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TURCK

TX200
HMI/PLC 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 Used

The following symbols are used in this manual:

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!
ATTENTION indicates a situation that may lead to property damage, if it is 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 Other Documents

The following additional documents are available online at www.turck.com
- Data sheet
- Installation guide
- CAD data

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

It combines integrated HMI and PLC applications. The product has been designed as IoT edge device with the combination of a controller with networking capability and a range of communication options including client/server OPC UA.

TX200 devices have been designed to run the TX VisuPro software for powerful HMI applications.

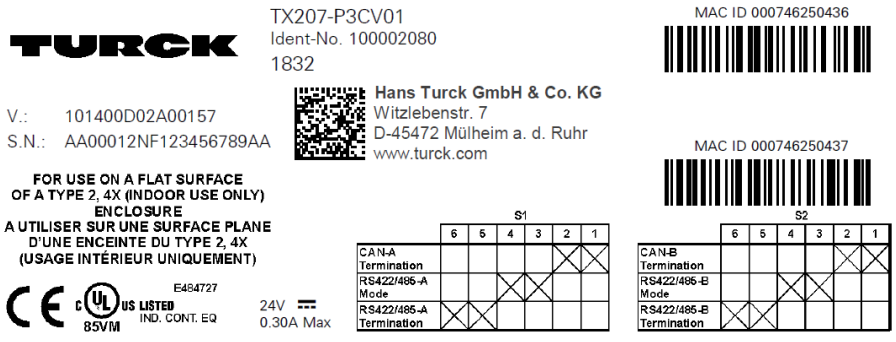
- Gateway function with OPC UA Server and Client.
- Secure connectivity with JMcloud and full network separation.
- Powerful browser wih industry standard Web engines.
- Optional CODESYS V3 PLC runtime with choice of major I/O protocols.
- Optional plug-in modules for fieldbus systems, I/O and controllers.

2.1 Product Identification

The manual refers to the following models:

- TX207 HMI with 7" TFT color with touchscreen. 2 Ethernet ports, 2 CAN ports, 4 serial ports, 2 USB
-

The type plate is located on the rear of the device.
An example of this plate is shown in the figure below:



TX2070	Product model name
100002080	Product part number
1832	Year/week of production
AA…	Serial number number
V…	Internal version ID of the product

2.2 Type Code

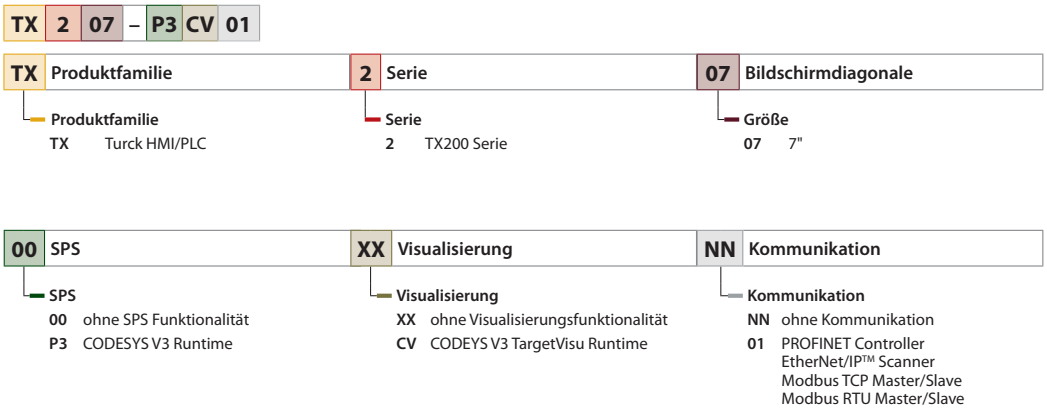


Fig.1: Type Code TX200

2.3 List of Available Devices

Ident no.	Device
100002080	TX207-P3CV01

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	CISPR 22, Class A
	CISPR 16-2-3
EN 61000-6-2	EN 61000-4-2
	EN 61000-4-3
	EN 61000-4-4
	EN 61000-4-5
	EN 61000-4-6
	EN 61000-4-8
	EN 61000-4-11
	EN 61000-4-29
	EN60945

