Remote monitoring via mobile network

User manual

UM EN TC MOBILE I/O...

User manual

Remote monitoring via mobile network

UM EN TC MOBILE I/O..., Revision 04 | 2020-09-09

This user manual is valid for:

Designation	Short designation	Order No.
TC MOBILE I/O X200	X200	2903805
TC MOBILE I/O X200-4G	X200-4G	1038567
TC MOBILE I/O X300	X300	2903807
TC MOBILE I/O X200 AC	X200 AC	2903806
TC MOBILE I/O X200-4G AC	X200-4G AC	1038568
TC MOBILE I/O X300 AC	X300 AC	2903808

Table of contents

1 For your safety

Read this user manual carefully and keep it for future reference.

1.1 Labeling of warning notes

This symbol indicates hazards that could lead to personal injury.

There are three signal words indicating the severity of a potential injury.

DANGER
Indicates a hazard with a high risk level. If this hazardous situation is not avoided, it will result in death or serious injury.

WARNING
Indicates a hazard with a medium risk level. If this hazardous situation is not avoided, it could result in death or serious injury.

CAUTION
Indicates a hazard with a low risk level. If this hazardous situation is not avoided, it could result in minor or moderate injury.

This symbol together with the **NOTE** signal word warns the reader of actions that might cause property damage or a malfunction.

Here you will find additional information or detailed sources of information.

1.2 Qualification of users

The use of products described in this manual is oriented exclusively to electrically skilled persons or persons instructed by them. The users must be familiar with the relevant safety concepts of automation technology as well as applicable standards and other regulations.

1.3 Field of application of the product

1.3.1 Intended use

The TC MOBILE I/O... devices monitor digital values via the mobile network and switch relay outputs. The data is transmitted depending on series via SMS, e-mail or the ODP protocol.

The devices are intended for use in Europe. If you are planning to use the devices outside of Europe, refer to the section "Use outside of Europe" on page 15.

> Operation of the wireless system is only permitted if accessories available from Phoenix Contact are used. The use of other accessory components could invalidate the operating license. You can find the approved accessories for this wireless system listed with the product at phoenixcontact.net/products.

1.3.2 Product changes

Modifications to hardware and firmware of the device are not permitted.

Incorrect operation or modifications to the device can endanger your safety or damage the device. Do not repair the device yourself. If the device is defective, please contact Phoenix Contact.

1.4   Safety notes

Only for the DC devices:

– **TC MOBILE I/O X200**
– **TC MOBILE I/O X200-4G**
– TC MOBILE I/O X300

> **WARNING: Risk of death due to electric shock!**
>
> During operation, certain parts of the device may be under hazardous voltages! Disregarding this warning may result in property damage and/or serious personal injury!
>
> – Provide overcurrent protection (I ≤ 6 A) within the installation.
> – The output power of the power supply unit may not exceed 240 VA.
> – The device is intended for installation in a control cabinet or a comparable container. The device may only be operated after it has been installed. The control cabinet must meet the requirements of EN/IEC 60950-1 in terms of fire protection shielding. Additionally, it must provide adequate protection against electric shock (touch protection).

Only for the AC devices:

– **TC MOBILE I/O X200 AC**
– **TC MOBILE I/O X200-4G AC**
– TC MOBILE I/O X300 AC

> **WARNING: Risk of death due to electric shock**
>
> During operation, certain parts of the device may be under hazardous voltages! Disregarding this warning may result in property damage and/or serious personal injury!
>
> – Never carry out work with voltage present.
> – This device is not suitable for monitoring sensitive systems or time-critical processes. GSM network failures or power supply interruptions may adversely affect monitoring.
> – The device is intended for installation in a control cabinet or a comparable container. The device may only be operated after it has been installed. The control cabinet must meet the requirements of EN/IEC 60950-1 in terms of fire protection shielding. Additionally, it must provide adequate protection against electric shock (touch protection).
> – It must be possible to disconnect the device from all phases of the power supply. Install an appropriate disconnect device (all-phase fuse, miniature circuit breaker, etc.) for this purpose.
> – During electrical installation, current standards and regulations must be complied with, and installation must be carried out by an expert.

1.5 Installation notes for the 2G devices

Installation notes for the following devices:
– TC MOBILE I/O X200
– TC MOBILE I/O X200 AC
– TC MOBILE I/O X300
– TC MOBILE I/O X300 AC

> **WARNING:**
> Observe the following safety notes when using the device.

- The category 3 device is designed for installation in Zone 2 potentially explosive areas. It meets the requirements of EN 60079-0:2012+A11:2013 and EN 60079-15:2010.
- Installation, operation, and maintenance must be carried out by qualified electricians. Follow the installation instructions as described. When installing and operating the device, the applicable regulations and safety directives (including national safety directives), as well as the general codes of practice, must be observed. The safety data is provided in the packing slip and on the certificates (conformity assessment, additional approvals where applicable).
- Do not open or modify the device. Do not repair the device yourself; replace it with an equivalent device instead. Repairs may only be carried out by the manufacturer. The manufacturer is not liable for damages resulting from noncompliance.
- The IP20 degree of protection (IEC 60529/EN 60529) of the device is intended for use in a clean and dry environment. Do not subject the device to mechanical and/or thermal loads that exceed the specified limits.
- The device is not suitable for installation in zone 22.
- If, however, you wish to use the device in zone 22, it must be installed in housing that complies with IEC/EN 60079-31. In doing so, observe the maximum surface temperatures. Observe the requirements of IEC/EN 60079-14.

1.5.1 Installation in zone 2

> **WARNING: Explosion hazard when used in potentially explosive areas**
> Make sure that the following notes and instructions are observed and complied with.

- Use in potentially explosive areas is not permitted in China.
- Observe the specified conditions for use in potentially explosive areas!
- Install the device in a suitable, approved housing (with at least IP54 protection) that meets the requirements of EN 60079-15. For this purpose, observe the requirements of IEC 60079-14 / EN 60079-14.
- Only connect devices to the supply and signal circuits in Zone 2 that are suitable for operation in Ex Zone 2 and for the conditions at the installation location.
- In potentially explosive areas, only connect and disconnect cables when the power is disconnected.
- Replace the SIM card only when the power is disconnected.
- The configuration interface may only be used if it has been ensured that there is no potentially explosive atmosphere present.
- The switches of the device that can be accessed may only be actuated when the power supply to the device is disconnected.

- Observe the derating information in the technical documentation (see "Derating for data connection, maximum ambient temperature").
- All plug connections must be completely plugged in and, if possible, screwed tightly and/or locked.
- The device must be stopped and immediately removed from the Ex area if it is damaged, was subjected to an impermissible load, stored incorrectly or if it malfunctions.
- Ensure that the radiated wireless power is neither bundled (focused) by the antenna itself nor by any inserts in the environment of the antenna, and that it cannot enter neighboring Zones 1 or 0. Please refer to the technical data for the HF output power. It must not exceed 2 W.
- The HF cable to the antenna must be suitable for the ambient conditions. Install the cable so that it is protected against mechanical damage, corrosion, chemical stress, and negative effects from heat or UV radiation. The same applies to the antenna which is connected to the cable and which functions as a cable termination.
- The antenna itself must meet the relevant requirements of EN 60079-0.

1.6   Installation notes for the 4G devices

Installation notes for the following devices:
– TC MOBILE I/O X200-4G
– TC MOBILE I/O X200-4G AC

WARNING:
– The devices do **not** have ATEX approval. They are **not** suitable for use in potentially explosive areas. Only install the devices in the safe area.
– Observe the following safety notes when using the device.

- Installation, operation, and maintenance may only be carried out by qualified electricians. Follow the installation instructions as described. When installing and operating the device, the applicable regulations and safety directives (including national safety directives), as well as generally approved technical regulations, must be observed. The safety data is provided in this package slip and on the certificates (conformity assessment, additional approvals where applicable).
- The device must not be opened or modified. Do not repair the device yourself, replace it with an equivalent device. Repairs may only be carried out by the manufacturer. The manufacturer is not liable for damage resulting from violation.
- The IP20 protection (IEC 60529/EN 60529) of the device is intended for use in a clean and dry environment. The device must not be subject to mechanical strain and/or thermal loads, which exceed the limits described.

2 Transport and unpacking

2.1 Transport

The device is delivered in cardboard packaging.

- Only transport the device to its destination in its original packaging.
- Please note the instructions regarding handling, moisture, shock, tilt, and temperature indicators on the packaging.
- Observe the humidity specifications and the temperature range specified for transport (see Section 7.4, "Technical data").
- Protect the surfaces as necessary to prevent damage.
- When transporting the equipment or storing it temporarily, make sure that the surfaces are protected from the elements and any external influences, and that they are kept dry and clean.

2.2 Storage

The storage location must meet the following requirements:

- Dry
- Protected from unauthorized access
- Protected from harmful environmental influences such as UV light
- Temperature range: -40°C ... +85°C
- Up to 2,000 m above sea level
- Permissible humidity: 0% ... 95%

2.3   Checking the delivery

- Check the delivery for transport damage.

Damaged packaging is an indicator of potential damage to the device that may have occurred during transport. This could result in a malfunction.

- Submit claims for any transport damage immediately, and inform Phoenix Contact or your supplier as well as the shipping company without delay.
- Enclose photos which clearly document the damage to the packaging/delivery together with your claim.
- Check the delivery note immediately upon delivery in order to check that the contents of the packaging are complete.
- Keep the box and packaging material in case you need to return the product.
- We strongly recommend using the original packaging to return the product.
- If the original packaging is no longer available, observe the following points:
  - Observe the humidity specifications and the temperature range specified for transport (see Section 7.4, "Technical data").
  - Use dehumidifying agents if necessary.
  - Use suitable ESD packaging to protect components that are sensitive to electrostatic discharge.
  - Make sure that the packaging you select is large enough and sufficiently thick.
  - Only use plastic bubble wrap sheets as filler material.
  - Attach warnings to the transport packaging so that they are clearly visible.
  - Please ensure that the delivery note is placed inside the package if the package is to be shipped domestically. However, if the package is being shipped internationally, the delivery note must be placed inside a delivery note pocket and attached to the outside so that it is clearly visible.

2.4   Unpacking

The device is delivered in packaging together with a packing slip that provides installation instructions.

- Read the entire packing slip carefully.
- Retain the packing slip.

NOTE: Electrostatic discharge!
Electrostatic discharge can damage or destroy components.

- When handling the device, observe the necessary safety precautions against electrostatic discharge (ESD) in accordance with EN 61340-5-1 and IEC 61340-5-1.

3 Installation

3.1 Product description

The compact TC MOBILE I/O... signaling system uses the mobile network to monitor analog and digital values. It also switches relay outputs remotely.

The device offers a number of helpful software functions, such as mobile network diagnostics and different user roles. A USB connection to a computer with a web browser is all that is required for configuration.

