

Operation Instruction

C-TEC 2403



DC-UPS

NCPA0727G01***

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Device designation	Note	Art. number:	Nominal input voltage	Nominal output voltage
C-TEC 2403-05	Standard device input decoupled	NCPA0727G01001	24 V DC	24 V DC
C-TEC 2403-1	Standard device input decoupled	NCPA0727G01002	24 V DC	24 V DC

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1 General

The capacitor buffered DC power supply ensures the secure DC supply in case of mains failure. Do not use the device for any other purpose!

Before installation respectively use of the power supply, the operation instructions must be read carefully. The general information must be followed. Putting into operation and maintenance may only be realized by qualified personnel. The disregard or unauthorized modification may cause the loss of all guarantee and warranty claims.

The device is a built-in unit. Operation is only permissible in dry rooms.

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 procedures or capacitors can lead to electric shock and severe burns.
	WARNING Even a long time after the release of the C-TEC a lot of energy may be stored inside the unit! When the device is de-installed, the capacitors must be discharged in a controlled way!
	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 section 10 Technical Data.
	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. The DC output circuit must be fused externally to avoid the overload (see section 3.2). To de-energize the unit at the output, it must be separated from the mains and the internal energy storage must be discharged!

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1.2 Short-description

The DC-UPS of the series **C-TEC** includes ultra-capacitors as energy storage inside the housing. This capacitor is charged with the system voltage (U_e) 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 capacitors 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
- Control of operation and status of charge with potential-free contacts and LED
- Capacity extension possible with external capacitor extension modules

1.3 Intended Use

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

If the **C-TEC** is operated outside of its intended use, the protection supported by the **C-TEC** cannot be guaranteed.

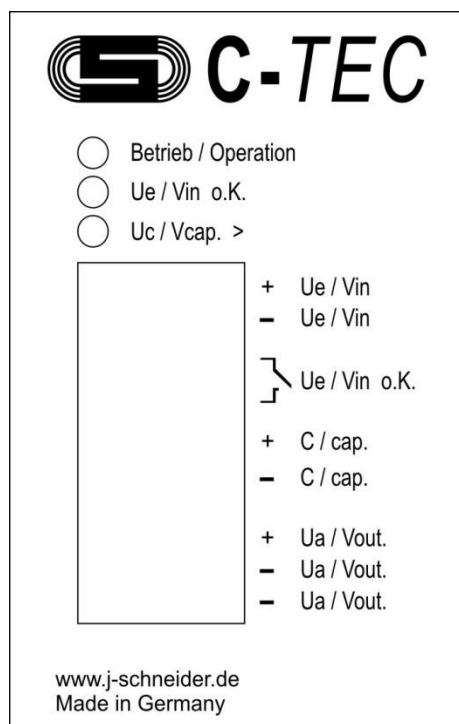
2 Transportation and storage

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 item 9 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. A minimum distance in the area of air in- and outlets to neighbouring devices of at least 40 mm must be observed. The assembly must always be done in the way that sufficient air flow is guaranteed. All fixing points must be used for the fixation of the device. The specified environmental temperature must not be exceeded. The maximum mounting height without load reduction is 2000 m above sea level.



	REFERENCE The unit must be covered during installation, if drilling chips may fall onto respectively into the unit. Risk of short-circuit!
	HINWEIS The device is a built-in unit. Operation is only permissible in closed cabinets or housings. The device is designed for pollution degree 2.

Snap fixation for 35 mm norm profile rail
DIN EN 50022 (NS 35 x 15 / 7,5 mm)

Mounting height:	92,5 mm
mounting width:	60,0 mm
mounting depth:	116,0 mm (without terminals)

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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 terminal assignment).

The supply voltage must be switched off and secured against being switched on again by third parties. The de-energised cable must be connected to the terminal provided for this purpose, ensuring the correct polarity "+" and "-".

Terminals			Connection	
Designation	Max. tightening torque/Nm	Cable cross section/mm ²		
+ Ue / Vin - Ue / Vin	Spring clamb terminal	0,5 – 2,0	Input voltage	
Ue / Vin o.K. (closer)		0,2 – 2,0	Message contact Ue o.K.	Maximum contact load: 30 V DC/0,5 A (potential-free relay contact)
+ C / cap. – C / cap.		0,5 – 2,0	CEM-Module	
+ Ua / Vout. – Ua / Vout.		0,5 – 2,0	loads	

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

The status of the external power supply can be forwarded to a higher-level control centre via signalling contacts. The contacts are coupled with the LED displays of the same name. The illumination of an LED thus causes the corresponding relay to be energised.



