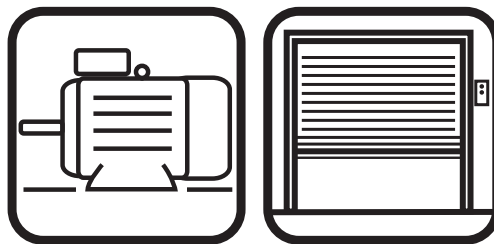


Manual / Handling
BEQ[®] Inverter/UPS
BEQ 2200-S01



Contact Information

Telephone

031-340 02 30

Order / Sales

order@milleteknik.se

Support

support@milleteknik.se

Service

service@milleteknik.se

Customer Information & Other Errands

info@milleteknik.se

SIMPLICITY AND RELIABILITY

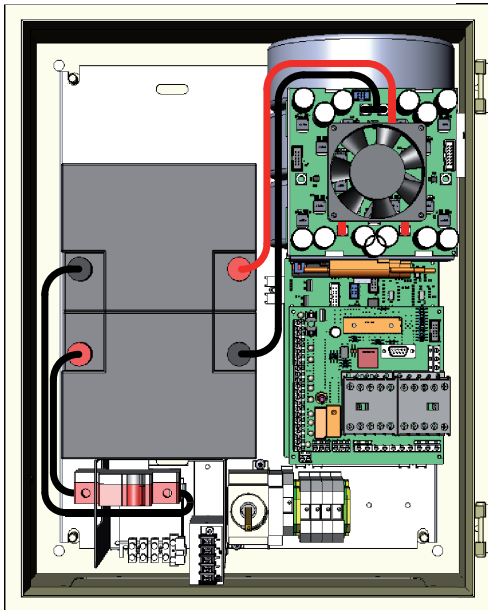
BEQ inverters are designed with the latest switching technology and microprocessor monitoring:

- Highest efficiency and operational reliability.
- Well-protected with isolation switch, battery circuit breakers, protection against over-temp., overload, and short-circuiting.
- Complete self-test including advanced battery test.

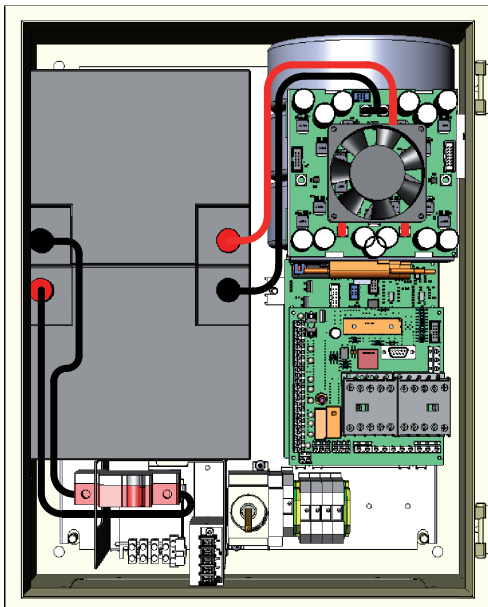
The units are installation- and service-friendly:

- Compact volume.
- External wall mounts are included, for set-up without even having to open the housing.
- Module design. All of the electronics on one cartridge. Ready if needs be for simple service.

