B-PRIMIS DC-PRO, B-PRIMIS ET-PRO
B-FORTIS CC-SLIM
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this website belong to the respective companies.

Notes on this handbook
This device handbook contains information which is specific to the product and which is valid at the
time of printing.
This equipment manual is only complete in conjunction with the product-related hardware and software
user manuals required for the individual application.

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Berghof Automation GmbH is certified to DIN EN ISO 9001:2015.
## Change log

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<td>Item numbers in the technical data corrected. Block circuit diagrams (graphics) corrected. User handbook from the Box Controller ECC2110 Slim extended and updated as necessary. New CE declaration; standards and directives updated.</td>
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# Table of contents

1. **GENERAL INFORMATION** ............................................................................................................. 7
   1.1. Notes on the handbook .................................................................................................................. 7
   1.2. Symbols and visual depictions ...................................................................................................... 7
   1.3. Hazard categories and indications ............................................................................................... 8
   1.4. Qualified personnel ...................................................................................................................... 9
   1.5. Duty of care ................................................................................................................................. 9
   1.5.1. General ..................................................................................................................................... 9
   1.6. Intended use ................................................................................................................................. 10
   1.7. Transport and storage .................................................................................................................. 11
      Transport and storage .................................................................................................................. 11
      Operation ...................................................................................................................................... 11
      Devices with batteries/rechargeable batteries ............................................................................. 11
   1.8. Unpacking .................................................................................................................................... 11

2. **SAFETY** ........................................................................................................................................... 12
   Safety-related systems ..................................................................................................................... 12
   2.1. Safety instructions ....................................................................................................................... 12
      Working on the device .................................................................................................................... 12

3. **PRODUCT DESCRIPTION** ............................................................................................................. 13
   3.1. Overview ..................................................................................................................................... 14
      3.1.1. Overview DC2004 ................................................................................................................. 14
      3.1.2. Overview DC2007 ................................................................................................................. 15
      3.1.3. Overview ET2004 ................................................................................................................. 16
      3.1.4. Overview ET2007 ................................................................................................................. 17
      3.1.5. Overview ECC2100 Slim and ECC2110 Slim ...................................................................... 18
   3.2. Scope of delivery and accessories ............................................................................................. 19
      Scope of delivery ............................................................................................................................ 19
      Accessories ................................................................................................................................. 19
   3.3. Product features .......................................................................................................................... 19

4. **INSTALLATION** ............................................................................................................................... 22
   4.1. Preparation for installation DC200X and ET200X ................................................................. 22
      4.1.1. Installation cut-out, DC2004 and ET2004 ............................................................................ 22
      4.1.2. Preparation for installation, DC2007 and ET2007 ............................................................... 24
   4.2. Installation, DC200X and ET200X ............................................................................................. 26
   4.3. Installation, ECC21XX Slim ....................................................................................................... 28

5. **CONNECTION** ............................................................................................................................... 29
   5.1. Power supply .............................................................................................................................. 29
      5.1.1. Connecting the power supply to the DC200X and ECC21XX Slim ................................... 30
      5.1.2. Connecting the power supply to the ET200X ................................................................. 31
   5.2. Data connections ......................................................................................................................... 32
6. OPERATION

6.1. Switching on and off ........................................................................................................ 53

6.2. Commissioning the network .......................................................................................... 54
   6.2.1. DC200X ................................................................................................................... 54
   6.2.2. ET200X ................................................................................................................... 56
   6.2.3. ECC21XX Slim ........................................................................................................ 58

6.3. Operation .......................................................................................................................... 61
   6.3.1. Status displays ........................................................................................................ 61
   6.3.2. Start/Stop .................................................................................................................. 62
   6.3.3. Real-time clock with buffer battery DC200X and ECC21XX Slim ..................... 62
   6.3.4. microSD card ........................................................................................................... 63

6.4. Troubleshooting .............................................................................................................. 64
   6.4.1. No network connection ......................................................................................... 64
   6.4.2. In error stop mode DC200X/ECC21XX Slim ......................................................... 64
   6.4.3. Unknown IP-address on the ECC21XX Slim ......................................................... 64

7. MAINTENANCE/UPKEEP .................................................................................................. 65

7.1. Maintenance .................................................................................................................... 65

7.2. Cleaning .......................................................................................................................... 65

7.3. Chemical resistance ....................................................................................................... 66
   7.3.1. Resistance of the touch screen .............................................................................. 66
   7.3.2. Resistance of the front diaphragm ......................................................................... 67

8. UNINSTALLATION .............................................................................................................. 70

8.1. Uninstallation, DC200X and ET200X ............................................................................ 70

8.2. Uninstallation, ECC21XX Slim ...................................................................................... 72

9. DISPOSAL ........................................................................................................................ 73

10. TECHNICAL DATA .......................................................................................................... 74

10.1. B-PRIMIS DC-PRO (DC200X) .................................................................................... 74

10.2. B-PRIMIS ET-PRO (ET200X) .................................................................................... 77

10.3. B-FORTIS CC-SLIM (ECC21XX Slim) ......................................................................... 79

10.4. Identification plate ........................................................................................................ 81

10.5. Identification ................................................................................................................ 82
11. STANDARDS AND CERTIFICATES .................................................................84
11.1. Standards .............................................................................................84
11.2. UL certificate .......................................................................................85
11.3. Declaration of conformity .................................................................88
12. CUSTOMER SERVICES / ADDRESSES ..................................................89
12.1. Customer service ...............................................................................89
12.2. Addresses ..........................................................................................89
13. APPENDIX ..............................................................................................90
13.1. Information on copyright and software licence ..................................90
13.2. List of figures .......................................................................................90
1. General information

This user handbook is intended for use by qualified professionals and contains information on the assembly, installation, start-up and maintenance of the device.

1.1. Notes on the handbook

This user handbook is a component of the product and applies to the following devices:

- B-PRIMIS DC-PRO 4,3" (DC2004)
- B-PRIMIS DC-PRO 7" (DC2007)
- B-PRIMIS ET-PRO 4,3" (ET2004)
- B-PRIMIS ET-PRO 7" (ET2007)
- B-FORTIS CC-SLIM ECC2100 Slim
- B-FORTIS CC-SLIM ECC2110 Slim

It contains information on the following topics:

- Applications
- Safety
- Mechanical design
- Electrical design
- Connections
- Start-up
- Upkeep and maintenance
- Decommissioning
- Disposal

► Always keep this user handbook available alongside the product.

1.2. Symbols and visual depictions

The following symbols and visual depictions are used in this handbook:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>➔ …</td>
<td>List entry</td>
</tr>
<tr>
<td>▶ …</td>
<td>Individual instruction or list of instructions which can be carried out in any order.</td>
</tr>
<tr>
<td>1. … 2. …</td>
<td>List of instructions which must be carried out in the order given.</td>
</tr>
<tr>
<td>❗</td>
<td>Additional product information</td>
</tr>
</tbody>
</table>
Design of warnings:

⚠️ **WARNING**

Optional: Hazard type and source
- Short description and consequences
  - Preventive measures

### 1.3. Hazard categories and indications

The following indications are used in the case of warning messages so as to ensure your personal safety and avoid any damage to property.

The indications have the following meanings:

⚠️ **DANGER**

Serious injury or death
Non-compliance with the safety features will result in death or serious injury.
- Take preventive measures.

⚠️ **WARNING**

Possible serious injury or death
Non-compliance with the safety features may result in death or serious injury.
- Take preventive measures.

⚠️ **CAUTION**

Possible minor injuries
Non-compliance with the safety features may result in minor injuries.
- Take preventive measures.

📝 **NOTE**

Possible damage to property
Non-compliance with the safety features may result in damage to property.
- Take preventive measures.
1.4. Qualified personnel

The installation, start-up and maintenance of the device must be carried out by qualified personnel. For the purposes of this documentation and the safety instructions contained therein, “qualified personnel” means trained staff who are familiar with safety concepts in automation engineering and who are authorised to assemble, install, start up, earth and identify devices, systems and electrical circuits in accordance with standards set in safety engineering.

1.5. Duty of care

1.5.1. General

The user or processor (OEM) must ensure the following:

⇒ The device must only be used according to regulations.
⇒ The device must only be used in good working order.
⇒ The user handbook must always be kept legible and fully available.
⇒ Only sufficiently qualified and authorised personnel may carry out the assembly, installation, start-up and maintenance of the device.
⇒ These authorised personnel must receive regular training on all relevant occupational health and safety and environmental protection issues and must be fully familiar with the contents of this user handbook, particularly the sections regarding safety features.
⇒ Any markings or identification labels and safety and warning signs on the device must not be removed and must be kept legible at all times.
⇒ The national and international regulations regarding the operating of machinery and facilities where the device is being used must be observed at all times.
⇒ The user must always be kept abreast of any current relevant information regarding the device and its use or operation.
⇒ The user takes direct responsibility for agreeing with the competent authorities the use of safety-related control components, and for compliance with their instructions.
1.6. Intended use

The devices are components of the CANtrol modular automation system based on the CAN bus. This is a modular automation system for industrial control applications within the medium to high performance range. It extends the communications capabilities to include EtherCAT, Profinet, Modbus and others.

The automation system is designed for use within overvoltage category I (IEC 364 4 443) systems for controlling and regulating machinery and industrial processes in low-voltage installations in accordance with the following general parameters:

- maximum rated supply voltage of 1,000 V AC (50/60 Hz) or 1,500 V DC
- for use in maximum category 2 pollution environment (EN 60950)
- for use up to a maximum altitude of 2,000 m above msn.
- for indoor use only in areas not exposed to direct UV radiation
- max. ambient temperature inside and outside the control cabinet in accordance with the technical data (see "Technical data")

Qualified project planning and design, proper transport, storage, installation, use and careful maintenance are essential to the flawless and safe operation of the automation system. The automation system may only be used within the scope of the data and applications specified in this documentation and associated user manuals.

The automation system must only be used:

- as intended
- in a technically perfect condition
- without any unauthorised modifications
- by qualified users

- Observe the rules of the employer’s liability insurance association, the technical inspectorate, and the VDE (Association of German Electrical Engineers) or corresponding country regulations.

The device is intended for installation into a suitable cut-out on industrial machines and systems in indoor areas.

- When installing the device, check that the seal profiles are undamaged.
- For operation, refer to the applicable statement of ambient conditions (see "Technical data").
1.7. Transport and storage

The device is susceptible to impacts, heavy vibration, moisture and extreme temperatures.

Transport and storage
- Protect the device against major mechanical stresses during transport.
- Always pack the device in its original packaging for transport.
- For storage, refer to the applicable statement of ambient conditions (see "Technical data").
- Protect the device against condensation and damp.

Operation
- If the device has been stored or transported in cold weather or under conditions or large fluctuations in temperature, do not start to operate it until it has acclimatised to room temperature for the place it is used.
- If condensation is present, wait at least 12 hours before starting to operate the device.

Devices with batteries/rechargeable batteries
Lithium metal batteries are hazardous items. The manufacturer’s information specifies that they are subject to UN 3091 (must be permanently installed within the device). The ADR 188 special regulations can be applied for transport.

1.8. Unpacking

On receipt of the device, a check must be made that it is complete and undamaged.
- Check the packaging for external damage.
- If the packaging is seriously damaged or if damage to the contents is evident: Do not proceed further with opening the packaging, instead immediately inform the transport company and your supplier.
- Remove the packaging and keep it safe for subsequent transport.
- Check the contents for evidence of damage in transport.
- Check the contents for completeness against the order documentation and keep all the delivery documentation for future reference. The delivery documentation contains important information about the device and is part of the product.
- If you discover damage in transport, or if the equipment delivered does not match the order: Inform the supplier immediately.
2. Safety

Safety-related systems
The use of PLCs in safety-related systems requires specific measures. Wherever a PLC is to be used in a safety-related system, the user must be given comprehensive advice by the PLC manufacturer in addition to information on any available standards or regulations regarding safety installations.

- Before starting any work on devices, switch off all power feeds, including to peripherals.
- Keep all ventilation holes unobstructed.

Failure in certain components in an electronic control system may result in uncontrolled and/or unpredictable operational behaviour.

- All types of failure must be considered at the system level and the associated preventative measures identified.
- If necessary, request information from your automation system provider.

2.1. Safety instructions

The device may be operated only when it is in good working order. Exposed sharp edges pose an injury risk.

- If you discover damage to the front glass of the device, do not continue to operate the device. Immediately disconnect it from the power supply.

Working on the device
Do not start work on the device until all necessary safety precautions have been taken. Take precautions to avoid unforeseeable functional events and movements of the system.

- Bring the system into a safe condition.
- Switch the system and the device off.
- Secure the system against being switched on again.
- Disconnect the device from the system.

