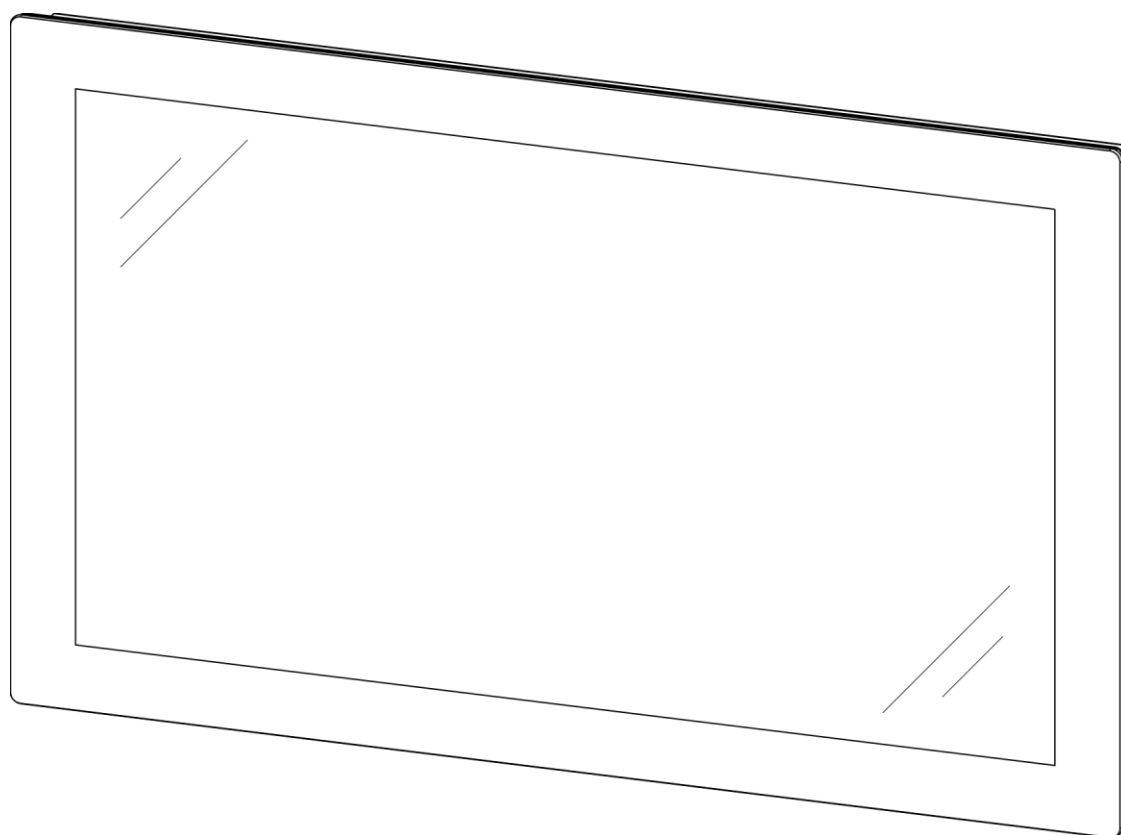


B-PRIMIS DC/ET PRIME 2110W X C, 2115WUX C



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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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Change log

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0.8	12/06/2018	Addition of graphics. Corrections, change to new layout
0.9	18/06/2018	Corrections, chapter added: Counter and web interface
1.0	26/06/2018	First version
1.1	05/12/2018	Modification to the mechanism, new group names
1.2	14/12/2018	Corrections after review
1.3	21/12/2018	Corrections (IP protection)

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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-PRIME DC2110W Dialog Controller X CM and DC2115WUX CM
- B-PRIMIS ET-PRIME Ethernet Terminal ET2110W X CS and ET2115WUX CS


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:

Symbol	Meaning
→ ...	List entry
▶ ...	Individual instruction or list of instructions which can be carried out in any order.
1. ... 2. ...	List of instructions which must be carried out in the order given.
	Additional product information

Design of warnings:

WARNING

Optional:	Hazard type and source
Other	Short description and consequences
Symbols	▶ 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 device is part of 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
- Environment with maximum category 2 pollution (EN 61010-1)
- 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.

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.

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.

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

The Dialog Controllers of the B-PRIMIS DC-PRIME product group (DC2110W X CM and DC2115WUX CM) are control modules with a display for the control and regulation of automation and industrial processes in low-voltage installations in real time.

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

The Ethernet Terminals of the B-PRIMIS ET-PRIME product group (ET2110W X CS and ET2115WUX CS) are input devices with a display for connection to a control system for machines or systems. The terminal shows the CODESYS Web visualisation or CODESYS Target visualisation, irrespective of whether the visualisation originates from a Berghof PLC control unit or some other CODESYS control unit.

ET211x Ethernet Terminals can be connected via Ethernet interfaces; DC211x Controllers can be connected via various different interfaces and in addition have their own digital and analogue inputs/outputs.

The device connection area for all external connections is located at the rear of the devices. These devices are intended for installation on a flat surface in a pre-prepared installation cut-out. All connections are of the plug-in type.

3.1. Overview

3.1.1. Overview DC2115WUX CM

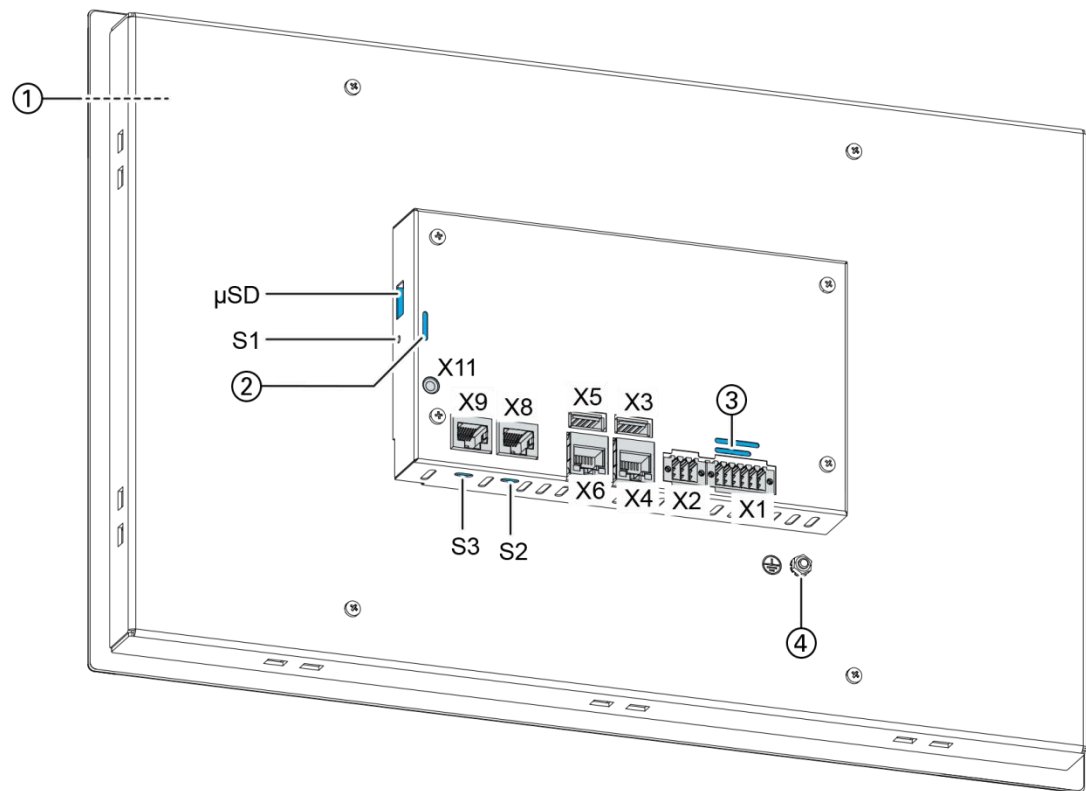


Fig. 1: Overview DC2115WUX CM (rear view)

Item	Designation	Item	Designation
1	Display 15.6 inch	X6	EtherCAT (ETH1)
2	LEDs: PWR, Run/Stop, Error	X8	CAN bus
3	LEDs: Power, digital I/O	X9	RS-232 / RS-485
4	Earth connection	X11	Debug interface (do not use this - it is for use only by Berghof Service Engineers)
X1	Power supply, digital inputs/outputs	S1	Function key
X2	Analogue inputs	S2	Terminating resistor CAN (120 Ohm)
X3	USB 2.0	S3	Terminating resistor RS-485 (120 Ohm)
X4	Ethernet (ETH0)	μSD	MicroSD card slot (for memory extension)
X5	USB 2.0		

3.1.2. Overview DC2110W X CM

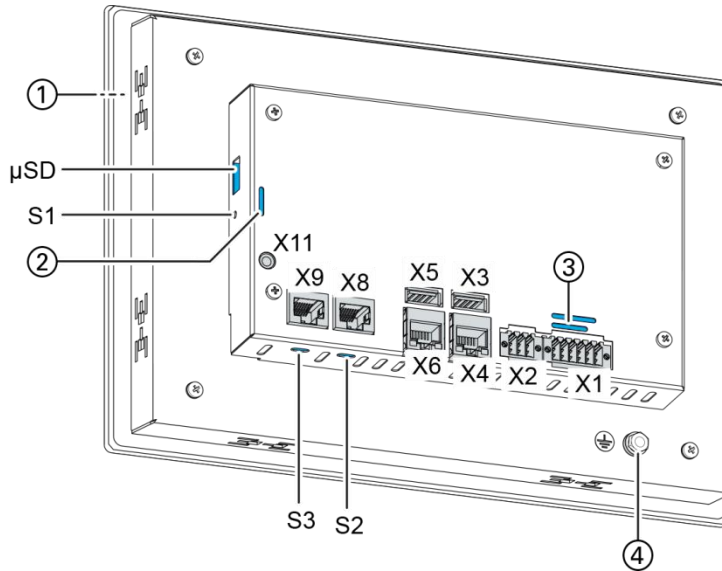


Fig. 2: Overview DC2110W X CM (rear view)

Item	Designation	Item	Designation
1	Display 10.1 inch	X6	EtherCAT (ETH1)
2	LEDs: PWR, Run/Stop, Error	X8	CAN bus
3	LEDs: Power, digital I/O	X9	RS-232 / RS-485
4	Earth connection	X11	Debug interface (do not use this - it is for use only by Berghof Service Engineers)
X1	Power supply, digital inputs/outputs	S1	Function key
X2	Analogue inputs	S2	Terminating resistor CAN (120 Ohm)
X3	USB 2.0	S3	Terminating resistor RS-485 (120 Ohm)
X4	Ethernet (ETH0)	μSD	MicroSD card slot (for memory extension)
X5	USB 2.0		