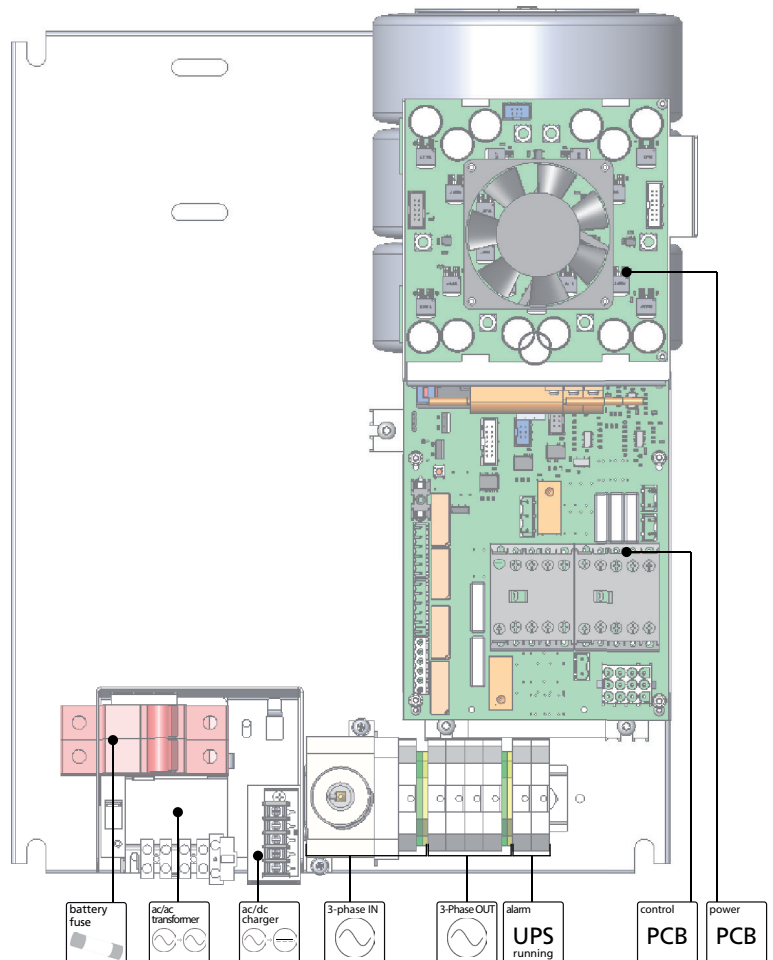
OVERVIEW UPS/INVERTER



BEQ 2200-S01/ 28Ah



BEQ 2200-S01 / 45Ah

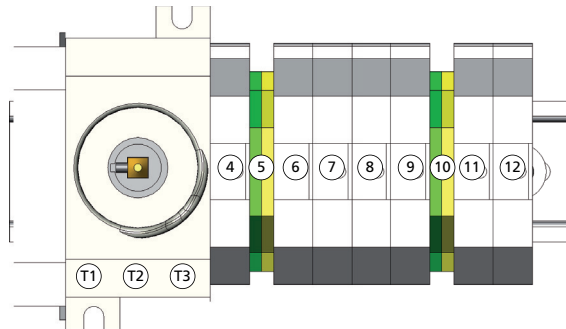


CONNECTING

INCOMING CABLE, INPUT

Connect (according to the picture here);

- Incoming mains first phase, "PHASE 1 – L1 IN", to conn. block T1 on isolation switch,
- Incoming mains second phase, "PHASE 2 – L2 IN", to conn. block T2 on isolation switch
- Incoming mains third phase, "PHASE 3 – L3 IN", to conn. block T3 on isolation switch,
- Incoming zero, "ZERO – N IN", to conn. block no. 4.
- Protective ground, "PROTECTIVE GROUND", to conn. block no. 5.



OUTGOING CABLE, OUTPUT:

Connect (according to picture here, cables ready for connection of port motor load);

- Outgoing first phase, "PHASE 1 – U1 OUT", to conn. block no. 6,
- Outgoing first phase, "PHASE 2 – V1 OUT", to conn. block no. 7,
- Outgoing first phase, "PHASE 3 – W1 OUT", to conn. block no. 8,
- Outgoing zero, "ZERO – N OUT", to conn. block no. 9.
- Protective ground, "PROTECTIVE GROUND", to conn. block no. 10.

CONNECTING ALARM

Connect summation alarm for SelfTest,

"Alarm 1", incorrect charging voltage (over- or under-voltage), aged battery which should be changed, or non-functional inverter (detects all three phases), to plug-in circuit card conn. block "sds" on the left side of the lower card.

Alarm - contact between NO & CO

Connect battery alarm (Low battery),

Alarm activated when a certain pre-determined amount of energy is used up during battery operation, to plug-in circuit card conn. block "låg batteri" on the left side of the lower card.

