

Operation Instruction

CAPTEC 2410



DC-UPS

NCPA1905G01001

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1. General

1.1 Safety regulations

	REFERENCE Before installation respectively use of the power supply, the operation instructions must be read carefully. The general information must be followed. The disregard may cause loss of all guarantee and warranty claims!
	WARNING Only specialized electricians are authorized to commission and maintain the unit. In-proper handling with voltage or capacitors may cause arcs and severe burns.
	WARNING Even a long time after the release of the CAPTEC a lot of energy may be stored inside the unit! Caution: Risk of short-circuit and arcs. Dismantling of the unit may only be done by the manufacturer!
	DANGER All work on the unit may only be performed in de-energized state! The five safety rules must be observed. Input and output lines must be dimensioned and fused sufficiently! Never open the housing! Repairs may only be done by the manufacturer. Non-observance can lead to fatal electric shocks.
	WARNING Only for use in climatically controlled environment, for further details see <i>10Technical Data</i> .
	REFERENCE In case of error we recommend to send the unit back to the manufacturer.

The operation is only permissible in dry rooms and closed cabinets. The unit is designed for pollutions degree 2. The valid VDE regulations must be respected, especially VDE 0100 and EN60204. Supply and output lines must be dimensioned and fused sufficiently. The permissible environmental temperature range must be respected.

To de-energize the unit at the output, it must be separated from the mains and the internal energy storage must be discharged!

1.2 Short-description

The capacitor buffered DC power supply is intended for the secure DC supply in case of mains failure. Do not use the device for any other purpose! The DC-UPS of the series **CAPTEC** includes ultra-capacitors as energy storage inside the housing. This capacitor is charged with the system voltage during normal operation. The connected loads are supplied as well from the system voltage. In case of an interruption of the system voltage the energy of the ultra-capacitors is released in a regulated way. With a dc/dc converter, the load is supplied by the capacitor until it is discharged. The back-up time depends on the state of charge of the capacitor and on the discharge current.

The DC-UPS has the following characteristics:

- Maintenance-free because of long-life ultra-capacitors
- Microcontroller based charging and discharging of the ultra-capacitors
- Parameterizable via USB interface with the **TECControl**-Software
- Control of operation and status of charge with LED's and signal contacts

1.3 Intended Use

The **CAPTEC** is designed and developed for the industrial and plant engineering sector. The installation of the **CAPTEC** is to be carried out exclusively by qualified electricians.

If the **CAPTEC** is operated outside of its intended use, the protection supported by the **CAPTEC** cannot be guaranteed

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2 Transportation and storage

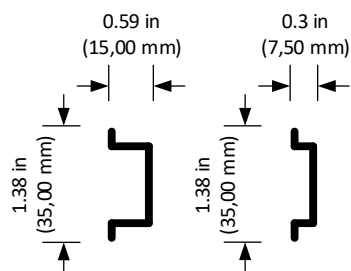
The transportation of the devices may only be done in original packaging. During transportation and storage the compliance with the environmental conditions must be observed. (see 10 *Technical Data*). The device must be protected against humidity and direct sunlight.

3 Installation and connection

3.1 Installation

The assembly must be done in the way, that sufficient cooling is guaranteed. The specified environmental temperature must not be exceeded. The maximum mounting height without load reduction is 2000 m above sea level.

	REFERENCE The minimum distance in the area of air in- and outlets to neighboring devices of at least 40 mm must be observed. Underneath the housing no heating sources are allowed.
	REFERENCE The unit must be covered during installation, if drilling chips may fall onto respectively into the unit. Risk of short-circuit!
	REFERENCE The device is a built-in unit. Operation is only permissible in closed cabinets or housings. The device is designed for pollution degree 2.



Mount the DC-UPS on to DIN-rail according to EN 60715 (see dimensions on the left).



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3.2 Connection

Prior to connection the values of the in- and output voltages must be compared with the values on the type plate. Connection according to the designations of the connection terminals (see circuit diagram and the table below).

Terminal			Connection
Designation	Max. tightening torque/Nm	Cable cross section/mm²	
IN + / OUT -	Push-in-spring connection	1,0 – 6,0	Input voltage / load
REL / Fault 1 = COM, 2 = NO, 3 = NC	Push-in-spring connection	0,2 – 4,0	Message contact REL / Fault (potential-free relay contact: 30 V DC/ 0,5 A)
SD 1 = +, 2 = -			Shut-Down potential-free switch input, switch level 24 V DC (6-45 V DC)
IN OK 3 = COM, 4 = NO			Message contact input voltage (potential-free relay contact: 30 V DC/ 0,5 A)
USB	USB-B-socket		USB-interface

Dimension the cable cross section of the supply and output cables according to EN 62368-1 table G.5; see also table above.