ATTENTION!
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 60079-15.
- 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 Specifications

4.1 Technical Data

	TX207
Touchscreen technology	Resistive
Display/backlight	TFT Color / LED
Colors	64 K
Brightness	200 Cd/m² typ.
Resolution	800x480
Diagonal (inches)	7" widescreen (16:9)
Dimming	yes, to 0 %
CPU	A9 dual core, 800 MHz
Operating System	Linux RT
Flash	4 GB
SD card slot	no
RAM	1 GB
Serial Port	2 × RS232, 2 × RS422/RS485, isolated, 2 × CAN 2.0b, isolated
Ethernet port	1 × 10/100 Mbit, 1 × 10/100/1000 Mbit
USB Host port	2 × USB 2.0, max. 100 mA
Expansion slot	no
Voltage 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 mm² wire size minimum, minimum temperature conductor rating 105 °C.
Real Time Clock	yes
Operational voltage	24 VDC (10…32 VDC)
Current consumption (at 24 VDC)	0.3 A
Weight	0.9 kg
Input protection	Electronic
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		
Operating temperature (surrounding air temperature)	-0…+50 °C (vertical installation)	EN 60068-2-14
Storage temperature	-20…+70 °C	EN 60068-2-1 EN 60068-2-2 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	EN 60529
Rear	IP20	EN 60529

NOTE
The front face of the unit, installed in a solid panel, has been tested using conditions equivalent to the standards shown in the "Environmental conditions". Even though the level of resistance of the unit is equivalent to these standards, oils that should have no effect on the TX200 can possibly harm the unit. This can occur in areas 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	CISPR 22 CISPR 16-2-3
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 inducted 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
	Port: DC mains; Level: 0% duration: 10ms 20 spaces by 1s	
Test executed on the 24Vdc of the EUT		EN 61000-4-29
Durability information		
Backlight service life (LED type)	20000 hours or more (Time of continuos operation until the brightness of the backlight reaches 50 % of the rated value when the surrounding air temperature is 25 °C).	

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 TX207

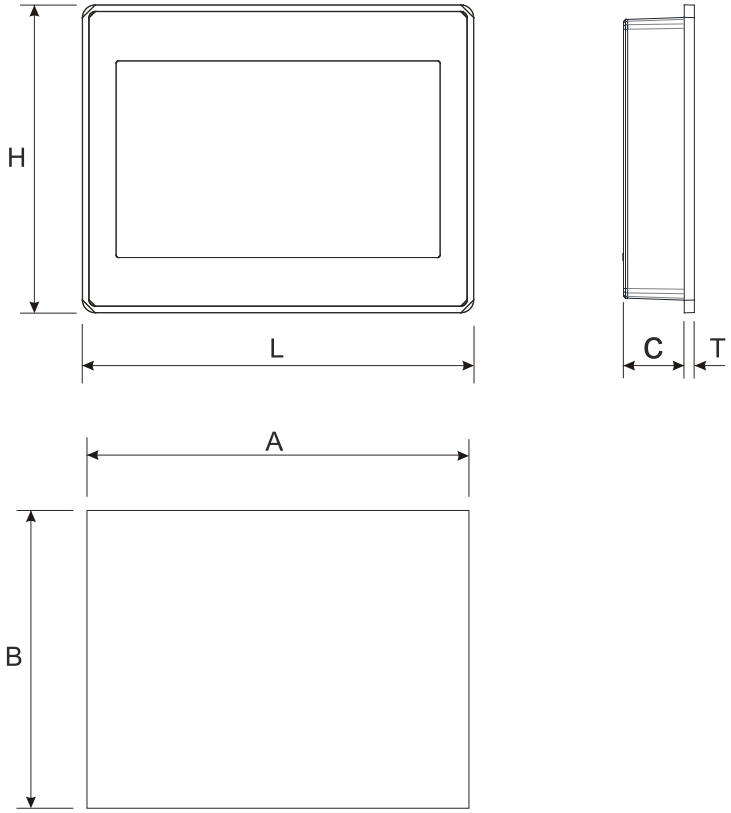


Fig.2: Dimensions TX207

Model	A	B	C	H	L	T
TX207	176 mm/6.90″	136 mm/5.35″	29 mm/1.14″	147 mm/5.79″	187 mm/7.36″	5 mm/0.19″

5 Installing the HMI

5.1 Installation Environment

Avoid prolonged exposition to direct sunlight to avoid the risk of overheating the device.

