



Instruction Manual

# Uninterruptible Power Supply

Optional Accessory



We make it visible.

## **Uninterruptible Power Supply**

Optional Accessory

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## **About this Instruction Manual**





# 1 About this Instruction Manual

## 1.1 Introduction

Welcome to the UPS Instruction Manual.

**Content** This Instruction Manual contains all the information you need to work with the accessory option.

The Instruction Manual contains the following chapters:

Chapter	Content
About this Instruction Manual	Explains function and structure of this Instruction Manual
Safety	Summarizes important safety details
Device Description	Overview of the UPS microscope and its main hardware components
Working with UPS	Powering up and powering down the microscope as well as obtaining a first image
Maintenance and Repair	Describes preventive maintenance and repair tasks
Troubleshooting	Common issues and how to solve them
Shutdown and Disposal	Summarizes notes on shutdown and disposal
Technical Data and Conformity	Hardware specifications of the components
Abbreviations	Alphabetical list of abbreviations used in this instruction manual
Glossary	Alphabetical list of important technical terms
Index	List of keywords to help you find relevant information quickly

This Instruction Manual is part of the Uninterruptible Power Supply, hereinafter referred to as "UPS". Read the instructions carefully. Keep the Instruction Manual nearby the microscope and hand it over to future owners of the microscope.

This Instruction Manual is designed for operators who have been trained to operate the microscope by a ZEISS service representative. Basic operator training and safety instructions will be provided within the scope of initial start up by ZEISS. Operators of the microscope must not deviate from the instructions provided in this Instruction Manual.

## 1.2 Text Conventions and Link Types

The following conventions are used in this Instruction Manual:

Text Conventions	Convention	Meaning
	■ Click Start	The name of a control element is written in bold letters.
	■ Push the <b>STANDBY</b> button	
	■ Press Enter on the keyboard	
	Press <Ctrl+Alt+Del>	Press multiple buttons on the keyboard at the same time.
	Select Tools > Goto Control Panel > Airlock	Follow a path in the software.
	Input text	The font <code>Courier</code> highlights
	Output text	<ul style="list-style-type: none"> <li>■ text to be entered by the user</li> <li>■ text that is displayed by the system</li> </ul>
Link Types	Link Type	Leads to
	see Safety Instructions and Tips	Link to further information

## 1.3 Safety Instructions and Tips

The safety instructions in this Instruction Manual follow a system of risk levels, that are defined as follows:

**NOTICE**

Risk of property damage

NOTICE indicates a property damage message.

**TIP**

TIP indicates useful additional information. Tips can help you to make your daily work easier, but they are all optional. There is no risk for health or property involved.

## **1.4 Related Documents**

**EATON 9130 UPS 5000 - 6000 VA User's guide** - The manufacturer's documentation contains additional information about installation, wiring, operation, communication, maintenance, specifications and troubleshooting.





## Safety



## 2 Safety

### 2.1 Intended Use

The UPS is an accessory option for scanning electron microscopes. It is designed to bridge short power failures and to shut down the microscope in a controlled manner during longer power failures. Using the accessory option for any other purpose can lead to unpredictable hazards and might damage the accessory option or the microscope.

- Only use the accessory option according to this Instruction Manual.
- Only operate the accessory option if it is in safe operation condition.
- Make sure that everyone working with the accessory option only performs the tasks for which he/she is trained.
- Only operate the accessory option to the operating conditions after correct installation by a ZEISS service representative.
- Only perform preventive maintenance tasks described in this Instruction Manual. All pursuing tasks of maintenance, service, and repair not described in this Instruction Manual have to be performed by an authorized ZEISS service representative.
- Tasks described in the document EATON 9130 UPS 5000 - 6000 VA User's guide are only to be performed by an authorized ZEISS service representative.

### 2.2 Prevention of Hazards

#### 2.2.1 Property Damage

##### **NOTICE**

##### Risk of Damaging the Electron Gun

After a power failure, the UPS battery is almost empty. If the microscope is switched back on immediately after a power failure, the battery might not have enough power to shut down the microscope in a controlled manner in case of a following power failure. This can lead to an abrupt power down of the microscope and therefore damage the electron gun.

- ◆ Once the power has been restored, allow the battery to charge for a few hours before switching the microscope back on. It takes 24 hours to fully charge the battery.

**NOTICE**

Risk of Data Loss

If there is a longer power failure, the UPS will shut down the microscope in a controlled manner. Any running experiments will be aborted and not automatically saved.

Once the shut-down process is initiated, it cannot be stopped.

The UPS will only shut down the microscope PC in a controlled manner. Any additional PCs controlling third-party equipment will just become currentless once the battery capacity is used up.

- ◆ If you are working on the microscope and there is a power failure, save your data on all connected PCs and finish or abort any running experiments.