Alarm - contact between NO & CO

Connect Mains failure alarm,

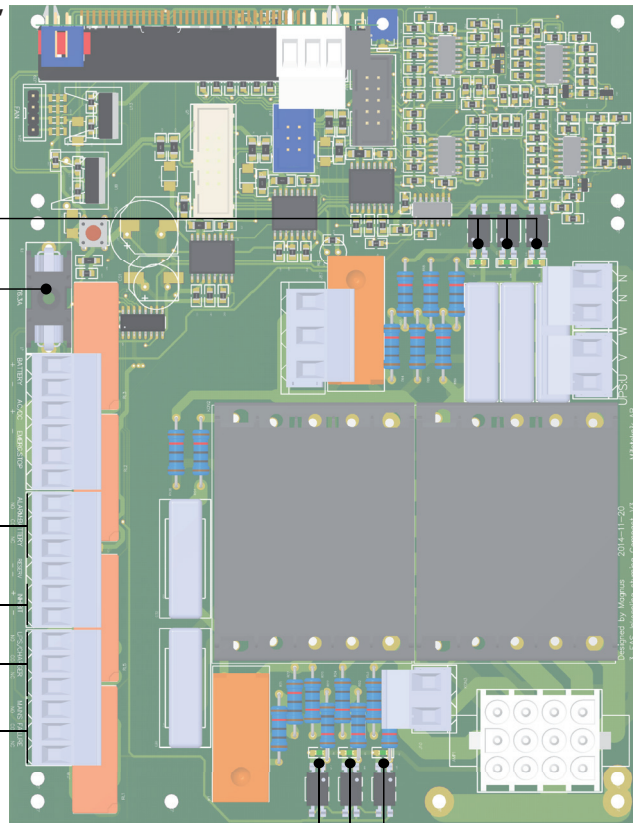
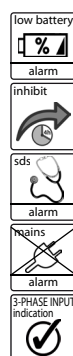
Alarm for Mains failure / Phase fault to plug-in circuit card conn. block "elnät";

Alarm - contact between NO & CO

Connect UPS alarm, (UPS running),

Alarm when UPS is in operation (Mains failure) to DIN rail block 11 & 12.

Alarm - contact between 11 & 12



LOAD DISCONNECTING SWITCH, INCOMING MAINS

For utmost safety, always disconnect from the mains before installation and service.

Connect load disconnecting switch (circuit breaker) on the incoming cable from the mains.

Put it in an easily accessible place and mark it clearly. With a load disconnecting switch installed, incoming voltage can easily be switched off during service and function tests.

STARTING UP

1. Turn the isolation switch to "0" and open the housing.
2. Connect the in- and outgoing cables and the alarm.
3. Connect the batteries by setting the batteries' double circuit breakers to the "1 – ON" position.
4. Close the housing and turn the isolation switch to "1".
5. Connect mains. The system starts up by itself and by a constant green LED "MAINS" on the front panel it indicates proper function.
6. Temporarily disconnect mains voltage to make sure the inverter works (connected load continues to be run).
7. Reconnect mains voltage.

INSTRUCTIONS FOR CARE

The unit is maintenance-free when installed in a room-temperature, indoor environment +15°C—+25°C. However, the batteries should be changed after 10-12 years in order to maintain high guaranteed safety. When in an increased/decreased temperature environment +5°C—+15°C/+25°C—+30°C, the batteries will age at twice the rate. Even colder or warmer ambient temperatures mean that the entire UPS-function is at risk!

CHANGING THE BATTERY

1. Turn the isolation switch to "0" and open the housing. Ingoing phases/voltage are switched off. The inverter is set to active stop position
2. For safety's sake, also disconnect the mains voltage.
3. Disconnect the batteries by setting battery circuit breakers to "0 – OFF".
4. Remove battery cables, battery clamps and change batteries. Be careful! Don't let the batteries short circuit! Take careful note of the orientation of the batteries (the battery poles +/-) and the assembly of the battery cables.
5. Connect the battery cables to the new batteries with the correct polarity. Be careful! Don't let the batteries short circuit!
6. Set battery circuit breakers to "1 – ON".
7. Close the housing and turn the isolation switch to "1".
8. Connect the mains again if it was disconnected.
9. Wait 10 seconds, during which the inverter does a start-up self-test, until the LED "MAINS" on the front panel, light up constant green.
10. Temporarily disconnect the mains voltage to make sure the inverter works (the connected charge continues to be run).
11. Reconnect mains voltage.

DIMENSIONING

Select the size of the connected load so that the total amount is maximally as large as the inverter's maximum rated power (W), preferably less, partly to reach safety margins, partly to compensate for losses in connections/ cables and the load, which means more real power use from the inverter than indicated rated power of the load. Also check for max power at start-up, so that it doesn't rise above the indicated max – acute – start power of the inverter. Back-up operation of load should take place within an hour of the occurrence of mains failure, since the inverter uses no-load power that successively empties the batteries (see under "Inverter" below).

FUNCTIONS

INVERTER

BEOLUX inverter is an Off-line UPS that goes in and replaces supply from the mains when a mains failure (including phase fault) occurs, until all three phases return (or the batteries become completely discharged). Reconnection time is about 100ms. The inverter replaces the mains sine voltage with a current-limiting sine voltage during battery operation. The inverter is especially designed for optimal (acute) operation of 3-phase motors.