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.

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 this manual.
- 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 µm

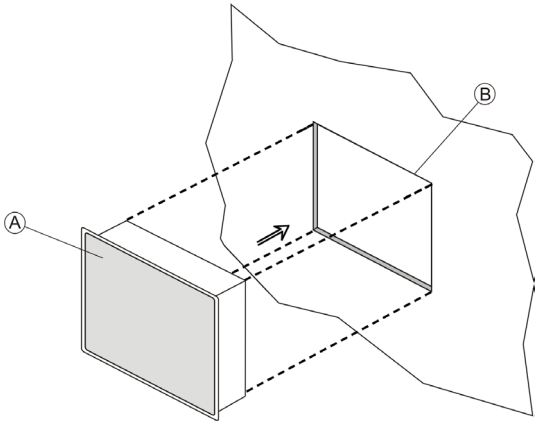


Fig.3: HMI TX200 – Mounting

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:

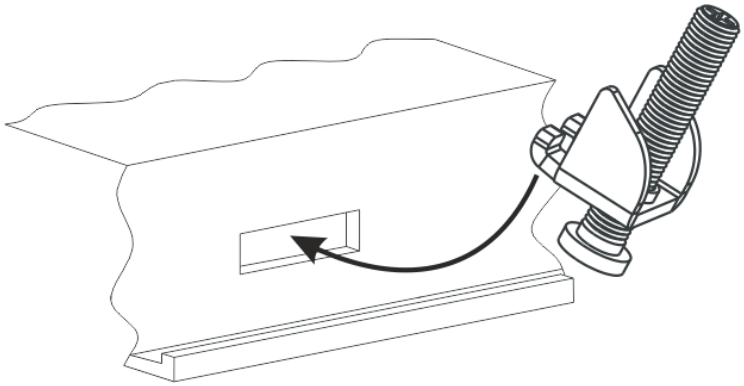


Fig.4: Mouting the fixing brackets

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

NOTE
Tightening torque: 130 Ncm or screw each fixing screw until the bezel corner gets in contact with the panel.

6 Connecting

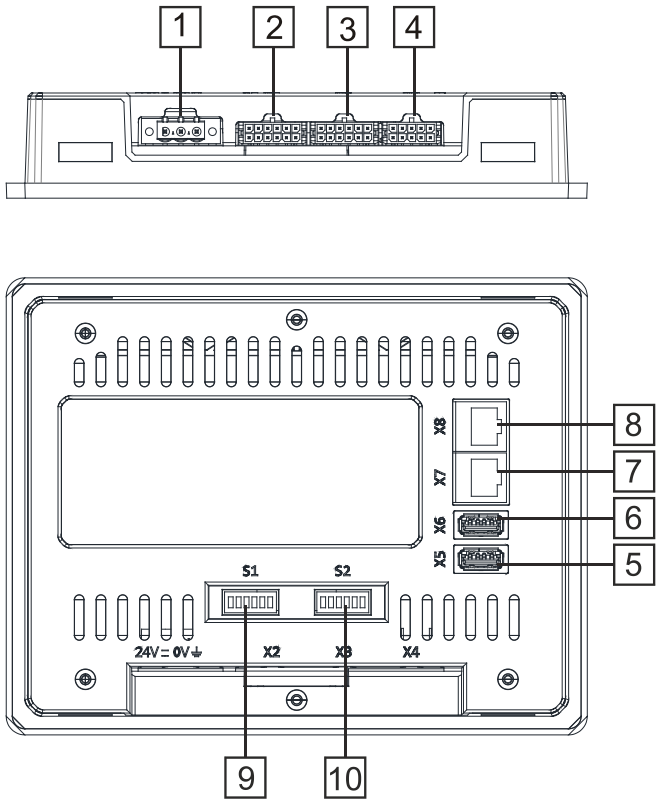


Fig.5: TX207 – connection options

Connector/Slot		Function
1		Power supply
2	X2	RS422/485 + CAN (COM2/CAN0)
3	X3	RS422/485 + CAN (COM3/CAN1)
4	X4	RS232 + RS232 (COM1/COM4)
5	X5	USB port
6	X6	USB port
7	X7	Ethernet port 0 (10/100/1000 Mbit)
8	X8	Ethernet port 1 (10/100 Mbit)
9	S1	RS485 + CAN port configuration (DIP switches)
10	S2	RS485 + CAN port configuration (DIP switches)