**3**

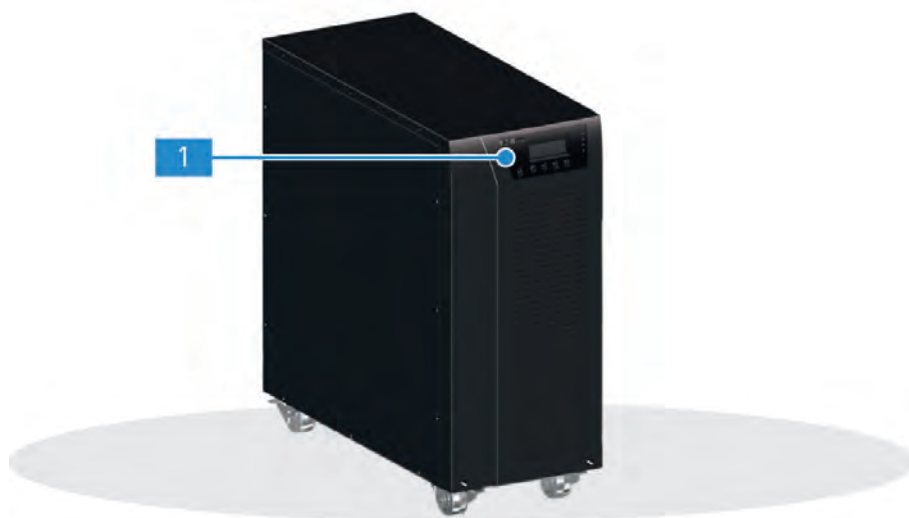
## **Device Description**



## 3 Device Description

### 3.1 Uninterruptible Power Supply (UPS)

**Purpose** The UPS provides electrical power for the entire microscope. The UPS supplies a regulated, and battery backed-up, 220-240 VAC output at 50/60 Hz to the microscope.



*Fig. 1: Uninterruptible power supply (front view)*

**1** Operator panel (front view)

### 3.1.1 Operator Panel

**Purpose** The UPS has a backlight graphical display with four buttons. It shows useful information about the UPS itself, the load status, events, measured values and settings.



Fig. 2: Operator panel of the UPS

- 1 On/Off Button
- 2 Escape
- 3 Up
- 4 Down
- 5 Enter
- 6 Power On Indicator (green)
- 7 On Battery Indicator (yellow)
- 8 Bypass Indicator (yellow)
- 9 Alarm Indicator (red)

#### 3.1.1.1 Status Indicators

Indicator	Status	Descriptions
Green	On	The UPS is operating normally.
	Flashing	A new information message is displayed.
Yellow	On	The UPS is in battery mode.
	Flashing	The battery capacity is below the warning threshold.

Indicator	Status	Descriptions
Yellow	On	<p>The UPS is in bypass mode. Die USV befindet sich im Bypass-Betrieb. Die USV funktioniert während des Hocheffizienzbetriebs Gelb ordnungsgemäß im Bypass-Betrieb.</p>
Red	On	<p>A warning or an error message is active.</p> <p>For details, refer to the document EATON 9130 UPS 5000 - 6000 VA User's guide.</p>



# 4

## Installation





## 4 Installation

Unpacking, installation and first start-up are carried out by an authorized ZEISS service representative. For details on installation refer to the document UPS Installation Requirements.



# 5

## Working with the UPS



## 5 Working with the UPS

### 5.1 Prerequisites

There are certain prerequisites that have to be taken into consideration when using the UPS.

- An air/water cooler has to be installed. Otherwise, the microscope might have to shut down due to a failure of the cooling system even though there is still power.
- The microscope PC has to be switched on all the time. Otherwise, the UPS can't shut down the microscope in case of an electricity failure.

### 5.2 How to Behave in Case of a Power Failure

If there is an power failure, pay attention to the following:

- If there is only a brief power failure, the UPS will provide enough energy to ensure regular operation of the microscope.
- If there is a longer power failure, the UPS will shut down the microscope in a controlled manner. To prevent data loss, save your data and finish or abort any running experiments.

#### NOTICE

##### Risk of Data Loss

If there is a longer power failure, the UPS will shut down the microscope in a controlled manner. Any running experiments will be aborted and not automatically saved.

Once the shut-down process is initiated, it cannot be stopped.

The UPS will only shut down the microscope PC in a controlled manner. Any additional PCs controlling third-party equipment will just become currentless once the battery capacity is used up.

- ◆ If you are working on the microscope and there is a power failure, save your data on all connected PCs and finish or abort any running experiments.

## 5.3 How to Behave After a Power Failure

After the microscope has been shut down due to an electricity failure, pay attention to the following:

### **NOTICE**

#### Risk of Damaging the Electron Gun

After a power failure, the UPS battery is almost empty. If the microscope is switched back on immediately after a power failure, the battery might not have enough power to shut down the microscope in a controlled manner in case of a following power failure. This can lead to an abrupt power down of the microscope and therefore damage the electron gun.

