

Installation- and Operating instructions for
Build-in Industrial PCs
C3620, C3640 from -0060

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BECKHOFF

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General instructions

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.

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.

Liability Conditions

The documentation has been prepared with care. The products described are, however, constantly under development. For that reason the documentation is not in every case checked for consistency with performance data, standards or other characteristics. 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.

All pictures shown in the documentation are exemplary. Illustrated configurations can differ from standard.

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EP1590927, EP1789857, DE102004044764, DE102007017835

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In addition, the general delivery conditions of the company Beckhoff Automation GmbH & Co.KG apply.

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 [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.



Danger

Displays used for the PCs LC-display are operated with a voltage of up to 1000 V, depending on type. For that reason:

The supply voltage must be disconnected before the housing of the Control Panel is opened.

The Industrial PC's power supply unit must be supplied with 100 V_{AC} - 240 V_{AC} or 24V_{DC} (optional).



Danger

Do not open the power supply unit while voltage is applied!

The supply voltage must be switched off before the power supply unit housing is opened.

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 chapter [Product Description](#)).
- 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.

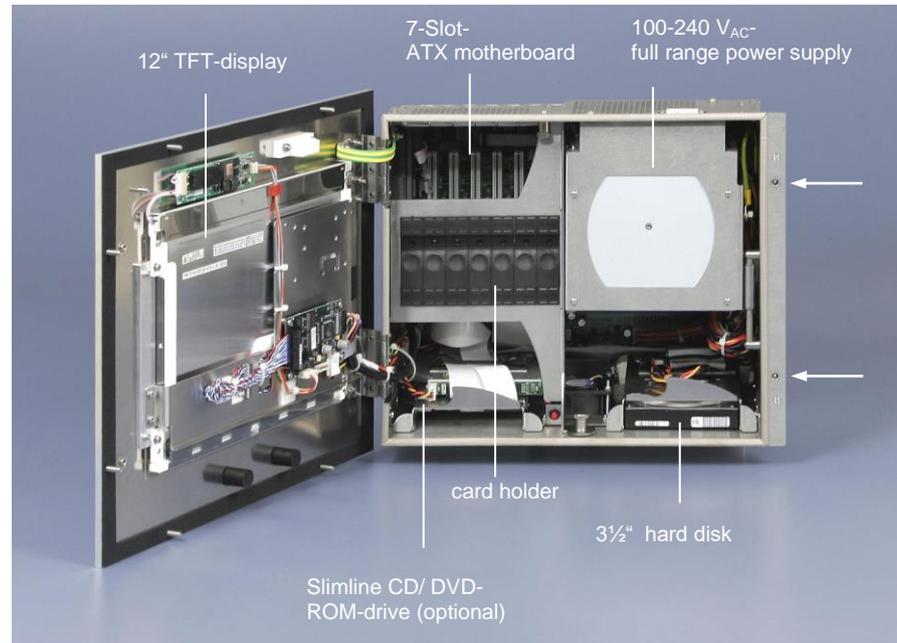
Product Description

Appropriate Use

The C3620 and C3640 Industrial PCs are designed for mounting in control cabinets in machine and plant engineering applications.

Structure of the C3620

View of the open PC C3620



Opening the housing

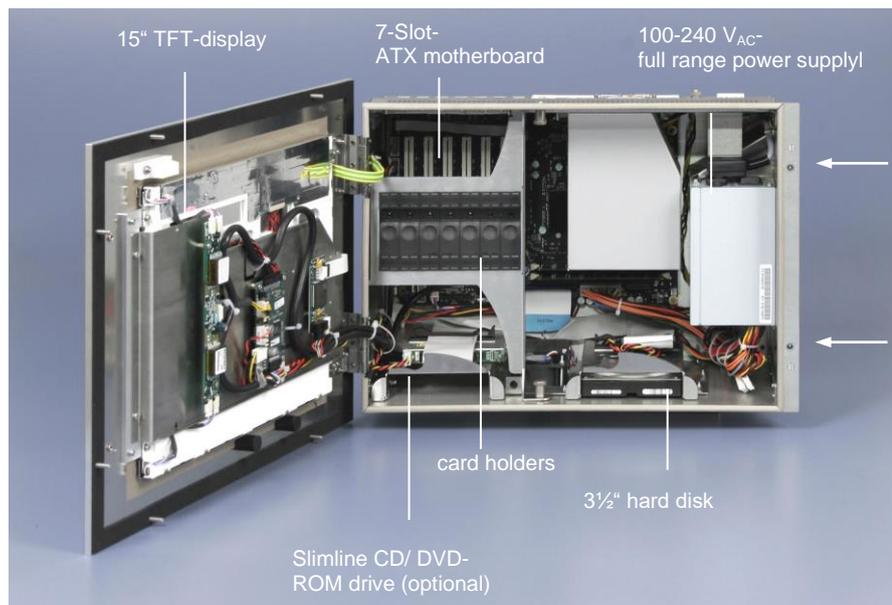
After loosening the two screws (see arrows) the front of the PC with TFT-display can be opened, thus providing access to the drive (optional), 3 1/2" hard disk, processor, memory and plug-in cards.

