

UNO-UPS/24DC/24DC/60W

Uninterruptible power supply

Data sheet
106855_en_01

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1 Description

Uninterruptible power supply units continue to deliver power even in the event of mains breakdowns or failures.

The product described here is an uninterruptible power supply (UPS) with integrated battery module. In the event of mains breakdowns or failures, it switches to battery operation without interruption so that connected loads continue to be consistently supplied.

Features

- Easy, space-saving retrofitting
- Integrated battery modules
- Extensive signaling, LED indicators, switch outputs
- Maximum energy efficiency
- 95% efficiency in mains operation in the case of charged battery modules

Technical data (short form)

Input voltage range	22.5 V DC ... 29.5 V DC
Nominal output voltage U_{OUT}	24 V DC (SELV)
Nominal output current I_N	2.5 A
Buffer period	45 min (0.5 A) 20 min (1 A) 8 min (2 A) 5 min (2.5 A)
MTBF (IEC 61709, SN 29500)	> 1900000 h (40°C)
Efficiency Mains operation, with charged power storage	> 95 %
Ambient temperature (operation)	-15 °C ... 50 °C
Weight	1 kg
Dimensions W/H/D	110 mm / 90 mm / 84 mm



Make sure you always use the latest documentation.
It can be downloaded from the product at phoenixcontact.net/products.

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3 Ordering data

Description	Type	Order No.	Pcs./Pkt.
Uninterruptible power supply with integrated power storage, lead AGM, VRLA technology, 24 V DC, 0.8 Ah.	UNO-UPS/24DC/24DC/60W	2905907	1

Accessories	Type	Order No.	Pcs./Pkt.
Primary-switched UNO POWER power supply for DIN rail mounting, input: 1-phase, output: 24 V DC/60 W	UNO-PS/1AC/24DC/ 60W	2902992	1
Primary-switched UNO POWER power supply for DIN rail mounting, input: 1-phase, output: 24 V DC/100 W	UNO-PS/1AC/24DC/100W	2902993	1



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

4 Technical data

Input data

Input voltage range	22.5 V DC ... 29.5 V DC
Max. current consumption ($I_{IN} = I_{CHARGE} + I_{BOOST}$)	2.8 A
No load ($I_{CHARGE} = 0, I_{OUT} = 0$)	< 60 mA
Charging process ($I_{CHARGE} = \text{max.}, I_{OUT} = 0$)	< 300 mA
Input fuse, integrated	5 A (electronic)

General output data

Nominal output voltage	24 V DC (SELV)
Output current	2.5 A
Connection in parallel	yes, with redundancy module
Connection in series	No

Output data (mains operation)

Nominal output voltage U_{OUT}	24 V DC
Output voltage range	$U_{OUT} = U_{IN} - 0.5 \text{ V DC}$
Nominal output current I_N	2.5 A
Power Dissipation	3 W
Efficiency ($I_{CHARGE} = 0, I_{OUT} = I_N$)	> 95 % (Mains operation, with charged power storage)

Output data (battery operation)

Nominal output voltage U_{OUT}	24 V DC
Output voltage range	20 V DC ... 27.3 V DC
Nominal output current I_N	2.5 A
Power Dissipation	6 W
Efficiency ($I_{CHARGE} = 0, I_{OUT} = I_N$)	> 92 % (Battery operation)

Battery module

Memory medium	Lead rechargeable battery module
Nominal capacity	2x 0.8 Ah
Battery type	Yuasa NP0.8-12
Charge current	200 mA
Charging time	approx. 5 h
Battery fuse	T 5 A 32 V
Battery presence check (time interval)	60 s
Buffer period	45 min (0.5 A) 20 min (1 A) 8 min (2 A) 5 min (2.5 A)

Status and diagnostic indicator POWER IN OK

Status indication	LED (green) , Static to
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Status and diagnostic indicators/signal outputs Battery Mode

Switching output	Transistor (24 V DC/15 mA)
Status indication	LED (green) , flashing

Status and diagnostic indicators/signal outputs Battery Charge

Status indication	LED (green) , flashing
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Status and diagnostic indicators/signal outputs Alarm

Switching output	Transistor (24 V DC/15 mA)
Status indication	LED (red) , Static to

Status and diagnostic indicator Service

Status indication	LED (red) , flashing
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Remote control

Version 1 : Output R1 to input R2	Plug-in bridge
Version 2 : Input R2	+ 24 V DC

Housing

Housing material	PC (polycarbonate)
Foot latch material	POM (Polyoxymethylen)
Dimensions W/H/D	110 mm / 90 mm / 84 mm
Mounting position	horizontal DIN rail NS 35, EN 60715

General data

Weight	1 kg
MTBF (IEC 61709, SN 29500)	> 1900000 h (40°C)

