

User Manual



Uninterruptible power supply

KESSUPS 92RT

1 to 6 kVA



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1. INTRODUCTION

We thank you in advance for the trust placed in us. Read this instruction manual carefully in order to familiarize yourself with its content, since the more you know about the equipment the greater your level of safety will be. We remain at your disposal for any additional information or questions.

The equipment described here is capable of causing significant physical damage in case of improper handling. For this reason its installation, maintenance and/or repair must be carried out exclusively by qualified personnel.

Although no effort has been spared to ensure that the information in this user manual is complete and accurate, we are not responsible for the completeness of contents and accuracy.

The images included in this document are for illustrative purposes and may not represent exactly the parts of the equipment shown.

Following our policy of constant evolution, we reserve the right to modify the characteristics, operations or actions described in this document without prior notice.

Reproduction, copying, assignment to third parties, modification or translation of this manual, in any form, without previous written authorization by our firm is prohibited. Our firm reserves the exclusive property rights.

1.1 CONTACT

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2. SAFETY INFORMATION

Important documents are available for downloading on our website www.kess.at.



Compliance with the „Safety Instructions“ is mandatory and the user is legally responsible for compliance and enforcement.

Read the safety instructions carefully before carrying out any action on the device relating to its installation or start-up, change of location, configuration or handling of any kind.

2.1 USED ICONS

For more information mind the safety instructions.

The equipment is delivered properly labelled for the correct identification of each of the parts, which together with the instructions described in this user manual allows the operations of installation and commissioning to be performed in a simple and orderly manner without having any doubts whatsoever.

Finally, once the equipment is installed and operating, it is recommended to save the documentation downloaded from the website, CD-ROM or Pen Drive in a safe and easy-to-access place, for any future queries or doubts that may arise. The following terms are used interchangeably in the document to refer to:

- “KESSUPS 92RT, KESSUPS, 92RT, device or UPS.” Depending on the context of the phrase, it can refer either to the actual UPS itself or to the the UPS and the batteries, regardless of whether it is all assembled in the same metal casing or not.
- “Batteries or accumulators.” Group or set of elements that stores the flow of electrons by electrochemical means.
- “Client, installer, operator or user.” These are used interchangeably to refer to the installer and/or operator who will carry out the corresponding actions, and the same person may be responsible for carrying out the respective actions when acting on behalf of, or in representation of, the same.

3. QUALITY ASSURANCE AND STANDARDS

The product KESSUPS 92RT is designed, manufactured and sold in accordance with quality management standards. The CE marking indicates conformity with EU norms and the following guidelines:

- 2014/35/EU Low voltage safety.
- 2014/30/EU Electromagnetic Compatibility (EMC)
- 2011/65/EU Restriction of the use of hazardous substances in electrical and electronic equipment (RoHS).
- EN-IEC 62040-1 Uninterruptible Power Supplies (UPS) part 1: General and safety requirements for UPS used in user access areas
- EN-IEC 60950-1 Information technology equipment - safety. part 1: General requirements.
- EN-IEC 62040-2 Uninterruptible Power Supplies (UPS) part 2: EMC requirements.



The manufacturer accepts no liability in the case of modification or intervention on the device by the user.

WARNING! KESSUPS 92RT up to 3 kVA is a category C2 UPS. In a residential environment, this product may cause radio interference. In this case the user must take additional measures.

KESSUPS 92RT 4 to 6 kVA is a category C3 UPS. This is a product for commercial and industrial application in a second environment. Installation restrictions or additional measures may be necessary to avoid disturbances.

It is not appropriate to use this equipment in basic life support applications (BLS), where a failure can render vital equipment out of service or significantly affect its safety or effectiveness. It is also not recommended in medical applications, commercial transport, nuclear installations, or other applications or loads, where a failure can lead to personal or material damages.

The EC declaration of the product is available to the customer on request.

3.1 FIRST ENVIRONMENT

Environment including residential, commercial and light industry installations, directly connected, without intermediate transformers, to a low voltage public power grid.

3.2 SECOND ENVIRONMENT

An environment that includes all commercial, light industrial and industrial establishments that are not directly connected to a low voltage power grid supplying buildings used for residential purposes.

3.3 ENVIRONMENT

This product has been designed according to ISO 14001 and complies with all essential environmental regulations .

Recycling of the equipment at the end of its lifespan

When it comes to disposal, the producer feels obliged to work together with authorized and regulatory companies, so that all components are recycled correctly after their effective lifespan. (Therefore contact your distributor.)

Packaging

Mind the legal requirements and specific regulations of the country in which the device is installed.

Batteries

Batteries pose a serious danger to our health and the environment. Their disposal should be carried out in accordance with the laws in force.

4. MODELS

4.1 VIEW OF THE MODELS

Fig. 1 to Fig. 3 show the different devices. Please mind that our products are constantly evolving and discrepancies or slight contradictions may arise. In case of doubt the labelling on the equipment itself will always be representative .



The nameplate of the device shows all relevant values.

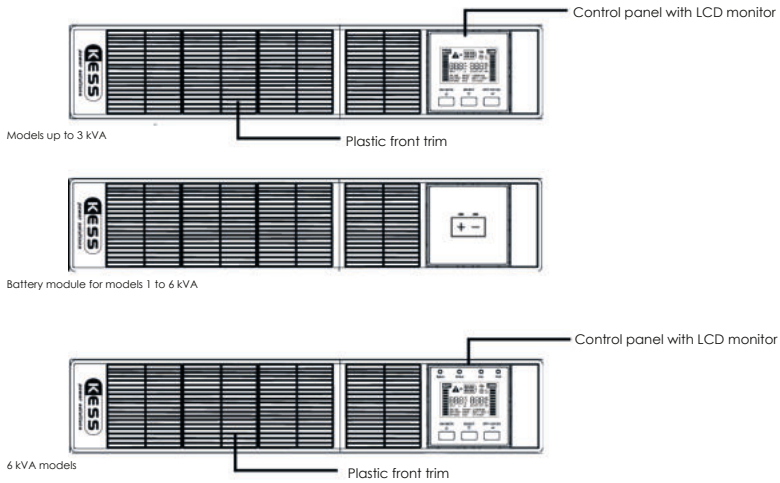
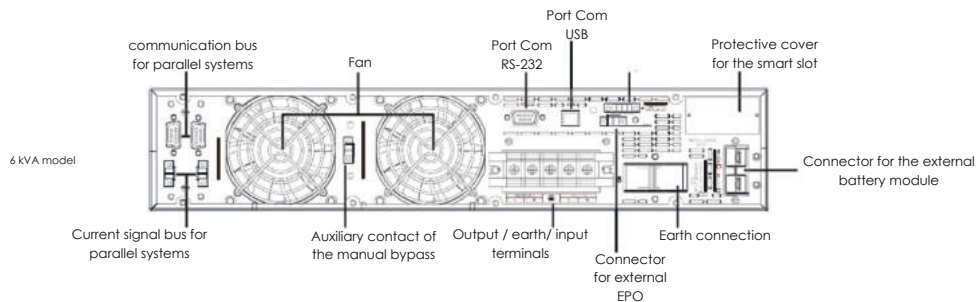
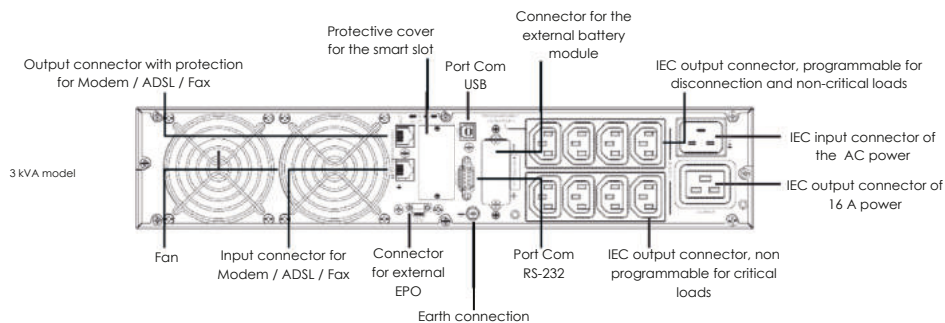
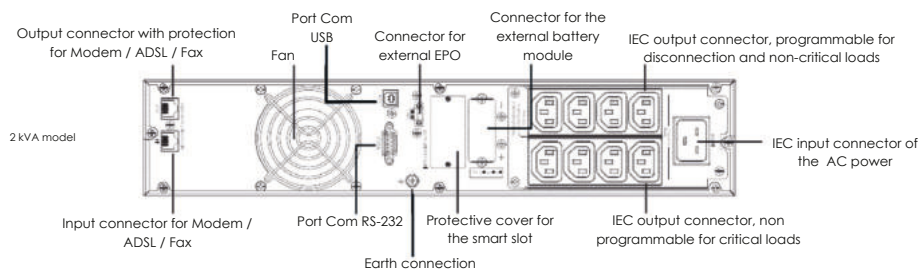
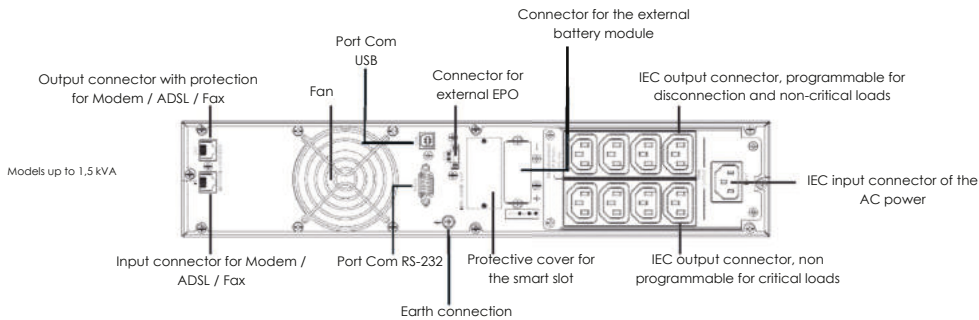
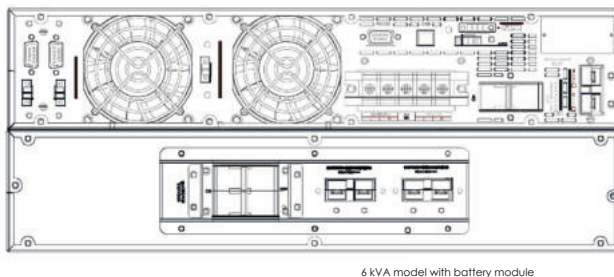


Fig.1: Front view of the models 3 to 6 kVA and its battery modules





6 kVA model with battery module

Fig.2: Rear view off the models 1 to 6 kVA

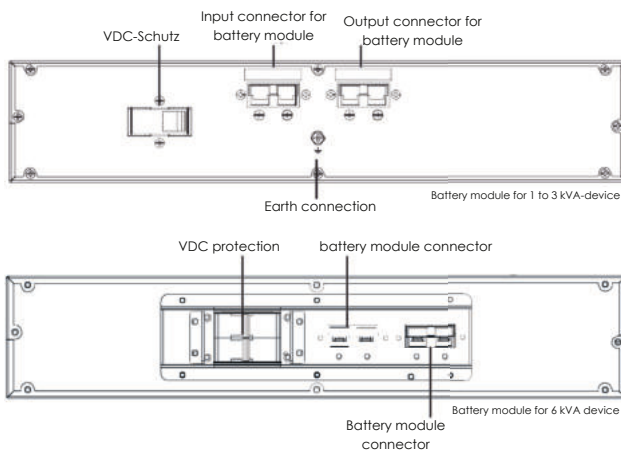


Fig.3: Rear view of the battery module

4.2 OPERATING PRINCIPLES

This manual describes the installation and operation of the uninterruptible power supply (UPS) KESSUPS 92RT as devices that can be independently operated or connected in parallel (for models > 3 kVA).

The KESSUPS 92RT series ensures optimum protection of any critical load, maintaining the supply voltage of the loads between the specified parameters without interruption during failure, deterioration or fluctuation of mains power, and comes in a wide range of models (from 1 kVA to 6 kVA). Thus market-specific needs and wishes can be addressed in a more individual way.