An ATX motherboard with seven slots for plug-in cards is located behind the removable card holder and the swivel-mounted power supply unit.

The connections of the Industrial PC to the outside are located on top of the housing.

Structure of the C3640

View of the open PC C3640



Opening the housing

After loosening the two screws (see arrows) the front of the PC with TFT-display can be opened, thus providing access to the drive (optional), 3½" hard disk, processor, memory and plug-in cards.

An ATX motherboard with seven slots for plug-in cards is located behind the removable card holder and the swivel-mounted power supply unit.

The connections of the Industrial PC to the outside are located on top of the housing.

CD/DVD-Drive (optional)

Configuration with CD/DVD-drive (optional)



Optional the Industrial PC is fitted with a CD/ DVD-drive. The drive is located at the rear side of the PC.

Interfaces from C3620/ C3640-0060

ATX motherboard
interfaces



PS/2 connections

PS/2

The upper PS/2 connector (**X104**) allows a PS/2 mouse to be used, while a PC keyboard can be connected to the lower PS/2 connector (**X103**).

USB interfaces

USB1 – USB4

The four USB interfaces (**X108 – X111**) are used to connect peripheral devices with USB connections:

- Devices with Intel® 4th generation processors (C3620/ C3640-0060) are equipped with 2 USB2.0 (**X110**, **X111**) and 2 USB3.0 (**X108**, **X109**) interfaces.
- Devices from Intel® 6th and 7th generation processors (C3620/ C3640-0070) are equipped with 4 USB3.0 interfaces.

Network connection

LAN1, LAN2

The RJ-45 connectors (**X112**, **X113**) allow the PC to be connected to a 10/100/1000BASE-T Local Area Network (LAN).

DVI-D (Digital Visual Interface)

DVI out

The DVI connectors (**X114**, **X115**) are used for transferring the video signal. DVI-D standard is supported.

Serial interfaces

RS 232
COM1 – COM2

The basic version of the Industrial PC has one serial interface, COM1 (**X116**), using the type RS 232, which is brought to a 9 pin SUB-D plug connector.

DisplayPort

DisplayPort

The DisplayPort (**X117**) is used for transferring the video signal.

Sound-On-Board

Sound

The Industrial PC has an on-board-interface with the following connectors: Line In (**X122**), Line Out (**X121**) and Microphone jack (**X120**).

Additional plug-in cards (optional)

Type plate

There is a type plate on the top 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 instructions](#).

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 in the control cabinet

The C3620 and C3640 Industrial PCs are designed for rack mounting in machine and plant engineering applications.

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

Preparation of the control cabinet wall

The control cabinet wall must be prepared with the required mounting opening for the computer unit and the eight holes for the set screws according to the PC's dimensions (see chapter [Assembly dimensions](#)).



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.
- When the unit is in its mounting position, the ventilation openings must not be obstructed.



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 100 mm in order to ensure adequate ventilation of the PC.

The ventilation slots of the PC must not be covered.

Installation in a control cabinet wall

Proceed as follows:

1. Insert the PC at the intended control cabinet wall position and protect it from falling out, prior to final mounting.
2. Using 8 M4 nuts, fix the PC to the control cabinet wall by screwing the nuts from the rear onto the set screws of the PC housing.

Earthing measures

Earthing connections dissipate interference from external power supply cables, signal cables or cables to peripheral equipment.

Establish a low-impedance connection from the earthing point on the PC housing to the central earthing point on the control cabinet wall, in which the computer is being installed. The earthing connection of the Industrial PC is located beside the power supply connector.

