EFFEKTA®

UPS
Uninterruptible Power Supply
Triton-Series 10 - 80 kVA

Operating Manual V 2.0

Article Numbers:

ACX33TRS10Kxxxxx
ACX33TRS15Kxxxxx
ACX33TRS20Kxxxxx
ACX33TRS30Kxxxxx
ACX33TRS40Kxxxxx
ACX33TRS60Kxxxxx
ACX33TRS80Kxxxxx

Translation of the original Operating Manual

Legal notice

EFFEKTA Regeltechnik GmbH

Rheinwaldstraße 34
D – 78628 Rottweil

Phone: + 49 (0) 741 17451 - 0
Fax: + 49 (0) 741 17451 - 22
E-mail: ups@effekta.com
Web: www.effekta.com

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We reserve the right to make changes to the design and the system that will improve the system, the production process or the product.

Table of contents

1. Introduction

1.1 Preface

Dear Operator,

This manual is required for the operation of the uninterruptible power supply described herein.
This operating manual should provide you with support for working responsibly and give basic information about the uninterruptible power supply, namely on how it operates, its application and, in addition, what you should do in the event of malfunctioning. Furthermore, this operating manual contains instructions for the transport and storage as well as the handling and installation of the uninterruptible power supply.

The planning guidelines in this operating manual only relate to special requirements and characteristics of the uninterruptible power supply. All national and local provisions and regulations for electrical installations must be adhered to in the installation process. The same applies to the operation of the equipment.

The content of this manual may change due to technological progress. We have done our best to present the content correctly and clearly. If, however, we have made errors, we would be grateful if you would let us know.

We do not assume any liability for errors in this operating manual or any consequences resulting thereof.

The uninterruptible power supply is intended to protect sensitive electronic systems and equipment from interferences that could occur due to poor electricity quality or grid failures.

Please read this operating manual carefully and take particular note of the safety instructions!

If you have questions about the device, the technical supervisor at your company or our employees will gladly assist you.

Your
EFFEKTA Regeltechnik GmbH

1.2 Validity

The descriptions in this operating manual relate solely to the uninterruptible power supply (UPS) defined in the technical data as a whole or as it refers to modules, components and individual parts that were developed and built by **EFFEKTA Regeltechnik GmbH** (⇨ Chapter 13. Technical data).

Read this documentation carefully and familiarize yourself with the product before you start operating it.

1.3 Storage

The operating manual for the device must be stored in the vicinity of the equipment at all times so it is immediately available if need be.

Pass this manual on to any subsequent users of the product.

1.4 Abbreviations, terms and symbols

In this manual, the abbreviation **UPS** stands for: uninterruptible power supply.

Typically, accumulators are used as energy storage of the UPS-equipment. Colloquially, these are referred to as batteries or rechargeable batteries. A **battery bank** is, therefore, the term for the pooling of several accumulators into one group which forms the energy storage.

Danger, Warning, and Attention references are explicitly marked by the respective symbols (pictograms) and must be adhered to without fail. See the following list and explanations:

Danger / Warning Levels / Notes:

DANGER!

Text that is marked with DANGER! provides a warning about dangers. If accident prevention measures are not taken, these dangers **result** in serious (irreversible) injuries or even death!

WARNING!

Text that is marked with WARNING! provides a warning about hazards. If accident prevention measures are not taken, these hazards **could result** in serious (irreversible) injuries or even death!

CAUTION!

Text that is marked with CAUTION! provides a warning about hazards. If accident prevention measures are not taken, these dangerous situations can lead to slight or medium reversible injuries.

ATTENTION!

Text that is marked with ATTENTION! contains very important instructions for situations that, if accident prevention measures are not taken, may result in damage to the product and / or its functions or an object in its vicinity.

This symbol indicates text that contains instructions / comments or tips.

Warning about danger spots:

General warning about danger spots!

Specific warning:

Warning about dangerous electrical voltage!

Warning about proper handling of accumulators!

Instruction Symbols:

Take note of the provided documentation and/or instructions!

Disconnect before work!

Environmental symbols:

Identifies instructions for recycling.

Identifies components that are subject to the Electronic Scrap Regulation.

Identifies components or parts that must be disposed of. Do not throw these into the household waste.

Text symbols:

- ● This dot marks descriptions of activities that you should carry out.
- ✓ Requirement that must be fulfilled, for example:
  ✓ The DC circuit breaker is on "OFF."
- – This dash marks specification lists.
- ⇨ This arrow marks a cross reference.
  If a cross reference to another chapter is necessary in the text, this is shortened for clarity.
  Example: ⇨ OM, 2 Safety Instructions
  This means: See Operating Manual, Chapter 2 Safety Instructions.

  If the cross reference refers to a page, figure or position number, this information is added at the end of the cross reference.

  Example: ⇨ Fig. 4 - 4, Pos. 1
  This means: See position number 1 in figure 4 in Chapter 4 of this manual.

- **(3)** Numbers in brackets refer to the positions in the figures.
- ****** Annotations within the text are marked with ** and explained accordingly.

1.5 Information obligation

This operating manual must be read and understood by all persons and qualified personnel working with this device (this equipment).

This applies, in particular, to maintenance, operating and cleaning personnel including persons responsible for transportation and/or disposal.

EFFEKTA Regeltechnik GmbH is not liable for damage incurred or caused by staff who have not been trained or who have been insufficiently trained!

1.6 Warranty conditions

The receipt of delivery is considered the record for the initial purchase and should be kept in a safe place. It will be necessary for making use of the warranty. If the product is passed on to another user, he has the right to the warranty for the remainder of the warranty period. The purchase receipt as well as this declaration should also be given to the new owner if the device is passed on.

We guarantee that this device, upon delivery, is in a functional state and technically conforms to the descriptions in the appended documentation.

The warranty period for special devices corresponds to the minimum periods stipulated by law.

The warranty ceases to apply in the following cases:

- if the defect is caused by: freight damage, accident, natural catastrophes, misuse, vandalism;
- in case of improper use, defective maintenance or incorrect repair by third parties;
- in the event of changes, unauthorized intervention, incorrect operation, false installation or other modifications not approved by us;
- in case of improper use such as connecting of the device to unsuitable energy sources or unsuitable loads, or, in general, use in an unsuitable environment, etc.;
- in the event of failure to follow the instructions in the provided documentation;
- for any defects caused by a lack of due care, e.g. splash water, etc.;
- in the event that the product is incompatible due to possible technical innovations or regulations (policies) that occur after the purchase;
- in case of malfunctions or damage caused by the connection to incompatible devices or accessories;
- in the event of developments that are related to the normal aging process of the product (wear parts);
- in the event of defects that were caused by external fixtures, e.g. electrical outlets;
- in the event of failure to provide due maintenance and care for the product;

The warranty period for replaced and/or repaired parts as part of this warranty expire together with the original warranty for the product.

Devices that are supplied without accessories are replaced without accessories. The return of the device is only accepted if they are sent in the original packaging.

Incurred transport costs are generally not included in the warranty.

In general, you shall bear the cost of repair and exchange of the device (the equipment).

The company is not liable for damage or for subsequent damage whether directly, unintentionally or if it was caused by negligence or other errors.

EFFEKTA Regeltechnik GmbH does not provide either explicit or implicit warranties related to this device and its quality, performance, salability or suitability for a certain purpose. In some countries, the exclusion of implicit warranties is not permitted by law. In this case, the validity of all explicit and implicit warranties is limited to the warranty period. With the expiration of these periods, all warranties lose their validity. In some countries, a limitation of the validity period of implicit warranties is not permitted by law so that the aforementioned limitation does not take effect.

1.7 Limitation of liability

Claims to damage compensation are excluded unless they involve intent or gross negligence by EFFEKTA Regeltechnik GmbH or its employees. This does not affect liability according to the Product Liability Act. Under no circumstances are we liable for:

- Claims that third parties make against you due to losses or damage;
- Loss or damage of your records or data or the costs of recovering this data;
- Economic subsequent damage (including lost profits or savings) or concomitant damage, including in the event that we were informed of the possibility of such damage.

Under no circumstances is EFFEKTA Regeltechnik GmbH responsible for any accidental, indirect, specific, subsequent or other damage of any kind (including, without any limitation, damage related to a loss of profits, interruption of business, loss of business information or any other losses) that result from use of the device or are connected with the device whether they are based on the contract, damage compensation, negligence, strict liability or other claims, even if EFFEKTA Regeltechnik GmbH was informed about the possibility of such damage in advance. This exemption also includes any liability that can result from the claims of third parties against the initial purchaser.

In some countries, the exemption or the limitation of concomitant or subsequent damage is not permitted by law so that the aforementioned declaration does not go into effect.

2. Safety Instructions

2.1 Introduction

The UPS is a device that has been produced according to the rules and regulations of technology for an uninterruptible power supply.

The device is safe when used properly and under consideration of the safety requirements and instructions provided in this operating manual.

2.2 Proper Use

The UPS and its related components may only be used for purposes in accordance with its design – to provide a short-term supply for electrical devices with the nominal power not exceeding the total.

Any other use above and beyond its intended use is considered **improper** and can lead to personal injury, property damage and/or damage to the device!

WARNING!

The device is not designed for use in

- explosive,
- dusty or humid,
- radioactive or
- biologically or chemically contaminated atmospheres!

For information on the respective IP protection class of the device (the equipment) please contact our service points.

In addition, the device class with regard to “electromagnetic compatibility” (EMC) has to be taken into consideration. Please see the DIN Standard EN550022.

The UPS is **class C3** equipment. UPS systems designated for use in the “second environment” belong to this class. These UPS systems are suited for use

in commercial or industrial facilities with a minimum distance of 30 m from other buildings which belong to the “first environment.”

In short, this equipment can cause radio interference in residential areas. In this case, the operating company may be requested to take appropriate measures!

2.3 Prevention of personal injury / property damage

- Please read this operating manual carefully to familiarize yourself with the device. Under no conditions, should the safety instructions be ignored.
- In particular, take note of the information regarding the installation and commissioning of the device.
- Only operate this product in the proper and appropriate way and always within the mandated performance parameters (⇨13 Technical dat).
- Only perform maintenance and service work that is described in the documentation. Observe the required steps. Only use original replacement parts from EFFEKTA Regeltechnik GmbH.

2.4 Protecting the environment

Send the product back to **EFFEKTA Regeltechnik GmbH** after the end of its service life. We will ensure environmentally friendly disposal.

2.5 Transport and Storage

The UPS may only be transported to the intended location in the original packaging. The same applies to moves or returns.

The packaging, in no way, serves as fall protection, so all fallen devices must be checked by EFFEKTA Regeltechnik GmbH before commissioning. The same applies, in general, for any damages to the device (the equipment).

WARNING!

Due to the possibility of existing energy storage (accumulators) within a UPS, devices / equipment must, in general, be inspected by EFFEKTA Regeltechnik GmbH or a qualified service center for transportation damages. Generally, transportation damages bear the high risk that the energy storage units and/or their electrical connections have been affected. As a result, short circuits

and/or the leaking of electrolytes cannot be ruled out. For this reason, the isolation of the unit is necessary until an inspection has been performed.

The device may not be transported or stored upside-down.

2.6 Positioning

Only operate the UPS in well-ventilated rooms, ensuring the specified ambient temperature range (according to ⇨13 Technical dat). The UPS may not be placed in the vicinity of heat sources.

Always take the operating situation into account when positioning the device.

Maintain the minimum distance to adjacent equipment and walls necessary for ventilation purposes (see ⇨13 Technical dat and ⇨ 5 UPS installation and . Ensure that the necessary air circulation is provided.

Never place or operate the device in a damp environment. Liquids must generally be kept away from the device.

Due to major temperature differences, condensation or dew effects may occur after the positioning of the UPS. Therefore, an acclimatization period of at least two hours has to be observed before any further steps are taken. Make sure the temperature adjustment has been completed and that any surfaces with condensation inside and outside the device have completely dried.

WARNING!

Never operate the UPS in a combustible and/or unventilated environment.

2.7 Connection

Always use the connection terminals provided for the purpose of connecting the UPS.

DANGER!

To avoid electrical hazards, the connection of the unit may only be made under de-energized conditions. The **5-points-rule** has to be observed:

1. **Disconnect** the unit and the connections;
2. All affected sources and units **must be secured to prevent unauthorized or unintended reactivation;**
3. **Check** all connections to ensure they are **de-energized**, in particular the power inputs of the UPS device as well;
4. If necessary **earth or short-circuit** parts;
5. Adjacent **energized parts must be covered** or blocked off;

The PE (protective earth conductor) must be connected without fail. The UPS-device as well as the connected loads may not be used without the PE under any circumstances!

The UPS output is supplied with power even in the event of a power outage; according to the provisions included in EN62040-1, the lines and power outlets supplied by the UPS must be clearly labeled!

In addition, the following points must always be followed when connecting the UPS:

- Install all connections appropriately and keep the cable length as short as possible;
- Always pay attention to the polarity of the UPS and the connected loads when installing the device;
- Only use suitable power cables for the connection of the UPS with the electricity grid and ensure the required current carrying capacity;
- Only use suitable power cables for the connection of loads with the UPS and ensure the required current carrying capacity;
- The safeguarding of any appliance must always be immediately in front of a load and may never be done centrally in front of the UPS;
- Never operate any household devices or tools such as e.g. fan heaters, vacuum cleaners, electric drills, hair dryers, toasters, etc. with the UPS;
- Do not connect any load to the UPS that could overload the device;
- In general, only use appropriate tools for the installation;

2.8 Operation

Only qualified personnel are allowed access to the unit and the operation of the equipment.

WARNING!

It must be kept in mind in any case that the UPS includes an energy storage or is connected to an external energy storage unit. This means that the outlet of the UPS can be current-carrying even when the UPS is already disconnected from the mains power supply.

Consequently, the UPS output is guaranteed de-energized only when the device is completely shut down and disconnected from the mains power supply.

2.9 Working with accumulators

When handling accumulators there is always a risk of electric shocks, burns and/or chemical burns.

This is why unauthorized personnel should not have access to accumulators.

DANGER!

Accumulators and their circuit points can cause electric shocks.

In the event of a short-circuit of the accumulators, touching the current-carrying parts can result in severe burns.

Do not place accumulators in the vicinity of heat sources and do not place them in contact with open fire. This is an explosion hazard!

Accumulators should never be opened or destroyed. The released electrolyte presents a great danger to health and the environment. It could result in chemical burns to skin and eyes, and the electrolyte is also highly toxic.

WARNING!

Defective accumulators have to be disposed of in an environmentally compatible manner.

Never dispose of accumulators with regular household waste.

Local disposal regulations must be observed.

2.10 Maintenance, service and malfunctions

DANGER!

Attention – Danger of electric shocks.

Even after switching off the supply with the power button or after disconnecting the accumulator feed respectively, parts of the UPS can still carry high voltages.

ATTENTION!

The following precautions must be taken when working on the UPS or the accumulators:

- Always observe the 5 point rules for voltage-free work (see ⇨ 2.7 Connection);
- Remove wrist watches, jewelry and other metallic objects;
- Use only isolated tools;
- Work on live equipment may only be carried out by specially trained qualified personnel. They must always wear the appropriate personal protective equipment (PPE);
- The UPS may not be disassembled;
- Work on the accumulators may only be carried out and supervised by personnel possessing the required know how concerning safety regulations;
- Unauthorized persons must be kept away from the equipment and the accumulators.

3. UPS device description

This UPS-unit is an ONLINE-UPS according to the double conversion principle. The UPS receives the classification **"VFI-SS-111"** due to the excellent operating performance according to EN62040-4. Consequently, any appliances connected via the unit are ideally supplied, regardless of the performance of the mains power supply.

Malfunctions such as mains failure, low voltage on the mains power supply, grid overvoltage, short-term grid alterations (transients), gradual supply voltage deviations, frequency changes, etc. are not transmitted to the connected loads.

Due to the modular design, the equipment can cover output values from **10 – 80 kVA.** The parallel installation of several units either provides for additional performance increase or the configuration of the installation of redundant systems. This produces maximum reliability.

The UPS-system is designed to provide a consistent power supply for sensitive electronic devices and equipment such as computers, servers, emergency systems, electronic cash registers, operations critical instruments, telecommunication systems, process controllers, supervision and control systems etc.

3.1 Topology and operating modes

The following diagram (Fig. 3-1), a block diagram of the UPS-Unit clearly shows the double conversion principle. The mains power supply is converted into the DC-intermediate circuit which charges the energy storage (accumulator). With an additional conversion (INVERTER) the connected loads on the UPS output are supplied without malfunction or interruption.

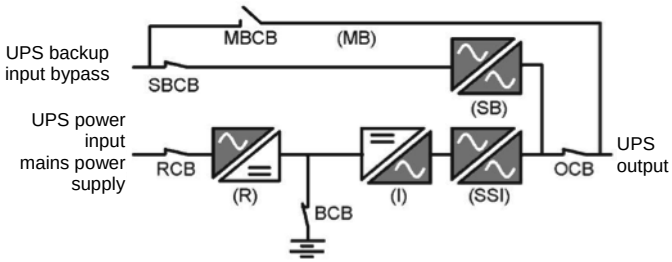


Fig. 3-1 Topology of the UPS-system (note: the bypass input and the mains power supply input are always connected in the Triton series).

As can clearly be seen, no power failures or disruptions of and within the mains power supply reach the UPS output and thus the loads. In addition, all operating modes of the UPS-system can be derived and described from the above block diagram:

Normal operating mode (INVERTER-MODE)

The normal operating mode is characterized here by the typical double conversion. The mains power supply is converted into the DC intermediate circuit which, in turn, feeds the UPS output via the inverter (DC/AC converter).

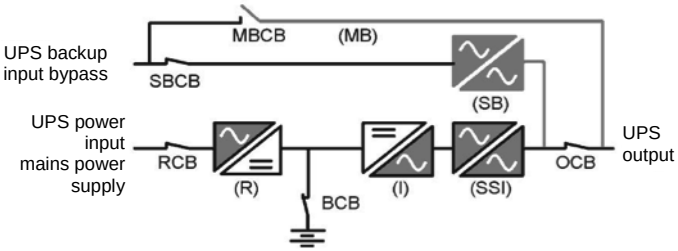


Fig. 3-2 Operating mode: Normal operation.

Back-up or autonomous mode (BATTERY-MODE)

In the event of a temporary mains failure, the inverter feeds directly from the accumulator bank and supplies the UPS-output without interruption this way. The autonomous mode is limited by the capacity of the accumulator bank and its charge level. The return from autonomous mode to normal operation occurs automatically provided the mains power supply is undisturbed.

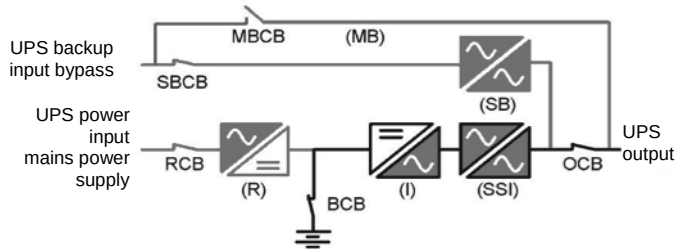


Fig. 3-3 Operating mode: Autonomous operation.

