



## Inverters

**SJ-1k0-2k3/2U2\_110V**

**SJ-1k5-2k3/2U2\_110V**

**SJ-2k0-2k3/2U2\_110V**

**SJ-2k5-2k3/2U2\_110V**

**OLF-INV-1k5/2U110 Type: BK-004**

**Operation instructions**

## 1 Caution

### **Warning**

During operation the device produces dangerous voltage. The device must be installed and handled with utmost care. Disregarding of safety conditions may result in death, injury or property damage.

Inexpert or rough handling of the device may cause property damage or a severe injury.

The inverters are prepared to work with lead-acid or gel batteries. When using another power supply verify whether it corresponds to the input range of the inverter.

Routine maintenance of the device may only be carried out by personnel with required qualifications. The personnel must heed all safety principles pertaining to work with electric devices included in these operation instructions. Trouble-free operation of this device depends on adequate handling during transport and proper storage. Routine maintenance and observance of operation conditions are also necessary.

## 2 Transport, acceptance

During transport the devices must not be exposed to vibrations or hard blows.

During transport, storage and handling observe the instructions on the package.

The device can be installed after unpacking and visual check of the delivery for completeness.

If you find damage caused during transport, report this fact to the forwarder.

## 3 Packing and storage

The product is packed in a PE bag and placed in a box of three-layered cardboard (bulk package). Installation and operation instructions are included in the delivery of the unit. The product should be stored at a temperature from -40 to 80 °C, at a relative humidity up to 99 % in rooms where precipitation of water vapour on products is eliminated. The product must not be exposed to blows, vibrations and the effect of harmful vapours and gases.

## 4 Waste disposal

Packages are disposed of through the EKOKOM associated system. Electric waste is disposed of through the REMA associated system.

## 5 Installation

### **Warning**

Before installation or disassembly the device must be disconnected from all power supply units. All connection work must be carried out in the switched-off condition!

Any work on the device may only be carried out by personnel with required qualifications. The personnel must heed all safety principles pertaining to work with electric devices and instructions included in these operation instructions.

The user is responsible for installation, connection and operation of the device in accordance with the rules and standards valid in the country of installation. In this respect, special attention should be paid to sizing of conductors, fuses, grounding and disconnecting elements. Incorrect connection of this device may result in its damage or destruction.

Trouble-free and reliable operation of the device requires adequate handling during transport, proper storage, suitable installation and assembly.

The device must be placed and operated in an environment where precipitation of water vapour is eliminated and it must not be exposed to blows, vibrations or the effect of harmful vapours and gases or radiant sources of heat.

The inverter may be connected by at least experienced persons.

The device is attached with the use of four screws (max Ø 5 mm) and 4 assembly openings. The operation position of the device is arbitrary. Possibility of passage of cooling air through the ventilation openings must be ensured. Keep the distance between a ventilation opening and an obstacle of at least 10 cm. The built-in fan is equipped by speed control depending on load and temperature.

For the input connection HDFK 25 terminals are used. For the output connection HDFK 4 terminals is used.

First, connect the protective grounding conductor to the front side of the inverter. Connect the load to the output terminals of the inverter. The connection must be implemented properly with regard to the marking of terminals and colours of cables.

**Yellow and green: protective grounding PE**

**Brown: phase conductor L**

**Blue: neutral conductor N**

Before connecting the inverter to the battery make sure the inverter is off (switch in the 0 position).

**The used battery must meet the operation characteristics of the inverter input. Verify its discharging current with regard to the input current of the inverter.**

**Connect the inverter to the battery observing the polarity of terminals and cable colour.**

**Blue: negative pole**

**Red: positive pole**

## 6 Commissioning

### Warning

The device corresponds to the protection class I. Any interruption or removal of the protective conductor may result in a failure or danger for health or life.

If you need to open the device, e.g. to change the input frequency, after disconnection from the power supply you must wait for the capacitors to discharge – at least 5 minutes. Interventions of this type may only be carried out by qualified personnel authorized to perform these activities.

Only operate the device in the completely assembled condition.

During operation of the device some parts are under dangerous voltage.

Any work on the device may only be carried out by personnel with required qualifications. The personnel must heed all safety principles pertaining to work with electric devices and instructions included in these operation instructions.

The user is responsible for installation, connection and operation of the device in accordance with the rules and standards valid in the country of installation. In this respect, special attention should be paid to sizing of conductors, fuses, grounding and disconnecting elements.

