

Operating Instruction

AC C-TEC 2420-8



DC-USV
NCPA0746G01***

Content

page

1	In general	2
1.1	General Safety Instructions	2
1.2	Short Description	3
1.3	Intended Use	3
2	Transportation and storage	3
3	Installation and Connection	3
3.1	Installation	3
3.2	Connection	4
3.3	Circuit diagram	5
4	Putting into operation	6
4.1	Display and Messages	6
5	Operation	6
5.1	Mains operation	6
5.2	Back-up operation	7
5.3	Back-up time (typical)	7
5.4	Derating	7
5.5	Capacitor Test	7
5.6	Shutdown	7
6	Software	8
6.1	paraTEC-Software	8
6.2	TECControl-Software	8
7	Maintenance	8
8	Putting out of operation	8
9	Disposal	8
10	Norms and Regulations	9
11	Technical Data	10

Operating Instruction

AC C-TEC 2420-8

1 In general

The intended use of the **AC C-TEC 2420-8** is to supply 24 V DC consumers from the 400 V three-phase mains. In the event of a power failure, the unit functions as an uninterruptible power supply (UPS). Never use the unit for other purposes.

1.1 General Safety Instructions

	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! Keep the operational instruction for later look-up
	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
	DANGER All work on the unit may only be performed in de-energized! Please look at the terminals +C / -C of the internal energy store. 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 shock.
	WARNING Even a long time after the release of the AC 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! Short-circuit of the capacitors may lead to strong heat generation and flying sparks!
	REFERENCE The device was developed for protection class I and has IP20 protection. It is a built-in device that may only be operated in closed switch cabinets or housings!
	REFERENCE The unit must not be operated above 2000 m above sea level without line reduction. The permissible ambient temperature range must be observed. The unit is designed for pollution degree 2. Attention: For use in a controlled environment (see UL standard)..
	REFERENCE Only the expansion modules provided by the manufacturer may be connected to the +C / -C connection. The expansion modules may only be connected in a de-energised state and with discharged capacitors. For this purpose the capacitors in the AC C-TEC and in the expansion module must be discharged in a controlled manner via a resistor!
	REFERENCE In case of error we recommend to send the unit back to the manufacturer.

Operating Instruction

AC C-TEC 2420-8

1.2 Short Description

The buffered DC power supply of the AC C-TEC series includes ultra-capacitors as energy storage inside the housing. During normal operation this capacitor is charged from AC-mains. The connected DC consumers are supplied as well from AC mains. In case of an interruption of the AC supply, the energy of the ultra-capacitor is released regulated. With a dc/dc converter the load is supplied from the capacitor until it is discharged. The backup time depends on the state of charge of the capacitor and the discharge current.

- The power supply has the following characteristics
- Maintenance-free because of long-life ultra-capacitors
- Mikrocontroller based charging and discharging of the ultra-capacitors
- Control of operation and status of charge with potential-free contacts and LED
- Low wiring effort due to the integration of power supply unit and energy storage
- Compatible with TECControl software
- Communication with an IPC via USB or RS232 cable possible
- Parameterisable via USB interface
- Capacity can be extended by external capacitor modules
- cyclical capacitor test during mains operation
- wide temperature range -40 °C to 60 °C

1.3 Intended Use

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

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

2 Transportation and storage

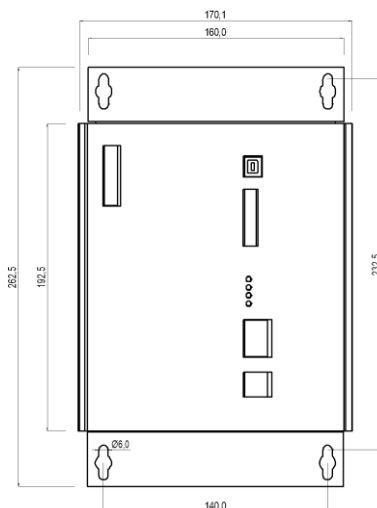
The transportation of the devices may only be done in original packaging. During transportation and storage the compliance with the environmental conditions must be observed. (see chapter 11 Technical Data). The devices must be protected against humidity and direct sunlight.

3 Installation and Connection

3.1 Installation

The power supply must be installed in the way that sufficient air cooling is guaranteed. A minimum distance in the area of air in- and outlets to neighbouring devices of at least 80mm must be observed.

The assembly must always be done in the way that sufficient air flow is guaranteed. Each fixation point must be used for device fixation.



Reference

If drilling chips may fall onto respectively into the unit, it must be covered during installation.

Risk of short-circuit!