6.1 Serial Interfaces/CAN Interface

6.1.1 RS232 (X4)

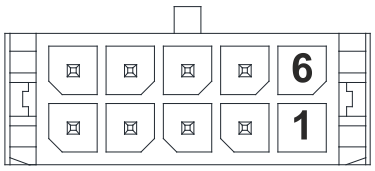


Fig.6: RS232 interface

Pin	RS232	
1	GND	COM 1
2	TxD	
3	RxD	
4	RTS	
5	CTS	
6	GND	COM 4
7	TxD	
8	RxD	
9	RTS	
10	CTS	

6.1.2 RS485/CAN (X2 and X3)

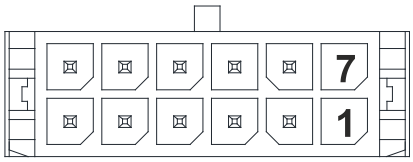


Fig.7: RS485/CAN interface

	Pin	RS485	CAN	Port
X2	1	n.c.	GND	CAN 0
	2		Terminating resistor	
	3		CAN-H	
	4		CAN-L	
	5		Terminating resistor	
	6	Terminating resistor	n.c.	COM 2
	7	GND		
	8	Terminating resistor		
	9	Y (TX+)		
	10	Z (TX-)		
	11	A (RX+)		
	12	B (RX-)		

	Pin	RS485	CAN	Port
X3	1	n.c.	GND	CAN 1
	2		Terminating resistor	
	3		CAN-H	
	4		CAN-L	
	5		Terminating resistor	
	6	Terminating resistor	n.c.	COM 3
	7	GND		
	8	Terminating resistor		
	9	Y (TX+)		
	10	Z (TX-)		
	11	A (RX+)		
	12	B (RX-)		

6.1.3 RS485 (CAN Port Configuration – DIP Switches S1 and S2)

Position	Description
1	CAN terminating resistor
2	CAN terminating resistor
3	RS485 halfduplex
4	RS485 halfduplex
5	RS485 terminating resistor
6	RS485 terminating resistor

6.2 Ethernet Ports

The Ethernet ports have two status indicators.

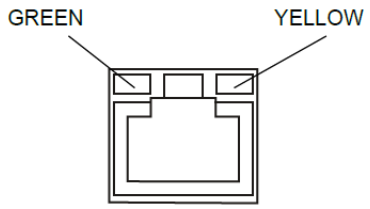


Fig.8: Ethernet ports

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-

6.3 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.

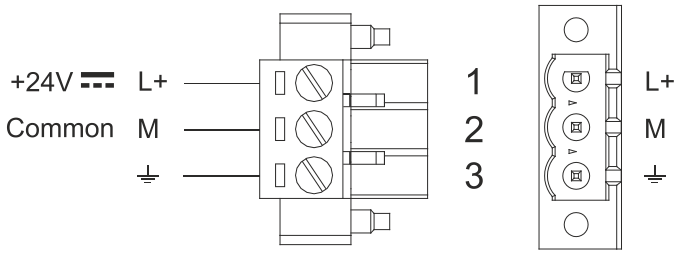


Fig.9: Power supply terminal block

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 1.5mm^2. 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.

