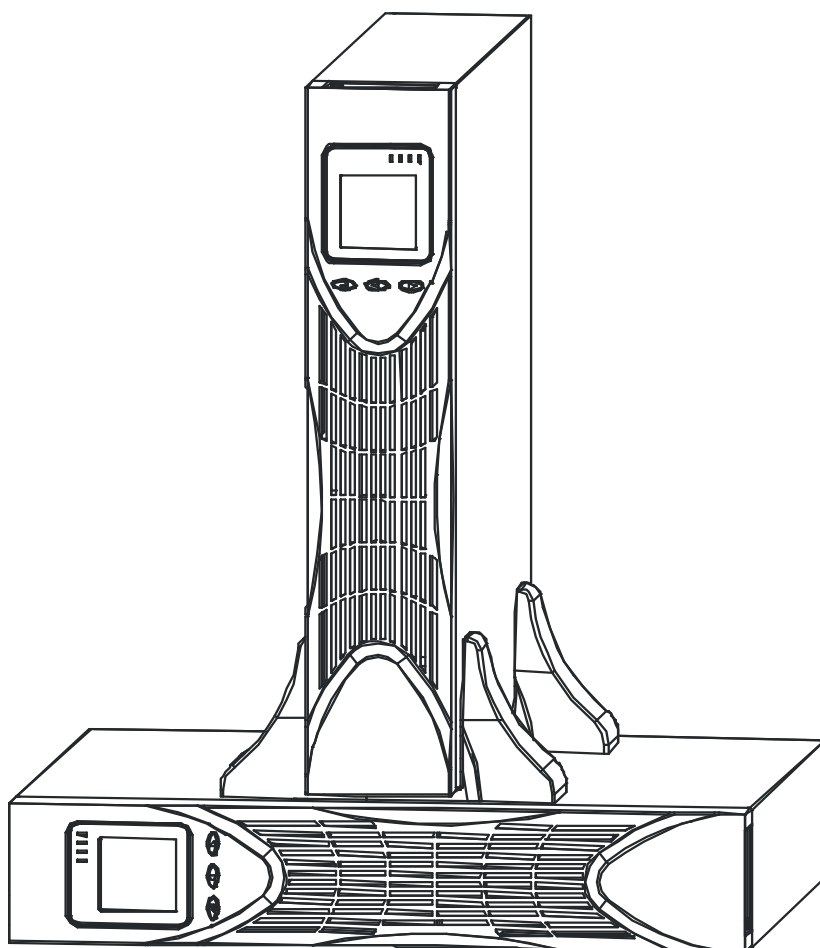


1KVA-3KVA

MID RT series intelligent On-Line UPS family RACK / Tower devices User manual)



Preface

Guide to the manual.

Thank you for choosing the MID RT series, our device is safe and reliable and therefore requires minimal maintenance.

Please read the entire manual carefully. You will also find information and help for installation and use. With the help of the information in the manual, you can ensure the longest service life and operating time of your device. This manual relies on parameters and operating data set during production.

Please follow the instructions in the manual and take into account the warnings in the manual or on the device. Do not operate the device without first reading the basic technical and installation information.

Attention: Due to continuous improvements and improvements, it is possible that the device you purchase may differ from what is described in the manual or from the images that appear. If necessary, contact your distributor representative for exact information.

contents

1. Overview.....	2
1.1 Introduction	2
1.2 Functions and technical data	2
2. Safety regulations	4
2.1 Safety regulation	4
2.2 Safety symbols	5
3. Product information	6
3.1 Appearance of the device.....	6
3.2 Block diagram of the product.....	7
3.3 Type information	7
4. Commissioning	8
4.1 Unpacking and visual inspection.....	8
4.2 Regulations.....	8
4.3 UPS input connection	8
4.4 UPS output connection	9
4.5 External battery connection.....	9
4.6 Commissioning	10
5. Operation and use of the front panel display.....	13
5.1 Backlighting of the front display	13
5.2 Treatment	16
5.3 Parameter setting.....	17
5.4 Querying parameters	21
5.5 Switching on	23
6. Maintenance	25
7.Troubleshooting and the technical parameters of the product family.....	26
7.1 LED indicator lights and the error code table.....	26
7.2 troubleshooting.....	28
7.3 EMC standards/ Safety standards	29
7.4 Technical parameters.....	29
7.5 Communication	30

1. Overview

1.1 Presentation

UPS (uninterruptible power supply) is an energy source that can efficiently and reliably supply consumers with uninterrupted power, and at the same time it is also capable of surge protection and remote monitoring. UPS plays a very important role in IT, IT networks, communication, commerce, shipping, scientific research and many other fields.

The 1KVA-3KVA members of the MID RT series are uninterruptible power sources with improved ON-LINE topology, which are capable of performing complex functions and providing quality performance.

1.2 Functions and technical presentation

1. Improved IGBT modules work in our devices. The built-in electronic components are designed for more than 30,000 operating hours.
2. High-precision digital control technology and the most reliable control algorithm ensure that the output parameters are kept at an optimal level.
3. The self-test that runs when it is turned on detects the possible causes of errors in order to prevent future failures.
4. The double-conversion on-line topology ensures the pure sine wave, constant voltage level, constant frequency, low noise uninterrupted alternating voltage. It provides comprehensive, perfect protection for the user's devices.
5. There is no switching time, neither when the mains voltage fails nor when it returns. It meets the needs of the most demanding precision equipment
6. The bypass function. If the UPS detects a fault, it can switch to bypass operation without losing the output voltage and supply the output with the mains voltage.
7. Advanced voltage compensation technology. It can accept the input voltage between 115V and 295V, thereby reducing the battery usage and enabling use in places with poor quality mains voltage.
8. Mains input frequency 50Hz or 60Hz. The advanced wide input frequency technology enables operation on fluctuating frequency networks. If the input frequency is 50Hz, the tolerance is 45Hz-55Hz. If the set frequency is 60Hz, the tolerance is 55Hz-65Hz. This technology makes it possible for members of the RT family to operate safely even on any network powered by a single-phase generator.
9. The advanced PFC (power factor correction) technology working on the UPS input improves the input $\cos\varphi$ to 0.98. It improves performance efficiency, filters out input harmonic noise, and reduces operating costs.
10. Unsupervised intelligent system. If the input voltage fails, the UPS switches to battery operation to power the loads. When the battery voltage is low, the UPS shuts down to protect itself. When the mains voltage is restored, the UPS detects the input voltage and checks whether it corresponds to the output. If the voltage is correct, the UPS will restart automatically, if it is not correct, it will only start charging the battery. The UPS will not turn on until the input voltage and frequency are restored.

11. Cold start. Even in the absence of input voltage, the device can be started from the internal or external battery, so it meets the user's needs even in the event of an emergency. With the cold start function, the UPS can be started even with full load.

12. UPS self-protection: If the input or output voltage is too high or too low, overload, if there is a short circuit on either side, or the temperature of the internal electronic components is too high, or the charging voltage of the batteries is too high or too low, or the mains voltage spike occurs the internal protection system of the UPS is activated.

13. Rack - Tower conversion display design. You can easily rotate the data displayed on the display according to the position of use of the UPS. The display can display a variety of data, such as mains voltage and frequency, battery voltage and remaining capacity, device internal temperature, and output voltage value. In addition to the data, the charging process and the operation of the fans are displayed on a graphic interface. In the event of an error, a two-digit error code will appear on the display to help identify the error (the error code table at the end of the manual will help you analyze it).

14. The UPS can also communicate with a computer via an RS232 serial port using an intelligent monitoring software. All operating parameters can be monitored from here, and many UPS functions can also be controlled from here.

15. Network (ethernet) communication can also be implemented using the SNMP adapter. With the right settings, you can keep your internal clock ready for the day (which is very important for logging) and send e-mails and SMS. With the help of the card, all important parameters can be monitored via a web interface, the most important functions can be controlled, and past events can also be traced back from the logged data.

16. USB communication. Full UPS supervision is also possible from here. If the RS232 port is in use, it will automatically switch to this communication line when the USB cable is connected.

17. With the help of the ECO function, you can save electricity. If the mains voltage is within fixed limits, the output consumers are fed directly from it by the UPS. In this case, the inverter is switched on, but in a "standby" state. If there is a disturbance in the mains voltage, the inverter immediately takes over and starts feeding the consumers.

18. In order to supply our most important consumers with uninterrupted voltage for as long as possible, the output connectors of the SPD version are divided into two groups. There is 1 primary connector on the 1000VA device, and 2 primary connectors on the 2000VA and 3000VA versions. Smaller workstations must be connected to these. Connect the consumers that require a longer running time to the secondary output connectors. If the voltage of the batteries falls below the predetermined value, only the consumers on the primary terminals will stop. Consumers on the secondary output only stop when the batteries are completely exhausted.

