USER MANUAL 1.1

B-FORTIS CC-Pi Slim Series

BERGHOF

Copyright © Berghof Automation GmbH

Distribution and reproduction of this document, as well as the use and disclosure of its contents, are prohibited without our express consent. All rights reserved.
Violations will result in liability for damages.

Disclaimer
The content of this publication has been checked for consistency with the described hardware and software. However, discrepancies cannot be ruled out, so we do not guarantee complete consistency. The information in this publication is reviewed regularly, and necessary corrections are included in subsequent editions. Suggestions for improvement are always welcome. Subject to technical changes.

Trademarks
- → EtherCAT® is a registered trademark and a patented technology licensed by Beckhoff Automation GmbH, Germany.
- → ARM® and Cortex® are registered trademarks of ARM Limited.
- → PROFINET® is a registered trademark of the PROFIBUS User Organization e. V.
- → Modbus® is a registered trademark of the Modbus-IDA Organization.
- → Raspberry Pi is a registered trademark of the Raspberry Pi Foundation
- → KNX is a registered trademark of the KNX Association
- → BACnet is a protocol; the rights belong to the organization BACnet International
- → EtherNet/IP is a registered trademark of the Open DeviceNet Vendors Association
- → CODESYS is a registered trademark of CODESYS GmbH

The rights to all companies and company names mentioned here, as well as products and product names, belong to the respective companies.

Notes on this manual
This manual:
- ➔ manual contains product-specific information that is valid at the time of publication.
- ➔ should be read carefully before commissioning the device to avoid errors during operation and to become familiar with the device.
- ➔ It is only complete when used in conjunction with the product-specific hardware and software user manuals required for the respective application.
- ➔ does not include repair instructions. If repairs are necessary, please contact your supplier or Berghof Automation GmbH directly

You can reach us at:
Berghof Automation GmbH
Arbachtalstrasse 26
72800 Eningen
Germany
T +49.7121.894-0
Email: controls@berghof.com
www.berghof-automation.com

Berghof Automation GmbH is certified according to DIN EN ISO 9001.

Change Log

Version	Date	Description
1.0	May 26, 2026	Initial version
1.1	June 26, 2026	Cover image replaced EtherCAT-Master added

Table of Contents

1. GENERAL INFORMATION 12
1.1. Notes on the Manual 12
1.2. Symbols and Notational Conventions 12
1.3. Hazard Categories and Signal Words 13
1.4. Qualified personnel 13
1.5. Duty of Care 14
1.5.1. General 14
1.6. Intended Use 15
1.7. Transport and Storage 16
Transport and Storage 16
Operation 16
1.8. Unpacking 16

2. SAFETY 17
2.1. Safety-related systems 17
2.2. Safety Instructions 17
Work on the device 18
2.3. Cybersecurity 18

3. PRODUCT DESCRIPTION 19
3.1. Overview: B-Fortis CC-Pi Slim 20
3.2. Scope of Delivery and Accessories 21
Scope of Delivery 21
Accessories 21
Extensions for tooling and debugging 21
3.3. Product Features 22
Features at a glance 22
Mounting 22
Processor 22
Ethernet 22
EtherCAT 22
USB 22
Onboard Inputs / Outputs 22
Additional Interfaces 22
Real-time clock 22

4. MOUNTING 23

5. CONNECTION 24
5.1. Power Supply 24
Installation 24
5.1.1. Connect the power supply 25
5.2. Grounding 26

5.3. Data connections 27
5.3.1. Block diagram 27
5.3.2. Digital Inputs and Outputs 28
5.3.3. CC-Pi Slim Connector Overview 28
5.3.4. Ethernet 33
5.3.5. USB 34

6. OPERATION 35

6.1. Switching on and off 35
Powering On 35
Turning off 35

6.2. Initial Commissioning Network 36
6.2.1. Web Interface Configuration 36

6.3. Operation 39
6.3.1. Status Indicators 39
6.3.2. Real-time clock with voltage buffer 40
Set date/time 40
6.3.3. Start/Stop Reset button S1 40
CODESYS Stop – Start – Reset 41
Service Mode 41

6.4. Troubleshooting 42
6.4.1. No network connection 42
6.4.2. In case of an error stop 42
6.4.3. IP address unknown 42

6.5. Berghof Control System Manual 43

7. MAINTENANCE / SERVICING 44

7.1. Maintenance 44

8. DISASSEMBLY 45

9. DISPOSAL 46

10. INFORMATION AND OPTIONS 47

10.1. Nameplate 49

10.2. Device variants and identification 50

10.3. Options and Extensions 50

11. STANDARDS AND CERTIFICATES 51

11.1. Standards 51
Applicable EU Directives 51
Applicable EU standards 51
Applicable UKCA Directives 51
Applicable UKCA Standards 51

11.2. Declaration of Conformity / Technical Specifications 52

12. CUSTOMER SERVICE / ADDRESSES 53

12.1. Customer Service 53
12.2. Repair Service 53
12.3. Addresses 54

13. APPENDIX 55
13.1. Information on software copyright and licensing 55
13.2. List of Figures 55

1. General Information

Please read this user manual carefully before commissioning. Failure to do so may result in damage to the device and injury to operating personnel.
Safety-related notes and their classifications are explained in the section Hazard Categories and Signal Terms (1.3). These instructions must be followed in all cases!

1.1. Notes on the Manual

This user manual is part of the product and applies to the following device:
→ B-Fortis CC-Pi Slim

1.2. Symbols and Notational Conventions

The following symbols and visual aids are used in this user manual:

Symbol	Meaning
→ …	List entry
▶ …	A single instruction or a list of instructions that can be carried out in any order.
1. … 2. …	A list of instructions that must be carried out in the specified order.
	Additional information about the product

Structure of the warnings:

⚠ WARNING

Optional: Additional symbols	**Type and cause of the hazard** Brief description and consequences ▶ Preventive measures

1.3. Hazard Categories and Signal Words

The signal words described below are used for warnings that you must observe for your personal safety and to prevent property damage.

The signal terms have the following meanings:

⚠ DANGER

Serious injury or death

Failure to follow safety precautions will result in death or serious injury.

- ▶ Follow the preventive measures.

⚠ WARNING

Possible serious injury or death

Failure to follow safety precautions can result in death or serious injury.

- ▶ Follow the safety precautions.

⚠ CAUTION

Possible minor injuries

Failure to follow safety precautions may result in minor injuries.

- ▶ Follow the precautions.

NOTE

Possible property damage

Failure to follow safety precautions may result in property damage.

- ▶ Follow the preventive measures.

1.4. Qualified personnel

Installation, commissioning, and maintenance of the device require qualified personnel.
Qualified personnel, as defined in this documentation and the safety instructions contained therein, are trained specialists who are familiar with the safety concepts of automation technology and who are authorized to assemble, install, commission, ground, and label devices, systems, and electrical circuits in accordance with safety engineering standards.

1.5. Duty of Care

1.5.1. General

The operator or secondary processor (OEM) must ensure the following:

- → The device is used only for its intended purpose.
- → The device is operated only in perfect, fully functional condition.
- → The user manual is always legible and available in its entirety.
- → Only sufficiently qualified and authorized personnel perform assembly, installation, commissioning, and maintenance of the device.
- → These specialists are regularly trained in all relevant aspects of occupational safety and environmental protection and are familiar with the contents of the user manual, particularly the safety instructions contained therein.
- → The device markings and identifications affixed to the device, as well as safety and warning notices, must not be removed and must always be kept in a legible condition.
- → The national and international regulations governing the control of machines and systems applicable at the device's respective location of use must be observed.
- → Users must always have access to all current information relevant to their needs regarding the device, its application, and its operation.
- → The user is responsible for coordinating the use of safety-related control components with the relevant authority and must comply with its specifications.

1.6. Intended Use

The device is a component of a modular automation system for industrial control applications in the medium to high performance range.

The automation system is designed for use within overvoltage category I (IEC 60364-4-44) for the control and regulation of machines and industrial processes in low-voltage systems under the following conditions:

- → Maximum rated supply voltage: 1000 V AC (50/60 Hz) or 1500 V DC
- → Environment with a maximum pollution degree of 2 (EN 61010-1)
- → Altitude up to 2000 m above sea level
- → Indoor use only, without direct UV exposure
- → Max. ambient temperature according to technical specifications (see “Technical Data,” p. 42)

The proper and safe operation of the automation system requires qualified project planning, proper transport, storage, installation, and use, as well as careful maintenance.
The automation system may only be used within the scope of the data and applications specified in this documentation and the associated user manuals.

