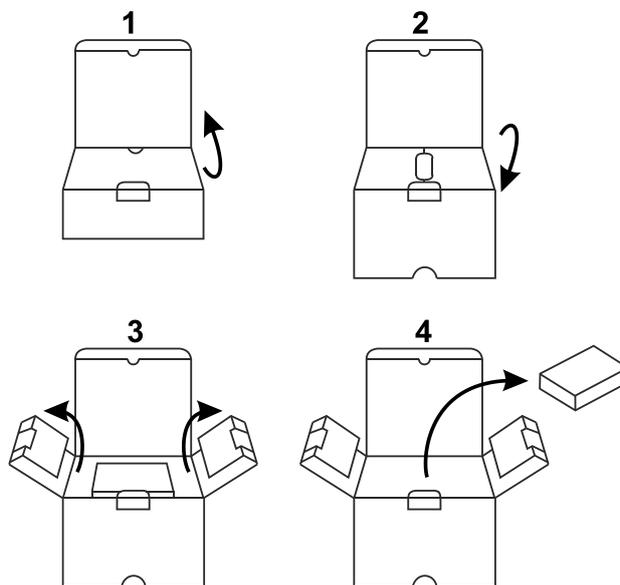


Fig.16: Unpacking TX110

To repack the unit, please follow the instructions backwards.

12 Appendix: Accessories

12.1 Mounting Material/Power Supply Connector

Ident no.	Type	Description
100003186	TX100-MOUNT-07	Mounting material for TX100 for 4" and 7" devices: 4× fixing bracket 1 × power supply connector
100003187	TX100-MOUNT-10	Mounting material for TX100 for 10" devices: 11 × fixing bracket 1 × power supply connector
100002938	TX-PSC	TX power supply onnector

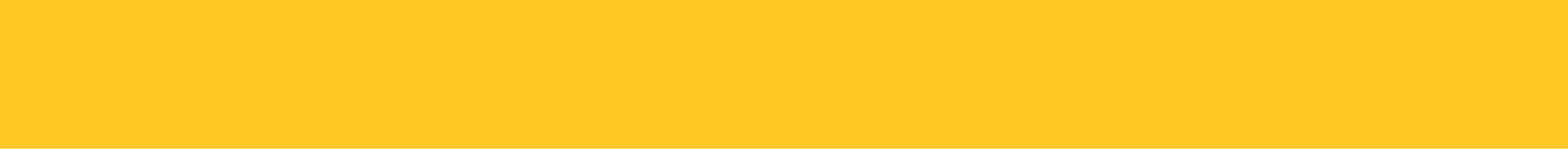
12.2 USB/SD Accessory

Ident no.	Type	Description
6828025	SD CARD 2GB	SD card, 2GB
6827348	USB 2.0 Industrial Memory Stick	1GB , industrial USB stick
6827389	USB 2.0 EXTENSION 5M	USB 2.0 extension cable, male (A) to female (A), 5 meters
6827390	USB 2.0 EXTENSION ACTIVE 5M	USB 2.0 extension cable, male (A) to female (A), with active repeater, 5 meters



NOTE

Further accessories like field bus nodes, bus and supply cables, junction boxes, power supplies etc. can be found on www.turck.com.



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30 subsidiaries and over
60 representations worldwide!

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