3.1.3. Overview ET2115WUX CS

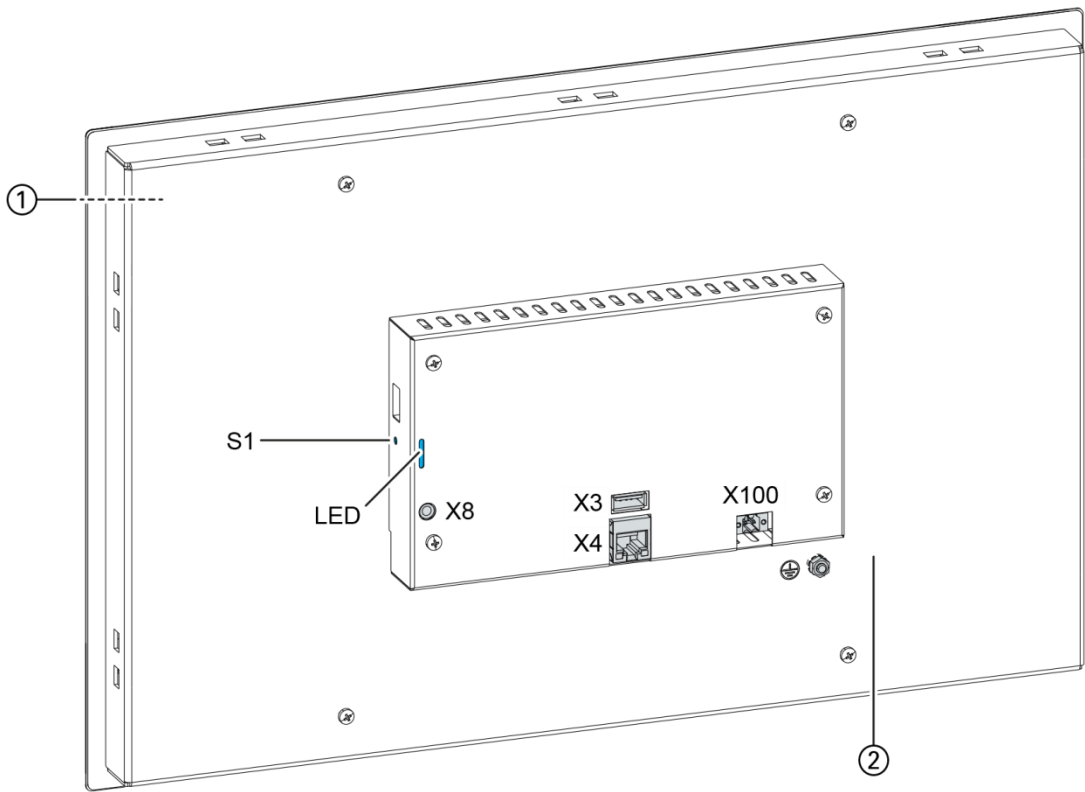


Fig. 3: Overview ET2115WUX CS (rear view)

Item	Designation	Item	Designation
1	Display 15.6 inch	X8	Debug interface (do not use this - it is for use only by Berghof Service Engineers)
2	Earth connection	X100	Power supply
X3	USB 2.0	S1	Function button (do not use this - it is for use only by Berghof Service Engineers)
X4	Ethernet (ETH0)	LED	LEDs: PWR, Run/Stop, Error

3.1.4. Overview ET2110W X CS

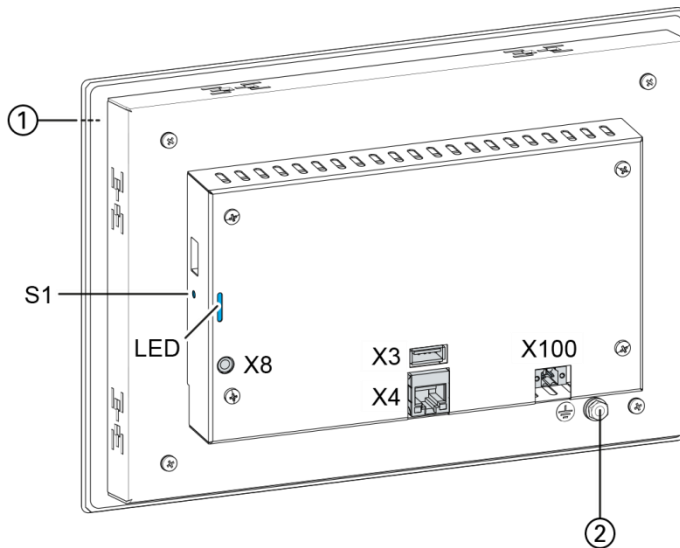


Fig. 4: Overview ET2110W X CS (rear view)

Item	Designation	Item	Designation
1	Display 10.1 inch	X8	Debug interface (do not use this - it is for use only by Berghof Service Engineers)
2	Earth connection	X100	Power supply
X3	USB 2.0	S1	Function button (do not use this - it is for use only by Berghof Service Engineers)
X4	Ethernet (ETH0)	LED	LEDs: PWR, Run/Stop, Error

3.2. Scope of delivery and accessories

Scope of delivery

DC2110W X CM / DC2115WUX CM:

- Device
- E-I/O plug, 6-pin, black (order no. 204803900)
- E-I/O connector, 12-pin, black (order no. 15838)
- Securing clip SMALL (8/14)

ET2110W X CS / ET2115WUX CS:

- Device
- E-I/O plug, 2-pin, black (order no. 204801800)
- Securing clip SMALL (8/14)

Accessories

DC2110W X CM / DC2115WUX CM:

- E-I/O plug, 6-pin, black (order no. 204803900)
- E-I/O connector, 12-pin, black (order no. 15838)
- Securing clip SMALL (8/14)

ET2110W X CS / ET2115WUX CS:

- E-I/O plug, 2-pin, black (order no. 204801800)
- Securing clip SMALL (8/14)

3.3. Product features

Installation

The device is designed for installation in a front panel or in a control panel in a rough industrial environment.

Processor

In its the basic configuration the device is equipped with an 800 MHz ARM® CPU with a Cortex™-A9 core.

Ethernet

1 Ethernet interface with 10/100 Mbit/s

The 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.

EtherCAT (DC2110W X CM / DC2115WUX CM)

The second Ethernet interface is used as an EtherCAT master interface.

Other protocols available for the Ethernet interfaces: PROFINET, Ethernet/IP, OPC UA, 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 interface (DC2110W X CM / DC2115WUX CM)

The device has one standard CAN interface which can be used at speeds up to 1 Mbit/s.

Serial interface (DC2110W X CM / DC2115WUX CM)

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

Onboard inputs / outputs (DC2110W X CM / DC2115WUX CM)

The device incorporates digital inputs / outputs and analogue inputs.

Real-time clock (DC2110W X CM / DC2115WUX CM)

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 (DC2110W X CM / DC2115WUX CM)

The standard commercial microSD card interface (SDHC up to max. 32 GB) allows data to be written to memory cards or read from memory cards.

Summary of features

DC2110W X CM / DC2115WUX CM:

ARM® CPU with Cortex™-A9 single-core (800 MHz; optional dual or quad core)

Program memory and data memory (RAM): 512 MB onboard

Program memory (flash): 2048 MB on-board

2 USB host interfaces (USB 2.0)

Non-volatile memory 100 kB

2 Ethernet 10/100 Base T interfaces (2nd Interface: EtherCAT master interface)

1 CAN interface

2 serial interfaces (1x RS-485; 1x RS-232)

1 µSD card slot

Onboard I/O

Real-time clock

ET2110W X CS / ET2115WUX CS:

ARM® CPU with Cortex™-A9 single-core (800 MHz)

1 USB host interface (USB 2.0)

1 Ethernet 10/100 Base T interface

4. Installation

4.1. Preparation for installation Front installation DC/ET2115WUX C

The device is intended for installation from the front into a rectangular cut-out on a panel. The support material must be rigid and be from 1 to 3 mm thick.

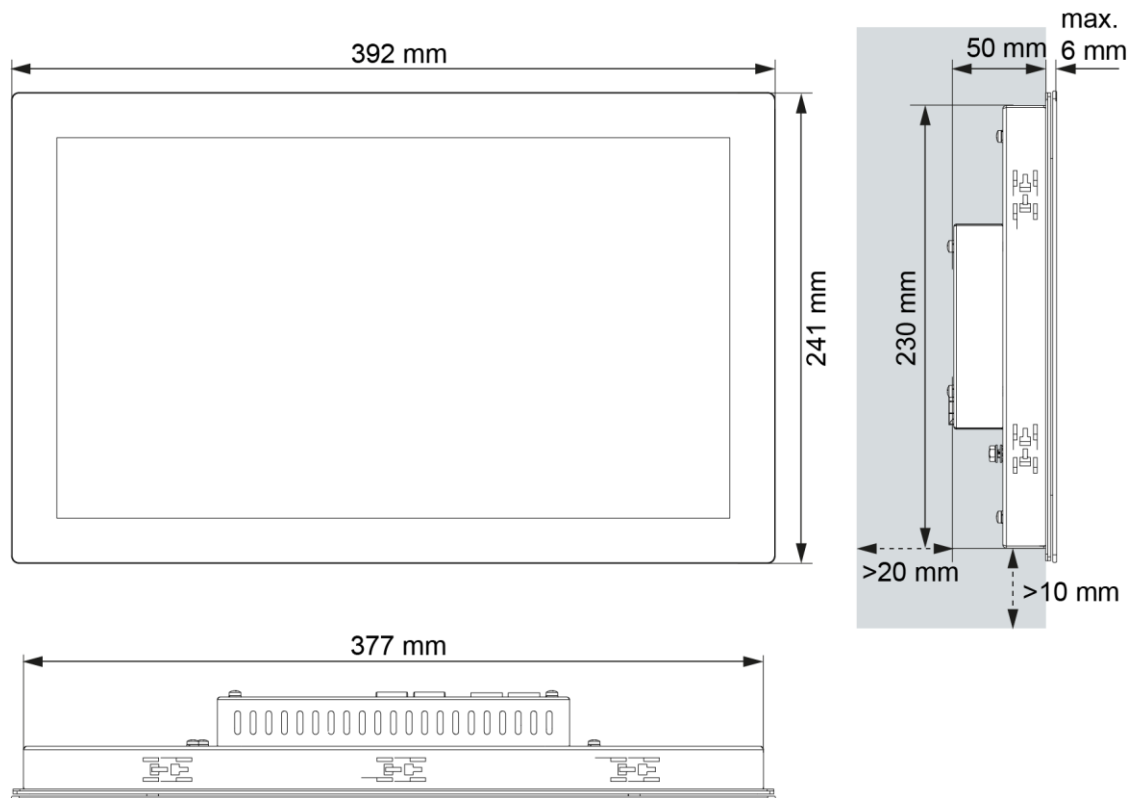


Fig. 5: Dimensions DC2115WUX CM / ET2115WUX CS

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.

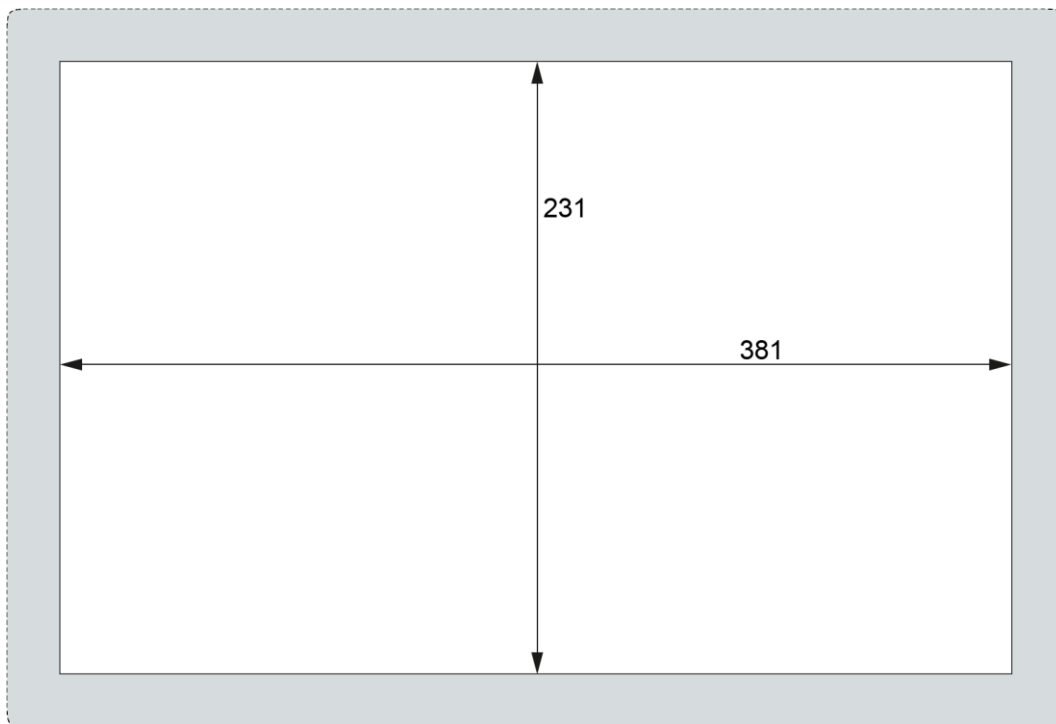


Fig. 6: Installation cut-out DC2115WUX CM / ET2115WUX CS

- Cut a rectangular installation cut-out in the support material:
Height: 231 mm
Width: 381 mm
Max. corner radius: 1.5 mm



Optimum thickness of the support material:
1.0 to 3.0 mm

4.2. Preparation for installation from the front

DC/ET2110W X C

The device is intended for installation from the front into a rectangular cut-out on a panel. The support material must be rigid and be from 1 to 3 mm thick.