Use the automation system only as follows:

- → As intended
- → In technically sound condition
- → Without unauthorized modifications
- → Exclusively by qualified users

- ▶ Observe the regulations of the employers’ liability insurance associations, the Technical Inspection Association, the VDE regulations, or corresponding national regulations.
- ▶ The device is intended for installation in a suitable control cabinet on industrial machinery and equipment in indoor environments.
- ▶ Observe the environmental conditions applicable to operation
  (see “Technical Data,” p. 42)

1.7. Transport and Storage

The device is sensitive to impacts, strong vibrations, moisture, and extreme temperatures.

Transport and Storage

- ► Protect the device from severe mechanical stress during transport.
- ► Always transport the device in its original packaging.
- ► Observe the applicable environmental conditions for storage (see “Technical Data,” p.43).
- ► Protect the device from precipitation and moisture.

Operation

- ► After storage or transport, do not put the device into operation until it has reached the permissible operating conditions.
- ► Wait at least 12 hours after condensation before putting the device into operation.

1.8. Unpacking

Upon receipt of the device, ensure that the shipment is undamaged and complete.

- ► Check the packaging for external damage.
- ► If the packaging is severely damaged or if damage to the contents is visible: Do not open the packaging any further and immediately inform the carrier and your supplier.
- ► Remove the packaging and keep it for return shipping.
- ► Check the contents for visible transport damage.
- ► Check the contents against the order to ensure they are complete, and be sure to keep all included documentation. The included documentation contains important information about the device and is part of the product.
- ► If you notice transport damage or discrepancies between the order and the delivered contents: Notify the supplier immediately.

2. Safety

2.1. Safety-related systems

The use of PLCs in safety-related systems requires special measures. If a PLC is to be used in a safety-related system, the user must seek detailed advice from the PLC manufacturer in addition to any available standards or guidelines for safety-related installations.

- Before working on the devices, disconnect all power supplies, including those of connected peripherals.
- Keep all ventilation openings clear.

In an electronic control system, the failure of certain components can lead to uncontrolled and/or unpredictable operation.

- Take into account all types of failures at the system level and the associated safeguards.
- If necessary, consult the manufacturer of the automation system.

2.2. Safety Instructions

⚠ CAUTION

Minor injuries and burns to the skin

Failure to observe the safety measures can result in minor injuries / superficial burns!

The device must only be operated when in perfect condition. Visible sharp edges pose a risk of injury.

The device housing can become very hot, especially at elevated ambient temperatures, due to the passive cooling of the internal components. The surface temperature may exceed the burn threshold depending on the duration of contact.

- Avoid touching the device housing during operation whenever possible.
- If you plan to perform work on the device, such as installing or removing it from the control cabinet or connecting or disconnecting a cable, turn off the device and let it cool down for a while.
- It is recommended to wear personal protective equipment, such as gloves, when handling the heated device.

Work on the device
Work on the device may only be performed if all necessary safety measures have been taken. Unpredictable functional and movement sequences of the system must be prevented.

- ▶ Ensure the system is in a safe condition.
- ▶ Turn off the system and the device.
- ▶ Secure the system against being switched back on.
- ▶ Disconnect the device from the system.

Do not open the device housing!

- ▶ If work inside the device is necessary or you suspect a defect, contact the manufacturer (see “ Addresses ”).

2.3. Cybersecurity

- ▶ Never connect the controller to the Internet without additional protective measures;
  this product is not designed for this
- ▶ Change the default passwords set at the time of delivery
- ▶ Always use an upstream external firewall to prevent external access to the internal network
- ▶ Use the security mechanisms of VPN server portals (e.g., IXON) to which the controller can actively connect via VPN or comparable mechanisms
- ▶ Always use HTTPS instead of HTTP
- ▶ Disable all unnecessary services (e.g., FTP/SSH/web server)

Contact for cyber security regarding Berghof products:
Berghof Product Security Incident Response Team
psirt.automation@berghof.com

3. Product Description

This manual describes the B-Fortis CC-Pi Slim product.
The B-Fortis CC-Pi Slim Compact Controller is a control module without a display for the real-time control and regulation of automatic and industrial processes in low-voltage systems.

The CODESYS 3.5 (IEC 61131-3) development environment from CODESYS GmbH is used for programming.

The B-Fortis CC-Pi Slim controller can be connected via various interfaces and also features digital inputs and outputs.

The connections are located on the front panel. The device is designed for mounting on a DIN rail in a control cabinet. All connections are pluggable.

3.1. Overview: B-Fortis CC-Pi Slim

The CC-Pi Slim is mounted on a mounting rail.

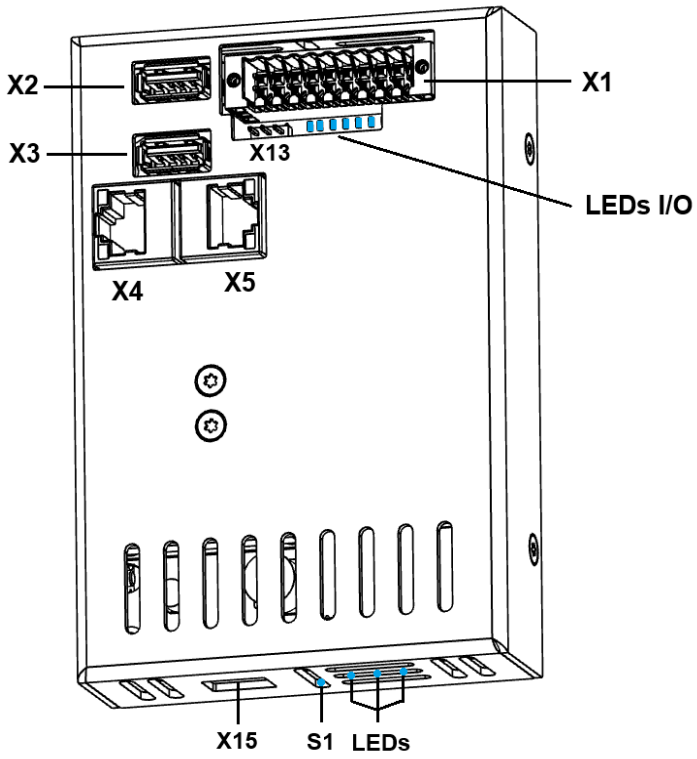


Fig. 1: Overview of the B-Fortis CC-Pi Slim

Item	Designation	Item	Description
X1	Power supply, digital inputs/outputs	X13	Debug interface (do not use – for Berghof service personnel only)
X4	Ethernet [ETH0] [1]	X15	USB Device (do not use – for Berghof service personnel only)
X5	EtherCAT [ETH1] [1]	S1	Function buttons (Reset and Run/Stop)
X2	USB 2.0 Host	LED	LEDs: PWR, Run/Stop, Error
X3	USB 2.0 Host	LEDs I/O	Status display for digital inputs/outputs

[1] Terms in [ ] are the CODESYS designations for the interfaces

3.2. Scope of Delivery and Accessories

Scope of Delivery

→ B-Fortis CC-Pi Slim
→ 20-pin connector

Accessories

The following accessories can be ordered directly or via the options (see chapter10.4):

CC-Pi Slim connector set:

Order option: H001
Order number: S-02020203-0901
Connector set consisting of
→ 20-pin connector for digital inputs/outputs and power supply
15EDGKNHBM-3.5-20P-13-00A&Z(H) (DEGSON)

Extensions for tooling and debugging

→ USB-to-Ethernet adapter Order number: S-02040101-0000

3.3. Product Features

Features at a glance

- → Raspberry Pi CM4 (1.5 GHz quad-core)
- → User program and data memory (RAM): 1 GB to 8 GB RAM
- → User program memory (Flash): 8 GB to 32 GB eMMC Flash
- → Retain memory: Persistent memory for retain variables (implemented in eMMC)
- → 2 USB host interfaces (USB 2.0), USB Type-A connectors
- → 2 Ethernet 10/100/1000 Base-T interfaces, configurable as EtherCAT
- → Onboard I/O (8x digital inputs, 8x digital outputs)
- → Real-time clock

Mounting

The device is designed for installation in a control cabinet on a DIN rail (35 x 7.5 mm) in an industrial environment with pollution degree 2.

Processor

The device features a Raspberry Pi CM4 CPU with a 1.5 GHz quad-core processor.

Ethernet

Two Ethernet interfaces with 10/100/1000 Mbit/s are available. The TCP/IP and UDP/IP protocols enable a highly flexible connection to visualization software, higher-level control units, or the IT infrastructure.

EtherCAT

Each Ethernet interface can also be used as an EtherCAT master interface.
Additional protocols supported by the Ethernet interfaces: PROFINET, EtherNet/IP, SNMP, OPC UA, IoT, BACnet, KNX, and Modbus TCP

USB

The two USB 2.0 host interfaces provide a widely used peripheral interface. This enables easy data exchange or expansion with compatible USB devices.