Table 3-1 Product versions

Designation	Order No.	Mobile network	Voltage	Communication
TC MOBILE I/O X200	2903805	2G	DC	– SMS
TC MOBILE I/O X200-4G	1038567	4G		– E-mail
TC MOBILE I/O X200 AC	2903806	2G	AC	– App (SMS, HTTPS)
TC MOBILE I/O X200-4G AC	1038568	4G		
TC MOBILE I/O X300	2903807	2G	DC	– ODP protocol
TC MOBILE I/O X300 AC	2903808	2G	AC	

You can find a detailed overview of the product versions in the "Comparison of product features" on page 50.

Applications

– Equipment, building, and system monitoring
– Pumps, wastewater treatment plants, water supply
– Lighting control systems, remote switching devices
– Elevators, gates
– Alarm technology and building services
– HVAC technology
– Battery monitoring (up to 60 V)
– Railway applications in accordance with EN 50121-4

Features of 2G devices:

– GSM mobile network: 850, 900, 1800, and 1900 MHz
– Event- or interval-controlled communication
– Four digital inputs
– Four relay outputs, can be switched via mobile network
– DC versions: two scalable analog inputs, can be switched between current and voltage
– Standard mini SIM card
– Compact design: 4HP in accordance with DIN 43880
– Housing cover can be sealed
– Mounting on a DIN rail or the wall
– SMS alarms in the event of voltage failure
– Approval for Ex zone 2
– FCC approval

Features of 4G devices:

– European LTE mobile network, CAT1:
  B3 (1800 MHz), B7 (2600 MHz), B20 (800 MHz)
– GSM mobile network: 850, 900, 1800, and 1900 MHz
– Event- or interval-controlled communication
– Four digital inputs
– Four relay outputs, can be switched via mobile network
– DC versions: two scalable analog inputs, can be switched between current and voltage
– Standard mini SIM card, LTE-capable
– Compact design: 4HP in accordance with DIN 43880
– Housing cover can be sealed
– Mounting on a DIN rail or the wall
– SMS alarms in the event of voltage failure

3.2   Use outside of Europe

To gain a rough idea of which frequency bands are available in your country of use, visit www.frequencycheck.com.

2G devices

The devices support all global 2G frequency bands.

- Check with your provider whether there is network coverage at the installation location.
- Check with your provider whether the device is approved for operation at the installation location.

4G devices

The devices are intended for use within Europe. Use outside of Europe is possible as long as the necessary general conditions are met.

- Check with your provider whether any of the following frequency bands are available:
  – LTE, CAT1, B3
  – LTE, CAT1, B7
  – LTE, CAT1, B20
- Check with your provider whether there is network coverage at the installation location.
- Check with your provider whether the device is approved for operation at the installation location.
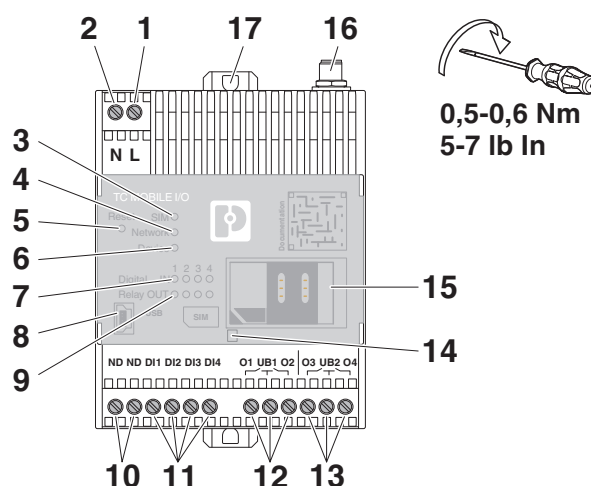
3.2.1 DC devices

**0,5-0,6 Nm
5-7 lb In**
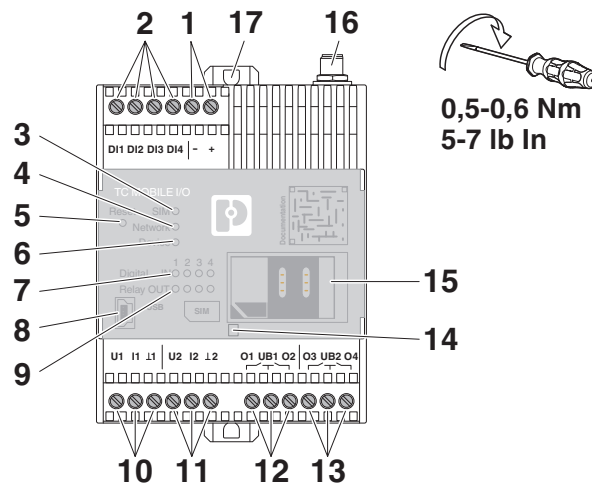
TC MOBILE I/O X200, TC MOBILE I/O X200-4G, TC MOBILE I/O X300

1	24 V DC supply voltage		
2	DI1 ... DI4	Digital inputs	
3	SIM	Green on	SIM card ready for operation
		Orange on	SIM card not inserted
		Flashing orange	Mobile engine waiting for PIN, PUK, or another password
		Red on	SIM card fault
4	Network	Green on	Connection present, very good field strength
		Orange on	Sufficient field strength
		Flashing orange	Poor field strength
		Red on	No connection
5	Reset button	Press and hold for three seconds to reset the device to the default settings	
6	Device	Green on	Power supply via power supply unit
		Orange on	Power supply only via USB
		Flashing orange	Firmware update
		Red on	Hardware fault
7	Digital IN	Green on	High level at the input
		Green off	Low level at the input
8	USB interface		For configuration only
9	Relay OUT	Green on	Relay energized, switch contact closed
		Green off	Relay de-energized, switch contact open
10	Analog input 1		Can be switched between current and voltage
11	Analog input 2		Can be switched between current and voltage
12	Relay 1 + 2 (N/O contact)		
13	Relay 3 + 4 (N/O contact)		
14	Lug for closing the housing cover		
15	Mini SIM card		
16	SMA antenna connection (female)		
17	Extendable base latch for wall mounting		

3.2.2 AC devices

**0,5-0,6 Nm
5-7 lb In**

TC MOBILE I/O X200 AC, TC MOBILE I/O X200-4G AC, TC MOBILE I/O X300 AC

1	L	230 V AC supply voltage	
2	N		
3	SIM	Green on	SIM card ready for operation
		Orange on	SIM card not inserted
		Flashing orange	Mobile engine waiting for PIN, PUK, or another password
		Red on	SIM card fault
4	Network	Green on	Connection present, very good field strength
		Orange on	Sufficient field strength
		Flashing orange	Poor field strength
		Red on	No connection
5	Reset button	Press and hold for three seconds to reset the device to the default settings	
6	Device	Green on	Power supply via power supply unit
		Orange on	Power supply only via USB
		Flashing orange	Firmware update
		Red on	Hardware fault
7	Digital IN	Green on	High level at the input
		Green off	Low level at the input
8	USB interface		For configuration only
9	Relay OUT	Green on	Relay energized, switch contact closed
		Green off	Relay de-energized, switch contact open
10	ND	Neutral conductor	
11	DI1 ... DI4	Digital inputs	
12	Relay 1 + 2 (N/O contact)		
13	Relay 3 + 4 (N/O contact)		
14	Lug for closing the housing cover		
15	Mini SIM card		
16	SMA antenna connection (female)		
17	Extendable base latch for wall mounting		

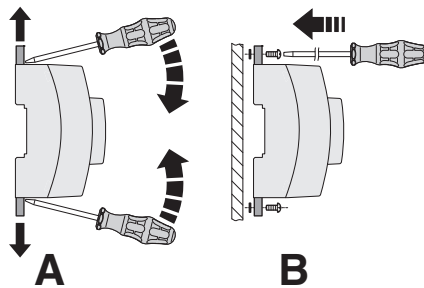## 3.3   Mounting

⚠️

> **WARNING: Risk of death due to electric shock**
> –   Only mount or remove the device when it is disconnected and de-energized.
> –   AC devices: The devices have basic insulation only. Mount the devices at least 5 mm away from other modules.

3.3.1   DIN rail

*   Use a grounding terminal block to connect a 35 mm EN DIN rail to the protective earth. The module is grounded by snapping it onto the DIN rail.
*   Place the device onto the DIN rail from above.
*   Push the front of the device toward the mounting surface until it snaps into place audibly.
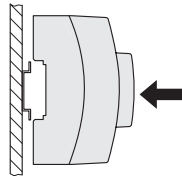
Figure 3-1   DIN rail mounting

3.3.2   Wall

There are two removable base latches for wall mounting on the back of the device.
*   Push the snap-in latch downwards with a screwdriver and pull out the base latch.
*   Insert a washer between the extended base latch and the even surface.
*   Secure the device to the wall using the screws.
    –   Maximum thread diameter 4 mm
    –   Maximum head diameter 8.5 mm

A   **B**

Figure 3-2   Wall mounting

3.4 Removal

⚠️ **WARNING: Risk of death due to electric shock**
Only mount or remove the device when it is disconnected and de-energized.

3.4.1 DIN rail

• Push the snap-in latch downwards with a screwdriver and pull out the base latch.
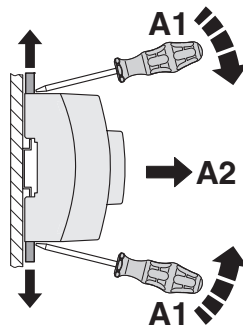• Pull the device away from the DIN rail.

Figure 3-3   Removal from the DIN rail

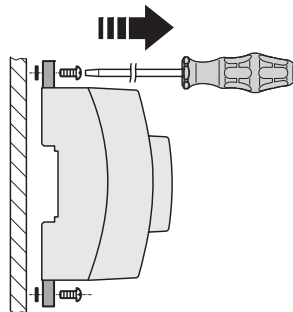### 3.4.2 Wall

• Remove the screws.
• Push the base latch inwards.

Figure 3-4   Removal from the wall

3.5 Connecting the antenna

⚠️

WARNING: danger of electric shock
An electrical potential can build up on the antenna.
– Ground the antenna coaxial cable.

The antenna is not supplied as standard. We recommend using the following antennas.

GSM/UMTS antenna:
– PSI-GSM/UMTS-QB-ANT (Order No. 2313371)

Antenna for 4G (LTE):
– TC ANT MOBILE WALL 5M (Order No. 2702273)

• Screw the antenna on to the device until it is hand-tight.

3.6 Inserting the SIM card

You need an LTE-capable SIM card for the 4G devices.

ⓘ

NOTE: Device damage
Disconnect the device power supply before replacing the SIM card

• Open the housing cover.
• Push the SIM card cover to the right and open it.
• Slide the SIM card into the holder with the contact surface facing down. Note the position of the diagonal corner.
• Close the SIM card cover. Push it to the left.
• Close the housing cover.
• Protect the SIM card with a multi-digit PIN code.
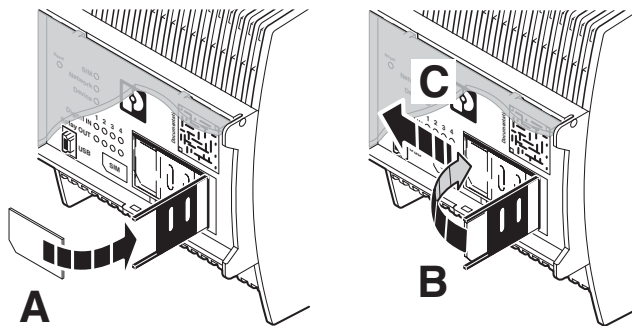
Figure 3-5   Inserting the SIM card

3.7 Wiring

> **Railway applications in accordance with EN 50121-4 beyond the 3 meter range:**
> – Use Phoenix Contact QUINT POWER power supplies directly at the device. Supply voltage to the device via the terminals.

