

Operating Manual

JOVYTEC PE NT

1000/2000 VA

100000011724_BA

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Important notes

Read carefully before using the product

These instructions contain specifications concerning safety, installation and work procedures that will help you put our product to optimal use. They must be read carefully before beginning assembly and installation of the product. They must be accessible to both the product's assembler and operator.

Keep for later reference

They contain important specifications and notes concerning use of the product as well as notes concerning questions and problems.

Validity

Our goods and services are subject to the general terms of delivery for products of the electronics industry as well as our general sales conditions. We reserve the right to make changes to these instructions – in particular as regards the technical data, operating instructions and the weights and dimensions – at any time. These instructions correspond to the product's technical version at the time of publication. Their contents are not part of any contract but are for information purposes only.

Wärtsilä JOVYATLAS GmbH reserves the right to make substantive and technical changes regarding the content of these instructions without prior notification. Wärtsilä JOVYATLAS GmbH cannot be held liable for any errors or inaccuracies in these instructions, as there is no obligation to provide regular updates.

Complaints

Complaints must be submitted to the supplier at the latest eight days after delivery of the product.

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1 Introduction

Storing or recycling packaging material

The packaging material for the UPS has been designed with great care to protect it against damage during transportation. This material is also useful should you ever need to return the UPS for inspection. Damage that arises during transportation is not covered by the warranty terms.

1.1 Overview of warning information

Correct operation and servicing and adherence to the safety regulations are essential in order to protect personnel and ensure that the system is constantly operational. All personnel involved in installing/dismantling, start-up, operation and service of this equipment must be familiar with and observe these safety regulations. Only trained and qualified personnel may carry out the described work and they must use the proper, intact tools, equipment, test equipment and materials.

Important instructions are indicated by the terms **CAUTION**, **ATTENTION** and **NOTE**, and by indented text passages.



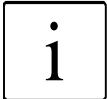
CAUTION:

This symbol identifies all working and operational procedures requiring absolute compliance to avoid any danger to personnel.



ATTENTION:

This symbol identifies all working and operational procedures requiring absolute compliance to prevent damage to or destruction of the uninterruptible power supply (UPS) or any of its components.



NOTE:

This symbol identifies technical requirements and additional information requiring the operator's attention.

1.2 Important information concerning the VRLA battery

VRLA (Valve-Regulated Lead-Acid) batteries, which include AGM and gel batteries, are often termed maintenance-free batteries. The maintenance-free feature only relates to the fact that distilled water cannot be topped-up and the acid level cannot be measured.

Always observe the instructions on use and care issues by the batteries' manufacturer.

You must always:

- Regularly check the battery in order to detect impending failures at an early stage.
- Immediately fully recharge the battery following (partial) discharging.

Under normal operating conditions, the UPS keeps the battery constantly charged.

When beginning regular operation, an AGM battery should be fully charged and then discharged to a charge voltage of around 1.87 V to 1.90 V per cell. Repeat this discharge procedure once a year.

A gel battery should ideally be discharged to a charge voltage of 1.87 V to 1.90 V per cell five times when beginning regular operation. Afterwards, a single discharge procedure per year will be sufficient.

If a battery discharges for a longer period (> 1h), make sure that the final discharge voltage is high enough. The battery will otherwise suffer irreversible damage.

If the UPS is not switched on, the battery will not be charged and will even lose part of its energy through self-discharging. So in this case the battery must be recharged from time to time. As a rule of thumb, recharging is required if the battery is stored as follows.

At approx. 20°C, every 6 months

At approx. 30°C, every 3 months

At approx. 35°C, every 2 months

These intervals become shorter when using an active battery charge monitor.

It should be noted that the service life of the battery may be drastically shortened at temperatures above 25°C.

The battery manufacturer can provide more information on this.

2 Target group

This equipment series is designed for industrial and commercial use. It may be installed and commissioned only by trained or instructed personnel who know about the potential hazards and the consequences of improper handling. Knowledge of the applicable safety regulations is absolutely mandatory.



Danger:

A UPS system's output connections may carry lethally high voltage even when the system is disconnected from the power grid.



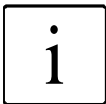
ATTENTION:

Connect and operate this system in accordance with the instructions in this manual.

