

# QUINT-UPS/ 1AC/ 1AC/500VA

## Uninterruptible power supply

Data sheet  
104661\_en\_02

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## 1 Description

The QUINT-UPS uninterruptible power supply (UPS) is used to ensure that power for critical electrical loads continues to be supplied in the event of disturbances in the power supply network, e.g., due to mains breakdown or failure.

In doing so, the UPS switches to battery operation without interruption so that connected loads continue to be consistently supplied.

When mains power is restored, the UPS automatically returns to normal operation. The connected loads are again supplied via the power supply network and the battery is charged.

The product described here is an uninterruptible power supply (UPS) with integrated power supply unit.

### Features

- Offline UPS in line with UPS classification code according to IEC 62040-3: VFD-SS-311
- Waveform Type: pure sine

### Optimum use of the buffer time and preventive monitoring of the power storage device

- Detects the current state of charge (SOC) and the remaining runtime of the power storage
- Detects the current state of health (SOH) of the power storage and warns of failure at an early stage

### Worldwide use

- Input voltage from 96 V AC ... 264 V AC
- Storage of the level and frequency of the input voltage, in the event of mains failure, the output is automatically supplied with 120 V AC/60 Hz or 230 V AC/50 Hz

### Maximum energy efficiency

- Offline operation: 98% efficiency for charged power storage device

### Extensive signaling and parameterization

- Switching outputs, USB interface, data port, parameterization with memory stick

### Simplified startup

- The UPS can be switched on without a power supply network



Make sure you always use the latest documentation.  
It can be downloaded from the product at [phoenixcontact.net/products](http://phoenixcontact.net/products).

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### 3 Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Uninterruptible power supply with IQ technology 1AC/1AC/500 VA. For 120 V AC/230 V AC applications. Provides information regarding the charging state, remaining runtime, and service life of your rechargeable battery module at all times and thereby increases system availability.	QUINT-UPS/ 1AC/ 1AC/500VA	2320270	1
Accessories	Type	Order No.	Pcs. / Pkt.
Power storage device, lead AGM, VRLA technology, 24 V DC, 3.4 Ah, tool-free battery replacement, automatic detection, and communication with QUINT UPS-IQ	UPS-BAT/VRLA/24DC/ 3.4AH	2320306	1
Power storage device, lead AGM, VRLA technology, 24 V DC, 7.2 Ah, tool-free battery replacement, automatic detection, and communication with QUINT UPS-IQ	UPS-BAT/VRLA/24DC/ 7.2AH	2320319	1
Power storage device, lead AGM, VRLA technology, 24 V DC, 12 Ah, tool-free battery replacement, automatic detection, and communication with QUINT UPS-IQ	UPS-BAT/VRLA/24DC/12AH	2320322	1
Power storage device, lead AGM, VRLA technology, 24 V DC, 38 Ah, automatic detection, and communication with QUINT UPS-IQ	UPS-BAT/VRLA/24DC/38AH	2320335	1
Power storage device, LI-ION technology, 24 V DC, 120 Wh, for ambient temperatures of -20°C ... 58°C, automatic detection and communication with QUINT UPS-IQ	UPS-BAT/LI-ION/24DC/120WH	2320351	16
Maintenance-free power storage based on double-layer capacitor, 24 V DC, 20 kJ, automatic detection and communication with QUINT UPS-IQ	UPS-CAP/24DC/20A/20KJ	2320380	1
Configuration software for QUINT UPS IQ and TRIO UPS uninterruptible power supplies.	UPS-CONF	2320403	1
USB connecting cable: USB plug type A to USB plug type Mini-B; length: 3 m	CABLE-USB/MINI-USB-3,0M	2986135	1
Data cable for communication, e.g., between Phoenix Contact type ILC 1xx Inline controllers and Phoenix Contact devices with the 12-pos. IFS data port, such as QUINT UPS-IQ UPS or TRIO UPS	IFS-MINI-DIN-DATACABLE	2320487	1
Data cable for communication between devices with a D-SUB 9 RS-232 connection and Phoenix Contact devices with the 12-pos. IFS data port such as QUINT UPS-IQ or TRIO UPS.	IFS-RS232-DATACABLE	2320490	1
Used for communicating between industrial PCs and Phoenix Contact devices with the 12-pos. IFS data port, such as QUINT UPS or TRIO UPS.	IFS-USB-DATACABLE	2320500	1
Multi-functional memory block with handle for the INTERFACE system; for easy storage and back up of the configuration.	IFS-CONFSTICK-L	2901103	1
Universal wall adapter	UWA 130	2901664	1
Universal wall adapter	UWA 182/52	2938235	1



Our range of accessories is being continually extended, our current range can be found in the download area.

## 4 Technical data

### General input data

Input voltage range	80 V AC ... 264 V AC
Frequency range	45 Hz ... 65 Hz
Activation threshold	$U_N \pm 10\%$ . Can be configured using UPS-CONF software.

### Input data (mains operation 230 V AC)

Nominal input voltage	230 V AC
Nominal input voltage range	180 V AC ... 264 V AC
Nominal frequency	50 Hz
Current consumption mains mode	2.2 A
Max. current consumption ( $I_{IN} = I_{CHARGE} + I_{BOOST}$ )	3.7 A
No load ( $I_{CHARGE} = 0, I_{OUT} = 0$ )	0.18 A
Charging process ( $I_{CHARGE} = \text{max.}, I_{OUT} = 0$ )	0.8 A
Device mains fuse	10 A
Backup fuse	B16 230 V AC

### Input data (mains operation 120 V AC)

Nominal input voltage	120 V AC
Nominal input voltage range	80 V AC ... 150 V AC
Nominal frequency	60 Hz
Current consumption mains mode	4.3 A
Max. current consumption ( $I_{IN} = I_{CHARGE} + I_{BOOST}$ )	6.8 A
No load ( $I_{CHARGE} = 0, I_{OUT} = 0$ )	0.35 A
Charging process ( $I_{CHARGE} = \text{max.}, I_{OUT} = 0$ )	1.3 A
Backup fuse	20 A 120 V AC, Listed breaker

### General output data

Apparent power	500 VA
Nominal power (real power)	400 W
Derating	> 50 °C ... 70 °C (2.5%/K)
Switch-over time	< 10 ms
UPS classification	EN 62040-3
Waveform type	pure sine

### Output data (mains operation 230 V AC)

Nominal output voltage	230 V AC
Nominal output current $I_N$ at 500 VA	2.2 A (-25 °C ... 70 °C)
POWER BOOST $I_{BOOST}$ (continual) at 625 VA	2.7 A (-25 °C ... 70 °C)
No load power dissipation ( $I_{CHARGE} = 0, I_{OUT} = 0$ )	14 W
Nominal load power dissipation ( $I_{CHARGE} = 0, I_{OUT} = I_N$ )	14 W
Efficiency ( $I_{CHARGE} = 0, I_{OUT} = I_N$ )	> 98 % (Mains operation)

**Output data (mains operation 120 V AC)**

Nominal output voltage	120 V AC
Nominal output current $I_N$ at 500 VA	4.3 A ( -25 °C ... 70 °C )
POWER BOOST $I_{BOOST}$ (continual) at 625 VA	5.2 A ( -25 °C ... 70 °C )
No load power dissipation ( $I_{CHARGE} = 0, I_{OUT} = 0$ )	15 W
Nominal load power dissipation ( $I_{CHARGE} = 0, I_{OUT} = I_N$ )	15 W
Efficiency ( $I_{CHARGE} = 0, I_{OUT} = I_N$ )	> 98 %

**Output data (battery mode 230 V AC)**

Nominal output voltage	230 V AC
Nominal output current $I_N$ at 500 VA	2.2 A ( -25 °C ... 50 °C , Derating >50 °C 2.5%/K )
POWER BOOST $I_{BOOST}$ (5 seconds) at 625 VA	2.7 A ( -25 °C ... 50 °C , Derating >50 °C 2.5%/K )
No load power dissipation ( $I_{CHARGE} = 0, I_{OUT} = 0$ )	20 W
Nominal load power dissipation ( $I_{CHARGE} = 0, I_{OUT} = I_N$ )	69 W
Efficiency ( $I_{CHARGE} = 0, I_{OUT} = I_N$ )	> 86 %
Buffer time ( $I_{OUT} = I_N$ ) 400 W/7.2 Ah	10 min

**Output data (battery mode 120 V AC)**

Nominal output voltage	120 V AC
Nominal output current $I_N$ at 500 VA	4.3 A ( -25 °C ... 50 °C , Derating >50 °C 2.5%/K )
POWER BOOST $I_{BOOST}$ (5 seconds) at 625 VA	5.2 A ( -25 °C ... 50 °C , Derating >50 °C 2.5%/K )
No load power dissipation ( $I_{CHARGE} = 0, I_{OUT} = 0$ )	20 W
Nominal load power dissipation ( $I_{CHARGE} = 0, I_{OUT} = I_N$ )	69 W
Efficiency ( $I_{CHARGE} = 0, I_{OUT} = I_N$ )	> 86 %
Buffer time ( $I_{OUT} = I_N$ ) 400 W/7.2 Ah	10 min

**Power storage device connection**

Nominal voltage $U_N$	24 V DC
End-of-charge voltage	25 V DC ... 30 V DC (temperature compensated)
Temperature compensation (preset)	42 mV/K
Nominal capacity range	3 Ah ... 200 Ah
Charge current	0.2 A ... 2 A
Battery presence check (cyclic) all	60 s

**Device combinations**

UPS connection in parallel	no
UPS connection in series	no
Power storage device connection in parallel	yes, 15 (observe line protection)
Power storage device connection in series	no

**Status and diagnostic indicator POWER IN OK**

Status indicator 230 V AC	LED green
Status indicator 120 V AC	LED green

**Status and diagnostic indicators/signal outputs Alarm**

Switching output	Transistor output, active
Output voltage	24 V (SELV)
Continuous load current	≤ 30 mA
Status display	LED ( red )

### Status and diagnostic indicators/signal outputs Battery Charge

Status indication Bar graph ( red/green )

### Status and diagnostic indicators/signal outputs Battery Mode

Switching output Transistor output, active

Output voltage 24 V (SELV)

Continuous load current  $\leq 30$  mA

Status display LED ( yellow )

### Status and diagnostic indicators/signal outputs POWER BOOST

Switching output Transistor output, active

Output voltage 24 V (SELV)

Continuous load current  $\leq 30$  mA

Status display LED ( yellow )

### Remote control

Version 1 : Output R1 to input R2 Plug-in bridge (plugged in by default)

Version 2 : Input R2 + 24 V DC

Input current R2 2.8 mA

### Battery-operated start (auto start)

230 V AC version: output +24 V DC 30 mA to A2 input Plug-in bridge

120 V AC version: output +24 V DC 30 mA to A1 input Plug-in bridge

### Interfaces

Data interface (configuration and communication) IFS (Interface system data port)

USB classification MINI-USB type B

### Housing

Degree of protection IP20

Side element version Aluminum

Hood version Galvanized sheet steel, free from chrome (VI)

Dimensions W/H/D (normal mounting position/delivered condition) 125 mm / 130 mm / 125 mm

### General data

Weight 2.2 kg

MTBF (According to EN 29500)

