USER MANUAL 1.1

DPC3100
Industrial PC

BERGHOF

Disclaimer

The content of this publication was checked for compliance with the hardware and software described. However, discrepancies may arise, therefore no liability is assumed regarding complete compliance. The information in this document will be checked regularly and all necessary corrections will be included in subsequent editions. Suggestions for improvements are always welcome.
Subject to technical changes.

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General Information on this Manual

→ Content
→ Completeness

This equipment manual contains product-specific information valid at the time of publication.
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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1. General

Documentation
This equipment manual is intended for qualified personnel and contains information regarding the mounting, installation, commissioning and maintenance of the Industrial PC.
The information contained in this manual is subject to change without prior notice.

1.1. Scope of the manual

This manual applies to PCs of the DPC31XX T/K [CP] AT1.6 series.

1.2. About This Manual

This equipment manual is an integral part of the product. Make sure the equipment manual is always available near the product's point-of-employment. The manual contains information about the following topics:

- → Areas of application
- → Safety
- → Mechanical construction
- → Electrical construction
- → Connections
- → Commissioning
- → Care and maintenance
- → Decommissioning
- → Disposal

1.3. Hazard Categories and Terminology

	**Immediate danger.** Failure to observe the information indicated by this warning will result in death, serious injury or extensive property damage.
	**Potential danger.** Failure to observe the information indicated by this warning may result in death, serious injury or extensive property damage.
	**Danger.** Failure to observe the information indicated by this warning may result in injury or property damage.
	**No hazard.** Information indicated in this manner provides additional notes concerning the product.

1.4. Qualified Personnel

Only qualified personnel may install, operate and maintain the Industrial PC.
Within the context of this documentation and the safety information it contains, qualified personnel constitutes trained specialists who have the authority to mount, install, commission, ground and identify equipment, systems and power circuits in accordance with the standards of safety technology, and who are familiar with the safety concepts of automation technology.

1.5. Due Diligence

The operator or original equipment manufacturer (OEM) must ensure ...

- → That the Industrial PC is only employed for its intended use.
- → That the Industrial PC is only employed in a fault-free, operational state.
- → That the equipment manual is always maintained in a complete and legible condition and is available at the point-of-employment of the Industrial PC.
- → That only properly qualified and authorized personnel mount, install, commission and maintain the Industrial PC.
- → That these specialists receive regular and ongoing instruction in all pertinent questions related to work safety and environmental protection and that they are familiar with the contents of the equipment manual, in particular, with the safety information it contains.
- → That the equipment identifiers as well as safety and warning information ap-plied to the Industrial PC are not removed and that they are maintained in a legible condition.
- → That all international, federal, state and local ordinances governing the control of machinery and equipment applicable at the location at which the Industrial PC is employed are complied with.
- → That the users always have available all relevant information they require with regard to the Industrial PC and its employment.

1.6. Basic Safety Measures

Working on the PC

Before beginning work on the Industrial PC you must always

→ First ensure that the equipment is in a safe state.
→ Then first switch the PC off, followed by the equipment, and
→ Only then disconnect the PC from the equipment.

WARNING	
 HAZARDOUS PROCESSES	**Hazards due to unforeseeable functional and processing movements when the Industrial PC is disconnected.** These can result in death, serious injury or extensive property damage. All equipment components must be disconnected from the Industrial PC whenever the Industrial PC is not being used for operational or control purposes, e.g., during maintenance or during functional checks after repairs. **Lock out and tag out all equipment components after they have been switched off!**

Switching the PC off

Before switching the Industrial PC off, make sure all programs have been properly exited. The Industrial PC must always be shut down normally.

CAUTION	
 DATA LOSS	**Use the standard procedures to exit any software running on the Industrial PC.** Failure to do so can result in data loss and damage to components. Only switch the Industrial PC off once all running software has properly shut down.

Opening the PC

The supply voltage must be switched off before opening the housing or when installing or removing components. To do this, switch the power supply to the Industrial PC off. Then remove the plug from the power supply socket on the Industrial PC.

WARNING	
 HAZARDOUS VOLTAGE	**Do not open the housing cover with the power switched on!** **Hazard due to contact with live components.** This can result in death, serious injury or extensive property damage. Only open the housing cover once the Industrial PC has been safely disconnected from the power supply.

1.7. Proper Use

The Industrial PC is designed as an OEM*) component for further integration into industrial equipment, machinery and systems. The Industrial PC is used to operate a controller. It therefore performs functions not directly related to safety.
The Industrial PC is designed for use within overvoltage category I (IEC 364-4-443) to operate machinery, equipment and industrial processes in low-voltage equipment in which the designated supply voltage does not exceed 1,000 V AC (50/60 Hz) or 1,500 V DC.

NOTICE	**This Industrial PC has not been approved for use in explosion hazard areas.** This Industrial PC is intended for employment in a typical Class A industrial environment. Limit value requirements in accordance with EN 55011 provide for two classifications: Class A for typical industrial environments. Class B for typical domestic environments.

Fault-free and safe operation of the Industrial PC requires qualified project planning, proper transport, storage, setup and use, as well as careful maintenance and upkeep.
The Industrial PC may only be employed within the context of the data specifications and applications defined in this equipment manual. Any other employment is deemed to represent improper use. Unauthorized modifications or alterations not described in this equipment manual are prohibited.

*) OEM = Original Equipment Manufacturer

1.8. Conformity Declaration

1.8.1. CE Notice (European Union)

Identification by the CE symbol indicates that this Industrial PC complies with the EMC guidelines and the low-voltage guidelines of the European Union. It further indicates compliance with the following technical standards:

- → **EN 55011:2007** Industrial, scientific and medical (ISM) radio-frequency Equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement, Class A
- → **EN 61326-1:2008-6** Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements
  1.) DC connections between parts of devices or systems which are not connected up to a DC supply mains.
  2.) USB and printer connector cords $\leq$ 3 m
  3.) Set shielding bilaterally, shielded cables

1.9. Transport and Setup

NOTICE

Please note the specified storage conditions in the section 'Technical Specifications'.

Transport

Protect the Industrial PC against extreme mechanical stress during transport. Always transport the Industrial PC in its original packaging. The built-in components are extremely sensitive to jarring and strong vibrations.

CAUTION

CONDENSATION

Condensation hazard resulting from climatic fluctuations.

Risk of damage as a result of moisture forming on or in the Industrial PC (condensation). This can result in destruction of the device or consequential damages.

After storage or transport in cold weather or under conditions of strongly fluctuating temperatures, the Industrial PC must be allowed to slowly adjust to the ambient temperature at its point of use before it can be taken into service.

In case of condensation, the unit may not be taken into service for at least 12 hours (temperature compensation).

Unpacking

Proceed as follows:

→ Inspect the packaging for any external damage. If the packaging is severely damaged or if damage to the contents can be detected, do not open the packaging any further. Immediately contact your shipper and your supplier.

→ Remove the packaging. Do not discard the original packaging! The packaging can be used for subsequent transport.

→ Inspect the contents for visible shipping damage.

→ Check the contents against the order for completeness. Save all included documentation. This documentation contains important information concerning the Industrial PC and is an integral part of the product.

→ If shipping damage is detected or if the received contents do not agree with the order, please contact your supplier immediately.

Setup

This Industrial PC is designed for installation in fully enclosed circuit cabinets of industrial machinery and equipment. When installing the Industrial PC, take particular care to ensure that the included seal profiles are not damaged. Also ensure compliance with the ambient conditions specified under 'Technical Specifications'.

2. Product description

Short description
The IBM-compatible Industrial PCs of the DPC3100 series are designed for front panel or circuit cabinet installation in harsh industrial environments. The fan-free design and flash memory (hard disk optional) keep maintenance expenditures to a minimum.
Depending on the computing power required by the application, the DPC31XX can be equipped with a variety of processors. A wide performance spectrum ranging from a simple geode processor offering 500 MHz up to an Intel® Atom™1.6 GHZ is available.
The DPC31XX has a 10, 12 or 15" TFT display. The housing dimensions and protective class (IP65 on the front) are identical on units of the 'Connect' series with either a touch screen or matrix keyboard. The 'Compact' series feature reduced mounting dimensions and is only available as touch screen.

2.1.1. Interfaces

Ethernet
Two Ethernet interfaces (1x 10/100 MBit/s, 1x 10/100/1000 MBit/s) are available. Thanks to the TCP/IP and UDP/IP protocols it is possible to link it very variably to visualisation software, to higher order control units or to the IT infrastructure.

USB
The max. 4+2 USB host interfaces provide a widely-used peripheral interface. For example it can be used to carry out an application update or data migration simply via a USB stick.

CAN Interfaces
The Industrial PC possesses 1 standard CAN interface which can be used up to 1 Mbit/s.

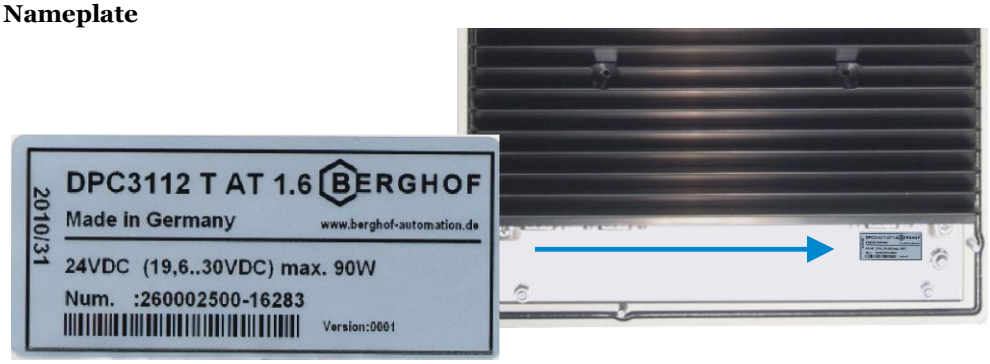
Serial Interfaces
There are two serial RS232 interfaces on the Industrial PC.
Optionally, 2 RS422 interfaces can be realized with an additional card. Those are implemented as USB-to-RS422 interfaces by a Prolific-IC. Driver support is available for (embedded) Windows XP. Please contact our Technical Support for other OS.

PC/104+
It is possible to plug in a PC104 card for the Connect DPC. For that the 02 type is necessary.