3.7.1 DC devices

> **WARNING: Risk of death due to electric shock**
> During operation, certain parts of the device may be under hazardous voltages! Disregarding this warning may result in property damage and/or serious personal injury!
> – Provide overcurrent protection (I ≤ 6 A) within the installation.
> – The output power of the power supply unit may not exceed 240 VA.

• Connect the device.
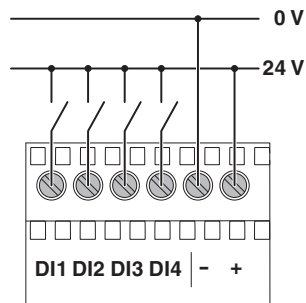
Figure 3-6   Supply voltage 10 V DC ... 60 V DC, digital inputs
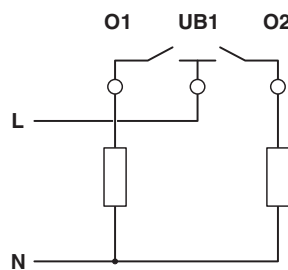
Figure 3-7   Relay outputs (DC devices)

> **NOTE: Device damage**
> Always connect the voltage source to the center contact of the relay (UB1, UB2) and the load to the N/O contact (O1, O2, O3, O4).
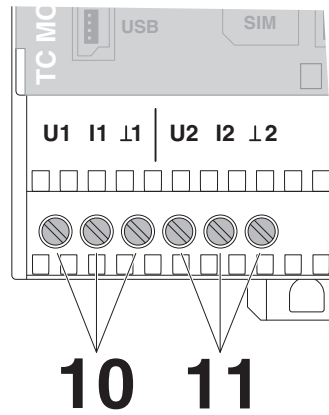
Figure 3-8   Analog inputs (DC devices)

⊥ = Ground

The analog inputs, can be switched between
–   Current: I1, and ⊥1
–   Voltage: U1, and ⊥1 or supply ground

3.7.2   AC devices

⚠️ **WARNING: Risk of death due to electric shock**

During operation, certain parts of the device may be under hazardous voltages! Disregarding this warning may result in property damage and/or serious personal injury!

–   Never carry out work with voltage present.
–   This device is not suitable for monitoring sensitive systems or time-critical processes. GSM network failures or power supply interruptions may adversely affect monitoring.
–   The device is intended for installation in a control cabinet or a comparable container. The device may only be operated after it has been installed. The control cabinet must meet the requirements of EN/IEC 60950-1 in terms of fire protection shielding. Additionally, it must provide adequate protection against electric shock (touch protection).
–   It must be possible to disconnect the device from all phases of the power supply. Install an appropriate disconnect device (all-phase fuse, miniature circuit breaker, etc.) for this purpose.
–   During electrical installation, current standards and regulations must be complied with, and installation must be carried out by an expert.

⚠️ **WARNING: Risk of death due to electric shock!**

Voltages above 230 V AC may not arise at the device itself. Ensure that all of the signals and the supply voltage refer to the same neutral conductor.
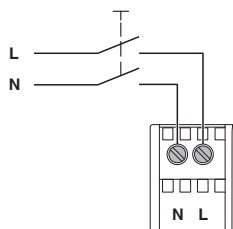
•   Connect the device.

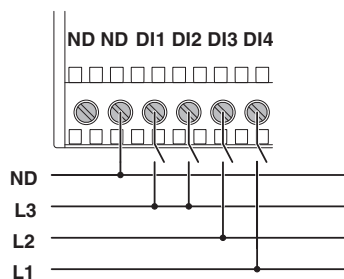Figure 3-9   Supply voltage: 93 V AC ... 250 V AC

Figure 3-10   Digital inputs (AC devices)

NOTE: Device damage
Always connect the voltage source to the center contact of the relay (UB1, UB2) and the load to the N/O contact (O1, O2, O3, O4).
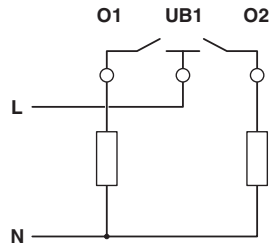

Figure 3-11   Relay outputs (AC devices)

---

4 Configuration

Communication is possible via the following channels:

TC MOBILE I/O X200...

✔ "Sending e-mails" on page 26

✔ "Sending SMS messages" on page 26

✔ "Receiving SMS messages" on page 26

✔ "Switching via call" on page 27

✔ "Communication via app" on page 27

TC MOBILE I/O X300...

✔ "Communication with an ODP server with TC MOBILE I/O X300..." on page 28

For security reasons, the following communication channels are **not** supported.

✘ Alarm via call (free flash call)

✘ "Receiving e-mails" on page 28

✘ "GPRS communication between two mobile network devices" on page 28

If you wish to use the e-mail receipt or alarm call functions despite the increased security risk, please contact Phoenix Contact. These functions have not been planned for so far.

4.1 TC MOBILE I/O X200... communication channels

4.1.1 Sending e-mails

The signaling systems can send alarms and cyclical messages by e-mail. For this purpose, GPRS communication is established with an e-mail server. The signaling systems can also send the entire logbook by e-mail.

In the event of a power failure, the device can no longer send e-mails because it requires more power to establish the connection to an e-mail server than the internal capacitor can store. However, it is still possible to send an SMS.

E-mail communication can take place without encryption or with SSL encryption. STARTTLS is not supported. Please consult your e-mail service provider beforehand. Most e-mail service providers support SSL encryption.
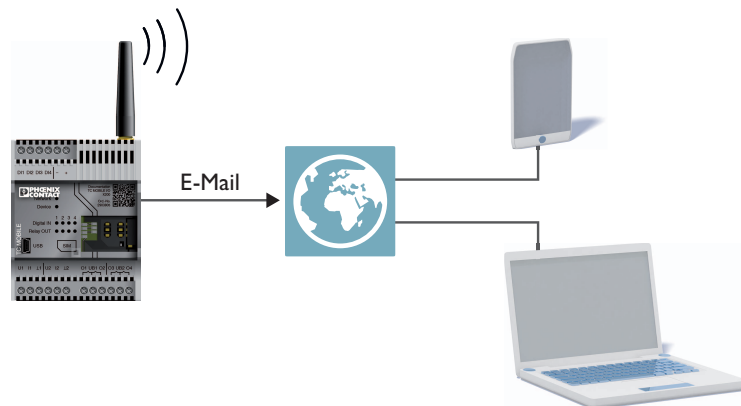
Figure 4-1   Sending e-mails

4.1.2 Sending SMS messages

Sending an SMS has the advantage of enabling communication even if the mobile network reception is very poor. The device can also send an SMS without an Internet connection. The signaling systems can send an SMS to individual devices or to a device group. You can configure the device group as a message chain.

In the event of a power failure, the device can still send an SMS to a selected device.

4.1.3 Receiving SMS messages

You can switch the integrated relays via SMS messages. All four relays can even be switched with a single SMS. You can also send the logbook to an e-mail address via SMS. Furthermore, exchanging individual contacts is also possible via SMS (name and telephone number).

The signaling systems are preset such that only SMS commands from contacts that are entered in the contact list can be processed (whitelist). You can disable this function.

4.1.4 Switching via call

You can also switch the outputs via a free telephone call:

1. The device identifies the incoming call.
2. The device checks whether the telephone number is authorized for switching.
3. If the telephone number is authorized, the device closes, opens, or switches one or more outputs depending on the configuration.
4. The device disconnects the call.

No costs are incurred because the device does not accept the call. Furthermore, the device disconnects the call, giving the user direct feedback that the call was received.

4.1.5 Communication via app

Download the app free of charge:

iOS

Android

You can also operate the TC MOBILE I/O X200... devices via app. The app transmits the switching commands. The app then receives feedback from the device via an encrypted HTTPS data connection. However, the iOS operating system prevents full SMS communication. Even direct communication between the two mobile network devices is not possible without further measures (see page 28). The data is therefore stored temporarily on a server that is hosted by Phoenix Contact in Germany. The app calls up the data from this server.

Naturally, alarms via SMS and e-mail are still possible. You thus have the best accessibility in the field. In order to keep the data volumes as low as possible and conserve battery, the app does **not** refresh in the background. When the app is open, however, you can set cyclical refreshing. This ensures that, for example, analog values are kept up to date, without a new SMS command being issued each time there is a change.
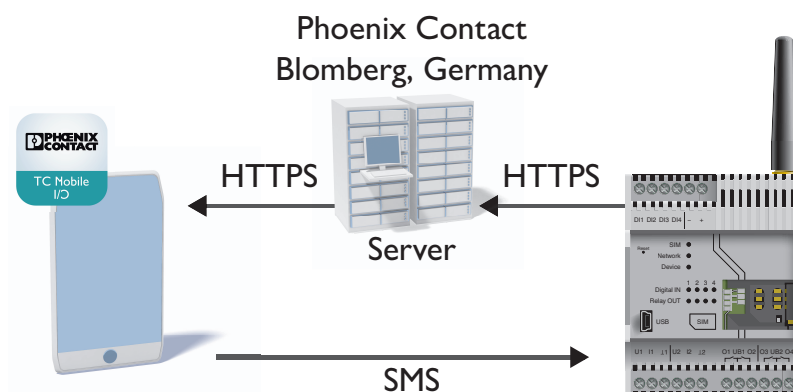

Figure 4-2   Communication via app

ℹ️ Further information is available in the application note "Getting started with the app for TC MOBILE I/O X200..." at phoenixcontact.net/product/2903805.

4.2 Communication with an ODP server with TC MOBILE I/O X300...

The TC MOBILE I/O X300... signaling systems communicate via the ODP protocol (Open Data Port), thus enabling cost-effective remote control substations. ODP is a solution for remote data transmission. ODP is used to monitor systems with remote stations, evaluate measured values, and back up data. The signaling systems transmit the data via the GPRS mobile network service either immediately or with a delay.

The platform is based on a top-down design, i.e., all central and key functions are managed by the control center. The ODP server from Phoenix Contact enables open communication between the signaling system and the control center.
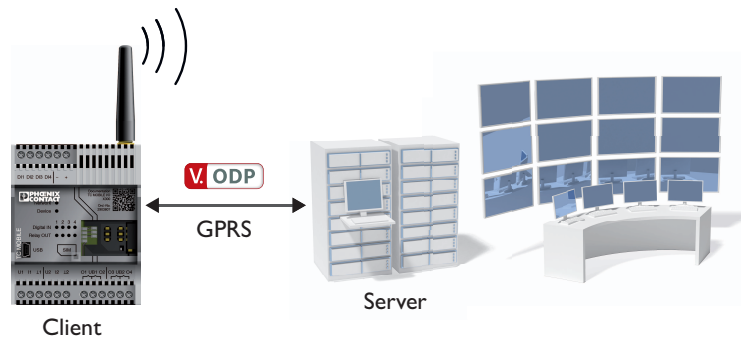

Figure 4-3   ODP communication

4.3 Communication channels not supported

4.3.1 Receiving e-mails

For security reasons, the signaling system does not process any incoming e-mails.