Thanks to their PWM (pulse width modulation) and double-conversion technology, the KESSUPS 92RT series is compact, silent and offers high performance.

The double converter principle eliminates all mains power disturbances. A rectifier converts the AC current of the mains into DC current. It maintains the optimum battery charge level and powers the inverter, which in turn, generates a suitable AC sine-wave voltage for continuously powering the loads. In the case of failure the batteries supply clean power to the inverter.

The design and construction of the KESSUPS 92RT series has been carried out in accordance with international standards.

In addition, models with power ratings greater than 3 kVA can be expanded with the connection of additional modules with the same power in parallel to obtain N+X redundancy or an increase in the system's power.

This series has been designed to maximise the availability of critical loads and to ensure that your business is protected from variations in the power distribution line voltage, frequency, electrical noise, cuts and micro-cuts. This is the primary goal of the KESSUPS 92RT series.

4.3 UPS OPERATING MODES

Normal mode

The device supplies output voltage from the inverter, mains power present with correct input voltage and frequency.

Battery mode

The device runs with mains voltage or frequency out of range or without AC input power, either due to mains failure or absence of cable connection, supplying output voltage from the batteries.

Bypass mode

No matter the device is running or not, it supplies output voltage directly from the AC mains.

With the inverter running, this operating mode may occur due to an overload, blockage or inverter fault. The actions for each incident will be as follows: Reduce the load connected to the output, unblock the device by resetting it (stop it and start it again) and if the fault remains, contact the KESS service.

With the inverter shut down, the output supplies the main power directly through the static bypass of the device, provided that it has AC input power.

Frequent converter mode (CF)

Operating mode of the UPS as a frequency converter. In this mode, the static bypass is disabled by the condition of disparate input and output frequencies. Even if the LCD monitor shows a messages, it does not mean that the inverter is operational. It is switched on by pressing the 'ON' button on the control panel, see chapter 7.

4.4 SPECIFIC FEATURES

- True online with double-conversion technology and output frequency separate from the mains.
- Output power factor 1. Pure sine waveform, suitable for almost all kinds of loads.
- Input power factor > 0.99 and high overall performance (between 0.89 and 0.91 for models up to 3 kVA models and > 0.93 for higher power ratings). Greater energy savings and lower user installation costs (wiring) are achieved, as well as low distortion of the input current, which reduces pollution in the power supply network.
- Great adaptability to the worst conditions of the mains. Wide input voltage, frequency and waveform ranges, thus avoiding excessive dependence on limited battery power.
- Possibility of fast and easy backup extension by adding modules in rack format. Each battery module has two connectors for easy connection to the device and other identical modules.
- N+X redundant parallel connection to increase reliability and flexibility in power models > 3 kVA, with a maximum of 3 devices in parallel.
- Selectable high-performance mode (ECO MODE) > 0.95 to 0.99 depending on the model. Financial savings for the users are possible.
- It is possible to start the device without mains power supply or discharged battery. Be careful with this aspect because the greater the batteries are discharged, the more the backup will be reduced.
- Intelligent battery management technology is very useful for extending the lifespan of the accumulators and optimising the recharge times.
- Standard communication options via the RS232 serial port or USB port.
- Digital input for Start/Stop of the device and 'Error or fault' digital output in models with power ratings > 3 kVA.
- Remote emergency power off control (EPO).
- Control panel with LCD monitor available on all models and LED indicators on devices with power ratings > 3 kVA.
- Availability of optional connectable cards to improve the communication capabilities.
- The device can be installed as a tower or rack using the attached supplies. The control panel can be rotated.

4.5 OPTIONAL SUPPLIES

Isolation transformer

The isolation transformer provides galvanic isolation in order to completely isolate the output from the input and/or change neutral mode. The placement of an electrostatic screen between the primary and secondary windings of the transformer provides a high level of electrical noise attenuation.

The isolation transformer can be physically placed at the input or output of the UPS depending on the technical conditions of the whole system (device supply voltage and/or load voltage, characteristics or their type, etc.).

In parallel systems, it is not possible to operate with independent transformers for each UPS. In contrary, it is necessary to have a single common element for the total adequate power. In any event, it will always be supplied as a peripheral component external to the device itself in a separate box.

External maintenance bypass

The purpose of this option is to electrically isolate the device from the mains and the critical loads without cutting the power to the latter. In this way, maintenance or repair operations on the device can be carried out without interruptions to the power supply of the protected system, while preventing unnecessary hazards for the technical personnel.

Communication card

The UPS features a slot at the rear for inserting one of the following communication cards:

- **Integration using an SNMP-Adapter:** Large computer systems based on LANs and WANs that integrate servers in different operating systems must provide the system manager with ease of control and administration. This facility is obtained through an SNMP adapter. While the connection between UPS and SNMP is internal, the connection of the SNMP is made through a RJ45-10 base connector.
- **Relay interface card:** The UPS has an optional interface for relay cards that provides digital signals in the form of potential-free contacts, with a maximum applicable voltage and current of 240 V AC or 30 V DC and 1 A. This communication port enables a dialogue between the device and other devices through the relays supplied in the terminal block (arranged on the same card), with a single common terminal for all of them. From the factory, all contacts are „normally open“ and can be changed one by one, as explained in the information concerning the optional supplies. Please contact our KESS Service for further information.

Extendible guide bars for rack mounting

An extendible guide bar is optional available for all models. These bars allow the 19" rack installation for any KESSUPS 92RT-device and any battery module.

5. INSTALLATION

Please mind our safety information. Non-compliance may lead to serious accidents for people in direct contact or in the immediate vicinity, as well as faults in the equipment and/or connected loads.

If not otherwise indicated, all actions, instructions, guidelines and notes are applicable to the device, no matter they are part of a parallel system or not.

Pay attention to the chapters 2 and 5 concerning the safety information, manual, storage, transport or installation of the device. Only use suitable means of transportation to move the UPS in its packaging with a forklift or a lifting cart.

In any means, consider the technical data of the device as described in chapter 9.

5.1 DELIVERY

Check that the data on the labelling corresponds to your specific order. Once the UPS is unpacked, check the previous data with those of the equipments nameplate.

If there are any discrepancies, let us as soon as possible know. Therefore please keep the manufactures number of the device and the reference number on the delivery note in readiness.

Also check the packaging and that it has not suffered any mishaps during transportation (packaging and impact indicator are in perfect condition). Otherwise, follow the protocol indicated on the label attached to the impact indicator.

5.2 PACKAGING



To check the contents, it will be necessary to remove the packaging. Unpack in the following way:

- Cut through the ribbons of the cardboard packaging.
- Remove the supplies (cable, mountings, etc.).
- Remove the device or the battery module from its packaging. Depending on the devices weight the help of a second person or suitable mechanical aids should be considered.

- Remove the corner protector and the plastic cover. Keep the packaging out of the reach of children.
- Check the device before continuing. If any failures occur, please contact the KESS service.
- The device packaging consists of a wooden pallet, cardboard, polystyrene corners, polyethylene cover and strapping. All materials are recyclable and the disposal must be carried out in accordance with current laws. We recommend to keep the packaging and use it again.

5.3 CONTENT

Devices 1 to 3 kVA:

- 1 UPS
- Quick start guide on paper
- 1 UPS communication cable
- 3 cables with IEC connectors for loads
- 1 cable for the device AC power supply
- 2 metal pieces for the use as handles and screws for installing the unit in a rack cabinet
- 4 plastic pieces for use as a base to facilitate the arrangement of the UPS as a tower (vertical position)

Optional battery modules for UPS 1 to 3 kVA:

- 1 battery module
- 2 metal pieces for the use as handles and screws for installing the unit in a rack cabinet
- 4 plastic pieces for use as a base to facilitate the arrangement of the UPS as a tower (vertical position)
- 1 cable for connecting the battery module and an UPS or an other module

Devices 4 to 6 kVA:

- 1 UPS
- 2 metal pieces for the use as handles and screws for installing the unit in a rack cabinet
- UPS connection cable
- USB-Kommunikationskabel
- 4 plastic pieces for use as a base to facilitate the arrangement of the UPS as a tower (vertical position)
- 1 connection cable for the communication bus (Only useful for the connection of parallel devices).
- 1 cable for connecting the battery module and the UPS

Optional battery module for UPS 4 to 6 kVA:

- 1 battery module
- 2 metal pieces for the use as handles and screws for installing the unit in a rack cabinet
- 2 plastic pieces for use as a base to facilitate the arrangement of the UPS as a tower (vertical position)
- 1 cable for connecting the battery module and an UPS or an other module

5.4 STORAGE

After receipt of the delivery it is advisable to repack the UPS till its final implementing to protect it against potential mechanical impacts, dust, mud, etc.

The device should be stored in a dry, ventilated room and protected from rain, dust and water or chemical splashes. It is advisable to keep each device and battery module in its original packaging, as it has been specifically designed to ensure maximum protection during transportation and storage.

For devices that contain Pb-Ca batteries, the indicated charging times must be respected, otherwise the warranty may be invalidated.

After this period, connect the device to the mains together with the applicable battery module. Start it according to the instructions described in this manual and charge it for 12 hours.

In parallel systems, it is not necessary to interconnect the devices before battery charging. Each of them can be treated independently to charge them.

Then shut the device down and disconnect it. Store the UPS and batteries in their original packaging and note the new date for recharging the batteries.

Do not store the devices at places where the ambient temperature exceeds 50°C or drops below -15°C, as this may cause degradation of the electrical characteristics of the batteries.

5.5 TRANSPORT TO THE SITE

It is recommended to transport the UPS with a forklift or suitable means of transportation. Always mind the distance between both locations. When the distance is great, it is recommended to transport the device in its packaging to the installation site and then unpack it.

5.6 SITE AND CONSTRUCTION

All KESSUPS 92RT UPS are designed to be mounted as a tower (vertical) or rack (horizontal) for installation in a 19" cabinet. This applies for single as well as parallel systems, whether a battery module is existing or not.

Follow the instructions indicated in this manual regarding the special features of your device.

As example, Fig. 4 to 6 show illustrations of a device or a battery module. These illustrations provide help and guidance in the following steps, but the instructions are not intended to refer to a single model. Although the carried out actions are in practice always the same for all of them.

For all instructions regarding the connections, refer to chapter 6.

5.6.1 ROTATION OF THE CONTROL PANEL WITH LCD MONITOR

To facilitate reading the messages on the display, it is possible to rotate the control panel clockwise by 90° (see Fig. 4).

Proceed as follows:

- Insert your fingertips into the recesses of the plastic housing around the display and pull outwards.
- Rotate the control panel with LCD monitor 90° to the right and put it on its initial position.

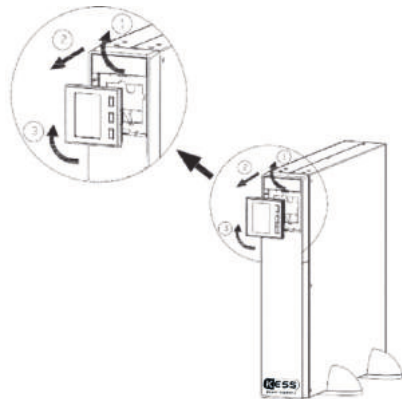


Fig.4: Rotatable LCD monitor

5.6.2 VERTICAL MOUNTING (TOWER)

- Rotate the control panel according to chapter 5.6.1.
- Take the 4 pieces of plastic supplied with the device and join 2 pieces together to obtain 2 feet bzw. bases.
- Place the UPS upright between the 2 feet at a distance of 70 mm (from each end). See Fig. 5.

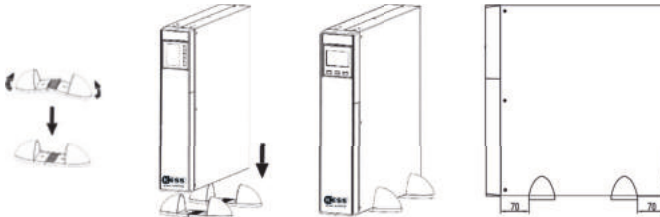


Fig.5: Vertical mounting (tower)

5.6.3 VERTICAL MOUNTING (TOWER) WITH BATTERY MODULE

This paragraph refers only to devices with a single battery module. For devices with a greater number of battery modules proceed in a similar way.