The casing of the device must not be opened.

- If work on the internal parts of the device is necessary, contact the manufacturer (see "Addresses").
3. **Product description**

This user handbook describes the products series B-PRIMIS DC/ET-PRO and B-FORTIS CC-SLIM. The B-PRIMIS DC-PRO (DC200X) is a control module with a display for the control and regulation of automation and industrial processes in low-voltage installations in real time. The B-FORTIS CC-SLIM (ECC2100 Slim) has the same functions as the DC200X, but without the display. The B-FORTIS CC-SLIM (ECC2110 Slim) has an additional 2nd CAN interface.

The CODESYS 3.5 (IEC 61131-3) development environment from 3S-Smart Software Solutions is used for programming the device.

The Ethernet terminals are specially configured for CODESYS visualisation and operation in machines and systems. The terminals show the CODESYS Web visualisation or the CODESYS Target visualisation, irrespective of whether the visualisation originates from a Berghof PLC control unit or some other compatible CODESYS control unit.

DC200X and ECC21XX Slim controllers can be connected using various different interfaces and in addition have their own digital and analogue inputs/outputs.

On the devices with displays (DC200X and ET200X) the connection area for all external connections is located at the rear. These devices are intended for installation on a flat surface in a pre-prepared installation cut-out.

The connections to the ECC21XX Slim Box Controller are located on the front. This device is intended for installation on a mounting rail in the control panel.

All connections are of the plug-in type.
### 3.1. Overview

#### 3.1.1. Overview DC2004

![Diagram of DC2004](image)

<table>
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<th>Item</th>
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<th>Item</th>
<th>Designation</th>
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<td>1</td>
<td>Display 4.3 inch</td>
<td>X7</td>
<td>CAN bus (CAN0)</td>
</tr>
<tr>
<td>2</td>
<td>Securing clip (qty 2)</td>
<td>X8</td>
<td>Debug interface</td>
</tr>
<tr>
<td>3</td>
<td>Twist-lock catch (qty 4) &lt;sup&gt;1&lt;/sup&gt;</td>
<td>X12</td>
<td>CAN bus (CAN1)</td>
</tr>
<tr>
<td>X1</td>
<td>Power supply, digital inputs / outputs</td>
<td>S1</td>
<td>Function key (Reset and Run/Stop)</td>
</tr>
<tr>
<td>X2</td>
<td>Analogue inputs</td>
<td>S2</td>
<td>Terminating resistor CAN (120 Ohm)</td>
</tr>
<tr>
<td>X3</td>
<td>USB 2.0</td>
<td>S3</td>
<td>Terminating resistor RS-485 (120 Ohm)</td>
</tr>
<tr>
<td>X4</td>
<td>Ethernet (ETH0)</td>
<td>µSD</td>
<td>microSD card connection (optional)</td>
</tr>
<tr>
<td>X5</td>
<td>EtherCAT (ETH1)</td>
<td>LED</td>
<td>LEDs: PWR, Run/Stop, Error</td>
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<tr>
<td>X6</td>
<td>RS-232 / RS-485</td>
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<sup>1</sup> Required only for protection rating IP65
### 3.1.2. Overview DC2007

![Image: Overview DC2007 (rear view)]

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</tr>
<tr>
<td>2</td>
<td>Securing clip (qty 3)</td>
<td>X8</td>
<td>Debug interface</td>
</tr>
<tr>
<td>3</td>
<td>Twist-lock catch (qty 6)(^1)</td>
<td>X12</td>
<td>CAN bus (CAN1)</td>
</tr>
<tr>
<td>X1</td>
<td>Power supply, digital inputs / outputs</td>
<td>S1</td>
<td>Function key (Reset and Run/Stop)</td>
</tr>
<tr>
<td>X2</td>
<td>Analogue inputs</td>
<td>S2</td>
<td>Terminating resistor CAN (120 Ohm)</td>
</tr>
<tr>
<td>X3</td>
<td>USB 2.0</td>
<td>S3</td>
<td>Terminating resistor RS-485 (120 Ohm)</td>
</tr>
<tr>
<td>X4</td>
<td>Ethernet (ETH0)</td>
<td>µSD</td>
<td>microSD card connection (optional)</td>
</tr>
<tr>
<td>X5</td>
<td>EtherCAT (ETH1)</td>
<td>LED</td>
<td>LEDs: PWR, Run/Stop, Error</td>
</tr>
<tr>
<td>X6</td>
<td>RS-232 / RS-485</td>
<td></td>
<td></td>
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</tbody>
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\(^1\) Required only for protection rating IP65
### 3.1.3. Overview ET2004

![Overview ET2004 (rear view)](image)

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<td>X1</td>
<td>Power supply</td>
</tr>
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<td>2</td>
<td>Securing clip (qty 2)</td>
<td>X3</td>
<td>USB 2.0</td>
</tr>
<tr>
<td>3</td>
<td>Twist-lock catch (qty 4)</td>
<td>X4</td>
<td>Ethernet (ETH0)</td>
</tr>
<tr>
<td>S1</td>
<td>Not used on variant ET</td>
<td>X8</td>
<td>Debug interface</td>
</tr>
<tr>
<td>LED</td>
<td>LEDs: PWR, Run/Stop, Error</td>
<td>µSD</td>
<td>MicroSD card slot (for future applications)</td>
</tr>
</tbody>
</table>

1 Required only for protection rating IP65
3.1.4. Overview ET2007

Fig. 4: Overview ET2007 (rear view)

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<th>Designation</th>
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</thead>
<tbody>
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<td>X1</td>
<td>Power supply</td>
</tr>
<tr>
<td>2</td>
<td>Securing clip (qty 3)</td>
<td>X3</td>
<td>USB 2.0</td>
</tr>
<tr>
<td>3</td>
<td>Twist-lock catch (qty 6) ^1</td>
<td>X4</td>
<td>Ethernet (ETH0)</td>
</tr>
<tr>
<td>S1</td>
<td>Not used on variant ET</td>
<td>X8</td>
<td>Debug interface</td>
</tr>
<tr>
<td>LED</td>
<td>LEDs: PWR, Run/Stop, Error</td>
<td>µSD</td>
<td>MicroSD card slot (for future applications)</td>
</tr>
</tbody>
</table>

^1 Required only for protection rating IP65
3.1.5. Overview ECC2100 Slim and ECC2110 Slim

The ECC2100 Slim and ECC2110 Slim do not have their own display, and are mounted on a mounting rail.

![Diagram of ECC2100 Slim](image1)

![Diagram of ECC2110 Slim](image2)

<table>
<thead>
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<th>Item</th>
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<td>X1</td>
<td>Power supply, digital inputs / outputs</td>
<td>X12</td>
<td>CAN bus (CAN1)</td>
</tr>
<tr>
<td>X2</td>
<td>Analogue inputs</td>
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<td>Function key (Reset and Run/Stop)</td>
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<tr>
<td>X3</td>
<td>USB 2.0</td>
<td>S2</td>
<td>Terminating resistor CAN (120 Ohm)</td>
</tr>
<tr>
<td>X4</td>
<td>Ethernet (ETH0)</td>
<td>S3</td>
<td>Terminating resistor RS-485 (120 Ohm)</td>
</tr>
<tr>
<td>X5</td>
<td>EtherCAT (ETH1)</td>
<td>S11</td>
<td>Terminating resistor CAN (120 Ohm)</td>
</tr>
<tr>
<td>X6</td>
<td>RS-232 / RS-485</td>
<td>µSD</td>
<td>microSD card connection (optional)</td>
</tr>
<tr>
<td>X7</td>
<td>CAN bus (CAN0)</td>
<td>LED</td>
<td>LEDs: PWR, Run/Stop, Error</td>
</tr>
<tr>
<td>X8</td>
<td>Debug interface</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.2. Scope of delivery and accessories

Scope of delivery
B-PRIMIS DC-PRO (DC200X):
→ Device
→ 12-pin plug connector for digital inputs / outputs and power supply
→ Weidmüller BLZF 3.50/12/180
→ 6-pin plug connector for analogue inputs
→ Weidmüller B2CF 3.50/06/180

B-PRIMIS ET-PRO (ET200X):
→ Device
→ 2-pin plug connector for power supply
→ Weidmüller BLZF 3.50/02/180

B-FORTIS CC SLIM (ECC21XX Slim):
→ Device
→ 12-pin plug connector for digital inputs / outputs and power supply
→ Weidmüller BLZF 3.50/12/180
→ 6-pin plug connector for analogue inputs
→ Weidmüller B2CF 3.50/06/180

Accessories
→ E-I/O plug, 6-pin, black (order no. 204803900)
→ E-I/O plug, 12-pin, black (order no. 204803800)
→ E-I/O plug, 2-pin, black (order no. 204801800)
→ Connection cable CAN RJ45/SUB-D9 (1m) (order no. 201608300)

3.3. Product features

Installation
B-PRIMIS DC-PRO:
The device is designed for installation in a front panel or in a control panel in a rough industrial environment.

B-PRIMIS ET-PRO:
The device is designed for installation in a front panel or in a control panel in a rough industrial environment.

B-FORTIS CC-SLIM:
The device is designed for installation on a DIN rail (35 mm) in a control cabinet in an industrial environment with a category 2 level of pollution.

Processor
In its the basic configuration the device is equipped with an 800 MHz ARM® CPU with a Cortex™-A9 core. Customer-specific variants are available, which instead of a single-core processor are equipped with a dual-core or quad-core processor.
Ethernet
The device has 2 Ethernet interfaces with 10/100 Mbit/s. The first Ethernet interface is used for standard Ethernet connections. TCP/IP and UDP/IP protocols permit flexible connections to visualisation software, higher-level control units and to the IT infrastructure. The second Ethernet interface is used as an EtherCAT master interface. Other protocols available for the Ethernet interfaces: PROFINET, BACnet and Modbus.

USB
The USB host interface allows a wide range of peripherals to be connected to the device. This allows a USB stick to be used for updating the application or for downloading data directly.

USB sticks with FAT/FAT32 formatting are supported. If you require support for other USB formats, please contact our Technical Support.

CAN ports
The DC200X and ECC21XX devices are available in versions with 1 or 2 standard CAN interfaces, which can used at up to 1 Mbit/s.

Serial ports
The device has 2 serial ports (1x RS-485; 1x RS-232).

Onboard inputs / outputs
The device incorporates digital inputs / outputs and analogue inputs.

Additional interfaces
There is also a debugging interface located on the device. A special cable with a 3.5 mm jack plug can be connected to this interface. For further information, please contact our customer services team.

Real-time clock
A software interface permits the current time and date to be set and read on a real-time clock with battery back-up.

microSD card
The standard commercial microSD card interface allows data to be written to memory cards or read from memory cards.

Summary of features
B-PRIMIS DC-PRO:
ARM® CPU with Cortex™-A9 single-core (800 MHz; optional dual or quad core)
User program and data memory (RAM): 256 MB on-board
User program memory (flash): 256 MB on-board
1 USB host interface (USB 2.0)
Non-volatile memory 100 kB
2 Ethernet 10/100 Base T interfaces (2nd Interface: EtherCAT master interface)
1 or 2 CAN interfaces
2 serial interfaces (1x RS-485; 1x RS-232)
1 µSD card slot
Onboard I/O
Real-time clock
B-PRIMIS ET-PRO:
ARM® CPU with Cortex™-A9 single-core (800 MHz; optional dual or quad core)
User program and data memory (RAM): 512 MB onboard
User program memory (flash): 512 MB onboard
1 USB host interface (USB 2.0)
1 Ethernet 10/100 Base T interface

B-FORTIS CC-SLIM:
ARM® CPU with Cortex™-A9 single-core (800 MHz; optional dual or quad core)
User program and data memory (RAM): 256 MB on-board
User program memory (flash): 256 MB on-board
1 USB host interface (USB 2.0)
Non-volatile memory 100 kB
2 Ethernet 10/100 Base T interfaces (2nd Interface: EtherCAT master interface)
1 or 2 CAN interfaces
2 serial interfaces (1x RS-485; 1x RS-232)
1 µSD card slot
Onboard I/O (digital and analogue)
Real-time clock
4. Installation

4.1. Preparation for installation DC200X and ET200X

The devices are intended for installation in a rectangular cut-out on a front panel. The support material must be rigid and be from 1 to 3 mm thick.

4.1.1. Installation cut-out, DC2004 and ET2004

![Diagram of installation cut-out](image)

Fig. 7: Dimensions, DC2004 and ET2004

Requirements:
- To allow sufficient air circulation, it must be ensured that the device has a clear space of at least 20 mm all round at the rear.
- The max. ambient temperature inside the control cabinet must not exceed 55 °C in operation.
- The support material for the installation cut-out must be flat, sufficiently stable, and be from 1 to 3 mm thick.