Security

Degree of protection	IP20
Protection class	III

Input connection data

Connection method	Screw connection
Conductor cross section, solid	0.2 mm ² ... 2.5 mm ²
Conductor cross section, flexible	0.2 mm ² ... 2.5 mm ²
Conductor cross section AWG/kcmil	24 ... 14
Stripping length	7 mm
Screw thread	M3
Tightening torque	0.5 Nm ... 0.6 Nm

Output connection data

Connection method	Screw connection
Conductor cross section, solid	0.2 mm ² ... 2.5 mm ²
Conductor cross section, flexible	0.2 mm ² ... 2.5 mm ²
Conductor cross section AWG/kcmil	24 ... 14
Stripping length	7 mm
Screw thread	M3
Tightening torque	0.5 Nm ... 0.6 Nm

Signal connection data

Connection method	Screw connection
Conductor cross section, solid	0.2 mm ² ... 2.5 mm ²
Conductor cross section, flexible	0.2 mm ² ... 2.5 mm ²
Conductor cross section AWG/kcmil	24 ... 14
Stripping length	7 mm
Screw thread	M3
Tightening torque	0.5 Nm ... 0.6 Nm

Ambient conditions

Ambient temperature (operation)	-15 °C ... 50 °C
Ambient temperature (storage/transport)	-20 °C ... 60 °C
Max. permissible relative humidity (operation)	≤ 95 % (at 25 °C, non-condensing)
Vibration (operation)	< 13.2 Hz, amplitude ±1.0 mm (according to IEC 60068-2-6) 13.2 Hz ... 100 Hz, 0.7g
Shock	30g in each direction, according to IEC 60068-2-27
Pollution degree in acc. with EN 50178	2

Standards

Electrical safety (of information technology equipment)	EN 60950-1/VDE 0805 (SELV)
Electronic equipment for use in electrical power installations	EN 50178/VDE 0160 (PELV)

Approvals

UL approvals	UL Listed UL 508 UL/C-UL Recognized UL 60950
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Current approvals/permissions for the product can be found in the download area under phoenixcontact.net/products.

Conformance with EMC Directive 2004/108/EC

Noise immunity according to EN 61000-6-2

	EN 61000-6-2 requirement	Tested
Electrostatic discharge EN 61000-4-2		
Housing contact discharge	4 kV (Test Level 2)	6 kV (Test Level 3)
Housing air discharge	8 kV (Test Level 3)	8 kV (Test Level 3)
Comments	Criterion B	Criterion A
Electromagnetic HF field EN 61000-4-3		
Frequency range	80 MHz ... 3 GHz	80 MHz ... 3 GHz
Test field strength	10 V/m (Test Level 3)	10 V/m (Test Level 3)
Comments	Criterion A	Criterion A
Fast transients (burst) EN 61000-4-4		
Input	2 kV (Test Level 3 - asymmetrical)	2 kV (Test Level 3 - asymmetrical)
Output	2 kV (Test Level 3 - asymmetrical)	2 kV (Test Level 3 - asymmetrical)
Signal	1 kV (Test Level 3 - asymmetrical)	2 kV (Test Level 4 - asymmetrical)
Comments	Criterion B	Criterion A
Surge current loads (surge) EN 61000-4-5		
Input	0.5 kV (Test Level 1 - symmetrical) 0.5 kV (Test Level 1 - asymmetrical)	1 kV (Test Level 3 - symmetrical) 2 kV (Test Level 3 - asymmetrical)
Output	0.5 kV (Test Level 1 - symmetrical) 0.5 kV (Test Level 1 - asymmetrical)	1 kV (Test Level 3 - symmetrical) 2 kV (Test Level 3 - asymmetrical)
Signal	1 kV (Test Level 2 - asymmetrical)	1 kV (Test Level 2 - asymmetrical)
Comments	Criterion B	Criterion A
Conducted interference EN 61000-4-6		
Input/Output/Signal	asymmetrical	asymmetrical
Frequency range	0.15 MHz ... 80 MHz	0.15 MHz ... 80 MHz
Voltage	10 V (Test Level 3)	10 V (Test Level 3)
Comments	Criterion A	Criterion A

Criterion A	Normal operating behavior within the specified limits.
Criterion B	Temporary impairment to operational behavior that is corrected by the device itself.

Emitted interference in acc. with EN 61000-6-3

Emitted radio interference in acc. with EN 55011 EN 55011 (EN 55022) Class B, area of application: Industry and residential



All technical specifications are nominal values and refer to a room temperature of 25 °C and 70 % relative humidity at 2000 m above sea level.

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:**

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:**

A battery can present a risk of electrical shock, burn from high shortcircuit current, fire or explosion from vented gases. Observe proper precautions.

**CAUTION:**

Keep flames, embers or sparks away from the UPS.

