

Operation Instructions

“PowerToStore”

Art.-Nr. 15.06.405

device designations	comments	art. no.	nominal input voltage	nominal output voltage
PowerToStore	Standard unit 1kJ	15.06.405	115-230 V AC	24V DC



Safety regulations

The operation instructions must be read carefully before use respectively installation of the unit, the general information must be followed. The disregard may cause the loss of all guarantee and warranty claims!

- ◆ The installation, start-up and maintenance may only be done by trained personnel!
- ◆ The valid VDE-Regulation, especially DIN VDE 0100 and EN 60204 are to be respected!
- ◆ Supply and outgoing feeder must be calculated and fused in a sufficient way (values look at point 3.1)!
- ◆ The unit is a built-in device. The operation is allowed only in dry rooms.
- ◆ The allowed environmental temperature range is to be respected!
- ◆ The unit may only be opened by qualified personnel!
- ◆ In case of failure we recommend to send the unit back to the manufacturer.
- ◆ Also long time after the release of the **PowerToStores** big energy may be stored inside the unit!
Before disassembling the unit, the capacitors must be checked. If the capacitors are short-circuited there is danger of heat and firebrands!

The disregard of the safety regulations may cause perilous injuries!

1. Short description

The DC buffer power supply in the **PowerToStores** range uses an ultra capacitor as energy storage. These Capacitor will be charged in normal operation through AC-Net. The connected DC-load will be provided from AC-Net as well. In case of interruption of the dc supply the energy of the capacitors is released. The load will be fed by an DC-DC-converter until it is discharged. The back-up time depends on the state of charge of the capacitors and on the discharge current.

The **PowerToStores** has the following features:

- maintenance-free because of long-life ultra capacitors
- microcontroller based charging and discharging of the ultra capacitor
- control of operation and state of charge with potential-free contact and LED's
- limited compatible with the **TECControl**-Software
- capacity is extendable through external capacitor modules (CEM)

2. Norms and regulations

terminal voltage	SELV / PELV according to EN 60950 / EN 50178	
emitted interference:	EN 61000-3-2 and EN 61000-3-3 class A EN 55011 class B EN 62040-2	
interference resistance: EN 61000-6-2	EN 62040-2	
	EN61000-4-2 ((static discharge ESD)	8kV/6kV
	EN61000-4-3 ((electro magnetic fields)	10V/m 27 – 1000MHz 3V/m 1400 - 2700MHz
	EN61000-4-4 (fast transients / burst)	DC IN, DC OUT 2kV others 1kV
	EN61000-4-5 (surge)	DC IN 0.5kV
	EN61000-4-6 (conducted stability)	10V 150kHz – 80MHz
	EN61000-4-11 (voltage drops)	bypass by Ultracapacitors
total unit	EN 50178 / EN 60950	

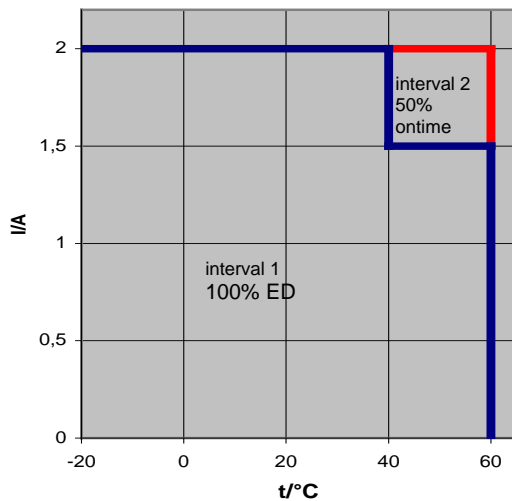
3.1. Technical Data

nominal input voltage	115-230 V AC
input voltage range	97,75-264,5 V AC 115V AC-15% 230V AC+15%
input frequency	47-63Hz
nominal input current	0,84 A-115V AC 0,42 A-230V AC
max. inrush current	30A / 2ms
output voltage in mains operation	24,3V DC±2%
output voltage in buffer operation	23,5V DC±2%
nominal output current	2A DC (with rated capacity) 3A DC (with reduced capacity)
Current limitation	1,05...1,5 x I _{ARated}
coefficient U _e =230V AC U _a =24,3V DC, I _a = I _{ARated}	88%
max. power loss 'worst-case'	12W

