SIEMENS

SIMOTION

SIMOTION P320-4 E / P320-4 S

Manual

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Preface

Safety instructions 1

Industrial security 2

Description 3

Application planning 4

Interfaces 5

Installation/mounting 6

Connection 7

Troubleshooting/FAQs 8

Technical data 9

Dimension drawings 10

Spare parts 11

Standards and approvals A

ESD Guideline B

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER
indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING
indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION
indicates that minor personal injury can result if proper precautions are not taken.

NOTICE
indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

⚠ WARNING
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Siemens AG
Division Digital Factory
Postfach 48 48
90026 NÜRNBERG
GERMANY

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Preface

Preface

This document is part of the **SIMOTION P documentation package**.

This documentation describes the SIMOTION P320-4 hardware platform which can be delivered in the SIMOTION P320-4 E and SIMOTION P320-4 S hardware versions:

- SIMOTION P320-4 E with the Windows Embedded Standard 7 32-bit operating system and real-time expansion for SIMOTION.
  Successor to SIMOTION P320-3.
- SIMOTION P320-4 E with the Windows 7 Ultimate 32-bit operating system and real-time expansion for SIMOTION.
  Successor to SIMOTION P350-3.

References

The following documents contain the descriptions for the SIMOTION P hardware platform:

- SIMOTION P320-4 E / P320-4 S, Manual, Edition 11/2016
- SIMOTION P320-4 E / P320-4 S, Commissioning and Hardware Installation Manual, Edition 11/2016

Validity range

This manual applies to the SIMOTION P320-4 E and SIMOTION P320-4 S devices as of product level SIMOTION V4.5.

Standards

The SIMOTION system was developed in accordance with ISO 9001 quality guidelines.

Chapters in this documentation

The following sections describe the purpose and the use of this documentation:

- Safety instructions
  Contains fundamental safety instructions for SIMOTION and specific safety instructions for SIMOTION P320-4.
- Description
  System overview and product description for SIMOTION P320-4. The communication versions are also described.
- Use planning
  Points to note in advance: upon delivery, the permitted installation positions, environmental and ambient conditions and electromagnetic compatibility.

- Interfaces
  Description of the interfaces and operator control and display elements for SIMOTION P320-4.
- Installation/mounting
  An overview of the installation of the SIMOTION P320-4 taking into account the mounting positions.
- Connecting
  This section provides general information and important notes that you must observe when connecting the SIMOTION P320-4.
- Troubleshooting/FAQs
  List of possible errors and their remedies.
- Technical specifications
  This section contains an overview of the technical data, which is listed in detail for the individual components.
- Dimension drawings
  In this section you can find dimension drawings and dimensions of the SIMOTION P320-4.
- Spare parts
  You can find information about the spare parts for the SIMOTION P320-4 here.
- Appendix
  In addition to the safety information, the annexes also contain information about the standards, approvals and EGB guideline.
- Index
  Alphabetical directory for locating information.

SIMOTION Documentation

An overview of the SIMOTION documentation can be found in the SIMOTION Documentation Overview document.

This documentation is included as electronic documentation in the scope of delivery of SIMOTION SCOUT. It comprises ten documentation packages.

The following documentation packages are available for SIMOTION V4.5:

- SIMOTION Engineering System Handling
- SIMOTION System and Function Descriptions
- SIMOTION Service and Diagnostics
- SIMOTION IT
- SIMOTION Programming
- SIMOTION Programming - References
- SIMOTION C
- SIMOTION P

- SIMOTION D
- SIMOTION Supplementary Documentation

Hotline and Internet addresses

SIMOTION at a glance

We have compiled an overview page from our range of information about SIMOTION with the most important information on frequently asked topics - which can be opened with only one click.

Whether beginner or experienced SIMOTION user – the most important downloads, manuals, tutorials, FAQs, application examples, etc. can be found at

https://support.industry.siemens.com/cs/ww/en/view/109480700

Additional information

Click the following link to find information on the following topics:

- Documentation overview
- Additional links to download documents
- Using documentation online (find and search manuals/information)

https://support.industry.siemens.com/cs/ww/en/view/109479653

My Documentation Manager

Click the following link for information on how to compile documentation individually on the basis of Siemens content and how to adapt it for the purpose of your own machine documentation:

https://support.industry.siemens.com/My/ww/en/documentation

Training

Click the following link for information on SITRAIN - Siemens training courses for automation products, systems and solutions:

http://www.siemens.com/sitrain

FAQs

Frequently Asked Questions can be found in SIMOTION Utilities & Applications, which are included in the scope of delivery of SIMOTION SCOUT, and in the Service&Support pages in **Product Support**:

https://support.industry.siemens.com/cs/de/en/ps/14505/faq

Technical support

Country-specific telephone numbers for technical support are provided on the Internet under **Contact**:

https://support.industry.siemens.com/cs/ww/en/sc/2090

Disposal and recycling of the device

The disposal of the products described in this manual must be performed in compliance with the valid national regulations.

To a great extent, the products can be recycled owing to their low pollutant content. To recycle and dispose of your old device in an environmentally friendly way, please contact a waste disposal service certified for electronic waste.

If you have any further questions about disposal and recycling, please contact your local Siemens contact person. Contact details can be found in our contacts database on the Internet at: http://www.automation.siemens.com/partner/index.asp

Table of contents

Preface **3**

1 Safety instructions **11**

1.1 Fundamental safety instructions 11
1.1.1 General safety instructions 11
1.1.2 Safety instructions for electromagnetic fields (EMF) 14
1.1.3 Handling electrostatic sensitive devices (ESD) 14
1.1.4 Industrial security 15
1.1.5 Danger to life due to software manipulation when using removable storage media 16
1.1.6 Residual risks of power drive systems 16

1.2 Specific safety instructions for the SIMOTION P320-4 17
1.2.1 General safety instructions for the SIMOTION P320-4 17
1.2.2 Notes on use 20

2 Industrial security **21**

2.1 Security concept for SIMOTION P320-4 21
2.1.1 Security 21

2.2 Why is industrial security so important? 23
2.2.1 Trends in the IT sector 24
2.2.2 Possible corporate security holes 24

2.3 General security measures 25
2.3.1 Overview 25
2.3.2 Plant security 27
2.3.2.1 Physical protection of critical production areas 27
2.3.3 Network security 28
2.3.3.1 Network segmentation 28
2.3.4 System integrity 31
2.3.4.1 System hardening 31
2.3.4.2 Patch management 32

2.4 Product-specific measures 33
2.4.1 Virus scanners, Windows security patches, SIMOTION P 33
2.4.2 Changing the Windows user password 34
2.4.3 Changing the AutoLogin 38
2.4.4 Deactivating the remote desktop connection 45

3 Description **49**

3.1 System overview 49

3.2 SIMOTION P320-4 product description 50
3.2.1 SIMOTION P320-4 overview 50
3.2.2 Features 51
3.2.3 SIMOTION P320-4 (hardware) structure 53
3.2.4 Interfaces and operating elements 54
3.2.5 SIMOTION P Runtime (software) structure 54
3.2.6 Components 55

3.3 HMI and SIMOTION SCOUT....57
3.3.1 HMI and SIMOTION SCOUT Overview....57
3.3.2 Local HMI or ES on SIMOTION P320-4....58
3.3.2.1 Setting up a network bridge - MAC bridge miniport....59
3.3.3 HMI or ES via PROFINET....70
3.3.4 HMI or ES via Ethernet....71
3.3.5 HMI or ES via IsoPROFIBUS (optional)....73
4 Application planning....75
4.1 Unpacking and checking the delivery....75
4.2 Identification data of the device....76
4.3 Permissible mounting positions....78
4.4 Environmental conditions....79
4.5 Electromagnetic compatibility....80
5 Interfaces....81
5.1 Hardware components of the SIMOTION P320-4....81
5.2 Overview of operator control and display elements....82
5.3 Control elements....84
5.4 Status displays....85
5.5 Overview of the SIMOTION P320-4 interfaces....86
5.6 PROFINET onboard....87
5.7 Ethernet....88
5.8 DVI-I....88
5.9 DisplayPort....90
5.10 USB 3.0....90
5.11 CFast card....91
5.12 COM1....92
5.13 IsoPROFIBUS board (optional)....92
6 Installation/mounting....95
6.1 Installing the device....95
6.2 Permissible mounting positions....95
6.2.1 Standard rail mounting and vertical mounting....97
6.2.1.1 Standard rail mounting....97
6.2.1.2 Vertical mounting....98
6.3 Installation notes....99
6.4 Overview of operating modes for the SIMOTION P320-4....100
6.5 Decentralized structure....101
7 Connection....103
7.1 Requirements....103

7.2 Overview of connections....104
7.3 Notes on connecting....106
7.4 Protective conductor connection and potential equalization....107
7.5 Connecting peripheral equipment....108
7.6 Connecting the power supply (24 VDC)....109
7.7 Connecting the device to networks....110
7.8 Installing the strain relief....111
8 Troubleshooting/FAQs....113
8.1 Error correction....113
8.2 Hotplug Enabled BIOS settings....115
9 Technical data....121
9.1 Overview of the technical specifications....121
9.2 General technical specifications....121
9.3 Ambient conditions....124
9.4 Technical data of the IsoPROFIBUS board....125
9.5 Power requirements of the components....126
9.6 Integrated DC power supply....127
9.7 Technical data for the SITOP smart 24 V/10 A....127
9.8 Typical power consumption....129
10 Dimension drawings....131
10.1 Overview of the dimensional drawings....131
10.2 Device dimension drawing for standard rail mounting....131
10.3 Device dimension drawing for vertical mounting....133
10.4 Dimension drawing of device with one expansion card....135
11 Spare parts....137
11.1 Available spare parts for SIMOTION P320-4....137
A Standards and approvals....139
A.1 General rules....139
B ESD Guideline....141
B.1 ESD definition....141
B.2 Electrostatic charging of individuals....141
B.3 Basic measures for protection against discharge of static electricity....142
Index....143

Safety instructions

1

1.1 Fundamental safety instructions

1.1.1 General safety instructions



⚠ DANGER

Danger to life due to live parts and other energy sources

Death or serious injury can result when live parts are touched.

- Only work on electrical devices when you are qualified for this job.
- Always observe the country-specific safety rules.

Generally, six steps apply when establishing safety:

1. Prepare for shutdown and notify all those who will be affected by the procedure.
2. Disconnect the machine from the supply.
   - Switch off the machine.
   - Wait until the discharge time specified on the warning labels has elapsed.
   - Check that it really is in a no-voltage condition, from phase conductor to phase conductor and phase conductor to protective conductor.
   - Check whether the existing auxiliary supply circuits are de-energized.
   - Ensure that the motors cannot move.
3. Identify all other dangerous energy sources, e.g. compressed air, hydraulic systems, or water.
4. Isolate or neutralize all hazardous energy sources by closing switches, grounding or short-circuiting or closing valves, for example.
5. Secure the energy sources against switching on again.
6. Ensure that the correct machine is completely interlocked.

After you have completed the work, restore the operational readiness in the inverse sequence.



⚠ WARNING

Danger to life from hazardous voltage when connecting an unsuitable power supply

Touching live components can result in death or severe injury.

- Only use power supplies that provide SELV (Safety Extra Low Voltage) or PELV (Protective Extra Low Voltage) output voltages for all connections and terminals of the electronics modules.



⚠ WARNING

Danger to life from touching live parts on damaged devices

Improper handling of devices can result in damage.

For damaged devices, hazardous voltages can be present at the enclosure or at exposed components; if touched, this can result in death or severe injury.

- Observe the limit values specified in the technical specifications during transport, storage, and operation.
- Do not use damaged devices.



⚠ WARNING

Danger to life through electric shock due to unconnected cable shields

Hazardous touch voltages can occur through capacitive cross-coupling due to unconnected cable shields.

- As a minimum, connect cable shields and the cores of power cables that are not used (e.g. brake cores) at one end at the grounded housing potential.



⚠ WARNING

Danger to life due to electric shock when not grounded

For missing or incorrectly implemented protective conductor connection for devices with protection class I, high voltages can be present at open, exposed parts, which when touched, can result in death or severe injury.

- Ground the device in compliance with the applicable regulations.

⚠ WARNING

Danger to life due to fire spreading if housing is inadequate

Fire and smoke development can cause severe personal injury or material damage.

- Install devices without a protective housing in a metal control cabinet (or protect the device by another equivalent measure) in such a way that contact with fire inside and outside the device is prevented.
- Ensure that smoke can only escape via controlled and monitored paths.

⚠ WARNING

Danger to life from unexpected movement of machines when using mobile wireless devices or mobile phones

Using mobile radios or mobile phones with a transmit power > 1 W closer than approx. 2 m to the components may cause the devices to malfunction, influence the functional safety of machines therefore putting people at risk or causing material damage.

- Switch off wireless devices or mobile phones in the immediate vicinity of the components.

⚠ WARNING

Danger to life due to fire if overheating occurs because of insufficient ventilation clearances

Inadequate ventilation clearances can cause overheating of components followed by fire and smoke development. This can cause death or serious injury. This can also result in increased downtime and reduced service life for devices/systems.

- Ensure compliance with the specified minimum clearance as ventilation clearance for the respective component.

⚠ WARNING

Danger of an accident occurring due to missing or illegible warning labels

Missing or illegible warning labels can result in accidents involving death or serious injury.

- Check that the warning labels are complete based on the documentation.
- Attach any missing warning labels to the components, in the national language if necessary.
- Replace illegible warning labels.

⚠ WARNING

Danger to life when safety functions are inactive

Safety functions that are inactive or that have not been adjusted accordingly can cause operational faults on machines that could lead to serious injury or death.

- Observe the information in the appropriate product documentation before commissioning.
- Carry out a safety inspection for functions relevant to safety on the entire system, including all safety-related components.
- Ensure that the safety functions used in your drives and automation tasks are adjusted and activated through appropriate parameterizing.
- Perform a function test.
- Only put your plant into live operation once you have guaranteed that the functions relevant to safety are running correctly.

Note

Important safety notices for safety functions

If you want to use safety functions, you must observe the safety notices in the safety manuals.

1.1.2 Safety instructions for electromagnetic fields (EMF)



⚠ WARNING

Danger to life from electromagnetic fields

Electromagnetic fields (EMF) are generated by the operation of electrical power equipment such as transformers, converters or motors.

People with pacemakers or implants are at a special risk in the immediate vicinity of these devices/systems.

- Ensure that the persons involved are the necessary distance away (minimum 2 m).

1.1.3 Handling electrostatic sensitive devices (ESD)

Electrostatic sensitive devices (ESD) are individual components, integrated circuits, modules or devices that may be damaged by either electric fields or electrostatic discharge.



NOTICE

Damage through electric fields or electrostatic discharge

Electric fields or electrostatic discharge can cause malfunctions through damaged individual components, integrated circuits, modules or devices.

- Only pack, store, transport and send electronic components, modules or devices in their original packaging or in other suitable materials, e.g conductive foam rubber of aluminum foil.
- Only touch components, modules and devices when you are grounded by one of the following methods:
  - Wearing an ESD wrist strap
  - Wearing ESD shoes or ESD grounding straps in ESD areas with conductive flooring
- Only place electronic components, modules or devices on conductive surfaces (table with ESD surface, conductive ESD foam, ESD packaging, ESD transport container).

1.1.4 Industrial security

Note

Industrial security

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept.

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens' guidance on appropriate security measures should be taken into account. For more information about industrial security, please visit http://www.siemens.com/industrialsecurity.

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under http://www.siemens.com/industrialsecurity..

⚠ WARNING

Danger as a result of unsafe operating states resulting from software manipulation

Software manipulation (e.g. by viruses, Trojan horses, malware, worms) can cause unsafe operating states to develop in your installation which can lead to death, severe injuries and/or material damage.

- Keep the software up to date.
  Information and newsletters can be found at:
  http://support.automation.siemens.com
- Incorporate the automation and drive components into a state-of-the-art, integrated industrial security concept for the installation or machine.
  For more detailed information, go to:
  http://www.siemens.com/industrialsecurity
- Make sure that you include all installed products into the integrated industrial security concept.

1.1.5 Danger to life due to software manipulation when using removable storage media

⚠ WARNING

Danger to life due to software manipulation when using removable storage media

The storage of files on removable storage media involves a high risk of infection, e.g. via viruses or malware. Incorrect parameter assignment can cause machines to malfunction, which can lead to injuries or death.

- Protect the files on removable storage media against harmful software through appropriate protective measures, e.g. virus scanners.

1.1.6 Residual risks of power drive systems

When performing the risk assessment for a machine or plant in accordance with the respective local regulations (e.g. EC Machinery Directive), the machine manufacturer or plant constructor must take into account the following residual risks associated with the control and drive components of a drive system:

1. Unintentional movements of driven machine or system components during commissioning, operation, maintenance and repairs caused by, for example:
   - Hardware and/or software errors in the sensors, control system, actuators, and cables and connections
   - Response times of the control system and of the drive
   - Operation and/or environmental conditions outside the specification
   - Condensation/conductive contamination
   - Parameterization, programming, cabling, and installation errors
   - Use of wireless devices / mobile phones in the immediate vicinity of electronic components
   - External influences/damage
   - X-rays, ionizing radiation and cosmic radiation
2. Unusually high temperatures, including open flames, as well as emissions of light, noise, particles, gases, etc., can occur inside and outside the components under fault conditions caused by, for example:
   - Component failure
   - Software errors
   - Operation and/or environmental conditions outside the specification
   - External influences/damage

3. Hazardous shock voltages caused by, for example:
   - Component failure
   - Influence during electrostatic charging
   - Induction of voltages in moving motors
   - Operation and/or environmental conditions outside the specification
   - Condensation/conductive contamination
   - External influences/damage
4. Electrical, magnetic and electromagnetic fields generated in operation that can pose a risk to people with a pacemaker, implants or metal replacement joints, etc., if they are too close
5. Release of environmental pollutants or emissions as a result of improper operation of the system and/or failure to dispose of components safely and correctly

For more information about the residual risks of the drive system components, see the relevant sections in the technical user documentation.

1.2 Specific safety instructions for the SIMOTION P320-4

1.2.1 General safety instructions for the SIMOTION P320-4

⚠ WARNING

Life-threatening voltages are present with an open control cabinet

When you install the device in a control cabinet, some areas or components in the open control cabinet may be carrying life-threatening voltages.

If you touch these areas or components, you may be killed by electric shock.

Switch off the power supply to the cabinet before opening it.

System expansions

NOTICE

Damage through system expansions

Device and system expansions may be faulty and can affect the entire machine or plant.

The installation of expansions can damage the device, machine or plant.

Device and system expansions may violate safety rules and regulations regarding radio interference suppression.

If you install or exchange system expansions and damage your device, the warranty becomes void.

Note the following for system expansions:

- Only install system expansion devices designed for this device. Contact your technical support team or where you purchased your PC to find out which system expansion devices may safely be installed.
- Observe the information on electromagnetic compatibility (Page 139).

NOTICE

"Open Type" UL508

Note that the device is classified as "Open Type" for use in the area of Industrial Control Equipment (UL508). Installation of the device in an enclosure according to UL508 is conditional for approval or operation according to UL508.

Battery and rechargeable battery

⚠ WARNING

Risk of explosion and release of harmful substances

Improper handling of lithium batteries can result in an explosion of the batteries.

Explosion of the batteries and the released pollutants can cause severe physical injury. Worn batteries jeopardize the function of the device.

Note the following when handling lithium batteries:

- Replace used batteries in good time, see the section "Replacing the backup battery" in the Commissioning and Hardware Installation Manual.
- Replace the lithium battery only with an identical battery or types recommended by the manufacturer (Article No.: A5E30314053).
- Do not throw lithium batteries into fire, do not solder on the cell body, do not recharge, do not open, do not short-circuit, do not reverse polarity, do not heat above 100°C and protect from direct sunlight, moisture and condensation.

High frequency radiation

NOTICE

Unintentional operating situations

High frequency radiation, e g. from a cellular phone, interferes with device functions and can result in malfunctioning of the device.

Persons are injured and the plant is damaged.

Avoid high-frequency radiation:

- Remove radiation sources from the environment of the device.
- Switch off radiating devices.
- Reduce the radio output of radiating devices.
- Observe the information on electromagnetic compatibility (Page 139).

ESD Guideline



Electrostatic sensitive devices can be labeled with an appropriate symbol.

NOTICE

Electrostatic sensitive devices (ESD)

When you touch electrostatic sensitive components, you can destroy them through voltages that are far below the human perception threshold.

If you work with components that can be destroyed by electrostatic discharge, observe the ESD Guideline.

Further information

You can find more detailed information about the **EGB Guideline** in Annex B in the section with the same name.

1.2.2 Notes on use

⚠ WARNING

Hazards on an unprotected machine or plant

According to the results of a risk analysis, hazards can occur on an unprotected machine. The hazards can result in personal injury.

According to the risk analysis, the risk of personal injury can be avoided with the following measures:

- Additional protective devices on the machine or plant. With this, especially the programming, configuration and wiring of the inserted I/O modules have to be executed, in accordance with the necessary risk analysis identified safety performance (SIL, PL or Cat.).
- The correct use of the device has to be verified with a function test on the system. This test can detect programming, configuration and wiring errors.
- Documentation of the test results that you can enter in the relevant safety records when required.

NOTICE

Ambient conditions

Ambient conditions for which the device is not suitable can cause faults or damage the device.

Note the following:

- Operate the device only in closed rooms. Failure to comply nullifies the warranty.
- Operate the device only in accordance with the ambient conditions specified in the technical specifications.
- Protect the device against dust, moisture and heat.
- Do not expose the device to direct sunlight or other strong sources of light.
- Without additional measures, such as a supply of clean air, the device may not be used in locations with harsh operating conditions caused by acidic vapors or gases.
- Observe the permissible mounting positions of the device.
- Do not obstruct the venting slots of the device.

Note

Use in an industrial environment without additional protective measures

This device was designed for use in a normal industrial environment according to IEC 60721-3-3.

Industrial security

2

2.1 Security concept for SIMOTION P320-4

2.1.1 Security

Note

Observe the general security information in this documentation for Industrial security (Page 15).

Regular change of the Windows password

Note

For security reasons, the Windows password should be changed regularly.

It is essential that the AutoLogin is also adapted for this purpose.

You can find instructions in the following sections:

- Changing the Windows user password (Page 34)
- AutoLogin for SIMOTION P (Page 38).

Unlocking Windows

Note

Windows locked

Windows may be accidentally locked, e.g. through shortcut key Windows + L.

If you do not know the password for the SIMOTION P320-4, please contact the Siemens Industry Online Support (https://support.industry.siemens.com/cs/?lc=en-DE).

Windows firewall

Note

Windows firewall

To allows the Windows IP to be accessed externally, this must be set as an exception in the Windows firewall **File and Printer Sharing**. Otherwise, there is only limited access to Windows from outside.

Security and networks

Note

You will find information on the security of networks in Section General security measures (Page 25).

Remote desktop connection

Note that for the SIMOTION P320-4 with Headless operation, you require a user name and password for a remote desktop connection. Per default, the remote desktop connection is already set up.

Note

Deactivating the remote desktop connection

If you do **not** use the remote desktop connection, it must be deactivated for security reasons.

See Section Deactivating the remote desktop connection (Page 45)

SIMOTION IT

Note

Security concept

Note the security concept of HTTP/S, FTP and Telnet access on the Web server when working with SIMOTION IT.

You will find information in the SIMOTION IT Diagnostics and Configuration Diagnostics Manual or the SIMOTION online help in Section Security concept.

Note

User administration

Note the information on the user administration when working with SIMOTION IT.

You will find information in the SIMOTION IT Diagnostics and Configuration Diagnostics Manual or the SIMOTION online help in Section User administration.

Information on industrial security

The following sections are taken from the Motion Control Industrial Security Configuration Manual:

- Why is industrial security so important? (Page 23)
- General security measures (Page 25)
- Product-specific measures (virus scanners) (Page 33)

You can view the entire document in the Industry Online Support (https://support.industry.siemens.com/cs/ww/en/view/108862708).

2.2 Why is industrial security so important?

The topic of data security and access protection (security) is becoming more and more important in industrial environments. The progressive networking of entire industrial plants, the vertical integration and networking of the individual levels of a company, and new technologies, such as remote maintenance and remote access, are leading to increased requirements for protecting industrial plants.

The threats are diverse and the consequences far-reaching.

Possible threats:

- Espionage of data, recipes, etc.
- Sabotage of production plants
- System stoppage, e.g. due to virus infection and malware
- Manipulation of data or application software
- Unauthorized use of system functions

Possible effects of a security incident

- Loss of intellectual property
- Loss of production or reduced product quality
- Company image and economic damage

- Catastrophic environmental influences
- Danger to persons and machines

2.2.1 Trends in the IT sector

Overview

There are many new trends which affect industrial security:

- Cloud computing in general
  The number of network connections across the world is constantly increasing. This enables innovations such as cloud computing and the applications that go hand in hand with it. In conjunction with cloud computing, there has been a massive increase in the number of mobile devices, such as mobile phones and tablet PCs.
- Wireless technology
  On the other hand, the increasing use of mobile devices has only become possible thanks to the ubiquitous availability of mobile networks. Wireless LAN is also becoming increasingly available.
- Smart Grid
  Networking is not only limited to data networks, it also influences our energy infrastructure.
- Worldwide remote access to plants, machines and mobile applications
- The "Internet of things"
  Millions of electronic devices are becoming network-capable and are communicating via the Internet, such as onboard computers in cars, which send warranty information to dealers, or water meter sensors that transmit water consumption data to municipal water suppliers via radio.

However, in order for everything from cloud computing to sensors to work without service disruptions, you need reliable network infrastructures that are well protected against attacks from malware and hackers.

2.2.2 Possible corporate security holes

Possible security holes or weak points

The security chain of a company is only as strong as its weakest link. Security holes can exist at numerous points. The following list gives only a few examples:

- Employees
- Production plants
- Network infrastructure
- Data centers
- PC workstations

- Laptops
- Tablet PCs
- Printers
- Smartphones
- Portable storage media
- Guidelines and regulations

For this reason, a holistic approach is required to deal with the issue of security. Coordinated guidelines and regulations are required that cover all areas: Devices, systems, processes and employees.

2.3 General security measures

2.3.1 Overview

In the following section you will learn about the general security measures you can take in order to protect your system from threats. All of the measures are recommended.

Additional specific security measures for SINUMERIK, SIMOTION and SINAMICS products can be found in Section Product-specific security measures (Page 33).

Basically, the measures should be coordinated with one another and correspond to the ring-shaped principle of the "Defense in Depth" strategy. The measures are structured according to the "onion" principle and each measure forms an additional protective layer around the core: the production plant.



Figure 2-1 Defense in depth strategy

- **Plant security**
  Plant security represents the outermost protective ring. Plant security includes comprehensive physical security measures, e.g. entry checks, which should be closely coordinated with protective measures for IT security.
- **Network security**
  The measures, grouped under the keyword "Network security", form the core of the protective measures. This refers to the segmentation of the plant network with limited and secure communication between subnetworks ("secure islands") and the interface check with the use of firewalls.
- **System integrity**
  "System integrity" represents the combination two major measures. PC-based systems and the control level must be protected against attacks. Steps include the following measures:
  - User authentication for machine or plant operators with individual authorization levels
  - Integrated access protection mechanisms in the automation components to prevent unauthorized changes via the engineering system or during maintenance
  - The use of antivirus and whitelisting software to protect PC systems against malware
  - Maintenance and update processes to keep the automation systems up-to-date (e.g. patch management, firmware updates, etc.)

2.3.2 Plant security

2.3.2.1 Physical protection of critical production areas

Unauthorized persons may be able to enter the production site/building and damage or alter production equipment as a result of gaps in a company's physical security. Confidential information can also be lost. This can be prevented if both the company's site and the production areas are protected accordingly.

Company security

The company's physical security can be ensured via the following measures:

- Closed off and monitored company premises
- Entry control, keys / card readers and/or security personnel
- Escorting of external personnel by company employees

Physical production security

The physical security of a production location can also be ensured via the following measures:

- Separate access control for production areas.
- Installation of critical components in securely lockable cabinets / switching rooms including monitoring and alarm signaling options
- Prohibited production areas with restricted access rights
- Configuration of the radio field to restrict the WLAN range so that it is not available outside the defined areas (e.g. factory building).
- Guidelines that prevent the use of third-party data storage media (e.g. USB sticks) and IT devices (e.g. notebooks) classified as insecure on the control.

Further information

Further information on integrated security solutions can be found on the Surveillance page (http://www.buildingtechnologies.siemens.com/bt/global/en/security-solution/Pages/security-solution.aspx).

2.3.3 Network security

2.3.3.1 Network segmentation

Separation between production and office networks

One important protective measure for your control is the strict separation of the production networks and the other company networks. This separation creates protection zones for your production networks.

Note

The products – drives, controllers, commissioning tools (e.g. STARTER or Startdrive) – described in this manual must only be operated in protection zones.

Separation by means of a firewall system

In the simplest scenario, separation is achieved by means of an individual firewall system which controls and regulates communication between networks.

Separation via a DMZ network

In the more secure version, the coupling is established via a separate DMZ network. In this case, direct communication between the production network and the company network is completely prevented by firewalls and only takes place indirectly via servers in the DMZ network.

Note

The production networks should also be divided into separate automation cells in order to protect critical communication mechanisms.

General security measures

Observe the general security measures even within protection zones, for example:

- Virus scanners (Page 31)
- Reduction of attack points (Page 31)

Network segmentation with SCALANCE S

Siemens provides SCALANCE S security modules to meet network protection and network segmentation requirements.