Static by-pass mode (FAULT MODE)

Often in the event of a device error (fault mode) inside the inverter, the UPS automatically and without interruption of the UPS output switches to static by-pass mode. This ensures that the power supply to the loads is maintained, however, without a support function of the UPS. Once the malfunction is cleared, the equipment returns to normal operating mode. Malfunctions can also be caused by the loads, e.g., when the UPS is overloaded.

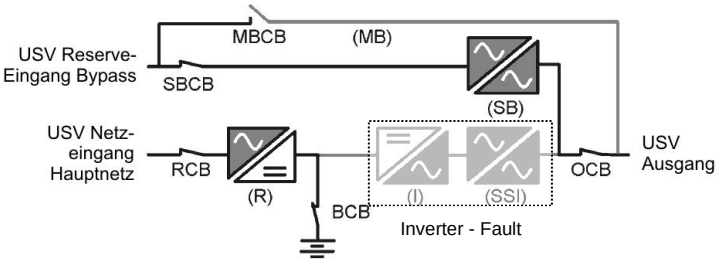


Fig. 3-4 Operating mode: Static by-pass.

WARNING!

Do not leave the UPS in static by-pass mode, or fault mode, for any extended period of time. The loads will continue to be supplied but without any backup function from the UPS.

The static by-pass mode can also be switched on specifically for e.g. testing. The supply inputs are connected to the grid and by-pass in equipment of 10 – 20 kVA.

Energy-saving mode (ECO MODE)

One special feature of the Triton series is its “power saving mode”, the so-called ECO-MODE. While the UPS-system is operated in the static by-pass mode, it remains “LINE-INTERACTIVE”. The Inverter remains inactive yet operable, and, as a result, the system consumes significantly less power. In the event of a mains failure / mains malfunction or disruption, the UPS automatically switches into autonomous mode. However, the application of the ECO-MODE only happens if the loads are “robust” devices that tolerate minimal switch and mains power fluctuations.

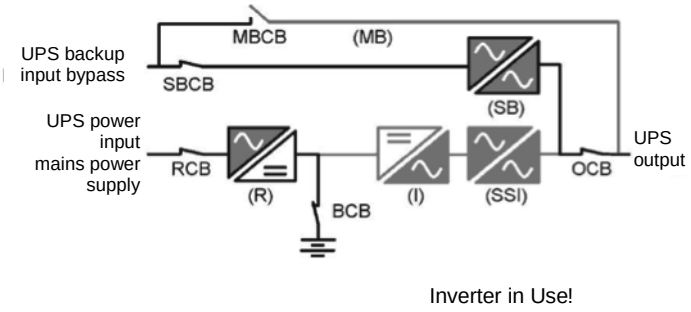


Fig. 3-5 Operating mode: ECO MODE (Static by-pass).

This operating mode (ECO-MODE) is not recommended for sensitive loads as certain disturbances such as, for example, transients can penetrate the by-pass and can affect the loads.

Manual by-pass mode (MAINTENANCE MODE)

The loads are directly connected to the mains power supply by a manual by-pass while the UPS-system is, at the same time, disconnected from all grids and systems during possible maintenance and repair work. This way the necessary work on the UPS can be executed in safety.

During the manual by-pass mode, the loads are not protected by the UPS.

Any mains power supply disturbances are directly transmitted to the loads.

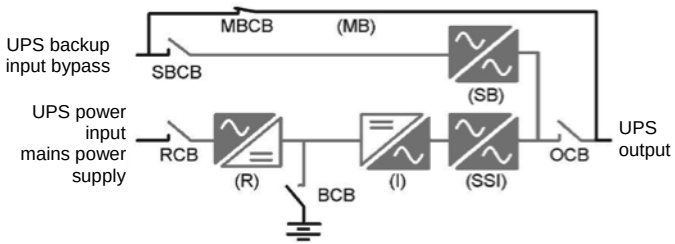


Fig. 3-6 Operating mode: Manual by-pass.

3.2 System variants and equipment components

The Triton series is based on a control enclosure concept which is delivered with either one or two UPS modules, depending on the configuration. This means that two power ranges from **10 -80 kVA** can be achieved. The pieces of equipment are then divided into three power classes based on their structure.

Power range:	Number of UPS-Modules:	Battery bank:
10 / 15 / 20 kVA	**1**	**internal / external**
30 / 40 kVA	**1**	**internal / external**
60 / 80 kVA	**2**	**external**

The overview (table) shows that devices which are built with only one UPS module can be equipped with accumulators in the remaining control enclosure room. As a result of this, one external accumulator cabinet can develop depending on the desired autonomy time.

3.2.1 Triton series 10 / 15 / 20 kVA

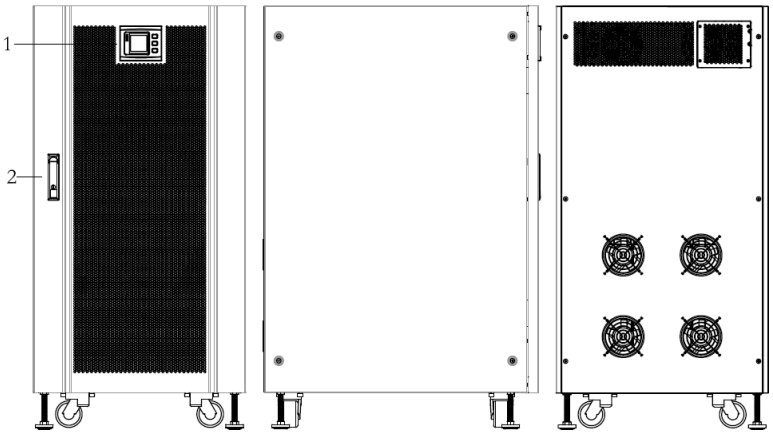
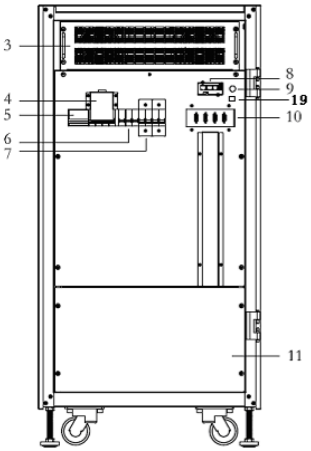


Fig. 3-7 Front, side and rear views of the Triton system with only one UPS-module.

Figure (Fig. 3-7, above) shows the three views of the UPS. The equipment can be rolled and be safely fixed into position with adjustable stands. All elements necessary for the operation are located in the front of the device (-door). This includes only the control panel (1). The emergency off button EPO (2). A locking

system (3) secures the UPS against unauthorized access to the installation, the fuses, the interfaces and the external emergency power off (REPO).

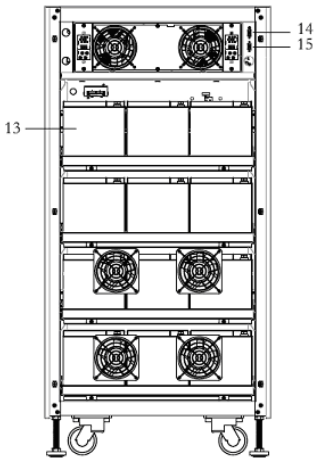
After opening the front cabinet door (Fig. 3-8 below), all relevant device components can be accessed with the exception of the accumulators. The UPS module ((3) 10, 15 or 20 kVA) is located the upper part, integrated with a typical slide-in construction. Immediately below the module are the circuit breaker, the communication interfaces, the adapter slot, the external emergency power off push-button (REPO), etc. The following figures illustrate the individual views of open UPS-systems and list the individual device components:



- (4) UPS module;
- (5) input switch (input fuse);
- (6) capacitator switch (only 20 kVA);
- (7) manual by-pass switch (by-pass fuse) with safety guard in place output switch (output fuse);
- (8) output switch (output fuse);
- (9) accumulator bank switch (-fuse);
- (10) connector block;
- (11) adapter slot (SNMP or relay card);
- (12) emergency power off (REPO) connector;
- (13) communication interfaces;

Fig. 3-8 UPS front view with open cabinet door (10 – 20 kVA).

By opening the rear panel of the device (Fig. 3-9) we gain access to the parallel interface and the accumulators:



- (14) connector for the UPS module;
- (15) accumulator of the accumulator bank;
- (16) parallel-port 1 (PARALLEL1);
- (17) parallel-port 2 (PARALLEL2);
- (18) connector for the UPS module;

Fig. 3-9 UPS rear view with open rear panel (10 – 20 kVA).

3.2.2 Triton series 30 / 40 kVA

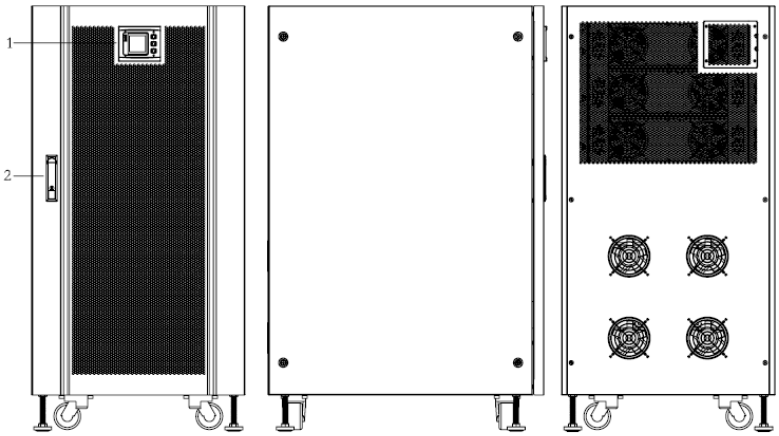


Fig. 3-10 Front, side and rear view of the Triton system (30 / 40 kVA).

Figure (Fig. 3-10, above) shows the three views of the UPS device. The equipment can be rolled and be safely fixed into position with adjustable stands.

All elements necessary for the operation are located in the front of the device (-door). This includes only the control panel (1). The emergency off button EPO (2). The locking system (3) secures the UPS against unauthorized access to the installation, the interfaces and the external emergency power off connector (REPO).

After opening the front cabinet door (Fig. 3-11, below), all relevant device components with the exception of the accumulators can be accessed.

The UPS module (3) is located in the upper part, integrated with a typical slide-in construction. Only a UPS module with a power capacity of 30 or 40 kVA can be installed in this version.

Located immediately below this are the communication and signal interfaces, the adapter slot, the external emergency power off connector (REPO), etc.

The middle section houses the circuit breakers. These differ slightly between the versions for 30 and 40 kVA but are identical in their configuration.

The connector block for the device is located in the lower section.

The following figures illustrate the views of an open UPS-system and list the individual device components:

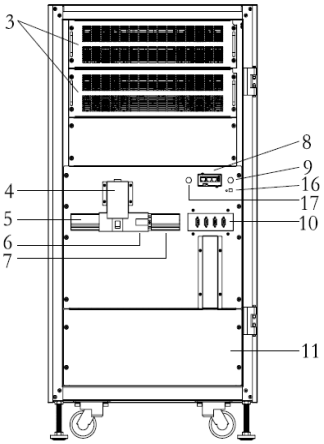


Fig. 3-11 UPS front view with open cabinet door (30 / 40 kVA).

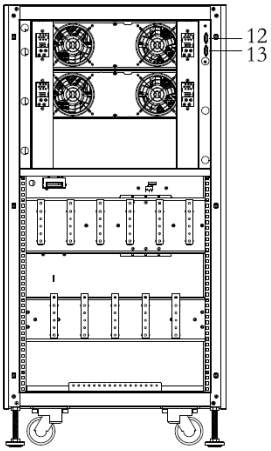


Fig. 3-12 UPS rear view with open rear panel (30 / 40 kVA).

- (4) UPS module;
- (5) RS232 connection;
- (6) USB connection;
- (7) signal interface;
- (8) adapter slot 1 (SNMP or relay card);
- (9) adapter slot 2 (SNMP or relay card);
- (10) input switch (fuse);
- (11) by-pass switch (fuse);
- (12) manual by-pass switch (fuse) with safety guard in place;
- (13) capacitator fuses;
- (14) connection block;
- (15) “cold start” button;
- (16) emergency power off (REPO) connector;
- (17) temperature sensor connector;
- (18) RS485 connection;
- (19) accumulator bank switch (fuse);
- (20) output switch (fuse);
- (21) earth connectors (PE);
- (22) LBS connector;
- (23) accumulators (internal accumulator bank);
- (24) parallel port 1;
- (25) parallel port 2;

3.2.3 Triton series 60 / 80 kVA

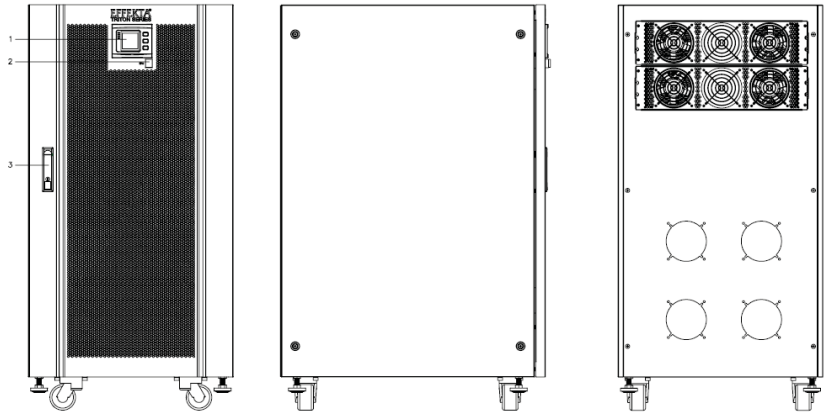


Fig. 3-13 Front, side and rear view of the Triton system with two UPS modules.

The figure (Fig. 3-13, above) again shows the three views of the UPS. From the outside, there is no difference between this and the above-mentioned systems. The UPS can also be rolled and be safely fixed into position with adjustable stands.

All elements necessary for the operation are also located in the front of the device (-door); the control panel (1) is here. The emergency off button EPO (2). The locking system (3) secures the UPS against unauthorized access to the installation, the fuses as well as the interfaces and the external emergency power off connector (REPO).

After opening the front cabinet door (Fig. 3-14, below), all relevant device components are accessible. The UPS module (3) is located in the upper part, integrated with a typical slide-in construction. Only a UPS module with a power capacity of 30 or 40 kVA can be installed in this version.

Located immediately below this are the communication and signal interfaces, the adapter slot, the external emergency power off push-button (REPO), etc.

The middle section houses the circuit breakers, and the connector block is in the section below.

It should be noted that accumulators are not integrable in these device variations. Thus, the UPS in this power range always requires an external accumulator bank.

The following figures illustrate the views of an open UPS-system and list the individual device components:

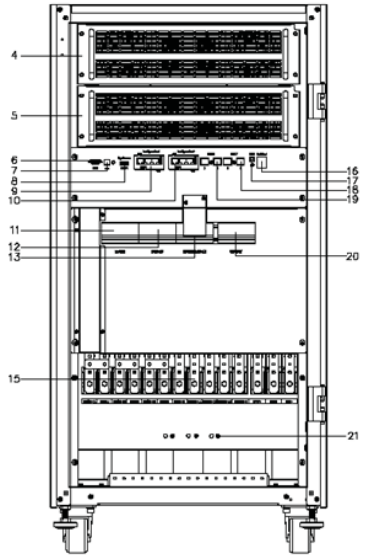


Fig. 3-14 UPS front view with open door (60 / 80 kVA).

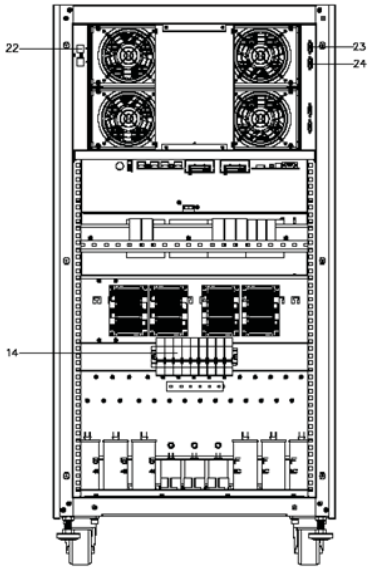


Fig. 3-15 UPS rear view with open rear panel (60 / 80 kVA).

- (4) UPS module 1;
- (5) UPS module 2;
- (6) RS232 connection;
- (7) USB connection;
- (8) signal interface;
- (9) adapter slot 1 (SNMP or relay card);
- (10) adapter slot 2 (SNMP or relay card);
- (11) input switch (fuse);
- (12) by-pass switch (fuse);
- (13) manual by-pass switch (fuse) with safety guard in place;
- (14) capacitator fuses;
- (15) connection block;
- (16) “cold start” button;
- (17) emergency power off (RE-PO) connector;
- (18) temperature sensor connector;
- (19) RS485 connection;
- (20) output switch (fuse);
- (21) earth connectors (PE);
- (22) LBS connector;
- (24) parallel port 1;
- (25) parallel port 2;

3.3 Device components and interfaces in detail

3.3.1 UPS module

The entire functionality of the UPS is provided by the UPS module. In general, no additional active external performance or control components are required. The UPS module is produced with power values of 10, 15, 20, 30 and 40 kVA. In addition, the modules can generally be connected in parallel.

perspective view

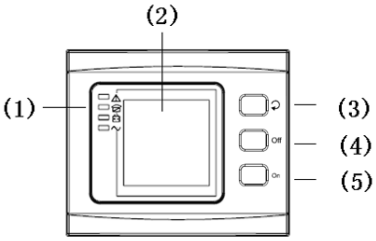
front view

rear view
(model view of a 20 kVA module)

Fig. 3-16 Different views of UPS module.

3.3.2 Control panel

You can access all operating modes and system information via the CONTROL PANEL. The control panel is divided into the following areas:



- **LED status display** (1)
  (from top down: alarm, by-pass mode, autonomous mode, inverter mode);
- **LCD information display** (2)
  (menu pages);
- **Key panel**
  (page selection button (3), off button (4), on button (5));

Fig. 3-47 Elements of the control panel.

The following table gives an overview of the most common states of the system with the respective status displays (LED):

LED display (color):	Status:	Description / state:
Alarm status (red):	on	UPS fault or alarm!
	off	UPS without fault.
By-pass mode (yellow):	on	UPS in by-pass mode
	blinking	By-pass fault!
	off	By-pass off;
Autonomous mode (yellow):	on	UPS in autonomous mode.
	blinking	End of autonomous period!
Inverter mode (green):	on	UPS output in normal mode.

For a full overview of all operating modes and status displays see ⇨ 8 Status and error messages.

The following information and system functions can be controlled with the key panel:

Key:	Description / Function:
↻	**Menu page selection**: pushing the key allows you to select the individual menu pages;
Off	**Off-button**: by pushing this button the following operations are possible: Switching from normal to by-pass mode, provided the by-pass is not malfunctioning; Switching-off of the UPS-output (inverter) during autonomous mode;
On	**On-button**: pushing this button starts the normal mode (inverter start); or Switching the UPS on in autonomous mode (“cold start”) in the event that the system had previously been shut down and no mains power supply is connected;

In addition, the system parameters can be set via the key panel. For this task, the individual keys have the following functions:

Key (parameter):	Description / function (parameter):
(↻) ↵	**ENTER**: pushing this key allows for the selection or entering of the parameter selection;
(Off) ▲	**UP**: by pushing this button the parameters are counted up or selected.
(On) ▼	**DOWN**: by pushing this button the parameters are counted down or selected.

