Installation and Operating instructions for

Panel-PC CP71xx

BECKHOFF

Table of contents

General Notes

Notes on the documentation

This description is only intended for the use of trained specialists in control and automation engineering who are familiar with the applicable national standards. It is essential that the following notes and explanations are followed when installing and commissioning these components.

Liability conditions

The responsible staff must ensure that the application or use of the products described satisfy all the requirements for safety, including all the relevant laws, regulations, guidelines and standards.

The documentation has been prepared with care. The products described are, however, constantly under development. For this reason, the documentation may not always be have been fully checked for consistency with the performance data, standards or other characteristics described. None of the statements in this manual represent a guarantee for as set out in § 443 of the German Civil Code or a statement about the assumed use according to the contract as set out in § 434 para. 1 clause 1 no. 1 of the German Civil Code. In the event that it contains technical or editorial errors, we retain the right to make alterations at any time and without warning. No claims for the modification of products that have already been supplied may be made on the basis of the data, diagrams and descriptions in this documentation.

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Description of safety symbols

The following safety symbols are used in this operating manual. They are intended to alert the reader to the associated safety instructions.

Danger
This symbol is intended to highlight risks for the life or health of personnel.

Warning
This symbol is intended to highlight risks for equipment, materials or the environment.

Note
This symbol indicates information that contributes to better understanding.

Basic safety measures

Only switch the PC off after closing the software

Before the Industrial PC is switched off, software that is running must be properly closed.

Otherwise it is possible that data on the hard disk is lost. Please read the section on *Switching the Industrial PC on and off*.

⚠️ *Warning*

Switch off all parts of the equipment, then uncouple the fieldbus!
Before opening the housing of the PC, and whenever the PC is being used for purposes other than plant control, such as during functional tests following repair, all parts of the equipment must first be switched off, after which the Industrial PC can be uncoupled from the plant.

Pulling out the fieldbus connection plug uncouples the PC (optional).

Items of equipment that have been switched off must be secured against being switched on again.

The Industrial PC's power supply unit must be supplied with 24 V_{DC}.

Do not exchange any parts when under power!
When components are being fitted or removed, the supply voltage must be switched off.

Fitting work on the Industrial PC can result in damage:
- If metal objects such as screws or tools fall onto operating circuit boards.
- If connecting cables internal to the PC are removed or inserted during operation.
- If plug-in cards are removed or inserted when the PC is switched on.

Operator's obligation to exercise diligence

The operator must ensure that

- the Industrial PC is only used for its intended use (see also *Product Description* chapter).
- the Industrial PC is in a sound condition and in working order during operation.
- the operation manual is in good condition and complete, and always available for reference at the location of the Industrial PC.
- the Industrial PC is operated, maintained and repaired only by sufficiently qualified and authorized personnel.
- the personnel is instructed regularly about relevant occupational safety and environmental protection aspects, and is familiar with the operating manual and in particular the safety notes contained herein.
- none of the safety and warning notes attached to the Industrial PC are removed, and that all notes remain legible.

National regulations depending on the machine type

Depending on the type of machine and plant in which the Industrial PC is being used, there will be national regulations for the control of such machines and plant that the operator must observe. These regulations cover, amongst other things, the intervals between inspections of the controller.

The operator must initiate such inspections in good time.

⚠️ *Warning*

Only trained persons may open the Industrial PC housing!
The operator is responsible for ensuring that only trained electrical staff opens the housing of the Industrial PC.

Procedure in the event of a fault

In the event of a fault in the Industrial PC, appropriate measures can be determined with the aid of the list in the *Fault correction* section.

Operator requirements

Read the operating instructions

Every user of the Industrial PC must have read these operating instructions.

Software knowledge

Every user must be familiar with any of the functions of the software installed on the PC that he can reach.

Product Description

Appropriate Use

The water protected Panel-PC CP71xx with plug-in card motherboard is designed for mounted behind a Beckhoff Control Panel.

Structure

Rear view of the CP71xx

Opening the housing

In order to open the PC housing, first remove the two M4 screws (**1**) using a combination wrench SW 7 and the Allen screw (**2**) using a No.2 Allen key (see photo above). The cover of the housing can then be removed to the rear.

Note

The position of the screws varies according to the position of the mounting arm.

Internal view of the PC

Removing the outer housing provides access to the inner chassis (**1**), the power supply unit (**2**) and the interfaces (**3**) of the PC. The inner chassis is fastened with 4 crosshead screws (see arrows).