3 Description of the system

This model of UPS provides the following:

- Constant voltage and frequency for electric consumers
- Reduces grid interference for electric consumers
- Guarantees an uninterruptible power supply to connected consumers for a specified period during a mains failure
- Reduces grid feedback effects from rectifiers with power factor correction
- Communication interfaces
 - RS-232/USB serial interfaces for reading UPS data (standard)
 - SNMP adapter for remote monitoring, data exchange via a LAN connection (option)
 - Relay card with alarm messages for industrial remote monitoring via floating contacts (option)



***NOTE:**

Operation of a UPS or other electronic consumers using a generator assumes that before installing the complete system the planner has established whether the generator can be used in conjunction with power electronics.

Some generators are designed such that operation with power electronics consumers is not possible due to the additional loading with harmonics, power factor and commutation notches. In some cases faults may occur such as voltage unbalance, a tendency to oscillate and the shutting down of the generator. It may help to ask the generator manufacturer about this and, if necessary change the regulator on the generator or incorporate damper windings in the generator from the outset.



ATTENTION:

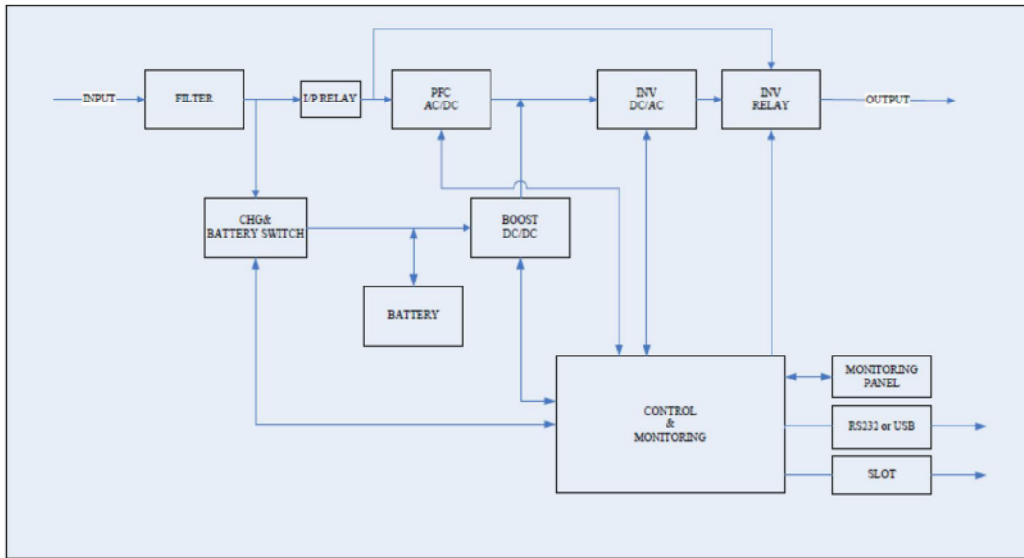
This model of UPS is NOT suitable for motors, hair dryers, loudspeakers and fluorescent lamps.

3.1 Included in delivery

UPS
Manual
CD
USB cable
RS-232 cable

3.2 Function description

The block diagram depicts the UPS's function schematic.
The UPS includes the following assemblies:
AC input filter for reducing interference from the supply grid
Rectifier (battery charger system)
Rectifier with DC/DC converter for the inverter
Inverter



Block diagram

3.2.1 High-efficiency mode

The UPS features an operating mode for increasing efficiency and reducing power consumption. The equipment switches over between bypass and inverter automatically depending on the quality of the input voltage from the supply grid. This operating mode may be selected if supply through the bypass usually works without problems. In this case, the load will be supplied through the bypass. If the input voltage from the grid becomes poorer, the UPS automatically switches to online operating mode and supplies the consumer through the inverter. Switching back to online mode occurs within one second when the following thresholds are exceeded:
Input voltage beyond $\pm 10\%$ (or $\pm 15\%$ if configured accordingly) of nominal voltage
Input frequency beyond ± 3 Hz threshold
You can activate this operating mode on the control panel.

