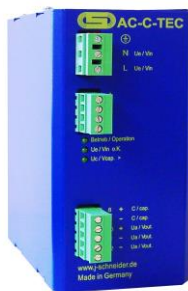


Operating Instruction

AC C-TEC 1203



DC-UPS

NCPA0724G10***

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Device designation	Note	Art.-No.:	Nominal input voltage	Nominal output voltage
AC C-TEC 1203-1	Standard device 1 kJ	NCPA0724G10002	115-230 V AC	12 V DC

Operating Instruction

AC C-TEC 1203

1. In 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. Commissioning and maintenance may only be carried out by qualified personnel. The disregard may cause loss of all guarantee and warranty claims.

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! 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.



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!



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 unit is developed for protective class I and has protective system IP20. The operation is only permissible in dry rooms and closed cabinets. The unit is designed for pollution 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 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
- Capacity extension possible with external capacitor extension modules

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 10 Technical Data). The devices must be protected against humidity and direct sunlight.

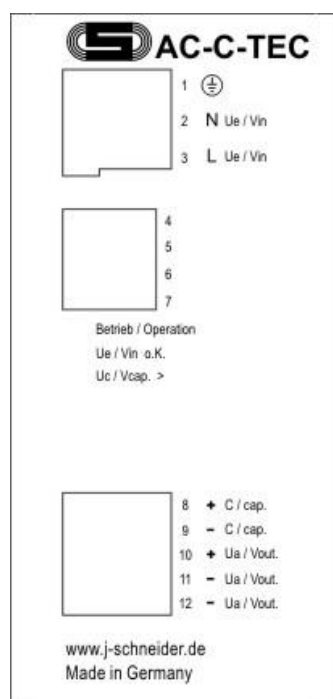
3 Installation and connection

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 40mm 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.

The specific environmental temperature may not be exceeded. The maximum installation height without load reduction amounts 2000 m above sealevel.



Reference

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

Risk of short-circuit!



Reference

The unit is a built-in unit. The operation is only permissible in closed cabinets of housings. The unit is designed for pollution degree 2. 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.

Snapp fixation for 35 mm top hat rail:
DIN EN 50022 (NS 35 x 15 / 7,5 mm)

Mounting height: 157 mm
Mounting width: 72 mm
Mounting depth: 139 / 149 mm
(without / with terminals)

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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 terminal allocation). Not used connection screws must be tightened. When connecting the consumers, pay attention to the polarity "+" and "-". The mains voltage must be switched off and secured against being switched on again by third parties. The de-energised mains cable must be connected to the mains terminal provided for this purpose, observing the mains phase. The mains connection is made at terminals "L", "N" and PE (). The operating earth must also be connected.

Terminals			Connection	
Designation	Max. tightening torque/Nm	Cable cross section/mm²		
L, N, PE(⊕)	0,4	0,5 – 2,5	Input voltage	
U _e / V _{in} o.K. (4 = COM, 5 = NO)	0,4	0,1 – 2,5	Message contact U _e / V _{in} o.K.	Maximum contact load: 30 V DC/0,5 A (potential-free relay contact)
U _C / V _{cap.} > (6 = COM, 7 = NO)			Message contact U _C / V _{cap.} >	
+ C / cap. – C / cap.	0,4	0,5 – 2,5	CEM-Module	
+ U _a / V _{out.} – U _a / V _{out.}	0,4	0,5 – 2,5	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.

	REFERENCE The external energy supply must be connected to a circuit with an own, specially marked fuse (16A). From this fusing up to the supply point of the low voltage side of the electrical mains (house connection box) it may be fused only one another time. It must be excluded, that the circuit tot he external energy supply is interrupted because of the switch off of other means of production.
	REFERENCE 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!
	DANGER The unit is prepared for protective system I (protective earthing). The operational earth must absolutely be connected. In case of non-observance touchable parts could carry voltage in case of error. Danger of fatal electric shock.