Rapid access to integrated components
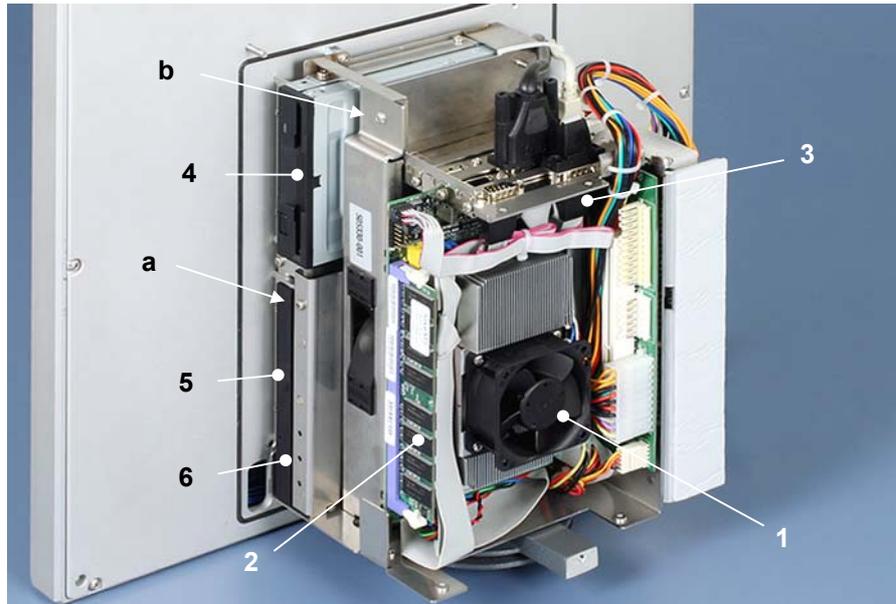
After removing the fastening screws the inner chassis can be taken off, thus providing access to the processor with cooling ribs and fan (**1**), memory (**2**), plug-in cards (**3**), floppy disk drive (**4**), CD-ROM drive (**5**) (optional) and Status-LEDs (**6**).

After unscrewing the crosshead screw (**a**) and removing the sheet metal cover you can pull out the CD-ROM drive.

Unscrewing the crosshead-screw (**b**) and removing the card holder allows access to the free slot.

Access to the drives

Side view of the Panel PC

Opening the side door

Unlock the side door (**1**) through tricks of the button (**2**) and then push the door to the side.
After opening the side door you have access to the floppy disk drive (**3**), the CD-ROM drive (**4**) (optional) and the Status-LEDs with Reset button (**5**).

Interfaces
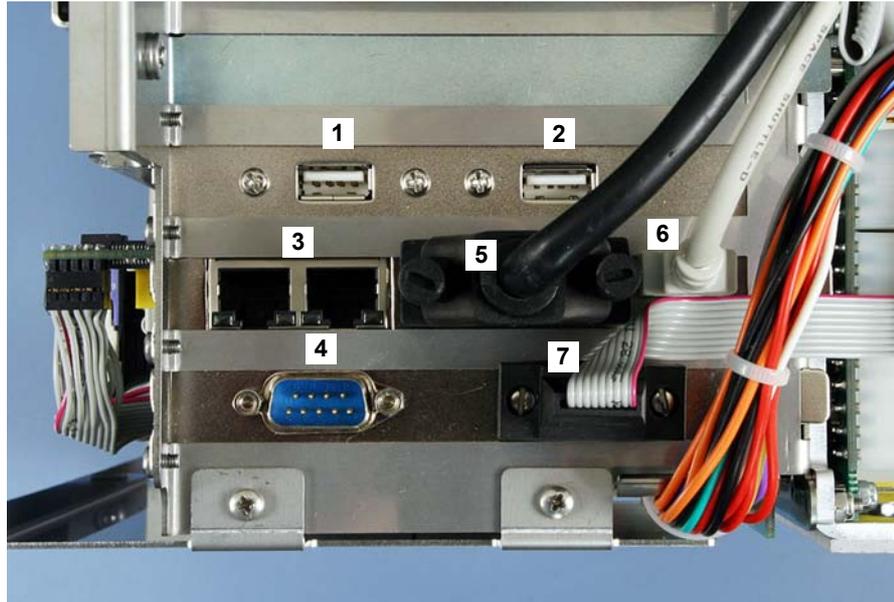
USB interfaces

USB1, USB2

The two USB interfaces (**1**) and (**2**) are used for connecting peripheral devices with USB port. USB 2.0 standard is supported.

