# COMTRAXX® CP9xx – Control Panel

Remote alarm indicator and operator panel
for medical locations and other areas
Software version V4.6.x

# Table of contents

# 1 General instructions

## 1.1 How to use the manual

**ADVICE**
This manual is intended for qualified personnel working in electrical engineering and electronics! Part of the device documentation in addition to this manual is the enclosed supplement 'Safety instructions for Bender products'.

**ADVICE**
Read the operating manual before mounting, connecting and commissioning the device. Keep the manual within easy reach for future reference.

## 1.2 Indication of important instructions and information

**DANGER**
Indicates a high risk of danger that will result in death or serious injury if not avoided.

**WARNING**
Indicates a medium risk of danger that can lead to death or serious injury if not avoided.

**CAUTION**
Indicates a low-level risk that can result in minor or moderate injury or damage to property if not avoided.

i   *Information can help to optimise the use of the product.*

## 1.3 Signs and symbols

| | | |
|---|---|---|
| Disposal | Protect from moisture | Protect from dust |
| Temperature range | Recycling | RoHS directives |
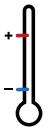
## 1.4 Service and Support

Information and contact details about customer service, repair service or field service for Bender devices are available on the following webside: Fast assistance | Bender GmbH & Co. KG.

## 1.5 Training courses and seminars

Regular face-to-face or online seminars for customers and other interested parties:

www.bender.de > know-how > seminars.

## 1.6    Delivery conditions

The conditions of sale and delivery set out by Bender GmbH & Co. KG apply. These can be obtained in printed or electronic format.

The following applies to software products:

**ZVEI:**
Die Elektroindustrie

'Software clause in respect of the licensing of standard software as part of deliveries, modifications and changes to general delivery conditions for products and services in the electrical industry'

## 1.7    Inspection, transport and storage

Check the shipping and device packaging for transport damage and scope of delivery. In the event of complaints, the company must be notified immediately, see 'Technical support: Service and support'.

The following must be observed when storing the devices:

## 1.8    Warranty and liability

Warranty and liability claims for personal injury and property damage are excluded in the case of:

• Improper use of the device.
• Incorrect mounting, commissioning, operation and maintenance of the device.
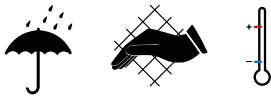• Failure to observe the instructions in this operating manual regarding transport, commissioning, operation and maintenance of the device.
• Unauthorised changes to the device made by parties other than the manufacturer.
• Non-observance of technical data.
• Repairs carried out incorrectly.
• The use of accessories or spare parts that are not provided, approved or recommended by the manufacturer.
• Catastrophes caused by external influences and force majeure.
• Mounting and installation with device combinations not approved or recommended by the manufacturer.

This operating manual and the enclosed safety instructions must be observed by all persons working with the device. Furthermore, the rules and regulations that apply for accident prevention at the place of use must be observed.

## 1.9    Disposal of Bender devices

Abide by the national regulations and laws governing the disposal of this device.

For more information on the disposal of Bender devices, refer to

www.bender.de > service & support.

## 1.10 Safety

If the device is used outside the Federal Republic of Germany, the applicable local standards and regulations must be complied with. In Europe, the European standard EN 50110 applies.

⚠️ **DANGER**    ***Risk of fatal injury due to electric shock!***
*Touching live parts of the system carries the risk of:*

- Risk of electrocution due to electric shock
- Damage to the electrical installation
- Destruction of the device

Before installing the device and before working on its connections, make sure that the installation has been de-energised. The rules for working on electrical systems must be observed.

## 2    Intended use

Remote alarm indicator and operator panels CP9xx display alarms, measured values and states of devices. These include, for example:

• All Bender devices with BMS bus or BCOM interface
• Bender devices (PEM, energy meters,…) with Modbus RTU or Modbus TCP interface
• Other devices with Modbus RTU or Modbus TCP interface

In addition, the data is available via the Modbus TCP protocol. This allows coupling to a higher-level building control system as well as visualisation and evaluation using standard web browsers.

Operation and settings are made via the COMTRAXX® user interface integrated in the device.

Any other use than that described in this manual is regarded as improper.

# 3 Product description

This manual describes

- The COMTRAXX® **CP907**-Control Panel
- The COMTRAXX® **CP915**-Control Panel
- The COMTRAXX® **CP924**-Control Panel

    Alarm indicator and operator panels play a decisive role at the interfaces between man and machine. Their task is to alert visually and acoustically and to convert information from the system into comprehensible operating and action instructions. This applies in particular when critical operational situations are developing. The CP9xx-Control Panel offers the user a solution that meets the requirements of modern medical locations as well as industrial and purpose-built buildings.

## 3.1 Scope of delivery

Included within the scope of delivery

- A CP9xx alarm indicator and operator panel
- A printed quick-start guide
- Safety instructions for Bender products
- The manuals 'COMTRAXX® CP9xx' and 'BCOM' are available as PDF files for download at https://www.bender.de/en/service-support/download-area/

For CP915 and CP924 additionally

- Connecting cable
- Ethernet-Keystone coupler
- USB cable
- RJ45 flat patch cable

## 3.2 Device features

- Display sizes 7', 15' and 24' with tempered and anti-reflective glass
- Easy to clean and disinfect, degree of protection IP54
- Screwless mounted front plate
- User-friendly touch-sensitive monitoring system for medical locations and other applications
- Particularly simple operation
- Additional information for medical and technical personnel
- Visual and acoustic notification in the event of an alarm
- Clear menu structure with intuitive interactive images
- Clearly labelled safety functions
- Silent due to operation without fan
- High-quality display with excellent contrast, high resolution and wide viewing angle
- Possibility of graphical integration of building plans or status displays in photo quality
- Easy integration of external equipment like charging stations for operating theatre table controls and intercom systems with front foil
- Simple conversion and expansion with minimal service interruptions

## 3.3    Possible applications

Monitoring, operation and display of
- Medical IT systems
- Supply systems for medical gases
- HVAC systems
- Room lighting
- Operating theatre lights
- Special power supply systems (BSV or UPS)
- Other systems from different manufacturers

## 3.4    Configuration, diagnosis, service

Each panel can be individually manufactured and tailored to the requirements of the user. The integration of the technical equipment into a single panel creates a technical monitoring centre. It provides diagnostic options through an overall system overview from a central location via a web browser, supported by data loggers and history memory.

Optional parameter setting (setting limit values, entering individual customer texts, editing the system configuration, etc.) is available.

## 3.5    Optional accessories

- The remote I/O system offers numerous options for integrating digital and analogue I/Os with different operating voltages, capacities, measurement signals or special functions into the alarm indicator and operator panel.
- Communication with building management systems via common interfaces such as Modbus TCP, Modbus RTU, PROFIBUS, KNX, LonWorks, Sercos interface, InterBus, Dali, CANopen, EtherNet/IP, CC-Link, DeviceNet, BACnet, PROFINET.