19. Uniform international 19" size. It can be installed in any standard 19" mounting frame using the RACK mounting tabs included in the package.

2. Safety regulations

Summary

This chapter mainly deals with safety regulations and warnings for 1-3kVA devices. Read it carefully before putting the device into operation.

2.1 Safety regulations

Dangerous voltage and high temperature are present in the device. Follow local safety regulations and applicable laws during installation, use and maintenance. Failure to do so may result in serious personal injury or property damage. The safety regulations in this manual are supplements to local safety regulations.

Our company does not assume any responsibility for damages and injuries that occur due to non-compliance with the rules. Please pay attention to the following.

1. Do not use the device if the load exceeds the rated power.
2. All devices have high capacity batteries. Do not open the device, as touching the parts can cause an electric shock. If you need maintenance or battery replacement, contact the specialist service.
3. An internal short circuit may cause electric shock or fire, so do not place a container full of liquid on top of the device and risk electric shock.
4. Do not operate the device in a place where the ambient temperature is high, humidity is high or there is a risk of rusting.
5. Always leave adequate space in front and behind the device to ensure ventilation, because the device heats up to 50-60°C during battery operation at full load. In the absence of adequate cooling, the thermal protection of the device is activated and the device switches off. In this case, the normal shutdown of the consumers does not take place!
6. Avoid placing the device in direct sunlight or near a strong heat source. If possible, provide it with an ambient temperature of around 20°C.
7. If you notice smoke or abnormal sound (buzzing, buzzing, crackling) from the UPS in any situation, immediately cut off the power supply, turn it off and contact your local service center.

2.2 Identification of safety symbols

The safety symbols are shown in the table below. They inform the user about the safety rules to be followed and possible sources of danger during maintenance or operation.

Safety symbol	Meaning
	Attention
	Static discharge hazard
	Risk of electric shock

We distinguish between three security levels: Danger, alarm, attention. The note associated with the symbol can be read on the right side of the symbol (see examples below.).



Danger

It warns of serious injury, death or serious damage to the device.



Alarm

Draws attention to serious injury or damage to the device.



Attention

It draws attention to the risk of injury or device failure.

3. Product information

3.1 Appearance of the device

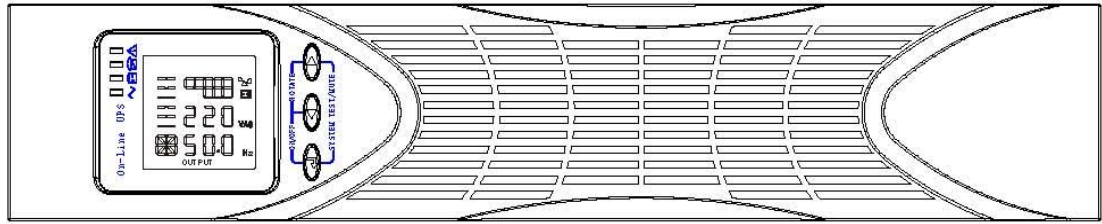


Figure 1: Image of the front panel

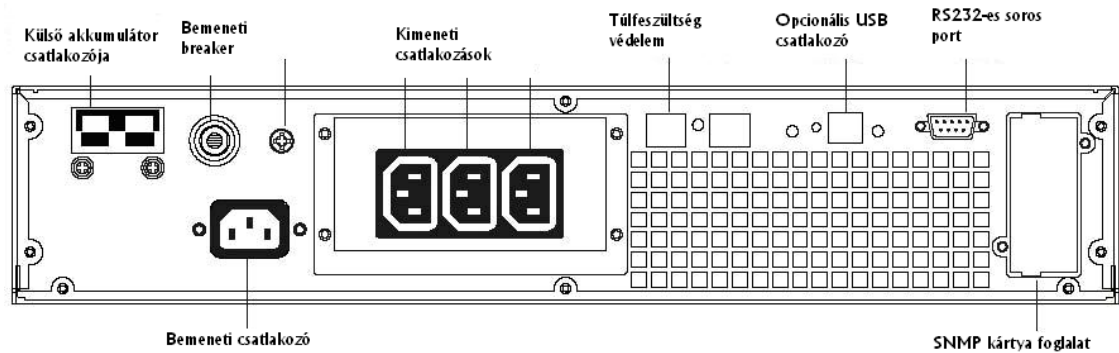


Figure 2: picture of the back of the 1kVA device

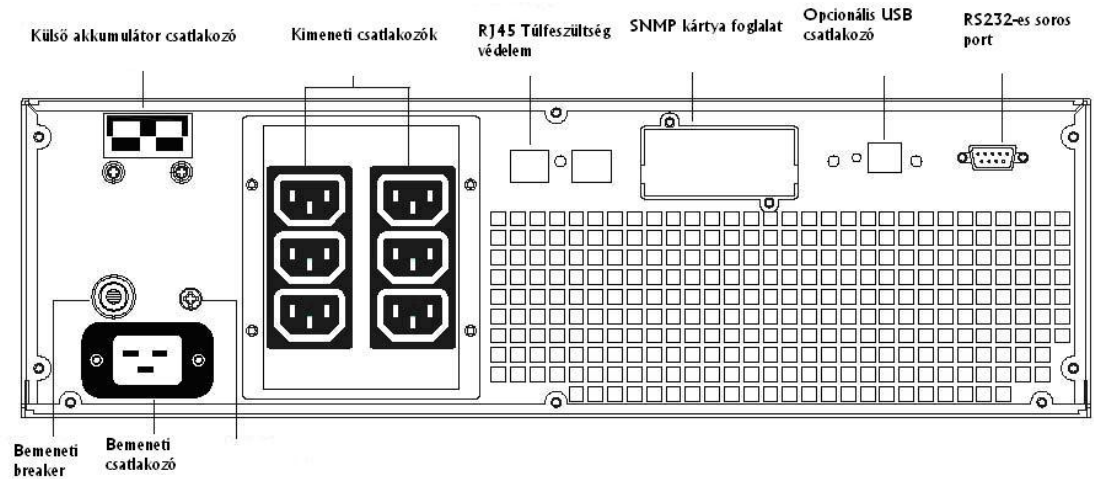


Figure 3: picture of the back of the 2-3kVA device

3.2 Block diagram of the device

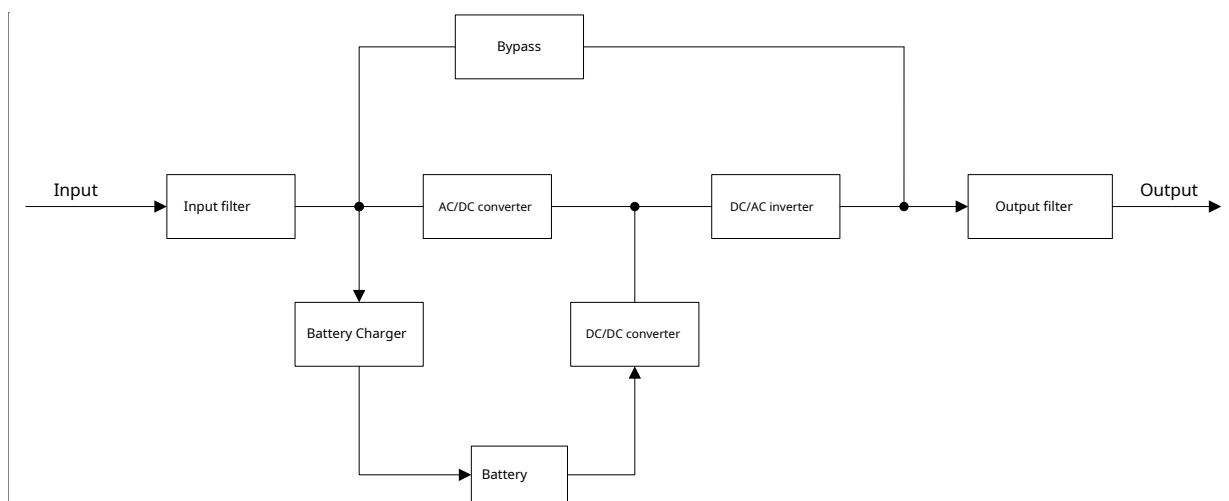


Figure 4. UPS block diagram

1. Input filter: Filters the mains voltage coming into the UPS.
2. AC/DC converter: It converts the filtered input alternating voltage into direct voltage and adjusts it to the DC/AC inverter.
3. DC/DC converter: When the UPS is running on battery, this unit regulates the DC voltage for the DC/AC inverter.
4. DC/AC inverter: Converts the regulated direct voltage into a stable alternating voltage.
5. Bypass: When an overload or failure occurs, the UPS immediately switches to bypass mode and continues to supply the consumers.
6. Battery charger: The charger of the standard unit has a power of 1A, for the device with an external battery it is 7A/14A.
7. Battery: Sealed, maintenance-free lead-acid battery.
8. Output filter: Filters the output voltage.