Network connection

Network

Two 10/100 Base-T RJ-45 connectors (**3**) allow the PC to be connected to a Local Area Network (LAN).

Serial interface

RS 232
COM1

The Industrial PC CP71xx has one available serial RS232 interface COM1 (**4**) which is connected to a 9-pin SUB-D pin connector.

DVI-I interface (in use)

DVI

The DVI-I interface (**5**) is used for connecting the Control Panel.

USB interface (in use)

USB3

An additional USB-interface (**6**) is used for connecting the Control Panel.

Serial interface (in use)

RS 232
COM2

The serial interface COM2 (**7**), using the type RS232, is used for connecting the power supply unit.

Protective Earthing

Protective Earthing

The earthing of the PC is established via the power supply cable.

Additional plug-in cards (optional)

Type plate

There is a type plate at the housing of the Industrial PC which provides information about the hardware configuration of the Industrial PC at the time it was supplied.

Installation Instructions

Please also refer to chapter *General Notes.*

Transport and Unpacking

The specified storage conditions must be observed (see chapter *Technical data*).

Transport

Despite the robust design of the unit, the components are sensitive to strong vibrations and impacts. During transport, your Industrial PC should therefore be protected from excessive mechanical stress. Therefore, please use the original packaging.

Warning

Danger of damage to the unit!
If the device is transported in cold weather or is exposed to extreme variations in temperature, make sure that moisture (condensation) does not form on or inside the device.

Prior to operation, the unit must be allowed to slowly adjust to room temperature. Should condensation occur, a delay time of approximately 12 hours must be allowed before the unit is switched on.

Unpacking

Proceed as follows to unpack the unit:

1. Remove packaging.
2. Do not discard the original packaging. Keep it for future relocation.
3. Check the delivery for completeness by comparing it with your order.
4. Please keep the associated paperwork. It contains important information for handling the unit.
5. Check the contents for visible shipping damage.
6. If you notice any shipping damage or inconsistencies between the contents and your order, you should notify Beckhoff Service.

Installation of the PC

The Panel PC series CP71xx is designed for mounting arm installation. A Control Panel is installed in the front of the Panel PC.

The ambient conditions specified for operation must be observed (see the section *Technical data*).

i *Note*

When the unit is installed in an enclosure, adequate space for ventilation and for opening the PC must be provided.

Please note the following points during installation of the PC:

- Position the PC in such a way that reflections on the screen are avoided as far as possible.
- Use the position of the screen as a guide for the correct installation height; it should be optimally visible for the user at all times.
- The PC should not be exposed to direct sunlight.

Warning

Extreme environmental conditions should be avoided as far as possible. Protect the rear of your PC from dust, humidity and heat.

The clearance above and below the housing must be at least 50 cm in order to ensure adequate ventilation of the PC.

The cooling ribs of the PC must not be covered.

Power Supply Connection

Supplied mains power unit

The Industrial PC is fitted with a 24 V_{DC} power supply unit .

Optional an uninterruptible power supply (UPS) can be realized using the battery pack C9900-U330.

⚠ *Danger*

Danger of Explosion if using other battery packs!

Electrical data

Input voltage: 22 – 30 V DC
Current consumption: 10 A (22 V)
Power consumption: 150 W (max.)

Current carrying capacity of the 24 V power supply unit

Output voltages from the 24 V power supply unit	Current loading maximum
+ 5 V	14 A
- 5 V	0,3 A
+ 12 V	12 A
- 12 V	0,5 A
+ 3,3 V	12 A
5 V VSB	1,5 A

Pin assignment of the connector

The Industrial PC is connected to the power supply and to the external switch for shutting on and off via the 7-pole plug connector.

Pin assignment for connecting the switch, the power supply and the battery pack (optional)
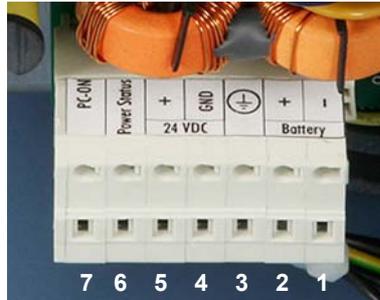
Pin	Function	
1	-	Akku-Pack (with UPS)
2	+	
3	⏚	
4	-	24 V DC power supply
5	+	
6	Power-Status	
7	PC_ON	

Fitting the cable

Wiring in accordance with wiring diagram

Fit the cables for the power supply of the Industrial PC, the connection of the battery pack as well as the connection of the power-switch in accordance with the wiring diagram, using the included material for assembling the connectors.