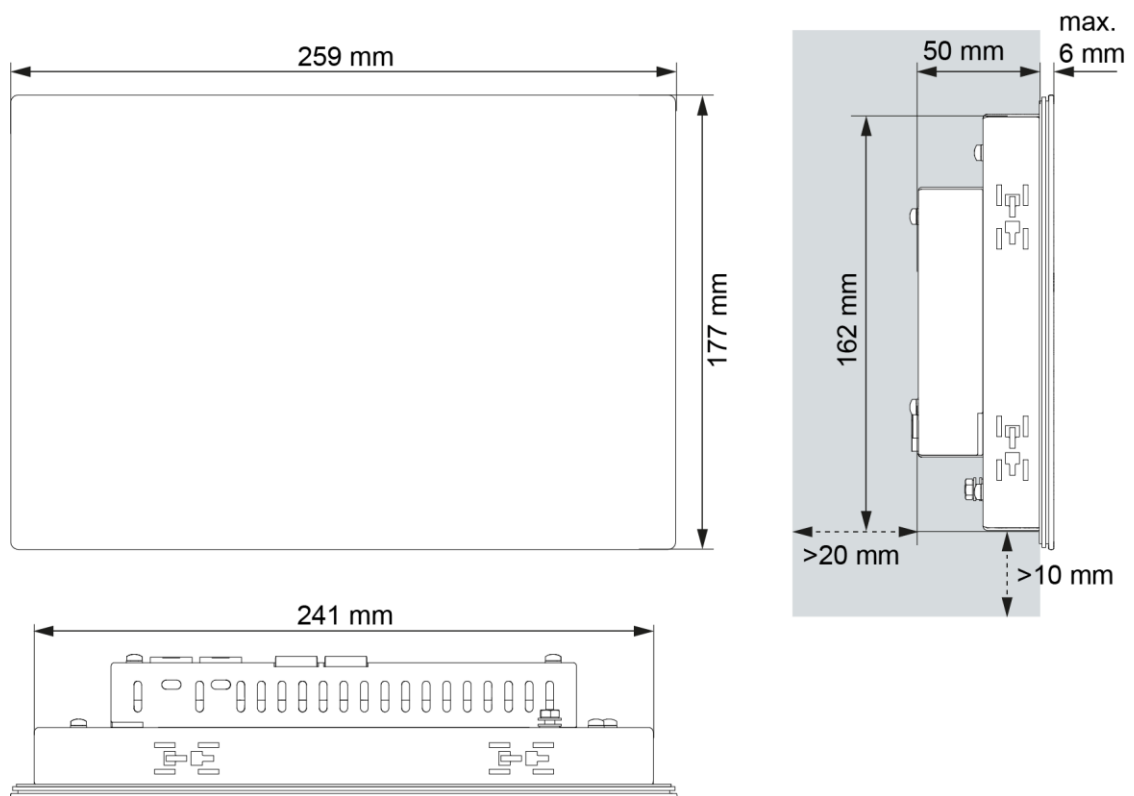


Fig. 7: Dimensions DC2110W X CM / ET2110W X CS

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.

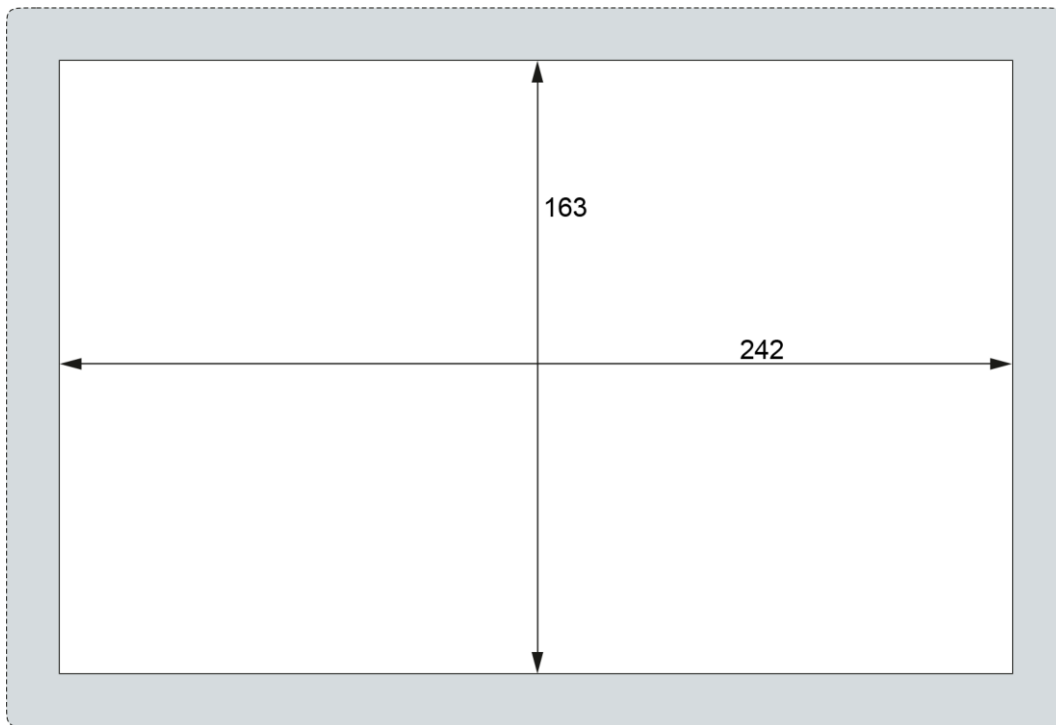


Fig. 8: Installation cut-out DC2110W X CM / ET2110W X CS

- Cut a rectangular installation cut-out in the support material:
 Height: 163 mm
 Width: 242 mm
 Max. corner radius: 1.5 mm

i Optimum thickness of the support material:
 1.0 to 3.0 mm

4.3. Installation

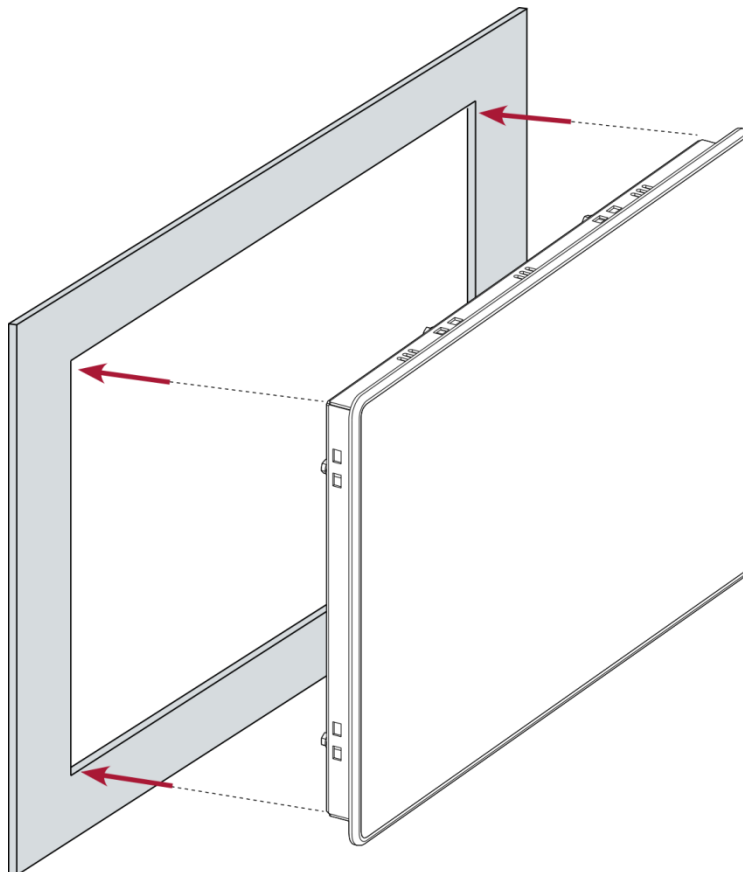


Fig. 9: Insertion into the installation cut-out

Requirements:

→ The securing clips must not be attached to the device.

1st Making sure the alignment is correct, push the device evenly into the installation cut-out.

NOTE

Damage to the device!

If installation is performed carelessly the device can fall out of the installation cut-out or be damaged.

- ▶ Do not tilt the device.
- ▶ Restrain the device against falling until the securing clips have been tightened.

2nd Make sure the device lies flush all round.

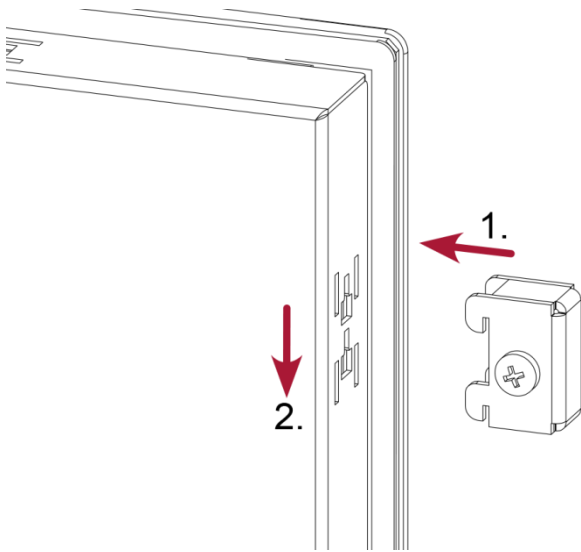


Fig. 10: Mounting the securing clips

3rd Secure the device with 2 securing clips: Insert the securing clips into the cover at diagonally opposite points and tighten the screws finger-tight.

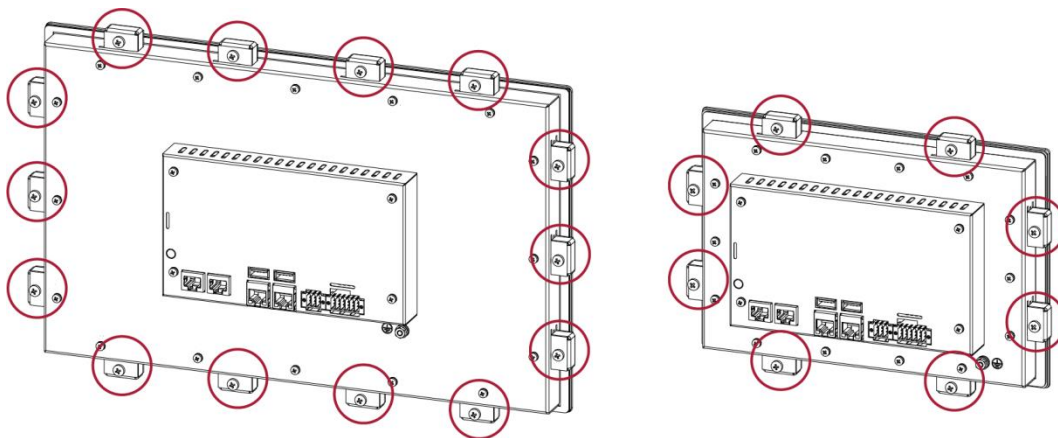


Fig. 11: Fully tightening the securing clips

4th Insert the other securing clips and tighten the screws in all the securing clips equally.
 DC/ET2115WUX: 14 securing clips
 DC/ET2110W X: 8 securing clips

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).

External power supply (24 V DC)

Supply voltage	+24 V DC SELV (–15% / +20%)
Ripple current proportion	Max. 5 % The direct voltage level must not fall below 20.4 V.
Power consumption	ET2110W X CS: Total max. 0.6 A at +24 V DC (peak current 1.2 A) ET2115WUX CS: Total max. 0.7 A at +24 V DC (peak current 1.2 A) DC2110W X CM: Total max. 0.8 A at +24 V DC (peak current 1.2 A) DC2115WUX CM: Total max. 0.9 A at +24 V DC (peak current 1.2 A)

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

⚠ CAUTION

Live parts!

