Installation and Operating instructions for

C6670-0010

Control Cabinet Industrial Server

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BECKHOFF

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1 Foreword

1.1 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.

1.1.1 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.

1.1.2 Trademarks

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1.1.3 Patent Pending

The EtherCAT Technology is covered, including but not limited to the following patent applications and patents: EP1590927, EP1789857, DE102004044764, DE102007017835 with corresponding applications or registrations in various other countries.
The TwinCAT Technology is covered, including but not limited to the following patent applications and patents: EP0851348, US6167425 with corresponding applications or registrations in various other countries.

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1.1.5 State at Delivery

All the components are supplied in particular hardware and software configurations appropriate for the application. Modifications to hardware or software configurations other than those described in the documentation are not permitted, and nullify the liability of Beckhoff Automation GmbH & Co. KG.

1.1.6 Delivery conditions

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

1.2 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	**Acute risk of injury!** If you **do not** adhere the safety advise adjoining this symbol, there is immediate danger to life and health of individuals!
WARNING	**Risk of injury!** If you **do not** adhere the safety advise adjoining this symbol, there is danger to life and health of individuals!
CAUTION	**Hazard to individuals!** If you **do not** adhere the safety advise adjoining this symbol, there is obvious hazard to individuals!
Attention	**Hazard to devices and environment** If you **do not** adhere the notice adjoining this symbol, there is obvious hazard to materials and environment.
Note	**Note or pointer** This symbol indicates information that contributes to better understanding.

1.3 Basic safety measures

Before the Industrial PC is switched off, software that is running must be properly closed.
Otherwise it is possible that data on the storage medium is lost. Please read the section *Switching the Industrial PC on and off*.

![Attention] **Attention**	**Switch off all parts of the equipment, then uncouple the fieldbus** Before opening the housing, and whenever the Industrial PC is not being used for control purposes (such as during functional checks after a repair), all parts of the equipment must first be switched off, after which the Industrial PC is to be disconnected from the equipment.

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 100 V_{AC} - 240 V_{AC}.

![Danger] **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.

![Attention] **Attention**	**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.

1.4 Operator's obligation to exercise diligence

The operator must ensure that

- the product is only used as intended (see chapter *Product Description*)
- the product is in a sound condition and in working order during operation
- the product is operated, maintained and repaired only by suitably 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
- the operation manual is in good condition and complete, and always available for reference at the location of the product.

! **Attention**	**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.

1.4.1 National regulations

Depending on the type of machine and plant in which the Industrial PC is used, national regulations governing the controllers of such machines will apply, and must be observed by the operator. These regulations cover, amongst other things, the intervals between inspections of the controller. The operator must initiate such inspections in good time.

1.4.2 Procedure in the event of a fault

In the event of faults at the Industrial PC, the list in the section *Troubleshooting* can be used to determine the measures to be taken.

1.4.3 Operator requirements

Anyone who uses the Industrial PC must have read these operating instructions and must be familiar with all the functions of the software installed on the Industrial PC to which he has access.

2 Product Description

2.1 Product overview

C6670 | Control cabinet Industrial Server

The C6670 Industrial Server is designed for installation in control cabinets. The C6670 and a Beckhoff Control Panel with DVI and USB connection make an ideal combination, representing a powerful platform for machine construction and plant engineering applications with the TwinCAT automation software.

In combination with TwinCAT 3, two Intel® Xeon® processors, each with 6, 12, 16 or 20 cores on one motherboard with two Gigabit Ethernet controllers and a powerful graphics card produce a machine or plant controller that offers computing power for completely new ideas. Apart from the extremely high performance, up to 1024 GB DDR4 RAM, three PCIe Gen3 x16 and three PCIe Gen3 x8 plug-in card slots are also available for several camera interface cards for video evaluation.

All connections of the Industrial Server face upwards, so that the connecting cables can be taken directly to the wiring channel. The side walls are completely passive, and allow the Industrial Server to be fitted immediately next to other control cabinet devices.

The C6670 features two hard drive removable frames which, together with the on-board RAID controller, form a RAID 1 system with two mirrored hard disks or SSDs. This ensures high data security. Hard disks or SSDs which failed can easily be exchanged during operation.