**NOTE**

*Damage to the device!*

Installation on uneven support material can lead to mechanical stresses and cracks in the front face or malfunctioning of the touch screen.

- Make sure that the mounting points of the device are all in a common plane, with no more than maximum ±0.5 mm variation.
Fig. 8: Installation cut-out, DC2004 and ET2004

- Cut a rectangular installation cut-out in the support material:
  Height: 86.8 mm
  Width: 123.8 mm
  Max. corner radius: 3.0 mm

- Optimum thickness of the support material:
  Protection rating IP65 with twist-lock catches: only for 1.5–3.0 mm
  Optimally: 1.5–2.0 mm
  Max.: 3.0 mm
4.1.2. Preparation for installation, DC2007 and ET2007

Fig. 9: Dimensions, DC2007 and ET2007

Requirements:
→ To allow sufficient air circulation, it must be ensured that the device has a clear space of at least 20 mm all round at the rear.
→ The max. ambient temperature inside the control cabinet must not exceed 55 °C in operation.
→ The support material for the installation cut-out must be flat, sufficiently stable, and be from 1 to 3 mm thick.

**NOTE**

*Damage to the device!*

Installation on uneven support material can lead to mechanical stresses and cracks in the front face or malfunctioning of the touch screen.

▶ Make sure that the mounting points of the device are all in a common plane, with no more than maximum ±0.5 mm variation.
Cut a rectangular installation cut-out in the support material:

- Height: 136.5 mm
- Width: 187.0 mm
- Max. corner radius: 3.0 mm

Optimum thickness of the support material:
- Protection rating IP65 with twist-lock catches: only for 1.5–3.0 mm
- Optimally: 1.5–2.0 mm
- Max.: 3.0 mm
4.2. Installation, DC200X and ET200X

Fig. 11: Open the twist-lock catches

1st Device with twist-lock catches: make sure that the twist-lock catches are turned anti-clockwise to the limit and are fully open (1).

Fig. 12: Installation in an installation cut-out, example with 4 securing clips

2nd Making sure the alignment is correct, push the device evenly into the installation cut-out until the 2 or 3 securing clips click home.
Fig. 13: Device clicked home in the installation cut-out, example with 4 securing clips

3rd Make sure the device lies flush all round.
4. Device with twist-lock catches: Secure the twist-lock catches by turning them with a T9x50 screwdriver. Apply maximum 0.4 Nm torque.

⚠️ The protection rating IP65 at the front face is achieved only when the twist-lock catches are used correctly.
4.3. Installation, ECC21XX Slim

The ECC21XX Slim is designed to be installed on a mounting rail to DIN EN 60715:2001, 35 x 7.5 mm.

⚠️ CAUTION

Danger of burns!
The surface of the device can become hot.

- Ensure that there is sufficient convectional cooling for heat to dissipate.
- Ensure that there is also a minimum of 50 mm free space both above and below the device.

![Diagram showing the installation process]

Fig. 14: Assembling the device

Requirements:
The next module must be spaced at least 10 mm away

1st Insert the device into the mounting rail from above so that the clip is resting on the rail.
2nd Push the device down against the mounting surface so that the retaining spring engages.

The device is now engaged on the mounting rail.
5. Connection

**WARNING**

Uncontrolled and unpredictable operational behaviour!

Failure of certain components in electronic control systems may result in uncontrolled and unpredictable operational behaviour.

- All types of failure and the associated protection systems must be taken into account at system level.
- Comply with all automation system manufacturer instructions.

5.1. Power supply

The device is powered by an external 24 V DC power supply. It is not designed to be connected to a DC mains supply.

- Before plugging in the device, ensure that the external power supply meets the required specifications (type K to 61131-2).

<table>
<thead>
<tr>
<th>External power supply (24 V DC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
</tr>
<tr>
<td>Ripple current proportion</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
</tr>
<tr>
<td>Energy buffering</td>
</tr>
</tbody>
</table>

**Internal power supply**

A power supply for the system electronics for an input voltage of 24 V DC (−15% / +20%) is integrated into the device. The power supply has integrated protection against reverse polarity and surge current protection (1.2 A).

**Installation**

- All connections and cables must be laid so as to prevent inductive and capacitive interference causing any damage to the device.
- Ensure that the infeed lines provide adequate current and voltage carrying capacity.
5.1.1. Connecting the power supply to the DC200X and ECC21XX Slim

**CAUTION**

Live parts!
- Before starting any work on the device, switch off all power feeds, including peripherals.
- Connect the power supply to plug X1 according to the following table.

![Diagram of power supply plug X1](image)

**Fig. 15: Power supply to the DC200X and ECC21XX Slim plug X1 with power LED**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Designation</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1…8</td>
<td>I/O</td>
<td>digital inputs and outputs (see “Digital inputs and outputs DC200X and ECC21XX Slim”</td>
</tr>
<tr>
<td>9</td>
<td>L1+</td>
<td>Feed to digital output (max. 2 A) for I/O</td>
</tr>
<tr>
<td>10</td>
<td>L+ 24 V</td>
<td>Power supply 24 V DC (−15 %/+20 %) (PLC internal processing) max. 1.2A</td>
</tr>
<tr>
<td>11</td>
<td>L+ 24 V</td>
<td>Power supply 24 V DC (−15 %/+20 %) (PLC internal processing) max. 1.2A</td>
</tr>
<tr>
<td>12</td>
<td>GND</td>
<td>–</td>
</tr>
</tbody>
</table>

The following counterparts have been tested for the SC-SMT 3.5 (Weidmüller) plug-in connector and are approved for use with the device:
- BLZF 3.50/12/180
5.1.2. Connecting the power supply to the ET200X

**CAUTION**

*Live parts!*

- Before starting any work on the device, switch off all power feeds, including peripherals.

- Connect the power supply to plug X1 according to the following table.

![Power supply ET200X plug X1](image)

**Table: Power supply plug X1**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Designation</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>L+ 24 V</td>
<td>Power supply 24 V DC (~15%/-20%), max. 1.2 A</td>
</tr>
<tr>
<td>12</td>
<td>GND</td>
<td>--</td>
</tr>
</tbody>
</table>

The following counterparts have been tested for the SC-SMT 3.5 (Weidmüller) plug-in connector and are approved for use with the device:

- BLZF 3.5/02/180 (F, LR, LH) SN BK
5.2. Data connections

5.2.1. Block circuit diagram DC200X

Fig. 17: Block circuit diagram, DC200X
5.2.2. Block circuit diagram ECC21XX Slim

Fig. 18: Block circuit diagram ECC21XX Slim

CAN interface X12 only for ECC2110 Slim.
5.2.3. Block circuit diagram, ET200X

Fig. 19: Block circuit diagram, ET200X
5.2.4. Digital inputs and outputs DC200X and ECC21XX Slim

The digital outputs are positive switching 24 V outputs with an output current of max. 500 mA. They have a common reference potential (GND) with the supply voltage.

**NOTE**

**Damage to the inputs or to the device!**

Voltages over ±32 V can damage the inputs or the device.
- No voltage in excess of ±32 V may be present at the inputs.

The digital inputs are type 1 or 3 (IEC 61131-2) positive switching inputs of type 1 or 3 (IEC 61131-2). They are designed for nominal input voltages of 24 V. The input signals are transmitted internally on a cyclical basis for process data processing. An open input is interpreted as static 0. The inputs also have a common reference potential (GND).

The following counterparts have been tested for the SC-SMT 3.5 (Weidmüller) plug-in connector and are approved for use with the device:

**→ BLZF 3.50/12/180**

![Digital inputs and outputs, DC200X and ECC21XX Slim plug X1 with LEDs 1 to 8](image)

**Digital inputs and outputs, plug X1**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Designation</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DO 1</td>
<td>digital output</td>
</tr>
<tr>
<td>2</td>
<td>DI 1 / C1</td>
<td>digital input / counting input 1</td>
</tr>
<tr>
<td>3</td>
<td>DO 2</td>
<td>digital output</td>
</tr>
<tr>
<td>4</td>
<td>DI 2 / C2</td>
<td>digital input / counting input 2</td>
</tr>
<tr>
<td>5</td>
<td>DO 3</td>
<td>digital output</td>
</tr>
<tr>
<td>6</td>
<td>DI 3 / C3</td>
<td>digital input / counting input 3</td>
</tr>
<tr>
<td>7</td>
<td>DO 4</td>
<td>digital output</td>
</tr>
<tr>
<td>8</td>
<td>DI 4 / C4</td>
<td>digital input / counting input 4</td>
</tr>
</tbody>
</table>
9…12  –  Power supply (see “Power supply”)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output type</td>
<td>semiconductor</td>
<td>Non-storing, current supplying (positive switching)</td>
</tr>
<tr>
<td>Protective circuit for inductive loads</td>
<td>41 V terminal voltage (typ.) compared to +24 V</td>
<td>fast de-excitation (must be provided externally)</td>
</tr>
<tr>
<td>Status display</td>
<td>yes</td>
<td>One orange LED per output</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lights up at logical 1</td>
</tr>
<tr>
<td>Overload protection</td>
<td>yes</td>
<td>In the case of thermal overload, auto-resetting</td>
</tr>
<tr>
<td>Short circuit protection response threshold</td>
<td>yes</td>
<td>electronic voltage limitation: typ. 7 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The current is limited electronically. Activation of short circuit protection results in thermal overload and tripping of thermal overload protection. Permissible limits based on cold state: max. 10,000 short circuits; overall duration max. 500 hours.</td>
</tr>
<tr>
<td>Status under unclear operating conditions</td>
<td>Logical 0</td>
<td>If the supply voltage is insufficient, and at booting up and shutting down the control system, the outputs are set to logical 0.</td>
</tr>
<tr>
<td>Output delay &quot;0&quot; after &quot;1&quot;</td>
<td>typ. 1 ms</td>
<td>–</td>
</tr>
<tr>
<td>Output delay &quot;1&quot; after &quot;0&quot;</td>
<td>typ. 1 ms</td>
<td>–</td>
</tr>
<tr>
<td>Output capacitance</td>
<td>&lt; 20 nF</td>
<td>–</td>
</tr>
<tr>
<td>Rated voltage</td>
<td>+24 V DC</td>
<td>–</td>
</tr>
<tr>
<td>Voltage drop (at rated current)</td>
<td>&lt; 0.1 V DC</td>
<td>–</td>
</tr>
<tr>
<td>Rated current at &quot;1&quot; signal</td>
<td>0.5 A</td>
<td>–</td>
</tr>
<tr>
<td>Total current of all outputs</td>
<td>max. 2 A</td>
<td>–</td>
</tr>
<tr>
<td>Parallel circuit in two outputs</td>
<td>max. 1 A</td>
<td>Maximum permissible value with a logical connection to increase power</td>
</tr>
</tbody>
</table>
### Data from the digital inputs

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of inputs</td>
<td>Type 1, 3</td>
<td>To IEC 61131-2 Current-consuming (positive switching)</td>
</tr>
<tr>
<td>Cable length</td>
<td>max. 30 m</td>
<td>For unshielded connection cables Cables over 30 m in length must be shielded.</td>
</tr>
<tr>
<td>Cable cross-section within the control cabinet</td>
<td>0.14 – 1.5 mm² (26-16 AWG)</td>
<td>Aim for plug connector limits to UL specifications.</td>
</tr>
<tr>
<td>Field wiring</td>
<td>according to regulations and standards</td>
<td>Comply with all local regulations and the stipulations of DIN EN 61131-2.</td>
</tr>
<tr>
<td>Rated load voltage</td>
<td>24 V DC (SELV)</td>
<td>–</td>
</tr>
<tr>
<td>Delay time</td>
<td>1 ms</td>
<td>Applies for transitions from 0 to 1 and 1 to 0</td>
</tr>
<tr>
<td>Signal evaluation</td>
<td>cyclical</td>
<td>Dependent on the cycle time set in the programming system</td>
</tr>
<tr>
<td>Protection against reverse polarity</td>
<td>yes</td>
<td>–</td>
</tr>
<tr>
<td>Potential isolation</td>
<td>No</td>
<td>–</td>
</tr>
<tr>
<td>Status display</td>
<td>yes</td>
<td>One yellow LED per input lights at logical 1</td>
</tr>
</tbody>
</table>
Fig. 22: Circuit diagram of the principles of positive switching input

Fig. 23: Operating ranges of the digital inputs (type 1/3), negative switching

<table>
<thead>
<tr>
<th>Item</th>
<th>Designation</th>
<th>Item</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>“ON” range</td>
<td>3</td>
<td>Transition range</td>
</tr>
<tr>
<td>2</td>
<td>Signal-noise ratio &lt;1 V</td>
<td>4</td>
<td>“OFF” range</td>
</tr>
</tbody>
</table>
5.2.5. Counting inputs (C)

The 4 digital inputs can also be used as counting inputs (C1…C4). This function must be enabled by appropriate licensing (obtainable also retrospectively).

