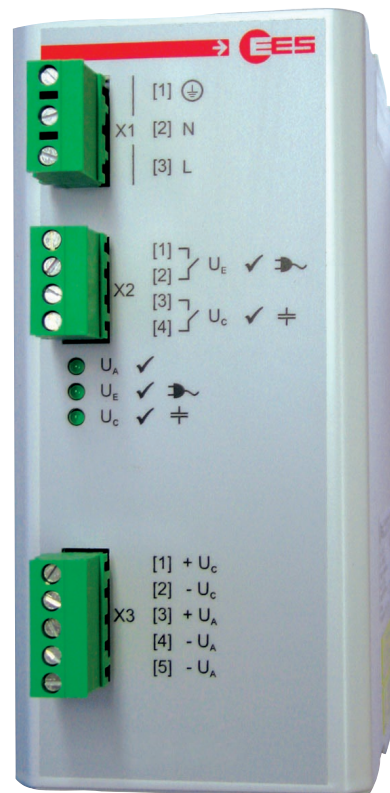




# Fail-safe power supplies for unsecured power nets



## → CBS - Capacitor Backed Power Supply

- › Capacitor buffered 24 V power supply unit
- › Maintenance-free by long-lasting ultra capacitors
- › Microcontroller supported loading and unloading of the ultra capacitors
- › High life time: 30 years@30° degrees Celsius
- › 500 J energy storage for a buffer time of e.g. 3 min @ 100 mA / 23.5 V load
- › Broad range voltage input 115 ... 230 V AC
- › Operation and loading state monitoring by 2 potential-free contacts and 3 LEDs
- › Operation temperature range: -20 ... +60° C
- › Mounting onto DIN rail TS35

→ [Datasheet](#)

SV-CBS-DB-UK-002

**→ Technical description**

The buffered dc power supply of the type CBS has internal ultra capacitors as an energy storage. In normal operation when input voltage is available the unit supplies the attached DC consumers and contains the charge of the capacitors. At an interruption of the input voltage the energy of the ultra capacitors is released regulated. By a DC-DC converter the load is buffered until it is unloaded. The buffer time is dependent on the state of charge of the capacitors and the discharging current.

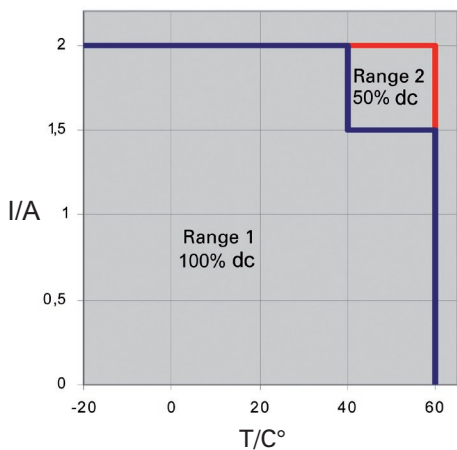
After switching on the input voltage the capacitor is loaded first. When the capacitor is almost fully loaded the output voltage is being released. The loading sequence of the capacitor can last for 25 -30 s. By switching off the input voltage or by falling below the minimum input voltage the CBS changes into the buffering mode that the supplied plant e.g. can be run to a defined condition or a alarm report can be generated. If the capacitor is no longer buffer capable, the output voltage is switched off.

The buffer time to be expected can be calculated with the following formula:

$$\text{Buffer time in s} = \frac{\text{effektive buffer capacity in Ws}}{\text{output current} \times \text{output voltage}}$$

Example:

$$12.8 \text{ s} = \frac{450 \text{ Ws}}{1.5 \text{ A} \times 23.5 \text{ V}}$$



Only the loading and unloading cycles of the capacitors are relevant for the analysis of the switching on duration. When the buffer module is fully loaded and works in the stand-by mode the device is not warming up noticeably. This case has to be equated thermally therefore with a device turned off.

