

MANUAL

MD-4500PRO MD-6000PRO MD-10000PRO



EDELSTROM MD-PRO SERIES

4,5-10 KVA 1/1 PHASED





Manual: **Operating Instructions**
Language: **English**
Issue Date: **10/2024**

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multimatic EDELSTROM GmbH, Im Wasen 2, D-78667 Villingendorf, Germany

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1 General Information

1.1 Information About This Manual

This manual contains the most important instructions for the safe, proper, and efficient operation of the uninterruptible power supply (UPS).

It applies to the following UPS devices

- MD-4500PRO
- MD-6000PRO
- MD11-10000PRO

This manual is an integral part of the UPS system and must be kept near the UPS system, accessible at all times for authorized operating personnel.

Follow the instructions in this manual!

Ensure that all individuals working on or with the UPS have carefully read and follow the instructions in the manual.

In addition, the applicable accident prevention regulations (UVV) for the installation site/operation must be observed. In case of conflicts with national safety regulations or instructions, the national requirements must be followed.

multimatic EDELSTROM GmbH does not assume any liability for damages resulting from non-compliance with the manual, even during the warranty period.

In addition to this manual, please refer to the relevant technical documentation for the battery modules and batteries.

1.2 Abbreviations


The abbreviation **UPS** stands for **U**ninterruptible **P**ower **S**upply. In the following instructions, the term UPS will be used for the UPS device or system.

As energy storage, **accumulators** are used in the UPS systems. In the following instructions, the term **battery** will be used for this.

1.3 Explanation of Symbols and Notes






To facilitate quick comprehension of these instructions and ensure safe handling of the UPS systems, the following warning symbols and icons are used.

Structure of Safety Warnings



Type and source of the hazard.
Folgen bei Nichtbeachtung der Hinweise.
← Consequences of not following the warnings.

Safety Symbols

Symbol	Meaning
	<p>This symbol provides a general warning of potential injury risks.</p> <p>← Follow these warnings to prevent injuries.</p>
	<p>This symbol warns of the risk of injury from electrical hazards.</p> <p>← Follow these instructions to avoid injury from electric currents.</p>
	<p>This symbol warns of dangers associated with handling batteries.</p> <p>← Follow these warnings to prevent injury.</p>
	<p>This symbol warns of damage to property from electrostatic discharge.</p> <p>← Follow these warnings to avoid damage.</p>
	<p>This symbol provides a general warning of potential property damage.</p> <p>← Follow these warnings to prevent damage.</p>

Symbol Conventions

Note

This symbol highlights important information and instructions that contribute to efficient and trouble-free operation.

- 1**

Position numbers
- ←

Directive to perform a specific action.
- »SIGNAL«

Signal, message, or command.
- ☑

Requirements that must be met before subsequent actions can be carried out.

2 Safety

2.1 Intended Use

The UPS systems described in this manual provide protection for critical business areas such as server landscapes, network components, IT systems, large telephone systems, or industrial plants.

The system may only be operated:

- Indoors on a level surface
- Under the specified environmental conditions
- Without obstructing ventilation (see **Chapter 5.1, Site Requirements, page 29 / Chapter 9, Technical Data, page 72**).

Warning Against Misuse

The UPS systems must only be used as intended. Any other use or use beyond the specified purpose, such as:

- Use for life-supporting applications, use in hospitals or direct patient care
- Operation in areas with fire or explosion hazards, as well as in areas of extreme heat/cold or excessive humidity

is considered improper use. This also includes:

- Failure to follow the instructions in this manual, especially the safety, installation, and maintenance sections
- Opening or tampering with the UPS system
- Using replacement parts not approved by the manufacturer.

The manufacturer is not liable for any damages resulting from improper use. The risk is solely borne by the user.

2.2 General Safety Instructions



- Operate the product only in proper working condition and in accordance with its intended use, safety regulations, and with an awareness of potential hazards, as outlined in this manual.
- Electrical work on the equipment may only be performed by authorized electricians in compliance with electrical engineering regulations. Touching live wires or components poses a risk of death or serious injury and burns from electric shock.
- Operation is only permitted with a connected protective ground. It is recommended to connect the UPS to a dedicated power line with its own circuit protection, with no additional devices connected.
- Ensure that the UPS input voltage matches the main power supply voltage. Use a certified power cable with the specified cross-sectional sizes for the power system in use. Adhere to the recommended cable lengths.
- The UPS has its own internal power source (battery) and capacitors with high capacity. Dangerous voltage may still be present at the outputs, even if the system is disconnected from the main power supply.
- Never open the UPS housing! Dangerous voltage may be present inside, even if the system is disconnected from the power supply.
- Do not insert any objects into the housing openings. Do not spill liquids over or into the housing. This can cause short circuits, electric shocks, fires, or injuries.
- To prevent damage when handling, charging, and operating the batteries, all guidelines from the respective manufacturers and safety data sheets must be followed. All personnel must be trained in battery handling.

3 Scope of Delivery

3.1 Delivery and Unpacking



Health hazard due to physical overexertion or falling load.

Due to the heavy weight of the UPS and battery modules, lifting, moving, or carrying them can lead to physical overexertion. Dropping the equipment can cause injuries and property damage.

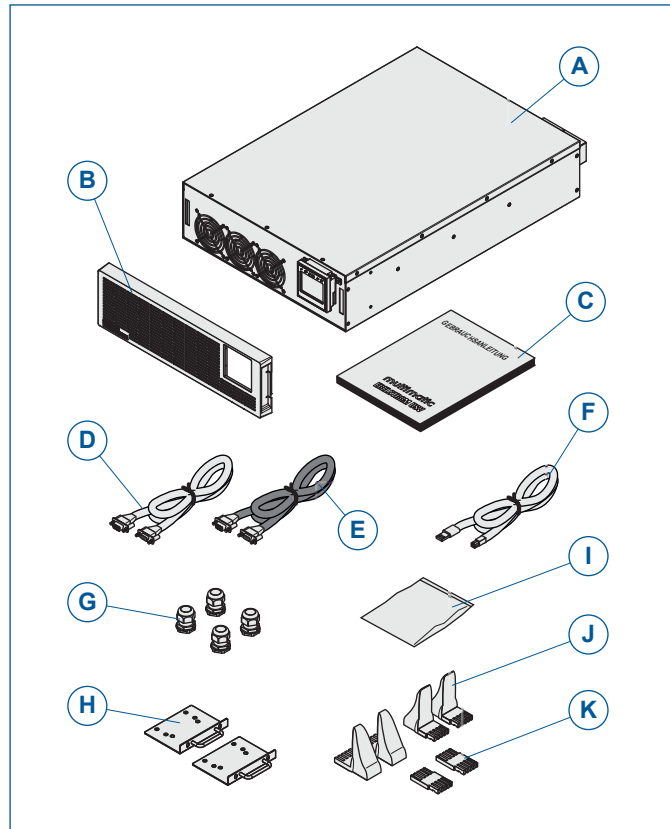
- ← Use appropriate lifting equipment and securing devices.
- ← Avoid manual handling of heavy loads. If manual handling is unavoidable, lift the load with multiple people.
- ← Observe the safety regulations for lifting and transporting heavy loads!

The individual components of the UPS are delivered separately.

Transport the devices internally to the installation location in accordance with the applicable accident prevention regulations

Unpacking

1. Inspect the condition of the packaging. In case of damage, contact the shipping company and the retailer/manufacturer.
2. Remove the UPS and accessories from the packaging. Retain the packaging for future use or dispose of it properly.



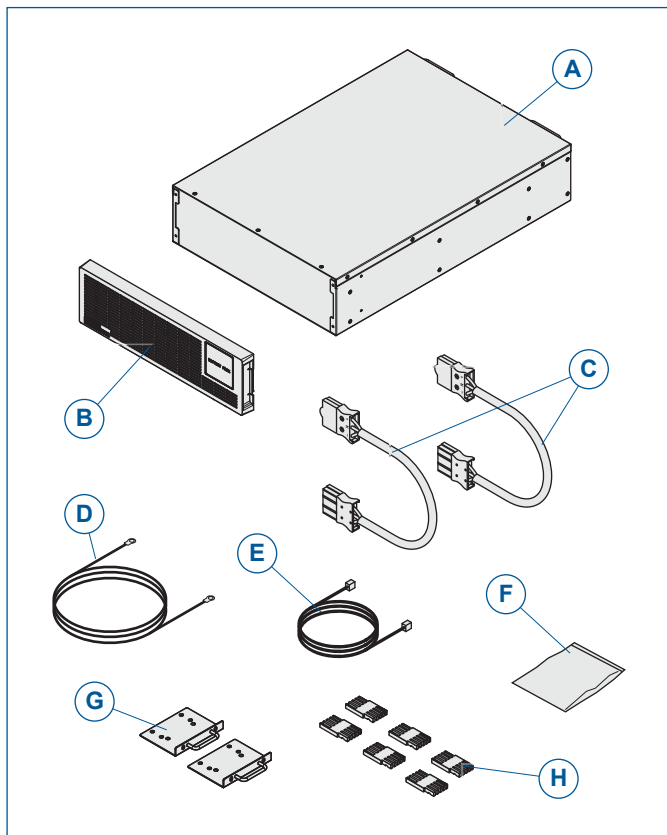
Scope of Delivery

MD-4500PRO

MD-6000PRO

MD11-10000PRO

- A** UPS
- B** Cover
- C** Manual
- D** RS232 data connection cable
- E** RS232 connection cable for parallel operation
- F** USB cable
- G** PG21 cable gland
- H** Mounting brackets for rack installation
- I** Small parts set, including:
M3x20 screws + washers and lock washers
Nuts (2x)
Ferrules (6x)
PDU connector
Countersunk screws M4x6 (4x)
- J** Stand feet
- K** Spacer pieces for stand feet



Scope of Delivery: Battery Pack

MDBP-4500PRO

MDBP-6000PRO

MD11BP-10000PRO

- A** Battery pack
- B** Cover
- C** Connection cable
- D** Grounding cable (65 cm)
- E** Connection cable for battery temperature measurement
- F** Small parts set, including:
 - train relief plates (2x)
 - M3x20 screws + washers and lock washers + Nuts (4x)
 - Countersunk screws M4x6 (4x)
- G** Mounting brackets for rack installation
- H** Spacer pieces for stand feet

4 Product Description

4.1 General

The UPS systems are double-conversion UPS with bypass, meaning that the load is supplied through a double conversion process from alternating current (AC) to direct current (DC) and vice versa (rectifier/inverter). This ensures that the output voltage is completely decoupled from the input voltage (VFI, Voltage and Frequency Independent).

The UPS systems protect against common power disturbances such as:

- Power supply failures, voltage dips, voltage fluctuations
- Overvoltages or voltage spikes
- Electrical noise signals, frequency deviations, or distortions (harmonic waves)

They meet the requirements for secure power supply quality, energy distribution, and power management for computer network and data centers, telecommunications equipment, and industrial applications.

Communication

The UPS systems feature an RS232 interface, a USB interface, and a slot for additional interface cards, allowing for easy remote control and monitoring.

Battery Management

The batteries are continuously charged if the UPS is connected to the mains power supply. When the load is supported by the batteries, the UPS will shut down when the end-of-discharge voltage is reached.

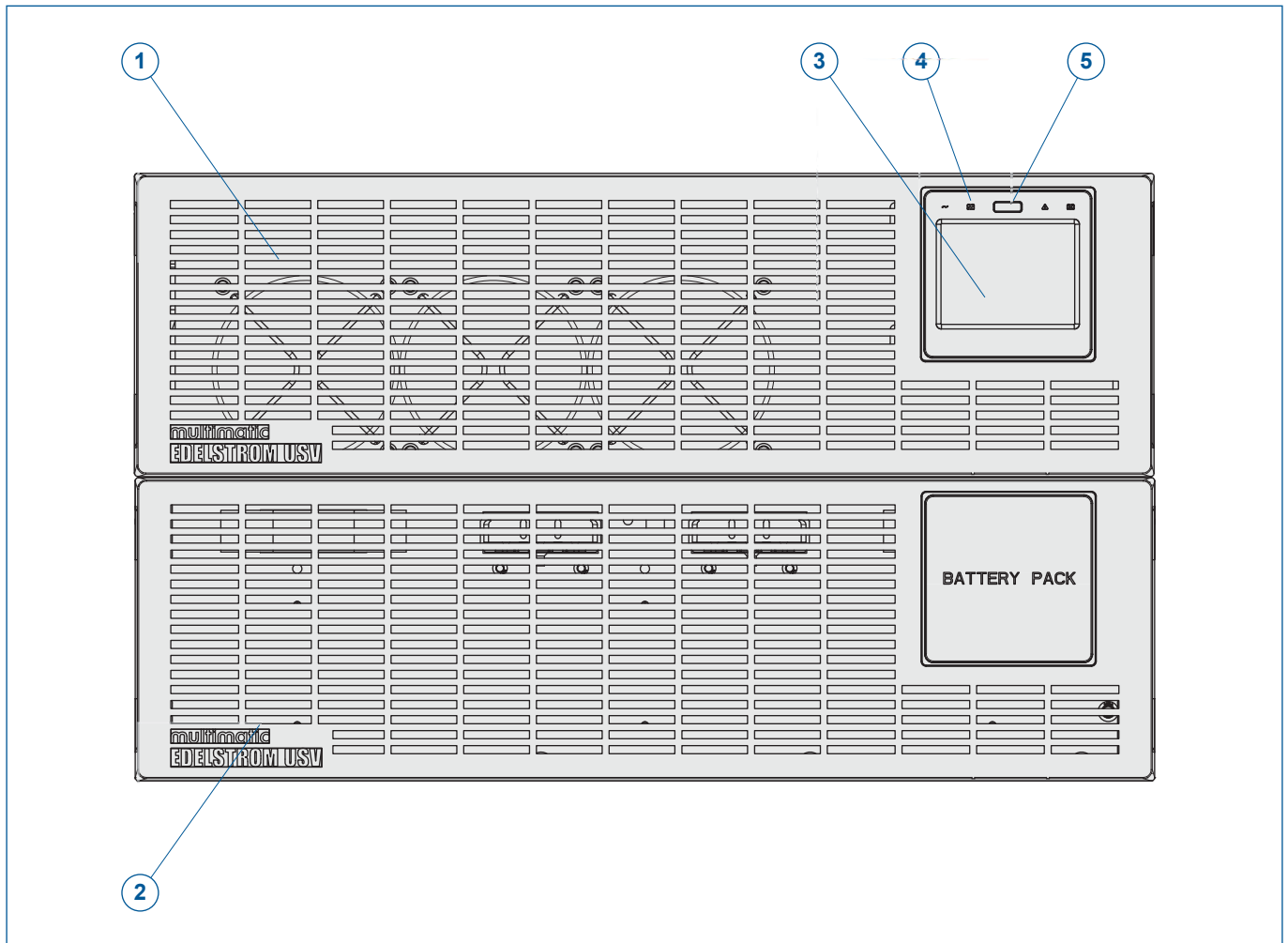
4.2 Models

UPS Systems and Battery Packs

UPS Models	Associated Battery Pack
MD-4500PRO	MDBP-4500PRO
MD-6000PRO	MDBP-6000PRO
MD11-10000PRO	MD11BP-10000PRO

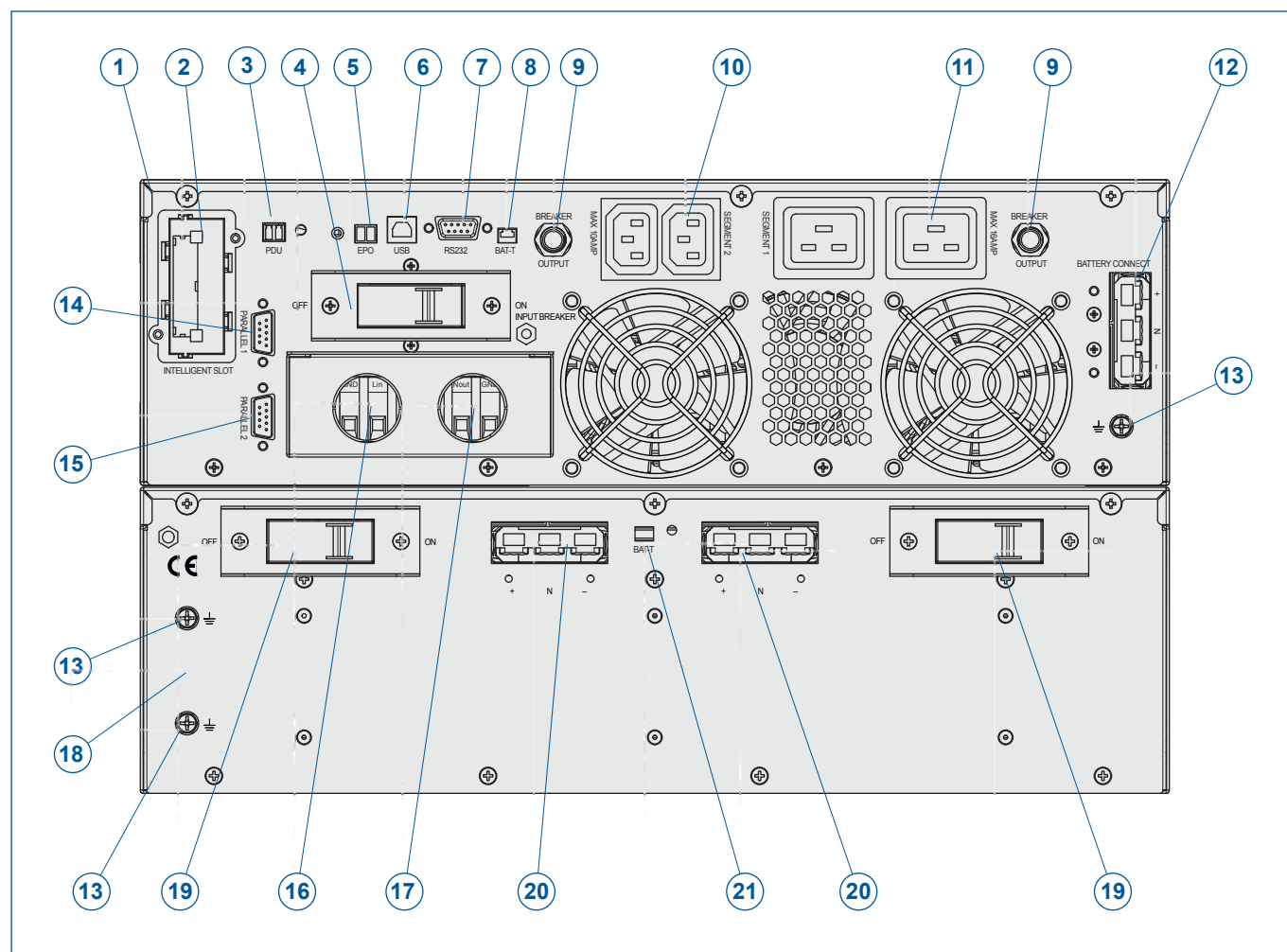
4.3 Device Components

4.3.1 Front Side



- 1 UPS
- 2 Battery pack
- 3 TOUCH Display
- 4 Status LEDs
- 5 Power On/Off Switch

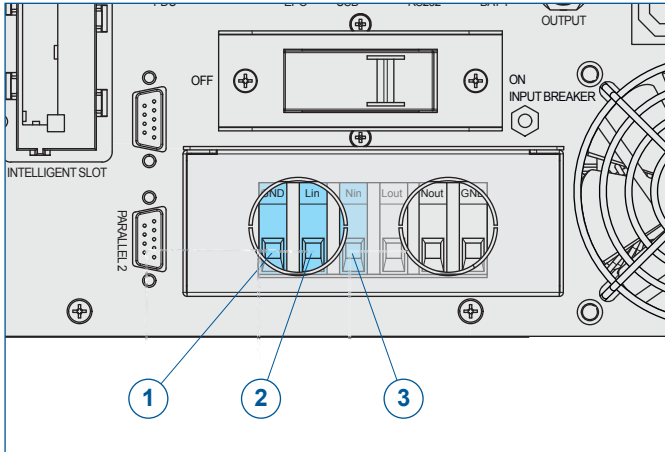
4.3.2 Rear Side



- | | |
|--|--|
| 1 UPS | 12 Connection Port for External Battery Pack |
| 2 Slot for Network Card (SNMP) / Relay Card | 13 Grounding Terminal |
| 3 PDU, Auxiliary Contact for External Bypass | 14 RS232 Port 1 for Parallel Operation |
| 4 disconnect switch | 15 RS232 Port 2 for Parallel Operation |
| 5 Terminal Blocks for External Emergency Power Off (EPO) | 16 Terminal Block for Input Power Supply 230 V |
| 6 USB Port | 17 Terminal Block for Output |
| 7 RS232 Port | 18 Battery Pack |
| 8 Connection Port for Battery Temperature Measurement | 19 Battery Disconnect Switch |
| 9 Output Fuse | 20 Connection Port (for UPS or additional external battery pack) |
| 10 Output Connectors: 2 × IEC 320 C13 (Segment 2) – Programmable | 21 Connection Port for Battery Temperature Measurement |
| 11 Output Connectors: 2 × IEC 320 C19 (Segment 1) – Programmable | |

4.4 Input Connections

4.4.1 Input Connection Terminal Block

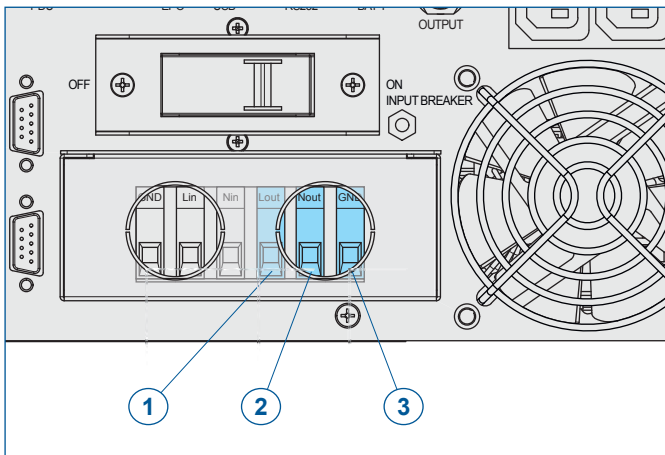


- 1 **GND** (Ground)
- 2 **L in** (Phase)
- 3 **N in** (Neutral)

The input connections on the terminal block are for connecting the power supply to the UPS. The power supply must be 230 V \pm 10%..