The counting inputs C1…C4 have quick filters, the unipolar inputs I5…I16 have a hysteresis. The counting inputs are linked to the signals of the other unipolar inputs. There is no changeover.

Available configurations of the counting inputs:

→ Up/Down counter
→ Pulse/Direction counter
→ Quadrature decoder

One of the counting inputs can also be used as a capture input. This configuration requires 3 of the inputs (partially as a CNT input or CAPT input). The flanks for Up, Down or Pulse can be defined as rising and/or falling flanks.

Direction: High = Up; Low = Down

Examples for counters: Up/Down; Pulse/Direction; Encoder (A/B)

![Counter Diagram](image)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Designation</th>
<th>Pin</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Up, Pulse, A (CNT0)</td>
<td>C3</td>
<td>Up, Pulse, A (CNT1)</td>
</tr>
<tr>
<td>C2</td>
<td>Down, Direction, B (CNT0)</td>
<td>C4</td>
<td>Down, Direction, B (CNT1)</td>
</tr>
</tbody>
</table>
Example for a counter: Capture input or counter input

![Counter Diagram]

Fig. 25: Counter with Capture input

<table>
<thead>
<tr>
<th>Pin</th>
<th>Designation</th>
<th>Pin</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Up, A (CNT0)</td>
<td>C3</td>
<td>–</td>
</tr>
<tr>
<td>C2</td>
<td>Down, B (CNT0)</td>
<td>C4</td>
<td>Capture (rise), Z (CNT0)</td>
</tr>
</tbody>
</table>

The counter CNT1 is not available with this configuration.

Data for the counting inputs

<table>
<thead>
<tr>
<th>Counting inputs</th>
<th>Function</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of counters</td>
<td>2</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Signal voltage</td>
<td>(1): DC 15...28 V</td>
<td>Pulse width within the valid level for at least 1 µs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0): DC –3…3 V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Max. frequency:</td>
<td>500 kHz</td>
<td>Special installation instructions are applicable to 100 kHz. At the</td>
</tr>
<tr>
<td></td>
<td>- Signal</td>
<td>1 counts/s</td>
<td>maximum counting frequency, the signal generator must ensure a flank</td>
</tr>
<tr>
<td></td>
<td>- Counter</td>
<td></td>
<td>steepness of at least 20 V/µs.</td>
</tr>
<tr>
<td></td>
<td>Min. Pulse width</td>
<td>1 µs</td>
<td>Per level</td>
</tr>
<tr>
<td></td>
<td>counter resolution</td>
<td>32 bit</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Internal pull-up</td>
<td>3 kΩ</td>
<td>–</td>
</tr>
</tbody>
</table>

Installation instructions

→ Screened cable must be used to connect the counters.
→ The power supply to the sensor (24 V DC; GND) and the signal must both be within the same cable.
→ The PLC and sensor must be supplied by the same power supply unit.
5.2.6. Ethernet

The on-board Ethernet adapter has one 10/100-Base-T RJ-45 port for connection to the network. The Ethernet interface X4 can be used as a standard Ethernet interface.

![Ethernet interface X4](image)

**Assignment of Ethernet interface plug X4**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Assignment</th>
<th>Pin</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TX+</td>
<td>5</td>
<td>NC</td>
</tr>
<tr>
<td>2</td>
<td>TX−</td>
<td>6</td>
<td>RX−</td>
</tr>
<tr>
<td>3</td>
<td>RX+</td>
<td>7</td>
<td>NC</td>
</tr>
<tr>
<td>4</td>
<td>NC</td>
<td>8</td>
<td>NC</td>
</tr>
</tbody>
</table>

**LEDs**

<table>
<thead>
<tr>
<th>LED</th>
<th>Colour</th>
<th>Meaning to IEEE 802.3 clause 25</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNK/RCV</td>
<td>yellow</td>
<td>Link, Data Receive&lt;br&gt;Flashing: connection active; data transfer in progress&lt;br&gt;Off: no connection established</td>
</tr>
<tr>
<td>SPEED</td>
<td>green</td>
<td>On = 100 Mbit/s&lt;br&gt;Off = 10 Mbit/s</td>
</tr>
</tbody>
</table>
5.2.7. EtherCAT

The onboard Ethernet adapter has two RJ-45 10/100 Base-T interfaces for networking. The Ethernet interface X6 can be used as the EtherCAT master.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Assignment</th>
<th>Pin</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TX+</td>
<td>5</td>
<td>NC</td>
</tr>
<tr>
<td>2</td>
<td>TX–</td>
<td>6</td>
<td>RX–</td>
</tr>
<tr>
<td>3</td>
<td>RX+</td>
<td>7</td>
<td>NC</td>
</tr>
<tr>
<td>4</td>
<td>NC</td>
<td>8</td>
<td>NC</td>
</tr>
</tbody>
</table>

**Fig. 27: EtherCAT interface X5**

**Assignment of EtherCAT interface plug X5**

**LEDs**

<table>
<thead>
<tr>
<th>LED</th>
<th>Colour</th>
<th>Meaning to IEEE 802.3 clause 25</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNK/RCV</td>
<td>yellow</td>
<td>Link, Data Receive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing: connection active; data transfer in progress</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off: no connection established</td>
</tr>
<tr>
<td>SPEED</td>
<td>green</td>
<td>On = 100 Mbit/s</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off = 10 Mbit/s</td>
</tr>
</tbody>
</table>
5.2.8. USB

Devices with a USB interface can be connected to the USB host port (Rev. 2.0). Suitable USB device classes are:
- CODESYS user: only USB stick
- Linux level: USB stick or mouse

![USB interface](image)

Fig. 28: USB interface X3

<table>
<thead>
<tr>
<th>Pin</th>
<th>Assignment</th>
<th>Pin</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>VCC</td>
<td>B3</td>
<td>D+</td>
</tr>
<tr>
<td>B2</td>
<td>D−</td>
<td>B4</td>
<td>GND</td>
</tr>
</tbody>
</table>

NOTE

Damage to USB stick and malfunction due to data loss!
Removing a USB stick while it is still in use and data are being transferred can render the USB stick unusable. Open files which can no longer be accessed because the USB stick has been removed can block the device.

Therefore ensure that all operations are complete before removing the USB stick.

NOTE

Damage to property and malfunctions due to data loss!
The USB interface is protected against overloading (> 0.5 A). In the event of a short circuit during operation, the control unit may trigger a reset of the system. Substantial property damage and damage to the USB device may ensue.

Before using a USB device, check carefully its power requirements.

NOTE

Failures and malfunctions will occur if direct connections are made to signal earth!

Use only USB devices that have no direct connection between signal earth and the housing.
USB sticks can be inserted and withdrawn whilst the system is in operation. The USB stick is detected automatically and incorporated into the Linux directory /media/usbX. When the USB stick is withdrawn the directory /media/usbX will be deleted from the directory structure. Either the first partition on the USB stick, or, if the memory is not partitioned, the entire memory will be connected, i.e. the respective directory appears automatically. The X stands for a number from 1 (the first USB device) to 8 (the last/max. USB device).

The USB interface plug is designed to withstand 1,000 plugging and unplugging cycles.

5.2.9. Serial ports

The module has two serial communications interfaces (1x RS-232 and 1x RS-485), which are connected via the common RJ45 plug X6. Maximum baud rate for both interfaces: 115 kBD

![Fig. 29: RS-232 / RS-485 interface X6](image)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Assignment / software interface</th>
<th>Pin</th>
<th>Assignment / software interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RS-232 RX / COM 1</td>
<td>5</td>
<td>RS-485 Tx/Rx+ / COM 2</td>
</tr>
<tr>
<td>2</td>
<td>RS-232 TX / COM 1</td>
<td>6</td>
<td>NC</td>
</tr>
<tr>
<td>3</td>
<td>NC</td>
<td>7</td>
<td>(reserved)</td>
</tr>
<tr>
<td>4</td>
<td>RS-485 Tx/Rx+ / COM 2</td>
<td>8</td>
<td>ISO GND</td>
</tr>
</tbody>
</table>

The RS-485 interface is "soft" terminated in the dialogue controller with 560 Ω. If the interface is located at the start or end of the bus topology:

- Set switch S3 to ON in order to switch on the 120 Ω terminating resistor.
As far as possible, the assignment of the interfaces should be carried out in accordance with the specifications given in "MODBUS over Serial Line; Specification and Implementation Guide V1.02".

**Signal interference and terminating resistor**

To minimise interference, the following instructions must be complied with.

**Actively driven bus**
- An appropriate protocol must be employed to ensure that at all times one of the bus participants is actively driving the bus.
- For a highly symmetrical signal-noise ratio the bus must have defined statuses for logical "1" \((A-B < -0.2 \text{ V})\) and logical "0" \((A-B > +0.2 \text{ V})\).

**Undriven bus**
- The bus termination must be as asymmetric as possible to ensure the greatest possible signal-noise ratio (to reduce the symmetrical signal-noise ratio).
- In order to achieve the necessary voltage difference between the signals, a suitable resistor network must be used as the line termination.
- The necessary size of the resistors is governed by the bus length and transmission rate (similarly to the line termination for Profibus, see DIN EN 61158-2).

**Connections with GND**

To minimise common-mode interference or malfunctions due to potential differences:
- Check the topology and line lengths to determine whether additional connections to GND are necessary.
- For electrically isolated interfaces with connections to the reference ground at one point: link to GND.
- Where necessary, provide an attenuated link to GND (e.g. via 200 Ω) at multiple points.
5.2.10. CAN Bus

<table>
<thead>
<tr>
<th>Properties of the CAN interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
</tr>
<tr>
<td>ISO 11898</td>
</tr>
<tr>
<td>Maximum Baud rate</td>
</tr>
<tr>
<td>1 MBit/s</td>
</tr>
<tr>
<td>Lowest adjustable Baud rate</td>
</tr>
<tr>
<td>50 kBit/s</td>
</tr>
<tr>
<td>Contacts</td>
</tr>
<tr>
<td>Electrically isolated</td>
</tr>
<tr>
<td>Assignment</td>
</tr>
<tr>
<td>to CiA303</td>
</tr>
</tbody>
</table>

Fig. 31: CAN interface X7 (X12)

<table>
<thead>
<tr>
<th>Assignment of CAN interface connector X7 (X12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>

If the CAN interface is located at the start or end of the CAN bus topology:
- Set switch S2 to ON in order to switch on the 120 Ω terminal resistance between CAN_L and CAN_H.

The Baud rates, settings and cable lengths are based on the recommendations of the CiA-303-1. Example: at 1 Mbit, max. 25 m
5.2.11. Analogue inputs

Basic considerations for analogue inputs

- An analogue input channel always consists of two connections: AI (U) or AI (U/T) and AGND.
- The AI (U/T) channels can either measure voltages (U) or evaluate PT100(0) sensors.
- The AI (U) channels can measure voltages or be used for compensation of the line resistances for PT100(0) measurements (3-wire measurement).
- The Earth/Ground/GND lead of a voltage sensor or temperature sensor connected to an analogue input may be connected only to AGND (not to GND or PE (equipotential)).
- Different AGNDs (e.g. on one terminal strip) may not be connected together.
- AGNDs may not be connected to the general GND of the control panel or to the "M" on the control unit (GND and AGND are already connected within the control unit, via a special filter).
- AGNDs may not be connected directly to the equipotential bonding conductor (PE) of the machine or system.
- Long cables and wires with a small cross-section lead to voltage drops and deviations in PT100(0) measurements (due to resistance of the lead). These unavoidable deviations must be taken into account when planning the wiring.
- To avoid interference, analogue I/O wires must be kept separate from digital signals and power cables.
- Screened cables are advisable for all analogue I/Os. The screen is maintained from the respective sensor or instrument through into the control panel or close to the control unit.