Earthing measures

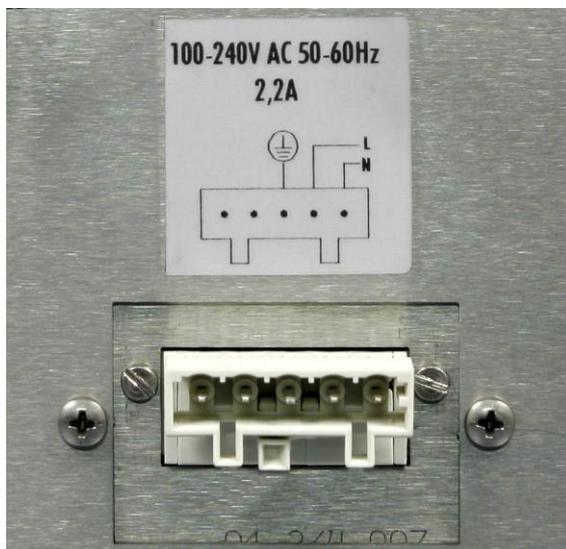


Power Supply Connection

The 5-pin CAGE CLAMP plug connector and mounting flange illustrated is located on the PC housing in order to connect the power supply.

Socket at the PC housing

Connection socket when fitted with 100-240 V_{AC}, 50-60 Hz power supply unit (standard)



Technical data	Connecting socket
Number of contacts	5
Contact spacing	5 mm
Minimum conductor cross-section	1.5 mm ²
Minimum conductor cross-section (AWG)	16
Rated voltage (EN)	250 V
Rated voltage (CSA)	300 V
Current EN [A]	12 A
Current CSA [A]	15 A
Length of stripped conductor	8 to 9 mm

Power Supply Configuration

Supplied mains power unit

The Industrial PCs is either fitted with a 100-240 V_{AC}, 50-60 Hz power supply unit (standard) or with a 24 V_{DC} power supply unit (with the option of an uninterruptible power supply, UPS).

Current carrying capacity of the 100-240 V power supply unit

Output voltages from the 100-240 V power supply unit	Current loading maximum
+3,3 V	16 A
+5 V stand by	2 A
+5 V	25 A
-5 V	0.3 A
+12 V	13 A
-12 V	0.8 A

Current carrying capacity of the 24 V power supply unit

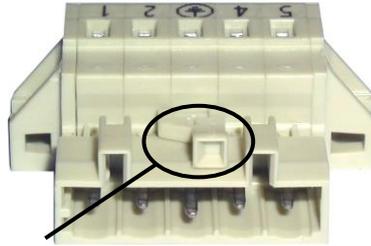
Output voltages from the 24 V power supply unit	Current loading maximum
+5 V	25 A
-5 V	1 A
+12 V	10 A
-12 V	1.5 A

Coding pieces

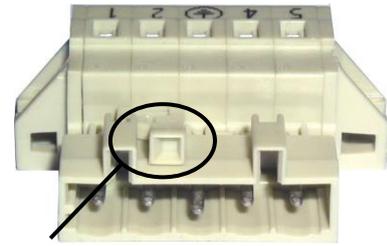


Differently coded plug connectors

The connectors are coded differently at the factory, using snap-on coding pieces, according to the power supply unit that has been fitted.



Coding for the 100-240 V_{AC}, 50-60 Hz power supply unit



Coding for the 24 V_{DC} power supply unit

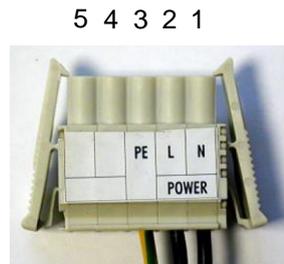
Pin assignment and cable requirements

Pin assignment

There is an adhesive label with the pin assignments on the top of the female plug connector. **The minimum permitted conductive cross-section is 1.5 mm², fused for 10 A (AWG 16).**

Industrial PCs with 100-240 V_{AC}, 50-60 Hz power supply unit

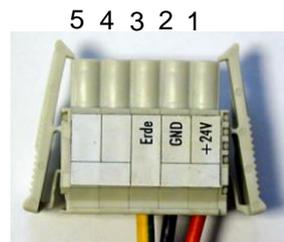
Pin assignment for the 100-240 V, 50-60 Hz power supply unit



