SIEMENS

SIMATIC

PC Adapter USB

Manual

Edition 05/2003
A5E00166353-02

Safety Guidelines

This manual contains notices intended to ensure personal safety, as well as to protect the products and connected equipment against damage. These notices are highlighted by the symbols shown below and graded according to severity by the following texts:

Danger
indicates that death, severe personal injury or substantial property damage will result if proper precautions are not taken.

Warning
indicates that death, severe personal injury or substantial property damage can result if proper precautions are not taken.

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

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

Notice
draws your attention to particularly important information on the product, handling the product, or to a particular part of the documentation.

Qualified Personnel

Only **qualified personnel** should be allowed to install and work on this equipment. Qualified persons are defined as persons who are authorized to commission, to ground and to tag circuits, equipment, and systems in accordance with established safety practices and standards.

Correct Usage

Note the following:

Warning
This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.

This product can only function correctly and safely if it is transported, stored, set up, and installed correctly, and operated and maintained as recommended.

Trademarks

SIMATIC®, SIMATIC HMI® and SIMATIC NET® are registered trademarks of SIEMENS AG.

Third parties using for their own purposes any other names in this document which refer to trademarks might infringe upon the rights of the trademark owners.

Disclaimer of Liability

We have checked the contents of this manual for agreement with the hardware and software described. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the data in this manual are reviewed regularly and any necessary corrections included in subsequent editions. Suggestions for improvement are welcomed.

Siemens AG
Bereich Automation and Drives
Geschaeftsgebiet Industrial Automation Systems
Postfach 4848, D- 90327 Nuernberg

Siemens Aktiengesellschaft

A5E00166353-02

Preface

Purpose of the Manual

This manual gives you a complete overview of PC Adapter USB. It guides you when installing and commissioning the software and hardware. It also describes the operation and hardware installation requirements, as well as, the connection of the Adapter to MPI/DP networks.

This manual is intended for the programmers and for those responsible for configuring, commissioning, and servicing automation systems.

Required Basic Knowledge

You require a general knowledge in the field of automation engineering to be able to understand this manua.

In addition, you should know how to use computers or devices with similar functions (e.g programming devices) under Windows 2000 or Windows XP operating systems.

Where is this Manual valid?

This manual is valid for the product PC Adapter USB.

Certification

PC Adapter USB have the following certification:

- Underwriters Laboratories, Inc.: UL 60950 registered and Canadian Standard C22.2 No. 60950 (Information Technology Equipment)

CE Labeling

PC Adapter USB fulfil the requirements and protection guidelines of the following EU directives:

- EC Directive 89/336/EWG "EMC directive"

CTick Mark

PC Adapter USB is compliant with requirements of the AS/NZS 3548 (Australian and New Zeeland) standard.

Further Support

If you have any technical questions, please get in touch with your Siemens representative or agent responsible.

http://www.siemens.com/automation/partner

Training Centers

Siemens offers a number of training courses to familiarize you with the SIMATIC S7 automation system. Please contact your regional training center or our central training center in D 90327 Nuremberg, Germany for details:

Telephone: +49 (911) 895-3200.

Internet: http://www.sitrain.com

A&D Technical Support

Worldwide, available 24 hours a day:

Worldwide (Nuernberg) **Technical Support** 24 hours a day, 365 days a year Phone: +49 (0) 180 5050-222 Fax: +49 (0) 180 5050-223 E-Mail: adsupport@ siemens.com GMT: +1:00		
Europe / Africa (Nuernberg) **Authorization** Local time: Mon.-Fri. 8:00 to 17:00 Phone: +49 (0) 180 5050-222 Fax: +49 (0) 180 5050-223 E-Mail: adsupport@ siemens.com GMT: +1:00	**United States** (Johnson City) **Technical Support and Authorization** Local time: Mon.-Fri. 8:00 to 17:00 Phone: +1 (0) 423 262 2522 Fax: +1 (0) 423 262 2289 E-Mail: simatic.hotline@ sea.siemens.com GMT: -5:00	**Asia / Australia** (Beijing) **Technical Support and Authorization** Local time: Mon.-Fri. 8:00 to 17:00 Phone: +86 10 64 75 75 75 Fax: +86 10 64 74 74 74 E-Mail: adsupport.asia@ siemens.com GMT: +8:00
The languages of the SIMATIC Hotlines and the authorization hotline are generally German and English.		