2.2. Identification

Product: Industrial PC, Type DPC3115

Nameplate



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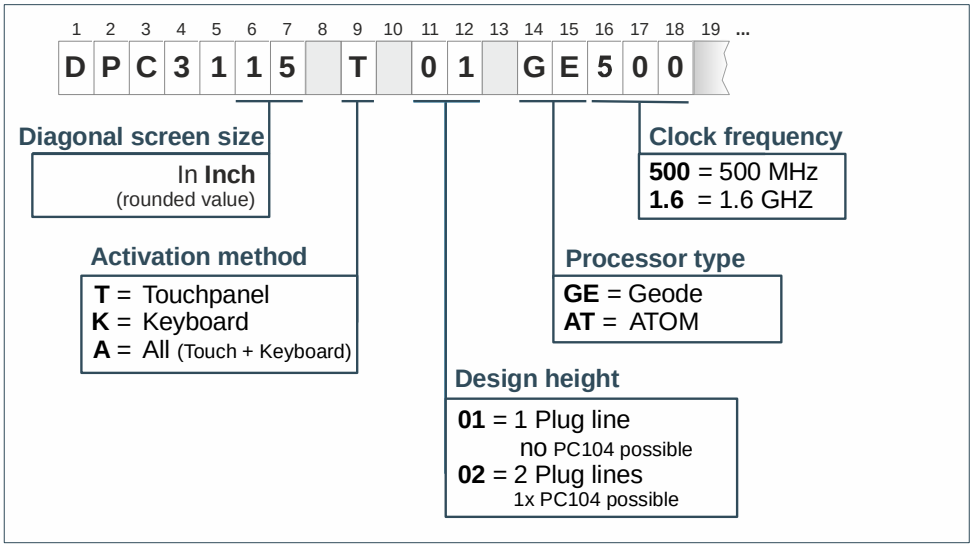
Identification key

Connect series

Using the identification key, the characteristics of the Industrial PC can be decoded as follows (refer to the nameplate).



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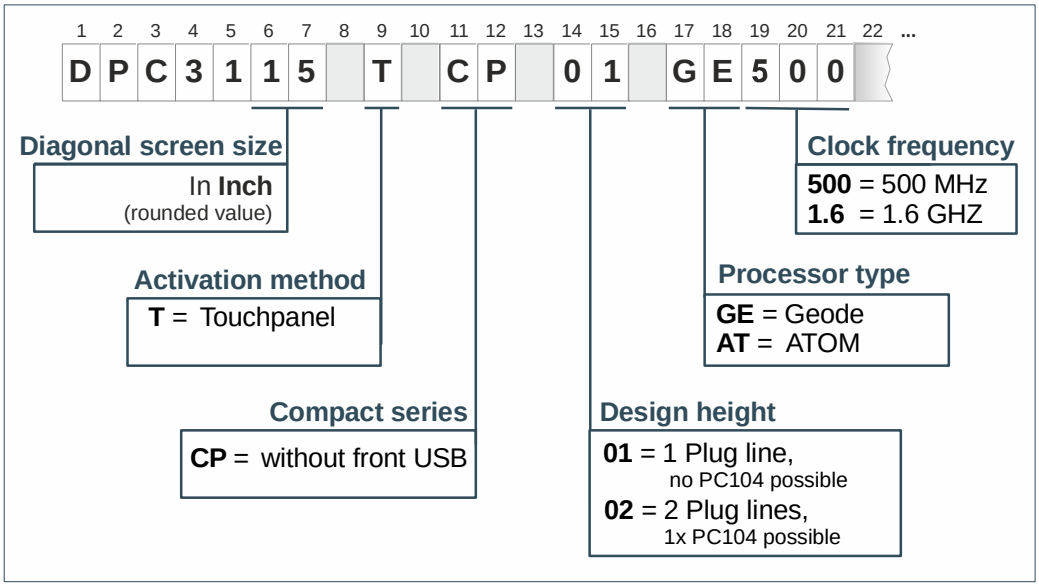
Identification key

Compact series

Using the identification key, the characteristics of the Industrial PC can be decoded as follows (refer to the nameplate).



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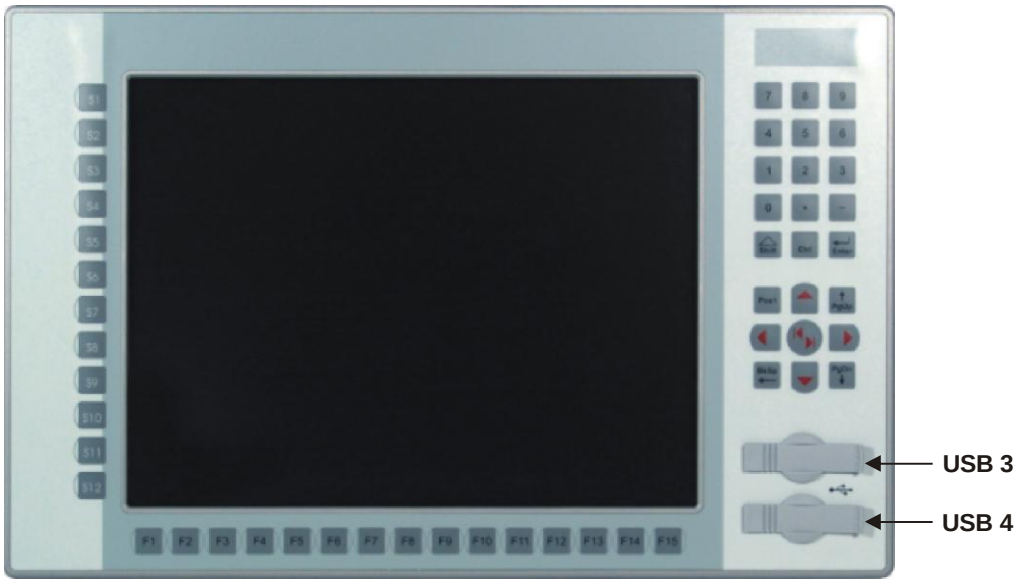
2.3. Technical data

Industrial PC			
Compact series DPC31XX			
Type	Compact-Touch		
Display	**10.4"**	**12.1"**	**15"**
Designation	**DPC3110 T CP**	**DPC3112 T CP**	**DPC3115 T CP**
Dimensions (WxHxD [mm]) incl. front panel (01/02)	330 x 260 x 115/130	360 x 260 x 115/130	400 x 310.3 x 115/130
Installation depth [mm] (01/02)	110/125	110/125	110/125
Weight [kg]	**Approx. 5**	**Approx. 6**	**Approx. 7**
Connect series DPC31XX			
Type	Connect-Touch / Connect-Key		
Display		**12.1"**	**15"**
Designation		**DPC3112 T/K**	**DPC3115 T/K**
Dimensions (WxHxD [mm]) incl. front panel (01/02)		440 x 300 x 115/130	482,6 x 310.3 x 115/130
Installation depth [mm] (01/02)		110/125	110/125
Weight [kg]		**ca. 6.5**	**ca. 7.5**
Operating conditions			
Ambient temperature	0°C to 50°C for DPC with touchscreen: 0°C to 35 °C max. 90 % relative air humidity 35°C to 50 °C max. 50 % relative		
Humidity	max. 90 %, non-condensating		
Resistance to vibrations			
Vibration	sinus-shaped (EN 60068-2-6) test: Fc 10 ... 150 Hz, 1 G (Operation Mode)		
Shock resistance	15 G (approx. 150 m/s²), 10 ms duration, semi-sinus (EN 60068-2-27) test: Ea		
Protection class			
Protection class	IP20 (front panel, IP65)		
Power supply (24 V power pack)			
Supply voltage	+24 VDC (-15% /+20%) SELV, max. AC component 5%		
Current consumption	typ. 1-1.5 A with +24 VDC, max. 2.0 A Expansion card: max. current consumption via PC104+ at +5 VDC = 2 A at +12 VDC = 1 A.		

Industrial PC	
Compatibility	
Electromagnetic resistance / emission	EN 61326-1:2008-6
Interfaces	
Ethernet	1x 10/100 Base T 1x 10/100/1000 Base T
USB	4x USB Rev. 2.0 (on rear) 2x USB Rev. 2.0 (on the front, optional)
CAN-Bus	1x Standard CAN ISO 11898
Serial	2x RS232 C (COM1 / COM2)
RS422/485	SUB-D9 (optional)
PS/2	for touch PC: external keyboard only (not hot plug-capable) for keyboard PC: mouse + keyboard via Y-Kabel ((not hot plug-capable))
VGA	1x optional VGA connection
Transport, storage	
Humidity	Same values as listed under ‘Ambient conditions’.
Vibration resistance	Vibration resistance can be increased by appropriate transport packaging.
Ambient temperature	-25°C to +60°C; für DPC with touchscreen: -25°C to 0°C, and 35°C to 60 °C max. 40 % relative humidity 0°C to 35°C max. 90 % relative humidity

2.4. Industrial PC construction

2.4.1. Front view (Example 15" Connect-Key)



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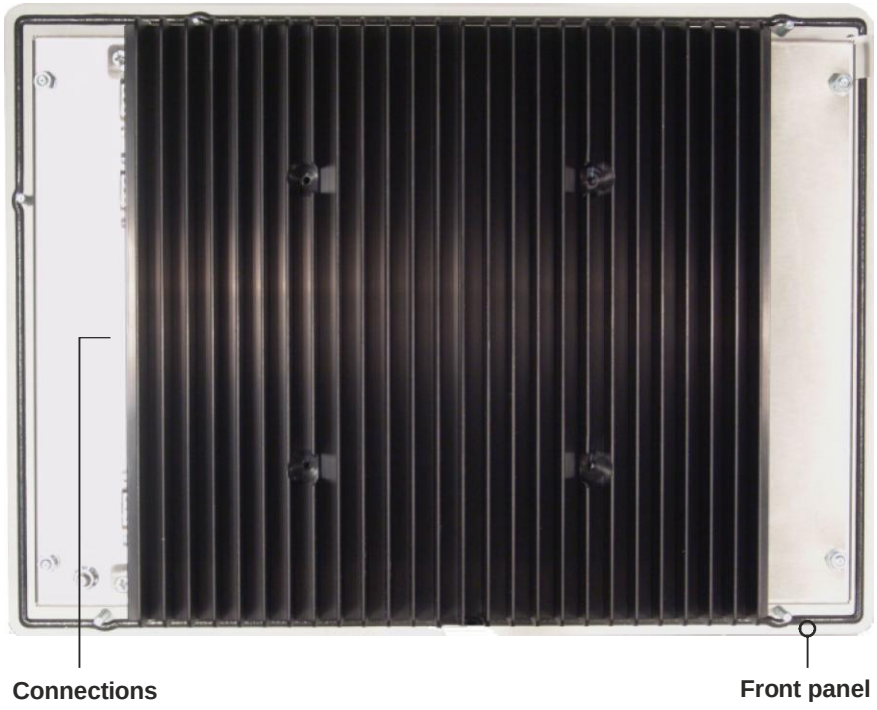
2.4.2. Rear view (Example 15" Connect-Key)