The result is an all-round system that is both modular and flexible and can thus be adapted, expanded or connected to new technologies.

Other project-specific versions with foil front or with additional internal components available on request:
- Charging trays for operating theatre table remote controls
- Intercom systems
- Operating theatre light controls
- Programmable backlit keypads
- Digital/Analogue inputs/outputs for installation in panel enclosures or control cabinets
- Data coupling to third-party systems
- Project-specific installation enclosures
- Integration of third-party equipment
- Antibacterial or highly transparent foil options available
- Replacement of existing panels (retrofitting)

## 3.6    Software products used

CP9xx devices are equipped with the COMTRAXX® user interface. It is described in the manual D00418.

## 3.7 Applications

- Optimal visualisation on the display tailored to the user
- Integration of all compatible Bender products (ISOMETER®, ATICS®, RCMS, EDS, Linetraxx® and MEDICS® systems, universal measuring devices and energy meters)
- Individual instructions in case of alarms
- Selective notification to various users in case of alarms
- Control and regulation of systems such as air conditioning or blinds control.

## 3.8 Functional description

### 3.8.1 Interfaces

CP9xx communicate with the devices and systems assigned via various interfaces:

- Internal BMS bus (RS-485) for Bender systems such as EDS46…/49…, RCMS46…/49… and MEDICS®. CP9xx can be operated as a master or as a slave. When operated as a master, requests are answered more quickly. The devices can only be operated on the internal BMS bus.
- BCOM (Ethernet) for new and future Bender systems, such as ISOMETER® iso685-D.
- Modbus RTU (RS-485) CP9xx when operated as a master for Bender devices PEM… with restricted functionality (full functionality of PEM…**5** only via Modbus TCP).
- Modbus RTU (RS-485)
  COM465…P when operated as a master for Bender devices PEM… with restricted functionality (full functionality of PEM…**5** only via Modbus TCP).
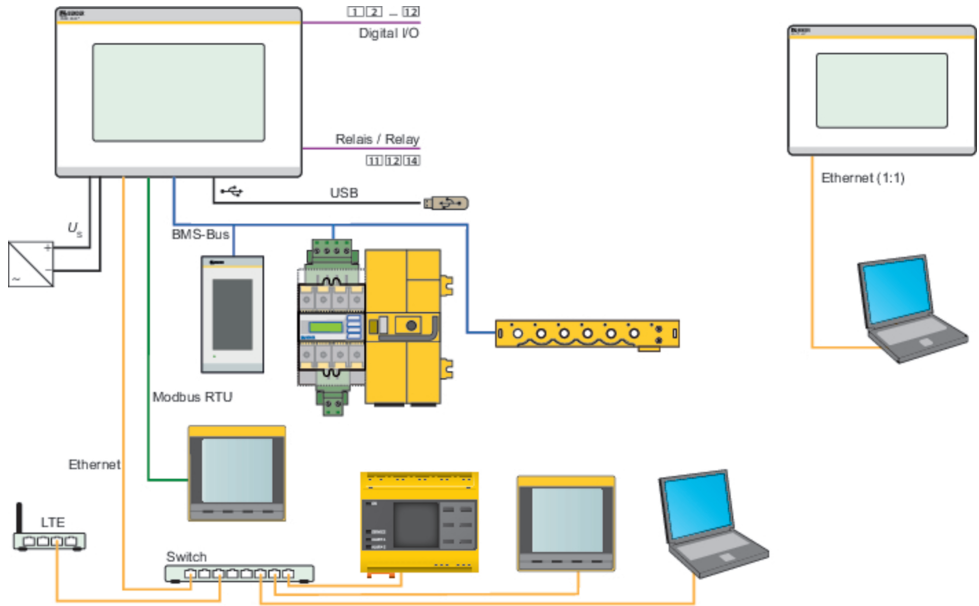- Modbus TCP (Ethernet) for Bender devices PEM…**5**

**⚡ BENDER**



Image 3-1: System overview interfaces CPxx

### 3.8.2 Process image

The CP9xx alarm indicator and operator panel combines the information from the different interfaces and makes it available for operation and visualisation via the web user interface of a PC.

It acts as a central user interface. In order to be able to identify them, one individual address is available for each device on this interface. BMS, BCOM and Modbus RTU devices receive the appropriate address for their interface. A virtual address is assigned to Modbus TCP devices.

### 3.8.3 Control of operating theatre lights

Operating theatre lights from different manufacturers can be controlled via the CP9xx. Most operating theatre lights feature a USB or RS-232 interface. The CP9xx can be connected via this interface. RS-232 interfaces require a converter from RS-232 to USB. The control (and the communication protocol) was tested and verified together with the operating theatre light manufacturers.

The functionality and design of the CP9xx controls are adapted to that of the operating theatre lights. The operating theatre light functions can be parameterised for specific projects in the CP9xx interface. In general, only the functions provided by the communication boxes of the respective manufacturers can be used.

The installation instructions of the communication boxes can be found in the documentation provided by the manufacturer. The manufacturer is also responsible for service. An overview of the supported operating theatre lights can be found in the document D00349_**N**_DEEN.

*Only **qualified personnel** are permitted to carry out the work necessary to install, commission and run a device or system.*

**CAUTION**
**Functional earth**
*The device must be earthed. Without connection of the functional earth, the device function is not guaranteed.*

**Electrostatic sensitive components**
*Observe the precautions for handling electrostatic sensitive devices.*

**Damage to components**
*Do not remove the device from the enclosure while it is in operation. Disconnect the device from the supply voltage and from the network (Ethernet) beforehand.*

**Damage to the device due to incorrect connector plug**
*Connector plugs of other devices may have different polarity. Make sure to use the supplied connector plug.*

**Protective separation**
*The power supply must be properly separated from hazardous voltages and meet the limit values of UL/CSA 61010-1, clause 6.3.*

The CP9xx touch panel can be integrated into existing LAN structures or operated via a single PC.

*If you are familiar with the configuration of computer networks, you can carry out the connection of the CP9xx alarm indicator and operator panel yourself. Otherwise please contact your IT administrator!*

## 4.1    Mounting

The COMTRAXX® CP9xx devices are installed
- either in the supplied and professionally pre-assembled flush-mounting enclosures
- or in an optionally available surface-mounting enclosure (CP907 only)
  Special variants with modified enclosure depths or surface-mounted variants are available on request.