The device can be equipped with a multi DVD drive. Card holders for the plug-in cards ensure resistance to impacts and vibrations. The C6670 offers convenient access to drives, memory and plug-in cards. The Industrial Server is supplied with a 100 to 240 V AC full range power supply unit.

A type plate is located on the top of the front cover, giving detailed information about the server configuration.

The Industrial Server offers the following benefits:

- 6-slot SSI EEB Industrial Server for control cabinet installation
- all slots for full-size plug-in cards
- 2 removable frames for hard disks
- drives and plug-in cards easily accessible
- all connectors on the top
- detailed PC configuration information on the front
- protection class IP20
- operating temperature 0…50 °C.

2.2 Appropriate Use

The C6670-0010 Industrial Server is designed for mounting in control cabinets for machine and plant engineering applications

⚠️ **Danger**	**Risk of explosion!** The Industrial Server must not be used where there is a risk of explosion.

2.3 Opening the Housing

Top view of the C6670-0010

unlock key (1)

The housing cover is locked by a latch. After pressing the key (**1**) the cover can be fold up a little in the region of the connectors.

Opening the housing

After folding up the cover as shown, it can be pulled out of the slides in direction of the arrow.

Taking off the housing cover

slides on both sides (2)

Now the housing cover can be taken off completely, so providing access to the components.

The reassembly of the cover takes place in reverse order. Ensure that the cover engages into the slides (**2**).

Removing the card holder

card holder
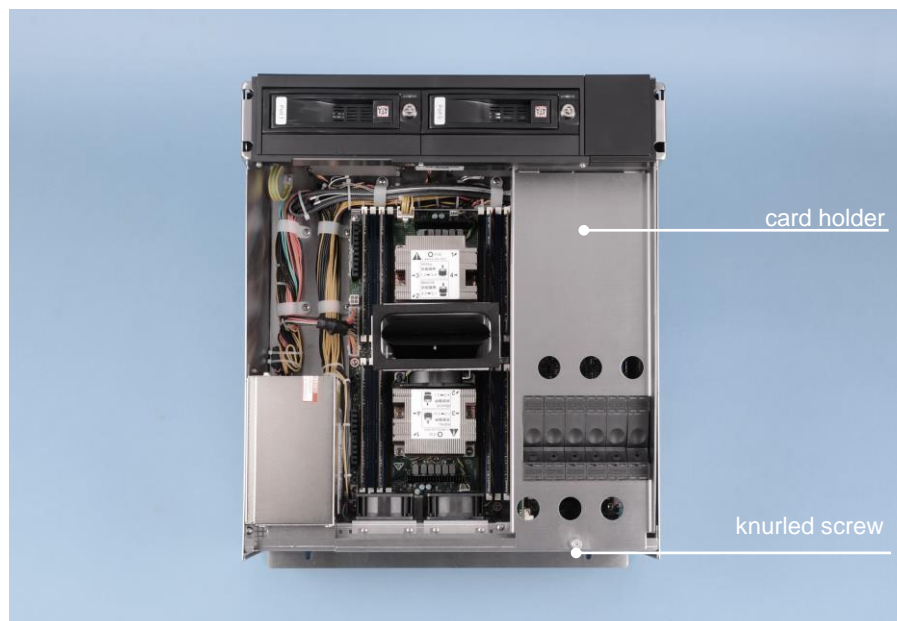
knurled screw

After loosening the knurled screw the card holder can be lifted off.