The control cabinets or enclosures used must meet the requirements for enclosures according to EN 62368-1. Observe the specifications for ventilation openings in the enclosure as per sections 6.4.8.3.3 and 6.4.8.3.4.

A warning notice "Warning of electrical voltage" (ASR A1.3 W012) must be attached to the enclosure.

Mounting depth **198 mm without terminals**

Operating Instruction

AC C-TEC 2420-8

3.2 Connection

Prior to connection, the values of the DC supply must be compared with the values on the type plate. Connection according to the designations of the connection terminals. (see 3.3 Circuit Diagram). Not used connection screws must be tightened.

Terminals			Connection	
Designation	Max. tightening torque/Nm	Cable cross section/mm²		
L1, L2, L3, PE(⊕)	0,6	0,5 – 2,5	Input voltage	
USB	USB-B-socket		USB-interface	
IO-1 (1+, 2-)	0,2	0,2 – 1,5	UPS-Switch-Off	24 V DC (6...40 V DC)
IO-1 (3 = COM, 4 = NO)			Message contact Netz / Mains	Maximum contact load: 30 V DC/0,5 A (potential-free Relay contact)
IO-1 (5 = COM, 6 = NO)			Message contact U _C / Vcap. >	
IO-1 (7 = COM, 8 = NO, 9 = NC)			Message contact Fehler / Fault (general error)	
+ U _a / Vout. – U _a / Vout. + C / cap. – C / cap.	0,6	2,5 – 4,0	load	
			CEM-Module	

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

If the system is constructed according to EN 62368-1 and supply cables leave the room (building wiring), observe section 6.5.3 of EN 62368-1.

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.



CAUTION

When connecting the terminals, make sure, that the nominal voltage and polarity match. Failure to do so may result in excessive heat generation and arcing, which can cause severe burns!

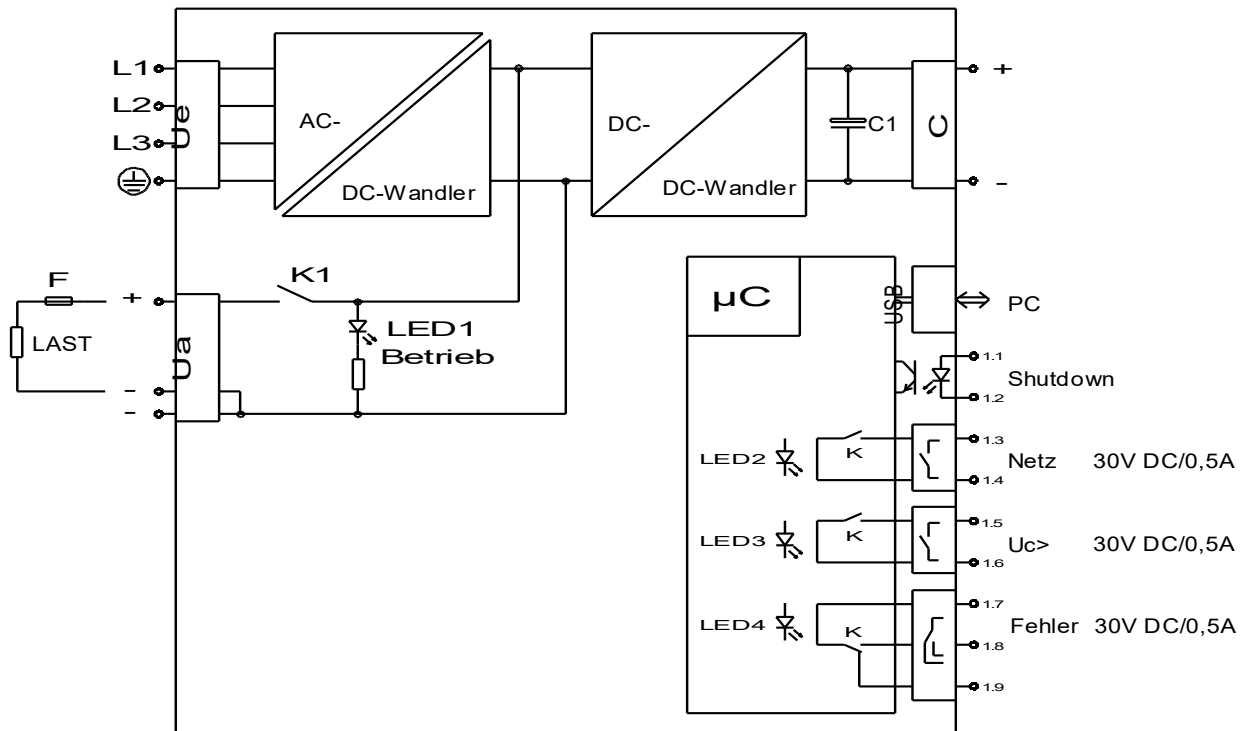
CAUTION

In case of overload the DC output current is composed of the maximum current of the DC – DC converter as well as of the current of the AC – DC converter. The output circuit must be fused externally to avoid an overload!