Furthermore, many e-mail servers limit the number of times that an inbox can be opened per day. In order for the signaling system to be able to respond promptly to incoming e-mails, it must regularly read out the inbox from the server at very short time intervals. Many e-mail services inhibit this function.

Communication via SMS or ODP is a suitable alternative.

4.3.2 GPRS communication between two mobile network devices

Many mobile network providers prevent direct GPRS communication between mobile network devices that use standard SIM cards. This special function is not supported because it is heavily dependent on the mobile network.

Communication via SMS or ODP is a suitable alternative.

4.4   Configuration

⚠️

WARNING: Explosion hazard when used in potentially explosive areas.
You can only use the configuration interface if it has been ensured that there is not a potentially explosive atmosphere present.

• Connect the device to the PC via a USB cable. Use the cable CABLE-USB/MINIUSB-3,0M (Order No. 2986135).

During configuration, the device is supplied with power via the USB cable. An additional power supply unit is therefore not necessary.

4.4.1   Operating system

You can use the following operating systems to configure the device:
– Windows®
– Linux and Mac OS®

When configuring with virtual machines (VM), page loading is slowed down. We therefore do not recommend using a virtual machine.

You can find which operating system has been set under "Diagnostics". To change the operating system, carry out the following steps:
• Disconnect the device from the supply voltage.
• Press and hold the reset button.
• Switch the supply voltage back on.
• Press and hold the reset button until the device LED flashes.

4.4.2   Initial commissioning

• **Windows®:** the device will be recognized as a virtual CD drive. If the autostart function is deactivated, start Setup.exe from the virtual CD drive. The driver for the device will be installed.
• **Linux and Mac OS®:** the driver is already integrated into the operating system.

4.4.3   Configuration via web browser

The web interface has been optimized for Mozilla Firefox version 62.0.

- Start a web browser.
- Enter "tcmobile" in the address line.

Configuration rights

User name:	admin
Password:	admin

If you do not have access to the device:

Internet communication takes place via a proxy server. Your firewall settings prevent you from entering the NetBIOS name "tcmobile".

- Disable the proxy server settings in your web browser. If necessary, disable the automatic configuration script (Internet Explorer) as well.
- Enter the IP address 169.254.10.1 directly into the address line.

> **i** With Linux/Mac, access is only possible via the IP address.

The installation wizard will support you during initial commissioning of the device. No additional software is required. In order for the device to function, you must configure at least points 1 ... 4 in "Configuration".
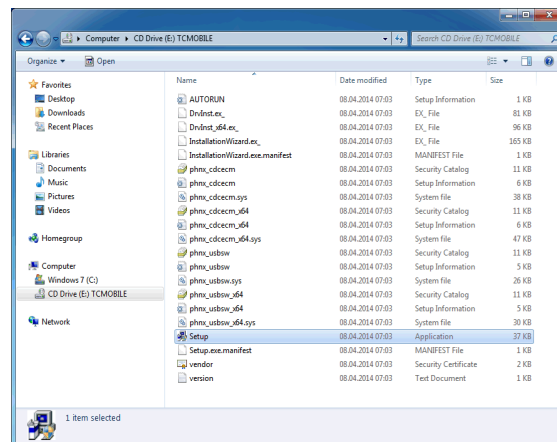

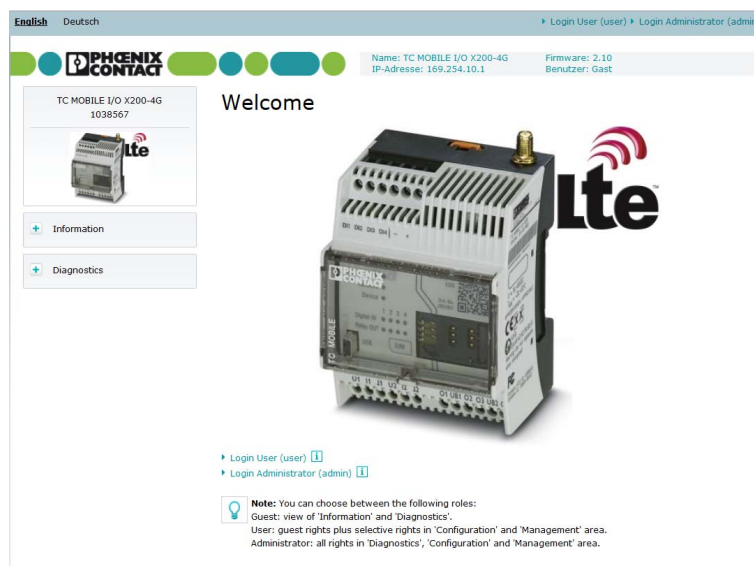Figure 4-4   Installation wizard

Figure 4-5   Web interface

The web browser may not open automatically because of individual security settings. You can find information on opening the web browser manually in section 5 "Detecting and removing errors".

Logging in

There are two ways to log in:
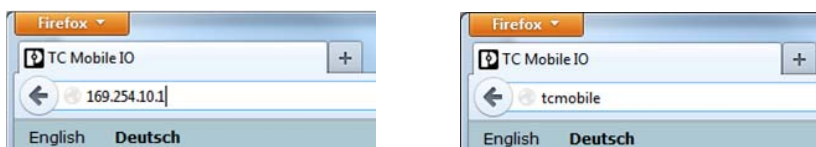
– Via an IP address
– Via a NetBIOS name

Figure 4-6   Logging in via an IP address or NetBIOS name

Three various user roles:

– **Guest:** no authorization, read-access to the tabs "Information" and "Diagnostics"
– **User (X200 devices only):** read-access to "Information" and "Diagnostics", write-access to mobile network access data and device names
– **Administrator:** all rights for "Diagnostics", "Configuration", and "Administration"

This means, for example your end customers can call up the diagnostics themselves, but cannot change the configuration of the device.

Remote access via USB/Ethernet converter is **not** possible, because a virtual network card is automatically installed at the connected peer. USB/Ethernet converters do not usually support this function.

4.4.4 Settings

Mini SIM card

You can use a SIM card that is protected with a PIN code. The PIN is encrypted when saved in the device. In addition, you can seal the cover of the device so that the card cannot be removed.

If the SIM card is blocked, you can also unlock it with the PUK.

Assigning a name

You can assign the device an individual name with a maximum of 32 characters. Alternatively, you can read in the serial number or the IMEI address.

Date and time

The time format can be set to either 12 hours or 24 hours, automatically or manually. You can also adjust the time manually. If the device loses time, e.g. after a power failure of more than 96 hours, it will send an SMS. This allows the device to come as close to the actual time as possible.

Contact list

The contact list contains up to 100 recipients with names, telephone numbers or e-mail addresses. You can also edit the contacts via SMS. Once the contact has been successfully edited, the administrator receives confirmation by SMS.

Message chain

You can create a message chain. An alarm is sent to the message chain participants via e-mail or SMS in the order of entries in the contact list. E-mail recipients cannot, however, confirm the message.

You can also enter the same contact more than once in the contact list. The same participant will then receive an alarm the corresponding number of times.

When the device receives a confirmation SMS, the message chain is broken. The confirmation SMS is sent by the participant whose turn it is in the message chain. The time window within which the participants are to send confirmation can be set to an amount of time between one minute and 999 hours. You are free to choose the text of the confirmation SMS.

Digital inputs

The alarm can be triggered in three ways:

– In the event of a rising edge
– In the event of a falling edge
– In the event of a rising and falling edge

The alarm can be triggered immediately or after a waiting period between 0 seconds and 999 hours. This avoids switch bouncing. You can save a different message text for each edge.

Figure 4-7   Digital inputs

Scalable analog inputs (DC devices only)

The device can send up to four messages per analog input:

– Exceeding the upper tolerance
– Falling below the upper tolerance
– Exceeding the lower tolerance
– Falling below the lower tolerance

You can use the analog inputs as a voltage input (0 V ... 60 V) or as a current input (0 mA ... 20 mA or 4 mA ... 20 mA). When a signal from 4 mA ... 20 mA is monitored, the device can report open circuits.
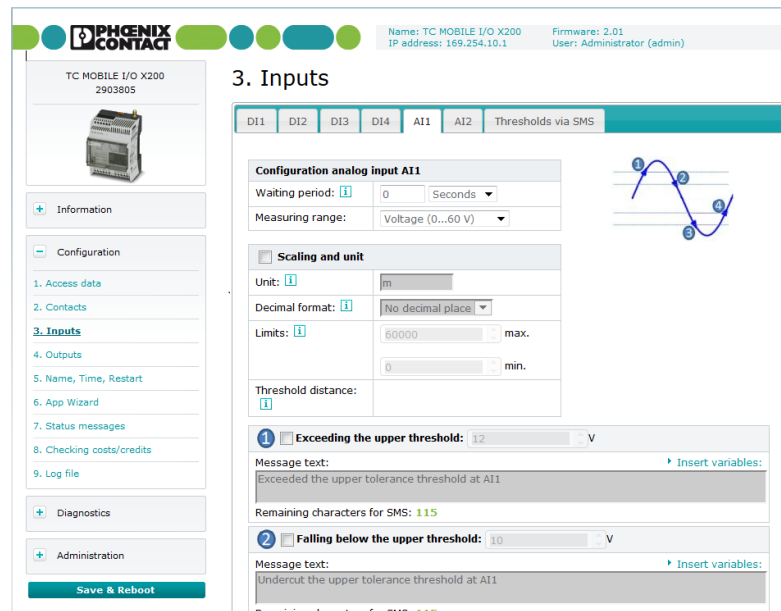

Figure 4-8   Scalable analog inputs

Relays

The device has four relays (N/O contacts). You can open or close the relays via a telephone call or an SMS. A command can also switch several relays at the same time. For security reasons, incoming e-mails are not supported.

If a relay was closed, it can automatically re-open itself after a freely selected waiting period between one second and 999 hours. The device can send a confirmation SMS to the recipient after a relay is opened or closed.

If the current fails or if the device restarts, the relay opens.

4.4.5   Messages

Alarm messages

The device sends alarm messages as an SMS or e-mail. E-mails are sent to an SMTP server. The e-mails can be sent without encryption or with SSL encryption.

You are free to choose the text of the alarm message and also to add variables.

Example:
"... The input DI1 has the state: *#DI1#*..."
(*#DI1#* = variable)

The firmware 2.x supports the following variables:

– Device name
– Device serial number
– Device IMEI number
– Time stamp of the current time
– Status of all four digital inputs (high = 1, low = 0)
– Status of the individual digital inputs (1 ... 4)
– Value and unit of the individual analog inputs (1 ... 2)
– Status of all four relay outputs
– Status of the individual relay outputs (1 ... 4)
– Variables for mobile network diagnostics
– Number of sent SMS messages
– Data volumes currently used
– Current network operator

Periodic status messages

In addition to alarm messages, the device can also send periodic status messages. The interval can be set to between five minutes and one month.