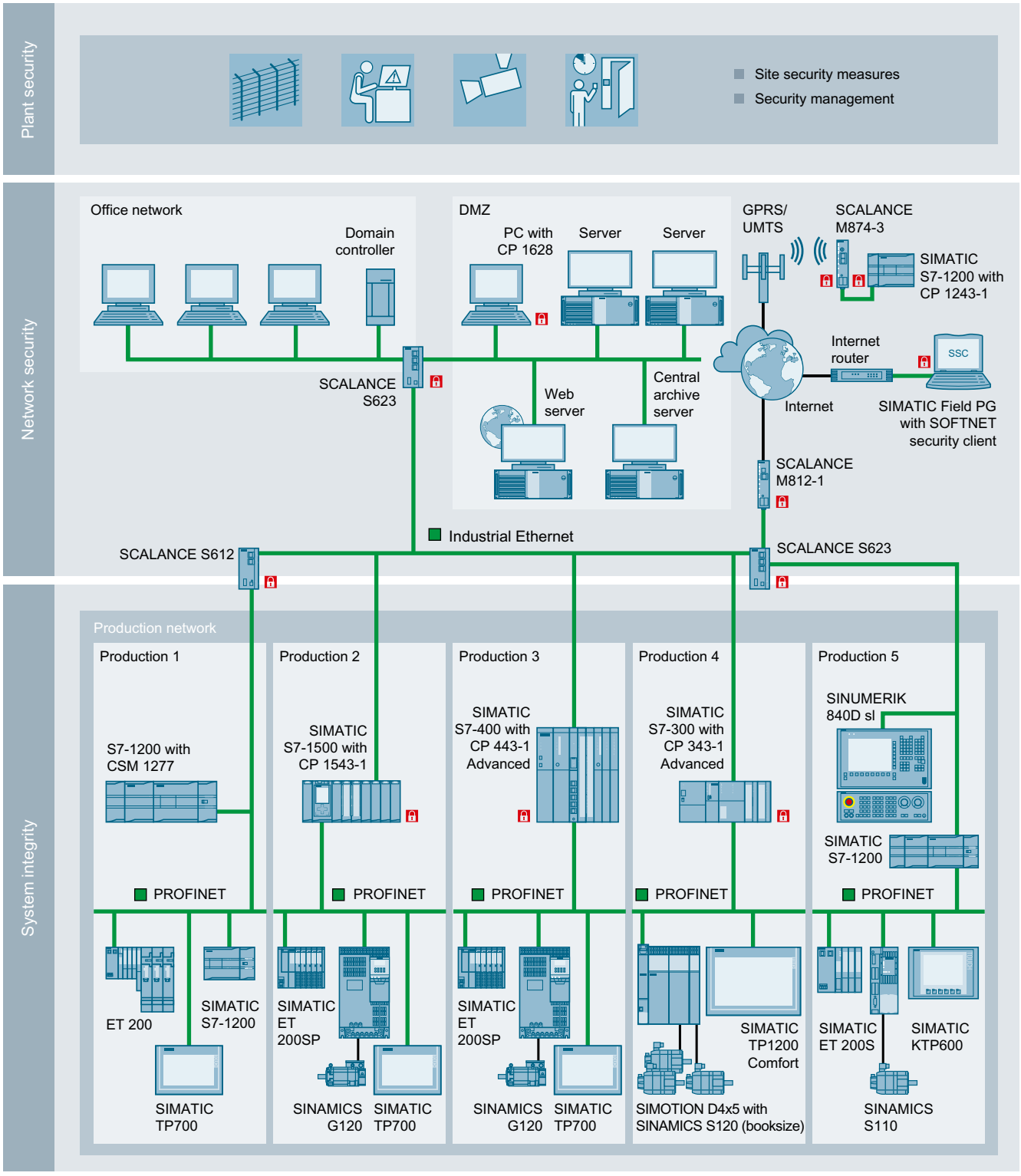
SCALANCE S security modules

SCALANCE S security modules with Security Integrated provide:

- Stateful inspection firewall
  In order to implement user-specific control and logging, firewall rules can also be specified that only apply to certain users.
- VPN via IPsec (data encryption and authentication)
  This establishes a secure tunnel between authenticated users whose data cannot be intercepted or manipulated. The most important aspect is the protection against external access via the Internet.
- NAT/NATP (address translation)
- Router functionality (PPPoE, DDNS) for broadband Internet access (DSL, cable)
- S623 with additional VPN port (DMZ) enables the secure connection of an additional network for service and remote maintenance purposes. S623 also permits the secure, redundant connection of subordinate networks by means of routers and firewall redundancy.

Principle

This application example shows cell segmentation by several SCALANCE S modules, each of which is upstream of the automation cell. The data traffic to and from the devices within automation cells can be filtered and controlled with the SCALANCE S firewall. If required, the traffic between the cells can be encrypted and authenticated. Secure channels and client access from the PCs to the cells can be established via SOFTNET Security Client, VPN client software for PCs.


Plant security
Site security measures
Security management
Network security
Office network
Domain controller
DMZ
PC with CP 1628
Server
Server
GPRS/ UMTS
SCALANCE M874-3
SIMATIC S7-1200 with CP 1243-1
Internet router
SSC
Internet
SIMATIC Field PG with SOFTNET security client
SCALANCE S623
Web server
Central archive server
SCALANCE M812-1
Industrial Ethernet
SCALANCE S612
SCALANCE S623
System integrity
Production network
Production 1
S7-1200 with CSM 1277
PROFINET
ET 200
SIMATIC S7-1200
SIMATIC TP700
Production 2
SIMATIC S7-1500 with CP 1543-1
PROFINET
SIMATIC ET 200SP
SINAMICS G120
SIMATIC TP700
Production 3
SIMATIC S7-400 with CP 443-1 Advanced
PROFINET
SIMATIC ET 200SP
SINAMICS G120
SIMATIC TP700
Production 4
SIMATIC S7-300 with CP 343-1 Advanced
PROFINET
SIMATIC TP1200 Comfort
SIMOTION D4x5 with SINAMICS S120 (booksize)
Production 5
SINUMERIK 840D sl
SIMATIC S7-1200
PROFINET
SIMATIC ET 200S
SIMATIC KTP600
SINAMICS S110

2.3.4 System integrity

2.3.4.1 System hardening

Reduction of attack points

Network services and ports

Activated services represent a risk. To minimize the risk, only the necessary services for all of the automation components should be activated. Ensure that all activated services are taken into account (especially web servers, FTP, remote maintenance, etc.) in the security concept.

A description of the ports used can be found in the Manuals and Function Manuals of the respective products.

User accounts

Any active user account allows access to the system is thus a potential risk. Therefore, take the following security measures:

- Reduction of configured/activated user accounts to the actually needed minimum
- Use of secure access data for existing accounts
- Regular checks, especially of the locally configured user accounts
- Regular change of passwords

Passwords

NOTICE
Changing default passwords The misuse of passwords can also represent a considerable security risk. We recommend that default passwords be changed during the commissioning and changed at regularly defined intervals as required.

Virus scanner

The use of a virus scanner must not impact the production operations of a plant. As the last consequence, this will lead to even a virus-infected computer not being permitted to immediately shut down if this would cause the control of the production process to be lost.

In order to be used on industrial control components, a virus scanner should therefore meet the following requirements:

Virus scanner requirements

- If a local firewall that has been adapted to the production operations is used, it must be possible to install the virus scanner without its own firewall.
- The virus scan clients can be divided into (product- and task-specific) groups and configured separately.
- It must be possible to deactivate the automatic distribution of the virus signatures and other updates.
- It must be possible to carry out the distribution of the virus signatures and updates manually and in groups.
- It must be possible to conduct a file scan and system scan manually and in groups.
- For the virus detection scenario, a message can be configured without a file action such as "Delete", "Clean", etc. being automatically carried out.
- It must be possible to log all of the messages on the virus scan server.
- On a virus scan client, it must be possible to suppress the local message window because it could obscure important messages from the production process.

Note

Installation of software

The installation of software is often a process which represents a serious and complicated change to the respective system. The storage location of the files to be installed must always be free of viruses (e.g. a file server with its own virus scanner or DVD checked for viruses).

2.3.4.2 Patch management

Microsoft security updates

The **WSUS** (Windows Server Update Service) system functionality provided by Microsoft is available for current Windows systems. WSUS supports administrators by providing Microsoft updates in large local networks. WSUS automatically downloads update packages from the Internet (Microsoft Update) and offers them to the Windows clients for installation.

The fully automatic update process ensures that Microsoft security updates are always available on Siemens clients.

2.4 Product-specific measures

2.4.1 Virus scanners, Windows security patches, SIMOTION P

General information on virus scanners

Once an industrial PC system is connected to the Internet, either directly or via an internal company network, there is a danger that it can become infected with a virus. However, malicious software is not only able to reach the system via the Intranet/Internet, but also, for example, via a removable storage device (such as a USB memory stick) attached to the system for backing up data.

SIMOTION P320-4 virus scanners

A virus scanner that runs on Microsoft Windows, as used in office or home computers, has a deep impact on a system's processes. There are, for example, processes such as real-time scans or regular system scans. Such interventions can cause performance issues for the system, and as a result, for the SIMOTION Runtime software. Although the SIMOTION Runtime software runs in a real-time environment, it still depends on the available system resources.

Note

Because of the resulting performance impairments, the installation and use of a standard virus scanner on a SIMOTION P320-4 during system runtime does not make sense and is not permitted.

Using a virus scanner

As a standard virus scanner cannot be used for SIMOTION P320-4, an alternative procedure is followed. The virus scanner is installed to a separately bootable Windows PE operating system. It is started, for example, from a CD or a USB storage device and then performs a virus scan.

Note

FAQ Service & Support portal

More information on using a virus scanner on a SIMOTION P320-4 can be found in the FAQ "How can a virus scanner be used on a SIMOTION P320-4?" (https://support.industry.siemens.com/cs/ww/en/view/59381507) which is available as a download from the Service & Support portal.

Windows security patches

A brief test is performed when a new SIMOTION version is released. During this brief test, a check is performed to establish whether the installation of the security update has affected any basic functions.

2.4.2 Changing the Windows user password

Permitting the Windows password to be changed

Before the Windows password can be changed, it must be permitted for the user.

If the following procedure is not observed, an error message is issued and the Windows password cannot be changed.

Note the following procedure:

1. Select the entry point **Control Panel** > **All Control Panel Items** > **Administrative Tools** > **Computer Management**.
   Double-click **Computer Management**.

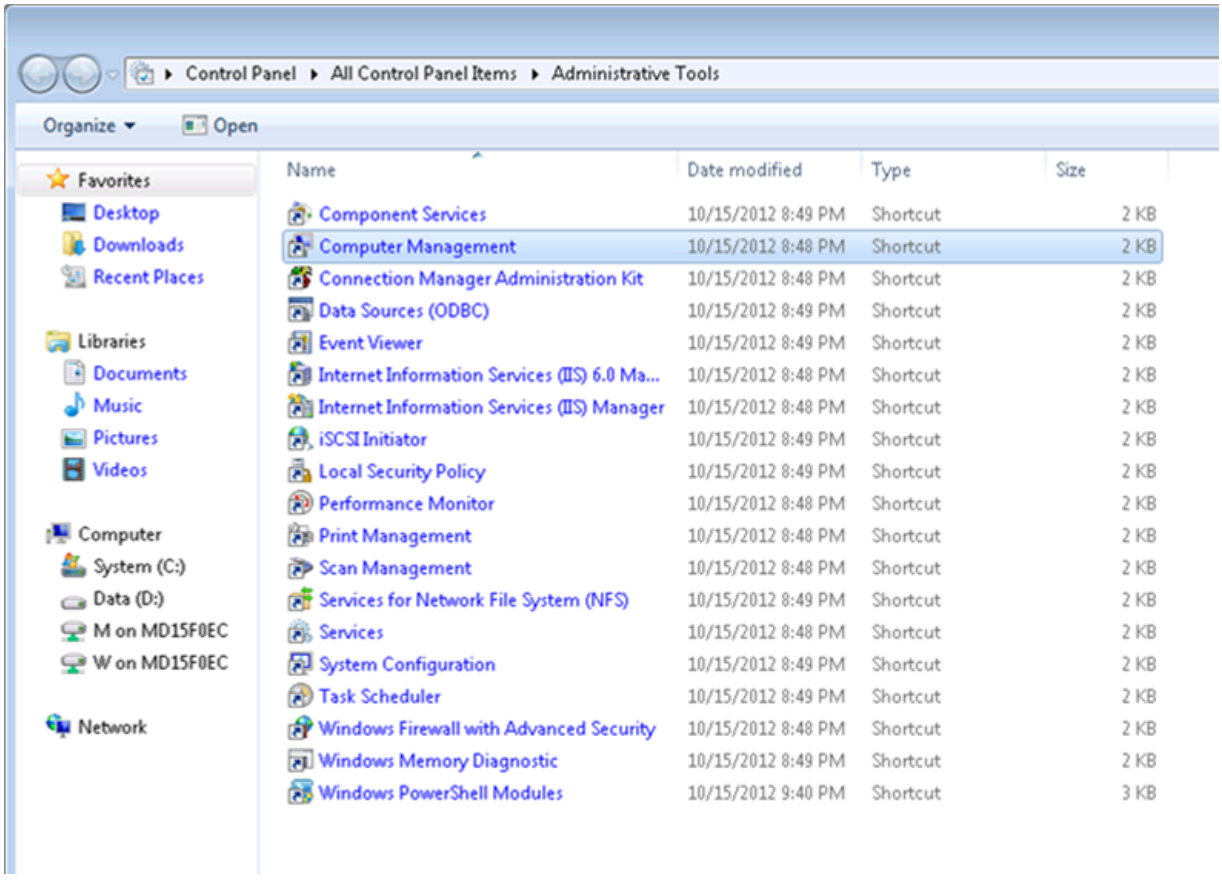


Figure 2-2 Homepage:

2. The **Users** folder is displayed at **Local Users and Groups** in the **Computer Management** window.
   Click the **Users** folder. The available user groups are displayed.

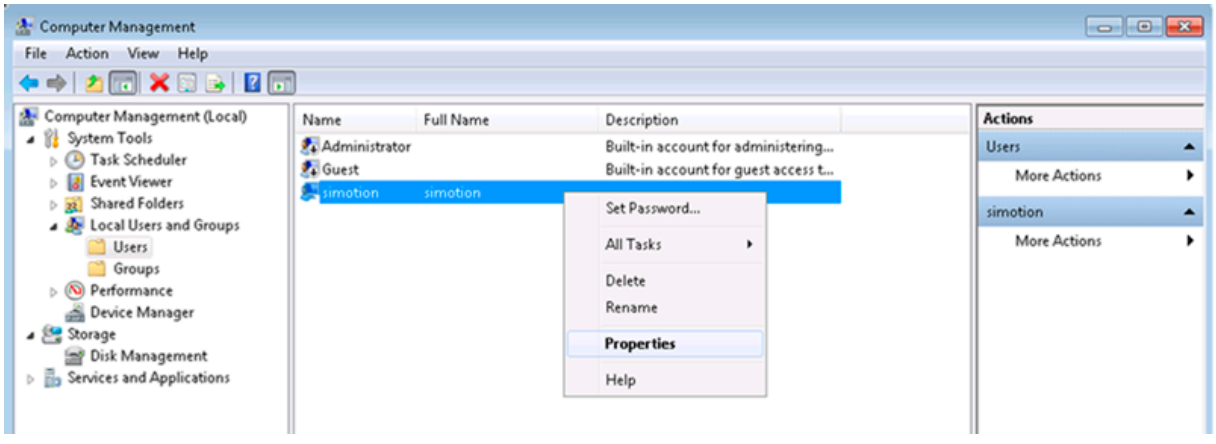


Figure 2-3 Computer management

3. With the selection of **Users simotion**, you can display the properties via **Properties**.
4. Deactivate the "**User cannot change password**" checkbox in the **General** tab on the **simotion Properties** dialog box.
   This checkbox must be deactivated for the user to change the Windows password.

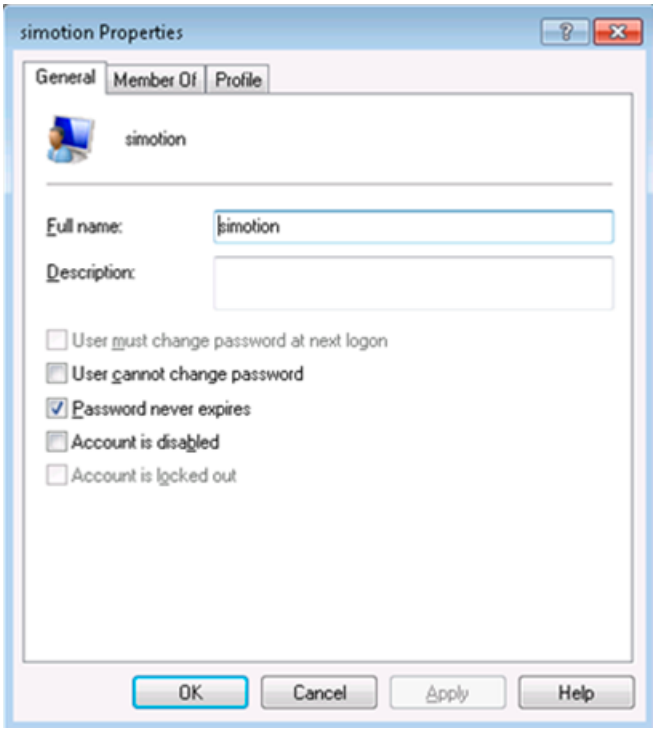


Figure 2-4 SIMOTION properties

Changing the Windows password

You can find general information on the Windows password on the website at Microsoft - Changing des Windows-password (http://windows.microsoft.com/en-us/windows/change-windows-password#change-windows-password=windows-7).

To change the Windows password, proceed as follows:

1. Press Ctrl+Alt+Del. The following Windows window opens.

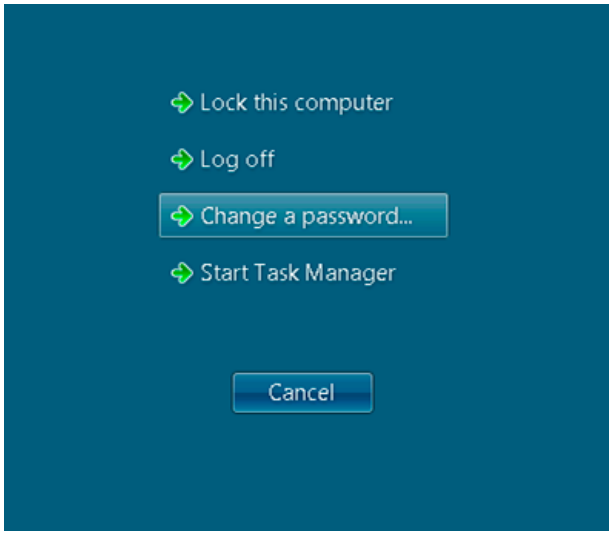


Figure 2-5 Changing the Windows password

2. After you have confirmed **Change a password...** , the Windows window to change the Windows password opens.
   First enter your current password and then the new Windows password. You must enter the new Windows password a second time for confirmation.

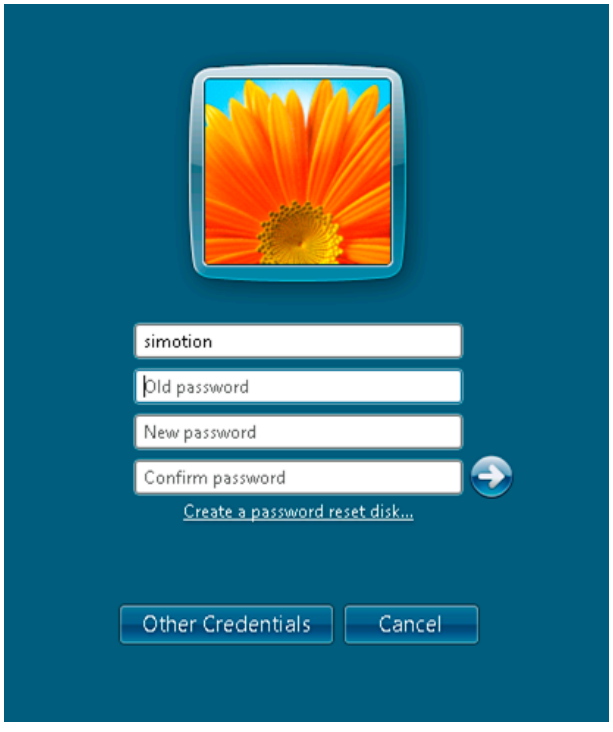


Figure 2-6 Entering the new Windows password

3. The password was changed successfully.

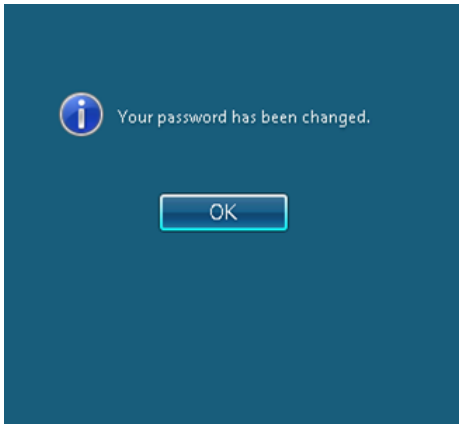


Figure 2-7 Confirmation of change

4. In the event of an error when the "User cannot change password" checkbox is activated, the following error message is displayed.
The Windows password has not been changed.

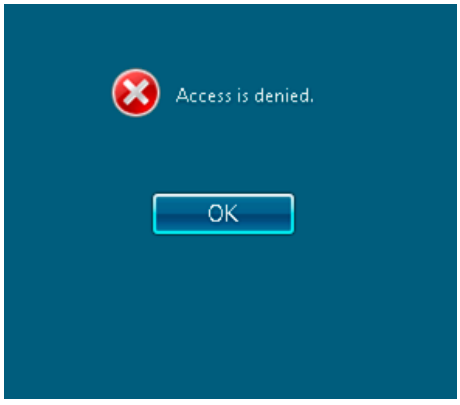


Figure 2-8 Error message when changing the Windows password has not been permitted.

2.4.3 Changing the AutoLogin

The password for the AutoLogin must be changed when the user has changed the Windows password.

The Windows user password is changed in the normal way, e.g. "Change Password" screen.
See also Section Changing the Windows user password (Page 34).

Automatically Log On

SIMOTION P320-4 is preset so that the user does not have to enter the user name and the password to log on.

Preparation for changing the AutoLogin

In order that an AutoLogin still functions after changing the Windows password, the password for the AutoLogin must be changed.

The required procedure is shown in the following so that the change of the AutoLogin for SIMOTION P320-4 can be prepared:

1. Open the **Computer Management** window via **Control Panel** > **All Control Panel Items** > **Administrative Tools** .

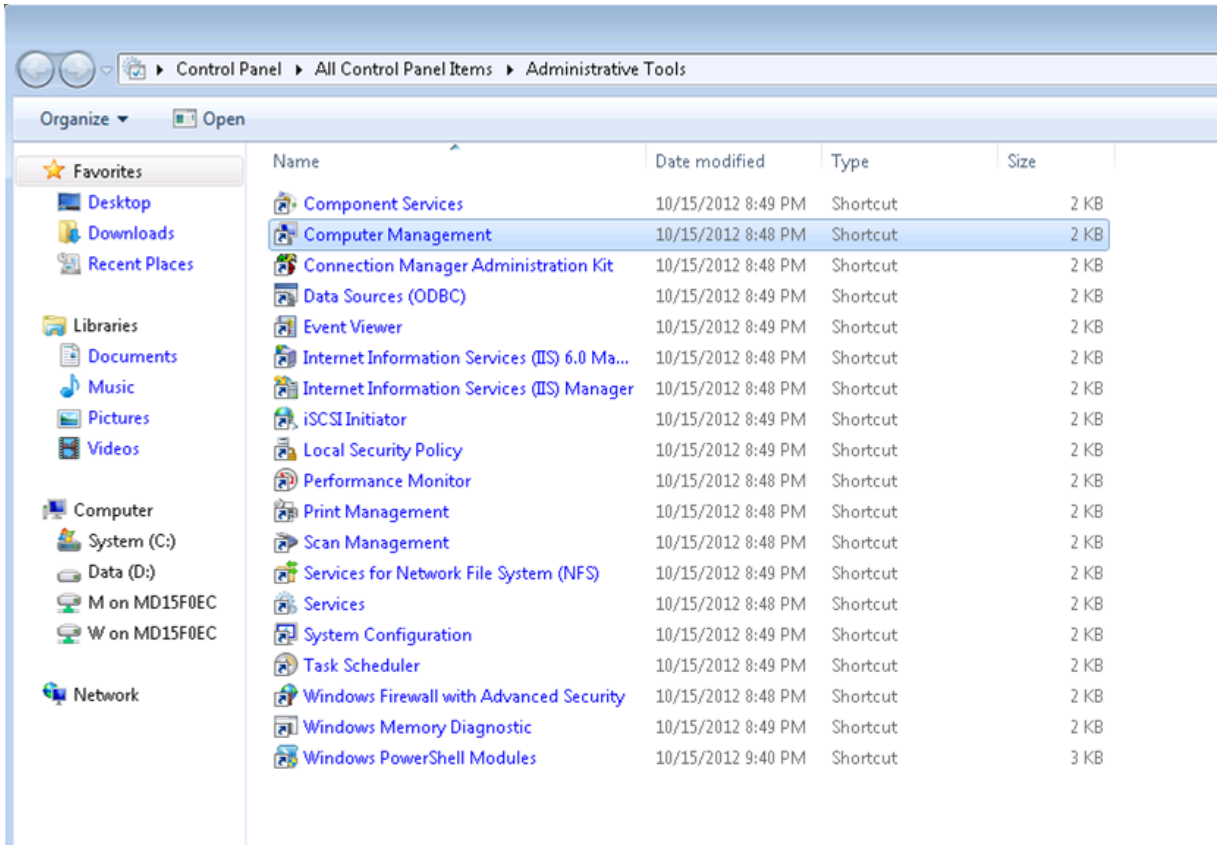


Figure 2-9 Computer Management entry point

2. The **Users** folder is displayed at **Local Users and Groups** in the **Computer Management** window.
   Click the **Users** folder. The available user groups are displayed.

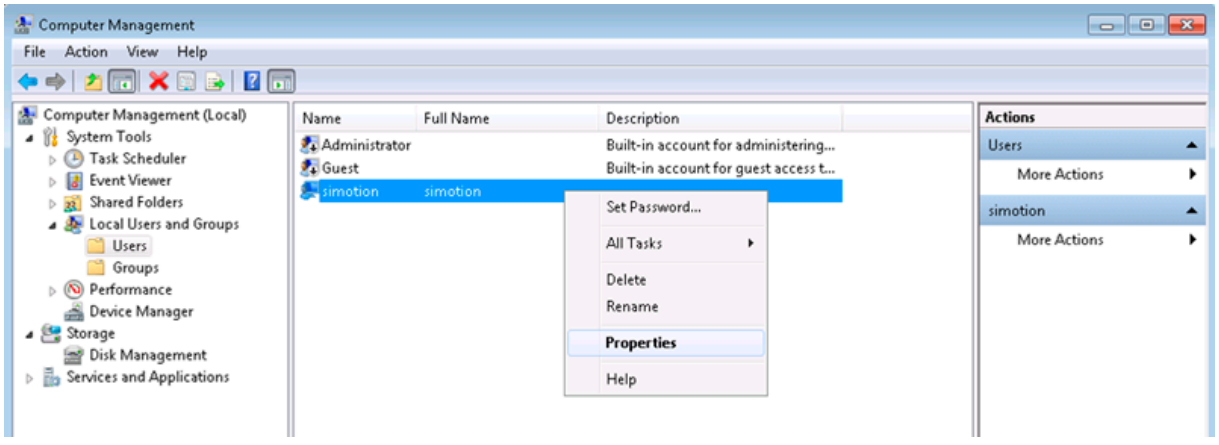


Figure 2-10 Computer Management - Users

3. With the selection of **Users> simotion**, you can display the properties via **Properties**.
4. Deactivate the **User cannot change password** checkbox in the **simotion Properties** dialog box.