fusing input	2A T (internal)
fusing DC- output circuit	3,15A T (external)
type of connection input 'U _E '	Spring balancer max. 2,5mm ²
type of connection output 'U _A '	Spring balancer max. 2,5mm ²
type of connection messages 'I/O'	Spring balancer max. 1,0mm ²
protective system	IP 20 and EN 60529
weight	0,85kg
storage temperature	-20...60°C
environmental temperature	-20 - 60°C
dimensions	152,5 x 72 x 130mm (H x W x D)

3.2. On-time

on-time depending on load current and environmental temperature



For the duration of on-time only the charge and discharge cycles are relevant. If the buffer-module is charged and works in the standby-modus there is no heating of the unit. From the thermal point of view this can be compared with a switched-off unit.

interval 1: 100% on-time Un-interrupted charge and discharge operation permissible.

interval 2: 50% on-time five charge- and discharge-cycles in direct series permissible.

3.3 Calculation of the back-up time

The possible back-up time can be calculated with the following principle:

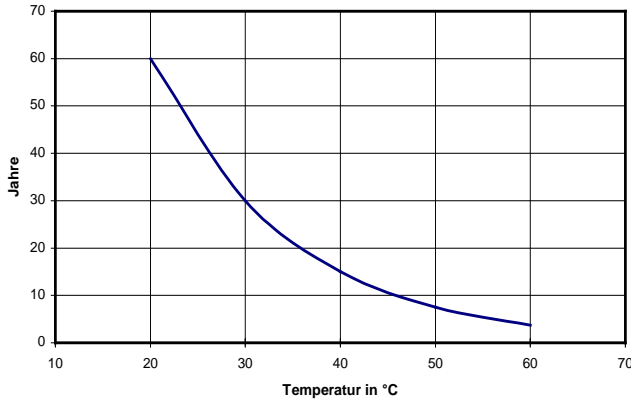
$$\text{back-up time in sec.} = \frac{\text{energy of the capacitor in J} \times \eta}{\text{output current} \times \text{output voltage}}$$


example:

$$12,8 \text{ Sec.} = \frac{500 \text{ J} \times 0,9}{1,5\text{A} \times 23,5\text{V}}$$

In case of long back-up times, a self-consumption of approximately 50mA must be regarded!

3.4 Life duration of the capacitors





The life duration of the capacitors depends on the temperature!
The end of the life duration is reached, when the capacity drops below 70% of the nominal capacity.

3.4 Display and message outputs

operation	LED green, illuminates at: system voltage present on terminal U _E respectively as long as the unit is supplied internally with energy	-
U _E -o.k. ¹⁾	LED green, illuminates at: external supply is present: • U _E > U _{SYSTEM}	potential-free relay-contact, changer, max. contact load 30 V DC/ 0,5A
U _C >	LED green, illuminates at: energy in the capacitor > 80% LED green, expires at: energy in the capacitor < 30% LED is blinking slowly (0,8Hz): during charging the capacitor until 80% of the energy LED is blinking fast (3,2Hz): if the capacitor is discharged (unit only supplies itself (values refer to standard parameterisation)	potential-free relay-contact, closer, max. contact load 30V DC/ 0,5A relay contact is closed if: energy at capacitor > 80% relay contact is open if: energy at capacitor < 30%

1) The message contact is coupled with the LED-display. When the LED illuminates the corresponding relays is tightened.