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2.5. Connections

2.5.1. Connector assignment

Option VGA (Sub-HD-15)

X 41 COM2 (RS232 C)

Option COM3+4 (RS422, Plug line 02)

X 42 COM1 (RS232 C)

X 27 USB2 + USB1 (Rev.2.0)

X 15 10/100/1000 Base-T (Network)

X 31 10/100 Base-T (Network)

X 28 USB4 + USB3 (Rev.2.0)

X 16 PS/2 (Keyboard, mouse)

X 19 CAN

X 26 Power supply (24 VDC)

Option PC/104+
(Extension for case 02)

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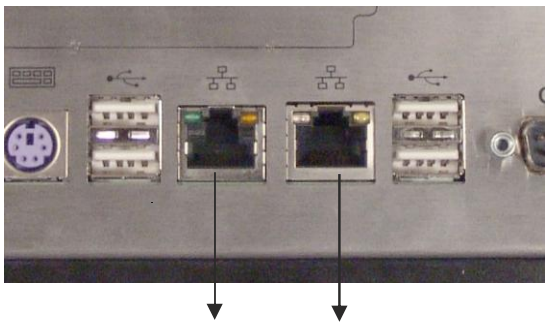
2.5.2. Status indicators



X31: 10/100 Base-T		
LED green		ready
LED yellow		Data Receive

X15: 10/100/1000 Base-T		
LED green orange		100 1000
LED yellow		LINK

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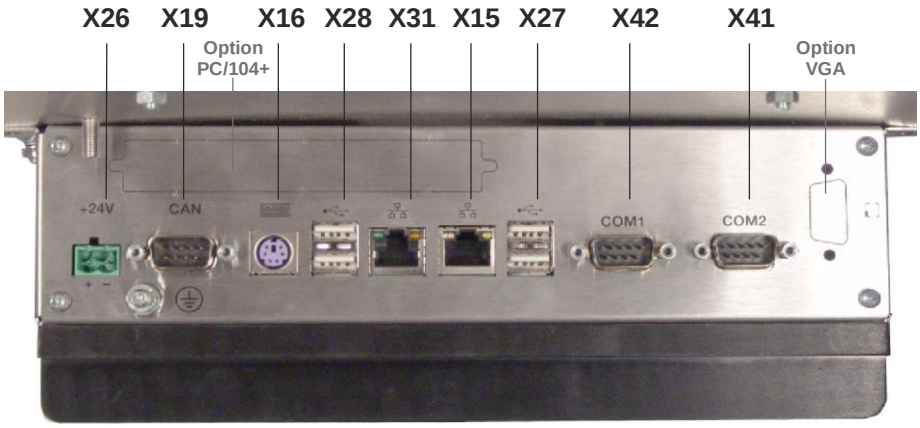
2.5.3. External connections

NOTICE	**Connecting other devices** Before connecting any peripheral device, please read the device's associated documentation. When connecting or disconnecting cords, always hold them by their plugs. Never pull on the cords themselves!

Connection points for all external connections are located on the back of the Industrial PC. All connections are plug-in type connections.



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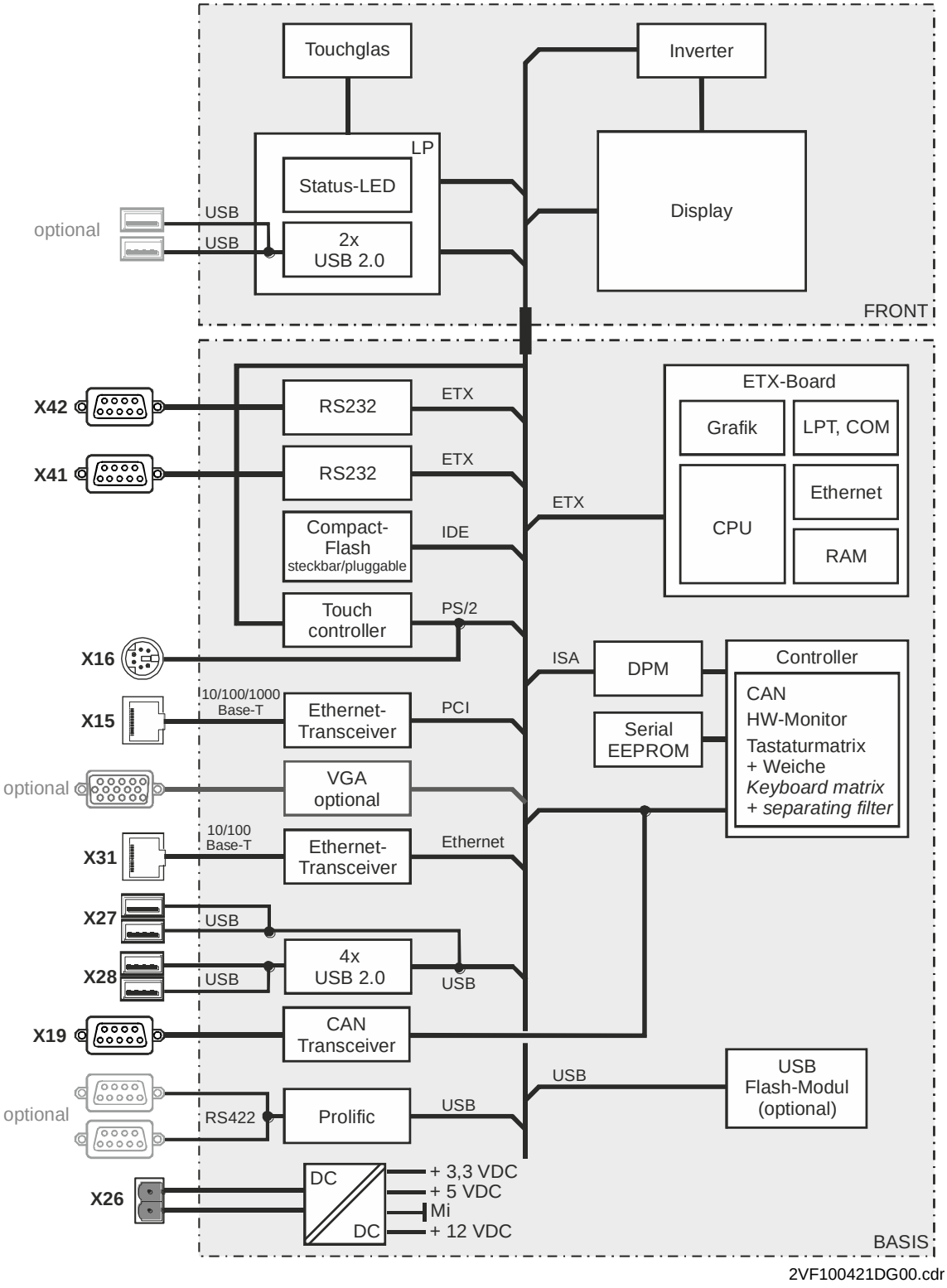
2.6. Block circuit diagram



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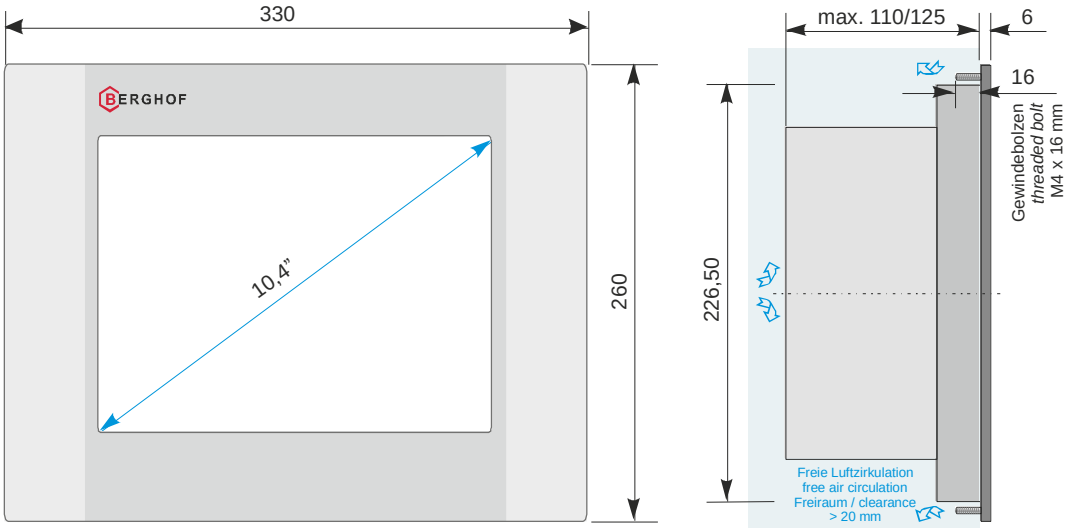
2.7. Dimensioned drawings

2.7.1. Dimensions of the Compact Touch 10.4"

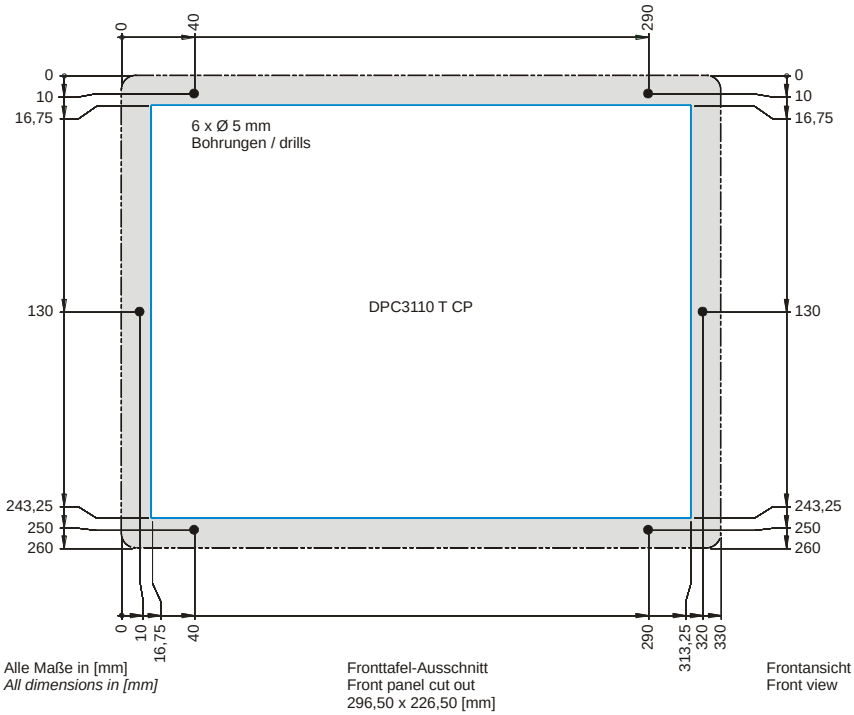


Alle Maße in [mm] / All dimensions in [mm] DPC3110 T

2VF100433DG00.cdr

2.7.2. Panel cut-out for the Compact Touch 10.4"

The Industrial PC is intended for front installation. A rectangular cut-out is required. The thickness of the bearing material must not exceed 6 mm.