3.2.2 Free-run mode

Free-run mode activates automatically when the input frequency lies beyond the configured tolerances. When switching on the UPS, the nominal frequency (± 0.25 Hz) is determined and the UPS's output set to this nominal frequency. If the frequency value later changes beyond the tolerance limits, the UPS switches to autonomous adjustment and adjusts the output frequency itself.

3.2.3 Diagnostic checks

When switched on, a number of self-tests are run. Any issues these uncover are shown on the display. The UPS can run an automatic battery test to check the battery voltage. This battery test is no substitute for the battery test conducted to determine battery capacity. These tests may be run manually from the control panel, but only after the first 24 hours following the first time the UPS is switched on (as the battery will still be charging during this time).

3.2.4 System configuration

The user can change some of the UPS's system parameters on the control panel. Please consult the manufacturer before doing so.

3.2.5 Audible alarms

Battery discharging:	One short tone sounds every 5 seconds
When battery close to depletion:	Two short tones sounds every 5 seconds
Fault:	Continuous tone
During battery test:	No tone

4 Transport and storage

Only transport the equipment in its original packaging. Always use the appropriate transport gear. Do not remove the original packaging until the equipment has reached its final operating destination. Protect against falling when storing! Store the equipment in a dry place; see also the technical data.

4.1 Storing the battery

If the UPS includes a battery or there is a separate battery unit, observe the following: Recharging is required if the battery is stored as follows.
At approx. 20°C, every 6 months
At approx. 30°C, every 3 months
At approx. 35°C, every 2 months
More information can be found in the battery manufacturer's operating instructions.

4.2 Unpacking and setup

Keep packaging for return transports. Store it in a dry place. Set up the equipment, making sure that it cannot fall over. Alternatively, slide it carefully into a slot designed for UPS systems. Note that you must insert it into a slot as far as it will go. Refer to the technical data for conditions concerning the setup location.

5 Installation

This model of UPS either comes with a battery integrated into the housing or with an external battery case. Use the cables included in delivery to connect it.



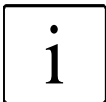
CAUTION:

UPSs from this model series are designed for different DC-voltages (battery voltages). Always check that the battery voltage matches the specifications before connecting an external battery to the UPS. There is otherwise a risk of destroying individual assemblies and/or the battery. The battery sockets and connectors have been mechanically coded to aid you in avoiding incorrect connection.



CAUTION:

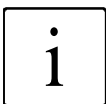
Do not connect an external battery until the UPS is being fed an input voltage. There is otherwise a risk of overloading the battery connection.



NOTE:

PME-1000VA has its air outlet on its front side.
All other models have their air outlet on their rear.

Connect the UPS to the supply grid.
Make sure that the UPS is receiving input voltage.
If required: Connect an external battery to the UPS.
Connect consumers to the output sockets.



NOTE:

Refer to the list of electrical connections for the connection assignments; see the section on technical data for the corresponding technical specifications.

5.1 Electrical connections

See the section on technical data for the electrical characteristics.

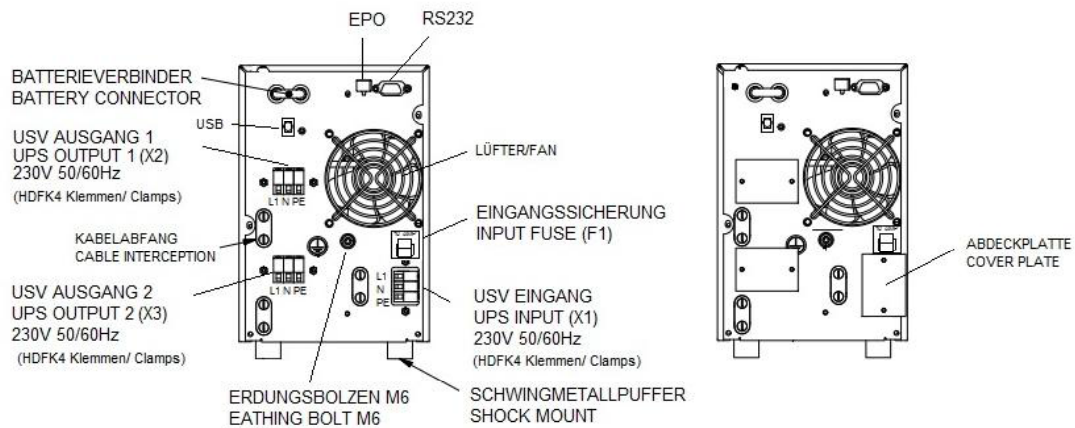
Designation (see the following sketches)	Description
OUTLET	UPS output terminal rail X2/...X3
EXTERNAL BATTERY (OPTIONAL)	Socket for connecting external battery (optional)
USB (OPTIONAL)	USB socket (optional)
INTERFACE (OPTIONAL)	Interface slot for relay card, SNMP adapter etc. (optional)
EPO	Input for UPS electronic power off
RS-232	Data/signal
NETWORK TRANSIENT PROT.	Ethernet filter
INPUT	UPS output terminal rail X1
CIRCUIT BREAKER	Fuse