4.5 Output Connections

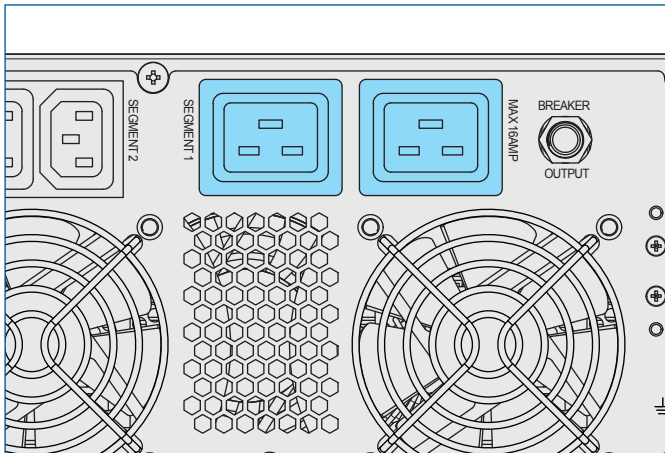
4.5.1 Output Connection Terminal Block



- 1 **L out** (Phase)
- 2 **N out** (Neutral)
- 3 **GND** (Ground)

The output connections on the terminal block are for connecting the load devices to the UPS through appropriate customer wiring. Maximum allowable current flow is specified in **Chapter 9 Technical Data, Page 72.**

4.5.2 Output Connection IEC 320 C19

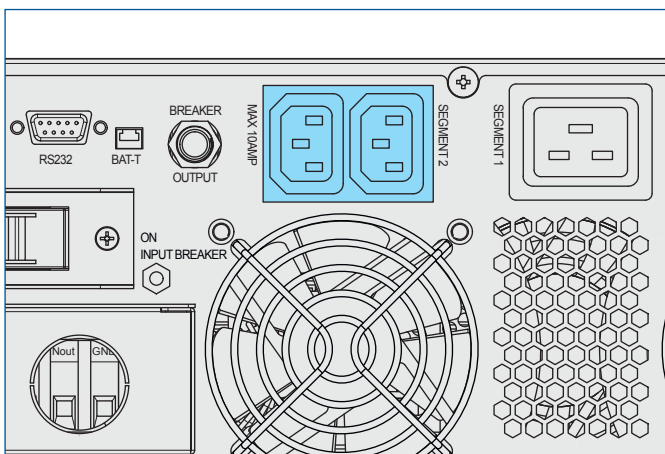


The output connectors are used to connect load devices to the UPS. The maximum allowable current flow is 16 A.

The connectors of Segment 1 can also be turned off earlier. This can be done by selecting the EOD (End of Discharge) level, **see Chapter 6.5.2 Battery, Page 50 – EOD Setting.**

For example, this feature allows you to keep critical devices running during a power outage while shutting down devices connected to Segment 1. This function helps effectively manage battery consumption and conserve battery power.

4.5.3 Output Connection IEC 320 C13

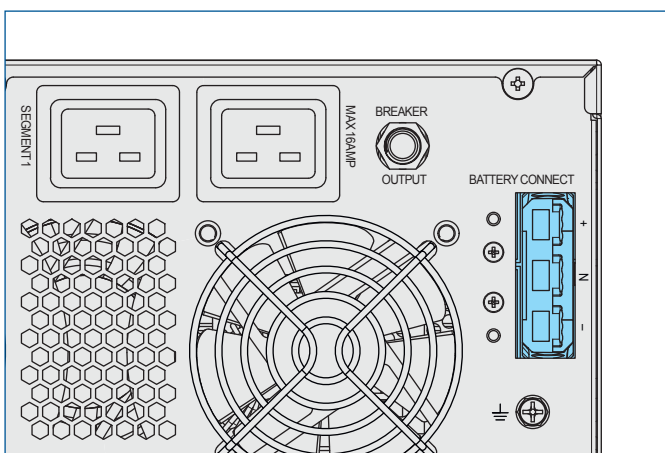


The output connectors are used to connect load devices to the UPS. The maximum allowable current flow is 10 A.

The connectors of Segment 2 can also be turned off earlier. This can be done by selecting the EOD (End of Discharge) level, **see Chapter 6.5.2 Battery, Page 50 – EOD Setting.**

For example, this feature allows you to keep critical devices running during a power outage while shutting down devices connected to Segment 2. This function helps effectively manage battery consumption and conserve battery power.

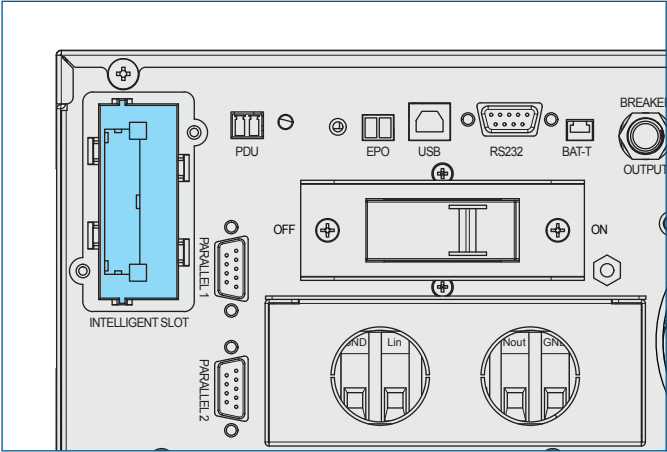
4.5.4 Connection Port for External Battery Pack



The connection port is used for connecting an external battery pack.

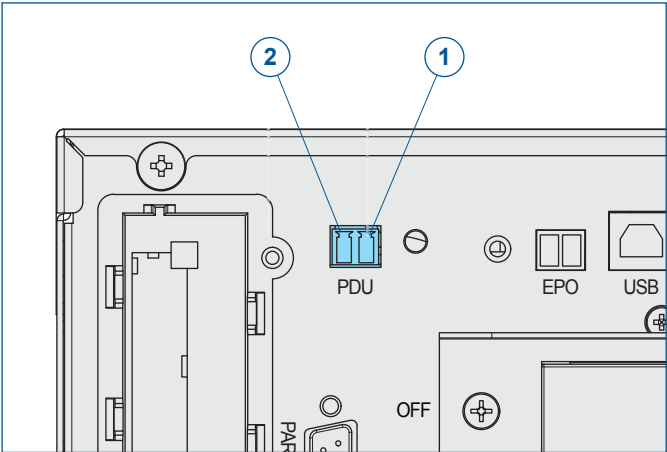
4.6 Communication Interfaces

4.6.1 Slot for Network Card (SNMP)/Relay Card



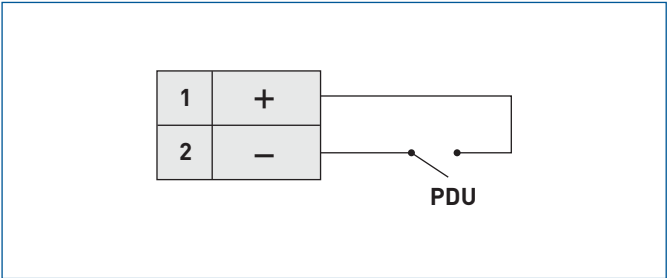
The UPS has a slot for an optional network card (SNMP) or relay card.

4.6.2 PDU Interface (Auxiliary Contact for External Bypass)

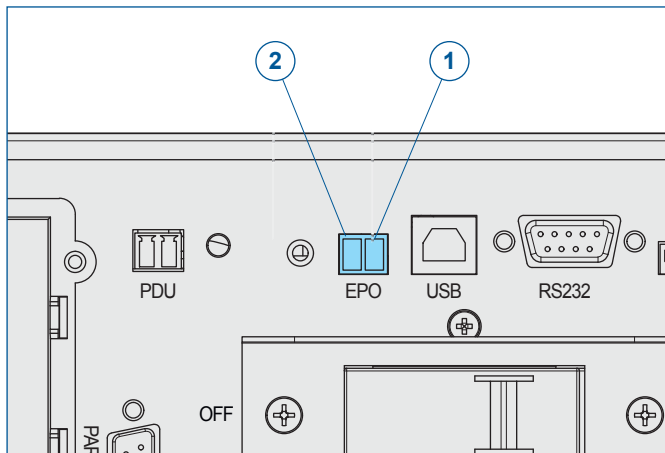


- 1 PIN 1
- 2 PIN 2

The PDU interface is an auxiliary contact for the external bypass. By connecting Pin 1 and Pin 2, the UPS switches to electronic bypass mode.



4.6.3 EPO Interface

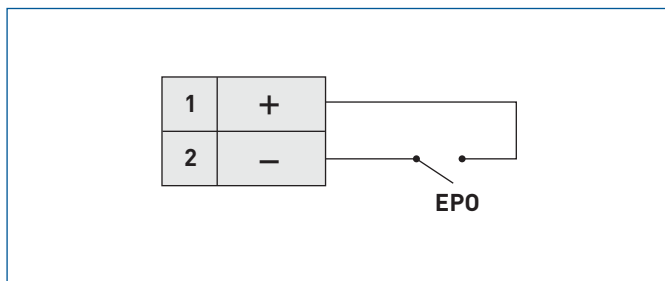


1 PIN 1

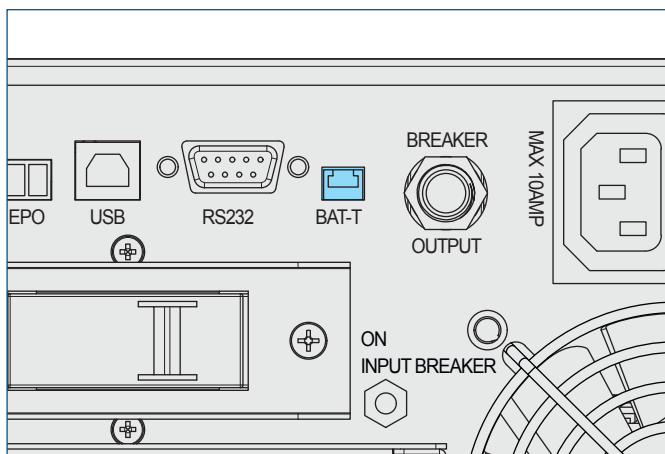
2 PIN 2

To activate the Emergency Power Off (EPO), PIN 1 and PIN 2 must be disconnected.

PIN 1 and PIN 2 are closed during normal operation.

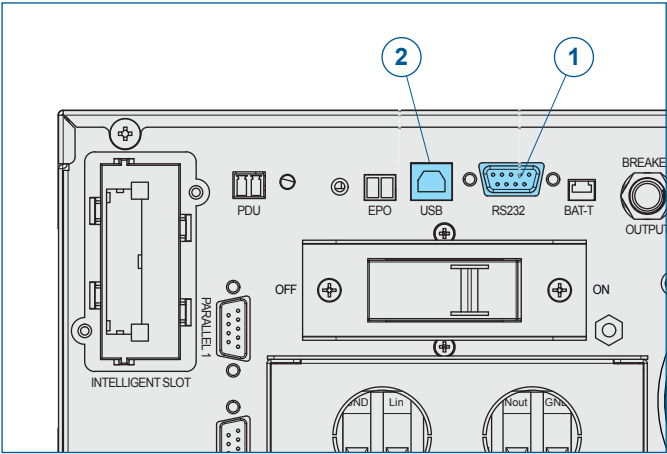


4.6.4 Connection Port for Battery Temperature Measurement



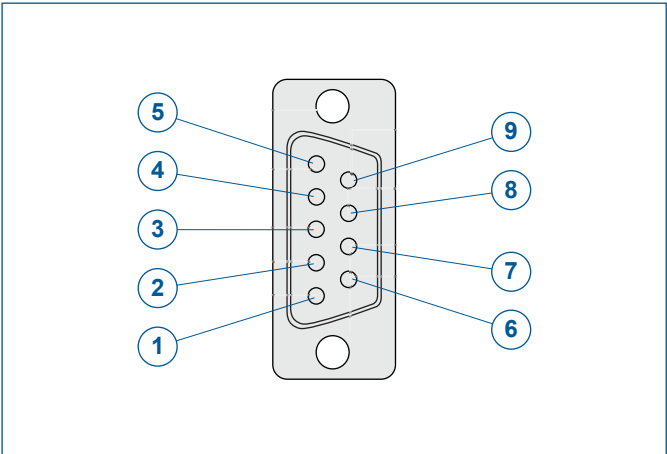
By connecting the battery pack to the UPS via the appropriate cable, the temperature of the batteries is transmitted.

4.6.5 RS232 / USB Communication Interfaces



- 1 RS232 Interface
- 2 USB Interface

The communication interfaces provide all relevant data for remote monitoring via a PC and UPS software.



Settings and Pinout:
Baud Rate: 2400 bps
Data Length: 8 bits
Stop Bit: 1 bit
Parity: None

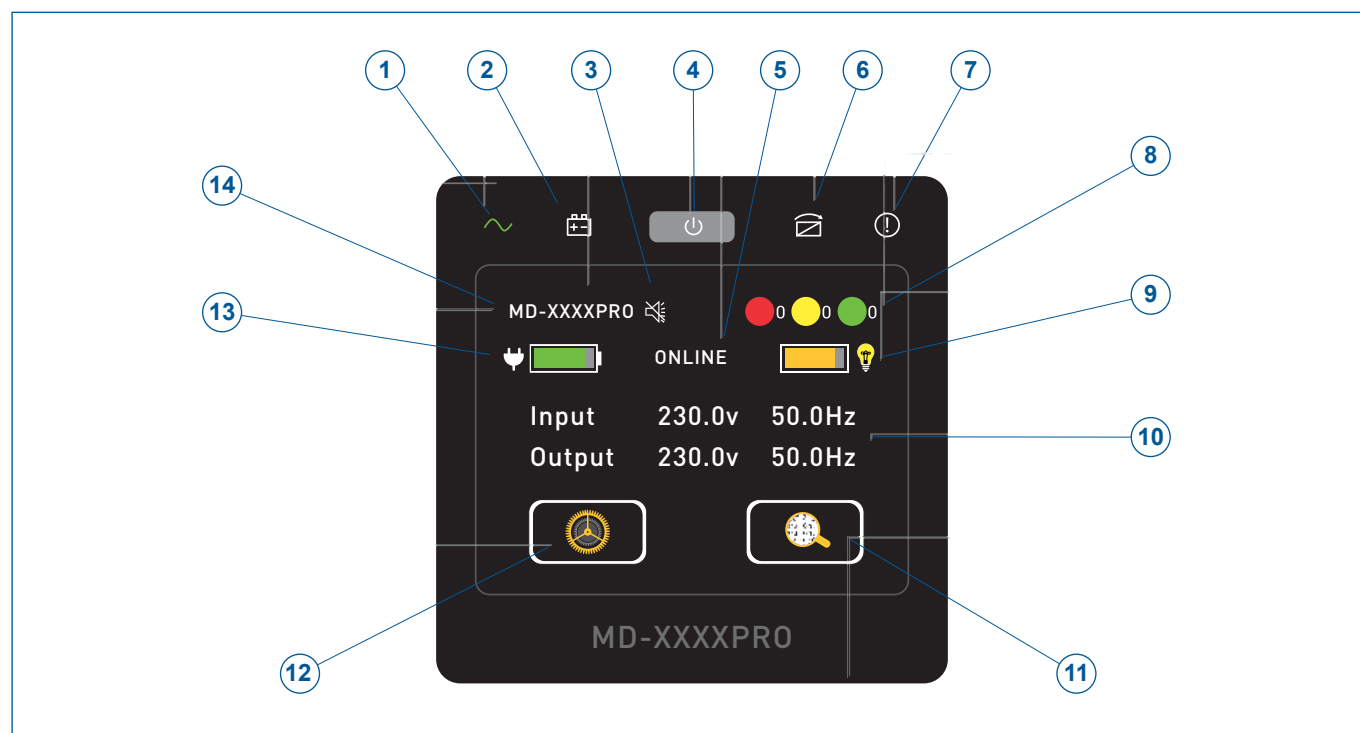
PIN	PC	UPS
PIN 2: RxD (Receive Data)	Receive	Send
PIN 3: TxD (Transmit Data)	Send	Receive
PIN 5:Gnd (Ground)	Ground Potential	

Note

- A network card can be used in parallel with the RS232 interface. [1]
- The USB interface can be used as an alternative to the RS232 interface, with the USB interface taking precedence.[1]

4.7 LCD Control Panel

4.7.1 Overview



- | | |
|------------------------|--|
| 1 Normal Operation | 8 Number of current faults, alarms, and events |
| 2 Battery Operation | 9 Load Indicator |
| 3 Mute | 10 Status Information |
| 4 On/Off Button | 11 Menu Information |
| 5 Operating Mode | 12 Menu Setting and Control |
| 6 Bypass Operation | 13 Battery Charge Status |
| 7 Error/Alarm Messages | 14 UPS Type |

On/Off Button



Turning off the UPS:

Press and hold the On/Off button for approximately 5 seconds to turn off the UPS. After about 3 seconds and again after about 5 seconds, a signal tone will sound. Then release the On/Off button. The UPS will be in OUT/OFF mode or Bypass mode. Within approximately 5 seconds, you can switch the main disconnect switch to OFF and shut down the UPS.

Turning the Bypass mode on/off:

Press and hold the On/Off button for approximately 5 seconds to turn Bypass mode on or off.

Note

This function is only available if the Bypass function is activated in the menu **Setting/UPS/Bypass Function** (see Chapter 6.5.1 UPS, page 48). In this case, the UPS cannot be turned off.

Status LEDs



Normal Operation



Battery Operation



Bypass Operation



Error



Alarm

LCD Display Symbols



Mute

The symbol indicates that the signal tone is muted.



Faults, Alarms, and Events

The respective number of current faults, alarms, and events is displayed. By tapping the corresponding symbol, You can view the messages.



Load Indicator

The load capacity is indicated by the number of yellow segments in the bar. Tapping the symbol will provide detailed information about the load capacity.



Battery Charge Status

The battery charge level is indicated by the number of green segments in the bar. Tapping the symbol will provide detailed information about the battery's charge status.



Battery Charging

The symbol indicates that the battery is being charged.

Input
Output

Input voltage / Input frequency
Output voltage / Output frequency



Settings

Tapping opens the **Setting** and **Control** menu.



Status Information

Tapping opens the **Measure Info** and **Product Info** menus.



Setting

Tapping the symbol opens the **Setting** menu, where UPS parameters can be configured.



Control

Tapping the symbol opens the **Control** menu, where you can manage the UPS operations.



Measure Info

Tapping the symbol opens the **Measure Info** menu, which displays the current UPS status data.



Product Info

Tapping the symbol opens the **Product Info** menu, which provides information about the UPS.

LCD Display Symbols



Fault Record

Tapping this symbol opens the **Fault Record** menu, displaying the last 20 faults of the UPS.



Event Record

Tapping this symbol opens the **Event Record** menu, displaying the last 20 events of the UPS.



Home

Returns to the main menu.



Back

Returns to the previous menu level.



Up

Go to the previous page.



Down

Go to the next page.



Left

Go to the left side.



Right

Go to the right side.



YES

Confirm.



NO

Cancel.



ESC

Exit.



DEL

Delete.

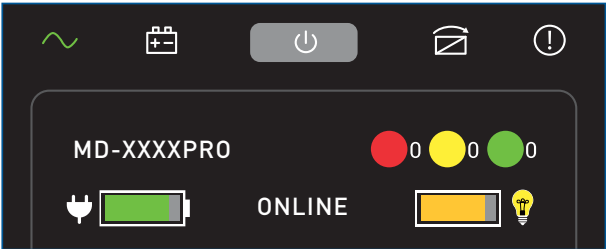


OK

Apply.

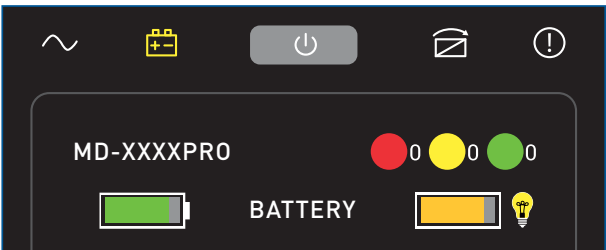
4.8 Operating Modes

4.8.1 Normal Operation



In normal operation, the load is continuously supplied with regulated and filtered alternating current (AC) by the inverter (rectifier/inverter). The mode ONLINE is displayed, and the status LED for normal operation lights up green.

4.8.2 Battery Operation

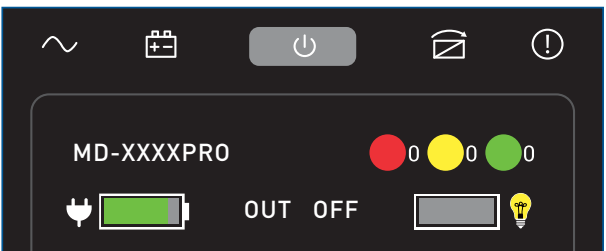


In the event of a power failure, the load is automatically supplied by the batteries. If this happens, the mode BATTERY is displayed, the status LED for battery operation lights up yellow, and an audible alarm sounds every 4 seconds. This continues until the batteries are depleted or the AC input voltage returns to within the UPS tolerances.

During discharge, the battery's charge level for the current load is displayed.

Before the batteries are fully discharged, an alarm is triggered until the UPS shuts down completely.