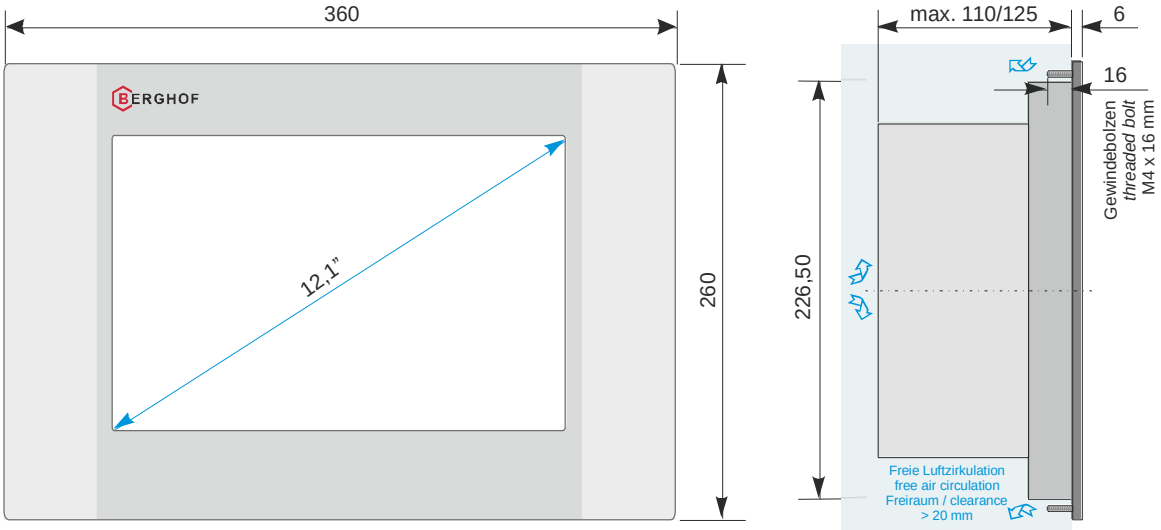
Alle Maße in [mm]
All dimensions in [mm]

Fronttafel-Ausschnitt
Front panel cut out
296,50 x 226,50 [mm]

Frontansicht
Front view

2VF100424DG00.cdr

2.7.3. Dimensions of the Compact Touch 12.1"

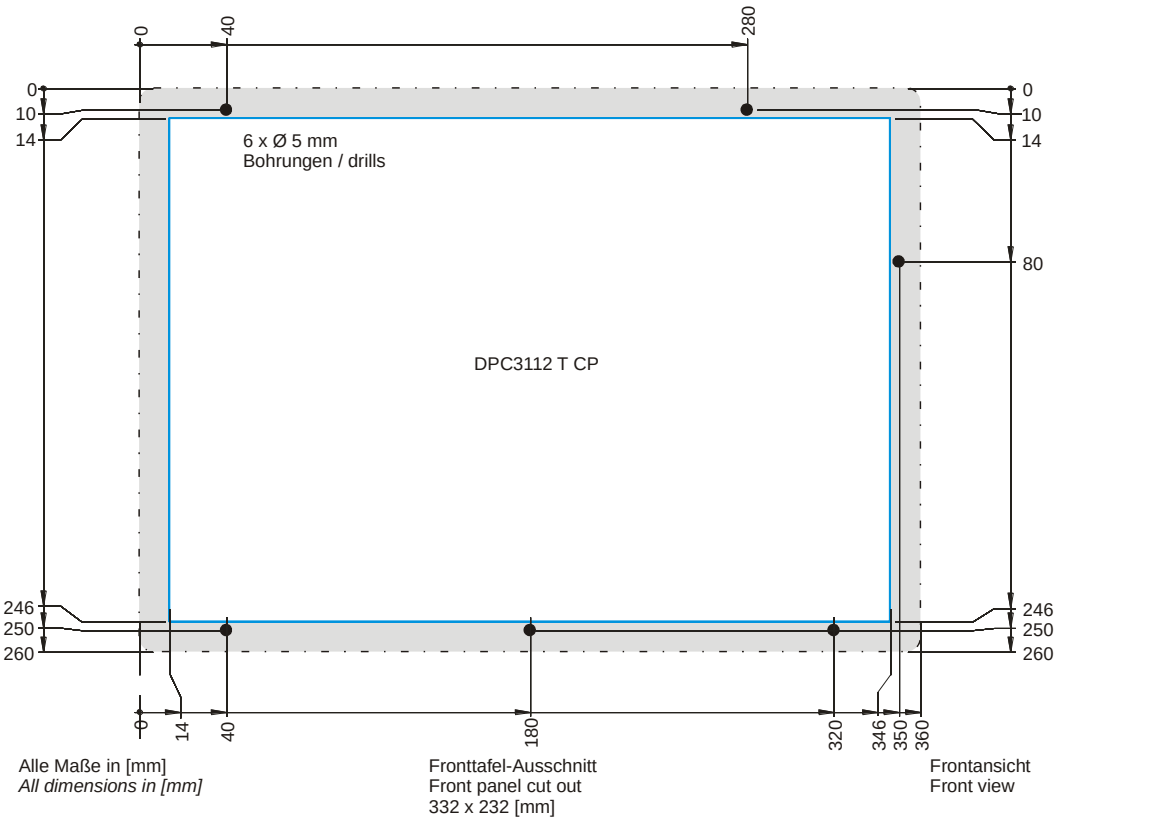


Alle Maße in [mm] / All dimensions in [mm] DPC3112 T

2VF100434DG00.cdr

2.7.4. Panel cut-out for the Compact Touch 12.1"

The Industrial PC is intended for front installation. A rectangular cut-out is required. The thickness of the bearing material must not exceed 6 mm.



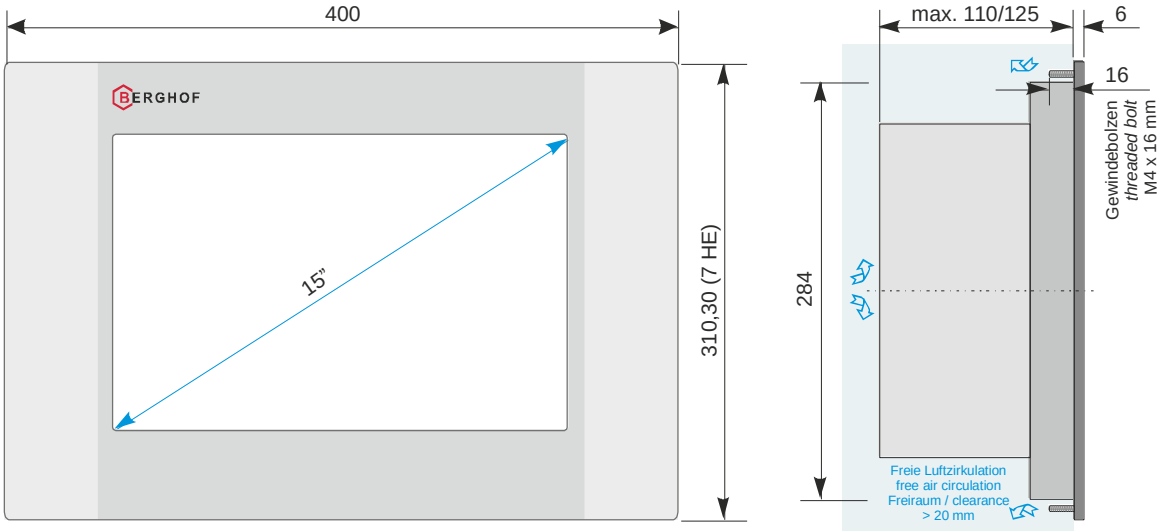
Alle Maße in [mm]
All dimensions in [mm]

Fronttafel-Ausschnitt
Front panel cut out
332 x 232 [mm]