Pin	Function	
1	N	100 – 240V _{AC}
2	L	Power supply
3	⊕	
4	not used	
5	not used	

Industrial PCs with 24 V_{DC} power supply unit

Pin assignment for the 24 V_{DC} power supply unit



Pin	Function	
1	+	24V _{DC}
2	-	Power supply
3	⊕	
4	not used	
5	not used	

Pin assignment for connecting the power switch



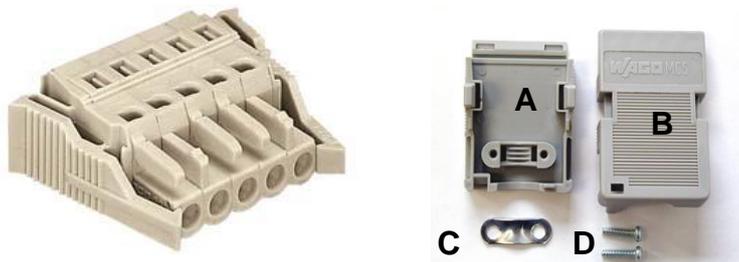
1 2 3

Pin	Funktion
1	Power-Status
2	PC_ON
3	24 V _{DC} Versorgungsspannung + Pol

Fitting the Power Supply Cable

A 5-pin female plug connector with CAGE CLAMP connection and insertion catches is supplied along with a snap-on strain relief housing in order to assemble the PC power supply cable.

Materials for assembly of the connector



Female plug connector

Strain relief housing

Female plug connector is correspondingly coded

This female plug connector is also coded at the factory, according to the type of power supply fitted, so that the plug, when assembled, will fit the Industrial PC's connecting socket.

Technical data	Female plug connector
Number of contacts	5
Contact spacing	5 mm
Minimum conductor cross-section	1.5 mm ²
Minimum conductor cross-section (AWG)	16
Rated voltage (EN)	250 V
Rated voltage (CSA)	300 V
Current (EN)	16 A
Current (CSA)	15 A
Length of stripped conductor	8 to 9 mm

Fitting the connector to the cable

The plug is fitted to the cable as follows:

1. Strip insulation from the cable ends. Follow the technical data for the female plug connector in the above table!
2. Push the conductors into their mountings, simply by pushing them in as indicated on the pin assignment label.
3. Push the lower part (part **A**) of the strain relief housing (see photograph on page 14) onto the top of the female plug connector until it snaps into place.
4. Relieve the strain on the supply cable by fixing it in place with the cable clamp (part **C**) and fixing screws (part **D**) (see photograph below).

Applying the strain relief



Fix the upper part (part **B**) of the strain relief housing by snapping it onto the lower part.

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

Cable-cross-section for connection of power supply

For the connection of the power supply, wiring with a cable-cross-section of 1.5 mm² 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.



Warning

The power supply must be protected with maximum 16 A.

Configuration for shutting down the PC

The connections for shutting down the Industrial PCs are established via the **PC_ON** input and the **Power Status** output.

PC_ON and Power Status functions

PC_ON and power status

- If the **PC_ON** input is connected to 24 V via a switch, the PC shuts down according to the rules. The **PC_ON** signal is inverted, i.e. the PC shuts down if the 24 V connection is live.
- If the **PC_ON** input is *NOT* connected by the user, the PC can be booted in the familiar way by connecting the supply voltage and shut down via the battery by switching off the supply voltage.



Warning

This procedure significantly reduces the service life of the rechargeable battery and should therefore not be used.

- Once the PC has shut down, the **Power Status** output is switched from 24 V to 0 V. Via this output a signal lamp can be connected or a contactor for de-energizing the whole system. The maximum load for the **Power Status** output is 0.5 A and a suitable fuse should be provided.

UPS output

UPS output

In order to maintain a screen display for the PC in the event of a power failure, the power supply unit is equipped with a **UPS output** for connecting a Control Panel. The maximum load for the output is 1.4 A (max. 2.5 A from 2016 and later).