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

ET2110W X CM / ET2115WUX CM

- ▶ Connect the power supply to plug X100 according to the following table.

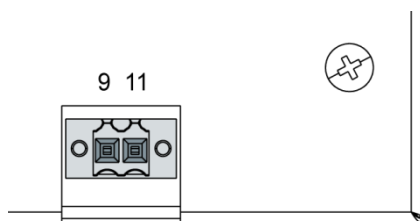


Fig. 12: Power supply plug X100

Power supply plug X100		
Pin	Designation	Assignment
9	L0+ 24 V	Power supply 24 V DC (–15 %/+20 %) ET2110W X CS: max. 0.6 A (peak current 1.2 A) ET2115WUX CS: max. 0.7 A (peak current 1.2 A)
11	GND	M0 / 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 3.5/02/180 (F,LR,LH)SN

DC2110W X CM / DC2115WUX CM

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

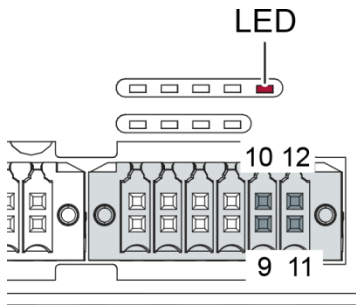


Fig. 13: Power supply DC2115 connector X1 with power LED

Power supply plug X1		
Pin	Designa- tion	Assignment
1...8	I/O	digital inputs and outputs (see "Digital inputs and outputs (DC2115)")
9	L0+ 24 V	Power supply 24 V DC (–15 %/+20 %) (internal PLC) DC2110W X CM: max. 0.8 A (peak current 1.2 A) DC2115WUX CM: max. 0.9 A (peak current 1.2 A)
10	L1+ 24 V I/O	Feed to digital output (max. 2 A for 0.5 A per output) for I/O
11	M0 / GND	–
12	L0+ 24 V	Power supply 24 V DC (–15 %/+20 %) (PLC internal processing) max. 1.2A DC2110W X CM: max. 0.8 A (peak current 1.2 A) DC2115WUX CM: max. 0.9 A (peak current 1.2 A)

The following counterparts have been tested with the S2C-SMT 3.5 (Weidmüller) connector and are approved for use with the device:

→ B2CF 3.50/12/180

5.2. Data connections

5.2.1. Block circuit diagram DC2115WUX CM / DC2110W X CM

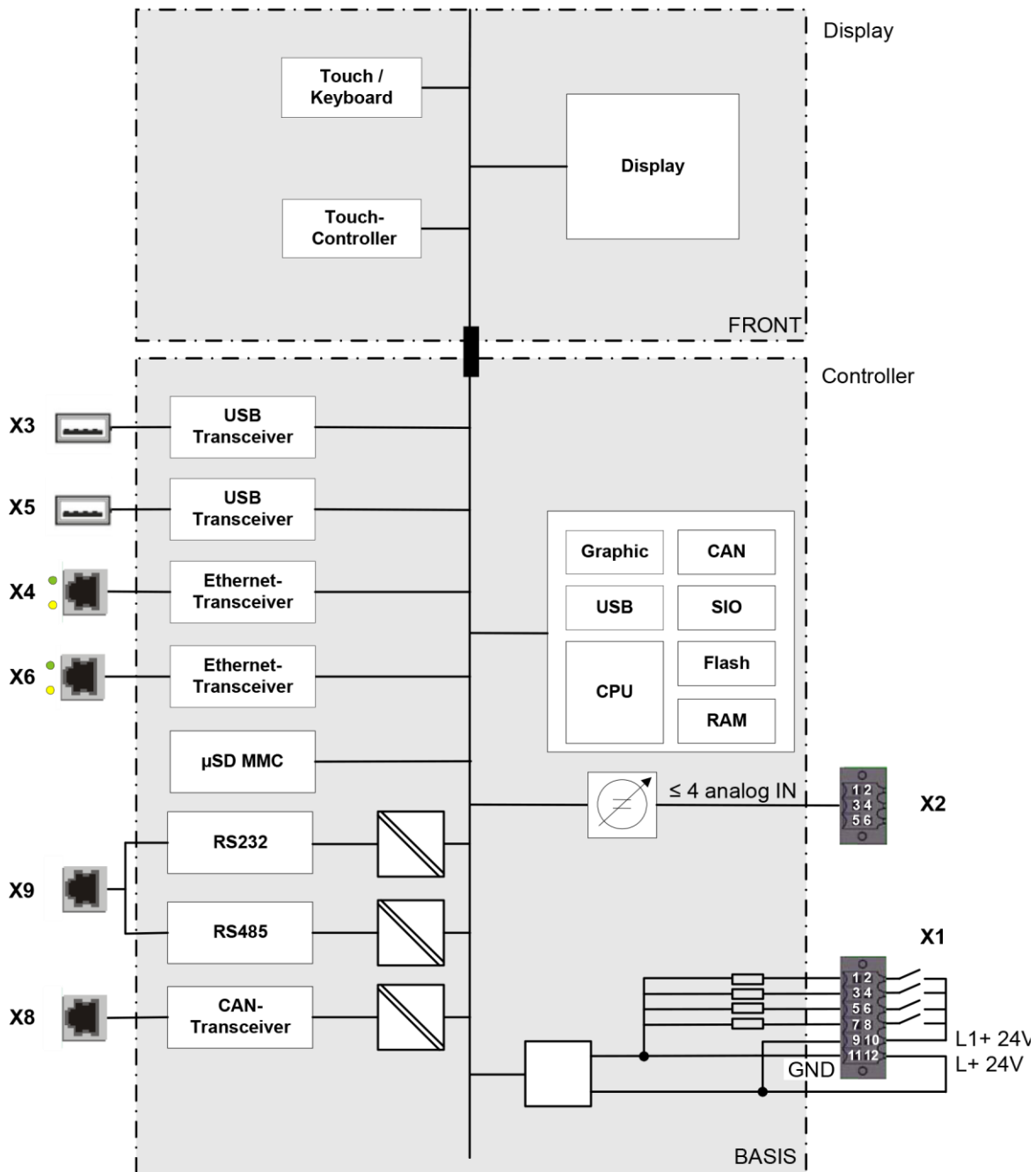


Fig. 14: Block circuit diagram DC2115WUX CM / DC2110W X CM

5.2.2. Block circuit diagram ET2115WUX CS / ET2110W X CS

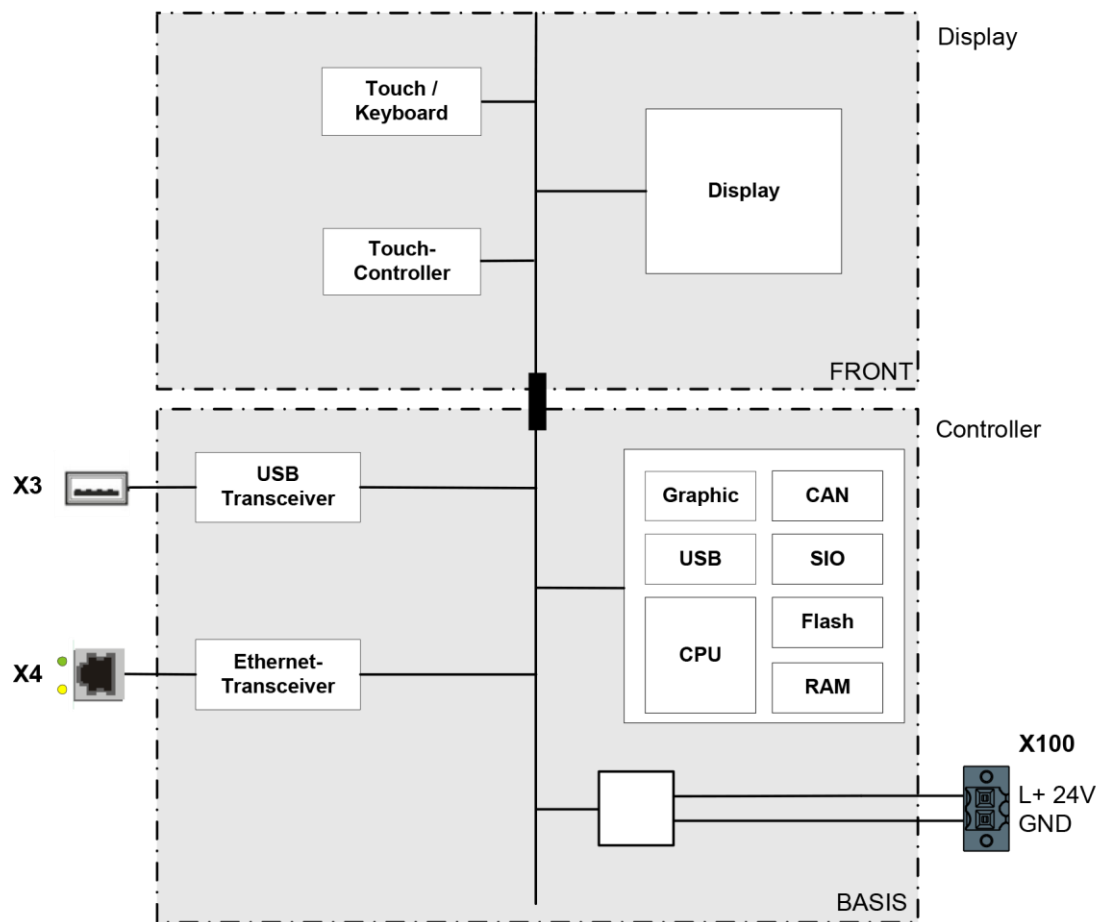


Fig. 15: Block circuit diagram ET2115WUX CS / ET2110W X CS

5.2.3. Digital inputs and outputs (DC2115WUX CM / DC2110W X CM)

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 with the S2C-SMT 3.5 (Weidmüller) connector and are approved for use with the device:

B2CF 3.50/12/180F

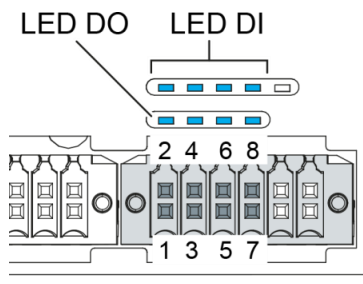


Fig. 16: Digital inputs and outputs DC2115WUX CM / DC2110W X CM plug connector X1 with LEDs 1 to 8

Digital inputs and outputs, plug X1

Pin	Designation	Assignment
1	DO 1	digital output
2	DI 1 / C1	digital input / counting input 1
3	DO 2	digital output
4	DI 2 / C2	digital input / counting input 2
5	DO 3	digital output
6	DI 3 / C3	digital input / counting input 3
7	DO 4	digital output
8	DI 4 / C4	digital input / counting input 4
9...12	–	Power supply (see "Power supply")

Data from the digital outputs		
Feature	Value	Description
Output type	semiconductor	Non-storing, current supplying (positive switching)
Protective circuit for inductive loads	41 V terminal voltage (typ.) compared to +24 V	fast de-excitation (must be provided externally)
Status display	yes	one orange LED per output Lights up at logical 1
Overload protection	yes	In the case of thermal overload, auto-resetting
Short circuit protection response threshold	yes	electronic voltage limitation: typ. 7 A 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.
Status under unclear operating conditions	Logical 0	If the supply voltage is insufficient, and at booting up and shutting down the control system, the outputs are set to logical 0.
Output delay "0" after "1"	typ. 1 ms	–
Output delay "1" after "0"	typ. 1 ms	–
Output capacitance	< 20 nF	–
Rated voltage	+24 V DC	–
Voltage drop (at rated current)	< 0.1 V	–
Rated current at "1" signal	0.5 A	–
Total current of all outputs	max. 2 A	–
Parallel circuit in two outputs	max. 1 A	Maximum permissible value with a logical connection to increase power