Frontansicht
Front view

2VF100425DG00.cdr

2.7.5. Dimensions of the Compact Touch 15"

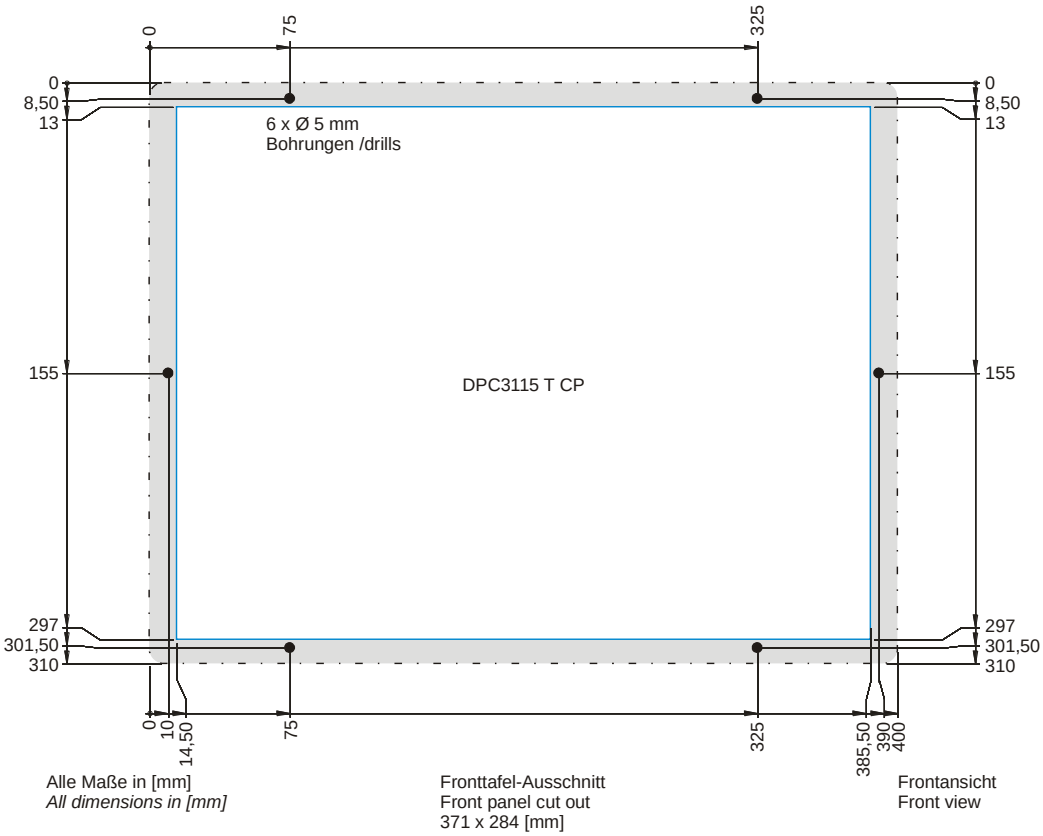


Alle Maße in [mm] / All dimensions in [mm] DPC3115 T

2VF100435DG00.cdr

2.7.6. Panel cut-out for the Compact Touch 15"

The Industrial PC is intended for front installation. A rectangular cut-out is required. The thickness of the bearing material must not exceed 6 mm.



Alle Maße in [mm]
All dimensions in [mm]

Fronttafel-Ausschnitt
Front panel cut out
371 x 284 [mm]

Frontansicht
Front view

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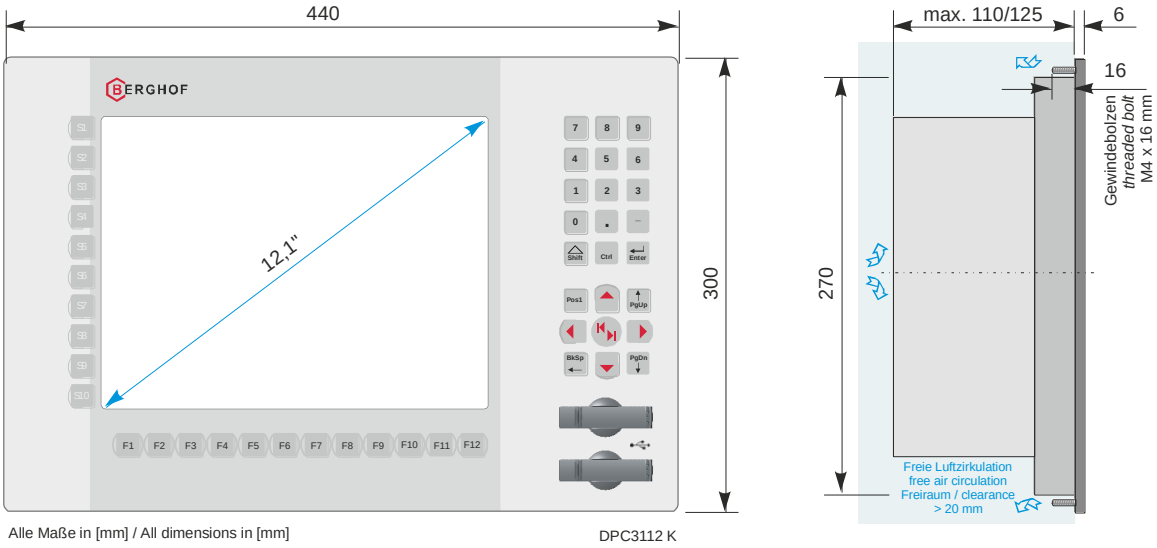
2.7.7. Dimensions of the Connect Touch/Key 12.1"

The dimensions are identical for both units with keyboards and units with touch panels.



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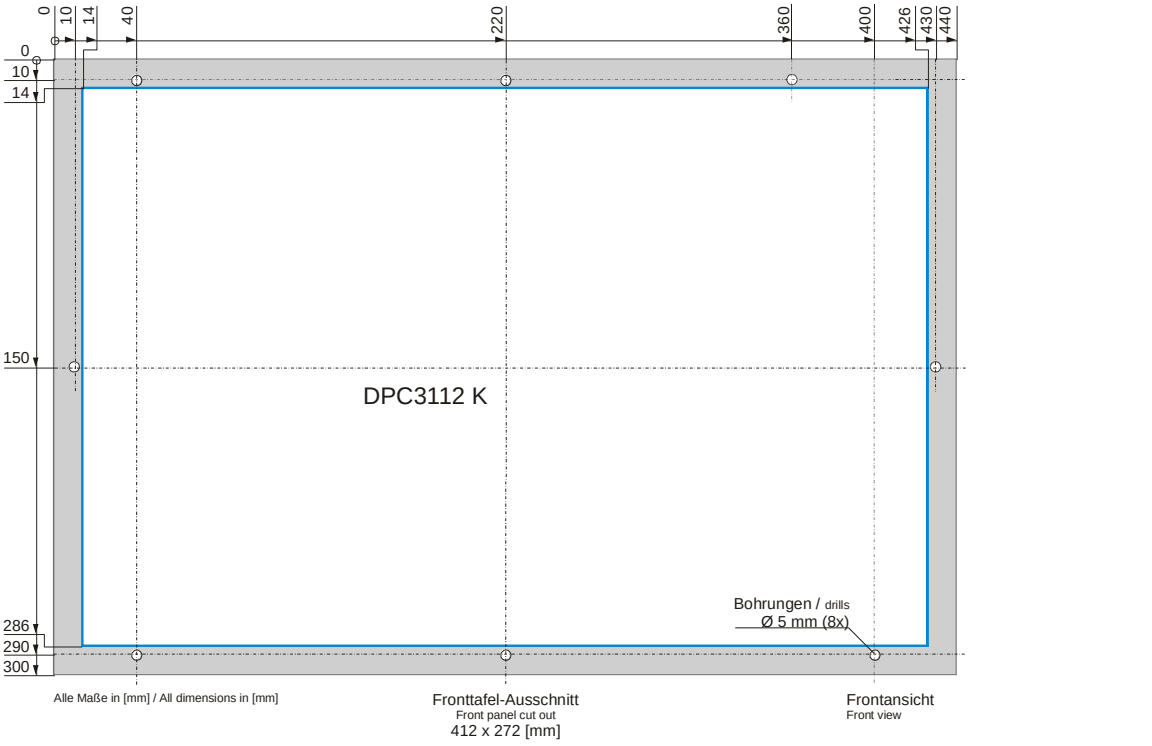
2.7.8. Panel cut-out for the Connect Touch/Key 12.1"

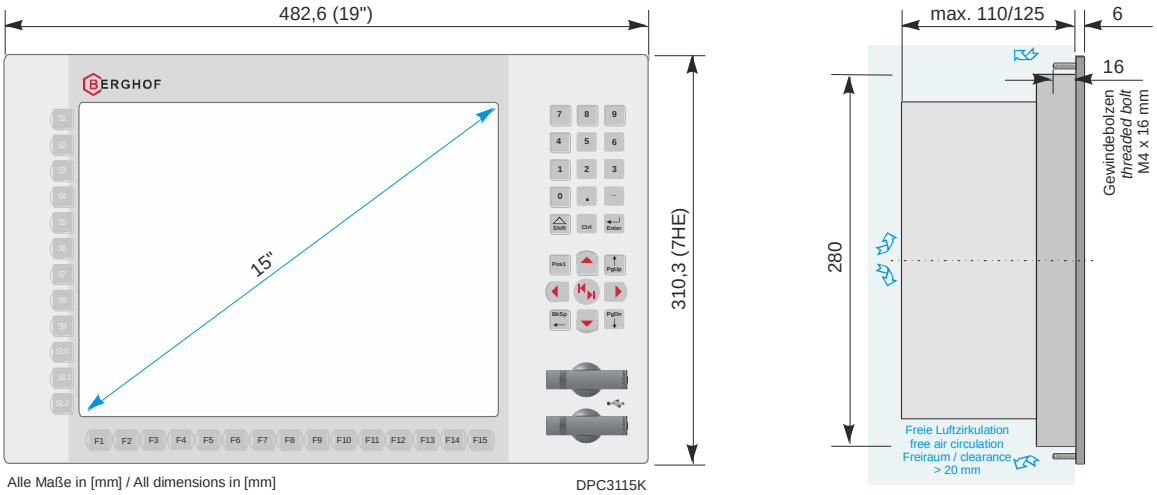
The Industrial PC is intended for front installation. A rectangular cut-out is required. The thickness of the bearing material must not exceed 6 mm. The panel cut-outs are identical for both units with keyboards and units with touch panels.



2VF100437DG00.cdr

2.7.9. Dimensions of the Connect Touch/Key 15"

The dimensions are identical for both units with keyboards and units with touch panels.