If the system is installed in accordance with EN 62368-1 and supply lines leave the room (building wiring), observe section 6.5.3 of EN 62368-1



CAUTION

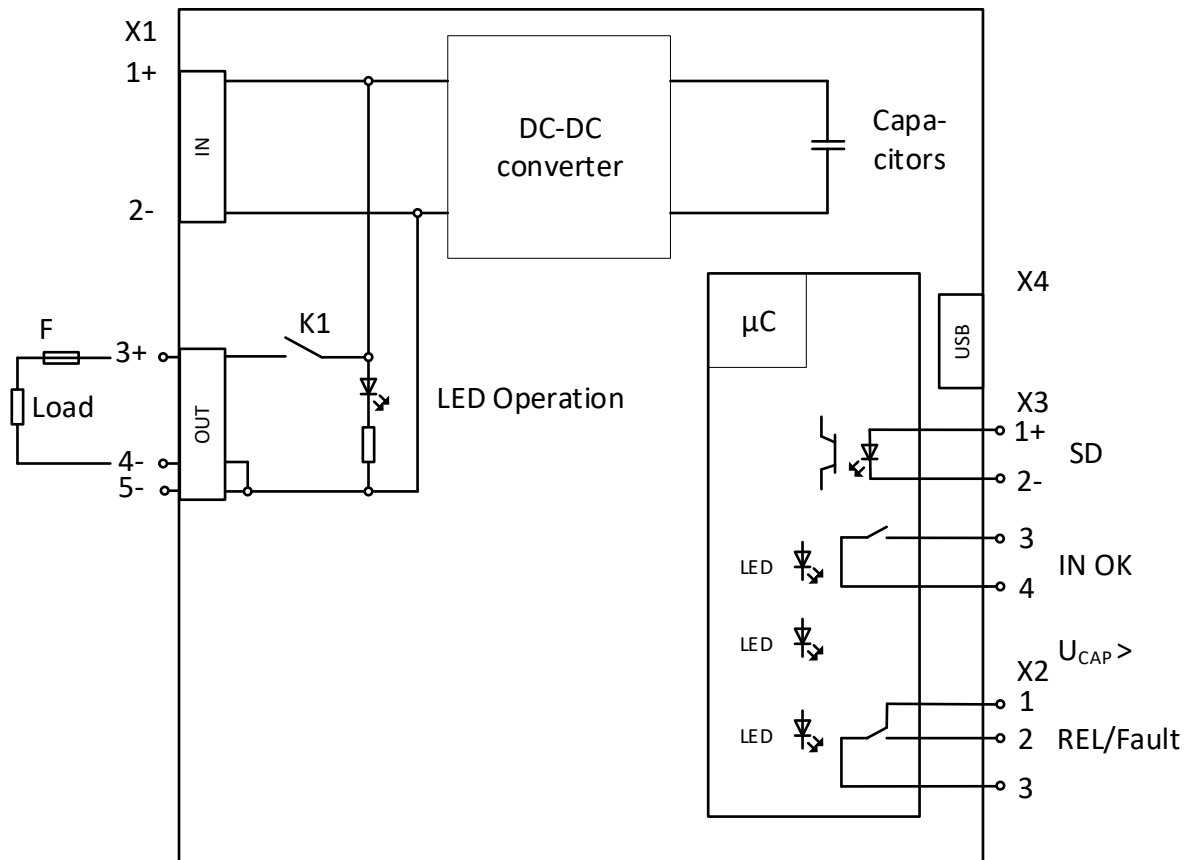
When connecting the terminals, make sure that the nominal voltage and polarity match. Failure to do so may result in electric arcs on the cables, which may cause burns.



REFERENCE

The total current of all consumers connected to the terminals IN and OUT must not exceed the maximum output current of the buffer module. Protect the output circuit externally to avoid overload (see 10 Technical data).

3.3 Circuit diagram



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4 Putting into operation

The device is put into operation with the switch on of the DC supply at terminal IN .