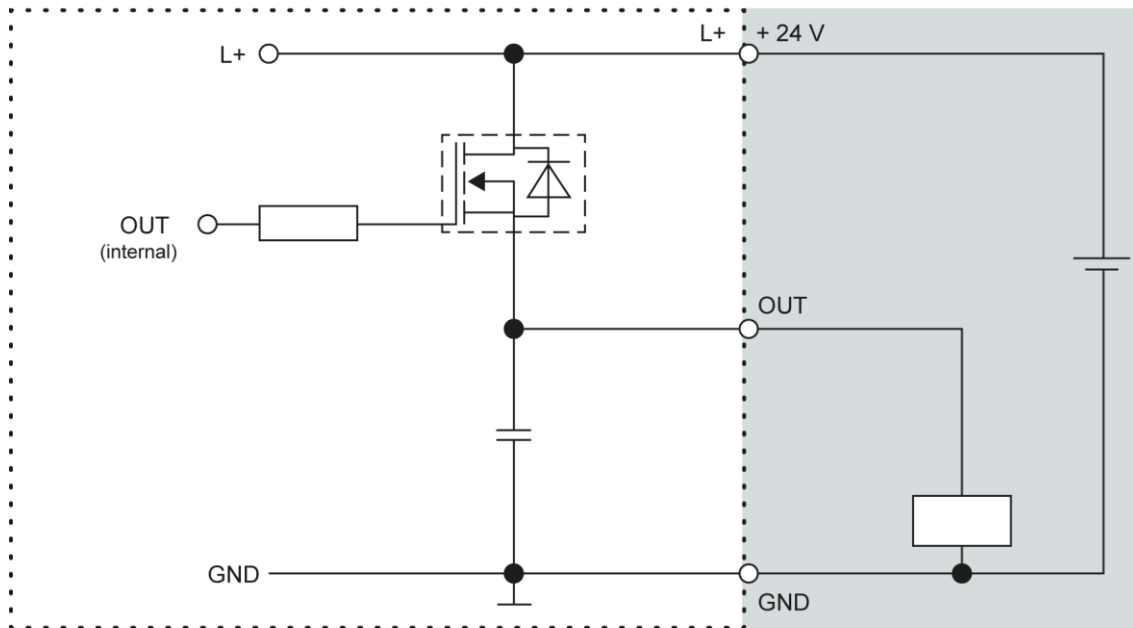


Fig. 17: Circuit diagram of the principles of positive switching output

Data from the digital inputs		
Feature	Value	Description
Type of inputs	Type 1, 3	To IEC 61131-2 Draws current (positive-switching)
Cable length	max. 30 m	For unshielded connection cables Cables over 30 m in length must be shielded.
Cable cross-section within the control cabinet	0.14 – 1.5 mm ² (26-16 AWG)	Aim for plug connector limits to UL specifications.
Field wiring	according to regulations and standards	Comply with all local regulations and the stipulations of DIN EN 61131-2.
Rated load voltage	24 V DC (SELV)	–
Delay time	1 ms	Applies for transitions from 0 to 1 and 1 to 0
Signal evaluation	cyclical	Dependent on the cycle time set in the programming system
Protection against reverse polarity	yes	–
Potential isolation	No	–
Status display	Yes	One yellow LED per input Lights up at logical 1

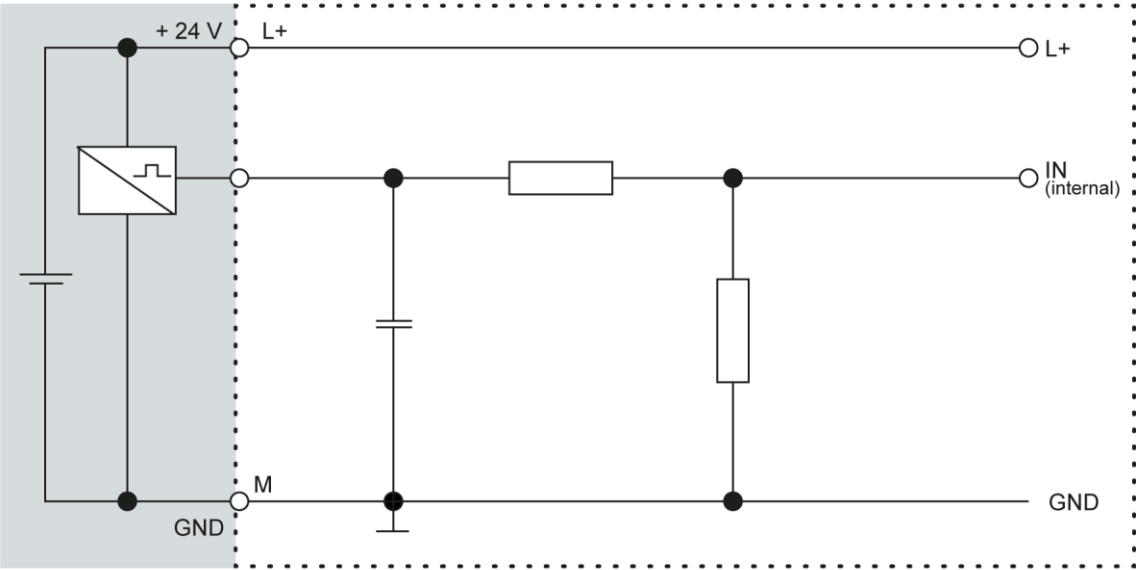


Fig. 18: Circuit diagram of the principles of positive switching input

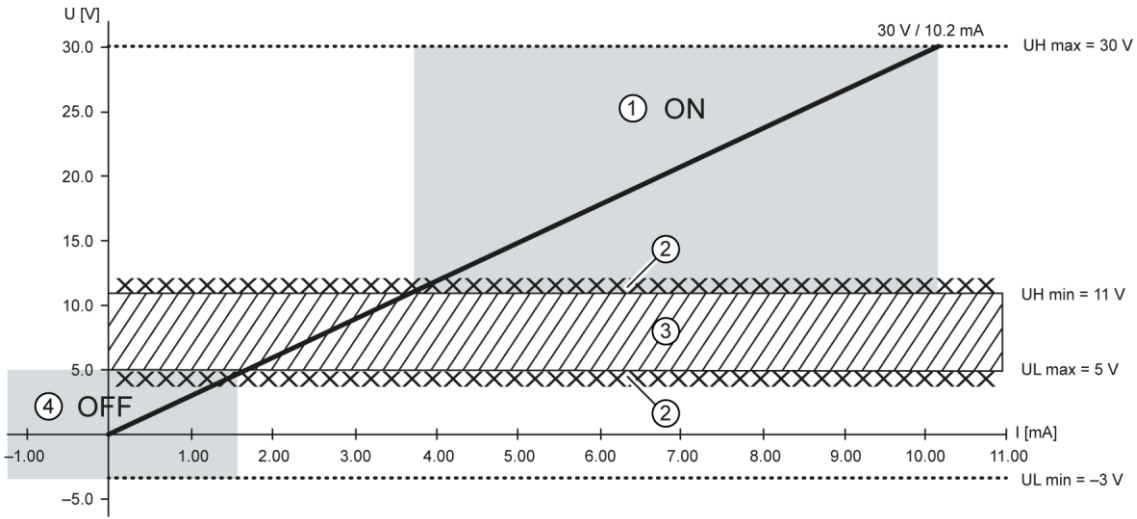


Fig. 19: Operating ranges of the digital inputs (type 1/3), negative switching

Item	Designation	Item	Designation
1	"ON" range	3	Transition range
2	Signal-noise ratio <1 V	4	"OFF" range

5.2.4. 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)

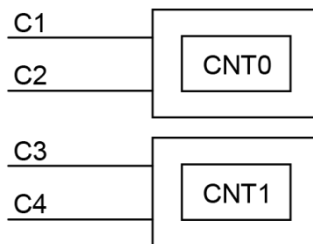


Fig. 20: Counter Up/Down or Pulse/Direction

Pin	Designation	Pin	Designation
C1	Up, Pulse, A (CNT0)	C3	Up, Pulse, A (CNT1)
C2	Down, Direction, B (CNT0)	C4	Down, Direction, B (CNT1)

Example for a counter: Capture input or counter input

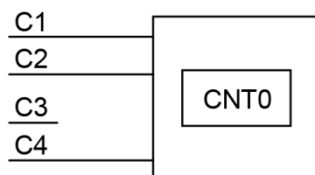


Fig. 21: Counter with Capture input

Pin	Designation	Pin	Designation
C1	Up, A (CNT0)	C3	–
C2	Down, B (CNT0)	C4	Capture (rise), Z (CNT0)

The counter CNT1 is not available with this configuration.

Data for the counting inputs

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

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.

5.2.5. Analogue inputs (DC2115WUX CM / DC2110W X CM)

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 (such as on a 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

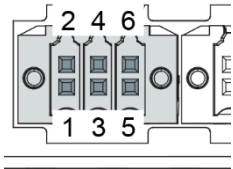


Fig. 22: Analogue inputs X2

Analogue inputs X2			
Pin	Assignment	Pin	Assignment
1	AI1 (U/T)	2	AI3 (U/T)
3	AGND	4	AGND
5	AI2 (U)	6	AI4 (U)

Data from analogue inputs

Data from analogue inputs		
Feature	Value	Description
Cable length	max. 30 m	Only valid for unshielded connection cables. Cables over 30 m in length must be shielded.
Modulation method	Delta-sigma modulation	–
Shared points between the channels	AGND reference ground	–
Clamp arrangement	Shielding on common AGND pins	–
Sampling duration/rate for measuring values	1 ms	A reading is taken from each input channel every millisecond, regardless of how many channels are actually in operation.
Sampling rate Operating mode AI-PT	250 ms	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.

Digital filtering		
Available filter settings	Time range for averaging	Time range for averaging Operating mode AI-PT
0	1 ms	0.25 s
10	10 ms	2.5 s
100	100 ms	25 s
1000	1,000 ms (1 s)	250 s

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)

Feature	Value	Description
Connections per input	–	AI (U/T) and AGND or AI (U) and AGND; connect screen to AGND.
Measuring range	–10 to +10 V	–
Input impedance in signal range	100 k Ω	between AI (U/T) and AGND or between AI (U) and AGND Value is valid whether the channel is switched on or off
Max. error at 25 °C	± 0.8 % (± 2 °C)	–
Temperature coefficient	± 40 ppm/K (± 0.4 mV/K)	–
Digital resolution	24 bit	–
Data format in user program	32 bit real	(floating-point number) in millivolts (mV)
Maximum permissible permanent overload	Max. ± 30 V compared to AGND	± 30 V = max. voltage at AI channel
Value of least significant bit	1.2 μ V	–
Output of digital value in case of overload	–	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.
Input type	–	Unsymmetrical voltage metering (single-ended)
Reference potential	AGND	–
Dynamic characteristics		
Analogue filtering	Second-grade order, limit frequency 650 Hz	–

Operating mode: voltage input AI (U)

Feature	Value	Description
Greatest temporary deviation during electrical error testing according to IEC 61131-2	1% of measuring range	–

Operating mode: temperature inputs AI-PT

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

Dynamic characteristics

Analogue filtering	Second-grade order, limit frequency 650 Hz	–
Greatest temporary deviation during electrical error testing according to IEC 61131-2	1% of measuring range	–

Voltage input AI (U)