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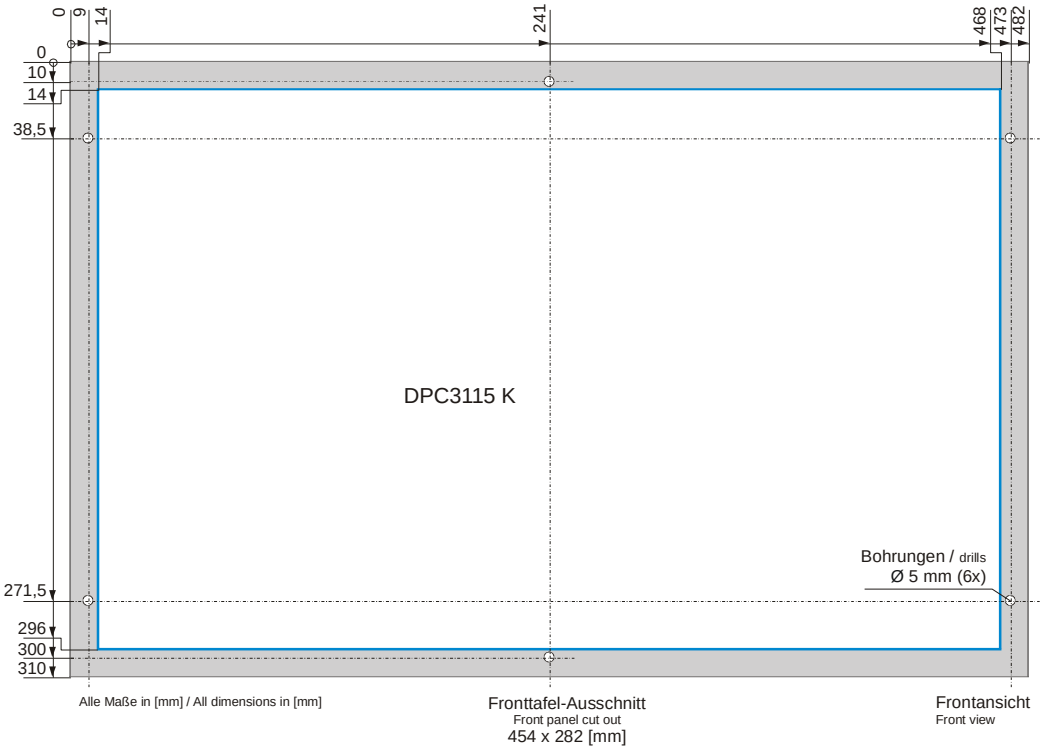
2.7.10. Panel cut-out for the Connect Touch/Key 15"

The Industrial PC is intended for front installation. A rectangular cut-out is required. The thickness of the bearing material must not exceed 6 mm. The panel cut-outs are identical for both units with keyboards and units with touch panels.



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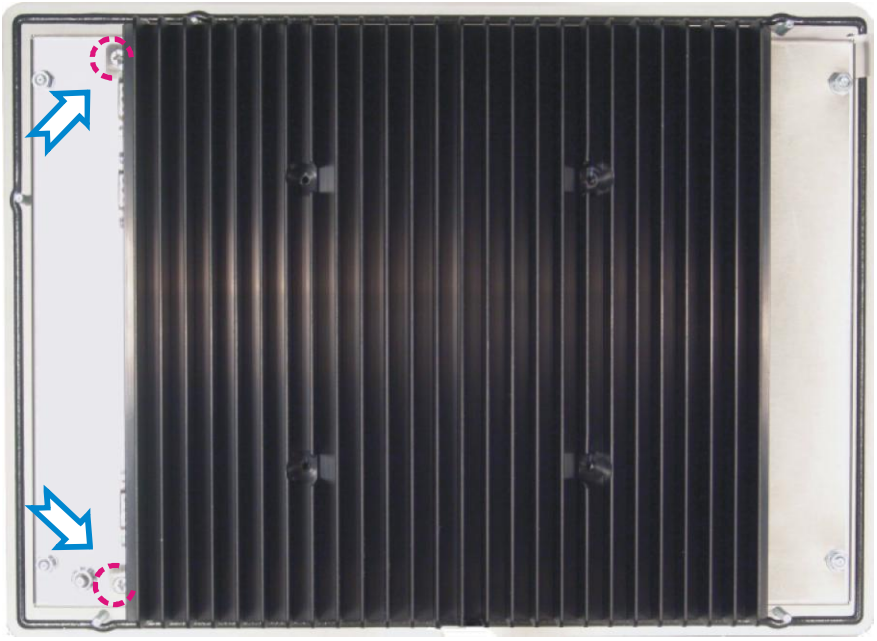
2.8. Mounting and installation

2.8.1. Mounting

Required tools
Allen key, socket wrench or open-end wrench SW, 7 mm (M4)

Mounting
The Industrial PC is equipped with 6 force fitted, M4 x approx. 16 mm threaded bolts. Number and order depend on the device type. For more details see section 'Dimensioned drawings'. A secure mounting requires U washers, spring/lock washers and nuts (M 4).

→ Remove the fastening nuts and washers from the bolts.
→ Push the Industrial PC through the mounting cut-out.
→ Secure the PC in the mounting cut-out.
→ Adjust the PC in the mounting cut-out and tighten all nuts.



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NOTICE

Disassembly
Disassembling/removing the Industrial PC occurs in reverse order.

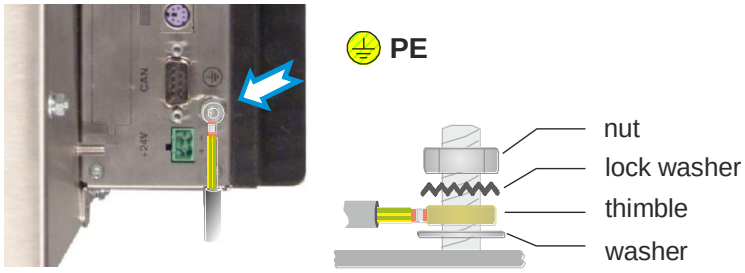
2.8.2. Connection

Power supply
Power is supplied to the Industrial PC via an external 24 VDC power supply. Before connecting the external power supply, check to make sure it conforms to the required specifications below.

External power supply (24 VDC)	
Output voltage	+24 VDC SELV (-15% /+20%)
Alternating current portion	max. 5% The DC level must not drop below 20.4 V.
Power output	min. 2.0 A at +24 VDC at 25 °C (w/o PC104 expansion card)

Installation
All connections and wiring must be laid out to prevent any interference as a result of inductive or capacitive pick-ups in the Industrial PC. Input wiring must have adequate current and voltage resistance.

Ground wire
Connect the housing of the Industrial PC to the ground terminal (PE), copper lead cross-section min. 1.5 mm².



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2.9. Pin assignment

2.9.1. Power supply

Internal power pack
The Industrial PC is equipped with an internal power pack for 24 VDC (19.2 V...30 V) input voltage. The power pack is equipped with built-in reverse polarity protection and a current at make limiter (5 A).
The infeed and the power pack must be protected by an external short circuit and overload protector with an activation current of 6 A.

24 V power pack output voltages	Maximum current load
+ 5 V	7 A
+ 12 V	2.5 A

X26 pin assignment

X26	Außen	Innen
 Phoenix MSTB 2.5/2-G-5.08	**1**	external 24 VDC (18 V...30 V) power supply
	2	external power supply GND

2.9.2. PS/2; keyboard

CAUTION

PS/2 is not hot plug-capable.
If a PS/2 keyboard is connected during operation the touch screen and/or the keyboard may crash.

X16 pin assignment

X16		
 Min-D6	**1**	KBDAT
	2	MSDAT; only on 'K' (keyboard) version
	3	GND
	4	VCC
	5	KBCLK
	6	MSCLK; only on 'K' (keyboard) version

NOTICE	**A Y cable is required to use the PS/2 mouse with version DPC31XXK.** PS/2: for touch PC external keyboard only, for keyboard PC mouse and keyboard via Y cable

2.9.3. 10/100 Base-T Network connection (Ethernet)

The on-board 10/100 Base-T Ethernet adapter with an RJ-45 connection is used to establish the network link.The length of the cable depends on the ETX module used (tested for 50 m). For more details please refer to the ETX-Board (CPU board) manual.

X31 pin assignment

X31		10/100
 RJ45	**1**	TX+
	2	TX-
	3	RX+
	4	75 Ohm
	5	75 Ohm
	6	RX-
	7	75 Ohm
	8	75 Ohm
LED	**green**	ON – operational
LED	**yellow**	FLASHING – Data Receive

2.9.4. 10/100/1000 Base-T Network connection (Ethernet)

The on-board 10/100/1000 Base-T Ethernet adapter with an RJ-45 connection is used to establish the network link.The length of the cable depends on the ETX module used (tested for 50 m). For more details please refer to the ETX-Board (CPU board) manual.

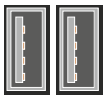
X15 pin assignment

X15		10/100/1000
 RJ45	**1**	MX0+
	2	MX0-
	3	MX1+
	4	MX1-
	5	MX2+
	6	MX2-
	7	MX3+
	8	MX3-
LED	**green** **orange**	100 1000
LED	**yellow**	LINK

2.9.5. USB 1+2 and USB 3+4

USB Ports (Rev. 2.0)

X27 and X28 pin assignment

X27 and X28		
 USB 2 USB 1 USB 4 USB 3	**B1**	VCC
	B2	D-
	B3	D+
	B4	GND

CAUTION DAMAGE	**The USB ports can provide a max. current of 0.5 A.** A device requiring more current will not function and may therefore be damaged. Recommendation: Please use devices which have an internal power supply in this case.

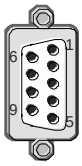
NOTICE	Certain USB floppy drives may not be identified as the boot medium. Recommendation: Please use TEAC drives.

NOTICE	The mechanical structure of the USB port is designed to max. 1000 mating cycles.

2.9.6. CAN

The CAN interface conforms to the ISO 11898 Standard.

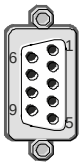
X19 pin assignment

X19		
 Sub-D9 M	**1**	NC
	2	**CAN_L**
	3	**CAN_GND**
	4	NC
	5	NC
	6	NC
	7	**CAN_H**
	8	NC
	9	NC

NOTICE	A terminating resistor for the CAN Bus can be connected with the switch S1 (see section ‘Motherboard’, ‘Internal connection’).

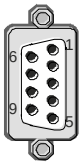
2.9.7. COM1 and COM2 IOIOI

Serial interfaces (COM1 / COM2) in accordance with RS232C
X42 (COM1) and X41 (COM2) pin assignment

X42 / X41		
 Sub-D9 M	**1**	DCD
	2	RXD
	3	TXD
	4	DTR
	5	GND
	6	DSR
	7	RTS
	8	CTS
	9	RI

2.9.8. Optional COM3 and COM4 IOIOI

Serial interfaces (COM3 / COM4) in accordance with RS422
COM3 and COM4 pin assignment

 Sub-D9 M	**1**	Not used
	2	RXD-
	3	TXD-
	4	Not used
	5	GND
	6	Not used
	7	TXD+
	8	RXD+
	9	Not used

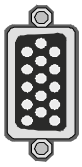
NOTICE

COM3 and COM4 are implemented as RS422 interfaces.
Conversion USB-to-Seriell ensues on the I/O board. In addition you find the Prolific driver in the device manager.