UPS output function

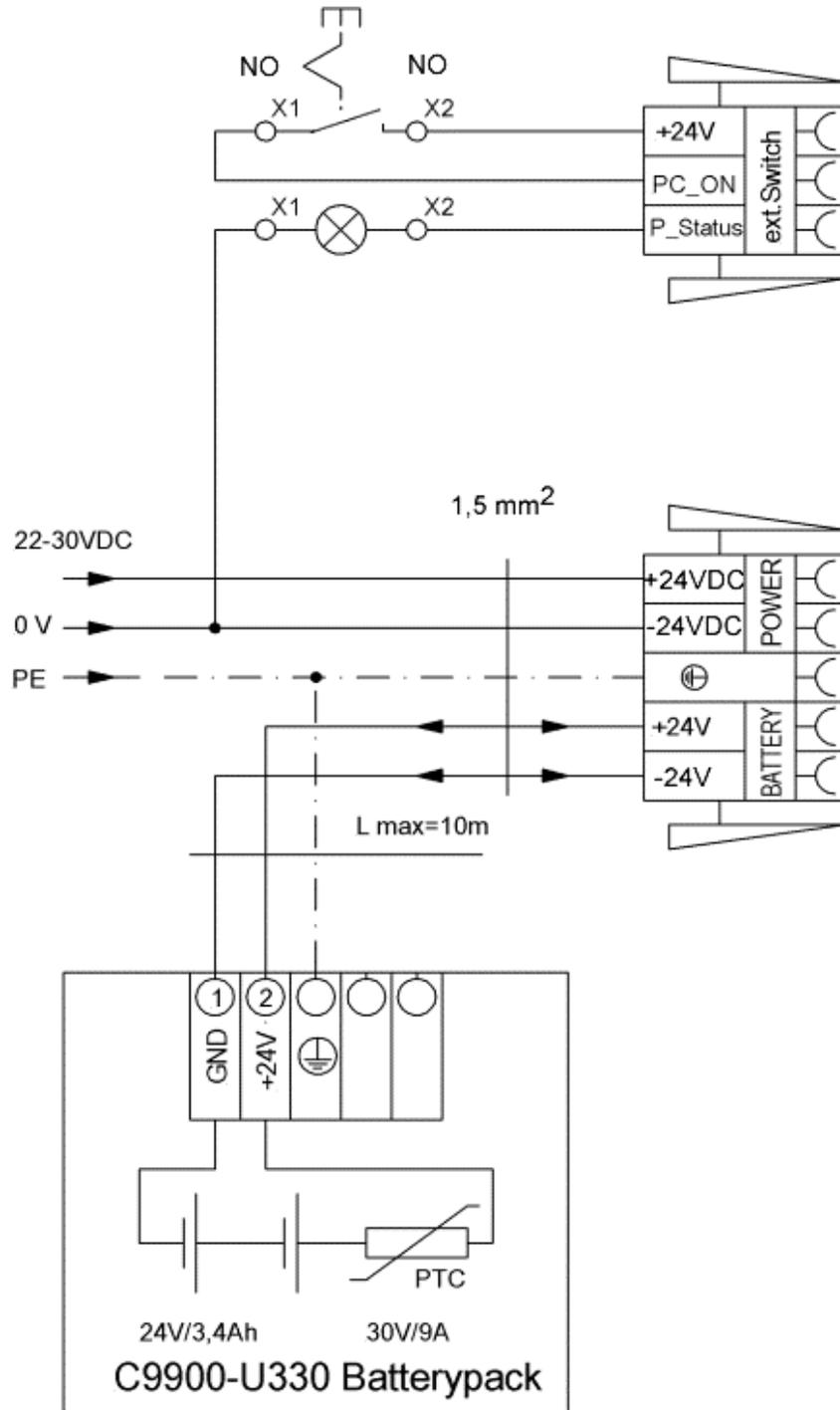
UPS output function

- The 24 V DC connection at the UPS output is live even after a power failure. The maximum load is 1.4 A (max. 2.5 A from 2016 and later).
- Once the PC has been de-energized via the UPS software, the **UPS output** is switched to 0 V. Any connected panel is thus switched off, and total discharge of the rechargeable battery is prevented.

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



Connection of the Battery Pack and UPS Output only in combination with integrated UPS (order option).

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 at the side of the Industrial PC and at the rear (power supply connection), and are documented in the section [Product Description](#).

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.

Check voltage rating and connect.

With compact 100-240 V_{AC} 50/60 Hz power supply:

1. Check that the mains voltage is correct.
2. Insert the power supply cable that you have assembled (see the section on [Fitting the Power Supply Cable](#)) into the Industrial PC's power supply socket. Then connect it to a power socket with a grounded earth connection.

When fitted with the (optional) 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 on [Fitting the Power Supply 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 correct 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.

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.

Maintenance

Please also refer to chapter [General instructions](#).

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!

Replace battery only with the identical type or an alternative type recommended by the manufacturer. Notice correct polarity!



Danger

Handling of Lithium Batteries

Lithium Batteries should not be recharged, exposed to fire, opened and they should be protected against sunlight and moisture.

The used battery must be disposed of in accordance with national electronics scrap regulations.

Servicing

The Industrial PC requires no maintenance.

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.

Troubleshooting

Please also refer to chapter [General instructions](#).