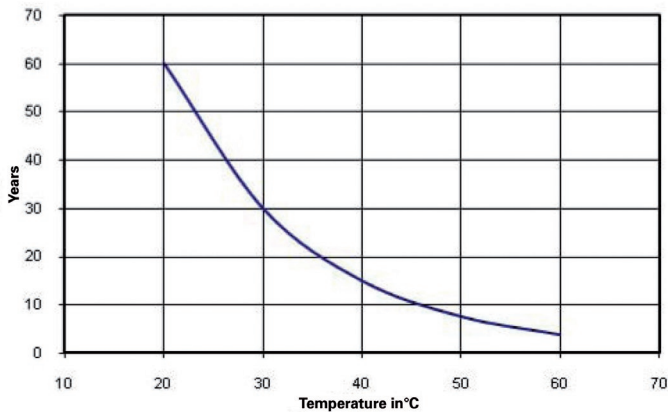
**Range 1: 100% duty cycle**

Uninterrupted loading and unloading operation permitted.

**Range 2: 50% duty cycle**



Five loading-unloading cycles in a direct sequence are permitted.

Duty cycle in dependency of the load current and ambient temperature



The life time of the capacitors is temperature-dependent! The life time is reached if the capacity is decreased to 70 % of the nominal capacity.

Dependency of the life time and the ambient temperature

LED / Colour Description	Meaning	Assigned relay contact
U <sub>A</sub> ✓	<b>Operation</b> <b>Steady light -</b> Input voltage available and respectively device is being supplied internally with energy. <b>Off -</b> No input voltage or capacitor load exhausted	
U <sub>E</sub> ✓ 	<b>Operation</b> <b>Steady light -</b> Input voltage available ( $U_E > U_{Emin}$ ) <b>Off -</b> No or too less input voltage	<b>Relays mains voltage</b> Potential free relays-contact, NO design, max. load on contact 30 V DC / 0.5 A <b>Contact closed -</b> Input voltage available ( $U_E > U_{Emin}$ ) <b>Contact open -</b> No or too less input voltage
U <sub>C</sub> ✓ 	<b>Capacitor storage</b> <b>Steady light -</b> Energy stored in capacitor > 80 % <b>Off -</b> Energy stored in capacitor < 30 % <b>Flashing light slow (0.8 Hz) -</b> Loading of capacitors up to 80 % of the energy <b>Flashing light fast (3.2 Hz) -</b> Unloaded capacitor (Device is in self-supplying mode)	<b>Relay capacitor storage</b> Potential free relays-contact, NO design, max. load on contact 30 V DC / 0.5 A <b>Contact closes -</b> Energy in capacitor has reached more than 80 % <b>Contact opens -</b> Energy in capacitor has dropped below 30 %