This figure (Fig. 3-5, below) shows the UPS system in normal mode (INVERTER, LED green) and the information of phase A with 230 V AC and 50.0 Hz (LC display).

Fig. 3-5 Example illustration of control panel

In addition, the control panel is equipped with a BUZZER to support warning and alarm signals acoustically. The pressing of any key is also confirmed by the BUZZER (short beep tone).

3.3.2.1 Information, menu pages of the control panel

The status and other information of the system can be accessed via the LC display. Of particular importance are, above all, current operating information and alarm codes in the event of a fault or failure of the UPS.

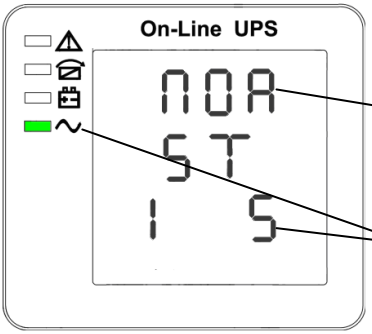
Due to continuous improvement of the software, it is possible that additional information already exists that may not be included here in detail yet.

Should warning or fault indicators occur during the operation, the information display automatically switches to page 17 of the menu and displays any and all error messages one after another.

The following table lists the most important information (menu pages).
You can scroll through the pages with the menu page selection key. On reaching the last page, it starts again from the first page.

Menu page:	Description:	Content (unit):
01	CODE	Operating mode and status of the UPS
02	grid phase A (L1)	Voltage (VAC) and frequency (Hz)
03	grid phase B (L2)	Voltage (VAC) and frequency (Hz)
04	grid phase C (L3)	Voltage (VAC) and frequency (Hz)
05	accumulator bank **+**	Voltage (VAC) and current (A)
06	accumulator bank **-**	Voltage (VAC) and current (A)
07	autonomous period	In minutes (& capacity bar)
08	output phase A (L1)	Voltage (VAC) and frequency (Hz)
09	output phase B (L2)	Voltage (VAC) and frequency (Hz)
10	output phase C (L3)	Voltage (VAC) and frequency (Hz)
11	power phase A (L1)	Output power values (in kVA and kW)
12	power phase B (L2)	Output power values (in kVA and kW)
13	power phase C (L3)	Output power values (in kVA and kW)
14	total power	Total output power (in kVA and kW)
15	temperatures	Internal and environment temperature (°C)
16	software versions, model	Rectifier and inverter version UPS model
17	CODE	Alarm status reports (alarm number)

The following menu page (01) is displayed after switching on the device (normal operating mode):

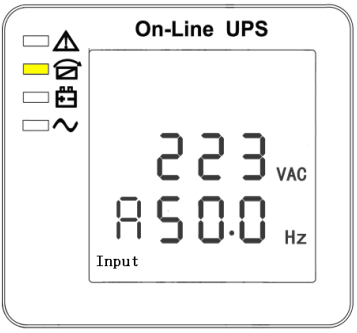


Menu page 01, displays the operating mode and status:

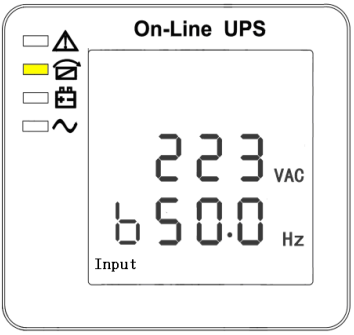
- Depicted here is the operating mode NOA (INVERTER); the displays ECO (ECO MODE) and PAL (PARALLEL MODE) are likewise other possibilities;
- The LED and the status number clearly show the normal mode (INVERTER);
- UPS-ID (number) of the UPS within a parallel system.

See chapter ⇨ 8 Status and error messages for the full **matrix of operating states** (LED and status information).

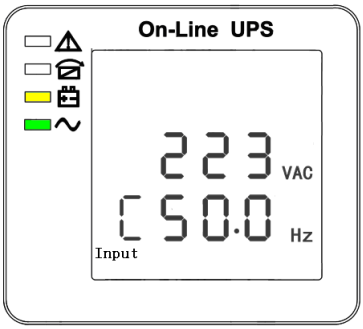
By scrolling (menu selection key) the following pages can be accessed:



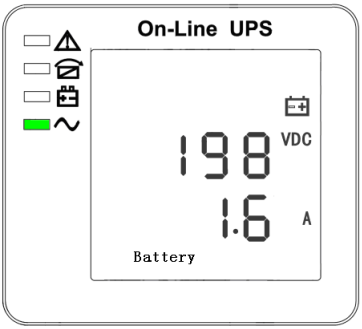
Menu page **02:** grid phase A (L1)



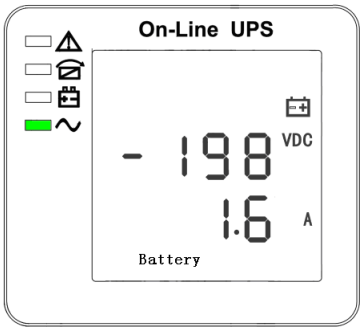
Menu page **03:** grid phase B (L2)



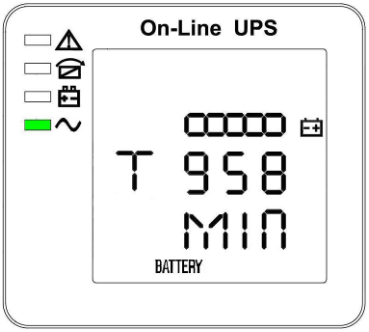
Menu page **04:** grid phase C (L3)



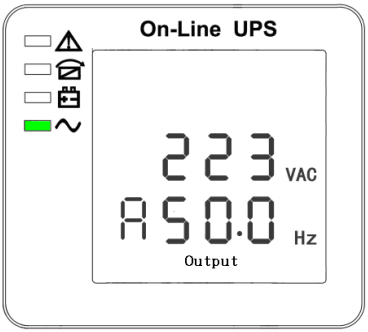
Menu page **05:** accumulator bank + (voltage & current)



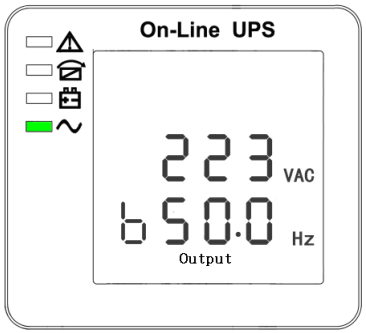
Menu page **06:** accumulator bank - (voltage & current)



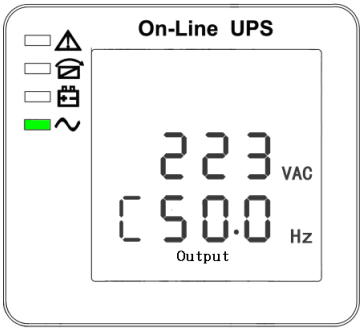
Menu page **07:** autonomous period



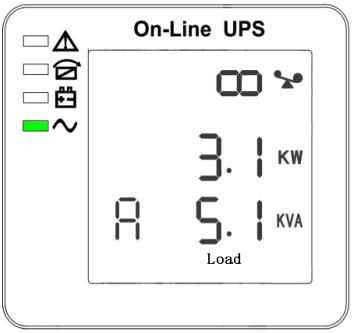
Menu page **08:** output phase A (L1)



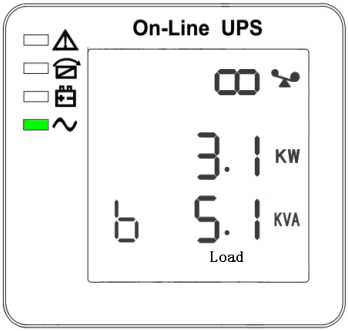
Menu page **09:** output phase B (L2)



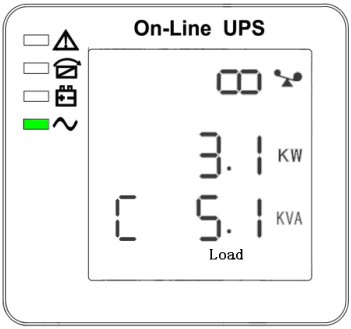
Menu page **10:** output phase C (L3)



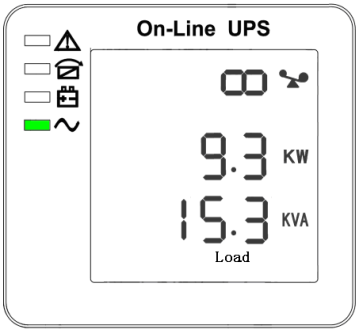
Menu page **11:** power phase A (L1)



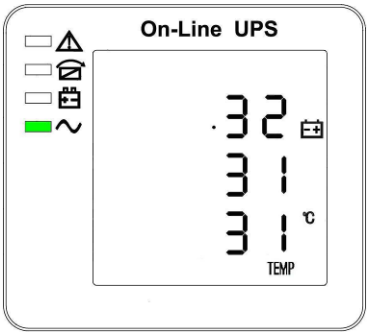
Menu page **12:** power phase B (L2)



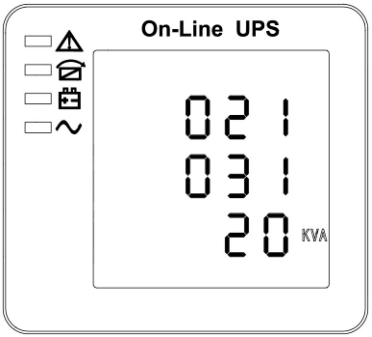
Menu page **13:** power phase C (L3)



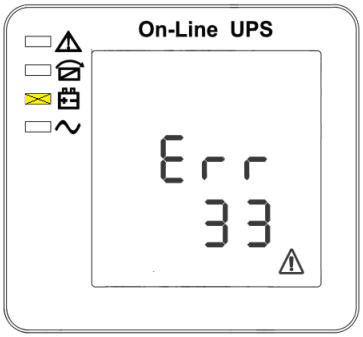
Menu page **14:** total power output



Menu page **15:** temperatures (int./ext.)



Menu page **16:** software version model

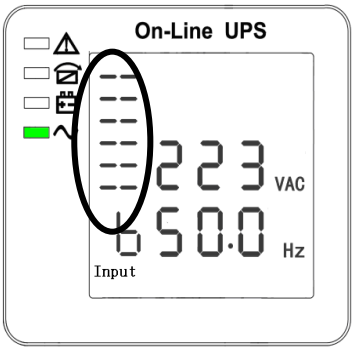


Menu page **17:** error messages (CODE)

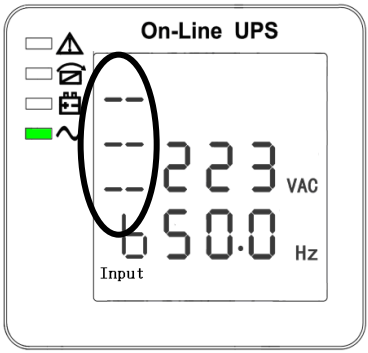
The above displayed error messages or CODES (menu page 17) are only displayed when a fault or alarm exists.

See the possible alarm messages in chapter ⇨ 8 Status and error messages.

Several of the menu pages mentioned above contain additional information about the charging operation by displaying horizontal bars. The display differentiates between whether it is charging at high current (BOOST) or has already completed charging and the charging state is only maintained (FLOATING). See the following illustration:



Charging mode: high current (BOOST)



Charging mode: low current (FLOATING)

3.3.3 Circuit breaker

The system is equipped with individual circuit breakers (automatic fuses) for switching the mains power supply on and off, the manual by-pass circuit and the UPS output. Depending on the design of the system, a static by-pass switch is also available. If accumulators are integrated in the UPS in addition to this, a circuit breaker for the accumulator circuit will also be provided.

DANGER!

The circuit breakers may only be operated by authorized qualified personnel!

The arrangement and design of the circuit breakers differ according to the device version and performance requirements. The following illustrations display their arrangement. The circuit breakers can deviate from the illustration depending on the manufacturer and performance requirements:

Triton series 10 / 15 / 20 kVA:

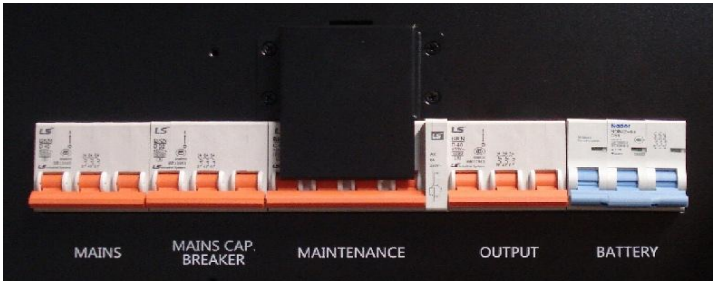


Fig. 3-19 The circuit breakers for the UPS systems (10 / 15 / 20 kVA) are labeled from left to right with: MAINS, MAINS CAP BREAKER, MAINTENANCE, OUTPUT, BATTERY.

Circuit breaker / identification:	Function:
Mains power supply / MAINS	Switching the mains power supply at the UPS input on or off.

Fuse protection input capacitator / MAINS CAP BREAKER	Protection for the mains input – filter capacitator. Only available for 20 kVA.
Manual by-pass / MAINTENANCE	Switching the manual by-pass circuit on or off for the mains by-pass of the UPS. The circuit breaker is generally secured by a cover to mechanically prevent unintentional activation.
UPS output / OUTPUT	Switching the UPS output, the loads on or off.
Accumulator bank / BATTERY	Switching the internal accumulator bank of the UPS on or off.

The circuit breaker “accumulator bank / BATTERY” is available in this version and is only effective if the system is equipped with and connected to an internal accumulator bank.

Triton Series 30/40 kVA:

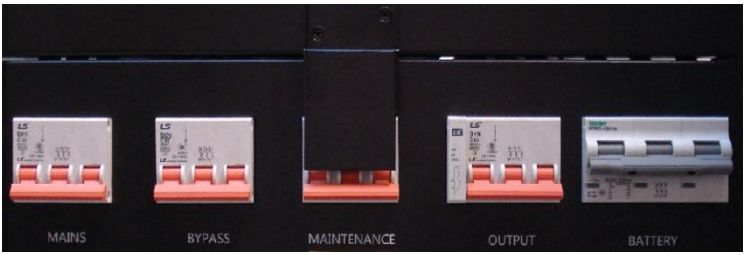


Fig. 3-20 The circuit breakers of the UPS system (30/40 kVA) are labeled from left to right: MAINS, BYPASS, MAINTENANCE, OUTPUT, BATTERY.

Circiut breaker / Identification:	**Function:**
Mains power supply / MAINS	Switching the mains power supply at the UPS input on or off.
Static by-pass / BYPASS	Switching the by-pass supply at the UPS input on and off.

Manuel By-pass / MAINTENANCE	Switching the manual by-pass circuit on or off for the mains by-pass of the UPS. The circuit breaker is generally secured by a cover to mechanically prevent unintentional activation.
UPS output / OUTPUT	Switching the UPS output, the loads on or off.
Accumulator bank / BATTERY	Switching the internal accumulator bank of the UPS on or off.

The circuit breaker “accumulator bank / BATTERY” is available in this version and is only effective if the system is equipped with and connected to an internal accumulator bank.

Triton series 60 – 80 kVA:

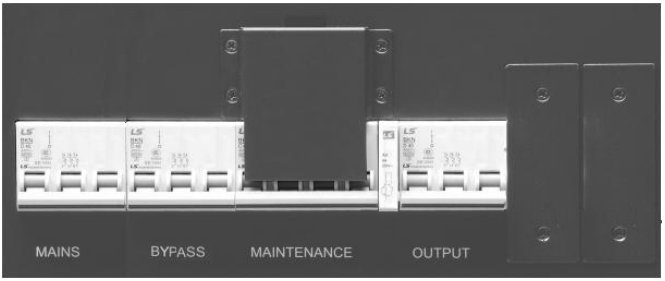


Fig. 3-21 The circuit breakers of the UPS-system are labeled from left to right with: MAINS, BYPASS, MAINTENANCE, OUTPUT.

Circuit breaker / identification:	**Function:**
Mains power supply / MAINS	Switching the mains power supply at the UPS input on or off.
Static by-pass / BYPASS	Switching the by-pass supply at the UPS input on and off.
Manual by-pass / MAINTENANCE	Switching the manual by-pass circuit on or off for the mains by-pass of the UPS. The circuit breaker is generally secured by a cover to mechanically prevent

	unintentional activation.
UPS output / OUTPUT	Switching the UPS output, the loads on or off.

The circuit breaker “accumulator bank / BATTERY” is not a component in this version of the UPS. Usually it can be found within the external accumulator bank.

3.3.4 Communication interfaces (COMMUNICATION INTERFACE)

The Triton series is, in general, equipped with all necessary interfaces. All variations of the system provide the interfaces RS232 and RS485.

Both interfaces RS232 and RS485 offer the following information and functions:

- Transmission of UPS status information;
- Transmission of UPS alarm information;
- Transmission of UPS operating parameters;
- Transmission of control commands to a PC such as, e.g., shut down (SHUT DOWN);

Systems up to 20 kVA also make a **SNMP connection** available in order to connect an external SNMP adapter because these systems only have an adapter slot (INTELLIGENT SLOT) which is possibly already used by a relay card.

The system variations 30 / 40 and 60 / 80 kVA also have a **USB slot** available. This is set up within a connected PC as a virtual COM port and thus works like a serial interface.

The USB interface generally transmits the same information by means of

the RS232 or RS485 interfaces.

ATTENTION!

The interfaces RS232, RS485 and USB cannot be used simultaneously!

Please see under Chapter 5 ⇨.2.3 Connecting the communication interfaces SNMP, RS232, RS485, USB for the connection of the interface.

3.3.5 Adapter slot (INTELLIGENT SLOT)

The adapter slot (Fig. 3-22) is used for the direct integration of intelligent extension cards. As a rule, this includes an SNMP adapter coupling of the system with a network or a relay card (DRY-CONTACT) for direct and floating coupling with external controls and/or machines.

ATTENTION!

The SNMP adapter must comply with the UPS norm MIB RFC 1628!

Regarding the relays cards, no third party products can be inserted!

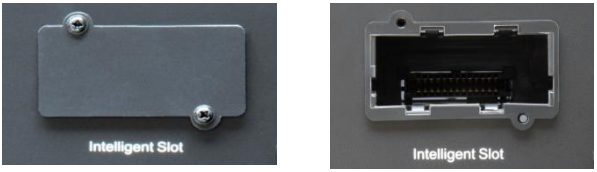


Fig. 3-6 Adapter slot for the insertion of a relay card or an SNMP adapter (left side closed, right side open).

To insert the respective extension card, please first remove the cover (both screws).

The system variations 30 / 40 and 60 / 80 kVA generally have two adapter slots available which are equivalent in design and can be used independently from one another.

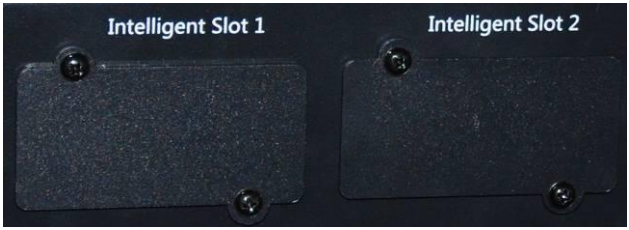


Fig. 3-23 Adapter slots for the accommodation of intelligent extension cards (System variants 30 / 40 and 60 / 80 kVA).