The following counterparts have been tested with the S2C-SMT 3.5 (Weidmüller) connector and are approved for use with the device:
Weidmüller B2CF 3.50/06/180(F) SN BK

![Analogue inputs X2](image)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Assignment</th>
<th>Pin</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AI1 (U/T)</td>
<td>2</td>
<td>AI3 (U/T)</td>
</tr>
<tr>
<td>3</td>
<td>AGND</td>
<td>4</td>
<td>AGND</td>
</tr>
<tr>
<td>5</td>
<td>AI2 (U)</td>
<td>6</td>
<td>AI4 (U)</td>
</tr>
</tbody>
</table>
## Data from analogue inputs

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable length</td>
<td>max. 30 m</td>
<td>Only valid for unshielded connection cables. Cables over 30 m in length must be shielded.</td>
</tr>
<tr>
<td>Modulation method</td>
<td>Delta-sigma modulation</td>
<td>–</td>
</tr>
<tr>
<td>Shared points between the channels</td>
<td>AGND reference ground</td>
<td>–</td>
</tr>
<tr>
<td>Clamp arrangement</td>
<td>Shielding on common AGND pins</td>
<td>–</td>
</tr>
<tr>
<td>Sampling duration/rate for measuring values</td>
<td>1 ms</td>
<td>A reading is taken from each input channel every millisecond, regardless of how many channels are actually in operation.</td>
</tr>
<tr>
<td>Sampling rate Operating mode AI-PT</td>
<td>250 ms</td>
<td>In operating mode AI-PT, calculations are carried out after the millisecond sampling rate. A new value is available in the user program every 250 ms.</td>
</tr>
</tbody>
</table>

### Digital filtering

<table>
<thead>
<tr>
<th>Possible filter settings</th>
<th>Timescale for averaging</th>
<th>Time range for averaging Operating mode AI-PT</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1 ms</td>
<td>0.25 s</td>
</tr>
<tr>
<td>10</td>
<td>10 ms</td>
<td>2.5 s</td>
</tr>
<tr>
<td>100</td>
<td>100 ms</td>
<td>25 s</td>
</tr>
<tr>
<td>1000</td>
<td>1,000 ms (1 s)</td>
<td>250 s</td>
</tr>
</tbody>
</table>

If filtering is active, an average is calculated for the set time range. However a value is still issued during the sampling rate interval. For example, if the filter is set to 1,000, the average of the measurements for the previous 1,000 ms / 1,000 measurements is issued each millisecond (or, in the case of operating mode AI-PT, the average for the last 250 ms / 1,000 measurements).

The filtering can be activated and configured using CODESYS V3. The sampling rate is constant. It can only be filtered with a whole multiple of the sampling rate.
Operating modes for the analogue inputs

**NOTE**

**Damage to channel!**

High voltages can damage analogue channels, stopping them from working correctly.

- Ensure the input voltage does not exceed ±30 V.

---

**Operating mode: voltage input AI (U)**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connections per input</td>
<td>–</td>
<td>AI (U/T) and AGND or AI (U) and AGND; connect screening with AGND.</td>
</tr>
<tr>
<td>Measuring range</td>
<td>–10 to +10 V</td>
<td>–</td>
</tr>
<tr>
<td>Input impedance in signal range</td>
<td>100 kΩ</td>
<td>applies between AI (U/T) and AGND or between AI (U) and AGND value when the channel is switched on or off</td>
</tr>
<tr>
<td>Max. error at 25 °C</td>
<td>±0.25% (±0.50 mV)</td>
<td>–</td>
</tr>
<tr>
<td>Temperature coefficient</td>
<td>±40 ppm/K (±0.4 mV/K)</td>
<td>–</td>
</tr>
<tr>
<td>Digital resolution</td>
<td>24 bit</td>
<td>–</td>
</tr>
<tr>
<td>Data format in user program</td>
<td>32 bit real</td>
<td>(floating-point number) in millivolts (mV)</td>
</tr>
<tr>
<td>Maximum permissible permanent overload</td>
<td>Max. ±30 V compared to AGND</td>
<td>±30 V = max. voltage at AI channel</td>
</tr>
<tr>
<td>Value of least significant bit</td>
<td>1.2 µV</td>
<td>–</td>
</tr>
<tr>
<td>Output of digital value in case of overload</td>
<td>–</td>
<td>If a voltage of ±10 V is applied to an AI (U), a plausible value is still given up to approx. ±15 V. The specified accuracy is only valid for the range −10 to +10 V. If the voltages applied are greater than +15 V or less than −15 V, an error bit (FAULTN/FAULTP) is set in the process image, which can be read by the user program.</td>
</tr>
<tr>
<td>Input type</td>
<td>–</td>
<td>Unsymmetrical voltage metering (single-ended)</td>
</tr>
<tr>
<td>Reference potential</td>
<td>AGND</td>
<td>–</td>
</tr>
</tbody>
</table>

**Dynamic characteristics**

| Analogue filtering                     | Second-grade order, limit frequency 650 Hz | –                                                                 |
| Greatest temporary                     | 1% of measuring range                  | –                                                                 |
### Operating mode: voltage input AI (U)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>deviation during electrical error testing according to IEC 61131-2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Operating mode: temperature inputs AI-PT

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connections per input</td>
<td>–</td>
<td>Sensor connection between AI (U/T) and AGND (if necessary a further AI (U) channel can be used for 3-wire measurement)</td>
</tr>
<tr>
<td>Possible sensors</td>
<td>PT100 and PT1000 acc. to EN 60751</td>
<td>Platinum sensors of accuracy classes AA, A, B and C may be used</td>
</tr>
<tr>
<td>Measuring range</td>
<td>–40 to +200 °C</td>
<td>–</td>
</tr>
<tr>
<td>Measuring current (RMS)</td>
<td>0.3 mA</td>
<td>–</td>
</tr>
<tr>
<td>Conversion time</td>
<td>250 ms</td>
<td>–</td>
</tr>
<tr>
<td>Max. error at 25 °C</td>
<td>±2100 ppm (±0.5 °C)</td>
<td>–</td>
</tr>
<tr>
<td>Temperature coefficient</td>
<td>±50 ppm/K (±0.012 °C/K)</td>
<td>–</td>
</tr>
<tr>
<td>Digital resolution</td>
<td>24 bit</td>
<td>–</td>
</tr>
<tr>
<td>Data format in user program</td>
<td>2 × 32 bit real</td>
<td>(floating-point number) in Ohms (Ω) and degrees Celsius (°C)</td>
</tr>
<tr>
<td>Linearisation</td>
<td>–</td>
<td>The value in degrees Celsius is calculated from the resistance value and linearised (6th degree polynomial)</td>
</tr>
<tr>
<td>Input type</td>
<td>–</td>
<td>2-wire measurement or 3-wire measurement</td>
</tr>
<tr>
<td>Reference potential</td>
<td>AGND</td>
<td>–</td>
</tr>
</tbody>
</table>

### Dynamic characteristics

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analogue filtering</td>
<td>Second-grade order, limit frequency 650 Hz</td>
<td>–</td>
</tr>
<tr>
<td>Greatest temporary deviation during electrical error testing according to IEC 61131-2</td>
<td>1% of measuring range</td>
<td>–</td>
</tr>
</tbody>
</table>
Voltage input AI (U)

Only use the corresponding AGND for each voltage input.
- Do not connect AGNDs from different channels.
- AGNDs from different channels must always be connected separately to the plug X1.
- Do not connect to the common GND. The required connections can already be found on the circuit board.
- Cables to the analogue sensors/encoders should be connected as directly as possible (avoid the use of terminals and terminal blocks).
Temperature measurement AI (T)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PT 100 with 2-wire connection</td>
</tr>
<tr>
<td>2</td>
<td>PT 100 with 3-wire connection</td>
</tr>
</tbody>
</table>

- Only use the corresponding AGND for each input.
- Do not connect AGNDs from different channels.
- Do not connect to the common GND. The required connections can already be found on the circuit board.
- Cables to the PT100(0) sensors should be connected as directly as possible (avoid the use of terminals and terminal blocks).
- Only connect PT100(0) sensors to AI (U/T) channels.

2-wire measurement
Resistance can result in a measurement error, which in the case of long cables with a small cross-section can be up to 10°. If the temperature of the sensor is known, this deviation can be subtracted by the software automatically and compensated (alternatively, use 3-wire measurement).

3-wire measurement
The nearest AI (U) connection is used to compensate the resistance in the cable. It can only be used directly in conjunction with the following AI (U/T) channel. Channels 1 and 2, and also channels 3 and 4 each form a pair for 3-wire measurement.
6. Operation

6.1. Switching on and off

NOTE

Damage or malfunction!
- Do not insert, connect, undo or touch any connections whilst the device is in operation.
- Before starting any work on the device, switch off all power feeds, including those to any connected peripherals (sensors and programmable devices etc. with independent power supplies).

NOTE

Damage to property!
- Before connecting the power supply, ensure that all cabling and the polarity of all the connections are correct.

Switching on
The device does not have an on/off switch. The device starts automatically when the system is switched on or the power is connected.

Switching off
The device is switched off when the system is switched off or the power supply is disconnected.
6.2. Commissioning the network

6.2.1. DC200X

The device must be connected to the network with the correct settings before it can be used.

**NOTE**

**Damage to property!**
- Before connecting the power supply, ensure that all cabling and the polarity of all the connections are correct.

1st Supply the device with power (24 V). After the start the current IP address and network mask of the device are shown at the top right of the display.
2nd Connect the device to a programming computer using a network cable (X4) and network switch.
3rd Open a web browser on the programming computer.
4th Enter the IP address of the device into the web browser. The login screen will appear.

![User Login:](image)

Fig. 35: login window

5th Use the following user name and password to log into the device:
- Name: admin
- Password: admin
The web configuration page will be displayed.

**Configuration**

- Network
- Real-Time-Clock
- Display
- FTP-Server
- Users

**System**

- Info
- Update
- Reboot
- Format Filesys

**PLC-Manager**

- Control
- Application Info
- Application Files
- Font Files

Fig. 36: List of web interface settings

6th Click on the "Network" link.
The "Network Configuration" page is displayed.

**Network Configuration**

<table>
<thead>
<tr>
<th>COMMON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hostname</td>
</tr>
<tr>
<td>Default Gateway</td>
</tr>
<tr>
<td>DNS Server 1</td>
</tr>
<tr>
<td>DNS Server 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ETH0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode: static</td>
</tr>
<tr>
<td>IP Address</td>
</tr>
<tr>
<td>NetMask</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ETH1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode: ethercat</td>
</tr>
</tbody>
</table>

Save

Fig. 37: "Network Configuration" page

7th Check the network settings and make any changes in the text boxes if required.
DC200X configuration: ETH0 = X4, ETH1 = X5

8th Save the settings by clicking on "Save".

9th Additional settings can also be viewed and/or modified on the web configuration page (for example "system time", display resolution, TargetVisu).
10th In order to save all the modified settings, reboot the device:
   Disconnect the device temporarily from the power supply
   – or –
   Click on "Reboot" in the web interface and then confirm it on the next screen by clicking on "Reboot Module".

The device is now configured and ready for use.

6.2.2. ET200X

**NOTE**

**Damage to property!**
- Before connecting the power supply, ensure that all cabling and the polarity of all the connections are correct.

1st Supply the device with power (24 V).
After the start the current IP address and network mask of the device are shown at the top right of the display.

![Fig. 38: Main screen of the device](image)

2nd To change the IP address via the display, press the “Settings” icon (1). The page with the network settings of the device appears.

![Fig. 39: Network settings](image)
3rd  If necessary, press the “Edit” button and change the network settings as required (IP address, network mask, gateway).

4th  Press the “Next” button.
    The page with the summary of the network settings appears.

![Settings: Summary](image)

3rd  If necessary, press the “Edit” button and change the network settings as required (IP address, network mask, gateway).

4th  Press the “Next” button.
    The page with the summary of the network settings appears.

![Settings: Summary](image)

5th  To change other settings or to correct the changes, press the “Back” button.

6th  If no settings were changed, press “OK”.
    The main screen of the device will appear.
    – or –
    Press the “Save” button.
    The settings will be saved and the device automatically restarts itself.

The device is now configured and ready for use.
6.2.3. ECC21XX Slim

The device must be connected to the network with the correct settings before it can be used.

1st  Note down the IP address and subnet mask:
    IP address: 169.254.255.XX
    XX corresponds to the last 2 digits of the device serial number. Exception: 00 becomes 100.
    Subnet mask: 255.255.255.0

**NOTE**

Damage to property!
- Before connecting the power supply, ensure that all cabling and the polarity of all the connections are correct.

2nd  Supply the device with power (24 V).
3rd  Connect the device to a programming computer using a network cable (X4) and network switch.
4th  Open a web browser on the programming computer.
5th  Enter the IP address of the device into the web browser.
    The login screen will appear.

6th  Use the following user name and password to log into the device:
    Name: admin
    Password: admin
    The web configuration page will be displayed.
Configuration

Network
Real-Time-Clock
Display
FTP-Server
Users

System
Info
Update
Reboot
Format Filesys

PLC-Manager
Control
Application Info
Application Files
Font Files

Fig. 43: List of web interface settings

7th Click on the "Network" link.

The "Network Configuration" page is displayed.