Operating Instruction

AC C-TEC 2420-8

3.3 Circuit diagram



Operating Instruction

AC C-TEC 2420-8

4 Putting into operation

The device is switched on by the switch on of the AC supply at the mains terminal.



REFERENCE:

If the devices are built in systems, in which over volages 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 msut be disconnected during the test)

4.1 Display and Messages

Display:	Meaning:	Message contacts:
Operation LED green	Illuminates at: - Mains voltage present at terminal UE - As long as the unit is internally supplies with energy.	-
mains ¹⁾ LED green	Illuminates at: - Mains supply present, means UE o.K.	Potential-free relay-contact, closer, max. contact load 30 V DC / 0,5 A
UC> ¹⁾ LED green	Illuminates at: - Energy in capacitor $\geq 80 \%$ Goes out: - If energy in capacitor $< 30 \%$ (The values refer to standard parameterization. This parameterization can be changed with the paraTEC-Software)	potential-free relay-contact, closer, max. contact load 30 V DC / 0,5 A
error ¹⁾ LED red	Illuminates at: - Overvoltage at the internal capacitor - Overvoltage at the output - Minimum capacity undercut	potential-free relay-contact, changer, max. contact load 30 V DC / 0,5 A
Shutdown	Shutdown of the UPS operation	Potential-free switch input, switch-ing level 24 V DC (6 - 40 V DC)

¹⁾ The signalling contact is coupled with the LED display.
When the LED is lit, the corresponding relay is energised.

5 Operation

5.1 Mains operation

Approximately 2 seconds after mains connection, the output voltage is released and the connected loads are supplied. The internal capacitors are also charged. This operating mode is indicated by the green 'Operation' LED and the green 'Mains' LED lighting up.

When the capacitor is almost charged the green LED 'Uc>' is lit.



REFERENCE

The charging time is extended if at the same time a large load current is required!

Operating Instruction

AC C-TEC 2420-8

5.2 Back-up operation

If the power supply fails or falls below the minimum input voltage, the **AC C-TEC** switches into buffer mode. The green 'Mains' LED goes out.

When the capacitor is almost discharged the green LED 'Uc>' goes out.

If the capacitor is no longer capable of buffering, the Ua is switched off and the 'Operation' LED also goes out.

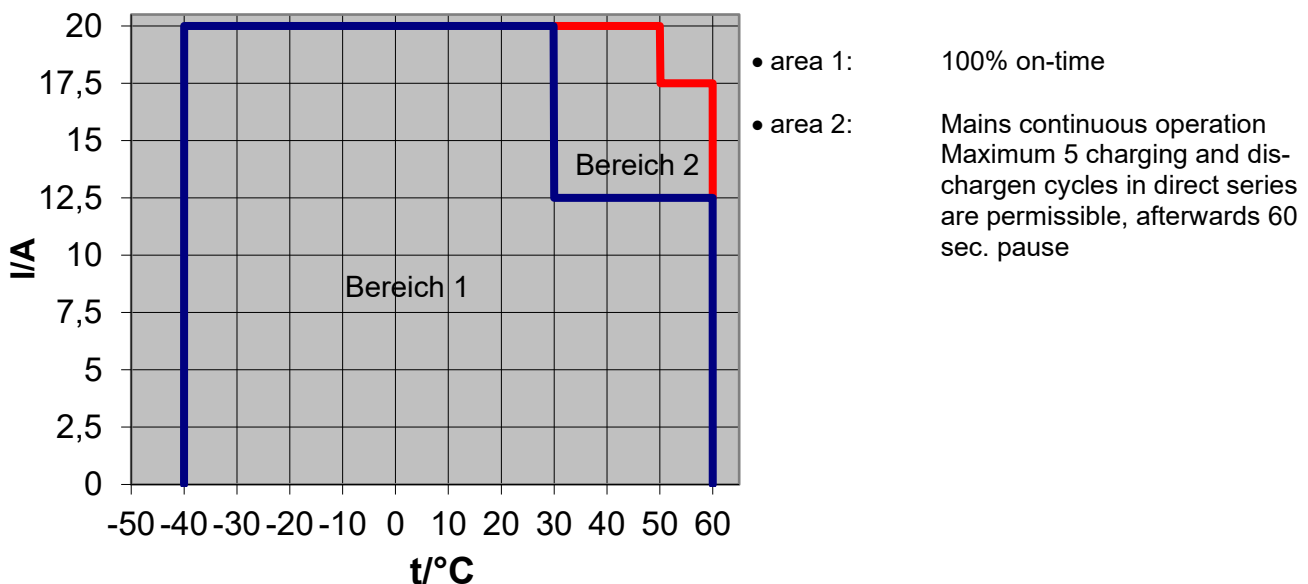
The red LED 'Error' has a general error signal function. The individual causes of faults are described under Section 4.1 Displays and messages described.