4. Installation

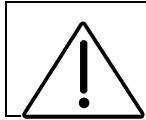
The power supply must be installed in that way that the necessary cooling is guaranteed. A minimum distance from the cooling vents to neighbouring devices of $\geq 40\text{mm}$ must be observed. The device must be built-in in the way that sufficient air circulation is ensured. The specified environmental temperature must not be exceeded. The max mounting height without power derating is 1000m above NN. During the installation the unit must be covered if drilling chips may fall on respectively into the unit. **(danger of short-circuit!)**

5 Connection

Before connecting the values of the dc supply must be compared with the values on the type plate. Connection according to the designation of the connection terminals. (look at circuit diagram and terminal assignment).

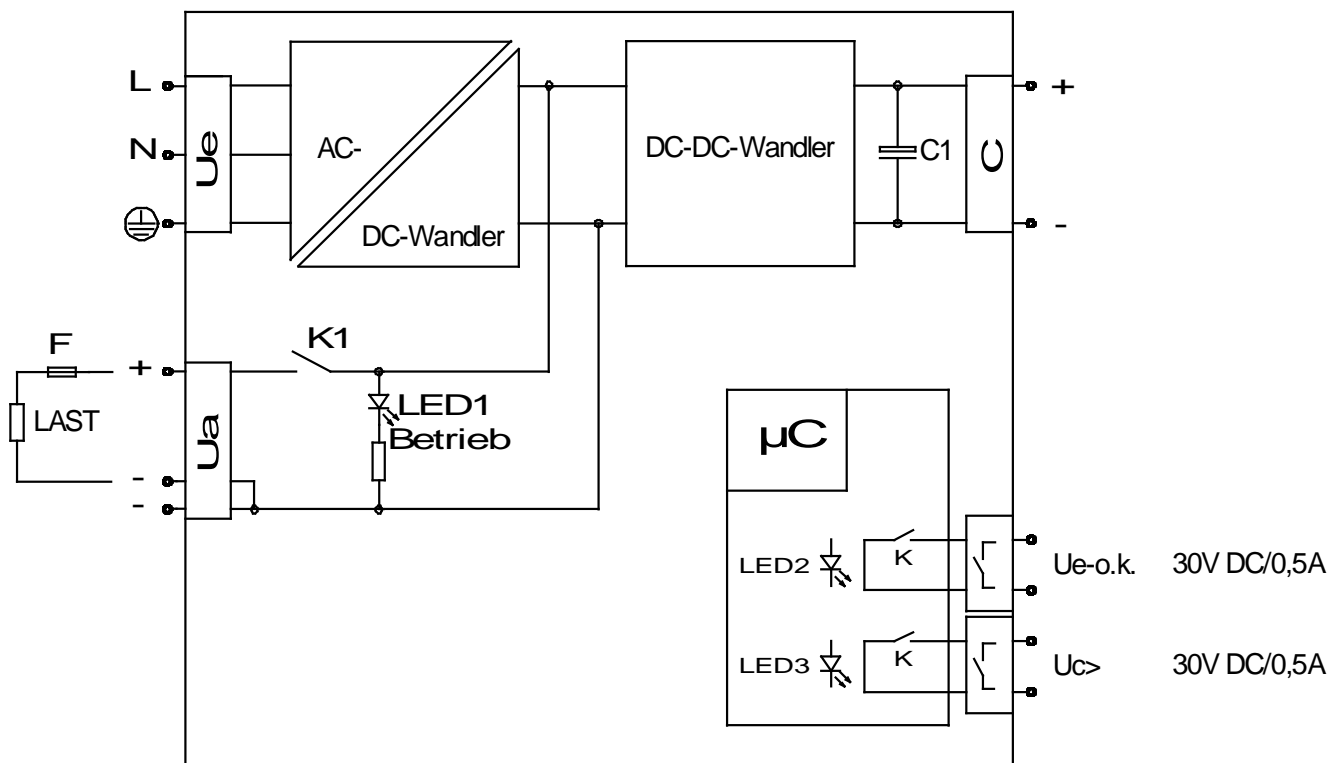
connection:	terminal:
AC-input	terminal 'Ue' L, N, \oplus
DC-output (consumer)	terminal 'Ua' +, -, -
capacitor module (optional)	terminal 'C' +, -

connection:	terminal:
message 'Ue-o.k.''	terminal 'contact symbol (closer) Ue-o.k.'
message 'Uc>'	terminal 'contact symbol (closer) Uc>'



In the case of overload, the DC output current comprises the maximum current of the DC-DC-converter and the current of the supporting AC-DC-converter. To prevent overload of the DC output circuit, the circuit is to be protected externally ! (Value see Section 3.1)

6. Principle circuit diagram



7. Putting into operation

The unit is switched on by the application of the mains supply. The LED 'Ue-o.k.' illuminates.