Service & Support on the Internet

In addition to our documentation, we offer our Know-how online on the internet at:

http://www.siemens.com/automation/service&support

where you will find the following:

- The newsletter, which constantly provides you with up-to-date information on your products.
- The right documents via our Search function in Service & Support.
- A forum, where users and experts from all over the world exchange their experiences.
- Your local representative for Automation & Drives via our representatives database.
- Information on field service, repairs, spare parts and more under "Services".

Contents

1 Features of the PC Adapter USB

The PC Adapter USB is compatible with USB V1.1 and conforms to the norms for a "low-powered“ USB device. The PC Adapter USB supports the energy saving mode (hibernate mode).

1.1 Function

The PC Adapter USB connects a PC to the MPI/DP interface of an S7/M7/C7 system through a USB port.

No slot is required in the PC and therefore the adapter can also be used for non-expandable PCs such as notebooks.

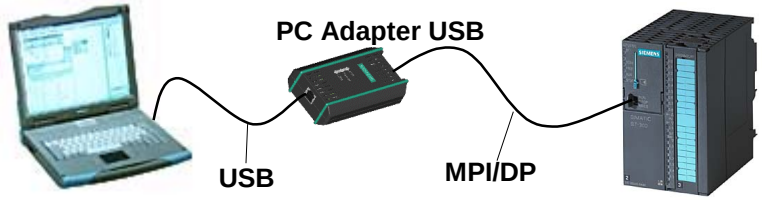


Fig. 1-1: Configuration with the PC Adapter USB

Note

Only one PC Adapter USB can be used on a PC.

1.2 Specifications

The following table shows a matrix of baud rates and network types supported by the PC Adapter USB.

Table 1: Bus profile and baud rates

Baud rate	MPI	PROFIBUS			
		DP	Standard	Universal	Custom
9,600 bps	-	✓	✓	✓	✓
19,200 bps	✓	✓	✓	✓	✓
45,450 bps	-	✓	✓	-	✓
93,750 bps	-	✓	✓	✓	✓
187,500 bps	✓	✓	✓	✓	✓
500 bps	-	✓	✓	✓	✓
1500 bps	✓	✓	✓	✓	✓

Other features

- Automatic search for baud rates and profiles
- Up to 16 communication connections, including a maximum of 4 slaves (DP/T connections)
- Supports routing

2 Package Components

The PC Adapter USB package includes:

- One "SIMATIC Software PC Adapter USB“ CD with software and documentation
- One USB cable (5 m)
- One MPI/DP cable (0.3 m)

Spare parts

Spare part	Order number
USB cable (5 m)	A5E00164956
MPI/DP cable (0.3 m)	A5E00164946

You can order a replacement cable from your Siemens representative.

3 Requirements for Operation

3.1 Software Requirements

One of the following operating systems must be installed on the PC to operate the PC Adapter USB:

- Windows 2000
- Windows XP Professional
- Windows XP Home

and

- a SIMATIC software package that communicates via MPI (for example, STEP 7)