WARNING

Only SELV or PELV voltage sources (EN 60204-1) are permitted for supplying the device. Failure to observe this may result in electric shock with fatal consequences.



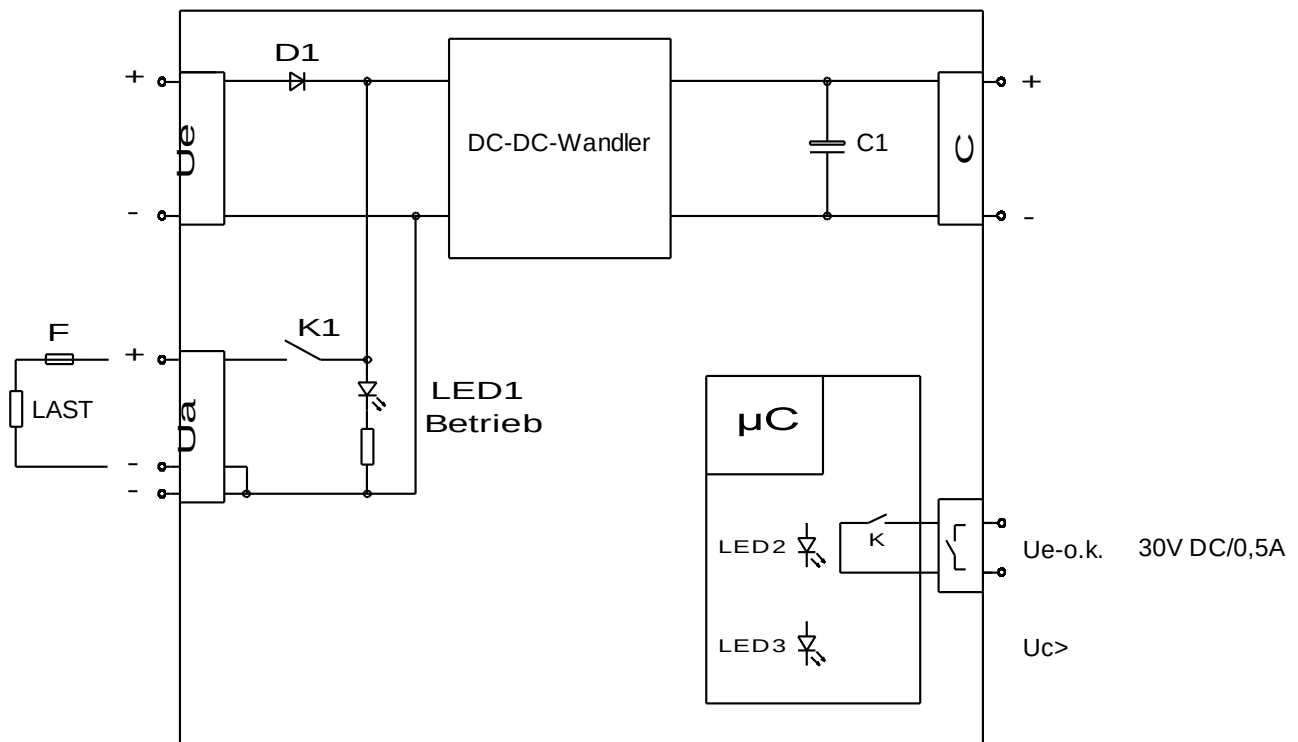
REFERENCE

In case of overload, the DC output current is composed of the maximum current of the DC-DC wall controller and the current of the system voltage. To prevent an overload of the DC output circuit must be protected by an external fuse!

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3.3 Circuit diagram



4 Putting into operation

The device is put into operation by switching on the input voltage (24 V). The status LED 'Ue-o.k.' illuminates, the status LED "Operation" illuminates.



DANGER

Control the correctness of the connection before the first switch on.
Make the connections only in voltage-free state.
In case of non-observance risk of touching energised parts.
Risk of fatal electric shock.



REFERENE

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

Three LED's are integrated in the housing for status display:

Display	Meaning
Operation	LED green illuminates: - if the input voltage is present at terminal U_e - as long as the device is internally supplied with energy
U_e -OK	LED green illuminates: - at mains operation $U_e > U_{e \min}$
$U_c >$	LED green: - is blinking slowly (0,8 Hz): - If the capacitor is charged up to 80 % - illuminates: - If the energy in the capacitor > 80 % - goes out: - If the energy in the capacitor < 30 % - is blinking fast (3,2 Hz): - If the capacitor is nearly discharged, output is switched off (keeps on blinking until it is totally discharged)

¹⁾ The message contact is coupled with the LED displayed.
The values refer to standard parameterization.