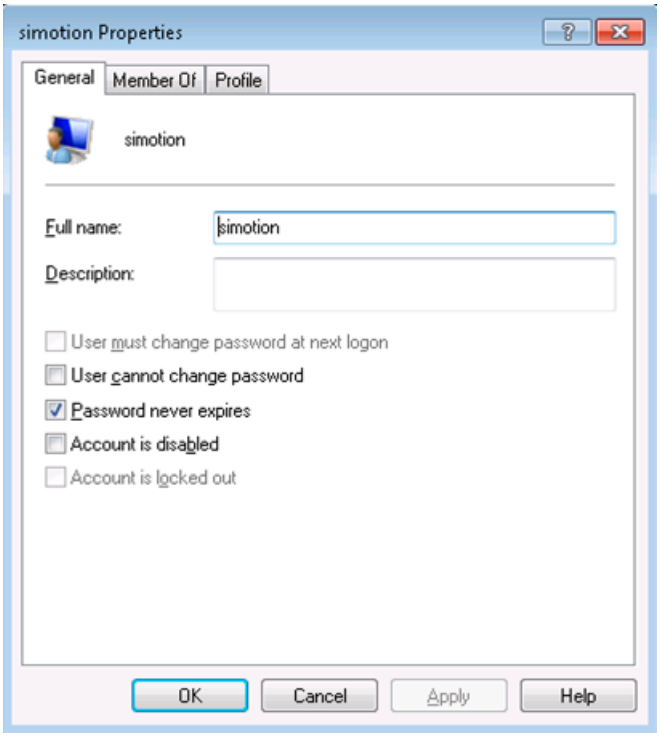


Figure 2-11 simotion Properties - General dialog box

5. Confirm with **OK.**

Changing the password for AutoLogin

To change the password for the AutoLogin, proceed as follows:

1. Open the search via **Windows-Start** and enter: **netplwiz**

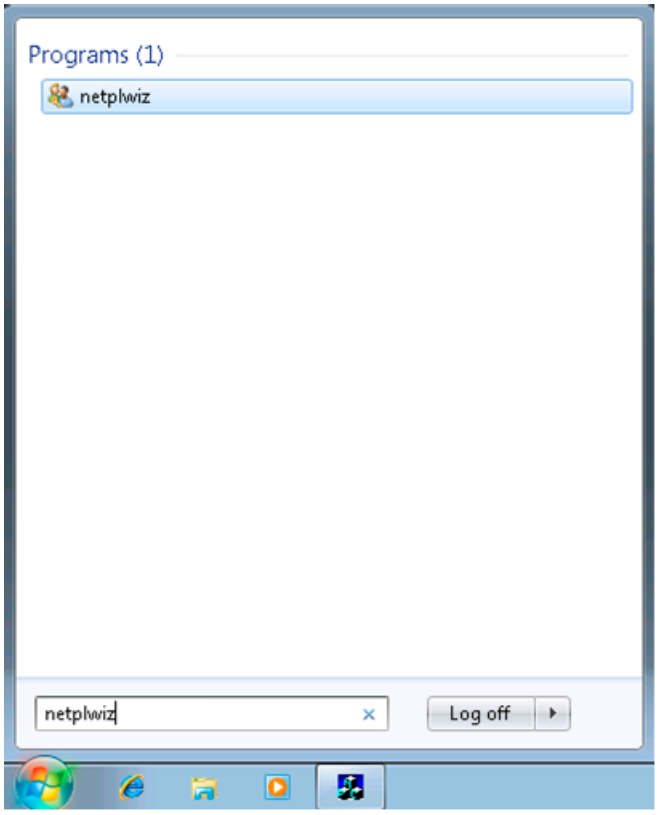


Figure 2-12 Programs netplwiz

2. The following **User Accounts** dialog box opens.

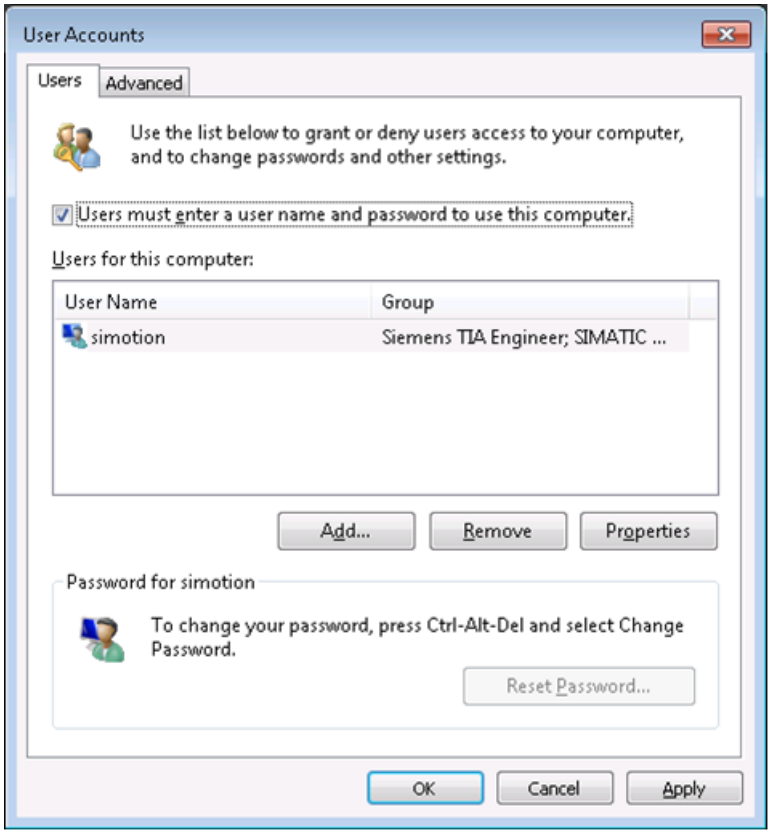


Figure 2-13 User Accounts

3. In the **Users** tab, activate the **Users must enter a user name and password to use this computer** checkbox.
   The **Apply** button is now active. Deactivate the checkbox and accept the changes now with the **OK** or **Apply** button.
   This is necessary so that the **Automatically Log On** dialog box is subsequently displayed.

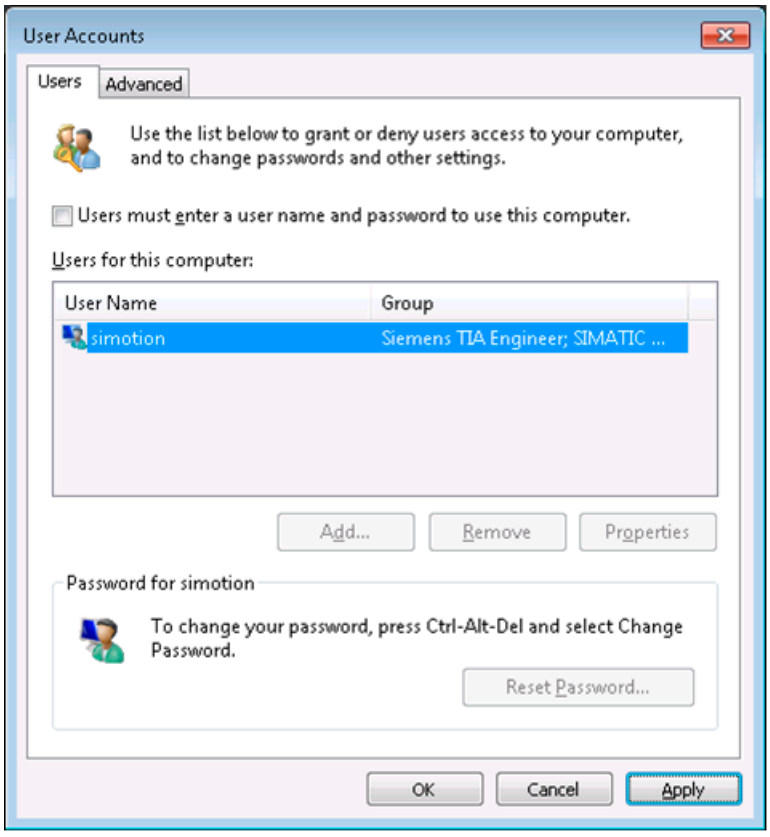


Figure 2-14 User accounts

4. Enter your changed Windows user password in the **Automatically Log On** dialog box and confirm it by entering it a second time.

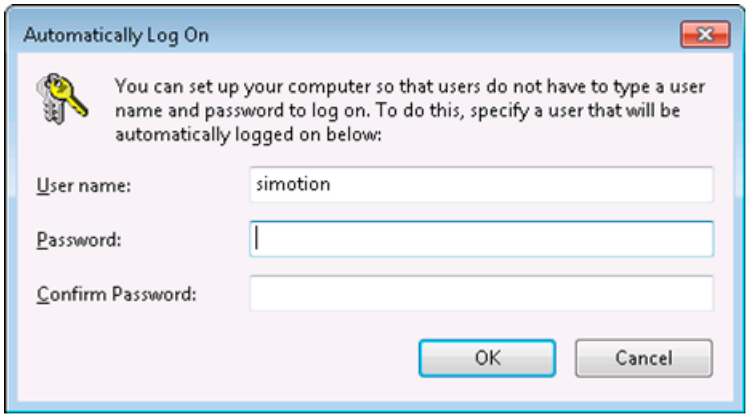


Figure 2-15 Automatically Log On dialog box

5. Confirm the password with **OK**.

2.4.4 Deactivating the remote desktop connection

Deactivating the remote desktop connection

NOTICE
Deactivating the remote desktop connection
To ensure that the remote desktop connection is not used, it must be explicitly deactivated.

Procedure for deactivating the remote desktop connection

1. Using the Control Panel, select **System** > **Remote settings**.

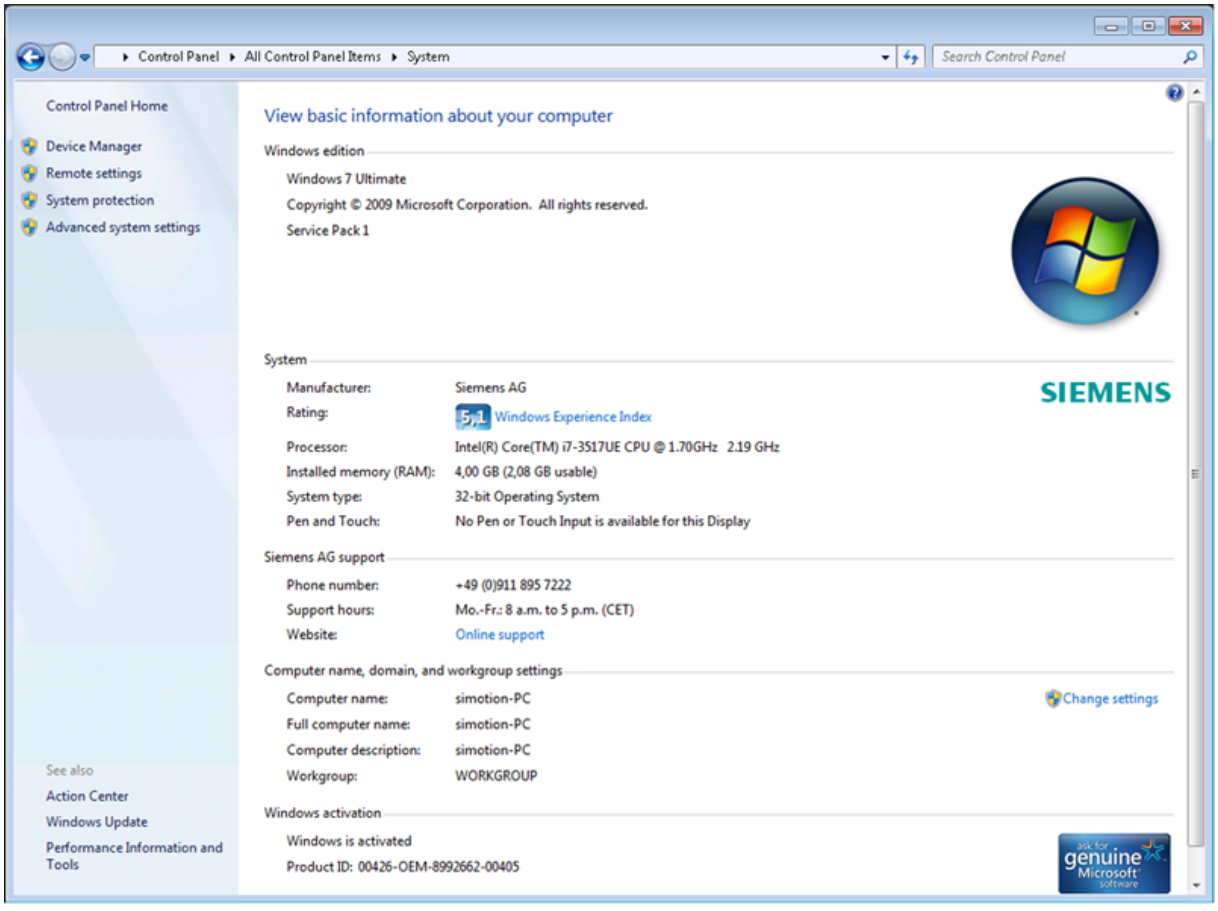


Figure 2-16 Remote settings

2. Select the **Remote** tab in the **System Properties** dialog box.

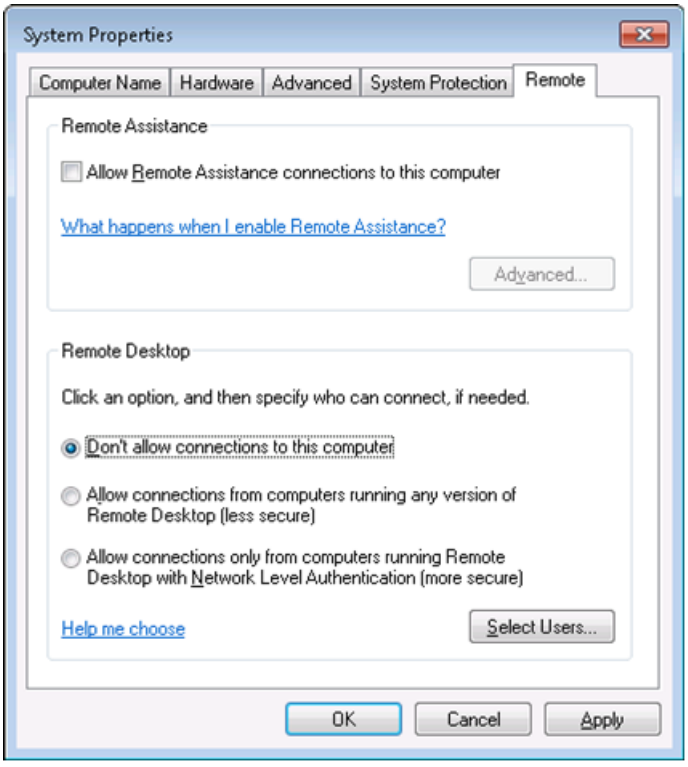


Figure 2-17 System Properties dialog box

3. Select the **Don't allow connections to this computer** option at **Remote Desktop**.
4. Confirm with **OK**.

Any remote desktop access is deactivated with this operation.

Description 3

3.1 System overview

Overview

SIMOTION P is a PC-based, open Motion Control System from SIMOTION.
Control, motion control, and HMI functions are executed together with standard PC applications on the SIMOTION P hardware platform. SIMOTION P combines the compatibility of the Windows operating system with real-time capability of SIMOTION P Runtime.

The fully independent SIMOTION P Runtime runs in parallel to Windows on SIMOTION P. This real-time expansion makes it possible to implement demanding motion control applications with high performance requirements on platforms of the SIMOTION P range. The hardware consists of a computing unit with innovative Intel technology, which is ready for operation at the time of delivery.

The drives and I/O devices are connected either via PROFINET onboard or IsoPROFIBUS board (optional).

The SIMATIC Flat Panel IFP1500, IFP1900 and IFP2200 can be used for the operation of the SIMOTION P320-4 hardware platform in a distributed configuration.

SIMOTION P320-4 versions

The SIMOTION P320-4 can control various I/O systems and HMI components via PROFINET onboard or the optional IsoPROFIBUS board.
If required, a USB DVD drive can be connected, for example.

The following versions of the SIMOTION P320-4 are available:

- SIMOTION P320-4 E
  with the Windows Embedded Standard 7 32-bit operating system and real-time expansion for SIMOTION.
- SIMOTION P320-4 S
  with the Windows 7 Ultimate 32-bit operating system and real-time expansion for SIMOTION.

Application

The SIMOTION P320-4 applications are directed at machines that require a high level of integration of PLC, motion control and technology functions on account of the increasing use of servo drives:

- Packaging machines
- Plastic and rubber processing machines
- Presses, wire-drawing machines
- Textile machines

- Printing machines
- Machines for processing wood, glass, ceramics, and stone
- Production lines in the renewable energy sector, e.g. solar technology, wind power installations

3.2 SIMOTION P320-4 product description

3.2.1 SIMOTION P320-4 overview

The SIMOTION P320-4 provides high-level industrial performance. It features:

- Compact design
- Maintenance-free operation
- High degree of ruggedness
- Long-term availability

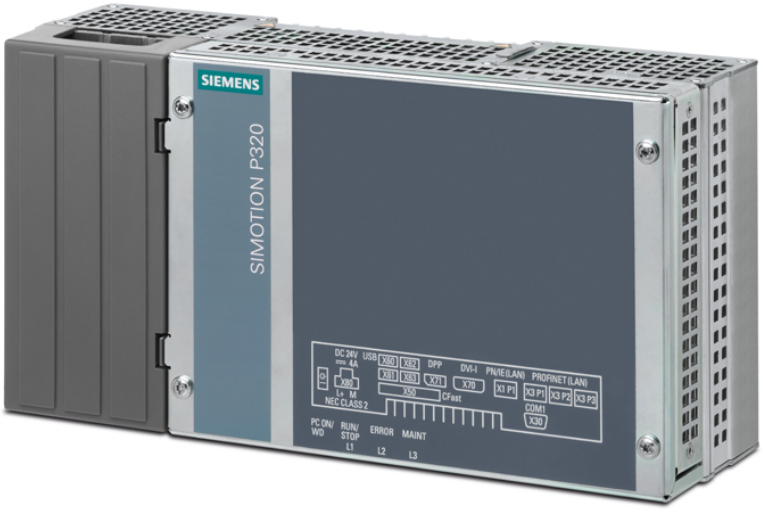


Figure 3-1 SIMOTION P320-4 view



Figure 3-2 SIMOTION P320-4 (open perspective) with plugged-in optional IsoPROFIBUS board

3.2.2 Features

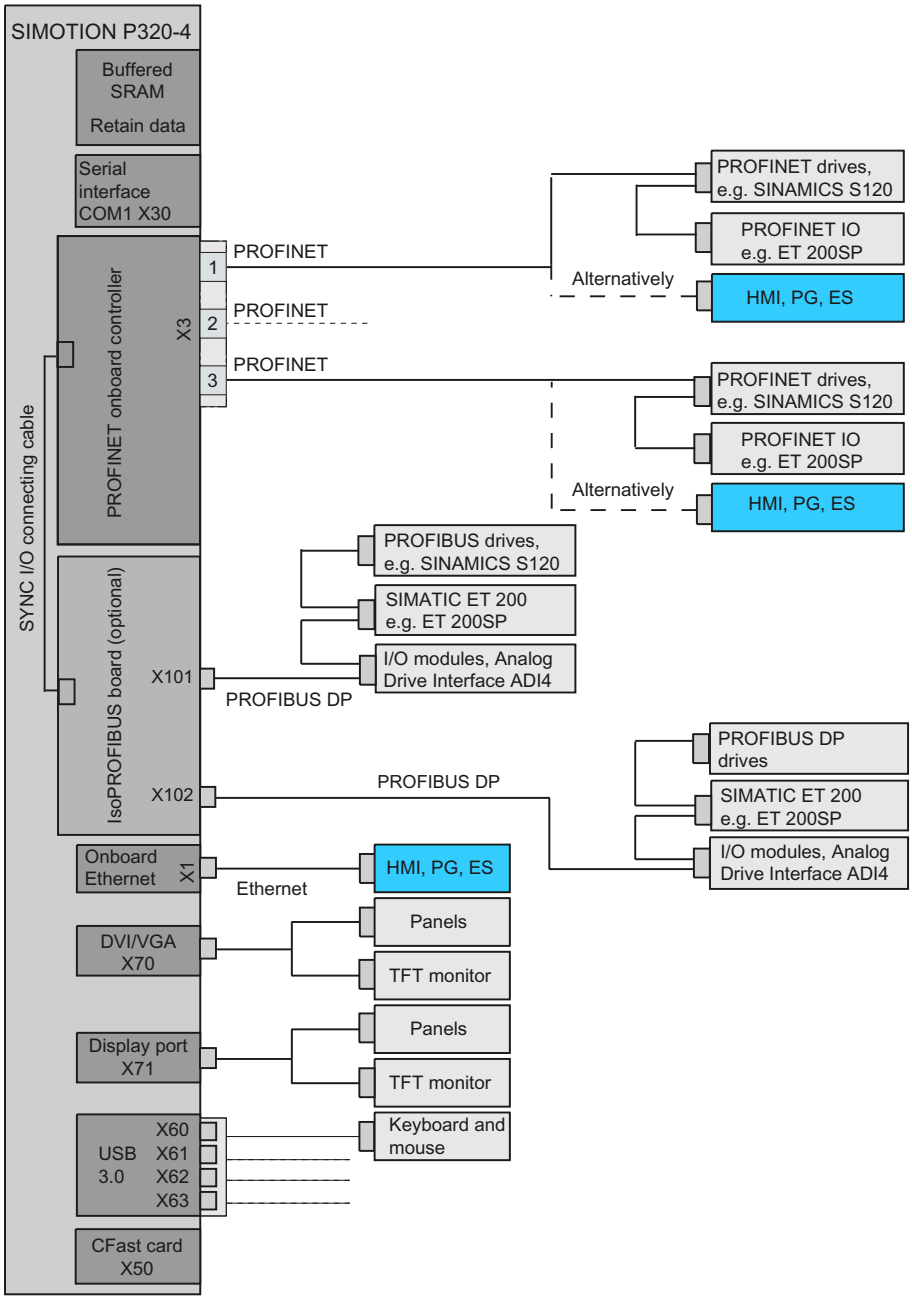
Basic data	
Installation	• Standard rail mounting • Vertical mounting
Processor	
P320-4 E **P320-4 S**	Intel Core i3-3217UE, 2 x 1.6 GHz, 3 MB cache Intel Core i7-3517UE, 2 x 1.7 GHz, 4 MB cache
Main memory	4 GB DDR3 RAM
Optional IsoPROFIBUS board (PROFIBUS DP)	2 x SUB-D socket with configurable baud rates (9.6 Kbit/s - 12 Mbps)
Graphics	• Integrated Intel HD2000 or HD4000 • DVI resolution of 640 × 480 pixels up to 1920 × 1200 pixels • Display port resolution max. 1920 × 1200 pixels • Graphics memory is occupied in the main memory (dynamic UMA)
Power supply	24 VDC (-20%/+20%) max. 4 A
Operating conditions	Operation without fan
Drives and storage media	
CFast card or SSD (Solid State Disk)	Depending on the hardware version of the SIMOTION P320-4

Basic data	
P320-4 E	**2 x CFast card** Internal interface: CFast External interface: CFast
P320-4 S	**SSD (Solid State Disk)** Internal interface: SSD **CFast card** External interface: CFast
USB stick	External, can be connected via USB interface
Interfaces	
Serial	COM (RS 232)
Graphics	DVI-I: Suitable for use as DVI or VGA DPP++: Display port, DVI via DPP-to-DVI adapter
USB	4 × USB 3.0, simultaneous operation of high current, backward compatible with USB 2.0/1.1
Ethernet	1 × RJ45 (10/100/1000 Mbps)
PROFINET I/O	3 × RJ45 (100 Mbps)
Keyboard, mouse	Can be connected via USB interface

Software	
Operating systems	
P320-4 E	Windows Embedded Standard 7 32-bit
P320-4 S	Windows 7 Ultimate 32-bit

3.2.3 SIMOTION P320-4 (hardware) structure

The following figure shows the integration of the SIMOTION P320-4 with integrated PROFINET onboard and optional IsoPROFIBUS board in a target system.

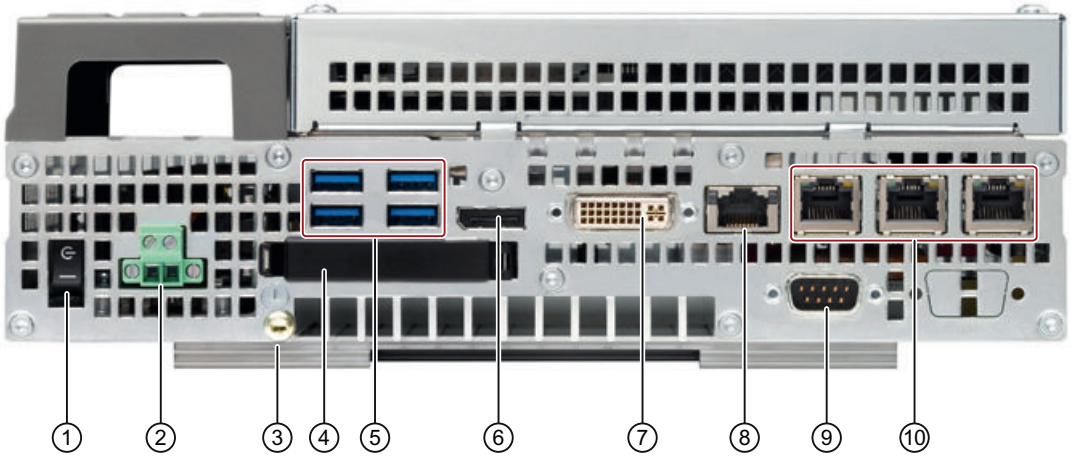


HMI Human Machine Interface
PG Programming device
ES Engineering system

Figure 3-3 SIMOTION P320-4 system overview

3.2.4 Interfaces and operating elements

SIMOTION P320-4



①	On/off switch	Position **OFF** is the delivery state. The on/off switch does not isolate the device from the power supply.
②	24 V DC	Power supply connection
③	Protective conductor	Protective conductor terminal
④	Memory card slot	Cover for the CFast card
⑤	4 × USB 3.0	USB 3.0 high current, backward compatible with USB 2.0/1.1
⑥	Display port	Display port connection for digital monitor
⑦	DVI-I	DVI connector for CRT or LCD monitor with DVI interface
⑧	Ethernet	RJ45 Ethernet connection for 10/100/1000 Mbps
⑨	COM1	Serial interface
⑩	3 × PROFINET	PROFINET ports with three RJ45 sockets

3.2.5 SIMOTION P Runtime (software) structure

SIMOTION P Runtime contains the SIMOTION P Kernel which performs the motion control and interface control.

A SIMOTION project is planned, configured, assigned parameters, commissioned and programmed via the SIMOTION SCOUT engineering system (ES).

The user data can be stored on the data media of the SIMOTION P320-4 .

Siemens WinCC flexible software can be used to visualize operational sequences or to operate the machine. Third-party systems can be linked via the OPC interface.

SIMOTION P Runtime

With the SIMOTION P320-4, the PLC and motion control functionality (starting from position controller upwards) is located centrally in a strictly deterministic task outside the Windows operating system.

Its main field of application is centralized motion control and control tasks requiring close coordination between multiple axes and/or input/output modules.

Functionality ranges from simple positioning to high-performance synchronous operation.

SIMOTION SCOUT

The SIMOTION SCOUT engineering system can be installed on the SIMOTION P320-4 S or connected via the interfaces integrated in SIMOTION P320-4 .

SIMOTION SCOUT TIA

As of version V4.5, the SIMOTION SCOUT TIA engineering system no longer supports the Windows 7 32-bit operating system and therefore cannot be installed.

HMI software

HMI/Runtime software can be operated on the same PC, e.g. the Siemens WinCC flexible software. Other software packages can be linked by means of the OPC interface.

The **HMI software** is used as the general term in the following.

Internal communication

A locally installed HMI can use the local communication to access the following:

- Variables in SIMOTION RT
- Drives on PROFINET IO or PROFIBUS DP
- Other SIMOTION devices on PROFINET IO or PROFIBUS DP

Scope of delivery

The system software supplied with the SIMOTION P320-4 is either already installed on the SIMOTION P320-4 storage medium or is ready to be installed:

- SIMOTION P Kernel
- SIMOTION IT
- SIMOTION IT VM Virtuell Machine (subject to license)

3.2.6 Components

The most important components of the SIMOTION P320-4 and their functions are listed below.

Distributed I/O systems (PROFINET)

Table 3-1 Components for distributed I/O

Component	Function
SIMATIC ET 200M	Modular I/O system for cabinet installation and high channel densities.
SIMATIC ET 200S	Finely modular I/O system for cabinet installation including motor starters, safety technology, and individual grouping of the load groups.
SIMATIC ET 200SP	Finely scalable I/O system for cabinet installation; SIMATIC ET 200SP features a single-cable and multi-cable connection with push-in terminals, compact dimensions, high performance, and low part variety.
SIMATIC ET 200MP	Modular I/O system for cabinet installation and high channel densities in the SIMATIC S7-1500 packaging system. SIMATIC ET 200MP permits the shortest bus cycle times and fastest response time even with large volumes of data.
SIMATIC ET 200eco	I/O system with IP67 degree of protection for machine-related, cabinet-free applications, featuring a flexible and fast connection system in ECOFAST or M12.
SIMATIC ET 200pro	Modular I/O system with IP65/67 degree of protection for machine-related, cabinet-free applications, including motor starters.

Note

Note that not all modules of the above-mentioned I/Os or I/O systems have been released for SIMOTION.

There may also be system-dependent functional differences with regard to the use on SIMOTION and on SIMATIC.
For example, special process-control functions (e.g. HART modules, etc.) are not supported by SIMOTION for the ET 200M distributed I/O system.

For a detailed and routinely updated list of I/O modules enabled with SIMOTION as well as application information, visit us online at:

SIEMENS Industry Online Support - Product support - Supplementary system components (https://support.industry.siemens.com/cs/de/en)

Further modules are integrated via the GSD file of the device's manufacturer.

Note

Note that in individual cases, additional supplementary conditions must be fulfilled.

Drive systems (via PROFINET IO)

Table 3-2 List of typically connected drive systems

Component	Function
SINAMICS S120	Servo drives, innovative single-axis and multi-axis solution

Optional components

Table 3-3 Optional components

Centralized I/O	Function
IsoPROFIBUS board	PROFIBUS connection
UPS	Uninterruptible Power Supply The drivers for the UPS are not pre-installed on the PC. Install the current drivers that are supplied with the UPS.

Note

An IsoPROFIBUS board may be inserted in addition to the PROFINET onboard.