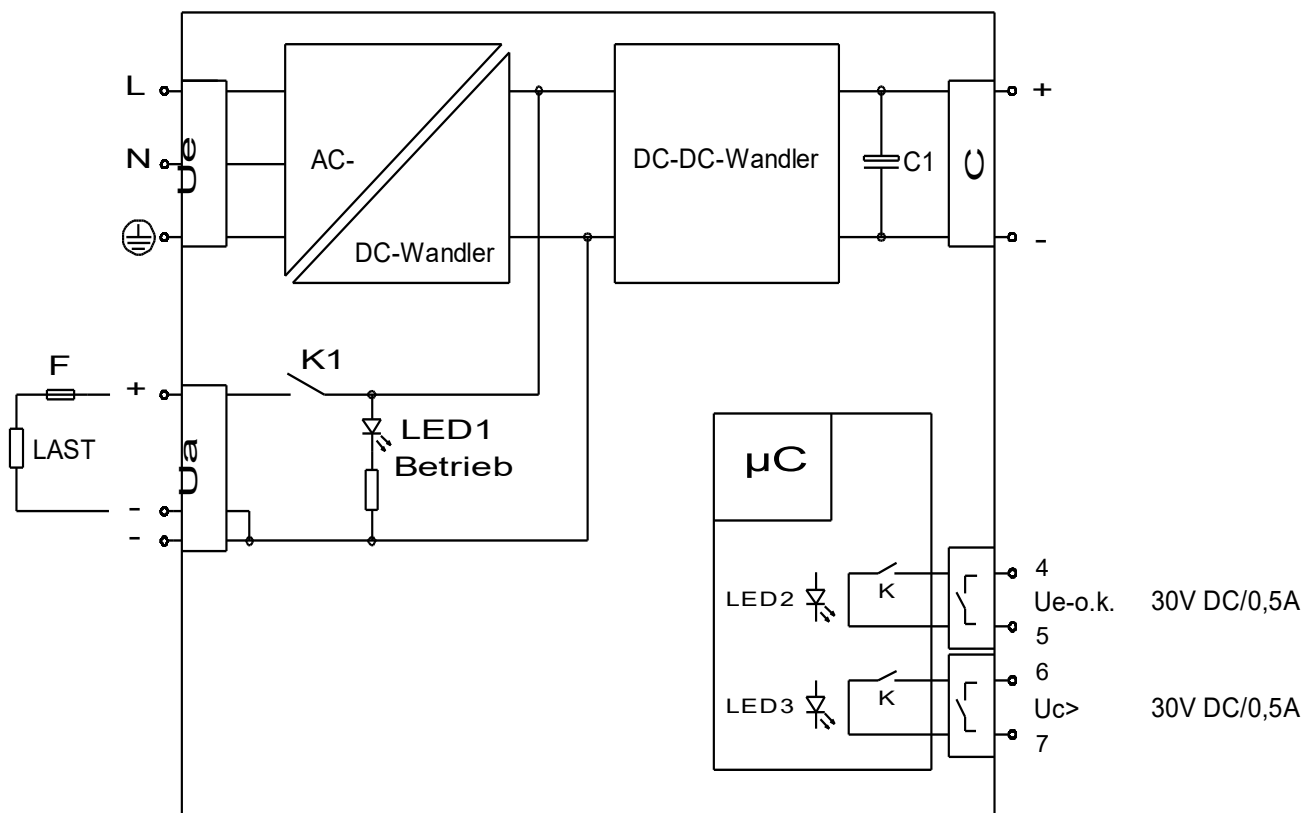
Operating Instruction

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3.3 Circuit diagram



4 Putting into operation

The power supply is switched on by the switch on of the mains voltage (230 V AC). The status-LED „Ue-O.k.“ illuminates

	DANGER Prior to the first switch on check the connections. The electrical connections must only be done in voltage-free status. The non-observance may cause a touch of energized parts. Risk of fatal electric shock!.
	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.)

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4.1 Display and messages

Inside the housing there are four LED's for status display:

Display	Designation
Oeration	LED green illuminates: - if input voltage is present at terminal U _e - as long as the device is supplied internally
U _e -OK	LED green illuminates: - if mains operation U _E > U _{Emin}
U _c >	LED green: - is blinking slowly (0,8 Hz): In case of charging of the capacitors up to 80 % - illuminates: If the energy in the capacitor is > 80 % Message contact is closed. - goes out: If the energy in the capacitor is < 30 % Message contact is opened. - is blinking fast (3,2 Hz): If the capacitor is nearly discharged, output is switched off (keeps on blinking until it is totally discharged)

(The LED-displays are coupled with corresponding message contacts.)

(The values refer to a standard parameterisation.)