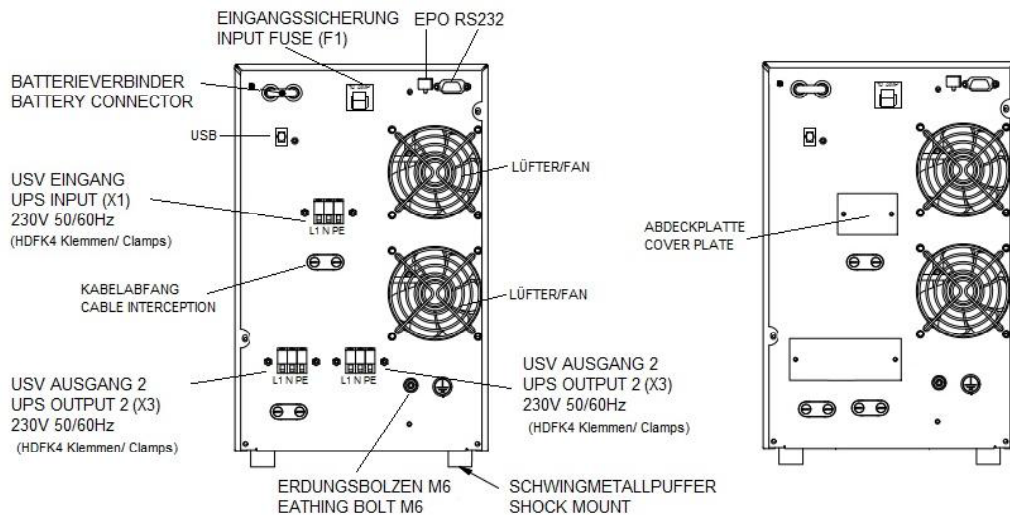
NOTE:

All of the images showing the device connections match the latest versions of our JOVYTEC PE NT series. They are subject to change and/or customisation. Refer to the technical data for notes on connection design.

5.1.1 1000VA JOVYTEC PE NT



5.1.2 2000VA JOVYTEC PE NT

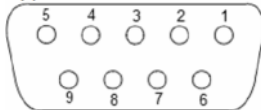


5.1.3 RS-232 interface

The RS-232 interface adds further functions.

If, for example, the card slot is occupied (SNMP adapter etc.), the RS-232 interface may be used to output external signals like those of a relay card. The 3 possible signals are listed in the table below (PIN 6 to 9).

Type: SUB-D9 socket

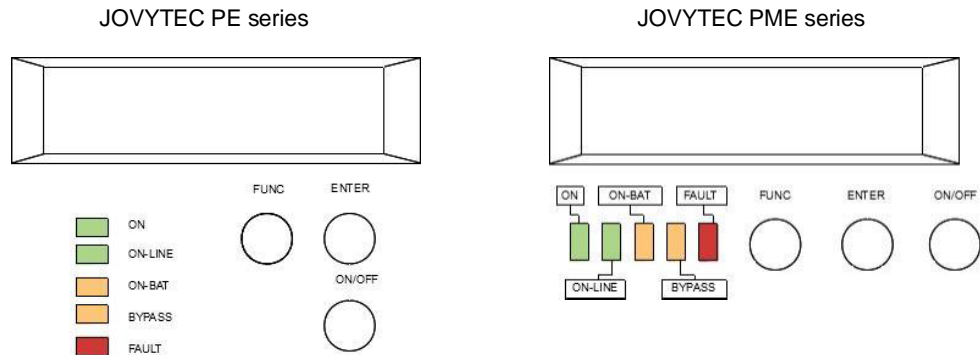


Pin no.	Signal name	Signal direction (in relation to UPS)	Function
2	TxD	Output	Transmit data
3	RxD	Input	Receive data
5	Common	----	Reference potential
6		Output	Grid failure signal
8		Output	Battery discharged signal
9		Output	12 VDC voltage