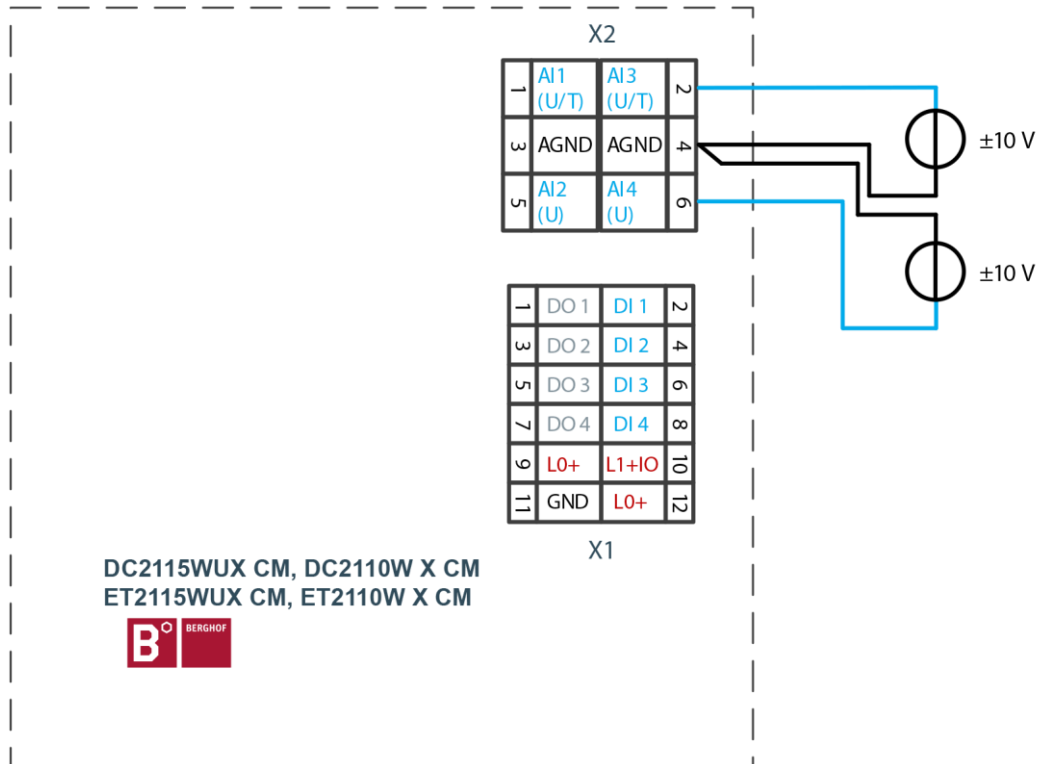


Fig. 23: example connection: voltage input

- ▶ 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)

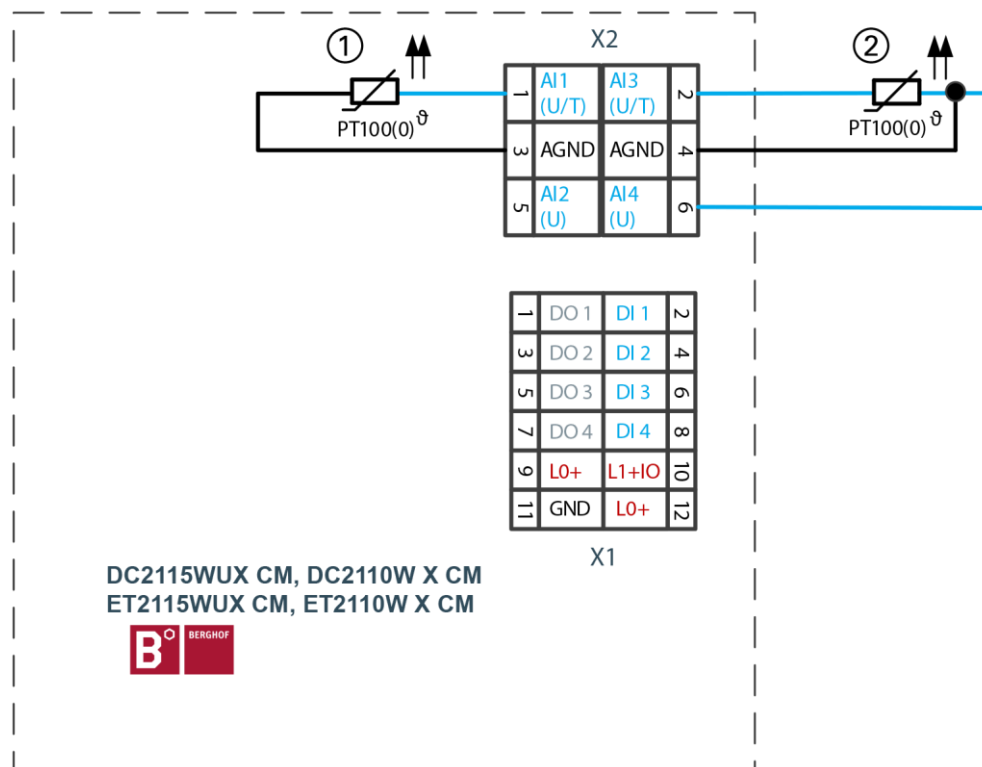


Fig. 24: example connection: temperature measurement

Item	Description
1	PT 100 with 2-wire connection
2	PT 100 with 3-wire connection

- ▶ 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.

5.2.6. Ethernet

The on-board Ethernet adapter has one 10/100-Base-T RJ-45 port for connection to the network.

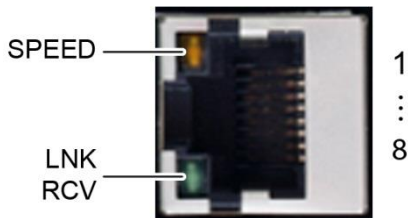


Fig. 25: Ethernet interface X4

Assignment of Ethernet interface plug X4

Pin	Assignment	Pin	Assignment
1	TX+	5	NC
2	TX-	6	RX-
3	RX+	7	NC
4	NC	8	NC

LEDs

LED	Colour	Meaning to IEEE 802.3 clause 25
LNK/RCV	green	Link, Data Receive Flashing: connection active; data transfer in progress Off: no connection established
SPEED	yellow	On = 100 Mbit/s Off = 10 Mbit/s

5.2.7. EtherCAT (DC2115WUX CM / DC2110W X CM)

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.

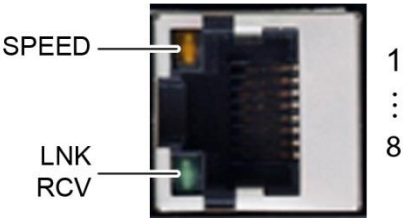


Fig. 26: EtherCAT interface X6

Assignment of EtherCAT interface connector X6			
Pin	Assignment	Pin	Assignment
1	TX+	5	NC
2	TX-	6	RX-
3	RX+	7	NC
4	NC	8	NC

LEDs		
LED	Colour	Meaning to IEEE 802.3 clause 25
LNK/RCV	green	Link, Data Receive Flashing: connection active; data transfer in progress Off: no connection established
SPEED	yellow	On = 100 Mbit/s Off = 10 Mbit/s

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

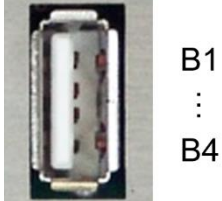


Fig. 27: USB interfaces X3 and X5 (DC2115)

Assignment of USB interface connectors X3 and X5 (DC2115WUX CM / DC2110W X CM)

Pin	Assignment	Pin	Assignment
B1	VCC	B3	D+
B2	D-	B4	GND

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 ($> 0.5\text{ A}$). 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.



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

5.2.9. CAN Bus (DC2115WUX CM / DC2110W X CM)

Properties of the CAN interface	
Standard	ISO 11898
Maximum Baud rate	1 MBit/s
Lowest adjustable Baud rate	50 kBit/s
Contacts	Electrically isolated
Assignment	to CiA303

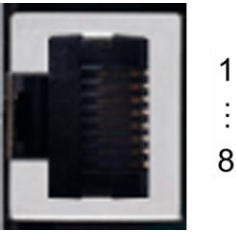


Fig. 28: CAN interface X8

Assignment of CAN interface connector X8			
Pin	Assignment	Pin	Assignment
1	CAN_H	5	NC
2	CAN_L	6	NC
3	ISO GND	7	ISO GND
4	NC	8	NC

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.

5.2.10. Serial interfaces (DC2115WUX CM / DC2110W X CM)

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

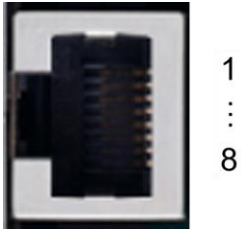


Fig. 29: RS-232 / RS-485 interface X9

Pin assignment for RS-232 / RS-485 interface connector X9			
Pin	Assignment / software interface	Pin	Assignment / software interface
1	RS-232 RX / COM 1	5	RS-485 Tx/Rx- / COM 2
2	RS-232 TX / COM 1	6	NC
3	NC	7	(reserved)
4	RS-485 Tx/Rx+ / COM 2	8	ISO GND

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.

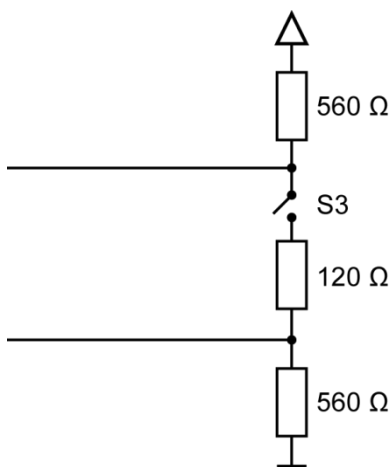


Fig. 30: RS-485 switchable terminating resistor



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 connection 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 (for instance via 200Ω) at multiple points.

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. DC2115WUX CM / DC2110W X CM web interface

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.
- 5th The login screen will appear.



User Login:

Name:

Password:

Fig. 31: login window

- 6th Use the following user name and password to log into the device:
Name: admin
Password: admin
- 7th 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. 32: List of web interface settings

- 8th Click on the "Network" link.
 The "Network Configuration" page is displayed.

Network Configuration

COMMON

Hostname
 Default Gateway
 DNS Server 1
 DNS Server 2

ETH0

Mode:
 IPAdress
 NetMask

ETH1

Mode:

Fig. 33: "Network Configuration" page

- 9th Check the network settings and if desired make changes in the respective text boxes.
 Configuration DC211x: ETH0 = X4, ETH1 = X5
- 10th Save the settings by clicking on "Save".
- 11th Additional settings can also be viewed and/or modified on the web configuration page
 (for example "system time", display resolution, TargetVisu).

- 12th In order to load 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. DC2115WUX CM / DC2110W X CM on-screen config

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. 34: Main screen of the device

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

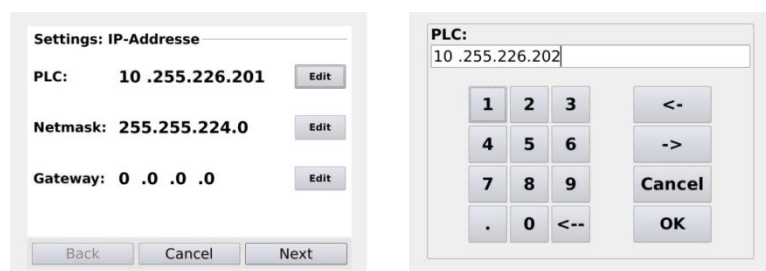


Fig. 35: Network settings

- 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.

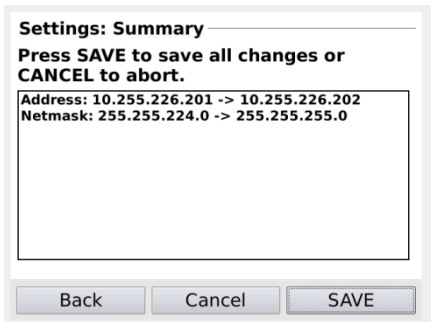


Fig. 36: Summary of the network settings

- 5th To change other settings or to correct the changes, press the “Back” button.
- 6th If no settings were changed, press the “OK” button.
The main screen of the device will be displayed.
– or –
Press the “Save” button.
The settings will be saved and the device will restart automatically.

The device is now configured and ready for use.

6.2.3. ET2115WUX CS / ET2110W X CS Configuration

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 network settings are displayed (server IP, IP address and network mask).

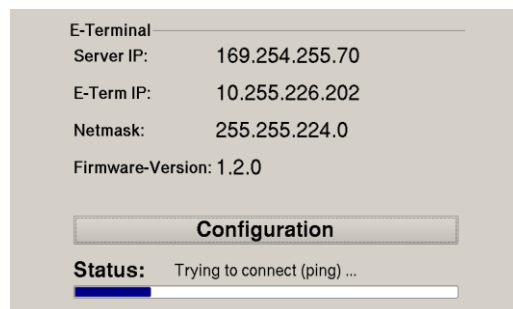


Fig. 37: Start page, with network settings

2nd Press the "Configuration" button.

A page with further information appears.