Protection class I

Insulation voltage input, output / housing 1.5 kV AC / 2.1 kV DC

### Input connection data

Connection method Screw connection

Conductor cross section, solid 1.5 mm<sup>2</sup> ... 6 mm<sup>2</sup>

Conductor cross section, stranded 1.5 mm<sup>2</sup> ... 4 mm<sup>2</sup>

Conductor cross section AWG/kcmil 18 ... 10

Stripping length 8 mm

Screw thread M4

Tightening torque 0.5 Nm ... 0.6 Nm

### Output connection data

Connection method	Screw connection
Conductor cross section, solid	1.5 mm <sup>2</sup> ... 6 mm <sup>2</sup>
Conductor cross section, stranded	1.5 mm <sup>2</sup> ... 4 mm <sup>2</sup>
Conductor cross section AWG/kcmil	18 ... 10
Connection method	8 mm
Screw thread	M4
Tightening torque	0.5 Nm ... 0.6 Nm

### Output connection battery

Connection method	Screw connection
Conductor cross section, solid	1.5 mm <sup>2</sup> ... 6 mm <sup>2</sup>
Conductor cross section, stranded	1.5 mm <sup>2</sup> ... 4 mm <sup>2</sup>
Conductor cross section AWG/kcmil	12 ... 10
Stripping length	8 mm
Screw thread	M4
Tightening torque	0.5 Nm ... 0.6 Nm

### Signal connection data

Connection method	Screw connection
Conductor cross section, solid	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section, stranded	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section AWG/kcmil	24 ... 10
Stripping length	8 mm
Screw thread	M4
Tightening torque	0.5 Nm ... 0.6 Nm

### Ambient conditions

Ambient temperature (operation)	-25 °C ... 70 °C (> 50°C derating)
Ambient temperature (start-up type tested)	-40 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Max. permissible relative humidity (operation)	≤ 95 % (25°C, no condensation)
Vibration (operation)	< 15 Hz, amplitude ±2.5 mm (according to IEC 60068-2-6) 15 Hz ... 150 Hz, 2.3 g t <sub>v</sub> = 90 min.
Shock	30 g in each direction, according to IEC 60068-2-27
Climatic class	3K3 (in acc. with EN 60721)

### Standards

Uninterruptible power supply	EN 62040-3
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### Approvals

UL approvals	UL/C-UL Recognized UL 1778
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Current approvals/permissions for the product can be found in the download area under [phoenixcontact.net/products](http://phoenixcontact.net/products).



<b>Conformance with EMC Directive 2004/108/EC</b>		
<b>Noise immunity according to EN 62040-2-2006</b>		
	<b>EN 62040-4 requirement</b>	<b>Tested</b>
<b>Electrostatic discharge EN 62040-2</b>		
Housing contact discharge	4 kV (Test intensity 2)	8 kV (Test intensity 4)
Housing air discharge	8 kV (Test intensity 3)	15 kV (Test intensity 4)
Comments	Criterion B	Criterion A
<b>Electromagnetic HF field EN 61000-4-3</b>		
Frequency range	80 MHz ... 1 GHz	80 MHz ... 3 GHz
Test field strength	10 V/m	10 V/m
Frequency range	1.4 GHz ... 2 GHz	1 GHz ... 3 GHz
Test field strength	3 V/m	10 V/m
Frequency range	2 GHz ... 2.7 GHz	2 GHz ... 3 GHz
Comments	Criterion A	Criterion A
<b>Fast transients (burst) EN 61000-4-4</b>		
Input	2 kV (Test intensity 3 - asymmetrical)	2 kV (Test intensity 3 - asymmetrical)
Output	2 kV (Test intensity 3 - asymmetrical)	2 kV (Test intensity 3 - asymmetrical)
Signal	1 kV (Test intensity 4 - asymmetrical)	2 kV (Test intensity 4 - asymmetrical)
Comments	Criterion B	Criterion A
<b>Surge current loads (surge) EN 62040-4</b>		
Input	1 kV (Test intensity 2 - symmetrical) 2 kV (Test intensity 3 - asymmetrical)	1 kV (Test intensity 2 - symmetrical) 2 kV (Test intensity 3 - asymmetrical)
Output	1 kV (Test intensity 2 - symmetrical) 1 kV (Test intensity 3 - asymmetrical)	1 kV (Test intensity 2 - symmetrical) 2 kV (Test intensity 3 - asymmetrical)
Signal	1 kV (Test intensity 2 - asymmetrical)	1 kV (Test intensity 2 - asymmetrical)
Comments	Criterion B	Criterion A
<b>Conducted interference EN 61000-4-6</b>		
Input/Output/Signal	asymmetrical	asymmetrical
Frequency range	0.15 MHz ... 80 MHz	0.15 MHz ... 80 MHz
Voltage	10 V (Test intensity 3)	10 V (Test intensity 3)
Comments	Criterion A	Criterion A
<b>Noise emission according to EN 62040-2 (Class C1)</b>		
Radio interference voltage	EN 62040-2 (Class C1)	
Limit value for harmonic currents	EN 61000-3-2 (Class A)	

## 5 Safety regulations and installation notes



**EXPLOSION HAZARD!**

Only remove equipment when it is disconnected and not in the potentially explosive area.

**DANGER**

Never carry out work on live parts!  
The housing can become very hot, depending on the ambient temperature and load!



**CAUTION: Risk of injury**

Use the device with the UPS-BAT.... recommended in the table of accessories. When using power storage devices other than UPS-BAT..., make sure that the corresponding parameters for the charging characteristics are adjusted and adhered to.

Phoenix Contact accepts no liability or responsibility for possible for any consequential damage.



**CAUTION:**

Before startup please ensure:

The connection must be carried out by a competent person and protection against electric shock guaranteed.

It must be possible to switch off power to device according to EN 60950.

All feed lines are sufficiently protected and dimensioned!

All output lines are dimensioned according to the maximum output current of the device or separately protected!

Sufficient convection must be guaranteed.

Observe mechanical and thermal limits.



**CAUTION: Risk of electric shock**

This unit receives power from more than one source - Disconnection of AC source and the energy storage is required to de-energize this unit before servicing.



**WARNING - Fire hazard**

To reduce the risk of fire, replace only with same type and rating of fuse.



**WARNING - Fire hazard**

To reduce the risk of fire, connect only to a circuit provided with the following maximum branch circuit overcurrent protection in accordance with the National Electric Code, ANSI/NFPA 70.



**NOTE: Danger if used improperly**

Uninterruptible power supplies are installable devices. Installation and startup may only be carried out by qualified personnel. The relevant country-specific regulations must be observed.



The device must be installed in a control cabinet that can be locked and only opened by specialist staff.



**CAUTION: Risk of injury**

Cover termination area after installation in order to avoid accidental contact with live parts (e. g., installation in control cabinet).



Provide a switch/circuit breaker close to the device at the AC input and at the battery terminals, which are labeled as the disconnecting device for this device.



Do not dispose of used batteries in the household waste! Dispose of these according to the currently valid national regulations.



They can also be returned to Phoenix Contact or the manufacturer.

## 6 Structure

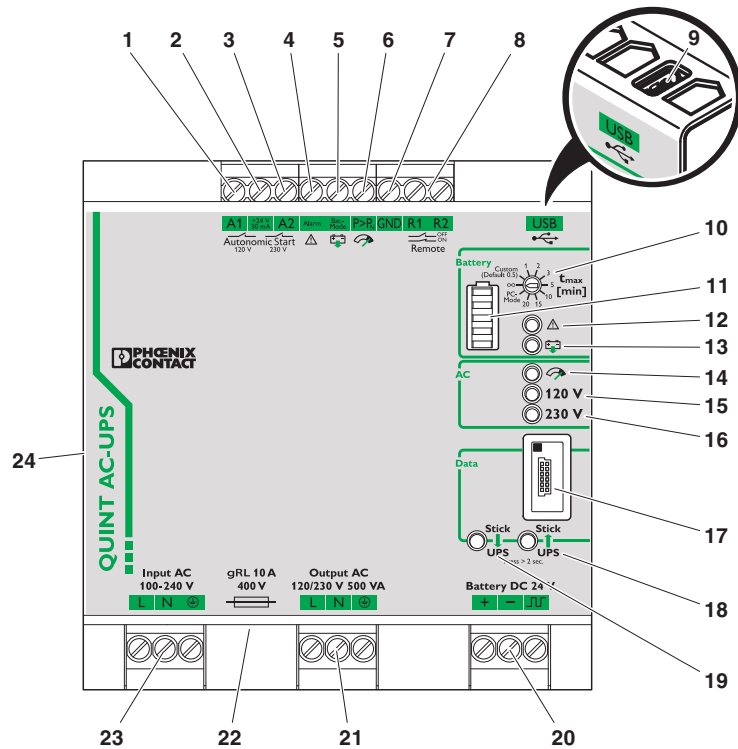
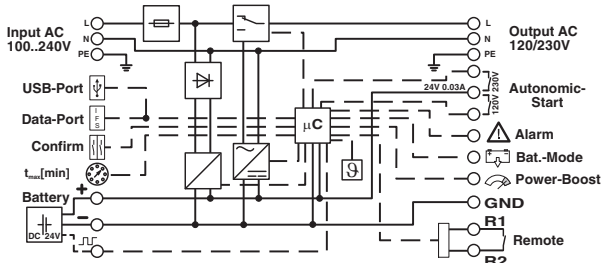


Figure 1 Position of the function elements

No.	Connection terminal blocks and function elements
1	UPS battery-operated start (120 V AC/60 Hz)
2	Active output for UPS battery-operated start
3	UPS battery-operated start (230 V AC/50 Hz)
4	Active signal output alarm
5	Active signal output battery mode
6	Active signal output POWER BOOST
7	GND, reference potential
8	Battery mode remote shutdown
9	USB interface MINI type B
10	Rotary switch for setting the buffer time tmax [min]
11	LED bar graph display
12	Red LED indicator: alarm
13	Yellow LED indicator: battery mode
14	Yellow LED indicator: BOOST mode active
15	Green LED indicator 120 V AC: POWER IN OK (mains operation), supply voltage load (battery mode)
16	Green LED indicator 230 V AC: POWER IN OK (mains operation), supply voltage load (battery mode)
17	Data port
18	Buttons for write function: parameter data from QUINT-UPS -> IFS-CONFSTICK
19	Buttons for write function: parameter data from IFS-CONFSTICK -> QUINT-UPS
20	Power storage device connection terminal blocks (plus/minus/communication cable)
21	Connection terminal blocks for AC outputs
22	Device mains fuse (400 V/10 A)
23	Connection terminal blocks for AC input
24	Universal snap-on foot (rear mounting)

## 7 Basic circuit diagram



Element	Meaning
	Microprocessor
	Decoupling
	Charging unit
	Switch
	Temperature sensor
	Selector switch
	Fuse
	Switch
	Inverter

## 8 Installation

### 8.1 Convection



**NOTE: enable convection**

To enable sufficient convection, we recommend a minimum vertical gap to other modules of 50 mm. A horizontal gap of 5 mm is recommendable.



The device can be snapped onto all DIN rails in accordance with EN 60715 and should be mounted in the normal mounting position (connection terminal blocks on top and bottom).