6 Operation

6.1 Front panel

Depending on the version, the front panel is laid out as follows:



6.1.1 LED

LED	Description
ON	LED green: Lit when UPS is on
ON-LINE	LED green: Lit when UPS is running in normal or bypass mode, output powered
ON-BAT	LED yellow: Lit when UPS running in battery mode
BYPASS	LED yellow: Lit when UPS in bypass mode
FAULT	LED red: Lit if there is an internal fault

6.1.2 Buttons

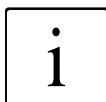
Description of buttons on control panel

Buttons	Description
ON/OFF	<ul style="list-style-type: none"> ➤ On/off button ➤ To switch on the UPS: press and hold for 3 seconds ➤ To switch off the UPS: press and hold for 3 seconds
FUNC	<ul style="list-style-type: none"> ➤ Function button ➤ To activate a function using this button: press and hold for 2 seconds ➤ Press briefly to skip between menu items
ENTER	<ul style="list-style-type: none"> ➤ ENTER key ➤ Confirms changes ➤ To review the UPS values: press and hold for 2 seconds ➤ If no further buttons are pressed in the next 10 seconds: display reverts to default

6.1.3 Displaying UPS status

If no button is pressed within a certain time, the UPS displays one of the following operating modes.

Display	Description	LED
Line Mode	UPS running in online mode	LED ON-LINE lit
High Efficiency	UPS running in bypass mode (high-efficiency mode)	LED BYPASS lit
Manual Bypass	UPS running statically through bypass	LED BYPASS lit
Battery Mode	UPS supplying consumers through battery (see note)	LED ON-BAT lit



NOTE:

When running in battery mode, the UPS sounds a tone. Refer to the section on function description. No sounds are emitted during the battery test.

6.1.4 Displaying UPS values

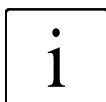
To review the UPS values, press and hold the <ENTER> button for about 2 seconds. Then press then <ENTER> button repeatedly until the desired value is shown in the display. The display reverts to showing the UPS status after a few seconds.

Display	Description
O/P VOLT = xxx.xV	Output voltage [V]
O/P FREQ=xx.x HZ	Output frequency [Hz]
I/P VOLT=xxx.xV	Input voltage [V]
I/P FREQ=xx.x HZ	Input frequency [Hz]
BAT VOLT= xx.xV	Battery voltage [V]
O/P LOAD%=xx%	Percentage of load capacity used [%]
O/P W=xW	Active power at output [W]
O/P VA=xVA	Output power [VA]
O/P CURR =x.xA	Output current [A]
BACKUP TIME=xxM	Available backup time [minutes]
BAT CHARG=xx%	Approximate battery charge level [%]
TEMPERATURE=xxC	Approximate temperature inside UPS [°C]
BAT PACK NUM=x	Configured number of external battery cases
RATING= xK VA	Rated power
CPU VERSION xx.xx	Firmware version

6.1.5 Serial interface

The serial interface can be used together with the included software and included serial data cable. Alternatively an optional SNMP adapter may be connected here.

The data cable is intended for directly connecting the UPS to a PC or an (optional) SNMP adapter.



NOTE:

The included software is free but corresponding support incurs a fee.

6.1.6 Configuration



ATTENTION:

The system should only be modified if said modifications are absolutely indispensable. If in doubt, please consult your authorised dealer first.

Procedure:

- To configure, press and hold the <FUNC> button for about 2 seconds.
- Then press the <FUNC> button repeatedly until the desired setting (column 2) appears.
- Then press <ENTER>: The current setting value appears.
- Press <FUNC> repeatedly to select the desired value (column 4).
- Press <ENTER> to confirm the setting.
- When the display shows "Save ?", press <ENTER> once more.