3.3.6 Emergency power off safety circuit (EMERGENCY POWER OFF)

The safety circuit is exclusively for the **emergency power off of the loads**. For this purpose, the UPS is equipped with a red button on the front door or on the internal communication front plate (EPO, manual trigger) and a clamped connection (2-pole, REPO, remote trigger).

To trigger the emergency power off, the front panel must be opened by internal EPO as seen in the figure below (Fig. 3-24). The illustration also shows the location and design of the EPO and REPO in a 20 kVA system.

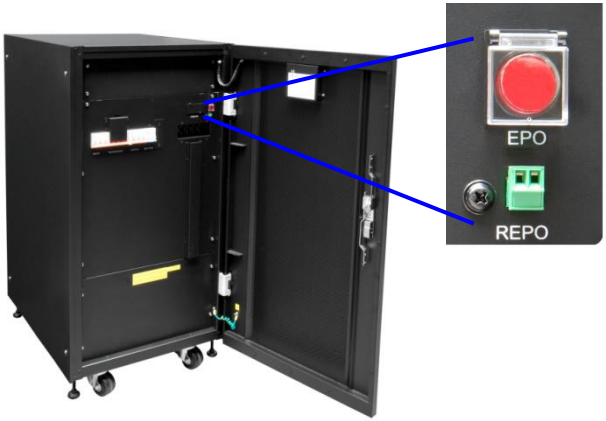


Fig. 3-7 Access to and model design of the “emergency power off”.

ATTENTION!

To avoid unintentional triggering of the emergency power off, the button is secured by a transparent cap. This cover has to be flipped up before the button can be pushed. In addition, the button has to be pressed for approximately 4 seconds before the loads

actually drop!

WARNING!

For the Triton series, the emergency power off circuit only applies to the shut-down of the UPS output and consequently the dropping of the loads. The UPS continues to be energized. Triggering the safety circuit emergency power off does not shut down the system completely!

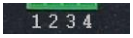
3.3.7 Temperature sensor connector (only in 30 / 40 / 60 / 80 kVA systems)

The interface is suited for a connection for a accumulator bank temperature sensor. This serves for the tracking of the final charge voltage of the accumulator bank depending on the temperature whereby the lifespan of the accumulator bank increases.

Fig. 3-25 Temperature sensor connector according to position (17) in Fig. 3-11 and Fig. 3-14.

Please see Chapter ⇨ 5.2.5 Connecting a temperature sensor for precise connection assignment.

3.3.8 Signal Interface (only in 30 / 40 / 60 / 80 kVA systems)



Essentially, the interface functions as Output (O) or Input (I) for the following signals:

- A: “UPS status” (autonomous mode, power failure);
- A: “Accumulator bank” status (low accumulator bank voltage);
- E: Command “System shut down”;

Fig. 3-26 The signal interface according to position (6) in Fig. 3-11 and Fig. 3-14.

Please see Chapter ⇨ 5.2.4 Signal interface (DRY CONNECT) for precise connection assignment.

Should other signals be necessary, an additional relay card must be used.

Systems up to 20 kVA also have this option. For this see ⇨ 15.3 Communication adapter relay card (DRY CONTACT).

3.3.9 "Cold Start" button (COLD START or BLACK START)

To start the system directly into autonomous mode, the Triton series, the "cold start" button is required. This button is frequently referred to as COLD or BLACK START.

A mains power supply is not necessary but rather an available accumulator bank that is switched on.

Fig. 3-27 "Cold Start" button according to position (14) in figure and Fig. 3.14.

This button is not required within the systems up to 20 kVA. Therefore, the "cold start" function can be triggered by activating the ON button directly on the system control panel.

3.3.10 Main terminal of the UPS-system (TERMINAL BLOCK)

As illustrated in the figure below (Fig. 3-28), the UPS terminal block can be found below the terminal block cover when the cabinet door is open. The cover can be removed by loosening the four rack screws and thus providing free access to the terminal block.

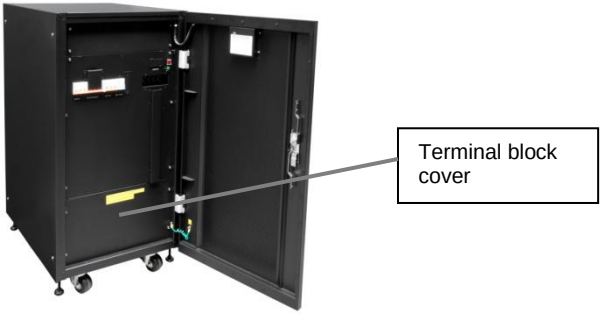


Fig. 3-28 Access to the terminal block of the UPS.

ATTENTION!

As a result of the different power classes, the terminal blocks of the system variants differ greatly. Thus, always pay attention to the corresponding connection wiring and fuse protection.

Terminal block up to 20 kVA

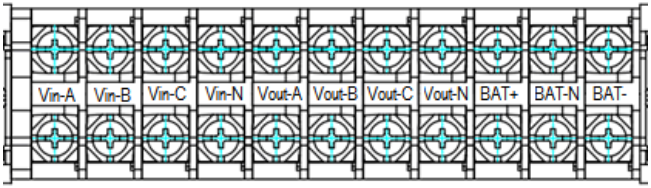


Fig. 3-29 Design of terminal block up to 20 kVA

All ports are correspondingly marked directly on the terminal block. A static by-pass input is not available.

Terminal block 30 / 40 kVA

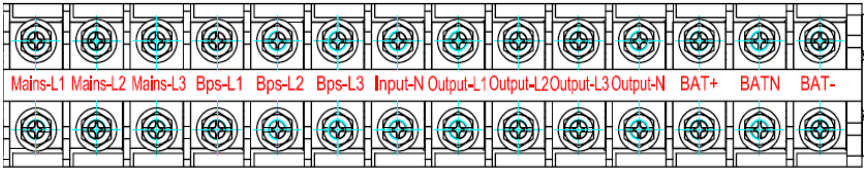


Fig. 3-30 Design of terminal block 30 / 40 kVA

All ports are correspondingly marked directly on the terminal block. A static by-pass input is available and must be activated according to their configuration (“standard” or “increased security”).

Terminal block 60 / 80 kVA

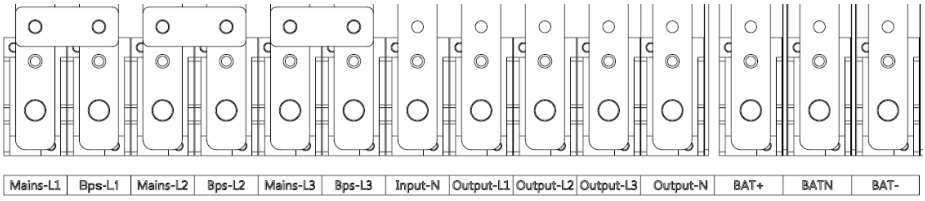


Fig. 3-31 Design of terminal block 60 / 80 kVA

All ports are correspondingly marked directly below the terminal block. A static bypass input is available and must be activated according to their configuration (“standard” or “increased security”). In this, the bridges for a “standard” configuration are already available (bridges: mains <> Bps).

See additional connection information for all system variations under Chapter ⇨ 5.2.1 Connecting to the UPS main connectors.

3.3.11 Parallel port of the UPS (PARALLEL PORT)

In general, two to four UPS-devices can be connected in parallel. These devices have to be synchronized with each other. For this purpose, the coupling of the devices in question is done via the parallel port (ring topology).

The parallel ports 1 and 2 necessary for this procedure are located in the upper right on the rear of the device in accordance with positions (14/15) Fig 3-9, Positions (22/23) Figs. 3-12 and 3-15.

Fig. 3-32 Access to and design of the parallel ports 1 and 2 in the rear of the UPS.

ATTENTION!

Only service personnel of EFFEKTA Regeltechnik GmbH or other accredited service stations are allowed to connect two or more devices in parallel!

3.3.12 LBS port of the UPS (LBS PORT)

In LBS mode (LOAD BUS SYNCHRONIZATION), two UPS devices are only connected in parallel on the outlet side. In this, the system works in a master/slave combination. A synchronization of the UPS outlets is also not necessary. A signal coupling (ring topology) of the systems occurs here via the LBS ports 1 and 2 which are located in the upper left of the control cabinet (rear side) (in accordance with the position (20) Figs. 3-12 and 3-15).

Fig. 3-33 LBS ports 1 and 2 on the rear side of the UPS system.

ATTENTION!

The application of this operation mode is only performed in a few cases because the master/slave operation is only possible with significant function restrictions.

3.4 Structure of the accumulator bank (BATTERY PACK)

A special feature of the Triton series is the wide accumulator bank voltage range. It allows for the use of 16 to 20 accumulators in series for each current path. This results in accumulator bank voltage ranges from ±192 to ±240 VDC. The standard version uses ±216 VDC (2x18 accumulators). The following illustration (Fig. 3-34) shows the general structure of the accumulator bank:

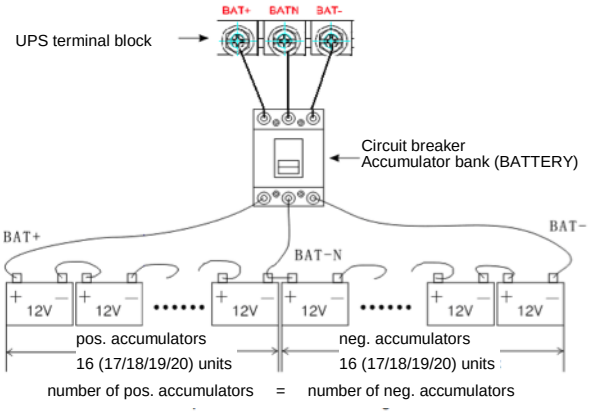


Fig. 3-84 General structure of the accumulator bank and connection to the UPS.

ATTENTION!

The adjustment of the accumulator capacity is always done by taking into account the required autonomous period.

The symmetry conditions require that the number of accumulators in the positive path is always equal to the number in the negative path!

The selection of accumulators and the layout of the current paths or of the circuit breakers must always be selected according to the UPS output power, in accordance with all installation regulations.

WARNING!

The arrangement, the installation and the maintenance of the accumulators may only be carried out by the service personnel of EFFEKTA Regeltechnik GmbH or other accredited service stations.

3.5 Connection of multiple UPS systems in parallel (PARALLEL SYSTEMS)

Connecting several UPS systems in parallel to form one unit is, on one hand, done to achieve increased performance and/or, on the other hand, to create a more reliable system through redundancies. The Triton series supports the connection in parallel of two to four UPS devices to form one parallel system. Within the Triton series, two concepts are available for this procedure (Fig. 3-35):

- Systems with one separate accumulator bank each (standard);

– Systems with one shared accumulator bank (special installation);

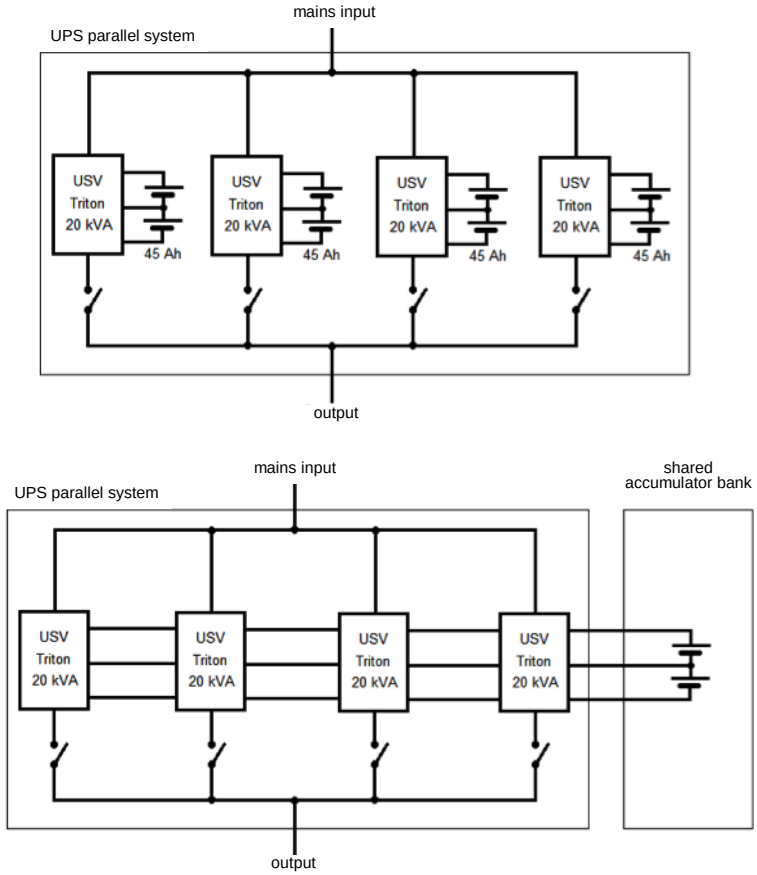


Fig. 3-35 Concepts for parallel systems with individual or shared accumulator banks.

The requirements for the parallel connection of the UPS systems are:

– all supply lines and outgoing feeder lines to the individual UPS devices must be of the same length and dimensions;

– all individual devices must be of the same model series and type (e.g. Triton series, 20kVA);

– the capacity distribution of the accumulator banks must be distributed as equally as possible;

- All units within a parallel system are connected with each other through a central EPO switch; the function of this EPO switch must be checked during initial operation without fail. As soon as the EPO switch is pressed, the output must be shut down in **all systems**.

.

4. Storage and Unpacking

4.1 Storage of the UPS

If the UPS or the whole system is to be put in storage after delivery, please read the following instructions:

ATTENTION!

- Always leave the device / equipment and all accessories in the original packaging.
- The recommended storage temperature should be between 10 – 25°C. In any event, the maximum temperature values may never be exceeded or fall below (see also ⇨ 13 Technical data).
- The delivered goods must also be protected against moisture. The device must therefore be stored in a dry area.
- If the storage period exceeds four months, the UPS with the internal or external accumulator bank have to be connected with the mains power supply for approximately 24 hours to avoid a total discharge of the accumulators which would result in irreversible damage to the accumulators.

4.2 Transport to the installation site

As the point of delivery is usually not the point of installation, the device has to be transported to the installation site. Please follow these instructions for the transport of the UPS:

ATTENTION!

- Always transport the original delivery as close as possible to the installation site. After unpacking and setting down the device, it can be rolled, but the device may only be moved across flat, unobstructed surfaces;
- Always transport the device in the stipulated transport position. Tilting or reclining is not possible.

WARNING!

- Pay attention to the identified center of gravity during the transport;
- There is always a general risk of tilting with any equipment where the center of gravity is located in a high position.

4.3 Unpacking and positioning of the device

Remove the packaging at the installation site with utmost care to, as much as possible, avoid any damage to the device and the packaging material.

The following sequence is suggested:

- Make sure you have sufficient space during unpacking;
- Open the metal tabs of the packaging walls and lid and remove these carefully;
- Also remove any padding material and the accessories so that the device is now standing freely on the palette;
- Now the device can be moved off the palette using a suitable ramp;

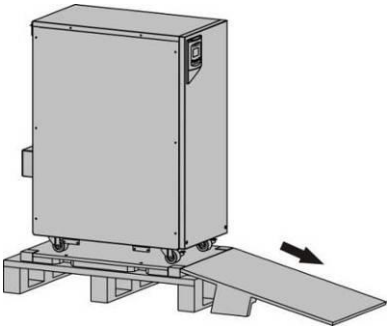


Fig. 4-1 Placing the UPS unit on a ramp

- If you do not have a ramp available, the device can also be lifted off the palette from the side with the assistance of a fork lift. In this case, it is essential that the side panels of the device are removed so that they cannot be damaged during the lifting of the UPS device;

ATTENTION!

Check the scope of delivery (see ⇨ 14 Scope of delivery / accessories).

Check all packaging materials to ensure that no items are missing.

Inspect the appearance of the UPS after unpacking to see if any visible damage could have incurred during transportation. Do not turn on the unit if you detect any damages or if any parts are missing, and notify the carrier and dealer immediately.

The shipping materials are recyclable. After unpacking, save them for later use or dispose of them appropriately.

5. UPS installation and connection

All critical values listed in the technical specifications concerning ambient and operating conditions must be met to ensure proper operation of the UPS.

ATTENTION!

The system may only be installed and connected by trained authorized electricians in accordance with respective safety rules, standards and national regulations!

The device must be installed in a well ventilated area, far away from water, flammable gases and corrosive agents.

In general, the following rules apply for the installation of the equipment:

- The device may only be mounted on a solid, weight bearing and horizontal surface;
- Ensure the specified vertical installation position;
- The device may only be installed in a clean, dry environment free of dust;
- Ensure that the installation location is sufficiently ventilated so that there is a sufficient flow of air for the cooling of the system;
- In addition, air exchange according to EN62040-1, appendix M for devices with accumulators must be ensured;
- Pay attention to the system layout and make sure that the UPS and other machines, where applicable, do not interfere with each other;

In addition, make sure that the ventilation channels of the UPS are not blocked and that there is sufficient clearance between the device and other equipment or walls. For the Triton series, the following minimum distances are recommended as clearance space and for maintenance access (see the table below and Fig. 5-1).

Measurement:	Distance [mm]:
X1	500
X2	1000
Y	1000

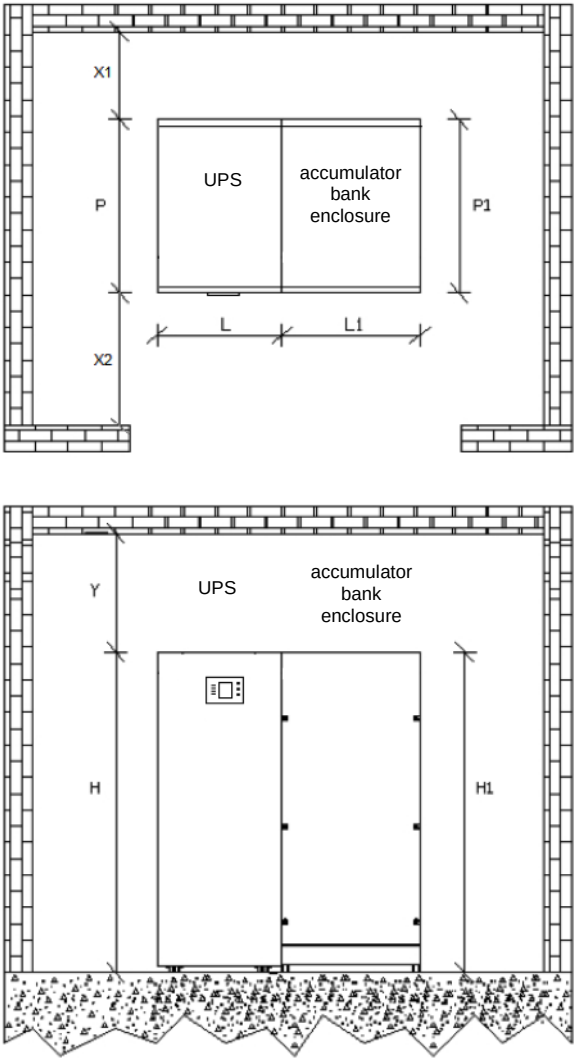


Fig. 5-1 Minimum distance and maintenance space around the UPS system.