Assembling the connector

The connector is specified for 16 A and can lift conductive cross-sections until 2,5 mm^2.

Fitting the connector to the cable:

Strip insulation from the cable ends

Strip insulation from the cable ends (Length of stripped conductor is 8 – 9 mm).

Insert cable ends
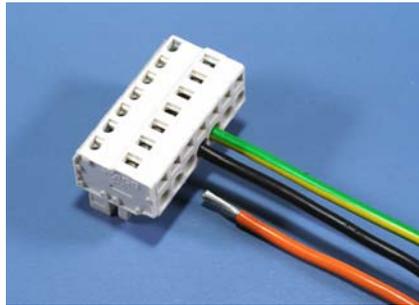
Insert the stripped cable ends into the opening of the terminal of the 7 -pole connector in accordance with the wiring diagram.

Connecting Power Supply

The external wiring consists of the connection of the power supply, the battery pack (optional) and the connection of customized components for shutting down the PC.

Cable Cross Sections

Note cable cross sections, avoid voltage drop!

For the connection of the power supply, wiring with a cable-cross-section of 1,5 mm^2 must be used.

With bigger distances between voltage source and PC, you take the voltage drop as a function of the cable-cross-section as well as voltage fluctuations of your distribution voltage into account, so that is secured that the voltage doesn't fall under 22 V at the power supply.

Insert Fuse

The power supply must be protected with maximum 16 A.

PC_ON, Power-Status

The circuit for shutting down the Industrial PC is realized using the input-signal **PC_ON** and the output-signal **Power-Status**:

- The PC starts shutting down if 24 V exists at **PC_ON**, for example using a switch.
- After shutting down, the output-voltage of 24 V at **Power-Status** is switched to 0 V. This allows for example connecting an air gap switch for disconnecting the system from power supply.

Wiring diagram

Wiring according to the wiring diagram (the circuit of PC_ON and Power-Status is symbolical):

Wiring diagram external switch and power supply
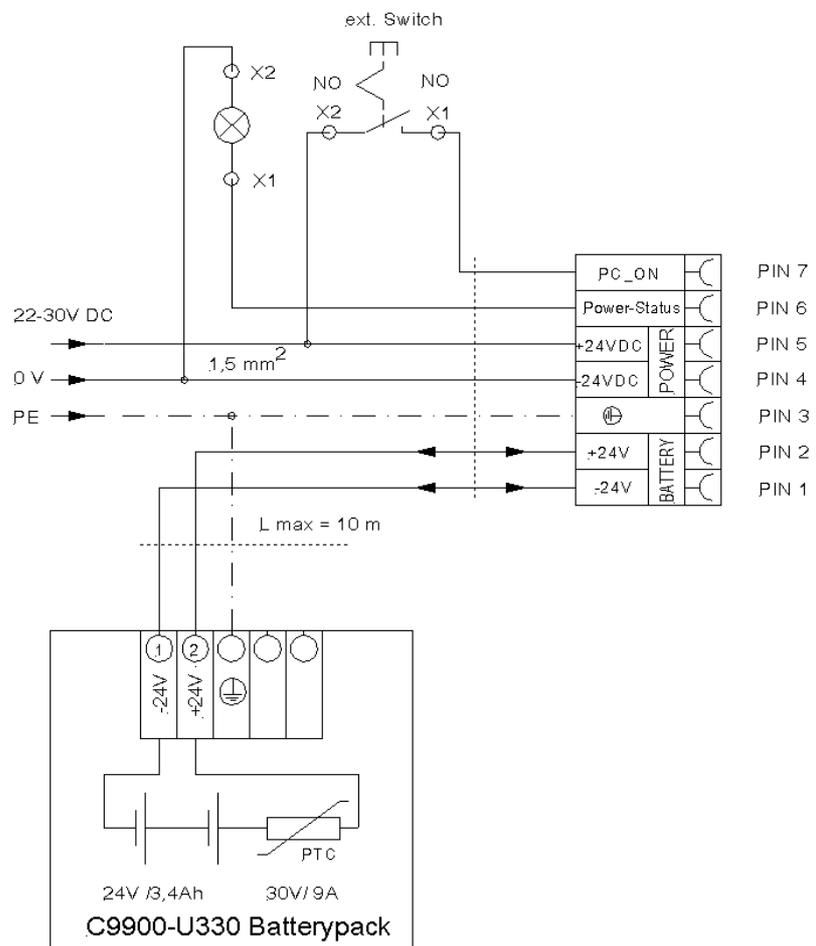
Connecting devices

⚠ Warning

The power supply plug must be withdrawn!