Trouble-free and reliable operation of the device requires adequate handling during transport, proper storage, suitable installation and assembly.

The inverter is designed for permanent operation, its input (positive and negative pole) and output (L and N conductors) are floating. If necessary, you can ground the positive or negative pole and at the output you can ground the N conductor.

The inverter does not contain its own disconnecting element or circuit-breaker, therefore, you must use an external circuit-breaker of the power supply. The circuit-breaker must be placed in the positive or negative pole depending on which one is not grounded. If neither of the poles is grounded, the circuit-breaker may be positioned arbitrarily in the positive or negative pole. However, if there is a danger of short-circuiting, both the input conductors must be protected. You are also recommended to protect the phase conductor L of the inverter output. The protection values are specified in paragraph **9 Technical data**.

After connection of the output terminals and the input voltage the inverter is ready for operation.

### **Operation and indication elements**

The inverter can be switched on and off using a switch on its front side. In the OFF position the device is deactivated and it does not consume energy from the input. After switching over to the ON position after certain time necessary for start-up of the inverter the generated voltage is connected to the output.

The POWER LED indicates that the inverter is in operation.

### **Potential-free relay - ALARM connector**

1. NO - Normally Open – Interconnection of the NO pin with the COM pin indicates presence of voltage at the inverter output.
2. NC - Normally Closed – Interconnection of the NC pin with the COM pin indicates absence of voltage at the inverter output.
3. COM - common pin

## 7 Functional description

BKE inverters with pure sine wave output are designed to cover needs of light industry, telecommunications and households. They meet high requirements for reliability, safety and comfort. Switched inverters are designed to supply electronic devices with purely sine wave 230 V AC voltage in environments without a risk of explosion.

The inverter is resistant to overheating, overloading and short-circuit at the output and it can also work without a load. For a certain time it is also able to withstand a higher than nominal load, see the technical data.

The input is adapted to battery supply and it is galvanically separated from the output. It is protected from pole reversal, voltage surges and insufficient voltage. You can use the lever switch to switch on and off the device, the green LED indicates operation. Potential-free relay - the ALARM connector indicates presence of voltage at the output.

### Description of inverter behaviour in error states

Cause of the error state	Consequence	Method of remedy of the error state
Low input voltage	The inverter will switch off. The Power LED may be lit.	When the supply voltage returns to the allowed range, the inverter will start automatically.
High input voltage	The inverter will switch off. The Power LED may be lit.	When the supply voltage returns to the allowed range, the inverter will start automatically.
Overheating	The inverter will disconnect the output and pass into the cooling mode. The fan will rotate at the top speed.	When the temperature drops to the allowed value, the output will be connected automatically
Short-circuit at the output	The inverter will disconnect the output.	After a few seconds the inverter will connect the input again.
Exceeding of the allowed overloading time.	The inverter will disconnect the output and pass into the cooling mode for 1 minute.	After 1 minute the output will be connected automatically
Reversed input polarity	The inverter will switch not switch on. The LED does not light up.	After restoring of the proper input polarity the inverter will start automatically.

Note: built-in protective devices prevent the device from being damaged in case of an accidental and temporary error. If the inverter is frequently or in the long term used in an incorrect way, its service life may be reduced or the device may get damaged.

## 8 Maintenance and repairs

### **Warning**

On the contacts of the potential-free relay - the ALARM connector - there may be foreign, higher than safe voltage.

Before starting maintenance work make sure the supply voltage has been disconnected and blocked and that the device is grounded.

Any work on the device may only be carried out by personnel with required qualifications. The personnel must heed all safety principles pertaining to work with electric devices and instructions included in these operation instructions.

Before the start of maintenance work involving possible contact with the input or output voltage the inverter must be switched off. To do this, first switch off the switch on the inverter front (position 0) and it is only then you can disconnect the input circuit-breaker.

The inverter requires checking of the fan and you must make sure that the flow of a sufficient air quantity through ventilation openings is not obstructed.

Also, protect the device from excessive soiling and voltage surge peaks, which will ensure extension of its service life. Dust and foreign objects, especially such that may obstruct the flow of cooling air must be removed in regular intervals, at least once every 12 months. Purge the device with dry pressurized air (overpressure max. 0.1 Mpa).

In case of a failure of the inverter return it to the manufacturer in a package that sufficiently protects the product from damage during transport.