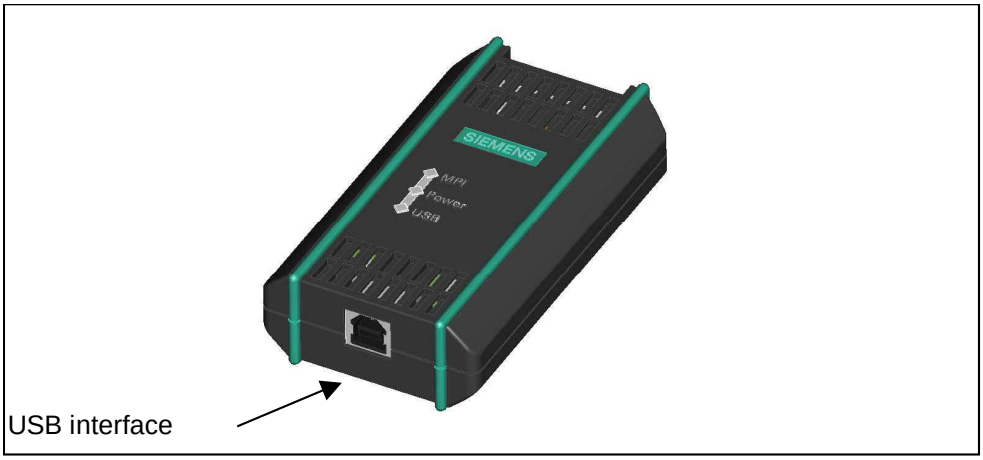
3.2 Hardware Requirements

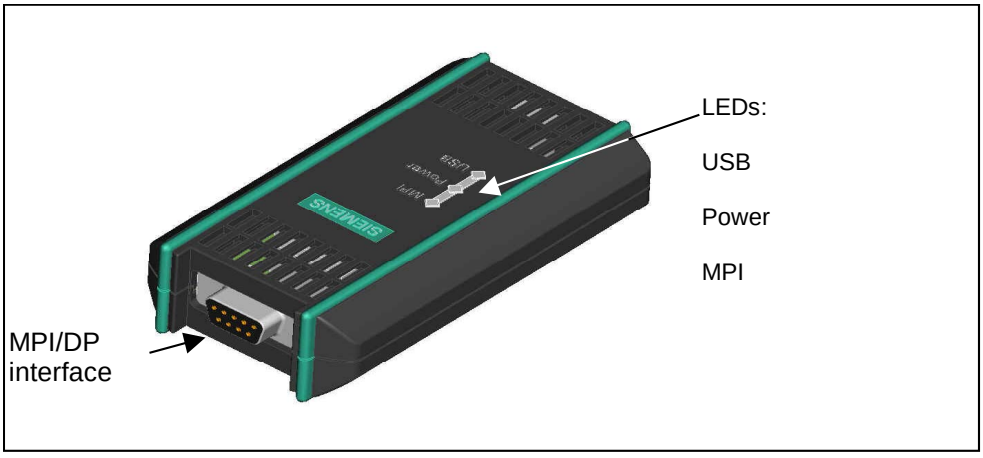
You require a PC with a USB interface and a CD ROM drive.

4 Hardware Design of the PC Adapter USB

4.1 Connections

The following connections are available on the PC Adapter USB:





4.2 LEDs on the PC Adapter USB

The LEDs on the PC Adapter USB indicate the following:

Name	Color	Meaning
USB	green	Lights when the PC Adapter USB is connected to the USB and the operating system of your PC is in the normal operating mode. This LED is not lit when the PC is in standby or idle mode. The LED flashes during data transmission.
POWER	green	Lights when the PC Adapter USB is supplied with the necessary power. Flashes when a hardware fault is detected.
MPI	green	Lights when the PC Adapter USB is connected to the MPI/DP network and is operational. The LED flashes during active data transmission via the MPI/DP network. The LED is off when no firmware has been loaded in the PC Adapter USB.

The LED displays for error states are described in Chapter 8: Error Diagnostics.

4.3 Power Supply

The PC Adapter USB is supplied with power by the automation system through the MPI cable included in the delivery.

It requires 24 volts (see Specifications).

Caution

For connection to NEC class 2 or limited power source only.

UL-recognized cable, AWM 2464, 80°C, 300V, 28 AWG, VW-1.

Fig. 1: MPI-cable, 0.3m with attached 9-pin Sub-D connectors.

Warning

Only use the MPI-cable as described here and provided with your PC Adapter USB.

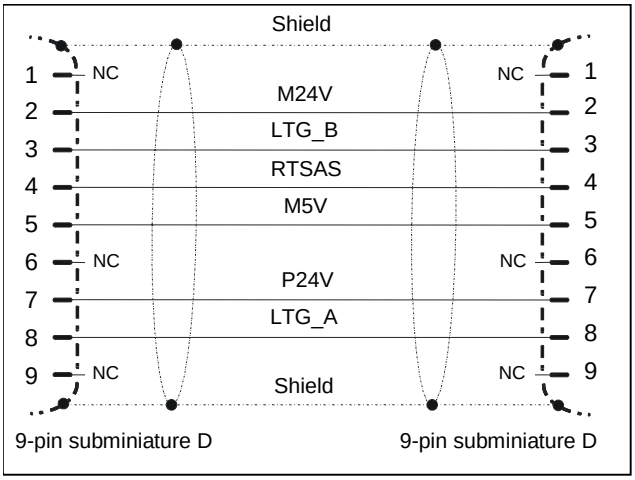


Fig. 2: MPI cable (0.3 m)