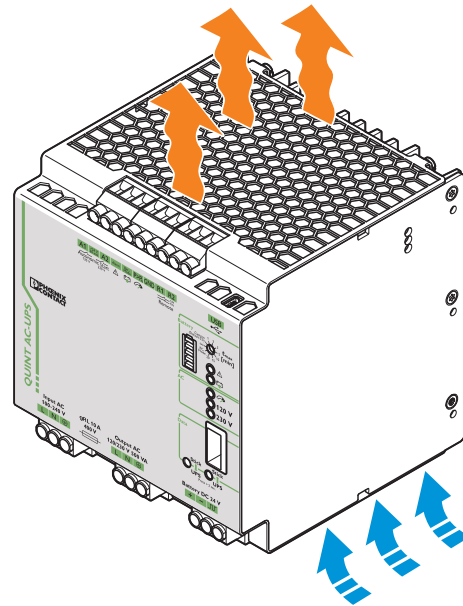


Figure 2 Convection

## 8.2 Mounting position

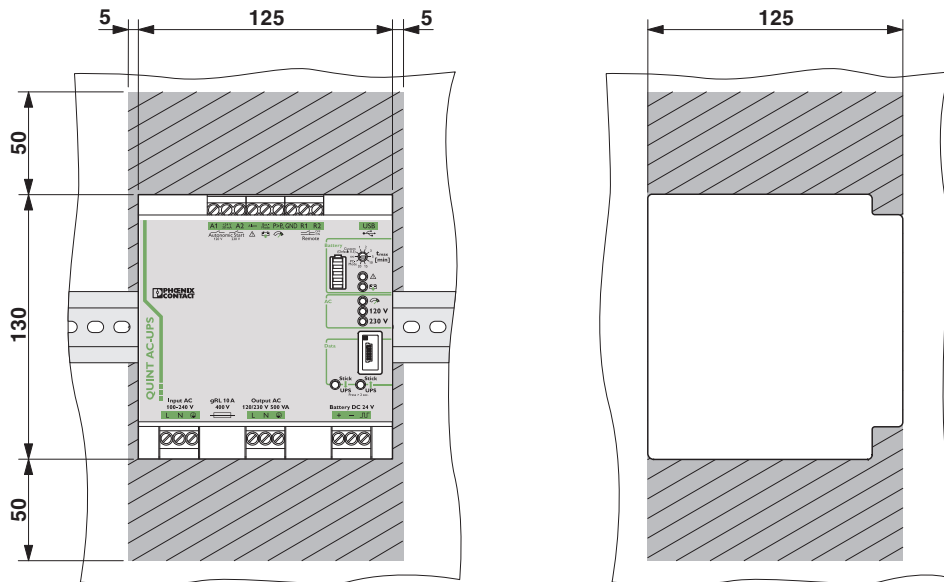


Figure 3 Installation dimensions and locked areas

## 8.3 Mounting on a DIN rail

### Assembly

Position the module with the DIN rail guide on the upper edge of the DIN rail, and snap it in with a downward motion.

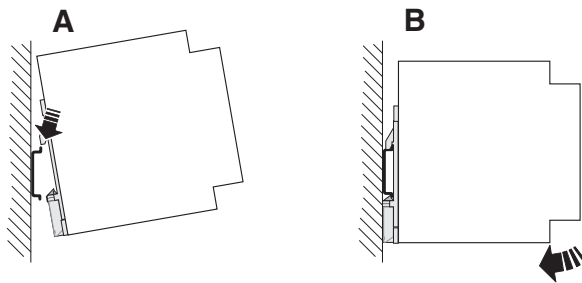


Figure 4 Assembly

### Removing

Pull the snap lever open with the aid of a screwdriver and slide the module out at the lower edge of the DIN rail.

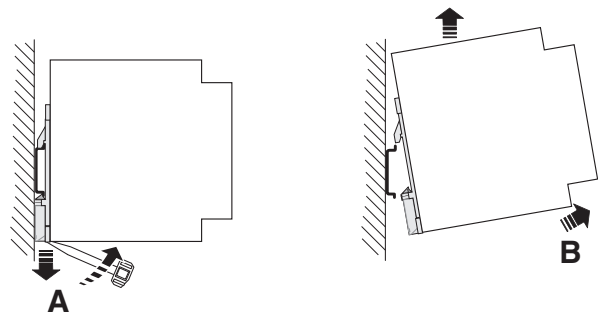


Figure 5 Removal

## 9 Installation of individual components

Installation of uninterruptible power supply units must correspond to EN 60950 regulations.



Provide a switch/circuit breaker close to the uninterruptible power supply unit at the AC input and at the battery terminals, which are labeled as the disconnecting device for these devices.

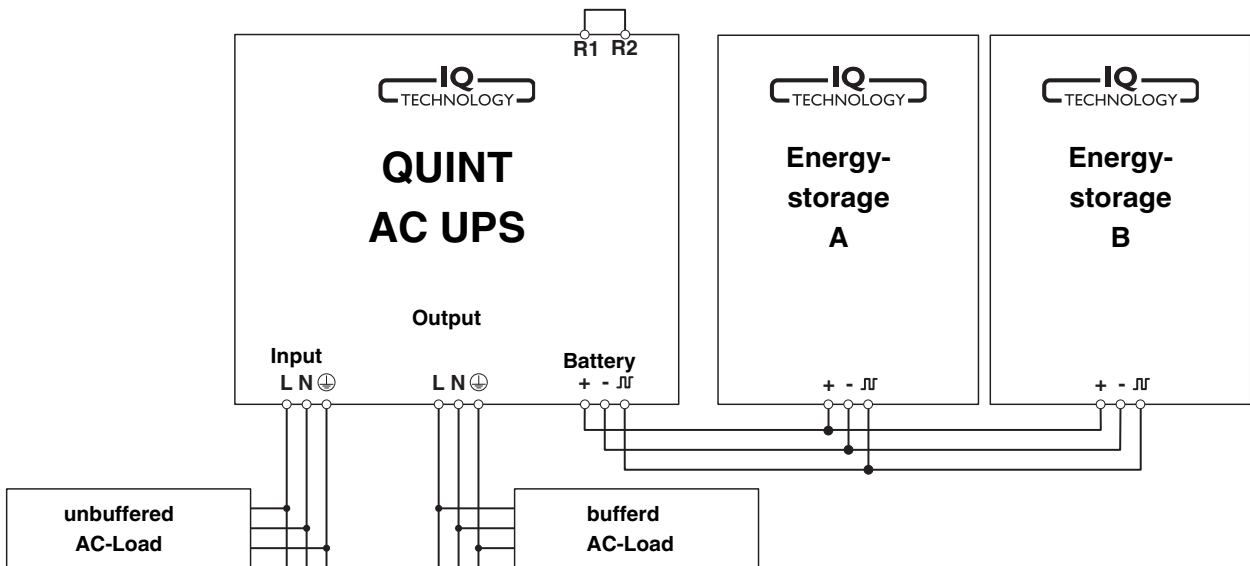


Figure 6 Schematic design

## 10 Device connection terminal blocks

### 10.1 AC input

The supply voltage is connected via "Input AC 100 - 240 V" connection terminal blocks.

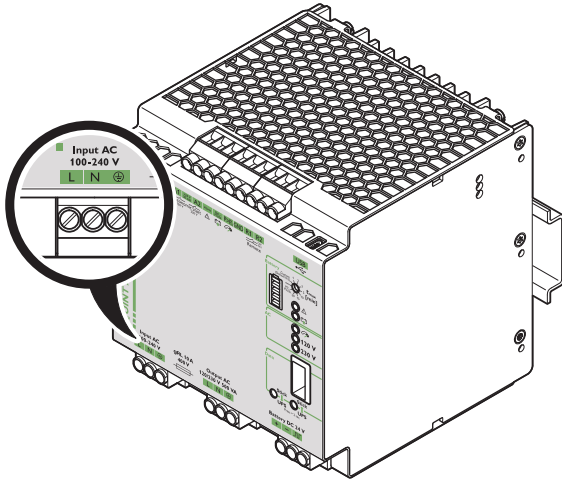


Figure 7 Connection terminal block, AC input



If loads must not be supplied in the event of a mains breakdown or failure, they must be connected directly to the input of the power supply as unbuffered AC load.

### 10.2 AC output

Buffered output voltage is connected via "Output AC" connection terminal blocks.

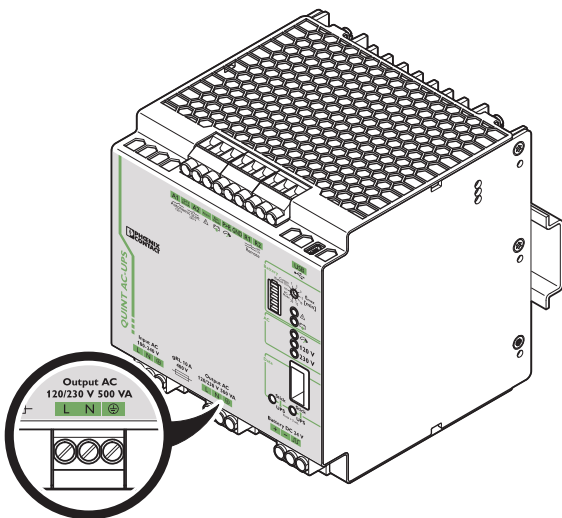


Figure 8 Connection terminal block, AC output

### 10.3 DC battery

The power storage device is connected via the "Battery DC 24 V" connection terminal blocks. In order to use the IQ technology of the power storage device, a communication cable should also be connected between the uninterruptible power supply unit and the power storage device used in IQ technology. Optimum use of the buffer time and preventive battery monitoring are ensured by the IQ technology, for example.

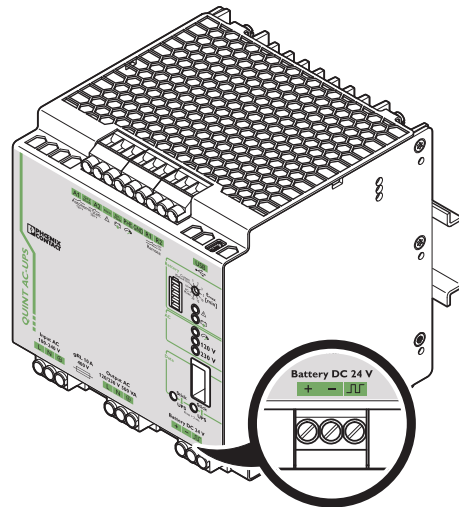


Figure 9 Connection terminal blocks, DC battery



Our range of accessories is being continually extended, our current range of power storage devices with IQ technology can be found in the download area at [www.phoenixcontact.net/products](http://www.phoenixcontact.net/products)

### 10.4 Remote shutdown R1, R2

The connection terminal blocks are bridged with a plug-in bridge by default. Remote shutdown of the uninterruptible power supply units is deactivated. Should the supply voltage fail or be undershot, the UPS switches over to battery mode. If the plug-in bridge is not plugged in, the UPS shuts down in the event of the mains supply voltage failing or being under-shot.

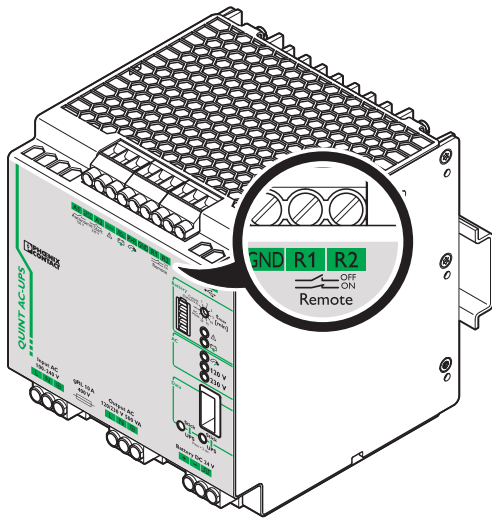


Figure 10 Connection terminal block R1, R2

### Remote shutdown is deactivated

UPS in function (delivery state)

- The "R1" and "R2" terminal points are short circuited (delivery with plug-in bridge) OR 24 V DC is present at terminal point "R2".
- In the event of a voltage supply failure, the UPS switches over to battery mode.