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	Check power supply cable
	Other cause	Call Beckhoff Service
The Industrial PC does not boot fully	CD in drive (optional).	Remove CD and press any key
	Setup settings are incorrect	Check the setup settings
	Other cause	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
Error during CD access	Faulty CD	Check the disk in another disk drive
	Faulty disk 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

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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

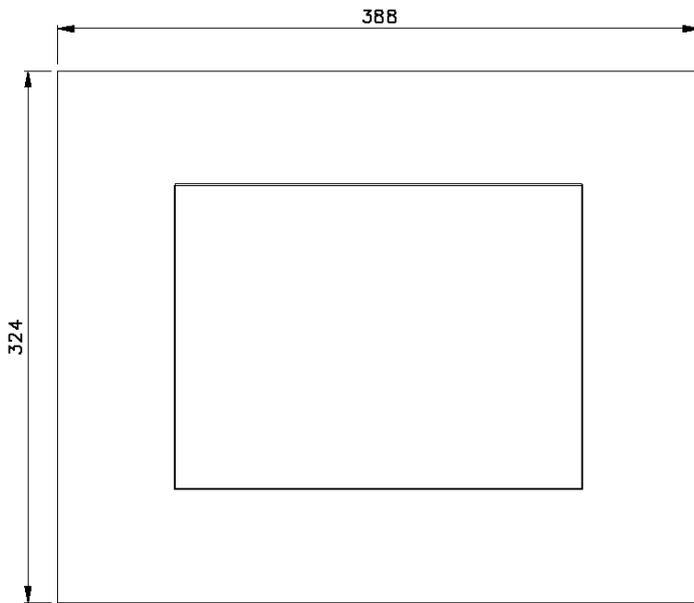
Industrial PC C3620



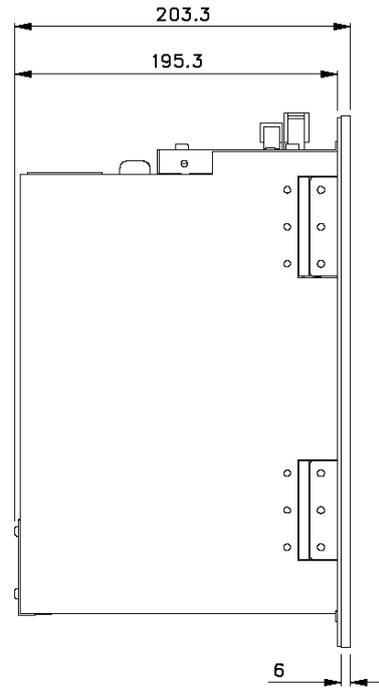
Warning

The assembly of the unit must take place with the orientation diagrammed here.

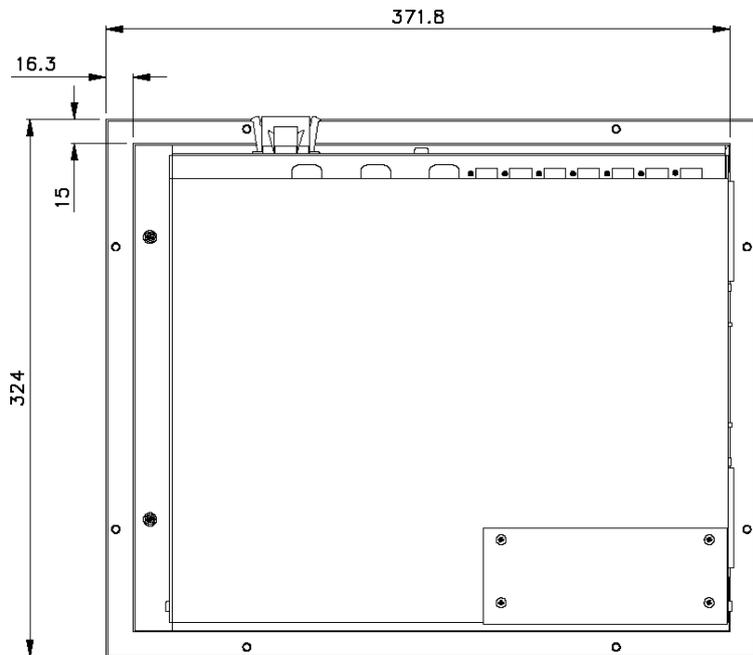
All dimensions in mm.