**CAUTION: Risk of injury**

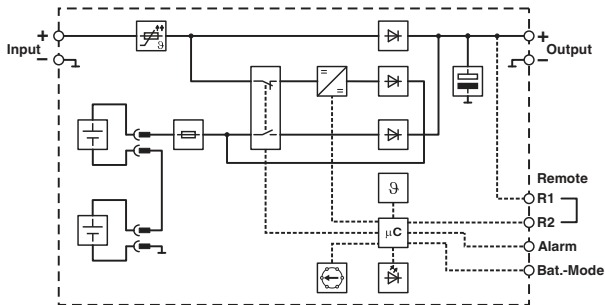
Cover termination area after installation in order to avoid accidental contact with live parts (e. g., installation in control cabinet).

**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.

6 Structure

6.1 Block diagram



Element	Meaning
	Fuse
	Decoupling
	Switch
	Microprocessor
	LED
	Temperature sensor
	Selector switch
	Battery module
	DC/DC converter
	Electrolytic capacitor
	Fuse element (PTC)

6.2 Function elements

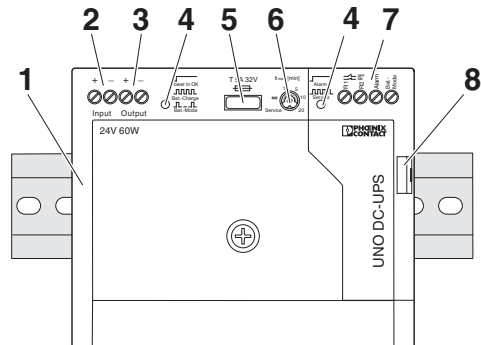


Figure 1 Front view

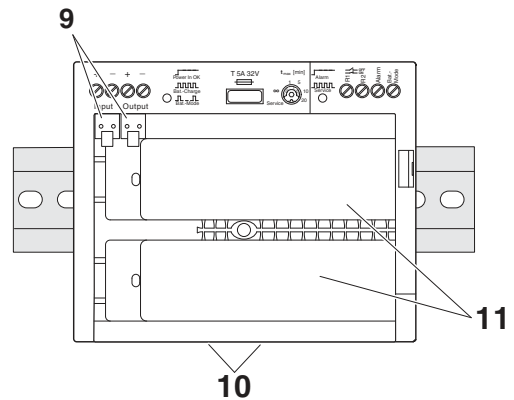


Figure 2 Inside view

No.	Connection terminal blocks and function elements
1	UPS
2	Input terminal block 24 V DC
3	Output terminal block 24 V DC
4	LED: status indicator
5	Fuse holder
6	Rotary selector switch
7	Signal contacts
8	Storage/transport position of the fuse
9	Battery module connector plug (any slot can be selected)
10	Base latch
11	Battery modules

6.3 Convection

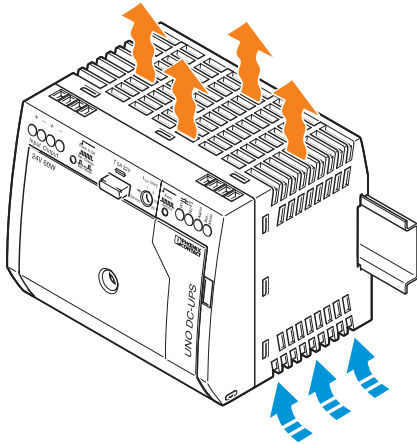


Figure 3 Convection



NOTE: enable convection

The housing can become very hot, depending on the ambient temperature and module load. In order to ensure sufficient convection, we recommend a minimum vertical distance of 30 mm to the other devices.



The device can be snapped onto all DIN rails in accordance with EN 60715 and should be mounted in the normal mounting position.