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5 Operation

5.1 Mains operation

After the switch on of the input voltage U_e the internal energy storage is charged.

Mains operation is signalized with the LED Operation.

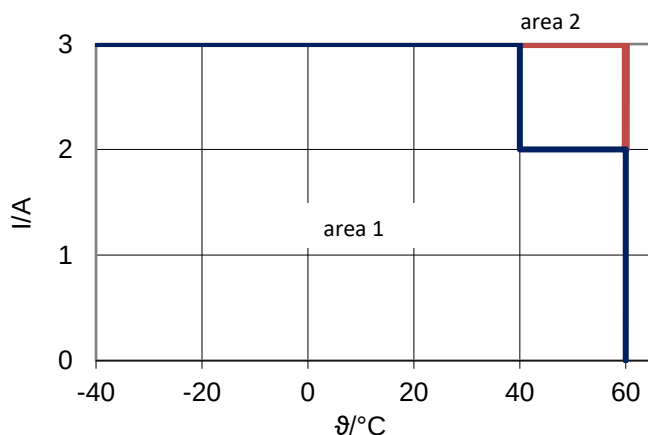
If the input voltage is above the minimum charging voltage (23,7 V DC) it is displayed with the signal **Ue O.K** and the output voltage is released.

The charging is indicated with the slow blinking of the LED **Uc>**. If the capacitor is nearly fully charged, the LED **Uc>** illuminates permanently.

5.2 ON-Time

The on-time is depending on the load current and the environmental temperature.

For the examination of the on-time only the charging and discharging cycles of the capacitors are relevant. If the back-module is charged and works in stand-by mode, no warming of the unit occurs. Thermally this case can be compared with a switched off device.



area 1: uninterrupted charging and discharging cycles permissible

area 2: maximum 5 charging and discharging cycles in series are permissible

5.3 Back-up operation

In case of failure of the supply respectively if the minimum input voltage is underrun the C-TEC switches over to back-up operation. The green LED 'UE-o.k' goes out.

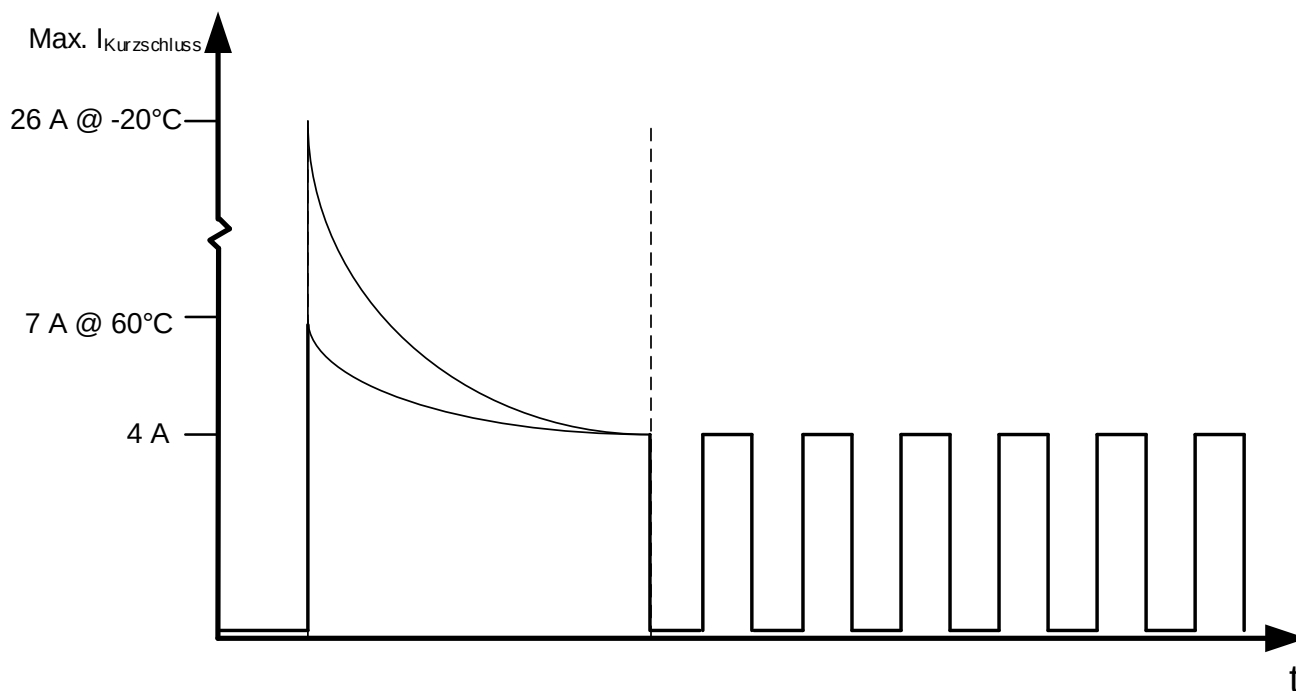
If the capacitor is nearly discharged the green LED 'Uc>' goes out.