3.3 HMI and SIMOTION SCOUT

3.3.1 HMI and SIMOTION SCOUT Overview

The operational sequences on the SIMOTION P320-4 are either monitored via the HMI system (Human Machine Interface) or the SIMOTION SCOUT engineering system.

The HMI or ES software can be connected using the following variants:

- Local (Page 58)
- via PROFINET (Page 70)
- via Ethernet (Page 71)
- via IsoPROFIBUS (optional) (Page 73)

Local communication of the HMI/ES

Only one local connection to the local SIMOTION Runtime is possible. If HMI or ES is also installed locally, **PC internal** can access other controllers/devices via PROFINET / PROFIBUS.

See Section Local HMI or ES on SIMOTION P320-4 (Page 58).

Communication of the HMI / ES via PROFINET / Ethernet / PROFIBUS

By using one of these communication variants, you can control and monitor several SIMOTION devices.

3.3.2 Local HMI or ES on SIMOTION P320-4

The model described below is used for the communication of the SIMOTION P320-4 with a local HMI or ES. The SIMOTION SCOUT engineering system or the HMI system can be installed directly on the **SIMOTION P320-4 S**.

For this model, you must set the communication (access point) to **TCP/IP** .

The SIMOTION P320-4 is already configured for this communication version at the time of delivery.

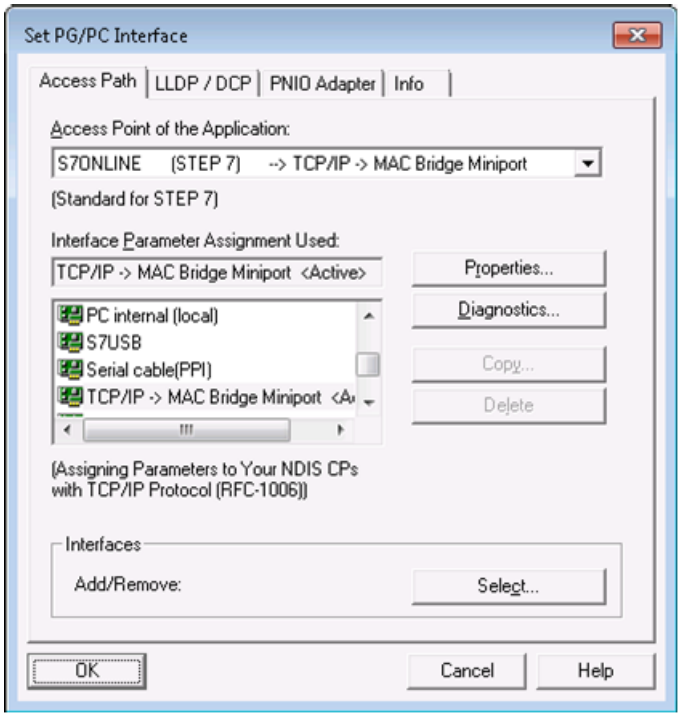


Figure 3-4 Set PG/PC Interface - TCP/IP -> MAC Bridge Miniport dialog box

Note

Local communication via Ethernet (TCP/IP)

For the communication via Ethernet (TCP/IP) to function locally, a link must be available to the Ethernet interface or a LAN cable must be connected **or** the MAC bridge set up.

Note

Setting up the MAC bridge miniport

See also Section Setting up a network bridge - MAC bridge miniport (Page 59)

Note

Only HMI-Runtime can be installed on the **SIMOTION P320-4 E** version.

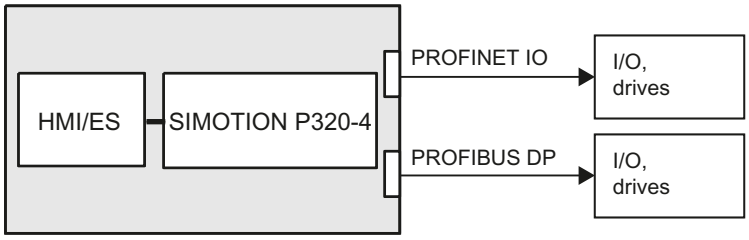


Figure 3-5 Model: Local HMI or ES

Alternatively to TCP/IP , SIMOTION SCOUT can also communicate locally via PC internal (local) .

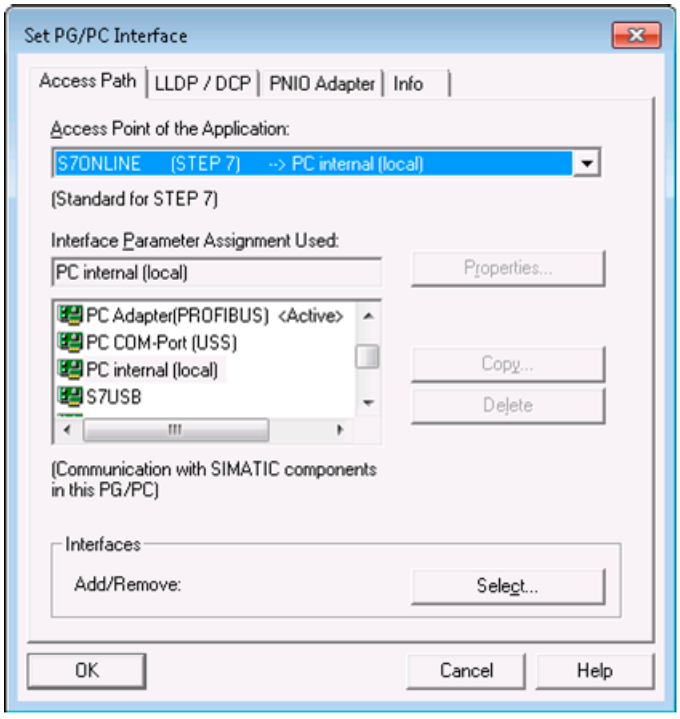


Figure 3-6 Set PG/PC Interface - PC internal (local) dialog box

3.3.2.1 Setting up a network bridge - MAC bridge miniport

Note

If you are working with SIMOTION P320-4 version V4.5, the Network Bridge is already preset.

The network bridge is not preset for version V4.4 and must be set up as described in the following.

The following is a step-by-step description of how the network bridge **MAC Bridge Miniport** is set up.

Network connections initial situation

Open the **Network and Internet** via the Control Panel.

- Select **Control Panel** > **All Control Panel Items** > **Network and Sharing Center** > **Change adapter settings**.
- Open the **Network and Internet** > **Network Connections** dialog box.
  The network connections of your PC are shown here.

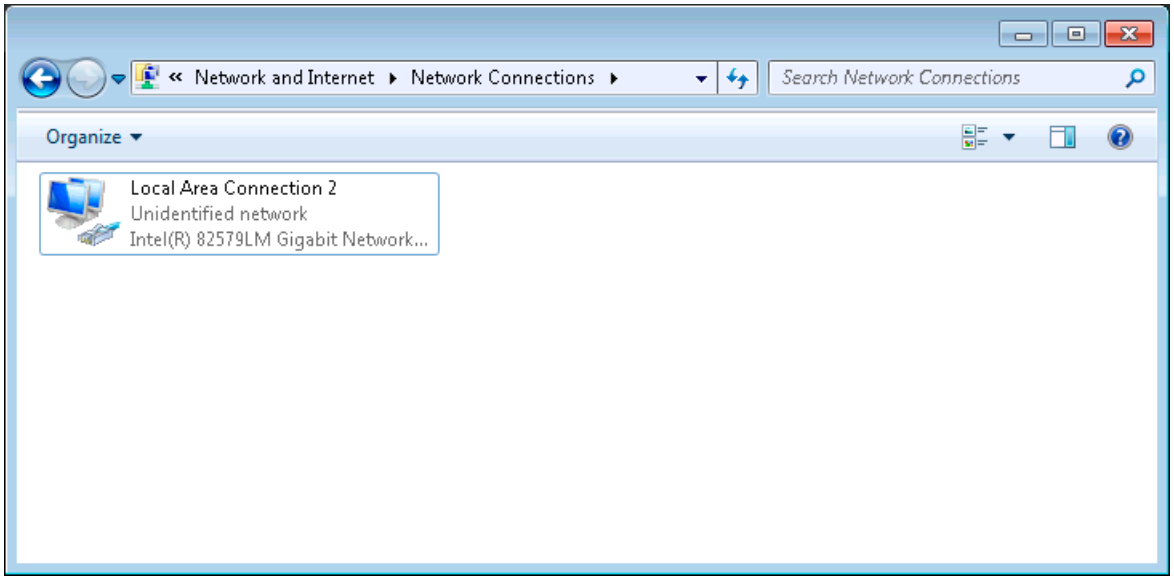


Figure 3-7 Initial situation - Network connections

Device Manager

Open the Device Manager via the Control Panel:

Control Panel > All Control Panel Items > System > Device Manager.

1. Select the **Network adapters** in the dialog box below the "SIMOTION PC".
   The available network connections are shown here.

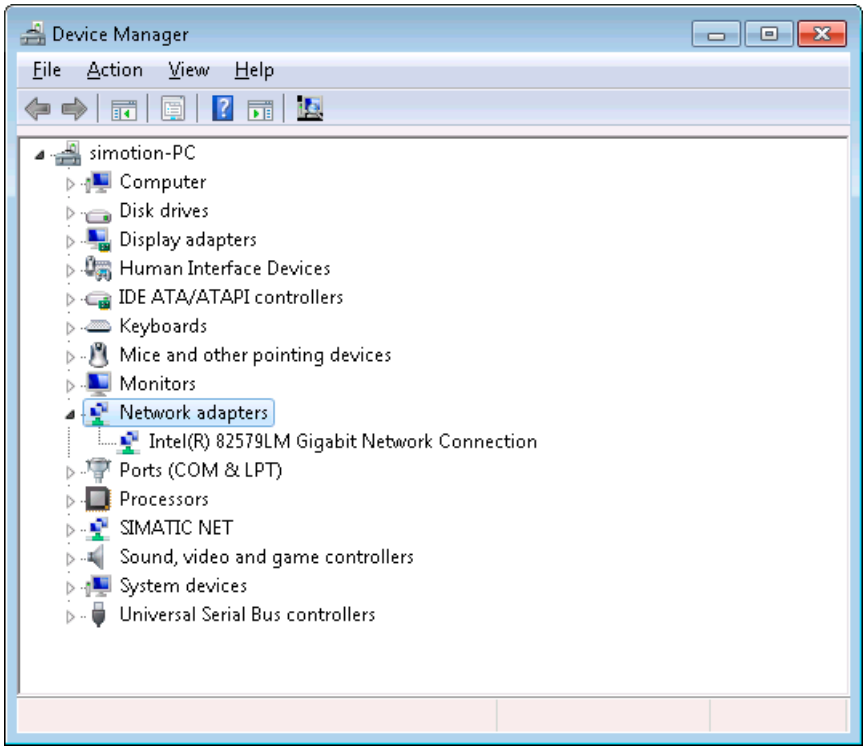


Figure 3-8 Opening the Device Manager

2. Install the **Microsoft Loopback Adapter** via the Device Manager.
3. To do this, select the menu **Action > Add legacy hardware**.
   The **Add Hardware Wizard** then opens.

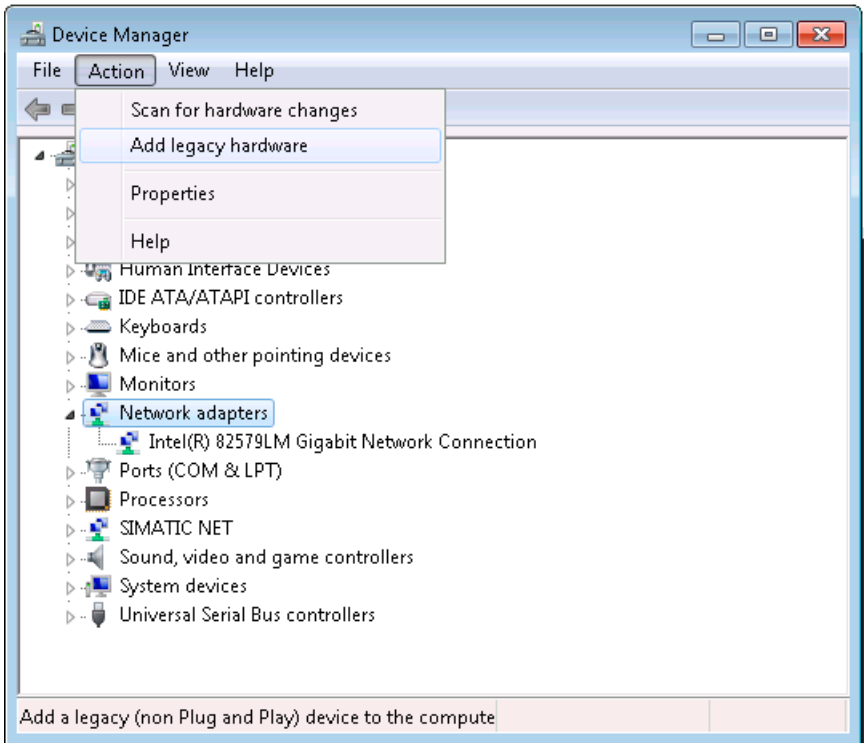


Figure 3-9 Device Manager - Action menu

Add Hardware Wizard

Use the **Add Hardware Wizard** to install the network bridge.

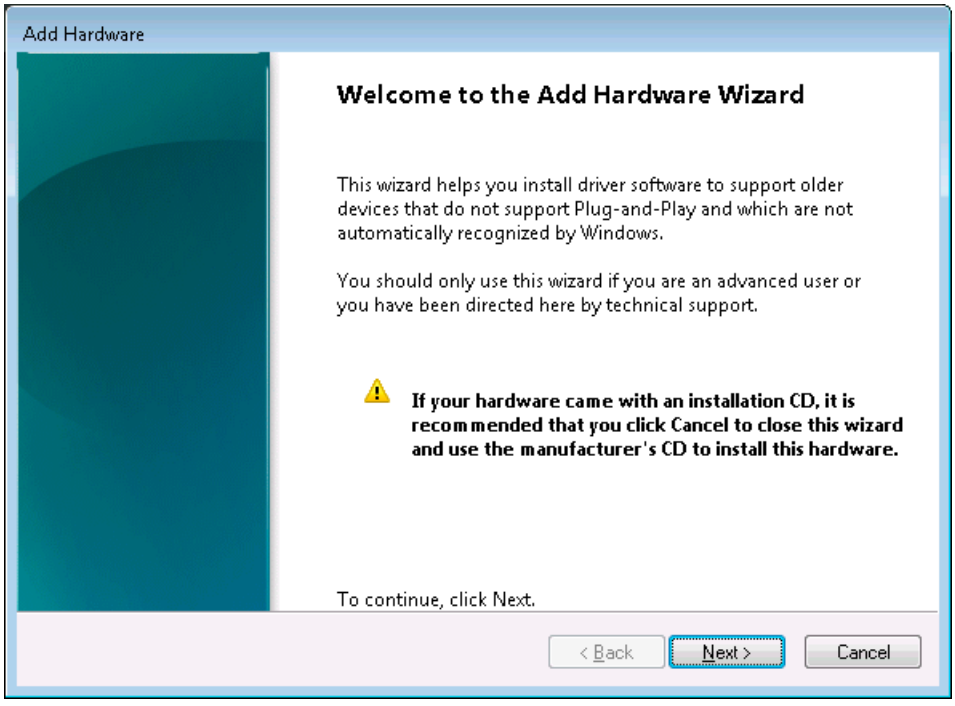


Figure 3-10 Add Hardware - Starting the wizard

1. Click **Next** to start the software wizard.
2. Select the option: **Install the hardware that I manually select from a list (Advanced)** and continue in the wizard with **Next**.

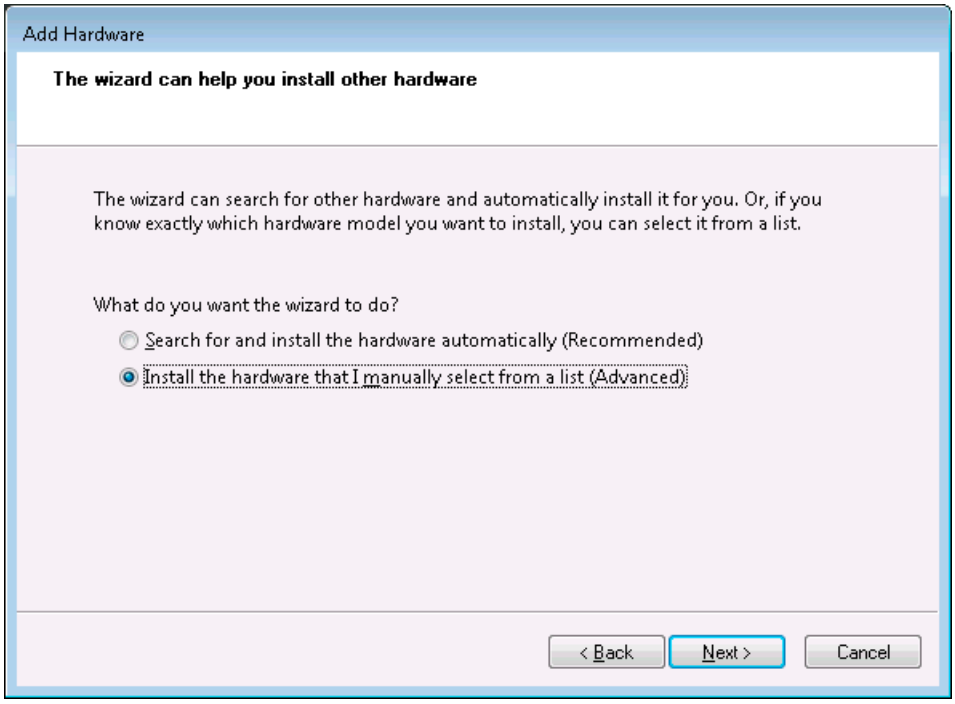


Figure 3-11 Add Hardware - Manual selection from a list

3. Select **Network adapters** in the dialog box now open and continue in the wizard with **Next**.

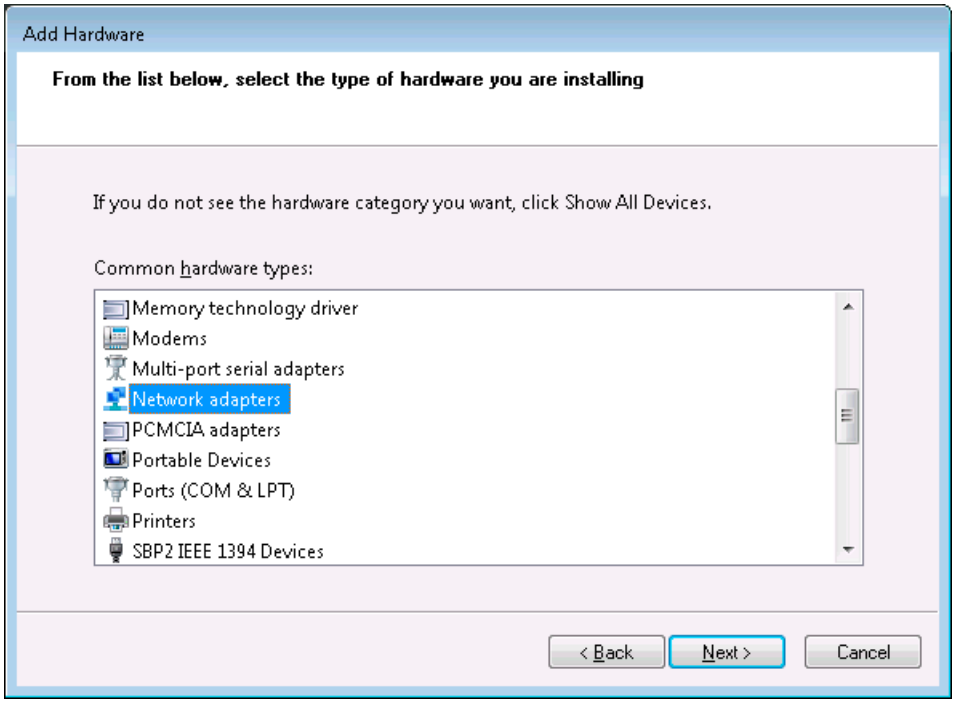


Figure 3-12 Select Add Hardware - Network adapters

4. In the following dialog box, select the **Microsoft Loopback Adapter**.
5. To do this, select Microsoft at **Manufacturer** and the Microsoft Loopback Adapter at **Network Adapter**.
6. Continue in the wizard with **Next**.

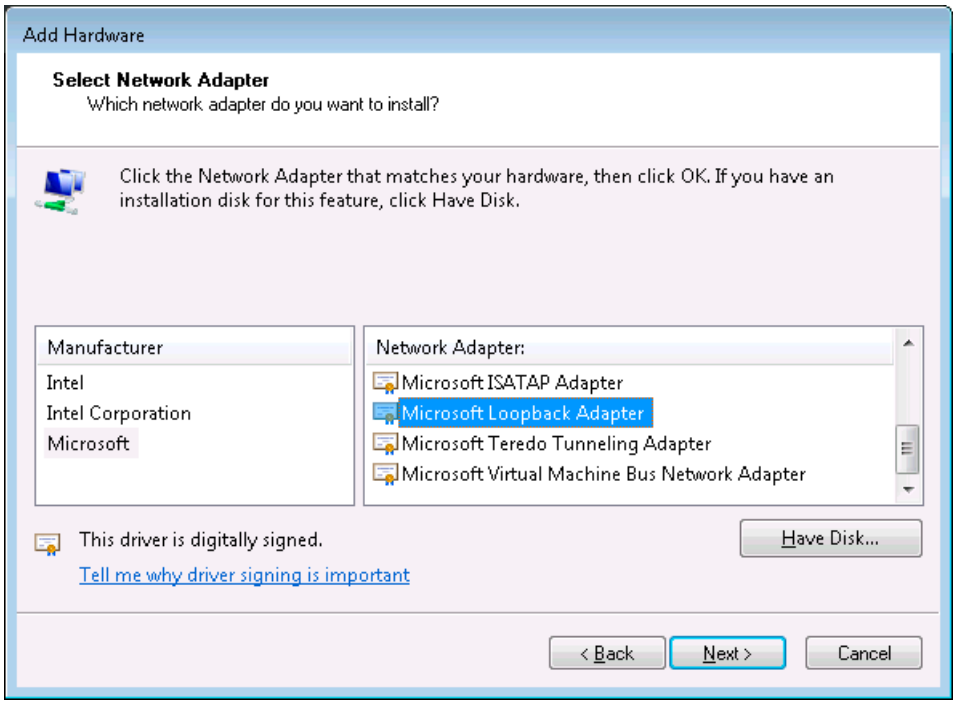


Figure 3-13 Add Hardware - Selecting the desired Network Adapter

7. The selected Network Adapter is shown in the following dialog box.
   Click **Next** to confirm and install.

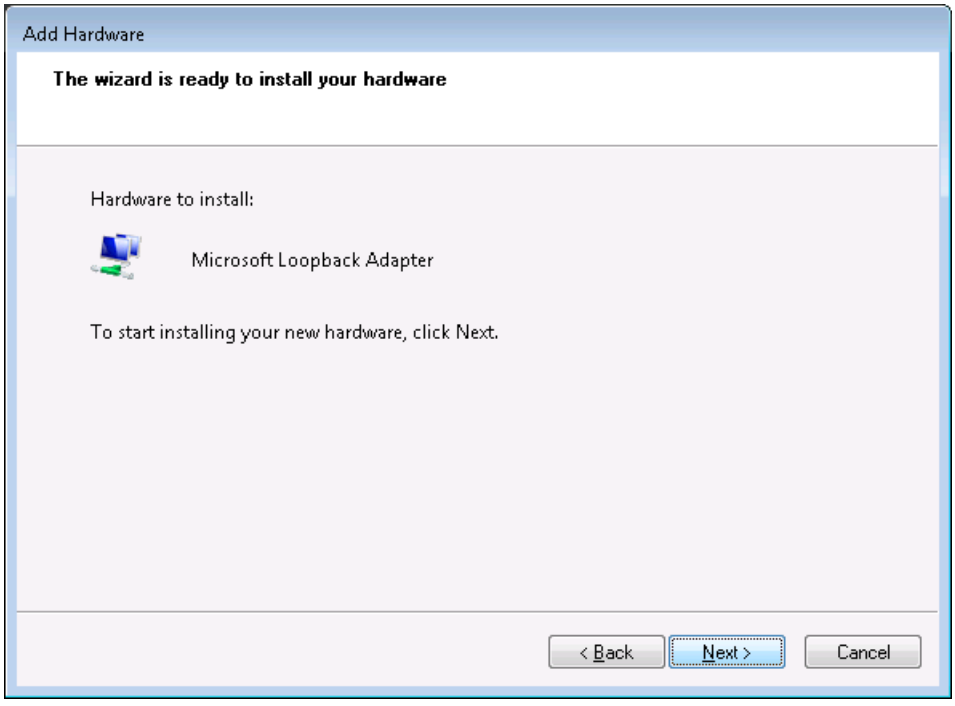


Figure 3-14 Add Hardware - Selected Network Adapter can be installed

8. After finishing the installation, the following dialog box is displayed.
   Exit the wizard with **Finish**.

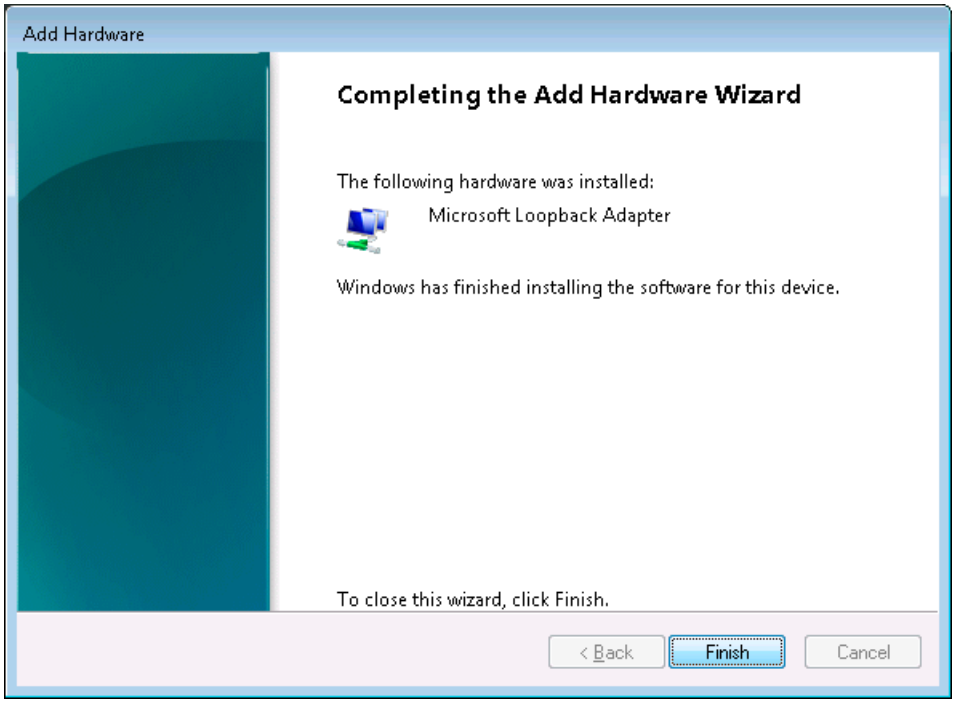


Figure 3-15 Add Hardware - Installation of the Microsoft Loopback Adapter is finished

Checking the installation of the network adapter

You can check the successful installation of the **Microsoft Loopback Adapters** in the

- Device Manager
- Internet connections

Device Manager

The Microsoft Loopback Adapter is displayed at **Network adapters** in the Device Manager.

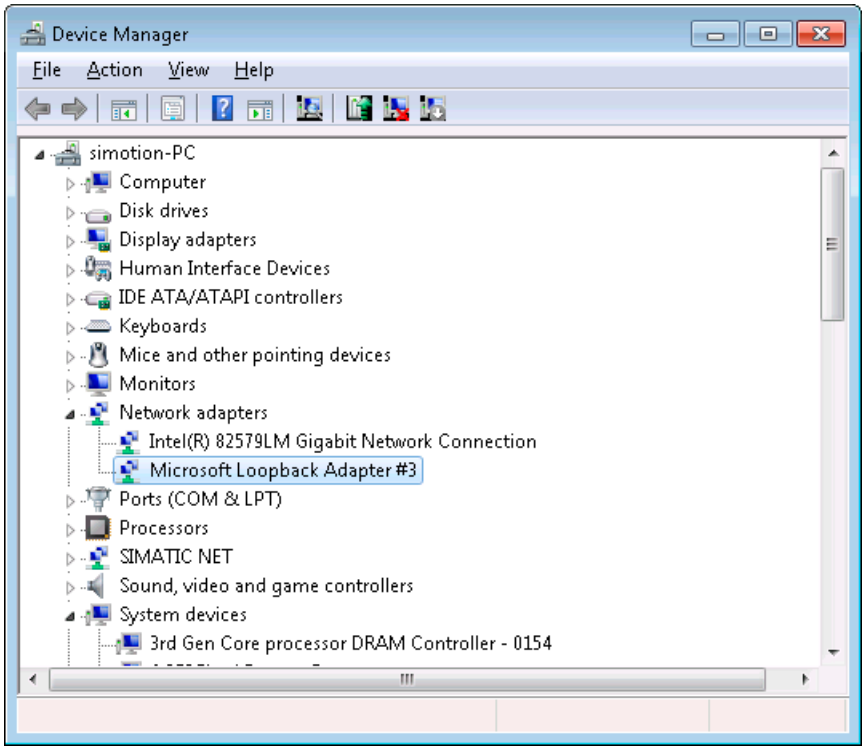


Figure 3-16 Device Manager - Microsoft loopback adapter

Network connections

The newly installed Microsoft Loopback Adapter is also displayed at **Network Connections**.