- Rotate the LCD monitor.
- Take the 4 plastic pieces in angle form (supplied with the UPS) and the 2 angle forms supplied with the battery module. Install them to obtain 2 bases to hold the device and the battery module.
- Place the UPS and battery module upright between the 2 bases at a distance of 70 mm from each end.

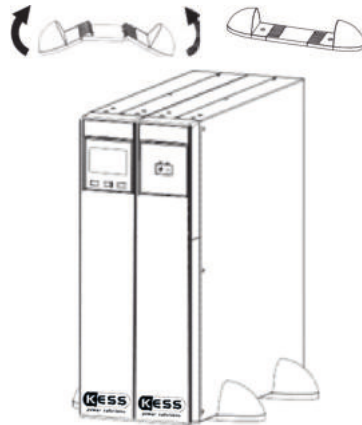


Fig.6: Vertical Mounting (tower) with battery module

5.6.4 MOUNTING IN A 19" CABINET

- Proceed as in fig. 7 to install the device in a 19" cabinet.
- Use the supplied screws to fix the 2 angle form adapters as handles on each side of the UPS.
- To install the device in a rack cabinet, it is necessary to apply the lateral internal guides as mounting. Alternatively, and on request, we can supply universal slides as guides. These must be installed by the user. Mount the guides at the required height, ensure the correct tightening of the fixing screws and the appropriate fitting of the slides.
- Place the device onto the guides and insert it all the way to the back. It depends on the device model and weight if it should be installed in the upper or lower position. It is recommended that 2 people carry out the installation operations.
- Fix the UPS to the cabinet frame using the screws supplied with the handles.

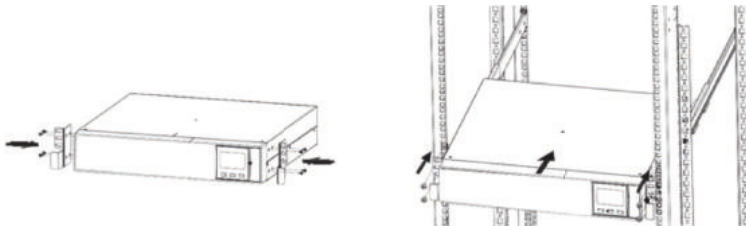


Fig.7: Mounting as a rack device in a 19" cabinet

5.6.5 MOUNTING IN A 19" CABINET WITH BATTERY MODULES

- This paragraph refers only to devices with a single battery module. For devices with a greater number of battery modules proceed in a similar way.
- Proceed as in Fig. 8 to install the device and its battery module in a 19" cabinet.
- Use the supplied screws to fix the 2 angle form adapters as handles on each side of the UPS. Mind your hands. Repeat the same procedure for the battery module.
- It is necessary to apply the lateral internal guides as mounting to install the device, UPS or battery modules in a rack cabinet. Alternatively, and on request, we can supply universal slides as guides. These must be installed by the user. Mount the guides at the required height, ensure the correct tightening of the fixing screws and the appropriate fitting of the slides.
- Place the device onto the guides and insert it all the way to the back. Repeat the same procedure for the battery module. It depends on the device model and weight if it should be installed in the upper or lower position. It is recommended that 2 people carry out the installation operations.
- Fix the UPS to the cabinet frame using the screws supplied with the handles.

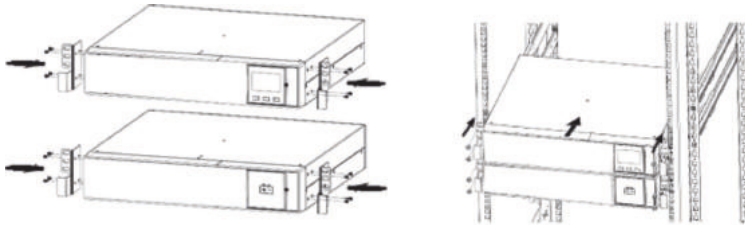


Fig.8: Mounting in a 19" cabinet with battery modules

6. CONNECTION OF THE DEVICE

6.1 BEFORE CONNECTING

In this manual, references are made to the connection of terminals and switch operations that are only available in some versions or devices with battery modules. Ignore the described operations if your device does not feature them.

The thermal controls of these devices are carried out with forced air ventilation from the front to the rear. The front surface and about 15 cm on the rear side should be left free of obstructions to facilitate the free air circulation.

Follow all instructions regarding the installation of a single device or a system in parallel. For fuse boxes or external manual bypass boxes:

- The installation must have at least one short-circuit protection on the UPS's power supply line.
- It is advisable to have an external manual bypass box fitted with input, output and manual bypass protections in single systems.
- For parallel systems it is essential to have a fuse box or manual bypass box. The circuit breaker of the box must be able to isolate a UPS from the system in the case of a fault and power the loads with the others, either during a preventative maintenance or during breakdown and repair actions.
- On request, we can supply an external manual bypass box for a single device or parallel system.
- For longer lengths correct the cross sections to avoid voltage drops. Always respect the regulations or standards corresponding to your country.
- For each configuration the information „n“ for parallel systems and backfeed protection characteristics are available.
- For parallel systems the length and cross section of the cables, that run from the fuse box or manual bypass box to each UPS and from there to the corresponding box, must be the same without any exception.
- The cross section of the cables must always be considered in relation to the size of the terminals and switches, so that the cables with their entire cross section are correctly fastened for an optimum contact between the two elements.
- The rated currents are printed on the nameplate of the equipment as indicated by the EN-IEC 62040-1 safety standard. For the calculation of the input current the power factor and the equipment's own performance have been considered.
- Overload conditions are considered a non-permanent and exceptional working mode. Thus they are not considered in the application of the protections. Do not connect devices which may overload the UPS and its terminals and/or outlets, such as motors.
- If peripheral input, output (f.i. transformers) or bypass elements are added to the UPS or to a parallel system, the currents indicated on the nameplates must be considered in any means to use the appropriate cross sections, in compliance with local and/or national low voltage electrotechnical regulations.
- When a galvanic isolation transformer is added to a UPS or a parallel system (as an optional extra or as an interdependent device) on the input line, at the output or both, it must be fitted with protection against indirect contact (differential circuit breaker) at the output of each transformer. Due to its own isolation properties, it will prevent the tripping of the protections placed on the primary of the isolation transformer in case of electric shock on the secondary (output of the isolation transformer).



- We remind you that all isolation transformers, installed or delivered ex factory, have the output neutral grounded through a bridge between the neutral terminal and ground. If the isolated output neutral is required, this bridge must be removed considering the respective local and/or national low voltage regulations.
- This device is suitable for installation in networks with TT, TN-S, TN-C or IT power distribution systems. Please consider the specific features of your used device and national electrical regulations at any times.
- The KESSUPS 92RT series features terminals for the installation of an external emergency power off button (EPO).

6.2 BEFORE CONNECTING BATTERIES AND THEIR PROTECTIONS

The KESSUPS models contain batteries in its UPS housing.



The battery protection of the device and of any accumulator module has to be carried out by internal fuses, so that it is not accessible to the user.

Important for your safety: If you install the batteries by yourself, the accumulator group must be fitted with a bipolar circuit breaker or disconnection fuse as described in Tab. 2. Inside the battery module, there are hazardous voltages with the risk of electric shocks. Thus it is classified as a area with restricted access.



Under no circumstances handle the fuse holder or battery circuit breaker if the device is in operation.



If the power supply of the device or the parallel systems is cut for longer than a simple intervention and it is expected that it will be out of service for a prolonged period, the system must be shut down completely.



The battery circuit is not isolated from the input voltage. Dangerous voltages can occur between the terminals of the battery group and the earthing. Check that there is no input voltage before intervening on the terminal.

6.3 CONNECTION ELEMENTS

All electrical connections of the device are carried out from the back of each unit:

Connection of the input and output:

- For models up to 3 kVA: Input via cable with plug, connectable to the UPS through an IEC connector. Output through IEC connectors.
- For models with power ratings higher than 3 kVA: Terminals for powering the device and loads. It is necessary to remove the transparent protective cover to access the terminals. After connecting, replace the cover to prevent possible accidents due to direct contact. Especially in tower mountings as there is a greater risk.



Connection of the batteries:

The device and battery module contain a polarised connector. Remove the screws and protective cover of the connector before interconnection. All battery modules include 2 connectors that enable extended backup times.

Available communication connectors:

- DB9 for RS232. Models up to 3 kVA are supplied with the same connector as the relay signals.
- USB to operate the UPS as a PC peripheral device.
- Digital input and output (only models > 3 kVA).
- Connection with external EPO button.
- Auxiliary contact for the manual bypass switch (only models > 3 kVA).
- DB15 communication bus connectors and analogue current signal block for connecting systems in parallel (only models > 3 kVA).


It is recommended to use terminals on all ends of the cables connected to the power terminals (input and output). Check that the terminal screws are correctly tightened.

6.4 INPUT CONNECTION

Models 1 to 3 kVA:


- Take the power cable and IEC connector and insert the latter into the input connector of the UPS.
- Plug the power cable into an AC power socket.

Models 4 to 6 kVA:

- As the device has class I protection against electric shock, it is essential to install a protective earth conductor (connect  earth). Connect this conductor before supplying voltage to the input terminals.
- Connect the power cables to the input terminals respecting the order of the phase (R) and the neutral (N) indicated on the labelling of the device and in this manual. Pay particular attention when connecting the power cables to the input terminals and do not reverse the connection to the output terminals or vice versa. Non-compliance may result in faults. When there are discrepancies between the labelling and the instructions in this manual, then the labelling on the device applies.
- In accordance with the safety standard EN-IEC 62040-1, the installation must be equipped with an automatic backfeed protection system. For example a contactor which prevents the appearance of hazardous voltage or power on the UPS input line during a mains failure (see Fig. 9). The standard applies to both, individual units as well as parallel systems.
- Warning labels should be attached to all primary power switches installed next to the device, so that the maintenance personall is informed about the existence of an UPS. The label should contain the following or an equivalent text:

Before working on the circuit

- Isolate the uninterruptible power supply system (UPS).
- Check the voltage between all terminals, including the protective earth.

 **Return voltage risk of the UPS.**

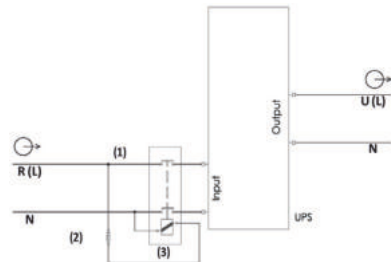


Fig.9: „Backfeed Protection“

Fig. 9 shows:

- 1) Automatic backfeed protection system external to the UPS (EN-IEC 62040-1).
- 2) Fuse holder and general purpose fuse 250V AC / 3A type F.
- 3) 230V AC bipolar contactor with minimum contact spacing of 1,4 mm and coil with the same voltage and the minimum current indicated on the nameplate of the UPS (input or bypass, as appropriate).



For parallel systems, each device must have its own separate backfeed protection.

6.5 CONNECTION OF THE IEC CONNECTOR OR OUTPUT TERMINALS

The KESSUPS 92RT devices contain IEC output connectors or terminals, depending on the power of the model:

Models up to 2 kVA: 2 groups of 4 x 10A IEC connectors identified as "output" or "programmable output (P1)", configurable through the control panel and/or software.

Models with 3 kVA: Same connectors as models up to 2 kVA and an additional 16A IEC connector (output).

Models from 4 to 6 kVA: 1 group of output terminals.



Do not connect loads that exceed the specifications of the device, as this would cause inconvenient cuts in the power supply of the loads connected to the output.

If it is necessary, in addition to the more sensitive 'critical loads', to connect high-consumption inductive loads, f.i. laser printers or CRT monitors, the starting up of these peripherals will need to be taken into account to prevent the device from crashing. We do not recommend connecting loads of this type due to the amount of power they absorb from the UPS.

6.6 CONNECTION OF THE LOADS FOR MODELS UP TO 3 KVA

Connect the loads to the 10 A IEC connectors. Consider the two available groups of IEC connectors, those for 'critical loads' and those for 'non-critical loads'.