3.3 Type of information

Building a UPS	Type	Battery tension	Description
All devices in basic equipment included in XL elements: (Charging panel and external battery connection)	1KVAH	=24VDC	Internal 1A battery charger, external 24V battery connection.
	2KVAH	=48VDC	Internal 1A battery charger, external 48Vos battery connection.
	3KW	=72VDC	Internal 1A battery charger, external 72V battery connection.

The external battery units ((MIDRT X000RTi-EBP) EBP as External Battery Pack) in all three power categories have their own charging electronics, so there is no need for a battery charger with a higher current in the UPS. Thus, the 1A charging circuit in the electronics is sufficient to fully charge the batteries even in stand-alone operation.

4. Commissioning

4.1 Unpacking and visual inspection

1. After unpacking, make sure that the device has not been damaged during transport. If you find it damaged or incomplete, do not start it.
2. Check the availability of accessories (Appendix Table 1)
3. Make sure the package contains the type you want to buy. The small label on the back of the device helps with this.

4.2 Regulations

1. Please place the UPS in an environment with a clean, stable surface, away from vibration, dirt, high humidity, flammable gases and liquids, and rust.
2. Keep the ambient temperature of the UPS between 0°C and 40°C. If the device is operated in an environment above 40°C, its rated load capacity decreases by 12% for every 5°C increase. The highest ambient operating temperature is 50°C.
3. Always provide sufficient ventilation for the device.

4.3 UPS input connection

Connect it to the wall socket using the supplied power cable.

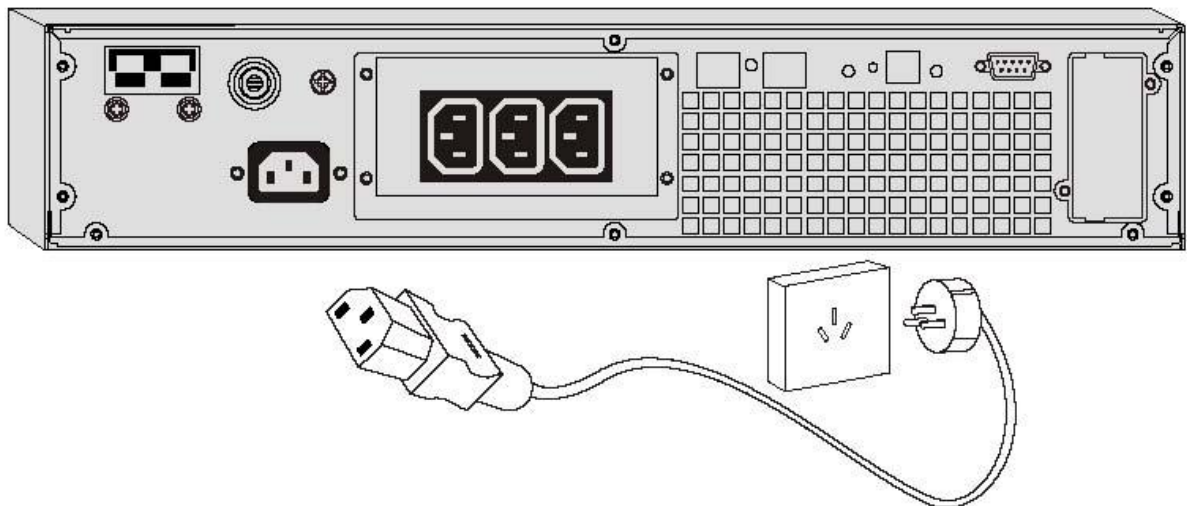


Figure 5. Input connection

(the design of the connectors may vary by type and country)

4.4 UPS output connection

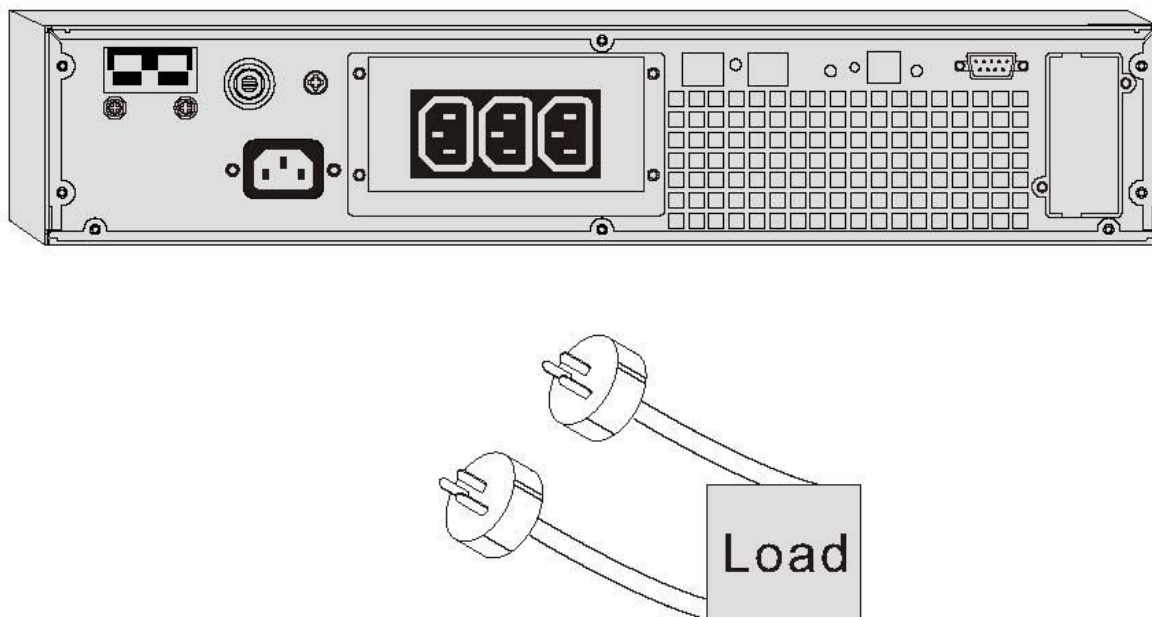


Figure 6 Output connection (LOAD = load, consumer)
(the design of the connectors may vary by type and country)

4.5 Connecting an external battery.

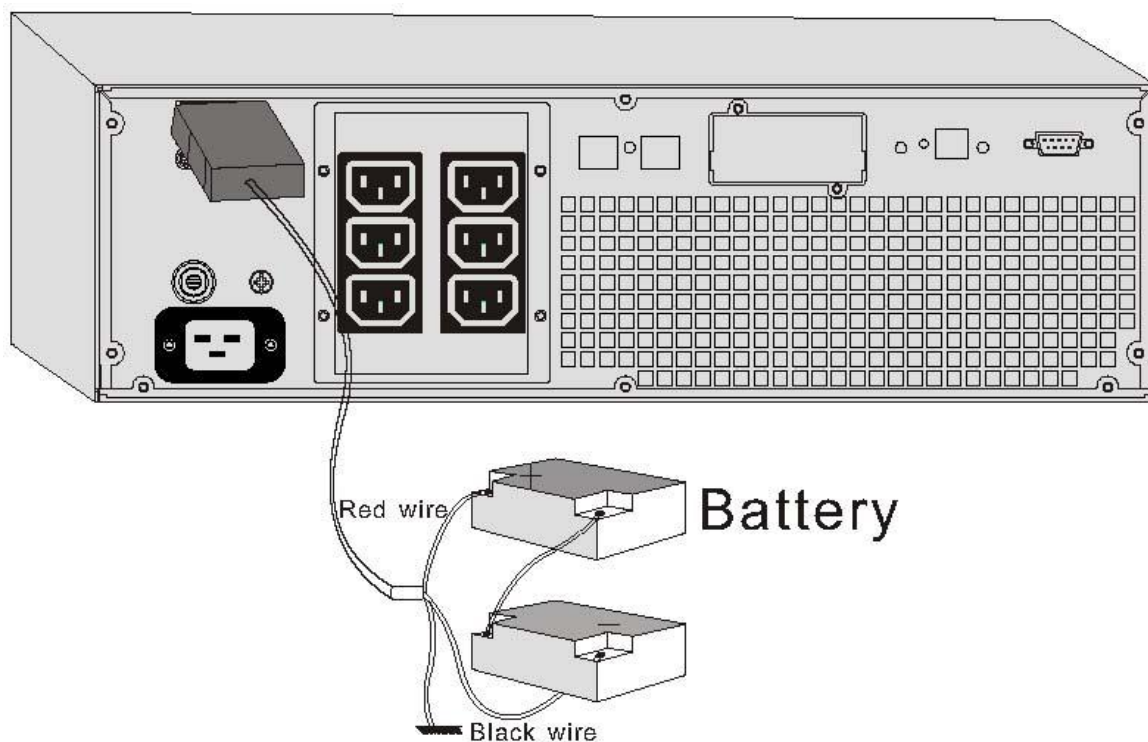


Figure 7. Connecting the battery
(Red wire = red wire (+), Black wire = black wire (-),
Battery = Accumulator)

4.6 Commissioning

4.6.1 Assembling the plastic plinth.

- ① Match the two elements as shown on the left.
- ② Straighten it as shown on the right.