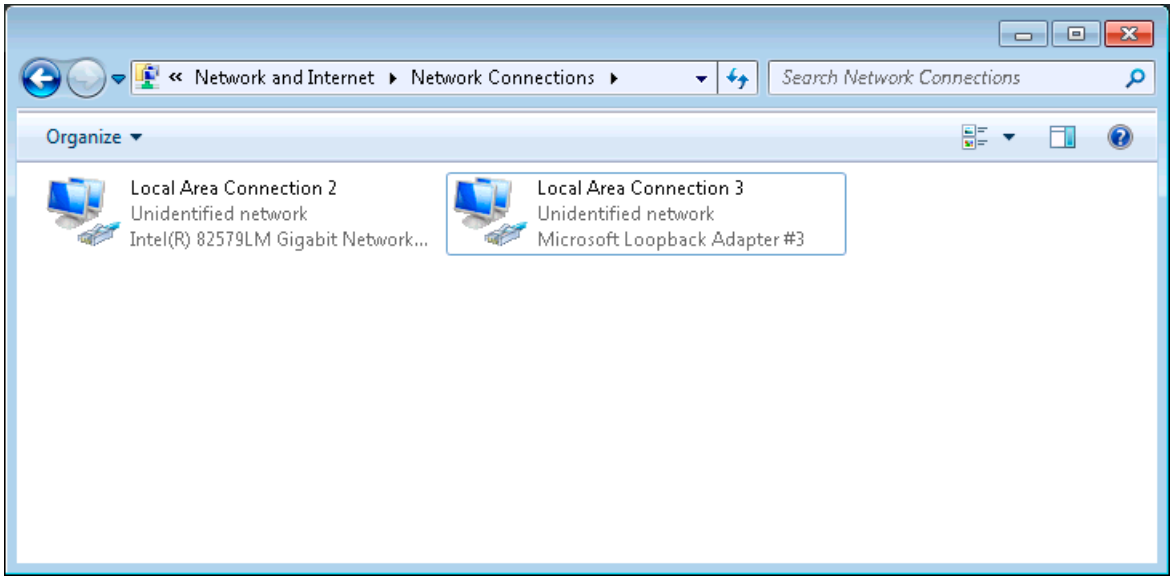


Figure 3-17 Network connections - Display of the newly installed Microsoft loopback adapter

Creating the network bridge

To activate the network bridge, proceed as follows:

1. Select both adapters at Network Connections
2. Select Bridge Connections via the context menu.

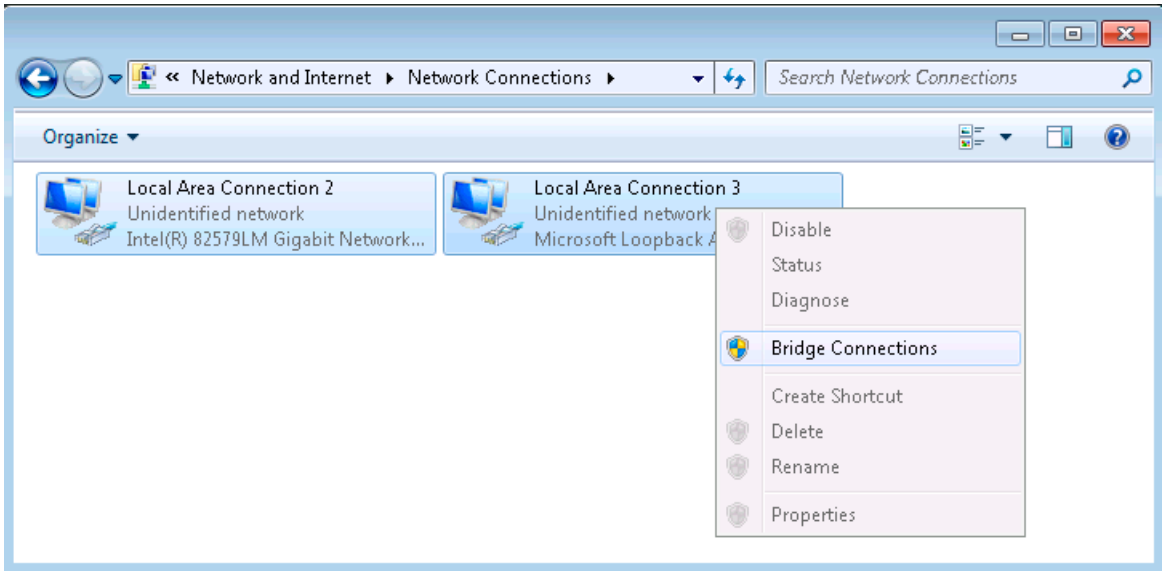


Figure 3-18 Network Connections - Setting the Bridge Connection

3. The Network Bridge MAC Bridge Miniport is displayed.

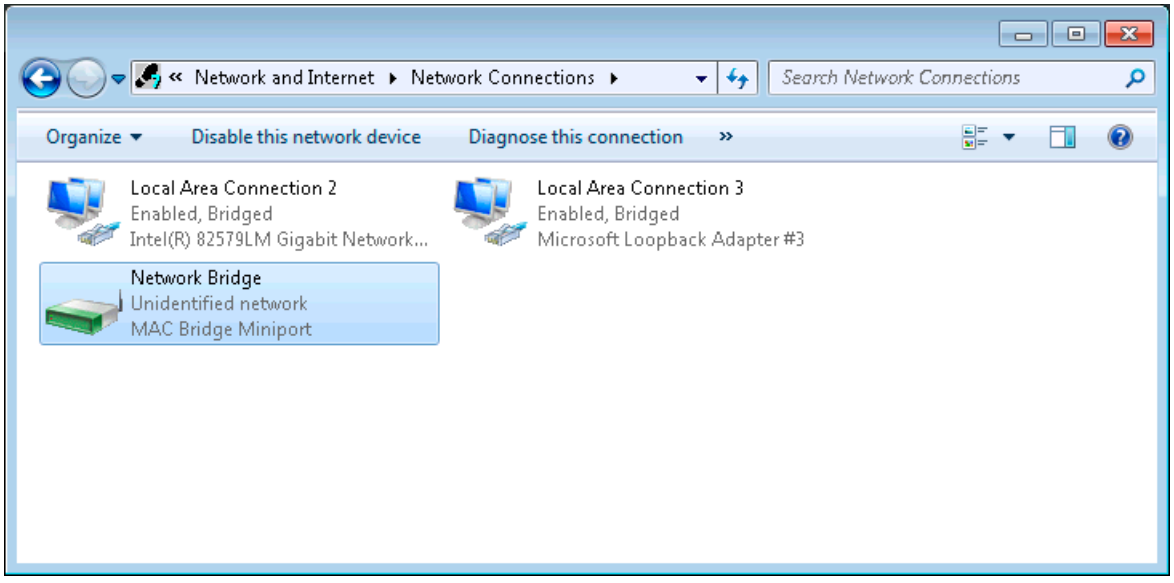


Figure 3-19 Network Connections - Display of the Network Bridge MAC Bridge Miniport

4. To initialize the network bridge, execute the **sp_bridge.cmd** Windows command script.
   The additional script can be found at C:\SiMotion\tools\sp_bridge.cmd
   After executing the batch file, the network bridge has been set up.

Setting "Set PG/PC interface"

Now open the PG/PC interface to complete the setting for the **Network Bridge** .

1. Open the **Set PG/PC Interface** dialog box via the **Control Panel** entry point.
2. Deactivate the **MAC Bridge Miniport DCP** checkbox in the **LLDP / DCP** tab.
   If you do not deactivate the MAC Bridge Miniport DCP, the SIMOTION P320-4 may not be found via Accessible nodes.

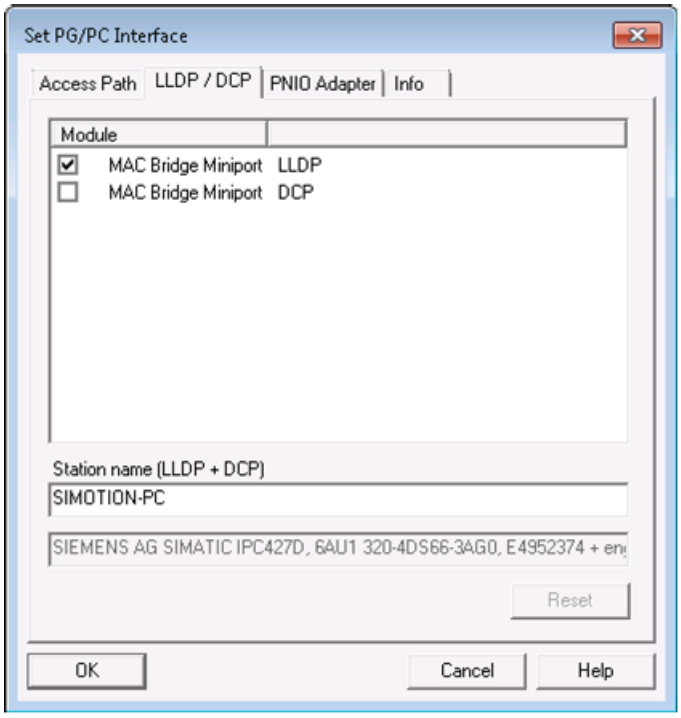


Figure 3-20 Set PG/PC interface

The settings for the network bridge have now been completed.

3.3.3 HMI or ES via PROFINET

Networking via PROFINET

PROFINET is the innovative and open Industrial Ethernet standard (EN 61158) for industrial automation. With PROFINET, devices can be linked up from the field level through to the management level.

With PROFINET, an external HMI or ES can also be integrated into the network and data can be exchanged directly with the SIMOTION P320-4 device.

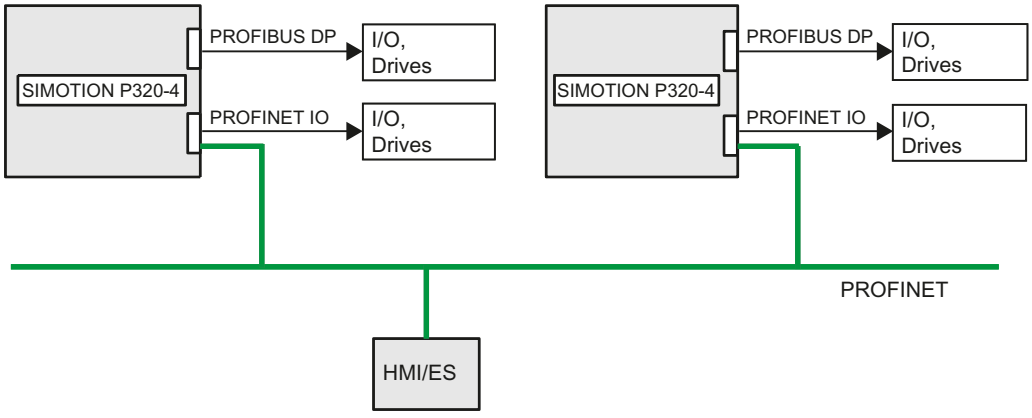


Figure 3-21 Model: Networking via PROFINET

References

You can find further information on the HMI in the documentation:

- SIMOTION Runtime Basic Functions, Section HMI (Human Machine Interface) coupling.
- SIMOTION SCOUT, Configuration Manual
- SIMOTION SCOUT TIA, Configuration Manual
- SIMOTION SCOUT TIA Device Proxy, Configuration Manual

3.3.4 HMI or ES via Ethernet

Networking via Ethernet

A complex interconnection with several HMIs or ESs is only possible using an Ethernet communication. This allows both an external HMI or ES to access several SIMOTION devices or one SIMOTION device to access another one, for example, to display the production data.

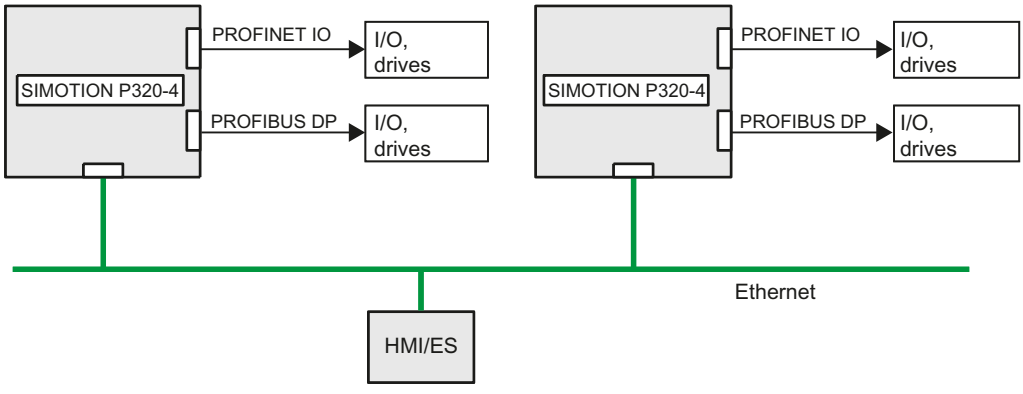


Figure 3-22 Model: Networking via Ethernet

The following services are possible on a SIMOTION device via Ethernet:

- HMI software
  WinCC flexible or the OPC server can use Ethernet to access one or more SIMOTION devices.
- SIMOTION SCOUT Engineering System
  SIMOTION SCOUT can also use Ethernet to access one or more SIMOTION devices.
- SIMOTION IT
  SIMOTION P320-4 offers communication with standard IT protocols (HTTP) over the integrated Ethernet interface.
  This makes it possible to access data or diagnostic information in the SIMOTION P320-4 from any location via intranet or the Internet.
- HTTP (browser, OPC XML)
  Setting in WebCFG.xml - default 80
- HTTPS (browser, OPC XML)
  Setting in WebCfg.xml - default 443
- FTP 21
- Telnet

Note

Information on the SIMOTION IT security concept

More detailed information on the SIMOTION IT security concept of HTTP/S, FTP and Telnet access on the Web server can be found in the following documentation:

- SIMOTION IT Diagnostics and Configuration, Diagnostics Manual, Section security concept

References

You can find further information in the documentation for SIMOTION IT:

- SIMOTION IT Diagnostics and Configuration
- SIMOTION IT Programming and Web Services
- SIMOTION IT Virtual Machine and Servlets

3.3.5 HMI or ES via IsoPROFIBUS (optional)

Networking via PROFIBUS DP

If you connect a central HMI via PROFIBUS DP, the X101 and X102 interfaces of the IsoPROFIBUS board are available.

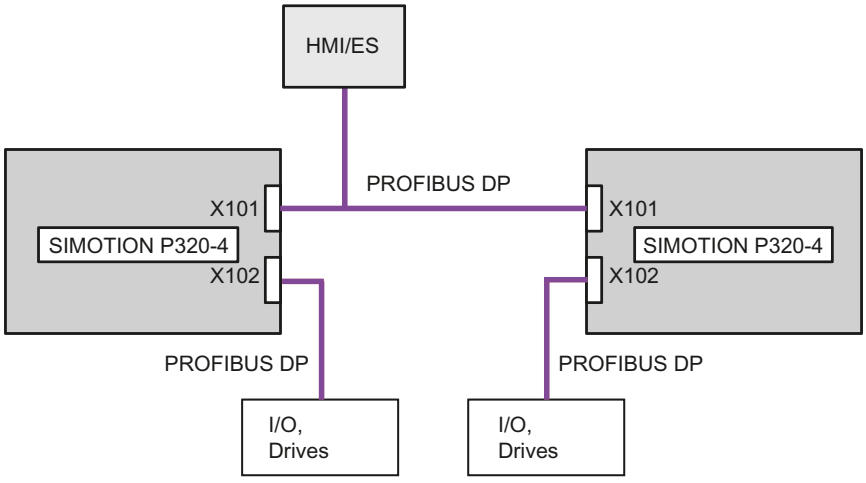


Figure 3-23 Model: Networking via PROFIBUS DP

References

You can find further information on the HMI in the documentation:

- SIMOTION Runtime Basic Functions, section HMI (Human Machine Interface) coupling.

Application planning

4

4.1 Unpacking and checking the delivery

Procedure

1. When accepting a delivery, please check the packaging for visible transport damage.
2. If any transport damage is present at the time of delivery, lodge a complaint at the shipping company in charge. Have the shipper confirm the transport damage immediately.
3. Unpack the device at its installation location.
4. Keep the **original packaging** in case you have to transport the device again.

   Note

   Damage to the device during transport and storage

   If a device is transported or stored without packaging, then shocks, vibrations, pressure and moisture may impact the unprotected device.
   A damaged packaging indicates that ambient conditions have already had a massive impact on the device.

   The device may be damaged.

   Do not dispose of the original packaging. Pack the device for transport and storage in the **original packaging**.

5. Check the contents of the packaging and any accessories you may have ordered for completeness and damage.

6. If the contents of the packaging are incomplete, damaged or do not match your order, inform the responsible delivery service **immediately**.

⚠ WARNING
Electric shock and fire hazard due to damaged device A damaged device can be under hazardous voltage and trigger a fire in the machine or plant. A damaged device has unpredictable properties and states. Death or serious injury could occur. Make sure that the damaged device is not inadvertently installed and put into operation. Label the damaged device and keep it locked away. Send off the device for immediate repair.

NOTICE
Damage from condensation If the device is subjected to low temperatures or extreme fluctuations in temperature during transportation, for example in cold weather, moisture could build up on or inside the HMI device. Moisture can result in short-circuits in electrical circuits and damage the device. In order to prevent damage to the device, proceed as follows: • Store the device in a dry place. • Bring the device to room temperature before starting it up. • Do not expose the device to direct heat radiation from a heating device. • If condensation develops, wait approximately 12 hours or until the device is completely dry before switching it on.

7. Please keep the enclosed documentation, it belongs to the device. You need the documentation when you commission the device for the first time.
8. Write down the identification data of the device.

4.2 Identification data of the device

Based on the identification data, the SIMOTION P320-4 device can be identified when service is required or in case of theft.

You also require the identification data in order to view further information on your SIMOTION P320-4 in the **Product Equipment Data** (PED) database.
All the important components of your SIMOTION P320-4 are stored in the PED. The entire history of the device is stored there, including the service reports.
To identify yourself in the PED database, enter the article number and the serial number of your device.

Link to the PED database

The Product Equipment Data database is available on the Internet via the following link (http://www.siemens.com/ped).

Identification data

Enter the identification data in the following table:

Identification data	Source	Value
Serial number	Rating plate	S VP ...
Article number of the device	Rating plate	6AU1320-...
Microsoft Windows Product Key Certificate of Authenticity (COA)	Rear of the device	Only devices with preinstalled Windows operating systems have COA labels
Ethernet address 1	BIOS setup, menu "Advanced", "Peripheral Configuration"	Input by the user.
PROFINET onboard MAC Address Layer 2		
PROFINET onboard MAC Address PROFINET		

SIMOTION P320-4 rating plate

Example of SIMOTION P320-4 S (standard)

You will find the following data on the rating plate of the SIMOTION P320-4:

- Device designation (here): SIMOTION P320-4 S
- Article number of the device (here): 6AU1320-4DS66-3AG0
- Serial number S VP<...>
  The computing unit is uniquely identifiable with the serial number at S VP <...>.
  <...> is an 8-digit character string.
- cULus Approval
- CE marking

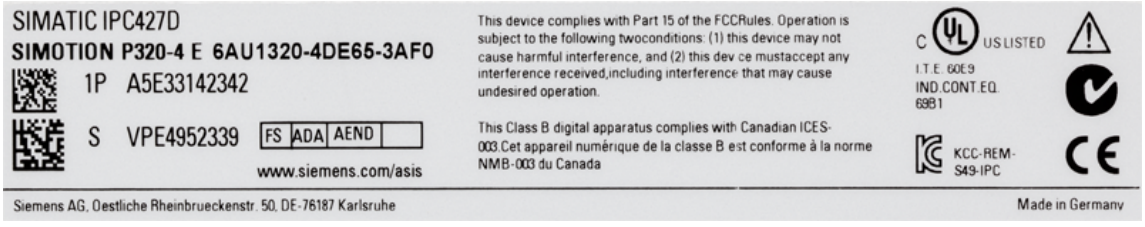


Figure 4-1 SIMOTION P320-4 rating plate

MAC addresses

Example of SIMOTION P320-4 S (standard)

In addition to the data that is found on the SIMOTION P320-4 rating plate, the MAC address plate also contains the **Onboard MAC addresses** for:

- ETHERNET (LAN) X1: VIPCTYSMAC1
- PROFINET (LAN) X3: VIPCTYSPROFINET

The data cited here is not real data.

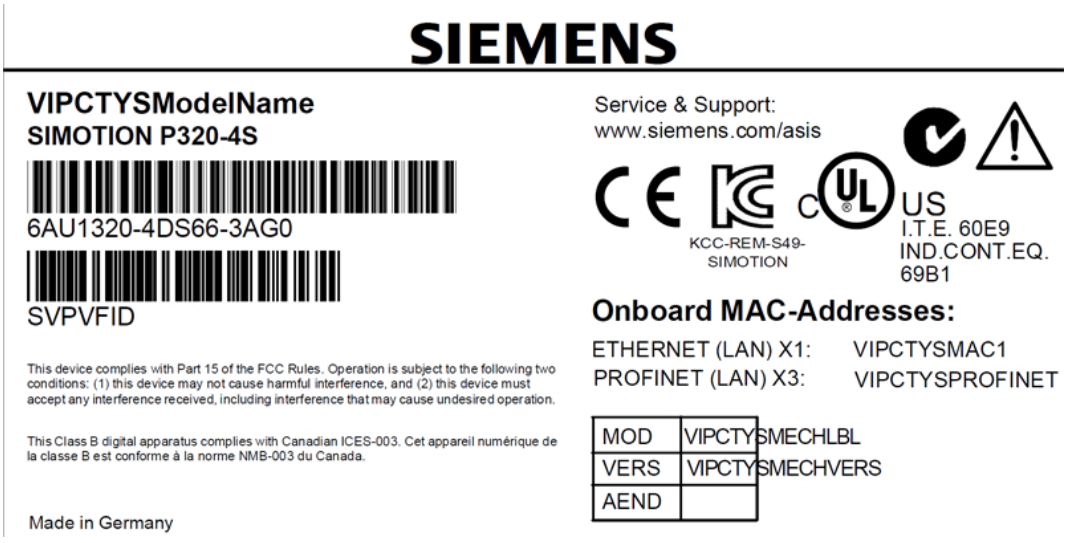


Figure 4-2 SIMOTION P320-4 S rating plate - MAC addresses

Example of a COA label

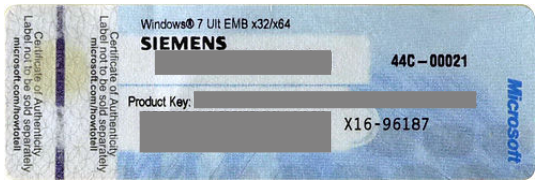
Microsoft Windows "Product Key" of the "Certificate of Authenticity" (COA):
The COA label is attached to the rear of all devices containing a Windows Embedded Standard 7 or Windows 7 operating system.

- COA label of a device with Windows Embedded Standard 7 32-bit operating system



Figure 4-3 ipc477d label coa 01

- COA label of a device with Windows 7 operating system



4.3 Permissible mounting positions

Information on the permissible mounting positions for the SIMOTION P320-4 can be found in the section Installation/mounting > Permissible mounting positions (Page 95).

4.4 Environmental conditions

Operating conditions

The SIMOTION P320-4 is designed for use in stationary, weather-protected locations.
The operating conditions exceed requirements according to EN 61131-2.

Observe the following points during installation:

- Note the climatic and mechanical environmental conditions specified in Section Technical specifications (Page 121).
- The device is designed for use in a normal industrial environment. Without additional protective measures (such as the provision of clean air), the SIMOTION P320-4 computing unit cannot be used in places with severe operating environments, for example, locations with corrosive vapors or gases.
- The clearance in the area of the ventilation slots must be at least 100 mm, so that the SIMOTION P320-4 receives sufficient ventilation.
- Do not cover the ventilation slots of the device.
- The DC power supply does not meet requirements according to EN 60950-1 in the area of the power unit connection. As such, SIMOTION P320-4 must be installed so that it is part of an operating area with restricted access (e.g. a locked control cabinet, console or server room).
- Always observe the mounting positions permitted for this device.
- The connected or installed I/O should not generate a reverse voltage greater than 0.5 V in the device.

⚠ WARNING

Invalidation of the approvals

Failure to adhere to these conditions when installing the system will invalidate approvals according to UL 60950-1, UL 508, and EN 60950-1!

Use prohibition

Without additional measures, the SIMOTION P320-4 should not be used in

- Locations with a high percentage of ionizing radiation
- Aggressive environments characterized, for example, by:
  - Dust accumulation
  - Corrosive vapors or gases
- at locations outside of the prescribed ambient conditions
- Installations requiring special monitoring such as:
  - Elevator installations
  - Electrical plants in particularly hazardous areas

An additional measure for using the SIMOTION P320-4 could be its installation in a cabinet.

Ambient conditions

For the mechanical and climatic environmental conditions, refer to the technical specifications in the section Ambient conditions (Page 124).

4.5 Electromagnetic compatibility

Definition

Standards for electromagnetic compatibility (EMC) are fulfilled if the EMC Installation Guideline is complied with.

See also:

Further information is provided in the Appendix, Section General regulations (Page 139).

Interfaces

5

5.1 Hardware components of the SIMOTION P320-4

Note

The article numbers of the components listed below can be obtained from the online catalog in the Siemens Industry Mall (http://www.siemens.com/industrymall).

SIMOTION P320-4 complete system

The SIMOTION P320-4 device is supplied with the integrated PROFINET onboard communication module.

An additional IsoPROFIBUS board can be inserted as required.

SIMOTION P320-4 spare parts

The SIMOTION P320-4 consists of the following hardware components:

- **SIMOTION P320-4** computing unit
- **Back-up battery** for the motherboard of the SIMOTION P320-4
- IsoPROFIBUS board (optional communication module for the SIMOTION P320-4)

Operation and display

The following hardware components for operation and display can be used:

- SIMATIC Industrial Flat Panel, in the variants IFP1500, IFP1900 or IFP2200.

Power supply of the SIMOTION P320-4

The power supply must satisfy the requirements as described in section Connecting the power supply (24 VDC) (Page 109). This can be ensured by using the following devices, for example:

- SITOP smart 24 V / 10 A
- 24 VDC UPS (optional)

Drives and I/O modules

The drives and I/O modules released for use with SIMOTION are specified on the website: www.siemens.com/simotion (www.siemens.com/simotion)

Note

Please note that not all modules of the I/O or I/O systems mentioned are approved for SIMOTION. Moreover, system-related functional differences can occur when these I/O or I/O systems are used on SIMOTION rather than SIMATIC. For example, special process-control functions (hot swapping, etc.) are not supported by SIMOTION for the ET 200M distributed I/O system.

A detailed and routinely updated list of I/O modules released for SIMOTION as well as instructions on their use is provided on the Internet at Siemens Product Support (https://support.industry.siemens.com/cs/ww/en/view/11886029).

In addition to the I/O modules approved for SIMOTION, all certified standard slaves can, in principle, be connected to SIMOTION provided that they support the following data traffic:

- Cyclic data traffic (DP V0)
- Acyclic data traffic (DP V1)
- Isochronous data traffic (DP V2)

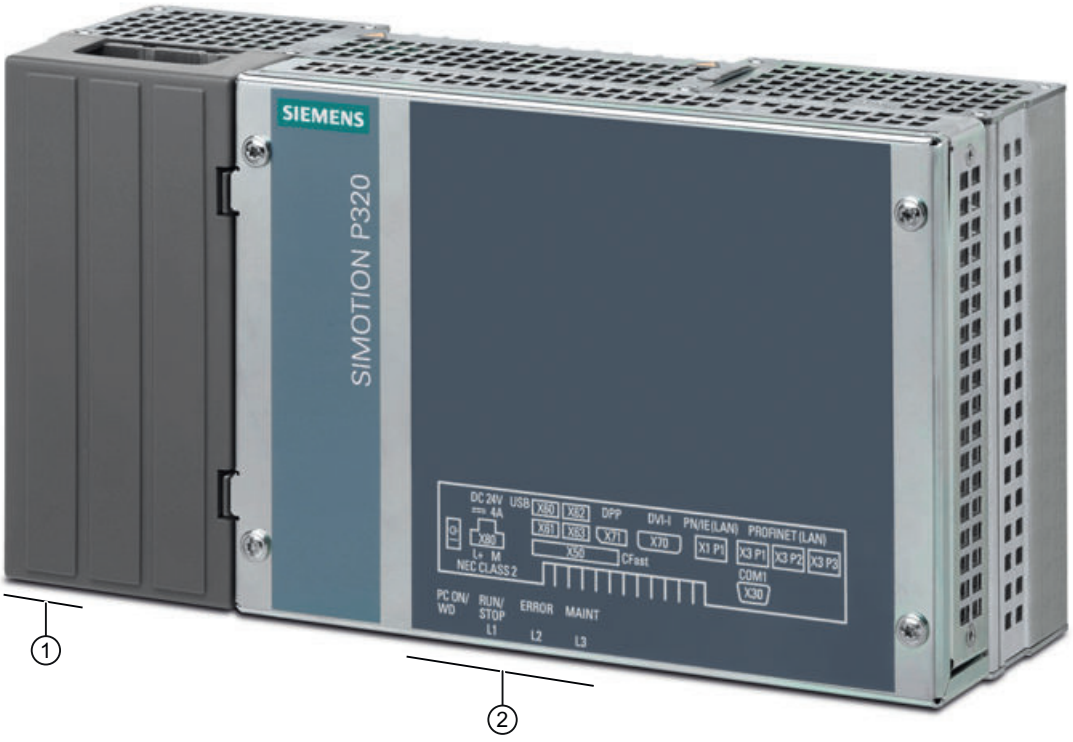
These modules are integrated via the GSD file of the device's manufacturer.