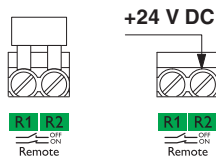


Figure 11 Remote shutdown is deactivated



**CAUTION: Risk of electric shock**

In the event of a voltage supply failure, the UPS switches over to battery mode. The load connected to the AC output is supplied by the power storage device.

### 10.5 Remote shutdown is activated

- The "R1" and "R2" terminal points are not short circuited.
- In the event of a voltage supply failure, the UPS does not switch over to battery mode. The device switches off.

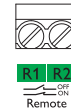


Figure 12 Remote shutdown active

### Example 1

The remote shutdown can be used to suppress the buffering of selective machine shutdowns. In doing so, the auxiliary contact of the main switch is connected to R1 and R2 connection terminal blocks.

### Example 2

End the buffering at a specific time (e.g., following shutdown of another machine part). Remote shutdown can be activated with a relay (N/C contact).



### 10.6 Setting the buffer time

You can set the time for exiting battery mode via the rotary selector switch on the front of the device. For this purpose use a screwdriver.

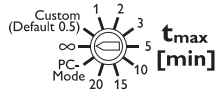


Figure 13 Buffer time selector switch

$t_{max}$ [min] setting	Meaning
1, 2, 3, 5, 10, 15, 20	The UPS switches off after the set buffer time.
Custom (default 0.5)	The UPS switches off after the individual buffer time set via UPS-CONF. If a buffer time is not set, the UPS shuts down after 30 seconds.
$\infty$ (unlimited, delivery state)	Buffering with the total stored power. A warning is generated as soon as the power storage device only has 10 % charge (default).
PC mode	In PC mode, it is possible to continue working with a PC after a mains failure, perform a controlled shutdown and restart automatically.

### 10.7 Remote activation of Autonomic Start

Remote activation of Autonomic Start is always used when primary voltage supply is not available at the AC input terminals of uninterruptible power supply units, but the device nonetheless needs to be started.

Another application, for example, is when a portable machine needs to be moved and connection should be established by a mains supply that can be used in any location.



**CAUTION: Risk of electric shock**

In this operating mode, the load connected to the AC output is supplied by the power storage device.

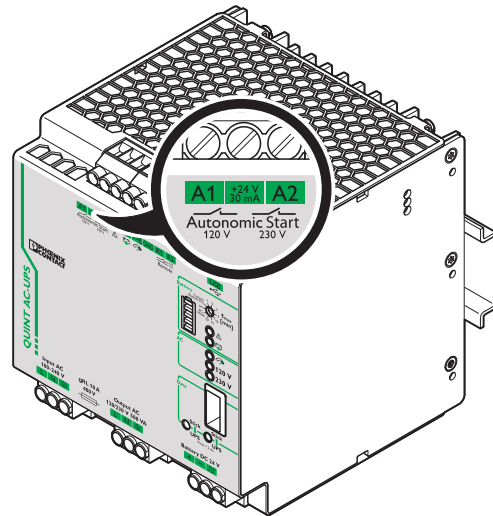


Figure 14 Autonomic Start connection terminal blocks

#### Autonomic Start 120 V

In this operating mode, the output voltage level is set according to the preselected value. The output voltage connected to the load is 120 V/60 Hz.

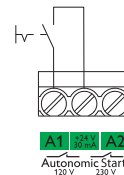


Figure 15 Autonomic Start 120 V

#### Autonomic Start 230 V

In this operating mode, the output voltage level is set according to the preselected value. The output voltage connected to the load is 230 V/50 Hz.

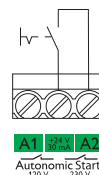


Figure 16 Autonomic Start 230 V

## 11 Signaling

Various LED indicators are available for visual function monitoring of uninterruptible power supplies. Moreover, active signal outputs can be used to forward this data to a higher-level control system.

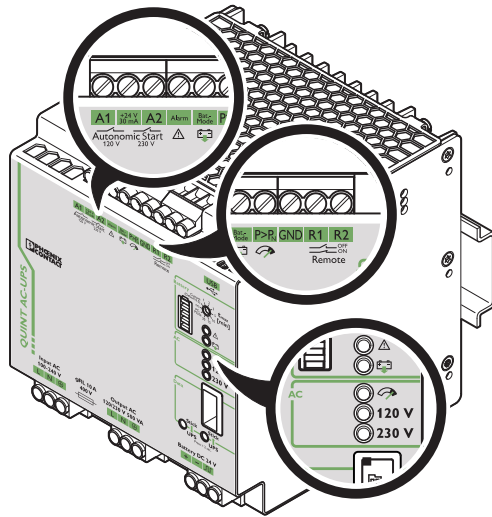


Figure 17 LED indicators and signal outputs

### LED test

When starting the uninterruptible power supply unit for the first time, a test is automatically performed on the LED indicators and the LED bar graph display.

The LEDs indicate the following states:

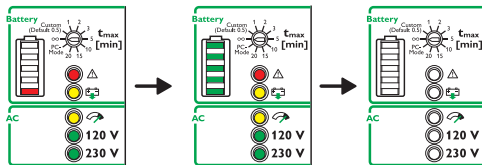


Figure 18 LED indicators

Following the LED test, the current device status of the uninterruptible power supply unit is displayed.

### 11.1 LED bar graph display

The LED bar graph display consists of five individual segments and displays the SOC (state of charge) of the power storage device. In this case, each segment corresponds to 20% of the total capacity.

Depending on the type of power storage device used, i.e. whether it is equipped with IQ technology or not, the display varies according to charging or discharging.

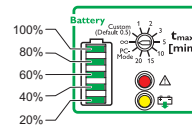


Figure 19 LED bar graph display

### 11.2 IQ power storage devices

In mains operation of the uninterruptible power supply unit, supplying the load connected to the AC output of the UPS is of paramount importance. The power storage device is charged using the power reserve of the UPS.

#### Charging a new, unknown IQ power storage device

- As the state of charge (SOC) of the power storage device is still unknown when installing it for the first time, it is essential that the device is fully charged once. For example, in doing so, the capacity of the power storage device is determined. The bar graph will exhibit an unstable curve until the device has been fully charged for the first time.



Figure 20 Charging a new IQ power storage device (unknown SOC)



The charging time of the power storage device depends on the capacity and energy supplied by the uninterruptible power supply unit. The maximum charging time can last up to several hours.

**Charging known IQ power storage devices**

- The power storage device has already been fully charged once and its properties have been determined. The individual segments of the LED bar graph display are illuminated based on the current state of charge (SOC) of the power storage device. The current charging state is indicated by permanently illuminated segments. The charging process is indicated by the flashing upper segment.



Figure 21 IQ power storage device is charged (SOC is known)

**Discharging IQ power storage devices**

When operating the uninterruptible power supply unit in battery mode, the load connected to the AC output of the UPS is supplied by the power stored in the power storage device. The charging state of the power storage device is indicated by means of the LED bar graph display. In this case, a distinction is made between the following states:

- A new power storage device that has not yet been fully charged. As the power storage device is still unknown when installing it for the first time, the state of charge must be determined. As such, it is essential that the power storage device is fully charged once.



Figure 22 New power storage device (unknown SOC)

- The power storage device has already been fully charged once and its properties have been determined. The individual segments of the LED bar graph are controlled based on the current state of charge of the power storage device.



Figure 23 Power storage device is discharged (SOC is known)

- Should the capacity of the connected power storage device drop to below 10% of the determined capacity during battery mode discharge, the lower segment of the LED bar graph display will be illuminated in red.

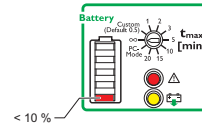


Figure 24 Power storage device capacity < 10%

**11.3 Standard power storage devices (without IQ technology)**

When operating the uninterruptible power supply unit in mains operation, the load connected to the AC output is supplied by the UPS. In addition, the connected power storage device is charged by the UPS.

The current charging state of the power storage device is indicated by means of the LED bar graph display. The lower segment of the LED bar graph display flashes green.



Figure 25 Charge standard power storage device

**Discharging power storage devices**

When operating the uninterruptible power supply unit in battery mode, the load connected to the AC output of the UPS is supplied by the power stored in the power storage device.



When the UPS is operated in battery mode with the power storage device without IQ technology, the LED bar graph display is not illuminated.

## 11.4 LED indicators

### Mains operation or battery mode

The UPS can be operated with a mains voltage of 120 V AC or 230 V AC. The permitted mains frequency ranges from 45 Hz to 65 Hz.

In mains operation, the load connected to the output of the uninterruptible power supply unit is supplied by the mains.

Depending on the input voltage detected and the resulting output voltage, the corresponding operating LED is activated at 120 V or 230 V.



Figure 26 LED indicators in mains or battery mode

### Battery operation

In battery mode, the load connected to the AC output of the uninterruptible power supply unit is supplied by the power storage device. The output voltage is automatically set to 120 V AC or 230 V AC based on the previously detected input voltage.

In battery mode, the corresponding yellow LED indicator is activated.

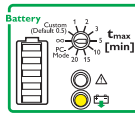


Figure 27 LED indicator battery mode active

### P > P<sub>N</sub> (POWER BOOST)

The load connected to the AC output of the uninterruptible power supply unit can be operated up to POWER BOOST static power reserve. The POWER BOOST static power reserve depends on the ambient temperature.

- In mains operation, POWER BOOST ( $I_N + 25\%$ ) can be permanently operated
- In battery mode, POWER BOOST ( $I_N + 25\%$ ) can be operated for a maximum of five seconds

In POWER BOOST, the corresponding yellow LED indicator is activated.

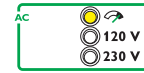


Figure 28 LED indicator P > P<sub>N</sub> active

### Alarm (power storage device disrupted in mains operation)

The LED indicator alarm is permanently illuminated in red. In addition, the lower segment of the LED bar graph display flashes red.

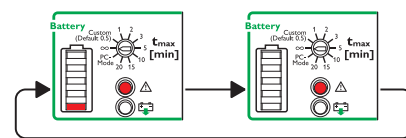


Figure 29 LED indicator alarm active



Check the connecting cables between the uninterruptible power supply unit and the power storage device.

Replace the power storage device while monitoring the polarity. Then perform an initialization. In doing so, the battery presence check is automatically performed and the uninterruptible power supply automatically detects the power storage device used. This functionality is only supported by power storage devices with IQ technology.

When using the UPS-BAT... power storage device and a connected communication cable, the current life expectancy (SOH, State of Health) is determined via the IQ technology. An alarm is signaled in the following cases:

- The adjustable threshold "remaining life expectancy" is reached.
- Different types of battery technology were connected that cannot be charged simultaneously, e. g. VRLA and LI-ION.
- The presence check is negative.
- The quality check is negative.

When using power storage devices other than UPS-BAT..., an alarm is signaled if it is not present or if the quality of the power storage device is no longer sufficient for supplying the load in the event of a mains failure.

If the lower LED bar graph display segment does not flash, the alarm indicates overload or service mode.

**11.5 LED bar graph display with communication cable installed between the UPS and the power storage device**

The current charging state and the remaining runtime of the power storage device is determined during startup of the UPS. As such, the LED indicator lights up from bottom to top during this process (charging the battery in mains operation) or from top to bottom (discharging the battery in battery mode).

When the power storage device is fully charged and the charging state is determined, this is displayed by the bar graph.



Depending on the charging state and the size of the power storage device, charging can range from a few minutes to hours.

**11.6 LED bar graph display without communication cable between the UPS and the power storage device**

If a communication cable is not connected between the UPS and the power storage device, the individual segments of the LED bar graph display will be illuminated as follows during startup.

The lower segment of the the LED bar graph display is activated.