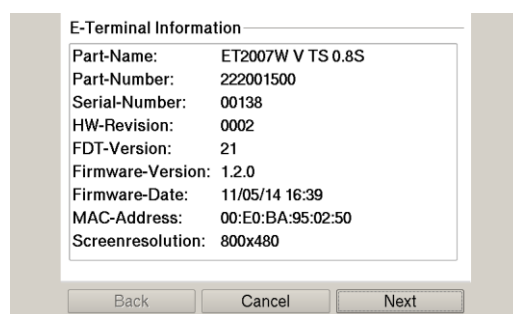


Fig. 38: Information page

3rd Press the "Next" button.

The page with the network settings of the device appears.

E-Terminal Settings: IP-Addresses

Terminal: **10.255.226.202** Edit

Netmask: **255.255.224.0** Edit

Gateway: **0.0.0.0** Edit

Back Expert Cancel Next

Fig. 39: Network settings of the device

4th If necessary, press the “Edit” button and change the network settings as required (IP address, network mask, gateway).

5th Press the “Next” button.

The page with the settings for the server IP and Lifeguard appears.

E-Terminal Settings: VNC

Server: **169.254.255.70** Edit

Scaling: **no scaling** Change

Lifeguard: **Ping LG**

Back Expert Cancel Next

Server: 10.255.226.146

1	2	3	<-
4	5	6	->
7	8	9	Cancel
.	0	<--	OK

Fig. 40: Setting the server IP

6th If necessary, press the “Edit” button and change the server IP as required.

7th Press the “Expert” button to change the Lifeguard setting.

The page with the Expert settings will appear.

– or –

Press the “Next” button and skip to the following page.

E-Terminal Expert Settings: VNC

Lifeguard: **Ping LG** Change

Quality: **high** Change

Port: **5900** Edit

Back Cancel Next

Fig. 41: Changing the Lifeguard setting

- 8th Depending on the controller version, press the "Change" button to change the Lifeguard setting:
CODESYS V2: "BERGHOF VNC LG"
CODESYS V3: "Ping LG"
- 9th Press the "Next" button to skip the following pages with until the page with the summary of the network settings appears.

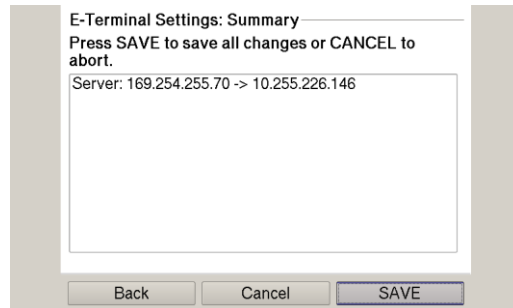


Fig. 42: Summary of the network settings

- 10th If no settings were changed, press the "OK" button.
The main screen of the device will be displayed.
– or –
Press the "Save" button.
The settings will be saved and the device will restart automatically.
- 11th Connect the device to the controller, using the network cable.

The device is now configured and ready for use.

6.2.4. ET2115WUX CS / ET2110W X CS web-terminal configuration

Before the device can be used in web-terminal mode it must be connected to the network with the correct settings before it can be used. Please read ET2115W X CS / ET2110W X CS Configuration for details.

- 1st Supply the device with power (24 V).
After the start the current network settings are displayed (server IP, IP address and network mask).
- 2nd Press the "Configuration" button and then press the "Next" button.
The page with the network settings of the device appears.
- 3rd Press the "Expert" button and then press the "Change" button to switch the device into a web terminal.

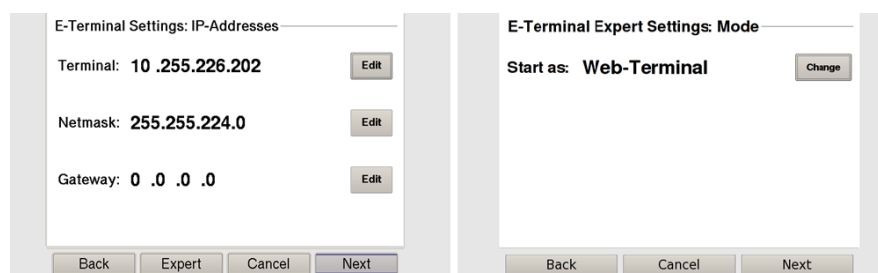


Fig. 41: Switching into web terminal mode

- 4th Press the "Next" button to skip the following pages until the page with the summary of the existing settings appears.
- 5th Press the "Save" button. The settings will be saved and the device will restart automatically. After the start-up, the device is in web terminal mode.



The "Configuration" button is accessible for only a brief time after the start-up. After a few seconds, the device starts its integral browser and blocks the "Configuration" button.

Once this has happened, the only way to access the "Configuration" button is to restart the device again.

- 6th Directly after the start-up, press the "Configuration" button.
- 7th Press the "Next" button to skip the IP settings until the page with the Visu URL appears.
- 8th Press the "Edit" button.
- 9th Input the desired URL and confirm by pressing the "OK" button.

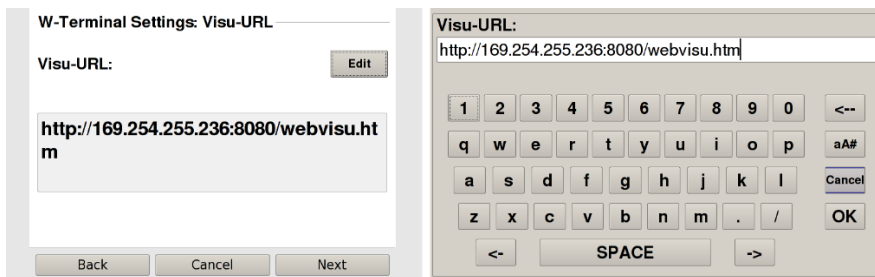


Fig. 42: Setting the Visu URL

- 10th Press the "Next" button to skip the following pages until the page with the summary of the existing settings appears.
- 11th Press the "Save" button. The settings will be saved and the device will restart automatically. After the restart, the device starts its integral browser and automatically loads the Visu URL settings.

6.3. Operation

6.3.1. Status displays (only DC-PRIME)

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.

Location of the operating status LEDs

The Run/Stop and Error LEDs display the system status.

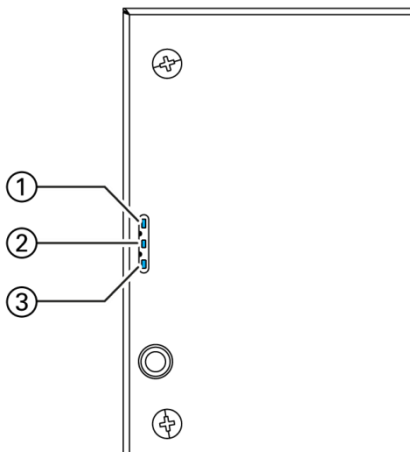


Fig. 43: Location of the operating status LEDs

LED		Meaning
1	PWR (green)	shows that the power supply to the electronics is correct.
2	Run/Stop (yellow/green/red)	shows the system statuses.
3	Error (red)	shows the device has been stopped due to an error.

Meaning of the LED displays

System statuses are shown using flashing signals on the Run/Stop LED in yellow.

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. Function key S1 (only DC-PRIME)

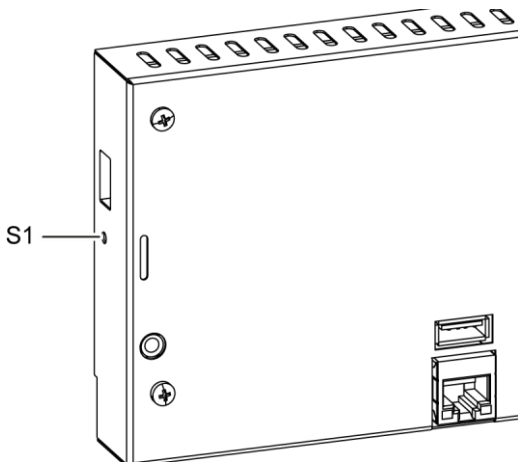


Fig. 44: Function key (S1)

Function key (S1)		
Operating status	Action	Command
Boot phase	Press.	Change to maintenance mode
CODESYS PLC/ CP1131-P	Press briefly.	Toggle between PLC run and stop mode
	Press and hold.	Stop the PLC with resetting of variables (cold re-set)

6.3.3. Real-time clock with buffer battery DC2115WUX CM / DC2110W X CM

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

- 1st 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.
- ▶ Check the Lifeguard settings.

6.4.2. In error stop mode DC2115WUX CM / DC2110W X CM

- 1st Log in to the device via a web browser.
 - 2nd Determine the cause of the fault (Diagnostics > PLC Log/System Log).
 - 3rd Correct the fault.
 - 4th Restart the device (press "Reset" on the device).
- The device is now 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.
 - ▶ Do not place any heavy, hard or sharp-edged objects on the device.
 - ▶ Do not dismantle the devices.
-
- ▶ 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.
 - ▶ Clean the glass only with normal window-cleaning agents or alcohol solutions.

8. Uninstallation

- 1st Disconnect the device and its peripherals from the power supply.
- 2nd Unplug all plug connectors and cables.

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.

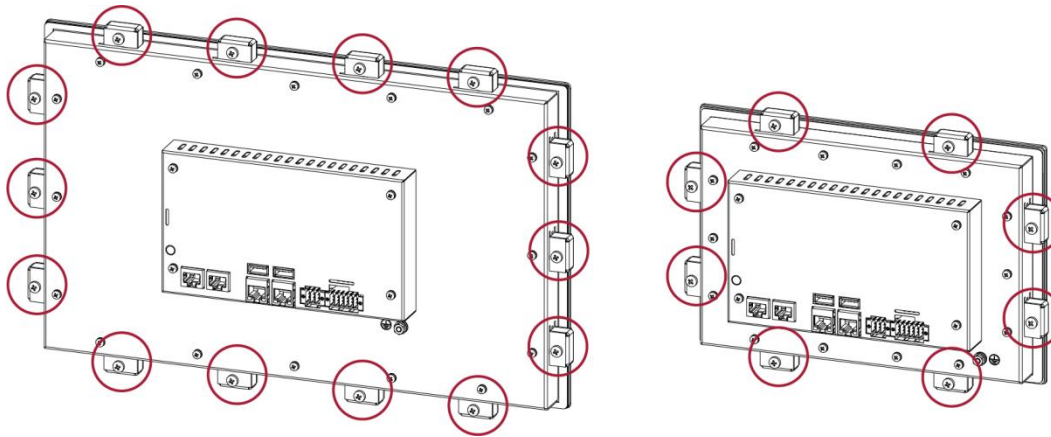


Fig. 45: Undoing the screws

- 3rd Undo the screws on all the securing clips equally.
 DC/ET2115WUX: 14 securing clips
 DC/ET2110W X: 8 securing clips

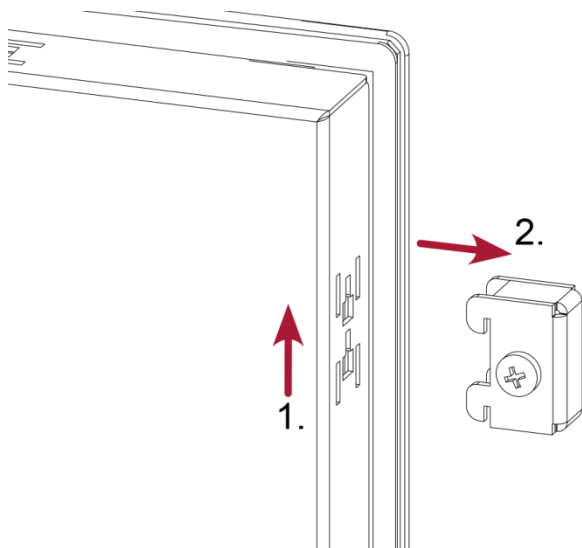


Fig. 46: Removing the securing clips

4th Removing the securing clips.