Note

Please note that in individual cases, additional boundary conditions must be fulfilled in order to integrate a standard slave into SIMOTION.

5.2 Overview of operator control and display elements

The following figure shows the arrangement of the indication and control elements of the SIMOTION P320-4.



① On/Off switch
② Operating displays (LEDs)

Figure 5-1 SIMOTION P320-4 control and display elements

5.3 Control elements

On/Off switch



① **Requirement**:
The BIOS setup entry **After Power Failure** is set to **Power on**.
The On/Off switch is used to switch the SIMOTION P320-4 on.

Figure 5-2 SIMOTION P320-4 - operator controls

⚠ WARNING

De-energize the SIMOTION P320-4!

The On/Off switch does not disconnect the device from the power supply system.
When the switch is in position **0** (Off), the device is still supplied with mains voltage.

To remove power from the device, the power supply plug must be removed.

NOTICE

Close down the operating system first

First close down the operating system before switching off the device with the on/off switch, otherwise data may get lost.

5.4 Status displays

The status indicators below the interfaces are described in the following table.

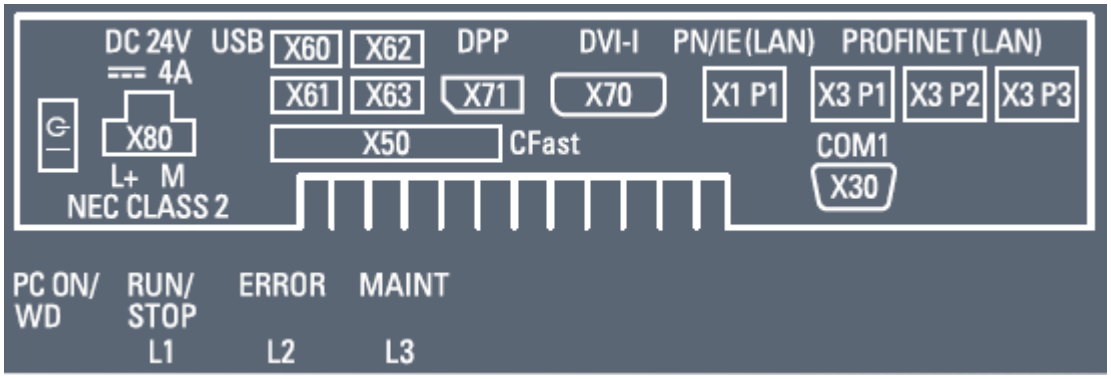


Figure 5-3 SIMOTION P320-4 status indicator

LED	Meaning	State	Description
PC ON/ WD	Power supply	Green	BIOS ready to boot. Indicates the correct supply voltage of 3.3 V, 5 V and 12 V from the integrated power unit.
		Off	Not relevant.
		Green/yellow flash-ing (1 Hz)	BIOS in POST, power switch on.
		Yellow	Idle state
RUN/STOP or L1	RUN STOP	Off	SIMOTION P Runtime is not running.
		Green	SIMOTION P320-4 in RUN.
		Yellow	SIMOTION P320-4 in STOP.
		Green/yellow: Flashes quickly (2 Hz)	DCP flashing
		Yellow: Flashes quickly (5 Hz)	FAULT state (only in combination with L2 and L3)

LED	Meaning	State	Description
ERROR or L2 (SF PROFINET LED)	-	Off	SIMOTION P320-4 is working error-free.
	Error	Red: Continuous light	Bus error at the PROFINET interface.
		Red: Flashes quickly (2 Hz)	Erroneous configuration.
		Red: Flashes quickly (5 Hz)	FAULT state (only in combination with L1 und L3)
	INIT	Red: Flashes slowly (0.5 Hz)	During the INIT process, the SF PROFINET LED is controlled by the boot loader. The precise flashing behavior therefore cannot be determined and displayed. In the INIT state, 0.5 Hz flashing is displayed in the SIMOTION P State. If no project has yet been loaded, 0.5 Hz flashing is also displayed for the INIT, which, in this case, is also retained in the Running state.
MAINT or L3 (SF LED)	-	Off	SIMOTION P320-4 works error-free.
	Error	Red	An event has occurred which needs to be acknowledged (alarm, message, notification). (See Diagnostics Guide)
		Red: Flashes slowly (0.5 Hz)	License missing for licensed technology objects. Carry out the licensing to correct the error. Further information on the licensing can be found in the SIMOTION P320-4 E / SIMOTION P320-4 S Commissioning and Hardware Installation Manual.
		Red: Flashes quickly (5 Hz)	FAULT state (only in combination with L1 and L2) A fault has occurred to which the user program cannot respond. The following actions may be required to rectify the fault: • Power OFF/ON • Recommissioning

5.5 Overview of the SIMOTION P320-4 interfaces

The following table provides an overview of the SIMOTION P320-4 interfaces.

Table 5-1 Overview of the interfaces

Interface	Description	Further information
PROFINET	Three PROFINET ports with RJ45 socket	PROFINET onboard interface (Page 87)
Ethernet	1 x 8-pole RJ45 interface	Ethernet RJ45 interface (Page 88)
DVI-I	26-pin socket for connection of a CRT or LCD monitor with DVI interface or VGA with DVI/VGA adapter	DVI-I interface (Page 88)

Interface	Description	Further information
Display port	20-pole DPP interface	Display port interface (Page 90)
USB 3.0	Lower USB channel 0, upper USB channel 1 Lower USB channel 2, upper USB channel 3	USB 3.0 interface (Page 90)
CFast card	Slot for CFast card 50-pin CF socket, types I/II	CFast card (Page 91)
COM1	Serial interface *V.24*	Serial interface COM1 (Page 92)
IsoPROFIBUS board (optional)	2 x 9-pin socket	IsoPROFIBUS board (optional) (Page 92)

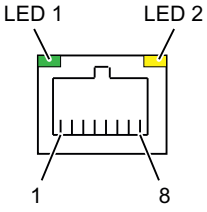
5.6 PROFINET onboard

Interface assignment

Designation: PROFINET LAN, X3, 3 ports: P1, P2, P3

Type: 8-pin RJ45 socket

PROFINET onboard LAN (X3) interface



Pin no.	Short description	Meaning	Input/output
1	RD+	Receive data [2]	Input
2	RD-	Receive data [2]	Input
3	TD+	Send data [2]	Output
4, 5 [1]	SYMR	Internal 75 Ohm terminating resistor	-
6	TD-	Receive data [2]	Output
7, 8 [1]	SYMT-	Internal 75 Ohm terminating resistor	-
S	-	Shield	-
-	LED 1	Lights up green: Link	-
-	LED 2	Lights up yellow: Activity	-

[1] Optional product feature

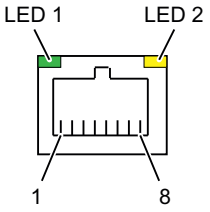
[2] Autonegotiation and autocrossover are supported.

5.7 Ethernet

Interface assignment

Designation: PN/IND. Ethernet (LAN), X1

Type: 8-pin RJ45 socket

Ethernet RJ45 interface			
			
Pin no.	**Short description**	**Meaning**	**Input/output**
1	BI_DA+	Bi-directional data A+	Input/output
2	BI_DA-	Bi-directional data A-	Input/output
3	BI_DB+	Bi-directional data B+	Input/output
4	BI_DC+	Bi-directional data C+	Input/output
5	BI_DC-	Bi-directional data C-	Input/output
6	BI_DB-	Bi-directional data B-	Input/output
7	BI_DD+	Bi-directional data D+	Input/output
8	BI_DD-	Bi-directional data D-	Input/output
S	–	Shield	–
	LED 1	Off: 10 Mbps Green light: 100 Mbps Orange light: 1000 Mbps	–
	LED 2	Lit: Active connection, e.g., to a hub Flashing: Activity	–

Note

The interfaces available on the device have been numbered for unique identification.

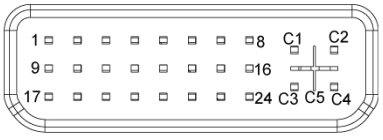
This numbering may deviate, however, from the numbering assigned by the operating system.

5.8 DVI-I

Interface assignment

Designation: DVI/VGA, X70

Type: 26-pin socket

DVI-I interface (standard socket)			
			
Pin no.	**Short description**	**Meaning**	**Input/output**

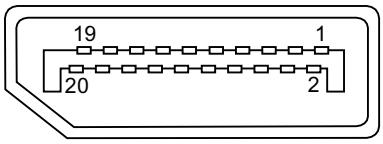
DVI-I interface (standard socket)			
1	TMDS Data2-	DVI data channel	Output
2	TMDS Data2+	DVI data channel	Output
3	TMDS Data2/4 shield	Cable shield	-
4	NC	-	-
5	NC	-	-
6	DDC clock (SCL)	Display Data Channel – Clock	Input/output
7	DDC data (SDA)	Display Data Channel – Data	Input/output
8	Analog vertical sync (VSYNC)	Analog Vertical Sync Signal	Output
9	TMDS Data1-	DVI data channel	Output
10	TMDS Data1+	DVI data channel	Output
11	TMDS Data1/3 shield	Cable shield	-
12	NC	-	-
13	NC	-	-
14	+5 V power (VCC)	+5 V power for DCC	Output
15	Ground (return for +5 V, Hsync and Vsync) (GND)	Analog ground	-
16	Hot Plug Detect	-	-
17	TMDS data 0-	DVI data channel	Output
18	TMDS data 0+	DVI data channel	Output
19	TMDS Data0/5 shield	Cable shield	-
20	NC	-	-
21	NC	-	-
22	TMDS clock shield	Cable shield	-
23	TMDS clock+	DVI clock channel	Output
24	TMDS clock-	DVI clock channel	Output
C1	Analog red (R)	Analog red signal	Output
C2	Analog green (G)	Analog green signal	Output
C3	Analog blue (B)	Analog blue signal	Output
C4	Analog horizontal sync (HSYNC)	Analog horizontal sSync signal	Output
C5	Analog ground (analog R, G, & return) (GND)	Analog ground	-

5.9 DisplayPort

Interface assignment

Designation: Display port interface, X71

Type: 20-pole DPP interface

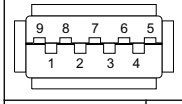
Display port interface			
			
Pin no.	**Short designation**	**Meaning**	**Input/output**
1	ML_Lane0+	DP data 0+	Output
2	GND	Ground	-
3	ML_Lane0-	DP data 0-	Output
4	ML_Lane1+	DP data 1+	Output
5	GND	Ground	-
6	ML_Lane1-	DP data 1-	Output
7	ML_Lane2+	DP data 2+	Output
8	GND	Ground	-
9	ML_Lane2-	DP data 2-	Output
10	ML_Lane3+	DP data 3+	Output
11	GND	Ground	-
12	ML_Lane3-	DP data 3-	Output
13	CONFIG1 CAD	Cable Adapter Detect	Input
14	CONFIG2	Ground (PullDown)	-
15	AUX_CH+	Auxiliary channel+	Bidirectional
16	GND	Ground	-
17	AUX_CH-	Auxiliary channel-	Bidirectional
18	HPD	Hot Plug Detect	Input
19	GND	Ground	-
20	DP_PWR	+3.3V (fused)	Output

5.10 USB 3.0

Interface assignment

Designation: USB X62, X61, X62, X63

Type: 9-channel *high current*

USB 3.0 interface			
			
Pin no.	**Short designation**	**Meaning**	**Input/output**
1	VBUS	+ 5 V (fused)	Output
2	D-	Data line	Input/output

USB 3.0 interface			
3	D+	Data line	Input/output
4	GND	Ground	–
5	RX-	Data line	Input
6	RX+	Data line	Input
7	GND	Ground	–
8	TX-	Data line	Output
9	TX+	Data line	Output

5.11 CFast card

Pin assignment of the interface

Designation: CFast X50

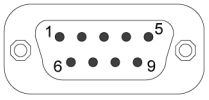
Pin no.	Short designation	Meaning
S1	SGND	Signal GND (ground for signal integrity)
S2	A+	SATA differential
S3	A-	SATA differential
S4	SGND	Signal GND (ground for signal integrity)
S5	B-	SATA differential
S6	B+	SATA differential
S7	SGND	Signal GND (ground for signal integrity)
PC1	CDI	Card Detect Out
PC2	GND	Device GND
PC3	TBD	TBD (not connected)
PC4	TBD	TBD (not connected)
PC5	TBD	TBD (not connected)
PC6	TBD	TBD (not connected)
PC7	GND	Device GND
PC8	LED1	LED Output (not connected)
PC9	LED2	LED Output (not connected)
PC10	IO1	Reserved Input/Output (not connected)
PC11	IO2	Reserved Input/Output (not connected)
PC12	IO3	Reserved Input/Output (not connected)
PC13	PWR	Device Power (3.3V)
PC14	PWR	Device Power (3.3V)
PC15	GND	Device GND
PC16	GND	Device GND
PC17	CDO	Card Detect In

5.12 COM1

Interface assignment

Designation: COM1, X30

Type: 9-pin (connector)

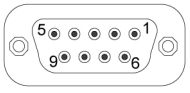
Serial interface COM1			
			
Pin no.	**Short designation**	**Meaning**	**Input/output**
1	DCD	Data carrier detect	Input
2	RxD	Receive data	Input
3	TxD	Transmit data	Output
4	DTR	Data terminal ready	Output
5	GND	Ground	-
6	DSR	Data set ready	Input
7	RTS	Request to send	Output
8	CTS	Clear to send	Input
9	RI	Incoming call	Input

5.13 IsoPROFIBUS board (optional)

Interface assignment

Designation: PROFIBUS, X101, X102

Type: 9-pin (socket)

PROFIBUS interface		
		
Pin no.	**Short designation**	**Meaning**
1-2	NC	Not connected
3	LTG_B	Data line (I/O)
4	RTS_AS	AS request to send (O)
5	GND	Ground electrically isolated
6	P5V_dp_fused	+5 V / max. 90 mA (fused) electrically isolated
7	NC	Not connected
8	LTG_A	Data line (I/O)
9	RTS_PG	PG request to send (O)

Installation/mounting

6

6.1 Installing the device

SIMOTION P320-4 is particularly suitable for installation in consoles, control cabinets and switchboards.

⚠ WARNING

Perform function test while installing the device in machines or plants

Following the results of a risk analysis, additional protection equipment on the machine or the system is necessary to avoid endangering persons. With this, especially the programming, configuration and wiring of the inserted I/O modules have to be executed, in accordance with the necessary risk analysis identified safety performance (SIL, PL or Cat.). The intended use of the device has to be secured.

The correct use of the device has to be verified with a function test on the system. This test can detect programming, configuration and wiring errors. The test results have to be documented and if necessary inserted into the relevant inputs.

6.2 Permissible mounting positions

Note

The SIMOTION P320-4 is approved for operation in closed rooms only.

Ensure the required minimum clearance to other components or enclosure panels:

- Below at least 100 mm
- Above at least 50 mm

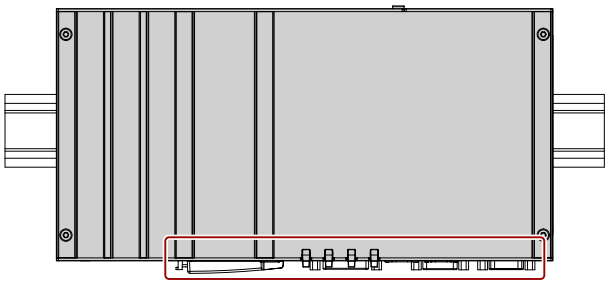
The permissible mounting positions for the SIMOTION P320-4 are standard rail mounting and vertical mounting.

Standard rail mounting

Horizontal mounting is the preferred position.

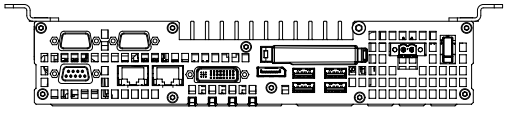
The following horizontal mounting option is permitted:

The interfaces are at the bottom.



The figure shows the interfaces on the front for representation purposes only.

For rail mounting, the interfaces always point downward.

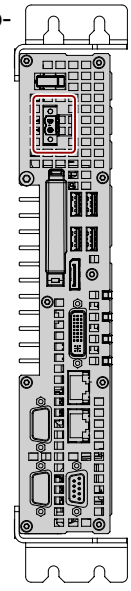


You can find mounting information under Standard rail mounting (Page 97).

Vertical mounting

The following vertical mounting option is permitted:

The interfaces are at the front. The power supply connection is at the top.



You can find information on mounting under Vertical mounting (Page 98).

Ambient conditions

Observe the permissible temperature range for operation in the respective mounting position as described in Section "Technical data > Ambient conditions (Page 124)".

6.2.1 Standard rail mounting and vertical mounting

6.2.1.1 Standard rail mounting

Requirement

- Standard mounting rail, 35 mm standard profile
  The standard mounting rail is installed at the installation site.
- The standard mounting rail clip is attached to the SIMOTION P320-4.

Note

Ensure that the wall or ceiling can hold four times the total weight of the SIMOTION P320-4 including the standard mounting rail and additional expansion cards. See section Notes on installation (Page 99).

Mounting the standard mounting rail clip

Before you can install the device on a standard mounting rail, you will need to attach the standard mounting rail clip included in the scope of delivery.

The fasteners and screws required are supplied with the device for mounting depending on the order number.

Requirement

- 1 standard mounting rail clip
- 2 screws
- 1 T20 screwdriver

Use the two screws to mount the standard mounting rail clip on the SIMOTION P320-4 enclosure.

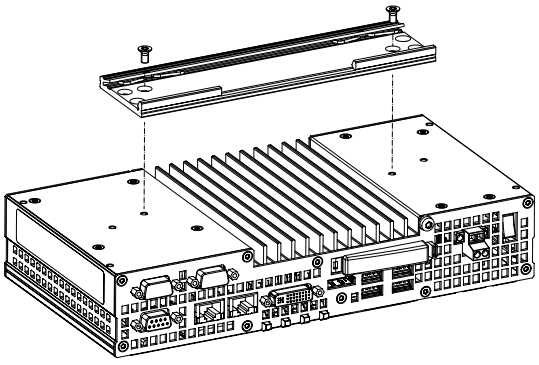
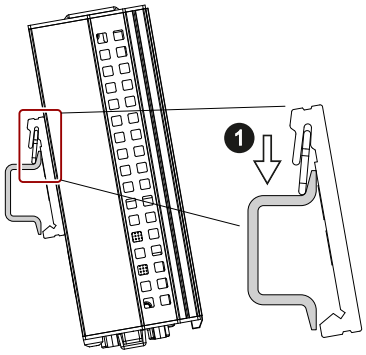


Figure 6-1 Mounting the standard mounting rail clip

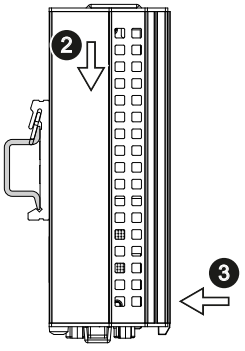
Mounting

1. Place the SIMOTION P320-4 and rail clip on the upper edge of the standard profile rail at the position shown.



2. Press the SIMOTION P320-4 slightly downward.
3. Once the rail clip slides over the bottom edge of the standard mounting rail, push the device onto the rail.

   Ensure that you hear the SIMOTION P320-4 snapping into place.



Note

To ensure secure vertical mounting on standard mounting rails, install a standard rail ground terminal beneath the device.

Removing

1. Press the SIMOTION P320-4 down until the rail clip releases the device.
2. Swing the SIMOTION P320-4 away from the standard mounting rail.
3. Lift the device up and off.

6.2.1.2 Vertical mounting

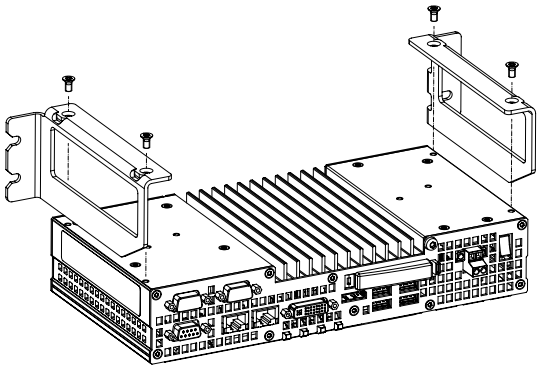
The fasteners and screws required are supplied with the device for the selected mounting option.

Requirement

- 2 mounting brackets
- 4 screws
- 1 T20 screwdriver

Procedure

1. Secure each mounting bracket with two screws.



6.3 Installation notes

Note the following:

- The SIMOTION P320-4 is approved for operation in closed rooms only.
- For installation in a control cabinet, observe the SIMATIC installation guidelines and applicable DIN/VDE requirements or other applicable country-specific regulations.
- When the device is used in the area of Industrial Control Equipment according to UL508, note that the device is classified as "Open Type". The installation of the device in a housing according to UL508 is therefore a mandatory requirement for approval or operation in according to UL508.

Securely fastening the SIMOTION P320-4

NOTICE
Insufficient load carrying capacity If the wall it is mounted on does not have a sufficient load-bearing capacity, the device may fall and be damaged. Ensure that the mounting surface on the wall can bear four times the total weight of the device, including fixing elements.

NOTICE
Incorrect fixing elements The device may not be securely fitted if you use dowels and screws other than those specified below for mounting. The device can fall and may be damaged. Use only the dowels and screws specified in the following table.

Connecting elements

The connecting elements for each mounting position are listed in the following:

- Standard rail mounting

Material	Bore diameter	Fastener
Metal, min. 2 mm thickness	5 mm	• 2 x M4 screws • 2 x M4 nuts
Concrete	6 mm, 40 mm depth	• 4 x dowels, ∅ 6 mm, 40 mm length • 4 x screws, ∅ 4 mm, 40 mm length
Plasterboard, min. 13 mm thickness	14 mm	4 x toggle bolts, ∅ 4 mm, 50 mm length

- Vertical mounting

Material	Bore diameter	Fastener
Concrete	6 mm, 40 mm depth	• 4 x dowels, ∅ 6 mm, 40 mm length • 4 x screws, ∅ 4 mm, 40 mm length
	8 mm, 40 mm depth	• Dowel, ∅ 8 mm, 40 mm length • Screw, ∅ 5 mm, 40 mm length
Plasterboard, min. 13 mm thickness	14 mm	Toggle bolt, ∅ 4 mm, 50 mm length

Mounting positions

The following mounting positions are permitted for the SIMOTION P320-4 and are described in detail in the following sections:

- Standard rail mounting (Page 95)
- Vertical mounting (Page 96)

6.4 Overview of operating modes for the SIMOTION P320-4

Overview

The following operating modes are available for mounting the SIMOTION P320-4.

The operating modes are:

- Decentralized structure
  The SIMOTION P320-4 is mounted separately from a panel in a decentralized structure.
- Headless operation
  The SIMOTION P320-4 is operated without panel.

Before mounting, the following must be noted:

Before you mount the SIMOTION P320-4 in a control cabinet or a rack, optional components are installed to expand the SIMOTION P320-4.

Example: installation of the optional IsoPROFIBUS board.

To do this, open the device and note the following procedure:

1. Open the cover of the SIMOTION P320-4.
2. Insert the optional IsoPROFIBUS board.
3. Plug in the SYNC I/O cable for synchronizing with PROFINET.
4. Close the cover.
5. Mount the SIMOTION P320-4.

Note

The installation and removal of components as well as the mounting of the SIMOTION P320-4 are described in detail in the SIMOTION P320-4 E / P320-4 S Commissioning and Hardware Installation Manual.

NOTICE
Avoid loss of warranty If you install or exchange system expansions and damage your device, the warranty becomes void.

6.5 Decentralized structure

Overview

The decentralized structure provides greater flexibility in terms of location and enables the SIMOTION P320-4 to be positioned in non-critical areas of the plant (e.g. control cabinet).

The decentralized structure of a panel with the SIMOTION P320-4 can be performed via the display port, USB or DVI connection. Please note the cable lengths that are supported for the panel.

For the use of an HMI system, the SIMATIC IFP, for example, can be connected by means of the described interfaces.

Connection

7

7.1 Requirements

General information

During the configuration of SIMOTION modules, you must pay attention to the "Electrical configuration design".

The following section provides information on wiring and networking the complete SIMOTION system.

Further information about the connection of the complete system and the individual components can be found in the SIMOTION P320-4 E / P320-4 S Commissioning and Hardware Installation Manual.

Open equipment

These modules are open equipment. This means they may only be installed in housings, cabinets, or in electrical equipment rooms that can only be entered or accessed with a key or tool. Housings, cabinets, or electrical equipment rooms may only be accessed by trained or authorized personnel. An external fire-protection housing is required.

Observe the following points during installation:

- The device should be connected only to **24 VDC** power supply networks that meet the requirements of **safety extra-low voltage** (**SELV**). The cable cross-section must be chosen large enough to ensure that no damage can result from cable overheating in the event of a short-circuit in the SIMOTION P320-4.
- Avoid extreme ambient conditions.
- Protect the device against dust, moisture, heat and severe vibration.
- Do not subject the SIMOTION P320-4 to direct sunlight.
- Install the device in such a way that it poses no danger, for example, by falling over.
- The clearance around the SIMOTION P320-4 must be at least 100 mm to ensure adequate ventilation.
- Do not cover the ventilation slots.

7.2 Overview of connections

The connection overview shows the SIMOTION P320-4 interfaces to which the appropriate I/O devices can be connected.

Note

The cabling for all elements and components of the complete system can only be carried out when disconnected from the mains.

It does not matter in which order connection takes place.

The connection of the individual components in the SIMOTION P320-4 E / P320-4 S Commissioning and Hardware Installation Manual.

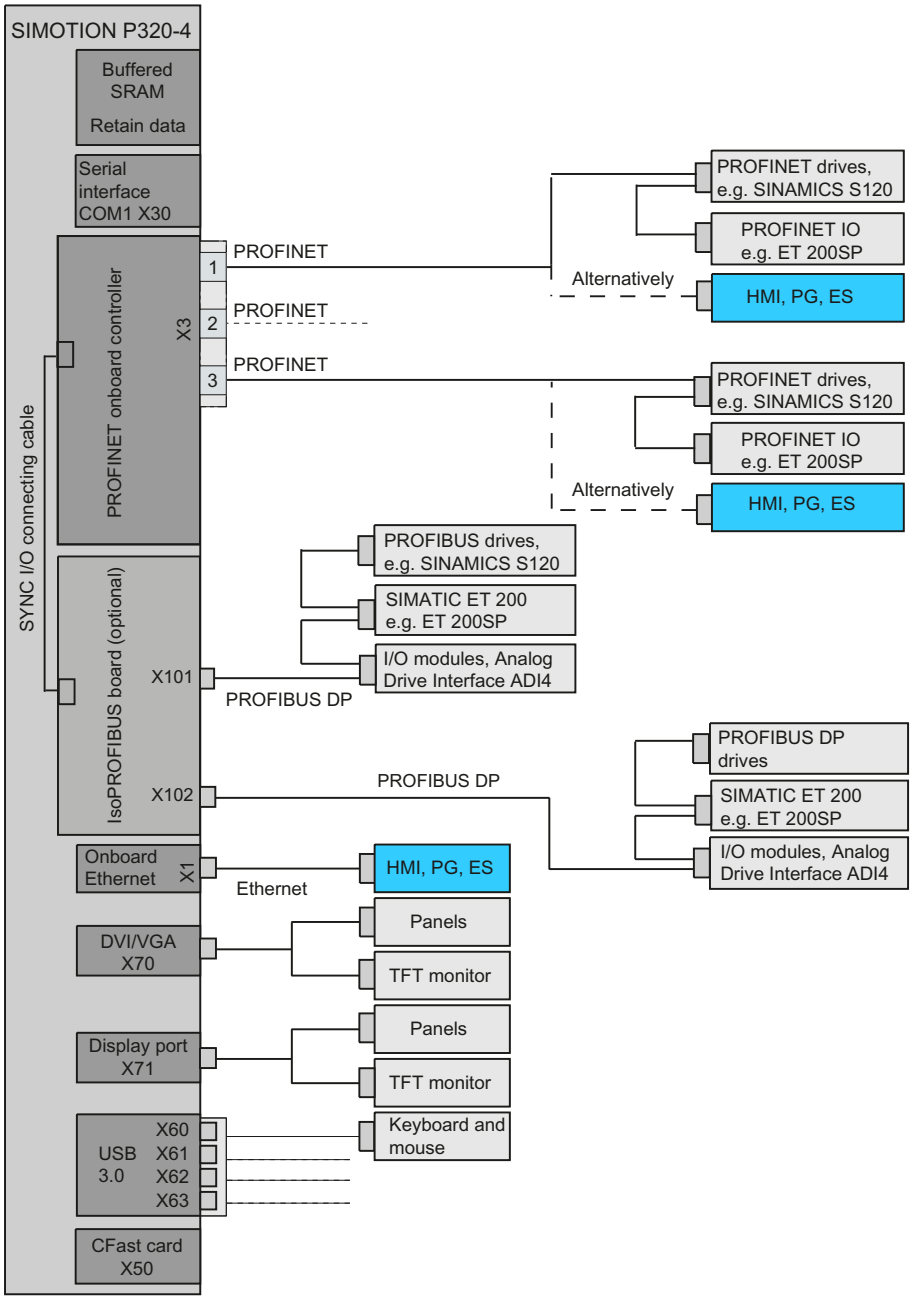


Figure 7-1 Hardware system overview - example with PROFINET onboard and optional IsoPROFIBUS board

7.3 Notes on connecting

⚠ WARNING

Risk of fire and electric shock

The On/Off switch does not isolate the device from the power supply. Risk of electric shock if the device is opened incorrectly or defective. There is also a risk of fire if the device or connecting lines are damaged.