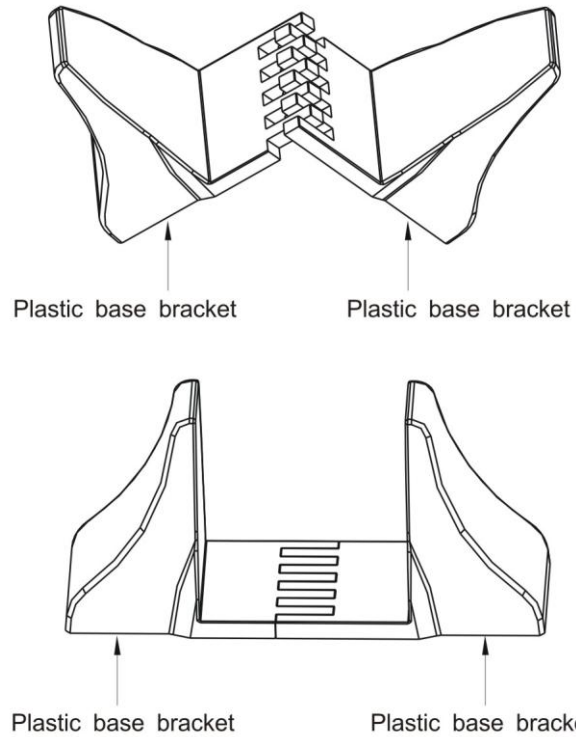


Figure 8. Assembling a 1kVA plinth (standard+XL)

- ③ The assembly of the plinth element of the 2KVA/3KVA (standard+XL) devices is the same as that of the 1kVA type, only a connecting piece must be inserted between the two elements.

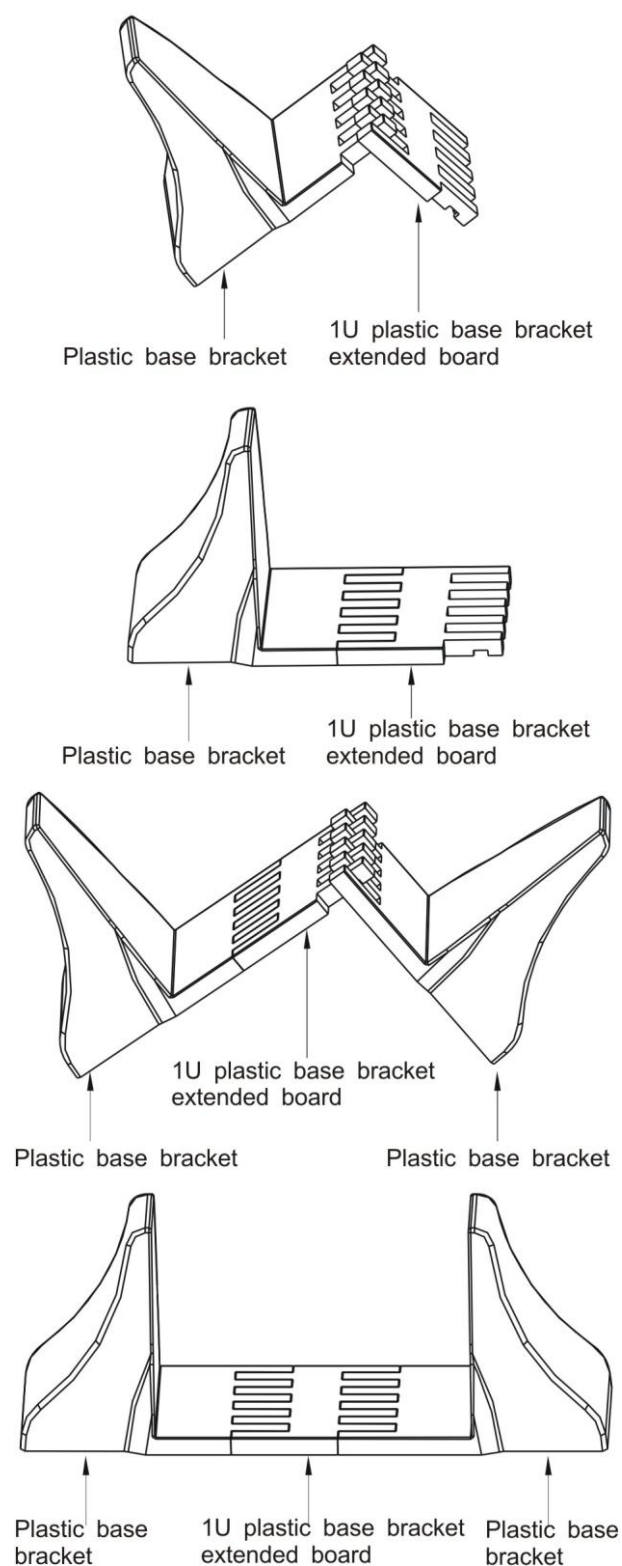


Figure 9. Assembly of 2kVA/3KVA (standard+XL) plinth element

4.6.2 Installation of 19" mounting lugs

- ① Unscrew the two M4 screws marked A and B in the figure on both sides (a total of 4)

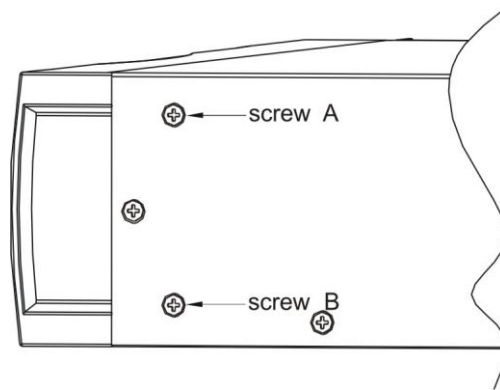


Figure 10. Position of screws "A" and "B" on the side of the UPS

- ② The two countersunk holes of the 19" mounting lugs exactly match the holes of the screws "A" and "B" on both sides of the device.

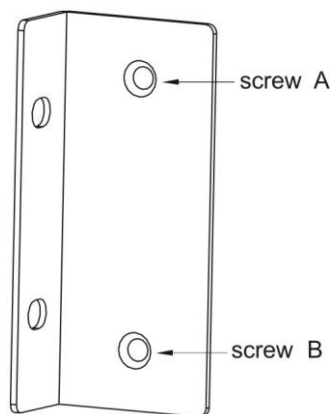


Figure 11. 19" mounting lug

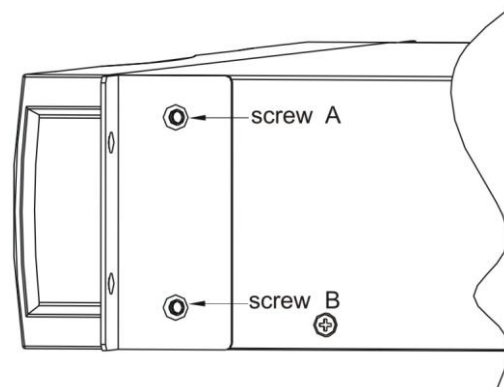


Figure 12. The 19" mounting lug installed

- ③ Screw the two M4 screws back into the two holes of the mounting tab on both sides of the device.

