Operation Instructions

"**AKKU***TEC* 2405 USB"

NBPA0616G01

device designation	notes	art.no.	nominal input voltage	nominal output voltage
AKKU*TEC* 2405-0 USB	standard device, single module	NBPA0616G01001	115-230V AC	24V DC
AKKU*TEC* 1205-0 USB	standard device, single module	NBPA0616G01002	115-230V AC	12V DC
AKKU*TEC* 4803-0 USB	standard device, single module	NBPA0616G01003	115-230V AC	48V DC

Technical modifications possible**!**

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Reg.-Nr. 2750

Safety regulations

- The operational instructions must be read and followed before the use respectively the installation of the device! In case of non-observance guarantee and warranty claims are no longer valid!
- The installation, putting into operation and maintenance may only be done by qualified personnel.
- The valid VDE-regulations, especially DIN VDE 0100 and EN 60204 are to be respected!! Incoming and outgoing feeders must be dimensioned and fused sufficiently (values see chapter 3.1)!
- The unit is a mount-in device. The operation is only permissible in dry rooms.
- The allowed environmental temperature range is to respected!
- **Only the battery types specified for the unit are permitted to be used!**
- **Battery replacement is only to be made with the unit un powered!**
- **On the connection of external backup batteries, battery protection must be provided by the user! In this case the protection components (overload and short circuit protection!) must be installed as close as possible to the set of batteries for safety reasons!**
- **On the usage of batteries, sufficient air flow in accordance with VDE 0510, part 2 must be ensured.**
- **Never connect together new and used batteries, or batteries of different types, or from different manufacturers!**
- The unit may only be opened by qualified personnel. In case of failure we recommend to send the unit back to the manufacturer.

The disregard of the safety regulations may cause perilous injuries.

1. Concise description

The battery backed DC power supply in the **AKKU***TEC* range uses the standby-parallel principle of operation and, in conjunction with a lead accumulator, ensures that the DC power supply is reliably maintained in the case of a mains power failure. The back - up time depends on the state of charge of the accumulator and the discharge current.
The power supply has the following features:

- battery charger system with I/U charging characteristics
- micro controller-based battery management
- Temperature compensation for charging voltage by means of external sensor module (optional module).
- USB interface with appropriate driver unit and *TEC***Control** Software of J. Schneider, message contacts may be controlled and a shut down/re-start can be effected.

2. Norms and regulations

power- HF- transmitter to ensure a safe separation primary / secondary	EN 61558 2-17 (VDE 0570 2-17)	
opto coupler to ensure a safe separation primary / secondary	VDE 0884	
emitted interference	EN 61000-3-2 and EN 61000-3-3 class A EN 55011 class B	
interference resistance: EN 61000-6-2		
	EN61000-4-2 (static discharge ESD)	(4kV)
	EN61000-4-3 (electromagnetic fields)	(10V/m)
	EN61000-4-4 (fast transients / Burst)	input (2kV) output (1kV)
	EN61000-4-5 (Surge)	mains (2 / 4kV) output (0,5kV)
	EN61000-4-6 (conducted interference resistance)	10V, 150kHz – 80MHz
	EN61000-4-11 (voltage drops)	back-up with accumulator
total unit	EN 50178 / EN 60950	

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3.1. Technical Data

nominal input voltage	115-230V AC
input voltage range	97,75-264,5V 115V – 15% - 230V + 15%
input frequency	47-63Hz
nominal input current	0,84A - 115V AC 0,42A – 230V AC
max. inrush current	35A / 2ms
output voltage (without battery) output voltage (with battery)	2405: 26,8V DC ±0,4% 2405: 19,8V – 26,8V DC±0,4% 1205: 9,9V – 13,4V DC±0,4%
final charging voltage (Temp.-Sensor optional)	26,8V DC ±0,4% without temp.-sensor 27,0V bei 25 °C with temp.-sensor
charging charasteristics	I/U DIN 41773-1
deep discharge protection and load rejection at	2405: 19,8V DC ±0,4% 1205: 9,9V DC ±0,4%
nominal output current I_{ANom}	5A DC
current limitation	1,05...1,1 x I_{ANom}
battery type	lead accumulator, maintenance-free
efficiency Ua=26,8V DC, Ia= I_{Anom} and Ue=230V AC	typ. 88%