	REFERENCE If the devices are built in systems, in which over voltages are switched on for testing, (for example according to EN60204-1 / VDE0113 part1 19.4 voltage test), The device must be separated from the test equipment before the switch on of the voltage. (Original text EN60204-1: parts, which are not designed for the testing voltage must be disconnected during the test.)
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4.1 Display and messages

Status	LED	Remark
Operation	Illuminates green at: system voltage present at terminal IN respectively OUT	-
IN OK	LED green, illuminates green at: external supply present; $U_E > U_{SYSTEM}$	Potential free closer, max contact load 30V DC/ 0,5A
$U_{CAP} >$	LED green, illuminates green at: energy in the capacitor > 80% LED green, goes out at: energy in the capacitor < 30% (values refer to standard parameterization)	-
REL/Fault	Illuminates red at: • Overvoltage at the internal capacitor • Over- or undervoltage at terminal IN • Overcurrent at the output	Potential free changer, max. contact load 30 V DC/ 0,5 A
Shut-Down	Shut-down of the UPS operation	Potential free switch input, switch level 24 V DC (6-45 V DC)

You can link LED $U_{CAP} >$ via software **TECControl** to relay contact REL/Fault. In this case, the LED REL/Fault indicates the same status as LED $U_{CAP} >$.

5 Operation

5.1 Commissioning

Switch on the **CAPTEC** by switching on the mains voltage.

After the switch-on the output voltage is released and the connected loads are supplied. With the illumination of the LED IN OK the supply voltage is measured and the corresponding system voltage is automatically selected.

The charging of the buffer capacitors is also realized. The charging of the capacitors is only possible if the feeding voltage exceeds the system voltage (voltage in back-up operation).

5.2 Back-up operation

In case of failure of the supply respectively if the minimum input voltage is underrun, the **CAPTEC** switches over into back-up operation. The green LED IN OK goes out.

The illumination of a LED always effectuates the activation of the corresponding message relay.

(see 3.3 *Circuit diagram*). The consumers at terminal OUT can be switched off using a time function.

5.3 Shut-Down

The back-up operation can be aborted early with the switch on of a +24 V DC-control voltage at terminal SD (1+ and 2-) of terminal strip X3. This ensures that the connected loads can be switched off in a defined state. In addition a certain residual energy is retained in the capacitor due to premature switch off. A subsequent charging of the capacitors is shortened herewith.

6 Maintenance

Inside the device there are no parts which should be maintained by the user. The device must be cleaned regularly depending on the degree of pollution.

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7 Putting out of operation

The putting out of operation is realized by the switch off of the supply voltage. To avoid the subsequent backup operation and the discharge of the capacitors, the device can be switch off without back-up operation with the activation of the Shut-Down (see 5.3 *Shut-Down*). Thereby all LED's must go out.



CAUTION

During operation the disconnection and the connection of electrical lines is forbidden! In case of non-observance there is a risk of arcs, which may cause severe burns.

8 Disposal



This symbol indicates that the device must not be disposed with the normal domestic waste. Please dispose the product professionally as electronic scrap. Herewith materials are separated and recycled according to their qualities and you contribute in environmental protection.

9 Norms and regulations

Terminal voltage	SELV / PELV nach EN 50178
Ermited interference	EN 61000-3-2 und EN 61000-3-3 Klasse A EN 55011 Klasse B, EN 62040-2
Noise immunity	EN 62040-2, EN 61000-6-2 EN 61000-4-2 EN 61000-4-4 EN 61000-4-5 EN 61000-4-6 EN 61000-4-11
Total unit	EN 50178 EN 61010-1 / EN 61010-2-201 / EN 62368-1 UL 508 / C22.2 Nr.107-01