If the capacitor is no longer able to buffer, U_a is switched off. Until the internal voltage supply breaks down, the LED **operation** illuminates. **area 1** ED 'Uc>' is blinking fast.

5.4 Back-up Time (typical)

I_{output}	0,5 A	1,0 A	1,5 A	2 A	3 A
Device					
C-TEC 2403-1	118,8 s	60,6 s	38,5 s	28,5 s	18 s
C-TEC 2403-05	46,8 s	23,0 s	14,6 s	10,2 s	6,2 s

5.5 Short-circuit



The unit limits the short-circuit current. The maximum short-circuit current depends on the environmental conditions and the operating status.

The unit then cyclically checks whether there is still a short circuit.

6 Maintenance

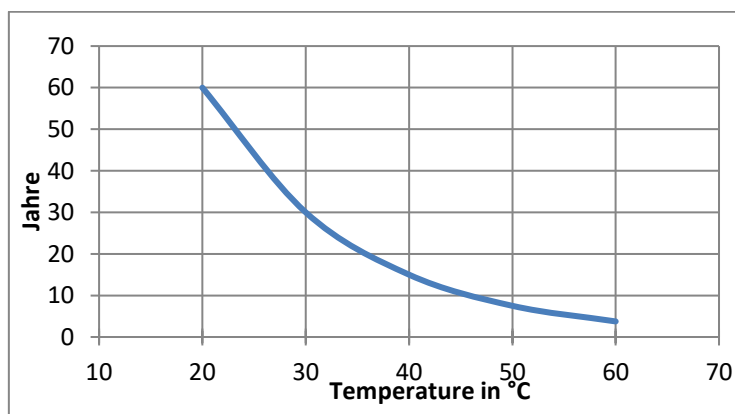
Inside the device there are no parts which should be maintained by the user.

To ensure the back-up capability of the power supply, the back-up capability of the devices should be controlled in regular distances of 3 to 6 months.

The device must be cleaned at least one time a year depending on the degree of pollution.

6.1 Life duration of the capacitors

The life duration of the capacitors depends on the temperature. The life duration is achieved, if the capacity is below 70% of the nominal capacity.



picture 1: life duration in dependence of the temperature

7 Putting out of operation

The putting out of operation is realized by the switch off of the input voltage. Subsequently the unit buffers the load until the capacitors are discharged. Directly after the discharge, the voltage-free output is indicated with the illumination of the LED **Operation** and the fast blinking of the LED **Uc**. The LEDs go out when the residual energy of the capacitor is consumed.



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

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9 Norms and regulations

Terminal voltage	SELV / PELV according to EN 60204-1
Emitted interference	EN 6100-3-2 EN 6100-3-3 class A EN 55011 class B EN 62040 -2
Noise immunity	EN 61000-6-2 EN 62040-2 EN 61000-4-2 EN 61000-4-3 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

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10 Technical Data

Input		
Nominal input voltage		24 V DC -1,2 % / +15 % (SELV/PELV)
Input voltage range		23,7...27,6 V DC ± 0 %
Min. charging voltage		23,7 V DC
Nominal input current		3 A
Output		
Output voltage in back-up operation		23,0 V DC ±2 %
Nominal output current		3 A
Energy (typical)	C-TEC 2403-0,5	0,7 kJ @ (U _a = 22,8 V DC, I _a = 0,6 A)
	C-TEC 2403-1	1,5 kJ @ (U _a = 22,8 V DC, I _a = 0,6 A)
Current limitation		See section 5.5 short-circuit
Max power loss ,worst-case‘		7 W
efficiency		93,9% @ (U _e =24,0 V DC; U _a =23 V DC; I _a = 3 A)
Fusing		
Internal device protection (internal)		4 A (T)
Fusing DC-output circuit (external)		3 A (T)
General		
Protective system		IP20
Operational temperature		-40 °C ... 60 °C
Storage temperature		-40 °C ... 60 °C
Rel. humidity		≤95% no condensation
Max. mounting height (without load reduction)		2000 m
Dimensions (HxWxD)		92,5 mm x 60 mm x 116 mm
weight		0,6 kg