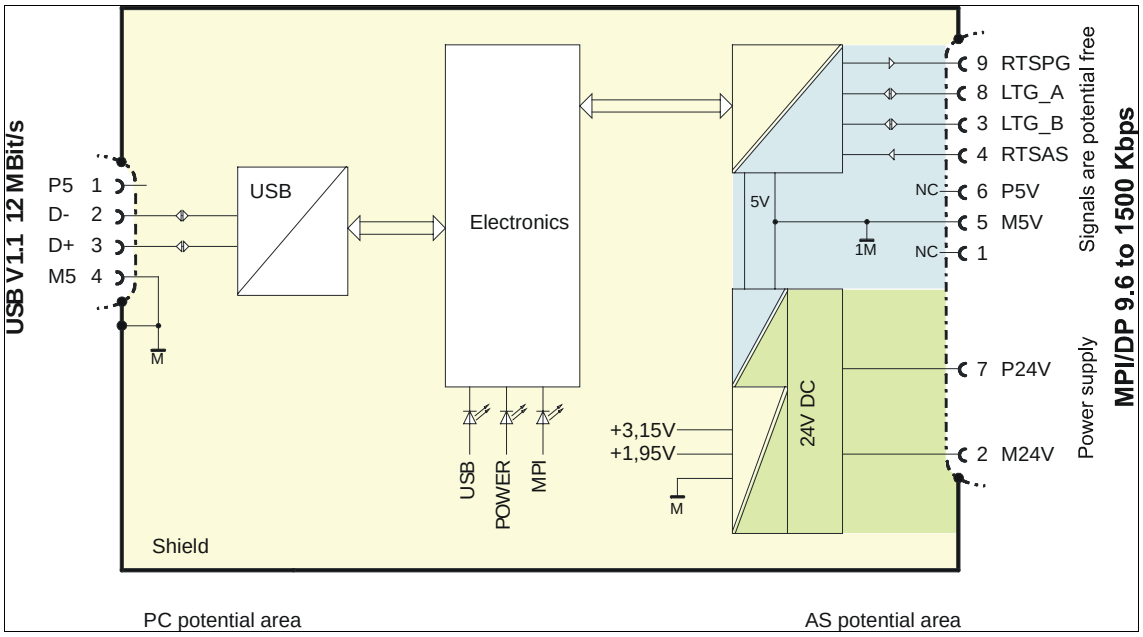


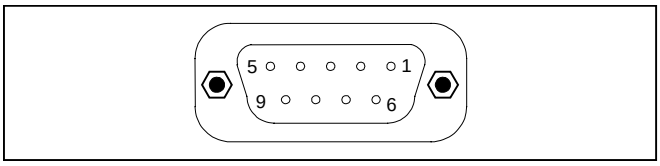
Fig. 3: Block diagram

The MPI/DP and USB interfaces of the PC Adapter USB are electrically isolated within a safety extra low-voltage circuit (SELV). It can therefore be operated directly on ungrounded S7/M7/C7 systems.

4.4 MPI/DP Interface

Connector Pin Assignment

The MPI/DP socket is configured as follows:



Description of Signals

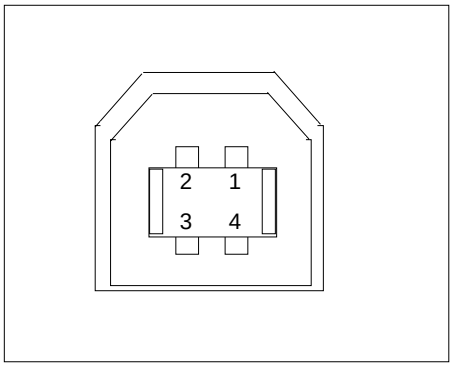
Pin. No.	Abbreviated Name	Meaning	Input/ Output
1	NC	Not used	–
2	M24V	24V supply's 0V line, supplies adapter electronics via DC/DC converter (PC potential area)	Input
3	LTG_B	Data line B	Input/output
4	RTS_AS	RTSAS control signal for receive data current. The signal is active '1' when the directly connected AS is transmitting.	Input
5	M5V	Reference potential of the MPI/DP interface for the RTS_AS and RTS_PG signals	Input
6	P5V	non used	
7	P24V	24V supply's +24V line, supplies adapter electronics via DC/DC converter (PC potential area)	Input
8	LTG_A	Data line A	Input/output
9	RTS_PG	Adapter's RTS output signal. The signal is '1' when the adapter is transmitting. The signal is not contained in the 0.3 m MPI cable!	Output
Shield		On socket casing*	

* The shielding is provided by a continuous screen from the adapter housing to the USB socket.