2.9.9. Optional VGA

VGA (optional) not for devices of the Compact series

Pin assignment



Sub-HD-15F

1	VGA_R
2	VGA_G
3	VGA_B
4	NC
5	GND
6	GND
7	GND
8	GND
9	NC
10	GND
11	NC
12	DDDA
13	VGA_H
14	VGA_V
15	DDCK

3. Operating the Industrial PC

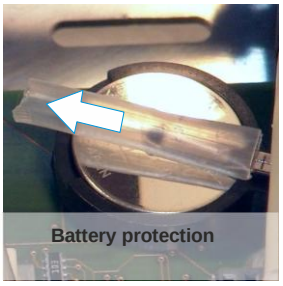
3.1. Commissioning

3.1.1. Driver installation and initial startup

The Industrial PC can be delivered with a preinstalled copy of the Linux XP embedded or XP Professional operating system. All hardware drivers required for the existing equipment are installed.

Remove battery protection

You must remove the battery protection before switching on for the first time!
To do so, first slide off the flexible insulating tubing towards the front.
The battery is located on the motherboard. Please also refer to the 'Motherboard' section.



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Power on

The Industrial PC is not equipped with its own mains power switch. The Industrial PC starts when the equipment is switched on or when the power supply is connected.

Switching off

CAUTION DATA LOSS	**Use the standard procedures to exit any software running on the Industrial PC.** Failure to do so can result in data loss and damage to components. Only switch the Industrial PC off once all running software has properly shut down.

The Industrial PC is switched off when the equipment is switched off or the power supply is shut down
Before switching the Industrial PC off, make sure all programs have been properly exited. The Industrial PC must always be shut down normally.

NOTICE	Software typically employed on the Industrial PC allows various users to be assigned different access privileges. Those users with no privileges to exit software are therefore also not permitted to switch the Industrial PC off.

3.2. Decommissioning

3.2.1. Disposal

Disassembly
The Industrial PC must be completely disassembled into its component parts for disposal. All metal components can be disposed of as recyclable metal waste.

Electronic scrap
All electronic components such as PCBs, drives, etc. must be sorted for disposal. Specifics concerning disposal are regulated by federal, state and local ordinances. Compliance with these is mandatory.

Battery

⚠ CAUTION  HAZARDOUS MATERIAL EMISSIONS	**Batteries contain materials which are hazardous to health and to the environment.** Batteries may only be disposed of through authorized channels. Make sure the battery is fully discharged. If necessary, protect the contacts against short circuiting with a strip of insulating tape.

3.3. Upkeep

Cleaning
In order to prevent faults due to accidental activation, the Industrial PC must be switched off when the front panel is cleaned.

⚠ CAUTION  DATA LOSS	**Use the standard procedures to exit any software running on the Industrial PC.** Failure to do so can result in data loss and damage to components. Only switch the Industrial PC off once all running software has properly shut down.

Use a moistened, clean, soft, lint-free cloth to clean the front of the Industrial PC. Please observe the following to prevent damaging the front panel during cleaning:

→ Never use high-pressure or steam cleaners.
→ Never use caustic cleansers, solvents, abrasives or hard objects when cleaning.
→ Do not apply excessive pressure to the front panel when cleaning.

3.4. Help in case of faults

Please read the section, 'Basic Safety Measures'. If the actions described below are unsuccessful, please contact your supplier's service department.

Fault	Possible cause	Recommended corrective actions
No function when the Industrial PC is started.	No power to the Industrial PC.	Make sure the power supply cable is plugged in. Check the pin assignment for a polarity reversal. Check (measure) the connection voltage.
The Industrial PC fails to completely boot up.	Compact Flash faulty (CF card).	Replace the faulty CF card with a new one if one is available.
	Incorrect SETUP settings.	Check the SETUP settings (Boot Device Priority).
	USB medium not bootable.	Remove USB.
Display shows nothing, external monitor OK.	Faulty SETUP settings.	Check SETUP display settings: 15"-XGA, 12.1"-SVGA, 10.4"-VGA.
LED display flickers.	Operating voltage fluctuates between 17 and 18 VDC.	Increase operating voltage, 19.2 VDC minimum.

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4. Maintenance

Battery
Use only VARTA CR2032 type batteries. The built-in battery must be replaced every 5 years at least.
In the case of computers which are not connected to the power supply (non-operative) the battery capacity is sufficient for approximately 500 days (without protection of battery drain).

Maintenance work
Maintenance work on the Industrial PC, particularly work involving the opening of the housing, may only be performed by qualified personnel!
Before beginning any maintenance work, please read the 'General' chapter, in particular, the 'Basic Safety Measures' section.

WARNING	
 HAZARDOUS VOLTAGE	**Do not open the housing cover with the power switched on!** **Hazard due to contact with live components.** This can result in death, serious injury or extensive property damage. Only open the housing cover once the Industrial PC has been safely disconnected from the power supply.

Maintenance work on the Industrial PC can result in damage
→ if metal objects such as screws, nuts, tools, etc. fall on the PCB.
→ if connecting cables are loosened, removed or incorrectly reconnected.

After maintenance
Before returning the Industrial PC to service, check to be sure that
→ there are no foreign objects in the PC.
→ there is a battery in the battery slot.
→ all connections are correct and secure.
→ the ground wire (PE) is properly connected.

NOTICE	
	Be sure all covers on the Industrial PC are closed before returning the PC to service!

4.1. Opening the housing

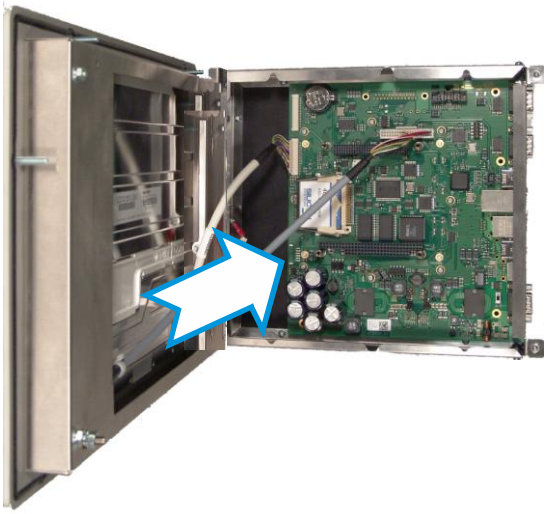
Tools are required to open the housing cover on the Industrial PC.

Open the housing cover as follows:

→ Loosen the 4 fastening screws (A). The screws are captive (M4/PH1 Philips head).

→ Lift the housing cover and flip it open.

Cover fastening screw



Expand laterally

Caution: Do not lever out the device!

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Reassemble the housing cover in the reverse order.

4.2. Motherboard

4.2.1. Internal connection

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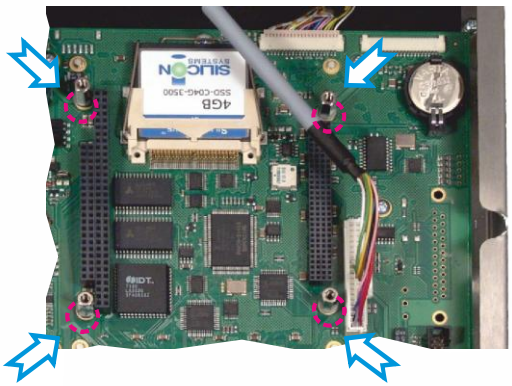
NOTICE

A terminating resistor for the CAN Bus (X19) can be connected resp. disconnected with the switch S1 (Right = ON). It is connected ex factory (see section ‘Product description’, ‘Pin assignment’, ‘CAN’).

4.2.2. Mounting PC/104+ cards



4x bolt (Item-No. 2T0760000)
max. length of external screw thread: 3.5 mm

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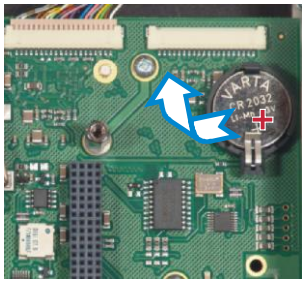
CAUTION	
DAMAGE	**Please use only bolts of the Berghof company with the order number 2T0760000 for mounting the PC/104+ cards.** The usage of other distance bolts may cause a damage of the hardware.

4.2.3. Battery replacement

CAUTION	
HAZARDOUS MATERIAL EMISSIONS	**Batteries contain materials which are hazardous to health and to the environment.** Batteries may only be disposed of through authorized channels. Make sure the battery is fully discharged. If necessary, protect the contacts against short circuiting with a strip of insulating tape.

Battery type

The battery is located on the motherboard. To replace the battery, open the tension tab on the battery holder and remove the battery. Replace the dead battery only with a round cell type VARTA CR2032. **Make sure the polarity is correct when installing the new battery.**



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4.2.4. CF card replacement

CF card removal

The CF card is located on the motherboard.

→ To replace the CF card, open the locking tab on the CF card socket.

→ Pull the locking tab forward and away from the CF card, then flip the tab up.

Carefully hold the CF card on its long sides and gently jiggle the card while pulling it out of its socket.

2VF100444DG00.cdr

CF card installation

Install the new CF card in the reverse order.

→ Make sure the CF card is properly positioned in the socket. The card is equipped with a reversal protection.

→ Do not force the card into the socket.

→ After installing the CF card, re-secure it with the locking tab.

CF card type
SILICON DRIVE = SSD-CXXX-3512, -3500 or -4300
Single Level Cell and fixed medium (XXX = storage capacity).

4.3. Display

The lamps for the back-lit display have a half brightness time of 50000 h. Therefore it is not necessary to replace them. If it is necessary to replace the display for some reason, send the PC to the manufacturer.