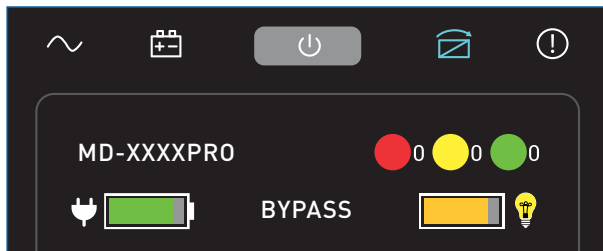
4.8.3 Out-Off Mode



When the UPS is connected to the power supply, it is in Out-Off mode. In Out-Off mode, the batteries are being charged, but the output is switched off.

The mode OUT OFF is displayed.

4.8.4 Bypass Operation



The UPS operates in normal mode, and the input voltage is within the permissible range. In the case of an overload, the UPS automatically switches to bypass mode. If this happens, the mode BYPASS is displayed, the status LED for bypass mode lights up blue, and an audible alarm sounds.

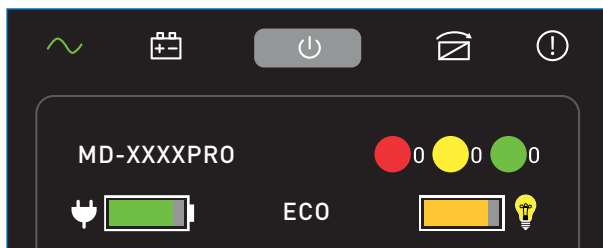
In bypass mode, the load is supplied with AC mains power through the internal bypass.

You can also manually activate bypass mode. When the UPS is in normal mode and the mains voltage is within the permissible range, press and hold the on/off switch for about 1 second to switch to bypass mode.

Note

In the default configuration, bypass mode is enabled. You can disable bypass mode in the menu **Setting/UPS/Bypass** Function, see **Chapter 6.5.1 UPS**, page 48.

4.8.5 Eco Mode (Power-Saving Mode)

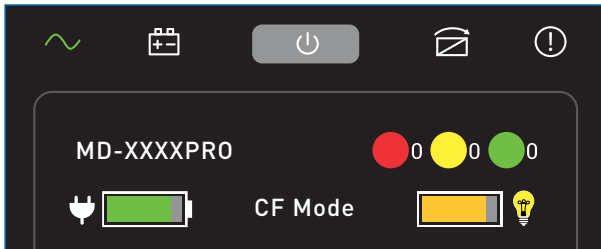


In eco mode, the load is supplied with AC mains power through the internal bypass. Tolerance ranges for the output voltage and output frequency can be set for this bypass operation.

If the mains voltage does not meet the tolerances, the load is automatically supplied by the UPS inverters (normal mode), or in the event of a power failure, the load is automatically supplied by the batteries.

The mode ECO is displayed.

4.8.6 Converter Mode (Constant Voltage/Constant Frequency)

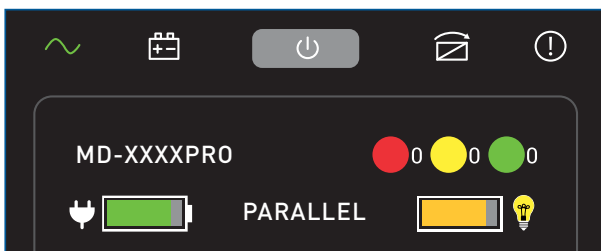


The UPS can be set to fixed voltage and frequency values, allowing devices with different input voltages/frequencies to be operated.

The output capacity of the UPS is reduced to **80%**.

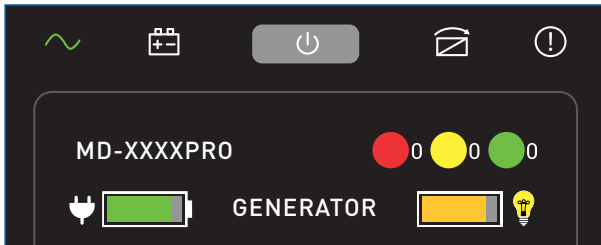
The mode CF Mode is displayed.

4.8.7 Parallel Mode



The UPS can be connected in parallel with a second UPS to increase system reliability. The mode PARALLEL is displayed.

4.8.8 Generator Mode



The UPS can be supplied by a generator in the event of a mains failure.

Generator mode has a broader frequency range compared to normal mode:

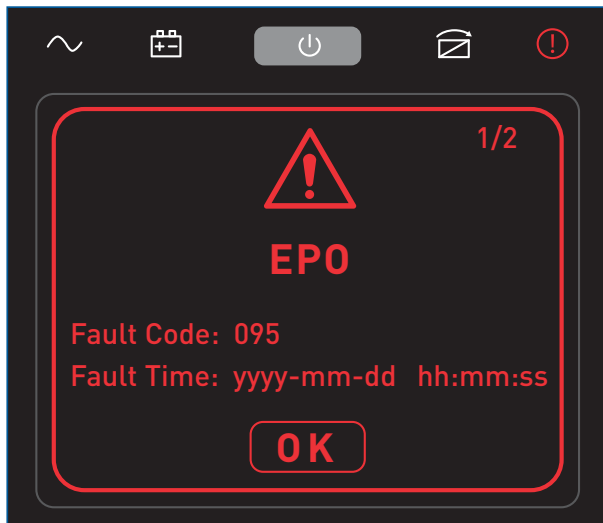
- Normal mode: 46 - 54 Hz
- Generator mode: 40 - 70 Hz

The broader frequency range in generator mode prevents the UPS from constantly switching to battery mode due to unstable frequency. This allows for stable 230V/50Hz power output for the load.

All other UPS functions (such as battery protection) continue to work properly.

The mode GENERATOR is displayed.

4.8.9 EPO (Emergency Power-off)



The UPS can be shut down using an emergency stop (EPO) switch through the EPO interface located on the rear side of the device.

The UPS will immediately shut down, deactivating all outputs, and the system will lock.

1. Turn off the emergency stop switch.
2. Confirm the fault message by selecting "OK." After about one minute, the alarm tone will stop.

4.8.10 PDU (Auxiliary Contact for External Bypass)

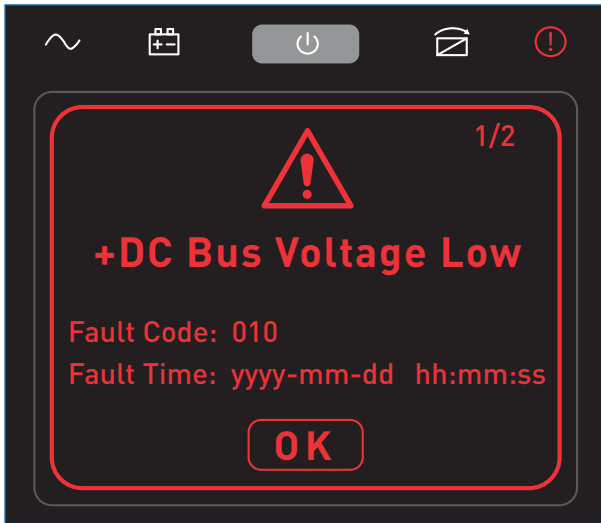


The PDU interface (Power Distribution Unit) is an auxiliary contact for an external bypass.

The UPS will switch to electronic bypass mode.

1. Confirm the alarm message by selecting "OK."

4.8.11 Fault Mode

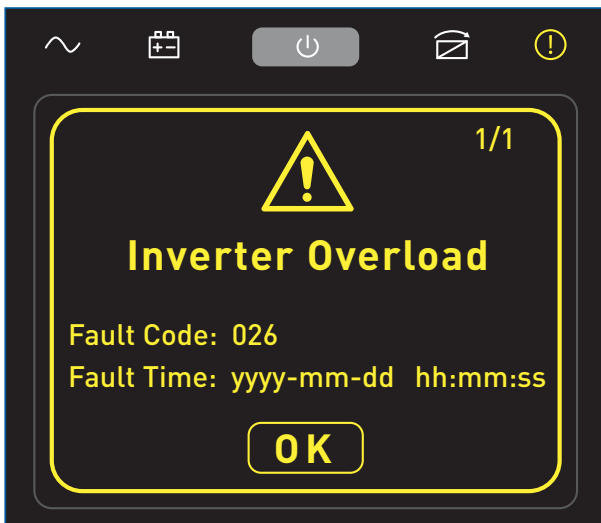


Fault mode is activated when an error occurs in the UPS. The UPS switches to fault mode and interrupts the output. The status LED for fault mode lights up red, and a continuous alarm tone sounds.

A fault code and a brief description are displayed. You can find detailed information on the fault codes in the fault code table.

1. Resolve the issue.
2. Confirm the fault message by selecting "OK." After about one minute, the alarm tone will stop.

4.8.12 Alarm Mode



Alarm mode is activated when an alarm is triggered in the UPS. The status LED for fault mode lights up yellow, and an alarm tone sounds.

A fault code and a brief description are displayed. You can find detailed information on the fault codes in the fault code table.

1. Confirm the alarm message by selecting "OK."

5 Installation and Connection

5.1 Site Requirements

CAUTION

Damage to Equipment Due to Inappropriate Location.

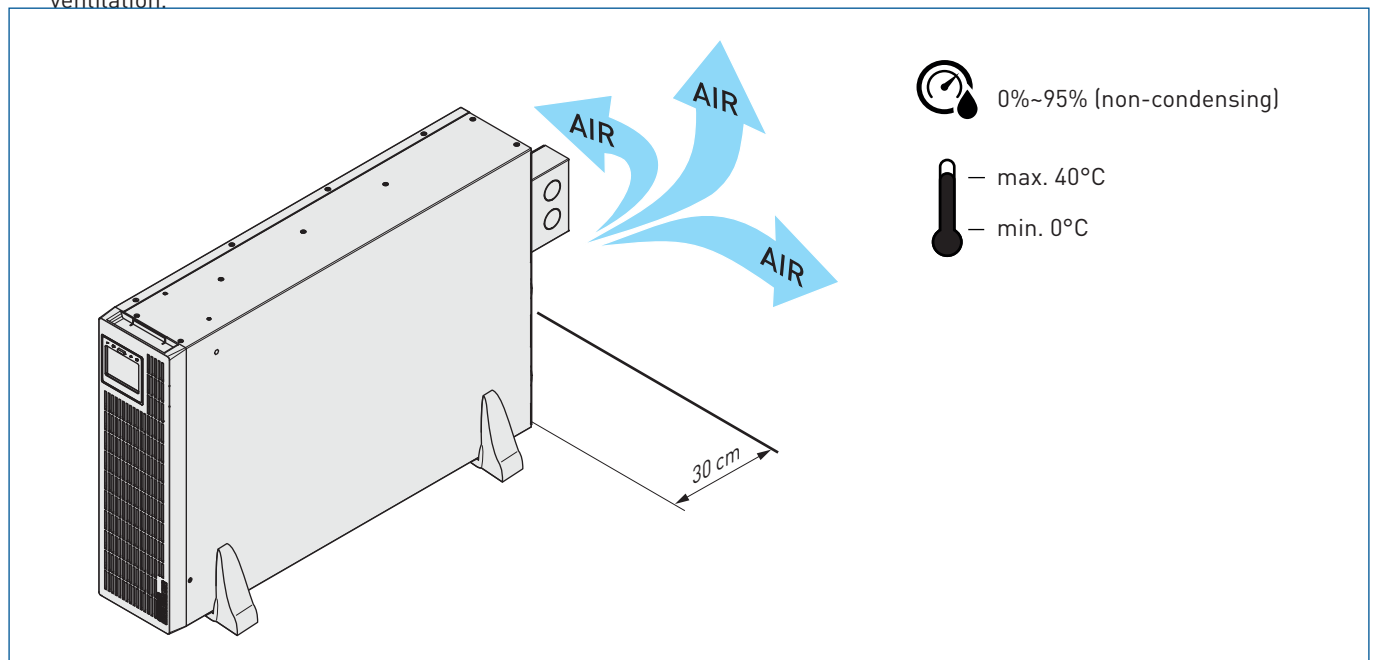
An unsuitable installation location can cause damage to the UPS and potentially lead to subsequent damage. ← Please strictly adhere to the guidelines in this section.

Location

The UPS should only be operated indoors. It is not suitable for use in dusty or corrosive environments, or in explosive atmospheres.

Requirements:

- Flat and sufficiently load-bearing surface
- Minimum Clearance: There must be at least 30 cm of space between the back of the device and the wall to ensure proper ventilation.



Climatic Conditions

Relative Humidity: $\leq 95\%$, non-condensing.

Temperature: 0...+40°C

Note

Temperature during operation has a significant impact on battery lifespan: temperatures of +10...+20°C are ideal.

Performance Derating Factors at Altitudes Above 1000 Meters Above Sea Level

The UPS should be installed in areas below 2000 meters above sea level. At locations above 1000 meters, it should be derated according to IEC62040-3. The table below is for reference only.

Performance Derating Factors at Altitudes Above 1000 Meters Above Sea Level:

Altitude Above Sea Level	Performance Derating Factors	
	Natural Convection	Required Air Cooling
1000 m	1.000	1.000
1200 m	0.994	0.990
1500 m	0.985	0.975
2000 m	0.970	0.950
2500 m	0.955	0.925
3000 m	0.940	0.900
3500 m	0.925	0.875
3600 m	0.922	0.870
4000 m	0.910	0.850
4200 m	0.904	0.840
4500 m	0.895	0.825
5000 m	0.880	0.800

Table according to IEC62040-3 / Heights not listed can be interpolated.

5.2 Setup/Rack Installation

The UPS units and their battery packs can be set up as standalone devices or mounted in a 19-inch rack. When installing an additional battery pack, the batteries should be installed only as the last step. The UPS is "Hot-Swap capable," meaning a qualified electrician can connect the batteries without fully turning off the UPS.

Please follow the instructions for battery installation in **Chapter 8.5 Battery Replacement, Page 69**, and the following precautions:



Hazards When Handling Batteries.

There are specific hazards associated with handling batteries.

- ← To prevent damage during handling, charging, and operation, all manufacturer guidelines and safety data sheets must be followed.
- ← All personnel must be trained in battery handling.
- ← Battery replacement must only be performed by qualified electricians.



Risk of Electric Shock.

After setting up the UPS, condensation effects may occur due to large temperature differences.

- ← Allow an acclimatization period of 2 hours before proceeding with further steps.
- ← Ensure that any condensed surfaces are completely dried.

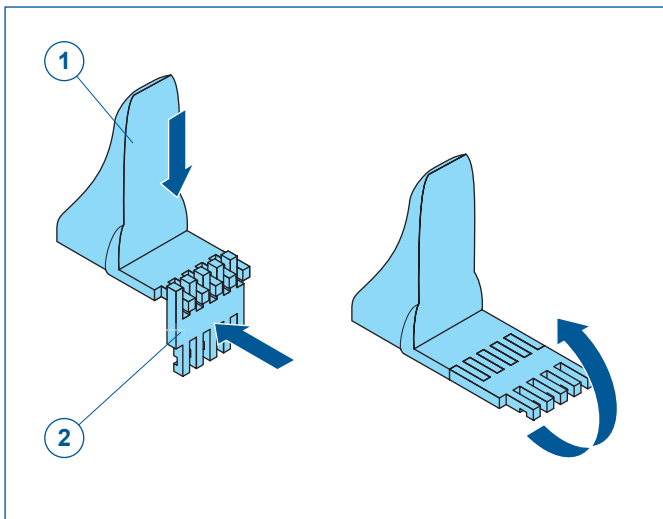


The UPS Unit is heavy!

Due to the high weight of the batteries, lifting, moving, or carrying can cause physical strain. Dropping the unit can result in injuries and damage.

- ← Installation should be carried out by at least two people.

5.2.1 Standalone Installation

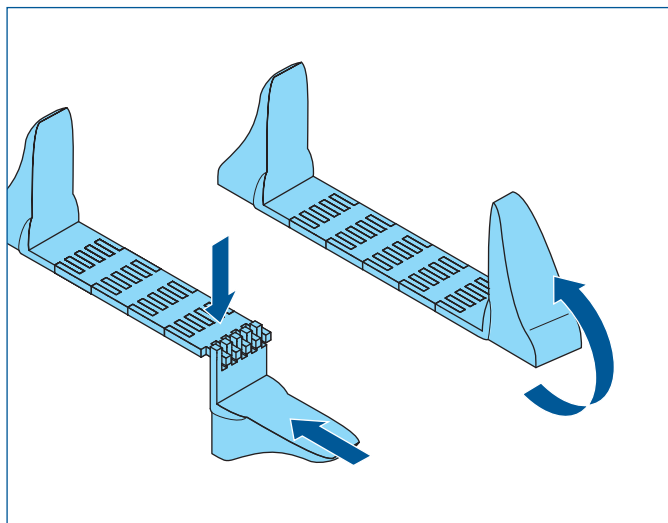


- 1 Stand Base
- 2 Spacer (5x)

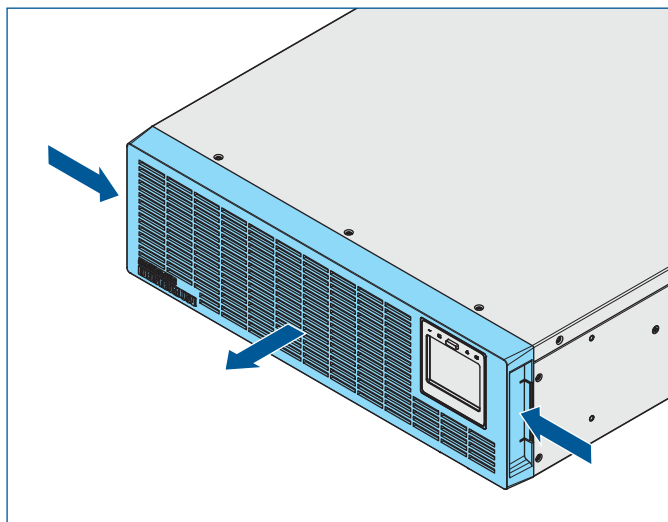
1. Attach the spacer to the stand base.
2. Rotate the spacer 90° upwards until it clicks into place.
3. Repeat the process with the remaining 3 spacers.

Note

The battery pack includes 2x3 spacers. For an additional optional battery pack, 3 more spacers need to be installed per stand element.



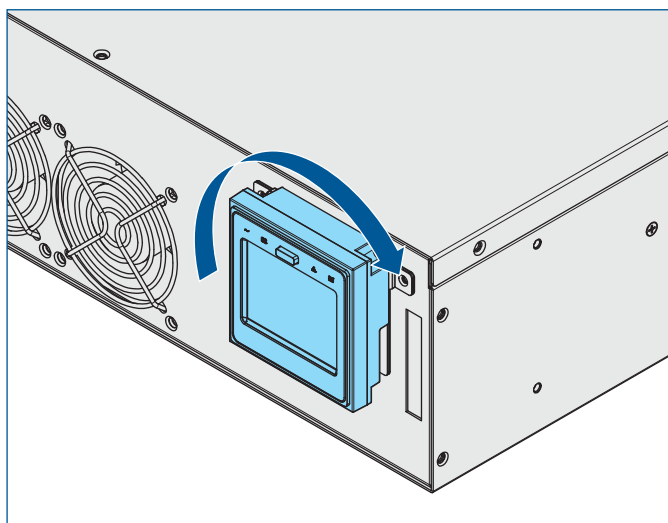
4. Attach the right stand base to the spacer.
5. Rotate the stand base 90° until it clicks into place.
6. Install the second stand element in the same manner.



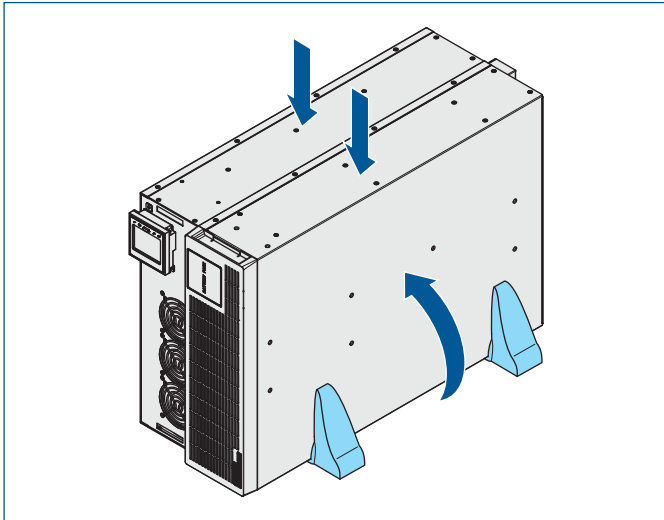
7. Remove the UPS cover by pressing in the side latches.

Note

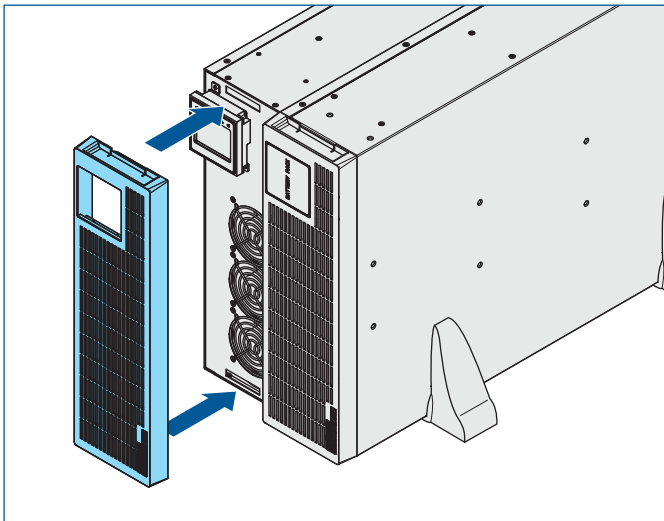
The cover is included with the unit and does not need to be removed initially.