By definition, 'critical loads' are considered to be those that can cause economic damage if they stop functioning or function incorrectly.

The IEC connectors indicated as 'non-critical loads' can be programmed as such through the control panel. In this case, the backup of the batteries for the loads connected to the IEC connectors indicated as 'critical loads' will be reserved. Take into account that they are set ex factory as 'critical loads'.



The 3 kVA models also have a 16A IEC connector that enables the connection of a load of the total power of the device.

6.7 CONNECTION OF THE LOADS FOR MODELS 4 TO 6 KVA

As the device has class I protection against electric shock, it is essential to install a protective earth conductor (connect  earth). Connect this conductor before supplying voltage to the input terminals.

Connect the loads to the output terminals U (L) and N. Mind the order of the phase and the neutral as indicated on the labelling of the device and in this manual. When there are discrepancies between the labelling and the instructions in this manual, then the labelling on the device applies.

With regard to the protection that must be placed at the output of the UPS when the PDU is not used, we recommend distributing the output power over at least four lines. Each of them will have a circuit breaker with a value of one quarter of the rated power. This type of output power distribution will allow that in case of a fault in any of the machines connected to the equipment does not affect more than the line that is broken. The remaining connected loads will have continuity assured due to the tripping of the protection, only in the line affected by the short circuit.

6.8 CONNECTION OF EXTERN BATTERIES (BATTERY MODULE)



Pay special attention to the information and safety instructions in this paragraph. Non-compliance may lead to a high risk of electric shocks and in the worst case even to death!

KESSUPS 92RT UPS 1 to 3 kVA contain batteries in the same housing as the device.



The battery protection of the device and of any accumulator module is always carried out by internal fuses that are not accessible to the user.

Important for your safety! If you install your batteries by yourself, the accumulator group must be fitted with a bipolar circuit breaker or disconnect fuse of the size as indicated in Tab. 1.



Before starting the connection process between battery module or device, check that the device and loads are 'Off'. Also check that the protection fuse or isolator must be deactivated.

The connection of the battery module and the device is made across a cable with polarised connectors at both ends which is supplied with the battery module. Two connectors are available for this purpose on the device and battery module. The battery modules feature two connectors that allow the linking of modules in parallel.

Model	Rated voltage of the batteries	Minimum values, fuses (fast types)	
		Voltage DC (V)	Current (A)
KESSUPS-92RT-1100	(12 V x 3) = 36 V	125	32
KESSUPS-92RT-1500			50
KESSUPS-92RT-2000	(12 V x 4) = 48 V		
KESSUPS-92RT-3000	(12 V x 6) = 72 V		
KESSUPS-92RT-6000	(12 V x 16) = 192 V	400	32

Tab.1: Protection features between device and battery module



Each battery module is independent from each device. It is permitted to connect two devices at one and the same battery module. In parallel systems (4 to 6 kVA models) each device should be considered as single devices that works independently.

Fig. 10 shows the connection of a 6 kVA device in rack mounting with two battery modules. For a larger number, proceed in a similar way.

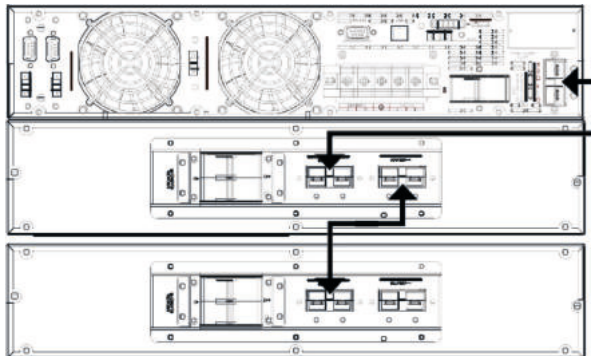



Fig.10: Connection with battery modules

6.9 CONNECTION OF THE INPUT EARTH TERMINAL AND THE EARTH CONNECTION TERMINAL

As the device has class I protection against electric shock, it is essential to install a protective earth conductor (connect  earth). Connect this conductor before supplying voltage to the input terminals.

Make sure that all loads connected to the UPS are only connected to its earth connection terminal. Failure to limit the earthing of the loads and battery modules to this single point may create earth return loops that will degrade the quality of the power supplied.

All terminals identified as an earth connection are connected to each other, to the earth terminal and to the device's earth.

6.10 TERMINALS FOR THE EPO

The UPSs has two terminals for the installation of an external emergency power off (EPO) output button. Die USV hat zwei Klemmen für die Installation eines externen Ausgangs-Notaus-Schalter (EPO). Standardmäßig wird das Gerät ab Werk mit einem geschlossenen Notaus-Stromkreis (EPO) geliefert. The device is delivered ex factory with its EPO circuit set to closed (NC).

The UPS will cut the output power supply, emergency power off, when the circuit is opened: Either by removing the female connector from the socket where it is inserted. This connector has a cable connected as a jumper that closes the circuit (see Fig. 11-A). Or by pressing the external button of the device and the user, that is installed between the terminals of the connector (see Fig. 11-B).

The reverse functionality can be selected via the communications software and the control panel. We advise, except for very specific cases, against this type of connection because in case of an emergency the EP can not react if one of the two UPS cables is accidentally separated. This fault would immediately be detected with a closed EPO circuit. Indeed with the disadvantage of an unexpected separation in the power supply of the load, but with guarantee of an effective emergency functionality.

To recover the normal operating mode of the UPS, it is necessary to insert the connector with the jumper or deactivate the EPO button. The device stays ready for operation.



Fig.11: Connector for an external EPO

6.11 TERMINALS FOR THE DIGITAL INPUT AND OUTPUT TO THE RELAY (ONLY MODELS > 3 KVA)

The device contains one connector with four terminals for a digital input and output to the relay (see Fig. 12).

Digital input to "Start-Stop" the device: When the device is in operation a sequential voltage between 5 and 12 V DC has to be applied to reverse the mode. The device contains an internal static bypass ex factory. If the inverter is shut down, the output terminals will supply voltage trough the internal static bypass. Deactivate the bypass across the panel if the output supply should be shut down.

Error or fault of the dry contact: Each alarm changes the mode of the normally opened 24 V DC 1A contac A (NO). (Pay attention to the applied voltage and current!)

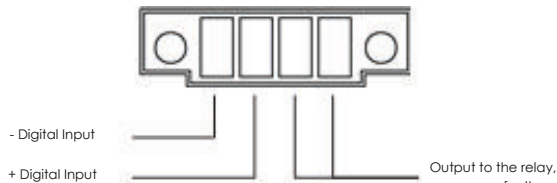


Fig.12: Digital Input / Output to the relay connector

6.12 AUXILIARY CONTACTS FOR THE MANUAL BYPASS (ONLY FOR MODELS > 3 KVA)

KESSUPS 92RT contains a auxiliary contact. It is possible to activate the shut down command for the UPS's inverter when it comes to closing the circuit. This normally open contact is intended for connection to an external manual bypass switch or disconnector (see Fig. 13).

The connection between the auxiliary contact and the UPS is in parallel. In this way, any of the auxiliary contacts that close the circuit will activate the shut down command of the inverter, transferring the powering of the loads to the internal static bypass, unless this is disabled across the control panel, so that it will cut the powering of the loads.



In parallel systems, the manual bypass switch of the fuse box or disconnector will have an auxiliary contact block for each device. Under no circumstances the different contacts should be joined as this would connect the different earths of the control of each UPS.



As safety measure it is necessary to connect the auxiliary contact of the bypass and the UPS, including the loads, to the powerboard with same functionality. This prevents that an incorrect action at the manual bypass disconnecter leads to a total or partial failure of the device. The same is applicable for systems in parallel.



Fig.13: Auxiliary contact for the external bypass with synchronization

6.13 PARALLEL CONNECTION (ONLY FOR MODELS > 3 KVA)

N+X is usually the most reliable power structure. N represents the minimum number of devices that the total load needs. X represents the number of redundant devices, that means the number of faulty UPS devices which are allowed simultaneously by the system. The higher X is, the greater the reliability of the system is. For occasions where reliability is very essential, N+X will be the optimum mode.

Up to 3 devices can be connected in parallel to configure a shared output or power redundancy.

Parallel installation and operation:

The communication line - com - constitutes a very low voltage safety circuit. To preserve the quality, this line must be installed separately from other lines carrying dangerous voltages (power distribution lines).

Bus for parallel connections and current signal bus:

Use the 15-wire signal cable with mesh and DB15 connectors at the ends to connect a maximum of 3 devices. Each cable has a male and a female connector at the ends which must be connected to link two devices. It is essential to close the communications loop of the parallel bus and the current signal bus through the cable with the connectors (see Fig. 14). The length of the cables related to the parallel bus is approximately 1,5 metres and must not be prolonged under any circumstances due to the risk of interference and communication failures that could be the consequences.

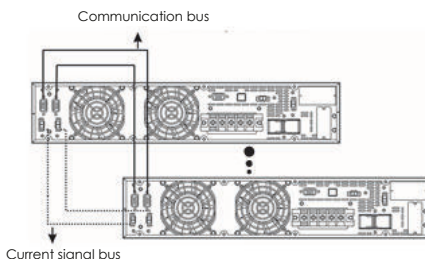


Fig.14: Communication and current signal connections for a parallel system

When installing systems in parallel, it is necessary to provide them with a box equipped with individual input and output protections, as well as a manual bypass with mechanical locking, see Fig. 15.

In case of a disruption this fuse boxes enable to isolate a single device in the system and to power the loads with the remaining devices during preventive maintenance or repair.

It also allows the removal of a parallel device and its reintegration once it is repaired, without interrupting the powering of the loads at any time. Provided that the power of the operational device permits it.

On request, we can supply a manual bypass box for a system in parallel with two devices.

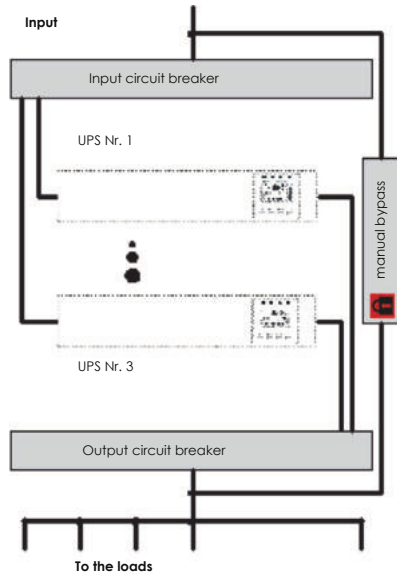


Fig.15: Parallel installation of two UPS systems from 4 to 6 kVA with fuse box and manual bypass

Mind the connection procedure for the input as described in paragraph 6.4.

Mind the connection procedure for the output (loads) as described in paragraph 6.5.

Mind the connection procedure as described in paragraph 6.8.

In parallel systems, the length and cross section of the cables that lead from the fuse box to each UPS and from the UPS to the box will be the same for all cables without exception.



In the worst case, the following instruction must be strictly observed:

- When the distance between the UPS in parallel and the circuit breaker board is less than 20 metres, the difference in length between the input and output cables of the device must be less than 20%.
- When the distance between the UPS in parallel and the the circuit breaker board is more than 20 metres, the difference in length between the input and output cables of the device must be less than 10%.

6.14 COMMUNICATION PORT

RS232 port und USB port

The communications line -COM- constitutes a very low voltage safety circuit. To preserve the quality it must be installed separately from other lines carrying dangerous voltages (power distribution lines).

The RS232 and USB interfaces are useful for the monitoring software and updating the firmware.

It is not possible to use both ports at the same time.

The DB9 connector supplies the RS232 signals and, in models up to 3 kVA, the normally open (NO) potential-free contacts (optocouplers). The maximum voltage and current applicable to these contacts is 30V DC and 1A.

There also is a 'Shutdown' input. It enables that the inverter is shut down when this input has a voltage between 10 and 12 V for more than 1 second.

The RS232 port consists of the transmission of serial data in such a way that a large amount of information can be sent through a communication cable with only 3 wires. The USB port is compatible with the USB 1.1 protocol for communication software.