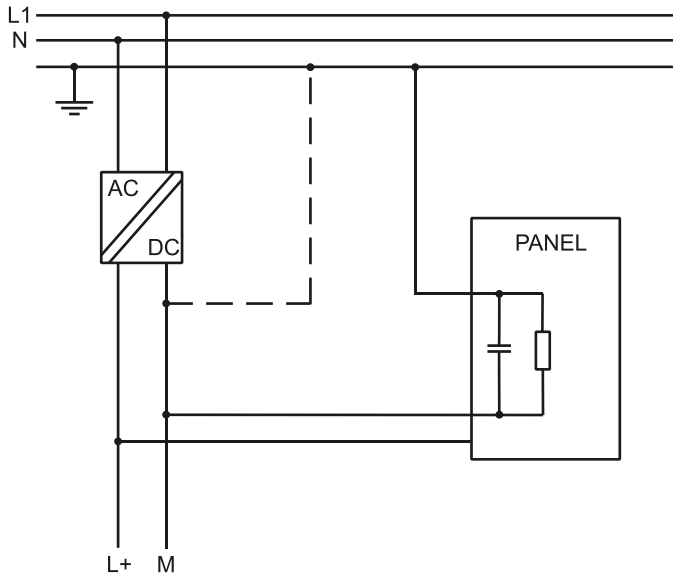


Fig.10: Power supply wiring

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 „13 Anhang: Zubehör“ S. 23.

8 Battery

These devices are equipped with rechargeable Lithium battery, not user-replaceable.
The following information is maintained by the battery:
- Hardware real-time clock (date and time)

Charge:
At first installation the battery must be charged for 48 hours.
When the battery is fully charged, it ensures a period of 3 months of data back-up at 25 °C.

NOTE
Dispose of batteries according to local regulations.

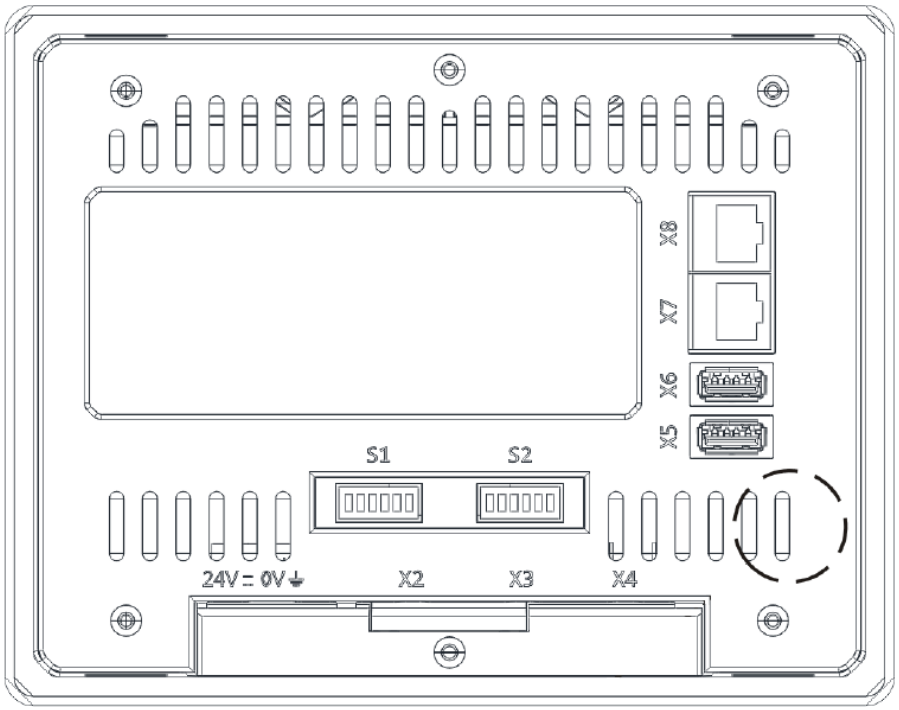


Fig.11: Battery position TX207

9 Special Instruction for Use

- Install the HMI device according to the accompanying installation instructions.
- Ground the HMI device according to the accompanying installation instructions.
- Only qualified personnel may install the HMI device or repair it.
- Ensure that the aeration holes are not covered.
- Care shall be taken not to allow layers of dust to form on the faceplate of the HMI device in a way that might cause the accumulation of static charges. Keep the faceplate of the HMI device clean:
  The equipment must be cleaned only with a soft cloth and neutral soap product.
- Do not use solvents.
- This device should not be used for purposes and methods other than indicated in this document and in the documentation accompanying the product.