Please see the respective manuals (technical data) for the measurements of the UPS equipment and the corresponding accumulator bank.

Sufficient clearance space is important to ensure that maintenance and servicing tasks can be completed quickly and safely.

5.1 Preparing the connection

Before the installation of the equipment, the following environment conditions have to be ensured:

5.1.1 Ensuring supply of the UPS

ATTENTION!

In general, it must be ensured that the UPS is connected to a suitable mains power supply according to EN62040. This usually includes the TN-S network. The neutral conductor and earth wire may not be disrupted within the overall installation (up to the loads).

The circuit breaker on the power supply side must also be accessible and available as a breaker for maintenance and service personnel.

In connection with a UPS system, we generally advise against the use of an earth leakage circuit breaker (ELCB) on the power supply side. Instead, the ELCB should always be installed at the UPS output or, better yet, directly before the load.

However, in case you do operate the UPS equipment with an upstream ELCB, some measures have to be taken into account:

- Due to the operating features of UPS systems as well as the characteristics of the supply network, certain ELCBs are recommended. The ELCBs must be sensitive to universal current and suitable for pulsating DC residual currents as well as short-time delayed;
- The leakage current of a permanently connected UPS-system may amount to no more than maximum 5% of the nominal output current in adverse conditions! As the filters are connected to the network in a radial fashion, the leakage current will adjust itself to a range of about 0.5 A in normal operating conditions due to the tolerance of the radio interference suppression capacitors. Therefore, we recommend using ELCBs with a sensitivity starting at 500mA. We give this recommendation as a precaution to avoid an undefined trigger of the ELBC. Based on our experience, this is a rather frequent occurrence;

The circuit breaker (3xF1) for the fuse protection on the input side of the UPS is to be selected in the characteristic “C” according to ICE 60947-2. Please note, that the nominal current (I_N) of the circuit breaker must comply with the UPS type or the output power respectively (see table below). The same applies for the cable dimensions of the UPS power supply cord which can also be seen in the table below (the cable dimensions serve as recommendations and are designed for a maximum connection length of 20 m):

Fuse protection:	Output power (UPS-type):						
	10 kVA	**15** kVA	**20** kVA	**30** kVA	**40** kVA	**60** kVA	**80** kVA
Circuit breaker (3xF1):	25 A	32 A	40 A	63 A	80 A	125 A	160 A
Diameter:	5x4 mm²	5x6 mm²	5x10 mm²	5x16 mm²	5x25 mm²	5x35 mm²	5x50 mm²

5.1.2 Feedback protection of the UPS

The international standard IEC 62040-1 on “General and safety requirements for UPS” indicates that a transfer of dangerous voltages or hazardous energy into the mains power supply must be prevented when the supply from the mains power supply no longer exists.

For that purpose, the operator of the UPS system has to install an isolator on the mains power supply (see Fig. 5-2). The requirements regarding the isolator are to maintain the current carrying capacity in the closed condition and the insulation capacity in the open condition.

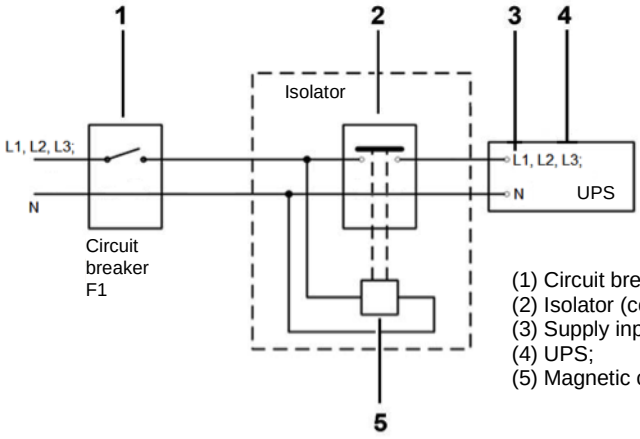


Fig. 5-2 Isolator in the UPS mains power supply (schematic).

ATTENTION!

If more than one UPS device is connected in parallel, a separate isolator is required for each UPS.
An explicit identification and labelling according to IEC 62040-1 (4.7.3) has to be performed on all circuit breakers of the mains power supply.

5.1.3 External by-pass

An external “manual by-pass” is a by-pass circuit that is independent of the UPS and forms a bridge between the mains power supply and the loads. So at the same time, the UPS is switched on free of tension both at the input and the output sides and thus the system is disconnected from the installation.

For this reason, the UPS system should, by all means, be equipped with an external by-pass that can replace the complete system without interruption of the load voltage, should it become necessary.

For connection details please see the corresponding operating manual (external by-pass).

You can also find additional information here in Chapter ⇨ 15 Optional accessories or please contact our sales and customer service department at EFFEKTA Regeltechnik GmbH.

5.1.4 Output fuse protection and load protection

The operator is responsible for the general fuse protection of the loads connected to the UPS output.

WARNING!

Therefore, we strongly recommend installing a residual current circuit breaker (FI, RCCD) and a circuit breaker before each load as long as this is required according to DIN VDE 0100-410 to guarantee full protection of persons and loads.

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5.1.5 Cable dimensions of the output line

With regard to the current carrying capacity, the UPS output line to the load or to a distribution system must be designed with the suitable cable dimension, as listed in the table below:

	Output power (UPS type):						
	10 kVA	**15** kVA	**20** kVA	**30** kVA	**40** kVA	**60** kVA	**80** kVA
Cable dimensions:	5x4 mm²	5x6 mm²	5x10 mm²	5x16 mm²	5x25 mm²	5x35 mm²	5x50 mm²

The cable cross-sections listed above are recommendations and are designed for a maximum connection distance of 20 m.

5.1.6 Final inspection and safety precautions

WARNING!

Before beginning with the connection procedure, please note the 5-points-rule according to the safety precautions (⇨ 2.7 Connection) for all components to be connected including the mains power supply.

Check once again and make sure that the temperature equalization between the UPS / accumulator bank and the surroundings has been performed completely to prevent any condensation effects (⇨ 2.6 Positioning).

Furthermore, ensure that the installation and wiring comply with the local safety regulations for electricity.

5.2 Connecting the UPS

After all preparatory tasks and inspections for the connection have been concluded, the UPS can be connected.

ATTENTION!

Connecting the UPS must only be executed by authorized qualified personnel. Always wear appropriate personal protective equipment.

5.2.1

Connecting the main terminal of the UPS

The UPS main terminal is located in the position indicated in the figures Fig. 3-9 (position (11)), Fig. 3-12 and 3-15 (position (12)). The main terminals of the UPS units differ according to the corresponding power category.

Standard main terminal for UPS systems up to 20 kVA

The following scheme shows the connections of the main terminal.

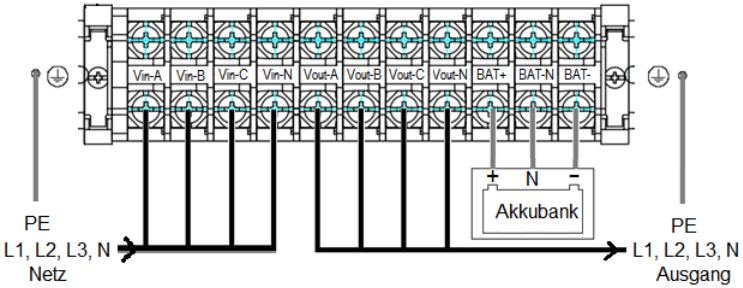


Fig. 5-3 Connection for systems up to 20 kVA.

Proceed with the connection of the power supply networks in the following order:

- Connect the mains power supply with the input terminals;

Connection:	Relevance / function:
Vin-A	Mains input terminal phase A (L1);
Vin-B	Mains input terminal phase B (L2);
Vin-C	Mains input terminal phase C (L3);
Vin-N	Mains input terminal neutral wire N;
⏚	Earth;

- Connect the load power supply with the output terminals;

Connection:	Relevance / function:
Vout-A	Power output phase A (L1);
Vout-B	Power output phase B (L2);
Vout-C	Power output phase C (L3);
Vout-N	Power output neutral wire N;
⏚	Earth;

ATTENTION!

Pay attention to the polarity / rotational direction of the three-phase power system between input and output of the UPS (sequence L1, L2, L3).

- Optional: connect an external accumulator bank with the accumulator terminals. In doing so, observe all instruction guidelines;

Connection:	Relevance / function:
BAT **+**	Accumulator bank connection positive;
BATN	Accumulator bank connection neutral;
BAT **-**	Accumulator bank connection negative;
⏚	Earth;

In using an internal accumulator bank, the accumulator terminals are already connected so that an additional allocation is therefore impossible.

WARNING!

With this model range, a parallel connection of an internal and external accumulator bank is not supported technically and therefore strictly prohibited.

Standard main terminal for UPS systems 30 – 80 kVA

The following scheme shows the connections of the main terminal for the power categories 30 / 40 kVA. The bridges plotted supply the static by-pass.

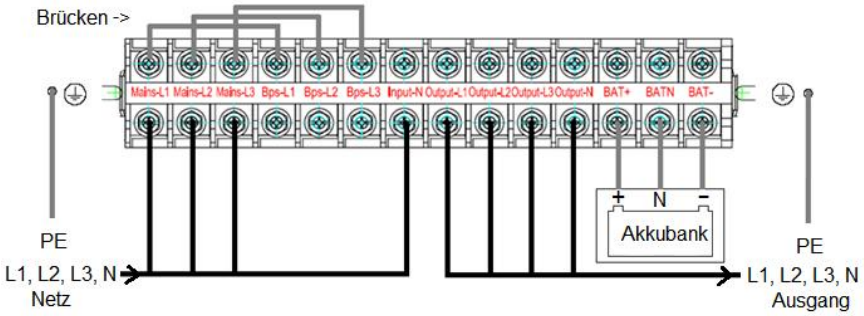


Fig. 5-4 Connection for the systems 30 / 40 kVA.

The following scheme shows the connections of the main terminal for the power categories 30 / 40 kVA. The bridges plotted here also supply the static by-pass.

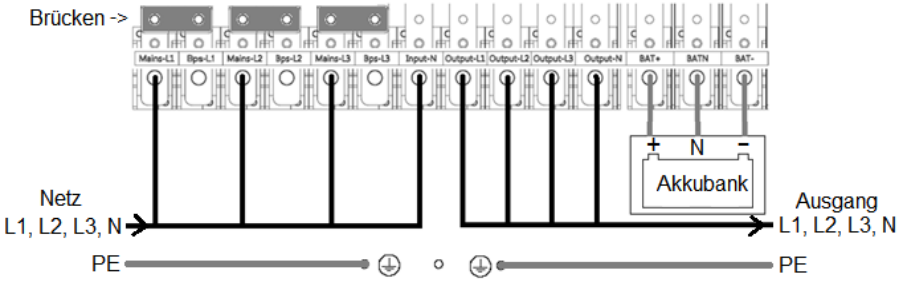


Fig. 5-5 Connection for the systems 60 / 80 kVA.

Proceed with the connection of the power supply networks in the following order:

- Connect the mains power supply with the input terminals;

Connection:	Relevance / function:
Mains-L1	Mains input terminal phase L1;
Mains-L2	Mains input terminal phase L2;
Mains-L3	Mains input terminal phase L3;
Input-N	Mains input terminal neutral wire N;
⏚	Earth;

- Connect the load power supply with the output terminals;

Connection:	Relevance / function:
Output-L1	Power output phase L1;
Output-L2	Power output phase L2;
Output-L3	Power output phase L3;
Output-N	Power output neutral wire N;
⏚	Earth;

ATTENTION!

Pay attention to the polarity / rotational direction of the three-phase power system between input and output of the UPS (sequence L1, L2, L3).

- Optional: connect an external accumulator bank with the accumulator terminals. In doing so, observe all instruction guidelines;

Connection:	Relevance / function:
BAT +	Accumulator bank connection positive;
BATN	Accumulator bank connection neutral;
BAT -	Accumulator bank connection negative;
⏚	Earth;

In using an internal accumulator bank, the accumulator terminals are already connected so that an additional allocation is therefore impossible.

Main terminal for UPS systems 30 – 80 kVA with separate by-pass

The following scheme shows the connections of the main terminal for the power categories 30 / 40 kVA. The static by-pass is connected separately, key word: “increased security.”

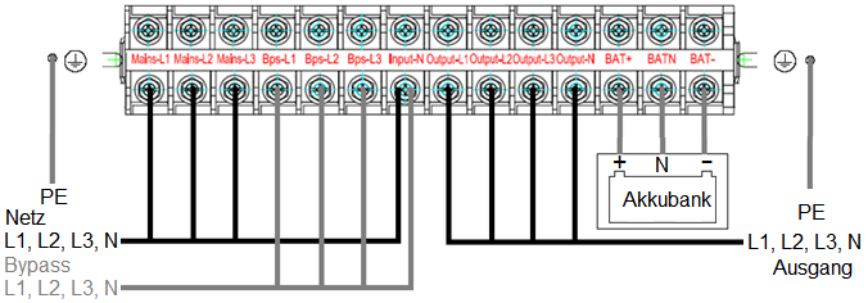


Fig. 5-6 Terminal with separate by-pass supply for the systems 30 / 40 kVA.

The following scheme shows the connections of the main terminal for the power categories 60 / 80 kVA. The static by-pass is connected separately, key word: “increased security.”

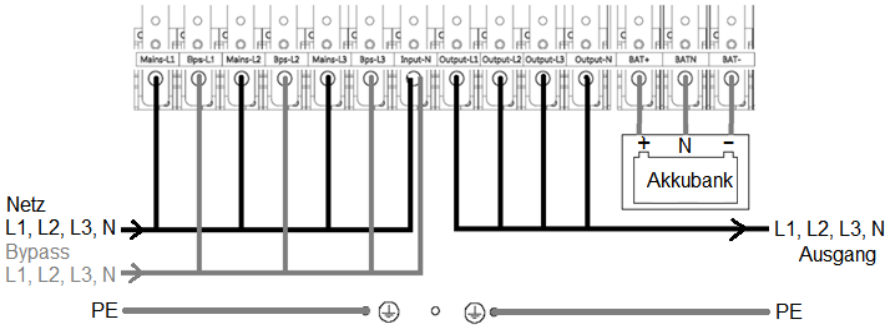


Fig. 5-7 Terminal with separate by-pass supply for the systems 60 / 80 kVA.

Proceed with the connection of the power supply networks in the following order:

- Connect the mains power supply with the input terminals;

Connection:	Relevance / function:
Mains-L1	Mains input terminal phase L1;
Mains-L2	Mains input terminal phase L2;
Mains-L3	Mains input terminal phase L3;
Input-N	Mains input terminal neutral wire N;
⏚	Earth;

- Connect the by-pass supply with the input terminals;

Connection:	Relevance / function:
Bps-L1	By-pass input phase L1;
Bps-L2	By-pass input phase L2;
Bps-L3	By-pass input phase L3;
Input-N	By-pass input neutral wire N;
⏚	Earth;

- Connect the load power supply with the output terminals;

Connection:	Relevance / function:
Output-L1	Power output phase L1;

Output-L2	Power output phase L2;
Output-L3	Power output phase L3;
Output-N	Power output neutral wire N;
	Earth;

ATTENTION!

Pay attention to the polarity / rotational direction of the three-phase power system between input and output of the UPS (sequence L1, L2, L3).

WARNING!

Ensure that the possibly factory-made fixed bridges (connection: power input <> by-pass input) are removed here because the by-pass is now supplied separately.

- Optional: connect an external accumulator bank with the accumulator terminals. In doing so, observe all instruction guidelines;

Connection:	Relevance / function:
BAT **+**	Accumulator bank connection positive;
BATN	Accumulator bank connection neutral;
BAT **-**	Accumulator bank connection negative;
	Earth;

In using an internal accumulator bank, the accumulator terminals are already connected so that an additional allocation is therefore impossible.

5.2.2

Connecting the emergency power off safety circuit (REPO)

The REMOTE EMERGENCY POWER OFF function serves known dimensions in immediately remotely disconnecting all connected loads. To utilize this function, the REPO-connecting terminal must be connected via contacts 1 and 2 to a connecting cable with a trigger contact (opener).

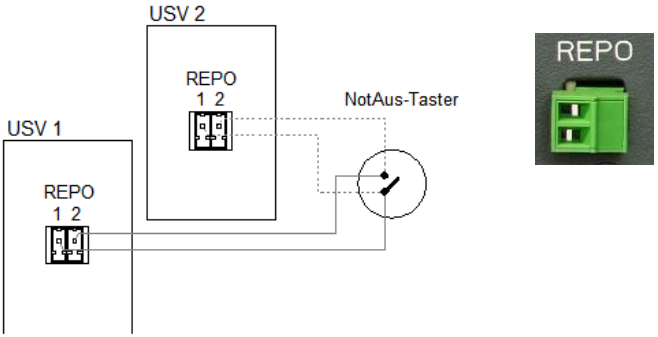


Fig. 5-8 Connection of the REPO trigger contact as remote trigger.

The EMERGENCY POWER OFF button can also be switched on in parallel on all devices within a parallel system.

ATTENTION!

Only use neutral (grid isolated) contacts as trigger contact with a minimum voltage of 24 VDC and a current carrying capacity of at least 50 mA. Furthermore, the trigger contact must be used as an **opener** in every case.

For proper operation, the emergency power off signal must be active for at least 4 seconds.

If the REPO-remote trigger is not used, the connection plug must be **bridged**.

5.2.3

Connecting the communication interfaces SNMP, RS232, RS485, USB

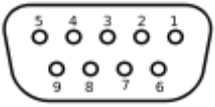
SNMP, in system up to 20 kVA:

The connection to an external SNMP-adapter is done via the SNMP-port. The UPS is equipped with a standard version SNMP-port, and must thus only be connected using the supplied connecting cable. Connection and transmission support the “Mega Tec Protocol.”

RS232:

The serial interface RS232 serves to connect the equipment with a PC or rather the application (software) installed on it.

The connection is likewise designed for a serial standard cable. The configuration is as follows (pins not listed are not assigned):



PC RS232:	UPS RS232:	Function:
Pin 2	Pin 2	Tx USV, Rx PC
Pin 3	Pin 3	Rx USV, Tx PC
Pin 5	Pin 5	GND

Fig. 5-9 RS232 Connecting a device to the UPS (Sub-D 9-pole, female).

The serial interface RS232 of the UPS runs with the following interface parameters:

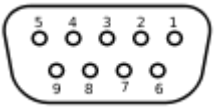
- data rate: 9600 Baud;
- data bits: 8;
- stop bits: 1;
- parity bit: none;

This interface supports the complete “Mega Tec Extended” protocol (August 2000 version).

RS485:

RS-485 is an interface standard for digital cable-based differential, serial data transmission that permits the construction of a bus system.

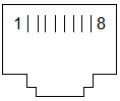
The design of the RS485 interface differs accordingly as to the system variants. The 9-pole, Sub-D connector is used for systems up to 20 kVA (pins not listed are not assigned):



PC RS485:	UPS RS485:	Function:
Pin 1	Pin 1	RS485 -
Pin 6	Pin 6	RS485 +

Fig. 5-10 RS485 Connecting a device to the UPS (Sub-D 9-pole, female).