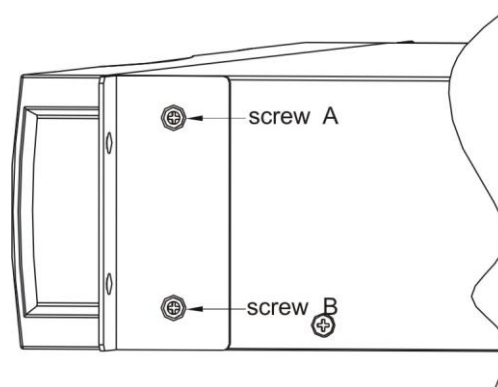


Figure 13. The installed 19" mounting lug

4.6.3 Tower/RACK installation position

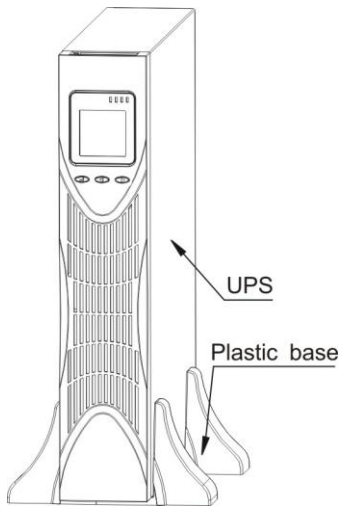


Figure 14. Tower position

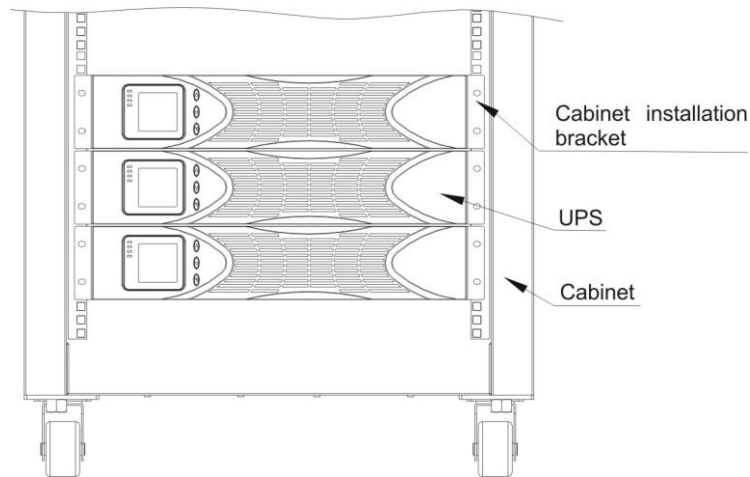


Fig. 15 in RACK position



Attention:

- ★ Before starting to install the batteries, make sure that the input fuse and breaker are turned off. Do not wear any metal jewelry (such as rings, bracelets, etc.) during installation.
- ★ Avoid connecting the connecting cables with opposite polarity and short-circuiting the poles of the batteries. The red wire is connected to the positive (+) pole of the battery, while the black wire is connected to the negative (-) pole of the battery.
- ★ When installing, use insulated tools and never place any metal objects on top of the batteries.



Comment:

- ★ When installing external battery units, it is recommended to use a connection cable of the appropriate design for the device.
- ★ Connect a consumer by first turning it off, then connecting it to the output of the UPS, then turn on the consumers one by one.
- ★ **Inductive consumers such as motors and fluorescent lamps, photocopiers should never be connected to the UPS output**. Otherwise, the device may be damaged.
- ★ Only operate the UPS from an outlet with proper overcurrent protection and an earth pole.
- ★ There is always voltage at the output of the UPS, even if no input cable is connected. Therefore, if you want to turn off the output, first turn off the device and then unplug the connecting cable.
- ★ If you want to connect a laser printer to the outlet, choose a device that matches the printer's start-up and heating power.

5. Operation and use of front panel display

Its management is simple. It is sufficient for the user to read this manual and follow its operating instructions without any special training.

5.1 Front display backlight

The display has a bright, blue backlight, which turns on when any button is pressed, then approx. It turns off automatically after 1 minute.

5.1.1 Control buttons

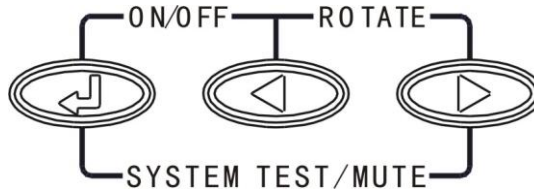


Figure 16. The operating buttons and commands

- ON/OFF command ( + )

Press and hold the two buttons on the left at the same time for more than half a second to turn the device on or off. When you hear the beep, release the buttons.

- ROTATE command ( )

Press and hold the two right buttons for at least 2 seconds to rotate the displayed data according to the operating situation.

- SELF-TEST/MUTE command ( + )

Press and hold the two extreme buttons for at least 1 second in normal or ECO mode to silence the sound alarm in effect or to start the self-test function in normal operation.

- QUESTION buttons  obsession 

Settings that do not affect operation:

With the help of these keys, we can "page" between the data that can be displayed (such as: input voltage and frequency, battery voltage and capacity, internal temperature, output voltage and frequency).

Press and hold a  button 2 for more than 2 seconds, so the data continuously displays alternately. Pressing the button again (for less than 2 seconds) will stop the process and display the output data again.

Settings affecting operation:

Press and hold the button for more than half a second and select the SET option.

- Function setting button 

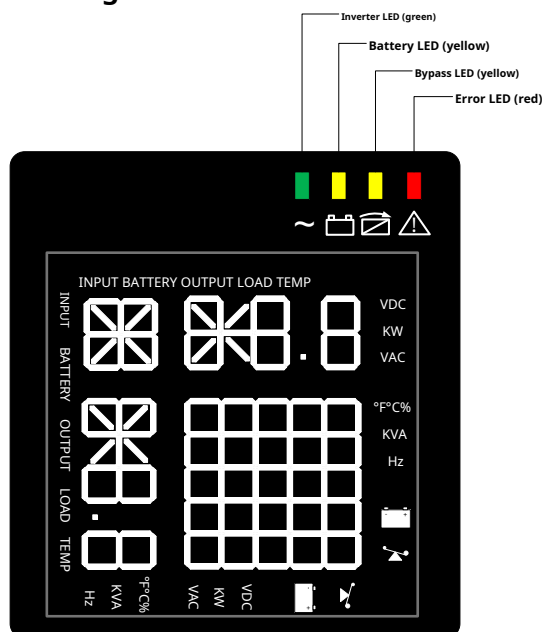
Setting mode that does not affect operation:

Press and hold for more than 2 seconds to enter the function setting menu.

Mode of setting affecting operation:

Press and hold for half a second (less than 2 seconds) and confirm the SET option.

5.1.2 Indications of LED traffic lights.



Error (red) LED lights up: UPS detects an error, no output. Such a situation can be overload, weak batteries, inverter or BUS error, overheating.

Bypass (yellow) LED lights up: UPS alarm. Indication of bypass operation. *Battery*

(yellow) LED lights up: UPS alarm. Indication of battery operation.

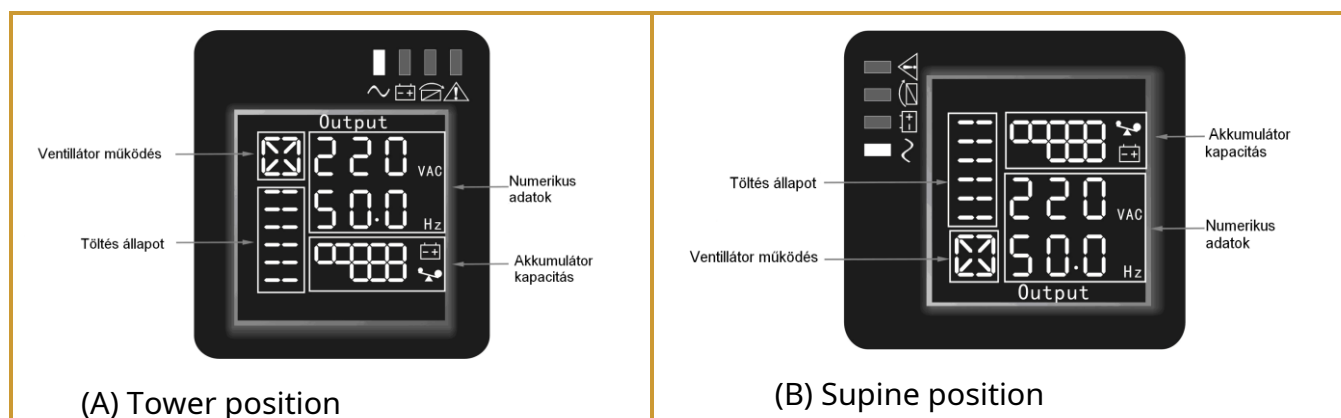
Inverter (green) LED lights up: The UPS operates from mains voltage in normal, ECO or battery mode.

When the UPS starts up, all the LEDs flash simultaneously and then turn off one by one. When switched on, they flash in sequence and go out several times in succession, then the device switches to normal operation.