The app can refresh itself every minute.

Status message in the event of a power failure

The device can send a freely configurable SMS to a participant in the contact list when switched off, in the event of a power failure, or when starting up. The SMS is sent to the selected participant once. It is not possible to send an e-mail because the power consumption is too high.

Status requests via SMS

You can request the current status of the inputs and outputs via SMS.

4.4.6   Diagnostics

You can view all relevant diagnostic information in the "Device status" and "Mobile network" areas. This allows you to quickly check that the device is working properly.
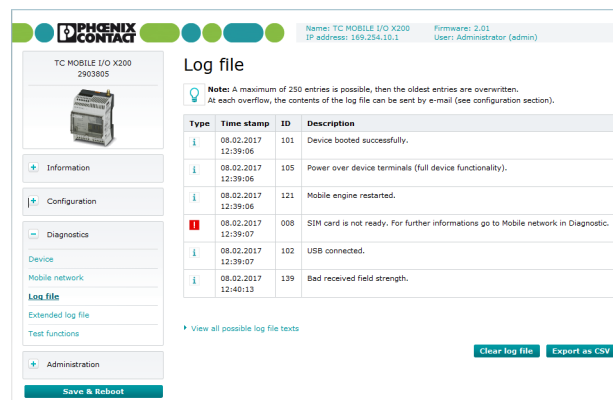
Log

The device contains a log in which important events are recorded. As of firmware 2.x, the X200 devices' logs can hold 250 entries. The X300 devices' logs or with an earlier firmware can hold 100 entries. When the log is full, the earliest entries are overwritten.

The device can send the content of the log automatically via e-mail:
– When full
– At regular intervals, e.g. once per week
– Upon receipt of an incoming SMS

The contents of the log are deleted in the event of power failure.

Figure 4-9   Log

Test functions

You can carry out the following actions via the web interface to make sure that the device has been installed properly:
– Switch outputs
– Send test messages via e-mail
– Send test messages via SMS

Costs and credits

For a rough initial cost estimate, you can be alerted of the following events:

– Exceeding a defined number of SMS messages, and every multiple of this number
– Exceeding a defined net data volume, and every multiple of this number

There may be deviations between the net data volumes and the gross data volumes (calculated by the mobile network operator). The calculation of the gross data volume is based on the mobile network provider's specific billing system.
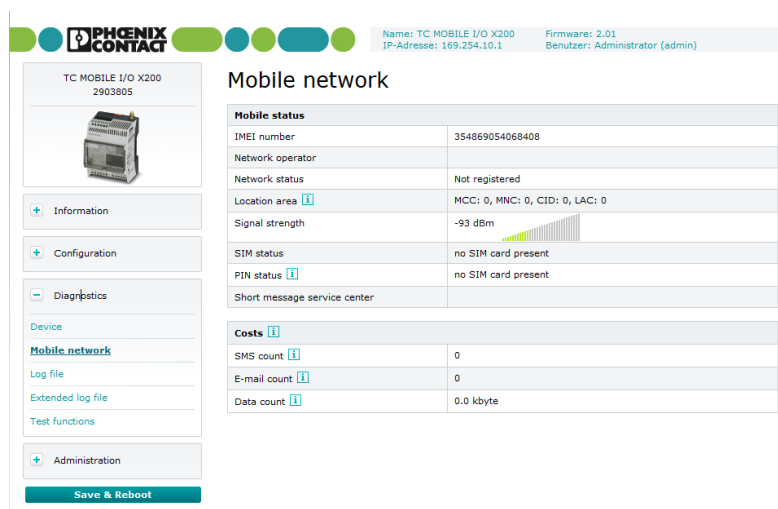
Figure 4-10   Monitoring costs and credits

4.4.7   Administration

As the administrator, you also have the option of exporting or importing the device's configuration file. You can update the firmware and change the passwords. We recommend the current version of Firefox for the firmware update.

4.4.8   Downgrade

You **cannot** downgrade the firmware 2.x to an earlier version via the web-based management. The versions are not compatible. If a downgrade is absolutely necessary, contact Phoenix Contact directly.

5 Detecting and removing errors

5.1 Initial installation does not start automatically (Windows®)

> Driver installation is **not** necessary with Linux and Mac OS® systems. You can access the device directly via a web browser at the IP address 169.254.10.1.

5.1.1 Possible case 1

You are using an outdated Windows® operating system or you are not using a Windows® operating system.

Solution 1:

- Use a computer with a USB interface and one of the following operating systems:
    - Windows XP®
    - Windows Vista®
    - Windows 7®
    - Windows 8®
    - Windows 10®

5.1.2 Possible case 2

The autostart function is not activated in the operating system.

Solution 2:

- Select this virtual drive via "Start, Computer".
- Start Setup.exe from the virtual CD drive. The driver for the device will be installed.
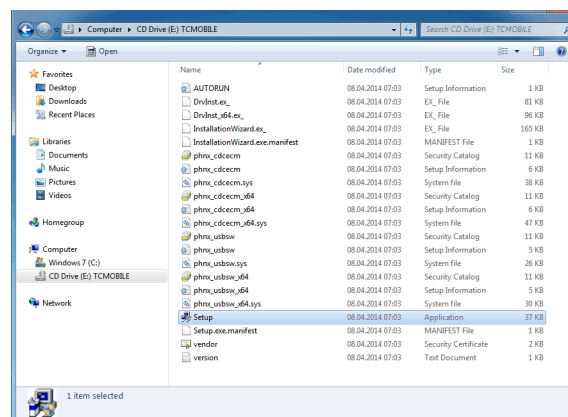- Follow the instructions of the installation wizard.

Figure 5-1   Virtual CD drive

5.2 Access via the web browser is not possible

The driver is installed, but the device website does not open automatically in the web browser. Access via the standard web browser is not possible. The installation wizard displays the following problems, for example:
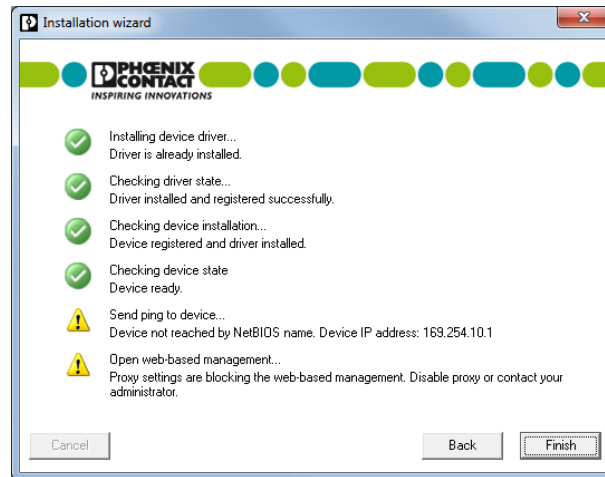
Figure 5-2   Installation wizard error message

5.2.1 Possible case 1

The proxy settings prevent access to the device.

Solution 1.1

• Install a second web browser on your PC, e.g. Firefox. When Firefox is installed for the first time, the proxy settings are generally not activated.

Advantage: you do not need to change the configuration settings of your standard web browser.

Disadvantage: you need to install a second web browser.

Solution 1.2

• Deactivate the proxy settings in your web browser (see "Internet Explorer 8" or "Firefox 24.1 or later").

Advantage: you can quickly access the device.

Disadvantage: during configuration, you **cannot** access the Internet.

| | After configuration, reset the proxy settings. Then you can use the Internet again. |

Internet Explorer 8

Deactivate the proxy settings under "Tools, Internet Options, Connections, LAN Settings".
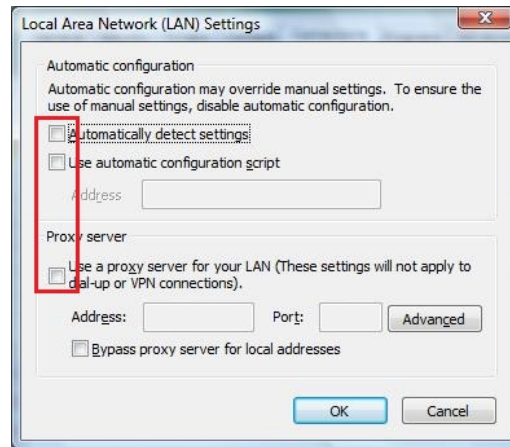
Figure 5-3   Proxy settings deactivated, Internet Explorer

Firefox 24.1 or later

Deactivate the proxy settings under "Tools, Options, Network, Settings".
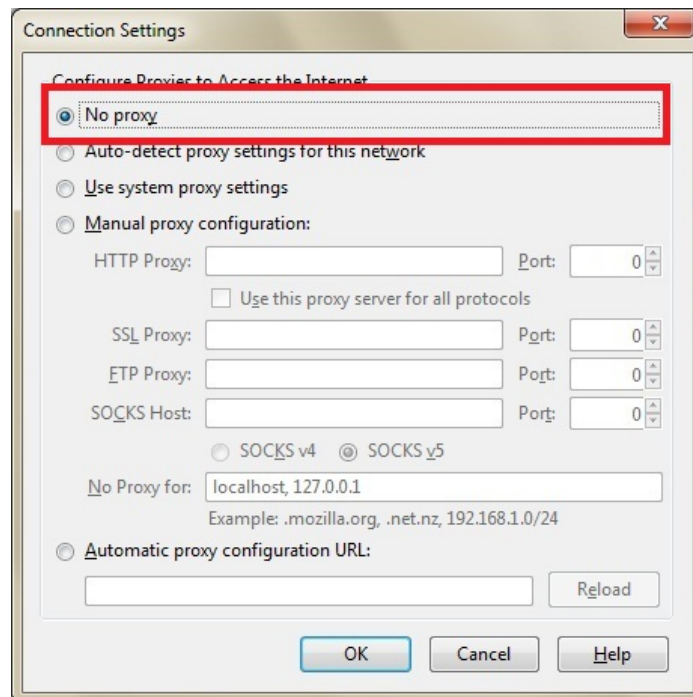
Figure 5-4   Proxy settings deactivated, Firefox

5.2.2 Possible case 2

The website does not open after entering the NetBIOS name "tcmobile" in the address line. A security product, e.g. a firewall, or specific system settings prevent access via the NetBIOS name.

Figure 5-5   tcmobile address line

Solution 2.1

Enter the standard IP address in the address line of the web browser: 169.254.10.1

Figure 5-6   Address line with standard IP address

Solution 2.2

If the standard IP address 169.254.10.1 is already assigned on your computer, the device is automatically assigned a different IP address.