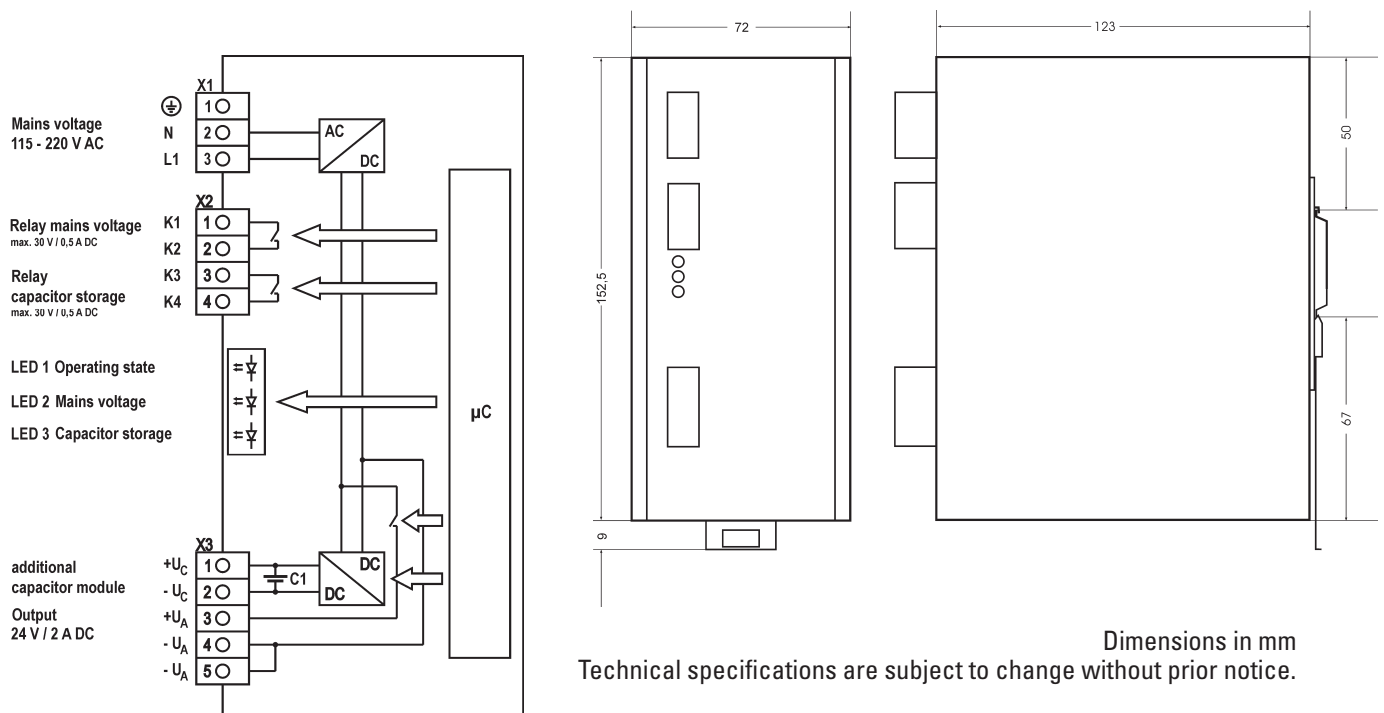
→ **Technical data**

Nominal input voltage	115 ... 230 V AC
Input voltage range	97.75 V – 264.5 V AC 115 V AC – 15% 230 V AC +15%
Input frequency	47 ... 63 Hz
Nominal input current	0.84 A @ 115 V AC 0.42 A @ 230 V AC
max. switch-on current	30 A / 2 ms
Current limitation	2,1 ... 3 A
max. dissipation 'worst-case'	12 W
Degree of effectiveness	88 % @ U <sub>e</sub> =230 V AC U <sub>a</sub> =24.3 V DC, I <sub>a</sub> = 2 A
<b>Mains operation</b>	
Output voltage	24.3 V DC ± 2 %
Output nominal current	2 A DC (with nominal capacity) 3 A DC (with reduced capacity)
<b>Buffer mode</b>	
Output voltage	23.5 V DC ± 2 %
effective buffering capacity	450 Ws / 900 Ws

# CBS-CAPACITOR BACKED POWER SUPPLY

<b>Fuse protection</b>	
Input	2 A (slow blow) (internally)
DC- output circuit	2 A (slow blow) (externally)
<b>Connection terminals</b>	
pluggable	
<b>Cross wire section rigid or flexible</b>	
without wire sleeves	0,2 ... 2,5 mm <sup>2</sup>
with wire sleeves	0,25 ... 2,5 mm <sup>2</sup>
<b>Load on relay contacts</b>	
30 V DC / 0,5 A	
<b>Protection class</b>	
IP 20 and DIN EN 60529:2000-09	
Weight	0,85 kg
Storage temperature	- 20°C ... + 60°C
Operation and ambient temperature	- 20°C ... + 60°C
Mounting	C-DIN rail TS35 acc. to DIN EN 60715:2001-09
Dimensions (H x W x D) [mm]	152.5 x 72 x 143 (incl. terminals)

## → Terminal assignment / Dimensional drawing



## → Ordering code

Article number	Typ	effective buffer capacity
98CBS2402500	CBS 2402-500	450 Ws
98CBS2402100	CBS 2402-1000	900 Ws

## → Contact

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