**Dimension diagram**
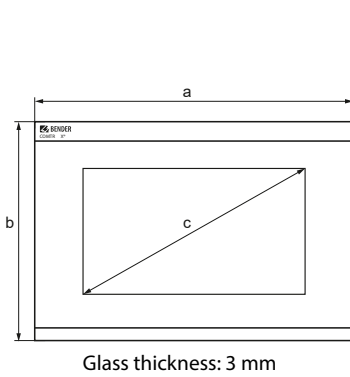
**Device dimensions**

| Type | Dimensions (mm) ±1 | | |
|---|---|---|---|
| | a | b | c |
| **CP907** | 226 | 144 | 176 (7') |
| **CP915** | 505 | 350 | 386 (15,6') |
| **CP924** | 654 | 441 | 610 (24') |

**Installation dimensions enclosure**

| Type | Enclosure | Dimensions (mm) | | Required installation depth |
|---|---|---|---|---|
| | | a | b | |
| **CP907** | Flush-mounting | 212 | 124 | 75 |
| | Surface-mounting | 299 | 173 | --- |
| **CP915** | Flush-mounting | 464 | 309 | 92 |
| **CP924** | Flush-mounting | 613 | 401 | 95 |

Glass thickness: 3 mm

**Mounting CP907**

**Flush-mounting enclosure CP907**

**i** *Mounting of flush-mounting enclosures*

The supplied flush-mounting enclosures are only suitable for mounting in cavity walls. In drywall and stud frame constructions, the enclosures must be screwed at right angles to battens or to the stud frame structure. The enclosure must not warp during mounting. The wall surface must be even.
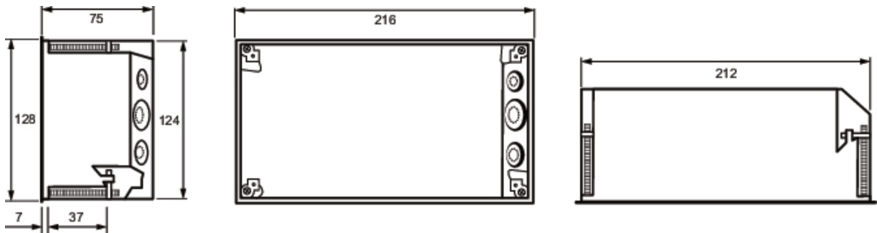
Flush-mounting enclosure CP907, dimensions in mm

**i** *Tightening torque*

The tightening torque for the mounting screws may be in a range between 0.8 …1 Nm.

**Surface-mounting enclosure CP907**

For surface mounting, the flush-mounting enclosure is mounted in the optionally available surface-mounting enclosure (B95061915).



*Enclosure for surface mounting CP907, dimensions in mm*

Mounting procedure:
1.  Assemble surface-mounting enclosure (fit hinges and bracket).

2.  Insert the flush-mounting enclosure through the opening in the cover. Mount the enclosed plastic frame from behind and screw it in place using the fasteners of the flush-mounting enclosure.

3.  Make the required cable openings in both enclosures.

4.  Connect the CP907 and mount it in the enclosure.

**Mounting CP915/CP924**

**Flush-mounting enclosure CP915/CP924**

i   ***Mounting of flush-mounting enclosures***

*The supplied flush-mounting enclosures are only suitable for mounting in cavity walls. In drywall and stud frame constructions, the enclosures must be screwed at right angles to battens or to the stud frame structure. The enclosure must not warp during mounting. The wall surface must be even.*
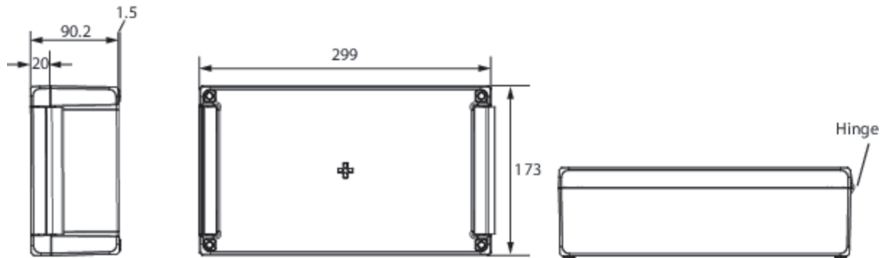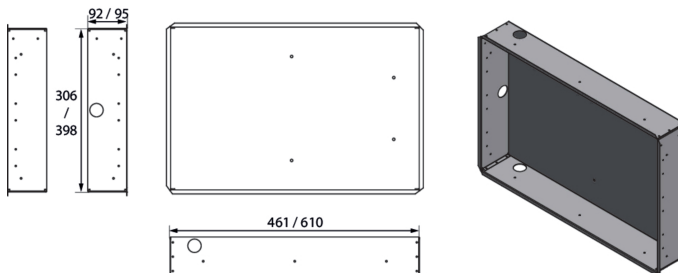


*Flush-mounting enclosure CP915/CP924, dimensions in mm*

![BENDER logo]

**Removing the CP915/CP924 front plate**

The front plate is removed from the enclosures of the CP915 and CP924 devices using a suction lifter. For this purpose, the suction lifter must be placed on the points marked below one after the other and the front plate must be removed until it clicks into place for the first time. If the front plate is detached on both sides, the plate can be lifted off the enclosure.

⚠ **CAUTION**   *Damage to the display front*
*Placing the suction lifter in the middle and pulling only at this point may damage the front plate. Always place the suction lifter on the edges of the display.*



**Connection of the CP9xx device**

The CP9xx is integrated into existing LAN structures, but can also be operated via a single PC.

ℹ **Configuration of computer networks**

*If you are familiar with the configuration of computer networks, you can carry out the connection of the device yourself. **Otherwise please contact your IT administrator!***

ℹ **Ethernet**

*The shield of the Ethernet cable must be connected to PE on both sides.*

ℹ **For UL applications** *(CP907 only)*

*Use copper lines only. Minimum temperature range of the wires to be connected to the plug-in terminals: 75 °C.*

ℹ **PoE** *(CP907 only)*

*Minimum temperature range of the cables (copper lines) to be connected to the PoE Ethernet connection: 80 °C*

*For operation via PoE, the voltage transmitter (router) must meet one of the following requirements:*
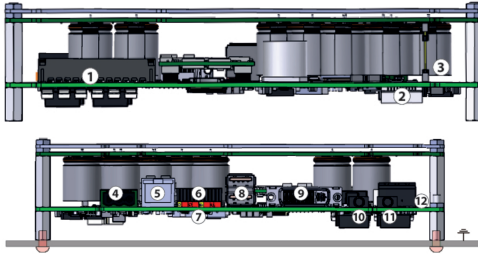*- Class 2 requirement acc. to UL1310 or*
*- Limited power source requirement acc. to UL 60950 or*
*- Limited energy circuit requirement acc. to UL 61010.*

*In case of a pure PoE supply, no supply of the I²C expansion modules is possible. Maximum cable length I²C < 3 m*

Remove the CP9xx from the built-in flush-mounting enclosure.