4.5 USB Interface

Interface Pin Assignments

Top view of the USB socket:



Description of Signals

Pin. No.	Signal	
1	+5V	Power supply
2	-Data	- Differential signal
3	+Data	+ Differential signal
4	Ground	Ground

Caution

Operating several USB devices on your PC may effect the data transmission rates. To obtain optimum communication performance with the automation system, disconnect USB devices that are not required.

5 Working with the PC Adapter USB

5.1 Technical Safety Notes

Qualified Personnel

The device should only be commissioned and operated by qualified personnel. Qualified personnel as referred to in safety guidelines in this document are persons authorized to start, ground, and tag circuits, equipment, and systems in accordance with established safety practice.

Proper Usage:

Warning

The equipment/system or the system components may only be used for the applications described in the catalog or the technical description, and only in combination with the equipment, components, and devices of other manufacturers as far as this is recommended or permitted by Siemens.

The product will function correctly and safely only it is transported, stored, set up, and installed as intended, and operated and maintained with care.

5.2 Installation of the Software

1. Insert the supplied "SIMATIC Software PC Adapter USB“ CD into the CD ROM drive of your PCs.
2. In the setup dialog select the desired language, click on the ***Install software*** button and follow the subsequent instructions. The software will be installed on your PC.

If the auto-start function for the CD drive is not activated, start the interactive program by clicking on the ***Welcome.pdf*** file on the “SIMATIC Software PC Adapter USB“ CD.

5.3 Configuring the PG/PC Interface

You are prompted to configure the PG/PC interface during the installation of the software.

1. Check the PG/PC Interface dialog field for the following interface settings.

   The following points should be available in the selection list:

   - PC Adapter (Auto) (only when STEP 7 is installed)
   - PC Adapter (MPI)
   - PC Adapter (PROFIBUS)

   If something is missing:

   - Click on the Select... button for adding/removing interfaces. A dialog for installing/uninstalling interfaces is subsequently displayed.
   - Select the PC Adapter module from the list and install it. Exit the dialog with the Close button.

2. Now select the interface configuration in the Set PG/PC Interface dialog with which you intend to communicate, for example, the PC Adapter (MPI). Click on the Properties button.
3. In the Properties dialog of the PC Adapter (see table below) check if the parameters set fit your system configuration and change the settings if necessary:

Interface Configuration	**Check in the tab**
PC Adapter (Auto)	Automatic bus profile detection
PC Adapter (MPI)	MPI
PC Adapter (PROFIBUS)	PROFIBUS

4. The Properties dialog for the PC Adapter (MPI) is displayed. Select the local connection in the Local tab. Set USB in the selection field for the COM port (or Connection to:).
5. Exit the Properties dialog for the PC Adapter by clicking the OK button.
6. Exit the Set PG/PC Interface dialog by clicking the OK button.
7. A warning appears if you have changed an access path during the configuration. Acknowledge the message with OK if you wish to accept the changes.

5.4 Connecting the PC Adapter USB

Connecting to the PC

1. Insert the supplied USB cable into the USB port of your PCs.
2. Insert the other end of the USB cable into the USB port of the PC Adapter USB.

Connecting to the Automation System

1. Insert the supplied MPI cable into the PC Adapter USB and screw it tight.
2. Insert the other end of the MPI cable into the MPI port of your CPU and screw it tight.

Note

The adapter and the S7/M7/C7 system each represent a network node.

- The adapter is connected directly to the socket of the S7/M7/C7 system in networks with two nodes (adapter and S7/M7/C7 system).
- When the network contains more than two nodes, the adapter should be connected to the "PG socket“ of a PROFIBUS connector (SINEC L2 bus connector).

Caution

Do not connect the PC Adapter USB to the automation system with any other cable than the supplied MPI cable.