Please note! When phase fault/mains failure occurs on the input mains, the inverter starts directly and draws ca 50-100W even unloaded. Connected charge should therefore start up within an hour of the occurrence of the phase fault/mains failure in order for there to be battery power left.

BATTERIES

The batteries are valve-regulated, maintenance-free 10-12 year batteries, especially designed for use in back-up power. Circuit breaker on batteryplus protects against possible internal short-circuiting. The batteries are protected from overload by the inverter by means of electronic current limitation. The batteries are protected against damaging over-discharge so that all current consumption ceases when the battery voltage falls below a critical value. Only mains voltage and consequently current from the battery charger cancels the over-discharge protection. The batteries are also protected from overcharging by being disconnected from charging current, by which the batteries are protected against "boiling".

BATTERY CHARGER

The batteries are charged to 27,3V final voltage during current limitation in order to achieve optimal lifetime at room temperature +20°C—+25°C. The charger is protected against over-current and short-circuiting and also protects the batteries from overcharging/high charging current.

PROTECTION UPS-STANDARD 62040-1-1

Electronic current limitation and over-temperature protection as well as automatic shut-off upon short-circuiting of the connected load after 3-5 seconds according to UPS-STANDARD EN-50091-1-1. The inverter is therefore protected against short-circuiting!

However, the mains voltage may not be connected to the inverter's ground or outlets, conn. blocks 6, 7, 8 and 9!!!

SELF-TEST SYSTEM

Included as standard in the unit is a SelfTestSystem that continually monitors all of the system's functions:

1. Battery charging. Alarm given when over- or under-voltage charging occurs. Under-voltage is indicated only if the charger for charged batteries doesn't provide the right charge voltage and not when the batteries are recharged after mains failure. The alarm is indicated with LED "CHARGING ERROR" on the front panel at the same time the summation alarm is set. Upon over-voltage, charging is disconnected from the batteries to avoid "boiling" them. When over-voltage occurs, with LED "CHARGING ERROR" on the front panel at the same time the summation alarm is set.
2. Alarm for aged battery. The batteries' capacity or aging is tested regularly (each week). When a test shows that the current battery capacity has sunk to below 80% of original capacity, an alarm is activated to warn that the batteries need to be changed. The reliability of the back-up power is hereby tested according to the dimensioning demands of lifetime in battery operation. Batteries that have lost 20% or more of their capacity are ageing at an accelerating rate and should therefore be changed. This limit is the definition of what is estimated to be the battery's lifetime. When the alarm for aged battery is activated, LED "BATTERY ERROR" on the front panel is lit and at the same time the summation alarm is set.

3. While also testing battery ageing, the SelfTestSystem also test-runs the inverter to make sure that it works by test-loading all three phases at a power corresponding to the provided system max (continual power). That way, the inverter gives back-up power to the load when it is needed. When there is something wrong with the inverter, the LED "UPS ERROR" is lit and summation alarm is set.

ALARM / STATUS INDICATION FRONT PANEL

ALARM SELF-TEST

Alarm is activated when the following occur:

1. Incorrect charging voltage (under- or over-voltage);

a/ Under-voltage. Every 45 minutes of mains voltage, the battery charging is disconnected (<1 sec.) if the system voltage falls below 26,5V and the charging voltage from the charger is measured unloaded. If incorrect charging voltage occurs (27,3V), an alarm is activated on potential-free contact, LED "CHARGING ERROR" is lit.
b/ Over-voltage. Charging is immediately disconnected and alarm is activated on potential-free contact, LED "CHARGING ERROR" is lit.

2. Aged battery. Each week the battery is given a test load with high, pre-determined and acute load current corresponding to the system max to measure and determine current battery capacity. If there is 20% loss of battery capacity compared to a new battery, the batteries should be changed. It is as if the microprocessor takes a fingerprint of the battery's current condition with the high current test, and compares it to the programmed values of similar batteries (model and size) that during controlled tests have aged and continually been measured in identical test loads. When a test indicates more than 20% aged battery, an alarm is activated on potential-free contact, LED "BATTERY ERROR" is lit.

3. Inverter test. Each week the inverter is test-run along with the battery test over internal load corresponding to the provided maximum operational load of the system. If the inverter does not provide enough output voltage on all three phases, an alarm is activated on a potential free contact, LED "UPS ERROR" is lit.