Components of the PCs
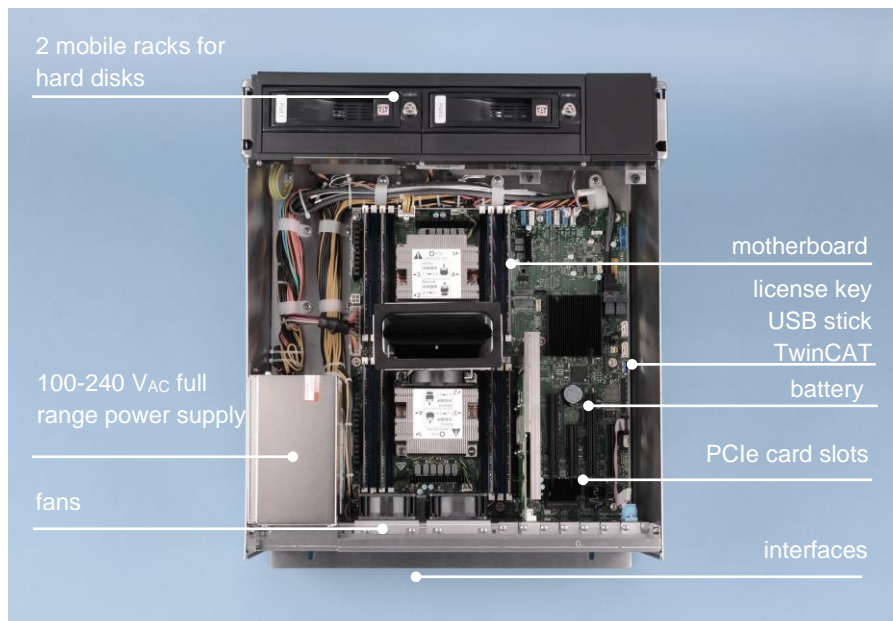
Under the housing cover there is a motherboard with two Intel® Xeon® prozessors with each 6, 12 or 18 Cores.

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

2.4 Access to the battery

Removing the cover allows access to the battery:

⚠ WARNING	**Danger of Explosion!** The battery is a CR2032 type (nominal voltage: 3.0 V) from e.g. Panasonic or Sanyo. Replace battery only with the identical type or an alternative type recommended by the manufacturer. Notice correct polarity!

Polarity of the battery:

— **+ pole**

⚠ WARNING	**Handling of Lithium Batteries** Lithium Batteries should not be recharged, exposed to fire, opened and they should be protected against sunlight and moisture.

2.5 Access to the fans

For optimal cooling the Industrial Server is equipped with two fans in the area of the connectors and one fan cartridge at the bottom. The fans can be exchanged.

2.5.1 Replacing the fans in the area of the interfaces

! Attention	**Identical fan type**
	Replace the fans only with the identical type or an alternative type approved by Beckhoff.

i Note	**Remove the housing cover**
	For exchanging the fan cartridge, it can be necessary to remove the housing cover.

Removing the fans
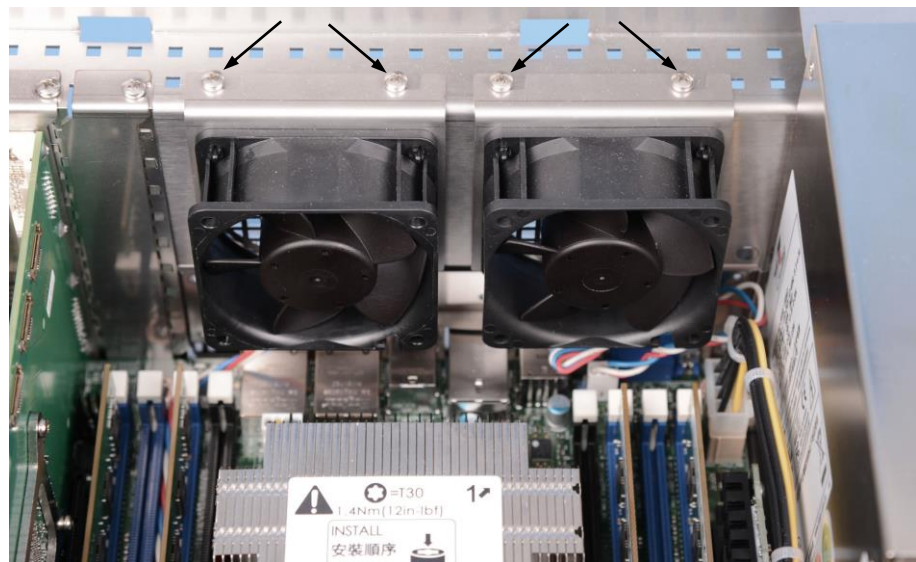
After removing the phillips head screws the fans can be exchanged. Therefor disconnect the supply cable from the motherboard.

2.5.2 Exchanging the fan cartridge

⚠ **Attention**	**Identical fan type** Replace the fans only with the identical type or an alternative type approved by Beckhoff.