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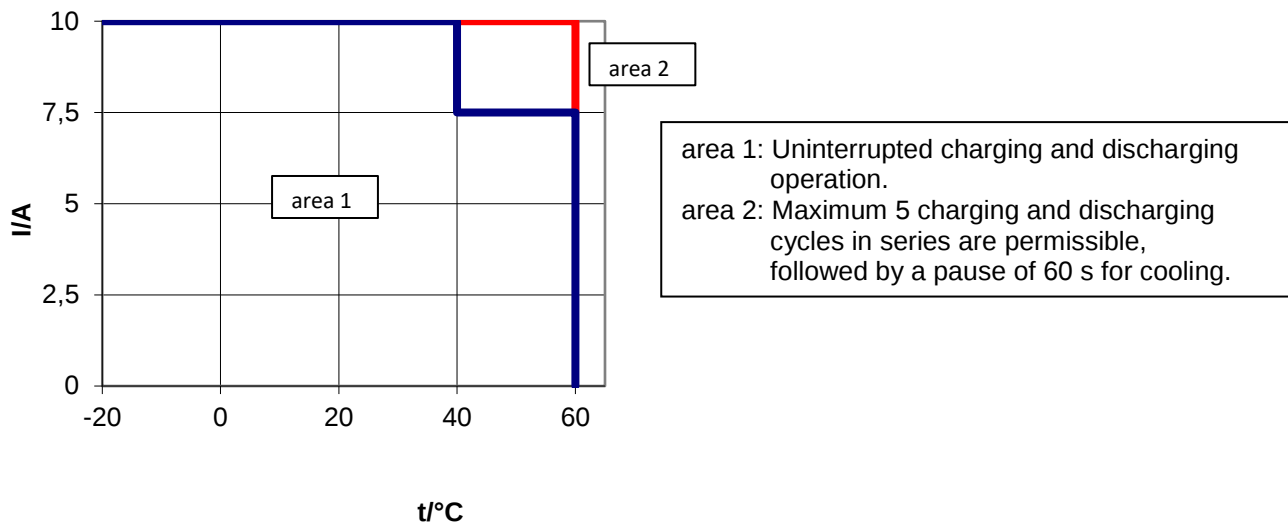
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10 Technical Data

Input	
Nominal input voltage	12 V DC -5 % / 24 V DC +12,5 %
Input voltage range	11,4 V DC - 27 V DC
Nominal input current	10,0 A
Max. inrush current	35 A / 2 ms
Energy ¹ @ I _{out} = 2 A	14 kJ ±4 %
Minimum charging voltage	System voltage + 0,2 V DC
Output	
Output voltage in back-up operation (System voltage)	
Nominal voltage 12 V	11,2 V DC ±4 %
Nominal voltage 24 V	23,0 V DC ±2 %
Nominal output current	10 A
Monitoring of limiting current	10,3 A ±0,1 A
Switch off if limiting current is exceeded	after 1,5 s
Current limitation (in back-up operation)	1,05...1,2 x I _{outNom}
Efficiency in mains operation (if capacitors are charged) @ I _{out} = 10 A	98 %
power loss in mains operation (if capacitors are charged) @ I _{out} = 10 A	5,4 W
Power loss in charge and discharge operation	20 W
Fuse	
Fusing input	15 A (FK2) (device internal)
Fusing DC- output circuit	15 A (FK2) (device internal)
Fusing DC- output circuit	25 A (FK2) (device internal)
Overall	
Protective system	IP20
Dimensions (H x W x D)	5.5 in x 6.5 in x 6.6 in (141 mm x 165 mm x 167 mm)
Weight	2,0 kg
Storage temperature / environmental temperature	-40 °C...+60 °C
Humidity	95 % condensation not permissible

¹ in new condition of the device at 25 °C ambient temperature

10.1 Derating / turn-on duration



10.2 Buffer time

The stored energy in the ultracaps depends on the output current and the capacitor voltage. See table below:

Back-up current	Back-up time
0,5	1160 s
1	583 s
1,5	338 s
2 A	300 s
3	195
5 A	115 s
8 A	63 s
10 A	47 s

The table contains typical values which relate to the device in new condition. Aged ultracaps have less storage capacity and therefore the energy content decreases.

10.3 Life duration of the ultracaps

The life duration (EOL) is reached, if the capacity has fallen on 70 % of the nominal capacity and the internal resistance has doubled. The life duration of the ultracaps depends on the temperature and the capacitor voltage. The capacitor voltage is factory set to 2.7 V.

The typical life duration is around 10 years at 35 °C ambient temperature. By changing the capacitor voltage from 2.6 V to 2.5 V, the life duration can be extended up to 15 respectively 20 years. The buffer time decreases accordingly.

At temperatures above 40 °C we recommend to reduce the capacitor voltage as otherwise the expected life duration has been reduced significantly.

11 Options

11.1 Software TECControl (Article number PSXX-0441G20002)

The software **TECCONTROL** can execute monitoring and parameterisation tasks. For example, you can parameterize the capacitor voltage.

11.2 Mounting flange (Article number NBP40812G01003)

Connecting element of the **CAPTEC** for screw mounting.

11.3 USB cable (Article number 3019.58)

USB 2.0 cable 2.00 m length. Plug type A to plug type B with knurled screws for adjusting to the case.

11.4 Device version with decoupled input (Article number on request)

A device version with decoupled input is available upon request.