RJ 45 connections (1:1) are used for system variants 30 -80 kVA:



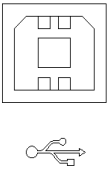
PC RS485:	UPS RS485:	Function:
Pin 1/5	Pin 1/5	RS485 – „A“
Pin 2/4	Pin 2/4	RS485 + „B“

Fig. 5-11 RS485 Connecting the interface to the UPS (RJ45).

The interface supports the complete “Modbus” protocol and with it the transmission standards: ASCII and RTU.

USB:

USB interfaces for the UPS are also made available for the completion of compatibility in systems with 30 – 80 kVA.



PC USB:	UPS USB:	Function:
Pin 1	Pin 1	5 V
Pin 2	Pin 2	D +
Pin 3	Pin 3	D -
Pin 4	Pin 4	Gnd

Fig. 5-12 USB Connecting a device to the UPS (SubD 9-pole, female).

The USB interface for the UPS behaves like a virtual, serial interface and runs with the following interface parameters:

- Data rate: 9600 Baud;
- Data bits: 8;
- Stop bits: 1;
- Parity bit: none;

5.2.4

Signal interface (DRY CONNECT)

The interface provides following signals for coupling with higher-level drives. The following displays the assignment of the interfaces:

UPS:	Signals (Output O:, Input I:)
Pin 1	O: UPS accumulator bank voltage low;
Pin 2	O: Power failure, autonomous mode;

Pin 3	I: shut down UPS
Pin 4	Gnd

Fig. 5-13 Design and assignment for the signal interface.

The signal interface is only available for the system variants 30 – 80 kVA.

5.2.5

Connecting a temperature sensor

The temperature sensors can be connected over the respective RJ45 connection. The configuration is as follows:

Fig. 5-14 PIN-configuration and counting direction of the BAT_T interface (RJ45).

Temperature sensor: (RJ45)	BAT_T (RJ45):	Description:
PIN 1/5	PIN 1/5	Tx (digital Signal)
PIN 2/4	PIN 2/4	Rx (digital Signal)
PIN 7	PIN 7	12 V
PIN 8	PIN 8	GND

This connection is only available for the system variants 30 – 80 kVA.

5.2.6

Connecting the relay contact extension card (DRY CONTACT)

The relay card is an intelligent extension card. You can find a general description of the relay card under ⇨ 15.3 Communication adapter relay card (DRY CONTACT)

All inputs and outputs have protective insulation (floating). The relay card can easily be slid into the adapter slot (INTELLIGENT SLOT) of the UPS and couples via a signaling cable with the upstream control. The following signals are available:

Article No. ZBBKSBRELTHORX00

Pin:	Description:	Contact, Logic:	Connection:

1	mains failure	N/O contact	Pin1 & Pin8 ON	relay output
2	accumulator bank voltage low	Change-over contact	Pin2 & Pin8 OFF	relay output
3			Pin3 & Pin8 ON	
4	by-pass mode	N/O contact	Pin4 & Pin8 ON	relay output
5	UPS failure	N/O contact	Pin5 & Pin8 ON	relay output
6	inverter mode	N/O contact	Pin6 & Pin8 ON	relay output
7	UPS alarm	N/O contact	Pin7 & Pin8 ON	relay output
8	GND	Common	Pin 8	General relay contact
9	remote trigger (SHUT DOWN)	N/O contact	Pin9 & Pin10 ON	optocoupler-input
10	GND			GND-input

The following example shows one possible connection variant:

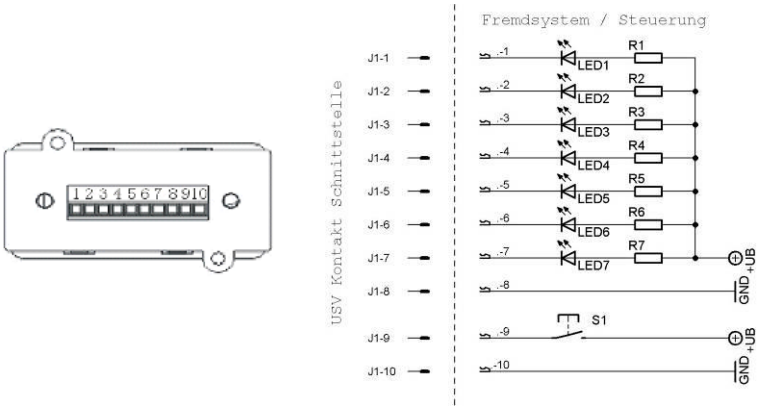


Fig. 5-15 Front view and connection example for relay card.

Make sure to follow the connection specifications of the relay card according to the technical data (⇨ 13.1 Connection specifications of relay card).

5.2.7

Connecting the SNMP adapter

The SNMP adapter can easily be slid into the adapter slot (INTELLIGENT SLOT) of the UPS and only needs to be connected with the network via a network cable (patch cable, category 5e or better).

See the respective adapter manual for additional information regarding the connection configuration.

5.2.8

Parallel connection of the UPS

WARNING!

Only EFFEKTA Regeltechnik GmbH service personnel is allowed to connect several UPS in parallel. This task requires substantial hardware, installation and parameter changes.

Because the UPS devices must be synchronized within a parallel system, all UPS systems are to each be coupled via the PARALELL connections (P1 and P2) and the corresponding signal cable below each other. A ring topology has been realized here for reliability reasons:

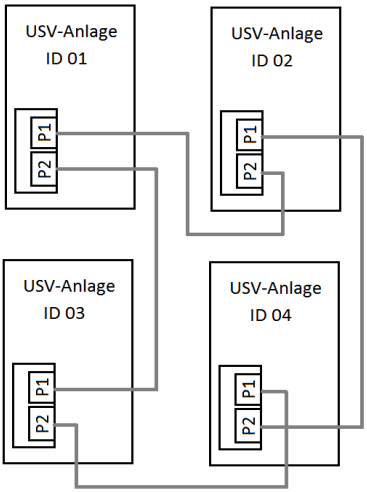


Fig. 5-16 Application of ring topology for signal technical parallel connection of all UPS devices involved.

In this, it is insignificant whether two, three or four devices are connected in parallel. The formation of a ring signal coupling via all UPS systems involved is characteristic (Fig. 5-16).

Always use the connection with the parallel cable provided.

6. Operation

Due to the extensive protective functions the system performs with regard to the load/s, the UPS operates fully automatically.

As a result, the operation of the system is limited to a few steps which, in addition, depend on the level of authorization. There is a distinction between “general operation” and “maintenance and service” of the UPS.

ATTENTION!

In general, the operating personnel should inform affected employees (keyword: consumer network) about any scheduled tasks concerning the UPS system.
Have the status and error messages listed in Chapter 8 ready in order to immediately facilitate the interpretation of the operation display and possibly occurring errors.

Familiarize yourself with the safety circuit emergency power off in advance!

6.1 General operation, operation of the UPS

In general, the switching on or starting and shutting down of the system is performed by the operating personnel.

WARNING!

The operator of the UPS-system must always adhere to the instructions in this operating manual. The operator may only carry out the following steps and must always exercise particular care in doing so:

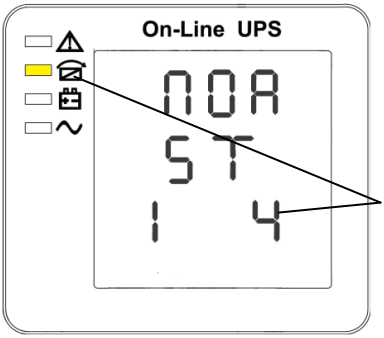
- Switching on and switching off of the UPS;
- Reading of the display messages and interpretation of the acoustic warning signals.;
- Switching from normal operating mode to static by-pass mode and vice versa;
- Triggering the safety circuit emergency power off;

In addition, data can be exchanged with the UPS via the communication interface or the SNMP adapter, but this data exchange is not imperative for the normal operation. Nevertheless, particular care and diligence are also required here, as the system can, for example, be shut down via the software.

6.1.1 Switching on (starting) the UPS

The following procedure lists the necessary steps for switching on (starting) the UPS.
Please complete the individual steps in this order:

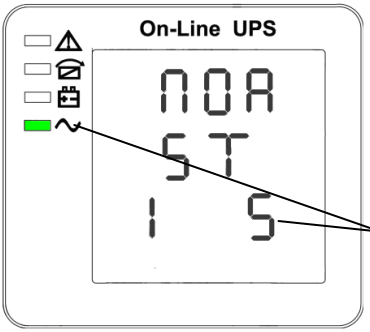
- Open the front panel of the UPS;
- Switch on the circuit breaker of the accumulator bank (BATTERY);
- Switch on the circuit breaker of the UPS output (OUTPUT);
- Switch on the circuit breaker of the UPS input (the mains power supply, INPUT);
- Now the UPS starts up automatically and begins with initializing the system. This procedure may take a few seconds;



After the initialization is complete, the UPS switches to **by-pass mode**. The UPS output and the loads are now connected.

The display shows the following:

LED-by-pass (yellow) and status number 4;



After the cycle of internal tests and the synchronization, the UPS switches to **normal operating mode or INVERTER mode.** This procedure may take a few seconds.

The display shows the following:

LED-INVERTER (green) and status number 5;

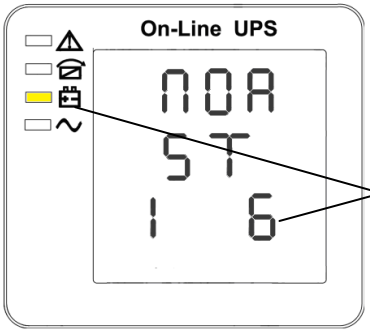
- To conclude the task, please close the front panel again and secure it against unauthorized access.

Now the start-up procedure is completed, the UPS can remain in this state.

6.1.2 Switching the UPS off

The following procedure lists the necessary steps for switching off the UPS. Please complete the individual steps in this order:

- ✓ The initial state of the equipment is the normal operating mode;
- First switch off all loads, one after the other, to ensure that they are shut down in a controlled manner;
- Open the front panel of the UPS;
- Switch off the circuit breaker at the UPS output (OUTPUT); now the loads are fully disconnected;
- Switch off the circuit breaker of the UPS input (the mains power supply, INPUT);



The UPS immediately switches to autonomous mode.

The display shows the following:

LED autonomous mode (yellow) and status number 6;

- Now press the OFF-button for at least 3 seconds to completely switch off the UPS;

Provided the UPS now shuts down by itself, the complete display of the control panel turns blank and shuts off.

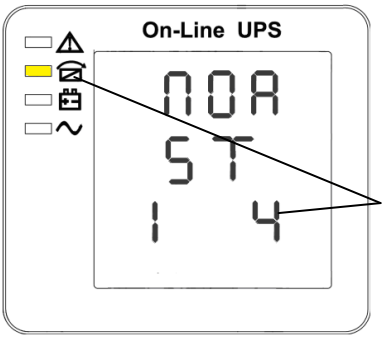
- Switch off the circuit breaker of the accumulator bank (BATTERY);
- Finally, close the front panel of the unit and secure it against unauthorized access;

This concludes the shut-down procedure; the UPS can remain in this state.

6.1.3 Manual switch between mains supply and by-pass operating mode

The UPS can be manually switched between the two operating modes mains power supply (INVERTER) and static by-pass:

- ✓ We assume that the UPS is in normal operating mode (LED-INVERTER, status number 5);
- Press the OFF button (the beep tone confirms the entry);



After a brief moment, the UPS switches to **static by-pass mode.** The UPS output and the loads are now directly supplied from the mains power supply.

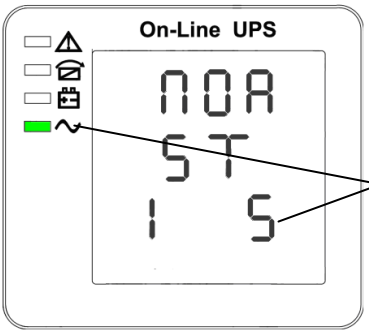
The display shows the following:

LED-by-pass (yellow) and status number 4;

The UPS is now in static by-pass mode and can remain in this state.

To switch back into normal operating mode:

- Press the ON button (the beep tone confirms the entry);



After a brief moment, the UPS switches to **normal operating mode (INVERTER)**.

The display shows the following:

LED-INVERTER (green) and status number 5;

Now the UPS is in normal operating mode and can remain in this state. The loads are again supplied via the inverter and fully protected.

In general, a change to static by-pass mode is only advisable if the INVERTER shows an error message or is overloaded.

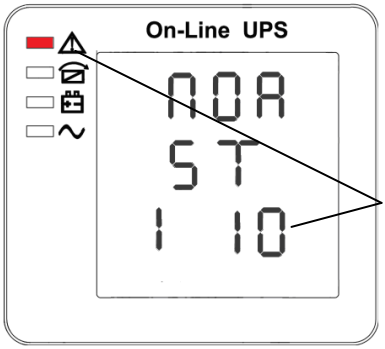
6.1.4 Triggering the safety circuit emergency power off

In the event of an emergency situation on the load side, you must trigger the safety circuit **emergency power off** of the UPS:

- Trigger the **external emergency power off** (**REPO**, REMOTE EMERGENCY POWER OFF) if it is accessible and/or available;

or:

- Open the front panel of the UPS;
- Flip the protective cap of the emergency power off button (EPO) up;
- Press the emergency power off button for at least 4 seconds to trigger the safety circuit;



After a brief moment, the UPS switches to **emergency power off mode**. The UPS output and the loads are now turned off.

The display shows the following:

LED-Alarm (red) and status number 10;

For safety reasons, the UPS now remains in this state, further key entries are ignored.

To restart the UPS, it first has to be completely shut down:

- Turn off the circuit breaker at the UPS input (mains power supply, INPUT);
- Press the OFF key (a beep tone confirms the entry);

The system fully shuts down after about 30 seconds.

- Turn off the circuit breaker of the accumulator bank (BATTERY);
- Eliminate the problem that had created the emergency situation;

Now the equipment can either remain in this state for some time, or you can restart the device (see switching on the UPS).

6.2 Maintenance and service mode

WARNING!

Only EFFEKTA Regeltechnik GmbH service personnel or personnel from other accredited service points may carry out maintenance and service tasks.

In general, the operating personnel should inform affected employees (key-word: consumer network) about any scheduled tasks concerning the UPS system so they can first back-up or save any data.

Maintenance and service tasks are essentially: parameter settings, reviewing autonomous periods, and exchanging accumulators or other components.

6.2.1

UPS settings

Parameters for the system and the module configuration are generally set via the module control panel(s).

The setting mode of the UPS module can be reached by simultaneously pressing the "↻" and "OFF" buttons for at least 2 seconds. The key assignment switches automatically from the function ↻, **OFF**, **ON** to ↵ (ENTER), ▲, ▼.

The menu page can be navigated from parameter to parameter by pressing the ▲ ▼ buttons. The selected parameter blinks and a selection or change is completed with ↵ .

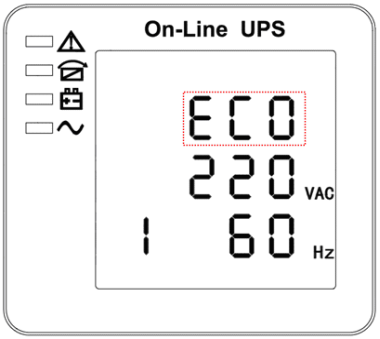
If no button is used for a period of time, the system automatically returns to the setting mode.

The settings primarily apply to:

- Parameters regarding the UPS and its environment;
- Parameters regarding the accumulator bank;
- Parameters for the general operation, like the permanent turning on of the ECO-mode or the muting of the buzzer;

After switching to the setting mode, the first setting page appears, and the first parameter for setting blinks:

P. Menu page 01 **Setting the operation mode:**

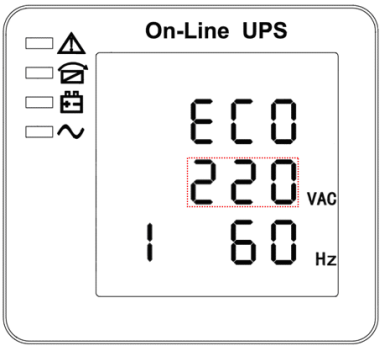


The system operation mode is selected (blinks).

The operating mode can be changed with ↳ (ENTER). Parallel mode (PAL) and normal operating mode (NOR) can also be selected.

The ▼button brings you to the next parameter. Analogous to this, the ▲ button brings you to the previous parameter.

P. Menu page 01 **Setting the output voltage:**

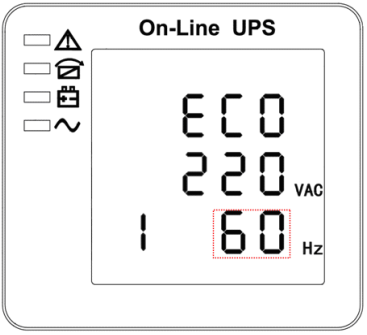


The output voltage is selected (blinks).

Three different output voltages can be chosen with ↳ (ENTER): 220 V, 230 V, 240 V.

The ▼button brings you to the next parameter. Analogous to this, the ▲ button brings you to the previous parameter.

P. Menu page 01 **Setting the frequency:**

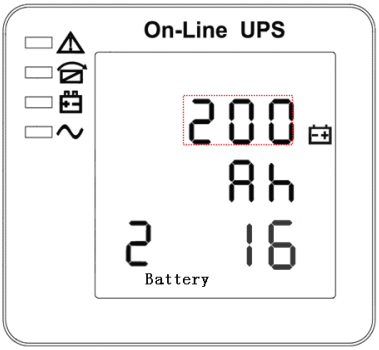


The frequency of the system is selected (blinks).

Two different frequencies can be chosen with ↳ (ENTER): 50 Hz, 60 Hz.

The ▼button brings you to the next parameter. Analogous to this, the ▲ button brings you to the previous parameter.

P Menu page 02 **Setting the accumulator bank capacity:**

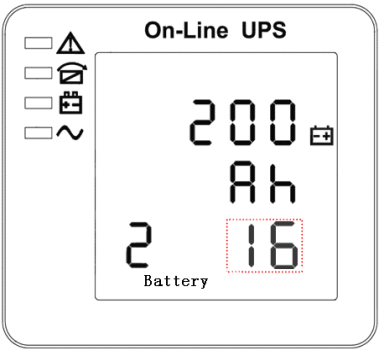


The accumulator bank capacity of the system is selected (blinks).

The accumulator bank capacity can be set from 1 – 200 Ah units with ↵ (ENTER).

The ▼button brings you to the next parameter. Analogous to this, the ▲ button brings you to the previous parameter.

P Menu page 02 **Setting the number of accumulators:**

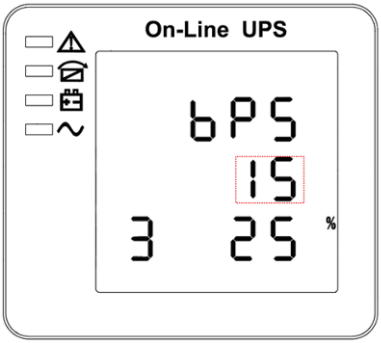


The number of accumulators for the system is selected (blinks).