For exchanging the fan cartridge (**1**), first solve the knurled screw (**2**):

Opening the fan cartridge
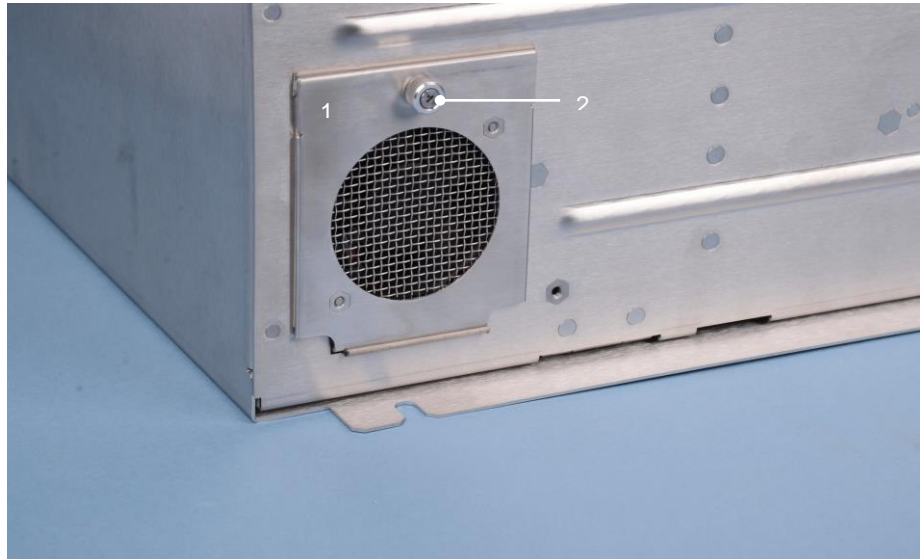
The cartridge can then be folded down and taken out.

Removing the fan
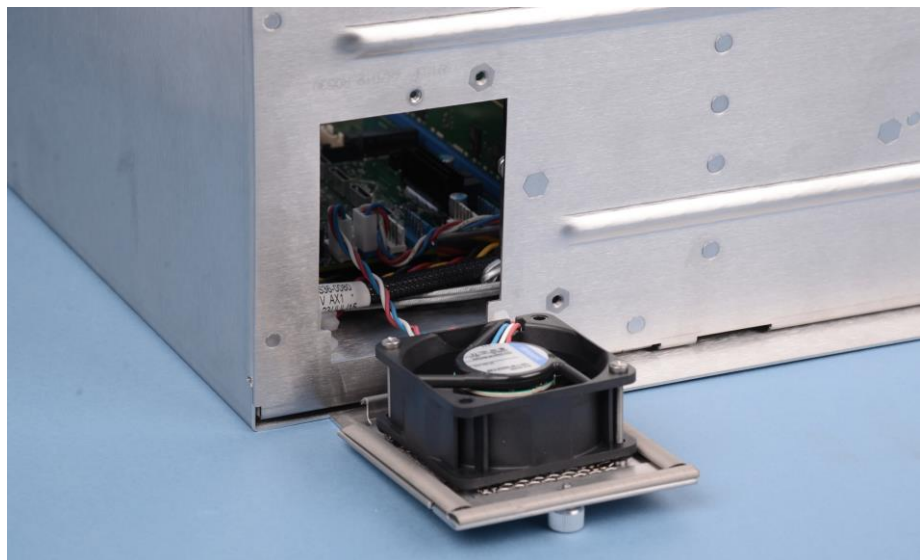
Disconnect the supply cable from the motherboard. Therefor it can be necessary to remove the housing cover.

After exchanging the fan cartridge the reassembly takes place in reverse order.

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2.6 TwinCAT license

Your TwinCAT license is managed via the license key USB stick C9900-L100. The transfer takes place via USB. The scope of delivery includes the USB stick, a cold appliance cable with plug for connecting the power supply as well as a key for opening the removable frame (see illustration).