- ◆ Once the power has been restored, allow the battery to charge for a few hours before switching the microscope back on. It takes 24 hours to fully charge the battery.

# 6

## Maintenance and Repair





## 6 Maintenance and Repair

### 6.1 Testing the Power-Down Process

Once a year, you should test the power-down process. This ensures that you can rely on the UPS in case of a power failure.

It also shows if the capacity of the battery is decreasing due to ageing. Under normal circumstances, the lead-gel battery has a lifetime of ten years.

#### NOTICE

##### Risk of Damaging the Electron Gun

After a power failure, the UPS battery is almost empty. If the microscope is switched back on immediately after a power failure, the battery might not have enough power to shut down the microscope in a controlled manner in case of a following power failure. This can lead to an abrupt power down of the microscope and therefore damage the electron gun.

- ◆ Once the power has been restored, allow the battery to charge for a few hours before switching the microscope back on. It takes 24 hours to fully charge the battery.

#### NOTICE

##### Risk of Data Loss

If there is a longer power failure, the UPS will shut down the microscope in a controlled manner. Any running experiments will be aborted and not automatically saved.

Once the shut-down process is initiated, it cannot be stopped.

The UPS will only shut down the microscope PC in a controlled manner. Any additional PCs controlling third-party equipment will just become currentless once the battery capacity is used up.

- ◆ If you are working on the microscope and there is a power failure, save your data on all connected PCs and finish or abort any running experiments.

#### Prerequisite

- The battery is fully charged

#### Procedure

- 1 Unplug the UPS mains cable from the socket.

- 2 Measure the time until the microscope is shut down by the UPS.

An acoustic signal indicates that the microscope is now powered by the UPS. On the monitor, a counter will display the remaining battery capacity.

The UPS will use up the battery until a certain limit is reached. This limit is set to a point where a safe power-down process is still possible.

If you notice a considerable decrease in battery buffer time, contact the local ZEISS service representative to have the battery replaced.

- 3** Write down the measured time. This allows you to keep track of the battery health status.
- 4** Plug the UPS mains cable into the socket.
- 5** Before going back to work, allow the battery to charge for a few hours.



## Troubleshooting



## 7 Troubleshooting

Troubleshooting is carried out by an authorizedZEISS service representative. For details, refer to the documentEATON 9130 UPS 5000 - 6000 VA User's guide.



# 8

## Shutdown and Disposal





## 8 Shutdown and Disposal

Shutdown and Disposal is carried out by an authorized ZEISS service representative. For details, refer to the document EATON 9130 UPS 5000 - 6000 VA User's guide.



# 9

## Technical Data and Conformity



## 9 Technical Data and Conformity

### 9.1 Product Specification

#### Overall Data

User Interface	Graphical LCD display with blue back light and language selection between English, French, German, Russian and Spanish.
LEDs	Four status LEDs
Topology	Real online double converter technology
Diagnosis	Whole-system selftest
UPS Bypass	Electronic bypass
Rail Kit	included in all rack-mounted devices

#### Electrical Input

Nominal Voltage	220-240 V
Voltage Range	Up to 120-276 Vac (depending on the load)
Frequency Range	40-70 Hz (50/60Hz)

#### Electrical Output

Performance Factor	0,9
Voltage	±3% of the nominal value (for mains and battery operation)
Frequency Control	±3Hz online
Load-Crest Factor	3:1

#### Communication

Interfaces	RS-232- and USB- HID-interface
------------	--------------------------------

**Communication**

Relais Output	1x programmable
Optional Interface Cards (BD slot)	SNMP/Web-card for monitoring in SNMP-based networks. Monitoring via web browser interface.  Relay card for integration in industrial environments and BMS. Remote-controlled shutdown of IBM-AS/400 systems.
Performance	IEC 62040-3: VFI-SS-111

**Environmental Data**

Security and EMV labelling	IEC/EN62040-1-1, IEC/EN62040-1-2, GS, CE-labelling
Noise Generation	<50 dB
Ambient Temperature during Operation	0°C to +40°C
Storage Temperature	-20°C to +40°C with batteries/-25°C to +55°C without batteries
Relative Humidity	5-90 %, non-condensing

<b>Battery Life Time* (min)</b>	<b>Internal Batteries 75% load</b>	<b>Internal Batteries 50% load</b>	<b>+1 EBMs 75% load</b>	<b>+1 EBMs 50% load</b>
PW9130i600 OT-XL	16	27	66	107

External Battery Module

**9.2 Installation Requirements**

For more details, refer to the document EATON 9130 UPS 5000 - 6000 VA User's guide.

## **9.3 Declaration of Conformity**

For more details, refer to the document EATON 9130 UPS 5000 - 6000 VA User's guide.







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