The installation wizard displays the new IP address during driver installation.
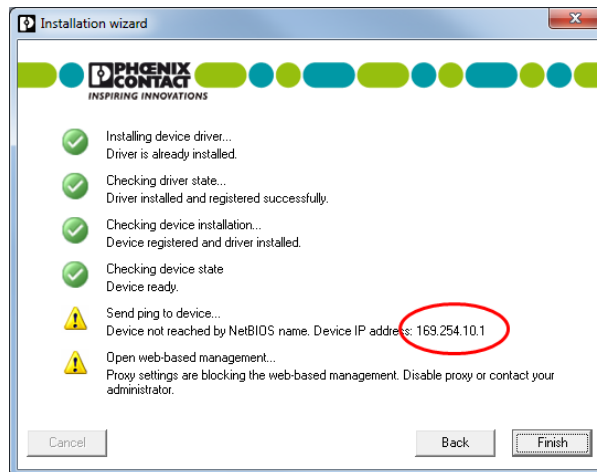
Figure 5-7   IP address displayed during driver installation

The IP address can also be read out manually.

• To do so, click the Start button. Enter "CMD" in the search field.

The DOS window opens.
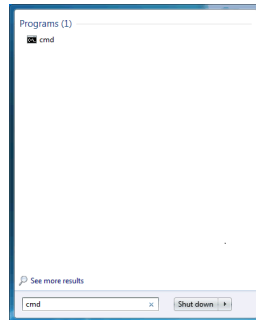
Figure 5-8   cmd.exe
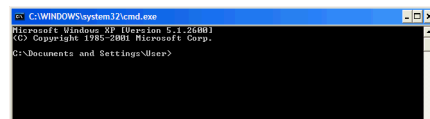
Figure 5-9   DOS window

• Enter the command IPCONFIG to view all the computer's network adapters. The designation of the virtual network adapter that is used for communication with the devices is Sevenstax.dhcpsrv.

Example: if the IP address 169.254.10.**2** is displayed here, then the address of the TC MOBILE device is 169.254.10.**1**.
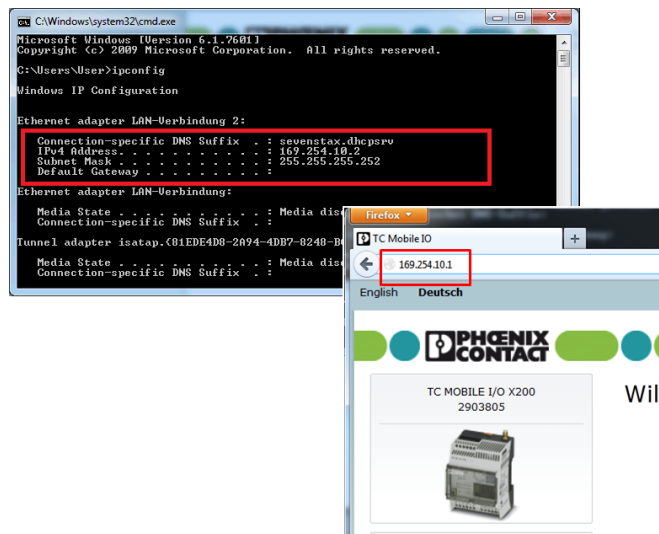
Figure 5-10   IP address

5.3 The content is not displayed correctly in the web browser

5.3.1 Possible case 1

You are using an outdated web browser.

Solution 1

• Use one of the following recommended web browsers:
    – Firefox 20.0 or later
    – Google Chrome 33.0 or later
    – Opera 18.0 or later
    – Internet Explorer 8.0 or later; this web browser cannot be used to update the firmware

5.3.2 Possible case 2 (Internet Explorer only)

The compatibility setting in Internet Explorer is incorrect. A script error message is displayed.
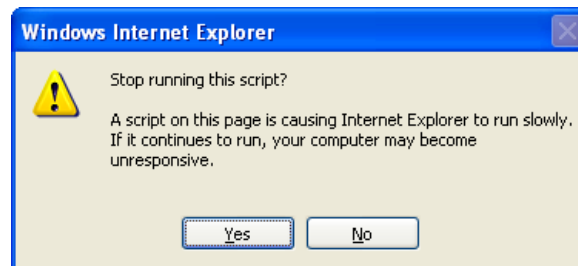
Figure 5-11   Script error message

Solution 2

Deactivate the compatibility view in Internet Explorer.

- Deactivate the following functions under "Tools, Compatibility View Settings":
  - Display intranet sites in Compatibility View
  - Display all websites in Compatibility View
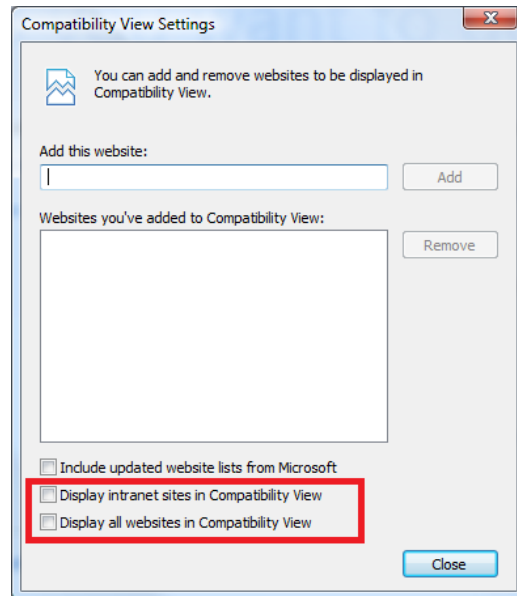
Figure 5-12   Deactivating Compatibility View, step 1

- Disable the "Compatibility View" checkbox under the "Tools" menu.
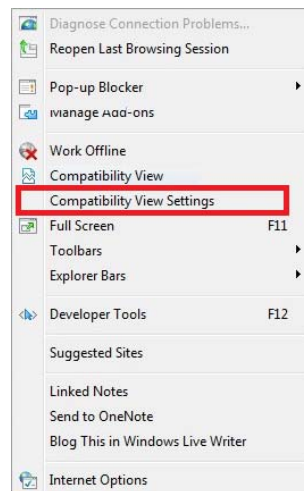
Figure 5-13   Deactivating Compatibility View, step 2

- Reload the page. If necessary, restart the web browser.

6 After use

6.1 Maintenance and servicing

The device is maintenance-free.

6.2 Device replacement

⚠️ **WARNING: Risk of death due to electric shock**
Only mount or remove the device when it is disconnected and de-energized.

You can replace the device if necessary.
• Disconnect the unit from the power supply.
• Remove all cables.
• Remove the device as described in Section 3.4, "Removal".
• Replace the device with an identical device (the same Order No.).

6.3 Device failure and repair

Repairs may only be carried out by Phoenix Contact.
• Send faulty devices back to Phoenix Contact for repairs or to receive a replacement device.
• We strongly recommend using the original packaging to return the product.
• Include a note in the packaging indicating that the contents are returned goods.
• If the original packaging is no longer available, observe the following points:
  – Observe the humidity specifications and the temperature range specified for transport (see Section 7.4).
  – Use dehumidifying agents if necessary.
  – Use suitable ESD packaging to protect components that are sensitive to electrostatic discharge.
  – Secure any loose parts.
  – Make sure that the packaging you select is large enough and sufficiently thick.
 – Only use plastic bubble wrap sheets as filler material.
  – Attach warnings to the transport packaging so that they are clearly visible.
  – Please ensure that the delivery note is placed inside the package if the package is to be shipped domestically. However, if the package is being shipped internationally, the delivery note must be placed inside a delivery note pocket and attached to the outside so that it is clearly visible.

6.4 Disposal

Dispose of the device separately from other waste, i.e., via an appropriate collection site.

• Dispose of packaging materials that are no longer needed (cardboard packaging, paper, bubble wrap sheets, etc.) with household waste in accordance with the currently applicable national regulations.

7 Technical data

7.1 Ordering data

DC devices	Type	Order No.	Pcs.
Remote control and signaling system via mobile network, four digital inputs and four relay outputs (N/O contact), two additional analog inputs, each can be switched between voltage and current Current: 0 mA ... 20 mA or 4 mA ... 20 mA (switchable), supply voltage from 10 V ... 60 V DC			
2G mobile network	TC MOBILE I/O X200	2903805	1
4G mobile network (LTE)	TC MOBILE I/O X200-4G	1038567	1
ODP functionality	TC MOBILE I/O X300	2903807	1

AC devices	Type	Order No.	Pcs.
Remote control and signaling system via mobile network, four digital inputs and four relay outputs (N/O contact), supply voltage from 93 V ... 250 V AC			
2G mobile network	TC MOBILE I/O X200 AC	2903806	1
4G mobile network (LTE)	TC MOBILE I/O X200-4G AC	1038568	1
ODP functionality	TC MOBILE I/O X300 AC	2903808	1

7.2 Accessories

$\boxed{\mathbf{i}}$
- Operation of the wireless system is only permitted if accessories available from Phoenix Contact are used. The use of any other accessory components may invalidate the operating license.
- For initial startup, you need a USB cable and an antenna. These accessories are not included in the scope of delivery.

Antenna	Type	Order No.	Pcs.
Multiband mobile network antenna with mounting bracket for outdoor installation. 5 meter antenna cable with SMA circular connector suitable for LTE/4G	TC ANT MOBILE WALL 5 M	2702273	1

Antennas for 2G only	Type	Order No.	Pcs.
Mobile network antenna for direct mounting on the device, SMA (male) antenna connector with articulated joint. The antenna is suitable for installation in plastic control cabinets not visible from the outside.	PSI-GSM-STUB-ANT	2313342	1
GSM UMTS antenna, with omnidirectional characteristic, 2 meter antenna cable with SMA circular connector	PSI-GSM/UMTS-QB-ANT	2313371	1

Antenna cables	Type	Order No.	Pcs.
Mobile network antenna cable, 10 meters in length, SMA (male) -> SMA (female), 50 ohm impedance	PSI-CAB-GSM/UMTS-10M	2900981	1
Mobile network antenna cable, 5 meters in length, SMA (male) -> SMA (female), 50 ohm impedance	PSI-CAB-GSM/UMTS- 5M	2900980	1

USB cable and surge protection	Type	Order No.	Pcs.
USB connecting cable: USB connector type A to USB connector type Mini-B; length: 3 meters	CABLE-USB/MINI-USB-3,0M	2986135	1
Attachment plug with LAMBDA/4 technology as surge protection for coaxial signal interfaces. Connection: SMA male/female connectors	CSMA-LAMBDA/4-2.0-BS-SET	2800491	1

Power supply for DC devices	Type	Order No.	Pcs.
Primary-switched STEP POWER power supply for DIN rail mounting, input: 1-phase, output: 24 V DC / 0.5 A	STEP-PS/ 1AC/24DC/0.5	2868596	1

7.3 Comparison of product features

Supply voltage	X200	X200-4G	X300	X200 AC	X200-4G AC	X300 AC
Supply voltage 10 V ... 60 V DC	●	●	●			
Supply voltage 93 V ... 250 V AC				●	●	●