![Network Configuration Page]

8th Check the network settings and make any changes in the text boxes if required.

Configuration ECC21XX Slim: ETH0 = X4, ETH1 = X5

9th Save the settings by clicking on "Save".

10th Additional settings can also be viewed and/or modified on the web configuration page (for example "system time", display resolution, TargetVisu).
11th In order to save all the modified settings, reboot the device:
   Disconnect the device temporarily from the power supply
   – or –
   Click on "Reboot" in the web interface and then confirm it on the next screen by clicking on "Reboot Module".

The device is now configured and ready for use.
6.3. Operation

6.3.1. Status displays

The status display function is dependent on the software development environment used in conjunction with the device.

The operating status LEDs show the current status of the power supply, the module mode and any error messages.

The signals from the LEDs depend on the current operating status of the device:
- CODESYS inactive: The firmware is controlling the LEDs.
- CODESYS active: only the CODESYS runtime system (CODESYS Runtime) controls the LEDs.

**Location of the operating status LEDs**
The Run/Stop and Error LEDs display the system status.

<table>
<thead>
<tr>
<th>LED</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 PWR (green)</td>
<td>Shows that the power supply to the electronics is correct.</td>
</tr>
<tr>
<td>2 Run/Stop</td>
<td>Shows the system statuses.</td>
</tr>
<tr>
<td>(yellow/green/red)</td>
<td></td>
</tr>
<tr>
<td>3 Error (red)</td>
<td>Shows the device has been stopped due to an error.</td>
</tr>
</tbody>
</table>

**Meaning of the LED displays**

System statuses are shown using flashing signals on the Run/Stop LED in yellow.
CODESYS operating statuses are shown via continuous illumination of the Run/Stop LED as either red or green. While the Run/Stop light is flashing yellow: the device is in use and must not be switched off. The device does not show warnings via the LEDs during start-up.

### 6.3.2. Start/Stop

![Function key (S1)](image)

#### Function key (S1)

<table>
<thead>
<tr>
<th>Operating status</th>
<th>Action</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boot phase</td>
<td>Press.</td>
<td>Change to maintenance mode</td>
</tr>
<tr>
<td>CODESYS PLC/CP1131-P</td>
<td>Press briefly.</td>
<td>Toggle between PLC run and stop mode</td>
</tr>
<tr>
<td></td>
<td>Press and hold.</td>
<td>Stop the PLC with resetting of variables (cold reset)</td>
</tr>
</tbody>
</table>

#### 6.3.3. Real-time clock with buffer battery DC200X and ECC21XX Slim

**Setting the date and time**
The time can be set via the web configuration page or via the CODESYS V3 library.

**Changing the battery**
The battery is not designed to be changed by the user; the manufacturer should be contacted in order to change the battery.

Further PSDS/MSDS information from the manufacturer is applicable batteries/rechargeable batteries as specified in UN 3091 -PI 970 Section II Button Cell.
6.3.4. microSD card

**WARNING**

**Serious injury as a result of uncontrolled and unpredictable operational behaviour!**

Inserting or removing the microSD card can result in the device malfunctioning. Failure in electronic control systems may result in uncontrolled and unpredictable operational behaviour.

- Insert or remove a microSD card only when the device is switched off.

**NOTE**

**Loss of data!**

- microSD cards do not have their own write protection system.
- Ensure that no data is deleted or overwritten by accident.

**Inserting a microSD card**

1. Switch the device off.
2nd  Insert the microSD card into the microSD card slot.
3rd  Switch the device on again.

The microSD card is now ready for data transfer (read, write and copy).

Path: /media/sd

- Max. possible storage capacity: 32 GB.
- The life cycle of the gold-plated contacts is up to 10,000 plugging and unplugging cycles.
- The microSD card drive has a push-in/push-out insertion and ejection mechanism.
- To avoid malfunctions, do not withdraw the microSD card by pulling it.
6.4. Troubleshooting

6.4.1. No network connection

- Check the cabling / switch.
- Check whether an IP address has been duplicated.
- Check the network settings on the PC: The subnet and the subnet mask settings must be the same as those for the controller.
- Check the firewall / anti-virus programs on the PC.
- ET200X: Check the Lifeguard settings.
- ECC21XX Slim: check for unknown IP addresses (see 6.4.3).

6.4.2. In error stop mode DC200X/ECC21XX Slim

1st Log in to the device via a web browser.
2nd Determine the cause of the fault (Diagnostics > PLC Log/System Log).
3. Correct the fault.
4th Restart the device (press “Reset” on the device).
The device is now ready for use.

6.4.3. Unknown IP-address on the ECC21XX Slim

If the IP address of the device is unknown, maintenance mode can be used to reconfigure it.
1st Reboot the device while pressing and holding S1 until the Run/Stop LED flashes every 2 seconds.
The device is now in maintenance mode and can be reached via the default IP address.
2nd Connect to the device using the default IP address:
IP address: 169.254.255.XX
Network mask: 255.255.255.0
XX corresponds to the last 2 digits of the device serial number. Exception: 00 becomes 100.
3rd Correct the network settings and make a note of them.
4. Restart the device.
Maintenance mode is exited automatically.
The device is now configured and ready for use.
7. Maintenance/upkeep

Repairs and corrective maintenance may be carried out only by the manufacturer or authorised customer service centres.

7.1. Maintenance

⚠️ WARNING

Uncontrolled and unpredictable operational behaviour!
Failures or malfunctions may result in uncontrolled and unpredictable operational behaviour.
- Do not insert, connect, undo or touch any connections whilst the device is in operation.
- Before starting any work on the device, switch off all power feeds, including those to any connected peripherals (sensors and programmable devices etc. with independent power supplies).

If the device is used correctly it should not require maintenance.
- Make sure all the ventilation holes are kept free of obstructions.
- Do not open the device. If work is required on the device necessary contact customer service.

7.2. Cleaning

⚠️ NOTE

Damage to the front panel!
The front panel is of glass and must not be exposed to any mechanical or chemical stress.
- Do not use any high-pressure cleaners or steam jets.
- Do not use any corrosive cleaning products, any thinners, any abrasive media or any hard objects.
- Do not apply any undue force to the front face. Do not bend the device.

- To avoid faults due to inadvertent activation, switch the device off before cleaning the front panel.
- Clean the surfaces using only a dry, lint-free cloth.
7.3. Chemical resistance

7.3.1. Resistance of the touch screen

The active area of the touch screen is resistant to the following chemicals when exposed to them for a period of up to an hour at a temperature of max. 21°C:

**Domestic and industrial chemicals**
- Detergent
- All-purpose cleaners
- Washing-up liquid
- Glass cleaner
- Hydrogen peroxide (3 %)
- Lysol
- Ethanol
- Isopropanol
- Acetone
- Methyl ethyl ketone
- Toluene
- Concentrated hydrochloric acid
- Petroleum
- White spirit
- Petrol
- Engine oil
- Diesel
- Gear oil
- Brake fluid
- Anti-freeze
- Hydraulic oil

**Condiments**
- Lemon juice
- Tomato juice
- Mustard
- Tomato ketchup
### 7.3.2. Resistance of the front diaphragm

**NOTE**

**Damage to the front diaphragm!**
The front diaphragm is not resistant to the following chemicals and influences, and can be damaged by their effects:
- Benzyl alcohol
- Concentrated alkalis
- Concentrated inorganic acids
- Dichloromethane (methylene chloride)
- High-pressure steam above 100 °C
- Long-term effects of direct sunlight
  - Keep these substances away from the front diaphragm.
  - Protect the display against direct sunlight.

The front diaphragm (Autoflex EB) is based on a polyester film with biaxial alignment. It is highly resistant to solvents.
The front diaphragm is resistant to the standard of DIN 42 115 part 2 against the following chemicals, without any evident change or damage:

**Application of more than 24 hours**
- 1,1,1 trichloro ethane
- Aliphatic hydrocarbons
- Benzene
- Cyclohexanol
- Diethyl ether
- Ethanol
- Acetaldehyde
- Acetone
- Acetic acid < 50 %
- Sulphuric acid 30 %
- Diacetone alcohol
- 1,4 dioxane
- DS2 decontamination fluid
- Fabric conditioner
- Acetonitrile
- Alkali carbonate
- Ammonia < 32 %
- Sal ammoniac < 10 %
- Bichromate
- Caustic potash (potassium hydroxide) < 2 %
- Sodium hydroxide 50 %
- Refrigerant (Hysol X)
- Diesel oil
- Castor oil
- Silver nitrate 20 %
Ethyl acetate
Acetaldehyde
Fluorochlorinated hydrocarbons
Glycerine
Isopropanol
Methanol

Ferric chloride < 30 %
Formic acid (methane acid) < 50 %
Hydrochloric acid < 10 %
Hydrogen peroxide < 25 %
Isophorone
Methyl ethyl ketone (butanone)
Nitric acid < 10 %
Tetrahydrofuran
Formaldehyde (37 %) in water

Linseed oil
Paraffin oil
Petrol
Silicone oil
Turpentine substitute
Universal brake fluid (e.g. Castrol Girling)
Dibasic ester 6
Skydrol 500B4
Lixtop
Potassium ferrocyanide

Tetrachloroethylene (perchloroethylene)
Toluene
Triacetin
Trichloroethylene
Xylene

Phosphoric acid < 30 %
Potash
Sodium hypochlorite < 20 %
Sulphuric acid < 10 %
Detergent
Saturated seawater solution

Application of 24 hours at 50 °C
Top Job
Jet Dry
Gumption
Fantastic
Formula 409
Grape juice
Milk
Ariel
Persil
Wisk
Lenor
Downey
Ajax
Vim
Domestos
Vortex
Windex

Application of less than 1 hour
Glacial acetic acid (pure acetic acid)
8. Uninstallation

8.1. Uninstallation, DC200X and ET200X

1st  Disconnect the device and its peripherals from the power supply.
2nd  Unplug all plug connectors and cables.
3rd  Device with twist-lock catches: Using a T9x50 screwdriver, fully open the twist-lock catches and turn them anti-clockwise to the stop.

NOTE

Damage to the device!
If uninstallation is performed carelessly the device can fall out of the installation cut-out or be damaged.
►  Do not tilt the device.
►  Secure the device against falling, especially when taking it out of the installation cut-out.

Fig. 47: Undo the securing clips

4th  Using a slotted screwdriver (blade 3–3.5 mm) undo the securing clips.
    DC2004 and ET2004: 4 securing clips (2 top, 2 bottom)
    DC2007 and ET2007: 6 securing clips (3 bottom, 3 top)
5th  Push the device sufficiently far out of the installation cut-out that the securing clips are no longer engaged.
Fig. 48: Pushing the device out of the installation cut-out

6th Push the device evenly forwards out of the installation cut-out.
8.2. Uninstallation, ECC21XX Slim

**CAUTION**

**Danger of burns!**
The surface of the device can become hot.
▶ If necessary, allow the device to cool down before uninstalling it.

---

![Uninstalling process](image)

Fig. 49: Uninstalling the device

1st  Use the slotted screwdriver to pull the retaining spring down fully and free the device below the mounting rail.
2nd  Pull the lower device catch off the mounting rail.
3rd  Push the device up and remove it from the mounting rail.
9. Disposal

The device contains the following components which need to be disposed of separately:

► Metals
► Electronic components
► Battery

The respective national regulations for disposal of electrical devices in B2B trade are applicable.

The following options are available for disposal of the device:

**Disposal by the manufacturer**

Unless agreed otherwise, devices can be sent back for disposal.