You should therefore protect the device as follows:

- Always pull out the power plug when you are not using the device or if the device is defective. The power plug must be freely accessible.
- Connect the device to a protective conductor as instructed, see Section "Connecting the protective conductor".
- Use a central isolating switch in the case of cabinet installation.

⚠ WARNING

Risk of lightning strikes

A lightning strike may enter the mains cables and data transmission cables and reach to a person.

Death, serious injury and burns can be caused by lightning.

Take the following precautions:

- Disconnect the device from the power supply in good time when a thunderstorm is approaching.
- Do not touch mains cables and data transmission cables during a thunderstorm.
- Keep a sufficient distance from electric cables, distributors, systems, etc.

NOTICE

Fault caused by I/O devices

The connection of I/O devices can cause faults in the device.

The result may be personal injury and damage to the machine or plant.

Note the following when connecting I/O devices:

- Read the documentation of the I/O devices. Follow all instructions in the documentation.
- Only connect I/O devices which are approved for industrial applications in accordance with EN 61000-6-2 and IEC 61000-6-2.
- I/O devices that are not hotplug-capable may only be connected after the device has been disconnected from the power supply.

NOTICE

Damage through regenerative feedback

Regenerative feedback of voltage to ground by a connected or installed component can damage the device.

Connected or built-in I/Os, for example, a USB drive, are not permitted to supply any voltage to the device. Regenerative feedback is generally not permitted.

7.4 Protective conductor connection and potential equalization

The protective conductor connection is needed to protect the device and helps ensure that interference signals generated by power lines, signal lines or lines to I/O devices are safely discharged to earth.

The protective conductor connection on the device must be connected to the protective conductor of the control cabinet or system in which the device is installed.

⚠ WARNING

Electrical shock hazard and risk of fire

Internal components of a faulty device may carry dangerous voltages that pose the risk of fire or electrical shock. Risk of death and serious injury.

- Always connect the ground conductor before you commission the device.
- Never operate the device without protective conductor.
- Take a faulty device out of service immediately and mark it accordingly.

Requirement

- The device has been installed.
- 1 protective conductor, minimum cross section 2.5 mm^2
- 1 T20 screwdriver
- 1 x M4 cable lug

Procedure

1. Crimp the cable lug onto the protective conductor.
2. Screw the cable lug onto the protective conductor connection as shown.



① Protective conductor connection / potential equalization

3. Wire the protective conductor to the protective conductor connection of the control cabinet in which the device is installed.

7.5 Connecting peripheral equipment

Note

Observe suitability for industrial applications

Only connect I/O devices that are suitable for industrial applications in accordance with EN IEC 61000-6-2.

Note

I/O devices capable of hot-plugging (USB)

Hot-plug I/O devices (USB) may be connected while the PC is in operation.

NOTICE
Non-hot-plug I/O devices I/O devices that do not support hot-plugging may not be connected until the device is powered down. Strictly adhere to the specifications for peripheral equipment.

Note

Wait at least ten seconds before you reinsert USB devices.

Note that the EMC immunity of standard USB devices is designed only for office environments. These USB devices are appropriate for handling commissioning and service tasks. You may only use USB devices that are suitable for industrial applications. The USB devices are developed and marketed by the respective supplier. The respective product supplier provides support for the USB devices. The manufacturer's terms of liability shall apply.

Note

The connected or built-in I/Os, such as USB drives, should not introduce a counter EMF into the device.

Reverse voltages exceeding 0.5 V to ground that are generated by connected or installed components may prevent proper operation of the device or lead to its destruction.

7.6 Connecting the power supply (24 VDC)

Please note the following to ensure you operate the device safely and in accordance with regulations:

⚠ WARNING

Electrical shock hazard and risk of fire

Voltage exceeding SELV levels may cause fire or electric shock. Death or serious physical injury can result.

- Always wire the device to a 24 VDC power supply that is compliant with SELV requirements.
- You need a corresponding NEC Class 2 power source to comply with requirements to UL 50950-1 and UL 508 when operating the device on a wall, in an open frame, or at any other location.
- In all other cases (IEC / EN / DIN EN 60950-1), either a current source of limited output (LPS = Low Power Source), or a line-side fuse or a line-side circuit breaker is necessary. Current must be limited to 4.16 A. This requires a 4 A fuse max.

The device has reverse polarity protection.

Requirement

- The device has been installed.
- The protective conductor is connected.
- One wired terminal.
  The corresponding 24 VDC power supply is off.
- One 0.5 × 3 Philips screwdriver.

NOTICE
Damage to the device Do not turn the screws of the terminal when the terminal is inserted in the device. The device can be damaged through the pressure of the screwdriver on the terminal and consequently the connection socket. Only connect the wires to the terminal when it is unplugged.

Note

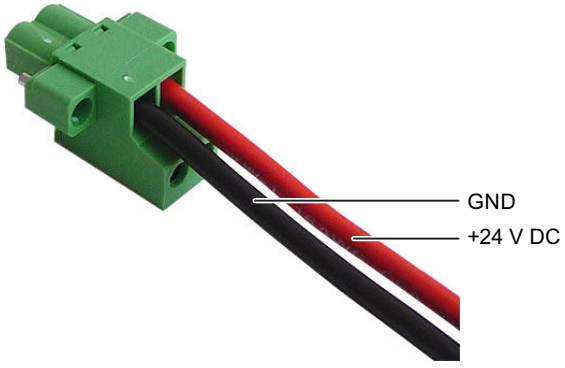
Make sure that the wires are not accidentally swapped over. Note the labeling for the contacts on the front cover of the device.

The terminal to connect the power supply is attached to the device. The terminal is designed for wires with a cross-section of 0.25 mm² to 2.5 mm². Only connect wires with a cross-section ≥ 0.5 mm².

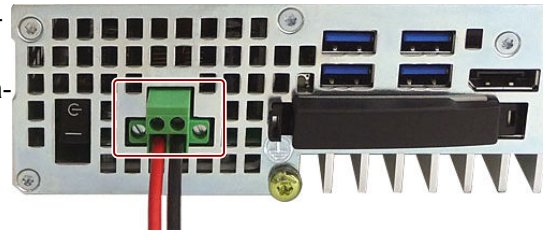
Solid or flexible cables can be used for the connection. Ferrules are not required.

Procedure

1. Connect the cables as shown.
   Note the position of the terminal.



2. Insert the terminal at the marked position.
3. Secure the terminal using the integrated screws.



7.7 Connecting the device to networks

Ethernet can be used for integrating the device into existing or planned networks.

Ethernet

The integrated Ethernet interface can be used for communication and for data exchange with automation devices such as SIMOTION SCOUT, SIMATIC S7.

Further information

Further information is available on the Internet at the Siemens Industry Mall (www.siemens.com/industrymall), the catalog and ordering system for automation and drives.

7.8 Installing the strain relief

Strain relief for the device is provided in the scope of delivery. The strain relief is designed to prevent the lines connected to the device from being accidentally pulled out.

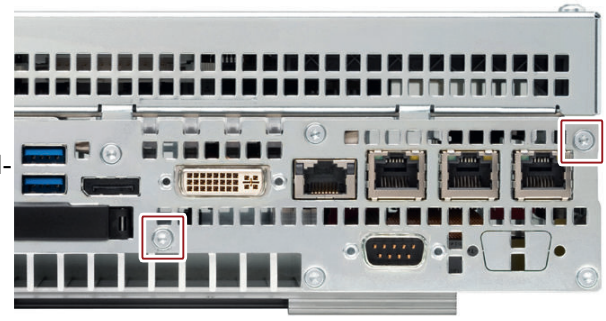
Attaching PROFINET strain relief

Requirement

- 1 strain relief
- 2 screws
- 1 T10 screwdriver

Mounting

1. Remove the marked countersunk screws.



2. Fasten the strain relief at the PROFINET interface(s).

   Use the oval head screws included with the strain relief.

Removing

Follow the mounting procedure in reverse to remove the strain relief.

Securing cables generally

Secure all cables connected to the device at the cable grip, each with a cable tie. The required cable ties are not part of the scope of delivery.

Requirement

- Maximum of 6 cable ties for USB, Ethernet, PROFIBUS
  Maximum cable tie width 3 mm.
- 1 cutting tool

Procedure

1. Place the cable tie around the attachment plate of the strain-relief assembly and secure the plugged-in cables.
2. Cut off the cable tie overhang.

Troubleshooting/FAQs

8

8.1 Error correction

This section provides you with tips on how to locate and troubleshoot common problems.

FAQs / error correction	Possible cause	Possible remedy
The device is not operational.	There is no power supply to the device.	• Check whether the 24 VDC power supply is connected. See Connecting the power supply (24 VDC) (Page 107). • Check whether the line side switch is activated. See Operator controls (Page 84).
SIMOTION P does not start after connecting the CFast card.	BIOS settings are not set to Hotplug Enabled.	You can find out how to check and correct the BIOS settings in Section Hotplug Enabled BIOS settings (Page 115).
SIMOTION P does not start after a reboot.	The user is not logged in automatically.	Set the password for the AutoLogin (Automatically Log On). See Section Changing the AutoLogin > SIMOTION P AutoLogin (Page 38).
The monitor remains dark.	The monitor is switched off.	Switch on the monitor.
	The monitor is in "power-save" mode.	Press any key on the connected keyboard.
	The brightness button has been set to dark.	Set the monitor brightness button to obtain more light. For detailed information, refer to the monitor operating instructions.
	The power cord or the monitor cable is not connected.	• Check whether the power cord has been properly connected to the monitor and to the system unit or to the grounded shockproof outlet. • Check whether the monitor cable has been properly connected to the system unit and to the monitor.
		If the monitor screen still remains dark after you have performed these checks, please contact your technical support team.
The mouse pointer does not appear on the screen.	The mouse driver is not loaded.	Check whether the mouse driver is properly installed and present when you start the application program. For more detailed information on the mouse driver, refer to the documentation for the mouse or application programs.
	The mouse is not connected.	Check whether the mouse is properly connected to the system unit. If you use an adapter or extension on the mouse cable, also check the connectors.
		If the cursor still does not appear on the screen after you have performed these checks and measures, please contact your technical support team.

FAQs / error correction	Possible cause	Possible remedy
Error message on the screen: Operating system not found	• No operating system present. • Incorrect active boot partition. • Incorrect drive entries in the SETUP.	Check whether one of the specified causes is present:
Wrong time and/or date on the PC.	-	• Press <ESC> during the boot sequence to open BIOS Setup. • Set the time and date in the setup menu.
Although the BIOS setting is OK, the time and date are still wrong.	The backup battery is empty.	Replace the backup battery. See SIMOTION P320-4 E / P320-4 S Commissioning and Hardware Installation Manual > Service and maintenances > Replacing the backup battery. If the problem cannot be resolved by replacing the battery, then contact your technical support team.
UPS does not function.	The operating system does not have a suitable driver for the UPS.	Install a suitable driver; the correct driver can often be downloaded from the homepage of the device's manufacturer. Note the SIMOTION P320-4 E / P320-4 S Commissioning and Hardware Installation Manual > Power on and software installation > Customer-specific software.
The display in the BIOS for the PROFINET MAC address is incorrect (00:00:00:00:00:00).	-	The correct MAC addresses can be taken from the rating plate on the housing. See also Device identification data (Page 76), Section MAC addresses.

8.2 Hotplug Enabled BIOS settings

Starting the BIOS setup

Proceed as follows:

1. Reset the SIMOTION P320-4 (warm or cold restart).
   Depending on the device version, the default settings may differ from the following figures.
2. After completing the startup test, you can start the program setup with BIOS.
   The following message is shown on the display:



Figure 8-1 SIEMENS Press Esc boot options

Press **Esc**.

3. After booting, the BIOS selection menu is displayed:



Figure 8-2 BIOS selection menu

4. The following buttons are available in the BIOS selection menu:

Button	Function
Continue	Exit BIOS menu, continue with the startup process
Boot Manager	Selection of the boot drive
Boot From File	Starting from a .EFI file
SCU	Device configurator (Setup Configuration Utility)
BIOS Update	BIOS update from USB stick
MEBx	Start the Intel Management Engine BIOS Extension

5. Select the **SCU** device configurator.

6. In the BIOS window, select the **Advanced** tab using the arrow keys and then select **IDE Configuration**.
   Press Enter to confirm the selection.

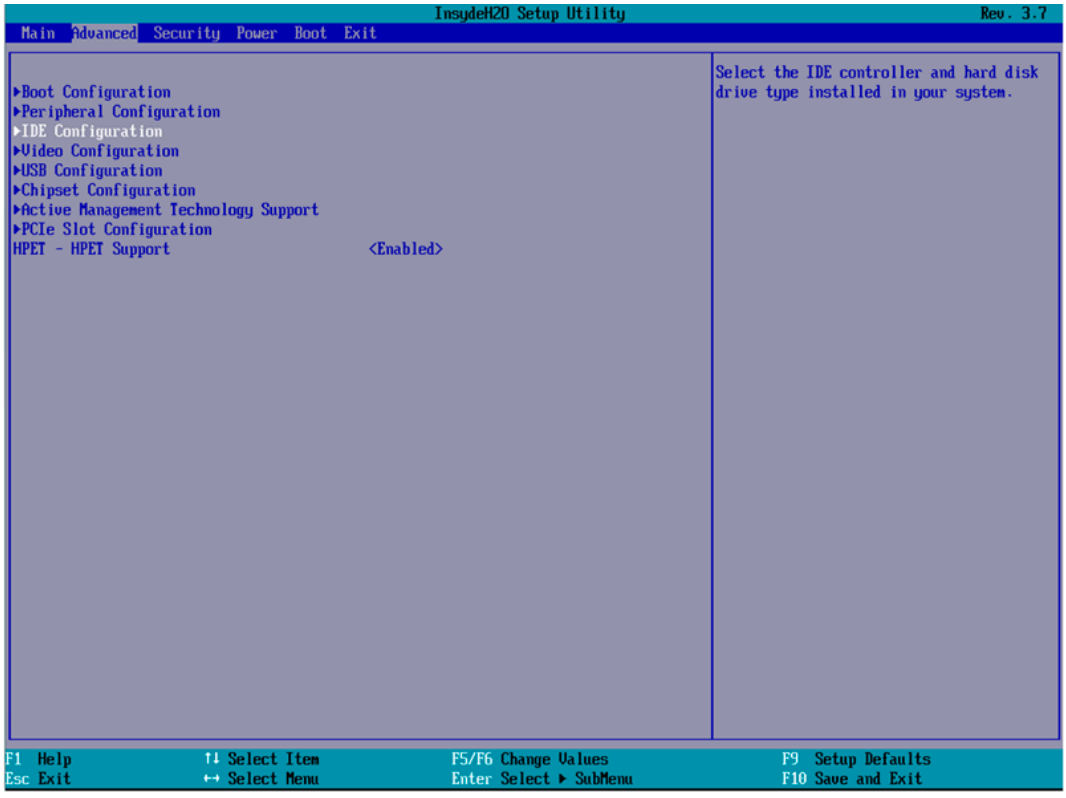


Figure 8-3 Advanced > IDE configuration

7. In the **IDE Configuration** window, select **SATA Port 2 HotPlug**.

8. Change the **Disabled** selection shown here to **Enabled**.

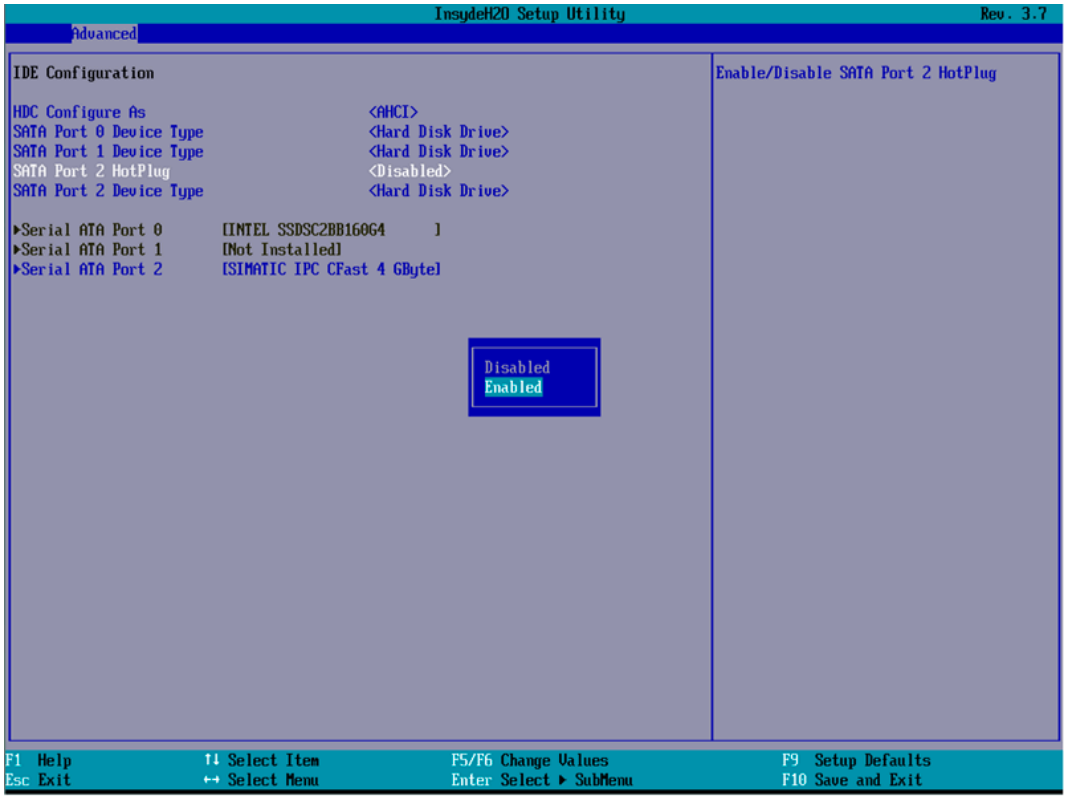


Figure 8-4 IDE Configuration > SATA Port 2 HotPlug

9. Press **F10** Save and Exit. The new entries are accepted.
10. Confirm the subsequent prompt to save the settings and exit the BIOS setup with **Yes**.

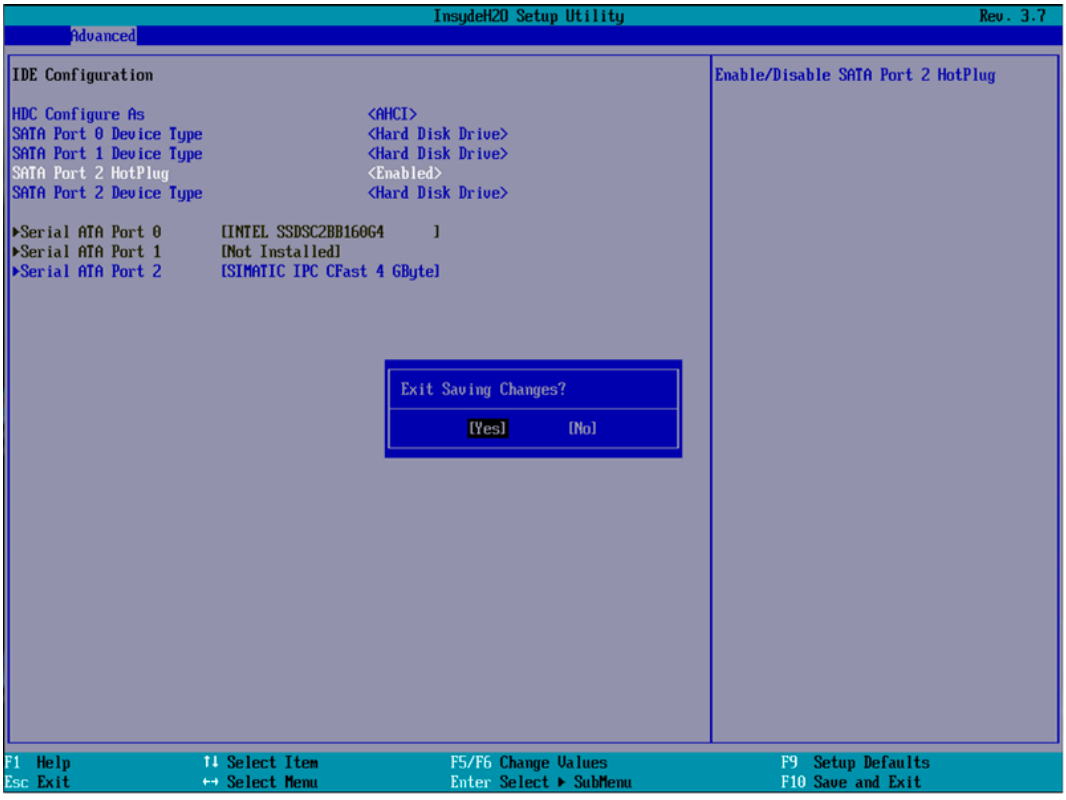


Figure 8-5 Confirming SATA Port 2 HotPlug > Enabled

Technical data

9

9.1 Overview of the technical specifications

Overview

The following technical specifications are available for SIMOTION P320-4 and the associated hardware components:

- General SIMOTION P320-4 technical specifications (Page 121)
- Ambient conditions (Page 124)
  - Climatic conditions
  - Mechanical conditions
- Technical specifications of the IsoPROFIBUS board (Page 125)
- Power requirement of the components (Page 126)
- Integrated DC voltage supply (Page 127)
- Technical specifications of the SITOP smart 24 V / 10 A (Page 127)
- Typical power consumption (Page 129)

9.2 General technical specifications

General technical specifications

General technical specifications for SIMOTION P320-4	
Article numbers	**SIMOTION P320-4 E** • 6AU1320-4DE65-3AF0 **SIMOTION P320-4 S** • 6AU1320-4DS66-3AG0
Dimensions	262 × 133 × 50.5 (W × H × D in mm)
Weight	Approximately 2 kg
Supply voltage (DC) [1]	24 VDC [1] (-20%/+20%)
Short-term voltage interruption in accordance with Namur	Min. 15 ms (at 20.4 V) Max. 10 events/h; recovery time min. 1 s
Max. power consumption	64.8 W (at 24 V)
Degree of protection	IP 20 according to IEC 60529
Protection class	Protection class I according to IEC 61140

General technical specifications for SIMOTION P320-4	
Safety regulations	EN 60950-1; UL 60950-1; UL 508;
Noise emission	<40dB (A) to DIN 45635-1
Quality assurance	In accordance with ISO 9001

[1] The upstream power supply must generate a safety extra-low voltage with safe electrical isolation according to IEC 60364-4-41 or an NEC Class 2 SELV and LPS according to IEC/ UL/EN/ DIN-EN 60950-1 (see the section "Connecting the power supply (24 V DC) (Page 107)").

Electromagnetic compatibility

Electromagnetic compatibility	
Interference emission	EN 61000-6-3, EN 61000-6-4, CISPR220 class B; FCC class A
Immunity with regard to conducted interference on the supply lines	± 2 kV according to IEC 61000-4-4; burst ± 1 kV according to IEC 61000-4-5; symmetrical surge ± 2 kV according to IEC 61000-4-5; asymmetrical surge
Noise immunity on signal lines	± 1 kV according to IEC 61000-4-4; burst; length < 3 m ± 2 kV according to IEC 61000-4-4; burst; length > 3 m ± 2 kV according to IEC 61000-4-5; surge; length > 30 m
Immunity to electrostatic discharge	± 6 kV contact discharge according to IEC 61000-4-2 ± 8 kV air discharge according to IEC 61000-4-2
Immunity to RF interference	10 V/m 80–1000 MHz and 1.4–2 GHz, 80% AM according to IEC 61000-4-3 1 V/m 2–2.7 GHz, 80% AM according to IEC 61000-4-3 10 V 10 kHz to 80 MHz, 80% AM according to IEC 61000-4-6
Immunity to magnetic fields	100 A/m, 50/60 Hz according to IEC 61000-4-8

Motherboard

Motherboard	
Processor	• Intel Core i3-3217UE 1.6 GHz, 3 MB SLC (SIMOTION P320-4 E) • Intel Core i7-3517UE 1.7 GHz, 4 MB SLC (SIMOTION P320-4 S)
Main memory	4 GB
Buffer memory	512 KB MRAM

Drive and memory media

Drive and memory media	
Solid State Disk (SSD)	≥ 80 GB Standard (SIMOTION P320-4 S)
CFast card	≥ 4 GB

Graphics

Graphics	
Graphics controller	Integrated Intel HD2000 or HD4000
Graphics memory	32 - 512 MB Shared Memory
Resolutions, frequencies, color depth	DVI-I: 640 × 480 to 1920 × 1200 / 60 Hz Display port: max. 1920 ×1200 / 60 Hz

Interfaces

Interfaces	
COM1	RS232, 115 kbps max., 9-pin SUB-D, male
DVI-I	Connection of display devices with DVI connector
Display port (DPP)	Connection of display devices with DPP connector
Keyboard	USB support
Mouse	USB support
USB	4 × USB 3.0
PROFINET	3 × RJ45 connector, onboard interface on ERTEC 400 basis, 100 Mbps electrically isolated
Ethernet	1 × Ethernet interface (RJ45) 10/100/1000 Mbps, electrically isolated, with teaming function

9.3 Ambient conditions

Climatic conditions

Temperature	Tested according to IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-14
- During operation	**Standard rail mounting (preferred mounting position)**:
	Operation with CFast card and/or SSD: • With max. 1 expansion card (max. load 10 W): 0 to +40° C • With max. 1 expansion card (max. load 10 W) in RAL [2]: 0 to +50° C [1] Operation with CFast card: • Without expansion cards in RAL [2]: 0 to +55° C [1]
	Vertical mounting:
	Operation with CFast card and/or SSD: • Without expansion cards: 0 to +40° C Operation with SSD: • With max. 1 expansion card (max. load 10 W) in RAL [2]: 0 to +45° C [1] Operation with CFast card: • Without expansion cards in RAL [2]: 0 to +50° C [1] • With max. 1 expansion card (max. load 10 W): 0 to +40° C • With max. 1 expansion card (max. load 10 W) in RAL [2]: 0 to +50° C [1]
- During storage/shipping	-40 °C to +70 °C (for devices with CFast or SSD)
- Gradient	Operating mode: Max. 10° C/h; Storage: 20° C/h; no condensation
Relative humidity	Tested according to IEC 60068-2-78, IEC 60068-2-30
- During operation	5% to 80% at 25° C (no condensation)
- During storage/shipping	5% to 95% at 25° C (no condensation)
Air pressure	
- During operation	1080 to 795 hPa (corresponds to an altitude of -1000 m to 2000 m)
- During storage/shipping	1080 to 660 hPa (corresponds to an altitude of -1000 m to 3500 m)

[1] For P320-4 S you must set "Turbo Mode Level" to "Temperature optimized" in the "Power" menu, selection "Advanced CPU Control", of the BIOS Setup; otherwise you have to reduce the maximum ambient temperature by 5 °C.

[2] RAL = Restricted Access Location
Installation of device in operating facilities with restricted access, for example, a locked control cabinet.

Mechanical conditions

Vibration	Tested according to DIN IEC 60068-2-6
- During operation	With CFast card or SSD: 5 to 9 Hz: 3.5 mm 9 to 500 Hz: 9.8 m/s2
- During storage/shipping	5 to 9 Hz: 3.5 mm 9 to 500 Hz: 9.8 m/s2
Resistance to shock	Tested according to DIN IEC 60068-2-27
- During storage/shipping	250 m/s^2, 6 ms

9.4 Technical data of the IsoPROFIBUS board

Technical specifications of the IsoPROFIBUS board (optional)

Table 9-1

IsoPROFIBUS board		
Power consumption for + 5 V PCI voltage		
Standard	2.5 W	
Maximum	3.5 W	
Permissible ambient conditions		
Heat dissipation	Open circuit ventilation	
Temperature	**Operation**	**Storage/transport**
• IsoPROFIBUS board in the SIMOTION P320-4	5° C to 45° C	-20° C to 60° C
Tested according to	EN 60068-2-1, EN 60068-2-2, EN 60068-2-14	
Relative atmospheric humidity	**Operation**	**Storage/transport**
• IsoPROFIBUS board in the SIMOTION P320-4	5 % … 80 %	5 % … 95 %
Tested according to	EN 60068-2-30	
Temperature change	Max. 10 K per hour in operation	
Moisture condensation and ice formation	Not permissible	
Design		
Module	Card (3.3 V/5 V, 32 bits)	
Dimensions (H x D) in mm	107 x 170	
Weight	150 g	
Space requirements	Short PCI slot	

Safety

Safety	
Degree of protection	IP20 in mounted state
Protection class	I complies with VDE 0106
Safety regulations	EN 60950
Approvals	CE, UL508, cULus

Quality assurance

Quality assurance complies with ISO 9001.

Note

The safety regulations, approvals, protection type and protection class specified are valid only if the module is inserted in a SIMOTION P320-4.