8. Rotate the display 90° clockwise.



9. Align the UPS and the battery pack. Position both devices between the stand bases. **Caution: Heavy! Have a second person assist!**

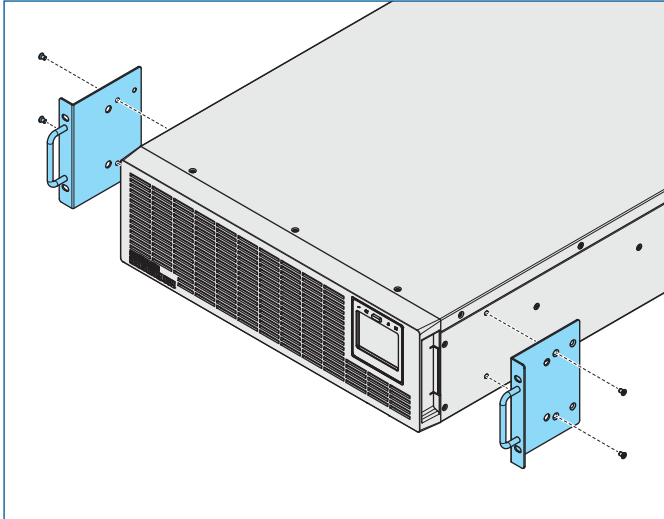


10. Attach the cover.

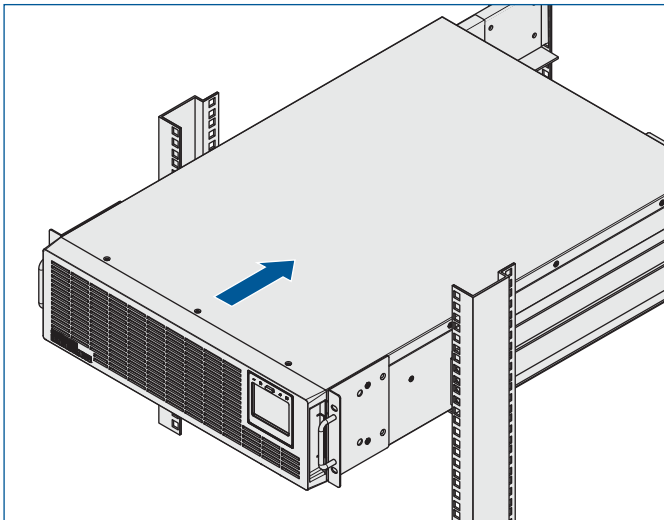
5.2.2 Installation in a 19-inch Rack

Note

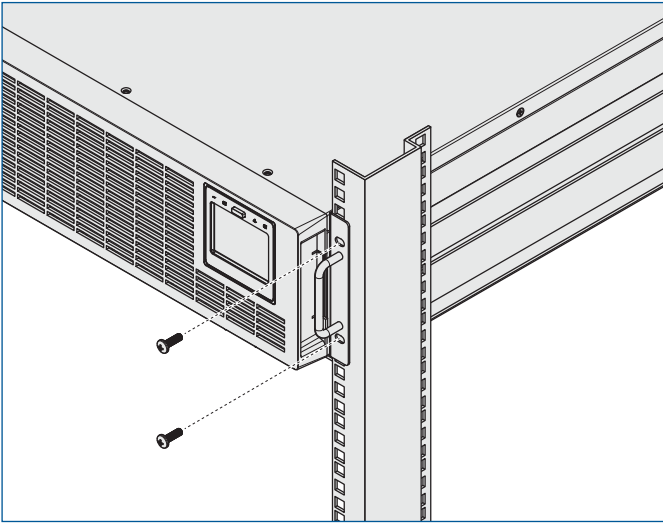
- To install the UPS in a 19-inch rack, you will need a rack rail kit. Refer to the associated multimatic rack rail installation instructions
- Battery packs should be installed below the UPS! Each battery pack also requires a rack rail kit.



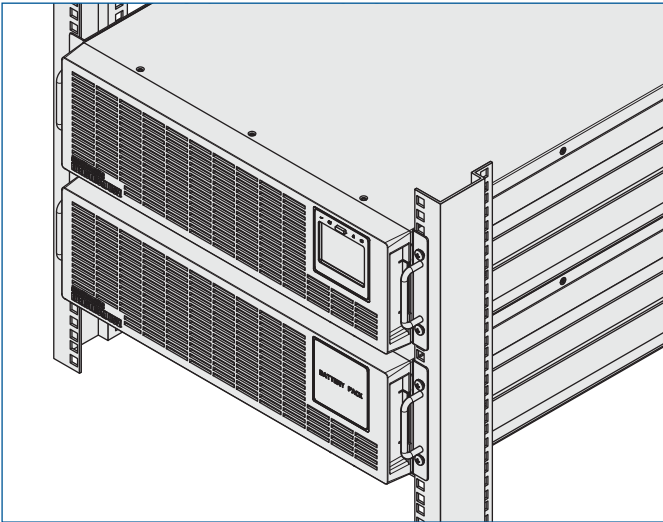
1. Attach the cover, **see Chapter 5.2.1 Standalone Installation, page 31.**
2. Install the two mounting brackets.



3. Install the two rack rails in your rack.
4. Carefully slide the UPS onto the two rack rails. **Caution: Heavy! Have a second person assist.**



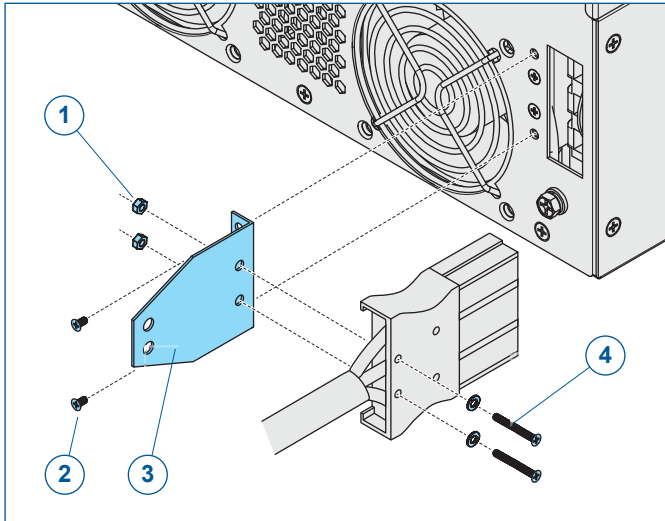
5. Secure the UPS to both sides of the rack using the mounting brackets with four M5x16 pan head screws.



6. Install the battery pack in the same manner beneath the UPS.
7. If necessary, install additional optional battery packs below the battery pack

5.3 Connecting the Battery Pack

5.3.1 Strain Relief for Connection Cable



- 1 Screw Nut M3
- 2 Countersunk Screws M4x6
- 3 Strain Relief Plate
- 4 4 Pan Head Screws M3x20 + Washer and Lock Washer

1. Attach the strain relief plate to the UPS using the countersunk screws.
2. Insert the connection cable plug into the corresponding socket. **Caution: Ensure the plug is fully inserted!**
3. Secure the plug to the strain relief plate using the pan head screws and M3 nuts.

Note

The battery pack package includes two additional strain relief plates and screws for securing the connection cables to the battery pack.

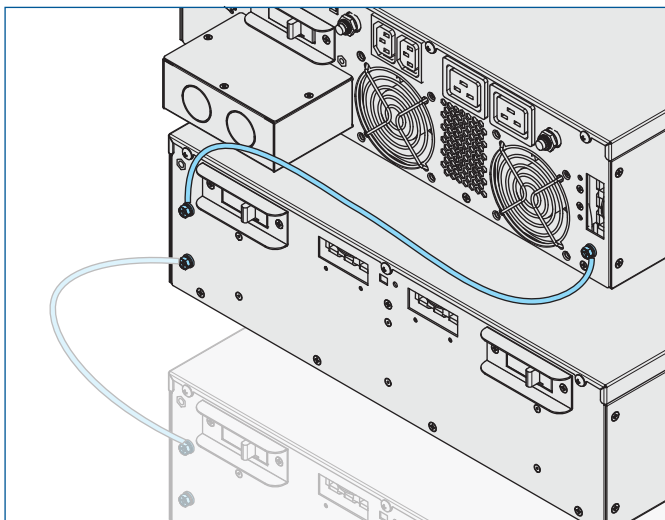
5.3.2 Grounding the Battery Pack



Danger of Electric Shock.

Risk of life due to live parts.

← Operation is only permitted with the protective ground connected.



1. Connect the battery pack to the UPS using the grounding cable.

Note

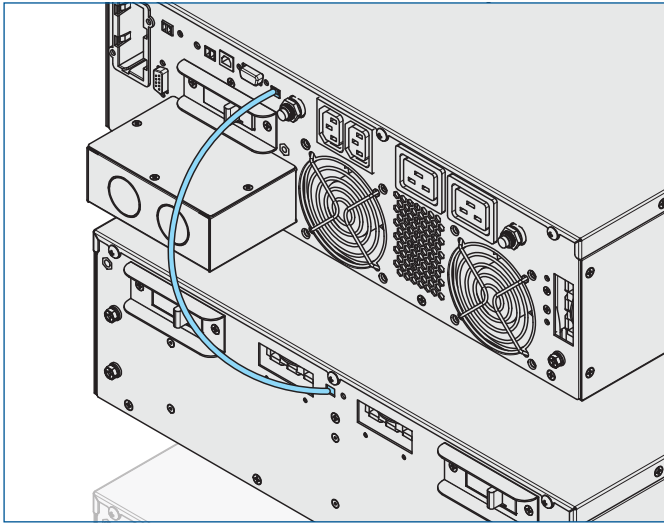
The grounding cable is included with the external battery pack.

2. Connect any additional optional battery packs to the battery pack above them using the grounding cable.

Note

The grounding procedure is the same for both stand-alone and 19-inch rack-mounted installations.

5.3.3 Connection Cable for Temperature Measurement

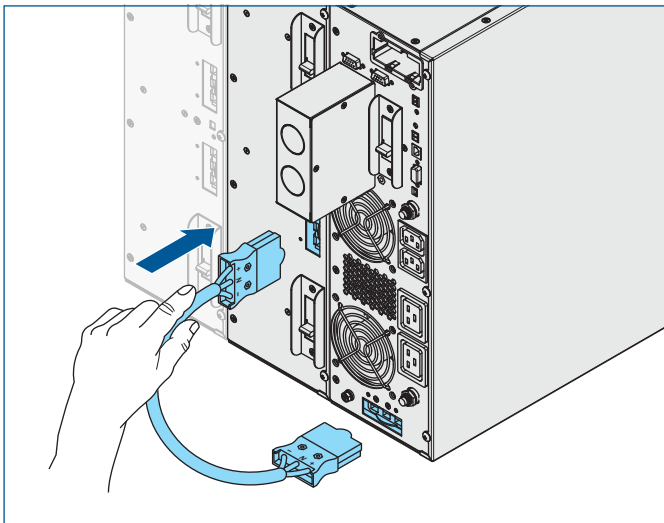


1. Connect the battery pack to the UPS using the temperature measurement connection cable.

Note

The temperature measurement connection cable is included with the external battery pack.

5.3.4 Standalone Mounting



1. Remove the cover from the connection for the external battery pack (**see Chapter 4: Product Description, Page 13**).
2. Insert the connection cable into the external battery port of the UPS.

Caution: Ensure the plug is fully inserted!

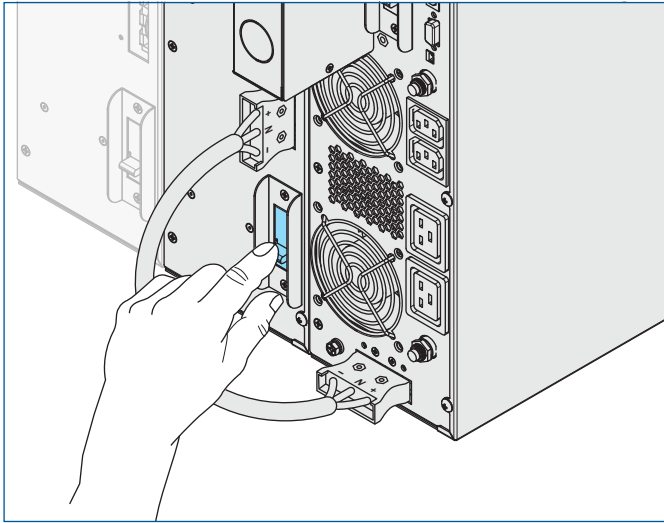
Note

The connection cable is included with the external battery pack.

3. Connect the UPS port to one of the two ports on the back of the external battery pack. **Caution: Ensure the plug is fully inserted!**

Note

A second battery pack can be connected via the second port on the back of the battery pack.

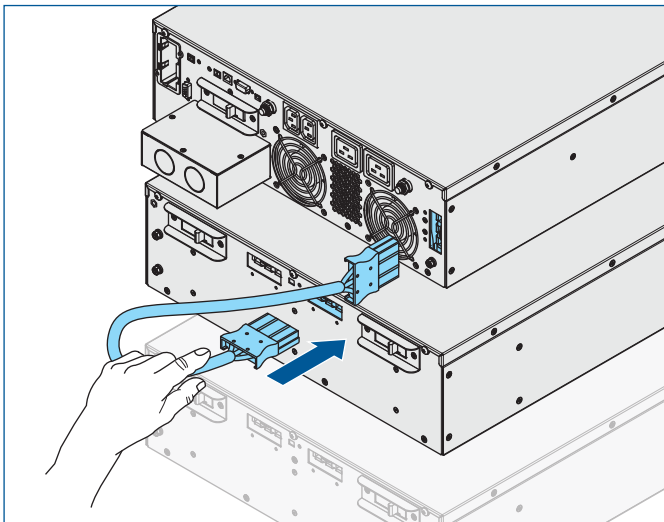


4. Switch the corresponding battery disconnect switch of the battery pack to the ON position.

Note

Both battery disconnect switches must be set to ON; otherwise, there will be no voltage at the connection port.

5.3.5 19-Inch Rack Mounting



1. Remove the cover from the external battery pack connection port (**see Chapter 4: Product Description, Page 13**).
2. Insert the connection cable into the external battery port of the UPS.

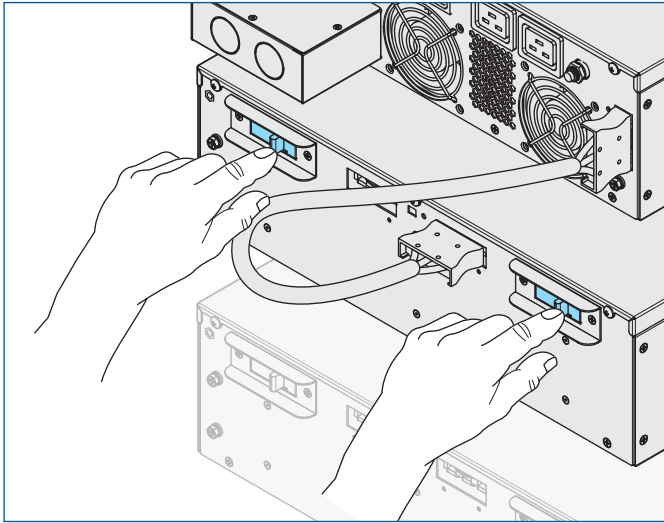
Note

The connection cable is included with the external battery pack.

3. Connect the UPS port to one of the two ports on the back of the external battery pack. **Caution: Ensure the plug is fully inserted!**

Note

A second battery pack can be connected via the second port on the back of the battery pack.



4. Switch both battery disconnect switches of the battery pack to the ON position.

Note

Both battery disconnect switches must be set to ON; otherwise, there will be no voltage at the connection socket.

5.4 Connecting Power Supply and Load

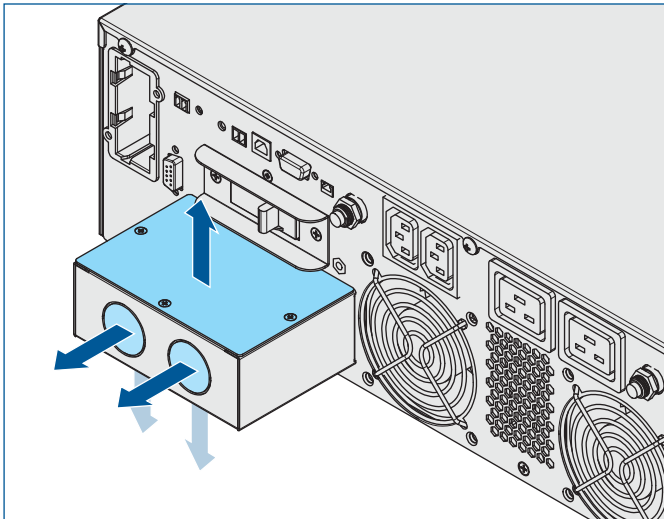


Danger of Electric Shock.

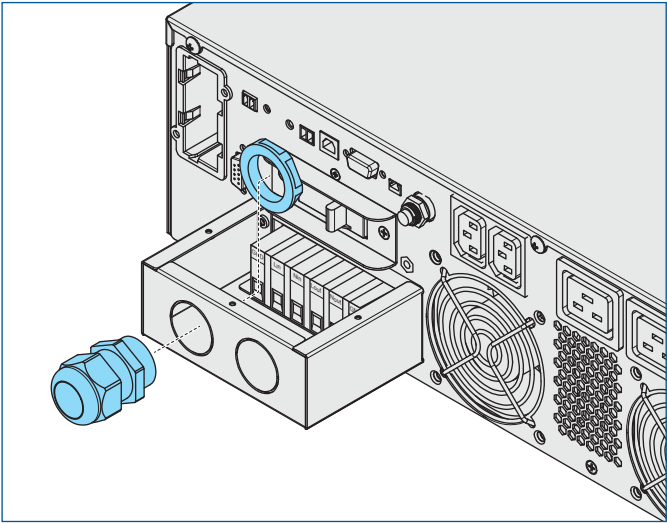
Risk of fatal injury due to live components.

← Connections must only be made by qualified electricians in accordance with electrical regulations.

PG Fittings



1. Remove the cover of the terminal box.
2. Knock out the required knockout sections from the terminal box.

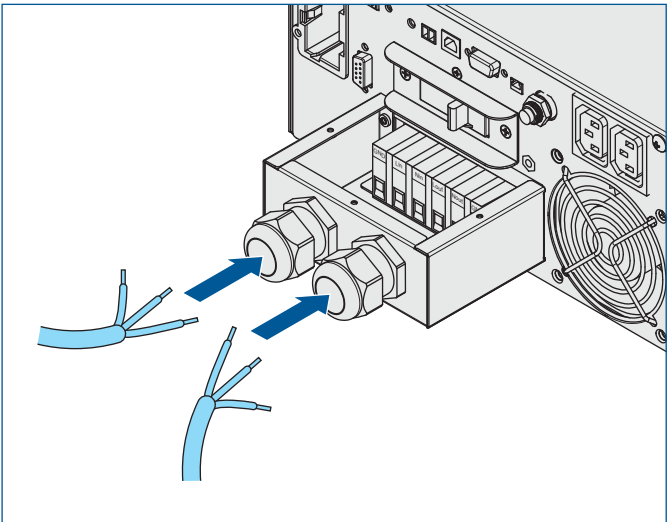


3. Install the PG fittings.

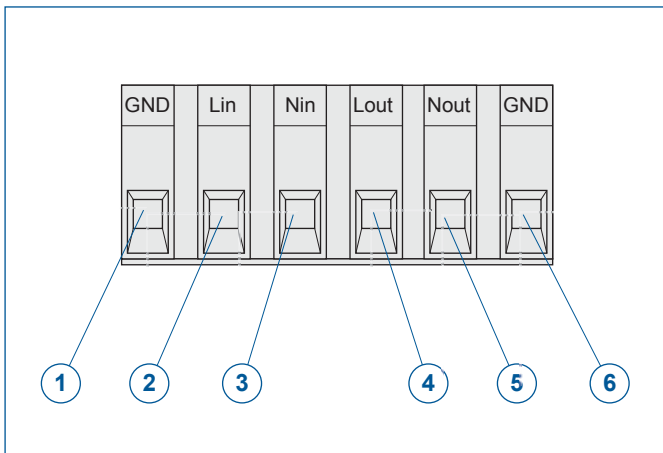
Connection of Mains and Load

Cable Cross-Sections

Type	Power	Maximum Current	Cable Cross-Section
MD-4500PRO	4,5 kVA	19,5 A	3 × 6 mm ²
MD-6000PRO	6 kVA	26 A	3 × 6 mm ²
MD11-10000PRO	10 kVA	43,5 A	3 × 10 mm ²



1. Pass the connection cable through the PG fitting.
2. Connect the cable according to the terminal configuration.
3. Install the cover on the terminal box.

Terminal Block**Input Connection**

- 1 GND:** Protective Earth Input
- 2 Lin:** Phase L1 Input
- 3 Nin:** Neutral Input

Output Connection

- 4 L out:** Phase L1 Output
- 5 N out:** Neutral Output
- 6 GND:** Protective Earth Output

5.5 Initial Startup



Danger from Electrical Current.

Risk of fatal injury due to live components.

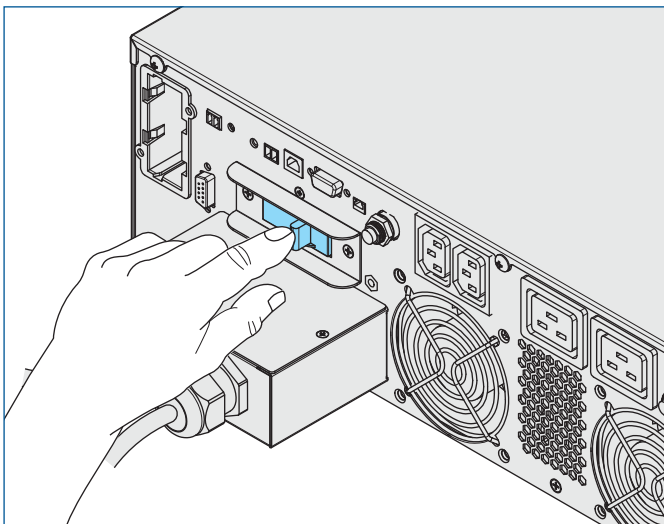
- ← Ensure that the mains voltage corresponds to the input voltage of the UPS.
- ← Use fuses and cable cross-sections appropriate to the connected load.
- ← Ensure safe cable routing and installation.
- ← Operation is only permissible with the protective earth connected.