Attention: For the meaning of the lights that light up in different modes and during errors and to identify the errors, see the appendix.

5.1.3 Description of LCD display

By default, when the UPS is used as a tower, the display is as shown in figure "A". After mounting in a RACK cabinet, press the ROTATE key combination and hold it down for more than 1 second to rotate the display. Thus, the display will be in accordance with figure "B".



The LCD display has a numeric section, a graphical capacity section, a graphical fan status section, and a graphical battery charge section.

Numerical section—The values of the queried data (output, load, temperature, input, battery) can be read here. As shown in the figure on the previous page.

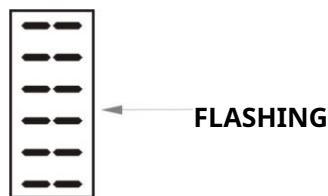
Battery capacity section—In battery operation, it displays the capacity and the load. Each unit represents 20%. As shown in the previous figure, the capacity is 80%-100% (5 units), while the load is 40%-60% (3 units). In case of overload, the load section starts flashing, the same happens with the battery capacity section in case of weak batteries.

Fan operation section—It shows the operation of the fans. When the fan(s) are running, the graphic shows the fan blades rotating. In the event of any fan failure, the graphic icon flashes and an alarm sounds.

Charging status—Displays the status of the battery charger. If the charger is operating normally, the graphic charging indicator shows the following process (1).

(1)

If the charger is malfunctioning, the full icon flashes and the UPS sounds an alarm (2):



(2)

In battery mode, the graphic indicator of the charge status is the same as the data displayed in the battery capacity section. So if there are 5 units on the battery capacity display, then 5 lines will also be visible on the charge status display.



(3)

5.2 Treatment

5.2.1 Starting the device

Starting the UPS from mains voltage:

1. As soon as the mains cable is connected to the UPS, the device will automatically turn on and start charging the batteries. It can be read from the display that the output voltage is 0V, if necessary it can be switched to bypass operation using the buttons.
2. Press and hold the ON/OFF buttons for half a second and the UPS will turn on the inverter.
3. After starting up, the UPS will perform a self-test, during which the LEDs will flash continuously. At the end of the test, it switches to mains operation and the green LED starts to light up. This indicates normal operation.

Starting the UPS from battery voltage:

1. In the absence of mains voltage, press and hold the ON/OFF buttons to turn on the UPS.
2. The further process of starting is the same as described in the chapter "starting from network mode". But in this case, after the self-test has run, the yellow LED starts to light up. This indicates battery operation.

5.2.2 Stopping the device

Stopping the device from network normal operation

1. Press and hold the ON/OFF buttons for half a second and the UPS will turn off the inverter. In this case, only the output voltage is lost, but the UPS continues to operate. To stop completely, remove the input voltage (pull out the mains cable).
2. As long as you do not unplug the network cable, you can switch the UPS to bypass mode using the display keys.

Stopping the device from battery operation.

1. Press and hold the ON/OFF buttons for half a second and the UPS will switch on completely.
2. When you turn off the UPS, the device first performs a self-test, then the display goes dark and the device turns off completely.

5.2.3 Use of UPS self-test/mute

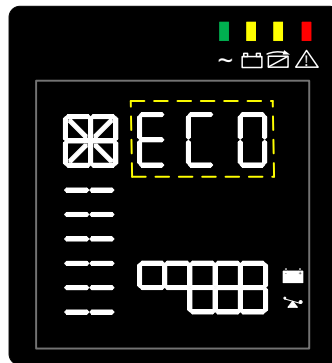
1. During normal network operation, press and hold the two extreme buttons below the display to start the self-test. During the test, the LED indicators flash continuously one after the other. In battery operation, you can turn off the alarm sound by pressing and holding the same two keys. If you press and hold the two buttons again in the muted state, the beep will turn on again.

5.3 Parameter setting

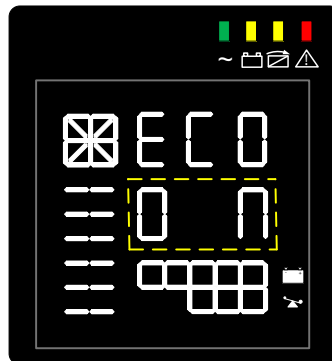
The parameter setting function can be accessed from any operating mode. As soon as the setting has been finalized, it will be activated immediately. The set data will only be saved when the batteries are connected and the UPS has been shut down according to normal steps. The settings are as follows:

5.3.1 ECO mode setting

- ① Enter the settings menu  button (press and hold 2 longer than a second). ECO appears flashing in the menu:



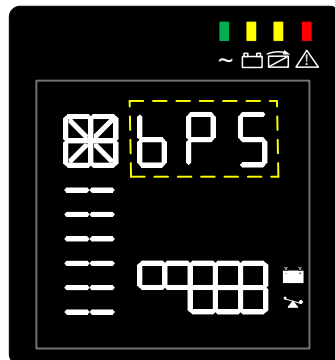
- ② Enter the ECO mode setting menu a  using button. Then the ECO will light up continuously, and the word ON will flash below it. Press and hold a  (query) button for less than 2 seconds and choose between ON and OFF.



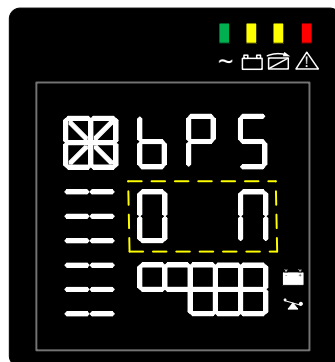
- ③ Press and hold to finalize the settings  button at 2 seconds for a longer period of time, then the flashing inscriptions will start to light up continuously.
- ④ Exit the settings menu a  button pressed longer than 2 seconds holding. The normal operating data is shown again on the display.

5.3.2 Bypass output setting

- ① Enter the setting menu longer than  button (press and hold 2 seconds). Press the  button approx. for half a second and select the appropriate function, in this case the Bypass (BPS) menu. Then the BPS inscription starts flashing on the display.



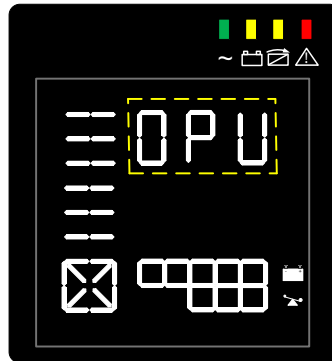
- ② Enter the bypass output setting menu a  button (see ECO setting). Then the inscription BPS starts to light up continuously and the inscription ON starts flashing below it. Here, even only when setting the ECO function a  (query) button can be used to choose between ON and OFF options.



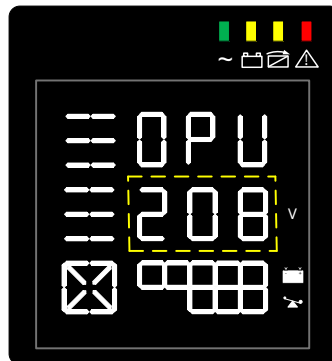
- ③ Press and hold to finalize the settings  button at 2 seconds for a longer period of time, then the flashing inscriptions will start to light up continuously.
- ④ Exit the settings menu a  button for longer than 2 seconds. The normal operating data is shown again on the display.
- ⑤ After turning on the bypass function, if the UPS is connected to the network, the device will start and switch to the bypass branch. There is no battery protection in this mode.

5.3.3 Setting the output voltage (optional menu item)

- ① Enter the settings menu by pressing the  button (press and hold 2 longer than a second). Press and hold a  more than half of the keys seconds and select the parameter you want to set. Here the OPU label starts flashing.



- ② Enter the output voltage setting menu as used for ECO and BPS settings. A flashing numerical adjustable value appears below the OPU label. As with the previous settings, the query button  is used to select a of possible values: 208v, 220v, 230v, 240v. The default value is 220V.



- ③ After selecting the appropriate voltage value, press it again for more than a second  button and the output voltage setting is complete. The numbers that have been flashing until now will be continuously illuminated.
- ④ Exit the settings menu  button (Hold down 2 longer than seconds.)

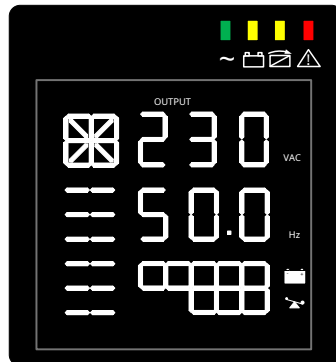


Attention: It is recommended to disconnect the output consumers before changing the output voltage.