USB flash drives formatted with FAT/FAT32/exFAT/ext3/ext4 are supported.
For support regarding additional USB devices, please contact our technical support.

Visualization

CODESYS Web Visu (Web Server, HTML5)**.**

Onboard Inputs / Outputs

The device features permanently integrated digital inputs and outputs.

Additional Interfaces

The device also features a debug interface, which is accessible via a special cable (contact customer service if needed).

Real-time clock

The current time and date of the maintenance-free real-time clock can be set and read via a software interface. The buffer time is 30 days.

4. Mounting

The B-Fortis CC-Pi Slim is designed for mounting on DIN rail (DIN EN 60715:2001, 35 x 7.5 mm).

⚠ CAUTION

Risk of burns!

The surface of the device can become hot.

- ▶ Ensure that the required convection cooling is provided.
- ▶ Ensure that there is at least 50 mm of free space above and below the device.

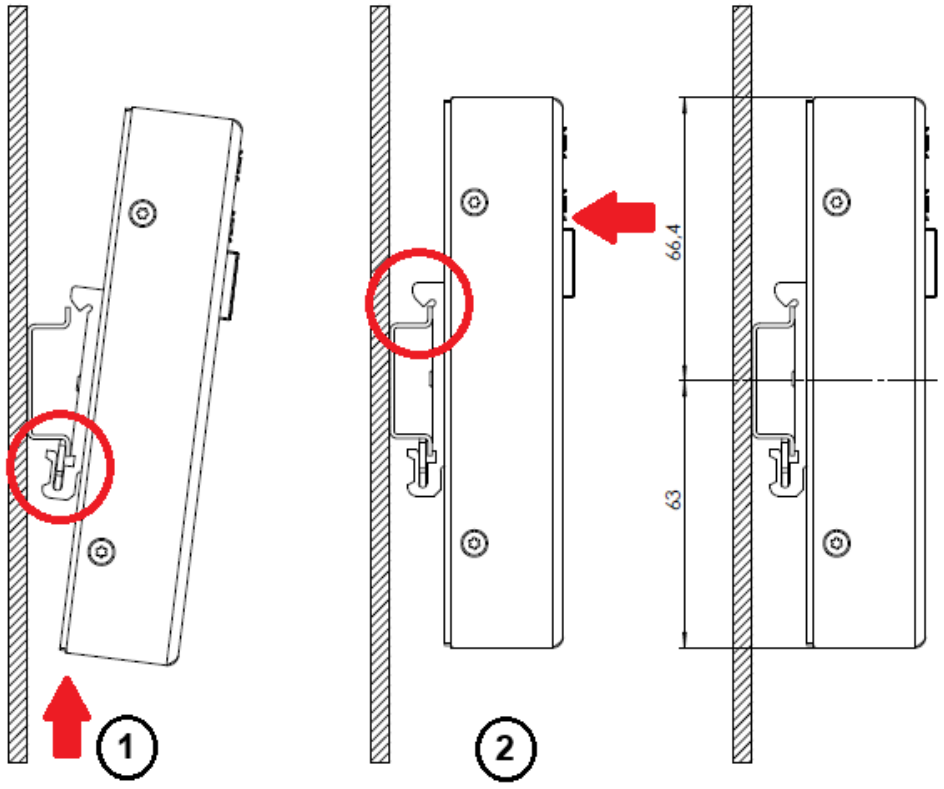


Fig. 2: Installing the device

Requirements:

There must be at least 10 mm of space to the next adjacent module

1st Guide the device from below against the mounting rail as shown in the figure and push it upward

2nd Press the device against the mounting wall at the top until the bracket snaps into place on the mounting rail.

The device is now secured on the mounting rail.

5. Connection

⚠ WARNING

Uncontrolled, unpredictable operation!

A failure of certain components in electronic control systems can lead to uncontrolled and unpredictable operation.

- ▶ Take into account all types of failures at the system level and the associated fuses.
- ▶ Follow the instructions provided by the automation system manufacturer.

5.1. Power Supply

The device is powered by an external 24 V DC power supply.

- ▶ Before connecting, verify that the external power supply meets the required specifications (Type K according to DIN EN 61131-2).

External power supply (24 V DC)	
Supply voltage	+24 V DC SELV (–20% / +25%)
AC component	Max. 5% The DC voltage level must not fall below 20.4 V.
Power consumption	I/O: max. 4.0 A at +24 V DC; PLC: max. 0.4 A at +24 V DC)
Energy buffering	10 ms

Installation

- ▶ Route all connections and cables so that no interference is caused by inductive and capacitive interference on the device.
- ▶ Ensure that the current and voltage ratings of the supply cables are sufficient.

5.1.1. Connect the power supply

⚠ CAUTION

Live parts!

- ▶ Before working on the device, disconnect all power supplies, including those from connected peripherals.

- ▶ Connect the power supply to connector X1 according to the following table.

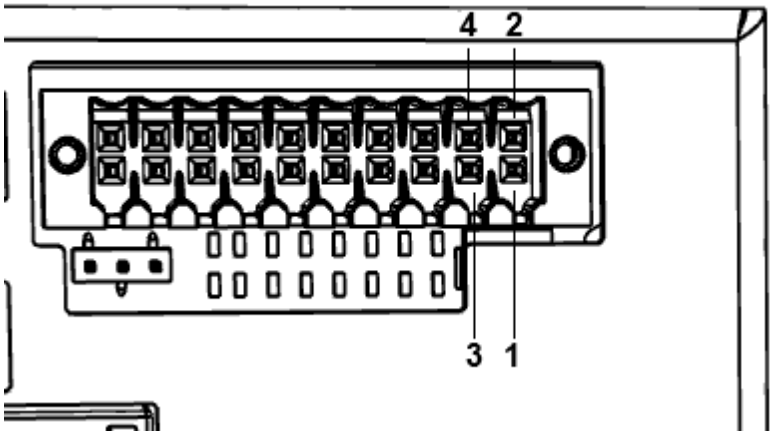


Fig. 3: CC-Pi Slim power supply, connector X1 with power LED

Power supply connector X1		
Pin	**Ref.**	**Assignment**
1	L1+ 24 V	Power supply for digital output (max. 4 A) for I/O
2	L0+ 24 V	24 V DC power supply (–20 %/+25 %) (PLC internal) max. 0.4 A
3	GND	-
4	GND	-
5…20	I/O	Digital Inputs and Outputs (see “Digital Inputs and Outputs”)

The following mating connector has been tested for the 15EDGVHDM-THR-3.5-20P-13-00R(H) (DEGSON) series connector and is approved for use with the device:

→ 15EDGKNHBM-3.5-20P-13-00A&Z(H) (DEGSON)

5.2. Grounding

The CC-Pi Slim must be grounded. To do this, connect the metal housing to a functional ground.
The functional ground serves to dissipate RF currents and is of great importance for the module's immunity to interference. RF interference is dissipated from the electronics board to the metal housing.
The functional ground is connected via the DIN rail.

As a general rule, ensure that

→ the module housing is connected to the DIN rail with good electrical conductivity,
→ the DIN rail is electrically conductive and connected to the control cabinet,
→ the control cabinet is properly grounded.

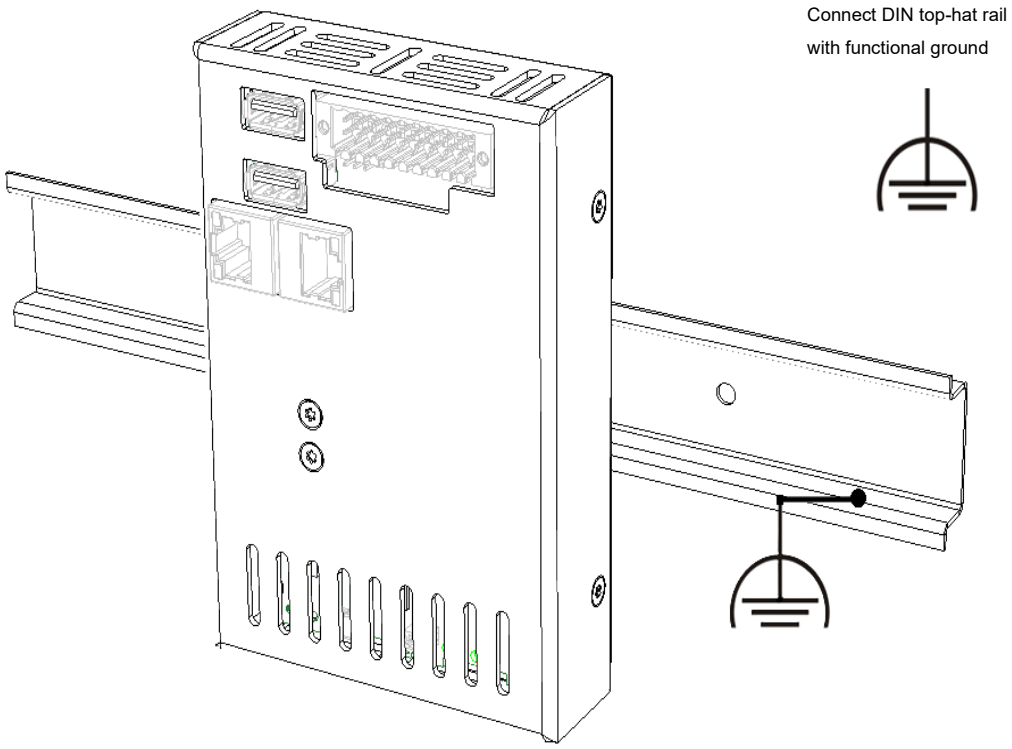


Fig. 4: Grounding

NOTE

Grounding wires should be short and have a large surface area (copper braid).