6.4 Dimensions and mounting positions

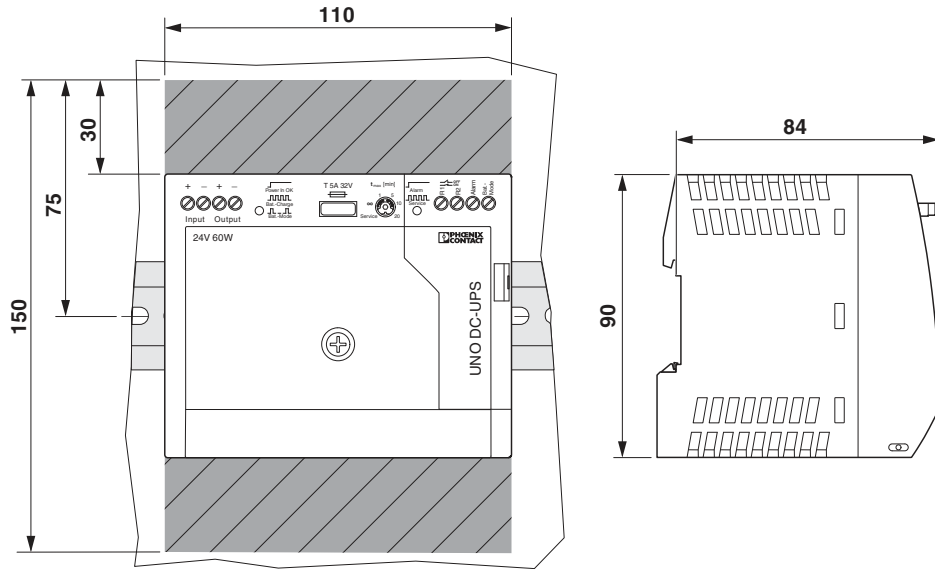


Figure 4 Locked areas

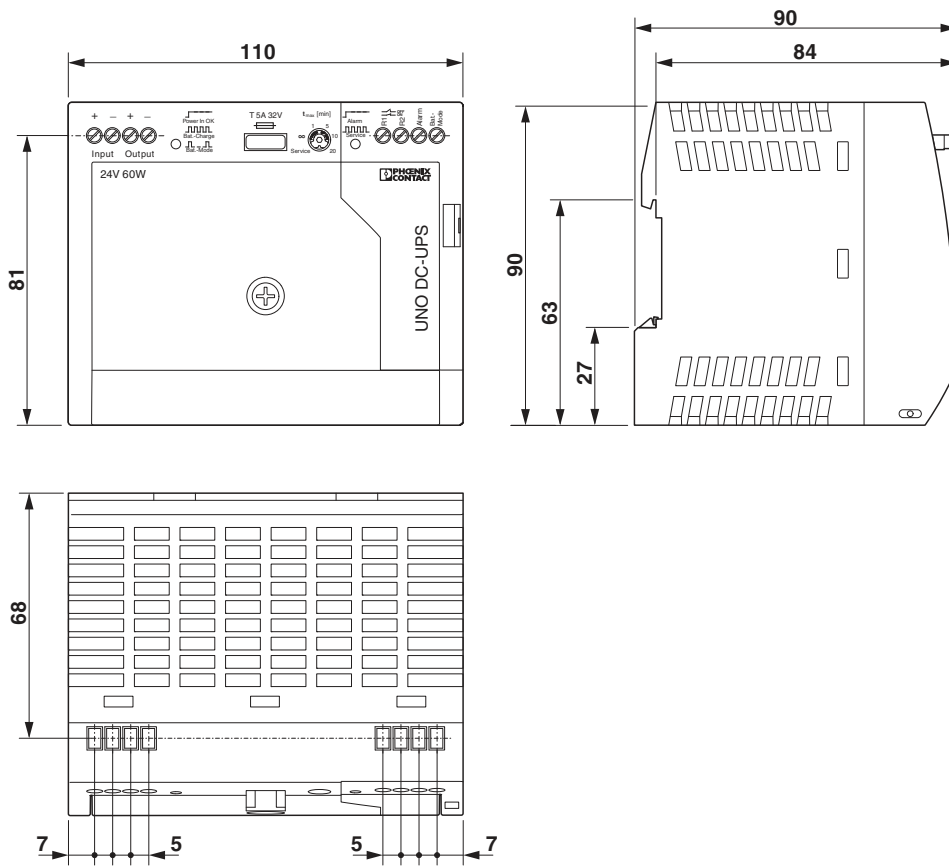


Figure 5 Device dimensions

7 Mounting/removal

7.1 Normal mounting position

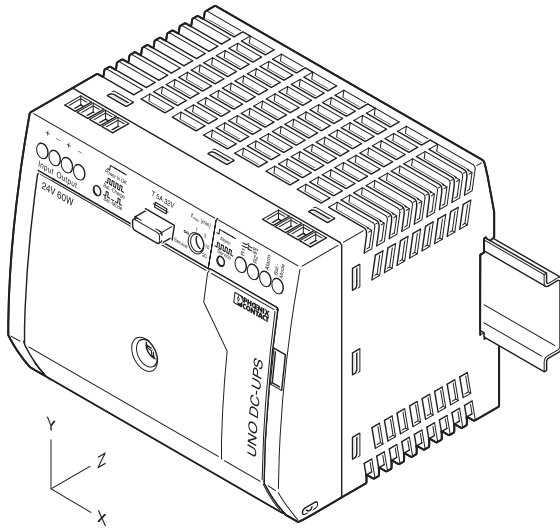
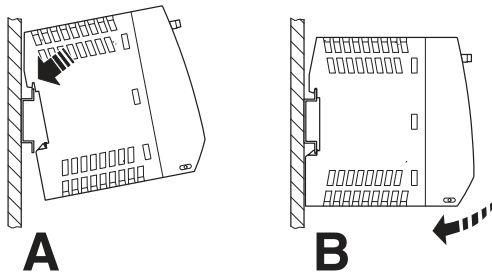