Inputs	X200	X200-4G	X300	X200 AC	X200-4G AC	X300 AC
Four digital inputs	●	●	●	●	●	●
Two scalable analog inputs, can be switched between current and voltage	●	●	●			
Interval-controlled data transmission via SMS, e-mail, app	●	●		●	●	
Event-controlled data transmission via SMS, e-mail, app	●	●		●	●	
Interval-controlled data transmission via ODP (GPRS)			●			●
Event-controlled data transmission via ODP (GPRS)			●			●

Outputs	X200	X200-4G	X300	X200 AC	X200-4G AC	X300 AC
Four relay outputs (N/O contact)	●	●	●	●	●	●
Set a switching output in the event of an incoming SMS (app)	●	●		●	●	
Switching via call	●	●		●	●	
Set a switching output in the event of an incoming ODP command			●			●
Set a switching output in the event of an incoming e-mail	Not possible for security reasons					

Outputs	X200	X200-4G	X300	X200 AC	X200-4G AC	X300 AC
Four relay outputs (N/O contact)	●	●	●	●	●	●
Set a switching output in the event of an incoming SMS (app)	●	●		●	●	
Switching via call	●	●		●	●	
Set a switching output in the event of an incoming ODP command			●			●
Set a switching output in the event of an incoming e-mail	Not possible for security reasons					

Communication channels	X200	X200-4G	X300	X200 AC	X200-4G AC	X300 AC
Sending and receiving SMS messages	●	●		●	●	
Sending e-mails via the Internet	●	●		●	●	
Bidirectional communication with an ODP control system (GPRS)			●			●

Security	X200	X200-4G	X300	X200 AC	X200-4G AC	X300 AC
Password protection (login on the device website)	●	●	●	●	●	●
Selection of authorized users (whitelist)	●	●	●	●	●	●
Configuration changes are logged in the log	●	●	●	●	●	●
Acknowledgement of receipt of incoming SMS messages	●	●		●	●	
Guest access and two user roles: User and Admin	●	●		●	●	
Guest access and administrator access			●			●
Data encryption in accordance with ODP specification			●			●

Alarms and messages	X200	X200-4G	X300	X200 AC	X200-4G AC	X300 AC
In the event of a power failure, via SMS	●	●	●	●	●	●
Event-controlled, in the event of rising and/or falling edge	●	●	●	●	●	●
Analog inputs: four switching thresholds for alarms (hysteresis), upper value range (fallen below or exceeded) and lower value range (fallen below or exceeded)	●	●	●			
In the event of a current input (configuration 4 mA ...20 mA), as soon as current < 4 mA and per message chain	●	●	●			
Send to individuals and groups of people (SMS and e-mail)	●	●		●	●	
Alarm to an ODP control system			●			●
In the event of an ODP error, per SMS			●			●

Data transmission	X200	X200-4G	X300	X200 AC	X200-4G AC	X300 AC
Cyclical, defined interval (minute to month), per SMS, e-mail, app	●	●		●	●	
Cyclical, defined interval (minute to month), per ODP			●			●

Address book	X200	X200-4G	X300	X200 AC	X200-4G AC	X300 AC
Address book with up to 100 contacts	●	●		●	●	
Change address book entries via SMS	●	●		●	●	
Change address book entries via e-mail			Not possible for security reasons			
ODP peer			●			●

Configuration	X200	X200-4G	X300	X200 AC	X200-4G AC	X300 AC
Integrated configuration software via web browser (USB interface)	●	●	●	●	●	●
Supported languages: English, German	●	●	●	●	●	●
Export or import of device configuration as file	●	●	●	●	●	●

Diagnostics	X200	X200-4G	X300	X200 AC	X200-4G AC	X300 AC
Integrated log	●	●	●	●	●	●
Mobile network diagnostics	●	●	●	●	●	●
Data volume counter (net data volume)	●	●	●	●	●	●
Charge request	●	●		●	●	
SMS counter	●	●		●	●	
Send log entries via e-mail	●	●		●	●	

Additional functions	X200	X200-4G	X300	X200 AC	X200-4G AC	X300 AC
Integrated clock, incl. 96 h buffer at 25°C, minimum 48 h	●	●	●	●	●	●
Change analog threshold values via SMS	●	●		●	●	
Restart via SMS	●	●		●	●	
Manual or automatic system time update via SMS	●	●		●	●	
Time stamp from the ODP control system			●			●
Switching calendar as backup for connection loss			●			●

7.4 Technical data

Supply	X200	X200-4G	X300	X200 AC	X200-4G AC	X300 AC
Supply voltage range	10 V DC ... 60 V DC			93 V AC ... 250 V AC (47.5 Hz ... 63 Hz)		
Nominal frequency	-			50 Hz/ 60 Hz	50 Hz	50 Hz/ 60 Hz
Typical current consumption	50 mA (24 V DC)	50 mA (24 V DC)	140 mA (24 V DC)	15 mA (230 V AC)	15 mA (230 V AC)	40 mA (230 V AC)
Maximum current consumption	80 mA	80 mA	180 mA	25 mA	90 mA	60 mA
Tightening torque	0.5 Nm ... 0.6 Nm (5-7 lbs-in, screw terminal blocks)					
Stripping length	7 mm					
Conductor cross section	$0.2 \text{ mm}^2 ... 2.5 \text{ mm}^2$ (24 AWG ... 14 AWG)					

USB 2.0	
Connection method	Mini-USB type B, 5-pos.
Transmission distance	≤ 3 meters (for configuration and diagnostics only)

Wireless interface	2G devices (X200, X200 AC, X300, X300 AC)	4G devices (X200-4G, X200-4G AC)
Interface description	GSM / GPRS	GSM / GPRS / EDGE / LTE (FDD)
Frequency	850 MHz (2 W (EGSM)) 900 MHz (2 W (EGSM)) 1800 MHz (1 W (EGSM)) 1900 MHz (1 W (EGSM))	850 MHz (2 W (EGSM)) 900 MHz (2 W (EGSM)) 1800 MHz (1 W (EGSM)) 1900 MHz (1 W (EGSM)) 800 MHz (LTE B20) 1800 MHz (LTE B3) 2600 MHz (LTE B7)
GPRS	Multislot Class 10	Multislot Class 33
EDGE	-	Multislot Class 33
LTE	-	CAT1

Digital input	X200	X200-4G	X300	X200 AC	X200-4G AC	X300 AC
Number of inputs	4					
Electric strength	Maximum supply voltage					
Switching threshold "0" signal	0% ... 30% of the applied supply voltage			-		
Switching threshold "1" signal	70% ... 100% of the applied supply voltage			-		
Switching level "0" signal	-			0 V AC ... 50 V AC		
Switching level "1" signal	-			90 V AC ... 250 V AC		
Input current at 250 V AC	-			3.5 mA, typical		

Analog input	X200	X200-4G	X300	X200 AC	X200-4G AC	X300 AC
Number of inputs		2			-	
Electric strength		Max. supply voltage			-	
Input signal voltage		0 V DC ... 60 V DC			-	
Input signal current		0 mA ... 20 mA			-	
		4 mA ... 20 mA (configurable)			-	
Resolution		15 bit			-	
Accuracy		±0.1%			-	
Error limit with interference		±0.2%			-	
Input impedance		600 kΩ (voltage inputs)			-	
		50 Ω (current inputs)			-	
Sample speed		<200 ms			-	
Tolerance through temperature response		< ±0.2%			-	

Relay output	X200	X200-4G	X300	X200 AC	X200-4G AC	X300 AC
Number of outputs			4			
Contact type			N/O contact			
Minimum switching voltage	5 V	100 mV	5 V		5 V	
Maximum switching voltage[1]		60 V DC / 30 V AC			125 V DC / 250 V AC	
Limiting continuous current		6 A			5 A	
Minimum switching current	10 mA	1 mA	10 mA		1 mA	
Switching capacity		100 W (Power Source PS2, P_{out} ≤100 W)			750 VA	
Electrical service life	5,000 switching cycles	30,000 switching cycles	5,000 switching cycles		150,000 switching cycles (5 A / 30 V DC) 150,000 switching cycles (3 A / 120 V AC) 30,000 switching cycles (5 A / 250 V AC)	
Insulation path between coil and contact		4000 V_{eff}			3000 V_{eff}	

[1]   For the load curves of the relay outputs, refer to .

General data	X200	X200-4G	X300	X200 AC	X200-4G AC	X300 AC
Degree of protection	IP20					
Dimensions (W/H/D)	72 mm x 90 mm x 62 mm (4TE in accordance with DIN 43880)					
Housing material	Polycarbonate					
MTTF (mean time to failure) SN 29500 standard, temperature 25°C, operating cycle 21% (5 days per week, 8 hours per day)	692 years	674 years	591 years	792 years	772 years	662 years
MTTF (mean time to failure) SN 29500 standard, temperature 40°C, operating cycle 34.25% (5 days per week, 12 hours per day)	338 years	324 years	302 years	378 years	363 years	333 years
MTTF (mean time to failure) SN 29500 standard, temperature 40°C, operating cycle 100% (7 days per week, 24 hours per day)	134 years	130 years	125 years	153 years	150 years	142 years
Electromagnetic compatibility	Conformance with EMC directive 2014/30/EU					

Permitted characters for configuration	
Device name	0-9 a-z A-Z !#%&'()*+,-./:;<=>?$_@"ÄÖÜäöü
SMS texts and commands to the device via SMS	0-9 a-z A-Z !#%&'()*+,-./:;<=>?$_@[]{|}~^"ÄÖÜäöü£¥èéùìòÇØøÅåÆæßÉ¤¡Ñ§¿ñà\
Input fields for access data	0-9 a-z A-Z !#%&'()*+,-./:;<=>?$_@[]{|}~^"
User password (User, Admin)	0-9 a-z A-Z !#%&'()*+,-./:;<=>?$_@[]{|}~
NetBIOS name	0-9 a-z A-Z _-
Service command for credit check	0-9 *#+

Ambient conditions	
Ambient temperature (operation)	-25°C ... 70°C (SMS mode only, for data connection see "Derating for data connection, maximum ambient temperature")
Ambient temperature (storage/transport)	-40°C … 85°C
Permissible humidity (operation)	0% ... 95%
Altitude	2000 m

Derating for data connection, maximum ambient temperature	X200	X200-4G	X300	X200 AC	X200-4G AC	X300 AC
Relay not used	60°C					
Maximum relay load current: 1 A	55°C			55°C	50°C	55°C
Maximum relay load current: 6 A	50°C			-	-	-
Maximum relay load current: 5 A	-			50°C	40°C	50°C

Approvals	X200	X200-4G	X300	X200 AC	X200-4G AC	X300 AC
Conformity	CE-compliant					
Corrosive gas test	ISA-S71.04-1985 G3 Harsh Group A					
ATEX Please follow the special installation instructions in the documentation.	Ⓔⓧ II 3 G Ex nA nC IIC T4 Gc X	No	Ⓔⓧ II 3 G Ex nA nC IIC T4 Gc X	Ⓔⓧ II 3 G Ex nA nC IIC T4 Gc X	No	Ⓔⓧ II 3 G Ex nA nC IIC T4 Gc X
FCC (see "FCC approval (2G devices)" on page 61)	Part 15.107(a), 15.109(a)	No	Part 15.107(a), 15.109(a)	Part 15.107(a), 15.109(a)	No	Part 15.107(a), 15.109(a)
Standards/regulations	EN 50360 EN 50121-4					

> **ⓘ** Compliance with standard EN 50121-4 is achieved under the following operating conditions.
>
> For installations within the 3-meter area and safety-related devices, there are additional requirements specified by EN 50121-4, Table 1, Note 1. This area is excluded from the manufacturer's declaration.
>
> Section 1, Paragraph 3 of EN 50121-4 applies. Use power supplies from the Phoenix Contact QUINT product range directly on the device.