The number of accumulators can be set from 16 to 20 units with ↵ (ENTER).

The ▼button brings you to the next parameter. Analogous to this, the ▲ button brings you to the previous parameter.

P Menu page 03 **Setting the upper limit of the by-pass voltage:**

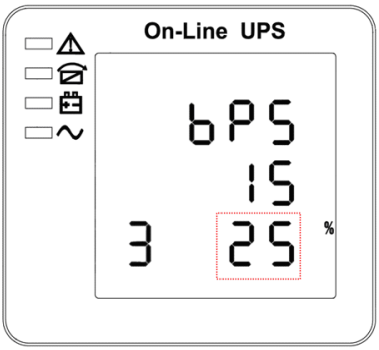


The upper limit of the by-pass voltage for the system is selected (blinks).

The upper limit of the by-pass voltage can be selected with ↵ (ENTER): 5%, 10%, 15%, 20%, 25%. The value of 25% is only selectable when 220V is selected as the output voltage.

The ▼button brings you to the next parameter. Analogous to this, the ▲ button brings you to the previous parameter.

P. Menu page 03 **Setting the lower limit of the by-pass voltage:**

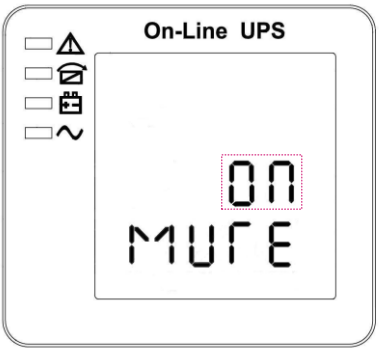


The lower limit of the by-pass voltage for the system is selected (blinks).

The lower limit of the by-pass voltage can be selected with ↵ (ENTER): 20%, 30%, 45%.

The ▼button brings you to the next parameter. Analogous to this, the ▲ button brings you to the previous parameter.

P Menu page 03 **Setting the buzzer (BUZZER, deactivation circuit):**

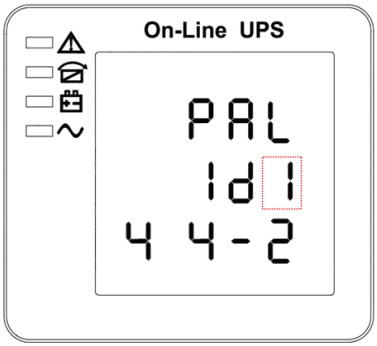


The buzzer setting for the system is selected (blinks).

The buzzer can be turned on (ON) as acoustic support or turned off (OFF) with ↵ (ENTER).

The ▼button brings you to the next parameter. Analogous to this, the ▲ button brings you to the previous parameter.

P. Menu page 04 **Setting the ID number (parallel system):**

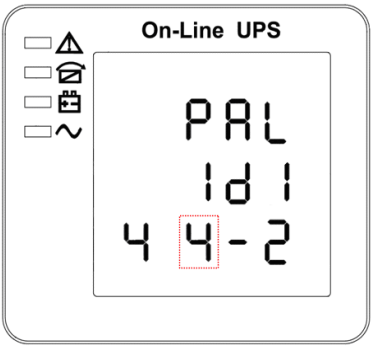


The identification number (ID) for the system is selected (blinks).

The ID number can be set from 1 – 4 with ↵ (ENTER).
ID numbers must not be assigned in duplicate within a parallel system.

The ▼button brings you to the next parameter. Analogous to this, the ▲ button brings you to the previous parameter.

P. Menu page 04 **Setting the number of parallel systems:**



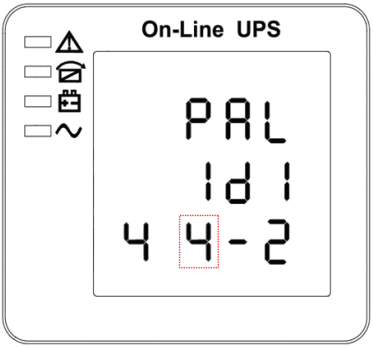
The number of systems within a parallel system is selected (blinks).

The total number of systems can be set from 2 – 4 within the parallel

system with ↳ (ENTER).

The ▼button brings you to the next parameter. Analogous to this, the ▲ button brings you to the previous parameter.

P. Menu page 04 **Setting the number of redundancy systems:**



The number of redundancy systems within a parallel system is selected (blinks).

The total number of redundancy systems can be set from 0 – 3

within the parallel system with ↳ (ENTER).

The ▼button brings you to the next parameter, in this case back to the start P menu page 01. Analogous to this, the ▲ button brings you to the previous parameter.

6.2.2

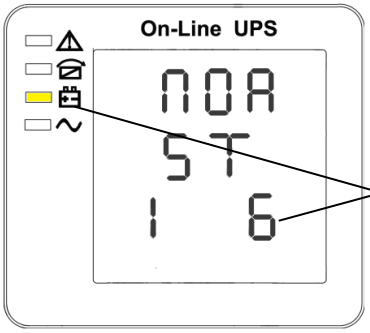
"Cold start" (COLD START) of the UPS, measuring the autonomy

The UPS-device can be switched on directly into autonomous mode without any mains power supply. This means, the loads can be supplied with power for a certain amount of time. Usually several stress tests on the UPS output are first carried out in this manner.

A "cold start" is conducted as follows:

- Open the front panel of the UPS;
- Turn on the circuit breaker of the UPS output (OUTPUT);
- Turn on the circuit breaker of the accumulator bank (BATTERY);

- Press the ON key (a beep tone confirms the entry) in systems up to 20 kVA or press the “cold start” button (COLD START, BLACK START) in systems with 30 / 40 / 60 / 80 kVA;



The UPS immediately switches to autonomous mode.

The display shows the following:

LED-autonomous mode (yellow) und status number 6;

- Always check the display for the UPS output and the values for the remaining autonomy period;

Measuring the autonomy can also now be carried out. Let the system run for a defined period of time and note the consumed accumulator bank capacity. Then calculate the maximum autonomy period, which, of course, is only possible and valid for the current load.

6.2.3

Manual by-pass mode (MAINTENANCE)

To exchange certain parts of the UPS, e.g. degenerated accumulators, the UPS-system has to be by-passed to ensure, on the one hand, that the loads will continue to be supplied with power from the mains power supply and, on the other side, the UPS is isolated and without power. The application is a follows:

✓ The initial situation is that the UPS is in normal operating mode;

- Open the safety cover of the circuit breaker (manual by-pass);

The system now automatically switches to static by-pass mode.

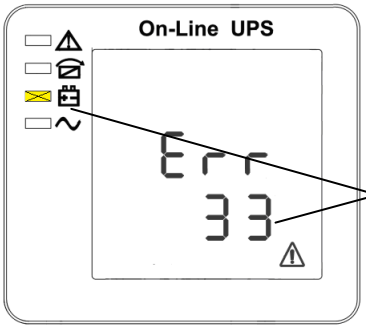
- Switch on the circuit breaker (manual by-pass);
- Switch off the circuit breaker for the accumulator bank (BATTERY);
- Switch off the circuit breaker for the UPS input (mains power supply, INPUT);

- Switch off the circuit breaker for the UPS output (OUTPUT);

The UPS-equipment is now isolated while all loads continue to be supplied directly from the mains power supply. Now components can be exchanged.

After finishing the maintenance or service tasks, the system must be returned to normal operating mode. Please follow these steps:

- ✓ The initial situation is the currently manual by-pass mode:
- Turn on the circuit breaker for the UPS output (OUTPUT);
- Turn on the circuit breaker for the UPS input (mains power supply, INPUT);



The UPS starts up and initializes.

Then the display shows the following:

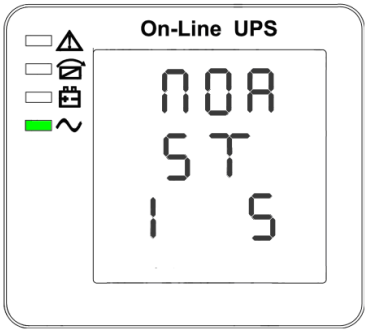
Error 33: this means that no accumulator bank is connected!

- Then switch on the circuit breaker for the accumulator bank (BATTERY);

After a brief moment, Error 33 goes off.

Now you must wait (ca. 1 min) until the **yellow by-pass LED lights**; only after this is the system operating in static by-pass mode.

- Turn off the circuit breaker (manual by-pass);
- Close the safety cap of the circuit breaker (manual by-pass). Pay attention to figure Fig. 6-1 and the following note;



After a brief moment, the UPS automatically returns to normal operating mode and completely supports the loads.

The display shows the screen depicted on the left.

ATTENTION!

When fitting the security cover onto the manual by-pass you must absolutely ensure that the sheet metal flap of the cover really activates the safety switch inside.

This means that when attaching the cover, the metal flap must push down vertically. Then the cover can be screwed into place (see Fig. 6-1).

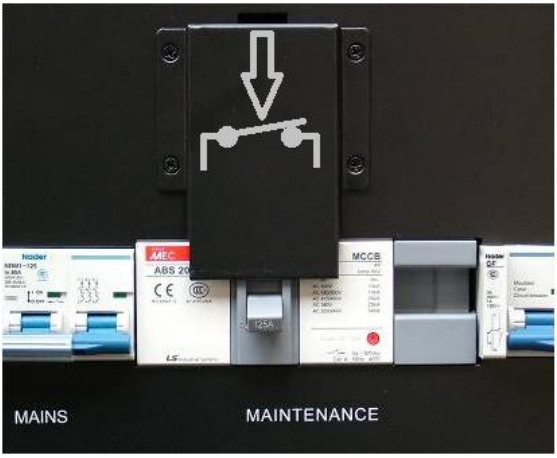


Fig. 6-1 Correctly placed safety cover for the manual by-pass (example illustration).

If the safety cover is not secured correctly in place correctly, the UPS cannot be switched into normal operating mode. The system remains in static by-pass mode.

6.2.4. Exchange of an UPS module

As a rule, the UPS modules are low maintenance and reliable. However, it can occur that a module must be exchanged on account of a defect or upcoming cleaning work. In this case, we recommend always changing the UPS module in manual by-pass mode (MAINTENANCE).

When exchanging the UPS module, please work in the following sequence:

- Turn the system on in the manual by-pass mode accordingly ⇨ 6.2.3 Manual by-pass mode (MAINTENANCE).

WARNING!

The shutdown procedure for the UPS module requires roughly 30 seconds and is first completed when the system control panel has been completely shut down and the module ventilators have come to a standstill. Only then have all internal voltages been dismantled.

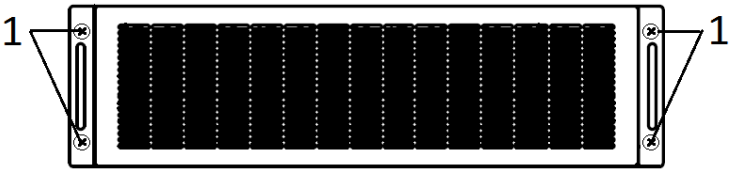


Fig. 6-2 Screwed on UPS module with indication for locking screws (1).

Unscrew the safety screws indicated in the figure Fig. 6-2. The module prompt (switch) is located under it. The module is only then integrated into the system when it has been fixed with the safety screws. The module prompt occurs either in the upper right or the upper left;

In removing the safety screws, the UPS module is simultaneously shut down in the event that this was not already the case.

WARNING!

The next steps, the removal and fitting of a module, must always be executed by two persons due to reasons of weight.

- Remove the UPS module (2 persons together) and store it safely;
- Then fit the new UPS module by inserting it in the same rack slot.

In any event, push the module carefully until it stops;

- Secure the UPS module with **all** safety screws (M5);
- Now switch the system on again in normal operation mode;

With this, the UPS module exchange is complete.

7. Initial operation of the UPS

WARNING!

The initial operation generally assumes that everything in the previous chapters of this manual has been executed and controlled successfully. Also ensure that the loads have been connected and turned off. The initial operation of UPS systems is exclusively reserved for service personnel from EFFEKTA Regeltechnik GmbH or other accredited service points.

Check again that the emergency off safety circuit (EPO, REPO) has been deactivated.

Please conduct the initial operation in the following order:

- Turn on the UPS device;
- Check all the status information (information pages) within the unit control panel;
- Check the output voltage and phase position via a measurement;
- Turn on the loads one by one under review of the power values indicated (also load distribution);
- Likewise check the autonomous mode under review of the power values and status information;
- Turn off the loads again;
- Then check the EPO or REPO (EMERGENCY POWER OFF) function of the device;
- Turn the UPS device off again;

Should errors occur during the initial operation, these must first be analyzed and resolved before the initial operation can be continued.

- Close all the openings and prepare the UPS device for general operation;

DANGER!

In each case, mind that a switched-off UPS device, disconnected from the mains power supply, can still carry voltage for a very long time. This not only relates to the UPS output but also to the UPS input. If there are tasks being performed on the UPS connections, check these for voltage and adhere to the safety regulations according to ⇨ 2.7 “Connection.”

7.1 Initial operation of a parallel system

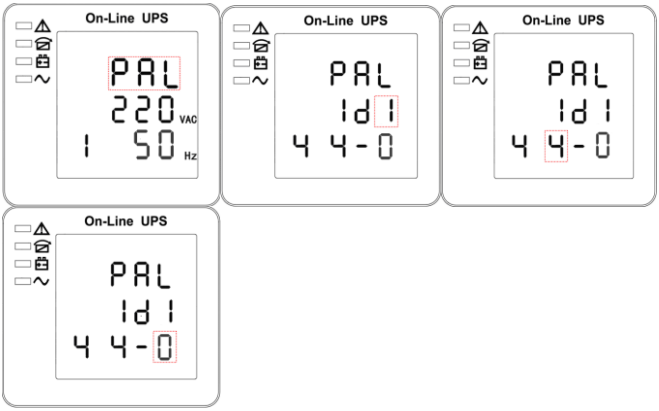
Check again that the emergency off safety circuit (EPO, REPO) is deactivated for all devices involved.

The following initial operation described is, for example, for a parallel system with 4 units. Redundancy units were not used.

Please conduct the initial operation in the following order:

✓ It is assumed that all devices are properly connected and the polarities are noted in each instance. Furthermore, all devices are also coupled via the signal cables (PARALLEL PORT).

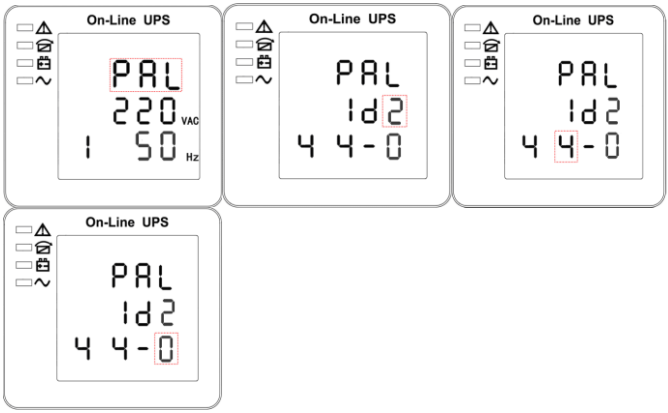
- All loads must still be disconnected or switched off.
- Be sure that all circuit breakers for the accumulation banks are open.
- Now start the UPS device 1 via the power supply (static by-pass mode). Configure this from single mode in the parallel mode and enter the system parameters (work mode, parallel amount and parallel ID).



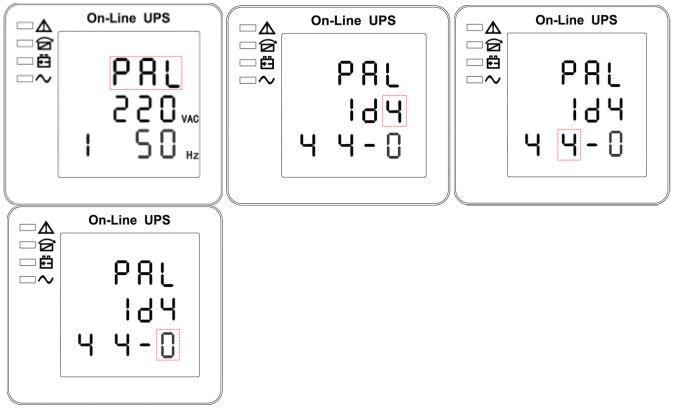
- Now switch device 1 off again.

- Repeat the previous steps with all devices 2-4 in the system. In doing so, the parameters (work mode, parallel amount and parallel ID) must all be set for all the devices according to the system.

Mind the that parameter “parallel ID” is continuously assigned.

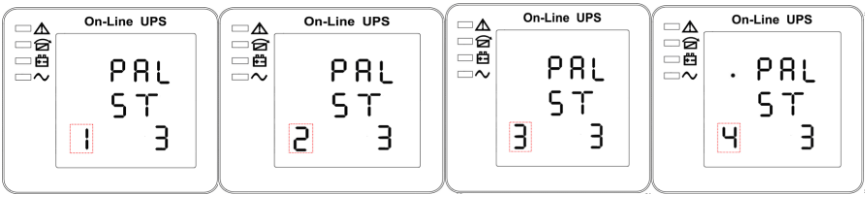


- …



- Now all devices can be switched on (static by-pass mode).

Then the following operation displays appear for the four devices:



Within a parallel system, one device always runs as a master device. This is indicated but a dot on the display. Here in our system, this is device 4 (see frame).

- When all devices are switched on and configured, turn off the circuit breaker for the UPS outputs (OUTPUT SWITCH) for all devices one after the other.
- Check the output voltages and load distributions for all devices via the respective device control panels.
- Now turn off the circuit breakers for all the accumulator banks (BATTERY) so that the devices switch to normal operating mode (INVERTER mode). With this step check the charging currents for all devices.
- If the output values and accumulator values are thus far in order, the loads can each be switched off/on individually. Always pay attention to the output values and the load distribution for all the devices.
- If all the values are in order up to this point, disconnect the loads again.
- Then test the emergency off function (REPO, EMERGENCY POWER OFF).
- After this, turn off the devices and open the circuit breaker for the UPS outputs in each instance (OUTPUT SWITCH).

Should errors occur during the initial operation, these must first be analyzed and resolved before continuing with the initial operation.

- Close all the opening and prepare the UPS system for general operation;

8. Status and error messages

The following table shows the various states via the LED indicator display in matrix form:

Indicator display: / Status (-number):		LED			
		Alarm mode	By-pass mode	Autonomy mode	Inverter mode
01	Initializing	off	off	off	off
02	Stand-by mode	off	off	**X	off
03	UPS output “off”	off	off	**X	off
04	By-pass mode	off	lit	**X	off
05	Normal operating mode (mains)	off	off	**X	lit
06	Autonomous mode	off	off	lit	off
07	Accumulator testing / diagnosis	off	off	lit	off
08	Inverter start periods	off	**X	**X	off
09	ECO mode	off	**X	**X	**X
10	EPO triggered	lit	off	**X	off
11	Manual By-pass	off	off	off	off
12	Alarm mode	lit	**X	**X	**X

** Note: “X” indicates non-defined states; the status display depends on the previous conditions.

To be able to unambiguously interpret a signal, you have to connect the indicator and the status, meaning e.g. the **alarm LED** is lit and status number **10** is displayed distinctly results in the message: **EPO triggered.**

Additional status displays such as the blinking of individual LEDs are possible whereby it usually indicates warning or alarm statuses (Chapter 8.1).