Pin#	Beschreibung	Eingang / Ausgang
1	End of the backup	Output
2	TXD for RS232	Output
3	RXD for RS232	Input
4	GND for Shutdown	Earth
5	GND for RS232	Earth
6	Common relays	-
7	Shutdown order	Input
8	Low battery	Output
9	Mains fault	Output

Tab.2: Pinout for DB9- RS-232-connectors

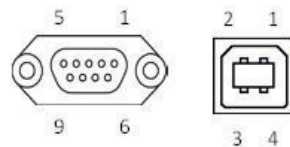


Fig.16: Connectors for DB9-, RS-232-Stecker and USB

Smart slot for the integration of an optional communication card

The following electronical units are available for communication:

- Relay interface with terminals, not programmable
- SNMP adapter
- The corresponding documentation is delivered with each supply. Please read it carefully before starting.

Installation

- Remove the protective cover from the device's slot.
- Insert the corresponding electronic unit in the reserved slot. Make sure that it is properly connected. The resistance caused in the connector must be overcome.
- Make the necessary connections in the terminal block or available connectors.
- Apply the new protective cover, that is delivered with relay interface, and attach it with the screws from the original cover.
- For further information please contact our KESS service.

Protection against voltage spikes for the modem / ADSL / fax ...



The communications line -COM- constitutes a very low voltage safety circuit. To preserve the quality it must be installed separately from other lines carrying dangerous voltages (power distribution lines).

Connect the main line for the modem / ADSL / fax ... to the RJ45 connector of the device, identified as 'Input'.

Connect the modem / ADSL / fax, ... to the RJ45 connector of the device, identified as 'Output'.

6.15 SOFTWARE

View Power is a UPS monitoring software which provides a user-friendly interface for monitoring and controlling. It features an auto shutdown function for systems consisting of several PCs in case of power failure. The software enables users to monitor and control any UPS in the same LAN through an RS232 or USB communications port, regardless of how far away they are from each other.

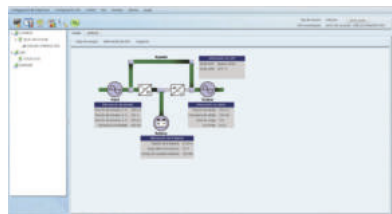


Fig.17: Main screen of the ViewPower software

7. OPERATION

7.1 BEFORE OPERATING THE DEVICE WITH CONNECTED LOADS



It is recommended to charge the battery at least 12 hours before using the UPS for the first time. Supply voltage to the device and turn the circuit breaker at the position 'On'. The battery charger will work automatically.

For models with extern battery module or backup extension modules, it will also be necessary to turn the fuse or circuit breaker, arranged between the batteries, in the position 'On'.

If you start the device without charging the battery at least 12 hours, you may have to deal with a prolonged power cut during the first hours of operation. The available backup time may be less than expected.

Make sure that all of the connections have been made correctly and with sufficient tightening torque, following the instructions on the labelling of the device and in its manual.

Check that the UPS and battery module or modules switches are 'Off'. Make sure that all loads are 'Off'.

Shut down the connected loads before starting the UPS and start the loads, one by one, only when the UPS is running. It is very important to proceed in the established order.

If, in addition to the more sensitive 'critical loads', it is necessary to connect high-consumption inductive loads, such as for laser printers or CRT monitors, the starting up of these peripherals will need to be taken into account to prevent the device from crashing. We do not recommend connecting loads of this type due to the amount of power they absorb from the UPS.

7.2 CHECKS BEFORE OPERATION



Make sure that all connections are correct and made with sufficient tightening torque, following the instructions on the labelling of the device and in Chapter 6. Check that the UPS and battery module or modules switches are 'Off'.

Shut down the connected loads before starting the UPS and start the loads, one by one, only when the UPS is running. Check that all loads are 'Off' before you shut down the UPS.

It is very important to proceed in the established order. For views of the UPS see Fig. 1 to Fig. 3. Fig. 15 shows a fuse box with manual bypass for a parallel system. For a single device the number of switches has to be adapted appropriately.

7.3 START-UP OF AN UPS WITH MAINS VOLTAGE

- Check that the power connection is correct.
- Supply voltage to the device (turn the input protection on the fuse box or manual bypass to 'On'). If the box has an output switch, turn it to 'On'.
- For 4 to 6 kVA models turn the UPS's input circuit breaker located at the back of the device to 'On'.
- If you press the 'ON' button for more than 2 seconds, the audible alarm will sound for 1 second and the UPS will start up.
- After a few seconds the UPS will operate in 'Normal mode'. If the mains voltage is incorrect the UPS will switch to 'Battery mode', without interrupting the power supply at the output terminals.
- Start the loads and make sure that the rated power of the device is not exceeded.

7.4 START-UP OF AN UPS WITHOUT MAINS VOLTAGE

- If a fuse box is available, turn the input and output protections to 'On'.
- Turn the battery switch to 'On'.
- Turn the device's input circuit breaker to 'On'.
- If you press the 'ON' button for more than 2 seconds, the audible alarm will sound for 1 second and the UPS will start up. Depending on the model, the fan will start. After checking the device, the main screen will be displayed.
- For 4 to 6 kVA models it is necessary to press the 'ON' button for a second time.
- After a few seconds the UPS will operate in 'Battery mode'. Depending on the charging level of the batteries, the remaining backup time may be very limited. Consider the risk if you operate the UPS without mains and discharged batteries.
- If the mains voltage return, the UPS will turn back to 'Normal mode' without interrupting the power supply at the output terminals.
- Start the loads and make sure sure that the rated power of the device is not exceeded.

7.5 SHUT-DOWN OF AN UPS WITH MAINS VOLTAGE

- Shut down the loads.
- Press the 'OFF' button for more than 2 seconds to shut down the inverter. The audible alarm will sound for 1 second. The device will be set to 'Bypass mode'.
- Disconnect the input plug of the power socket. Turn the input circuit breaker located at the back of the device to 'Off'. Or simply turn the input and output protections of the UPS's fuse box to 'Off'.
- A few seconds later, the LCD monitor turns off and the entire device will be out of service.



7.6 SHUT-DOWN OF AN UPS WITHOUT MAINS VOLTAGE

- Shut down the loads.
- Press the 'OFF' button for more than 2 seconds to shut down the inverter. The audible alarm will sound for 1 second. The device will leave the output terminals without voltage.
- A few seconds later, the LCD monitor turns off and the entire device will be out of service.
- To leave the assembly completely isolated, turn the input and output switches of the fuse box to 'Off'.

7.7 OPERATION OF A PARALLEL SYSTEM (ONLY 4 TO 6 KVA MODELS)

- For parallel systems check that the programming of the output 2 is the same to avoid conflicts.
- The operating mode described in this manual applies to devices with a specific configuration ex factory.
- Make sure that the loads and the output circuit breaker of the box are 'Off'.
- Mind the input circuit breaker of the fuse box or of the manual bypass box and the input switch of each UPS from the models 4 to 6 kVA. The UPSs supply output voltage from the internal static bypass of each unit. Observe the LCD monitor of the control panel for any warnings or error information. Measure the output voltage at the terminals of each UPS separately to check that the voltage difference between them is less than 0,5 V. If the difference is greater than 1 V, check the connection and the associated instructions.
- If everything is correct, proceed. Press the 'ON' button on all of the UPS devices for more than 2 seconds and each of them will start up. All UPSs will transfer to 'Normal mode'. Measure the output voltage at the terminals of each UPS separately to check that the voltage difference between them is less than 0,5 V. If the difference is greater than 1 V, the UPSs will need to be adjusted. Please contact the KESS Service.
- If everything is correct, proceed. Press the 'OFF' button for more than 2 seconds on all of the UPS devices and each of them will begin to shut down. Turn the input circuit breakers on the distribution or manual bypass board to 'On'. The output terminals on the fuse box will be under potential through the static bypass of the device.
- Press the 'ON' button for more than 0,5 seconds on all of the UPS devices and each of them will begin to start up in order to finally leave the system in parallel operation in 'Normal mode'.
- Start the loads.
- There must always be a connection between the neutrals, either input or output.
- Do not open the input and output circuit breakers of a fuse box when the UPS is in operation. Otherwise a fault in the UPS may occur and the connected loads may shut down.



7.8 OPERATION OF AN UPS WITH A PARALLEL SYSTEM OR A SINGLE UPS (MODELS 4 TO 6 KVA)

To operate the parallel system, it is necessary to have a manual bypass box for the parallel system. If there is none, you have to shut down the whole system and the connected loads.

The following steps are meant to add a device in a system with two units. To incorporate a device into a system with only one UPS, proceed in the same way.

The fuse box must have input and output switches for each UPS, in addition to the one for the manual bypass. Otherwise, it will be necessary to adapt the box or acquire a new one if it has not been previously anticipated.

Since it is necessary to change the parallel bus connection to incorporate the new device into the system (cable with DB15 connectors), it will be necessary to switch the powering of the loads to the manual bypass. Proceed as follows:



- Press the 'OFF' button on all of the UPS devices for more than 2 seconds to shut down the inverter in all of them. The audible alarm will sound for 1 second. The devices, that make up the current parallel system, will switch to 'Bypass mode'.
- Switch the devices to manual bypass using the following procedure: Remove the mechanical lock on the manual bypass switch or disconnecter of the fuse box and turn it to 'On'. Remove the protective cover of the manual bypass switch, which is located at the back of each unit, and turn all of the switches to 'Bypass'. Consider that in 'Bypass mode' the loads are exposed to voltage and frequency variations and cuts or micro-cuts in mains power. If it is possible, it is recommended to choose a day with lower probability of failure (days without fluctuations, days without storms, etc.) and a certain speed in the process.
- Turn the input circuit breakers of each device to 'Off'.
- Turn the input and output circuit breakers of the box to 'Off'.
- Before incorporating the new KESSUPS 92RT into the system, carry out the appropriate steps to leave it in the same condition as the others (input switch turned to 'Off' and manual bypass switch without protective cover turned to 'Bypass').
- Incorporate the new UPS to the system following the procedure established in section 6.13 for connection in parallel.
- Disconnect the communication bus between the first and last device, and reconnect it including the new UPS. The bus must be closed for proper operation.
- Turn the input circuit breakers of each UPS on the fuse box to 'On'.
- Turn the input circuit breakers of each UPS to 'On'.
- The output switches of each UPS on the fuse box must be opened. The UPS supplies output voltage from the internal static bypass of each unit. Check if the LCD monitor shows any warning or error information. Measure the output voltage at the terminals of each UPS separately to check if the voltage difference is greater than 1 V. If the difference is greater than 1 V, then check the connection plans and follow the instructions.



- If everything is correct, proceed. Press the 'ON' button on all of the UPS devices for more than 2 seconds and each of them will start up. All of the UPSs will transfer to 'Normal mode'. Measure the output voltage at the terminals of each UPS separately to check that the voltage difference between them is less than 0,5 V. If the difference is greater than 1 V, the UPSs will need to be adjusted. Please contact the KESS Service.
- If everything is correct, proceed. Press the 'OFF' button on all of the UPS devices for more than 2 seconds and each of them will begin to shut down the device. Turn the output circuit breakers on the fuse box to 'On'. The output terminals on the board will be under potential through the static bypass of the devices, in fact at the same potential as the manual bypass line.
- Turn the manual bypass switch or disconnecter on the distribution board to 'Off' and reposition the mechanical lock to prevent possible accidents. To prevent incorrect operations, it is necessary to fit the mechanical lock and the covers of the manual bypass mechanisms and their fixing screws.
- Press the 'ON' button on all of the UPS devices for more than 2 seconds and each of them will start up, in order to finally leave the system in parallel operation in 'Normal mode'.
- The loads are again protected by the parallel system.

7.9 REPLACEMENT OF A FAULTY UPS IN A PARALLEL SYSTEM

If a UPS device, that consist of one or three units, has to be replaced, follow the same steps as for an installation.