max. power loss 'worst-case'	31W
leackage current	<3,5mA
fusing input	250V 2,5A T (internal)
fusing DC- output circuit	[1] (7.5A) / 6A T (external)
fusing battery circuit	[1] (7.5A) / 6A T (external)
type of connection input 'mains'	spring-type max. 2,5mm²
type of connection output 'Ua', 'Batt'	spring-type max. 2,5mm²
type of connection messages	spring-type max. 1,5mm²
type of protection	IP 20 u. EN 60529
weight	1kg
storage temperature	0...50°C
environmental temperature, recommended for battery	0 - 45°C 0 - 25°C
dimensions	160 x 75 x 150mm (H x W x D)

[1] In case of FK2-fuses the values in brackets are valid

3.2 Display and message outputs

Ua	LED green, voltage is present at the output Ua		
mains OK [1]	LED green, illuminates at: • mains operation, what means UE>U_{Emin}	potential free relais contact, change-over, max. contact load 30V DC/ 0,5A	message with virtual Com-Port to USB: DCD enabled
Batt OK [2]	LED green , expires at: • battery circuit interruption • battery voltage < 21,6 V (battery operation) • battery temperature > 45 °C LED green, blinks at: battery low • battery damaged	potential free relay-contact, nomally open, max. contact load 30V DC/ 0,5A	message with virtual Com-Port to USB: CTS enabled

[1] The message contact is coupled with a LED display
When the LED illuminates, the corresponding relay is enabled

[2] If the LED illuminates, the relay is active, the contact is closed.
When the LED is blinking or expired, the relay contact is open

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3.3 Message inputs

Shut-Down	Shut-down of the UPS operation, respectively switch off of the mains operation	gate input referring to earth, switch level: 24V DC (6-45 V DC)	Shutdown via virtual Com-Port to USB: set RTS

3.4 USB-Anschluß

This standard-USB-connection has potential separation from the mains and the DC-output. It can be connected to a PC with a normal USB cable. When a suitable driver is installed on the PC, the typical windows USB-plug-and-play software starts, after the connection. After the installation the AKKUTEC can be adressed with the means of a virtual COM_Port (Com1 – Com255). The Com-Port can be chosen in the driver adjustments.
With the Schneider-Software *TEC***Control** it is possible to:

- work up mains interruptions, for example start an external program (delayed).
- work up battery messages, for example shut-down the PC (delayed)

It is also possible to analyse the RS232-signals CTS (Batt OK) and DCD (mains OK) by oneself and then for example to send back a shut-down signal with RTS to the **AKKU***TEC*.

4. Installation

The DC power supply is to be installed such that the necessary cooling is provided. A minimum separation of ≥40mm to neighbouring equipment or assemblies in the area of the ventilation open ings is to be maintained. The installation is always to be made in such a way that sufficient air circulation through the unit is ensured.
The temperature of the cooling air at the bottom of the unit may not exceed the value provided in the technical data. The maximum mounting heights without load reduction is about 1000 m above N.N. During installation, the unit must be covered in such a way that no swarf from drilling can fall on or in the unit. (**Risk of short circuit!)**

5. Connection

Prior to connection, the values for the mains voltage and frequency as well as the values of the battery must be checked against the values on the rating plate. Connection in accordance with the labels on the connecting terminals. (See main block diagram and connector assignments).