9.5 Power requirements of the components

Maximum power consumption of the auxiliary components

Auxiliary components		Maximum permitted power consumption			Max. total power
		+5 V	+3.3 V	+12 V	
USB device	High current	900 mA	-	-	10 W (for all USB devices)
Display port		-	500 mA	-	
DVI-I		500 mA	-	-	
PROFIBUS		500 mA	-	-	
PCI modules	Per slot	-	1.5 A	0.5 A	10 W (for entire device)
	Total	-	2 A	1 A	

[1] The total power of the PCI and USB cards may not exceed 15 W

Note

Device can overheat!

To avoid overheating, the power loss per PCI slot should not exceed 5 watts.

9.6 Integrated DC power supply

Technical specifications

DC power supply	
Input voltage	24 V DC (-20%/+20%)
Power consumption [1]	Max. 90 W
Power failure buffering	hold-up time = 20 ms at 20.4 V (DC_FAIL is active after > 5 ms)
Maximum continuous output power [1]	80 W
Degree of protection	IP 20
Protection class	Protection class I (a protective conductor must be connected to the device)

[1] The power specifications apply to the power supply component not to the device.

Note

Inrush current

The device requires an inrush current of at least 6.5 A for 50 ms.

The peak value of the startup current depends on the input voltage and the impedance of the 24 V power source. Peak currents greater than 6.5 A are possible. This will not have a negative impact on device functionality.

9.7 Technical data for the SITOP smart 24 V/10 A

Table 9-2 Technical specifications for the SITOP smart 24 V / 10 A

SITOP smart 24 V/10 A	
Input data	
Input voltage rated value	120/230 VAC
Input voltage range	85 to 132 VAC / 170 to 264 VAC
Power failure bridging	> 20 ms at V_{in} = 93/187 V
Mains frequency rated value	50/60 Hz
Mains frequency range	47 … 63 Hz
Input current rated value	4.1/2.4 A
Switch-on current (at +25° C)	< 65 A
Recommended miniature circuit breaker	10 A, Characteristic C
Output data	
Output voltage rated value	24 VDC
Output voltage tolerance	± 3 %
Residual ripple/spikes	< 150/240 mV_{pp}
Output voltage adjustment range	22.8 to 28 VDC

SITOP smart 24 V/10 A	
Output current rated value	10 A (12 A up to +45° C)
Efficiency	Typ. 90%
Electronic short-circuit protection	Yes; constant current approx. 1.3 × output current rated value; for 5 seconds extra power at 1.5 × output current rated value
Ambient conditions	
Ambient temperature during storage and transport	-40° … +85° C
Ambient temperature during operation	0° … +60° C
Humidity class	Climate class 3K3 according to EN 60721; relative atmospheric humidity 5 to 95%; no condensation
Degree of protection (EN 60529)	IP20
Radio suppression level (EN 55022)	Class B
Line harmonic limitation according to EN 61000-3-2	No
EMC immunity	EN 61000-6-2; EN 61000-4-2/-3/-4/-5/-6/-11
EMC interference emission	EN 61000-6-4
Safety	
Safety class (IEC 536; VDE 1006 T1)	Class I
Primary/secondary galvanic isolation	SELV output voltage according to EN 60950 and EN 50178; transformer according to EN 61558-2-17; overvoltage protection in the event of an internal error U_a < 60 V
Dimensions and weight	
Dimensions (W x H x D) in mm	70 x 125 x 125
Weight	Approximately. 0.75 kg
Certifications and approvals	
CE	CE conformity according to 98/336 EEC and 73/23 EEC
UL/CSA	UL 508 (Listed, File E197259); CSA C22.2 No 14, No 60950-1-03
Shipbuilding	Germanischer Lloyd
Directive 94/9/EC	Declaration of conformity according to EN 60079-15: ATEX94/9/EC Cat.3;Eex, nA, II, T4 U
C-Tick	AS/NZS 2064:1997
Article numbers	
	6EP1334-2AA01, 6EP1334-2BA01

9.8 Typical power consumption

Technical specifications

Typical current and power consumption of the device at a rated voltage of 24 V

Description	Current consumption	Power consumption
Device with core i3 or core i7 processor	950 mA	23 W
Fieldbus (PROFINET)	120 mA	3 W
USB expansion [1]	Max. 500 mA	Max. 12 W
PCI expansion [1]	Max. 500 mA	Max. 12 W

[1] The total power of the PCI and USB expansion may not exceed 15 W

Dimension drawings

10

10.1 Overview of the dimensional drawings

This section contains the dimension drawings for the SIMOTION P320-4:

- Standard rail mounting (Page 131)
- Vertical mounting (Page 133)
- SIMOTION P320-4 with an expansion card (Page 135)

10.2 Device dimension drawing for standard rail mounting

Various views of the standard rail mounting with dimensions are shown in the following:

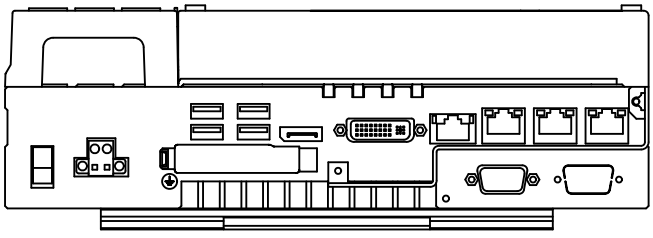


Figure 10-1 Standard rail mounting, bottom view

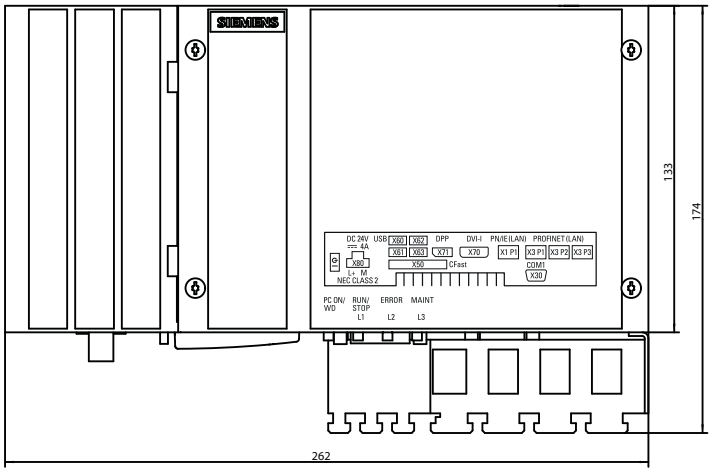


Figure 10-2 Standard rail mounting, front view

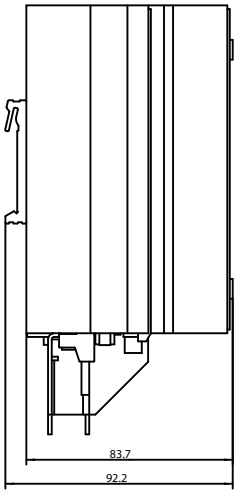


Figure 10-3 Standard rail mounting, side left view

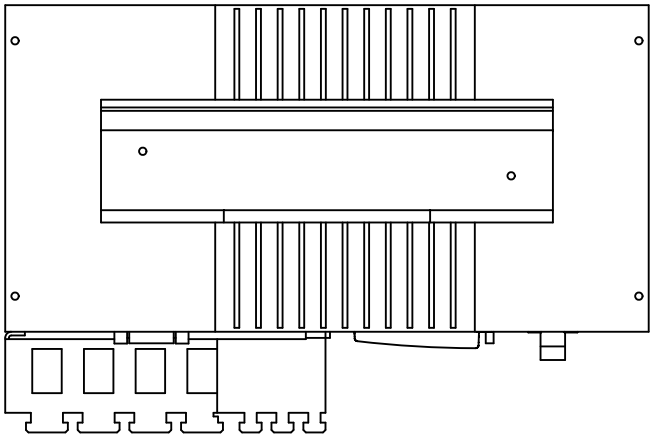


Figure 10-4 Standard rail mounting, rear view

All dimensions in mm.

10.3 Device dimension drawing for vertical mounting

Various views of the vertical mounting with dimensions are shown in the following:

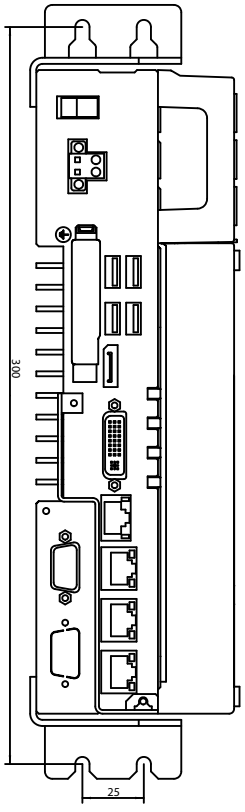


Figure 10-5 Vertical mounting, front view

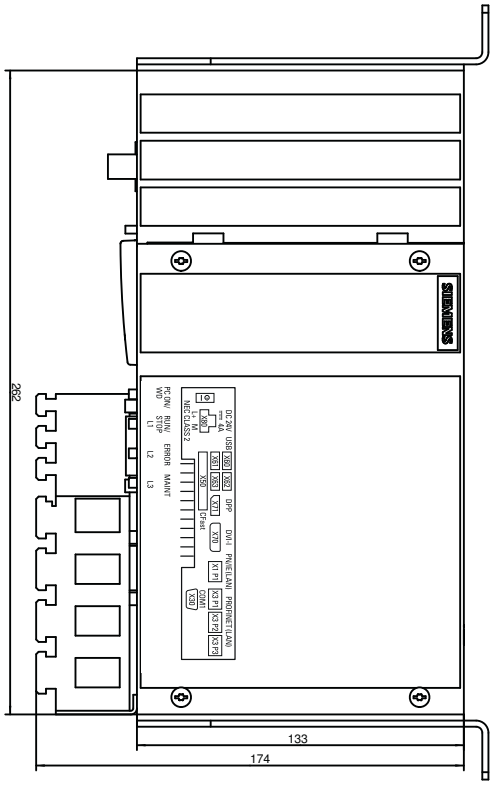


Figure 10-6 Vertical mounting, front side view

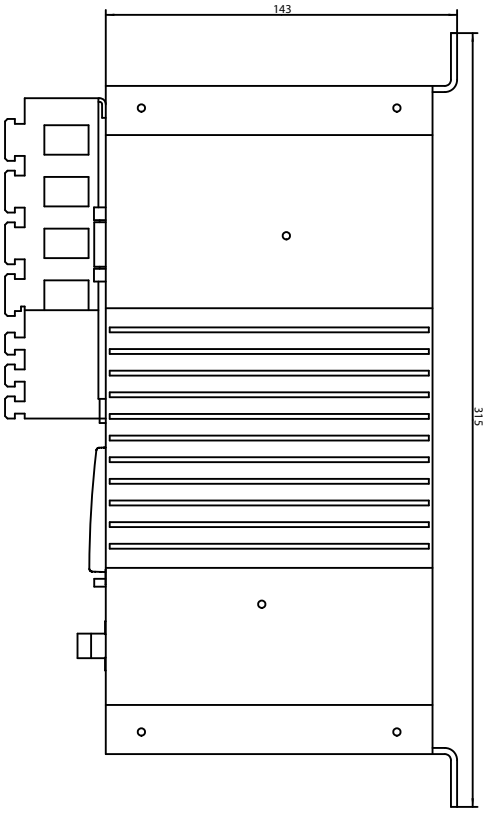


Figure 10-7 Vertical mounting, rear side view

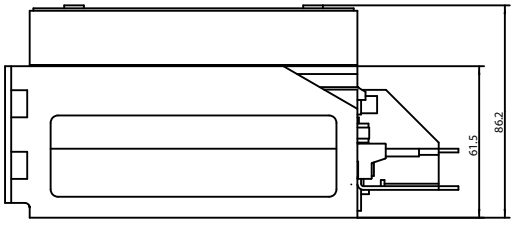


Figure 10-8 Vertical mounting, view from above

All dimensions in mm.

10.4 Dimension drawing of device with one expansion card

Device with one expansion card

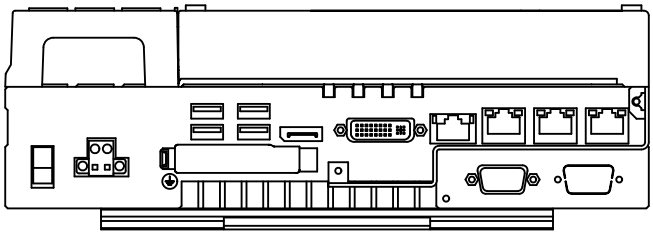
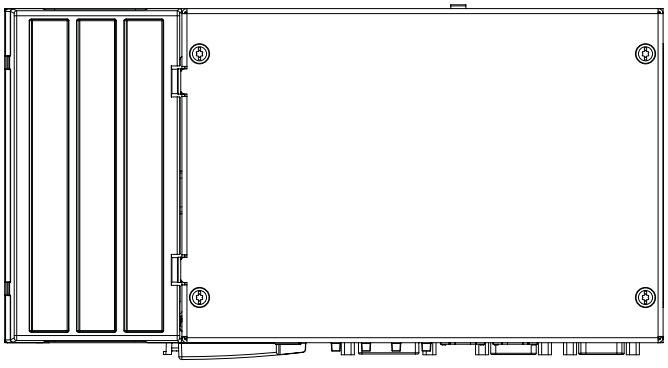
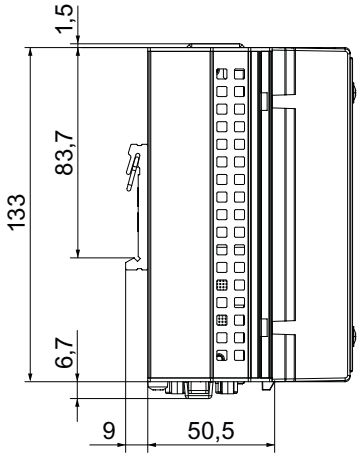


Figure 10-9 Standard rail mounting, bottom

SIMOTION P320-4 - Side views





Alle Angaben in mm

Spare parts

11

11.1 Available spare parts for SIMOTION P320-4

You can order the accessories via the Siemens Industry Mall (www.siemens.com/industrymall).

The following spare parts are available for SIMOTION P320-4:

Spare parts for SIMOTION P320-4			
Spare parts	**Article number**	**Scope of delivery**	**Accessories**
Lithium battery	A5E30314053	x	x
External CFast card The external CFast card contains user data. If a CFast card is used as a replacement for the external memory card, **no** Restore DVD or image is necessary.	6ES7648-2BF10-0XG0	x	x
IsoPROFIBUS board	6AU1390-0AA00-0AA1	-	x

Spares On Web

Spares On Web (http://support.automation.siemens.com/WW/view/en/16612315) is an information system that enables you to find out which spare parts are available for your device.

Standards and approvals

A

A.1 General rules

CE marking

CE	Our products satisfy the requirements and protection objectives of the EC Directives and comply with the harmonized European standards (EN).

Electromagnetic compatibility

Standards for EMC are satisfied if the EMC Installation Guideline is observed.

SIMOTION products are designed for industrial use in accordance with product standard DIN EN 61800-3, Category C2.

cULus approval

c UL us	Listed component mark for United States and the Canada Underwriters Laboratories (UL) according to Standard UL 508, File E164110, File E115352, File E85972.

You can find further information on the respective device on the Internet at http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm Enter the first seven characters of the article number at **Keyword**. Then click **Search**.

Korea certification

KC	KC registration number: KCC-REM-S49-SIMOTION Note that this device complies with limit class A with regard to the emission of radio frequency interference. This device can be used in all areas except residential areas. 이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

Declaration of conformity

The current Declaration of conformity is available on the Internet at Declaration of conformity (http://support.automation.siemens.com/WW/view/en/10805446/134200).

ESD Guideline

B

B.1 ESD definition

What does ESD mean?

Electrostatic sensitive devices (ESDs) are individual components, integrated circuits, modules or devices that may be damaged by either electrostatic fields or electrostatic discharge.



NOTICE

Damage caused by electric fields or electrostatic discharge

Electric fields or electrostatic discharge can result in malfunctions as a result of damaged individual parts, integrated circuits, modules or devices.

- Only pack, store, transport and send electronic components, modules or devices in their original packaging or in other suitable materials, e.g conductive foam rubber or aluminum foil.
- Only touch components, modules and devices if you are first grounded by applying one of the following measures:
  - Wearing an ESD wrist strap
  - Wearing ESD shoes or ESD grounding straps in ESD areas with conductive flooring
- Only place electronic components, modules or devices on conductive surfaces (table with ESD surface, conductive ESD foam, ESD packaging, ESD transport container).

B.2 Electrostatic charging of individuals

Any person who is not conductively connected to the electrical potential of the environment can accumulate an electrostatic charge.

This figure indicates the maximum electrostatic charges that can accumulate on an operator when he comes into contact with the indicated materials. These values comply with the specifications in IEC 801-2.

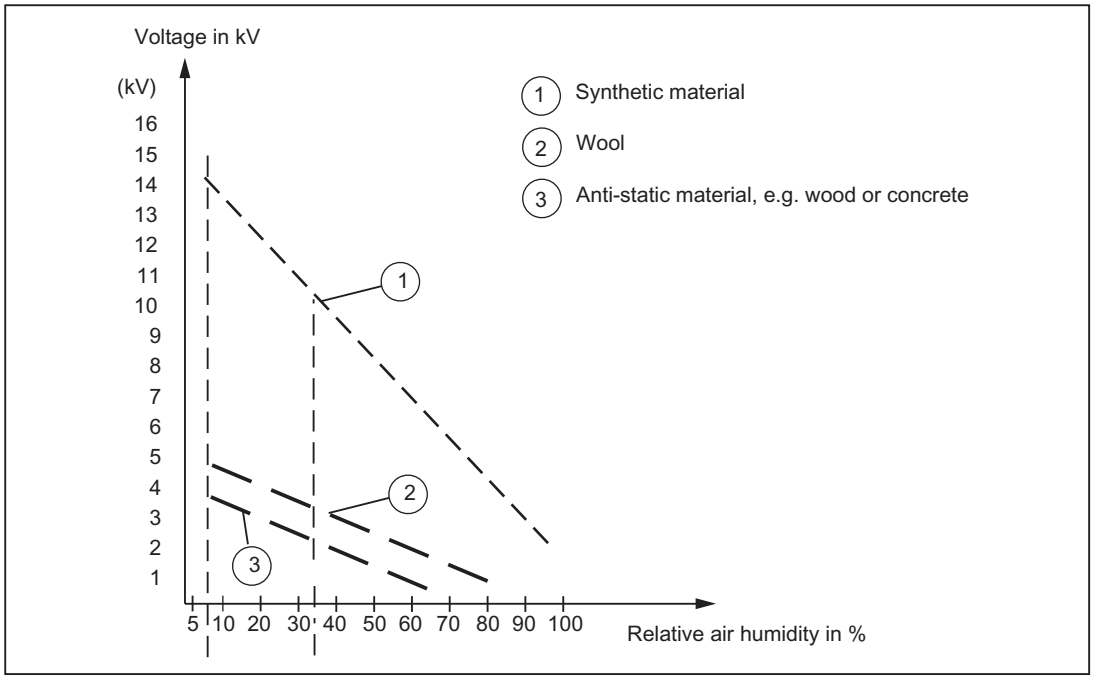


Figure B-1 Electrostatic voltage that can accumulate on operating personnel

B.3 Basic measures for protection against discharge of static electricity

Ensure sufficient grounding

When working with electrostatic sensitive devices, make sure that the you, your workstation, and the packaging are properly grounded. This prevents the accumulation of static electricity.

Avoid direct contact

You should only touch ESD components if unavoidable (for example, during maintenance work). When you touch modules, make sure that you do not touch either the pins on the modules or the printed conductors. If you follow these instructions, electrostatic discharge cannot reach or damage sensitive components.

If you have to take measurements on a module, make sure that you first discharge any static that may have accumulated in your body. To do this, touch a grounded metal object. Only use grounded measuring instruments.

Index

A

Add Hardware Wizard, 63
Ambient conditions, 79
    SIMOTION P320-4, 122
Approval, 79
Article number
    SIMOTION P320-4, 77
    SIMOTION P320-4 S, 119
    SIMOTION P320-4 E, 119
AutoLogin, 38
Automatically Log On, 38

B

Basic data
    P320-4, 51, 52
Battery
    SIMOTION P320-4, 135
BIOS settings, 113
Buffer memory, 120

C

CE marking, 137
CFast card
    Pin assignment of the interface, 91
    SIMOTION P320-4, 91
    SIMOTION P320-4, 135
Change
    Password, 31
Climatic conditions
    SIMOTION P320-4, 122
Cloud computing, 24
COA label, 78
COM1 - serial interface
    SIMOTION P320-4, 92
COM1 interface, 92
Company security, 27
Condensation, 76
Connecting I/Os
    Information, 106
    SIMOTION P320-4, 105
Connecting the power supply
    SIMOTION P320-4, 108
cULus approval, 137

D

DC power supply, 125
Decentralized structure
    SIMOTION P320-4, 99
Declaration of conformity, 137
Defense in depth strategy, 25
Degree of protection, 119
Device Manager, 60
Diagnostics
    SIMOTION P320-4, 111
Dimensions, 119
Display elements and operator controls, 82
Display port
    Interface, 90
    SIMOTION P320-4, 90
Displaying, 81
Distributed configuration
    SIMATIC Flat Panel, 49
Distributed I/O systems, 56
DMZ network, 28
DPP, (Display port)
Drive / storage media
    SIMOTION P320-4, 120
Drive systems
    For connection via PROFINET, 56
Duty types
    SIMOTION P320-4, 98
DVI-I interface, 88, 89
    SIMOTION P320-4, 88, 89

E

Effects, 23
Electromagnetic compatibility, 137
    SIMOTION P320-4, 80
    SIMOTION P320-4, 120
EMC directives, 80, 137
Environmental conditions
    SIMOTION P320-4, 79
Equipotential bonding
    SIMOTION P320-4, 106
Error correction
    SIMOTION P320-4, 111
ESD guideline, 139
ET 200, 56

Ethernet, 121
P320-4, 52
SIMOTION P320-4, 109
Ethernet interface
SIMOTION P320-4, 88

F

FAQs
SIMOTION P320-4, 111
Firewall, 28
Functional test
SIMOTION P320-4, 93

G

General technical specifications
SIMOTION P320-4, 119
Graphics
P320-4, 51
SIMOTION P320-4, 121
Guideline
ESD, 139

H

Hardware components
SIMOTION P320-4, 81
Hardware overview
SIMOTION P320-4, 53
HMI
Ethernet, 57
Local, 58
Local communication, 57
PROFIBUS, 57
PROFINET, 57
SIMOTION P320-4, 57
Via Ethernet, 71
Via IsoPROFIBUS (optional), 73
Via PROFINET, 70

I

I/O systems, 56
Identification data
SIMOTION P320-4, 77
Industrial security
Possible effects, 23
Industrial Security
Threats, 23
Info material
URL, 82
Information
Connecting I/Os, 106
Integration
Ethernet, 109
Interfaces
CFast card, 91
COM1, 92
Display port, 90
DVI-I, 88, 89
P320-4, 52
PROFIBUS, 92
PROFINET, 87
RJ45 Ethernet, 88
SIMOTION P320-4, 54, 121
USB 3.0, 90, 91
Interference emission, 120
Internet of things, 24
IsoPROFIBUS board
SIMOTION P320-4, 135
Technical specifications, 123

L

Local HMI / ES
SIMOTION P320-4, 58

M

MAC addresses
SIMOTION P320-4 S, 77
MAC bridge miniport, 58
Setting up, 59
Main memory, 120
P320-4, 51
Mechanical conditions
SIMOTION P320-4, 123
Memory modules, 120
Microsoft loopback adapter
Installing, 63
Mobile devices, 24
Mobile networks, 24
Motherboard
SIMOTION P320-4, 120
Mounting
SIMOTION P320-4, 99
SIMOTION P320-4 - decentralized structure, 99
Mounting positions
SIMOTION P320-4, 93

N

Network bridge
Setting up, 59
Network connections, 60
Checking, 67
Network security, 26
Network services and ports, 31
Notes about usage
SIMOTION P320-4, 20
Notes for
Connecting I/Os, 105

O

OPC interface, 54
Operating, 81
Operating conditions, 79
Operating system
P320-4 E, 52
P320-4 S, 52
Operator controls
SIMOTION P320-4, 54
Optional components
SIMOTION P320-4, 57
Overview of connections
SIMOTION P320-4, 103
Overview of the interfaces
SIMOTION P320-4, 86

P

P320-4 E
Operating system, 52
Processor, 51
Storage media, 52
P320-4 S
Operating system, 52
Processor, 51
Storage media, 52
Package contents, 75
Checking, 75
Packaging, 75
Checking, 75
Removing, 75
Password
Change, 31
PED
Database, 76
Physical production security, 27
Pin assignment
CFast card, 91
Plant security, 26
Power consumption, 119
Power supply
Connecting, 108
DC power supply, 125
P320-4, 51
Processor, 120
P320-4, 51
Product Equipment Data
Link, 76
PROFIBUS
Interface, 92
PROFIBUS interface
SIMOTION P320-4, 92
PROFINET, 121
Interface, 87
P320-4, 52
PROFINET interface
SIMOTION P320-4, 87
Protection zone, 28
Protective conductor connection
SIMOTION P320-4, 106

R

Radiation
High frequency radiation, 19
SIMOTION P320-4, 19
Rating plate
SIMOTION P320-4 S, 77
References, 4
Remote access, 24
Remote desktop connection
Deactivating, 45
Requirements
Virus scanner, 32

S

Safety information
Storage, 76
Transportation, 76
Safety instructions
SIMOTION P320-4, 18
SCALANCE S, 29
Scope of delivery
SIMOTION P320-4, 55
Security
AutoLogin for SIMOTION P, 21

Changing the Windows password, 21
Remote desktop connection, 22
SIMOTION IT, 22
Security holes, 24
Security module
SCALANCE S, 29
Serial number
SIMOTION P320-4, 77
Siemens Industry Mall
URL, 81, 109
Siemens Product Support
URL, 82
SIMATIC Flat Panel
Distributed configuration, 49
SIMOTION
Virus scanners, 33
SIMOTION P Runtime, 54
HMI software, 55
SIMOTION SCOUT, 55
Software, 54
SIMOTION P320-4
AutoLogin, 38
Automatically Log On, 38
BIOS settings, 113
CFast card, 91
COM1, 92
Connecting I/Os, 105
Display port, 90
Electromagnetic compatibility, 80
Functional test, 93
Hardware overview, 53
HMI, 57
Industrial security, 21
Notes about usage, 20
Optional components, 57
PROFIBUS interface, 92
Scope of delivery, 55
Status indicators, 85
Structure, 53
SIMOTION P320-4 E, 58
SIMOTION P320-4 S, 55, 58
SIMOTION SCOUT TIA, 55
SIMOTION P320-4
Ambient conditions, 122
Article number, 77
Battery, 135
CFast card, 135
Climatic conditions, 122
Connecting the power supply, 108
Decentralized structure, 99
Display elements and operator controls, 82
Drive / storage media, 120
Duty types, 98
DVI-I interface, 88, 89
Electromagnetic compatibility, 120
Environmental conditions, 79
Equipotential bonding, 106
Error correction, 111
Ethernet, 109
Ethernet interface, 88
FAQs, 111
General technical specifications, 119
Graphics, 121
Hardware components, 81
Identification data, 77
Interfaces, 54, 121
IsoPROFIBUS board, 123, 135
Local HMI / ES, 58
Mechanical conditions, 123
Motherboard, 120
Mounting positions, 93
Operator controls, 54
Overview of connections, 103
Overview of the interfaces, 86
PROFINET interface, 87
Protective conductor connection, 106
Radiation, 19
Rating plate, 77
Safety instructions, 18
Serial number, 77
SITOP smart 24 V/10 A, 125
Spare parts, 135
Standard rail mounting, 93
Versions, 49
Vertical mounting, 94
SIMOTION P320-4 S
Article number, 119
MAC addresses, 77
SIMOTION P320-4 E, 49
Article number, 119
SIMOTION P320-4 S, 49
SITOP smart 24 V/10 A
Technical specifications, 125
Smart Grid, 24
Spare parts
SIMOTION P320-4, 135
Spares On Web, 135
Standard rail mounting
Ambient conditions, 122
SIMOTION P320-4, 93
Status indicators
SIMOTION P320-4, 85

Storage media
P320-4 E, 52
P320-4 S, 52
Structure
SIMOTION P320-4, 53
Supply voltage, 119
System integrity, 26
System overview
SIMOTION P320-4, 53

T

Tablet PCs, 24
TCP/IP
Communication versions, 58
Technical specifications
Degree of protection, 119
Dimensions, 119
Drive / storage media, 120
Electromagnetic compatibility, 120
General information on SIMOTION P320-4, 119
Graphics, 121
IsoPROFIBUS board, 123
Motherboard, 120
Power consumption, 119
SITOP smart 24 V/10 A, 125
Supply voltage, 119
Weight, 119
Technical specifications interfaces, 121
Threats, 23
Troubleshooting/FAQs, 111

U

UL certification, 137
URL
Info material, 82
Siemens Industry Mall, 81
Siemens Product Support, 82
USB 3.0
Interface, 90, 91
User accounts, 31

V

Ventilation grid, 79
Vertical mounting
Ambient conditions, 122
SIMOTION P320-4, 94
Virus scanner
Requirements, 32

W

Warranty, 18
Weight, 119
Windows password
Changing, 36
Permitting changes, 34
Windows Server Update Service, 32
Windows user password
Changing, 34
Wireless technology, 24
WSUS, 32