Figure 6 Normal mounting position

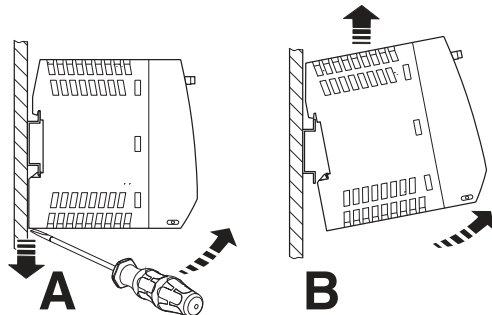
7.2 Mounting on a DIN rail

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



7.3 Removal from the DIN rail

Pull back the snap-on catch using a screwdriver and detach the module from the bottom edge of the DIN rail.



7.4 Notes on disposal



Do not dispose of the UPS and battery modules in household waste! They should be disposed of according to the currently applicable national regulations.



You can return old batteries and accumulators to Phoenix Contact.

8 Device connection

8.1 Installation of individual components

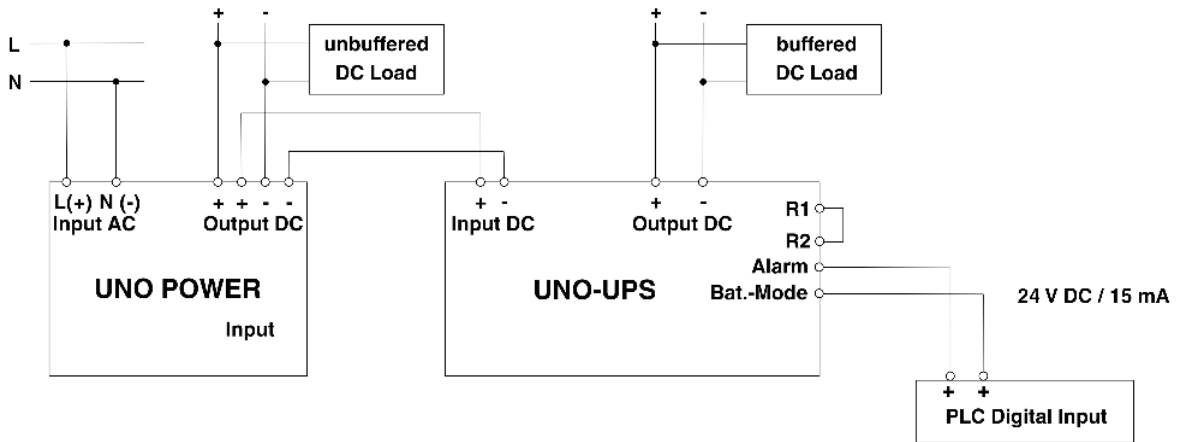


Figure 7 Schematic design



The image is a schematic representation of the design and does not contain all parts. Observe the installation instructions.

Power supply

Use a current-limited source (e.g., UNO POWER power supply) or connect a suitable fuse upstream.



It must be possible to disconnect the power supply unit connected upstream (e.g., UNO POWER) from the outside (e.g., by line protection on the primary side).



Use copper cables with an operating temperature > 75°C (ambient temperature < 55°C) and > 90°C (ambient temperature < 75°C).



To ensure symmetrical current distribution, all cable connections from the power supply unit to the busbar must be the same length and have the same conductor cross section.

UNO-UPS uninterruptible power supply

- Input DC: The input DC is connected to the output DC of the power supply (e.g. UNO POWER).
- Output DC: in the event of mains interruption or failure, the connected DC load is supplied with voltage without interruption.
- Signal R1, R2: activation/deactivation of the UPS functionality

8.2 DC input

The supply voltage is connected via "Input" connection terminal blocks.

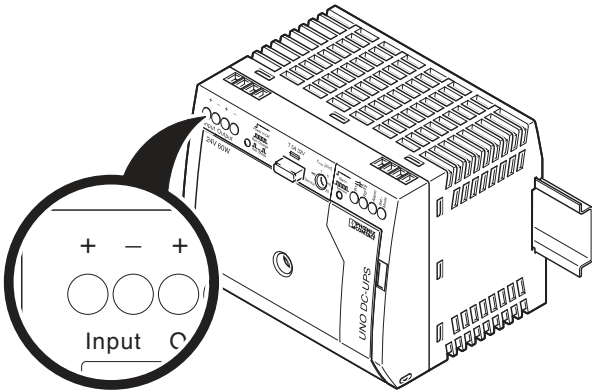


Figure 8 Input

8.3 DC output

The output voltage is connected via the "Output" connection terminal blocks.