Please read the documentation for the external devices prior to connecting them.

During thunderstorms, plug connector must neither be inserted nor removed.

When disconnecting a plug connector, always handle it at the plug. Do not pull the cable!

Connecting cables

The connections are located behind the outer housing of the Industrial PC and are documented in the *Product Description* chapter.

When connecting the cables to the Industrial PC, proceed according to the following sequence:

- Switch off all the devices that are to be connected.
- Disconnect all the devices that are to be connected from the power supply.
- Connect all the cables between the Industrial PC and to the devices that are to be connected.
- Connect all data transfer cables (if present) to the appropriate plug-in receptacles of the data/telecommunication networks.
- Reconnect all devices to the power supply.

Protective Earthing

Protective Earthing

The earthing of the PC is established via the power supply cable.

Check voltage rating and connect

Fitted with the 24 V_{DC} power supply unit:

1. Check that the external power supply is providing the correct voltage.
2. Insert the power supply cable that you have assembled (see the section *Fitting the cable*) into the Industrial PC's power supply socket. Then connect it to your external 24 V power supply.

⚠ Warning

If a 24 V UPS is installed, the same type of rechargeable battery must be used.

Operating Instructions

Switching the Industrial PC on and off

Switch on

The Industrial PC does not have its own mains switch. The Industrial PC will start when the equipment is switched on, or when it is connected to the power supply.

Shutting down and switching off

When the plant is switched off, or when it is disconnected from its power supply, the Industrial PC will be switched off.

Control software such as is typically used on Industrial PCs permits various users to be given different rights. A user who may not close software may also not switch the Industrial PC off, since data can be lost from the hard disk by switching off while software is running.

⚠ *Warning*

First shut down, then switch off the PC!
If the Industrial PC is switched off as the software is writing a file to the hard disk, the file will be destroyed. Control software typically writes something to the hard disk every few seconds, so that the probability of causing damage by switching off while the software is running is very high.

⚠ *Warning*

When you have shut down the Industrial PC, you have to switch off power supply for at least 10 seconds before rebooting the system.
After resetting power supply the PC will start booting automatically.

Reset key

A Reset button (**1**) for rebooting the system is provided behind the side door for the drives.

LEDs

Three LEDs are located next to the Reset button (**2**).
The red LED signalizes hard disk activity, the green LED signalizes the presence of the voltage supply, while the yellow LED indicates Turbo operation.

First switching on and driver installation

When you switch on the Industrial PC for the first time, the pre-installed operating system (optional) will be started. In this case, all the required drivers for any additional, optional hardware components ordered with the PC will already have been installed.

If the PC was ordered without operating system, you have to install the operating system and the driver software for any auxiliary hardware yourself. Please follow the instructions in the documentation for the operating system and the additional devices.

Keyboard codes

Type-dependent number of keys

Depending on the precise type, the Control Panel can have fewer keys than those described here.

Operation

The cursor is the blinking character that marks the point at which the next character entered will be displayed. The cursor is also known as the insertion point. The cursor keys each move the cursor one place in the associated direction.

The Home key moves the cursor to the beginning of the line, while the End key moves it to the end of the line.

The *Pg Up* key scrolls one page back, the *Pg Dn* key scrolls one page forward.

The Tab key takes the cursor to the next input field, while Shift and Tab moves to the previous input field.

The mouse cursor can be moved over the screen with the aid of the touch screen or of the touch pad (optional). The keys correspond to the left and right hand keys of a Microsoft mouse.
The *Del* key deletes the character to the right of the cursor.

The *Ins* key causes characters to the right of the cursor to be overwritten. The overwrite mode is cancelled by pressing the key again.
Print-Screen prints a hard copy of a text screen on the printer.

The Pause key stops the computer until another key is pressed (only under MS-DOS).

Your input is confirmed with the Enter key.

Backspace deletes the character to the left of the cursor.

If the Shift key is pressed at the same time as another key, then instead of the numbers you obtain the character printed above the number, and you obtain upper case letters instead of lower case letters.
Pressing the *Caps Lock* key once activates and locks the *Shift* key. Pressing the *Shift* key cancels this function.