8. CONTROL PANEL WITH LCD MONITOR

8.1 INFORMATION SHOWN ON THE DISPLAY

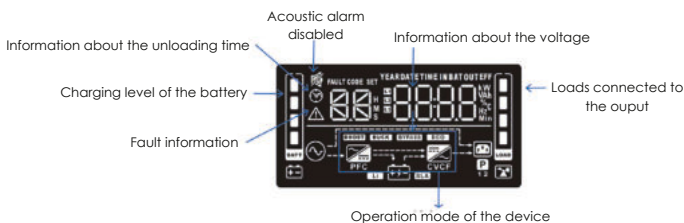


Fig.18: Information shown on the display

Display	Meaning
Information about the backup time	
	Shows the backup time
Fault information	
	Shows symbols of the configuration mode
	Shows warnings and fault codes
Information about the acousting alarms	
	Shows that the acousting alarm of the UPS is turned off
Temperature, Battery, Charging, Input and output voltage	
	Shows input voltage, input frequency, input current, battery voltage, battery current, battery capacity, temperature, output voltage, output frequency, charging current, charging level
Information about the load	
	Shows the level of the load: 0-24%, 25-49%, 50-74%, 75-100%
	Shows overload
Information about programmable outputs	
	The programmable outputs are activated
Information about the battery mode of the device	
	The device is connected to the power grid
	The battery is in operation
	Charging level
	The bypass mode is activated
	The ECO mode is activated
	The AC to DC circuit is activated
	The PFC circuit is activated
	The frequency converter circuit is activated
	The UPS works in frequency converter mode
	The output voltage is activated
Information about the battery	
	Shows the charging level: 0-24%, 25-49%, 50-74%, 75-100%
	Shows that the battery is low

Tab.3: Information shown on the display

Code	On display	Meaning
ENA	ENR	Enabled
DIS	di S	Disabled
ESC	ESC	Escape
HLS	HLS	Upper voltage limit for transfer to the battery mode
LLS	LLS	Lower voltage limit for transfer to the battery mode
AO	AO	EPO normally open
AC	AC	EPO normally closed
EAT	EAT	Estimated backup time
RAT	RAT	Backup time
SD	SD	Shutdown
OK	OK	Ok
ON	ON	On
BLn.L	BL	Low battery
OL	OL	Overload
OI	OI	Input overcurrent
NC	NC	Battery is not connected
OC	OC	Battery overcharge
SF	SF	Connection error
EP	EP	EPO
TP	TP	Temperature
CH	CH	Charger
BF	BF	Battery fault, low voltage
BV	bv	Bypass voltage out of range
FU	FU	Bypass frequency out of range
BR	BR	Replace the batteries
EE	EE	Internal EEPROM error

Tab.4: Abbreviations shown on the display

8.2 LCD MONITOR FOR MODELS UP TO 3 KVA

The control panel consists of three buttons and one LCD monitor with background lighting.

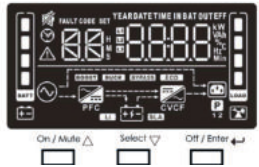





Fig.19: View of the control panel (Models to 3 kVA)

Button	Meaning
<p>On / Mute</p> 	<p>UPS startup: Press this button at least 2 sec.</p> <p>Muting the alarm: Press this button at least 3 sec. to mute or unmute the acoustic alarm</p> <p>Button to navigate upwards: When you press this button in the UPS setting mode, the menu will be moved upwards one point</p> <p>Activate the battery test: Press this button at least 3. sec when the device operates in 'Normal mode' or 'Frequency converter mode' (CF). After testing, the device will return to the respective mode.</p>
<p>Select</p> 	<p>Settings or configuration mode: Press this button at least 3 sec. to access this mode when the inverter of the UPS is shut down ('Bypass mode')</p> <p>Button to navigate downwards: When you press this button in the UPS setting mode, the menu will be moved downwards one point</p>
<p>Off / Enter</p> 	<p>UPS shutdown: Press this button at least 2 sec.</p> <p>Confirm your selection: Press this button to confirm your selection</p>

Tab.5: Functionality of the control panel buttons (models up to 3 kVA)

8.2.1 ACOUSTIC ALARMS

Meaning	Alarm sound	Possibility of muting
State of the UPS		
Bypass mode	Beeps every 10 sec.	Yes
Battery mode	Beeps every 5 sec.	
Fault	Continuous	No
Warning		
Overload	Beeps every second	Yes
Backup time ends	Beeps every second	No
Fault		
All	Continuous	No

Tab.6: Acoustic alarm (models up to 3 kVA)

8.2.2 PARAMETERS FOR THE UPS CONFIGURATION

Parameter 1: Code of the UPS setting mode (see Tab. 7)

Parameter 2: Configuration of value options for each UPS setting mode

All parameter settings are saved when the UPS is completely shut down and if batteries, whether internal or external, are connected. If a complete shutdown is not carried out, the setting will not be saved.

Tab. 7 shows an overview off the adjustable parameters 1 for each battery type.

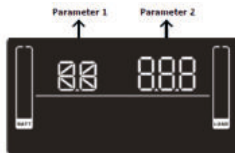


Fig.20: Position of the parameters on the LCD monitor (models up to 3 kVA)

#	Meaning	Bypass-Mode / Mode without output	AC Mode	ECO Mode	CF Mode	Battery Mode	Battery Test
01	Output voltage	Yes	-	-	-	-	-
02	Frequency converter state	Yes	-	-	-	-	-
03	Output frequency	Yes	-	-	-	-	-
04	ECO enable/disable mode	Yes	-	-	-	-	-
06	Bypass state (UPS 'Off')	Yes	Yes	-	-	-	-
09	Programmable output state	Yes	Yes	Yes	Yes	Yes	Yes
10	Programmable output configuration	Yes	Yes	Yes	Yes	Yes	Yes
11	Backup limitation configuration	Yes	Yes	Yes	Yes	Yes	Yes
12	Total battery pack Ah configuration	Yes	Yes	Yes	Yes	Yes	Yes
15	EPO logical configuration	Yes	Yes	-	Yes	Yes	-
17	Viewable backup time configuration	Yes					

Tab.7: Codes of the parameters 1

Configuration of code 12 (Battery capacity in Ah)

Standard models are configured ex factory, so it is not necessary to perform any actions to adjust this parameter. However, for models with extended backup it is necessary to adjust the value to the total capacity of the battery pack. Any alteration of the battery pack will entail a readjustment, so it will be necessary to adapt the value in the event of future expansions.

There are basically two reasons to perform the adjustment. Even if it does not affect the correct functionality of the device if it is not done, it is recommended:

- The charging current of the batteries is directly related to the capacity of the battery pack. The charger will adapt the charging factor automatically according to the value of the total capacity entered, up to the maximum of the current that is possible. This leads to a faster charging and a greater availability in the case of a frequent mains failure.

b) It is important to enter the value in Ah, so that the control system calculates the available backup time and shows it without further changes on the LCD monitor.

The settings values are determined as follows:

Devices with backup time are configured for internal batteries and external battery modules. The battery capacity of both are described in Tab. 8 and Tab. 9. For example, a KESSUPS 1500 and a backup extension module KESSUPS-EBM-36V: 9 Ah + 18 Ah = 27 Ah (value for parameter 12).

Model	Internal batteries	
	Voltage (V)	Capacity (Ah)
KESSUPS-92RT-1000	36	7
KESSUPS-92RT-1500		9
KESSUPS-92RT-2000	48	
KESSUPS-92RT-3000	72	








Tab.8: Characteristics of batteries with standard modules





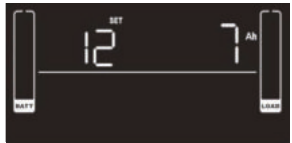


Code	Battery module	
	Voltage (V)	Capacity (Ah)
KESSUPS-EBM-36V	36	18 (2 x 9)
KESSUPS-EBM-48V	48	
KESSUPS-EBM-72V	72	

Tab.9: Characteristics of batteries with external battery modules

8.2.3 SETTINGS ON THE UPS DISPLAY

These settings are only featured in bypass or standby mode

Code	Meaning	LCD monitor
01	Choose the correct output voltage: 200 / 208 / 220 / 230 / 240 VAC	
02	Converter mode ENA: Converter mode enabled DIS: Normal UPS mode	
03	Output frequency BAT 50: output frequency is 50 Hz BAT 60: output frequency is 60 Hz When the converter mode is activated, choose following output frequency: CF 50: output frequency is 50 Hz CF 60: output frequency is 60 Hz	
04	ECO mode ENA: ECO mode enabled DIS: ECO mode disabled	
05	Choose the highest and lowest acceptable voltage value for the ECO mode with the Up-button and Down-button. HLS: High loss of voltage LLS: Low loss of voltage	
06	Bypass mode with shut down UPS ENA: Bypass enabled DIS: Bypass disabled - No output voltage if the UPS is shut down	
07	Bypass voltage range Choose the highest and lowest acceptable voltage value for the bypass mode with the Up-button and Down-button. HLS: Bypass highest voltage value LLS: Bypass lowest voltage value	

Code	Meaning	LCD monitor
08	<p>Bypass frequency range</p> <p>Choose the highest and lowest acceptable frequency value with the Up-button and Down-button.</p> <p>HLS: Bypass highest frequency value LLS: Bypass lowest frequency value</p>	
09	<p>Programmable outputs</p> <p>ENA: Programmable outputs enabled DIS: Programmable outputs disabled</p>	
10	<p>Backup time for programmable outputs</p> <p>0-999: Choose the backup time in the range 0-999 min. for programmable outputs, that are connected to non-critical loads in battery mode</p>	
11	<p>0-999: Choose the backup time in the range 0-999 min. for all programmable outputs</p> <p>DIS: Turn off the limited backup time, so that the backup time depends on the capacity of the battery</p> <p>If 0 is chosen, the backup time is only 10 sec.</p>	
12	<p>Totale Ah of the UPS</p> <p>7-999: Choose the total capacity of the battery in the range 7-999. Choose the correct total capacity of the battery if external battery modules are connected.</p>	
13	<p>Maximum charging current of the charger</p> <p>Please choose the maximum charging current based on the battery capacity. The recommended charging current is 0,1 ~ 0,3 of the battery capacity.</p> <p>Battery capacity / current (A) 7 ~ 20 / 2 20 ~ 40 / 4 40 ~ 60 / 6 60 ~ 80 / 8 80 ~ 100 / 10 100 ~ 150 / 12</p>	
14	<p>Choose charger boost-voltage</p> <p>2,25 - 2,40 V</p>	



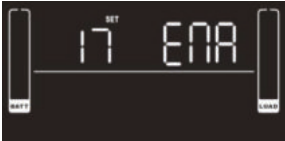
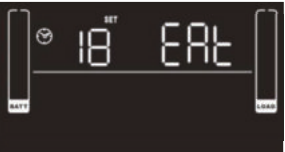








Code	Beschreibung	LCD-Anzeige
15	Choose charger maintenance voltage: 2,20 - 2,33 V	
16	EPO functionality control AO: When AO is chosen, then the EPO is 'Normally Open'. AC: When AC is chosen, then the EPO is 'Normally Closed'.	
17	External output isolation transformer ENA: It is allowed to connect an external output isolation transformer DIS: It is not allowed to connect an external output isolation transformer	
18	Choose the display settings for the backup time EAT: Shows the remaining backup time RAT: Shows the expired backup time	
19	Permitted input voltage range Choose the highest and lowest acceptable voltage value with the Up-button and Down-button. HLS: Highest input voltage value LLS: Lowest input voltage value	
00	Leave the operation settings	

Fig.21: Setting menu (models up to 3 kVA)

8.2.4 MEANINGS OF THE OPERATION MODE





















Operation mode	Meaning	LCD monitor
Online mode	When the voltage is within the range of the device, the UPS will supply stable AC sine-wave voltage to the loads, and charge the batteries.	
ECO mode	If the input voltage is within the regulation ranges and ECO mode is activated, the UPS supplies the output voltage from the bypass in ECO mode (energy saving).	
CF mode	When the input frequency is between 40 Hz and 70 Hz, the UPS can be set to a constant output frequency of 50 or 60 Hz. The device will still charge the batteries in this mode.	
Battery mode	When the input / frequency voltage is not within the predefined range of the device or there is an AC mains failure, the UPS powers the loads from the batteries for a limited time due to their own capacity and activates the audible alarm modulated every 5 seconds.	
Bypass mode	When the input voltage is within the range but the UPS is overloaded, the system will automatically transfer to bypass mode or the transfer to this mode can be forced through the front panel. The audible alarm beeps every 10 seconds.	
Fault mode	When an error occurs, the ERROR icon and the fault code are displayed.	