CAUTION

Damage from Improper Commissioning.

Improper commissioning and configuration can result in damage or insufficient protection of connected loads, for example, if the UPS switches to automatic bypass mode and provides an output voltage unsuitable for the load.

- ← Configuration and initial commissioning should only be performed by an authorized specialist.

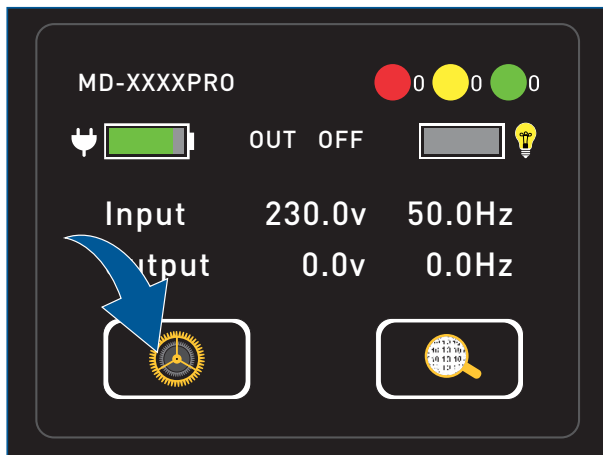


1. Ensure that the connection to the external battery pack is correct.
2. Ensure that the battery pack is properly grounded.
3. Ensure the correct wiring of the terminal block for mains and load connections.
4. Install any necessary accessories, such as network cards, relay cards, or PC connections, and EPO.
5. 1Connect the devices to be protected to the appropriate sockets on the UPS.

Note

Ensure that the connected devices do not exceed the UPS capacity to avoid an overload alarm.

6. Set the mains disconnect switch to ON. After a self-test, the UPS will enter bypass mode. After a short period, the UPS will automatically switch to normal operation, and the batteries will start charging.



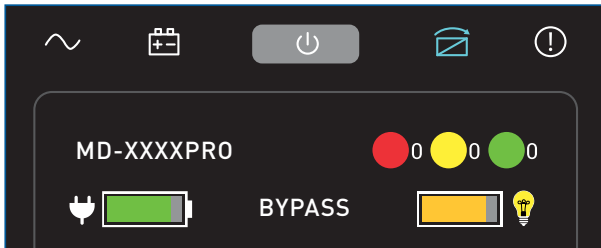
7. Set the Display Language on the LCD Panel: **See Chapter 6.5.3 Display, Page 52.**
8. Set the Output Voltage: **See Chapter 6.5.1 UPS, Page 48.**
9. Set the Battery Capacity: **See Chapter 6.5.2 Battery, Page 50.**
10. Set the System Time: **See Chapter 6.5.3 Display, Page 52.**

Note

After approximately 4 to 8 hours of charging, the batteries will reach 100% capacity and will be fully operational.

6 Operation

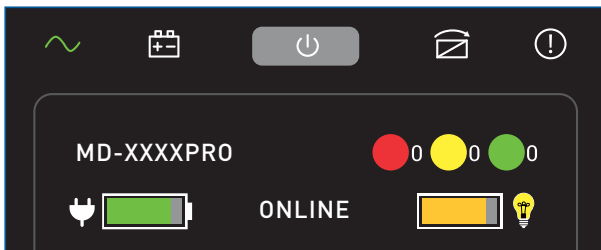
6.1 Turning the UPS On



1. Turn the UPS mains switch to ON. After performing a self-test, the UPS will switch to bypass mode.

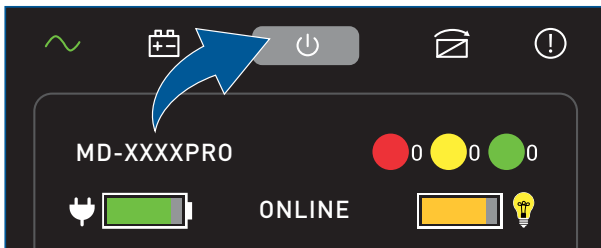
Note

If bypass mode is disabled, the UPS will switch to Out-Off mode after being turned on.



2. After a short period, the UPS will automatically switch to normal operation. The ONLINE mode will be displayed, and the status LED for normal operation will light up green. The UPS is now operational.

6.2 Turning the UPS Off



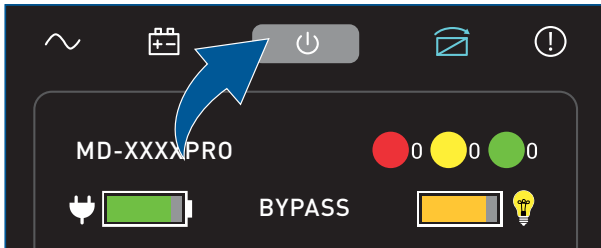
1. Press and hold the power switch for about 5 seconds to turn off the UPS. An audible signal will sound after approximately 3 seconds and again after about 5 seconds.
2. Release the power switch. The UPS will then be in Out-Off mode or bypass mode.
3. Within 5 seconds, turn the mains switch to OFF.
4. Wait until the LCD panel goes off after about 20 seconds. The UPS is now turned off.

6.3 Enabling/Disabling Bypass Mode

Note

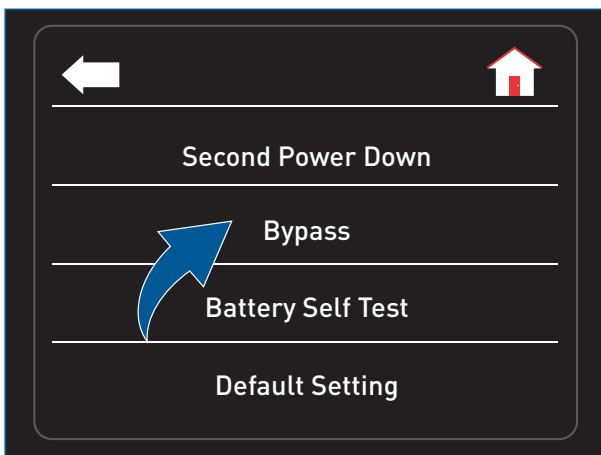
The function to turn Bypass mode on or off is only available if Bypass mode has been activated in the **Setting /UPS/Bypass** Function menu, see **Chapter 6.5.1 UPS, page 48**. In this case, the UPS cannot be turned off.

Physical Switch



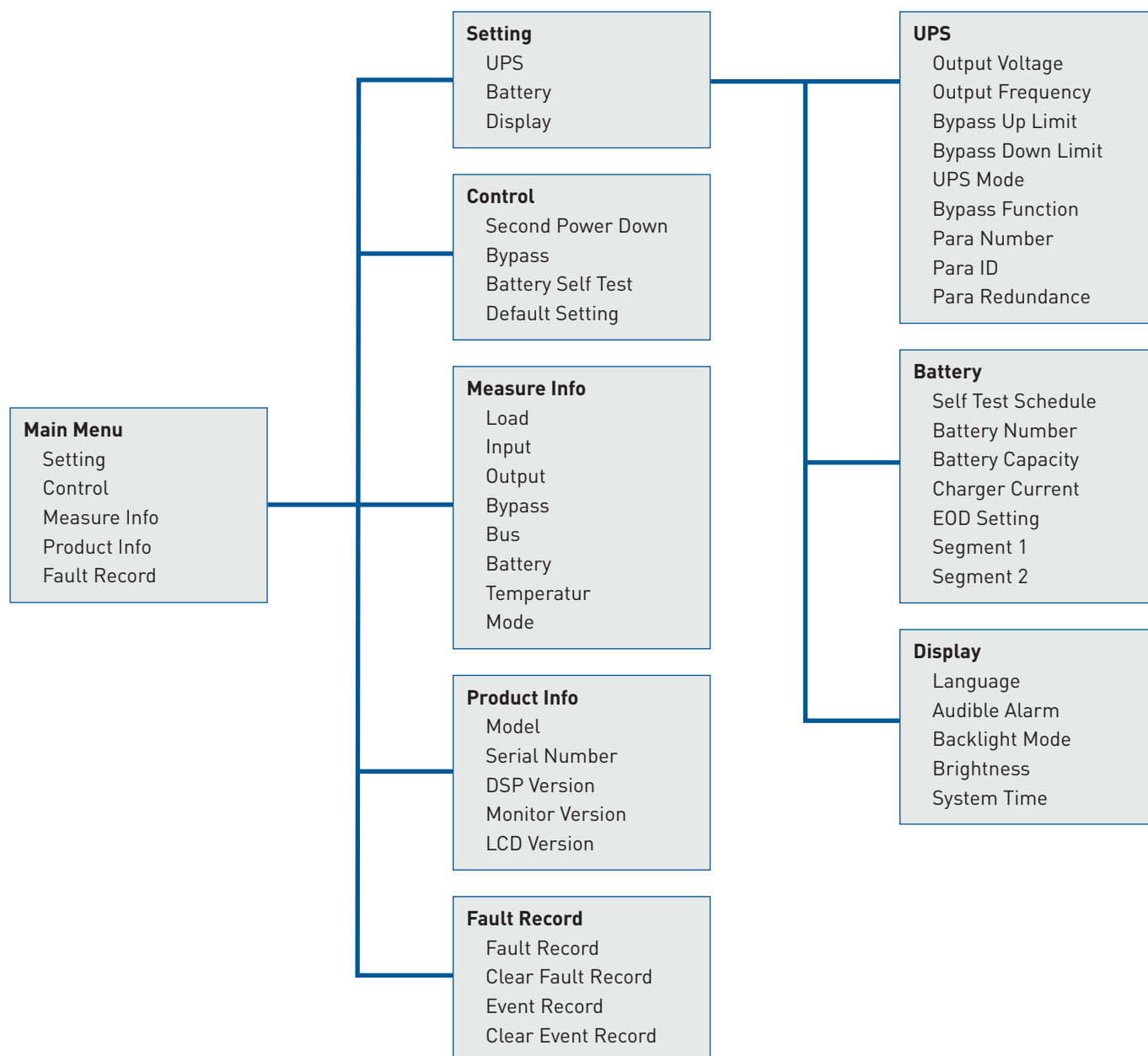
5. Press and hold the power switch for about 5 seconds to turn Bypass mode on or off. The mode BYPASS will be displayed, the status LED for Bypass mode will light up blue, and an audible signal will sound.

Software

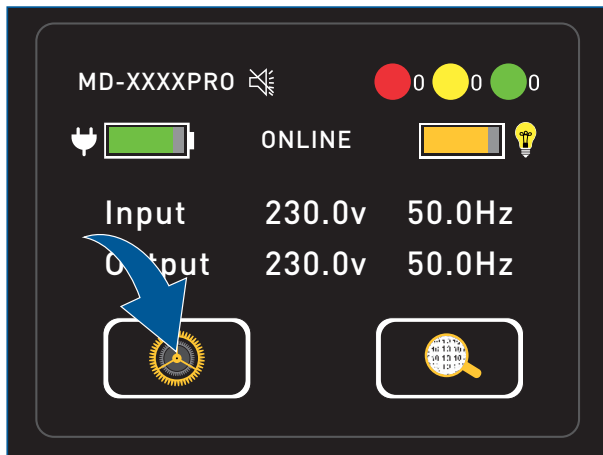


1. In the **Control menu**, tap on **Bypass** to turn Bypass mode on or off.

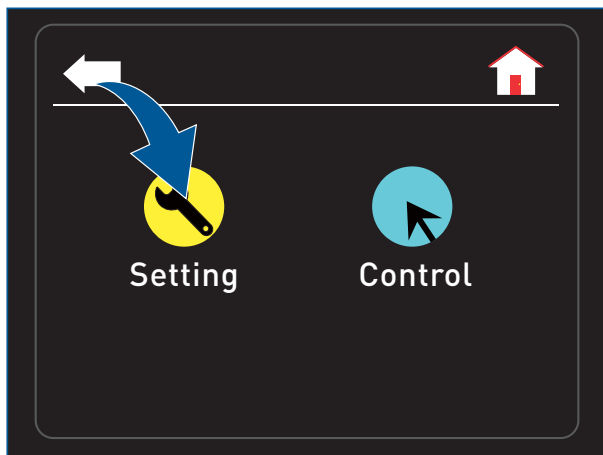
6.4 Menu Overview



6.5 Settings

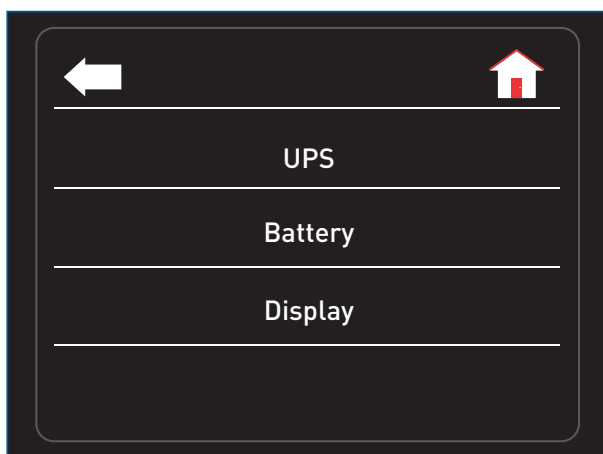


1. Tap the **Settings** icon. You will enter the **Setting** and **Control** menu.



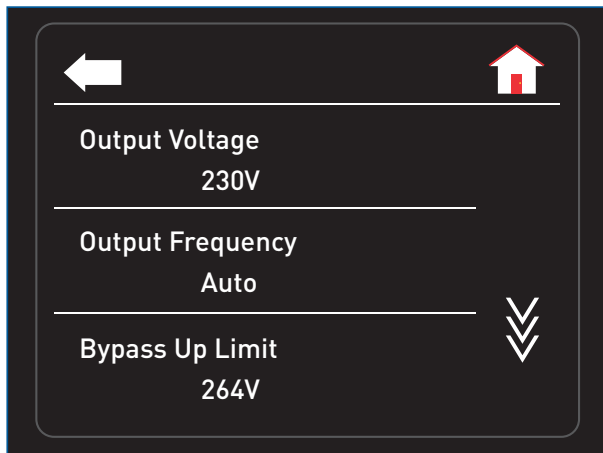
2. Tap the **Settings** icon. You will enter the **Setting** menu.

In the **Settings** menu, you can adjust the parameters for the operation of the UPS, the batteries, and the display.



3. Select the desired menu.

6.5.1 UPS



1. Tap the desired menu to adjust the corresponding settings.

Output Voltage

Set the output voltage:

220 V

230 V (default)

240 V

Note

The output voltage must be set during the initial setup. Changing the value is only possible when the output is turned off.

Output Frequency

Set the output frequency:

50 Hz

60 Hz

Auto (default)

Bypass Up Limit

Set the upper limit for the bypass output voltage. Enter the value using a numeric keypad.

230 V to 264 V (default)

Bypass Down Limit

Set the lower limit for the bypass output voltage. Enter the value using a numeric keypad.

176 V (default) to 220 V

UPS Mode

Set the operating mode of the UPS:

Normal (default)

ECO

CF

Parallel

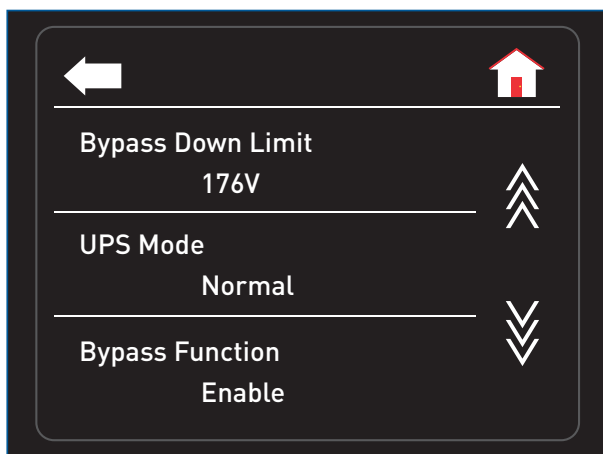
Generator

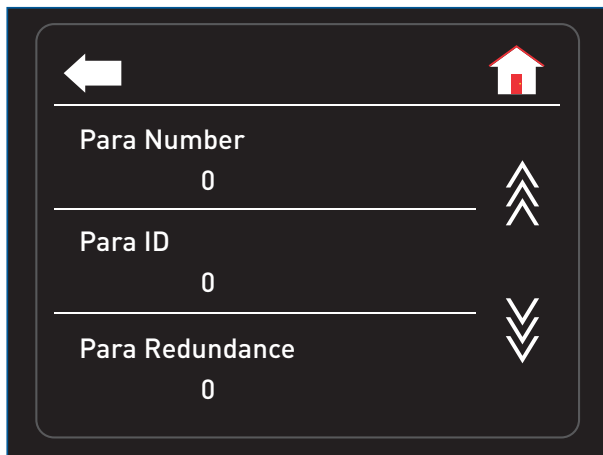
Bypass Function

Enable or disable the bypass function:

Enable (default)

Disable





The screenshot shows a dark-themed configuration menu for a UPS system. At the top left is a white left-pointing arrow, and at the top right is a white house icon. The menu contains three settings, each with a label, a value, and a navigation icon to its right:

- Para Number**: The value is 0. To the right is an icon of three upward-pointing chevrons.
- Para ID**: The value is 0. To the right is an icon of three downward-pointing chevrons.
- Para Redundance**: The value is 0. To the right is an icon of three downward-pointing chevrons.

Para Number

Specify the number of UPS units in the parallel system:
0 (default) to 4

Para ID

Set the ID number of the UPS:
0 (default) to 4

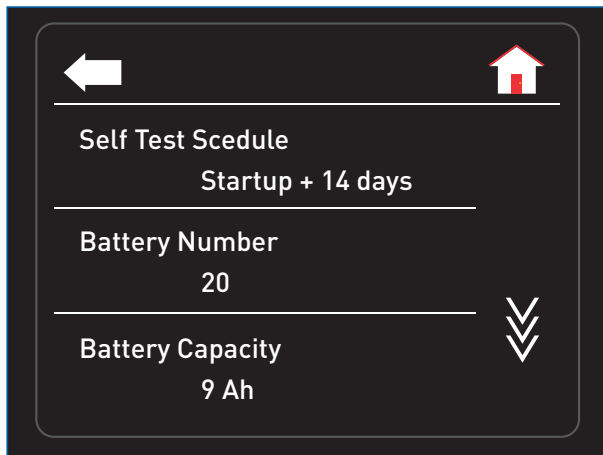
Para Redundance

Number of redundancy modules:
0 (default) to 3

Note

The number of redundancy modules determines how many UPS units will automatically take over full supply in the event of an internal failure.

6.5.2 Battery



1. Select the desired menu to make the appropriate settings.

Self Test Schedule

Set when a battery self-test should occur:

- Never
- Startup Only
- Startup + 7 days
- Startup + 14 days (default)

Battery Number

Specify the number of batteries:

- 16
- 18
- 20 (default)

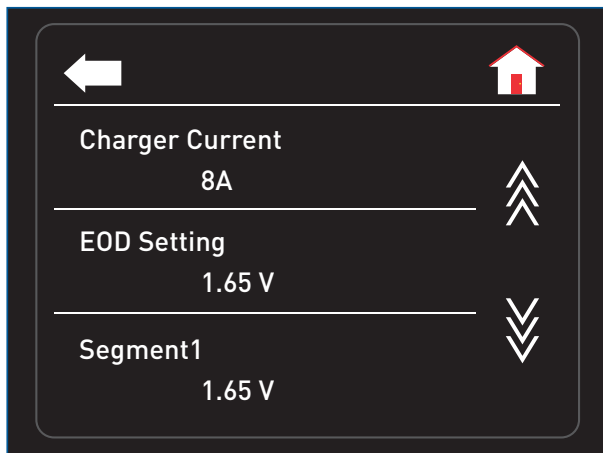
Battery Capacity

Specify the battery capacity. Enter the value using a numeric keypad.

- 1 to 200 Ah
- 9 Ah (default)

Note

- The UPS battery pack has a capacity of 9 Ah.
- The battery capacity is preset from the factory. When connecting additional battery packs, adjust the value accordingly:
 - 1 × Battery pack = 9 Ah
 - 2 × Battery packs = 18 Ah
 - 3 × Battery packs = 27 Ah
 - and so on.
- To apply the change in battery capacity, the UPS system must be completely turned off and then turned on again.

**Charger Current**

Specify the battery charging current. Enter the value using a numeric keypad.

1 to 10 A

8 A (default)

EOD Setting (For Experts Only)

Set the shutdown threshold for the UPS.

1.65 V (default)

1.70 V

1.75 V

1.80 V

Note

A battery typically has a voltage of 13.5 V, consisting of 6 cells at 2.25 V each. To avoid deep discharge of the battery, our systems generally define a total shutdown threshold of 1.65 V per cell.

Segment1 (For Experts Only)

Set the shutdown threshold for the output connections of Segment 1.

1.65 V (default)

1.70 V

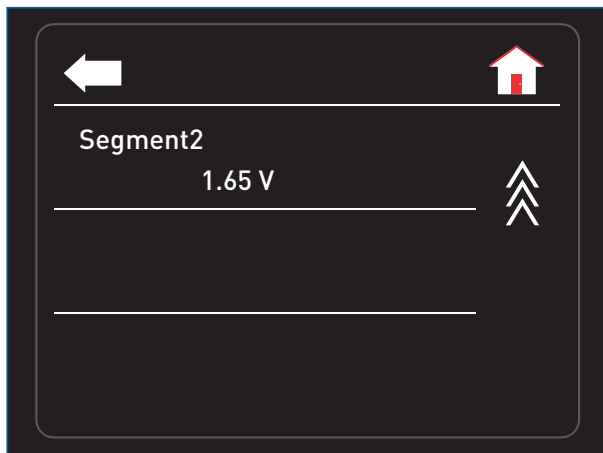
1.75 V

1.80 V

Note

The output connections of Segment 1 can be shut down at a certain battery voltage. The output connection at the terminal block will continue to be powered until the UPS is completely shut down.