connection:	**terminal:**
mains connection	terminal connection ‘mains’ L, N, PE (earth)
DC-output (load)	terminal connection ‘Ua’ +, -, - (Minus is exists two times)
lead battery	terminal connection ‘Batt’ +, -
battery- temperature sensor (optional module)	terminal connection ‘I/O’ 1, 2

connection:	**terminal:**
control input Shut-Down	terminal connection ‘IO’ 3 + , 4 -
mains OK mains present mains interruption	‘I/O’ 6 / 7 (closed) 5 / 7 (closed)
Batt OK	’I/O’ 8 / 9 (closed)

In the case of overload, the DC output current comprises the maximum current charging rectifier current as well as the battery current. To prevent overload of the DC output circuit, the circuit is to be protected externally ! (Value see Section 3.1)

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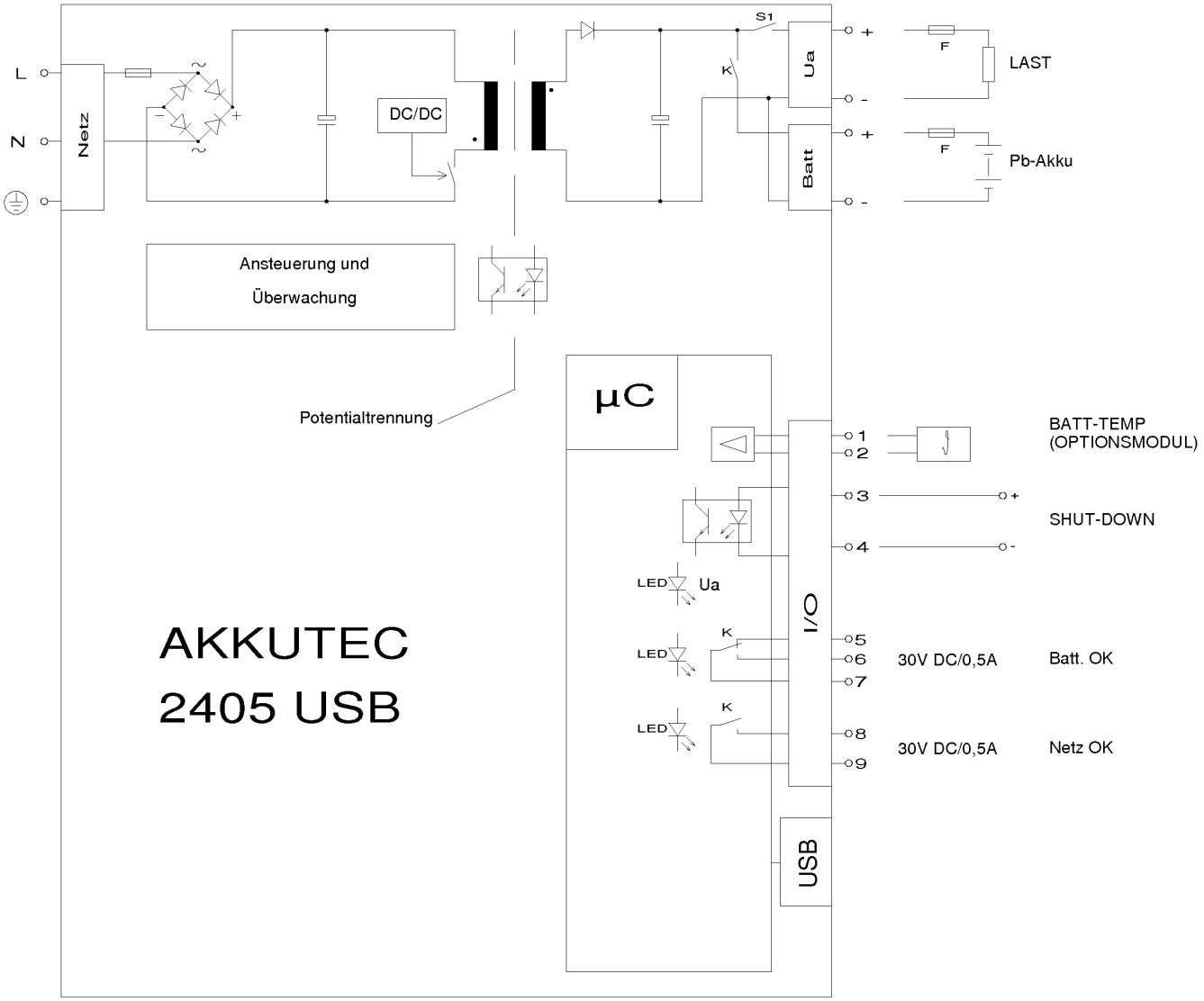
6. Circuit diagramm