Note: If any button is not being pressed for a time, the display reverts to what it was showing previously and no changes are adopted.

1. Designation	2. Text on display	3. Description	4. Options available <u>Default value</u>
Nominal output voltage (version 220/230/240 V)	O/P V Setting	For selecting nominal output voltage	208V 220V 230V 240V
Input frequency tolerance window	I/P F Setting	For selecting tolerance range in which the UPS matches output frequency	±2% ±5% ±7%
Bypass voltage tolerance window	I/P Bypass Set	For selecting tolerance range in which the UPS may switch to bypass if necessary	+/-10% +10% / -15% +15% / -20%
Autonomous adjustment of output frequency	Free Run Set	UPS sets and maintains frequency at nominal value itself	ON / OFF
Bypass on in autonomous mode (only shown if free-run mode is active!)	Bypass disable	When activated, the UPS can switch to bypass even without synchronising.	ON / OFF
High-efficiency mode	HE Mode Set	For choosing between online mode and high-efficiency mode (bypass mode) including setting tolerance range	ON +/-10% ON +/- 15% OFF
Activate internal bypass*)	Manual Bypass	Force UPS to internal bypass	ON / OFF
Output group controls	Outlet Setting	For setting the two output groups for the consumers: both on/one on only/both off	1 ON & 2 ON 1 OFF & 2 ON 1 ON & 2 OFF 1 OFF & 2 OFF
Battery test	Battery Test	Battery quick test (approx. 5 seconds)	Test ?
Switch off alarm sound	Silence Set	Switches off the alarm sound	ON / OFF
Configured number of external battery cases**)	Bat Cabinet Set	Sets number of external battery cases for calculating backup time	0 /1/2
Alert to inverted supply grid	Sit Fault Set	Sounds an alarm if phase and neutral line have been swapped over at input.	Disable Enable
Language setting	Language	Language setting	English Deutsch-German Français-French Español-Spanish Italian
Generator mode***)	Generator	For activating generator mode special function	ON/ OFF
RS-232 interface settings	RS232 Control	For setting RS-232 interface	Enable Disable

*) For servicing only; load is not supplied if grid fails while this function is active.

***) Depends on backup time

***) Every time you change this setting: leave UPS connected to grid, use ON/OFF to restart.

6.1.7 Optional accessories

The following UPS options are available:

- External Relay card
- External SNMP adapter

7 Servicing

The ambient conditions will decisively affect the UPS's capacity to operate flawlessly. The equipment should be set up in a clean, dust-free area where the ambient conditions will match those specified in the data sheet. We recommend an ambient temperature of +20°C for the battery . . .+25°C.

7.1 Maintenance

Only authorised service personnel are permitted to perform maintenance work on the system.

7.1.1 Visual inspection

During visual inspections, check for:

- Unusual noises or odours
- Mechanical damage or foreign bodies in the unit
- Accumulations of dust that affect heat dissipation
- Fault messages in the display

The intervals between visual inspections depend first and foremost on the conditions at the location where the equipment is installed. Perform visual inspections every 6 months at least.

7.1.2 Function test

The UPS should be tested for correct operation every six months. You may use a test load to do so. This will allow a more precise assessment of the UPS's condition. A power grid failure is then simulated to intentionally discharge the battery. This function test can also be used to test the battery's capacity.

7.1.3 Battery inspection

We recommend having an authorised service provider inspect the battery once a year. This will aid in detecting impending failure in good time.

7.1.4 Changing the battery

Only authorised service personnel are permitted to change the battery.

When changing the battery, use an identical battery type with the same number of battery blocks.



CAUTION:

Never dispose of batteries by incinerating them. They may explode.



CAUTION:

Never open or mechanically damage batteries. Escaping electrolyte is harmful to eyes and skin. It can be toxic.

7.2 Repairs

For repairs, send the system in to an authorised service provider or to the manufacturer directly.