Rather like the effect of the *Shift* key, *Ctrl* and *Alt* also change the meaning of another key that is pressed at the same time.

This key brings up the Start menu of the operating system in use (Windows 95, 98, ME, NT, 2000, XP).

Pressing this key opens the property sheet of the active (or marked) object.

The *Esc* key has the effect of closing dialog windows and of interrupting some of the computer's working operations.

All other keys bring the character printed on them onto the display at the position of the cursor.
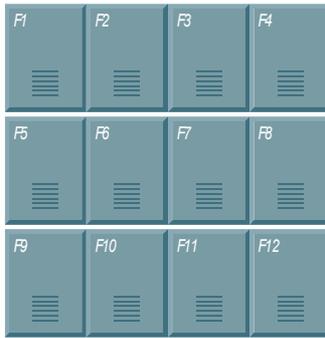
The meaning of the function keys, *F1* to *F10*, is determined by the software and is displayed at the bottom edge of the display.

The function of the special keys above the display is also determined by the software. The function is displayed at the top edge of the display. The special keys each have an orange LED controlled by the software.

Servicing and maintenance

Please also refer to chapter *General Notes.*

Cleaning the Industrial PC

Danger

Switch off the Industrial PC and all connected devices, and disconnect the Industrial PC from the power supply.

The Industrial PC can be cleaned with a soft, damp cloth. Do not use any aggressive cleaning materials, thinners, scouring material or hard objects that could cause scratches.

Replacing the battery on the motherboard

A used battery on the motherboard has to be replaced according to the rules of the board manufacturer.

Danger

Danger of Explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Servicing

The Industrial PC requires no maintenance.

Replacing the fluorescent lamps in the display

Since fluorescent lamps represent a consumable item in a display, they must be replaced after a few years, depending on the number of operating hours.

The fluorescent lamps of the 12 inch and 15 inch displays can be replaced by a **technically competent person**.
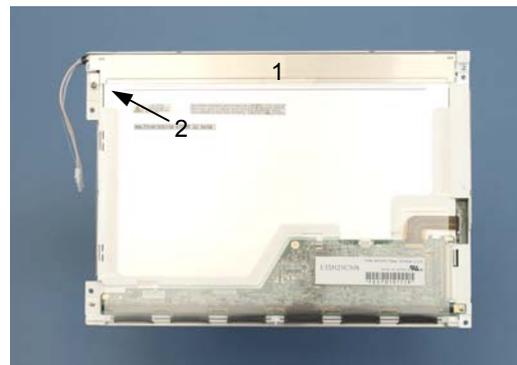
Note

Replacement of the fluorescent lamps may require partial disassembly of the display!

Replacement for the 12 inch display

First release the screw (**2**) with a small Philips screwdriver, then tilt the fluorescent tubes with their brackets (**1**) carefully outwards.
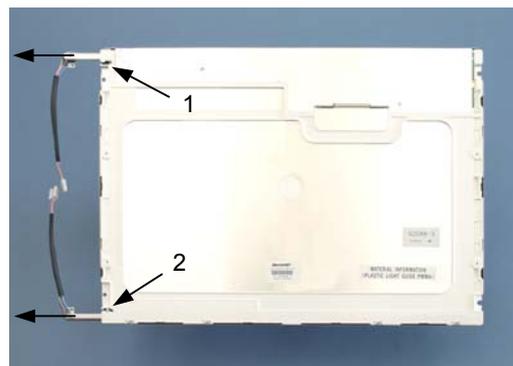
After the exchange of the fluorescent lamps the installation takes place in reverse order.

Replacement for the 15 inch display

First release the two screws (**1**) and (**2**) with a small Philips screwdriver, then carefully pull out the fluorescent lamps in direction of the arrows.

After the exchange of the fluorescent lamps the installation takes place in reverse order.

Lamp sets

Order number	Background illumination unit for
C9900 - L364	12 inch TFT display LTD121C30S
C9900 - L366	15 inch TFT display LQ150X1LW71N

Emergency procedures

In case of fire, the control panel should be extinguished with powder or nitrogen.

Shutting down

Disposal

Dismantling the Industrial PC

The device must be fully dismantled in order to dispose of it. The housing can be sent for metal recycling.

Observe national electronics scrap regulations

Electronic parts such as disk drives and circuit boards must be disposed of in accordance with national electronics scrap regulations.

UPS Software Components (optional)

Installing the UPS driver software

For operating the power supply unit as a UPS, the UPS driver software and the associated UPS driver must be installed on the Industrial PC.