6 PC Adapter USB on the MPI/DP Network

6.1 General

A maximum of 32 nodes can be connected to a MPI/DP network segment. The total length may not exceed 50 meters. Several network segments can be connected together using RS485 repeaters enabling a maximum total of 127 nodes on the network. The data transmission rate in the MPI/DP network is a maximum of 12 Mbps.

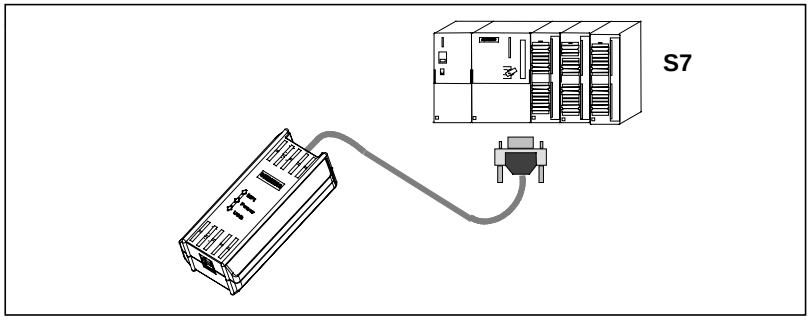
The PC Adapter USB supports transmission rates up to a maximum of 1.5 Mbps.

Warning

An extension cable should not be used in the connection between the adapter and the S7/M7/C7 system.

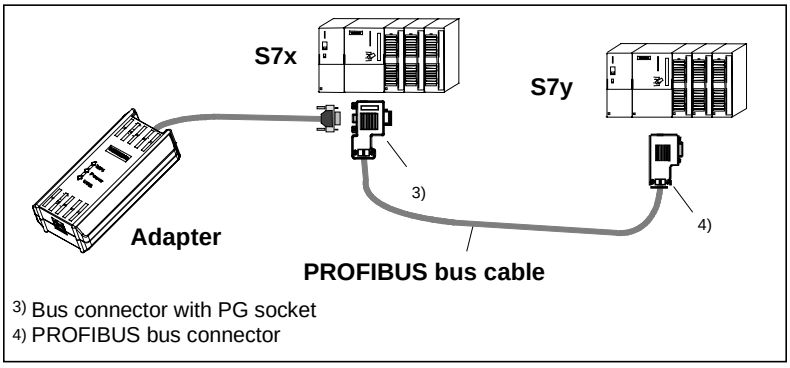
6.2 Use as a Stand-alone System

The following illustration shows the connection between two individual systems (2 network nodes).



6.3 Use in a Network System

The following illustration shows the connection in a S7 system network (MPI/DP network with 2 or more network nodes).



3) Bus connector with PG socket
4) PROFIBUS bus connector

Once you have completed the installation and configuration of the PG/PC interface, you can communicate with the automation system using your SIMATIC software package.

7 Firmware Update

The firmware of the PC Adapter USB can be updated, for example, when new functions have been added.

Carry out the following steps to update the firmware:

- Download the latest firmware and the firmware update utility from the Internet address:

  http://www.siemens.de/automation/simatic-cs

- Search the product support area for the term "PC Adapter USB“.
- Download the self-extracting EXE file containing the available firmware and the firmware update utility to your PC.
- Unzip the files to a local drive and update the firmware in your PC Adapter USB by following the instructions presented by the firmware update utility.
- Please read the readme file in the "Firmware" folder of the firmware update utility. It contains notes about the installation and use of the latest firmware.

Note

The latest firmware and the firmware update utility is available on your "SIMATIC Software PC Adapter USB" CD in the "Firmware" folder at the time of delivery.

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8 Error Diagnostics

The information in the following section offers support to help you locate and perhaps correct common errors by yourself.

Error/Cause	Remedy
POWER LED does not light	
• MPI cable not connected • Automation system is switched off • Hardware error	• Connect MPI cable • Switch on automation system • Inform Customer Support
USB LED does not light	
• USB cable not connected • PC and PC Adapter USB are in energy saving mode (hibernate mode). • PC Adapter USB is not detected by the PC	• Connect USB cable • Enter a reliable operating mode • Check driver installation and reinstall if necessary
MPI LED does not light	
• MPI cable not connected • Firmware not loaded	• Connect MPI cable • Start the supplied firmware update utility and check if the firmware is loaded.
No LED lights	
• MPI cable not connected • The required 24 V are not available at the MPI socket • Hardware error	• Connect MPI cable • Check cabling • Inform Customer Support
POWER LED flashes continuously	
• Hardware error	• If the POWER LED of the device continues to flash continuously even after pulling and plugging the MPI cable several times, the device is defective and should be exchanged.