For more information, see, for example, http://de.wikipedia.org/wiki/Masse_(Electronics).

5.3. Data connections

5.3.1. Block diagram

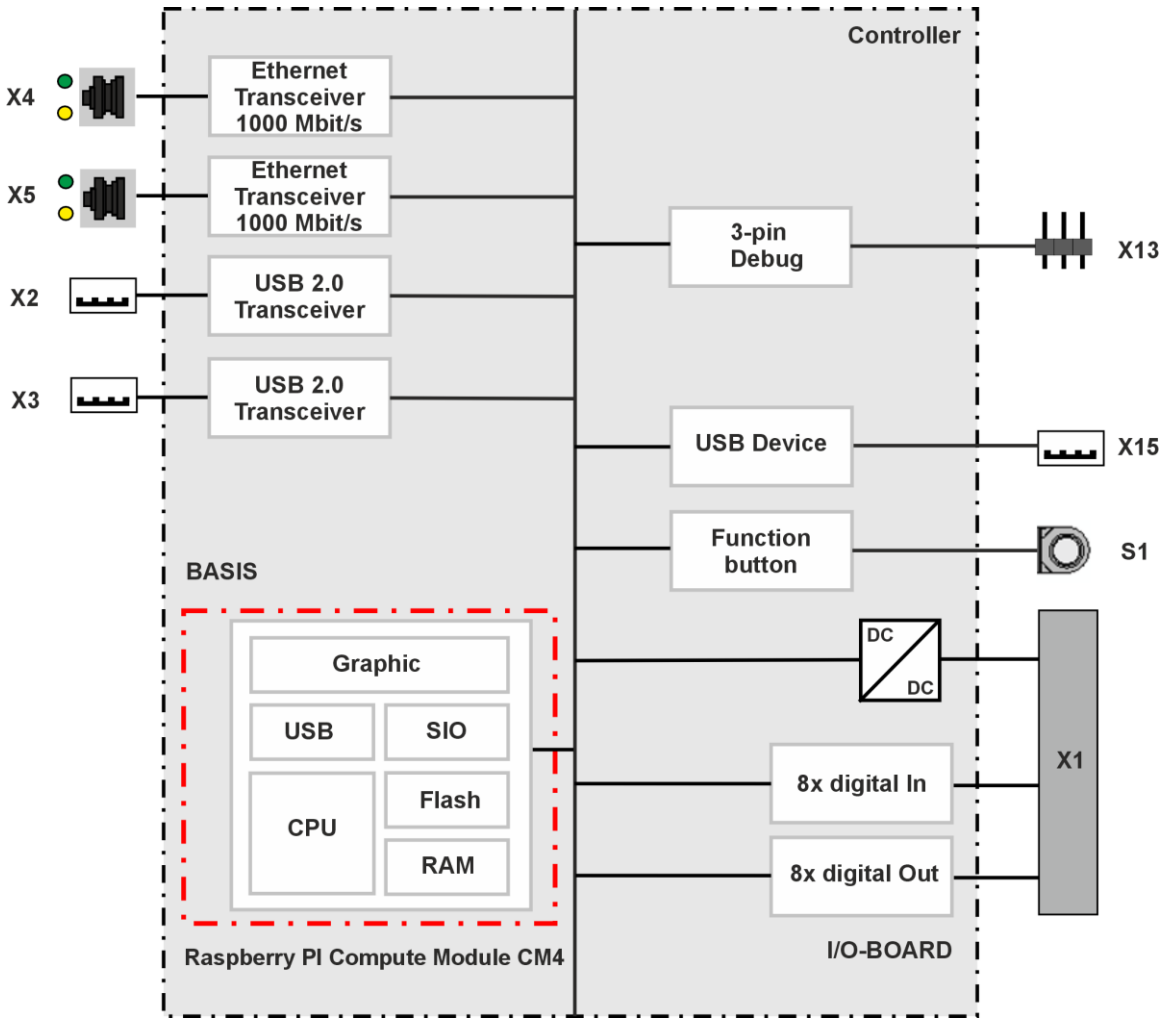


Fig. 5: Block diagram B-Fortis CC-Pi Slim

5.3.2. Digital Inputs and Outputs

The digital outputs are positive-switching 24V outputs with a maximum output current of 500 mA (per channel). They share a common ground (GND) with the supply voltage.

NOTE

Damage to the inputs or the device!

Voltages exceeding ±32 V can damage the inputs or the device.

- ▶ Do not apply a voltage exceeding ±32 V to the inputs.

The digital inputs are positive-polarity 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 cyclic basis for process data processing. An open input is interpreted as a static 0 (LOW). The inputs also share a common reference potential (GND).

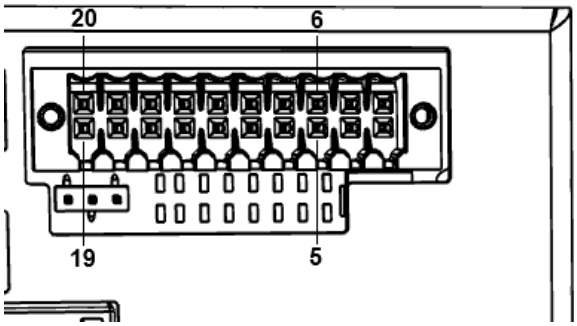
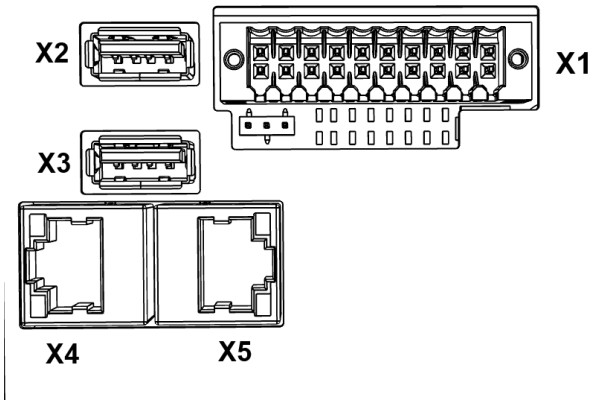


Fig. 6: Digital Inputs and Outputs CC-Pi Slim Connector X1 with LEDs 5 to 20

5.3.3. CC-Pi Slim Connector Overview



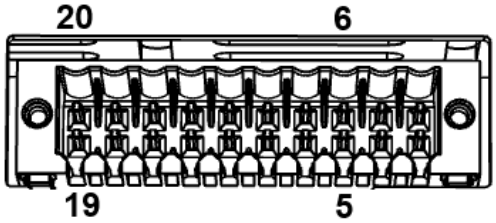


Fig. 7: Digital Inputs and Outputs X1

Digital Inputs and Outputs Connector X1		
Pin	**Ref.**	**Assignment**
1…4	-	Power supply (see “ Power supply”)
5	DO 8	Digital output 8
6	DI 8	Digital input 8
7	DO 7	Digital output 7
8	DI 7	Digital input 7
9	DO 6	Digital output 6
10	DI 6	Digital input 6
11	DO 5	Digital output 5
12	DI 5	Digital input 5
13	DO 4	Digital output 4
14	DI 4	Digital input 4
15	DO 3	Digital output 3
16	DI 3	Digital input 3
17	DO 2	Digital output 2
18	DI 2	Digital input 2
19	DO 1	Digital output 1
20	DI 1	Digital input 1