On delivery of the Beckhoff Industrial PC with operating system the software is already installed. Should the software not be installed on your PC, the drivers can be installed from the driver CD provided.

Installation on the PC

Installation

To install the UPS driver software, execute file **Beckhoff_UPS_vx.xx.xx.exe** from the subdirectory of **UPS\…** from the CD provided on the Industrial PC (Driver-archive for the Industrial-PC, C9900-S700-xxxx).

The program is self-extracting and will guide the user through the installation routine.

Help files

Beckhoff Information System

The driver software comes with a detailed help function.
The help files can be called up either directly from the configuration register by clicking the Help button, or under via *Start > Programs > Beckhoff > UPS software components*.

Troubleshooting

Please also refer to the section *General Notes*.

i *Note*	**Pixel errors in the TFT display are production-caused and represent no complaint-reason!**

Fault correction

Fault	Cause	Procedure
Nothing happens after the Industrial PC has been switched on	No power supply to the Industrial PC Other cause	Check power supply cable Call Beckhoff Service
The Industrial PC does not boot fully	Floppy disk or CD in the drive Setup settings are incorrect Other cause	Remove floppy disk or CD and press any key Check the setup settings Call Beckhoff Service
Computer boots, software starts, but control does not operate correctly	Cause of the fault is either in the software or in parts of the plant outside the Industrial PC	Call the manufacturer of the machine or the software
Floppy disk or CD access error	Faulty disk or CD Faulty disk drive	Check disk or CD in another drive Call Beckhoff Service
The Industrial PC functions only partially or only part of the time, e.g. no or dark picture, but disk drive responds when switching on	Defective components in the Industrial PC	Call Beckhoff Service

Service and Support

Beckhoff and their partners around the world offer comprehensive service and support, making available fast and competent assistance with all questions related to Beckhoff products and system solutions.

Beckhoff's branch offices and representatives

Please contact your Beckhoff branch office or representative for local support and service on Beckhoff products!

The addresses of Beckhoff's branch offices and representatives round the world can be found on her internet pages:
http://www.beckhoff.com

You will also find further documentation for Beckhoff components there.

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- spare parts service
- hotline service

Hotline:	+49(0)5246/963-460
Fax:	+49(0)5246/963-479
e-mail:	service@beckhoff.com

Quote the project number   If servicing is required, please quote the **project number** of your Industrial PC.

Assembly dimensions

The illustrations show the measurements of the Panel-PCs. Please refer to the tables for the dimensions of the Control Panel. All Dimensions in mm.