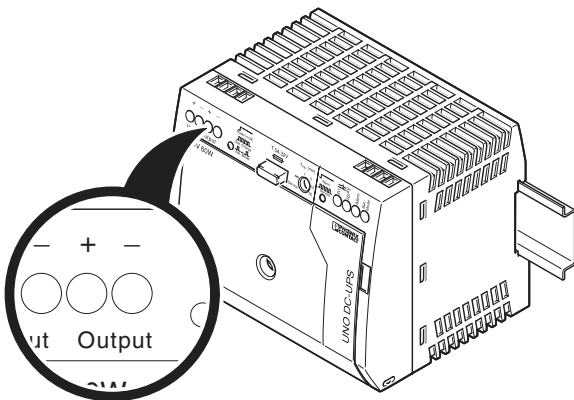


Figure 9 Output

9 Operation

9.1 Startup

1. Inserting the fuse

Remove the fuse from the storage/transport position and insert the fuse into the fuse holder.

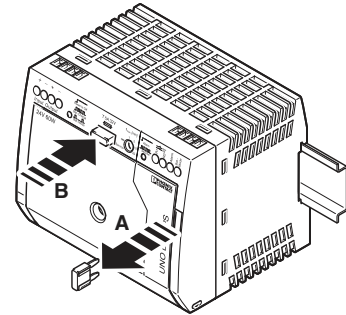


Figure 10 Insert fuse into fuse holder

2. Connecting cables



Use copper cables with an operating temperature > 75°C (ambient temperature < 55°C) and > 90°C (ambient temperature < 75°C).

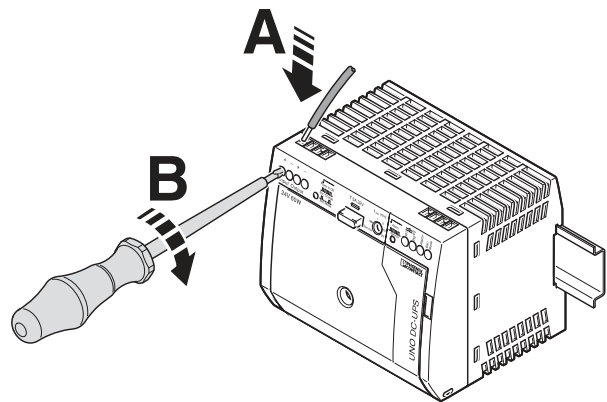


Figure 11 Connecting cables

- Connect the supply lines to the "Input" connection terminal blocks.
- Connect the output lines to the "Output" connection terminal blocks.

3. 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.

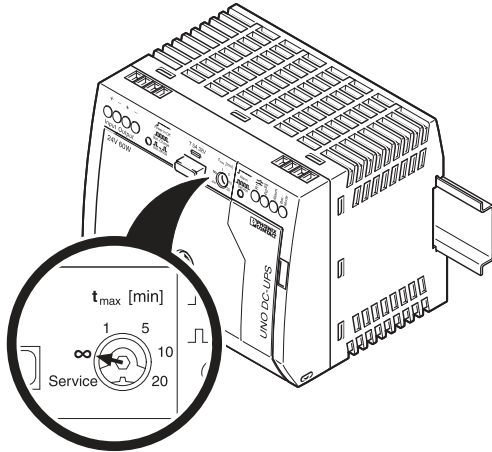


Figure 12 Buffer time selector switch

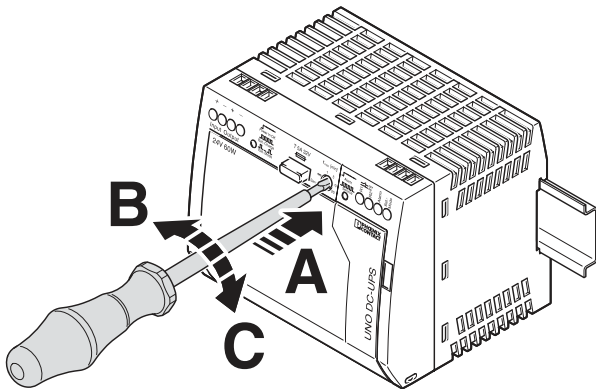


Figure 13 Setting the buffer time

t_{max} [min] setting	Meaning
1, 5, 10, 20	The UPS switches off after the set buffer time.
∞ (unlimited, delivery state)	Buffering with the total stored power

Using the chart select the resulting values for the buffer time and discharge current.

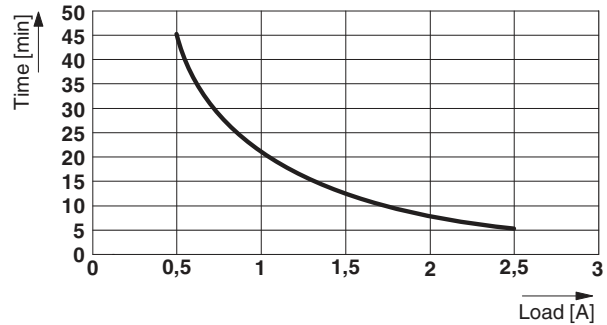


Figure 14 Buffer time/discharge current diagram

9.2 Battery replacement



The batteries are maintenance free and may not be opened.