This allows you to, for example, keep critical devices (connected to the terminal block) running during a power outage while shutting down other devices (Segment 1) early.



Segment2 (For Experts Only)

Set the shutdown threshold for the output connections of Segment 2.

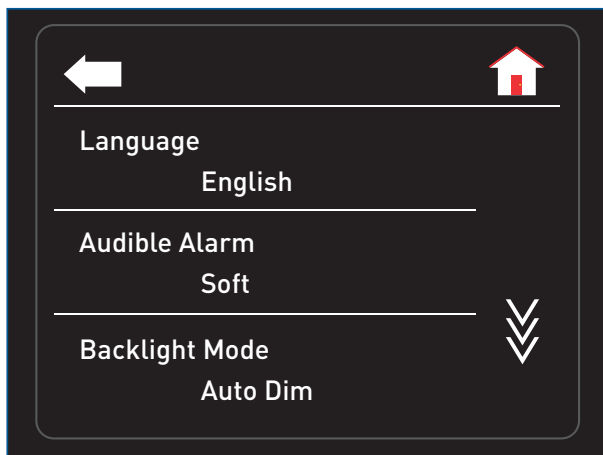
- 1.65 V (default)
- 1.70 V
- 1.75 V
- 1.80 V

Note

The output connections of Segment 2 can be shut down at a certain battery voltage. The output connection at the terminal block will continue to be powered until the UPS is completely shut down.

This allows you to, for example, keep critical devices (connected to the terminal block) running during a power outage while shutting down other devices (Segment 2) early.

6.5.3 Display



1. Tap the desired menu to make the corresponding settings.

Language

Set the menu language:

- English (default)
- Chinese

Language

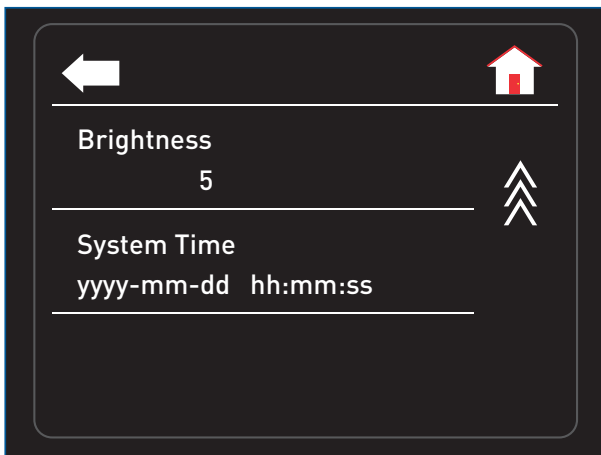
Enable or disable the beep sound and set the volume:

- Disable
- Soft (default)
- Medium
- Loud

Backlight Mode

To save energy, the LCD backlight can be dimmed or turned off when no events are active. Set the dimming behavior:

- Always ON
- Auto DIM (default)
- Always Off

**Brightness**

Set the brightness level using a numeric keypad.
1 bis 5 (default)

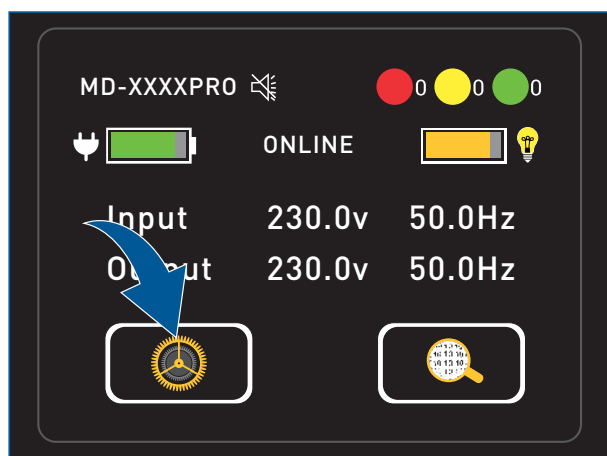
System Time

Set the system time using a numeric keypad.

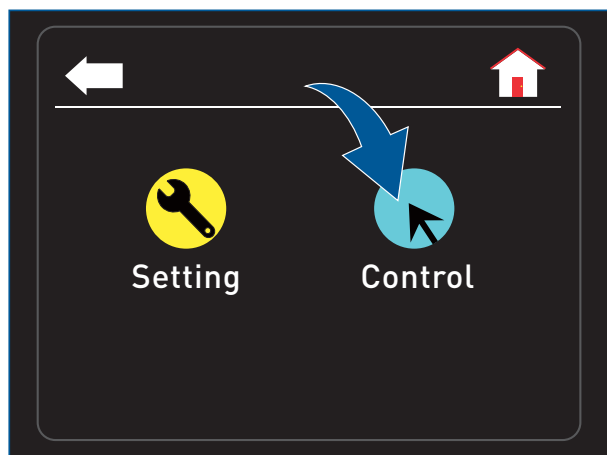
Input format:

yyyy-mm-dd hh:mm:ss

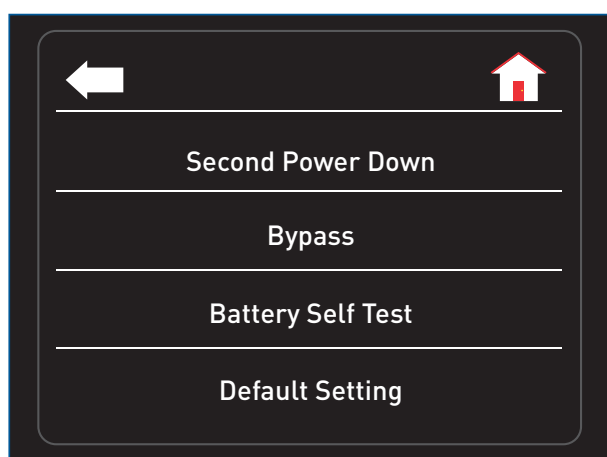
6.6 Control



1. Tap the **Settings** icon. You will enter the **Setting** and **Control** menu.

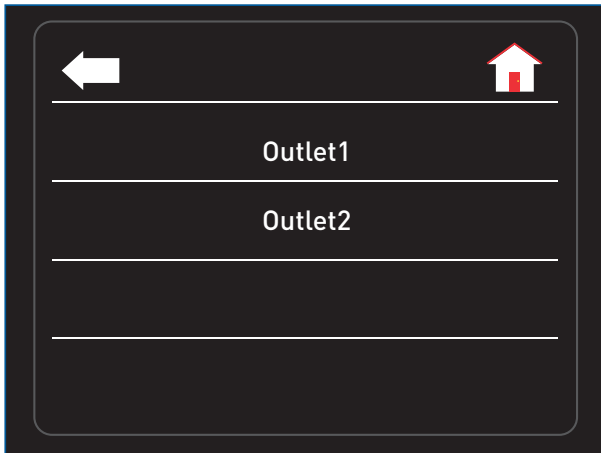


2. Tap the **Control** icon. You will enter the **Control** menu.



3. Select the desired menu.

6.6.1 Second Power Down

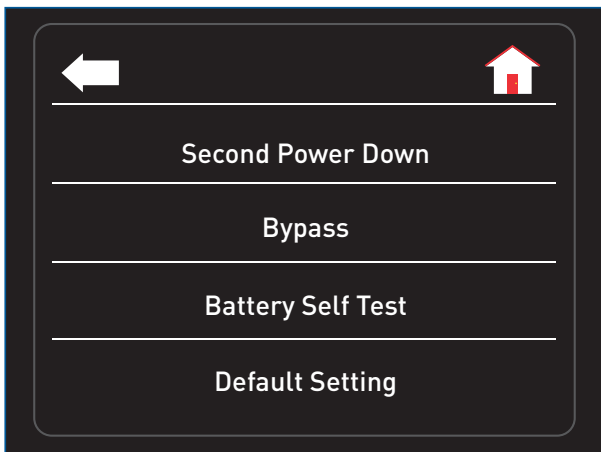


1. Tap on **Outlet1** to turn Segment 1 output connections on or off.
2. Tap on **Outlet2** to turn Segment 2 output connections on or off.

Note

Refer to the **Segment1** or **Segment2** menu for setting the shutdown threshold of the output connections Segment 1, see **Chapter 6.5.2 Battery, Page 50**.

6.6.2 Bypass

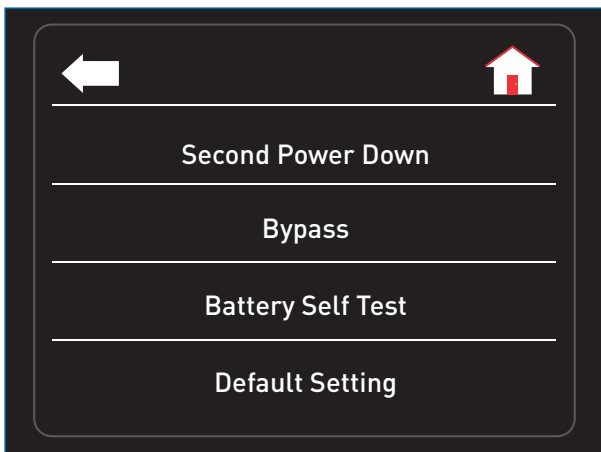


1. Tap on **Bypass** to enable or disable the bypass mode.

Note

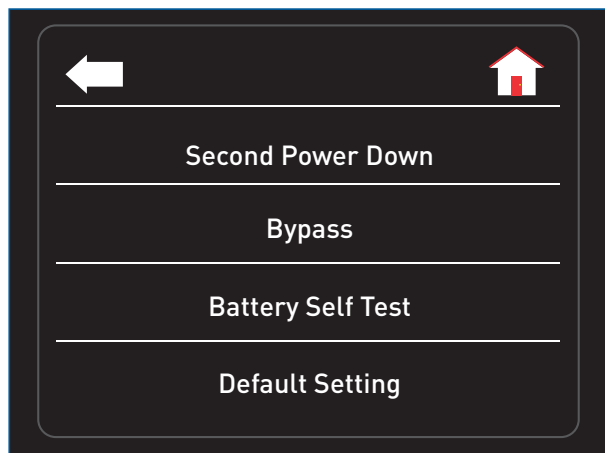
To enable bypass mode, it must first be activated in the **Setting/UPS/Bypass Function** menu, see **Chapter 6.5.1 UPS, Page 48**.

6.6.3 Battery Self Test



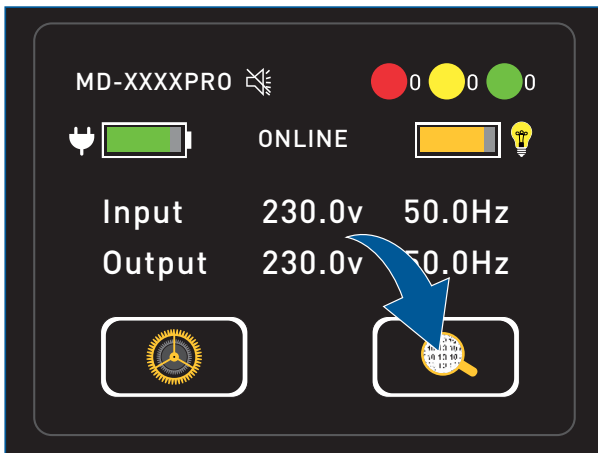
1. Tap on **Battery Self Test** to start or cancel a battery self-test.

6.6.4 Default Setting

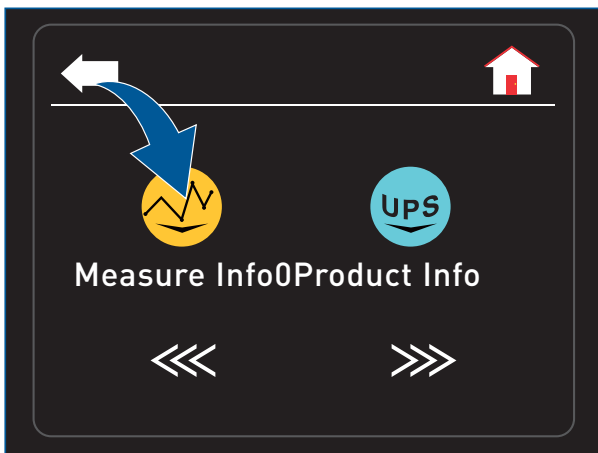


1. Tap on **Default Setting** to reset the UPS to factory settings.

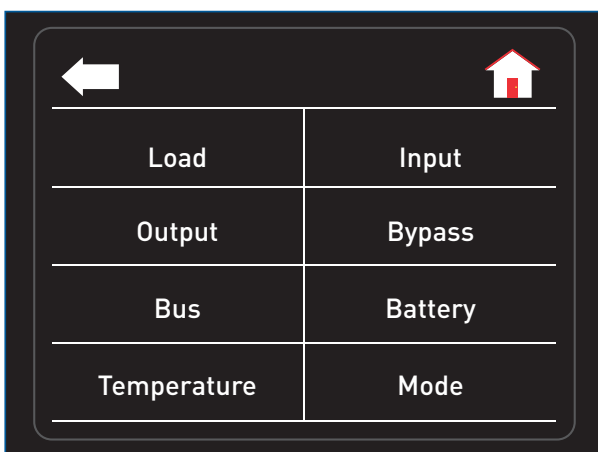
6.7 Measure Info



1. Tap on the **Information** icon to access the **Measure Info**, **Product Info**, and **Fault Record** menus.

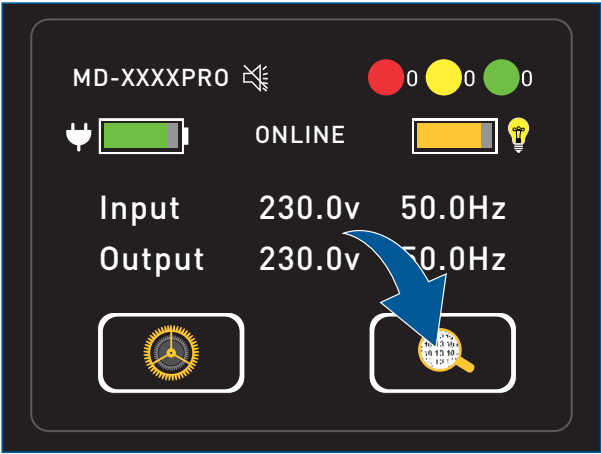


2. Tap on the **Measure Info** icon to enter the **Measure Info** menu.

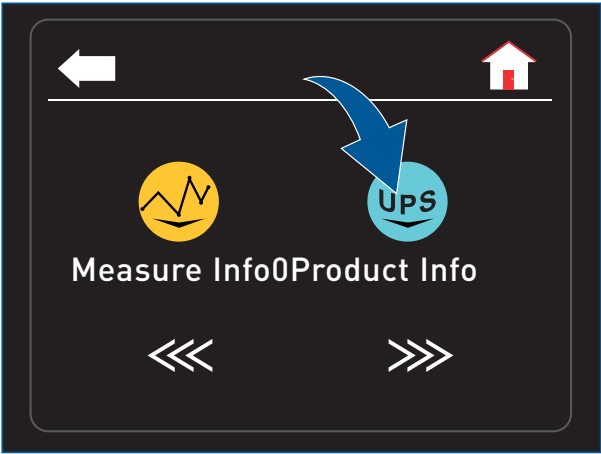


3. Select the desired menu to view detailed measurements for:
 Load
 Input
 Output
 Bypass
 Bus
 Battery
 Temperature
 Operating Mode

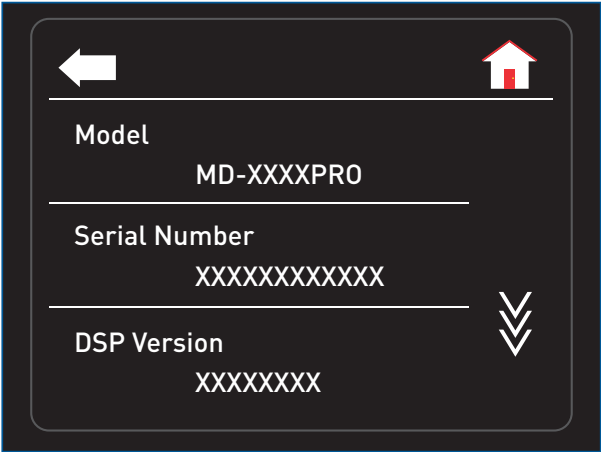
6.8 Product Info



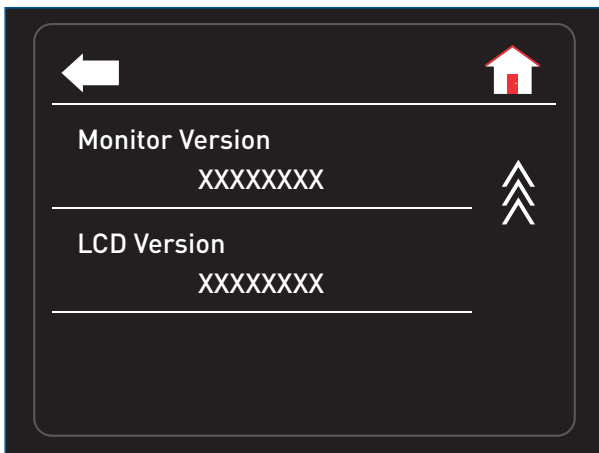
1. Tap on the **Information** icon to access the **Measure Info**, **Product Info**, and **Fault Record** menus.



2. Tap on the **Product Info** icon to enter the **Product Info** menu.

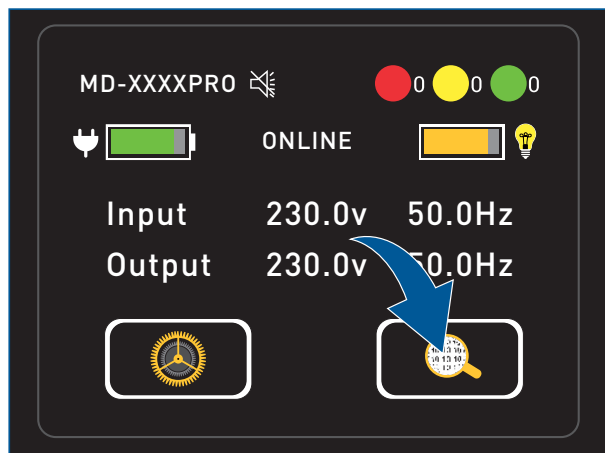


3. You will receive detailed information about your UPS:
- Type
 - Serial Number
 - DSP Version

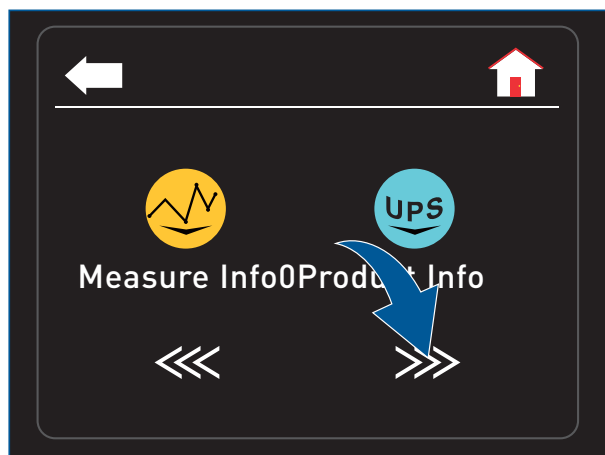


and
Monitor Version
LCD Version

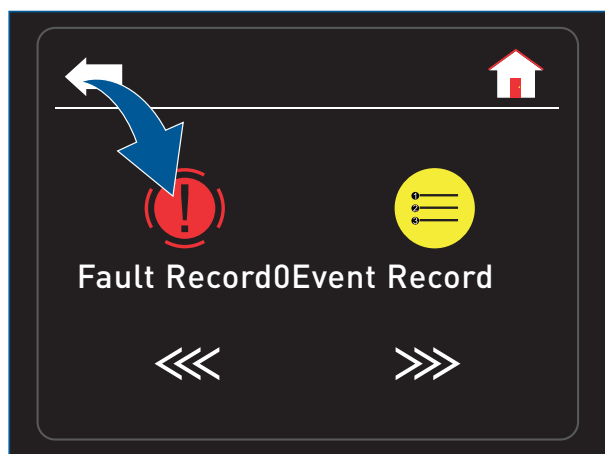
6.9 Fault Record



1. Tap on the **Information** icon to access the **Measure Info**, **Product Info**, and **Fault Record** menus.

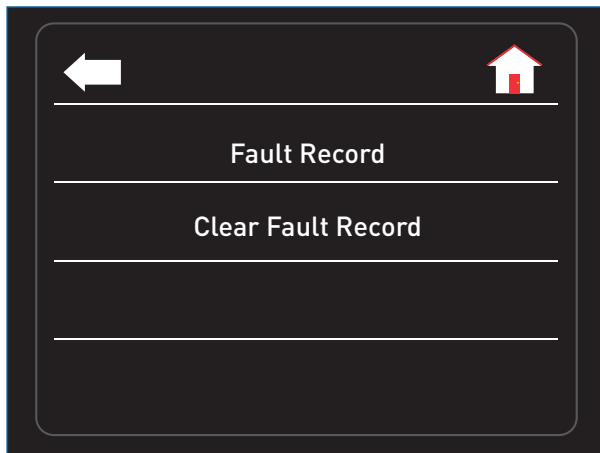


2. Tap on one of the two arrows.

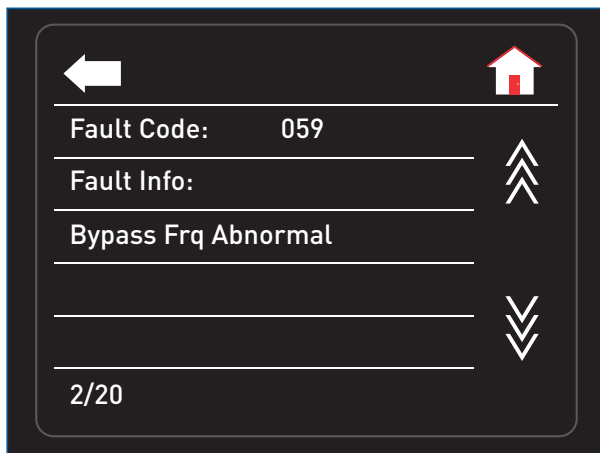


3. Tap on the **Fault Record** icon to enter the **Fault Record** menu.

6.9.1 Fault Record



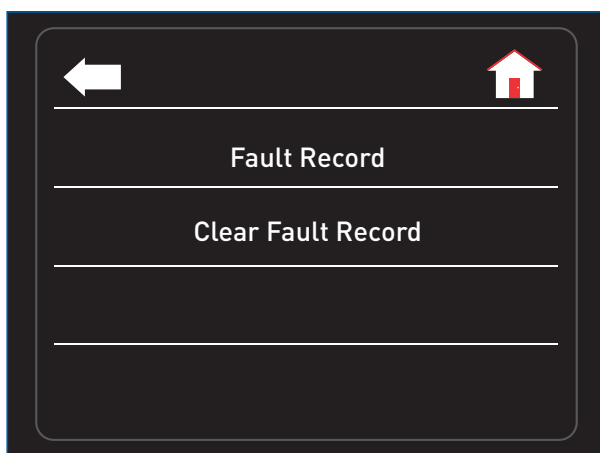
1. Tap on **Fault Record** to view the list of error messages.