Mounting arm Rolec
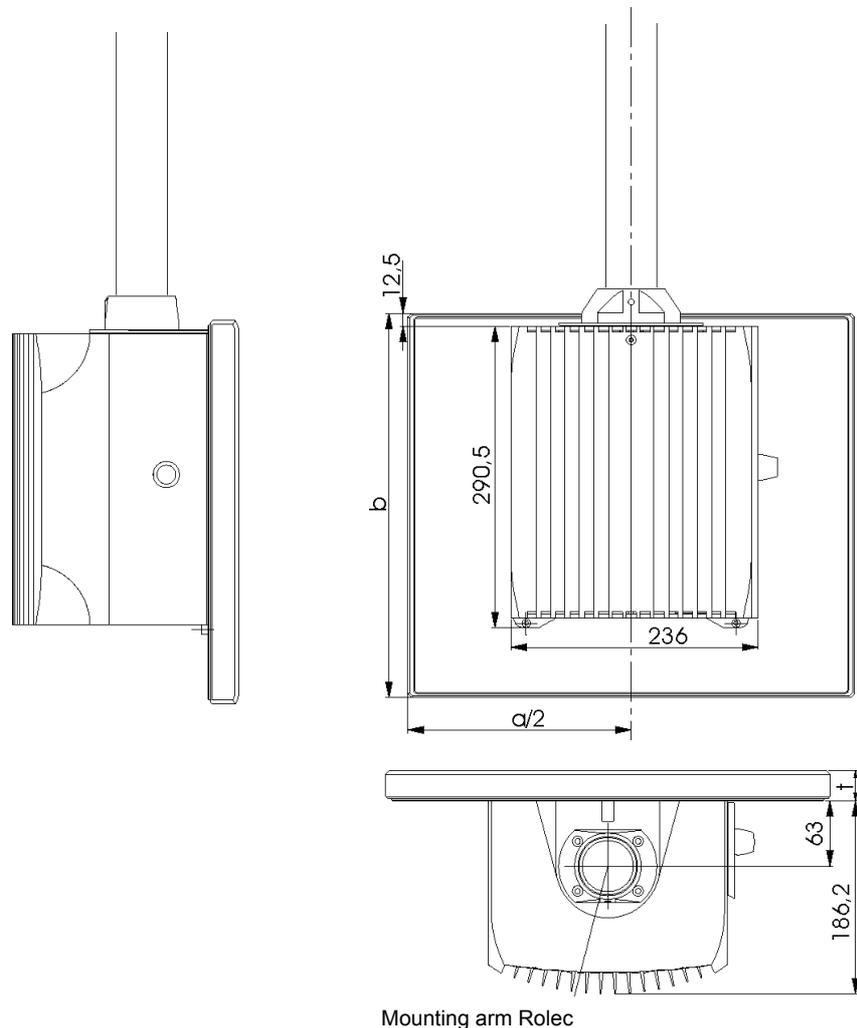
Display only

Dimensions		a	b	t
CP7100	10" Display	353,8	308,3	29,5
CP7101	12" Display	353,8	326,3	29,5
CP7102	15" Display	426	395	30,5
CP7103	19" Display	504	455	47

With function keys

Dimensions		a	b	t
CP7110	10" Display	353,8	308,3	29,5
CP7111	12" Display	353,8	326,3	29,5
CP7112	13" Display	426	395	30,5
CP7113	19" Display	504	455	47

Numerical keyboard

Dimensions		a	b	t
CP7120	10" Display	406	308,3	29,5
CP7121-0000/1	12" Display	406	308,3	29,5
CP7121-0002	12" Display	439,8	308,3	29,5
CP7122	15" Display	515	370,2	30,5
CP7123	19" Display	563	426	47

Alphanumerical keyboard

Dimensions		a	b	t
CP7130	10" Display	403,4	368,2	29,5
CP7131-0000/1	12" Display	406	370,2	29,5
CP7131-0002	12" Display	426	370,2	29,5
CP7132	15" Display	485	410,2	30,5
CP7133	19" Display	504	535	47

Appendix

Technical data

Dimensions	**Dimensions (W x H x D):**	236 x 291 x 186 mm (without Control Panel)
	Weight:	11,5 kg (basic configuration, without Control Panel)
Do not use the PC in areas of explosive hazard	**The Industrial PC must not be used where there is a risk of explosion.**	
	The following conditions must be observed during operation:	
Environmental conditions	**Ambient temperature:**	0 to 45°C
	Atmospheric humidity:	Maximum 95%, non-condensing
Shock resistance	**Sinusoidal vibration:**	
	(EN 60068-2-6)	10 to 58 Hz: 0.035 mm
		58 to 500 Hz: 0.5 G (~ 5 m/ s^2)
	During reading of CD-ROM:	10 to 58 Hz: 0.019 mm
		58 to 500 Hz: 0.25 G (~ 2.5 m/ s^2)
	Impact:	
	(EN 60068-2-27/ -29)	5 G (~ 50 m/ s²), duration: 30 ms
	During reading of CD-ROM:	5 G (~ 50 m/ s²), duration: 11 ms
Protection class	**Protection class:**	IP65
Power supply	**Supply voltage:**	24 V$_{DC}$ (22 – 30 V$_{DC}$)
24 V$_{DC}$ power pack	**Power consumption:**	approx. 55 W for the basic version
		approx. 67 W with 10" display
		approx. 69 W with 12" display
		approx. 80 W with 15" display
		approx. 87 W with 19" display
	If operated with UPS:	additional 30 W (while charging)
EMC compatibility	**Resistance to interference:**	according to EN 61000-6-2
	Emission of interference:	according to EN 61000-6-4
Transport and storage	The same values for atmospheric humidity and shock resistance are to be observed during transport and storage as in operation. Suitable packaging of the Control Panel can improve the resistance to impact during transport. The ambient temperature during storage and transport must be between -20°C and +65°C.	

> [i] *Note* **Pixel errors in the TFT display are production-caused and represent no complaint-reason!**

Approvals

FCC: Federal Communications Commission
Radio Frequency Interference Statement

FCC Approval for USA

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC: Canadian Notice

FCC Approval for Canada

This equipment does not exceed the Class A limits for radiated emissions as described in the Radio Interference Regulations of the Canadian Department of Communications.