Once you have gained access to the interior of the industrial PC, you can plug the USB stick onto the motherboard in the designated location. Chapter 2.3 Opening the Housing shows how to access the interior of the PC and where to position the stick.
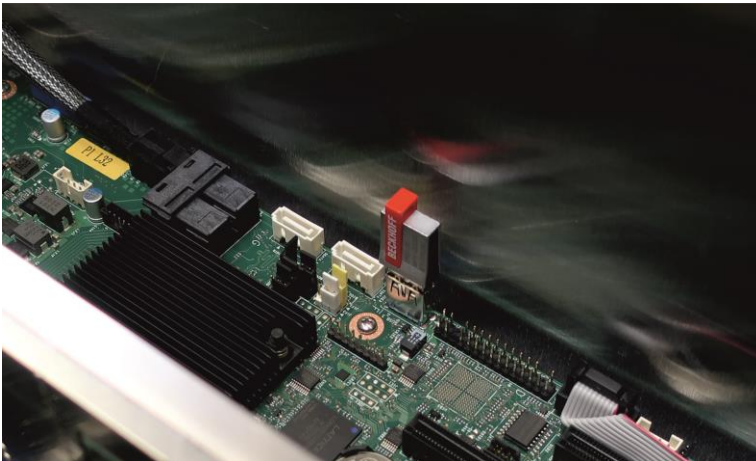
2.7 Interfaces
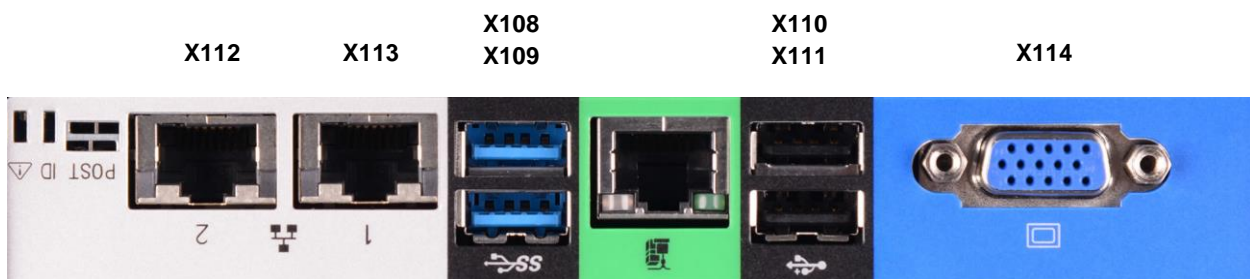
2.7.1 Network connection (X112, X113)

The RJ-45 connectors (**X112, X113**) allow the PC to be connected to a 10Gbit BASE-T Local Area Network (LAN). The interfaces do **not** support EtherCAT.

2.7.2 USB interfaces USB3, USB4 (X108, X109)

The two USB interfaces (**X108, X109**) are used for connecting peripheral devices with USB connection. USB3.0 standard is supported. The power delivery is each limited to 900 mA.

2.7.3 USB interfaces USB1, USB2 (X110, X111)

The two USB interfaces (**X110, X111**) are used for connecting peripheral devices with USB connection. USB2.0 standard is supported. The power delivery is each limited to 500 mA.

2.7.4 VGA (Video Interface) (X114)

The VGA connection (**X114**) is used for transferring the video signal.

2.7.5 Serial interface (PCIe Slot1)

The Industrial Server has one serial interfaces COM1, using the type RS232, which is brought to a 9 pin SUB-D plug connector.

The interface is preferably suitable for connecting a Beckhoff UPS C9900-U124.

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2.7.6 DVI-I (Digital Visual Interface) (PCIe Slot6)

The DVI connection is used for transferring the video signal. DVI-I standard is supported.

The power delivery is limited to 1000 mA.

2.7.7 DVI-D (Digital Visual Interface) (PCIe Slot6)

The DVD connection is used for transferring the video signal. DVI-D standard is supported.

The power delivery is limited to 1000 mA.

2.7.8 Additional plug-in cards (optional)

There is a type plate on the front cover of the Industrial Server which provides information about the hardware configuration of the Industrial PC at the time of delivery.

2.7.9 Ground connection

Earthing connections dissipate interference from external power supply cables, signal cables or cables to peripheral equipment. See also chapter *Earthing measures*.

3 Installation

3.1 Transport and Unpacking

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

3.1.1 Transport

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

! Attention	**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.

3.1.2 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.

3.2 Installation of the PC in the control cabinet

The C6670-0010 Industrial Server is designed for mounting in control cabinets for machine and plant engineering applications.

The ambient conditions specified for operation must be observed (see chapter *Technical Data*).