- Flashing green: power storage device is being charged
- Permanent red light: battery problem
- Off: power storage device is not being charged

**11.7 Active signal outputs**

Active signal outputs can be used to forward this data to a higher-level control system. Each signal output can be loaded with a maximum of 24 V DC/25 mA.

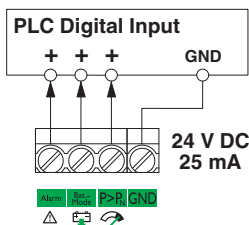


Figure 30 Active signal outputs

Alarms, warnings and/or operating states can be individually assigned to the battery mode and battery charge via the UPS-CONF configuration software. In addition to this, the current device status can be conveniently displayed on your PC by using UPS-CONF configuration software combined with an IFS communication cable.



The free configuration software, along with accompanying documentation, can be found in the device download area at [www.phoenix-contact.net/products](http://www.phoenix-contact.net/products)



**NOTE**  
Assignment between the LED indicator and the active signal output is identical in the default settings. If necessary, the corresponding signal output can be set in addition to the LED indicator.

The free UPS-CONF configuration software can be used to individually change the assignment and control of the active signal output. When individually parameterizing the signal outputs, ensure that a logical combination is used.

## 12 Function

In mains mode (AC input voltage present), the output voltage corresponds to the applied input voltage. In the event of a failure of the voltage supply, switching to battery mode takes place without interruption.

The output voltage is set to 120 V AC or 230 V AC based on the previously detected input voltage.

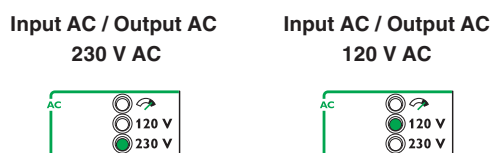


Figure 31 LED indicator mains mode

### 12.1 SOC application example

#### Task:

An industrial PC must be continuously supplied with 120 V AC or 230 V AC.

#### Previous solution:

The UPS is buffered with a 3.4 Ah power storage device and supplies 120 V AC or 230 V AC and a load of 180 W for ten minutes under optimum conditions.

#### Problem:

Can the power storage device actually bridge this time? Charging state, performance, and remaining runtime of the battery are unknown.

#### Solution with IQ technology:

The intelligent UPS determines all relevant battery states. This ensures the transparency required to guarantee the stability of the supply and optimum use of the battery at all times.

The intelligent battery management detects the current charging state of the connected battery and uses this to calculate the remaining runtime.

The QUINT UPS-IQ also signals whether the buffer time is actually 10 minutes. As soon as an adjustable threshold value is reached, the active switching output or the configuration software generates a warning message or the industrial PC is shut down. The industrial PC works for as long as possible and is only shut down if absolutely necessary.

### 12.2 SOH/SOF application example

#### Task:

#### Previous solution:

The user invests in a new battery every two years assuming that the system is reliably protected by this.

#### Problem:

Is the power storage device really 100% available for two years? Could the battery have aged more quickly as a result of higher ambient temperatures and not be able to deliver sufficient performance?

#### Solution with IQ technology:

The remaining life expectancy of the battery is known. This allows servicing to be planned. If the battery is replaced at the ideal time, costs are also avoided that would occur by replacing the battery too early or after failure. It is particularly important for applications that are widely separated from each other to ascertain whether the battery will continue to work reliably for another two years or only for another two months.

### 12.3 Charging characteristic

When the recommended UPS-BAT power storage device is used, the intelligent battery management of the UPS adapts itself to the respective connected storage technology such as lithium or lead (VRLA – Valve Regulated Lead Acid) batteries. Additional charging parameter settings are not necessary due to automatic detection.

The UPS is equipped with an integrated charging unit. Charging is performed according to the current battery state. By measuring the current temperature at the battery, temperature-compensated charging takes place.

Intelligent battery management ensures fast availability and maximum service life of the power storage device.

If the communication cable between the UPS and the power storage device is interrupted, the temperature detected in the UPS module is used temporarily to ensure temperature compensation.

Temperature recording only takes place in the UPS module when using power storage devices other than the UPS-BAT. Furthermore, adjustment and adherence to the charging parameters is necessary.

### 13 Interfaces

The uninterruptible power supply unit is equipped with two interfaces for data transmission.

1. Interface: data port
2. Interface: USB interface MINI type B

#### 13.1 Data port

The uninterruptible power supply unit is equipped with a data port for data transmission. A data cable is required for communicating with a PC or a higher-level controller.

##### IFS-USB-DATACABLE

The uninterruptible power supply unit is connected to the USB PC connection with data cable IFS-USB-DATACABLE (Order No. 2320500) via the data port.

The data cable can be used to parameterize and monitor the UPS. The data cable is electrically isolated.

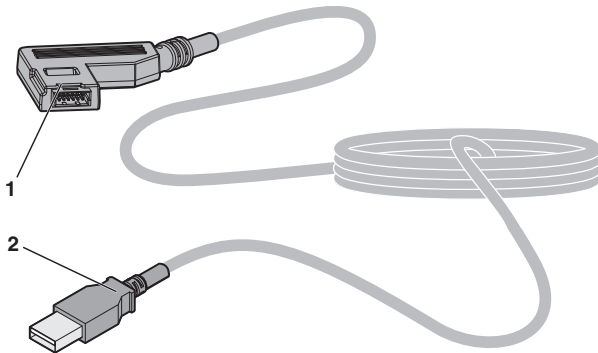


Figure 32 IFS-USB-DATACABLE

No.	Designation
1	IFS plug
2	USB plug type A
	Cable length: 3 m

##### IFS-RS232-DATACABLE

The uninterruptible power supply unit is connected to the serial RS-232 connection of a data transmission device, such as a modem, with data cable IFS-RS232-DATACABLE (Order No. 2320490) via the data port.

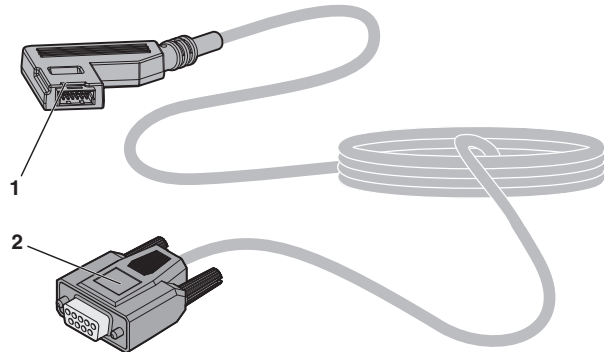


Figure 33 IFS-RS232-DATACABLE

No.	Designation
1	IFS plug
2	9-pos. D-SUB plug
	Cable length: 2 m

Ethernet connection is possible by connecting via an FL-COMSERVER (e.g., Order No. 2313452).

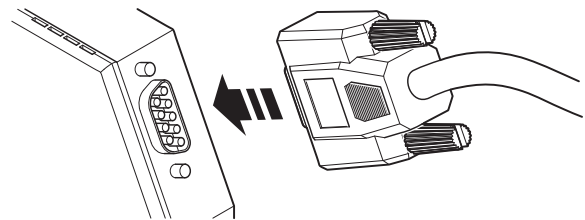


Figure 34 FL COMSERVER connection

The data cable between the modem and the UPS is necessary for parameterization and monitoring. It contains the interface electronics and electrical isolation.



**IFS-MINI-DIN-DATACABLE**

The uninterruptible power supply is connected, for example, to Phoenix Contact type ILC 1xx controllers with data cable IFS-MINI-DIN-DATACABLE (Order No. 2320487) via the data port.

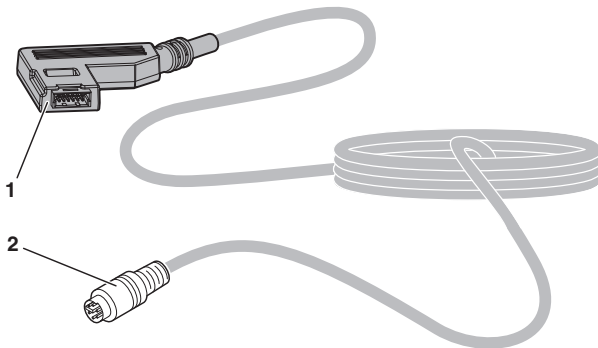


Figure 35 IFS-MINI-DIN-DATACABLE

No.	Designation
1	IFS plug
2	6-pos. MINI-DIN plug
	Cable length: 2 m

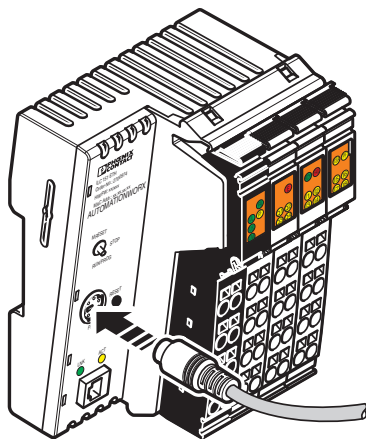


Figure 36 Connection to an ILC 1xx controller

**IFS-OPEN-END-DATACABLE**

The uninterruptible power supply is connected, for example, to a Phoenix Contact IB IL RS UNI-PAC Inline communication terminal (Order No. 2700893) with data cable IFS-OPEN-END-DATACABLE (Order No. 2320450) via the data port.

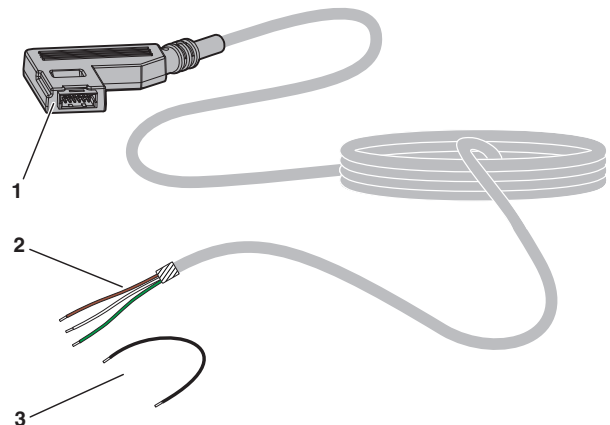


Figure 37 IFS-OPEN-END-DATACABLE

No.	Designation
1	IFS plug
2	Data cable (open signal lines), ready for connection, assembled
3	Wire jumper, ready for connection, assembled
	Cable length: 2 m



Figure 38 Connection to communication terminal IB IL RS UNI-PAC



### 13.2 IFS-CONFSTICK-L

The IFS-CONFSTICK-L is a multi-functional memory block for easy storage and backup of configuration and parameter data. You can copy the parameterization of one UPS to another UPS of the same type using the IFS-CONFSTICK-L.