5 Operation

5.1 Mains operation

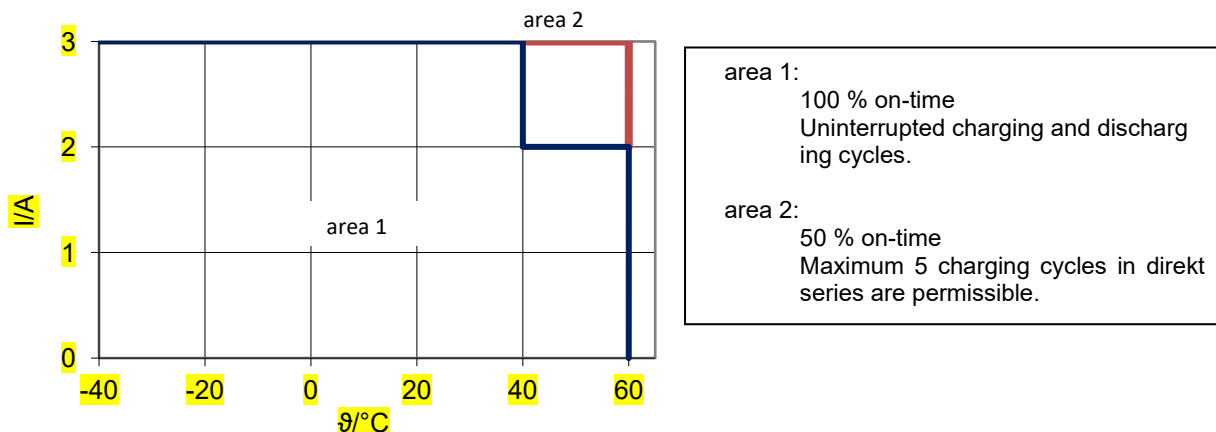
After the switch on of the input voltage U_e the internal energy storage is charged.

Mains operation is signalled by the LED **U_e-OK**.

The charging is signalled by a slow blinking of the LED **U_c>**. If the capacitor is nearly charged, the LED **U_c>** is permanently illuminating, the corresponding relay is activated and U_a is released. A charging voltage which is too low is signalled by fast blinking of LED **U_c>**.

5.2 ON-Time

For the examination of the on-time only the charging and discharging cycles of the capacitors are relevant. If the back-up module is charged and works in standby mode, no warming of the energy storage occurs.



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5.3 Back-up operation

With the switch off of the input voltage respectively with the underrun of the minimum input voltage, the C-TEC switches over in back-up operation. The green LED **Ue-OK** goes out.

If the capacitor is nearly discharged, the LED **Uc>** goes out.

If the capacitor is no longer able to buffer, the output terminal U_a is switched off.

Until the internal voltage supply breaks down, the LED **Operation** and the LED **Uc>** are blinking fast.

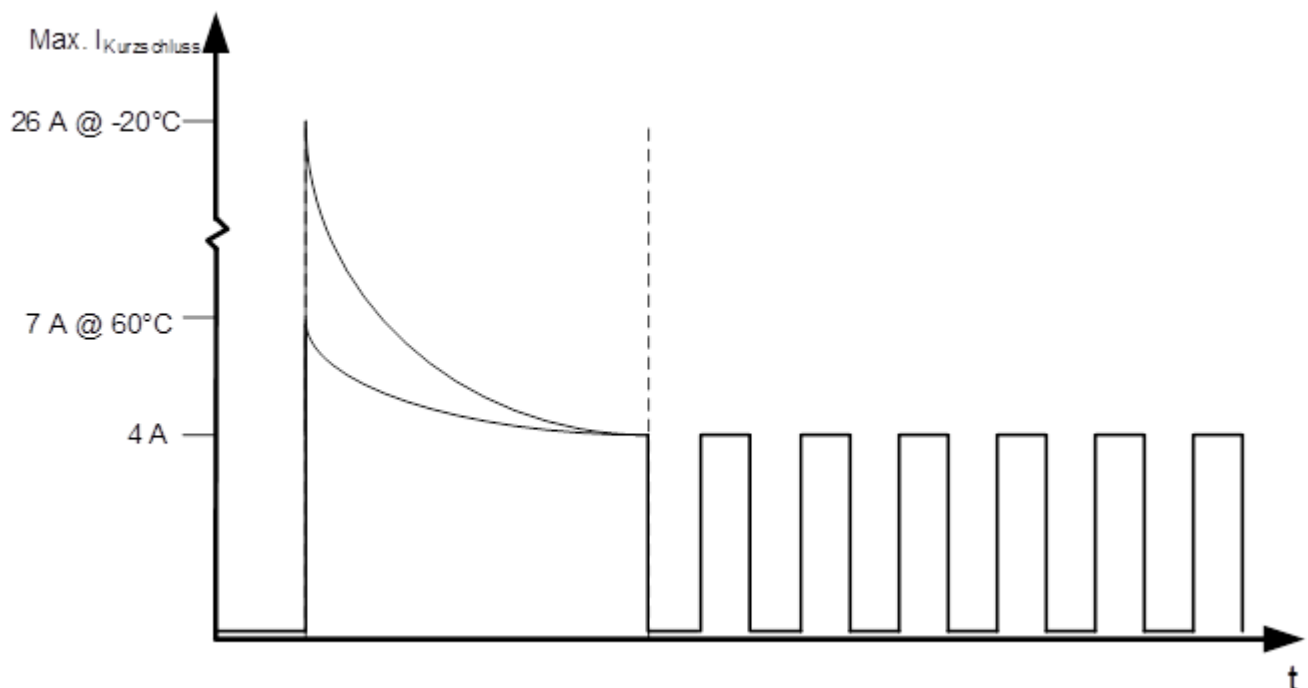
5.4 Back-up Time (typical)

I_{Output}	0,5 A	1,0 A	1,5 A	2 A	3 A
Device					
AC C-TEC 1203-1	237,6 s	121,2 s	76,8 s	57 s	36 s

5.5 Short-Circuit

The unit limits the short-circuit current. The maximum short-circuit current depends on the ambient conditions and the operating state.