Up to 20 error messages are stored. Each entry includes an error code and a brief description of the error.
For details, **see Chapter 7.2 Error and Alarm Codes, page 65.**

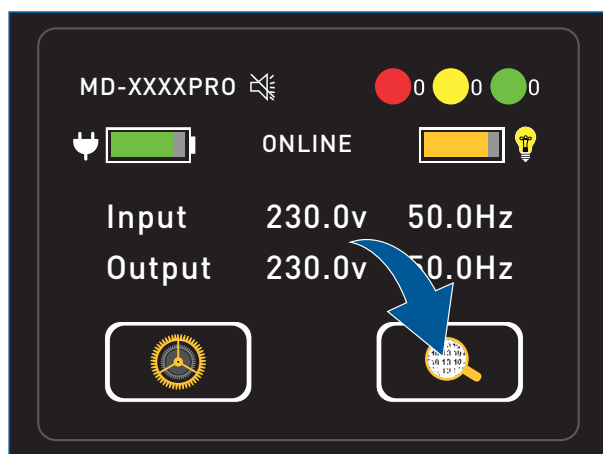
Use the arrows to scroll through the error messages.

6.9.2 Clear Fault

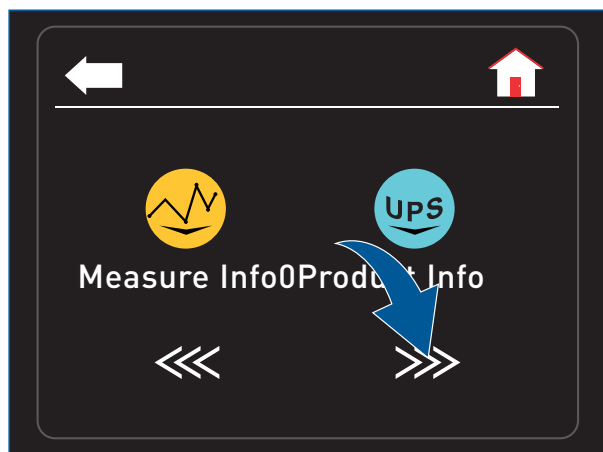


1. Tap on **Clear Fault Record** to delete the list of error messages.

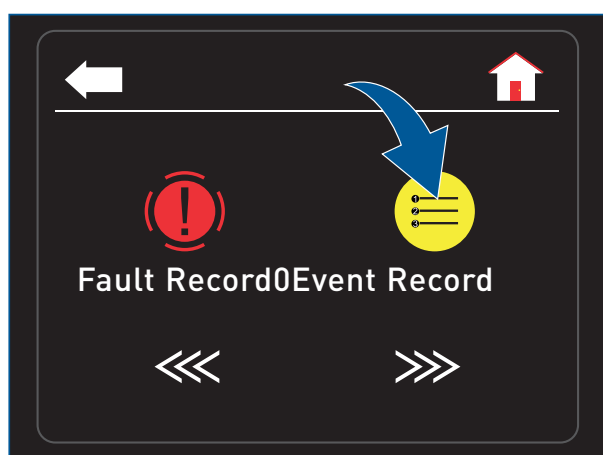
6.10 Event Record



1. Tap on the **Information** icon to access the **Measure Info**, **Product Info**, and **Fault Record** menus.

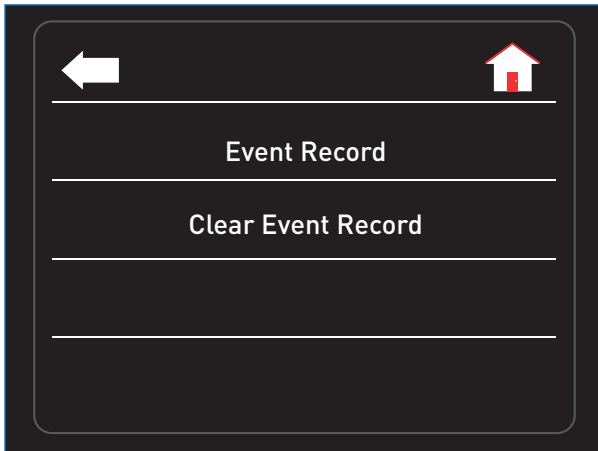


2. Tap one of the arrows to navigate.

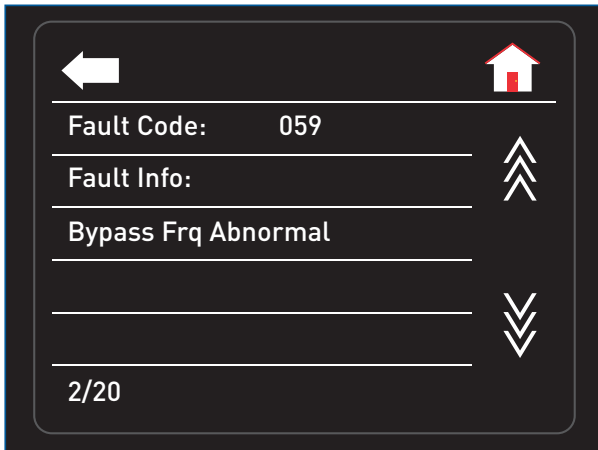


3. Tap on the **Event Record** icon. You will enter the **Event Record** menu.

6.10.1 Event Record



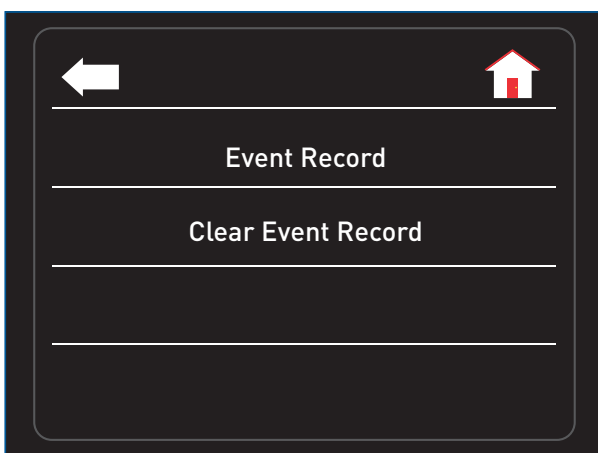
1. Tap on **Event Record** to view the list of events.



Up to 20 events are stored. Each entry includes an event code and a brief description of the event. For details on fault and alarm codes, refer to **Chapter 7.2, Fault and Alarm Codes, Page 65.**

Use the arrows to scroll through the events.

6.10.2 Clear Event Record



1. Tap on **Clear Event Record** to delete the list of events.

7 Troubleshooting

In the event of a malfunction, the UPS will enter error mode. The error status LED will light up red, and a continuous alarm sound will be emitted. An error code and a brief description will be displayed on the screen.

In many cases, error messages are caused by input voltage issues. Therefore, first check if the input voltage is within the tolerance range.

Check the causes of the error message and rectify them. If the issue persists, please contact the multimatic customer service:

multimatic Service GmbH

Im Wasen 2
D-78667 Villingendorf
Phone +49 741 9292-99
Fax +49 741 9292-33
Mail service@edelstrom.eu
www.edelstrom.eu

7.1 Resolving Issues

Fault	Possible Cause	Solution
Power is available, but no status LED is lit and no alarm sounds.	The power cable may be loose or not connected.	← Ensure the power cable is properly connected to the input port of the UPS.
Error Code "41" Status LED Battery Operation blinks	Internal battery or an external battery pack is incorrectly connected.	← Connect the internal battery or external battery pack correctly.
Error Code "39" Status LED Battery Operation blinks	<ul style="list-style-type: none"> · Battery voltage is too high. · Charger is defective. · Bridging cap configuration on the control board is incorrect. 	← Contact multimatic customer service.
Error Code "45" Status LED Battery Operation blinks	<ul style="list-style-type: none"> · Battery voltage is too low. · Charger is defective. 	← Contact multimatic customer service.
Error Code "26" Status LED Bypass Operation blinks Status LED Normal Operation blinks	Overload of the UPS output.	← Remove the corresponding load.
Error Code "32" Status LED Battery Operation blinks	Short circuit at the UPS output caused by a load.	← Eliminate the short circuit by removing or replacing the load.

Fault	Possible Cause	Solution
Error Code "68" Status LED Error Operation lights	Device fan malfunction.	<ul style="list-style-type: none"> ← Check if the device fan is blocked. ← Remove the blockage. ← Restart the UPS.
Error Codes "21", "22", "23", "24", or "48"	Fault in the UPS.	← Contact multimatic customer service.
Battery runtime is significantly reduced.	Batteries are not fully charged.	<ul style="list-style-type: none"> ← Charge the UPS for at least 5 hours before checking the battery status. If the battery status remains low, contact the dealer
	Faulty battery.	← Contact multimatic customer Service for battery replacement.

7.2 Fault and Alarm Codes

Code	Fault Description	Category	Alarm Sound	Status LED
001	Input Phase Sequence Error	Error	1x per second	Error Operation lights
002	Input Voltage High	Alarm	1x every 2 seconds	–
003	Input Voltage Low	Alarm	1x every 2 seconds	–
004	Input Frequency Abnormal	Alarm	1x every 2 seconds	–
005	+DC bus Over Voltage	Alarm	Continuous	Error Operation lights
006	-DC bus Over Voltage	Alarm	Continuous	Error Operation lights
007	DC Bus OV HW Ckt	Fehler	Continuous	Error Operation lights
008	+DC bus Low Voltage(output on)	Alarm	Continuous	Error Operation lights
009	-DC bus Low Voltage(output on)	Alarm	Continuous	Error Operation lights
010	+DC Bus Voltage Low(output off)	Alarm	Continuous	Error Operation lights
011	-DC Bus Voltage Low(output off)	Alarm	Continuous	Error Operation lights
012	DC bus Delta(line)	Alarm	Continuous	Error Operation lights
013	DC bus Delta(on battery)	Alarm	Continuous	Error Operation lights
014	+DC Bus soft start Fail(line)	Error	Continuous	Error Operation lights
015	-DC Bus soft start Fail(line)	Error	Continuous	Error Operation lights
016	+DC Bus soft start Fail(Battery)	Error	Continuous	Error Operation lights
017	-DC Bus soft start Fail(Battery)	Error	Continuous	Error Operation lights
018	+DC Bus Discharge Fail	Error	Continuous	Error Operation lights

Code	Fault Description	Category	Alarm Sound	Status LED
019	-DC Bus Discharge Fail	Error	Continuous	Error Operation lights
021	Inverter Output Low	Error	Continuous	Error Operation lights
022	Inverter Output High	Error	Continuous	Error Operation lights
023	Inverter hardware CKT	Error	Continuous	Error Operation lights
024	Output Relay Weld Close	Error	Continuous	Error Operation lights
025	Output Relay Weld Open	Error	Continuous	Error Operation lights
026	Inverter Overload	Alarm	1x per second	Normalbetrieb leuchtet
027	Inverter Overload Time Out	Alarm	1x per second	Normalbetrieb leuchtet
028	Inverter DC Over Voltage	Alarm	1x per second	Normalbetrieb leuchtet
029	Output Meas Mismatch	Error	Continuous	Error Operation lights
030	Inverter soft start Fail	Error	Continuous	Error Operation lights
032	Output Short Circuit	Error	Continuous	Error Operation lights
033	Output Over Voltage	Error	Continuous	Error Operation lights
034	Output Svr Over Voltage	Error	Continuous	Error Operation lights
035	Output Low Voltage	Error	Continuous	Error Operation lights
036	Output Over VA	Alarm	1x per second	–
038	Battery Reverse Connection	Error	2x pro Sekunde	Error Operation lights
039	+Battery Over Voltage	Alarm	1x per second	Battery Operation blinks
040	-Battery Over Voltage	Alarm	1x per second	Battery Operation blinks
041	+Battery Disconnected	Alarm	2x per second	Battery Operation blinks
042	-Battery Disconnected	Alarm	2x per second	Battery Operation blinks
043	+Battery Low Pre Alarm	Alarm	2x per second	Battery Operation blinks
044	-Battery Low Pre Alarm	Alarm	2x per second	Battery Operation blinks
045	+Battery Low Voltage	Alarm	1x per second	Battery Operation blinks
046	-Battery Low Voltage	Alarm	1x per second	Battery Operation blinks
047	RBC Needs Replacement	Error	2x per second	Battery Operation blinks
048	+Charger Error	Error	Continuous	Error Operation lights
049	-Charger Error	Error	Continuous	Error Operation lights
050	+Charger Over Voltage	Alarm	1x per second	Error Operation blinks
051	-Charger Over Voltage	Alarm	1x per second	Error Operation blinks
052	+Charger Low Voltage	Alarm	–	Error Operation blinks
053	-Charger Low Voltage	Alarm	–	Error Operation blinks
054	Charger Meas Mismatch	Error	1x per second	Error Operation blinks
056	Bypass Phase Sequence Error	Error	1x per second	–
057	Bypass Over Current	Alarm	1x per second	Bypass Operation blinks

Code	Fault Description	Category	Alarm Sound	Status LED
058	Bypass Voltage Abnormal	Alarm	–	Bypass Operation blinks
059	Bypass Frequency Abnormal	Alarm	–	Bypass Operation blinks
060	Bypass Overload	Alarm	1x per second	Bypass Operation blinks
061	Bypass Overload Time Out	Alarm	1x per second	–
062	PDU Activated	Alarm	–	–
064	Battery Over Temp Critical	Alarm	Continuous	Error Operation lights
065	Battery Low Temperature	Alarm	Continuous	Error Operation lights
066	Battery Over Temp	Alarm	Continuous	Error Operation lights
067	Battery Temp Sensor Disconnected	Alarm	Continuous	Error Operation lights
068	Fan Inoperative	Error	Continuous	Error Operation lights
069	Heatsink over temp	Alarm	Continuous	Error Operation lights
071	Ambient Over Temperature	Alarm	1x per second	Error Operation lights
072	Ambient Low Temperature	Alarm	1x per second	Error Operation lights
074	Bypass Rly weld close	Error	Continuous	Error Operation lights
075	Bypass Rly weld open	Error	Continuous	Error Operation lights
076	Bkfeed Relay Weld Close	Error	Continuous	Error Operation lights
077	Bkfeed Relay Weld Open	Error	Continuous	Error Operation lights
078	Logic Power Supply Event	Alarm	Continuous	Error Operation lights
079	EEPROM Error	Error	Continuous	Error Operation lights
080	RAM Error	Error	Continuous	Error Operation lights
081	Para Communication Error	Alarm	Continuous	Error Operation lights
082	Internal Comm. Fault	Alarm	Continuous	Error Operation lights
083	CPLD Fault	Alarm	Continuous	Error Operation lights
084	MCU Reseted	Error	Continuous	Error Operation lights
085	Bkfeed Relay locked	Alarm	1x per second	Error Operation lights
086	BMS Communication Error	Alarm	1x per second	Error Operation blinks
088	Para Relay Error	Error	Continuous	Error Operation lights
089	Para Connect Error	Alarm	Continuous	Error Operation lights
090	Para Current Share Error	Alarm	1x per second	Error Operation blinks
091	Para Overload	Alarm	1x per second	–
093	Button error	Error	2x per second	Error Operation lights
095	EPO ACTIVATED	Error	Continuous	Error Operation lights
096	Firmware Mismatch	Error	Continuous	Error Operation lights
099	Firmware Upgrading	Alarm	–	Error Operation lights

8 Maintenance

8.1 General

Regular maintenance and testing of your installation ensure high reliability of your power supply. We recommend **annual maintenance and inspection** of your installation. Maintenance can be done on demand or through a maintenance contract with multimatic Service GmbH.

8.2 Safety



Danger from electrical current.

Risk of death from live parts.

- ← Do not open the UPS yourself.
- ← The UPS should only be serviced by qualified electrical professionals according to electrical regulations.

8.3 Maintenance of Device Fans

The estimated lifespan of the device fans is approximately 20,000 to 40,000 hours of continuous operation. Dust, dirt, and environmental conditions can reduce this lifespan. We recommend checking and cleaning the device fans annually.

8.4 Battery Maintenance

The average lifespan of the installed batteries is 3 to 6 years and depends on operating temperature and the number of charge-discharge cycles. A good battery condition is crucial for the UPS to function properly. The following methods are available for checking:

Battery Test

We recommend testing the batteries monthly (see **Chapter 6.6.3 Battery Self Test, page 55**) and replacing them if necessary (see **Chapter 8.5 Battery Replacement, page 69**).

Full-Test via SNMP (Performance Test)

For ensuring safe battery operation, an automatic or manual battery check via SNMP/web interface can be performed regularly. It is recommended to test the batteries every 3 to 6 months, especially if the battery is not heavily used in normal operation. Replace the batteries if necessary (see **Chapter 8.5 Battery Replacement, page 69**).

After a full battery test via SNMP/web interface to check the battery autonomy, the charger needs at least 5 hours to recharge the battery to 100% of its capacity.

To avoid self-discharge leading to irreversible deep discharge of the battery, the UPS system should be operated for **at least 12 hours every 3 months**.

8.5 Battery Replacement



Hazards in handling batteries.

Handling batteries involves specific hazards.

- ← To prevent damage during handling, charging, and operation of the batteries, all guidelines from the respective manufacturers and safety data sheets must be followed.
- ← All personnel must be trained in handling batteries.
- ← Battery replacement should only be performed by qualified electrical professionals.



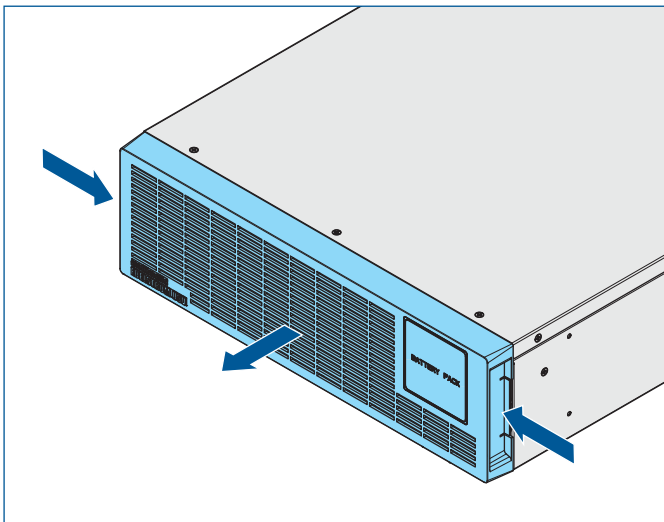
The batteries are heavy!

Due to the high weight of the batteries, lifting, moving, or carrying them can lead to physical strain. Dropping them can result in injuries and property damage.

- ← Pull the batteries out of the device onto a flat surface at the same height.
- ← Push the new batteries into the device on a flat surface at the same height.

CAUTION

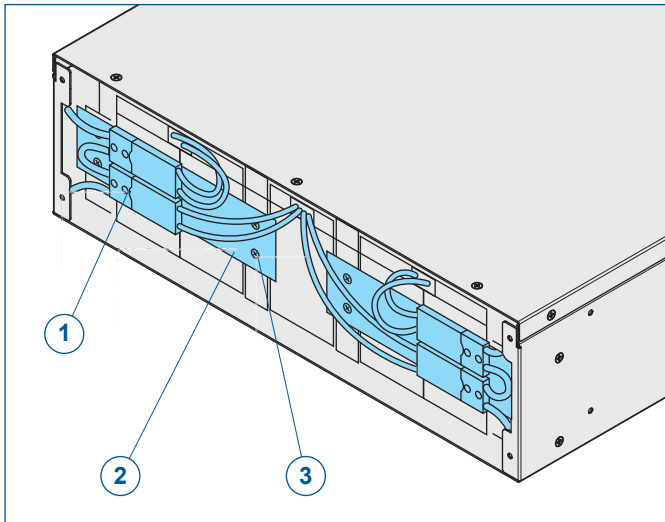
The UPS is hot-swappable. Only a qualified electrical professional can replace the batteries without fully shutting down the UPS.