7. Putting into operation

The unit is switched on by the switch on of the mains voltage.

If the units are built into systems, which must be tested with over voltages (for example according to EN60204-1 / VDE0113 part1 19.4 voltage test), the unit must be separated from the test assembly before the voltage is switched on.
(Original text EN60204-1 : parts, which are not dimensioned for the testing voltage, must be separated during the test.)

The battery voltage must match the nominal voltage of the AKKU*TEC*!
Never reverse the poles of the battery!
Never short circuit batteries! Risk of arcing!
Check the connections for correctness prior to switching on for the first time
Only make electrical connections with the unit un powered

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8. Operation

Approx. 2s after the switch on of the mains, the output voltage is enabled and the loads connected are supplied with power. The back up battery is also charged. This operating mode is indicated by the illumination of the green LED 'Netz ok' (mains operation).
When the output voltage increases the LED Ua, which is coupled to the output, illuminates. This LED illuminates as long as voltage is present at the output, as well when the voltage is provided by the battery or another external supply.
When the mains voltage is switched off or when the voltage drops under the minimum input voltage the **AKKU***TEC* switches to battery operation. The green LED 'Netz ok' (mains operation) expires.

The illumination of this LED always results in the energisation of the corresponding signal relay 'Netz OK' (mains operation). (See block diagram, Section 6)

9.1 Battery Circuit Monitoring

After switch-on the unit, at first the LED 'Batt OK' illuminates. The corresponding message relay is enabled, the contact is closed. To ensure the back-up capability, the battery circuit is tested cyclically each 60s; the first test is performed 60s after mains switch on. By means of this test it is possible to identify an open circuit or the high impedance of the battery circuit.

A defective battery circuit is indicated by the expiring of the green LED 'Batt OK". The corresponding message relay is inactive, the contact is opened. Possible causes: battery not connected, current circuit interrupted, battery defective, external fusing at the battery circuit defective.

9.2 Battery Test

During mains operation, a cyclic battery test loads the battery whilst the voltage is measured. In this way it is possible to evaluate the quality of the battery. A seriously aged battery is indicated by the blinking of the green LED 'Batt OK' . Approximately 1 hour after mains switch-on the first battery test is made, each other after 24 hours.

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With the processor controlled automatic battery test, the back-up capability of the battery is ensured.

To evaluate the capacity of the batteries we recommend additionally to check the batteries with the nominal load current at least one time each year. Therefore battery operation is enforced by mains switch off and the back-up time is measured until automatic switch off (deep discharge limitation). The actual battery capacity can be evaluated from the back-up time and the nominal load current. If the capacity of the batteries is not sufficient for the necessary back-up time, the batteries must be exchanged.

9.3 Shut-Down

To avoid the discharge of the battery until the deep discharge limitation, it is possible to abandon the battery operation with an external signal. This is effected by connecting a +12V/+24V DC control voltage at terminal 3 (+) and 4 (-) at the terminal strip 'IO'. Additionally a shut-down signal can be given over the serial interface via USB (RTS signal of the virtual RS232, for example with the J. Schneider *TEC***CONTROL** Windows Software).