**Disposal in accordance with regional regulations**

► Dismantle the device and disassemble it completely into its component parts.
► Send the metal parts for metal recycling.
► Sort the electronic parts (circuit boards, drives etc.).
► Dispose of the electronic scrap in accordance with the national laws and regulations.
► Check that the battery is fully discharged.
► Dispose of the battery in accordance with the national laws and regulations, via an authorised collection point.
10. Technical data

10.1. B-PRIMIS DC-PRO (DC200X)

<table>
<thead>
<tr>
<th>Dialog Controller</th>
<th>DC2004 (2 CAN)</th>
<th>DC2007 (2 CAN)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Display</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Across diagonals</td>
<td>WQVGA</td>
<td>WVGA</td>
</tr>
<tr>
<td></td>
<td>4.3&quot;</td>
<td>7&quot; wide</td>
</tr>
<tr>
<td>Item no.</td>
<td>270010700 (270011400)</td>
<td>270010800 (270011500)</td>
</tr>
<tr>
<td>Resolution</td>
<td>480 x 272 pixels</td>
<td>800 x 480 pixels</td>
</tr>
<tr>
<td>Colours</td>
<td>TFT: 16.7 M (24 bits/pixel)</td>
<td></td>
</tr>
<tr>
<td><strong>CPU, user memory</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU</td>
<td>800 MHz ARM® CPU</td>
<td></td>
</tr>
<tr>
<td>Program memory (flash)</td>
<td>256 MB</td>
<td></td>
</tr>
<tr>
<td>Program memory and data memory (RAM)</td>
<td>256 MB</td>
<td></td>
</tr>
<tr>
<td>Non-volatile memory (FRAM)</td>
<td>100 kB (FRAM)</td>
<td></td>
</tr>
<tr>
<td><strong>Dimensions and weight</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (WxHxD)</td>
<td>161 x 103 x 46 mm</td>
<td>224 x 152 x 46 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 450 g</td>
<td>approx. 600 g</td>
</tr>
<tr>
<td><strong>Operating conditions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0 °C to 55 °C (front and rear of the device; in compliance with installation requirements at a rated voltage 24 V DC +5 %)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>50 °C at a max. power supply of 28.8 V DC</td>
<td></td>
</tr>
<tr>
<td>Relative humidity</td>
<td>max. 85%, non-condensing</td>
<td></td>
</tr>
<tr>
<td><strong>Transport and storage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>–20 °C to +70 °C</td>
<td></td>
</tr>
<tr>
<td>Relative humidity</td>
<td>max. 85%, non-condensing</td>
<td></td>
</tr>
<tr>
<td><strong>Operation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Installation</td>
<td>integral securing clips</td>
<td></td>
</tr>
<tr>
<td>Certification</td>
<td>to product standards EN 61010-2-201, EN 61131-2</td>
<td></td>
</tr>
<tr>
<td>Development environment</td>
<td>CODESYS V3 (IEC 61131-3)</td>
<td></td>
</tr>
<tr>
<td>Touch operation</td>
<td>Touch resistive</td>
<td></td>
</tr>
<tr>
<td><strong>Shock resistance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration</td>
<td>sinusoidal (EN 60068-2-6) test: Fc 10…150 Hz, 10 m/s²</td>
<td></td>
</tr>
<tr>
<td>Dialog Controller</td>
<td>DC2004 (2 CAN)</td>
<td>DC2007 (2 CAN)</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td><strong>Shock</strong></td>
<td>15 G (approx. 150 m/s²), 11 ms duration, sinusoidal half-wave (EN 60068-2-27)</td>
<td>Test: Ea</td>
</tr>
<tr>
<td><strong>EMC, protection rating</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emitted interference</td>
<td>EN 61131-2; EN 61000-6-3, residential areas</td>
<td>EN 61131-2; EN 61000-6-4, industrial areas</td>
</tr>
<tr>
<td>Resistance to interference</td>
<td>EN 61131-2; EN 61000-6-2, industrial areas</td>
<td></td>
</tr>
<tr>
<td>Protection class</td>
<td>III</td>
<td></td>
</tr>
<tr>
<td>Protection rating</td>
<td>IP20, front IP54 (IP65 only with twist-lock catches tightened)</td>
<td></td>
</tr>
<tr>
<td><strong>Power supply (24 V power)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply voltage</td>
<td>+24 V DC (−15 % / +20 %) SELV max. ripple component 5%</td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>typ. 0.3 A, max. 3 A at +24 V DC, fused depending on the load on the I/O</td>
<td></td>
</tr>
<tr>
<td>Protection against reverse polarity</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>Voltage failure switching</td>
<td>10 ms at &lt; 20.4 V DC</td>
<td></td>
</tr>
<tr>
<td><strong>Ethernet interfaces</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. / type of interface</td>
<td>1x 10/100 Base T</td>
<td></td>
</tr>
<tr>
<td>Connection system</td>
<td>RJ45</td>
<td></td>
</tr>
<tr>
<td>Protocols</td>
<td>TCP/IP, Modbus TCP, BACnet, Profinet</td>
<td></td>
</tr>
<tr>
<td><strong>EtherCAT interface</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. / type of interface</td>
<td>1x EtherCAT (EtherCAT master)</td>
<td></td>
</tr>
<tr>
<td>Connection system</td>
<td>RJ45</td>
<td></td>
</tr>
<tr>
<td><strong>USB interfaces</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. / type of interface</td>
<td>1x host USB 2.0 / USB plug port A</td>
<td></td>
</tr>
<tr>
<td>No. plugging/unplugging cycles</td>
<td>max. 1,000</td>
<td></td>
</tr>
<tr>
<td><strong>CAN bus interfaces</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. / type of interface</td>
<td>1x CAN bus</td>
<td></td>
</tr>
<tr>
<td>Protocols</td>
<td>CAN-Bus and/or CANopen master</td>
<td></td>
</tr>
<tr>
<td><strong>Serial ports</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. / type of interface</td>
<td>1x RS-232; 1 x RS-485</td>
<td></td>
</tr>
<tr>
<td>Protocols</td>
<td>Modbus RTU</td>
<td></td>
</tr>
<tr>
<td><strong>Additional functions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real-time clock</td>
<td>yes, with battery back-up</td>
<td></td>
</tr>
<tr>
<td>Dialog Controller</td>
<td>DC2004 (2 CAN)</td>
<td>DC2007 (2 CAN)</td>
</tr>
<tr>
<td>-------------------</td>
<td>----------------</td>
<td>----------------</td>
</tr>
<tr>
<td>microSD card slot</td>
<td>1x microSD card</td>
<td></td>
</tr>
</tbody>
</table>

**I/O**

<table>
<thead>
<tr>
<th></th>
<th>DC2004 (2 CAN)</th>
<th>DC2007 (2 CAN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital IN</td>
<td>4x</td>
<td></td>
</tr>
<tr>
<td>Digital OUT</td>
<td>4x (0.5 A)</td>
<td></td>
</tr>
<tr>
<td>Analogue IN</td>
<td>2x (–10…+10 V, PT100/PT1000 with 2-wire)</td>
<td>2x (–10…+10 V, or return lead for 3-wire)</td>
</tr>
</tbody>
</table>

**Battery**

<table>
<thead>
<tr>
<th></th>
<th>DC2004 (2 CAN)</th>
<th>DC2007 (2 CAN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Panasonic VL2020 or similar</td>
<td></td>
</tr>
<tr>
<td>Lifespan</td>
<td>10 years (depends on operating temperature)</td>
<td></td>
</tr>
<tr>
<td>Storage</td>
<td>1 year without voltage (any longer and RTC data can be lost)</td>
<td></td>
</tr>
</tbody>
</table>

**Front membrane display (Autoflex)**

<table>
<thead>
<tr>
<th></th>
<th>DC2004 (2 CAN)</th>
<th>DC2007 (2 CAN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature (rel. atmospheric humidity 10…95 %)</td>
<td>–40…+60 °C</td>
<td></td>
</tr>
<tr>
<td>Operating temperature (rel. atmospheric humidity &lt; 10 %)</td>
<td>–40…+85 °C (without loss of functionality after 0.5 million activations at –40 °C)</td>
<td></td>
</tr>
<tr>
<td>Use outdoors</td>
<td>Like all polyester-based membranes, Autoflex is unsuitable for long-term exposure to direct sunlight.</td>
<td></td>
</tr>
</tbody>
</table>
## 10.2. B-PRIMIS ET-PRO (ET200X)

<table>
<thead>
<tr>
<th>Ethernet Terminal</th>
<th>ET2004</th>
<th>ET2007</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Display</strong></td>
<td>WQVGA</td>
<td>WVGA</td>
</tr>
<tr>
<td>Across diagonals</td>
<td>4.3”</td>
<td>7” wide</td>
</tr>
<tr>
<td>Item no.</td>
<td>222001800</td>
<td>222001900</td>
</tr>
<tr>
<td>Resolution</td>
<td>480 x 272 pixels</td>
<td>800 x 480 pixels</td>
</tr>
<tr>
<td>Colours</td>
<td>TFT: 16.7 M (24 bits/pixel)</td>
<td></td>
</tr>
</tbody>
</table>

### CPU, user memory

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>CPU</td>
</tr>
<tr>
<td>Program memory (flash)</td>
<td>Program memory (flash)</td>
</tr>
<tr>
<td>Program memory and data memory (RAM)</td>
<td>Program memory and data memory (RAM)</td>
</tr>
</tbody>
</table>

### Dimensions and weight

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (WxHxD)</td>
<td>161 x 103 x 46 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 450 g</td>
</tr>
</tbody>
</table>

### Operating conditions

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature</td>
<td>0 °C to 55 °C (front and rear of the device; in compliance with installation requirements)</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>max. 85%, non-condensing</td>
</tr>
</tbody>
</table>

### Transport and storage

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature</td>
<td>–20 °C to +70 °C</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>max. 85%, non-condensing</td>
</tr>
</tbody>
</table>

### Operation

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation</td>
<td>integral securing clips</td>
</tr>
<tr>
<td>Certification</td>
<td>to product standards EN 61010-2-201, EN 61131-1</td>
</tr>
<tr>
<td>Touch operation</td>
<td>Touch resistive</td>
</tr>
</tbody>
</table>

### Shock resistance

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Vibration</td>
<td>sinusoidal (EN 60068-2-6) test: Fc 10...150 Hz, 10 m/s²</td>
</tr>
<tr>
<td>Shock</td>
<td>15 G (approx. 150 m/s²), 11 ms duration, sinusoidal half-wave (EN 60068-2-27)</td>
</tr>
<tr>
<td>Test: Ea</td>
<td></td>
</tr>
</tbody>
</table>

### EMC, protection rating

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Emitted interference</td>
<td>EN 61131-2; EN 61000-6-3, residential areas</td>
</tr>
<tr>
<td><strong>Ethernet Terminal</strong></td>
<td><strong>ET2004</strong></td>
</tr>
<tr>
<td>-----------------------</td>
<td>------------</td>
</tr>
<tr>
<td><strong>Resistance to interference</strong></td>
<td>EN 61131-2; EN 61000-6-2, industrial areas</td>
</tr>
<tr>
<td><strong>Protection class</strong></td>
<td>III</td>
</tr>
<tr>
<td><strong>Protection rating</strong></td>
<td>IP20, front IP54 (IP65 only with twist-lock catches tightened)</td>
</tr>
<tr>
<td><strong>Power supply (24 V power)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Supply voltage</strong></td>
<td>+24 V DC (−15 % / +20 %) SELV max. ripple component 5%</td>
</tr>
<tr>
<td><strong>Power consumption</strong></td>
<td>typ. 0.3 A, max. 1.2 A at +24 V DC</td>
</tr>
<tr>
<td><strong>Protection against reverse polarity</strong></td>
<td>yes</td>
</tr>
<tr>
<td><strong>Ethernet interface</strong></td>
<td></td>
</tr>
<tr>
<td><strong>No. / type of interface</strong></td>
<td>1x 10/100 Base T</td>
</tr>
<tr>
<td><strong>Connection system</strong></td>
<td>RJ45</td>
</tr>
<tr>
<td><strong>Protocols</strong></td>
<td>TCP/IP</td>
</tr>
<tr>
<td><strong>USB interface</strong></td>
<td></td>
</tr>
<tr>
<td><strong>No. / type of interface</strong></td>
<td>1x host USB 2.0 / USB plug port A</td>
</tr>
<tr>
<td><strong>No. plugging/unplugging cycles</strong></td>
<td>max. 1,000</td>
</tr>
<tr>
<td><strong>Additional functions</strong></td>
<td></td>
</tr>
<tr>
<td><strong>microSD card slot</strong></td>
<td>1x microSD card</td>
</tr>
<tr>
<td><strong>Front membrane display</strong></td>
<td></td>
</tr>
<tr>
<td><strong>(Autoflex)</strong></td>
<td></td>
</tr>
</tbody>
</table>
| **Operating temperature** | −40…+60 °C | −40…+85 °C
(rel. atmospheric humidity 10…95 %) | (without loss of functionality after 0.5 million activations at −40 °C) |
| **Use outdoors** | Like all polyester-based membranes, Autoflex is unsuitable for long-term exposure to direct sunlight. |    |
### 10.3. B-FORTIS CC-SLIM (ECC21XX Slim)

<table>
<thead>
<tr>
<th>Ethernet Terminal</th>
<th>ECC2100 Slim</th>
<th>ECC2110 Slim</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Item no.</strong></td>
<td>250000200</td>
<td>250001100</td>
</tr>
</tbody>
</table>

**CPU, user memory**

- **CPU**: 800 MHz ARM® CPU
- **Program memory (flash)**: 256 MB
- **Program memory and data memory (RAM)**: 256 MB
- **Non-volatile memory**: 100 kB (FRAM)