1. Remove the cover by pressing in the side locks.

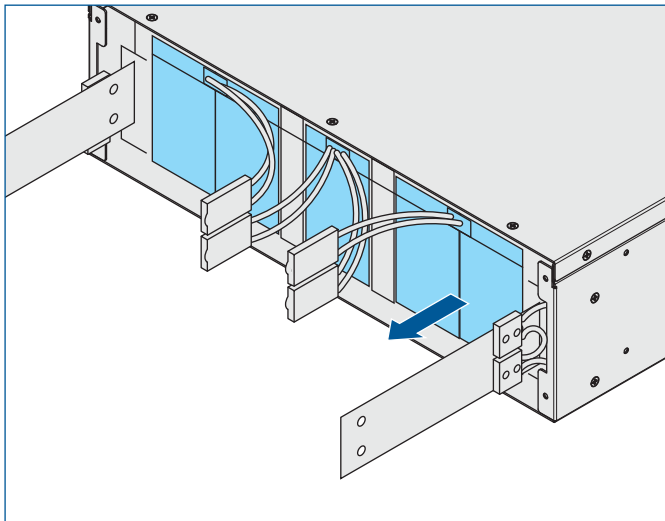
Note

The cover is included in the delivery and does not need to be removed in the factory condition.



- 1 Connectors
- 2 Mounting Plate
- 3 Mounting Screws

- 2. Disconnect the connectors.
- 3. Remove the mounting screws.
- 4. Remove the mounting plate.



- 5. Pull the battery out of the enclosure.
- 6. Replace the battery.
- 7. Reassemble in the reverse order.
- 8. Check the voltage between BAT+ and BAT N, and BAT N and BAT- with a multimeter.

CAUTION

Damage from improper wiring.

Improper wiring of the battery pack can cause damage to the batteries.

← Follow the wiring diagram of the battery pack.

8.6 Cleaning

CAUTION**Damage from improper cleaning.**

Using incorrect cleaning agents or methods can cause damage.

- ← Clean the UPS only with a soft, non-abrasive dust cloth.
- ← Do not use chemical cleaners such as alcohol, acetone, or solvents.

8.7 Storage

To keep an unused UPS functional over an extended period, observe the following points:

- The storage area must be dry and clean.
- Store the unit on a level surface and secure it against tipping and unauthorized use.
- Completely cover the unit to prevent dirt and dust from entering.
- Do not expose the unit to extreme cold or heat.
- Charge the batteries for 5 hours before storing the UPS.
- Storage at -25°C to 40°C: Charge the batteries for 12 hours every 3 months.
- Storage at 40°C to 45°C: Charge the batteries for 12 hours every 2 months. Connect the UPS to the mains supply for this purpose.

9 Technical Data

Type	MD-4500PRO	MD-6000PRO	MD11-10000PRO
Technology	VFI-SS-111 according to IEC/EN 62040-3 (Online Double Conversion)		
Power			
Power (VA)	4500	6000	10000
Power (Watt)	4500	6000	10000
Power factor (pf)	1		
Phases Input/Output	Single-phase / Single-phase		
Input			
Rated voltage	230 VAC (configurable to 220/230/240 VAC)		
Voltage range	110 – 286 VAC at 50% load / 176 – 264 VAC at 100% load		
Frequency	50/60 Hz (40 - 70 Hz)		
Connection	Fixed connection via terminals		
Generator input/operation	Configurable		
Output			
Rated voltage	230 VAC (configurable to 220/230/240 VAC)		
Frequency	50/60 Hz Auto Sensing		
Transfer time	0 ms (none)		
Waveform type	Sine wave		
Load crest factor	3:1		
THD	<3% (Linear Load) <5% (Non-Linear Load)		
Overload behavior in AC mode	105% – 125% for 60 seconds 125% – 130% for 30 seconds		
Overload behavior in battery mode	105% - 125% for 60 seconds 125% – 130% for 10 seconds >130% for 200 ms		
Efficiency	Up to 94% in Online Mode / Up to 97.5% in ECO Mode		
Connections	Fixed connection 2 × IEC 320 C13 (10 A) – Segment 2 programmable 2 × IEC 320 C19 (16 A) – Segment 1 programmable		

Type	MD-4500PRO	MD-6000PRO	MD11-10000PRO
Battery (Autonomy at 80% Load*)			
Internal Batteries	20 Min.	11 Min.	4 Min.
Additional Battery (per battery pack)	+22 Min.	+19 Min.	+10 Min.
Battery Charging Current	10 A		
Hot-Swap Capability	Yes		
Battery Life Expectancy	5 years (according to EUROBAT), 10 years optional		
Replacement Battery Kit for Battery Pack	MM-MD9PRO		
Communication			
Interfaces	1 × RS232, 1 × USB, 1 × Slot for SNMP card or relay card		
EPO	Connection terminals for external emergency shutdown switch		
PDU	Auxiliary contact for external bypass		
Display	LCD + LED		
Software	multimatic Management Software		
Optional Communication	SNMP card, relay card		
Optional Sensorsl	Temperature sensor, humidity sensor (only with SNMP card - Professional Version)		
Dimensions and Weights			
Form Factor	Tower / Rackmount (19")		
Dimensions (H × W × D)			
Tower	USV: 440 × 132 × 750 mm Battery pack: 440 × 132 × 680 mm		
Rackmount (19")	UPS: 132 (3U) × 440 × 750 mm UPS: 132 (3U) × 440 × 680 mm		
UPS Net Weight	19 kg + 63 kg		21 kg + 63 kg
UPS Shipping Weight	22 kg +68 kg		24 kg + 68 kg
UPS Shipping Dimensions	UPS: 285 × 565 × 810 mm Battery pack: 285 × 565 × 780 mm		
Battery Pack Dimensions (H × W × D)			
Tower	440 × 132 × 680 mm		
Rackmount (19")	132 (3U) × 440 × 680 mm		
Battery Pack Net Weight	63 kg		
Battery Pack Shipping Weight	68 kg		
Battery Pack Shipping Dimensions	285 × 565 × 780 mm		

Type	MD-4500PRO	MD-6000PRO	MD11-10000PRO
Optional Accessories	19" Rackmount rails, External Bypass		
Environment and Safety			
Noise Level	≤ 51 dBA		
Protection Class	IP20		
Operating Temperature	0 – 40°C		
Relative Humidity	0 bis 95 % (non-condensing)		
Safety Certification	IEC/EN62040-1, IEC/EN60950-1		
EMC Certification	IEC/EN62040-2 (Class 2)		
Approvals	CE		
Warranty**	36 months on device and battery		

* Runtime values are approximate and may vary depending on battery age, charging/discharging cycles, temperature, etc.

**Subject to the warranty conditions

Declaration of Conformity

Units with CE mark comply with EU harmonized standards and directives.

EU Declaration of Conformity is available upon request.

10 Decommissioning and Disposal

**Danger from Electric Shock.**

Risk of fatal injury from live electrical parts.

- ← The UPS may only be dismantled by authorized electrical specialists in accordance with electrical regulations.
- ← Disconnect the UPS from all external power sources before dismantling.
- ← Note that the UPS has its own internal power source (battery) and capacitors with high capacity. Dangerous voltages can be present at the output terminals even when the system is disconnected from the mains supply.



Batteries are classified as hazardous waste and must be disposed of through a specialized recycling company.




Electrical devices contain valuable materials. Defective electrical devices should be handed over to a specialized recycling company for proper disposal.



Do not dispose of batteries or electrical devices with household waste.

11 Additional Information

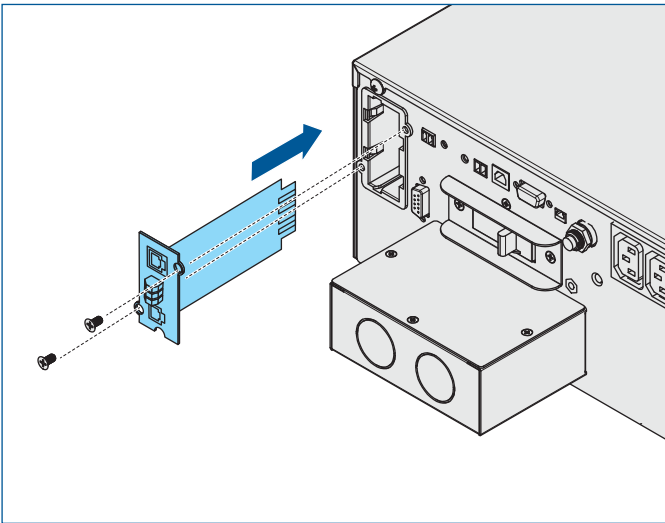
11.1 Installing Network Card or Relay Card



ESD Protected Area!

The network card and relay card are susceptible to electrostatic discharge. Observe ESD precautions when handling these components.

← The installation should only be carried out by a qualified electrical technician.

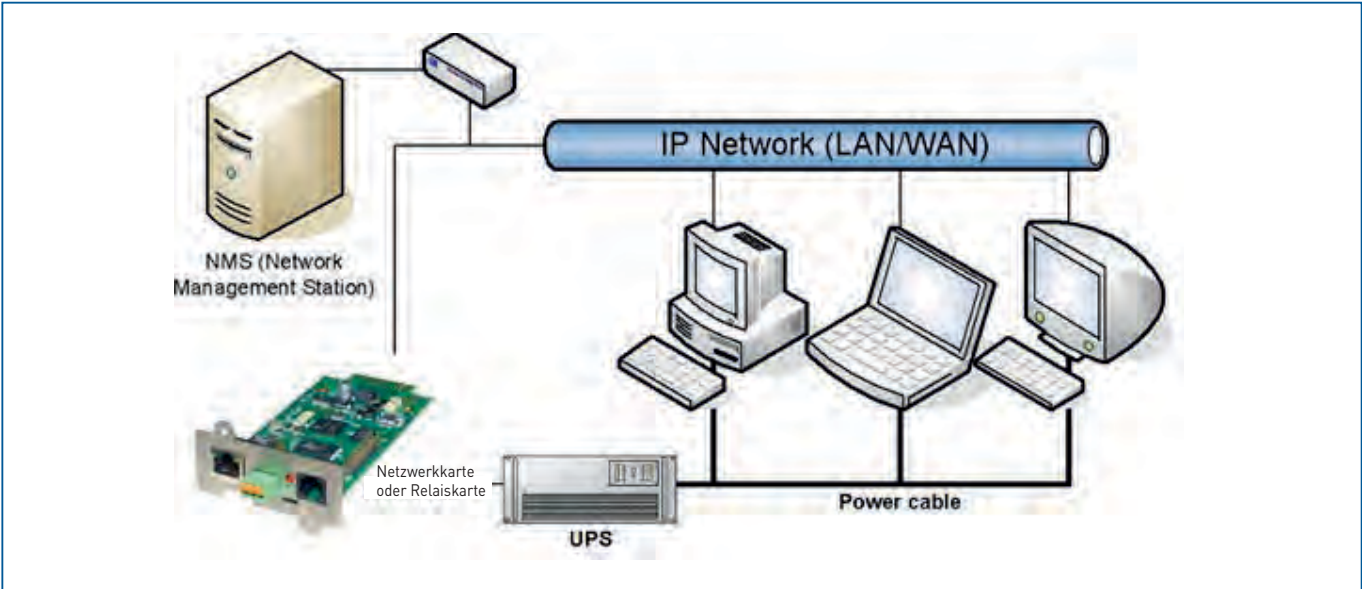


1. The installation should only be carried out by a qualified electrical technician.
2. Insert the network card or relay card into the slot.
3. Secure the network card or relay card using the two screws.

Note

Upon delivery and in configuration mode, the SNMP card is set with the **IP address 10.10.10.10** and **subnet mask 255.255.255.0**.

Description



During configuration, both a LAN cable and a cross-over cable can be used, depending on the PC or notebook being used.

For the initial setup of the network card, we recommend avoiding devices such as hubs and switches.

Recommended Network Settings for the Client PC:

IP Address	10.10.10.11
Subnet Mask	255.255.255.0
Gateway	10.10.10.11 (will be automatically hidden)
DNS	Empty

If the adapter responds to a PING command, you can access the preset address in a browser. Variations in PING response times do not indicate a fault. Due to different UPS protocols, the adapter might not respond to each PING signal at the same speed. Only a consistent timeout indicates a problem.

Setting a static IP address is strongly recommended because the CS141 may be used for multi-server shutdowns via RCCMD, and there may be cases where the DHCP server fails. Additionally, in some environments, RCCMD message reception might be restricted to specific IP addresses.

First-Time Setup

Note

Important Information!

All settings are applied immediately when you click "APPLY". If you navigate away from the page before applying, all previously made settings will be discarded.

To access the system, log in using the administrator account and password (default: cs141-snmp). Navigate to Setup, then System, and select Network. Here, you need to set a hostname, enter the IP address, subnet mask, and gateway. Optionally, you can configure a DNS server.

After making the settings, click “Apply.” If the switch on the device was previously set to “Configured Address,” the CS141 will now attempt to redirect you to the new IP. You might need to adjust the client’s IP address accordingly. If you change the switch later, you should either restart the device using the reboot button in the web interface or alternatively, interrupt the power supply for 5 seconds.

Navigate to Setup -> Devices/Systems -> UPS -> Configuration in the menu.

Geräte/Anlagen UPS	
Modell	MD-XXXXPRO
Leistung (VA)	10000
Last (VA)	1000
Haltezeit (Min.)	10
Aufladezeit (Std.)	8
Baud Rate	1200
Kabeltyp	Serial
UPS Id	0
Batterieinstallationsdatum	
Batterie veraltet nach	48 Monate
System Shutdown Zeit	6 Minuten

Select your UPS model from the list. If your UPS is not listed, contact your manufacturer for an alternative model that can be configured. If you have not received specific baud rate values, keep the default setting.

System Shutdown Time indicates when the system shutdown should be performed in the event of a power failure.

Note
Important Information!

If the incorrect cable type is selected, there will be no communication with the UPS.

Please pay attention to the System Shutdown Time field. This value determines how many minutes before a complete battery discharge the system shutdown event will be triggered. Do not use this event to trigger shutdown signals with RCCMD, as the remaining time in this status is not reliable. Use the Powerfail event for this purpose. The adapter will generate a warning message if the “Battery outdated after” value exceeds the battery installation date.

UPS Functions

The CS141 can be used as a remote control to execute commands and tests supported by the UPS. Please note that the functions and displayed screens may vary for each UPS model, and functions will only be available if the device supports them.

Device Status: Ready

UPS Remote Control

UPS Test

Start Custom Test

Custom Test

Duration(Min)

3

Start Battery Test

Battery Test

Start Full Test

Full Test

Start Self Test

Self Test

Start Cancel Test

Cancel Test

Last UPS Test Result

Name	Status	Result	Holdtime(Min)	Start Time
CustomTest				
BatteryTest				
FullTest				
SelfTest				

UPS Control

Shutdown Restore

Shutdown[Sec]

3

Restore[Sec]

3

Restore with Duration

Restore[Sec]

3

Shutdown with Duration

Shutdown[Sec]

3

Switch off UPS

Cancel Shutdown

Switch to Bypass Mode

Switch to Online Mode

Last UPS Control Result

Auto Restart	On
Shutdown Type	System
UPS Shutdown Begin in approx.	—
UPS Restore Begin in approx.	—

11.2 Installation as a Parallel System

11.2.1 Safety



Risk of Electrical Shock.

Risk of fatal injury due to live components.

- ← Work on electrical components, such as switching elements and electrical wiring, must only be performed by authorized electrical professionals in accordance with electrical regulations.
- ← Before starting any work, disconnect the UPS from all external power sources.
- ← Be aware that the UPS has its own internal power source (batteries) and high-capacity capacitors. Dangerous voltages may be present at the outputs even if the system is disconnected from the mains.
- ← Ensure safe routing and installation of cables.

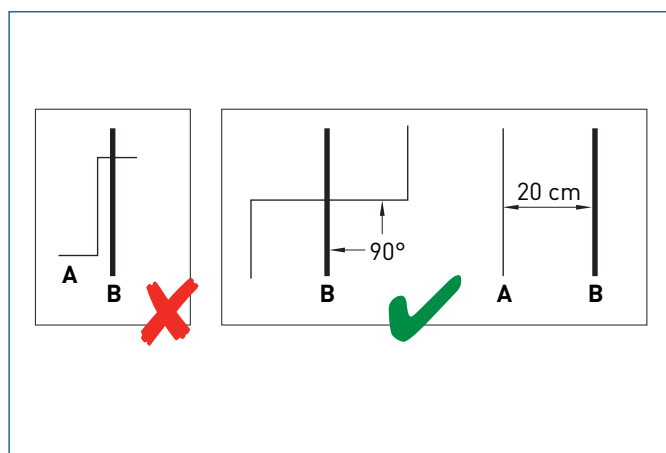
CAUTION

Risk of Property Damage Due to Improper Configuration or Commissioning.

Configuration and commissioning must only be performed by trained technical staff.

- ← Note that UPS parallel functions are only activated during normal operation.
- ← Ensure that the voltage difference between the UPS units at no load is less than 0.5 V. Contact your dealer if any UPS output voltage has a tolerance exceeding 0.5 V AC.
- ← Ensure that RS232 communication cables are securely connected in parallel operation to avoid damage to the UPS and connected equipment.
- ← Only UPS units of the same power rating and type can be installed in parallel. For example, a UPS without a galvanic transformer cannot be connected in parallel with a UPS that has a galvanic transformer.
- ← Ensure that a 40 A RMS / 250 A overcurrent protection device and a 30 A RMS / 250 A overcurrent protection device are installed at the input and output of each UPS to ensure the operational safety of the equipment during maintenance.

11.2.2 Installation



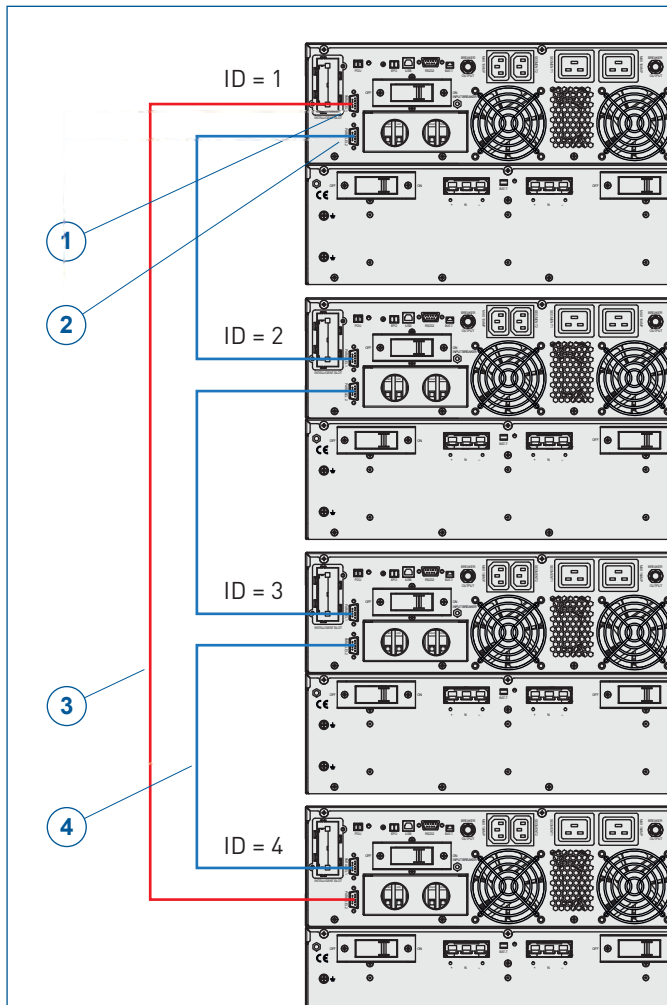
A: Communication or Control Signal Cables

B: Power Cables

- ← Ensure that the cables used for the mains connection, load, and battery pack are installed separately. To avoid impulse disturbances, they should not cross each other.
- ← RS232 cables for parallel operation and other control signal and communication cables (RS232, USB, etc.) should be routed separately from the cables mentioned above. If separation is not possible, route the cables at right angles or maintain a minimum distance of 20 cm.

Note

The UPS is equipped with a network filter. To avoid risks from leakage currents, ensure that the power supply is properly grounded.



- 1 RS232 Port 1 for Parallel Operation
- 2 RS232 Port 2 for Parallel Operation
- 3 3 RS232 Connection Cable
- 4 4 RS232 Connection Cable

1. Position the UPS Unit: Refer to **Chapter 5.2 "Setting Up / Rack Mounting"** on page 31.
2. Connect the Battery Packs: See **Chapter 5.3 "Connecting the Battery Pack"** on page 36.
3. Connect Load and Mains: Refer to **Chapter 5.4 "Connecting Mains and Load"** on page 39.
4. Connect the RS232 ports of the UPS units with the RS232 connection cables as shown.

Note

Up to four UPS units can be operated as a parallel system.

5. Turn all the UPS units on.
6. Set each UPS to **Parallel Operation** mode and enter the relevant values as described in **Chapter 6.5.1 "UPS"** on page 48.

11.3 EPO Function Test

1. Make sure the UPS is turned off and disconnected from the mains power.
2. Connect the external EPO switch to the two pins of the EPO connector, as described in **Chapter 4.8.9 "EPO (Emergency Power-off)" on page 27.**

Note

In normal operation, the two pins are connected by a jumper.

3. Turn on the UPS.
4. Turn on the emergency power-off switch.
5. Test whether the UPS shuts down (e.g., by unplugging the connection).

Note

The UPS should turn off when the EPO switch is activated. This indicates that the EPO interface has been correctly wired and is functioning.

6. Reconnect the external EPO switch to its normal position.
7. Turn the UPS back on.

Note

Ensure the EPO interface functions correctly before using the UPS with a critical load to prevent unexpected power outages.

multimatic EDELSTROM GmbH
Im Wasen 2
78667 Villingendorf
Germany
Phone: +49 (0)741 9292-0
Fax: +49 (0)741 9292-22

info@edelstrom.eu
www.edelstrom.eu

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multimatic
EDELSTROM USV



multimatic EDELSTROM GmbH
Im Wasen 2
78667 Villingendorf
Deutschland
Fon: +49 (0)741 9292-0
Fax: +49 (0)741 9292-22
info@edelstrom.eu
www.edelstrom.eu