**If the units are built-in into systems, for which Overvoltages for testing are required (for example according EN60204-1 / VDE0113 part1 19.4 voltage examination), the unit must be separated from the test assembly before switching on the voltage.
(Original text EN60204-1 : parts, which are not dimensioned for this testing voltages must be disconnected during the testing.)**

Before switching on the unit for the first time, please verify the connections! Realize electrical connections only when the unit is un-energized!

8 Operation

After switching on the Ui the capacitor is charged. The LED 'Ue-o.k.' illuminates. The charging is indicated with slow blinking of the LED 'Uc>'. If the charging voltage is too low the LED 'Uc>' is blinking fast. If the capacitor is nearly charged the LED 'Uc>' illuminates without interruption and the Ua is released. When the supply is switched off respectively when the minimum input voltage is under-run, the PowerToStore switches over to back-up operation. The green LED 'Ue-o.k.' expires. If the capacitor is nearly discharged, the LED 'Uc>' expires. If the capacitor has no back-up capacity anymore, Ua is swichted off. Until the internal voltage supply breaks down, the LED 'Betrieb' illuminates and the LED 'Uc>' is blinking in a fast way.

9. Putting out of operation

Putting out of operation is realized by the switch-off of the supply voltage. The device supplies the load until the capacitors are discharged. Directly after the discharge the voltage-free output is indicated by the illumination of the LED 'Betrieb' and fast blinking of the LED 'Uc>'. The LED's expire when the capacitor is totally discharged.



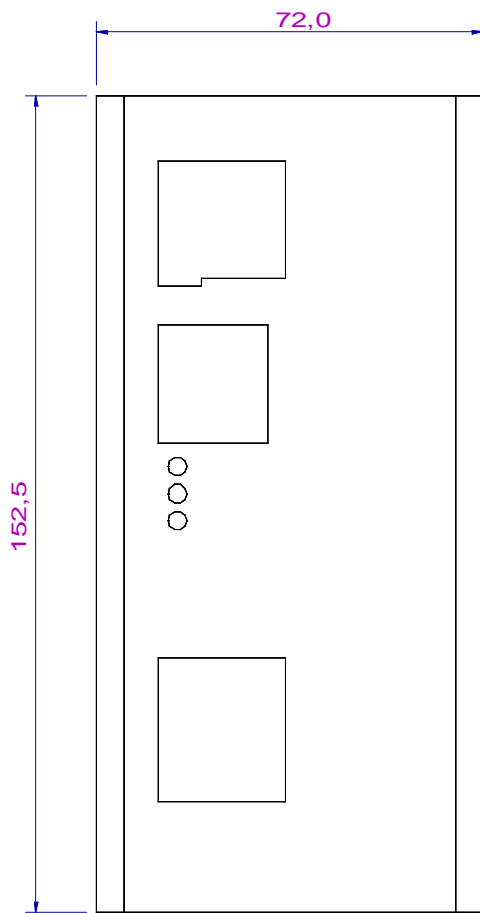
Never undo electrical connections whilst the unit is in operation! It also not permitted to make electrical connections whilst the unit is in operation!

11. Maintenance

There are no parts within the unit which should be maintained by the user.
The unit should be cleaned regularly depending on the degree of soiling.

12. Installation drawings

snap mounting for 35 mm standard profile rail
DIN EN 50022 (NS 35 x 15 / 7,5mm)



mounting depth 130mm