Digital output data		
Property	**Value**	**Description**
Type of outputs	Semiconductor	Non-latching, current-sourcing (positive switching)
Protection circuit for inductive loads	40 V clamping voltage (typ.) against +24 V	External fast decay must be provided for large inductive loads
Status indicator	Yes	One yellow LED per output lights up at logic 1 (load side)
Overload protection	Yes	In case of thermal overload, self-resetting
Short-circuit protection Response threshold	Yes	Electronic current limiting: typ. 4 A The current is limited electronically. Activation of the short-circuit protection at 1.1 A or higher leads to thermal overload and triggers the thermal overload protection. Permissible limits starting from a cold state: max. 10,000 short circuits, total duration max. 500 hours.
State during unsafe operating conditions	Logic 0	In the event of insufficient supply voltage and during startup or shutdown of the control system, the outputs are set to logic 0.
Output delay for level change	typ. 200 µs	–
Signal delay during activation	typ. 1 ms	Cyclical, depending on the cycle time set in the programming system
Output capacity	< 20 nF	–
Rated voltage	+24 V DC	–
Voltage drop (at rated current)	< 0.5 V	–
Rated current at logic "1" signal	0.5 A	Rated current per channel
Total current of all outputs	max. 4 A	In case of overload, the digital outputs automatically (over-temperature protection)

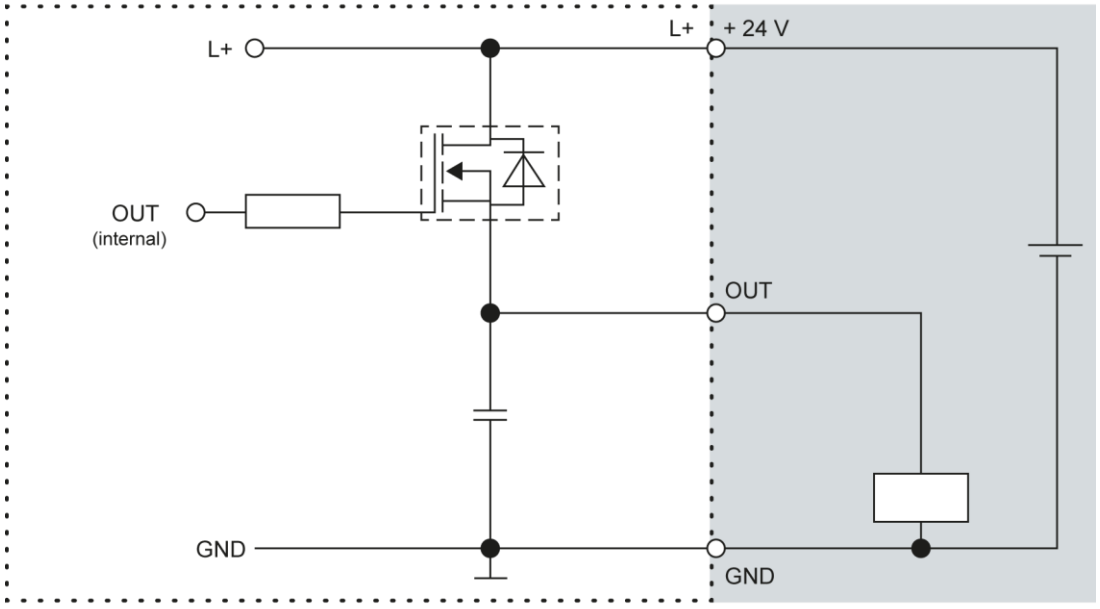


Fig. 8: Schematic diagram of the output, positive-switching

Digital input data		
Property	**Value**	**Description**
Type of inputs	Type 1 / 3	According to IEC 61131-2 Current-sinking (positive-polarity)
Cable length	max. 30 m	For unshielded connection cables For cable lengths exceeding 30 m, the cables must be shielded.
Cable cross-section in the control cabinet	0.14–1.5 mm² (26–16 AWG)	–
Field wiring	in accordance with regulations and standards	Comply with all applicable local regulations as well as the requirements of DIN EN 61131-2.
Nominal load voltage	+24 V DC	–
Delay time	2.5 µs	Applies during the transition from a logical "0" to a "1" and from a logical "1" to a "0"
Signal delay during evaluation	typ. 1 ms	Cyclical, depending on the cycle time set in the programming system
Reverse polarity protection	Yes	–
Isolation	No	–
Status indicator	Yes	One yellow LED per input lights up at logic 1

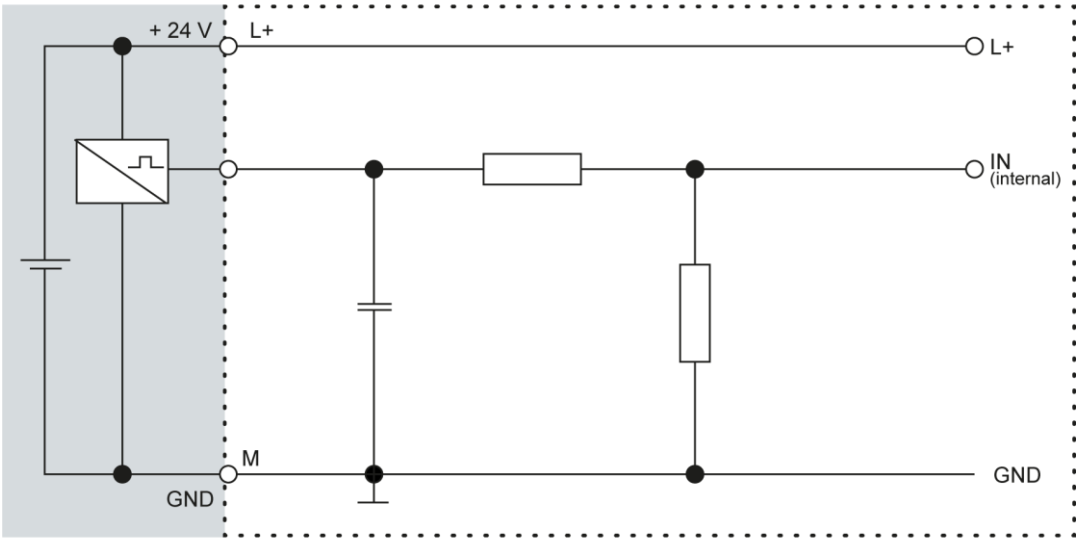


Fig. 9: Schematic diagram of input, positive-polarity

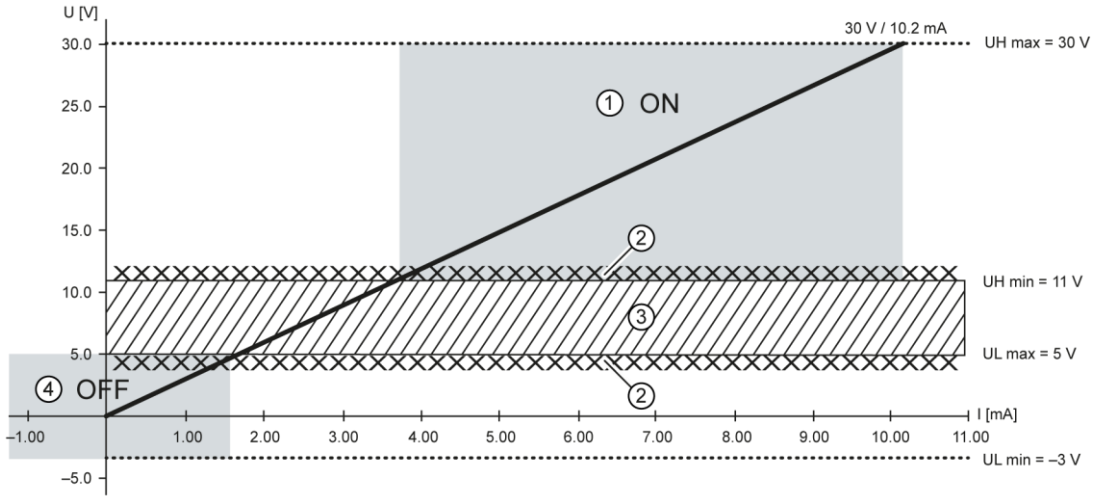


Fig. 10: Operating ranges of the digital inputs (Type 1/3)

Item	Description	Item	Description
1	"ON" range	3	Transition zone
2	Signal-to-noise ratio < 1 V	4	"OFF" region

5.3.4. Ethernet

The onboard Ethernet adapter features two 1000/100/10 Base-T ports with RJ-45 connectors for network connections X3 and X4