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



The unit limits the short-circuit current. The maximum short-circuit current depends on the ambient conditions and the operating state.

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

6 Maintenance

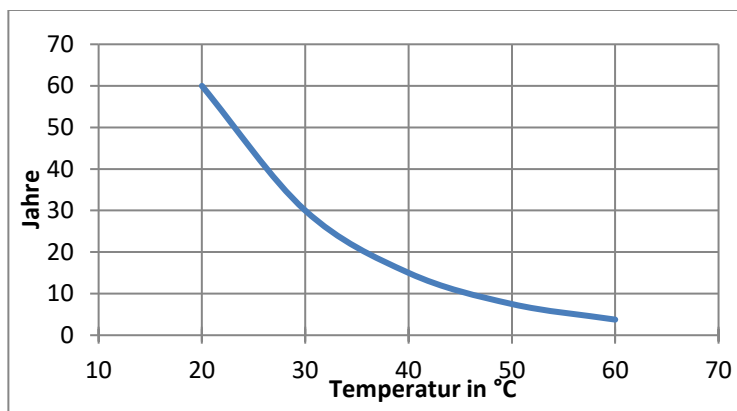
Inside the housing there are no parts, which should be maintained by the user.

To ensure the back-up capability of the power supply, the units should be tested regularly in intervals of 3 to 6 months on their back-up capability.

The housing must be cleaned at least 1 time per year, depending on the degree of pollution.

6.1 Life duration of the capacitors

The life duration of the capacitors depends on the temperatures. The end of the life duration is reached, if the capacity drops down to 70% of the nominal capacity.



picture 1: life duration depending on temperature

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7 Putting out of operation

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

Subsequently the device buffers the load until the capacitors are discharged. Directly after the discharge the voltage-free output is signaled by the illumination of the LED **Operation** and the fast blinking of the LED **Uc>**.

The LED's go out when the rest of the energy of the capacitors is used.



VORSICHT

Während des Betriebs ist das Lösen oder Herstellen von elektrischen Verbindungen untersagt!
Bei Nichtbeachten besteht die Gefahr von Lichtbögen an den Leitungen, die zu Verbrennungen führen können.

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 according to EN 60204-1
Ermited 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 (Static discharge ESD) 8kV/6kV EN 61000-4-3 (electromagnetic fields) 10V/m 27 – 1000MHz 3V/m 1400 - 2700MHz EN 61000-4-4 (fast transients / Burst) DC IN, DC OUT 2kV others 1kV EN 61000-4-5 (Stoßstrombelastung / Surge) DC IN 0.5kV EN 61000-4-6 (conducted noise immunity) 10V 150kHz – 80MHz EN 61000-4-11 (voltage interruptions) back-up with ultra capacitors
Total unit	EN 50178 EN 61010-1 / EN 61010-2-201 EN 62368-1
	UL 508 / C22.2

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10 Technical Data

Input	
Nominal input voltage	115 V...230 V AC $\pm 15\%$
Nominal input voltage rang	97,8 V...264,5 V AC $\pm 0\%$
Nominal frequency	47 Hz...63 Hz
Nominal input current	0,84 A @ 115 V AC 0,42 A @ 230 V AC
Max. inrush current	30 A / 2 ms
Output	
Nominal output current	3 A -13 % +9 %
Nominal output voltage (in mains operation)	12,3 V DC $\pm 2\%$
Nominal output voltage (in back-up operation)	11,5 V DC $\pm 2\%$
Energy1t (typical)	1,5 kJ @ ($U_a = 11,5$ V DC, $I_a = 0,6$ A)
Current limitation	See section 5.5 short-circuit
Max power loss ,worst-case'	12 W
efficiency	88 % @ ($U_e = 230$ V AC; $U_a = 12,3$ V DC; $I_a = I_{Nenn}$)
fusing	
Internal device protection	2 A (T), 250 V
fusing DC-outipit (extern)	3,15 A (T)
General	
Protective system	IP20
Operational temperature	-40 °C...60 °C
Storage temperature	-40 °C...60 °C
Rel. humidity	$\leq 95\%$ no condensation
Max. mounting heigth (without load reduction)	2000 m
dimensions (HxWxD)	157 mm x 72 mm x 139 mm
weight	0,9 kg