Mainboard and connections of the CP9xx device



| No. | Connection | CP907 | CP915/CP924 |
|-----|------------|-------|-------------|
| 1 | Plug connector digital inputs | | |
| 2 | I²C interface | | |
| 3 | Plug connector to energy storage board | | |
| 4 | Voltage supply A1/+, A2/–, PE | | |
| 5 | Ethernet (RJ45/CAT5); HTTP, Modbus TCP, BCOM | with PoE | without PoE |
| 6 | X1 plug connector for Modbus RTU, BMS bus | | |
| 7 | Termination of Modbus RTU and BMS bus | | |
| 8 | USB ports (for touch sensor) | not included | |
| 9 | DVI output | not included | |
| 10 | Audio output | not included | |
| 11 | Audio input | not included | |
| 12 | Connection to control relay | | |

Connect the device as follows:

1. Modbus RTU connection (**6**): Connect terminals **A**MB and **B**MB to the Modbus RTU (A to A, B to B).

2. BMS bus connection (**6**): Connect terminals **A**BMS and **B**BMS to the BMS bus (A to A, B to B)
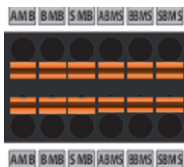


X1 plug assignment (**6**)

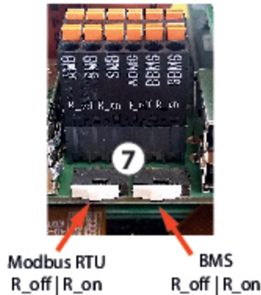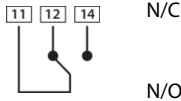3. If the CP9xx is located at the beginning or end of the respective bus (Modbus RTU and BMS), the respective terminating switch of the device (**7**) must be switched to 'ON'.



Modbus RTU          BMS
R_off | R_on       R_off | R_on

4. Establish connection with PC and BCOM: Connect the CP9xx device to the PC network using an Ethernet cable (**5**).

5. Link digital inputs.
   See chapter Digital inputs.

6. Connect the control relay (**12**):

   Connection relay



| | | **N/C** operation contacts **11-12** (the alarm relay is energised during normal operation). |
| N/C | | |

**N/O** operation contacts **11-14**
N/O (the alarm relay is de-energised during normal operation).

7. Connect the power supply.

   ⚠ **CAUTION**
   **Functional earth**
   The device must be earthed. Without connection of the functional earth, the device function is not guaranteed.

   **Electrostatic sensitive components**
   Observe the precautions for handling electrostatic sensitive devices.

   **Damage to components**
   Do not remove the device from the enclosure while it is in operation. Disconnect the device from the supply voltage and from the network (Ethernet) beforehand.

   **Damage to the device due to incorrect connector plug**
   Connector plugs of other devices may have different polarity. Make sure to use the supplied connector plug.

   **Protective separation**
   The power supply must be properly separated from hazardous voltages and meet the limit values of UL/CSA 61010-1, clause 6.3.

Connect terminals A1/+ and A2/- (**4**) to the power source. Connect PE to earth. The CP907-I can also be supplied via Power-over-Ethernet (PoE). **The PoE switch must be earthed**. For further details, see technical data.

8.  Attach the front plate to the built-in flush-mounting enclosure.

**CP907 is mounted. The following steps apply to CP915 or CP924 only:**

9.  Connect the front panel to the control board and the power supply:
    Connect a USB socket (**8**) to the touch sensor connector on the front panel. Associated connection cable included in the scope of delivery.
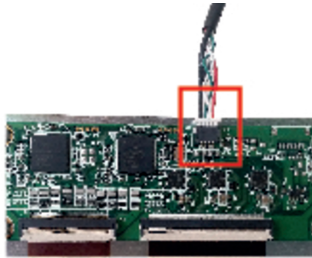


10. Connect the screen output DVI (**9**) to the front plate. DVI cable: Cable length < 3 m, connect firmly to PE on both sides.
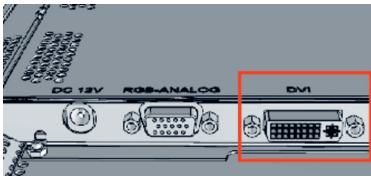


11. When using the audio output (**10**), an electrically isolated amplifier must be used.

12. Connect the voltage supply to the power supply unit via the pre-assembled wiring. Connect the earthing to the front plate.
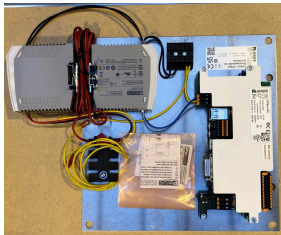


Pre-assembled voltage supply
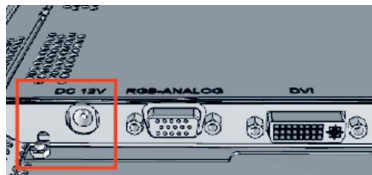


Connection earthing on front plate

i *The dual power supply unit supplies the CP915 or CP924 with 24 V and the display with 12 V.*

13. **CP915:** Attach the front plate to the built-in flush-mounting enclosure.
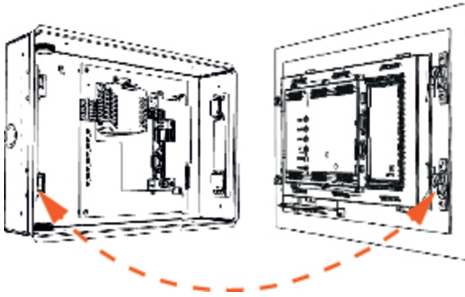


14. **CP924:** Hold the display unit from above in front of the flush-mounting enclosure. Place the two mounting hooks behind the upper snap locks of the flush-mounting enclosure (see red markings). Lower the display and slide it into the flush-mounting enclosure.
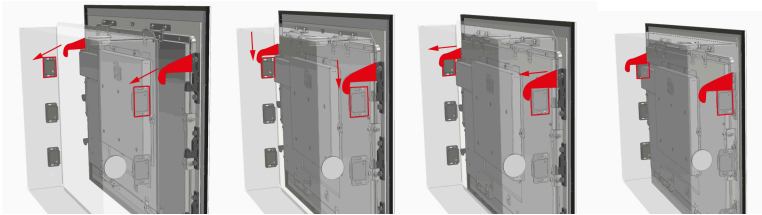


15. When pushing in the display, the spring force of the snap locks must be overcome. Make sure that no wiring gets jammed in the process.

16. When removing the display unit, it is important that you only place the suction lifter in the side area of the display and carefully remove the display unit from the snap locks.