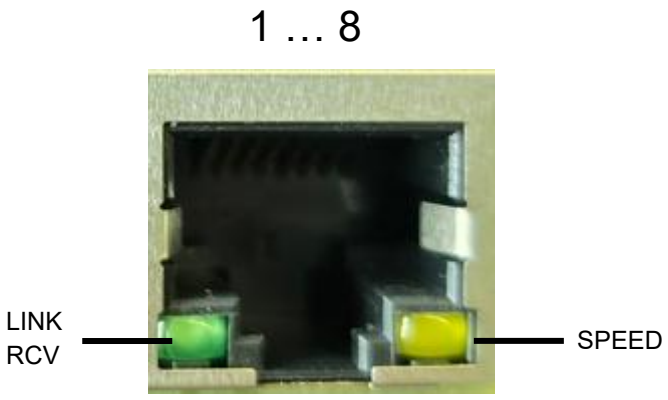


Fig. 11: Ethernet interface X3 ,and X4

Pin assignment for Ethernet interfaces X3 and X4			
Pin	**Assignment**	**Pin**	**Assignment**
1	BI_DA+ Bidirectional pair A+	5	BI_DB- Bidirectional Pair B-
2	BI_DA- Bidirectional Pair A-	6	BI_DC - Bidirectional Pair C-
3	BI_DB+ Bidirectional Pair B+	7	BI_DD+ Bidirectional pair D+
4	BI_DC+ Bidirectional pair C+	8	BI_DD- Bidirectional pair D-

LEDs		
LED	**Color**	**Meaning according to IEEE 802.3 clause 25**
LNK/RCV	Green	Link, Data Receive Flashing: Connection is active, data transfer in progress Off: No connection established
SPEED	Yellow	On = 1000 Mbit/s On = 100 Mbit/s Off = 10 Mbit/s

5.3.5. USB

Devices with a USB interface can be connected to the two USB host ports.

Fig. 12: USB interfaces X 2, and X3

NOTE

Damage to the USB flash drive and malfunctions due to data loss!

Removing a USB flash drive during operation while file operations are still in progress can render the USB flash drive unusable. Open files that a program can no longer access when the USB flash drive is removed can cause the device to freeze.

- ▶ Before removing the USB flash drive, ensure that all data operations are complete.

NOTE

Property damage and malfunctions due to data loss!

The USB interface is protected against overload (see USB interfaces max. current→ p.68). In the event of a short circuit during operation, a reset of the controller may be triggered.

This can result in significant property damage and damage to the USB device.

- ▶ Check the current consumption of a USB device before use.

NOTE

Failures and malfunctions may occur with a direct connection to the signal ground!

- ▶ Use only USB devices that do not have a direct connection between the signal ground and the housing.

The mechanical design of the USB interface is rated for up to 1,000 insertion cycles.

6. Operation

6.1. Switching on and off

NOTE

Destruction or malfunction!

- Do not plug in, connect, disconnect, or touch any connections during operation.
- Before working on the device, disconnect all power supplies, including those of connected peripherals (externally powered encoders, programming devices, etc.).

NOTE

Property damage!

- Before applying the supply voltage, check that all connections are wired correctly and have the correct polarity.

Powering On
The device does not have its own power switch. The device starts up when the system is powered on or when the power supply is connected.

Turning off
The device is turned off when the system is turned off or disconnected from its power supply.

6.2. Initial Commissioning Network

6.2.1. Web Interface Configuration

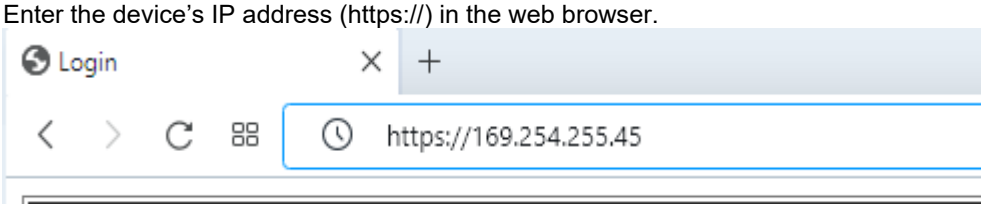
Before the device can be used, it must be integrated into the network with the correct configuration.

NOTE

Property damage!

- Before applying the supply voltage, check that all connections are wired correctly and have the correct polarity.

1st Supply power to the device (+24 V DC).
2nd Connect the device to a programming computer via a network cable (X4) and a network switch.
3rd Open the web browser on the programming computer.
4th Enter the device's IP address (https://) in the web browser.



Depending on the browser used, a warning about an unknown connection may appear.
You must manually trust this connection in the browser.

The login window appears.

Fig. 13: Login window

5th Name: admin
The default password, which is printed on the device label, is used as the password.

NOTE

Device password

To prevent attacks and ensure compliance with cybersecurity standards, change the password during initial setup

- ▶ Change the password according to password guidelines.

The web configuration is displayed.

Fig. 14: List of settings in the web interface

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

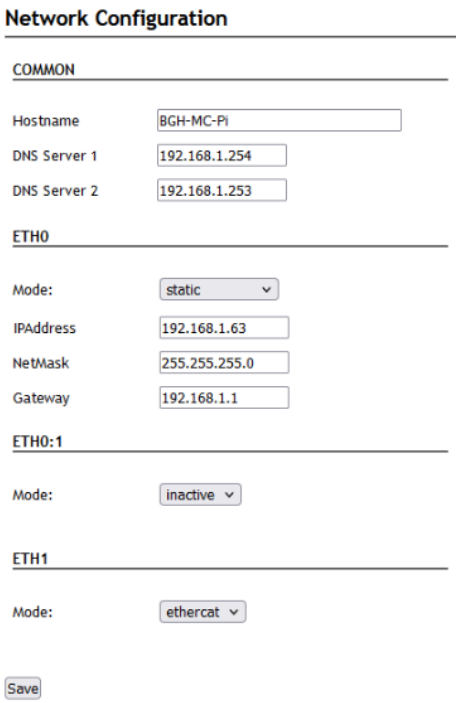


Fig. 15: "Network Configuration" page

7th Check the network settings and, if desired, change them in the corresponding text fields.

8th Save the settings by clicking “Save.”

9th If desired, access and change additional settings in the web configuration (e.g., "Time and Date," "SSH Server," "Web Server").

10th To apply all changed settings, restart the device:
Briefly disconnect the device from the power supply.
– or –
Click “Reboot” in the web interface and confirm with “Reboot Module” in the following window.

The device is configured and ready for use.

6.3. Operation

6.3.1. Status Indicators

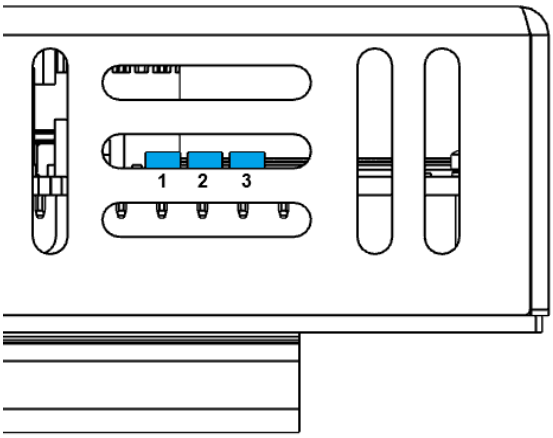


Fig. 16: Operating status LEDs positions

Status LEDs
Three operating status LEDs indicate the current status of the power supply, module mode, and error messages.

LED		Logical state
1	PWR (blue)	ON = correct supply voltage for the module electronics
2	Run/Stop	Indicates the status of the PLC application
3	Error (red)	Indicates an error stop

RUN/STOP ERROR - LED Indication

The module features 2 LEDs for signaling the system status (RUN/STOP multicolor: red/green/yellow; ERROR single-color red). The following system statuses are indicated by the LEDs:

System states	RUN/STOP LED	ERROR LED
Firmware, USB package update, or service mode active	Flashing yellow	Off
System error	Off	Red
PLC states		
RUN	Green	Off
STOP	Red	Off
Error stop	Red	Red
Reset button pressed	Flashing red	Off
Application states		
PROFINET device identification	Flashing yellow	Flashing

General procedure for error stops:

→ Determine the cause of the error (view via web browser)
→ Resolve the cause of the error
→ Perform a reset on the controller; alternatively: operating mode selector switch / CODESYS / web browser
→ Restart the controller

6.3.2. Real-time clock with voltage buffer

The DC-Pi series is equipped with a real-time clock. The buffer time is 30 days.

Set date/time
The clock can be set either via the web configuration or via the CODESYS library.