9 Specifications

PC Adapter USB	
Order number	6ES7 972-0CB20-0XA0
Dimensions	Approx. 105 x 58 x 26 mm
Weight	Approx. 250 g
Interfaces	
To S7 / M7 / C7 To PC	RS 485 (max. 1.5 Mbps) USB (12 Mbps)
Power supply (via MPI interface)	24V DC (SELV) (18V.. 30VDC)
Power consumption	50 mA (type) / 100 mA (max.)
Inrush current	Imax. 700 mA; 8µs
Safety	
Safety class	Safety class III conforming to IEC 60950
Safety requirements	IEC 60950 corresponds to DIN/EN 60950
Degree of protection	IP 20
Electromagnetic Compatibility (EMC)	
Emitted interference	Limit value class B according to EN 55022
Immunity on signal lines	2 kV (according to IEC 61000-4-4; burst; length > 3m)
Immunity to discharges of static electricity (ESD)	6 kV, contact discharge (according to IEC 61000-4-2 8 kV, contact discharge (according to IEC 61000-4-2
Noise immunity to high-frequency radiation	10 V/m 80-1000 MHz, 80% AM (according to IEC 61000-4-3) 10 V/m 900 MHz, 1.89 GHz, 50% ED (according to IEC 61000-4-3)
RF conductance	10 V 9 kHz - 80 MHz (according to IEC 61000-4-6)
Ambient Conditions	
Temperature Operation Storage/shipping	Tested according to DIN EN 60068-2-2, DIN IEC 60068-2-1 +0 °C to +60°C, temperature change max. 10 K/h –20°C to +60°C, temperature change max. 20 K/h
Relative humidity Operation Storage/shipping	Tested according to DIN IEC 60068-2-3, DIN IEC 60068-2-30, DIN IEC 60068-2-14 5% to 80% at 25°C (no moisture) 5% to 95% at 25°C (no moisture)

PC Adapter USB	
Mechanical Ambient Conditions	
Vibration	Tested according to DIN IEC 60068-2-6
Operation	10 to 58 Hz: amplitude 0.075 mm, 58 to 500 Hz: acceleration 9.8 m/s
Storage/shipping	5 to 9 Hz: amplitude 3.5 mm, 9 to 500 Hz: acceleration 9.8 m/s
Shock	Tested according to DIN IEC 60068-2-27/29
Operation	150 m/s, 11 ms, 100 shocks
Storage/shipping	250 m/s, 6 ms, 1000 shocks

A Appendix

A.1 Certificates, Directives and Declarations

Notes on the CE Symbol

The following applies to the SIMATIC product described in this documentation:

EMC Directive

This product fulfils the requirements for the EC directive 89/336/EEC on “electromagnetic compatibility” and the following fields of application apply according to this CE symbol:

Field of Application	Requirement for	
	Emitted Interference	**Noise Immunity**
Residential and commercial areas and small businesses.	EN 61000-6-3: 2001	EN 61000-6-1: 2001
Industry	EN 61000-6-4: 2001	EN 61000-6-2: 2001

Declaration of Conformity

The EC declarations of conformity and the documentation relating to this are available to the authorities concerned, according to the above EC directive, from:

Siemens AG
Bereich Automation and Drives
A&D AS RD 4
Postfach 1963
D–92209 Amberg, Germany
Tel.: +49 9621 80 3283
Fax: +49 9621 80 3278

Observing the Installation Guidelines

The installation guidelines and notes on safety given in the manual must be observed
at startup and during operation.

Connecting Peripheral Devices

Noise immunity when connected to industrial standard PC conforms with the requirements of EN 61000-6-2:200.

A.2 Certification for the USA, Canada and Australia

One of the following markings on a device is indicative of the corresponding approval:

	Underwriters Laboratories (UL) according to the UL 60950 standard, and Canadian standard C22.2 No. 60950 (I.T.E) or to UL508 and C22.2 No. 142 (IND.CONT.EQ)
	UL Recognition Mark

EMC

Australia and New Zealand

This product meets the requirements of the AS/NZS 3548 Norm.

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