Tab.10: Operation mode (models up to 3 kVA)

8.2.5 ERRORS, FAULT CODES & WARNING

Code	Meaning
01	DC bus start-up fault
02	DC bus overvoltage
03	DC bus undervoltage
11	Inverter soft start fault
12	High voltage in the inverter
13	Low voltage in the inverter
14	Inverter output short-circuited
27	High battery voltage
28	Low battery voltage
2A	Battery charger short-circuited at its output
41	Overtemperature
43	Output overload
45	Charger faulty
49	Input over current

Tab.11: Error or fault codes (models up to 3 kVA)

Warning	Icon (flashing)	Code	Acoustic alarm
Battery voltage low	 	bL	Beeps every 2 sec.
Overload	 	OL	Beeps every 2 sec.
Input overcurrent		OI	Beeps twice every 10 sec.
Disconnected battery	 	NC	Beeps every 2 sec.
Battery overload	 	OC	Beeps every 2 sec.
Fault at the connection socket	 	SF	Beeps every 2 sec.
EPO activated		EP	Beeps every 2 sec.
Overtemperature		EP	Beeps every 2 sec.
Charger faulty		CH	Beeps every 2 sec.
Battery fault		bF	Beeps every 2 sec. (The UPS shuts down and warns that the batteries are not okay.)
Voltage of the static bypass beyond tolerance range	 	bV	Beeps every 2 sec.
Frequency of the static bypass is instable		FU	Beeps every 2 sec.
Change battery		bR	Beeps every 2 sec.
EEPROM fault		EE	Beeps every 2 sec.

Tab.12: Warnings and indicators (models up to 3 kVA)

8.3 LCD MONITOR FOR MODELS 4 TO 6 KVA

The control panel consists of 4 buttons, one LCD monitor with background lighting and 4 optical LED displays.

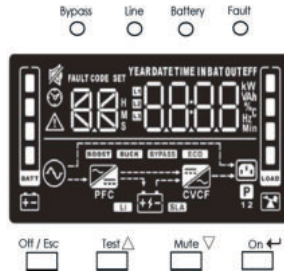


Fig.22: View of the control panel (models 4 to 6 kVA)

Button	Meaning
Off / Esc	<p>UPS shutdown: Press this button at least 2 sec.</p> <p>ESC function: Press this button to return to the last parameter of the configuration menu.</p>
Test △	<p>Activate the battery test: Press this button at least 3. sec when the device operates in 'Normal mode' or 'Frequency converter mode' (CF). After testing, the device will return to the respective mode.</p> <p>Button to navigate upwards: When you press this button in the UPS setting mode, the menu will be moved upwards one point.</p>
Mute ▽	<p>Muting the alarm: Press this button at least 3 sec. to mute or unmute the acoustig alarm.</p> <p>Button to navigate downwards: When you press this button in the UPS setting mode, the menu will be moved downwards one point.</p>
On ↩	<p>UPS startup: Press this button at least 2 sec.</p> <p>Confirm your selection: Press this button to confirm your selection.</p>
Test △ Mute ▽	<p>Press both buttons at the same time and at least 1 sec. to enter or exit the configuration menu.</p>

Tab.13: Functionality of the control panel buttons (models 4 to 6 kVA)

UPS state	LED			
	Bypass (yellow)	Line (green)	Battery (yellow)	Fault (red)
Start up	●	●	●	●
Mode without output	○	○	○	○
Bypass mode	●	○	○	○
AC mode	○	●	○	○
Battery mode	○	○	●	○
CF mode	○	●	○	○
ECO mode	●	●	●	○
Battery test	●	●	○	○
Fault	○	○	○	●

● LED flashes continuously ○ LED off

Tab.14: LED display with different modes (models 4 to 6 kVA)

8.3.1 ACOUSTIC ALARMS

Meaning	Alarm tone	Possibility to mute
UPS state		
Bypass mode	Beeps every 2 sec.	Yes
Battery mode	Beeps every 4 sec.	
Fault	Continuously	No
Warnings		
Over load	Beeps every 2 sec.	Yes
Autonomy ending	Beeps every sec.	No
Fault		
All	Continuously	No

Tab.15: Acoustic alarm (models 4 to 6 kVA)

8.3.2 PARAMETERS FOR THE UPS CONFIGURATION

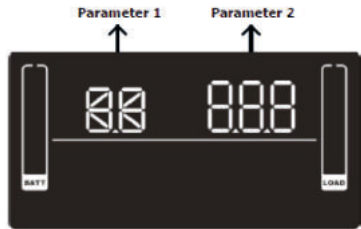


























Fig.23: Position of the parameters on the LCD display (models 4 to 6 kVA)

Code	Meaning	Bypass-Mode / Mode without output	AC mode	ECO mode	CF mode	Battery mode	Battery test
01	Output voltage	Yes	-	-	-	-	-
02	Output frequency	Yes	-	-	-	-	-
05	ECO mode enabled / disabled	Yes	-	-	-	-	-
08	Settings for the bypass mode	Yes	Yes	-	-	-	-
09	Settings for the maximum time of the battery discharge	Yes	Yes	Yes	Yes	Yes	Yes
10	Reserved	Reserved for future options					
11	Reserved	Reserved for future options					
12	Functionality hot standby	Yes	Yes	Yes	Yes	Yes	Yes
17	Reserved	Reserved for future options					

Tab.16: Codes of the parameter 1 (models 4 to 6 kVA)

8.3.3 DESCRIPTION OF THE UPS OPERATION MODES (4 TO 6 KVA)

Code	Meaning	LCD display
AC mode	If the input voltage is within the range of the device, the UPS will supply stable AC sine-wave voltage to the load or loads, and charge the batteries.	   
ECO mode	If the input voltage is within the regulation ranges and ECO mode is activated, the UPS supplies the output voltage from the bypass in ECO mode (energy saving).	   
CF mode	When the output frequency is selected as CF in parameter 3 of the settings menu code 02, the inverter supplies a constant output frequency (50 or 60 Hz). In this way, the UPS will not supply bypass output voltage, but will charge the batteries.	   
Battery mode	When the input / frequency voltage is not within the predefined range of the device or there is an AC mains failure, the UPS powers the loads from the batteries for a limited time due to their own capacity and activates the audible alarm modulated every 4 seconds.	  
Bypass mode	When the input voltage is within the predefined range of the device and the bypass is enabled, when the UPS is switched off, the device enters bypass mode. The audible alarm modulated every two minutes is activated.	   
Battery test	<p>With the UPS in AC mode or CF mode, press the 'TEST' button for more than 0.5 seconds. The audible alarm will beep and the battery test will start.</p> <p>In the electric flow diagram of the display, the line between I / P and the inverter icon flashes for information purposes.</p> <p>This test is useful to check the battery state.</p>	  
Error fault state	When an error or fault is detected in the UPS, fault codes are shown on the LCD monitor.	 

Tab.17: Operation modes (models 4 to 6 kVA)
















8.3.4 ERRORS, FAULT CODES AND WARNINGS

Code	Meaning
01	DC bus start-up fault
02	DC bus overvoltage
03	DC bus undervoltage
04	DC bus imbalance
11	Inverter soft start fault
12	High voltage in the inverter
13	Low voltage in the inverter
14	Inverter output short-circuited
1A	Negative power fault at the output
21	Battery thyristor short-circuited
24	Inverter relay short-circuited
2A	Battery charger short-circuited at its output
31	CAN communication fault
35	Parallel cable fault
36	Parallel communication fault
41	Overtemperature
42	CPU communication fault
43	Output overload
6A	Battery start-up fault
6B	PFC current fault in battery mode
6C	DC Bus voltage change too fast

Tab.18: Error or fault codes (models 4 to 6 kVA)

Code	Meaning
01	Disconnected battery
07	Overcharge in the battery
08	Low battery
09	Output overload
0A	Fan fault
08	EPO activated
0D	Overtemperature
0E	Charger fault
10	L1 input fuse open
21	Line voltages of the UPSs connected in parallel are different
22	Bypass voltages of UPSs connected in parallel are different
33	UPS locked in bypass after 3 successive overloads in 30 minutes
3A	Maintenance switch cover open
3D	Bypass not available
3E	Start-up fault

Tab.19: Warning or fault codes (models 4 to 6 kVA)

Code	Icon (flashing)	Acoustig alarm
Overload	 	Beeps twice every sec.
Battery overload	 	Beeps every sec.
EPO activated	 	Beeps every sec.
Fan fault / overtemperature	 	Beeps every sec.
Charger faulty	 	Beeps every sec.
I/P circuit disconnected	 	Beeps every sec.
Triple overload within 30 min.		Beeps every sec.
Battery disconnected	 	Beeps every sec.

Tab.20: Fault and error codes (models 4 to 6 kVA)

9. MAINTENANCE, GARANTY AND SERVICE

9.1 MAINTENANCE OF THE BATTERY

Pay attention to all safety instructions regarding batteries indicated in this manual.

The life span of the batteries greatly depends on the ambient temperature and other factors such as the number of charges and discharges, as well as their depth. The life span is between 3 and 5 years if the ambient temperature is between 10 and 20°C. Different types of battery with different service lives are available on request.

The KESSUPS 92RT series requires minimum maintenance. The batteries used in the standard models are lead acid, sealed, valve regulated and maintenance free. The only requirement is to charge the batteries regularly to extend their life expectancy. While the UPS is connected to the mains supply, whether or not it is running, it will keep the batteries charged and also offer protection from overcharging and deep discharge.

9.2 INDICATIONS FOR INSTALLATION AND REPLACEMENT OF THE BATTERIES



If it is necessary to replace any connection cables, original materials have to be purchased through our KESS Service or authorised distributors. Using inappropriate cables can lead to overheating and fire hazards. Inside the device there are permanent dangerous voltages even without mains supply through its connection with the batteries and especially in UPS devices where the electronics and batteries share the same housing.

Therefore it is irrelevant if the input circuit breaker of the fuse box and/or input of the device for the models > 3 kVA is in position 'Off'.

Mind that the battery circuit is not isolated from the input voltage, so there is a risk of discharge with dangerous voltages between the battery terminals and the earth terminal, which is in turn connected to the earth (any metal part of the device).

Repair and/or maintenance must be carried out by our KESS Service. The replacement of batteries may only be performed by qualified personnel.

Depending on the configuration of the UPS, certain actions have to be carried out before handling batteries:

1) UPS with batteries and electronic in the same housing:

- Stop the loads and the device completely.
- Disconnect the KESSUPS 92RT from the mains.
- Open the device to have access to the interior.
- Remove the internal battery fuses.
- Release the battery holders and replace the batteries.
- Perform the steps above in reverse to return the device to how it was at the start, including the start-up.

2) UPS with batteries and electronic in a different housing:

- Stop the loads and the device completely.
- Disconnect the KESSUPS 92RT from the mains.
- Disconnect the battery module from the UPS.
- Open the device to have access to the interior.
- Remove the internal battery fuses.
- Release the battery holders and replace the batteries.
- Perform the steps above in reverse to return the device to how it was at the start, including the start-up.

9.3 TROUBLESHOOTING FOR THE UPS






To check if the UPS works correctly, see the information on the LCD monitor of the control panel and act appropriate to your models.

Try to solve the problem with the guide of Tab. 21 and Tab. 22. If the problems consist, please contact our KESS Service.