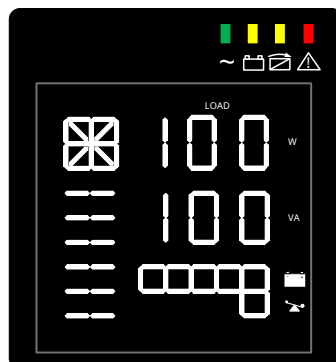
5.4 Query parameters

Hold down the two query buttons ( ) is less than 2 seconds to change the data displayed on the display (such as: output voltage and frequency, load (in W and VA), internal temperature, input voltage and frequency, battery voltage and frequency. The figures below illustrate these in the order of appearance .

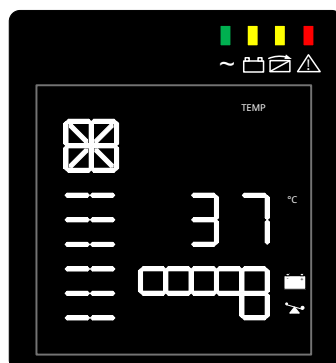
Output: To display the output voltage and frequency. In the example below, the voltage is 220VAC, the frequency is 50Hz.



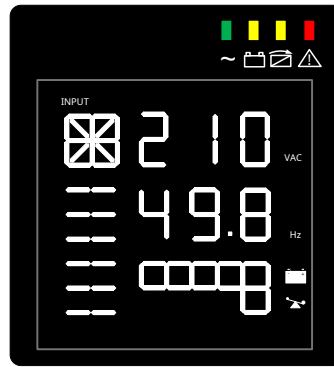
Load (LOAD):The real power in W and the apparent power in VA are displayed with numerical data. In the example below, the real power is 100W, and the apparent power is 100VA. Even in the no-load state, minimum performance is visible for both values.



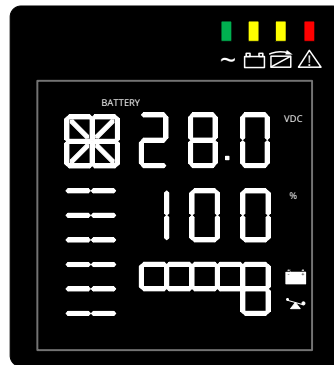
Temperature:Displays the temperature measured on the inverter. In the example below, the temperature of the inverter is 37 °C.



Input (INPUT): It shows the input voltage and frequency. If the connecting cable is not plugged into the wall socket in the correct phase, the input label starts flashing and the device beeps continuously.



Battery: Displays the current battery voltage and capacity. In the example below, the battery voltage is 28v, the battery capacity is 100%. The value of the battery capacity is an approximate value based on the battery voltage.



Press and hold a  button for more than 2 seconds to display data that can be displayed continuously alternately appear one after the other. Press the same button again and the display shows the OUTPUT data again.

5.5 Activation

5.5.1 Bypass operation

In bypass operation, the following indicator lights light up:



As shown in the figure above, in this operating state, the 3rd yellow LED from the left lights up and the alarm sounds every 2 minutes. Along with the sound signal, the red error LED also lights up. The display shows the current load and battery capacity.

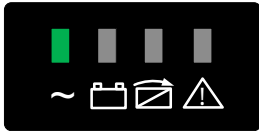
In two cases, it is recommended to connect to the bypass circuit of the UPS:

1. If we want to supply the consumers with voltage with the inverter switched off
2. If the output load overloads the device.

IMPORTANT: If the device is used in bypass mode, there is no battery protection.

5.5.2 Mains (normal) operation

In mains operation, the following indicator lights light up:



5.5.3 Battery operation

In battery operation, two LEDs light up, the green LED for mains (in this case normal) operation and the yellow LED for battery operation. The beep sounds every 4 seconds. At the same time as the sound signal, the red error LED lights up.



If the input voltage is lost or inadequate, the device immediately switches to battery operation. Depending on the connected batteries and the current load, it can run on batteries for up to 20 hours. If the battery run time has reached 20 hours or the battery capacity falls below the critical 10%, the device will send an alarm for half an hour and then stop the load to protect the batteries.

5.5.4 ECO mode

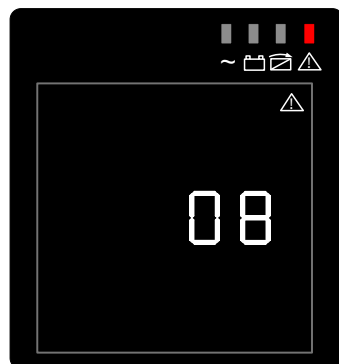
In this operating state, two LEDs light up, the green signal for mains operation and the yellow signal for bypass operation.



The UPS operates in ECO mode as long as the mains voltage is suitable for this. If the mains voltage falls outside the tolerance limit several times within one minute, the device immediately switches to inverter operation.

5.5.5 Faulty operation

If the device detects an error, the display shows the following data:



The UPS switches to this mode when overload, inverter failure or overheating occurs. In this case, the far right red error LED lights up and a continuous sound signal is heard. The UPS shuts off the output and displays an error code on the display. The audible alarm can be silenced using the SelfTest/Mute key combination. You can use the ON/OFF key combination to turn off the UPS if you are satisfied that there is no serious fault.

IMPORTANT: To identify error codes, refer to the "error code information table" in the appendix.

**Comment:**

Follow the procedure below if the UPS is running on generator voltage.

- ★ First, start the generator and wait until the output voltage stabilizes. Then supply the voltage to the UPS connection and start the device. If it is also in normal operation, connect the output consumers one by one.
 - ★ The power of the generator should be twice the power of the UPS.
 - ★ It is not recommended to use ECO mode in case of poor quality input voltage.
-

6. Maintenance

This UPS family requires minimal maintenance. The batteries are sealed and maintenance-free. To reach the expected lifetime, it only requires continuous and even charging. The UPS is constantly charging the batteries, even when it is turned off, when the input is connected. Built-in electronics protect the batteries against overcharging and deep discharge.

6.1 Maintenance of batteries

- 1 It is recommended to charge and discharge the batteries manually every three months if the UPS we don't use it for a long time. The discharge of the batteries lasts until the set cell voltage, after which they require a full charge.
2. If the same is in a warm environment, manual charging and discharging must be performed every 2 months.
3. Under normal conditions, the battery life is 3-5 years. If you notice that the run time is significantly reduced or the battery voltage is very erratic, the batteries should be replaced. The batteries should be replaced by a specialist.
4. When replacing batteries, it is recommended to replace all built-in batteries.

**IMPORTANT:**

- Before replacing the batteries, disconnect all uninterruptible loads and switch off the device. Remove all metal jewelry before starting work.
 - Use insulated tools to perform the job and never place metal objects on top of bare batteries.
 - Never short-circuit the battery terminals and make sure the polarity is correct.
-

7. Troubleshooting and technical parameters of the product family

In this chapter, the user can find solutions to errors and problems that occur during installation and use. With the help of the following data, the user can filter out the source of the error and search for a solution based on this.

1. Error display shows that the UPS has detected an error.
2. The sound signal alerts the user that the device requires attention.
3. If you need help or technical support, contact your distributor or service center. To do this, first collect the following data for faster administration:

- ◆ UPS type and serial number (can be found on the label on the back of the device)
- ◆ Time of failure
- ◆ A detailed description of the problem and the error code displayed on the front panel.

7.1 LED display and error code table

Appendix No. 1: Error code information table

The reason of the mistake	Error code
BUS error	00—19
Inverter error	20—39
High temperature	40—44
Output short circuit	45—49
Overload	50—54
Output relay error	55—59
Input NTC error	60—64
Auxiliary power supply error	65—69
Internal fuse error	70—74
Other	99

Appendix No. 2: Operating conditions and indications

№	Mode	Signaling				Sound signal	Comment
		LINE	BATT	BPS	FANS		
1	Normal (network) operation						
	Normal voltage	●				There isn't	
	Tall or short tension. For battery operation switch.	●	●		- -	Once every 4 seconds	
2	Battery operation						
	Normal voltage	●	●		- -	Once every 4 seconds	
	Incorrect battery tension.	●	- -		- -	Every second	
3	Bypass plant						
	Bypass operation normal mains under voltage			●	- -	2 lawsuits once per cent	After turning on the UPS cease
	High input voltage in bypass operation				- -	4 seconds me once	
	Low input voltage in bypass operation				- -	One every 4 seconds wed	
4	Battery not connected indication						
	In bypass operation			●	- -	Once every 4 seconds	Check the batteries connection and the breaker
	In normal operation	●			- -	Once every 4 seconds	Check the batteries connection and the breaker
	You are on commissioning when switching on					six times in a row	Check ze the batteries connection and the breaker
5	Output overload						
	Warning is normal in operation	●			- -	Other every second twice	Turn off the less important consumers
	Protection in normal operation			●	●	Long beeps	Turn off the less important consumers
	Warning in battery operation	●	●		- -	Mondayper ore twice	Turn off the less important consumers
	Battery-powered protection in operation	●	●		●	Long beeps	Switch k ia less important consumers
6	Warning bypass in operation			●	- -	two others every second	Turn off the less important consumers
7	Fan error (the fan graphic flashes)	▲	▲	▲	- -	every two seconds	Check the fans. Look isn't something stopping you? his movement
8	Fault mode				●	Long beeps	Call the service

-
- -The indicator light is constantly on
-
- -The indicator light is flashing
-
- -Its operation depends on other conditions

IMPORTANT: In the event of a UPS failure, it is important to know its current operating status and have accurate information about the cause and nature of the failure before using the two tables above.