When replacing batteries, always use two new batteries from the same production batch.



When storing the battery modules, observe the latest startup date and recharge, if necessary. The batteries may only be recharged in an uninterruptible power supply.

1. Setting the Service mode

To change the battery modules, select service mode via the rotary selector switch on the front of the UPS.



The alarm signal output is activated if the batteries are not removed in service mode!

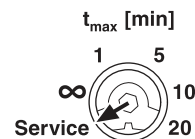


Figure 15 Buffer time selector switch

2. Opening the battery compartment

Unscrew the screw connection of the battery compartment on the front of the UPS. Use a suitable screwdriver to do this.

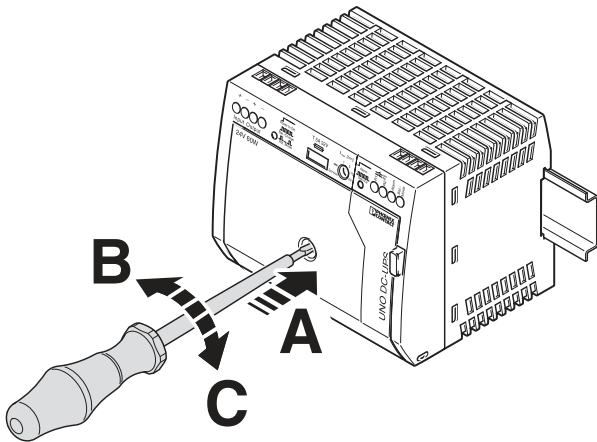


Figure 16 Loosen the screw connection

Open the battery compartment by folding the cover forward.

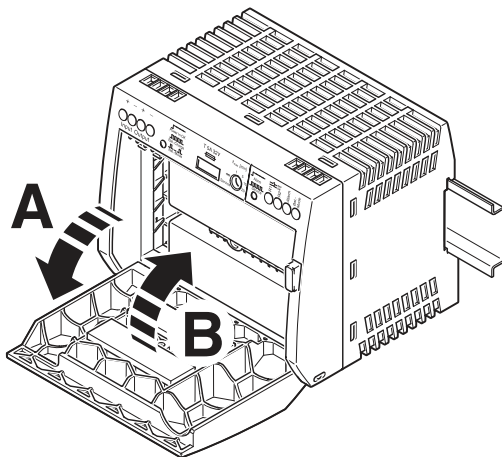


Figure 17 Open/close the cover

3. Remove the battery modules

Remove both connectors from the PCB and remove the batteries.

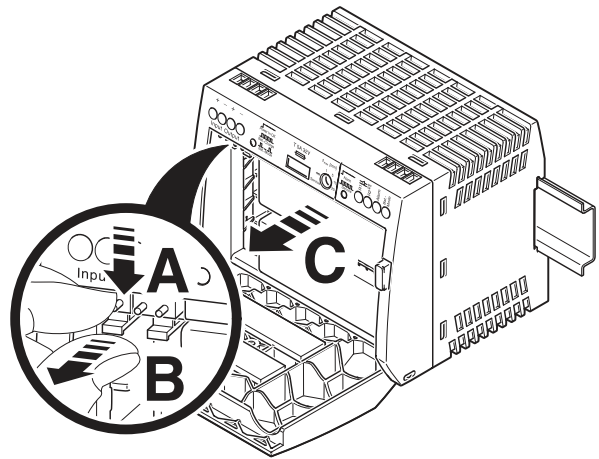


Figure 18 Remove the battery modules

4. Insert the battery modules

Plug the connectors onto the PCB (the order is not important).

Then store the cables between the battery modules.

5. Closing the battery compartment

Close the cover of the battery compartment.

Fix the cover by tightening the screw using the screwdriver.

6. Setting the buffer time

Exit Service mode.

Set the buffer time (see Section 9.1).

9.3 Remote control (contact R1, R2)

Battery operation of the UPS can be switched on and off via a signal to contacts R1/R2. Shutdown can take place during mains operation or active battery operation.

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.



NOTE:

In the event of a supply voltage failure, the UPS switches over to battery operation. The load connected to the DC output is supplied by the battery modules.

Remote shutdown is activated

- Terminal points "R1" and "R2" are not short circuited and 0 V is applied at terminal point "R2".
- In the event of a voltage supply failure, the UPS does not switch over to battery mode. The device switches off.



NOTE:

If the supply voltage fails, the UPS does not switch to battery operation. The load connected to the DC output is not supplied by the battery modules.