## 4.2 Digital inputs

CP9xx-devices feature 12 configurable digital inputs. Settings are made via the COMTRAXX® user interface in a browser.
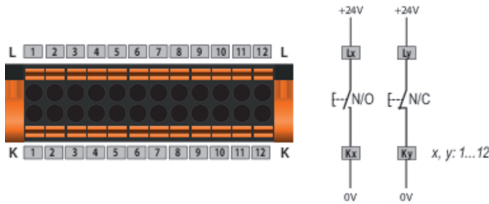


**Function**

The following functions can be assigned to the digital inputs:

off         Digital input without function
TEST       Self test of the device
RESET     Reset fault and alarm messages

**Menu > Settings > Digital input 1 - 12**

For each of the 12 digital inputs DI1...12, the following can be defined:

| Parameter | Options/Setting range | |
|---|---|---|
| Mode | High-active<br>Low-active<br>Impuls (High-active)<br>Impuls (Low-active) | |
| Measurement type | Operating message<br>Alarm<br>Error(s) | |
| $t_{on}$ | Response delay | 0 s…10 minutes |
| $t_{off}$ | Switch-off delay | |

An event is executed when the digital input experiences an edge change. The edge change must be present at least for the set response delay $t_{on}$, otherwise it is ignored.

High-active          Low-active
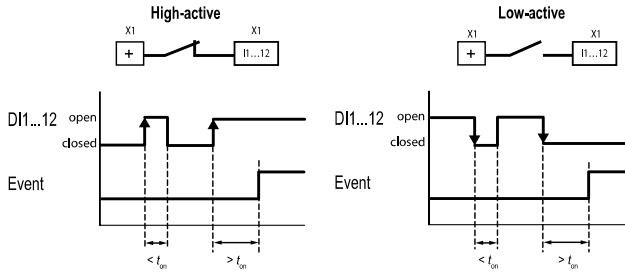
## 4.3 Relay

Connection relay



N/C

N/O
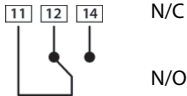
**N/C** operation contacts **11-12**
(the alarm relay is energised during normal operation).

**N/O** operation contacts **11-14**
(the alarm relay is de-energised during normal operation).

**Commissioning of the CP9xx device**

1.  Switch on the supply voltage:
    After switching on, the device performs a start routine. It is completed when the commissioning page appears on the display.
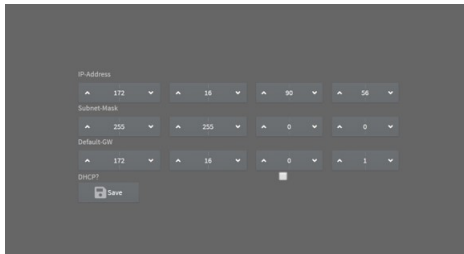


2.  Enter the desired IP address in the 1st line

3.  Enter the subnet mask in the 2nd line

4.  Enter the address of the default gateway.

5.  Press the 'Save' button to store the entries.

6.  Wait 8…10 seconds. The COMTRAXX® system overview starts.

7. If there is a DHCP server in the network, select only the check box to the right of the 'DHCP?' label in line 4. Confirm your selection by pressing the 'Save' button. The network settings transmitted from the server are shown on the display after 8…10 seconds.

> **i** *After this, the commissioning must be continued via the COMTRAXX® user interface.*

**Factory settings communication addresses**

| Parameter | Factory setting |
|---|---|
| IP address | - |
| IP address for 1:1 ETH conn. | 169.254.0.1 |
| Net mask | 255.255.0.0 |
| Standard gateway | 192.168.0.1 |
| DNS | - |
| DHCP | aus |
| $t_{off}$ Timeout for address assignment | 30 s |
| BMS address | 1 |
| BMS protocol | BMS i |
| BCOM system name | SYSTEM |
| Subsystem address | 1 |
| BCOM device address | 1 |

The settings can be changed during commissioning via the display or the web user interface.

- From an external application (e.g. visualisation software), commands can be sent to BMS devices. The 'Modbus control commands' menu provides Modbus control commands for selected BMS commands. These commands can be copied to the clipboard of the PC and then included in the programming of the external application.
- Graphical display with scaling of the time axis for the data loggers of the gateway and compatible Bender devices.

**BMS interface**

The majority of Bender devices communicate via the internal BMS bus. CP9xx can be operated as a master or as a slave.

> **i** ***CP9xx is to be operated as a master*** *if:*
> - *Parameters are queried or changed*
> - *Certain control commands are issued*
>
> *Note that not all BMS masters can surrender their master function!*

### 4.4.1 Address configuration and termination

To ensure proper functioning of the CP9xx, correct address assignment and termination is of utmost importance.

**i** ***Multiple assignment of addresses***
*The factory setting for the system name on all Bender BCOM devices is 'SYSTEM'. If several systems with the same system name are integrated into the same network, addresses are assigned twice. This leads to transmission errors. Always enter a unique BCOM system name during initial configuration.*

### 4.4.2 Browser configuration

The latest version of Google Chrome, Microsoft Edge or Mozilla Firefox is recommended.

### 4.4.3 Software products used

Select 🔧 **Tools > Information > Copyright**, to display the used software products.

## COMTRAXX® user interface

The device has a web user interface for setting and operation. How to start the web user interface:

- Open an Internet browser from any network device.
- Enter the address of the CP9xx device in the address line of the browser.

It is possible to connect the CP9xx directly to a computer/laptop. In this case, the CP9xx can be addressed via a second fixed IP address.

- Open the browser on the connected device.
- Enter the following IP address: 169.254.0.1

The start screen of the COMTRAXX® user interface appears in the browser window.
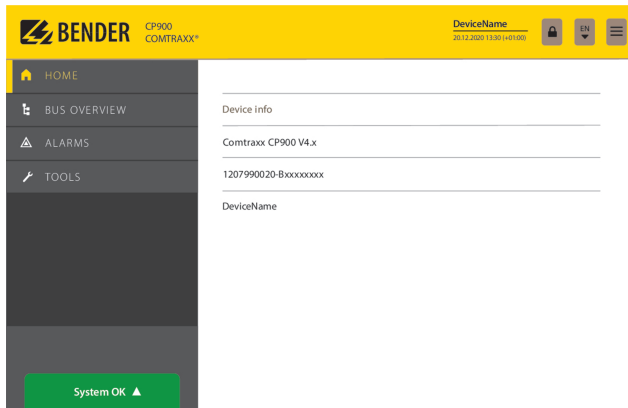


Start screen of the COMTRAXX® user interface

| | |
|---|---|
| 🔒 | Login to the device |
| ⌄ EN | Language selection |
| ☰ | Show/Hide Menu |
| System OK ▲ | System is without faults |
| Alarms 2 ▲ | Alarms (number of alarms) |

ℹ️ **COMTRAXX® documentation**
*Further information on functionality and configuration of the CP9xx is described in the manual D00418.*

**Factory settings of the communication addresses**

| Parameter | Factory setting |
|---|---|
| IP address | |
| IP address for 1:1 ETH connection | 169.254.0.1 |
| Net mask | 255.255.0.0 |
| Standard gateway | 192.168.0.1 |
| DNS | - |
| DHCP | aus |
| Timeout for DHCP address assignment | 30 s |
| BMS address | 1 |
| BMS protocol | BMS i |
| BCOM system name | SYSTEM |
| Subsystem address | 1 |
| BCOM device address | 1 |

The settings can be changed on the display or via the web user interface during commissioning.