### 13.3 Transfer parameter data from UPS to IFS-CONFSTICK

1. Insert the IFS-CONFSTICK-L carefully into the data port of the UPS while observing the plug-in direction.

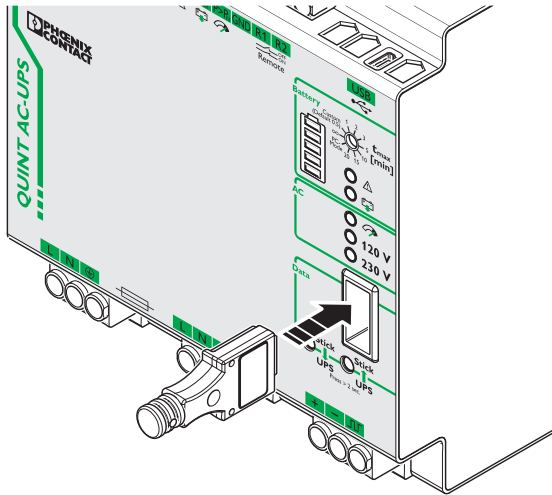


Figure 39 Insert IFS-CONFSTICK-L

2. Press the "UPS -> Stick" button and hold for at least 2 seconds.

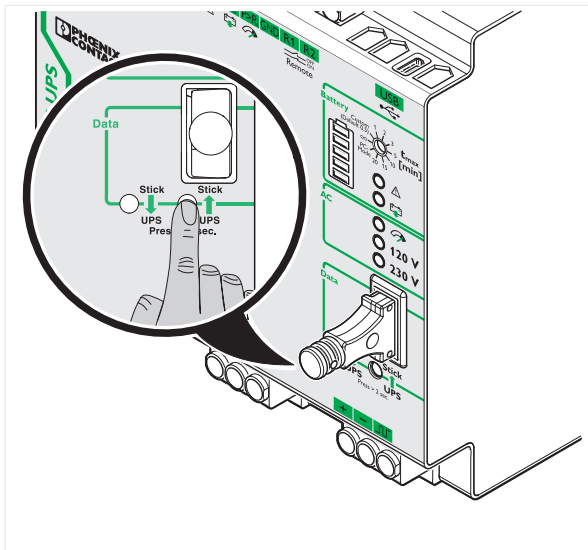


Figure 40 Transfer parameter data from UPS -> IFS-CONFSTICK-L

3. The parameter transmission is started. The three LED indicators will be cyclically illuminated during the transmission.

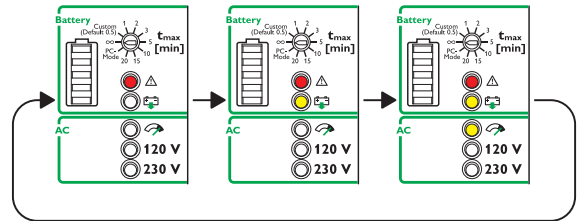


Figure 41 Write parameter data active

4. An error-free transmission is represented by a flashing green LED indicator. An inaccurate transmission is represented by a red LED indicator.

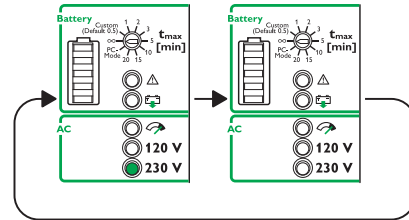


Figure 42 Transmission successful

5. Once the signaling time has elapsed, all LED indicators are switched off and the current device status is displayed.

### 13.4 Transferring IFS-CONFSTICK parameters to the UPS

1. Insert the IFS-CONFSTICK-L carefully into the data port of the UPS while observing the plug-in direction.

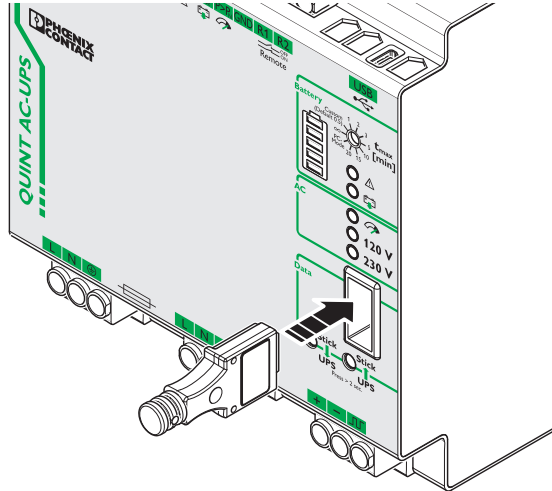


Figure 43 Insert IFS-CONFSTICK-L

2. Press the “Stick -> UPS” button and hold down for at least 2 seconds.

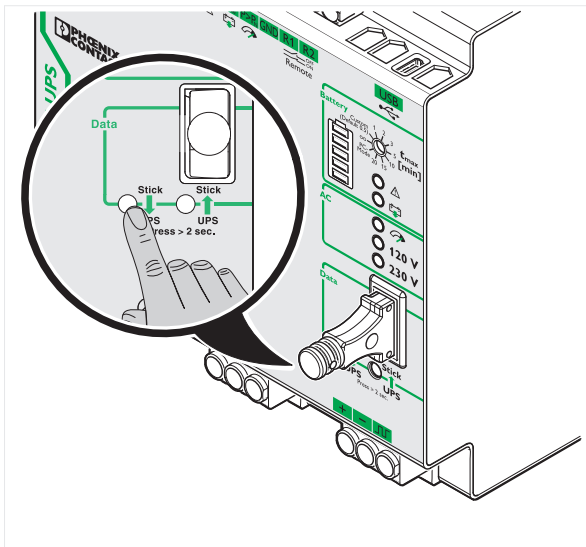


Figure 44 Start parameter transmission

3. The parameter transmission is started. The three LED status indicators will be cyclically illuminated during the transmission.

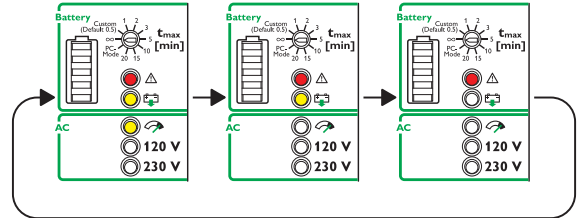


Figure 45 Write parameter data active

4. An error-free transmission is represented by a flashing green LED indicator. An inaccurate transmission is represented by a red LED indicator.

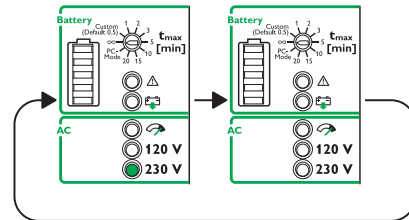


Figure 46 Transmission successful

5. Once the signaling time has elapsed, all LED indicators are switched off and the current device status is displayed.

### 13.5 USB interface MINI type B

The uninterruptible power supply unit is connected to the USB PC connection with data cable CABLE-USB/MINI-USB-3.0M (Order No. 2986135) via USB interface mini type B.

The data cable can be used to parameterize and monitor the UPS.



Connection via the MINI type B USB interface is not electrically isolated.

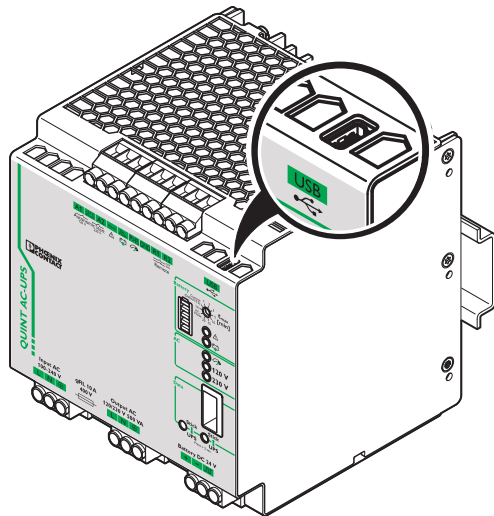


Figure 47 USB interface

## 14 Derating

### 14.1 Temperature-dependent derating

At an ambient temperature of up to +40 °C, the UPS supplies the  $I_{BOOST}$  continuous output current in mains operation. In battery mode and mains operation, the device supplies the  $I_N$  nominal output current up to an ambient temperature of +50 °C. In the case of ambient temperatures above +50 °C, the output power must be decreased by 2.5 % per Kelvin temperature increase.

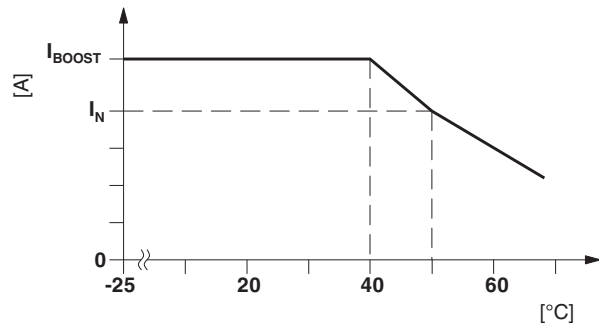


Figure 48 Derating diagram

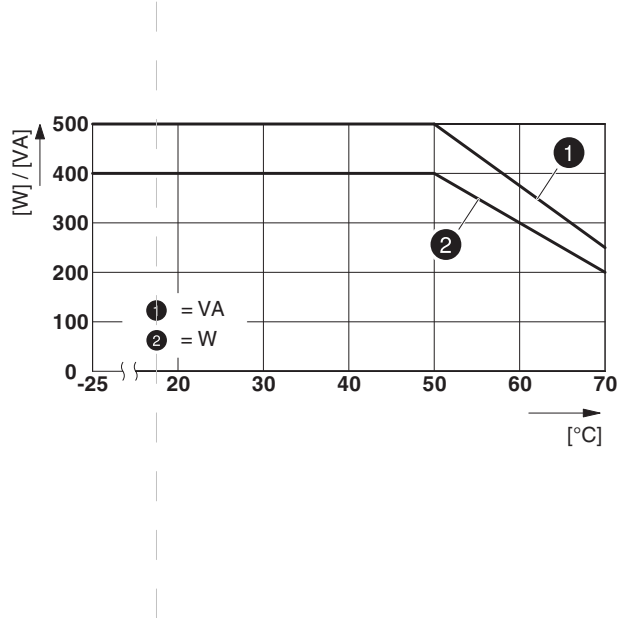
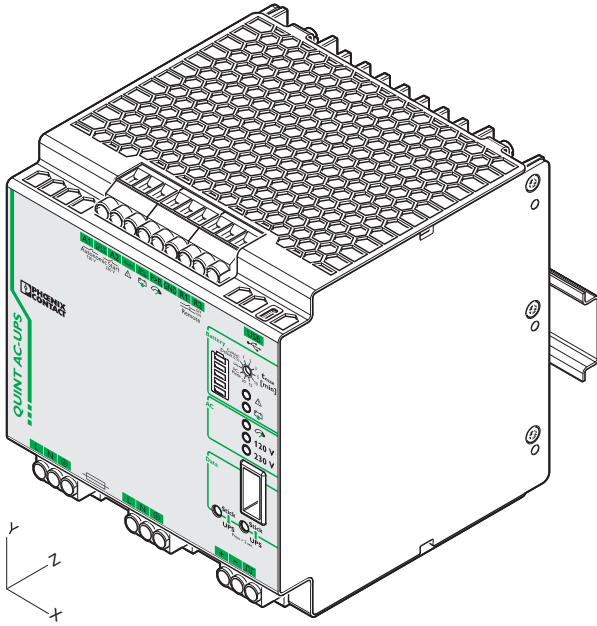
### 14.2 Position-dependent derating

The uninterruptible power supply unit can be snapped onto all DIN rails according to EN 60715. It should be mounted horizontally in the normal mounting position (with the input terminals facing downward).