10 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.

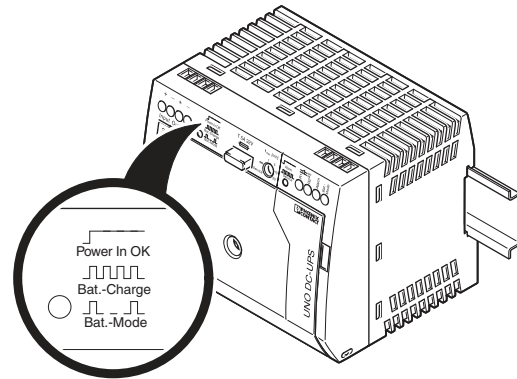


Figure 19 LED mode indicator

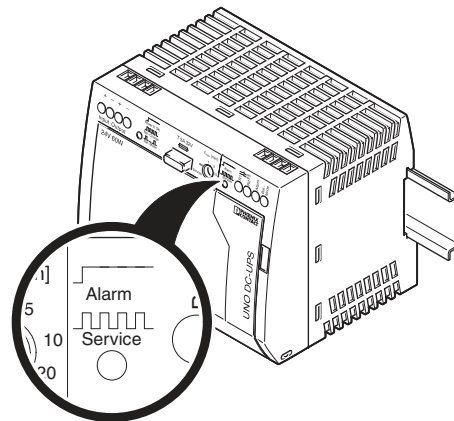


Figure 20 Alarm/service LED indicator

10.1 Active signal outputs

The 24 V DC signal is applied between the "Alarm" or "Bat.-Mode" and "Input" or "Output" connection terminal blocks and can carry up to 15 mA.

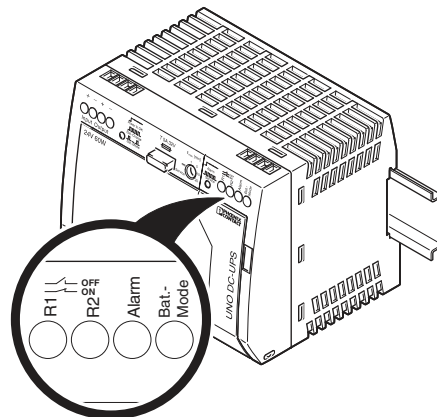


Figure 21 Active signal outputs

10.2 LED indicators and signal outputs

For UPS signaling and the corresponding states, please refer to the table.

Status LED		Switching output		Note
Green	Red	Bat.-Mode	Alarm (active low)	
●	○	OFF	ON	Mains operation
	● D = 50%	OFF	ON	Mains operation, service mode for battery change
	●	OFF	OFF	Mains operation, battery failure
● D = 50%	○	OFF	ON	Mains operation, battery charging in process
	● D = 50%	OFF	OFF	System initialization (3 sec.)
	●	OFF	OFF	Mains operation, battery charging in process, battery failure
● D = 10%	○	ON	ON	Battery mode
	● D = 50%	ON	ON	Battery mode, service mode for battery change
	●	ON	OFF	Battery mode, battery voltage low or battery failure
● D = 90%	○	OFF	ON	Mains operation, remote contact (R1/R2) open
	● D = 50%	OFF	ON	Mains operation, remote contact (R1/R2) open, service mode for battery change
	●	OFF	OFF	Mains operation, remote contact (R1/R2) open, battery failure
○	○	OFF	OFF	Input voltage not present / invalid range
	● D = 10%	OFF	OFF	Undervoltage or overvoltage
	●	OFF	OFF	Input voltage not present / invalid range, output switched off in battery mode

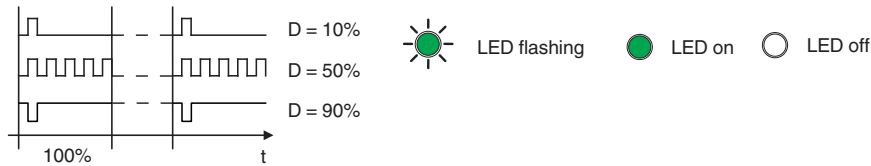


Figure 22 LED indicators and signal outputs

11 Derating

11.1 Temperature-dependent derating

In the ambient temperature range, the uninterruptible power supply supplies the nominal current (I_N).

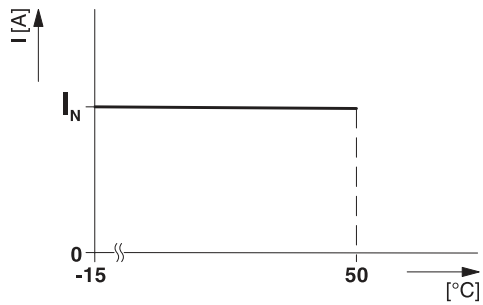


Figure 23 Temperature-dependent derating