front view



left view



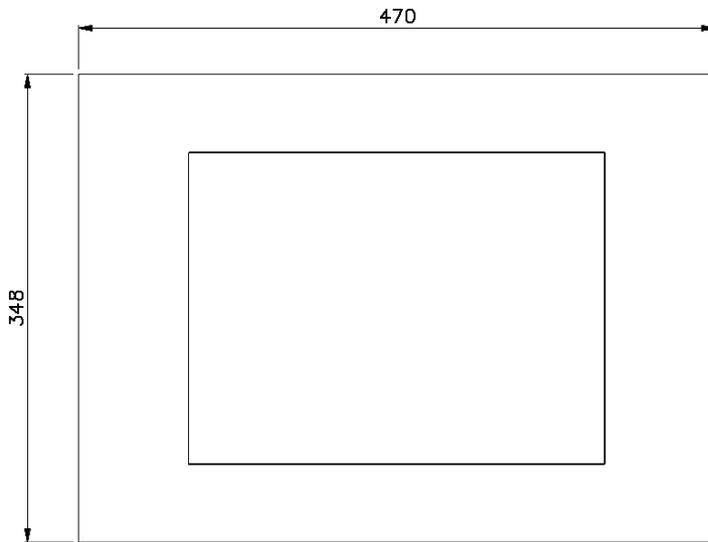
rear view

Industrial PC C3640

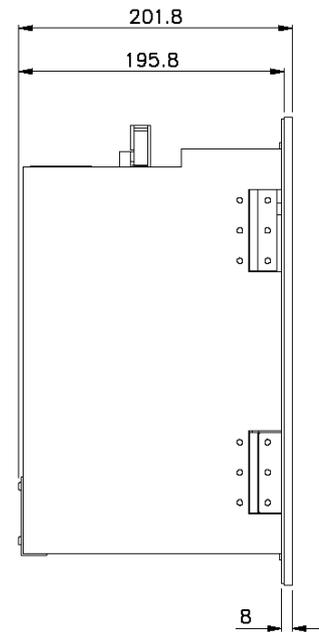


The assembly of the unit must take place with the orientation diagrammed here.

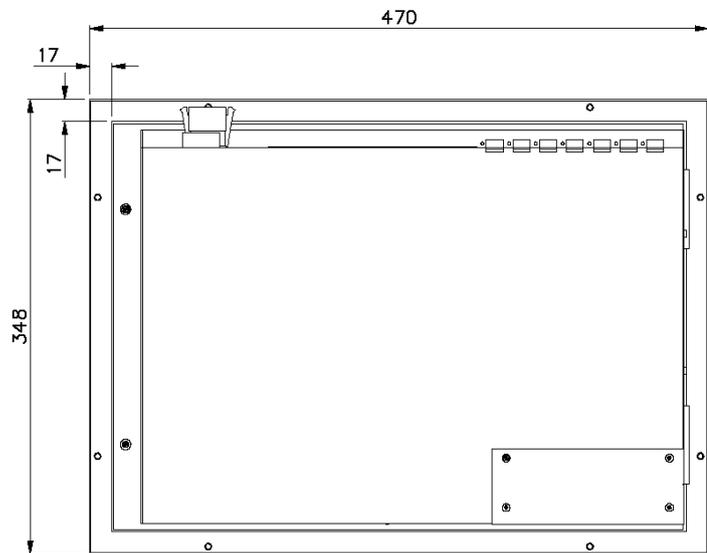
All dimensions in mm.