7.2 Troubleshooting

When the error occurs, first try to eliminate it using the table below, if you do not succeed, contact a specialist service.

Fault	Cause of error	Possible solution
The word INPUT flashes on the display	The input voltage is not correct	UPS is in battery operation, check the input voltage.
	Incorrect phase connection	Connect the cable to the wall in phase into the socket.
The battery capacity indicator flashes	Battery voltage is low or no battery connected.	Check the connection of the batteries, see if they are not damaged, perform an instrument test measurements. Replace them if necessary.
Mains voltage is correct, but the UPS is still not receiving voltage	The fuse has blown on the device or it in distributor	Turn on or reset the breaker.
The running time is short	The batteries are not charged	Charge the batteries for more than 8 hours
	UPS is overloaded	Check the magnitude of the load.
	The batteries are old	Replace the battery.
The UPS does not turn ON when pressing a key.	He held it too short	Press and hold for more than 1s
	There is no battery connected or very weak. The load is too high.	Connect the batteries correctly or reduce the load
	UPS internal error	Call the service
The charging indicator flashes and the UPS beeps every second	Defective charging circuit or batteries they are weak	Call the service

7.3 EMC and Safety Standards

◆ Our product was made in accordance with the following standards and passed CE certification:

EMC standards	Safety standards
IEC 62040-2	IEC 62040-1
IEC 61000-4-2	GB 4943-2005
IEC 61000-4-3	
IEC 61000-4-4	
IEC 61000-4-5	

7.4 Technical parameters

7.4.1 Electrical data

Type			MID RT 1000XLi	MID RT 2000XLi	MID RT 3000XLi
Real and Apparent Performance			800W/1000VA	1600W/2000VA	2400W/3000VA
Input	Input format		Grounded single phase		
	Voltage range		115 ±5VAC to 295 ±5VAC		
	Frequency range		45Hz-55Hz@50Hz/55Hz-65Hz@50Hz		
	Power factor		≥0.98		
	ECO range		adjustable output voltage ±20VAC		
	Bypass range		186VAC-252VAC		
Output	Output format		Grounded single phase		
	Output voltage		It can be set in the following values: 208/220/230/240VAC		
	Power factor		0.8		
	Voltage accuracy		±2%		
	Output frequency	In mains operation	If the input frequency is within the tolerance, then the output frequency is with it identical		
			If the input frequency is out of tolerance, the output frequency is 50/60Hz ±0.2Hz		
		In battery operation	50/60Hz ±0.2Hz		
	Top rate		3: 1		
	Switching time		Mains operation D Battery operation 0ms		
			Mains operation D bypass operation 4ms		
	Overload capacity	In battery operation	At loads between 108%±5% and ≤150%±5% > 30s, then the output switches off and an audible signal is heard		
			At loads between 150%±5% and 200%±5% > 300ms, then the output switches off and an audible signal is heard		
		In mains operation	At loads between 108%±5% and 150%±5% > 30s bypass switches on and an audible signal is heard		
			At loads between 150%±5% and 200%±5% > 300ms bypass switches on and an audible signal is heard		
	Efficiency	In mains operation	At full load ≥87%		At full load ≥88%
		In battery operation	At full load ≥85%		
		ECO mode	At full load ≥94%		
Battery	Battery circuit voltage		24VDC	48VDC	72VDC
	Number of internal batteries		2	4	6
	Type of internal batteries		12V/9AH high-capacity, maintenance-free, lead-acid battery		
	Backup time		≥5 minutes at full load		
	Charging current (THE)		1A	1A	1A

Attention: The nominal output voltage is preset by the manufacturer. It can be adjusted in steps of 208, 220, 230 and 240V as required using the optional menu item available from the display.

-Operating environment

Type	1KVA – 2kVA – 3kVA
Temperature	0 °C ~ 40 °C
Relative humidity	0~95%, non-condensing
Operating height	Max. 1500m. If you operate in a higher environment, a its rated performance decreases
Storage environment temperature	- 25°C~55°C

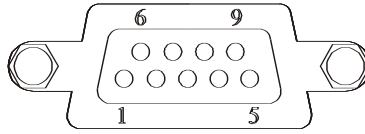
-Mechanical parameters

Type	Dimensions (mm) (Width*Depth*Height)	Net / Gross weight (kg)
1KVA	440*380*86.5	12/14.5
1KVA XL		7/9.5
2KVA	440*520*131	21.5/24.3
2KVA XL		11.5/14.3
3KVA		26/28.8
3KVA XL		11.7/14.5

7.5 Communication

7.5.1 RS232 serial communication

The connector is located on the upper part of the back of the device. The appearance of the connector is illustrated in the figure below, the pin assignment is shown in the table below.



Pin / hole	Description
1, 4, 6, 7, 8, 9	not used
2	Broadcasting
3	Purchase
5	Body

7.5.2 RS232 serial communication cable

If you want to connect the UPS to a computer, you must use a standard serial cable with the following pinout:

Foot (hole) PC serial port	Leg (pin) UPS serial port
2	2
3	3
5	5

7.5.3 Optional communication options

-USB communication (primary form of communication):

Install the UPSilon software included in the package attached to the device, you can use it to monitor the UPS. If the UPS has both RS2323 and USB ports, only one can communicate at a time. The preferred mode is USB. The manufacturer has developed its own protocol for this form of communication (MegaUSB). After connecting the cables, selecting this protocol immediately activates the connection and displays the parameters of the monitored device.

-Smart SNMP expansion slot:

The following cards can be installed in this expansion slot: intelligent SNMP card and intelligent dry contact card. All card types support the "Hot Swap" solution. The v6 series SNMP management card fits into each device. The card can be accessed via a web interface based on its IP address or MAC address, where all basic parameters are available.

- Intelligent SNMP card: Enables monitoring of the UPS via an ethernet network or even the Internet.
- Intelligent dry contact card: It can be a useful part of building monitoring systems or display error signals in a visible form.

IMPORTANT:

Remove the closing cover to install the smart accessories. You will find help for managing the UPSilon2000 software on the installation CD.
When using each smart card, follow the type-specific user instructions.

Intelligent external battery housings with Rack-Tower design

The manufacturer has specially developed an external battery pack for this series, which is completely identical in appearance to the design of the UPS.

It is primary and important to know that the external battery units (henceforth only EBP (ExternalBbatterypack)) voltages are type specific. Since the connectors are not color-coded either, check the voltage mark next to the receiving socket before connecting.

- Only MID1000EBP (=24VDC) can be connected to MID1000RTi Only
- MID2000EBP (=48VDC) can be connected to MID2000RTi Only
- MID3000EBP (=72VDC) can be connected to MID3000RTi

Otherwise, it may cause malfunctions in both units.

The manufacturer also installed an independent charging circuit in the new EBP units, thereby significantly simplifying the maintenance charging of the EBPs stored in the warehouse. At the same time, the recharge time of batteries that are discharged during use has also been shortened. The charging circuit is connected to the ~230V/10A connector on the rear wall. At the same time, it can handle the charging from the UPS.

The front panel looks identical to the electronics, but instead of the display, there are only two LEDs. One indicates the presence of external charging, the other is used to check the batteries. There is also a small circuit breaker on the back wall, which serves to protect and disconnect the battery. In the same place, there are 2 battery connectors for connecting additional batteries.

A minimum 6-hour molding charge is recommended before first use, and a minimum of 36 hours must be charged every six months during long-term storage (6 months or longer).

Only one or two external EBPs can be connected to standard (RTi) devices, because the capacity of the charging circuit in the electronics (1A) cannot supply more. If a longer running time is required, the XLi (RTx000XLi) design should be chosen. The built-in 7/14A charging circuit can supply more than two EBPs and recharge them in a short time.