10 Getting Started

10.1 Programming with CODESYS

The devices are delivered with a pre-installed CODESYS runtime.
CODESYS (≥ V 3.5.12.0) and the package "TXxxx HMI/PLC series" for the HMI/PLCs have to be installed on a PC computer running Microsoft Windows.
The CODESYS software as well as the CODESYS package for the HMI/PLCs can be downloaded from **www.turck.com**.

10.2 Programming with TX VisuPro

For programming the HMI/PLCs with TX VisuPro, the software tool has to be installed on a PC computer running Microsoft Windows.

If TX VisuPro should be used instead of the CODESYS TargetVisu, the TX VisuPro runtime needs to be installed. Before installing TX VisuPro, the existing TargetVisu runtime has to be deleted. To do so, use the internal configuration menu:
"System Settings" → "Management" → "Data" → "Clear"
There are two options to transfer a TX VisuPro runtime project to a device:

- Ethernet:
  Connect the HMI device to the computer with an Ethernet network. In TX VisuPro select 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.

11 Adapting the System Settings

The TX… HMI are provides with 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 vailable options.

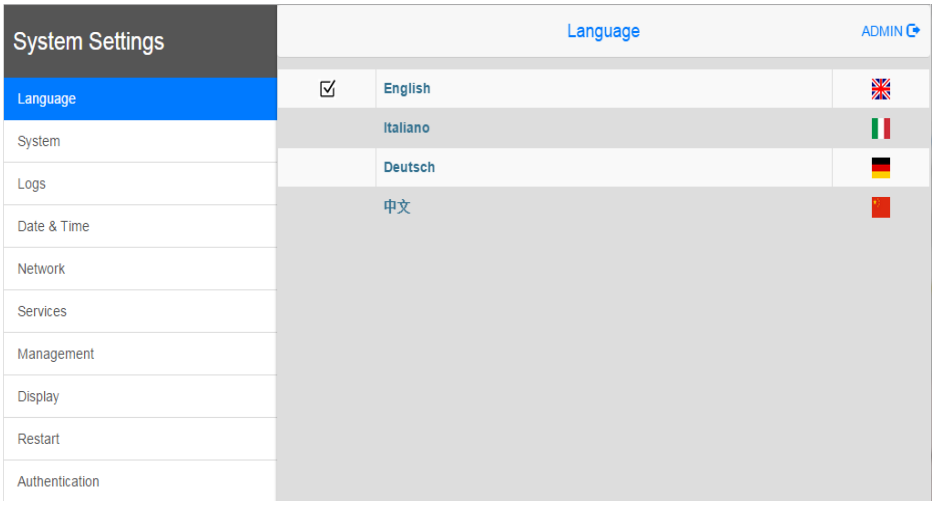


Fig.12: System settings

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.

11.1 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 modify the system/network settings during operation.
➤ Always stop the machine and disconnect the HMI when modifying the system settings.

Status	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.

11.2 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 modify the system/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 of services are: 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.

12 Unpacking and Packing the Device

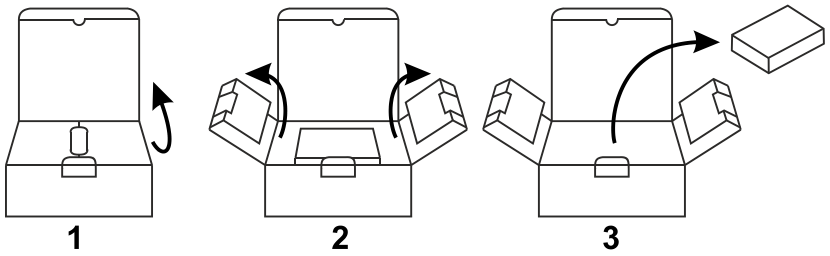


Fig.13: Unpacking TX104/TX107

To repack the unit, please follow the instructions backwards.

13 Appendix: Accessories

13.1 Mounting Material/Power Supply Connector

Ident no.	Type	Description
100003206	TX200-MOUNT-07	Mounting material for TX207: 1 × power supply connector 4× fixing bracket 3 × connector for the serial/CAN interface
100002938	TX-PSC	TX power supply onnector

13.2 USB/SD Accessory

Ident no.	Type	Description
6828025	SD CARD 2GB	SD card, 2GB
6827348	USB 2.0 Industrial Memory Stick	1 GB , 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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