Proceed as follows if you contact the service:






- Model and serial number of the UPS
- Date on which the issue occurred
- Full description of the issue, including the LCD monitor and the alarm state
- Power supply conditions, type of the load and level of the load applied to the UPS, ambient temperature and ventilation conditions
- Any other relevant information

9.3.1 TROUBLESHOOTING GUIDE FOR DEVICES UP TO 3 KVA

Symptoms	Possible causes	Solutions
No alarms or indications on the LCD monitor and normal mains voltage.	The power cable is not connected correctly.	Check that the power cables are firmly connected to the mains.
	The power cable is connected to an IEC output connector on the UPS.	Correctly connect the power cable to the respective IEC connector.
 These icons are shown on the LCD monitor. The acoustic alarm beeps every sec.	The EPO function is activated.	Close the EPO signal circuit to deactivate it.
 These icons are shown on the LCD monitor. The acoustic alarm beeps every 2 sec.	Neutral earth fault detection. Inverted phase and neutral input cables.	Disconnect the input plug from the AC power socket and invert the connection of the phase and the supply neutral (rotate the plug 180°).
 These icons are shown on the LCD monitor. The acoustic alarm beeps every 2 sec.	The internal or external batteries are badly connected.	Check that all batteries are properly connected.
The fault code 27 is shown on the LCD monitor. The acoustic alarm beeps continuously.	The voltage of the batteries is too high or the charger is faulty.	Contact our KESS Service.
The fault code 28 is shown on the LCD monitor. The acoustic alarm beeps continuously.	The voltage of the batteries is too low or the charger is faulty.	Contact our KESS Service.
 These icons are shown on the LCD monitor. The acoustic alarm beeps every sec.	The UPS is overloaded.	Disconnect the not needed loads from the output sockets.
	The UPS is overloaded. The connected loads are powered directly from the mains through the bypass.	Disconnect the not needed loads from the output sockets.
	After repeated overloads, the UPS is locked in Bypass mode. The connected loads are powered directly from the mains.	Disconnect the not needed loads from the output sockets, shut down the device and restart it.
The fault code 49 is shown on the LCD monitor. The acoustic alarm beeps continuously.	UPS input overcurrent.	Disconnect the not needed loads from the output sockets.
 These icons and the fault code 43 are shown on the LCD monitor. The acoustic alarm beeps continuously.	The UPS shuts down automatically as a result of an overload in the output of the device.	Disconnect the not needed loads from the output sockets and restart it.
The fault code 14 is shown on the LCD monitor. The acoustic alarm beeps continuously.	The UPS shuts down automatically as a result of a short circuit in the output.	Check the output wiring and that the connected loads are not short-circuited.
The fault codes 01, 02, 03, 11, 12, 13 or 41 are shown on the LCD monitor. The acoustic alarm beeps continuously.	An internal fault has occurred in the UPS. There are two possibilities: 1. The load is still powered, but directly from the mains through the bypass. 2. The load is no longer powered.	Contact our KESS Service.
The backup time is shorter than expected.	The batteries do not charge completely.	Charge the batteries for at least 5 h and check their charging state. If the problems proceed, please contact our KESS Service.
	Faulty batteries.	Contact our KESS Service to arrange a battery replacement.
The fault code 2A is shown on the LCD monitor. The acoustic alarm beeps continuously.	Charger short-circuited at its output.	Check if the connection of the external battery pack connected to the UPS is short-circuited.
The fault code 45 is shown on the LCD monitor. The acoustic alarm beeps continuously.	The charger does not provide output and the battery voltage is less than 10 V per element.	Contact our KESS Service.

Tab.21: Troubleshooting guide for models < 3 KVA

9.3.2 TROUBLESHOOTING GUIDE FOR DEVICES FROM 4 TO 6 KVA

Symptoms	Possible causes	Solutions
No alarms or indications on the LCD display and mains voltage normal.	The power cables are not connected correctly.	Check that the power cables are firmly connected to the mains.
 <p>These icons are shown on the LCD monitor. The acoustic alarm beeps every sec.</p>	The EPO function is activated.	Close the EPO signal circuit to deactivate it.
 <p>These icons and the message BATT FAULT are shown on the LCD monitor. The acoustic alarm beeps every sec.</p>	The internal or external battery is not correctly connected.	Check that all batteries are correctly connected.
 <p>These icons are shown on the LCD monitor. The acoustic alarm beeps twice every sec.</p>	The UPS is overloaded.	Disconnect or shut down the not needed loads connected to the UPS output.
	The UPS is overloaded. The loads connected to the UPS are directly powered by the mains through the bypass.	Disconnect or shut down the not needed loads connected to the UPS output.
	After repeated overloads, the UPS will transfer to bypass mode. The loads connected to the device will be powered from the input through the bypass.	Disconnect or shut down the not needed loads connected to the UPS output, shut down the device and restart it.
 <p>This icon and the fault code 43 are shown on the LCD monitor. The acoustic alarm beeps continuously.</p>	The UPS is overloaded for a long time and the device is locked. The UPS shuts down automatically.	Disconnect or shut down the not needed loads connected to the UPS output, shut down the device and restart it.
The fault code 14 is shown on the LCD monitor. The alarm beeps continuously.	The UPS shuts down automatically due to a short circuit at the UPS output.	Check that the output connection and/or the loads connected to it are not short-circuited.
The fault code 01, 02, 03, 04, 11, 12, 13, 14, 1A, 21, 24, 35, 36, 41, 42 or 43 is shown on the LCD monitor. The acoustic alarm beeps continuously.	<p>An internal fault has occurred in the UPS. There are two possibilities:</p> <ol style="list-style-type: none"> 1. The load is still powered, but directly from the mains through the bypass. 2. The load is no longer powered. 	Contact our KESS Service.
The backup time is shorter than expected.	The batteries do not charge completely.	Charge the batteries for at least 7 h and check their charging state. If the problems proceed, please contact our KESS Service.
	Faulty batteries.	Contact our KESS Service to arrange a battery replacement.
 <p>This icon and the message Temp are shown on the LCD monitor. The acoustic alarm beeps every sec.</p>	The fan is locked, does not work or the temperature of the UPS is very high.	Contact our KESS Service.

Tab.22: Troubleshooting for models from 4 to 6 kVA

9.4 WARRANTY CONDITIONS

On our website www.kess.at you will find our warranty conditions for the purchased product.

9.4.1 EXCLUSIONS FROM THE WARRANTY

Our company will not be bound by the warranty if it notices that the defect of the product does not exist or was caused by improper use, negligence, improper installation and/or verification, unauthorized repair or any other modifications of by accident, fire, lightning or other hazards. Nor shall it cover any compensation for damages.

10. GENERAL TECHNICAL SPECIFICATIONS

Technical specifications					
KESSUPS 92RT models	1 kVA	1,5 kVA	2 kVA	3 kVA	6 kVA
Technology	Online double conversion, PFC, double DC bus				
Rectifier					
Input type	Single phase				
Number of cables	3 cables - phase R (L) + neutral (n) and earth				
Rated voltage	200 / 208 / 220 / 230 / 240V AC ⁽¹⁾			208 / 220 / 230 / 240V AC ⁽²⁾	
Input voltage range	176 - 276V AC with 100 % load				
	110-300V AC up to 60 % load			110-300V AC up to 50 % load	
Frequency	50 / 60 Hz (auto-detectable)				
Input frequency range	± 10 Hz (40 - 60 / 50 - 70 Hz)			± 4 Hz (46 - 54 / 56 - 64 Hz)	
Total harmonic distortion (THDI) at full load	≤ 5 %			≤ 4 %	
Power factor	≥ 0,99 (at full load)				
Inverter					
Technology	Pwm				
Waveform	Pure sine wave				
Power factor	1 ⁽³⁾				
Rated voltage	200 / 208 / 220 / 230 / 240V AC ⁽¹⁾			208 / 220 / 230 / 240V AC ⁽²⁾	
Output voltage accuracy (battery mode)	± 1				
Total harmonic distortion (THDi) with linear board	≤ 2 %			≤ 1 %	
Frequency (with mains present, synchronised to rated input)	47 - 53 Hz			56 - 64 Hz	

⁽¹⁾ power reduction to 80 % for devices with 200 or 208 V
⁽³⁾ For devices (b1) from 4 to 10 kVA: output power factor 0,8

⁽²⁾ power reduction to 90 % for devices with 208 V

Technical specifications					
KESSUPS 92RT models	1 kVA	1,5 kVA	2 kVA	3 kVA	6 kVA
Frequency (with mains absent, backup mode)	< 1 Hz / sec.				
Transfer time, inverter to battery	0 ms				
Performance at full load, in line mode with battery charged 100 %	> 89%	> 90%		> 91%	> 93%
Performance at full load, in ECO mode	> 95%	> 96%		> 97%	> 99%
Overload in online mode	110 - 130 %, 5 min.			100 - 110 %, 10 min.	
	> 130 - 140 %, 30 sec.			> 110 - 130 %, 1 min.	
	> 140 - 150 %, 1,5 sek.			> 130 %, 1 sec.	
	> 150 %, 100 mS.			-	
Overload in battery mode	110 - 130 %, 2 min.			100 - 110 %, 30 sec.	
	> 130 - 140 %, 10 sec.			> 110 - 130 %, 10 sec.	
	> 140 - 150 %, 1,5 sec.			> 130 %, 1 Sek.	
	> 150 %, 100 mS.			-	
Crest factor	3:1				
Possibility for parallel connection / number of devices	Function not available			Yes / Up to 3 UPSs (4)	
Static bypass					
Type	Common line with mains. Mixed (thyristors in antiparallel + relay)				
Rated voltage	That of the mains				
Rated frequency	That of the mains				
Batteries					
Element voltage	12 V DC				
Capacity	7 Ah	9 Ah		7 Ah	
Numbe of batteries in series / group voltage	3 / 36 V DC	4 / 48 V DC	6 / 72 V DC	16 / 192 V DC	
Blocking voltage for group ending of the backup	31,5 V DC	42 V DC	63 V DC	168 V DC	
Internal battery charger					
Group fast charge voltage	42,5 V DC	56,6 V DC	85 V DC	224 V DC	
Group floating voltage	41,0 V DC	54,7 V DC	81,9 V DC	218, V DC	
Maximum charge current	4 A			1A	
Charging time	< 3 Std. to 90%				
Voltage / Temperature compensation	5 mV per battery / °C temperature > 30 °C			20 mV per battery / °C temperature > 25 °	
Other functions					
Cold start	Yes				
Emergency power off	Yes				
Frequency inverter	Yes (5)			Yes (6)	

(4) power reduction to 90 % of the parallel devices

(6) as frequency converter the supplied power will be 60 % of the rated voltage

5) as frequency converter the supplied power will be ca. 78 % of the rated voltage

Technical specification						
KESSUPS 92RT model		1 kVA	1,5 kVA	2 kVA	3 kVA	6 kVA
General						
IEC connectors or input terminals		IEC connector 10 A		IEC connector 16 A		3 (phase, neutral and earth)
IEC connectors or output terminals		8 IEC connector 10 A (4 + 4) + 1 IEC connector (only for 3 kVA models)				3 (phase, neutral and earth)
Communication ports		2 (RS-232, Db9 and USB, mutually exclusive)				
Dry contacts , Interface to relays		3 relays are supplied with the same connector as the RS-232				-
Digital input and output		-				1 + 1
Transient protection for ADSL / Fax / Modem		Yes (RJ45 connectors)				No
Monitoring software		ViewPower (free download)				
Optional card (for the slot)		Interface to relays, SNMP, remote management via Internet and Intranet				
Noise level at 1m		< 50 db		< 55 db		< 58 db
Operating temperature		0 to +40 °C				
Storage temperature		-15 to +50 °C				
Working altitude		2400 m above sea level				
Relative humidity		0 - 95 %, non-condensing				
Protection rating		IP20				
Dimensions (mm) depth x width x height	Standard UPS module	410 x 438 x 88		510 x 438 x 88	630 x 438 x 88	600 x 438 x 88
	Standard battery module	-	-		-	720 x 438 x 88
	Optional battery module	410 x 438 x 88		510 x 438 x 88	630 x 438 x 88	
Module height in number of devices		2				2 + 2
Weight (kg)	Standard UPS module	14,1	15,5	19,5	27,5	17
	Battery module	-				52
	Optional battery module	19,1	21,5	29	41,2	52
Safety		EN-IEC 62040-1				
Electromagnetic compatibility		EN-IEC 62040-2 (C2)				EN-IEC 62040-2 (C3)
Operation		EN-IEC 62040-3				
Marking		CE				
Quality system		ISO 9001 and ISO 140001				



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