Alarm self diagnosis - contact NO & CO on terminal block "sds".

ALARM LOW BATTERY.

The alarm is activated after a period of mains failure (= delayed mains failure alarm/phase fault on the mains), when remaining battery capacity in battery operation falls below a pre-determined level. The alarm occurs on switching relay contact through the contact between CO and NO when alarm is activated, as well as indicated with the LED "BATTERY ERROR" on the front panel is lit.

LARM NÄTDRIFT/NÄTAVBROTT.

During normal mains operation, the green LED on front panel is lit constantly green

During mains failure/phase fault on the input voltage, the inverter goes into battery operation, so the LED "UPS MODE" is lit and the Mains failure alarm is set.

Alarm Mains failure - contact NO & CO on terminal block "elnät".

FRONT PANEL:

1

2

3

4

5

6

7

POWER SUPPLY / Ups

BEQ SERIES

STATUS	LED INDICATION	DISPLAY INDICATION
1. MAINS		Sty = STANDBY
2. UPS MODE		tSt = BATTERY TEST
3. UPS ERROR		U.Er = UPS ERROR
4. OVER CURRENT		OC = OVER CURRENT
5. OVER TEMP.		OT = OVER TEMPERATURE
6. CHARGING ERROR		AG.O = CHARGER OVER VOLTAGE
7. BATTERY ERROR		AG.U = CHARGER UNDER VOLTAGE
		Inh = INHIBIT ACTIVATED AT TEST

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POWER SUPPLIES - MADE IN SWEDEN

TECHNICAL DATA

400V input voltage: 400V -15%, +20% in mains op.
Mains current: charger max 0,3A + load

400V output voltage: 400V -15% in battery operation,
Voltage form: 3-Phase sinusoidal voltage
Efficiency: ca 90 %
No.load power c:a: 50W

Model:	BEQ 2200-S01
Max operational effect (sinus):	1100W
Max start effect (sinus):	4kVA
Battery capacity (24V):	28 / 45 Ah
Charging current :	1A
Dimensions (h*w*d):	500*400*250mm
Weight exkl batteries:	35 kg

Batteri:

Battery type/lifetime: Maintenance-free, valve-regulated lead batteries, 10-12 years at 25°C.
US12-28H (28 Ah)
US12-45 (45Ah)
No of batteries: 2 pcs.

Battery charging:

Constant voltage: I / U acc. to DIN 41773
Current limitation.

Protection:

Curr. Lim. electronic: About 400% of rated capacity.
Short-circuit protection: Shutdown within 5 sec upon major overload/short-circuiting according to UPS EN-50091-1-1 standard. Restart when mains voltage returns (in battery operation).
Over-discharge Prot: Battery pole voltage <18 Volt.
Overcharge protection: Disconnection of charging voltage upon overcharge.
Circuit breaker: Batteryplus is protected by a fuse.
Isolation switch: When housing is opened, the knob on the door must be turned to "0", which disconnects the input phases.
Ground fault switch: Can be installed on outlet (extra protection option according to EN50091-1-1).
Tested: Pending

Self-test:

Battery charging: Continual monitoring of battery charger.
Battery ageing: Automatic test-loading of batteries during high, acute discharging current to verify battery ageing. Alarm when the battery has lost 20%-40% of the capacity of the beginning value.
Function: Test load on the UPS (with corresponding max. load for the unit) to check on its functioning and sufficient output voltage on all three phases.

Alarm:

Mains failure alarm:

Low Battery alarm:

Summ. alarm, Self-test:

Alarm UPS running:

Status(indication):

Alarm:

LEDs, housing front

LED "MAINS":
"UPS MODE"
"UPS ERROR"
"OVER CURRENT"
"OVER TEMP."
"CHARGING ERROR"
"BATTERY ERROR"

Alarm at Mains failure with adjustable time delay.
Alarm on adjustable alarm level corresponding to certain used up battery capacity (standard 75% when mains failure has occurred).
Internal error; Incorrect charging voltage (over- or under-voltage), aged battery that should be changed, or non-functional inverter. Indicates that UPS is in operation. (Mains failure)

All alarms occur on potential-free relay-switching

Mains connected
UPS mode
UPS error
Over current in UPS-mode
Over temp. in UPS mode
Charging error (batteries)
Battery error

Physical conditions:

Ambient temperature:

Encasing, density:

Mounting:

15-25°C (20-25°C for optimal Self-test batteries).
SARELcase, IP54
Provided wall mounts.

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