7.5   Conformity

RED directive (2014/53/EU)	X200	X200-4G	X300	X200 AC	X200-4G AC	X300 AC
Safety – Protection of personnel with regard to electrical safety	IEC/EN 62368-1					
Health – Limitation of exposure of the population to electromagnetic fields	Official Journal of the European Union 1999/519/EC					
	Recommendation of the Council of the European Union from July 12, 1999					
Radio – Effective use of the frequency spectrum and avoidance of radio interference	DIN EN 301511					

Noise emissions in accordance with EN 61000-6-4	
Conducted noise emissions, radio noise emissions in accordance with EN 55011	Class B, industrial and residential applications

7.5.1 DC devices

Conformance with EMC directive 2014/30/EU		
Noise immunity in accordance with EN 61000-6-2		
Electrostatic discharge	EN 61000-4-2	
	Contact discharge	±6 kV
	Air discharge	±8 kV
	Indirect discharge	±6 kV
	Comment	Criterion B
Electromagnetic HF field	EN 61000-4-3	
	Frequency range	26 MHz ... 6 GHz
	Field strength	10 V/m
	Comment	Criterion A
Fast transients (burst)	EN 61000-4-4	
	Input	±2 kV (unshielded supply line)
	Signal	±2 kV (shielded signal line)
		±2 kV (analog I/O cables, unshielded)
	Comment	Criterion B
Surge current loads (surge)	EN 61000-4-5	
	Input	±0.5 kV (symmetrical unshielded supply line) ±0.5 kV (asymmetrical unshielded supply line)
	Signal	±1 kV (data cable, asymmetrical)
	Comment	Criterion B
Conducted interference	EN 61000-4-6	
	Frequency range	0.15 MHz ... 80 MHz
	Voltage	10 V
	Comment	Criterion A

Criterion A	Normal operating behavior within the specified limits
Criterion B	Temporary impairment of operating behavior that is corrected by the device itself.

7.5.2 AC devices

Conformance with EMC directive 2014/30/EU		
Noise immunity in accordance with EN 61000-6-2		
Electrostatic discharge	EN 61000-4-2	
	Contact discharge	±6 kV
	Air discharge	±8 kV
	Indirect discharge	±6 kV
	Comment	Criterion B
Electromagnetic HF field	EN 61000-4-3	
	Frequency range	26 MHz ... 6 GHz
	Field strength	10 V/m
	Comment	Criterion A
Fast transients (burst)	EN 61000-4-4	
	Input	±2 kV (unshielded supply line)
	Signal	±2 kV (shielded signal line)
	Comment	Criterion B
Surge current loads (surge)	EN 61000-4-5	
	Input	±1 kV (symmetrical unshielded supply line) ±2 kV (asymmetrical unshielded supply line)
	Signal	±1 kV (data cable, asymmetrical)
	Comment	Criterion B
Conducted interference	EN 61000-4-6	
	Frequency range	0.15 MHz ... 80 MHz
	Voltage	10 V
	Comment	Criterion A
Voltage dips	EN 61000-4-11	
	Test level	30%, number of periods 0.5
	Test level	60%, number of periods 5
	Comment	Criterion B

Criterion A	Normal operating behavior within the specified limits
Criterion B	Temporary impairment of operating behavior that is corrected by the device itself.

7.6 Load curves of the relay outputs

7.6.1 DC devices
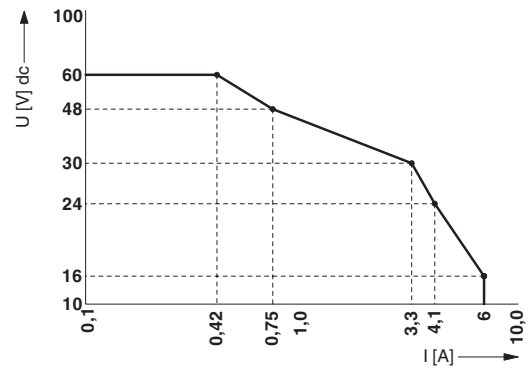
Figure 7-1   Load curve of the DC devices: DC switching voltage
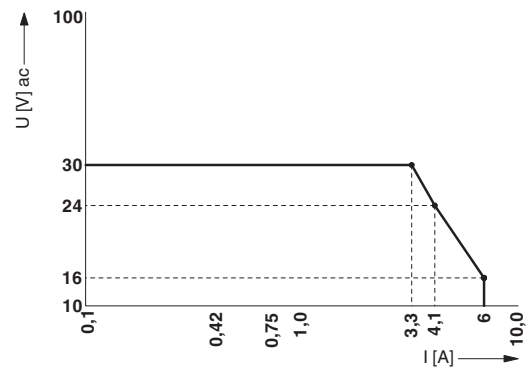
Figure 7-2   Load curve of the DC devices: AC switching voltage

7.6.2 AC devices

❶ AC
❷ DC
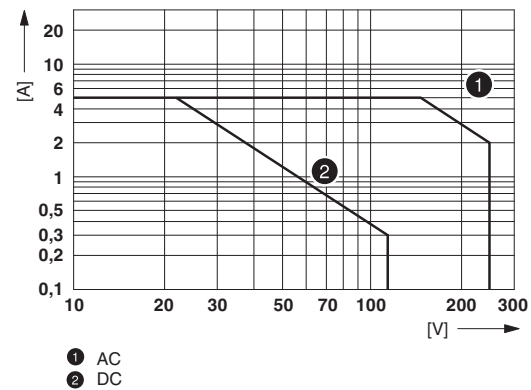
Figure 7-3   Load curve of the AC devices

A FCC approval (2G devices)

Declaration of Conformity

FC

Responsible Party Name: Phoenix Contact
Address: 586 Fulling Mill Road
                            Middletown, Pa 17057

Representative Person's Name:

David E. Landis
Standards Technician
Americas Business Unit
Phone: (717) 944-1300 Ext. 3619
Fax: (717)-948-3468
E-mail: dlandis@phoenixcon.com

Product Name: TC MOBILE I/O X200
Ord-No.: 2903805

Product Name: TC MOBILE I/O X200 AC
Ord-No.: 2903806

Product Name: TC MOBILE I/O X300
Ord-No.: 2903807

Product Name: TC MOBILE I/O X300 AC
Ord-No.: 2903808

The above listed products conform to the following specifications:
FCC Part 15, Subpart B, Section 15.107(a) and Section 15.109(a), Class B Digital Device

Supplementary Information:
This equipment has been tested and found to comply with the limits for a Class B digital
device, pursuant to part 15 of the FCC Rules. These limits are designed to provide
reasonable protection against harmful interference in a residential installation. This
equipment generates, uses, and can radiate radio frequency energy and, if not installed and
used in accordance with the instructions, may cause harmful interference to radio
communications. However, there is no guarantee that interference will not occur in a
particular installation. If this equipment does cause harmful interference to radio or television
reception, which can be determined by turning the equipment off and on, the user is
encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is
connected.

—Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This device contains:
FCC ID: QIPBGS2
IC: 7830A-BGS2

Grant of Equipment Authorization (QIPBGS2):

This device contains GSM functions that are not operational in the U.S. Territories. This filing is only applicable for U.S. operations.
This device is to be used in mobile or fixed applications only. Antenna gain including cable loss must not exceed 7.24 dBi in the 850 MHz Cellular band and 3.3 dBi in the PCS 1900 MHz band, for the purpose of satisfying the requirements of 2.1043 und 2.1091, 22-H, 24-E.

The antenna(s) used this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operated in conjunction with any antenna or transmitter not described under this FCC ID. The final product operating with this transmitter must include operating instructions and antenna installation instructions, for end-users and installers to satisfy RF exposure compliance requirements. This device is approved for use in specific co-located configurations in generic host platforms as described in this filing.
Compliance of this device in all final product configurations is the responsibility of the Guarantee. Installation of this device into specific final products may require the submission of a Class II permissive change application containing data pertinent to RF Exposure, spurious emissions, ERP/EIRP, and host/module authentication, or new application if appropriate.

FCC RF radiation Exposure Statement

This equipment complies with FCC RF exposure limits set forth for an uncontrolled environment. The antenna(s) used for this transmitter must be installed and operated with a minimum separation distance of 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter expect in accordance with the FCC multi-transmitter policy.

IC Statement:

CAN ICES-3 (B) / NMB-3 (B)

Antenna accessories

PSI-GSM-STUB-ANT 2313342
PSI-GSM-ANT-OMNI-2-5 2900982 2dBi gain
PSI-GSM/UMTS-QB-ANT 2313371

B Appendixes

B 1 List of figures

B 2   Index

Please observe the following notes

General terms and conditions of use for technical documentation

Phoenix Contact reserves the right to alter, correct, and/or improve the technical documentation and the products described in the technical documentation at its own discretion and without giving prior notice, insofar as this is reasonable for the user. The same applies to any technical changes that serve the purpose of technical progress.

The receipt of technical documentation (in particular user documentation) does not constitute any further duty on the part of Phoenix Contact to furnish information on modifications to products and/or technical documentation. You are responsible to verify the suitability and intended use of the products in your specific application, in particular with regard to observing the applicable standards and regulations. All information made available in the technical data is supplied without any accompanying guarantee, whether expressly mentioned, implied or tacitly assumed.

In general, the provisions of the current standard Terms and Conditions of Phoenix Contact apply exclusively, in particular as concerns any warranty liability.

This manual, including all illustrations contained herein, is copyright protected. Any changes to the contents or the publication of extracts of this document is prohibited.

Phoenix Contact reserves the right to register its own intellectual property rights for the product identifications of Phoenix Contact products that are used here. Registration of such intellectual property rights by third parties is prohibited.

Other product identifications may be afforded legal protection, even where they may not be indicated as such.

How to contact us

Internet

Up-to-date information on Phoenix Contact products and our Terms and Conditions can be found on the Internet at:
phoenixcontact.com

Make sure you always use the latest documentation.
It can be downloaded at:
phoenixcontact.net/products

Subsidiaries

If there are any problems that cannot be solved using the documentation, please contact your Phoenix Contact subsidiary.
Subsidiary contact information is available at phoenixcontact.com.

Published by

PHOENIX CONTACT GmbH & Co. KG
Flachsmarktstraße 8
32825 Blomberg
GERMANY

PHOENIX CONTACT Development and Manufacturing, Inc.
586 Fulling Mill Road
Middletown, PA 17057
USA

Should you have any suggestions or recommendations for improvement of the contents and layout of our manuals, please send your comments to:
tecdoc@phoenixcontact.com