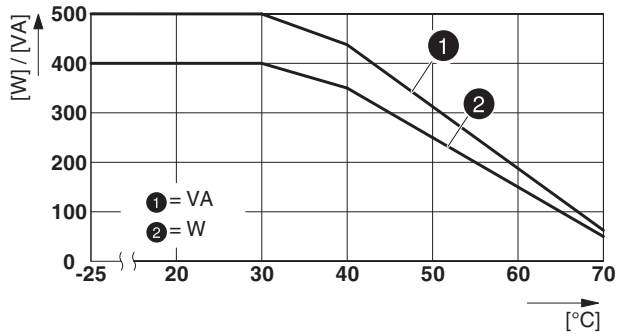
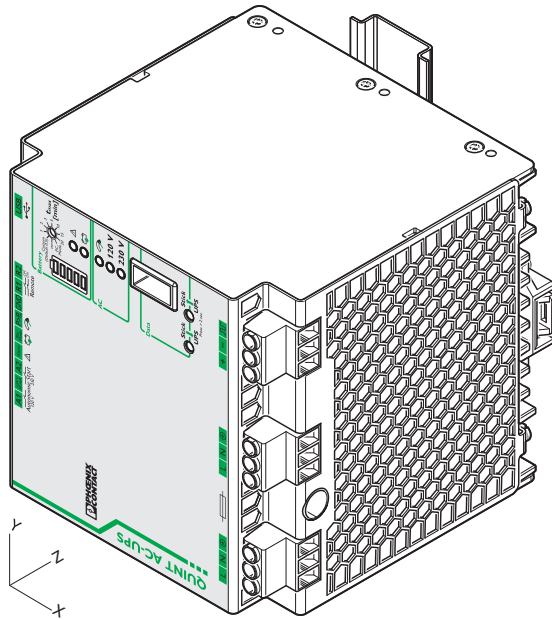
When installing in a different mounting position, derating should be adhered to.

The characteristic curve can be used to determine the maximal output power to be drawn for each ambient temperature for different mounting positions.

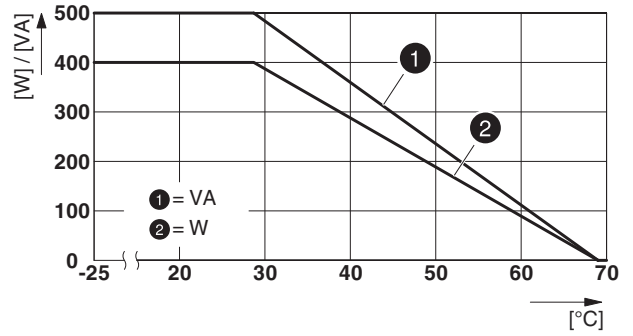
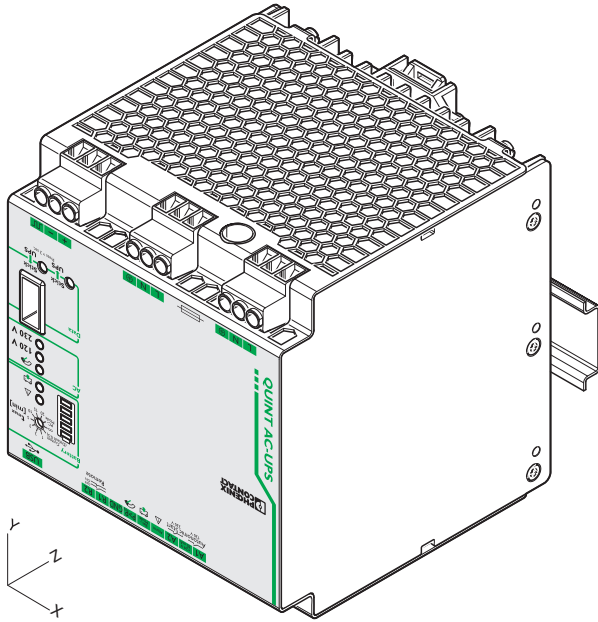
Normal mounting position



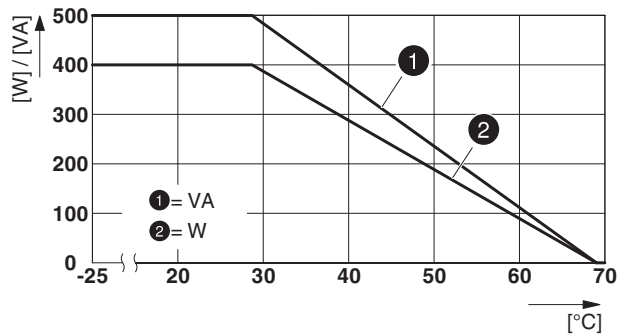
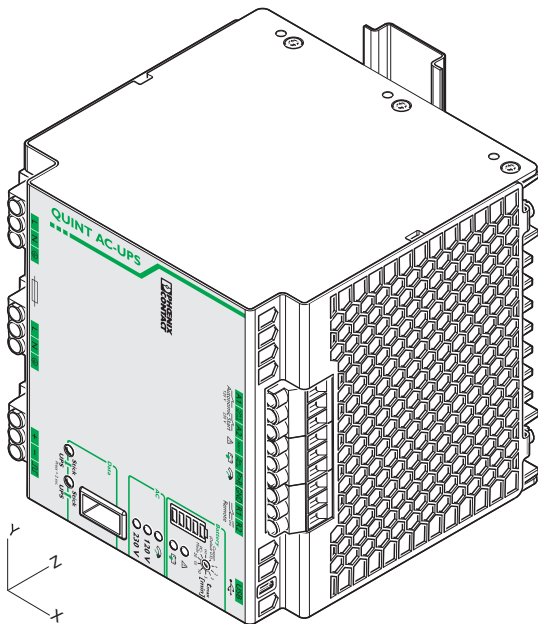
Rotated mounting position 90° X-axis



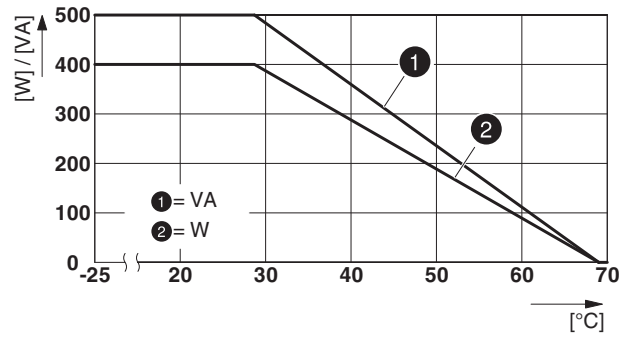
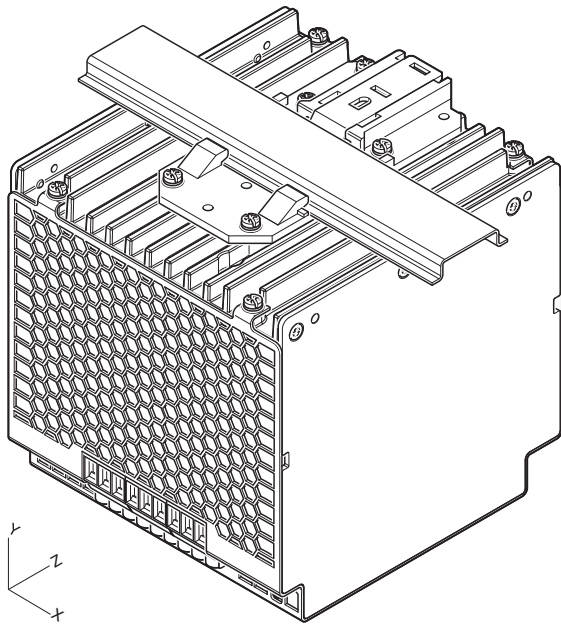
Rotated mounting position 180° X-axis



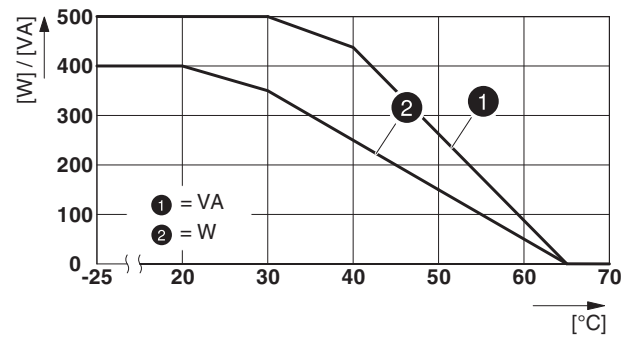
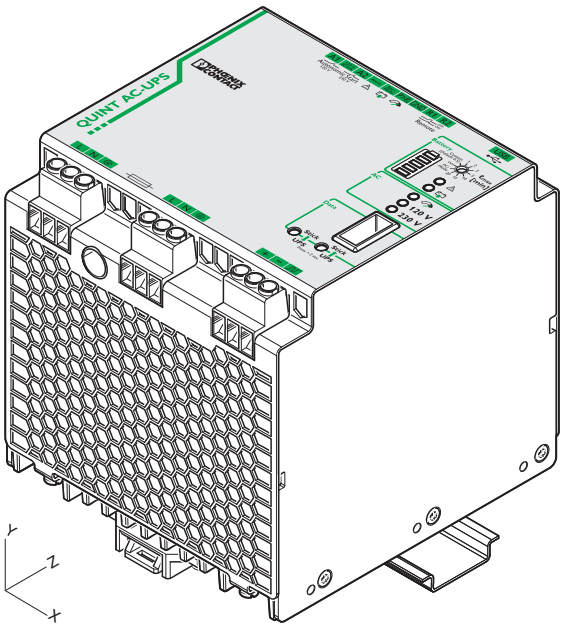
Rotated mounting position 270° X-axis



Rotated mounting position 90° Z-axis



Rotated mounting position 270° Z-axis



## 15 Service mode

When working in a system, it may be necessary to switch the uninterruptible power supply unit over to service mode.



In this operating mode, DC battery connection terminal blocks are deactivated using software. The active signal output is always activated when the unit is switched over to service mode.

The following options are available for switching to service mode:

- Button on the front of the UPS
- UPS-CONF software
- Service stick (IFS-CONFSTICK-L including service formatting, see UPS-CONF user manual)



Further information can be found in the UPS-CONF user manual at [phoenixcontact.net/products](http://phoenixcontact.net/products)

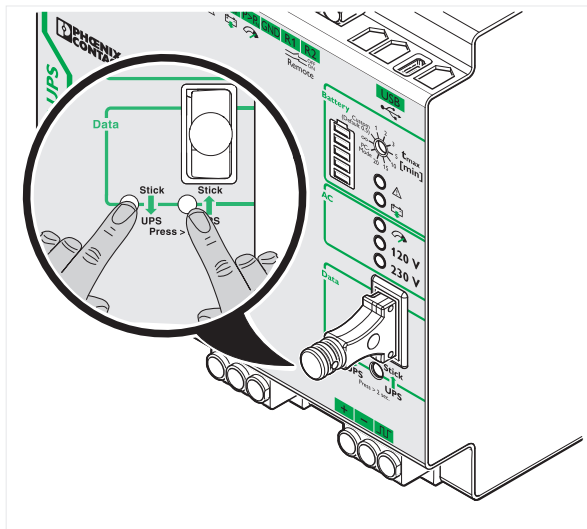
### 15.1 Power storage device replacement

To switch to UPS service mode, press and hold the two buttons on the front of the UPS for longer than 6 seconds.

- The red LED indicator alarm is illuminated



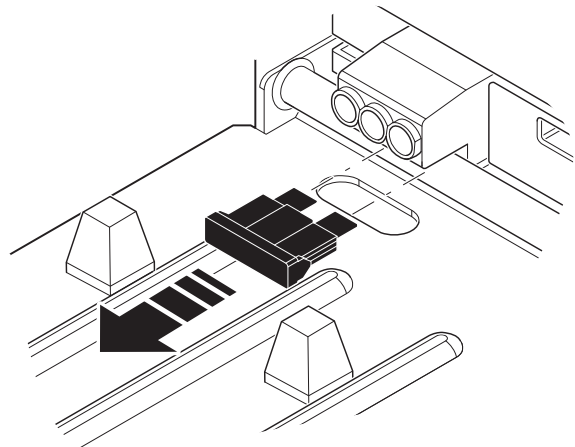
The battery charger is deactivated in this operating mode. Charging and buffer operation are not possible.