6.3.3. Start/Stop Reset button S1

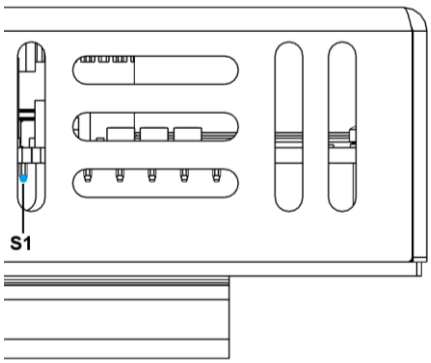


Fig. 17: Function button (S1)

Function button (S1)		
Operating state	**Action**	**Command**
Boot phase	Press and hold.	Boot in maintenance mode
CODESYS PLC	Press briefly.	Switching between Run and Stop modes on the PLC
	Press and hold.	Stop the PLC with a variable reset (cold reset)

The Reset/Stop button S1 is located on the left side of the device.
To prevent accidental activation, the Stop/Reset button can only be pressed with a pointed object (pen, screwdriver).
The function depends on the current operating state of the controller.

CODESYS Stop – Start – Reset
Pressing the button briefly stops a running CODESYS application. The Run/Stop LED changes from green to red. Pressing the button briefly again starts the CODESYS application. The Run/Stop LED changes from red to green. If the button is held down for more than 5 seconds, a "warm reset" is triggered. After the time has elapsed, the Run/Stop LED flashes rapidly and the button can be released. The controller is now in reset mode.

Service Mode
To enter Service Mode, the controller must be turned off. Then hold down the button and turn the controller back on. The button must be held down until the Run/Stop LED flashes yellow at 2-second intervals.

6.4. Troubleshooting

6.4.1. No network connection

- Check the cabling/switch.
- Check whether an IP address has been assigned twice.
- Check the network settings on the PC: The subnet and subnet mask must match the settings in the controller.
- Check the firewall and antivirus programs on the PC.
- Check for unknown IP addresses (see 6.4.3).

6.4.2. In case of an error stop

- Log in to the device via a web browser.
- Determine the cause of the error (Diagnostics > PLC Log/System Log).
- Resolve the cause of the error.
- Restart the device (reset on the device, see also 6.4.3).

The device is ready for use.

6.4.3. IP address unknown

If the device's IP address is unknown, start the device in maintenance mode (see below).
Alternatively, the device can also be reconfigured via a USB update.

1st Restart the device while holding down the S1 function button until the Run/Stop LED flashes yellow every 2 seconds.
The device is in maintenance mode and can be accessed via the factory-set default IP address.

2nd Access the device via the default IP address:
IP address: 169.254.255.XX
Subnet mask: 255.255.255.0
XX corresponds to the last 2 digits of the device serial number. Exception: 00 becomes 100.

3rd Adjust the network settings and make a note of them.

4. Restart the device.
Maintenance mode is exited automatically.
The device is configured and ready for use.

6.5. Berghof Control System Manual

NOTE

Applicable documentation!

- Further software descriptions and basic programming instructions can be found in the Berghof Control System Manual.

7. Maintenance / Servicing

Repairs and maintenance may only be performed by the manufacturer or its authorized service center.

7.1. Maintenance

⚠ WARNING

Uncontrolled, unpredictable operation!

A failure or malfunction can lead to uncontrolled and unpredictable operation.

- ▶ Do not plug in, connect, disconnect, or touch any connections during operation.
- ▶ Before working on the device, disconnect all power supplies, including those from connected peripherals (externally powered encoders, programming devices, etc.).

The device is maintenance-free when used as intended.

- ▶ Ensure that all ventilation openings are unobstructed.
- ▶ Do not open the device. If work inside the device is necessary, contact service.

8. Disassembly

→ Disconnect the device and its peripherals from the power supply.
→ Disconnect all connectors and cables.

⚠ CAUTION

Risk of burns!

The surface of the device may become hot.

▶ If necessary, allow the device to cool down before disassembly.

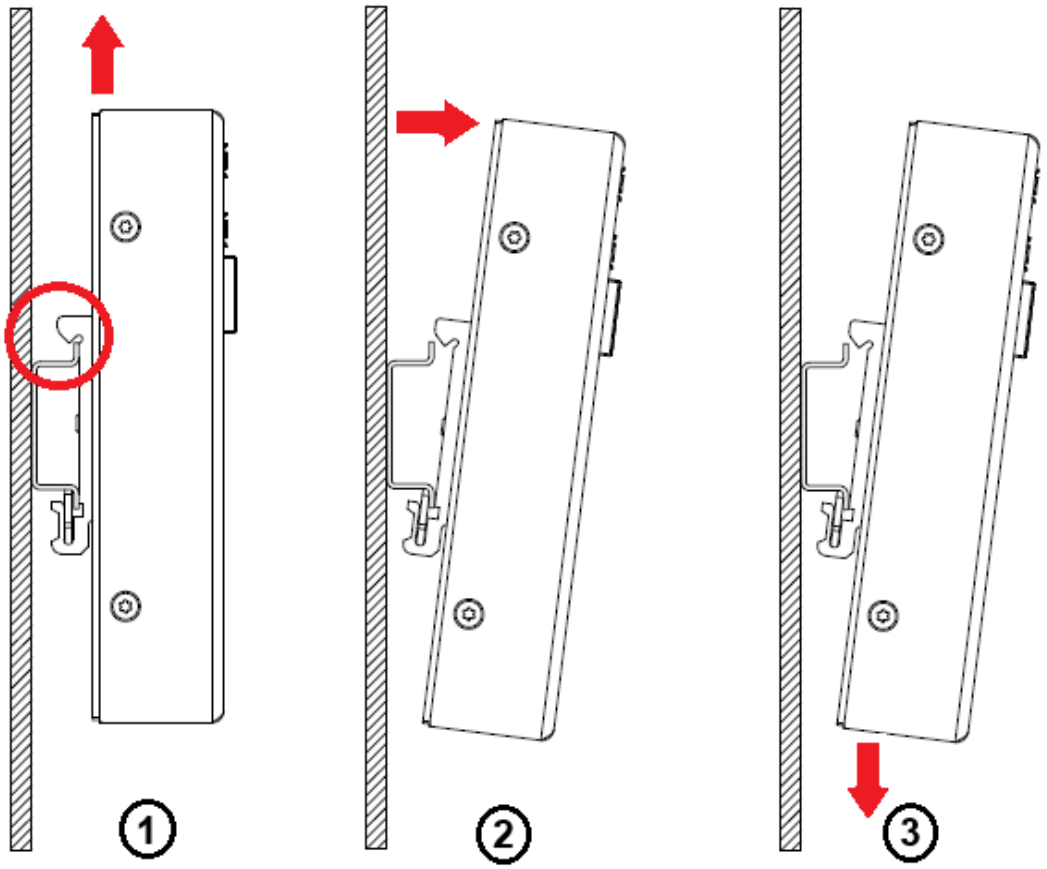


Fig. 18: Disassembling the unit

1. Pull the device upward and unhook it from the mounting rail.
2. Pull the device off the mounting rail at the top.
3. Push the device downward and remove it from the mounting rail.

9. Disposal

The device contains the following components, which must be disposed of separately:
→ Metals
→ Electronic components

The applicable national regulations for the disposal of electrical equipment in the B2B sector apply.

The following options are available for disposing of the device:

Disposal through the manufacturer
Unless otherwise agreed, devices can be returned for disposal.

Disposal in accordance with regional regulations
→ Disassemble the device and completely break it down into its individual parts.
→ Send metal parts to metal recycling.
→ Sort electronic components (circuit boards, drives, etc.).
→ Dispose of electronic waste in accordance with national regulations and laws.