# 4 PROFINET

PROFINET is supported from COMTRAXX® version V4.6.0 and higher.

All measured values and alarm states in the system are made available via PROFINET. These can then be recorded and processed in a PLC or visualisation system. The integration into the respective PLC or visualisation system is done via the provided GSDML file.

In the COMTRAXX® device, only a device assignment is required to allocate the required data to the available PROFINET slots. The COMTRAXX® device is integrated into the PROFINET system as an IO device.

## 4.1 Configuration of the PROFINET interface

The PROFINET interface is configured in the menu of the COMTRAXX® device at **Menu > Settings > Interface > PROFINET**.

- Configure status of PROFINET on the COMTRAXX® device (factory setting: PROFINET off)
- Configure PROFINET device names (this can also be done via the PLC or similar system)
- Provision of GSDML file

The GSDML file is also available in the download area of our homepage at
https://www.bender.de/en/service-support/download-area/

## 4.2 Device assignment for PROFINET

To make the required measured values or alarm states available via PROFINET, a device assignment must be generated for the PROFINET image. The device assignment defines on which PROFINET slot the respective measuring channel appears. The device assignment can either be done automatically or configured individually. A total of 255 slots are available, which can access all measuring channels in the system. Configuration is done at

🔧 **Tools > Device management > Device assignment > PROFINET**.

**i** *If no device assignment is defined for a slot, the COMTRAXX® device will generate a diagnostic alarm when querying this slot. In addition, the data status (IO provider data) of the input data will be set to invalid!*

## 4.3 Data modules

The following data modules can be applied to the available 255 slots in the respective PLC or similar system. The various data modules define which data is to be read via a slot. For each data module, it is also possible to set in the respective PLC or similar system whether a process alarm is to be generated. The process alarm is triggered when the respective assigned measuring channel reports an active alarm. By default, this setting is disabled in the PLCs or similar systems.

| Data module | Format | Comment/Unit |
|---|---|---|
| **Measured value** | Float32 | **Measured value of the measuring channel** as floating point number (IEEE754) with 32 bits |
| **Measuring channel structure** (Complete measuring channel as a structure with 26 bytes) | UINT32 | **Time stamp in s** as 32-bit unsigned integer (UTC) |
| | UINT16 | **Decimal places of the time stamp** in ms as 16-bit unsigned integer |
| | INT16 | **Time stamp UTC Offset in minutes** as 16-bit integer |
| | UINT32 | **Alarm time stamp in s** as 32-bit unsigned integer (UTC) |
| | UINT16 | **Decimal places of the alarm time stamp in ms** as 16-bit unsigned integer |
| | INT16 | **Alarm time stamp UTC Offset in minutes** as 16-bit-integer |
| | Float 32 | **Measured value of the measuring channel** as floating point number (IEEE754) with 32 bits |
| | UINT16 | **Description** as 16-bit unsigned integer (see Channel descriptions for the process image) |
| **Measuring channel structure** (Complete measuring channel as a structure with 26 bytes) | UINT8 | **Alarm state** as 8-bit unsigned integer<br>0 = No alarm<br>1 = Prewarning<br>2 = Error<br>3 = Reserved<br>4 = Warning<br>5 = Alarm |
| | UINT8 | **Unit** as 8-bit unsigned integer (see R&U = Range and unit) |
| | UINT8 | **Value range** as 8-bit unsigned integer<br>0 = Actual value<br>1 = Actual value is lower <<br>2 = Actual value is higher ><br>3 = Invalid value |
| | UINT8 | **Test state** as 8-bit unsigned integer<br>0 = None<br>1 = Intern<br>2 = Extern |
| **Alarm state** | UINT8 | **Alarm state** as 8-bit unsigned integer<br>0 = No alarm<br>1 = Prewarning<br>2 = Error<br>3 = Reserved<br>4 = Warning<br>5 = Alarm |

## 4.4    Example of a data query

*Example: Query measuring channel of an iso685-D*

The iso685-D is connected to the COMTRAXX® device via BCOM. Measuring channel 3 (leakage capacitance $C_e$) is to be made available on slot 13 in order to be able to read it out via PROFINET.

In order for the required measuring channel to be read via PROFINET, it only has to be included in the device assignment. To do this, open the PROFINET device assignment of the COMTRAXX® device

🔧 **Tools > Device management > Device assignment > PROFINET**

and click on the 'Add entry' button. Select slot and channel in the pop-up dialogue and confirm with 'Ok'. The measuring channel now appears in the table and can be accepted with the 'Save changes' button. The configuration of the COMTRAXX® device is now complete and the measuring channel can be read on slot 13.

# 5 Modbus TCP server

The Modbus TCP server supports the following function codes:

- Function code **0x03** (Read Holding Registers)
- Function code **0x04** (Read Input Registers)
- Function code **0x10** (Preset Multiple Registers)

The Modbus TCP server generates a function-related response to requests and sends it back to the Modbus TCP client.

i *Detailed information as well as examples on Modbus TCP and system images can be found in the manual D00418.*

# 6    Troubleshooting

## 6.1    Malfunctions

If the device causes malfunctions in the connected networks, please refer to this manual.

### 6.1.1    What should be checked?

Check whether
- the device is supplied with the correct supply voltage $U_S$.
- the BMS bus cable is correctly connected and terminated (120 Ω).
- the BMS address is set correctly.
- the BCOM address settings are correct.
- the power supply cable to the display is plugged in firmly.
- the video cable is plugged in firmly.
- the USB cables are plugged in firmly.

### 6.1.2    Frequently asked questions

**How do I access the device if the address data are unknown?**

1.    Connect the device directly to a Windows PC using a patch cable

2.    Activate the DHCP function on the PC.

3.    Wait around one minute.

4.    Access is now possible using the following pre-defined IP address: 169.254.0.1.

5.    Now set the new address data.

> **i**    _Document the new settings as a PDF file. Use the backup function to save all settings of the device (see Chapter: Device features)._

**Frequently asked questions on the Internet**

FAQs on many Bender devices can be found at:

Fast assistance | Bender GmbH & Co. KG

## 6.2    Device operation, maintenance, cleaning

**Device operation**

The device can be operated with latex, vinyl and nitrile gloves without impairing functionality.

**Maintenance**

The device does not contain any parts that require maintenance.

**Cleaning**

The glass front can be cleaned with common cleaning agents. Glass and seal are resistant to alcoholbased disinfectants.