5.3 Back-up time (typical)

I_{output} Gerät	0,5 A	1,0 A	1,5 A	2 A	3 A	5 A	8 A	10 A	15 A	20 A
AC C-TEC 2420-8	657 s	346 s	236 s	179 s	121 s	72,8 s	44,4 s	35,2 s	22,4 s	15,5 s

5.4 Derating

The permissible operation mode depending on load current and ambient temperature.



5.5 Capacitor Test

A cyclic capacitor test during mains operation loads the capacitor. At the same time the voltage is measured. So a conclusion concerning the quality of the capacitors can be drawn. An aged capacitor which does not fulfill the requirements anymore is indicated with the illumination of the LED 'Fehler / Fault' (general error).

5.6 Shutdown

The back-up operation can be aborted in advance by feeding a +24 V control voltage at terminal 1.1 (+) and 1.2 (-) at the terminal strip 'I/O-1'. Hereby the connected loads are switched off in a defined state. Furthermore a rest-energy rests in the capacitor by the advanced switched off. So a subsequent charging of the capacitor is shortened. After a shutdown the switch on of the output is only made when the mains voltage returns.

6 Software

6.1 paraTEC-Software

The paraTEC Software is used for pc based parameterization of the device parameters.
A quick start instruction for software-installation and parameterization possibilities is available.
The software is available for all popular Windows operation systems.

6.2 TECControl-Software

The **TECControl** software enables a controlled process stop, the specific shut-down of a PC as well as the restart of the **C-TEC**.

An operational instruction for this software is available.

The software is also available for all popular Windows operation systems.

7 Maintenance

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

The device must be cleaned regularly depending on the degree of pollution.

8 Putting out of operation

The putting out of operation is realized by the switch off of the supply voltage.

To avoid the subsequent back-up operation and the discharge of the capacitors, the module can be switched off by activating the 'Shutdowns' (see item 5.6 Shutdown). Hereby 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.

WARNING

Even after the putting out of operation high energy can be stored in the internal stores of the device.

The voltage of the capacitors is also present at the output terminals +C / -C.

In case of short-circuit of the capacitors risk of strong heat generation and arcs!

9 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.

Operating Instruction

AC C-TEC 2420-8

10 Norms and Regulations

Total unit	EN 50178 EN 61010-1 / EN 61010-2-201 EN 62368-1 UL 508
EMC	EN 55011 / 1998 / Klasse A EN 61000-3-2 und EN 61000-3-3 / Klasse A EN 61000-6-2 EN 62040-2
Power HF-transmitter to ensure safe isolation primary/secondary	EN 61558 2-17 (VDE 0570 2-17)
Optocoupler to ensure safe isolation primary/secondary	VDE 0884

Operating Instruction

AC C-TEC 2420-8



J. Schneider
Elektrotechnik

11 Technical Data

Input	
Nominal input voltage	400 V AC -15% / 500 V AC +10%
Input voltage range	340 V – 550 V AC
Nominal frequency	45 – 66 Hz
Rated input current	0,95 A AC (U _e = 400 V AC)
Max. pre-fusing	3 x 2 A (T)
Max inrush current	32 A / 0,5 ms
output	
Nominal output voltage (in mains operation)	24,6 V DC ± 2,0 %
Nominal output voltage (in back-up operation)	23,2 V DC ± 2,0 %
Max. nominal output current (in mains operation)	17,5 A DC @ 60 °C 20,0 A DC @ 50 °C
Max. nominal output current (in back-up operation)	17,5 A DC @ 60 °C 20,0 A DC @ 50 °C
Max. power loss 'worst-case'	65 W (U _a = 24,0 V DC)
Energy	8 kJ
Back-up time	344 s @ 1 A / 12 s @ 20 A
In general	
Leackage current	< 3,5 mA
Parallel operation	Yes
Serial operation	Yes
Protective system	IP20
Operational temperature	-40 ... 60 °C
Storage temperature	-40 ... 70 °C
Relative humidity	< 95 % non-condensing
Max. mounting heigth	2000 m above sea level
dimensions (H x W x D)	192,5 mm x 170 mm x 198 mm
weight	3,5 kg