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9.4 Temperature Compensation (optional module)

Lead batteries have a temperature coefficient of approx. -3mV per °C and cell. The **AKKU***TEC* final charging voltage is selected such that battery charging is provided over a temperature range of 15 -45°C.
In applications with frequent and large temperature variations, the charging voltage should be appropriately compensated to achieve optimal battery life. Also, particularly in the case of very low environmental temperature (Tu < 15°C), compensation should be performed to ensure adequate battery charging.
By connecting the external temperature sensor module (option) to terminal strip 'IO -1' connection 1 and 2 (note poles!), temperature compensation is automatically activated. For an surrounding air temperature variation of 0 -45°C, the final charging voltage (and thus also the output voltage) varies over a range of 27. 85 - 26.3 V DC
Battery temperatures above 45°C are indicated by the expiring of the LED 'Batt OK'.
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F **To obtain satisfactory battery life, the operating temperature of the batteries should not exceed 25°C. Higher temperatures lead to a reduction in the lifetime!**

10. Taking out of operation

The unit is taken out of operation by removing the mains supply. To prevent subsequent backup from the batteries, the battery circuit must be opened by activating 'Shut-Down'. (See Section 9.3). The LEDs 'Netz OK' and 'Batt OK' must expire. (s. Punkt 9.3).

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

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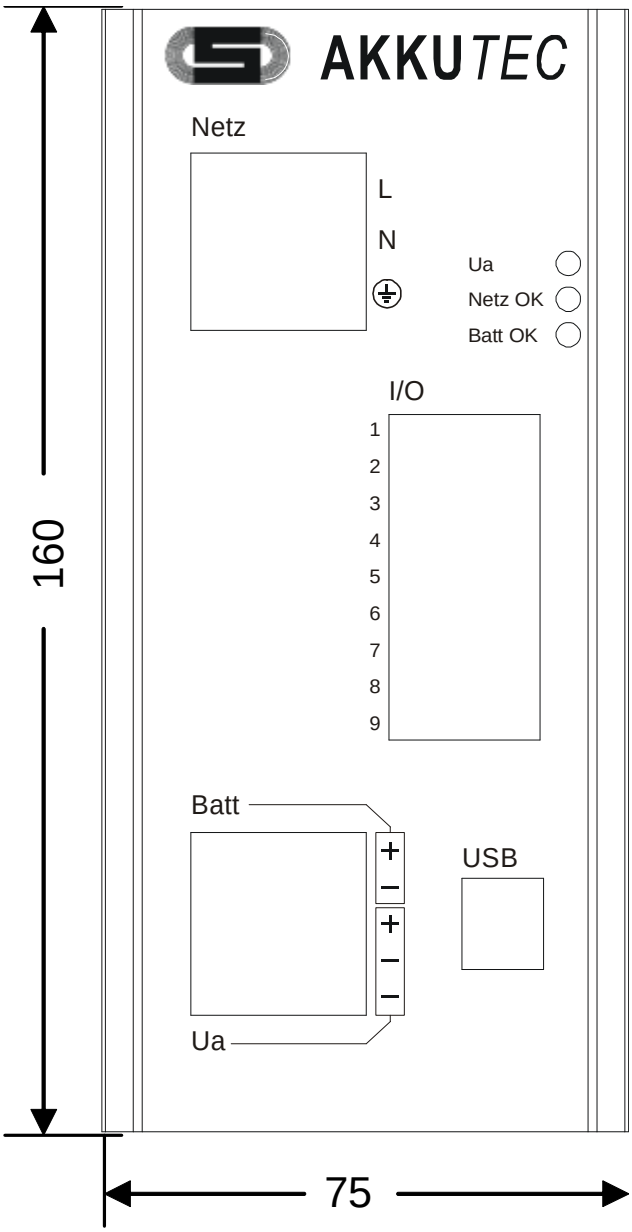
11. Installation drawings

snap fixation for 35 mm Normprofilschienen
DIN EN 50022 (NS 35 x 15 / 7,5mm)



Tiefe: 150mm
Depth: 150mm

12. Maintenance

Inside the unit there are no parts which may be maintained by the user.
The unit is to be cleaned regularly, depending on the degree of soiling
The batteries must be checked as described in section 9.2 and must eventually be exchanged.

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