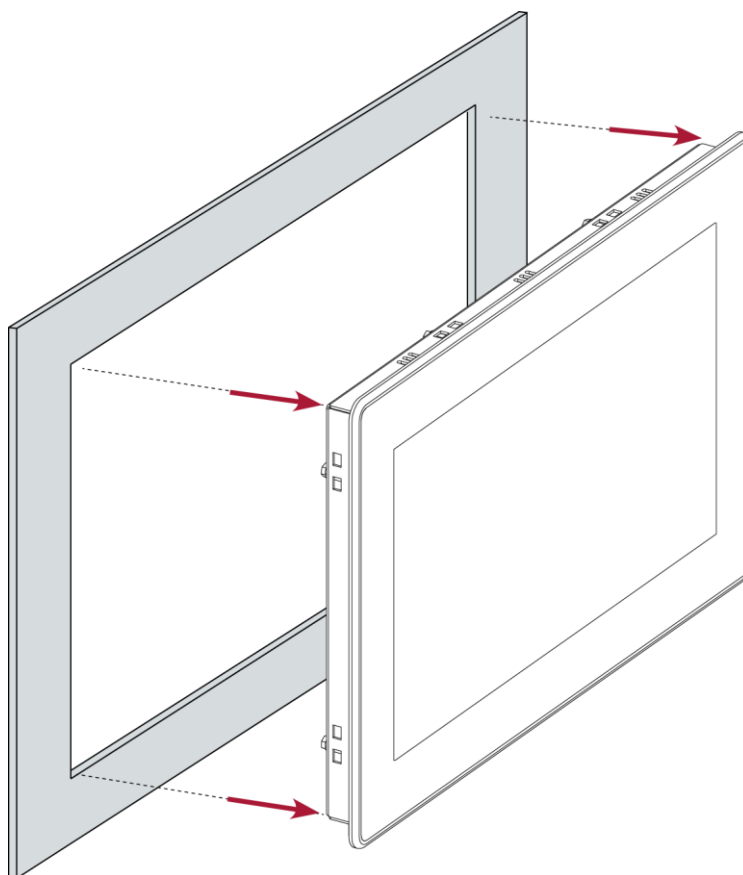


Fig. 47: Pushing the device out of the installation cut-out

5th Push the device evenly forwards out of the installation cut-out.

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. DC2115WUX CM / DC2110W X CM Dialog Controller

Dialog Controller	DC2115WUX CM	DC2110W X CM
Display	FHD	WXGA
Across diagonals	15.6"	10.1"
Item no.	270011300	270011200
Resolution	1920 x 1080 pixels	1280 x 800 pixels
Colours	TFT: 16.7 M	
CPU, user memory		
CPU	800 MHz ARM® with Cortex™-A9 single core	
Program memory (flash)	512 MB (max. 2048 MB)	
Program memory and data memory (RAM)	512 MB	
Non-volatile memory (FRAM)	100 kB	
Dimensions and weight		
Dimensions (WxHxD)	392 x 242 x 55 mm	259 x 177 x 55 mm
Weight	approx. 3 kg	approx. 2.5 kg
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	removable securing clips	
Certification	to product standards EN 61010-2-201, EN 61131-2	
Development environment	CODESYS V3 (IEC 61131-3)	
Protocols	Standard EtherCAT master, CANopen master Optional: Modbus RTU M/S, Modbus TCP M/S, SNMP, OPC UA, Ethernet/IP, PROFINET, BACnet	
Visualisation	Target Visu (Display), Web Visu (Web Server, HTML5)	
Touch operation	Touch capacitive (multi-touch)	

Dialog Controller	DC2115WUX CM	DC2110W X CM
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, industrial zone	
Protection class	III	
Insulation resistance	EN 61131-2; 500 V DC test voltage	
Protection rating	IP20 (front IP44)	
Power supply (24 V power)		
Supply voltage	+24 V DC (–15 % / +20 %) SELV max. ripple component 5%	
Power consumption	Max. 0.8 A, peak current 1.2 A at +24 V DC fused	
Power consumption, dig. Outputs	Depending on the output load, max. 2 A continuous rating	
Protection against reverse polarity	yes	
Ethernet interfaces		
No. / type of interface	1x 10/100 Base T	
Connection system	RJ45	
EtherCAT interface		
No. / type of interface	1x EtherCAT (EtherCAT master)	
Connection system	RJ45	
CAN bus interface		
No. / type of interface	1x CAN-Bus (optional)	
Protocols	CAN-Bus and/or CANopen master (optional)	
Serial interfaces		
No. / type of interface	1x RS-232 (optional); 1x RS-485 (optional)	
Protocols	Modbus RTU (optional)	
USB interfaces		
No. / type of interface	2 x host USB 2.0 / USB connector port A	
No. plugging/unplugging cycles	max. 1000	

Dialog Controller	DC2115WUX CM	DC2110W X CM
Additional functions		
Real-time clock	yes, with battery back-up	
microSD card slot	1x microSD card (optional)	
I/O		
Digital IN	4x	
Digital OUT	4x (0.5 A)	
Analogue IN	4 x universal analogue inputs (–10 V...+10 V, 2 x PT100/PT1000) Resolution 24 bit 2x (-10...+10 V, PT100/PT1000 with 2-wire) 2x (–10...+10 V, or return conductor for 3-wire)	
Battery		
Type	Panasonic VL2020 or similar	
Lifespan	10 years (depends on operating temperature)	
Storage	1 year without voltage (ex-works value with no ageing; any longer and RTC data may be lost)	

10.2. ET2115 Ethernet TerminalWUX CS / ET2110W X CS

Ethernet Terminal	ET2115WUX CS	ET2110W X CS
Display	FHD	WXGA
Across diagonals	15.6"	10.1"
Item no.	222003100	222003200
Resolution	1920 x 1080 pixels	1280 x 800 pixels
Colours	TFT: 16.7 M	
CPU		
CPU	i.MX6 800 MHz / Single Core	
Dimensions and weight		
Dimensions (WxHxD)	392 x 241 x 55 mm	259 x 177 x 55 mm
Weight	approx. 3 kg	approx. 2.5 kg
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	Removable securing clips	
Certification	to product standards EN 61010-2-201, EN 61131-2	
Touch operation	Touch capacitive (single-touch)	
Shock resistance		
Vibration	sinusoidal (EN 60068-2-6) test: Fc 10...150 Hz, 10 m/s ²	
Shock	15 G (approx. 150 m/s ²), 11 ms duration, sinusoidal half-wave (EN 60068-2-27) Test: Ea	
EMC, protection rating		
Emitted interference	EN 61131-2	
Resistance to interference	EN 61131-2, industrial zone	
Protection class	III	

Ethernet Terminal	ET2115WUX CS	ET2110W X CS
Insulation resistance	EN 61131-2; 500 V DC test voltage	
Protection rating	IP20 (front IP55)	
Power supply (24 V power)		
Supply voltage	+24 V DC (–15 % / +20 %) SELV max. ripple component 5%	
Power consumption	Max. 0.8 A, peak current 1.2 A at +24 V DC fused	
Protection against reverse polarity	yes	
Ethernet interface		
No. / type of interface	1x 10/100 Base T	
Connection system	RJ45	
Protocols	TCP/IP	
USB interface		
No. / type of interface	1x host USB 2.0 / USB plug port A	
No. plugging/unplugging cycles	max. 1,000	

10.3. Identification plate

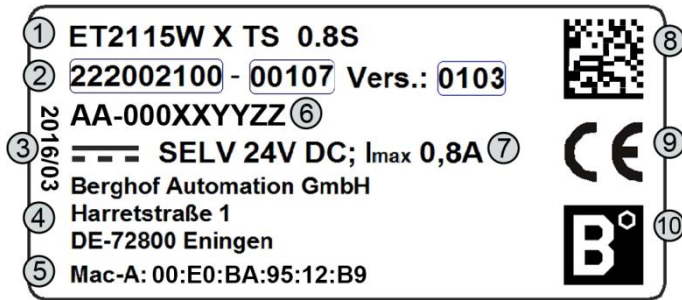


Fig. 48: ET2115 identification plate

Item	Designation	Item	Designation
1	Device type description	6	Customer no.
2	Identification no. (Article no., serial no. and version/as-delivered condition)	7	Supply voltage und maximum current consumption
3	Date of manufacture (year/week)	8	QR code (Identification no.)
4	Manufacturer's address	9	CE mark
5	Mac addresses	10	Manufacturer's mark (trademark)



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

10.4. Identification

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

- ET2110W X CM and ET2115 WUX CM are members of the B-PRIMIS ET-PRIME device series
- DC2110W X CM and DC2115 WUX CM are members of the B-PRIMIS DC-PRIME device series

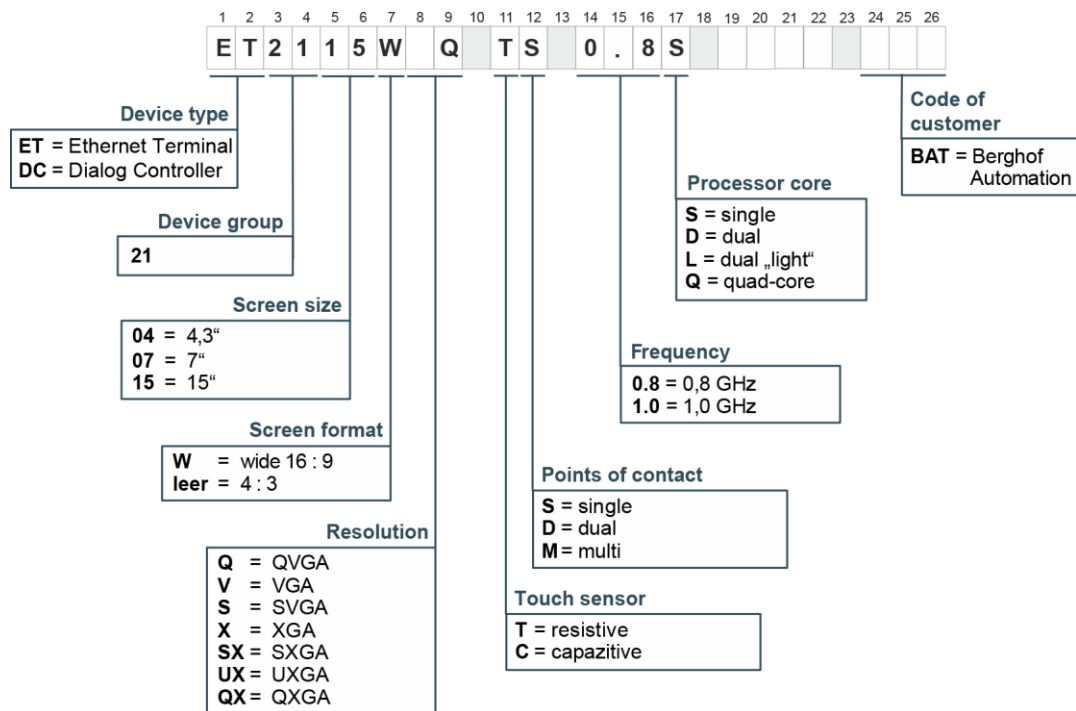


Fig. 49: Identification key DC/ET21xx

11. Standards and certificates

11.1. Standards

Applicable directives

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

Applicable standards

- Programmable Logic Controllers, part 1: General information
EN 61131-1
- Programmable Logic Controllers, part 2: Equipment requirements and tests EN 61131-2
- Safety provisions
DIN EN 61010-2-201
- Technical documentation for assessing electrical and electronic equipment in respect of restriction of hazardous substances
EN 50581:2012

11.2. 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 → Capacitive → Product

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

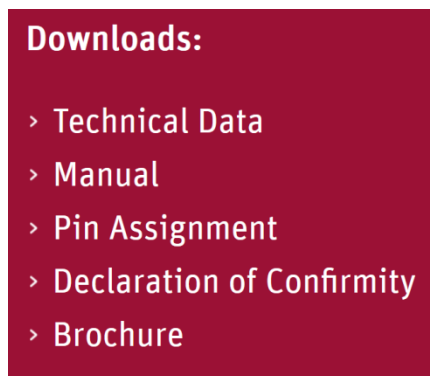


Fig. 50: Download menu

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 search: www.iec.ch

13. Appendix

13.1. Information on copyright and software licence

The firmware of the devices contains der 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 pf delivery of the device, at cost price.

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