3.2.1 Preparation of the control cabinet

Four holes for the fixing bolts have to be provided in the control cabinet according to the dimensions of the PC (see chapter *Assembly dimensions*).

i **Note**	**Circulation of air** When the unit is installed in an enclosure, adequate space for ventilation and for opening the PC must be provided. The clearance above and below the housing must be at least 5 cm in order to ensure adequate ventilation of the PC.

! **Attention**	**Avoid extreme environmental conditions** Extreme environmental conditions should be avoided as far as possible. Protect the PC from dust, moisture and heat. The ventilation slots of the PC must not be covered.

3.2.2 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 is located in the area of the connectors of the Industrial PC.

3.3 Power supply of the Industrial PC

The Industrial PC is serially fitted with a 100-240 V_{AC}, 50-60 Hz full range power supply unit.

3.3.1 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	20 A
+5 V stand by	3 A
+5 V	25 A
+12 V	50 A
-12 V	0.5 A

Total output current of +5 V and +3.3 V not exceed 135 W!

3.3.2 Mains Socket

A mains socket is located on top of the PC housing next to the main switch in order to connect the power supply.

Mains socket and main switch at the PC housing
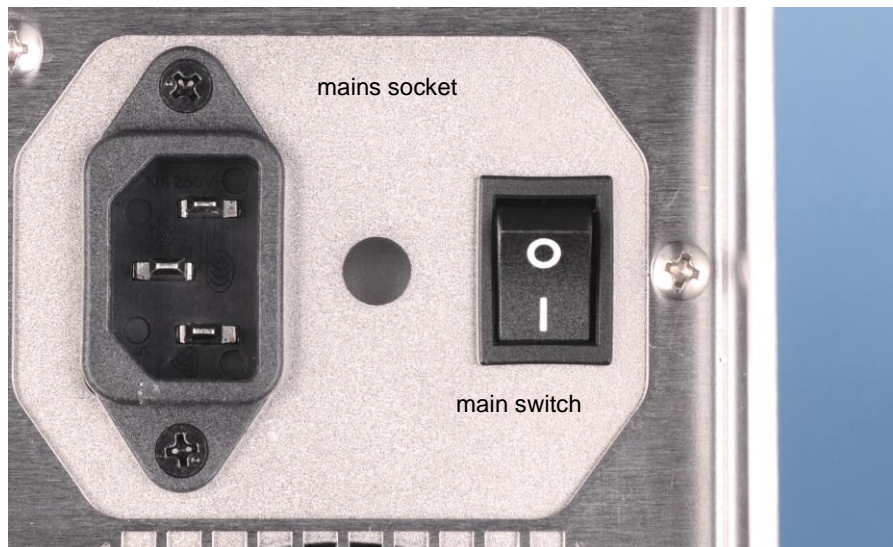
3.3.3 Power cords Europe

In the area Europe you use the provided cable with inlet connector for non-heating apparatus to connect the Industrial-PC to the power supply. Minimum temperature rating of supply cables should be 80 °C.

3.3.4 Power cords USA / Canada

In the area USA / Canada the power supply cable must show the following specifications according to the supply voltage:

- Listed, Detachable, maximum 4.5 m (14.76 ft.) long; rated minimum 125 V, 10 A, Type SJT or Type SVT; one end terminates in NEMA 5-15P/-20P grounding-type attachment plug, other end in appliance coupler. Minimum temperature rating of supply cables should be 80 °C.

or

- Listed, Detachable, maximum 4.5 m (14.76 ft.) long; rated minimum 250 V, 10 A, Type SJT or Type SVT; one end terminates in NEMA 6-15P/-20P grounding-type attachment plug, other end in appliance coupler. Minimum temperature rating of supply cables should be 80 °C.

3.4 Connecting the Industrial PC

⚠ **Attention**	**The mains plug must be disconnected**	

⚠ **Attention**	**The mains plug must be disconnected** 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!

3.4.1 Connecting cables

The connections are located at the top side 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.

4 Operating Instructions

4.1 Switching the Industrial PC on and off

4.1.1 Switch on

The Industrial PC has its own mains switch. The Industrial PC will start when the main switch switched on.

4.1.2 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.

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

! Attention	**Switch off power supply** 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.

4.1.3 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.

4.2 Servicing and maintenance

4.2.1 Cleaning of the Industrial PC

⚠️ **DANGER**	**Disconnect power supply** Switch off the Industrial PC and all connected devices, and disconnect the Industrial PC from the power supply.