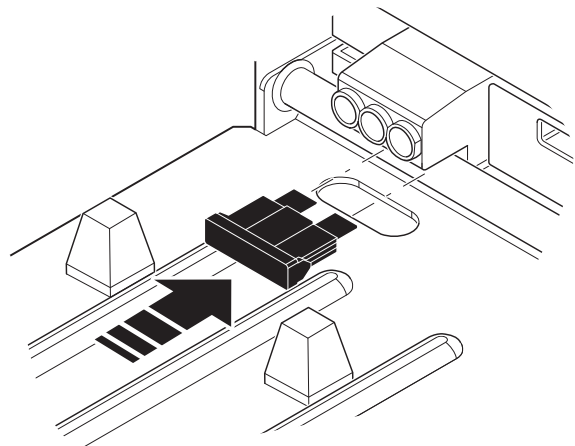
- You may need to remove the existing fuse, depending on the power storage device used
- Disconnect the connecting cables from the power storage device



Ensure that the power storage device can continue charging.



- Connect the new power storage device while observing the polarity.
- Plug in the fuse required, depending on the power storage device used



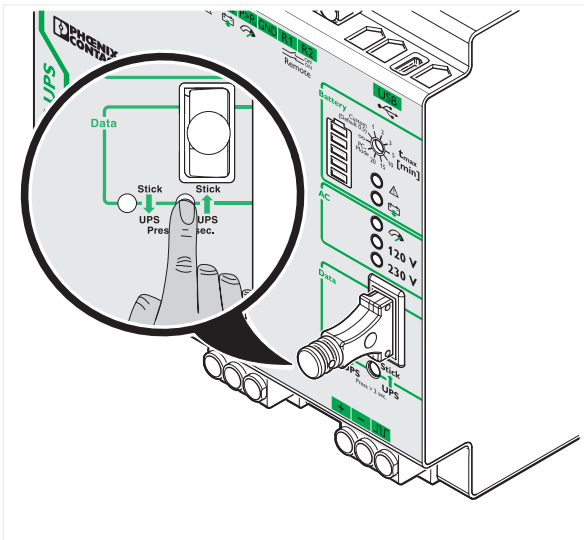


- Press one button on the front of the UPS for longer than 6 seconds. The battery presence check is started and the properties of the new power storage device are determined.

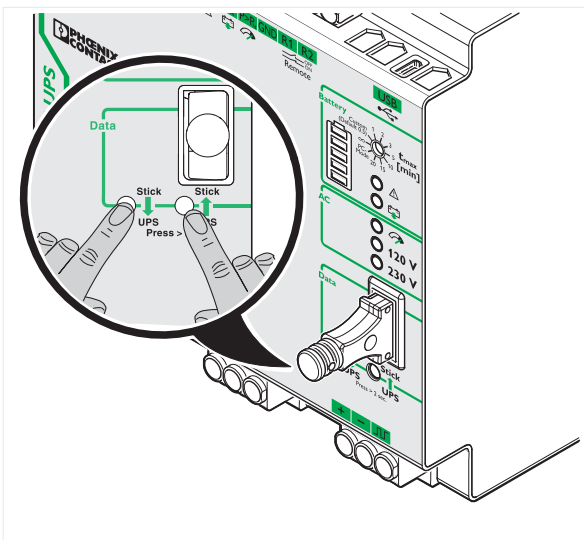


Power storage device data can only be automatically determined for power storage devices with IQ technology.

- The LED bar graph display flashes cyclically



- Press and hold down both buttons on the front of the UPS for longer than 6 s to exit the service mode. The red LED indicator alarm is deactivated.





## 16 PC mode in UPS-CONF

In "PC mode", the UPS function follows a chronological sequence that can be parameterized via UPS-CONF configuration software. In this way, it can be adjusted to each individual application.



The following components are required for the PC mode function:

Data cable IFS-XXX-DATACABLE (Order No. 2320XXX)

Configuration software UPS-CONF (Order No. 2320403)

Communication cable between the UPS and the power storage device with IQ technology

In the event of a mains failure, one PC can continue to work, perform a controlled shutdown, and restart automatically.

### 1. Delay time

Delay time is calculated automatically from the current remaining battery life minus the time required by the PC to shut. Delay time is calculated automatically from the current remaining battery life minus the time required by the PC / IPC to shut-down. Alternatively, a fixed delay time may be chosen.

Example: setting is 10 minutes - if mains power has not returned within 10 minutes, a corresponding alarm is signaled.

### 2. Program start

After the delay time has expired, it is possible to start a program.

Example: a software backup starts which ensures successive backup of system data.

In the "PC Mode" setting on the UPS rotary selector switch, the UPS functionality follows a chronological sequence that can be parameterized via configuration software and is therefore individually optimized for the respective application.

Menu: Settings > Time setting

### 3. PC shutdown

The time required to shut down the PC or industrial PC is set here.

### 4. PC idle time

The output voltage is interrupted during the reset time and the PC automatically restarted only if the PC is shut down and the mains returned in the mean time

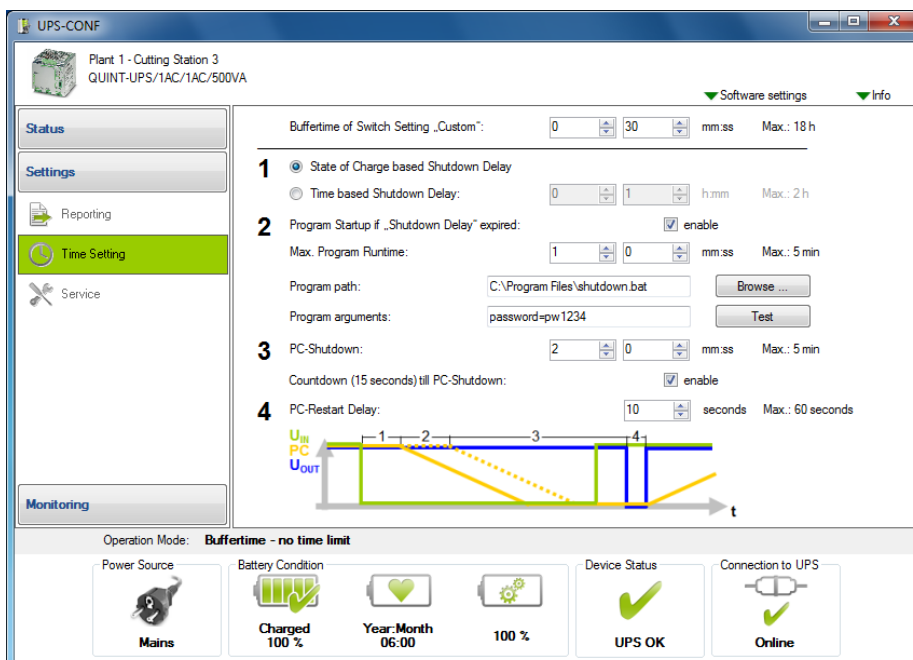


Figure 49 UPS-CONF user interface

## 17 Application example

### Parallel connection of the power storage devices

To increase the buffer time, a maximum of 15 power storage devices can be switched in parallel. It is recommended to keep the number as low as possible and use power storage devices with a higher capacity if required.

After discharging the power storage, the required recharging time depends on the maximum charging current that the uninterruptible power supply can provide.

If possible, install at a cool location e. g., at the bottom of the control cabinet to ensure optimum function. For this, the following cabling design is advantageous.



Use a suitable fuse.

The required fuse value of the backup fuse must not exceed the nominal fuse value of an individual power storage device.

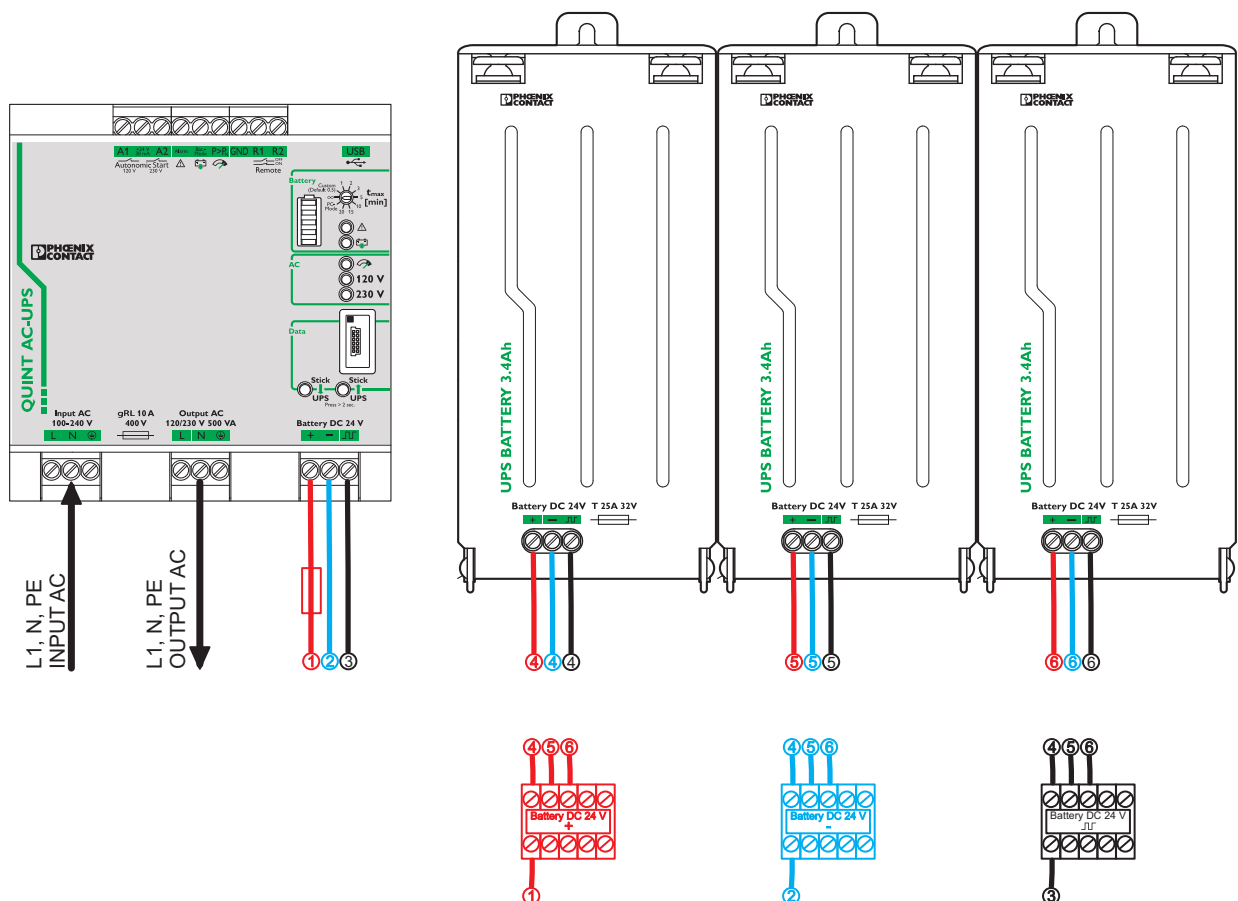


Figure 50 Parallel connection of the power storage devices in the control cabinet with modular terminal blocks (example)



The power storage device should always be wired with the same cable cross sections and cable lengths.