front view



left view

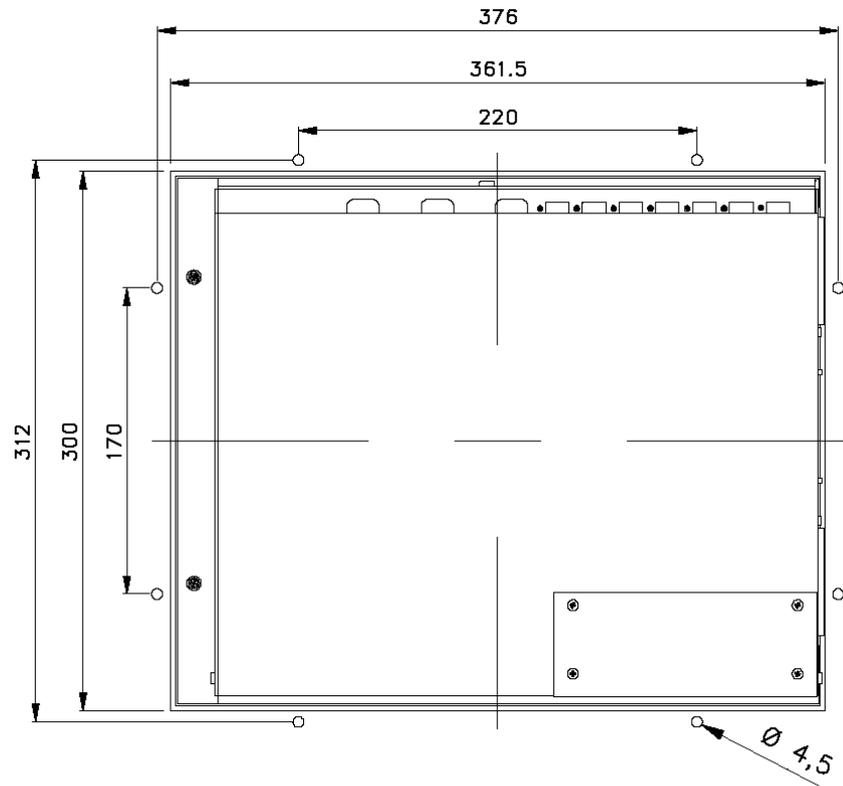


rear view

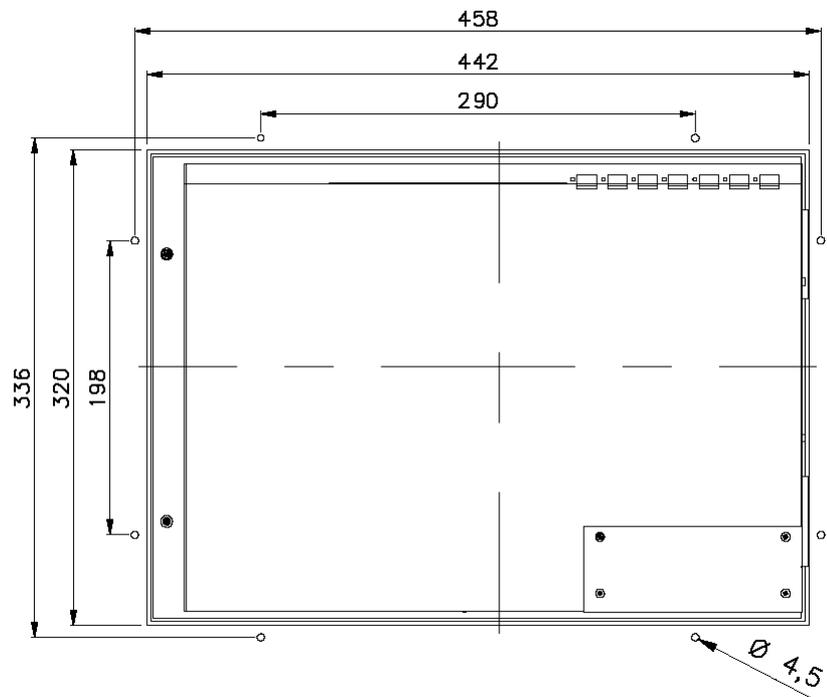
Mounting Opening

A mounting opening according to the following diagram is required:

*Mounting opening for
C3620*



*Mounting opening for
C3640*



Appendix

Technical data

<i>Dimensions</i>	C3620	Dimensions (W x H x D):	388 x 324 x 201 mm
		Weight:	11.5 kg (basic configuration)
	C3640	Dimensions (W x H x D):	470 x 348 x 199 mm
		Weight:	14.1 kg (basic configuration)
<i>Color</i>	C3620	Size, Resolution:	12", 800 x 600 dpi
<i>Display</i>	C3640	Size, Resolution:	15", 1024 x 768 dpi
<i>Do not use the PC in areas of explosive hazard</i>		The Industrial PC may not be used in areas of explosive hazard.	
The following conditions must be observed during operation:			
<i>Environmental conditions</i>		Ambient temperature:	0 to 55°C
		Atmospheric humidity:	Maximum 95%, non-condensing
<i>Shock resistance</i>		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)	5 G (~ 50 m/ s ²), duration: 30 ms
		During reading of CD-ROM:	5 G (~ 50 m/ s ²), duration: 11 ms
<i>Protection class</i>		Protection class:	Front side IP65, rear side IP20
<i>Power supply with 100-240 V_{AC} power supply unit or 24 V_{DC} power supply unit (optional)</i>		Supply voltage:	100-240 V _{AC} 50-60 Hz Optional: 24 V _{DC} (22 – 30 V _{DC})
		Power consumption:	C3620-0020: ca. 89 W C3620-0030: ca. 114 W C3640-0020: ca. 98 W C3640-0030: ca. 123 W
			(for the basic version)
		If operated with UPS:	additional 30 W (while charging)
<i>Electromagnetic Compatibility (EMC)</i>		Interference resistance:	according to EN 61000-6-2
		Emitted resistance:	according to EN 61000-6-4
<i>Transport and storage</i>		The same values for atmospheric humidity and shock resistance are to be observed during transport and storage as in operation. The shock resistance during transport can be improved by means of suitably packing the Industrial PC. The ambient temperature during storage and transport must be between -20°C and +65°C.	



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.