8.1 Warning and error messages in detail

The UPS provides all warning and alarm signals via the status display and the LCD information (menu page 17). These messages are audibly supported by a BUZZER.

Should the UPS equipment not be operating properly, please first check the operating information on the control panel.

Please try to localize the problem using the following table in order to pass this information directly on to customer service.

Alarm message (CODE)	Warning alarm message	BUZZER	Status display LED
1	Rectifier error	constant beep	Alarm LED on
2	Inverter error	constant beep	Alarm LED on
3	Inverter thyristor short circuit	constant beep	Alarm LED on
4	Inverter thyristor error	constant beep	Alarm LED on
5	By-pass thyristor short circuit	constant beep	Alarm LED on
6	By-pass thyristor error	constant beep	Alarm LED on
7	Fuse failure	constant beep	Alarm LED on
8	Parallel relay error	constant beep	Alarm LED on
9	Fan error	constant beep	Alarm LED on
10	Reserve	---	---
11	Auxiliary voltage error	constant beep	Alarm LED on
12	Initializing error	constant beep	Alarm LED on
13	Loading unit (+ path) error	constant beep	Alarm LED on
14	Loading unit (- path) error	constant beep	Alarm LED on
15	DC-circuit overvoltage error	constant beep	Alarm LED on
16	DC-circuit low voltage error	constant beep	Alarm LED on
17	DC-circuit balance error	constant beep	Alarm LED on
18	“SOFT START” error	constant beep	Alarm LED on
19	Rectifier overtemperature	2 beeps / second	Alarm LED on
20	Inverter overtemperature	2 beeps / second	Alarm LED on
21	Reserve	---	---
22	Accumulator polarity	2 beeps / second	Alarm LED on
23	Cable, connection error	2 beeps / second	Alarm LED on
24	CAN-Bus communication error	2 beeps / second	Alarm LED on
25	Parallel load balance error	2 beeps / second	Alarm LED on

26	Accumulator bank overvoltage error	1 beep / second	Alarm LED blinking
27	Mains / input wiring error	1 beep / second	Alarm LED blinking
28	By-pass wiring error	1 beep / second	Alarm LED blinking
29	UPS output short circuit	1 beep / second	Alarm LED blinking
30	Rectifier overcurrent	1 beep / second	Alarm LED blinking
31	By-pass overcurrent	1 beep / second	Bypass LED blinking
32	Overload	1 beep / second	Inverter LED or by-pass LED blinking
33	No accumulator bank	1 beep / second	Autonomy blinking
34	Accumulator bank low voltage	1 beep / second	Autonomy blinking
35	Accumulator bank voltage low (advance warning)	1 beep / second	Autonomy blinking
36	Internal communication error	1 beep / 2 seconds	Alarm LED blinking
37	DC-circuit component overload	1 beep / 2 seconds	Inverter blinking
38	Parallel overload	1 beep / 2 seconds	Inverter blinking
39	Mains voltage out of range	1 beep / 2 seconds	Autonomy LED on
40	Mains frequency out of range	1 beep / 2 seconds	Autonomy LED on
41	By-pass not available		By-pass blinking
42	By-pass not switchable		By-pass blinking
43	Inverter irregularly active		
44	UPS module not secured (screwed into place)		
45	Inverter is not active		
46	Output switch is not activated.	1 beep / 3 seconds	

ATTENTION!

Never try to start the UPS (system) if there is an unresolved error. Should you try to do so, the UPS software usually prevents a start-up if an error is present.

Should the safety circuit (emergency power off) be activated by any chance, the UPS will also not turn on.

9. Troubleshooting

Over the course of time, malfunctioning or failures of the UPS, the accumulator bank or their setting may occur. Should this be the case, please contact our customer service (service hotline) as soon as possible.

When you contact the service center, please provide the following information to ensure swift resolution:

- Model number, serial number and configuration of the equipment;
- Date on which the issue first occurred and process;
- Control panel LCD/LED display information (status or warning or alarm messages);
- Conditions of the mains power supply, load, environment, temperature and moisture as well as ventilation conditions;
- Information on the condition, such as age, etc. regarding the accumulator bank (internal or external);

Please always name the respective competent contact persons for the clarification of the issue and its resolution.

10. Service-Hotline

Generally, should you encounter any problems or need any information regarding safety, please contact our service hotline:

Phone: 0049 / (0) 741 – 17451-52
Fax: 0049 / (0) 741 – 17451-29

You can also reach us via e-mail at:

kundendienst@effekta.com

In addition, you can find the relevant department or branch office for you on our website:

http://www.effekta.com

11. Software

The UPS management software **Power Shut Plus** runs as a client / server application for heterogeneous networks or on a local computer.

It works on any common platform (Win, Linux, UNIX).

In addition, it includes an SNMP adapter under Windows NT and Novell.

All servers within the network can be shut down via RCCMD (multi-server shut down).

The software shows all relevant UPS data such as the battery condition, temperature, status of the mains power supply, etc. among other data within a clear graphic interface.

Malfunctioning of the system can easily be reported via e-mail, mobile phone or fax.

The range of services of Power Shut Plus can be roughly summarized as follows:

- the availability for Windows 95/98/2000/NT/XP/Vista/Win7, Novell, Linux and all common Unix derivatives;
- the local or network shut down of up to several hundred computers;
- integrated SNMP-sub-agent (RFC 1628);
- graphic user interface with all UPS data;
- graphic interface in UNIX, MAC, VMS (JAVAMON);
- event-based sending of network news;
- event-based sending of e-mails and SMS;
- recording (logging) of all UPS status data and measurements in MS Excel format;
- scheduler for time-controlled execution of functions such as reboot, shut down, etc.;

The software package Power Shut Plus is included in the scope of delivery of the equipment. Please see the respective manual on the CD for additional information on the performance, installation, use etc.

12. Maintenance and Service

You can expect a long service life and interference-free operation for this product. However, the life and reliability of the UPS is greatly dependent on the conditions of the environment. The temperature and humidity must remain within the given range. In addition, the area surrounding the UPS should be kept as clean and as free of dust as possible.

At an ideal ambient temperature of approximately 20-25°C, the typical service life of the accumulators is ca. 4 years. Through the use of special accumulators, the service life can be significantly increased (up to ca. 8 years).

The device should periodically (every 6 - 12 months) be checked as to whether the remaining autonomy time (backup power time) is sufficient for the intended purposes. If that is no longer the case, the accumulators have to be replaced.

Please remember that after measuring the autonomous period, the device accumulators may be discharged. This means that the UPS device must remain in normal operating mode for several hours (min. 6 h) to recharge the accumulator bank accordingly before the device is up to ca. 70 % operational again.

ATTENTION!

If the backup-time is not measured due to local conditions or regulations, we recommend a prophylactic replacement of the accumulators every other year to avoid any risk of an insufficient autonomous period (back-up time) caused by degenerated accumulators.

In addition, the fans and ventilation ducts of the equipment should be inspected regularly and, if needed, cleaned to ensure full output power. The cleaning and inspection intervals are very dependent on the system environment (key word: dust).

12.1 Replacing components / accumulators

DANGER!

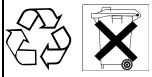
Only EFFEKTA Regeltechnik service personnel or personnel of other accredited service points is allowed to replace accumulators and other UPS components.

WARNING!

During the replacement of accumulators and other components, the loads are directly connected to the mains power supply via a manual by-pass in which case there is no protection or back-up function from the UPS during this period. Mains power failures or other grid problems are directly transferred to the load.

12.2 Maintenance and service contracts

EFFEKTA Regeltechnik GmbH also offers corresponding maintenance and service contracts to guarantee the best possible reliability and availability of your UPS equipment. Additionally, under a maintenance contract, our service personnel can support and help you in the following areas:

	Periodical inspection of the equipment, in particular, the accumulators and their timely replacement.
	Inspection of the UPS installation and its functionality.
	Measuring the remaining back-up time or autonomous period.
	Professional cleaning, especially important in the ventilation area.
	Proper disposal of defective or degenerate components.
	Environmentally sound disposal of accumulators.

Please contact us directly through our service hotline listed above for a complete list of our services or send us an e-mail request.

12.3 Service-Log

Please always enter all maintenance and service work conducted on the UPS into the service-log.

Date	Performed tasks	Performed by

13. Technical data

	Model ACX33..	TRS10K	TRS15K	TRS20K	TRS30K	TRS40K	TRS60K	TRS80K
	P:	10 kVA 9 kW	15 kVA 13.5 kW	20 kVA 18 kW	30 kVA 27 kW	40 kVA 36 kW	60 kVA 54 kW	80 kVA 72 kW
UPS input	Phase	3 phases, neutral and protective earth conductors						
	Nominal voltage	380/**400**/415 VAC						
	Voltage range	208 - 478 VAC						
	Frequency range	40 Hz – 70 Hz						
	Performance factor	≥ 0.99						
	Current (THDI)	≤ 3%						
	By-pass voltage, frequency range	max. voltage: +15% (optional +5 %, +10 %, +25 %) min. voltage: -45 % (optional -20 %, -30 %) frequency range: ±10 %						
	Generator mode capable	Yes						
UPS output	Phase	3 phases, neutral and protective earth conductors						
	Nominal voltage	380/**400**/415 VAC						
	Performance factor	0.9						
	Voltage accuracy	±2 %						
	Frequency range	mains power supply: 50/60 Hz ±5% (±1 %, ±2 %, ±4 %, ±5 %, ±10 % optional) autonomy mode: 50/60 Hz ± 0.2 %						
	Crest factor	3 (CREST FACTOR)						
	THD	≤ 2 % with linear load ≤ 5 % with non-linear load						
	wave form	Sinus						
Efficiency factor		max. 92 % in normal operating mode (INVERTER)						

Model ACX33..			TRS10K	TRS15K	TRS20K	TRS30K	TRS40K	TRS60K	TRS80K
P:			10 kVA 9 kW	15 kVA 13.5 kW	20 kVA 18 kW	30 kVA 27 kW	40 kVA 36 kW	60 kVA 54 kW	80 kVA 72 kW
Accumulator bank	Voltage		Standard: **±216** VDC Optional: ±192, ±204, ±216, ±228, ±240 VDC						
	Capacity		Standard: 72 x 9.5 Ah or 36 x 45 Ah						
	Charge current		max. 6 A			max. 10 A		max. 20 A	
			Charging current is adjusted according to the accumulator bank (parameter).						
Changeover time			Normal (mains supply) in autonomous mode: 0 ms; Normal (mains supply) in by-pass mode: 0 ms;						
Protective response	Overload response	Mains	Load ≤110 %: 60 min, ≤125 %: 10 min, ≤150 %: 1 min, >150 % immediate shut down						
		Autonomous	Load ≤110 %: 10 min, ≤125 %: 1 min, ≤150 %: 5 s, >150 % immediate shut down						
		By-pass	LS 20 A	LS 32 A	LS 40 A	LS 63 A	LS 80 A	LS 100 A	LS 125 A
	Short circuit		Current limiting						
	Overheating		Normal mode (mains power supply): switches to by-pass, Autonomous mode: immediate shut down;						
	Accumulator voltage low		Alarm and immediate shut down						
	EPO triggered		Load disconnected, immediate shut down						
	Interference suppression		according to EN 62040-2						
Alarms (acoustic & visual)			mains failure, accumulator bank low, overload, system error;						
Display	Status LED & LCD		mains-, by-pass, autonomous mode, accumulator bank & UPS failure, overload						
	Display LCD		mains voltage, mains frequency, output voltage, output frequency, load in %, accumulator bank voltage, temperature, alarm messages						
Communication			RS232, RS485, USB, parallel, LBS, SNMP, temperature sensor adapter slot for: SNMP (internal), relay cards (DRYCONTACT)						
Measurements (W x D x H)			600 x 780 x 1200 mm						
Weight (without accumulators)			131 Kg	134 Kg	135 Kg	156 Kg	158 Kg	170 Kg	172 Kg

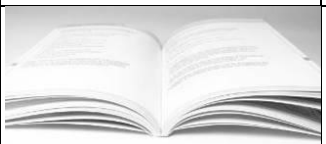
	Model ACX33..	TRS10K	TRS15K	TRS20K	TRS30K	TRS40K	TRS60K	TRS80K
	P:	10 kVA 9 kW	15 kVA 13.5 kW	20 kVA 18 kW	30 kVA 27 kW	40 kVA 36 kW	60 kVA 54 kW	80 kVA 72 kW
Environment	Operating temperature range	0 – 40 °C						
	Storage temperature range	-25 – 55 °C (without accumulators) 0 – 40 °C (with accumulators)						
	Moisture	0 – 95 % (non-condensing)						
	Operating height / output performance	0 - 1500 m / 100% 1500 - 2000 m / 95% 2000 - 2500 m / 90% 2500 - 3000 m / 85% 3000 - 3500 m / 80% 3500 - 4000 m / 75% 4500 - 5000 m / 65%						
Conformity	Safety	EN 62040-1						
	EMV	EN 62040-2 (Class C3)						
	Operation	EN 62040-3						

13.1 Connection specifications of the relay card

Connection:	Load capacity:	
	Voltage:	Current:
Relay output:	30 VDC 230VAC	1 A
Optocoupling input:	5 – 12 VDC	---

14. Scope of delivery / accessories

Below you find the list of the scope of delivery; please compare this with the received product. Please let us know immediately if any items or components are missing in your delivery.

No.	Article or art. no.	Function / View:	Description:
1 x	UPS		Triton series, Model according to your order;
2 x	Keys		Keys for the locking system on the front panel;
1 x	Manual		Operating Manual – English v. 2.0;
1 x	RS232-Kabel		Interface connection between UPS and PC;
1 x	Power Shut Plus		Software package: Power Shut Plus CD-ROM network-compatible shutdown and diagnosis software 1 license for Windows/Novell 1 license for UNIX, LINUX, MAC 1 license for RCCMD (network remote client);

15. Optional accessories

The components, devices and/or equipment listed below are accessories that fit the Triton series and that have been tested and approved by EFFEKTA Regeltechnik GmbH.

15.1 External accumulator bank

Each UPS-system needs an energy storage system in order to supply the loads with this stored power during a power failure. In this, external accumulator cabinets can either be used as the sole energy storage or as a supplement to an internal accumulator bank to extend the autonomous period and/or adjust the necessary load balance.

Due to the different requirements of customers, the accumulator cabinets are built and assembled individually. Additionally, some standard sizes are offered.

Please contact our sales and service points to develop a suitable accumulator bank concept for your needs.

The Triton series is already prepared for the adaptation of an external accumulator bank.

15.2 Communication adapter SNMP

The SNMP adapter integrates the UPS into a network and communicates via TCP/IP, Telnet or FTP. After assigning an individual IP-address, the UPS can be accessed from any location, which is of particular interest for the remote administration and maintenance of the equipment.

Fig. 15-1 SNMP adapter to connect the UPS to a network.

The SNMP adapter can easily be slid into the adapter slot (INTELLIGENT SLOT) of the UPS and only has to be connected with a network cable.

For additional information about this product and the associate software please contact our sales and service points.

15.3 Communication adapter relay card (DRY CONTACT) Article Nr. ZBBKSBRELTHORX00

The relay card also belongs to the intelligent extension card and is used for the direct and floating coupling with external controls and/or machines. This allows for the UPS status to be transmitted to higher-level controls in real time.

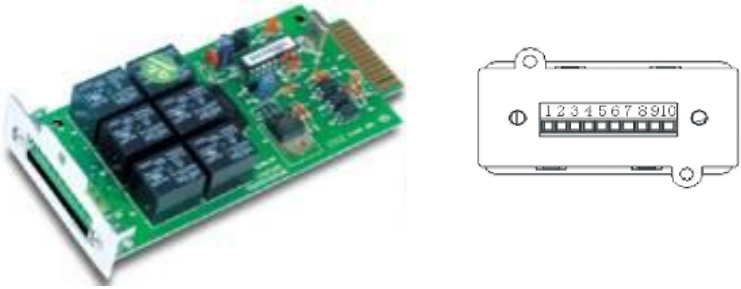


Fig. 15-2 Relay card for real-time monitoring of the UPS.

The following signals are available for the monitoring and control:

Function:	Connection type:
Mains failure	output
Accumulator bank voltage low	output
By-pass mode	output
UPS error	output
Inverter mode	output
UPS common alarm	output
Remote trigger: SHUT DOWN	input

All inputs and outputs have protective insulation or are floating. The relay card can easily be slid into the adapter slot (INTELLIGENT SLOT) of the UPS and must be connected with a higher control unit via a signal cable.

For details about this connection please see chapter 0

This connection is only available for the system variations 30 – 80 kVA

Connection of relay contact extension card (DRY CONTACT) in this manual.

For additional information about this product please contact our sales and service points.

15.4 External by-pass

An external by-pass system allows the operation of the loads in two different paths. In UPS operating mode (Fig. 15-3) the UPS system is integrated into the current path and the loads are protected in the usual manner. In by-pass mode (Fig. 15-4), the loads are directly connected to the mains power supply and the UPS input and output are isolated.

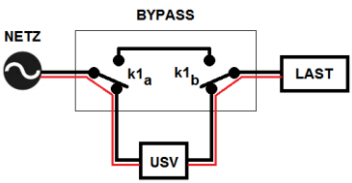


Fig. 15-3 UPS mode

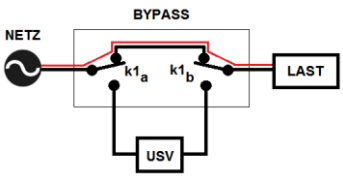


Fig. 15-4 By-pass mode

In this case, maintenance and service tasks of the UPS or the accumulator bank can be performed faster and safer.
it is also possible to replace the UPS or its components in exceptional cases and without shutting down the loads.

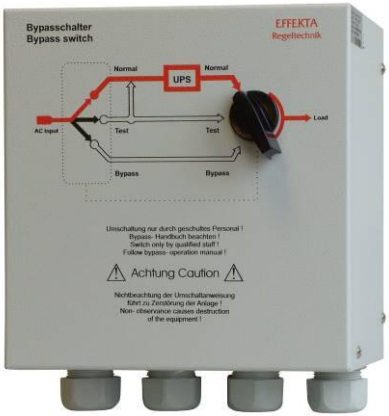


Fig. 15-5 Example presentation of an external by-pass.

In addition, using an external by-pass results in a more cost efficient and more manageable installation of the UPS system.

16. Wear parts

The components listed below can show regular wear and are excluded from the warranty for this UPS.

Wear part	Function	Article number
XXXX XX XX ** accumulator (BATTERY) 12 V xx Ah	Energy storage	Depending on assembly!

** Please check your accumulator delivery documents for the name and identification of the accumulators or contact the service hotline.

17. Declaration of conformity

All units labeled with a CE symbol fulfill the EU harmonized standards and regulations.

The EU declaration of conformity for this product is available upon request. Please contact our ⇨ 10 Service hotline

You can also find the declaration of conformity for this product on our website:

http://www.effekta.com

EFFEKTA®

EFFEKTA Regeltechnik GmbH

Rheinwaldstraße 34
D – 78628 Rottweil