10. Information and options

B-Fortis	CC-Pi Slim
Order number	S-01020302-0400
CPU, User Memory	
CPU	Raspberry Pi CM4 (1.5 GHz quad-core)
Program memory (Flash)	8 GB to 32 GB eMMC
Data memory (RAM)	1 GB to 8 GB
Retain memory	Persistent memory for retain variables (implemented in eMMC)
Dimensions and weights	
Dimensions (W x H x D)	92 x 128 x 40.3 mm
Weight	300 g
Operating conditions	
Ambient temperature	-10 °C to +55 °C
Relative humidity	max. 85%, non-condensing
Transport, storage	
Ambient temperature	-20 °C to +70 °C
Relative humidity	Max. 85%, non-condensing
Operation	
Mounting	On DIN rail per DIN EN 60715:2001, 35 x 7.5 mm
Certification	CE, UKCA
Vibration resistance	
Vibration	Sine wave (EN 60068-2-6) Test: Fc; 10 ... 150 Hz, 1 G (Operation Mode)
Shock resistance	15 G (approx. 150 m/s²), 10 ms duration, half-sine (EN 60068-2-27) Test: Ea
EMC, Protection Class	
Emission	EN IEC 61000-6-3, residential environment
Immunity	EN IEC 61000-6-2, industrial environment
Protection class	III
Dielectric strength	SELV (U_e < 30 V) in accordance with EN 61131-2; 500 VDC test voltage
Protection class	IP20

B-Fortis	CC-Pi Slim
Power supply (24 V power supply)	
Supply voltage	+24 V DC (-20% / +25%) SELV supply voltage Max. AC component 5%
Current consumption	PLC: max. 0.4 A at +24 V DC I/O: Max. 4.0 A at +24 V DC (8 x 0.5 A)
Reverse polarity protection	Yes
Power failure bypass	10 ms at < 20.4 V DC
Ethernet interfaces	
Number / Type of Interfaces	2x 10/100/1000 Base-T
Connection technology	RJ45
Protocols	Standard: EtherCAT-Master, TCP/IP, NTP, FTP Optional: Modbus, BACnet, PROFINET, EtherNet/IP, SNMP, KNX, OPC UA, IoT
USB interfaces	
Number / Type of Interfaces	2x USB 2.0 host ports, USB Type-A port
Number of insertion cycles	max. 1,000
Additional features	
Real-time clock	Capacitor-buffered (30-day buffer), accuracy ±7 ppm
Digital I/O	
Digital IN	8 x digital input (Type 1/3, 1 ms)
Digital OUT	8 x digital output (rated current: 0.5 A per output, 1 ms)

10.1. Nameplate

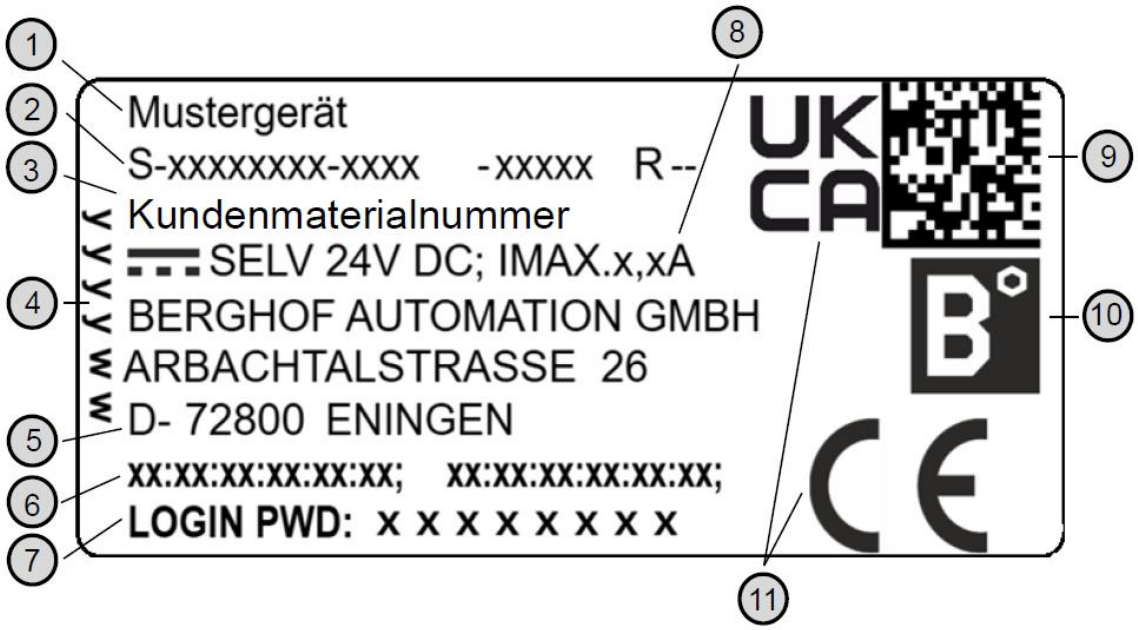


Fig. 19: Type plate

Item	Designation	Item	Description
1	Product name	7	Default Password
2	Order No. / Serial No. / Revision	8	Supply voltage and maximum current
3	Customer part number	9	QR code (identification no.)
4	Production date (year/week)	10	Manufacturer's logo
5	Manufacturer (Manufacturer's address)	11	Conformity marking
6	MAC addresses of the device		

10.2. Device variants and identification

Designation	Order number
CC-Pi Slim S04	S-01020302-0400

10.3. Options and Extensions

Options are ordered using the following format
"Order number Option1 Option2 …"

e.g.: **S-01020302-0400 S001 S002 H001**

In addition to the order number, additional extensions in the form of hardware, software, and customer-specific options are identified as follows:

Option code	Option Type
S000-S999	Software options e.g., fieldbuses
H000-H999	Hardware options e.g., connector set, certifications
C000-C999	Customer-specific options e.g., custom firmware, custom front panel

For more information regarding the options available for this device, please refer to the product catalog or the website.

The additional features included or installed in the respective device are listed on the options label. This label can be found on the device and/or on the packaging.

Fig. 20: Options label

11. Standards and Certificates

11.1. Standards

Applicable EU Directives

→ EMC Directive 2014/30/EU
→ RoHS Directive 2011/65/EU (also 2015/863/EU)

Applicable EU standards

→ Technical documentation for the assessment of electrical and electronic equipment regarding the restriction of hazardous substances
EN IEC 63000
→ Programmable Logic Controllers – Part 2: Equipment requirements and tests
EN 61131-2
→ Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission for residential environments (IEC 61000-6-3)
EN IEC 61000-6-3
→ Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments (IEC 61000-6-2)
EN IEC 61000-6-2

Applicable UKCA Directives

→ EMC Directive of 2016
UK S.I. 2016 No. 1091
→ RoHS Directive of 2012
UK S.I. 2012 No. 3032

Applicable UKCA Standards

→ Technical documentation for the assessment of electrical and electronic equipment regarding the restriction of hazardous substances
BS EN IEC 63000
→ Programmable Logic Controllers – Performance Requirements and Tests
BS EN 61131-2
→ Electromagnetic compatibility (EMC). Generic standards. Emission for residential environments
BS EN IEC 61000-6-3
→ Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments
BS EN IEC 61000-6-2

11.2. Declaration of Conformity / Technical Specifications

You can find the declarations of conformity, technical data, and additional information on our website at:
https://www.berghof-automation.com/en/downloads/

Select the relevant section (Automation Technology) and fill out the form. Information regarding data protection can also be found on the page.

The technical data for CC-Pi Slim can be found under the **Compact Controllers** category.

If a document is missing, it can be requested via our contact form at:
https://www.berghof-automation.com/en/contact-us

12. Customer Service / Addresses

Repairs and maintenance may only be performed by the manufacturer or its authorized customer service.

12.1. Customer Service

Berghof Automation GmbH
Arbachtalstrasse 26
72800 Eningen
Germany
T +49.7121.894-183
Email: support-controls@berghof.com
https://www.berghof-automation.com/en/

12.2. Repair Service

Please send the goods for repair to the Berghof Repair Service, quoting the RMA number and including a detailed description of the fault.

Berghof Automation GmbH
BU Automation Technology
Repair Service
Arbachtalstrasse 26
72800 Eningen

You can request the RMA number at:
https://www.berghof-reparaturservice.com/en/

12.3. Addresses

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

DIN Media Verlag GmbH, 10787 Berlin
or
VDE-Verlag GmbH, 10625 Berlin
or
Search online: www.iec.ch

13. Appendix

13.1. Information on software copyright and licensing

The devices' firmware contains free software. Parts of this software are licensed under the following and other open-source licenses:

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

The source code for the free software can be requested from Berghof Customer Service at cost price within three years of the device's delivery.

13.2. List of Figures

Fig. 1: Overview of the B-Fortis CC-Pi Slim 15
Fig. 2: Installing the device 18
Fig. 3: CC-Pi Slim power supply, connector X1 with power LED 20
Fig. 4: Grounding 21
Fig. 5: Block diagram B-Fortis CC-Pi Slim 22
Fig. 6: Digital Inputs and Outputs CC-Pi Slim Connector X1 with LEDs 5 to 20 23
Fig. 7: Digital Inputs and Outputs X1 24
Fig. 8: Schematic diagram of the output, positive-switching 26
Fig. 9: Schematic diagram of input, positive-polarity 27
Fig. 10: Operating ranges of the digital inputs (Type 1/3) 27
Fig. 11: Ethernet interface X3 ,and X4 28
Fig. 12: USB interfaces X 2, and X3 29
Fig. 13: Login window 31
Fig. 14: List of settings in the web interface 32
Fig. 15: "Network Configuration" page 33
Fig. 16: Operating status LED positions s 34
Fig. 17: Function button (S1) 35
Fig. 18: Disassembling the unit 40
Fig. 19: Type plate 44
Fig. 20: Options label 45