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

4.2.2 Maintenance

The Industrial PC is maintenance-free.

4.2.3 Replacing the Battery on the Motherboard

A used battery on the motherboard has to be replaced. See also chapter *Access to the battery*.

⚠️ **WARNING**	**Danger of Explosion!** The battery is a CR2032 type (nominal voltage: 3.0 V) from e.g. Panasonic or Sanyo. Replace battery only with the identical type or an alternative type recommended by the manufacturer. Notice correct polarity!

⚠️ **WARNING**	**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.

4.3 Emergency procedures

In case of fire, the Industrial PC should be extinguished with powder or nitrogen.

4.4 Shutting down

4.4.1 Disposal

ℹ️ **Note**	**Observe national electronics scrap regulations** Observe the national electronics scrap regulations when disposing of the device.

In order to dispose of the device, it must be removed and fully dismantled:

- Housing components (polycarbonate, polyamide (PA6.6)) are suitable for plastic recycling
- Metal parts can be sent for metal recycling
- Electronic parts such as disk drives and circuit boards must be disposed of in accordance with national electronics scrap regulations.

5 Troubleshooting

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	Setup settings are incorrect Other cause	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
Memory device access error	Faulty device	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

6 Assembly dimensions

Industrial Server C6670-0010

⚠️ **Attention**	**Notice mounting orientation**
	The assembly of the unit must take place with the orientation diagrammed here.

All dimensions in mm.

front view

left view

top view

! **Attention**	**Notice mounting orientation**
	The assembly of the unit must take place with the orientation diagrammed here.

All dimensions in mm.

rear view

7 Technical Data

⚠️ **Danger**	**Risk of explosion!** Do not use the Industrial Server in areas of explosive hazard!

Product name	C6670-0010
Dimensions (B x H x T)	see chapter *Assembly dimensions*
Weight	16 kg (basic configuration)
Supply voltage	100 V_{AC} - 240 V_{AC}, max. 3 A
Power consumption	app. 250 W (basic configuration)
Interfaces	1 x DVI-I 1 x DVI-D 2 x RJ-45 Ethernet 10Gbit BASE-T 2 x USB 2.0 2 x USB 3.0 1 x RS232 D-Sub-9
Protection class	IP20
Operating altitude	max. 2000 m
Pollution degree	2
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)
Shock resistance (Shock)	EN 60068-2-27: 5 G (~ 50 m/ s^2), duration: 30 ms
EMC compatibility	Resistance to interference conforms to EN 61000-6-2
EMC compatibility	Emission of interference conforms to EN 61000-6-4
Permissible ambient temperature	0°C to +50°C (operation) -25°C to +65°C (transport/ storage)
Permissible relative humidity	to 95%, no condensation
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 Industrial PC can improve the resistance to impact during transport.
Certifications	CE

8 Appendix

8.1 Beckhoff Support and Service

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

8.1.1 Beckhoff branches and partner companies

Please contact your Beckhoff branch office or partner company for local support and service on Beckhoff products!
The contact addresses for your country can be found in the list of Beckhoff branches and partner companies: www.beckhoff.com. You will also find further documentation for Beckhoff components there.

8.1.2 Beckhoff company headquarters

Beckhoff Automation GmbH & Co. KG
Huelshorstweg 20
33415 Verl
Germany

Phone: + 49 (0) 5246/963-0
Fax: + 49 (0) 5246/963-198
E-mail: info@beckhoff.de
Web: http://www.beckhoff.de/

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- world-wide support
- design, programming and commissioning of complex automation systems
- and extensive training program for Beckhoff system components

Hotline: + 49 (0) 5246/963-157
Fax: + 49 (0) 5246/963-9157
E-mail: support@beckhoff.com

Beckhoff Service

The Beckhoff Service Center supports you in all matters of after-sales service:
- on-site service
- repair service
- spare parts service
- hotline service

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

If servicing is required, please quote the **project number** of your product.

8.2 Approvals for USA and Canada

8.3 FCC Approvals for the United States of America

FCC: Federal Communications Commission Radio Frequency Interference Statement
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.

i **Note**	**Technical modifications** Technological changes to the device may cause the loss of the FCC approval.

8.4 FCC Approval for Canada

FCC: Canadian Notice
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.