**Dimensions and weight**

- **Dimensions (WxHxD)**: 87 x 128 x 39 mm (ECC2100 Slim), 87 x 128 x 47 mm (ECC2110 Slim)
- **Weight**: approx. 550 g

**Operating conditions**

- **Operating temperature**: 0 °C to 55 °C (front and rear of the device; in compliance with installation requirements)
- **Relative humidity**: max. 85%, non-condensing

**Transport and storage**

- **Operating temperature**: –20 °C to +70 °C
- **Relative humidity**: max. 85%, non-condensing

**Operation**

- **Installation**: on a mounting rail to DIN EN 60715:2001, 35 x 7.5 mm
- **Certification**: to product standards DIN EN 61010-2-201, DIN EN 61131-2
- **Touch operation**: CODESYS V3 (IEC 61131-3)

**Shock resistance**

- **Vibration**: sinusoidal (EN 60068-2-6) test: Fc 10...150 Hz, 10 m/s²
- **Shock**: 15 G (approx. 150 m/s²), 11 ms duration, sinusoidal half-wave (EN 60068-2-27) Test: Ea

**EMC, protection rating**

- **Emitted interference**: EN 61131-2; EN 61000-6-3, residential areas
- **Resistance to interference**: EN 61131-2; EN 61000-6-2, industrial areas
- **Protection class**: III
- **Protection rating**: IP20, front IP54
<table>
<thead>
<tr>
<th><strong>Ethernet Terminal</strong></th>
<th><strong>ECC2100 Slim</strong></th>
<th><strong>ECC2110 Slim</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power supply (24 V power)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply voltage</td>
<td>+24 V DC (−15 % / +20 %) SELV max. ripple component 5%</td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>typ. 0.3 A, max. 3 A at +24 V DC, fused depending on the load on the I/O</td>
<td></td>
</tr>
<tr>
<td>Protection against reverse polarity</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>Voltage failure switching</td>
<td>10 ms at &lt; 20.4 V DC</td>
<td></td>
</tr>
<tr>
<td><strong>Ethernet interface</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. / type of interface</td>
<td>1x 10/100 Base T</td>
<td></td>
</tr>
<tr>
<td>Connection system</td>
<td>RJ45</td>
<td></td>
</tr>
<tr>
<td>Protocols</td>
<td>TCP/IP, Modbus TCP, BACnet, Profinet</td>
<td></td>
</tr>
<tr>
<td><strong>EtherCAT interfaces</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. / type of interface</td>
<td>1x EtherCAT (EtherCAT master)</td>
<td></td>
</tr>
<tr>
<td>Connection system</td>
<td>RJ45</td>
<td></td>
</tr>
<tr>
<td><strong>USB interface</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. / type of interface</td>
<td>1x host USB 2.0 / USB plug port A</td>
<td></td>
</tr>
<tr>
<td>No. plugging/unplugging cycles</td>
<td>max. 1,000</td>
<td></td>
</tr>
<tr>
<td><strong>CAN bus interfaces</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. / type of interface</td>
<td>1x CAN bus</td>
<td>2x CAN bus (CAN0, CAN1)</td>
</tr>
<tr>
<td>Protocols</td>
<td>CAN-Bus and/or CANopen master</td>
<td></td>
</tr>
<tr>
<td><strong>Serial ports</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. / type of interface</td>
<td>1x RS-232; 1x RS-485</td>
<td></td>
</tr>
<tr>
<td>Protocols</td>
<td>Modbus RTU</td>
<td></td>
</tr>
<tr>
<td><strong>Additional functions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>microSD card slot</td>
<td>1x microSD card</td>
<td></td>
</tr>
<tr>
<td><strong>I/O</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital</td>
<td>4x</td>
<td></td>
</tr>
<tr>
<td>Digital OUT</td>
<td>4x (0.5 A)</td>
<td></td>
</tr>
<tr>
<td>Analogue IN</td>
<td>2x (−10…+10 V, PT100/PT1000 with 2-wire)</td>
<td>2x (−10…+10 V, or return lead for 3-wire)</td>
</tr>
<tr>
<td><strong>Battery</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Panasonic VL2020 or similar</td>
<td></td>
</tr>
<tr>
<td>Lifespan</td>
<td>10 years (depends on operating temperature)</td>
<td></td>
</tr>
</tbody>
</table>
10.4. Identification plate

![Identification plate example](image)

<table>
<thead>
<tr>
<th>Item</th>
<th>Designation</th>
<th>Item</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>QR code (Identification no.)</td>
<td>5</td>
<td>Supply voltage</td>
</tr>
<tr>
<td>2</td>
<td>Version (delivery version; as-delivered condition)</td>
<td>6</td>
<td>Identification no. (article no. and serial no.)</td>
</tr>
<tr>
<td>3</td>
<td>CE mark</td>
<td>7</td>
<td>Device type description</td>
</tr>
<tr>
<td>4</td>
<td>Date of manufacture (year/calendar week)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The 'Version' field (delivered version) specifies the ex works condition of the module.
10.5. Identification

The characteristics of the device can be decoded from the identification key.

Assignment to the product designations:

- B-PRIMIS DC-PRO = DC200X
- B-PRIMIS ET-PRO = ET200X
- B-FORTIS CC-SLIM = ECC21XX

![Identification Key Diagram]

Fig. 51: DC200X identification key
Fig. 52: ET200X identification key

Fig. 53: ECC21XX Slim identification key
11. Standards and certificates

11.1. Standards

Applicable directives
- EMC directive 2014/30/EU
- RoHS directive 2011/65/EU

Applicable standards
- Standard
  EN 50581:2012
- PLC standard EN
  EN 61131-2:2008-4
- Emission standards
  EN 61000-6-3:2012-11
- Safety provisions
  DIN EN 61010-2-201
11.2. UL certificate

CERTIFICATE OF COMPLIANCE

Certificate Number: 20150126-E242595
Report Reference: E242595-20150123
Issue Date: 2015-JANUARY-26

Issued to: BERGHOF AUTOMATION GMBH
Harretstrasse 1
72800 Eningen GERMANY

This is to certify that representative samples of PROGRAMMABLE CONTROLLERS have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: UL / CSA 61010-1, Electrical Equipment For Measurement, Control, and Laboratory Use; Part 1: General Requirements UL61010-2-201 and CAN/CSA-IEC 61010-2-201:14, Electrical Equipment For Measurement, Control, and Laboratory Use – Part 2-201: Particular Requirements for Control Equipment

Additional Information: See the UL Online Certifications Directory at www.ul.com/database for additional information

Only those products bearing the UL Certification Mark should be considered as being covered by UL's Certification and Follow-Up Service.

Look for the UL Certification Mark on the product.

Fig. 54: UL certificate page 1 of 2
CERTIFICATE OF COMPLIANCE

Certificate Number 20150126-E242595
Report Reference E242595-20150123
Issue Date 2015-JANUARY-26

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Programmable Logic Controllers, models DC or ET, followed by 20, followed by 00..99, followed by blank or W, followed by Q, V, S, X, SX, UX or QX, followed by blank, followed by T, followed by S, followed by blank, followed by 0.8 or 1.0, followed by S, D, L or Q, followed by blank, may be followed by additional suffixes.

Programmable Logic Controllers, models ECC, followed by 21, followed by 00, followed by blank, followed by 0.8 or 1.0, followed by S, D, L or Q, followed by blank, may be followed by additional suffixes.

Fig. 55: UL certificate page 2 of 2
The devices are authorised to use the following mark:

![cULus Mark](image)

Fig. 56: cULus authorisation

The devices have been awarded cULus authorisation according to standard UL 61010-2-201 NRAQ /7.

Link:
UL File Number: E242595
11.3. Declaration of conformity

The declarations of conformity can be found on our website www.berghof-automation.com/ and are available for downloading in respect of each product.

Example of a path:

Products ➔ Controllers / PLC ➔ Display PLC ➔ Resistive ➔ Product

On each product page there is a link for downloading the declaration of conformity:

![Download menu](image)

Fig. 57: Download menu
12. Customer services / addresses

Repairs and corrective maintenance may be carried out only by the manufacturer or authorised customer service centres.

12.1. Customer service

Berghof Automation GmbH
Harretstr. 1
72800 Eningen
Germany
T +49.7121.894-183
F +49.7121.894-100
e-mail: support-controls@berghof.com
www.berghof-automation.com

12.2. Addresses

CAN in Automation; international manufacturer and user organisation for CAN users in automation:
CAN in Automation e.V. (CiA)
Am Weichselgarten 26
91058 Erlangen
headquarters@can-cia.de
www.can-cia.de

EtherCAT Technology Group
ETG Headquarters
Ostendstraße 196
90482 Nuremberg
info@ethercat.org
www.ethercat.org

Beuth Verlag GmbH, 10772 Berlin
or
VDE-Verlag GmbH, 10625 Berlin

VDE Verlag GmbH, 10625 Berlin
or
Internet research: www.iec.ch
13. Appendix

13.1. Information on copyright and software licence

The firmware of the devices contains the free software. Parts of this software are available under the following OpenSource licences, amongst others:

→ GNU General Public License (GPL)
→ GNU Lesser General Public License (LGPL)
→ Mozilla Public License (MPL)
→ FreeType License (FTL)

The source code of the free software may be requested from Berghof Customer Service within three years of delivery of the device, at cost price.

13.2. List of figures

Fig. 1: Overview DC2004 (rear view) ................................................................. 14
Fig. 2: Overview DC2007 (rear view) ................................................................. 15
Fig. 3: Overview ET2004 (rear view) ................................................................. 16
Fig. 4: Overview ET2007 (rear view) ................................................................. 17
Fig. 5: Overview ECC2100 Slim ........................................................................ 18
Fig. 6: Overview ECC2110 Slim ........................................................................ 18
Fig. 7: Dimensions, DC2004 and ET2004 .......................................................... 22
Fig. 8: Installation cut-out, DC2004 and ET2004 ............................................... 23
Fig. 9: Dimensions, DC2007 and ET2007 .......................................................... 24
Fig. 10: Installation cut-out, DC2007 and ET2007 .............................................. 25
Fig. 11: Open the twist-lock catches .................................................................. 26
Fig. 12: Installation in an installation cut-out, example with 4 securing clips ....... 26
Fig. 13: Device clicked home in the installation cut-out, example with 4 securing clips ................................................................. 27
Fig. 14: Assembling the device ......................................................................... 28
Fig. 15: Power supply to the DC200X and ECC21XX Slim plug X1 with power LED ........................................................................ 30
Fig. 16: Power supply ET200X plug X1 .............................................................. 31
Fig. 17: Block circuit diagram, DC200X ............................................................. 32
Fig. 18: Block circuit diagram ECC21XX Slim ................................................. 33
Fig. 19: Block circuit diagram, ET200X ............................................................. 34
Fig. 20: Digital inputs and outputs, DC200X and ECC21XX Slim plug X1 with LEDs 1 to 8 ................................................................. 35
Fig. 21: Circuit diagram of the principles of positive switching output .......... 37
Fig. 22: Circuit diagram of the principles of positive switching input .......... 38
Fig. 23: Operating ranges of the digital inputs (type 1/3), negative switching ......... 38
Fig. 24: Counter Up/Down or Pulse/Direction .................................................. 39
Fig. 25: Counter with Capture input .................................................................... 40
Fig. 26: Ethernet interface X4 ........................................................................... 41
Fig. 27: EtherCAT interface X5 ........................................................................... 42
Fig. 28: USB interface X3 .................................................................................. 43
Fig. 29: RS-232 / RS-485 interface X6 ............................................................... 44
Fig. 30: RS-485 switchable terminating resistor ............................................... 45
Fig. 31: CAN interface X7 (X12) ........................................................................ 46
Fig. 32: Analogue inputs X2 ............................................................................... 47
Fig. 33: example connection: voltage input

Fig. 34: example connection: temperature measurement

Fig. 35: login window

Fig. 36: List of web interface settings

Fig. 37: "Network Configuration" page

Fig. 38: Main screen of the device

Fig. 39: Network settings

Fig. 40: Summary of the network settings

Fig. 41: Identification plate with device serial number 00001 (example)

Fig. 42: login window

Fig. 43: List of web interface settings

Fig. 44: "Network Configuration" page

Fig. 45: Location of the operating status LEDs

Fig. 46: Function key (S1)

Fig. 47: Undo the securing clips

Fig. 48: Pushing the device out of the installation cut-out

Fig. 49: Uninstalling the device

Fig. 50: Identification plate (example)

Fig. 51: DC200X identification key

Fig. 52: ET200X identification key

Fig. 53: ECC21XX Slim identification key

Fig. 54: UL certificate page 1 of 2

Fig. 55: UL certificate page 2 of 2

Fig. 56: cULus authorisation

Fig. 57: Download menu