# 7 Technical data

## 7.1 Tabular data

**Insulation coordination acc. to IEC 60664-1**

CP907

| | |
|---|---|
| Rated voltage | 50 V |
| Overvoltage category | III |
| Pollution degree | 2 |
| Rated impulse voltage | 800 V |

CP915 / CP924

| | |
|---|---|
| Rated voltage | AC 250 V |
| Overvoltage category | III |
| Pollution degree | 2 |
| Rated impulse voltage | 4 kV |

**Supply**

CP907 via plug-in terminal (A1/+; A2/-)

| | |
|---|---|
| Nominal voltage | DC 24 V SELV/PELV |
| Nominal voltage tolerance | ±20 % |
| Typical power consumption at DC 24 V | < 15 W |
| Maximum cable length when supplied via B95061210 (24-V DC power supply unit 1.75 A): | |
| 0.28 mm² | 75 m |
| 0.5 mm² | 130 m |
| 0.75 mm² | 200 m |
| 1.5 mm² | 400 m |
| 2.5 mm² | 650 m |

CP907 via Power-over-Ethernet (PoE)

| | |
|---|---|
| Nominal voltage | DC 48 V SELV/PELV |
| Nominal voltage tolerance | -25…+15 % |
| Typical power consumption for PoE | < 15 W |
| Maximum cable length when supplied via AWG 26/7; 0.14 mm² | 100 m |

CP915 via terminal block (L1; N)

| | |
|---|---|
| Nominal voltage via external power supply unit | AC 100… 240 V |
| Nominal voltage tolerance | -15…+10 % |
| Frequency range$U_S$ | 50…60 Hz |
| Typical power consumption at AC 230 V | < 30 W |

CP924 via terminal block (L1; N)

| | |
|---|---|
| Nominal voltage via external power supply unit | AC 100… 240 V |
| Nominal voltage tolerance | -15…+10 % |
| Frequency range$U_S$ | 50…60 Hz |
| Typical power consumption at AC 230 V | < 55 W |

**Stored energy time in the event of voltage failure**

| | |
|---|---|
| Time, date | min. 3 days |

**Displays, memory**

| | |
|---|---|
| Display CP907/Resolution | 7" TFT-Touch Display/800 x 480 |
| Display CP915/Resolution | 15,6" TFT-Touch Display/1280 x 720 |
| Display CP924/Resolution | 24" TFT-Touch Display/1280 x 720 or 1920 x1080 |
| E-mail configuration and device failure monitoring | max. 250 entries |
| Individual texts | unlimited number of texts with 100 characters each |
| Number of data points for 'third-party devices' to Modbus TCP and Modbus RTU | 1600 |
| Number of data loggers | 30 |
| Number of data points per data logger | 10,000 |
| Number of entries in the history memory | 20,000 |

**Visualisation**

| | |
|---|---|
| Number of pages | 50 |
| Background image size | max. 3 MB |

## Interfaces

Ethernet

| | |
|---|---|
| Connection | RJ45 |
| Cable | shielded, both ends of shield connected to PE |
| Cable length | < 100 m |
| Data rate | 10/100 Mbit/s, autodetect |
| HTTP mode | HTTP/HTTPS (HTTP)* |
| DHCP | on/off (off)* |
| $t_{off}$ (DHCP) | 5…60 s (30 s)* |
| IP address | nnn.nnn.nnn.nnn (192.168.0.254)*, always reachable via: 169.254.0.1 |
| Net mask | nnn.nnn.nnn.nnn (255.255.0.0)* |
| Protocols | TCP/IP, Modbus TCP, Modbus RTU, PROFINET, DHCP, SNMP, SMTP, NTP |

BMS bus

| | |
|---|---|
| Interface/protocol | RS-485/BMS internal |
| Operating mode | master/slave (master)* |
| Baud rate | 9.6 kBit/s |
| Cable length | < 1200 m |
| Cable | shielded, one end of shield connected to PE |
| recommended | CAT6/CAT7 min. AWG23 |
| alternative | twisted pair, J-Y (St) Y min. 2x0.8 |
| Connection | 'ABMS', 'BBMS' (see plug-in terminal) |
| Terminating resistor | 120 Ω (0.25 W), can be switched on internally (see plug-in terminal) |
| Device address | 1…150 (1)* |

BCOM

| | |
|---|---|
| Interface/protocol | Ethernet/BCOM |
| Cable length | < 100 m |
| BCOM system name | (SYSTEM)* |
| BCOM subsystem address | 1…255 (1)* |
| BCOM device address | 0…255 (1)* |

## Modbus

| Bender Modbus image | V1, V2 (V2)* |
|---|---|

## Modbus TCP

| Interface/protocol | Ethernet/Modbus TCP |
|---|---|
| Cable length | < 100 m |
| Operating mode | client for Bender Modbus TCP devices and 'third-party devices' |
| Operating mode | Server for access to process image and for Modbus control commands |
| Parallel data access from different clients | max. 25 |

## Modbus RTU

| Interface/protocol | RS-485/Modbus RTU |
|---|---|
| Cable length | < 1200 m |
| Cable | shielded, one end of shield connected to PE |
| recommended | CAT6/CAT7 min. AWG23 |
| alternative | twisted pair, J-Y (St) Y min. 2x0.8 |
| Connection | 'AMB', 'BMB' (see plug-in terminal) |
| Operating mode | master/slave (master)* |
| Baud rate | 9.6…57.6 kBit/s |
| Terminating resistor | 120 Ω (0.25 W), can be connected internally (see plug-in terminal) |
| Supported Modbus RTU slave addresses | 2…247 |

## PROFINET

| Interface/protocol | Ethernet/PROFINET |
|---|---|
| Operating mode | slave (IO device) |

## SNMP

| Interface/protocol | Ethernet/SNMP |
|---|---|
| Versions | 1, 2c, 3 |
| Supported devices | query of all devices (channels) possible |
| Trap support | no |

USB

| Number | 2 |
|---|---|
| Operating mode | USB-2.0 host (5 V, 500 mA) |
| Data rate | 480 Mbit/s |
| Cable length | < 3 m |
| Connection type | USB 2 Standard-A |

**Used ports**

| 53 | DNS (UDP/TCP) |
|---|---|
| 67, 68 | DHCP (UDP) |
| 80 | HTTP (TCP) |
| 123 | NTP (UDP) |
| 161 | SNMP (UDP) |
| 443 | HTTPS (TCP) |
| 502 | MODBUS (TCP) |
| 4840 | OPCUA (TCP) |
| 5353 | MDNS (UDP) |
| 48862 | BCOM (UDP) |

**Digital inputs (1…12)**

| Number | 12 |
|---|---|
| Galvanic separation | ja |
| Maximum cable length | < 1000 m |
| Operating mode | selectable for each input: active-high or active-low |
| Factory setting | active-high |
| Voltage range (high) | AC/DC 10…30 V |
| Voltage range (low) | AC/DC 0…2 V |
| Max. current per channel (at AC/DC 30 V) | 8 mA |
| Connection push-in terminal | (1-1) (2-2) (3-3) … (12-12) |