7.3 Troubleshooting

Display message	Alarm tone	Description	Remedy
Output Overload	Two tones per second	The UPS is overloaded and switches to bypass	Reduce the load. The UPS will revert to normal operation
Battery Test	No tone	UPS is running a battery test	No action required. Wait until battery test is complete.
Over-Charge	Continuous tone	Batteries overcharging	Switch off UPS, notify service
Low Battery	Two tones per second	Battery depleted	UPS will start automatically when power grid is available again
On-Battery	One tone every 5 seconds	UPS running in battery mode	Prepare your consumers for a possible end of backup.
Charger Failure	Continuous tone	Battery charger failure	Request service
Over-Temperature	Continuous tone	Ambient temperature too high	Check the UPS's cooling air flows for blockages, reduce ambient temperature. Otherwise request service.
Output Short	Continuous tone	Short circuit at output	Check the connected consumers
High Output Voltage	Continuous tone	Output voltage too high	Request service
Low Output Voltage	Continuous tone	Output voltage too low	Request service
Bus Fault	Two tones per second	Internal DC voltage too high	Switch off loads, shut down UPS. Request service
Site Wiring Fault	One tone per second	Voltage present between neutral and earth	UPS input connected inversely or UPS connected without earth. Check that connection is correct.
Line abnormal	One tone per second	Input voltage incorrect during automatic startup	

8 Disassembly and disposal

After decommissioning and removing the UPS system from the connected mains supply, the UPS and batteries must be disposed of in accordance with the legal regulations. We take back UPS units and batteries from the operator free of charge and recycle them accordingly.



Do not dispose of the equipment with regular household waste!

9 Other technical documents

We supply the following documents for download on the UPS system's product page on our website:

- Battery data sheets
- Battery usage instructions
- Material Safety Data Sheet
- CE - declaration of conformity

Download them here:

<http://www.jovyatlas.de>

10 Technical data

10.1 Technical data UPS

	1000VA	2000VA
	GE 3030 G 020	GE 3030 G 022
Output		
Rated power (cos $\varphi = 0,9$)	1000 VA	2000 VA
Active power at output (cos $\varphi = 1$)	900 W	1800 W
Rated output voltage adjustable (version 208V – 240V)	230 VAC (*) $\pm 2\%$	
Phase	1-phase	
Rated output frequency (automatic)	50/60 Hz (+0,25Hz)	
THDU (adherent to IEC EN 62040-3) - linear load	< 2,5 %	
Overload (Online-Mode)	30 seconds @ 106 – 120 % 10 seconds @ 121 – 150 %	
Overload (Battery-Mode)	10 seconds @ 106-115 % 3 seconds @ 115-150 %	
Efficiency (AC – AC)	appr. 89 %	
Input rectifier		
Rated input voltage (version 208V – 240V)	230 V - 20 % / +13%	
Rated input frequency (automatic)	45 Hz – 65 Hz	
Max. input current (Unom. = 230V)	4,4 A	9,4 A
Input mains power factor (at 100 % load)	0,98	
Battery		
Pieces of battery cells	18	36
Battery charging voltage (per cell)	2,27 V	
Battery cut off discharge voltage (per cell) @load > 30%	1,67 V	
Battery cut off discharge voltage (per cell) @load < 30%	1,80 V	
Battery charging characteristic	IU (DIN 41772)	
Internal battery string voltage	36 V	72 V
Type	Maintenance-free, sealed lead acid batteries	
Recharging	< 8 hours for 90%	
Additional data		
EMC – class (EN 62040-2)	C1	C2
Classifikation (EN 62040-3)	VFI SS 111	
Acustik noise level	< 45 dB	< 50 dB
Isolation protection (DIN EN 60529)	IP 20	
Protection class (DIN EN 61140)	I	
Type of cooling	Forced air cooling	
Varnishing	RAL 9005	
Installation site requirements		
Installation height	according EN 62040-3	
UPS- Operation ambient temperature	0 bis +45 °C	
Recommended ambient temperature	+ 15° C - + 25° C	
UPS storage temperature (without battery)	-20 to +50 °C	
Battery ambient / storage temperature (recommended battery ambient temperature, see also battery instructions for use)	0 bis +25 °C +20 °C	
Relative humidity (without condensation)	< 95 %	
Dimension (net)	width	225 mm
	depth	420 mm
	height	358 mm
Weight (without installed batteries)	10 kg	17,2 kg
Weight (with installed batteries)	18 kg	33,1 kg
General information		
Marking of conformity	CE	
Certification	DNVGL TAE0000194	