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5. Chemical resistance

Terminals, controllers with displays and industrial PCs with displays are available in 3 versions with regard to the front foil finish (refer to section on 'Front foils'). The 3 versions also differ in respect of the materials used and their chemical resistance:

Version	Outside	Inside
Connect Touch	AUTOTEX foil	Touch foil
Connect Key	AUTOTEX foil	Glass pane
Clean Touch	AUTOFLEX foil	AUTOFLEX foil

5.1. Resistance of the touch screen

The active area of the touch screen is resistant to the following chemicals if exposed to them for a period of one hour at a temperature of 21 °C:

Industrial chemicals	Household chemicals
Acetone	Ammonia-based glass cleaners
Dichloromethane	Laundry detergent
Methyl ethyl ketone	Cleansers (Fantastic, Formula 409, Joy, etc.)
Isopropyl alcohol	Vinegar
Hexane	Coffee
Turpentine	Tea
Naphtha	Grease
Lead-free gasoline	Cooking oil
Diesel oil	Salt
Motor oil	
Transmission fluid	
Antifreeze	

5.2. Resistance of the AUTOTEX front foil sheeting to chemicals

5.2.1. General resistance of the foil sheeting material

AUTOTEX is based on a polyester foil sheet with a biaxial arrangement and therefore exhibits better resistance to solvents. It is stronger and more durable than other sheeting materials such as polycarbonate or PVC, commonly employed for touch pads and front face panels.

AUTOTEX is resistant to the following chemicals in accord. with DIN 42 115, Part 2, and will exhibit no alterations for exposure periods of more than 24 hours:		
Ethanol Cyclohexanol Diacetone alcohol Glycol Isopropanol Glycerin Methanol Triacetin Dowandol DRM/PM	Formaldehyde 37% - 42% Acetaldehyde Aliphatic hydrocarbons Toluene Xylene Thinners (white spirits)	l.l.l. trichloro ethane Ethyl acetate Diethyl ether N-butyl acetate Amyl acetate Butyl cellosolve Ether
Acetone Methyl ethyl ketone Dioxan Cyclohexanon MIBK Isophoron	Formic acid <50% Acetic acid <50% Phosphoric acid <30% Hydrochloric acid <36% Nitric acid <10% Trichloro acetic acid <50% Sulfuric acid <10%	Sodium chloride <20% Hydrogen peroxide <25% Potash soap Laundry soap Tensides Softeners Ferric chloride (FeCl2) Ferrous chloride (FeCl3) Dibutyl phthalate Dioctyl phthalate Sodium carbonate
Ammonia <40% Caustic soda <40% Potassium hydroxide <30% Alkali carbonate Bichromate Potassium ferrocyanide Acetonitril Sodium bisulfate	Drilling emulsions Diesel oil Varnish Paraffin Castor oil Silicone oil Turpentine oil replacements Brake fluid Decon Aircraft fuel Gasoline Water Salt water	

AUTOTEX is resistant to glacial acetic acid in accordance with DIN 42 115, Part 2, for exposure times of <1 hour and will exhibit no visible damage.

CAUTION

SURFACE RESISTANCE

The product is not resistant to the following chemicals and impact may damage the front foil:

- → Concentrated mineral acids
- → Concentrated alkaline solutions
- → Benzyl alcohol
- → Methyl alcohol
- → Iodine or Iodine solution
- → High pressure steam above 100°C

5.2.2. Resistance to household chemicals

AUTOTEX is resistant to the following products and will exhibit no visible damage for exposure periods of 24 hours at 50 °C:			
Top Job	Grape juice	Ariel	Ajax
Jet Dry	Milk	Persil	Vim
Gumption	Coffee	Wisk	Domestos
Fantastic		Lenor	Vortex
Formula 409		Downey	Windex

Very close examinations would reveal mild discoloration after exposure to the following materials:

- → Mustard
- → Tomato juice
- → Ketchup
- → Lemon juice

5.2.3. Environmental values

Lowest exposure temperature
After 0.5 million activations at –40°C, AUTOTEX exhibited no functional impairment.

Highest exposure temperature
High humidity (>80% rel.H.): 40°C
Moderate humidity (10-80% rel.H.): 60°C
Low humidity (<10% rel.H.): 85°C

Outdoor use
As is the case for all polyester-based sheeting, AUTOTEX is not intended for extended exposure to direct sunlight.

5.3. Resistance of the AUTOFLEX- front foil sheeting to chemicals

5.3.1. General resistance of the foil sheeting material

AUTOFLEX is based on a polyester foil sheet with a biaxial arrangement and therefore exhibits better resistance to solvents. It is stronger and more durable than other sheeting materials such as polycarbonate or PVC, commonly employed for touch pads and front face panels.

AUTOFLEX is resistant to the following chemicals in accord. with DIN 42 115, Part 2, and will exhibit no alterations for exposure periods of more than 24 hours:		
Ethanol Cyclohexanol Glycol Isopropanol Glycerin Methanol	Acetaldehyde Aliphatic hydrocarbons Toluene Xylene	Ethyl acetate Diethyl ether
Acetone Methyl ethyl ketone Dioxan	Formic acid <50% Acetic acid <50% Phosphoric acid <30% Hydrochloric acid <10% Nitric acid <10% Sulfuric acid <10%	Sodium chloride <20% Hydrogen peroxide <25% Potash soap Laundry soap Softeners
Ammonia <2% Caustic soda <2% Alkali carbonate Bichromate Potassium ferrocyanide	Drilling emulsions Diesel oil Varnish Paraffin Castor oil Silicon oil Turpentine oil replacements	

AUTOFLEX is resistant to glacial acetic acid in accordance with DIN 42 115, Part 2, for exposure times of <1 hour and will exhibit no visible damage.

CAUTION

SURFACE RESISTANCE

The product is not resistant to the following chemicals and impact may damage the front foil:

- → Concentrated mineral acids
- → Concentrated alkaline solutions
- → Benzyl alcohol
- → Methyl alcohol
- → Iodine or lodine solution
- → High pressure steam above 100°C

5.3.2. Resistance to household chemicals

AUTOFLEX is resistant to the following products and will exhibit no visible damage for exposure periods of 24 hours at 50 °C:			
Top Job	Grape juice	Ariel	Ajax
Jet Dry	Milk	Persil	Vim
Gumption	Coffee	Wisk	Domestos
Fantastic		Lenor	Vortex
Formula 409		Downey	Windex

Very close examinations would reveal mild discoloration after exposure to the following materials:

→ Tomato juice
→ Ketchup
→ Lemon juice

5.3.3. Outdoor use

As is the case for all polyester-based sheeting, AUTOTEX is not intended for extended exposure to direct sunlight.

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6. Annex

6.1. Environmental Protection

6.1.1. Emission

When used correctly, our modules do not produce any harmful emissions.

6.1.2. Disposal

At the end of their service life, modules may be returned to the manufacturer against payment of an all-inclusive charge to cover costs. The manufacturer
will then arrange for the modules to be recycled.

6.2. Maintenance/Upkeep

⚠ WARNING	**Do not insert, apply, detach or touch connections while in operation – risk of destruction or malfunction.** Disconnect all incoming power supplies before working on our modules; this also applies to connected peripheral equipment such as externally powered sensors, programming devices, etc. All ventilation openings must always be kept free of any obstruction.

→ The modules are maintenance-free when used correctly.

→ Clean only with a dry, non-fluffing cloth.

→ Do not use detergents!

6.3. Repairs/Service

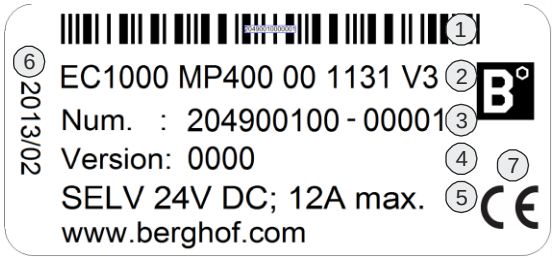
⚠ WARNING	Repair work may only be carried out by the manufacturer or its authorised service engineers.

6.3.1. Warranty

Sold under statutory warranty conditions. Warranty lapses in the event of unauthorised attempts to repair the equipment and/or product, or in the event of any other form of intervention.

6.4. Nameplate

Nameplate descriptions (example)



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1 **Barcode**
same as identification number.

2 **Module type**
plain-text name of module.

3 **Identification no.**
is the unique labeling of the module, consists of two elements.
Part no. (the first nine digits)
The designation of this number suffices for ordering a module.
The delivery takes place in each current hard- and software version.
Serial no. (five digits behind the hyphen)

4 **Version**
defines the design-level of the module as supplied ex-works.

5 **Supply voltage**

6 **Production date**
year / calendar week of the production.

7 **CE mark**

NOTICE

The 'Version' (supply version) panel specifies the design-level of the module as supplied ex-works.

When replacing a module, users, with the CNW (CANtrol Node Wizard) tool, can read off the current software version of the newly supplied module, and then reload their 'own' software version for a particular project if necessary. With the latter in mind, before the download you should always keep a record of the existing software levels in your project documentation (software version, node IDs, baud rate, etc.).

6.5. Addresses and Bibliography

6.5.1. Addresses

CAN in Automation; international manufacturers and users organisation for CAN users in the field of automation:
CAN in Automation e.V. (CiA)
Am Weichselgarten 26
D-91058 Erlangen / Germany
headquarters@can-cia.de
www.can-cia.de

→ CiA

EtherCAT Technology Group
ETG Headquarters
Ostendstraße 196
D-90482 Nuremberg / Germany
info@ethercat.org
www.ethercat.org

→ ETG

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

→ DIN-EN Standards

VDE Verlag GmbH, 10625 Berlin
or
Internet search: www.iec.ch

→ IEC Standards

6.5.2. Standards/Bibliography

Standard	Label
IEC61131-1 / EN61131-1	Programmable controllers Part 1: General information
IEC61131-2 / EN61131-2	Programmable controllers Part 2: Equipment requirements and tests
IEC61131-3 / EN61131-3	Programmable controllers Part 3: Programming languages
IEC61131-4 / EN61131Bl1	Programmable logic controllers Supplementary Sheet 1: User guidelines
IEC61000-6-4 / EN61000-6-4	German EMC Standard: Emitted interference
IEC61000-6-2 / EN61000-6-2	German EMC Standard: Noise immunity
ISO/DIS 11898	Draft International Standard: Road vehicles - Interchange of digital information - Controller Area Network (CAN) for high-speed communication
DIN EN ISO 13849-1	Safety of machinery: Safety-related parts of control systems (Part 1)
Bibliography	A variety of specialist publications on the CANbus is available from specialist bookshops, or can be obtained through the CiA users' organisation.

Notice: Our Technical Support team will be glad to provide other literature references on request.