## Switching elements

| | |
|---|---|
| Number | 1 relay |
| Operating mode | N/C operation or N/O operation |
| Function | programmable |
| Electrical endurance under rated operating conditions, number of cycles | 10,000 |
| | Contact data acc. to IEC 60947-5-1 |
| Utilisation category | AC-13 / AC-14 / DC-12 |
| Rated operational voltage | 24 V / 24 V / 24 V |
| Rated operational current | 2 A / 2 A / 2 A |
| Minimum contact load (relay manufacturer's reference) | 10 µA / 10 mV DC |
| Connection | plug-in terminal (11;12;14) |

## Buzzer

| | |
|---|---|
| Buzzer message | can be acknowledged, adoption of characteristics of new value |
| Buzzer interval | configurable |
| Buzzer frequency | configurable |
| Buzzer repetition | configurable |

## Audio

| | |
|---|---|
| Line IN | not used |
| Line OUT | Output to a STEREO playback device via 3.5 mm jack plug |
| Cable length | < 3 m |

## Device connections

Terminal block (L1; N; PE) (for CP915 and CP924 only)

| | |
|---|---|
| Conductor sizes | AWG 20-12 |
| Stripping length | 10…11 mm |
| rigid/flexible | 0.5…4 mm$^2$ |
| flexible with ferrule with/without plastic sleeve | 0.5…4 mm$^2$ |
| Multiple conductor, flexible with TWIN ferrule with plastic sleeve | 0.5…4 mm$^2$ |

Plug-in terminal (A1/+; A2/-) (11;12;14)
Plug-in terminal (A1/+; A2/-; PE) (11;12;14)

| | |
|---|---|
| Conductor sizes | AWG 24-12 |
| Stripping length | 10 mm |
| rigid/flexible | 0.2…2.5 mm² |
| flexible with ferrule with/without plastic sleeve | 0.25…2.5 mm² |
| Multiple conductor, flexible with TWIN ferrule with plastic sleeve | 0.5…1.5 mm² |

Plug-in terminal (I1…12), (k1…k12), (…MB), (…BMS)

| | |
|---|---|
| Conductor sizes | AWG 24-16 |
| Stripping length | 10 mm |
| rigid/flexible | 0.2…1.5 mm² |
| flexible with ferrule without plastic sleeve | 0.25…1.5 mm² |
| flexible with ferrule with plastic sleeve | 0.25…0.75 mm² |

## For UL applications (CP907 only)

| | |
|---|---|
| | Use copper lines only. |
| Minimum temperature range of the cable to be connected to the plug-in terminals | 75 °C |
| Minimum temperature range of the cable to be connected to the PoE plug | 80 °C |

## Environment/EMC

| | |
|---|---|
| EMV | IEC 61326-1 |

Operating temperature

| | |
|---|---|
| CP907 | -10…+55 °C |
| CP907 for UL applications | -10…+50 °C |
| CP915 | -5…+40 °C |
| CP924 | -5…+40 °C |

| | |
|---|---|
| Operating altitude | ≤ 2000 m AMSL |
| Rel. humidity | ≤ 98 % at 25 °C |

Classification of climatic conditions acc. to IEC 60721

| | |
|---|---|
| Stationary use (IEC 60721-3-3) | 3K22 |
| Transport (IEC 60721-3-2) | 2K11 |
| Long-term storage (IEC 60721-3-1) | 1K22 |

Classification of mechanical conditions acc. to IEC 60721

| | |
|---|---|
| Stationary use (IEC 60721-3-3) CP907 only | 3M11 |
| Stationary use (IEC 60721-3-3) CP915 only | 3M10 |
| Transport (IEC 60721-3-2) | 2M4 |
| Long-term storage (IEC 60721-3-1) | 1M12 |

**Other**

| | |
|---|---|
| Operating mode | continuous operation |
| Mounting | display-oriented |
| Degree of protection, front | IP54 |
| Degree of protection, front, for UL applications | IP50 |
| Degree of protection, enclosure | IP20 |
| Flammability class | UL 94V-0 |

Dimensions

| | |
|---|---|
| CP907 (B x H x T) | 226 x 144 x 78 mm |
| CP915 (B x H x T) | 505 x 350 x 95 mm |
| CP924 (B x H x T) | 654 x 441 x 100 mm |

Weight

| | |
|---|---|
| CP907 | < 1,1 kg |
| CP915 | < 6,1 kg |
| CP924 | < 9,1 kg |

( )* = factory setting

## 7.2 Standards, approvals and certifications

CE  UKCA  c(UL)us LISTED
CP907 only
B95061080

## 7.3 Ordering information CP9xx

**Complete devices**

| Type | Display size | Supply | Device dimensions (W x H x D), mm | Weight | Display (glass tempered) | Art. No. |
|---|---|---|---|---|---|---|
| CP907 | 7' (17,6 cm) | DC 24 V, < 15 W alternatively PoE possible | 226 x 144 x 78 | 1.1 kg | white | B95061080 |
| CP907 without flush-mounting enclosure | | | | 0.9 kg | white | B95061093 |
| CP915 | 15,6' (38,6 cm) | AC 100…240 V < 30 W | 505 x 350 x 92 | 6.1 kg | white | B95061081 |
| | | | | | grey | B95061085 |
| CP924 | 24" (61 cm) | AC 100…240 V, < 55 W | 654 x 441 x 100 | 9.1 kg | white | B95061083 |
| | | | | | grey | B95061084 |

Scope of delivery:

• Display unit
• Flush-mounting enclosure incl. mounting plate with electronics
• CP9xx connecting cable
• Plug kit

**Individual components**

| Device series | Type | Art. No. |
|---|---|---|
| CP907 | Flush-mounting enclosure | B95100140 |
| CP915 | Display unit, white | B95061090 |
| | Display unit, grey | B95061110 |
| CP924 | Display unit, white | B95061097 |
| | Display unit, grey | B95061111 |

**Accessories**

| Device series | Type | Art. No. |
|---|---|---|
| CP907 | Surface-mounting enclosure | B95061915 |
| CP915, CP924 | CP9xx suction lifter[1] | B95061911 |
| All | CP9xx replacement plug kit | B95061910 |

1) The suction lifter is required to remove the display

## 7.4     Document revision history

| Date | Document version | Valid from software version | State/Changes |
|---|---|---|---|
| 02.2022 | 08 | V4.5.x | *Editorial revision*<br>Chapter 4.: Indications connection Ethernet and PoE, connections main board<br>Chapter 6.: Reference to D00418<br>Chapter 8. Cable recommendations and lengths<br>*Added*<br>Chapters 4.1 and 8.3: Surface-mounting enclosure CP907<br>Chapter PROFINET<br>UKCA logo |
| 03.2023 | 09 | V4.6.x | *Editorial revision*<br>Chapter 'Data modules'<br>Wiring diagram<br>*Added*<br>Chapter 'Device operation, maintenance, cleaning' |

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The Power in Electrical Safety©

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