## 9 Technical data

### 9.1 Mechanical design

The inverter is produced in the 19", 2U design. HDFK terminals for the input and output connection lead from the front panel. There is also the grounding screw, on/off switch, indication LED's and reporting contacts.

	<b>SJ-1k0-2k3/2U2</b>	<b>SJ-1k5-2k3/2U2</b>	<b>SJ-2k0-2k3/2U2</b>	<b>SJ-2k5-2k3/2U2</b>
Device dimensions (h x w x d)	88 x 220 x 483 mm		88 x 250 x 483 mm	
Weight	5.5 kg	5.5 kg	6.7 kg	6.7 kg
Ingress protection class	IP20			
Cooling	with an active fan with a speed controller			
Conductor cross-section	input HDFK 2x25 mm <sup>2</sup>		input HDFK 2x25 mm <sup>2</sup>	
	output HDFK 3x4 mm <sup>2</sup>		output HDFK 3x4 mm <sup>2</sup>	

**OLF-INV-1k5/2U110 Type: BK-004 equivalent type: SJ-1k5-2k3/2U2\_110V**

## 9.2 Electric parameters of the inverter

	SJ-1k0-2k3/2U2	SJ-1k5-2k3/2U2	SJ-2k0-2k3/2U2	SJ-2k5-2k3/2U2
Input voltage	72 – 144 V DC			
Input current	max. 30 A		max. 50 A	
Output voltage	230 V AC			
Output voltage frequency	50 Hz or 60 Hz (set by a jumper inside the inverter)			
Output power	1000 W (1250VA)	1500 W (1850VA)	2000 W (2550VA)	2500 W (3125VA)
Allowed overloading	all overloading values are actively limited			
20 min: 20 seconds: shut down:	Up to 1200 W Over 1200 W 2800 VA	Up to 1700 W Over 1700 W 3300 VA	Up to 2300 W Over 2300 W 3700 VA	Up to 3000 W Over 3000 W 4200 VA
Idle power input	approx. 20 W		approx. 25 W	
Short-circuit current	20 A		25 A	
Load crest factor	<2.5 at nominal power			
Cos $\phi$	0.1 inductive / 0.8 capacitive			
THD	<2.5 % at nominal power			
Efficiency	93 %	92 %	92 %	92 %
External power supply protection	direct-current 40 A, characteristic C		direct-current 63 A, characteristic C	
Recommended output protection if required by application Output protection is not necessary	output 10 A, characteristic B		output 16 A, characteristic B	

**OLF-INV-1k5/2U110 Type: BK-004** equivalent type: **SJ-1k5-2k3/2U2\_110V**

Protection

from overloading (peak current limitation),  
from pole reversal,  
from voltage surges at the input,  
from undervoltage at the input,  
from overheating,  
limitation of current surges,

check of purely sine waves at the output.

Electric strength	input – output: 4 kV input – protective grounding: 500 V output – protective grounding: 2 kV (piece test)
-------------------	--

### **Potential-free relay - ALARM connector**

maximum contact current	1 A
Max. switched voltage	125 V AC, 60 V DC
Max. switched load	62.5 VA, 30 W

### **9.3 Operation conditions**

Operation temperature	-10 °C to +50 °C
Operation humidity (non-condensing)	10 to 90 % relative humidity
Storage temperature	-40 to 80 °C
Storage humidity (non-condensing)	max. 99 % relative humidity
Altitude	up to 2000 m above sea level
Environment	without explosion risk
Operation position	any
Service life	50,000 hours

## **10 Standards**

A declaration of conformity is delivered together with the device.

Standards pertaining to the product

Safety	EN 60950-1 ed. 2
EMC	EN 61000-6-4 EN 61000-6-2 EN 61000-4-2, criterion A EN 61000-4-3, criterion A EN 61000-4-4, criterion A EN 61000-4-5, criterion A EN 61000-4-6, criterion A

## 11 Guarantee

The product has been produced in accordance with the manufacturer's production and testing regulations. The product is covered by a 24-month guarantee from the delivery date indicated in the delivery sheet. The guarantee covers defects caused by faulty material or workmanship of the product. The guarantee is void if the product has been modified or mechanically damaged or damaged by improper use. Possible damage claims with description of the defect should be sent in writing together with the faulty product protected from transport damage back to the manufacturer.

## 12 Quality certificate

The identification label of the product serves as the product quality certificate confirming validity of the manufacturer's guarantee.

6k159504

